MICHIGAN STATE
UNIVERSITY

ELECTRONIC BIDDING

PUBLICLY BID AND ADVERTISED
SPECIFICATION FOR

Parking – Lot 61 – Spartan Stadium – West Side – Build Parking Lot

PROJECT NUMBER

CP23106

Wednesday, March 13, 2024

AT

MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN

Infrastructure Planning and Facilities
Planning, Design and Construction

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DIVISION 33 - UTILITIES

- 334000 STORM DRAINAGE

SCHEDULE OF DRAWINGS

Project Title: **Parking – Lot 61 – Spartan Stadium – West Side – Build Parking Lot**
Capital Project Number: **CP23106**
No. of Sheets: **20**

C000 Cover Sheet
EC100 Existing Conditions Plan
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C201 SESC Plan
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ADVERTISEMENT FOR BIDS

DATE: **March 16, 2024**

PROJECT TITLE: **Parking – Lot 61 – Spartan Stadium – West Side – Build Parking Lot**

PROJECT NUMBER: **CP23106**

for

MICHIGAN STATE UNIVERSITY

located at

EAST LANSING, MICHIGAN

OWNER: BOARD OF TRUSTEES
MICHIGAN STATE UNIVERSITY

ENGINEER/ARCHITECT: PLANNING, DESIGN AND CONSTRUCTION
Infrastructure Planning and Facilities
Michigan State University

DESIGN REPRESENTATIVE: **Caitlin Jackson** **PHONE: 231-357-4002**

PROJECT MANAGER: **Andy Linebaugh** **PHONE: 517-243-0029**

Beckett & Raeder, Inc.
535 West William St, Suite 101
Ann Arbor, MI **48103**

BID DUE DATE: Until **3:00 p.m.** on **Wednesday, April 10, 2024**, the Owner will receive bids for the work as set forth in the Bidding Documents at via the Owner's Oracle Primavera Unifier Bid Manager, at which time and place all proposals will be publicly opened. Bidders are responsible for properly registering for this process, and familiarizing themselves with the system and its requirements. Registration information can be found at https://ipf.msu.edu/construction/partners/prospective-partners.

Proposals are invited for the following work:
Proposal 1 – General Construction Work

This project involves construction of a bituminous parking lot, parking lot striping, and sidewalks south of the IM Sports West building and west of Spartan Stadium, including associated removal of existing site walls, pavements, utilities and landscape treatments. Work includes construction of a stormwater infiltration system and storm piping.

Publicly Bid and Advertised: This project is publicly bid and advertised.

The substantial construction completion date for the project, as set forth in the project manual and drawings is **August 16, 2024**. See applicable start date and interim completion dates in the General Requirements (Division One) – Part 1 Work Sequence section.

LIQUIDATED DAMAGES:
☐ Shall, or ☒ Shall not be assessed for Substantial Completion at:
$_____PER DAY

☐ Shall, or ☒ Shall not be assessed for Final Completion at:
$_____PER DAY

EXCLUSIONS FROM MUTUAL WAIVERS OF CONSEQUENTIAL DAMAGES:
DEFAULT IS NONE. (If exclusions apply, project team to insert applicable exclusions below).

The complete set of documents is also available for viewing through our new MSU Plan Room or via the MSU Planning, Design and Construction (PDC) web page at https://ipf.msu.edu/construction/partners/prospective-partners and then select “dedicated plan room”.

PLAN ROOMS

The Bidding documents are on file and may be examined at the following locations during regular business hours, Monday through Friday:

Builders Exchange of Lansing &
Central Michigan
1240 East Saginaw
Lansing, MI 48906

Dodge Data & Analytics
25330 Telegraph Road, Suite 350
Southfield, MI 48009

Dodge Data & Analytics
914 E. Vine Street
Kalamazoo, MI 49001

Dodge Data & Analytics
1311 South Linden Road, Suite B
Flint, MI 48532

Builders Exchange
P.O. Box 2031
Grand Rapids, MI 49501

Tri-City Builders & Traders Exchange
334 South Water
Saginaw, MI 48607

Construction Association of Michigan
43636 Woodward Avenue
P. O. Box 3204
Bloomfield Hills, MI 48302-3204

Builders Exchange
3431 East Kilgore
Kalamazoo, MI 49001

CNS Construction News Service
of West Michigan, Inc.
1793 R. W. Berends Dr. SW.
Wyoming, MI 49509-4993

MMSDC Michigan Minority Supplier
Development Council.
100 River Place STE 300
Detroit, MI 48207

Builders Exchange of NW MI, Inc.
1373 Barlow St. , Suite 4
Traverse City, MI 49686

Capital Imaging
2521 East Michigan Avenue
Lansing, MI 48912

A pre-bid site inspection will be held on **Thursday, March 28, 2024** at **1:30 p.m.**. All interested Contractors or Bidders are encouraged to attend. Interested parties should meet at the **Infrastructure Planning and Facilities, 1147 Chestnut Rd. – Rm. 11, East Lansing, MI 48824**. All Contractors submitting bids for the work will be held to have visited the site prior to submitting bids.

Each proposal shall be accompanied by a bid security as set forth in the Instructions to Bidders.

The Owner reserves the right to reject any or all proposals either in whole or in part and to waive any irregularities.

Withdrawal of any proposal is prohibited for a period of 120 days after the actual date of the opening thereof.

Performance and Labor and Material Bonds are required as set forth in the Instructions to Bidders.

All prospective Bidders, their Subcontractors and suppliers must be awardable by and in compliance with the directives and guidelines of the Contract Compliance Division of the Michigan Civil Rights Commission.

SUBCONTRACTING AND SUPPLIER DIVERSITY

The University makes a continuous effort to broaden its business relationships with Minority Business Enterprise (MBE) contractors, Women Business Enterprise (WBE) contractors, and small business concerns (including veteran-owned small business, service-disabled veteran owned small business, HUB Zone small business, and small disadvantaged business concerns certified by the U.S. Small Business Administration). For the purposes of this provision, suppliers are considered subcontractors. If third parties are needed to fulfill contractual obligations to the University, you are strongly encouraged to consider all qualified sources, including WBE, MBE, and small business subcontractors. For purposes of this paragraph, MBE is defined as a business enterprise of which more than 50% of the voting shares or interest in the business is owned, controlled, and operated by individuals who are members of a minority and with respect to which more than 50% of the net profit or loss attributable to the business accrues to shareholders who are members of a minority. WBE is defined as a business enterprise of which more than 50% of the voting shares or interest in the business is owned, controlled, and operated by women and with respect to which more than 50% of the net profit or loss attributable to the business accrues to the women shareholders.

The apparent Low Bidder shall, within 24 hours, after receipt of bids, provide the names of any MBE/WBE/small business subcontractors, description of work to be done by each, dollar value of work, and percentage of contract price. This information shall be included with the contract breakdown specified in Section 012000.1.4 of the specifications.

The Michigan State University Purchasing Department maintains a list of known Minority and Women Business Enterprises in the region for informational purposes. Bidders can obtain a copy of this list by calling (517) 355-0357. This list is not intended to be comprehensive. Similarly, it does not constitute an endorsement or certification of acceptability of the contractors and vendors included.

INSTRUCTION TO BIDDERS

ARTICLE 1

DEFINITIONS

1.1 Bidding Documents include the Advertisement or Invitation to Bid, Instruction to Bidders, the Bid Form, other sample bidding and Contract forms and the proposed Contract Documents including any Addenda issued prior to receipt of Bids.

1.2 All definitions set forth in ConsensusDocs 200- Standard Agreement and General Conditions Between Owner and Constructor (as modified by MSU) and in other Contract Documents are applicable to the Bidding Documents.

1.3 **Addenda** are written or graphic instruments, issued by the Architect prior to the receipt of Bids, which modify or interpret the Bidding Documents by addition, deletions, clarifications or corrections.

1.4 A **Bid** is a complete and properly signed proposal to do the Work or designated portion thereof, for the sums stipulated therein, supported by data called for by the Bidding Documents.

1.5 **Base Bid** is the sum stated in the Bid for which the Bidder offers to perform the Work described as the base, to which Work may be added or deducted for sums stated in Alternate Bids.

1.6 An **Alternate Bid** (or Alternate) is an amount stated in the Proposal to be added to or deducted from the amount of the Base Bid if the corresponding change in project scope or materials or methods of construction described in the Bidding Documents is accepted.

1.7 A **Unit Price** is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Contract Documents.

1.8 A **Bidder** is one who submits a Bid for a prime Contract with the Owner for the Work described in the proposed Contract Documents.

1.9 A **Sub-bidder** is one who submits a Bid to a Bidder for materials or labor for a portion of the Work.

1.10 **Bid Manager** is the Oracle Primavera Unifier Bid Manager application used the by the Owner to received competitive bids for this project.

ARTICLE 2

BIDDER'S REPRESENTATION

2.1 Each Bidder, by making his/her Bid, represents that:

2.1.1 They have read and understand the Bidding Documents and their Bid is made in accordance therewith.

2.1.2 They have visited the site and are familiar with the local conditions under which the Work is to be performed.

2.1.3 Their Bid is based upon the materials, systems and equipment described in the Bidding Documents, without exceptions.

ARTICLE 3

BIDDING DOCUMENTS

3.1 COPIES

3.1.1 Bidders may obtain complete sets of the Bidding Documents via the MSU PLANNING, DESIGN AND CONSTRUCTION web page at https://ipf.msu.edu/construction/partners/prospective-partners, or as outlined in the Advertisement for Bids, page AB-2.

3.1.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither the Owner nor the Architect assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.1.3 The Owner or Architect, in making copies of the Bidding Documents available on the above terms, does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant for any other use.

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

3.2.1 Bidders shall promptly notify the Architect of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding Documents or of the site and local conditions.

3.2.2 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to be received by the Architect at least fourteen days prior to the date for receipt of Bids.

3.2.3 Any interpretation, correction or change of the Bidding Documents will be made by Addendum. Interpretations, corrections or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

3.3 SUBSTITUTIONS

3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

3.3.2 No substitution will be considered unless written request for approval has been submitted by the Bidder and has been received by the Architect at least fourteen days prior to the date for receipt of Bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data, and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. It is the burden of the bidder proposing the substitution to establish its merits. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

3.3.3 If the Architect approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

3.4 ADDENDA

3.4.1 The Architect and Owner will endeavor to notify all known plan holders of addenda issued, but it is the Bidder’s responsibility to verify receipt of all addenda.

3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

3.4.3 Normally Addenda will not be issued later than five days prior to the date for receipt of Bids except an Addendum, if necessary, postponing the date for receipt of Bids or withdrawing the request for Bids.

3.4.4 Each Bidder shall ascertain prior to submitting their Bid that they have received all Addenda issued, and receipt of all Addenda shall be acknowledged on their bid.

ARTICLE 4

BIDDING PROCEDURE

4.1 FORM AND STYLE OF BIDS

4.1.1 Bids shall be submitted via the Bid Manager on the form specified.

4.1.2 All fields on the Bid Form shall be completed.

4.1.3 All requested Alternates shall be listed and quoted in the Bid Manager. Failure to quote a requested Alternate will be cause to reject the Bid.

4.1.3.1 If an alternate is added via Addendum, bidders will include by adding new line to bid form, clearly labeling ALTERNATE X(x being the number) or providing pricing on an attachment, also clearly labeling pricing for Alternate.

4.1.4 All requested Unit Prices shall be listed and quoted via attachment in the Bid Manager. Failure to quote a requested Unit Price will be cause to reject the Bid.

4.1.5 Acknowledge the receipt of the last Addendum on the Bid Form. By acknowledging this addendum, Bidder also acknowledges receipt of all prior consecutive addenda (e.g., acknowledging Addendum 3 also acknowledges Addendum 1 and 2).

4.1.6 Bidder shall make no additional stipulations on the Bid Form nor qualify its Bid in any manner.

4.1.7 By submitting a Bid via the Bid Manager, the Bidder has committed the offer to perform the Work. The Owner will rely on this document as properly signed by the Bidder. The Owner may rely on this commitment, including submitting a claim on the Bidder's Bid Bond if they fail to enter into a contract per the project manual.

4.2 BID SECURITY

4.2.1 Any base bid greater than $50,000 shall be accompanied by a Bid Security in the form of a bid bond made payable to the Board of Trustees, Michigan State University, in the amount of not less than five percent (5%) of the Base Bid, as a proposal guarantee, pledging that the Bidder will enter into a Contract with the Owner on the terms stated in its Bid, and will furnish bonds as described hereunder in Article 8 covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Bidder shall attach a scanned copy of the bid bond to the bid in Unifier Bid Manager.

As an alternative to a bid bond, Bidders may provide certified check, cashiers' check, or money order made payable to the Board of Trustees, Michigan State University, in the amount of not less than five percent (5%) of the Base Bid, to be delivered to MSU Infrastructure Planning and Facilities, 1147 Chestnut Road, Room 101, East Lansing, MI 48824. The proposal guarantee of Bidders under consideration will be returned immediately after approval of contracts by the Owner; those of all others will normally be returned upon request within 48 hours after bid opening.

Should the Bidder refuse to enter into a Contract, or fail to furnish such bonds within 30 days of notification of intent to award, the amount of the Bid Security shall be forfeited to the Owner as liquidated damages, not as penalty.

4.2.2 The bonding firm must be listed on the current U.S. Department of Treasury Circular 570, rated A- or better by Best, and be licensed to do business in the State of Michigan. The bonds are to be made out to "Michigan State University, Board of Trustees."

4.2.3 The Owner will have the right to retain the Bid Security of Bidders under consideration until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all Bids have been rejected.

4.3 SUBMISSION OF BIDS

4.3.1 Bids shall be completed prior to the time and date for receipt of Bids indicated in the Advertisement or Invitation to Bid, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids will not be considered.

4.3.2 Bidder shall assume full responsibility for timely delivery at location designated for receipt of Bids.

4.3.3 Oral, telephone, paper, or faxed Bids are invalid and will not receive consideration.

4.4 MODIFICATION OR WITHDRAWAL OF BID

4.4.1 A Bid may not be modified, withdrawn, or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and Bidder so agrees in submitting his/her Bid.

4.4.2 Prior to the time and date designated for receipt of Bids, Bids submitted early may be modified or withdrawn only by withdrawing current Bid, and resubmitting within the Bid Manager.

4.4.3 Bid security shall be in an amount sufficient for the Bid as modified or resubmitted.

4.5 BIDDER REGISTRATION

4.5.1 The Owner will only receive Bids via the Bid Manager, which requires prior registration and invitation. The Bidder is responsible to familiarize itself with this system and request access in a timely manner.

4.5.2 The Owner will endeavor to maintain a list of all interested bidders, and invite to all public bids. Bidders interested in being added to this list must register. Registration information can be found at https://ipf.msu.edu/construction/partners/prospective-partners.

4.5.3 Bidders are encouraged to continue to monitor projects via plan rooms and other advertising venues. They must express interest to bid on MSU projects by request at least 7 days prior to a bid opening. Owner takes no responsibility for inviting a bidder after that date.

ARTICLE 5

CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

5.1.1 Unless stated otherwise in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be opened publicly and will be read aloud. Opening will generally take place in MSU Infrastructure Planning and Facilities Building, 1147 Chestnut Road, East Lansing, Michigan 48824.

5.1.1.1 Unless stated otherwise in the Advertisement or Invitation to Bid, the Owner will endeavor to share bid results within 24 hours of opening.

5.1.1.2 The Owner will endeavor to stream the bid opening, and will share details in the bid invitation

5.2 REJECTION OF BIDS

5.2.1 The Owner shall have the right to reject any or all Bids.

5.3 ACCEPTANCE OF BID (AWARD)

5.3.1 The Owner shall have the right to waive any informality or irregularity in any Bid received.

5.3.2 If the University accepts any alternates, it will do so in the order representing the Owner's opinion of the best value to Michigan State University. The Owner shall be the sole judge of value. The low bidder will be determined on the basis of the sum of the base bid and the alternates accepted.

5.4 ACCEPTANCE OF CONTRACTOR AND SUBCONTRACTORS

5.4.1 Each portion of the Work shall be performed by an organization equipped and experienced to do the Work in each particular field, and no portion shall be reserved by the Contractor unless they are so equipped and experienced. Within 24 hours after the receipt of Bids, the successful Contractor shall submit a list of each Subcontractor proposed for each section of the Work. Subcontractors shall be satisfactory to the Owner. Unless authorized to the contrary in writing from the Owner, Subcontracts shall be awarded to the firms named in this list. Acceptance of the Bid does not imply approval of the Subcontractors subsequently named, but each Subcontractor shall be approved individually.

ARTICLE 6

QUALIFICATION OF CONTRACTORS

6.1 SUBMISSION OF QUALIFICATION STATEMENT

6.1.1 Bidders to whom award of a Contract is under consideration shall submit to the Architect upon his/her request, a properly executed Contractor's Qualification Statement, Consensus Docs 221 – Constructor's Statement of Qualifications for a Specific Project, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

6.2 NONDISCRIMINATION

6.2.1 In performing under this Contract, the Contractor agrees not to discriminate against any employee, or applicant for employment, with respect to hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height or weight, marital status or handicap. Subcontracts with each Subcontractor will contain a provision requiring nondiscrimination in employment, as herein specified. Any breach of this covenant may be regarded as a material breach of this Contract. The foregoing is included as a part of the University's institutional Affirmative Action/Equal Opportunity commitment.

6.3 APPROVED ASBESTOS ABATEMENT CONTRACTORS

6.3.1 The Department of Environmental Health and Safety (EHS) annually prequalifies asbestos abatement contractors to perform asbestos abatement work on Campus. Asbestos abatement work shall only be performed by one of the asbestos abatement contractors on the approved list. The current list is available from the PDC Project Representative, the Environmental Coordinator for EHS, and at https://ehs.msu.edu/enviro/asbestos/index.html.

ARTICLE 7

POST-BID INFORMATION

7.1 SUBMISSIONS

7.1.1 Unless waived by the Architect, the apparent low Bidder shall, within 24 hours after receipt of bids, submit the following information to the Architect:

7.1.1.1 A designation of the Work to be performed by the Bidder with their own forces.

7.1.1.2 The proprietary names and the suppliers of principal items or systems of material and equipment proposed for the Work.

7.1.1.3 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 each division and/or major subdivision, for the Owner’s approval.

7.1.1.4 The names of the MBE/WBE and a description of work to be done by each, dollar value of Work and percentage of Contract price.

7.1.1.5 List of representatives authorized to perform Unifier functions on behalf of the contractor using the Unifier New Company Request, available at Unifier System Vendor Information Form.

7.1.1.6 Certificate of Insurance demonstrating compliance with project requirements.

7.1.2 At the option of the Owner, the Bidder may be required to establish to the satisfaction of the Architect and the Owner the capability, reliability, and responsibility of the proposed Contractor and Subcontractors to furnish and perform the Work.

7.1.3 Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner and the Architect must 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.

ARTICLE 8

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

8.1 OWNER'S RIGHT TO REQUIRE BONDS

8.1.1 Each Bidder under a proposal in which the base bid exceeds $50,000, shall include the premiums for furnishing a Performance Bond and also Labor Material Bond, each in the full amount of the proposal sum as specified in the Owner / Constructor Agreement.

8.1.2 The bonding firm must be listed on the current U.S. Department of Treasury Circular 570, rated A- or better by Best, and be licensed to do business in the State of Michigan. The bonds are to be made out to "Michigan State University, Board of Trustees."

8.1.3 In assuming assigned Subcontractor by the successful Bidder for general building work as specified, each assigned Subcontractor for each Subcontract shall reimburse the General Contractor his/her proportionate share of the premiums for bonds.

8.2 TIME OF DELIVERY AND FORM OF BONDS AND INSURANCE

8.2.1 The Bidder shall deliver two (2) copies of the required bonds and insurance to the Owner not later than the date of execution of the Contract.

8.2.2 The Bidder shall require the Attorney-In-Fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his/her Power of Attorney.

ARTICLE 9

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

9.1 FORM TO BE USED

9.1.1 The Agreement for the Work will be governed by the project manual, and by the terms and conditions of ConsensusDocs 200- Standard Agreement and General Conditions Between Owner and Constructor (as modified by MSU).

9.1.3 If the project is over $250,000, the ConsensusDocs 200- Standard Agreement and General Conditions Between Owner and Constructor will be used and the terms and conditions of that Agreement will be formalized through the execution of a Contract Finalization Form.

ARTICLE 10

APPLICATION FOR PAYMENT

10.1 FORM TO BE USED

10.1.1 Applications for Payment shall be submitted in Unifier in accordance with the Pay Apps (Pay Applications) business process. Refer to the MSU IPF website for more information

ARTICLE 11

ELECTRONIC TRANSACTIONS

11.1 UNIFIER

11.1.1 The Owner reserves the right to require that any or all transactions and submissions be conducted and delivered electronically through Unifier, a web-based project management software system. Unifier functions on most popular web browsers. If the owner requires the use of Unifier, the owner will provide the necessary licenses for access into Unifier and the initial training necessary to use Unifier. Access to Unifier will be password restricted, and any proposal, acceptance, quote or other information submitted through Unifier through the use of a party's password shall be deemed to be the submission of such party and any proposal, acceptance, quote or other information in the submission shall be binding on such party as if such proposal, acceptance, quote or other information was in a writing signed by such party. Owner shall not be required to verify the validity of any such submission or inquire as to the authority of the user gaining access to Unifier through the use of a party's password. The following are the minimum Unifier user software and hardware requirements. It is the responsibility of the vendor to verify compatibility of their systems with Unifier. For more information, see Unifier System Vendor Information Form.

11.2 CONTRACT EXECUTION

11.2.1 The Owner may choose to accept a scanned signed contract, provided through Unifier, as acceptance of the agreement. The Owner will rely on this document as properly signed by the Constructor.

State of Michigan

WHPWRequest@michigan.gov

General Request No.: 544
Requestor:
Project Description:
Project Number:

Statewide County

Commercial Prevailing Wage Rates

GENERAL INFORMATION

Classification Name	Description	Straight Hourly	Time and a Half	Double Time	Overtime Provision
A Operator (0-6 months)	IBEW 876 & IBEW 17 - Teledata	$38.27	$52.09	$65.91	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	
A Operator (7-12 months)	IBEW 876 & IBEW 17 - Teledata	$40.95	$55.96	$70.96	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
A Operator (over 1 yr)	IBEW 876 & IBEW 17 - Teledata	$45.81	$62.97	$80.12	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	
B Operator (0-6 months)	IBEW 876 & IBEW 17 - Teledata	$34.25	$46.29	$58.33	H H H X x X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	
B Operator (over 6 months)	IBEW 876 & IBEW 17 - Teledata	$39.35	$53.65	$67.94	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Boilermaker					
Boilermaker	BO169	$72.47	$107.55	$142.63	H H H H H H H D Y
	Apprentice Rates:				
	1st Period	$53.53	$79.15	$104.75	
	2nd Period	$55.14	$81.56	$107.97	
	3rd Period	$56.73	$83.94	$111.15	
	4th Period	$58.31	$86.31	$114.31	
	5th Period	$59.85	$88.62	$117.39	
	6th Period	$63.03	$93.39	$123.75	
	7th Period	$66.17	$98.10	$130.03	
	8th Period	$69.32	$102.83	$136.33	
Bricklayer					
Brick Masonry, Stone Masonry, Artificial Masonry	BR2-31-BS	$53.52	$67.86	$82.19	H H H H H H H D N
	Apprentice Rates:				
	0-749 hours	$42.05	$50.65	$59.25	
	750-1,499 hours	$43.49	$52.81	$62.13	
	1,500-2,249 hours	$44.92	$54.95	$64.99	
	2,250-2,999 hours	$46.35	$57.10	$67.85	
	3,000-3,749 hours	$47.79	$59.26	$70.73	
	3,750-4,499	$49.22	$61.41	$73.59	
	4,500-5,249 hours	$50.65	$63.55	$76.45	
	5,250 hours	$52.09	$65.71	$79.33	
Pointing, Caulking and Cleaning	BR2-31-PCC	$53.52	$67.86	$82.19	H H H H H H H D N
	Apprentice Rates:				
	0-749 hours	$43.49	$52.81	$62.13	
	750-1,499 hours	$44.92	$54.95	$64.99	
	1,500- 2,249 hours	$46.35	$57.10	$67.85	
	2.250 -2,999 hours	$47.79	$59.26	$70.73	
	3,000-3,749 hours	$24.37	$36.56	$48.74	
	3,750-4,499 hours	$50.65	$63.55	$76.45	
	4,500 hours	$53.52	$67.85	$82.19	

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Cable spicer or COE foreman					
	IBEW 876 & IBEW 17 - Teledata	$42.53	$58.24	$73.94	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	
Cable spicer, Central Office Employee					
	IBEW 876 & IBEW 17 - Teledata	$40.71	$55.61	$70.51	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	
Carpenter					
Resilient floorlayer	CA1004FL	$49.49	$64.19	$78.89	X X H H H H H D N
	Apprentice Rates:				
	1st Year	$38.95	$48.46	$57.97	
	2nd Year	$40.31	$50.50	$60.69	
	3rd Year	$43.02	$54.57	$66.11	
	4th Year	$45.74	$58.65	$71.55	
Carpenter	CA1004L	$50.82	$65.79	$80.75	X X H H H H H D N
	Apprentice Rates:				
	1st Year	$41.84	$52.32	$62.79	
	2nd Year	$43.34	$54.57	$65.79	
	3rd Year	$46.33	$59.05	$71.77	
	4th Year	$49.32	$63.54	$77.75	

GENERAL INFORMATION

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Cell Tower Tech						
		IBEW 876 & IBEW 17 - Teledata	$38.78	$52.83	$66.87	H H H X X X X D Y
	Apprentice Rates:					
	Lineman (6th - 6 months)		$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)		$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)		$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)		$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)		$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)		$22.91	$30.85	$38.78	
Cement Mason						
Cement Mason		BR2-31-CM	$47.16	$60.76	$74.36	X H H H H H H D N
	Apprentice Rates:					
	0-749 hours		$37.64	$46.48	$55.32	
	750-1,499 hours		$39.00	$48.52	$58.04	
	1,500-2,249 hours		$40.36	$50.56	$60.76	
	2,250-2,999 hours		$41.72	$52.60	$63.48	
	3,000-3,749 hours		$43.08	$54.64	$66.20	
	3,750-4,499 hours		$44.44	$56.68	$68.92	
	4,500 hours		$47.16	$60.76	$74.36	
Cement Mason		CE514-L	$47.09	$61.77	$76.45	H H H H H H H D Y
	Apprentice Rates:					
	1st Year		$36.81	$46.35	$55.89	
	2nd Year		$39.75	$50.76	$61.77	
	3rd Year		$42.69	$55.17	$67.65	
Communication Technician						
		IBEW 876 & IBEW 17 - Roadway	$67.89	$98.24	$128.58	H H H H H H H D Y

GENERAL INFORMATION

Classification Name / Description			Straight Hourly	Time and a Half	Double Time	Overtime Provision
Drywall						
Drywall Taper and Finisher		PT-845-DF	$44.64	$58.17	$71.75	H H H H H H H D N
	Apprentice Rates:					
	1st level		$31.06	$37.80	$44.59	
	2nd level		$36.49	$45.95	$55.45	
	3rd level		$41.92	$54.09	$66.31	
Electrician						
Inside wireman		EC-252-IW	$77.98	$100.47	$122.96	H H D H D D D D N
	Apprentice Rates:					
	1st Period		$44.21	$51.51	$59.94	
	2nd Period		$50.44	$62.70	$74.95	
	3rd Period		$55.95	$69.44	$82.94	
	4th Period		$61.46	$77.21	$92.95	
	5th Period		$66.96	$84.95	$102.94	
	6th Period		$72.47	$92.71	$112.95	
Subdivision of county	Townships of Onondaga, Leslie, Stockbridge and Bunker Hill ONLY.					
Sound and Communications Installer Technician BICSI certified & 6,000 OJT Straight time Rate $54.32 Time and Half $73.16 Double Time $91.99		EC-252-SC	$51.10	$66.96	$83.79	H H D H D D D D N
	Apprentice Rates:					
	Period 1		$33.56	$40.49	$48.72	
	Period 2		$35.31	$43.02	$52.07	
	Period 3		$37.07	$45.56	$55.43	
	Period 4		$38.82	$48.11	$58.80	
	Period 5		$40.57	$50.63	$62.14	
	Period 6		$44.09	$55.70	$68.85	
	Period 7		$47.59	$60.76	$75.56	
	Period 8		$49.34	$63.29	$78.92	
	Technician BICSI certification & 6,000 OJT		$54.32	$73.16	$91.99	
Subdivision of county	Onondaga, Leslie, Stockbridge & Bunker Hill townships					

