

TECHNICAL STANDARDS FOR DESIGN AND CONSTRUCTION OF SANITARY SEWERS

**TOWNSHIP OF NOTTAWA
3032 S. WINN ROAD
WEIDMAN, MICHIGAN 48893**

DATE ADOPTED: JANUARY 3, 2022

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GENERAL

PART 1 GENERAL

1.01 STANDARDS

- A. The following represents standards for the design of sanitary sewers for projects under the jurisdiction of the Township of Nottawa.

1.02 PUBLISHING

- A. A synopsis of the Technical Standards for Design and Construction of Sanitary Sewers shall be published in a newspaper of general circulation within the Township of Nottawa qualifications under State law to publish legal notices, within ten (10) days after its adoption, and the same shall be recorded and such recording authenticated by the signatures of the Township Supervisor and Clerk.

1.03 CONSTRUCTION WORKING HOURS

- A. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, all construction shall be limited to the hours of 7:00 am to 7:00 pm during the regular workweek of Monday through Friday.
- B. *Contractor* may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with written consent from the Township of Nottawa.

1.04 PREAMBLE

- A. This document represents the Technical Standards for Design and Construction of Sanitary Sewers promulgated under the Township of Nottawa Sewer Use Ordinance of 2020. It shall control all new construction or reconstructions/repairs requiring a site plan within the Township of Nottawa, or requiring new materials used to connect the sewer system lines where no site plan is required.
- B. Provisions for these Technical Standards for Design and Construction of Sanitary Sewers shall be held to be the minimum requirements adopted for promotion and preservation of public health, safety and general welfare of the Township of Nottawa. These Standards are not intended to repeal, abrogate, annul or in any manner interfere with existing regulations or laws of the Township of Nottawa, nor to conflict with any statutes of the State of Michigan or the County of Isabella, except that these standards shall prevail in cases where these standards impose a greater restriction than is provided by the existing statutes, laws or regulations.
- C. *Proprietors* and their Design Engineers are encouraged to design facilities to provide for actual conditions encountered in their project work area. Where existing conditions warrant, designs which are more substantial than these adopted minimum standards should be developed and utilized by the *Proprietor*.

1.05 WAIVER

- A. The requirements of these Technical Standards for Design and Construction of Sanitary Sewers are in place to protect the health, safety, and general welfare of all

of the residents of the Township of Nottawa. If for some reason the strict letter of these standards cannot be followed due to circumstances beyond the control of *Proprietor*, then any one of the Technical Standard requirements may be waived with the written consent of the Township Board after consulting the *Qualified Agent*. A waiver can only be evaluated in cases involving practical difficulties or unnecessary hardships, when the applicant demonstrates the following:

1. That the alleged practical difficulties or hardships, or both, are exceptional and peculiar to the subject property, and result from physical conditions that do not generally exist throughout the Township of Nottawa.
2. That failure to grant the waiver will deprive the property owner of its reasonable use as enjoyed by other property owners in the same district. This shall include substantially more than mere inconvenience and/or inability to attain a higher financial return.
3. That allowing the waiver will result in substantial justice being done, considering the public benefits intended to be secured by the standards, the individual hardships that will be suffered by failure to grant the waiver, and the rights of others whose property would be affected by approval of the waiver, if applicable.
4. That the waiver will be consistent with the purpose and intent of the standards, will not be contrary to the public interest, and will not injure the public or private rights of others.
5. That the conditions and circumstances on which the waiver request is based have not been self-created by the property owner.
6. That the waiver will not constitute a special privilege inconsistent with the limitations upon other properties in the Township of Nottawa, and shall constitute the minimum deviation that allow for a reasonable use of the property.

B. When *Proprietor* seeks a waiver, the following should be noted:

1. All waiver requests shall be submitted in writing.
2. It is recommended that the need for waivers is evaluated and requested in the early stages of the site plan review submittal process.
3. All costs incurred by the Township of Nottawa for the professional review of a waiver request and the re-review of the site plan due to incorporation of the waiver shall be the sole responsibility of the *Proprietor*. This cost is not part of the general preliminary/final/construction cost review escrows.

1.06 COORDINATION WITH UTILITY COMPANIES

- A. The *Contractor* shall carefully and thoroughly check with the owners of all necessary utilities before and during construction operations so that damages to utilities may be avoided and grade conflicts are adjusted in advance of construction operations to prevent delays. See Section **01 0002.01 - UTILITY COORDINATION**.
- B. The *Contractor* shall notify "Miss Dig" at 800-482-7171 a minimum of seventy-two (72) hours before any excavation or work,

1.07 TRAFFIC CONTROL

- A. *Contractor* shall furnish and install all necessary devices for traffic control as required by the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), latest revision thereof and the Isabella County Road Commission.

1.08 SAFETY OFFICER

- A. It is the *Contractor's* responsibility to comply with all current Federal, State, and Local safety regulations where applicable including confined space regulations for new construction. The Township of Nottawa and its *Qualified Agent* will not oversee the *Contractor's* operations from the standpoint of safety and are not obligated to act as the *Contractor* or Subcontractor's safety officer.

1.09 EXISTING INFORMATION

- A. Prior to starting proposed utility design, the *Proprietor* is encouraged to make use of maps and information available at the Township of Nottawa Offices regarding the existing utilities. It shall be the *Proprietor's* sole responsibility to verify the existing utility location information provided by the Township of Nottawa.

1.10 SOIL EROSION AND SEDIMENT CONTROL

- A. Soil Erosion and Sediment Control measures shall be in compliance with the latest edition of the Isabella County Community Development Department requirements and clearly shown with details on the Final Site Plan.
- B. <https://www.isabellacounty.org/departments/community-development/other-services/soil-erosion/>

1.11 PRE-CONSTRUCTION MEETING

- A. A pre-construction meeting shall be held prior to the start of all construction of projects totaling in excess of \$10,000.00 or at the discretion of the *Qualified Agent*.
- B. The pre-construction meeting shall be in accordance with Section **00 0119 - ADMINISTRATIVE AND PRODUCT REQUIREMENTS**.

1.12 BONDS

- A. A Performance/Maintenance and Guarantee Bond shall be posted by *Contractor* prior to the beginning of construction to ensure complete construction of structures and development of the land area as proposed and approved.
- B. Bond shall be posted for the "Estimated Cost of Improvements" as defined in Section **00 0118 - DEFINITIONS**, and may be reduced in proportion to the amount of Work accomplished or the amount of land left undisturbed upon recommendation of the *Qualified Agent*.

1.13 REFERENCE STANDARDS

- A. The **MDOT 2020 Standard Specifications for Construction** or latest edition, including all errata is the standard for the basic requirements governing the materials, equipment and methods used in Work identified as "Standard Specifications for Construction" or with an MDOT designation.

 - B. The following parts of the Contract will prevail over all other parts in the following order:
 - 1. *Township of Nottawa Special Provisions.
 - 2. *Township of Nottawa Special Details.
 - 3. *MDOT Standard Plans and Special Details
 - 4. MDOT Standard Specifications for Construction.
 - 5. Project Plans and Drawings.
- * Found herein.

END OF SECTION

DEFINITIONS

PART 1 GENERAL

1.01 DEFINITIONS

A. **"AHJ":**

1. Authority Having Jurisdiction.

B. **"BALANCE OF THE CONTRACT PRICE":**

1. The total cost of Work not completed under the Construction Contract and included on the approved Estimated Cost of Improvements.

C. **"BOND":**

1. Performance/Maintenance and Guarantee Bond or Irrevocable Letter of Credit in amounts and on forms approved by the *Owner*.

D. **"CODE OFFICIAL":**

1. The person appointed and employed by a governmental subdivision charged with the administration and enforcement of the state code or codes and registered in accordance with the requirements of 1986 PA 54, MCL 338.2301 to 338.2313.

E. **"CONTRACT PRICE":**

1. The total cost of Work under the Construction Contract and included on the approved Estimated Cost of Improvements.

F. **"CONSTRUCTION CONTRACT":**

1. The agreement between the *Owner* and *Proprietor*, including all Contract Documents and changes made to the agreement and the Contract Documents.

G. **"CONTRACT DOCUMENTS":**

1. All documents that comprise the agreement between the *Owner* and *Proprietor* including, but not limited to, approved Final Site Plan, approved Estimated Cost of Improvements, approved Change Proposals, approved Bonds, approved Insurance Policies, these Technical Standards for Design and Construction of Sanitary Sewers, etc.

H. **"CONTRACTOR":**

1. Construction contractor hired by the *Proprietor* to construct the proposed improvements.

I. **"EFFECTIVE DATE OF THE CONTRACT":**

1. The date, indicated in the Construction Contract, on which the Contract becomes effective. This is the date of Final Site Plan Approval unless another date is selected by the *Owner*.

J. "EGLE":

1. Michigan Department of Environment, Great Lakes, and Energy

K. "ESTIMATED COST OF IMPROVEMENTS":

1. A cost estimate prepared by the *Proprietor* and approved by the *Qualified Agent* for all Work impacting or having the potential to impact the Township of Nottawa or any departments or commissions of Isabella County.

L. "FINAL COMPLETION":

1. The date set by the *Owner* on which all Work has been completed and all required documentation has been submitted and approved.

M. "IMPROVEMENTS":

1. Improvements as defined in "Estimated Cost of Improvements" above.

N. "OWNER":

1. Township of Nottawa. The term "Owner" shall apply to all Work included in the Estimated Cost of Improvements and does not mean that the Township of Nottawa has any obligation to own or maintain said Work or assume any liability for said Work.

O. "PROGRESS SCHEDULE":

1. A schedule, prepared and maintained by *Contractor*, describing the sequence and duration of the activities comprising *Contractor's* plan to accomplish the Work within the Contract Times.

P. "PROPRIETOR":

1. Applicant or his/her Authorized Agent including; property owner, developer, construction contractor, design engineer, etc.

Q. "PROPRIETOR DEFAULT":

1. Failure of the *Proprietor*, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

R. "QUALIFIED AGENT":

1. Engineer, Superintendent or other qualified agent hired or appointed by the *Owner*.

S. "SCHEDULE OF SUBMITTALS":

1. A schedule, prepared and maintained by the *Contractor*, of required submittals and the time requirements for *Qualified Agent's* review of the submittals and the performance of related construction activities.

T. "SITE":

1. Lands or areas indicated in the Contract Documents upon which the Work is to be performed, including rights-of-way and easements, and such other lands which are designated for the use of the *Contractor*.

U. "SUBSTANTIAL COMPLETION":

1. The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of *Qualified Agent*, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

V. "WORK":

1. The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

END OF SECTION

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ADMINISTRATIVE AND PRODUCT REQUIREMENTS

ADMINISTRATIVE REQUIREMENTS: *(For projects exceeding \$10,000 or as deemed necessary by the Township of Nottawa)*

1.01 **References and Standards**

- A. For products and Workmanship specified by reference to a document or documents not included in the Contract Documents, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards as necessary.
- D. Maintain copy at Site during submittals, planning, and progress of the specific Work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the *Qualified Agent* before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the *Qualified Agent* shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.02 **General Administrative Requirements**

- A. Make the following types of submittals to *Qualified Agent*.
 - 1. Requests for Information (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Progress Schedules, Schedule of Submittals, Schedule of Values.
 - 8. Coordination drawings.
 - 9. Closeout submittals.

1.03 **Preconstruction Meeting**

- A. *Qualified Agent* will schedule a meeting after Final Site Plan approval.

1. Attendance Required:
 - a. *Owner*
 - b. *Qualified Agent*
 - c. *Proprietor*
 - d. *Contractor*
 - 1) Project Manager
 - 2) Site Superintendent
 - 3) Specialty and Designated Item Subcontracts and/or Suppliers as required in Section **01 0000.02 - PROGRESS CLAUSE**.
2. Attendance Requested:
 - a. Utility Companies
 - b. Drain Commissioner
 - c. Road Commission
 - d. Fire Officials
 - e. Police Officials
 - f. Property Owners along the right-of-way within the project limits (to discuss the private utilities such as irrigation systems within the Construction Influence Area)
3. Agenda:
 - a. Utility Company concerns;
 - b. Material Testing requirements;
 - c. Procedures and processing of field decisions, Submittals, Substitutions, Change Proposals, Field Orders, Work Change Directives, and Contract closeout procedures;
 - d. Review of Progress Schedule;
 - e. Review of Plans and Special Provisions;
 - f. *Owner's* requirements and occupancy prior to completion;
 - g. Construction facilities and controls;
 - h. Temporary utilities;

- i. Construction staking;
 - j. Security and housekeeping procedures;
 - k. Procedures for maintaining record documents;
4. Distribution
- a. *Proprietor* will record minutes and distribute copies to participants, with copies to *Owner, Qualified Agent, Contractor*, participants, and those affected by decisions made.

1.04 **Progress Meetings**

A. *Proprietor* shall:

1. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals unless otherwise directed by the *Qualified Agent*.
2. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
3. Attendance Required:
 - a. *Proprietor*
 - b. *Owner*
 - c. *Qualified Agent*
 - d. *Contractor*
 - 1) Project Manager
 - 2) Site Superintendent
 - 3) Specialty and Designated Item Subcontracts and/or Suppliers as required in Section **01 0000.02 - PROGRESS CLAUSE**.
4. Agenda:
 - a. Review minutes of previous meetings.
 - b. Review of Work progress.
 - c. Field observations, problems, and decisions.
 - d. Identification of problems that impede, or will impede, planned progress.
 - e. Review of Schedule of Submittals and status of submittals.
 - f. Review of RFIs log and status of responses.

- g. Review of off-site fabrication and delivery schedules.
 - h. Maintenance of Progress Schedule.
 - i. Corrective measures to regain projected schedules.
 - j. Planned progress during succeeding Work period.
 - k. Coordination of projected progress.
 - l. Maintenance of quality and Work standards.
 - m. Effect of proposed changes on Progress Schedule and coordination.
 - n. Other business relating to Work.
5. Record minutes and distribute copies within 5 business days after meeting to participants, with copies to *Owner, Qualified Agent, Contractor*, participants, and those affected by decisions made.

1.05 **Requests for Information (RFI)**

A. Definition: A request seeking one of the following:

- 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of Work is described differently at more than one place in the Contract Documents.
- 2. A resolution to an issue which has arisen due to field conditions and affects design intent.

B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

C. Preparation: Prepare an RFI immediately upon discovery of a need for additional information or interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional delays in execution of the Work.

- 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with Subcontractors and/or materials Suppliers.
 - b. Do not forward requests which solely require internal coordination between Subcontractors.
- 2. Prepare in a format and with content acceptable to *Owner*.

3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request *Contractor's* signature attesting to good faith effort to determine from the Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of or-equals and substitutions.
 - c. Different methods of performing Work than those indicated in the Contract Drawings and Specifications.
 3. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Names of *Owner, Qualified Agent, and Contractor*.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information or interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. *Contractor's* suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of Work shown diagrammatically in Contract Documents.

- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.
 - 4. Highlight items for which a timely response has not been received to date.
 - 5. Identify and include improper or frivolous RFIs.
- H. Review Time: *Qualified Agent* will endeavor to respond and return RFIs to Contractor within 7 calendar days of receipt. For the purpose of establishing the start of the response period, RFIs received after 12:00 noon will be considered as having been received on the following regular Working day.
 - 1. Response period may be shortened or lengthened for specific items, based on the complexity of the RFI.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra Work or delay the project.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify *Qualified Agent* within 7 calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

1.06 **Submittals**

A. Submittal Schedule

- 1. Submit to *Qualified Agent* for review a Schedule of Submittals in tabular format.
 - a. Coordinate with *Contractor's* Progress Schedule, Schedule of Values, and Schedule of Items.

- b. Format schedule to allow tracking of status of submittals throughout duration of construction.
- c. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of Work covered, and role and name of subcontractor.
- d. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - 1) For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other Work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

B. Submittals for Review

- 1. Submit the following for review:
 - a. Material Certificates
 - b. Material Source Lists. Use [MDOT Form 0501](#).
 - c. Product data.
 - d. Shop drawings.
 - e. Samples for selection.
 - f. Samples for verification.
- 2. Submit to *Qualified Agent* for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.

C. Submittals for Information

- 1. Submit the following for information:
 - a. Design Data: Submit for *Qualified Agent's* knowledge for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents, or for *Owner's* information.
 - b. Certifications: *Proprietor's* Design Engineer shall provide a final letter to the *Owner* certifying that all Work for the project has been constructed in general conformance with the approved Final Site Plans. The *Proprietor* shall identify deviations from the approved plans, if any. *Qualified Agent* may require that *Proprietor's* Design Engineer submit for a waiver from identified deviations, if warranted.
 - c. Manufacturer's Instructions.

d. Manufacturer's Field Reports.

e. Test reports.

f. Inspection reports.

g. Other types indicated.

2. Submit for *Qualified Agent's* knowledge as contract administrator or for *Owner*.

D. Number of Copies of Submittals

1. Documents for Review:

a. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

2. Samples: Submit the number specified in individual specification sections; one of which will be retained by *Qualified Agent*.

a. After review, produce duplicates.

b. Retained samples will not be returned to *Contractor* unless specifically so stated.

E. Submittal Procedures

1. General Requirements:

a. Use a single transmittal for related items.

b. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.

c. Transmit using approved form.

1) Use *Contractor's* form, subject to prior approval by *Qualified Agent*.

d. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.

e. Identify: Project; *Contractor*; Subcontractor or Supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.

f. Apply *Contractor's* stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

- 1) Submittals from sources other than the *Contractor*, or without *Contractor's* stamp will not be acknowledged, reviewed, or returned.
- g. Deliver each submittal on date noted in Schedule of Submittals, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - 1) Deliver submittals to *Qualified Agent* at business address.
- h. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - 1) For each submittal for review, allow 15 days excluding delivery time to and from the *Contractor*.
 - 2) For sequential reviews involving *Qualified Agent's* consultants, *Owner*, or another affected party, allow an additional 7 days.
- i. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed Work.
- j. Provide space for *Contractor* and *Qualified Agent* review stamps.
- k. When revised for resubmission, identify all changes made since previous submission.
- l. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
- m. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the Work, and have received prior approval for their use.

F. Product Data Procedures:

1. Submit concurrently with related Shop Drawing submittal.

G. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
2. Generic, non-project-specific information submitted as Shop Drawings do not meet the requirements for Shop Drawings.

H. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to Shop Drawings showing installation locations.

1.07 **Submittal Review**

- A. Submittals for Review: *Qualified Agent* will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: *Qualified Agent* will not acknowledge receipt, and take no other action.
- C. *Qualified Agent's* actions will be reflected by marking each returned submittal using actual stamp on hard copies of submittals.
 - 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. *Qualified Agent's* and consultants' actions on items submitted for review:
 - 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "No Exceptions Taken", or language with same legal meaning.
 - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At *Contractor's* option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of Project record documents.
 - 2) Non-responsive resubmittals may be rejected.
 - 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. *Qualified Agent's* and consultants' actions on items submitted for information:
 - 1. Items for which no action was taken:

- a. "Received" - to notify the *Contractor* that the submittal has been received for record only.
- 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from *Contractor*.

1.08 **Record Documents Maintained During Construction**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Work Change Directives.
 - 4. Field Orders.
 - 5. Written Interpretations and Clarifications.
 - 6. Approved Shop Drawings, product data, and samples.
 - 7. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by *Owner*.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by modifications.
- F. Record Drawings and Shop Drawings: In addition to requirements of individual specification sections, legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to project datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension and detail.
5. Details not on original Drawings.
6. Diagram of all trace wire systems and appurtenances.

QUALITY REQUIREMENTS:

2.01 *Testing and Inspection*

A. *Contractor* Responsibilities:

1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time specialist and responsible officer.
2. Provide documentation showing testing laboratory is accredited under IAS AC89.
3. Employ and pay for services of an independent testing agency to perform specified testing. Employment of agency in no way relieves *Contractor* of obligation to perform Work in accordance with requirements of Contract Documents.
4. Provide adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
5. Cooperate with laboratory personnel, and provide access to the Work.
6. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
7. Notify *Qualified Agent* and laboratory 72 hours prior to expected time for operations requiring testing/inspection services.
8. Replace Work or portions of the Work not conforming to specified requirements.

TEMPORARY FACILITIES AND CONTROLS:

3.01 *Temporary Sanitary Facilities*

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

3.02 ***Vehicular Access and Parking***

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and *Owner*.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When Site space is not adequate, provide additional off-site parking.

3.03 ***Removal of Utilities, Facilities, and Controls***

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary Work.

PRODUCT REQUIREMENTS:

4.01 ***Transportation and Handling***

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

4.02 ***Storage and Protection***

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.

- C. Store sensitive products in weather tight, climate controlled enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- F. Comply with manufacturer's warranty conditions, if any.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

CLOSEOUT REQUIREMENTS:

5.01 Closeout Procedures

- A. Notify *Qualified Agent* when Work is considered ready for Substantial Completion inspection.
- B. Accompany *Qualified Agent* on Substantial Completion inspection and create Final Correction Punch List containing *Qualified Agent's* comprehensive list of items identified to be completed or corrected and submit to *Qualified Agent*.
- C. Correct items of Work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- D. Complete items of Work determined by *Qualified Agent* listed in executed Certificate of Substantial Completion.

5.02 Submittals

- A. Project Record Drawings: Submit record plans to *Qualified Agent* showing final locations of all sanitary pipe, manholes, wyes, stubs, cleanouts, trace wire boxes, and other appurtenances, signed and sealed by *Proprietor's* Design Engineer, and marked as-built. Plans shall include Liber and Page of all easements.
 - 1. Locations shall be in State Plane Coordinate System and elevations shall be in North American Vertical Datum.

2. Submit Project Record Documents in final form, two hard copies, one Mylar copy, one electronic copy in pdf format, and one electronic copy in AutoCAD Civil 3D format.
- B. Sewer Videos.
- C. Executed easements and agreements.
- D. Witness drawings for all sanitary leads, stubs, clean-outs, and trace boxes in pdf format.
- E. Warranties and Bonds: Submit documents to *Qualified Agent* with the following modification(s):
1. For equipment or component parts of equipment put into service during construction with *Owner's* permission, submit documents within 10 days after acceptance.
 2. Make other submittals within 10 days after Date of Substantial Completion.
 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
 4. Submit Warranties and Bonds in final form, two hard copies and one electronic copy in pdf format.

5.03 **Warranties and Bonds**

1. Maintain bonds for durations required.
2. Provide Maintenance and Guarantee Bond on form prescribed in Section **00 6120 - EJCDC C-612 WARRANTY BOND** (when required).
3. Verify that documents are in proper form, contain full information.
4. Co-execute submittals when required.
5. Retain warranties until time specified for submittal.
6. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
7. Cover: Identify each binder with typed or printed title **WARRANTIES AND BONDS**, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
8. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or Work item.

9. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, Supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

EASEMENT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General easement requirements.
- B. Wording and language for plats, condominiums and site plans.
- C. Required easement widths for buried and open facilities.

1.02 EASEMENTS

A. General:

1. All easements shall be in a Township of Nottawa approved recordable format.
2. Legal descriptions and easement drawings are required.
3. Easement drawings shall be signed and sealed by a Land Surveyor registered in the State of Michigan.
4. All costs of easement document recording shall be the responsibility of Proprietor.

B. Notification/Format:

1. Wording relative to easement information shown on the plat, condominium Exhibit B drawings, or site plan shall be as specifically required by the Township of Nottawa.
2. The location and purpose of easements should be clearly described in subdivision deed restrictions or condominium master deeds, or other property that requires easements.
3. Language shall be included within the subdivision property deed restriction or condominium master deed that clearly notifies property owners of the presence of facilities and accompanying easements, as well as restrictions on use or modification of these areas.

C. Maintenance:

1. All public sewer facilities, as well as private sewer facilities as required by the *Qualified Agent*, shall have sufficient easements for maintenance purposes.
2. Easements shall be sized and located to accommodate access and operation of equipment spoils deposition, and other activities.
3. All easements located outside of paved areas shall include a drivable surface approved by the *Qualified Agent*.

