



PROPOSAL

FOR

**WESTON ROAD AND SILBERNHORN ROAD
REHABILITATION PROJECT**

**LENAWEE COUNTY ROAD COMMISSION
OGDEN, RIGA AND BLISSFIELD TOWNSHIPS
LENAWEE COUNTY, MICHIGAN**

**BID OPENING:
Thursday, March 23, 2017 at 10:00 am**

MSG PROJECT NO. LEDC0002

**WESTON ROAD AND SILBERNHORN ROAD
REHABILITATION PROJECT**

TO: Lenawee County Road Commission
Ogden, Riga and Blissfield Townships Lenawee County, Michigan

FOR: Weston Road and Silberhorn Road Rehabilitation Project

Ladies and Gentlemen:

The undersigned bidder hereby affirms that:

1. The proposal is in all respects fair and without any collusion or fraud.
2. The undersigned have examined the site of the proposed project and have made a personal investigation and estimate of quantities.
3. The undersigned will contract to furnish all labor, equipment, tools and material necessary for the complete construction of the above described project at the unit prices stated on the attached bid forms and to complete the work in the time specified to the satisfaction of the Lenawee County Road Commission.

Company: _____

Address: _____

City, State, ZIP: _____

Telephone: _____

By: _____

Title: _____

Date: _____

NOTE: If the bidder is a co-partnership, each member must sign the proposal.

Corporations must execute the proposal by duly authorized officers in accordance with Articles of Incorporation.

INSTRUCTIONS TO BIDDERS
and
GENERAL CONDITIONS

The Michigan Department of Transportation 2012 Standard Specifications for Construction are incorporated as part of these bidding documents and shall govern except as provided in the Invitation to Bid, Instructions to Bidders and General Conditions, Proposal, Contract, Supplemental Specifications, Special Provisions and Plans. Reference to the Department in the Michigan Department of Transportation 2012 Standard Specifications for Construction shall for this project mean the Lenawee County Road Commission, hereinafter referred to as "Owner", unless otherwise specified.

OWNER

The owner of the project is the Lenawee County Road Commission (LCRC).

ENGINEER

The Engineer is the individual assigned by the LCRC to be in charge of the project. The individual assigned as the Engineer may be an employee of the LCRC or a consultant assigned by the LCRC.

BIDDER

The Bidder is one who submits a signed bid with the required documentation directly to the Engineer at the time and place specified.

BID FORMS

Sealed proposals must be submitted on the bid forms furnished by the Owner. The proposal shall be submitted in its entirety with no modifications or changes except as authorized by an addendum and with no pages removed. Unit prices as listed will govern in determining the correct total of the bid. All proposals must be filled out in ink or typewritten and shall be legibly signed, giving the complete name and address of the Bidder.

All bids must be in a sealed envelope and clearly marked "**Weston Road and Silberhorn Road Rehabilitation Project**".

INTERPRETATION AND ADDENDA

All questions about the meaning or intent of the Contract Documents are to be directed to the Design Engineer, Steve Bouws of the Mannik & Smith Group, Inc at sbouws@manniksmithgroup.com or 734-289-2200. Interpretation or clarification considered necessary by the Engineer to such questions will be issued by Addenda e-mailed to all parties recorded by the Engineer as having received the Bidding Documents. Questions received less than seven days prior to the date for opening the bids may not be answered. Only questions answered by formal written Addenda are binding. Oral and other interpretations or clarifications will be without legal effect.

OPENING OF BIDS

Bids will be received at the Lenawee County Road Commission, 2461 Treat Highway, Adrian, Michigan 49221 until **10:00 a.m. local time on Thursday, March 23, 2017** at which time they will be publicly opened and read aloud. Following the bid opening the bids are reviewed by various staff members in order to make a recommendation to the County Board of Road Commissioners at its next regular meeting. During this time period the bids are closed and information regarding the bids is not available. Bids will be awarded at the next regularly scheduled Board Meeting of the Board of County Road Commissioners following the due date for receipt of bids. Notification of the bid award will be mailed to each bidder on the next business day following the Board Meeting.

REJECTION OF BIDS

The Owner reserves the right to reject any or all bids, including without limitation the right to reject any or all nonconforming, nonresponsive, unbalanced, or conditional bids and to reject the bid of any Bidder if the Owner believes that it would not be in the best interest of the project to make an award to that Bidder, whether because the bid is not responsive or if the Bidder is unqualified or of doubtful financial ability or

fails to meet any pertinent standards or criteria established by the Owner. The Owner also reserves the right to waive all informalities in any bid should it be deemed in the best interest of the Owner to do so. Discrepancies between the multiplication of units of work and the unit prices will be resolved in favor of the unit price. Discrepancies between the indicated sum of any column of figures and the correct sum will be resolved in favor of the correct sum. Discrepancies between words and figure will be resolved in favor of words.

CONTRACT EXECUTION

The Bidder to whom the contract is awarded shall, within ten (10) calendar days after notice of award, enter into a written contract with the Owner and furnish bonds (if required) and proof of insurance as hereinafter specified. Failure to execute the contract or furnish satisfactory bonds and proof of insurance will be considered cause for annulment of award and forfeiture of the Bidder's surety. Following the execution of the contract, the Bidder shall become known as the Contractor.

INCREASED OR DECREASED QUANTITIES

The Owner reserves the right to increase or decrease quantities from those originally estimated and such changes will be paid for at the unit price bid so long as the total contract amount is not changed more than ten (10) percent. Changes in excess of that amount will be individually negotiated.

TIME OF COMPLETION

All contract work shall be completed on or before Friday, **September 22, 2017**.

FAILURE TO COMPLETE ON TIME

Liquidated damages will be assessed at \$600/day for failure to complete on time.

PAYMENTS TO CONTRACTOR

Payments will be made to the Contractor on a bi-weekly basis. The Owner will make a partial payment to the Contractor on the basis of an estimate, prepared by the Engineer, of the work performed on the project during the preceding period less a five (5) percent retainer.

FINAL INSPECTION, ACCEPTANCE AND FINAL PAYMENT

The Engineer will make a final inspection of all work included in the contract, and notify the Contractor of defects to be remedied prior to final acceptance. The Contractor is required to provide unconditional waivers of lien from all sub-contractors and suppliers before preparing a final estimate. Upon satisfactory completion of the work by the Contractor, a final estimate will be prepared. Payment for all work completed and accepted, less previous payments will be made within thirty (30) days of final acceptance.

DISPUTES

The Engineer's written decision on any question arising under the contract between the Owner and Contractor shall be final and binding upon both the Owner and the Contractor in the absence of fraud, bad faith, or abuse of discretion.

ARBITRATION

All claims, disputes and other matters in question between the Owner and the Contractor arising out of, or relating to, the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining subject to the limitations of this section. This agreement so to arbitrate and any other agreement or consent to arbitrate entered into in accordance herewith will be specifically enforceable under the prevailing laws of any court having jurisdiction.

No demand for arbitration of any claim, dispute or other matter that is required to be referred to Engineer initially for decision will be made until the earlier of (a) the date on which Engineer has rendered a decision or (b) the tenth day after the parties have presented their evidence to Engineer if a written decision has not been rendered by Engineer before that date. No demand for arbitration of any such claim, dispute or other matter will be made later than thirty (30) days after the date on which Engineer has

rendered a written decision in respect thereof; and the failure to demand arbitration within said thirty (30) days' period shall result in Engineer's decision being final and binding upon Owner and Contractor. If Engineer renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned. No demand for arbitration of any written decision of Engineer will be made later than ten (10) days after the party making such demand has delivered written notice of intention to appeal.

Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the American Arbitration Association, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the thirty (30) day or ten (10) day period specified above as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity who is not a party of this contract unless:

- a) the inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration;
- b) such other person or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and;
- c) the written consent of the other person or entity sought to be included and of Owner and Contractor has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

Notwithstanding the above paragraph, if a claim, dispute or other matter in question between Owner and Contractor involves the Work of a Subcontractor, either Owner or Contractor may join such Subcontractor as a party to the arbitration between Owner and Contractor hereunder. Contractor shall include in all subcontracts a specific provision whereby the Subcontractor consents to being joined in arbitration between Owner and Contractor involving the Work of such Subcontractor. Nothing in this paragraph or in the provision of such subcontract consenting to joinder shall create any claim, right or cause of action in favor of Subcontractor and against Owner or Owner's Consultants that does not otherwise exist.

The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal.

PROGRESS SCHEDULE

Start work within ten (10) days after receiving notice of award of contract or on or before the date designated as the starting date in the approved detailed progress schedule. In no case shall any work be commenced prior to receipt of formal notice of award by the Owner.

The low Bidder(s) for the work covered by this proposal will be required to meet with the Owner's representative to review the Contractor's proposed detailed work schedule. The schedule for this meeting will be set within one (1) week after the low Bidder is determined. It is recommended that any Subcontractors be at this meeting if their work materially affects the work schedule.

The Owner's representative will arrange the time and place for the meeting.

The detailed progress schedule shall include, as a minimum, the controlling work items for the completion of the project and the planned work dates (or work day for a work day project) that these work items will be controlling operations. When specified in the bidding proposal the date the project is to be opened to traffic as well as the final project completion date shall also be included in the Detailed Progress Schedule. If bidding proposal specifies other controlling dates, these dates shall also be included in the Detailed Progress Schedule.

Failure on the part of the Contractor to carry out the provisions of the Detailed Progress Schedule, as established, may be considered sufficient cause to prevent bidding on future projects until a satisfactory rate of progress is again established.

TAXES

The Contractor shall include, and will be deemed to have included, in its base bid and contract price all applicable Michigan Sales and Use taxes which have been enacted into law as of the date the bid is submitted.

OWNER'S RESPONSIBILITY

The Owner shall not supervise, direct or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with laws and regulations applicable to the furnishing or performance of the work unless otherwise specified in the Special Provisions. Owner will not be responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

INDEMNIFICATION, DAMAGE LIABILITY AND INSURANCE

Indemnification, damage liability, and insurance shall be in accordance with subsection 107.10 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

All insurance policies and binders shall include the following endorsements, verbatim:

"ADDITIONAL INSURED: The Board of County Road Commissioners of the County of Lenawee, Michigan; the Lenawee County Road Commission and its officers, agents and employees; Ogden Township and its officers, agents and employees; Riga Township and its officers, agents and employees; Blissfield Township and its officers, agents and employees; and The Mannik & Smith Group, Inc. and its officers, agents and employees.

"Provide written notice ten (10) days prior to cancellation, expiration, termination or reduction in coverage for nonpayment of the premium and written notice thirty (30) days prior to the cancellation, expiration, termination or reduction in coverage for all other reasons."

SPECIFICATIONS

All work not otherwise specified shall be done in accordance with the Michigan Department of Transportation 2012 Standard Specifications for Construction. Within these specifications all references to the Michigan Department of Transportation shall mean the Owner.

SPECIAL PROVISIONS AND STANDARD PLANS (ATTACHED)

1. Indemnification, Damage Liability and Insurance
2. Maintaining Traffic, SP
3. Utility Coordination, NTB
4. Clearing Special
5. Pavement Saw Cut
6. Sewer, Schedule 40 PVC, 4 inch to 10 inch
7. HMA Application Estimate
8. Post, Mailbox, Relocate
9. Slope Restoration
10. Full Depth Reclamation, Emulsified Asphalt

11. Full Depth reclamation, Mix Design
12. Sanitary Shutoff, Adjust
13. Sanitary Structure Cover, Adjust
14. Coordination Clause – I&O
15. Coordination Clause RR
16. Railroad Insurance Requirements
17. Ground Driven Sign Supports for Temporary Signs, MDOT Traffic and Safety, WZD-100-A
18. Temporary Traffic Control Devices, WZD-125-E
19. Drainage Structures, Plan R-1-G
20. Utility Trenches, R-83-C
21. Errata to the 2012 Standard Specifications, MDOT Supplemental Specification

UTILITY COORDINATION

For the protection of underground utilities, the contractor shall notify “Miss Dig” at 1-800-482-7171 or 811, a minimum of three working days excluding weekends or holidays, prior to excavating and otherwise fully comply with the provisions of Public Act 174 of 2013, as amended. Miss Dig members will thus be routinely notified. This does not relieve the Contractor of the responsibility of notifying utility owners who may not be part of the Miss Dig system.

The Contractor shall conduct operations in such a manner as to ensure that those utilities not requiring relocation will not be disturbed.

EROSION CONTROL

Erosion control measures shall be installed as directed by the engineer. Items and estimated quantities have been outlined in the miscellaneous items summary.

UNIT PRICE CONTRACT
Weston Road and Silberhorn Road Rehabilitation Project

TO: Lenawee County Road Commission

The undersigned, having full knowledge of the site, proposal, plans and specifications for the **Weston Road and Silberhorn Road Rehabilitation Project** in Ogden, Riga and Blissfield Townships, Lenawee County, Michigan including Bidders' Addenda _____, and the conditions of these Contract Documents, hereby agrees to furnish all services, labor, materials, tools, equipment, transportation, and incidentals necessary to perform the entire Work; to complete the contract by the date specified in the Instructions to Bidders and General Provisions, according to the Proposal, Plans and Specifications, and to accept in full, compensation for all work necessary to complete the project at the unit prices named below:

UNIT PRICE WORK					
Item Code	Item Description	Approx. Quantity	Unit	Unit Price	Bid Amount
1500001	Mobilization, Max \$200,000	1.00	LSUM		
2010001	Clearing	0.50	Acre		
2020006	Stump, Rem, 19 inch to 36 inch	27.0	Ea		
2020007	Stump, Rem, 37 inch or Larger	5.0	Ea		
2020008	Stump, Rem, 6 inch to 18 inch	34.0	Ea		
2030001	Culv, Rem, Less than 24 inch	56.0	Ea		
2030002	Culv, Rem, 24 inch to 48 inch	9.0	Ea		
2030003	Culv, Rem, Over 48 inch	7.0	Ea		
2030011	Dr Structure, Rem	6.0	Ea		
2030015	Sewer, Rem, Less than 24 inch	568.0	Ft		
2040045	Masonry and Conc Structure, Rem	25.3	Cyd		
2040050	Pavt, Rem	41.0	Syd		
2047001	_Pavt Saw Cut	652.0	Ft		
2047051	_Clearing, Special	1.0	LSUM		
2050010	Embankment, CIP	19,162.0	Cyd		

2050015	Excavation, Channel	144.0	Cyd		
2500016	Excavation, Earth	14,115.0	Cyd		
2050041	Subgrade Undercutting, Type II	40.0	Cyd		
2080012	Erosion Control, Check Dam, Stone	300.0	Ft		
2080020	Erosion Control, Inlet Protection, Fabric Drop	24.0	Ea		
2080036	Erosion Control, Silt Fence	5,000.0	Ft		
3020001	Aggregate Base	17,614.0	Ton		
3020050	Aggregate Base, Conditioning, Intersections	3,545.0	Syd		
3020050	Aggregate Base, Conditioning HMA and Concrete Driveways	136.0	Syd		
3070021	Approach, CI II	696.0	Ton		
3070125	Shoulder, CI II, 3 inch	12,063.0	Syd		
3070128	Shoulder, CI II, 6 inch	437.0	Syd		
3070200	Trenching	551.4	Sta		
3077011	Shoulder, CI II, 3.5 inch	6,562.0	Syd		
3077011	Shoulder, CI II, 1.5 inch	2,365.0	Syd		
4010199	Culv, CI A, CSP, 12 inch	899.0	Ft		
4010200	Culv, CI A, CSP, 15 inch	56.0	Ft		
4010201	Culv, CI A, CSP, 18 inch	132.0	Ft		
4010202	Culv, CI A, CSP, 24 inch	80.0	Ft		
4010203	Culv, CI A, CSP, 30 inch	160.0	Ft		
4010207	Culv, CI A, CSP, 54 inch	130.0	Ft		
4010208	Culv, CI A, CSP, 60 inch	84.0	Ft		
4010210	Culv, CI A, CSP, 72 inch	220.0	Ft		

4010211	Culv, CI A, CSP, 78 inch	84.0	Ft		
4010675	Culv, CI F, CSP, 12 inch	1,150.0	Ft		
4011678	Culv, CI F, CSP, 24 inch	238.0	Ft		
4010680	Culv, CI F, CSP, 36 inch	30.0	Ft		
4010756	Culv, CSP Arch, CI A, 112 inch by 75 inch	70.0	Ft		
4017001	Culv, CSP Arch, CI A, 117 inch by 79 inch	62.0	Ft		
4020001	Sewer, CI A, 6 inch, Tr Det A	12.0	Ft		
4020002	Sewer, CI A, 8 inch, Tr Det A	34.0	Ft		
4020601	Sewer, CI E, 15 inch, Tr Det B	8.0	Ft		
4021201	Sewer Tap, 6 inch, Modified	4.0	Ea		
4027001	Sewer, CL A, CSP, 12 inch, Tr Det A	407.0	Ft		
4027001	Sewer, CL A, CSP, 12 inch, Tr Det B	1,287.0	Ft		
4030005	Dr Structure Cover, Adj, Case 1	1.0	Ea		
4030010	Dr Structure Cover, Type B	2.0	Ea		
4030040	Dr Structure Cover, Type G	23.0	Ea		
4030200	Dr Structure, 24 inch dia	16.0	Ea		
4030210	Dr Structure, 48 inch dia	9.0	Ea		
4030306	Dr Structure, Tap, 6 inch, Modified	4.0	Ea		
4030308	Dr Structure, Tap, 8 inch	1.0	Ea		
4030312	Dr Structure, Tap, 12 inch	4.0	Ea		
4037050	_Sanitary Structure, Temp Lowering	1.0	Ea		
4037050	_Sanitary Structure Cover, Adj, Case 1	3.0	Ea		
4037050	_Sanitary Shutoff, Adj, Case 2	6.0	Ea		

4040111	Underdrain, Outlet Ending, 4 inch	5.0	Ea		
4040113	Underdrain, Outlet Ending, 6 inch	5.0	Ea		
4040115	Underdrain, Outlet Ending, 8 inch	5.0	Ea		
4047001	_Sewer, Schedule 40 PVC, 4 inch to 10 inch	150.0	Ft		
5010001	Pavt, Cleaning	1.0	LSUM		
5010002	Cold Milling HMA Surface	6,112.0	Syd		
5010005	HMA Surface, Rem	5,085.0	Syd		
5010025	Hand Patching	16.0	Ton		
5010050	HMA, 4E1	5,213.0	Ton		
5010056	HMA, 5E1, Intersection	596.0	Ton		
5010056	HMA, 5E1	17,628.0	Ton		
5010061	HMA Approach	33.0	Ton		
8020015	Curb and Gutter, Conc, Det B1	658.0	Ft		
8077050	_Post Mailbox, Relocate	60.0	Ea		
8110114	Pavt, Mrkg, Polyurea, 24 inch, Stop Bar	48.0	Ft		
8110231	Pavt Mrkg, Waterborne, 4 inch, White	100,545.0	Ft		
8110232	Pavt Mrkg, Waterborne, 4 inch, Yellow	14,565.0	Ft		
8110251	Pavt Mrkg, Waterborne, 2nd Application, 4 inch, White	100,545.0	Ft		
8110252	Pavt Mrkg, Waterborne, 2nd Application, 4 inch, Yellow	14,565.0	Ft		
8110411	Pavt, Mrkg, Polyurea, Railroad Sym	4.0	Ea		
8120012	Barricade, Type III, High Intensity, Double Sided, Lighted, Furn	39.0	Ea		
8120013	Barricade, Type III, High Intensity, Double Sided, Lighted, Oper	39.0	Ea		

8120030	Channelizing Device, 42 inch, Furn	25.0	Ea		
8120031	Channelizing Device, 42 inch, Oper	25.0	Ea		
8120170	Minor Traf Devices	1.0	LSUM		
8120250	Plastic Drum, High Intensity, Furn	100.0	Ea		
8120251	Plastic Drum, High Intensity, Oper	100.00	Ea		
8120350	Sign, Type B, Temp, Prismatic, Furn	778.0	Sft		
8120351	Sign, Type B, Temp, Prismatic, Oper	778.00	Sft		
8120352	Sign, Type B, Temp, Prismatic, Special, Furn	112.0	Sft		
8120353	Sign, Type B, Temp, Prismatic, Special, Oper	112.0	Sft		
8120370	Traf Regulator Control	1.0	LSUM		
8167011	_Slope Restoration, Type 1	20,300.0	Syd		
8167011	_Slope Restoration, Type 2	115,420.0	Syd		
8167011	_Slope Restoration, Type 3	1,500.0	Syd		
8230421	Hydrant, Relocate, Case 2	3.0	Ea		
8230421	Water Shutoff, Adj, Case 1	4.0	Ea		
8230422	Water Shutoff, Adj, Case 2	3.0	Ea		
8507011	_Full Depth Reclamation, Emulsified Asphalt Stabilized Base Course, 6 inch	46,469.0	Syd		
8507011	_Full Depth Reclamation, Emulsified Asphalt Stabilized Base Course, 8 inch	82,918.0	Syd		
8507022	_Emulsified Asphalt	392,466.0	Gal		
TOTAL BID					

TOTAL OF BID: _____
Use words

_____ Dollars

Contractor Signature: _____

Printed Name and Title: _____

Quantities are not guaranteed. Final payment will be based on actual quantities.

Bidder agrees that the work will be completed and ready for final payment in accordance with the General Conditions. All work on the **Weston Road and Silberhorn Road Rehabilitation Project** to be completed by **Thursday, September 22, 2016** and as detailed in the Time of Completion section above.

Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work on time.

The following documents are attached to and made a condition of this Bid:

Required Bid Security in an amount of 5 percent of the Bid in the form of either:

Certified Check or a Bidder's Bond in the amount of:

_____ Dollars (\$ _____)

Communications concerning this Bid shall be addressed to the Bidder's representative.

Name of Representative: _____

Address: _____

City, State, ZIP: _____

Telephone Number: _____

Fax Number: _____

E-Mail Address: _____

The terms used in this Bid, which are defined in subsection 101.03 of the Michigan Department of Transportation 2012 Standard Specifications of the Construction, have the meanings assigned to them in the Standard Specifications for Construction.

SUBMITTED on: _____, 2017.

If Bidder is:

An Individual

By: _____ (SEAL)
Individual's Name

Doing Business As: _____

Business Address: _____

Phone No.: _____

A Partnership

By: _____ (SEAL)
Firm Name

General Partner

Business Address: _____

Phone No.: _____

A Corporation

By: _____ (Corporate SEAL)
Corporate Seal

State of Incorporation

By: _____
Name of Person Authorized to Sign

Title

Business Address: _____

Phone No.: _____

A Joint Venture

By: _____
Name

Business Address: _____

Phone No.: _____

By: _____
Name

Business Address: _____

Phone No.: _____

(Each joint venture must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

Special Provisions

**INDEMNIFICATION, DAMAGE LIABILITY AND INSURANCE REQUIREMENTS
FOR ACTIVITIES PERFORMED BY CONTRACT/PERMIT ISSUED BY THE
LENAWEE COUNTY ROAD COMMISSION**

MSG:SLB

1 of 2

Rev: 3-2-17

Indemnification, Damage Liability and Insurance- The Contractor/Permitee shall comply with the following:

a. Indemnification - The Contractor/Permitee agrees to save harmless, indemnify, defend and represent the BOARD OF COUNTY ROAD COMMISSIONERS OF THE COUNTY OF LENAWE (BOARD) and its officers, agents and employees against any and all claims for bodily injury or property damage, or any other claim arising out of or related to the work covered by the permit or for any other work done within county road right-of-way whether or not specifically authorized or in conformance with the description of the work for which the permit was issued. The Contractors aforesaid indemnity, hold harmless and release agreement, shall not be applicable to any liability caused by the sole negligence or willful misconduct of the Lenawee County Road Commission, its officers, agents of employees. The Contractor/Permitee agrees and understands that the obligations set forth herein are binding upon their sub-contractors, successors, transferors, assigns sureties, and guarantors.

b. Worker's Compensation Insurance - The Contractor/Permitee shall certify before the issuance of the permit that the Contractor/Permitee carries Worker's Compensation Insurance per the Statutory Limits.

c. Bodily Injury and Property Damage - The Contractor/Permitee, before issuance of the permit, shall file with the BOARD copies of completed certificates of insurance, as evidence that the Contractor/Permitee carries adequate insurance, satisfactory to the BOARD, to afford protection against all claims for damages to public or private property, and injuries to persons, arising out of and during the progress of the work, and to its completion and, where specified in the permit, similar insurance to protect the owner of premises on or near which construction operations are to be performed.

1. General Liability, Bodily Injury and Property Damage - Unless otherwise specifically required by special provisions in the permit, the minimum limits of property damage and bodily injury liability covering each permit shall be:

Property Damage Liability:
Each Occurrence:\$1,000,000
Aggregate:\$1,000,000

Bodily Injury Liability:
Each Person: \$1,000,000
Each Occurrence:.....\$1,000,000

The requirements above may be met through an Umbrella policy. The insurance shall include, but not be limited to, coverage for:

- A.** Damage to underground facilities due to drilling, boring and excavating with mechanical equipment, and
- B.** Collapse or structural injury to structures due to blasting or explosion, excavation, tunneling, pile driving, cofferdam work, or building moving or demolition.

2. Automobile Liability, Bodily Injury and Property Damage - Unless otherwise specifically required by special provisions in the permit, the minimum limits of property damage and bodily injury liability covering each permit shall be:

Bodily Injury Liability:

Each Person: \$1,000,000

Each Occurrence:\$1,000,000

Property Damage:

Per Accident: \$500,000

d. Notice - The Contractor/Permitee shall not cancel or reduce the coverage of any insurance required by this provision without providing 30-day prior written notice to the BOARD. All insurance policies and binders must include an endorsement by which the insurer shall agree to notify the BOARD, in writing, immediately of any cancellation or reduction in the insurance coverage. The Contractor/Permitee shall cease operations if any insurance is canceled or reduced, and shall not resume operations until new insurance is in force.

All insurance policies and binders must also include endorsements by which the insurer shall agree to provide the BOARD, in writing, the following:

- 1. A thirty (30) day prior notice of any insurer initiated cancellation, expiration, termination or reduction in coverage for reasons other than nonpayment of the premium.
- 2. A ten (10) day prior notice of any cancellation, expiration, termination or reduction in coverage for nonpayment of the premium.

e. Reports - The Contractor/Permitee or insurance carrier shall report to the BOARD claims received, inspections made, and disposition of claims. The BOARD will withhold the reserve or final permit release until either the Contractor/Permitee pays the claim or until final disposition of the claim by the Contractor/Permitee insurance company has been received by the BOARD.

f. Endorsements - All insurance policies and binders shall include the following endorsements, verbatim:

"ADDITIONAL INSURED: The Board of County Road Commissioners of the County of Lenawee, Michigan; the Lenawee County Road Commission and its officers, agents and employees; Ogden Township and its officers, agents and employees; Riga Township and its officers, agents and employees; Blissfield Township and its officers, agents and employees; and The Mannik & Smith Group, Inc. and its officers, agents and employees."

"Provide written notice ten (10) days prior to cancellation, expiration, termination or reduction in coverage for nonpayment of the premium and written notice thirty (30) days prior to cancellation, expiration, termination or reduction in coverage for all other reasons."

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC

MSG:SLB

1 of 4

2-16-17

a. General. Maintain traffic in accordance with sections 104.07, 104.11, 812 and 922 of the Standard Specifications for Construction, the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) and any typical or supplemental specifications in this proposal and project plans.

The Contractor shall be responsible for the protection of vehicular and pedestrian traffic, work in progress and construction workers in the Construction Influence Area through the implementation of procedures as described in this proposal, the MMUTCD, the Standard Specifications for Construction, and other applicable state and federal requirements.

The Contractor shall coordinate this work with any other contractors or maintenance agencies performing work within the Construction Influence Area or adjoining areas to avoid conflicts in the maintenance of traffic, construction signing, and the orderly progress of contract work.

b. Construction Influence Area. The Construction Influence Area (CIA) on Weston Road shall consist of the width of the existing and proposed right-of-way of Weston Road from approximately 0.50 mile west of Hodges Highway to approximately 0.5 mile east of Riga Highway. The CIA on Silberhorn Highway shall consist of the width of the existing and proposed right-of-way of Silberhorn Highway from approximately 0.50 mile south of Weston Road to approximately US-223. The CIA shall also include the right-of-way of all intersecting crossroads adjacent to the CIA within the limits of the advance construction signing.

c. Traffic Restrictions. The traffic restrictions described in this special provision apply to all work with the CIA unless otherwise specified.

All work shall be conducted during normal daytime hours unless otherwise approved by the Engineer. Normal daytime hours are considered to be Monday through Saturday from 7 a.m. to 7 p.m.

No work shall be performed or complete roadway closures permitted from 3:00 p.m. on the day before until 7:00 a.m. the day after the following holidays or holiday periods as defined by the Engineer: These may include but are not limited to New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.

Night work may be permitted at the discretion of the Engineer; however, any additional cost for lighting or traffic control for night work shall be borne by the Contractor. A noise ordinance waiver may be required from Ogden, Riga or Blissfield Township if the Contractor elects to perform night work. Local permits for night work shall be the responsibility of the Contractor.

The Contractor shall notify the Engineer a minimum of 7 calendar days prior to the implementation of any roadway closures, traffic shifts or detours.

Maintain access for emergency vehicles at all times. The Contractor will be required to assist emergency vehicles (fire, ambulance, police) in gaining access into, around, and through the work zone at all times without exception.

Access to all commercial and residential driveways must be maintained at all times. If a commercial property has multiple driveways, one of the driveways may be closed as long as the other driveway that allows full access to the property remains open.

e. Special Considerations at Railroad Crossings. The following requirements will be necessary during construction near the railroad crossing(s).

