SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR:
MACOMB TOWNSHIP
AEW PROJECT NO. 0249-0322

OWNER:
MACOMB TOWNSHIP
54111 BROUGHTON RD
MACOMB, MICHIGAN 48042

586.726.1234
www.aewinc.com

ISSUED FOR PROPOSALS:
FEBRUARY 13, 2025

DOCUMENT 00 01 00

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REQUEST FOR PROPOSAL

PROJECT
Macomb Township
DPW Addition
AEW Project No. 0249-0322

OWNER
Macomb Township
54111 Broughton Rd.
Macomb, MI 48042

LOCATION
Macomb Township DPW
51650 Card Rd
Macomb, MI 48042

ARCHITECT/ENGINEER
AEW Inc.
51301 Schoenherr Road
Shelby Township, Michigan 48315
(586) 726-1234

DESCRIPTION
The scope of work involved for this project is as follows:
10,557 sq ft addition to the east of the existing Macomb Township DPW, including 9,360 sq ft PEMB garage and 1,197 sq ft masonry storage work area.

SCOPE OF PROPOSAL
Sealed proposals are invited for the Project and will be received at the Township Clerk until 1 p.m., local time; **March 13, 2025**. Proposals will be publicly opened in the Township Board Room immediately thereafter. Each proposal will be evaluated and scored based on its price, workplan, staff experience, and schedule. As such, proposal prices will not be read at proposal opening.

PRE-PROPOSAL MEETING
A mandatory pre-proposal meeting will be held at the project location at **February 20, 2025, 2:00pm**

Pre-proposal questions shall be submitted to the Owner before **February 27, 2025, 2:00pm**, local time. Email all questions to: solomonj@macomb-mi.gov. Please include the Project Name and AEW Project Number in the Subject line of the email, "Project Name – Project Number – Pre-Proposal Questions" for example.

DOCUMENTS
This solicitation, along with all attachments may be downloaded from the BidNet at www.bidnetdirect.com. Documents shall be available on **February 13, 2025**. Any and all Addenda issued by the owner must be viewed or downloaded from the above listed website.

PROPOSAL GUARANTEE AND CONTRACT SECURITY

Each proposal shall be accompanied by a certified check, bank draft or satisfactory proposal bond in an amount of 5% of the maximum proposal amount. Checks shall be made payable to "**Macomb Township**". Proposals may not be withdrawn for a period of sixty (60) calendar days after receipt of proposals. The successful respondent will be required to furnish the required insurance and bond certificates.

RIGHTS OF THE OWNER

The Owner reserves the right to reject any or all proposals and to waive irregularities in proposals, or to accept the lowest responsible proposal that, in the opinion of the Owner, will serve his best interest. If an applicant fails to fully comply with these requirements by the time the contract is ready to be awarded, it may be determined that the applicant is not qualified to receive an award and use that determination as a basis to make an award to another applicant.

DATED: FEBRUARY 14, 2025 Macomb Township

SECTION 00 21 13 - INSTRUCTIONS TO RESPONDENTS

Owner will receive sealed proposals only as set forth in the Request for Proposal and complying with all requirements as contained in Instructions to Respondents.

DOCUMENTS

Proposal documents consist of plans and specifications as prepared by Anderson, Eckstein and Westrick, Shelby Township, Michigan.

Proposal documents can be downloaded from the BidNet website at https://www.bidnetdirect.com/ beginning February 13, 2025.

Proposal DOCUMENTS

The Proposal Documents consist of the following:

The Drawings as enumerated in Section 00 85 10, Index of Drawings.

The Specifications as enumerated in the Table of Contents.

All other documents as provided for in Article 1, Paragraph 1, Section 1 of the General Conditions as modified.

EXAMINATION

Each respondent shall examine the Proposal Documents and satisfy himself about the extent of the proposed work by personal examinations of the site and surroundings, and make his own estimate therefrom of the facilities and difficulties attending the performance and completion of the job.

No additional compensation will be allowed on account of conditions which could be determined by examining the Proposal Documents or the site.

INTERPRETATION

If any person contemplating submitting a proposal is in doubt as to the true meaning of any part of the Drawings, Specifications, or other proposal Documents, they must submit to the Owner, a written request for an interpretation thereof. If such an

interpretation is not requested, the proposals will be presumed to be based upon the interpretation and directions given by the Architect after Contract award, in accordance with provisions of the Contract. Neither the Owner nor the Architect will be responsible for any verbal explanations or interpretations of the Proposal Documents.

Every request for such interpretation should be in writing, addressed to the Owner at his office, and to be given consideration, must be received at least fourteen (14) days prior to the date fixed for the opening of proposal. Any and all such interpretations, and any supplemental instructions will be in the form of written addenda to the Proposal Documents which, if issued, will be posted on BidNet prior to the date fixed for the opening of proposals. All addenda so issued shall become part of the Proposal Documents.

SUBSTITUTIONS

To obtain approval to use unspecified products, respondents shall submit written requests at least fourteen (14) days before the proposal date. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. If the product is acceptable, the Architect will approve it in an Addendum issued to BidNet.

BASIS OF PROPOSAL

A single lump sum proposal is being entertained for the complete work of this proposal.

Partial or segregated proposals or assignments will not be considered. Include quotes for all alternates and unit prices; failure to do so may result in rejection of the proposal.

PREPARATION

Proposal shall be submitted on the form bound in these specifications, Form of Proposal, in original form without erasures, interlineations or alterations.

Submit three (3) copies of proposal, retain one for your records. Oral, fax, email, or telephone proposals will not be accepted.

Proposals must be filled out in ink or typewritten in duplicate. Blank spaces in the proposals must be filled in and no changes shall be made to the phraseology of the proposal. Quotes shall be entered in written and numeric forms. In case of a discrepancy between the written and the numeric form, the written form shall govern.

All proposals shall be signed and dated in longhand.

Proposals which are not signed by the individual making them should have attached thereto a power of attorney, evidencing authority to act as agent for the person whom it is signed.

Proposals which are signed for a partnership should be signed by one of the partners or by an attorney-in-fact. If signed by an attorney-in-fact, evidence of authority to sign the proposals shall be attached.

Proposals which are signed for a corporation should have the correct corporate name thereon and the signature of the president or other officer legally able to contract in the name of the corporations. In addition, a signed Secretary's Certificate evidencing the authority of the Officer to contract in the name of the corporation shall be included. Any proposal submitted by a corporation shall bear its seal.

PROPOSAL SECURITY

The successful respondent's securities will be retained until they have signed the Contract and furnished the required payment and performance bonds. The Owner reserves the right to retain the security of the next two lowest respondents for each contract until the lowest respondents enter into contract, or until sixty (60) days after the proposal opening, whichever is the shorter. All other proposal security will be returned as soon as practicable. If any respondent refuses to enter into a Contract, the Owner will retain his Proposal Security as liquidated damages, but not as a penalty.

SUBCONTRACTORS

The Owner and Architect reserve the right to require of respondents tentatively selected for consideration in the awarding of the Contract, a list of the subcontractors whom the Contractor intends to employ.

The Owner reserves the right to disapprove the use of any proposed subcontractor,

and in such event, the respondent submitting such subcontractor shall submit another such subcontractor in like manner within the time specified by the Owner. The Owner reserves the right to reject any proposal if such information required by the Owner is not submitted as above indicated.

SUBMITTAL

Submit proposals in sealed opaque envelopes having listed thereon the following:

PROPOSAL: MACOMB TOWNSHIP DPW ADDITION
REQUEST FOR PROPOSALS
Macomb Township
ATTN: Township Clerk
Project #: 0249-0322

Contractor: _____

WITHDRAWAL

Proposals for base proposal may not be withdrawn for a period of sixty (60) days after the time established for the receiving of proposals. Respondents may withdraw at any time prior to the time set for the receiving of proposals.

IRREGULARITIES

The Owner reserves the right to disqualify proposals before or after opening, upon evidence of collusion with intent to defraud, or other illegal practices upon the part of the respondent.

The Owner also reserves the right to reject any or all proposals in whole or in part and to waive any informalities therein.

Any error and/or omission in the proposal form or any other irregularity as a result of negligent preparation shall not furnish cause for relief for any damages resulting therefrom, nor in any way relieve the Contractor from fulfillment of all contractual obligations as provided for in the Proposal Documents.

EVALUATION CRITERIA

Minimum Information Required- The owner will use a qualification-based selection

process to review and award the project. Respondents are required to include the following information with their Proposal:

a. Professional qualifications and Past involvement with similar projects.
b. Proposed work plan
c. Schedule
d. Cost Proposal

The following describes the elements that should be included in each of the Proposal sections and the weighted point system that will be used for evaluation of the proposals:

1) Professional Qualifications and Past Involvement with Similar Projects – 25 points.
    a. State the full name and address of your organization and, if applicable, the branch office, and Major Subcontractors that will perform, or assist in performing, the work hereunder.
    b. Complete the attached respondent's Qualifications Questionnaire (Section 00 45 13) for the prime contractor.
    c. Provide a list of specific experience and indicate proven ability in implementing similar projects for the firm to be involved in the project. At a minimum, prime contractor should provide a minimum of one project of similar size and type completed in the past 10 years. A complete list of client references must be provided for similar projects recently completed. It shall include the firm/agency name, address, telephone number, project title, and contact person. In addition to the information requested on the form, provide detailed explanations of the previous projects as part of the written Proposal and any additional information that would be helpful for the owner to determine the most appropriate respondent to be used.
    d. Provide any additional information on your qualifications or those of the Major Subcontractors that would be helpful for the owner to determine the most appropriate respondent to be used.
2) Proposed Work Plan – 30 points.
    a. Provide a detailed and comprehensive description of how the respondent intends to complete the services requested in the Drawings, Specifications and other Contract Documents.
    b. Respondents will be evaluated on the clarity, thoroughness, and content of their responses to the above items.
3) Schedule – 15 points.
    a. Each respondent shall submit with the proposal documents a

preliminary resource-loaded schedule demonstrating the respondent's plan to complete the construction work within the time allowed in the contract and to achieve the completion of any milestones identified in the contract documents.

b. The respondent's Preliminary Schedule will provide an orderly progression of the work to completion within the Contract Times. The Preliminary Schedule will outline major project milestones including completion dates. This will reflect the Contract dates and include all construction activities such as detailing, shop fabrication, intervals from purchase to delivery of purchased items, crew and other resource loading, field activity durations, etc., and will be sufficiently detailed to enable the owner and architect to evaluate the contractor's plan and ability to complete all aspects of the work within the contract time periods. the preliminary schedule shall include all activity by others that contractor requires to successfully complete the project, and its scheduled activities within the times set forth in the preliminary schedule. The preliminary schedule shall show all critical path activities regardless of duration.

c. The respondent's Preliminary Schedule shall be prepared using the current version of Primavera, Microsoft Project, or Microsoft Excel and shall be submitted with the Proposal. Failure to provide the requested schedule including all the above provisions may result in the contractor being declared non-responsive.

4) Cost Proposal – 30 Points.

a. Cost Proposal shall be submitted as part of the proposal using the proposal Form included in this proposal package.

b. The following documents are included in the proposal package and are to be submitted with the proposal Form

i. Respondent's Certificate of Insurance
ii. Section 00 40 10 Familial Disclosure Statement
iii. Section 00 40 30 Non-Discrimination in Employment
iv. Section 00 40 50 Contractor Notification Form
v. Section 00 40 60 Contractors Certification of asbestos- free product and installation
vi. Section 00 43 36, Proposed Subcontractors Form.
vii. Section 00 45 13, Respondents' Qualifications, for the prime contractor and each of the major Subcontractors.

PROPOSAL EVALUATION

A. A selection committee composed of owner staff and architecture staff will evaluate each Proposal on the above-described criteria and point system to select a short list of respondents for further consideration. The owner reserves the right to not consider any Proposal which it determines to be unresponsive and/or deficient in any of the information requested for evaluation. A Proposal with all the requested information does not guarantee the proposing firm to be a candidate for further consideration. The owner may contact references to verify material submitted by the respondents.

B. Interviews with the short-listed respondents will be scheduled if deemed necessary by the owner. At the interviews, the short-listed respondents will be given the opportunity to discuss in more detail their qualifications, past experience, proposed work plan, schedule, and cost proposal. The interview must include the project team members expected to complete a majority of work on the project. The interview shall consist of a presentation of up to fifteen (15) minutes by the respondent, including the person who will be the project manager on this contract, as well as Site Supervisor, followed by up to Thirty (30) minutes of questions and answers. The oral interviews may be recorded by the Evaluation Team.

C. The respondents interviewed will then be re-evaluated on the above criteria, and adjustments to scoring will be made as appropriate.

TAXES AND CONTRIBUTIONS

Proposal, unit prices, alternate prices stated include all taxes or contributions required by respondent's business.

Michigan State sales tax is applicable to this work.

OPENING

Proposals will be publicly opened.

PROPOSAL BREAKDOWN CONSTRUCTION INFORMATION

Upon notice from the Architect, the low respondents shall submit a detailed cost breakdown of all work covered by the Proposal Documents. The breakdown shall show quantity of material and labor, units of material and labor, material cost, labor cost and total cost in a schedule of values on an AIA G703 form.

EXECUTION OF CONTRACT

The Owner reserves the right to accept any and all proposal, or to negotiate contract terms with the various respondents when such is deemed by the Owner to be in their best interest.

END OF SECTION 00 21 13

SECTION 00 40 10 - FAMILIAL DISCLOSURE STATEMENT

All Respondents must complete the following familial disclosure form in compliance with MCL 380.1267 (Public Act 232 of 2004) and attach this information to the Proposal.

By the attached sworn and notarized statement we are disclosing the following familial relationship(s) that exists between the owner or any employee of the Respondent and any member of the Board of trustees, or employees of The Owner and will not accept a Proposal that does not include this sworn and notarized disclosure statement.

Disclose any familial relationship and complete the form below in its entirety:

The following are familial relationships as described above (provide employee name, family contact name, family contact position, and familial relationship or NONE.)

_____

_____

_____

PRINT:
Company Name: _____

Phone: _____

Street Address: _____

City / State / Zip: _____

Company Officer: _____Title: _____

Officer's Signature: _____ Date: _____

STATE OF MICHIGAN)
) SS
COUNTY OF_____)

On this ____ day of _____, 20____, before me a Notary Public in and for said county, personally appeared agent of the said firm _____ and who acknowledged the same to be their free act and deed as such agent.

Notary Public: _____ Expiration Date: _____

Seal Imprint:

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT

Michigan Public Act No. 517 of 2012

The undersigned, the owner or authorized officer of the below-named Contractor, pursuant to the compliance certification requirement provided in the Macomb Township (the "Owner") Macomb Basement Build Out Phase 2 (the "RFP"), hereby certifies, represents and warrants that the Contractor (including its officers, directors and employees) is not an "Iran linked business" within the meaning of the Iran Economic Sanction Act, Michigan Public Act No. 517 of 2012 (the "Act"), and that in the event the Contractor is awarded a contract as a result of the aforementioned RFP, the Contractor will not become an "Iran linked business" at any time during the course of performing any services under the contract.

The Contractor further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than $250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the Owner's investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to respond to a request for proposal for three (3) years from the date that it is determined that the person has submitted the false certification.

_____
Name of Contractor

By: _____

Its: _____

Date: _____

State of_____)
)SS.
County of _____)

This instrument was acknowledged before me on the _____ day of _____, 20__, by_____.

_____
Notary Public

_____County,_____

My commission expires on _____

Acting in the County of _____

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SECTION 00 40 30 NON-DISCRIMINATION IN EMPLOYMENT

TO _____

Name of union or organization of workers

The undersigned currently holds contract(s) with _____ (Applicant's Name) involving funds or credit of the U.S. Government of (a) subcontract(s) with a prime contractor holding such contract(s).

You are advised that under the provisions of the above contract(s) or subcontract(s) and in accordance with Executive Order 11246, dated September 24, 1965, the undersigned is obliged not to discriminate against any employee or applicant for employment because of race, color, creed, or national origin. This obligation not to discriminate in employment includes, but is not limited to the following:

HIRING, PLACEMENT, UPGRADING, TRANSFER, DEMOTION, RECRUITMENT, ADVERTISING, SOLICITATION FOR EMPLOYMENT, TRAINING DURING EMPLOYMENT, RATES OF PAY OR OTHER FORMS OF COMPENSATION, SELECTION FOR TRAINING INCLUDING, APPRENTICESHIP, LAYOFF OR TERMINATION.

This notice is furnished to you pursuant to the provisions of the above contract(s) or subcontract(s) and Executive Order 11245.

Copies of this notice will be posted by the undersigned in conspicuous places available to employees or applicants for employment.

PRINT:

Company Name: _____Phone: _____

Street Address _____

City / State / Zip _____

Company Officer: _____Title: _____

Officer's Signature: _____Date: _____

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SECTION 00 40 50 CONTRACTOR NOTIFICATION FORM FOR NEW OR RENOVATION WORK

(In accordance with 40 CFR Part 763.84 [d])

As required by the EPA AHERA standard, the Owner is responsible for providing Contractors with information regarding locations of known or assumed asbestos containing material prior to entering a building under the district's jurisdiction.

Please complete this form and return it to Anderson, Eckstein & Westrick, Inc.

I (We) representing and having authority for _____(company), hereby indicate and agree that a representative of the Owner has provided me information regarding the specific locations and materials that are asbestos-containing materials which may be encountered or have the potential of being encountered during the course of activities involving Macomb Township DPW Addition. 0249-0322.

I expressly agree that neither I nor any of my employees, agents, subcontractors or other individuals or entity over whom I have any responsibility or control, will disturb asbestos-containing materials as listed in the Management Plan for the above-mentioned building, except as required for the completion of the Work and only by licensed abatement contractors per requirements under law.

I further understand and agree that should I, my employees, agents, subcontractors or other individuals or entities over whom I have control, encounter any material suspected of containing asbestos, said materials shall not be disturbed without first notifying the Owner and receiving approval that such material may be disturbed.

PRINT:
Company Name _____Phone_____

Street Address _____

City / State / Zip _____

Company Officer _____Title_____

Officer's Signature _____Date_____

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SECTION 00 40 60 CONTRACTOR'S CERTIFICATION OF ASBESTOS-FREE PRODUCT AND INSTALLATION

It is hereby understood and agreed that no products/materials containing asbestos, including Chrysotile, Amosite, Crocidolite, Tremolite Asbestos, Anthopyllite Asbestos, Actinolite Asbestos or any combination of these materials that have been chemically treated and/or altered shall be installed or introduced into the building by the Contractor or their employees, agents, subcontractors or other individuals or entities over whom the Contractor has control. The Contractor shall be required to sign this certification statement ensuring that all products or materials installed or introduced into a building will be asbestos-free.

The Contractor shall also be required to furnish certified statements from the manufacturers of supplied materials used during construction verifying their products to be asbestos-free in accordance with the previous paragraph.

Project's Name: _____

Project's Address: _____

Project's City/State/Zip: _____

Architect's Name: _____

Project Number: _____

CONTRACTOR'S CERTIFICATION

We (I) certify and will direct that all products and materials that will be and/or have been installed or introduced into the above-named Project shall be asbestos-free (or less than one-percent (1%) asbestos by weight).

PRINT:

Company Name: _____

Phone: _____

Street Address: _____

City / State / Zip: _____

Company Officer: _____

Title: _____

Officer's Signature: _____

Date: _____

MACOMB TOWNSHIP DPW ADDITION
AEW PROJECT #0249-0322 FEBRUARY 13, 2025

NON-COLLUSION AFFIDAVIT

County)
) SS:

_____ being first duly sworn, deposes and says that he is the

_____
(Individual, Partner, Corporate Officer)

making the foregoing proposals; that such proposals are genuine and not collusive or sham; such respondent has not colluded, conspired, connived, or agreed, directly or indirectly, with any respondent or person, to put in sham a proposal, or that such other person shall refrain from responding and has not in any manner, directly with any person, to fix the proposal price of afferent or any other respondent, or to fix any overhead, profit or cost element of said proposal price, or of that of any other respondent, or to secure any advantage against the Joint Purchasers or any person or persons proposal are true; and further, that such respondent has not, directly or indirectly submitted this proposal, or the contents thereof, or divulged information or data relative thereto any association or to any member or to any member or agent thereof.

_____

Sworn to and subscribed before me this _____ day of _____, 20_____.

_____
Notary Public

My commission expires on _____

RESPONDENT: THIS AFFIDAVIT MUST BE COMPLETED, SIGNED, NOTARIZED AND INCLUDED IN YOUR PROPOSAL SUBMISSION.

SECTION 00 41 00 – PROPOSAL FORM/ALL TRADES

_____
Name of Contractor

_____
Address, City, Zip

_____
Phone #/Fax #

_____
Email Address

PROJECT
Macomb Township DPW Addition

OWNER
Macomb Township
54111 Broughton Rd.
Macomb, MI 48042

ARCHITECT
ANDERSON ECKSTEIN & WESTRICK
51301 SCHOENHERR ROAD
SHELBY TOWNSHIP, MICHIGAN 48315

BASE PROPOSAL

Pursuant to and in compliance with the Request for Proposal and the Instructions to Respondents, and having carefully examined the Proposal Documents with the Owner to complete the work in accordance with the said Proposal Documents (include an Owner directed contingency of $100,000.00 in the base proposal) for the sum of:

_____
(Sum to be written out)

$_____

BREAKDOWN OF BASE PROPOSAL (Submit at time of submission of proposal):

SITE, UNDERGROUND, & EARTHWORK	($_____)DOLLARS
DEMOLITION	($_____)DOLLARS
ARCHITECTURAL	($_____)DOLLARS
MECHANICAL HVAC	($_____)DOLLARS
ELECTRICAL	($_____)DOLLARS
GENERAL/MISC. CONDTIONS	($_____)DOLLARS
OWNER DIRECTED CONTINGENCY	($__100,000.00__)DOLLARS
TOTAL LUMP SUM BASE PROPOSAL	($_____)DOLLARS

Alternate No. 1:

$_____(ADD) FAÇADE BRICK

TIME OF COMPLETION

The undersigned agrees to complete the work covered by this proposal within ____ calendar days which includes Saturdays, Sundays, and Holidays to run consecutively after date of notice to proceed with work.

VOLUNTARY ALTERNATES

The following voluntary alternates are offered by the respondent. The undersigned agrees the amounts indicated below shall be added to or deducted from the Base proposal, as the case may be, for each alternate which is accepted.

Description of Voluntary Alternates	Add	Deduct

1. _____ _____ _____

2. _____ _____ _____

3. _____ _____ _____

4. _____ _____ _____

PRICE GUARANTEE

The undersigned proposes that the price stated in this Proposal is guaranteed for sixty (60) consecutive days from proposal date.

TAXES

The undersigned acknowledges that the price stated above includes all taxes of whatever character or description.

SUPPLEMENTAL FEES

For additional work performed upon instruction of the Owner by subcontractors of the undersigned, add to the subcontractor's prices for such additional work a fee of _____% which includes all the charges of the undersigned for overhead and profit.

Any additional work performed upon instructions of the Owner by persons other than the subcontractors of the undersigned, the charges will be actual cost of all labor and materials (less all discounts) plus the fee of _____% which includes all the charges of the undersigned for overhead and profit and to which shall be added the actual cost of insurance and taxes.

Each proposal covering extra work shall be accompanied with complete itemized materials and labor break downs.

For all revisions involving the deletion of contract work, it is agreed that full credit shall be given the Owner for such work deleted, including overhead and profit as quoted hereinbefore.

ADDENDA

If any addenda or bulletins covering changes to the Proposal Documents have been received during the open proposal period, the respondent shall fill in their numbers and dates which acknowledges having received same, and having included in this Proposal the work involved:

_____ Dated _____

_____ Dated _____

_____ Dated _____

PROPOSAL SECURITY

A proposal bond executed by a U.S. Treasury Listed Surety Company acceptable to __Macomb Township__ or a cashier's check in the amount of 5% of the sum of the proposal payable to Macomb Township shall be submitted with each proposal. All proposals shall be firm for a period of sixty (60) days.

PERFORMANCE, LABOR, AND MAINTENANCE AND GUARANTEE BOND

Successful Respondents will be required to furnish a U.S. Treasury Listed Company Performance, Payment, and 2 Year Maintenance and Guarantee Bond in the amount of 100% of their proposal. The cost of the Bond shall be included in each proposal.

The Owner reserves the right to reject any and/or all Proposals in whole or in part and to waive any informality therein. The Owner reserves the right to accept the proposal which in its opinion, is in the best interest of the Owner.

FAMILIAL DISCLOSURE

Respondent has included Section 00401 Familial Disclosure Form (proposal will not be read without this form)

NEGOTIATION

The undersigned agrees that, should the overall cost exceed the funds available,

he will be willing to negotiate with the Owner and Architect for the purpose of making further reductions in the Contract work, and shall agree to give full credit for all such reductions in the work requested by the Owner, including full value of labor, materials, and subcontract work and reasonable proportionate reductions in overhead and profit, thereby arriving at an agreed upon Contract price.

CONTRACT EXECUTION

The undersigned agrees to execute a Contract for work covered by this Proposal, provided that he be notified of its acceptance within sixty (60) days after the opening of proposals.

The undersigned hereby declares that he has the legal status checked below

( ) Individual

( ) Partnership having the following partners:

_____

_____

_____

( ) Corporation incorporated under the State laws of:

_____

This proposal is submitted in the name of, and notice of acceptance should be mailed, faxed, or delivered to:

Date: Firm's Name:

_____ _____

Phone No. ( ) _____

By: _____

(Signature)

In the presence of : Title:

END OF SECTION 00 41 00

00 43 36 Proposed Subcontractors Form

As part of the proposal, respondents shall furnish, in the spaces provided, the names of the subcontractors that the respondent proposes to provide as part of this Project and as required in the proposal Documents. The listed subcontractor will be part of the basis upon which the Contract will be considered for award.

Upon award of a Contract, the Work shall be performed using the listed subcontractor. Substitutions will be permitted only if listed subcontractor does not meet the specifications or is unable to meet delivery requirements of the construction schedule. All substitutions shall be submitted to the owner for consideration and approval.

The owner/Architect reserves the right to require other waivers at the owner/Architect's sole discretion.

Nature of Work	**Subcontractor**	**Location of Business**	**Percent of Contract Amount**

END OF SECTION 00 43 30

RESPONDENT'S QUALIFICATIONS

The owner is committed to providing a safe, healthy workplace for all employees, contractors and neighbors. the contractor selected must demonstrate management leadership and systems resulting in excellent safety performance.

To be selected to perform on-site work, the contractor must:

- Have a OSHA/BLS Recordable Injury Frequency Rate equal to or less than the average rate for applicable industry.

- Agree that all subcontractors employed by the contractor will meet the requirements listed above and submit a suitable qualification questionnaire.

- Provide supporting environmental, safety & health information as requested to verify the contractor's ability to comply with applicable health and safety requirements.

- Require that all contractor's employees, and visitors must communicate with a level of proficiency to ensure their safety and the safety of others.

RESPONDENT'S QUALIFICATIONS QUESTIONNAIRE

(Must be completed and submitted with proposal for consideration - all information shall be treated confidentially)

1. COMPANY DETAILS

Firm's Name_____

Telephone No._____Fax No._____

Street Address_____

City_____State _____Zip Code _____

President_____Vice President_____

2. COMPANY CONTACT

Person for Proposal_____Title_____

3. FORM OF BUSINESS (check one)

[ ] Sole Owner

Years in Business _____

Home Address _____

[ ] Partnership

Date of Reg. _____ in _____ County, MI.

Years in Business__

Individual Name _____

Address _____

Individual Name _____

Address _____

Individual Name _____

Address _____

[ ] Corporation

State of Registration:_____ Date of Reg._____ Years in Business__

Licensed to do Business in Michigan: [ ] Yes [ ] No

President's Name _____

Address _____

Vice President's Name _____

Address _____
Secretary's Name _____
Address _____
Treasurer's Name _____
Address _____

4. OTHER INTERESTS

Are there any inter-related companies, either partnerships or corporations, or other individuals who will be in any way, financial or otherwise, be involved in the Contract?

[ ] Yes [ ] No

If yes, please attach details including the name, nature of business and relationship.

Has any person named in Item 1 or 3 ever been, or still is, a principal, partner, or officer in a contracting organization in addition to the one named herein?

[ ] Yes [ ] No

If yes, please attach details including the name, position, organization name, and dates.

Did any of the above organizations ever fail to complete work or default on a contract while any person names in Items 1 or 3 was a partner or officer?

[ ] Yes [ ] No

If yes, please attach a statement as to when, where, and why, and who bonded the work.

5. NUMBER OF PERMANENT COMPANY PERSONNEL INCLUDING:

Admin:_____ Field Supervision_____Eng. & Design_____
Normal Field Construction Workers (per week)____ Others_____
Do you have on call capability, 24 hours a day everyday?_____

6. FINANCIAL RATING: (D&B) $_____Net Work $_____

7. ASSETS/LIABILITIES: Current Assets $_____Current Liab. $_____

8. PAST EXPERIENCE OF RESPONDENT
Largest gross amount of work completed in one year $_____
Largest single contract amount completed:
Work performed as: [ ] Prime Contractor [ ] Subcontractor [ ] Joint Venture
Type and Location of Work _____
Owner _____Contract Price $_____Date Completed_____

If the above project is not the same general type of project as the present contract, list the largest contract of such a similar type completed.
Work performed as: [ ] Prime Contractor [ ] Subcontractor [ ] Joint Venture
Type and Location of Work _____
Owner _____Contract Price $_____Date Completed_____

9. PRESENT WORK
Do you have other work?
[ ] Yes, valued at $_____ [ ] No

Is any of the present work behind schedule?
[ ] Yes [ ] No

If yes, please attach a statement giving reasons for delay and other pertinent data.

10. EXPERIENCE OF PRINCIPALS
Give a brief resume of the construction experience of the principals named in Items 1 or 3. A supplemental attachment is acceptable.

_____

_____

_____

11. SURETY (BONDING COMPANY)
Surety (not the agent) who will bond this Contract: _____
Name: _____ Years bonding your work _____
If less than 3 years, give the name of the previous Surety: _____
Maximum bonding limitation: $_____
Amount of present work bonded: $_____
Net amount available for new work: $_____
Individual official of Surety who can verify and furnish additional information:
Individual Name _____Phone Number_____
Address _____
If a corporation, will any or all officers be required by the Surety to pledge their own personal assets as a condition for obtaining the bonds required for this Contract?
[ ] Yes [ ] No
If yes, list the names.

12. INSURANCE
Insurance representative who can verify and furnish additional information:
Individual Name _____Phone Number_____
Address _____
Have you ever had an insurance policy of any of the above types canceled?
[ ] Yes [ ] No
If yes, explain including the insurer, date of incident, and reason.

13. LEGAL ISSUES
Are there any judgments, claims or suits pending or outstanding against

your company?
[ ] Yes [ ] No

Are you now or have you ever been involved in any bankruptcy or reorganization proceedings?
[ ] Yes [ ] No

If yes to any of the above questions, please attach details.

14. HAS YOUR COMPANY BEEN CITED BY OSHA OR EPA IN THE LAST 3 YEARS?
[ ] Yes [ ] No

If the answer is yes, explain:

_____

_____

_____

15. ENVIRONMENTAL, SAFETY & HEALTH POLICIES AND PROCEDURES
Do you have a documented Environmental, Safety & Health policy and program?[ ] Yes [ ] No

Do you have a Safety Officer in your company?
[ ] Yes [ ] No

If yes:
Name:_____Phone No._____

Do you employ full time safety supervision on all job sites?
[ ] Yes [ ] No

Do you have a Personnel Protective Equipment (PPE) Policy or Program, for example mandatory hard hats, safety glasses, etc.?
[ ] Yes [ ] No

Does your Safety Program address all OSHA Standards as they apply to Contractors, for example Hazardous Communication Standard (29CFR 1910.1200) and all of the required associated with said Standards?

[ ] Yes [ ] No

Comment on any other areas of your company's safety program and policies that you feel will be appropriate in our evaluation.

_____

_____

_____

16. ENVIRONMENTAL, SAFETY & HEALTH TRAINING

Do you require on-site supervision to have OSHA Training Course?

[ ] Yes [ ] No

Do you train on environmental subjects? [ ] Yes [ ] No

Specify Topics:_____

_____

_____

17. SUPERVISION

Overall Supervision:

Individual Name _____Phone Number_____

Address _____

Years employed by your company: _____Years employed in this capacity: _____

Construction Experience:_____

_____

_____

Superintendent on Site:
Individual Name _____Phone Number_____
Address _____
Years employed by your company: _____Years employed in this capacity: _____
Previous Jobs as Superintendent:
Type and Location of Work _____
Owner _____Contract Price $_____Date Completed_
Type and Location of Work _____
Owner _____Contract Price $_____Date Completed_
Type and Location of Work _____
Owner _____Contract Price $_____Date Completed_

Will he perform any other specific work at the site other than Superintendent?

[ ] Yes, _____ [ ] No

18. QUALITY CONTROL
Do you have a documented Quality Control policy/program?
[ ] Yes [ ] No

19. SCHEDULING/PROJECT PLANNING
Do you have project planning and scheduling capabilities?
[ ] Yes [ ] No

If yes - Description of program: _____

_____

_____

REFERENCES

List municipal contracts of similar type and size completed in the last 10 years and provide references. Not providing these may result in disqualification of the proposal.

A. Client's Name: _____

Address:_____

Contact Name: _____Contact Phone:_____

Type of Work:_____

_____

_____

Year Work Performed:_____ Work Amount ($):_____

B. Client's Name: _____

Address:_____

Contact Name: _____Contact Phone:_____

Type of Work:_____

_____

_____

Year Work Performed:_____Work Amount ($):_____

C. Client's Name: _____

Address:_____

Contact Name: _____Contact Phone:_____

Type of Work:_____

_____

_____

Year Work Performed:_____ Work Amount ($):_____

SIGNATURE OF COMPANY OFFICER

_____

Signature Title Date

REMINDER: Upon the request of the owner the following documents are to be submitted within 48 hours of receipt of Notice.

1. Contractor's written safety policy
2. List of licenses
3. Certificate of insurance

End of Section 00 45 13

SECTION 00 72 00 – GENERAL CONDITIONS

DOCUMENTS:

"The General Conditions of the Contract for the Construction"
A.I.A Documents A-201, 2017 Edition, Forms a part of these Specifications and shall have the same effect as if bound herein.

This Document is modified as described in Modification of the General Conditions.

Contractors shall be held responsible for having familiarized themselves with this Document and all other documents affecting their contracts in this Specification.

END OF SECTION 00 72 00

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SECTION 00 81 10 MODIFICATIONS TO THE GENERAL CONDITIONS

Where any Article of the American Institute of Architects General Conditions, (AIA Document A201- 2017 Edition) is supplemented by the following provisions of such Article shall remain in effect and all supplementary provisions shall be considered as added thereto. Where any such article is modified, superseded or deleted herein, provisions of such articles not so specifically modified, superseded or deleted shall remain in effect.

THROUGH OUT THE ENTIRE DOCUMENT:

Modification: "Invitation to Bid" modify to read "Request for Proposal"
Modification: "Bidder/s" modify to read "Respondent/s"
Modification: "Bid" modify to read "Proposal"
Modification: "Bidding" modify to read "Request for Proposal Submission Phase"

Article 1 - General Provisions

1.1.1 The Contract Documents. Modification: first sentence: "The Contract Documents consist of the entire Proposal Documents package and the Agreement...."

Deletion: last sentence.