D. Width:

1. Minimum easement widths for new sanitary systems are provided below.
2. Easements shall be situated in such a way as to allow maximum maintenance, repair, and reconstruction access (for example, by offsetting them from the centerline). Utility offset requirements shall be determined by the *Qualified Agent*.
3. In general, easements widths will conform to the following:
 - a. Easement width for sanitary systems shall conform to the following table. Burial depths are to the invert of the proposed pipe:

Burial (ft)	Easement Width	Centerline Offset
0-7.0	40 ft	10 ft
7.1-12	50 ft	15 ft
12.1-17	60 ft	20 ft
>17.1	70 ft	25 ft

- b. There shall be a 10 foot separation and a minimum of a 50 foot wide easement where sanitary, storm, and water utilities are parallel.

END OF SECTION

MAINTENANCE AGREEMENT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sanitary monitoring manhole agreement requirements.
- B. Grease and oil interceptors, grit separators, and other interceptor, separator, and comminutor devices.

1.02 GENERAL

- A. Agreement Form/Execution:
 - 1. All agreements both as to form and content shall be subject to the approval of the legal counsel for the Township of Nottawa.
 - 2. Legal descriptions and easement drawings shall be reviewed and approved by the Township of Nottawa Surveyor.
 - 3. Sample agreements are available from the Township of Nottawa Clerk upon request.
 - 4. Agreements shall be executed by *Proprietor* and the recorded original submitted to the Township of Nottawa prior to release of Performance Bond.

1.03 MAINTENANCE AGREEMENTS

- A. Sanitary Monitoring Manhole Agreement:
 - 1. A Monitoring Manhole Agreement shall be required for all monitoring manholes.
 - 2. Adequate maintenance access from public or private right-of-way to the manhole shall be reserved.
- B. Grease and oil interceptors, grit separators, and other interceptor/separator device Agreement:
 - 1. A grease and oil interceptors, grit separators, and other interceptor/separator device Agreement shall be required for all devices.
 - 2. Adequate maintenance access from public or private right-of-way to the device shall be reserved.

END OF SECTION

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PUBLIC SANITARY SEWER SYSTEM DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Gravity and forcemain sewer design requirements.

1.02 REFERENCE STANDARDS

- A. Michigan Plumbing Code; 2015, or Latest Edition.
- B. [Michigan Public Act 451 of 1994](#) - Natural Resources and Environmental Protection Act; 1994.
- C. [Recommended Standards for Wastewater Facilities](#) - 10 States Standards; 2014, or Latest Edition.
- D. State Plane Coordinate System - MI83-SIF; Latest Edition.

1.03 SANITARY SEWER DESIGN CRITERIA

A. General:

1. The [Recommended Standards for Wastewater Facilities](#) and [Michigan Public Act 451 of 1994](#) shall be followed for the design of sanitary sewers unless more stringent requirements are found herein.
2. A Baseline Monitoring Report (BMR) is required in accordance with subsection 6.8 of the [Township of Nottawa Sewer Use Ordinance of 2020](#).

B. Sewer Design Computations:

1. Sewer design flow computations shall be submitted to *Qualified Agent* for approval with an area wide plan of the area to be serviced.
2. Developmental phases, present and future, with acreages and offsite areas contributing, shall be shown with the number of lots included.

C. Sewer Capacity:

1. Sewer capacities shall be based upon 400 gallons per capita per day for laterals and 300 gallons per capita per day for trunks.
2. Existing sewer capacity must be taken into account in the sewer computations and design to assure that available capacity is present for the proposed development.

D. Design Population:

1. For residential developments of single-family homes, design population shall be at least 3.5 persons per household.

2. In developments for housing of other types and institutions, commercial, and industrial developments, studies shall be made to establish equivalent population values.

E. Minimum Size:

1. Minimum size for public sanitary sewer main shall be 8 inch diameter.

F. Minimum/Maximum Design Velocity:

1. Minimum design velocity for sanitary sewers shall be 2 feet per second with pipe flowing full.
2. Maximum design velocity for sanitary sewers shall be 12 feet per second with the pipe flowing full.
3. Following are minimum grades for each size of pipe:

Pipe Diameter	Minimum Grades (%)
6 inch	1.00
8 inch	0.40
10 inch	0.28
12 inch	0.22
15 inch	0.15
18 inch	0.12

G. Sewer Location:

1. Sanitary sewers shall be located to best conform to the layout of existing facilities.
2. In streets where no pattern has been established, sewers shall generally be located approximately 8 feet from the property line on the north or west side of the street.
3. Minimum horizontal separation of 10 feet shall be provided between water mains, sanitary sewers and storm sewers.

H. Depth of Sewers:

1. Minimum depth of cover to top of pipe shall be 4 feet.
2. Generally, the minimum public sanitary sewer main depth shall be such that the Service Connections will be 10 feet (or 8.5 feet at the right-of-way line) below the finished grade of the building to be served unless otherwise approved by the *Qualified Agent*. Deep setbacks or unusual conditions may require greater depths.
3. The maximum depth to invert of any sanitary sewer shall not exceed the depth recommended by the manufacturer for each size and class of pipe.

I. Manhole Location:

1. Manholes shall be placed at intervals not greater than 400 feet.
2. Manholes shall be placed at every change of grade, direction, pipe size, sewer junction and/or at the discretion of the *Qualified Agent*.
3. Whenever possible, manholes shall be placed out of the asphalt or concrete surfaces such as paved streets or sidewalks, etc.

J. Manhole Structure:

1. Drop manhole connections shall be used whenever a sewer enters a manhole at an elevation more than 24 inches above manhole invert.
2. Whenever there is an increase in pipe size, the grades shall match at a line 0.8 of the diameters above the inverts.
3. An allowance of 0.10 foot in grade shall be made for loss of head through a manhole.
4. The minimum inside diameter of all manholes shall be 48 inches.
5. The manhole(s) at the lowest end of the proposed system shall include a 2 foot sump for acceptance testing purposes.
 - a. Sump shall be filled with concrete once acceptance testing is complete.
 - b. The requirement to provide a sump may be waived by the *Qualified Agent* where testing is to be done by either low pressure air testing or exfiltration testing.
6. Special approved wet area manholes with precast rubber gasket type pipe fittings and lockdown rubber gasket type manhole covers shall be required in areas of high ground water table and where manholes are to be located in or adjacent to drainage ditches, low areas and flood plains.

K. Force Mains:

1. Pipe for force mains shall be designed to withstand both internal pressures and external trench and live loads. Design computations shall be submitted by the *Proprietor* for review and approval.
2. Mechanical Restraints for HDPE shall be approved by the *Qualified Agent*.
 - a. All HDPE to PVC transitions shall include fused transition couplings, concrete deadmen and a minimum of 5 restrained joints.
 - b. All HDPE deadmen shall include 2 electrofusion flex restraints.
 - c. The length of restrained joint pipe shall be adequate to resist all design working and surge pressures to which the main will be subjected.

3. Force main cleanout structures shall be located along the length of the main at intervals not exceeding 1,000 feet unless otherwise approved by the *Qualified Agent*.
 4. Air release structures shall be located along the length of the main at all local high points.
 5. Forcemain drops will be reviewed on a case-by-case basis.
- L. Trace Wire:
1. Trace wire and locator tape shall be installed on all sanitary sewer mains and Service Connections.

END OF SECTION

PRIVATE BUILDING SEWER DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Service Connection requirements.
- B. Building Sewer requirements.
- C. Monitoring Manhole requirements.
- D. Grease and Oil Interceptor, Grit Separator, and other interceptor, separator, and comminutor device requirements.

1.02 REFERENCE STANDARDS

- A. Michigan Plumbing Code; 2015, or Latest Edition.
- B. State Plane Coordinate System - MI83-SIF; Latest Edition.

1.03 BUILDING SEWER DESIGN CRITERIA

A. General:

- 1. Chapter 7 and Chapter 10 of the Michigan Plumbing Code shall be followed for the design of Building Sewer, Service Connections, and other devices unless more stringent requirements are found herein.

B. Minimum Size:

- 1. Minimum size for all Service Connections to any gravity sewer shall be 6 inch diameter.
- 2. Minimum size for all Service Connections to any low pressure sewer system shall be 1.25 inch diameter.
- 3. Minimum size for all Building Sewers shall be in accordance with Chapter 7 of the Michigan Plumbing Code.

C. Sewer Location:

- 1. Minimum horizontal separation between water, sanitary and storm services shall be in accordance with subsection 603.02 of the Michigan Plumbing Code.

D. Depth of Sewers:

- 1. Minimum depth of cover to top of pipe shall be 4 feet.
- 2. Generally, the minimum depth of Service Connections shall be 10 feet (or 8.5 feet at the right-of-way line) below the finished grade of the building to be served unless otherwise approved by the *Qualified Agent*.

- a. Deep setbacks or unusual conditions may require greater depths.
3. The invert of Service Connections at the point of terminus (right-of-way line) shall be constructed such that it adequately provides basement sewer service unless otherwise approved by the *Qualified Agent*.
4. The maximum depth to invert of any sanitary sewer shall not exceed the depth recommended by the manufacturer for each size and class of pipe.

E. Service Connections:

1. All Service Connections shall be designed and installed in accordance with Article 4 of the Township of Nottawa Sewer Use Ordinance of 2020 and Section **01 0402.04 - SANITARY SEWERS**.
2. Unless otherwise approved by the *Qualified Agent* due to exceptional circumstances, construction of the Service Connection, from public sewer to property line for each fronting parcel which the sewer is designed to serve, shall be included with construction of all public sewer.
3. Service Connection shall extend a minimum of 10 feet beyond the property line for new construction or to the right-of-way line for reconstruction or as approved by the *Qualified Agent*.
4. Wyes, Tees, and Risers:
 - a. Each building site shall include a Service Connection.
 - b. Risers shall be constructed at the right-of-way line unless otherwise approved by the *Qualified Agent*.
 - c. Where the cover over sanitary sewer to finished grade is more than 12 feet, Deep-Cut Risers in accordance with Section **99 0002 - DEEP-CUT SANITARY RISER** shall be installed.
 - d. Location of the wye or tee shall be marked from the downstream manhole on the record sewer plans prepared and also located using survey grade equipment in State Plane Coordinate System.
 - e. Where the water table is high, the riser shall end at a depth of 1 foot above the water table unless otherwise directed by the *Qualified Agent*.
5. Lead Size:
 - a. Lead size for single family homes shall be as specified in subsection 1.03.B. of this section unless otherwise approved by the *Qualified Agent*.
 - b. Lead size for commercial and industrial developments shall be approved by the *Qualified Agent*.
6. Grinder Pumps/STEP Systems:

- a. Grinder pump and STEP system connections will be approved on a case-by-case basis.

F. Building Sewers:

1. All Building Sewers shall be designed and installed in accordance with Article 4 of the Township of Nottawa Sewer Use Ordinance of 2020 and Chapter 7 of the Michigan Plumbing Code.
2. All Building Sewers shall be equipped with a check valve if required by subsection 715 of the Michigan Plumbing Code to prevent sewage from back-flowing into any dwelling or establishment.
3. Connections other than Sanitary:
 - a. Downspouts, weep tile footing drains, water softener devices and sump pump discharges or any other conduit that carries stormwater, groundwater, brine water shall not be allowed to discharge into the Building Drain or Building Sewer.
4. Cleanouts shall be installed in accordance with section 708 of the Michigan Plumbing Code. Cleanouts are required for all new construction.

G. Monitoring Manholes:

1. Monitoring manholes are required for commercial or industrial developments.
2. The location and number of manholes is at the discretion of the *Qualified Agent*.

H. Grease and Oil Interceptors and Grit Separators and other interceptor, separator, and comminutor devices:

1. All new commercial and industrial uses shall install a grease interceptor, oil interceptor and/or grit separator for use upstream of the Service Connection if required by the Michigan Plumbing Code or other interceptor, separator, comminutor devices as required by the *Qualified Agent*. Devices shall be approved by the *Qualified Agent*.

END OF SECTION

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TOWNSHIP OF NOTTAWA

PROGRESS CLAUSE

The Contractor will be required to present a detailed Progress Schedule as required in Section 00 0119 - ADMINISTRATIVE AND PRODUCT REQUIREMENTS. The *Contractor* shall prepare and submit a complete, detailed, and signed [MDOT Form 1130](#), Progress Schedule, at least 7 days prior to the preconstruction meeting.

In no case shall any work be commenced prior to all required bonds and insurances being approved by the *Owner* and a preconstruction meeting has been held.

The Progress Schedule shall include, at a minimum, the controlling work items for the completion of the project, as well as the planned dates or work days that these work items will be controlling operations. All contract dates including open to traffic, project completion, interim completion, substantial completion and any other controlling dates in the contract, must be included in the Progress Schedule. The Progress Schedule shall also include the following (submit additional pages if necessary):

1. The proposed phased order of construction.
2. Any proposed lane or shoulder closures intended for work within each phase. All business drives shall remain open to traffic during the project.

Prior to the start of Work, the *Contractor* must attend a preconstruction meeting with the *Qualified Agent*. The *Qualified Agent* will determine the day, time and place for the preconstruction meeting. The subcontractor(s) for Designated and Specialty Items, which materially affect the schedule, shall also be present at the scheduled meeting and they will be required to sign the Progress Schedule to indicate their approval of the scheduled dates of work set forth in the Progress Schedule.

The *Proprietor* will schedule and conduct progress meetings, when deemed necessary by the *Qualified Agent*, that will be held with the Township of Nottawa, other affected local governing agencies, utility companies, businesses, homeowners, and *Contractor* to discuss local concerns. *Contractor* attendance at these meetings is mandatory.

Hours of Work

The *Contractor*, by Township of Nottawa Ordinance, is required to execute work done under this Contract only between the hours of 7:00 P.M. and 7:00 P.M., Monday through Saturday. No construction equipment shall be started or operated outside of these hours except to save property or life or as specifically authorized by the *Qualified Agent*. All requests to work during off-hours shall be submitted to the *Qualified Agent* for approval a minimum of two business days prior to beginning the work.

Holiday Schedule

Contractor shall cease construction operations during the holiday periods as directed by the *Qualified Agent*.

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TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
UTILITY COORDINATION

The *Contractor* shall cooperate and coordinate construction activities with the owners of utilities as stated in subsection 104.08 of the Standard Specifications for Construction. In addition, for the protection of underground utilities, the *Contractor* shall follow the requirements in subsection 107.12 of the Standard Specifications for Construction.

Contractor delay claims, resulting from a utility, will be determined based upon subsection 108.09 of the Standard Specifications for Construction.

Public Utilities

The following Public Utilities have facilities located within the Right-of-Way:

ISABELLA COUNTY

Isabella County Drain Commissioner's Office

200 N. Main Street

Mt. Pleasant, MI 48858

O. 989-772-0911 ext. 247

Isabella County Road Commission

2261 East Remus Road

Mt. Pleasant, MI 48858-9002

O. 989-773-7131

Isabella County Community Development Department (Soil Erosion)

200 N. Main Street

Mt. Pleasant, MI 48858

O. 989-772-0911

HEALTH DEPARTMENT

Central Michigan District Health Department

2012 E. Preston St.
Mt. Pleasant, MI 48858
O. 989-773-5921

ELECTRIC

Consumers Energy
1325 Wright Ave.
Alma, MI 48801
O. 989-466-4271

NATURAL GAS

Consumers Energy
Saginaw Service Center
O. 989-791-5885

DTE Energy
609 Bjorson Street
Big Rapids, MI 49307
O. 231-349-2364

TELEPHONE

Frontier Communications
303 S. Main St
Mt. Pleasant, MI 48858 Office:- 989-463-5497
O. 855.552.9691

COMMUNICATIONS

Charter Communications

221 Ellis Place

Mt. Pleasant, MI 48858

O. 866.874.2389

Winn Telecom

402 N. Mission Street, Suite 1

Mt. Pleasant, MI 48858

O. 989.779.9800

Existing Water Mains and Sewers

The *Contractor* shall be responsible for any damage to properly identified existing water mains and/or existing sewers during the construction of this project.

The *Contractor* shall notify the Owner at least 48 hours before he intends to cross an existing municipal utility (main or service lead). The *Contractor* shall take proper precautions to protect the utility. Should a utility be damaged, the *Contractor* shall immediately repair.

Existing utilities which are intercepted by a new utility shall be connected to the new utility respectively when required by the *Qualified Agent*.

Unless otherwise indicated, the *Contractor* shall replace any disturbed storm or sanitary sewer at a grade to be established by the *Qualified Agent* such that sufficient clearance will be provided.

Existing Gas, Electric, Phone, Cable, and Other Public Utilities

Contractor shall make all necessary arrangements with the utility owner for supporting existing utilities which may interfere with performing the work.

Where water, sewer, gas, telephone, cable TV, or any other public or private utilities are encountered, *Contractor* must provide adequate protection for them and he will be held responsible for any damages to such utilities arising from his operations.

When it is apparent that construction operations may endanger the foundation of any utility conduit, or the support of any structure, *Contractor* shall notify the utility owner of this possibility and he shall take such steps as may be required to provide temporary

bracing or support of conduits or structures.

Contractor shall ensure that utility poles which are endangered by construction are properly supported and shall cooperate with the utility owner in avoiding damage to lines and poles.

When the utility owner elects to make repairs to damaged conduit or other structures, Contractor shall cooperate to the fullest extent with the utility owner and he shall see that his operations interfere as little as possible with those operations.

When it is necessary in order to perform the Work, that a utility pole be moved to a new location, or moved and replaced after construction, *Contractor* shall arrange for the moving of such poles and the lines.

TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
CLEANING AND VIDEO TAPING SEWER PIPE

WESI:JW

1 of 2

APPR:JCW:4-22-21

- a. **Description.** This work consists of all labor, equipment and materials necessary for cleaning sanitary and storm structures and cleaning and video taping sanitary and storm sewer 6-18 inch diameter in accordance with section 402 and section 403 of the Standard Specifications for Construction and this special provision.

Provide a video record of the physical and structural conditions of the existing sanitary and storm sewers and siphons in pipe runs as directed by the *Qualified Agent* prior to the beginning of any construction activities, and again after construction. Also provide video record of newly constructed sewers. The videos must be professional quality, in color and provide a clear and accurate visual record of the pipe conditions.

Furnish three copies of the pre-construction video(s) and log(s) to the *Qualified Agent* at least 3 calendar days prior to placement of any materials or equipment in the vicinity of the sewers. Any portion of the video(s) determined by the *Qualified Agent* to be unacceptable for the documentation of existing conditions must be re-inspected prior to the start of any construction activity.

Furnish three copies of the post-construction video(s) and log(s) to the *Qualified Agent* within 7 calendar days of the completion of all work in the vicinity of the sewers with the exception of HMA wearing course placement and restoration. Any portion of the video(s) determined by the *Qualified Agent* to be unacceptable for the documentation of post-construction conditions must be re-inspected within five calendar days.

Bear responsibility for damage to the existing AHJ sewers, drains and siphons caused by the construction of this project and repair damage as identified by the *Qualified Agent* in the post-construction video(s) and log(s).

- b. **Materials.** None specified.
- c. **Construction.** Complete all work for both sanitary and storm sewer piping and structures according to the following:
1. Video Inspection. Clean the pipe as necessary prior to the video inspection. Dispose of all waste materials in accordance with applicable federal, state, and local regulations and permit requirements. Conduct video inspection in accordance with subsection 402.03 of the Standard Specifications for Construction. Work must be completed at a time approved by the *Qualified Agent* to coincide with low flow rate periods and must be coordinated with the *AHJ* prior to starting Work. Provide the *Owner* a minimum notice of 2 working days prior to starting Work. Obtain approval from the *Qualified Agent* for pumping, bypassing and other methods of flow control prior to starting work.
 2. Use video equipment specifically designed for sewer inspection and recording. Video equipment must be capable of pan, tilt and zoom to provide all-around views of sewers, and must produce high-quality, color recordings in flash drive format with date/time stamp and digital annotation capabilities.

3. Inspect and record sewers, in either direction, at a rate not exceeding 30-feet per minute. Stopping may be necessary to properly document the sewer's condition. Winches, cable, rewind, and other devices must not obstruct the view or interfere with proper documentation. If the video equipment will not pass through an entire section in one direction, set up equipment to enter from the opposite direction. If the video equipment fails to pass through from the opposite direction, the inspection will be considered complete.
4. The final video recording must display the date (month, day and year) and the time (hours, minutes and seconds). This transparent information must appear on the upper left hand corner of the frame. Total sewer length and locations of sewer defects must be displayed on upper right hand corner of the frame.

TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
TRENCHING

WESI:JW

1 of 4

APPR:JCW:4-19-21

- a. **Description.** This work consists of all labor, equipment and materials necessary for installation of sanitary piping and appurtenances including removals, excavation, trenching or tunneling in earth and in rock, and the complete drainage of excavations in accordance with section 402 of the Standard Specifications for Construction and MDOT Standard Plan R-83 Series, except as modified in this special provision.
- b. **Materials.** Provide materials conforming to subsection 902.02 of the Standard Specifications for Construction and MDOT Standard Plan R-83 Series.
- c. **Construction.** Construct miscellaneous trenching in accordance with subsection 402.03 of the Standard Specifications for Construction and the following:
 1. Remove existing drainage structures, culverts, and sewers in accordance with subsection 203.03 of the Standard Specifications for Construction with the following modification(s):
 - A. Drainage structure abandonment is not allowed unless specifically indicated on the plans and/or in the Schedule of Items as directed by *Qualified Agent*.
 2. Classification of Excavation:
 - A. Earth, as a name for excavated material, shall include all glacial deposit, whether cemented or not, except solid boulders one-half cubic yard or more in volume. It shall include all alluvial deposits and material of every kind that can be excavated with equal facility by the equipment and means used for other earth excavation in the Work.
 - B. Rock, as a name for excavated material, shall include pre-glacial solid ledge rock that can be removed most practically by blasting, barring, or wedging or by some other standard method of quarrying solid rock; it shall include boulders of one-half cubic yard or more in volume. It shall not include fragile, friable, or disintegrated materials of any kind that can be excavated with equal facility by equipment and means used for earth excavation in this Work.
 3. Limits of Excavation in Earth:
 - A. Excavations for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and other construction methods to be followed.
 - B. Where, through the *Contractor's* construction procedure, or because of poor existing ground conditions, it is impossible to maintain alignment and grade properly, excavate below grade and replace with stone in order to ensure that the pipe, when laid, will maintain the correct alignment and grade.

- C. In excavating for utilities, finish the excavation at all times to the required grade for an adequate distance in advance of the completed utility. However, unless otherwise permitted by the *Qualified Agent*:
- (1) not more than 50 feet of trench shall be open at one time in advance of the utility,
 - (2) at no time shall more than 150 lineal feet (urban areas) or 500 feet (rural areas) of trench be opened and incompletely backfilled. The remainder of the area of trenching operations shall be available for safe vehicular and pedestrian traffic at all times, special exceptions may be allowed by the *Qualified Agent*, and
 - (3) backfilling shall accompany excavation in such a manner as to avoid large piles of surplus spoil.
- D. The length of road which may be occupied by the construction activities at any one time shall be subject to the discretion of the *Qualified Agent* and will be based on the requirements of use of the road by the public and shall be in accordance with MDOT Maintenance of Traffic typicals. However, unless otherwise permitted by the *Qualified Agent*:
- (1) not more than 1,000 consecutive feet of road shall be occupied at one time.
 - (2) vehicular traffic through the road shall not be entirely stopped.
- E. Temporarily store excavated materials along the trench in a manner that will not cause damage to trees, shrubs, fences or other property nor that will endanger the bank of a trench by imposing too great a load thereon.
4. Disposal of Water and Sewage:
- A. All methods and procedures for soil erosion and sediment control must meet the *AHJ* and *EGL* standards for construction.
 - B. Remove by pumping, bailing, or other acceptable method all water which may accumulate or be found in the trenches and other excavations and shall take all necessary precautions to keep the trenches and other excavations entirely clear of water while the utilities are being constructed.
 - C. Where existing sewers or drains are encountered during construction, make adequate provision for diverting the flow of the existing sewers or drains, so as to keep the Work entirely dry during construction.
 - D. Protect newly placed concrete from damage resulting from ground water or sewage, or from the handling or disposal of water and sewage.
 - E. At all times have sufficient pumping equipment ready for immediate use to carry out the Work.
 - F. If wet areas of construction are encountered, make use of well pointing equipment and of other measures such as stone which, in the judgment of the *Qualified Agent* are required for laying the utility under dry conditions and with proper bedding of the pipe.

