ENGINEERING ROAD STANDARDS
FOR
OXFORD TOWNSHIP

Prepared by:

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Forward

In order to protect the public health, safety and welfare, it is necessary to establish standards for engineering in the Township of Oxford, Isanti County, Minnesota.

These standards outline specific requirements and materials that will be incorporated into the preparation of plans and specifications for street and other construction improvements within the Township.

Street surface improvements shall be designed to the standards of the Minnesota Department of Transportation design manuals and shall be constructed in accordance with the Minnesota Department of Transportation Standard Specifications except as modified by Township requirements.

Once the plat, plans and specifications and associated documents have been reviewed, approved and signed will the developers be allowed to proceed with the construction, or as defined in the Development Agreement,.

These standards are established as policy and as such may be subject to change by action of the Town Board.

The Township of Oxford Engineering Manual was approved by the Town Board on May 11, 2010.

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Joseph D. Pelawa, PE
Township Engineer

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GLOSSARY OF TERMS

AASHTO	American Association of State Highway and Transportation Office
ANSI	American National Standards Institute
ASTM	American Society of Testing and Materials
AWWA	American Water Works Association
CEAM	City Engineer's Association of Minnesota
CMP	Corrugated Metal Pipe
HDPE	High Density Polyethylene
Mn/DOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
PID	Property Identification Number
PVC	Polyvinyl chloride
RCP	Reinforced Concrete Pipe
SDR	Strength to Diameter Ratio

TOWNSHIP OF OXFORD
STANDARD SPECIFICATIONS
FOR
STREET CONSTRUCTION
OXFORD TOWNSHIP, ISANTI COUNTY

1.00 SUMMARY OF CONTENTS

1.01 Introduction

These Standard Specifications are provided to meet the following objectives of the Township for Street Construction.

A. Provide a written description of what is expected with regard to plan preparation and subsequent construction.

B. Provide uniform standards for street construction for all Developers.

C. Aid the Township in the review of Developers submittals.

D. Provide the Township with streets that are functional, safe and have a public value.

These Specifications are divided into several sections, each of which is utilized at different stages of a project. All sections must be referenced to insure a smooth project line is obtained and also to insure that a beneficial final product is received by the Township. The following paragraphs provide a summary of each individual section. The individual sections provide detailed requirements for use to complete improvements within Oxford Township, Isanti County, Minnesota.

1.02 General Requirements Section

This section gives a broad overview of the improvement requirements. All work shall conform to the latest edition of the Minnesota Department of Transportation (Mn/DOT) Standard Specifications for Highway Construction unless modified in supplemental specifications. This is to insure that a uniform set of guidelines is followed during construction. Most Contractors are familiar with the Mn/DOT Specifications, and therefore, will know what is expected of them.

1.03 STRICTER PROVISIONS. To the extent any requirement contained herein is less strict than any other requirement which may apply by ordinance or otherwise, the stricter requirement shall apply. However, the Town Board may expressly agree to alter the requirements of these Specifications as part of a development agreement entered into between the Town and Developer if the Town Board determines such alteration is appropriate to respond to the circumstances of a particular situation or is otherwise in the public interest.

1.04 Submittal Procedures and Construction Plan Requirements Section

This section informs the Developer of the plan submittal requirements established by the Township. The requirements for the number of drawings, when to submit the drawings and what should be shown on the drawings are

outlined in this section. The Developer shall submit concept or sketch plans to the Town Board for review and comment prior to proceeding with preliminary plans. 5 copies will be required.

1.05 Design Considerations Section

The design considerations section informs the Developers Engineer of the guidelines to follow in the design of the street and drainage systems. The majority of the items listed are safety related items. Items such as cul-de-sac length and right-of-way width are items with significant public safety implications requiring review and approval by the Town Engineer. This is to provide for the safe conveyance of motorists in the Township. The design standards listed also take into account maintenance items such as snow removal and drainage conveyance systems.

1.06 Description and Construction Requirements and Construction Materials Section

The Description and Construction Requirements and the Construction Materials Sections both reference the Mn/DOT Standard Specifications as previously mentioned. The Mn/DOT Specifications were written to cover construction of streets in a wide variety of locations. For instance, Turf Establishment can be accomplished in many different ways, these sections instruct specifically what seed mix is to be used, at what rate to apply it and how much to fertilize it to obtain the best results in Oxford Township.

1.07 Construction Staking, Observation and Testing Requirements Section

This section is intended to specify the staking, observation and testing requirements, which shall be followed during the construction phase to insure that the final product meets the design requirements. This gives the Township a high degree of certainty that the final product is serviceable and of high quality. This allows Contractors to know 1) what is expected for construction staking; 2) when Township site reviews are required; and 3) what tests are expected of them and at what frequency testing is to occur.

1.08 Standard Construction Details Section

This section is intended to provide a graphical representation of the design requirements for various street sections. They are intended to be utilized hand-in-hand with the design standards section to provide a complete picture for the Developer. These sections are commonly copied onto the drawings to aid the Contractor in construction. A copy of these standard construction details is available electronically from the Township Engineer.

1.09 COSTS. All costs associated with complying with these Specifications, including all testing and inspections, shall be the responsibility of the developer or other

person, entity, or group responsible for constructing the Street (collectively referred to herein as the "Developer"). The developers shall also be required to fully reimburse the Town for all professional costs and expenses it may incur to oversee, inspect, or otherwise ensure compliance with these Specifications.

2.00 GENERAL REQUIREMENTS

2.01 All new roads or streets shall be dedicated to the public within a plat or roadways previously established, which the Town Board is being asked to open and maintain as a Town road, shall be constructed in accordance with all of the Standard Specifications for Street Construction or Improvement contained herein.

The Board may require the Developer to improve the road(s) used to access a plat, if the Town Board determines such improvements are needed and necessary to accommodate the traffic generated by the development. Lots within the plat will have the road used to access the lot (frontage) be improved to township standards in accordance with all of the standard specifications for street construction.

Township roads utilized to access the plat may be subject to these specifications, unless expressly defined by the terms of a development agreement or by other action of the Town Board.

2.02 All work shall conform to Minnesota Department of Transportation Standard Specification for Construction, 2005 Edition with all supplements except as modified herein.

2.03 All work shall be completed in a workman like manner in accordance with typical industry standards.

2.04 All materials utilized for street construction, site drainage and site restoration as described herein shall meet all requirements as defined in each specific reference cited.

2.05 Minimum design standards shall meet:

A. All streets must be paved. All lots must front on a paved street constructed to township standards.

B. An obstacle free zone shall be provided adjacent to Streets in accordance with the standards of the Minnesota Department of Transportation Road Design Manual.

C. All boulevards shall have at least 6 inches of top soil (black dirt) placed on them and be stabilized with sod or seeded.

D. Streets shall be logically related to the topography so as to produce useable lots and reasonable grades. Arrangement of Streets in new plats shall make provisions for the appropriate continuation of the Streets into adjoining areas as reasonably needed to accommodate future development. Where these streets may continue into adjoining areas the following notice sign (2'X4') shall be installed by the Developer. "Notice this street may be extended beyond this point in the future. Further information may be obtained by contacting the Township Clerk"

E. Access shall be given to all lots and outlots in the subdivision or plat, and to adjacent unsubdivided parcels, unless the topography clearly indicates that such connection is not feasible. Reserved strips and land-locked areas shall not be created.

2.06 PAVEMENT DESIGN. The Street shall be designed in accordance with Standard Details Appendix A with a minimum of 6" of aggregate base, Class 5, 100% crushed aggregate, 2 inches of bituminous non-wearing course, and 1-1/2 inches of bituminous wearing course, Some developments, especially commercial or industrial use areas, to facilitate special traffic conditions or to accommodate certain subgrade soil classifications may be subject to thicker pavement sections and/or wider street sections as designated by the Town Engineer.

2.07 CUL-DE-SACS. The Town Board may allow a cul-de-sac if the Street is platted solely to provide future access into adjoining parcels or where topography or other conditions justify their use. Dead end streets shall have a 60' radius cul-de-sac constructed on them with an 80' radius right-of-way. Cul-de-sac islands are not allowed.

2.08 SHOULDERING. Where the Street grade exceeds 4%, the shoulders shall be paved with a minimum of 2" thick bituminous surfacing. Where the street grade exceeds 6%, bituminous curb shall be installed.

2.09 Definitions:

Owner: Owner shall mean the person(s), company, corporation, etc. that enter into a "Developers Agreement" with Oxford Township for the purpose of construction of public improvements on lands under the ownership and control of said persons(s), company, corporation, etc.

Engineer: Engineer shall mean the Owner's Licensed Professional Engineer.

Township Engineer: Township Engineer shall mean the Licensed Professional Engineer(s) directed by and under contract to the Township to serve in that capacity.

Approved Plans: Shall mean all Plans and Specifications and information required to be shown thereon per the requirements of Oxford Township, along with these Standard Specifications.

3.00 SUBMITTAL PROCEDURES AND CONSTRUCTION PLAN REQUIREMENTS

3.01 The Owner shall submit a complete set of Grading, Drainage and Erosion Control Plans and Street Construction Drawings together with required supplementary information for improvements to be constructed within Oxford Township. The drawings shall be submitted with the subdivision Preliminary Plat for Township review. The drawings shall be revised, if required, after review by the Township Engineer and Town Board and resubmitted. Five sets of construction drawings shall be submitted with both the Preliminary Plat and Final Plat. Preliminary Plats and Final Plats will not be approved until this requirement has been satisfied. The Construction Drawings shall be in compliance with the requirements and standards as set forth herein.

3.02 The Grading, Drainage and Erosion Control Plans and Preliminary Street Construction Drawings shall be complete and submitted with the Preliminary Plat. The drawings shall be on standard 22"x34" sheets. The street and storm sewer information shall be drawn on plan and profile style sheets. Street cross sections will be required for the Final Plat submittal only and shall be drawn with vertical and horizontal grid lines. The following minimum information shall be depicted on the Grading, Drainage and Erosion Control Plans and Street Construction Drawings:

A. General

1. North arrow
2. Scale with bar-graph
3. Date of preparation
4. Proposed name of the subdivision in which the street is to be constructed.
5. Proposed name of all streets.
6. Name of the plan preparer, Engineer, Surveyor and Owner.
7. Seal or signature of the preparer and Licensed Engineer.
8. The Grading, Drainage and Erosion Control Plan shall be drawn at a maximum scale of 1" = 50'. The plan shall include the entire boundary of the plat.
9. Street and storm sewer plan and profiles shall be drawn at a maximum scale of 1"=50' horizontal and 1"=5' vertical.
10. Street cross sections shall be drawn at a scale of 1" = 10' horizontal and 1"=5' vertical.
11. Benchmark(s) based on USGS datum within the proposed subdivision boundary.

B. Existing conditions

1. Location, street width, right-of-way width, street name and street improvements for all streets abutting, adjacent or within 500 feet of the proposed subdivision. Bearings and distances for all existing street centerlines and right-of-ways described above shall be shown.

2. When any existing street will provide access to a proposed subdivision street, all existing access points to that street shall be shown for a distance of 500 feet on either side of the proposed intersection. The existing accesses shall be labeled as to width, type and condition.

3. Location, size, type, invert elevations, catchbasin location and condition of all storm sewers and culverts located within 500 feet of the proposed subdivision.

4. Location and size of existing sanitary sewer mains, watermains, and all other underground utilities and structures located within 100 feet of the proposed subdivision.

5. Location and size of buildings, structures, power and telephone lines and poles, and other above ground facilities within 100 feet of the proposed subdivision.

6. Natural topography including trees, water courses, wetlands, and other above ground natural features within 100 feet of the proposed subdivision.

7. Existing ground surface contours at an interval of two feet within 100 feet of the proposed subdivision. The Township Engineer may require one foot contour intervals where conditions require more detailed grading information.

C. Proposed Conditions

1. Plan and profile of proposed streets showing centerlines and right-of-ways. Centerline stationing shall be shown with station 0+00 being the centerline of an accessed street. Centerline information shall include:

a. Bearings and distances of all tangent sections,
b. Radius, degree of curvature, delta, length and stationing of the PC and PT for all curves,
c. Vertical data including all existing and proposed grades and vertical curve information such as length of curve and superelevation requirements.

2. Cross sections of all proposed streets at 100 foot stations and other pertinent locations such as maximum cut and fill areas, through cul-de-sacs and adjacent to wetlands. Cross sections shall depict existing and proposed grades, and any existing and proposed surface and subsurface features, located at the cross section location. The cross sections shall be labeled to define the street stations from which they were taken.

3. Plan and profile of all proposed storm sewer depicting size, type, location of pipe, flow line gradients and manhole and catchbasin locations. Locations of flared end sections, riprap and other appurtenances shall be shown on the Plans.

4. Locations, sizes, types and inverts of all culverts shall be shown. Location and type of end sections shall be depicted.

5. Typical street sections, typical manhole and catchbasin details, typical ditch sections and standard riprap details shall be shown if proposed.

6. The Grading, Drainage and Erosion Control Plan shall show the proposed contours at two foot intervals. The Township Engineer may require one foot intervals where conditions require more grade information. The plan shall also show all proposed temporary and permanent erosion control features. The grading plan shall also include estimated cubic yardage of excavation, fill and anticipated dirt balance.

D. Supplemental Information

1. A soils investigation shall be performed by a licensed geotechnical engineer and a report of their findings submitted to the Township Engineer. The report shall specifically address the adequacy of the existing subgrade to support the proposed street. Areas of weak soil and associated depths shall be discussed. Typical R-values of the soils shall be discussed. Estimate the seasonal high water elevations along the street and present this data in the report. Test holes shall be taken at a maximum interval of 500 feet along the proposed street centerline. Test hole data shall be included in the

soils report and shall depict depth of bore, depth to water table, soil stratification and soil type within each stratification and thickness of each strata. Design recommendations for street section shall be included in the report.

2. A site specific Stormwater Management Plan shall be prepared by property trained (Mn/DOT, U of M) Certified Stormwater Management Plan preparer or a Licensed Professional Engineer and submitted to the Township Engineer with the street construction drawings. Drainage calculations shall be performed in accordance with the design considerations section of this standard. The report shall include the minimum items:

   a. **Title Page.** The title page shall list the project name, project location, date prepared, and preparer's name, title, and company.

   b. **Table of Contents.** The table of contents must provide a description of the major categories of the report and also list each hydrograph and reservoir report presented in the report.

   c. **Summary.** The summary must provide descriptions of items critical to the review of the entire report. Assumptions and results of the calculations shall be included in the summary:

- Pre-Development Site Conditions (Existing)
  - Total site area
  - Delineation of sub-drainage areas, as appropriate
  - For each drainage area, or sub-drainage area, provide the following information:
    1. Area in acres
    2. Curve number (with justification)
    3. Time of Concentration (with justification)
    4. Runoff rate and runoff volume

- Post-Development Site Conditions (Proposed)
  - Total site area
  - Delineation of sub-drainage areas, as appropriate
  - For each drainage area, or sub-drainage area, provide the following information:
    1. Area in acres
    2. Curve number (with justification)
    3. Time of Concentration (with justification)
    4. Runoff rate and runoff volume

- Comparison of pre-development to post-development runoff rates and volumes when rate control is required.