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Inside Wireman	EC-665-IW	$69.20	$89.45	$109.70	H H D H H H D D Y
Apprentice Rates:					
1st Period		$27.98	$36.52	$45.06	
2nd period		$30.12	$39.72	$49.34	
3rd Period		$34.37	$45.05	$55.73	
4th Period		$49.01	$62.90	$76.79	
5th Period		$51.14	$66.10	$81.05	
6th Period		$53.28	$69.31	$85.33	
Subdivision of county	Lansing, Meridian, Williamston, Locke, Delhi, Alaiedon, Wheatfield, Leroy, Aurelius, Vevay, Ingham, & White Oak townships				
Sound and Communication Journeyman a 4 day schedule of ten hours a day is allowed Monday thru Friday.	EC-665-SD	$66.56	$86.06	$105.56	H H D H H H D D Y
Apprentice Rates:					
1st period		$26.80	$35.03	$43.26	
2nd period		$28.86	$38.11	$47.37	
3rd period		$32.98	$43.26	$53.55	
4th period		$47.07	$60.45	$73.82	
5th period		$49.13	$63.53	$77.94	
6th period		$51.19	$66.63	$82.05	
Subdivision of county	Lansing, Meridian, Williamston, Locke, Delhi, Alaiedon, Wheatfield, Leroy, Aurelius, Vevay, Ingham and White Oak townships				
Elevator Constructor					
Elevator Constructor Mechanic	EL-85	$96.72		$152.57	D D D D D D D D Y
Apprentice Rates:					
1st year		$68.96		$99.68	
2nd year		$74.88		$111.18	
3rd year		$77.85		$116.95	
4th year		$84.65		$129.33	

GENERAL INFORMATION

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Equipment Operator (line truck & man lifts)						
		IBEW 876 & IBEW 17 - Teledata	$38.78	$52.83	$66.87	H H H X X X X D Y
	Apprentice Rates:					
	Lineman (6th - 6 months)		$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)		$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)		$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)		$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)		$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)		$22.91	$30.85	$38.78	
Fiber Optic Splicer						
		IBEW 876 & IBEW 17 - Roadway	$67.89	$98.24	$128.58	H H H H H H H D Y
Foreman						
		IBEW 876 & IBEW 17 - Roadway	$75.47	$109.61	$143.74	H H H H H H H D Y
In charge of three man crew		IBEW 876 & IBEW 17 - Teledata	$40.71	$55.61	$70.51	H H H X X X X D Y
	Apprentice Rates:					
	Lineman (6th - 6 months)		$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)		$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)		$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)		$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)		$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)		$22.91	$30.85	$38.78	
	Apprentice Rates:					
	Lineman (6th - 6 months)		$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)		$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)		$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)		$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)		$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)		$22.91	$30.85	$38.78	

GENERAL INFORMATION

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Glazier						
Glazier	4 tens allowed on consecutive days	GL-826	$49.84	$67.73	$85.62	H H H H H H H D Y
	Apprentice Rates:					
	1st level		$31.62	$40.40	$49.18	
	2nd level		$35.12	$45.66	$56.18	
	3rd Level		$40.38	$53.54	$66.70	
	4th level		$45.66	$61.46	$77.26	
Heat and Frost Insulator						
Spray Insulation		AS25S	$25.29	$36.51	$47.73	X X X H H H H H N
Heat and Frost Insulator and Asbestos Worker						
Heat and Frost Insulators and Asbestos Workers		AS47	$52.00	$68.89	$85.77	X X X H H H H D Y
	Apprentice Rates:					
	1st year		$26.38	$33.69	$40.99	
	2nd year		$30.15	$38.92	$47.68	
	3rd year		$33.92	$44.15	$54.37	
	4th year		$37.70	$49.39	$61.08	
	5th year		$41.48	$54.63	$67.78	
IBEW 252						
Installor Technician		EC-252-sc				H H H D N
	Apprentice Rates:					
	Period 1		$33.56	$40.49	$48.72	
	Period 2		$35.31	$43.02	$52.07	
	Period 3		$37.07	$45.56	$55.43	
	Period 4		$38.82	$48.11	$58.80	
	Period 5		$40.57	$50.63	$62.14	
	Period 6		$44.09	$55.70	$68.85	
	Period 7		$47.59	$60.76	$75.56	
	Period 8		$49.34	$63.29	$78.92	
	Technician BICSI certification & 6,000 OJT		$54.32	$73.16	$91.99	

Subdivision of county Onondaga, Leslie, Stockbridge & Bunker Hill townships

General Request #: 544
Requestor:
Project Description:
Project Number:
County: Ingham

GENERAL INFORMATION

Date Rendered: 2/22/2024

GENERAL INFORMATION

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Installer - Repairman						
		IBEW 876 & IBEW 17 - Teledata	$38.78	$52.83	$66.87	H H H X X X X D Y
	Apprentice Rates:					
	Lineman (6th - 6 months)		$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)		$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)		$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)		$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)		$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)		$22.91	$30.85	$38.78	
Ironworker						
Reinforced Iron Work		IR-25-RF	$69.51	$85.85	$102.19	H H D H H D D D N
	Apprentice Rates:					
	Level 8		$66.76	$82.48	$98.19	
	Level 7		$66.76	$82.48	$98.19	
	Level 1		$52.63	$64.23	$75.83	
	Level 2		$54.68	$66.77	$78.86	
	Level 3		$56.56	$68.98	$81.40	
	Level 4		$59.41	$72.65	$85.88	
	Level 5		$62.27	$76.32	$90.37	
	Level 6		$66.76	$82.48	$98.19	
Rigging Work		IR-25-RIG	$76.08	$92.93	$109.78	H H D H H H D D N
	Apprentice Rates:					
	Level 8		$69.43	$84.94	$100.45	
	Level 1		$51.75	$62.38	$73.01	
	Level 2		$52.56	$63.54	$74.52	
	Level 3		$54.83	$66.33	$77.83	
	Level 4		$57.51	$69.71	$81.91	
	Level 5		$60.60	$73.67	$86.74	
	Level 6		$63.27	$77.04	$90.80	
	Level 7		$66.35	$80.99	$95.62	

GENERAL INFORMATION

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Structural, ornamental, welder and pre-cast	If bad weather, Friday may be a make up day. If holiday celebrated on a Monday, 4 10s may be worked Tuesday thru Friday.	IR-25-STR	$76.21	$102.75	$129.29	H H D H H H D D Y
	Apprentice Rates:					
	Level 8		$69.43	$84.94	$100.45	
	Level 1		$51.25	$61.88	$72.51	
	Level 2		$52.56	$63.54	$74.52	
	Level 3		$54.83	$66.33	$77.83	
	Level 4		$57.51	$70.34	$83.17	
	Level 5		$60.60	$73.67	$86.74	
	Level 6		$63.27	$77.04	$90.80	
	Level 7		$66.35	$80.98	$95.62	
Journeyman Signal Technician		IBEW 876 & IBEW 17 - Roadway	$67.89	$98.24	$128.58	H H H H H H H D Y
Journeyman Specialist		IBEW 876 & IBEW 17 - Roadway	$76.98	$111.87	$146.76	H H H H H H H D Y
Labor Crew Foreman		IBEW 876 & IBEW 17 - Roadway	$61.86	$89.19	$116.52	H H H H H H H D Y
Laborer						
Journeyperson - building and heavy construction craft laborer, portable concrete mixer operator, air, electric or gasoline tool operator, hot dope carrier, tar kettle tender, gasoline vibrators, concrete gas buggies, concrete saw, signal person and top pe		L499L	$38.53	$51.20	$63.86	X X H H H H H D Y
	Apprentice Rates:					
	0-1,000 hours		$32.20	$41.70	$51.20	
	1,001-2,000 hours		$33.46	$43.60	$53.73	
	2,001-3,000 hours		$34.73	$45.50	$56.26	
	3,001-4,000 hours		$37.26	$49.30	$61.33	
Ground Burner		L499LG	$50.83	$66.15	$81.46	X X H H H H H D Y

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
High Burner	L499LH	$51.33	$66.90	$82.46	H H H H H H H D Y
Apprentice Rates:					
Laborer Road Class 1: asphalt shoveler or loader, yard man, fence erector tender, dumper, joint filling, form setting, form stripper, pavement reinforcing, waterproofing, seal coating, bridge painting, sandblasting, pressure grouting, RC equipment	MITA-RZ2-C1	$45.39	$58.38	$71.36	H H H H H H H D Y
Apprentice Rates:					
3,001-4,000 hours					
2,001-3,000 hours					
1,001-2,000 hours					
0-1,000 hours					
3,001-4,000 hours		$44.09	$56.42	$68.76	
2,001-3,000 hours		$41.49	$52.52	$63.56	
1,001-2,000 hours		$40.20	$50.59	$60.98	
0-1,000 hours		$38.90	$48.64	$58.38	
Laborer Road Class 2: mixer operator, air or electric tool operator, spreader, boxman, concreter paddler, power chain saw operator, paving patch truck dumper, tunnel mucker, concrete saw operator, dry pack macine and roto-mill grounds person	MITA-RZ2-C2	$45.59	$58.18	$71.26	H H H H H H H D Y
Apprentice Rates:					
3,001-4,000 hours		$44.28	$56.21	$68.64	
2,001-3,000 hours		$41.66	$52.28	$63.40	
1,001-2,000 hours		$40.36	$50.33	$60.80	
0-1,000 hours		$39.05	$48.36	$58.18	
Laborer Road Class 3: tunnel miner, finish tenders, guard rail builder, median barrier installer, earth retention barrier and wall installer, fence erector, bottom man, powder man, wagon drill and air track operator, curb and side rail setter	MITA-RZ2-C3	$45.43	$58.64	$71.84	H H H H H H H D Y
Apprentice Rates:					
3,001-4,000 hours		$44.11	$56.66	$69.20	
2,001-3,000 hours		$41.47	$52.70	$63.92	
1,001-2,000 hours		$40.15	$50.72	$61.28	
0-1,000 hours		$38.83	$48.74	$58.64	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Laborer Road Class 4: asphalt raker	MITA-RZ2-C4	$46.18	$59.56	$72.94	H H H H H H H D Y
Apprentice Rates:					
3,001-4,000 hours		$44.84	$57.55	$70.26	
2,001-3,000 hours		$42.17	$53.54	$64.92	
1,001-2,000 hours		$40.83	$51.54	$62.24	
0-1,000 hours		$39.49	$49.52	$59.56	
Laborer Road Class 5: pipe layers, oxy-gun	MITA-RZ2-C5	$46.05	$59.37	$72.68	H H H H H H H D Y
Apprentice Rates:					
3,001-4,000 hours		$44.72	$57.37	$70.02	
2,001-3,000 hours		$42.06	$53.38	$64.70	
1,001-2,000 hours		$40.72	$51.37	$62.02	
0-1,000 hours		$39.39	$49.38	$59.36	
Laborer Road Class 6: line form setter for curb or pavement, asphalt screed checker/screw man on asphalt paving machines	MITA-RZ2-C6	$46.39	$59.88	$73.36	H H H H H H H D Y
Apprentice Rates:					
3,001-4,000 hours		$45.04	$57.85	$70.66	
2,001-3,000 hours		$42.34	$53.80	$65.26	
1,001-2,000 hours		$41.00	$51.79	$62.58	
0-1,000 hours		$39.65	$49.76	$59.88	
Laborer Road Class 7: concrete specialist - including finishing and trowling, cast in place or precast by any method	MITA-RZ2-C7	$48.96	$63.73	$78.50	H H H H H H H D Y
Apprentice Rates:					
3,001-4,000 hours		$47.48	$61.51	$75.54	
2,001-3,000 hours		$44.53	$57.08	$69.64	
1,001-2,000 hours		$43.05	$54.86	$66.68	
0-1,000 hours		$41.58	$52.66	$63.74	
Asbestos & Lead Abatement Laborer 4 ten hour days @ straight time allowed Monday-Saturday, must be consecutive calendar days	MLDC	$50.60	$65.37	$80.13	H H H X X X X D Y
Apprentice Rates:					
Trainee 600 hours +1 year		$34.07			

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Laborer - Hazardous					
Class A Laborer - 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 feder	LHAZ-Z6-A	$38.53	$51.20	$63.86	H H H H H H H D Y
Apprentice Rates:					
0-1,000 work hours		$32.20	$41.70	$51.20	
1,001-2,000 work hours		$33.46	$47.09	$60.72	
2,001-3,000 work hours		$34.73	$45.50	$56.26	
3,001-4,000 work hours		$37.26	$49.29	$61.32	
Class B Laborer - 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-Z6-B	$39.53	$52.70	$65.86	H H H H H H H D Y
Apprentice Rates:					
0-1,000 work hours		$32.95	$42.82	$52.70	
1,001-2,000 work hours		$34.26	$44.79	$55.32	
2,001-3,000 work hours		$35.58	$46.77	$57.96	
3,001-4,000 work hours		$38.21	$50.72	$63.22	
Laborer - Landscape					
Class B1: Landscape Operator includes air, gas, and diesel equipment operator, lawn sprinkler installer,skidsteer, mini excavators, backhoe loaders, ride and walk behind trenchers, off road dump vehicle, articulated haulers, hydroseeder, wheel loaders	LLAN-Z1-A	$32.40	$42.43	$52.95	X X H X X X H D Y
Class B2: Skilled Landscape Laborer: small power tool operator, lawn sprinkler installers' tender, irrigation installers' tender, material mover	LLAN-Z1-B	$30.40	$39.93	$49.45	X X H X X X H D Y
Class B1: Landscape Operatior includes air, gas, and diesel equipment operator, lawn sprinkler installer,skidsteer, mini excavators, ride and walk behind trenchers, backhoe loaders, off road dump vehicle, articulated haulers, hydroseeder, wheel loaders	LLAN-Z2-A	$32.40	$42.96	$53.48	X X H X X X H D Y
Class B2: Skilled Landscape Laborer: small power tool operator, lawn sprinkler installers' tender, irrigation installers' tender material mover	LLAN-Z2-B	$30.40	$39.93	$49.45	X X H X X X H D Y
Class C: landscape laborer with 90 or more calendar days worked	LLAN-Z2-C	$24.66	$33.27	$41.87	H H H H H H H D N
Class D: Inexperienced landscape laborer - individual who has worked less than 90 calendar days	LLAN-Z2-D	$15.54	$23.31	$31.08	H H H H H H H D N

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
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	$38.97	$50.26	$61.54	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$32.85	$42.64	$52.43	
1,001-2,000 work hours		$33.97	$44.32	$54.67	
2,001-3,000 work hours		$35.08	$45.99	$56.89	
3,001-4,000 work hours		$37.31	$49.33	$61.35	
Class II - Manhole, headwall, catch basin builder, bricklayer tender, mortar man, material mixer, fence erector, and guard rail builder	LAUCT-Z2-2	$39.06	$50.39	$61.72	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$32.92	$42.75	$52.57	
1,001-2,000 work hours		$34.04	$44.43	$54.81	
2,001-3,000 work hours		$35.16	$46.11	$57.05	
3,001-4,000 work hours		$37.39	$49.45	$61.51	
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, con	LAUCT-Z2-3	$39.16	$50.54	$61.92	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$32.99	$42.85	$52.71	
1,001-2,000 work hours		$34.12	$44.55	$54.97	
2,001-3,000 work hours		$35.24	$46.23	$57.21	
3,001-4,000 work hours		$37.49	$49.60	$61.71	
Class IV - Tunnel, shaft and caisson mucker, bracer man, liner plate man, long haul dinky driver and well point man.	LAUCT-Z2-4	$39.58	$51.17	$62.76	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$33.11	$43.03	$52.95	
1,001-2,000 work hours		$34.25	$44.74	$55.23	
2,001-3,000 work hours		$35.38	$46.43	$57.49	
3,001-4,000 work hours		$37.64	$49.83	$62.01	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
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	$39.58	$51.17	$62.76	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$33.31	$43.33	$53.35	
1,001-2,000 work hours		$34.45	$45.04	$55.63	
2,001-3,000 work hours		$35.60	$46.77	$57.93	
3,001-4,000 work hours		$37.89	$50.20	$62.51	
Class VI - Dynamite man and powder man.	LAUCT-Z2-6	$39.34	$52.38	$65.41	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$33.54	$43.67	$53.81	
1,001-2,000 work hours		$34.70	$45.41	$56.13	
2,001-3,000 work hours		$35.86	$47.15	$58.45	
3,001-4,000 work hours		$38.18	$50.63	$63.09	
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	$32.16	$40.04	$47.92	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$27.75	$34.99	$42.23	
1,001-2,000 work hours		$28.52	$36.15	$43.77	
2,001-3,000 work hours		$29.29	$37.30	$45.31	
3,001-4,000 work hours		$30.84	$39.63	$48.41	
Laborer -Underground Open Cut, Class I					
Construction Laborer	LAUC-Z3-1	$36.91	$47.01	$57.10	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$31.39	$40.40	$49.41	
1,001-2,000 work hours		$32.38	$41.88	$51.39	
2,001-3,000 work hours		$33.38	$43.38	$53.39	
3,001-4,000 work hours		$35.37	$46.37	$57.37	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Laborer -Underground 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-Z3-2	$37.05	$47.22	$57.38	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$31.49	$40.55	$49.61	
1,001-2,000 work hours		$32.49	$42.05	$51.61	
2,001-3,000 work hours		$33.50	$43.56	$53.63	
3,001-4,000 work hours		$35.50	$46.56	$57.63	
Laborer -Underground 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	LAUC-Z3-3	$37.17	$47.40	$57.62	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$31.58	$40.68	$49.79	
1,001-2,000 work hous		$32.59	$42.20	$51.81	
2,001-3,000 work hours		$33.60	$43.72	$53.83	
3,001-4,000 work hours		$35.61	$46.73	$57.85	
Laborer -Underground Open Cut, Class IV					
Trench or excavating grade man.	LAUC-Z3-4	$37.22	$47.47	$57.72	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$31.62	$40.74	$49.87	
1,001-2,000 work hours		$32.63	$42.26	$51.89	
2,001-3,000 work hours		$33.64	$43.78	$53.91	
3,001-4,000 work hours		$35.66	$46.80	$57.95	
Laborer -Underground Open Cut, Class V					
Pipe Layer (including crock, metal pipe, multiplate or other conduits)	LAUC-Z3-5	$37.36	$47.68	$58.00	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$31.73	$40.91	$50.09	
1,001-2,000 work hours		$32.74	$42.42	$52.11	
2,001-3,000 work hours		$33.76	$43.96	$54.15	
3,001-4,000 work hours		$35.79	$47.00	$58.21	

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Laborer -Underground 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 & repair of water service pipe & appurtenances	LAUC-Z3-6	$34.66	$43.63	$52.60	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$29.70	$37.86	$46.03	
1,001-2,000 work hours		$30.58	$39.18	$47.79	
2,001-3,000 work hours		$31.46	$40.50	$49.55	
3,001-4,000 work hours		$33.23	$43.16	$53.09	
Laborer -Underground 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-Z3-7	$31.81	$39.36	$46.90	X X X X X X X D Y
Apprentice Rates:					
0-1,000 work hours		$27.56	$34.66	$41.75	
1,001-2,000 work hours		$28.30	$35.76	$43.23	
2,001-3,000 work hours		$29.04	$36.88	$44.71	
3,001-4,000 work hours		$30.52	$39.10	$47.67	
Landscape Laborer					
Class A: Irrigation Foremen and Construction Foremen.	LLAN-Z1-A	$34.62	$46.26	$57.89	x X H X X x H D Y H
Lanscape Laborer					
Class A: Irrigation Foremen and Construction Foremen.	LLAN-Z1	$34.62	$46.26	$57.89	X X H X X X X D Y
Subdivision of county Zones 1 & 2					
Lineman, Teledata Wireman					
	IBEW 876 & IBEW 17 - Teledata	$38.78	$52.83	$66.87	H H H X X X X D Y
Apprentice Rates:					
Lineman (6th - 6 months)		$35.61	$49.90	$64.18	
Lineman (5th - 6 months)		$33.06	$46.07	$59.08	
Lineman (4th - 6 months)		$30.53	$42.27	$54.02	
Lineman (3rd - 6 months)		$27.99	$38.47	$48.94	
Lineman (2nd - 6 months)		$25.45	$34.66	$43.86	
Lineman (1st - 6 months)		$22.91	$30.85	$38.78	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Operating Engineer					
Forklift, lull, extend-a-boom forkliftWork in excess of 12 per day M-F shall be paid at double time.	EN-324-FL	$63.36	$79.81	$96.25	X X X X D D D D Y
Class I - diver/wet tender, engineer, blaster, leverman	EN-324-Statewide	$82.82	$107.82	$132.82	x x X X X X X D N H
Class III - Deck equip. operator, maintenance of crane or excavator, tug/launch operator, loader/dozer on barge/deck machinery, truck-able tug, lead surveyor, ROV operator, AB deckhand, welder	EN-324-Statewide-III	$76.82	$98.82	$120.82	X X X X X X X D N
Class IV - Deck equipment operator, machineryman/fireman, off road trucks, deck hand, tug engineer, assistant tug operator, blaster helper, deck hand, jet machine, subsea plow, trencher, tug engineer	EN-324-Statewide-IV	$72.32	$92.07	$111.82	H X X X X X X D N x
Ind. Forklift/forktruck under 5,000 lb capacity power jacks/poer packs, composite crew only	EN-324-SW	$64.70	$81.75	$98.80	H H D H H H D D Y
Compressor or Welding MachineFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work not performed due to weather, Monday-Thursday may be scheduled on Friday.	EN-AC	$56.05	$69.32	$82.58	X X X X D D D D Y
Forklift or Straight Mast Four 10 hour days may be scheduled M-Th or T-F. Work not performed due to weather on M-Th may be scheduled on Friday	EN-F	$57.50	$71.40	$85.29	X X X X D D D D Y
Fireman or Oiler Four 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work not performed due to weather, Monday-Thursday may be scheduled on Friday.	EN-FO	$55.02	$67.84	$80.65	X X X X D D D D Y
Lull or Extend-a-Boom ForkliftFour 10 hour days may be scheduled M-Th or T-F. Work not performed due to weather on M-Th may be scheduled on Friday	en-l	$59.73	$77.09	$94.45	X X H H D D D D Y
Crane with main boom & jib 120' or longerFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Worked not performed due to weather, Monday-Thursday may be scheuled Friday	en-os120	$63.27	$82.40	$101.53	X X H H D D D D Y
Crane w/ main Boom & Jib 220' or longerFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work not performed due to weather, Monday-Thursday may be scheduled on Friday.	EN-OSA	$64.38	$84.07	$103.75	X X H H D D D D Y

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Crane w/ main Boom & Jib 300' or longerFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work unabled to be performed due to weather, Monday-Thursday may be scheduled on Friday.	EN-OSA3	$65.89	$86.33	$106.77	X X H H D D D D Y
Crane w/ main Boom & Jib 400' or longerFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work not performed due to weather, Monday-Thursday may be scheduled on Friday.	EN-OSA4	$78.46	$101.49	$124.52	X X X X X X X D Y
Crane with main boom and jib 140' or longerFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work unabled to be performed due to weather, Monday-Thursday may be scheduled on Friday.	EN-OSB	$64.09	$83.63	$103.17	X X H H D D D D Y
Regular Crane Operator, Job Mechanic, Concrete Pump with BoomFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work not performed due to weather, Monday-Thursday may be scheduled on Friday.	EN-RC	$66.04	$83.65	$101.26	X X X X D D D D Y
Apprentice Rates:					
0-999 hours		$51.13	$64.18	$77.22	
1,000-1,999 hours		$52.99	$66.96	$80.94	
2,000-2,999 hours		$54.86	$69.77	$84.68	
3,000-3,999 hours		$56.72	$72.56	$88.40	
4,000-4,999 hours		$58.59	$75.36	$92.14	
5,000-5,999 hours		$60.44	$78.15	$95.84	
Regular Engineer, Hydro Excavator & Remote Controlled Concrete BreakerFour 10 hour days may be scheduled Monday-Thursday or Tuesday-Friday. Work not performed due to weather, Monday-Thursday may be scheduled on Friday.	en-re	$65.07	$82.26	$99.44	X X X X D D D D Y
Apprentice Rates:					
5,000-5,999 hours		$63.09	$81.87	$100.64	
4,000-4,999 hours		$61.11	$78.90	$96.68	
3,000-3,999 hours		$59.13	$75.93	$92.72	
2,000-2,999 hours		$57.16	$72.97	$88.78	
1,000-1,999 hours		$55.19	$70.02	$84.84	
1-999 hours		$53.21	$67.02	$80.85	

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Journeyman - Class IV		OE-324-Statewide	$56.46	$70.09	$83.72	X X X X X X X D Y
	Apprentice Rates:					
	31-36 months		$62.01	$80.44	$98.88	
	25-30 months		$60.08	$77.54	$95.01	
	19-24 months		$58.13	$74.62	$91.13	
	13-18 months		$56.19	$71.72	$87.24	
	7-12 months		$54.25	$68.81	$83.36	
	0-6 months		$48.21	$59.76	$71.29	
	Apprentice Rates:					
	31-36 months		$62.01	$80.44	$98.88	
	25-30 months		$60.08	$77.54	$95.01	
	19-24 months		$58.13	$74.62	$91.13	
	13-18 months		$56.19	$71.72	$87.24	
	7-12 months		$54.25	$68.81	$83.36	
	0-6 months		$48.21	$59.76	$71.29	
	Apprentice Rates:					
	31-36 months		$62.01	$80.44	$98.88	
	25-30 months		$60.08	$77.54	$95.01	
	19-24 months		$58.13	$74.62	$91.13	
	13-18 months		$56.19	$71.72	$87.24	
	7-12 months		$54.25	$68.81	$83.36	
	0-6 months		$48.21	$59.76	$71.29	
	Apprentice Rates:					
	31-36 months		$62.01	$80.44	$98.88	
	25-30 months		$60.08	$77.54	$95.01	
	19-24 months		$58.13	$74.62	$91.13	
	13-18 months		$56.19	$71.72	$87.24	
	7-12 months		$54.25	$68.81	$83.36	
	0-6 months		$48.21	$59.76	$71.29	

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Apprentice Rates:					
31-36 months		$62.01	$80.44	$98.88	
25-30 months		$60.08	$77.54	$95.01	
19-24 months		$58.13	$74.62	$91.13	
13-18 months		$56.19	$71.72	$87.24	
7-12 months		$54.25	$68.81	$83.36	
0-6 months		$48.21	$59.76	$71.29	
Operating Engineer - Marine Construction					
Diver/Wet Tender/Tender/Rov Pilot/Rov Tender	GLF D	$52.81	$78.57	$104.32	H H H H H H H D N
Diver/Wet Tender, Engineer (hydraulic dredge)	GLF-1	$78.97	$102.47	$125.97	X X H H H H H D Y
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	$77.47	$100.22	$122.97	X X H H H H H D Y
Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters					
Friction, Lattice Boom or Crane License Certification30	GLF-2B	$78.97	$102.47	$125.97	X X H H H H H D Y
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	$72.92	$93.40	$113.87	X X H H H H H D Y
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	$66.72	$84.10	$101.47	X X H H H H H D Y
Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters					
Operating Engineer Steel Work					
Extended boom forklift over 5,000 lb capacity, 1 Drum Hoist	EN-324-ef	$69.61	$88.88	$108.15	H H D H H H D D Y
Crane w/ 120' boom or longer	EN-324-SW120	$74.14	$95.24	$116.33	H H D H H H D D Y
Crane w/ 120' boom or longer w/ Oiler	EN-324-SW120-O	$75.01	$96.54	$118.07	H H D H H H D D Y
Crane w/ 140' boom or longer	EN-324-SW140	$75.19	$96.80	$118.41	H H D H H H D D Y

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Crane w/ 140' boom or longer W/ Oiler	EN-324-SW140-O	$76.19	$98.24	$120.28	H H D H H H D D Y
Boom & Jib 220' or longer	EN-324-SW220	$76.46	$98.62	$120.78	H H D H H H D D Y
Crane w/ 220' boom or longer w/ Oiler	EN-324-SW220-O	$74.01	$95.11	$116.20	H H D H H H D D Y
Boom & Jib 300' or longer	EN-324-SW300	$76.96	$99.34	$121.72	H H D H H H D D Y
Crane w/ 300' boom or longer w/ Oiler	EN-324-SW300-O	$77.96	$100.78	$123.59	H H D H H H D D Y
Boom & Jib 400' or longer	EN-324-SW400	$78.46	$101.49	$124.52	H H D H H H D D Y
Crane w/ 400' boom or longer w/ Oiler	EN-324-SW400-O	$79.46	$102.93	$126.39	H H D H H H D D Y
Crane Operator, Job Mechanic, 3 Drum Hoist & Excavator	EN-324-SWCO	$73.65	$94.59	$115.53	H H D H H H D D Y
Apprentice Rates:					
0-999 hours		$59.16	$76.02	$92.88	
1,000-1,999 hours		$61.56	$79.63	$97.68	
2,000-2,999 hours		$63.96	$83.22	$102.48	
3,000-3,999 hours		$66.38	$84.18	$101.98	
4,000-4,999 hours		$68.78	$90.46	$112.12	
5,000 hours		$71.20	$91.09	$110.99	
Crane Operator w/ Oiler	EN-324-SWCO-O	$74.65	$96.03	$117.40	H H D H H H D D Y
Compressor or Welder Operator	EN-324-SWCW	$37.03	$49.48	$61.92	H H D H H H D D Y
Hoisting Operator, 2 Drum Hoist, & Rubber Tire Backhoe	EN-324-SWHO	$73.01	$93.67	$114.33	H H D H H H D D Y
Oiler	EN-324-SWO	$53.42	$67.61	$81.80	H H D H H H D D Y
Tower Crane & Derrick where work is 50' or more	EN-324-SWTD50	$74.74	$96.16	$117.57	H H D H H H D D Y
Tower Crane & Derrick 50' or more w/ Oiler	EN-324-SWTD50-O	$75.84	$97.69	$119.54	H H D H H H D D Y