5. Bracing and Sheeting:
 - A. Furnish, install, and maintain such sheeting, bracing, and shoring, as may be required to properly support the sides of any excavation and to prevent any movement of earth which could in any way injure the Work.
 - B. If the *Qualified Agent* is of the opinion that, at any point, sufficient and proper supports have not been provided, he may order additional supports at the expense of *Contractor*; but neither the placing of such additional supports by the order of the *Qualified Agent* nor the failure of the *Qualified Agent* to order such additional supports placed, shall release *Contractor* from his responsibility for the sufficiency of such supports and the integrity of the Work and protection of existing adjacent property or structures from damages.
 - C. In the removing of sheeting and bracing after the utility has been constructed, take special care to prevent any caving of the sides of excavation and injury to the completed Work or to adjacent property.
6. Preparation for Utility Placement
 - A. Cut out soft areas of subgrade not capable of compaction in place.
 - B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
 - C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.
 - D. Form foundations in the trench to prevent any subsequent settlement and resulting excessive pressure to the pipe after backfilling. If the subgrade is of unstable soil, provide well pointing or use stone to assure that settlement is eliminated. Carefully form subgrade so that the pipe rests on the correct line and grade. Provide the required grade by one of the following methods:
 - (1) Excavate to a level 4 inches or more below the final grade line and install embedment material according to MDOT Standard Plan R-83 Series. Use this procedure in stable soils only.
 - (2) Excavate to a level 4 inches or more below the final grade line and install MDOT 6A course aggregate to 12 inches above top of pipe and furnish and install a separator fabric in accordance with section 308 of the Standard Specifications for Construction. Use this method to stabilize the trench bottom and/or for dewatering purposes.
7. Backfill according to subsection 401.03 of the Standard Specifications for Construction, MDOT Standard Plan R-83 Series and the following:
 - A. Backfill shall be placed over utilities to within 1 foot of final grade prior to acceptance testing.
 - B. Bring any depression resulting from settlement of the trench backfill to the proper grade and the surface made to match the adjacent surface.

- C. As soon as practicable after concrete structures have been set, forms and debris have been removed, the surface of the concrete pointed up, and the structures have been inspected and approved, backfill the excavated area around structures up to the specified grade.
- D. Do not place backfill around and over the top of cast-in-place concrete structures until the concrete has attained sufficient strength to sustain all the loads imposed by the backfilling operations.
- E. Maintain all road and driveway crossings in suitable repair.
 - (1) Promptly repair settlements.
 - (2) Check complaints received by the *Qualified Agent* and make necessary repairs within 24 hours of the time received.
- F. Compact trenches constructed in established lawn areas so as to permit restoration shortly after completion of the backfilling without appreciable settlement.
- G. Maintenance and Restoration of Pavement, Walks, Road Surfaces, Etc.:
 - (1) Replace all concrete or asphalt pavement, curbs, drives and sidewalks removed, destroyed, or damaged by *Contractor* in a manner equal or superior to the previously existing pavement. Saw cut to full depth at the nearest control joint on each side of the area to be removed. Drill and secure green epoxy coated reinforcing bars conforming to section 917 of the Standard Specifications for Construction into the existing concrete curb and driveways where required by *Qualified Agent* before the replacement concrete is poured.
 - (2) Where trenches cut or damage roadways or drives other than hard surface pavements, thoroughly compact the trench backfill and restore roadway with MDOT 23A aggregate base at least 6 inches thick and maintain the roadway during the life of the contract in good condition with additional aggregate as settling takes place.
- H. Trenches Excavated for Repair of Utilities within 1:1 Influence of Roadway (including roadway reconstruction unless waived by the *Qualified Agent*.
 - (1) Replace excavated material with MDOT 6A course aggregate with a minimum crushed material content of 95%.
 - (2) Furnish and install a geotextile separator in accordance with section 308 of the Standard Specifications for Construction. Install the separator on the roadbed subgrade with an overlap of at least 2 feet beyond the excavated area to ensure that no sand subbase material migrates into the trench.

TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
DEWATERING

WESI:JW

1 of 4

APPR:JCW:3-17-20

a. **Description.** This work consists of providing all materials, labor and equipment necessary to lower the groundwater table to facilitate construction in the area of the excavation for the proposed project. This work may require the use of pumps for trench dewatering or well points, deep wells, or other measures that are utilized to control groundwater to facilitate installation of underground utilities and structures.

1. System Design Requirements:

- A. Design the dewatering systems to prevent damage to adjacent properties, buildings, structures, utilities, and other Work as a result of settlement or other groundwater-related effects.
- B. Design dewatering system to prevent pumping fines from below grade or disturbing materials exposed at the excavation bottom. Wells shall be cased, and filter(s) shall be provided to prevent such pumping of fines.

2. Submittals:

A. Submit dewatering plan for information including the following elements:

- (1) The proposed type of dewatering system.
- (2) Arrangement, location, and depths of system components.
- (3) Complete description of equipment and instrumentation to be used, with installation, operation and maintenance procedures.
- (4) Types and sizes of filters.
- (5) Design calculations demonstrating adequacy of the proposed system and equipment.
- (6) Methods of disposal of pumped water.
- (7) Method of water quality monitoring.
- (8) Type of filtration and chemical treatment of contaminated water, as applicable.
- (9) Method for establishing and monitoring Site groundwater levels.

B. Submit the following additional items:

- (1) Criteria for determining the acceptability of removing the dewatering system from operation.

- (2) Copies of permits and registrations required for Work of this special provision.
 - (3) Documentation and calculations verifying that the approved criteria for determining the acceptability of removing the system from operation have been met prior to removing the dewatering system from operation.
3. Quality Assurance:
- A. Design shall be prepared by a person qualified and experienced to perform such design.
 - B. Dewatering Contractor Qualifications: Registered by the State of Michigan as required in Part 127, Water Supply and Sewer Systems, of the Public Health Code, Public Act 368 of 1978.

4. Approvals/Registrations:

- A. Obtain approval of the selected dewatering system from the AHJ.
- B. Apply for and secure a Part 327 large water withdrawal permit if the proposed dewatering system will have a pump capacity of 70 gallons per minute or more combined total for all pumps on the property. Utilize the Water Withdrawal Assessment Tool to register the proposed water withdrawal with *EGLE* prior to commencement of dewatering. This online tool can be found at:

[https://www.egle.state.mi.us/wwat/\(S\(eaz4fowhabbzsgioyit2fsm\)\)/default.aspx](https://www.egle.state.mi.us/wwat/(S(eaz4fowhabbzsgioyit2fsm))/default.aspx)

The Part 327 permit application can be found at:

https://www.michigan.gov/documents/egle/egle-wrd-wateruse-permitapp_658371_7.pdf

- b. **Materials.** Provide materials conforming to the Standard Specifications for Construction and as approved by the *Qualified Agent*.
- c. **Construction.** Construct according to the following:
 1. Comply with all quality and quantity discharge requirements of the *AHJ* and *EGLE* during discharge operations.
 2. Provide filtration system for construction dewatering for the purpose of filtering silt prior to discharge of water.
 3. At all times, have on Site sufficient pumping equipment for immediate use, including standby pumps for use in case other pumps become inoperable.
 4. Dispose of water in accordance with the detailed requirements specified herein and so as to cause no injury to personnel or the public, damage to public or private property, nor menace to the public health.
5. Provide a sufficient number of monitoring wells to confirm the following:

- A. The dewatering system is performing as intended and is achieving the specified reduction in groundwater levels.
- B. Site groundwater levels inside and outside dewatered excavations to determine the acceptability of removing the dewatering system from operation.
6. Remove water which accumulates in excavations during the progress of Work so that all Work can be done in the dry, unless otherwise approved by the *Qualified Agent*.
 - A. Keep excavated areas free from water while underground utilities or structures are constructed, while concrete is setting, and until backfill or elements of the structure have been placed to a sufficient height to anchor the Work against possible leakage or buoyant uplift forces.
 - B. A height to anchor the Work against buoyant uplift forces shall be considered sufficient when the dead load weight of the backfill or elements of the structure exceeds the uplift forces by a minimum factor-of-safety of 1.5.
7. Perform dewatering to accomplish a lowering of measured static ground water level to an elevation which is suitable for the construction of utilities and structures below grade.
8. Accomplish pumping in a manner that will not disrupt the surrounding environment.
9. Discharge ground water to nearby storm sewers or water courses.
 - A. Extracted groundwater of sufficient quality as shown by test data may be used on Site with *Qualified Agent's* written approval for those purposes approved by the *Qualified Agent*.
 - B. Do not discharge quantities of water in excess of the capacity of existing storm sewers or water courses. Bear responsibility for any damage incurred to storm sewers or water courses.
 - C. Maintain storm sewers used for ground water discharge during dewatering operations and leave in a clean condition.
10. Provide equipment used for temporary pumping of ground water that operates at a noise level acceptable to the *Qualified Agent*.
 - A. Use electrically driven pumps unless otherwise approved by the *Qualified Agent*.
 - B. The use of excessively noisy equipment will not be allowed. Engine driven pumps (if approved by the *Qualified Agent*) must be adequately equipped with suitable muffler to minimize pumping noise.
11. If any dewatering well pumps fines, terminate pumping and modify well or construct new well to eliminate the pumping of fines.
12. Do not turn off the dewatering system in a manner that the upsurge in water weakens the subgrade for completed excavation and structure foundation Work.

13. Remove filters and other dewatering facilities from the Site at the completion of dewatering operations.

TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
SANITARY SEWERS

WESI:JW

1 of 10

APPR:JCW:3-17-20

- a. **Description.** This work consists of all labor, equipment and materials necessary for installation and testing of sanitary sewer piping in accordance with section 825 of the Standard Specifications for Construction, MDOT Standard Plan R-83 Series and this special provision.
- b. **Materials.** Provide materials conforming to the following:
1. **Gravity Sewer Mains**
 - A. Use PVC Pipe conforming to ASTM D3034 with a Standard Dimension Ratio of SDR 26 unless otherwise indicated on plans or this special provision:
 - B. Use fittings conforming to ASTM D3034 of same SDR as pipe molded or formed to suit pipe size and end design, in tee, bends, elbows, cleanouts, reducers, traps, repair couplings and other configurations required.
 - C. Use the following **wye** product(s), or request a substitute, for this project.
 - (1) The Harrington Corporation, 3721 Cohen Place, Lynchburg, VA 24501-5047, Ph. 800.825.7094, Product Name: SDR26 HWS x SCH40 Wye
 - D. Use joints conforming to ASTM D3212, with ASTM F477 gaskets.
 - E. Use joint lubricants as recommended by the pipe manufacturer.
 2. **Gravity Service Connections and Building Sewers**
 - A. Use PVC Pipe conforming to ASTM D1785/ASTM D2665 solid wall with a Schedule 40 rating and bell and spigot style solvent sealed joint ends unless otherwise indicated on plans or this special provision.
 - B. Use fittings conforming to ASTM D1785/ASTM D2665 of same schedule rating as pipe molded or formed to suit pipe size and end design, in tee, bends, elbows, cleanouts, reducers, traps, repair couplings and other configurations required.
 - C. Use primer and solvent conforming to subsection 705.11.2 of the Michigan Plumbing Code and as recommended by the pipe manufacturer.
- c. **Construction.** Construct according to ASTM D2321, subsection 825.03 of the Standard Specifications for Construction, subsection 705.11.2 of the Michigan Plumbing Code (for Service Connections and Building Sewers), the manufacturer's installation instructions, and the following:

1. Pipe Installation

- A. Maintain horizontal separation from water main piping, if present, of at least 10 feet in all horizontal directions for all public sewer.
- B. Maintain vertical separation from water main piping of at least 18 inches in all vertical directions.
- C. Maintain horizontal and vertical separation from water services in accordance with subsection 603.02 of the Michigan Plumbing Code for all Service Connections and Building Sewers.
- D. Before lowering and while suspended, inspect pipe and each fitting for defects. Installation of defective material is not permitted.
- E. Where pipe, fittings or joint materials have been soiled by earth in handling, thoroughly clean soiled surfaces until all traces of earth are removed before joining pipe.
- F. Alignment:
 - (1) All pipes shall be laid to line and grade. They shall be carefully centered so that when laid they form a pipe run with a uniform invert.
 - (2) Alignment Laser (Use on all Sewer Mains):
 - (a) Use a suitable alignment laser for horizontal and vertical alignment.
 - (b) The alignment laser shall be of a type and manufacture especially suitable to the construction of sewers and the instrument shall provide a target which ensures an instant and continuous visual check on the instrument alignment.
 - (c) Provide a competent and skilled superintendent or operator for the laser beam instrument to be on duty at all times.
 - (3) Smart Level (Use on all Service Connections and Building Sewers)
 - (a) The smart level shall be a minimum of 4 feet in length and properly calibrated.
- G. Install pipe with bell ends facing the direction of laying, proceed upward against the direction of flow.
- H. Maintain interior of all pipes thoroughly clean. After each pipe has been laid, carefully inspect, identify and remove pipe cuttings and filings, dirt, trash, rags and other foreign matter from interior.
- I. Protect completed Work by closing pipe openings with caps or plugs before, during, and after installation.
- J. As soon as possible after the joint is made, place sufficient embedment material along each side of the pipe to offset conditions which might tend to move the pipe off line and grade.

- K. Backfill trenches immediately after the pipe has been installed. Do not displace or damage pipe when backfilling or compacting.
- L. Only deflection testing will be required on projects involving replacement of existing public sewer in place.
- M. Stubs and Service Connections
- (1) Provide leads where indicated on plans or as directed by the *Qualified Agent*.
 - (2) Solvent weld the Schedule 40 service lead into SDR 26 sewer main wyes.
 - (3) Construct service leads to 1 foot beyond the right-of-way line for existing buildings and 10 feet beyond the right-of-way for vacant land unless otherwise indicated on plans.
 - (a) Construct concurrently with the new main and fit with a stopper for testing purposes. For vacant lots the stopper shall remain in place.
 - (b) Immediately connect to existing service leads if directed by the *Qualified Agent*.
 - (4) Construct sanitary risers at the right-of-way line unless otherwise approved by the *Qualified Agent*.
 - (a) In all depths over 12 feet, provide riser with two 45 degree long radius elbows and sufficient pipe to bring the top of the riser to within 8.5 feet of the finished grade at the right-of-way line or as directed by the *Qualified Agent*.
 - (b) Carefully place backfill at all risers and tamp sufficiently to insure against damage from backfill settlement.
 - (5) After each section of new main/Service Connection lead has been tested and approved, connect all existing Building Sewers to the new system. Connection of existing sewers to the new sewer before testing will not be allowed unless testing is waived by the *Qualified Agent*.
- N. Building Sewers:
- (1) Test all existing and newly installed Building Sewers in accordance with subsection 312.6 of the Michigan Plumbing Code prior to connecting to the Service Connection.
 - (2) Televiser all existing Building Sewers to ensure joint integrity and pipe condition.
- O. Existing Wastewater Disposal Facility Abandonment:
- (1) Abandon existing wastewater disposal facilities in accordance with Section 3.4.(B) of the Township of Nottawa Sewer Use Ordinance of 2020.

2. Sanitary Manhole Connections:

- A. Connect service leads to manholes where indicated on the plans or as directed by the *Qualified Agent*.
 - B. Field core connections and install flexible connectors; install external drop pipe if the service lead invert is greater than 24 inches above the main sewer flow line; and shape flow channels to assure smooth hydraulic flows.
 - C. Stubs for future sewer extension shall be of the length indicated on the plans and terminate with a 2 foot section of pipe inserted into the bell end of the downstream pipe and capped.
3. Marking Stubs and Storm and Service Connections:
- A. In order to mark the location of unconnected stubs and sanitary leads, make accurate measurements of all stubs and service connections before the trench is closed.
 - B. Keep a record of the distance of each service connection from the nearest downstream manhole and furnish this record to the *Qualified Agent*.
 - (1) Mark each unconnected stub and service connection with the following:
 - (a) Place a number 4 rebar adjacent to marking stick extending from the invert of the capped stub or service lead, terminating 6 inches below finished grade.
 - (b) Place a 4 inch by 4 inch western red cedar or pressure treated pine marking stick extending from the invert of the capped stub or service connection, terminating 3 feet above finish grade.
4. Field Quality Control
- A. Perform acceptance testing in accordance with manufacturer's instructions and the following:
 - (1) All public sewer mains and private Service Connections shall be subjected to the following tests prior to acceptance at the sole discretion of the *Qualified Agent*.
 - (a) Alignment (Sewer Mains)
 - (b) Low-pressure air: (Sewer Mains and Service Connections)
 - 1) Sewer pipe 18 inches and smaller.
 - 2) Sewer pipe larger than 18 inches (or smaller diameters based on ground water conditions) shall be tested by either infiltration or exfiltration and shall be tested in lengths approved by the *Qualified Agent*.
 - (c) Deflection (Sewer Mains)
 - (d) Television (Sewer Mains, Service Connections, and Building Sewers)
 - (e) Infiltration test: (Sewer Mains and Service Connections)

- 1) If ground water level is 2 feet or more above the top of the pipe at the upstream end, or if the air pressure required for the test is greater than 9-psig.
- (f) Exfiltration test:
 - 1) If ground water level is 2 feet or less above the top of the pipe at the downstream end and pipe diameter is larger than 18 inches.
- (g) Verify ground water level to determine appropriate leakage testing method.
 - 1) Remove cap from pipe nipple.
 - 2) Clear pipe nipple with air pressure.
 - 3) Connect a clear plastic tube to nipple.
 - 4) Support tube vertically and allow water to rise in the tube.
 - 5) After water stops rising, measure height in feet of water over crown of the pipe.
 - 6) Furnish all equipment and personnel to conduct system acceptance tests as specified herein on all completed sewers.
- (2) If any section of the sewer fails to meet acceptance testing requirements, perform a television inspection of the faulty section and repair or replace all defective materials and/or workmanship to the satisfaction of the *Qualified Agent*. Repeat test procedure until the results are acceptable.
- (3) Plug outlet pipe from Sanitary Test Manholes with a waterproof stopper to prevent discharge to the existing system until acceptance of the system by the *Qualified Agent*.
- (4) Repair all visible leakage as directed by the *Qualified Agent*, even though air tests and infiltration/exfiltration tests may have been satisfactorily completed.
- (5) Clean and Televiser sewer lines in accordance with Section **01 0402.06 - VIDEO INSPECTION OF SANITARY AND STORM SEWERS** and the following:
 - (a) Existing sewer lines within the influence of proposed construction to remain in service shall be cleaned and televised prior to and after construction. Repair any damage determined to be caused by negligence of the Contractor.
 - (b) Clean and televise all new sewer lines after construction.
 - (c) Cleaning and televising schedule shall take into consideration other elements of Work.
 - (d) Upon request by the *Qualified Agent*, provide a manifest receipt from the disposal site to verify proper disposal of sediment.

B. Alignment Testing:

- (1) An alignment test may be required by the *Qualified Agent*.
- (2) If required, shine a light through the pipe at a manhole and view the light from an adjacent manhole.
- (3) Correct any section of sewer in which a light cannot be seen from one manhole to the next to the satisfaction of the *Qualified Agent*.

C. Low-Pressure Air Testing:

- (1) All sewer lines shall be clean and free of debris prior to air testing.
- (2) *Contractor* may desire to make an air test prior to backfill for his own purposes, however, the line acceptance test shall be conducted only after backfilling or extensions are completed.
- (3) After a manhole-to-manhole section of line has been backfilled and is ready for testing, plug at each manhole with pneumatic plugs. Provide pneumatic plugs capable of holding against the line test pressure without requiring external blocking or bracing.
- (4) Provide pneumatic plug with three (3) hose connections.
 - (a) One hose shall be used for inflation of the pneumatic plug.
 - (b) One hose shall be used for continuously reading the air pressure in the sealed line.
 - (c) One hose shall be used for introducing low-pressure air into the sealed line.
- (5) Provide a 0-30 psig gauge for reading the internal pressure of line being tested. Calibrations from the 1-10 psig gauge shall be in tenths of pounds (not ounces) and this 0-10 portion shall cover ninety percent (90%) of the completed dial gauge.
- (6) Conduct a line acceptance test using low pressure air testing on all newly constructed PVC sanitary sewer lines, including private sewer lines.
- (7) Perform air testing in accordance with ASTM F1417 - 11a and UNI-B-6-98.

D. Deflection Testing:

- (1) Flexible pipe, including "semi-rigid" pipe, is required to show no more than 5 percent deflection.
- (2) Test pipe no sooner than 30 days after backfilling of a line segment but prior to final acceptance using a standard mandrel to verify that installed pipe is within specified deflection tolerances.

- (3) Submit manufacturers' specification sheet listing O.D. of the mandrel to the *Qualified Agent* for review before initiating testing.
- (4) Mandrel Sizing:
 - (a) Provide rigid mandrel with an outside diameter (O.D.) equal to 95 percent of the inside diameter (I.D.) of the pipe.
 - (b) The inside diameter of the pipe, for the purpose of determining the outside diameter of the mandrel, shall be the average outside diameter minus two minimum wall thicknesses for O.D. controlled pipe and the average inside diameter for I.D. controlled pipe.
- (5) Mandrel Design:
 - (a) The rigid mandrel shall be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed.
 - (b) The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number.
 - (c) The barrel section of the mandrel shall have a length of at least 75 percent of the inside diameter of the pipe.
 - (d) The rigid mandrel shall not have adjustable or collapsible legs which would allow reduction in mandrel diameter during testing.
 - (e) The mandrel shall be marked on the fins indicating that it is for use with PVC pipe.
 - (f) A proving ring shall be provided and used for verifying each size mandrel.
- (6) Proving Ring:
 - (a) Furnish a "proving ring" with each mandrel.
 - (b) Fabricate the ring of 2 inch thick, 3 inch wide bar steel to a diameter 0.02-inches larger than approved mandrel diameter.
- (7) Draw mandrel by hand through the pipe from manhole-to-manhole.
- (8) Any portion of pipe through which the mandrel passes freely shall be deemed to have passed the deflection test.
- (9) Locate, uncover, and repair or replace sections of pipe through which the mandrel does not pass.
- (10) Perform deflection testing in accordance with ASTM D3034 (4-15 inch pipe) and ASTM F679 (18-36 inch pipe).

E. Infiltration Testing:

- (1) An infiltration test may be required by the *Qualified Agent*.
- (2) The total infiltration shall not exceed 200 gallons per inch diameter per mile of pipe per 24 hours.
- (3) Total infiltration may be reduced to 40 gallons per inch of inside diameter per mile per 24 hours, when sewer is identified as located within the 25-year floodplain.
- (4) Test Equipment:
 - (a) Pipe plugs
- (5) Procedure:
 - (a) Calculate volume of flow channel and each vertical inch of manhole.
 - (b) Plug incoming pipes in upstream manhole.
 - (c) Plug outgoing pipes in downstream manhole.
 - (d) After plugs have been installed, allow 2 hours time to pass and calculate volume of water accumulated.
 - (e) Water volume must not exceed that calculated from the formula above.

F. Exfiltration Testing:

- (1) An exfiltration test may be required by the *Qualified Agent*.
- (2) The total exfiltration, as determined by a hydrostatic head test, shall not exceed 200 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of 2 feet above the crown of the pipe at the upstream manhole or 2 feet above the groundwater elevation, whichever is greater.
- (3) Total exfiltration may be reduced to 40 gallons per inch of inside diameter per mile per 24 hours, when sewer is identified as located within the 25-year floodplain.
- (4) Test Equipment:
 - (a) Pipe plugs.
 - (b) Pipe risers where the manhole cone is less than 2 feet above highest point in pipe or service lead.
- (5) Procedure:
 - (a) Determine ground water elevation.
 - (b) Plug outgoing pipes in downstream manhole.