Addition: new text as follows (sub-subparagraph to 1.1.1):

1.1.1.1 As used in the Contract Documents, the following terms are defined as indicated below:

OWNER - as defined in Advertisement or Request for Proposal.
ARCHITECT/ENGINEER - the firm of Anderson, Eckstein and Westrick, Inc.
CONTRACTOR - the person or entity so named in the Agreement who shall be known as the "prime contractor" in addition to references in Article 3.
SUPPLIER - such person or entity that supplies materials or the work to the Contractor or to a subcontractor but performs no work at the site.
N.I.C. - not in contract, work not included in this Contract.
OCCURRENCE: is defined as follows for purposes of insurance. An event which occurs during the policy period, or a continuous or

repeated exposure to condition(s) which result, during the policy period, in bodily injury, sickness, or disease, or injury to, or destruction of property, of one or more persons or organizations, including the loss of use thereof, resulting from a common cause, or from exposure to substantially the same general condition existing at, or emanating from each location shall be deemed to result from one occurrence.

Addition: new text as follows (sub-subparagraph to 1.1.3):

1.1.3.1 The Contractor is responsible for coordinating and allocating the work of all trades on the project at the time of proposal as well as during the Construction in regards to the providing of labor and materials, and performance of all cutting, coring, patching and repair work necessary to complete the project as required by the various trades including the proper allocation of work to the proper trade as claimed by the trade unions having jurisdiction over such work. Whether the Contractor's own forces perform such work or he allocates it to various subcontractors or trades, the contractor is responsible for such work and the complete project.

1.1.3.2 The Contractor shall interface all Contract work with no duplication of cost incurred due to the allocation of same work to more than one trade, and with no omissions of costs of any work due to such work not being properly assigned or allocated to a specific subcontractor, trade or the Contractor.

Addition: new text as follows:

1.2.4 The Drawings show the general arrangement, design and extent of the Work and are partially diagrammatic. The Drawings shall not be scaled for rough-in measurements, nor serve as Shop Drawings.

1.2.5 RELATION OF SPECIFICATIONS AND DRAWINGS:

.1 To be equal authority and priority. Should they disagree in themselves, or with each other, Proposal shall be based on the most expensive combination of quality and quantity of work indicated. The appropriate Work, in the event of the above mentioned disagreements, shall be determined by the Architect.

.2 Figures take precedence over scale measurements.

.3 Large scale details take precedence over smaller scale details.
.4 Architectural Drawings take precedence in regard to dimensions, when in conflict with Mechanical and Structural Drawings, except for the size of the structural members.
.5 Specifically titled drawings and sections of the specifications take precedence over indication of the item in a collateral way.
.6 Existing conditions take precedence over Drawings and Specifications for dimensions.
.7 When multiple requirements are given for any item, all requirements shall be met.

1.2.6 CODE, LAWS, ORDINANCES, RULES, and REGULATIONS: Requirements of public authorities apply as minimum requirements only. They do not supersede more stringent requirements given elsewhere in the Contract Documents. If changes must be made to the Contract because of public authorities, appropriate adjustments will be made in the Contract Sum.

1.2.7 ENUMERATION OF ITEMS: Lists of "Work Included", "Scope" or "Description of Work" are not intended to enumerate each and every item of work or appurtenance required, and must be used in conjunction with other portions of the Contract Documents.

1.2.8 SPECIFIED MATERIALS, PRODUCTS, BRANDS, and AND PROCESSES: When multiple requirements are given for an item complies with all.

1.2.9 REFERENCE NOTES: Terms such as "as shown", "as indicated", "as noted" mean there are additional requirements given elsewhere in the Contract Documents. Comply with all requirements.

1.2.10 ABBREVIATIONS AND NAMES: Acronyms or abbreviations as referenced in contract documents and listed on the General Abbreviations and Symbols Sheet G-1 are defined to mean the associated names. Acronyms or abbreviations are subject to change, and believed to be, but not assured to be, accurate and up-to-date as of date of contract documents.

1.2.11 DRAWING SYMBOLS AND STANDARDS: Except as otherwise indicated, graphic symbols and standards used on drawings are those symbols recognized in the construction industry for purposes indicated.

1.2.12 M/E DRAWINGS: Graphic symbols used on Mechanical/ Electrical drawings

are generally aligned with symbols recommended by ASHRAE, supplemented by more specific symbols where appropriate as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to Architect for clarification before proceeding.

1.2.13 STANDARD REFERENCES: Any materials, equipment or workmanship specified by references to number, symbol, or title of any specific Federal, ASTM, Industry, Association or Government Agency Standard Specifications shall comply with all applicable provisions of such standard specifications, except as limited to type, class or grade, or modified in contract documents. Reference to "Standards" referred to in the contract documents, except as modified, shall have full force and effect as though printed in detail in specifications.

1.2.14 PUBLICATION DATES, except as otherwise indicated, where compliance with an industry standard, ASTM, association standard, or Federal Standard, shall meet the standard in effect as of date of Contract Documents.

1.2.15 ACCEPTABLE MANUFACTURERS where used in the Project Manual shall mean that the listed products and manufacturers shall meet specified and indicated requirements.

Article 2 - Owner

Addition: new text as follows (sub-subparagraph to 2.2.1):

2.2.1.1 "The Owner shall establish site property lines by staking or other means, shall establish a permanent bench mark, and provide copies of soil boring logs and soil report, if any, for the Contractor's convenience and information. None of the data therein relating to sub-surface soil and water conditions; size, elevation and location of existing underground services; existing underground obstructions or structures; etc., are guaranteed as being accurate or uniformly representative of actual conditions. The Owner assumes no responsibility for deductions, interpretations or conclusions drawn there from by the Contractor."

Article 3 - Contractor

Addition: new text as follows:

3.4.4 Materials supplied shall conform to industry and manufacturer's standards specified, in effect on the date of issuance of the specifications. Materials shall generally be shipped, received, stored, installed and protected in accordance with printed manufacturer's instructions as modified by the detailed provisions of the specifications. Copies of the printed manufacturer's or industry standards shall be maintained on file by the Contractor at his field office.

3.4.5 Not later than 72 hours from the Contract Date or letter of intent to award contract, the Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the products identified in the General Requirements of the Specifications (Division 1) and, where applicable, the name of the installing Subcontractor.

3.4.6 The Architect will promptly reply in writing to the Contractor stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposal. If adequate data on any proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides further data. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

3.4.6.1 Should the Contractor desire after the Contract Award, to substitute for the benefit of the Owner another article, material or item of equipment for one or more specified by name, he shall make a request for such substitution in writing, to the Architect stating the benefit to the Owner and the credit or extra involved and he shall provide all required supporting data and samples. If such request is rejected, the Contractor shall perform the work in accordance with the Contract Documents. Such requests shall be submitted so as to allow a reasonable time for their consideration and shall not be justification for delay of the work.

3.4.6.2 If a substitution requires changes in the work or other trades or Contractors, or redesign or other substantial changes in the Contract Documents, the Contractor proposing the substitution shall pay any

additional costs thereby incurred.

3.4.6.3 After Contract Award, no substitution of any material listed in the Contract Documents or Proposal will be permitted if the request is based on delivery dates, test requirements, or other causes, unless the respondent proves that the original material was ordered or scheduled for tests within 30 days after the contract was let and due to unforeseen circumstances cannot be delivered at the promised time or tested in accordance with the specifications without materially delaying work.

3.4.6.4 by making requests for substitutions based on Clause 3.4.5.1 above, the Contractor:

(a) Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
(b) Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
(c) certifies that the cost data presented is complete and includes all related costs under this Contract but excludes costs under separate contracts, and excludes the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently became apparent; and
(d) will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

3.5 Deletion: last sentence

Addition: new text as follows:

3.5.1 Proofs of conformance, as hereinafter defined, will constitute satisfactory evidence as to the kind, quality and performance values of the respective products for which such proofs are required by the Specifications. Neither delivery nor installation of the respective products shall be made until written acceptance by the Architect of the submitted proof of conformance is received by the Contractor, unless Architect gives written instruction to the contrary.

3.5.1.1 Affidavit - An affidavit is a notarized statement on the letterhead of the manufacturer and signed by a responsible agent of the manufacturer, certifying that the product is in conformance with the requirements of the specified regulatory agency or reference standard or performance values, as applicable; in the case of the latter, the performance values shall be listed. Each Affidavit shall be identified by name of Project, Architect's Project number, name of product, and Specification section, page and paragraphs for which the product is proposed.

3.5.1.2 Testing Laboratory Certificate - A Testing Laboratory Certificate is a notarized test report from a laboratory, bureau or agency acceptable to the Architect, signed by a responsible agency of that facility, certifying that the designated product has been tested within one year of the date of submittal, unless otherwise specified, and is in conformance with the reference standard of performance requirements specified, and listing the results of all tests required. The testing laboratory certificate shall accompany an Affidavit as defined in clause 3.5.2.1.

Addition: new text as follows:

3.9.2 The Contractors superintendent or his authorized representative shall remain in attendance at the project site and shall be present at all times when work of any kind is in progress, including overtime work.

3.13.1 Modification: Insert "the directions of the owner" into the paragraph to read in part as follows: "The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the directions of the owner and the contract documents..."

Addition: new text as follows:

3.14.1.1 Unless specified otherwise, Work specified in each section of the specifications includes cutting, fitting, and patching for that trade section, including that required to accommodate the work of other trades.

Addition: new text as follows (paragraph to 3.15.1):

3.15.1.1 "The Contractor, each Subcontractor and all separate Contractors shall at all times keep the project free from their surplus and waste materials, and bulk rubbish and debris; combustible materials shall be removed daily or more often as may be required, non-combustible materials at least once a week. Such materials shall not be allowed to accumulate or disperse around the neighborhood. Further the Contractor is responsible for:

1. Positive implementation of the "General Safety Rules and Regulations for the Construction Industry", "State Construction Safety Commission, and appropriate City Ordinances as regards the scope of this paragraph.
2. Maintenance of the site and premises in an orderly and clean condition at all times.
3. Keeping all sidewalks, pavements, parking areas, floors and roofs free from any accumulations of snow, ice, dirt, rubbish and general refuse prior to "closing-in" of the building.
4. Broom clean (exclusive of removal of bulk debris described above) floors in all interior spaces where work is in progress after the project has been "closed-in", with the participation and cooperation of all Subcontractors and separate Contractors employed on the work.
5. Final cleaning of the entire building, including all interior finish materials, as specified in detail under Section 01700, Contract Closeout.

Addition: new text as follows (sub-subparagraph to 4.2.3):

4.2.3.1 The Architects presence does not imply concurrence or approval of the work. The Contractor shall call specific things to the Architect's attention if he wishes to know the Architects opinion.

Addition: new text as follows (sub-paragraph to 5.2.1):

5.2.1.1 The Contractor shall have primary responsibility for obtaining proposals and preparing and awarding Subcontracts for all portions of the Work (except General Condition Items).

5.4.1 Deletion: sub-paragraph & sub-subparagraphs in its entirety

Addition: new text as follows:

5.4.1 Unless the Owner elects otherwise, all Subcontracts shall be between the Contractor and the appropriate Subcontractor, and shall provide that the Subcontractor consents to the assignment of the Subcontract to the Owner pursuant to Section 5.3 hereof, and agrees in the event such assignment becomes effective, to recognize the Owner as successor to the Contractor and to complete the Work under the Subcontract.

5.4.2 The Contractor shall cause all Subcontractors, laborers and vendors to agree to indemnify the Owner and hold it harmless from all claims for property damage and bodily injury that may arise from such Subcontractor's operations. Such provisions shall be in a form reasonably satisfactory to Owner.

5.4.3 The agreement between Contractor and the Subcontractors (and, where appropriate, between Subcontractors and Sub-Subcontractors) shall contain provisions that:

5.4.3.1 Preserve and protect the right of the owner and the Architect under this Agreement with respect to the Work to be performed under the Subcontract so that the subcontracting thereof will not prejudice such rights;

5.4.3.2 Require that such Work be performed in accordance with the requirements of these Contract Documents;

5.4.3.3 Require submission to Contractor of applications for payment under each Subcontract and Sub-Subcontract, in reasonable time to enable Contractor to apply for payment in accordance with General Conditions of the Construction Contract, all such applications to be in a form that fully complies with all requirements of the Michigan Construction Lien Act, the Michigan Builder's Trust Fund Act, any other requirements of law, the requirements of any financing agency and any requirements of Owner and Owner's title insurer to demonstrate the foregoing;

5.4.3.4 Require that all claims for additional costs or extension of time with respect to subcontracted portions of the Work shall be submitted to Contractor (via any Subcontractor or Sub-Subcontractor where appropriate) in sufficient time so that Contractor may comply in the

manner provided, if any, in this Agreement for a like claim by Contractor upon the Owner;

5.4.3.5 Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance described in General Conditions hereof;

5.4.4 Contractor hereby assigns to Owner, as security for Contractor's performance hereunder, all Subcontracts and all other contracts and agreements entered into in connection with the Project, and appoints Owner is attorney to enforce said contracts according to their terms. Such assignment shall be operative only in the event of default by, or termination of, Contractor under this Agreement.

5.4.2 Modification: change paragraph number to 5.4.5.

7.3.3 Addition: insert new item after 7.3.3.4 as follows: ".5 cost to be determined based on estimated cost of materials, equipment and labor for the work, plus the percentage thereof stated in the Contract Documents for supervision, overhead and profit."

Addition: new text as follows:

8.3.4 Should the progress of the Work or of the Project be delayed by any fault or neglect or act or failure to act of the Contractor or any of Contractor's agents, employees, or anyone for whose acts any of them may be liable, so as to cause additional cost, expense, liability or damage to the Owner or damages or additional costs or expenses for which the Owner may or shall become liable, the Contractor shall and does hereby agree to compensate the Owner for and indemnify him against such costs, expenses, damages and liability.

Addition: new paragraph as follows:

8.4 Liquidated Damages

8.4.1 If the Contractor fails to complete the work by the completion date agreed upon by the parties or by an authorized extension thereof, the Contractor will be charged damages due the Owner from the Contractor for its failure to complete the project within the specified time at the scheduled charges as

specified per calendar day. Sums assessed as liquidated damages shall not be considered penalties but shall reflect the costs to the Owner for continuing supervision and administration of the project and other directly attributable costs.

SCHEDULE OF LIQUIDATED DAMAGES

Original Contract Amount	**Charges Per Calendar Day**
$0-$50,000	$ 50.00
$50,000-$100,000	$100.00
$100,000-$500,000	$175.00
$500,000-$1,000,000	$225.00
$1,000,000-$2,000,000	$300.00
over-$2,000,000	$500.00

9.3.1 Modification: change existing text to read as follows: "At least 20 days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. The Contractor shall be responsible to ensure that Application for Payment is complete, including notarized signature. A Sworn Statement from Contractor and partial waivers of lien from Subcontractors and major materials Suppliers shall also accompany each payment request, to confirm and acknowledge disbursement of the preceding payment. The Sworn Statement shall be a record attesting to the fact that sub-constructors suppliers, materials, etc. have been paid or paid for, when considering materials, from the time of the last application for payment by the Contractor. Partial waivers of lien shall be properly completed and shall list the cumulative amounts of payments received by the date of the waiver. This requirement shall not be waived unless agreed upon in writing by both the Surety and Owner."

Addition: new text as follows (sub-subparagraph to 11.1.2)

11.1.2.1 The insurance required by sub-paragraph 11.1.1 shall be written and maintained without interruption from date of commencement of the

work until date of final payment and termination of any coverage required to be maintained after final payment for not less than the following (or greater if required by law):

1. Workers' Compensation

(a)	State: Michigan	Statutory
(b)	Applicable Federal (e.g., Longshoremen, harbor work, Work at or outside U.S. Boundaries):	Statutory
(c)	Employer's Liability:	
	$100,000	Each Accident
	$500,000	Policy Limit
	$100,000	Each Employee
(d)	Benefits Required by Union labor Contracts:	As applicable

2. Comprehensive General Liability (Including Premises-Operations; Independent Contractors' Protective; Products and Completed Operations; Broad Form Property Damage):

(a)	Bodily Injury:	
	$1,000,000	Each Occurrence
	$2,000,000	Aggregate, Products & Completed Operations
(b)	Property Damage:	
	$1,000,000	Each Occurrence
	$2,000,000	Aggregate

(c) Products and Completed Operations Insurance shall be maintained for a minimum period of 1 year after final payment and Contractor shall continue to provide evidence of such coverage to Owner on an annual basis during the aforementioned period.

(d) Property Damage Liability Insurance shall include coverage for the following hazards:
X (Explosion)

C (Collapse
U (Underground)

(e) Contractual Liability (Hold Harmless Coverage):
(1) Bodily Injury:
$1,000,000 Each Occurrence
(2)Property Damage:
$1,000,000 Each Occurrence
$2, 000,000 Aggregate

(f) Personal Injury, with Employment Exclusion deleted:
$1,000,000 Aggregate
(g) Fire Damage $50,000
(h) Medical Payments $5,000

3. Comprehensive Automobile Liability (owned, non-owned, and hired):
(a) Bodily Injury:
$1,000,000 Each Person
$1,000,000 Each Accident
(b) Property Damage:
$1, 000,000 Each Occurrence
(c) Combined Single:
$1,000,000 Limit

NOTE: The State of Michigan has a no-fault insurance requirement. The Contractor shall be certain coverage is provided which conforms to any specific stipulation in the law.

4. ADD Item 4. Additional Insured: Commercial General Liability and Motor Vehicle Liability Insurance, as described above, shall include an endorsement stating that the following shall be Additional Insured:
a. Macomb Township
Anderson, Eckstein and Westrick, Inc.

5. ADD Item 5. Additional Insured: The contractor shall cause the commercial liability coverage required by the Contract Documents to include an endorsement stating that the following shall be Additional Insured:

a. Macomb Township
Anderson, Eckstein and Westrick, Inc.

6. ADD Item 6. Owners and Contractors protective liability.
(a) General Aggregate: $2,000,000
(b) Each Occurrence: $1,000,000
(c) Combined Single Limit: $1,000,000

7. ADD Item 7. The Owners and Contractors Protective Liability Insurance Policy shall include as Additional Insured all persons listed as follows:
a. Macomb Township
b. Anderson, Eckstein and Westrick, Inc.

11.1.2.2 Contractor shall procure and maintain builders risk insurance (Fire and Extended Coverage) on 100% completed value basis including the value of all materials furnished by parties other than the Contractors for installation in the project to cover all project structures and materials, supplies, equipment and fixtures including the installation cost thereof which are owned by the insured or for which the insured is legally liable. This policy is to have a zero (0) deductible for any and all claims made.

This policy will cover the property of insured a) while in transit at the risk of the insured, b) while on the construction site or awaiting installation, c) during construction installation or testing. This policy shall insure against all risk of direct physical damage or loss to the property insured hereunder and shall specially cover loss due to fire, wind, flood, collapse, extended coverage, vandalism and malicious mischief.

The Owner and Architect/Engineer and their consultants for this project shall be named on the policy as being also insured.

11.1.2.3 Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance:

(a) The Contractor shall either:

(1) Require each of his subcontractors to procure and to maintain during the life of his subcontract,

Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified for the Contractor herein, or

(2) Insure the activities of his subcontractors in his policy as specified herein.

Umbrella Excess Liability:

(a) Umbrella Excess Liability must be supplied in an amount not less than $2,000,000 and be made to cover at least all risks described in the Comprehensive General Liability and Comprehensive Motor Vehicle Liability policies.

11.2.1 Modification: change the text to read as follows: "The Contractor shall obtain, maintain in force, and pay all cost incurred for, public liability insurance to protect the Owner & Architect/Engineer and their consultants for this project from claims which may arise from operations under the Contract. This policy is to have a zero (0) deductible for any and all claims made and name Owner and Architect/Engineer and their consultants as insured parties hereunder. Certificates of this insurance must be filed with the Owner and the Architect/Engineer prior to commencing works and remains in force for the full duration of the project.

11.3.1 Modification: delete phase "Unless otherwise provided, the Owner..." in the first sentence and substitute, "The Contractor..."

11.3.1 Modification: change text of last part of first sentence after the phase, "...at the site on a replacement cost basis..." to following test, "...with a zero deductible for any and all claims made."

11.3.1 Modification: change text of last sentence to read as follows: "This insurance shall name, in addition to the contractor, subcontractors and sub-subcontractors, the Owner and Architect/Engineer and their consultants is insured parties hereunder."

11.3.1 Addition: After last sentence insert the following: "The form of policy for this coverage shall be Completed Value. If the Owner is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto."

11.3.1.2 Deletion: omit entire sub-subparagraph.

11.3.1.3 Deletion: omit entire sub-subparagraph.

11.3.3 Addition: to end of last sentence insert the following: "...unless through gross negligence of contractor."

11.3.4 Deletion: omit entire sub-subparagraph.

11.3.6 Modification: change the text to read as follows: "Before an exposure to loss may occur, the Contractor shall file with the Owner two certified copies of the policy or policies providing this Property Insurance coverage, each containing those endorsements specifically related to the Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days prior written prior written notice has been given to the Contractor."

11.3.7 Modification: at end of first sentence, substitute "Contractor" for "Owner."

11.3.8 Modification: at first reference to "Owner" in the first sentence, the word "this should be substituted for "Owner's."

11.3.8 Modification: in first sentence, substitute "Contractor" for "Owner" as fiduciary.

11.3.9 Modification: throughout text of subparagraph, substitute "Contractor" for "Owner" each time the latter appears.

11.3.10 Modification: throughout text of subparagraph, substitute "Contractor" for "Owner" each time the latter word appears.

11.4.1 Modification: change the text to read as follows: "The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising hereunder. Bonds may be obtained through the Contractors usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100% of the total contract sum."

Addition: new text as follows (sub-subparagraph to 11.4.1):

11.4.1.1 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

Addition: new text as follows (sub-subparagraph to 11.4.1):

11.4.1.2 The Contractor 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 the power of attorney.

12.2.1 Modification: in the first line, after the words "shall correct it promptly", insert the words: "...commencing corrective action within seven days..."

12.2.2 Addition: insert new text before first sentence: The Contractor, as a condition precedent to final payment, shall execute a guarantee in writing, warranting all products provided by him or for which he may be required to accept responsibility in accordance with the terms of the Contract Documents, to be and to remain without defect and in accordance with the Contract Documents.

Addition: new test as follows (sub-subparagraph to 12.2.2):

12.2.2.1 Where special guarantee is specified, the Contractor, as a condition precedent to final payment, shall submit to the Architect the guarantee in triplicate on 8-1/2-inch by 11-inch paper in the following form:

A.E.W. Project Number

Contractor's Job Number

Date

Guaranteed Work

Specification Section Number Reference

Specification Page and Paragraphs Describing Guarantee

Length of Guarantee (Years)

Contractor

Subcontractor

The Undersigned herewith warrant that the Work to which this guarantee applies has been executed in conformance with the requirements of the Contract Documents, and guarantee the Work to perform as specified without failure for the stated period of time after Substantial Completion or as otherwise agreed to by the Owner.

This guarantee does not apply to failure or to failure to perform due to abuse or neglect by the Owner, or his successor in interest, or damage by vandalism.
SUBCONTRACTOR -

Signed_____

Title_____

Notary_____

Date_____

CONTRACTOR -

Signed_____

Title_____

Notary_____

Date_____

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

Addition: new text as follow (sub-subparagraph to 12.2.3):

12.2.3.1 Limits of non-conforming Work: When any such Work is found, the entire area of work involved shall be corrected unless the Contractor can completely define the limits. Additional testing, sampling, or inspecting needed to define non-conforming work shall be at the contractor's expense. He shall employ the Owner's independent testing laboratory, or a mutually satisfactory independent testing laboratory, if such services are required. All corrected work shall be re-tested at the Contractor's expense.

Addition: new text as follows: (sub-subparagraph to 12.2.4):

12.2.4.1 Restriction of Supplier's Identification: In areas generally accessible to the public. Omit all supplier's name plates and identification symbols from visible products.

14.2.1 Addition: new text as follows, sub-subparagraph after last item listed: ".5 should cause or give cause for legal proceeding seeking to have himself adjudged a bankrupt, or should the Contractor become insolvent, or if the contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors."

Addition: new article as follows

Article 16

Equal Opportunity

16.1 The Contractor shall maintain policies of employment as follows:

16.1.1 The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin or age. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees

and applicants for employment, notices setting forth the policies of non-discrimination.

16.1.2 The Contractor and all Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf; state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin or age.

Addition: new article as follows:

Article 17

Special Conditions

17.1 Michigan Construction Lien Statute

17.1.1 Contractor must record the notice of commencement, on behalf of the Owner, with the Register of Deeds and shall post the notice in a conspicuous place on the site.

Addition: new article as follows:

Article 18

Abbreviations

18.1 Abbreviations

18.1.1 When the following abbreviations and symbols are used in the Contract Documents, or Subcontract documents, they shall have the meaning shown. Many of the abbreviations used throughout the Subcontract documents refer to associations, institutes, societies and other public bodies who publish standards which are readily available to the public. Whenever the initials representing such a body are shown, followed by a number or a combination of numbers and letters, they refer to a particular standard to which the Subcontractor shall conform. The number or combination of numerals and letters, following the abbreviation designates the standard. In all such cases, the Subcontractor shall conform to the edition or issue of the standard which is current at the Subcontract date, as revised or amended to

the Subcontract date.

18.1.2 Abbreviations and Meanings for Organizations.

AIA	American Institute of Architects
AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ASA	American Standard Association
ASH & AE	American Society of Heating & Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	American Woodwork Institute
AWSC	American Welding Society Code
CSI	Construction Specification Institute
FS	Federal Specifications
NAFM	National Association of Fan Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
UL	Underwriters Laboratories
USDC	U.S. Department of Commerce

18.1.3 Abbreviations and Meanings for Construction Terms.

Ad	access door	oc	on center
B	bottom layer reinf. concrete	Od	outside diameter
		part	partition
brg	bearing	pol	polished
brkt	bracket		
cl	centerline	po	polyethylene
ci	cast iron	pl	plate
cc	center to center	psi	pounds per sq. in.
conc	concrete	psf	pounds per sq. foot
cont	continuous	rec	recessed
csk	countersunk	reinf	reinforced
crs	courses	rh	right hand

dh	double hung	rhr	right hand reverse
div	division	rm	room
dpc	dampproof course	rs	roof sump
dwg	drawing	rwc	rain water conductor
ef	exhaust fan	rwl	rain water leader
elev	elevation	s.f.	square foot
ewc	electric water cooler	ss	stainless steel
exist	existing	std	standard
fin	finished, finishing	t&f	tongue and groove
ftg	footing	terr	terrazzo
fd	floor drain	typ	typical
flr/fl	floor	u/s	underside
ga	gauge	ul	upper layer reinf. concrete
Gi	galvanized iron		
gs	galvanized sheet	vct	vinyl composition tile
gsg	galvanized sheet gauge		
hor	horizontal	vb	vapor barrier
ins	inches	vert	vertical
id	inside diameter	wc	water closet
ksf	kips per square foot	wt	weight
lav	lavatory	wd	wood
lh	left hand		
lhr	left hand reverse	E-W	East to West in reinf. concrete
lpc	laminated plastic covering	N-S	North to South in reinf. concrete
mk	master keyed		
max	maximum	O/	diameter
met	metal	'	foot, feet
min	minimum		
mfgr	manufacturer	"	inch, inches
ms	manufacturers standard	#	pounds (behind numerals)
mo	masonry opening		
nrc	noise reduction coefficient		

END OF SECTION

MACOMB TOWNSHIP DPW ADDITION
AEW PROJECT #0249-0322 FEBRUARY 13, 2025

SECTION 00 85 10 - INDEX OF DRAWINGS

The following drawings, dated February 13, 2025, are issued for Macomb Township DPW Addition, Macomb, Michigan. Architect's Project Number 0249-0322

SHEET NO.	TITLE
	COVER SHEET
1	CONSTRUCTION PLAN
2	CONSTRUCTION DETAILS
3	SOIL EROSION AND SEDIMENTATION CONTROL PLAN
P1	PAVING STANDARD DETAILS
P2	PAVING STANDARD DETAILS
OF	SANITARY SEWER STANDARD DETAILS
STM1	STORM SEWER STANDARD DETAILS
A011	GENERAL PROJECT INFORMATION
A021	ADA
A031	SPECIFICATIONS
AD101	DEMOLITION PLAN
A101	FIRST FLOOR PLAN
A111	REFLECTED CEILIN G PLAN
A121	ROOF PLAN
A201	EXTERIOR ELEVATIONS
A202	ALTERNATE 1 EXTERIOR ELEVATIONS AND DETAILS
A301	BUILDING SECTIONS
A311	WALL SECTIONS
A312	WALL SECTIONS
A501	PLAN DETAILS
A511	SECTION & MISCELLANEOUS DETAILS
A601	DOOR SCHEDULE AN ELEVATIONS
S011	GENERAL NOTES & DESIGN CRITERAI
S100	FOUNDATION PLAN & DETAILS
S102	ROOF AND LINTEL FRAMING PLAN
M011	MECAHNCIAL SPECIFICATIONS
M101	MECHANICAL PLAN
P101	PLUMBING PLAN
E100	ELECTRICAL GENERAL INFORMATION
E101	FIRST FLOOR POWER PLAN
E102	COMPOSITE POWER PLAN
E201	FIRST FLOOR LIGHTING PLAN
E300	ONE-LINE DIAGRAM AND DETAILS
E400	ELECTRICAL SPECIFICAITONS

END OF SECTION 00 85 10

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Contract description.
2. Work by Owner or other Work at the Site.
3. Owner-furnished products.
4. Contractor's use of Site and premises.
5. Work sequence.
6. Owner occupancy.
7. Permits.
8. Specification conventions.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes is as identified in the proposal documents.

B. Perform Work of Contract under fixed cost Contract with Owner according to Conditions of Contract.

1.3 WORK BY OWNER OR OTHERS

A. Owner will award contracts, if required, for installation of security system and cameras, audio/visual and other low voltage system under a separate contract, unless called out in the Contract Document.

B. If Owner-awarded contracts interfere with each other due to work being performed at the same time or at the same Site, Owner will determine the sequence of work under all contracts according to "Work Sequence" and "Contractor's Use of Site" Articles in this Section.

C. Coordinate Work with utilities of Owner and public or private agencies.

D. Work under this Contract includes:
1. Work as indicated in the Contract Documents.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of Site and premises to allow:

1. Owner occupancy.
2. Work by Others.
3. Use of Site and premises by the public.

B. Construction Operations: Limited to areas indicated on Drawings.

1. Noisy and Disruptive Operations (such as Use of Jack Hammers and Other Noisy Equipment): Coordinate and schedule such operations with Owner to minimize disruptions.

C. Utility Outages and Shutdown:

1. Coordinate and schedule electrical and other utility outages with Owner.

D. Construction Plan: Before start of construction, post electronic file to Project website of construction plan regarding access to Work, use of Site, and utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.5 WORK SEQUENCE

A. Construct Work in order to accommodate Owner's occupancy requirements during construction period. Coordinate construction schedule and operations with Owner:

B. Sequencing of Construction Plan: Before start of construction, post electronic file to Project website of construction plan regarding phasing of demolition, renovation, and new Work for acceptance by Owner. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.6 OWNER OCCUPANCY

A. Owner will occupy Premises during entire period of construction.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.7 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 10 00

SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values.

B. Application for Payment.

C. Change procedures.

D. Defect assessment.

1.2 SCHEDULE OF VALUES

A. Submit electronic file to Project website of schedule on AIA G703 - Continuation Sheet for G702.

B. Submit Schedule of Values as electronic file to Project website within 15 days after date of Owner-Contractor Agreement.

C. Format: Use Table of Contents of this Project Manual. Identify each line item with number and title of major Specification Section. Also identify Site mobilization, bonds and insurance, General Conditions, and General Contractor Overhead and Profit.

D. Include separately from each line item, direct proportional amount of Contractor's overhead and profit.

E. Revise schedule to list approved Change Orders with each Application for Payment.

1.3 APPLICATION FOR PAYMENT

A. Submit electronic file to Project website of each Application for Payment on AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702.

B. Content and Format: Use Schedule of Values for listing items in Application for Payment.

C. Submit updated construction schedule with each Application for Payment.

D. Payment Period: Submit at intervals stipulated in the Agreement.

E. Submit submittals with transmittal letter as specified in Section 01 33 00 - Submittal Procedures.

F. Submit three copies of waivers requested by Owner.

G. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
   1. Current construction photographs specified in Section 01 33 00 - Submittal Procedures or requested by the Architect.
   2. Partial release of liens from major Subcontractors and vendors.
   3. Record Documents as specified in Section 01 70 00 - Execution and Closeout Requirements, for review by Owner, which will be returned to Contractor.
   4. Affidavits attesting to off-Site stored products.
   5. Construction Progress Schedule, revised and current as specified in Section 01 33 00 - Submittal Procedures.

1.4 CHANGE PROCEDURES

A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Architect/Engineer of any error, inconsistency, omission, or apparent discrepancy.

C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Architect/Engineer; establish procedures for handling queries and clarifications.
   1. Use AIA G716 - Request for Information for requesting interpretations.
   2. Architect/Engineer may respond with a direct answer on the Request for Interpretation form, AIA G710 - Architect's Supplemental Instruction, or AIA G709 - Work Changes Proposal Request.

D. Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on AIA G710.

E. Architect/Engineer may issue AIA G709 including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change with stipulation of overtime work required and with the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within 10 days.

F. Contractor may propose changes by submitting a request for change to Architect/Engineer, describing proposed change and its full effect on the Work.

Include a statement describing reason for the change and the effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on the Work by separate or other Contractors.

G. Document requested substitutions according to Section 012500 - Substitution Procedures.

H. Stipulated Sum/Price Change Order: Based on AIA G709 and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Architect/Engineer.

I. Unit Price Change Order: For Contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of that which are not predetermined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

J. Construction Change Directive: Architect/Engineer may issue directive, on AIA G714 - Construction Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

K. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.

L. Maintain detailed records of Work done on time and material basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.

M. Document each quotation for change in Project Cost or Time with sufficient data to allow evaluation of quotation.

N. Change Order Forms: AIA G701 - Change Order.

O. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

P. Correlation of Contractor Submittals:
   1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
   2. Promptly revise Progress Schedules to reflect change in Contract Time, revise sub schedules to adjust times for other items of Work affected by the change, and resubmit.

3. Promptly enter changes in Record Documents.

1.5 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of Architect/Engineer, it is not practical to remove and replace the Work, Architect/Engineer will direct appropriate remedy or adjust payment.

C. Authority of Architect/Engineer to assess defects and identify payment adjustments is final.

D. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:
   1. Products wasted or disposed of in a manner that is not acceptable.
   2. Products determined as unacceptable before or after placement.
   3. Products not completely unloaded from transporting vehicle.
   4. Products placed beyond lines and levels of the required Work.
   5. Products remaining on hand after completion of the Work.
   6. Loading, hauling, and disposing of rejected products.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 20 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality assurance.

B. Product options.

C. Product substitution procedures.

1.2 QUALITY ASSURANCE

A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.

B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.

C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. See Section 01 60 00 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

A. Architect/Engineer may consider requests for substitutions during the Request for Proposal submission period. Contractor to provide Substitution Request form in 01 25 01 and relevant supporting data. Requests must be submitted prior to the final deadline for questions during Request for Proposal submission period. Architect/Engineer's decision on acceptance/rejection of products is final.

B. Architect/Engineer may consider requests for substitutions within 15 days after date of Owner-Contractor Agreement. Contractor to provide Substitution Request form in 01 25 02 and relevant supporting data. Architect/Engineer's decision on acceptance/rejection of products is final.