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Operating Engineer Underground					
Class I Equipment	EN-324A1-UC1	$66.39	$84.19	$101.98	X X X X X X X D Y
	Apprentice Rates:				
	0-999 hours	$52.76	$67.08	$81.41	
	1,000-1,999 hours	$54.80	$70.14	$85.49	
	2,000-2,999 hours	$56.85	$73.22	$89.59	
	3,000-3,999 hours	$58.90	$76.30	$93.69	
	4,000-4,999 hours	$60.94	$79.35	$97.77	
	5,000-5,999 hours	$62.99	$82.43	$101.87	
Class I Equipment - Backfiller Tamper, Backhoe, Batch Plant Operator, Clamshell, Concrete Paver 2 drums or larger, Conveyor Loader Euclid type, Crane (crawler, truck type or pile driving), Dozer, Dragline, Elevating Grader, endloader, gradall, grader, hyd	EN-324A2-UC1	$65.17	$82.61	$100.05	X X X X X X X D Y
	Apprentice Rates:				
	0-999 hours	$49.19	$61.74	$74.29	
	1,000-1,999 hours	$50.99	$64.44	$77.89	
	2,000-2,999 hours	$52.78	$67.12	$81.47	
	3,000-3,999 hours	$54.58	$69.82	$85.07	
	4,000-4,999 hours	$56.37	$72.51	$88.65	
	5,000-5,999 hours	$58.16	$75.19	$92.23	
Class II Equipment - Boom Truck, Crusher, Hoist, Pump 6 inch discharge or larger, side boom tractor, Tractor (pneu-tired other than backhoe or front end loader), Trencher 8 ft. digging capcity and smaller, Vac Truck	EN-324A2-UC2	$60.42	$75.80	$91.17	X X X X X X X D Y
Class III Equipment - Air Compressors 600 cfm or larger, Air Compressors 2 or more less than 600 dfm, Boom Truck non-swinging non-powered type boom, Concrete Breaker self-propelled or truck mounted, Concrete paver 1 drum 1/2 yd. or larger, Elevator other	EN-324A2-UC3	$59.59	$74.61	$89.62	X X X X X X X D Y
Class IV Equipment - Boiler, Concrete Saw 40 hp or over, curing machine self propelled, end dumps, extend a boom forklift, farm tractor with attachment, finishing machine concrete, firemen, hydraulic pipe pushing machine, mulching equipment, oiler, pumps	EN-324A2-UC4	$58.93	$73.66	$88.38	X X X X X X X D Y

GENERAL INFORMATION

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Painter						
Painter	A 4-10s workweek allowed Monday-Thursday.	PT-845-BR	$40.09	$52.29	$64.49	H H H H H H H D Y
	Apprentice Rates:					
	1st level		$27.89	$33.99	$40.09	
	2nd level		$30.33	$37.65	$44.97	
	3rd level		$33.99	$43.14	$52.29	
	4th level		$37.65	$48.63	$59.61	
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	$28.20	$38.20	$48.19	H H H H H H H H N
Tap cutter/CCTV Tech/Grout Equipment Operator: unit driver and operator of CCTV; grouting equipment and tap cutting equipment		TM247-2	$32.70	$44.95	$57.19	H H H H H H H H N
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	$31.45	$43.07	$54.69	H H H H H H H H N
Boiler Operator: unit driver and operator of steam/water heater units and all ancillary equipment associated		TM247-4	$33.20	$45.70	$58.19	H H H H H H H H N
Combo Unit driver & Jetter-Vac Operator		TM247-5	$33.20	$45.70	$58.19	H H H H H H H H N
Pipe Bursting & Slip-lining Equipment Operator		TM247-6	$34.20	$47.20	$60.19	H H H H H H H H N
Plasterer						
Plasterer		CE514-P-L	$45.00	$59.93	$74.85	H H H H H H H D N
	Apprentice Rates:					
	1st Year		$34.55	$44.25	$53.95	
	2nd Year		$37.54	$48.73	$59.93	
	3rd Year		$40.52	$53.21	$65.89	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Plumber & Pipefitter					
Plumber, Pipefitter and HVACTech Four 10s allowed Monday thru Thursday. Friday not a makeup, considered OT, paid @ time & one-half.	PL-333-RI	$63.77	$95.66	$127.54	H H H H H H H D Y
Apprentice Rates:					
1st 6 months		$41.61	$62.42	$83.22	
2nd 6 months		$43.62	$65.43	$87.24	
3rd 6 months		$45.64	$68.46	$91.28	
4th 6 months		$47.65	$71.48	$95.30	
5th 6 months		$49.67	$74.50	$99.34	
6th 6 months		$51.68	$77.52	$103.36	
7th 6 months		$53.70	$80.55	$107.40	
8th 6 months		$55.71	$83.56	$111.42	
9th 6 months		$57.73	$86.60	$115.46	
10th 6 months		$59.74	$89.61	$119.48	
Roofer					
Commercial Roofer 4 consecutive tens allowed M-TH5 consecutive nine hour days M-F also allowed, time over forty hours per/week shall be at OT. Sat makeup day	RO-70-Z2	$48.36	$63.20	$78.04	H X X X X X X D Y x
Apprentice Rates:					
1st Class		$32.77	$40.27	$47.77	
2nd Class		$34.88	$43.38	$51.88	
3rd Class		$36.77	$46.19	$55.60	
4th Class		$38.90	$49.36	$59.81	
5th Class		$41.05	$52.53	$64.00	
6th Class		$43.15	$55.62	$68.09	
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	$52.84	$69.23	$85.62	H H H H H H H D N
Apprentice Rates:					
0-6 months		$41.58	$54.66	$67.74	
6-12 months		$45.31	$60.26	$75.20	

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Class II-Operator of hot water heaters and circulation system; water jetters; and vacuum and mechanical debris removal systems and those assisting.	SR-II	$50.80	$68.49	$86.18	H H H H H H H D N
Sheet Metal Worker					
Sheet Metal Worker 4 10s allowed as consecutive days, M-Th or T-F	SHM-7-1	$56.87	$75.25	$93.62	H H H H D D D D Y
Apprentice Rates:					
First Year		$30.01	$39.20	$48.39	
Second Year		$36.34	$47.37	$58.39	
Third Year		$45.84	$58.70	$71.56	
Fourth Year		$49.52	$64.22	$78.92	
Sprinkler Fitter					
Sprinkler Fitter	SP 669	$60.34	$78.45	$96.56	H H H H H H H D Y
Apprentice Rates:					
Class 1		$24.57	$32.72	$40.87	
Class 2		$26.38	$35.43	$44.49	
Class 3		$39.14	$49.10	$59.06	
Class 4		$40.95	$51.82	$62.68	
Class 5		$43.01	$54.78	$66.55	
Class 6		$44.82	$57.49	$70.17	
Class 7		$46.63	$60.21	$73.79	
Class 8		$48.45	$62.94	$77.43	
Class 9		$50.26	$65.65	$81.05	
Class 10		$52.07	$68.37	$84.67	

GENERAL INFORMATION

Classification Name	Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Tile, Terrazzo and Mosaic Finisher						
Tile, Terrazzo and Mosaic Finisher		BR2-TF	$42.34	$54.17	$65.99	H H H H H H H D N
	Apprentice Rates:					
	1st Period		$35.25	$43.53	$51.81	
	2nd Period		$36.43	$45.30	$54.17	
	3rd Period		$37.61	$47.07	$56.53	
	4th Period		$38.79	$48.84	$58.89	
	5th Period		$39.97	$50.61	$61.25	
	6th Period		$41.16	$52.39	$63.63	
Tile, Terrazzo and Mosaic Setters						
Tile, Terrazzo and Mosaic Setters		BR2-Tile	$48.48	$62.11	$75.73	H H H H H H H D N
	Apprentice Rates:					
	1st Period		$40.31	$49.85	$59.39	
	2nd Period		$41.67	$51.89	$62.11	
	3rd Period		$43.03	$53.93	$64.83	
	4th Period		$44.39	$55.97	$67.55	
	5th Period		$45.75	$58.01	$70.27	
	6th Period		$47.12	$60.07	$73.01	
Tower Technician						
		IBEW 876 & IBEW 17 - Roadway	$67.89	$98.24	$128.58	H H H H H H H D Y
Truck Driver						
of all trucks of 8 cubic yd capacity or over		TM-RB2	$44.10	$48.81	$49.80	H H H H H H H H Y
of all trucks of 8 cubic yard capacity or less (except dump trucks of 8 cubic yard capacity or over, tandem axle trucks, transit mix and semis, euclid type equipment, double bottoms and low boys)		TM-RB2A	$44.00	$48.66	$49.60	H H H H H H H H Y
on euclid type equipment		TM-RB2B	$44.25	$49.04		H H H H H H H H Y

General Request #: 544
Requestor:
Project Description:
Project Number:
County: Ingham

Date Rendered: 2/22/2024

GENERAL INFORMATION

Classification Name / Description		Straight Hourly	Time and a Half	Double Time	Overtime Provision
Truck Driver / Groundman (less than a yr)	IBEW 876 & IBEW 17 - Teledata	$30.78	$41.29	$51.79	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	
Truck Driver / Groundman (over 1 yr)	IBEW 876 & IBEW 17 - Teledata	$37.40	$50.84	$64.27	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	
TV Terminator - Tech II	IBEW 876 & IBEW 17 - Teledata	$38.78	$52.83	$66.87	H H H X X X X D Y
	Apprentice Rates:				
	Lineman (6th - 6 months)	$35.61	$49.90	$64.18	
	Lineman (5th - 6 months)	$33.06	$46.07	$59.08	
	Lineman (4th - 6 months)	$30.53	$42.27	$54.02	
	Lineman (3rd - 6 months)	$27.99	$38.47	$48.94	
	Lineman (2nd - 6 months)	$25.45	$34.66	$43.86	
	Lineman (1st - 6 months)	$22.91	$30.85	$38.78	

STATE OF MICHIGAN

Wage and Hour Division
PO Box 30476
Lansing, MI 48909
517-284-7800

Informational Sheet: Prevailing Wages on State Funded Projects

REQUIREMENTS

Effective February 13, 2024

The purpose of establishing prevailing rates is to provide minimum rates of pay that must be paid to workers on construction projects that are financed or financially supported by the state Prevailing rates compiled from the rates contained in collectively bargained agreements which cover the locations of the state projects. While the prevailing wage rates are compiled through surveys of collectively bargained agreements, a collective bargaining agreement is not required for contractors to be on or be awarded state projects. The 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. The prevailing wage is satisfied when wages plus fringe benefits are equal to or greater than the required rate.

State of Michigan responsibilities:

- The department establishes the prevailing rate for each classification of construction mechanic requested by the contracting agents prior to contracts being let out for bid on a state project.

DTMB responsibilities

- 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 agents.
- 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.

Contractor responsibilities:

- 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. This record shall be available for reasonable inspection by DTMB or the department.
- Each contractor or subcontractor is 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.
- 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 prevailing wage project may file a complaint with the State of Michigan. 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 contractual requirements, the Contracting Agent may consider the Contractor to be in material breach of the contract and may terminate the contract for cause at the sole discretion. There are also civil penalties for failure to be in compliance with Act 10. View the entire text of Act 10 of 2023 at michigan.gov/wagehour.

STATE OF MICHIGAN

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 =	$.27
Dental insurance	$31.07 monthly premium X 12 mos. = $372.84 /2080 =	$.18
Vision insurance	$5.38 monthly premium X 12 mos. = $64.56/2080 =	$.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 =	$.16
Tuition	$500.00 annual cost/2080 =	$.24
Bonus	4 quarterly bonus/year x $250 = $1000.00/2080 =	$.48
401k Employer Contribution	$2000.00 total annual contribution/2080 =	$.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

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 *cannot* 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.

ENGINEERS - CLASSES OF EQUIPMENT LIST

UNDERGROUND ENGINEERS

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.

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.

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).

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.

HAZARDOUS WASTE ABATEMENT ENGINEERS

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.

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.

CARPENTER CRAFT JURISDICTION

Michigan recognizes the Carpenters for any and all work related to weatherization that has historically been the work of the Carpenter. This work shall include, but not be limited to: all work defined under the Federal Weatherization Assistance Program.

The jurisdiction of Carpenters, as to all work that has historically and traditionally been performed consisting of the milling, fashioning, joining, assembling, erecting, fastening or dismantling of all materials of wood, plastic, metal, fiber, cork, or composition and all other substitute materials, as well as the handling, cleaning, erecting, installing and dismantling of all machinery, equipment and all materials used by Carpenters.

The jurisdiction, therefore, extends over the following divisions and subdivisions of the trade: Carpenters and Joiners, Millwrights, Pile Drivers, Bridge, Dock and Wharf Carpenters, Underpinners, Timbermen, and Core-drillers, Shipwrights, Boat Builders, Ship- hand, Stair-Builders, Millmen, Wood and Resilient Floor Decorators, Floor Finishers, Carpet-layers, Shinglers, Siders, Insulators, Acoustic and Drywall Applicators, Sharers and House Movers, Loggers, Lumber and Sawmill Workers, Reed and Rattan Workers, Shingle Weavers, Casket and Coffin Makers, Railroad Carpenters and Car Builders, regardless of material used and all those engaged in the operation of woodworking or other machinery required in fashioning, milling or manufacturing of products used in the trade, and the handling, erecting and installing materials on any of the above divisions or sub-divisions, burning, welding and rigging incidental to the trade. When the term "Carpenter and Joiner" is used, it shall mean all the subdivisions of the trade. The trade autonomy of Carpenters therefore extends over the divisions and subdivisions of the trade, which are set forth as follows:

(a) The framing, erecting and prefabrication of roofs, partitions, floors and other parts of buildings of wood, metal, plastic or other substitutes; application of all metal flashing used for hips, valleys and chimneys; the erection of Stran Steel section or its equal. The building and setting of all forms and centers for brick and masonry. The fabrication and erection of all forms for concrete and decking, the dismantling of same (as per International Agreement) when they are to be re-used on the job or stored for re-use. The cutting and handling of all falsework for fireproofing and slabs. Where power is used in the setting or dismantling of forms, all signaling and handling shall be done by carpenters. The setting of templates for anchor bolts for structural members and for machinery, and the placing, leveling and bracing of these bolts. All framing in connection with the setting or metal columns. The setting of all bulkheads, footing forms and the setting of and fabrication of, screeds and stakes for concrete and mastic floors where the screed is notched or fitted, or made up of more than one member. The making of forms for concrete block, bulkheads, figures, posts, rails, balusters and ornaments, etc.

(b) The handling and erecting of rough material and drywall, the handling, assembly, setting and leveling of all fixtures, display cases, all furniture such as tables, chairs, desks, coat racks, etc., all de-mountable or moveable partitions such as Von wall, E Wall, Steel Case, Herman Miller, Haworth, American Seating, Westinghouse, Lazy Boy, rosewood, etc. All rebuilding, remodeling and setting up of all kinds of partitions, finished lumber, metal and plastic trim to be erected by Carpenters shall be handled from the truck or vehicle delivering same to the job by Carpenters.

CARPENTER CRAFT JURISDICTION

(c) The building and moving of all scaffolding runways and staging where carpenters' tools are used, the building from the ground up of all scaffolds over fourteen (14) feet in height including metal and specially designed scaffolding. The building and construction of all hoists and derricks made of wood; the making of mortar boards, boxes, trestles, all shoring, razing and moving of buildings. Lift type trucks are to be considered a tool of the trade. Metal siding and metal roofing fall within the scope of jurisdiction for the carpenters.

(d) The cutting or framing and fireproofing of the openings for pipes, conduits, ducts, etc., where they pass through floors, partitions, walls, roofs or fixtures composed in whole or in part of wood. The laying out of making and installation of all inserts and sleeves for pipes, ducts, etc., where carpenters' tools and knowledge are required. The making and installing of all wooden meter boards, crippling and backing for fixtures. The welding of studs and other fastenings to receive material being applied by carpenters.

(e) The installation of all grounds, furring or stripping, ceilings and sidewalks, application of all types of shingling and siding, etc.

(f) The installation of all interior and exterior trim or finish of wood, aluminum, kalamein, hollow or extruded metal, plastic, doors, transoms, thresholds, mullions and windows. The setting of jambs, bucks, window frames of wood or metal where braces or wedges are used. The installation of all wood, metal or other substitutes of casing, molding, chair rail, wainscoting, china closets, base of mop boards, wardrobes, metal partitions as per National Decisions or specific agreements, etc. The complete laying out, fabrication and erection of stairs. The making and erecting of all fixtures, cabinets, shelving, racks, louvers, etc. The mortising and application of all hardware in connection with our work. The sanding and refinishing of all wood, cork or composition floors to be sanded or scraped, filled, sized and buffed, either by hand or power machines. The assembling and setting of all seats in theaters, halls, churches, schools, auditorium, grandstands and other buildings. All bowling alley work.

(g) The manufacture, fabrication and installation of all screens, storm sash, storm doors and garage doors; the installation of wood, canvas, plastic or metal awnings or eye shades, door shelters, jalousies, etc. The laying of wood, wood block and wood composition in floors.

(h) The installation of all materials used in drywall construction, such as plasterboard, all types of asbestos boards, transite and other composition board. The application of all material which serves as base for acoustic tile, except plaster. All acoustical applications as per National Agreement or specific agreement.

(i) The building and dismantling of all barricades, hand rails, guard rails, partitions and temporary partitions. The erection and dismantling of all temporary housing on construction projects.

(j) The installation of rock wool, cork and other insulation material used for sound or weatherproofing. The removal of caulking and placing of staff bead and brick mold and all Oakum caulking, substitutes, etc., and all caulking in connection with carpentry work.

(k) The installation of all chalk boards/marker boards.

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(l) The operation of all hand operated winches used to raise wooden structures.

(m) The erection of porcelain enameled panels and siding.

(n) The unloading and distribution of all furnished, prefabricated and built-up sections such as door bucks, window frames, cupboards, cabinets, store fixtures, counters and show cases or comparably finished or prefabricated materials, to the job sites or points of installation as used in the construction, alteration and remodeling industry.

(o) The handling of doors, metal, wood or composite, partitions and other finished bulk materials used for trim from the point of delivery.

(p) All processing of these materials and handling after processing.

(q) The making up of panels and fitting them into walls, all bracing and securing, all removal of panels from the casting including all braces, whalers, hairpins, etc.

(r) The handling and setting of all metal pans and sections from the stock piles of reasonable distance as required by job needs shall be performed by carpenters. The stripping of such metal pans, panels or sections is to be performed by carpenters.

(s) The sharpening of all carpenter hand or power tools, or those used by carpenters.

(t). The layout, fabrication, assembling of and erection and dismantling of all displays made of wood, metal, plastic, composition board or any substitute material; the covering of same with any type of material, the crating and un-crating, the handling from the point of unloading and back to the point of loading of all displays and other materials or components.

(u) The same shall apply to all other necessary component parts used for display purposes such as turntables, platforms, identification towers and fixtures, regardless of how constructed, assembled or erected or dismantled.

(v) The make-up, handling, cutting and sewing of all materials used in buntings, flags, banners, decorative paper, fabrics and similar materials used in the display decorative industry for draperies and back drops. The decorative framing of trucks, trailers and autos used as floats or moving displays. The slatting of walls to hand fabrics and other decorative materials, drilling of all holes to accommodate such installations. Setting up and removal of booths constructed of steel or aluminum tubing as stanchions, railings, etc., handling and placing of furniture, appliances, etc., which are being used to complete the booth at the request of the exhibitor. Fabricating and application of leather, plastic and other like materials used for covering of booths. The handling of all materials, fabricating of same. The loading and unloading, erecting and assembling at the exhibit of show area, also in or out of storage when used in booth decorations.

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(w) A display shall be construed as any exhibit or medium of advertising, open to private or public showing, which is constructed of wood, metal, plastic or any other substitute to accomplish the objectives of advertising or displaying.

(x) Handling, fitting, draping, measuring and installation of fixtures and other hardwares for draperies, all manner of making, measuring, repairing, sizing, hanging and installation of necessary fixtures and hardware for shades and Venetian blinds.

(y) Work consisting of cutting and/or forming of all materials in preparation for installing of floors, walls and ceilings; the installation of all resilient floor and base; wall and ceiling materials to include cork, linoleum, prefabricated, laminated, rubber, asphalt, vinyl, metal, plastic, seamless floors and all other similar materials in sheet, interlocking liquid or tile form; the installation of all artificial turf, the installation, cutting and/or fitting of carpets; installation of padding, matting, linen crash and all preformed resilient floor coverings; the fitting of all devices for the attachment of carpet and other floor, wall and ceiling coverings; track sewing of carpets, drilling of holes for sockets and pins, putting in dowels and slats; and all metal trimmings used; the installation of all underlayments, sealants in preparation of floors, walls and ceilings, the unloading and handling of all materials to be installed and the removal of all materials in preparing floors when contracted for by the employer, shall be done only by employees covered under this Agreement.

(z) The installation of all sink-tops and cabinets, to include all metal trim and covering for same. All cork, linoleum, congo-wall, linewall, veos tile, plexiglass, vinawall tile, composition tile, plastic tile, aluminum tile and rubber in sheets or tile form and the application thereof. All bolta-wall and bolta-wall tile and similar products.

(aa) The handling and placing of all pictures and frames and the assembly of bed frames and accessories. The hanging and placing of all signage.

(bb) The installation of all framework partitions and trim materials for toilets and bathrooms made of wood, metal, plastics or composition materials; fastening of all wooden, plastic or composition cleats to iron or any other material for accessories.

(cc) The erection of cooling towers and tanks.

(dd) The setting, lining, leveling and bracing of all embedded plates, rails and angles. The setting of all stay in place forms.

(ee) Environmental: Clean room, any type of environmental chamber, walk in refrigerated coolers and all refrigerated rooms or buildings.

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PILE DRIVING AND CAISSON DRILLING

(ff) All unloading, handling, signaling and driving of piles, whether wood, steel, pipe, beam pile, composite, concrete or molded in place, wood and steel sheeting, cofferdam work, trestle work, dock work, floating derricks, caisson work, foundation work, bridge work, whether old or new, crib work, pipe line work and submarine work. Cutting of all wood, steel or concrete pile, whether by machine or hand; welding and cutting, peeling, and heading of all wood pile, steel sheeting and wood sheeting. The erecting and dismantling of all pile driving rigs, also derricks whether on land or water; also the moving, shoring and underpinning of all buildings. The loading and unloading of all derricks, cranes and pile driving materials. The tending, maintenance and operation of all valves pertaining to the operation of driving of pile. All diving and tending essential to the completion of jurisdictional claims.

All work done in the established yards of the Company and all work not enumerated above, shall be handled and manned as the Employer decides.

The pile driver will unload all material shipped in by rail from the point that the rail car is spotted.

All cleaning and preparation of all piling prior to driving.

The welding and attachment of all boot plates, pile points, splice plates, connectors, rock crosses, driving crosses, driving rigs, point reinforcements and overboots.

The construction, reconstruction, repair, alteration, demolition and partial or complete removal of all marine work including, but not limited to, docks, piers, wharves, quays, jetties, cribs, causeways, breakwaters, lighthouses and permanent buoys, etc. (mixing and placing of concrete excepted).

The driving and pulling of all wood, steel and concrete foundation piles and sheet piling.

The heading, pointing, splicing, cutting and welding of all piles.

The placing of all wales, bolts, studs, lagging, rods and washers including the cutting, drilling, boring or breaking of all holes or openings thereof.

The removal of all materials and/or obstructions of any nature (rip-rap included) that retard or interfere with the driving of piles or with the placing of wales, bolts and rods.

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This is to be subject to the discretion of the contractor who may choose to use blasting specialists or other demolition specialists.

The handling on the job of all materials used in the work.

The manning of all floating equipment (towing equipment excepted) engaged in the work enumerated, including deck engines, except machinery manned by Operating Engineers.

The placing of all rip-rap, fill stone, bedding stone, cover stone and concrete blocks in connection with marine construction. Work normally performed by Employers, such as soil tests, shoring, underpinning of buildings, cribbing, driving of sheet piling, marine divers, tenders, underwater construction workers and similar operations shall continue to be included in the jurisdiction of this Agreement.

All burning, cutting, welding and fabrication of pipe, H-beams, sheet pile (metal or wood), done on the job site or in the yard of the Employer shall be done by pile drivers. The driving of bearing piles, sheet piling with heavy equipment, caissons, pile caps, auger drilling and boring, the setting up for load testing for any type of piling, all layout and spotting for piling, caisson and boring work, all earth retention, ditch boarding, installing tiebacks.

ASBESTOS ABATEMENT CARPENTERS

(gg) All erection and maintenance of barriers and partitions used in the removing of asbestos or any abatement work. The abatement of any materials previously installed by the carpenter such as transite, ceiling and floor tiles. All operating and maintaining of current equipment used in any abatement work.

ELECTRICIAN – SOUND AND COMMUNICATION / DATA/ VOICE JURISDICTION

The installation, testing, service and maintenance, of systems which utilize the transmission and/or transference of voice, sound, vision or digital for commercial, education, security and entertainment purposes for the following: TV monitoring and surveillance, CATV and CCTV, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, radio page, school intercom and sound, burglar alarms, low voltage fire alarm systems, low voltage master clock systems, distributed antenna systems (DAS), IP data networks, and all surface-mounted (non-power) telecommunications wiremold. Shall additionally include the installation of all raceway systems of unlimited length in telecommunications rooms, entrance facilities, equipment rooms, and similar areas. Energy management systems. Security systems; perimeter, vibration, card access, access control and sonar/infrared monitoring equipment. Communications systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; SCADA (Supervisory Control and Data Acquisition), PCM (Pulse Code Modulation), Digital Data Systems, Broadband and Baseband and Carriers, POS (Point of Sale systems), VSAT Data Systems, RF and Remote Control Systems, Fiber Optic Data Systems and Voice and Data Infrastructure and Backbone.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Work Under This Contract

1. This Contract encompasses the furnishing of all labor, materials, services, equipment, and insurance to complete the following as shown on drawing and specified herein: Construction of a bituminous parking lot, parking lot striping, and sidewalks south of the IM Sports West building and west of Spartan Stadium, including associated removal of existing site walls, pavements, utilities and landscape treatments. Work includes construction of a stormwater infiltration system and storm piping.

2. Any premium time necessary to complete this project as scheduled, shall be included in the Base Bid.

3. All pertinent requirements of the Invitation to Bidders, Instructions to Bidders, and General Conditions shall form a part of these specifications and the Contractor shall consult them in detail for instructions pertaining to the work in the following divisions.

B. Work Performed Under Separate Contracts

1. The following will be provided by the Owner or by others under separate contracts:

a. Installation and electric service for future electric vehicle charging station

b. Footing construction, installation, and utility infrastructure for emergency phones

c. Parking lot and pedestrian lighting, including construction of light pole footings, installation of light poles, and electrical infrastructure

d. Regulatory signage installation

e. Subsoil scarification prior to topsoil placement

f. Placement of topsoil

g. Installation of landscape treatments including seeding, mulch, landscape edging, plantings, and trees

h. Tie-back, pruning, removal and/or transplanting of existing plantings

i. Smart Ball utility locators

j. As-built Site Survey

1) The Contractor shall notify the Project Representative when new underground utility installation starts, or when existing utilities are exposed, to allow the Project Representative to coordinate with IPF Facility Information Services for documentation.

2) The Project Representative shall coordinate with IPF Facility Information Services for an As-built Survey upon completion of exterior improvements and utilities.

2. Coordinate pickup of the following site-related, owner-provided materials from Beaumont Supply at 4080 Beaumont Rd., Lansing, MI 48910, phone: (517) 643-6253 (Hours of operation are May 1st – October 31st 6am-4pm Monday – Friday excluding university holidays. November 1st – up until the Thanksgiving Holiday 6am-230pm Monday -Friday and following Thanksgiving Holiday – April 30th 5am-130pm to accommodate for snow) Extended hours are available with a minimum 24-hour notice. Contractor is responsible for transporting materials to the jobsite.

a. Soil Erosion and Sedimentation Control (SESC) materials: (removed and retained by Owner at end of permit)

1) Erosion eels

b. Recycled concrete aggregate for parking bituminous pavement base (see section 321216)

C. Pre-Ordered Products

1. The Contractor shall assume full responsibility for all pre-ordered products after their arrival at MSU. This includes transportation, handling, storage, start-up, warranty services, and installation in accordance with the General Conditions unless otherwise specified.

D. Work Sequence

1. The Substantial construction completion date for this project is as specified in the Advertisement for Bids.

1.2 WORK RESTRICTIONS

A. Access Routes

1. All materials and equipment, including mechanical and electrical, shall be transported through a building via the designated building receiving area (usually the loading dock), and through main corridor to rooms or areas. Alternate routes may be used only with the approval of the Project Representative.

B. Owner Occupancy

1. Unless otherwise stated, University buildings will continue to function and remain occupied during the construction process.