- (c) Plug incoming pipes in upstream manhole.
- (d) Install riser pipe in outgoing pipe of upstream manhole if highest point in service lead is less than 2 feet below bottom of manhole cone.
- (e) Fill sewer pipe and manhole or pipe riser, if used, with water to a point 2-1/2 feet above highest point in sewer pipe, house lead, or ground water table, whichever is highest.
- (f) After the sewer has been filled with water, allow 2 hours time for water absorption by the pipe before exfiltration tests are initiated.
- (g) Take water level reading to determine drop of water surface, in inches over a one-hour period, and calculate water loss (1 inch of water in 4 foot diameter manhole equals 7.83 gallons) or measure the quantity of water required to keep water at the same level.
- (h) Loss shall not exceed that calculated from the formula above.

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TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
BYPASS PUMPING, SANITARY SEWER

WESI:JW

1 of 2

APPR:JCW:4-14-21

- a. **Description.** This work consists of providing all materials, labor, equipment, power, maintenance etc. to implement a temporary pumping system for the purpose of diverting the existing sanitary sewer flow around portions of the sanitary sewer and sanitary structures for the duration of the portions of the project which require such a temporary pumping system.
- b. **Materials.** Use materials in accordance with the standard specifications, as applicable, and as approved by the *Qualified Agent*.
- c. **Construction.** Design, install, and operate a temporary pumping system. The bypass system must be in accordance with all applicable federal, state, and local regulations and permit requirements.

A Temporary Bypass Pumping Plan (plan) must be submitted to the *Qualified Agent* detailing plans and outlining all provisions and precautions to be taken by the *Contractor* regarding the handling of existing sanitary sewer flow. This plan must be specific and complete, including such items as capacities of equipment, materials, and all other miscellaneous items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in the Contract Documents. The consequences of surface runoff and surface flood water caused by climatic conditions must be considered in designing the bypass pumping system. Construction must not begin until the plan has been reviewed and approved by the *Qualified Agent*.

The plan must include, but not be limited to, details of the following:

1. Sewer plugging method and types of plugs;
2. Bypass pump sizes, capacity, number of each size to be on site, and power requirements;
3. Standby power generator size, location;
4. Downstream discharge plan;
5. Method of protecting discharge manholes or structures from erosion and damage;
6. Thrust and restraint block sizes and locations;
7. Method of noise control for each pump and/or generator. In particular on operations which require continuous pumping over prolonged periods of time, minimize noise from pumps, generators and other equipment. The work may need to be performed on weekends, holidays or off-peak hours to minimize impact;
8. Any temporary pipe supports and anchoring required;

Use pumps that are fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of sanitary effluent flows.

Bypass piping must be designed so as not to allow a surcharge of the existing inlet pipe.

The necessary stop/start controls for each pump will be provided by the Contractor.

One stand-by pump of each size must be maintained on site. Back-up pumps must be on-line and isolated from the primary system by valve.

In order to prevent the accidental spillage of flows, all temporary discharge systems must be constructed of rigid pipe with positive, restrained joints. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by approval of the *Qualified Agent*.

Allow 15 working days for the review and approval of the plan.

TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
MANHOLES AND OTHER CONCRETE STRUCTURES

WESI:JW

1 of 4

APPR:JCW:1-22-21

- a. **Description.** This work consists of providing all labor, equipment and materials necessary to install concrete sanitary structures in accordance with section 403 of the Standard Specifications for Construction and MDOT Standard Plan R-1 Series except as modified by the plans and this special provision.
- b. **Materials.** Provide materials conforming to subsection 403.02 of the Standard Specifications for Construction except as modified by the following:
1. Select one of the following **step** product(s), or request a substitute, for this project.
 - A. M.A. Industries, Inc, 303 Dividend Drive, Peachtree City, GA 30269, Ph. 800.241.8250, Product Name: PS1-PF
 - B. American Step Company, Inc, 830 East Broadway, Griffin, GA 30224-0137, Ph. 800.988.7837, Product Name: ML-10-NCR
 2. Select one of the following **flexible connector** product(s), or request a substitute, for this project.
 - A. Trelleborg, 5503 Distribution Drive, Fort Wayne, IN 46825, Ph. 260.478.2800, Product Name: Kor-N-Seal 106/406 Series
 - B. Press Seal Gasket Corporation, P.O. Box 10482, Fort Wayne, IN 46852, Ph. 800.348.7325, Product Name: PSX:Direct Drive
 3. Select one of the following **water infiltration sealing system** product(s), or request a substitute, for this project.
 - A. **GPT Industries**, 4990 Iris Street, Wheat Ridge, CO 80033, Ph. 303.988.1242, Product Name: Boa-Tape Extra Grip or Riser-Wrap (12 inch)
 - B. **Sealing Systems, Inc.**, 9350 County Road 19, Loretto, MN 55357, Ph. 800.478.2054, Product Name: Infa-Shield Gator Wrap (12 inch)
 4. Use the following **concrete adjustment ring** product(s), or request a substitute, for this project.
 - A. Northern Concrete Pipe, Inc, 5281 Lansing Road, Charlotte, MI 48813, Ph. 800.874.4100, Product Name: Precast Adjusting Ring
 5. Use rubber gaskets conforming to ASTM C443 on all structures.
 6. Provide Grout Type R-1 in accordance with section 702 of the Standard Specifications for Construction for grouting interior surface of adjustment rings.

7. Configuration:

- A. Provide precast structures only unless otherwise indicated on the plans.
- B. Install factory flow channels/benches on all sanitary structures unless otherwise indicated on the plans.
- C. Sanitary structures(s) at the lowest end of the proposed system may include a 2 foot sump for acceptance testing purposes. If the plans include a sump, *Contractor* shall comply with the following:
 - (1) Fill the sump with concrete once acceptance testing is complete.
 - (2) Provide field fabricated flow channels/benches.
 - (3) The requirement to provide a sump may be waived by the *Qualified Agent* where testing is to be done by either low pressure air testing or exfiltration testing.
- D. Provide an integral base on all bottom riser sections unless otherwise approved by the *Qualified Agent*.
- E. Top Sections (unless otherwise indicated on plans):
 - (1) Manholes: Cone section unless otherwise approved by the *Qualified Agent*.
- F. Include a 1/2 inch galvanized or stainless steel capped pipe nipple approximately 10 inches long precast into manhole at a location 6 inches above the invert of the flow channel to determine groundwater level for testing purposes on sanitary structures where soil borings show ground water more than 6 inches above the lowest invert.
- G. Drop Manholes:
 - (1) Provide external drop manholes at all sanitary structure locations where the incoming sewer invert elevation is greater than 24 inches above the outletting sewer invert elevation.
 - (2) Use precast reinforced bottom section conforming to MDOT Standard Plan R-1 Series.
 - (3) Use SDR 26 for drop pipe and fittings (tee and elbow).
 - (4) Use a standard elbow cast into the bottom section of the structure.
 - (5) Include a flexible connector on the upper penetration.
 - (6) Backfill drop side of structure with 6A Aggregate to 1 foot above top of tee.

<u>Sewer Pipe Size</u>	<u>Drop Pipe Size</u>
Up to 10 inches	8 inches
10 inches to 18 inches	10 inches

18 inches

12 inches

- (7) Inside drops may be allowed under special circumstances only.
- H. Fabricate pipe openings at the time of structure manufacture. No structures will be accepted where openings have been made in precast units at the Site unless approved by the *Qualified Agent*.
- I. Use reinforced concrete adjustment rings with a minimum thickness of 2 inches unless otherwise approved by the *Qualified Agent*, and include four equally spaced 3/4" diameter holes for bolt down type castings. Cracked or otherwise damaged adjustment rings will be rejected.
- c. **Construction.** Install structures according to subsection 403.03 of the Standard Specifications for Construction, ASTM C1821, and the following:
1. General:
 - A. Install structures under dry conditions with dewatering as necessary.
 - B. Construct structures in such a manner as to exclude all ground water.
 - C. No settlement or shearing of the connecting pipe will be allowed.
 - D. Grout pockets manufactured for pipe penetrations in sanitary structures with non-shrink grout to eliminate any voids between the pipe and the flow channel.
 - E. Install water infiltration sealing system on all sanitary structure riser joints and adjustment rings in accordance with manufacturer recommendations.
 2. Flow Channels (where field fabricated channels are required):
 - A. For existing structures that require construction of a flow channel, install flow through test balls with piping to accommodate existing flow while constructing a smooth flow channel approved by the *Qualified Agent*.
 - B. Construct flow channels in such a manner as to ensure flow through them without splashing on sides or deposition of solids.
 - C. Pour concrete floors and flow channels for structures under dry conditions and protect concrete for a period of at least 24 hours after placement.
 - D. Rebuild poorly constructed flow lines as directed by the *Qualified Agent*.
 - E. Construct channels with split PVC pipe or wyes securely anchored to the structure floor with stainless steel fasteners or by forming the concrete structure floor to flow channels of the same shape and dimensions as the required split pipe and wyes.
 3. Final Adjustment, Finishing, and Cleaning:
 - A. Keep adjustment rings to a minimum by using the thickest rings available for any given application.

- B. Set cover frames and covers to match adjacent slope.
 - C. Adjust castings in accordance with Section **01 0403.03 - ADJUSTING DRAINAGE STRUCTURE COVERS, CASE 1, MODIFIED.**
 - D. Remove debris and clean inside of structure to a condition acceptable to the Qualified Agent.
4. Field Quality Control
- A. A test of sanitary structures for leakage employing the following method(s) may be required by the *Qualified Agent* if watertightness is in question.
 - (1) Test structures in accordance with ASTM C1244.

TOWNSHIP OF NOTTAWA

SPECIAL PROVISION
FOR
TRACE WIRE AND LOCATOR TAPE

WESI:JW

1 of 6

APPR:JCW:3-17-20

- a. **Description.** This work consists of all labor, equipment and materials necessary for the installation of trace wire and locator tape on underground utility systems in accordance with this special provision.
1. Install trace wire and detectable locator tape on all sanitary sewer piping.
 2. Color code trace wire and locator tape according to APWA UCC - American Public Works Association - Uniform Color Code for Marking Underground Facilities; 1999.
 3. Provide trace wire diagram showing the installed location of all anodes, connectors, trace boxes, and wire. Include this diagram on contractor maintained record drawings in accordance with subsection 5.02 of Section **00 0119 - ADMINISTRATIVE AND PRODUCT REQUIREMENTS.**
- b. **Materials.** Provide materials conforming to the following:
1. Select one of the following **open cut trace wire** product(s), or request a substitute, for this project. Trace wire shall be #12AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.
 - A. Copperhead Industries, LLC, 9530 Fallon Avenue NE, P.O. Box 1081, Monticello, MN 55362, Ph. 877.726.5644, Product Name: Superflex 1230-HS
 - B. Pro-Line Safety Products Co, 1099 Atlantic Drive, unit #1, West Chicago, IL 60185, Ph. 800.544.3424, Product Name: Pro-Trace 12 SOL HS-CCS
 2. Select one of the following **at grade trace box** product(s), or request a substitute, for this project. At grade terminal trace box shall include a two-terminal switchable lid with "sewer" cast into the cap.
 - A. Copperhead Industries, LLC, 9530 Fallon Avenue NE, P.O. Box 1081, Monticello, MN 55362, Ph. 877.726.5644, Product Name: Snakepit LD14*2T-SW (lawn and greenbelt areas), CD14*2T-SW (concrete driveways and sidewalks), RB14*2T-SW (asphalt areas)
 - B. Pro-Line Safety Products Co, 1099 Atlantic Drive, unit #1, West Chicago, IL 60185, Ph. 800.544.3424, Product Name: TRACER-PIT Magnetized Test Station Lite Duty (lawn and greenbelt areas), TRACER-PIT Magnetized Test Station Roadway (all other areas)
 3. Select one of the following **wire connector** product(s), or request a substitute, for this project. All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At Crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable

alternative. Direct Bury Wire Connectors shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure.

A. Copperhead Industries, LLC, 9530 Fallon Avenue NE, P.O. Box 1081, Monticello, MN 55362, Ph. 877.726.5644, Product Name: Snakebite Locking Connector

B. Pro-Line Safety Products Co, 1099 Atlantic Drive, unit #1, West Chicago, IL 60185, Ph. 800.544.3424, Product Name: TL-LUG-SS – TRACER-LOCK DB Connector w/in-line tap min #18-8

4. Select one of the following **grounding anode** product(s), or request a substitute, for this project. Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20 feet of #12 red HDPE insulated copper clad steel wire connected to anode (minimum 1.5 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility.

A. Copperhead Industries, LLC, 9530 Fallon Avenue NE, P.O. Box 1081, Monticello, MN 55362, Ph. 877.726.5644, Product Name: Magnesium Anode ANO-12*

B. Pro-Line Safety Products Co, 1099 Atlantic Drive, unit #1, West Chicago, IL 60185, Ph. 800.544.3424, Product Name: PTANODE12 – PRO-TRACE 1.5# Magnesium Grounding Anode [12 AWG]

5. Use the following **locator tape** product(s), or request a substitute, for this project.

A. Pro-Line Safety Products Co, 1099 Atlantic Drive, unit #1, West Chicago, IL 60185, Ph. 800.544.3424, Product Name: 10314XXX3 5.0 Mil, 6 inch Detectable Locator Tape

- c. **Construction.** Install trace wire and locator tape according to the following:

1. Perform trace wire installation in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
2. Install trace wire systems as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.
3. Repair any damage occurring during installation of the trace wire by removing the damaged wire, and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
4. Install trace wire at the bottom half of the pipe and secured (taped or zip tied) at 5 foot intervals.
5. Properly ground trace wire as specified.

6. At all mainline dead-ends, trace wire shall go to ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire.
7. Do not connect mainline trace wire to existing conductive pipes. Treat as a mainline dead-end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the trace wire.
8. Provide a single wire for all service lateral trace wires, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
9. In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, connect the new trace wire and existing trace wire using approved splice connectors, and properly ground at the splice location as specified.
10. A minimum of 2 feet of excess/slack wire is required in all trace wire access boxes after meeting final elevation.
11. All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
12. Connect grounding anode wire to the identified (or bottom) terminal on all access boxes.
13. Service Connections
 - A. Terminate trace wire at an approved at grade trace wire access box, located at the edge of the road right-of-way, and out of the roadway.
14. Long-runs, in excess of 500 linear feet without service laterals or hydrants:
 - A. Provide trace wire access utilizing an approved at grade trace wire access box, located directly above the pipe, and out of the roadway. Delineate the at grade trace wire access box using a minimum 48" polyethylene marker post, color coded in accordance with APWA UCC.
15. Grounding:
 - A. Properly ground trace wire at all dead end/stubs.
 - B. When grounding the trace wire at dead ends/stubs, install the grounding anode in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.
 - C. When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire nor the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.
 - D. Where the anode wire will be connected to a trace wire access box, provide a minimum of 2 feet of excess/slack wire after meeting final elevation.

16. Sanitary Sewer Trace Wire

- A. Install mainline trace wire, with all Service Connection trace wires properly connected to the mainline trace wire, to ensure full trace/locating capabilities from a single connection point.
- B. Lay mainline trace wire continuously, by-passing around the outside of manholes/structures on the North or East side.
- C. Terminate trace wire on all sanitary Service Connections at an approved trace wire access box color coded green and located directly above the service lateral at the edge of the road right-of-way.

17. Locator Tape

- A. Install locator tape one foot below finished grade in accordance with Manufacturer's recommendations.

18. Accurately record actual locations of grounding anodes, trace wire routing, connectors, and tracer boxes.

19. Prohibited Products and Methods

- A. Uninsulated trace wire.
- B. Trace wire insulations other than HDPE.
- C. Trace wires not domestically manufactured.
- D. Non locking, friction fit, twist on or taped connectors.
- E. Brass or copper ground rods.
- F. Wire connections utilizing taping or spray-on waterproofing.
- G. Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another.
- H. Trace wire wrapped around the corresponding utility.
- I. Brass fittings with trace wire connection lugs.
- J. Wire terminations within the roadway, i.e. in valves boxes, cleanouts, manholes, etc.
- K. Connecting trace wire to existing conductive utilities.

20. Field Quality Control

- A. Locate all new trace wire installations using typical low frequency (512Hz) line tracing equipment, witnessed by the *Qualified Agent* and *Owner*, prior to acceptance of ownership.

- B. Perform this verification upon completion of rough grading and again prior to final acceptance of the project.
- C. Continuity testing in lieu of actual line tracing shall not be accepted.
- D. Utility will not be accepted until the trace wire has been located and tested.

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TOWNSHIP OF NOTTAWA

SPECIAL DETAIL
FOR
SANITARY RISER

WESI:JW

1 of 2

JCW:4-16-21

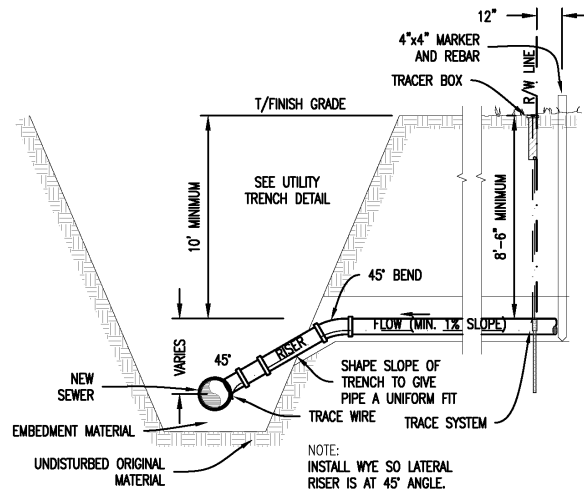
SANITARY RISER

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01 0402.02 - TRENCHING: Trench requirements.
- B. Section 01 0402.04 - SANITARY SEWERS: Pipe and fitting material and installation requirements.
- C. Section 01 0819.01 - TRACE WIRE AND LOCATOR TAPE: Service lead trace wire and locator tape requirements.

SEE NEXT PAGE(S) FOR DETAIL



TOWNSHIP OF NOTTAWA
SPECIAL DETAIL
FOR
DEEP-CUT SANITARY RISER

WESI:JW

1 of 2

JCW:4-16-21

DEEP-CUT SANITARY RISER

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01 0402.02 - TRENCHING: Trench requirements.
- B. Section 01 0402.04 - SANITARY SEWERS: Pipe and fitting material and installation requirements.
- C. Section 01 0819.01 - TRACE WIRE AND LOCATOR TAPE: Service lead trace wire and locator tape requirements.

SEE NEXT PAGE(S) FOR DETAIL

TOWNSHIP OF NOTTAWA

SPECIAL DETAIL
FOR
CLEANOUT

WESI:JW

1 of 2

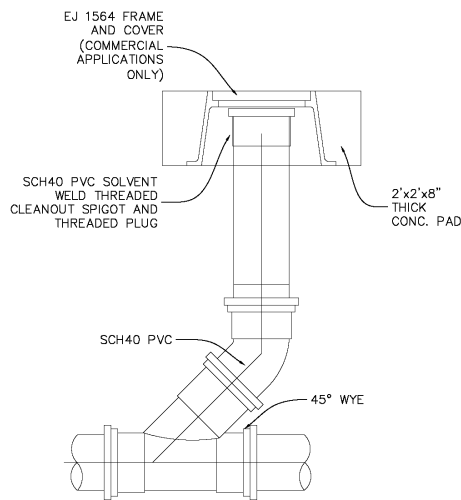
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CLEANOUT

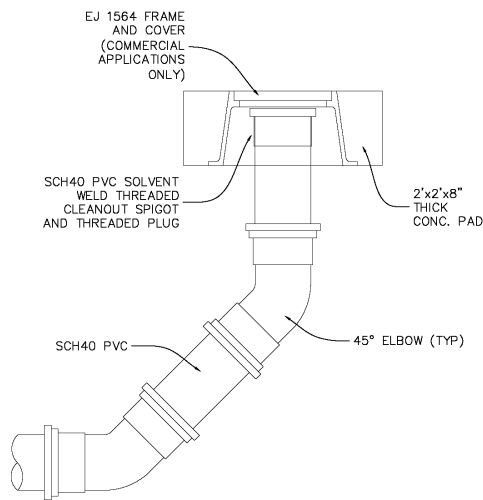
PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01 0402.02 - TRENCHING: Trench requirements.
- B. Section 01 0402.04 - SANITARY SEWERS: Pipe and fitting material and installation requirements.
- C. Section 01 0819.01 - TRACE WIRE AND LOCATOR TAPE: Service lead trace wire and locator tape requirements.



INTERMEDIATE SANITARY CLEANOUT DETAIL
NO SCALE



TERMINAL SANITARY CLEANOUT DETAIL
NO SCALE

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TOWNSHIP OF NOTTAWA

SPECIAL DETAIL
FOR
TRACE WIRE DIAGRAM

WESI:JW

1 of 1

JCW:4-16-21

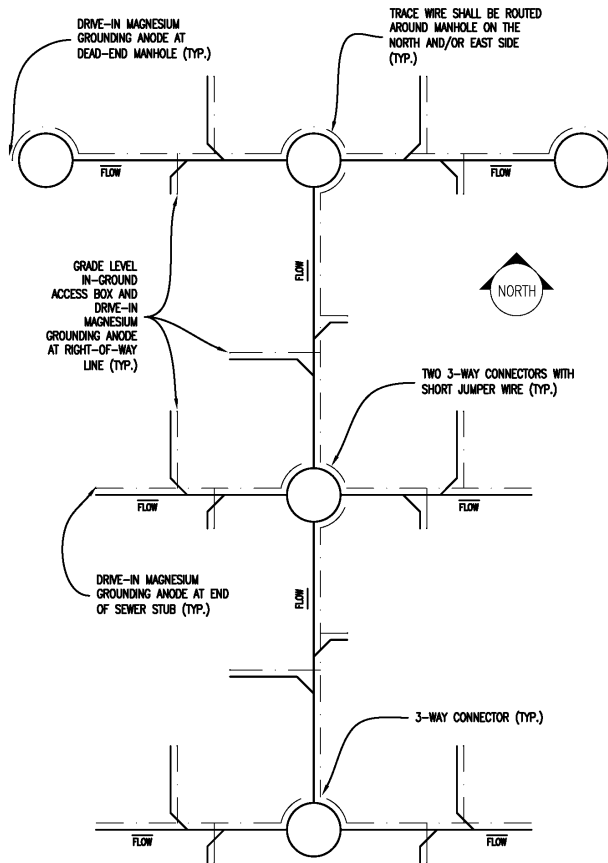
TRACE WIRE DIAGRAM

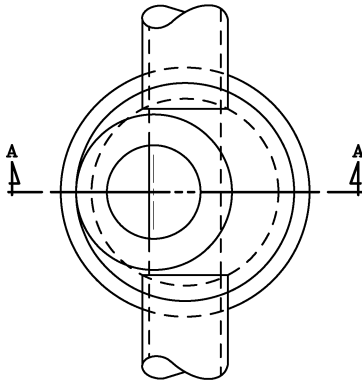
PART 1 GENERAL

1.01 RELATED REQUIREMENTS

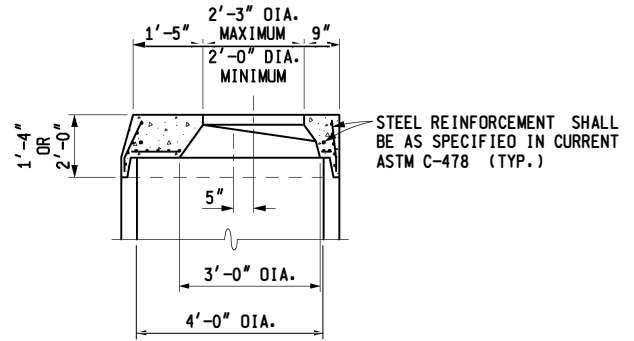
- A. Section 01 0819.01 - TRACE WIRE AND LOCATOR TAPE: Service lead trace wire and locator tape requirements.