- Discussion of temporary and permanent erosion control measures utilized.

- A discussion of the storm sewer system, if applicable, to include a summary of flows to each catchbasin and the depth of water over each catchbasin during the ten year event.

d. **Drainage maps:** Drainage maps depicting pre-development and post-development conditions. The maps may be 22" x 34" plans, but shall also be provided on 11" x 17" reductions. The plans shall delineate drainage area and sub-drainage area boundaries. All areas shall be labeled and referenced to those presented in the report.

e. **Computer Printouts:** Drainage maps of all hydrograph and reservoir files shall be included at the back of the report for reference.

4.00 DESIGN CONSIDERATIONS

4.01 Storm Water: The methodology presented in the National Engineering Handbook Section 4 (1972), prepared by the USDA, is the hydrologic practice to be used for determining storm water drainage and ponding within the Township. Both Pre-development and Post-development runoff conditions are to be evaluated and ponding provided for 2 year and 100 year event storm water runoff difference. The post rate of runoff shall not exceed the pre-rate of runoff. The difference must be ponded for the 2-year and 100-year storm event.

The Mn/DOT Drainage Manual shall be used to design culvert capacity for the 10 year storm water event.

The construction of Nationwide Urban Runoff Program (NURP) ponds are required to treat the concentrated storm water runoff from hard surfaces such as but not limited to, roadway and parking lots where pollutants can conceivably be deposited. The pond volume required below the outlet elevation (dead storage) shall be equal to or greater than the volume of runoff produced by a 2.5 inch rainfall event. The runoff volume shall consider the entire area contributing to the pond, however, the minimum permanent pool volume must be greater than or equal to the volume produced from 0.5 inches of runoff from all impervious area in the contributing watershed.

The Best Management Practice Manual and the Township's Standard Specifications shall be used as a guide for the design and construction of these ponding devices for removal of sediments and surface pollutants.

4.02 Street design shall be in accordance with the State of Minnesota Department of Transportation Street Design Manuals, State Aid Manual, Grading Base Manual, Bituminous Manual and Standard Plates Manual, all as amended herein.

4.03 All right-of-way widths, street widths and shoulder widths shall conform to the following minimum standards. All design information shall be subject to review by the Township Engineer. Additional widths of right-of-way, street or shoulder may be required by the Township Engineer, if, in his/her opinion, conditions warrant.

RURAL DESIGN

CLASSIFICATION	R/W WIDTH	ROAD TOP WIDTH	SURFACE EDGE TO EDGE
Local	66'	34'	28'
Cul-de-sac turnaround	80' radius	63' radius	

4.04 Streets and driveways shall intersect at right angles or within ten degrees. Intersections having more than four corners shall be prohibited. Adequate right-of-way for future intersections and streets shall be dedicated with the Final Plat. A 2% maximum grade shall extend 100 feet from all intersections or as deemed necessary by the Engineer.

4.05 A minimum typical street section tangent of 100 feet shall be placed between reverse curves on all streets. A minimum typical street section tangent of 100 feet shall be placed between tangent runout portions of reverse super elevated curves. The minimum tangent distance may be increased to facilitate tangent runout for super elevated curves.

4.06 Street design speed shall be based upon the functional classification of the street. Horizontal and vertical alignment shall be designed to accommodate a minimum 55 mile per hour design speed for collector streets unless otherwise approved by the Commissioner of Transportation, and a 40 mile per hour design speed on all other streets. The minimum curve radius, without super elevation, shall be 500 feet for 40 miles per hour local streets. Where the required radius cannot be met, a maximum superelevation of 2.5% will be allowed.

4.07 Centerline gradients of urban street sections shall have a minimum vertical gradient of 0.6 percent and a maximum gradient of 6.0 percent. Rural street sections may have a minimum vertical gradient of 0.5 percent and a maximum gradient of 6.0 percent. Rural street section ditch inverts shall have a minimum vertical gradient of 0.75%.

4.08 Street intersection jogs with centerline offsets of less than 200 feet shall be prohibited.

4.09 Access of local streets onto collector and arterial streets shall be prohibited at less than 500 foot intervals.

4.10 Residential street intersections shall be rounded by a radius of not less than 30 feet. Corners of entrances to the turnaround portions of cul-de-sacs shall be rounded by a radius of not less than 60 feet. Corner radius to arterial and collector streets shall not be less than 40 feet.

4.11 Residential streets shall be constructed with ditch sections (rural) as shown on the standard details.

4.12 The maximum allowable cul-de-sac length shall be reviewed by the Township Engineer. The length of the cul-de-sac shall be measured along the centerline from the nearest intersection to the center point of the cul-de-sac. Cul-de-sac streets shall only be allowed where one or more of the following criteria have been met:

A. Area topography or other physical site conditions warrant a cul-de-sac, dead-end design.

B. A through street is not physically feasible.

Where a temporary residential cul-de-sac is required, the turnaround right-of-way shall be placed adjacent to a plat boundary line and a right-of-way of the same width as the street shall be carried to said property line in such a way as to permit future extension of the street into the adjoining tract. A temporary easement equal to the additional right-of-way width over 66 feet minimum required shall be provided by dedication and recorded as a separate instrument. At the time the street is extended and the cul-de-sac is removed, the easement may be vacated upon vacation completion process.

Cul-de-sacs shall be formed with a 2% cross slope or a 2% continual slope from the center point of the cul-de-sac. Concrete curb & gutter will be required on urban sections only, a minimum of a 0.75% flow line grade around the perimeter of the cul-de-sac shall be maintained.

4.13 Utilities shall be located within easements. Disturbed areas shall be restored upon completion of utility construction.

5.00 DESCRIPTION AND CONSTRUCTION REQUIREMENTS

5.01 Clearing and Grubbing:

All work related to this item shall be performed in accordance with the Minnesota Department of Transportation Standard Specifications for Construction, Section 2101 as modified herein. All trees, shrubs, brush, stumps, roots, windfalls and other plant life, including dead and decayed matter, that exist within the entire street right-of-way width shall be removed from site and disposed of in accordance with Isanti County regulations. Items listed above which are specifically designated to remain as shown on the approved Plans shall be preserved.

At a minimum all clearing and grubbing operations shall extend into the back slope of the ditch cross section or to the right-of-way line.

5.02 Subgrade Preparation:

All work related to subgrade preparation shall conform to the Minnesota Department of Transportation Standard Specifications for Construction, Section 2112 as modified herein. Subgrade preparation shall consist of preparation of the street subgrade after installation of all underground work and prior to placing the design section as depicted in the appendix of this Specification. The required density in the top three feet of the subgrade shall be a minimum 100% of standard proctor density. Cohesive soils shall be compacted in lifts not exceeding 4" loose thickness and at a moisture content of $\pm$ 10% of optimum moisture content.

Test rolling shall be applied to subgrade per Mn/DOT Specification Section 2111 except as modified in subsection 2111.2 where the Township Engineer may allow other suitable equipment for the test rolling.

5.03 Aggregate Base and Surface: Aggregate base and surface shall be placed in accordance with the Minnesota Department of Transportation Standard Specifications for Construction, Section 2118 and Section 2211.

Aggregate shall be placed to the dimensions as shown on the construction details in the appendix of this Specification. In-place density shall be a minimum of 100% standard proctor density.

5.04 Bituminous Placement: Bituminous materials shall be furnished and installed in accordance with the Minnesota Department of Transportation Standard Specifications for Construction Section 2360 as modified herein.

All bituminous mixture shall be compacted in accordance with the specified density method to not less than 95% of the Marshall density.

The thickness of all single course of pavement shall be within a tolerance of plus or minus 1/4 inch of thickness as shown on the construction details in the

appendix of this Specification. Two courses of bituminous material shall be required for all paved street sections.

The Control Strip Method of compaction may be used as an alternate to the Specified Density Method with permission of the Township Engineer; however cores are still required per Section 7.03.1c.

5.05 Pipe Culverts and Pipe Sewer: All pipe culverts and pipe sewers shall be furnished and installed in accordance with the provisions of the Minnesota Department of Transportation Standard Specifications, Section 2501and Section 2503. Pipe culverts shall be a minimum of 18" in diameter and pipe sewers shall be a minimum of 15" in diameter and sized based upon a Licensed Engineer's recommendation. All pipe culverts and pipe sewers, except driveway culverts, located within the right-of-way shall be reinforced concrete pipe. Driveway culverts must be corrugated steel or approved by Township Engineer.

All storm sewer shall have a minimum cover of 24 inches as measured from the final pavement grade to the top of the pipe.

5.06 Manholes and Catchbasins: All manholes and catch basins shall be furnished and installed in accordance with the provisions of the Minnesota Department of Transportation Standard Specification 2506 as modified herein.

5.07 Temporary Traffic Signs and Devices: Temporary traffic signs and devices shall be furnished and installed in accordance with the Minnesota Department of Transportation Standard Specifications for Construction, Section 2564 and in accordance with the Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways.

5.08 Temporary Erosion Control: Erosion control devices shall be installed prior to construction to insure the protection of adjoining properties, wetlands, ponds, lakes and rivers. All work shall be in accordance with the Minnesota Department of Transportation Standard Specifications for Construction and Specifications, Section 2573. Erosion control devices shall remain in-place after construction until such time as the Township Engineer determines that they are no longer required. At such time that the Township Engineer orders the removal of the erosion control devices, they shall be removed and disposed of by the Owner. Silt accumulated shall be spread evenly or disposed of to insure the protection of wetland and drainage areas.

5.09 Riprap: Riprap shall be furnished and placed in accordance with the Minnesota Department of Transportation Standard Specifications for Construction, Section 2511. Riprap shall be utilized as a protective cover for earth slopes or wherever the soil is susceptible to erosion. A geotextile fabric is required to serve as a filter layer beneath all riprap placed.

5.10 Turf Establishment: All disturbed areas not surfaced shall recieve top soil, seeded, mulched, disc anchored and fertilized in accordance with the Minnesota Department of Transportation Standard Specifications for Construction, Section 2105 and Section 2575. These areas include but are not limited to in-slopes, ditches, backslopes, boulevards, temporary construction easements, disturbed lot areas, and permanent construction easements. Topsoil shall be placed to a minimum four inches and maximum of eight inches in-place compacted depth. All areas shall be graded to drain per the approved Plans.

5.11 Other Work: Work not specifically described herein shall be performed in accordance with the appropriate section(s) of the Minnesota Department of Transportation Standard Specifications for Construction and Supplemental Specifications.

5.12 Sediment dirt and dust shall be controlled by the Developer by means or methods to contain within the project limits. Watering or other approved means to minimize nuisance for existing residents will be required.

6.00 CONSTRUCTION MATERIALS

6.01 Aggregate Sub-base: Aggregate sub-base course shall be Class III or Class IV in accordance with Section 3138 of the Minnesota Department of Transportation Standard Specifications for Construction.

6.02 Aggregate Base and Surface: Aggregate base and surface courses shall be Class I or Class V in accordance with Section 3138 of the Minnesota Department of Transportation Standard Specifications for Construction.

A. Class I Aggregate Surfacing shall be modified to 12 to 20% passing the #200 sieve.
B. Class V Aggregate Base shall be modified to 5-10% passing the #200 sieve.
C. Class V Aggregate Surfacing shall be modified to 7% to 12% passing #200 sieve.
D. Street shouldering material shall be Class 2, 100% Crushed Recycled Concrete Aggregate, meeting Mn/DOT Specification 3138, where street grades do not exceed 4%.

6.03 Bituminous Mixture: Materials required under this section shall be in accordance with the Minnesota Department of Transportation Standard Specifications for Construction Section 2360.

Bituminous mixture for base course shall be Low Volume (LV), Non-Wear, with aggregate size 3 (¾" maximum size) and specified asphalt binder grade 58-28. Bituminous mixture for wearing courses and surfacing shall be (Low Volume), Wear with aggregate size 4 (½" maximum size) and a specified asphalt binder grade 58-28. Bituminous mixture containing recycled mixture may be utilized for

Non-Wearing courses only. Asphalt binder grade shall be adjusted per Specification 2360 for recycled mix.

A tack coat shall be applied between pavement courses and to contact surfaces between pavement and abutting concrete or bituminous edges. Bituminous material for tack coat shall be CSS-1 (emulsified asphalt) or approved equal applied at a minimum rate of 0.05 gallons per square yard.

6.04 Pipe Culverts and Pipe Sewers:

A. Corrugated steel pipe shall conform to Minnesota Department of Transportation Standard Specification for Construction, Section 3226 and to Minnesota Department of Transportation standard plate 3040. Pipe shall be 2–2/3" x ½" corrugation, minimum 16 gauge. Bands shall be 10½" minimum width, same thickness and coating as the pipe.
B. Reinforced concrete pipe shall be in accordance with Section 3236 and of the size and class on the approved construction drawing. Reinforced concrete aprons shall conform to Section 3236 and be utilized for all "daylight" situations. Pipe joint sealer materials shall be preformed rubber, Type A, in accordance with Section 3726. Connections shall be made with bell and spigot joints. Clamp-on-bands shall not be allowed. Pipe couplers shall be subject to rejection upon failure to conform to any requirements of this specification.

6.05 Manholes and Catchbasins: Manholes and catchbasins shall conform to Minnesota Department of Transportation Standard Specifications for Construction Section 2506.

A. Catch basin structures shall be 27" Reinforced Concrete unless otherwise approved by the Town Engineer.
B. Manhole inlets shall be Neenah Foundry R-1733 or equal with Type B lid with "storm sewer" inscribed.
C. Catchbasin manhole and catchbasin inlets shall be Neenah Foundry R-3250-1 or equal with type K grate.
D. Off-street catchbasin manhole and catchbasin inlets shall be per township standard plates.

6.06 Stormwater outlet structures shall be precast concrete structures.

6.07 Concrete Mats and Geotextile Fabric: Concrete Mat and geotextile fabric shall conform to the Minnesota Department of Transportation Standard Specifications for Construction, Section 2515, 3604 and Section 3733. Concrete mats shall be open cell precast blocks with a Type IV geotextile fabric.

6.08 Signs and Markings: All signs and markings will be provided and installed by the developer to meet Township and County standards.

6.09 Turf Establishment: Turf establishment shall be in accordance with the Minnesota Department of Transportation Standard Specification for Construction.

A. Seed mixture shall be in accordance with Section 3876, mixture number 240, 250, or 260 applied at the rate of 100 lbs. per acre as directed by the Township Engineer.
B. Topsoil borrow shall be in accordance with Section 3877.
C. Sod shall be low maintenance in accordance with Section 3878.
D. Commercial fertilizer shall be in accordance with Section 3881, shall have a minimum analysis of 10-10-10, and be applied at a rate of 500 lbs. per acre.
E. Mulch material shall be in accordance with Section 3882 and shall be Type I applied at the rate of two tons per acre. Mulch material shall be disc anchored.
F. Wood Fiber Blanket shall meet the requirements of Mn/DOT Specification 3885. Shall be used in areas where slope is greater than 4:1 and anchored with biodegradable pegs.
G. Silt fence utilized for erosion control shall be in accordance with Section 3886.