1. The Contractor will not obstruct the right-hand display of the railroad signal to traffic approaching the crossing.
2. An intermediate traffic regulator is required at the railroad crossing while it is in the zone where traffic is maintained by traffic regulator control. The traffic regulator will serve to stop traffic for vehicles traveling in the direction opposed to normal flow and prevent them from entering the crossing upon a train approaching the crossing. When the railroad crossing is in the influence zone of active construction work, but not in a lane closure, the roadway traffic regulator will give immediate preference to clearing any traffic which backup over the crossing as a result of the traffic regulator control away from the crossing.
3. The Contractor will place a temporary stop line and sign R15-1 (crossbuck) to indicate the stopping point in advance of the crossing for vehicles traveling in a direction opposed to normal flow.
4. Payment for intermediate traffic regulator(s) stationed at the crossing is included in the pay item Traffic Regulator Control.
5. No lane closure taper(s) may extend through the crossing. Traffic lane shifts cannot transition over the crossing.
6. No construction traffic control devices may be placed in the railroad crossing or closer than 25 ft. from the outside rail on either side crossing approach.

f. Closures for Culvert and Cross Tile Replacements. All roadway closures for county drain culvert replacements and cross tile replacements shall be completed under complete roadway closure. Adequate signage and barricades have been provided in the project quantities to allow two simultaneous closures. When the closure limits through traffic between cross roads additional signage shall be placed at the nearest intersection. This sign shall be a W20-3 "Road Closed Ahead" in addition to already placed signage. When the closure involves an intersection these signs shall be placed at all approaching

roadways in addition to the traffic control signage called for on the plans. These signs shall be relocated as required throughout the project limits as required by the Engineer. Closures for county drain culvert replacements cannot close two consecutive intersections within the project limits.

g. Traffic Control Devices. All traffic control devices shall conform to the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) 2011 Edition.

All signs shall be 3 feet x 3 feet with black legends on reflectorized orange background unless otherwise noted.

All temporary signing anticipated to be in place for more than 14 days shall be installed on ground driven supports as shown on WZD-100-A.

Minimum merging taper lengths, distance between traffic control devices, and length of longitudinal buffer space shall conform to standards as shown on Maintaining Traffic Typical M0020a. Field adjustment may be necessary as determined by the Engineer.

Signing for a single lane closure where two-way traffic is maintained with traffic regulators shall be in accordance with Maintaining Traffic Typical M0140a. The cost for this work will be included in the item of work Traf Regulator Control.

Channelizing devices used on this project will be Channelizing Device, 42 inch and/or high intensity plastic drums as outlined. The Contractor will be responsible for protecting the work area and must supply the necessary traffic control devices apart from those called for on the plans to delineate the work area from the adjacent property.

All plastic drums and/or channelizing devices used on this project will have sufficient ballast to prevent the barrel from moving or tipping. If moving or tipping of devices occurs as the result of wind generated by traffic or occurring naturally, the Contractor will be required to place additional ballast on the devices at no additional cost.

All existing pavement markings that are removed for traffic control or obliterated during construction operations must be replaced with Waterborne for the longitudinal lane lines and overlay cold plastic for special markings (stop bars, arrows, etc).

All permanent signing must be maintained in workable condition by the contractor during construction. Any temporary moving and relocation will be completed by the contractor. The cost for this work will be included in the item of work Minor Traf Devices. The LCRC will be placing all permanent signage on completion of the project in its final location. The contractor shall coordinate all final sign placement with the LCRC as construction is completed.

If signs are removed, they must be taken down and stored in accordance with MDOT standards. All signs permanently removed with Engineers approval will become the property of the LCRC. Signs damaged during removal must be replaced with identical new signs at the Contractor's expense

Permanent pavement markings must be constructed in accordance with section 811 of the Standard Specifications for Construction, the pavement marking plans, the most current version of the MDOT Pavement Marking Typical Plans PAVE-900 series, any Supplemental Specifications and any special provisions in this proposal.

All construction signing shall be covered or removed during the times they do not apply.

Following is an estimate of the type and number of temporary traffic items needed for this project:

Barricade, Type III, High Intensity, Double Sided, Lighted	39	Each
Channelizing Device, 42 inch	25	Each
Plastic Drum, High Intensity	100	Each
Sign, Type B, Temp, Prismatic	778	Square foot
Sign, Type B, Temp, Prismatic, Special	112	Square foot

h. Measurement and Payment. The estimate of quantities for maintaining traffic is based on the signing and related traffic control devices as shown on the plans and specified in this special provision.

No payment will be made for unused quantities of traffic control devices or temporary pavement markings.

NOTICE TO BIDDERS

UTILITY COORDINATION

MSG:SLB

1 of 2

02-17-17

The Contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in section 104.08 of the Standard Specifications for Construction. In addition, for the protection of underground utilities, the Contractor shall follow the requirements in section 107.12 of the Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon section 108.09 of the Standard Specifications for Construction.

For protection of underground utilities and in conformance with Public Act 174 of 2013, the Contractor shall dial 1-800-482-7171 or 811 a minimum of three full working days, excluding Saturdays, Sundays, and Holidays, prior to beginning each excavation in areas where public utilities have not been previously located. Members will thus be routinely notified. This does not relieve the Contractor of the responsibility of notifying utility owners who may not be a part of the "MISS DIG" alert system.

Public Utilities

The following public utilities have facilities located within the Right-of-Way:

PHONE/CABLE

Ogden Telephone Company
4726 East Weston Road
Blissfield, MI 49228
ATTN: Larry J. Bausman
(517) 443-5595

D&P Communications
100 East Church Street
Adrian, MI 49221
Attn: James Plotts
(734) 279-1339 (ext 5502)

Frontier Communications
340 South Main Street
Adrian, MI 49221
ATTN: Mark Spina
(517) 265-0648

ELECTRIC

Consumers Energy
1955 West Parnell Road
Jackson, MI 49201
ATTN: David A. Southward
(517) 788-2400

Midwest Energy Cooperative
1610 East Maumee Street
Adrian, MI 49221
ATTN: Greg Karmol
(517) 263-1808 Ext. 4601

WATER

Lenawee County Drain Commission
320 Springbrook Avenue, Suite 102
Adrian, MI 49221
ATTN: Tom Gillenwater
(517) 264-4696

NATURAL GAS

Michigan Gas Utilities
899 South Telegraph Road
Monroe, MI 48161
Attn: Kris Kleinsmith
(734) 457-6166

Consumers Energy
1955 West Parnell Road
Jackson, MI 49201
(248) 830-3139

COUNTY DRAINS

Lenawee County Drain Commission
320 Springbrook Avenue
Adrian, MI 49221
ATTN: Jennifer Escott
(517)264-4696

SANITARY SEWER

Lenawee County Drain Commission
320 Springbrook Avenue, Suite 102
Adrian, MI 49221
ATTN: Tom Gillenwater
(517) 264-4696

PIPELINES

Kinder Morgan Cochin Pipeline
10743 Stone Quarry Road
Riga, MI 49276
ATTN: Lori Deaton
(419) 764-3130

The owners of existing service facilities that are within the grading limits will protect or move them to locations designated by the Engineer or will remove them entirely from the highway Right-of-Way. Owners of public utilities will not be required by the County to move additional poles or structures in order to facilitate the operation of construction equipment unless it is determined by the Engineer that such poles or structures constitute a hazard to the public or are extraordinarily dangerous to the Contractor's operations.

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
CLEARING, SPECIAL

MSG:SLB

1 of 1

01-25-17

a. Description. This work consists of removal of trees and stumps smaller than 6 inch diameter, brush, shrubs, roots, logs, rocks, miscellaneous vegetation and landscaping to the limits shown on the plans, as directed by the engineer or encountered in the field. Small miscellaneous minor removals and/or relocations may or may not be shown on plans. This item shall include all items of work as required not specifically called out on the plans and paid for with other removal items.

b. Materials. Provide materials in accordance with subsection 201.02 of the Standard Specifications for Construction.

c. Construction. All work must be in accordance with subsection 201.03 of the Standard Specifications for Construction.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Pay Unit
Clearing, Special	Lump Sum

Clearing, Special will be paid for by lump sum.

LENEWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
PAVT SAW CUT

MSG:SLB

1 of 1

02-08-17

a. **Description.** This work consists of saw cutting concrete and HMA pavement.

b. **Materials.** None specified.

c. **Construction.** Saw cut concrete or HMA surfaces at locations shown on plans and as directed by the Engineer. In removing old pavement, curb, gutter, sidewalk, crosswalk and similar structures, where portions of the existing structure are to be left in the surface of the finished work, remove the old structure to existing joints or saw to a reasonably true line with a vertical face. Perform saw cuts with a power driven concrete saw to the full depth of the item being saw cut.

Take precautions to maintain a clean vertical edge on the sawcut throughout the duration of the work. Any resawing or additional removal and replacement of pavement, curb and gutter or sidewalk which may be necessary due to Contractor carelessness will be at the Contractor's expenses.

d. **Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price for the following pay item:

Pay Item	Pay Unit
Pavt Saw Cut	Foot

Pavt Saw Cut will be measured by length and will be paid for saw cutting of HMA and concrete pavement, and driveways as noted on plans.

Payment for this item will not be made when pavement is removed by a milling machine or in areas where pavement pulverization is to be completed or other method(s) that does not require a sawcut.

LENAWEE COUNTY ROAD COMMISSION
 SPECIAL PROVISION
 FOR
SEWER, SCHEDULE 40 PVC, 4 INCH TO 10 INCH

MSG:SLB

1 of 2

1-23-17

A. **Description.** Extend or replace existing drain outlet pipes to roadside ditches, storm sewers or drainage structures.

B. **Materials.** Provide materials meeting the following:

Sound Earth.....	205
Schedule 40 Polyvinyl Chloride Pipe.....	918

Sound earth consists of a natural material that can be compacted to the required density, contains no organic material, and has a maximum unit weight of at least 95 pounds per cubic foot.

Smooth-wall Schedule 40 polyvinyl chloride (PVC) pipe, fittings and accessories must be manufactured from polyvinyl chloride meeting ASTM D 1784. At the discretion of the Engineer, other materials may be substituted to make proper connections.

C. **Construction.** Excavate trenches as needed and shape the bottom of the trench so the pipe will be uniformly supported. Connect Schedule 40 PVC pipe to the existing drain outlet and extend the pipe to the roadside ditch, storm sewer or drainage structure. If necessary, make watertight connections to storm sewers or drainage structures. Backfill the pipe with sound earth only after the Engineer approves all connections and the line and grade of the pipe.

D. **Measurement and Payment.** The completed work as described will be paid for at the contract unit price for the following contract item (pay item):

Contract Item (Pay Item)	Pay Unit
Sewer, Schedule 40 PVC, 4 inch to 10 inch.....	Foot

Sewer, Schedule 40 PVC, 4 inch to 10 inch will be measured along the centerline of the pipe placed.

The diameter range of 4 inch to 10 inch for the drain pipe is an estimate only. The extension of any diameter drain outlet pipe, whether smaller than 4 inch up to less than 12 inch, will be measured and paid for as **Sewer, Schedule 40 PVC, 4 inch to 10 inch** regardless of the diameter of the pipe.

The unit price for **Sewer, Schedule 40 PVC, 4 inch to 10 inch** includes the cost of the following:

1. Excavating;
2. Connecting the Schedule 40 PVC pipe to the existing drain outlet;
3. Installing Schedule 40 PVC pipe to the roadside ditch, storm sewer or drainage structure;
4. Installing bends and fittings as needed; and
5. Backfilling the pipe with sound earth.

If the new pipe is connected to an existing storm sewer or drainage structure, the tap will be measured and paid for separately as **Sewer Tap, 6 inch** or **Dr Structure, Tap, 6 inch** regardless of the diameter of the pipe.

If sewer empties into an open roadside ditch the engineer may require placement of an Underdrain, Outlet Ending of the appropriate size. Payment for this item of work will be included in the item:

Contract Item (Pay Item)	Pay Unit
Underdrain, Outlet Ending __ inch.....	Each

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
HMA APPLICATION ESTIMATE

MSG:SLB

1 of 2

02-15-17

a. Description. The hot mix asphalt (HMA) work shall be done in accordance with the requirements of Division 5 of the Standard Specifications for Construction and as herein specified.

b. Materials. The materials and application rates shall be as follows:

The leveling course mixture for Weston Road from Station 113+52 to Station 379+19 shall be **HMA, 5E1** with an estimated yield of 165 pounds per square yard. Placement of the HMA, 5E1 leveling course will be done by the contractor.

The top/wearing course mixture for Weston Road from Station 113+52 to Station 432+59 shall be **HMA, 5E1** with an estimated yield of 165 pounds per square yard. Placement of the HMA, 5E1 top course will be done by the contractor.

The base course mixture for Silberhorn Highway from Station 339+00 to Station 359+50 shall be **HMA, 4E1** with an estimated yield of 330 pounds per square yard. Placement of the HMA, 4E1 base course will be done by the contractor.

The leveling course mixture for Silberhorn Highway from Station 188+75 to Station 359+50 shall be **HMA, 4E1** with an estimated yield of 220 pounds per square yard. Placement of the HMA, 4E1 leveling course will be done by the contractor.

The top/wearing course mixture for Silberhorn Highway from Station 188+75 to Station 386+61 shall be **HMA, 5E1** with an estimated yield of 165 to 220 pounds per square yard. Placement of the HMA, 5E1 top course will be done by the contractor.

The Performance Graded (PG) asphalt binder for the all HMA mixtures shall be PG 64-22.

The HMA Approach wearing course mixture for driveway and intersecting road approaches shall be **HMA, 36A** or **HMA 5E1** with an estimated yield of 165 pounds per square yard.

The HMA Approach leveling and base course mixture for driveway approaches shall be **HMA, 13A** or **HMA 5E1** with an estimated yield of 165 pounds per square yard per lift.

The Performance Graded (PG) asphalt binder for the HMA Approach mixture shall be PG 64-22.

The Aggregate Wear Index for the top/wearing course shall be 260 minimum.

The bond coat material shall be emulsified asphalt SS-1h conforming to the requirements in section 904 of the Standard Specifications for Construction. The uniform rate of application for the bond coat shall be 0.05 to 0.15 gallons per square yard.

c. Construction. None specified.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Pay Unit
HMA, 5E1	Ton
HMA, 4E1	Ton
HMA Approach	Ton

The unit price for HMA, ____ includes the cost of placing and compacting HMA in the tapers and widening areas by hand or other methods.

No separate payment will be made for the bond coat material.

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
POST, MAILBOX, RELOCATE

MSG:AMN

1 of 1

05-19-15

a. Description. This work consists of moving the existing mailbox supports and mailboxes, maintaining serviceability during construction, and installing the mailbox post at the permanent location after construction is complete.

b. Materials. Use materials meeting the requirements of subsection 807.02 of the Standard Specifications for Construction.

c. Construction. Install the mailbox post in accordance with subsection 807.03 of the Standard Specifications for Construction and the following:

1. Newspaper boxes and supports, whether separate or attached to the existing mail box post, shall be reinstalled. This work is included in the payment for the property owner's associated mailbox.

2. When the mailboxes are required to be temporarily relocated, the mailboxes shall be accessible to post office vehicles from the pavement. Coordinate all mailbox relocations with the property owners and the local post office.

3. Set the mailbox post so that the bottom of the mailbox is located 42 to 44 inches above the edge of the road and the face of the mailbox is offset 6 to 8 inches from the edge of the shoulder.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Pay Unit
Post, Mailbox, Relocate	Each

The unit price for **Post, Mailbox, Relocate** includes the cost of the following:

1. Removing and relocating the existing post and mailbox post during construction activities;

2. Maintaining serviceability;

3. Installing the post and mailbox at the permanent location after construction activities are complete;

4. Removing and reinstalling newspaper boxes and supports; and

5. Replacing existing mailbox posts in poor condition with a new post.

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION FOR SLOPE RESTORATION

MSG:SLB

1 of 2

01-31-17

a. Description. This work consists of preparing all lawns and slopes on non-freeway projects designated for slope restoration on the plans or as directed by the Engineer and applying topsoil, fertilizer, seed, mulch with mulch anchor, mulch blanket, high velocity mulch blanket and permanent turf reinforcement mat to those areas. Turf establishment must be in accordance with section 816 of the Standard Specifications for Construction and Standard Plan R-100 Series, except as modified herein or otherwise directed by the Engineer.

b. Materials. The materials and application rates specified in sections 816 and 917 of the Standard Specifications for Construction apply unless modified by this special provision or otherwise directed by the Engineer. The following materials must be used on this project:

1. Seeding mixture TUF
2. Fertilizer, Chemical Nutrient, Class A
3. Topsoil Surface, Furnished or Salvaged, 3 inch. Remove any stones greater than 1/2 inch in diameter or other debris from all topsoil.
4. Hydromulch. Wood fiber shall have a moisture content of no less than 7% or more than 13%, shall be no less than 98.4% organic matter, shall have a pH no less than 4.3 nor more than 5.3, shall be dyed green to aid in visual metering during application. All mulch shall contain a tackifier to minimize movement of soil erosion and shall be mixed and applied in accordance with standard accepted procedures.
5. High Velocity Mulch Blanket

c. Construction. Construction methods must be in accordance with subsection 816.03 of the Standard Specifications for Construction. Begin this work as soon as possible after final grading of the areas designated for slope restoration but no later than the maximum time frames stated in subsection 208.03 of the Standard Specifications for Construction. It may be necessary, as directed by the Engineer, to place materials by hand.

Shape, compact and assure all areas to be seeded are weed free prior to placing topsoil. Place topsoil to the minimum depth indicated above, to meet proposed finished grade. If the area being restored requires more than the minimum depth of topsoil to meet finished grade, this additional depth must be filled using topsoil or, at the Contractor's option, embankment. Furnishing and placing this additional material is included in this item of work.

Topsoil must be weed and weed seed free and friable prior to placing seed. Remove any stones greater than 1/2 inch in diameter or other debris. Apply seed mixture and fertilizer to prepared soil surface. Incorporate seed into top 1/2 inch of topsoil

Apply hydromulch at a minimum rate of 2000 lb/acre (dry). Clean any overspray from pavements, poles, trees, bushes, sidewalks or buildings.

High Velocity Mulch Blanket must be placed in accordance with subsection 816.03.H of the Standard Specifications for Construction and as shown on Standard Plan R-100 Series.

If an area washes out after this work has been properly completed and approved by the Engineer, make the required corrections to prevent future washouts and replace the topsoil, fertilizer, seed and mulch. This replacement will be paid for as additional work using the applicable contract items.

If an area washes out for reasons attributable to the Contractor's activity or failure to take proper precautions, replacement will be at the Contractor's expense.

The Engineer will inspect the seeded turf to ensure the end product is well established, weed free, in a vigorous growing condition, and contains the species called for in the seeding mixture.

If the seeded turf is not well established at the end of the first growing season, the Contractor is responsible to re-seed until the turf is well established and approved by the Engineer.

If weeds are determined by the Engineer to cover more than 10 percent of the total area of slope restoration, the Contractor must provide weed control in accordance with subsection 816.03.J of the Standard Specifications for Construction. Weed control will be at the Contractor's expense with no additional charges to the project.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Pay Unit
Slope Restoration, Type _____	Square Yard

1. Place **Slope Restoration, Type 1** in all areas of residential yards or as directed by the Engineer. Slope restoration will be measured by area in square yards in place. **Slope Restoration, Type 1** includes all labor, equipment and materials required to install Topsoil Surface, Furnished or Salvaged; Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and Hydromulch which will not be paid for separately but is included in the contract unit price for **Slope Restoration, Type 1**.

2. Place **Slope Restoration, Type 2** will be completed in areas outside of residential yards parallel to the edge of the roadway outside of county drain crossing locations, or as directed by the Engineer. **Slope Restoration, Type 2** will be measured by area in square yards in place. **Slope Restoration, Type 2** includes all labor, equipment and materials required to place Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and Hydromulch which will not be paid for separately but is included in the contract unit price for **Slope Restoration, Type 2**.

3. Place **Slope Restoration, Type 3** in areas that have a 1 on 2 slope, any ditch with a grade of 1.5 percent to 3 percent or as directed by the Engineer, generally being areas within county drain easements. **Slope Restoration, Type 3** will be measured by area in square yards in place. **Slope Restoration, Type 3** includes all labor, equipment and materials required to install Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and High Velocity Mulch Blanket which will not be paid for separately but is included in the contract unit price for **Slope Restoration, Type 3**.

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
**FULL DEPTH RECLAMATION,
EMULSIFIED ASPHALT STABILIZED BASE COURSE, 8 INCH**

MSG:SLB

1 of 8

01-05-17

a. Description. This work consists of pulverizing the existing hot mix asphalt, chip seal or gravel road surface and a portion of the existing aggregate base material to the specified depth and maximum size; adding aggregate or RAP shaping and compacting the pulverized material to correct for profile, crown and contour; mixing emulsified asphalt, water and additives with the pulverized material; and spreading and compacting the mixture to produce a stabilized base course.

b. Submittals. Prepare and submit a mix design report for the existing pavement and aggregate base sampled from the project with added aggregate or recycled asphalt pavement (RAP), emulsified asphalt, water and additives to be used on the project in accordance with the Special Provision for Full Depth Reclamation with Emulsified Asphalt Mix Design Procedures to produce a stabilized base course that meets or exceeds all requirements specified.

Prior to construction, submit a list of the equipment to be used for the full depth reclamation work for review and approval by the Engineer.

c. Materials. Provide materials in accordance with the following:

1. Asphalt Emulsion. The type of asphalt emulsion to be used shall be determined by the mixture design in order to meet the requirements in Table 1. A representative from the asphalt emulsion supplier shall be on the job site at the beginning of the emulsion injection process to monitor the characteristics and performance of the asphalt emulsion. The asphalt emulsion supplier representative shall be available throughout the duration of the project to provide technical support to the Contractor and the Engineer. The asphalt emulsion supplier representative has the right to make adjustments to the asphalt emulsion formulation and job mix formula during this project, as required, to provide for changing conditions in material, weather or any other unforeseen condition. The supplied emulsified asphalt residue penetration shall be within 25 percent of the design emulsified asphalt residue penetration. The emulsified asphalt shall be received on the job site at a temperature no greater than 120 °F. The emulsified asphalt shall meet the requirements of Table 1.

Test	Procedure	Minimum	Maximum
Viscosity, Saybolt Furol, at 77 °F (25 °C), SFS	AASHTO T59	20	100
Sieve Test, No. 20 (850 µm), retained on sieve, %	AASHTO T59		0.10
Storage Stability Test, 24 hour, %	AASHTO T59		1.0

Distillation Test, Residue from distillation to 347 °F ± 9 °F (175 °C ± 5 °C), %	AASHTO T59 (a)	64.0	
Distillation Test, Residue from distillation to 347 °F ± 9 °F (175 °C ± 5 °C), %	AASHTO T59		1.0
Penetration, 77 °F (25°C), 100 gram, 5 second, dmm	AASHTO T49	75	200
a. Modified AASHTO T59 procedure – distillation temperature of 347 °F ± 9 °F (175 °C ± 5 °C) with a 20 minute hold.			

2. Water. Water shall conform to section 911 of the Standard Specifications for Construction and be free from salt, sugar and other harmful materials.
3. Other Additives. If necessary, additives may be used to meet the requirements in Table 1. In the case that an additive is used, the type and allowable usage percentage must be described in the submitted mix design.
4. Pulverized Material. Prior to the addition of the emulsified asphalt, the gradation of the pulverized material shall meet the requirements of Table 2.

Table 2: Pulverized Material Gradation		
Gradation No.	Sieve Size and Percent Passing	
	2 inch (50 mm)	1 1/2 inch (37.5 mm)
PM 3	100	100 - 97

d. Mix Design Requirements. A mix design for each distinct pavement section shall be submitted to the Engineer prior to construction using in-situ materials sampled by the Contractor and any new materials from the Contractor’s material suppliers proposed for the project. The job mix formula shall meet the criteria of Table 3 and be approved by the Engineer.

Table 3: Full Depth Reclamation with Emulsified Asphalt Mix Design Requirements			
Test Method	FDR Type 1 (a)	FDR Type 2 (a)	Test Purpose
Gradation for Design Millings, AASHTO T 27	Report	Report	
Sand Equivalent, ASTM D2419, Method B	Report	Report	
Modified Proctor, ASTM D1557, Method C	Report	Report	Optimum Moisture Content for Density and Compaction
Design Moisture Content	Report	Report	Dispersion of Emulsion

Superpave Gyrotory Compaction, 1.25° angle, 87 psi (600 kPa)	30 gyrations at 6 inches (150 mm)	30 gyrations at 6 inches (150 mm)	Laboratory Density Indicator
Short Term Strength (STS), ASTM D 1560, Part 13, 175 g/25 mm of width	175 minimum	150 minimum	Stability Indicator
Bulk Specific Gravity (Density), ASTM D 6752 or ASTM D 2726	Report	Report	Laboratory Density Indicator
Rice (Maximum Theoretical) Specific Gravity, ASTM D 2041	Report	Report	Laboratory Density Indicator
Air Voids, Modified	Report	Report	Laboratory Density Indicator
Indirect Tensile Strength, ASTM D 4867, psi (kPa)	40 (276) minimum	35 (241) minimum	Strength Indicator
Conditioned Indirect Tensile Strength, ASTM D 4867, psi	25 (172) minimum	20 (138) minimum	
Additional Additive(s) (b) Coarse Aggregate Fine Aggregate RAP Fly Ash Cement, %	Report Report Report Report 1.0 maximum	Report Report Report Report 1.0 maximum	
Emulsified Asphalt (b) Distillation Residue, % Residue Penetration, dmm Optimum Emulsion Content, % Residual Asphalt to Cement Content Ratio	Report Report Report 3:1 minimum	Report Report Report 3:1 minimum	
<p>a. FDR Type 1 for mixtures containing < 8 percent passing No. 200. FDR Type 2 for mixtures containing ≥ 8 percent passing No. 200 or for all granular materials.</p> <p>b. Report shall include type/gradation and producer/supplier.</p>			

e. Equipment. Provide equipment capable of producing a stabilized base that meets the requirements of this special provision

1. Reclaimer/Stabilizer. The self-propelled reclaimer shall be capable of fully pulverizing the existing pavement and aggregate base material to the depth shown on the plans, incorporating additional aggregate or RAP, incorporating the asphalt emulsion and water, and mixing the materials to produce a homogenous material. The recommended minimum power of the reclaimer shall be 400 horsepower. The machine shall be capable of reclaiming not less than 7 feet wide and up to 12 inches deep in each pass. The reclaimer shall have a system that includes a full width spray bar with nozzles for adding asphalt emulsion and a positive displacement pump interlocked to reclaimer speed so that the amount of emulsion added is automatically adjusted with changes in the ground speed. The additive system shall be capable of incorporating up to 7 gallons of emulsified asphalt per square yard. Individual nozzles on the spray bar shall be capable of being turned off as necessary to minimize emulsion overlap on

- subsequent passes. The use of a heating device to soften the pavement will not be permitted.
2. Grader. The grader shall be capable of aerating, spreading and final shaping of the pulverized and reclaimed material. The grader shall have an automated cross slope indicator and a grade reference system for longitudinal control. The grader blade shall not have scarifying teeth.
 3. Rollers. Provide rollers meeting the following minimum requirements:
 - A. Vibratory Padfoot Roller. The self-propelled vibratory padfoot shall have a minimum 84 inch wide drum and a 10 ton minimum weight. A front mounted blade is recommended for back dragging. A self-propelled vibratory padfoot roller shall be required for each self-propelled reclaimer.
 - B. Pneumatic Tire Roller. The self-propelled pneumatic tire roller shall have a water spray system and a 20 ton minimum weight. If a vibratory padfoot roller is not used, then the pneumatic tire roller shall be increased to a 25 ton minimum weight.
 - C. Vibratory Steel Drum Roller. The vibratory steel roller, double drum or single drum, shall have with a water spray system and a 10 ton minimum weight.
 4. Water Truck. A water truck capable of supplying the above equipment and providing a controlled spray of water on the road as required for moisture content before, during and after the asphalt emulsion injection and as required to assist in final compaction of the reclaimed material shall be used. The water truck shall be free of excessive leaks that would be detrimental to the reclaimed material.

f. Construction. Perform stabilization operations only for the length that required compaction can be completed within the work day and prior to impending inclement weather that could be detrimental to compaction and curing of the stabilized base material.

1. Weather Limitations. This work shall be performed when the atmospheric temperature in the shade and away from artificial heat is 50 °F and rising. Also, the weather shall not be foggy or rainy. The weather forecast shall not call for freezing temperatures within 7 days after placement of any portion of the project and the annual average low temperature within 7 days of the end of the project shall be greater than 32 °F. The Engineer may restrict work when the heat index is greater than 100 °F.
2. Pre-pulverization and Initial Shaping. The existing pavement shall be pre-pulverized by the self-propelled reclaimer and/or shaped by the grader to correct for profile, crown and contour before the addition of the emulsified asphalt. Water, coarse aggregate, RAP material or other additives may be added during this operation. The

- pre-pulverized and shaped material shall be compacted with a vibratory roller in static mode to support equipment and/or traffic and to provide depth control during processing. Depth of pre-pulverization and shaping shall be 1 inch to 2 inches less than the depth of final processing.
2. Processing and Placing. Moisture content of the pulverized material shall be within 1.0 percent of the mix design. If the moisture content is too low, water shall be added directly to the surface of the pulverized material by a water truck. The emulsified asphalt shall be applied at the percentage recommended in the mix design. The required depth of reclamation shall be monitored regularly. Prior to spreading and compacting, the processed material shall have a gradation meeting the mix design. Uniformly spread the processed material to the dimensions shown on the plans.
 3. Compaction. The recycled material shall be compacted according to the following:
 - A. Rollers. Immediately after processing and final shaping, the recycled material shall be compacted with equipment meeting the requirements of this special provision.
 - B. Rolling. The breakdown roller shall be 500 feet or less behind all self-propelled reclaimer units. The recycled material shall be compacted by the vibratory padfoot roller, applying high amplitude and low frequency, or the pneumatic-tired roller. Breakdown rolling shall be performed until the breakdown roller walks out of the material. "Walking out" for the vibratory padfoot roller is defined as light being clearly evident between all of the pads at the recycled material-padfoot drum interface and being no more than 3/16 inch deep. "Walking out" for the pneumatic-tired roller is defined as no significant wheel impressions being left on the surface.

After the completion of breakdown rolling, the grader shall be used to cut the recycled material no deeper than necessary to remove breakdown roller marks from the initial compaction and to achieve desired cross slope.

The bladed recycled material shall be compacted by the intermediate and final rollers. The number of passes and order of rollers may be altered to meet compaction requirements. Finish rolling shall not be done in vibratory mode. Water may be lightly sprayed by a water truck to aid in improving final density and appearance. A second water truck is required if water is also being added ahead of the reclaimer. The stabilized recycled material shall not be reshaped with a grader after final compaction. Should reshaping be required, a micromill may be acceptable as long as the mill is not detrimental to the integrity of the stabilized recycled material.

