



GENERAL CONTRACTORS
CONSTRUCTION MANAGERS

ADDENDUM #5

Essexville-Hampton Public Schools
New Innovation Center Project
September 18, 2026

1. The civil specifications and plans have been reissued as the official bid set. Please ensure that the reissued documents are used when preparing and submitting your proposal.

Attachments:

Essexville STEM Civil Specs 09-16-2026 (119 pages)

Essexville STEM Civil Plan Set 09-16-2026 (7 pages)

2. Pre-Bid RFI #18 was a substitution request to use Petersen Aluminum Roof and Wall Panels as an approved product; however, the Architect denied the request due to aesthetic concerns.
3. The Architect's responses to the remaining Pre-Bid RFIs are attached for reference.

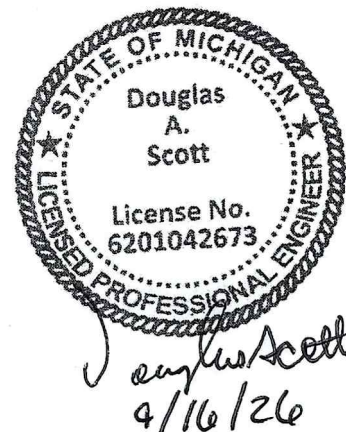
Attachment:

EHPS New Innovation Center Project 260918 RFI Response (1page)

END OF ADDENDUM #5

2600121 TECHNICAL SPECIFICATIONS

01 33 00	Submittal Procedures
01 45 16.01	Concrete Testing
01 45 16.02	Density and Aggregate Testing
01 55 26	Maintaining Traffic
100-GEN-KEY	Typical Numbering Key
101-GEN-SPACING-CHARTS	"B", "D" and "L" Tables Channelizing Device Spacing, Sign Border Key, and Roll-Ahead Spacing
102-GEN-NOTES	Traffic Typicals Note Sheet
110-TR-NFW-2L	Lane Closure Utilizing Traffic Regulators on a 2-Lane Undivided Roadway
122-NFW-SHL-(R)	Shoulder Closure on a 2-Lane, Undivided Roadway
WZD-125-E	Temporary Traffic Control Devices
01 71 23.16	Construction Staking by Contractor
01 74 50	Cleanup and Restoration
02 41 13.13	Pavement Removal
31 10 01	Clearing and Removal of Miscellaneous Structures
31 23 01	Excavating, Filling, and Grading
31 25 00	Soil Erosion and Sedimentation Control
32 11 23	Aggregate Base
32 12 16	HMA Paving
32 13 00	Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement
R-29-J	Driveway Openings & Approaches, and Concrete Sidewalk
R-30-G	Concrete Curb and Concrete Curb & Gutter
32 17 23	Pavement Markings
32 31 13	Fences and Gates
32 92 00	Turf Establishment
32 93 00	Landscaping
33 11 00	Water Main
33 31 00	Sanitary Sewer
33 44 00	Storm Sewers



SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 Work Included

- A. This section includes procedures for preparing and transmitting submittals required by specification sections for a product, material, or construction method. Submittals shall include the following:
 - 1. Shop drawings
 - 2. Product data
 - 3. Manufacturer's certificates
 - 4. Design data and calculations
 - 5. Manufacturer's instructions
 - 6. Manufacturer's field service reports
 - 7. Samples
 - 8. Operation and maintenance manuals (timing, quantity, content, and form)
- B. It is the responsibility of the General Contractor to convey the requirements of this section to their sub-contractors and their suppliers and vendors.

1.02 Submittals

- A. Schedule submittals to expedite work. Unless otherwise indicated in this section, submittals shall be submitted within 30 days of date of Notice to Proceed.
- B. Preparation
 - 1. Provide separate submittals for each specification section requiring submittals. Where multiple sections relate to the same system or element and are being provided from the same source, a single combined submittal is acceptable.
 - 2. Coordinate submission of related items. Group submittals of related products in a single transmission.
 - 3. Include all submittal material requested for that section.
 - 4. Identify variations from requirements of contract documents. State product and system limitations which may adversely affect work.
 - 5. Mark or show dimensions and values in same units as specified.
- C. Contractor Responsibilities
 - 1. Review submittals prior to transmittal. Verify compatibility with field conditions and dimensions, product selections and designations, quantities, and conformance of

submittal with requirements of contract documents. Return non-conforming submittals to preparer for revision, rather than submitting for review.

2. Coordinate submittals to avoid conflicts between various items of work.

3. Submittal Transmittal Form

a. Include with each submittal a transmittal form. A sample copy of an acceptable form is included in Attachment A. The Contractor's standard submittal form may be used, provided it contains essentially the same information as the sample.

b. Identify project, Contractor, subcontractor, supplier, manufacturer, pertinent drawing sheet and detail numbers, and associated specification section numbers.

c. Sequentially number transmittal forms. Re-submittals shall have original number with a suffix. Acceptable form of number is SS SS SS-NN-T where:

i. SS SS SS indicates specification section number;

ii. NN indicates different submittals for that specification section; and

iii. T indicates the number of times that submittal has been made.

4. Failure of the Contractor to review submittals, prior to transmittal for review, shall be cause for rejection.

5. Incomplete, improperly packaged, and submittals from sources other than the Contractor will not be accepted.

D. Transmittal

Where possible, transmit all submittals electronically. Where electronic submittal is not possible, submit four paper copies for the Engineer's retention, plus as many copies as the Contractor desires returned after review. Samples shall be submitted as described elsewhere in this specification.

E. Review

The Engineer will review and return submittals with comments.

F. Do not fabricate products or begin work which requires submittals until return of reviewed submittal with A/E or SNL SE acceptance.

G. On return, promptly distribute reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

H. Resubmission

1. Revise and resubmit submittals, as required, within 15 days of return from initial review.

2. Make re-submittals under procedures specified for initial submittals.

3. Identify all changes made since previous submittal.

1.03 Quality Assurance and Quality Control

A. Where required by specification sections, provide quality assurance submittals:

1. Qualification Data

Contractor shall submit written information demonstrating capabilities and experience of firm or person. Include lists of complete projects with names and contact information for references.

2. Manufacturer's Certificates

Submit reference data, affidavits, and certifications on manufacturer's letterhead certifying that products conform to or exceed specified requirements. Certificates may be based on recent or previous test results supplied by manufacturer and accepted by the Engineer.

3. Installer Approval

Certification on manufacturer's letterhead that installer complies with requirements and is approved for installing manufacturer's products.

4. Welding Certificates

Written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specifications (WPS) and Procedure Qualification Record (PQR) on American Welding Society (AWS) forms. Include names of firms and personnel certified.

5. Field Test Reports

Written reports from qualified testing agency indicating and interpreting results of field tests performed either during or after installation for compliance with specified requirements.

1.04 Submittal Review

A. The Engineer will review submittals for the sole purpose of verifying general conformance with design intent and general compliance with contract documents. Approval of submittal by the Engineer does not relieve the Contractor of responsibility for correcting errors which may exist in submittal, or from meeting requirements of contract documents.

B. Review Time

Initial review will be performed within 14 days of receipt. Reviewer reserves the right to withhold action on a submittal requiring review of related submittals, until related submittal is received. Additional time will be required if processing must be delayed to permit review of related subsequent submittals. The Engineer will review re-submittals within 14 days.

C. Review Actions

After review, submittals will be returned and marked as follows to indicate action taken:

1. Reviewed, No Comments

Part of work covered by submittal may proceed, provided it complies with requirements of contract documents. Final acceptance will depend upon that compliance.

2. Reviewed, With Comments

Part of work covered by submittal may proceed, provided it complies with notations and corrections on submittal and requirements of contract documents. Final acceptance will depend upon that compliance.

3. Revise and Resubmit

Do not proceed with part of work covered by submittal including purchasing, fabricating, and delivering. Revise or prepare new submittal in accordance with notations and resubmit.

1.05 Drawings

A. Where required by specifications or otherwise needed, prepare drawings illustrating portion of work for use in fabricating, interfacing with other work, and installing products. Contract drawings shall not be reproduced and submitted as shop drawings.

B. When construction is complete, prepare and submit red-lined copies of the contract drawings showing clearly how construction deviated from the design, along with the authority for the deviation or change.

C. Electronic Format

1. Size printable to: 8½ inches by 11 inches minimum and 24 inches by 36 inches maximum.
2. Present in a clear and thorough manner. Title each drawing with project name. Identify each element of drawing with reference number.
3. Plans, elevations, sections, and detail shop drawings shall be to scale, with scale indicated.
4. Indicate field verified dimensions. Show relationship of products to adjacent work. Note coordination requirements.
5. Schematics and diagrams shall be logically arranged and presented in a clear, understandable manner with all items labeled.
6. Internal wiring diagrams: Provide internal wiring and elementary ladder diagrams for factory pre-wired equipment.
7. Control diagrams: Show relative positions of each component as a system diagram.

1.06 Product Data

A. Provide product data such as manufacturer's brochures, catalog pages, illustrations, diagrams, tables, performance charts, and other material which describe appearance, size, attributes, code and standard compliance, ratings, and other product characteristics.

B. Form

1. Provide all critical information such as reference standards, performance characteristics, capacities, power requirements, wiring and piping diagrams, controls, component parts, finishes, dimensions, and required clearances.
2. Submit only data which are pertinent. Mark each copy of manufacturer's standard printed data to identify products, models, options, and other data pertinent to project.

3. Modify manufacturer's standard schematic drawings and diagrams and supplement standard data to provide specific information applicable to project. Delete information not applicable.
4. Colors and Patterns: Unless color and pattern is specified for product, submit accurate color and pattern charts or samples illustrating manufacturer's full range for selection by the Engineer. Submit two hard copies only.

1.07 Design Data and Calculations

- A. Where required by specification sections, provide basic calculations, analyses, and data to support design decisions and demonstrate compliance with specified requirements. State assumptions and define parameters. Give general formulas and references. Provide sketches, as required, to illustrate design method and application.
- B. Arrange calculations and data in a logical manner, with suitable text to explain procedures and order.
- C. Indicate name, title, and telephone number of individual performing design and include professional seal of designer where applicable or required.

1.08 Manufacturer's Instructions

- A. Where required by specification sections, provide manufacturer's instructions for activities such as delivery, storage, assembly, installation, wiring, start-up, adjusting, and finishing.
- B. Indicate pertinent portions and identify conflicts between manufacturer's instructions and contract documents.
- C. Where appropriate, include preparation procedures; service connection requirements; critical ambient conditions; foundation requirements; special precautions; adjustment requirements; alignment procedures; leveling; purging; charging; lubrication; and cleaning prior to operation and/or Owner's acceptance.
- D. Installation (e.g., assembly, mounting, or wiring) and start-up instructions shall be submitted and available for review in the field prior to scheduled material or equipment installation.

1.09 Samples

- A. Submit samples to illustrate functional and aesthetic characteristics of products with all integral parts and attachment devices. Include full range of manufacturer's standard finishes, indicating colors, textures, and patterns for Engineer selection.
- B. Submission
Submit the number of samples specified in individual specification sections. One sample will be retained by the Engineer.
- C. Label with identification related to submittal transmittal form.

1.10 Manufacturer's Field Service Reports

- A. When an individual specification section requires services of manufacturer's field representative, submit report of observations, site decisions, and instructions given to installers.
- B. Form
 - 1. Present complete information in clear concise manner.
 - 2. Bind with titled cover in folder or binder.
- C. Report shall include:
 - 1. Time, location, conditions, and duration of activity;
 - 2. Names of persons performing and witnessing activity;
 - 3. Equipment used;
 - 4. Description of activity, data recorded, and results;
 - 5. Deficiencies found, corrective measures, and results of retesting; and
 - 6. Other pertinent data.
- D. Submit report within 30 days of construction site service visit.

1.11 Operation and Maintenance Data

- A. Where required by specification sections, provide operation and maintenance manuals.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

END OF SECTION

ATTACHMENT A - SAMPLE SUBMITTAL TRANSMITTAL FORM

Attachment A

SAMPLE SUBMITTAL TRANSMITTAL FORM

PROJECT: _____
CONTRACT NUMBER: _____
SUBMITTAL NUMBER: _____ RESUBMITTAL: YES NO
DATE: _____ NUMBER OF COPIES SUBMITTED: _____
SUBMITTAL DESCRIPTION: _____

RELATED DESIGN DISCIPLINE (circle):
Civil Landscape Architectural Structural
Mechanical Electrical Telecommunications Security
Fire Protection Controls Other: _____

ASSOCIATED SPECIFICATION SECTION NO: _____
REFERENCED DRAWING SHEET NO: _____
SUBCONTRACTOR/SUPPLIER/MANUFACTURER PROVIDING SUBMITTAL DATA:

Name: _____
Address: _____
Telephone Number: _____

CONTRACTOR:
Name: _____
Address: _____
Telephone Number: _____

CONTRACTOR'S CERTIFICATION:

The undersigned, as representative of the Contractor for the above project, submits the following and certifies that:

1. Submittal has been reviewed and it is complete and conforms to requirements of contract documents, except as noted.
2. Required dimensions have been field verified and are acceptable for installation of proposed products and construction of proposed work.
3. Required quantities for products and materials covered by this submittal have been verified as correct.
4. Fabrication processes and construction methods proposed in this submittal are acceptable for this project and will result in a complete, functional installation.
5. Submittal has been coordinated with other submittals and work and proposed products and construction will properly interface with other construction.

NAME OF CONTRACTOR REVIEWER: _____
SIGNATURE OF CONTRACTOR REVIEWER: _____
DATE: _____

SECTION 01 45 16.01
CONCRETE TESTING

PART 1 - GENERAL

1.01 Work Included

This work includes requirements for concrete, concrete submittals, and testing.

1.02 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

- A. ACI PRC-211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- B. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
- C. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- D. ASTM C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- E. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
- F. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete
- G. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- H. ASTM C595 – Standard Specification for Blended Hydraulic Cements
- I. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
- J. ASTM C1260 – Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
- K. ASTM C1293 – Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction
- L. ASTM C1567 – Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
- M. ASTM E29 – Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- N. Michigan Department of Transportation 2020 Standard Specifications for Construction
- O. Michigan Test Methods (MTM)
- P. Michigan Department of Transportation Qualified Products List

Q. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

A. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement

1.04 Submittals

A. Prior to beginning construction, the Contractor shall submit the name and plant location of the proposed NRMCA certified concrete supplier for the project.

B. Prior to beginning construction, the Contractor shall submit mix designs for the proposed concrete mixtures proposed for use on the project for the Engineer to review.

1.05 Quality Assurance and Quality Control

A. The Owner will be responsible for Quality Control and Quality Assurance Testing.

B. Concrete Testing

1. The temperature of concrete will be determined in accordance with ASTM C1064.

2. Samples of concrete for testing will be obtained in accordance with ASTM C172.

3. The slump of concrete will be determined in accordance with ASTM C143.

4. The air content of concrete will be measured in accordance with ASTM C231.

5. Concrete cylinders for compressive testing will be made in accordance with ASTM C31. The Engineer and Contractor shall use the same size cylinder for test specimens. Four-inch cylinders are preferred, as allowed by ASTM C31.

6. The compressive strength of concrete will be determined in accordance with ASTM C39.

PART 2 - PRODUCTS

2.01 Mix Design and Documentation

Design concrete mixtures shall meet the requirements specified in Table 1. The Contractor shall provide the grade of concrete for the section number reference application specified in Table 1, or as specified in the contract. The Contractor shall submit a request variance, in writing, when proposing a mix design that exhibits temperature, slump, or air content other than those specified. This submittal shall include the proposed mix design, Job Mix Formula (JMF), and associated trial batch verification test data. Do not use a grade of concrete with a lower specification limit (LSL) 28-day compressive strength less than what is designated for the application.

Blended cement meeting the requirements of ASTM C595 Type IL is permitted.

Secure prior approval from the Engineer to use concrete intended for early opening to traffic to facilitate driveway gaps or other features necessary for required local access.

Unless otherwise specified in the contract, set accelerating admixtures are prohibited.

Unless otherwise specified in the contract, do not exceed 40 percent replacement of the Portland cement in the concrete mixture with slag cement (Grade 100 minimum) or fly ash. Do not exceed 40 percent total replacement of the Portland cement if both slag cement and fly ash are used in the concrete mixture.

Use the combined weight of all cementitious materials to determine compliance with the maximum water-cementitious ratio and cementitious material content requirements specified in Table 1.

Table 1: Minimum Mix Design Requirements for Concrete					
		Concrete Grade			
		3,000	3,500	4,000	4,500
Compressive strength (psi)	7-day	2,200	2,600	3,000	3,200
	28-day	3,000	3,500	4,000	4,500
	70%	2,100	2,450	2,800	3,150
Flexural Strength (psi)	7-day	500	550	600	625
	28-day	600	650	700	750
	70%	420	455	490	525
Slump (inch)		(c)-(f)	(c)-(k)	(l)-(n)	(d)-(f)
Cementitious material content (lb/cyd)		489-517	517-611 (o)	517-611	517-658
Class of coarse aggregate		(p)-(r)			
Maximum w/cm ratio		0.45			
Air content range		5.5-8.5%			

- a. Reserved for future use.
- b. Reserved for future use.
- c. 0- to 3-inch slump for mixtures for pavements.
- d. 0- to 3-inch slump without admixtures or with Type A or D admixture.
- e. 0- to 6-inch slump after the addition of Type MR admixture.
- f. 0- to 7-inch slump after the addition of Type F or G admixture.
- g. 3- to 7-inch slump for tremie applications without admixture or with Type A or D admixture.
- h. 3- to 7-inch slump for tremie applications after the addition of Type MR admixture.
- i. 3- to 8-inch slump for tremie applications after the addition of Type F or G admixture.
- j. 6- to 8-inch slump for dry placed drilled shafts.
- k. 7- to 9-inch slump for wet placed drilled shafts.
- l. 3- to 5-inch slump without admixtures or with Type A or D admixture.
- m. 3- to 6-inch slump after the addition of Type MR admixture.
- n. 3- to 7-inch slump after the addition of Type F or G admixture.
- o. For concrete pavement repair mixtures, use 658 lb/cyd of cement when the weather is forecast to be above 50 degrees Fahrenheit or 752 lb/cyd when the weather is forecast to be 50 degrees Fahrenheit or below.
- p. Use aggregates only from geologically natural sources for pavement, shoulder, miscellaneous pavement (including ramps), concrete pavement overlay, bridge approach slab, structural concrete, drilled shaft, bridge railing, and bridge sidewalk applications.

- q. Unless otherwise required, use Coarse Aggregate 6AA or 17A for exposed structural concrete in bridges, retaining walls, and pump stations.
- r. The flexural and compressive strengths are not part of the specifications but are listed for informational purposes only and are the minimum strengths anticipated for the mix proportions specified for the various grades of concrete when cured under standard conditions.

A. Alkali-Silica Reactivity

Provide documentation to the Engineer that the concrete mixture does not present the potential for excessive expansion caused by alkali-silica reactivity (ASR). Provide current ASR test results (valid for two years from completion of testing), for the fine aggregate that is proposed to be used in the concrete from an independent testing laboratory proficient in ASR testing. The independent testing laboratory must certify, in writing, that all testing was conducted in accordance with the designated standard test procedures described herein. Test results must conform to the specified criterion for one of the following standard test methods. Use the Rounding Method described in ASTM E29 when determining significant digits for reporting expansion test results.

1. Method 1 – ASTM C1260 Mortar Bar Test

If the expansion of the mortar bars is less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the fine aggregate is considered non-deleterious to ASR and may be used in the concrete without the need for ASR mitigation.

2. Method 2 – ASTM C1293 Concrete Prism Test

- a. If the expansion of concrete prisms is not greater than 0.040 percent (rounded to the nearest 0.001 percent) after 1 year, the fine aggregate is considered non-deleterious to ASR and may be used in the concrete without the need for ASR mitigation.
- b. If the expansion of concrete prisms is greater than 0.040 percent, but not exceeding 0.120 percent (rounded to the nearest 0.001 percent) after 1 year, the fine aggregate is considered moderately deleterious to ASR and mitigation is required, as follows. A low-alkali cement with Na_2O equivalent alkalies ($\text{Na}_2\text{O} + 0.658 \times \text{percent K}_2\text{O}$) not exceeding 0.60 percent must be used in the concrete mixture to mitigate the potential for ASR. Slag cement or fly ash may be used in conjunction with the low-alkali cement. The total alkali content for the cementitious materials combination must not exceed 3 pounds per cubic yard of Na_2O equivalent.

3. Method 3 – ASTM C1567 Accelerated Mortar Bar Test

If no previous test data are available for the fine aggregate that shows it is resistant to ASR using either Method 1 or 2 above, replace 25 percent to 40 percent of the Portland cement in the concrete mixture with slag cement (Grade 100 minimum) or fly ash. A blended cement meeting the requirements of ASTM C595 containing Portland cement and slag cement or fly ash may also be used.

Demonstrate the ability of the fly ash or slag cement to control the deleterious expansion caused by ASR by molding and testing mortar bars according to the standard test method described in ASTM C1567, using the mix proportions and constituent sources for both the aggregates and the cementitious materials that will be used for the project. Make at least three test specimens for each cementitious materials-aggregate combination. If the

average of 3 mortar bars for a given cementitious materials-aggregate combination produces an expansion less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the JMF associated with that combination will be considered non-deleterious to ASR. If the average expansion is 0.10 percent (rounded to the nearest 0.01 percent) or greater, the JMF associated with that combination will be considered not sufficient to control the deleterious expansion caused by ASR and the JMF will be rejected.

The Engineer will not approve the use of the JMF if the expansion exceeds the respective threshold limits for the respective ASTM test method used.

B. Mix Documentation

Provide mix design and accompanying JMFs using the methods of verification included in this specification. Include sufficient information on constituent materials and admixtures, along with trial batch verified physical properties of the fresh concrete, mix proportions per cubic yard for all constituents, and compressive strength test results necessary to allow the Engineer to fully evaluate the expected performance of the concrete mixture.

Submit mix design and JMF; include accompanying documentation. List the source of materials, bulk density (unit weight) of coarse aggregate (rodding procedure or shoveling procedure), absorption of aggregates, relative density (specific gravity) of aggregates, aggregate correction factors, batch weights, and project specific or historical laboratory test data. Include the recorded air content of fresh concrete using the same admixture and cementitious material sources to be used in the production of the concrete for the project. A JMF will be approved only if all of the minimum mix design requirements specified in the contract have been met. Use of the MDOT Job Mix Formula Concrete Field Communication Form (MDOT Form Number 1976) is encouraged.

1. Job Mix Formula

Select proportions for concrete mixtures according to ACI Standard 211.1. The volume (oven-dry-rodded) of coarse aggregate per unit volume of concrete must be 65 percent, minimum.

Four methods of verification of proposed JMF are acceptable.

a. Method 1 – Trial Batches

Verification of JMF is based on trial batches with the same materials and proportions proposed for use on the project. Prepare at least one trial batch for each mix design in sufficient time before starting concrete placement to allow for review, according to subsection 2.01.A of this specification. Provide the results of temperature, slump, density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of 3 independent samples. All samples may be taken from a single trial batch for a mix design, provided the trial batch is at least 4 cubic yards in volume. For JMF trial batch verification purposes only, 7-day compressive strength test results which report at least 70 percent of the specified 28-day lower specification limit will be sufficient documentation, in lieu of 28-day compressive strengths. The average of at least two strength test specimens represents one compressive strength sample test result for

each independent sample. Provide the necessary ASR documentation as described in subsection 2.01.A of this specification.

b. Method 2 – Same Mix

Verification of JMF is based on experience with the same mix design, JMF, and the same materials. Provide the results of temperature, slump, density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of 3 independent samples produced within the previous 12 months. The average of at least two strength test specimens represents one compressive strength sample test result for each independent sample. Do not substitute material types or sources, including admixtures or cementitious materials, nor change mix proportions in the JMF. Provide the necessary ASR documentation as described in subsection 2.01.A of this specification.

c. Method 3 – Similar Mix

Verification of JMF is based on requirements described in Method 2 above. Substitution of coarse aggregate source is permitted if the new source is of the same geologic type as the original aggregate, and conforms to the specification requirements for the application. Substitution of fine aggregate is permitted only if the new source has been tested for ASR. Provide the necessary ASR documentation as described in subsection 2.01.A of this specification.

Provide the supporting laboratory trial batch documentation and accompanying calculations showing how the mix proportions in the JMF were adjusted, based on the documented differences in relative density (specific gravity), bulk density (unit weight), and absorption of the substituted aggregate sources, to produce a theoretical yield of 100 percent and the required fresh concrete properties.

d. Method 4 – Annual Verification

At the Engineer's option, verification may be accepted annually for a concrete plant rather than on a project basis provided the sources and proportions of the constituent materials, including cementitious materials and source and types admixtures, do not change. If the project is the continuation of work in progress during the previous construction season and written certification is submitted to the Engineer that materials from the same source and with the same mixture properties are to be used, the Engineer may waive the requirement for annual renewal verification of the JMF for the project. Provide the necessary ASR documentation as described in subsection 2.01.A of this specification.

PART 3 - EXECUTION

3.01 Sampling and Testing

A. The following ASTM test methods will apply.

1. C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

3. C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
4. C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
5. C172 – Standard Practice for Sampling Freshly Mixed Concrete
6. C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

B. Sampling

Sampling and testing shall be conducted by the Owner during placement of the concrete. The Contractor shall take a random sample at a rate of approximately once per 50 cubic yards, based on the anticipated total quantity of concrete to be placed and site conditions, with a minimum of 1 sampling for each day of production per mix design. The sampling rate may be increased by the Engineer if project conditions warrant increased testing. A minimum of 3 cylinders shall be taken for each test (one 7-day break and two 28-day breaks).

Samples will be taken from the concrete at the location as close to its final placement into the forms or on the grade as practical. If sampling from the discharge of the haul unit, the sample will be taken from approximately the middle $\frac{1}{3}$ of the load.

Samples for acceptance will not be taken at the concrete production facility (batch plant), nor prior to discharge from a concrete pump (excluding tremie seal placement applications).

C. Small Incidental Quantities

1. Reduced Quality Control (QC) for Small Incidental Quantities.

Reduced levels of on-site QC testing for concrete may be considered for small incidental quantities. Unless approved by the Engineer, multiple small incidental quantities, including ones that are placed consecutively throughout the project on the same day, are not eligible for reduced QC consideration if the total plan quantity of concrete for the item exceeds 100 cubic yards. Include details for reduced QC testing and oversight in the approved QC plan in accordance with following:

- a. The small incidental quantity of concrete will be limited to a single day's concrete placement of a maximum 20 cubic yards;
- b. The small incidental quantity of concrete is not an integral part of a structural load-bearing element;
- c. The Engineer has received written certification from the Contractor that the concrete supplier has a current QC plan in place and available for review upon request by the Engineer;
- d. The concrete supplier employs an MCA-certified Michigan Concrete Technician Level II available at the plant or on call during concrete placement to validate and authorize modifications to the concrete JMF;
- e. Prior to the first concreting operation, concrete representing the JMF for the small incidental quantity has been sampled and tested by an MCA-certified Michigan Concrete Technician Level I or Level II to verify that, historically, the JMF produced a

concrete mixture meeting the minimum requirements for density (unit weight), slump, air content, and strength. Annual verification may be acceptable provided there are no changes to the material types or sources, including the cementitious materials and admixtures;

- f. The Engineer verifies that the temperature, slump, and air content conform to specification requirements at the start of the day's concreting operation associated with the small incidental quantity; and
- g. The Engineer is notified a minimum of 24 hours prior to concrete placement.

2. Reduced Quality Assurance (QA) for Small Incidental Quantities.

At the discretion of the Engineer, daily 28-day compressive strength QA test cylinders for small incidental quantities of concrete may not be required provided QA test cylinders representing the same JMF were sampled and molded at least once during the same week.

3.02 Suspension Limits

If during the pour the concrete is found to be out of the specifications in Table 2, then the pour shall be stopped until concrete can be provided that meets the project specifications. The Engineer will not pay for items placed with concrete that does not meet the following specifications.

Table 2	
Quality Characteristic	Suspension Limits
Air Content (percent)	<5.0 or >9.0
Air Content Loss (percent)	Greater than 1.5
Concrete Temperature (degrees Fahrenheit)	<45 or >90 at time of placement
Slump	See Table 1

3.03 Acceptance

Concrete items will be accepted based on the criteria in the items specification; concrete was placed within the limits of Table 2 and the average of the corresponding 28-day test cylinders being above the design strength.

END OF SECTION

SECTION 01 45 16.02
DENSITY AND AGGREGATE TESTING

PART 1 - GENERAL

1.01 Work Included

This work includes material testing of soil, aggregates, stabilized mixtures, and pulverized pavement mixtures.

1.02 References

- A. Michigan Department of Transportation 2020 Standard Specifications for Construction
- B. Michigan Department of Transportation Density Testing and Inspection Manual
- C. Michigan Department of Transportation Procedures for Aggregate Inspection
- D. Michigan Test Methods (MTM)
- E. All references to "Engineer" in this specification shall be interpreted as "Owner". Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 01 74 50 – Cleanup and Restoration
- B. Section 31 23 01 – Excavating, Filling, and Grading
- C. Section 32 11 23 – Aggregate Base
- D. Section 32 12 16 – HMA Paving
- E. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement
- F. Section 33 11 00 – Water Main
- G. Section 33 31 00 – Sanitary Sewer
- H. Section 33 44 00 – Storm Sewers

1.04 Quality Assurance and Quality Control

- A. Soil and Aggregate Density Testing
 - 1. The Owner is responsible for all onsite density testing on this project. The Owner has the right to determine which materials shall be tested and the frequency of testing.
- B. Sand and Aggregate Gradation

The Contractor is to supply sand and aggregates in the Michigan Department of Transportation gradations, as specified by the project specifications.

Contractors are encouraged to use "prequalified" Michigan Department of Transportation aggregate sources. If the Contractor elects to use a non-prequalified source, then the

Contractor shall be responsible for supplying the Engineer with Sieve Analysis (MTM109) and Loss by Washing (MTM108) at the following rates:

Coarse Aggregates	1 per 1,000 tons
Dense-Graded Aggregates	1 per 1,000 tons
Open-Graded Aggregates	1 per 1,000 tons
Granular Material Class I	1 per 1,000 tons
Granular Material Class II and IIA	1 per 3,000 cubic yards
Granular Material Class III	1 per 10,000 cubic yards
Fine Aggregate	1 per 1,000 tons

All Sieve Analysis and Loss by Washing reports shall be signed and sealed by a Professional Engineer.

1.05 Job Conditions

A. Access for Testing

The Contractor shall provide the Engineer safe access for testing technicians to complete any required testing. Reasonable time for testing shall be allowed by the Contractor.

B. Safety

The Contractor is responsible for conducting operations in a safe and orderly manner and in conformance with MIOSHA P.A. 154.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Minimum Percent of Compaction for Aggregates

The following are a minimum percent compaction for typical items of work. Note: Higher percent compaction may be required for specific items of work, see Section 3.06.03.B of the Michigan Department of Transportation 2020 Standard Specifications for Construction for those items.

A. Original Ground

Road Embankment Areas	90 percent
Bridges – within the limits as shown on the plans	95 percent

B. Cut Areas

Cuts requiring Sand Subbase	95 percent
Cuts not requiring Sand Subbase	95 percent
Subgrade for HMA Base, Aggregate Base, and Concrete Widening	95 percent
Trenches for under HMA Shoulders	98 percent*

C. Embankments and Backfill

Regular	95 percent* (within top 3 feet)
---------	------------------------------------

Abutments with Piling	95 percent
Abutments without Piling	100 percent
Foundation Undercut Backfill	100 percent
Backfill for Bridges, Culverts, Utilities, Manholes, Catch Basins, Edge Drains, and Subgrade Undercuts	95 percent
Foundations and Miscellaneous Structures	95 percent
D. Pavement Structure	
Subbase	95 percent*
Subbase for Slope Paving	90 percent
Aggregate Base under Concrete Pavement	95 percent*
Aggregate Base under HMA Pavement	98 percent*
Pulverized HMA Aggregate Base	98 percent
Recycled Concrete Aggregate Base – under Concrete Pavement	95 percent
Recycled Concrete Aggregate Base – under HMA Pavement	98 percent
Aggregate Base – Sleeper Slab and Bridge Approach	98 percent
Shoulders – Class I	98 percent*
Shoulders – Class II, III, and IV	95 percent*
Aggregate Surface	95 percent*
OGDC – used under Concrete and HMA Pavement	95 percent*
OGDC – used under Concrete and HMA Pavement (recycled material)	98 percent*
* May NOT exceed optimum moisture	

3.02 HMA Density

The density control target, “Theoretical Maximum Density” (TMD) for HMA shall be calculated using the Gmm from the Contractors approved HMA mix design. $TMD = Gmm \times 62.4$.

HMA Base Course	92 percent to 98 percent
HMA Leveling Course	92 percent to 98 percent
HMA Top Course	92 percent to 98 percent

The HMA layer must meet the required density target before the succeeding lift or traffic is placed on the pavement.

3.03 Testing Frequency

Each layer must be tested and meet compaction requirements before the succeeding layer is placed. The Engineer will test at a rate that is warranted for field conditions and Contractor means and methods. The list of frequencies below are minimums.

Subgrade	1 test per 500 feet per width of 24 feet or less
Embankment	1 test per 1,000 cubic yards of material and every lift
Subbase	1 test per 500 feet per width of 24 feet or less
Backfill	1 test per 300 cubic yards of material
Aggregate Base Course	1 test per 500 feet per width of 24 feet or less
HMA Mixtures	1 test per 500 feet per width of 24 feet or less

Shoulders	1 test per 1,000 feet each side
Sleeper Slab	1 test per bridge approach per stage
Foundations and Miscellaneous Structures	1 test per 1-foot lift or per 300 cubic yards
Trenching	1 test per 1,000 feet each side

3.04 Compaction Efforts

The Contractor shall continue to make compaction efforts to obtain the minimum standards given within this specification upon notification of a failing test. A passing test is required at every location of a failing test prior to starting the next related item of work.

END OF SECTION

SECTION 01 55 26
MAINTAINING TRAFFIC

PART 1 - GENERAL

1.01 Work Included

The Contractor shall execute the work in a manner such that traffic is maintained and access is provided to all residences, businesses, and commercial establishments.

1.02 References

- A. Michigan Department of Transportation 2020 Standard Specifications for Construction
- B. Michigan Manual on Uniform Traffic Control Devices
- C. All references to "Engineer" in this specification shall be interpreted as "Owner". Owner will determine the involvement of the Engineer during construction.

PART 2 - PRODUCTS

2.01 Signing

Signing and barricading shall be provided by the Contractor in accordance with the details on the plans, the Michigan Manual on Uniform Traffic Control Devices, the Michigan Department of Transportation Maintaining Traffic Typical, and the requirements of the road agency. Barricades left in place after dark shall be lighted.

The Contractor shall submit a plan of the proposed traffic control to the Engineer for review.

PART 3 - EXECUTION

3.01 Maintain Access to all Properties

The duration of any closure shall be limited to the minimum length of time necessary to complete the particular task requiring the closure. In no case shall a closure extend overnight, unless approved by the Engineer or Owner.

Upon completion of pipe installation or other work requiring a closure of a driveway, road, or sidewalk, the area shall be backfilled and regraded to meet adjacent grades. A temporary gravel surface shall be provided and maintained by the Contractor. The gravel shall meet the requirements of 23A series aggregate, as specified in the Michigan Department of Transportation 2020 Standard Specifications for Construction. Recycled HMA may also be utilized after approval of material by the Engineer. The gravel shall be placed to a depth of at least 8 inches.

3.02 Protection of Hazardous Areas

Excavation and hazardous areas shall be protected by barricades or snow fence. Barricades left in place at night shall be lighted.

3.03 Corrective Action

A representative of the prime Contractor will review all maintaining traffic devices for proper placement prior to the start of work each day and again at the conclusion of work each day. On non-working days, the prime Contractor will review maintaining traffic devices for proper placement. All deficiencies will be corrected by the prime Contractor within four hours.

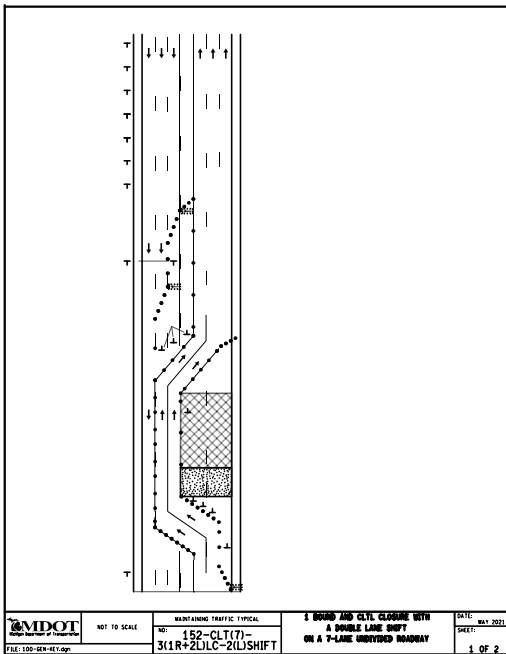
END OF SECTION

TYPICAL NUMBER KEY

CODES

AB = ARROW BOARD
 AW = ADVANCE WARNING
 C = CLOSURE
 CLT = CENTER LEFT TURN LANE
 CROSS = CROSSOVER
 CruSha = CRUSH AND SHAPE
 EM = EARLY MERGE
 EnR = ENTRANCE RAMP
 ExR = EXIT RAMP
 FW = FREEWAY
 GEN = GENERAL INFORMATION
 GORE = FREEWAY GORE AREA
 IN = INSIDE
 INT = INTERSECTION
 L = LANE
 (L) = LEFT
 LC = LANE CLOSURE
 LD = LONG DURATION

LO = LANE OPEN
 O = OUTSIDE (LANE CLOSURE)
 OUT = OUTSIDE OF SHOULDER
 MID = MIDDLE OF INTERSECTION OR ROAD
 NFW = NON-FREEWAY
 PARK = PARKING LANE
 PCMS = PORTABLE CHANGEABLE MESSAGE SIGN
 (R) = RIGHT
 ROLL = ROLLING ROADBLOCK
 RUM = RUMBLE STRIP
 SD = SHORT DURATION
 SHL = SHOULDER CLOSURE
 SIGN = SIGN
 SP = SPECIAL
 SPEED = SPEED
 STA = STOPPED TRAFFIC ADVISORY
 TR = TRAFFIC REGULATOR
 TS = TEMPORARY SIGNAL
 ZIP = ZIPPER MERGE



100 - GENERAL NOTES
 110 - TRAFFIC REGULATORS
 120 - NON-FREEWAY
 130 - CENTER LEFT TURN (CLT) LANES
 140 - PARKING LANES
 150 - CLT 7 LANE SECTIONS
 160 - SIGNAL WORK
 200 - FREEWAY CLOSURES
 210 - FREEWAY LANE SHIFTS
 220 - FREEWAY ENTRANCE RAMPS
 230 - FREEWAY EXIT RAMPS
 300 - ADVANCE WARNINGS
 310 - CROSSOVER CLOSURE
 320 - CRUSH AND SHAPE
 340 - MERGE SYSTEMS
 350 - GORE LOCATIONS
 360 - ROLLING ROADBLOCK
 4000 - MAINTENANCE
 5000 - SURVEY

EXAMPLE TYPICAL

CODE: 152-CTL(7)-3(1R+2L)LC-2(L)SHIFT

152 - TYPICAL NUMBER

CTL(7) = CENTER LEFT TURN LANE, 7 LANES TOTAL.

3(1R+2L)LC = 3 LANES CLOSED, (1 RIGHT LANE AND 2 LEFT LANES).

2(L)SHIFT = 2 LANES SHIFTED TO THE LEFT.

NOT TO SCALE

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	TYPICAL NUMBERING KEY	DATE: DECEMBER 2021
		NO: 100-GEN-KEY		SHEET: 1 OF 1

FILE: 100-GEN-KEY.dgn

DISTANCE BETWEEN TRAFFIC SIGNS, "D"

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
D (FEET)	250	300	350	400	450	500	550	600	650	700	750

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE, "B"

"B" LENGTHS	SPEED*, MPH (PRIOR TO WORK AREA)											
	20	25	30	35	40	45	50	55	60	65	70	75
B (FEET)	33	50	83	132	181	230	279	329	411	476	542	625

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

MINIMUM MERGING TAPER LENGTH, "L" (FEET)

OFFSET (FEET)	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
1	11	15	21	27	45	50	55	60	65	70	75
2	21	30	41	54	90	100	110	120	130	140	150
3	32	45	62	80	135	150	165	180	195	210	225
4	42	60	82	107	180	200	220	240	260	280	300
5	53	75	103	134	225	250	275	300	325	350	375
6	63	90	123	160	270	300	330	360	390	420	450
7	73	105	143	187	315	350	385	420	455	490	525
8	84	120	164	214	360	400	440	480	520	560	600
9	94	135	184	240	405	450	495	540	585	630	675
10	105	150	205	267	450	500	550	600	650	700	750
11	115	165	225	294	495	550	605	660	715	770	825
12	125	180	245	320	540	600	660	720	780	840	900
13	136	195	266	347	585	650	715	780	845	910	975
14	146	210	286	374	630	700	770	840	910	980	1050
15	157	225	307	400	675	750	825	900	975	1050	1125

NOT TO SCALE

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL		DATE: MAY 2021	
		NO: 101-GEN-SPACING-CHARTS		SHEET: 1 OF 3	
FILE: 101-GEN-SPACING-CHARTS.dgn		"B", "D" AND "L" TABLES CHANNELIZING DEVICE SPACING, SIGN BORDER KEY, AND ROLL-AHEAD SPACING			

FILE: 101-GEN-SPACING-CHARTS.dgn

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

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

"L" = W X S WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

L = MINIMUM LENGTH OF MERGING TAPER
S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
W = WIDTH OF OFFSET

TYPES OF TAPERS

UPSTREAM TAPERS

MERGING TAPER
SHIFTING TAPER
SHOULDER TAPER
2 TO 1 LANE ROAD TAPER

TAPER LENGTH

L - MINIMUM
1/2 L - MINIMUM
1/3 L - MINIMUM
100' - MAXIMUM

DOWNSTREAM TAPERS

(USE IS RECOMMENDED)

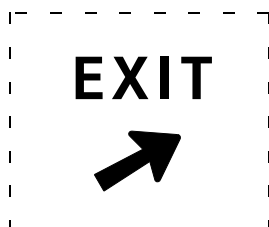
100' (PER LANE)

MAXIMUM SPACING FOR CHANNELIZING DEVICES

WORK ZONE SPEED LIMIT	DRUM AND 42" DEVICE SPACING (FT)		NIGHTTIME 42" DEVICE SPACING (FT)	
	TAPER	TANGENT	TAPER	TANGENT
< 45 MPH	1 x SPEED LIMIT	2 x SPEED LIMIT	25 FEET	50 FEET
≥ 45 MPH	50 FEET	100 FEET	25 FEET	50 FEET

SIGN OUTLINE KEY

DASHED OUTLINES INDICATE A SIGN THAT EXISTS ON SITE, AND NEEDS TO BE COVERED.