2. On every project involving new construction, additions or alterations to existing facilities, M.S.U. requires the ability of a person with physical disabilities to independently get to, enter, and use the site, facility, building or element. In no way shall a site, building or facility be restricted to individuals with disabilities, due to alterations or construction, which would normally be made accessible to individuals with no disabilities. Alternate routes for all new and alterations of existing facilities shall incorporate the latest federal, state and local barrier free standards and include temporary access accommodations for individuals with disabilities.

C. Use of Site

1. There shall be a pre-construction site walk-thru with the Project Representative to clarify and discuss limitations and concerns prior to construction.

2. Construction fence

a. A construction fence shall be placed around the construction site as shown on the drawings and as approved by the Project Representative.

b. The Contractor is responsible for installing and maintaining the construction fence and gates to restrict access by the public to the area under construction. The Contractor may be required to reposition the fence and/or gate(s) during the course of construction to accommodate the construction activities in order to minimize the inconvenience to the public.

c. The fence shall be constructed of chain link fabric with a minimum height of 6', with metal or wood posts at not to exceed 8' spacing. Fence fabric shall be supported by either a top bar or tension cable. Gates (where specified) will be constructed of a suitable metal frame with chain link fabric with a height of not less than 6'. This fence shall be installed before work commences.

d. Metal signs reading "Construction Area - Keep Out" must be attached to the fence at not more than 20' spacing and to the gate(s).

e. Where any fence crosses an existing walk, drive, or road, a lighted MDOT Type 1 barricade or larger shall be attached to the inside of the fence facing on-coming pedestrian and/or vehicular traffic.

f. No construction work, parking, storage of materials or related activities shall occur beyond this boundary fencing.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 012000 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 PROPOSAL QUOTATION REQUIREMENTS

A. Projects to be bid will be quoted as required by the front-end documents on the specification.

1.2 ALLOWANCES

A. An allowance of $25,000 for subbase compaction testing, bituminous paving testing, and concrete testing as defined in section 310000 and elsewhere in this specification shall be included with the base bid.

1.3 UNIT PRICES

A. N/A.

1.4 CONTRACT BREAKDOWNS

A. Within twenty-four (24) hours after receipt of Bids, the apparent Low Bidder shall submit to the Architect/Engineer, the following:

1. A Schedule of Values (SOV), indicating the cost of each specified Division and/or Major Subdivision of the Bid. The approved SOV will be used as the basis for estimating partial payments to the Contractor when allowed per the front-end documents.

a. All contracts shall assign a minimum of 1% of the contract value for final completion and project closeout. This item must be identified as a separate line item labeled *Closeout* on the SOV. Exceptions must be approved by the Construction Superintendent.

b. Due to changes to Generally Accepted Accounting Practices, environmental remediation must be separately reported in the Owner's financial statements. Accordingly, all contracts shall carry remediation costs in separate lines clearly marked *remediation*. These titles should not be used in other line descriptions.

c. Construction Management contracts shall carry separate detail lines for at least the following lines:

i. Preconstruction Services
ii. Construction phase staffing
iii. General conditions
iv. Bonds and Insurance. Note that subcontractor bonds are not required to be separately listed.
v. Fee
vi. Closeout

2. Identify a Subcontractor for each Division and/or Major Subdivision for the Owner's approval. Once approved, no Subcontractors will be changed without the Owner's written consent. The List of Subcontractors will have indicated the MBE/WBE Contractors and their percentages of the Contract Price as specified in the "Cover Letter" or "Advertisement for Bids" of this project.

3. A list of representatives authorized to perform Unifier functions on behalf of the Contractor using the Unifier System - Vendor Information available at http://ipf.msu.edu/index.cfm/capital-project-procedures/documents/unifier-system-vendor-information/.

1.5 CONTRACT MODIFICATION PROCEDURES

A. Change Management Quotation Requirements

1. Quotations for changes in the Contract will be submitted via Unifier when requested, as outlined in Section 012000-1.5.B, Change Management Procedures. This section will not prohibit the Project Representative from requesting and receiving verbal quotations. It is intended that mutual cooperation will keep any changes to an absolute minimum. The Contractor shall promptly document any verbal request by initiating a Change Management or Change Request record in Unifier. The Contractor shall not engage in added work without proper authorization by the Owner. Any added work the Contractor engages in without authorization shall be at the Contractor's risk. In no event shall the failure of the Construction Representative to initiate a change constitute authorization for the Contractor to proceed with work.

2. The Change Order Quotation Format Form is available on the MSU Capital Project Delivery Procedures website (http://procedures.ipf.msu.edu/index.cfm/capital-project-delivery-procedures/). This Form shall be forwarded to each required Subcontractor, and is recommended as an outline of the information required by this Contract.

3. The Contractor will submit quotations through Unifier, including detailed breakdowns. Upon request, originals of any documents shall be provided to the Owner. The Project Representative will receive quotations from the Contractor only. Subcontractors will submit quotations through the Contractor. All Contractors will submit quotations with information and back-up data as indicated on the quotation form.

B. Change Management Procedures

1. Change Orders shall be issued as required to alter the Contract, (i.e. change the work scope, materials, dates, etc.), in accordance with the General Conditions of the Contract, and the following procedure:

   a. The Contractor or the Project Representative shall initiate a Change Request in the Unifier Project Management System. Each Change Request will consist of only one change item of work.

   b. Items brought up by the Department or Contractor shall be reviewed first with the

Project Representative.

c. The Architect/Engineer will review the Change Request, and with the Project Representative, will determine the need for an item to be changed in the Contract by Change Order.

d. If the Change Request is approved, the Contractor will receive a request through Unifier to proceed with the work and/or provide pricing, as applicable. Provide a quotation for the item requiring change, unless the Change Request is submitted as a lump sum with a quotation attached

e. The Contractor will submit a quotation for each Change Request item in accordance with the applicable Unifier business process. Overhead and profit shall be applied consistent with the General Conditions.

f. The Project Representative and Architect/Engineer will evaluate the quotations and accept or reject each item quoted. A Change Order will be created within the Unifier system and will be issued through the MSU Purchasing Department to change the contract amount if required.

g. The Construction Supervisor or Director of Planning, Design and Construction has approval authority for the Contract Change.

1.6 CONTRACT PAYMENT PROCEDURES

A. Payment application requirements
1. Payment applications shall be submitted in Unifier, consistent with the contract documents.

1.7 ALTERNATES

A. Add Alternate No. 1 – North Storm Spurs
1. Base Bid: Omit 66 lf of 12” CL IV RCP and bulkhead of pipe north from STR CB 120 and omit 66 LF of CL IV RCP and bulkhead of pipe north from STR CB 140 as shown on sheets C500 and C511.
2. Alternate: Construct 66 lf of 12” CL IV RCP from STR CB 120 and 66 LF of CL IV RCP from STR CB 140 and bulkhead pipes for future expansion as indicated on Drawings sheets C500 and C511.

B. Add Alternate No. 2 – Additional Stormwater Infiltration
1. Base Bid: Construct stormwater infiltration system consisting of eight (8) 12” perforated HDPE pipes and header pipe to STR MH 100 with eight cleanout structures and 2’ wide x 6” deep concrete band around cleanout structures as well as aggregate, non-woven geotextile, and backfill as shown on sheet C500 as well as stormwater detention system cross-section on sheet C700. Additional 27’ x 2’ x 6” concrete band around alternate cleanout structures to be parking area bituminous pavement.
2. Alternate: Construct stormwater infiltration system consisting of seventeen (17) 12” perforated HDPE pipes and header pipe to STR MH 100 with seventeen (17) cleanout

structures and 2’ wide x 6” deep concrete band around cleanout structures as well as aggregate, non-woven geotextile, and backfill as shown on C500 as well as stormwater detention system cross-section on C700.

PART 2 - PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT MANAGEMENT AND COORDINATION

A. Project Meetings

1. Project meetings may be called as deemed necessary by the Project Manager.

B. Project Scope Documentation

1. The Contractor shall use PlanGrid for coordination of changes in the field, punch list items, and potential use for plan review comments.

C. Project Coordination

1. The Contractor is ultimately responsible for coordination to complete all work shown on drawings and specified herein independent of the location of the work on drawings and within the specifications. The arrangement of work within the specification into Divisions and Sections shall be considered as given for convenience of reference only and shall not be held to conform to jurisdictional rules which may prevail in any particular trade. It shall be the responsibility of the Contractor to so arrange or group items of work under a particular trade to conform to the prevailing customs of that trade and best interest of the Owner. Specific items of work will be performed by specific subcontractors or workmen when so specified herein or subsequently deemed necessary by the Project Representative to produce competent results.

2. The Contractor shall lay out the work and be responsible for all lines and measurements of the work. Before ordering material or executing work the Contractor shall obtain field measurements and prepare the work to fit conditions properly.

3. The Contractor will be held responsible for any error resulting from his/her failure to verify the figures shown on the drawing before laying out the work.

4. No extra charge will be allowed on account of slight variations between field dimensions and dimensions given on the drawings.

D. Mechanical and Electrical Coordination

1. Connection to Existing Equipment

a. The Contractor shall make arrangements with Planning, Design and Construction, through the Project Representative, before connecting to existing facilities. Unless otherwise noted, if interruption of service is required it shall be done at the convenience of the Owner.

1.2 CONSTRUCTION PROGRESS DOCUMENTATION

A. Construction Schedule Development/Coordination Responsibilities.

1. A simple bar chart construction schedule shall be prepared by the Contractor an initially submitted to the Owner prior to or at the first Pre-Construction Meeting.

2. The Construction Schedule shall include without limitation, milestones, shop drawing submittals with time allowed for Owner approval, procurement and construction of all major items of work, depicted in weekly increments.

3. The Contractor shall submit updates to the Construction Schedule on no less than a monthly basis and shall submit updates with each Application for Payment, as required by paragraph 3.10 of the Conditions of the Contract.

4. The Contractor shall coordinate its work with the Owner and other Subcontractors and shall cooperate with other Subcontractors by utilizing orderly progress toward completion in accordance with the work scheduled.

1.3 MILESTONE SCHEDULE REQUIREMENTS

A. N/A

1.4 SUBMITTALS

A. Submittal Schedule

1. Concurrently with the development of the Contractor's Construction Schedule, the Contractor shall prepare a complete schedule of submittals. Submit the initial Submittal Schedule along with the Construction Schedule, at, or prior to, the Pre-Construction Conference.

a. Coordinate the Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products, as well as the Contractor's Construction Schedule.

b. Prepare the schedule in chronological order. Provide the following information:
- Scheduled date for the first submittal
- Related section number or specification number
- Submittal category (Shop Drawing, Product Data, Calculations, Test Results or Samples.
- Name of the subcontractor
- Scheduled date for resubmittal
- Scheduled date for completion of the A/E's review

2. Distribution: Following the Owner's response to the initial submittal, print and distribute copies to the Project representative, A/E, Owner, subcontractors, suppliers and other parties required to comply with the submittal dates indicated. Keep copies at the Project Site at all times.

a. When revisions are made, distribute to the same parties and post at the same locations. Delete parties for distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

3. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting, or as requested by the Project Representative.

B. Submittals are required for, but are not limited to, each of the following. The Contractor should refer to each of the following referenced sections for additional requirements of each submittal. All submittals are to be processed electronically using Unifier.

1. GENERAL SUBMITTALS
Section 012000 for Contract Breakdowns
Section 013000 for Safety Documentation
Section 017000 for FADE Log, if Reqd.

2. TECHNICAL SUBMITTALS
Section 024200 for Waste Management Plans, Waste Reduction Progress Reports, Waste Reduction Calculations, Records of Donations, Records of Sales, Recycling and Processing Facility Records, and Landfill and Incinerator Disposal Records.

Section 033010 for concrete product data and design mixtures.

Section 312300 for earthwork warranties.

Section 321216 for bituminous mix designs, quality control test reports, project documentation, and warranties.

Section 321313 for mix designs and concrete warranty.

Section 321613 for concrete curb test reports and warranties.

3. AS-BUILT DRAWINGS
As-built Drawings are required as specified in Section 017000.

3. OPERATION AND MAINTENANCE DATA
Operation and maintenance data is required as specified in Section 017000.

4. SHOP DRAWINGS
N/A

5. TEST AND BALANCE REPORTS
   Test and balance reports are required as specified in:

   Section 033010 Cast-in-Place Concrete for Sitework
   Section 312300 Earthwork
   Section 321216 Bituminous Pavement
   Section 321313 Concrete Pavement
   Section 321613 Concrete curbs and gutters

C. Shop Drawings and Samples

1. The Contractor shall review, stamp with their approval, and submit via the Unifier Submittal process to the Project Representative all Shop Drawings and Samples asked for in these specifications, or deemed necessary by the Architect/Engineer.

2. Work will not begin on any item requiring Shop Drawings or samples until the Contractor receives approval in writing from the Architect/Engineer. Any material or item, ordered or fabricated prior to final approval shall be at the Contractors' risk. No changes shall be made on the approved drawings or samples without the written consent of the Architect/Engineer. Each Shop Drawing or Sample shall be properly identified as to MSU project title and number, Contractor, item, etc., with cover sheet, stamp, tag, etc., so as not to be confused with any other. The Contractor shall direct specific attention with written explanation to any deviation from what is specified or shown on the drawing.

D. Samples

1. Samples shall be submitted as directed to provide a representative sample. Samples shall be physical examples, from the actual materials, to be used whenever practical. All packing and transportation charges on samples shall be paid by the Contractor.

2. A Submittal record shall be created in Unifier for each sample, indicating the manufacturer and specifications, and informing the Owner of the status of delivery of the physical sample. The physical sample will be retained by the Owner. The Submittal record will be returned to the Contractor with a review status by the Owner.

3. Approval of Samples shall be generally for quality, color, and finish, and shall not modify the requirements of any of the Contract Documents as to dimensions or design.

1.5 SPECIAL PROCEDURES

A. Constructor Safety Requirements

1. MIOSHA regulations apply to all university projects. Each constructor is responsible for ensuring compliance with “all applicable requirements” that govern their work, including any additional regulations, interpretations, clarifications, and consensus standards incorporated therein by reference.

2. MSU-specific safety requirements are published in the Constructor Safety Requirements Manual. The most current version of this manual is available at http://www.ehs.msu.edu/contractors. Constructors will be held to the version of the manual in effect at the time of contract execution.

3. Requirements specific to work at Michigan State University generally fall into one of two categories:

    a. Administrative Requirements, such as but not limited to communication, planning, documentation, submittals, notifications, reporting, and inspections.

    b. Safety Requirements unique to work at MSU, such as but not limited to Control of Hazardous Energy/Lock Out Tag Out, Confined Space, Electrical, Excavations, Fall Protection, Hot Work, etc.

4. Constructor shall submit a Site-Specific Safety Plan or work under an existing Area-Specific Safety Plan where allowed, as described in the MSU Contractor Safety Requirements Manual.

B. Hazardous Materials

1. If the Contractor suspects a material, preexisting or newly discovered, within the scope of this project to be a hazardous material such as, asbestos, lead, polychlorinated biphenyl or any other potentially hazardous material, that has not already been identified and/or in the scope of work for the Contractor to abate, notify the Project Representative immediately. Do not impact or disturb the material in question until it has been determined to either be non-hazardous, included in the original scope of work, or until other arrangements can be made with the project representative and the MSU Department of Environmental Health and Safety (EHS).

2. Due to the age of buildings on the Michigan State University campus, all coated surfaces shall be assumed to contain lead-based paint. This includes but is not limited to any type of paint, primer, coating, lacquer, or varnish on any building component. Proper precautions must be taken to ensure that workers and building occupants are not exposed to airborne lead concentrations at or above the OSHA Action Level (AL) of 30 ug/m3.

3. If work will be conducted on any coated surface at MSU, the contractor must submit to the Department of Environmental Health and Safety (EHS) and Infrastructure Planning and Facilities Project Representative current proof of appropriate detailed written lead work plan in accordance with 29 CFR § 1926.62 (Michigan Part 603). This submittal will include proof of training, written respirator program, and negative exposure assessments from projects with similar conditions at a minimum. Contractors performing work on campus must follow the provisions of the MSU Lead Management Program from EHS.

4. Any work that impacts Lead shall comply with the provisions of the MSU EHS Lead Management Plan.

5. Any work that impacts Asbestos shall comply with the provisions of the MSU EHS Asbestos Management Plan.

1.6 Requests for Information

A. Requests for Information (RFI's) shall be processed within PlanGrid, using the RFI business process in the IPF PlanGrid Standardization Guide. Failure to complete the tasks within the Plangrid time frames shall not be a basis for a delay claim.

PART 2 – PRODUCTS
Not Used

PART 3 – EXECUTION
Not Used

END OF SECTION

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 REGULATORY REQUIREMENTS

A. Applicable Codes, Standards, and Regulations

1. The following list of codes and regulations, establish the minimum requirements applied to work done at MSU. Where the specifications or plans, exceed the applicable code, the specifications and plans shall be followed.

a. NFPA National Fire Codes.
b. NFPA National Electrical Code.
c. ICC International Building Code.
d. ICC International Plumbing Code.
e. ICC International Mechanical Code.
f. State of Michigan Elevator Safety Act - Act 227, P.A. 1967.
g. State of Michigan Boiler Act - Act 290, P.A. 1965.
h. State of Michigan Construction Code Act - Act 230, P.A. 1972, as amended.
i. State of Michigan Occupational Safety and Health Act - Act 154, P.A. 1974, as amended.
j. Americans With Disabilities Act (ADA) Public Law 101-336.
k. Regulations of Air Pollution Control Commission State of Michigan, and the Federal Clean Air Act (42 U.S.C. 1857C - 8 © (1)).
l. Soil Erosion and Sedimentation Control - Act 451 of 1994, parts 31 and 91, as amended.
m. Environmental Impact Statement Executive Order 1974-4.
n. State Fire Safety Board's New Rules for Schools, Colleges, and Universities.
o. State of Michigan Safe Drinking Water Act, P.A. 339 of 1976, and Federal Water Pollution Control Act (33 U.S.G. 1319 ©).
p. State of Michigan Energy Code (Adopting ASHRAE 90 by reference).

1.2 REFERENCES

A. Abbreviations and Symbols

1. AIA - American Institute of Architects
2. ACI - American Concrete Institute
3. AISC - American Institute of Steel Construction
4. ANSI - American National Standards Institute
5. ASTM - American Society for Testing Materials
6. BOCA - Building Officials and Code Administrators
7. LEED - Leadership in Energy and Environmental Design
7. NFPA - National Fire Protection Association
8. OSHA - Occupational Safety and Health Act
9. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
10. MDOT - Michigan Department of Transportation

11. USGBC - U.S. Green Building Council

1.3 QUALITY CONTROL

A. Testing Laboratory Services

1. All work (materials and installation procedure) shall be tested and inspected by an independent testing and inspection agency, approved by the Project Representative to provide the quality control requirements in accordance with these specifications. Results of these tests and inspections when performed in accordance with these specifications will not be disputed by either party. Failure of the Contractor to provide quality control in accordance with this specification may result in the replacement of the work at the Contractor's expense.

B. Contractor's Responsibilities

1. Submit the name of the proposed testing and inspection agency(s) to the Project Representative for review and approval prior to contracting for such services.

2. Employ and pay the cost of independent testing and inspection as required in this specification. Pay applications from the testing/inspection agency shall be reviewed by the Owner before the Contractor's pay request for testing/inspection services is approved.

3. Advise the testing and inspection agency sufficiently in advance of the work to be inspected in the field to allow time to schedule personnel and equipment to perform the required inspections. Failure of the work to be inspected shall be the sole responsibility of the Contractor regardless of the fault of the testing and inspection agency.

4. Furnish certificates to authenticate the type and or quality of products furnished for installation as required in these specifications.

5. Shall notify the Project Representative in a timely manner when and where testing is to take place to provide sufficient time for the Project Representative to be in attendance.

C. Testing & Inspection Agency Responsibilities

1. Perform all testing and inspection of the work in accordance with these specifications.

2. Furnish qualified personnel and sufficient equipment in a timely manner when required by the Contractor and/or Project Representative to perform all testing and inspection in accordance with these specifications.

3. Provide written reports (2 copies) in a timely manner of the work tested and inspected. The reports shall include complete material test results and for in-place material, a sketch showing the exact location where the test was taken on the project site.

4. The inspection and testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirements of the Contract Documents, nor to approve or accept any portion of the work.

5. 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 Project Representative and Contractor to such non-conformance.

6. Quality control testing items shall include the following:

   a. Soil densities
   b. Proof roll
   c. Concrete testing
   d. Asphalt field testing (density and yield)
   e. Bituminous mix design approval and batch plant verification
   f. Asphalt plant mix verification
   g. Verify pavement sections
   h. Determine need for and extent of sub-grade undercutting and testing

D. Authority of the Project Representative

1. May order additional tests and inspection beyond those required, if in their opinion, the subject work may not meet specification. The costs for these tests and inspections shall be borne by the Contractor.

2. May terminate the testing and inspection agency. The Contractor shall then furnish to the Project Representative the name of an additional agency for approval.

3. May perform quality control tests and inspections.

PART 2 - PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1- GENERAL

1.1 TEMPORARY UTILITIES

A. General

1. The Contractor for the general construction work shall be responsible for all items specified in Section 015000. The Contractor shall install and maintain all items until project is finished and shall remove same and restore areas to their original conditions.

B. Temporary Electricity

1. The Contractor may use any permanent electrical outlets in the construction area.

2. Construction lighting shall be turned off during unoccupied periods, with the exception of lighting required for safety reasons such as path of egress.

3. Temporary service for heavy loads, or where no other service is available, will be provided by the general Contractor at the Contractor's expense. Power for temporary service connected to public utility company lines, (before an MSU service meter) will be paid for by the Contractor. Power for temporary service connected to the MSU power system, or after an MSU service meter, will be furnished by the Owner at no charge.

4. The contractor shall install temporary lighting within the construction area consistent with MIOSHA requirements.

C. Temporary Heat

1. All equipment and labor for temporary heat shall be furnished by the Contractor. Use of University utilities for temporary heat will be at the discretion of the Owner. The cost of natural gas or steam for heating new structures or other applications requiring temporary heat will be paid by the Contractor.

D. Temporary Telephone Service

1. If there is no University phone at the immediate work site, the Contractor shall provide a temporary job site telephone and/or provide the Job Superintendent with a phone activated paging device or cell phone.

E. Temporary Water

1. Each Contractor may use water for construction purposes from the nearest University source.

F. Temporary Sanitary Facilities

1. A toilet in the work area may be used by the Contractor's employees.

2. Where there is no toilet in the work area, an approved chemical type portable toilet will be provided by the Contractor.

1.2 VEHICULAR ACCESS AND PARKING

A. Parking Regulations

1. Unless otherwise directed, all non-University personnel working on the Campus of Michigan State University are required to park as Visitors. Between 7:00 a.m. and 6:00 p.m., Monday through Friday, Visitors may park only in metered parking spaces or gate controlled parking lots.

2. Commercial permits are available from the Department of Police and Public Safety (355-8440), which will allow parking in specific areas. The cost of a commercial permit is the responsibility of the Contractor.

3. Permits for one day parking in areas reserved for university employees are available to Contractors or their personnel from the Department of Police and Public Safety at the current rate, with a signed note from the Project Representative.

4. Parking permits are not required for vehicles south of Mount Hope Road.

5. Remote parking for Contractor personnel is available in various lots on campus Please contact MSU DPPS Parking Office at 517-355-8440 for availability and cost per vehicle. Due to the limited number of faculty/staff parking spaces in the vicinity of the construction site, no general commercial permits will be issued.

1.3 TEMPORARY BARRIERS AND ENCLOSURES

A. General

1. The Contractor shall provide, install, and maintain necessary temporary barriers, warning signs, and other safety measures to protect the public, property, and plant growth.

2. The Contractor will be required to work within limitations imposed by the University Police and Public Safety Department with respect to vehicular and pedestrian traffic. When approved by the Owner, if it becomes necessary to occupy a traffic lane for **ANY** length of time, proper directional signs, flashers and barricades shall be provided at the Contractor's expense in accordance with the most recent edition of the Michigan Manual of Uniform Traffic Control Devices. The Contractor will replace if damaged or stolen, all barricades, flares, and night protection at Contractor's expense, all being considered as incidental to the work.

B. Dust Control

1. Temporary Partitions

a. The Contractor shall construct necessary temporary partitions to isolate the new work from the existing building.

b. Unless noted otherwise, construct partitions of 2" x 4" wood studs, 16" on center and heavy mil, fire retardant plastic sheeting securely attached so as to keep dust, dirt, and debris from spreading beyond the work area.

2. Return Air Openings

a. The Contractor shall block all return air openings in the work area so that dust will not carry into other areas of the building.

3. Site Dust

a. The General Contractor shall be responsible for eliminating airborne dust in the work area and staging area by application of appropriate mitigation measures, as approved by the Owner.

C. Security Measures

1. Temporary & Access Keying

a. The MSU Infrastructure Planning and Facilities Key Shop will furnish construction keys, and furnish and install construction cores for use during construction as deemed necessary by the Project Representative. The Contractor may pick up the construction keys at the Key Shop with the form, "Authorization for Construction Cores and Keys," completed and authorized by the Project Representative.

b. All construction keys and facility keys issued to a Contractor for a particular project will be returned to the Project Representative before final payment will be processed. If keys are not returned, the Contractor may be held responsible to pay for re-keying any and all affected facilities.

2. Campus Security and Access Control System

   a. When deemed necessary by the Project Representative, temporary security access cards will be issued to the Contractor for building exterior doors, rooms, and/or spaces that are secured by the Campus Security and Access Control System.

   b. On construction projects where the security system is active and armed during construction the Contractor will be assessed a false alarm fee for any unauthorized entry of a secure space and/or setting off an alarm by propping open secured doors/windows, cutting into the security wiring, removing security devices, or any other action causing an alarm.

   c. The false alarm fees shall be as follows:

First occurrence	No assessed fee
Second occurrence	$500
Third and subsequent occurrences	$1,000 each

   d. The breaches of security and associated fees shall be assessed by project to the Contractor, not by sub-contractor, vendor, supplier, etc.

D. Campus Woody Plant Protection

1. Coordinate all plant protection and site work limits with the Project Representative. SITE WORK CANNOT COMMENCE WITHOUT A PRE-CONSTRUCTION WALK-THROUGH.

   All Contractor employees engaged on the project site shall attend, or are expected to have attended, the Contractor Woody Plant Protection Seminar, hosted by MSU's Landscape Services (formerly Grounds Maintenance) Division. This seminar will be presented on an annual basis at a minimum. Coordinate with the Project Representative for times and locations of the seminar(s).

2. Work by Owner

   a. Tie-back of existing plantings. Pruning, thinning, and sealing of existing plantings. Root pruning and root protection of exposed roots. Watering of existing trees under stress. Salvaging of existing small trees, shrubs, and other plant growth that the Owner wishes to retain.

   b. Tree protection barricades will be provided by the Owner. Plant damage occurring within installed barricades does not absolve the Contractor from damage assessment.

   c. Work shall be performed by MSU Landscape Services Department unless otherwise arranged, as needed to provide either preventative or remedial care to plants on a construction site. Contractor shall immediately contact the Project Representative should "protected plants" be compromised in violation of agreed

upon fencing locations and work limits. Failure to communicate promptly could result in 100% damage assessment of fines.

3. Protection of Plantings

a. Protect existing trees and other vegetation indicated to remain in place. Prohibited practices include breaking of branches, scraping of bark, or unauthorized cutting; nailing or bolting into trees or plants; use of trees or plants as temporary support (i.e. for cables); unauthorized filling, excavating, trenching or auguring within the root zone; compaction/driving over the root zone; (see definitions below), storage of any materials or vehicles within the root zone; dumping of construction waste or materials (including liquids); unauthorized removal or relocation of woody plants; removal of tree protection barricades or construction fencing prior to completion of project.

b. Compaction within the root zone is the increasing of the soil density caused by heavy equipment or concentrated foot traffic which significantly alters the soil conditions from that which was present prior to construction.

c. The root zone of a tree is one and a half the distance of plant crown drip line outward from the stem, along undisturbed grade. Should placement of concrete be specified or authorized by the Owner within the root zone, a sulfur application will be applied by the Owner. The Contractor shall notify the Owner at least 48 hours prior to pouring concrete. Trees to receive sulfur shall be identified by Owner.

4. Damage

a. Damage to campus woody plants shall include any of the items indicated in paragraph 2.a above as determined solely by the Owner. The Owner shall evaluate damage and establish proportional fines up to 100% of the value shown below, regardless of the current disposition of the plant.

b. 100% Value Schedule for Campus Trees

1" - 3" caliper	$200/inch
3" - 6" DBH	$290/inch
6" - 9" DBH	$380/inch
9" - 12" DBH	$480/inch
12" - 15" DBH	$670/inch
15" DBH or greater	$960/inch

c. DBH is the tree trunk diameter at breast height.

d. Replacement value for shrubs, vines, and perennials shall be assessed at three times the current market cost of the plant.

e. Alternatives to the above protective measures, or any variations, must be approved by the staff Landscape Architect and the Project Representative.

(Measures may include: thinning and root pruning, fertilization, aeration, boring & jacking, hand excavation, supervision by campus arborist, seasonal schedule recommendations.) Alternatives would be based on the specific requirements of the plant species in question, as determined by the staff Landscape Architect.