- C. Density Measurement. A nuclear gauge (ASTM D 2950, direct transmission) shall be used for acceptance testing, and the density shall be measured at the same location as the Modified Proctor for the first test. Subsequent gauge

readings may use the results of the initial Modified Proctor as long as the recycled pavement material remains constant or until the next required Modified Proctor test is performed. Samples shall be obtained from the full depth reclamation before rolling and stored in sealed containers for no longer than one hour before Proctor compaction. The recycled pavement material shall be compacted to a minimum of 97 percent of the Modified Proctor dry density (ASTM D 1557, Method C, 6 inch mold). Moisture content on the material shall be tested to permit the calculation of the dry density of the Modified Proctor sample. The mold shall be placed on a firm surface during compaction. If accurate dry density results cannot be obtained, then wet density shall be the reference.

4. Opening to Traffic. The compacted recycled pavement material shall be proof rolled with the type of vehicular traffic expected on the road. If permanent deformation does not occur, moving vehicular traffic may be allowed on the recycled pavement material. If permanent deformation greater than 1/4 inch occurs, truck traffic shall be kept off until the recycled pavement material is firm enough to support expected traffic with minimal deformation.
5. Curing. Before placing any surfacing, the recycled pavement material shall be allowed to cure until the moisture content is less than 2.5 percent, or less than 50 percent of the optimum moisture content as determined during the mix design process, or at the discretion of the Engineer. The recycled pavement material shall be surfaced before November 1.
6. Surface Test. The completed recycled pavement material will be tested for smoothness in the wheel paths with a 16 foot straightedge from any point on the straightedge resting on any two points and laid parallel to the centerline.

The crown will be tested for smoothness with variations no greater than 3/8 inch from any point on a 10 foot straightedge resting on any two points and laid at right angles to the centerline.

For each variation in the recycled pavement material that exceeds 3/8 inch, the entire area affected shall be corrected by a self-propelled cold milling machine. The recycled pavement material shall be swept by a mechanical broom to remove all loose material before opening to traffic. Correct all deviations from this tolerance at no additional cost.

The Contractor shall assist in the surface testing, furnish the 10 foot and 16 foot straightedges, and provide for their transportation to the job site at no additional cost.

g. Quality Assurance Testing. The Engineer will conduct assurance tests on the stabilized base material.

1. Test Methods and Frequency.

- A. Pulverized Material Sizing and Gradation. A sample shall be obtained before the addition of asphalt cement and screened using a 1.5 inch sieve (or smaller sieve if required) to determine if the material meets the maximum particle size requirement. Gradations shall be performed each day on site on the pulverized material using the following sieves: 1.5 inch, 1.0 inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16 and No. 30. The resulting gradation shall be compared to the mix design gradations to determine any necessary changes to emulsified asphalt cement content.
- B. Depth of Base Stabilization. The Engineer will check the nominal depth at the centerline and edges of the stabilized base. Anytime depth changes are made or equipment is idle, a depth check shall be taken.
- C. Emulsified Asphalt Content. The Engineer shall be notified any time emulsified asphalt content is changed. The emulsified asphalt content shall be checked and recorded for each segment in which the percentage is changed. Emulsified asphalt content changes shall be made based upon mix design recommendations, which are based upon different mix designs for road segments of varying construction. The emulsified asphalt content shall be checked from the belt scale totalizer or emulsified asphalt pump totalizer.
- D. Water Content. The Engineer shall be notified any time the water content is changed. Water content changes shall be made based on mixture consistency, coating, and dispersion of the recycled materials.
- E. Compacted Density. Compacted density shall be determined using a nuclear gauge following the procedures for ASTM D 2950, direct transmission measurement. This measurement shall be compared to the target density obtained by the Modified Proctor test following the procedures for ASTM D 1557, Method C.
- F. Frequency. Table 4 provides the recommended frequency for tests; however, the Engineer may increase the testing frequency if the construction process is experiencing problems or unknown conditions are encountered.

Table 4: Recommended Quality Assurance Testing Frequency	
Test	QA Testing Frequency
Pulverized Material Gradation	1 per day of production
Depth of Base Stabilization	1 per 2,500 feet
Emulsified Asphalt Content	1 yield check per day of production

Water Content	1 per 2,500 feet
Modified Proctor Test	1 per day of production
Compacted Density	1 per 2,500 feet

h. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	Pay Unit
Full Depth Reclamation, Emulsified Asphalt Stabilized Base Course, 6 inch	Syd
Full Depth Reclamation, Emulsified Asphalt Stabilized Base Course, 8 inch	Syd
Emulsified Asphalt	Gal

The Engineer will measure **Full Depth Reclamation, Emulsified Asphalt Stabilized Base Course, _ inch** by width and length, for the specified depth, as shown on the plans or as directed by the Engineer. The unit price for **Full Depth Reclamation, Emulsified Asphalt Stabilized Base Course, _ inch** includes the cost of the following:

1. Sampling the existing pavement surface and aggregate base;
2. Preparing and submitting a mix design based on the sampled in-situ materials and any new materials, if applicable;
3. Pulverizing the existing road surface and aggregate base;
4. Initial shaping and compaction of the pulverized material to correct for profile, crown and contour;
5. Mixing emulsified asphalt, water and additives with the pulverized material;
6. Spreading and compacting the mixed material to produce a stabilized base course;
7. Proof rolling the compacted stabilized base course prior to opening to traffic;
8. Moving barricades into place prior to beginning work; and
9. Protecting vehicular and pedestrian traffic and maintaining local traffic within the work zone.

The emulsified asphalt added to the pulverized material will be paid for separately. The Engineer will measure **Emulsified Asphalt** by volume in gallons at a temperature of 60° Fahrenheit.

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
FULL DEPTH RECLAMATION WITH EMULSIFIED ASPHALT
MIX DESIGN PROCEDURES

MSG:SLB

1 of 5

01-05-17

a. Laboratory Temperature and Humidity Control. Each laboratory performing mix designs shall have heating, ventilation, and air conditioning (HVAC) equipment that maintains a room temperature of 68 to 86 °F (20 to 30 °C) and relative humidity of less than 60 percent. The mix design laboratory shall be an AMRL accredited lab in asphalt, HMA, aggregate and soils at a minimum.

b. Sampling and Processing. A minimum sample size of 350 pounds (160 kg) is needed for each mix design. Bulk samples of the recycled layer thickness shall be obtained from either test pits or cores. Each layer shall be examined to confirm thickness and material.

The hot mix asphalt millings, RAP, shall be crushed. A washed gradation of the crushed bituminous materials(s) shall be performed according to AASHTO T 27 and reported and meet the following requirement(s).

Table 1: Grading Requirements for FDR Aggregate			
Sieve Size		Percent Passing	
		FDR Crushed Gradations	
		Ideal	Less Suitable
2 in	50 mm	100	
1 1/2 in	37.5 mm	87 – 100	
1 in	25 mm	77 – 100	100
3/4 in	19 mm	66 – 99	99 – 100
1/2 in	12.5 mm	67 – 87	87 – 100
3/8 in	9.5 mm	49 – 74	74 – 100
No. 4	4.75 mm	35 – 56	56 – 95
No. 8	2.36 mm	25 – 42	42 – 78
No. 16	1.18 mm	18 – 33	33 – 65
No. 50	300 µm	10 – 24	24 – 43
No. 200	75 µm	4 – 10	10 – 20

Washed gradation (AASHTO T 27) and sand equivalent (ASTM D 2419, Method B) shall be performed and reported for any granular layer. The washed gradation (AASHTO T 27) of combined layers shall be performed and reported. If combined layers include an aggregate layer, the sand equivalent (ASTM D 2419, Method B) shall be performed and reported.

All washed gradations shall be dried at no greater than 104 °F (40 °C).

c. Mixing and Compaction. Perform Modified Proctor compaction according to ASTM D 1557, Method C to determine optimum moisture content (OMC) at peak dry density. OMC shall be defined by a best-fit curve from a minimum of four points. Material containing 20 percent or more passing the No. 200 sieve shall be mixed with target moisture, sealed, and set aside a minimum of 12 hours. All other material shall be set aside a minimum of 3 hours. If a material contains less than 4 percent passing the No. 200 sieve, then this testing is not required.

Select the water content of specimens, not including water in the emulsified asphalt, based on sand equivalent value (SE) from the combined materials:

- 60 to 75 percent of OMC if $SE \leq 30$
- 45 to 65 percent of OMC if $SE > 30$

If a material contains less than 4 percent passing the No. 200 sieve or if no peak develops with the OMC curve, then fix the moisture content between 2 and 3 percent.

Specimens shall be mixed with the required amount of water before the addition of emulsified asphalt. Specimens shall be mixed with the appropriate amount of water and allowed to sit sealed according to the same guidelines as used for Modified Proctor specimens.

Samples shall have a weight before addition of water and emulsified asphalt to produce 2.75 to 3.25 inch (70 mm to 80 mm) tall compacted specimens.

Choose four emulsified asphalt contents that will bracket the design emulsified asphalt content. Recommended emulsified asphalt content percentages: 1.5, 2.0, 2.5, 3.0, 3.5, or 4.0. The following specimens shall be created:

- A minimum of two specimens at each of four emulsified asphalt contents shall be produced for short-term strength testing.
- Four specimens at each of four emulsified asphalt contents shall be produced for the strength and retained strength tests.
- Two specimens shall be produced for maximum specific gravity.

A mechanical mixer shall be used that has a bowl with a diameter of 10 to 12 inches (250 to 300 mm). It shall rotate on its axis at 50 to 75 revolutions per minute. A mixing paddle which makes contact with the bottom and side of the bowl shall rotate on its axis at twice the bowl rotation rate and in the opposite rotation direction as the bowl.

Aggregate material and emulsified asphalt shall be mixed at a temperature of 68 to 79 °F (20 to 26 °C). Water shall be mixed for 60 seconds. Emulsified asphalt shall be mixed for 60 seconds. If other materials are added, such as lime or cement, then they shall be introduced in a similar manner as they will be on the project. For example, if lime is incorporated a day or more before emulsified asphalt addition, then it shall be added to the wet aggregate a day or more before mixing with emulsified asphalt. If lime is incorporated as a slurry, then it shall be incorporated as a slurry in the laboratory.

Loose specimens shall be cured individually in plastic containers of 4 to 7 inches (100 to 175 mm) in height and 6 inches (150 mm) in diameter. Specimens shall be cured at 104 °F (40 °C) for 30 ± 3 minutes. No further mixing or aeration shall occur during this time.

Specimens shall be compacted in a Superpave gyratory compactor (SGC) at a vertical pressure of 87 psi (600 kPa), an angle of 1.25°, and a mold of 6 inches (150 mm) in diameter for 30 gyrations. After the last gyration, 87 psi (600 kPa) ram pressure shall be applied for 10 seconds. The mold shall not be heated.

d. Curing After Compaction. Specimens (except STS specimens) shall be cured for 72 hours at 104 °F (40 °C). The bottom of the specimens shall rest on racks with slots or holes for air circulation. After curing, specimens for moisture conditioning shall be cooled at ambient temperature a maximum of 24 hours; specimens for dry strength shall cool at ambient temperature or 77 °F (25 °C) and be tested at the same time as the moisture-conditioned specimens.

Specimens for Rice (maximum theoretical) specific gravity shall be cured at the same conditions as the compacted specimens, except they can be tested after cooling a maximum of 24 hours.

e. Short-Term Strength (STS) Test. A modified Hveem cohesiometer apparatus shall be used to test early strength (1 hour). This apparatus and procedure generally conforms to ASTM D 1560, Section 13 with the following exceptions:

- It shall have the capability of testing 6 inch (150 mm) diameter specimens.
- It shall have a shot flow rate of 5.95 ± 0.11 pounds per minute (2700 ± 50 grams per minute).
- Specimens shall be cured before compaction according to Section 5, and cure each specimen at each emulsified asphalt content for 60 ± 5 minutes at 77 °F (25 °C) and 10 to 70 percent humidity after compaction and before testing.

The following calibrations shall be made:

- The counter balance should be positioned exactly so that the hinged plate just barely remains horizontal when the top brackets and empty bucket are in place. This ensures that there is no force on the sample until shot begins to flow into the bucket.
- The gap between the bars of the switch that turns off the flow of shot should have a gap of 0.75 inches (18 mm) when there is 3000 grams of shot in the bucket. During this adjustment the locking bolt that prevents the plate from moving is in place.

Cohesion shall be tested as follows:

1. Tare the balance with the empty bucket weight.
2. Center the specimen on the unit.
3. Place plates on top of sample and press down while adjusting the outer lower nuts up until they just contact the bottom of the plate.

4. Use a torque wrench or torque meter to tighten the nuts on the specimen to a maximum of 1.6 foot-pounds (2.6 Newton-meters).
5. Gently support the bar so the unit does not move when the pin is pulled releasing the hinged plate.
6. Pull pin and push open valve to start the flow of shot.
7. After the unit shuts off the flow of shot, immediately put the locking pin in place and then record the weight of shot.
8. Loosen top nuts to remove plates and rotate specimen 90 degrees.
9. Repeat procedure on the other axis of the specimen.
10. Calculate short-term strength as follows:

$$STS = SW / (15(0.031h + 0.0027h^2))$$

Formula 1

Where:

SW = Shot Weight in grams
 h = height in centimeters

A total of two results will be obtained for each specimen at each emulsified asphalt content, and a total of four results will be obtained at each emulsified asphalt content.

f. Volumetric Measurements. Determine bulk specific gravity (ASTM D 6752) of the specimens. Keep specimens in bags until testing or vacuum saturation is performed. ASTM D 2726 may be used to determine bulk specific gravity if the specimens' absorption is less than or equal to 2 percent of water by volume.

Determine Rice (maximum theoretical) specific gravity (ASTM D 2041) except as noted in the Mixing, Compaction, and Curing after Compaction sections.

Determine air voids at all emulsified asphalt contents used in the design.

g. Mechanical Measurements. Perform ITS testing according to ASTM D 4867. Specimens shall be conditioned at 77 °F (25 °C) for two hours before testing. Vacuum saturate half the specimens at each emulsified asphalt content to a minimum 55 percent of the voids filled with water. Soak for 24 hours at 77 °F (25 °C) before testing.

h. Emulsified Asphalt Content Selection. The emulsified asphalt content selected shall result in the mixture meeting the mix design requirements of the FDR with Emulsified Asphalt special provision.

i. Report. All mix design test results shall be reported to the Engineer. All additional additives and bituminous material shall be reported to the Engineer.

j. Measurement and Payment. All costs associated with preparing the mix designs are included in the unit price for **Full Depth Reclamation, Emulsified Asphalt Stabilized Base Course, 6 inch** and will not be paid for separately.

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
SANITARY SHUTOFF, ADJUST

MSG:SLB

1 of 1

02-23-17

a. Description. This work consists of adjusting sanitary shutoff as directed by the Engineer.

b. Materials. Provide materials in accordance with section 823 of the Standard Specifications for Construction.

c. Construction. All work must be in accordance with section 823 of the Standard Specifications for Construction.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Contract Item (Pay Item)	Pay Unit
Sanitary Shutoff, Adj, Case 1.....	Each
Sanitary Shutoff, Adj, Case 2.....	Each

The unit price for **Sanitary Shutoff, Adj, Case 1** includes the cost of the following:

1. Saw cutting existing pavement, curb, and curb and gutter;
2. Adjusting the cover up or down, no greater than 6 inches;
3. Removing and replacing pavement adjacent to the adjusted shutoff.

Removal and replacement of curb and gutter adjacent to the adjusted structure will be paid for separately.

Sanitary Shutoff, Adj, Case 2 applies to sanitary structure adjustments located outside existing pavement, curb, and curb and gutter or within pavement at locations where the pavement is shown to be removed.

LENAWEE COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
SANITARY STRUCTURE COVER, ADJUST

MSG:SLB

1 of 3

02-21-17

a. Description. This work consists of adjusting or temporarily lowering sanitary structures as directed by the Engineer.

b. Materials. Provide materials in accordance with section 403 of the Standard Specifications for Construction and the following exceptions and additions:

1. Precast Concrete Adjusting Ring – Provide precast concrete manhole adjusting rings meeting the requirements of subsection 913.06 of the Standard Specifications for Construction. No other method of adjustment is permitted.
2. Butyl Rubber Sealant – Provide $\frac{3}{4}$ inch diameter butyl rubber sealant from one of the following:
 - A. Conseal CS-202 by Concrete Sealants, Inc.
 - B. BN109 – Butyl-Nek Joint Sealant by Henry
 - C. Kent Seal No. 2 Butyl Sealant by Hamilton Kent
3. Anchor Bolts – Provide $\frac{5}{8}$ inch diameter stainless steel (Type 304) threaded rod of sufficient length to anchor the casting and adjusting rings into the cone section of the existing sanitary manhole. The nuts and washers for the anchor bolts shall also be stainless steel (Type 304).
4. Adhesive System – Provide an adhesive system from the Qualified Products List in section 712.03J of the Michigan Department of Transportation Materials Source Guide for grouting of the anchor bolts.

c. Construction. All work shall be in conformance with section 403 of the Standard Specifications for Construction and the following requirements:

1. Adjusting sanitary structure covers applies when the new elevation of the cover requires a vertical change of no greater than 6 inches. Immediately before placing the HMA top course or overlay, make final adjustments to sanitary sewer structure covers within the HMA pavement section.
2. Adjust the cover to the required elevation by supporting it on precast concrete adjusting rings.
3. Place two (2) rows of $\frac{3}{4}$ inch diameter butyl rubber sealant between each of the following joints:

- A. Between the top of the cone and the bottom adjusting ring
 - B. Between each adjusting ring
 - C. Between the bottom of the casting and the top adjusting ring
4. Mortar joints will not be permitted. Metal or plastic shims may be used for fine adjustments of the frames.
 5. Drill four (4) holes through the precast adjusting rings to set the 5/8 inch diameter stainless steel anchor bolts for the manhole frame. The holes for the anchor bolts shall extend a minimum of 6 inches into the cone of the manhole.
 6. After drilling the holes, clean with a blast of oil-free compressed air.
 7. After cleaning the holes, fill with a grout selected from section 712.03J of the Qualified Products List and insert the anchor bolts.
 8. After the grout has cured sufficiently, secure the manhole frame to the anchor bolts with stainless steel washers and nuts.
 9. Apply a ½ thick plaster coat of mortar to the outer and inner surface of the structure from the bottom of the casting to a minimum of 3 inches below the limit of the adjustment.

Contact Tom Gillenwater (517-264-4696) of the Lenawee County Drain commission a minimum of two (2) business days in advance of the work to arrange for inspection of the structure adjustments.

d. Measurement and Payment. The completed work as described will be paid for at the contract unit price for the following contract item (pay item):

Contract Item (Pay Item)	Pay Unit
Sanitary Structure Cover, Adj, Case 1.....	Each
Sanitary Structure Cover, Adj, Case 2.....	Each
Sanitary Structure Cover, Adj, Add Depth.....	Foot

The unit price for **Sanitary Structure Cover, Adj, Case 1** includes the cost of the following:

1. Saw cutting existing pavement, curb, and curb and gutter;
2. Adjusting the cover up or down, no greater than 6 inches;
3. Placing two (2) rows of butyl rubber sealant between each joint;
4. Drilling holes and installing four (4) stainless steel threaded anchor bolts;

5. Securing the manhole frame to the anchor bolts with stainless steel washers and nuts;
6. Applying a ½ inch thick plaster coat of mortar to the outer and inner surface of the structure; and
7. Removing and replacing pavement adjacent to the adjusted cover.

Removal and replacement of curb and gutter adjacent to the adjusted structure will be paid for separately.

Sanitary Structure Cover, Adj, Case 2 applies to sanitary structure adjustments located outside existing pavement, curb, and curb and gutter or within pavement at locations where the pavement is shown to be removed.

The Engineer will measure **Sanitary Structure Cover, Adj, Add Depth** beginning 6 inches from the bottom of the casting to the limit of the additional adjustment depth.

Temporary lowering of sanitary structure covers, if required, will be measured and paid for as **Dr Structure, Temporary Lowering** in accordance with subsection 403.04.E of the Standard Specifications for Construction.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

COORDINATION CLAUSE – I&O

RAL:DT

1 of 1

01/24/17

The following information may be pertinent to the determination of construction methods, railroad protective insurance, and railroad flagging rates.

RAILROAD COMPANY

Indiana & Ohio Railroad
1750 N. Sugar Street
Lima, OH 45246

Contact: Dick Kreinbrink, Road Master
Phone: (513) 505-1908

TRAIN MOVES

Location 05

Silberhorn Hwy – NI# 258299M and Weston Rd – NI# 258316B

Train moves are approximately 4 freight moves daily at 25 mph and 4 switching moves weekly. Maximum timetable is 25 mph.

The train movement and speed information does not represent a commitment by the railroad and is subject to change without notice.

Railroad watchperson will be provided by Railroad for the Contractor operations within 25 feet of the crossing for roadway work at no cost to the Contractor.

NOTICE TO BIDDERS

COORDINATION CLAUSE

MSG:SLB

1 of 1

05-20-15

During construction the Indiana & Ohio Railway Company (IORC) will reconstruct both of their crossings within the project limits. These crossings are located near Station 393+00 on Weston Road and Station 225+00 on Silberhorn Highway. These crossing replacements will be completed by IORC and all costs associated with this work will be the responsibility of IORC. The contractor will be responsible to coordinate work with IORC. IORC will be allowed to completely close each crossing for up to seven calendar days during the course of the approved construction schedule submitted by the contractor. The contractor in exchange for no fees being charged for IORC flag control during work within the IORC right-of-ways shall saw cut the pavement on each side of both sets of tracks at locations coordinated with IORC and dispose of all excess pavement materials generated during the rail crossing replacement work by IORC. Additionally on completion of the rail work the contractor will pave the area up to the rails on both sides and in between the rails as necessary for the contractor to continue work and safely cross the railroad. Work up to the railroad on both sides will be paid according to the bid item completed. Patching between rails will be paid as Hand Patching for the quantity needed to completely fill between rails as required.

INDIANA AND OHIO RAILWAY
SPECIAL PROVISION
FOR
RAILROAD INSURANCE REQUIREMENTS

RAL:DGT

1 of 2

APPR: JLD:SMR:01-24-17

a. Description. This work consists of providing Railroad Protective Liability Insurance before work is commenced and kept in effect until all work required to be performed under the terms of the contract is satisfactorily completed as evidenced by the formal acceptance by the Michigan Department of Transportation (Department).

b. Insurance Requirements. To carry the following insurance, in a form, and with an insurer or insurers, acceptable to the Department and Indiana and Ohio Railway and its parent companies on all insurance forms listed below with railroad contact information as noted in the Coordination Clause for Work on Railroad Property.

1. Railroad Protective Liability Insurance in behalf of Indiana and Ohio Railway and its parent companies, as the named insured.

The Contractor must furnish to the Department and to the Railroad copies of policies as evidence that, with respect to Contractor or Subcontractor operations standard Railroad Protective Liability Insurance is carried providing for limits of liability in the amount of two million dollars (\$2,000,000) combined single limit per occurrence for bodily injury, death, and property damage with an aggregate limit of six million dollars (\$6,000,000) applying separately to each annual period. Said Railroad Protective Liability Insurance must conform to the regulations prescribed therefore in the Federal-Aid Policy Guide, Part 646, Subpart A of the Federal Highway Administration dated December 9, 1991, and amendments thereto.

This coverage can be purchased through Genesee and Wyoming Inc. subsidiary railroads.

2. Provide insurance as required in subsection 107.10 of the Standard Specifications for Construction except with the modifications stated herein. Provide Commercial General Liability Insurance.

A. Single occurrence limit is two million dollars (\$2,000,000).

B. Aggregate limit is six million dollars (\$6,000,000).

C. List Indiana and Ohio Railway and its parent companies as additional insured on the policy.

D. Shall contain Insurance Services Office Standard Endorsement CS 2417 or its equivalent.

E. A waiver of subrogation in favor of the railroad must also be shown as an endorsement to the policy.

The Contractor must furnish to the Department evidence of any reductions in the limits of liability herein described as determined by the Railroad.

The policy must contain the following endorsement:

"It is hereby agreed that 30 days prior written notice of cancellation, expiration, termination, or reduction of coverage provided by this policy will be given to the Department and Indiana and Ohio Railway and its parents".

c. Construction. If any of the insurance is canceled, the Contractor and all subcontractors must cease operations as of the date of cancellation and cannot resume operations until new insurance is in force.

d. Measurement and Payment. The Contractor must pay for all railroad insurance. Insurance costs as described in this special provision will be included as part of other pay items.

SIGN MATERIAL SELECTION TABLE

SIGN SIZE	SIGN MATERIAL TYPE		
	TYPE I	TYPE II	TYPE III
≤ 36" X 36"		X	X
>36" X 36" < 96" TO WIDE		X	
> 96" WIDE TO 144" WIDE	X	X	
> 144" WIDE	X		


TYPE I ALUMINUM EXTRUSION
 TYPE II PLYWOOD
 TYPE III ALUMINUM SHEET

ROUNDING OF CORNERS IS NOT REQUIRED FOR TYPE I OR II SIGNS.
 VERTICAL JOINTS ARE NOT PERMITTED.
 HORIZONTAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE NOT PERMITTED.

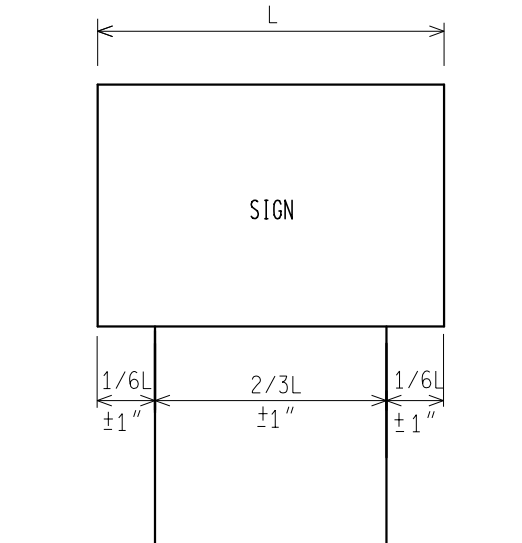
POST SIZE REQUIREMENTS TABLE

SIGN AREA (ft ²)	POST TYPE		
	U-CHANNEL STEEL	SQUARE TUBULAR STEEL	WOOD
≤9	1 - 3 lb/ft*	1 - 2" 12 or 14 GA*	N/A
9 ≤ 20	2 - 3 lb/ft	2 - 2" 12 or 14 GA	1 - 4" X 6"*
> 20 ≤ 30	N/A	N/A	2 - 4" X 6"
> 30 ≤ 60	N/A	N/A	2 - 6" X 8"
> 60 ≤ 84	N/A	N/A	3 - 6" X 8"

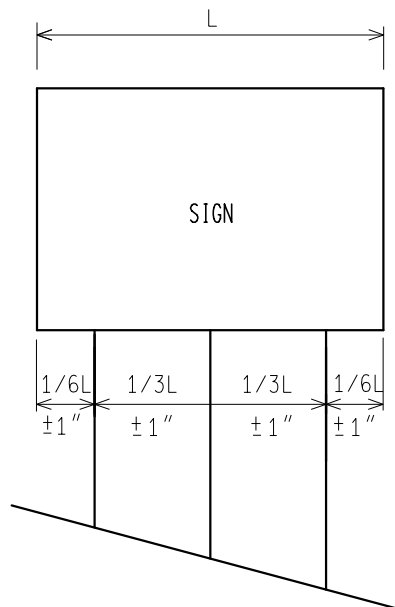
*SIGNS 4 FEET AND GREATER IN WIDTH REQUIRE 2 POSTS.
 SIGNS GREATER THAN 8 FEET IN WIDTH REQUIRE 2 OR 3 WOOD
 POSTS DEPENDING ON AREA OF SIGN.
 A MAXIMUM OF 2 POSTS WITHIN A 7' PATH IS PERMITTED.

 PREPARED BY OPERATIONS FIELD SERVICES	DEPARTMENT DIRECTOR Kirk T. Steudle APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL FOR GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS		
	DRAWN BY: <u>CON/ECH</u> CHECKED BY: <u>AUG</u>	APPROVED BY: _____ DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT	F.H.W.A. APPROVAL	<u>7/20/2016</u> PLAN DATE

2 POST SIGN SUPPORT SPACING



3 POST SIGN SUPPORT SPACING

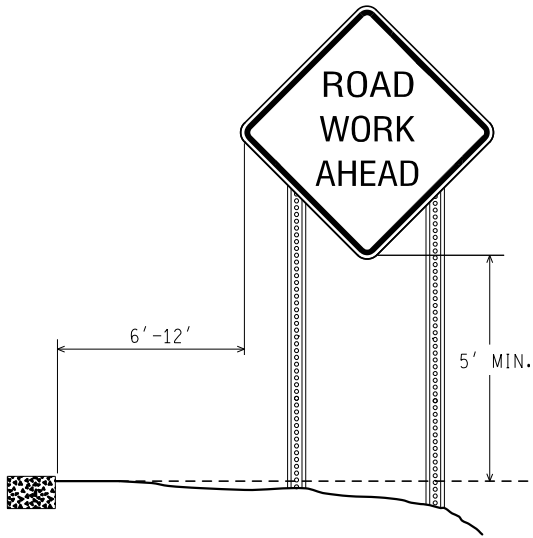


* FOR ALL 11' AND 12' LONG SIGNS ON 3 WOOD SUPPORTS, SPREAD POSTS SO AS TO HAVE A 8' MIN. TO 9' MAX. DISTANCE BETWEEN OUTSIDE POSTS.