SEE NEXT PAGE(S) FOR DETAIL



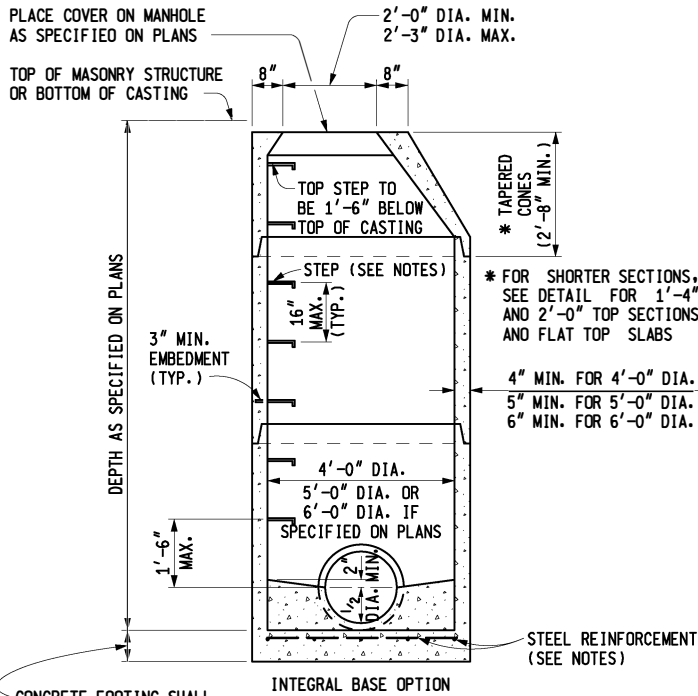


PLAN VIEW



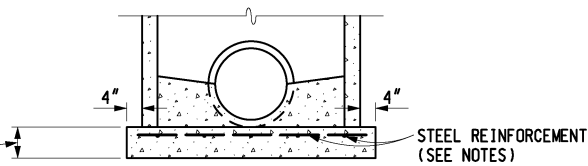
DETAIL FOR
1'-4" & 2'-0" TOP SECTIONS

SHAPE MAY VARY FROM DETAIL SHOWN BUT MUST COMPLY WITH ASTM C-478 AND JOINTS SHALL BE COMPATIBLE WITH THE RISER



CONCRETE FOOTING SHALL BE 8" THICK FOR DEPTHS TO 25'-0" AND 1'-0" THICK FOR DEPTHS OVER 25'-0"

INTEGRAL BASE OPTION

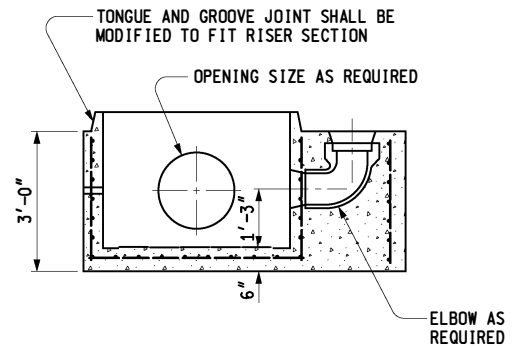
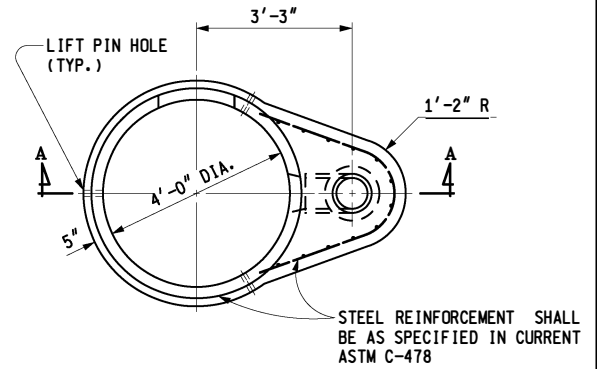


CONCRETE FOOTING SHALL BE 8" THICK FOR DEPTHS TO 25'-0" AND 1'-0" THICK FOR DEPTHS OVER 25'-0"

SEPARATE BASE OPTION

SECTION A - A
TYPICAL MANHOLE

PRECAST REINFORCED CONCRETE SHOWN
OTHER OPTIONS INCLUDE CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE WALL SECTIONS
SEE TYPICAL WALL SECTIONS FOR WALL THICKNESS



SECTION A - A

TYPICAL PRECAST REINFORCED
BOTTOM SECTION FOR DROP MANHOLE



PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

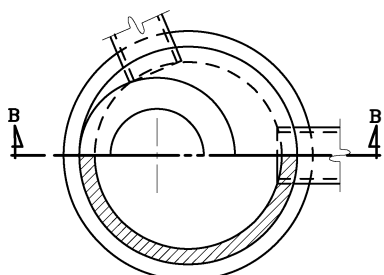
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

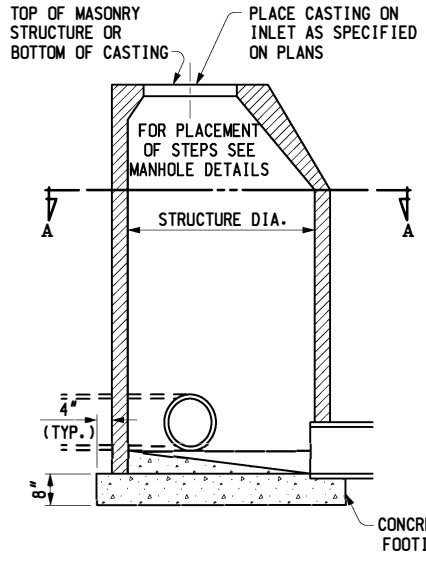
6-15-2016
PLAN DATE

R-1-G

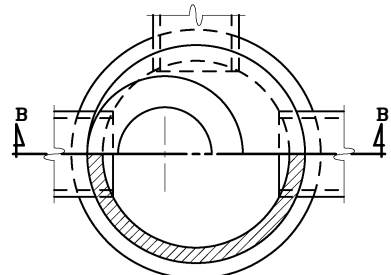
SHEET
1 OF 9



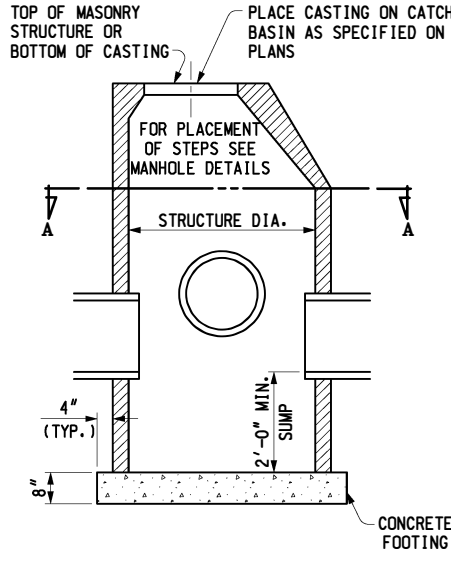
HALF SECTION A - A



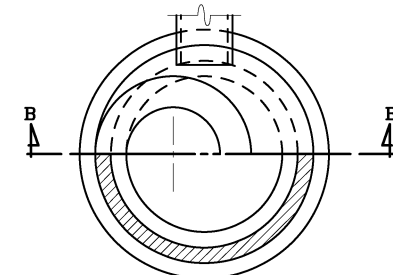
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B
INLET



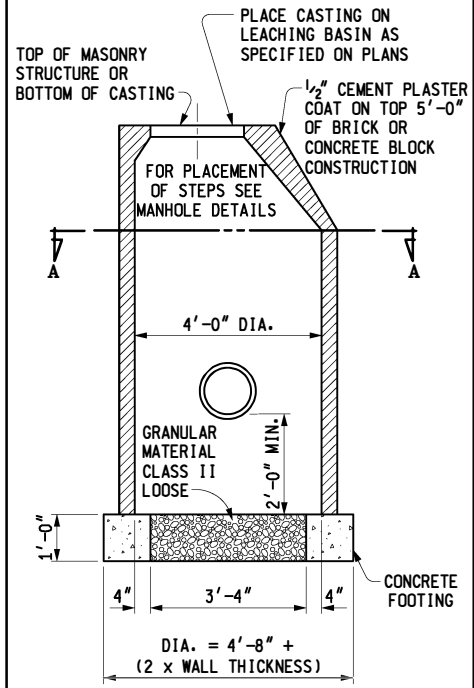
HALF SECTION A - A



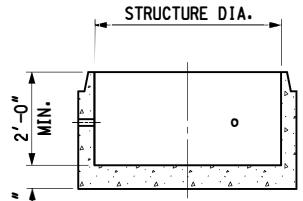
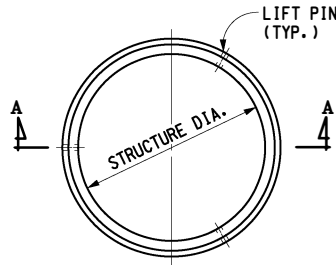
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B
CATCH BASIN



HALF SECTION A - A

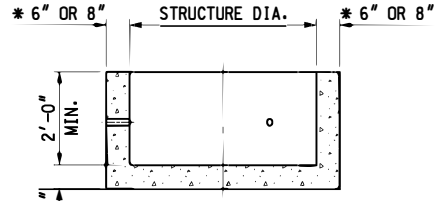
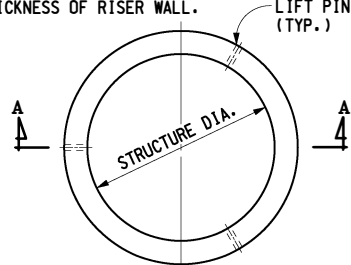


SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
LEACHING BASIN

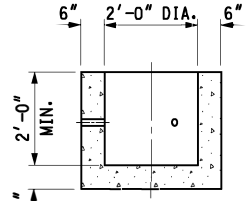
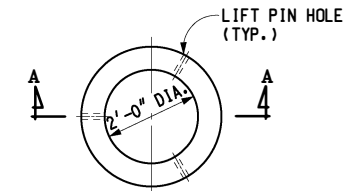


SECTION A - A
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
PRECAST SUMP FOR PRECAST RISERS

* WALL THICKNESS SHALL MATCH THICKNESS OF RISER WALL.



SECTION A - A
SEE TYPICAL BRICK AND BLOCK SECTION FOR SIZE AND BASE OPTIONS
PRECAST SUMP FOR BRICK OR BLOCK CONSTRUCTION



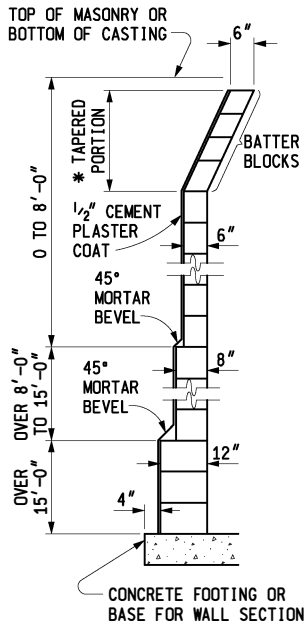
SECTION A - A
PRECAST SUMP FOR 2'-0" DIA. STRUCTURES

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

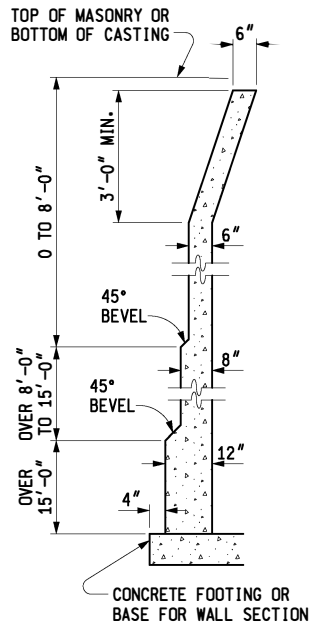
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL	6-15-2016 PLAN DATE	R-1-G	SHEET 2 OF 9
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* 4 BLOCK MIN. FOR 4'-0" DIA. STRUCTURE
 6 BLOCK MIN. FOR 5'-0" DIA. STRUCTURE
 6 BLOCK MIN. FOR 6'-0" DIA. STRUCTURE

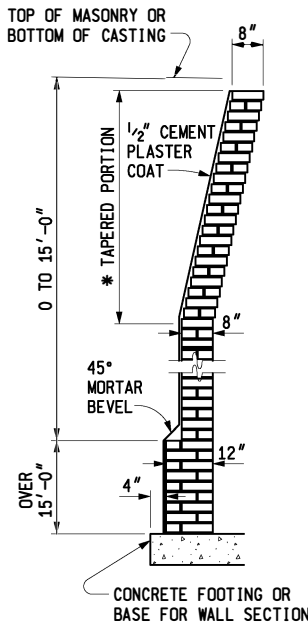


TYPICAL CONCRETE BLOCK WALL SECTION

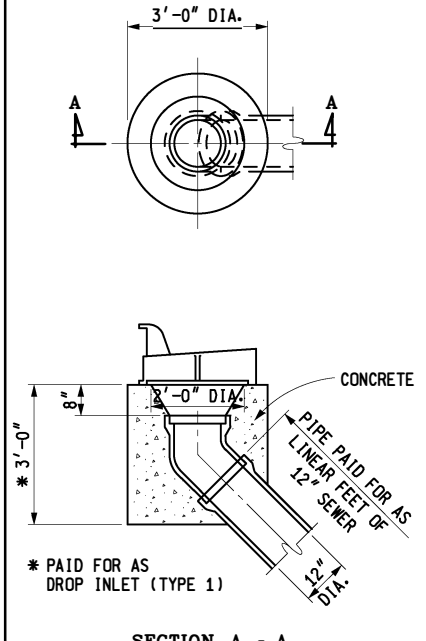


TYPICAL CAST-IN-PLACE CONCRETE WALL SECTION

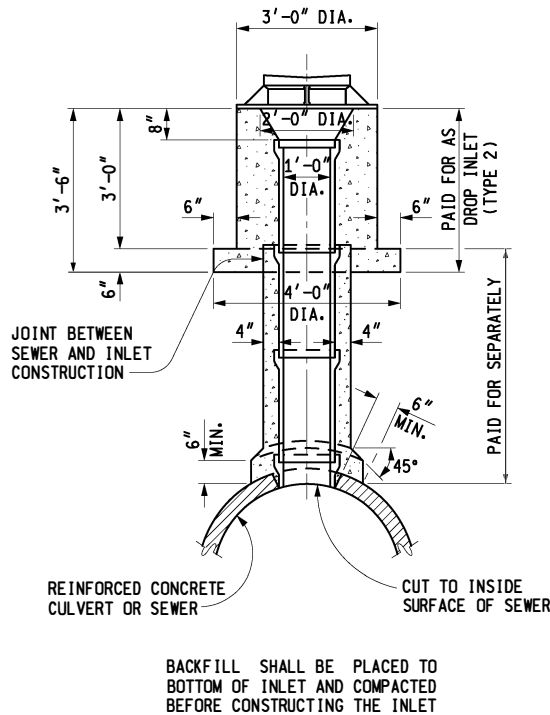
* 5'-0" MIN. FOR 4'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 5'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 6'-0" DIA. STRUCTURE



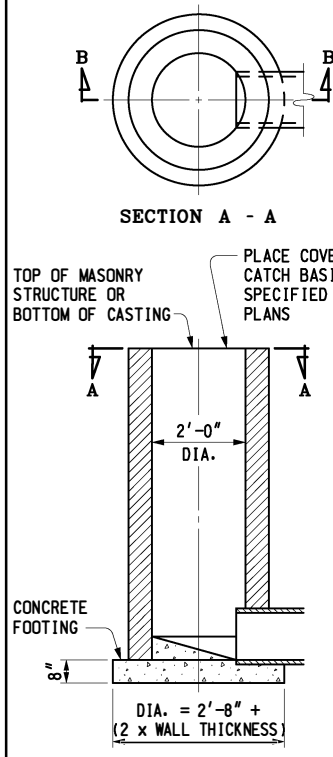
TYPICAL BRICK WALL SECTION



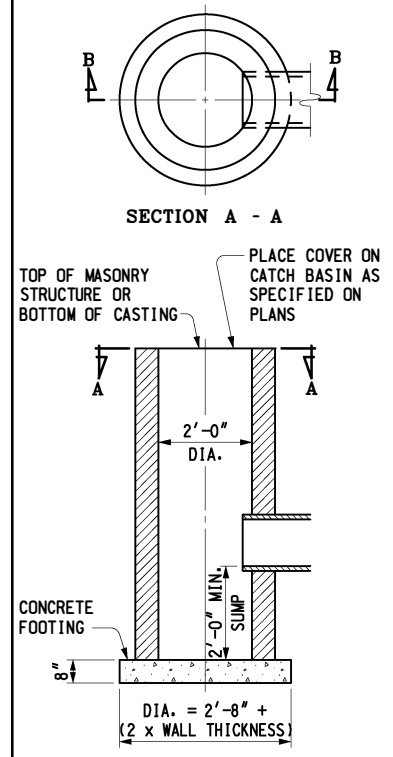
SECTION A - A
 DROP INLET (TYPE 1)



DROP INLET (TYPE 2)



INLET



CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

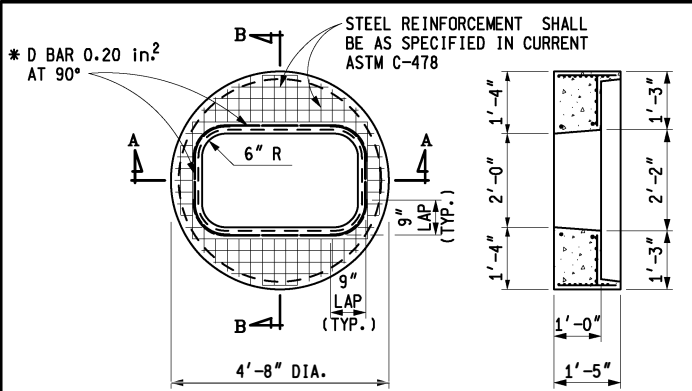
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

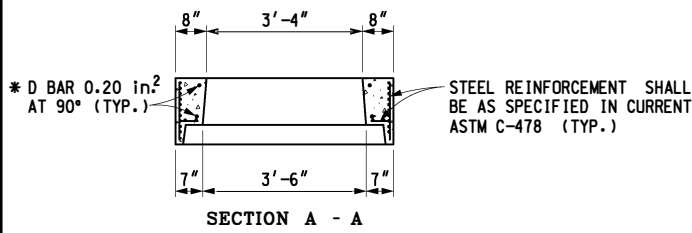
6-15-2016
 PLAN DATE

R-1-G

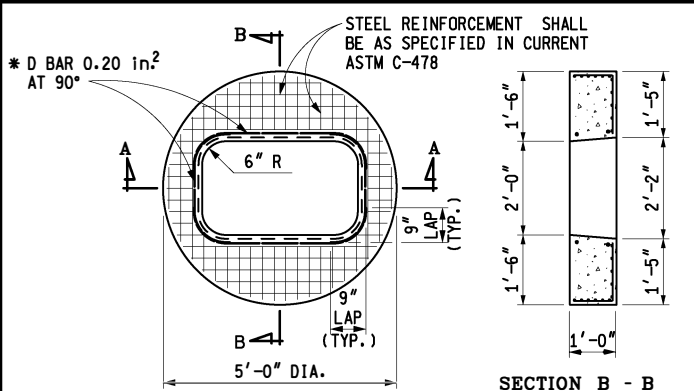
SHEET
 3 OF 9



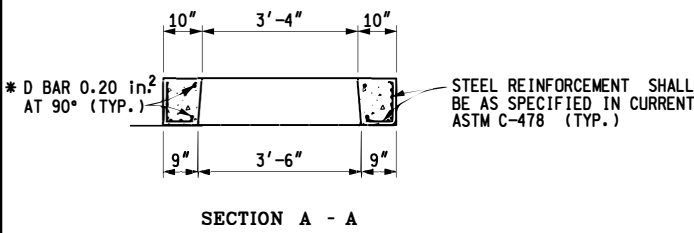
* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



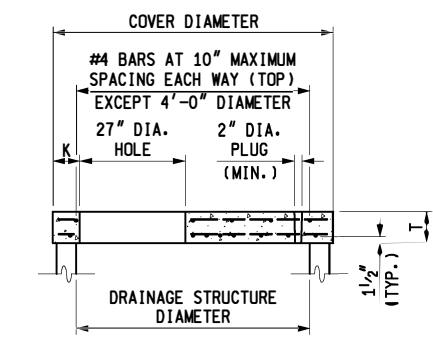
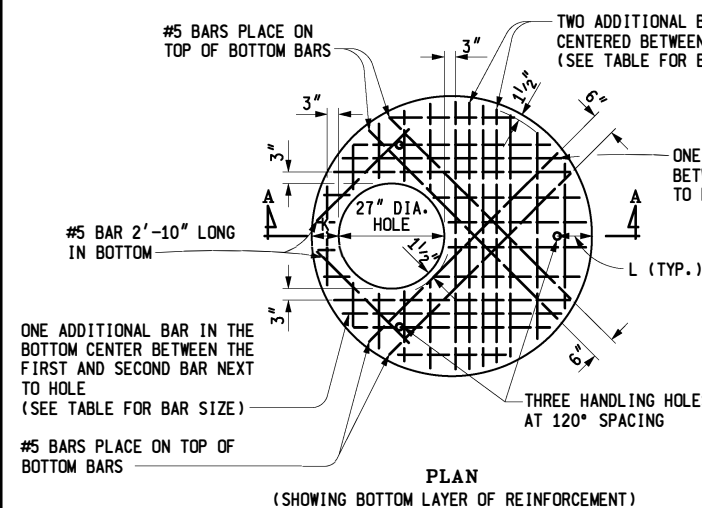
PRECAST FLAT SLAB TOP FOR PRECAST CONCRETE STRUCTURE, 2' x 4' CASTING



* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



PRECAST FLAT SLAB TOP FOR MASONRY STRUCTURE, 2' x 4' CASTING



SECTION A - A
PRECAST REINFORCED CONCRETE FLAT SLAB TOP

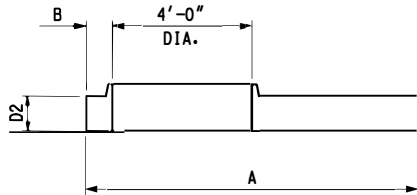
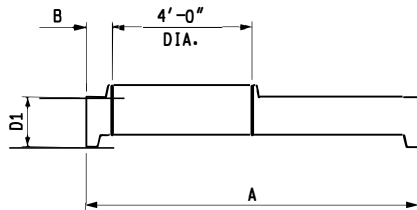
TABLE OF DIMENSIONS					
STRUCTURE DIAMETER	COVER DIAMETER	T	K	L	BAR MAXIMUM SPACING (BOTTOM EACH WAY)
* 4'-0"	58"	6"	6"	8"	#5 AT 6"
5'-0"	72"	8"	7"	9"	#5 AT 7"
6'-0"	86"	8"	8"	10"	#5 AT 6"
7'-0"	101 1/2"	12"	8 3/4"	11"	#5 AT 5"
8'-0"	114"	12"	9"	11"	#6 AT 6"
9'-0"	128"	12"	10"	12"	#5 AT 6"
10'-0"	140"	12"	10"	13"	#5 AT 6"

* ONLY BOTTOM LAYERS OF STEEL NECESSARY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

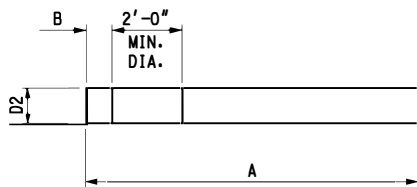
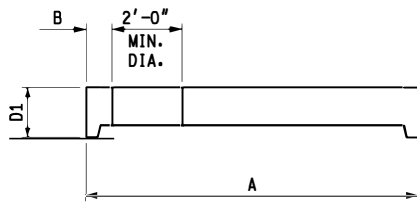
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL	6-15-2016 PLAN DATE	R-1-G	SHEET 4 OF 9
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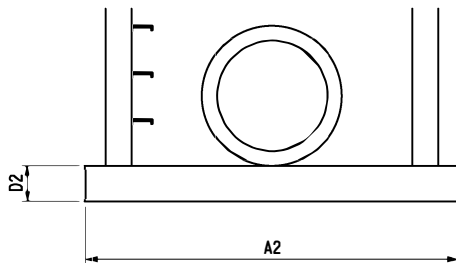
PRECAST REDUCER CAP