1.4 TEMPORARY CONTROLS

A. Soil Erosion and Sediment Control (SESC)

1. The Contractor shall comply with all Contract Documents, approved SESC plans, permit conditions and with Parts 31 and 91 of Public Act 451 of 1994. The Owner shall obtain a Soil Erosion and Sedimentation Control (SESC) permit from the appropriate Municipal (MEA) or County (CEA) Enforcing Agency. Permit Fees and MEA/CEA routine inspections will be paid for by the Owner.

2. Prior to beginning any earth change, the Contractor shall retain a DEQ Certified Storm Water Operator (CSWO) to provide the required SESC reports (which include the weekly and storm event reports as well as all follow up reports for both violations and storm event corrections) on the standard DEQ form. The Contractor shall provide the reports to the Owner on a weekly basis, and retain those reports for 3 years.

3. Prior to beginning any earth change, and during the life of the contract, the Contractor shall install and maintain all temporary SESC measures as shown on the Contract Documents, SESC plans, and as directed by the Owner, CSWO, DEQ, or MEA/CEA, until MSU officially takes over responsibility for the site.

4. Immediately prior to MSU taking responsibility for the site, the Contractor:
   a. Will be required to clean all catch basins affected by the construction, both within the Contract Limits and all surrounding roads and lawn areas when soil may have spread as the result of construction activities.
   b. Shall put all temporary SESC measures in satisfactory condition as determined by the CSWO.

5. All temporary SESC measures will remain in place and will become the property of the Owner when responsibility for maintaining the SESC measures becomes the Owner's responsibility.

6. The Contractor shall conduct all excavation, filling, grading and clean-up operations in a manner such that sediment generated by wind or water is not discharged off site or into any storm sewer, drainage ditch, river, lake, air or underground utility system. Stage the work per plan to minimize the area of exposed soil, thereby reducing the opportunity for soil erosion.

7. Water from trenches and other excavation shall be passed through an approved filtration bag to remove sediments from the water before it is released into the storm water drainage system.

8. If sediment extends beyond the project limits, the Contractor shall be responsible for cleanup and restoration of all surfaces and utility systems to the condition that existed prior to the Contract award.

9. All SESC measures shall be maintained daily.

10. Should violations (irrespective of a fine being assessed) be identified by the Owner, CSWO, MEA/CEA or DEQ, they shall be corrected within 24 hours of notification. The correction(s) shall be approved by the Owner, CSWO, MEA/CEA or DEQ. All subsequent inspections performed by the Owner, CSWO, MEA/CEA or DEQ as a result of the violation (and any other associated costs) will be paid by the Contractor. If identified violations are not corrected within 24 hours of written notice, the Owner shall have the right to make necessary repairs at the Contractor's expense, without being required to provide further notice to Contractor.

11. Fines assessed as a result of the violation for non-compliance of the SESC provisions, will be paid by the Contractor. If a "Stop Work" order for non-compliance is issued, a time extension request for that time period will **not** be granted. (Fines could be assessed up to and including $25,000/DAY for each violation.)

12. Only one Seven Day Notice will be issued for violations of the SESC provisions. Should subsequent violations be identified, the contractor will be expected to make the satisfactory correction within 24 hours of notification. Should the corrections not be made, the Owner, without further notice to the Contractor, will correct the violation. The cost of the corrective action will be charged to the Contractor.

1.5 CONSTRUCTION DEBRIS CONTROL

A. The Contractor shall provide and administer a system for disposal of construction debris, and shall be responsible for seeing that the site and the new building are at all times free of accumulated debris caused by the construction. For purposes of this paragraph, debris shall include ALL materials used in construction including construction roads and pads. Special attention should be given to materials that could leach into the ground, including but not limited to lime based materials, all chemicals, and any liquids except clean water.

B. The Contractor shall comply with LEED Materials & Resources Credit 2, including documentation of the Construction Waste materials recycled, reused and sent to the landfill, using the Construction Waste Management form and process provided by the Owner in Unifier. This form shall be submitted monthly, and will be generated from completed payment applications. Negative reports are required.

C. This shall include, but not be limited to, rubbish containers conveniently located throughout the site for the daily disposal of debris directly into them from each work location. Debris shall not be allowed to accumulate on the ground through-out the site overnight.

D. All combustible debris shall be removed to a solid waste disposal site properly licensed under Act 87 of the Public Acts of 1965 of the State of Michigan.

E. No burning of debris will be permitted on the Project site or elsewhere on the Owner's property.

F. Should the Contractor not execute the work required in this section, the Owner reserves the right to perform the work by other forces and deduct the cost from the contract price.

1.6 CONFINED SPACES

A. The workplace may contain permit confined spaces and entry is allowed only through compliance with a confined space program as defined by 29 CFR 1910.146. The contractor is responsible for assessing real or potential atmospheric hazards and other serious safety and health hazards in the confined space. MSU will make available records of known confined space hazards. The contractor shall provide all necessary equipment for confined space entry. If MSU personnel will be working in or near confined spaces occupied by the contractor, the contractor is required to coordinate activities with the Project Representative. The contractor will inform the Project Representative of procedures followed and hazards confronted or created during entry operations.

1.7 LOCK-OUT/TAG-OUT PROCEDURE

A. The Contractor shall conform to Michigan State University Infrastructure Planning and Facilities lock-out/tag-out procedure. Copies are available from Planning, Design and Construction, Infrastructure Planning and Facilities Building, Michigan State University.

1.8 FM RED TAG PERMIT MONITORING SYSTEM

A. When working on fire protection sprinkler systems the Contractor shall conform to the Factory Mutual Red Tag Permit Monitoring System modified by notifying the Project Representative in lieu of the Emergency Organization, Public Fire Department, and Factory Mutual. Documentation is available from Factory Mutual, (781) 255-4359.

1.9 FM HOT WORK PERMIT SYSTEM

A. For all hot work operations, the Contractor shall conform to the Factory Mutual Hot Work Permit System modified by notifying the Project Representative in lieu of the Fire Safety Supervisor and Factory Mutual. Documentation is available from Factory Mutual, (781) 255-4359.

1.10 HAZARDOUS SUBSTANCE SPILLS

A. Releases of hazardous substances that pose a significant threat to health and safety, or that, by their very nature, require more than a routine response, are emergency situations. If a release of an emergency nature occurs, call 911 immediately. Provide all applicable information and stay on the phone until told to hang up. If a non-emergency release of a hazardous substance occurs, contact the MSU Infrastructure Planning and Facilities Project Representative immediately.

1.11 ROOF PROTECTION

A. In the event a roof has to be used as a storage, work and/or walkway area, the following protective measures shall be employed.

1. The size and location of the storage, work or walkway areas shall be approved by the MSU Infrastructure Planning and Facilities Project Representative.

2. The storage, work or walkway area protection shall consist of a 1-inch layer of water resistant insulation such as EPS, and a layer of ½ inch plywood. Stagger the seams of the insulation and plywood; use plywood clips to prevent cupping.

3. The perimeter of the area shall be lined with barricades and warning tape to ensure that all traffic will stay on the protected areas.

1.12 CRANE HOISTING

A. Crane hoisting of equipment or materials over occupied spaces shall be performed at the convenience of the Owner, with arrangements made by the Project Representative.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Storage and Protection

1. The Contractor shall be responsible for work, material, and equipment until finally inspected, tested, and accepted. The project shall be protected against theft, injury, and damage. Material and equipment received on the site shall be carefully stored until installation.

B. Staging Area

1. Should the Contractor require exterior staging or on-site storage of materials - the location of this area must be agreed upon prior to actual use of the space by the Project Representative and the Contractor. The area will not be within the drip-line of any tree or in plant beds, as per Section 015000.1.3.D.3. A staging area is designated on the drawings.

2. If this exterior area is outside the fenced project site, the area shall be enclosed with a minimum 4' high welded wire fence, with metal fence T-posts not exceeding 8' on center. Fence fabric shall be supported by either a top bar or a tension cable.

3. The Contractor shall be responsible for the cost of placing and removing the fence.

4. Each designated area shall have only one access route from the road or drive.

5. The area is not to be used for employee parking, but may be utilized by the Contractors' vehicles and equipment necessary to service the project.

6. Any areas damaged as a result of the staging operation shall be repaired by the Contractor, at no additional cost to the Owner.

PART 2 - PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 017000 - EXECUTION REQUIREMENTS

PART 1- GENERAL

1.1 EXAMINATION

A. Pre-Bid Site Inspection

1. Each Bidder shall be held to have visited the site of the proposed work before submitting their proposal and to have familiarized themselves with all existing conditions affecting the execution of the work in this project. No allowance or extra consideration on behalf of the Contractor or Subcontractor will subsequently be made by reason of failure to observe the site conditions.

1.2 PREPARATION

A. Protection of Work and Property

1. Contractor shall protect existing and new work as required by this construction or as requested by the Project Representative.

2. Interior Protection

a. This will include, but not be limited to the wall, floor, and ceiling finishes to remain at the construction site, along the access route to the site, existing elevators, and other areas such as roofs and mechanical rooms where related work is specified or required.

3. Exterior Protection

a. The Contractor shall be responsible for any damage to existing facilities, including but not limited to the following: buildings, trees and shrubs, walks, roads, utility systems, terraces and steps, lights, and unreasonable turf damage as determined by the Project Representative. Damage shall be repaired by the Contractor in accordance with MSU's Construction Standards at no cost to the Owner.

b. No crawler cranes, bulldozers, or other equipment, fitted and running on steel treads, shall be permitted to traverse any walk, road, street, or other thoroughfare on the Campus of Michigan State University. Where it is necessary to unload such equipment on these thoroughfares, and when approved by the Project Representative, planking shall be provided to protect same. If this is not done, and damage is observed, the cost of replacing shall be the burden of the Contractor causing such damage.

c. Staging zones for materials and equipment shall be coordinated with Project Representative. They are to be placed on paved areas where possible. Set-up and storage areas shall be fenced with minimum 6-foot high pedestal-type chain link fencing. Locations shall be reviewed with the Department of Police and Public Safety and approved by the Project Representative.

d. Crane hoist dates shall be coordinated with Project Representative for sufficient notice to building users. Project Representative shall direct the notice to the building users and coordinate with DPPS.

e. Owner may provide temporary access-ways in turf or root zone areas, as determined in pre-construction walk-through. For heavy equipment on turf areas, Alturna mats or approved equal, must be utilized for travel and set-up zones.

f. All electric, telephone, and steam vaults and water valves shall be protected and remain accessible at all times. Heavy equipment shall not be run over the top of vaults or valve boxes, nor shall materials be stored over them.

g. Contractor shall provide lighted barricades if building entrances or pedestrian walks are closed after work hours or on the weekends.

h. Tree pruning, plant tie-back, and vine removal shall be done by the Owner, as coordinated with the Project Representative, and as noted in Section 015000.1.3.D.2.a. Trees or other plant material shall not be used as anchor points for any lines or equipment.

i. Plant protection as directed by the Project representative:

a. Minor work: Plants adjacent to, or below work zones are to be washed off daily. In no case shall masonry dust or other construction debris remain on plants for more than 24 hours.
b. Major work: Plants adjacent to, or below work zones are to be covered with breathable woven mesh tarp. Tarp shall be removed at the end of each day and debris disposed of. Debris and dust shall not be absorbed into soil.

B. Field Engineering

1. Quality Assurance

a. Surveyor

1. Engage a Registered Land Surveyor, registered in Michigan, to perform ALL project surveying, including construction layout, as outlined in Section 017000-1.2.B, "Field Engineering."

2. Submittals

a. Project Record Documents

1. Upon completion of Work requiring Field Engineering, submit a record of Work performed and record survey data as required in Section 017000-1.2.B.5.

2. Upon completion of Work requiring Field Engineering, submit a certificate signed by the Registered Land Surveyor, certifying the location and

elevation of improvements comply with the Contract Documents.

3. Control Points

   a. The Owner will identify existing control points and property line corner stakes.

   b. Verify layout information shown on the Drawings in relation to the property survey and existing benchmarks before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

   c. If a discrepancy between the contract drawings and the existing site is found, contact the Project Representative for a resolution BEFORE any actual layout of the work is begun.

   d. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.

   e. Promptly replace lost or destroyed control points. Base replacements on the original survey control points.

   f. Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.

   g. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

   h. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.

   i. Prior to construction, verify the location and invert elevation at points of connection to existing utilities.

4. Benchmarks and Markers

   a. Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do no scale Drawings to determine dimensions.

   b. Advise entities engaged in construction activities of marked lines and levels provided for their use.

   c. As construction proceeds, check every major element for line, level, and plumb.

5. Registered Land Surveyor's Log

   a. Maintain a surveyor's log of control and other survey Work. Make this log available for reference.

   b. Record deviations from required lines and levels, and **immediately** advise the Project Representative when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

   c. On completion of foundation walls, major site improvements, and other Work requiring field engineering, submit this log and associated Project Drawings to the Project Representative.

6. Existing Utilities

   a. Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in or affected by construction.

7. Site Improvements

   a. Locate and layout all site improvements including, but not limited to, pavements, structures, earthwork and utility locations and grades.

8. Structure Lines and Levels

   a. Locate and layout batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical Work.

1.3 EXECUTION

A. Cutting and Patching – Concrete and Masonry

1. The Contractor shall be responsible for any cutting, fitting, and patching that may be required to complete this project, except for core drilling required for mechanical and electrical installations, which shall be the responsibility of the Mechanical or Electrical Contractor.

2. The Contractor shall not endanger any work of any other Contractors by cutting, excavating, or otherwise altering any other work and shall not cut or alter the work of any other Contractor except with the written consent of the Architect/Engineer.

3. No cutting of structural members of the building, likely to impair its strength, shall be done without written approval from the Architect/Engineer.

4. To avoid damage to hidden utilities and structural re-enforcement any cutting or core drilling over one inch in diameter, through concrete floors and slabs will be x-

rayed/scanned by the contractor prior to cutting.

a. A qualified engineer will conduct an on-site assessment before any cutting or drilling of a pre-tensioned or post-tensioned component or other structural component of a building or structure commences. The assessment will be documented and provided to the person contracted to carry out the work.

b. If any load bearing member is cut, cored or removed all the requirements of 29 CFR 1926 Subpart T (LARA Part 20) shall apply. This will require notifications to the DEQ 10 working days before cutting begins. Emergency notifications are possible under specific conditions.

c. The responsible person for the project shall ensure substantial compliance with the requirements for exposure to Silica Dust. Substantial compliance will also be required for all other construction safety standards and published by the State of Michigan or Federal OSHA.

d. Work shall be conducted outside of the regular hours to avoid disturbing the building occupants. An exception to this rule will be granted only by the project manager and shall be in writing.

e. The MSU project representative or employee shall be responsible for locating all utilities in the area to be cut. This part of the job is mandatory and shall be given appropriate attention. Minimally the responsible person shall review all available prints and consider structural scanning. The MSU representative or employee shall take necessary steps to isolate and lock out any energy sources that may be jeopardized by the cut to protect worker safety and avoid equipment damage. In some cases, utilities will need to be cut and relocated to conduct the work. The responsible person shall take steps to notify repair persons in advance of the anticipated timing and scope of the repair project or the need for temporary services.

f. Responsible person shall inspect the area to ensure that no damage has occurred and that the area is cleaned to an acceptable level.

5. Cutting and Patching for Mechanical Work

a. The Mechanical Contractor shall be responsible for any core drilling required to complete their work.

b. The Mechanical Contractor shall be responsible for the accurate location of all openings necessary for the installation of the mechanical work. Any additional openings required to move their work due to an error in the initial layout and the repair of inaccurate openings, shall be made at the expense of the Mechanical Contractor.

B. Salvaging of Materials

1. Materials or equipment shown on drawing or specified herein to be removed, which are

not to be reused or salvaged, shall become the property of the Contractor and will be removed from University property and disposed of legally.

2. Salvage the following items to the locations as directed:

   a. Catch basin and/or manhole frames and covers

3. Deliver all fire alarm equipment removed from the job to the IPF Storage Building 210, 1457 Recycling Drive, East Lansing, MI.

4. Deliver all Best key cylinders to be removed from the job to the Key Shop in the Infrastructure Planning and Facilities Building, 1147 Chestnut Road, East Lansing, MI.

1.4 CLEANING UP

A. Cleaning up shall be in accordance with the General Conditions of the Contract.

B. No rubble, dust, or debris shall be allowed to accumulate or be transported throughout the building.

C. A thorough final cleaning of all of the adjacent streets, as specified by the Project Representative, will be required before final payment is made.

D. If the Contractor fails to clean up, the Owner may do so and the cost thereof shall be charged to the Contractor.

1.5 STARTING AND ADJUSTING

A. Refer to each Division for requirements.

1.6 CLOSEOUT PROCEDURES

A. In general, one or more walk-throughs will be performed with the Contractor and punch lists developed of items to be completed before the project can be closed out.

1.7 CLOSEOUT SUBMITTALS AND PROJECT DELIVERABLES

A. Operation and Maintenance Data

1. The Contractor shall provide operation and maintenance data as required in this specification, and submit the required information through use of the Unifier and PlanGrid systems.

2. Submittals for equipment and systems shall contain the manufacturer's information on installation, balancing, operating, maintenance, lubrication, and repair instructions and parts list for each component.

3. Please refer to MSU Document Submittal Standards and PlanGrid Standardization Guide.

B. As-Built Drawings

1. Submission of all As-built Drawings called for in this specification shall precede request for final payment.

2. The Contractor shall submit As-built Drawings in electronic (.pdf) format, that is not password protected, indicating any deviations from the Contract Drawings, including contract Change Orders. Upon request of the Owner, printed copies of the As-Built drawings shall be provided as well.

3. Provide any Building Information Model (BIM) data developed for this Project to the Project Representative.
4. Please refer to MSU Document Submittal Standards

C. Facility Asset Data Exchange (FADE) Log

1. The Constructor shall furnish all information as indicated on the FADE log spreadsheet. The University's FADE procedure and requirements for asset tracking and populating the log can be found at the following web addresses:

   FADE process during design phase:
   https://us.promapp.com/msu/Process/Minimode/Permalink/BrVwOrmhTRjBaJ5QaaOZKI

   FADE process during construction:
   https://us.promapp.com/msu/Process/Minimode/Permalink/BDKsT36upoGpxJeNiakDkW

   Should the Owner change the FADE process change in form or content, the Constructor is not relieved of fully executing the work required to compile the information and complete the Log.

D. Construction Safety Documentation

1. The Contractor shall provide written documentation of the following site safety information, as it pertains to the project only:

   a. List of all lost time accidents.
   b. Reportable incident rate (total hours worked).
   c. Details of many MIOSHA site visits, including resulting citations, violations, or actions.

E. Certificates of Inspection

1. The Contractor shall provide a copy of all Certificates of Inspection called for in this specification. Refer to Section 013000 Part 1.4.B.

F. Construction Waste Management – LEED Documentation

1. The Contractor shall provide written documentation of the Construction Waste Management program, as required for LEED Materials & Resources Credit 2. A form for this purpose is provided within this specification. Refer to Section 024200, Construction Waste Management.

G. Warranty

A. The Contractor shall provide a written guarantee stating that all work performed and material furnished is free from all defects in workmanship, and material for a period of one year, unless noted otherwise, after the equipment has been accepted by the Owner. Final payment or Certificate of Substantial Completion, whichever is issued first, shall constitute Owner acceptance.

B. Additional warranties are required for site concrete pavement (Section 321313), curb/gutter (Section 321613), and bituminous pavement (Section 321216).

H. Final payment

A. The contractor shall provide a sworn statement with final payment. The statement shall detail all subcontractors paid on the project and other information detailed in the link below:

https://api.gis.msu.edu/edms/file/{C500C6DD-E852-11ED-0000-76DDD13A85C5}

PART 2 - PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 024113– SITE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide labor, materials and equipment as necessary to complete work as indicated on the Drawings and specified herein.

B. This section includes the removal of existing structures, fences, pavements, and other items indicated on the Drawings or specified, or both.

C. Related sections include the following:
1. Division 01 Section "General Requirements – Temporary Facilities and Controls."
2. Division 31 Section "Site Clearing."
3. Division 31 Section "Earthwork."

1.3 PROJECT CONDITIONS

A. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the Project Representative. Provide alternate routes around closed or obstructed traffic ways if required.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 DEMOLITION OPERATIONS

A. At the direction of the Project Representative, certain items within the Project limits may be salvaged by the Contractor to the Owner. Salvaged materials or equipment will be indicated on the Drawings or specified. Salvaged items not indicated or noted to be reinstalled shall be delivered to designated location(s) on campus as directed by Project Representative.

B. Materials to be recycled shall be hauled from the project to Beaumont Landscape Supply, 4080 Beaumont Road, East Lansing MI 48824. Call (517) 884-4880 to coordinate drop-off time and location.

1. Items to be salvaged include, but are not limited to:
a. Post and chain fencing
b. Ornamental fencing and gates
c. Chain link fence
d. Catch basins and manhole frames and covers
e. Bike racks

f. Litter receptacles and ash urns
g. Light fixtures and poles
h. Face brick
i. Paver brick
j. Limestone cap
k. Steel and concrete bollards
l. Irrigation system components, including but not limited to valves, heads, and vacuum breakers

2. Materials to be recycled include, but are not limited to:
   a. Concrete material (pavement, curb and gutter, walls and footings)
   b. Bituminous pavement millings
   c. Topsoil
   d. Clean pavement base aggregate

C. The use of explosives is not permitted.

D. Conduct demolition operations and the removal of debris to ensure minimum interference with adjacent roads, streets, walks, and other facilities, operations and people.

E. Conduct operations to prevent damage by falling debris or other cause to adjacent buildings, structures, vegetation to be retained, and other facilities as well as persons.

F. Promptly repair damages caused to adjacent facilities by demolition operations, as directed by the Project Representative. Repairs shall be made at no cost to the Owner.

3.2 REMOVAL OF PAVEMENTS

A. Saw cut concrete curb and gutter and flatwork on nearest existing joint beyond area required to be removed as shown on the Drawings.

B. Provide a minimum of 18 inches between the new gutter pan edge and the bituminous paving edge.

3.3 CLEANUP

A. Contractor shall be responsible for disposing debris from demolition and salvage operations. Disposal of debris shall be done legally off the Owner's property, except that specifically requested for salvage by the Project Representative. Burning of debris is not permitted.

B. During demolition operations, keep dust to a minimum using appropriate methods.

C. During demolition operations, access roads and adjacent concrete pathways shall be maintained broom clean. Roads shall be cleaned by using a pick-up type sweeper. A front-end tractor mounted sweeper is not permitted.

D. The site shall be graded to provide surface drainage and shall be left in a clean condition.

END OF SECTION 024113

SECTION 024200– CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the following:
   1. Salvaging nonhazardous demolition and construction waste.
   2. Recycling nonhazardous demolition and construction waste.
   3. Disposing of nonhazardous demolition and construction waste.

B. Related sections include the following:

   1. Division 01 Section "General Requirements – Temporary Facilities and Controls."

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations and clearing debris including soil, vegetation, and rocks are not to be included.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Collect, reprocess and reuse of materials diverted or recovered from solid waste stream.

E. Salvage: Recovery of demolition or construction materials from existing buildings or construction sites and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction materials from existing buildings or construction sites and subsequent incorporation into the Work.

1.4 PERFORMANCE GOALS

A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 50 (75) percent by weight of total waste generated by the Work.

1.5 SUBMITTALS

A. Waste Management Plan: Submit 3 copies of plan within 14 days of date established for commencement of the Work

B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit 2 copies of report. Include separate reports for demolition and construction waste. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons or cubic yards.
5. Quantity of waste recycled, both estimated and actual in tons or cubic yards.
6. Total quantity of waste recovered (salvaged plus recycled) in tons or cubic yards.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Waste Reduction Calculations: Before request for Substantial Completion, submit 2 copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licenses to accept them. Include manifests, weight tickets, receipts, and invoices.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section. Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification, waste reduction plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number for each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

D. Plan for and describe the means for securing waste containers from unauthorized users.

E. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from salvaged materials.
5. Revenue from recycled materials.
6. Savings in hauling and tipping fees by donating materials.
7. Savings in hauling and tipping fees that are avoided.
8. Handling and transportation costs. Include cost of collection containers for each type of waste.
9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Owner. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
2. Observe and follow site measures that prevent cross-contamination of waste. Cross-contamination could render some portion of waste to be non-recyclable, thereby disqualifying the Project from earning LEED Credit MR 2, and the exemplary performance credit of diverting 95% of waste from landfill.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project. The Construction Superintendent may perform the role of the Waste Management Coordinator.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at the Project site.

a. Distribute waste management plan to everyone concerned within three days of submittal return.
b. Distribute waste management plan to entities upon execution of their contracts. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

a. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
b. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use:

a. Clean salvaged items.
b. Pack or crate items after cleaning. Identify contents of containers.
c. Store items in a secure area until delivery to Owner.

d. Transport items to Owner's storage area off-site designated by Owner.
e. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closes, leave door hardware attached to doors.

3.3 RECYCLING DEMOLITION AND CONTRUCTION WASTE, GENERAL

A. General:

a. Recycle paper and beverage containers used by on-site workers.
b. Concrete, masonry, or asphalt crushed and reused are to be identified and include in calculations.
c. Exclude hazardous waste from calculations.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

a. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

i. Inspect containers and bins for contamination and remove contaminated materials if found.

b. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
c. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
d. Store components off the ground and protect from the weather.
e. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

a. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
b. Polystyrene Packaging: Separate and bag materials.
c. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
d. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

C. Wood Materials:

a. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
b. Clean Sawdust; Bag sawdust that does not contain painted or treated wood.

D. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

a. Clean Gypsum board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

E. Metals: Separate metal by type or to meet requirements of recycling receiver or processor.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

a. Except as otherwise specified, do not allow excessive on-site accumulation of waste materials.
b. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
c. Coordinate with each product manufacturer for take-back programs. Set aside scrap to be returned to manufacturer for recycling into new product.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner’s property and legally dispose of them.

END OF SECTION 024200

SECTION 033010 – CAST-IN-PLACE CONCRETE FOR SITEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cast-in-place concrete for sitework foundations, retaining walls, landscape curbs, and other related sitework applications.

B. Related Requirements:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
2. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. All concrete mix components, including admixtures aggregates, cements, fillers, and fiber reinforcement.
2. Curing materials.

3. Joint fillers.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.

5. Slump limit.
6. Air content.
7. Nominal maximum aggregate size.
8. Synthetic micro-fiber content.
9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
10. Intended placement method.
11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Preconstruction Test Reports: For each mix design.

B. Field quality-control reports.

C. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Mockups: Cast concrete formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.

1. Formed Surfaces: Build panel approximately 100 sq. ft. in the location indicated or, if not indicated, as directed by Architect.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
2. Obtain aggregate from single source.
3. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I/II, gray.

2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

4. Blended Hydraulic Cement: ASTM C595/C595M, Type IL, portland-limestone cement.

5. Silica Fume: ASTM C1240 amorphous silica.

C. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260/C260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

7. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.

8. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

F. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.3 FIBER REINFORCEMENT

A. Synthetic Fibrillated Micro-Fiber: Fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1/2 to 1-1/2 inches long.

2.4 CURING MATERIALS

A. Water: Potable or complying with ASTM C1602/C1602M.

B. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

2.5 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete.

2.7 CONCRETE MIXTURES

A. Normal-weight concrete used for footings, retaining walls, and formed curbs.

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum w/cm: 0.45.

3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.
5. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 1.5 lb/cu. yd..

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.3 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Joints: Coordinate with design pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.

    a. Continue reinforcement across construction joints unless otherwise indicated.

3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

4. Space vertical joints in walls as indicated on Drawings.

C. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.4 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.

    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.

c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

3.5 FINISHING FORMED SURFACES

A. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:

1. Smooth-Rubbed Finish:

a. Perform no later than one day after form removal.
b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.6 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.7 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. If forms remain during curing period, moist cure after loosening forms.

2. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

    a. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

3.8 TOLERANCES

A. Conform to ACI 117.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.

    a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.

    b. Compact mortar in place and strike off slightly higher than surrounding surface.

2. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Contractor will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength,

aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

    a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

    a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    b. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;.

    a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C1064/C1064M:

    a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C31/C31M:

    a. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C39/C39M.

    a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
    b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
    c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 1 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests:

    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.11 PROTECTION

A. Protect concrete surfaces as follows:
    1. Protect from site debris and equipment marks and stains.
    2. Prohibit use of pipe-cutting machinery over concrete surfaces.
    3. Prohibit placement of steel items on concrete surfaces.
    4. Prohibit use of acids or acidic detergents over concrete surfaces.

END OF SECTION 033010

SECTION 311400 – SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This Section includes sod and topsoil stripping.

C. Related sections include the following:

1. Division 01 Section “General Requirements - Temporary Facilities and Controls.”
2. Division 02 Section “Site Demolition.”
3. Division 31 Section “Earthwork.”

1.3 DEFINITIONS

A. Topsoil: Friable clay loam surface soil containing 2.5% to 12% organic matter. Topsoil shall be free of subsoil, clay lumps, stones, rocks, weeds, roots, construction debris, and other unsuitable materials as determined and approved by the Project Representative.