SOLID OUTLINES INDICATE A SIGN THAT IS TO BE PLACED ON THE PROJECT



NOT TO SCALE



NOT TO SCALE

FILE: 101-GEN-SPACING-CHARTS.dgn

MAINTAINING TRAFFIC TYPICAL

NO: 101-GEN-
SPACING-CHARTS

"B", "D" AND "L" TABLES
CHANNELIZING DEVICE SPACING
SIGN BORDER KEY AND ROLL-AHEAD SPACING

DATE: MAY 2021

SHEET:

2 OF 3

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES – TEST LEVEL 2

WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5.5 TONS (STATIONARY)	40 MPH OR LESS	25 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 4,410 POUND IMPACT VEHICLE WEIGHT.

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES – TEST LEVEL 3

WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5 TONS (MOBILE)	45 MPH	100 FT
	50-55 MPH	150 FT
	60-75 MPH	175 FT
12 TONS (STATIONARY)	45 MPH	25 FT
	50-55 MPH	25 FT
	60-75 MPH	50 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 10,000 POUND IMPACT VEHICLE WEIGHT.

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

GENERAL NOTES

- G1: SEE GEN-SPACING-CHARTS FOR COMMON VALUES INCLUDING:
D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
ROLL AHEAD DISTANCE
- G2: DISTANCE BETWEEN SIGNS, "D", THE VALUES FOR WHICH ARE SHOWN IN TYPICAL GEN-KEY ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- G3: ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING MUST MEET NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP 350) TEST LEVEL 3, OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) TL-3 AS WELL AS THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.
- G4: DO NOT STORE EQUIPMENT, MATERIALS OR PERFORM WORK IN ESTABLISHED BUFFER AREAS.
- G5: ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR TRAFFIC PATTERNS FOR WORK LESS THAN THREE DAYS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

SIGN NOTES

- S1: ALL NON-APPLICABLE SIGNING WITHIN THE CIA MUST BE MODIFIED TO FIT CONDITIONS, COVERED, OR REMOVED. FOR GUIDANCE SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, SECTIONS 6.01.09 AND 6.01.10.
- S2: R5-18b SIGNS ARE ONLY REQUIRED ON FREEWAY PROJECTS WITH A DURATION OF 15 DAYS OR LONGER OR NON-FREEWAY PROJECTS WITH A DURATION OF 90 DAYS OR LONGER. TO APPLY THIS TYPICAL WITHOUT R5-18b SIGNS, REMOVE THE SIGNS AND CONSOLIDATE THE SEQUENCE AS APPROPRIATE.
- S3: R5-18c IS ONLY REQUIRED IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. OMIT THIS SIGN IN SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE.
- S4: ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W20-5 SIGNS.
- S5: PLACE ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE WORK ZONE SPEED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK ZONE, OR AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT. PLACE ADDITIONAL SPEED LIMIT SIGNS AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS ARE MORE THAN 2 MILES APART. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, PLACE ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED BEYOND THE LIMITS OF THE WORK AREA AS INDICATED. IF PERMANENT SIGNS DISPLAYING THE CORRECT SPEED LIMIT ARE POSTED, OMIT ALL W3-5b AND R2-1 SIGNS AND REDUCE SPACING ACCORDINGLY.
- S6: FABRICATE SPECIAL SIGNS IN ACCORDANCE WITH CURRENT SIGNING DESIGN STANDARDS.
- S7: PLACE ADDITIONAL R8-3 SIGNS AT A MAXIMUM 500' SPACING THROUGHOUT THE WORK ZONE.
- S8: WHEN SPEED LIMIT SIGNS CANNOT BE PLACED SIDE BY SIDE AS SHOWN, PLACE THEM "D" DISTANCE APART.
- S9: STOP SIGNS NOT REQUIRED IF SIGNALS ARE ON 4-WAY FLASHING RED. STOP AHEAD SIGNS ARE NOT REQUIRED IF THERE IS ADEQUATE VISIBILITY OF THE STOP SIGN OR IF SIGNALS ARE BEING USED TO CONTROL TRAFFIC.
- S10: PLACE REDUCED SPEED ZONE AHEAD SIGN (W3-5b) HERE WHEN USING A SPEED REDUCTION IN THIS DIRECTION.
- S11: THE NUMBER OF W1-6 SHIFT SIGNS TO PLACE FOR A SHIFT IS AS FOLLOWS:
SHIFTS 4FT OR LESS, PLACE ONE W1-6(R)(L)
SHIFTS 5FT TO 12FT, PLACE TWO W1-6(R)(L)
SHIFTS MORE THAN 12FT, PLACE THREE OR MORE W1-6(R)(L) SIGNS DEPENDING UPON LENGTH OF SHIFT AND AS PER THE ENGINEER.
- S12: PLACE R2-1 SIGNS AS DETAILED IN NOTE S5 WHEN THERE IS A SPEED REDUCTION IN THIS DIRECTION

TRAFFIC REGULATOR NOTES

- TR1: TRAFFIC REGULATORS MUST FOLLOW ALL THE REQUIREMENTS IN THE STANDARD SPECIFICATIONS, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS, THE CURRENT VERSIONS OF THE TRAFFIC REGULATOR'S INSTRUCTION MANUAL AND THE VIDEO "HOW TO SAFELY REGULATE TRAFFIC IN MICHIGAN". THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS IS DETERMINED BY THE ROADWAY ADT, GEOMETRICS, AND AS DIRECTED BY THE ENGINEER.
- TR2: PROVIDE APPROPRIATE BALLOON LIGHTING TO SUFFICIENTLY ILLUMINATE TRAFFIC REGULATOR'S STATIONS WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS.
- TR3: PROVIDE EITHER A STOP/SLOW AFAD OR A RED/YELLOW LENS AFAD, MEETING THE REQUIREMENTS OF THE MMUTCD

TEMPORARY TRAFFIC CONTROL DEVICE NOTES

- TCD1: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD NOT EXCEED 1.0 TIMES THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 50 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TAPERS ARE NOT TO EXCEED 25 FEET AT NIGHT.
- TCD2: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TANGENT SHOULD NOT EXCEED TWICE THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 100 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TANGENTS ARE NOT TO EXCEED 50 FEET AT NIGHT.
- TCD3: TYPE III BARRICADES MUST BE LIGHTED FOR OVERNIGHT CLOSURES.
- TCD4: WHEN THE HAUL ROAD IS NOT IN USE, PLACE LIGHTED TYPE III BARRICADES WITH "ROAD CLOSED" EXTENDING COMPLETELY ACROSS THE HAUL ROAD.
- TCD5: USE OBJECT MARKER SIGNS IN LIEU OF THE TYPE B HIGH INTENSITY LIGHT SHOWN IN THE STANDARD PLAN FOR TEMPORARY CONCRETE BARRIER (R-53, AND R-126) WHEN USED WITH A TEMPORARY SIGNAL SYSTEM. THE OBJECT MARKERS MUST BE A MINIMUM OF 12 INCHES IN WIDTH AND 36 INCHES IN HEIGHT AND HAVE ORANGE AND WHITE RETROREFLECTIVE SHEETING. THE RETROREFLECTIVE SHEETING MUST HAVE ALTERNATING DIAGONAL ORANGE AND WHITE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION VEHICULAR TRAFFIC IS TO PASS.
- TCD6: PLACE LIGHTED ARROW PANELS AS CLOSE TO THE BEGINNING OF TAPERS AS PRACTICAL, BUT NOT IN A MANNER THAT WILL OBSCURE OR CONFUSE APPROACHING MOTORISTS WHEN PHYSICAL LIMITATIONS RESTRICT PLACEMENT. IN CURBED SECTIONS, IF ARROW BOARD CANNOT BE PLACED BEHIND CURB, PLACE ARROW BOARD IN THE CLOSED LANE AS CLOSE TO THE BEGINNING OF TAPER AS POSSIBLE.
- TCD7: ADDITIONAL TYPE III BARRICADES MAY BE REQUIRED TO COMPLETELY CLOSE OFF ROAD FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT.
- TCD8: WHERE THE SHIFTED SECTION IS SHORTER THAN 600 FEET, A DOUBLE REVERSE CURVE SIGN (W24-1) CAN BE USED INSTEAD OF THE FIRST REVERSE CURVE SIGN, AND THE SECOND REVERSE CURVE SIGN CAN BE OMITTED.
- TCD9: RUMBLE STRIPS ARE TO BE PLACED AS SPECIFIED IN THE CONTRACT. IF NOT SPECIFIED IN THE CONTRACT, PLACE RUMBLE STRIPS AS SHOWN, AND IN ACCORDANCE WITH THE RUMBLE STRIP MANUFACTURER'S RECOMMENDATIONS. AN ARRAY OF RUMBLE STRIPS CONTAINS THREE RUMBLE STRIPS. PLACE THE RUMBLE STRIPS IN THE ARRAY AT A CONSISTENT DISTANCE, BETWEEN 10' AND 20' APART.
- TCD10: SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, PORTABLE CHANGEABLE MESSAGE SIGN GUIDELINES FOR RECOMMENDED AND CORRECT PCMS MESSAGING. STAGGER PCMS THAT ARE ON OPPOSING SIDES OF THE ROAD 1000 FEET FROM EACH OTHER.

RAMP NOTES

- RMP1: WHEN CONDITIONS ALLOW, E5-1 SIGNS MUST BE REMOVED OR COVERED AND CHANNELIZING DEVICES MUST BE POSITIONED TO ENABLE RAMP TRAFFIC TO DIVERGE IN A FREE MANNER
- RMP2: STOP AND YIELD CONDITIONS SHOULD BE AVOIDED WHENEVER PRACTICAL. WHEN CONDITIONS WARRANT, R1-1 SIGNS MAY BE USED IN PLACE OF R1-2 SIGNS. WHEN R-1 SIGNS ARE USED, W3-1 SIGNS MUST BE USED IN PLACE OF W3-2 SIGNS. CONSIDERATION SHOULD BE GIVEN TO CLOSING THE RAMP TO COMPLETE WORK TO ALLOW AN ADEQUATE MERGE DISTANCE. WORK SHOULD BE EXPEDITED TO AVOID THE STOP AND/OR YIELD CONDITIONS.



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO:

102-GEN-NOTES

TRAFFIC TYPICALS
NOTE SHEET

DATE:
MAY 2022

SHEET:

1 OF 2

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

SIGNAL NOTES

- SIG1: EXISTING SIGNAL MUST BE EITHER 4-WAY FLASHING RED, BAGGED, OR TURNED OFF.
- SIG2: SIGNAL IS IN OPERATION.
- SIG3: DELINEATE THE WORK ZONE AREA WITH 28 INCH CONES FOR DAYTIME WORK, OR 42 INCH CHANNELIZING DEVICES FOR NIGHTTIME WORK.
- SIG4: THE CONTRACTOR MUST HAVE A DESIGNATED SPOTTER IF THE AERIAL BUCKET TRUCK IS LOCATED OVER ACTIVE TRAVEL LANES.
- SIG5: THE LOWEST POINT OF THE BUCKET MAY NOT TRAVEL BELOW 14 FOOT VERTICAL CLEARANCE. THE CONTRACTOR MUST UTILIZE AN ALTERNATE SET UP, OR PLACE THE INTERSECTION IN A 4 WAY STOP IF THE 14 FOOT VERTICAL CLEARANCE IS COMPROMIZED. USE TRAFFIC REGULATORS TO CONTROL TRAFFIC THROUGH THE INTERSECTION WHEN TRAFFIC IS PLACED IN A 4 WAY STOP.
- SIG6: DELINEATE THE TRUCK WITH CHANNELIZING DEVICES. THE POSITION OF THE TRUCK MAY BE MOVED TO FACILITATE WORK.

MAINTENANCE AND SURVEYING NOTES

- MS1: WHENEVER STOPPING SIGHT DISTANCE EXISTS TO THE REAR, THE SHADOW VEHICLES SHOULD MAINTAIN THE RECOMENDED DISTANCE FROM THE WORK AREA AND PROCEED AT THE SAME SPEED. THE SHADOW VEHICLE SHOULD SLOW DOWN AND TRAVEL AT A FARTHER DISTANCE TO PROVIDE ADEQUATE SIGHT DISTANCE IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES.
- MS2: WORKERS OUTSIDE OF VEHICLES SHOULD WORK WITHIN 150' OF WORK VEHICLES WITH AN ACTIVATED BEACON, BETWEEN THE "BEGIN WORK CONVOY" SIGN AND THE "END WORK CONVOY" SIGN, OR BETWEEN THE "WORK ZONE BEGINS" AND "END ROAD WORK" SIGN.
- MS3: WORK OR SHADOW VEHICLES WITH OR WITHOUT A TMA MAY BE USED TO SEPARATE THE WORK SPACE FROM TRAFFIC. IF USED, THE VEHICLES SHOULD BE PARKED ACCORDING TO THE ROLL AHEAD DISTANCE TABLES.
- MS4: WORK AND SHADOW VEHICLES SHALL BE APPROPRIATELY EQUIPPED WITH AN ACTIVATED AMBER BEACON.
- MS5: WHEN WORKERS ARE OUTSIDE THEIR VEHICLES IN AN EXISTING LANE WHILE A MOBILE OPERATION IS OCCURRING DURING THE NIGHTTIME HOURS, CHANNELIZING DEVICES TO DELINEATE OPEN OR CLOSED LANES AT 50 FT SPACING MUST BE USED. AN EXAMPLE OF AN OPERATION (BUT NOT LIMITED TO) IS THE LAYOUT OF CONCRETE PATCHES.
- MS6: W21-6 AND W20-1 SIGNS MAY BE SUBSTITUTED AS DETERMINED BY THE TYPE OF WORK TAKING PLACE AS PER THE ENGINEER.



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO:

102-GEN-NOTES

TRAFFIC TYPICALS
NOTE SHEET

DATE:
MAY 2022

SHEET:

2 OF 2

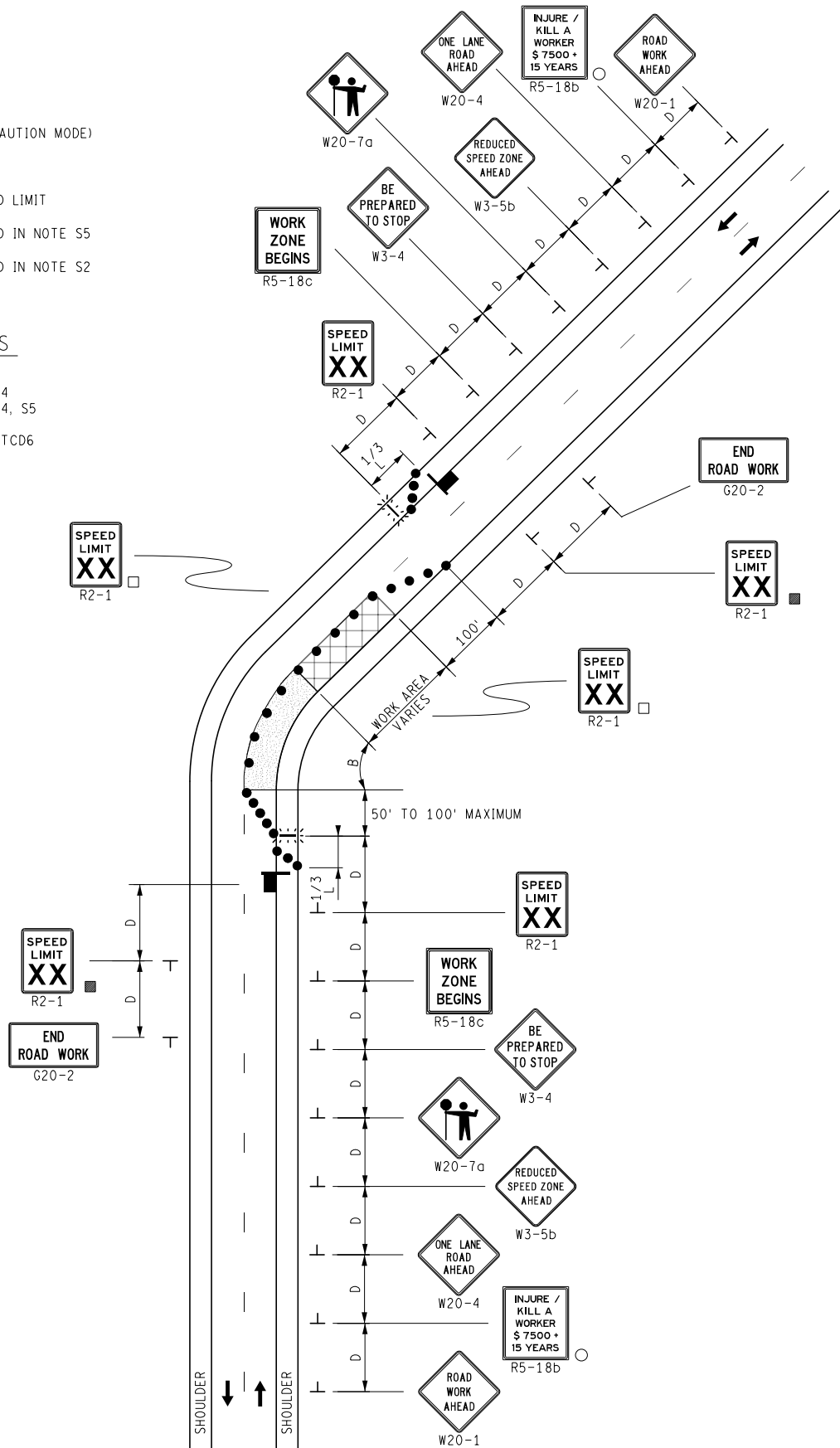
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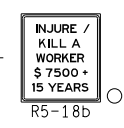
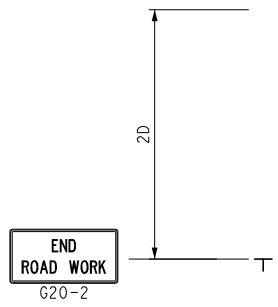
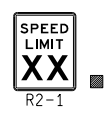
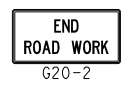
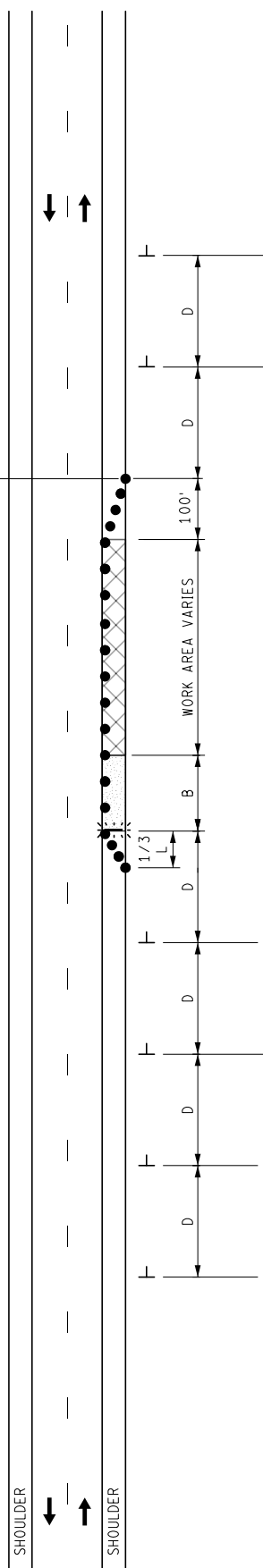
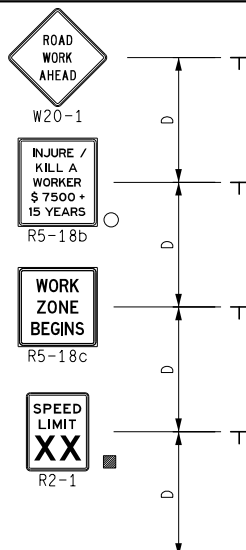
-  TRAFFIC REGULATOR
-  CHANNELIZING DEVICES
-  LIGHTED ARROW PANEL (CAUTION MODE)
-  TRAFFIC FLOW
-  REFLECTS EXISTING SPEED LIMIT
-  PLACE SIGN AS INDICATED IN NOTE S5
-  PLACE SIGN AS INDICATED IN NOTE S2

STANDARD NOTES

(SEE GEN-NOTES)

GENERAL: G1, G2, G3, G4
SIGNING: S1, S2, S3, S4, S5
TRAF REG: TR1, TR2
DEVICES: TCD1, TCD2, TCD6





POST W16-4aP WHEN SHOULDER CLOSURE EXCEEDS 1 MILE IN LENGTH

KEY

- ... CHANNELIZING DEVICES
- ⚡ LIGHTED ARROW PANEL (CAUTION MODE)
- ← TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT
- PLACE SIGN AS INDICATED IN NOTE S2

STANDARD NOTES

(SEE 102-GEN-NOTES)

GENERAL: G1, G2, G3, G4
SIGNING: S1, S2, S3, S5
DEVICES: TCD1, TCD2, TCD6, TCD7



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

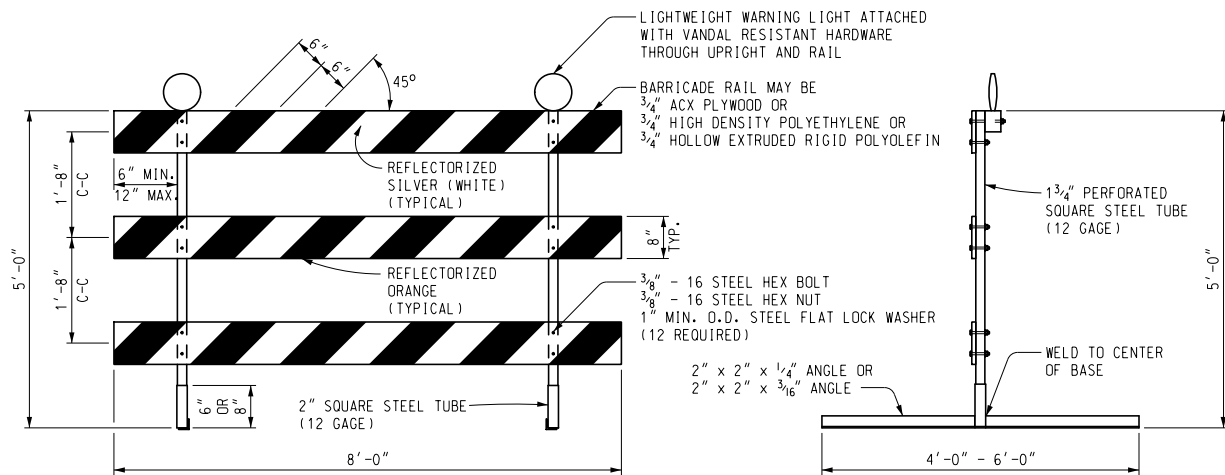
NO: 122-NFW-SHL-(R)

SHOULDER CLOSURE
ON A 2-LANE, UNDIVIDED ROADWAY

DATE: MAY 2021
SHEET:

1 OF 1

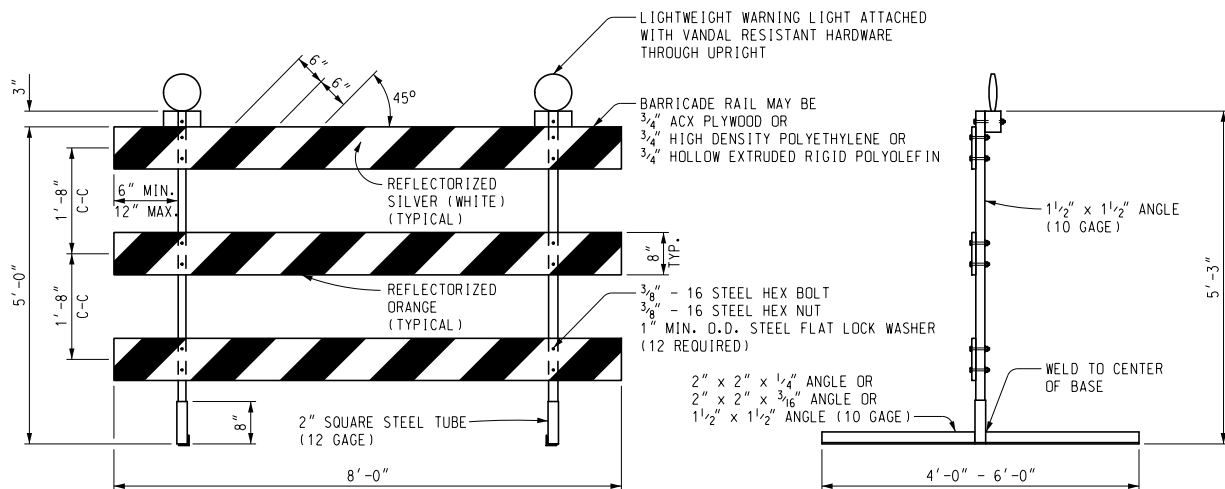
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FRONT ELEVATION

SIDE VIEW

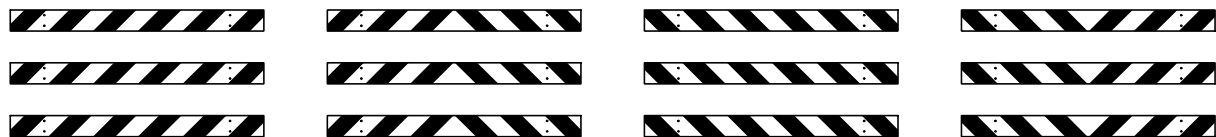
PERFORATED SQUARE STEEL TUBE OPTION



FRONT ELEVATION

SIDE VIEW

ANGLE IRON OPTION



LEFT DIRECTIONAL

BI-DIRECTIONAL

RIGHT DIRECTIONAL

CLOSURES

BARRICADE RAIL SHEETING OPTIONS TYPE III BARRICADES

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



PREPARED
BY
OPERATIONS
FIELD SERVICES

DRAWN BY: ECH

CHECKED BY: MWB

DEPARTMENT DIRECTOR
Paul C. Ajegba

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
(SPECIAL DETAIL)
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF FIELD SERVICES SPECIAL DETAIL FOR

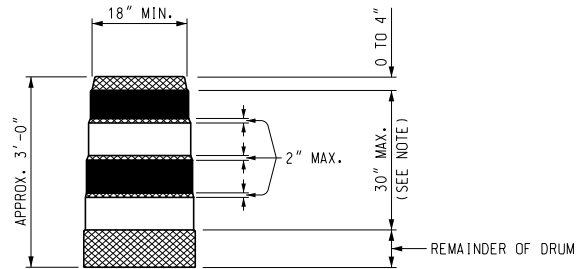
Temporary Traffic Control Devices

F.H.W.A. APPROVAL

6/16/22
PLAN DATE

WZD-125-E

SHEET
1 OF 3



REFLECTORIZED ORANGE
 REFLECTORIZED WHITE
 NON REFLECTORIZED ORANGE

NOTE:
 DRUMS SHALL HAVE AT LEAST 4 HORIZONTAL REFLECTORIZED STRIPES (2 ORANGE AND 2 WHITE) OF 6" UNIFORM WIDTH, ALTERNATING IN COLOR WITH THE TOPMOST REFLECTORIZED STRIPE BEING ORANGE. NON REFLECTORIZED SPACES BETWEEN THE HORIZONTAL REFLECTORIZED ORANGE AND WHITE STRIPES SHALL BE ORANGE IN COLOR AND EQUAL IN WIDTH.

PLASTIC DRUM

NOTES:

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

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

SEE ROAD STANDARD PLANS R-113-SERIES FOR TEMPORARY CROSSEOVERS FOR DIVIDED ROADWAY, AND R-126-SERIES FOR TYPICAL LOCATION AND SPACING OF PLASTIC DRUMS FOR PLACEMENT OF TEMPORARY CONCRETE BARRIER.

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

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

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF FIELD SERVICES SPECIAL DETAIL

(SPECIAL DETAIL)
 F.H.W.A. APPROVAL

6/16/22
 PLAN DATE

WZD-125-E

SHEET
 3 OF 3

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

SECTION 01 71 23.16
CONSTRUCTION STAKING BY CONTRACTOR

PART 1 - GENERAL

1.01 Work Included

The Contractor is responsible to provide all staking and layout necessary for construction of the project.

1.02 Notifications

In the event that it appears there is an error or contradiction between plan grades, construction stakes, and/or actual conditions, the Contractor shall notify the Owner immediately.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Requirements

The Contractor is responsible to provide such layout and control work as may be required for construction of the proposed improvements.

The Contractor shall provide workers competent in the layout and control work necessary. The Contractor shall provide the equipment and materials necessary for establishing the necessary control and layout.

Pipelines, 8 inches or larger that are to be laid at a uniform grade, shall be laid using a laser for alignment control.

3.02 Plan Grades and Alignment

The horizontal alignment of manholes and drainage structures will be from the center of casting, unless otherwise noted.

Final casting elevation for drainage structures and manholes shall be determined by the Owner after grading is completed.

END OF SECTION

SECTION 01 74 50
CLEANUP AND RESTORATION

PART 1 - GENERAL

1.01 Work Included

The Contractor shall restore areas disturbed by construction activities to a condition reasonably close to their condition before the project, unless shown otherwise on the plans. Restoration work should be performed as soon as possible after construction work is completed in a particular area.

Upon the completion of work in an area, all excess materials, debris, equipment, and similar items shall be removed from the project area by the Contractor and disposed of properly.

1.02 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 31 25 00 – Soil Erosion and Sedimentation Control
- C. Section 32 11 23 – Aggregate Base
- D. Section 32 12 16 – HMA Paving
- E. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement
- F. Section 32 92 00 – Turf Establishment

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Restoration

Unless otherwise provided, aggregate surfaces, HMA pavements, and concrete pavements shall be restored by construction of similar replacement surfaces. Aggregate surfaces shall be replaced with the materials and thicknesses described in the specification for aggregate surfaces or as shown on the drawings. HMA pavement shall be replaced with the cross section(s) shown on the plans and in accordance with Section 32 12 16 – HMA Paving. Concrete pavement shall be replaced with pavement in accordance with Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement.

Turf areas shall be restored by re-establishing the turf as described in Section 32 92 00 – Turf Establishment. All areas disturbed by construction that are not to be surfaced with aggregate or pavement shall be restored with turf, unless otherwise directed.

Mailboxes, fences, signs, ornaments, and similar items shall be replaced at the completion of construction. Posts shall be installed plumb. Items that are lost or stolen shall be repaired or replaced at the Contractor's expense. Repairs or replacements shall meet the Owner's approval.

3.02 Temporary Restoration of Driving Surfaces

Where a pavement or gravel surface is removed as a result of construction activities, a temporary surface shall be provided and maintained by the Contractor until the permanent surface is provided. Unless otherwise directed, the temporary surface shall be 8 inches of aggregate compacted according to Section 01 45 16.02 – Density and Aggregate Testing and graded to meet the adjacent, remaining surfaces. Aggregate shall meet the requirements of Series 23A as described in the Michigan Department of Transportation 2020 Standard Specifications for Construction. Recycled HMA may also be utilized after approval of material by the Owner.

The Contractor shall regrade the temporary surface and add additional aggregate periodically, as necessary, to maintain them in a relatively smooth condition.

END OF SECTION

SECTION 02 41 13.13
PAVEMENT REMOVAL

PART 1 - GENERAL

1.01 Work Included

This work includes removal of an existing pavement, including streets, driveways, sidewalks, curb and/or gutter, and parking areas. For purposes of the work "pavement removal", pavement material may include HMA, concrete, brick, or any combination thereof, including any reinforcement materials.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Limits of Removal

Pavement shall be removed to the limits shown on the plans, or as directed by the Owner in the field. Where pavement is to be removed to allow for the construction of utilities or other improvements, pavement shall be removed to the limits required for their construction.

3.02 Pavement Removal (Including Curb and Gutter Removal)

Pavement shall be removed to an existing joint or to a sawed joint. An existing crack is not suitable for the limit of removal. Sawed joints for pavement removal are to be either parallel or perpendicular to the longitudinal centerline. Sawed joints shall extend substantially through the full thickness of the pavement so that a "clean break" is made and that the adjacent pavement or structures that are to remain are not damaged. If adjacent pavement or structures that are to remain are damaged as a result of the Contractor's removal operations, they shall be replaced to the Owner's satisfaction at the Contractor's expense.

Curb and gutter removal shall be as directed by the Owner. The Contractor shall sawcut existing curb and/or gutter perpendicular to and completely through the existing concrete.

Broken concrete, HMA, brick, and other debris resulting from pavement removal operations shall become the Contractor's property and disposed of properly.

Where pavements are encountered that are composed of more than one material or multiple courses of the same material, the pavement shall be removed in its entirety and all components shall be considered part of the same pavement area.

The Contractor shall provide sufficient barricades and fences to protect pedestrians and vehicles from hazardous areas.

END OF SECTION

SECTION 31 10 01
CLEARING AND REMOVAL OF MISCELLANEOUS STRUCTURES

PART 1 - GENERAL

1.01 Work Included

This work includes, but is not limited to, clearing, topsoil removal, tree and stump removal, and the removal and protection of miscellaneous items within the project area.

1.02 Related Work

A. Section 02 41 13.13 – Pavement Removal

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Location of Underground Utilities

The Contractor shall call MISS DIG at least three work days before excavating in an area so that utility companies can identify their buried utilities. The Contractor shall notify area municipalities and other utilities in the area that do not participate in the MISS DIG program for location of their utilities.

3.02 Stripping and Stockpiling of Topsoil

Prior to excavating, the existing topsoil surface shall be stripped and stockpiled from within the limits of the proposed excavation.

3.03 Removal of Fences, Signs, Mailboxes, Ornaments, and Other Objects

Fences, signs, mailboxes, ornaments, and similar objects that fall within the project area shall either be protected or removed. If removed, the materials shall be carefully taken apart and stored in a place where they will not be damaged or stolen.

Where mailboxes are removed, a temporary mailbox shall be installed and maintained by the Contractor until the permanent one is replaced.

Traffic signs shall not be removed unless approved by the agency responsible for them. If approved for removal, traffic signs and posts shall be reinstalled in accordance with the requirements of the agency responsible for them.

If any of the materials to be removed are damaged or badly deteriorated before the Contractor removes them, the Contractor shall notify the Owner before the object is removed. Materials that are damaged, stolen, or lost after they have been removed shall be replaced by the Contractor at no increase in project cost.

3.04 Conflicts with Utility Poles

Where the proposed excavation requires that a pole or guy be supported or temporarily relocated, the Contractor shall make arrangements with the appropriate utility to have the pole or guy supported or relocated. Any costs for this shall be the Contractor's expense.

If the Contractor supports the pole or relocates the guy themselves, the method used shall meet the approval of the appropriate utility. The Contractor shall be solely responsible for any supporting work to the utility company.

3.05 Trees and Brush

Brush lying within the limits of the proposed excavation shall be cleared by the Contractor. Brush shall be removed from the project area and disposed of properly.

Trees lying within the limits of the proposed excavation that are to be removed shall be cut down by the Contractor. Plans may not show all trees of all nature and the Contractor shall become familiar with the project and base their work on their own assessment. The Contractor shall coordinate with the Owner as to which trees are to be left in place and those that will be acceptable to remove. The Contractor shall notify the property owner (or the adjacent property owner if the tree is located in a public right-of-way) in advance of cutting down tree(s). The wood from the tree(s) shall be offered to the landowner. If the landowner wants the wood, the tree shall be cut into sections 8 feet long and stacked adjacent to the project area.

Small branches, limbs, and other debris shall be removed from the area by the Contractor and disposed of properly. If the landowner does not want wood from the trees, all wood including branches, limbs, and other debris shall be removed from the area by the Contractor and disposed of properly.

Stumps shall be removed in their entirety and disposed of away from the project area in an acceptable manner. Burning or burying along the project route is not acceptable.

END OF SECTION

SECTION 31 23 01
EXCAVATING, FILLING, AND GRADING

PART 1 - GENERAL

1.01 Work Included

The work of excavating, filling, and grading includes, but is not necessarily limited to:

- A. Excavating for footings and foundations;
- B. Filling and backfilling to attain indicated grades;
- C. Trenching and trench backfilling;
- D. Rough and finish grading of the site; and
- E. Furnishing and installing granular cushion under concrete slabs on grade.

1.02 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

- A. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- B. Michigan Department of Transportation 2020 Standard Specifications for Construction
- C. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 02 41 13.13 – Pavement Removal
- C. Section 31 25 00 – Soil Erosion and Sedimentation Control

1.04 Job Conditions

A. Dust Control

Dust caused by the Contractor's operations during performance of the work, or resulting from the condition in which the Contractor leaves the site, shall be controlled by the Contractor. The Contractor shall use all means necessary to control dust on and near the work zone and all off-site borrow areas.

All surfaces shall be thoroughly moistened, as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

B. Protection

The Contractor shall use all means necessary to protect all materials before, during, and after installation and to protect all objects designated to remain.

In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Safety

The Contractor is responsible for conducting operations in a safe and orderly manner and in conformance with MIOSHA P.A. 154.

D. Permits

Unless otherwise provided, the Contractor is responsible to obtain and comply with permits required under Parts 31 and 91 of Michigan PA 451 of 1994 (Natural Resources and Environmental Protection Act) and any local ordinances.

PART 2 - PRODUCTS

2.01 Fill Material – General

All fill material shall be subject to the approval of the Engineer.

For approval of fill material, notify the Engineer at least four working days in advance of intention to import material, designate the proposed borrow area, and permit the Engineer to sample, as necessary, from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

2.02 Fill, Trench, and Structural Backfill Material

Fill material, unless specified otherwise, shall be soil or soil-rock mixture that is free from organic matter and other deleterious substance. It shall contain no rocks or lumps over 6 inches in greatest dimension and not more than 15 percent of the rocks or lumps shall be larger than 2½ inches in greatest dimension.

Fill material obtained from offsite sources shall meet the requirements of the preceding paragraph and additionally, shall be predominantly granular with a maximum particle size of 2 inches and a plasticity index of 12 or less.

Fill material placed within 2 feet horizontally of the base of building foundations and/or slabs shall have a plasticity index of 15 or less.

2.03 Sand

Sand shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2020 Standard Specifications for Construction.

2.04 Granular Cushion

Granular cushion under slabs shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2020 Standard Specifications for Construction.

2.05 Sand for Backfill and Pipe Bedding

Sand shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2020 Standard Specifications for Construction.

2.06 Aggregate for Pipe Bedding

Aggregate shall meet the requirements of Series 6AA aggregate, as specified in the Michigan Department of Transportation 2020 Standard Specifications for Construction.

2.07 Aggregate for Backfill

Aggregate shall meet the requirements of 21AA crushed aggregate or 4G open-graded aggregate, as specified in the Michigan Department of Transportation 2020 Standard Specifications for Construction.

2.08 Flowable Fill

Flowable fill shall be a mixture of Portland cement, fly ash, sand, and water in the following proportions.

Flowable Fill Mixture Ratios		
Material	Type	Quantity
Portland Cement	Type I or IA	50 lb/cyd
Fly Ash	ASTM C618, Class C or F	500 lb/cyd
Sand	MDOT 2NS	2,850 lb/cyd
Water		Approx. 376 lb/cyd (sufficient to produce desired flowability)

Flowable fill shall be produced and delivered at a minimum temperature of 50 degrees Fahrenheit. Mixtures shall be transported to the point of placement in a revolving drum mixer or agitator.

2.09 Geotextile

Geosynthetics must be composed of long-chain synthetic fiber of at least 85 percent, by weight, polyolefins or polyesters. Geosynthetics must be capable of resisting degradation from chemicals, mildew, rot, and ultraviolet (UV) light.

Geotextile used to prevent intermixing of soft subgrade and subbase materials shall meet the requirements per the Michigan Department of Transportation 2020 Standard Specifications for Construction, as shown in Table 910-1 for geotextile stabilization and separator.