C. Substitutions may be considered if within 90 days of contract award a product becomes unavailable, through no fault of the contractor. Contractor to provide documentation from the product manufacturer that product is no longer

available. Failure to provide notification that a product is no longer available within 90 days of contract award shall result in the Architect selecting an alternative material at no additional cost.

D. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:
   1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
   2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
   3. Reference to Article and Paragraph numbers in Specification Section.
   4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
   5. Changes required in other Work.
   6. Availability of maintenance service and source of replacement parts as applicable.
   7. Certified test data to show compliance with performance characteristics specified.
   8. Samples when applicable or requested.
   9. Other information as necessary to assist Architect/Engineer's evaluation.

E. A request constitutes a representation that Respondent or Contractor:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product, and provides the same features and options as the specified product.
   2. Will provide same warranty for substitution as for specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
   6. Will reimburse Owner and Architect/Engineer for review or redesign services associated with reapproval by authorities having jurisdiction.

F. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.

G. Substitution Submittal Procedure:
   1. Submit requests for substitutions on form 01 25 01 Request for Substitution Form.
   2. Submit electronic files to Project website of Request for Substitution for consideration. Limit each request to one proposed substitution.
   3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
   4. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

1.5 INSTALLER SUBSTITUTION PROCEDURES

A. Architect/Engineer will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement.

B. Document each request with:
   1. Installer's qualifications.
   2. Installer's experience in work similar to that specified.
   3. Other information as necessary to assist Architect/Engineer's evaluation.

C. Substitution Submittal Procedure:
   1. Submit electronic files to Project website of Request for Substitution for consideration. Limit each request to one proposed substitution.
   2. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 25 00

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Advancement of Construction Technology

SUBSTITUTION REQUEST

(During the Request for Proposal Submission Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

A/E Project Number: _____

Re: _____

Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 33 00.

☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 33 00.

☐ Substitution rejected - Use specified materials.

☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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SUBSTITUTION REQUEST
(After the Request for Proposal Submission Period/Negotiating Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Phone: _____

Address: _____

Trade Name: _____ Model No.: _____

Installer: _____ Phone: _____

Address: _____

History: ☐ New Product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

☐ Point-by-point comparative data attached.

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed Substitution affects other parts of work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution: _____ ($_____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests

☐ Reports ☐ _____ The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effects on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction cots cause by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____
_____
Telephone: _____
Attachments:
_____

A/E's Review Action

☐ Substitution approved – Make submittals in accordance with Specification Section 01 33 00.

☐ Substitution approved as noted – Make submittals in accordance with Specification Section 01 33 00.

☐ Substitution rejected – Use specified materials.

☐ Substitution Request received too late – Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer

☐ A/E ☐ Other

_____

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

F. Closeout meeting.

G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later as identified by the owner.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
   1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

E. In finished areas, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.

G. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Architect/Engineer will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Architect/Engineer, Owner, and Contractor.

C. Minimum Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
5. Designation of personnel representing parties in Contract, and Architect/Engineer.
6. Communication procedures.
7. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Critical Work sequencing.

D. Contractor: Record minutes and distribute electronic copies to participants within two days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.4 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, and Architect/Engineer, Owner, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems impeding planned progress.
   5. Review of submittal schedule and status of submittals.
   6. Review of off-Site fabrication and delivery schedules.
   7. Maintenance of Progress Schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on Progress Schedule and coordination.
   13. Other business relating to Work.

E. Contractor: Record minutes and distribute electronic copies to participants within two days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.5 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Architect/Engineer four days in advance of meeting date.

D. Prepare agenda and preside over meeting:
   1. Review conditions of installation, preparation, and installation procedures.
   2. Review coordination with related Work.

E. Record minutes and distribute electronic copies to participants within two days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.6 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, Architect/Engineer, Owner, and others appropriate to agenda.

C. Notify Architect/Engineer ten days in advance of meeting date.

D. Minimum Agenda:
   1. Start-up of facilities and systems.
   2. Operations and maintenance manuals.
   3. Testing, adjusting, and balancing.
   4. System demonstration and observation.
   5. Operation and maintenance instructions for Owner's personnel.
   6. Contractor's inspection of Work.
   7. Contractor's preparation of an initial "punch list."
   8. Procedure to request Architect/Engineer inspection to determine date of Substantial Completion.
   9. Completion time for correcting deficiencies.
   10. Inspections by authorities having jurisdiction.
   11. Certificate of Occupancy and transfer of insurance responsibilities.
   12. Partial release of retainage.
   13. Final cleaning.
   14. Preparation for final inspection.
   15. Closeout Submittals:
      a. Project record documents.
      b. Operating and maintenance documents.
      c. Operating and maintenance materials.
      d. Affidavits.
   16. Final Application for Payment.
   17. Contractor's demobilization of Site.
   18. Maintenance.

E. Record minutes and distribute electronic copies to participants within five days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 ALTERATION PROCEDURES

A. Designated areas of existing facilities will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.
   1. Perform Work not to interfere with operations of occupied areas.
   2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
   3. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. Materials: As specified in product Sections; match existing products with new products for patching and extending Work.

C. Employ skilled and experienced installer to perform alteration and renovation Work.

D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 01 70 00 - Execution and Closeout Requirements

E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

F. Remove debris and abandoned items from area and from concealed spaces.

G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

I. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to match adjacent condition, unless specified otherwise.

J. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with neat transition to adjacent finishes.

K. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

L. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.

M. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition to Architect/Engineer for review.

N. Trim existing doors to clear new floor finish. Refinish trim to specified condition.

O. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

P. Finish surfaces as specified in individual product Sections.

END OF SECTION 01 30 00

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SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. Bar chart schedules.

D. Review and evaluation.

E. Updating schedules.

F. Distribution.

1.2 SUBMITTALS

A. Within 10 days after date of Owner-Contractor Agreement, submit proposed preliminary network diagram defining planned operations for Work.

B. Participate in review of preliminary and complete network diagrams jointly with Architect/Engineer.

C. Submit updated network schedules with each Application for Payment.

D. Post as electronic file to Project website.

E. Submit network schedules under transmittal letter form specified in Section 01 33 00 - Submittal Procedures.

F. Schedule Updates:
   1. Overall percent complete, projected and actual.
   2. Completion progress by listed activity and sub-activity, to within five working days prior to submittal.
   3. Changes in Work scope and activities modified since submittal.
   4. Delays in submittals or resubmittals, deliveries, or Work.
   5. Adjusted or modified sequences of Work.
   6. Other identifiable changes.
   7. Revised projections of progress and completion.

1.3 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel specializing in CPM scheduling with five years' minimum experience in scheduling construction work of complexity comparable to the Project, and having use of computer facilities capable of delivering detailed graphic printout within 48 hours of request.

B. Contractor's Administrative Personnel: five years' minimum experience in using and monitoring CPM schedules on comparable Projects.

1.4 BAR CHART SCHEDULES

A. Format: Bar chart Schedule, to include at least:
   1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:
      a. Subcontract Work.
      b. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
      c. Move-in and other preliminary activities.
      d. Equipment and equipment system test and startup activities.
      e. Project closeout and cleanup.
      f. Work sequences, constraints, and milestones.
   2. Listings identified by Specification Section number.
   3. Identification of the following:
      a. Horizontal time frame by year, month, and week.
      b. Duration, early start, and completion for each activity and sub-activity.
      c. Critical activities and Project float.
      d. Sub-schedules to further define critical portions of Work.

1.5 REVIEW AND EVALUATION

A. Participate in joint review and evaluation of schedules with Architect/Engineer at each submittal.

B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.

C. After review, revise schedules incorporating results of review, and resubmit within **10** days.

1.6 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.

C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

D. Upon approval of a Change Order, include the change in the next schedule submittal.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit sorts as required to support recommended changes.

G. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect including effects of changes on schedules of separate Contractors.

1.7 DISTRIBUTION

A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, to Subcontractors, suppliers, Architect/Engineer, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 32 16

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SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions.

B. Submittal procedures.

C. Construction progress schedules.

D. Proposed product list.

E. Product data.

F. Use of electronic CAD files of Project Drawings.

G. Shop Drawings.

H. Samples.

I. Other submittals.

J. Design data.

K. Test reports.

L. Certificates.

M. Manufacturer's instructions.

N. Manufacturer's field reports.

O. Erection Drawings.

P. Construction photographs.

Q. Contractor review.

R. Architect/Engineer review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect/Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Architect/Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Number submittals with a prefix of the specification number related to the submittal, a sequential number, and a revision number (i.e. 092216–001–001).

B. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

C. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

D. Schedule submittals to expedite Project, and submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.

E. For each submittal for review, allow 15 working days excluding delivery time to and from Contractor.

F. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

G. Allow space on submittals for Contractor and Architect/Engineer review stamps.

H. When revised for resubmission, identify changes made since previous submission.

I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

J. Submittals not requested will not be recognized nor processed.

K. Incomplete Submittals: Architect/Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Architect/Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with Section 01 32 16 - Construction Progress Schedule.

1.5 PROPOSED PRODUCT LIST

A. Within 15 working days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Architect/Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit electronic submittals via email as PDF electronic files.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.

B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:
   1. Use of files is solely at receiver's risk. Architect/Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Architect/Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
   2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.

3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
4. Receiver shall not hold Architect/Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
5. Receiver shall understand that even though Architect/Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
6. Receiver shall not hold Architect/Engineer responsible for such viruses or their consequences, and shall hold Architect/Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.
7. Receiver shall submit Electronic Documents Request Form, 01 33 01, indicating what documents are requested.

1.8 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit electronic submittals via email as PDF electronic files.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

F. Shop drawings shall be drafted in a professional manner on a title block provided by the shop drawing producer. Markups, photocopies or PDF files of Construction Documents are not an acceptable shop drawing submittal.

1.9 SAMPLES

A. Samples: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, and finish selection.
   2. Submit Samples of finishes, textures, and patterns for Architect/Engineer selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Architect/Engineer will retain one Sample.

F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.10 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 01 70 00 - Execution and Closeout Requirements.

B. Informational Submittal: Submit data for Architect/Engineer's knowledge as Contract administrator or for Owner.

C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 TEST REPORTS

A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Architect/Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Architect/Engineer in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit report within 5 days of observation to Architect/Engineer for information.

C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.15 ERECTION DRAWINGS

A. Informational Submittal: Submit Drawings for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

1.16 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Architect/Engineer.

B. Contractor: Responsible for:
   1. Determination and verification of materials including manufacturer's catalog numbers.
   2. Determination and verification of field measurements and field construction criteria.
   3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
   4. Determination of accuracy and completeness of dimensions and quantities.
   5. Confirmation and coordination of dimensions and field conditions at Site.
   6. Construction means, techniques, sequences, and procedures.
   7. Safety precautions.
   8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Architect/Engineer.

1.17 ARCHITECT/ENGINEER REVIEW

A. Do not make "mass submittals" to Architect/Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Architect/Engineer's review time stated above will be extended as necessary to perform proper review. Architect/Engineer will review "mass submittals" based on priority determined by Architect/Engineer after consultation with Owner and Contractor.

B. Informational submittals and other similar data are for Architect/Engineer's information, do not require Architect/Engineer's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, Architect's Supplemental Instruction or Construction Change Directive.

E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Mockup requirements.

F. Testing and inspection services.

G. Manufacturers' field services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Architect/Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date for receiving Proposal except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mockups shall be comparison standard for remaining Work.

D. Where mockup has been accepted by Architect/Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Architect/Engineer.

1.7 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.
   1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time Professional Engineer or specialist and responsible officer.
   2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Architect/Engineer or authorities having jurisdiction.
   1. Laboratory: Authorized to operate in the project's jurisdiction.
   2. Laboratory Staff: Maintain full-time Professional Engineer on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Architect/Engineer or Owner.

D. Reports shall be submitted by independent firm to Architect/Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
   1. Submit final report indicating correction of Work previously reported as noncompliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Architect/Engineer and independent firm 48 hours before expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Architect/Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:
   1. Test Samples of mixes submitted by Contractor.
   2. Provide qualified personnel at Site. Cooperate with Architect/Engineer and Contractor in performance of services.
   3. Perform indicated sampling and testing of products according to specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect/Engineer and Contractor of observed irregularities or nonconformance of Work or products.
   6. Perform additional tests required by Architect/Engineer.
   7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer, Contractor, and authorities having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
   4. Date and time of sampling or inspection.
   5. Identification of product and Specification Section.
   6. Location in Project.
   7. Type of inspection or test.
   8. Date of test.
   9. Results of tests.
   10. Conformance with Contract Documents.

J. Limits on Testing Authority:
   1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.8 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer is subject to approval of Architect/Engineer.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 01 33 00 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 40 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities under Construction Management Agreement.

B. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary heating.
   4. Temporary cooling.
   5. Temporary ventilation.
   6. Communication services.
   7. Temporary water service.
   8. Temporary sanitary facilities.

C. Construction Facilities:
   1. Field offices and sheds.
   2. Vehicular access.
   3. Parking.
   4. Progress cleaning and waste removal.
   5. Project identification.
   6. Traffic regulation.
   7. Fire-prevention facilities.

D. Temporary Controls:
   1. Barriers.
   2. Enclosures and fencing.
   3. Security.
   4. Water control.
   5. Dust control.
   6. Erosion and sediment control.
   7. Noise control.
   8. Pest and rodent control.
   9. Pollution control.

E. Removal of utilities, facilities, and controls.

1.2 REFERENCES

A. ASTM International:
   1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 TEMPORARY ELECTRICITY

A. Owner will pay cost of energy used. Exercise measures to conserve energy. Use Owner's existing power service.

B. Complement existing power service capacity and characteristics as required for construction operations.

C. Provide power outlets with branch wiring and distribution boxes located as required for construction operations. Provide suitable, flexible power cords as required for portable construction tools and equipment.

D. Provide feeder switch at source distribution equipment.

E. Permanent convenience receptacles may be used during construction.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watts/sq. ft.

B. Provide and maintain 0.25 watt/sq. ft. HID lighting to interior work areas after dark for security purposes.

C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, lamps, and the like, for specified lighting levels.

D. Maintain lighting and provide routine repairs.

E. Permanent building lighting may be used during construction.

1.5 TEMPORARY HEATING

A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse Owner for cost of energy used.

B. Enclose building before activating temporary heat according to "Enclosures and Fencing" Article in this Section.

C. Before operating permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.

D. Maintain minimum ambient temperature of 50 degrees F in areas not occupied by the owner where construction is in progress unless indicated otherwise in individual product Sections.

E. Maintain minimum ambient temperature of 68 degrees F in areas occupied by the owner where construction is in progress unless indicated otherwise in individual product Sections.

1.6 TEMPORARY COOLING

A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse Owner for cost of energy used.

B. Enclose building before activating temporary cooling according to '"Enclosures and Fencing"' Article in this Section.

C. Before operating permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.

D. Limit maximum ambient temperature to 80 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.

1.7 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Use existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.8 COMMUNICATION SERVICES

A. Telephone Service: Provide, maintain, and pay for telephone service to field office at time of Project mobilization and until completion of Work.

B. Facsimile Service: Provide, maintain, and pay for facsimile service including dedicated telephone line to field office at time of Project mobilization and until completion of Work.

C. Internet Service: Provide, maintain, and pay for broadband Internet service to field office at time of Project mobilization. Provide desktop computer with Microsoft operating system and appropriate office function software, modem, and printer.

1.9 TEMPORARY WATER SERVICE

A. Owner will pay cost of temporary water. Exercise measures to conserve energy. Use Owner's existing water system, extended and supplemented with temporary devices as needed to maintain specified conditions for construction operations.

B. Extend branch piping with outlets located so that water is available by hoses with threaded connections. Provide temporary pipe insulation and heat tape to prevent freezing.

1.10 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.11 FIELD OFFICES AND SHEDS

A. Designated existing spaces may be used for field offices. Coordinate locations with Owner.

B. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 01 60 00 - Product Requirements.

C. Preparation: Fill and grade Sites for temporary structures sloped for drainage away from buildings.

D. Installation:
   1. Install field office spaces ready for occupancy 15 days after date established by Owner-Contractor Agreement.
   2. Employee Residential Occupancy: Not allowed on Owner's property.

E. Maintenance and Cleaning:
   1. Weekly janitorial services for field offices; periodic cleaning and maintenance for sheds and storage areas.
   2. Maintain walks free of mud, water, snow, and the like.

F. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.12 VEHICULAR ACCESS

A. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.

B. Provide unimpeded access for emergency vehicles. Maintain 20-foot-wide driveways with turning space between and around combustible materials.

C. Provide and maintain access to fire hydrants and control valves free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Use designated existing on-Site roads for construction traffic.

1.13 PARKING

A. Arrange for temporary surface parking areas to accommodate construction personnel.

B. Locate as approved by Owner.

C. If Site space is not adequate, provide additional off-Site parking.

D. Use of Owner designated areas of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

E. Use of Owner designated areas of existing parking facilities used by construction personnel is permitted.

F. Do not allow heavy vehicles or construction equipment in parking areas.

G. Do not allow vehicle parking on existing pavement.

H. Permanent Pavements and Parking Facilities:
1. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.

I. Maintenance:
1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

J. Removal, Repair:
1. Remove temporary materials and construction before Substantial Completion.

2. Remove underground Work and compacted materials to depth of 2 feet fill and grade Site as indicated.
3. Repair existing facilities damaged by use, to original condition.

K. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.14 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 PROJECT IDENTIFICATION

A. Project Identification Sign:
1. **One** painted sign of construction, design, and content shown on Drawings, location designated.
2. Content:
   a. Project**,** title, and name of Owner.
   b. Names and titles of authorities.
   c. Names and titles of Architect/Engineer and Consultants.
   d. Name of Prime Contractor.
3. Graphic Design, Colors, and Style of Lettering: Designated by Architect/Engineer.

B. Project Informational Signs:
1. Painted informational signs of same colors and lettering as Project identification sign or standard products; size lettering for legibility at 100 -foot distance.
2. Provide sign at each field office and storage shed, and provide directional signs to direct traffic into and within Site. Relocate as Work progress requires.
3. Provide municipal traffic agency directional traffic signs to and within Site.
4. No other signs are allowed without Owner's permission except those required by law.

C. Design sign and structure to withstand 60 -mph wind velocity.

D. Sign Painter: Experienced as professional sign painter for minimum of three years.

E. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

F. Show content, layout, lettering, and color.

G. Sign Materials:
   1. Structure and Framing: New wood structurally adequate.
   2. Sign Surfaces: Exterior grade plywood with medium-density overlay, minimum of ¾ inches thick, standard large sizes to minimize joints.
   3. Rough Hardware: Galvanized, aluminum, or brass.
   4. Paint and Primers: Exterior quality, two coats; sign background of as selected.
   5. Lettering: Exterior quality paint, contrasting colors as selected.

H. Installation:
   1. Install Project identification sign within 15 days after date established by Owner-Contractor Agreement.
   2. Erect at Owner designated location.
   3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
   4. Install sign surface plumb and level, with butt joints. Anchor securely.
   5. Paint exposed surfaces of sign, supports, and framing.

I. Maintenance: Maintain clean signs and supports; repair deterioration and damage.

J. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.16 TRAFFIC REGULATION

A. Signs, Signals, and Devices:
   1. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.
   2. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
   3. Flag Person Equipment: As required by authorities having jurisdiction.

B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:
   1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.

E. Traffic Signs and Signals:

1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
3. Relocate signs and signals as Work progresses, to maintain effective traffic control.

F. Removal:
1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.
3. Remove post settings to depth of 2'-0".

1.17 FIRE-PREVENTION FACILITIES

A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.

B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
1. Provide one fire extinguisher at each stairway on each floor of buildings under construction and demolition.
2. Provide minimum of one fire extinguisher in every construction trailer and storage shed.
3. Provide minimum of one fire extinguisher on roof during roofing operations using heat-producing equipment.

1.18 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.

C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.

1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
2. Provide 6-foot-high barriers around drip line, with access for maintenance.
3. Replace trees and plants damaged by construction operations.

D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.19 ENCLOSURES AND FENCING

A. Construction: Commercial-grade chain-link fence.

B. Provide 6-foot-high fence around construction Site, at locations coordinated with Owner; equip with vehicular and pedestrian gates with locks.

C. Exterior Enclosures:
1. Provide temporary insulated weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

D. Interior Enclosures:
1. Provide temporary partitions and ceilings at locations requested by owner to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
2. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces.
   a. STC rating of 35 according to ASTM E 90.
   b. Surface-Burning Characteristics: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E 84.
   c. Fire-Rated Wall Construction: 2-hour rating.
      1) Tested Rating: Determined according to ASTM E 119.
3. Paint surfaces exposed to view from Owner-occupied areas.

1.20 SECURITY

A. Security Program:
1. Protect Work on existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
2. Initiate program in coordination with Owner's existing security system at Project mobilization.

3. Maintain program throughout construction period until Owner's acceptance precludes need for Contractor's security.

B. Entry Control:
1. Restrict entrance of persons and vehicles to Project Site and existing facilities.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors and make available to Owner on request.
4. Coordinate access of Owner's personnel to Site in coordination with Owner's security forces.

C. Personnel Identification:
1. Provide identification badge for each person authorized to enter premises.
2. Badge to Include: Personal photograph, name, expiration date, and employer.
3. Maintain list of accredited persons and submit copy to Owner on request.
4. Require return of badges at expiration of employment on the Work.

D. Restrictions:
1. Do not allow cameras on Site or photographs taken except by written approval of Owner.
2.
3. Do no work on days indicated in Owner-Contractor Agreement.

1.21 WATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.

B. Protect Site from puddles or running water.

1.22 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere and into Owner-occupied areas.

1.23 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work or entering facility.

B. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.24 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.

B. Remove underground installations to minimum depth of 2'-0".

C. Clean and repair damage caused by installation or use of temporary Work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 50 00

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SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. At minimum, comply with specified requirements and reference standards.

B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

D. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.

E. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products according to manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with seals and labels intact and legible.

C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.

D. For exterior storage of fabricated products, place products on sloped supports aboveground.

E. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01 25 00 - Substitution Procedures.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Furnish minimum 6-foot long cord and plug including grounding connector for connection to electric wiring system. Cord of longer length may be specified in individual Specification Sections.

PART 3 - EXECUTION - Not Used

END OF SECTION 01 60 00

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SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Field engineering

B. Closeout procedures.

C. Starting of systems.

D. Demonstration and instructions.

E. Testing, adjusting, and balancing.

F. Project record documents.

G. Operation and maintenance data.

H. Manual for materials and finishes.

I. Manual for equipment and systems.

J. Spare parts and maintenance products.

K. Product warranties and product bonds.

L. Maintenance service.

M. Examination.

N. Preparation.

O. Execution.

P. Cutting and patching.

Q. Protecting installed construction.

R. Final cleaning.

1.2 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
   1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
   2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
   3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
   4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
   5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
   6. Make final change-over of locks and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
   7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
   8. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:
   1. When Contractor considers Work to be substantially complete, submit to Architect/Engineer:
      a. Written certificate that Work, or designated portion, is substantially complete.
      b. List of items to be completed or corrected (initial punch list).
   2. Within seven days after receipt of request for Substantial Completion, Architect/Engineer will make inspection to determine whether Work or designated portion is substantially complete.
   3. Should Architect/Engineer determine that Work is not substantially complete:
      a. Architect/Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
      b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Architect/Engineer.
      c. Architect/Engineer will reinspect Work.

d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.

4. When Architect/Engineer finds that Work is substantially complete, Architect/Engineer will:
   a. Prepare Certificate of Substantial Completion on AIA G704 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Architect/Engineer and Owner (final punch list).
   b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
5. After Work is substantially complete, Contractor shall:
   a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
   b. Complete Work listed for completion or correction within time period stipulated.
6. Owner will occupy portions of building as specified in Section 01 10 00 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
   1. When Contractor considers Work to be complete, submit written certification that:
      a. Contract Documents have been reviewed.
      b. Work has been examined for compliance with Contract Documents.
      c. Work has been completed according to Contract Documents.
      d. Work is completed and ready for final inspection.
   2. Submittals: Submit following:
      a. Final punch list indicating all items have been completed or corrected.
      b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
      c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
      d. Accounting statement for final changes to Contract Sum.
      e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
      f. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens.
      g. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.
   3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven days after receipt of request for final inspection, Architect/Engineer will make inspection to determine whether Work or designated portion is complete.
2. Should Architect/Engineer consider Work to be incomplete or defective:
    a. Architect/Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
    b. Contractor shall remedy stated deficiencies and send second written request to Architect/Engineer that Work is complete.
    c. Architect/Engineer will reinspect Work.
    d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.

1.3 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Architect/Engineer seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. Submit a written report according to Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.5 TESTING, ADJUSTING, AND BALANCING

A. Owner will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, product data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates used.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
   1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
   2. Include locations of concealed elements of the Work.
   3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.

4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
5. Identify and locate existing buried or concealed items encountered during Project.
6. Measured depths of foundations in relation to finish floor datum.
7. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
9. Field changes of dimension and detail.
10. Details not on original Drawings.

G. Submit marked-up paper copy documents to Architect/Engineer before Substantial Completion.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.

C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.

D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.

e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
g. Safety precautions to be taken when operating and maintaining or working near equipment.

3. Part 3: Project documents and certificates, including the following:
   a. Shop Drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Originals of warranties.

1.8 MANUAL FOR MATERIALS AND FINISHES

A. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

B. Submit one copy of completed volumes before Substantial Completion.

C. Submit two sets of revised final volumes within ten days after final inspection.

D. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.

E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations.

F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

H. Additional Requirements: As specified in individual product Specification Sections.

I. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

A. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

B. Submit one copy of completed volumes before Substantial Completion.

C. Submit two sets of final volumes within ten days after final inspection.

D. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.

E. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; by label machine.

G. Include color-coded wiring diagrams as installed.

H. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

J. Include servicing and lubrication schedule and list of lubricants required.

K. Include manufacturer's printed operation and maintenance instructions.

L. Include sequence of operation by controls manufacturer.

M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

N. Include control diagrams by controls manufacturer as installed.

O. Include Contractor's coordination drawings with color-coded piping diagrams as installed.

P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

R. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.

S. Additional Requirements: As specified in individual product Specification Sections.

T. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.12 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in Specification Sections during warranty period.

B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
   1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
   2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
   3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect/Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
   1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
   2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
   1. Refer questionable mounting heights choices to Architect/Engineer for final decision.
   2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

A. Employ skilled and experienced installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.

2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching to complete Work and to:
1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and nonconforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-rated material according to Section 078400 – Firestopping, to full thickness of penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.
   1. Employ experienced personnel or professional cleaning firm.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.

C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

D. Replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean Site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION 01 70 00

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PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the demolition of existing pipes, structures, objects, or other existing facilities as indicated on the drawings.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item, refer to Section 01 22 00, Unit Prices – Measurement and Payment.

1.03 REFERENCES

A. Except as herein specified or as indicated on Drawings, the work of this Section shall comply with the following:
   1. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.04 DEFINITIONS

A. Terms:
   1. Abandon: Remove an item to the extent that it is not visible and does not interfere with new construction. Portions of the abandoned item may be left in place. No abandoned items shall be left below new footings.
   2. Demolish: Remove existing items from their present location in the Project area and haul to an area outside of the Project area. Remove utilities serving these items.
   3. Relocate: Move existing items from their present location to another location in the Project area. Extend utilities serving the present location to the new location.
   4. Remove: Remove existing items from their present location in the Project area and haul to an area outside of the Project area. Remove utilities serving these items.
   5. Replace: Remove existing items from their present location in the Project area, haul them to an area outside of the Project area, and furnish and install new items in the same or another location. Extend utilities serving the present location to the new location.
   6. Reuse: Move existing items from their present location to another location in the Project area. Extend utilities serving the present location to the new location.

1.05 PROTECTION

A. CONTRACTOR shall comply with requirements of NFPA 241.

B. Existing Structures:
   1. Demolition and disassembly will not be allowed until it is coordinated with OWNER's operations.
   2. CONTRACTOR shall maintain free and safe passage to and from buildings.
   3. Prevent movement or settlement of structures.
   4. Provide and place bracing, shoring and underpinning, and be responsible for safety and support of structures and assume liability for such movement, settlement, damage, or injury.
   5. Cease operations and notify ENGINEER immediately if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.

6. All active utility mains traversing the project site shall be maintained.
7. CONTRACTOR shall not close or obstruct any streets, sidewalks, alleys, or passageways unless specifically authorized.

C. Barricades:
1. CONTRACTOR shall provide, erect and maintain barricades, lighting and guard rails as required by applicable regulatory agencies to protect occupants of building and workers.
2. Provide temporary fencing for security if it is necessary to temporarily remove OWNER's security fencing for access to the site. Obtain OWNER's approval prior to removing any existing fencing.

D. Coordination with Local Authorities:
1. Cooperate with local authorities and utility companies whose work affects or will be affected by the demolition operations. Ascertain the rules, regulations and requirements of these authorities which affect the demolition process; notify them of conditions affecting their work. Disconnect or arrange for disconnection of utility services if required.
2. Comply fully with all provisions of the local codes, laws and ordinances applicable to the Work of this Section.

1.06 SUBMITTALS

A. Upon request, CONTRACTOR shall submit to ENGINEER for review 2 copies of proposed methods and operations of demolition of the structures and modifications specified herein prior to the start of work. Include in the submittal a schedule for the coordination of shutoff, capping and continuation of utility services as required; and

B. Provide a detailed sequence of demolition, disassembly and removal work to ensure the uninterrupted progress of OWNER's operations.

1.07 SEQUENCING AND SCHEDULING

A. Scheduling:
1. Before commencing demolition work, CONTRACTOR shall complete all modifications necessary to bypass the affected structure.
2. Actual work shall not begin until ENGINEER has inspected and approved the modifications and authorized commencement of the demolition work.
3. CONTRACTOR shall follow this procedure for each individual demolition operation.

PART 2 - PRODUCTS

2.01 SALVAGED MATERIALS

A. Ownership:
1. OWNER shall have the option of retaining ownership of any or all existing equipment, materials, and items removed under this Contract.
2. Should OWNER decide not to retain ownership of certain items removed under the Work, those items shall become property of CONTRACTOR and shall be promptly removed from the Project Site and disposed of properly.

B. Deliver all items which remain property of OWNER to a location, or locations, as selected by OWNER within the Township boundaries.

2.02 MATERIALS

A. Weatherproof Closures: Polyethylene sheets or plywood.

B. Temporary Protective and Dustproof Partitions: Plywood and 2x4 wood studs.

PART 3 - EXECUTION

3.01 PREPARATION

A. Permits: Obtain all necessary permits.

B. Weatherproof Closures:
1. Erect weatherproof closures for exterior openings.
2. Maintain exit requirements.

C. Temporary Dustproof and Protective Partitions:
1. Erect temporary partitions separating construction areas from occupied areas to prevent spread of dust, fumes and smoke to other parts of the building and to protect occupants from falling debris.
2. Construct temporary corridor walls and ceilings within construction areas to give occupants access to exits, toilet rooms, etc.
3. On completion, remove partitions and repair damaged surfaces to match adjacent surfaces.

D. Be responsible for all safety requirements in accordance with the General Conditions.

E. Carry out demolition work to cause as little inconvenience to existing occupied building areas as possible.

3.02 DEMOLITION

A. General:
1. Repair all demolition performed in excess of that required at no cost to OWNER.
2. Explosives shall not be used in the Work.
3. Remove all demolished concrete, masonry and other debris completely from site.
4. [Remove concrete and steel substructures and other debris 10 feet below finished grade.]
5. Remove all mechanical, electrical, piping, and miscellaneous equipment and appurtenances before commencing structural demolitions.
6. [Fill remaining substructure with flowable fill to 10 feet below finished grade and bulkhead all openings.]

B. Wells: CONTRACTOR shall properly abandon existing wells where indicated on the Drawings and in accordance with all applicable State of Michigan laws and regulations.

C. Burning: Materials shall not be burned on Site.

D. Specific Items of Demolition: Refer to Drawings for extent and locations of various items of demolition work. Also, verify conditions at the Site.

E. Disposal of Materials:
1. CONTRACTOR shall remove and dispose of contaminated, dangerous, and other materials from Site in accordance with applicable regulations.
2. Pay for all hauling, storage, collection and disposal costs.

3.03 CLEANING

A. CONTRACTOR shall clean affected areas in accordance with Section 01 70 00, Execution and Closeout Requirements.

END OF SECTION 02 41 00

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the major items listed below:
   1. Clearing Site of above-grade brush, shrubs and plant life.
   2. Removal of the following man-made items:
      a. Walls.
      b. Fences.
      c. Sheds.
      d. Other surface improvements as indicated on the Drawings.
   3. Removal of roots and stumps.
   4. Removal of exposed rocks, boulders and debris.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item, refer to Section 01 22 00, Unit Prices – Measurement and Payment.

C. Tree Protection: The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the Work of this Section shall comply with the following:
   1. MDOT Current Standards:
      a. Standard Specifications for Construction.
      b. Standard Plans.
   2. Macomb County Department of Roads (MCDR) Requirements.
   3. Macomb Township Requirements.
   4. Macomb County Public Works Office (MCPWO) Requirements.
   5. Michigan Department of Environment, Great Lakes, and Energy (EGLE).

1.04 DEFINITIONS

A. Brush: Vegetation with trunks or stalks less than 8 inches in diameter (as measured at a point 4-1/2 feet above the base of the tree at the ground line).

B. Clearing: Cutting and removal of trees less than 8 inches in diameter (as measured at a point 4-1/2-feet above the base of the tree at the ground line), brush, and shrubs.

C. Disposal: Removal from site of all debris and woody material that is removed during the clearing and grubbing operations.

D. Grubbing: Removal of tree stumps and roots from below ground.

E. Rock: Igneous, metamorphic, or sedimentary rock; hardpan; or other solid material which does not soften when wet; or cannot be excavated without continuous drilling, sawing, blasting, or continuous use of a ripper or other special equipment. This includes all boulders of 1/2 cubic yard or more in volume.

F. Roots: Underground portion of a tree.

G. Stumps: The bottom part of a tree that projects from the ground after most of the trunk has fallen or been cut down.

H. Surface Improvements: All surface improvements beyond what might be encountered in an open unimproved field.

I. Trees:
1. Vegetation with trunks or stalks equal to or exceeding 8 inches (as measured at a point 4-1/2 feet above the base of the tree at the ground line).
2. A stump with numerous branches, trunks or sprouts shall be considered 1 tree.

1.05 SUBMITTALS

A. Permit to Store or Dump Removed Materials:
1. On property owned, leased or occupied by someone other than OWNER.
2. Submit prior to storing or dumping.
3. Permit shall absolve OWNER from responsibility for storing or dumping.

1.06 QUALITY ASSURANCE

A. Interference:
1. Ensure that Site preparation work does not unduly interfere with pedestrian and vehicular traffic.
2. Obtain ENGINEER's and governing authority's approvals prior to closing a public street.

1.07 PROJECT CONDITIONS

A. Burning:
1. Not permitted.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Temporary Fencing: Provide fencing for protection of trees and shrubs which are to remain from permanent damage by construction activities. See Section 01 50 00, Temporary Facilities.

PART 3 - EXECUTION

3.01 PREPARATION

A. Soil Erosion Control: Provide soil erosion control in accordance with Section 31 25 00, Erosion and Sedimentation Control, prior to starting Site preparation work.

B. Protection of Trees, Brush, and Shrubs:
1. Protect trees and shrubs which are outside the limits of construction from permanent damage by construction operations.
2. Prevent vehicles from driving within area under dripline of trees which are outside the limits of construction operations.
3. Erect and maintain temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.

