

DESIGN GUIDELINES AND STANDARD DETAILS



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CHAPTER 1 - General

The purpose of this section is to establish design criteria for the design of water distribution mains, sanitary sewer collection mains, streets, storm drainage mains and traffic control signs in the City of Victoria and its ETJ. Any exceptions or deviations from these minimum requirements may be granted on a project-by-project basis by the Director of Public Works.

The following references refer to the other requirements and standards that may affect the design or construction:

- City of Victoria Standard Specifications; City of Victoria Subdivision and Development Ordinance, and all other applicable City Codes or Ordinances (Most Current)
- City of Victoria Water Master Plan; Sanitary Sewer Master Plan; Master Thoroughfare Plan; Master Drainage Plan and all other applicable Master Plans (Most Current)
- Texas Engineering Practice
- Texas Professional Land Surveying
- Texas Commission on Environmental Quality (TCEQ)
- Other Miscellaneous Organizations, including but not limited to; AWWA, NSF, ASTM, International Fire Code, International Building Code, and MUTCD
- Abbreviations:
 - AWWA – American Water Works Association
 - NSF – National Sanitary Foundation
 - ASTM – American Society for Testing & Materials
 - MUTCD – Manual of Uniform Traffic Control Devices

Submittal Requirements

The design engineer shall submit the following information with all designs:

- Plan and profile sheets containing all information necessary to review, construct and inspect the proposed improvements. This includes, but is not limited to, water mains and appurtenances, sanitary sewer mains and collection lines and appurtenances, service line locations, pavement, curb and gutter, storm sewer and appurtenances, pavement markings and signage. Topographical information outside the right-of-way should be provided where the information is available.
- Drainage calculations in accordance with the Drainage Criteria Manual and City of Victoria Storm Drainage Master Plan.

- Traffic control plans detailing the safe and efficient operation of traffic through the work zone during construction.
- A street lighting plan and layout.
- Certification that plans meet all requirements except where noted.

Special Designs

The Director of Public Works may approve an alternate design, a specific circumstance or construction methodology that differs from this manual on a case by case basis; if it is determined that the improvements are equivalent or superior and it ensures public health and safety.

CHAPTER 2 - Water

Pipe Selection:

Pipes shall be selected, sized and designed to provide safe, maintainable conveyance of domestic water.

Pipe Materials

The following pipe materials may be specified for water distribution mains:

- Polyvinyl chloride pipe (PVC) shall be pressure class 150 DR 18 (meeting AWWA C-900) for sizes six (6) through twelve (12) inches. PVC pipe will not be permitted for aerial crossings. DI fittings shall be used with PVC pipe. All fittings, including but not limited to bends, tees, spool pipe sections, reducers, etc., shall be restraint joints; EBBA Iron, Ford, Smith Blair or approved equal and wrapped with eight-mil poly-wrap and sealed on the edges with an approved tape.
- Ductile iron pipe (DIP) per ANSI/AWWA C151/A21.5 pressure class 350 for sizes six (6) through twelve (12) inches. Pipe shall be wrapped with 8-mil thick poly. Where excessive depths are encountered, greater than ten (10) feet, the design engineer shall specify an appropriate thickness class to be approved by the Director of Public Works.
- Cross-linked polyethylene (PEX) tubing or Type "K" copper tubing shall be used for all water services three-quarter ($\frac{3}{4}$) inch to two (2) inches.

Changes in pipe material shall only occur at valves or fittings with the exception of short replacements of water mains needed to meet TCEQ separation requirements.

Fittings

Use mechanical joint fittings. Properly designed restraint joints, EBBA Iron, Ford, Smith Blair or approved equal shall be provided for each fitting; or stainless steel all thread. Fittings shall be SIP, Sigma or approved equal and shall be wrapped with 8-mil thick poly. In addition to joint restraints, concrete thrust blocks may also be utilized to properly restrain the joints.

Pipe Sizing

The minimum size water line shall be eight (8) inches in diameter.

- Pipe with a six (6) inch diameter may be allowed on a case by case basis for the purpose of interconnecting eight (8) inch mains; for example, two cul-de-sacs that are interconnected via a six (6) inch main between subdivided lots.
- Pipe greater than twelve (12) inches in diameter shall be determined and designed in accordance with the approved Water Master Plan and the Director of Public Works.
- Fire hydrant leads shall be a minimum of six (6) inches in diameter and not exceed one hundred (100) linear feet.

Looping Requirements

Permanent dead end mains will not be allowed if looping alternatives are available. This may require extending the water mains beyond the limits of the project.

When it is not possible to meet the looping requirement, the maximum length of a water main, including a fire hydrant lead, shall not exceed eight hundred (800) linear feet and shall terminate with a fire hydrant or blow-off assembly.

Fire Suppression Service Line

Fire suppression service mains shall be private. A valve, in the open position, shall be installed on the fire suppression line and shall be maintained by the City. Fire suppression mains shall not be tapped for service. Only one connection from the City main to each individual building shall be permitted. No looping of fire suppression mains back to the City mains shall be allowed.

Pipe Alignment:

The design of the water distribution mains should be provided for economical access, maintenance and repair, future extension and minimum disruption to surrounding facilities during repair operations. Separation between sanitary sewer mains and water mains shall follow the most current TCEQ guidelines.

Horizontal Layout

The centerline of the mains shall be parallel to the right-of-way and behind the curb when possible. Avoid placing water fittings and connections under paved and fenced areas. Water mains shall not be placed along rear (back lot) easements. In residential areas, water mains shall be no closer than fifteen (15) feet to any building structure (size and depth may increase the distance). When a water line is

placed parallel to another utility line other than a sanitary sewer, the water line shall have a minimum of four (4) feet horizontal clearance from the outside wall of the water line to the outside wall of the existing utility.

Vertical Layout

Water mains should be laid to a straight as grade as possible between cross street connections. Vertical alignment should avoid high or low points between connections. The minimum depth of cover for both water mains and appurtenances (water services, valves, tees, etc.) shall be no less than thirty-six (36) inches from natural ground or proposed grade.

Flushing Design

Water mains shall be designed to allow adequate flushing capability. All dead end mains shall be provided with an approved means of flushing the dead end main.

Deflections, Bends and Curves

The maximum designed deflection of water main joints shall be one-half (1/2) of the manufacturer's allowable deflection.

Valves:

All main line valves twelve (12) inches in diameter or less shall be resilient seat gate valves.

Location and Spacing

Spacing:

- The total number of valves at any water line intersection shall equal the total number of mains leading out from the intersection point minus one; three (3) valves for a cross and two (2) valves for a tee except when one lead is a dead end main, in which case, all leads must have valves.
- Every eight hundred (800) linear feet of water line
- Intermediate valves shall be installed to isolate a maximum of two (2) fire hydrants
- At the end of a public line that is to be extended for future development

Location:

- Where possible, place valves in green areas and avoid sidewalks or accessible ramps
- Locate valves at street intersections projected to the P.C. of the intersection right-of-way, except for tapping sleeves and valves.
- Valves shall not be located in the slope or flow line of a roadside ditch.
- Intermediate valves, not located at an intersection, shall be located on lot lines or next to fire hydrants, but not set in driveways.
- Valves shall have a minimum nine (9) foot horizontal clearance to a sanitary sewer main as dictated by TCEQ standards.

Fire Hydrants:

Fire hydrants are to be located at street intersections or as close to an intersection as possible. The fire hydrant shall not be located within the intersection curb return radius.

- Intermediate fire hydrants should be located near property line extension and no closer than five (5) feet to any service line or within three (3) feet from a curbed driveway.
- Fire hydrants shall not be placed closer than fifteen (15) feet from any building.
- Fire hydrants shall have a minimum horizontal and vertical clearance of nine (9) feet from any sanitary sewer main or appurtenance.
- If a fire hydrant is placed in a sidewalk, the sidewalk shall be widened or relocated to maintain a minimum three (3) foot sidewalk width.
- Fire hydrants located on the opposite side of an arterial thoroughfare, railroad, expressway, primary or secondary arterial section as defined in the City of Victoria Master Thoroughfare Plan shall not be considered when determining adequate fire hydrant coverage for the development.
- Fire loops and waterline looping shall be required where more than two (2) fire hydrants will be installed on a main.
- Locate fire hydrants primarily at street intersections.
- Locate fire hydrants at the street intersection for cul-de-sac streets a length of three hundred (300) feet or less. For cul-de-sacs longer than three hundred (300) feet, the fire hydrant can be located at the P.C. of the cul-de-sac.
- Locate fire hydrants a minimum of two (2) feet behind back of curb.
- On streets with roadside ditches, set the fire hydrants within five (5) feet of right-of-way lines. Fire hydrant lead valves shall not be located in the slopes or flow lines of ditches.
- Fire hydrants shall be designed to have a forty-two (42) inch bury depth where possible. As a normal policy, vertical offsets in fire hydrant leads will not be allowed.

Fire Hydrants in Residential Developments

Fire hydrants shall be placed within the right-of-way at the property lines. Public fire hydrants shall be spaced no greater than six hundred (600) feet between fire hydrants as measured along dedicated right-of-ways or utility easements.

Fire Hydrants in Commercial and Industrial Developments

Public fire hydrants shall be spaced no greater than three hundred (300) feet between fire hydrants as measured along dedicated right-of-ways or utility easements. Fire loops and waterline looping shall be required where more than two (2) fire hydrants will be installed on a main. Provide isolation valves at each end of fire loops requiring on-site fire hydrants. The City Fire Marshall shall approve the location of fire hydrants and blow-offs in all commercial and industrial developments, apartment complexes, platted private street developments and other multi-family developments. The fire hydrant or blow-off, if unable to be located inside the water line easement, shall be located in a separate ten (10) foot by ten (10) foot easement adjacent to the waterline easement.

Backflow Preventers in Commercial and Industrial Developments

Backflow preventers shall be required on all fire suppression lines in commercial and industrial developments.