2.10 Other Materials

All other materials not specifically described, but required for a complete and proper installation, shall be as selected by the Contractor and subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 General

Prior to all work of this section, the Contractor shall become thoroughly familiar with the site, the site conditions, and all portions of the work falling within this section. The Contractor shall not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections, tests, and approvals. Should any of the work be enclosed or covered up before it has been approved, the Contractor shall uncover all such work at no additional cost to the Owner. After the work has been completely tested, inspected, and approved, the Contractor shall make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

The Contractor shall excavate ahead of the proposed utility installation to expose any existing buried utilities. If existing utility grades conflict with the proposed utility grade, the proposed utility grade may be adjusted by the Engineer, if necessary, to miss the existing utility grade at no additional expense to the contract.

3.02 Geotextile Stabilization and Geotextile Separator

Deliver and store geosynthetics in packaging capable of resisting UV radiation, contaminants, and moisture. Label each unit of material with product information, including supplier and lot identification. Do not expose geosynthetics to direct sunlight for prolonged periods. Repair or replace damaged geosynthetics at no additional cost to the project.

A. Geotextile Placement

Place or install geotextile products in accordance with the manufacturer's installation guidelines and this subsection.

Do not operate equipment required to place backfill directly on geotextile products. Eliminate wrinkles or waves that develop during placement. Place the products in direct contact with the soil below before placing backfill on the geotextile products.

Shingle-lap longitudinal and transverse joints at least 2 feet, or seam the joints in accordance with the manufacturer's recommendations. Ensure field or factory seams meet the minimum grab tensile strength for the product application. Place seams facing upward for inspection purposes.

Repair tears or damage to the geotextile in accordance with the manufacturer's recommendations.

B. Aggregate or Granular Material Placement

Spread and grade the first layer of aggregate or granular material after placing geotextile to create a stable work platform before compaction. Place additional aggregate or granular material, as required, and compact. Fill ruts with additional aggregate or granular material and compact before placing each subsequent layer. The cost of aggregate or granular material, including additional quantities required to fill ruts, is included in the unit prices for related pay item(s).

3.03 Excavating

Where depressions result from, or have resulted from, the removal of surface or subsurface obstructions, the Contractor shall open the depression and remove all debris and soft material as directed by the Engineer.

The Contractor shall excavate to the grades shown on the drawings. Where excavation grades are not shown on the drawings, excavation shall be completed, as required, to accommodate the installation.

All over-excavated areas shall be backfilled and compacted at no additional cost to the Owner.

3.04 Preparation of Subgrade

After the site has been cleared, stripped, and excavated to within 6 inches of the specified depths for recompaction, the exposed surface shall be scarified to a minimum depth of 6 inches, thoroughly moisture-conditioned, and compacted to the requirements specified below for fill.

All ruts, hummocks, and other uneven surfaces shall be removed by surface grading prior to placement of fill.

3.05 Subgrade Undercutting

Subgrade undercutting shall be performed to replace material susceptible to frost heaving, differential frost action, or unstable soil conditions, as determined by the Engineer.

After the subgrade has been excavated to the approximate grade, the Engineer will inspect the grade to determine if subgrade undercutting is required and to determine the limits of such undercutting. The Contractor shall provide suitable equipment for proof rolling the grade. The inspection, proof rolling, and subgrade undercutting shall be completed prior to placing any embankment, road base, or pavement.

The Contractor shall undercut the subgrade within the limits defined by the Engineer. All excavated material resulting from the undercutting shall become the Contractor's property disposed of outside the project limits, unless otherwise directed. The volume of earth removed by subgrade undercutting shall be replaced by suitable soils as follows:

A. Type I Subgrade Undercutting - backfill with selected clay or similar material approved by the Engineer.

B. Type II Subgrade Undercutting - backfill with sand.

C. Type III Subgrade Undercutting

Backfill with the material excavated from subgrade undercut areas after mixing the excavated material to break up the undesirable strata of soils or with other Engineer-approved backfill material.

D. Type IV Subgrade Undercutting

Backfill with 21AA crushed aggregate or 4G open-graded aggregate. Encapsulate 4G aggregate with geotextile separator.

Backfill material shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

3.06 Excess Water Control

Fill material shall not be placed, spread, or rolled during unfavorable weather conditions. Operations shall not resume until moisture content and fill density are satisfactory to the Engineer. Berms or channels shall be provided to prevent flooding of subgrade. All water collecting in depressions shall be promptly removed.

Where soil has been softened or eroded by flooding or placement during unfavorable weather, all damaged areas shall be removed and compacted as specified below for fill and compaction.

The Contractor shall provide suitable means and equipment to maintain excavations and other parts of the work free from water.

Dewatering means and methods shall provide dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3.07 Fill and Compaction

After subgrade compaction has been approved by the Engineer, the Contractor shall place approved fill material in layers not exceeding 8 inches in uncompacted thickness.

The fill material shall be watered or aerated, as necessary, and thoroughly mixed to obtain a moisture content that will permit proper compaction.

Each soil layer shall be compacted to at least the specified minimum degree. The filling and compaction process shall be repeated until plan grade is attained.

A. Compaction Requirements

Unless otherwise specified on the drawings or in other sections of the specifications, fill and backfill shall be placed in 8-inch lifts and each lift shall be compacted to not less than the percentages of the maximum density stated in Section 01 45 16.02 – Density and Aggregate Testing.

Compaction by jetting will not be permitted unless specifically authorized by the Engineer.

3.08 Grading

Except as otherwise directed by the Engineer, the Contractor shall perform all rough and finish grading required to attain the elevations shown on the drawings.

Tolerances For Grading			
Rough Grade		Finish Grade	
Building, roads, and parking areas	Plus or minus 0.1 feet	Granular cushion under concrete slabs	Plus or minus 0.05 feet
Landscaped areas	Plus or minus 0.25 feet	Parking areas	Plus or minus 0.03 feet
		Landscaped areas	Plus or minus 0.1 feet

After grading is completed and has been accepted by the Engineer, the Contractor shall permit no further excavating, filling, or grading.

The Contractor shall use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

3.09 Excavating for Footings

Earth surfaces, upon which footings will be placed, shall be compacted in accordance with the compaction requirements established in this section of these specifications.

The Contractor shall verify that all compaction is complete and approved prior to excavating for footings.

The Contractor shall excavate to the required lines and grades. The bottom of trenches shall be cut level and all loose soil shall be removed. Where soft spots are encountered, unsuitable materials shall be removed and replaced with flowable fill at no additional cost to the Owner.

3.10 Placing Granular Cushion

The Contractor shall carefully place the specified granular cushion in areas to receive concrete slabs on grade, uniformly attaining the thickness indicated on the drawings, and providing all required transition planes.

3.11 Trenching

The Contractor shall perform all trenching required for the installation of items where the trenching is not specifically described in other sections of these specifications.

All trenches shall be open construction, with sufficient width to provide free working space at both sides of the trench and around the installed item as required for pipelaying, backfilling, and compacting.

Trenching shall be completed, as required, to provide the elevations shown on the drawings.

Where elevations are not shown on the drawings, trench to sufficient depth to give a minimum of 18 inches of fill above the top of the pipe, measured from the adjacent finished grade.

Where trench excavation is inadvertently carried below proper elevations, the over-excavated area shall be backfilled with material approved by the Engineer, and then compacted to provide a firm and unyielding subgrade and/or foundation to the approval of the Engineer and at no additional cost to the Owner.

The Contractor shall properly support all trenches in accordance with all applicable rules and regulations.

The Contractor shall brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage.

In the event of damage to such improvements, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

Bracing, sheeting, and shoring shall be constructed so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength. The Contractor shall exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse and caving of the excavation faces being supported.

Trenched material shall be stockpiled in a manner to prevent water running into the excavations. Surface drainage shall not be obstructed. A means shall be provided whereby storm and wastewaters are diverted into existing gutters, other surface drains, or temporary drains.

3.12 Foundation for Pipes

Trench bottoms shall be graded to provide a smooth, firm, and stable foundation free from rock points throughout the length of the pipe.

A minimum of 4 inches of sand or aggregate bedding shall be placed in the bottom of the trench.

In areas where soft, unstable materials are encountered at the surface where the bedding is to be placed, the unstable material shall be removed and replaced with material approved by the Engineer. The area shall be undercut to a sufficient depth to develop a firm foundation for the item being installed. Over excavation and replacement of material shall be the responsibility of the Contractor and shall be completed at no additional cost to the Owner.

At each joint in pipe, the bottom of the trench shall be recessed, as required, to relieve the bell of the pipe of all load and to ensure continuous bearing of the pipe barrel on the firm foundation.

The pipe subgrade shall be shaped to fit the bottom of the trench to the pipe shape.

3.13 Bedding for Pipes

Pipe bedding shall be in accordance with the details in the construction plans.

The pipe bedding shall be shaped to match the bottom $\frac{1}{4}$ of the pipe's shape. The bedding shall be excavated to accommodate the pipe bells. The completed bedding shall provide uniform support of the entire length of pipe.

The bedding material shall be compacted after placing along both sides of the pipe.

3.14 Backfill for Pipes

Unless otherwise directed, all trenches and excavation shall be backfilled as the pipe is laid. No pipes shall be backfilled until the sewer elevations, gradient, alignment, and the pipe joints have been observed by the Engineer.

The trench shall be backfilled to the proposed final elevations with suitable materials. Unless other compaction methods are demonstrated and approved by the Engineer, backfill shall be placed in 8-inch lifts and compacted to the required density as stated in Section 01 45 16.02 – Density and Aggregate Testing.

In areas which are not to be restored with a pavement or aggregate surface, the backfill shall be graded to a height slightly above the adjacent surface. When final restoration of the area is completed by the Contractor, the backfill surface shall be excavated (or filled if settlement has occurred), trimmed, or graded, as necessary, to provide for the required depth of topsoil and its transition to adjacent, undisturbed areas.

The Contractor shall correct any areas where the trench backfill settles by adding fill, topsoil, and re-seeding.

3.15 Miscellaneous Pipe Repair

When an existing sewer pipe, drain pipe, field tile, or other existing pipe is damaged as a result of construction activities and is not designated for removal or abandonment on the plans or by the Engineer, it shall be repaired by the Contractor.

The section of damaged pipe shall be removed to existing joints or to sawed joints where the existing pipe is sound and undamaged. A length of new pipe of the same size as the original pipe shall be furnished and installed to replace the section of pipe removed. The new pipe may be any one of the following materials:

- A. Same material, class or thicknesses, as the original pipe
- B. PVC Schedule 40, for pipes 8 inches or less in diameter
- C. PVC SDR 26, for pipes 8 inches or greater in diameter
- D. Other pipe material approved by the Engineer

Each end of the new section of pipe shall be connected to the remaining sections of existing pipe using a rubber gasketed sleeve, suitable for the pipe materials and sizes being joined, to provide a watertight connection. The repaired section of pipe shall be firmly bedded in sand or aggregate, compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

END OF SECTION

SECTION 31 25 00
SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 Work Included

The Contractor shall provide permanent and/or temporary erosion and sedimentation control as called for on the plans and as required by the county soil erosion agent and permit.

1.02 Definitions

A. Major rainfall event – ¼-inch or more precipitation over a period, delineated by dry periods of at least 24 hours.

1.03 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

- A. ASTM D3786 – Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
- B. ASTM D4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
- C. ASTM D4491 – Standard Test Method for Water Permeability of Geotextiles by Permittivity
- D. ASTM D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles
- E. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- F. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile
- G. ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
- H. Michigan Department of Transportation 2020 Standard Specifications for Construction

1.04 Related Work

- A. Section 32 92 00 – Turf Establishment

1.05 Permit

The Contractor shall apply for and obtain an Act 451 permit from the local Soil Erosion and Sedimentation Control Enforcing Agent. The Contractor shall pay all permit fees and provide any required bonds or insurance.

1.06 Scheduling

- A. Control measures shall be constructed by the Contractor prior to the time construction starts uphill or upstream from the control measure location.
- B. The Contractor shall inspect all temporary erosion control measures weekly and within 18 hours of major rainfall events.
- C. Maintenance and replacement of erosion control measures shall be completed by the Contractor when necessary, or as directed by the soil erosion control agent or the Owner.
- D. Removal and cleanup of temporary control structures shall be provided by the Contractor within one week after the control measure is no longer needed.

1.07 General Soil Erosion and Sedimentation Control Procedures

- A. Keep disturbed areas small.
- B. Stabilize and protect disturbed areas as soon as possible.
- C. Keep storm water runoff velocities low.
- D. Protect disturbed areas from runoff.
- E. Retain sediment within the construction area.

PART 2 - PRODUCTS

2.01 Materials

A. Geotextiles

Geotextiles for filters shall be non-woven, meeting the requirements of the table below.

Silt fence geotextiles shall meet the requirements of the following table and shall be designed to collect eroded sediment transported in storm water runoff. The fabric shall have at least 70 percent minimum retained strength after 500 hours of U.V. exposure when tested according to ASTM D4355.

Geotextile Category	Property/Test Method					
	Grab Tensile Strength (min) ASTM D4632 lbs	Trapezoid Tear Strength (min) ASTM D4533 lbs	Puncture Strength (min) ASTM D4833 lbs	Mullen burst strength (min) ASTM D3786 psi (a)	Permittivity ASTM D4491 Per second	Apparent Opening Size (max) ASTM D4751 (b) Millimeters
Filters	90	45	45	140	0.5	0.21
Silt Fence	100(c)	45	--	--	0.1	0.60
(a) ASTM D3786. The fluid displacement rate for the Mullen burst test equipment must be 170± 5 ml/minute. Subtract tare strength from the ultimate burst strength as specified by ASTM.						
(b) Filtration opening size (FOS, Canadian General Standards Board, method 148.1 No. 10) is permitted as an alternate test method to ASTM D4751 for non-woven geotextiles.						
(c) Elongation at the specified grab tensile strength not to exceed 40 percent for silt fence.						

B. Stone

Unless otherwise directed, stone shall meet the requirements of Series 6AA as specified in Michigan Department of Transportation 2020 Standard Specifications for Construction.

2.02 Mixtures

A. Seed

Seed shall meet the requirements of Section 32 92 00 – Turf Establishment.

2.03 Fabricated Items

A. Silt Fence

Geotextile for silt fences shall meet the requirements of Section 2.01. The geotextile shall be attached to machine pointed No. 2 common grade hardwood posts, using at least 5 staples through wood lath a minimum of $\frac{3}{8}$ -inch thick and 2 feet long. Post spacing shall not exceed $6\frac{1}{2}$ feet. Posts must be of sufficient length and cross-section to support the installed silt fence under full sediment load; however, posts shall have cross-sectional area of at least $2\frac{1}{4}$ square inches and shall be a minimum of 36 inches in length. Silt fence fabric must be a minimum height of $2\frac{1}{2}$ feet. Silt fence shall have at least two permanent markings or affixed labels per assembled roll which positively identifies the fabricator.

B. Mulch Blankets

Mulch blankets shall meet the requirements of Section 32 92 00 – Turf Establishment.

C. Filter Sacks

All materials shall adhere to the requirements of the Michigan Department of Transportation 2020 Standard Specifications for Construction, except fabric drop, which shall consist of a geotextile filter sack inserted into the drainage structure under the cover.

Filter sack shall be as manufactured by “Siltsack”, “Catch-All”, “Ultra-Urban Filter”, “Flogard + Plus”, or approved equal. The filter sacks shall be installed and maintained in accordance with the manufacturer’s specifications.

PART 3 - EXECUTION

3.01 General Requirements

The Contractor shall perform work on the project in a manner which prevents or reduces erosion and controls sedimentation. The Contractor shall provide controls which keep sedimentation from the project area, within the limits of the project area, and out of any lake, river, stream, wetland, or storm drain.

The Contractor shall install appropriate controls or measures to control or prevent erosion or sedimentation from the project area before beginning any earth disturbance operations. Temporary erosion and sedimentation control measures shall be maintained by the Contractor, until such times as disturbed areas have become permanently stabilized.

During the life of the project, the Contractor shall provide any additional soil erosion or sedimentation control measures necessary to address specific problems which develop in and adjacent to the project area.

3.02 Time Limitations

Grading operations shall be completed as soon as practical. Permanent soil erosion controls for disturbed areas shall be completed within 5 calendar days of the completion of grading, except that permanent measures shall be completed within 24 hours when the disturbed area is within 150 feet of a lake, stream, river, or wetland area.

Temporary soil erosion measures shall be implemented when it is not practical to complete the permanent measures.

3.03 Area Limitations

For linear projects (roads, sewers, water main, etc.), the length of the disturbed area shall be limited to ½-mile, unless otherwise approved by the Owner.

Areas outside the project right-of-way or outside the grading limits shown on the drawings shall not be disturbed, unless otherwise approved by the Owner.

3.04 Construction of Erosion and Sedimentation Controls

The Contractor shall provide all permanent and temporary erosion and sedimentation controls shown on the drawings, required by the permitting agency, or necessary to appropriately control erosion and sedimentation from the project area.

A. Check Dams

Check dams shall be installed and maintained across ditches and watercourses, which might convey surface runoff from disturbed areas within the project area, or where shown on the drawings or required by the Owner or permitting agency.

B. Silt Fence

The Contractor shall furnish, erect, and maintain silt fence around the perimeter of the project area where earth will be disturbed and sediment from the disturbed area could be conveyed.

C. Filters

Fabric or stone filters shall be installed in waterways or in advance of inlets to drainage courses or storm sewers.

D. Sediment Traps and Basins

Sediment traps shall be excavated upstream of check dams and where shown on the drawings or directed by the Owner or permitting agency. Check dams shall be installed downstream of the sediment traps and basins prior to the sediment traps and basins being excavated.

E. Seeding

Earth areas shall be stabilized with turf immediately following the completion of earthwork and grading activities. Where permanent seeding cannot be completed, earth areas shall be

stabilized with temporary seeding. Areas which are properly seeded temporarily for stabilization shall be permanently seeded, as shown, as the work can be appropriately completed.

F. Mulch Blankets

Areas susceptible to erosion from moving water, which are not to be paved, shall be seeded and protected with high velocity mulch blankets.

3.05 Maintenance and Erosion and Sedimentation Control

The Contractor shall maintain all temporary erosion and sedimentation controls until such time as the permanent measures have been completed and established.

The Contractor shall inspect all erosion and sedimentation controls weekly and within 18 hours of a major rain event.

Damaged controls or measures shall be replaced or repaired. Sediment shall be cleaned from traps, sumps, basins, filters, and fences periodically. Sediment shall be removed to prevent the accumulation of sediment from exceeding half of the volume of traps, sumps, and basins. Sediment or debris along silt fences shall be removed before the accumulation reaches half the height of the fence.

Sediment and debris removed from soil erosion and sedimentation control devices shall be disposed of properly by the Contractor. Sediment shall not be used for fill or backfill in the project area, except when an area is specifically designated on the plans or by the Owner.

Drainage filters shall be cleaned when an accumulation of silt might reduce flow and result in flooding.

Any sediment from the construction area which enters storm sewers or drainage ditches shall be removed by the Contractor. Since sediment can be carried great distances within storm sewers, it may be necessary for many segments of downstream storm sewer segments to be televised, jetted, and vacuumed. If the Owner believes that the Contractor has allowed or provided the potential for sediment to enter storm sewers or drainage courses, the Contractor will be responsible for the costs of inspection and removing sediment from downstream drains, whether it can be conclusively proven that the sediment was the result of the Contractor's actions (or inaction).

3.06 Removal of Erosion and Sedimentation Control Devices

Temporary soil erosion and sedimentation control devices shall be removed or obliterated by the Contractor when the permanent measures are in place and established. Any areas damaged by the removal of the temporary devices shall be corrected by the Contractor.

Mulch used for temporary erosion control may either be removed or worked into the soil before the permanent topsoil and seeding is completed.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE

PART 1 - GENERAL

1.01 Work Included

This specification describes the requirements for constructing an aggregate base under a proposed pavement surface.

1.02 References

A. Michigan Department of Transportation 2020 Standard Specifications for Construction

1.03 Related Work

A. Section 01 45 16.02 – Density and Aggregate Testing

B. Section 31 23 01 – Excavating, Filling, and Grading

PART 2 - PRODUCTS

2.01 Materials

A. Aggregate shall meet the requirements of Series 21AA aggregate, as described in the Michigan Department of Transportation 2020 Standard Specifications for Construction, unless otherwise noted on the plans, proposal, or specifications.

PART 3 - EXECUTION

3.01 Subgrade Preparation

Aggregate shall not be placed until the subgrade is properly prepared. The subgrade shall be graded to the required elevations and shape for placement of the specified aggregate thickness. The subgrade shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Soft or yielding spots shall be excavated and replaced with sound material.

3.02 Placement

Aggregate shall be placed in a manner that provides a uniform cross section of the specified thickness and the required surface grades. The edges of the area of aggregate surface shall be straight and uniform.

Aggregate shall be placed in lifts not exceeding 8 inches (loose measure) and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

END OF SECTION

SECTION 32 12 16
HMA PAVING

PART 1 - GENERAL

1.01 Work Included

This work includes preparation for and construction of one or more courses of plant mixed Hot Mix Asphalt (HMA).

1.02 References

- A. Michigan Department of Transportation 2020 Standard Specifications for Construction
- B. Michigan Testing Methods (MTM)
- C. Michigan Department of Transportation HMA Production Manual
- D. ASTM E965 – Standard Test Method for Measuring Pavement Macrotexture Depth Using a Volumetric Technique
- E. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 31 23 01 – Excavating, Filling, and Grading
- C. Section 32 11 23 – Aggregate Base

1.04 Quality Assurance and Quality Control

- A. The Engineer will take 20,000 gram samples of the HMA mixture using the mini-stockpile method. The rate of sampling will be determined by the Engineer.

PART 2 - PRODUCTS

2.01 Submittals

The Contractor shall submit material source and mix designs to the Engineer for approval prior to the start of construction.

2.02 Mixtures

Materials shall meet the requirements of Sections 501.02, 902, and 904 of the Michigan Department of Transportation 2020 Standard Specifications for Construction. If milling, the mix design to initially cover the milled surface must be approved prior to milling operations.

Provide aggregates, mineral filler (if required) and asphalt binder to produce a mixture proportioned within Superpave Final Aggregate Blend Gradation Requirements, and meeting the uniformity tolerance limits in the Uniformity Tolerance Limits for HMA Mixtures tables below.

Superpave Final Aggregate Blend Gradation Requirements					
	Mix Number				
	5	4	3 Leveling Course	3 Base Course	2
Standard Sieve	% Passing Criteria (Control Points)				
1½ inch	-	-	-	-	100
1 inch	-	-	100	100	90-100
¾ inch	-	100	90-100	90-100	≤90
½ inch	100	90-100	≤90	≤90	-
⅜ inch	90-100	≤90	-	-	-
No. 4	≤90	-	-	-	-
No. 8	47-67	39-58	35-52	23-52	19-45
No. 16	-	-	-	-	-
No. 30	-	-	-	-	-
No. 50	-	-	-	-	-
No. 100	-	-	-	-	-
No. 200	2.0-10.0	2.0-10.0	2.0-8.0	2.0-8.0	1.0-7.0

Uniformity Tolerance Limits for HMA Mixtures					
Parameter		Top and Leveling Course		Base Course	
Number	Description	Range 1 (a)	Range 2 (b)	Range 1 (a)	Range 2 (b)
1	% Binder Content	-0.3 to +.4	+/- 0.5	-0.3 to +0.4	+/- 0.5
2	% passing # 8 and Larger Sieves	+/- 5	+/- 8	+/- 7	+/- 9
		+/- 4	+/- 6	+/- 6	+/- 9
		+/- 1	+/- 2	+/- 2	+/- 3
3	Crushed Particle Content	Below 10%	Below 15%	Below 10%	Below 15%
(a) This range allows for normal mixture and testing variations. The mixture must be proportioned to test as closely as possible to the Job-Mix-Formula (JMF).					
(b) Deviation from JMF.					

Parameter Number 2, as shown in the Uniformity Tolerance Limits for HMA Mixtures table, is aggregate gradation. Each sieve will be evaluated on one of the three gradation tolerances. If more than one sieve is exceeding Range 1 or Range 2 tolerances, only the one with the largest exceedance will be counted as the gradation parameter.

The master gradation should be maintained throughout production; however, price adjustments will be based on the Uniformity Tolerance Limits for HMA Mixtures table. Aggregates which are used in plant-mixed HMA mixtures must not contain topsoil, clay, or loam.

The mixture will be considered out-of-specification, as determined by the acceptance tests, if for any one mixture, two consecutive tests per parameter, (for Parameter 2, two consecutive

aggregate gradations on one sieve) are outside Range 1 or Range 2 tolerance limits. If a parameter is outside of Range 1 tolerance limits and the second consecutive test shows that the parameter is outside of Range 2, then it will be considered to be a Range 1 out-of-specification. Consecutive refers to the production order and not necessarily the testing order. Out-of-specification mixtures are subject to a price adjustment of 50 percent of the bid amount.

HMA mixtures and application rates shall be as shown on the plans.

Reclaimed Asphalt Pavement (RAP) shall be limited to 0 percent to 17 percent RAP by weight of the total binder in the mixture. No binder grade adjustment is made to compensate for the stiffness of the asphalt binder in the RAP.

Reclaimed Asphalt Shingles (RAS) will not be allowed in the mixture.

Oil bottoms/recycled motor oil will not be allowed in the mixture.

PART 3 - EXECUTION

3.01 Equipment

Equipment shall meet the requirements of Section 501.03 of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

3.02 HMA Sampling and Testing

The HMA will be sampled at a rate determined by the Engineer that is appropriate for the project.

Samples will be obtained using the "Mini-stockpile" method in accordance with MTM 324.

Quantitative Extraction of Bitumen from HMA Paving Mixtures (MTM 325) will be used to determine the asphalt content of the HMA mixture.

The Owner is responsible for HMA testing.

At the Engineer's discretion, original samples of asphalt binder will be taken by the Contractor and delivered to the Engineer prior to incorporation into the mixture. The frequency of sampling will be determined by the Engineer. The cost of obtaining and delivering the samples to the Engineer will be included in the HMA pay item(s). The Contractor must certify, in writing, that the materials used in the HMA mixture are from the same source as the materials used in developing the HMA mixture design and the bond coat is from an approved supplier, as stated in the Material Quality Assurance Procedures Manual.

3.03 Preparation

A. Aggregate Base (for Pavements Constructed on an Aggregate Base)

See Section 32 11 23 – Aggregate Base.

B. Existing Pavement (for Overlays)

The existing pavement surface shall be thoroughly cleaned of all dirt and debris. Loose material shall be removed from all joints and cracks using compressed air, or other suitable means that does not damage the existing pavement.

The existing pavement surface shall be observed by the Engineer prior to placement of a bond coat or HMA.

C. Removal of Existing Pavement Surface

1. Butt Joints

When a butt joint is to be provided, the existing HMA surface shall be removed to a thickness equal to the thickness of the proposed overlay, for the full width of the butt joint, where the overlay is to meet the existing pavement surface. The depth of pavement removal shall be uniformly tapered from the full depth of the overlay at the butt joint to zero, at a rate of 1-inch per 10 feet.

2. Edge Trimming

Where the edge of an existing HMA pavement is required, the HMA pavement shall be cut its full depth in a manner that provides a vertical, straight edge.

3. Cold Milling

Cold milling shall be performed only when the Contractor is prepared to commence subsequent operations, such as pavement repair and HMA placement, and completes these subsequent operations expeditiously.

The HMA surface shall be removed to the required depth, width, grade, and cross section. The surface shall be removed to the limits shown on the plans, or as directed by the Engineer.

Where the HMA surface is removed below the limits specified, the Contractor shall fill and compact the area removed so that the remaining surface is at the proper level. The work to restore the pavement to the required level will be at the Contractor's expense.

Do not maintain traffic on the milled surface unless specified in the contract or approved by the Engineer.

After cold milling, and before placement of a new surface, the pavement shall be thoroughly cleaned.

Remove the HMA surface to the depth, width, grade, and cross section shown on the plans. Backfill and compact depressions resulting from removal of material below the specified grade, in accordance with subsection 501.03.C.9.

Immediately after cold-milling, clean the surface and dispose of removed material.

Mill the existing pavement to the cross slope shown on the plans. Supply a 10-foot straightedge. Ensure that the finished surface does not vary longitudinally or transversely

more than ¼ inch from a 10-foot straightedge. Ensure that the milled area is free from gouges, continuous grooves, and ridges and has a uniform texture. Ensure that the horizontal gouge in the vertical edge created from the milling operation is limited to a maximum width of 1.0 inch.

D. Joint and Crack Repair

Joints and cracks in an existing pavement shall be repaired where shown on the drawings, or directed by the Engineer. Joints and cracks shall be repaired in accordance with the details shown on the drawings, or as directed by the Engineer.

All loose, broken, and unsound pavement along or adjacent to an existing joint or crack designated for repair shall be removed.

E. Hand Patching

When hand patching is called for on the plans or directed by the Engineer, the Contractor shall fill holes, depressions, joints and cracks, and areas to be repaired in an existing pavement. HMA material used for hand patching may be any HMA material approved for use as a top course. A bond coat shall be applied to the exposed pavement surfaces within the area to be patched. The HMA material shall be placed in lifts to the level of the surface of the adjacent existing pavement surface. Each lift shall be within the minimum and maximum thickness range allowed for the mix design, and shall be compacted using a mechanical vibrator or an approved roller.

F. Bond Coat

Bond coat shall be applied to existing pavement surfaces, only when they are clean and dry. Bond coats shall be uniformly applied to the pavement surface with a pressure applicator. Bond coat shall be placed in advance of HMA placement to provide for its curing prior to HMA placement.

Bond coat shall not be allowed to pool on the surface; pooling shall be removed. The adjacent pavement surfaces which are not to be overlaid shall not be sprayed with bond coat.

Bond coat shall be applied to each layer of the HMA pavement and to the vertical edges of the adjacent pavements before placing subsequent courses.

G. Transportation of HMA

HMA shall be transported to the project site in accordance with the requirements of Section 501.03.E of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

Each load of HMA delivered to the project site shall be weighed on an approved scale with automatic print out system. Weights shall be measured to the nearest 20 pounds. Scales and print out systems shall meet the requirements of Section 109 of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

H. Placement of HMA

HMA shall be placed in accordance with the requirements of Section 501.03.F of the Michigan Department of Transportation 2020 Standard Specifications for Construction and at the rate shown in the HMA Application Rate table in the project plans.

I. Rolling

HMA shall be rolled in accordance with the requirements of Section 501.03.G of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

J. Smoothness requirements as per the requirements of Section 501.03.H of the Michigan Department of Transportation 2020 Standard Specifications for Construction shall be adhered to.

K. Weather and Seasonal Limitations

1. The Contractor shall not place bond coat or HMA when precipitation is imminent or when there is moisture on the existing surface to be overlaid.
2. HMA shall not be placed when the underlying base is frozen, and the surface being paved is at least 35 degrees Fahrenheit.
3. Unless otherwise approved by the Engineer in writing, HMA shall not be placed before May 15 or after November 15.

L. Protection

The Contractor shall protect surfaces, structures, signs, poles, vehicles, and other items adjacent to the area to be paved from being discolored or damaged. Damaged items shall be corrected at the Contractor's expense. The Contractor shall protect the newly placed HMA surface from damage by traffic and construction activities.

M. Aggregate Shoulders

On resurfacing projects, existing aggregate shoulders shall be scarified prior to placing new aggregate.

Shoulders shall be maintained in a satisfactory condition to allow for vehicles to pass construction operations or for the operation of construction equipment. The Contractor shall restore any damages or disturbances to the shoulders, or to the surface between the edge of pavement and the right-of-way. The cost of restoration is considered included in the other work performed by the Contractor and will not be paid for separately.

END OF SECTION

SECTION 32 13 00
CONCRETE CURB AND GUTTER, SIDEWALK,
AND MISCELLANEOUS PAVEMENT

PART 1 - GENERAL

1.01 Work Included

This work includes all preparation, forming, concrete production and placement, finishing, jointing, reinforcing, curing, protection, and restoration for the construction of concrete curb and gutter, sidewalk, and miscellaneous pavement.

1.02 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

- A. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- B. ASTM C94 – Standard Specification for Ready-Mixed Concrete
- C. ASTM C150 – Standard Specification for Portland Cement
- D. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- E. ASTM C595 – Standard Specification for Blended Hydraulic Cements
- F. ASTM A706, ASTM A615, or ASTM A996 (Type R or Type A only) for Grade 60 steel bars
- G. ASTM A775 for epoxy coated steel reinforcement
- H. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- I. Michigan Department of Transportation 2020 Standard Specifications for Construction
- J. Michigan Department of Transportation Standard Plan
- K. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 01 45 16.01 – Concrete Testing
- B. Section 01 45 16.02 – Density and Aggregate Testing
- C. Section 02 41 13.13 – Pavement Removal

PART 2 - PRODUCTS

2.01 Materials

- A. Portland cement shall meet the requirements of ASTM C150 and ASTM C595.
- B. Coarse aggregate shall meet the requirements of Class 6AA aggregate, as described in the Michigan Department of Transportation 2020 Standard Specifications for Construction.
- C. Intermediate aggregate shall meet the requirements of Class 26A aggregate, as described in the Michigan Department of Transportation 2020 Standard Specifications for Construction.
- D. Fine aggregate shall meet the requirements of Class 2NS, 2SS, or 2MS aggregate, as described in the Michigan Department of Transportation 2020 Standard Specifications for Construction.
- E. Reinforcing steel fabric shall meet the requirements of ASTM A1064.
- F. Deformed bars must meet the requirements of ASTM A706, ASTM A615, or ASTM A996 (Type R or Type A only) for Grade 60 steel bars, unless otherwise required. All deformed bars shall be epoxy coated.
- G. Epoxy coated steel reinforcement must be coated in accordance with ASTM A775.
- H. White membrane curing compound shall conform to ASTM C309, Type 2. Curing compound shall be agitated to provide a uniform consistency prior to transfer between containers or before application.
- I. Fiber joint filler shall meet the requirements of ASTM D1751.
- J. Sand for base shall meet the requirements of Granular Material Class II, as described in the Michigan Department of Transportation 2020 Standard Specifications for Construction.
- K. The detectable warning surface shall contrast visually with adjacent walking surfaces. The Contractor shall submit the detectable warning product information to the Engineer for approval.
- L. Geotextile liner shall meet the requirements per the Michigan Department of Transportation 2020 Standard Specifications for Construction, as shown in Table 910-1 for physical requirements of geotextile.

2.02 Mixtures

Concrete shall be transit mixed 3,500 psi concrete in accordance with ASTM C94 and Section 01 45 16.01 – Concrete Testing.

Air content, slump, and compressive strength shall be according to Section 01 45 16.01 – Concrete Testing. Concrete shall contain at least six sacks of cement per cubic yard of concrete. Modifications and the use of admixtures may be submitted and shall be approved by the Engineer.

2.03 Submittals

- A. Prior to beginning construction, the Contractor shall submit the name and plant location of the proposed concrete supplier for the project.

- B. Prior to beginning construction, the Contractor shall submit mix designs for the proposed concrete mixtures proposed for use on the project for the Engineer to review.

2.04 Cross Sections

A. Sidewalk

Unless indicated otherwise on the plans, sidewalk shall have a minimum thickness of 4 inches. Sidewalk through residential driveways shall have a minimum thickness of 6 inches. Sidewalk through commercial driveways shall have a minimum thickness of 8 inches. Sidewalk through driveways shall be reinforced with #10 by 6 inches by 6 inches welded wire fabric.

B. Driveways

Unless indicated otherwise on the plans, residential driveways shall have a minimum thickness of 6 inches. Commercial driveways shall have a minimum thickness of 8 inches. Driveways shall be reinforced with #10 by 6 inches by 6 inches welded wire fabric.

C. Pavement

Concrete pavement section shall be as indicated on the plans.

D. Concrete Curbs and Concrete Curb and Gutter

Unless shown otherwise on the plans, concrete curb and concrete curb and gutters shall be in accordance with Michigan Department of Transportation Standard Road Plan R-30 Series.

PART 3 - EXECUTION

3.01 Coordination of Traffic

Hazardous areas shall be barricaded to protect pedestrian and vehicular traffic.

Work shall be scheduled so that access is maintained to driveways and entrances through the project area to the extent possible. Where a driveway or entrance must be closed for a period, the property owner or occupant shall be notified in advance of the closing.

3.02 Removal of Existing Sidewalk, Curb and Gutter, and Pavement

Where an existing sidewalk, curb and gutter, and/or pavement are to be removed and replaced, the existing structure shall be removed in accordance with Section 02 41 13.13 – Pavement Removal.

3.03 Preparation

The base shall be excavated, filled, and shaped, as required, to construct pavement of the required thickness at the proposed grades and alignment. The base shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Soft and yielding soils shall be excavated and replaced with suitable soils.

Where existing curb and gutter has been removed and prior to constructing new curb and gutter, the Contractor shall install 2 dowels, 1/2-inch in diameter, into existing curb and gutter at each end. Cost of dowels are included in the payment for curb and gutter.

Concrete may be placed by slipforming, unless indicated otherwise.

Where forms are used, the forms shall extend the full depth of the concrete. Forms shall be of sufficient strength and staked to prevent springing or yielding after placement of concrete. Flexible forms capable of making a smooth arc shall be used for curved sections. Face forms for the exposed face of curb are not required.

Where steel reinforcement is used, it shall be spliced and held in place in a manner approved by the Engineer. Splices shall be overlapped by 10 inches.

3.04 Required Grades

- A. Driveways shall be constructed with a maximum slope of 10 percent.
- B. Sidewalks shall be constructed with a maximum transverse slope of 2 percent. Transverse slopes shall be at least 1 percent, unless longitudinal drainage is provided. The longitudinal slope of sidewalk shall not exceed the general grade established for the adjacent street or highway. Where adjacent street or highway general grades are less than 5 percent, the longitudinal slope of sidewalk may exceed the general road grade to a maximum of 5 percent.
- C. Gutter grades shall not be constructed flatter than 0.4 percent, or less than the grades shown on the plans, whichever is less.

3.05 ADA Requirements

- A. Sidewalks and sidewalk ramps shall meet ADA requirements and shall follow the Michigan Department of Transportation Standard Road Plan R-28-series.
- B. ADA sidewalk ramps shall include polymer, cast in, detectable warning surfaces, red in color. ADA ramps shall be constructed per Michigan Department of Transportation and ADA specifications.
- C. Concrete ramp thickness shall be 6 inches within the first 5 feet behind the back of curb and 4 inches thick beyond the first 5 feet, with a minimum of 4 inches of Michigan Department of Transportation Class II granular material base compacted in place.

3.06 Driveway Openings

Concrete driveway openings shall be constructed in accordance with the Michigan Department of Transportation Standard Road Plan R-29 Series.

3.07 Placement of Concrete

Concrete shall not be placed until the forms (or grade, if the concrete will be slipformed) have been inspected by the Engineer. The Contractor shall notify the Engineer a minimum of 24 hours prior to scheduling a concrete pour.

The base shall be moistened just prior to placement of the concrete.

Concrete shall have a temperature between 45 degrees Fahrenheit and 90 degrees Fahrenheit at the time of placement.

Concrete shall be deposited to the proper depth and spaded or vibrated to ensure proper consolidation. Concrete shall be placed and finished in a continuous operation.

Any material required to fill low spots shall be obtained from the mixture used in the work. Exposed surfaces of the concrete slab shall be finished smooth and even by means of a moistened wood float. Sidewalk and pavement slabs shall be lightly brushed perpendicular to the normal direction of traffic. Water shall not be added to the concrete surface as an aid to finishing. The top edges of the slab and all transverse joints shall be rounded with a finishing tool having a radius of ¼-inch. Surfaces shall not vary more than 3/8-inch from the alignment and typical cross section.

Joints shall be constructed in accordance with the Michigan Department of Transportation Standard Road Plan R-29 and R-30 Series.

Expansion joint filler shall extend the full depth of the concrete, with the top of the filler material just below the finished concrete surface.

Exposed concrete surfaces shall be cured using white membrane curing compound, applied uniformly at a rate of 200 square feet per gallon. Curing compound shall be applied regardless of temperature or humidity conditions.

3.08 Protection

Concrete shall not be placed if the air temperature is not at least 25 degrees Fahrenheit and rising, or more than 90 degrees Fahrenheit. Concrete shall be protected from damage caused by freezing or rain.

The Contractor shall provide protection for existing surfaces (building faces, light poles etc.) from splattering of concrete. Any damage to building faces, light poles, etc. from concrete splatter shall be repaired or replaced at the Contractor's expense.