REDUCER CAP DIMENSIONS				
STRUCTURE DIAMETER	CAP DIAMETER "A"	B	CAP DEPTH "D1"	CAP DEPTH "D2"
7'-0"	101 1/2"	8 3/4"	1'-5"	12"
8'-0"	114"	9"	1'-5"	12"
9'-0"	128"	10"	1'-5"	12"
10'-0"	140"	10"	1'-6"	12"



PRECAST FLAT SLAB TOP

FLAT SLAB TOP DIMENSIONS				
STRUCTURE DIAMETER	COVER DIAMETER "A"	B	COVER DEPTH "D1"	COVER DEPTH "D2"
7'-0"	101 1/2"	8 3/4"	1'-5"	12"
8'-0"	114"	9"	1'-5"	12"
9'-0"	128"	10"	1'-5"	12"
10'-0"	140"	10"	1'-6"	12"



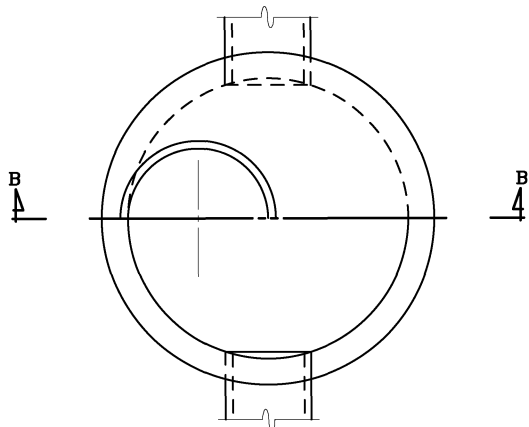
SEPARATE BASE OPTION

BASE AND RISER DIMENSIONS					
STRUCTURE DIAMETER	BASE DIAMETER "A1"	BASE DIAMETER "A2"	MIN. WALL THICKNESS "T"	BASE DEPTH "D1"	BASE DEPTH "D2"
7'-0"	101 1/2"	108"	7"	8"	12"
8'-0"	114"	128"	8"	8"	12"
9'-0"	128"	140"	9"	8"	12"
10'-0"	140"	154"	10"	8"	12"

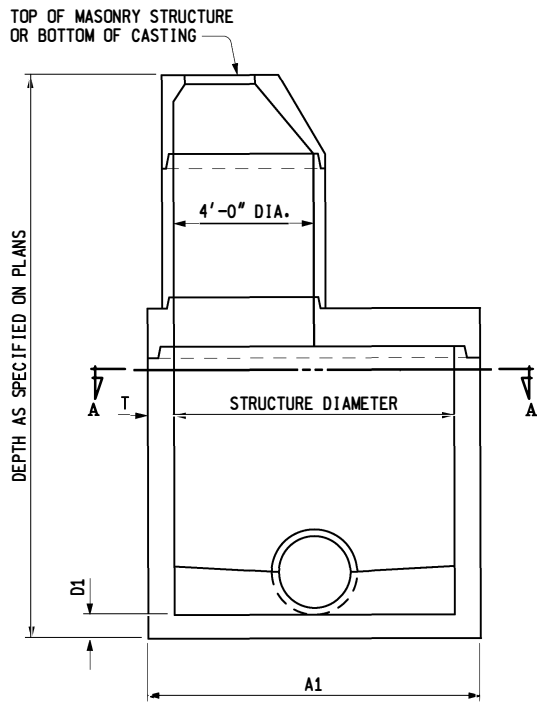
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

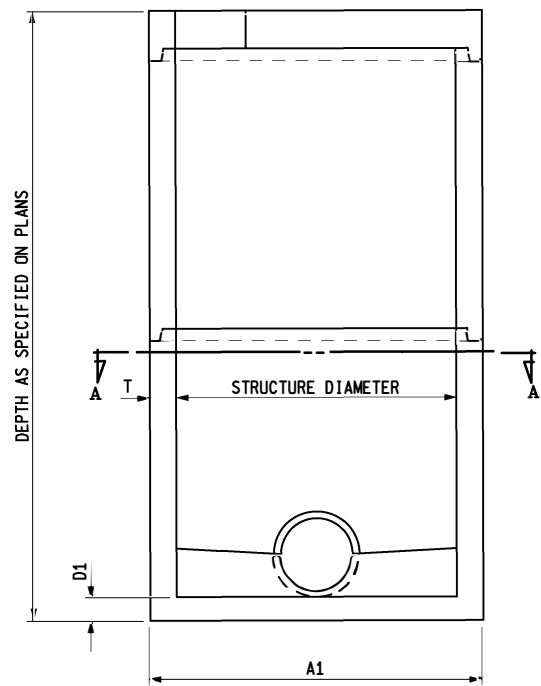
F.H.W.A. APPROVAL	6-15-2016 PLAN DATE	R-1-G	SHEET 5 OF 9
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HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST MANHOLE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

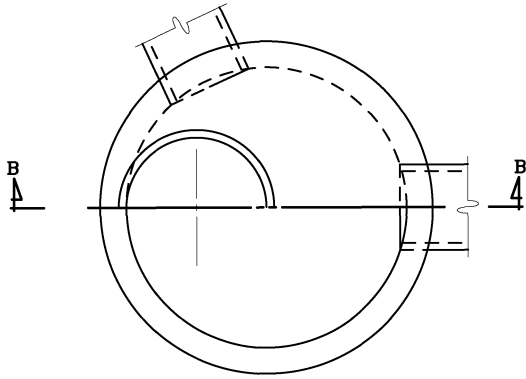
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

6-15-2016
PLAN DATE

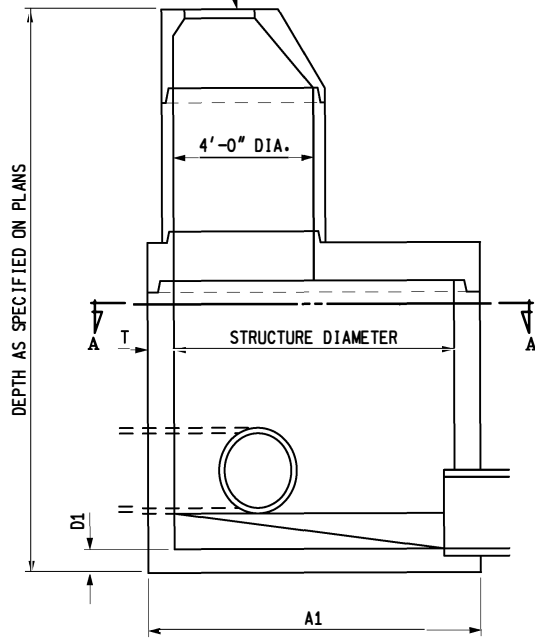
R-1-G

SHEET
6 OF 9

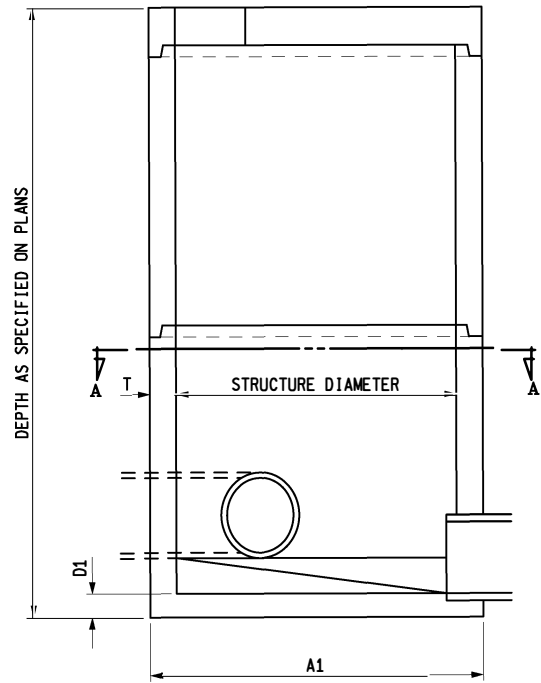


HALF SECTION A - A

TOP OF MASONRY STRUCTURE
OR BOTTOM OF CASTING



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST INLET

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

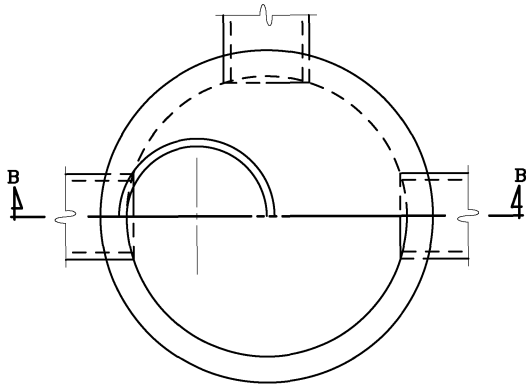
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

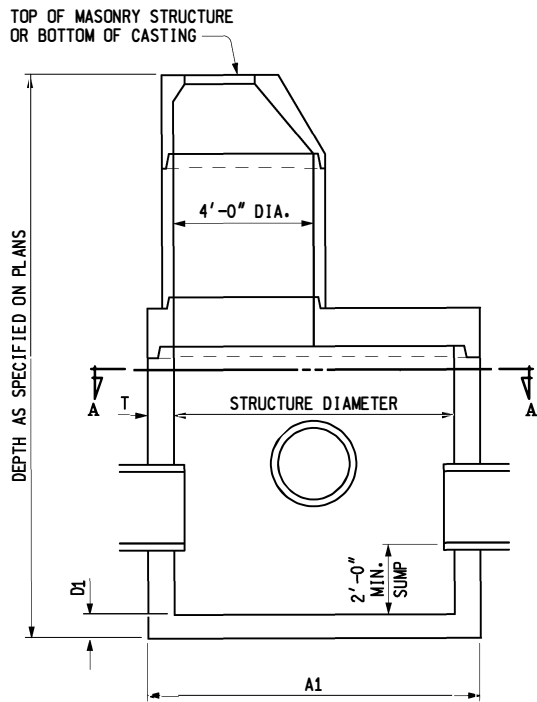
6-15-2016
PLAN DATE

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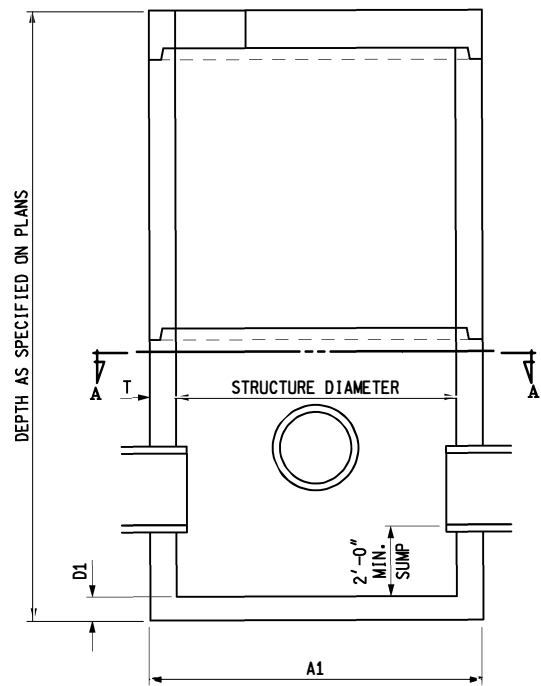
SHEET
7 OF 9



HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

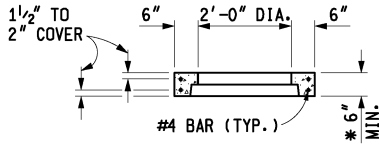
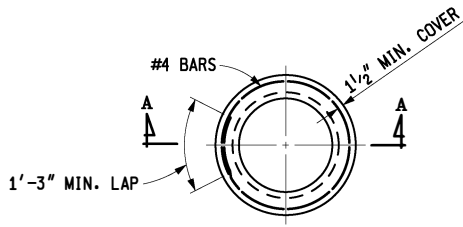
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

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PLAN DATE

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8 OF 9



SECTION A - A

* WHEN RISER TONGUE LENGTH IS GREATER THAN 3", USE 2 TIMES THE TONGUE LENGTH.

NOTE: PRECAST RISER SHALL FULLY ENGAGE THE TONGUE OF THE RISER PIPE.

PRECAST RISER RING
(FOR 2'-0" DIAMETER STRUCTURE)

NOTES:

THE DRAINAGE STRUCTURE COVERS ALLOWED FOR USE ON THESE DRAINAGE STRUCTURES ARE SPECIFIED IN SUBSEQUENT STANDARD PLANS AND ARE INTERCHANGEABLE ON ANY STRUCTURE.

THE TOPS OF MASONRY STRUCTURES SHALL BE SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENT OF COVER TO GRADE USING MORTAR OR BRICK AS DIRECTED BY THE ENGINEER.

PREMIUM JOINTS ARE REQUIRED ON ALL SANITARY MANHOLES. SEE ASTM DESIGNATION C-923.

GRANULAR MATERIAL CLASS III SHALL BE USED IN BACKFILLING AROUND ALL STRUCTURES THAT FALL WITHIN THE 1:1 INFLUENCE LINES FROM THE EDGE OF PAVEMENT OR BACK OF CURB.

STEPS FOR DRAINAGE STRUCTURES SHALL BE OF AN APPROVED DESIGN AND MADE FROM CAST IRON, ALUMINUM, OR PLASTIC COATED STEEL. RUNGS SHALL BE A MINIMUM OF 10" IN CLEAR LENGTH, DESIGNED TO PREVENT THE FOOT FROM SLIPPING OFF THE END. THE MINIMUM HORIZONTAL PULL OUT LOAD SHALL BE 400 LBS. THE MINIMUM VERTICAL LOAD SHALL BE 800 LBS.

THE BELL SHALL BE REMOVED FOR THE FIRST LENGTH OF OUTLET PIPE PROJECTING THROUGH THE WALL OF THE MANHOLE.

PRECAST CONCRETE SECTIONS, SUMPS, AND FLAT TOP SLABS SHALL BE BUILT ACCORDING TO CURRENT ASTM C-478 AND ACCORDING TO DETAILS SPECIFIED ON THIS PLAN. PRECAST REINFORCED CONCRETE FLAT TOP SLAB SHALL BE MARKED TO SHOW LOCATION OF REINFORCEMENT. THE WALLS OF THE PRECAST UNITS MAY HAVE A SLIGHT TAPER TO ALLOW FOR FORM REMOVAL. PRECAST CONCRETE 2'-0" DIAMETER DRAINAGE STRUCTURES SHALL HAVE A MINIMUM 3" WALL THICKNESS WITH A 6" MINIMUM BEARING SURFACE ON TOP. SEE PRECAST RISER RING FOR 2'-0" DIAMETER STRUCTURE.

THE MAXIMUM INSIDE DIAMETER OF PIPES ENTERING OR LEAVING PRECAST DRAINAGE STRUCTURES SHALL BE 2'-0" LESS THAN THE INSIDE DIAMETER OF THE DRAINAGE STRUCTURE. A PIPE LEAVING A 2'-0" DIAMETER DRAINAGE STRUCTURE IS ALLOWED TO HAVE 1'-0" INSIDE DIAMETER OR LESS.

THE NUMBER OF PIPE OPENINGS IN A RISER SHALL BE DETERMINED BY THE DESIGNER. SPACING BETWEEN OPENINGS SHALL BE 1'-0" MINIMUM. OPENINGS MAY BE CONSTRUCTED BY CASTING OR SCRIBING IN PRECAST STRUCTURES DURING FABRICATION OR BY CORING THE CURED CONCRETE.

PRECAST CONCRETE FOOTINGS OR BASES SHALL BE REINFORCED WITH #4 BARS SPACED AT 1'-0" BOTH WAYS OR WITH TWO LAYERS OF WELDED WIRE FABRIC OF EQUIVALENT CROSS SECTIONAL AREA LAID AT RIGHT ANGLES AND WIRED TOGETHER. REINFORCEMENT SHALL BE PLACED IN TOP OF FOOTING AND SHALL BE MARKED.

PRECAST CONCRETE FOOTINGS SHALL BE SUPPORTED BY A COMPACTED 6" GRANULAR SUBBASE.

THE MINIMUM WALL THICKNESS FOR ALL 2'-0", 4'-0", 5'-0", AND 6'-0" DRAINAGE STRUCTURES USING CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE CONCRETE SHALL BE AS SPECIFIED IN TYPICAL WALL SECTIONS.

THE CONICAL SECTION OF MANHOLES OR CATCH BASINS CONSTRUCTED OF BLOCK OR BRICK SHALL BE SHROUDED WITH GEOTEXTILE FABRIC TO A MINIMUM DEPTH OF 5'-0" OR THROUGH THE FROST ZONE. ENOUGH GEOTEXTILE MATERIAL SHALL BE LEFT ON THE TOP (8" OR MORE) TO ROLL OVER THE TOP OF THE CONE.

PREFORMED HIGH DENSITY POLYSTYRENE FILLER PIECES MAY BE USED TO CHANNEL FLOW IN THE BOTTOM OF MANHOLES PROVIDED THEY HAVE AT LEAST 2" OF CONCRETE COVER. THE USE OF THIS MATERIAL FOR CHANNEL FLOW IS RESTRICTED TO MANHOLES WHERE THE BOTTOM SECTION IS NOT SUBJECT TO FREEZING. THE USE OF THIS MATERIAL MUST BE APPROVED BY THE ENGINEER.

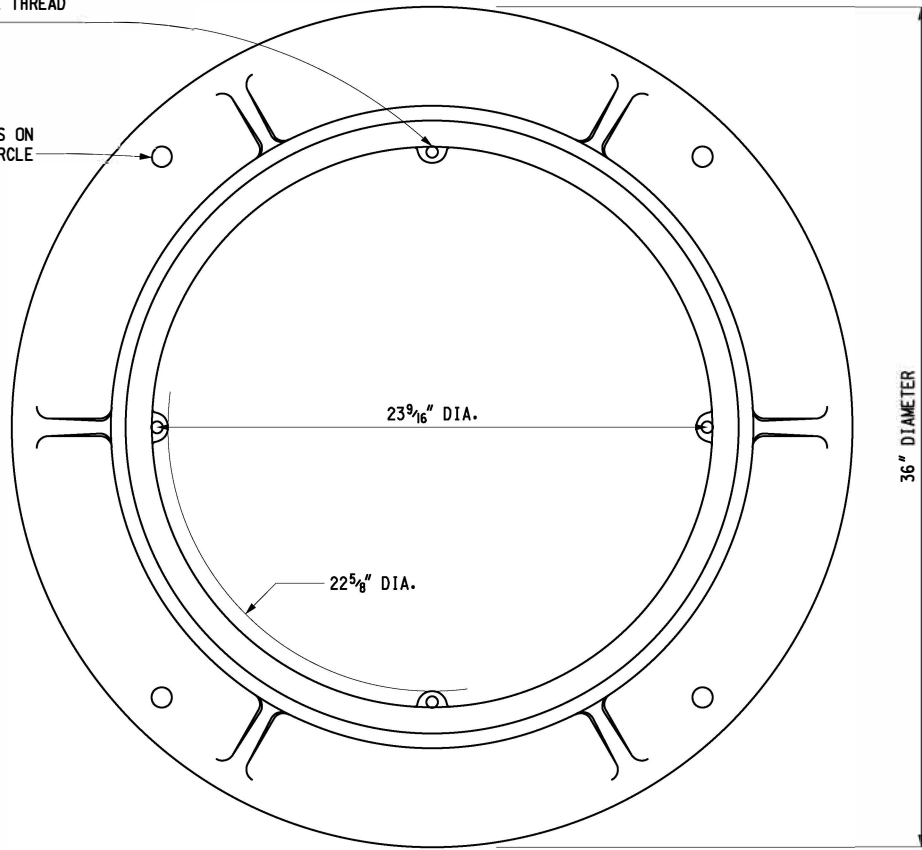
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

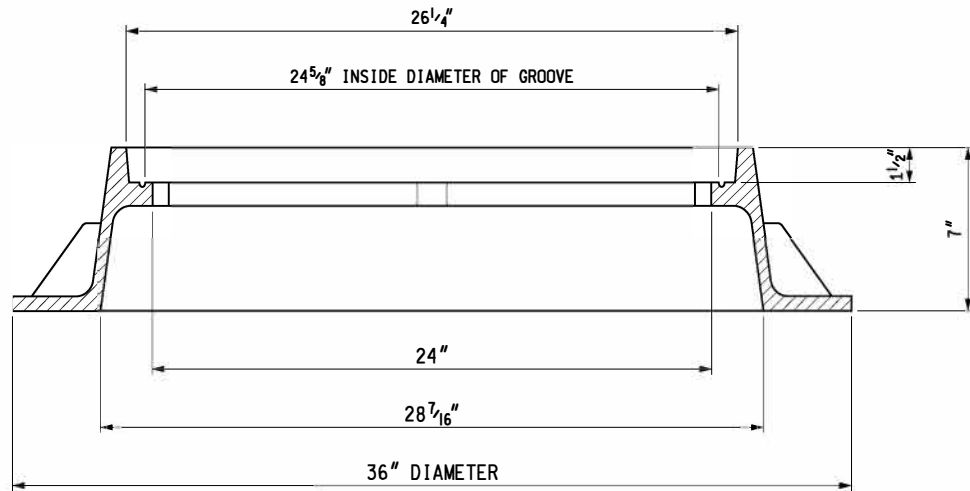
F.H.W.A. APPROVAL	6-15-2016 PLAN DATE	R-1-G	SHEET 9 OF 9
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DRILL AND TAP FOR 1/2" - 13 BOLTS
ON DRILL DIMPLES PROVIDED. TYP.
OR PROVIDE REPLACEABLE THREAD
OPTION

FOUR 7/8" DIAMETER HOLES ON
32 3/4" DIAMETER BOLT CIRCLE



TOP VIEW OF FRAME



FRAME SECTION



PREPARED
BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: *Randy Van Pelt*
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