1.4 PLANT PROTECTION

A. Refer to Division 01 Section “General Requirements - Temporary Facilities and Controls.”

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 SOD STRIPPING

A. Stripping and stockpiling sod shall be done under reasonably dry conditions. Secure approval of soil quality in advance from the Project Representative to begin sod stripping. Sod removal shall include the entire root system but not an excess amount of topsoil. Contractor shall haul the sod to a campus location, as directed.

3.2 TOPSOIL STRIPPING

A. Stripping and stockpiling topsoil shall be done under reasonably dry conditions. Stripping and stockpiling under wet conditions will not be allowed.

B. Contractor shall strip available topsoil to its full depth from within the Contract limits, excluding areas in close proximity to trees designated to remain, unless otherwise specified or directed by the Project Representative.

C. Contractor shall stockpile topsoil in a storage pile as directed by the Project Representative. Storage pile shall be shaped to freely drain surface water during and after stockpiling operations. Excess topsoil shall be hauled by the Contractor and stockpiled on the Owner's property as directed by the Project Representative. The stockpile shall be protected from soil and sediment erosion as required elsewhere in these Specifications.

END OF SECTION 311400

SECTION 312300 – EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. Related sections include the following:

1. Division 01 Section 15000-TEMPORARY FACILITIES AND CONTROLS
2. Division 02 Section 024116-SITE DEMOLITION
3. Division 31 Section 311400-SITE CLEARING

C. Approved Topsoil Installation Contractors shall bid directly to and be contracted directly by the General Contractor or Construction Manager.

D. Approved Topsoil Installation Contractors:

1. Anderson Fischer Associates Inc., 225 E. Kipp Rd, Mason MI 48854-1946
(517) 676-5522

2. Carols Excavating Inc., 5103 Lansing Rd, Charlotte MI 48813
(517) 645-0670

3. Central Excavating LLC , 11303 W Price Rd, Westphalia MI 48894-8208
(517) 749-2566

4. E.T. MacKenzie, 4248 W. Saginaw Highway, Grand Ledge MI 48837
(517) 627-8408

5. Eagle Excavation Inc., 4295 Holiday Drive, Flint MI 48507
(810) 767-7878

6. Owner Pre-Approved Topsoil Installation Contractor

E. Testing and inspection agency will be under contract with the contractor and will perform QA activities of the material below all pavements and structures.

1.3 DEFINITIONS

A. Excavation: Removal of material encountered to indicated subgrade elevations and subsequent disposal of materials removed. Excavation material is unclassified.

B. Unauthorized Excavation: Removal of materials beyond indicated subgrade elevations or dimensions without specific direction by the Project Representative. Unauthorized excavation shall be at the Contractor's expense. Undermining of existing footings or disturbing the bearing soil shall not be permitted unless it is specifically indicated or specified in the Contract Documents.

C. Additional Excavation: When excavation has reached required subgrade elevations the Contractor shall notify the Project Representative who will inspect conditions. If the Contractor encounters unsuitable bearing materials at the required subgrade elevations Contractor shall carry excavations deeper and replace excavated material as directed by the Project Representative. Removal of unsuitable material and its replacement, as directed, is part of this Contract.

D. Backfilling: Placement of fill soil, either provided on site or Contractor-furnished, which shall be uniformly compacted to the required density.

E. Bedding: The material placed around a utility between 4 inches below to 12 inches above the utility the full width of the trench.

F. Building Compacted Areas: Areas under slabs on ground within the building line. Exterior concrete slabs attached to the building, such as entrances, shall be considered within the building line.

G. Contract Limits: Those areas of the project site on which, or upon which, work will be done in accordance with the Contract.

H. Fill: Imported material which is placed in structure undercut.

I. Imported Material: Soil material which is purchased by Contractor and hauled onto the site.

J. MDOT: Michigan Department of Transportation's Standard Specifications for Construction, 2012.

K. Proof-Rolling: The use of a loaded 10 CY capacity or larger truck driven over the subgrade and subbase to check for unstable areas that should be undercut. The method, pattern and frequency will be determined by the Pavement Consultant.

L. Quality Assurance (QA): All activities that have to do with the Owner ensuring the quality of the product as specified, including materials sampling and testing, construction inspection, and review of Contractor quality control documentation. This work will be performed by the Pavement Consultant.

M. Quality Control (QC): All activities that have to do with the Contractor producing the quality of the product as specified, including training, materials sampling and testing, project oversight and documentation.

N. Rock Excavation:

1. Excavation of igneous, metamorphic or sedimentary rock or hardpan which cannot be excavated without continuous drilling or continuous use of a ripper or other special equipment.

2. Excavation of boulders of 1/2-cubic yard or more in volume.

O. SESC: Soil Erosion and Sedimentation Control as required in Division 01 "General Requirements – Temporary Facilities and Controls" and elsewhere in these Specifications.

P. Site Compacted Areas: Areas outside of the building line within the Contract limits.

Q. Structure: A building, retaining wall, tank, footing, slab or other similar construction.

R. Structure Backfill: Soil or other material which is placed against walls or sides of structures.

S. Subbase: Compacted fine and course aggregate layers used in the pavement between the subgrade and the pavement.

T. Subgrade: Compacted soil, either existing or provided as part of the Work, upon which new construction is to be installed.

U. Undercut: Excavation of native material from below the bottom of footings, floors, structures and subbases.

1.4 SUBMITTALS

A. Warranties: Submit written special warranty as specified in this Section. Include contact information, description of coverage, and start date for each special warranty.

1.5 SOIL EROSION AND SEDIMENTATION CONTROL

A. Prior to and during earthwork operations refer to Division 01 Section "General Requirements - Temporary Facilities and Controls" to ensure that provisions of that section are fulfilled.

1.6 BACKFILL COMPACTION TESTING

A. Contractor shall retain a licensed soils testing engineer, approved by the Owner, paid for as an allowance item, and shall submit to the Project Representative 3 copies of a report containing testing procedure, test results, and a statement that soil has been compacted in accordance with the specifications. The Project Representative shall give final approval of the backfill before construction continues. The following submittals shall be submitted directly to the Project Representative from the soils testing engineer, with one copy to the Contractor:

1. Test reports of borrow material.
2. Verification of each footing subbase.
3. Field density test reports.
4. One optimum moisture-maximum density curve for each type of soil.

B. Where more than one lift of soil is being placed, the soils testing engineer shall be present during the entire filling operation to confirm that each lift is properly compacted with approved soil.

C. Perform a maximum density test conforming to ASTM D1557 (Modified Proctor) for each type of soil encountered.

D. Field density tests shall conform to ASTM D2922 - Nuclear Method.

E. The frequency of testing shall be as follows:

1. Footing Subgrade: As required by Project Representative.

2. Paved Areas and Building Slab Subbase: One test per 2000 square feet for Subbase and one test per 1500 square feet per lift.

3. Footing and Trench Backfill: One test per 50 lineal feet per lift.

4. Trench Backfill: One test per 50 lineal feet per lift.

5. Post Backfill: One test per 12-inch lift (provided equipment is available).

6. Tree Stump Backfill: One test per 12-inch backfill lift (same as above).

F. Quality Assurance for Bituminous Pavement: the Pavement Consultant will perform QA of existing and installed material below the bituminous pavement. In order to perform that function, Contractor shall contact the Pavement Consultant 2 days prior to separately proof rolling the subgrade and subbase material, as well as keep the Pavement Consultant informed of the schedule of the installation of aggregates prior to paving. the Pavement Consultant will inform the Owner of deficient areas that have not been identified by Contractor as part of the Contractor's quality control procedure. This inspection by the Pavement Consultant does not relieve Contractor of Contractor's responsibility to provide adequate quality control.

1.7 DESIGN AND PERFORMANCE REQUIREMENTS

A. Trench Bottom Suitability:

1. Contractor shall be responsible for the suitability of the normal trench bottom in supporting utility, bedding and backfill.

2. Contractor shall notify the Project Representative and await the Project Representative's decision if a possible unsuitable condition exists.

3. NOTE: Poor dewatering techniques or lack of excess water control shall not be a reason for additional payment for remedial measures.

B. Trench Wall Stability:

1. Contractor shall be responsible for trench configuration, including sheeting, shoring and bracing necessary to support trench side walls from collapsing.

2. Contractor shall be responsible for structural design and stability of a pipe-laying box if utilized on the Project to prevent trench walls from collapsing.

C. Excavation Side Stability: Be responsible for structural design of sheet piling, underpinning, shoring and bracing to prevent sides of excavation from collapsing and causing damage to adjacent structures pavements and materials.

1.8 MATERIAL STORAGE

A. Stockpile satisfactory excavated materials in accordance with MDOT Standards where directed, until required for backfill or fill. Place grade, and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain. Place silt fence around stockpile, if left overnight.

1.9 WARRANTY

A. Failures of surface areas caused by settlement shall be repaired at Contractor's expense for a period of 3 years after completion of Contract.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Materials: For backfill and fill, soils complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP. (Contractor shall note exceptions under Article 3.11 – Backfill and Fill.)

B. Unsatisfactory Soil Materials: For backfill and fill, soils complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

C. Granular Materials: In accordance with MDOT Sections 301, 302 and 902 for 22A aggregate, Class I, II and Class II Subbase materials, except no foundry sand is permitted. Granular material shall contain sufficient binder to provide fill capable of supporting construction equipment without displacement.

1. Sections 2.11 and 8.02 for Class II Subbase and shall meet or exceed a minimum permeability requirement (K) of 8 feet per day as determined by the Michigan Test Method (MTM) 122.

2. Quality control shall include a lab test prior to delivery and field testing each 1000 cubic yard delivered or fraction thereafter. Each test shall include taking 3 samples, testing them individually and averaging the results.

3. The Michigan Test Method (MTM) shall be used to determine acceptable material. Once tested and accepted, Contractor shall acquire the material from the identical location.

4. Contractor shall notify the Project Representative in advance of changing the source location.

5. Field permeability test samples shall only be taken after the material has been spread uniformly on the subgrade and before compaction takes place. Material shall be less than 90% saturated upon completion of the test.
6. Material that fails the test shall be replaced at no cost to the Owner, and the cost for failed tests shall be paid by Contractor.

D. Sand:

1. Fill Sand: MDOT Class II granular material that is free of clay.
2. Washed Sand: MDOT 2NS.

E. Lean Concrete: Mixture of Portland cement, aggregate and water having compressive strength of 2,000 psi at 28 days.

F. Granular Surface Materials: In accordance with MDOT specifications.

1. Gravel Drives: 22A aggregate modified to minimum 6% wash.

2. Limestone Drives: 21AA limestone aggregate.

3. Construction Tracking Mat: 6A crushed limestone.

4. Pavement Subbase: If not specified on Drawings, place thicknesses and materials as follows:

a. For concrete pavement, use 2-inch Class II sand compacted in place (CIP).

b. For bituminous pavement in parking lots, use 6-inch Owner provided 21AA recycled concrete aggregate (CIP) over 6-inch Class II Subbase (CIP).

1) Provided to Contractor from Owner stockpile. Loaded by Owner. Contractor is responsible for hauling, spreading and compacting.

2) Owner stockpile is located at 4080 Beaumont Rd., East Lansing, MI 48824, phone: 517-884-4881

a) Hours of operation are 6:00am-4:00pm Monday – Friday excluding university holidays.

b) Extended hours available with minimum 24 hour notice.

2.2 UTILITY SLEEVING

A. Schedule 80 PVC under roads.

B. Schedule 40 PVC under walks.

C. End caps as required.

2.3 SMART BALL

A. Product 1428-XR/1D purple; manufactured by 3M Dynatel. Michigan Representative: Gregware Equipment, Grand Rapids, Michigan; 1-800-248-5678.

1. Provided by Owner

B. Quantity:

1. One smart ball on pipe lengths 0 to 12 feet; with end cap at other end.
2. For pipe lengths over 12 feet, place one smart ball at each end of the sleeve.

PART 3 - EXECUTION

3.1 SOIL EROSION AND SEDIMENTATION CONTROL

A. Prior to and during earthwork operations, refer to Division 01 Section "General Requirements - Temporary Facilities and Controls" to ensure that provisions of that section are fulfilled.

3.2 PREPARATION

A. Plan the Work to minimize the time excavation remains open. If excavation remains open beyond the time approved in the Project schedule, additional requirements may be imposed at no additional cost to the Owner.

B. Adequately barricade the excavation at all times to protect workers and the public from the danger of the open excavation.

3.3 EXCAVATION FOR STRUCTURES

A. Excavations shall extend a sufficient distance from footings and foundations to permit placement and removal of concrete formwork, installation of services, other construction, and inspection. Care shall be taken not to disturb bottom of excavation. Trim bottoms to required lines and grades to leave solid base to receive concrete.

B. Bracing and Sheeting:

1. Do not install by jetting.

2. Furnish, put in place and maintain sheeting, bracing and shoring, as may be required to properly support the sides of excavations and to prevent movement of earth which could in any way injure the Work or adjacent property.

3. Exercise care in removal of sheeting, shoring, bracing and timbering to prevent collapse or caving of excavation faces being supported and damage to the Work and adjacent property.

4. Do not leave sheeting or bracing in the excavation after completion of the Work, unless approved by the Project Representative.

C. Undercut:

1. If suitable bearing for foundations is not encountered at elevations indicated on the Drawings, immediately notify the Project Representative.

2. If soft material, which in the opinion of the independent testing laboratory is not suitable, is encountered below a structure, the Project Representative may order removal of this soft material and its replacement with specified material in order to make a suitable foundation for construction of the structure.

3. Undercutting made at the order of the Project Representative will be paid for on the basis of the actual quantity of material excavated. Do not proceed further until instructions are

received and necessary measurements made for purposes of establishing additional volume of excavation.

4. No extra payment will be made if removal is required as a result of poor dewatering techniques.

5. Undercutting, which is specifically indicated on the Drawings or herein specified, shall be included in the base bid.

6. Soil removed may be used as fill in areas not below driving surfaces, structures or utility structures.

7. Compact subgrade at bottom of undercut prior to placing fill.

8. Place and compact specified fill in undercut.

9. Lateral extent of undercut shall be a horizontal distance equal to the depth of undercut below structure.

D. Excavating:

1. Excavation shall be by open cut from the surface except as herein specified or as indicated on the Drawings.

2. Excavations for structures shall be made in such manner and to such depth and width as will give ample room for building the structures and for bracing, sheeting and supporting the side of the excavation, for pumping and draining groundwater and wastewater which may be encountered, and for removal of material excavated.

3. Excavate to required cross section and elevation indicated on the Drawings. Subgrade shall not vary more than 0.1 feet above or below the established elevations.
4. Depression caused by excess excavation, traffic or rolling shall be filled with MDOT 902 Granular Material Class II or approved fill and rerolled and compacted in place as specified herein.

5. If required because of excess water conditions, place stone stabilization course prior to proceeding with construction. Place filter fabric over stone stabilization course.

3.4 EXCAVATION FOR UTILITIES

A. Width of Trenches:

1. Steam Tunnels: Widths at bottom of trench shall be 3 feet wider than the overall width of tunnel or vault, and shall at all times be of sufficient width to permit tunnel and vaults to be built properly, waterproofed and backfilled.

2. Pipelines: Widths of trenches for pipe lines shall allow for proper compaction of the haunching. The trench width at the spring line of the pipe for pipes less than 48 inches shall be pipe width plus 18 inches. The trench width for pipes larger than 48 inches shall be the pipe diameter plus 30 inches.

3. Electric and Telephone Ducts: Trench shall be the proper width and depth for the duct bank, allowing a minimum of 3 inches of concrete on each side of the duct formation.

4. Street Light Cable: Minimum trench width shall be 6 inches, maximum width shall be 12 inches, and minimum depth shall be 30 inches.

B. Length of Trenches: Excavation shall be finished to the required grade for an adequate distance in advance of the completed installation. Unless otherwise permitted by the Project Representative, the amount of trench that shall be open in advance of the construction shall not exceed the following limits:

1. Sewers: 50 lf.

3.5 REMOVAL OF EXCESS SUBSOIL

A. Excess subsoil shall be removed from the Owner's property and legally disposed.

3.6 UTILITIES TO BE ABANDONED

A. When pipes, conduits, sewers or utility structures are removed from the trench, leaving dead ends in the ground, fully plug such ends with brick and mortar.

B. Entirely remove abandoned utility structures unless otherwise specified or indicated on Drawings.

C. Remove materials which can be readily salvaged from the excavation and store on site as indicated on the Drawings.

D. Salvageable materials will remain the property of the Owner unless otherwise indicated on the Drawings.

3.7 UTILITY SLEEVING

A. Place sleeve as located on the Drawings. Maintain structural integrity of pipe.

B. Place Smart ball at end of pipe and fabric. Attach with duct tape to end of pipe. See PART 2 - PRODUCTS for quantities.

C. Place PVC cap on end of pipe when only one Smart ball is required.

3.8 BEDDING

A. Place bedding material up to 1/8 the height of the utility. Compact as herein specified.

B. Accurately shape bedding material to fit pipe shape. Recess bedding to relieve pressure on the bell or other projecting utility joint.

C. After laying out the utility, tamp additional bedding in place up to the midpoint of the utility. Use hand-operated compactors to achieve required compaction.

D. Place additional bedding up to 12 inches above top of utility. Use hand-operated compactors to achieve required compaction.

E. Place bedding in maximum lifts of 12 inches.

F. No payment shall be made for aggregate or stone bedding when used for Contractor convenience.

G. Provide concrete encasement at utilities as indicated on the Drawings.

3.9 SHEETING, SHORING AND BRACING EXCAVATIONS

A. General:

1. Furnish, put in place and maintain sheeting, bracing and shoring as may be required to properly support side of excavations and to prevent movement of earth, which could in any way injure the Work or adjacent property.

2. Exercise care in the removal of sheeting, shoring, bracing and timbering to prevent collapse or caving of excavation faces being supported and damage to the Work or adjacent property.

3. A pipe-laying box may be used in lieu of sheeting.

B. Sheeting:

1. Do not install by jetting.

2. Remove as backfilling proceeds, unless ordered left in place by the Project Representative. Use care to fill and compact voids created by removal, especially below mid-height of utility.

3. Sheeting Left In Place:

a. Required written approval of the Project Representative.
b. Cut off minimum of 4 feet below finished grade.

3.10 BACKFILL AND FILL

A. General:

1. Commencement of Backfill Operations: Backfill excavations as promptly as work permits, but not until completion of the following:

a. Acceptance by Project Representative of construction below finish grade including where applicable, dampproofing, waterproofing and perimeter insulation.

b. Removal of trash and debris.

c. Permanent or temporary horizontal bracing is in place on horizontally supported wall.

d. Removal of concrete formwork.

e. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in

manner to prevent settlement of the structure or utilities. Contractor shall leave shoring to be embedded in the backfill of the trench or other excavation, for the purpose of preventing injury to the completed structure or other adjacent structures or property. Ends of sheeting, bracing or timber left embedded in the backfill shall be cut off and removed at least 2 feet below the established grade.

2. Acceptable Backfill: Place specified soil material in layers to required subgrade elevations, up to, but not including subbase material, for each area classification listed below:

   a. In excavations, use approved excavated or borrow material, except as otherwise specified.

   b. Under grassed areas use satisfactory excavated materials, unsatisfactory excavated soil classification groups GC, SC, ML, and CL, or approved borrow material.

   c. Under pavement use satisfactory excavated Class II and Class II subbase granular material. Soil classification groups GC, SC, ML and CL may be used with the approval of the Project Representative.

   d. Under building slabs, use Class II granular material.

   e. In utility trenches, use Class II granular material.

3. Required Concrete Within Backfill:

   a. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.

   b. For piping or conduit less than 2′-6″ inches below surface of roadways, provide 4-inch thick concrete base slab support. After installation and testing of piping or conduit, provide minimum 4-inch thick encasement (sides and top of concrete) prior to backfilling or placement of roadway subbase.

B. Ground Surface Preparation:

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1-foot vertical to 4 feet horizontal so that fill material will bond with existing surface.

2. Subsoil Preparation Prior to Topsoiling (performed by owner): This procedure is required to prevent permanent establishment of a dense layer of soil caused by construction operations, that would make it difficult for vigorous plant growth and proper drainage. In areas of the Project site that are compacted during construction, as determined by Project Representative, and after completion of exterior building construction operations, where vehicles/equipment would be required to travel across the soil around the structure or the constructed site improvements, or both, the existing subsoil, as well as the top 12 inches of newly placed subsoil, shall be loosened using the following procedures:

a. Prior to owner beginning this work, contractor shall re-stake existing and new utilities that may be disturbed by these earthwork operations.

b. The moisture content of existing and new soil shall be optimum for this earthwork operation. Each step shall be approved by the Project Representative, prior to continuing to the next step, and prior to satisfactory completion of the final step.

c. For areas where the existing subsoil grade is to remain and for areas which will receive additional soil:

1) STEP 1 – Loosening Existing Subsoil and Debris Removal: Existing subsoil shall be brought to a friable condition 12-inches deep, prior to placing additional subsoil fill. Possible equipment to use to loosen the soil include, but are not limited to, chisel plow, backhoe bucket, disc or harrow; followed by discing, if a disc is not initially used, to reduce the soil clump to the desired size. The soil shall be broken up sufficiently so that the resulting soil fragments are small. Also it is equally important to legally dispose of construction debris and rocks larger than 27 cubic inches exposed during this process.

2) STEP 2 – Placing of Additional Subsoil Fill- Transitional Layer Blending: Where additional fill is required, place the initial "transitional" layer and blend with the existing subsoil utilizing methods mentioned in Step 1.

3) STEP 3 –Subsoil Fill - Top Layer Loosening: Loosen top layer to a friable condition, blending in the first 1"-2" of topsoil. If no additional subsoil is required, delete Step 2.

4) STEP 4 – Final Grading and Protection: Grade the disturbed area to the elevations as specified, in preparation for topsoil placement. Do not otherwise recompact the subsoil. Once the subgrade is approved, construction equipment and vehicles unrelated to topsoiling and planting operations shall be prohibited.

d. For areas where existing subgrade is to be lowered:

1) STEP 1 – Existing Subsoil Excavation and Debris Removal: Excavate the subsoil, removing all excess material from the site to the proposed subgrade. Remove and legally dispose of construction debris exposed during this process.

2) STEP 2 – Subsoil Loosening: Existing subsoil shall be brought to a friable condition 12-inches deep. Possible equipment to use to loosen the soil include, but are not limited to, chisel plow, backhoe bucket, disc or harrow; followed by discing, if a disc is not initially used, to reduce the soil clump to the desired size. The resulting soil shall be broken up sufficiently so that the resulting soil fragments are small.

3) STEP 3 – Final Grading and Protection: Grade the disturbed area, as specified, in preparation for topsoil placement. Do not otherwise recompact

the subsoil. Once the subgrade is approved, construction equipment and vehicles, unrelated to topsoiling and planting operations, shall be prohibited.

3. Subsoil Preparation for Paved Areas:

   a. If, after rough grade has been achieved in cut areas and prior to placement of fill material in fill areas, the exposed subgrade has a density less than that specified under Article 3.12 – Compaction for particular area classification, break-up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density. Entire area shall be proof rolled with a heavy rubber-tired vehicle, such as a loaded scraper or loaded dump truck, to locate areas of extreme pumping and yielding, which shall be repaired as follows:

      1) Soft areas due to moisture laden soil shall be corrected by applying an appropriate soil stabilization procedure to be specified, or as directed by Project Representative.

      2) If required density cannot be obtained, the objectionable material shall be removed and replaced as ordered by the Project Representative.

      3) The cost of corrective measures incurred as a result of stabilizing poor subgrade conditions shall be paid on basis of contract conditions relative to changes in work.

C. Placement and Compaction:

1. No backfill shall be placed without it being compacted in place. Backfill material shall be compacted in layers not exceeding 6 inches in compacted thickness.

   a. Granular, non-cohesive soils shall be compacted with mechanical tamping or vibration-type compactors. Sand may be compacted by flooding the trench when water is available.

   b. When clays are encountered, a mechanical tamper or sheeps-foot roller shall be used to compact the soil. Manual mechanical tamping equipment shall have a rammer which weighs not less than 20 pounds and has surface area of not more than 36 square inches. Hand compaction is not acceptable.

2. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.

3. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

4. Existing Utilities: Where existing utilities are required to be tunneled under, the area under the utility shall be filled with compacted sand, and have the pipe embedment reconstructed as for new piping.

5. Pipe Embedment: New piping shall be laid on a sand leveling bed compacted to maximum thickness of 6 inches. Dig holes in bedding for bells and fittings so pipe bears uniformly along its length. Hand compact the haunching under the spring line of the pipe. Take extra care to control the density of the haunching on plastic pipe in accordance with the manufacturer's instructions.

3.11 COMPACTION

A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification. Perform all required tests.

B. Moisture Control:

1. Where soil material must be moisture conditioned before compaction, uniformly apply water to surface of subbase, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

C. Required Densities:

1. Lawn or Unpaved Areas: 80-85% maximum density, Refer to Article 3.11.B.

2. Trench Backfill: Compact layers 6 inches or less to 95% maximum density or greater.

3. Fill Under Existing Utilities: Compact top 6 inches of subgrade and each layer of backfill to 95% maximum density or greater.

4. Sand Pipe Bedding: Compact top 6 inches of subgrade and 6-inch layer of sand to 95% maximum density or greater.

3.12 FINISH GRADING

A. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Owner will finish topsoil to within not more than 0.10 feet above or below specified finish grade as measured after settlement and/or specified compaction is attained

B. After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

C. Proof Roll: Contractor shall arrange with the Pavement Consultant to approve subgrade as indicated in Articles 3.11 and 3.12.

3.13 TOPSOIL OPERATIONS (SUBSOIL SURFACE PREPARATION, HAULING, SPREADING, ROUGH GRADING AND CLEAN-UP)

A. Project Representative shall approve rough grade elevations of existing subsoil prior to commencement of owner-performed subsoil loosening operations.

B. Topsoil shall be placed by owner.

3.14 INSPECTION

A. Contractor shall notify the Project Representative when the excavation is complete. A visual subgrade inspection shall be performed prior to placing reinforcing steel, concrete, pipe beddings, etc. If satisfactory soil conditions are not found at the depths indicated, immediately notify the Project Representative in writing before proceeding further. Should Contractor fail to notify the Project Representative, all settlement and damage caused by new work resting on soft or unsound earth shall be made good at the sole expense of the Contractor.

3.15 PROTECTION

A. Protect newly graded areas from traffic and erosion. Keep free of trash, debris and plant material, including weeds and grass.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances. Where settling is measurable or observable at excavated areas during Project warranty period, remove pavement, lawn or other finish, add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

C. Where completed compacted areas are disturbed beyond specified tolerances by subsequent construction operations or adverse weather, scarify, reshape, and restore surface to match surface of originally installed work. Eliminate evidence of the repair to the greatest extent possible.

D. Continue to properly maintain soil erosion and sedimentation control measures. Perform and document required site inspections until the Owner has officially accepted the Project site.

3.16 CLEAN-UP

A. Refer to Division 01 Section “General Requirements - Temporary Facilities and Controls.”

B. The Contractor shall perform daily maintenance and cleanup of construction materials and debris tracked on and off site. Materials and debris that accumulate and are not removed or maintained after a 24-hour notification of a violation by the Owner, will be separately contracted by the Owner and all associated costs will be charged to the Contractor.

END OF SECTION 312300

SECTION 321216 – BITUMINOUS PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials, and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This section includes bituminous pavement.

C. Work Excluded: This section does not apply to bituminous pavement patching.

D. Related sections include the following:

1. Division 02 Section 024113-SITE DEMOLITION
2. Division 31 Section 312300-EARTHWORK
3. Division 32 Section 321218-BITUMINOUS PAVEMENT PATCHES
4. Division 32 Section 321723-PAVEMENT MARKING

E. Quality assurance

1. Removal:

a. If the pavement density for a sublot (average of sublot cores) is less than 92.0 percent, the Contractor shall remove and replace the sublot.

b. The Engineer reserves the right to evaluate a sublot whose test results for asphalt binder content, Gmm, VMA, or air voids, exceed the single test tolerances indicated in Table 1 – Bituminous Quality Assurance Testing Tolerances (+ or -) from JMF, included at the end of this section. If the Engineer determines that the in-place mixture will not perform in accordance with normal standards, the Contractor shall remove and replace the sublot.

c. General: The cost of the mixture removed and the removal cost shall be borne by the Contractor. Removal decisions will be applied to individual sublots.

1.3 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the Work of this section shall comply with the following:

1. ASTM:

a. C 117 – Test Method for Materials Finer Than 75µ-m (no. 200) Sieve in Mineral Aggregates by Washing.

b. C 136 – Test Method for Sieve Analysis of Fine and Coarse Aggregates.

c. D 1559-89 – Test Method for Resistance to Plastic Flow of Bituminous Mixtures using Marshall Apparatus (section 4.5).

d. D 2041 – Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

e. D 2172 – Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures.

f. D 2726 – Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens.

g. E 29 – Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications. All equipment requirements to perform these sampling and testing procedures shall apply.