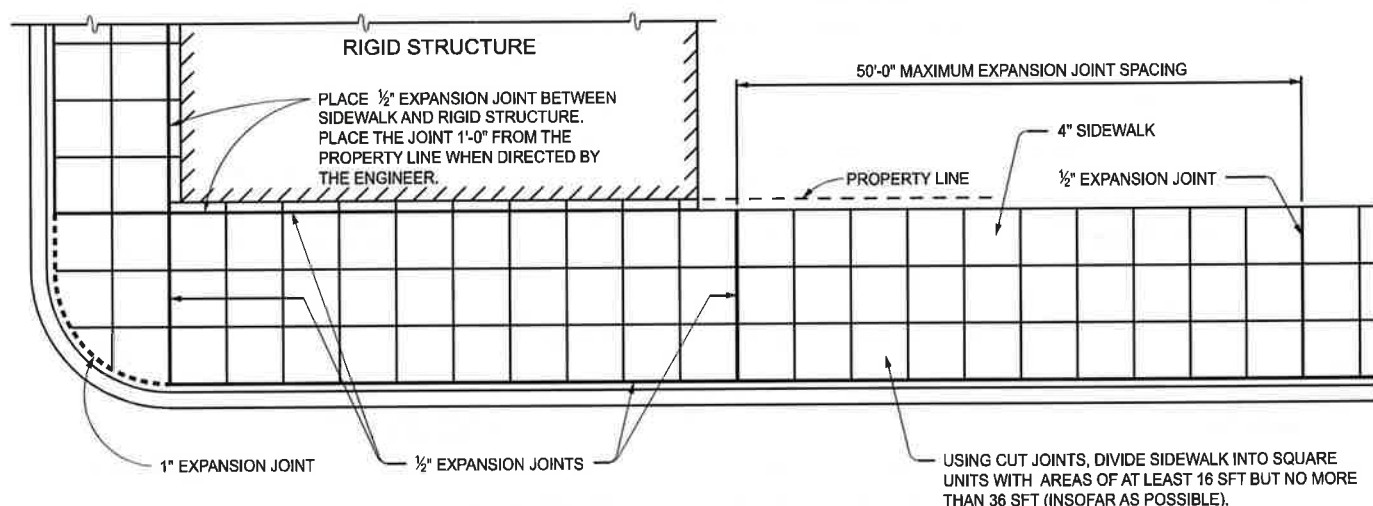
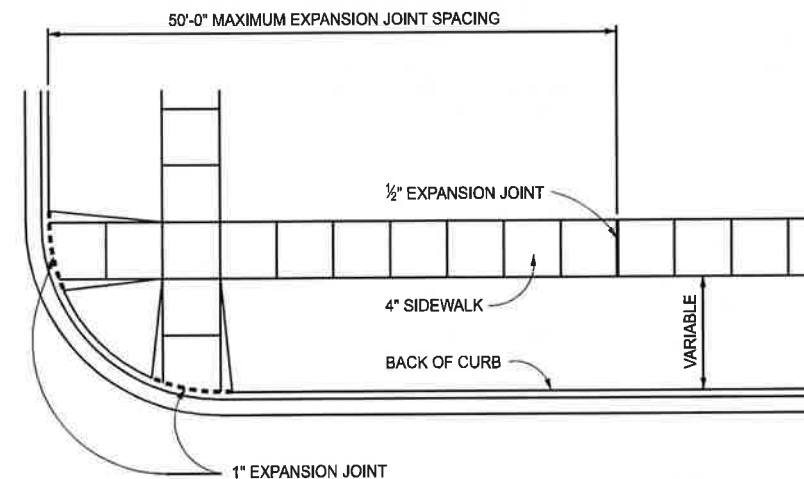
The Contractor shall provide sufficient barricading and security to protect fresh concrete from accidental damage or vandalism. Damaged concrete shall be removed to a joint and replaced at the Contractor's expense.

3.09 Cleanup

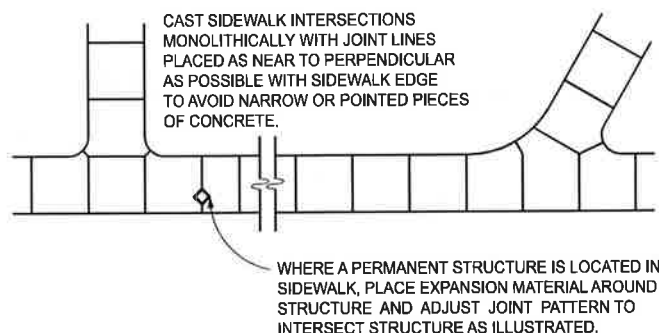
After the concrete has attained sufficient strength, the forms shall be removed.

Where adjacent areas are turf, the area next to the pavement shall be backfilled with sound earth and topsoil, and graded so the surface is about 1-inch below the pavement or as necessary to provide proper drainage.

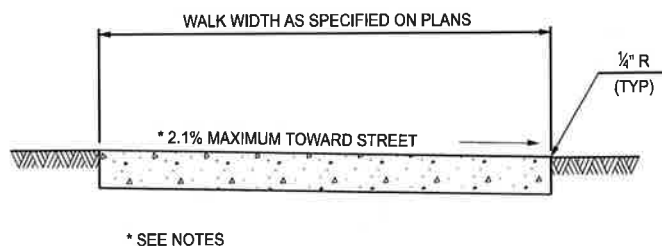
END OF SECTION



LOCATION OF JOINTS IN CONCRETE SIDEWALK



TYPICAL SIDEWALK JOINT LAYOUTS



4" CONCRETE SIDEWALK

APPROVED BY: E-SIGNED by JASON GUTTING
on 2024-09-24 12:55:49 EDT
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: E-SIGNED by Demetrius Parker
on 2024-09-24 09:51:28 EDT
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

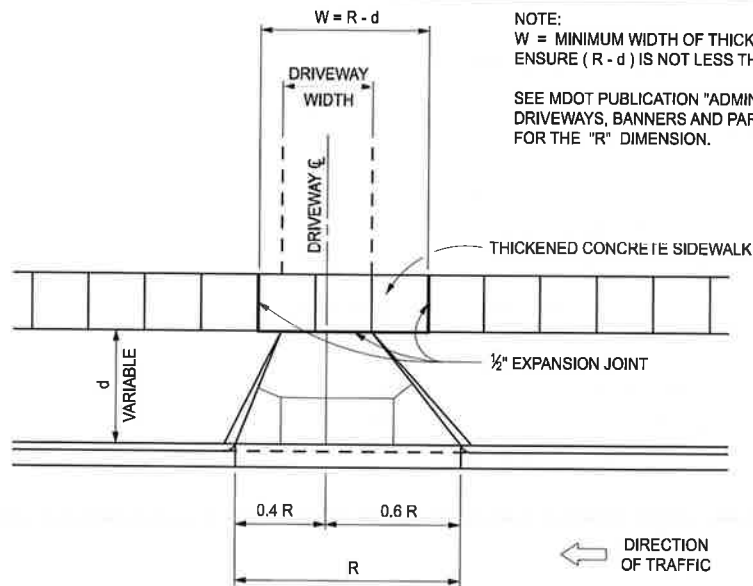
STANDARD PLAN FOR DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

12/18/2024
FHWA APPROVAL

06/12/2024
PLAN DATE

R-29-J

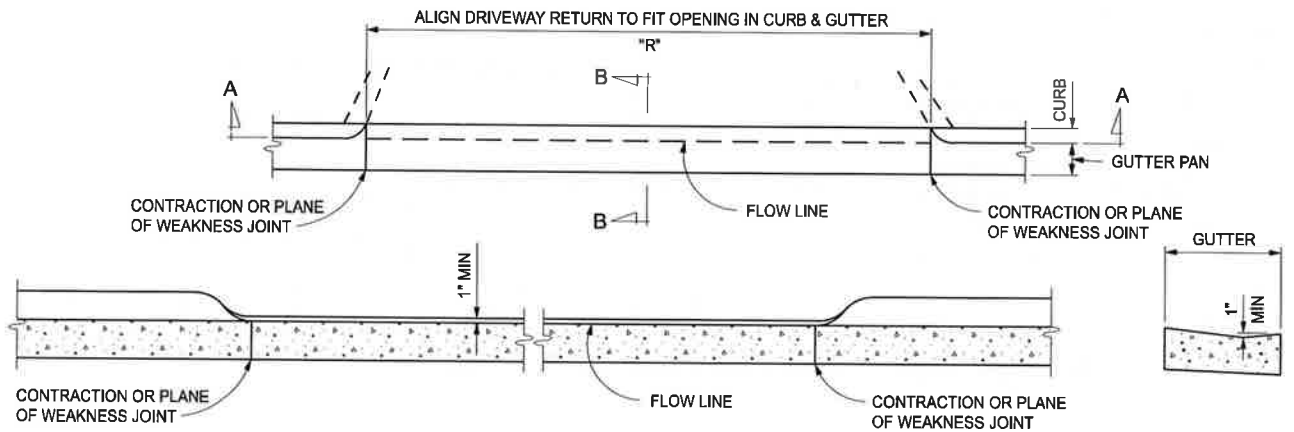
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1 OF 4



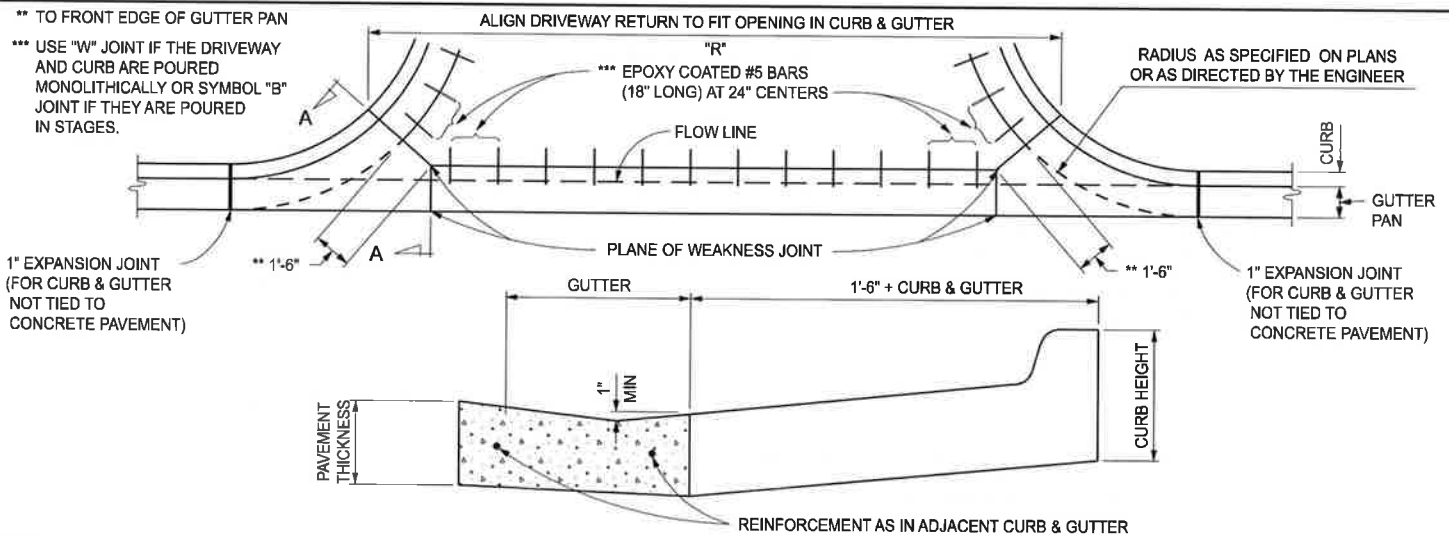
NOTE:
W = MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK.
ENSURE (R - d) IS NOT LESS THAN DRIVEWAY WIDTH.

SEE MDOT PUBLICATION "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS AND PARADES ON OR OVER HIGHWAYS" FOR THE "R" DIMENSION.

CONCRETE DRIVEWAY OPENING LAYOUT



SECTION A - A
CONCRETE DRIVEWAY OPENING, DETAIL L



SECTION A - A
CONCRETE DRIVEWAY OPENING, DETAIL M

NOTE:
ENSURE LONGITUDINAL LANE TIES ARE CONTINUOUS THROUGH THE DRIVEWAY OPENING IN ROADWAYS WITH CONCRETE PAVEMENTS AND ADJUST THE SPACING OF THE #5 BARS IN CONCRETE DRIVEWAYS TO AVOID CONFLICT WITH THE LONGITUDINAL LANE TIES.



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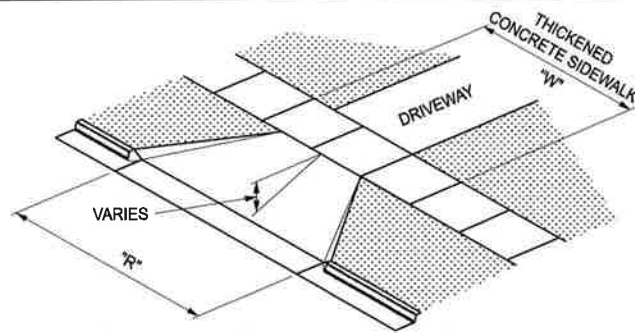
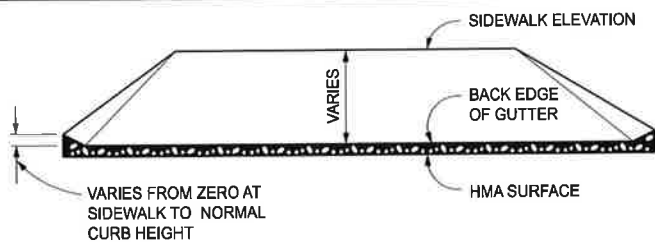
STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES,
AND CONCRETE SIDEWALK

12/18/2024
FHWA APPROVAL

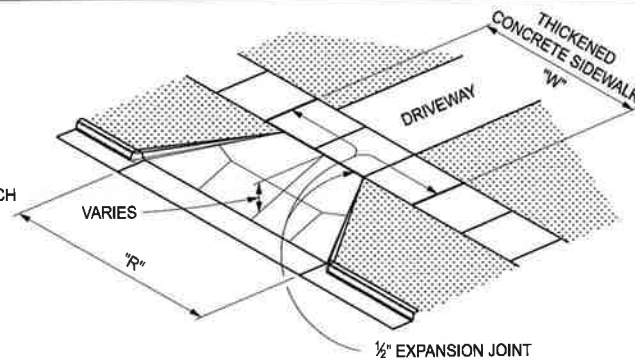
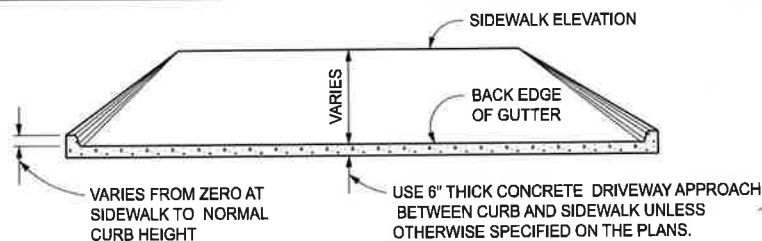
06/12/2024
PLAN DATE

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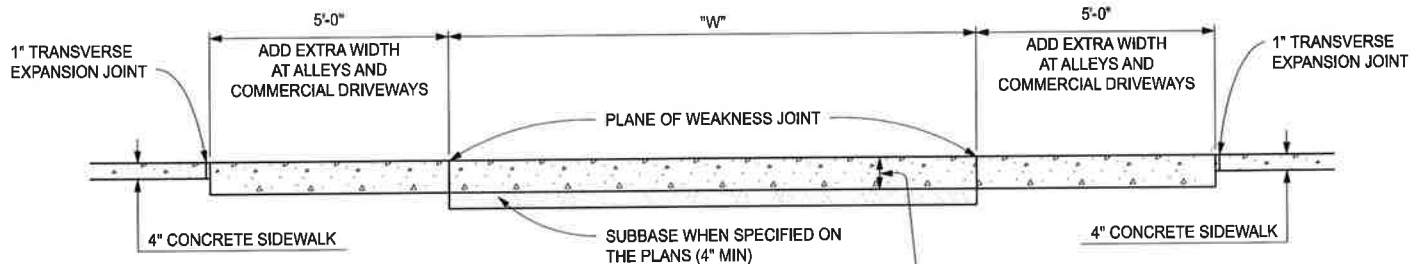


HMA DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L)



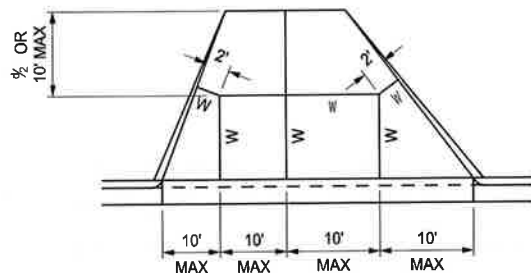
NOTES:
INCLUDE MONOLITHIC CURB IN THE CONCRETE DRIVEWAY APPROACH QUANTITY.
SEE CHART ON THIS SHEET WHEN REINFORCEMENT IS REQUIRED (SPECIFIED ON THE PLANS).

CONCRETE DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L OR M)



WHEN CONCRETE DRIVEWAY APPROACH IS SPECIFIED, MATCH THICKENED CONCRETE SIDEWALK THICKNESS TO THICKNESS OF CONCRETE DRIVEWAY APPROACH. WHEN HMA DRIVEWAY APPROACH IS SPECIFIED, USE 6" MINIMUM FOR THICKENED CONCRETE SIDEWALK THICKNESS.

THICKENED CONCRETE SIDEWALK



ADJUST DRIVEWAY JOINTS AS NEEDED TO ALIGN WITH ANY COINCIDING TRANSVERSE PAVEMENT JOINTS.

USE JOINT LAYOUT AS INDICATED OR AS DIRECTED BY THE ENGINEER.

INTERMEDIATE DRIVEWAY JOINT DETAILS

REINFORCEMENT FOR CONCRETE DRIVEWAYS

CONCRETE DRIVEWAY THICKNESS	WIRE SIZE (6" x 6" MESH)	AVERAGE WEIGHT (LBS/100 SFT)
LESS THAN 8"	W1.4	21
	W2.9	42
8" OR GREATER	USE WIRE FABRIC REINFORCEMENT SPECIFIED ON STANDARD PLAN R-37-SERIES	



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

**STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES,
AND CONCRETE SIDEWALK**

12/18/2024

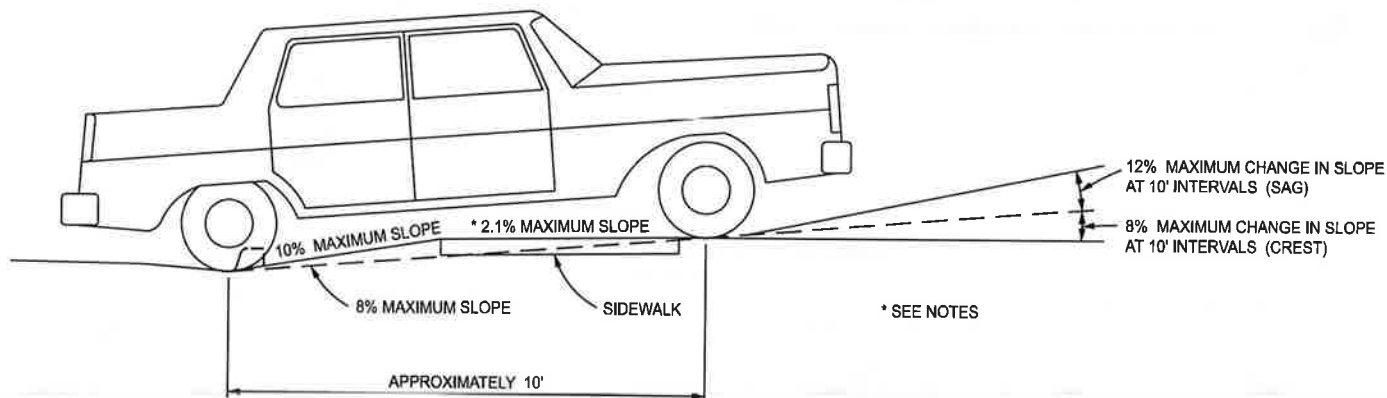
FHWA APPROVAL

06/12/2024

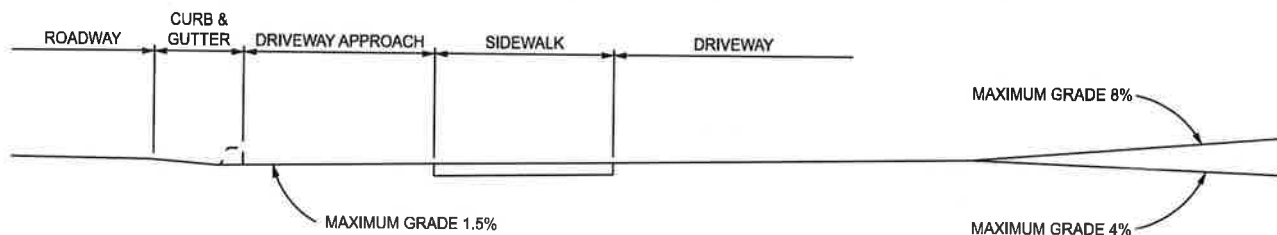
PLAN DATE

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LOW VOLUME COMMERCIAL OR RESIDENTIAL DRIVEWAY SLOPES



COMMERCIAL DRIVEWAY PROFILE FOR MAJOR TRAFFIC GENERATORS

NOTES:

SEE MDOT PUBLICATION "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS, AND PARADES ON OR OVER HIGHWAYS" AND GEOMETRIC DESIGN GUIDE G-680-SERIES, "COMMERCIAL DRIVEWAYS" FOR DRIVEWAY DESIGN.

SEE STANDARD PLAN R-30-SERIES FOR CURB AND GUTTER DETAILS.

LIMIT TRANSVERSE SIDEWALK SLOPES TO 2.1% MAXIMUM. PROVIDE LONGITUDINAL DRAINAGE IF THE TRANSVERSE SLOPE IS REQUIRED TO BE LESS THAN 1.5%.

CONSIDER THE TYPES OF VEHICLES USING THE DRIVE WHEN SETTING GRADES FOR COMMERCIAL DRIVES.



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

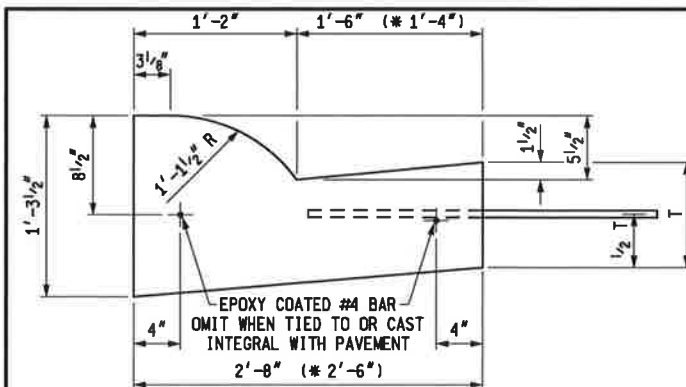
STANDARD PLAN FOR DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

12/18/2024
FHWA APPROVAL

06/12/2024
PLAN DATE

R-29-J

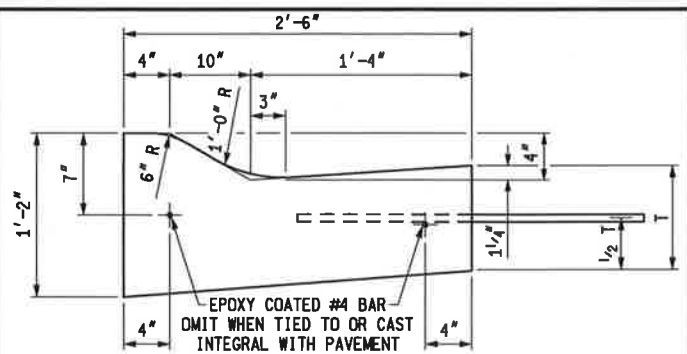
SHEET
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(* GUTTER PAN WIDTH MAY BE REDUCED WHEN APPROVED BY THE ENGINEER)

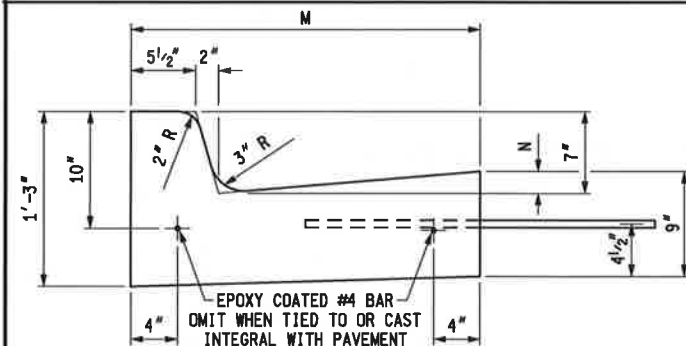
DETAIL	DIMENSION	LANE TIES	CONCRETE CYD / LFT	CONCRETE CYD / LFT
	T			
B1	9"	AS SHOWN	0.0900	(* 0.0855)
B2	9"	OMITTED	0.0900	(* 0.0855)
B3	10"	AS SHOWN	0.0941	(* 0.0894)

B



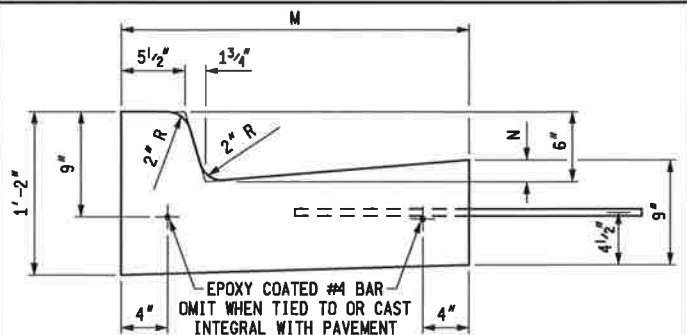
DETAIL	DIMENSION	LANE TIES	CONCRETE CYD / LFT
	T		
D1	9"	AS SHOWN	0.0788
D2	9"	OMITTED	0.0788
D3	10"	AS SHOWN	0.0826

D



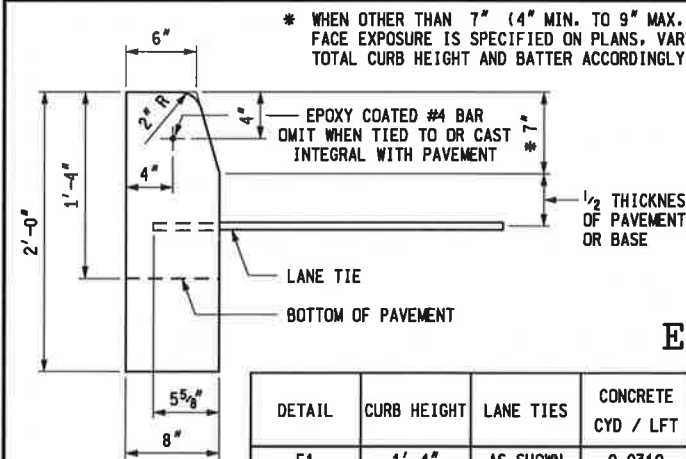
DETAIL	DIMENSION		LANE TIES	CONCRETE CYD / LFT
	M	N		
C1	1'-6"	7/8"	AS SHOWN	0.0506
C2	1'-6"	7/8"	OMITTED	0.0506
C3	2'-0"	1 3/8"	AS SHOWN	0.0632
C4	2'-0"	1 3/8"	OMITTED	0.0632
C5	2'-6"	1 7/8"	AS SHOWN	0.0757
C6	2'-6"	1 7/8"	OMITTED	0.0757

C



DETAIL	DIMENSION		LANE TIES	CONCRETE CYD / LFT
	M	N		
F1	1'-6"	7/8"	AS SHOWN	0.0484
F2	1'-6"	7/8"	OMITTED	0.0484
F3	2'-0"	1 3/8"	AS SHOWN	0.0610
F4	2'-0"	1 3/8"	OMITTED	0.0610
F5	2'-6"	1 7/8"	AS SHOWN	0.0737
F6	2'-6"	1 7/8"	OMITTED	0.0737

F



DETAIL	CURB HEIGHT	LANE TIES	CONCRETE CYD / LFT
E1	1'-4"	AS SHOWN	0.0310
E2	1'-4"	OMITTED	0.0310
E4	2'-0"	OMITTED	0.0477

E



PREPARED
BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Staudle

APPROVED BY:

Randy V. Poff
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY:

Mark A. Van Pelt
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

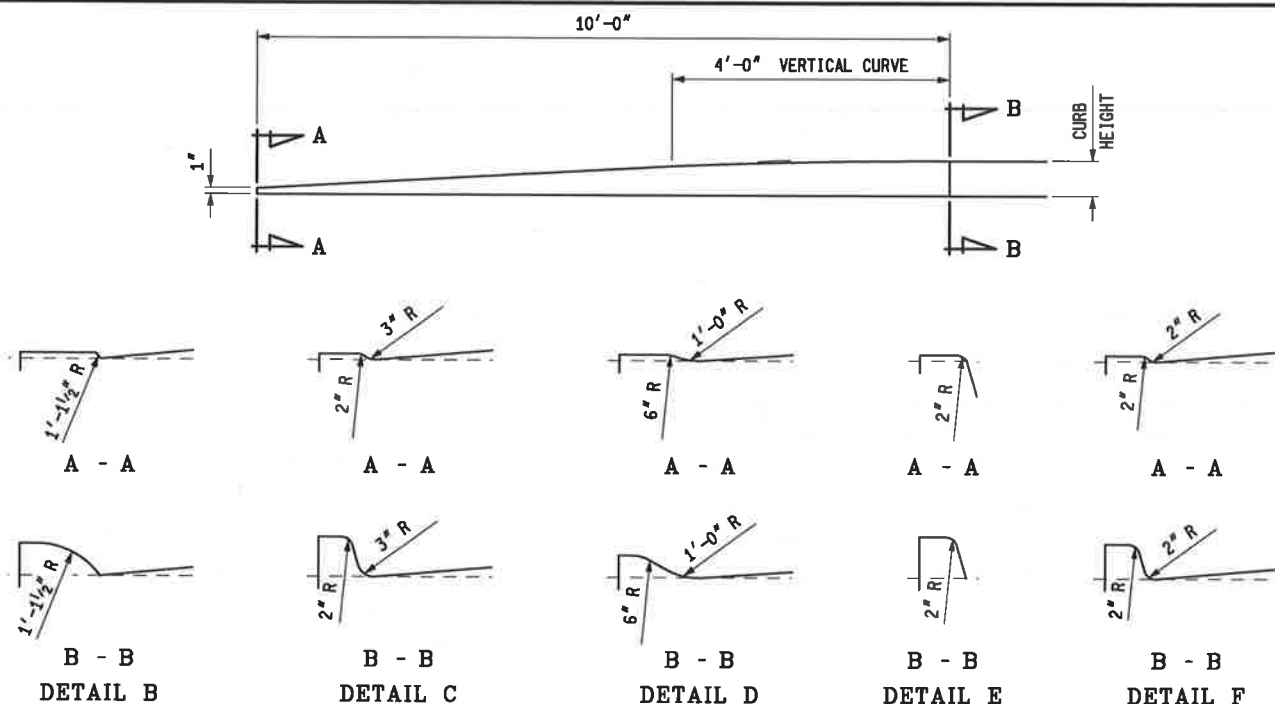
CONCRETE CURB AND CONCRETE CURB & GUTTER

9-30-2014
F.H.W.A. APPROVAL

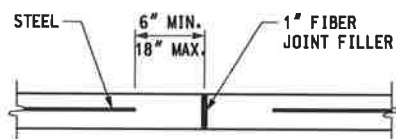
2-6-2014
PLAN DATE

R-30-G

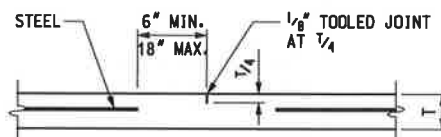
SHEET
1 OF 2



CONCRETE CURB, CURB AND GUTTER ENDINGS



1" FIBER JOINT FILLER



CONTRACTION JOINT

NOTES:

CURB AND GUTTER RADII SHALL BE DIMENSIONED TO THE FRONT EDGE OF THE GUTTER PAN OR EDGE OF PAVEMENT.

CONCRETE CURB AND GUTTER ENDINGS WILL BE PAID FOR IN LINEAR FEET OF THE ADJACENT CURB DETAIL.

JOINTS SHALL BE PLACED AT RIGHT ANGLES TO THE EDGE OF CONCRETE CURB AND GUTTER.

JOINTS DETAILED ON THE PLANS SHALL SUPERSEDE THOSE SPECIFIED ON THIS STANDARD PLAN.

BOTTOM SLOPE OF CURB AND GUTTER STRUCTURE MAY BE THE SAME SLOPE AS BOTTOM OF PAVEMENT. BACK OF CURB AND VERTICAL EDGE OF GUTTER PAN MAY HAVE A MAXIMUM 1/2" BATTER TO FACILITATE FORMING.

WHEN CURB AND GUTTER IS CAST INTEGRALLY, SEE CURRENT STANDARD PLAN R-31-SERIES.

ALL JOINTS FOR CURB OR CURB AND GUTTER ARE INCLUDED IN THE PAY ITEM FOR THE CURB OR CURB AND GUTTER.

JOINTS IN CURB OR CURB AND GUTTER NOT TIED TO CONCRETE PAVEMENT; ADJACENT TO CONCRETE BASE COURSE; OR ADJACENT TO HMA PAVEMENT:

- PLACE 1" FIBER JOINT FILLER AT 400' MAXIMUM INTERVALS.
- PLACE 1" FIBER JOINT FILLER AT SPRING POINTS OF INTERSECTING STREETS.
- PLACE 1/2" ISOLATION JOINT AT CATCH BASINS PER STANDARD PLAN R-37-SERIES.
- PLACE CONTRACTION JOINTS AT 40' MAXIMUM INTERVALS.

JOINTS IN CURB OR CURB AND GUTTER TIED TO JOINTED PAVEMENT

- PLACE 1" FIBER JOINT FILLER OPPOSITE ALL TRANSVERSE EXPANSION JOINTS IN PAVEMENT.
- PLACE 1/2" ISOLATION JOINT AT CATCH BASINS PER STANDARD PLAN R-37-SERIES.
- PLACE CONTRACTION JOINTS OPPOSITE ALL TRANSVERSE CONTRACTION JOINTS IN PAVEMENT.
- A SYMBOL (B) JOINT SHALL BE PLACED BETWEEN CURB OR CURB AND GUTTER AND ADJACENT CONCRETE PAVEMENT AS SPECIFIED ON STANDARD PLAN R-41-SERIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE CURB AND CONCRETE CURB & GUTTER

9-30-2014
F.H.W.A. APPROVAL

2-6-2014
PLAN DATE

R-30-G

SHEET
2 OF 2

SECTION 32 17 23
PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 Work Included

This work includes furnishing and applying pavement markings at locations shown on the plans, in the proposal, or as directed by the Engineer, in accordance with the Michigan Manual on Uniform Traffic Control Devices and as specified herein.

The Contractor is responsible for all layout work necessary for the location and placement of pavement markings, as shown on the plans or in the proposal or as directed by the Engineer.

All markings, shapes, and dimensions shall conform to the Michigan Department of Transportation Pavement Marking Standards or other details provided.

1.02 References

- A. Michigan Department of Transportation 2020 Standard Specifications for Construction
- B. Michigan Manual on Uniform Traffic Control Devices
- C. Michigan Department of Transportation's Qualified Products List
- D. All references to "Engineer" in this specification shall be interpreted as "Owner". Owner will determine the involvement of the Engineer during construction.

1.03 Submittals

The Contractor shall submit a list of all proposed materials and suppliers for pavement marking materials for review prior to performing the work.

1.04 Quality Assurance and Quality Control

The Contractor shall maintain and provide the Engineer with records of application of pavement marking materials, including paint and beads. The records shall include descriptions of the materials used (manufacturer, batch, date of manufacture, etc.) and quantities of each (gallons of paint or binder, pounds of beads).

PART 2 - PRODUCTS

2.01 Materials

A. General Requirements

All pavement markings must be lead-free and selected from the Michigan Department of Transportation's Qualified Products List. Pavement marking materials must be manufactured in the calendar year in which they are to be applied.

B. Packaging and Labeling

Materials shall be furnished in containers or packages plainly marked showing the manufacturer, description of materials, product identification number, batch number, date of manufacture, contents weight, and contents volume.

Thermoplastic material shall be packaged in a manner to prevent it to adhere during storage or shipment. The label on the material shall include the manufacturer's recommendations for the application temperature.

Glass beads shall be packaged in moisture resistant bags.

C. Glass Beads

Glass beads shall meet the requirements of Section 920.02 of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

PART 3 - EXECUTION

3.01 Applying Pavement Markings

Prior to the application of pavement markings, the pavement surfaces shall be clean, dry, and free of foreign materials. The Contractor shall be responsible for removal of foreign material, which can be removed by air-blasting. The Contractor shall also be responsible for removing occasional debris or dead animals from the line track. When shown on the plans or in the proposal, or when directed by the Engineer, curing compound on new concrete shall be removed by light sandblasting.

All materials and glass beads shall be placed according to the manufacturer's requirement.

Pavement markings shall be applied uniformly to the surface and so that they adhere adequately, following manufacturer's recommendations. All materials shall be thoroughly mixed at all times during application. Thinning of liquid materials will not be permitted.

Pavement markings shall be of the width called for on the plans, details, or pay item(s). The markings shall be of the color(s) and configuration as shown on the plans, in the proposal, or as directed by the Engineer. A solid line of the color and width specified shall have no gaps or spaces of unapplied material.

Improperly located markings shall be removed at the Contractor's expense, in accordance with Section 811 of the Michigan Department of Transportation 2020 Standard Specifications for Construction and shall be reapplied in the correct locations at no cost to the Owner.

Applied markings shall be sharp and well-defined. The markings shall be free of uneven edges, overspray, or other readily visible defects which, in the opinion of the Engineer, detract from the appearance or function of the pavement markings. Appropriate care shall be taken to prevent motorists and adjacent properties from being sprayed. Shields or other devices may be used for this purpose.

Pavement marking lines shall be straight or of uniform curvature and shall conform with the

tangents, curves, and transitions, as specified in the pavement marking plans and/or directed by the Engineer. The lateral deviation of the finished lines shall not exceed ½-inch from the proposed location alignment, as specified in the plans and/or directed by the Engineer.

Any deviation of the pavement marking lines greater than that specified herein, or shown on the pavement marking plans, shall be sufficient cause for requiring the Contractor to remove and correct such pavement markings at no additional expense to the Owner.

Pavement markings shall be protected from damage by the Contractor during the cure period. Pavement markings damaged by traffic, that were not applied and/or suitably protected, shall be traced at the Contractor's expense as directed by the Engineer. Tracked lines shall be removed at the Contractor's expense when ordered by the Engineer.

Application, temperature, protection, and seasonal restrictions shall be in accordance with Section 811 of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

END OF SECTION

SECTION 32 31 13
FENCES AND GATES

PART 1 - GENERAL

1.01 Work Included

This work shall include the excavation for and installation of concrete post bases, and the installation of fence framework, panels, and accessories.

PART 2 - PRODUCTS

2.01 Fence Materials

A. Acceptable Manufacturers:

1. New Lexington by CertainTeed
2. Owner approved equivalent.

2.02 Concrete Mix

- A. Concrete mix shall have a minimum compressive strength of 3,500 psi and shall conform to the requirements of Grade 35S concrete as outlined in the Michigan Department of Transportation 2020 Standard Specifications for Construction.

PART 3 - EXECUTION

3.01 Installation

- A. Install fences and gates per manufacture's specifications and as detailed within plans.

END OF SECTION

SECTION 32 92 00
TURF ESTABLISHMENT

PART 1 - GENERAL

1.01 Work Included

This work includes soil preparation, seeding, fertilizing, and mulching on those areas designated for turf establishment.

1.02 References

- A. Michigan Department of Transportation Qualified Products List
- B. All references to "Engineer" in this specification shall be interpreted as "Owner". Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 31 25 00 – Soil Erosion and Sedimentation Control

1.04 Performance Requirements for Guaranteed Growth and Smooth Ground Surface

The Contractor is responsible to provide turf, substantially free of bare spots and free of weeds. The ground in turf areas shall be smooth, graded to provide positive drainage, and graded to provide a smooth transition to adjacent areas. The Engineer will determine when the requirements of guaranteed growth and smooth ground surface have been met.

Materials, requirements, and methods described in this specification are provided to establish minimum levels. Where the Contractor believes that other materials or methods are appropriate for the specific site conditions or better suited to the Contractor's schedule, the Contractor shall submit details of the alternative materials and/or methods to the Engineer for approval.

The Contractor shall provide re-seeding, watering, and herbicides, as necessary, to achieve the desired results.

There will be no adjustment in project cost for re-seeding, watering, application of herbicides, or using alternative methods of turf establishment.

1.05 Areas Designated for Turf Establishment

All areas disturbed by the Contractor's activities or as a result of the project, which are not to be restored with a pavement or aggregate surface, are to be restored with turf, unless specifically directed otherwise.

Turf shall be established on borrow areas and areas where excess soil is stockpiled.

When shown on the drawings or directed by the Engineer, the Contractor shall establish turf in other areas.

PART 2 - PRODUCTS

2.01 Materials

A. Topsoil

Topsoil shall be a humus-bearing, natural mineral soil of loam, sandy loam, silty loam, or clay loam classification. Topsoil shall neither be excessively acidic or alkaline.

Topsoil shall be screened and free of stones, roots, debris, and other foreign matter. Topsoil which is stripped from the project area shall be removed, transported, and stockpiled in a manner which prevents it from becoming mixed with sub-soils.

B. Fertilizer

Fertilizers shall be standard, commercial packaged or bulk products in granular or liquid form. Each container of packaged fertilizer shall be marked by the manufacturer with the following information: manufacturer name; lot number; date; analysis of contents, including the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash; and the net weight. Bulk fertilizer shall be accompanied with an invoice indicating the manufacturer name; lot number; date; analysis of contents, including the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash; and the net weight or volume.