COVER Q

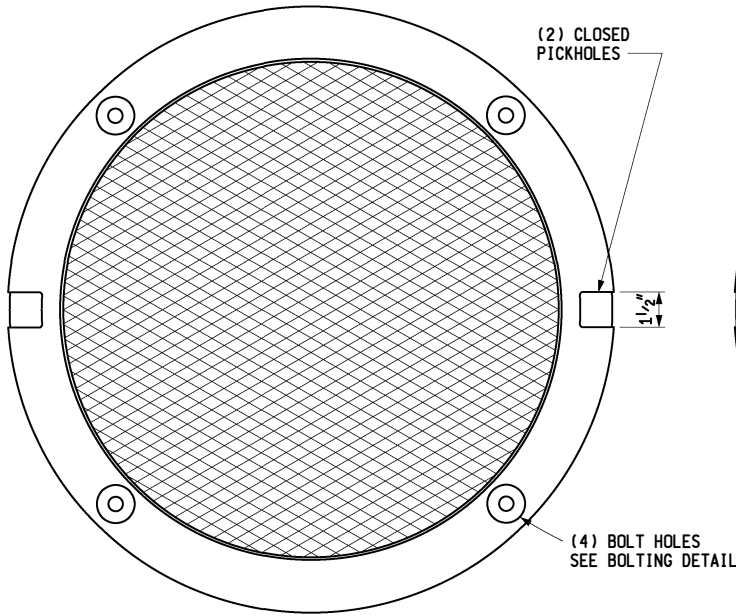
FOR USE ON MANHOLES OR SANITARY SEWERS
WHERE VENT HOLES ARE NOT DESIRED

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

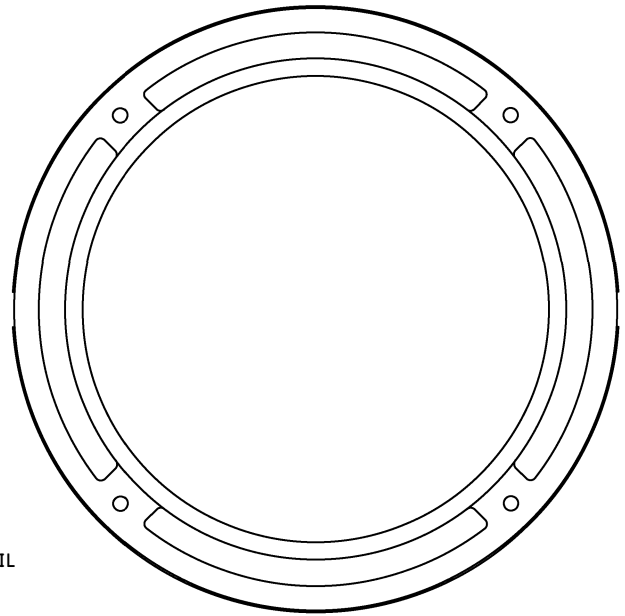
3-12-2014
PLAN DATE

R-18-F

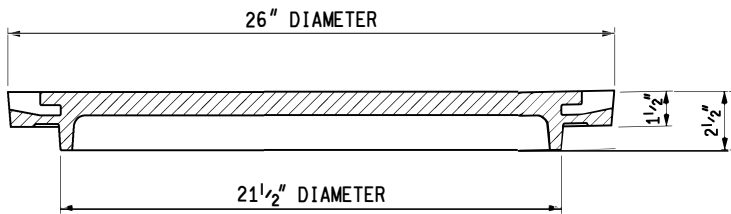
SHEET
1 OF 2



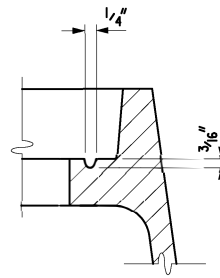
TOP VIEW OF COVER



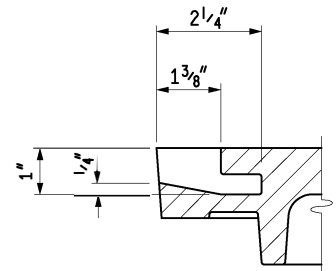
BOTTOM VIEW OF COVER



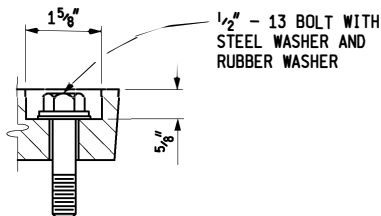
COVER SECTION



GROOVE DETAIL
1/4" DIA. NEOPRENE GASKET
PLACED IN GROOVE



PICKHOLE DETAIL
ALTERNATE CLOSED
PICKHOLES ALLOWED



BOLTING DETAIL

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE LID AND THE SEAT FOR THE SAME ON THE FRAME SHALL BE GROUND OR MACHINED SO THAT THE LID WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THIS COVER IS DESIGNED TO FIT ON ANY MANHOLE OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

A NON-LOCKING COVER MAY BE USED WHEN APPROVED BY THE ENGINEER

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER Q

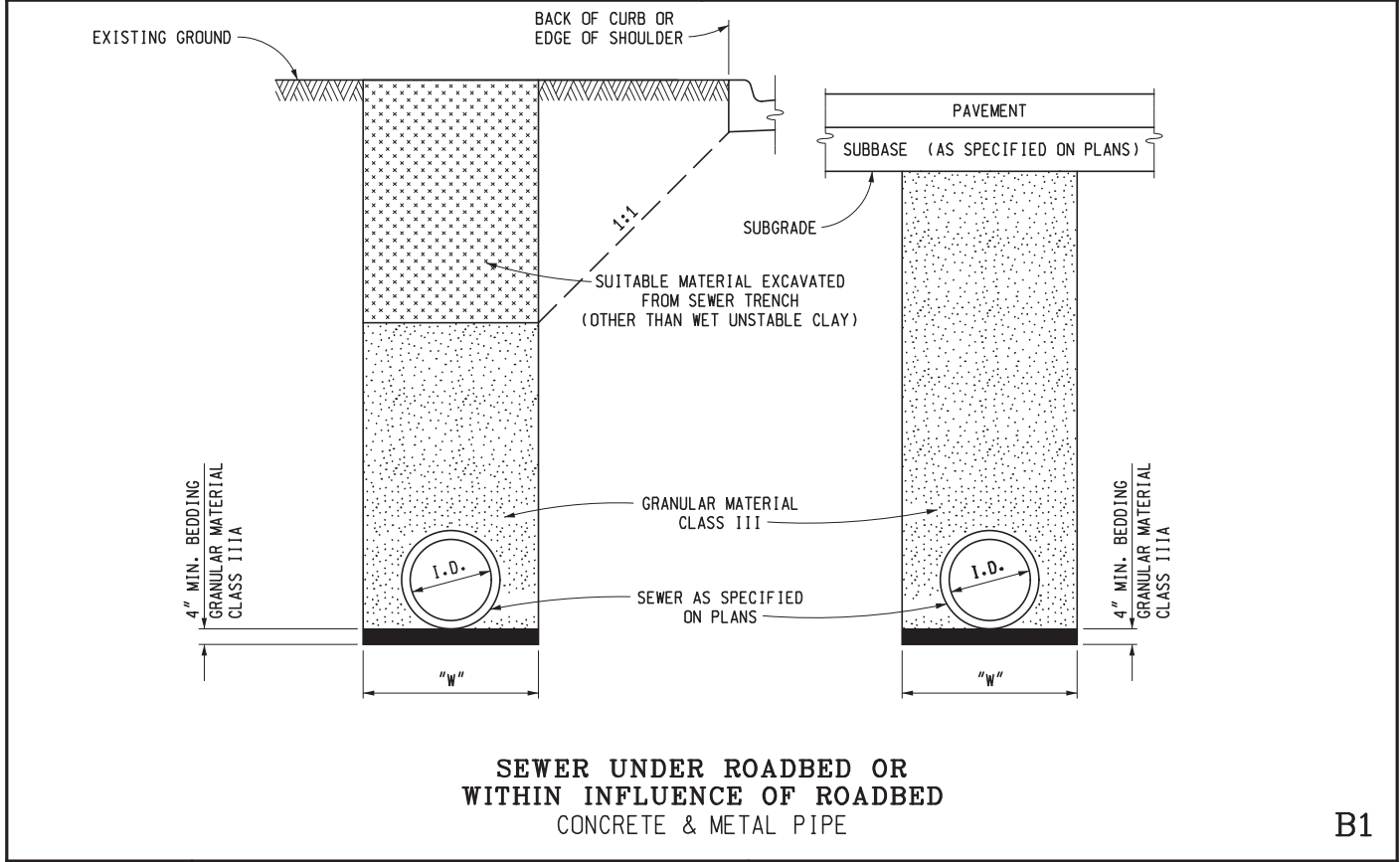
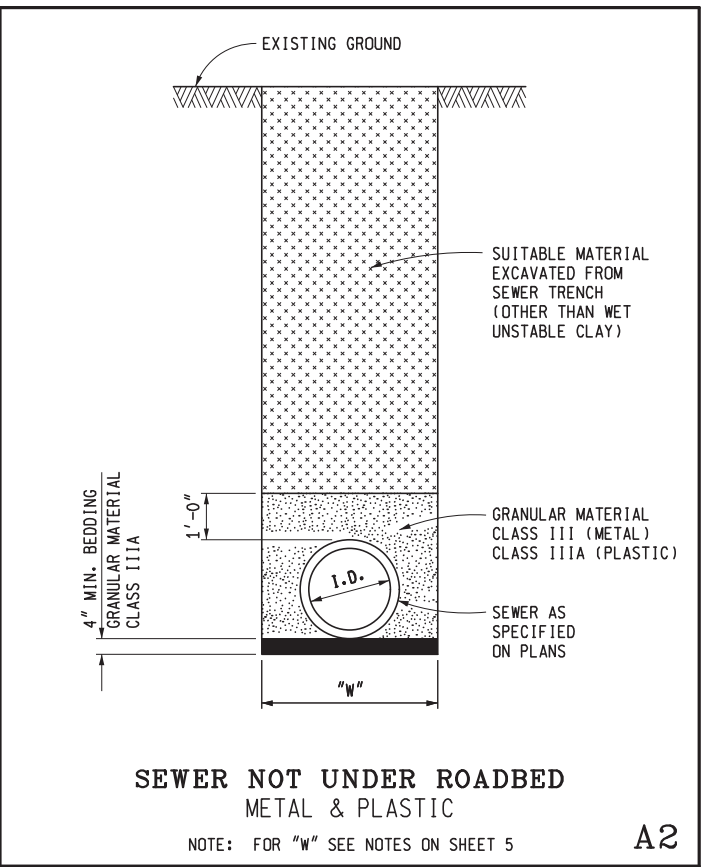
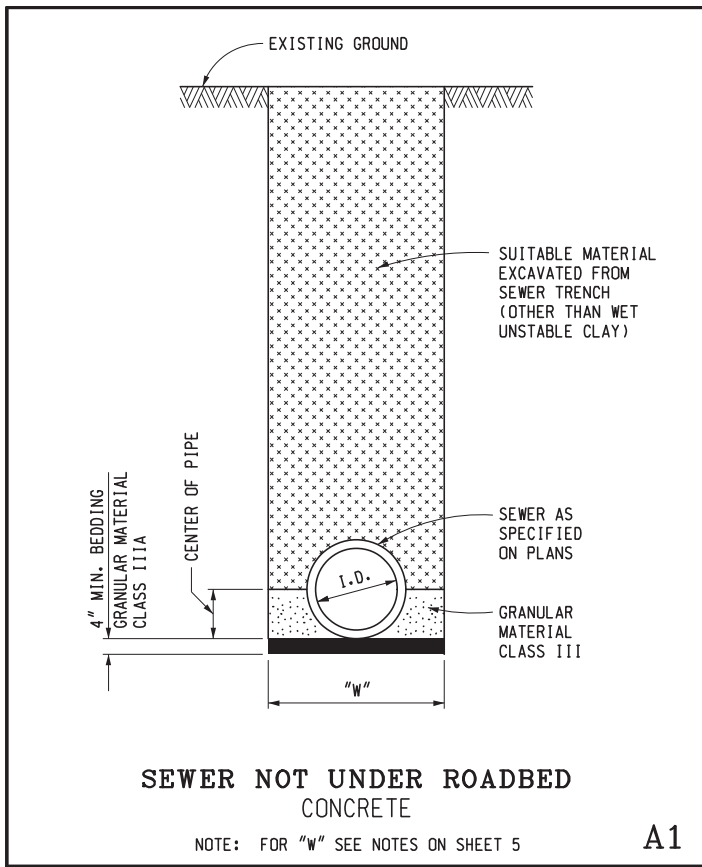
FOR USE ON MANHOLES OR SANITARY SEWERS
WHERE VENT HOLES ARE NOT DESIRED


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

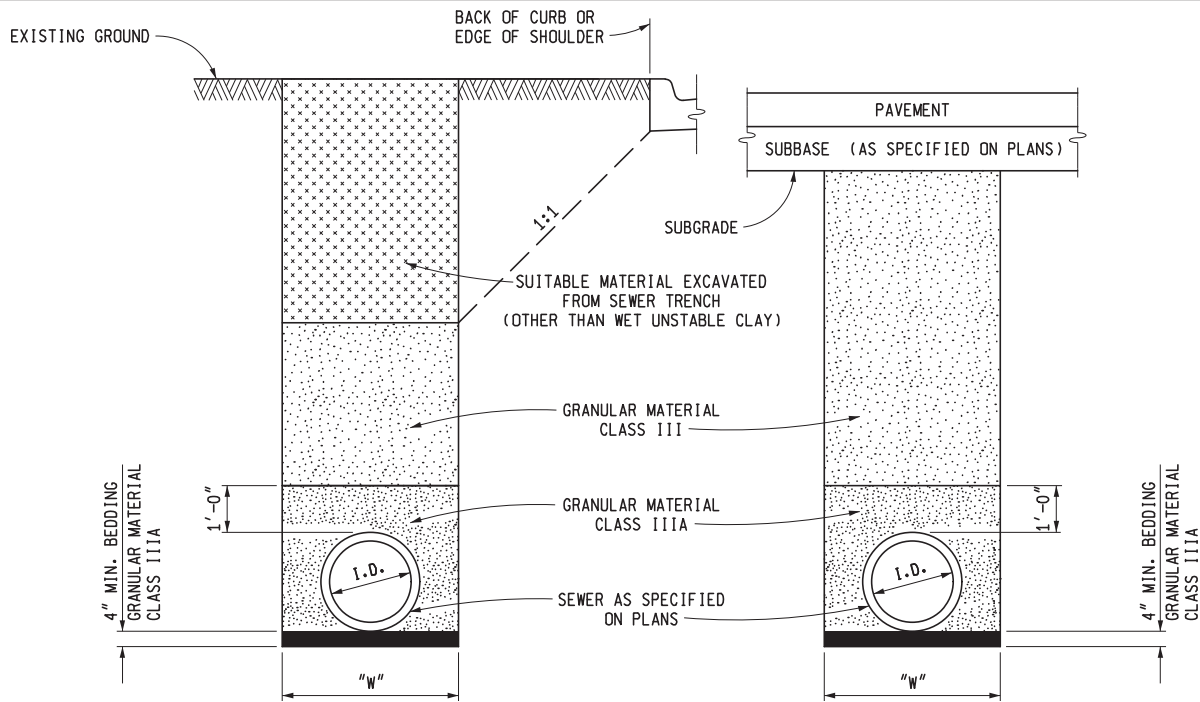
3-12-2014
PLAN DATE

R-18-F

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2 OF 2

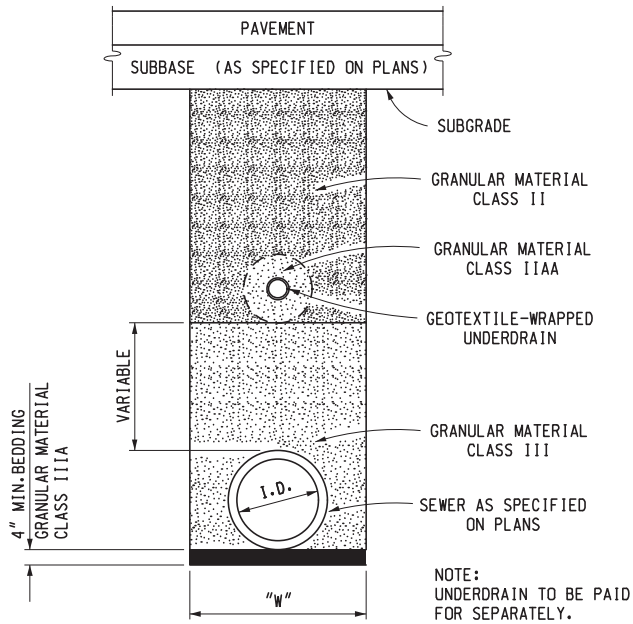


 PREPARED BY DESIGN DIVISION DRAWN BY: <u>B.L.T.</u> CHECKED BY: <u>W.K.P.</u>	DEPARTMENT DIRECTOR Kirk T. Steudle Kimberly Avery <small>Digitally signed by Kimberly Avery DN: cn=Kimberly Avery, o=MDOT, ou=Bureau of Field Services, email=averyk@michigan.gov, c=US Date: 2016.12.15 09:03:17 -0500</small> APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR UTILITY TRENCHES		
	Bradley C. Wieferich <small>Digitally signed by Bradley C. Wieferich DN: cn=Bradley C. Wieferich, o=Michigan Department of Transportation, ou=Design Division, email=wieferichb@michigan.gov, c=US Date: 2016.12.15 09:45:44 -0500</small> APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	7-25-2017 F.H.W.A. APPROVAL	2-8-2016 PLAN DATE	R-83-C



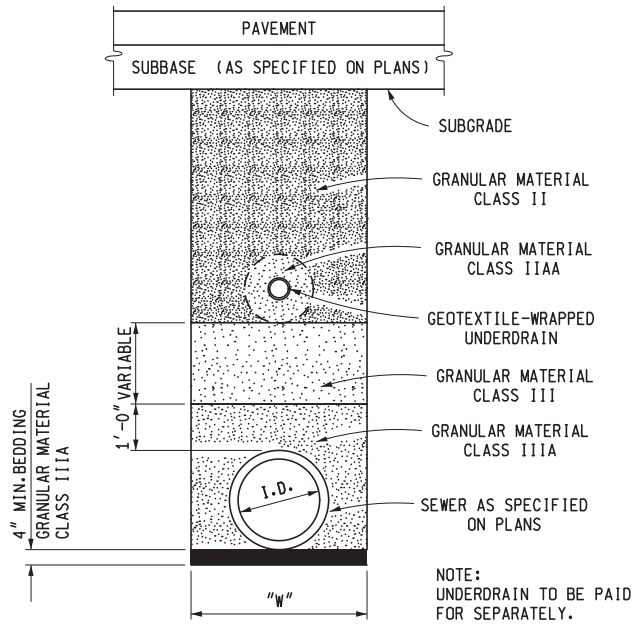
**SEWER UNDER ROADBED OR
WITHIN INFLUENCE OF ROADBED
PLASTIC PIPE**

B2



**SEWER WITH UNDERDRAIN UNDER ROADBED
CONCRETE & METAL PIPE**

C1



**SEWER WITH UNDERDRAIN UNDER ROADBED
PLASTIC PIPE**

C2

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

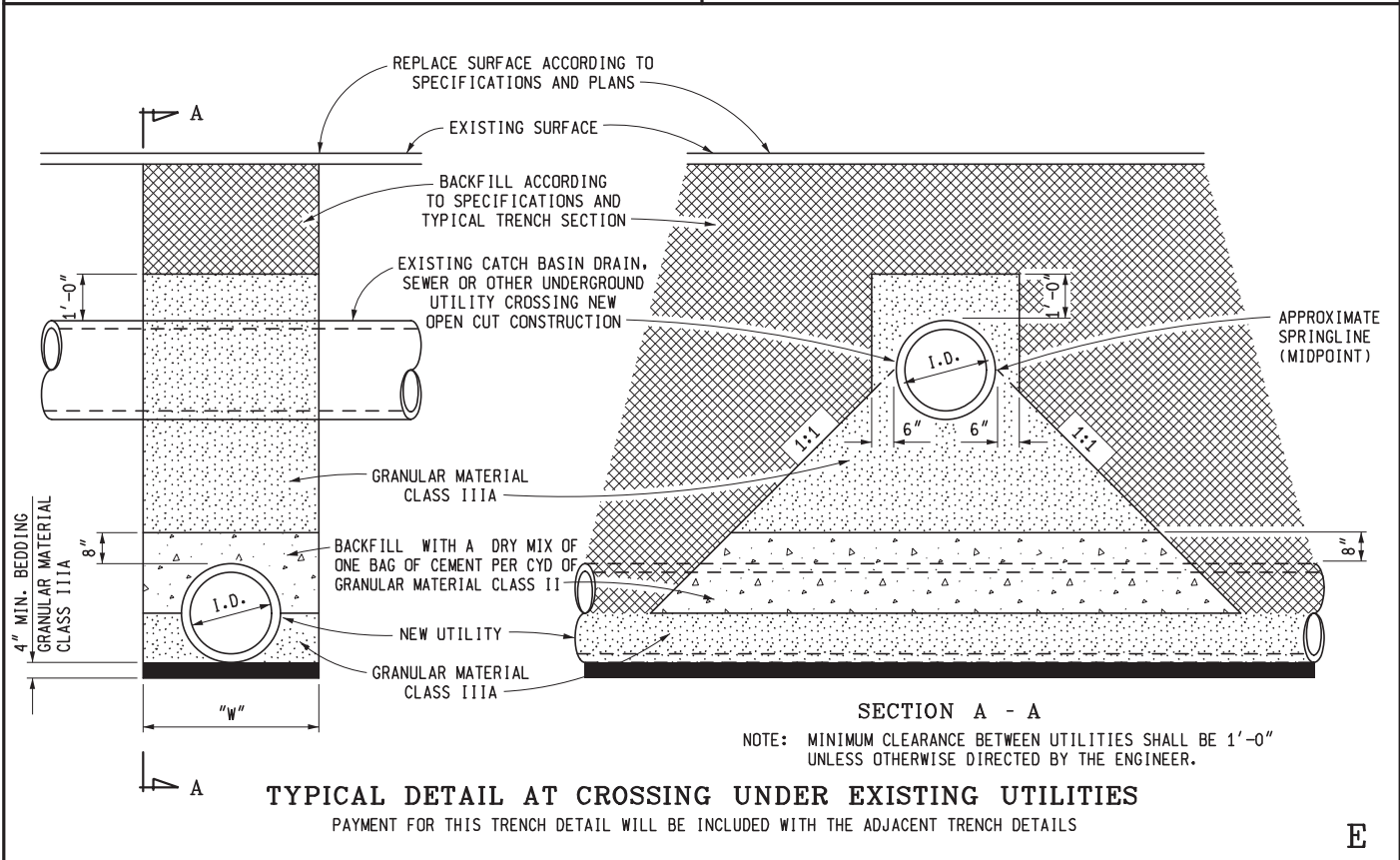
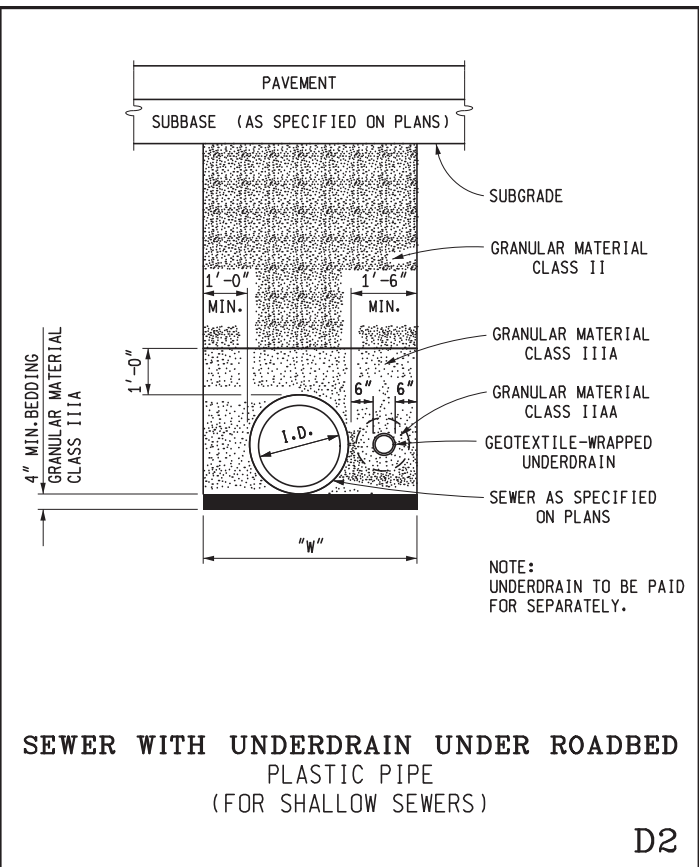
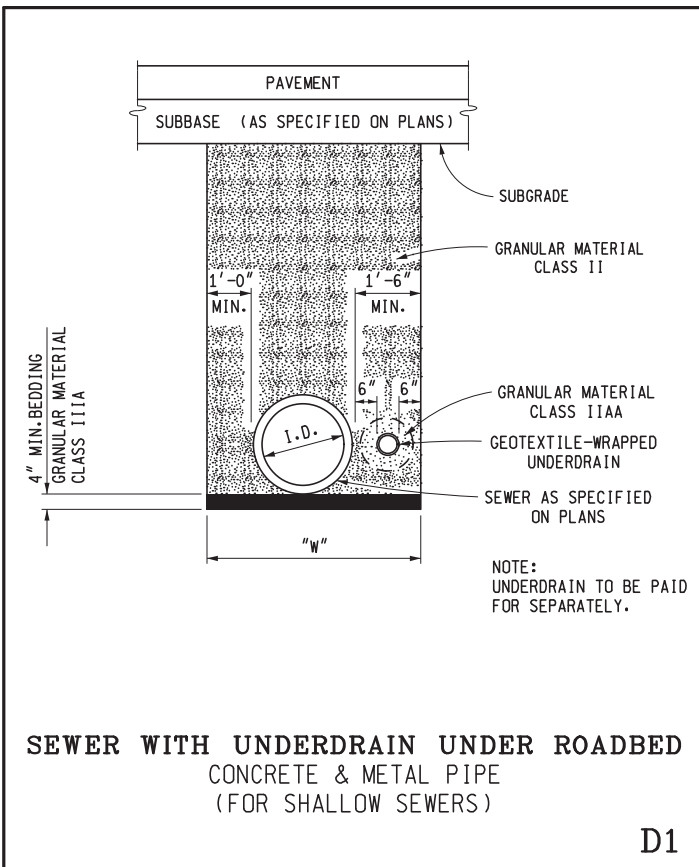
UTILITY TRENCHES