6. 10 All materials to be utilized for construction and not specifically detailed above shall be in accordance with the Minnesota Department of Transportation Standard Specifications for Construction and Supplemental Specifications.

7.00 CONSTRUCTION STAKING, OBSERVATION AND TESTING REQUIREMENTS

7.01 Construction Staking

Construction staking shall be performed by a surveyor licensed in the State of Minnesota and contracted by the Owner to perform such work. All plat and right-of-way boundaries shall be delineated. Street centerline shall be referenced off the established plat and right-of-way boundaries. One set of slope stakes or offset hubs is required prior to construction and one set of blue tops placed either in the subgrade or gravel surface is required during construction.

Street grade hubs shall be placed at a maximum of 100 feet on center and shall be required at a maximum of 50 feet on center for all curves. The street grade hubs shall be placed along the street on each edge of pavement at the spacing stated above.

7.02 Township Observation: The Township Engineer and/or his/her representative shall observe the work to insure compliance with and conformance to Township Standards and approved plan. The Township Engineer shall observe the work at the following times during construction and prior to proceeding with the next phase of construction:

A. After clearing limits are staked and prior to construction.
B. Upon completion of site clearing and grubbing.
C. Upon completion of removal of all required topsoil and unsuitable subgrade materials. The Owners Soils Engineer shall be present to provide assurance that all unsuitable soils have been removed. Alternatively, a written communication from the developer's Soils Engineer to the Township's Engineer stating that "all unsuitable soils have been removed from the street sub-base" may be supplied by the Owner. The Township Engineer may require soil borings to verify the removal of unsuitable soils.
D. Upon completion of sub-base preparation. The sub-base shall be considered complete when it has been graded and compacted to ±0.05 feet of the lines and grades as established in the approved Plans. Compaction tests will be required in embankments and cut sections by the Township Engineer.
E. During placement of stormwater structures.
F. Upon completion of base course preparation. The base course shall be considered complete when it has been placed, graded and compacted to ±0.05 feet of the lines and grades established on the approved Plans. Compaction test results which verify in-place density of the base material shall be submitted to the Township Engineer at this time.
G. During placement of aggregate surface, bituminous base course and bituminous wearing course. Compaction test results for the in-place bituminous material, as required by the Minnesota Department of Transportation Standard Specifications for Construction and Supplemental Specifications, shall be submitted to the Township Engineer prior to acceptance of the street by the Township.
H. Upon completion of the work as shown on the approved Plans. The complete work shall meet all drainage related, street related, turfing related and other such items required by the approved Plans and Specifications as set forth herein.

The Township Engineer shall be notified by the Owner 24 hours in advance to schedule site reviews for the above mentioned times. The Township Engineer may, at his/her discretion, perform additional site reviews. The Developer shall provide access to the site for the Engineer or his/her representative to perform his/her site reviews.

7.03 Construction Materials Testing

A. The cost of all materials testing shall be born by the Owner including costs related to secure and maintain an independent testing firm to provide testing services. The testing shall be performed to insure compliance with these standards.

1. Compaction tests shall be performed in the embankments, sub-base and the base materials. A minimum standard proctor density of 100% is required on all base materials located within the upper three feet of the proposed finished grade of the street and a standard proctor density of 95% is required on materials below this level. An in-place compaction testing rate of one test per 500 feet of street in each sub-base and base materials shall determine the minimum number of tests required. Testing shall be performed in accordance with the Minnesota Department of Transportation Grading & Base Manual at the rates indicated above.

2. Compaction shall be by the Ordinary Compaction Method. Acceptance testing shall be performed by driving a fully loaded tandem truck gross weight of 25 tons over street prior to placement of aggregate material and bituminous material. The Township Engineer reserves the right to require soil borings or excavation to verify unsuitable material is removed from the subgrade. If there appears to be insufficient compaction, the Township reserves the right to order additional compaction tests.

3. Sieve analysis shall be performed on all Class V aggregate material and any other manufactured sub-base or base materials to be utilized for the project. The Owner shall provide the Township Engineer with sieve analysis performed by an independent approved soils testing firm. A minimum of one test for every 350 tons of material placed shall be performed. Sampling and testing shall be in accordance to the Minnesota Department of Transportation Grading and Base Manual at the rates indicated above.

4. Core samples are required in both the Non-Wear and Wear Course and shall be taken at random location for every 500 tons placed. The cores shall determine thickness of pavement and be used to measure density of the core by Rice Test (Maximum Density). A minimum of three cores shall be provided on each layer. Cores shall be taken and asphalt repaired within 48 hours of the paving.

5. The Township reserves the right to have tests run on other materials placed on the street or in the right-of-way at the Developer's

expense. Those tests may include but not be limited to topsoil analysis, placement of soils and seed analysis.

8.00 STANDARD CONSTRUCTION DETAILS

The Developer shall construct all streets to the sections shown on the Standard Construction Details, which are attached to these Specifications.

9.00 ACCEPTANCE

The Developer shall construct all streets to the sections shown on the Standard Construction Details, which are attached to these Specifications.

Additional requirements may be considered by the Town Board or County, which will be required by the Developer. Items proposed by the developer but not specifically covered in these engineering standards will require Town Board approval.

9.01 GENERAL

If the Developer fails to reasonably allow for inspections if such inspections are required by the Town Board, the Street will not be accepted and the Developer will be required, at his/her own expense, to either reconstruct the portion of construction not inspected, or place a 10 year performance bond with the Town in the amount equal to the estimated cost of the repair. Any work considered unacceptable shall be subject to Mn/DOT Specification 1512. The Town Board will not open and maintain a Street as a Town road until at least 75% of the lots adjacent to the Street are developed with a residential structure or business. The decision to open and maintain a Street as a Town road can only be made by a resolution adopted by the Town Board at a meeting. The Developer shall be responsible for maintaining a Street until the Town Board adopts such a resolution. The developer may be required to provide a performance bond or letter of credit in the name of the Town in an amount set by the Town Board to warranty the work for a period of two years following acceptance by the Town. If the Town Board adopts a resolution to open and maintain a Street as a Town road within a required warranty period, the Developer shall remain obligated to immediately repair or replace at his/her own expense any work caused by faulty workmanship or materials during the warranty upon notification by the Town.

9.02 FINAL ACCEPTANCE. Final acceptance of the work to construct or improve a Street shall only occur after the established warranty period.

10.00 ACKNOWLEDGMENT

10.01 General. The Developer shall read and acknowledge the following:

I have read, understood and agree to the terms and conditions of the Standard Specifications for Oxford Township, Isanti County, Minnesota. I have submitted this acknowledgement with my preliminary plans as an indication of my understanding of the street construction requirements.

By: _____ _____
Date

_____
Printed Name

_____
Title

Township of Oxford Standard Details
(Plates in Appendix)

SERIES 1 STREET

100 Local Residential Rural Street Section – 9 Ton
101 -- Blank --
102 Residential Cul-De-Sac Rural Section
102A Residential Off-Set Cul-De-Sac Rural Section
103 -- Blank --
104 Driveway Detail: Rural
105 -- Blank --
106 Mailbox Pullout Rural Section
107 -- Blank --
108 Mailbox Support

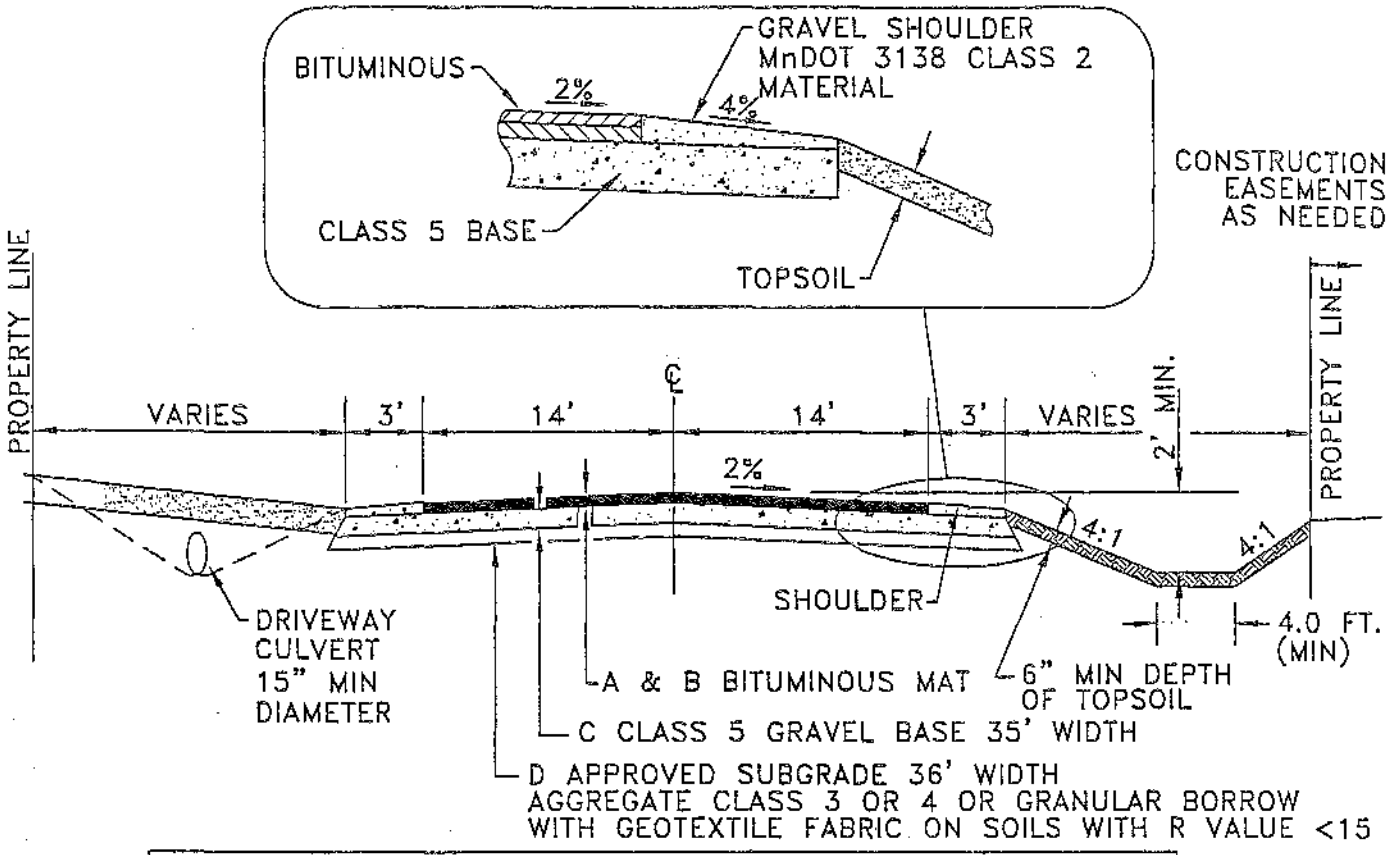
SERIES 4 STORM WATER

400 Skimmer Structure
401 Skimmer Structure with Weir
402 Skimmer Structures Screen Cover
403 Typical Treatment Pond

SERIES 5 EROSION CONTROL & LAND APPURTENANCES

500 Articulate Concrete Block
500A Rip-Rap Placement
501 Silt Fence
502 Wood Fiber Blanket Installation
503 Rock Construction Entrance
Mn/DOT 9102D Turf Establishment Areas (Culvert Ends)

TOWNSHIP OF OXFORD
STANDARD DETAIL PLATES



LEGEND				
	BITUMINOUS SURFACE		AGGREGATE BASE	SUBGRADE
SOIL R VALUE	WEAR 2350 LVWE45030B A*	NON-WEAR 2350 LVNW35030B B*	CLASS 5, OR 6 3138 C*	CLASS 3, OR 4 3138 D*
R-70	** 1 1/2"	** 2"	** 6"	-
R-30	1 1/2"	2"	6"	4"
R-20	1 1/2"	2"	6"	4"
R-15	1 1/2"	2"	6"	8"
R-10	1 1/2"	2"	6"	12"
R-5	1 1/2"	2"	6"	18"

* TO BE REVIEWED AND APPROVED BY QUALIFIED SOILS ENGINEER

** MINIMUM ALLOWABLE DESIGN THICKNESS, 100% CRUSHED

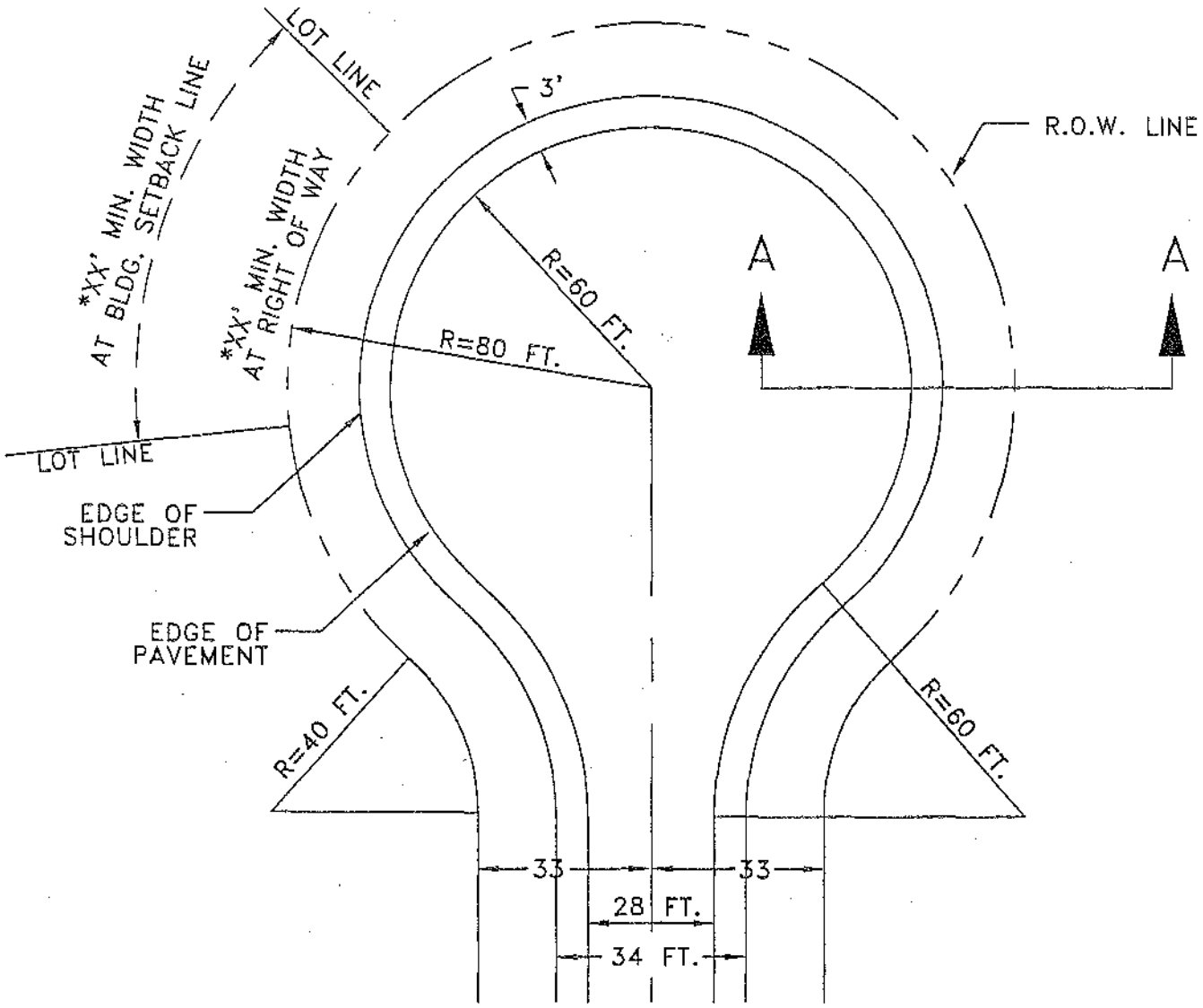
NOTES: R VALUE IS A MEASURE OF EMBANKMENT SOIL RESISTANCE STRENGTH AS DETERMINED BY THE HVEEM STABILOMETER METHOD

CUMULATIVE DESIGN LANE 18 KIP ESAL'S IS THE CUMULATIVE DAMAGE EFFECT OF VEHICLES DURING THE DESIGN LIFE OF A FLEXIBLE PAVEMENT.