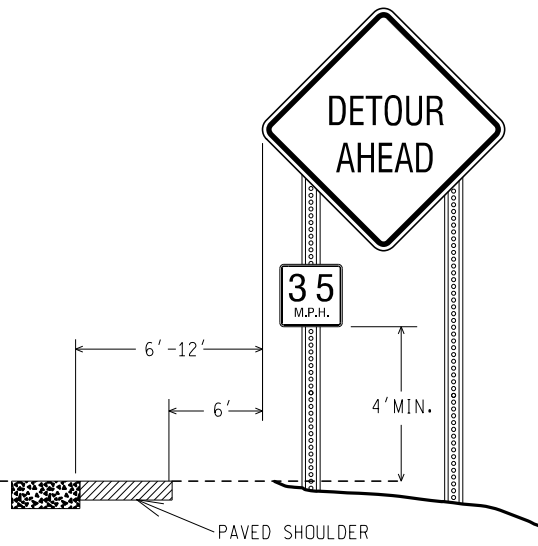
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 2 OF 11
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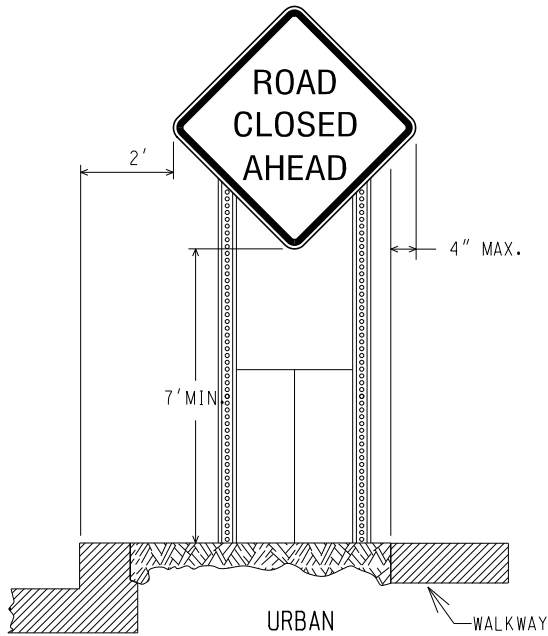
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RURAL



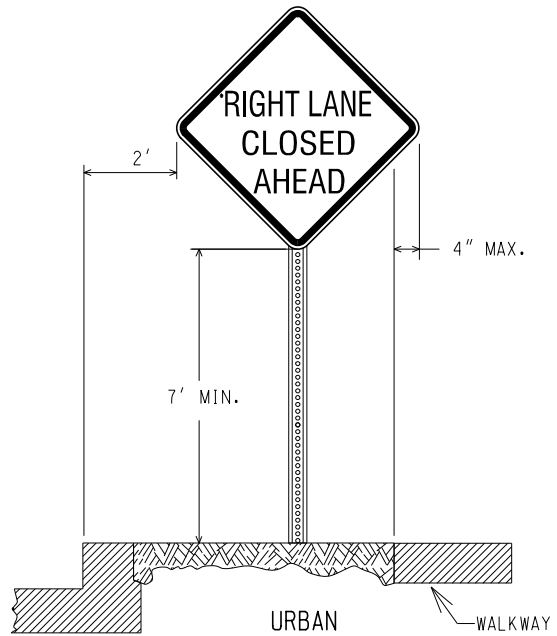
RURAL WITH ADVISORY SPEED PLATE



URBAN

WALKWAY

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)



URBAN

WALKWAY

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

BOTTOM HEIGHT AND OFFSET

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF FIELD SERVICES SPECIAL DETAIL

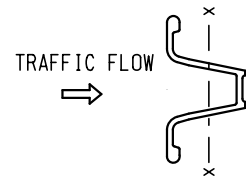
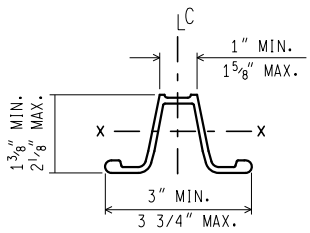
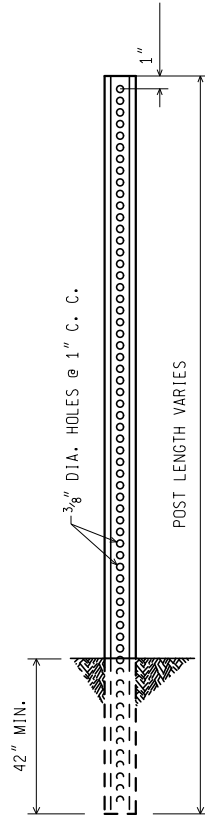
F.H.W.A. APPROVAL

7/20/2016
PLAN DATE

WZD-100-A

SHEET
3 OF 11

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WEIGHT = 3 lbs/ft
 SECT. MOD. X.-X. = 0.31 CUBIC INCHES MIN.

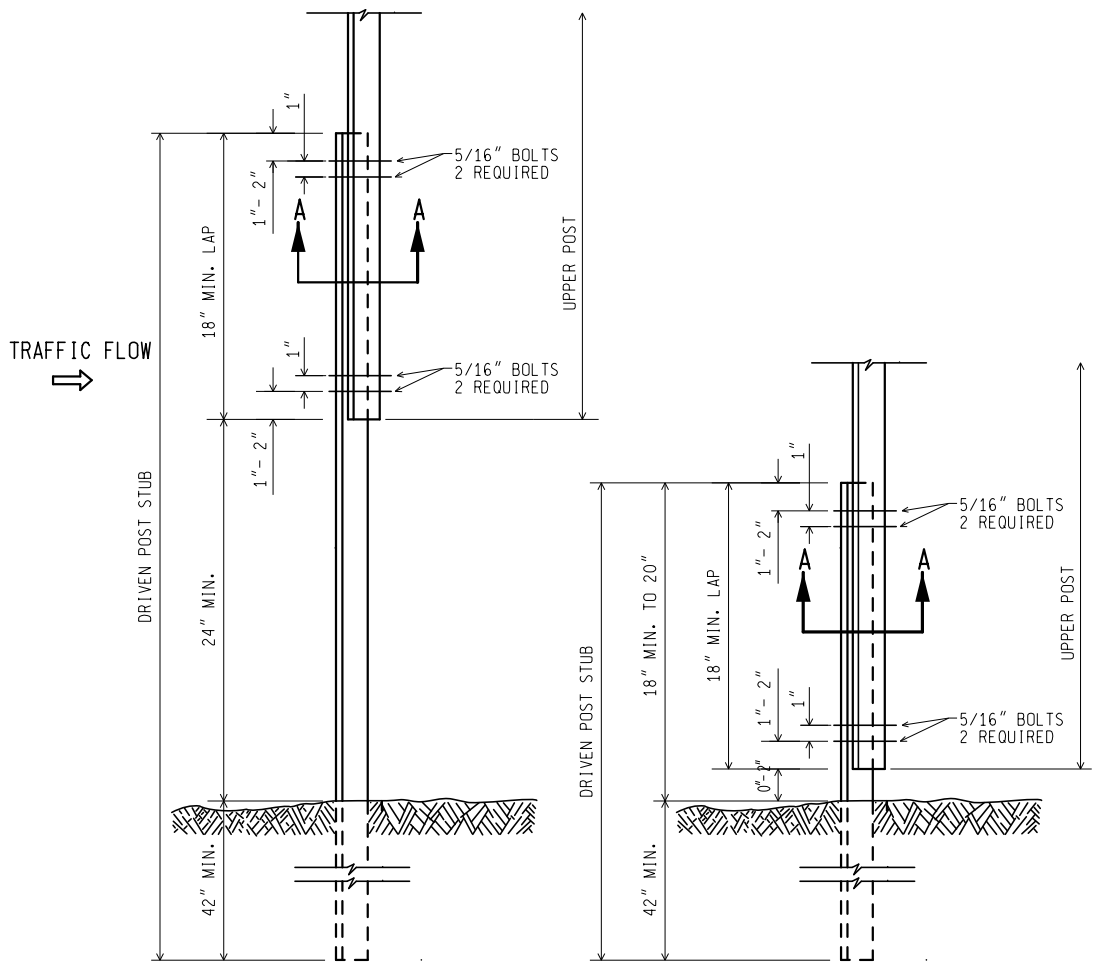
3 lb. U - CHANNEL STEEL POST
 (NO SPLICE)

MOUNT SIGN ON OPEN FACE OF
 U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 4 OF 11
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UPPER SPLICE

LOWER SPLICE

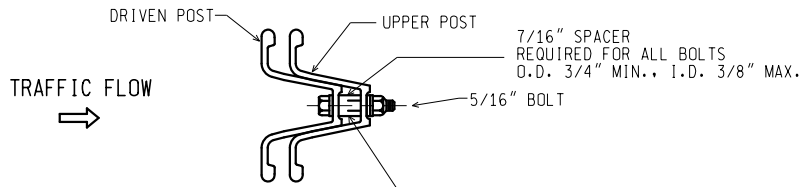
3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)

MOUNT SIGN ON OPEN FACE OF
UPPER U - CHANNEL STEEL POST

NOT TO SCALE

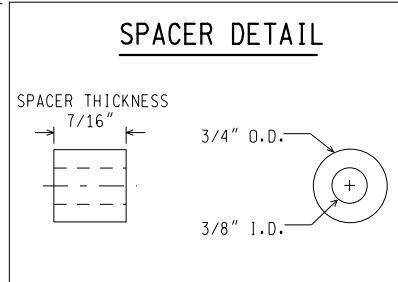
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 5 OF 11
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SECTION A-A

7/16" SPACER
 REQUIRED FOR ALL BOLTS
 O.D. 3/4" MIN., I.D. 3/8" MAX.



NOTES:

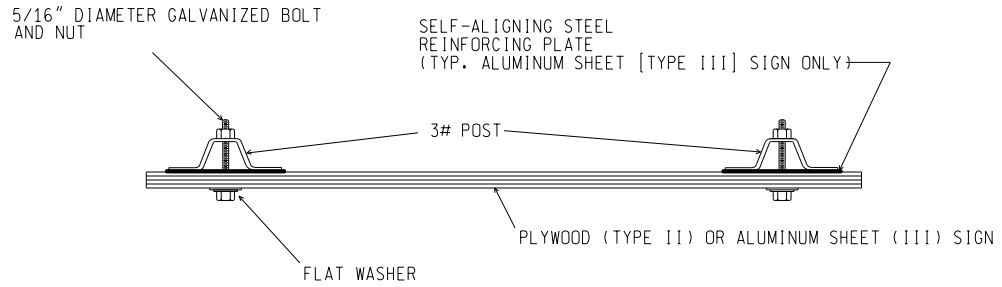
1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNBOLTED CONFIGURATION.
2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" TO 2" FROM THE END OF THE LAP.
3. THE INTERIOR BOLT (FARTHEST FROM LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN THE NEXT PREPUNCHED HOLE.
4. THE DRIVEN POST SHALL ALWAYS BE MOUNTED IN FRONT OF THE UPPER POST WITH RESPECT TO THE ADJACENT ONCOMING TRAFFIC, REGARDLESS OF THE DIRECTION THE SIGN IS FACING.
5. THE SPLICE LAP SHALL BE FASTENED BY FOUR-5/16" DIA. GALVANIZED A449 BOLTS (SAE J429 GRADE 5) OR GALVANIZED A325 BOLTS.

3 lb. U - CHANNEL STEEL POST
 (WITH SPLICE)

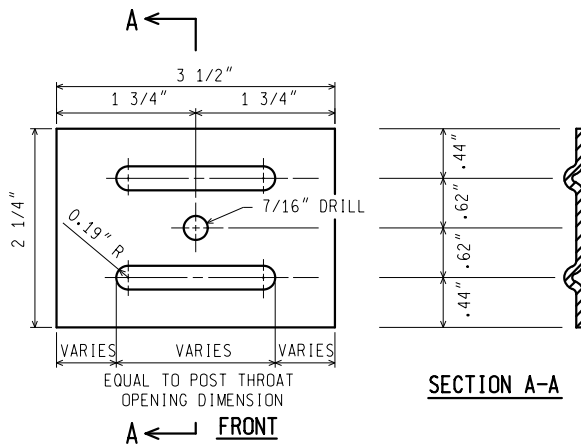
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 6 OF 11
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SIGN TO 3 lb. POST CONNECTION



NOTES: (FOR STEEL SIGN REINF' PLATE)

1. MATERIAL: 12 GAUGE CARBON STEEL.
2. TOLERANCE ON ALL DIMENSIONS $\pm 0.0625"$
3. FINISH-AFTER STAMPING AND PUNCHING, GALVANIZE ACCORDING TO CURRENT SPECIFICATIONS FOR ZINC (HOT GALVANIZE) COATINGS ON PRODUCTS FABRICATED FROM PLATES OR STRIPS

STEEL SIGN REINFORCING PLATE
REQUIRED FOR TYPE III SIGNS ONLY

3 lb. U - CHANNEL STEEL POST SIGN CONNECTION

NOT TO SCALE

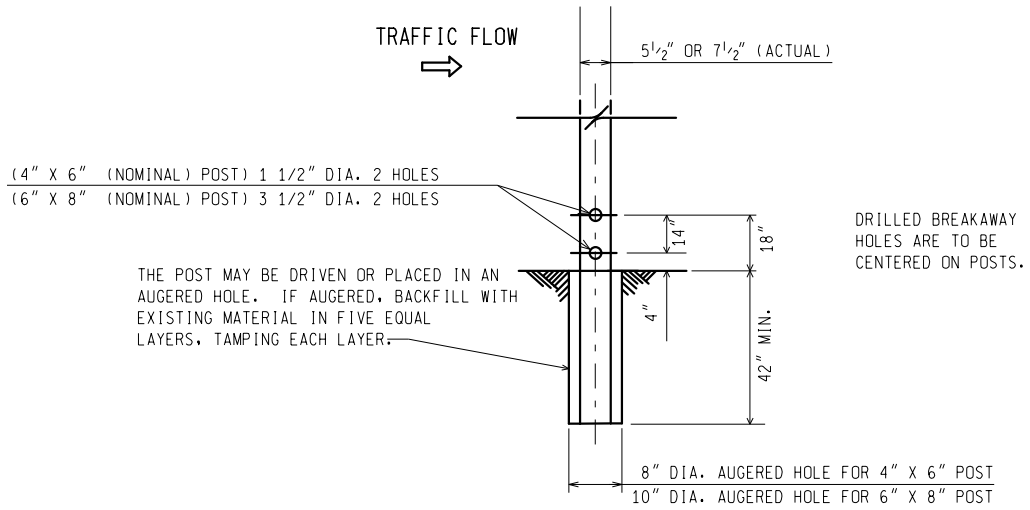
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF FIELD SERVICES SPECIAL DETAIL

F.H.W.A. APPROVAL

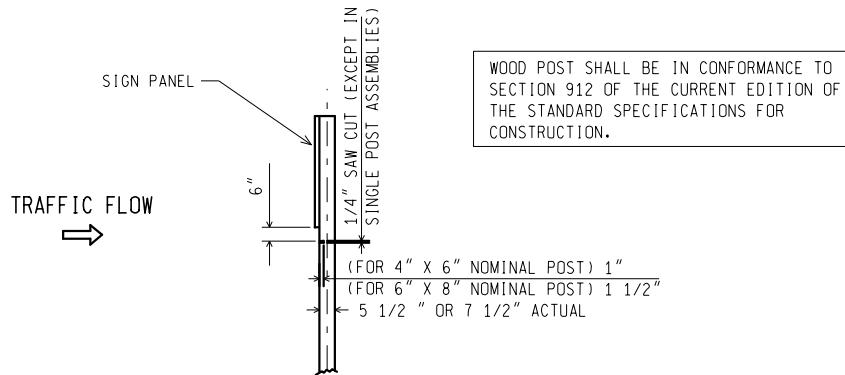
7/20/2016
PLAN DATE

WZD-100-A

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7 OF 11



WOOD POST BREAKAWAY HOLES/
 DIRECT EMBEDMENT DETAILS



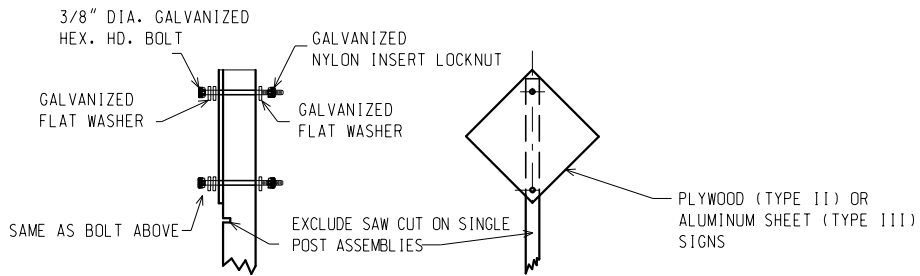
SAW CUT DETAIL
 (MULTIPLE POST INSTALLATIONS)

WOOD POST DETAILS

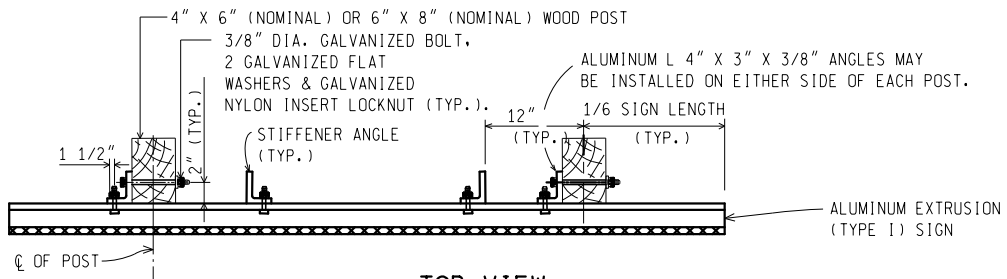
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 8 OF 11
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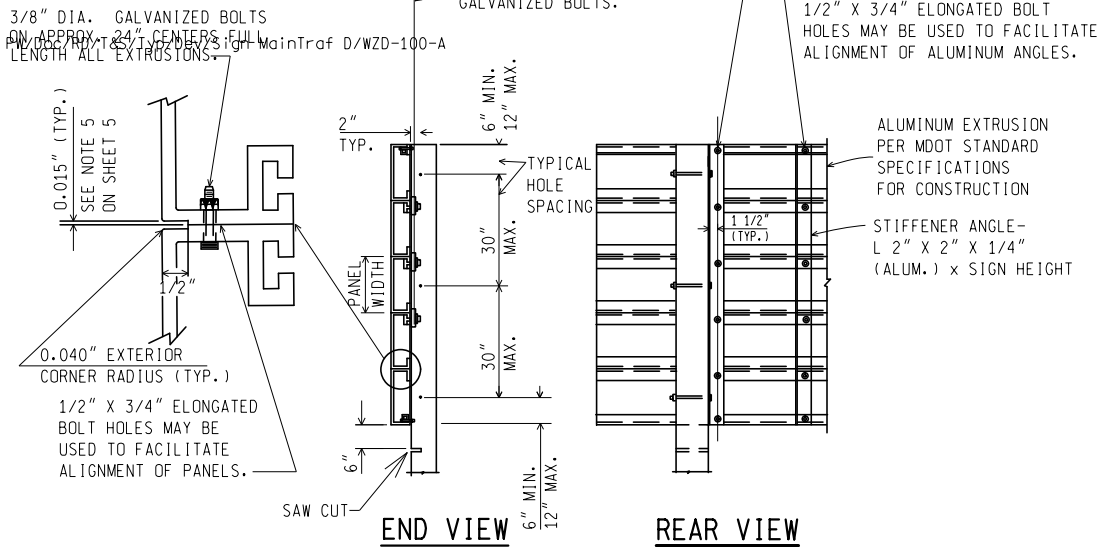
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TYPE II AND TYPE III SIGNS



**TOP VIEW
TYPE I SIGN**



TYPE I SIGN - ERECTION DETAILS

WOOD POST CONNECTIONS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF FIELD SERVICES SPECIAL DETAIL

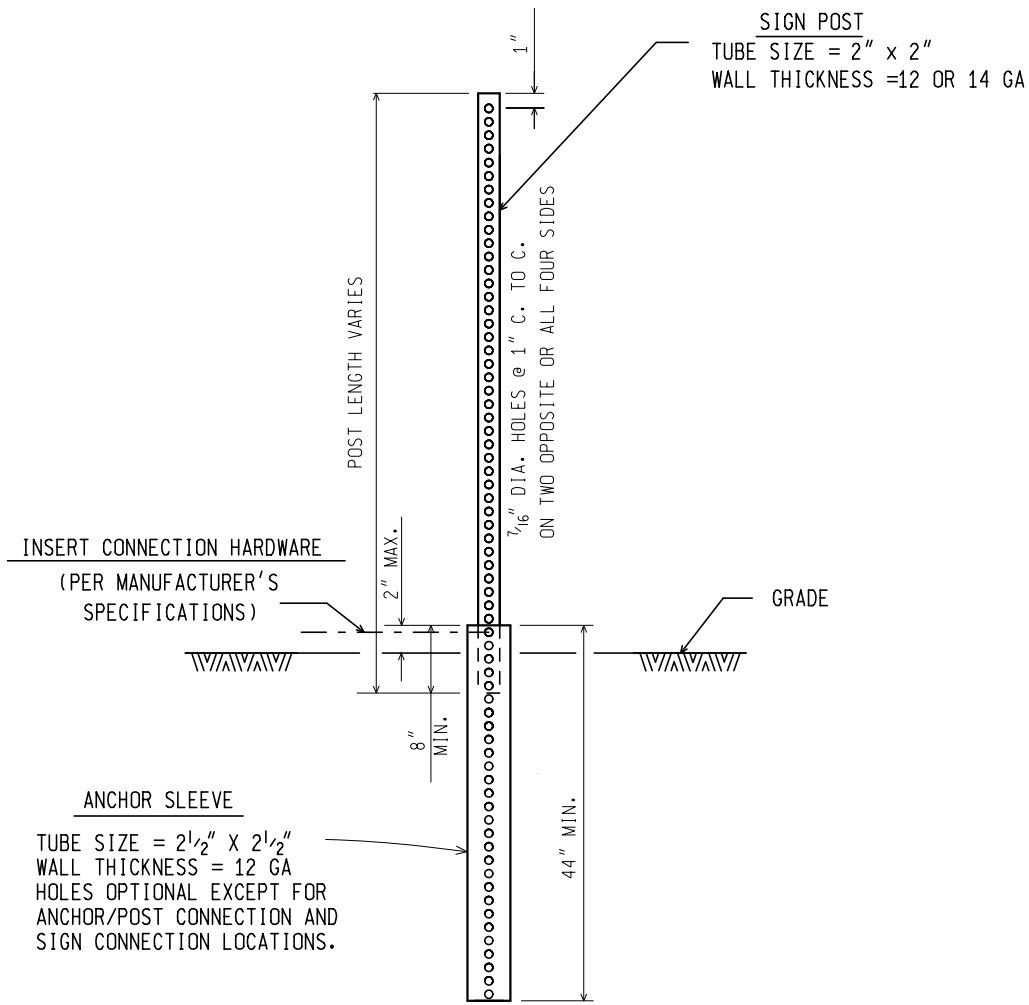
F.H.W.A. APPROVAL

7/20/2016
PLAN DATE

WZD-100-A

SHEET
9 OF 11

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SQUARE TUBULAR STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 10 OF 11
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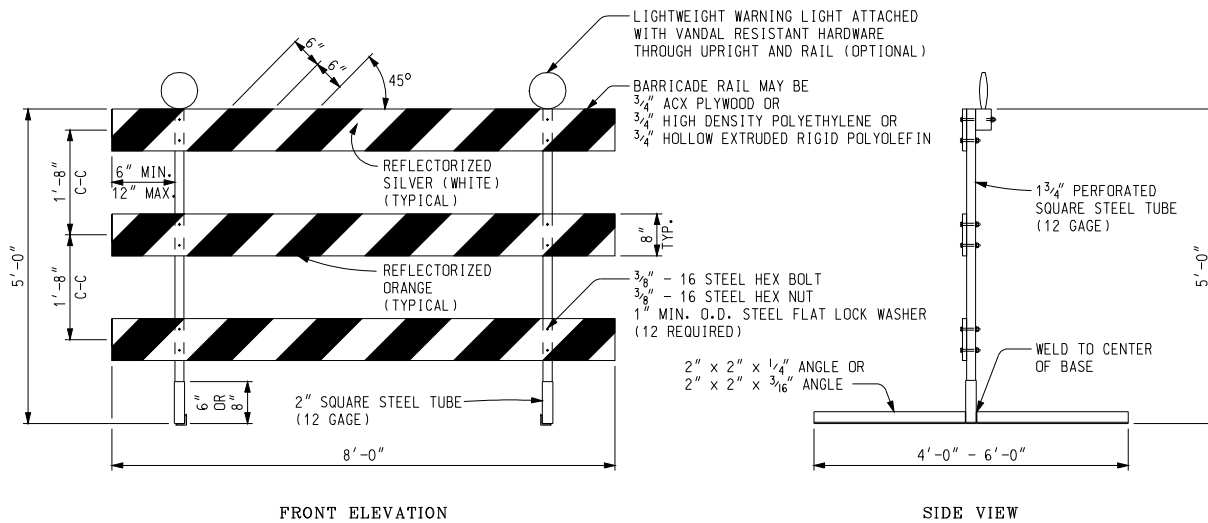
GENERAL NOTES:

1. A MAXIMUM OF TWO POSTS WITHIN A 7 FOOT PATH IS PERMITTED.
2. ALL SIGN POSTS SHALL COMPLY WITH NCHRP 350.
3. ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 42".
4. BRACING OF POST IS NOT PERMITTED.
5. SIGN SHALL BE LEVEL, AND UPRIGHT FOR THE DURATION OF INSTALLATION.
6. ERECT POSTS SO THE SIGN FACE AND SUPPORTS DO NOT VARY FROM PLUMB BY MORE THAN 3/16" IN 3'. PROVIDE A CENTER-TO-CENTER DISTANCE BETWEEN POSTS WITHIN 2 PERCENT OF PLAN DISTANCE.
7. NO MORE THAN ONE SPLICE PER POST, AS SHOWN, WILL BE PERMITTED.
8. POST TYPES SHALL NOT BE MIXED WITHIN A SIGN SUPPORT INSTALLATION.
9. NO VERTICAL JOINTS ARE PERMITTED IN SIGN. NO HORIZONTAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE PERMITTED IN SIGN
10. REMOVE SIGN POSTS AND/OR POST STUBS IN THEIR ENTIRETY WHEN NO LONGER REQUIRED.
11. ALL LABOR, MATERIALS, AND EQUIPMENT, INCLUDING TEMPORARY SUPPORTS REQUIRED TO INSTALL, MAINTAIN, RELOCATE, AND/OR REMOVE THE TEMPORARY SIGN, INCLUDING SUPPORTS, ARE CONSIDERED TO BE INCLUDED IN THE COST OF THE TEMPORARY SIGN.
12. SAW CUTS IN WOOD POSTS ARE TO BE PARALLEL TO THE BOTTOM OF THE SIGN.
13. POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE TOP OF SIGN.
14. TEMPORARY WOOD SUPPORTS DO NOT REQUIRE PRESERVATIVE TREATMENT.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	F.H.W.A. APPROVAL	7/20/2016 PLAN DATE	WZD-100-A	SHEET 11 OF 11
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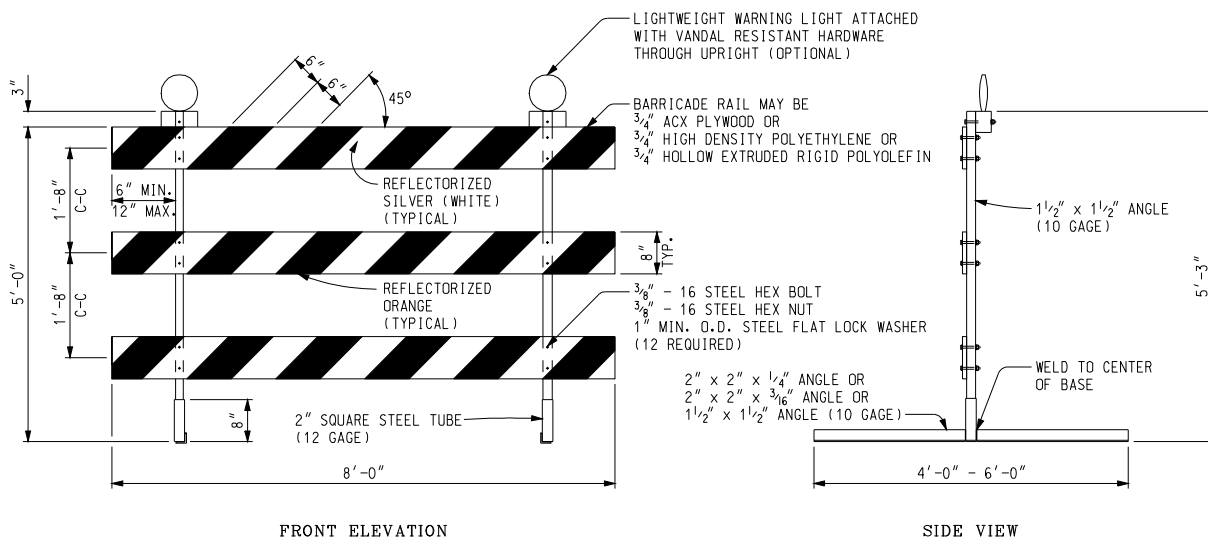
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FRONT ELEVATION

SIDE VIEW

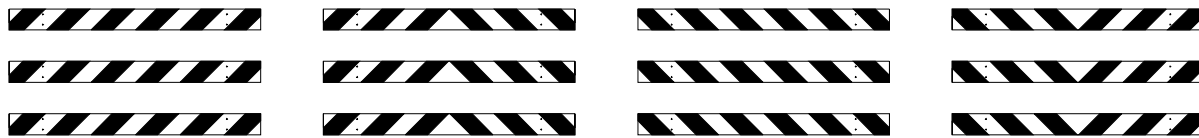
PERFORATED SQUARE STEEL TUBE OPTION



FRONT ELEVATION

SIDE VIEW

ANGLE IRON OPTION



LEFT DIRECTIONAL

BI-DIRECTIONAL

RIGHT DIRECTIONAL

CLOSURES

BARRICADE RAIL SHEETING OPTIONS
TYPE III BARRICADES

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

NOT TO SCALE

File: T&S/Typ/Signs/WorkZones/wzd 125 d

Rev. 09/22/09 PJ



PREPARED BY
TRAFFIC AND SAFETY

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

Temporary
Traffic Control Devices

DRAWN BY: ECH

(SPECIAL DETAIL)

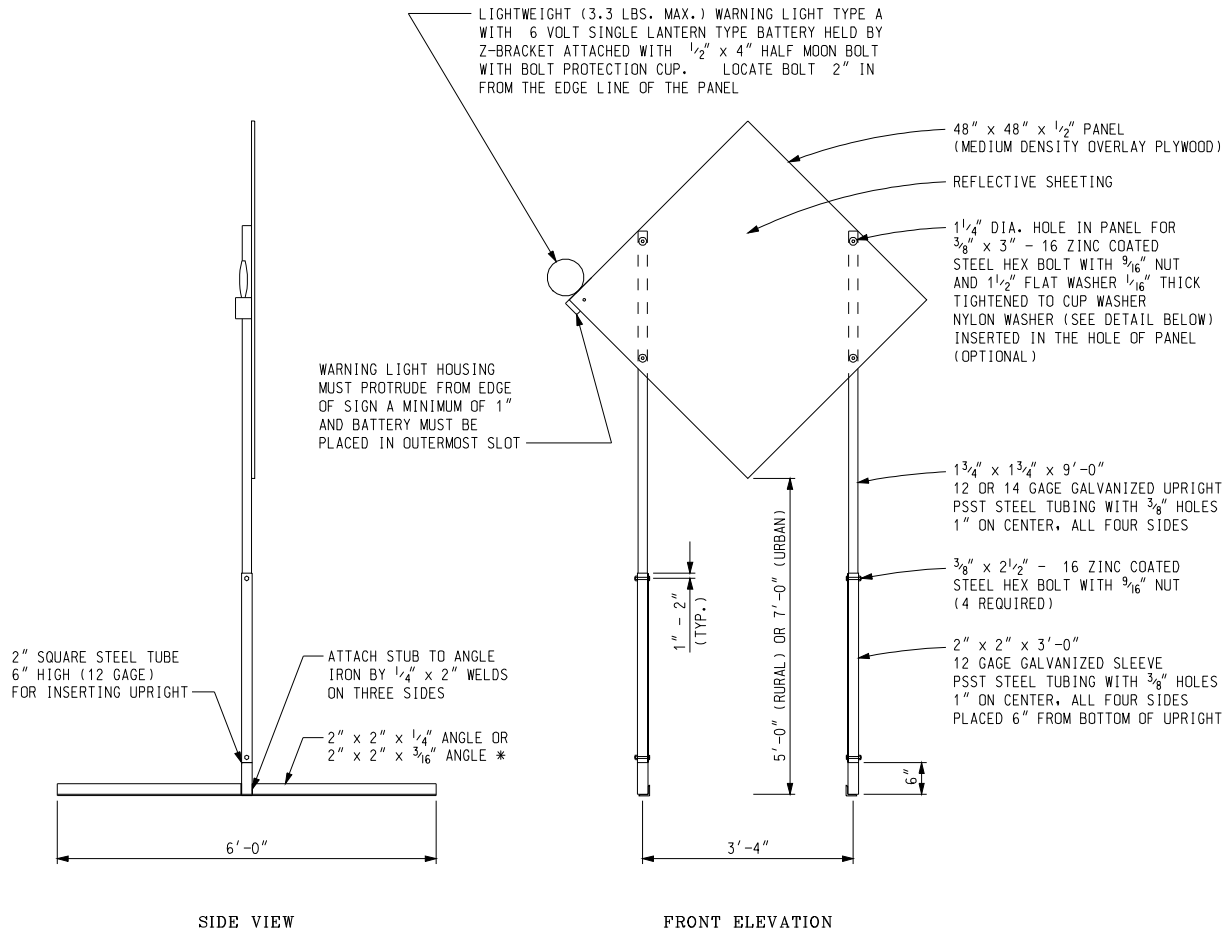
9/22/09
PLAN DATE

WZD-125-E

SHEET
1 of 3

CHECKED BY: MWB

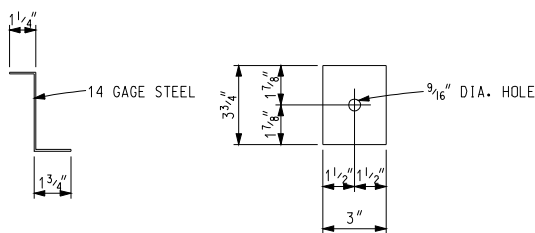
FHWA APPROVAL DATE



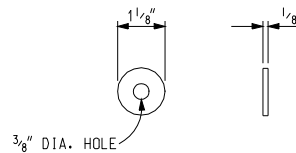
TEMPORARY SIGN SUPPORT

(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)

* SIGN STAND IS BALLASTED WITH FOUR OR MORE 35 LB SANDBAGS. A MINIMUM OF ONE ON EACH END.
 UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.