C. Maintain designated temporary roadways, walkways, and detours for vehicular and pedestrian traffic.

D. Precautions:
1. Avoid damage to stable vegetation or shrubs that are not designated for removal during completion of the site clearing and grubbing operations.
2. Avoid damage to surface improvements that are not designated for removal during completion of the site preparation activities.

3.02 CLEARING

A. Cutting:
1. Cut brush a maximum of 18 inches above the ground.
2. The final cut shall be an even cut, parallel with the ground.

B. Remove items requiring removal from area indicated on Drawings.

C. Rock Removal:
1. Where rock is encountered, expose the surface of the rock sufficient to permit adequate measurements to be taken before the rock excavation is started.
2. Notify ENGINEER prior to removal if rock is encountered.
3. Blasting will not be allowed.
4. Rock removal shall be paid under separate Change Order unless a specific item appears in the Bid.

3.03 GRUBBING

A. Stump and Root Removal: Unless stumps are specifically designated for chipping, remove the entire stump and roots.

B. Utilities:
1. Notify ENGINEER of instances in which stump and/or root removal may result in damage to existing utilities or culverts.
2. CONTRACTOR is responsible for damage to utilities that may result from stump and/ or root removal.

C. Chipping: Where authorized by ENGINEER, stumps and/ or roots may be chipped to a minimum depth of 12 inches below ground in lieu of pulling the stump and roots.

3.04 DISPOSAL OF EXCESS MATERIAL

A. General:
1. Remove and properly dispose of all material not needed to complete Project.
2. Dispose of excess material at a location offsite.
3. Disposal of materials shall not violate laws, rules, regulations and the like regarding the filling of flood plains, wetlands and other environmentally sensitive areas.
4. Provide adequate controls to maintain disposal sites in a neat and safe condition by periodic leveling of material, the control of erosion and such other practices as are necessary.
5. Burial will not be permitted.
6. Burning will not be permitted.

END OF SECTION 31 10 13

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all material, labor, equipment, and service necessary for tree removal and trimming and tree relocation as shown on the Drawings and/or as specified herein. The work of this Section includes but is not limited to:
   1. Protecting existing trees and vegetation to remain.
   2. Trimming tree limbs and roots.
   3. Removing trees as designated.
   4. Relocation of trees as designated.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Tree Protection: The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. Tree Trimming and/or Root Pruning: The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

C. The removal and disposal of tree stumps and/or roots are included in Section 31 10 13, Site Preparation, and are included in the cost of the project.

D. The removal and disposal of trees (brush) less than 8 inches in diameter (as measured at a point 4-1/2 feet above the base of the tree at the ground line) are included in Section 31 10 13, Site Preparation, and are included in the cost of the project.

E. The removal and disposal of trees greater than or equal to 8 inches in diameter (as measured at a point 4-1/2 feet above the base of the tree at the ground line):
   1. Basis of Measurement:
      a. By each tree removed for the various diameters as stated in the proposal. The average diameter of the tree will be measured at a point 4-1/2 feet above the base of the tree at the ground line.
      b. Trees having major limbs lower than 4-1/2 feet above the base of the tree will be measured at the smallest diameter below such lines.
   2. Basis of Payment:
      a. Includes removal and disposal of the entire tree, including the stump and major roots.
      b. Also includes backfilling holes or voids with approved materials.

F. The relocation of ornamental trees or shrubs:
   1. Basis of Measurement:
      a. By each tree removed and relocated for the various diameters as stated in the proposal. The average diameter of the tree will be measured at a point 4-1/2 feet above the base of the tree at the ground line.
      b. Trees having major limbs lower than 4-1/2 feet above the base of the tree will be measured at the smallest diameter below such lines.
   2. Basis of Payment:
      a. Includes removal, relocation, and backfilling with approved materials.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. MDOT Current Standards:
      a. Standard Specifications for Construction.
      b. Standard Plans.
   2. Macomb County Department of Roads (MCDR) Requirements.
   3. Macomb Township Requirements.
   4. Macomb County Public Works Office (MCPWO) Requirements.
   5. American National Standards Institute (ANSI). 2006. Safety Requirements for Arboricultural Operations (Z133). New York, NY.
   6. American National Standards Institute (ANSI). 2008. American National Standard for Tree Care Operations – Tree Shrub and Other Woody Plant Maintenance – Standard Practices (A300 Part 1): Pruning. New York, NY.
   7. Gilman, E. 2012. An Illustrated Guide to Pruning. 3rd edition. Delmar. Clifton Park, NY.
   8. Gilman, E. and S. Lilly. 2006. Best Management Practices: Tree Pruning. 2nd edition. International Society of Arboriculture. Champaign, IL.
   9. Harris, Richard W., James Clark and Nelda Matheny, 2004. Arboriculture: The Integrated Management of Landscape Trees, Shrubs, and Vines. 4th edition. Englewood Cliffs, NJ: Regents/Prentice Hall.
   10. Matheny, N. and Clark, J. 2000. Trees and Development: A Technical Guide to Preservation of Trees During Land Development. Champaign, IL: International Society of Arboriculture.

1.04 DEFINITIONS

A. Brush: Vegetation with trunks or stalks less than 8 inches in diameter (as measured at a point 4-1/2 feet above the base of the tree at the ground line).

B. Clearing: Cutting and removal of trees less than 8 inches in diameter (as measured at a point 4-1/2 feet above the base of the tree at the ground line), brush, and shrubs.

C. Disposal: Removal from site of all debris and woody material that is removed during the clearing and grubbing operations.

D. Grubbing: Removal of tree stumps and roots from below ground.

E. Roots: Underground portion of a tree.

F. Stumps: The bottom part of a tree remaining that projects from the ground after most of the trunk has fallen or been cut down.

G. Trees:
   1. Vegetation with trunks or stalks equal to or exceeding 8 inches (as measured at a point 4-1/2 feet above the base of the tree at the ground line).
   2. A stump with numerous branches, trunks or sprouts shall be considered 1 tree.

1.05 SUBMITTALS

A. Trimming methods and procedures.

1.06 QUALITY ASSURANCE

A. Tree Service Qualifications: An experienced and professional tree service firm that has successfully completed tree removal and pruning work similar to that required for this Project.

B. Trimming: Trimming of limbs and branches and the painting of tree wounds shall be actively supervised by a member of one of the following:
1. ASCA – American Society of Consulting Arborists.
2. ISA – International Society of Arboriculture.
3. NAA – National Arborist Associations.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Temporary Fencing: Provide fencing for protection of trees and shrubs which are to remain from permanent damage by construction activities. See Section 01 50 00, Temporary Facilities.

B. Water: Clean, potable and free of deleterious matter.

PART 3 - EXECUTION

3.01 PREPARATION

A. Locate and clearly flag trees to remain or to be relocated.

B. Make provisions for salvaging and disconnecting, capping and temporarily supporting any irrigation lines as directed by ENGINEER.

3.02 TREE PROTECTION

A. Erect and maintain temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.

B. Do not store construction materials, debris, or excavated material within drip line of remaining trees.

C. Do not permit vehicles or equipment within drip line of remaining trees.

D. Do not excavate within drip line of remaining trees, unless otherwise indicated.

E. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation edge as possible.

F. Cover exposed roots with burlap and water regularly.

G. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

H. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.

I. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

3.03 TREE TRIMMING

A. Trim trees to balance the crown and eliminate hazards. Perform main work to reduce sail effect through thinning, reducing end weights, shortening long heavy limbs, removing deadwood, weak limbs and sucker growth. Trim limbs back to an appropriate lateral branch.

B. Make final cuts at the outer edge of the branch collar in accordance with the arborist's recommendations.

C. Perform trimming work in a safe and proper manner, adhering to MIOSHA Standards.

3.04 ROOT PRUNING

A. Do not cut tree roots greater than 3 inches in diameter and less than 12 inches below ground level without approval of the OWNER.

B. Cut tree roots cleanly, as far from the trunk as possible, and not underneath any area where walkways are to be constructed. Root pruning shall be to a depth of 12 inches.

C. Prune tree roots using a Vermeer root-cutting machine or equal. Obtain the OWNER's approval before using alternate equipment or techniques.

D. Complete tree root pruning prior to any excavation adjacent to the tree.

E. Do not expose tree roots to drying out. Cover root ends with soil and burlap and keep moist until the final backfill is completed.

3.05 TREE REMOVAL

A. Remove trees designated for removal prior to the construction of new improvements.

B. Perform tree removal work in a safe and proper manner, adhering to MIOSHA Standards.

3.06 RESTORATION

A. Repair or replace trees indicated to remain that are damaged by construction operations, as directed by the OWNER.

B. Employ a qualified arborist, certified in the jurisdiction where the Project is located, to submit details of proposed repairs and to repair damage to trees.

C. Replace trees that cannot be repaired and restored to full-growth status, as determined by the OWNER.

3.07 RELOCATION

A. Temporary removal and relocation of an ornamental tree or shrub as indicated on the drawings, shall be planted elsewhere, and then replanted in approximately the original location during site restoration activities.

B. Permanent relocation of an ornamental tree or shrub as indicated on the drawings.

3.08 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. The property owner shall have the option of retaining ownership of trees that are removed on their property.

C. Trees, stumps, etc., that are not removed by the property owner after a reasonable amount of time shall become the property of CONTRACTOR and shall be removed or disposed of in accordance with the Specifications.

END OF SECTION 31 13 00

PART 1 - GENERAL

1.01 SUMMARY

A. Provide facilities, labor, materials, tools, equipment, appliances, transportation, supervision, and related work necessary to complete the work specified in this Section, and as shown on the Drawings. Work performed under this Section includes but is not necessarily limited to:
   1. The removal, hauling, and stockpiling of suitable excavated materials for subsequent use in the work. Stockpiling shall include protection to maintain materials in a workable condition.
   2. Rehandling, hauling, and placing of stockpiled materials for use in refilling, filling, backfilling, grading, and such other operations.
   3. Protect and preserve all existing buildings, pavements, and utilities to remain.
   4. Environmental controls.
   5. Obtain all required permits, licenses, and approvals of appropriate municipal and utility authorities, prior to commencing the work of this Section, and pay costs incurred.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item, refer to Section 01 22 00, Unit Prices – Measurement and Payment.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. MDOT Current Standards:
      a. Standard Specifications for Construction.
      b. Standard Plans.
   2. Macomb County Department of Roads (MCDR) Requirements.
   3. Macomb Township Requirements.
   4. Macomb County Public Works Office (MCPWO) Requirements.

1.04 DEFINITIONS

A. Terms:
   1. Driving Surface: A pavement, curb, or sidewalk.
   2. Excavation:
      a. Removing the following materials from their present location:
         1) Native below-grade material such as soil, boulders less than 1/2 cubic yard in volume, and buried trees.
         2) Man-made items such as, but not necessarily limited to:
            a) Bituminous and concrete paving.
            b) Curbs.
            c) Riprap.
            d) Head walls.
            e) Underground utilities.
            f) Manholes and catch basins.
            g) Foundations.
            h) Sidewalks.
   3. Imported Material: Soil material which is purchased by CONTRACTOR and hauled onto the Site.

4. Native Material: Soil and other natural earth materials, except rock and boulders of 1/2 cubic yard or more in volume, which are existing on the Site prior to the start of Work.
5. Suitable Material:
   a. Native material excavated from the trench and approved as backfill by ENGINEER.
   b. Not used under or within 1 on 1 slope of driving surfaces or structures.
   c. Placed between the top of the bedding or trench backfill as indicated on the Drawings and the bottom of the surface restoration.
6. Other Definitions: Other earthwork terms not defined herein or in the Contract Documents shall be as defined in MDOT Standard Specifications for Construction.

1.05 QUALITY ASSURANCE

A. Material tests and inspection may be made by the ENGINEER or their authorized representative in accordance with Section 01 40 00, Quality Requirements.

1.06 PROJECT CONDITIONS

A. Dust Control:
   1. Use all legal means necessary to control dust on and near the Work and on and near off-site borrow areas if such dust is caused by CONTRACTOR's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
   2. Moisten or otherwise treat haul roads, delivery roads, temporary site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.
   3. Scrape, broom, or vacuum adjacent streets to remove tracked dirt every afternoon, or more as necessary if directed by ENGINEER. Utilize vacuum if dust from brooming is excessive in opinion of ENGINEER.

B. Existing Structures, Utility Structures, and Utilities:
   1. Call MISS DIG to locate existing underground utilities prior to starting excavation.
   2. Where utilities, utility structures or structures are encountered which are in active use:
      a. Provide adequate protection.
      b. Be responsible for their damage.
   3. Provide stand-by utility service if temporary removal is necessary for a period exceeding 2 hours.
   4. Where utility service connections to occupied buildings must be temporarily disconnected, give 48 hours' notice to the affected occupants of the time and duration of the anticipated shutoff.
   5. Notify Fire Department 48 hours in advance if water main or fire supply line shutoff is required.
   6. Raise, lower, or move underground utilities, utility structures or structures which interfere with the utility or utility structure being constructed as part of this Work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil shall meet the requirements of Section 31 22 00, Grading.

B. Erosion and sedimentation control for stockpiles shall meet the requirements of Section 31 25 00, Erosion and Sedimentation Control.

PART 3 - EXECUTION

3.01 STRIPPING

A. Strip all sod, topsoil, subsoil, and other unsuitable soil to its full depth within the Contract limits as shown on the Drawings.

B. Removal of Sod: Cut to a straight line at the expected excavation limits with sod cutter.

C. Under pavement areas, unsuitable materials shall be removed and disposed of by the CONTRACTOR in an approved location, or if no approved location exists on site, to an approved off-site location and replaced with structural fill.

D. Existing onsite material shall be processed to remove all roots, rocks larger than 3/4 inch in diameter, and other deleterious materials.

E. Protect the topsoil from contamination by other materials.

3.02 STOCKPILE

A. After screening, stockpile the topsoil and subsoil material separately. The material shall be stored in locations, and in a manner, approved by the ENGINEER.

B. No soil stockpile shall exceed 15 feet in height.

C. All stockpiles shall be protected from sediment transport by surface roughening, watering, and perimeter silt fencing.

D. Any topsoil stockpile remaining longer than 30 days shall be seeded to form a temporary cover.

E. Upon completion of Project or as approved by ENGINEER, remove surplus subsoil and topsoil from the site. Grade stockpile area as necessary for planting and seeding.

END OF SECTION 31 14 00

PART 1 - GENERAL

1.01 SUMMARY

A. This Section covers excavation and backfill for the installation of water, storm, sanitary, and other utility systems including pipes and utility structures. This Section includes the furnishing and installation of the major items listed below:
   1. Excavation and trenching in earth and in rock.
   2. Disposal of items from clearing and unsuitable or excess excavated materials.
   3. Complete drainage of excavations.
   4. Temporary or permanent sheeting, bracing and shoring of excavations.
   5. Installation of normal and special foundations, bedding and backfill materials.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item:
   1. Undercut:
      a. Basis of Measurement: By cubic yard (CY).
      b. Basis of Payment: Furnishing all labor, equipment, and material necessary to complete the work described including excavating, hauling, and disposing of the undercut excavated material including the cost of obtaining disposal areas and placing and grading the excavated material on the disposal area.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. ASTM Standard Specifications:
      a. D698 – Laboratory Compaction Characteristics of Soil Using Standard Effort
      b. D1556 – Density and Unit Weight of Soil In Place by the Sand-Cone Method.
      c. D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.
      d. D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
      e. D6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods.
   2. MDOT Current Standards:
      a. Standard Specifications for Construction.
      b. Standard Plans.
   3. Macomb County Department of Roads (MCDR) Requirements.
   4. Macomb Township Requirements.
   5. Macomb County Public Works Office (MCPWO) Requirements.

1.04 DEFINITIONS

A. Terms:
   1. Driving Surface: A pavement, curb, or sidewalk.
   2. Excavation:
      a. Removing the following materials from their present location:
         1) Native below-grade material such as soil, boulders less than 1/2 cubic yard in volume, and buried trees.

2) Man-made items such as, but not necessarily limited to:
   a) Bituminous and concrete paving.
   b) Curbs.
   c) Riprap.
   d) Head walls.
   e) Underground utilities.
   f) Manholes and catch basins.
   g) Foundations.
   h) Sidewalks.

3. Fill: Soil, native material, imported material or other material which is placed over the subgrade, or excavated trench areas; under roadways, parking areas, walks, buildings, or structures; and anywhere else on the Site.
4. Grading: The act of moving soil from one location on the Site to another to achieve the contours and elevations as indicated on the Drawings and as herein specified.
5. Hardpan:
   a. Cemented soil layers.
   b. Is not hard clay layers that are not cemented.
6. Imported Material: Soil material which is purchased by CONTRACTOR and hauled onto the Site.
7. Native Material: Soil and other natural earth materials, except rock and boulders of 1/2 cubic yard or more in volume, which are existing on the Site prior to the start of Work.
8. Pavement: Any combination of subbase, base course and concrete, bituminous or aggregate surface course, including shoulders, placed on a subgrade. Includes roadways, parking areas, driveways, sidewalks, and bituminous seal coat.
9. Rock: igneous, metamorphic, or sedimentary rock; hardpan; or other solid material which does not soften when wet; or cannot be excavated without continuous drilling, sawing, blasting, or continuous use of a ripper or other special equipment. This includes all boulders of 1/2 cubic yard or more in volume.
10. Structure: A building, retaining wall, tank, footing, slab, or other similar construction.
11. Subbase: The layer of material placed on the subgrade as part of the pavement structure.
12. Subgrade:
    a. Below structures and below fill on the Site: The top elevation of the undisturbed native material after all topsoil is stripped off and excavation is completed.
    b. Below driving surfaces: The bottom elevation of the subbase.
13. Bedding: The material placed around a utility between 4 inches below to 12 inches above the utility the full width of the trench.
14. Normal Trench Bottom: The surface of the undisturbed native material at an elevation 4 inches below the bottom of the utility.
15. Special Foundations:
    a. Specially constructed systems for support of underground utilities such as timber piling, concrete foundations and surcharge techniques.
    b. Undercutting and placing imported or native materials are not special foundations.
16. Suitable Material:
    a. Native material excavated from the trench and approved as backfill by ENGINEER.
    b. Not used under or within 1 on 1 slope of driving surfaces or structures.
    c. Placed between the top of the bedding or trench backfill as indicated on the Drawings and the bottom of the surface restoration.
17. Trench Backfill:
    a. The material placed between the top of bedding and either the bottom of suitable material or the bottom of pavement/surface restoration, as indicated on the Drawings.
    b. Used under and within 1 on 1 slope of driving surfaces or structures.
18. Undercut: Excavation of native material from below the normal trench bottom.

19. Utility Structure: Manhole, catch basin, pump station, valve chamber, junction chamber, water main valve, or other similar utility appurtenance.
20. Other Definitions: Other earthwork terms not defined herein or in the Contract Documents shall be as defined in MDOT Standard Specifications for Construction.

1.05 DESIGN AND PERFORMANCE REQUIREMENTS

A. Trench Bottom Suitability:
1. Be responsible for the suitability of the normal trench bottom in supporting the utility, bedding and backfill.
2. Notify ENGINEER and await ENGINEER's decision if a possible unsuitable condition exists.
3. 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. Be responsible for the trench configuration, including sheeting, shoring and bracing necessary to support trench side walls from collapsing.
2. Be responsible for the structural design and stability of a pipe-laying box if utilized on the Project to prevent trench walls from collapsing.

1.06 QUALITY ASSURANCE

A. Testing will be performed in accordance with Section 01 40 00, Quality Requirements.

B. Compaction:
1. Predominately Granular Soils:
   a. Determine density by the modified Proctor method, ASTM D1557.
   b. Compact trench backfill and bedding to at least 95% maximum density.
   c. Compact suitable material to at least 95% maximum density.
   d. The first 12 inches of native material at the bottom of utility trenches:
      1) Test for density.
      2) Compact to at least 95% maximum density if the existing density is below 95%.
2. Predominately Cohesive Soils:
   a. Density shall be determined by using the standard Proctor method, ASTM D698.
   b. Compact fill to at least 95% maximum density.
   c. The first 12 inches of native material at the bottom of utility trenches:
      1) Test for density.
      2) Compact to at least 95% maximum density if the existing density is below 95%.

1.07 SUBMITTALS

A. Action Submittals: For imported materials:
1. Source.
2. MDOT classification.
3. Sieve Analysis.

1.08 PROJECT CONDITIONS

A. Dust Control:
1. Use all legal means necessary to control dust on and near the Work and on and near off-site borrow areas if such dust is caused by CONTRACTOR's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
2. Moisten or otherwise treat haul roads, delivery roads, temporary site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.
3. Scrape, broom, or vacuum adjacent streets to remove tracked dirt every afternoon, or more as necessary if directed by ENGINEER. Utilize vacuum if dust from brooming is excessive in opinion of ENGINEER.

B. Existing Structures, Utility Structures, and Utilities:
1. Call MISS DIG to locate existing underground utilities prior to starting excavation.
2. Where utilities, utility structures or structures are encountered which are in active use:
   a. Provide adequate protection.
   b. Be responsible for repairing any damages to them.
3. Provide stand-by utility service if temporary removal is necessary for a period exceeding 2 hours.
4. Where utility service connections to occupied buildings must be temporarily disconnected, give 48 hours' notice to the affected occupants of the time and duration of the anticipated shutoff.
5. Notify Fire Department 48 hours in advance if water main or fire supply line shutoff is required.
6. Raise, lower, or move underground utilities, utility structures or structures which interfere with the utility or utility structure being constructed as part of this Work.

C. Special Backfilling Requirements:
1. Comply with the regulations of the MDOT, MCDR, MCPWO, and railroad company engineering departments with regard to filling, backfilling and compaction in their respective rights-of-way.
2. Obtain all necessary permits for filling off Site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:
1. Approval Required: Material shall be subject to the approval of ENGINEER.
2. Notification: For approval of imported material, notify ENGINEER at least 1 week in advance of intention to import material, designate the proposed borrow area, and permit ENGINEER or their authorized representative to sample as necessary from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

B. Material Sources and Uses:
1. Imported Material:
   a. Fill in undercut.
   b. Bedding.
   c. Trench backfill.
2. Native material unless quantity is not sufficient; then shall be imported material: Suitable material.

C. Fill in Undercut: MDOT 902 Dense Graded Aggregate 21AA Limestone.

D. Bedding:
1. For Pipes:
a. MDOT 902 Granular Material Class II, or
b. MDOT 902 Dense Graded Aggregate 21AA Limestone.
2. For Utility Structures:
a. MDOT 902 Dense Graded Aggregate 21AA Limestone.

E. Trench Backfill: MDOT 902 Granular Material Class II below pavement cross-section or up to one-on-one influence zone from edge of pavement followed by suitable excavated material to the surface.

F. Suitable Material:
1. Native Material Which is Used as Backfill:
a. Exclusive of gray or blue clay, peat, organic matter, or frozen lumps.
b. Containing no rocks or lumps over 3 inches in greatest dimension.
c. Having a moisture content such that material is capable of being compacted to 95% maximum density.
2. MDOT 902 Granular Material Class II if native material is not adequate in opinion of ENGINEER.

G. Concrete Encasement of Utilities:
1. Only as indicated on the Drawings.

2.02 OTHER MATERIALS

A. Other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by CONTRACTOR subject to the approval of ENGINEER.

PART 3 - EXECUTION

3.01 GENERAL

A. Excavating, Backfilling and Compacting:
1. For Structures: In accordance with Section 31 23 06, Excavation and Fill for Structures.
2. For Utility Structures: In accordance with this Section.

B. Obstructions:
1. Remove and dispose of buried trees, boulders less than 1/2 cubic yard in volume, driving surfaces, pipes and the like, as required for the performance of the Work.
2. Exercise care in excavating around catch basins, inlets and manholes.
3. Avoid removing or loosening castings or pushing dirt into utility structures.
4. Repair or replace damaged or displaced castings; remove dirt entering utility structures during the performance of the Work at no additional cost to OWNER.

C. Cutting Paved Surfaces and Similar Improvements:
1. Cut pavement prior to excavating.
2. All cuts shall be a minimum of 1-foot wider than trench on each side. When the remaining width of paved surface is less than 4 feet, remove the entire paved surface.
3. Before removing pavement, mark the pavement removal area. The pavement removal shall always be perpendicular to the roadway.
4. Concrete:
a. Pavements: Saw cut if over 3 feet from expansion or construction joint, otherwise remove to joint.

b. Sidewalks: Remove to joints.
c. Curb and Gutter: Remove to joints.

5. Final Surface Course Bituminous: Saw cut joints unless otherwise approved by ENGINEER.
6. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.
7. CONTRACTOR may tunnel under curbs that are encountered. Replace curb disturbed by construction.
8. Dispose of materials removed.

D. Utilities to be Abandoned:
1. 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.
2. Entirely remove and dispose of abandoned utility structures not identified to be salvaged, unless otherwise specified or indicated on the Drawings.
3. Remove from the excavation all materials which can be readily salvaged and store at a location selected by the OWNER.
4. All salvageable materials will remain the property of OWNER unless otherwise indicated by OWNER.

E. Undercut:
1. If soft material, which in the opinion of ENGINEER is not suitable, is encountered below the normal trench bottom or below a utility structure ENGINEER may order the removal of this soft material and its replacement with specified material in order to make a suitable foundation for the construction of the utility or utility structure.
2. All undercutting made at the order of ENGINEER 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.
3. No extra payment will be made if removal is required as a result of poor dewatering techniques.
4. Undercutting which is specifically indicated on the Drawings or herein specified, shall be included in the base Bid.
5. Place and compact specified fill in undercut.
6. Special foundations shall be determined on an individual basis by ENGINEER in cooperation with CONTRACTOR, unless otherwise provided in the Contract Documents.

3.02 EXCAVATION AND TRENCHING

A. General:
1. By open cut from surface unless designated otherwise.
2. Slope sides of trench adequately for protection of the Work and safety of workers.

B. Maximum Length of Open Trench: 100 feet.

C. Width:
1. Minimum Clearance on Each Side of Utility: 6 inches.
2. Maximum Width of Trench at Top of Bedding:
a. Up Through 15-Inch Diameter Utility: 30 inches.
b. Greater Than 15-Inch Diameter Utility: 4/3 inside diameter of pipe plus 15 inches.
3. Maximum Width of Trench at Ground Surface:
a. Not outside of the property line or easement.
b. As required for protection of the Work and safety of workers.
c. Use sheeting, bracing and shoring if required.
4. Provide sufficient space in the trench to permit the joint to be properly made.

D. Depth:
1. Excavate to provide the elevations, grades, and depths of cover indicated on the Drawings and herein specified.
2. The 4 inches of required bedding material below the utility may be omitted if:
   a. Approved by ENGINEER.
   b. CONTRACTOR arranges and pays for testing of the native material.
   c. The native material complies with MDOT 902 Granular Material Class II material or MDOT 902 Dense Graded Aggregate 21AA Limestone.
   d. The material is compacted as specified herein.
3. Excavate to the normal trench bottom elevation with an accuracy of ± 0.10 foot.

E. Rock Removal:
1. Where rock is encountered within the excavation, expose the surface of the rock sufficient to permit adequate measurements to be taken before the rock excavation is started.
2. Notify ENGINEER prior to removal if rock is encountered.
3. No utility shall be within 6 inches of rock.
4. Blasting will not be allowed.
5. Rock removal shall be paid under separate Change Order unless a specific item appears in the Bid.

F. Bedding:
1. Place the bedding material up to 1/8 the height of the utility. Compact as herein specified.
2. Accurately shape the bedding material to fit the pipe shape. Recess the bedding to relieve the pressure on the bell or other projecting utility joint.
3. After laying out the utility, tamp additional bedding in place up to the midpoint of the utility. Use hand-operated compactors to achieve the required compaction.
4. Place additional bedding up to 12 inches above the top of the utility. Use hand operated compactors to achieve required compaction.
5. Place bedding in maximum lifts of 6 inches.
6. No payment shall be made for aggregate or stone bedding when used for CONTRACTOR convenience.
7. Provide concrete encasement at utilities so indicated on the Drawings.

G. Trench Backfill in accordance with Macomb Township Standard Detail Drawings:
1. Trench Detail A:
   a. Suitable material placed between the top of the bedding and the bottom of the surface restoration.
   b. If trench is within 1 on 1 slope of driving surfaces or structures, place MDOT Class II sand from top of bedding to top of 1 on 1 slope influence zone, followed by suitable material to the bottom of the surface restoration.
2. Trench Detail B:
   a. MDOT Class II sand placed between the top of bedding and the bottom of pavement/surface restoration.
3. Place backfill in 6-inch lifts and compact as herein specified. ENGINEER will consider greater lifts if testing indicates that the required compaction is being achieved.

H. Utility Structures:
1. Place and compact specified bedding below utility structures.
2. Backfill around utility structures shall be in accordance with Macomb Township Standard Detail Drawings.
3. Place backfill in 6-inch lifts and compact as herein specified.

3.03 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. General: CONTRACTOR responsibility and expense.

B. Disposal Sites:
   1. Material desired by OWNER shall be disposed of by CONTRACTOR in the following priority order:
      a. At locations designated by the Contract Documents.
      b. At locations on the Project Site by written arrangement with individual property owners.
      c. OWNER may choose not to accept certain materials, including but not necessarily limited to, items from clearing, muck, peat, marl and whole or broken man-made items removed by construction.
   2. Material not desired by OWNER shall be disposed of in a location determined by CONTRACTOR.
   3. Disposal of materials shall not violate laws, rules, regulations and the like regarding the filling of flood plains, wetlands and other environmentally sensitive areas.
   4. Provide adequate controls to maintain disposal sites in a neat and safe condition by periodic leveling of material, and such other practices as are necessary.
   5. Provide soil erosion control measures necessary to prevent soil erosion and sedimentation of wetlands, rivers, ditches, or similar low lying areas.

3.04 EXCESS WATER CONTROL

A. Regulations and Permits: Comply with soil erosion control permit in accordance with Mich. P.A. 451, Part 91 of 1994, the Natural Resource and Environmental Protection Act, and all pertinent rules, laws, and regulations.

B. Unfavorable Weather:
   1. Do not place, spread or roll fill material during unfavorable weather conditions.
   2. Do not resume operations until moisture content and fill density are satisfactory to ENGINEER.

C. Pumping and Drainage:
   1. Provide, maintain and use at all times during construction adequate means and devices to promptly remove and dispose of water from every source entering the excavations or other parts of the Work.
   2. Dewater by means which will ensure dry excavations, preserve final lines and grades, and do not disturb or displace adjacent soil. Use wells, portable pumps, temporary underdrains, or other methods as necessary.
   3. Perform Pumping and Drainage:
      a. In such a manner to cause no damage to property or structures and without interference to the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors.
      b. In accordance with pertinent laws, rules, ordinances, and regulations.
   4. Do not overload or obstruct existing drainage facilities.

D. General:
   1. Keep excavations dry during construction.
   2. Remove water by use of wells, well points, portable pumps, bailing, drains, underdrains or other acceptable methods.
   3. Provide crushed stone or gravel as required to aid dewatering operations.
   4. Divert or temporarily reroute existing sewers and drainage of discharge lines to adequate and acceptable outlets during construction. CONTRACTOR responsible to ascertain availability of outlets.
   5. Divert surface water from entering excavations by construction and maintenance of channels or berms.

6. Sediment traps and other soil erosion control measures shall prevent soil particles from entering any sewer, watercourse or similar conveyance.
7. Protect utilities, utility structures, and structures, existing and new, from hydrostatic uplift.

3.05 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 the sides of excavations and to prevent movement of earth which could in any way injure the Work or adjacent property. Shoring and bracing must be designed by an engineer licensed in the State of Michigan.
2. Exercise care in the removal of sheeting, shoring, bracing and timbering to prevent collapse or caving of the excavation faces being supported and damage to the Work and 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 ENGINEER. Use care to fill and compact voids created by removal, especially below mid-height of utility.
3. Sheeting Left in Place:
   a. Requires written approval of ENGINEER.
   b. Cut off minimum of 2 feet below finished grade.

3.06 CLEANUP

A. Upon completion of the work of this Section, remove all excess excavated material, trash, and debris resulting from construction operations. Remove equipment and tools. Leave the Site in a neat and orderly condition acceptable to ENGINEER, and in accordance with Section 01 70 00, Execution and Closeout Requirements.

END OF SECTION 31 23 03

PART 1 - GENERAL

1.01 SUMMARY

A. This Section covers excavation and backfill for the construction of buildings, retaining walls, footings, slabs, and other below ground structures. This Section includes the furnishing and installation of the major items listed below:
   1. Excavation in earth and rock.
   2. Disposal of items from clearing and unsuitable or excess excavated materials.
   3. Complete drainage of excavations.
   4. Temporary or permanent sheeting, bracing, and shoring of excavations.
   5. Installation of backfill materials.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item:
   1. Undercut:
      a. Basis of Measurement: By cubic yard (CY).
      b. Basis of Payment: Furnishing all labor, equipment, and material necessary to complete the work described including excavating, hauling, and disposing of the undercut excavated material including the cost of obtaining disposal areas and placing and grading the excavated material on the disposal area.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. ASTM Standards:
      a. D698 – Laboratory Compaction Characteristics of Soil Using Standard Effort.
      b. D1556 – Density and Unit Weight of Soil In Place by the Sand-Cone Method.
      c. D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.
      d. D6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods.
   2. MDOT Current Standards:
      a. Standard Specifications for Construction.
      b. Standard Plans.
   3. Macomb County Department of Roads (MCDR) Requirements.
   4. Macomb Township Requirements.
   5. Macomb County Public Works Office (MCPWO) Requirements.

1.04 DEFINITIONS

A. Terms:
   1. Driving Surface: A pavement, curb, or sidewalk.
   2. Excavation:
      a. Removing the following materials from their present location:
         1) Native below-grade material such as soil, boulders less than 1/2 cubic yard in volume, and buried trees.
         2) Man-made items such as, but not necessarily limited to:
            a) Bituminous and concrete paving.
            b) Curbs.
            c) Riprap.

d) Head walls.
e) Underground utilities.
f) Manholes and catch basins.
g) Foundations.
h) Sidewalks.

3. Fill: Soil, native material, imported material or other material which is placed over the subgrade, or excavated areas; under roadways, parking areas, walks, buildings, or structures; and anywhere else on the Site
4. Grading: The act of moving soil from one location on the Site to another to achieve the contours and elevations as indicated on the Drawings and as herein specified.
5. Hardpan:
   a. Cemented soil layers.
   b. Is not hard clay layers that are not cemented.
6. Imported Material: Soil material which is purchased by CONTRACTOR and hauled onto the Site.
7. Native Material: Soil and other natural earth materials, except rock and boulders of 1/2 cubic yard or more in volume, which are existing on the Site prior to the start of Work.
8. Pavement: Any combination of subbase, base course and concrete, bituminous or aggregate surface course, including shoulders, placed on a subgrade. Includes roadways, parking areas, driveways, sidewalks, and bituminous seal coat.
9. Rock: igneous, metamorphic, or sedimentary rock; hardpan; or other solid material which does not soften when wet; or cannot be excavated without continuous drilling, sawing, blasting, or continuous use of a ripper or other special equipment. This includes all boulders of 1/2 cubic yard or more in volume.
10. Structure: A building, retaining wall, tank, footing, slab, or other similar construction.
11. Structure Backfill: Soil or other material which is placed against walls or sides of structures.
12. Subbase: The layer of material placed on the subgrade as part of the pavement structure.
13. Subgrade:
    a. Below structures and below fill on the Site: The top elevation of the undisturbed native material after all topsoil is stripped off and excavation is completed.
    b. Below driving surfaces: The bottom elevation of the subbase.
14. Undercut: Excavation of native material from below the bottom of footings, floors, structures and subbases.
15. Utility Structures: Manhole, catch basin, pump station, valve chamber, junction chamber, water main valve, or other similar utility appurtenance.
16. Other Definitions: Other earthwork terms not defined herein or in the Contract Documents shall be as defined in MDOT Standard Specifications for Construction.