LOCAL RESIDENTIAL RURAL STREET SECTION - 9 TON

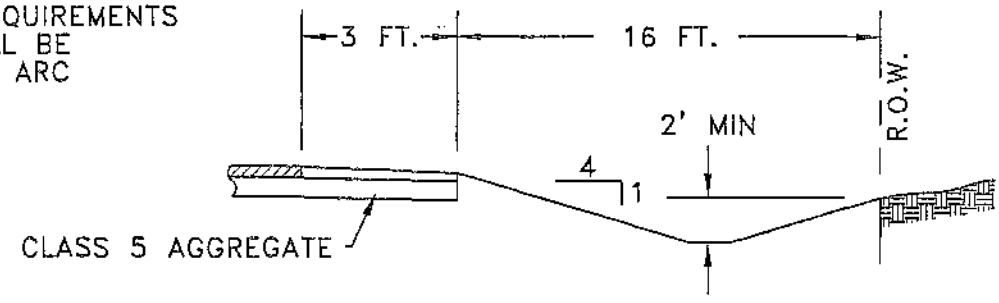
NO SCALE

APPROVED - JDP 08/2009	OXFORD TOWNSHIP	STANDARD PLATE NO. STR-100
REVISED		



NOTE:

* MINIMUN LOT WIDTH REQUIREMENTS ON CUL-DE-SAC SHALL BE MEASURED ALONG THE ARC AS SHOWN.

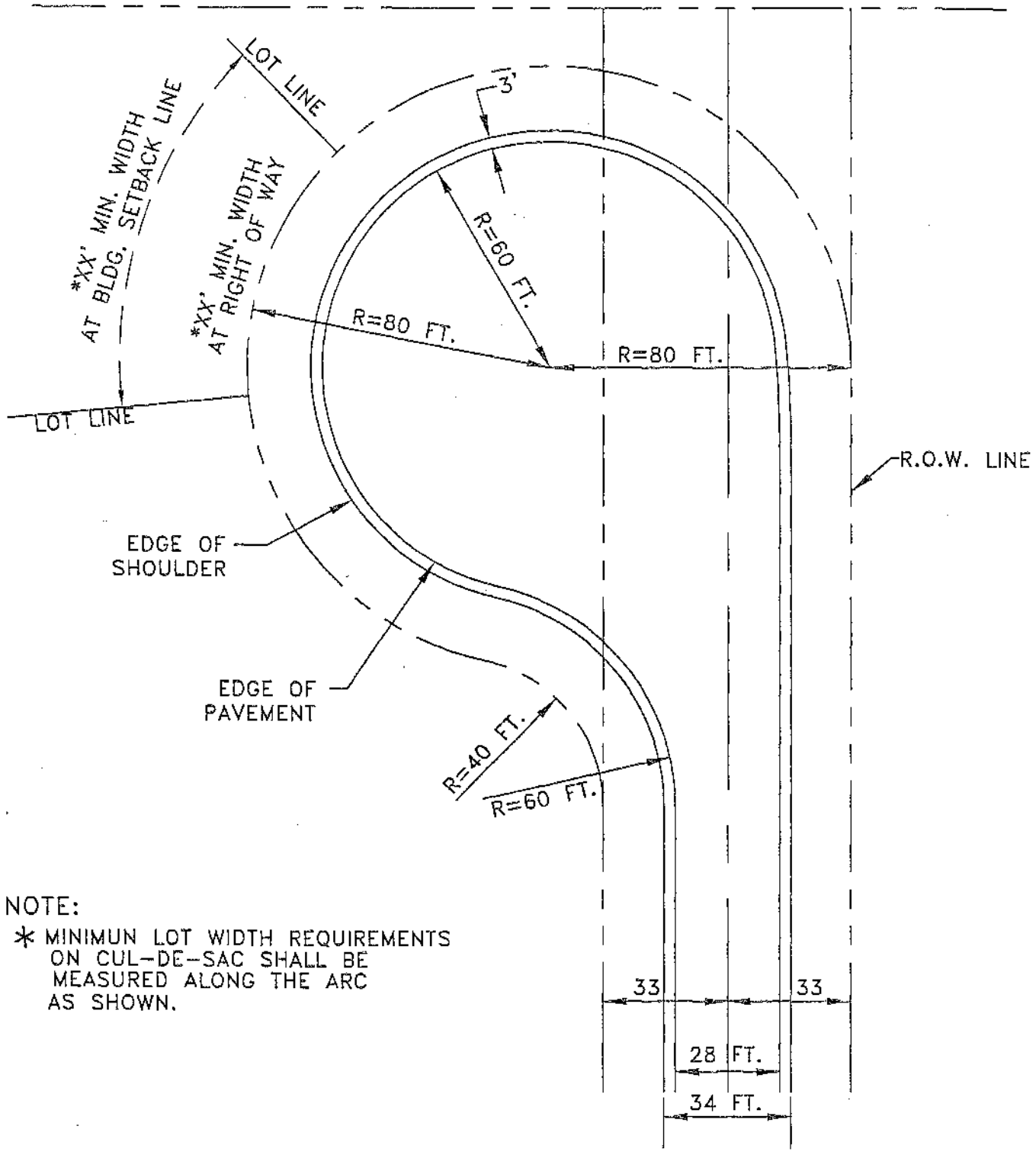


SECTION A-A

RESIDENTIAL CUL DE SAC RURAL SECTION

NO SCALE

APPROVED - JDP 08/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. STR-102



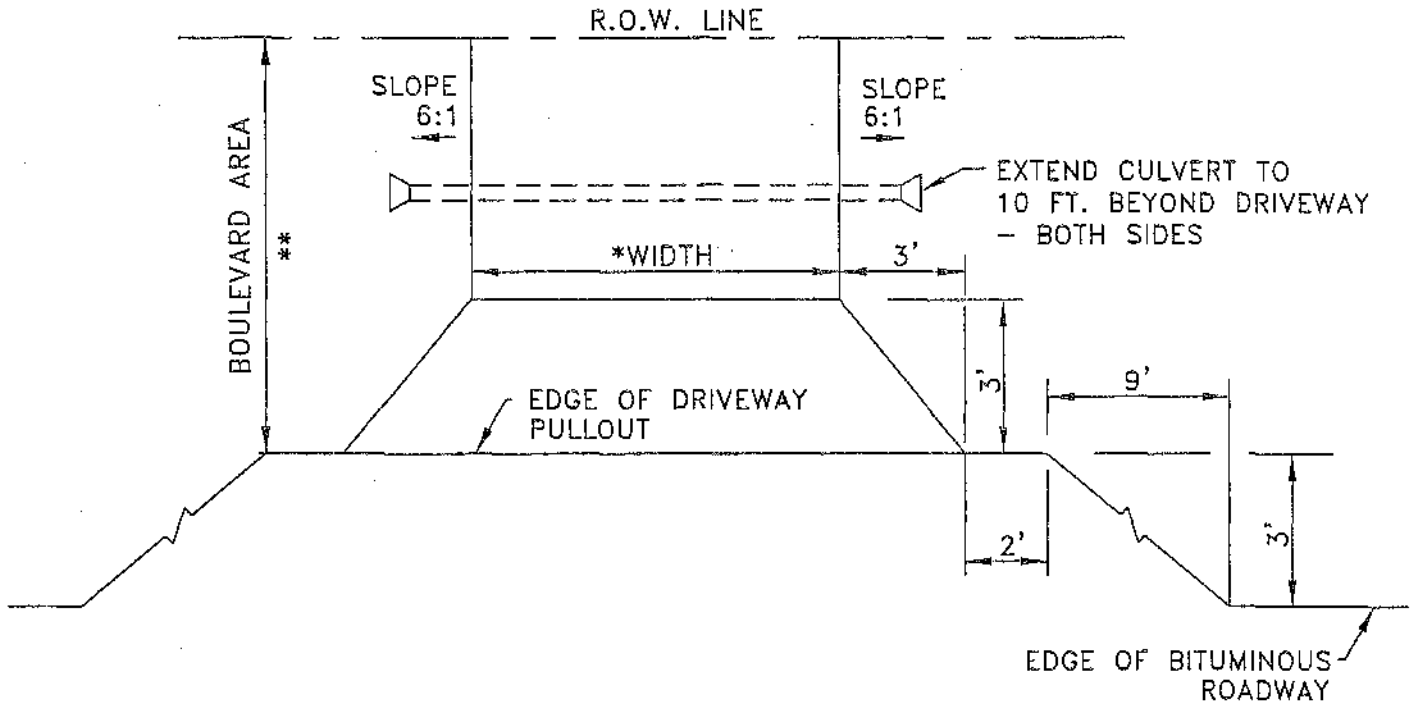
NOTE:

* MINIMUN LOT WIDTH REQUIREMENTS ON CUL-DE-SAC SHALL BE MEASURED ALONG THE ARC AS SHOWN.

RESIDENTIAL CUL DE SAC RURAL SECTION

NO SCALE

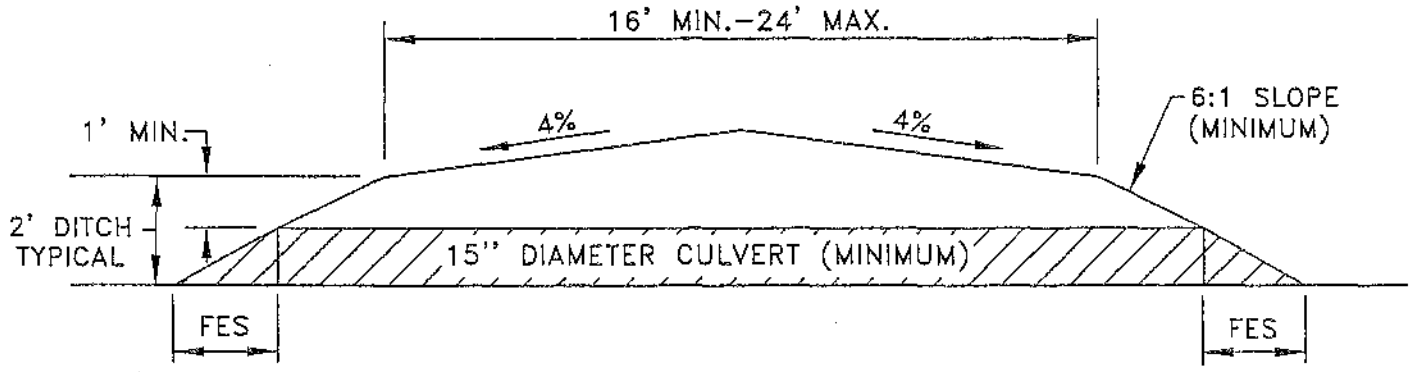
APPROVED - JDP 08/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. STR-102A



* STANDARD WIDTH – 16 FT.
MAXIMUM WIDTH – 24 FT.