Meter Services:

Water Meters Two (2) Inches and Smaller

Water services shall be designed in accordance with the City of Victoria Standard Specifications and Details. Minimum size water service line, including fittings, shall be one (1) inch for a double lot connection for lot sizes ten thousand (10,000) square feet and smaller. For lots greater than ten thousand (10,000) square feet, the minimum size water service line, including fittings, shall be a one (1) inch single service connection or one and one-half (1½) inch double service connection, servicing two lots. Services shall be buried no less than two (2) feet.

Water Meters Three (3) Inches and Larger

The meters shall be located in areas with easy access (not fenced), protection from traffic and adjacent to City right-of-ways. Services shall be buried no less than two (2) feet. The water meter shall be located in a ten (10) foot by twenty (20) foot easement adjacent to the City right-of-way.

Water Line Crossings and Auger Construction:

Crossings

Where a water line crosses another utility other than a sanitary sewer main or collection line, a minimum of twelve (12) inches of clearance shall be provided during design. When crossing an oil or gas transmission line, utilize non-metallic pipe and maintain a minimum clearance of eighteen (18) inches or as required by pipeline company. Creek crossings shall have a minimum cover of four (4) feet below the flow line. All creek crossings, from high bank to high bank, shall utilize steel casing with restraint joints and casing spacers. Wooden casing spacers will not be allowed.

Auger Construction

Auger or boring sections shall be shown on the design. The auger or bore shall require the use of restraint joints and/or steel encasement. When crossing a State facility or railroad facility, the design shall include steel encasement in addition to restraint joints as approved by both the City and the respective facility owner. All steel encased water lines shall include restraint joints (PVC with bell restraints, Certa-Lok pipe or approved equal, or HDPE), casing spacers and sealed end caps. Steel encasement pipe shall have a wall thickness one-half (½) inch thick.

Water Quality and Testing:

Water mains shall be designed to provide adequate circulation by looping water mains to prevent odor, taste and color problems associated with stagnant water. Bacteriological water tests and pressure tests shall be witnessed by the City at the time of the test. Bacteriological samples shall be submitted to the Health Department. The water main will remain out of service until the water mains have been tested and approved for public consumption. In general, bacteriological tests are performed first with passing results, followed by a pressure test. If the pressure test fails, it shall be up to the City to determine whether another bacteriological test is necessary.

CHAPTER 3 – Sanitary Sewer

Pipe Selection:

Pipes shall be selected, sized and designed to provide safe, efficient and maintainable conveyance for the collection of sanitary sewer from its various sources of generation to the existing collection system.

Pipe Materials

The following pipe materials may be specified for sanitary sewer mains:

- Polyvinyl chloride pipe (PVC) shall be SDR26, 115 psi, ASTM D3034 for sizes six (6) through twelve (12) inches. Above twelve (12) inches, pipe material shall be approved by the Director of Public Works. PVC pipe will not be permitted for aerial crossings.
- Ductile iron pipe (DIP) per ANSI/AWWA C151/A21.5 pressure class 350 for sizes six (6) through twelve (12) inches. The pipe shall be lined with 40 mils of Polybond, Polyline, Polyurethane (Corro-pipe II) or ceramic epoxy (Protecto 4-1). The pipe shall also be wrapped with 8-mil thick poly. Where excessive depths are encountered, greater than ten (10) feet, the design engineer shall specify an appropriate thickness class to be approved by the Director of Public Works.

Changes in pipe material shall occur at manholes with the exception of short replacements or repairs of sanitary sewer mains needing to meet TCEQ separation requirements.

Pipe Sizing

The minimum size sanitary sewer main or collection line shall be eight (8) inches in diameter or as calculated per TCEQ requirements.

- Pipe sizes shall be of standard size; eight (8) inch, ten (10), and twelve (12) and sufficient to meet the demands based on Peak Hourly Flow = (Average Daily Flow)x(4)
- Pipe greater than twelve (12) inches in diameter shall be determined in accordance with the approved Waste Water Master Plan and the Director of Public Works.

Pipe Alignment:

The design of the sanitary sewer mains and collection lines should provide for economical access for maintenance and repair, future extension and minimum disruption to surrounding facilities during repair operations. In all cases sanitary sewer facilities shall comply with TCEQ requirements.

Horizontal Layout

The centerline of the collection mains shall be parallel to the right-of-way and behind the curb when possible. Sanitary sewer mains and collection lines should be laid straight between manholes. Sanitary sewer mains may be deflected up to one-half (1/2) of the manufacturer's allowable deflection. The centerline of sanitary sewer mains and collection lines constructed in street right-of-ways shall be located on the opposite side of the street from the water main. Where possible, avoid placing sewer under paved areas, especially manholes. Collection lines shall not be placed along rear (back lot) easements and shall be no closer than fifteen (15) feet to any building structure (size and depth may increase the clearance requirement). Separation of public water and sanitary sewer mains will be consistent with the current Rules and Regulations for Public Water Systems of the TCEQ. Intersecting sanitary sewer mains at manhole shall match top of pipe to top of pipe.

Vertical Layout

The desired depth for sanitary sewer mains shall have six (6) feet of cover to finished ground or pavement surface elevation. The minimum depth shall be three (3) feet. Maximum desired depth for a sanitary sewer mains and collection lines shall be no greater than fifteen (15) feet. Sanitary sewer mains and collection lines should be laid on a straight grade between manholes while avoiding excessive depths. Elevations must be shown on construction plans at one hundred (100) foot stations and at all manholes and match lines. Elevations are to be calculated to the nearest hundredth (0.01) foot. Construction of sanitary sewer mains and collection lines must be constructed to a depth which will insure gravity flow in service connections to adjacent properties. In general, sewer services shall be set at a two percent (2%) grade from the collection main to the property line. The service lead must have a minimum cover of two (2) feet at its shallowest point when crossing roadside drainage ditches.

Manholes:

Manholes will be required at changes in horizontal alignment, changes in grade, changes in pipe size and junctions with other sanitary sewer mains or collection lines. Manholes will not be required where service leads (six (6) inch diameter or less) join mains; except

when the sanitary sewer main is greater than fifteen (15) inches in diameter. Manholes shall be either pre-cast concrete with an approved non-corrosive liner (sprayed or pre-cast) or one-half (1/2) inch thick fiberglass per standard details. Manholes located in the one hundred (100) year floodplain shall not have lids with pick-holes and shall be gasketed and bolted to the frame. A City Floodplain permit shall be obtained for installation of manholes located in the one hundred (100) year floodplain. When three manholes in sequence are bolted and gasketed, an alternate means of venting shall be provided at less than fifteen hundred (1,500) foot intervals.

Spacing and Sizing

Spacing:

- The maximum distance between manholes shall be five hundred (500) feet or as required by TCEQ, whichever is less.
- At the end of a sanitary sewer main or collection line (Clean-outs on the collection line or main will not be allowed).

Sizing:

- | <u>Manhole Diameter</u> | <u>Main Size</u> |
|-------------------------|------------------------|
| 4 foot | <18 inches |
| 5 foot | 18 inches to 30 inches |
| 6 foot | >30 inches |
- A tenth (0.1) foot drop through the manhole is desired.
 - Manhole shall be no shallower than three (3) feet in depth.
 - External drops shall be required when the difference in elevation between two sanitary sewer mains or collection lines is two (2) feet or greater.

Sanitary Sewer Services:

Size and Location

Residential:

- The minimum size of a sanitary sewer service shall be four (4) inches for a single lot. Each lot shall be individually serviced from the sanitary sewer main to the property line; no double services.
- Locate the sanitary sewer service on the opposite side of the lot from the water service.
- All sanitary sewer services shall require the installation of a clean-out located at the property line by the developer.

Commercial or Industrial:

- Minimum size sanitary sewer service shall be a four (4) inch minimum for daily flows of five thousand (5,000) gallons per day or less. Flows larger than five thousand (5,000) gallons per day shall be a minimum of six (6) inches or larger as determined by the developer's engineer.
- All sanitary sewer services shall require the installation of a clean-out located at the property line by the developer.
- Installation of a sample port located on private property may be required as determined by City staff.

Crossings and Auger Construction:

Crossings

Where the sanitary sewer line or collection line crosses another utility other than a water line, a minimum of twelve (12) inches of clearance shall be provided during design. When crossing an oil or gas transmission line, metallic pipe shall not be utilized with a clearance of eighteen (18) inches. Creek crossings shall be provided with piers on each side of the crossing and shall utilize steel casing with casing spacers (no wood) and sealed end caps. Maintain a three (3) foot minimum vertical depth to the top of pipe at a creek crossing or street crossing.

Auger Construction

Auger or boring sections shall be shown on the design. The auger or bore shall require the use of restraint joints and/or steel encasement. When crossing a TxDOT facility or railroad facility, the design shall include steel encasement in addition to restraint joints as provided by both the City and the respective facility owner. All steel encased sanitary sewer mains shall include restraint joints, casing spacers and sealed end caps. Steel encasement pipe shall have a wall thickness one-half ($\frac{1}{2}$) inch thick.

Force Mains:

Force mains shall be reviewed on a case by case basis. Size, location, material and design of a force main shall be provided to the City by the developer's engineer and approved by the Director of Public Works. Force mains crossing State Highways and railroads shall be augured and encased.

Testing:

Sanitary sewer mains shall be tested by mandrels and pressure testing in accordance with the TCEQ requirements. Manholes shall be vacuum tested in accordance with the TCEQ requirements.

CHAPTER 4 - Streets

General:

The purpose of this section is to establish basic guidelines and certain minimum design criteria for the design of local streets. Arterial and collector designs shall be provided by the developer's engineer and reviewed and approved by the City and the Director of Public Works. The minimum design criteria for pavement structure for local streets are intended to produce streets having a useful life expectancy of twenty (20) years with reasonable expenditures for maintenance and repair.