1.05 DESIGN AND PERFORMANCE REQUIREMENTS

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

1.06 QUALITY ASSURANCE

A. Testing will be performed in accordance with Section 01 40 00, Quality Requirements.

B. Compaction:
   1. Predominately Granular Soils:
      a. Density shall be determined by using the modified Proctor method, ASTM D1557.
      b. Compact fill and backfill to at least 95% maximum density.
      c. The first 12-inches of subgrade below all structures, fill and backfill on the Site:
         1) Shall be tested for density.
         2) Compact to at least 95% maximum density if the existing density is below 95%.

2. Predominately Cohesive Soils:
   a. Density shall be determined by using the standard Proctor method, ASTM D698.
   b. Compact fill and backfill to at least 95% maximum density.
   c. The first 12-inches of subgrade below all structures, fill, and backfill on the Site:
      1) Shall be tested for density.
      2) Compact to at least 95% maximum density if the existing density is below 95%.

1.07 SUBMITTALS

A. Action Submittals: For imported materials:
   1. Source.
   2. MDOT classification.
   3. Sieve Analysis.

1.08 PROJECT CONDITIONS

A. Dust Control:
   1. Use all legal means necessary to control dust on and near the Work and on and near all off-site borrow areas if such dust is caused by CONTRACTOR's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
   2. Moisten or otherwise treat haul roads, delivery roads, temporary site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.
   3. Scrape, broom, or vacuum adjacent streets to remove tracked dirt every afternoon, or more often as necessary if directed by ENGINEER. Utilize vacuum if dust from brooming is excessive in opinion of ENGINEER.

B. Existing Structures, Utility Structures, and Utilities:
   1. Call MISS DIG to locate all existing underground utilities prior to starting excavation.
   2. Where utilities, utility structures, or structures are encountered which are in active use:
      a. Provide adequate protection.
      b. Be responsible for repairing any damage to them.
   3. Provide stand-by utility service if temporary removal is necessary for a period exceeding 2 hours.
   4. Where utility service connections to occupied buildings must be temporarily disconnected, give 48 hours' notice to the affected occupants of the time and duration of the anticipated shutoff.
   5. Notify Fire Department 48 hours in advance if water main or fire supply line shutoff is required.
   6. Raise, lower, or move underground utilities, utility structures, or structures which interfere with the structure being constructed as part of this Work.

C. Special Backfilling Requirements:
   1. Comply with the regulations of the MDOT, MCDR, MCPWO, and railroad company engineering departments with regard to filling, backfilling and compaction in their respective rights-of-way.
   2. Obtain all necessary permits for filling off Site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:
1. Approval Required: Material shall be subject to the approval of ENGINEER.
2. Notification: For approval of imported material, notify ENGINEER at least 1 week in advance of intention to import material, designate the proposed borrow area, and permit ENGINEER or their authorized representative to sample as necessary from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

B. Material Sources and Uses:
1. Imported Material:
   a. Sand layers below floor slabs.
   b. Fill in structure undercut.
   c. Stone stabilization course below structures.
   d. Structure backfill.
2. Native material unless quantity is not sufficient; then shall be imported material:
   a. Structure backfill not below driving surfaces.
3. Native Material: Clay cap over structure backfill.

C. Granular Layer Below Floor Slabs:
1. Choose Either of the Following:
   a. Sand-gravel fill of such gradation that 100% will pass a 1/2-inch sieve and not more than 10% by weight is lost by washing.
   b. MDOT 902, Granular Material Class II.

D. Fill In Structure Undercut: MDOT 902, Granular Material Class II or MDOT 902 Dense Graded Aggregate 21AA Limestone.

E. Structure Backfill Below Driving Surfaces: MDOT 902, Granular Material Class II.

F. Stone Stabilization Course:
1. Crushed Stone: 1-1/2 inches maximum size.
2. Filter Fabric:
   a. By TenCate Geosynthetics; Propex; Exxon; or equal.
   b. Must meet requirements of heavy geotextile liners or stabilization geotextiles as listed in MDOT Table 910-1 of Section 910 Geosynthetics.

G. Structure Backfill Not Below Driving Surfaces:
1. Native material.
2. Exclusive of gray or blue clay, peat, organic matter, or frozen lumps.
3. Containing no rocks or lumps over 3 inches in greatest dimension.
4. Obtain approval for using native material as backfill from ENGINEER.

2.02 OTHER MATERIALS

A. All other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by CONTRACTOR subject to the approval of ENGINEER.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Excavating, Backfilling, and Compacting:
1. For Structures: In accordance with this Section.
2. For Utility Structures: In accordance with Section 31 23 03, Excavation and Fill for Utilities.

B. Bracing and Sheeting:
1. Do not install by jetting.
2. Furnish, put in place, and maintain all sheeting, bracing, and shoring as may be required to properly support the sides of all excavations and to prevent all movement of earth which could in any way injure the Work or adjacent property.
3. Exercise care in the removal of sheeting, shoring, bracing, and timbering to prevent collapse or caving of the excavation faces being supported and damage to the Work and adjacent property.
4. Do not leave any sheeting or bracing in the excavation after completion of the Work, unless approved by ENGINEER.

C. Obstructions:
1. Remove and dispose of buried trees, boulders less than 1/2 cubic yard in volume, driving surfaces, pipes, and the like, as required for the performance of the Work.
2. Exercise care in excavating around catch basins, inlets, and manholes.
3. Avoid removing or loosening castings or pushing dirt into utility structures.
4. Repair or replace damaged or displaced castings; remove dirt entering utility structures during the performance of the Work at no additional cost to OWNER.

D. Utilities To Be Abandoned:
1. When pipes, conduits, sewers, or other utilities or utility structures are removed from the excavation leaving dead ends in the ground, fully plug such ends with brick and mortar.
2. Entirely remove and dispose of abandoned utility structures not identified to be salvaged, unless otherwise specified or indicated on the Drawings.
3. Remove from the excavation all materials which can be readily salvaged and store at a location designated by OWNER.
4. All salvageable materials will remain the property of OWNER unless otherwise indicated by OWNER.

E. Cutting Paved Surfaces and Similar Improvements:
1. All cuts shall be a minimum of 1-foot wider than excavation on each side. When the remaining width of paved surface is less than 4 feet, remove the entire paved surface.
2. Before removing pavement, mark the pavement removal area. The pavement removal shall always be perpendicular and/or parallel to the existing pavement joints.
3. Concrete:
   a. Pavements: Saw cut if over 3 feet from expansion or construction joint, otherwise remove to joint.
   b. Sidewalks: Remove to joints.
   c. Curb and Gutter: Remove to joints.
4. Final Surface Course Bituminous: Saw cut joints unless otherwise approved by ENGINEER.
5. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.
6. CONTRACTOR may tunnel under curbs that are encountered. Replace curb disturbed by construction.
7. Dispose of materials removed.

F. Undercut:
1. If suitable bearing for foundations is not encountered at the elevations indicated on the Drawings immediately notify ENGINEER.
2. If soft material, which in the opinion of ENGINEER is not suitable, is encountered below a structure, ENGINEER may order the removal of this soft material and its replacement with specified material in order to make a suitable foundation for the construction of the structure.
3. All undercutting made at the order of ENGINEER 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.

G. Excavating:
1. All excavation shall be by open cut from the surface except as herein specified or as indicated on the Drawings.
2. All 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 sides of the excavation, for pumping and draining groundwater and wastewater which may be encountered, and for the removal of all materials excavated.
3. Excavate to the required cross-section and elevation indicated in the Drawings. Subgrade shall not vary more than 0.1 foot above or below the established elevations.
4. All depressions 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.

H. Rock Removal:
1. Where rock is encountered within the excavation, expose the surface of the rock sufficient to permit adequate measurements to be taken before the rock excavation is started.
2. Notify ENGINEER prior to removal if rock is encountered.
3. Blasting will not be allowed.
4. Rock removal shall be paid under separate Change Order unless a specific item appears in the Bid.

I. Frost Protection: Protect bottoms of excavations from frost.

3.02 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 the sides 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 the excavation faces being supported and damage to the Work and adjacent property.

B. Sheeting:
1. Do not install by jetting.
2. Do not leave any sheeting or bracing in the excavation after completion of the Work, unless approved by the ENGINEER.
3. Sheeting Left in Place:
   a. Requires written approval of ENGINEER.
   b. Cut off minimum of 2 feet below finished grade.

3.03 FILL

A. General:
1. Do not place fill until the subgrade has been examined by ENGINEER.
2. Place fill in even layers not exceeding 6 inches in depth and thoroughly compact as herein specified.
3. Do not place additional fill until compaction on a lift complies with specification requirements.
4. If an analysis of the soil being placed shows a marked difference from 1 location to another, the fill being placed shall not be made up of a mixture of these materials.
5. Handle each different type of material continuously so that field control of moisture and density may be based upon a known type of material.
6. Do not place fill following a heavy rain without first making certain on isolated test areas that compaction can be obtained without damage to the already compacted fill.
7. Do not place fill on frozen subgrade.

B. Compaction:
1. Select compaction equipment to achieve the required compaction without damaging adjacent structures.
2. Suggested Equipment Selections:
   a. If soil is predominantly granular, use pneumatic tired or vibratory drum rollers loaded to not less than 325 pounds per rated inch of tire width.
   b. For clay fills, compact each layer with sheepsfoot rollers. Rollers shall have staggered rows of feet projecting not less than 7 inches from drum and shall be loaded to produce at least 200 pounds per square inch of tamping area in contact with the ground.
   c. Compact around structures with hand-operated vibrating compactors for granular soils and Barco rammer type compactors for clay soils.

C. Moisture:
1. Compact all fill with the moisture content as specified.
2. If fill material is too wet, provide and operate approved means to assist the drying of the fill until suitable for compaction.
3. If fill material is too dry, provide and operate approved means to add moisture to the fill layers.

3.04 STRUCTURE BACKFILL

A. General:
1. Remove debris from excavations before backfilling.

2. Do not backfill against foundation walls until:
   a. Approved by ENGINEER.
   b. All indicated perimeter insulation is in place.
3. Protect insulation during filling operations.
4. Wherever possible, backfilling shall be simultaneous on both sides of walls to equalize lateral pressures.
5. Do not backfill on only 1 side of vertically spanning walls unless walls are adequately shored or permanent construction is in place to furnish lateral support on both top and bottom of wall.
6. Place all backfill in layers not exceeding 6 inches in depth.
7. Do not place backfill on frozen subgrade.
8. Place an 18-inch layer of clay over granular backfill to prevent surface water from saturating the granular backfill. Place 4-inches of topsoil over the clay cap.

3.05 EXCESS WATER CONTROL

A. Regulations and Permits: Comply with soil erosion control permit in accordance with Mich. P.A. 451, Part 91 of 1994, the Natural Resource and Environmental Protection Act, and all pertinent rules, laws, and regulations.

B. Unfavorable Weather:
1. Do not place, spread, or roll any fill material during unfavorable weather conditions.
2. Do not resume operations until moisture content and fill density are satisfactory to ENGINEER.

C. Pumping and Drainage:
1. Provide, maintain, and use at all times during construction adequate means and devices to promptly remove and dispose of all water from every source entering the excavations or other parts of the Work.
2. Dewater by means which will ensure dry excavations, preserve final lines and grades, and do not disturb or displace adjacent soil. Use wells, portable pumps, temporary underdrains or other methods as is necessary.
3. Perform Pumping and Drainage:
   a. In such a manner to cause no damage to property or structures and without interference with the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors.
   b. In accordance with all pertinent laws, rules, ordinances and regulations.
4. Do not overload or obstruct existing drainage facilities.
5. Provide berms or channels to prevent flooding of subgrade. Promptly remove all water collected in depressions.

3.06 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. General:
1. Remove and properly dispose of all excavated material not needed to complete filling and backfilling.
2. Dispose of excess excavated material at a location off the Site.
3. Disposal of all materials shall not violate laws, rules, regulations and the like regarding the filling of flood plains, wetlands and other environmentally sensitive areas.
4. Provide adequate controls to maintain disposal sites in a neat and safe condition by periodic leveling of material and such other practices as are necessary.
5. Provide all soil erosion control measures necessary to prevent soil erosion and sedimentation of wetlands, rivers, ditches, or similar low lying areas.

3.07 CLEANUP

A. Upon completion of the work of this Section, remove all excess excavated material, trash, and debris resulting from construction operations. Remove equipment and tools. Leave the Site in a neat and orderly condition acceptable to ENGINEER, and in conformance with Section 01 70 00, Execution and Closeout Requirements.

END OF SECTION 31 23 06

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes removal of discovered rock during excavation, tools, and equipment necessary to assist rock removal.

B. Blasting will not be allowed.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. When listed in the Bid Form as a Bid Item:
   1. Rock Removal:
      a. Basis of Measurement: By the cubic yard (CY) by the staked-section method with no allowance for overbreak.
      b. Basis of Payment: Includes preparation of rock for removal, mechanical disintegration of rocks, removal from position, loading, and removing from site. For over excavation, payment will not be made for over excavated work nor for replacement materials.

1.03 REFERENCES

A. Division 2 of the current MDOT Standard Specifications for Construction.

1.04 DEFINITIONS

A. Rock: igneous, metamorphic, or sedimentary rock; hardpan; or other solid material which does not soften when wet; or cannot be excavated without continuous drilling, sawing, blasting, or continuous use of a ripper or other special equipment. This includes all boulders of 1/2 cubic yard or more in volume.

B. Excavation:
   1. Removing the following materials from their present location:
      a. Native below-grade material such as soil, boulders less than 1/2 cubic yard in volume, and buried trees.
      b. Man-made items such as, but not necessarily limited to:
         1) Bituminous and concrete paving.
         2) Curbs.
         3) Riprap.
         4) Head walls.
         5) Underground utilities.
         6) Manholes and catch basins.
         7) Foundations.
         8) Sidewalks.

C. Staked-section Method: the ENGINEER will calculate earthwork quantities using the original cross-sections taken before construction, and slope stake and grade stake data from field notes.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions and note subsurface irregularities affecting Work of this Section.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Notify ENGINEER prior to removal where rock is encountered.

C. Where rock excavation is encountered within the excavation, expose the surface of the rock sufficient to permit adequate measurements to be taken before the rock excavation is started.

3.03 ROCK REMOVAL BY A MECHANICAL METHOD

A. Excavate and remove rock by the mechanical method.
   1. Drill holes and use expansive tools, wedges or mechanical disintegration compound to fracture rock.

B. Cut away rock at bottom of excavation to form level bearing.

C. Remove shaled layers to provide sound and unshattered base for foundations.

D. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

E. Remove excavated materials from site.

F. Correct unauthorized rock removal as directed by ENGINEER.

END OF SECTION 31 23 16

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the design, furnishing and installation of a dewatering system.
   1. Determination by CONTRACTOR:
      a. Determine the need for a dewatering system. The water table does fluctuate seasonally, and dewatering will be required at certain times of the year.
      b. CONTRACTOR may choose between a well dewatering system by a qualified dewatering Subcontractor and an open excavation pump and bail system by either a qualified dewatering Subcontractor or CONTRACTOR's own labor forces.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item, refer to Section 01 22 00, Unit Prices – Measurement and Payment.

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. Design:
   1. The design of the dewatering system used shall be the responsibility of CONTRACTOR.
   2. The dewatering system selected shall result in a dry excavation that is not in a quick condition.
   3. Design dewatering system so that no silts, clays or other fine-grained materials are removed from the natural geological formation.
   4. Monitor the dewatering system at frequent intervals, including nights and weekends, as necessary, so that an equipment failure will not cause significant delay. Ensure that standby equipment is available in case of equipment or power failure.
   5. Maintain lowered water table continuously (day and night) until the structure to be built or the installation of utilities is completed to such an extent that no damage from hydrostatic pressure, flotation or other causes will result.

B. Protection of Adjacent Property:
   1. Design, construct, and operate system so that no damage occurs to adjacent property, structures, and wells.
   2. Monitor adjacent property, structures, and wells to ensure no damage occurs.
   3. Correct damages to adjacent property, structures and wells due to installation or operation of dewatering systems.

1.04 SUBMITTALS

A. Delegated Design Submittals: Include the following for Dewatering plan:
   1. System description.
   2. Number, size, and length of wells.
   3. Estimated pumping rate.
   4. Pumping equipment.
   5. Discharge location.
   6. Sedimentation control procedures.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Comply with the Dewatering Well Act, Soil Erosion Control Act, and other state and local laws that affect dewatering work.
2. Obtain all permits necessary to perform dewatering operation, including, but not necessarily limited to:
a. Soil erosion control permit, or modifications to existing permit.
b. All new discharge permits and modifications to existing discharge permits.

1.06 SEQUENCING AND SCHEDULING

A. Coordinate Dewatering Work with Scheduling of Other Trades:
1. To ensure adequate protection of personnel and materials.
2. In a manner that will not unduly delay the Project.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Utilize all materials as necessary to perform the dewatering work including wells, pumps, screens, gravel packs, observation wells, piping, power source and standby gas or diesel equipment.

PART 3 - EXECUTION

3.01 APPLICATION

A. Disposal of Water:
1. Establish means and methods for disposal of all water pumped from the dewatering system which conform to all applicable laws, rules and codes.
2. Construct and maintain a sedimentation basin or other structures and measures to comply with discharge permit.
3. Monitor discharge to ensure compliance with permits, and to ensure that no damage to receiving ditch, stream, or sewer is occurring.
4. Discontinue discharge if damage to receiving ditch, stream, or sewer is occurring, and repair damage.

3.02 CLEANING

A. Prior to completion of the work of this Section, clean all affected areas in accordance with Section 01 70 00, Execution and Closeout Requirements.

END OF SECTION 31 23 19

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the furnishing, installation and maintenance of soil erosion and sedimentation control measures.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item, refer to Section 01 22 00, Unit Prices – Measurement and Payment.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. Soil erosion and sedimentation control rules and guidelines of the Macomb County Public Works Office (MCPWO) and the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

1.04 SUBMITTALS

A. Product Data:
   1. Mulch blankets.
   2. Geotextile fabric.
   3. Seed mixtures.
   4. Fertilizer.
   5. Turbidity curtain.
   6. Silt Guard.
   7. Dewatering Filter Bag.
   8. Enviroberm.

1.05 QUALITY ASSURANCE

A. The CONTRACTOR shall follow the procedures delineated below and construct and maintain the facilities shown on the Drawings to minimize soil erosion and offsite sedimentation during construction of this Project.

B. Stop Work Order:
   1. OWNER reserves the right to issue a Stop Work Order if soil erosion and sedimentation controls are not properly installed or maintained.
   2. Work performed under a Stop Work Order will not be considered for payment.
   3. Costs resulting from delay due to issuance of a Stop Work Order shall be the responsibility of CONTRACTOR.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.

B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.

C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to OWNER.

PART 2 - PRODUCTS

2.01 SOIL EROSION AND SEDIMENTATION CONTROL MATERIALS

A. Vegetation:
1. Temporary Vegetative Cover: Perennial ryegrass or Alfalfa. Provide mix design for hydroseed mixes.
2. Permanent Vegetative Cover: Sod or Seed, fertilizer, and mulch blanket all disturbed areas.

B. Mulch Blanket:
1. Biodegradable:
   a. Straw: Tensar North American Green HydraMax; or equal.
   b. Coconut: Tensar North American Green RollMax C-125; or equal.
   c. Straw and Coconut: Tensar North American Green RollMax SC-150; or equal.
2. Non-Degradable: Polyester: Tensar North American Green EroNet P-300; or equal.
3. Anchoring Staples or Pins:
   a. Hardwood stakes at least 6 inches long.

C. Riprap: In accordance with Section 31 37 00, Riprap.

D. Geotextile Fabric: Non-woven.

E. Silt Guard:
1. Above Ground Filters:
   a. The Silt Saver by Silt Saver, Inc.; or equal approved by OWNER and agency having jurisdiction.
   b. Nonwoven polypropylene filter with needle punched holes.
   c. High density polyethylene frame.
2. Below Ground Filters:
   a. Siltsak by ACF Environmental; or equal.
   b. Geotextile fabric silt sump.
   c. 200 gallons per minute per square foot (GPM/SF) permeability.
   d. Manufactured to meet size of inlet.

F. Dewatering Filter Bags: Made From Geotextile Fabric:
1. Manufacturer:
   a. Ultratech International, Inc.: Ultra Dewatering Bag.
   b. Pactec: Geopac.
   c. Or equal.

G. Geotextile Silt Fence:
1. Manufacturer:
   a. Synthetic Industries, Terra Tex SC.
   b. Exxon, GTF-180.
   c. Enviroberm.
   d. Or equal.

H. Turbidity Curtain:
1. Impermeable barrier designed to control the setting of solids (silts).
2. Constructed of flexible reinforced thermoplastic material, 18oz/yd^2 minimum, yellow color.

3. Dielectrically welded or double-sewn seams upper hem of sufficient strength to contain flotation material.
4. Flotation material to be expanded polystyrene of sufficient diameter to support curtain at or above the water level.
5. Dielectically welded or double-sewn seams lower hem of sufficient strength to enclose lower ballast.
6. Lower ballast to be galvanized steel chain of sufficient strength and weight to hold curtain in vertical position.
7. Curtain to be tied to concrete anchors at both ends, top and bottom, to prevent moving.

PART 3 - EXECUTION

3.01 GENERAL

A. Standards:
1. Achieve Effective Erosion Control:
a. Provide all materials per approved SESC plan.
b. Promptly take actions necessary to prevent off Site sedimentation.
2. Maintain erosion controls.
3. Remove temporary soil erosion and sedimentation control measures once permanent measures are established and accepted by the ENGINEER.

B. Site Evaluation:
1. Conduct a field evaluation of the Site:
a. Prior to start of the Work.
b. With representatives of OWNER/ENGINEER.

C. All disturbed surface areas (including utility trenches) shall be temporarily graded and/or ditched to direct all water runoff from such areas to sedimentation control devices to prevent sedimentation from entering a watercourse, sewer, or adjacent lands.

D. After the Project Work has been completed, inspected, stabilized, and approved, the CONTRACTOR shall remove all sedimentation control devices, material, and their collected silt and debris and complete the Project Work in accordance with the Drawings.

E. In roadway and driveway areas temporary aggregate surfacing shall be placed immediately after the backfilling operation has been completed.

F. Dust control measures shall be taken at all times.

3.02 TEMPORARY VEGETATIVE COVER

A. General:
1. Permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area shall be completed within 5 calendar days after final grading or the final earth change has been completed. When it is not possible to permanently stabilize a disturbed area after earth change activities ceases, temporary soil erosion control measures shall be implemented immediately. All temporary soil erosion control measures shall be maintained until permanent soil erosion control measures are implemented. All permanent soil erosion control measures will be implemented and established before a certificate of compliance is issued.

B. Seed: Apply uniformly at the application rate specified by the MDOT Standard Specifications for Construction Table 917-2, Seed Mixtures.

C. Mulch: As needed to effectively control soil erosion.

3.03 MULCH BLANKET

A. Direction of installation, staple patterns and other requirements in accordance with Manufacturer's directions and MCWPO Standards.

B. Location: Where indicated on the Drawings or as directed by the ENGINEER or MCPWO SESC department.

3.04 GEOTEXTILE SILT FENCE

A. Install silt fence in accordance with Manufacturer's instructions.

B. Location: Where indicated on the Drawings or as directed by the ENGINEER.

3.05 OPEN CHANNEL EXCAVATION

A. Power equipment such as bulldozers shall not enter the water unless approved by ENGINEER.

B. Complete excavation, clearing, grubbing, snagging, tree cutting, pulling, raking, and related work in such a way as to minimize erosion of soil in the areas in which work is completed.

C. Construct sediment basins prior to excavation.

D. Comply with measures for soil erosion and sediment control as indicated on the Drawings.

3.06 AIRBORNE SEDIMENT

A. Dust Control:
1. Use legal means necessary to control dust on and near the Work and on and near off Site borrow areas if such dust is caused by CONTRACTOR’s operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
2. Treat haul roads, delivery roads, temporary Site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site, and as directed by ENGINEER.
3. Scrape and broom adjacent streets and paved areas daily to remove tracked dirt.

B. Wind Erosion:
1. Erect and maintain barriers to prevent migration of windblown sediment off Site.
2. Conduct operations in such a manner as to minimize the amount of Site area exposed to wind erosion.
3. Be responsible for removal of windblown sediments deposited off Site, including costs for repairs required due to sediment deposition and removal.
4. Erect and maintain snow fence windward side of earthwork.

END OF SECTION 31 25 00

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes furnishing and installation of the major items listed below:
   1. Aggregate Surface Course.
   2. Base course.
   3. Subbase.
   4. Temporary Maintenance Aggregate.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item:
   1. Aggregate Surface Course (of the thickness specified):
      a. Basis of Measurement: Square yard (SY) for the actual number of square yards of road or drive constructed.
      b. Basis of Payment: Furnishing all labor, equipment, and materials required to perform the work including, but not limited to, grading the existing surface, furnishing, placing, grading, and compacting the aggregate material to the proper profile; applying calcium chloride when required; and maintaining the surface until final acceptance.
   2. Aggregate Base (of the thickness specified):
      a. Basis of Measurement: Square yard (SY) for the actual number of square yards of aggregate base constructed.
      b. Basis of Payment: Furnishing all labor, equipment, and materials required to prepare the subbase, proof roll subgrade, supply and place the base material specified, rolling, compacting, grading, and maintaining the road until its acceptance. This item will include the cost of aggregate shoulders when required.
   3. Subbase:
      a. Basis of Measurement: Cubic yard (CY) for the actual number of cubic yards of subbase constructed.
      b. Basis of Payment: Furnishing all labor, equipment, and materials required to prepare the subgrade, proof roll subgrade, supply and place the subbase material specified, rolling, compacting, and grading to achieve the proper profile.
   4. Temporary Maintenance Aggregate:
      a. Basis of Measurement: Square yard (SY) for the actual number of square yards of maintenance aggregate placed.
      b. Basis of Payment: Furnishing all labor, equipment, and materials necessary to supply, place, grade, and compact temporary maintenance aggregate. This item includes the cost of removing temporary maintenance aggregate, when no longer needed, to the depths and profiles required to restore to the designed section specified on the Drawings. This item also includes disposal of temporary maintenance aggregate material off site, if required.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the Work of this Section shall comply with the following:
   1. ASTM Standard Test Methods:
      a. D1556 – Density and Unit Weight of Soil In Place by the Sand-Cone Method.

b. D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.
c. D2922 – Density of Soil and Soil-Aggregate In Place by Nuclear Methods.

2. MDOT Current Standards:
   a. Standard Specifications for Construction.
   b. Standard Plans.
3. Macomb County Department of Roads (MCDR) Requirements.
4. Macomb Township Requirements.
5. Macomb County Public Works Office (MCPWO) Requirements.

1.04 DEFINITIONS

A. Terms:

1. Base Course: The layer of specified material of designed thickness placed on a subbase or a subgrade to support a surface course.
2. Pavement Structure: Combination of subbase, base course, and surface course, including shoulders, placed on a subgrade.
3. Plan Grade: Vertical control grade indicated on the Drawings.
4. Roadbed: The portion of the roadway between the outside edges of finished shoulders, or the outside edges of berms back of curbs or gutters, when constructed.
5. Roadside: The portion of the right-of-way outside of the roadway.
6. Roadway: The portion of the right-of-way required for construction, limited by the outside edges of slopes and including ditches, channels, and all structures pertaining to the Work.
7. Shoulder: The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.
8. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.
9. Subgrade: The portion of the earth grade upon which the pavement is to be placed.
10. Surface Course: The layer of specified material of designed thickness placed above a base course as a final aggregate topping course.
11. Temporary Maintenance Aggregate: The layer of specified material placed temporarily to backfill an excavated area to match surrounding grade and allow the work area to be opened to traffic.

1.05 SUBMITTALS

A. Action Submittals: For aggregate:

1. Source.
2. MDOT classification.
3. Sieve analysis.

1.06 QUALITY ASSURANCE

A. Testing of Aggregate Materials: In accordance with Section 01 40 00, Quality Requirements.

B. Compaction:

1. Shall be in accordance with MCDR and MDOT requirements.
2. Determine density by the modified Proctor method, ASTM D1557.
3. Compact subbase to at least 95% maximum density at a moisture content not greater than optimum.
4. Compact aggregate base to at least 95% maximum density at a moisture content not greater than optimum for aggregate base under hot mix asphalt pavement.
5. Compact aggregate base to at least 95% maximum density at a moisture content not greater than optimum for aggregate base under concrete pavement.
6. Compact shoulders to at least 95% maximum density at a moisture content not greater than optimum.

1.07 PROJECT CONDITIONS

A. Dust Control:
1. On a daily basis, use all legal means necessary to control dust on and near the Work and on and near off-site borrow areas if such dust is caused by CONTRACTOR's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
2. Moisten or otherwise treat haul roads, delivery roads, temporary Site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.

B. Existing Utility Structures:
1. Where utility structures are encountered which are in active use:
a. Provide adequate protection.
b. Be responsible for their damage.
2. Adjust utility structures to meet plan grade.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:
1. Approval Required: Material shall be subject to the approval of ENGINEER.
2. Notification: For approval of materials, notify ENGINEER at least 1 week in advance of intention to import material, designate the proposed stockpile area, and permit ENGINEER or their authorized representative to sample as necessary from the stockpile area for the purpose of making acceptance tests to prove the quality of the material.

B. Subgrade: In accordance with Section 31 22 00, Grading.

C. Material Source: Imported Material:
1. Subbase.
2. Base course.
3. Surface course.

D. Subbase:
1. MDOT 902, Granular Material Class II.
2. Thickness compacted in place: as indicated on the Drawings.

E. Aggregate Base Course:
1. MDOT 902, Dense Graded Aggregate 21AA Limestone.
2. Thickness Compacted in Place: as indicated on the Drawings.

F. Aggregate Shoulders and Surface Course:
1. MDOT 902, Dense Graded Aggregate 23A Limestone.

G. Temporary Maintenance Aggregate:
1. MDOT 902, Dense Graded Aggregate 21AA Limestone.

PART 3 - EXECUTION

3.01 PREPARATION

A. Subgrade:
1. Prepared in accordance with Section 31 22 00, Grading.

2. Maintain in a smooth and compacted condition until the subbase or base course has been placed.
3. Proof roll subgrade prior to placing subbase or base course.
4. No base course shall be placed on the subgrade until it has been approved by ENGINEER.

3.02 INSTALLATION

A. Subbase:
1. Smooth, spread and compact.
2. Place in one layer, provided that the depth of the compacted layer does not exceed 12 inches.
3. Where the specified depth of subbase is more than 12 inches, place material in layers of approximately equal thickness.
4. Construct to the grade and cross-section as indicated on the Drawings.
5. Should the subgrade at any time prior to or during the placing of subbase become soft or unstable to the extent that rutting occurs in the subgrade or to the extent that subgrade material is forced up into the subbase materials, the operation of hauling and placing subbase shall be immediately discontinued. Where subgrade material has become mixed with the subbase material, the mixed material shall be removed and disposed of. After the subgrade has been corrected to the specified condition, new subbase material shall be placed and compacted as specified above.
6. Shape to specified crown and grade within a tolerance of plus 1-inch and maintain in smooth condition.
7. Do not place on a frozen, soft, unstable or rutted subgrade.
8. Remove, dispose of and replace subbase material, at CONTRACTOR's expense, if it becomes mixed with subgrade material.
9. Proof roll subbase prior to installation of base course.

B. Base and Surface Course:
1. Do not place aggregate base on frozen, soft, unstable or rutted subgrade, subbase, or aggregate base.
2. Additives may be used to ease compaction, shaping, and maintenance of the aggregate surface.
3. Do not rut or distort the subbase material or aggregate base during spreading.
4. Place in uniform layers to such a depth that when compacted, the course will have the thickness indicated on the Drawings.
5. The compacted depth of each layer shall not be more than 6 inches nor less than 3 inches.
6. Compact each layer of aggregate.
7. Place aggregate shoulder material in conjunction with the top layer of aggregate base material.
8. Shape to the crown and grade within a tolerance of ± 0.05 feet unless otherwise specified. The surface of each spreading operation shall be continuously maintained in a smooth condition.
9. Roll the shaped surface, when required, to provide thorough compaction.
10. Where the existing surface is very irregular, the use of a scarifier may be required. Wetting may be required to facilitate shaping the surface and to assist in providing compaction.
11. Remove, dispose of and replace aggregate base material, at the CONTRACTOR's expense, if it becomes mixed with the subbase or subgrade material.
12. Final shaping and compacting shall be accomplished by use of a subgrade machine operating on crawler tracks, or by the use of a maintainer or surface planer, with a rigid frame.
13. If the subgrade, subbase, or aggregate base is damaged due to the CONTRACTOR's operations or by traffic, restore to the specified condition at
14. CONTRACTOR's expense.

END OF SECTION 32 11 23

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the furnishing and installation of form work, reinforcement, concrete pavement, and pavement markings for exterior work:
   1. Roadways.
   2. Parking lots.
   3. Miscellaneous exterior concrete pavement (not including concrete walks, driveways, and curb and gutter).

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Concrete Pavement (of the thickness specified):
   1. Basis of Measurement: Square yard (SY) for the actual number of square yards of concrete pavement constructed.
   2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to construct the concrete pavement as specified. This work shall include preparation of the subgrade; furnishing, placing, and compacting subbase and base materials; furnishing, placing, curing, and protecting the concrete pavement and integral curbs, including tie bars, joint hook bolts, end headers, pavement reinforcement (when specified), all joint materials, load transfer devices, dowel bar assemblies, end of pour load transfer devices, sawing, cleaning, patching spalls, tests, backfill, fine grading, cleanup, pavement admixtures and accelerators, cold weather protection; and includes all labor, material, equipment, and machinery required to construct the pavement complete in place. This Bid Item includes the cost of curb drops, adjustment of structures within the ROW, protecting and replacing government plat and street corners, designated survey bolts and benchmarks, pavement striping, and marking if specified. Also included is the cost of replacing existing aggregate, bituminous, or concrete drive approaches, if necessary, due to change in grade of the ROW grading cross-sections or due to damage by the CONTRACTOR's construction methods and operations. No extra payment will be made for extra thickness of concrete at joints and in intersections.

B. Concrete Pavement Patching (of the thickness specified):
   1. Basis of Measurement: Square yards (SY) for the actual number of square yards of concrete pavement replaced.
   2. Basis of Payment: Furnishing, placing, and compacting aggregate base material; furnishing, placing, finishing, and curing all concrete pavement required, including saw cutting, subgrade or base preparation, backfill, grading, furnishing and placing shoulder material, reinforcement, dowel bars, lane ties, joint materials, and other Work required to complete this item.

C. Pavement Marking (of the size and color specified):
   1. Basis of Measurement: Linear Feet (LF).
   2. Basis of Payment: Furnishing all labor, equipment, and material necessary to perform the work of this item.

D. Cold Plastic Pavement Marking (of the size and color specified):
   1. Basis of Measurement: Linear Feet (LF).
   2. Basis of Payment: Furnishing all labor, equipment, and material necessary to perform the work of this item including removing curing compound from new concrete surfaces before applying cold plastic tape.