** DRIVEWAYS PAVED TO R/W OR HOUSE FRONT

PLAN VIEW

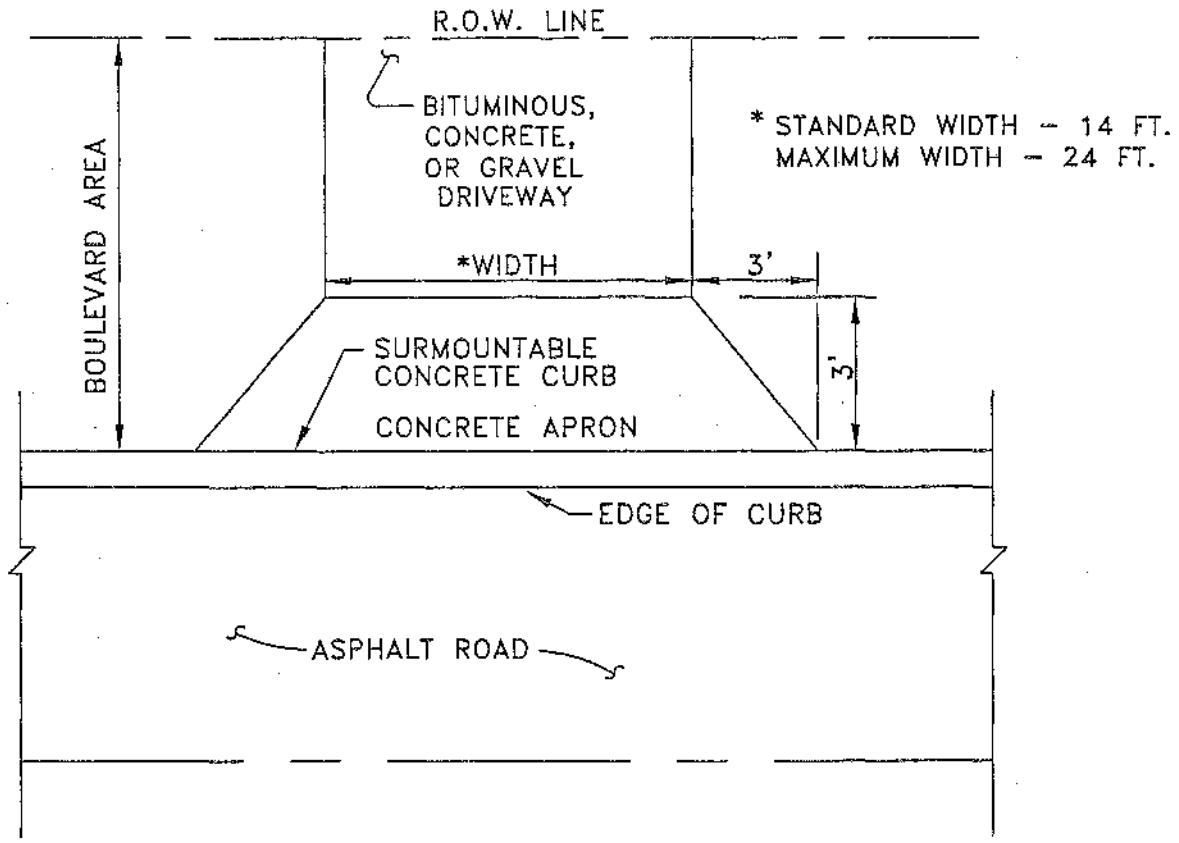


CROSS SECTION VIEW

RURAL DRIVEWAY SECTION

NO SCALE

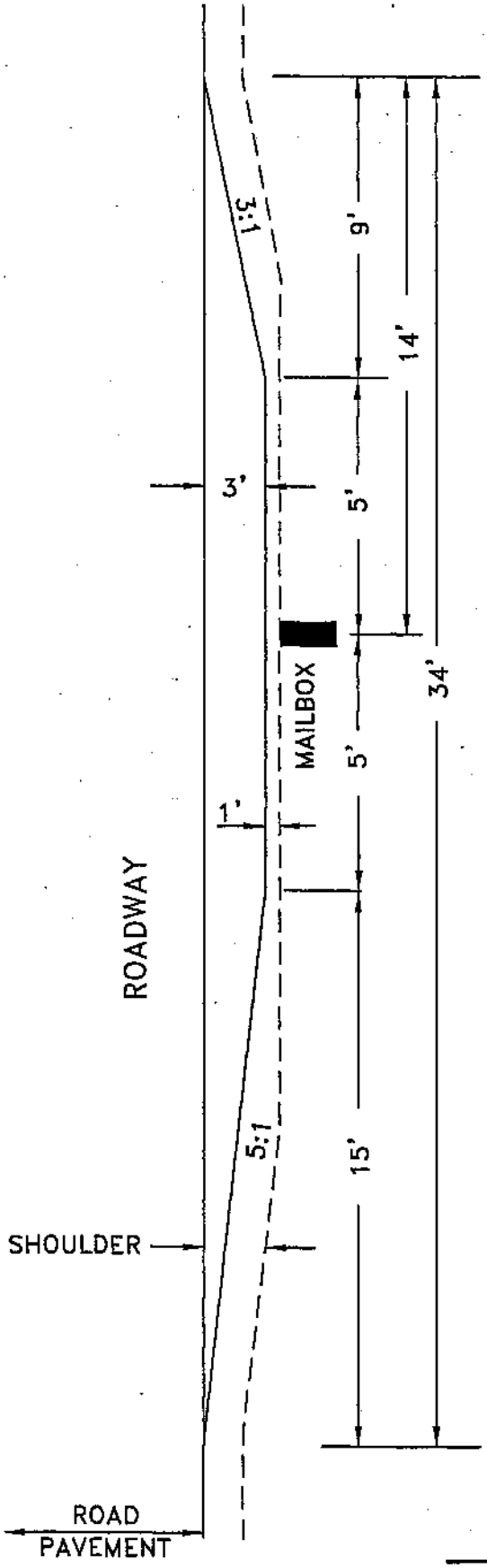
APPROVED – JDP 08/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. STR–104



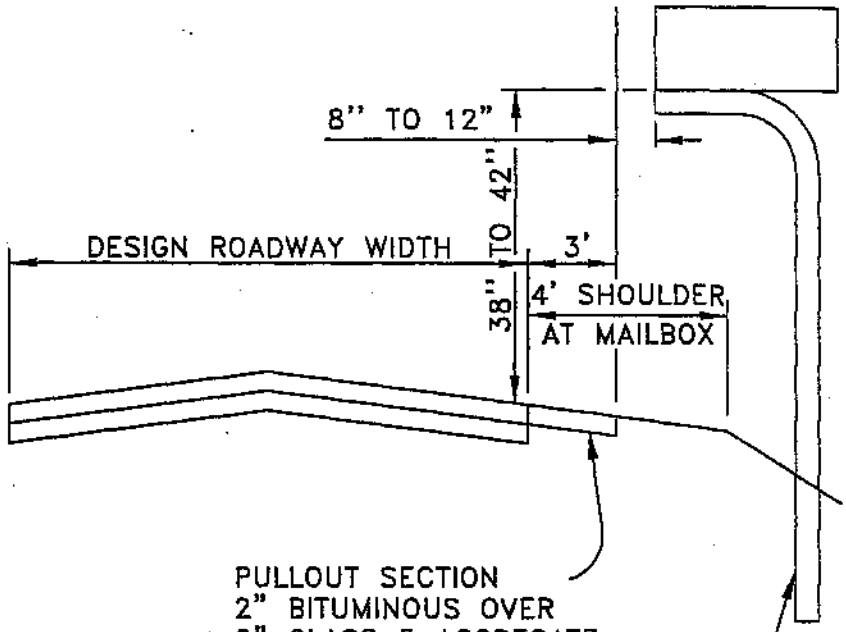
URBAN DRIVEWAY SECTION

NO SCALE

APPROVED - JDP 08/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. STR-105



MAILBOX AND SUPPORT



PULLOUT SECTION
2" BITUMINOUS OVER
6" CLASS 5 AGGREGATE
BASE COURSE

SECTION

SEE PLATE 108
FOR APPROVED
MAILBOX SUPPORT

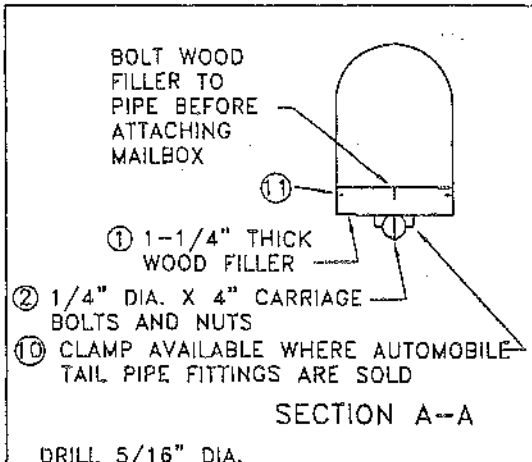
NOTE: TAPERS MAY BE REDUCED IF 34' SECTION EXTENDS TO DRIVEWAY PAVEMENT

LOCATION OF PULL-OUTS SHALL BE STAKED IN FIELD PRIOR TO CONSTRUCTION.

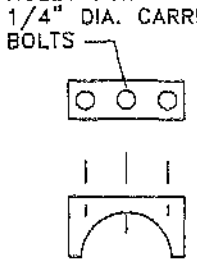
MAILBOX PULLOUT
RURAL STREET SECTION

NO SCALE

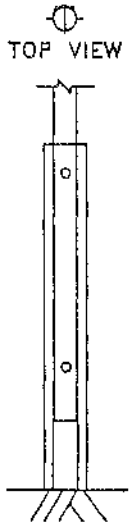
APPROVED - JDP 08/2009 REVISED	**OXFORD TOWNSHIP**	STANDARD PLATE NO. STR-106



SECTION A--A

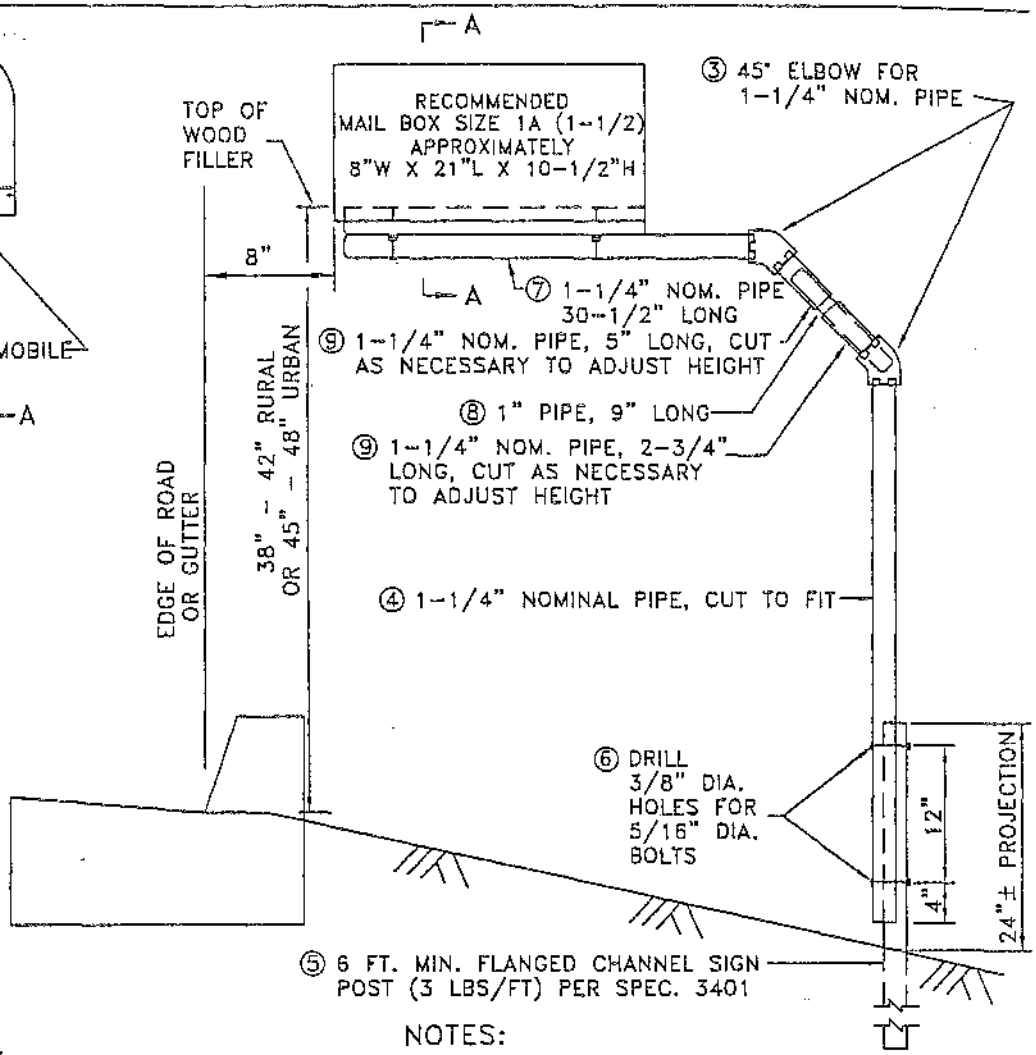


TAIL PIPE CLAMP DETAIL



ROADWAY VIEW

PIPE/POST CONNECTION



NOTES:

ALL PIPE AND PIPE FITTINGS SHALL CONFORM TO SPEC. 3362

ALL FASTENERS SHALL CONFORM TO SPEC. 3391

ALL MATERIALS SHALL BE GALVANIZED PER SPEC. 3392

MAIL BOX LOCATIONS SHOULD BE STAKED BEFORE INSTALLATION FOR PROPER HEIGHT AND DISTANCE FROM THE ROADWAY. ONCE STAKED, THE INSTALLER MUST NOTIFY THE ENGINEER. THE ENGINEER WILL BE ALLOWED 48 HOURS TO REVIEW AND MODIFY THE STAKED LOCATIONS PRIOR TO FINAL INSTALLATION.

OTHER MnDOT APPROVED MAILBOX SUPPORTS MAY ALSO BE USED.

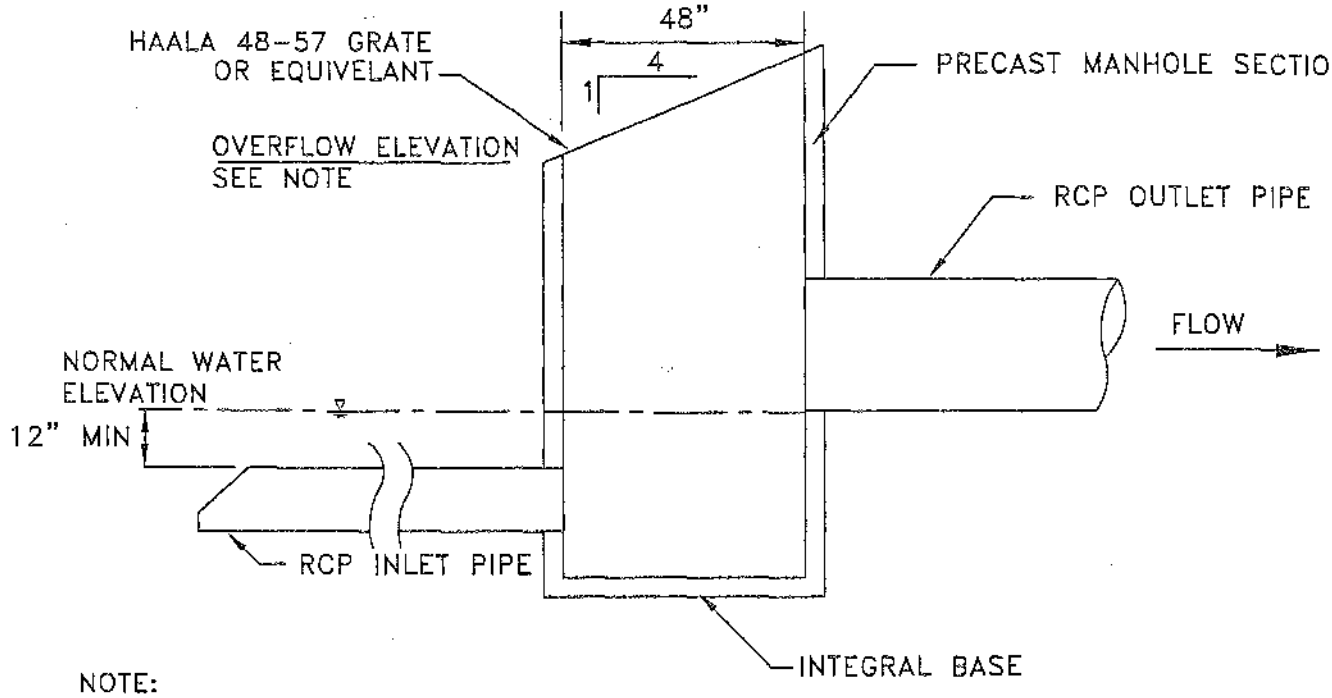
THE MAILBOX TO BE 8 INCHES TO 12 INCHES OUTSIDE THE EDGE OF SHOULDER OR 8 INCHES FROM THE FACE OF CURB.