Z-BRACKET DETAIL



OPTIONAL NYLON WASHER

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

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
 FHWA APPROVAL DATE

9/22/09
 PLAN DATE

WZD-125-E

SHEET
 2 of 3

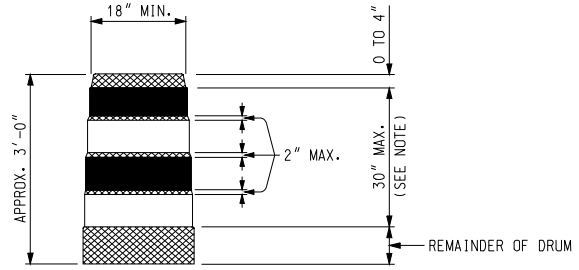
File: T&S/Typ/Signs/WorkZones/wzd 125 d

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- PLASTIC DRUM
- ▲▲▲ PROPOSED TYPE III BARRICADE
- △△△ EXISTING TYPE III BARRICADE

SYMBOLS TO BE USED ON PLANS



- REFLECTORIZED ORANGE
- REFLECTORIZED WHITE
- NON REFLECTORIZED ORANGE

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

PLASTIC DRUM

NOTES:

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

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

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

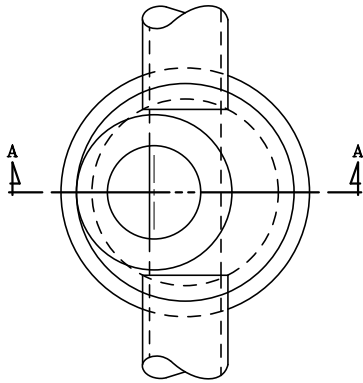
SIGNS, BARRICADES, AND PLASTIC DRUMS SHALL BE FACED WITH PRESSURE-SENSITIVE REFLECTIVE SHEETING ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

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

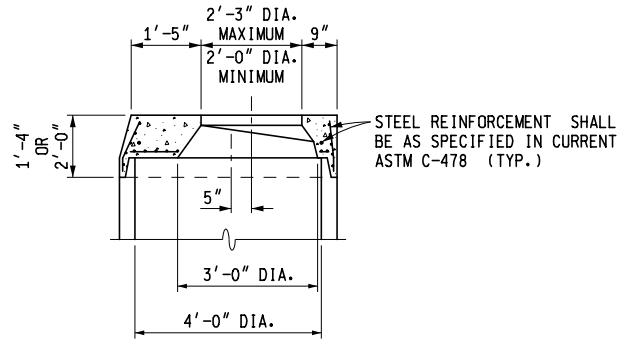
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	9/22/09	WZD-125-E	SHEET 3 of 3
File: T&S/Typ/Signs/WorkZones/wzd 125 d	Rev. 09/22/09 PJ	PLAN DATE		

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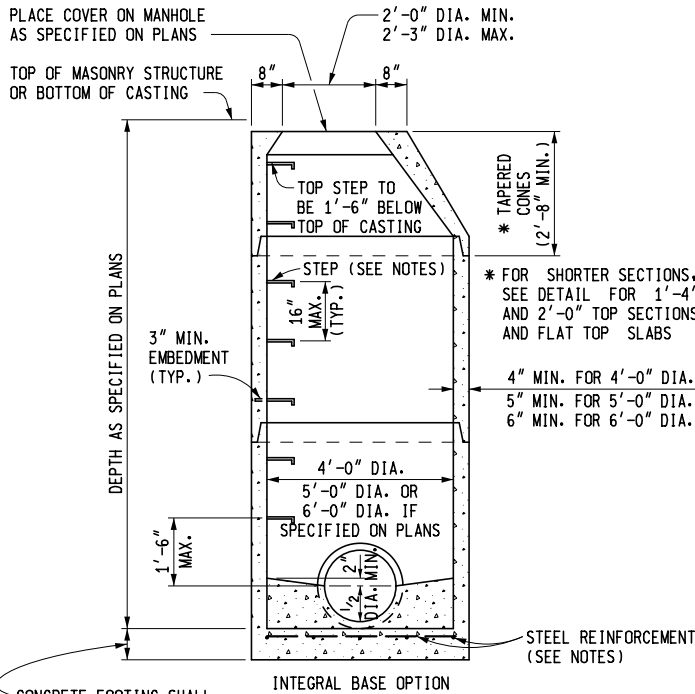


PLAN VIEW

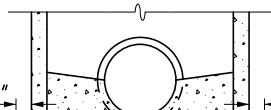


DETAIL FOR
1'-4" & 2'-0" TOP SECTIONS

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"

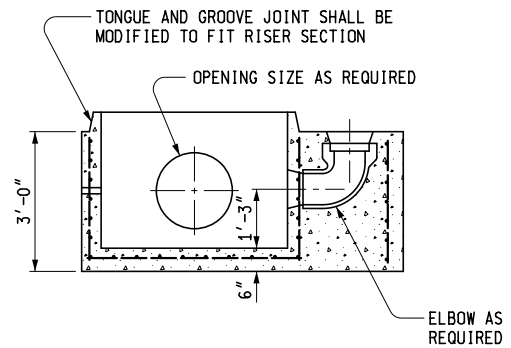
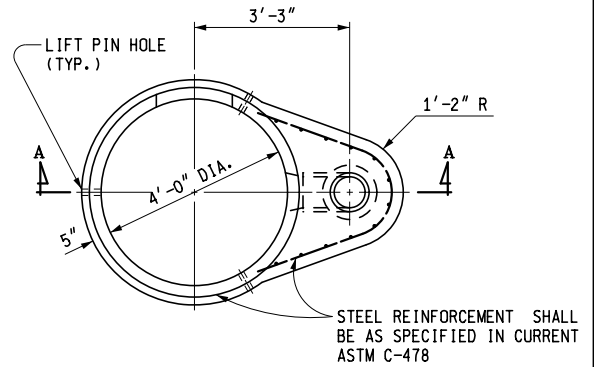


SEPARATE BASE OPTION

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

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. Stedile

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT 69

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

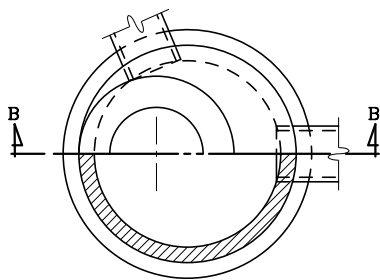
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

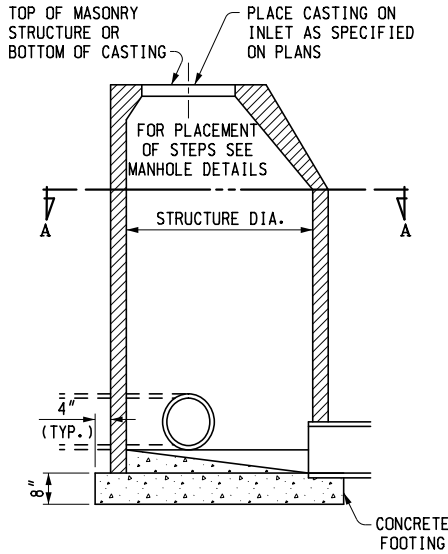
6-15-2016
PLAN DATE

R-1-G

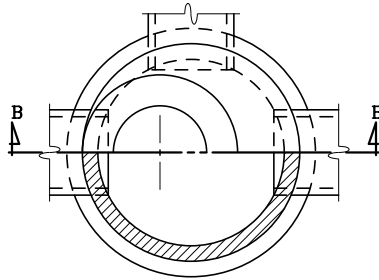
SHEET
1 OF 9



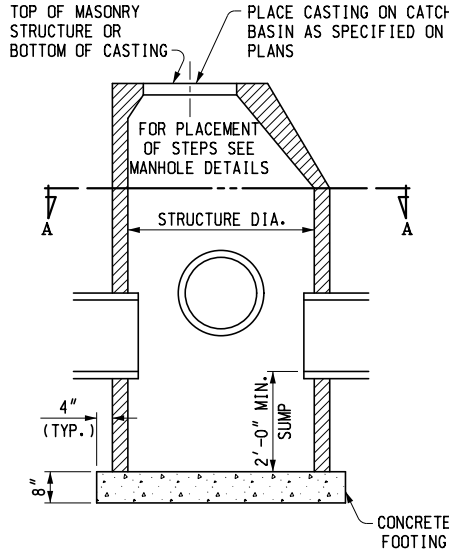
HALF SECTION A - A



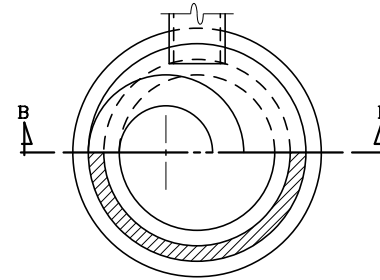
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B
INLET



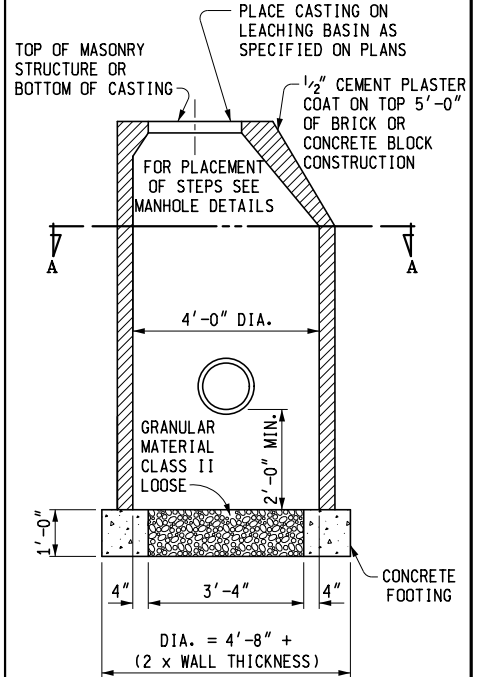
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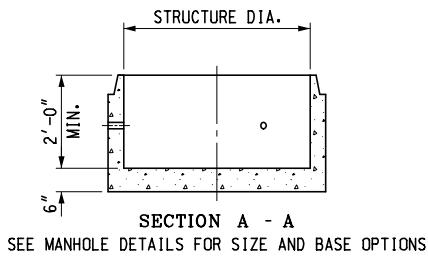
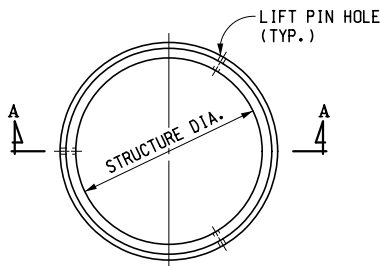
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B
CATCH BASIN



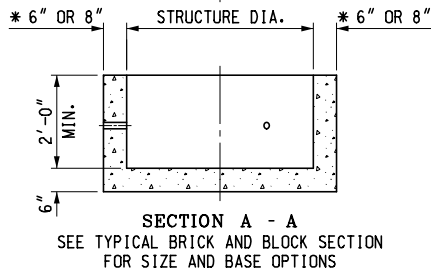
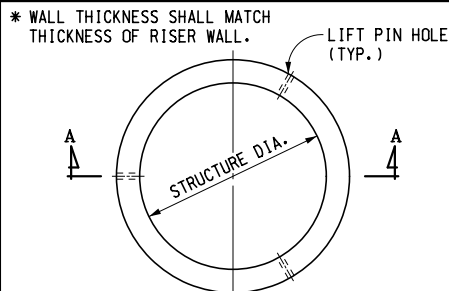
HALF SECTION A - A



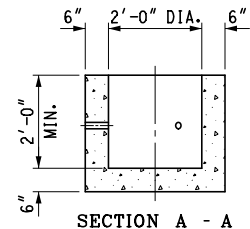
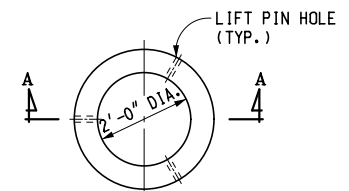
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
LEACHING BASIN



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



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

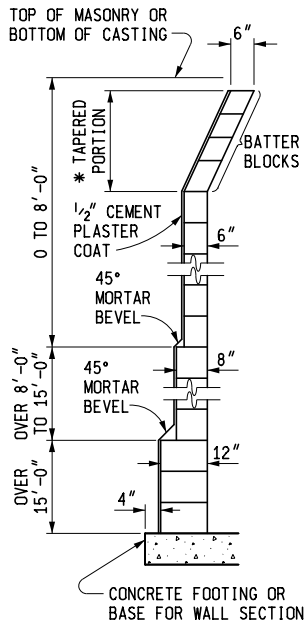


SECTION A - A
PRECAST SUMP FOR 2'-0" DIA. STRUCTURES

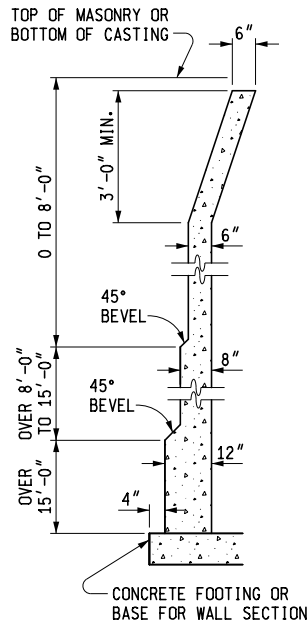
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

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

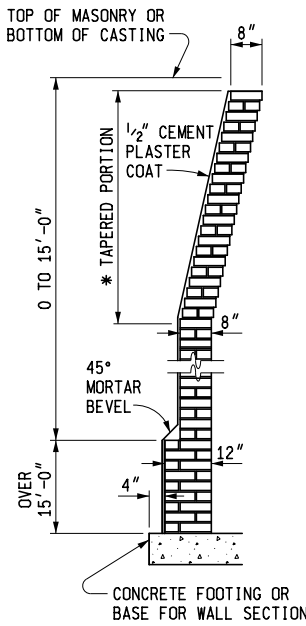


TYPICAL
 CONCRETE BLOCK
 WALL SECTION

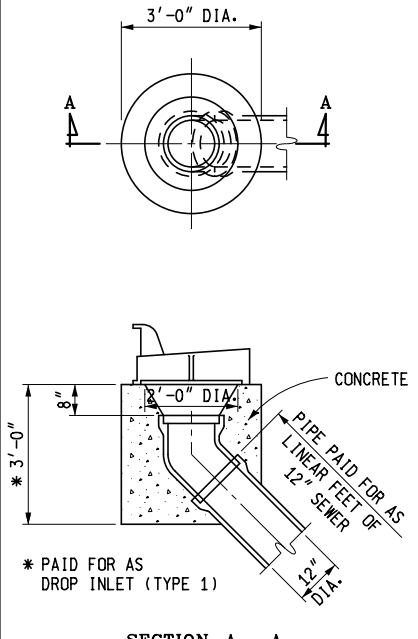


TYPICAL
 CAST-IN-PLACE
 CONCRETE
 WALL SECTION

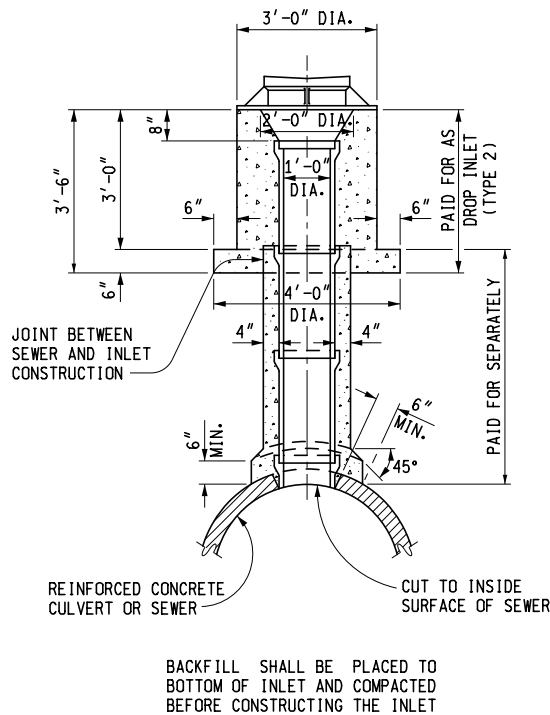
* 5'-0" MIN. FOR 4'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 5'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 6'-0" DIA. STRUCTURE



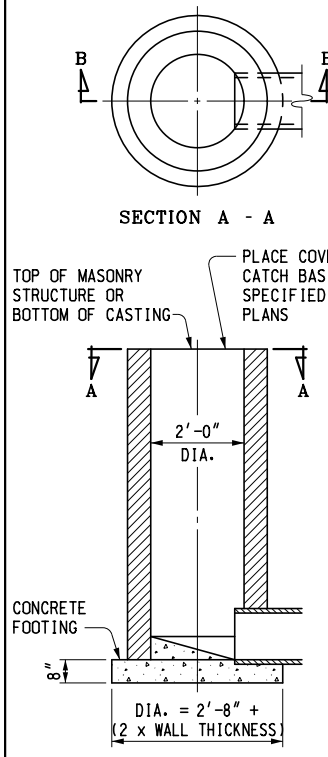
TYPICAL BRICK
 WALL SECTION



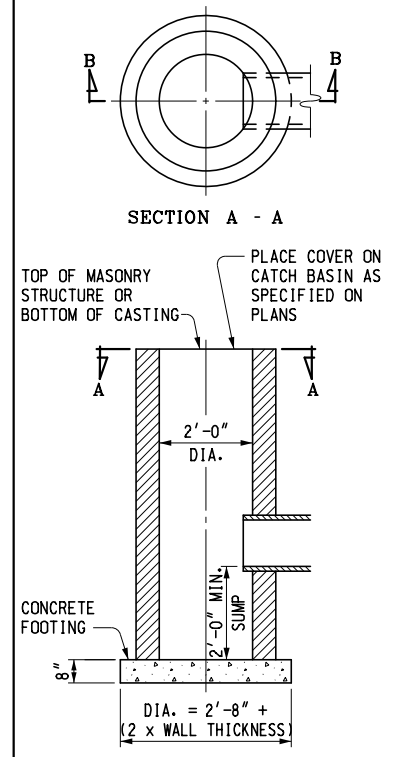
DROP INLET (TYPE 1)



DROP INLET (TYPE 2)



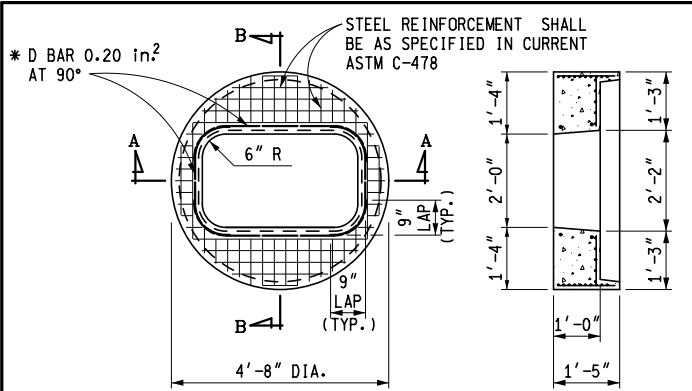
INLET



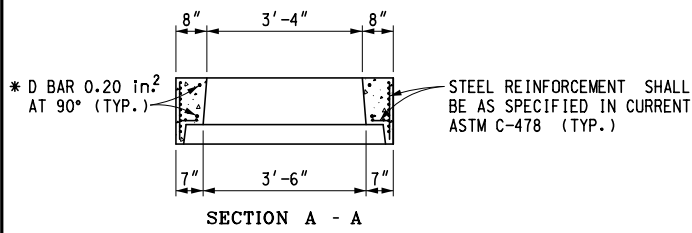
CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

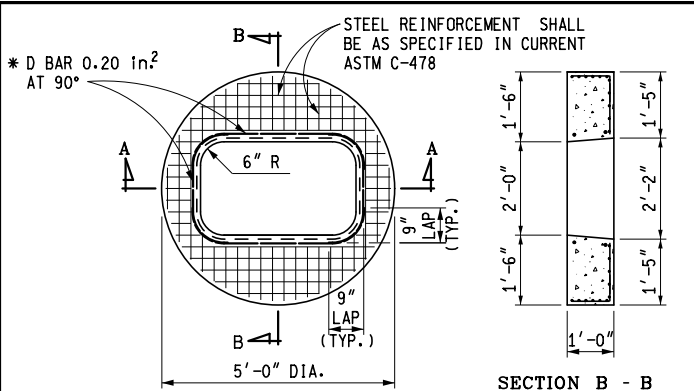
DRAINAGE STRUCTURES



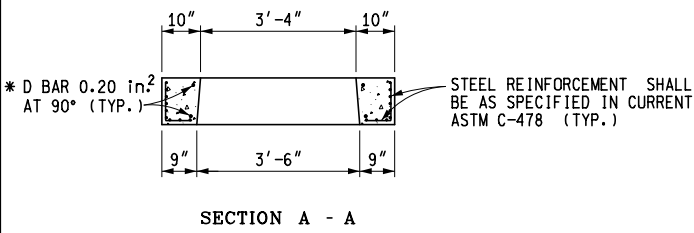
* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



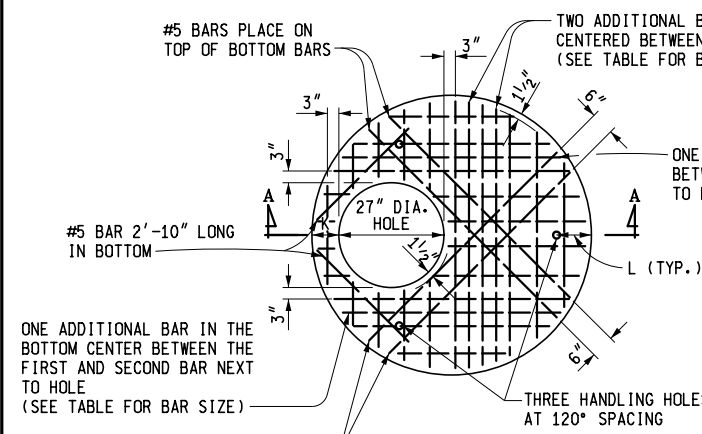
PRECAST FLAT SLAB TOP FOR PRECAST CONCRETE STRUCTURE, 2' x 4' CASTING



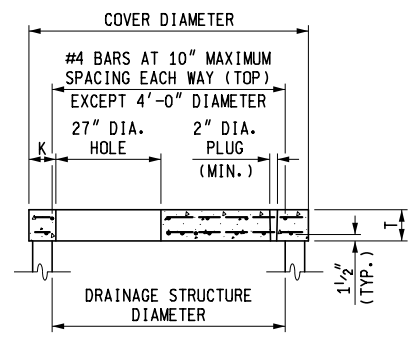
* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



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



PLAN (SHOWING BOTTOM LAYER OF REINFORCEMENT)



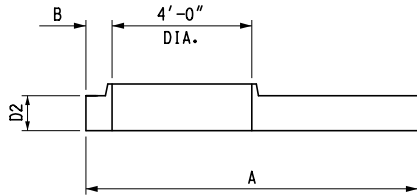
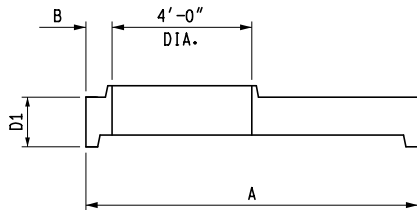
SECTION A - A
PRECAST REINFORCED CONCRETE FLAT SLAB TOP

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

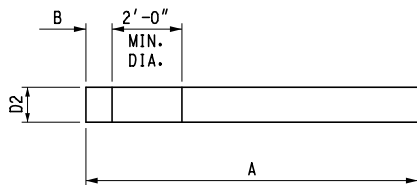
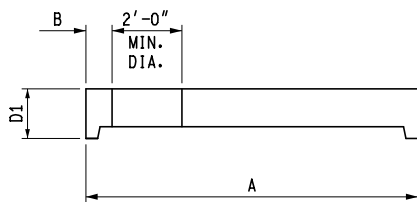
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES



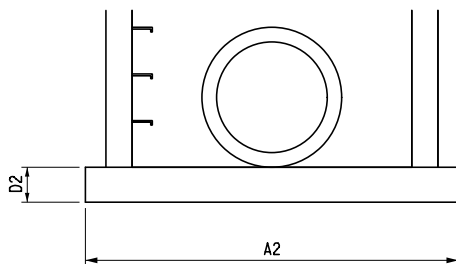
PRECAST REDUCER CAP

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"

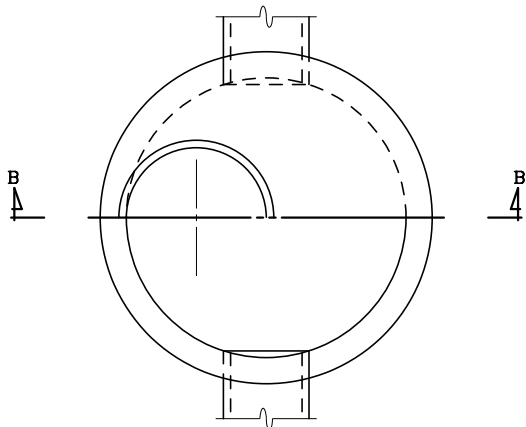


SEPARATE BASE OPTION

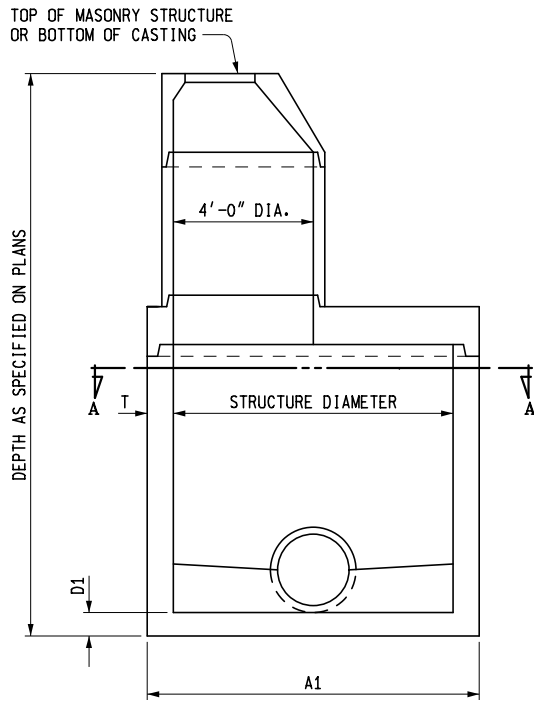
BASE AND RISER DIMENSIONS					
STRUCTURE DIAMETER	BASE DIAMETER "A1"	BASE DIAMETER "A2"	MIN. WALL THICKNESS "T"	BASE DEPTH "D1"	BASE DEPTH "D2"
7'-0"	101 1/2"	108"	7"	8"	12"
8'-0"	114"	128"	8"	8"	12"
9'-0"	128"	140"	9"	8"	12"
10'-0"	140"	154"	10"	8"	12"