E. Cold Plastic Pavement Marking (of the symbol specified):
1. Basis of Measurement: Each.
2. Basis of Payment: Furnishing all labor, equipment, and material necessary to perform the work of this item including removing curing compound from new concrete surfaces before applying cold plastic tape.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
1. ASTM Publications:
a. A185 – Steel Welded Wire, Fabric, Plain for Concrete Reinforcement.
b. A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
c. A775 – Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
d. A820 – Steel Fibers for Fiber Reinforced Concrete.
e. C33 – Specification for Concrete Aggregates.
f. C39 – Test Method for Compressive Strength of Cylindrical Concrete Specimens.
g. C94 – Specification for Ready-Mixed Concrete.
h. C136 – Sieve Analysis of Fine and Coarse Aggregates.
i. C150 – Specification for Portland Cement.
j. C260 – Specification for Air-Entraining Admixtures for Concrete.
k. C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
l. C330 – Specification for Lightweight Aggregates for Structural Concrete.
m. C494 – Specification for Chemical Admixtures for Concrete.
n. C618 – Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
o. C989 – Ground Granulated Blast Furnace Slag (GGBFS) For Use in Concrete and Mortars.
p. C1116 – Standard Specification for Fiber Reinforced Concrete and Shotcrete.
q. C1260 – Potential Alkali Reactivity of Aggregates (Mortar-bar method).
r. C1293 – Determination of Length Change of Concrete Due to Alkali-silica Reaction (Concrete prism test).
s. C1567 – Potential alkali-silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-bar method).
t. D3963/D and 3963M – Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.
2. ACI – American Concrete Institute:
a. 117 – Standard Tolerances for Concrete Construction and Materials.
b. 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
c. 224.3R – Joints in Concrete Construction.
d. 302.1R – Guide for Concrete Floor and Slab Construction.
e. 303R – Guide to Cast-In-Place Architectural Concrete Practice.
f. 304R – Guide for Measuring, Mixing, Transporting and Placing Concrete.
g. 304.2R – Placing Concrete by Pumping Methods.
h. 305R – Hot Weather Concreting.
i. 306R – Cold Weather Concreting.
j. 309R – Guide for Consolidation of Concrete.
k. 330 – Guide for Design and Construction of Concrete Parking Lots.
l. 360 – Design of Slabs on Grade.
3. Concrete Reinforcing Steel Institute (CRSI):
a. Manual of Standard Practice – current edition.
b. Placing Reinforcing Bars – current edition.
4. Americans with Disabilities Act (ADA).

5. MDOT Current Standards:
   a. Standard Specifications for Construction.
   b. Standard Plans.
6. Macomb County Department of Roads (MCDR) Requirements.
7. Macomb Township Requirements.

1.04 SUBMITTALS

A. Action Submittals:
   1. Provide mix design(s) for concrete to be supplied.
      a. Include quantities and sources of all aggregates, cement, cementitious materials, and admixtures to be used.
      b. Submitted from a MDOT certified testing laboratory regularly engaged in designing and testing concrete for exterior paving.
      c. Use test results for mix design from within the past 12 months.
   2. Product Data: Submit Manufacturer's product data with application and installation instructions for admixtures, curing compounds, expansion joint fillers and sealants.
   3. Alkali-Silica Reactivity (ASR):
      a. Submit to ENGINEER ASTM C1260 Accelerated mortar bar test, and ASTM C1293 Concrete prism expansion for ASR from aggregate supplier.
      b. Documentation may include previous testing (within previous 1 year) of materials and sources intended for use.
      c. Documentation may include previous testing (within previous 1 year) from other projects or records provided by the material suppliers.

1.05 QUALITY ASSURANCE

A. Pre-Paving Meeting:
   1. Meeting held at a time mutually agreed upon with ENGINEER, OWNER, CONTRACTOR and subcontractors involved in the paving work.
   2. Discussion of proposed schedule and methods of accomplishing all phases of the paving work.
   3. Minutes distributed to all in attendance.

B. Installation Personnel Qualifications:
   1. Trained and experienced in the fabrication and installation of the materials and equipment.
   2. Knowledgeable of the design.

C. Testing of Materials:
   1. In accordance with Section 01 40 00, Quality Requirements.
   2. In accordance with approved CONTRACTOR's Quality Control Plan.
   3. In accordance with all applicable standards.

D. Batch tickets: Furnish batch tickets to ENGINEER, or ENGINEER'S representative for material incorporated in the Project to verify that the required concrete mix has been supplied.

E. Batch Plant Certification: Ensure portland cement concrete batch plant is certified to meet the requirements specified in the National Ready Mixed Concrete Association *Certification of Ready Mixed Concrete Production Facilities Quality Control Manual* or other MDOT approved requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.

B. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to OWNER.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete Reinforcement:
1. Welded wire fabric in accordance with ASTM A185, yield stress 65,000 psi.
2. Reinforcing bars in accordance with ASTM A615, yield stress 60,000 psi.

B. Cement:
1. Portland cement: ASTM C150, Type IA.
2. For high early strength concrete the cement shall be air-entraining portland cement Type IIIA.
3. Do not use different Manufacturers of cement, or different degrees of fineness.

C. Cementitious Materials or Cement Substitutes:
1. Fly Ash: ASTM C618, Class C or F.
2. Ground Granulated Blast Furnace Slag (GGBFS):
   a. ASTM C989 Grade 100 minimum.
   b. Use only as a blending material with Type I or Type IA portland cement.
3. Silica Fume, Dry-Densified:
   a. ASTM C1240.
   b. Use only as a blending material with Type I or Type IA portland cement.
4. Reduce the cement quantity up to a maximum of 25% for fly ash substitution or up to 30% for GGBFS substitution.
5. Fly ash or GGBFS weight additions must equal the weight of the cement reduction.
6. For concrete containing portland cement, fly ash and GGBFS in the same mix design, reduce the cement quantity up to 40%, with the maximum fly ash quantity not exceeding 15%.

D. Aggregates:
1. Grade aggregates according to procedures of ASTM C136, Class M, Exposure 4.
2. Coarse Aggregates: ASTM C33, Number 57 (1-inch), crushed limestone.
3. Fine Aggregate: ASTM C33.
4. Test all aggregates for alkali-silica reactivity and provide mitigation method, if required.

E. Water: Clean, fresh and potable.

F. Steel Reinforcement:
1. Reinforcement shall meet MDOT Standard Specifications.
2. Deformed bars that conform to ASTM A706 or Grade 60 steel bars ASTM A615.
3. Bars for Dowels or Lane Ties: Conform to Grade 40 ASTM A615 or A617.
4. Welded Wire Fabric: Conform to ASTM A185.
5. Epoxy Coating:
   a. Where required, conform to ASTM D3963/D3963M.
   b. Select coating material from MDOT qualified products list.
   c. Provide certification, if required by ENGINEER, that material conforms to standards.
   d. Use bar chairs and wire ties that are plastic coated, epoxy coated or plastic.

G. Epoxy Coating Material:
1. Corrosion Protection Coatings:
a. One part, heat curable, thermosetting powdered epoxy.
b. Conforming with ASTM A775.
2. Epoxy Coating Patching Material:
a. Compatible with factory applied epoxy coating.
b. Conforming with ASTM A775.

H. Synthetic Fibers:
1. Synthetic fibers are fibers manufactured from polymer-based materials such as polypropylene, nylon and polyethylene telephthalate.
2. Monofilament or fibrillated polypropylene designed for use in concrete pavement.

I. Admixtures:
1. General:
a. No admixture shall contain more than 0.1% water soluble chloride ions by mass of cementitious material.
b. No admixture shall contain calcium chloride.
2. Air-Entraining:
a. Required in all mixtures.
b. Comply with ASTM C260.
c. Daravair series or Darex series, by W.R. Grace & Company; Micro Air, by BASF Admixtures, Inc.; or equal.
3. Water-Reducing Admixtures:
a. Provide concrete mixtures with the same strength, air content as the respective concrete without the admixture.
b. Select water reducing admixtures from MDOT's qualified products list.
c. Admixture dosage rates are based on the total cementitious material (cement plus fly ash or GGBFS).

J. Curing Agents:
1. Comply with ASTM C309, Type 2, Class B.

2.02 CONCRETE MIX DESIGN

A. Concrete shall conform to Grade 3500 as shown in MDOT Table 1004-1. When roadway must be open to traffic within 72 hours, provide concrete mix conforming to Grade 3500HP according to MDOT Table 1004-1. Design mix to project normal-weight concrete consisting of a mixture of portland cement, blended portland cement, cement substitutes, fine aggregate, coarse aggregate, water and admixtures, when required or permitted, producing the following properties:
1. Cement Content: 517-611 lb/cy.
2. Compressive Strength: 3,500 psi (min) at 28 days.
3. Air Content: 7.0% ±1.5%.
4. Slump: 0 to 3 inches or the slump in the approved mix design.
5. Water Cement Ratio: 0.45 maximum.

B. Alkali-Silica Reactivity (ASR):
1. The Concrete supplier is required to evaluate the fine aggregates (only) used in the production of the concrete for ASR.
2. Submit to the ENGINEER ASTM C1260 Accelerated mortar bar test for ASR from the aggregate supplier.
3. Submit to the ENGINEER ASTM C1293 Concrete prism expansion for ASR from the aggregate supplier if available, or if necessary.
4. Documentation may include previous testing of materials so long as material source has not changed, and test is not more than 1 year old.

5. No ASR mitigation is required if aggregates are non-reactive where ASTM C1260 Accelerated mortar bar test expansion is less than 0.10% at 14 days, or if ASTM C1293 Concrete prism expansion is less than 0.04% at 1 year.
6. If ASTM C1260 mortar bar test results is more than 0.10% expansion at 14 days, ASTM C1293 concrete prism test is required to be performed before aggregates can be used.
7. ASR mitigation is required if aggregates are found to be moderately reactive where ASTM C1293 Concrete prism expansion is equal to or greater than 0.04%, but less than 0.12% at 1 year.
8. Aggregates will not be accepted if ASTM C1293 Concrete prism expansion is equal to or greater than 0.12% at 1 year.

C. Mitigation Methods for Moderately Reactive Aggregates:
1. In accordance with MDOT approved Specifications.
2. Use low Alkali Cements:
   a. Submit mill test report data and calculations for Cement and Fly Ash.
   b. Maximum Alkali content of cementitious materials (cement and fly ash) (Na2Oe) (Na2O equivalent) ≤ 3.5 lbs/cyd.
   c. Maximum Alkali content in cement (Na2Oe) (Na2O equivalent) ≤ 0.7%.
   d. Maximum lime CaO in Fly ash ≤ 20%.
   e. Minimum Silica in Fly ash SiO_2 ≥ 35%.
   f. Total oxides in Fly ash (SiO_2 + Al_2O_3 + Fe_2O_3) ≥ 60%.
3. Demonstrate the effectiveness of the proposed mix combination to resist the potential for excessive expansion caused by ASR using current and historic data:
   a. ASTM C1567 (14-day test) using both coarse and fine aggregate and all cementitious materials.
   b. Mortar bars constructed of cementitious materials and coarse and fine aggregates must produce an expansion of less than 0.10%.

2.03 FORM WORK

A. Provide necessary form work to provide concrete dimensions indicated on the Drawings ±1/2 inch.
1. Forms to be straight and true, minimum 1-5/8-inch-thick wood, full depth of concrete or steel forms.
2. All curved radius pours to be smooth deflectable steel or wood forms.

2.04 CONTRACTION JOINTS

A. Provide necessary contraction joints to control random cracking with sawcut or hand-troweled joint.
1. Depth: 1/4 slab thickness minimum, or as indicated on the Drawings.
2. Spacing according to Macomb County Department of Roads Requirements.
3. Cut in location as indicated on the Drawings.
4. Keep panels as square as possible with length not more than 25% greater than width.

2.05 ISOLATION (EXPANSION) JOINTS

A. Joint fiber shall be preformed, composed of either blended, bonded flexible and waterproof fiber meeting the requirements of AASHTO M213 or polyvinyl chloride with fabric strand.

B. Full depth of concrete.

2.06 SEALANTS

A. Joint sealant to be hot-poured rubber in accordance with MDOT requirements.

2.07 PAVEMENT MARKINGS

A. Marking paint shall meet Federal Specification GSA-FSSTT-P-115E Type 1.

B. Size and Color: 4-inch or 6-inch width, white, yellow, blue or other color depending on intended use.
1. As indicated on the Drawings.
2. In accordance with guidelines, MMUTCD and FHWA – MUTCD.

C. Traffic paint shall be waterborne spray type for stripe marking. If seasonal limitations prevent the placement of waterborne paint, the ENGINEER may approve regular dry paint. Select pavement marking materials from the MDOT Qualified Product List.

D. Glass beads shall meet MDOT requirements with the exception of bead coating for waterborne pavement marking paint. The bead used in waterborne pavement marking shall have a moisture resistant coating and an adhesion promoting silane coating.

PART 3 - EXECUTION

3.01 PREPARATION

A. Test subgrade, subbase or aggregate base for density.
1. Rework surfaces that have become too wet or dry to provide the required density.
2. Required Density: Minimum 95% of Maximum Density.

B. Proof of Test Rolling:
1. Field test the uniformity and stability of the subgrade, subbase, or base.
2. Loaded dump truck or other approved equipment over entire area in each of 2 perpendicular directions.
3. Areas indicated or as designated by ENGINEER or field representative.
4. In presence of ENGINEER or field representative.
5. Repair/undercut unstable or yielding areas as directed.

C. Fine Grading:
1. Immediately prior to placing paving materials, test the subgrade or aggregate base course for conformity to the elevations and cross-section as indicated on the Drawings.
2. Fine grade as necessary to bring base course into conformance with the proper elevation and cross-section.
3. Compact areas which have been re-graded to minimum 95% Maximum Density.

D. Do not place concrete until the surface to be paved upon has been inspected and approved by ENGINEER.

3.02 INSTALLATION

A. Weather, Temperature, and other Limitations:
1. Do not place concrete until the ambient air temperature away from artificial heat is at least 25 degrees F and rising, unless otherwise approved by ENGINEER.
2. Do not place concrete if portions of the base, subbase, or subgrade layer are frozen, or if the grade exhibits poor stability from excessive moisture levels.
3. Temperature of concrete at time of placement shall be between 45 degrees F and 90 degrees F.
4. Paving will not be allowed between November 15 and May 1 without written approval from the Macomb County Department of Roads and Township Engineer.

B. Cold Weather Concrete Operations:
   1. Comply with the recommendations of ACI 306R.
   2. Recommended Protective Measures:
      a. Heating materials.
      b. Providing insulating blankets and windbreaks.
      c. Heated enclosures.
      d. Advise ENGINEER of planned protective measures.
      e. Straw or similar materials are not allowed.
   3. Do not use frozen materials or materials containing ice or snow.
   4. Do not place concrete on frozen subgrade.

C. Hot Weather Concrete Operations:
   1. Comply with the recommendations of ACI 305R.
   2. Recommended Protective Measures:
      a. Cooling materials.
      b. Concrete placement during cooler hours of the day.
      c. Providing shading and windbreaks.
   3. Advise ENGINEER of planned protective measures.

D. Preparation of Base:
   1. Excavate to the required depth and to a width that will permit forming.
   2. Remove unsuitable material below the required depth and replace with suitable material approved by the ENGINEER.
   3. Shape and compact the base to conform to the section indicated on the Drawings.

E. Forms:
   1. Use fixed forms.
   2. Apply form releasing agent to prevent concrete from bonding to forms.
   3. Provide straight, full depth forms free of warp and strong enough to resist springing during concrete placement.
   4. Firmly stake fixed forms to prohibit movement.

F. Placing and Finishing Concrete:
   1. Place all concrete in accordance with ACI 304R and ACI 304.2R.
   2. Do not exceed the time limits specified in MDOT Table 1001-1 for the time of charging the mixer to complete concrete discharge.
   3. Moisten base before placing concrete.
   4. Place concrete and consolidate, including along the faces of the forms, before finishing.
   5. Place and finish in a continuous operation.
   6. When replacing gutters along with concrete walk ramps, construct the gutter to the same dimensions and profile and use the same reinforcement pattern as the existing gutter.
   7. Float the surface just enough to produce a smooth surface free from irregularities.
   8. Round edges and joints with an approved finishing tool.
   9. Broom finish concrete walks and ramps by drawing a fine-hair broom across the concrete surface, perpendicular to the line of traffic. Repeat operation if required to provide a fine line texture acceptable to the ENGINEER.

G. Joints:
   1. General: Comply with ACI 318-6.3, 6.4, and ACI 301, Section 6.
      a. Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete.
      b. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
      c. Seal joints with hot-poured rubber asphalt in accordance with Macomb County Department of Roads joint standard details.

2. Weakened-Plane (Contraction) Joints:
   a. Provide weakened-plane (contraction) joints, sectioning concrete into areas:
      1) As indicated on the Drawings.
      2) 24 to 36 times the thickness of the slab if not indicated on the Drawings.
   b. Contraction joints for curbs shall be provided at maximum 10-foot intervals and maximum 15 foot spacing for slabs, unless indicated otherwise.
   c. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
      1) Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
      2) Sawed Joints: Form weakened-plane joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
3. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such placements terminate at expansion joints.
4. Expansion Joints:
   a. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.
   b. Locate expansion joints at 100 feet on center along linear lengths of curb and walks, and at points of radii of curbs unless otherwise indicated.
5. Extend joint fillers full width and depth of joint, and not less than 1/2 inch or more than 1 inch below finished surface for joint sealant.
6. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip joint filler sections together.

H. Reinforcing:
1. Install reinforcing as indicated on the Drawings.
2. Install in accordance with CRSI for placing reinforcing bars and Manual of Standard Practice.

I. Epoxy Coating:
1. Minimum 6 mils thick and uniform.
2. Coat reinforcement after fabrication.
3. Repair damage to epoxy coating in accordance with:
   a. ASTM A775.
   b. Epoxy-coating Manufacturer's recommendations.

J. Backfilling:
1. After the concrete has gained sufficient strength, remove fixed forms and backfill with suitable material approved by the ENGINEER.
2. Compact and level the backfill 1 inch below the surface of the concrete.

3.03 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screening and floating. Use hand method only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10-foot straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
   1. Exterior slabs and concrete pavement types shall have a non-slip finish by scoring the surface with a heavy broom, perpendicular to the line of traffic.
   2. Repeat operation if required to provide a line texture acceptable to the ENGINEER.

E. Do not remove forms for 24 hours after concrete has been placed.
   1. After form removal, clean ends of joints and point-up any minor honeycombed areas.
   2. Remove and replace areas or sections with major defects, as directed by the ENGINEER.

3.04 CURING

A. General:
   1. As soon as possible, after texturing operations have been completed and after the free water has left the surface, coat the concrete walk surface and sides of slip-formed concrete walks with a uniform layer of membrane curing compound.
   2. Apply 1 coat of curing compound on non-grooved surfaces and 2 coats on grooved surfaces.
   3. Apply not less than 1 gallon per 25 square yards of concrete for each application.
   4. Apply the second coat after the first has dried sufficiently but do not exceed 2 hours between coats.
   5. Keep the compound thoroughly mixed according to the Manufacturer's recommendations.
   6. Do not thin curing compound.
   7. Reapply curing compound immediately to surfaces damaged by rain, joint sawing, foot traffic or other activities.
   8. If fixed forms are removed during the curing period, coat the entire area of the sides of the concrete walk with curing compound immediately after removal of forms.

B. These requirements are minimum requirements only.

C. Repair or replacement of concrete showing damage due to inadequate curing is required.

D. All costs associated with this corrective work will be borne by the CONTRACTOR.

3.05 PROTECTION

A. Protect the concrete from damage until acceptance of the Work.

B. Protect the concrete from freezing until the concrete has attained a compressive strength of at least 1800 psi.

C. Maintain surface as clean by removing surface stains and spillage of materials as they occur.

D. Sweep concrete and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

3.06 DEFECTIVE WORK

A. The following list of deficiencies are considered defective work and removal or replacement by the CONTRACTOR at no cost to the OWNER is required:
   1. Difference in elevation between panels of 1/2-inch or greater.
   2. Cracks of any lengths that are 1/8-inch-wide or wider.

3. Surface spalling covering in excess of 20% of the area of any 1 panel.
4. A hole that is 1/2 inch or greater in depth and 2 inches or greater in diameter.
5. Residual splatter that is 1/2 inch or higher and attached to a panel.
6. Elevation difference of 3/4 inch in 10 feet caused by settling, that has not caused an elevation difference between panels.
7. Multiple hairline cracking.
8. Footprints, bike tire tracks, animal tracks, or the like, created while concrete was not cured.
9. Improper cross-slope.
10. Low areas which result in ponding or bird baths in the finished concrete.
11. ASR cracking or potholing.
12. Other work identified as defective by OWNER.

3.07 PAVEMENT MARKING

A. Apply pavement marking in accordance with MCDR, MDOT, and FHWA requirements.

B. Clean pavement surface of sand, dirt, oil, and free of foreign material. Remove curing compound from new concrete surfaces before applying cold plastic tape.

C. Pavement surface shall be dry:
1. Apply waterborne paint when the surface temperature of the pavement is 50 degrees F or higher.
2. Apply regular dry paint when the surface temperature of the pavement is 25 degrees F or higher.
3. Wait at least 14 days after the surface is placed to apply regular dry pavement markings unless otherwise approved by the ENGINEER.

D. Follow Drawings for layout of pavement markings, symbols, and the like.

E. Apply pavement marking uniformly to the surface, with sharp and well-defined edges.

F. Protect pavement marking from traffic crossing over uncured paint.

G. Apply second coat of paint to areas designated by ENGINEER just prior to Project completion.

3.08 CLEAN-UP

A. For duration of work, CONTRACTOR is to maintain work area free of waste material, debris, and the like.

B. CONTRACTOR shall provide on-site containers as necessary for work of this Section. Locate as directed by ENGINEER.

C. Upon completion and when directed by ENGINEER, CONTRACTOR shall remove all excess material, debris, and equipment.

D. Prior to acceptance of the work, clean the pavement and related areas to remove dirt and stones.

END OF SECTION 32 13 13

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the furnishing and installation of concrete walks and concrete driveways.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Concrete Pathway (of the thickness specified):
   1. Basis of Measurement: Square feet (SF) for the actual number of square feet of pathway constructed.
   2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to construct the pathway, including the cost of any permits required; excavating and preparing the subbase; furnishing, placing, and compacting MDOT Class II sand cushion; placing, finishing, and curing the pathway; installation of expansion joints; saw cutting contraction joints; and all related cleanup and grading of the Work area.

B. Concrete Sidewalk (of the thickness specified):
   1. Basis of Measurement: Square feet (SF) for the actual number of square feet of sidewalk constructed.
   2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to construct the sidewalk, including the cost of any permits required; excavating and preparing the subbase; furnishing, placing, and compacting MDOT Class II sand cushion; placing, finishing, and curing the sidewalk; installation of expansion and contraction joints; and all related cleanup and grading of the Work area.

C. Concrete Pathway Ramp (of the thickness specified):
   1. Basis of Measurement: Square feet (SF) for the actual number of square feet of pathway ramp and level landing constructed.
   2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to construct the pathway ramp and level landing, including the cost of any permits required; excavating and preparing the subbase; furnishing, placing, and compacting MDOT Class II sand cushion; placing, finishing, and curing the pathway ramp; level landing; monolithic rolled curbs or side flares along the longitudinal edges of the ramp or landing; curb and gutter openings; installation of expansion joints; saw cutting contraction joints; and all related cleanup and grading of the Work area.

D. Concrete Sidewalk Ramp (of the thickness specified):
   1. Basis of Measurement: Square feet (SF) for the actual number of square feet of sidewalk ramp and level landing constructed.
   2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to construct the sidewalk ramp and level landing, including the cost of any permits required; excavating and preparing the subbase; furnishing, placing, and compacting MDOT Class II sand cushion; placing, finishing, and curing the sidewalk ramp; level landing; monolithic rolled curbs or side flares along the longitudinal edges of the ramp or landing; curb and gutter openings; installation of expansion and contraction joints; and all related cleanup and grading of the Work area.

E. ADA Sidewalk Ramp Tactile Warning Plate:
   1. Basis of Measurement: Square feet (SF) for actual number of square feet of tactile warning plate placed.
   2. Basis of Payment: Furnish and place warning plate at locations indicated on drawings.

F. Concrete Driveway (of the thickness specified):
1. Basis of Measurement: Square yards (SY) for the actual number of square yards of concrete driveway constructed.
2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to construct the concrete driveway, including the cost of any permits required; excavating and preparing the subbase; furnishing, placing, and compacting base material; placing, finishing, and curing the driveway; installation of expansion and contraction joints; and all related cleanup and grading of the Work area.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
1. ASTM Publications:
a. A185 – Steel Welded Wire, Fabric, Plain for Concrete Reinforcement.
b. A820 – Steel Fibers for Fiber Reinforced Concrete.
c. C33 – Specification for Concrete Aggregates.
d. C39 – Test Method for Compressive Strength of Cylindrical Concrete Specimens.
e. C94 – Specification for Ready-Mixed Concrete.
f. C136 – Sieve Analysis of Fine and Coarse Aggregates.
g. C150 – Specification for Portland Cement.
h. C260 – Specification for Air-Entraining Admixtures for Concrete.
i. C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
j. C330 – Specification for Lightweight Aggregates for Structural Concrete.
k. C494 – Specification for Chemical Admixtures for Concrete.
l. C618 – Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
2. ACI – American Concrete Institute:
a. 117 – Standard Tolerances for Concrete Construction and Materials.
b. 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
c. 224.3R – Joints in Concrete Construction.
d. 302.1R – Guide for Concrete Floor and Slab Construction.
e. 303R – Guide to Cast-In-Place Architectural Concrete Practice.
f. 304R – Guide for Measuring, Mixing, Transporting and Placing Concrete.
g. 305R – Hot Weather Concreting.
h. 306R – Cold Weather Concreting.
i. 309R – Guide for Consolidation of Concrete.
3. Americans with Disabilities Act (ADA).
4. MDOT Current Standards:
a. Standard Specifications for Construction.
b. Standard Plans.
5. Macomb County Department of Roads (MCDR) Requirements.
6. Macomb Township Requirements.

1.04 SUBMITTALS

A. Action Submittals:
1. Provide mix design for concrete to be supplied.
a. Include quantities and sources of all aggregates, cement, cementitious materials, and admixtures to be used.
b. Submitted from a MDOT certified testing laboratory regularly engaged in designing and testing concrete for exterior paving.
c. Use test results for mix design from within the past 12 months.

2. Product Data: Submit Manufacturer's product data with application and installation instructions for admixtures, curing compounds, expansion joint fillers and sealants.
3. Alkali-Silica Reactivity (ASR):
   a. Submit to ENGINEER ASTM C1260 Accelerated mortar bar test, and ASTM C1293 Concrete prism expansion for ASR from aggregate supplier.
   b. Documentation may include previous testing (within previous 1 year) of materials and sources intended for use.
   c. Documentation may include previous testing (within previous 1 year) from other projects or records provided by the material suppliers.

1.05 QUALITY ASSURANCE

A. Pre-Paving Meeting:
   1. Meeting held at a time mutually agreed upon with ENGINEER, OWNER, CONTRACTOR and subcontractors involved in the paving work.
   2. Discussion of proposed schedule and methods of accomplishing all phases of the paving work.
   3. Minutes distributed to all in attendance.

B. Installation Personnel Qualifications:
   1. Trained and experienced in the fabrication and installation of the materials and equipment.
   2. Knowledgeable of the design.

C. Testing of Materials:
   1. In accordance with Section 01 40 00, Quality Requirements.
   2. In accordance with approved CONTRACTOR's Quality Control Plan.
   3. In accordance with all applicable standards.

D. Batch tickets: Furnish batch tickets to ENGINEER, or ENGINEER'S representative for material incorporated in the Project to verify that the required concrete mix has been supplied.

E. Batch Plant Certification: Ensure portland cement concrete batch plant is certified to meet the requirements specified in the National Ready Mixed Concrete Association *Certification of Ready Mixed Concrete Production Facilities Quality Control Manual* or other MDOT approved requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.

B. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to OWNER.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement:
   1. Portland cement, ASTM C150, Type IA or I/II.
   2. For high early strength concrete the cement shall be air-entraining portland cement Type IIIA.
   3. Do not use different types of cement, different manufacturers of cement, or different degrees of fineness.

B. Cementitious Materials or Cement Substitutes:
   1. Fly Ash: ASTM C618, Class C or F.
   2. Ground Granulated Blast Furnace Slag (GGBFS):
      a. ASTM C989 Grade 100 minimum.
      b. Use only as a blending material with Type I or Type IA portland cement.
   3. Silica Fume, Dry-Densified:
      a. ASTM C1240.
      b. Use only as a blending material with Type I or Type IA portland cement.
   4. Reduce the cement quantity up to a maximum of 25% for fly ash substitution or up to 30% for GGBFS substitution.
   5. Fly ash or GGBFS weight additions must equal the weight of the cement reduction.
   6. For concrete containing portland cement, fly ash and GGBFS in the same mix design, reduce the cement quantity up to 40%, with the maximum fly ash quantity not exceeding 15%.

C. Aggregates:
   1. Grade aggregates according to procedures of ASTM C136, Class M, Exposure 4.
   2. Coarse Aggregates: ASTM C33-5S, Number 57 (1-inch), crushed limestone.
   3. Fine Aggregate: ASTM C33.
   4. Test all aggregates for alkali-silica reactivity and provide mitigation method, if required.

D. Water: Clean, fresh and potable.

E. Admixtures:
   1. General:
      a. No admixture shall contain more than 0.1% water soluble chloride ions by mass of cementitious material.
      b. No admixture shall contain calcium chloride.
   2. Air-Entraining:
      a. Comply with ASTM C260.
      b. Daravair series or Darex series, by W.R. Grace & Company; Micro Air, by BASF Admixtures, Inc.; or equal.
   3. Water-Reducing Admixtures:
      a. Provide concrete mixtures with the same strength, air content as the respective concrete without the admixture.
      b. Select water reducing admixtures from MDOT's qualified products list.
      c. Admixture dosage rates are based on the total cementitious material (cement plus fly ash or GGBFS).

F. Curing Agents:
   1. Curing agents shall comply with ASTM C309, Type 2, Class B.

G. Concrete Reinforcement:
   1. In accordance with MDOT requirements and drawings when required.
   2. Welded wire fabric in accordance with ASTM A185.

2.02 CONCRETE MIX DESIGN

A. Concrete shall conform to Grade 3500 as shown in MDOT Table 1004-1. When driveway must be open to traffic within 72 hours, provide concrete mix conforming to Grade 3500HP according to MDOT Table 1004-1. Design mix to project normal-weight concrete consisting of portland cement, aggregate, add mixtures, and water producing the following properties:
   1. Cement content: 517-611 lb/cy.
   2. Compressive Strength: 3,500 psi (min) at 28 days.
   3. Air Content: 7.0% ±1.5%.

4. Slump: 0 to 3 inches or the slump in the approved mix design.
5. Water Cement Ratio: 0.45 maximum.

B. Alkali-Silica Reactivity (ASR):
1. The Concrete supplier is required to evaluate the fine aggregates (only) used in the production of the concrete for ASR.
2. Submit to the ENGINEER ASTM C1293 concrete prism expansion for ASR from the aggregate supplier.
3. Documentation may include previous testing of materials so long as material source has not changed, and test is not more than 1 year old.
4. No ASR mitigation is required if aggregates are non-reactive where ASTM C1260 accelerated mortar bar test expansion is less than 0.10% at 14 days, or if ASTM C1293 Concrete prism expansion is less than 0.04% at 1 year.
5. If ASTM C1260 mortar bar test results is more than 0.10% expansion at 14 days, ASTM C1293 concrete prism test is required to be performed before aggregates can be used.
6. ASR mitigation is required if aggregates are found to be moderately reactive where ASTM C1293 Concrete prism expansion is equal to or greater than 0.04%, but less than 0.12% at 1 year.
7. Aggregates will not be accepted if ASTM C1293 Concrete prism expansion is equal to or greater than 0.12% at 1 year.

C. Mitigation Methods for Moderately Reactive Aggregates:
1. In accordance with DOT approved Specifications.
2. Use low Alkali Cements:
   a. Submit mill test report data and calculations for Cement and Fly ash.
   b. Maximum Alkali content of cementitious materials (cement and fly ash) (Na2Oe) (Na2O equivalent) ≤ 3.5 lbs/cyd.
   c. Maximum Alkali content in cement (Na2Oe) (Na2O equivalent) ≤ 0.7%.
   d. Maximum lime CaO in Fly ash ≤ 20%.
   e. Minimum Silica in Fly ash SiO_2 ≥ 35%.
   f. Total oxides in Fly ash (SiO_2 + Al_2O_3 + Fe_2O_3) ≥ 60%.
3. Demonstrate the effectiveness of the proposed mix combination to resist the potential for excessive expansion caused by ASR using current and historic data:
   a. ASTM C1567 (14-day test) using both coarse and fine aggregate and all cementitious materials.
   b. Mortar bars constructed of cementitious materials and coarse and fine aggregates must produce an expansion of less than 0.10%.

2.03 SAND CUSHIONS AND SAND FILL

A. Provide sand backfill material for sidewalk base consisting of natural sand composed of granular material resulting from the natural disintegration of rock. This material shall consist of clean, hard, durable, uncoated particles of sand, free from clay lumps and soft or flaky material. Sand used for backfill shall be 4 inches thick and conform to the gradation for Class II material specified in Section 902 of the MDOT Standard Specifications for Construction.

2.04 DETECTABLE/TACTILE WARNING SURFACES

A. Furnish and install tactile surface plate into uncured concrete cement.
1. In accordance with most current Americans with Disabilities Act (ADA).
2. Materials: As specified on Macomb Township Standard Detail Sheets.

2.05 FORM WORK

A. Provide necessary form work to provide concrete dimensions indicated on the Drawings ±1/2 inch.
1. Forms to be straight and true, minimum 1-5/8-inch-thick wood, full depth of concrete or steel forms.
2. All curved radius pours to be smooth deflectable steel or wood forms.

2.06 CONTRACTION JOINTS

A. Provide necessary contraction joints to control random cracking with sawcut or hand-troweled joint.
1. Depth: 1/4 slab thickness minimum, or as indicated on the Drawings.
2. Cut and space joints as indicated on the drawings.

2.07 EXPANSION JOINTS

A. Joint fiber shall be preformed, composed of either blended, bonded flexible and waterproof fiber meeting the requirements of AASHTO M213 or polyvinyl chloride with fabric strand or ASTM D1751 fiber joint filler.

B. Full depth of concrete.

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide smooth base of granular material compacted to 95% of its maximum density in accordance with ASTM D1557.

B. Do not place concrete until the surface to be paved upon has been inspected and approved by ENGINEER.

3.02 INSTALLATION

A. Weather, Temperature, and other Limitations:
1. Do not place concrete until the ambient air temperature away from artificial heat is at least 25 degrees F and rising, unless otherwise approved by ENGINEER.
2. Do not place concrete if portions of the base, subbase, or subgrade layer are frozen, or if the grade exhibits poor stability from excessive moisture levels.
3. Temperature of concrete at time of placement shall be between 45 degrees F and 90 degrees F.
4. Paving will not be allowed between November 15 and May 1 without written approval from the Macomb County Department of Roads and Township Engineer.

B. Cold Weather Concrete Operations:
1. Comply with the recommendations of ACI 306R.
2. Recommended Protective Measures:
a. Heating materials.
b. Providing insulating blankets and windbreaks.
c. Heated enclosures.
3. Advise ENGINEER of planned protective measures.
4. Straw or similar materials shall not be allowed.
5. Do not use frozen materials or materials containing ice or snow.
6. Do not place concrete on frozen subgrade.