ITEM NO.	NUMBER REQUIRED	DESCRIPTION
1	1	1-1/2" THICK WOOD FILLER CUT TO FIT SNUG UNDER MAILBOX
2	2	1/4" DIA. X 4" LONG CARRIAGE BOLTS AND NUTS
3	2	45° ELBOW FOR 1-1/4" NOMINAL PIPE
4	1	1-1/4" NOMINAL PIPE, CUT TO FIT
5	1	6 FT. MIN. SIGN POST (3LBS./FT.)
6	2	5/16" DIA. BOLT, NUT & LOCKWASHER
7	1	1-1/4" NOMINAL PIPE, 30-1/2" LONG
8	1	1" PIPE, 9" LONG
9	1	1-1/4" NOMINAL PIPE, 5" LONG 1-1/4" NOMINAL PIPE, 2-3/4" LONG
10	2	1-1/2" TAIL PIPE CLAMP
11	9	NO. 10 X 1" SHEET METAL SCREWS

MAILBOX SUPPORT

STEEL PIPE WITH FITTINGS AND STEEL FENCE POST
(SINGLE SUPPORT)
NO SCALE

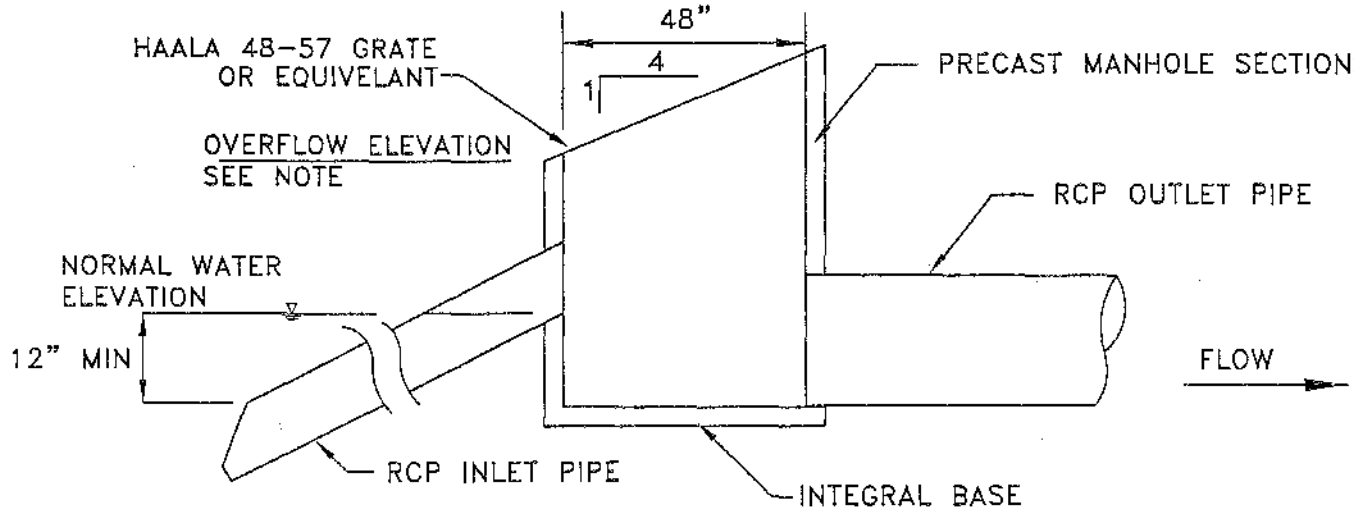
APPROVED - JDP 08/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. STR-108



NOTE:
THE OVERFLOW ELEVATION SHALL BE AT OR
ABOVE THE PEAK 2-YEAR STORM EVENT ELEVATION

SKIMMER STRUCTURE

NO SCALE

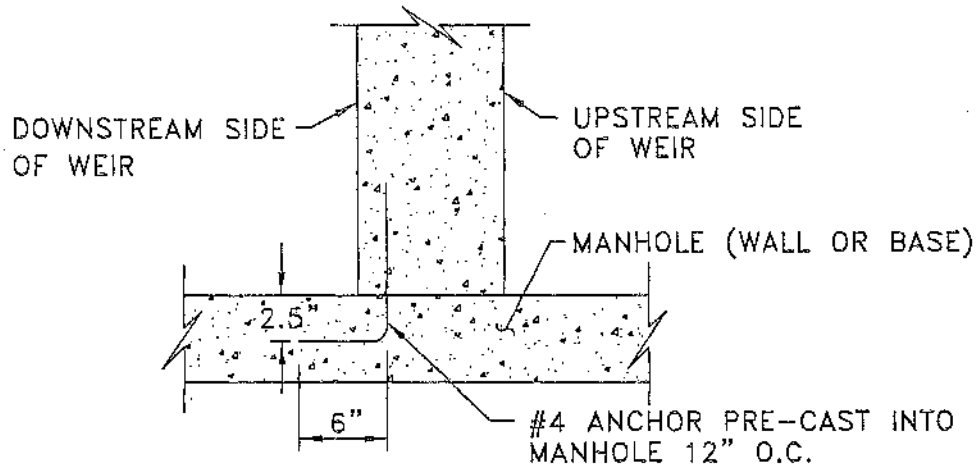


NOTE:
THE OVERFLOW ELEVATION SHALL BE AT OR
ABOVE THE PEAK 2-YEAR STORM EVENT ELEVATION

SKIMMER STRUCTURE

NO SCALE

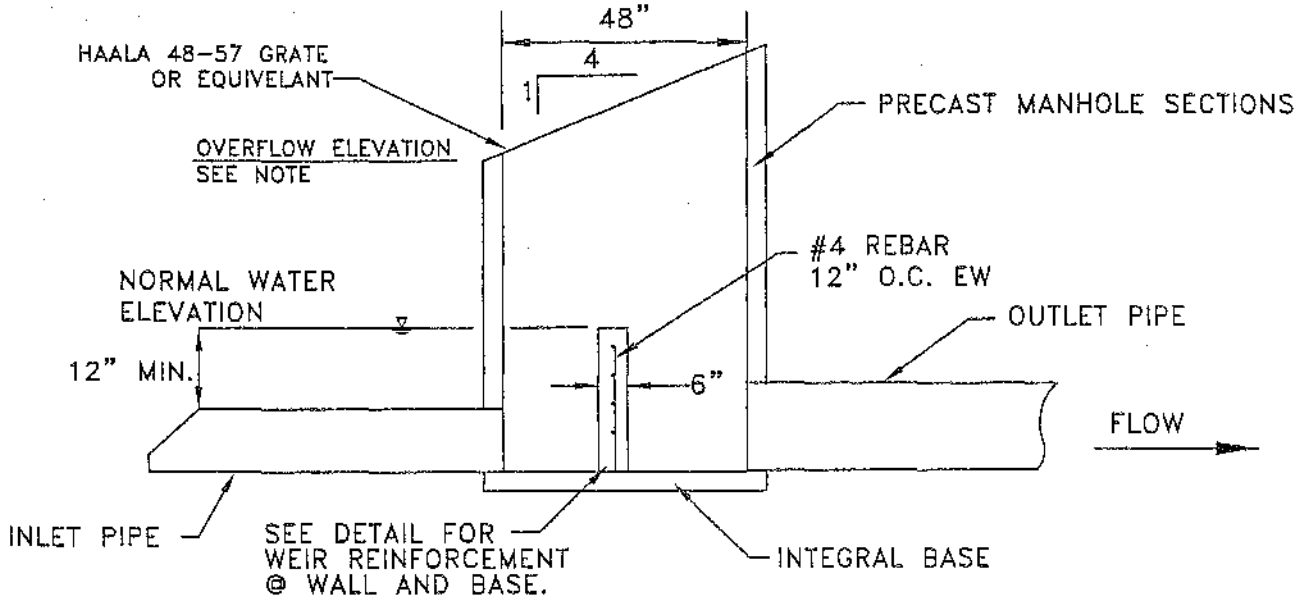
APPROVED - JDP 07/2009 REVISED	**OXFORD TOWNSHIP**	STANDARD PLATE NO. STM-400



NOTE:

1. THE FOLLOWING MAY BE USED AS AN ALTERNATIVE TO THE PRE-CAST ANCHORS: HVA ADHESIVE ANCHOR SYSTEM, WITH HVA ADHESIVE CAPSULES AND #5 REBAR, AS MANUFACTURED BY HILTI CORP OR APPROVED EQUAL.
2. REINFORCEMENT BARS IN WEIR NOT SHOWN.

WEIR REINFORCEMENT @ WALL AND BASE



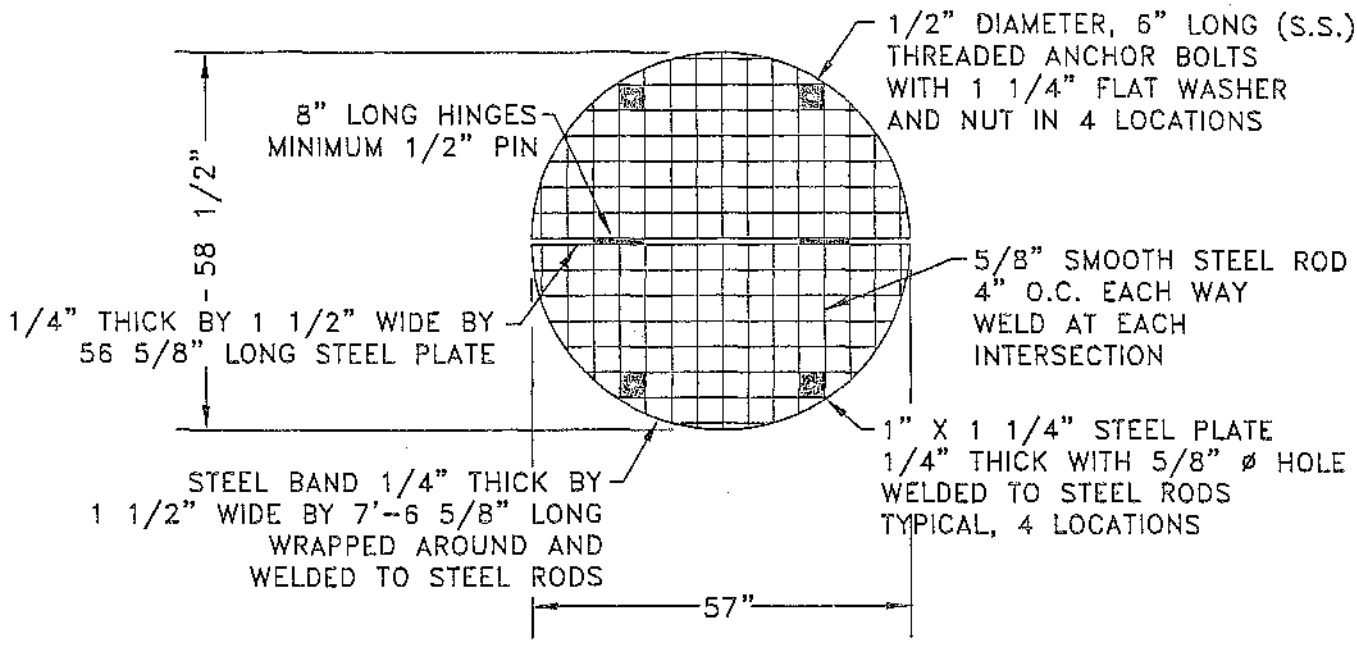
NOTE:
THE OVERFLOW ELEVATION SHALL BE AT OR ABOVE THE PEAK 2-YEAR STORM EVENT ELEVATION