Fertilizer for seeding shall be comprised of both a water insoluble component and a water soluble component. The water insoluble nitrogen must be from ureaformaldehydes and/or coarse grade isobutylidene diurea.

Fertilizer shall provide 33 pounds of actual water insoluble nitrogen per acre. The water soluble component of the fertilizer shall provide 65 pounds of actual nitrogen, phosphorus, and potassium nutrient per acre, in equal proportions. The water soluble component of the fertilizer shall include urea, diammonium phosphate, and potassium chloride.

C. Mulch

1. Loose Mulch

Mulch shall be straw or marsh hay, in an air-dried condition. Mulch material must be clean, undamaged, and rot-free. It must be substantially free of weed seed and other objectionable foreign matter.

2. Turf Mulch Blankets

Mulch blankets shall be manufactured by a company currently listed on the Michigan Department of Transportation's Qualified Products List.

Mulch blankets shall have a net covering on both sides of the blanket and shall be manufactured from either excelsior or straw. Excelsior blankets shall be manufactured from a uniform layer of interlocking excelsior fibers cut from sound, green timber, with an average dry weight of 12 ounces per square yard. Straw blankets shall be made of a uniform layer of clean wheat straw, free of weeds and weed seed, with the straw and net covering securely stitched together to form a uniform mat having an average dry weight of 8 ounces per square yard.

3. Mulch Anchoring

Mulching anchoring shall be manufactured by a company currently listed on the Michigan Department of Transportation's Qualified Products List.

Latex-based anchoring shall have a composition, by weight, of 48 percent styrene, 50 percent butadiene, and 2 percent additive, 42 percent to 46 percent solids, and a pH of 8.5 to 10.

Recycled newsprint mulch shall be comprised of specifically prepared, biodegradable, shredded newspaper particles consisting of recycled newsprint fibers. The recycled newsprint must contain a wetting agent, defoaming agent, and nontoxic dyestuff that will impart a bright green or blue color. The dyestuff must adhere tightly to the fiber. Recycled newsprint shall meet the following minimum requirements:

Moisture content (total weight)	12 percent maximum
Shredded high-grade newsprint (oven dry)	96 percent minimum
Tackifier, by weight	1½ percent to 3 percent
Water holding capacity (water per 3½ ounces of fiber)	32 ounces minimum

Wood fiber shall be specially prepared, biodegradable, air-dried virgin wood fibers manufactured from 100 percent whole wood chips. The wood fiber must be manufactured with a tackifier. Recycled materials are not acceptable. The fibers must be dyed with a green or blue biodegradable dye to aid in visual metering during construction. The process and materials must not contain growth or germination inhibiting materials. The wood fiber must conform to the following specifications:

Moisture content (total weight)	12 percent maximum
Organic wood fiber (oven dry)	95 percent minimum
Tackifier, by weight	3 percent to 5 percent
Water holding capacity (water per 3½ ounces of fiber)	35 ounces minimum

Guar gum tackifiers shall contain a minimum of 95 percent guar gum by weight. The remaining components shall be dispersing and crosslinking additives.

Other tackifiers may include water soluble natural vegetable gums, or guar gums blended with gelling and hardening agents, or a water soluble blend of hydrophilic polymers, viscosifiers, sticking aids, and other gums.

4. Mulch Netting

Netting shall have a mesh size not larger than 1½ inches by 2 inches and not smaller than ½-inch by ½-inch. The netting shall be fabricated from a plastic formulated from or treated with a chemical which will promote the breakdown of the net within the first growing season after its placement. The net shall have sufficient strength to hold the mulch in place and still deteriorate rapidly upon exposure to sunlight. Steel staples or pins shall not be used for anchoring of netting.

D. Weed Control

Herbicides must be approved for use by the Michigan Department of Agriculture and the U.S. Environmental Protection Agency.

2.02 Seeding Mixtures

Seed shall be furnished in durable bags, each with a tag indicating the seed supplier, lot number, date, mixture proportions, purity, germination, and net weight.

Seed mixtures shall meet the requirements of one or more of the following mixtures, or other mixtures that are approved in advance by the Engineer. Where the Contractor believes that another mixture is appropriate for areas within the limit of the project, the Contractor shall request that the Engineer review and approve the substituted mixture(s). Requests for substitutions shall include the name of the seed supplier, the mixture proportions, the purity, and the germination.

Species	Purity, Minimum (percent)	Germination (percent)	Seed Mixture						
			Mixture Proportions (percent by weight)						
			TDS	THV	TUF	TGM	THM	CR	TSM
Kentucky Blue Grass	98	85	5	15	10	10	30		
Perennial Ryegrass	96	85	25	30	20	20	20		50
Hard Fescue	97	85	25		20	30			
Creeping Red Fescue	97	85	45	45	40	40	50		
Fults Salt Grass	98	85		10	10				
Cereal Rye	85	85						100	
Spring Oats	85	85							50

PART 3 - EXECUTION

3.01 Preparation for Turf Establishment

A. Topsoil Stripping

Prior to performing any excavation, filling, grading, or other earthwork, the Contractor shall strip and stockpile topsoil for later use on the project. Excess topsoil shall not be removed from the project site unless specifically provided elsewhere in the contract documents.

B. Finish Grading

The areas that are to be seeded shall be properly graded, sloped, and shaped with an allowance for the thickness of the topsoil layer. The earth bed upon which topsoil will be placed shall be friable to a depth of at least 4 inches. Earth beds not in a friable condition shall be harrowed with a disk, spring tooth drag, or similar equipment.

C. Placement and Preparation of Topsoil

Topsoil shall be spread on the prepared areas to a depth of 3 inches (in place, after rolling or compaction), unless otherwise shown on the plans or proposal. After spreading, any large clods or lumps shall be broken and all stones larger than 1-inch diameter, rocks, roots, litter, and other foreign debris shall be raked up and disposed of by the Contractor. After

spreading and raking, the topsoil surface shall be in a friable condition and the surface shall be reasonably close to the proposed grades and cross section.

The topsoil surface shall be shaped to provide proper drainage. Where proposed grades are not shown on the plans, the topsoil surface shall be graded to provide a smooth transition between the new construction and the existing, adjacent ground.

Excess topsoil shall be stockpiled in a location acceptable to the Owner and neatly trimmed to present a neat appearance.

3.02 Turf Establishment

A. Permanent Seeding and Fertilizing

Disturbed areas shall be seeded upon completion of earthwork and grading operations. Disturbed areas shall be stabilized with temporary seeding if permanent seeding cannot be completed.

Seed mixtures for permanent seeding shall be appropriate for the soil type and location, as indicated in the following table. The Contractor may propose and submit alternative mixtures to the Engineer for review and approval. It is the Contractor's responsibility to provide turf areas which are substantially free of bare spots and generally weed-free.

Mixture Designation	Soil Type	Location
TDS	Dry Sandy to Sand Loam	Rural or Urban
THV	Heavy	Rural
TUF	All Types	City Streets
TGM	Medium to Heavy	All
THM	Loamy to Heavy	Residential / Commercial

Fertilizer and seed shall be applied uniformly on areas prepared for seeding. Seed shall be applied at a rate of 220 pounds per acre. Seed and fertilizer may be applied by drilling, broadcasting, or hydraulically. Seed and fertilizer shall be applied before applying mulch. Seed and fertilizer shall be lightly raked or rolled into the prepared topsoil surface.

Neither broadcast seeding nor hydraulic seeding shall be performed during windy weather.

There shall be provisions for mixing or agitating the seed – fertilizer mixture used for hydraulic seeding to keep it evenly distributed in suspension. Mixtures shall be applied within an hour of mixing the seed with water; unused portions shall be discarded.

B. Temporary Seeding

Temporary seeding shall be completed when the permanent seeding cannot be completed because of seasonal conditions. Temporary seeding shall be applied at a rate of 100 pounds per acre, and shall be of the following designation.

Mixture Designation	Soil Type	Location
CR	All Types	Temporary, less than 6 months
TSM	All Types	Temporary, more than 6 months

Before completion of the contract, the Contractor shall complete permanent seeding of all areas which are temporary seeded.

C. Dormant Seeding

Dormant seeding should be used only when necessary to complete a project when seasonal conditions are not conducive to permanent seeding. Dormant seeding shall not be completed on frozen ground. Dormant seeding shall be completed, as required, for permanent seeding.

The Contractor is responsible to establish turf which is substantially free of bare spots and generally free of weeds.

3.03 Mulching

A. Mulch Placement

Immediately after the seed has been set into the topsoil surface by light raking or rolling, the Contractor shall spread mulch and anchor it as appropriate. Mulching shall not be performed during windy conditions.

Loose mulch shall be placed thick enough to shade the ground, conserve moisture, and resist erosion, but open enough to allow sunlight to penetrate and air to circulate.

The Contractor shall maintain mulched areas and repair any areas where damage from erosion, wind, traffic, fire, or other causes occur.

Mulch shall be applied at a uniform rate of 2 tons per acre, except that a rate of 3 tons per acre is required with dormant seeding.

B. Mulch Anchoring

Mulch anchoring (tackifiers) shall be sprayed immediately after the mulch is placed. Spraying shall not be performed when wind might prevent the proper placement of the adhesive. The Contractor shall provide protection measures, as necessary, to protect traffic, signs, structures, and other objects from being marked or disfigured by tackifier materials.

Latex based adhesive shall be mixed at a rate of at least 15 gallons of adhesive with a minimum of 250 pounds of recycled newsprint and 375 gallons of water.

Recycled newsprint shall be mixed at a minimum rate of 750 pounds of newsprint with 1,500 gallons of water.

Wood fiber shall be mixed at a minimum rate of 750 pounds of wood fiber with 1,500 gallons of water.

Guar gum shall be mixed at a minimum rate of 100 pounds of dry adhesive and a minimum of 250 pounds of recycled newsprint and 1,300 gallons of water.

Other tackifiers shall be mixed at a minimum rate of 100 pounds of dry adhesive with a minimum of 250 pounds of recycled newsprint with 1,300 gallons of water.

C. Mulching Netting

When netting is used to secure mulch, it shall be secured with anchors, staples, or pins. The net shall be spread over the mulch so that a worker can walk between adjacent widths of the net. The edges of adjacent widths of net shall be pulled together and held in place with net anchors. Net anchors shall be spaced not more than 30 inches apart along the edges, joints, and centerline. The net shall not be installed in direct contact with the ground. If the Contractor elects to use mulch netting or blankets, the Contractor will be required to remove the netting fabric once the turf is established.

D. Mulch Blankets

Mulch blankets shall be installed within one day of seeding. The side edges of blankets shall be overlapped by 2 inches. Blanket ends shall be shingle lapped 6 inches. Non-metallic staples or pegs shall be placed along all joint edges and along blanket centerlines at a maximum spacing of 2 feet. Blankets in waterways shall be shingle lapped 12 inches on the downslope edge. If the Contractor elects to use mulch netting or blankets, the Contractor will be required to remove the netting fabric once the turf is established.

High velocity blankets shall be installed on slopes of 1:2, or steeper, on ditch bottoms, on ditch side slopes (to an elevation 1 foot above the ditch bottom), and where specifically shown on the drawings or directed by the Engineer.

3.04 Weed Control

Weed control shall be provided by the Contractor, as necessary, to develop turf areas which are relatively free of weeds. Herbicides shall be applied in accordance with federal, state, and local regulations. Herbicides shall be applied in accordance with manufacturer's instructions. Herbicides shall be applied by commercial applicators, licensed in the State of Michigan and certified by the Michigan Department of Agriculture in the appropriate category(ies).

Target weeds shall be sprayed in the newly seeded turf when the new turf grass is sufficiently established to withstand the application of herbicide. Herbicide application shall be repeated if the first application failed to control target weeds.

The Contractor shall take appropriate measures to preserve and protect adjacent property from damages resulting from the application of herbicides. Herbicides shall not be applied when wind may carry it to adjacent areas.

END OF SECTION

SECTION 32 93 00
LANDSCAPING

PART 1 - GENERAL

1.01 Work Included

This work includes excavating planting areas for trees and shrubs, disposing of excess soils, furnishing and planting trees and shrubs of the size and type shown on the plans, backfilling the planting holes with prepared soil, watering and cultivating, and such other work necessary to complete the landscaping as described herein.

This work includes a guarantee of one complete growing season for all planted materials. Where planted materials fail to become established after one complete season, they shall be replaced by the Contractor.

1.02 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

A. ANSI Z60.1 – Nursery Stock

B. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

PART 2 - PRODUCTS

2.01 Materials

A. Nursery Stock

1. Requirements – General

Nursery stock shall be from nurseries located in Zones 4, 5, or 6 of the USDA Hardiness Zone Map.

All stock shall comply with state and federal laws, with respect to inspection for plant diseases and insect infestation, and the Contractor shall maintain the file with the department with all certificates of such inspection.

Any stock which does not conform to these specifications will be rejected and shall be immediately removed by the Contractor.

All nursery stock shall be true to type and name, in accordance with the current edition of *Standardized Plant Names* published by the American Joint Committee on Horticultural Nomenclature. Stock shall be clearly labeled as to species and variety, giving both the common name and scientific names of the plant. The label or tag shall be securely attached to the plant. When age is specified, the label shall also provide such information. The plant shall be of first-class quality, with well-developed branch systems and vigorous,

healthy root systems. All stock shall be well-formed and the trunks of trees shall be uniform and straight. They shall be free from insects, disease, and defects. Thin, weak plants will not be accepted. All stock shall be nursery grown and shall qualify under ANSI Z60.1, except that the size of ball shall not be less than that shown on the plans.

The stock shall come directly from the nursery row. Cold storage plants will not be accepted unless authorized. Substitution shall not be made except with the written permission of the Engineer, and then only when sufficient evidence is shown that the stock called for cannot be secured. Container grown plants shall be used, as called for on the plans or as approved by the Engineer. Such plant material shall meet current ANSI Z60.1.

Inspection of nursery stock will be made at the nursery, by the Engineer, whenever such inspection is deemed advisable. Approval on such inspection shall not be construed as an acceptance of it. Acceptance for planting will not be made until the stock has been delivered and inspected at the planting project site. Inspection will include examination of the root systems of plants. Plants may be examined by removing soil from the root systems of balled or container-grown plants, or digging in the nursery row. Sufficient plant root systems will be inspected for each species and separate plant source to determine the extent and condition of plant root systems. Payment will not be made for plants rendered unsuitable for planting because of the root system inspection. The Contractor shall give the Engineer at least 24 hours' notice before making any delivery of stock, and each shipment shall be accompanied by an invoice showing sizes, species, and varieties included.

Deciduous shade trees shall be straight and symmetrical, with a crown having a persistent main leader. The amount of crown shall be in good overall proportion to the total height of the tree.

Where a clump is specified, it shall have a minimum of two stems originating from a common base at the ground line.

B. Natural Materials

1. Mulching Materials

Shredded Bark: This material shall consist of tree bark which has been stripped and shredded from saw logs by means of a de-barking machine. The material shall be sufficiently fine and free from extraneous material so that it will readily pass through a conventional mulch blower.

2. Prepared Soil

Topsoil shall consist of the dark brown or black loam, clay loam, silt loam, or sandy loam surface of a fertile, friable, humus soil, or mineral origin.

Peat moss shall consist of finely-shredded sphagnum or fibrous peat moss of an approved commercial grade, free from woody substance.

The fertilizer for mixing with peat moss and topsoil shall be a ready-mixed granular material containing equal amounts, by weight, of phosphorus and potassium.

Prepared soil shall consist of a uniform mixture of topsoil, peat moss, and fertilizer. The prepared soil shall be proportioned such that a cubic yard of the prepared soil will contain $\frac{3}{4}$ -cubic yard of topsoil, $\frac{1}{4}$ -cubic yard of peat moss, and sufficient chemical fertilizer to provide 1 pound each of available phosphorus and potassium (5 pounds of 0-20-20, 10 pounds of 0-10-10, etc).

Prepared soil shall be produced by thoroughly mixing the component materials prior to final placement.

C. Accessories

1. Wrapping and Balling Materials

Twine for use in tree wrapping shall be composed of a minimum of two-ply jute material. Balling material shall be untreated burlap or other material which will readily decompose. Synthetic materials, such as nylon or plastic, will not be permitted for wrapping or balling.

2. Weed Suppressing Permeable Fabric

Fabric used shall be permeable to air and water. Material shall be black polypropylene with polyester blend. Fabric thickness shall be at least 25 mils.

3. Steel Bed Edging

Edging shall have an average wall thickness of $\frac{3}{16}$ -inch and powder-coated black. Edging height shall be 6 inches. The edging shall be secured in the ground with steel stakes every 5 feet or per manufacturer recommendations.

4. Tree Stakes

Tree stakes shall be 2-inch by 2-inch hardwood. All stakes shall be straight and free of large knots.

PART 3 - EXECUTION

3.01 Preparation

Individual holes shall be centered at the proposed plant locations, dug cylindrical in shape with perpendicular sides and flat bottoms. Unless otherwise specified, the minimum diameters and depths of planting holes shall be large enough to permit placing a minimum of 8 inches of prepared soil below, and 12 inches laterally, beyond the ends of bare roots of root balls. Where special conditions of soil or plant requirements so dictate, planting hole sizes shall be subject to reasonable variation.

If site preparation precedes planting by more than two weeks, the planting holes shall be immediately backfilled with prepared soil.

All plant material shall be clearly labeled as to species and variety. At time of planting, the label or tag shall be securely attached to each plant and shall show the scientific name of the plant. Unless otherwise shown on the plans, all plants shall be balled and burlapped or container grown.

Nursery stock shall be prepared for shipment, in accordance with the requirements of the current ANSI Z60.1, and shall be enclosed or covered during transportation to prevent drying.

In preparation for spring planting, all balling operations shall be completed prior to "bud break". All stock shall be dug and packed with care immediately prior to shipment. Plants shall be dug and transported so as to provide and retain a firm ball of earth. The roots shall be carefully protected with wet straw, moss or other material. The root balls shall be adequately protected from rain or sudden changes in the weather. Trees or plants will not be accepted if the balls of earth are loosened or broken.

Plants furnished in containers shall have grown in the container for at least one growing season. Plants other than ground covers, over-established in the container as evidenced by "pot bound" root ends, will not be accepted.

Immediately following delivery and inspection at the job, all plants with exposed roots shall be "heeled in" in moist soil. All "heeled in" plants shall be protected and their roots kept moist until planted. The "heeling in" grounds shall be a well-protected, shaded area or a well-ventilated enclosure.

The roots of all planting stock shall be kept moist and adequately protected at all times.

The trunks and branches of all trees shall be carefully protected from injury of any kind during all operations. Any trees that are injured may be rejected.

Planting Beds: Before planting beds are covered with weed control fabric, the beds shall be edged and free of all turf, weeds, dirt clumps, etc. The bed edging lines shall consist of smooth curves, free of kinks, as shown on the plans.

3.02 Planting

Just prior to planting, the earth in the bottom of the holes shall be loosened to a depth of 2 inches, and the earth in the sides shall be loosened to the extent necessary to break the glaze caused by digging.

For plants located on slopes, an earth saucer or berm shall be constructed half way around each plant on the down-slope side. The saucer or berm shall have an inside diameter equal to that of the planting hole, and a maximum height of 6 inches. Soil shall not spill down-slope more than 18 inches.

Plants shall be set plumb. Their depth, after setting, shall be the same as the depth in their original location. The prepared soil shall be carefully puddled and thoroughly firmed at intervals during backfilling, under and around the ball. Care should be exercised to prevent damaging the root ball during the tamping operation. When the plant hole has been backfilled and compacted to one-half depth, the burlap and lacing shall be removed from the upper half of the ball. The backfilling of the hole with prepared soil should then continue to an elevation which, after compaction, is flush with the ground line.

When plants are furnished in containers, the containers shall be removed at the time of planting. Handling methods, which result in a broken or excessively loosened root and soil ball mass, will be sufficient reason for rejection of the plant.

A maximum of root growth shall be preserved and no root pruning will be permitted. Plants shall be set plumb and at a depth equal to the depth in their original location. The exposed roots shall be held firmly in the proper position with the roots spread out. The prepared soil shall be puddled around the roots and thoroughly firmed at intervals during the process of backfilling. Sufficient water shall be used to ensure thorough saturation of the prepared soil placed in the plant hole.

All new and existing trees shall be provided with a 4-foot diameter spade cut mowing ring. Each mowing ring shall be covered with 1 layer of weed suppressing permeable fabric and then 3 inches of shredded bark mulch.

3.03 Placement of Bed Edging and Weed Control Fabric

Placing both the bed edging and the weed suppressing permeable fabric shall be performed as recommended by the manufacturer. The weed control fabric shall cover 100 percent of exposed earth within the bed lines. All fabric edges shall be "tucked in" and covered by 3 inches of mulch or 4 inches of stone. Edging is not required around individual tree mowing rings.

Annual beds shall be excavated to a depth of 12 inches and filled with 12-inch screened topsoil base and be mulched with Hoffman CoCoa Shell mulch or comparable light mulch. Material weed suppressing permeable fabric shall not be recommended for annual bed areas.

3.04 Pruning, Watering, Cultivating

All pruning shall be done by workmen experienced in this type of work. Pruning shall be completed prior to planting.

The branches shall be pruned to balance the loss of roots in such manner as to retain the natural form of the plant type. Usually one-third to one-half of the branches shall be removed, but the proportion shall in all cases be subject to the approval of the Engineer. The height ratio of crown to trunk, after pruning, shall be approximately one-third crown to two-thirds trunk. The primary leader shall not normally be cut back. Branches to be removed shall be cut off flush with the trunk or main branch.

Immediately upon completion of the planting work, the Contractor shall clean up the area of surplus materials.

The Contractor shall be responsible to water plants, as necessary, throughout the period of establishment. The intervals between waterings shall be determined by the Contractor, based on their experience and climatic conditions.

At the time of final watering, wrapping material, identification tags, and inspection tags shall be removed and disposed of off the project.

3.05 Period of Establishment

A period of establishment, commencing at the completion of the initial planting and extending through the following complete growing seasons, will be required for all plants. A growing season is defined as the months of June, July, and August.

All plants shall be in a thriving growing condition at the start of the establishment period.

The Engineer will inspect the plants at the end of the first complete growing season to determine any unacceptable plants. Replacement plants shall be planted, as specified in this specification, prior to May 10 of the following spring planting season. This will fulfill the one-year warrantee on the original plantings and no additional warrantee is required for the replacement plants.

END OF SECTION

SECTION 33 11 00
WATER MAIN

PART 1 - GENERAL

1.01 Work Included

The Contractor shall install water main and appurtenances in accordance with this specification. This work includes excavation, pipelaying, backfilling, and testing.

The Contractor shall protect existing utilities during construction, whether the existing utilities are shown on the plans or not. Utilities damaged by construction shall be repaired in a manner satisfactory to the Engineer and at the Contractor's expense. The Contractor shall call MISS DIG (800-482-7171) for staking and locating the existing utilities.

The water department will assist the Contractor in locating existing water service leads and mains.

The Contractor shall contact the water department to schedule work that may interfere with existing water service.

The Contractor shall develop a construction sequencing plan and submit to the Engineer and Owner for approval. The construction sequence shall minimize interruption of service.

1.02 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

- A. ANSI A21.4/AWWA C104 – American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
- B. ANSI A21.5/AWWA C105 – American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
- C. ANSI A21.11/AWWA C111 – American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- D. ANSI A21.50/AWWA C150 – American National Standard for Thickness Design for Ductile-Iron Pipe
- E. ANSI A21.51/AWWA C151 – American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water
- F. ANSI A21.53/AWWA C153 – American National Standard for Ductile-Iron Compact Fittings for Water Service
- G. AWWA C110 – Ductile-Iron and Gray-Iron Fittings
- H. AWWA C115 – Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
- I. AWWA C504 – Rubber-Seated Butterfly Valves

- J. AWWA C509 – Resilient-Seated Gate Valves for Water Supply Service
- K. AWWA C515 – Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service
- L. AWWA C600 – Installation of Ductile Iron Water Mains and Their Appurtenances
- M. AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings
- N. AWWA C651 – Disinfecting Water Mains
- O. AWWA C800 – Underground Service Line Valves & Fittings
- P. AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm), for Water Transmission and Distribution
- Q. AWWA C904 – Crosslinked Polyethylene (PEX) Pressure Tubing, 1/2 In. (13 mm) Through 3 in. (76 mm) for Water Service
- R. AWWA C908 – Standard for PVC Self-Tapping Saddle Tees for Use on PVC Pipe
- S. AWWA C909 – Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4 In. (100 mm) and Larger
- T. ASTM B88 – Standard Specification for Seamless Copper Water Tube
- U. ASTM B251 – Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
- V. ASTM D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
- W. ASTM F876 – Standard Specification for Crosslinked Polyethylene (PEX) Tubing
- X. ASTM F2080 – Standard Specification for Cold-Expansion Fittings with Metal Compression Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene of Raised Temperature (PE-RT) Pipe
- Y. ASTM F2657 – Standard Test Method for Outdoor Weathering Exposure of Crosslinked Polyethylene (PEX) Tubing
- Z. ISO 9002 – Model for Quality Assurance in Production, Installation and Servicing
- AA. CSA B137.5 - Crosslinked Polyethylene Tubing Systems for Pressure Applications
- BB. DIPRA – Polyethylene Encasement Installation Guide
- CC. DIPRA – Thrust Restraint Design for Ductile Iron Pipe
- DD. NSF/ANSI Standard 14 – Plastics Piping System Components and Related Materials
- EE. NSF/ANSI Standard 61 – Drinking Water System Components-Health Affects
- FF. Plastic Pipe Institute TR-3/2021/HDB/HDS/PDB/SDB/MRS/CRS Policies
- GG. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 01 55 26 – Maintaining Traffic
- C. Section 01 71 23.16 – Construction Staking by Contractor
- D. Section 01 74 50 – Cleanup and Restoration
- E. Section 02 41 13.13 – Pavement Removal
- F. Section 31 10 01 – Clearing and Removal of Miscellaneous Structures
- G. Section 31 23 01 – Excavating, Filling, and Grading
- H. Section 31 25 00 – Soil Erosion and Sedimentation Control
- I. Section 32 11 23 – Aggregate Base
- J. Section 32 12 16 – HMA Paving
- K. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement
- L. Section 32 92 00 – Turf Establishment

1.04 Submittals

Submit shop drawings or manufacturer's data to the Engineer for review and approval prior to ordering for the following:

- A. Valves
- B. Pipe, including fittings and joints
- C. Restraints
- D. Curb stops, corporation taps, and curb stop boxes
- E. Tracer wire and splice connections
- F. Casing pipe
- G. Manholes, manhole adjusting rings, and castings
- H. Directional Bore

1. Work Plan

Prior to beginning work, the Contractor shall submit to the Engineer a work plan detailing the procedure and schedule to be used to execute the project. The work plan should include a description of all equipment to be used, a schedule of work activity, a safety plan (including MSDS of any potentially hazardous substances to be used), an environmental protection plan, and contingency plans for possible problems. The work plan should be comprehensive, realistic, and based on actual working conditions for this particular project. The work plan should document the thoughtful planning required to successfully complete the project.

2. Equipment

Submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project. Equipment shall include, but not be limited to: drilling rig, mud system, mud motors (if applicable), downhole tools, guidance system, and rig safety systems. Calibration records for guidance equipment shall be included. Specifications for any drilling fluid additives that the Contractor intends to use or might use shall be submitted.

1.05 Quality Assurance and Quality Control

A. Leakage

The completed pipeline shall be subjected to a hydrostatic pressure test in accordance with Section 3.18.

B. Bacteriological

Following disinfection, a bacteriological test shall be completed in accordance with Section 3.18.

1.06 Local Standards

The Owner's standards for materials are shown on the plans. Where there is a conflict between the Owner's standards and the specifications, the Owner's standards prevail.

1.07 Directional Bore Contractor's Qualifications and Experience

All directional boring operations shall be done by a qualified directional boring Contractor, with at least five years of experience involving work of a similar nature to the work required of this project.

Notify the Owner and Engineer a minimum of three days in advance of the start of work.

All work shall be performed in the presence of the Owner or Engineer.

PART 2 - PRODUCTS

2.01 Materials

A. Pipe

Pipe may be any of the following materials, except where a specific material is indicated on the plans or in the proposal.

1. Ductile Iron Pipe (Thickness Class)

Ductile iron pipe shall meet ANSI A21.51/AWWA C151. Pipe shall be cement lined and shall meet ANSI A21.4/AWWA C104. Pipe wall thickness shall conform to ANSI A21.50/AWWA C150 and shall be of the following thicknesses, unless specifically noted otherwise on the plans or in the proposal:

Pipe Diameter (inches)	Pipe Class
4	52
6	52
8	52
10	52
12	52
14	54
16	54
18	54
20	54
24	54

The pipe manufacturer and class shall be marked on each length of pipe.

Joints for buried pipe shall be either mechanical type or push-on type, in accordance with ANSI A21.11/AWWA C111. Working pressure shall be 350 psi. Provide electrical conductivity at each joint.

Joints for piping in structures shall be flanged.

Joints for directionally bored pipe shall be snap lock gasket style manufactured by Griffen, or as approved by the Engineer.

2. Ductile Iron Pipe (Pressure Class)

Ductile Iron Pipe shall meet the requirements of ANSI A21.51/AWWA C151. Pipe shall be cement lined and shall meet ANSI A21.4/AWWA C104.

Water main shall be of the class(es) indicated in the following table, unless specifically noted otherwise on the plans or in the proposal:

Pipe Diameter (inches)	Pressure Class (psi)
4	350
6	350
8	350
10	350
12	350
14	250
16	250
18	250
20	250
24	250

The pipe manufacturer and class shall be marked on each length of pipe.

Joints for buried pipe shall be either mechanical or push-on type, in accordance with ANSI A21.11/AWWA C111. Working pressure shall be 350 psi. Electrical conductivity shall be provided at each joint.

Joints for piping within structures shall be flanged.

Joints for directionally bored pipe shall be snap lock gasket style manufactured by Griffen, or as approved by the Engineer.

3. Polyvinyl Chloride (PVC) Pipe

PVC pipe shall meet the requirements of AWWA C900. Pipe shall have a ratio of diameter to wall thickness (DR) of 14 (Pressure Class 305), for 6-inch thru 12-inch diameter pipe and DR 18 (Pressure Class 235) for pipe diameters larger than 12-inch, unless noted otherwise on the plans or on the proposal.

Pipe shall meet both NSF/ANSI Standard 61 and NSF/ANSI Standard 14. Pipe shall be marked with "NSF-PW" to indicate its compliance with these standards.

The pipe manufacturer and class shall be marked on each length of pipe.

Joints for pipe shall be push-on type with elastomeric gaskets meeting the requirements of ASTM D3139.

4. Molecularly Oriented Polyvinyl Chloride (PVCO) Pipe

PVCO pipe shall meet the requirements of AWWA C909. Pipe shall be of the class(es) indicated in the following table, unless specifically noted otherwise on the plans or in the proposal:

Pipe Diameter (inches)	Pressure Class (psi)
6	305
8	305
10	305
12	305
16	165

Pipe shall meet both NSF/ANSI Standard 61 and NSF/ANSI Standard 14. Pipe shall be marked with "NSF-PW" to indicate its compliance with these standards.

The pipe manufacturer and class shall be marked on each length of pipe.

Joints for pipe shall be push-on type with elastomeric gaskets meeting the requirements of ASTM D3139.

5. PVC Pipe for Directionally Bored Construction

PVC pipe shall meet the requirements of AWWA C900. Pipe shall have a ratio of diameter to wall thickness (DR) of 18, unless noted otherwise on the plans or on the proposal, and shall be suitable for directional boring, both pushable and pullable.

Pipe shall meet both NSF/ANSI Standard 61 and NSF/ANSI Standard 14. Pipe shall be marked with "NSF-PW" to indicate its compliance with these standards.

The pipe manufacturer and class shall be marked on each length of pipe.

Joints for pipe shall be fusible or have a mechanical locking system suitable for directional boring. Gaskets (if applicable) shall be elastomeric meeting the requirements of ASTM D3139.

B. Fittings

Fittings shall be mechanical joint or push-on type, either cast iron or ductile iron as follows: Cast iron fittings shall meet the requirements of AWWA C110 and shall be rated for 350 psi working pressure. Ductile iron fitting shall meet the ANSI A21.53/AWWA C153 and shall be Class 350. Fittings shall be cement lined in accordance with ANSI A21.4/AWWA C104. Rubber gasket joints shall meet ANSI A21.11/AWWA C111. Electrical conductivity shall be provided at each joint.

C. Gate Valves

Gate valves shall meet the Owner's standards for manufacturer, style, and opening direction.

Gate valves shall be iron body, non-rising stem, resilient wedge type meeting the requirements of AWWA C509. Gate valves shall be designed for direct bury application.

Resilient seated valves shall meet the requirements of AWWA C509, thick wall valves shall meet AWWA C515.

D. Tapping Sleeves and Valves (Pressure Connections)

Tapping sleeves and valves shall meet the Owner's standard for manufacture, style and opening direction.

Tapping sleeves shall be mechanical joint by flanged outlet, all stainless steel, built in two sections. All pressure connections shall be installed in a concrete manhole. The outlet flange shall be class 125 ANSI/ASME B16.1 and have a built-in test plug. The gasket for the mainline shall be made for the pipe material in place.

The valve shall meet all requirements of the current version of AWWA C515 standard and have flanged by restrained joint. The valve shall have oversized seat rings to permit entry of the tapping machine cutters. All nuts and bolts shall be 316 stainless steel.

E. Copper Pipe

Copper pipe shall be constructed of Type K, soft temper copper tubing for underground use, in accordance with ASTM B88 and B251. The manufacturer and pipe type shall be marked on the outside of the pipe. The weight per foot of copper tubing shall meet or exceed that specified by ASTM B251, Table II.

F. Crosslinked Polyethylene (PEX) Water Service Pipe

PEX pressure tubing shall be made from material having a standard PEX material designation code of PEX 1306, or higher, according to ASTM F876 and intended for use as underground

potable water, reclaimed water, and wastewater service lines that conform to a standard dimension ratio of SDR 9. Tubing may incorporate an optional polymeric outer layer.

Pipe shall be certified to AWWA C904 by approved testing agency. In addition, pipe shall be certified to standards ASTM F876, CSA B137.5, NSF 14, and NSF 61, by approved testing agencies, with a standard materials designation code of 3306.

Pipe shall demonstrate ability to satisfy the performance requirements of section F.7 of PPI TR-3 for PE materials in order to apply a 0.63 design factor resulting in a temperature/pressure rating of 200 psi at 73.4 degrees Fahrenheit (1380 kPa @ 23°C).

Pipe shall be rated for 160 psi at 73.4 degrees Fahrenheit (1103 kPa @ 23°C) and 100 psi at 180 degrees Fahrenheit (690 kPa @ 82°C) per PPI TR-4.

Pipe shall have a co-extruded UV Shield made from UV-resistant high-density polyethylene. Pipe shall have minimum recommended UV exposure time of one (1) year when tested in accordance with ASTM F2657, or as per manufacturer's recommendations.

Pipe shall be compatible with cold-expansion compression-sleeve fittings certified to ASTM F2080 for installations as cold as -40 degrees Fahrenheit (-40°C).

Pipe shall be approved for use with AWWA C800 fittings when using manufacturer's recommended insert.

Pipe shall be approved by manufacturer for use with manual plastic pipe squeeze-off tools for temporary stoppage of flow.

G. Stops and Fittings

Corporation stops, curb stops, and fittings shall be fabricated of brass and shall be lead free.

For PVC pipe, any taps 2 inches or less shall be Style 202B saddle with stainless steel bands, as manufactured by Ford Brass or approved equal.

H. Service Boxes

Water services boxes shall be of a style conforming to the Owner's standard. Boxes shall be adjustable, a minimum of 6 inches above and below finish grade.

I. Valve Boxes

Valve boxes shall be made of good quality cast iron and shall be of the sectional type. The lower section shall be a minimum of 5 inches in diameter, enlarged at the base to fit around the bonnet of the valve. The upper section shall be arranged to slide or screw down over the adjoining lower section and shall be full diameter throughout. Valve boxes shall be provided with cast iron lids or covers. Lids or covers shall be marked "WATER". The over-all length of valve boxes shall be sufficient to permit the top to be set flush with the final ground surface grade. Valve boxes shall be as manufactured by Traverse City Iron Works, Clow Corporation, or equal.

J. Tracer Wire

Tracer wire shall be designed and manufactured for the purpose of detecting buried utilities. Tracer wire shall be 12 AWG (minimum) copper wire coated with a 30 mil (minimum) polyethylene jacket. The Contractor shall use larger wire, when necessary, for installation without damage during bored installations.

PART 3 - EXECUTION

3.01 Alignment and Grade

The water mains shall be constructed at the alignment and grades indicated in the plans and specifications, except where changes are directed or approved by the Engineer. Fittings, valves, hydrants, and service connections shall be installed at the locations indicated on the drawings or in the specifications, except where field conditions warrant changes which are directed and approved by the Engineer.

Valves and hydrants shall be installed plumb. Valve operating stems shall be installed in a manner to allow for their proper operation.

3.02 Investigation

Prior to excavation, the Contractor shall call MISS DIG and shall contact utility agencies which are not part of the MISS DIG system to make arrangements for identifying the location of existing utilities in the project area. Where potential conflicts are suggested by the plans and/or the utilities' locations, the Contractor shall excavate and expose the existing utilities at least 100 feet in advance of pipelaying operations. Where the existing utilities may conflict with the proposed alignment and construction, the Contractor shall make such appropriate modifications to the alignment and grade, as necessary, to prevent a conflict. Changes to the alignment and grade shall be as directed and approved by the Engineer. Changes to the alignment and grade shall be completed by the Contractor at no additional cost to the project.

3.03 Excavation

The Contractor shall excavate all materials to the depths necessary to construct the water main as shown on the plans. Excavation shall include the removal of rock, dirt, abandoned pipelines, old foundations, stumps and roots, and similar materials encountered. Excavation of whatever material encountered shall be included in the contract unit prices for water main installation and will not be paid for separately.

Excavation shall be in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

3.04 Pipe Handling

Pipe shall be handled in such a manner as to prevent the ends from splitting, damages to the protective coatings, and other undesirable conditions. Pipe shall not be dropped, skidded, or rolled into other pipe. Repairs to damaged pipe must be approved by the Engineer.

3.05 Pipe Cutting

Pipe cutting shall be done in a neat and workmanlike manner, without damage to the pipe or lining, and as to leave a smooth end at right angles to the axis of the pipe. Cutting shall be done by an approved mechanical saw or cutter. Hydraulic squeeze cutters are not acceptable.

3.06 Pipelaying

Pipe located inside structures shall be rigidly supported.

Pipe laid underground shall be uniformly supported through its entire length on a 4-inch cushion of sand. A depression shall be carved out of the sand cushion to accommodate the pipe bells.

Pipe shall be inspected for defects, debris, or dirt while suspended in a sling prior to lowering it into the trench. Defective pipe shall be removed from the project site immediately. Lumps, blisters, and excess coal tar coating shall be removed from inside the bell and outside the spigot. These areas shall be wire-brushed and wiped clean with a dry oil-free rag. No debris, tools, clothing, or other materials shall be allowed in the pipe.

Pipe shall be laid in a dry trench, with bell ends facing in the direction of laying. After placing a length of pipe in the trench, and after installing the gasket and applying the gasket lubricant, the spigot end shall be centered in the bell, and the pipe pushed home and brought to the correct line and grade. The pipe shall be secured in place by tamping sand around it. Precautions shall be taken to prevent soil from entering the joint space.

A watertight plug shall be inserted in the open end(s) of the pipe to prevent water, soil, animals, or other foreign matter from entering the pipe during the construction phase.

When it is necessary to deflect pipe from a straight line, either horizontally or vertically, the deflection shall not exceed the following values:

Nominal Pipe Size (inches)	PVC & PVCO "Push on" Joint Maximum Deflection (inches/18-foot length)	Ductile Iron "Push on" Joint Maximum Deflection (inches/18-foot length)	Ductile Iron Mechanical Joint Maximum Deflection (inches/18-foot length)
4	4	19	27
6	4	19	27
8	4	19	20
10	4	19	20
12	4	19	20
14	0	11	13
16	0	11	13
18	0	11	13
20	0	11	11
24	0	11	9

3.07 Jointing

A. Fittings

Mechanical and "push on" joints shall be installed in accordance with the joint manufacturer's recommendations. Copies of such recommendations shall be furnished to the Engineer prior to the start of construction.

Flange faces of flanged joints shall be thoroughly cleaned with a wire brush and the pipe carefully aligned. The gasket shall then be inserted between the flanges and the bolts and nuts installed. Tightening of the bolts shall be done evenly around the flange so as to uniformly distribute the stress carried by the bolts.

B. Butt Fusion

Joints for pipe shall be by thermal butt fusion per ASTM D2657. All joints shall be performed in accordance with the procedures recommended by the manufacturer.

3.08 Tracer Wire

A tracer wire shall be laid along the crown of any plastic pipes. The wire shall be attached to the top of the pipe in such a manner that it will not become displaced during construction and backfilling. Tracer wire shall be continuous (without splices) over each separate run. If wire is damaged or broken during installation, a new wire shall be installed by the Contractor. The wire shall be terminated in valve wells or boxes as approved by the Engineer.