Submittal Requirements

The design engineer shall submit the following information with all street designs:

- Plan and profile sheets containing all information necessary to review, construct and inspect the proposed improvements. This includes, but is not limited to, pavement markings and signage. Topographical information outside of the right-of-way should be provided where the information is available.
- Drainage calculations in accordance with the Drainage Criteria Manual and City of Victoria Storm Drainage Master Plan.
- Traffic Control Plans detailing the safe and efficient operation of traffic through the work zone during construction.
- A street lighting plan and layout. Street lights should be placed at all intersections, at the end of cul-de-sacs and at a minimum spacing of three hundred (300) feet.

Special Designs

The City and/or Director of Public Works may, upon request, approve an alternate design, unusual circumstance, or construction methodology that differs from the requirements of City Standards, including, but not limited to, pavement structure (cross section), alignment, width, curbing, etc. on a case by case basis if it is determined that: (1) the alternate design or construction methodology is equivalent to approved standards and (2) the alternative design or construction methodology is sufficient to ensure public health and safety.

Geometrical Criteria:

Horizontal and Vertical Alignment

Horizontal and vertical alignment shall provide safe and comfortable vehicle operations at normal travel speeds, accommodate access to adjacent properties, and provide adequate operating sight distances. The minimum grade for streets and curbs and gutters is three-tenths percent (0.30%), desirable is five-tenths percent (0.50%). The minimum grade for curb returns and cul-de-sacs shall be five-tenths percent (0.50%). The design shall show flow lines and/or top of curb grades at all PC and PT of curves. At intersections, the grades of the intersecting streets should not be more than two percent (2%) within the first twenty-five (25) feet of the intersecting curb line to provide a safe approach sight distance and accessible routes per the Texas Accessibility Standards (TAS) and the Americans with Disabilities Act (ADA). When an algebraic difference in intersecting longitudinal street grades exceeds two percent (2%), a parabolic vertical curve is required.

Intersection Design:

Street intersections should normally be designed at right angles on centerline tangents. The minimum curb return radii for all right angle intersections shall be thirty (30) feet measured from the face of the curb. Storm drainage inlets shall be located outside of the intersection curb returns and should be designed to minimize the volume of storm water entering an intersection. Intersections shall also have adjacent visibility triangles, free of obstacles as outlined by the latest edition of AASHTO's "A Policy on Geometric Design of Highways and Streets". Obstacles prohibited include vegetation, entry signage, structures, buildings, fences, etc. Public use facilities required to be at intersections such as fire hydrants, traffic signage, utility structures, etc. are exempted.

Medians:

The use of medians will be determined either by the City or by the Developer. Medians shall be aesthetically pleasing with bricks, stamped concrete, or landscape. Medians that are less than ten (10) feet in width, measured from the back of curb, shall be hardscaped. Medians are considered a "special design" and plans addressing plant material, irrigation, drainage and impact on adjacent pavement must be submitted. Perpetual maintenance of landscaped medians will be determined on a case by case basis and approved by the Director of Public Works.

Sidewalks:

Sidewalks shall be a minimum of five (5) feet wide when located adjacent to the curb. Sidewalks not adjacent to the back of curb shall be a minimum of four (4) feet in width. If the distance between the back of curb and the edge of sidewalk would be less than four (4) feet, the sidewalk shall be placed adjacent to the back of curb. Locate sidewalk adjacent to curb and gutter on all arterial and collector streets. Designs for the construction of sidewalks, ramps and driveway crossings shall meet current TAS and ADA requirements, which include driveway crossings.

Curbing:

Arterial and collector streets shall have a six (6) inch raised curb. Local streets may have a six (6) inch raised curb or a four (4) inch roll type curb. All roll type curb designs must be accompanied with drainage design calculations. Sidewalks shall not be installed adjacent to street designs with roll curb.

CHAPTER 5 – Storm Water

GENERAL:

The purpose of this section is to establish basic guidelines and certain minimum design criteria for the design of storm drainage improvements. Design of all public storm water drainage shall conform to the most current Storm Drainage Criteria Manual and the Master Drainage Plan. The design of a storm water drainage system in existing developed areas shall meet the current standards, even if the point of connection is inadequate and/or does not meet current drainage standards. The developer's engineer shall take into account current drainage flow of downstream or upstream properties during design and construction of the development.

Special Designs

The City and/or Director of Public Works recognizes that each site has unique differences that can enhance the opportunity to provide proper drainage, the intent of these criteria is to specify minimum requirements that can be modified provided that the objective for drainage standards is maintained. Lined or un-lined channels, creeks or large drainage-way improvements shall be approved on a case by case basis.

PIPE SELECTION:

Pipes shall be selected, sized and designed to provide safe, efficient and maintainable conveyance of storm water.

Pipe Materials

The following pipe materials may be specified for storm water drainage systems:

- Tongue and groove Class III Reinforced Concrete Pipe (RCP) thirty-six (36) inch diameter and less.
- Rubber gasketed Class III Reinforced Concrete Pipe (RCP) meeting the requirements of ANSI/ASTM C-443 for pipes larger than thirty-six (36) inch diameter.
- High Density Polyethylene Pipe (HDPE), smooth core, with a pressure rating of ten (10) psi, may be substituted for RCP provided the depth of cover is greater than two feet below the proposed ground or street elevation.

- Storm sewer located along the side or rear of developed properties (not within or adjacent to the street right-of-way) or lots shall be HDPE or rubber gasketed Class III RCP.

Pipe Sizing

The minimum size pipe shall be eighteen (18) inch diameter. Pipe shall be in six (6) inch increments, for instance, eighteen (18) inches, twenty-four (24) inches, thirty (30) inches, etc. No odd diameter pipe sizes shall be accepted. Box culverts shall be no smaller than two (2) feet by two (2) feet.

GEOMETRICAL CRITERIA:

Horizontal and Vertical Alignment

Storm sewer shall be located behind the curb and run from inlet box to inlet box whenever possible. Storm sewer not located within the street right-of-way shall have a minimum twenty (20) foot drainage easement for pipe thirty-six (36) inches in diameter or smaller or a twenty five (25) drainage easement for storm sewer larger than thirty-six (36) inches in diameter.

INLETS AND JUNCTION BOXES:

Inlets or junction boxes shall be required at changes in horizontal alignment, changes in grade, changes in pipe size and junctions with other storm water mains.

Spacing and Sizing

Spacing:

- The maximum distance between inlets or junction boxes shall be six hundred (600) feet.

Sizing:

- The inside width or length of an Inlet or junction box will accommodate the outside diameter of the pipe plus six (6) inches as shown on detail.
- A one-tenth (0.1) foot drop through the junction box or inlet is desired.
- Junction boxes and inlets shall be no shallower than three (3) foot in depth.

CHAPTER 6 – Easements

This section defines all City of Victoria Public Utility Mains, including, but not limited to, water mains, wastewater (sanitary sewer) mains, storm sewer mains and fiber optic lines.

Mains constructed outside of public rights-of-way shall be in easements of not less than 15 feet in width except for the following: if the main bury is deeper than 6 feet the easement width shall be not less than 20 feet; and if the main bury is greater than 14 feet, the easement width shall be 30 feet. Larger widths will be required depending on the depth of the main and type of easement.

If both water and wastewater mains are located within the same easement, the width shall not be less than 30 feet.

Where mains will be adjacent to building structures, increases to the easement will be required.

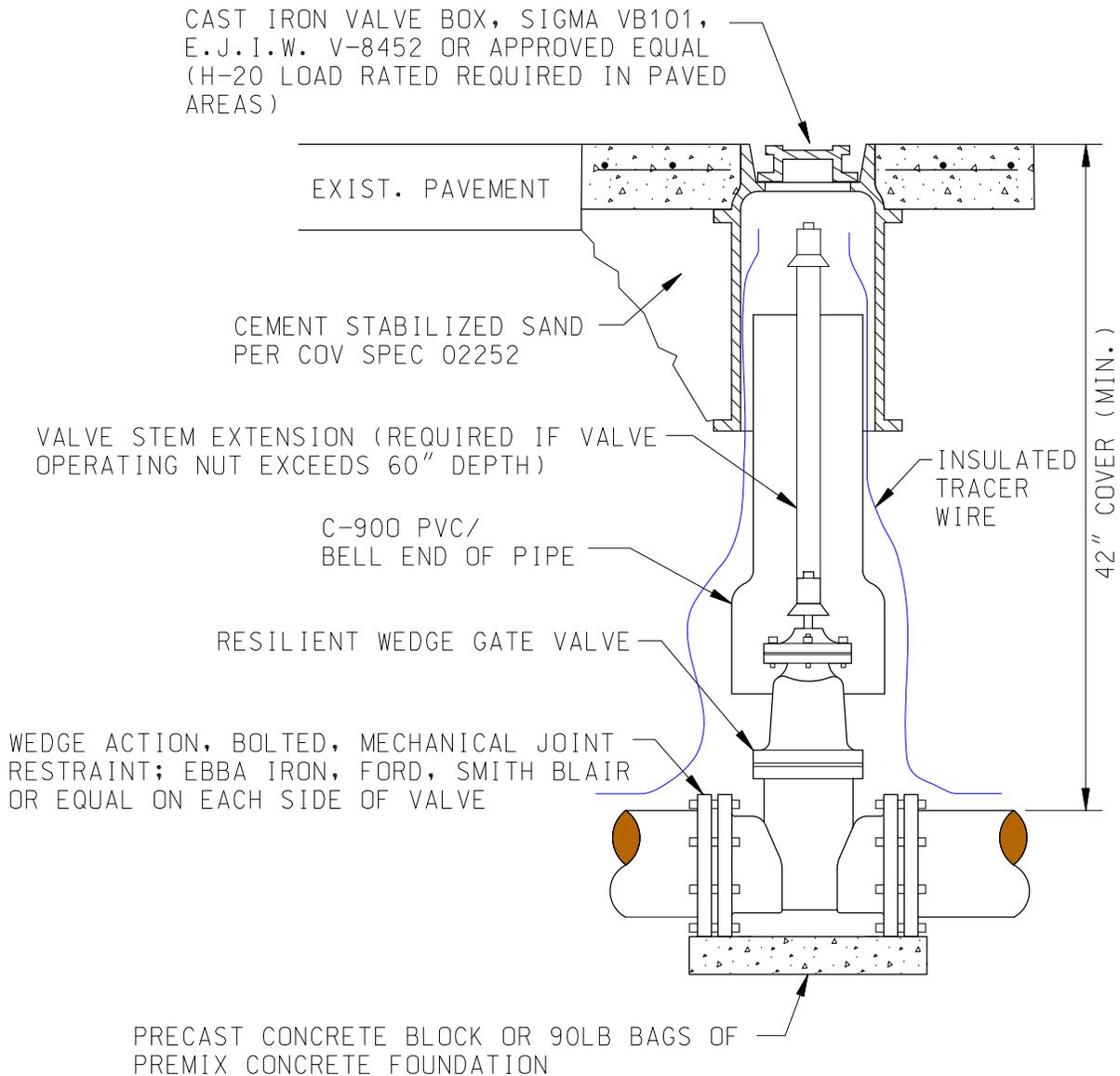
The easement must be located such that the centerline of the main is no closer than 5.5 feet to the closest edge of the easement.