SKIMMER STRUCTURE WITH WEIR

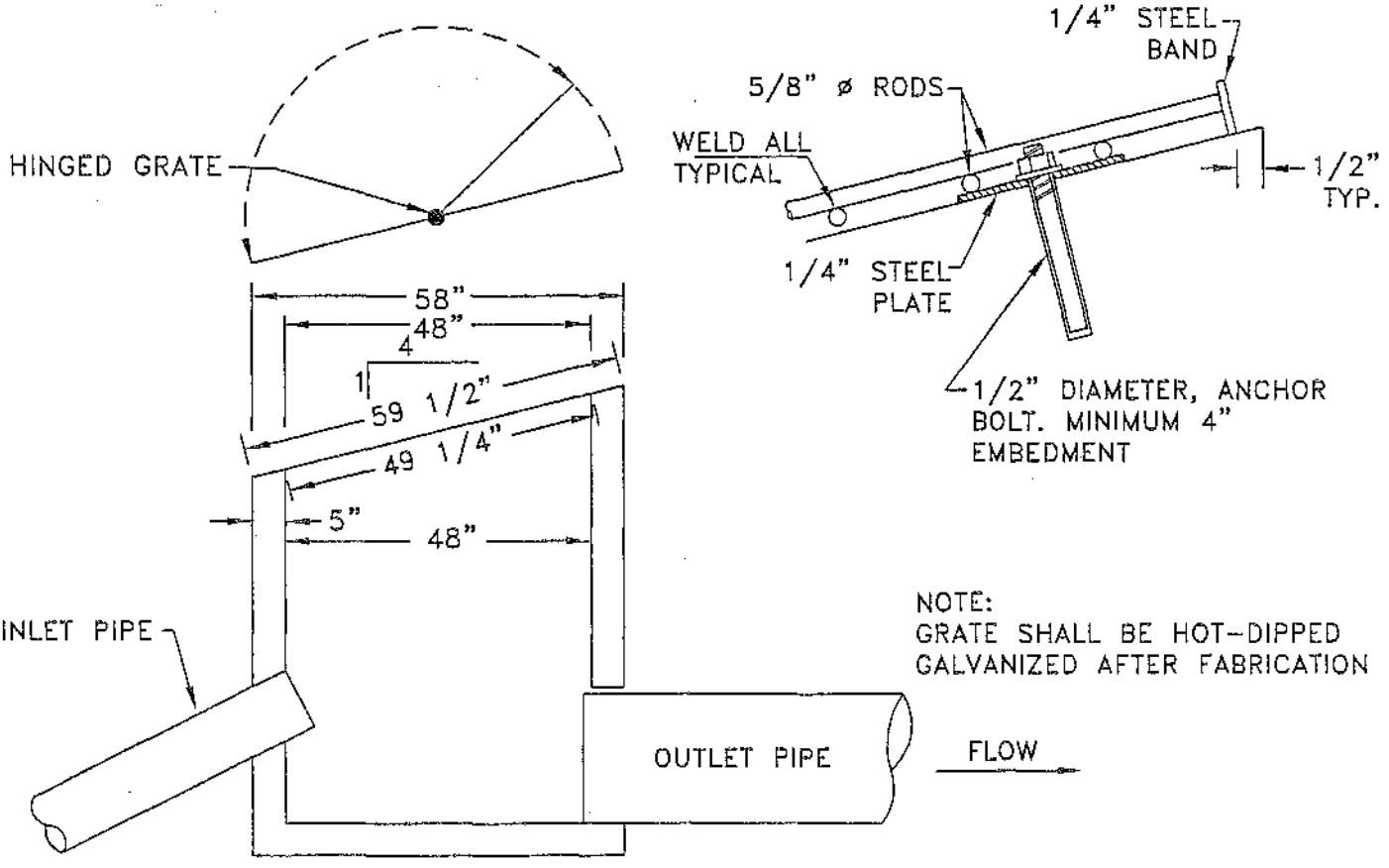
NO SCALE

APPROVED - JDP 07/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. STM-401

GRATE GALVANIZED



TOP VIEW



NOTE:
GRATE SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION

SCREEN COVER FOR 48" DIA. OUTLET STRUCTURE

NO SCALE

APPROVED - JDP 07/2009 REVISED	**OXFORD TOWNSHIP**	STANDARD PLATE NO. STM-402

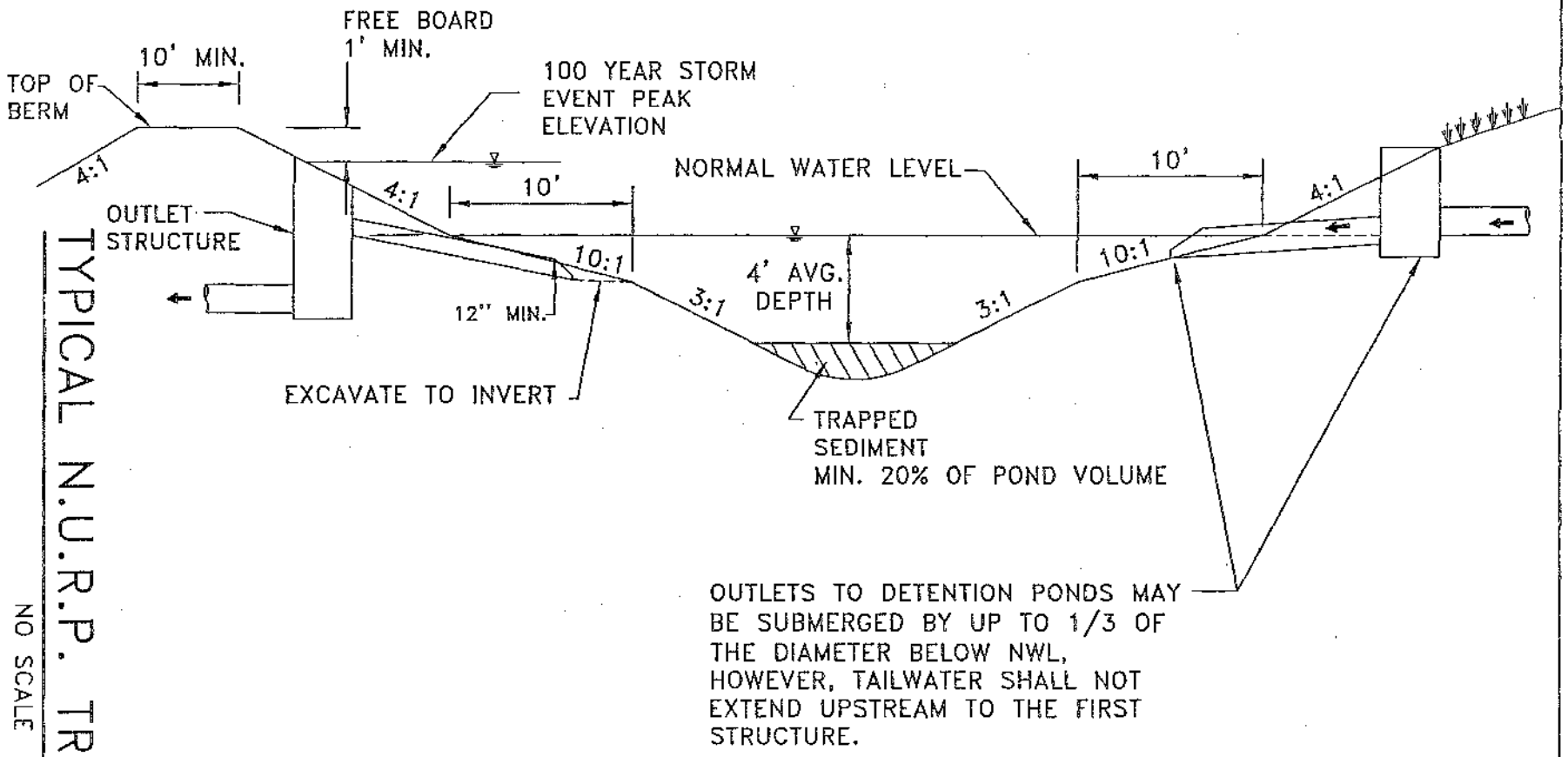
APPROVED - JDP
07/2009
REVISED

OXFORD TOWNSHIP

TYPICAL N.U.R.P. TREATMENT BASIN

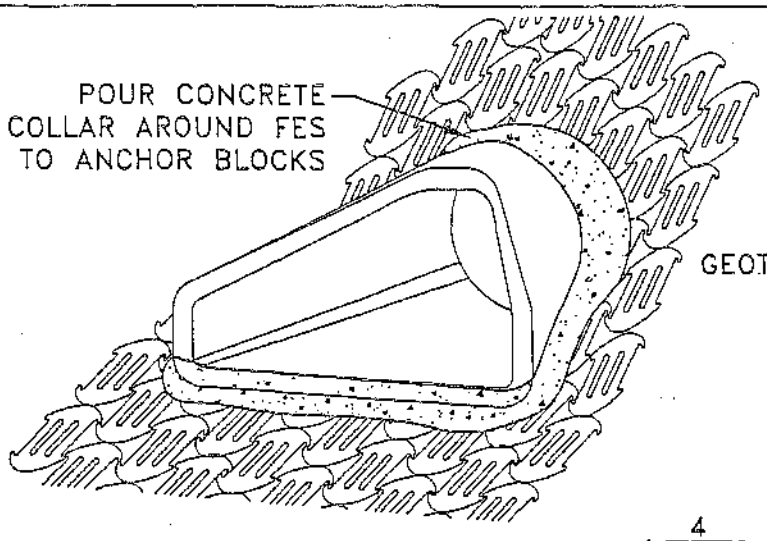
NO SCALE

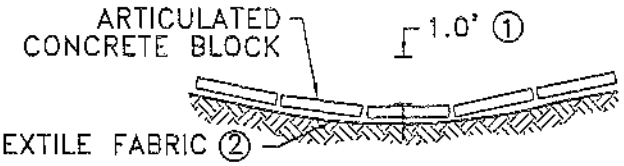
STANDARD PLATE NO.
STM-403



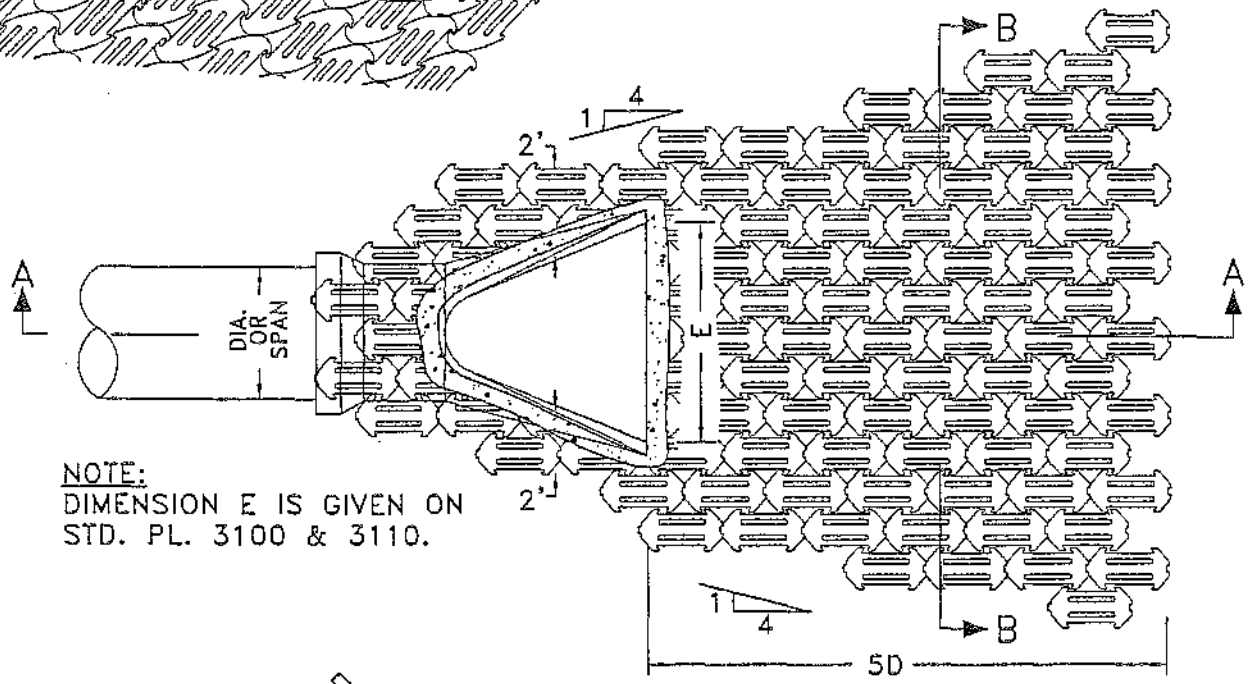
NOTE:

1. SLOPES SHALL BE NO STEEPER THAN THOSE SHOWN.
2. AN EMERGENCY RIPRAP OVERFLOW SHALL BE PROVIDED.
3. 10' WIDE ACCESS ROUTE TO BE PROVIDED TO SKIMMER STRUCTURE/RIPIRAP OVERFLOW.
4. TOPSOIL SHALL BE PLACED ON POND SLOPES FOUR INCHES THICK TO A DEPTH OF FOUR FEET BELOW POND NORMAL WATER LEVEL OR TWO FEET BELOW THE EXISTING GROUNDWATER ELEVATION.

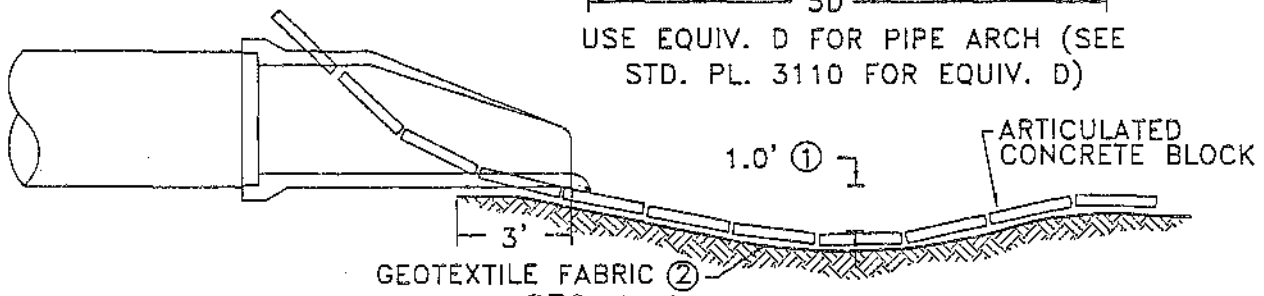




SEC. B-B



USE EQUIV. D FOR PIPE ARCH (SEE STD. PL. 3110 FOR EQUIV. D)



SEC A-A

ARTICULATED CONCRETE BLOCK SHALL BE A HANDPLACED INTERLOCKING CONCRETE BLOCK SYSTEM OR CABLE CONNECED CONCRETE BLOCK MAT.

① FOR PIPES GREATER THAN OR EQUAL TO 48", USE 2.0'

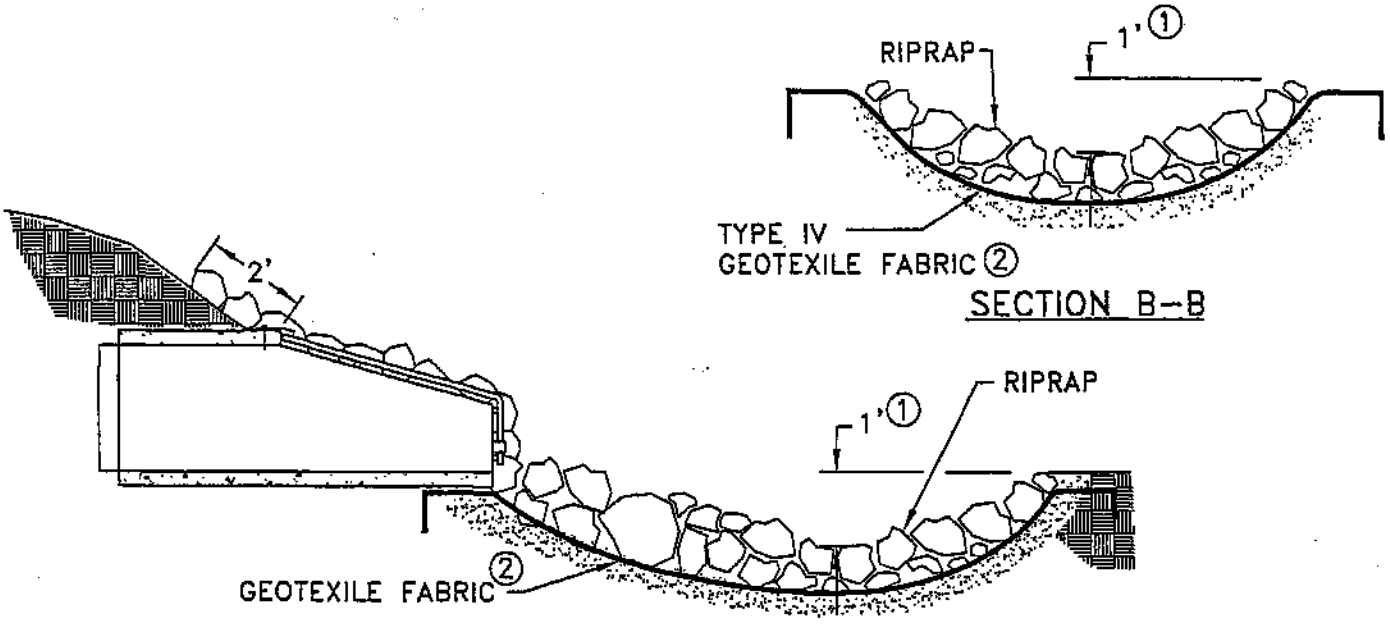
② GEOTEXTILE FABRIC PER Mn/DOT SPEC. 3733. FABRIC SHALL COVER THE AREA OF THE ARTICULATED BLOCK MAT AND EXTEND UNDER THE CULVERT APRON 3 FEET.

③ IF A CABLE CONCRETE SYSTEM IS USED, MULTIPLE MATS MUST BE TIED TOGETHER PER MANUFACTURERS SPEC. AND ALL CABLES PROTRUDING BEYOND THE FINISHED EDGES SHALL BE CUT FLUSH TO THE BLOCK.