7-25-2017
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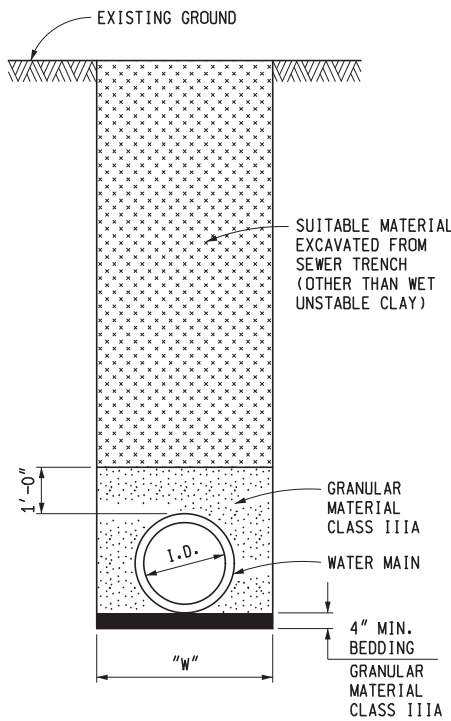
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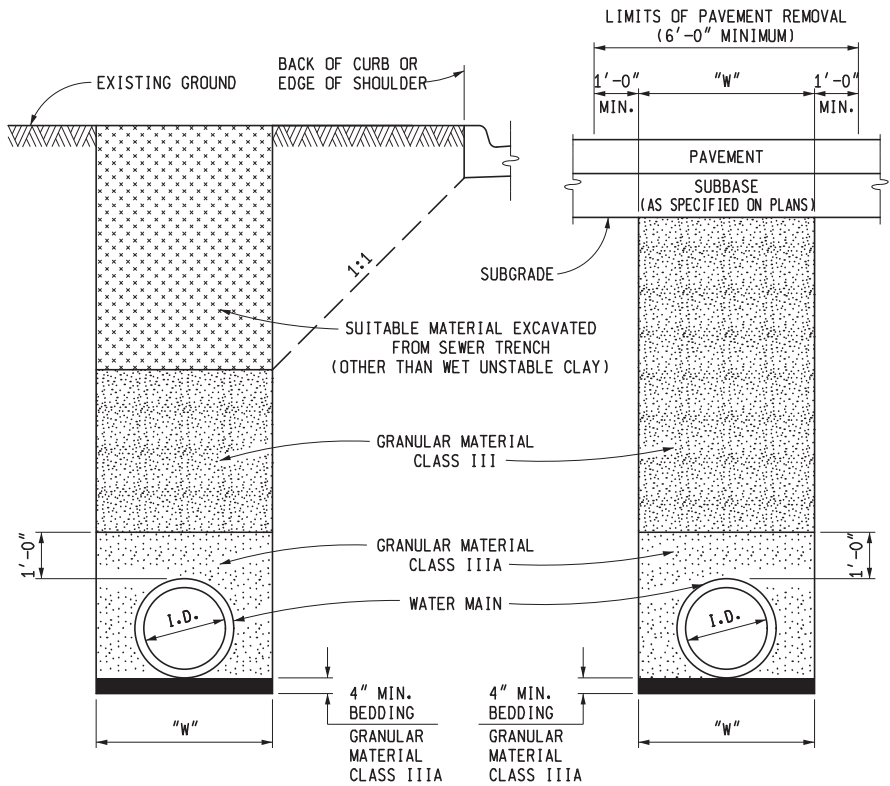
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

UTILITY TRENCHES

7-25-2017 F.H.W.A. APPROVAL	2-8-2016 PLAN DATE	R-83-C	SHEET 3 OF 5
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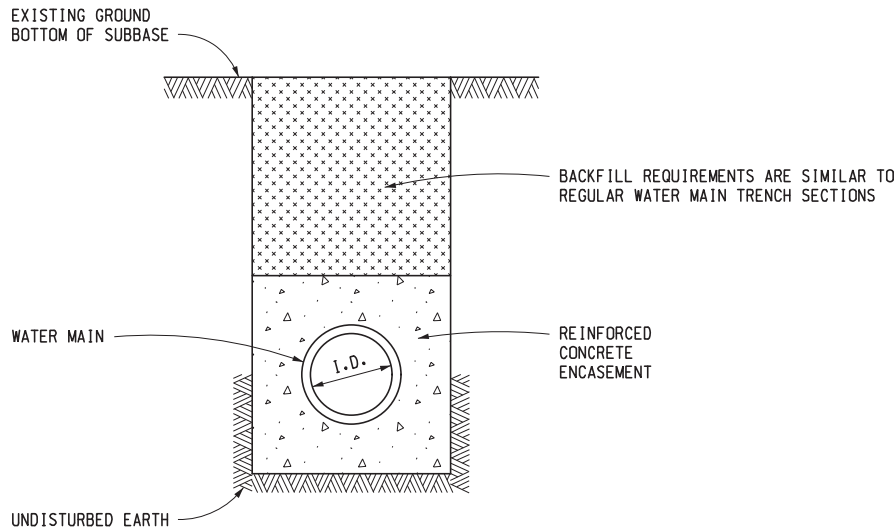


WATER MAINS NOT UNDER ROADBED F



NOTE: WHEN WATER MAIN IS PLACED IN PROPOSED ROADBED AREA, IT SHALL BE BACKFILLED WITH SELECTED EXCAVATION MATERIAL ABOVE FUTURE SUBGRADE TO EXISTING GROUND LINE.

WATER MAINS UNDER ROADBED OR WITHIN INFLUENCE OF ROADBED G



NOTE: REINFORCEMENT SHALL BE AS SPECIFIED ON PLANS.

WATER MAINS IN REINFORCED CONCRETE ENCASUREMENT H

REQUIRED ENCASEMENT SIZE FOR RESPECTIVE PIPE SIZES

DIAMETER OF PIPE	ENCASEMENT SIZE AND TRENCH WIDTH
6" - 12"	3'-0"
16"	3'-6"
24"	4'-6"
30"	5'-0"
36"	5'-6"
42"	6'-0"
48"	7'-0"
54"	7'-6"
60"	8'-0"
66"	8'-6"
72"	9'-0"

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NOTES:

BACKFILLING SHALL BE ACCORDING TO THE STANDARD SPECIFICATION.

SUFFICIENT TRENCH WIDTH SHALL BE PROVIDED TO ALLOW FREE WORKING SPACE AND TO PERMIT COMPACTING THE BACKFILL AROUND THE PIPE.

THE FOLLOWING ARE MINIMUM TRENCH WIDTHS:

I.D. PIPE SIZE (INCHES)	LESS THAN 18	21	24	30	36
"W" TRENCH WIDTH (FEET)	3.0	3.5	4.0	5.0	6.0

I.D. PIPE SIZE (INCHES)	42	48	54	60	66	72
"W" TRENCH WIDTH (FEET)	7.0	8.0	9.5	10.0	10.5	11.0

I.D. PIPE SIZE (INCHES)	78	84	90	96	102	108
"W" TRENCH WIDTH (FEET)	11.5	12.0	12.5	13.0	13.5	14.0

ESTIMATED PAVEMENT REMOVAL WIDTH IS TO BE TRENCH WIDTH "W" PLUS 1'-0" EACH SIDE OF THE TRENCH (6'-0" MINIMUM).

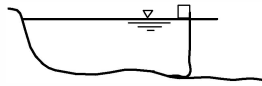





MICHIGAN DEPARTMENT OF TRANSPORTATION
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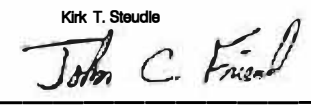
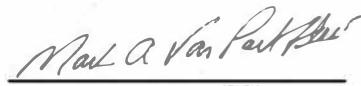
UTILITY TRENCHES

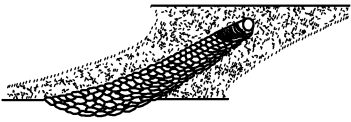
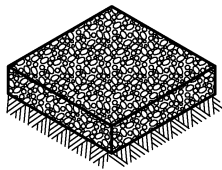
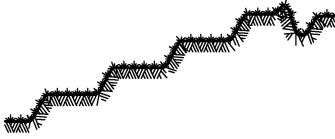

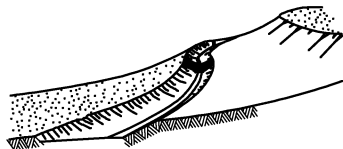
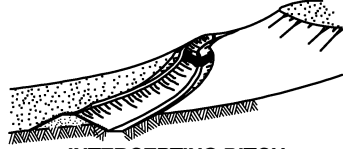

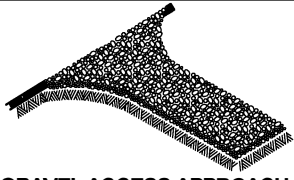
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● APPLICABLE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES
 (COMPREHENSIVE DETAILS ARE LOCATED IN SECTION 6 OF
 THE SOIL EROSION & SEDIMENTATION CONTROL MANUAL)

- A = SLOPES
- B = STREAMS AND WATERWAYS
- C = SURFACE DRAINAGEWAYS
- D = ENCLOSED DRAINAGE (INLET & OUTFALL CONTROL)
- E = LARGE FLAT SURFACE AREAS
- F = BORROW AND STOCKPILE AREAS
- G = DNRE PERMIT MAY BE REQUIRED

KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
1	 TURBIDITY CURTAIN	A Turbidity Curtain is used when slack water area is necessary to isolate construction activities from the watercourse. The still water area contains the sediments within the construction limits.		●					
2	 GRUBBING OMITTED	Retains existing root mat which assists in stabilizing slopes. Assists in the revegetation process by providing sprout growth. Reduces sheet flow velocities preventing rilling and gulying. Discourages off-road vehicle use.	●				●		
3	 PERMANENT/TEMPORARY SEEDING	Inexpensive but effective erosion control measure to stabilize flat areas and mild slopes. Permits runoff to infiltrate soil, reducing runoff volumes. Proper preparation of the seed bed, fertilizing, mulching and watering is critical to its success.	●		●		●	●	
4	 DUST CONTROL	Dust control can be accomplished by watering, and/or applying calcium chloride. The disturbed areas should be kept to a minimum. PERMANENT/TEMPORARY SEEDING (KEY 3) should be applied as soon as possible.	●				●	●	
5	 SODDING	Provides immediate vegetative cover such as at spillways and ditch bottoms. Proper preparation of the topsoil, placement of the sod, and watering is critical to its success.	●				●	●	
6	 VEGETATED BUFFER STRIPS	Reduces sheet flow velocities preventing rilling and gulying. Assists in the collection of sediments by filtering runoff. Assists in the establishment of a permanent vegetative cover.	●				●		

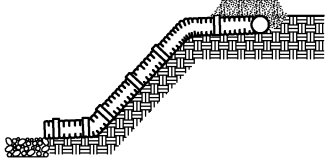

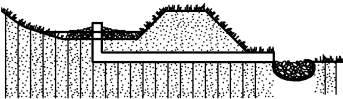
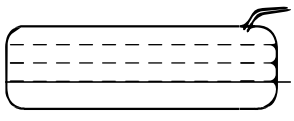

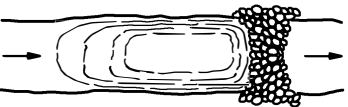

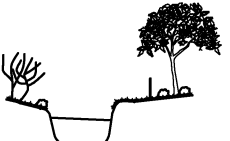
 PREPARED BY DESIGN DIVISION DRAWN BY: <u>B.L.T.</u> CHECKED BY: <u>W.K.P.</u>	DEPARTMENT DIRECTOR Kirk T. Steudle  APPROVED BY: _____ ENGINEER OF DELIVERY	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR SOIL EROSION & SEDIMENTATION CONTROL MEASURES	
	APPROVED BY:  ENGINEER OF DEVELOPMENT	9-10-2010 F.H.W.A. APPROVAL	6-3-2010 PLAN DATE

KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
7	 RIPRAP	Used where vegetation cannot be established. Very effective in protecting against high velocity flows. Should be placed over a geotextile liner.	•	•	•	•			•
8	 AGGREGATE COVER	Can be used in any area where a stable condition is needed for construction operations, equipment storage or in heavy traffic areas. Reduces potential soil erosion and fugitive dust by stabilizing raw areas.	•				•	•	
9	 BENCHES	Reduces sheet flow velocities preventing rilling and gulying. Assists in the collection and filtering of sediments. Provides access for stabilizing slopes.	•						•
10	 DIVERSION DIKE	Assists in the diversion of runoff to a stable outlet or sediment control device. Reduces sheet flow velocities preventing rilling and gulying. Collects and diverts runoff to properly stabilized drainage ways. Works well with INTERCEPTING DITCH (KEY 11)	•				•	•	
11	 INTERCEPTING DITCH	Assists in the diversion of runoff to a stable outlet or sediment control device. Reduces sheet flow velocities preventing rilling and gulying. Works well with DIVERSION DIKE (KEY 10)	•				•	•	
12	 INTERCEPTING DITCH AND DIVERSION DIKE	Assists in the diversion of runoff to a stable outlet or sediment control device. Reduces sheet flow velocities preventing rilling and gulying.	•				•	•	
13	 GRAVEL FILTER BERM	Useful in filtering flow prior to its reentry into a lake, stream or wetland. Works well with SEDIMENT TRAP (KEY 20) and TEMPORARY BYPASS CHANNEL (KEY 35). Not to be used in lieu of a CHECK DAM (KEY 37) in a ditch.	•		•				•
14	 GRAVEL ACCESS APPROACH	Provides a stable access to roadways minimizing fugitive dust and tracking of materials onto public streets and highways.						•	•

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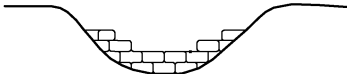
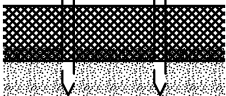
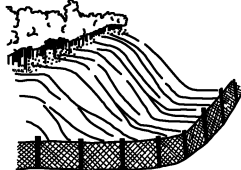

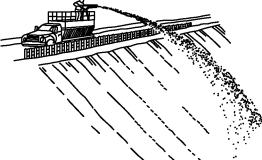
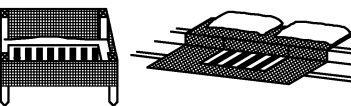
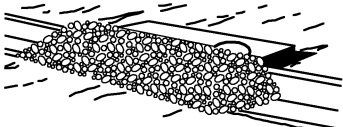
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KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
15	 <p>SLOPE DRAIN SURFACE</p>	<p>Excellent device for carrying water down slopes without creating an erosive condition.</p> <p>Generally used in conjunction with DIVERSION DIKE (KEY 10), INTERCEPTING DITCH (KEY 11) and INTERCEPTING DITCH AND DIVERSION DIKE (KEY 12) to direct flow to a stable discharge area or SEDIMENT TRAP (KEY 20).</p>		•		•			
16	 <p>TREES, SHRUBS AND PERENNIALS</p>	<p>Trees, shrubs and perennials can provide low maintenance long term erosion protection. These plants may be particularly useful where site aesthetics are important along the roadside slopes.</p>		•				•	
17	 <p>PIPE DROP</p>	<p>Effective way to allow water to drop in elevation very rapidly without causing an erosive condition.</p> <p>Also works as a sediment collector device.</p> <p>May be left in place as a permanent erosion control device.</p>		•		•			
18	 <p>DEWATERING WITH FILTER BAG</p>	<p>It may be necessary to dewater from behind a cofferdam or construction dam to create a dry work site.</p> <p>Discharged water must be pumped to a filter bag.</p> <p>A GRAVEL FILTER BERM (KEY 13) may be placed downslope of the filter bag to provide additional filtration prior to entering any stream or wetland.</p>			•				•
19	 <p>ENERGY DISSIPATORS</p>	<p>A device to prevent the erosive force of water from eroding soils.</p> <p>Used at outlets of culverts, drainage pipes or other conduits to reduce the velocity of the water.</p> <p>Prevents structure scouring and undermining.</p>		•	•	•	•		
20	 <p>SEDIMENT TRAP</p>	<p>Used to intercept concentrated flows and prevent sediments from being transported off site or into a watercourse or wetland.</p> <p>The size of a Sediment Trap is 5 cubic yards or less.</p> <p>Works well when used with CHECK DAM (KEY 37).</p>		•		•	•		
21	 <p>SEDIMENT BASIN</p>	<p>A Sediment Basin is used to trap sediments from an upstream construction site.</p> <p>Requires periodic inspections, repairs, and maintenance.</p> <p>Where practical, sediments should be contained on site.</p> <p>A Sediment Basin should be the last choice of sediment control.</p> <p>The size of a Sediment Basin is greater than 5 cubic yards.</p>			•				•
22	 <p>VEGETATIVE BUFFER AT WATERCOURSE</p>	<p>This practice is used to maintain a vegetative buffer adjacent to a watercourse.</p> <p>When utilized with SILT FENCE (KEY 26) it will, under normal circumstances, prevent sediment from leaving the construction site.</p>		•	•	•		•	•

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KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
23	 <p>STREAM RELOCATION</p>	<p>A detail depicting the proper procedures for stream relocation. Maintains same width, depth, and flow velocity as the natural stream. Revegetate banks with PERMANENT/TEMPORARY SEEDING (KEY 3), MULCHING AND MULCH ANCHORING (KEY 28), MULCH BLANKETS AND HIGH VELOCITY MULCH BLANKETS (KEY 33) and woody plants to shade the stream.</p>		•					•
24	 <p>SAND AND STONE BAGS</p>	<p>Sand and stone bags are a useful tool in the prevention of erosion. Can be used to divert water around a construction site by creating a DIVERSION DIKE (KEY 10). Works well for creating a CONSTRUCTION DAM (KEY 36) and temporary culvert end fill.</p>	•	•	•	•	•	•	•
25	 <p>SAND FENCE AND DUNE STABILIZATION</p>	<p>A Sand Fence traps blowing sand by reducing wind velocities. Can be used to prevent sand from blowing onto roads. Must be maintained until sand source is stabilized.</p>	•				•	•	
26	 <p>SILT FENCE</p>	<p>A permeable barrier erected below disturbed areas to capture sediments from sheet flow. Can be used to divert small volumes of water to stable outlets. Ineffective as a filter and should never be placed across streams or ditches where flow is concentrated.</p>	•				•	•	
27	 <p>PLASTIC SHEETS OR GEOTEXTILE COVER</p>	<p>Plastic Sheets can be used to create a liner in temporary channels. Can also be used to create a temporary cover to prevent erosion of stockpiled materials.</p>	•	•	•			•	
28	 <p>MULCHING AND MULCH ANCHORING</p>	<p>Anchored mulch provides erosion protection against rain and wind. Mulch must be used on seeded areas to promote water retention and growth. Should be inspected after every rainstorm and repaired as necessary until vegetation is well established.</p>	•		•		•	•	
29	 <p>INLET PROTECTION FABRIC DROP</p>	<p>Provides settling and filtering of silt laden water prior to its entry into the drainage system. Can be used in median and side ditches where vegetation will be disturbed. Allows for early use of drainage systems prior to project completion.</p>			•		•		
30	 <p>INLET PROTECTION GEOTEXTILE AND STONE</p>	<p>Provides settling and filtering of silt laden water prior to its entry into the drainage system. Should be used in paved areas where drainage structures are existing or proposed. Allows for early use of drainage systems prior to project completion.</p>			•		•		

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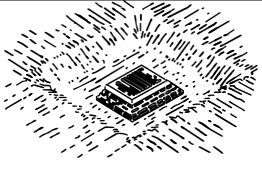
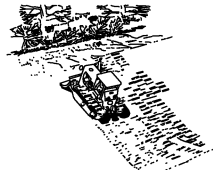
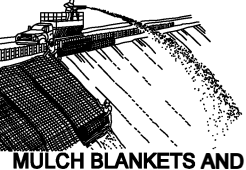
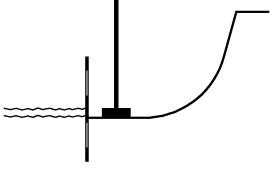



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KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
31	 INLET PROTECTION SEDIMENT TRAP	An Inlet Protection Sediment Trap is a temporary device that can be used in areas where medium flows are anticipated. Effective in trapping small quantities of sediments prior to water entering the drainage system. Can be used in areas such as median and side ditches.			•		•		
32	 SLOPE ROUGHENING AND SCARIFICATION	A simple and economical way to reduce soil erosion by wind and water. Can be accomplished by harrowing with a disk, back blading, or tracking with a dozer perpendicular to the slope.	•				•	•	
33	 MULCH BLANKETS AND HIGH VELOCITY MULCH BLANKETS	Mulch blankets provide an immediate and effective cover over raw erodible slopes affording excellent protection against rain and wind erosion. High velocity mulch blankets work well for stabilizing the bottom of ditches in waterways.	•		•		•	•	
34	 COFFERDAM	Used to create a dry construction area and protect the stream from raw erodible areas. Must be pumped dry or dewatered according to DEWATERING WITH FILTER BAG (KEY 18).		•					•
35	 TEMPORARY BYPASS CHANNEL	Utilized when a dry construction area is needed. Isolates stream flows from raw erodible areas minimizing erosion and subsequent siltation. Can incorporate SEDIMENT BASIN (KEY 21), CHECK DAM (KEY 37), and GRAVEL FILTER BERM (KEY 13) to remove sediments from water. Construction sequence of events may be necessary.		•					•
36	 CONSTRUCTION DAM	Used to create a dry or slack water area for construction. Isolates the stream from raw erodible areas. Can be created out of any non-erodible materials such as SAND AND STONE BAGS (KEY 24), a gravel dike with clay core or plastic liner, steel plates or plywood.		•					•
37	 CHECK DAM	Can be constructed across ditches or any area of concentrated flow. Protects vegetation in early stages of growth. A Check Dam is intended to reduce water velocities and capture sediment. A Check Dam is not a filtering device.	•		•			•	

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NOTES:

THIS STANDARD PLAN WILL SERVE AS A KEY IN THE SELECTION OF THE APPROPRIATE SOIL EROSION AND SEDIMENTATION CONTROL DETAILS. THIS PLAN ALSO PROVIDES THE KEY TO THE NUMBERED EROSION CONTROL ITEMS SPECIFIED ON THE CONSTRUCTION PLANS. REFER TO THE MDOT SOIL EROSION & SEDIMENTATION CONTROL MANUAL, SECTION 6 FOR SPECIFIC DETAILS, CONTRACT ITEMS (PAY ITEMS), AND PAY UNITS.

COLLECTED SILT AND SEDIMENT SHALL BE REMOVED PERIODICALLY TO MAINTAIN THE EFFECTIVENESS OF THE SEDIMENT TRAP, SEDIMENT BASIN, AND SILT FENCE. AGGREGATES PLACED IN STREAMS SHOULD CONTAIN A MINIMUM OF FINES.

TEMPORARY EROSION AND SEDIMENTATION CONTROL PROVISIONS SHALL BE COORDINATED WITH THE PERMANENT CONTROL MEASURES TO ASSURE EFFECTIVE CONTROL OF SEDIMENTS DURING CONSTRUCTION OF THE PROJECT.

ALL TEMPORARY EROSION CONTROL DEVICES SHALL BE REMOVED AFTER VEGETATION ESTABLISHMENT OR AT THE DISCRETION OF THE ENGINEER. CARE SHALL BE TAKEN DURING REMOVAL TO MINIMIZE SILTATION IN NEARBY DRAINAGE COURSES.

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