Mains constructed adjacent to maintained roadways shall be located behind the back of curb (outside of paved road surface). If there is no available area, or if the area is occupied, then the main shall be installed in a separate easement (min. 15 feet) adjacent to the right-of-way.

Large developments, defined as subdivisions with multiple tracts and out-parcels, shall be designed to eliminate individual taps to lines abutting highway or street rights-of-way. A parallel main may be necessary to eliminate multiple taps located in the roadway. The intent of this section is to reduce the number of right-of-way and street excavations.

GENERAL NOTES

1. GATE VALVES SHALL BE USED FOR WATER LINES 12" IN DIAMETER AND SMALLER.
2. ALL VALVES SHALL HAVE: CONCRETE DISC AROUND TOP OF VALVE BOX WITH 11" RADIUS CIRCLE (MEASURED FROM CENTER OF VALVE BOX), 6" - 10" THICK, CLASS "A" CONCRETE (MATCH ADJACENT CONCRETE PAVEMENT, IF ASPHALT USE 6"), REINFORCE WITH #4 REINFORCEMENT BARS AT 8" O.C.E.W. ONE LAYER.
3. EXTEND INSULATED TRACER WIRE INSIDE VALVE BOX, WITH 3" OF SLACK IN WIRE.



VALVE DETAIL

STANDARD CONSTRUCTION DETAILS

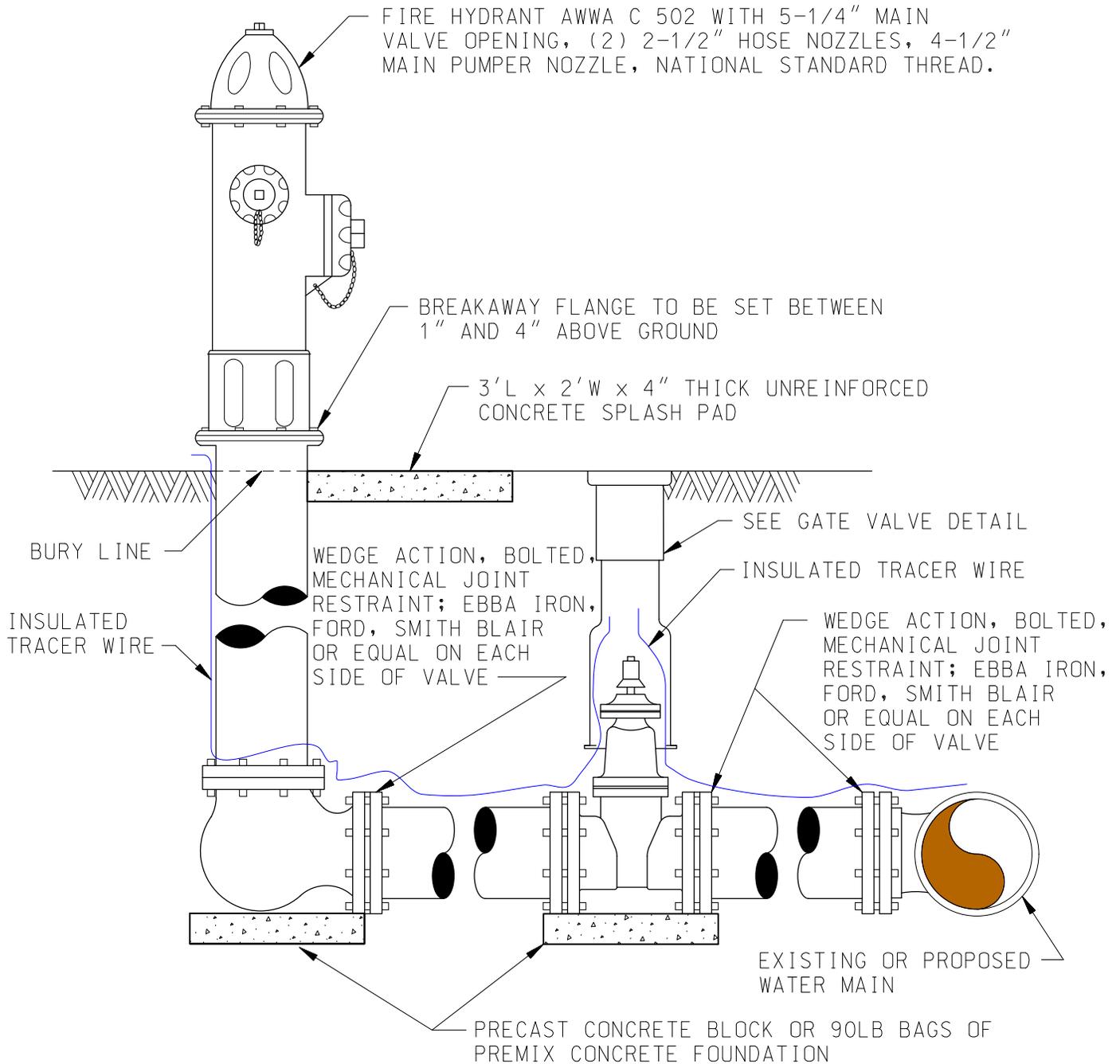
DATE: 4/2012

REVISED DATE: 6/12/18

WTR - 1

GENERAL NOTES

1. INSTALL WEDGE ACTION, BOLTED MECHANICAL JOINT RESTRAINT; EBBA IRON, FORD, SMITH BLAIR OR APPROVED EQUAL ON ALL PIPE JOINTS BETWEEN MAIN AND HYDRANT.
2. BLUE REFLECTORIZED MARKERS SHALL BE LOCATED ON THE CENTERLINE OF THE PAVEMENT ACROSS FROM ALL FIRE HYDRANTS. PAVEMENT MARKERS AT INTERSECTIONS SHALL BE FOUR-SIDED. MARKERS SHALL BE SUBSIDIARY TO THE FIRE HYDRANT.



FIRE HYDRANT DETAIL

STANDARD CONSTRUCTION DETAILS

DATE: 4/2012

REVISED DATE: 6/12/18

WTR - 2

GENERAL NOTES

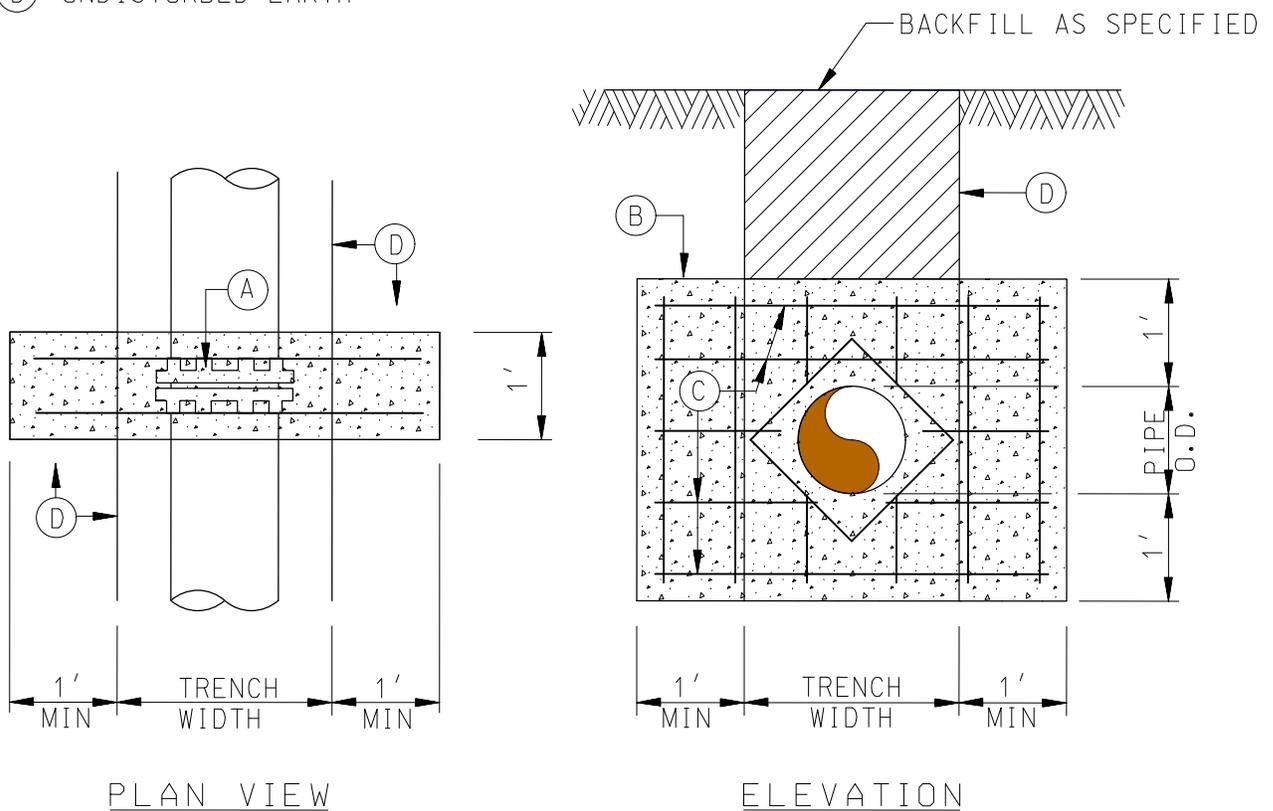
1. CONCRETE THRUST COLLARS MAY BE USED IN LUE OF JOINT RESTRAINT FOR REDUCERS AND VERTICAL BENDS
2. CONCRETE THRUST COLLARS MAY BE USED IN OTHER LOCATIONS, SUCH AS TIE-INS, WHERE THE DISTANCE REQUIRED FOR JOINT RESTRAINT WOULD REQUIRE RESTRAINING OF EXISTING PIPE BEYOND THE TIE-IN POINT
3. ALL MJ FITTINGS SHALL BE JOINT RESTRAINED.