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

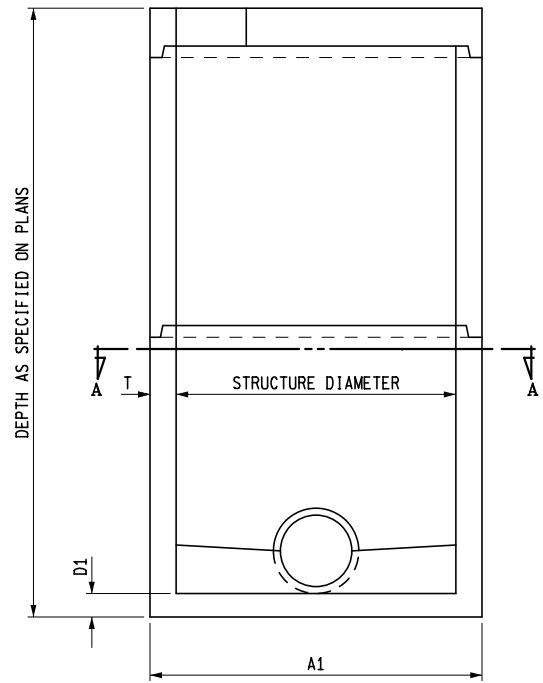
DRAINAGE STRUCTURES



HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP

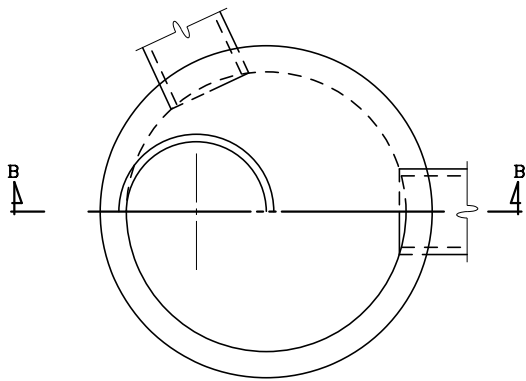


SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST MANHOLE

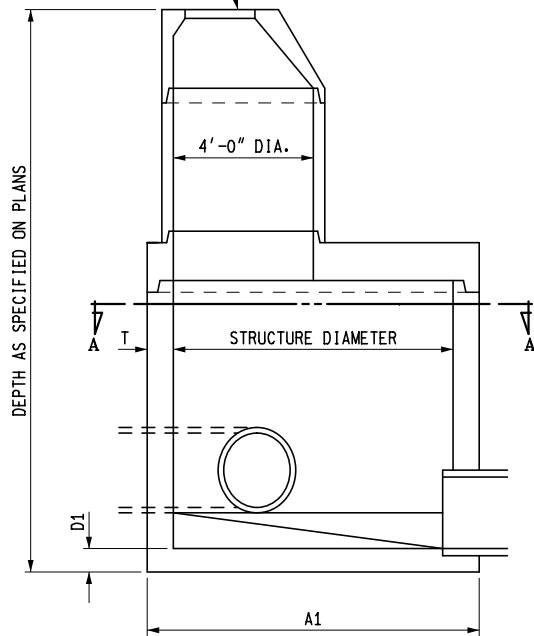
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

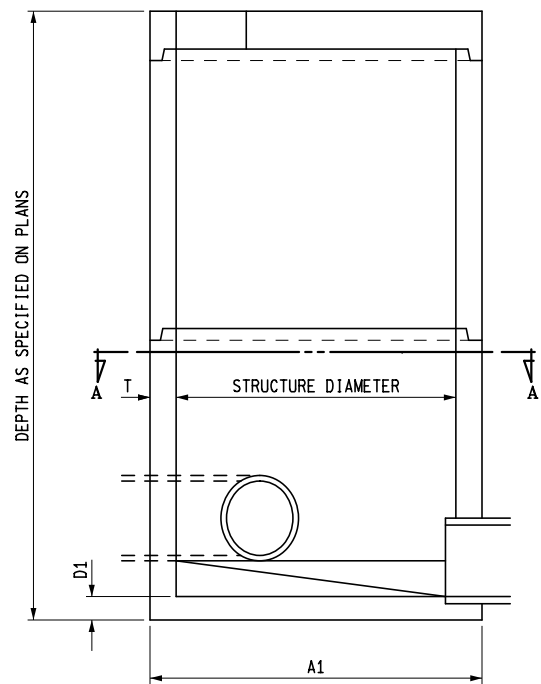


HALF SECTION A - A

TOP OF MASONRY STRUCTURE
OR BOTTOM OF CASTING



SECTION B - B
SHOWING REDUCER CAP

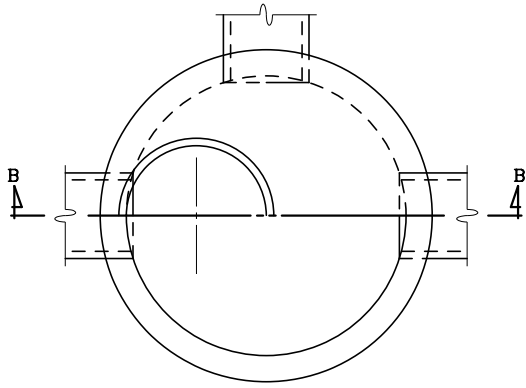


SECTION B - B
SHOWING FLAT SLAB TOP

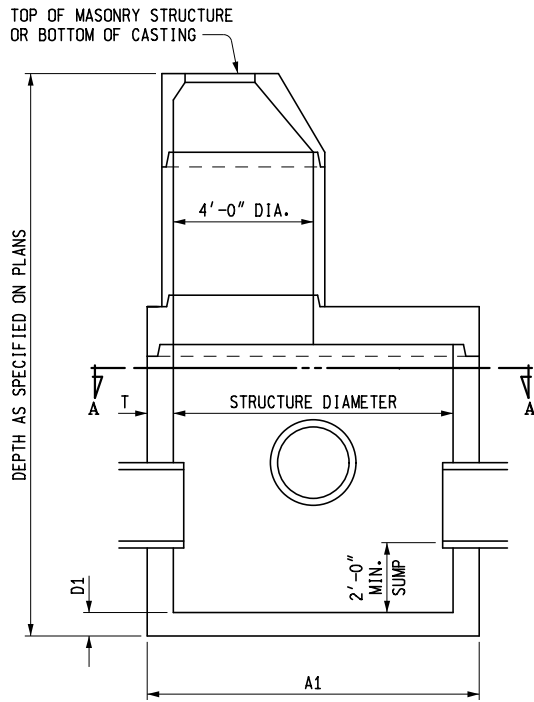
PRECAST INLET

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

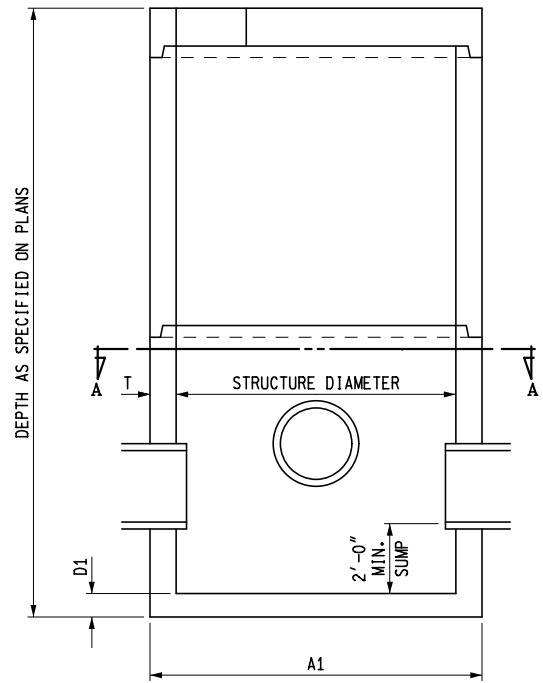
DRAINAGE STRUCTURES



HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP

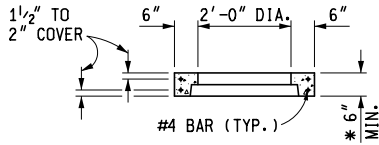
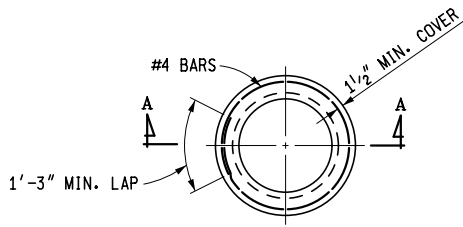


SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES



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

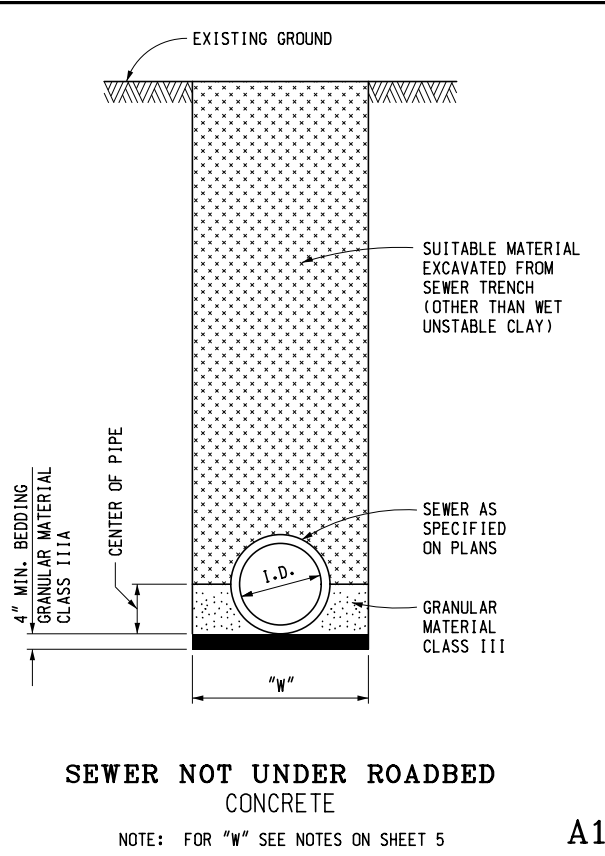
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

6-15-2016
PLAN DATE

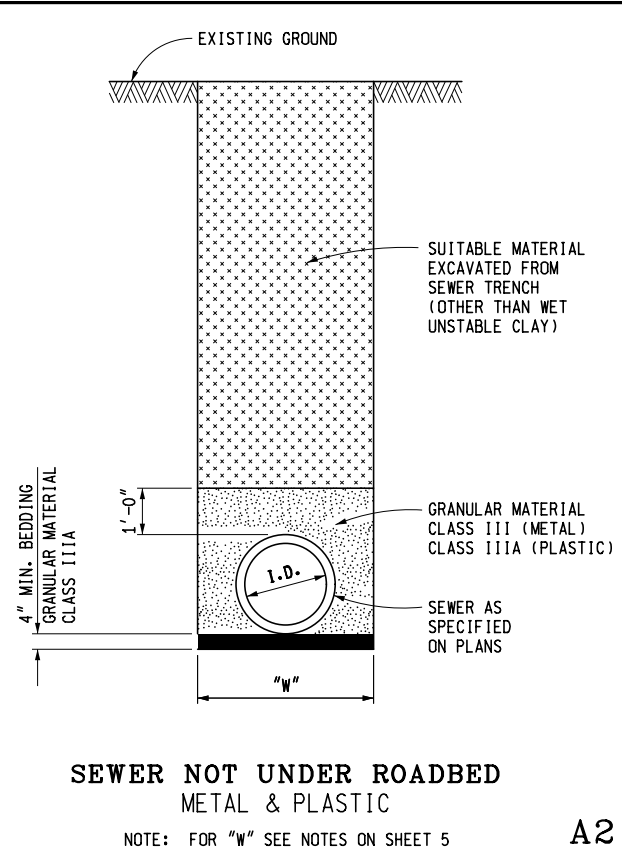
R-1-G

SHEET
9 OF 9



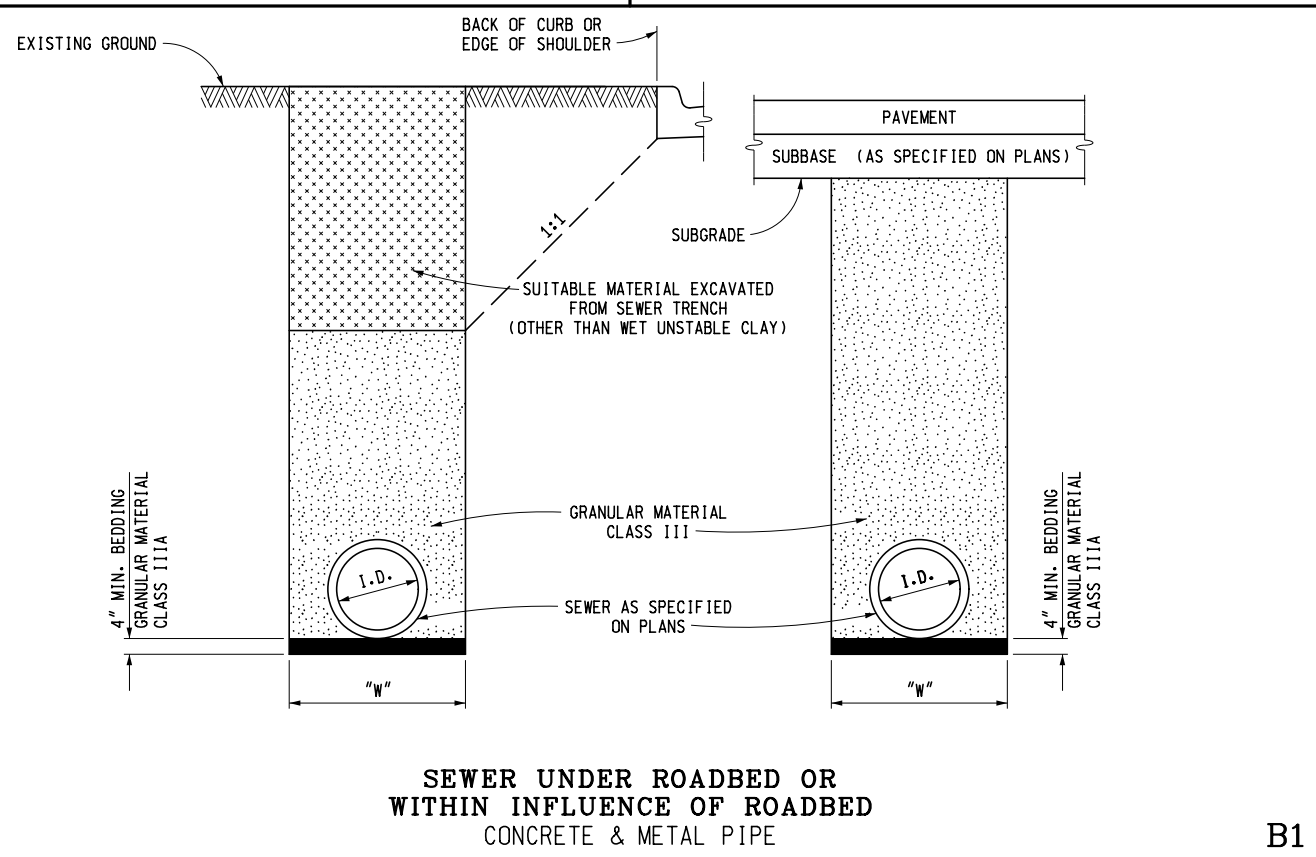
**SEWER NOT UNDER ROADBED
CONCRETE**

NOTE: FOR "W" SEE NOTES ON SHEET 5 **A1**



**SEWER NOT UNDER ROADBED
METAL & PLASTIC**

NOTE: FOR "W" SEE NOTES ON SHEET 5 **A2**



**SEWER UNDER ROADBED OR
WITHIN INFLUENCE OF ROADBED
CONCRETE & METAL PIPE**

B1



DEPARTMENT DIRECTOR
Kirk T. Steudle

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

PREPARED BY
DESIGN DIVISION

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

UTILITY TRENCHES

DRAWN BY: B.L.T.
CHECKED BY: W.K.P.

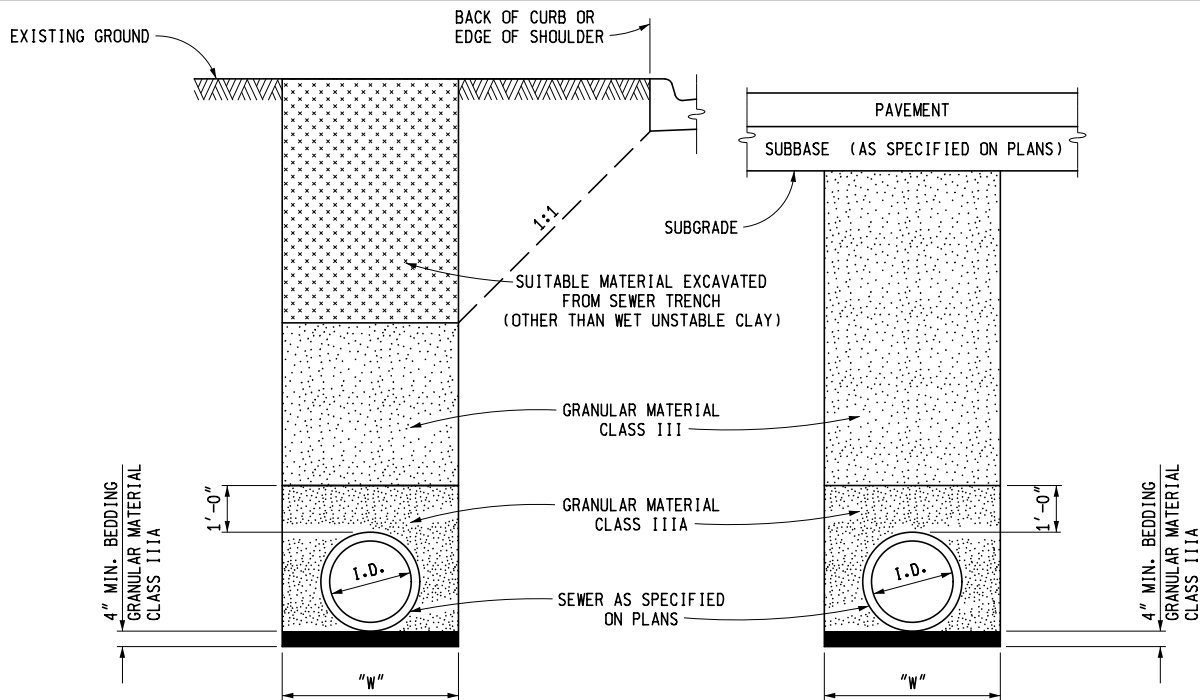
APPROVED BY: _____ 78
DIRECTOR, BUREAU OF DEVELOPMENT

F.H.W.A. APPROVAL

2-8-2016
PLAN DATE

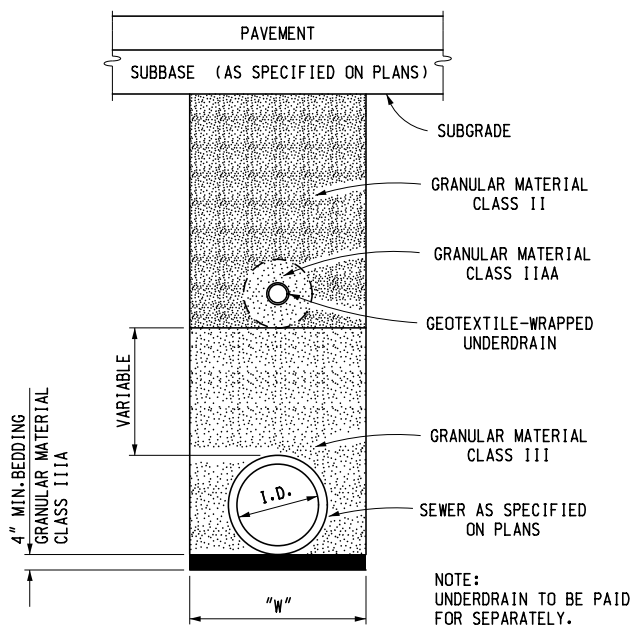
R-83-C

SHEET
1 OF 5



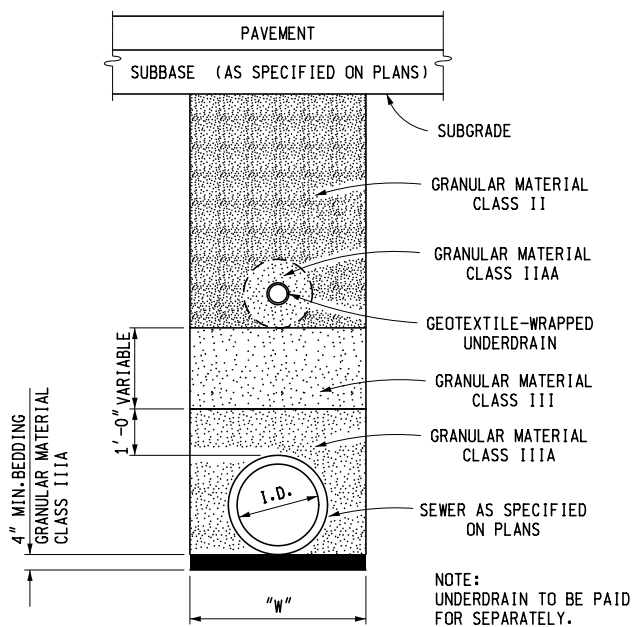
**SEWER UNDER ROADBED OR
WITHIN INFLUENCE OF ROADBED
PLASTIC PIPE**

B2



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

C1

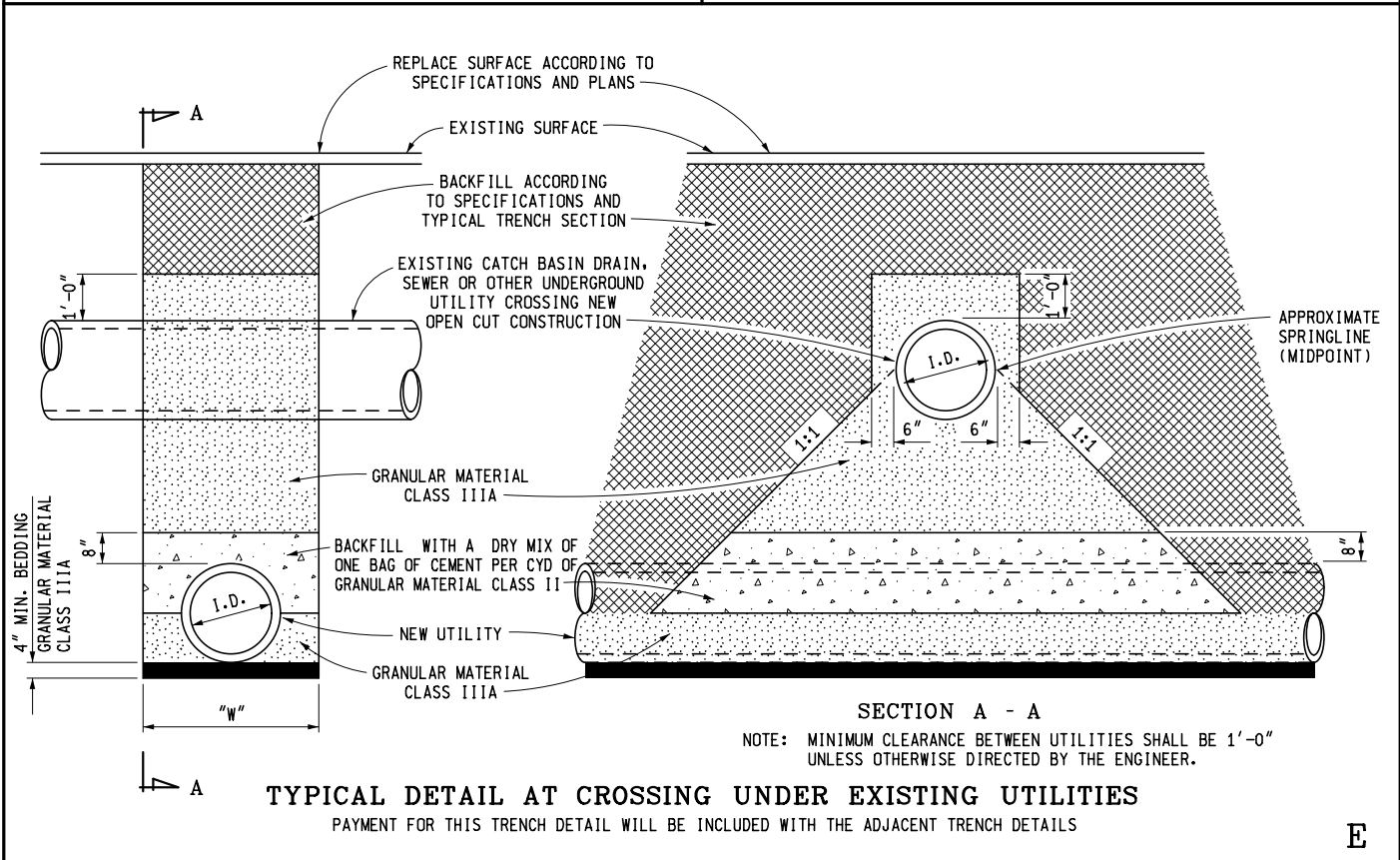
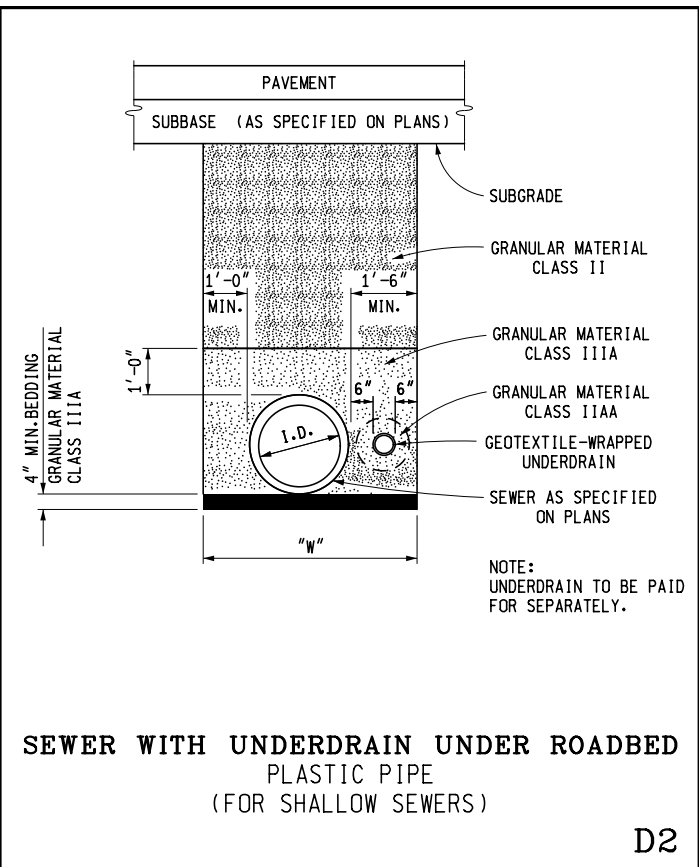
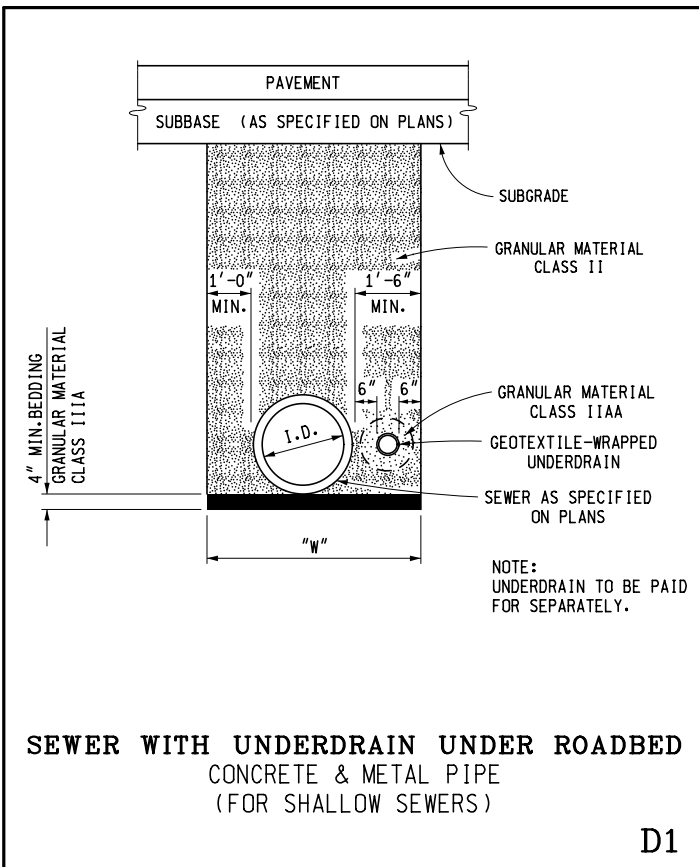


**SEWER WITH UNDERDRAIN UNDER ROADBED
PLASTIC PIPE**

C2

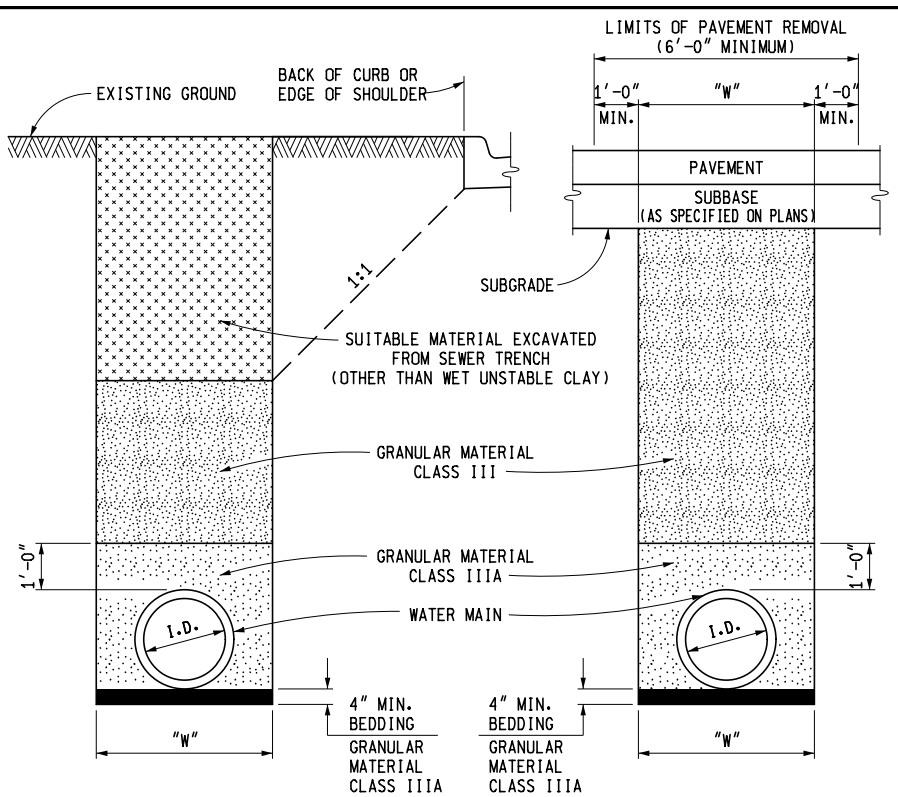
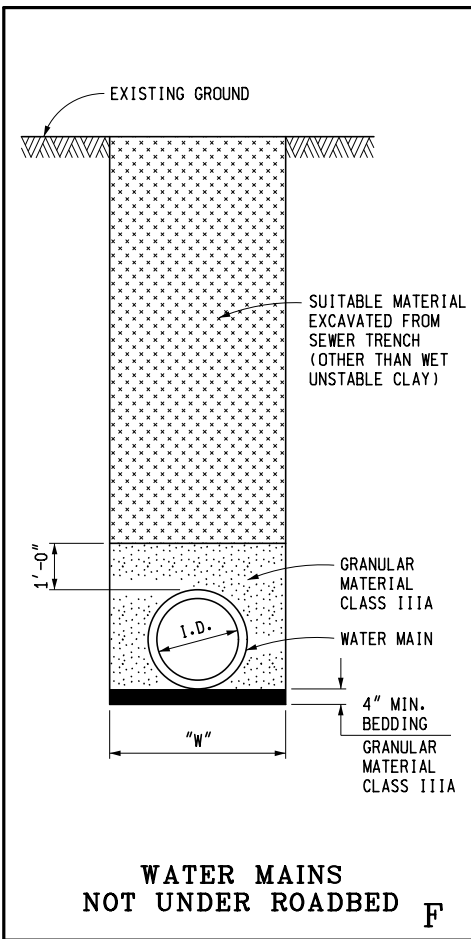
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

UTILITY TRENCHES

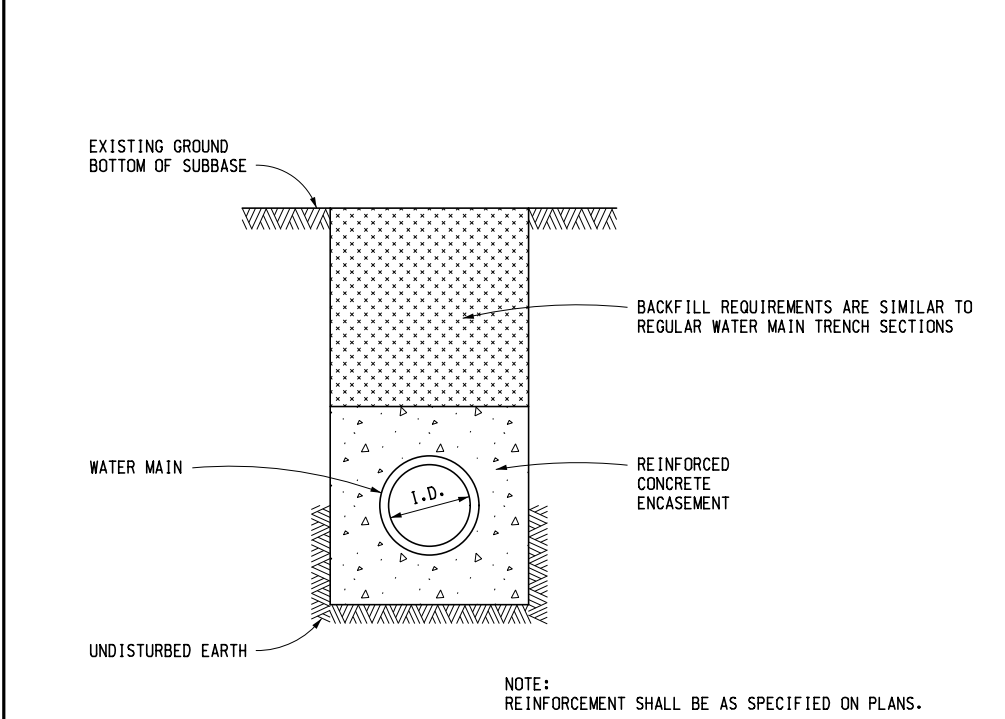


MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

UTILITY TRENCHES



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.