3.09 Backfilling

Backfilling shall be in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

3.10 Separation and Cover

Where the proposed water main crosses under an existing utility, the proposed water main shall be deflected above or below the existing utility in accordance with the following:

- A. Maintain a minimum depth of cover over top of proposed water main as shown on the drawings.
- B. Maintain at least 18 inches of vertical separation and 10 feet of horizontal separation between the outside of the proposed water main and the outside of a sewer, drain pipe, or catch basin lead.
- C. Maintain at least 1 foot of vertical separation between the outside of the proposed water main and the outside of an existing utility other than a sewer, drain or catch basin lead.
- D. When crossing an existing sewer, drain pipe, or catch basin lead, construct the proposed water main so that its joints are equidistant from the utility being crossed.

3.11 Valves

A. General

Valves shall be located as shown on the plans or as otherwise directed by the Engineer. Failure

by the Contractor to locate said valves, as called for, may result in Contractor correcting the error at their own expense.

B. Setting Valves

Valves shall be examined by the Contractor prior to lowering in the trench. All nuts and bolts shall be checked to assure tightness.

Valves shall be installed with the valve closed, supported on two 2-inch by 6-inch by 18-inch hardwood blocks and vertically plumb. The valve box shall be set plumb and its axis shall be in line with the stem. Valve boxes shall have the ability for future adjustments of up to 6 inches, above or below grade.

C. Tapping Sleeves and Valves

Tapping sleeves and valves shall be installed in accordance with the manufacturer's recommendations.

D. Cutting-in Valves

Where shown on the plans or directed by the Engineer, the Contractor shall install a new valve on an existing line. The existing main shall be uncovered by the Contractor. A section of the existing main shall then be cut out. The length will vary depending on the valve and sleeve dimensions. A suitable mechanical joint cutting-in sleeve shall be slid over one end of the pipe, and a gate valve installed over the other end. After the gate valve is in the "home" position, the sleeve shall be slid into the gate valve. The gaskets shall be positioned and the mechanical joints shall be tightened to the manufacturer's specifications. The valve shall be plumb. Provide support under the valve by placing two 2-inch by 6-inch by 18-inch hardwood boards. The completed installation shall be visually inspected for leaks before the pipe is covered. The valve box shall be installed over gate valve and adjusted to the proposed grade. The excavation shall be backfilled with sand and compacted. That part of the excavation that is not within the 1:1 influence of an existing or proposed roadway or railway, and at least 6 inches above the water main, may be backfilled with suitable excavated material and compacted.

3.12 Polyethylene Encasement

All ductile iron fittings and hydrants below grade shall be wrapped with polyethylene encasement. Installation shall be as set forth in ANSI A21.5/AWWA C105 and DIPRA's "Polyethylene Encasement" brochure.

3.13 Thrust Restraint

All tees, plugs, bends, hydrants, offsets, and similar fittings shall be mechanically restrained or braced to undisturbed ground by use of concrete thrust blocks.

Concrete for use as thrust blocks shall have a 28-day compressive strength of not less than 3,000 psi. The thrust block shall be placed so that the pipe, valve, hydrant, or fitting joints are accessible for repair. Details of placement of thrust blocks are shown on the plans. Vertical bends will require blocking and strapping as shown on the plans.

Restrained joints shall be designed in accordance with DIPRA *Thrust Restraint Design for Ductile*

Iron Pipe. The following restraint joint systems are approved for ductile iron pipe, when observed by the Engineer.

Pipe Size	Restrained Joint Type
12 inch or less	Field Lok, Fast Grip
16 inches or larger	FlexRing, TR Flex

Restrained joints for PVC and PVCO pipe shall be as follows:

- A. MEGALUG by EBAA Iron, Series 19MJ00 or approved equal for mechanical joint restraints.
- B. MEGALUG by EBAA Iron, Series 1900 or approved equal for push joint/bell restraints.

Restrain all mechanical joints with retainer glands. Restraint all joints within length(s) according to restraint schedule, as determined using EBAA Iron Restraint Length Calculator.

Restrained joints are considered included in work of water main construction and will not be paid for separately.

3.14 Water Services

Water services shall be constructed where shown on the plans or where directed by the Engineer.

Water service pipe shall be connected to the water main through a brass corporation stop.

Water service pipe shall be connected to the water main through a service clamp or saddle (except where direct tapping is permitted) and brass corporation stop. The water main shall be under pressure during the tapping process. The pipe shall be drilled and tapped to the appropriate size for the connection being installed. The service clamp or saddle shall provide full support around the circumference of the pipe, and have a bearing area of sufficient width along the length of the pipe so that the pipe will not be distorted when the saddle is tightened. U-bolts will not be permitted.

Ductile iron pipe may be direct tapped in accordance with the following tables. Direct taps shall be drilled and tapped under pressure by use of a tapping machine with a combination drill and tap of the appropriate size for the connection being installed.

Minimum DIP Thickness Class Required for Direct Tapping					
Water Main Diameter (inches)	Tap Size				
	¾"	1"	1¼"	1½"	2"
4	53	55			
6	51	53	55		
8	50	52	53	55	
10	50	51	52	53	
12	50	50	51	52	55
16	50	50	50	50	54
20	50	50	50	50	52
24	50	50	50	50	50

Minimum Pressure Class of DIP Required for Direct Tapping					
Water Main Diameter (inches)	Tap Size				
	¾"	1"	1¼"	1½"	2"
4					
6					
8	350				
10	350				
12	350				
16	250	250	250	300	350
20	250	250	250	250	250
24	250	250	250	250	250

PVC and PVCO pipe shall not be direct tapped. Services 2 inches and under shall utilize a service saddle.

The maximum service connection for PVC and PVCO pipe is 2 inches.

After tapping the main and installing the corporation stop, the tap shall be tested by turning the corporation on and off. Any leakage detected visually shall be corrected by the Contractor.

The water service pipe shall be laid such that there is at least 24 inches of slack in the service line at the main. In other words, the first 3 feet of trench adjacent to the main shall have at least 5 feet of service lead pipe laid in it.

All joints of copper pipe shall be flared joints. After the copper pipe is in place and connected to the curb stop, the line shall be visually checked for leaks by closing the curb stop and opening the corporation stop.

The Contractor shall leave the corporation stop in the open position, unless directed otherwise by the Engineer.

The excavation resulting from water service pipe construction or reconnections and within the 1:1 influence of a roadway, driveway, sidewalk, parking lot, railroad, or other structures shall be backfilled by the Contractor with sand and compacted. Excavations not within the 1:1 influence of structures or paved surfaces may be backfilled with suitable native soils and shall be compacted.

Water service pipe shall be buried to the depth shown on the plans for water main depth, unless otherwise directed by the Engineer.

3.15 Conflicts with Existing Utilities

Excavation shall be made sufficiently in advance of pipelaying operations so that water main alignment can be adjusted to go above, below, or around existing pipes, structures, cables, or other obstacles that are encountered. Where such minor adjustments are made to the water main alignment, no additional compensation will be due to the Contractor.

Where existing electric cables, telephone cables, gas mains, or services are damaged, repairs shall be at the Contractor's expense. The repairs shall be made by the appropriate utility.

Where sewer leads are damaged, they shall be repaired by the Contractor at no charge to the Owner. Sewer leads shall be repaired with a section of schedule 40 PVC pipe of the size encountered. Pipe of the same material as that encountered can also be used. The damaged pipe shall be cut square and the "connection" area shall be thoroughly cleaned. Rubber gasketed sleeve couplings, suitable for connecting the pipe sizes and materials encountered, shall be furnished and installed by the Contractor for each reconnection or repair joint.

3.16 Conflicts with Proposed Utilities

This work consists of relocating a portion of existing water main or water service to avoid a conflict with a proposed utility. This work includes furnishing all labor, equipment, and materials required for excavation, installation, disinfection, and backfilling as shown on the plans and specified within this specification.

3.17 Restoration

Areas disturbed by construction activities shall be restored by the Contractor.

3.18 Testing and Disinfection

A. Hydrostatic Pressure Testing for Water Main

Water main shall be hydrostatically tested immediately after the section to be tested is installed. The Contractor shall provide all labor, equipment, and materials to perform the test, including pumps, gauges, plugs, corporations, water, miscellaneous pipes and fittings, and a means of measuring lost water. The testing equipment shall be approved by the Engineer.

The Contractor shall fill the main through hydrants or corporations. After completion of the tests, corporations made for the purpose of testing shall be plugged. Water shall be added to the line and air expelled to provide a pressure of 150 psig. When the Contractor has verified that all air is expelled and that the test pressure is maintained, the Contractor shall notify the Engineer to witness the test. The Engineer shall be given at least a 24-hour notice. The test duration shall be two hours. Water shall be added during the test period, as required, to maintain the required pressure to the highest point in the system throughout the test period. The amount of water required to maintain the test pressure is the actual leakage.

The actual leakage shall not exceed the allowable leakage as tabulated below:

Pipe Size (inch)	Allowable Leakage per 1,000 feet of Water Main (gallons/2 hours)
6	1.00
8	1.32
10	1.66
12	1.98

Pipe Size (inch)	Allowable Leakage per 1,000 feet of Water Main (gallons/2 hours)
16	2.64
20	3.32
24	3.98

If unsatisfactory results are obtained, the Contractor shall locate and repair the leak and the system shall be retested.

B. Tracer Wire Continuity

The Contractor shall demonstrate continuity of the installed tracer wire to the Engineer.

C. Disinfection

The Contractor shall flush the water main with potable water until discharge from the main runs clear. The main shall be chlorinated in accordance with AWWA C651. After the chlorination procedure is completed, the water main shall be flushed again until the chlorine content is equal to that of the water being supplied. Sixteen hours or longer after the flushing, the Contractor may begin collecting samples for bacteriological analysis. Samples shall be collected at 24-hour intervals until two consecutive satisfactory results are obtained. Samples shall be collected at the end opposite the chlorine injection, except that in long lines or where contamination is suspected, the Engineer may require other sampling points. Sampling shall be performed under the observation of the Engineer.

Where satisfactory results are not obtained, the main shall be reflushed, disinfected, and retested. Heavily chlorinated water shall be disposed of properly.

3.19 Removal of Water Main

Existing water main shall be removed where shown on the drawings or directed by the Engineer.

Existing gate box, gate well, or other appurtenance shall be removed where shown on the drawings or directed by the Engineer.

Where directed, the existing gate box, gate well, or other appurtenance shall be removed in their entirety. The Contractor shall fill the excavation resulting from the excavation and removal of the water main, gate box, gate well, or other appurtenance. Backfill within the 1:1 influence of pavements, roads, driveways, or structures shall be sand and compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Backfill in other areas shall be suitable soil, free of rocks, debris, and frozen material and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

3.20 Abandoning Water Mains

Existing water main shall be abandoned where shown on the drawings or directed by the Engineer.

Water main that is to be abandoned shall be disconnected from the existing main which is to remain in service. A suitable sized plug or cap shall be installed on the existing main to remain in service, together with suitable thrust restraint.

Where directed, the abandoned water main, together with any fittings and appurtenances, shall be removed in their entirety. The Contractor shall fill the excavation resulting from the excavation and removal of the pipe. Backfill within the 1:1 influence of pavements, roads, driveways, or structures shall be sand and compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Backfill in other areas shall be suitable soil, free of rocks, debris, and frozen material and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

If the abandoned water main pipe is to remain in place, the open ends of the pipe shall be bulkheaded.

END OF SECTION

SECTION 33 31 00
SANITARY SEWER

PART 1 - GENERAL

1.01 Work Included

The Contractor shall supply all labor, material, and equipment required for the installation and testing of gravity sanitary sewers and appurtenances in compliance with these general specifications, project specifications, and the contract drawings.

1.02 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

- A. ASTM D1785 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- B. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- C. ASTM D2665 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
- D. ASTM D2680 – Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping
- E. ASTM D3034 – Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
- F. ASTM D3139 – Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
- G. ASTM D3212 – Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- H. ASTM D4101 – Standard Specification for Polypropylene Injection and Extrusion Materials
- I. ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- J. ASTM F679 – Standard Specifications for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
- K. ASTM F1417 – Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air
- L. ASTM F1668 – Standard Guide for Construction Procedures for Buried Plastic Pipe
- M. Michigan Department of Transportation 2020 Standard Specifications for Construction
- N. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 01 55 26 – Maintaining Traffic
- C. Section 01 71 23.16 – Construction Staking by Contractor
- D. Section 01 74 50 – Cleanup and Restoration
- E. Section 31 10 01 – Clearing and Removal of Miscellaneous Structures
- F. Section 31 23 01 – Excavating, Filling, and Grading
- G. Section 31 25 00 – Soil Erosion and Sedimentation Control
- H. Section 32 92 00 – Turf Establishment

1.04 Submittals

The Contractor shall submit shop drawings or certificates of compliance to the Owner and Engineer for the following items.

- A. Pipe, fittings, and joint material
- B. Pipe bedding and backfill material

1.05 Quality Assurance and Quality Control

A. Grade and Alignment

Grade and alignment shall be maintained using a laser. The Contractor shall verify that the sewer is constructed at the proper alignment by checking grades and offsets at each manhole, at 50 feet upstream from manholes, and at 100-foot intervals. The Contractor shall report as-constructed measurements to the Engineer.

B. Acceptance Tests

The completed sewer(s) shall be subjected to the following tests, prior to acceptance by the Owner. Acceptance tests shall be completed by the Contractor, in the presence of the Engineer (or Owner's representative).

1. Internal Video Inspection

The video inspection shall be completed in accordance with Section 3.09.A.

2. Air Test

Air testing shall be completed in accordance with section 3.09.B.

3. Deflection Testing

All plastic sewers shall be subjected to a deflection test in accordance with Section 3.09.C.

4. Physical Inspection

The physical inspection shall be completed in accordance with Section 3.09.D.

PART 2 - PRODUCTS

2.01 Materials

All material supplied shall be new and shall be designed and guaranteed to perform the service required.

A. Pipe

Pipe shall be of the material, class and/or thickness indicated on the plans or on the proposal. If no specific materials or classes are provided on the plans or on the proposal, any of the following pipe materials are permissible.

1. PVC Pipe

All 3-inch diameter thru 15-inch diameter PVC pipe shall be ASTM D3034 gasketed sewer pipe with an SDR of 26 or lower. All PVC pipe with a diameter larger than 15-inch shall meet ASTM F679 with a pipe stiffness (PS) of 115. Pipe joints shall conform to ASTM D3212. Gaskets shall conform to ASTM F477. PVC pipe conforming to ASTM D1785 Schedule 40 and ASTM D2665 is acceptable for 6-inch service leads.

2.02 Material Testing

All materials to be incorporated in the construction of gravity sewers and appurtenances shall be subject to inspection and tests, as specified by ASTM or AWWA references. The Owner reserves the right to subject any material supplied for a particular project to an independent testing laboratory. Such tests, if scheduled, shall be paid for by the Owner. The results of such tests shall be the basis of material acceptance.

The Contractor shall supply the Owner with shop drawings, a certificate of compliance, or actual test results stating that the material to be used is in conformance with the specifications prior to using material for construction.

PART 3 - EXECUTION

3.01 General

Sewers shall be constructed in accordance with the following standards, except as modified in this specification:

A. Concrete Pipe: ASTM C1479

B. Plastic Pipe: ASTM D2321 and ASTM F1668

3.02 Excavation

Excavation shall be completed in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

3.03 Pipe Alignment

It shall be the Contractor's responsibility to transfer the line and grade to the bottom of the excavation for pipe laying. Lasers shall be used for pipe laying.

It shall be the Contractor's responsibility to protect the original survey control and benchmarks, as set by the Engineer.

3.04 Pipe Laying

Each pipe shall be laid on an even, firm bed, so that no uneven strain will come to any part of the pipe. Particular care shall be exercised to prevent the pipes bearing on the sockets. Bell holes for bell and spigot pipe shall be dug at each point as specified before. Each pipe shall be laid in the presence of the inspector. The bell-end of the pipe shall be laid up-grade. Pipe laying shall proceed in the upstream direction, except where otherwise approved by the Engineer.

The interior of the sewer shall be cleaned of all dirt, debris, jointing material, and other material.

All pipe shall be completely pushed to the "home" position.

Pipes laid in tunnel or casing pipe shall be supported on suitable blocks, cut or grouted into position to place the invert of the sewer or drain at the slope, and to the elevations indicated on the contract drawings.

3.05 Connections to Existing Sewers

When replacing an existing sewer or manhole or constructing a new manhole over an existing sewer, the original sewer shall be reconnected to the new sewer or manhole. Existing sewer pipe shall be removed, salvaged, and reused to make connection to the new manhole, if possible. If existing pipe is not salvageable, a new sewer pipe shall be installed, as required, and connected to the existing sewer. When a new sewer is connected to an existing sewer, the existing sewer shall be removed to an existing joint, if existing joint is compatible with new sewer. If existing sewer joint is not compatible with new sewer, a watertight coupler shall be installed.

3.06 Pipe Joints

In all jointing operations, the trench must be dewatered when joints are made. Bell and spigot or tongue and groove ends of the pipe shall first be wiped clean before actual jointing operations are started.

Joints between consecutive bell and spigot or tongue and groove pipe shall be made with a rubber gasket. The gasket shall be fitted over the tongue or spigot of each pipe, as recommended by the manufacturer, and the pipe entered into the bell or groove and shoved home.

A. PVC Joints

All PVC pipe shall be joined with rubber compression gaskets that are factory installed. The joint shall be lubricated and joined so the "home" mark on the pipe is flush with the bell end.

3.07 Connections for Service Pipes

Service connections for house sewers shall be provided in the main sewers, as shown on the contract drawings or as designated in the specifications. The exact location shall be as directed by the Engineer during construction.

Either tee or wye branches are acceptable for service connections, where the main line sanitary sewer is 12 inches or greater. Wye fittings are required on 8-inch and 10-inch sewers. Cleanouts are required at existing right-of-way or easement limits, every 100 feet along the service pipe, or at horizontal bends, and within 5 feet of the building/structure to be serviced. Service leads shall be installed at a sufficient depth to service house basements if the main line sewer is sufficiently deep, but shall be left above the water table at their terminus.

The Contractor shall place a hardwood stake on the property line directly opposite each opening left in the sewer. The hardwood stake shall be 8 feet long and a minimum size of 2 inches by 2 inches. The Contractor shall locate and keep a record, in tabular form, of all manhole and sewer opening locations by measurement to the nearest downstream opening. All manhole locations shall be witnessed by at least two ties to existing topographic features. This record shall be delivered to the Engineer during the progress of the work. When constructing sanitary sewer connections in wet ground, place a 45-degree bend at the property end of the connection and install enough house lead to bring the connection above the natural ground water level.

3.08 Backfill

Backfill shall meet the requirements of Section 31 23 01 – Excavating, Filling, and Grading.

3.09 Acceptance Tests - Sanitary Sewers

The methods of testing shall be approved by the Engineer. The Contractor shall provide the necessary equipment and labor for making the tests, and the cost of testing and repair shall be included in the unit price bid for completed sanitary sewer. The Engineer shall determine when grouting or relaying of faulty pipe is required.

A. Alignment, Grade, and Wyes

Each section of the sanitary sewer shall be checked for alignment and grade by using a closed circuit television inspection. The report and video shall indicate the measurements from manhole center to manhole center and shall tabulate all service leads. The Contractor shall supply the Engineer with a digital file of the video inspection and a listing of service connections prior to requesting final inspection.

B. Air Testing

Sewers less than 24 inches in diameter shall be subjected to an air test. The Contractor shall furnish all necessary labor, equipment, and supervision to perform the required air testing. The testing of PVC pipe sewer shall conform to ASTM F1417.

The Contractor shall be required to furnish the Owner with acceptable air test results for each segment of sanitary sewer. All testing shall be monitored by the Engineer.

The procedure for air testing of sewers shall be as follows:

The sewer line shall be tested in increments between manholes. The line shall be cleaned and plugged at each manhole. Such plugs shall be designed to hold against the test pressure and shall provide an air-tight seal. One of the plugs shall have an orifice through which air can be introduced into the sewer. An air supply line shall be connected to the orifice. The air supply line shall be fitted with suitable control valves and a pressure gauge for continually measuring the air pressure in the sewer. The pressure gauge shall have a minimum diameter of 3½ inches and a range of 0-10 psig. The gauge shall have minimum divisions of 0.10 psig and an accuracy of plus or minus 0.04 psig.

The sewer shall be pressurized to 4 psig, plus sufficient pressure to equal the force exerted by ground water over the pipeline. At least 2 minutes shall be allowed for the air pressure to stabilize between 3.5 and 4 psig. If necessary, air shall be added to the sewer to maintain a pressure of 3.5 psig or greater.

After the stabilization period, the air supply control valve shall be closed so that no more air will enter the sewer. The sewer air pressure shall be noted and timing for the test begun. The test shall not begin if the air pressure is less than 3.5 psig, or such other pressure as is necessary to compensate for ground water level.

The time required for the air pressure to decrease 1 psig during the test shall not be less than the time shown in the following table:

Pipe Diameter (inches)	Minimum Test Time (minutes)	Pipe Length for Minimum Time (feet)	Time for Longer Pipe Length (seconds)
4	3:46	597	0.380 L
6	5:40	398	0.854 L
8	7:34	298	1.520 L
10	9:26	239	2.374 L
12	11:20	199	3.418 L
15	14:10	159	5.342 L
18	17:00	133	7.692 L
21	19:50	114	10.470 L

Length is based on the length of the sewer main only. If laterals or other leads are connected, their lengths are not to be included in the testing length.

If a sewer fails to pass any of the previously described tests, the Contractor shall determine the location of the leaks, repair them, and retest the sewer. The tests shall be repeated until satisfactory results are obtained.

C. Deflection Testing

All sanitary sewers constructed using plastic pipe shall be subjected to a deflection test. The Contractor shall furnish all labor, materials, and equipment necessary to perform deflection testing. The testing shall be completed after the pipeline has been backfilled for a period of at least 30 days. The pipeline shall be tested with a rigid ball or mandrel having at least 7

points, and having a diameter of not less than 95 percent of the average inside diameter of the pipe being tested. The average diameter for the pipe will be as specified by the ASTM specification for the pipe material, class, and size. Where testing indicates that the pipe deflection exceeds 5 percent of the pipe diameter, the pipe shall be removed and replaced. Pipe that is replaced shall be re-tested at least 30 days following its replacement.

Deflection testing shall be performed in the presence of the Engineer. The Contractor shall provide the Engineer with a least two working days' notice of conducting deflection testing.

D. Physical Inspection

Upon completion of all work, the Contractor shall open all manholes in the presence of the Engineer to demonstrate that the manholes are complete and free of debris.

3.10 Bypass Pumping

Bypassing of the existing sewage shall be provided, as required, to maintain uninterrupted sanitary sewer service. The line shall be plugged at an upstream manhole and the flow shall be pumped to a downstream point or adjacent system. The pump and bypass lines provided shall be of sufficient size to handle the normal and peak flow conditions for the system. Internal combustion engines shall have adequate exhaust silencers to muffle engine noise to an acceptable level for the area where located.

The bypass plan for each segment of pipe shall be submitted to the Owner and Engineer for review and approval prior to the start of the project, along with a list of equipment. All property owners affected by the bypass shall be notified by the Contractor a minimum of 48 hours in advance.

3.11 Removal of Sanitary Sewer

Existing sanitary sewer shall be removed where shown on the drawings or directed by the Engineer.

Existing sanitary sewer structures shall be removed where shown on the drawings or directed by the Engineer.

Where directed, the existing sanitary sewer and sanitary sewer structures shall be removed in their entirety. The Contractor shall fill the excavation resulting from the excavation and removal of the pipe and structures. Backfill within the 1:1 influence of pavements, roads, driveways, or structures shall be sand and compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Backfill in other areas shall be suitable soil, free of rocks, debris, and frozen material and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

END OF SECTION

SECTION 33 44 00
STORM SEWERS

PART 1 - GENERAL

1.01 Work Included

This work includes construction of storm sewers, drainage structures, and appurtenances. Drainage structures include catch basins, inlets, manholes, and manhole tees.

1.02 References

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

- A. AASHTO M170 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- B. AASHTO M294 – Standard Specification for Corrugated Polyethylene Pipe, 300-mm to 1,500-mm (12-in. to 60-in.) Diameter
- C. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- D. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- E. ASTM C478 – Standard Specifications for Circular Precast Reinforced Concrete Manhole Sections
- F. ASTM D1056 – Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber
- G. ASTM D4101 – Standard Specifications for Polypropylene Injection and Extrusion Materials
- H. Michigan Department of Transportation 2020 Standard Specifications for Construction
- I. Michigan Department of Transportation Standard Plans
- J. All references to “Engineer” in this specification shall be interpreted as “Owner”. Owner will determine the involvement of the Engineer during construction.

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 01 55 26 – Maintaining Traffic
- C. Section 01 71 23.16 – Construction Staking by Contractor
- D. Section 01 74 50 – Cleanup and Restoration
- E. Section 31 23 01 – Excavating, Filling, and Grading

F. Section 31 25 00 – Soil Erosion and Sedimentation Control

G. Section 32 92 00 – Turf Establishment

1.04 Submittals

The Contractor shall submit shop drawings or certificates of compliance to the Owner and Engineer for the following items.

- A. Pipe, fittings, and joint material
- B. Manholes and manhole adjusting rings and castings
- C. Pipe bedding and backfill material

1.05 Quality Assurance and Quality Control

A. Grade and Alignment

Grade and alignment shall be maintained using a laser. The Contractor shall verify that the sewer is constructed at the proper alignment by checking grades and offsets at each manhole, at 50 feet upstream from manholes, and at 100-foot intervals. The Contractor shall report as-constructed measurements to the Engineer.

B. Acceptance Tests

The completed sewer(s) shall be subjected to the following tests, prior to acceptance by the Owner. Acceptance tests shall be completed by the Contractor, in the presence of the Engineer (or Owner's representative).

1. Internal Video Inspection

The video inspection shall be completed in accordance with Section 3.06.A.

2. Physical Inspection

The physical inspection shall be completed in accordance with Section 3.06.B.

PART 2 - PRODUCTS

2.01 Materials

A. Pipe

Unless a specific type, class or thickness is called for on the plans or in the proposal, material class shall meet the requirements of Pipe Alternates for Storm Sewer Classes, as described in Section 402 of the Michigan Department of Transportation 2020 Standard Specifications for Construction. Corrugated steel pipe will not be allowed.

1. Reinforced Concrete Pipe

Pipe shall meet ASTM C76. Where no class is shown on the drawings or on the proposal, Class III or better shall be provided.

Joints shall be rubber gaskets in accordance with ASTM C443.

2. Smooth-Lined Corrugated Plastic Pipe

Where storm sewers from 12-inch to 24-inch diameter are called for on the plans, with at least 3 feet of cover over the pipe, and when a particular kind of sewer pipe is not specified, the Contractor may furnish smooth-lined corrugated plastic pipe (SLCPP).

SLCPP shall be corrugated polyethylene pipe meeting the requirements of AASHTO M294, Type S. Any fittings required shall also meet the requirements of AASHTO M294. Only fittings supplied or recommended by the pipe manufacturer shall be used. When gaskets are used in couplings to provide watertight or silt-tight joints, gaskets shall be a band of expanded rubber meeting the requirements of ASTM D1056 for Type 2 closed cell rubber, or O-rings meeting the requirements of ASTM C443.

3. PVC Pipe

All PVC pipe shall be ASTM D3034 gasketed sewer pipe with a SDR of 26 or lower. PVC pipe conforming to ASTM D1785 Schedule 40 and ASTM D2665 is acceptable for 6-inch service leads.

B. Drainage Structures

Drainage structures shall be precast concrete units meeting the requirements of ASTM C478 with rubber gaskets conforming to ASTM C443. Drainage structures shall be 4 feet in diameter, unless shown otherwise on the plans or in the proposal. Precast concrete grade rings meeting ASTM C478 shall be used to adjust the top of the structure to the final grade. At least 6 inches, but not more than 18 inches, of vertical adjustment shall be provided with grade rings. Manhole lifting holes shall not be permitted in the manhole sections. Lifting lugs shall be cast into the manhole for lifting.

Manhole steps shall be copolymer polypropylene plastic steps with a steel reinforcement bar, with a minimum diameter of ½-inch, a minimum width of 10 inches center to center of wall anchor, and complete with anti-skid side plates conforming to ASTM D4101. Steps shall be manufactured with the manhole wall and spaced at a maximum of 16 inches on center. Gray iron castings shall be heavy duty classification and shall conform to ASTM A48 Class 35B coated with asphalt coating.

C. Castings

Castings shall meet the requirements of the Michigan Department of Transportation 2020 Standard Specifications for Construction, and the Michigan Department of Transportation Standard Plans.

PART 3 - EXECUTION

3.01 Excavation

Excavation shall be completed in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

3.02 Pipelaying

Sections of sewer pipe shall be carefully laid in the prepared trench, bell ends upgrade, with the spigot end fully entered in the adjacent bell. Each section shall have firm bearing throughout its length and shall be substantially true to the line and grade required. The use of blocks to bring sections to grade will not be permitted.

Circular concrete pipe with lift holes shall be installed with the lift holes on top of the pipe. Holes shall be plugged with suitable concrete plugs before backfilling.

Existing live sewers that are to remain shall be carefully protected during construction of the new sewers. If they are damaged in any way, they shall be immediately repaired or replaced, as directed by the Engineer.

All junctions with house or building leads shall be made in a manner acceptable to the Engineer.

Flexible watertight joints shall be installed in accordance with the manufacturer's recommendations.

Connections to sewers owned by other agencies shall be done in accordance with their requirements.

Connections to existing sewers having a plug or bulkhead shall be made with a watertight joint. The plug or bulkhead shall be removed without damage to the sewer, and the plug material shall be removed from the sewer and properly disposed of.

If there are no openings in the existing pipe or structures at the point of connection, an opening shall be cut in the pipe or the structure sufficiently large enough to permit 3 inches of mortar to be packed around the entering pipe and the mortar pointed up smooth and flush with the inner wall. Pipe passing through pipe or structure walls shall be cut at the end to conform with the shape of the inside of the wall and to be flush therewith. On the outside of the pipe or structure, the entering pipe shall be encased with sufficient mortar to provide bearing under the pipe. Any existing pipe broken or cracked while making the connection shall be replaced at the Contractor's expense.

When replacing an existing sewer, connections to the original sewer or drain that are encountered shall be reconnected to the new sewer.

Sewers and drainage structures shall be reasonably free of accumulation of silt debris and other foreign matter at the time of final acceptance.

3.03 Backfill

Backfill shall meet the requirements of Section 31 23 01 – Excavating, Filling, and Grading.

3.04 Additional Requirements of Construction for SLCPP Sewers

SLCPP shall be installed in accordance with Section 3.01. and the additional requirements provided here.

Joints in SLCPP shall be wrapped with a 2-foot wide strip of non-woven geotextile filter fabric with a 1-foot lap at the fabric joint.

The installed pipe shall not be deformed such that any diameter is reduced by 5 percent or more. Deformed pipe shall be removed and replaced at the Contractor's expense. The completed pipeline shall be tested for deformation by the Contractor under the Engineer's supervision. The Contractor shall furnish a 9-point mandrel having a diameter equal to at least 95 percent of the original uninstalled inside diameter of the pipe. The mandrel shall meet the Engineer's approval. Mandrel testing shall be performed no less than thirty calendar days after installation.

3.05 Drainage Structures

Precast concrete units shall be placed on a 6-inch sand base, leveled, and thoroughly compacted. Joints shall be sealed with mortar. Joints shall be thoroughly wetted prior to sealing. The joints inside the structure shall be flush with the walls. Joints shall be completely filled with mortar.

Pipe or tile connections to concrete drainage structures shall extend through the structure wall and be cut flush with the inside surface. The opening around the pipe shall be neatly filled with mortar to prevent leakage.

Drainage structure covers shall be new and adjusted to the finish elevation using precast concrete grade rings. Covers shall be of the type called for on the plans. Covers and grade rings shall be set in full mortar beds.

Cover elevations given on the plans are for information only. The final elevation will be determined in the field, based on as-constructed conditions.

Drainage structures shall be maintained reasonably free of accumulations of silt, debris, and other foreign matter at the time of final acceptance.

3.06 Acceptance Tests - Storm Sewers

The methods of testing shall be approved by the Engineer. The Contractor shall provide the necessary equipment and labor for making the tests, and the cost of testing and repair shall be included in the unit price bid for completed storm sewer. The Engineer shall determine when grouting or relaying of faulty pipe is required.

A. Alignment, Grade, and Connections

Each section of the storm sewer shall be checked for alignment and grade by using a closed circuit television inspection. The report and video shall indicate the measurements from manhole center to manhole center and shall tabulate all connections. The Contractor shall supply the Engineer with a digital recording of the video inspection and a listing of service connections prior to requesting final inspection.

B. Physical Inspection

Upon completion of all work, the Contractor shall open all manholes in the presence of the Engineer to demonstrate that the manholes are complete and free of debris.

3.07 Removal of Storm Sewer

Existing storm sewer shall be removed where shown on the drawings or directed by the Engineer.

Existing storm sewer structures shall be removed where shown on the drawings or directed by the Engineer.

Where directed, the existing storm sewer and storm sewer structures shall be removed in their entirety. The Contractor shall fill the excavation resulting from the excavation and removal of the pipe and structures. Backfill within the 1:1 influence of pavements, roads, driveways, or structures shall be sand and compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Backfill in other areas shall be suitable soil, free of rocks, debris, and frozen material and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

END OF SECTION

SURVEY MONUMENTATION

	TRAVERSE POINT		SET MONUMENT
	BENCHMARK		FOUND MONUMENT
	ALIGNMENT POINT		SECTION & 1/4 CORNER
	SET IRON		1/8 & 1/16 CORNER
	FOUND IRON		NGS & USGS MONUMENT
		SECTION LINE	
		EXISTING PROPERTY LINE (APPROX)	
		PARCEL LINE / LOT LINE	
		EXISTING EASEMENT LINE	
		EXISTING RIGHT OF WAY	
		PROPOSED EASEMENT	
		PROPOSED RIGHT OF WAY	
		PROJECT CONTROL LINE	

MISCELLANEOUS TOPO

	SATELLITE DISH		TRASH CAN
	ANTENNA		PICNIC TABLE
	COLUMN		PARK BENCH
	FLOOD LIGHT		BBQ GRILL
	FOUNTAIN		DUMPSTER
	STATUE/SCULPTURE		BIKE RACK
	GRAVE MARKER		AIR CONDITIONING UNIT
	PLANTER BOX		PAY PHONE/BOOTH
	ROCK		SOIL BORING
	MAILBOX		MONITORING WELL
	PAPER BOX		BUMPER BLOCK
	FENCE GATE		SWAMP OR WETLAND

SIGNS, SIGNALS & POSTS

	FLAG POLE		CANTILEVERED SIGN
	ADVERTISING/BUSINESS SIGN		PEDESTRIAN SIGNAL
	POST (WOOD/METAL/CONCRETE/FENCE)		PEDESTRIAN CROSSING BUTTON
	HIGHWAY DELINEATOR POST		TRAFFIC SIGNAL
	EXISTING ONE POST TRAFFIC SIGN		RAILROAD CROSSING GATE
	EXISTING TWO POST TRAFFIC SIGN		RAILROAD CROSSING SIGNAL
	PARKING METER		PROPOSED ONE POST TRAFFIC SIGN
	BILLBOARD		PROPOSED TWO POST TRAFFIC SIGN
	CANTILEVERED TRAFFIC SIGNAL		

PLAYGROUND EQUIPMENT

	SWING SET		VOLLEYBALL POLE
	SLIDE (STRAIGHT)		MERRY-GO-ROUND
	SLIDE (SPIRAL)		BASKETBALL HOOP POST
	MONKEY BARS (RECTANGLE)		FOOTBALL/SOCCER GOAL
	MONKEY BARS (ROUND)		

MISCELLANEOUS UTILITIES

	CABLE TV RISER		UTILITY HANDHOLE
	CABLE TV MARKER POST		STRAIN POLE
	CIRCUIT BREAKER		UTILITY/LIGHT POLE
	ELECTRIC METER		GUY WIRE
	ELECTRIC OUTLET		GUY POLE
	ELECTRIC RISER		UTILITY POLE
	ELECTRIC TRANSFORMER PAD		WOOD LIGHT POLE
	ELECTRIC TRANSMISSION TOWER		METAL LIGHT POLE
	ELECTRIC MANHOLE		LIGHT POLE BASE
	ELECTRIC MARKER POST		ORNAMENTAL LIGHT POLE
	TELEPHONE RISER		POLE BOX
	TELEPHONE MANHOLE		TRAFFIC CONTROL BOX
	TELEPHONE MARKER POST		ELECTRIC VEHICLE CHARGING STATION
	FIBER OPTIC MARKER POST		EXISTING MISCELLANEOUS MANHOLE
	EXISTING OVERHEAD UTILITY LINE		
	EXISTING U.G. ELECTRIC LINE		
	EXISTING U.G. TELEPHONE LINE		
	EXISTING U.G. FIBER OPTIC LINE		
	EXISTING U.G. CABLE TV LINE		

GAS

	GAS METER		PROPANE TANK
	GAS RISER		GAS TEST STATION
	GAS STOP BOX		GAS FILLPORT
	GAS VALVE		GAS PUMP
	GAS VENT		GAS MANHOLE
	GAS BLOW OFF		GAS MARKER POST
	6" S-MP GAS		EXISTING U.G. GAS LINE

WATER MAIN

	EXISTING FIRE HYDRANT		EXISTING WATER FAUCET/SPIGOT
	EXISTING WATER GATE VALVE AND BOX		EXISTING WATER MANHOLE
	EXISTING WATER STOP BOX		EXISTING WATER VALVE
	EXISTING WATER GATE VALVE AND WELL		EXISTING WATER POST VALVE
	EXISTING WATER METER PIT		EXISTING WATER AIR RELEASE VALVE
	EXISTING WATER WELL		EXISTING WATER MARKER POST
	EXISTING SPRINKLER HEAD		PROPOSED FIRE HYDRANT
	EXISTING POST HYDRANT		PROPOSED WATER GATE VALVE AND BOX
	EXISTING WATER BACK FLOW PREVENTER		PROPOSED WATER STOP BOX
	EXISTING WATER TOWER		PROPOSED WATER GATE VALVE AND WELL
	EXISTING SPRINKLER VALVE		PROPOSED WATER MAIN REDUCER
	EXISTING WATER METER		PROPOSED WATER MAIN SLEEVE
	12" WM		EXISTING WATER MAIN
	REMOVE WATER MAIN		ABANDON WATER MAIN
	PROPOSED WATER MAIN		

STORM SEWER

	EXISTING CURB INLET		PROPOSED CATCH BASIN IN CURB LINE (5' DIA AND SMALLER)
	EXISTING SQUARE CATCHBASIN		PROPOSED CATCH BASIN IN CURB LINE (6' DIA AND LARGER)
	EXISTING ROUND CATCHBASIN		PROPOSED CATCH BASIN IN GREEN SPACE (5' DIA AND SMALLER)
	EXISTING DOWNSPOUT		PROPOSED CATCH BASIN IN GREEN SPACE (6' DIA AND LARGER)
	EXISTING STORM SEWER CLEANOUT		PROPOSED STORM MANHOLE (5' DIA AND SMALLER)
	EXISTING STORM MANHOLE		PROPOSED STORM MANHOLE (6' DIA AND LARGER)
	EXISTING PIPE INLET/OUTLET		PROPOSED CULVERT END SECTION
	EXISTING STORM MARKER POST		PROPOSED STORM SEWER CLEANOUT
	EXISTING STORM SEWER STRUCTURE NUMBER		PROPOSED STORM SEWER STRUCTURE NUMBER
	12" STM		EXISTING STORM SEWER
	12" CONC		EXISTING DRIVE/CROSS CULVERT
	12" STM		REMOVE STORM SEWER
	12" STM		ABANDON STORM SEWER
	PROPOSED STORM SEWER LESS THAN 24"		
	PROPOSED STORM SEWER 24" AND GREATER		

SANITARY SEWER

	EXISTING SANITARY MANHOLE		EXISTING SANITARY SEWER CLEANOUT/RISER
	EXISTING SANITARY PUMP STATION		EXISTING SANITARY MARKER POST
	EXISTING SANITARY SEWER VALVE		PROPOSED SANITARY SEWER MANHOLE
	EXISTING SEPTIC TANK		PROPOSED SANITARY SEWER CLEANOUT
	EXISTING SANITARY SEWER STRUCTURE NUMBER		PROPOSED SANITARY SEWER STRUCTURE NUMBER
	12" SAN		EXISTING SANITARY SEWER
	12" SAN		REMOVE SANITARY SEWER
	12" SAN		ABANDON SANITARY SEWER
	12" SAN FM		EXISTING SANITARY FORCE MAIN
	12" SAN FM		REMOVE SANITARY FORCE MAIN
	12" SAN FM		ABANDON SANITARY FORCE MAIN
	PROPOSED SANITARY SEWER		

COMBINED SEWER

	EXISTING CURB INLET		EXISTING SQUARE CATCHBASIN
	EXISTING ROUND CATCHBASIN		EXISTING COMBINED SEWER MANHOLE
	EXISTING COMBINED SEWER STRUCTURE NUMBER		
	12" COMB		EXISTING COMBINED SEWER
	12" COMB		REMOVE COMBINED SEWER
	12" COMB		ABANDON COMBINED SEWER

PARCEL INFORMATION

401-069	PARCEL/TAX IDENTIFICATION NUMBER
#5324	EXISTING BUILDING AND ADDRESS/BUSINESS NAME

CAUTION SYMBOLS

	USED WITH UNDERGROUND GAS & ELECTRICAL LINES
	USED WITH FIBER OPTIC LINES
	USED WITH CRITICAL UNDERGROUND LINES

PLAN VIEW LINETYPES

	EXISTING CENTERLINE OF DITCH
	EXISTING FENCE
	EXISTING GUARDRAIL
	EXISTING RAILROAD TRACK
	EXISTING CONTOUR MAJOR
	EXISTING CONTOUR MINOR
	EXISTING EDGE OF WETLAND
	EXISTING SHORELINE / EDGE OF WATER
	EXISTING TOP OF BANK
	EXISTING TOE OF SLOPE
	PROPOSED DITCH CENTERLINE
	PROPOSED FENCE
	PROPOSED CONTOUR MAJOR
	PROPOSED CONTOUR MINOR
	PROPOSED SLOPE STAKE LINE
	PROPOSED SILT FENCE

PROPOSED CALLOUTS

ADJ	ADJUST STRUCTURE
ADJ-X	ADJUST STRUCTURE W/ NEW COVER
ADJ-B/O	ADJUST STRUCTURE BY OTHERS
REC	RECONSTRUCT STRUCTURE
REL	RELOCATE
REL-B/O	RELOCATE BY OTHERS
R	REMOVE
R&R	REMOVE AND REPLACE
SALV	SALVAGE
S	SAVE
A	ABANDON
C	CLEARING
B	BULKHEAD
SR-X	SIDEWALK RAMP TYPE
##	SOIL EROSION CONTROL MEASURE

TREES & SHRUBS

	STUMP		CONIFEROUS TREE
	DECIDUOUS TREE		CONIFEROUS SHRUB
	DECIDUOUS SHRUB		DEAD TREE
	EXISTING EDGE OF WOODS		
	EXISTING EDGE OF BRUSH		

PAVEMENT IDENTIFICATION

	EXISTING EDGE OF GRAVEL
	EXISTING CURB AND GUTTER
	PROPOSED FLOW CURB AND GUTTER

REMOVAL HATCHING LEGEND

	REMOVE CURB AND GUTTER
	REMOVE PAVEMENT
	REMOVE SIDEWALK

PROPOSED HATCHING LEGEND

	PROPOSED PAVEMENT
	PROPOSED CONCRETE SIDEWALK OR DRIVEWAY

SEAL OF ENGINEER

ARCHITECT SEDGEWICK+ FERWEDA ARCHITECTS

410 East Court Street Flint, MI 48503
810-238-9647 | www.sfarch.us

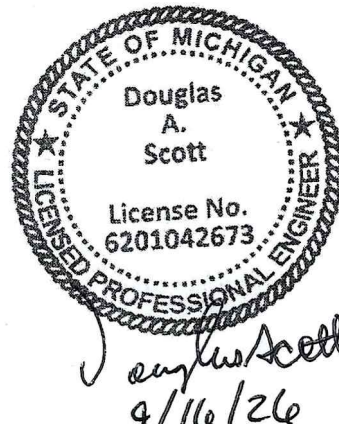
Good clients +Good design+Great architecture

REVISIONS

Date	Description
6.10.26	.SITE PLAN REVIEW

Project
Essexville STEM
305 Pine Street, Essexville, MI 48732

Drawing
LEGEND SHEET



ISSUED FOR CONSTRUCTION 09-16-2026



ROWE PROFESSIONAL SERVICES COMPANY	
PLAN SUBMITTALS AND CHANGES	
SITE PLAN APPROVAL - **NOT FOR CONSTRUCTION**	
DATE	DESCRIPTION
6-10-26	ISSUED FOR SITE PLAN REVIEW

DRAWN BY:	MCC
CHECKED BY:	DAS
PROJECT NUMBER	25-028
DATE	JUNE 2026
SCALE	N.T.S.
SHEET NUMBER	C1.0

GENERAL CONSTRUCTION NOTES

EMERGENCY CONTACTS

BEFORE BEGINNING WORK ON THE PROJECT, THE CONTRACTOR SHALL PROVIDE THE OWNER AND ENGINEER WITH THE NAMES AND TELEPHONE NUMBERS OF EMERGENCY CONTACTS. AT LEAST ONE PERSON REPRESENTING THE CONTRACTOR SHALL BE AVAILABLE TO RESPOND TO EMERGENCIES THROUGHOUT THE LIFE OF THE PROJECT, 24 HOURS A DAY, 7 DAYS A WEEK.