C. Hot Weather Concrete Operations:
   1. Comply with the recommendations of ACI 305R.
   2. Recommended Protective Measures:
      a. Cooling materials.
      b. Concrete placement during cooler hours of the day.
      c. Providing shading and windbreaks.
   3. Advise ENGINEER of planned protective measures.

D. Slope:
   1. All walks should have a cross slope of a minimum 1% and maximum 2% sloped toward a curb or lower elevation.

E. Preparation of Base:
   1. Excavate to the required depth and to a width that will permit forming.
   2. Remove unsuitable material below the required depth and replace with suitable material approved by the ENGINEER.
   3. Shape and compact the base to conform to the section indicated on the Drawings.

F. Forms:
   1. Use fixed forms.
   2. Apply form releasing agent to prevent concrete from bonding to forms.
   3. Provide straight, full depth forms free of warp and strong enough to resist springing during concrete placement.
   4. Firmly stake fixed forms to prohibit movement.

G. Placing and Finishing Concrete:
   1. Placing of concrete shall not commence until an approved inspection has been made of the forms and subgrade.
   2. Place all concrete in accordance with ACI 304R and ACI 304.2R.
   3. Do not exceed the time limits specified in MDOT Table 1001-1 for the time of charging the mixer to complete concrete discharge.
   4. Moisten base before placing concrete.
   5. Place concrete and consolidate, including along the faces of the forms, before finishing.
   6. Place and finish in a continuous operation.
   7. When replacing gutters along with concrete walk ramps, construct the gutter to the same dimensions and profile and use the same reinforcement pattern as the existing gutter.
   8. Float the surface just enough to produce a smooth surface free from irregularities.
   9. Round edges and joints with an approved finishing tool.
   10. Broom finish concrete walks, ramps, and driveways by drawing a fine-hair broom across the concrete surface, perpendicular to the line of traffic. Repeat operation if required to provide a fine line texture acceptable to the ENGINEER.

H. Joints:
   1. General: Comply with ACI 318-6.3, 6.4, and ACI 301, Section 6.
      a. Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete.
      b. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
   2. Weakened-Plane (Contraction) Joints:
      a. Provide weakened-plane (contraction) joints, sectioning concrete into areas
         1) As indicated on the Drawings.
      b. Contraction joints for curbs shall be provided at 10-foot intervals and 20-foot spacing for slabs, unless shown otherwise.

c. Construct weakened plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
   1) Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
   2) Sawed Joints: Form weakened-plane joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.

3. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such placements terminate at expansion joints.
4. Expansion Joints:
   a. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.
   b. Locate expansion joints at 50 feet on center along linear lengths of walks, and at points of radii of curbs unless otherwise indicated.
5. Extend joint fillers full width and depth of joint, and not less than 1/2 inch or more than 1 inch below finished surface for joint sealant.
6. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip joint filler sections together.

I. Thickness: Except as otherwise specified or indicated on the Drawings, provide a minimum thickness of 4 inches for sidewalks, 6 inches for sidewalk ramps, and 6 inches for driveways.

J. Where walkways cross driveways, and for the first flag of walk on either side of the driveways, provide a minimum thickness of 6 inches.

K. Ramps:
1. As indicated on the Drawings.
2. No ramp shall exceed 1:12 slope.
3. Place detectable warning domed plates in fresh concrete in accordance with Manufacturer's instructions on ramp surface.
4. ADA domes to be 24 inches wide, full width of ramp.

L. Reinforcing:
1. Install reinforcing as indicated on the Drawings.

M. Backfilling:
1. After the concrete has gained sufficient strength, remove fixed forms and backfill with suitable material approved by the ENGINEER.
2. Compact and level the backfill 1 inch below the surface of the concrete.

3.03 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screening and floating. Use hand method only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10-foot straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
   1. Exterior slabs, sidewalks, flow channels, flumes, curbs, and other similar concrete pavement types shall have a non-slip finish by scoring the surface with a fine-hair broom, perpendicular to the line of traffic. Repeat operation if required to provide a fine line texture acceptable to the ENGINEER.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by ENGINEER.

3.04 CURING

A. General:
   1. After texturing operations have been completed and after the free water has left the surface, coat the concrete walk surface and sides of slip-formed concrete walks with a uniform layer of membrane curing compound.
   2. Apply 1 coat of curing compound on non-grooved surfaces and 2 coats on grooved surfaces.
   3. Apply not less than 1 gallon per 25 square yards of concrete for each application.
   4. Apply the second coat after the first has dried sufficiently but do not exceed 2 hours between coats.
   5. Keep the compound thoroughly mixed according to the Manufacturer's recommendations.
   6. Do not thin curing compound.
   7. Reapply curing compound immediately to surfaces damaged by rain, joint sawing, foot traffic or other activities.
   8. If fixed forms are removed during the curing period, coat the entire area of the sides of the concrete walk with curing compound immediately after removal of forms.

B. These requirements are minimum requirements only.

C. Repair or replacement of concrete showing damage due to inadequate curing is required.

D. All costs associated with this corrective work will be borne by the CONTRACTOR.

3.05 ADA TRUNCATED DOMES

A. Prior to installation, review mix design with concrete supplier and installer to ensure concrete has proper slump and will not set too rapidly to allow for proper installation.

B. Install system in accordance with Manufacturer's specifications and recommendations. Dome panels to be perpendicular and parallel with curb with no gaps between panels. Panels must be level and flush with adjacent concrete walk. Installation must be acceptable to ENGINEER or removed and replaced at CONTRACTOR's expense.

C. Install top of domes flush with top of adjacent concrete along top and sides of plates. Install bottom of domes flush with concrete at lower end of plates.

3.06 PROTECTION

A. Protect the walks and driveways from damage until acceptance of the Work.

B. Protect the concrete from freezing until the concrete has attained a compressive strength of at least 1800 psi.

C. Maintain walks and driveways as clean as practical by removing surface stains and spillage of materials as they occur.

D. Sweep concrete walks and driveways and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

3.07 DEFECTIVE WORK

A. The following list of deficiencies shall be considered defective work and shall be replaced by the CONTRACTOR at no cost to the OWNER:
1. Difference in elevation between panels of 1/2-inch or greater.
2. Cracks of any length that are 1/8-inch wide or wider.
3. Surface spalling covering in excess of 20% of the area of any 1 panel.
4. A hole that is 1/2 inch or greater in depth and 2 inches or greater in diameter.
5. Residual splatter that is 1/2 inch or higher and attached to a panel.
6. Elevation difference of 3/4 inch in 10 feet caused by settling, that has not caused an elevation difference between panels.
7. Multiple hairline cracking.
8. Footprints, bike tire tracks, animal tracks, or the like, created while concrete was not cured.
9. Improperly installed tactile warning surface.
10. Improper cross-slope.
11. Low areas which result in ponding or bird baths in the finished concrete.
12. ASR cracking or potholing.
13. Other work identified as defective by OWNER.

3.08 CLEAN-UP

A. For duration of work, CONTRACTOR is to maintain work area free of waste material, debris, and the like.

B. CONTRACTOR shall provide on-site containers as necessary for work of this Section. Locate as directed by ENGINEER.

C. Upon completion and when directed by ENGINEER, CONTRACTOR shall remove all excess material, debris, and equipment.

D. Prior to acceptance of the work, clean the pavement and related areas to remove dirt and stones.

END OF SECTION 32 13 14

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the furnishing and installation of concrete curbs and gutters and concrete driveway openings.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Proposal as a Bid Item:
   1. Concrete Curbs:
      a. Basis of Measurement: Linear feet (LF) along the back of curb as installed.
      b. Basis of Payment: Furnish all labor, equipment, and materials necessary to construct the curb as specified including excavation, compaction, bedding and backfill, disposal of excess excavated material, and seeding of backfill or sodding of backfill as required.
   2. Concrete Driveway Opening (of the type specified):
      a. Basis of Measurement: Linear feet (LF) measured from springline to springline.
      b. Basis of Payment: Furnish all labor, equipment, and materials necessary to construct the driveway opening as specified including reinforcement, excavation, compaction, bedding and backfill, disposal of excess excavated material, and seeding of backfill or sodding of backfill as required.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. ASTM Publications:
      a. A820 – Steel Fibers for Fiber Reinforced Concrete.
      b. C33 – Specification for Concrete Aggregates.
      c. C39 – Test Method for Compressive Strength of Cylindrical Concrete Specimens.
      d. C94 – Specification for Ready-Mixed Concrete.
      e. C136 – Sieve Analysis of Fine and Coarse Aggregates.
      f. C150 – Specification for Portland Cement.
      g. C260 – Specification for Air-Entraining Admixtures for Concrete.
      h. C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
      i. C330 – Specification for Lightweight Aggregates for Structural Concrete.
      j. C494 – Specification for Chemical Admixtures for Concrete.
      k. C618 – Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
   2. ACI – American Concrete Institute:
      a. 117 – Standard Tolerances for Concrete Construction and Materials.
      b. 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
      c. 302.1R – Guide for Concrete Floor and Slab Construction.
      d. 303R – Guide to Cast-In-Place Architectural Concrete Practice.
      e. 304R – Guide for Measuring, Mixing, Transporting and Placing Concrete.
      f. 305R – Hot Weather Concreting.
      g. 306R – Cold Weather Concreting.
      h. 309R – Guide for Consolidation of Concrete.

3. Concrete Reinforcing Steel Institute (CRSI):
   a. Manual of Standard Practice – current edition.
   b. Placing Reinforcing Bars – current edition.
4. Americans with Disabilities Act (ADA).
5. MDOT Current Standards:
   a. Standard Specifications for Construction.
   b. Standard Plans.
6. Macomb County Department of Roads (MCDR) Requirements.
7. Macomb Township Requirements.

1.04 SUBMITTALS

A. Action Submittals:
   1. Provide mix design for concrete to be supplied.
      a. Include quantities and sources of all aggregates, cement, cementitious materials, and admixtures to be used.
      b. Submitted from a MDOT certified testing laboratory regularly engaged in designing and testing concrete for exterior paving.
      c. Use test results for mix design from within the past 12 months.
   2. Product Data: Submit Manufacturer's product data with application and installation instructions for admixtures, curing compounds, expansion joint fillers and sealants.
   3. Alkali-Silica Reactivity (ASR):
      a. Submit to ENGINEER ASTM C1260 Accelerated mortar bar test, and ASTM C1293 Concrete prism expansion for ASR from aggregate supplier.
      b. Documentation may include previous testing (within previous 2 years) of materials and sources intended for use.
      c. Documentation may include previous testing (within previous 2 years) from other projects or records provided by the material suppliers.

1.05 QUALITY ASSURANCE

A. Pre-Paving Meeting:
   1. Meeting held at a time mutually agreed upon with ENGINEER, OWNER, CONTRACTOR and subcontractors involved in the paving work.
   2. Discussion of proposed schedule and methods of accomplishing all phases of the paving work.
   3. Minutes distributed to all in attendance.

B. Installation Personnel Qualifications:
   1. Trained and experienced in the fabrication and installation of the materials and equipment.
   2. Knowledgeable of the design.

C. Testing of Materials:
   1. In accordance with Section 01 40 00, Quality Requirements.
   2. In accordance with approved CONTRACTOR's Quality Control Plan.
   3. In accordance with all applicable standards.

D. Batch tickets: Furnish batch tickets to ENGINEER, or ENGINEER'S representative for material incorporated in the Project to verify that the required concrete mix has been supplied.

E. Batch Plant Certification: Ensure portland cement concrete batch plant is certified to meet the requirements specified in the National Ready Mixed Concrete Association *Certification of Ready Mixed Concrete Production Facilities Quality Control Manual* or other MDOT approved requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.

B. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to OWNER.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement:
1. Portland cement, ASTM C150, Type IA.
2. For high early strength concrete the cement shall be air-entraining portland cement Type IIIA.
3. Do not use different types of cement, different manufacturers of cement, or different degrees of fineness.

B. Fly Ash: ASTM C618, Class F.

C. Aggregates:
1. Grade aggregates according to procedures of ASTM C136, Class M, Exposure 4.
2. Coarse Aggregates: ASTM C33-5S, Number 57 (1-inch), crushed limestone.
3. Fine Aggregate: ASTM C33.

D. Water: Clean, fresh and potable.

E. Admixtures:
1. General:
   a. No admixture shall contain more than 0.1% water soluble chloride ions by mass of cementitious material.
   b. No admixture shall contain calcium chloride.
2. Air-Entraining:
   a. Comply with ASTM C260.
   b. Daravair series or Darex series, by W.R. Grace & Company; Micro Air, by BASF Admixtures, Inc.; or equal.

F. Curing Agents:
1. Curing agents shall comply with ASTM C309, Type 2, Class B.

G. Concrete Reinforcement:
1. Reinforcement shall meet MDOT Standard Specifications for Construction.
2. Deformed reinforcing bars.
3. ASTM A615, Fy = 60,000 psi.
4. Required only when indicated on the Drawings.

2.02 CONCRETE MIX DESIGN

A. Concrete shall conform to Grade 3500 as shown in MDOT Table 1004-1. Design mix to project normal-weight concrete consisting of portland cement, aggregate, air-entrained add mixture, and water producing the following properties:
1. Cement Content: 517-611 lb/cy.
2. Compressive Strength: 3,500 psi (min) at 28 days.
3. Air Content: 7.0% ±1.5%.

4. Air content may be reduced to 4.5% if curb and gutter is being installed with slip-form machine.
5. Slump: 0 to 3 inches unless mid-range water reducer is used then slump may be 6 inches.
6. Water Cement Ratio: 0.45 maximum.

B. Sand Cushions and Sand Fill: 4 inches of compacted granular material.

2.03 FORMWORK

A. Provide necessary formwork to provide concrete dimensions indicated on the Drawings ±1/2 inch.
1. Forms to be straight and true, minimum 1-5/8-inch-thick wood, full depth of concrete or steel forms.
2. All curved radius pours to be smooth deflectable steel or wood forms.

2.04 CONTRACTION JOINTS

A. Construct joints, as approved by the ENGINEER, to ensure a plane-of-weakness at least 1/4 the depth of the section.

2.05 EXPANSION JOINTS

A. Joint fiber shall be preformed, composed of either blended, bonded flexible and waterproof fiber meeting the requirements of AASHTO M213 or polyvinyl chloride with fabric strand or ASTM D1751 fiber joint filler.

2.06 SEALANTS

A. Joint sealant to be hot-poured rubber in accordance with MDOT requirements.

PART 3 - EXECUTION

3.01 GRADING

A. Provide smooth base of granular material compacted to 95% of its maximum density in accordance with ASTM D1557.

3.02 INSTALLATION

A. Weather, Temperature, and other Limitations:
1. Do not place concrete until the ambient air temperature away from artificial heat is at least 25 degrees F and rising, unless otherwise approved by ENGINEER.
2. Do not place concrete if portions of the base, subbase, or subgrade layer are frozen, or if the grade exhibits poor stability from excessive moisture levels.
3. Temperature of concrete at time of placement shall be between 45 degrees F and 90 degrees F.
4. Paving will not be allowed between November 15 and May 1 without written approval from the Macomb County Department of Roads.

B. Cold Weather Concrete Operations:
1. Comply with the recommendations of ACI 306R.
2. Recommended Protective Measures:
   a. Heating materials.
   b. Providing insulating blankets and windbreaks.
   c. Heated enclosures.
3. Advise ENGINEER of planned protective measures.

4. Straw or similar materials shall not be allowed.
5. Do not use frozen materials or materials containing ice or snow.
6. Do not place concrete on frozen subgrade.

C. Hot Weather Concrete Operations:
1. Comply with the recommendations of ACI 305R.
2. Recommended Protective Measures:
   a. Cooling materials.
   b. Concrete placement during cooler hours of the day.
   c. Providing shading and windbreaks.
3. Advise ENGINEER of planned protective measures.

D. Preparation of Base:
1. Excavate to the required depth and to a width that will permit forming.
2. Remove unsuitable material below the required depth and replace with suitable material approved by the ENGINEER.
3. Shape and compact the base to conform to the section indicated on the Drawings.

E. Forms:
1. Use fixed forms.
2. Apply form releasing agent to prevent concrete from bonding to forms.
3. Provide straight, full depth forms free of warp and strong enough to resist springing during concrete placement.
4. Firmly stake fixed forms to prohibit movement.

F. Reinforcing:
1. Place reinforcement in accordance with CRSI placing reinforcement bars and Manual of Standard Practice.
2. Tolerances indicated in ACI 117.
3. 3-inch minimum cover.

G. Placing and Finishing Concrete:
1. Place all concrete in accordance with ACI 304R and ACI 304.2R.
2. Do not exceed the time limits specified in MDOT Table 1001-1 for the time of charging the mixer to complete concrete discharge.
3. Moisten base before placing concrete.
4. Place concrete and consolidate, including along the faces of the forms, before finishing.
5. Place and finish in a continuous operation.
6. When replacing gutters along with concrete walk ramps, construct the gutter to the same dimensions and profile and use the same reinforcement pattern as the existing gutter.
7. Float the surface just enough to produce a smooth surface free from irregularities.
8. Round edges and joints with an approved finishing tool.

H. Joints:
1. General: Comply with ACI 318-6.3, 6.4, and ACI 301, Section 6.
   a. Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to the centerline, unless otherwise indicated on the Drawings.
2. Weakened-Plane (Contraction) Joints:
   a. Provide weakened-plane (contraction) joints, sectioning concrete into areas as indicated on the Drawings.
   b. Contraction joints for curbs shall be 1-1/2 inch deep provided at 10-foot intervals unless indicated otherwise on the Drawings.
3. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such placements terminate at expansion joints.

4. Install expansion joints at the end point of curves of all radius curbs.
5. Seal joints with hot-poured rubber asphalt in accordance with Macomb County Department of Roads joint standard details.

I. Backfilling:
1. After the concrete has gained sufficient strength, remove fixed forms and backfill with suitable material approved by the ENGINEER.
2. Compact and level the backfill 1-inch below the surface of the concrete.

3.03 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screening and floating. Use hand method only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10-foot straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing to create a non-slip finish by scoring the surface with a fine-hair broom, perpendicular to the line of traffic. Repeat operation if required to provide a fine line texture acceptable to the ENGINEER. Finish edges with 1/2-inch radius.

D. Do not remove forms for 24-hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by the ENGINEER.

3.04 CURING

A. General:
1. After texturing operations have been completed and after the free water has left the surface, coat the concrete with a uniform layer of membrane curing compound.
2. Apply 1 coat of curing compound on non-grooved surfaces and 2 coats on grooved surfaces.
3. Apply not less than 1 gallon per 25 square yards of concrete for each application.
4. Apply the second coat after the first has dried sufficiently but do not exceed 2 hours between coats.
5. Keep the compound thoroughly mixed according to the Manufacturer’s recommendations.
6. Do not thin curing compound.
7. Reapply curing compound immediately to surfaces damaged by rain, joint sawing, foot traffic or other activities.
8. If fixed forms are removed during the curing period, coat the entire area of the sides of the concrete walk with curing compound immediately after removal of forms.

B. These requirements are minimum requirements only.

C. Repair or replacement of concrete showing damage due to inadequate curing is required.

D. All costs associated with this corrective work will be borne by the CONTRACTOR.

3.05 PROTECTION

A. Protect the concrete from damage until acceptance of the Work.

B. Protect the concrete from freezing until the concrete has attained a compressive strength of at least 1800 psi.

C. Maintain as clean as practical by removing surface stains and spillage of materials as they occur.

D. Sweep concrete and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

3.06 DEFECTIVE WORK

A. The following list of deficiencies shall be considered defective work and shall be replaced by the CONTRACTOR at no cost to the OWNER:
1. Cracks of any length that are 1/8 inch wide or wider.
2. A hole that is 1/2 inch or greater in depth and 2 inches or greater in diameter.
3. Residual splatter that is 1/2 inch or higher than adjacent concrete.
4. Elevation difference of 1/4 inch in 10 feet caused by settling or improper forming.
5. Footprints, bike tire tracks, animal tracks, or the like, created while concrete was not cured.
6. Other work identified as defective by OWNER.

3.07 CLEANING

A. For duration of work, CONTRACTOR is to maintain work area free of waste material, debris, and the like.

B. CONTRACTOR shall provide on-site containers as necessary for work of this Section. Locate as directed by ENGINEER.

C. Upon completion and when directed by ENGINEER, CONTRACTOR shall remove all excess material, debris, and equipment.

D. Prior to acceptance of the work, clean the pavement and related areas to remove dirt and stones.

END OF SECTION 32 16 13

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the furnishing and installation of the major items listed below:
1. Seed.
2. Fertilizer.
3. Mulch.
4. Sod.
5. Dune grass.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item:
1. Seeding and Mulching:
a. Basis of Measurement: Square yards (SY) for the actual number of square yards of seeding and mulching installed within the limits of measurement.
b. Basis of Payment: Furnishing all labor, equipment, and material required to perform all the work described in this Section. This includes furnishing, placing, and grading topsoil; placing seed as specified; placing mulch and mulch anchoring; and watering and maintaining until final acceptance.
2. Class A Sodding:
a. Basis of Measurement: Square yards (SY) for the actual number of square yards of Class A Sodding installed within the limits of measurement.
b. Basis of Payment: Furnishing all labor, equipment, and material necessary to furnish and place sod, including the preparation of the foundation material, topsoil, water, fertilizer, final cleanup, re-sodding, and all other work to complete the sodding as described.
3. Mulch Blanket:
a. Basis of Measurement: Square yards (SY) for the actual number of square yards of Mulch Blanket installed within the limits of measurement.
b. Basis of Payment: Furnishing al labor, equipment, and material required to perform all the work described in this Section. This includes furnishing and placing mulch blanket, anchoring system, and maintaining until final acceptance.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
1. MDOT Current Standards:
a. Standard Specifications for Construction.
b. Standard Plans.
2. Macomb County Department of Roads (MCDR) Requirements.
3. Macomb Township Requirements.

1.04 DEFINITIONS

A. Follow-up Maintenance: Maintenance required when seeding, sodding, or other vegetative practices do not achieve the desired degree of stabilization.

B. Periodic Maintenance: Maintenance performed after the vegetation has been established.

C. Limits of Measurement: the width determined by the smaller of:
   1. The street right-of-way width
   2. Easement width.
   3. A width equal to twice the utility's depth as measured from the top of the utility to the surface of the ground, such width being centered on the centerline of the utility. This width shall be not less than 16 feet.

1.05 LOCATION

A. Sodded Areas: As indicated on the Drawings.

B. Seeded Areas: All disturbed areas within the project limits not covered by other surface improvements or features.

C. Mulch Blankets: As indicated on the Drawings.

1.06 SUBMITTALS

A. Action Submittals: Product Data for mulch blanket.

B. Informational Submittals:
   1. Samples: For netting and mulch blanket.
   2. Supplier's certified analysis for each seed and fertilizer mixture required.

1.07 QUALITY ASSURANCE

A. Fabrication and Installation Personnel Qualifications:
   1. Trained and experienced in the fabrication and installation of the materials and equipment.
   2. Knowledgeable of the design and the reviewed Submittals.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.

B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, and damage by weather or elements, and according to Manufacturer's directions.

C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to OWNER.

1.09 WARRANTY

A. CONTRACTOR shall repair any erosion or sedimentation damage to finished or unfinished work.

B. Maintain and repair the restored areas to achieve the Final Acceptance criteria. The CONTRACTOR shall warranty the work until Final Acceptance has been granted by the OWNER.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil: In accordance with Section 31 22 00, Grading.

B. Fertilizer:
1. Comply with MDOT 917.09, Class A except as herein specified.

C. Seed:
1. Mixture composed of certified seed of the following purity, germination, and proportions by Weight:
a. Lawns: THM (Turf Loamy to Heavy) as defined in Table 917-2 in the current MDOT Standard Specifications for Construction.
b. Roadside: THV (Turf Heavy Soil) as defined in Table 917-2 in the current MDOT Specifications for Construction.
2. Furnish seed in durable bags, each marked by the supplier of the blended mix with a tag giving name, lot number, net weight of contents, purity, and germination.

D. Mulch:
1. Small Grain:
a. Straw.
b. Hay.
2. Anchoring Material for Small Grain Mulch:
a. Netting:
1) Biodegradable.
2) Openings not to exceed 1-1/2 inches x 2 inches.
3) Minimum Roll Width: 35 inches.
4) Anchoring Staples or Pins: Wood pegs at least 6 inches long.
3. Mulch Blankets:
a. Biodegradable:
1) Straw: North American Green S-75; or equal.
2) Coconut: North American Green C-125; or equal.
3) Straw and Coconut: North American Green SC-150; or equal.
b. Non-Degradable Polyester: North American Green P-300; or equal.
c. Anchoring Staples or Pins:
1) Hardwood stakes at least 6 inches long.
2) North American Green Bio-Stake blanket pins at least 6 inches long.

E. Sod: Comply with MDOT Section 917.12.

PART 3 - EXECUTION

3.01 TOPSOIL

A. In accordance with Section 31 22 00, Grading.

3.02 SEEDBED PREPARATION

A. General:
1. After the areas to be seeded have been brought to the required grade and properly trimmed, bring soil to a friable condition by disking, harrowing, or otherwise loosening and mixing to a depth of 3 inches to 4 inches. Thoroughly break all lumps and clods.
2. If the prepared seedbed is not fertilized, satisfactorily seeded, and mulched before the friable condition is lost through compaction or crusting, repeat the seedbed preparation prior to seeding or reseeding.

B. Raking: Rake prepared seedbed before seeding.

3.03 FERTILIZING

A. Dry Fertilizer:
1. Broadcast on surface as first step in seeding process.
2. Apply with seeding if drilled.
3. Work fertilizer into the soil to a depth of 1 inch to 2 inches.
4. Apply uniformly.
5. Application Rate: Equivalent to 400 pounds per acre of 12-12-12.

3.04 SEEDING

A. Scheduling:
1. Within 30 days from the time the area was first disturbed.
2. Channel Banks: Within 24 hours from the time the area was first disturbed.
3. Seasonal Limitations:
a. April 15 through October 10.
b. Dormant seeding after November 15.

B. Sowing:
1. Sow the seed following or in conjunction with the fertilizer and while the seed bed is in a friable condition.
2. Do not sow seeds through mulch.
3. Application Rate:
a. All Areas: Sow seed at a minimum rate of 220 lbs. per acre.

C. Finishing: Float and lightly compact areas sown by the broadcast method to incorporate the seed into the uppermost 1/2 inch of the soil.

D. Method:
1. Broadcast: Do not seed when wind velocity exceeds 5 miles per hour.
2. Mechanical drills.

E. Inspection: Areas which are sown by the broadcast method shall be visually inspected for uniformity of application; areas in which visual inspection fails to reveal an average of 2 seeds per square inch shall be resown at no additional cost to OWNER.

F. Seed on Slopes: Protect seeded slopes against erosion with mulch blanket.

3.05 MULCHING

A. Small Grain Mulch:
1. Application:
a. Immediately after seeding.
b. Uniform distribution.
c. Allow sunlight to penetrate mulch.
2. Application Rate: Two tons per acre (2-1/2 bales per 1000 square feet).
3. Anchoring:
a. Mulch anchoring tool.
b. Netting.

B. Mulch Blankets:
1. Netting on top.
2. Fibers in direct contact with soil.
3. Staple in accordance with Manufacturer's guidelines for slope conditions.
4. Direction of Installation:
a. Direction of flow of water in intermittent and ephemeral drains.
b. Perpendicular to sideslopes above normal water level in perennial drains.

3.06 SOD BED PREPARATION

A. Area to be Sodded:
1. Apply soil conditioner and till soil to form a smooth and uniform surface.
2. Rake and fine grade to remove large clods.
3. Make parallel to the finished grade and cross-sections indicated on the Drawings.

3.07 LAYING SOD

A. General:
1. Moisten sod and place on a moist earth bed.
2. Lay sod within 24 hours after cutting and properly protect it until placed.
3. Carefully place the sod by hand in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward.
4. Do not use pitch forks to handle sod. Dumping from vehicles will not be permitted.
5. Extend bottom edge of sodded areas at least 2 inches into the ground or ditch bottom.
6. Break transverse joints of sod strips and carefully lay sod to produce tight joints.
7. When the sod may be displaced during sodding operations, work from ladders or treaded planks.
8. Firmly compact the sod by tamping or light rolling immediately after it is placed.
9. After tamping or rolling, the sod shall present a smooth, even surface free from bumps and depressions.
10. Use a lawn roller over the sod to force the grass roots firmly into the soil.

B. Sod on Slopes:
1. On slopes steeper than 1 vertical to 3 horizontal, peg the sod with wooden pegs.
2. Space pegs not over 2 feet apart in any direction.
3. Drive pegs flush with the surface of the sod.

C. Frozen Materials:
1. Do not place frozen sod.
2. Do not place sod on frozen soil.

D. Watering: After placing sod, water with an initial application and at regular intervals during the days following placement until the sod is rooted in the topsoil.

3.08 MAINTENANCE

A. General:
1. CONTRACTOR: Responsible for follow-up maintenance.
2. CONTRACTOR is responsible for periodic maintenance after completion of areas of seeding or sodding until Final Acceptance has been granted by OWNER.

B. Follow-up Maintenance:
1. Inspect materials planted in the spring during the summer or early fall, and take corrective action during the fall planting season.
2. Inspect materials planted in the fall during the spring and take corrective action during this spring planting season.
3. Reseed, sod, plant, fertilize, mulch, topsoil, grade and roll as necessary to achieve a uniform lawn or stand of grass free from eroded or bare areas.
4. Maintain turf to a visually appealing level, and not more than 8 inches in height at any time, prior to final acceptance. Weeds must be controlled to less than 10% of the turf establishment area at all times during construction.
5. Water sodded and seeded areas as required to maintain the viability of the Product.

3.09 FINAL ACCEPTANCE

A. Final acceptance shall not be granted by OWNER until the following conditions are met:
   1. Proper watering leading to well rooted growth, resistant to drought, pests, and disease.
   2. Consistent stand of grass covering at least 90% of the restored area with no obvious bare spots.
   3. Stand of grass shall be free of weeds. A minimum (less than 10%) of small weeds may be acceptable.

B. CONTRACTOR is responsible to achieve the final acceptance criteria.

C. If final acceptance criteria are not met, CONTRACTOR shall repeat the necessary operations to produce the desired results, at no additional cost to the OWNER.

D. If the CONTRACTOR does not agree with the decision made by the OWNER, the CONTRACTOR can request an inspection by a mutually agreed upon third party (Michigan State University Extension service or other). A joint inspection, including the OWNER, CONTRACTOR, and the third party, will be scheduled. All third-party expert fees and expenses will be paid by the CONTRACTOR.

END OF SECTION 32 92 00

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the furnishing and installation of a sanitary sewer system.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Sewer (of the type, class, size, and trench detail specified):
1. Basis of Measurement: Linear Foot (FT). Measured at ground level from center to center of the appurtenances connected by the sewer pipe or end of pipe.
2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to furnish, install, and place into service the sewer pipe, including: Pipe, pipe fittings, wyes, risers, and all other appurtenances; connections to existing or proposed manholes and/or pipe; existing sewer line connections into proposed system; leakage testing; television inspection of installed sewers; patching and plastering of manholes that have been "cut into"; excavation; disposal of surplus excavation; bulkheads; dewatering; bypass pumping; stabilization of trench subgrade; sheeting and bracing trenches; bedding material; special bedding in unstable soil; compacted backfill (trench Detail A or B, as required by Macomb Township Standard Detail Drawings); plugging or capping existing utilities where required; repairing or replacing all existing utilities damaged as a result of construction operations; replacement of pavement and sidewalks (unless listed as a separate item in the Bid Form); maintenance aggregate; temporary pavement and patching; fence removal and replacement; mailbox removal and replacement; storm sewer removal and replacement; landscape (ornamental trees and shrubs) removal and replacement; sprinkler system removal and replacement; and road, curb and gutter, sidewalk, parking lot, paved spillways, and driveway restoration; regrading disturbed road ditches; swale restoration; resetting culverts; restoring shoulders; final grading, seeding and mulching (or sodding if specified on the Drawings), and cleanup; and other necessary work incidental to the construction of sewer not specifically listed.

Seventy percent of the Unit Price for sewers will be considered earned when the pipe is satisfactorily installed. An additional 20% of the Unit Price for sewer will be considered earned when the paved or gravel roadways, driveways, drainage are restored and maintained in a satisfactory, useable condition. The balance of the Unit Price for sewers will be considered earned after the sewer has been finally inspected; the infiltration or air tests have been satisfactorily completed, the sewer TV inspection has been completed, and the sewer placed in service; finish grading (including final ditching of the project area) has been completed; and the seeding and mulching (or sodding if specified on the Drawings) has been completed.

B. Sewer Service, (Long or Short, of the type, class, size, and trench detail specified):
1. Basis of Measurement: Each (EA), where "Long" connections are those installations where the service crosses over the road centerline and "Short" connections are those installations where the service is on the same side of the road as the sanitary sewer and the service does not cross over the road centerline.
2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to furnish and install the service including: field locating existing sanitary service, clearing, disposal of brush and trees, excavation, trenchless installation (for long side reconnections), bedding, backfill (trench Detail A or B, as required by Macomb Township Standard Detail Drawings), sewer service pipe and fittings, wye, connection to sanitary sewer, connection to existing sanitary service to remain, complete removal or cutting and capping existing sanitary service to be abandoned, electronic location marker disks, replacement and restoration of surfacing, final cleanup, and all other incidental work not specifically listed.

C. Manholes, Drop Assemblies, Tee Manholes, Junction Chambers, or Other Structures:
   1. Basis of Measurement: Each (EA).
   2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to install the structure and appurtenance completely as detailed on the drawings, including: excavation, disposal of surplus excavation, bulkheads, dewatering, bypass pumping, stabilization of trench subgrade, sheeting and bracing trenches, bedding material, special bedding in unstable soil, compacted backfill (to match trench Detail A or B used for the utility pipe, as required by Macomb Township Standard Detail Drawings), precast concrete structure, reinforcing steel, brick and/ or blocks, mortar, plastering, forms and forming reinforced concrete structures; forming and shaping of bottom fillets, sleeves, pipes, pipe fittings, risers, connections, valves, steps, frame and cover; fittings, connections, plugging or capping existing utilities where required, repairing or replacing all existing utilities damaged as a result of construction operations, replacing surface conditions, and all other incidental work not specifically listed.