2. MTM (Michigan Test Method):

a. 110 – Determining Deleterious and Objectionable Particles in Aggregates.

b. 117 – Determining Percentage of Crushed Particles in Aggregates.

c. 118 – Measuring Fine Aggregate Angularity.

d. 311 – Determining Aggregate Gradation for Bituminous Mixture.

e. 313 – Sampling Bituminous Mixtures.

f. 319 – Determination of Asphalt Content from Asphalt Paving Mixtures by the Ignition Method.

1.4 DEFINITIONS

A. Quality Control (QC): Activities that have to do with the Contractor producing a quality product as specified; including training, materials sampling and testing, project oversight and documentation.

B. Quality Assurance (QA): Activities that have to do with the Owner ensuring a quality product, as specified; including materials sampling and testing, construction inspection, and review of Contractor quality control documentation. To perform this service, the Contractor shall notify the Engineer 2 days (see definition below) in advance so that QA activities can be properly performed.

C. Bituminous Mix Design: The selection and proportioning of aggregate(s), mineral filler (if required), reclaimed asphalt pavement (RAP) and asphalt binder such that the specified mixture design criteria are met. Laboratory evaluation is required to determine if the stated mix design complies with specifications.

D. Job Mix Formula (JMF): A bituminous mixture for a specific project. This may include adjustments to the mix design to optimize the field application.

E. Target Value: A JMF parameter value that may be adjusted, if approved by the Engineer, to account for changes in the physical properties of the mixture.

F. JMF Adjustment: The Contractor may propose an adjustment to the JMF based upon QC or QA test results; or both. The proposed JMF shall meet the requirements of MDOT 2012 Standard Specifications for Construction. When approved by the Engineer, a JMF adjustment may be applied retroactively to 1 lot, for parameters with target values. The Engineer may also require the Contractor to make adjustments to the mixture to assure that the parameters of the mix design are being met.

G. Voids in Mineral Aggregate (VMA): The volume of void space between the aggregate particles of a compacted paving mixture that includes the air voids and the asphalt binder, including the absorbed asphalt binder, expressed as a percent of the total volume of mixture.

H. Effective Specific Gravity (Gse): The ratio of the oven dry weight in air of a unit volume of an aggregate (excluding voids permeable to asphalt) at a stated temperature to the weight of an equal volume of water at a stated temperature.

I. Bulk Specific Gravity of Aggregate (Gsb): The ratio of the oven dry weight in air of a unit volume of an aggregate at a stated temperature to the weight of an equal volume of water at a stated temperature.

J. Maximum Specific Gravity of Mixture (Gmm): The ratio of the weight in air of a unit volume of an uncompacted bituminous paving mixture at a stated temperature to the weight of an equal volume of water at the same temperature.

K. Lot: Bituminous mixtures produced and placed under this specification will be evaluated on a lot-by-lot basis. A lot is made up of a discrete tonnage of 1 mixture. Each lot consists of up to 3 sublots. These sublots shall be of approximately equal size up to a maximum of 2,000 tons. The sublot size shall be approved by the Engineer prior to the start of production. The Contractor may request a change in the sublot size during production based upon the Contractor's ability to produce a mixture that meets the specification contained within the Contract Documents, and upon approval of the Engineer. If only 1 or 2 sublots are included in a lot at the end of production, they shall be combined with the previous lot using the same mix, and this combined lot shall be evaluated based upon all sublot samples.

L. Lot Average Test Result: The average of all sublot QA test results, for a specific parameter, for the lot. Test results for a sublot removed from the project shall not be used in calculating a lot average. However, the replacement material shall be tested and the results included in the lot average.

M. Process Quality Control Targets: Targets established by the Contractor based upon initial production lot test results (and from an approved trial run) for air voids, VMA, asphalt binder content and Gmm. QC tolerances shall be applied to these established targets to determine the need for production changes, including stopping production, to control the quality of the product. Process quality control targets shall be reported to the Engineer prior to the end of placement of the second lot.

N. Rounding of Numbers: Rounding of numerical data shall follow ASTM E 29-93a, as described in MDOT Bituminous QC/QA Procedures Manual of Field Testing.

O. Random Sampling: Selection of QA samples (bituminous mixture and density) and verification samples may be by a random process managed by the Engineer. The Engineer may use a random number generating calculator to determine the locations of each density core and mixture sample. The Contractor will be given the opportunity to observe the sampling process. However, the random numbers selected and the sampling locations will not be revealed to the Contractor until the time of sampling in order to avoid bias in the random sampling process.

P. Project Representative: An individual appointed by the Owner, Board of Trustees, Michigan State University.

Q. Engineer: Third party testing and inspection agency.

R. MDOT Specification: Michigan Department of Transportation 2012 Standard Specifications for Construction.

S. RAP: Recycled Asphalt Pavement.

1.5 SUBMITTALS

A. Submit a 4-point mix design, including regression chart, to the Owner for review and approval. Mix design shall follow the format as indicated in the Asphalt Institute Manual MS-2 Marshall Stability Method. It is the intent of this specification for the Contractor to produce mixtures at the parameters indicated in Table 3 – Mixture Type and Table 4 – Gradations (Percent Passing), both included at the end of this section.

B. If the Engineer believes the Contractor is producing mixture at the high or low end of any of these specification limits, the Engineer shall have the authority to make changes necessary to bring the mixture back to the specified parameters.

C. Quality Control Test: Provide test reports as described in this section.

D. Project Documentation: Provide documentation as described in this section.

E. Warranties: Submit written special warranty as specified in this Section. Include contact information, description of coverage, and start date for each special warranty.

1.6 QUALITY CONTROL

A. Sampling and Testing:

1. Follow the sampling and testing procedures listed in Article 1.2 - References in completing this work.

B. The Contractor shall take random samples of loose mixture at a sampling frequency agreed upon with the Engineer. The Contractor shall provide the Engineer a split Sample of QC Samples. This Sample may be taken anywhere in the production process, except behind the paver. The Contractor shall be responsible for establishing process quality control targets for air voids, asphalt binder content, aggregate gradation, Gmm, obtaining QC Samples, and conducting QC testing in accordance with the Contractor's quality control plan (QCP).

C. Each QC Sample shall be identified to allow test reports to be linked to a specific lot or sublot within the Project.

D. The Contractor shall maintain daily control charts and have them available for review at Infrastructure Planning and Facilities at all times. Copies of these control charts shall be provided to the Engineer, if requested. Test results shall be plotted and used in quality control decisions. When corrective action is necessary, the Contractor shall notify the Engineer in writing of the specific action taken, if it required a JMF adjustment.

E. The Contractor shall have available a density gauge for quality control testing during the compaction process and an apparatus for determining the temperature of the hot mix asphalt. The Contractor shall also have the capability to take 6-inch cores from random locations throughout the paved area for acceptance testing. The Contractor may take up to 3 informational cores from each mixture type, to help correlate the density gauge. The average in-place density shall be not less than 95 percent of the theoretical maximum density.

1.7 QUALITY ASSURANCE

A. The Engineer may collect bituminous mixture quality assurance Samples and provide the Contractor with splits of these Samples. If the criteria for the verification procedure are satisfied, the Contractor's test results may be incorporated into the acceptance and payment decisions for the mixture. During the course of production, the Engineer may acquire random Samples at any point in the production process. These Samples may be tested to determine if the mixture, the aggregate and the binder meet the specification requirements contained in the Contract Documents. As the Samples are collected, the Engineer will assign an alphanumeric identifier to the sample and split, which can be used to trace the test results to the lot and sublot. This alphanumeric identifier must be included on Engineer test reports associated with that Sample. An example is 4-2-A, which would designate the Engineer's split (A) of the Sample from sublot 2 of lot 4 on a Project.

B. A minimum 16,000 gram Sample may be taken. The Sample will be divided equally for Contractor and Engineer testing. The following tests may be conducted by the Engineer on the QA Sample splits.

1. Maximum Specific Gravity, Gmm (ASTM D 2041).

2. Bulk Compacted Density (ASTM D 1559, paragraph 4.5).

3. Air Voids (calculated).

4. Voids in Mineral Aggregate, VMA (calculated).

5. Composition of the Mixture: Asphalt binder content based on calculated value using sublot maximum specific gravity (Gmm) and current JMF effective specific gravity (Gse). The retained Gmm sample may be used for gradation (ASTM C 117 and C 136) and crushed particle content (MTM 117) from extracted (ASTM D 2172) or incinerated (MTM 319) aggregate, or from MTM 311.

C. In-Place Density: The Engineer may identify random core sample locations for each sublot based on longitudinal and transverse measurements. The Engineer will mark each core location with a paint dot, which represents the center of the core. The Contractor shall drill a 6-inch core sample at each core location. The Contractor shall notify the Engineer sufficiently in advance of coring to ensure that a representative can be present to witness the coring. The core Samples shall be taken after final rolling.

1. As an option, when mutually agreed to by the Engineer and Contractor, the core Samples may be waived and the density gauge will be used for acceptance testing.

2. Core Samples shall not be damaged during removal from the roadway. If, for any reason, a core is damaged or determined not to be representative at the time of coring, the Engineer will evaluate and document the problem and determine whether re-coring is necessary.

3. All previous pavement, base aggregate or bond coat material shall be sawed off the bottom of the core Samples before the core density is calculated.

4. The core holes shall be filled with hot mixture and thoroughly compacted as part of the coring operation. The method of filling holes and obtaining compaction shall be agreed upon prior to production. Pavement density acceptance testing will be completed within 1 work day after the cores were taken. Testing will be in accordance with ASTM D 2726. The test results on the compacted bituminous mixture may be used as a basis of acceptance and payment.

D. Verification of Quality Control Test:

1. The Engineer will review the Contractor’s sampling and testing procedures, test results and Engineer QA test results. If, in the opinion of the Engineer, sampling and testing procedures are proper, the Contractor’s quality control test data may be used for acceptance decisions.

2. The Contractor's QC test results may be considered verified if the following criteria are satisfied:

   a. The difference between the Contractor's QC test results and the JMF fall within the single test tolerance indicated in Table 1 – Bituminous Quality Assurance Testing Tolerances (+ or -) from JMF, included at the end of this section, **or**

   b. The difference between the Engineer's test results and the Contractor's test results fall within the single test tolerance indicated in Table 1 – Bituminous Quality Assurance Testing Tolerances (+ or -) from JMF, included at the end of this section.

3. If the difference between the Contractor's QC test results, compared to the JMF, exceed the single test tolerances indicated in Table 1 – Bituminous Quality Assurance Testing Tolerances (+ or -) from JMF, included at the end of this section, the Engineer's test results will be used as the acceptance test. If the sublot is not verified, the Contractor shall be notified and given a copy of the test results. Both the Contractor and the Engineer will verify that testing equipment is calibrated and operating properly, and correct testing procedures have been followed. Unless it is documented that the difference resulted from equipment or procedural problems, the Engineer's test results will remain as the acceptance test of record.

E. Project Documentation:

1. The format of test reports and QC charts to be submitted by the Contractor shall be approved by the Engineer before mixture production is allowed to commence. Suggested formats of reports and charts are available from the Engineer. Project documentation to be provided by the Contractor shall include, but may not be limited to, the following:

   a. Lot Basis:

      1) A complete report of QA tests shall be submitted to the Engineer within 24 hours of the time the last tests were completed.

      2) Control charts of test data must be current (data should be plotted as soon as the test is complete) and available for review by the Engineer.

   b. Project Summation:

      1) Control charts for test data indicating individual test values, lot averages and the running average of 5.

      2) A tabulation of test data including sublot data, lot averages, Project average, Project standard deviation and a projection of which lots are subject to a price adjustment.

2. Provide documentation to confirm that the material used on the Project meets or exceeds minimum specified requirements in accordance with MDOT 2012 specifications.

3. The Contractor shall provide a letter to the Owner certifying that materials approved in the mix design were, in fact, used in the production of the mixture installed on this Project.

1.8 DELIVERY, STORAGE AND HANDLING

A. Provide to the Engineer the asphalt delivery tickets showing asphalt cement grade, date of delivery, and quantity delivered.

1.9 PROJECT CONDITIONS

A. Weather and seasonal limitations shall not exceed those specified in MDOT 2012
B. MSU will reject loads with a temperature either below 250 deg F or greater than +/- 20 deg F from the recommended maximum mixing temperature selected by the binder producer at the time of discharge from behind the screed.

1.10 WARRANTY

A. Furnish and sign 5 year written warranty (last page of this section) which shall cover the following conditions:

1. Cracking: A crack caused by improper joints in the pavement, either a construction joint, a butt joint, or cracking caused by expansion or contraction of the pavement, or by any settlement of the pavement.

2. Delamination: An instance where the surface course de-bonds from the underlying layer of asphalt pavement, causing slippage or complete separation.

3. Raveling: An area where the aggregate or matrix becomes loose, or separates from the asphalt pavement. This condition will generally be caused by poor density or segregation.

B. Remedies for the conditions described above shall be as follows:

1. Cracking: Cracks over 3-inch length or wider than 1/8-inch, or both, shall be corrected by routing/sawing and sealing or overband sealing, as directed by the Engineer, with a sealer approved by the Engineer.

2. Delamination: Areas that exhibit delamination shall be repaired by removing the surface course and cleaning the leveling course, installing a bond coat, and furnishing and installing a new surface course of a like hot mix asphalt.

3. Raveling: Areas that exhibit raveling, or a loss of aggregate or matrix, shall be repaired by removing the distressed area, cleaning the leveling course, applying a bond coat, and furnishing and installing a new surface course of a like hot mix asphalt.

C. At least once a year, for the duration of the warranty period, Project Representative will inspect the pavement to determine if warranty work is necessary. If deficiencies are found, the Project Representative shall notify the Contractor in writing as to the extent of the repairs needed. The Contractor shall perform the repairs within 30 calendar days or other period as approved by the Project Representative. Should the Contractor not perform the required repairs, the Owner may make the repairs at the Contractor's expense. The Contractor may also inspect the lot from time to time to determine if warranty work is necessary. The Contractor will be allowed, with approval of the Project Representative, to perform warranty work that will retard any further deterioration of the warranted conditions. Any and all costs to repair deficiencies in the asphalt shall be paid for by the Contractor.

PART 2 - PRODUCTS

2.1 SUBBASE COURSE

A. See Division 31 Section 312300-EARTHWORK.

2.2 BASE COURSE

A. Not used.

2.3 BITUMINOUS MIXTURES

A. See Table 3 – Mixture Type and Table 4 – Gradations, both included at the end of this section.

2.4 ASPHALT EMULSION

A. The bond/tack coat shall conform to MDOT 2012 Specification for Asphalt Emulsion SS-1h.

2.5 ASPHALT CEMENT

A. Final binder properties shall meet asphalt PG 58-28. The asphalt cement shall conform to MDOT 2012 Specification for Asphalt Cement and conform to the Project Specifications. If the binder obtained from the recycled asphalt pavement exceeds 17 percent of the total binder in the mixture, the Contractor shall furnish documentation (i.e., blending chart) in order to determine the proper grade of virgin binder required to achieve the desired final binder properties.

2.6 TRAFFIC PAINT

A. See Division 32 Section 321723-PAVEMENT MARKING.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare subbase according to MDOT 2012 Specifications and Project requirements.

B. Where entire pavement thickness is to be completely removed, cut existing pavement neatly with a saw. Otherwise, edges shall be cut straight and smooth allowing for a full depth pavement throughout.

C. Proof roll subgrade and subbase to check for unstable areas and areas requiring additional compaction. Perform proof rolling as directed by the Engineer.

D. Notify Project Representative of unsatisfactory conditions. Do not begin paving work until deficient subgrade areas have been corrected, tested, and approved by the Project Representative.

E. Required Grades for Barrier Free Parking Areas:

1. In areas designated on the Drawings as a barrier free parking space, either so noted or with a uniform barrier free graphic symbol, the slope of the parking space and adjacent access aisle shall not exceed 2 percent (1/4-inch per foot) in any direction.

2. Should this provision conflict with the Drawings, inform the Project Representative so that the necessary revision(s) can be made.

3.2 INSTALLATION OF PAVEMENT

A. General: Place bituminous pavement and bond coats over approved subbase or existing pavement according to MDOT 2012 Specifications, Division 5.

B. Pavement Thickness and Type: Over the subbase, place bituminous pavement as indicated on the Drawings. For courses exceeding 3-inch, place bituminous pavement in 2 lifts with a bond coat between each layer. For patching, provide 4-inch leveling course and 2-inch surface course over compacted subbase.

1. Mix Type:

a. Surface Course – Parking:

1) Thickness: 1.5-inch.
2) Yield: 165 lbs/syd.

b. Leveling Course – Parking:

1) Thickness: 2.5-inch.
2) Yield: 275 lbs/syd.

C. Bond Coat: Uniformly apply a coat of SS-1h at a rate of 0.10 to 0.15 gallon per square yard over the entire surface of each bituminous course, except the last.

D. Protection: After final rolling, protect pavement from vehicular traffic until the surface has cooled sufficiently to eliminate surface abrasion.

3.3 TABLES

TABLE 1 – BITUMINOUS QUALITY ASSURANCE TESTING TOLERANCES (+ OR -) FROM JMF

Parameter	Single Test	Lot Average
Air Voids	1.00%	0.60%
Voids in Mineral Aggregate (VMA)*	1.20%	0.75%**
Maximum Specific Gravity (Gmm)*	0.019	0.012
Asphalt Binder Content*	0.50%	0.35%

* Parameters with Target Values

** Or less, determined by VMA Value from MDOT 2012 Standard Specifications for Construction.

TABLE 2 – BITUMINOUS MIXTURE PAY ADJUSTMENTS

Parameter (Lot Average)	Deviation (d)	Negative Unit Price Adjustment (%)
Asphalt Binder Content (deviation from JMF)	$0.35 < d \leq 0.55$	10
	$d > 0.55$	25
Air Voids (deviation from JMF)	$0.6 < d \leq 0.7$	2
	$0.7 < d \leq 0.8$	4
	$0.8 < d \leq 1.0$	6
	$1.0 < d \leq 1.1$	8
	$1.1 < d \leq 1.2$	10
	$d > 1.2$	25
Maximum Specific Gravity (Gmm) (deviation from JMF)	$0.012 < d \leq 0.014$	2
	$0.014 < d \leq 0.015$	4
	$0.015 < d \leq 0.017$	6
	$0.017 < d \leq 0.019$	8
	$0.019 < d \leq 0.021$	10
	$d > 0.021$	25
Voids in Mineral Aggregate (VMA) (deviation below minimum value in the MDOT 2012 Standard Specifications for Construction)	$0.0 < d \leq 0.1$	2
	$0.1 < d \leq 0.3$	4
	$0.3 < d \leq 0.4$	6
	$0.4 < d \leq 0.5$	8
	$0.5 < d \leq 0.6$	10
	$d > 0.6$	25

TABLE 3 – MIXTURE TYPE

	Surface Course		Leveling Course	
	Roadway & Dock Area	**Parking Only**	**Roadway & Dock Area**	**Parking Only**
Mixture Number	5C Modified	36A Modified	3C Modified	13A Modified
VMA % (Eff. Spec. Gravity)	16.0	16.5	15.0	15.5
Air Voids % *	3.0	2.5	3.0	2.5
Fines to Binder Ratio (Max.)	1.2	1.2	1.2	1.2
Fine Angularity (Min.) MTM 118	4.0	3.0	4.0	2.5

* Modified from MDOT specifications.
No more than 50% of the material passing the #4 sieve shall pass the #30 sieve for Parking mixtures.

TABLE 4 – GRADATIONS (PERCENT PASSING)

	Surface Course		Leveling Course	
	Roadway & Dock Area	**Parking Only**	**Roadway & Dock Area**	**Parking Only**
Mixture Number	5C Modified	36A Modified	3C Modified	13A Modified
1-inch	100	100	100	100
3/4-inch	100	100	99-100	100
1/2-inch	100	100	90 Max.	75-95
3/8-inch	99-100	92-100	77 Max.	60-90
#4	90 Max.	65-90	57 Max.	45-80
#8	55-70	55-75	15-45	30-65
#16	30-55		33 Max.	20-50
#30	20-30	25-45	25 Max.	15-40
#50	15-25		19 Max.	10-25
#100	15 Max.		15 Max.	5-15
#200	3-6	3-7	3-6	3-6
Crush (Min.) MTM 117*	90	60	90	50

* Modified from MDOT specifications.
No more than 50% of the material passing the #4 sieve shall pass the #30 sieve for Parking mixtures.

(BITUMINOUS PAVEMENT WARRANTY ON THE FOLLOWING PAGE.)

BITUMINOUS PAVEMENT WARRANTY

PROJECT:

CONTRACTOR:

OWNER: **BOARD OF TRUSTEES**
MICHIGAN STATE UNIVERSITY

We, the undersigned, hereby provides a five (5) year warranty to Owner against defects caused by deficiencies in the materials and/or workmanship of the bituminous pavement in accordance with the requirements set forth in the Drawings and Specifications for the above named project.

The warranty covers the following conditions:

1. Cracking as defined shall be any cracked caused by improper joints in the pavement, either a construction joint, a butt joint, or any cracking caused by expansion or contraction of the pavement, or by any settlement of the pavement, i.e., thermal cracking. Cracks caused by fatigue or settlement will not be covered by this Warranty.
2. Delamination as defined shall be any instance where the surface course de-bonds from the underlying layer of bituminous pavement, causing slippage or complete separation.
3. Raveling, as defined shall be any area where the aggregate or matrix becomes loose, or separates from the asphalt pavement. This condition is generally caused by poor density or segregation.

Remedies for the conditions described above will be as follows:

1. Cracking. Any cracks over 3" in length and/or wider than 1/8" shall be corrected by routing/sawing and sealing or band sealing, as directed by the Owner's Representative, with a sealer approved by the Owner's Representative.
2. Delamination. Any area that exhibits delamination will be repaired by removing the surface course and cleaning the leveling course, installing a bond coat and furnishing/installing a new surface course of a like hot mix asphalt.
3. Raveling. Any area that exhibits raveling, or a loss of aggregate or matrix, will be repaired by removing the distressed are, cleaning and leveling course, applying a bond coat and furnishing and installing a new surface course of a like hot mix asphalt.

At least once a year, for the duration of the Warranty period, Owner's Representative will inspect the pavement to determine if any warranty work is necessary. If deficiencies are found, the Owner's Representative will notify the Contractor, in writing, as the extent of the repairs needed. The Contractor will perform the repairs within 30 calendar days, or within period as approved by the Owner's Representative. Should the Contractor not perform the required repairs, the Owner may make the repairs at the Contractor's expense. The Contractor may also inspect the lot from time to time to determine if any warranty work is necessary. The Contractor will be allowed, with approval of the Owner's Representative, to perform any warranty work that it appears will retard any further deterioration of any of the warranted conditions. Any and all costs to repair any deficiencies in the pavement shall be paid by this Contractor.

CONTRACTOR: _____ DATE _____

ADDRESS: _____

AUTHORIZED REPRESENTATIVE: _____ _____
(Print) (Signature)

SUBSCRIBED AND SWORN TO BEFORE ME,
THIS____DAY OF_____
A.D._____
NAME
MY COMMISSION EXPIRES

END OF SECTION 321216

SECTION 321218 – BITUMINOUS PAVEMENT PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials, and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This section includes bituminous pavement patching.

C. Related sections include the following:

1. Division 02 Section 024113-SITE DEMOLITION
2. Division 31 Section 312300-EARTHWORK
3. Division 32 Section 321723-PAVEMENT MARKING

1.3 PROJECT CONDITIONS

A. Weather and seasonal limitations shall not exceed those specified in MDOT 2012 Standard Specification for Construction.

PART 2 - PRODUCTS

2.1 SUBBASE COURSE

A. See Division 31 Section 312300-EARTHWORK

2.2 BASE COURSE

A. Not used.

2.3 LEVELING COURSE

A. An approved commercial bituminous mixture from a local bituminous mixture producer. Design air voids shall be designed at not more than 3 percent. Provide the Engineer with a copy of the mixture design or a signed Job Mix Formula (JMF) from the producer.

2.4 SURFACE COURSE

A. An approved commercial bituminous mixture from a local bituminous mixture producer. Design air voids shall be designed at not more than 3 percent. Provide the Engineer with a copy of the mixture design or a signed JMF (Job Mixture Formula) from the producer.

2.5 ASPHALT EMULSION

A. Conform to MDOT 2012 Specification Section 904.03, Table 904-4 for Asphalt Emulsion SS-1h.

2.6 ASPHALT CEMENT

A. Conform to MDOT 2012 Specification for Asphalt Cement PG 64-22 or as approved by the Engineer.

2.7 TRAFFIC PAINT

A. See Division 32 Section "Pavement Markings."

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare subbase according to MDOT 2012 Specification-Division 5, and Project requirements.

B. Where entire pavement thickness is to be completely removed, cut existing pavement neatly with a saw. Cut edges straight and smooth allowing for a full-depth pavement patch.

C. When possible, proof roll subgrade and subbase layers to check for unstable areas and areas requiring additional compaction. Perform test rolling as directed by the Engineer.

D. Notify Project Representative of unsatisfactory conditions. Do not begin patching work until deficient subgrade and subbase areas have been corrected, tested, and approved by the Engineer.

E. Required Grades for Barrier Free Parking Areas:

1. In areas designated on the Drawings as a barrier free parking space, either so noted or with a uniform barrier free graphic symbol, the slope of the parking space and adjacent access aisle shall not exceed 2 percent (1/4-inch per foot) in any direction.

2. Should this provision conflict with the Drawings, inform the Project Representative so that the necessary revision(s) can be made.

3.2 INSTALLATION

A. General: Place bituminous pavement and bond coat over approved subbase or existing pavement according to MDOT 2012 Specification, Division 5.

B. Pavement Thickness and Type: Over the subbase, place 3-inch hot mix asphalt leveling course with a maximum air void content of 3 percent, and 2-inch bituminous surface course with a maximum air void content of 3 percent. If the existing surrounding pavement is thicker than 5 inches, match existing depth. Place bituminous pavement in 2 layers with a tack coat between each layer. The surface of completed patch shall be true to the line and grade of the surrounding pavement, and shall not pond water.

C. Compaction: The bituminous mixture shall be placed as uniformly as possible and compacted, with the compaction equipment approved by the Engineer. The goal is to compact the mixture to the maximum achievable density as determined by the Engineer.

D. Tack Coat: Uniformly apply a coat of SS-1h at a rate of 0.10 to 0.15 gallon per square yard over the entire surface of each bituminous course, except the last one, and to the sides of the existing pavement that were saw cut.

E. Protection: After final rolling, protect pavement of vehicular traffic until the surface has cooled sufficiently to prevent surface deformation.

END OF SECTION 321218

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SECTION 321313 – CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This section includes concrete pavement.

C. Related sections include:

1. Division 01 Section 014000-QUALITY REQUIREMENTS
2. Division 31 Section 312300-EARTHWORK
3. Division 33 Section 334000-STORM DRAINAGE

1.3 SUBMITTALS

A. Warranties: Submit written special warranty as specified in this Section. Include contact information, description of coverage, and start date for each special warranty.

B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.4 QUALITY ASSURANCE

A. Provide required testing and inspection as indicated in Division 01 Section “General Requirements - Quality Requirements.”

B. Concrete sampling, testing, and inspection shall conform to the following requirements:

1. Sampling Fresh Concrete: ASTM C172, except initial Samples shall be taken immediately after first 1/4 cubic yard (CY) has been discharged and subsequent Samples shall be taken as specified herein. If found to be in non-conformance, the concrete shall be removed from the forms.

2. Slump: ASTM C143, except initial Sample shall be taken in accordance with paragraph above. Additional tests shall be made for each set of compressive strength test specimens, and as required by the Project Representative.

3. Air Content: ASTM C231, except as previously specified herein and additional tests at the end of the load, if possible.

4. Concrete Temperature: Taken each time compression test specimens are made and hourly when temperature is 40 degrees F and below and over 80 degrees F.

5. Unit Weight: ASTM C138, except the Sample volume shall be equal to air content specimen.

6. Compressive Strength: ASTM C31 and C39, except one set of 3 cylinders for every 40 cy or fraction thereof. One specimen shall be tested at 7 days and the remaining 2 specimens shall be tested at 28 days. Strength level of the concrete will be considered unsatisfactory if the 7 day compressive strength does not equal or exceed 60% of the 28 day design strength. Strength level of concrete will be considered satisfactory if the average compressive strength of two consecutive 28 day tests equals or exceeds the 28 day design strength, and neither individual strength test results falls below the specified compressive strength requirement by more than 100 psi.

7. Inspection: Monitored by the Project Representative.

8. Frequency: In accordance with Division 01 Section "General Requirements - Quality Requirements."

9. Concrete Replacement: Failure of a test or to follow proper installation procedures will require that the concrete be removed and properly replaced at Contractor's expense.

10. Additional Tests: Contractor may have the testing agency make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42. Contractor shall pay for all such tests conducted. Holes shall be patched at the Contractor's expense.

1.5 SEQUENCING AND SCHEDULING

A. Concrete shall not be placed after October 15 without written permission from the Project Representative.

1.6 WARRANTY

A. Furnish and sign 2 year written warranty (last page of this section) which shall cover cracking, spalling, settling, finishing and forming.