NOTE: REINFORCEMENT SHALL BE AS SPECIFIED ON PLANS.

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"

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

UTILITY TRENCHES

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION
FOR
ERRATA TO THE 2012 STANDARD SPECIFICATIONS

1 of 29

07-29-16

Page	Subsection	Errata
3	101.02	Modify the abbreviation reading "AIS" to read "AISI".
4	101.02	Delete the following abbreviations and the long forms MDELEG MDNRE Add the following abbreviations and the long forms MDNR Michigan Department of Natural Resources MDEQ Michigan Department of Environmental Quality MDLARA Michigan Department of Licensing and Regulatory Affairs NESC National Electrical Safety Code
27	103.02.B.2	Change the last sentence of the first paragraph to read "For decreases below 75 percent, the maximum allowable payment for work performed, including any adjustment, will not exceed an amount equal to 75 percent of the original contract quantity times the contract unit price."
34	104.05	The first sentence of this subsection should read "If the Contractor performs unauthorized work (work performed without the inspections required by the contract, extra work performed without Department approval, work performed contrary to the inspectors direction, or work performed while under suspension by the inspector), the Engineer may reject the unauthorized work."
46	104.12	Add the following to the end of the first paragraph "The use of right-of-way in wetlands and floodplains, or the crossing of water courses by construction equipment is prohibited."
53	105.09	Add the following to the end of the second paragraph "Any specifically produced material not purchased by the Department, will remain the Contractors and must be removed from the project prior to final acceptance."
56	107.02.B.2	This sentence should read "U.S.Army Corps of Engineers' Section 404, Dredge and Fill; and Section 10, Navigable Waterway."
56	107.02.B	Add the subsection reading as follows: "3. U.S. Coast Guard Section 9, Navigable Waterway." Change "MDNRE" to "MDEQ" in this subsection.

- 64 107.12 Change the first sentence of the first paragraph to read:
 “For protection of underground utilities and in accordance with 2013 PA 174, the Contractor must notify Miss Dig at least 3 work days, excluding Saturdays, Sundays and holidays, before beginning each excavation in areas where public utilities have not been previously located.”
- 65 107.15.A Change "MDNRE" to "MDEQ" in four instances in this subsection.
- 66 107.15.A.3 Add the following to the end of the paragraph "Note that a burn permit from the MDNR is required for any open burning whenever the ground is not snow covered. Any individuals that allow a fire to escape will be in violation of the Natural Resources and Environmental Protection Act and will be required to reimburse the costs of suppressing the wild fire."
- 67* 107.16 The third sentence should read "In State Forests, the Contractor must contact the local Unit Manager, Forest Management Division, MDNR, regarding the work to be performed within or adjacent to the forest land."

 Delete the last sentence of the first paragraph of this subsection.
- 80 108.08.F Delete the second paragraph in its entirety.
- 80 108.08.G Add the following new subsection:
 “G. The Contractor may propose and the Engineer may approve another equitable method, supported by an acceptable rationale to determine time extensions for any of the excusable delays listed in subsection 108.08.
- 83 108.10.C Change the last sentence of the first paragraph to read:
 “The liquidated damages may contain one or more components of damages added together.”
- 83 108.10.C.1 In Table 108-1 delete the last row of the table and replace it with the following:

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- 102 109.05.E.1 Change the second sentence of the third paragraph to read:
 “Provide the content specified in subsection 109.05.D.11 for the applicable items in this statement and as follows:”
- 107 150.04 Change the following pay item reading “Mobilization, Max ___” to read “Mobilization, Max (dollar)” at nine locations throughout the subsection.
- 112 201.03.A.3.b Change "MDNRE" to "MDNR" in three instances in this subsection.
- 150 208.01 Change "MDNRE" to "MDEQ" in this subsection.
- 180 308.03.A Change the first sentence of the second paragraph to read:

- “Do not operate equipment required to place backfill directly on geotextile products.”
- 185 401.03.A Change the first sentence of the second paragraph to read:
Where unstable soil conditions, or obstructions other than rock, require excavation of the trench below the elevation detailed on the plans; undercut, backfill, and compact the trench as directed by the Engineer.
- 188 401.03.H Change the second sentence of the paragraph to read “Jack steel pipes in place in accordance with subsection 401.03.G”.
- 189 401.03.N Add the following sentence to the end of the first paragraph "Where possible, maintain the stream flow thru a temporary channel or temporary culvert."

The second sentence of the second paragraph should read "Direct water from the dewatering operations through a filter bag before discharging to an existing drainage facility."
- 190 401.04 Change the fourth pay item from the end of the list to read as follows:
“Steel Casing Pipe, __ inch, Tr Det __.”
- 195 402.03.C Change the third sentence of the first paragraph to read as follows:
“Wrap pipe joints, with a diameter greater than 24 inches, using geotextile blanket.”
- 200 402.04 Change the third pay item from the top of the list to read as follows:
“Sewer, CI __, __ inch, Jacked in Place”
- 200 402.04.A Change the last sentence of the subsection to read as follows:
“The unit price for **Sewer** and **Sewer, Reinf Conc, Ellip** includes the cost of excavation, backfill, geotextile blanket and mandrel testing.”
- 201* 402.04.H Change the last sentence of the first paragraph to read "The Department will not make an adjustment in the pay items of **Minor Traf Devices** or **Traf Regulator Control**."
- 208 403.04.D.3 Change the sentence to read:
“Removing and replacing pavement adjacent to the adjusted cover per Standard Plan R-37 Series.”
- 218 406.03.A.2 Change the first sentence of the first paragraph to read:
“Design precast box culverts less than 10 feet in span length measured along the centerline of the roadway in accordance with current AASHTO LRFD Bridge Design Specifications and ASTM C 1577.”

Add the following sentence to the end of the first paragraph:
“Design precast box culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway for HL-93 Modified live load.”

- 219 406.03.B Change the first sentence of the first paragraph to read:
 “Submit shop drawings for culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway to the Engineer, for review and approval in accordance with subsection 104.02.”
- 219 406.03.C.1 Change the second sentence of the first paragraph to read:
 “Before manufacture, perform load ratings on precast three-sided, arch or box culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway, in accordance with the AASHTO Manual of Bridge Evaluation, Section 6, Part A, the Michigan Bridge Analysis Guide current at the time load rating is performed, and the Michigan Structure Inventory and Appraisal Guide.”
- 223 406.03.G Add the following after the first sentence of the second paragraph:
 “Where possible, maintain the stream flow thru the existing channel, temporary channel, or temporary culvert.”
- 224 406.03.G Replace the fifth paragraph of this subsection with the following:
 “The Contractor may use cast-in-place wing walls, headwalls, and aprons, as alternatives to precast wing walls, headwalls, and aprons. Attach cast-in-place wing walls or headwalls as shown on the shop drawings.”
- 225 406.03.G.2 Change the third sentence of the first paragraph to read:
 “Before placing the open-graded aggregate 34R, compact the coarse aggregate 6A using at least three passes of a vibrating plate compactor.”
- 226 406.03.G.2 Change the first sentence of the second paragraph of this subsection to read:
 “Fill the space between the box culvert joints during placement of box sections with closed-cell rubber extrusion type gaskets in accordance with ASTM C 990.”
- 226 406.04.A.9 Change the sentence to read:
 “Providing plan modifications including design, additional plan quantities and pay items to accommodate any changes to the precast units as shown on the plans.”
- 226* 406.04.A Add the following paragraph after the last paragraph of the subsection:
 “The substructure design is specific to the three-sided or arch culvert detailed on the plans. The Contractor must use approved MDOT service vendors qualified in Hydraulics, Geotechnical Engineering Services, and Short and Medium Span Bridges to perform the required design and plan modifications, as directed by the Engineer, if the Contractor selects a culvert shape different than shown on the plans.”
- 227 406.04.B Add the following new item in the list of items in this subsection:

2. Headwalls, wingwalls, aprons, and curtain walls, precast or cast-in-place;

Renumber the exist items 2 through 4 in this list to read 3 through 5.

Delete existing item numbered 5 and replace with the following:

6. Inserts for bars and connection hardware; and

Renumber the existing item 6 in this list to read 7.

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| 227 | 406.04.B | Delete the first and second paragraphs following the list of items in this subsection and replace with the following:
"The Department will pay separately for cast-in-place concrete, other than for culvert segments, wing walls, and headwalls; excavation; protective coating; providing and placing backfill material; by plan quantity in accordance with subsection 109.01.A." |
| 239 | 501.03.C.6 | The first sentence of this subsection should read "Except as specified in subsection 501.03.C.4, removing HMA surface applies to removing HMA overlying a material designated for removal or that is required to remain in place." |
| 247 | 501.03.O | Change footnote e in Table 501-5 to read:
"Flushing severe enough to significantly affect surface friction (Friction Number <35)." |
| 249 | 501.04.H | The first sentence of this subsection should read "The Engineer will measure, and the Department will pay for removing HMA surface, no greater than 12 inches thick, overlying a material designated for removal or that is required to remain in place, as HMA Surface, Rem. "

The second paragraph of this subsection should read "The Engineer will measure, and the Department will pay for removing HMA surface, greater than 12 inches thick, overlying a material designated for removal or that is required to remain in place, as Pavt, Rem in accordance with subsection 204.04." |
| 257 | 503.03.E | Delete this subsection in its entirety. |
| 265 | 504.03.E.3 | Delete this subsection in its entirety. |
| 269 | 504.04.A | This subsection should read "The unit prices for Micro-Surface , regardless of the type required, include cleaning existing pavement; applying a bond coat; temporary pavement markings; stationing; corrective action; and traffic control to complete corrective action." |
| 299 | 601.04 | In table 601-2 delete the row for Grade P-NC concrete in its entirety. |
| 300 | 601.04 | In table 601-2, the first sentence of footnote b. should read:
"Use coarse aggregate 6A, 6AA or 6AAA for Grades P1, P2 and M." |

		countersunk screws with 3/4-inch or 1/2-inch diameter inserts for use in expansion joint cover plates."
389	706.03.D.4.b	Change the first sentence of the fourth paragraph to read "Design forms, form supports, and attachments to carry dead loads, and resultant horizontal loads due to forming of cantilever overhangs."
390	706.03.E.4	Change the fourth sentence of the first paragraph to read: "Use wire ties to secure all bar intersections for the top mat. Use wire ties to secure all bar intersections for other mats where the product of the length and width of bar intersection spacing exceeds 120 square inches."
391	706.03.E.8	Change the first sentence of the second paragraph of this subsection to read: "Patch sawed or sheared ends and visible defects in accordance with ASTM A 775."
392	706.03.E.8	Change the last sentence of the third paragraph of this subsection to read: "Coat mechanical splices after splice installation in accordance with ASTM A 775 for patching damaged epoxy coating."
394	706.03.H.1	Delete the last paragraph on page 394 and replace it with the following: "Do not cast sidewalk, curb, or barrier pours until the deck concrete attains at least the minimum specified 7-day flexural or compressive strength, and after completion of the 7-day continuous wet cure. The forming of succeeding portions may occur, provided the wet cure is maintained."
406*	706.03.N.1.b	Add the following to the end of the last paragraph of the subsection: "Do not discontinue wet cure nor cast succeeding portions onto the bridge deck prior to completion of the 7-day two-phase continuous wet cure. Ensure excess or ponding cure water is removed prior to casting of succeeding structure portions."
416	707.03.C.1	Change the title of the subsection from "Shop Plans to read "Shop Drawings". Change the second sentence of this subsection to read: "Do not use design drawings in lieu of shop drawings."
426	707.03.C.17	Change the second sentence in the first paragraph of this subsection to read: "Tap oversized galvanized nuts in accordance with ASTM A 563 or AASHTO M 292 and meet Supplementary Requirement S1 of ASTM A 563 or AASHTO M 292."
430	707.03.D.7.b	Delete the first sentence of the last paragraph of this subsection.

430*	707.03.D.7.b	Change the title of the Table 707-4 to read: "Minimum Bolt Tension for ASTM A 325 Bolts"
430	707.03.D.7.b	Change "104,000" to "103,000" in the last row under the column titled Minimum Bolt Tension.
431	707.03.D.7.c	Add the following sentence to the end of the first paragraph of this subsection: "If using impact wrenches, provide wrenches sufficient to tighten each bolt in approximately 10 seconds."
431*	707.03.D.7.c	Change the first sentence of the second paragraph to read: "Do not reuse ASTM A 325 bolts and nuts."
434	707.04.A	Change the first sentence of the first paragraph of this subsection to read: "The Engineer will measure structural steel by the calculated weight of metal in the finished structure, excluding filler metal in welding, as shown on the shop drawings or working drawings."
438	708.03.A.2	Change the title of the subsection from "Shop Plans to read "Shop Drawings". Change the first sentence to read: "Submit shop drawings in accordance with subsection 104.02." Change the fourth sentence to read: "Do not start production until the Engineer approves the shop drawings."
441*	708.03.A.11	Change the last sentence of the first paragraph to read "Cure concrete at temperatures from 70 °F to 150 °F until concrete attains the release strength shown on the shop drawings".
441	708.03.A.11	Change the fourth sentence of the fourth paragraph to read "Do not exceed a maximum concrete temperature of 150 °F during the curing cycle."
458	711.03.A	Change the first sentence in the first paragraph to read: "Shop drawings for structural steel and pipe railings are not required."
460	711.04.A	Change the second sentence of the first paragraph to read: "The unit price for Bridge Barrier Railing includes the cost of placing steel reinforcement, providing and placing concrete, constructing joints, and forming, finishing, curing and protecting the concrete."
461	711.04.F	The title of this subsection should read " Reflective Marker, Permanent Barrier. "
467	712.03.C	Add the following to the end of the third paragraph of the subsection:

“Notify the Engineer of any saw cuts in the top flange. Saw cuts equal to or less than 1/32 inch deep in steel beams must be repaired by grinding, to a surface roughness no greater than 125 micro-inches per inch rms, and tapering to the original surface using a 1:10 slope. Saw cuts in excess of 1/32 inch deep in steel beams require a welded repair to be submitted to the Engineer for approval. Weld in accordance with subsection 707.03.D.8 and provide adequate notice to allow the Engineer to witness the repair work. Inspect and test all saw cut repairs (including grinding repairs) using ultrasonic testing in accordance with 707.03.D.8.c at no additional cost to the Department.”

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| 471 | 712.03.J | Add the following to the end of the second paragraph of the subsection:
“Select adhesive anchor systems from the Qualified Products List.” |
| 471 | 712.03.J.1 | Delete the first paragraph in this subsection and replace it with the following: “Propose complete details of drilling, cleaning, and bonding systems for anchoring reinforcement and submit for the Engineer’s approval before use. The minimum embedment depth must be nine times the anchor diameter for threaded rod or bolt and twelve times the anchor diameter for reinforcing bar. Propose a drilling method that does not cut or damage existing reinforcing steel. Prepare at least three proof tests per anchor diameter and type in the same orientation in which they will be installed on the existing structure, on a separate concrete block, in the presence of the Engineer. The Engineer will proof test the proposed systems. The Engineer will base approval of the anchoring system on the following criteria:” |
| 471 | 712.03.J.2 | Change the third sentence of the first paragraph to read:
“Use a tension testing device for unconfined testing, in accordance with ASTM E 488.” |
| 473 | 712.03.L.2 | Change the first sentence in the second paragraph of this subsection to read:
"If using epoxy coated steel reinforcement, epoxy coat mechanical reinforcement splices in accordance with ASTM A 775." |
| 473 | 712.03.L.3 | Delete the existing first sentence in the first paragraph. |
| 473 | 712.03.L.3 | Change the third sentence of the first paragraph to read "Provide two test splices on the largest bar size." |
| 473* | 712.03.L.3 | Change the sentence beginning “Demonstrate to the.... to read:
“Demonstrate to the Engineer that splices have a tensile strength of 125 percent of the bar yield strength and high strength splices have a tensile strength of 150 percent of the bar yield strength.” |
| 488 | 713.02 | Add the following as subsection 713.02.C:
"C. Structural Steel for Retrofitting and Welded Repairs. Structural steel material used for retrofitting and welded repairs of primary |

members as defined in subsection 707.01.B must meet longitudinal Charpy V-Notch impact test requirements."

- 501 715.02 Add the following material reference above the two existing items:
"Sealant for Perimeter of Beam Plates713"
- 508 715.03.D.1 Add the following sentence after the second paragraph of the subsection:
"Apply sealant for perimeter of beam plates in accordance with subsection 713.03.F."
- 515 716.03.A Delete the second paragraph of this subsection in its entirety.

Change the last sentence of the last paragraph of this subsection to read:
"Provide a primer dry film thickness for the top flange between 4 mils and 10 mils."
- 519 716.04 Change the second sentence of the first paragraph of this subsection to read:
"The unit price for **Field Repair of Damaged Coating (Structure No.)** includes the costs of making field repairs to the shop applied coating system; prime coat surfaces and exposed surfaces of bolts, nuts, and washers; and repairing stenciling."
- 521 717.04.B This subsection should read "The unit price for **Drain Casting Assembly** includes the cost of providing and installing the downspout and, if necessary, the lower bracket to the drain casting."
- 522 718.02 Change the section number "906" in the third material in the list to read "919."
- 533 718.04 Delete the following pay item from the list:
Temp CasingFoot
- 533 718.04.B.2 Delete this subsection in its entirety.
- 533 718.04.B.3 Renummer this subsection as follows:
"2. **Permanent Casing.**"
- 540 802.04 Change "Non reinf" in the last pay item of the list with "Nonreinf".
- 545* 803.04.E Change the second sentence of the second paragraph to read:
"The unit price for **Railing for Steps** includes the cost of providing, fabricating, installing, and grouting the railing."
- 560 807.04 Delete the following pay item from the list:
Guardrail Buffered EndEach
- 560 807.04.B Change the fifth paragraph of this subsection to read:

- “The Engineer will measure **Guardrail Salv** and **Guardrail, Mult, Salv** along the face of the rail (one face for multiple beams), including terminals and end shoes.”
- 567 808.04.C Change the first paragraph of this subsection to read:
"The Department will not pay separately for protective fence required in accordance with subsection 104.07."
- 569 809.04.A Change the first sentence to read:
“The unit price for **Field Office, CI** __ includes the cost of setup, providing access, grading, maintaining, plowing snow, and utility hook-up charges.”
- 570 809.04.B Delete the existing second and third sentences in the first paragraph and replace them with the following:
“The unit price for **Field Office, Utility Fees** includes the cost of monthly usage fees for electricity, gas, telephone service and charges, fuel for the stove, monthly water and sanitary service.”
- 570 809.04.B Change the existing fourth sentence in the first paragraph to read:
“The Department will reimburse the Contractor for monthly usage fees for electricity, gas, telephone, water and sanitary charges incurred by the Department.”
- 575 810.03.K Change the subsection to read
"K. **Drilled Piles for Cantilever and Truss Foundations.** Construct drilled piles for cantilever and truss foundations in accordance with section 718."
- 578 810.03.N.2 Add the following sentence after the first sentence of the second paragraph on this page:
"Mark each nut and bolt to reference the required rotation."
- 584 810.04 Delete the last pay item in the list:
Truss Fdn Anchor Bolts, Replace.....Each
- 596 811.03.G Delete this subsection in its entirety.
- 597* 811.03.H Rename this subsection as follows:
“G. **Raised Pavement Marker (RPM) Removal.**”
- 597* 811.04 Change "Crosshatching" in the last pay item of the list on this page to "Cross Hatching".
- 598* 811.04 Delete the following pay items from the list:
Pavt Mrkg, (material), 4 inch, SRSM, (color).....Foot
Pavt Mrkg, (material), 4 inch, SRSM, 2nd Application, (color).....Foot
- Add the following pay items to the list:
“Pavt Mrkg, Polyurea, (legend).....Each

Pavt Mrkg, Polyurea, (symbol).....Each”

Change the sixth item down the list to read:
“Pavt Mrkg, Polyurea, __ inch, Cross Hatching, (color)”

Change the eleventh item down the list to read:
“Rem Curing Compound, for Longit Mrkg, __ inch.....Foot”

Change the last item in the list to read:
“Witness, Log, Layout, \$1000.00”

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| 599 | 811.04.B | Delete this subsection in its entirety. |
| 599 | 811.04 | Rename the following subsections as follows:
B. Call Back.
C. Pavement Marking Removal.
D. Material Deficiency.” |
| 602 | 812.03.D | Change the first sentence to read "Provide and maintain traffic control devices meeting the requirements in the ATSSA Quality Guidelines for Work Zone Traffic Control Devices and Features." |
| 603 | 812.03.D.1 | The last sentence on this page should read "Lay the sign behind the guardrail, with the uprights pointing downstream from the traffic, and place the support stands and ballasts close to the guardrail." |
| 604 | 812.03.D.2 | The first sentence of the fourth paragraph should read "Do not use burlap or similar material to cover Department or Local Government owned signs." |
| 604 | 812.03.D.5 | The fifth sentence of the first paragraph should read "Do not mix drums and cones within a traffic channeling sequence." |
| 605 | 812.03.D.6.b | Change the first sentence of the first paragraph to read:
“The Department will allow the nighttime use of 42-inch channelizing devices, in the tangent area only, on CPM and pavement marking of any duration where the use of plastic drums restricts proposed lane widths to less than 11 feet, including shy distance.” |
| 605 | 812.03.D.7 | Add the following sentence after the first sentence of the first paragraph:
“Place a shoulder closure taper in advance of the lighted arrows placed on the shoulders.” |
| 607 | 812.03.D.9 | Delete the second paragraph of this subsection and replace with the following: “Link sections together to fully engage the connection between sections. Maintain the barrier with end-attachments engaged and within 2 inches of the alignment shown on the plans.” |
| 608 | 812.03.D.10.b | Delete the second sentence of the second paragraph of this subsection beginning with "Install sand module attenuators..." |

- 608 812.03.D.10.b Add the following sentence after the second paragraph of this subsection:
"Install impact attenuation devices as shown on the plans, as directed by the Engineer, or both."
- 609 812.03.D.10.e Delete the second paragraph of this subsection.
- 613 812.03.D.14.a.iii Change the sentence in this subsection to read "Place an ET Type or SKT Type extruder guardrail ending on both blunt guardrail ends."
- 615 812.03.F The second sentence of the second paragraph of this subsection should read: "The Contractor may use a Type R temporary pavement marking cover, per subsection 812.03.D.12 when authorized by the Engineer."
- 616 812.03.F.2 The last sentence of the first paragraph should read: "If the removal equipment cannot collect all removal debris, operate a self-propelled sweeper capable of continuously vacuuming up the removal debris immediately behind the removal equipment."
- 617 812.03.G.3 The first sentence of the second paragraph should read: "Sweep the shoulder and remove debris prior to placing traffic on the shoulder and throughout the time the shoulder is used to maintain traffic."
- 617 812.03.G.4.a Delete "48 inch by 48 inch" from the first sentence of this subsection.
- 618* 812.03.G.7 The first sentence of the first paragraph should read: "Clean barrier reflectors, plastic drums, 42 inch channelizing devices, tubular markers, signs, barricades, and attached lights in operation on the project to ensure they meet required luminosity."
- 619 812.03.G.8 The second sentence of the third paragraph from the end of the subsection should read: "Illuminate traffic regulator stations at night per subsection 812.03.H."
- 621 812.03.I.6 Delete "48 inch by 48 inch" from the second sentence of this subsection.
- 622* 812.03.J The second paragraph should read "Apply one 2-inch wide horizontal stripe of red and white conspicuity tape along at least 50 percent of each side of, and across the full width of the rear of the vehicle or equipment."
- 622 812.04 Change the second item down the list to read:
"Traf Regulator Control"
- Change the sixth item down the list to read:
"Sign Cover, Type I"
- 626 812.04.I Change the reference "812.04.E" in the first sentence to "812.04.D".
- 628 812.04.M.4 Add the following as the first sentence of this subsection:

“The Engineer will not measure a temporary barrier ending move as **Conc Barrier Ending, Temp, Relocated** if it involves work defined in subsection 812.04.M.3.”

- 629 812.04.N.1 Change the reference "811.04.D" in the second paragraph of this subsection to read "811.04.C".
- 630 812.04.S Change the first sentence to read: "The Department will not make additional payments for traffic regulating, signing, arrow boards, and lighting systems for traffic regulator stations operated at night due to a temporary PTS system failure."
- 634 813.03.C.3 Change the reference "903.07.A" in the paragraph of this subsection to read "907.07.B".
- 646 815.04 Change the first, third and fourth pay items in the list to read:
"Site Preparation, Max (dollar) Lump Sum
Watering and Cultivating, First Season, Min (dollar)..... Lump Sum
Watering and Cultivating, Second Season, Min (dollar) Lump Sum"
- 646 815.04.C.1 Change the following pay item reading: "Watering and Cultivating, First Season, Min. (dollar)" to read "Watering and Cultivating, First Season, Min (dollar)" at two locations throughout the subsection.
- 646 815.04.C.1.b Delete this subsection in its entirety.
- 646 815.04.C.1.c Rename this subsection to read:
"b. Removal and disposal of unacceptable plants."
- 646 815.04.C.2 Change the following pay item reading: "Watering and Cultivating, Second Season, Min. (dollar)" to read "Watering and Cultivating, Second Season, Min (dollar)" at three locations throughout the subsection.
- 647 815.04.C.2 Change the last paragraph of this subsection to read:
"For each unacceptable plant identified, the Engineer will calculate a 50 percent reduction in the unit price for the relevant (**Botanical Name**) pay item, and will process a negative assessment for each unacceptable plant for that amount."
- 650 816.03.B Delete the first paragraph of this subsection and replace with the following:
"Conduct soil tests when called for in the contract or when directed by the Engineer. Provide soils tests results to the Engineer when testing is required. Provide and place fertilizer as indicated below and as indicated in the soils tests, if required."
- 650 816.03.B.1 Change the sentence to read: "For Class A fertilizer, evenly apply 176 pounds of chemical fertilizer nutrient per acre on a prepared seed bed."