ARTICULATED CONCRETE BLOCK AT R.C.P. OUTLET

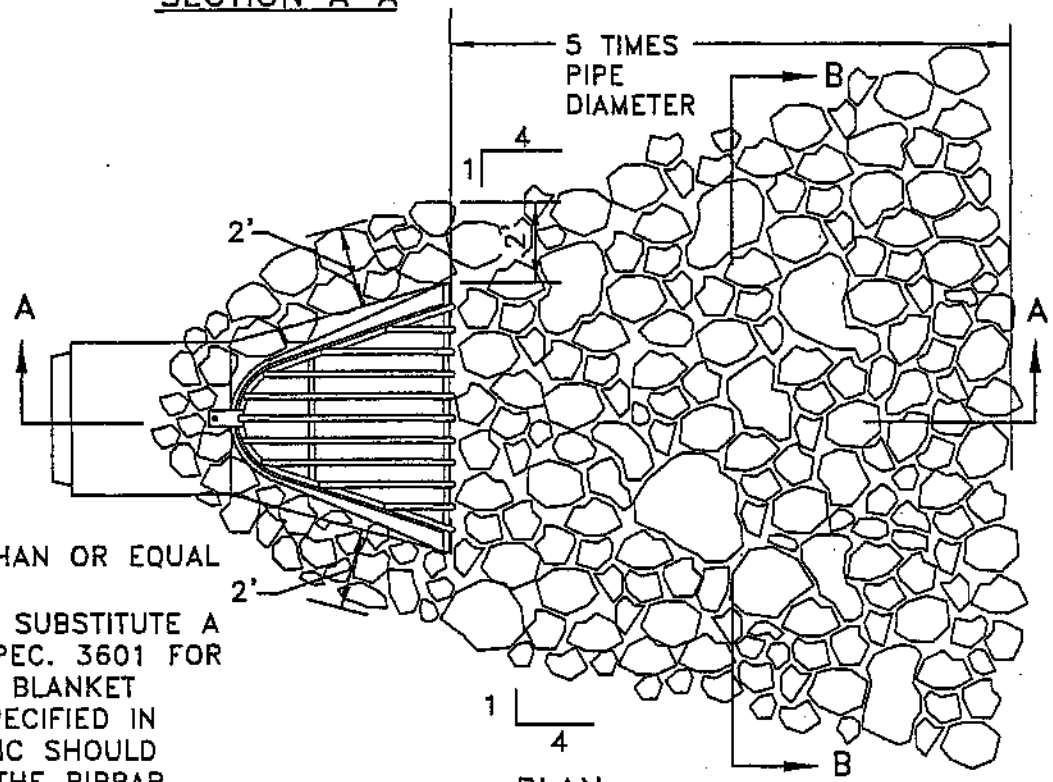
NO SCALE

APPROVED – JDP 08/2009 REVISED	OXORD TOWNSHIP	STANDARD PLATE NO. EROS-500



SECTION B–B

SECTION A–A



PLAN

① FOR PIPES GREATER THAN OR EQUAL TO 48" USE 2.0'

② THE CONTRACTOR MAY SUBSTITUTE A GEOTEXTILE FABRIC, SPEC. 3601 FOR THE GRANULAR FILTER BLANKET UNLESS OTHERWISE SPECIFIED IN THE PLANS. THE FABRIC SHOULD COVER THE AREA OF THE RIPRAP AND EXTEND UNDER THE CULVERT APRON 3 FEET.

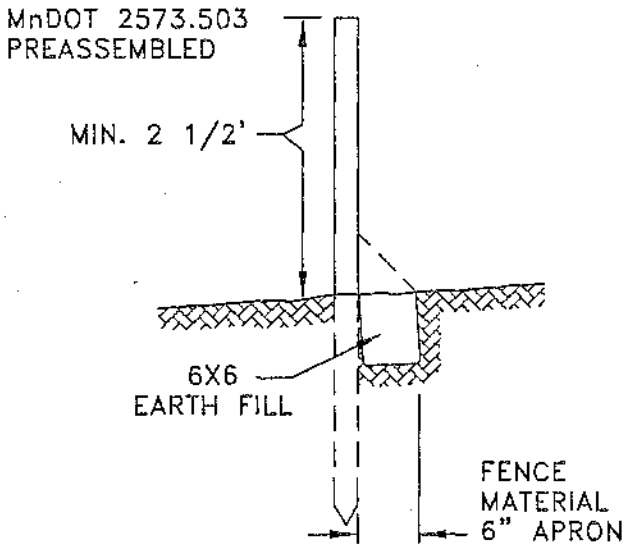
③ TRASH GUARD REQUIRED FOR 18" PIPE OR LARGER.

④ QUANTITIES AS PER MnDOT STANDARD PLATE UNLESS OTHERWISE SPECIFIED IN THE PLANS.

RIPRAP PLACEMENT

NO SCALE

APPROVED – JDP 07/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. EROS–500A



5' POSTS – 8' MAX. ON CENTER
MINIMUM 2' PENETRATION

REF. MnDOT 3886

SILT FENCE

NO SCALE

APPROVED – JDP 07/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. EROS–501

NOTE:

WOOD FIBER BLANKET SHALL BE PLACED AND STAPLED ACCORDING TO Mn/DOT SPECIFICATION 2575.3K2 WITH THE FOLLOWING EXCEPTIONS. ADJACENT STRIP EDGES SHALL BE OVERLAPPED A MINIMUM OF 6".

BIODEGRADABLE STAPLE STAKES (PLASTIC OR WOOD) SHALL BE USED IN PLACE OF METAL WIRE STAPLES.

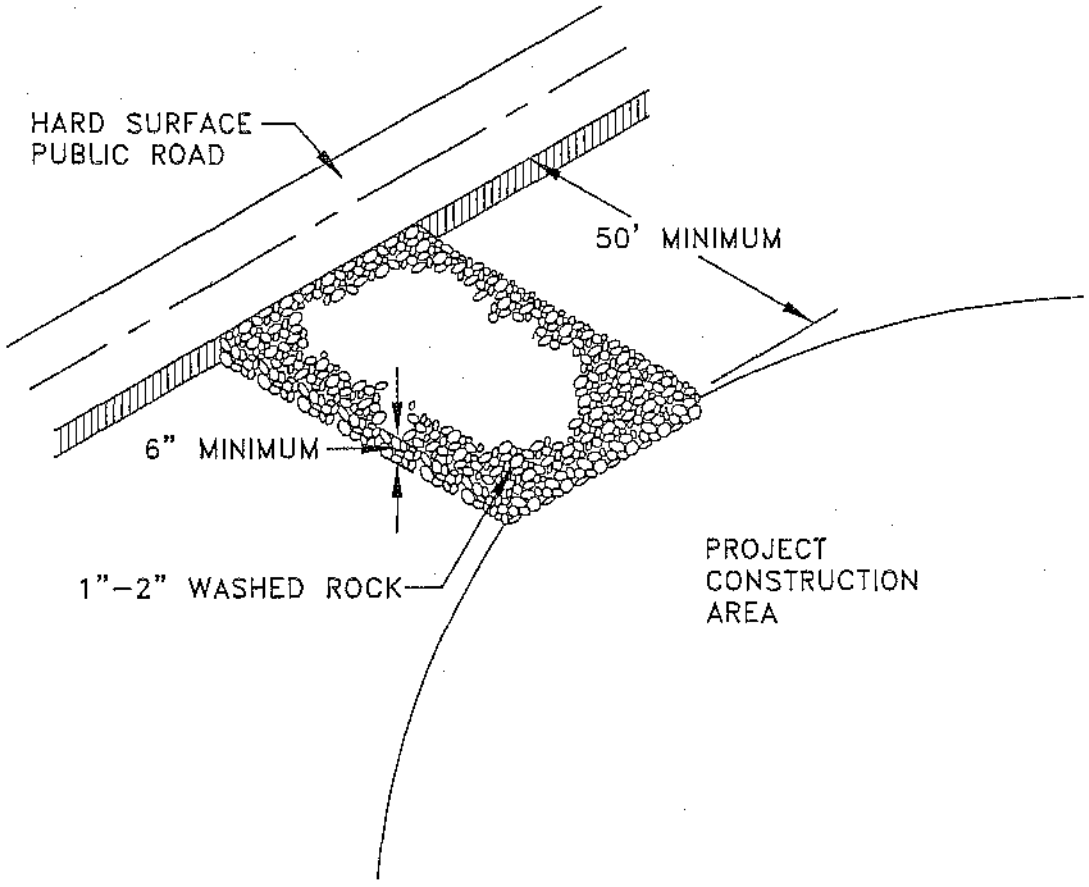
ECOSTAKES AND BIOSTAKES ARE ACCEPTABLE PRODUCTS FOR USE TO FASTEN WOOD FIBER BLANKET.

WOOD FIBER BLANKET INSTALLATION

NO SCALE

APPROVED - JDP 07/2009 REVISED	OXFORD TOWNSHIP	STANDARD PLATE NO. EROS-502

SEDIMENT TRACK OUT CONTROL



* ALTERNATE DEVICES AND METHODS REQUIRE TOWNSHIP ENGINEER APPROVED PLANS.

ROCK CONSTRUCTION ENTRANCE

NO SCALE

APPROVED – JDP 07/2009 REVISED	**OXFORD TOWNSHIP**	STANDARD PLATE NO. EROS–503

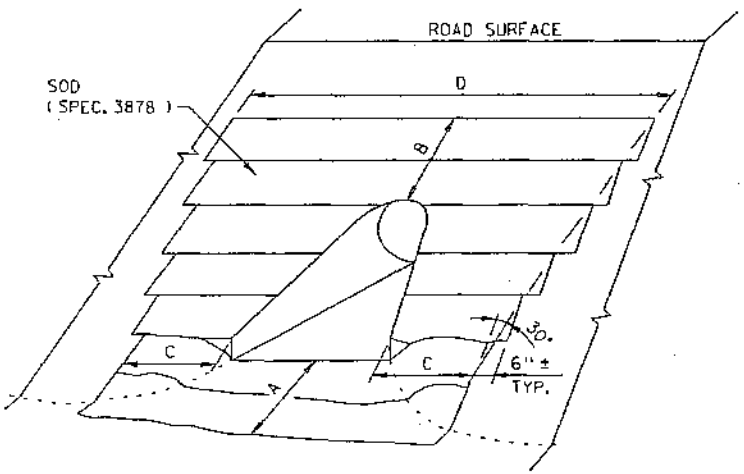
APPROVED Dec. 12, 1990
DIRECTOR
OFFICE OF TECHNICAL SUPPORT

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

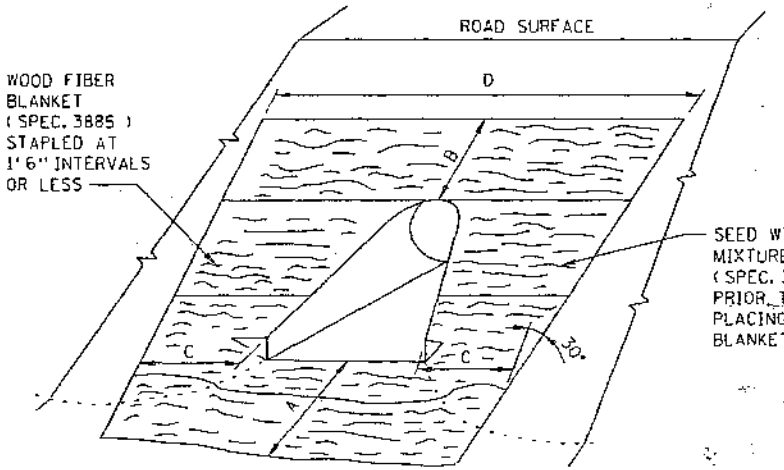
TURF ESTABLISHMENT AREAS
(AT PIPE CULVERT ENDS)

SPECIFICATION REFERENCE
2575

STANDARD PLATE NO.
9102D



SODDING DETAIL



MULCHING & SEED DETAIL

QUANTITIES (SQ. YDS.) AROUND CULVERT APRONS ①

INLET APRON						
CULVERT DIAMETER	SOD OR MULCH AREA (SQ. YDS.)		"A"	"B"	"C"	"D"
	METAL APRON	CONCRETE APRON				
15" & SMALLER	7	8	3'	1.5'	3'	13'
18"	11	10	3'	3'	3'	16'
24"	13	13	3'	3'	3'	18'
30"	19	19	3'	4.5'	3'	22'
36"	28	29	4.5'	4.5'	4.5'	27'
42"	36	34	4.5'	6'	4.5'	30'
48"	45	42	4.5'	7.5'	4.5'	34'
54"	54	47	4.5'	9'	4.5'	37'
60"	57	46	4.5'	9'	4.5'	39'
66"	58	50	4.5'	9'	4.5'	39'
72"	65	59	4.5'	10.5'	4.5'	41'
78"	78	75	6'	10.5'	6'	45'
84"	79	76	6'	10.5'	6'	45'
90"	—	77	6'	10.5'	6'	45'

OUTLET APRON						
CULVERT DIAMETER	SOD OR MULCH AREA (SQ. YDS.)		"A"	"B"	"C"	"D"
	METAL APRON	CONCRETE APRON				
15" & SMALLER	9	9	4.5'	1.5'	3'	13'
18"	11	11	6'	1.5'	3'	14'
24"	15	15	7.5'	1.5'	3'	16'
30"	19	20	9'	1.5'	3'	18'
36"	30	30	10.5'	1.5'	4.5'	23'
42"	36	34	12'	1.5'	4.5'	25'
48"	41	39	13.5'	1.5'	4.5'	27'
54"	47	41	15'	1.5'	4.5'	29'
60"	62	52	16.5'	1.5'	6'	33'
66"	63	56	16.5'	1.5'	6'	33'
72"	64	58	16.5'	1.5'	6'	34'
78"	65	62	16.5'	1.5'	6'	34'
84"	66	63	16.5'	1.5'	6'	35'
90"	—	65	16.5'	1.5'	6'	35'

NOTES:

AREA SHOWN IN SQUARE YARDS IS FOR ONE CULVERT END. FOR PIPE ARCHES USE AREA OF EQUIVALENT DIAMETER PIPE.

AREAS AND DIMENSIONS ARE APPROXIMATE AND ARE BASED ON CULVERT SLOPES. BUT NO STEEPER THAN 2:1.

DETAILS ARE SHOWN FOR METAL APRON, THE SAME DIMENSIONS, EXCEPT DIMENSION "D", APPLY WHEN A CONCRETE APRON IS USED. DIMENSION "D" MAY VARY SLIGHTLY DUE TO DIFFERENT WIDTHS OF APRON FROM METAL AND CONCRETE. DIMENSION "D" SHOWN FOR 90" DIA. APRON IS FOR CONCRETE APRON.

① ADDITIONAL QUANTITIES MAY BE SHOWN IN THE PLAN OR REQUIRED BY THE ENGINEER.