PART 2 - PRODUCTS

2.1 CEMENT

A. Portland cement conforming to the requirements of the current specifications for Portland Cement ASTM C150 Type 1.

2.2 AIR-ENTRAINING ADMIXTURE

A. Conform to ASTM C260 for concrete.

2.3 FINE AGGREGATE

A. Limestone or other fine aggregate that is free of soft particles or other material that could cause staining or pitting of the pavement surface. For gradation purposes only, the material shall conform to MDOT Specification 2NS.

2.4 COARSE AGGREGATE

A. Well-graded limestone. Gradation and physical requirements to conform to MDOT Specification 6AA.

2.5 WATER

A. Potable.

2.6 REINFORCEMENT

A. Welded Wire Reinforcement:
1. Standard; Welded wire fabric (6 x 6 - W4.0 / W4.0) in flat sheets only, conforming to ASTM A1064.

B. Bar Reinforcement: No. 3, No. 4 and No. 5 bar reinforcement as specified on the Drawings. It shall be new billet stock of intermediate grade in accordance with ASTM A615.

2.7 DOWELS

A. Construction Expansion Joints:

1. No. 5 speed dowel 9 inches long, as manufactured by Greenstreak, Inc., 3400 Tree Court Industrial Blvd., St Louis, MO; 800-325-9504; or approved equal.

2. Dowel: 18 inches long, No. 5 smooth epoxy-coated rebar (coated all surfaces); or approved equal.

3. 1/4” x 4-1/2” x 4-1/2” electroplated zinc steel, ASTM A36, ASTM B633 with pocket formers

a. Diamond Dowel System as manufactured by PNA Construction Technologies www.PNA-INC.com ; 800-542-0214 ; or approved equal.

B. Construction Joints:

1. As specified above.

2.8 FORMED KEYWAY

A. Standard keyway, 1-5/8-inch x 1-3/4-inch x 2-3/4-inch, as manufactured by Dee Concrete Accessories Company, P.O. Box 11119, Chicago, IL 60611; or approved equal.

2.9 ASPHALT EXPANSION JOINTS

A. Conform with ASTM Specification D994-53. Fiber joint material is not acceptable.

2.10 JOINT SEALER

A. Tremco Spectrem 800. Primer: Tremco Silicone Primer No. 23. Tremco-Sealant/Weatherproofing Division, 3735 Green Road, Beachwood, OH 44122; 800 321 7906.

2.11 CURING AND ANTI-SPALLING COMPOUNDS

A. Curing and Anti-Spalling Compound:

1. For use when the concrete is placed at 40 degrees F and above.

2. Sealtight brand Lin-Seal Emulsion curing and sealing compound; Clear emulsion product (not to be confused with Lin-Seal or Lin-Seal white).

3. Manufactured by M.G. by W.R. Meadows, Inc, PO Box 338, Hampshire, IL 60140 0338; 847-683-4500, 800-342-5976.

B. Waterproofing Compound:

1. For use when the concrete is placed below 40 degrees F or when the concrete pavement is within 50 feet of building entrances; or both. Either of the following will be accepted.

2. Products:

a. Lifetime™ Water Sealant by Coatings International, Inc., 112 North Monroe, N.E. Rockford, MI 49341; 616-863-6529; Fax: 616-863-1076; www.coatingsinternational.com

b. Consolideck Saltguard WB by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046; 785-865-4200; Fax: 785-830-9016; www.prosoco.com.

C. Evaporation Retardant:

1. Conspec Aquafilm by Conspec Marketing & Manufacturing, 636 S. 66th Terrace, Kansas City, Kansas 66111; 800-348-7351

2. Confilm Evaporation Reducer by BASF Construction Chemicals, LLC, 23700 Chagrin Boulevard, Cleveland, Ohio 44122-5544, 800-628-9990; Fax 216-839-8821

3. Approved equal

2.12 ADMIXTURES

A. As approved by Project Representative.

2.13 FORMWORK

A. Steel or wood forms of an approved section shall be used throughout the construction. On radii 3 feet or less, 1/4-inch plywood or masonite shall be used. All forms shall have a height equal to concrete thickness. Built-up, battered, bent, twisted, or broken forms shall be removed from the Work. Expansion joint materials shall not be used.

2.14 CONCRETE QUALITY

A. The mixture shall contain 6 sack Portland cement concrete, coarse aggregate, fine aggregate admixtures and water. The concrete mix design shall have a minimum 4000 psi compressive strength at 28 days. The maximum allowable slump shall be 4.5 inches. Aggregates shall be batched by weight. Air content shall be 5% to 8%. Maintain a maximum water/cement ratio of 0.46 pounds of water per pound of cement.

B. Contractor shall provide the Project Representative with delivery tickets which shall list slump, sack mix, percent of air entraining agent, time the truck left the plant, arrived on the site and departed the site, and water added at the site.

C. When requested, Contractor shall provide documentation from the concrete supplier certifying that the concrete meets the specifications of this section.

D. Color shall be limestone. Consistency of the color shall be uniform throughout the Project.

2.15 DETECTABLE WARNING PLATES

A. 24” x 24” Duralast Detectable Warnings, Product number 00700571, Natural Finish by East Jordan Iron Works, Inc.; 800-626-4653

PART 3 - EXECUTION

3.1 PLACING FORMS

A. Forms shall be so constructed and set as to resist, without springing or settlement, the pressure of the concrete. Forms shall not deviate more than 1/8-inch in 10 feet from the true horizontal alignment and no more than 1/8-inch in vertical alignment.

B. Where forms are set above general surrounding area, earth shall be placed along outside edges of forms to ensure stability.

C. Forms shall be cleaned and oiled each time they are used.

D. Forms shall be reviewed by the Project Representative prior to pouring.

3.2 PLACING REINFORCEMENT

A. Place reinforcement mesh as indicated on the Drawings and in the following areas:

1. Where the pavement crosses a recently filled trench and extending a minimum of 5 feet beyond the trench wall.

2. Where fill soil of 18 inches or more occurs.

3. As directed by the Project Representative.

B. Concrete shall be placed in 2 layers when mesh reinforcing is used. Use of brick, stones, etc., or unusual raising with bars or tools is prohibited. Proper positioning of the mesh can be achieved by either; (1) the use of metal or plastic chairs specifically intended for holding mesh reinforcement in the soil conditions present at the required depth, or (2) placing and consolidating a layer of concrete at the specified elevation of the reinforcement prior to placing reinforcement and a top layer of concrete

3.3 PLACING CONCRETE

A. Placing 6-inch (or greater, if specified) concrete shall not commence until the subbase and forms have been approved. Subbase shall be moistened in advance of concreting, but shall not be muddy or excessively wet. A sufficient quantity of forms shall be placed to accommodate the concrete that is scheduled to be poured at any one time. Concrete shall be deposited with a minimum of re-handling and shall be spaded adjacent to forms and joints. In the case of isolation joints, concrete shall be placed simultaneously against both sides of the joint.

B. Concreting shall not be continued when the air temperature is below 45 degrees F, unless the aggregates or water, or both, are heated to produce a placing temperature of the concrete between 60 degrees F and 90 degrees F., and unless adequate provisions are made for maintaining protection against freezing of the concrete for at least 7 days after placing. No concrete shall be placed on frozen subbase.

C. Should placement of concrete be necessary over or near tree roots, a thin layer of sulfur shall be placed on the area of the subbase which may be affected by the roots. Owner shall place sulfur. Provide 2 day notice to coordinate work with Owner’s crews.

3.4 JOINTING

A. As indicated on the Drawings, as directed in the field by the Project Representative and in the following situations, unless otherwise specified:

1. Control (contraction) joints shall ordinarily be placed at intervals equal to the width of the slab or 8 feet, whichever is less. They shall be 1/8-inch to 3/16-inch wide and 1-1/4 inch deep, or 1/4 the thickness of the slab, whichever is greater. Where slabs exceed 8 feet in width, a straight longitudinal control joint shall be placed along the centerline of the slab. This joint shall begin and end only at isolation or construction joints.

2. Expansion joints shall be placed as indicated on the Drawings and if not conflicting with Drawings at intervals of at least every 40 lineal feet (LF), adjacent to footings and foundations, adjacent to curbs when required, adjacent to existing concrete where new concrete is to abut or at next available joint that is parallel to the edge of the existing

concrete. Continue joints in adjoining concrete, in the same location as existed in the concrete that was removed, and where 2 or more walks intersect. Joints shall be placed in a vertical position through the entire slab thickness.

3. Construction joints (with dowels) shall be installed when placing operations are delayed more than a 1/2-hour at locations where normal control joints would occur, as indicated on the Drawings and as directed by the Project Representative.

B. Joints shall be tooled to the specified depth. If the pavement thickness is greater than 6 inches, sawing will be permitted after the joints have first been tooled. The only exception to this requirement is for basketball courts, where only saw cutting is permitted.

C. Joints shall be perpendicular to the edge and tangents and normal to curves. The joints shall not vary from the true line more than 1/4-inch.

D. When new walkways are adjacent to new curb and gutter or when required by the Project Representative, the Contractor shall install a Diamond Dowel System.

E. Place sealant in non-heated pavement joints when specified, according to manufacturer's recommendations, using primer as specified.

3.5 FINISHING

A. Concrete shall be placed and struck off with a straight board until voids are removed in the surface at the required grade and cross section.

B. Adding water to the surface of the concrete to assist in finishing operations is not permitted. If a finishing aid is permitted by the Project Representative, it shall only be an approved product for that intended purpose and then applied according to the product recommendations.

C. Immediately after the concrete has been struck off, the surface shall be floated with a magnesium bull float, just enough to produce a smooth surface free from irregularities. Edges shall be rounded to a radius of 1/4-inch with an approved edging tool. Jointing shall then commence immediately after edging and before the large aggregate in the concrete has started to settle.

D. The entire surface shall then be steel-troweled so that the large aggregate is set and the surface is free of edging joints and trowel marks.

E. The surface shall be heavy-broomed, keeping mortar out of joints. Brooming direction shall generally be perpendicular to the normal path of travel, unless otherwise directed by the Project Representative. Provide 2-inch retool at joints, if detailed on the Drawings.

F. Surface variations greater than 1/8-inch in 10 feet are unacceptable.

G. Walks shall be protected from pedestrian traffic for 2 days and vehicles for 7 days.

H. Concrete shall be stamped at each end of the work with the Contractor's name and the current year.

3.6 CURING AND ANTI-SPALLING COMPOUND APPLICATION

A. For temperatures above 40 degrees F, concrete shall be cured utilizing the specified curing/anti-spalling compound in accordance with product specifications using only a motorized sprayer. This application includes the sides of the concrete, once the forms have been removed.

B. For temperatures between 32 degrees F and 40 degrees F and on concrete within 50 feet of building entrances, cure pavement using an approved wet cure method for a period of not less than 7 full days while maintaining a concrete temperature above 34 degrees F for 14 days. After 30 days, the specified water proofing compound shall be applied according to product specifications.

3.7 DETECTABLE WARNING PLATES

A. Follow manufacturer's installation specifications to properly install detectable warning plates per site plan layout. Pay special attention to be sure the plastic concrete comes through all the holes in the plate to eliminate all cavities below the plate that could trap water.

(CONCRETE PAVEMENT WARRANTY ON THE FOLLOWING PAGE.)

CONCRETE PAVEMENT WARRANTY

PROJECT:
CONTRACTOR:
OWNER: BOARD OF TRUSTEES
MICHIGAN STATE UNIVERSITY

We, the undersigned, herewith warranty all the work to be free from defective workmanship and/or materials for **two (2) years** from November 1st of the calendar year of the date written below, in accordance with the requirements set forth in the Drawings and Specifications for the above-named Project.

The Contractor agrees that by acceptance of this Work and in consideration thereof, for them and for each of their Subcontractors, binds themselves to all warranties called for. The Contractor shall warranty all work, except as noted elsewhere in these Contract Documents in which a longer warranty is specified. This shall include, but not be limited to, the following defects:

1. Cracking
2. Spalling
3. Settling
4. Finishing
5. Forming

If during the warranty period, it is found by the Owner's Representative, that the warranty Work needs to be repaired or replaced because of the use of materials, equipment, or workmanship which is inferior, defective, or not in accordance with the terms of Agreement, the Contractor, upon notification, shall promptly and without additional expense to the Owner:

a. Place in satisfactory condition all of such warranted Work,
b. Make good all damage to the project, or contents thereof, which is a result of such unsatisfactory warranted Work, and
c. Make good any Work, materials and equipment that are disturbed in fulfilling the Warranty, including any disturbed work, materials and equipment that may have been warranted under another contract.

Should the Contractor fail to proceed promptly in accordance with the Warranty, the Owner's Representative may have such work performed at the expense of the Contractor and their surety.

CONTRACTOR: _____ DATE: _____

ADDRESS: _____

AUTHORIZED REPRESENTATIVE: _____ _____
(Print) (Signature)

SUBSCRIBED AND SWORN TO BEFORE ME,

THIS_____DAY OF_____

A.D._____

NAME

MY COMMISSION EXPIRES

END OF SECTION 321313

SECTION 321613 – CONCRETE CURBS AND GUTTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This section includes:

1. Curb and gutters.

C. Related sections include the following:

1. Division 01 Section 015000-TEMPORARTY FACILITIES AND CONTROLS
2. Division 31 Section 312300-EARTHWORK
3. Division 32 Section 321218-BITUMINOUS PAVEMENT
4. Division 32 Section 321313-CONCRETE PAVEMENT

1.3 SUBMITTALS

A. Testing and Inspection: Provide reports as described in this section.

B. Warranties: Submit written special warranty as specified in this Section. Include contact information, description of coverage, and start date for each special warranty.

1.4 QUALITY ASSURANCE

A. Provide the required testing and inspection as indicated in Division 01 Section “General Requirements - Temporary Facilities and Controls.” Concrete sampling, testing, and inspection shall conform to the requirements found in Division 32 Section “Concrete Pavement.”

1.5 SCHEDULE

A. Concrete shall not be placed after October 15 without written permission from the Project Representative.

1.6 WARRANTY

A. Furnish and sign 2 year written warranty (last page of this section) which shall cover cracking, spalling, settling, finishing and forming.

PART 2 - PRODUCTS

2.1 Refer to Division 32 Section "Concrete Pavement" for all products, except for the following:

A. Reinforcement: Shall be No. 4 bar reinforcement of new billet stock of intermediate grade in accordance with ASTM A615.

PART 3 - EXECUTION

3.1 PLACING FORMS

A. Steel or wood forms of an approved section shall be used throughout the construction. On radii 3 feet or less, 1/4-inch plywood or masonite shall be used. All forms shall have a height equal to concrete thickness. Built-up, battered, bent, twisted, or broken forms shall be removed from the work. Expansion joint materials shall not be used.

B. Forms shall be so constructed and set as to resist, without springing or settlement, the pressure of the concrete. On curbs of sharp radius, plywood or other approved flexible material shall be used in sections short enough to form a smooth, uninterrupted curb which shall not vary form the true radius by more than 1/4-inch. Forms shall not deviate more than 1/8-inch in 10 feet from the true horizontal alignment and no more than 1/8-inch in vertical alignment.

C. Where forms are set above general surrounding area, earth shall be placed along outside edges of forms to ensure stability.

D. Forms shall be cleaned and oiled each time they are used.

E. Forms must be approved by the Project Representative prior to placing concrete.

3.2 PLACING REINFORCEMENT

A. Place 2 bars in gutter pan as specified in Drawings and in the following areas:

1. Where curb crosses a recently filled trench and extending a minimum of 5 feet beyond trench wall.

2. Where fill soil of 18 inches or more occurs.

3. In all valley gutter pans. (exception – 3 bars as shown on the detail drawing)

4. In all path ramps and extending a minimum of eighteen inches beyond the bottom of the curb taper or curb transition.

5. As directed by the Project Representative.

3.3 PLACING CONCRETE

A. Refer to Division 32 Section "Concrete Pavement." However, the time restriction may be extended with the approval of the Project Representative.

3.4 JOINTING

A. Control (contraction) joints shall be perpendicular to the curb edge, 1-1/2-inch deep, open and free of all excess concrete. Control joints shall be placed at intervals of not more than 10 feet as indicated on the Drawings.

B. Expansion joints shall be placed at all points of curvature, tangency, and at intervals of not more than 100 lineal feet.

3.5 FINISHING

A. Concrete shall be struck off true to cross section, after which it shall be finished smooth and even. Face forms, if used, shall be left in place until the concrete has set sufficiently so that they can be removed without injury to the curb. The remaining forms shall be rounded with an edging tool. No tool marks are to be left on exposed edges.

B. A straight edge check is to be made while concrete is still plastic. Irregularities exceeding 1/8-inch shall be corrected. Finish surfaces shall not vary form the required cross section as indicated on Drawings by more than 1/8-inch. They shall not vary from the true horizontal alignment by more than 1/4-inch in 10 lineal feet. Sections exceeding those limitations are subject to rejection and replacing at Contractor's expense.

C. Adding water to the surface of the concrete to assist in finishing operations is not permitted. If a finishing aid is permitted by the Project Representative, it shall only be an approved product for that intended purpose and then applied according to the product recommendations.

3.6 CURING AND ANTI-SPALLING COMPOUND APPLICATION

A. Refer to Division 32 Section "Concrete Pavement."

(CONCRETE CURB AND GUTTER WARRANTY ON FOLLOWING PAGE.)

CONCRETE CURB & GUTTER WARRANTY

PROJECT:
CONTRACTOR:
OWNER: **BOARD OF TRUSTEES**
MICHIGAN STATE UNIVERSITY

We, the undersigned, herewith warranty all the work to be free from defective workmanship and/or materials for **two (2) years** from November 1st of the calendar year of the date written below, in accordance with the requirements set forth in the Drawings and Specifications for the above-named Project.

The Contractor agrees that by acceptance of this Work and in consideration thereof, for them and for each of their Subcontractors, binds themselves to all warranties called for. The Contractor shall warranty all work, except as noted elsewhere in these Contract Documents in which a longer warranty is specified. This shall include, but not be limited to, the following defects:

1. Cracking
2. Spalling
3. Settling
4. Finishing
5. Forming

If during the warranty period, it is found by the Owner's Representative, that the warranty Work needs to be repaired or replaced because of the use of materials, equipment, or workmanship which is inferior, defective, or not in accordance with the terms of Agreement, the Contractor, upon notification, shall promptly and without additional expense to the Owner:

a. Place in satisfactory condition all of such warranted Work,
b. Make good all damage to the project, or contents thereof, which is a result of such unsatisfactory warranted Work, and
c. Make good any Work, materials and equipment that are disturbed in fulfilling the Warranty, including any disturbed work, materials and equipment that may have been warranted under another contract.

Should the Contractor fail to proceed promptly in accordance with the Warranty, the Owner's Representative may have such work performed at the expense of the Contractor and their surety.

CONTRACTOR: _____ DATE: _____

ADDRESS: _____

AUTHORIZED REPRESENTATIVE: _____ _____
(Print) (Signature)

SUBSCRIBED AND SWORN TO BEFORE ME,

THIS_____DAY OF_____

A.D._____

NAME

MY COMMISSION EXPIRES

END OF SECTION 321613

SECTION 321723 – PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This section includes pavement markings.

C. Related sections include the following:

1. Division 32 Section 321216-BITUMINOUS PAVEMENT
2. Division 32 Section 321613-CONCRETE PAVEMENT

1.3 QUALITY ASSURANCE

A. Approved installation contractors for both pavement marking types:

1. P.K. Contracting, P.O. Box 184, Clawson, MI 48017; 313-362-2130.
2. Parallel Contracting, Inc., 3420 E. Grand River, Williamston, MI 48895; 517-819-3853.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC PAVEMENT MARKINGS

A. According to 2012 MDOT Section 811 specification. Color: White and yellow, as indicated on the Drawings.

2.2 PRE-FORMED THERMOPLASTIC BARRIER FREE SYMBOL

A. Barrier Free Kit White on Blue Item #89230237HS, 40-inch x 40-inch size. Color: Blue.

B. Manufacturer: Ennis-Flint, Inc. (allow 2 weeks for delivery), 115 Todd Court, Thomasville, NC 27360; 336-475-6600, Fax: 336-475-7900.

2.3 PRIMER FOR THERMOPLASTIC MATERIAL

A. #623206-20 – 5 gallon.

B. #623206-4 – 1 gallon.

2.4 GLASS BEADS

A. According to 2012 MDOT Section 811 specification.

2.5 TRAFFIC PAINT

A. Regular dry pavement marking paint according to 2012 MDOT Section 811 specification.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Pavement cleaning and marking application shall be according to 2012 MDOT section 811 specification and as indicated on the Drawings.

B. Use primer on installations as indicated in the manufacturer's specifications.

C. Barrier Free Symbol Placement: Bottom edge of the symbol square shall be aligned with the end of the line striping closest to the travel aisle and in the center of the parking space.

D. Place glass beads on thermoplastic lines.

E. All thermoplastic pavement markings (symbols and line work) on bituminous pavement in roadways shall be recessed to the thickness of the pavement marking.

1. The resulting surface interface between the markings and the bituminous shall be smooth.

2. Concrete pavement shall not be recessed for pavement markings.

F. Pavement markings in new bituminous pavement parking areas shall be thermoplastic unless otherwise noted on plans.

G. Thermoplastic pavement markings in parking areas are not required to be recessed unless otherwise noted on the plans.

END OF SECTION 321723

SECTION 334000 – STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This section includes storm drainage systems.

C. Related sections include the following:

1. Division 01 Section “General Requirements - Temporary Facilities and Controls.”
2. Division 31 Section “Earthwork.”

1.3 DESCRIPTION

A. Storm and sanitary sewers shall be 2 separate systems.

B. New manholes and catch basins shall be precast construction except for bases.

C. Surface drainage shall be to catch basins; no storm water shall pass into a storm sewer without first passing through a catch basin.

D. Concrete storm sewer pipe shall use a rubber "O" ring joint.

E. Manholes and catch basins shall be constructed as specified herein and indicated on Drawings.

1.4 REFERENCES

A. Except as herein specified or as indicated on the Drawings the work of this section shall comply with the following:

1. AASHTO Standards M36 – Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains

2. M218 – Sheet Steel, Zinc-Coated (Galvanized) for Corrugated Steel Pipe.

3. MDOT:

a. 2012 MDOT Standard Specifications for Construction.
b. MDOT Standard Plans.

1.5 SUBMITTALS

A. Before commencing work, the Contractor shall provide an affidavit from the material manufacturers, that their materials meet the Specifications.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE SECTIONS

A. ASTM C-478: Cone section shall be eccentric to allow for a straight vertical ladder.

2.2 STRUCTURE BLOCK AND BRICK

A. Block: ASTM C-139.

B. Brick: ASTM C-139.

2.3 COVERS AND GRATES:

A. As specified on Drawings, or as indicated below:

1. Curb Inlet: EJIW 7045, M1 grate.

2. Square Inlet: EJIW 5105, M1 grate (for valley gutter pans).

3. Round Inlet – Light Duty: EJIW 1130, M3 grate.

4. Round Inlet – Heavy Duty: EJIW 1040, M1 grate for parking lots, M3 grate for walks – ADA compliant.

5. Manhole Structure: EJIW 1040, Type B – Vented cover.

6. Rolled Curb: EJIW 7065, M1 grate.

2.4 ADJUSTING RINGS

A. The inside diameter shall not be less than the diameter of the casting for which it is used.

B. Allowable types include:

1. Precast Reinforced Concrete: Without cracks. 2-inch to 6-inch thick, minimum 3000 psi. Reinforcement rod shall not be visible on the surface.

2.5 MANHOLE STEPS

A. EJIW 8500.

2.6 PORTLAND CEMENT

A. ASTM C150 Type 1.

2.7 HYDRATED LIME

A. ASTM C207.

2.8 SAND AND GRAVEL AGGREGATE

A. ASTM C33.

2.9 CONCRETE

A. Refer to Division 32 Section “Concrete Pavement.”

2.10 MASONRY CEMENT

A. ASTM C91.

2.11 CORRUGATED PERFORATED POLYETHYLENE DRAIN TILE

A. ASTM F405 with heavy sock.

2.12 PVC GASKETED DRAIN PIPE

A. Storm sewer up to and including 12-inch diameter and for pipe leading from catch basins.

1. SDR 35, ASTM D2729.
2. Other products as specified.
3. Rubber boot to connect pipe to structure.

2.13 REINFORCED CONCRETE PIPE

A. Storm Sewer 12-inch Diameter and Larger: ASTM C76.

2.14 INLET STRUCTURE SILT SCREEN

A. Silt-Saver sold by Price and Company, Inc. 425 36th St., SW, Wyoming, MI 49548; 800-248-8230, 616-530-8230; or approved equal.

1. SS-100A: Fits round structures to 48-inch ID.
2. SS-200A: Fits square structures to 60-inch OD.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Connections and changes in direction or grade shall be made in manholes.

B. Structure bases shall be cast-in-place concrete, transit mixed with minimum compressive strength of 3000 psi at 28 days, formed and finished level. Precast bases may be used with written approval of the Project Representative and where required by extremely difficult site conditions. Base slab shall be fully cured before precast portions are set.

C. Precast concrete shall be used to construct structures. Only when precast sections are not manufactured in the size and shape required will block constructed structures be permitted. The Project Representative shall be notified prior to construction of block structures. Set precast sections in full mortar bed.

D. Adjustment to Casting Elevations:

1. Concrete rings shall be used wherever possible to adjust casting elevations. Rings shall be set in full mortar bed. Use a maximum of 3 rings.

E. Tile shall be laid through the manhole and 3000 psi concrete shall be placed around the tile up to half of the diameter. The concrete shall slope from the walls of the manhole to the sewer. When there is a change in grade, direction, or pipe size, the flow channel shall be built from bricks and 3000 psi concrete to make a uniform, smooth change in grade, direction or pipe size.

F. Vertical elevation of the invert shall be within plus or minus 0.04 foot (1/2-inch) of required elevation. Horizontal alignment must meet the same tolerance.

G. Pipe Connections to Structures:

1. Connections with existing sewers shall be made at points and in a manner indicated on the Drawings and approved by the Project Representative.

2. Sewers being disconnected shall be sealed off with concrete.

3. If PVC pipe connects to an existing or new structure, the pipe shall connect with an appropriately sized rubber boot.

H. Catch basin sump shall extend 2 feet below the pipe outlet invert.

I. Construct a peripheral sub-drainage system for catch basins.

1. Install 4-inch diameter perforated polyethylene corrugated drain pipe with a heavy duty sock covering around each new structure and existing structure, if at least 4 vertical feet is exposed or the outlet pipe is exposed.

2. Pipe shall enter catch basin with a tee connector, 2 inches above and directly opposite the outlet invert.

3. The peripheral drain pipe shall be positioned at 1/4-inch to provide positive drainage to the catch basin. The peripheral drain pipe shall be placed over the outlet pipe. Do not cut and cap the drain pipe at the outlet pipe.

4. Backfill the drain pipe with properly compacted Class II sand to the finish subgrade.

3.2 TESTING AND INSPECTION

A. Internal Television Inspection of Storm Sewers:

1. General:

a. Inspect sanitary sewers using a closed-circuit color television camera.

b. Provide Engineer with videos DVD format and written logs to document the internal television inspection:

1) Written logs shall note the location of sewer laterals and pipe deficiencies by distance from the upstream manhole.

2) The video tape shall include audio commentary regarding the sewer condition.

c. Engineer will review the videos and written logs to verify that the storm sewers were constructed in accordance with the Contract Documents.

d. The videos shall verify that the storm sewers are clean and free of sediment and debris to the satisfaction of Engineer. Storm sewers not satisfactorily cleaned shall be promptly cleaned and reinspected by closed-circuit color television camera.

e. Television inspection shall be completed, documentation of television inspection shall be provided and Engineer shall determine that the sewers were constructed in accordance with the Contract Documents before payment for completed sections of sanitary sewer will be recommended to Owner.

2. Performance Requirements:

a. Inspection procedures and equipment shall meet the applicable standards as presented in the National Association of Sewer Service Companies (NASSCO) Recommended Specifications for Sewer Collection System Rehabilitation.

b. Each section of sanitary sewer between manholes shall be television inspected separately utilizing a video camera and related equipment specifically designed for the purpose of internal sewer inspection.

c. The camera speed shall not exceed 30 feet per minute.

d. The camera shall be stopped for no less than 10 seconds at the entrance manhole, each service lateral, exit manhole, and at points where the sewer is damaged or deficient.

e. Lighting for the camera shall be adequate to allow a clear picture of the entire periphery of the sewer and shall be varied as required to be effective for all pipe diameters inspected.

f. Cables and equipment used to propel the camera shall not obstruct the camera view or interfere with the documentation of the sewer conditions.

g. The video recording shall be continuous video file.

h. The mobile recording studio shall have adequate space to accommodate up to 3 persons for the purpose of viewing the video monitor while the inspection is in progress.

i. Whenever possible, the camera shall move in a downstream direction.

j. The location of the camera in the sewer shall be monitored by an accurate measuring system which records the distance traveled from the upstream manhole on the video.

k. Video DVDs and written logs shall be clearly labeled with the Project name and location identification.

l. If sewer has dirt and debris which prohibits video inspection, the sewer shall be cleaned and re-televised at no expense to Owner.

END OF SECTION 334000