UNDERGROUND UTILITY IDENTIFICATION AND LOCATION

THE CONTRACTOR SHALL CALL MISS DIG (1-800-482-7171) A MINIMUM OF 3 WORK DAYS IN ADVANCE OF BEGINNING EXCAVATION. THE CONTRACTOR IS RESPONSIBLE TO IDENTIFY AND NOTIFY UTILITY AGENCIES WITHIN THE PROJECT AREA WHICH DO NOT PARTICIPATE IN THE MISS DIG NOTIFICATION PROGRAM.

PUBLIC UTILITIES

EXISTING UTILITIES ARE SHOWN BASED UPON RECORDS AND LOCATIONS PROVIDED BY UTILITY AGENCIES. THE INFORMATION SHOWN IS CONSIDERED APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR. UNLESS THE PLANS SPECIFICALLY SHOW THAT EXISTING UTILITIES ARE TO BE MOVED, THE CONTRACTOR IS RESPONSIBLE TO PROTECT AND MAINTAIN EXISTING UTILITIES.

VERIFICATION OF UNDERGROUND UTILITIES

THE CONTRACTOR SHALL EXCAVATE AND LOCATE ALL EXISTING UTILITIES IN THE PROJECT AREA IN ADVANCE OF CONSTRUCTION TO VERIFY THEIR ACTUAL LOCATION. POTENTIAL CONFLICTS SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL MAKE SUCH CHANGES TO GRADE AND ALIGNMENT OF PROPOSED WORK AS DIRECTED BY THE ENGINEER TO AVOID CONFLICTS, AT NO INCREASE IN COST TO THE OWNER.

UTILITY SERVICE

UNLESS SPECIFICALLY PROVIDED OTHERWISE IN THE CONTRACT DOCUMENTS, ALL EXISTING UTILITIES ARE TO REMAIN IN SERVICE DURING THE PROJECT.

MAILBOXES

MAILBOXES LOCATED WITHIN THE LIMITS OF EXCAVATION, GRADING, OR CONSTRUCTION SHALL BE REMOVED AND PROTECTED FROM DAMAGE BY THE CONTRACTOR. TEMPORARY MAILBOXES SHALL BE PROVIDED AND MAINTAINED DURING THE PROJECT. UPON COMPLETION OF GRADING OR CONSTRUCTION ACTIVITIES, THE ORIGINAL MAILBOX SHALL BE REINSTALLED.

MAILBOXES (AND/OR SUPPORTS) WHICH ARE DAMAGED AS A RESULT OF THE PROJECT SHALL BE REPLACED BY THE CONTRACTOR, AT THE CONTRACTOR'S EXPENSE. MAILBOXES SHALL BE REPLACED IN ACCORDANCE WITH THE STANDARDS OF THE U.S. POSTAL SERVICE AND THE REGULATIONS OF THE AGENCY HAVING JURISDICTION OVER THE ROADS AND STREETS IN THE PROJECT AREA.

PRIVATE IRRIGATION SYSTEMS

WHERE IRRIGATION SYSTEMS WITHIN THE PUBLIC RIGHT-OF-WAY WILL INTERFERE WITH THE PROPOSED CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE PROPERTY OWNERS THAT IT IS THEIR RESPONSIBILITY TO REMOVE AND PROTECT THEIR IRRIGATION SYSTEM. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A COPY OF THE NOTIFICATION.

WHERE THE OWNER HAS NOT REMOVED THEIR PRIVATE IRRIGATION SYSTEM, THE CONTRACTOR SHALL CUT AND PLUG THOSE SECTIONS OF PIPING WHICH INTERFERE WITH CONSTRUCTION. SPRINKLER HEADS, VALVES, AND PIPING WHICH INTERFERES WITH THE CONTRACTOR'S WORK, SHALL BE REMOVED AND STOCKPILED ON THE OWNER'S PROPERTY.

SOIL BORINGS / PAVEMENT CORES

IF PROVIDED ON THE PLANS OR IN THE CONTRACT DOCUMENTS, LOGS OF SOIL BORINGS OR PAVEMENT CORES REPRESENT THE SUBSURFACE CONDITIONS ENCOUNTERED AT SPECIFIC POINTS. THE INFORMATION IS PROVIDED FOR THE CONTRACTOR'S INFORMATION ONLY.

MAINTAINING TRAFFIC

LOCAL AND EMERGENCY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES WITHIN THE PROJECT AREA.

WHEN EXCAVATION, FRESH CONCRETE, OR OTHER CONSTRUCTION WORK WILL RESULT IN THE CLOSURE OF A STREET OR DRIVEWAY FOR A PERIOD OF TIME, THE CONTRACTOR IS RESPONSIBLE TO NOTIFY ALL AFFECTED RESIDENTS AND BUSINESSES IN ADVANCE.

THE CONTRACTOR SHALL NOTIFY EMERGENCY RESPONSE AGENCIES IN ADVANCE OF ROAD CLOSURES OR THE ESTABLISHMENT OF DETOURS.

TRAFFIC SIGNS

TRAFFIC SIGNS WHICH INTERFERE WITH CONSTRUCTION SHALL BE REMOVED AND REPLACED BY THE AGENCY HAVING JURISDICTION OVER THE STREETS OR ROADS IN THE PROJECT AREA. THE CONTRACTOR IS RESPONSIBLE TO CONTACT THE AGENCY TO ARRANGE FOR REMOVAL OF THE SIGN AND IS RESPONSIBLE TO PAY ANY FEES ASSOCIATED WITH THE REMOVAL AND REPLACEMENT OF THE SIGNS.

SCHEDULE

THE CONTRACTOR SHALL COMPLETE ALL WORK IN AN EXPEDITIOUS MANNER AND SHALL NOT STOP WORK ON THE PROJECT ONCE BEGUN.

ALIGNMENT

ALIGNMENT AND GRADES FOR CURB AND GUTTER (INCLUDING THROUGH RAMPS AND DRIVEWAY OPENINGS) SHOWN ON THE PLANS ARE FOR THE TOP, BACK OF CURB, UNLESS SPECIFICALLY SHOWN OTHERWISE ON THE PLANS.

THE HORIZONTAL ALIGNMENT SHOWN ON THE DRAWINGS FOR DRAINAGE STRUCTURES LOCATED IN THE CURB LINE IS TO THE CENTER OF THE CASTING.

THE HORIZONTAL ALIGNMENT SHOWN ON THE DRAWINGS FOR DRAINAGE STRUCTURES WHICH ARE NOT IN THE CURB LINE AND FOR MANHOLES IS TO THE CENTER OF THE STRUCTURE.

WHERE RIM ELEVATIONS ARE PROVIDED ON THE PLANS FOR MANHOLE CASTINGS, THE ELEVATION PROVIDED IS FOR THE TOP OF THE CASTING.

WHERE RIM ELEVATIONS ARE PROVIDED FOR INLET TYPE CASTINGS, THE ELEVATIONS ARE PROVIDED AS FOLLOWS:

- CURB INLETS – THE ELEVATION OF THE TOP OF CURB
- ALL OTHER INLETS – THE ELEVATION OF THE FLOW LINE

WHERE RIM ELEVATIONS ARE PROVIDED ON THE PLANS FOR INLETS OR MANHOLE CASTINGS, THE ELEVATIONS PROVIDED ARE CONSIDERED PRELIMINARY. THE CONTRACTOR SHALL MAKE THE FINAL ADJUSTMENT FOLLOWING THE ESTABLISHMENT OF ACTUAL GRADING AND PAVEMENT ELEVATIONS.

CONSTRUCTION STAKING

WHEN CONSTRUCTION STAKING IS TO BE PROVIDED BY THE ENGINEER OR OWNER, THE CONTRACTOR SHALL REQUEST STAKING AT LEAST 3 WORKING DAYS IN ADVANCE.

WHEN CONSTRUCTION STAKING IS TO BE PROVIDED BY THE ENGINEER OR OWNER, STAKING WILL BE PROVIDED ONE TIME. THE CONTRACTOR SHALL PROTECT AND PRESERVE SURVEY CONTROL AND STAKING. RE-STAKING WILL BE AT THE CONTRACTOR'S EXPENSE.

SURVEY CORNERS, BENCHMARKS, AND CONTROL POINTS

THE CONTRACTOR SHALL PRESERVE ALL GOVERNMENT CORNERS, PROPERTY CORNERS, BENCHMARKS, SURVEY CONTROL POINTS AND OTHER SURVEY POINTS WITHIN THE PROJECT AREA. WHERE CORNERS, BENCHMARKS, OR SURVEY POINTS ARE ENCOUNTERED WHICH WILL BE DISTURBED BY THE CONTRACTOR'S ACTIVITIES; A LICENSED SURVEYOR SHALL WITNESS THE POINT BEFORE DISTURBANCE AND SHALL RE-SET THE POINT FOLLOWING THE COMPLETION OF CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL PAY THE SURVEYOR TO WITNESS AND TO RE-SET THE POINTS.

WORK HOURS

UNLESS PROVIDED OTHERWISE IN THE CONTRACT DOCUMENTS OR LIMITED BY LOCAL ORDINANCE, THE CONTRACTOR SHALL WORK WITHIN OF THE FOLLOWING TIMES, UNLESS OTHERWISE APPROVED BY THE OWNER: MONDAY THROUGH SATURDAY 7 A.M. TO 7 P.M.

THE CONTRACTOR SHALL NOT WORK ON SUNDAYS OR HOLIDAYS, UNLESS OTHERWISE APPROVED BY THE OWNER.

PROTECTION OF TREES, SHRUBS, AND LANDSCAPING

ALL TREES, SHRUBS, AND LANDSCAPING WITHIN THE CONSTRUCTION AREA WHICH ARE NOT SPECIFICALLY DESIGNATED FOR REMOVAL SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR. DAMAGED TREES, SHRUBS, AND LANDSCAPING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

CONSTRUCTION SIGNING AND BARRICADING

THE CONTRACTOR SHALL PROTECT HAZARDOUS AREAS WITH BARRICADES. BARRICADES LEFT IN PLACE AFTER SUNSET SHALL BE LIGHTED.

THE CONTRACTOR SHALL PROVIDE SUITABLE SANDBAGS OR OTHER SUITABLE MEASURES FOR ANCHORING OF TEMPORARY SIGNS AND BARRICADES, TO PREVENT THEIR TIPPING OR DISPLACEMENT BY WIND OR AIR FLOW FROM VEHICLES.

THE CONTRACTOR SHALL PROVIDE SIGNING, BARRICADES, TRAFFIC REGULATORS, CONES, AND OTHER TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE REQUIREMENTS OF THE AGENCY HAVING JURISDICTION OVER STREETS OR ROADS IN THE PROJECT AREA, THE CURRENT MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AND THE PLANS AND SPECIFICATIONS.

THE CONTRACTOR SHALL COVER OR REMOVE TEMPORARY SIGNS DURING PERIODS WHEN THEY ARE NOT APPROPRIATE.

TURF ESTABLISHMENT

ALL DISTURBED AREAS WHICH ARE NOT TO BE SURFACED WITH PAVEMENT, AGGREGATE OR OTHER APPROVED SURFACES SHALL BE ESTABLISHED WITH TURF.

TURF AREAS SHALL BE GRADED TO PROVIDE POSITIVE DRAINAGE.

DISTURBED AREAS SHALL BE SURFACED WITH 3 INCHES OF SCREENED TOPSOIL.

THE CONTRACTOR IS RESPONSIBLE TO ESTABLISH TURF WHICH IS SUBSTANTIALLY FREE OF BARE SPOTS AND FREE OF WEEDS. THE GROUND SURFACE IN TURF AREAS SHALL BE SMOOTH AND PROVIDE A NATURAL TRANSITION TO ADJACENT, UNDISTURBED AREAS.

THE CONTRACTOR IS RESPONSIBLE TO PROVIDE WATERING, WEEDING, RESEEDING, AND REWORKING AS NECESSARY TO ESTABLISH TURF AREAS TO THE REQUIRED STANDARD.

ADA COMPLIANCE

ALL PROPOSED CONSTRUCTION SHALL COMPLY WITH THE PROVISIONS OF THE AMERICANS WITH DISABILITIES ACT (ADA), AND APPLICABLE GUIDELINES OR STANDARDS. WHERE EXISTING CONDITIONS AND/OR THE REQUIREMENTS OF THE PLANS WILL RESULT IN FINISHED CONDITIONS THAT DO NOT MEET THE ADA REQUIREMENTS, GUIDELINES, OR STANDARDS; THE CONTRACTOR SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO REMOVE AND REPLACE WORK DETERMINED TO BE NOT IN ACCORDANCE WITH APPLICABLE REQUIREMENTS, GUIDELINES, OR STANDARDS.

EARTHWORK

THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF THE EARTHWORK QUANTITIES, AND BASE THEIR BID ON THEIR DETERMINATION OF THE QUANTITIES OF WORK REQUIRED.

IF ADDITIONAL FILL MATERIAL MUST BE PROVIDED TO ATTAIN THE FINISH GRADES SHOWN ON THE PLANS, THE CONTRACTOR SHALL PROVIDE THE REQUIRED FILL MATERIAL, UNLESS A SPECIFIC BORROW AREA IS IDENTIFIED ON THE PLANS.

EXCESS SOILS RESULTING FROM EXCAVATION AND EARTHWORK SHALL BECOME THE CONTRACTOR'S PROPERTY AND DISPOSED OF PROPERLY, UNLESS AN AREA(S) HAS BEEN DESIGNATED FOR STOCKPIILING OR 'BLENDING IN' THE EXCESS MATERIAL WITHIN THE PROJECT LIMITS.

BACKFILL AND EMBANKMENT

BACKFILL OF AN EXCAVATION UNDER OR WITHIN THE ONE ON ONE INFLUENCE OF AN EXISTING OR PROPOSED ROAD, SIDEWALK, DRIVEWAY, PAVEMENT, OR AGGREGATE SURFACE, SHALL BE SAND, MEETING THE REQUIREMENTS OF GRANULAR MATERIAL CLASS II AS DESCRIBED IN THE CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION. THE SAND BACKFILL SHALL BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT.

BACKFILL OF AN EXCAVATION WHICH IS NOT UNDER OR WITHIN THE ONE ON ONE INFLUENCE OF AN EXISTING OR PROPOSED ROAD, SIDEWALK, DRIVEWAY, PAVEMENT, OR AGGREGATE SURFACE MAY BE SUITABLE EXCAVATED MATERIAL OR OTHER SOIL, WHICH IS FREE OF ORGANIC MATTER, STONES AND ROCKS, ROOTS, BROKEN CONCRETE, FROZEN MATERIAL, OR DEBRIS. THE BACKFILL SHALL BE COMPACTED TO AT LEAST 90% OF ITS MAXIMUM UNIT WEIGHT.

THE CONTRACTOR SHALL INDICATE THE SOURCE OF SAND USED FOR BACKFILL TO THE ENGINEER, AND PROVIDE THE ENGINEER WITH THE RESULTS OF A GRADATION TEST PERFORMED ON A SAMPLE OF THE SAND. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN ADVANCE OF USING SAND FROM OTHER SOURCES.

EMBANKMENT USED TO BUILD THE SUBGRADE TO REQUIRED ELEVATION SHALL BE SUITABLE SOIL EXCAVATED FROM THE PROJECT SITE, OR FURNISHED BY THE CONTRACTOR FROM OTHER SOURCES. SUITABLE SOIL IS FREE FROM ORGANIC MATTER, ROCKS AND STONES, FROZEN MATERIAL, BROKEN CONCRETE, AND DEBRIS.

EMBANKMENT CONSTRUCTED OF GRANULAR SOILS SHALL BE COMPACTED IN LIFTS NOT EXCEEDING 10 INCHES TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT.

EMBANKMENT CONSTRUCTED OF COHESIVE SOILS SHALL BE COMPACTED IN LIFTS NOT EXCEEDING 10 INCHES TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT.

DENSITY TESTING

THE MAXIMUM UNIT WEIGHT OF SAND AND OTHER GRANULAR SOILS WILL BE DETERMINED BY THE ONE POINT CONE TEST, AS DESCRIBED IN THE MICHIGAN DEPARTMENT OF TRANSPORTATION'S DENSITY TESTING AND INSPECTION MANUAL, EXCEPT WHEN ANOTHER TEST METHOD IS SPECIFIED.

THE MAXIMUM UNIT WEIGHT OF COHESIVE SOILS WILL BE DETERMINED BY THE ONE POINT PROCTOR TEST, AS DESCRIBED IN THE MICHIGAN DEPARTMENT OF TRANSPORTATION'S DENSITY TESTING AND INSPECTION MANUAL, EXCEPT WHEN ANOTHER TEST METHOD IS SPECIFIED.

DRAINAGE

THE CONTRACTOR SHALL MAINTAIN DRAINAGE OF THE PROJECT AREA AND ADJACENT AREAS. WHERE EXISTING DRAINAGE FACILITIES ARE DISTURBED OR BLOCKED BY CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY PROVISIONS FOR DRAINAGE.

WHERE CONSTRUCTION HAS DISTURBED EXISTING DITCHES, SWALES, OR OTHER DRAINAGE FACILITIES; THE CONTRACTOR SHALL RESTORE THEM TO THEIR GRADES AND DIMENSIONS WHICH EXISTED PRIOR TO THE BEGINNING OF CONSTRUCTION, UNLESS DIRECTED OTHERWISE.

DRAINAGE SHALL NOT BE REROUTED ONTO ADJACENT PROPERTIES NOR ALLOWED TO DRAIN ONTO ADJACENT PROPERTIES AT AN INCREASED RATE, AS A RESULT OF THE CONTRACTOR'S WORK.

ADJUSTING STRUCTURES

WHERE CASTINGS FOR MANHOLES, CATCH BASINS, INLETS, VALVE BOXES, AND MONUMENT BOXES ARE TO BE ADJUSTED TO MEET A NEW PAVEMENT SURFACE ELEVATION, THE FINAL ADJUSTMENT SHALL NOT BE COMPLETED UNTIL ALL PAVEMENT COURSES HAVE BEEN PLACED EXCEPT THE FINAL COURSE. THE FINAL ADJUSTMENT SHALL BE COMPLETED JUST PRIOR TO PLACEMENT OF THE FINAL COURSE OF PAVEMENT.

THE MATERIALS AND PROCEDURES FOR ADJUSTING STRUCTURES SHALL MEET THE REQUIREMENTS OF THE AGENCIES HAVING JURISDICTION OVER THE ROAD AND UTILITIES.

SUBGRADE PREPARATION

TOPSOIL, PEAT, AND ORGANIC MATERIAL SHALL BE EXCAVATED AND REMOVED.

SOFT AND YIELDING SOILS SHALL BE REMOVED OR DRIED IF THE RESULT OF EXCESSIVE MOISTURE CONTENT.

PRIOR TO CONSTRUCTING FILLS, SUBBASE, OR PAVEMENT ON A SUBGRADE; THE SUBGRADE SHALL BE PROOF-ROLLED TO DETERMINE THE SUITABILITY OF THE SUBGRADE. THE CONTRACTOR SHALL DRIVE A HEAVY PIECE OF WHEELED CONSTRUCTION EQUIPMENT OVER THE SUBGRADE WHILE THE ENGINEER IS OBSERVING. THE CONSTRUCTION OF FILLS, SUBBASE, OR PAVEMENTS SHALL NOT PROCEED UNTIL THE SUBGRADE HAS BEEN DEMONSTRATED TO BE FREE OF SOFT AREAS.

THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN THE MOISTURE CONTENT OF SUBGRADE SOILS WITHIN A SUITABLE RANGE TO ALLOW FOR COMPACTION TO THE REQUIRED DENSITY. WHEN THE SOIL IS TOO DRY, THE CONTRACTOR SHALL ADD WATER. WHEN THE SOIL IS TOO WET, THE CONTRACTOR SHALL PROVIDE DRAINAGE OR AERATE THE SOIL.

THE SURFACE OF THE SUBGRADE SHALL BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT, PRIOR TO CONSTRUCTING FILLS, SUBBASE, OR PAVEMENTS.

CURB AND GUTTERS

THE CONTRACTOR SHALL DETERMINE THE LOCATION AND DIMENSIONS OF CURB OPENINGS FOR DRIVEWAYS, RAMPS, AND DRAINAGE STRUCTURES.

HOT MIX ASPHALT (HMA) PAVING

PAVEMENTS WHICH ARE TO BE OVERLAID WITH A NEW PAVEMENT COURSE SHALL BE SWEEPED TO REMOVE ALL DIRT AND DEBRIS.

A BITUMINOUS BOND COAT SHALL BE APPLIED TO PAVEMENTS WHICH ARE TO BE OVERLAID WITH A NEW PAVEMENT COURSE AND ALLOWED TO CURE PRIOR TO CONSTRUCTING THE NEW PAVEMENT COURSE.

HMA PAVEMENT SHALL NOT BE PLACED WHEN THE SURFACE BEING OVERLAID IS WET, OR WHEN RAIN IS FORECAST OR THREATENING.

DRIVEWAY CONSTRUCTION

DRIVEWAY SLOPES SHALL NOT EXCEED 10%, EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE ON THE PLANS OR DIRECTED BY THE ENGINEER.

THE CONTRACTOR SHALL PROVIDE PROPERTY OWNERS WITH SUITABLE NOTICE BEFORE REMOVING AND REPLACING AN EXISTING DRIVEWAY.

SIDEWALK CONSTRUCTION

SIDEWALKS SHALL BE CONSTRUCTED TO PROVIDE POSITIVE DRAINAGE OF THE SIDEWALK AND ADJACENT SURFACES.

EXCEPT WHERE NECESSARY TO PROVIDE POSITIVE DRAINAGE OR MEET EXISTING SURFACES, SIDEWALK SHALL BE CONSTRUCTED WITH A CROSS SLOPE SLOPED TOWARD THE STREET.

SIDEWALK CROSS SLOPES SHALL NOT EXCEED 2%.

IN TURF AREAS, THE SURFACE OF THE SIDEWALK SHALL BE ABOUT 1/4 INCH HIGHER THAN THE ADJACENT GROUND SURFACES, EXCEPT WHERE NECESSARY TO PROVIDE POSITIVE DRAINAGE OR MEET EXISTING SIDEWALKS, CURBS, OR PAVEMENTS.

SIDEWALK SHALL BE CONSTRUCTED ON A SAND BASE, COMPACTED TO AT LEAST 95% OF ITS MAXIMUM UNIT WEIGHT.

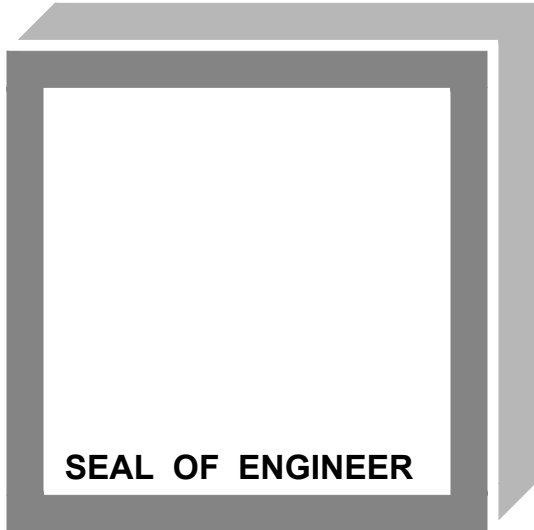
THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN SIDEWALK FORMS HAVE BEEN SET AND THE SAND BASE PREPARED. CONCRETE SHALL NOT BE PLACED UNTIL THE ENGINEER HAS OBSERVED THE FORMS. CONCRETE DELIVERY SHALL BE SCHEDULED TO ALLOW SUFFICIENT TIME FOR ADJUSTMENT OF THE FORMS, IN THE EVENT THAT ADJUSTMENT IS NECESSARY.

THE CONTRACTOR SHALL PROTECT FRESH CONCRETE FROM DAMAGE BY THE WEATHER, TRAFFIC, OR VANDALISM. DAMAGED CONCRETE SHALL BE REPLACED BY THE CONTRACTOR'S EXPENSE.

STORM SEWER CONSTRUCTION

DRAINAGE STRUCTURES SHALL BE CONSTRUCTED FROM PRECAST CONCRETE MANHOLE SECTIONS MEETING ASTM C478.

SUMPS IN DRAINAGE STRUCTURES AND PIPELINES SHALL BE FREE OF SEDIMENT AND DEBRIS AT THE TIME OF ACCEPTANCE BY THE OWNER.



ARCHITECT
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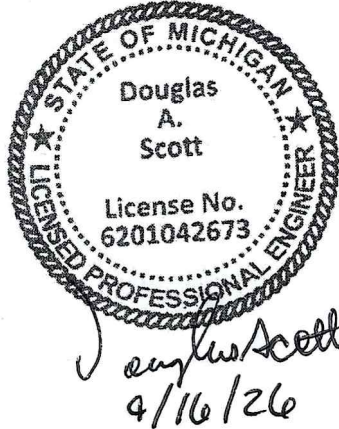
Good clients +Good design+Great architecture



REVISIONS	
6.10.26	SITE PLAN REVIEW
Date	Description

Project
Essexville STEM
305 Pine Street, Essexville, MI 48732

Drawing
MISCELLANEOUS NOTE SHEET



ISSUED FOR CONSTRUCTION 09-16-2026



Know what's below.
Call before you dig.

PLAN SUBMITTALS AND CHANGES	
SITE PLAN APPROVAL – **NOT FOR CONSTRUCTION**	
DATE	DESCRIPTION
6-10-26	ISSUED FOR SITE PLAN REVIEW

DRAWN BY: MCC
CHECKED BY: DAS
PROJECT NUMBER 25-028
DATE JUNE 2026
SCALE N.T.S.
SHEET NUMBER

C2.0

STAKING NOTE:
TP TO TC = 0.39'

TOP OF PAVEMENT (TP)
GRADE @ EDGE OF
PAVEMENT

TOP OF CURB (TC) GRADE
@ BACK OF CURB

NOTE:
WHERE NEW CURB ABUTS
EXISTING CURB, PROVIDE TWO
#4 EPOXY COATED DOWELS
DRILLED AND EPOXIED 6" INTO
EXISTING CURB. NEW CURB
SHALL MATCH THE PROFILE AND
WIDTH OF THE EXISTING CURB.

#4 EPOXY COATED BAR.
COMPOSITE REBAR WILL
NOT BE ALLOWED

SUBGRADE SHALL BE FIRM EARTH
FREE OF TOPSOIL & SOFT SPOTS
AND SHALL BE C.I.P.

MDOT 3500 PSI CONCRETE

4" (MIN) AGGREGATE BASE
C.I.P., UNLESS NOTED
OTHERWISE

24"

1 3/4"

5 1/2"

6"

9"

14"

1 3/8"

4"

4"

SLOPE

2%
2%

5' WIDE MINIMUM

1% MIN & 2% MAX

MDOT 3500 PSI CONCRETE WITH BROOM FINISH

4" THICK NORMAL SIDEWALK
6" THICK THRU RESIDENTIAL DRIVE

4" CLASS II SAND BASE, C.I.P.

Diagram illustrating the cross-section of a curb and gutter repair. The diagram shows the following components and dimensions:

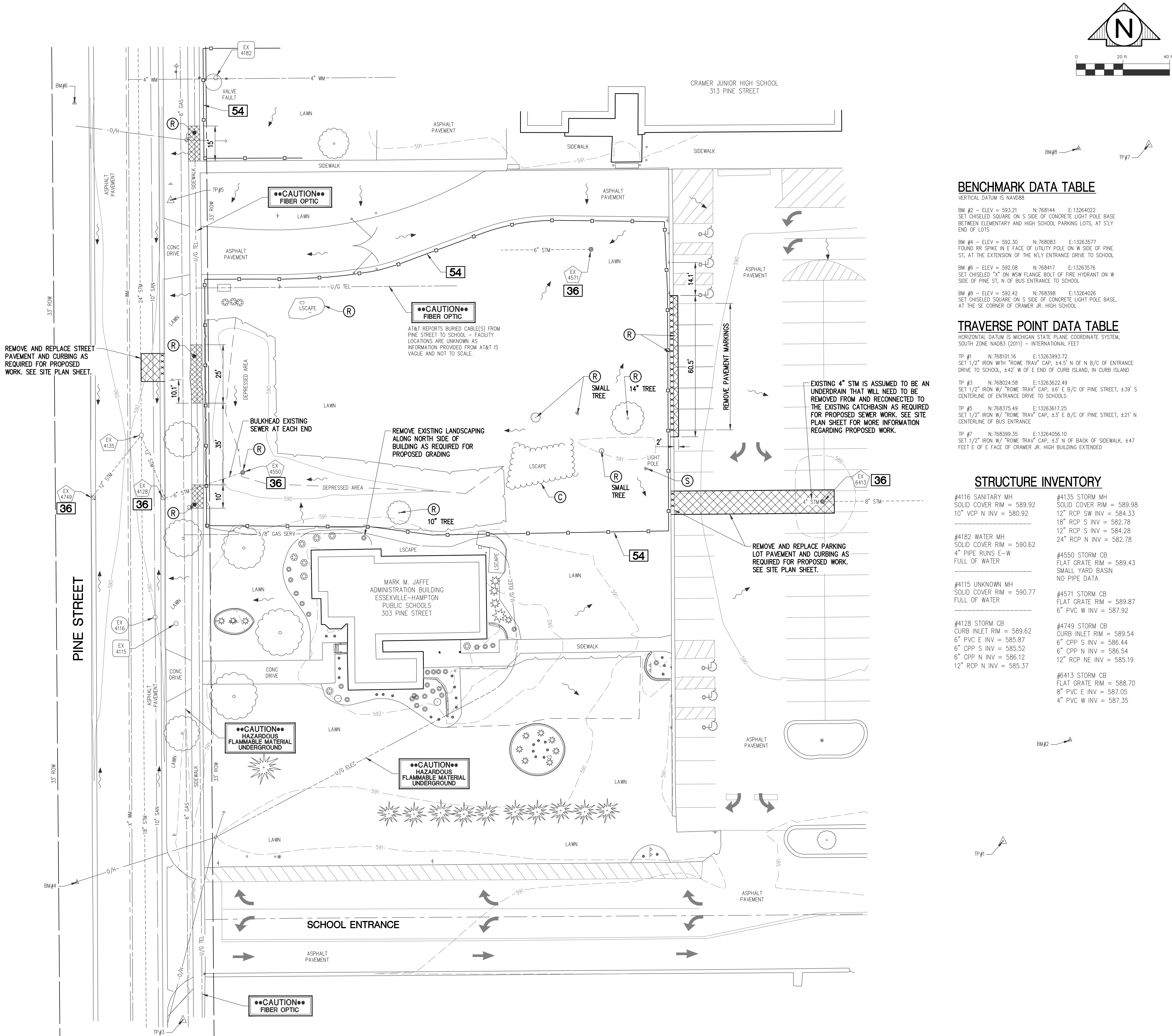
- NEW OR REPLACEMENT CURB AND GUTTER**: Indicated by a dashed line on the left.
- 24"**: Dimension for the width of the HMA pavement repair area.
- 6"**: Dimension for the height of the curb.
- HMA PAVEMENT REPAIR SHALL MATCH EXISTING PAVEMENT THICKNESS (4" MINIMUM THICKNESS)**: Label for the top layer of the repair.
- EXISTING PAVEMENT**: Label for the existing pavement surface.
- 4" (MIN) 21AA AGGREGATE BASE, C.I.P.**: Label for the base layer.
- 4EL 2"**: Label for the first layer of the repair.
- 4EL VARIABLE - 3" LIFT MAX**: Label for the second layer of the repair.
- 6" 21AA AGGREGATE BASE, C.I.P.**: Label for the base layer.

Diagram illustrating the cross-section of a curb and gutter assembly. The diagram shows the following dimensions and components:

- Overall Width:** 18"
- Top of Pavement (TP) Grade @ Edge of Pavement:** 1 3/4" (from centerline to curb face) and 5 1/2" (from curb face to gutter edge).
- Top of Curb (TC) Grade @ Back of Curb:** 6" (from gutter edge to curb back).
- Vertical Dimensions:** 9" (from subgrade to TP), 5/8" (from TP to curb face), 14" (from gutter edge to TC).
- Horizontal Dimensions:** 4" (from curb face to gutter edge), 4" (from gutter edge to curb back).
- Curbside Slope:** 2" R (from curb face to gutter edge).
- Notes:**
 - WHERE NEW CURB ABUTS EXISTING CURB, PROVIDE TWO #4 EPOXY COATED DOWELS DRILLED AND EPOXIED 6" INTO EXISTING CURB. NEW CURB SHALL MATCH THE PROFILE AND WIDTH OF THE EXISTING CURB.
 - MDOT 3500 PSI CONCRETE
 - 4" (MIN) AGGREGATE BASE C.I.P. UNLESS NOTED OTHERWISE
 - SUBGRADE SHALL BE FIRM EARTH FREE OF TOPSOIL & SOFT SPOTS AND SHALL BE C.I.P.
 - #4 EPOXY COATED BAR-COMPOSITE REBAR WILL NOT BE ALLOWED
- Staking Note:** TP TO TC = 0.55'

HMA APPLICATION RATE TABLE					
IDENT	HMA MIX	PAY ITEM	RATE PER SQUARE YARD	PERFORMANCE GRADE	REMARKS
(4EL) 2"	4EL		220# / SYD	58-28	TOP COURSE
(4EL)	4EL		110#/SYD/INCH	58-28	PAVEMENT REPAIR 330#/SYD MAXIMUM LIFT
RAP SHALL BE LIMITED TO TIER 1 DESIGN (17% MAX RAP BY BINDER WEIGHT) FOR ALL MIXES					
BOND COAT RATE SHALL BE 0.05 TO 0.15 GAL / SYD					
TOP COURSE AGG. WEAR INDEX (AWI) = 220 MIN					

R:\Projects\2600121\Drawings\Construction Drawings\02-2600121 NOTE DET.dwg 6/10/2026 2:36 PM



BENCHMARK DATA TABLE

VERTICAL DATUM IS NAVD88

BM #2 - ELEV = 593.21 N:768144 E:13264022
SET CHISELED SQUARE ON S SIDE OF CONCRETE LIGHT POLE BASE BETWEEN ELEMENTARY AND HIGH SCHOOL PARKING LOTS, AT SLY END OF LOTS

BM #4 - ELEV = 592.30 N:768083 E:13263577
FOUND RR SPIKE IN E FACE OF UTILITY POLE ON W SIDE OF PINE ST, AT THE EXTENSION OF THE NLY ENTRANCE DRIVE TO SCHOOL.

BM #6 - ELEV = 592.08 N:768417 E:13263576
SET CHISELED "X" ON WSW FLANGE BOLT OF FIRE HYDRANT ON W SIDE OF PINE ST, N OF BUS ENTRANCE TO SCHOOL.

BM #8 - ELEV = 592.42 N:768398 E:13264026
SET CHISELED SQUARE ON S SIDE OF CONCRETE LIGHT POLE BASE, AT THE SE CORNER OF CRAMER JR. HIGH SCHOOL.

TRAVERSE POINT DATA TABLE

HORIZONTAL DATUM IS MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE NAD83 (2011) - INTERNATIONAL FEET

TP #1 N:7680116 E:13263993.72
SET 1/2" IRON W/ "ROWE TRAV" CAP, ±4.5' N OF N B/C OF ENTRANCE DRIVE TO SCHOOL, ±42' W OF E END OF CURB ISLAND, IN CURB ISLAND

TP #3 N:768024.58 E:13263622.49
SET 1/2" IRON W/ "ROWE TRAV" CAP, ±6' E B/C OF PINE STREET, ±39' S CENTERLINE OF ENTRANCE DRIVE TO SCHOOLS

TP #5 N:768375.49 E:13263617.25
SET 1/2" IRON W/ "ROWE TRAV" CAP, ±3' E B/C OF PINE STREET, ±21' N CENTERLINE OF BUS ENTRANCE

TP #7 N:768399.35 E:13264056.10
SET 1/2" IRON W/ "ROWE TRAV" CAP, ±3' N OF BACK OF SIDEWALK, ±47 FEET E OF E FACE OF CRAMER JR. HIGH BUILDING EXTENDED

STRUCTURE INVENTORY

#4116 SANITARY MH
SOLID COVER RIM = 589.92
10" VCP N INV = 580.92

#4182 WATER MH
SOLID COVER RIM = 590.62
4" PIPE RUNS E-W
FULL OF WATER

#4115 UNKNOWN MH
SOLID COVER RIM = 590.77
FULL OF WATER

#4128 STORM CB
CURB INLET RIM = 589.62
6" PVC E INV = 585.87
6" CPP S INV = 585.52
6" CPP N INV = 586.12
12" RCP N INV = 585.37

#4135 STORM MH
SOLID COVER RIM = 589.98
12" RCP SW INV = 584.33
18" RCP S INV = 582.78
12" RCP S INV = 584.28
24" RCP N INV = 582.78

#4550 STORM CB
FLAT GRATE RIM = 589.43
SMALL YARD BASIN
NO PIPE DATA

#4571 STORM CB
FLAT GRATE RIM = 589.87
6" PVC W INV = 587.92

#4749 STORM CB
CURB INLET RIM = 589.54
6" CPP S INV = 586.44
6" CPP N INV = 586.54
12" RCP NE INV = 585.19

#6413 STORM CB
FLAT GRATE RIM = 588.70
8" PVC E INV = 587.05
4" PVC W INV = 587.35

FLOODPLAIN

PROPERTY IS NOT WITHIN A REGULATED FLOODPLAIN PER FEMA FLOOD MAP 26017C0352F, EFFECTIVE ON 7/31/2024.