(A) WEDGE ACTION, BOLTED, MECHANICAL RESTRAINT RING; EBBA, FORD, SMITH BLAIR OR APPROVED EQUAL

(B) CLASS A 3000 PSI CONCRETE, PER SPEC 03305

(C) #4 BARS @ 8" O.C.B.W. EACH FACE

(D) UNDISTURBED EARTH

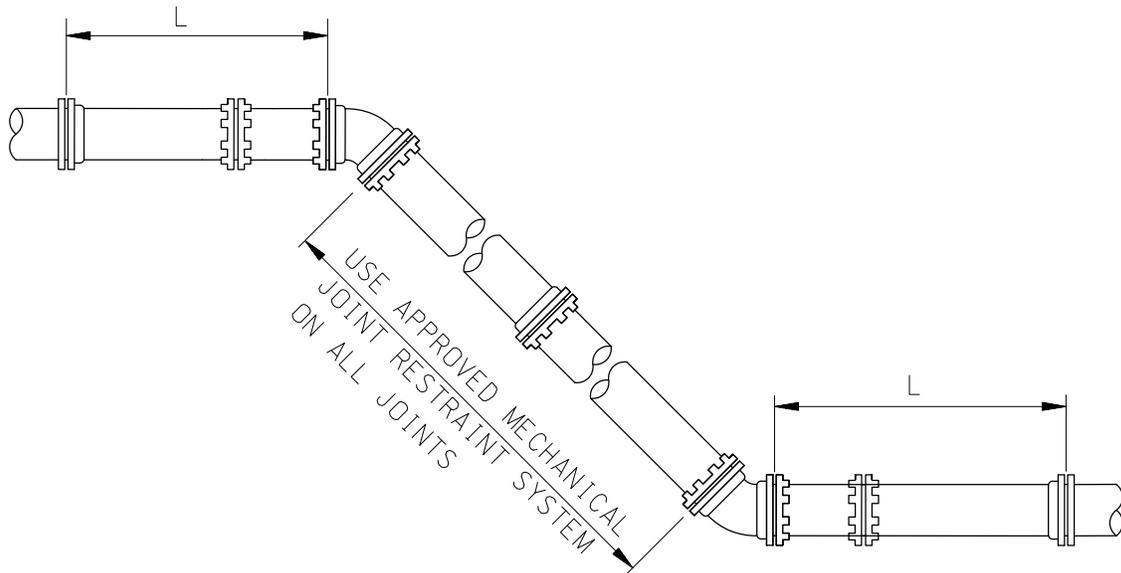


GENERAL NOTES

1. ALL JOINTS WITHIN DISTANCE "L" OF A HORIZONTAL BEND SHALL BE RESTRAINED USING A MECHANICAL RESTRAINT SYSTEM;
EBBA, FORD, SMITH BLAIR OR APPROVED EQUAL.
2. ALL MJ FITTINGS SHALL BE JOINT RESTRAINED.

HORIZONTAL BENDS			
PIPE SIZE	BEND	"L" PVC PIPE	"L" D.I. PIPE W/ POLY
6"	45 DEG ↓	6'	7'
8"		9'	10'
10"		10'	12'
12"		12'	14'
16"		16'	18'
6"	90 DEG ↓	16'	18'
8"		21'	23'
10"		25'	28'
12"		29'	33'
16"		38'	43'

NOTE: CALCULATIONS BASED ON A TEST PRESSURE OF 150 PSI, A SAFETY FACTOR OF 1.5 AND A BURY DEPTH OF 3.5'



THRUST RESTRAINT DETAIL
(VERTICAL OFFSETS)

STANDARD CONSTRUCTION DETAILS

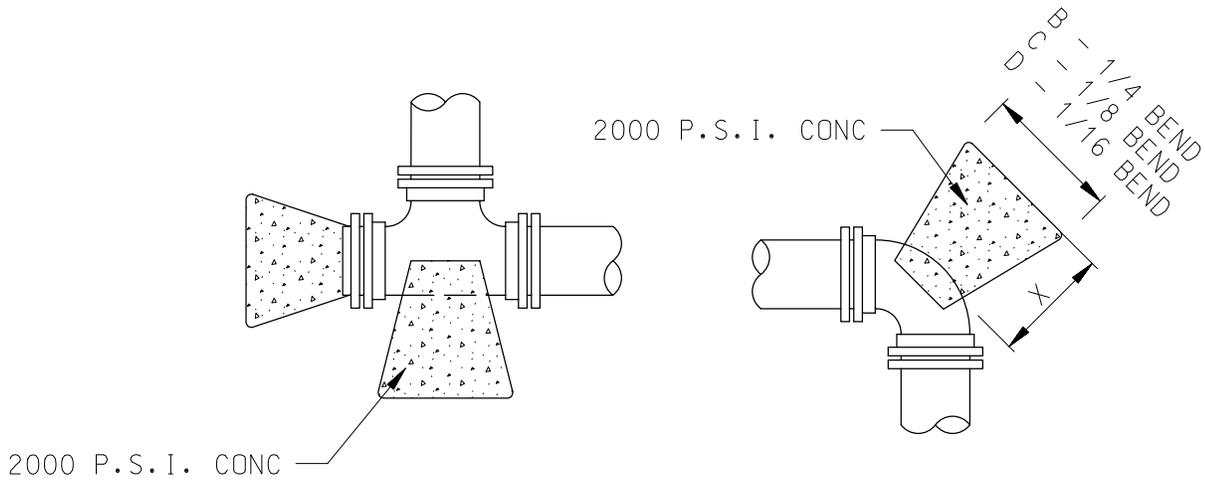
DATE: 4/2012

REVISED
DATE: 6/12/18

WTR - 4

GENERAL NOTES

1. CONCRETE THRUST BLOCKS MAY ONLY BE UTILIZED AT TIE-IN LOCATIONS WITH EXISTING MAINS. ALL OTHER LOCATIONS SHALL BE RESTRAINED USING A MECHANICAL JOINT RESTRAINING SYSTEM; EBBA, FORD, SMITH BLAIR OR APPROVED EQUAL.
2. ALL MJ FITTINGS SHALL BE JOINT RESTRAINED.



PIPE SIZE	A PLUGS & TEES	B 90° BENDS	C 45° BENDS	D 22 1/2° BENDS	X
4" & 6"	1' - 0"	1' - 2"	-----	-----	TO BE A MINIMUM OF 1' - 0" OR AS REQ'D.
8"	1' - 3"	1' - 6"	1' - 3"	1' - 0"	
10"	1' - 9"	2' - 0"	1' - 6"	1' - 0"	
12"	2' - 0"	2' - 3"	1' - 9"	1' - 3"	
16"	2' - 7"	3' - 0"	2' - 3"	1' - 8"	
20"	3' - 3"	3' - 3"	2' - 9"	2' - 0"	



CONCRETE THRUST
BLOCK DETAIL

STANDARD CONSTRUCTION DETAILS

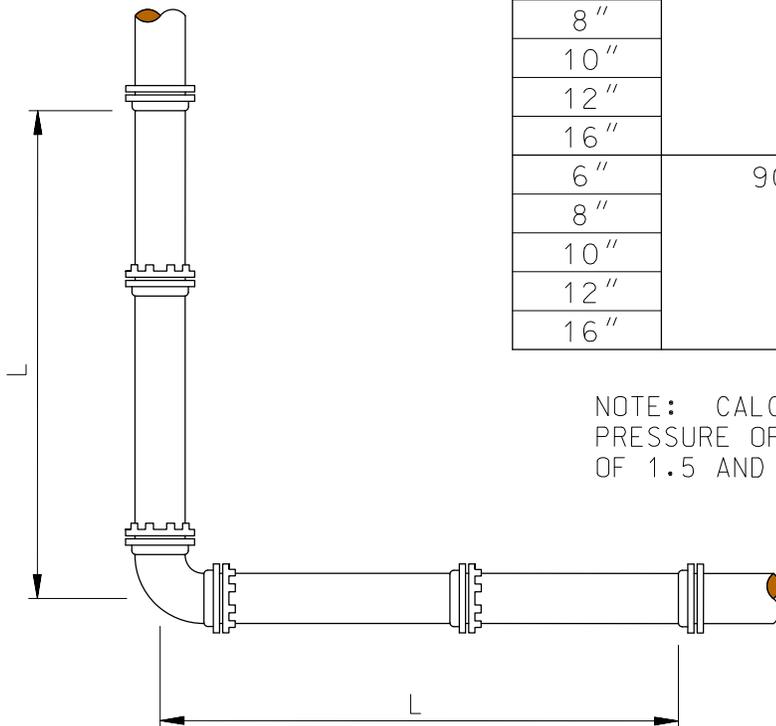
DATE: 4/2012
REVISED
DATE: 6/12/18

WTR - 5

GENERAL NOTES

1. ALL JOINTS WITHIN DISTANCE "L" OF A HORIZONTAL BEND SHALL BE RESTRAINED USING A MECHANICAL RESTRAINT SYSTEM; EBBA, FORD, SMITH BLAIR OR APPROVED EQUAL.
2. ALL MJ FITTINGS SHALL BE JOINT RESTRAINED.