650	816.03.B.2	Change the sentence to read: "For Class B fertilizer, evenly apply 120 pounds of chemical fertilizer nutrient per acre on a prepared seed bed."
650*	816.03.B.3	Change the sentence to read: "For Class C fertilizer, evenly apply 80 pounds of chemical fertilizer nutrient per acre on established turf."
663*	819.01	<p>Delete the first paragraph in the subsection and replace it with the following:</p> <p>"This work consists of providing operating electrical and lighting units; removing, salvaging, or disposing of existing electrical and lighting components; excavating, backfilling, restoring the site in accordance with section 816; and disposing of waste excavated materials. Complete this work in accordance with this section, section 820, and the contract and to the requirements of the NEC, the National Electrical Safety Code, and the MDLARA for those items not identified in the contract."</p> <p>Change the third sentence of the second paragraph in this subsection to read:</p> <p>"Contact the MDLARA for electrical service inspection and pay the applicable fees."</p>
671	819.03.F.1	<p>Change the paragraph to read:</p> <p>"Install light standard foundations as shown on the plans and the standard plans, as applicable."</p>
673	819.03.G.4.b	<p>Change the last sentence of the first paragraph to read:</p> <p>"Tighten the anchor bolts to a snug tight condition as described in the third paragraph of subsection 810.03.N.2 ensuring the lock washer is completely compressed."</p>
673	819.03.G.4.b	<p>Delete the first two sentences of the second paragraph and replace with the following:</p> <p>"Tighten bolts connecting the pole to the frangible base to a snug tight condition. Snug tight is the tightness attained by a few impacts of an impact wrench, or the full effort of a person using an ordinary spud wrench. The lock washers must be fully compressed."</p>
678*	819.04	<p>Delete the last item in the list on this page reading:</p> <p>"DB Cable, in Conduit, 600 Volt, (number) 1/C# (size) Foot"</p>
680	819.04	<p>Change the first paragraph to read:</p> <p>"Unless otherwise required, the unit prices for the pay items listed in this subsection include the cost of excavation, granular material, backfill, and disposal of waste excavated material. If the contract does not include pay items for restoring the site in kind in accordance with section 816, the Department will consider the cost of restoration included in the pay items listed in this subsection."</p>
680	819.04.A	Add the following paragraph after the first paragraph of the subsection.

“The unit prices for **Conduit, Rem** include the cost of removing the type, number, and size of conduit shown on the plans.”

Change the third paragraph of the subsection to read:

“The unit prices for **Conduit, (type), __ inch** and **Conduit, DB, (number), __ inch** include the cost of installing the type, number, and size of conduit shown on the plans, and installing marking tape.”

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| 681 | 819.04.B | Change the last paragraph of the subsection to read:
“The unit price for DB Cable, in Conduit, Rem includes the cost of removing all cables from the existing conduit measured per lineal foot of conduit.” |
| 681 | 819.04.C | Change the first paragraph of the subsection to read:
“The unit prices for Cable, Rem and Cable, (type), Rem include the cost of dead ending, circuit cutting, installing guying, work required to leave circuits operable, and disposing of the removed cables, wire, hardware, and other appurtenances.” |
| 681 | 819.04.D | Change the first paragraph of the subsection to read:
“The unit price for Cable, Pole, (type), Disman includes the cost of dismantling and off-site disposal of the following:” |
| 685 | 820.01.D | Change the sentence to read:
“Excavate, backfill, restore the site in kind in accordance with section 816, and dispose of excess or unsuitable material;” |
| 688 | 820.03.C | Change the seventh paragraph of this subsection to read:
“Tighten top anchor bolt nuts, snug, in accordance with the first four paragraphs of subsection 810.03.N.2, except beeswax will not be required.” |
| 696 | 820.04 | Add the following pay items to the list:
“Pedestal, Pushbutton, Alum.....Each
Pedestal, Pushbutton, Rem.....Each” |
| 697 | 820.04.A.2 | Change the sentence to read:
“If the contract does not include pay items for restoring the site in kind in accordance with section 816, the Department will consider the cost of restoration included in the pay items listed in this subsection.” |
| 698 | 820.04.B | Delete the second paragraph of this subsection found on this page. |
| 698 | 820.04.C | Change " Fdns " to read " Fdn " in four instances in this subsection. |
| 701 | 820.04.J.3 | Change the sentence to read: "Installing wires in the saw slots and to the handholes;" |
| 701. | 820.04.J | Add the following as a new subsection: |

		“7. A 3/4 inch minimum flexible conduit (non-metallic and rated for underground use) from the pavement to the handhole.”
706	821.01.B	Change the website address listed after the second paragraph on this page to read: “ http://www.ngs.noaa.gov/heightmod/GuidelinesPublications.shtml ”
711	822.03.B	Change the second paragraph to read: “If corrugations are required on concrete shoulders and the method of installation is not shown on the plans or directed by the Engineer, construct corrugations by grinding, or cutting.”
720	823.04	Change the pay item seventh from the bottom of the list to read: “Water Shutoff, Adj, Temp, Case ___”
730	824.03.Q	Change the third sentence of the fourth paragraph to read: “Ensure placement of monumentation in accordance with section 821.”
730	824.03.Q	Change the first sentence of the last paragraph to read: “The Department will not pay for work dependent on lost or destroyed stakes until the Contractor replaces the stakes.”
732	824.04	Change the first sentence of the first paragraph following the list of pay items to read: “If the Engineer determines the Contractor will perform staking as extra work, the Department will pay for staking in accordance with section 103.”
733	824.04	Change the left column header in Table 824-2 to read: “ Percent of Original Contract Amount Earned ”
739	902.02	Change the last aggregate testing description to read: “Determining Specific Gravity and Absorption of Fine Aggregates.....MTM 321”
742	902.03.C.1.a	Change the sentence to read: “Coarse aggregate includes all aggregate particles greater than or retained on the 3/4-inch sieve.”
742	902.03.C.2.a	Change the sentence to read: “Intermediate aggregate includes all aggregate particles passing the 3/4-inch sieve through those retained on the No. 4 sieve.”
742	902.03.C.2.b.iii	Change the sentence to read as follows: “Maximum Loss by Washing per MTM 108 of 3.0 percent”.
744	902.07	Delete the fourth paragraph of the subsection and replace it with the following: “The Engineer will only allow the use of granular material produced from crushed portland cement concrete for embankment and as trench

backfill for non-metallic culvert and sewer pipes without associated underdrains. However, granular material produced from crushed portland cement concrete is not permitted as swamp backfill, nor within the top 3 feet below subgrade regardless of the application.

746*	902.11	<p>Change the Item of Work by Section Number column in Table 902-1 for the 6AA row to read: "406, 601, 602, 706, 708, 806".</p> <p>Change the Item of Work by Section Number column in Table 902-1 for the 6A row to read: "206, 401, 402, 406, 601, 602, 603, 706, 806".</p> <p>Change the Item of Work by Section Number column in Table 902-1 for the 34R row to read: "401, 404, 406".</p>
751*	902.11	Replace Table 902-6 with the Table 902-6 below.
751	Table 902-7	Under the Material column in the fourth row change the "FA2" to read "2FA".
751	Table 902-7	Under the Material column in the fifth row change the "FA3" to read "3FA".
752	Table 902-8	Under the Material column in the fourth row change the "FA2" to read "2FA".
752	Table 902-8	Under the Material column in the fifth row change the "FA3" to read "3FA".
761	Table 904-2	Delete the footnote f and any other reference to footnote f from the table.
767	905.03	Change the first sentence of the first paragraph to read: "Deformed bars, must meet the requirements of ASTM A 706, ASTM A 615, or ASTM A 996 (Type R or Type A only) for Grade 60 steel bars, unless otherwise required".
767*	905.03	Change the first sentence of the second paragraph to read: "Unless otherwise specified, spiral reinforcement must meet the requirements of plain or deformed Grade 40 steel bars of ASTM A 615, ASTM A 996 (Type A), or the requirements of cold-drawn wire of ASTM A 1064".
767	905.03	Change the first sentence of the third paragraph to read: "Bar reinforcement for prestressed concrete beams must meet the requirements of ASTM A 996 (Type R) for Grade 60 steel bars, except the Engineer will allow bar reinforcement that meets the requirements of ASTM A 615 or ASTM A 996 (Type A) for Grade 40 steel bars for stirrups in prestressed concrete beams".
768	905.03.C	Change the first sentence in the subsection to read:

		"Epoxy coated steel reinforcement, if required, must be coated in accordance with ASTM A 775, with the following exceptions and additions."
768	905.03.C.3	Change the first sentence of this subsection to read: "Include written certification that the coated reinforcing bars were cleaned, coated, and tested in accordance with ASTM A 775 with the coating applicator."
768	905.05	Change the first sentence of the first paragraph to read: "Deformed steel bars must meet the requirements of ASTM A 706 or the requirements for Grade 40, Grade 50, or Grade 60 of ASTM A 615 or ASTM A 996 (Type R or Type A only)".
768	905.06	Delete this subsection in its entirety and replace it with the following: "Deformed wire fabric for prestressed concrete and fabric for concrete pavement reinforcement must meet the requirements of ASTM A 1064 and fabricated as required."
772	906.07	Change the first paragraph to read: "High-strength bolt fasteners for structural joints must meet the requirements of ASTM A 325 Type 1 bolts. High-strength nuts for structural joints must meet the requirements of ASTM A 563 Grade DH or AASHTO M 292 Grade 2H. High-strength washers for structural joints must meet the requirements of ASTM F 436 Type 1 for circular, beveled, clipped circular, and clipped beveled washers." Change the second sentence of the second paragraph of this subsection to read: "Galvanized nuts must be tapped oversize in accordance with ASTM A 563 and meet Supplementary Requirements S1, Lubricant and Rotational Capacity Test for Coated Nuts and S2, Lubricant Dye."
777*	907.03.D.2.a	Change the first sentence of the second paragraph to read: "Angle sections must be nominal 2½ inch by 2½ inch by ¼ inch."
777*	907.03.D.2.b	Change the first sentence of the first paragraph to read: "Angle section braces must be nominal 1¾ inch by 1¾ inch by ¼ inch or nominal 2 inch by 2 inch ³/₁₆ inch."
782	908.04	Change the first sentence of the first paragraph of this subsection to read: "Steel castings for steel construction must meet the requirements of ASTM A 148 for Grade 60/90 carbon steel castings, as shown on the plans, unless the Engineer approves an alternate in writing."
783*	908.09.A	Change the title of this subsection and the first sentence to read "A. Base Plates, Angle, and Non-Tubular Post Elements. Galvanized base plates, angle, rail splice elements, and non-tubular

post elements must meet the requirements of ASTM A 36 and ASTM A 123".

- 783* 908.09.B Change the title of this subsection and the first sentence to read
"B. **Rail Elements and Tubular Post Elements.** Rail elements and tubular post elements must meet the requirements of ASTM A 500, for Grade B and subsection 908.09.B and be galvanized in accordance with ASTM A 123".
- 784* 908.09.C Change this subsection to read:
"C. **Hardware.** Railing anchor studs must meet the requirements of ASTM A 449. Heavy hex nuts must meet the requirements of ASTM A 563. Bolts, used as rail fasteners, must meet the requirements of ASTM A 325, Type 1. Where called for, round head bolts must meet the requirements of ASTM A 449. The material for the railing hand hole screws must meet the requirements of ASTM A 276, Type 304. All nuts must meet the requirements of ASTM A 563 Grade DH or AASHTO M 292 Grade 2H. All flat washers must meet the requirements of ASTM F 436. Lock washers must be steel, regular, helical spring washers meeting the requirements of ANSI B18.21.1 - 1972. Bolts, nuts, washers and other hardware must be hot-dip galvanized in accordance with AASHTO M 232. Galvanized nuts must be tapped oversize in accordance with ASTM A 563, and meet Supplementary Requirements S1, Lubricant and Rotational Capacity Test for Coated Nuts, and S2, Lubricant Dye."
- 785 908.11.B Change the second paragraph to read:
"Bolts, nuts, and round washers for guardrail, other than at bridge barrier railings, must meet the requirements of ASTM A 307, ASTM A 563 (Grade A with Supplementary Requirements S1 of ASTM A 563), and ASTM F 436, respectively."

Change the third paragraph to read:
"Washers, other than round washers, for guardrail must meet the requirements for circular washers in ASTM F 436 except that the dimensions must be as shown on the plans."

Change the fifth paragraph to read:
"Bolts, nuts, and washers for connections at bridge barrier railings must conform to ASTM A 325 Type 1 galvanized high-strength structural bolts with suitable nuts and hardened washers."
- 787 908.14.B Add the following sentence to the end of the third paragraph of this subsection:
"Exposed threaded ends of anchor bolts must be galvanized a minimum of 20 inches."

Change the sixth paragraph in this subsection to read:
"Provide washers meeting the requirements of ASTM F 436 for circular washers."

787	908.14.B	Change the second sentence of the fourth paragraph to read "After coating, the maximum limit of pitch and major diameter for bolts with a diameter no greater than 1 inch may exceed the Class 2A limit by no greater than 0.021 inch, and by no greater than 0.031 inch for bolts greater than 1 inch in diameter".
787*	908.14.C	Change the first paragraph to read "Provide either four or six high strength anchor bolts per the contract plans, meeting the mechanical requirements of ASTM F 1554, for Grade 105, with each standard. Anchor bolts for traffic signal strain poles must meet the requirements of subsection 908.14.B with the following exceptions and additions:"
789	909.03	Change the second sentence of the second paragraph to read: "As an alternative to the AASHTO M 36 requirements for metal pipe, the Contractor may use gasket material meeting the low temperature flexibility and elevated temperature flow test requirements of ASTM C 990, excluding the requirements for softening point, flashpoint and fire point."
793	909.06	Change the first sentence of the second paragraph of this subsection to read: "Provide Corrugated Polyvinyl Chloride Pipe (CPV) and required fittings meeting the requirements of AASHTO M 304."
793*	909.05.D	Change the second sentence of the paragraph to read "Provide a continuous welded joint to create a watertight casing that is capable of withstanding handling and installation stresses. Perform field welding by the SMAW process using E7018 electrodes."
794*	909.08.A	Change the first sentence to read: "Provide bridge deck downspouts of PE pipe meeting the requirements of ASTM F 714, PE 4710, DR 26."
804	Table 909-9	In the note area at the bottom of the table change the designation of the second note from "c." to "b."
811	910.04	Add the following sentence to the end of this subsection: "Fabricate silt fence according to subsection 916.02."
814	Table 911-1	In the 4 th row of the 5 rows in the table change the Property listed as "Total Organic Content (TOC)" to read "Total Organic Carbon (TOC)".
829*	912.08.K	Replace Table 912-10 with the Table 912-10 below.
833*	913.03.B	Change the first sentence of the first paragraph to read: "Clay brick, to construct manholes, catch basins, and similar structures, must meet the requirements of ASTM C 32, for Grade MS."
837*	914.04	Add the following as subsection 914.04.C:

“C. Lubricant-Adhesive for Neoprene Joint Seals. The lubricant-adhesive must be a single-component moisture-curing polyurethane and aromatic hydrocarbon solvent mixture meeting ASTM D 2835, Type I. Ship in containers plainly marked with the lot or batch number of the material and date of manufacture. Store at temperatures between 58 and 80°F. Do not exceed 12 months shelf-life prior to use.”

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| 840 | 914.08 | Change the first sentence of the second paragraph to read: “Straight tie bars for end-of-pour joints must consist of bars of the diameter and length shown on the plans meeting the requirements of ASTM A 615, ASTM A 706, or ASTM A 996 (Type R or Type A only)”. |
| 840* | 914.09.A | Change the first sentence of the first paragraph to read: “Straight tie bars for longitudinal pavement joints must consist of bars of the diameter and length shown on the plans meeting the requirements of ASTM A 615, ASTM A 706, or ASTM A 996 (Type R or Type A only)”. |
| 840 | 914.09.B | Change the first sentence of the first paragraph to read: “Bent tie bars for bulkhead joints must consist of bars of the diameter and length shown on the plans.” |
| 841 | 914.12 | In the first sentence of this subsection change "AASHTO Division II" to read "AASHTO LRFD Bridge Construction Specifications". |
| 841* | 914.13 | In the first sentence of this subsection change "ASTM D 1248, for Type III, Class B" to read "ASTM D 4976, Group 2, Class 4, Grade 4". |
| 844 | 916.01.A | Change the first sentence to read: "Cobblestone must consist of rounded or semi-rounded rock fragments with an average dimension from 3 inches to 10 inches." |
| 845 | 916.01.D.1 | Change the second sentence to read: "Checkdams for ditch grades 2 percent or greater must be constructed using cobblestone or broken concrete ranging from 3 inches to 10 inches in size." |
| 851* | 917.10.B.1 | Delete the paragraph and replace it with the following:
“1. Class A. Provide and apply Class A chemical nutrient fertilizer either according to MSU Soil Testing Lab Recommendations for Phosphorus Applications to Turfgrass, except the maximum single application rate of nutrient will be 48 pounds per acre, when soil tests are required or as indicated in subsections 917.10.B.1.a and 917.10.B.1.b.” |
| 851 | 917.10.B.1 | Add the MSU Soil Testing Lab Recommendations for Phosphorus Applications to Turfgrass, found below, after the first paragraph of this subsection. |
| 853 | 917.15.B.1 | Change the second sentence of the subsection to read: |

- “The net must meet the requirements of subsection 917.15.D and be capable of reinforcing the blanket to prevent damage during shipping, handling, and installation.”
- 857 918.01 Add the following two paragraphs following the first paragraph of this subsection:
 “Wall thickness and outside diameter dimensions must conform to ASTM D 1785 for smooth-wall schedule 40 and 80 PVC conduit material. The Department will allow no more than 3 percent deviation from the minimum wall thickness specified.
 Wall thickness range must be within 12 percent in accordance with ASTM D 3035 for smooth-wall coilable schedule 40 and 80 PE conduit.”
- 858 918.01.E Delete the first three sentences of the second paragraph shown on page 858.
- 863 918.06.F.1 Delete the third paragraph in this subsection in its entirety and replace it with the following:
 "Provide smooth or deformed welded wire fabric in accordance with ASTM A 1064."
- 864 918.07.C Change the first sentence of the first paragraph to read:
 “Provide anchor bolts, nuts, and washers meeting the requirements of subsection 908.14.A and subsection 908.14.B.”
- 864 918.07.C Delete the second sentence of the second paragraph.
- 864 918.07.C Change the third sentence to read:
 “Provide anchor bolts threaded 4 inches beyond the anchor bolt projection shown on the plans.”
- 867 918.08.C Change the last sentence of the first paragraph on this page to read:
 “Galvanize bolts, nuts, washers, and lock washers as specified in subsection 908.14.B.”
- 867 918.08.C Change the last sentence of the subsection to read:
 “Provide each frangible base with manufacturer access covers as shown on the plans.”
- 867* 918.08.D Delete this subsection in its entirety and replace with the following:
 "Provide galvanized anchor bolts, studs, nuts, couplings, and washers in accordance with subsection 908.14."
- 879 918.10.J Change the third sentence of the second paragraph of this subsection to read:
 "Provide anchor bolts and associated nuts, washers, and hardware meeting the requirements of subsection 908.14."
- 887 919.06 Change the second paragraph to read:

“Shims must be fabricated from brass shim stock or brass strip meeting the requirements of ASTM B 36, for copper alloy UNS No. C26000, half-hard rolled temper, or fabricated from galvanized sheeting meeting the requirements of ASTM A 653, for Coating Designation G 90.”

- 887 919.07.C Change the sentence to read:
“Galvanized high-strength steel bolts, nuts, and washers for connecting arm connection flanges must meet the requirements of subsection 906.07.”

- 903 921.03.D Delete the last three sentences of the first paragraph of this subsection.

- 914 921.05.D Change the first sentence of this subsection to read:
"Provide anchor bolts meeting the requirements of subsection 908.14.C, including elongation and reduction of area requirements."

- 916 921.07 Change the first sentence of the first paragraph to read: "Provide LED case signs internally illuminated by LEDs and changeable message case signs internally illuminated with LED light sources."

- 936 922.04.B In the first sentence of the first paragraph change the "R-52" to "R-126".

- 936 922.04.B Add the following to the end of the first paragraph:
“Hardware used to connect the end section to the barrier must meet the requirements of NCHRP 350 or MASH (Test Level 3 or higher).”

- 936 922.04.B In the first sentence of the second paragraph delete "R-52".

- 936 922.04.B Change the fourth paragraph of this subsection to read as follows:
For all endings requiring impact attenuators provide a NCHRP-350 Test Level 3 or MASH Test Level 3 approved impact attenuation system, unless otherwise approved by the Engineer.

- 953* Pay Item Index Delete the following pay item reading:
“DB Cable, in Conduit, 600 Volt, (number) 1/C# (size)678 819”

- 957 Pay Item Index Delete the following pay item from the list:
Guardrail Buffered End560 807

- 960 Pay Item Index Change the following pay item to read:
“Mobilization, Max (dollar)107 150”

- 961 Pay item Index Delete the following pay items from the list:
Pavt Mrkg, (material), 4 inch, SRSM, (color).....598.....811
Pavt Mrkg, (material), 4 inch, SRSM, 2nd Application,
(color).....598.....811

- 961 Pay Item Index Change the following pay items in the list to read:
Pavt Mrkg, Ovly Cold Plastic, 12 inch, Cross Hatching, (color)
Pavt Mrkg, Polyurea, __ inch, Cross Hatching, (color)

Add the following pay items to the list:

"Pavt Mrkg, Polyurea, (legend).....	598.....	811
Pavt Mrkg, Polyurea, (symbol).....	598.....	811
Pedestal, Pushbutton, Alum.....	696.....	820
Pedestal, Pushbutton, Rem.....	696.....	820"

962	Pay Item Index	Change the following pay items in the list to read: "Pile Driving Equipment, Furn (Structure No.) Pile, Galv (Structure No.)"
963	Pay Item Index	Change the following pay item to read: "Rem Curing Compound, for Longit Mrkg, __ inch598 811"
964	Pay Item Index	Change the following pay item to read: "Sewer, CI __, __ inch, Jacked in Place200 402" "Sign Cover, Type I.....622 812"
965*	Pay Item Index	Change the following pay item in the list to read: "Steel Casing Pipe, __ inch, Tr Det __ Site Preparation, Max (dollar)646 815"
966	Pay Item Index	Delete the following pay item form the list; Temp Casing.....533.....718
967*	Pay Item Index	Delete the following pay item from the list; Truss Fdn Anchor Bolts, Replace.....584.....810
967	Pay Item Index	Change the following pay item in the list to read: "Traf Regulator Control"
968*	Pay item Index	Change the following pay item in the list to read: "Water Shutoff, Adj, Temp, Case __ Watering and Cultivating, First Season, Min (dollar).....646 815 Watering and Cultivating, Second Season, Min (dollar)646 815"
969	Pay item Index	Change the following pay item in the list to read: "Witness, Log, Layout, \$1000.00"
993	General Index	Change "Shop Plans (see Plans and Working Drawings)" to read "Shop Drawings (see Plans and Working Drawings)".

**Table 701-1
Concrete Structure Mixtures**

Concrete Grade (e,h)	Section Number Reference (i)	Cement Content per cyd (b,c)		Type A, D or no Admixture	Type MR, F, or G Admixtures (g)			Minimum Strength of Concrete (f)					
		lb	sack		Before Admixture	After Admixture (Type MR)	After Admixture (Type F or G)	Flexural (psi)			Compressive (psi)		
								7 Day	14 Day	28 Day (Class Design Strength)	7 Day	14 Day	28 Day (Class Design Strength)
D (a)	706, 711, 712	658 (d)	7.0	0 - 3	0 - 3	0 - 6	0 - 7	625	700	725	3,200	4,000	4,500
S1	705	611	6.5	3 - 5	0 - 3	3 - 6	3 - 7	600	650	700	3,000	3,500	4,000
T	705, 706	611	6.5	3 - 7	0 - 4	3 - 7	3 - 8	550	600	650	2,600	3,000	3,500
S2 (a)	401, 705, 706, 712, 713, 801, 802, 803, 810	564	6.0	0 - 3	0 - 3	0 - 6	0 - 7	550	600	650	2,600	3,000	3,500
		526 (d)	5.6										
S3	402, 403, 803, 804, 806	517	5.5	0 - 3	0 - 3	0 - 6	0 - 7	500	550	600	2,200	2,600	3,000
		489 (d)	5.2										

- a. Unless otherwise required, use Coarse Aggregate 6AA or 17A for exposed structural concrete in bridges, retaining walls, and pump stations.
- b. Do not place concrete mixtures containing supplemental cementitious materials unless the local average minimum temperature for the next 10 consecutive days is forecast to be above 40 °F. Adjustments to the time required for opening to construction or vehicular traffic may be necessary. Cold weather protection may be required, as described in the quality control plan. The restriction does not apply to Grade S1 concrete in foundation piling below ground level or Grade T concrete in tremie construction.
- c. Type III cement is not permitted
- d. Use admixture quantities specified by the Qualified Products Lists to reduce mixing water. Admixture use is required for Grade D, Grade S2, and Grade S3, concrete with a reduced cement content. Use a water-reducing retarding admixture at the required dosage for Grade D concrete to provide the setting retardation required. When the maximum air temperature is not forecast to exceed 60 °F for the day, the Contractor may use a water-reducing admixture or a water-reducing retarding admixture. Ensure Grade D concrete in concrete diaphragms contains a water-reducing admixture, or a water-reducing retarding admixture. For night casting, the Contractor may use a water-reducing admixture in lieu of water-reducing retarding admixture, provided that the concrete can be placed and finished prior to initial set.
- e. The mix design basis for bulk volume (dry, loose) of coarse aggregate per unit volume of concrete is 68% for Grade S1, and 70% for Grade D, Grade S2, Grade T, and Grade S3.
- f. The Contractor may use flexural strength to determine form removal. Use compressive strength for acceptance in other situations.
- g. MR = Mid-range.
- h. The Engineer will allow the use of an optimized aggregate gradation as specified in section 604.
- i. Section Number Reference:

401	Culverts	711	Bridge Railings	803	Concrete Sidewalk, Sidewalk Ramps, and Steps
402	Storm Sewers	712	Bridge Rehabilitation-Concrete	804	Concrete Barriers and Glare Screens
403	Drainage Structures	713	Bridge Rehabilitation-Steel	806	Bicycle Paths
705	Foundation Piling	801	Concrete Driveways	810	Permanent Traffic Signs and Supports
706	Structural Concrete Construction	802	Concrete Curb, Gutter and Dividers		

**Table 902-6
Superpave Final Aggregate Blend Physical Requirements**

Est. Traffic (million ESAL)	Mix Type	Percent Crushed Minimum Criteria		Fine Aggregate Angularity Minimum Criteria		% Sand Equivalent Minimum Criteria		Los Angeles Abrasion % Loss Maximum Criteria		% Soft Particles Maximum Criteria (b)		% Flat and Elongated Particles Maximum Criteria (c)	
		Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course
< 0.3	LVSP	55/—	—	—	—	40	40	45	45	10	10	—	—
< 0.3	E03	55/—	—	—	—	40	40	45	45	10	10	—	—
≥0.3 - <1.0	E1	65/—	—	40	—	40	40	40	45	10	10	—	—
≥1.0 - <3	E3	75/—	50/—	40(a)	40(a)	40	40	35	40	5	5	10	10
≥3 - <10	E10	85/80	60/—	45	40	45	45	35	40	5	5	10	10
≥10 - <30	E30	95/90	80/75	45	40	45	45	35	35	3	4.5	10	10
≥30 - <100	E50	100/10 0	95/90	45	45	50	50	35	35	3	4.5	10	10

- (a) For an E3 mixture type that enters the restricted zone as defined in Table 902-5, the minimum is 43. If these criteria are satisfied, acceptance criteria and associated incentive/disincentive or pay adjustment tied to this gradation restricted zone requirement included in contract, do not apply. Otherwise, final gradation blend must be outside of the restricted zone.
- (b) Soft particles maximum is the sum of the shale, siltstone, ochre, coal, clay-ironstone and particles that are structurally weak or are non-durable in service.
- (c) Maximum by weight with a 1 to 5 aspect ratio.

Note: "85/80" denotes that 85 percent of the coarse aggregate has one fractured face and 80 percent has at least two fractured faces.

Table 912-10 Minimum Retention Requirements				
Preservative	Minimum Retention, (pcf)			AWPA Standard
	Guardrail Posts	Sign Posts	Blocks	
Pentachlorophenol	0.60	0.50	0.40	A6
CCA, ACZA	0.60	0.50	0.40	A11
ACQ (a)	0.60	Not Allowed	0.40	A11
CA-B (a)	0.31	Not Allowed	0.21	A11
CA-A (a)	0.31	Not Allowed	0.15	A11
Other Waterborne preservatives	AWPA Commodity Specification A, Table 3.0, Use Category 4B	Not Allowed	AWPA Commodity Specification A, Table 3.0, Use Category 4A	A11
a. Non-Metallic washers or spacers are required for timber and lumber treated with ACQ or CA placed in direct contact with aluminum. Do not use with sign posts.				

MSU Soil Testing Lab Recommendations for Phosphorus Applications to Turfgrass
3/8/2012

		Sand based rootzone establishment	Golf greens and tees est. or mature; Kentucky bluegrass or perennial ryegrass athletic fields est. or mature; sand based rootzone mature	Lawns, golf course fairways; establishment or mature	Establishment without soil test
Bray P1, Mehlich 3 Soil Test Value (ppm): pH<7.4	Olsen Soil Test Value (ppm) pH>7.4	Recommendation (lbs. P ₂ O ₅ /1000 ft. ²)	Recommendation (lbs. P ₂ O ₅ /1000 ft. ²)	Recommendation (lbs. P ₂ O ₅ /1000 ft. ²)	Recommendation (lbs. P ₂ O ₅ /1000 ft. ²)
0	0	4.4	3.4	2.5	2.5 lbs. year (Maximum single application of 1.5 lbs.)
2	1.3	4.1	3.1	2.2	
4	2.7	3.9	2.7	1.9	
6	4	3.6	2.4	1.6	
8	5.3	3.4	2.0	1.3	
10	6.7	3.1	1.7	1.0	
12	8	2.8	1.4	0.7	
14	9.3	2.6	1.0	0.4	
16	10.7	2.3	0.7	0.1	
18	12	2.1	0.3	0.0	
20	13.3	1.8	0.0		
22	14.7	1.5			
24	16	1.3			
26	17.3	1.0			
28	18.7	0.8			
30	20	0.5			
32	21.3	0.2			
34	22.7	0.0			

Web resources: www.turf.msu.edu or www.bephosphorusmart.msu.edu