D. Cleanout:
   1. Basis of Measurement: Each (EA).
   2. Basis of Payment: Furnishing all labor, equipment, and materials necessary to furnish and install the cleanout structure completely as detailed in the Drawings including: excavation, disposal of surplus excavation, dewatering, bypass pumping, stabilization of trench subgrade, sheeting and bracing trenches, bedding material, special bedding in unstable soil, compacted backfill (to match trench Detail A or B used for the utility pipe, as required by Macomb Township Standard Detail Drawings), pipes, pipe fittings, risers, connections, plugging or capping existing utilities where required, repairing or replacing all existing utilities damaged as a result of construction operations, replacing surface conditions, and all other incidental work not specifically listed.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. ASTM Standard Specifications:
      a. A48 – Gray Iron Castings.
      b. A167 – Stainless and Heat Resisting Chromium – Nickel Steel Plate, Sheet, and Strip.
      c. A536 – Ductile Iron Castings.
      d. A746 – Ductile Iron Gravity Sewer Pipe.
      e. C12 – Practice for Installing Vitrified Clay Pipe Lines.
      f. C14 – Concrete Sewer, Storm Drain, and Culvert Pipe.
      g. C55 – Concrete Building Brick.
      h. C62 – Building Brick (Solid Masonry Units Made from Clay or Shale).
      i. C76 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
      j. C139 – Concrete Masonry Units for Construction of Catch Basins and Manholes.
      k. C270 – Mortar for Unit Masonry.
      l. C301 – Method for Testing Vitrified Clay Pipe.
      m. C425 – Compression Joints for Vitrified Clay Pipe and Fittings.
      n. C443 – Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
      o. D449 – Asphalt Used in Dampproofing and Waterproofing.
      p. C478 – Precast Concrete Manhole Sections.
      q. C497 – Method of Testing Concrete Pipe, Sections, or Tile.
      r. C700 – Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
      s. C822 – Definitions of Terms Relating to Concrete Pipe and Related Products.
      t. C828 – Practice for Low Pressure Air Test of Vitrified Clay Pipe Lines.
      u. C923 – Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.

v. C924 – Practice for Testing Concrete Sewer Lines by Low-Pressure Air Test Method.
w. C969 – Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
x. C1103 – Practice for Joint Acceptance Testing of Installed Precast Pipe Sewer Lines.
y. C1479 – Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe.
z. D1784 – Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
aa. D1785 – Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
bb. D2239 – Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
cc. D2241 – Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series).
dd. D2321 – Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity – Flow Applications.
ee. D2680 – Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Pipe.
ff. D3034 – Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
gg. D3035 – Polyethylene (PE) Plastic Pipe (SDR-PR) based on Controlled Outside Diameter.
hh. D3212 – Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
ii. D3262 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe.
jj. D3839 – Practice for Underground Installation of Flexible Reinforced Thermosetting Resin Pipe and Reinforced Plastic Mortar Pipe.
kk. D3840 – Reinforced Plastic Mortar Pipe Fittings for Non-Pressure Applications.
ll. D4161 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Pipe Joints using Flexible Elastomeric Seals.
mm. D4396 – Rigid Poly(Vinyl Chloride) (PVC) and Related Plastic Compounds for Nonpressure Piping Products.
nn. F402 – Practice for Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings.
oo. F794 – Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
pp. F949 – Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings.
qq. F1417 – Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.
rr. F1803 – Poly (Vinyl Chloride) (PVC) Closed Profile Gravity Pipe and Fittings Based on Controlled Inside Diameter.

2. ANSI/AWWA:
   a. A21.4 – Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water.
   b. C111/A21.11 – Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
3. NASSCO – National Association of Sewer Service Companies: Recommended Specification for Sewer Collection System Rehabilitation.
4. MDOT Current Standards:
   a. Standard Specifications for Construction.
   b. Standard Plans.
5. Macomb County Department of Roads (MCDR) Requirements.
6. Macomb Township Requirements.
7. Macomb County Public Works Office (MCWPO) Requirements.

1.04 SUBMITTALS

A. Action Submittals: For Product Data:
1. Pipe materials certification.
2. Pipe Coating.
3. Gaskets.
4. Manholes, vaults, and chambers.
5. Fittings.
6. Resilient connector.
7. Antimicrobial additive for precast structures.

B. Informational Submittals: Submit Manufacturers' sworn statements that the pipe materials furnished comply with this Specification.

1.05 QUALITY ASSURANCE

A. Installation Personnel Qualifications:
1. Trained and experienced in the installation of the materials and equipment used on the Project.
2. Knowledgeable of the design and the reviewed Shop Drawings.
3. Testing as specified in Paragraph 3.04.

B. Antimicrobial Additive:
1. The liquid antibacterial additive shall be an EPA registered material and the registration number shall be submitted for approval prior to use in the project.
2. The amount to be used shall be as recommended by the Manufacturer of the antibacterial additive. This amount shall be included in the total water content of the concrete mix design.
3. The additive shall be added into the concrete mix water to ensure even distribution of the additive throughout the concrete mixture.
4. The antibacterial additive shall have successfully demonstrated prevention of microbiologically induced corrosion (MIC) in sanitary sewers for 10 or more years.
5. The antibacterial additive shall be used by factory certified pre-cast concrete plants.
6. Acceptance shall be a letter of certification from the pre-caster to the project OWNER stating that the correct amount and correct mixing procedure were followed for all antimicrobial concrete.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unbroken, brand marked containers.

B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.

C. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to OWNER.

PART 2 - PRODUCTS

2.01 PIPE MATERIALS

A. Sanitary Sewer Pipe:
1. General:
a. One type for entire work, unless noted otherwise on the Drawings.
b. Except service leads or where a specific type is indicated on the Drawings.

2. Types:
   a. Reinforced Concrete:
      1) ASTM C76. Class IV or V.
      2) Joints:
         a) ASTM C443.
         b) O-ring or Profile Gasket.
   b. PVC Composite (Truss):
      1) Pipe and Fittings: ASTM D2680.
      2) Joints: ASTM D3212, gasketed seal (ASTM F477).
   c. PVC (Solid Wall) – Pipe Diameter of 15 Inches or Less:
      1) Pipe and Fittings: ASTM D3034 SDR 26:
         a) PVC Compound Cell Classification: ASTM D1784, 12454-B or 12454-C.
      2) Joints: ASTM D3212, elastomeric gasket, push-on.
      3) Gaskets: ASTM F477.
   d. Mortar Pipe (CCFRPM) – Pipe Diameter 18-Inch and Larger:
      1) ASTM D3262. Type1, Liner 2, Grade 3.
      2) Joints:
         a) ASTM D4161.
         b) Fiberglass sleeve couplings with elastomeric sealing gaskets.
   e. PVC Closed Profile Pipe – Pipe Diameter 18-Inch to 60-Inch:
      1) Pipe and Fittings: ASTM F1803
      2) Joints: ASTM D3212, elastomeric gasket.
      3) Gaskets: ASTM F477.

B. Sanitary Service Leads (Laterals):
   1. Refer to “Sanitary Building Service Connection” on the Sanitary Sewer Standard Details Sheet.
   2. Material:
      a. PVC Schedule 40, ASTM D2466 with glued joints.
      b. PVC SDR 23.5, ASTM D2241 with glued joints.
      c. PVC Composite Truss Pipe, ASTM D2680 with glued joints.
      d. PVC Solid Wall SDR 26, ASTM D3034 with glued joints.
      e. HDPE pipe (directional drill only), ASTM D3350 with butt-fusion joints (ASTM F2620).
   3. Wyes:
      a. Sanitary Sewer (PVC Schedule 40, PVC SDR 23.5, PVC Truss, PVC SDR 26, HDPE) 6-inch through 10-inch diameter: Wye.
      b. Cored with resilient rubber connector (boot) on all concrete pipe 18-inch diameter and greater.
   4. Plugs or Stoppers:
      a. Air-tight seal.
      b. Removable without damage to pipe bell.
      c. Capable of holding 5 psig.
      d. Joints and gaskets to match sanitary sewers.

C. Tapping Existing Sewer:
   1. Refer to “Tapping Existing Sewer” on the Sanitary Sewer Standard Details Sheet.
   2. Building Service Connection Material:
      a. PVC Schedule 40, ASTM D2466 with glued joints.
      b. PVC SDR 23.5, ASTM D2241 with glued joints.
      c. PVC Composite Truss Pipe, ASTM D2680 with glued joints.
      d. PVC Solid Wall SDR 26, ASTM D3034 with glued joints.
      e. HDPE pipe (directional drill only), ASTM D3350 with butt-fusion joints (ASTM F2620).

3. Wyes and Tees:
   a. Sanitary Sewer (PVC Schedule 40, PVC SDR 23.5, PVC Truss, PVC SDR 26, HDPE): Wye saddle with adhesive and stainless steel straps.
   b. Concrete Pipe: Cored with KOR-N-TEE fitting or approved equal.

2.02 MANHOLES

A. Type of Units:
   1. As indicated on the Drawings.
   2. Precast Reinforced Concrete:
      a. Base Section:
         1) ASTM C478.
         2) Base riser section with integral floor unless constructing a manhole over an existing pipe, in which case base may be separate from riser.
      b. Riser and Cone Sections:
         1) ASTM C478.
         2) Watertight Manholes: Provide four 5/8-inch threaded anchor bolts in cone section.
      c. Joints: Premium: ASTM C443, O-ring or Profile Gasket.
      d. Pipe Connector: ASTM C923.

B. General:
   1. Steps:
      a. Polypropylene plastic-coated steel.
      b. M.A. Industries PSI-1; or equal.
      c. At 16 inch off center, bottom step 24 inches (maximum) above bottom of manhole, and top step 16 inches below top of structure 45 degrees from centerline of pipe.
   2. Manhole Castings:
      a. Manufacturers: Watertight: EJ, 1040ZPT
      b. Solid covers; no vent holes.
      c. Cover shall be embossed “Macomb Twp Sanitary”.
   3. Connection Between Manhole and Sewer:
      a. Resilient Connector: ASTM C923.
      b. Type 304 stainless steel bands in accordance with ASTM A167.
      c. KOR-N-SEAL by NPS, Inc.; Boot type by Press Seal Gasket Corporation; or equal.
   4. Mortar: ASTM C270, Type M.
   5. Flow Channels:
      a. Concrete as shown on details.
      b. Tight to inlet and outlet pipes.
   6. Grade Rings: ASTM C478.
   7. Concrete: 3500 psi (minimum).
   8. Waterproofing: Bituminous: ASTM D449.
   9. Antimicrobial Additive:
      a. Manufacturer: ConShield.

PART 3 - EXECUTION

3.01 PREPARATION

A. Alignment and Grade:
   1. If there is a grade discrepancy or an obstruction which is not indicated on the Drawings, notify OWNER and obtain instructions prior to proceeding.
   2. Where Sanitary Sewer Crosses Water Main:
      a. Expose water main prior to laying sanitary sewer to verify existing depth.
      b. Maintain minimum clearance of 18 inches unless otherwise indicated on the Drawings.

3. Control:
   a. Laser Beam:
4. Check Line and Grade At:
   a. Set-up point, 25 feet, 50 feet, 100 feet and;
   b. 200 feet intervals thereafter.
5. Reset laser at each manhole.

3.02 INSTALLATION

A. General:
1. Install pipe, fittings and appurtenances in accordance with Manufacturer's recommendations except as herein specified or indicated on the Drawings:
   a. Truss Pipe, PVC Profile Pipe, PVC SDR 26: ASTM D2321.
   b. Concrete Pipe: ASTM C1479.
2. Prevent entrance of foreign material.

B. Pipe Laying:
1. Bearing:
   a. Support entire length of pipe barrel evenly.
   b. Provide bell holes at joints.
2. Direction: Commence at outlet and proceed upgrade with spigot ends pointing in direction of flow.
3. Method:
   a. Clean socket, bell, gasket groove, and spigot.
   b. Set gasket.
   c. Apply lubricant to spigot.
   d. Center spigot end of pipe to be laid and push home against base of socket.
   e. Center pipe to form a sewer with uniform invert.

C. Tolerances:
1. The maximum allowable deviation from grade for gravity flow pipe shall be 2% of the pipe diameter, but not more than 0.1 foot.
2. Maximum allowable deviation from line between manholes:
   a. 3 inches for pipe 8 to 12 inches in diameter.
   b. 6 inches for pipe 15 to 24 inches in diameter.
   c. 9 inches for pipe greater than 24 inches in diameter.
   d. Maximum deflection per pipe shall be 1 inch.

D. Jointing:
1. All lubricants, gaskets, and solvent cement to be furnished by pipe Manufacturer.
2. Gaskets:
   a. Surfaces of Joint: Clean and dry before lubricant is applied.
   b. Take care in laying that the pipe does not shift and that gasket remains in a home position after assembly.

E. Manholes:
1. Base Section Placement: Full and even bearing.
2. Precast Units: Mortar joints and lift holes.
3. Top of Casting Elevation:
   a. Gravel Areas: 3 inches below surface.
   b. Bituminous Base Course: At base course grade.
   c. Final Bituminous Wearing Surface:
      1) At finished grade.
      2) Adjustment of castings from base course grade to finished grade is included in the cost of the manhole.
   d. Other Areas: As directed by OWNER or as indicated on Drawings.

F. Service Leads (Sanitary Sewer Laterals):
1. Locations:
a. Service lead locations indicated on Drawings are schematic only to represent approximate locations and total number.
b. Confirm exact service lead location. OWNER will confirm location with current property owner (if applicable) and will advise the CONTRACTOR on where to place the service lead.
c. Unless otherwise directed, install service leads at center of vacant lots.
2. Alignment: Right angles to street centerline, except as indicated otherwise on the Drawings.
3. Grade: Uniform minimum of 1/8-inch per foot (1%) and maximum of 4%.
4. Depth:
a. Elevations at property line indicated on Drawings.
b. If Drawings are not specific, depth shall be adequate to serve basement of existing building.
c. At property line or easement line of vacant lots or structures not connected to sewer, minimum depth shall be 10 feet or as indicated on the Drawings.
d. Record depth of end of lateral below finished grade.
5. Plug ends air tight with standard pressure tight plug.
6. Markers:
a. Install 2-inch x 4-inch pressure treated wood marking rod at end of each service lead extending vertically from end of lead to within 3 inches of ground surface.
7. Witnesses and Measurements:
a. Wyes and Tees:
1) Measurement to center of nearest downstream manhole.
2) Note manhole by number indicated on Drawings.
b. Ends of Service Leads: 3 measurements to permanent surface features.

G. Connections:
1. To Existing Structures:
a. Opening: No larger than needed for new pipe.
b. KOR-N-SEAL by NPS, Inc.; Boot type by Press Seal Gasket Corporation; or equal.
c. Brick or Block Structure: Relay and repoint loose blocks and bricks.
2. For Future Use:
a. 4-Inch Through 21-Inch Diameter: Plug with standard cap or disc.
b. 24-Inch and Larger:
1) Bulkhead with 8-inch thick brick and mortar.
2) 1/2-inch mortar plaster on outside of bulkhead.

3.03 CLEANING

A. Remove dirt and debris, including cemented or wedged material, from the inside of sewers and manholes before any testing or video recording.

3.04 TESTING AND INSPECTION

A. Observation: By OWNER.

B. Notification for Testing: Arrange with OWNER following backfill, cleaning and pretesting.

C. Equipment and Manpower: Provide everything required for testing.

D. Alignment and Grade Tests:
1. Visual:
a. Each manhole to manhole section.
b. Mirrors or Lights: Adequate to illuminate the section.

E. Low Pressure Air Test for Leakage:
1. Required for all types of pipe, except if sewer is live (in service).
   a. Concrete Pipe: ASTM C924.
   b. Plastic Pipe: ASTM F1417.
2. If the groundwater level is 2 feet or more above the top of the pipe at the upstream end or if the air pressure required for the test is greater than 9 psi gage, the air test should not be used until the groundwater level is lowered by pumping or dewatering.
3. Test each manhole to manhole section following completion of service leads, risers and other appurtenances.
4. Pressure: Initially 4.0 psi greater than groundwater back pressure for 2-minute duration.
5. Pressure Drop for Concrete Pipe:
   a. Measure time interval for pressure drop from 3.5 to 2.5 psi greater than groundwater back pressure. Compare with the minimum test time. Measured time interval must be equal to or greater than the minimum test time.
   b. Minimum Test Time for Various Pipe Sizes:

Nominal Pipe Size, Inches	Time, T minutes/100 feet
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8
36	6.0
42	7.3

6. Pressure Drop for Plastic Pipe:
   a. Measure time interval for pressure drop from 3.5 psi to 2.5 psi greater than groundwater back pressure. Compare with the minimum test time. Measured time interval must be equal to or greater than the minimum test time.
   b. Test Time For Various Pipe Sizes:

Nominal Pipe Size, Inches	Time, Minutes			
	Minimum	250 Feet	300 Feet	400 Feet
10	9:26	9:53	11:52	15:49
12	11:20	14:15	17:05	22:47
15	14:10	22:15	26:42	35:36
18	17:00	32:30	38:27	51:16
21	19:50	43:37	52:21	69:48
24	22:40	56:58	68:22	91:10
27	25:30	72:07	86:32	115:22
30	28:20	89:02	106:50	142:26
36	34:00	128:12	153:50	205:07

   c. Repair leaks and repeat tests until acceptable results are achieved.

F. Other Leakage Tests for Special Situations Only:
1. Requires prior approval of OWNER.
2. In accordance with ASTM C969 or C1103.
3. Water Infiltration:
4. Groundwater: Minimum 2 feet above high point of pipe.

5. Allowable Rate: 100 gallons/inch pipe diameter/mile/day.
6. Water Exfiltration:
   a. Water Test Elevation: Minimum 2 feet above higher point of pipe or groundwater elevation.
   b. Allowable Rate: 100 gallons/inch pipe diameter/mile/day.

G. Deflection Test for Plastic Pipe:
1. Go, No Go Gage:
   a. Pull go, no go gage through each section:
      1) At least 30 days after completion of backfill.
      2) Pulled by one person with no mechanical advantage.
      3) Complete per ASTM D3034, 7.5% mandrel deflection
   b. If go, no go gage will not pass:
      1) Remove and replace section.
      2) Undamaged pipe may be reused.
2. Vibratory Re-rounding Device:
   a. Use not permitted

H. Internal Television Inspection of Sanitary Sewers:
1. General:
   a. Inspect all sanitary sewers using a closed-circuit color pan and tilt television camera. Inspection to be performed by National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) certified inspectors.
   b. Provide OWNER with a copy of all videos and written logs on flash drives or portable hard drives to document the internal television inspection:
      1) Inspection shall proceed from downstream to upstream, unless otherwise approved by OWNER.
      2) Written logs shall note the location of all sewer laterals and pipe deficiencies by distance from the downstream manhole.
      3) The video shall include audio commentary regarding the sewer condition.
   c. OWNER will review the video and written logs to verify that the sanitary sewers were constructed in accordance with the Contract Documents.
   d. The video shall verify that the sanitary sewers are clean and free of sediment and debris to the satisfaction of OWNER. Sanitary sewers not satisfactorily cleaned shall be promptly cleaned and reinspected by closed-circuit color television camera.
   e. Documentation of television inspection shall be provided and OWNER 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 all 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 edited as necessary to produce a video sequence proceeding from the most downstream manhole to the most upstream manhole on the mainline run. Branch runs shall be shown in similar downstream to upstream sequencing, subsequent to the mainline sequence.
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 an upstream 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 downstream manhole on the video.
k. All video 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 33 30 00

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the furnishing and installation of a storm sewer system.

1.02 UNIT PRICE – MEASUREMENT AND PAYMENT

A. The cost of all work under this item shall be included in the cost of the Project and no separate payment shall be made therefor unless listed in the Bid Form as a Bid Item.

B. When listed in the Bid Form as a Bid Item:

1. Storm Sewer, Culvert Pipe (of the type, class, size, and trench detail specified):
   a. Basis of Measurement: Linear Foot (LF). Measured at ground level from center to center of the appurtenances connected by the sewer pipe or end of pipe.
   b. Basis of Payment: Furnishing all labor, equipment, and materials necessary to furnish, install, and place into service the sewer pipe or culvert, including: Pipe, pipe fittings, and all other appurtenances; connections to existing or proposed manholes and/or pipe; existing sewer line connections into proposed system; patching and plastering of manholes that have been “cut into”; excavation; disposal of surplus excavation; bulkheads; dewatering; stabilization of trench subgrade; sheeting and bracing trenches; bedding material; special bedding in unstable soil; compacted backfill (trench Detail A or B, as required by Macomb Township Standard Detail Drawings); plugging or capping existing utilities where required; repairing or replacing all existing utilities damaged as a result of construction operations; replacement of pavement and sidewalks (unless listed as a separate item in the Bid Form); maintenance aggregate; temporary pavement and patching; fence removal and replacement; mailbox removal and replacement; landscape (ornamental trees, bushes, and shrubs) removal and replacement; sprinkler system removal and replacement; and road, curb and gutter, sidewalk, parking lot, paved spillways and driveway restoration; regrading disturbed road ditches; swale restoration; resetting culverts; restoring shoulders; final grading, seeding and mulching (or sodding if specified on the Drawings), and cleanup; and other necessary work incidental to the construction of sewer not specifically listed.

      Seventy percent of the Unit Price for sewers will be considered earned when the pipe is satisfactorily installed. An additional 20% of the Unit Price for sewer will be considered earned when the paved or gravel roadways, driveways, and drainage are restored and maintained in a satisfactory, useable condition. The balance of the Unit Price for sewers will be considered earned after the sewer has been finally inspected and the sewer placed in service; finish grading (including final ditching of the project area) has been completed; and the seeding and mulching (or sodding if specified on the drawings) has been completed.

2. Manholes, Catch Basins, Inlets, Tee Manholes, Junction Chambers, or Other Storm Drainage Structures:
   a. Basis of Measurement: Each (EA).
   b. Basis of Payment: Furnishing all labor, equipment, and materials necessary to install the structure and appurtenance completely as detailed on the drawings, including: excavation; disposal of surplus excavation; bulkheads; dewatering; stabilization of trench subgrade; sheeting and bracing trenches; bedding material; special bedding in unstable soil; compacted backfill (to match trench Detail A or B used for the utility pipe, as required by Macomb Township Standard Detail Drawings); precast concrete structure; reinforcing steel; brick and/ or blocks; mortar; plastering; forms and forming reinforced concrete structures; forming and shaping of bottom fillets; sleeves; pipes; pipe fittings, connections, grates; steps;

frame and cover; fittings; thrust blocks; connections; plugging or capping existing utilities where required; repairing or replacing all existing utilities damaged as a result of construction operations; replacing surface conditions; and all other incidental work not specifically listed.

3. End Section (of the type and size specified):
   a. Basis of Measurement: Each (EA).
   b. Basis of Payment: Furnishing all labor, equipment, and materials necessary to furnish, install, and place into service the end section.
4. Bar Screen:
   a. Basis of Measurement: Each (EA).
   b. Basis of Payment: Furnishing all labor, equipment, and materials necessary to furnish, install, and attach the grating/bar screen to the end section.
5. Headwall:
   a. Basis of Measurement: Each (EA).
   b. Basis of Payment: Furnishing all labor, equipment, and materials necessary to install structure as detailed in the Drawings including: furnishing precast wing walls, headwalls, and aprons, or steel reinforcement and concrete for cast-in-place structures.
6. Detention Basin Outlet Riser:
   a. Basis of Measurement: Each (EA).
   b. Basis of Payment: Furnishing all labor, equipment, and materials necessary to install and place into service the outlet riser.

1.03 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. ASTM Standards:
      a. A48 – Gray Iron Castings.
      b. A536 – Ductile Iron Castings.
      c. C14 – Concrete Sewer, Storm Drain and Culvert Pipe.
      d. C55 – Concrete Building Brick.
      e. C62 – Building Brick (Solid Masonry Units Made from Clay or Shale).
      f. C76 – Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
      g. C139 – Concrete Masonry Units for Construction of Catch Basins and Manholes.
      h. C270 – Mortar for Unit Masonry.
      i. C443 – Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets.
      j. C478 – Precast Concrete Manhole Sections.
      k. C497 – Method of Testing Concrete Pipe, Sections or Tile.
      l. C822 – Definitions of Terms Relating to Concrete Pipe and Related Products.
      m. C923 – Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.
      n. C924 – Standard Practice for Testing Concrete Sewer Lines by Low-Pressure Air Test Method.
      o. C1103 – Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Line.
      p. D449 – Asphalt Used in Dampproofing and Waterproofing.
      q. D520 – Zinc Dust Pigment for Paints.
      r. D3350 – Standard Specifications for Polyethylene Plastic Pipes and Fitting Materials.
      s. F449 – Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage or Water Table Control.
      t. F1417 – Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.

2. AASHTO Standard Specifications:
   a. M36 – Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains.
   b. M167 – Standard Plate for Pipe, Pipe Arches, and Arches.
   c. M190 – Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches.
   d. M218 – Steel Sheet, Zinc-Coated (Galvanized) for Corrugated Steel Pipe.
   e. M274 – Steel Sheet, Aluminum-Coated (Type 2) for Corrugated Steel Pipe.
   f. M288 – Geotextiles Used for Subsurface Drainage Purposes.
3. MDOT Current Standards:
   a. Standard Specifications for Construction.
   b. Standard Plans.
4. Macomb County Department of Roads (MCDR) Requirements
5. Macomb Township Requirements.
6. Macomb County Public Works Office (MCWPO) Requirements.

1.04 DEFINITIONS

A. Abbreviations:
   1. RCP – Reinforced concrete pipe.
   2. CSP – Corrugated steel pipe.
   3. PVC – Polyvinyl chloride.

1.05 SUBMITTALS

A. Action Submittals: For Product Data:
   1. Pipe.
   2. Manholes.
   3. Catch Basins & Inlets.
   4. End Sections.
   5. Water Quality Structures.

B. Informational Submittals: Submit Manufacturers' sworn statements that the pipe materials furnished comply with this Specification

1.06 QUALITY ASSURANCE

A. Fabrication and Installation Personnel Qualifications:
   1. Trained and experienced in the fabrication and installation of the materials and equipment.
   2. Knowledgeable of the design and the reviewed Shop Drawings.

B. Testing of Material Installation:
   1. Light or reflected light test for alignment.
   2. Visual inspection for leakage and workmanship.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.

B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.

C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to OWNER.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. RCP: Northern Concrete Pipe; or equal.

B. CSP: Contech; St. Regis Culvert, Inc.; or equal.

C. PVC: Contech; JM Eagle; or equal.

2.02 PIPE MATERIALS

A. RCP:
1. General: Type and class as indicated on the Drawings.
2. Types:
   a. Reinforced Concrete (RCP): ASTM C76.
3. Joints:
   a. Premium O-ring or Profile Gasket and shall conform to ASTM C-443. Lubricants by pipe Supplier.
   b. With OWNER approval, bituminous compound joint filler material may be allowed for rear yard storm sewer (ASTM D994) provided joints are covered in geotextile fabric and the pipe is bedded in sand.
      1) Geotextile Fabric: Nonwoven. Width: 3 feet.
      2) Physical Requirements:

	Geotextile Blanket	Geotextile Blanket with MDOT Class II Backfill
Grab Tensile Strength (Minimum), Lbs.	120	
Trapezoid Tear Strength (Minimum), Lbs.	45	
Puncture Strength (Minimum), Lbs.	230	
Mullen Burst Strength (Minimum), PSI	N/A	100
Permittivity Per Second, Sec^{-1}	0.5	
Apparent Opening Size (Maximum), MM	0.21	0.30 (Pavement and Foundation Underdrains) 0.60 (Other Areas)

      3) For pipe wrap where backfill around the pipe meets MDOT granular material Class II requirements; geotextiles, including knitted polyester sock, which meet the following minimum requirements in the applied condition are permitted:
         a) Mass/Unit Area: 3.0 oz/sq. yd.
         b) Mullen Burst Strength: 100 psi.
         c) Maximum Apparent Opening Size: 0.30 mm for pavement and foundation underdrains; and 0.60 mm in all other areas.
4. End Sections:
   a. As indicated on the Drawings.
   b. Type:
      1) Flared concrete end section with concrete footing.
5. Bar Screen: As indicated on the Drawings.

B. CSP:
1. General: Type, gage, and corrugations as indicated on the Drawings.
2. Types:
a. Galvanized: AASHTO M36.
1) Zinc-coated Sheets: AASHTO M218.
b. Bituminous-coated: AASHTO M190.
3. Corrugations:
a. Pitch and Depth:
1) 12-inch to 72-inch Diameter: 2-2/3-inch x 1/2-inch.
4. Wall Thickness:
a. Minimum: 0.064 inches (16 gage), unless indicated otherwise on the Drawings.
5. Coupling Bands:
a. Pipe Diameters 12 Inches to 36 Inches with Annular Corrugations or Reformed Ends:
1) Corrugated band with sleeve gasket; or
b. Coating: Match pipes being connected.
c. Wall Thickness: Match pipes being connected.
d. Width:

Coupling Width	Pipe Diameter
7 inches	18 inches and less
12 inches	24 inches through 60 inches
24 inches	Over 60 inches

6. End Sections:
a. As indicated on the Drawings.
7. Bar Screen: As indicated on the Drawings.

C. PVC Pipe:
1. General: PVC pipe may be allowed for roof drain connections to manholes or catch basins. Type and schedule as indicated on the Drawings.
2. Types:
a. Smooth Walled:
1) 4-inch to 15-inch ASTM D3034.
2) 18-inch to 48-inch ASTM F679.
b. Ribbed ASTM F794.
3. Section Properties:
a. SDR 23.5.
b. Schedule 40.
c. Truss Pipe
4. Joints:
a. Push-on Type Joint.
b. ASTM D3212.
5. Fittings: Manufactured and furnished by the pipe Supplier.

2.03 MANHOLES, CATCH BASINS AND INLETS

A. Type of Units:
1. As indicated on the Drawings:
2. Precast Reinforced Concrete:
a. Base Section: ASTM C478, precast or poured concrete base.
b. Riser and Cone Sections: ASTM C478.
c. Joints: Premium O-ring or Profile Gasket conforming to ASTM C443.
3. Radial Concrete Block:
a. Base Slab: ASTM C478, separate base slab.
b. Blocks:
1) ASTM C139.
c. Joints: Mortar: ASTM C270, Type M.

B. Hardware:
1. Steps:
a. General:
1) Steps shall be placed in all catch basins more than 7 feet deep or catch basins with oil/grease separators.
2) Steps shall be factory installed by M.A. Industries, PS-1 (precast manhole), PS1-B (block manhole) polypropylene, or approved equal.
3) If steps are to be installed, then eccentric cones shall be installed (per ASTM C-478 for pre-cast structures)
2. Castings: in accordance with Macomb Township Standard Detail Drawings.
3. Mortar: ASTM C270, Type M.
4. Brick:
a. Concrete: ASTM C55, Type I, Grade N.
5. Grade Rings: ASTM C478.
6. Concrete: MDOT Grade 3000.
7. Waterproofing:
a. Bituminous: ASTM D449.

PART 3 - EXECUTION

3.01 PREPARATION

A. Alignment and Grade:
1. If there is a grade discrepancy or an obstruction which is not indicated on the Drawings, notify OWNER and obtain instructions prior to proceeding.
2. Where Storm Sewer Crosses Water Main:
a. Expose water main prior to laying storm sewer to verify existing depth.
b. Maintain minimum clearance of 18 inches unless otherwise indicated on the Drawings or approved by OWNER.
c. Space joints equidistant from crossing.
3. Control:
a. Level and Grade Rod: Check line and grade at each structure or cleanout, and 25-foot intervals thereafter.
b. Laser Beam:
1) Check Line and Grade At: Set-up point, 25 feet, 50 feet, 100 feet and 100-foot intervals thereafter.
2) Reset laser at each manhole with a 600-foot maximum.
c. Allowable Deflection:
1) Horizontal: 0.20 foot.
2) Vertical: 0.10 foot.

3.02 INSTALLATION

A. General:
1. Install pipe, fittings and appurtenances in accordance with Manufacturer's recommendations except as herein specified or indicated on the Drawings.
2. Prevent entrance of foreign material.

B. Pipe Laying for Concrete and PVC Pipe:
1. Bearing: Support entire length of pipe barrel evenly with extra excavation at joints.
2. Direction: Commence at outlet and proceed up grade with spigot ends pointing in direction of flow.
3. Method:
a. Wipe clean the socket of pipe last laid.
b. Center spigot end of pipe to be laid and push home against base of socket.
c. Center pipe to form a sewer with a uniform invert.

C. Pipe Laying for CSP Culvert:
   1. Bearing: Support entire length of pipe barrel evenly with extra excavation at joints.
   2. Direction: Commence at outlet and precede upgrade with inside laps of circumferential joints pointing in direction of flow, and with no longitudinal joints in the lower quadrant.
   3. Method:
      a. Put coupling band into position at the end of pipe last laid with band open to receive next section.
      b. Bring next section into position within about 1-inch of section last laid.
      c. Clean the interior of band and exterior of pipe of all dirt, stones and debris.
      d. Center pipe to match connecting parts of both the band pipe sections.
      e. Insert bolts and tighten.

D. Tolerances:
   1. The maximum allowable deviation from grade for gravity flow pipe shall be 2% of the pipe diameter, but not more than 0.1 foot.
   2. Maximum allowable deviation from line between manholes:
      a. 3 inches for pipe 8 to 12 inches in diameter.
      b. 6 inches for pipe 15 to 24 inches in diameter.
      c. 9 inches for pipe greater than 24 inches in diameter.
      d. Maximum deflection per pipe shall be 1 inch.

E. Jointing:
   1. Bituminous Compound:
      a. Surfaces of Joint: Clean and dry before compound is applied.
      b. Apply bituminous compound to the spigot or tongue of the pipe in sufficient quantity to completely fill the space between the pipe tongue and the mating pipe bell when the joint is pushed home.
      c. Pipe 36 inches and larger shall have the inside of the joint pointed with mortar by removing the bituminous compound to a minimum depth of 3/4 inch and filling this space with mortar. Pipe smaller than 36 inches in diameter shall not require pointing.
   2. Lubricants: As required for coated CSP pipe. As required for gaskets.
   3. Gaskets:
      a. Surfaces of Joint: Clean and dry before lubricant is applied.
      b. Take care in laying that the pipe does not shift and that it remains in a home position after assembly.
   4. Band Connector for CSP:
      a. Bar, Bolt, and Strap: Tighten bolts to a torque of 100 to 300 foot-pounds.
   5. Geotextile Wrap: Wrap around joint surfaces.
   6. Allowable Joint Tolerance:
      a. Maximum: 1/2-inch at newest surfaces of the joint.
      b. Allowable joint tolerance shall not affect the lines and grades and their permissible to tolerances.

F. Manholes:
   1. Base Section Placement: Full and even bearing.
   2. Precast Units: Mortar joints, lift holes, and around pipes.
   3. Block Units:
      a. Block: Set in full bed of mortar with key slots filled.
      b. Joints: Maximum 1/2-inch wide at inside face and wiped.
      c. Exterior coating: 1/2-inch mortar coat outside surface.

4. Top of Casting Elevation:
    a. Bituminous Base Course: At base course grade.
    b. Final Wearing Surface:
        1) At finished grade.
        2) Adjustment of castings from base course grade to finished grade is included in the cost of the manhole.
        3) Other Areas: As directed by the OWNER or indicated on the Drawings.
5. Waterproofing: Prevent visible leakage.
6. Refer to standard detail on the Drawings.

G. Catch Basins and Inlets:
1. Base Section Placement: Full and even bearing.
2. Precast Units: Mortar joints, lift holes and around pipes.
3. Block Units:
    a. Block: Set in full bed of mortar with key slots filled.
    b. Joints: Maximum 1/2-inch below gutter grade.
    c. Exterior coating: 1/2-inch mortar coat outside surface.
4. Casting Elevation:
    a. Gutter Area: 1/2-inch below gutter grade.
    b. Other Areas: As indicated on the Drawings or directed by OWNER.
5. Waterproofing: Prevent visible leakage.
6. Refer to standard detail on the Drawings.

H. Connections:
1. To Existing Structures: Relay and repoint loose blocks and bricks as required.
2. For Future Use:
    a. Bulkhead: With 8-inch-thick brick and mortar and 1/2-inch plaster outside.

3.03 REPAIR

A. Treatment of Field Welds and Damaged Galvanized Steel Surfaces:
1. Clean with wire brush.
2. Two coats of zinc rich paint conforming to ASTM D520.

3.04 CLEANING

A. Debris: Remove all dirt and debris, including cemented or wedged material from the inside of all sewers, manholes, and catch basins.

B. Final Acceptance: Clean all sewers, manholes, and catch basins before requesting final acceptance.

3.05 TESTING AND INSPECTION

A. Observation: By OWNER.

B. Alignment and Grade Tests:
1. Visual:
    a. Each manhole to manhole section.
    b. Mirrors or Lights: Adequate to illuminate the section.

END OF SECTION 33 40 00