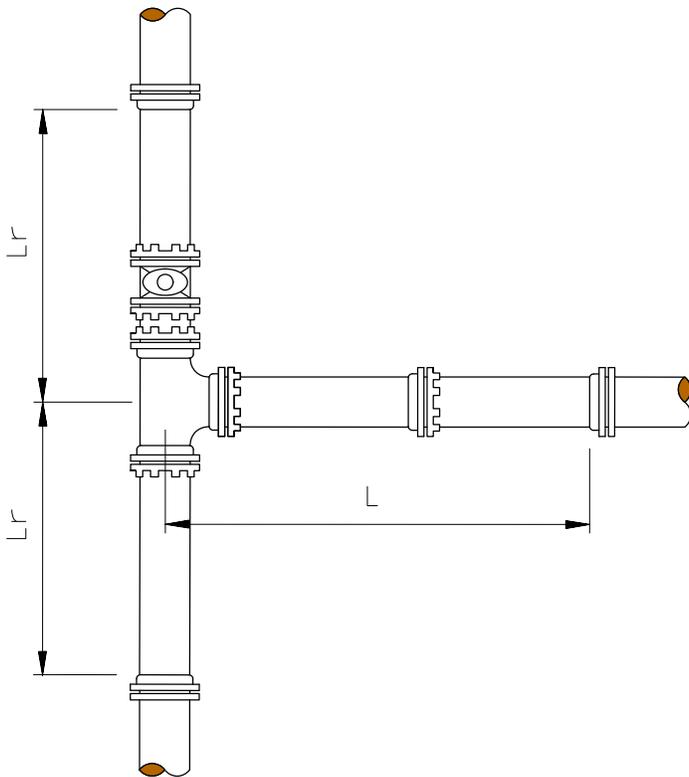
HORIZONTAL BENDS			
PIPE SIZE	BEND	"L" PVC PIPE	"L" D.I. PIPE W/ POLY
6"	11-1/4 DEG ↓	2'	2'
8"		2'	2'
10"		3'	3'
12"		3'	3'
16"		4'	4'
6"	22-1/2 DEG ↓	3'	3'
8"		4'	5'
10"		5'	6'
12"		6'	7'
16"		8'	9'
6"	45 DEG ↓	6'	7'
8"		9'	10'
10"		10'	12'
12"		12'	14'
16"		16'	18'
6"	90 DEG ↓	16'	18'
8"		21'	23'
10"		25'	28'
12"		29'	33'
16"		38'	43'



NOTE: CALCULATIONS BASED ON A TEST PRESSURE OF 150 PSI, A SAFETY FACTOR OF 1.5 AND A BURY DEPTH OF 3.5'

GENERAL NOTES

1. THE VALUES IN THE TABLE WERE ESTABLISHED FOR DISTANCE "Lr" EQUAL TO "L". OTHER VALUES OF "L" MAY BE CALCULATED FOR VARYING DISTANCES OF "Lr".
2. ALL JOINTS WITHIN DISTANCE "L" OF A TEE SHALL BE RESTRAINED USING A MECHANICAL RESTRAINT SYSTEM; EBBA, FORD, SMITH BLAIR OR APPROVED EQUAL.
3. NO JOINTS, OTHER THAN RESTRAINED VALVES LOCATED ADJACENT TO THE TEE, ARE ALLOWED WITHIN DISTANCE "Lr" OF A TEE.
4. ALL MJ FITTINGS SHALL BE JOINT RESTRAINED.



TEES		
MAIN SIZE	BRANCH SIZE	"L" AND "Lr"
6"	4"	4'
6"	6"	7'
8"	4"	3'
8"	6"	6'
8"	8"	10'
10"	6"	5'
10"	8"	8'
10"	10"	11'
12"	6"	4'
12"	8"	7'
12"	10"	10'
12"	12"	13'
16"	6"	3'
16"	8"	5'
16"	10"	8'
16"	12"	10'
16"	16"	17'

NOTE: CALCULATIONS BASED ON A TEST PRESSURE OF 150 PSI, A SAFETY FACTOR OF 1.5 AND A BURY DEPTH OF 3.5'



THRUST RESTRAINT DETAIL
(TEES)