WETLANDS

IN REVIEW OF THE MICHIGAN EGLE WETLANDS MAP VIEWER, REGULATED WETLANDS ARE NOT APPARENT WITHIN THE PROJECT SITE.

TRAFFIC CONTROL NOTES

- ALL PROPOSED CONSTRUCTION WITHIN PINE STREET R.O.W. SHALL BE COORDINATED WITH AND PERMITTED BY THE CITY OF ESSEXVILLE. TWO-WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES. ALL SIGNAGE, ETC. SHALL BE PER MDOT AND MMUTCD STANDARDS. MDOT MAINTAINING TRAFFIC TYPICALS 101-GEN-SPACING-CHARTS, 102-GEN-NOTES, 110-TR-NFW-2L AND 122-NFW-SHL-(R) SHALL BE UTILIZED AS APPROPRIATE TO MAINTAIN TRAFFIC. OWNER HAS OBTAINED PERMIT (PENDING).
- CONTRACTOR SHALL PROVIDE FLAGGERS TO ASSIST CONSTRUCTION TRAFFIC ENTERING OR EXITING SITE.

REMOVAL NOTES

- NO WORK SHALL TAKE PLACE UNTIL ALL APPLICABLE PERMITS HAVE BEEN OBTAINED.
- ALL CONSTRUCTION TRAFFIC SHALL UTILIZE THE DESIGNATED CONSTRUCTION ENTRANCE.
- THE CONTRACTOR SHALL REMOVE TREES AND BRUSH IN THE DESIGNATED AREAS. REMOVALS SHALL INCLUDE TREES AND STUMPS IN THEIR ENTIRETY. NO MATERIALS MAY BE BURNED OR BURIED ON SITE.
- ALL PAVEMENT REMOVALS SHALL BE SAWCUT. THE CONTRACTOR SHALL COORDINATE ALL PAVEMENT REMOVALS WITH THE OWNER.
- ALL EXISTING CONCRETE CURBING, PAVEMENT AND SIDEWALKS NOT SPECIFICALLY DESIGNATED FOR REMOVAL OR REPLACEMENT SHALL REMAIN IN PLACE AND BE PROTECTED DURING CONSTRUCTION.
- MISCELLANEOUS ITEMS TO REMAIN SUCH AS SIGN POSTS, UTILITY RISERS, ETC. SHALL BE PROTECTED DURING CONSTRUCTION.
- THE EXISTING UTILITY INFORMATION SHOWN ON THE PLANS IS BASED ON THE BEST AVAILABLE RECORDS. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL UTILITY LOCATIONS AND NOTIFYING MISS DIG PRIOR TO PERFORMING ANY WORK. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECONNECTING ANY SERVICES THAT ARE ENCOUNTERED DURING THE CONSTRUCTION OF THIS PROJECT. ANY SERVICES THAT ARE NOT SHOWN ON THE PLANS SHALL BE REPORTED TO THE OWNER.
- CONTRACTOR SHALL NOTIFY / SCHEDULE WITH OWNER IN ADVANCE FOR ALL ITEMS LABELED "AS DIRECTED" (IF ANY).
- ANY STOCK PILE OF MATERIALS SHALL BE WITHIN LIMITS OF WORK AND SESC MEASURES.

SOIL EROSION CONTROL NOTES

- LIMITS OF EARTH CHANGE BOUNDARY = 0.5± ACRES - A SOIL EROSION CONTROL PERMIT MAY NOT BE REQUIRED - CONTRACTOR SHALL CONFIRM WITH SESC AGENT. A NPDES NOTICE OF COVERAGE IS NOT REQUIRED SINCE UNDER 5 ACRES.
- ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO BEGINNING WORK ON THE PROJECT. THE CONTRACTOR SHALL REVIEW THE SESC PERMIT AND ABIDE BY ALL REQUIREMENTS OF THE PERMIT, IF A PERMIT IS REQUIRED.
- ALL DISTURBED AREAS SHALL BE TOP SOILED, SEED, AND MULCHED.
- CONSTRUCTION ENTRANCE SHALL BE THE EXISTING HMA DRIVE ONTO PINE STREET. EXISTING PAVEMENT AND STREET SHALL BE CLEANED AND SWEEP AS REQUIRED TO KEEP DIRT FROM TRACKING.
- THE SOIL EROSION CONTROLS SHALL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY THE CONTRACTOR.
- SEE SESC KEY AND NOTE SHEET SHEET FOR MORE SESC INFORMATION.

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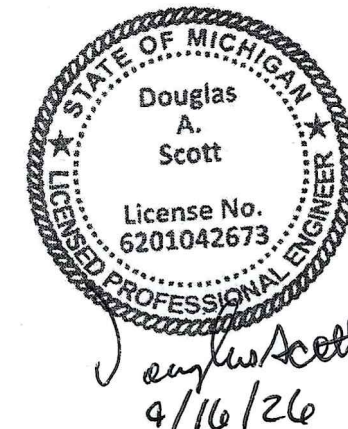
REVISIONS

Date	Description
6.10.26	.SITE PLAN REVIEW

Project
Essexville STEM
305 Pine Street, Essexville, MI 48732

Drawing

EXISTING CONDITIONS AND REMOVAL SHEET



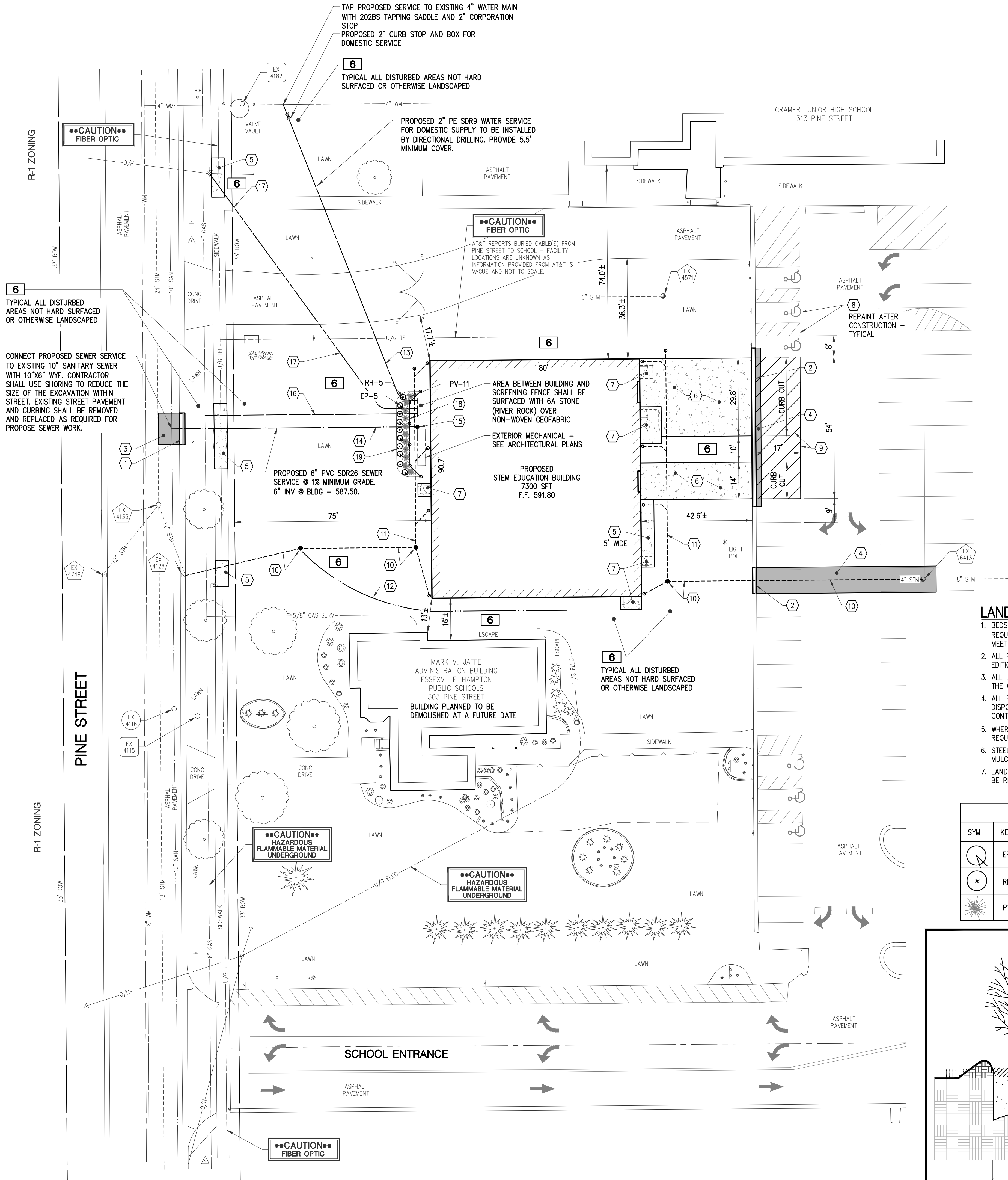
Know what's below.
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ROWE PROFESSIONAL SERVICES COMPANY	
PLAN SUBMITTALS AND CHANGES	
SITE PLAN APPROVAL - **NOT FOR CONSTRUCTION**	
DATE	DESCRIPTION
6-10-26	ISSUED FOR SITE PLAN REVIEW

DRAWN BY: MCC
CHECKED BY: DAS

PROJECT NUMBER 25-028
DATE JUNE 2026
SCALE 1" = 20'
SHEET NUMBER

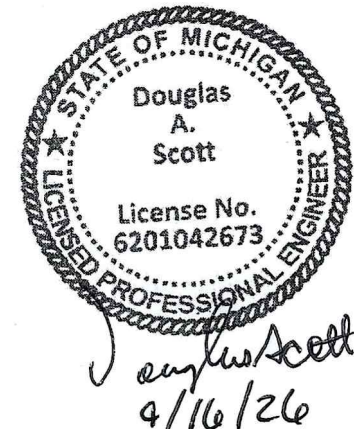
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PROPOSED IMPROVEMENT LEGEND

- 1 24" MDOT F4 CURB & GUTTER - STREET
- 2 18" MDOT F2 (TIP-OUT) CURB & GUTTER - PARKING LOT
- 3 HMA PAVEMENT REPAIR - STREET
- 4 HMA PAVEMENT REPAIR - PARKING LOT
- 5 CONCRETE SIDEWALK, 4" THICK
- 6 CONCRETE DRIVEWAY, 6" THICK
- 7 FROST FREE CONCRETE DOOR STOOP *
- 8 ADA PARKING SYMBOL AND PAVEMENT MARKINGS
- 9 PAVEMENT MARKINGS FOR "NO PARKING"
- 10 STORM SEWER
- 11 ROOF WATER COLLECTION SEWER
- 12 DRAINAGE SWALE
- 13 2" DOMESTIC SERVICE LEAD **
- 14 6" PVC SANITARY SERVICE LEAD **
- 15 6" CLEANOUT
- 16 UNDERGROUND GAS SERVICE BY OTHERS **
- 17 UNDERGROUND ELECTRIC SERVICE (DIRECTIONALLY DRILLED) BY OTHERS **
- 18 VINYL SCREENING FENCE, 4' HIGH
- 19 MULCH BED WITH LOW LYING LANDSCAPING SHRUBBERY

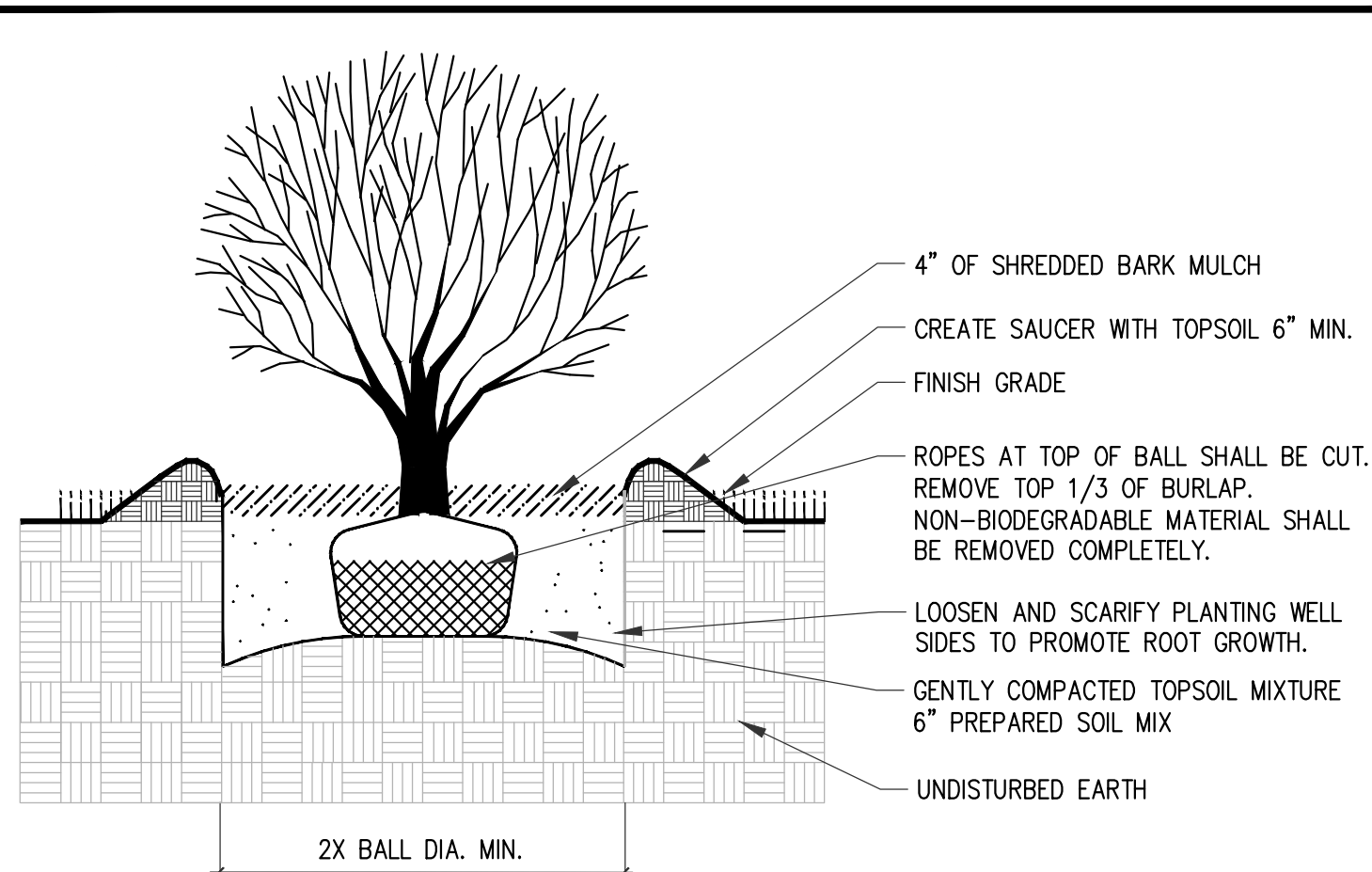
* SEE ARCHITECTURAL PLANS
** SEE ARCHITECTURAL PLANS FOR LOCATION AT BUILDING



LANDSCAPE NOTES

- BEDS SHALL BE FREE OF DEBRIS AND GRADED PROPERLY TO ALLOW FOR THE REQUIRED 4" DEPTH OF SHREDDED HARDWOOD MULCH WITH FINAL ELEVATION TO MEET TOP OF CURB OR METAL EDGING.
- ALL PLANT MATERIAL AND PLANTINGS SHALL CONFORM TO ANSI 260.1 OR CURRENT EDITION.
- ALL LANDSCAPE LAYOUT IS TO BE STAKED BY THE CONTRACTOR FOR APPROVAL BY THE OWNER PRIOR TO CONSTRUCTION.
- ALL EXCESS EXCAVATED MATERIALS AND DEBRIS WHICH ARE NOT ACCEPTED FOR DISPOSAL ON THE SITE BY THE OWNER SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF LEGALLY OFFSITE.
- WHERE A DISCREPANCY IS FOUND BETWEEN EXISTING FIELD CONDITIONS AND/OR REQUIRED LANDSCAPING WORK, NOTIFY OWNER FOR CLARIFICATION IMMEDIATELY.
- STEEL LANDSCAPE EDGING IS TO BE INSTALLED ALONG PLANTING BED EDGES WHERE MULCH AND LAWN MEET.
- LANDSCAPING MAINTENANCE - ALL DISEASED, DAMAGED OR DEAD MATERIALS SHALL BE REPLACED IN ACCORDANCE WITH THE STANDARDS OF THE ZONING ORDINANCE.

PLANT SCHEDULE				
SYM	KEY	BOTANICAL NAME	COMMON NAME	NOTES
	EP	ECHINACEA PURPUREA	PURPLE CONE FLOWER	NO. 3 CONT. 5 @ 2' SPACING
	RH	RUDEBECKIA HIRTA	BLACK-EYED SUSAM	NO. 3 CONT. 5 @ 2' SPACING
	PV	PANICUM VIRGATUM 'NORTHWIND'	NORTHWIND SWIFTHGRASS	NO. 3 CONT. 11 @ 3' SPACING



SHRUB PLANTING DETAIL

ZONING INFORMATION

ZONING DISTRICT = R-1 SINGLE FAMILY RESIDENTIAL
PROPOSED USE = PUBLIC SCHOOL FACILITY
REQ'D FRONT YD SETBACK = 25 FEET PROPOSED = 75'
REQ'D SIDE YD SETBACK = 5 FEET MIN FOR ONE - 15 FEET MIN TOTAL OF TWO PROPOSED EXCEEDS 100'
REQ'D REAR YD SETBACK = 25 FEET PROPOSED EXCEEDS 1000'
MINIMUM LOT SIZE & WIDTH = 7,200 SFT, 60' WIDE
EXISTING LOT = 44+ ACRES & EXCEEDS MINIMUMS

PARKING

PARKING FOR PROPOSED BUILDING WILL BE PROVIDED WITHIN ADJACENT 3 ACRE +/- PARKING LOT FOR MAIN SCHOOL BUILDING(S).

LOADING/UNLOADING AREA WILL BE PROVIDED ADJACENT TO PROPOSED BUILDING AND WITHIN PROPOSED DRIVEWAY FROM EXISTING PARKING LOT TO PROPOSED BUILDING.

PARKING

EXISTING PARKING SPACES FOR EXISTING SCHOOL BUILDINGS: 576 SPACES EXISTING MINUS 6 SPACES PROPOSED TO BE ELIMINATED FOR PROPOSED STEM BUILDING = 570 SPACES NET. IMPACT TO EXISTING PARKING SPACES RESULTS IN A 1.05% REDUCTION IN EXISTING PARKING SPACES.

PARKING SPACES REQUIRED:
NORMAL SCHOOL HOURS - USERS OF PROPOSED STEM BUILDING DURING SCHOOL HOURS WILL BE TEACHERS ALREADY ONSITE FOR CLASSES WITHIN OTHER EXISTING BUILDINGS, STUDENTS ALREADY ONSITE AND STUDENTS THAT WILL BE BUDED IN. MAINTENANCE AND JANITORIAL EMPLOYEES WILL ALREADY BE ONSITE FOR OTHER EXISTING BUILDINGS. STEM COMPETITIONS WILL BE HELD AFTER NORMAL SCHOOL HOURS. THEREFORE, REQUIRED PARKING FOR PROPOSED STEM BUILDING USE DURING NORMAL SCHOOL HOURS = 0.

AFTER SCHOOL HOURS - SPECTATOR AREA AND BLEACHERS ADJACENT TO COMPETITION CLEAR FLOOR AREA = 545 SQUARE FEET. PER 16.2.H OF THE ZONING ORDINANCE, ONE SPACE SHALL BE PROVIDED PER 28 SQUARE FEET = 20 SPACES REQUIRED FOR PROPOSED STEM BUILDING USE AFTER SCHOOL HOURS. PARKING FOR PROPOSED STEM BUILDING AFTER SCHOOL HOUR USE WILL BE PROVIDED WITHIN ADJACENT PARKING LOTS FOR MAIN SCHOOL BUILDINGS. IMPACT TO EXISTING PARKING SPACES RESULTS IN A 3.5% UTILIZATION OF NET EXISTING PARKING SPACES.

LOADING/UNLOADING AREA WILL BE PROVIDED ADJACENT TO PROPOSED BUILDING AND WITHIN PROPOSED DRIVEWAY FROM EXISTING PARKING LOT TO PROPOSED BUILDING.

SITE LIGHTING

NO CHANGES TO EXISTING PARKING LOT LIGHTING ARE PROPOSED.

PROPOSED EXTERIOR BUILDING LIGHTING WILL CONSIST OF WALL MOUNTED LED FIXTURES ON THE PROPOSED BUILDING SHIELDED DOWNWARD. SEE ARCHITECTURAL PLANS FOR LIGHTING DESIGN.

SITE SIGNAGE

PROPOSED SIGNAGE IS PROPOSED ON THE WEST WALL OF PROPOSED BUILDING - SEE ARCHITECTURAL PLANS.

MISCELLANEOUS NOTES

- PROPOSED BUILDING IS PARALLEL AND PERPENDICULAR TO PINE STREET R.O.W.
- REGULAR PAVEMENT MARKINGS SHALL BE YELLOW - BARRIER FREE MARKINGS SHALL BE BLUE. ALL MARKINGS SHALL BE 4" WIDE. ALL EXISTING PAVEMENT MARKINGS DISTURBED DURING CONSTRUCTION SHALL BE REPAINTED.
- WHERE A DISCREPANCY IS FOUND BETWEEN EXISTING CONDITIONS AND/OR PROPOSED WORK, CONTRACTOR SHALL NOTIFY OWNER FOR CLARIFICATION IMMEDIATELY.
- SEE MISCELLANEOUS DETAIL SHEET FOR DETAILS OF PROPOSED WORK.
- SEE EXISTING CONDITIONS AND REMOVAL SHEETS FOR SURVEY CONTROL, BENCHMARK INFORMATION AND EXISTING STRUCTURE INVENTORIES.
- SEE ARCHITECTURAL PLANS FOR BUILDING DETAILS.

WATER AND SEWER SERVICE NOTES

- THE CONTRACTOR SHALL NOTIFY THE CITY DEPARTMENT OF PUBLIC WORKS (DPW) FORTY EIGHT (48) HOURS PRIOR TO UTILITY CONSTRUCTION.
- ALL CONSTRUCTION PROCEDURES AND MATERIALS USED FOR WATER SERVICE CONSTRUCTION SHALL CONFORM TO THE CITY'S CURRENT STANDARDS AND SPECIFICATIONS.
- ALL CONSTRUCTION PROCEDURES AND MATERIALS USED FOR SANITARY SERVICE CONSTRUCTION SHALL CONFORM TO THE CITY'S CURRENT STANDARDS AND SPECIFICATIONS.
- THE CITY DPW SHALL OPERATE ALL VALVES AND HYDRANTS IN THE ACTIVE WATER SYSTEM. THE CONTRACTOR SHALL REQUEST VALVE AND HYDRANT OPERATION WITH AT LEAST 24 HOURS ADVANCE NOTICE TO THE WATER DEPARTMENT. THE CITY RESERVES THE RIGHT TO RESCHEDULE OR CANCEL VALVE OPERATION AT ANY TIME.
- TAPS FOR SERVICE CONNECTIONS SHALL BE COMPLETED UNDER PRESSURE. THE CORPORATION AND SERVICE LEAD SHALL BE VISUALLY CHECKED FOR LEAKAGE WHILE UNDER PRESSURE. ALL JOINTS SHALL REMAIN EXPOSED UNTIL THE ENGINEER HAS OBSERVED THEM.
- A 12 AWG COPPER TRACER WIRE DESIGNED AND MANUFACTURED FOR THE PURPOSE OF DETECTING BURIED UTILITIES SHALL BE INSTALLED ALONG THE ROUTE OF PE WATER SERVICE.
- WATER METER WILL BE REQUIRED INSIDE OF BUILDING. METER TYPE TO BE DETERMINED BY THE CITY DPW.

SOIL EROSION CONTROL NOTES

- ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO BEGINNING WORK ON THE PROJECT. THE CONTRACTOR SHALL REVIEW THE SESC PERMIT AND ABIDE BY ALL REQUIREMENTS OF THE PERMIT, IF A PERMIT IS REQUIRED.
- ALL NEW CATCH BASINS, EXISTING CATCH BASINS WITHIN PROJECT LIMITS AND ADJACENT DOWN GRADIENT CATCH BASINS SHALL HAVE SESC MEASURE #36 (FILTER SACK) INSTALLED UNTIL RESTORATION IS COMPLETE.
- ALL DISTURBED AREAS SHALL BE TOP SOILED (3" MIN), SEEDED, FERTILIZED AND MULCHED TO ESTABLISH TURF.
- SEE EXISTING CONDITIONS AND REMOVAL SHEET FOR ADDITIONAL SESC MEASURES.
- SEE SESC KEY AND NOTE SHEET SHEET FOR MORE SESC INFORMATION.

ISSUED FOR CONSTRUCTION 09-16-2026



Know what's below.
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ROWE PROFESSIONAL SERVICES COMPANY	
PLAN SUBMITTALS AND CHANGES	
SITE PLAN APPROVAL - **NOT FOR CONSTRUCTION**	
DATE	DESCRIPTION
6-10-26	ISSUED FOR SITE PLAN REVIEW
7-14-26	REVISED PER SITE PLAN REVIEW
9-9-26	ADDED LANDSCAPING DESIGN

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REVISIONS

Date	Description

Project
Essexville STEM
305 Pine Street, Essexville, MI 48732

Drawing
SITE PLAN SHEET

DRAWN BY: MCC
CHECKED BY: DAS

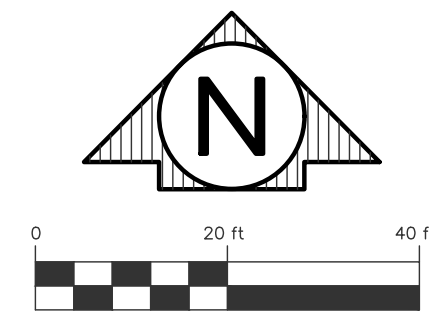
PROJECT NUMBER 25-028

DATE JUNE 2026

SCALE 1" = 20'

SHEET NUMBER

C5.0



EXISTING DRAINAGE STRUCTURE
RIM = 588.70
EX 8" PVC E INV = 587.05
EX 4" PVC W INV = 587.35 (REMOVE)
PR 8" PVC W INV = 587.10
CONNECT PROPOSED 8" SEWER TO EXISTING
STRUCTURE AT LOCATION OF EXISTING 4"
STORM (ASSUMED UNDERDRAIN) AND
RECONNECT UNDERDRAIN TO CATCHBASIN OF
SEWER.

(DS1) PROPOSED 3' DIA DR STRUCTURE WITH
SOIL COVER
N: 768245.62 E: 13263798.94
RIM = 591.40
6" INV N = 587.60
6" INV SW = 587.60
8" INV E = 587.60
97' - 8" PVC @ 0.5% GRADE TO EX 6413

EXISTING DRAINAGE STRUCTURE
RIM = 589.62
EX 6" PVC E INV = 585.87 (REMOVE)
EX 6" CPP S INV = 585.52
EX 6" CPP N INV = 586.12
EX 12" RCP N INV = 585.37
PROPOSED 8" PVC NE INV = 585.90
CONNECT PROPOSED 8" SEWER TO EXISTING
STRUCTURE AT LOCATION OF EXISTING 6"
STORM BEING REMOVED.

(DS2) PROPOSED 2' DIA DR STRUCTURE WITH
FLAT GRATE COVER
N: 768258.21 E: 13263658.83
RIM = 589.00
8" INV E = 586.35
8" INV SW = 586.35
45° - 8" PVC @ 1.0% GRADE TO EX 4128

(C02) PROPOSED 6" CLEANOUT
 N: 768326.78 E: 13263702.26
 RIM = 591.50
 6" INV S = 588.40

PROPOSED ROOF WATER COLLECTION SEWER NOTES:
6" PVC SCH40 OR SDR26 PIPE SHALL BE INSTALLED FROM ROOF DRAINAGE TO PROPOSED DRAINAGE STRUCTURES WITH A 1% MINIMUM GRADE AND 2.5 FEET MINIMUM OF COVER. SEE ARCHITECTURAL PLANS FOR DOWNSPOUT CONNECTION LOCATIONS.

1. PROPOSED CURB & GUTTER FLOW LINE SHALL MATCH EXISTING FLOW LINE WHERE CONNECTING TO EXISTING CURB & GUTTER.
2. PROPOSED PAVEMENT, SIDEWALKS AND ETC. ELEVATIONS SHALL MATCH EXISTING GRADE WHERE ABUTTING EXISTING MATERIALS TO REMAIN.
3. SEE MISCELLANEOUS DETAIL SHEET FOR DETAILS OF PROPOSED WORK.
4. SEE EXISTING CONDITIONS AND REMOVAL SHEET FOR SURVEY CONTROL, BENCHMARK INFORMATION AND EXISTING STRUCTURE INVENTORIES.

1. ALL NEW CATCH BASINS HAVE SESC MEASURE #36 (FILTER SACK) INSTALLED UNTIL RESTORATION IS COMPLETE.
2. ALL DISTURBED AREAS SHALL BE TOP SOILED (3" MIN), SEEDED, FERTILIZED AND MULCHED TO ESTABLISH TURF.
3. SEE EXISTING CONDITIONS AND REMOVAL SHEET FOR ADDITIONAL SESC MEASURES.
4. SEE SESC KEY AND NOTE SHEET SHEET FOR MORE SESC INFORMATION.

- ① 24" MDOT F4 CURB & GUTTER – STREET
- ② 18" MDOT F2 (TIP-OUT) CURB & GUTTER – PARKING LOT
- ④ HMA PAVEMENT REPAIR – SEE SITE PLAN
- ⑤ CONCRETE SIDEWALK, 4" THICK
- ⑥ CONCRETE DRIVEWAY, 6" THICK
- ⑩ STORM SEWER
- ⑪ ROOF WATER COLLECTION SEWER
- ⑪A DOWNSPOUT COLLECTION RISER **
- ⑫ DRAINAGE SWALE
- ⑬ 2" DOMESTIC SERVICE LEAD **
- ⑭ 6" PVC SANITARY SERVICE LEAD **
- ⑯ UNDERGROUND GAS SERVICE BY OTHERS **
- ⑰ UNDERGROUND ELECTRIC SERVICE (DIRECTIONALLY DRILLED) BY OTHERS **

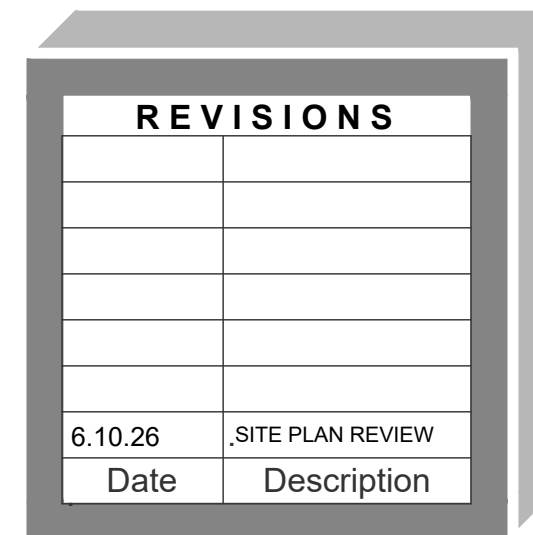
○ C999.99	PROPOSED TOP OF CONCRETE SIDEWALK OR DRIVEWAY ELEVATION
○ P999.99	PROPOSED TOP OF HMA PAVEMENT ELEVATION
○ G999.99	PROPOSED GROUND ELEVATION
○ 999.99 ME	MATCH EXISTING ELEVATION
	PROPOSED PAVEMENT DRAINAGE
	PROPOSED DRAINAGE STRUCTURE
	CURB CUT
RIM =	ELEVATION AT CURB FLOW LINE
SLCPP =	SMOOTH LINED, CORRUGATED PLASTIC PIPE (ADS HP STORM OR EQUAL)

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DRAWN BY: MCC
CHECKED BY: DAS

PROJECT NUMBER **25-028**

DATE **JUNE 2026**

SCALE **1" = 20'**

SHEET NUMBER

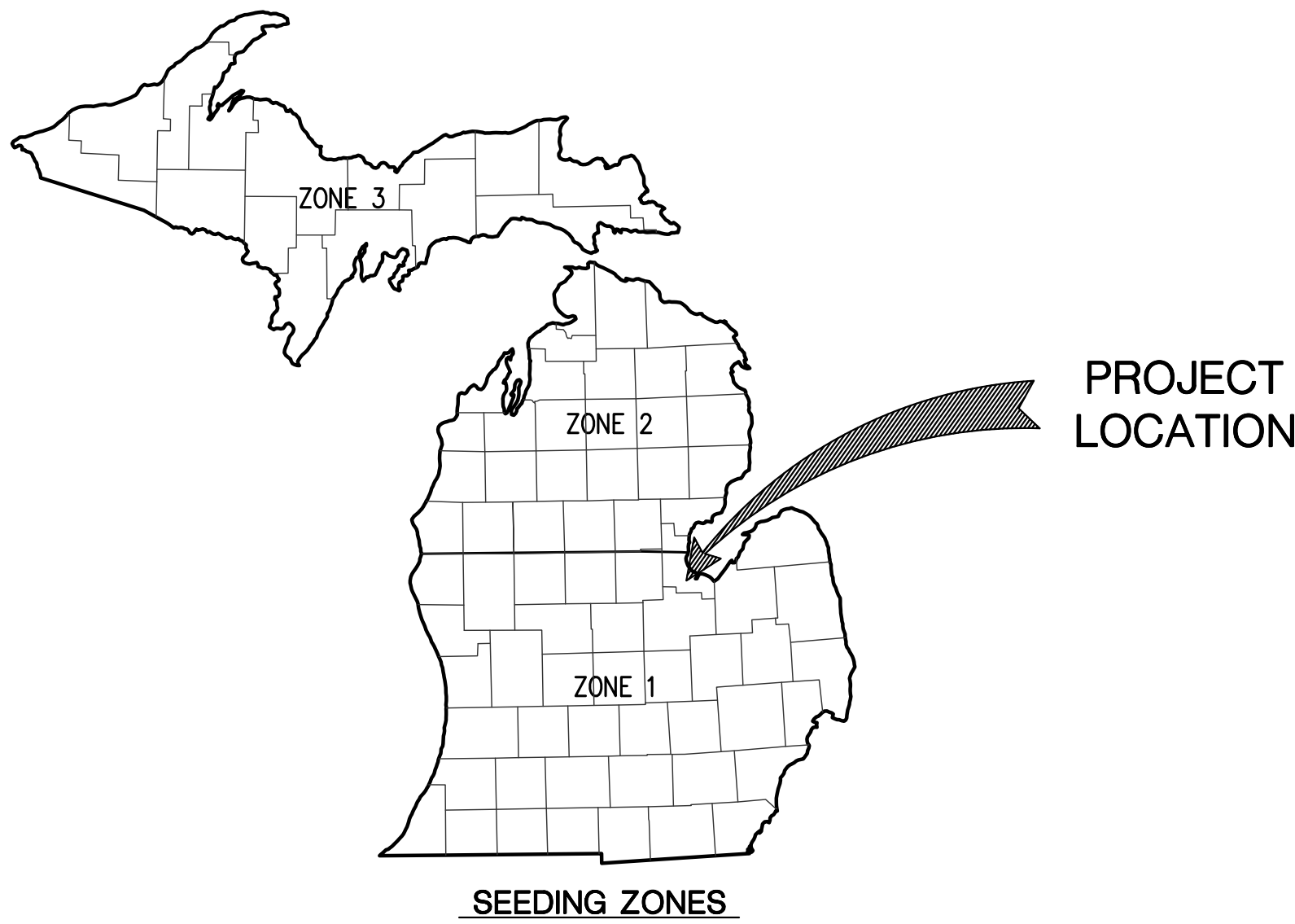
C6.0

MICHIGAN UNIFIED KEYING SYSTEM
SOIL EROSION SEDIMENTATION CONTROL MEASURES

* INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS

Table with 8 columns: KEY, DETAIL, CHARACTERISTICS, A, B, C, D, E, F, G. Rows 1-27 detailing various erosion control measures like strippling, seeding, mulching, etc.

Table with 8 columns: KEY, DETAIL, CHARACTERISTICS, A, B, C, D, E, F, G. Rows 28-54 detailing various erosion control measures like drop spillway, pipe drop, pipe spillway, etc.



TEMPORARY SEEDING GUIDE
ZONE 1
Table with columns: TYPE OF SEED, APR, MAY, JUN, JUL, AUG, SEP, OCT.

PERMANENT SEEDING GUIDE
Table with columns: IRRIGATED AND/OR MULCH, APR, MAY, JUN, JUL, AUG, SEP, OCT, ZONE 1, ZONE 2, ZONE 3.

SOIL EROSION CONTROL NOTE

ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE COUNTY SOIL EROSION DEPARTMENT.
DAILY INSPECTIONS SHALL BE MADE BY THE CONTRACTOR FOR EFFECTIVENESS OF THE EROSION AND SEDIMENT CONTROL MEASURES, AND ANY NECESSARY REPAIRS SHALL BE MADE WITHOUT DELAY.
EROSION AND SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT BE ALLOWED TO COLLECT ON ANY OFF SITE AREAS OR IN WATERWAYS.
STAGING OF THE WORK WILL BE DONE BY THE CONTRACTOR AS DIRECTED IN THE PLANS AND/OR AS REQUIRED TO INSURE PROGRESSIVE STABILIZATION OF THE DISTURBED EARTH.
SOIL EROSION CONTROL MEASURES WILL BE ESTABLISHED PRIOR TO CONSTRUCTION BY THE CONTRACTOR.
ALL MUD/DIRT TRACKED ONTO EXISTING PUBLIC ROADS FROM THIS SITE DUE TO THE CONSTRUCTION, SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR/BUILDER.
ALL SLOPES 3:1 OR STEEPER SHALL BE STABILIZED WITH PEGGED SOD OR SEED AND MULCH SECURED WITH EROSION MATTING FOLLOWING MASS GRADING OPERATIONS.
VEGETATION MUST BE ACCEPTABLY ESTABLISHED AND ALL TEMPORARY SOIL EROSION CONTROL MEASURES MUST BE REMOVED PRIOR TO ACCEPTANCE AND FINAL RELEASE OF THE CONSTRUCTION GUARANTEE BY THE COUNTY SOIL EROSION SEDIMENTATION CONTROL AGENT.

ISSUED FOR CONSTRUCTION 09-16-2026



ROWE PROFESSIONAL SERVICES COMPANY
PLAN SUBMITTALS AND CHANGES
SITE PLAN APPROVAL - **NOT FOR CONSTRUCTION**
Table with columns: DATE, DESCRIPTION.

REVISIONS
Table with columns: Date, Description.
DRAWN BY: MCC
CHECKED BY: DAS
PROJECT NUMBER 25-028
DATE JUNE 2026
SCALE N.T.S.
SHEET NUMBER C7.0

ARCHITECT
SEDGEWICK+ FERWEDA ARCHITECTS
410 East Court Street Flint, MI 48503
810-238-9647 | www.sfarch.us
Good clients + Good design + Great architecture



REVISIONS
Table with columns: Date, Description.

Project
Essexville STEM
305 Pine Street, Essexville, MI 48732
Drawing
SESC KEY AND NOTE SHEET

Table with columns: DRAWN BY, CHECKED BY, PROJECT NUMBER, DATE, SCALE, SHEET NUMBER.

R.C. Hendrick

Project Manager: Chip Hendrick

Phone: 989.781.8116

Fax: 989.781.9512

Project: EHPS New Innovation Center Project

RC Hendrick Job Number 35425

RE: Pre-Bid RFI Response

September 18, 2026

To Whom It May Concern,

Please see responses below to all applicable Requests for Information received regarding the Innovation Center for Excellence at 305 Pine Street in Essexville, MI. Included answers pertain to construction documents and design only.

Prebid RFI #19 - CPT-1 in Room 102 Arena

1. CPT-1 in Room 102 Arena. Looking at the drawing doesn't show the layout for the amount of carpet in this room 102 Arena. It says sealed concrete at room 103 and room 108 around the area. Just need the layout of the extended carpet in the 102 arena on the drawing.
 - a. Utilize the clear floor area dimensions of the arena - 63'-6" x 27'-10".

Prebid RFI #20 - Stair 110

1. On drawing A2.5 Detail 4/A2.5 at 4 stair detail, it says wood stair w/ carpet typical. On room finish, it says sealed concrete. If they want carpet need a broadloom carpet and wrap down the steps or carpet tile going to need stair nosing on the steps. Need to know how to figure this stairway.
 - a. Utilize broadloom carpeting on Stair 110. Utilize Shaw Contract broadloom carpet 'Stay', color to be determined, for pricing.

Additional updates are as follow:

1. A6.0 - Finish Schedule
 - a. Utilize broadloom carpet from Stair 110, Shaw Contract broadloom carpet 'Stay', color to be determined (refer above to RFI 20), in the Mezzanine 211 *in lieu of* Surround Srataworx 24x24 tile.

Sincerely,

Lauren N. Meyer, AIA, NCARB