STANDARD CONSTRUCTION DETAILS

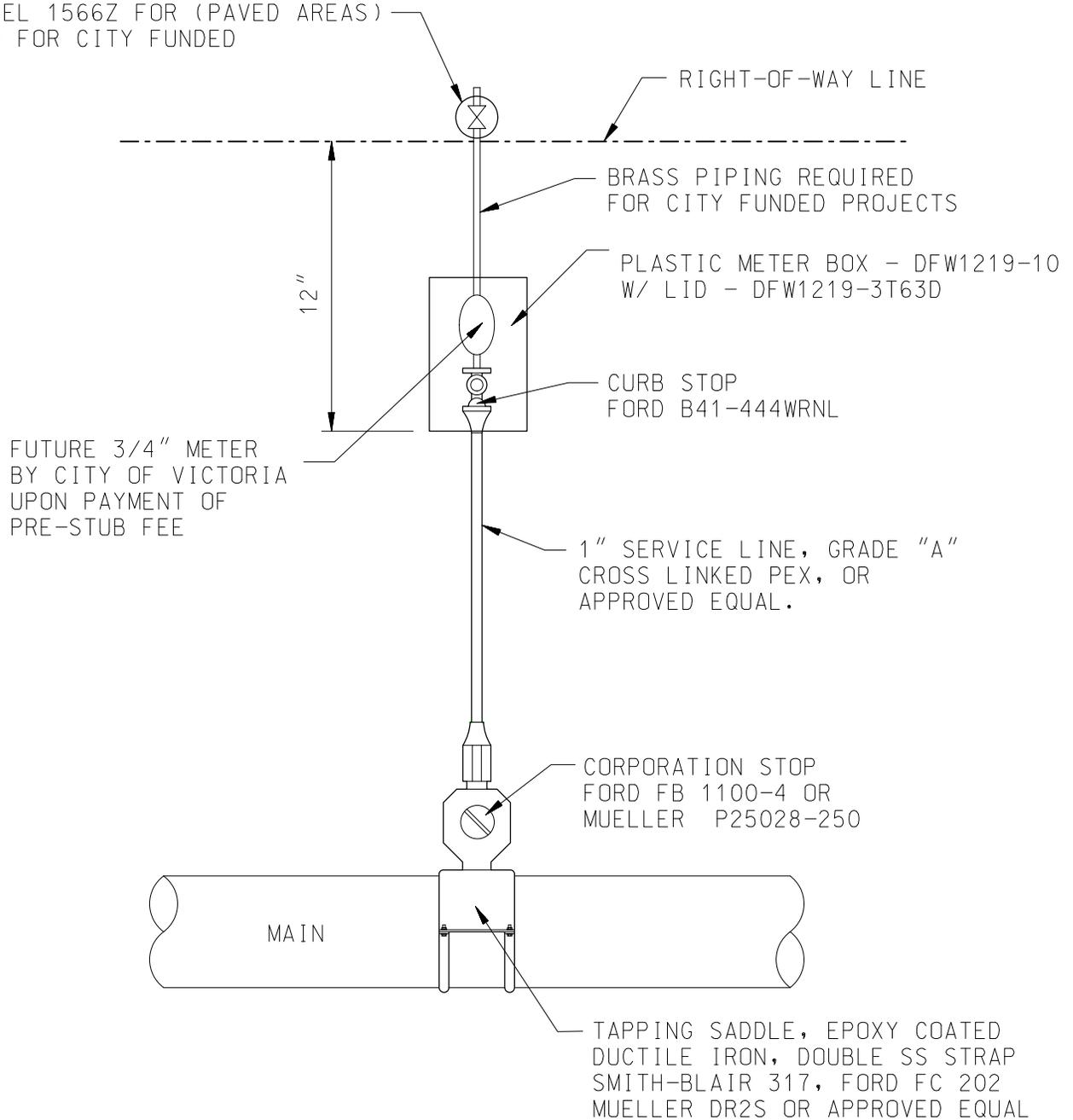
DATE: 4/2012
REVISED
DATE: 6/12/18

WTR - 7

GENERAL NOTES

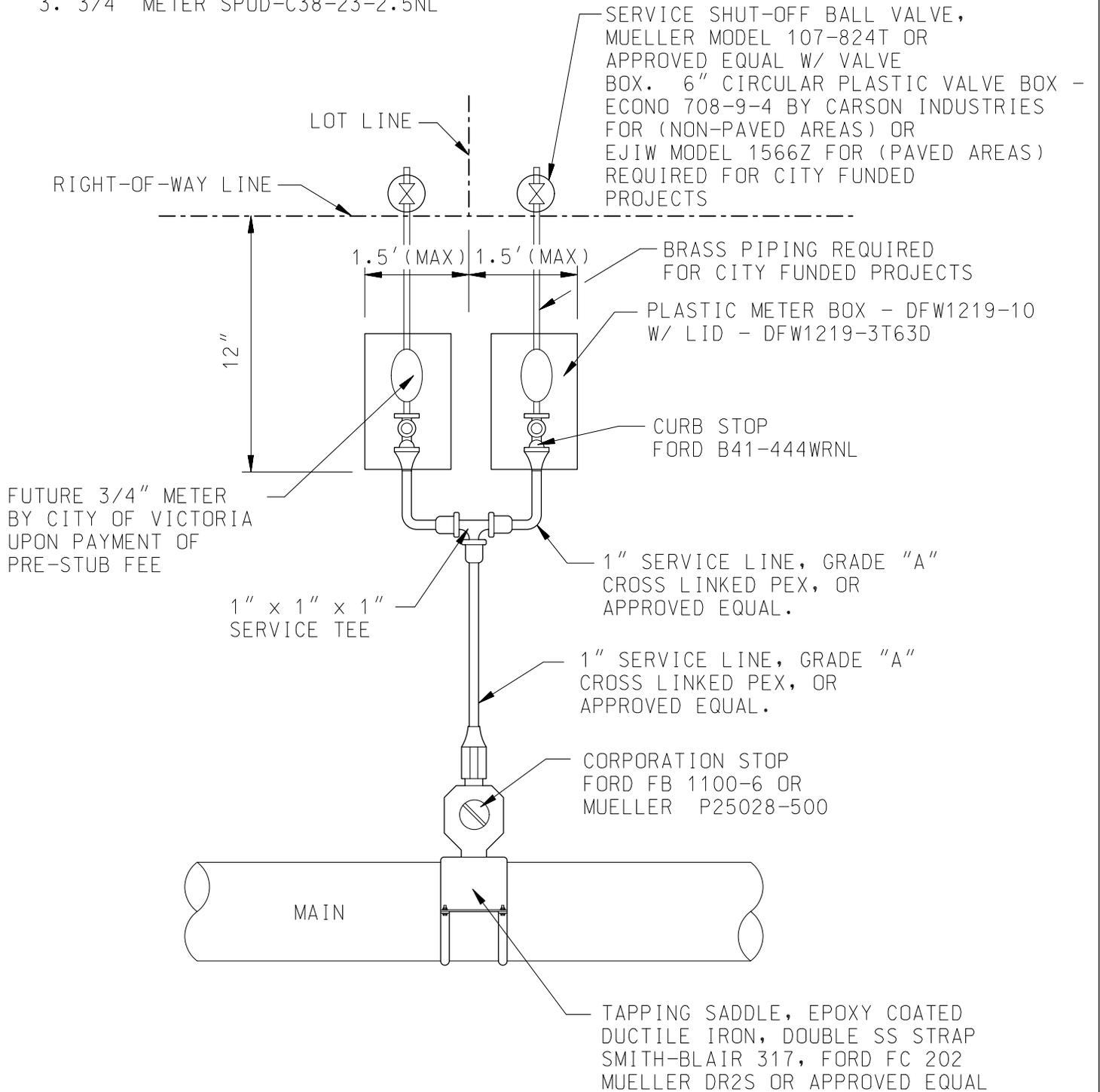
SERVICE SHUT-OFF BALL VALVE, MUELLER MODEL 107-824T OR APPROVED EQUAL W/ VALVE BOX. 6" CIRCULAR PLASTIC VALVE BOX - ECONO 708-9-4 BY CARSON INDUSTRIES FOR (NON-PAVED AREAS) OR EJIW MODEL 1566Z FOR (PAVED AREAS) REQUIRED FOR CITY FUNDED PROJECTS

1. 1-1/2" SERVICE LINE FOR LOTS OVER 10,000 S.F.
2. 3/4" X 1" BUSHING-FORD C18-34NL
3. 3/4" METER SPUD-C38-23-2.5NL



GENERAL NOTES

1. 1-1/2" SERVICE LINE FOR LOTS OVER 10,000 S.F.
2. 3/4" X 1" BUSHING-FORD C18-34NL
3. 3/4" METER SPUD-C38-23-2.5NL



WATER SERVICE DETAIL
(DOUBLE SERVICE)

STANDARD CONSTRUCTION DETAILS

DATE: 4/2012

REVISED 1/18/18

DATE: 7/15/22

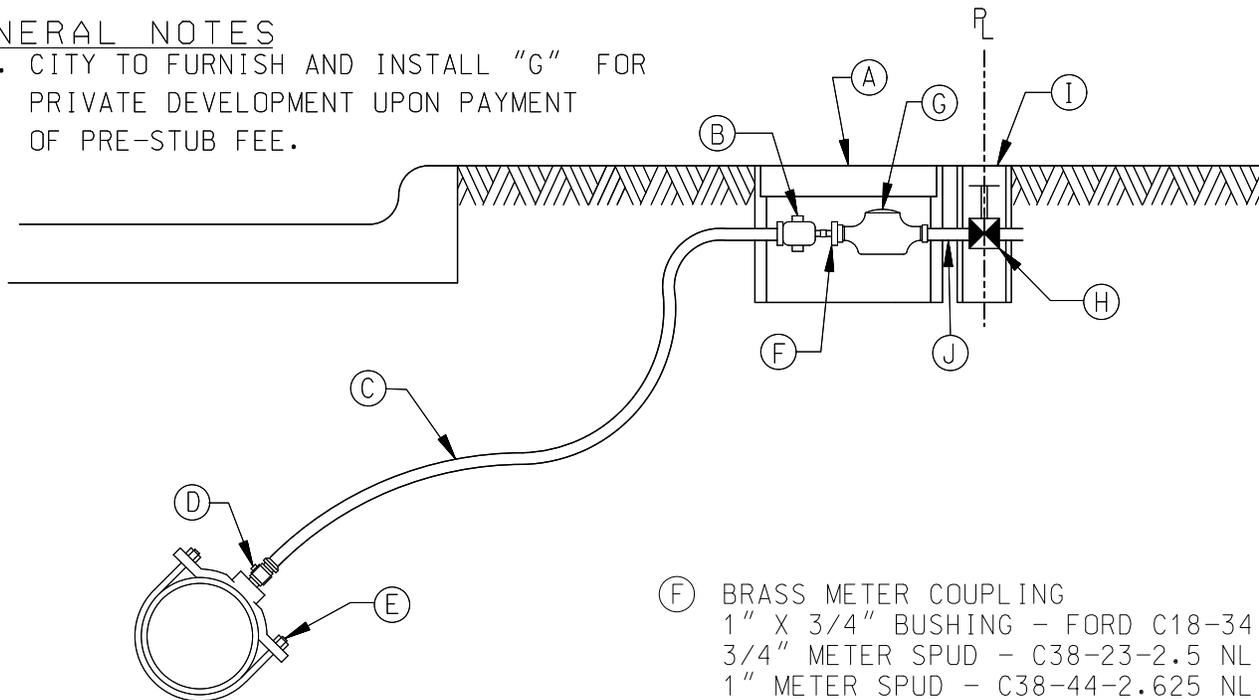
WTR - 9

METER SIZE	METER BOX	METER BOX LID	CURB STOP
3/4"	DFW1219-10	DFW1219-3T63D	FORD B-41-444WRNL
1"	DFW1324C-18	DFW1324C-3T63A	FORD B-41-444WRNL
1-1/2"	DFW1730F-12	DFW1730F-24-3T63D	FORD B-41-666WRNL
2"	DFW1730F-12	DFW1730F-24-3T63D	FORD B-41-777WRNL

METER SIZE	CORP STOP	SHUT-OFF VALVE	SERVICE LINE
3/4"	FORD FB 1100-4 OR MUELLER P25028-250	MUELLER 107-824T	1" PEX OR COPPER
1"	FORD FB 1100-4 OR MUELLER P25028-330	MUELLER 107-825T	1" PEX OR COPPER
1-1/2"	FORD FB 1100-6 OR MUELLER P25028-500	MUELLER 107-827	1-1/2" PEX OR COPPER
2"	FORD FB 1100-7 OR MUELLER P25028-550	MUELLER 107-828	2" PEX OR COPPER

GENERAL NOTES

1. CITY TO FURNISH AND INSTALL "G" FOR PRIVATE DEVELOPMENT UPON PAYMENT OF PRE-STUB FEE.



- (F) BRASS METER COUPLING
1" X 3/4" BUSHING - FORD C18-34 NL
3/4" METER SPUD - C38-23-2.5 NL
1" METER SPUD - C38-44-2.625 NL
- (G) WATER METER - PROVIDED BY CONTRACTOR FOR CITY FUNDED PROJECTS
- (H) SHUT-OFF VALVE - REQUIRED FOR CITY FUNDED PROJECTS
- (I) VALVE BOX, ECONO 708-9-4 BY CARSON INDUSTRIES FOR (NON-PAVED AREAS) OR EJIW MODEL 1566Z FOR (PAVED AREAS) - REQUIRED FOR CITY FUNDED PROJECTS
- (J) BRASS PIPING BETWEEN METER AND SHUT-OFF VALVE - REQUIRED FOR CITY FUNDED PROJECTS

- (A) PLASTIC METER BOX W/ LID (2" DIA. KNOCKOUT IN LID)
- (B) CURB STOP
- (C) GRADE "A" CROSS LINKED PEX OR TYPE "K" COPPER OR APPROVED EQUAL
- (D) CORPORATION STOP
- (E) TAPPING SADDLE, EPOXY COATED DUCTILE IRON, DOUBLE STAINLESS STEEL STRAP, SMITH BLAIR 317, FORD FC 202, MUELLER DR2S OR APPROVED EQUAL



WATER SERVICE

STANDARD CONSTRUCTION DETAILS

DATE: 4/2012

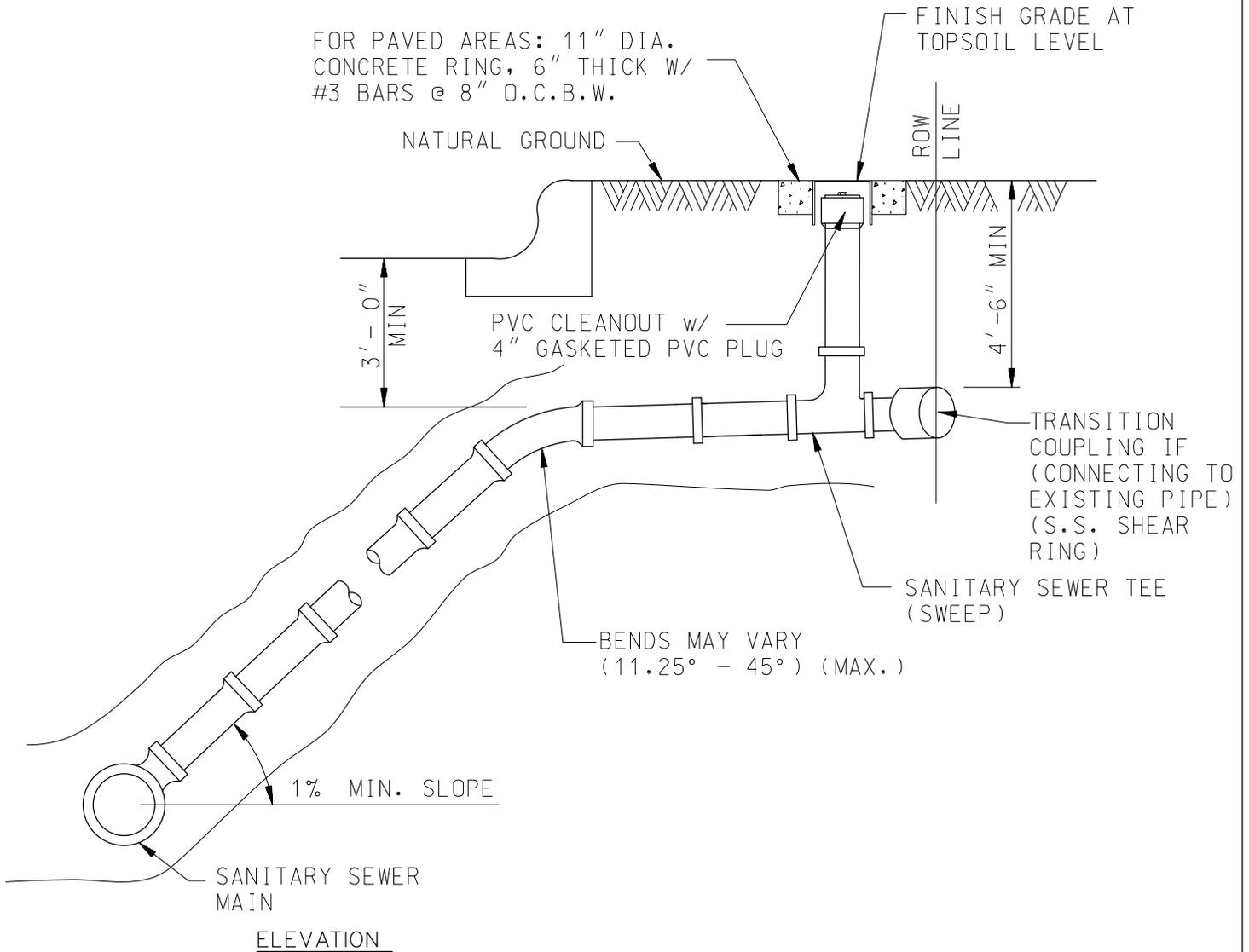
REVISED 1/18/18

DATE: 7/15/22

WTR - 10

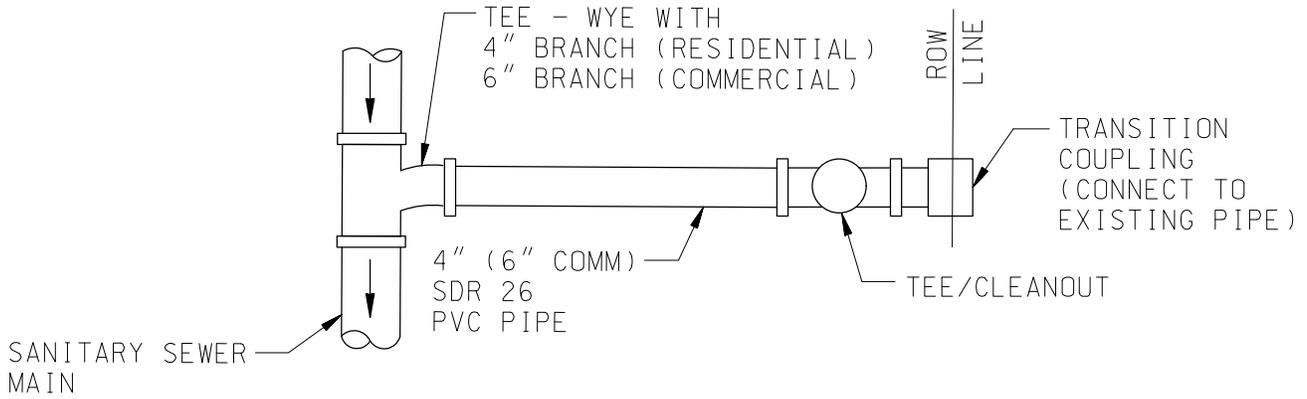
GENERAL NOTES

1. MAINTAIN MINIMUM 6" CLEARANCE FROM WATER LINE AND CENTER ONE JOINT OF SEWER PIPE ON WATER LINE.
2. SEE SINGLE AND DOUBLE SERVICE DETAIL FOR TOP VIEW.
3. IF INSTALLED IN PAVED AREAS; DRIVEWAYS, SIDEWALKS, ETC; CAP AND BOOT TO BE CAST IRON.
4. FOR NEW RESIDENTIAL SUBDIVISIONS; LEAVE CLEAN-OUT TOP 12" +/- ABOVE GRADE. (PRIVATE PLUMBER TO ADJUST)
5. IN NON-PAVED AREAS, PLACE 2 - #4 (18" DEEP) REBAR PIECES EITHER SIDE OF CLEAN-OUT.

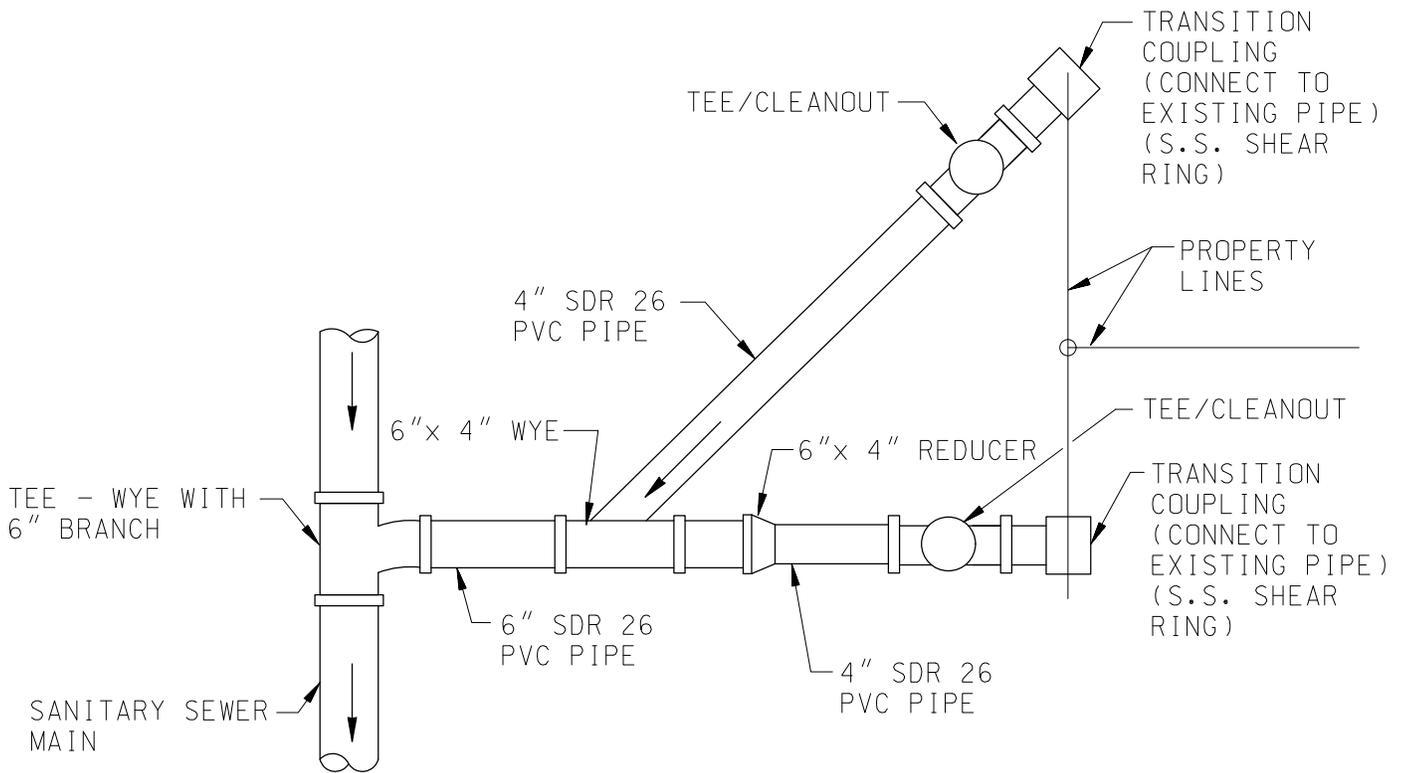


GENERAL NOTES

1. CONTRACTOR TO AVOID PLACING CLEANOUT CASTINGS IN SIDEWALKS AND DRIVEWAYS WHERE POSSIBLE.
2. REMOVAL OF EXISTING CLEANOUT AT PROPERTY LINE (IF PRESENT) SHALL BE SUBSIDIARY TO THE NEW CLEANOUT ITEM AND SHALL NOT BE PAID FOR SEPERATELY.



SINGLE SERVICE PLAN
(RESIDENTIAL AND COMMERCIAL)



DOUBLE SERVICE PLAN (RESIDENTIAL)



SEWER SERVICE DETAIL
(SINGLE OR DOUBLE)

STANDARD CONSTRUCTION DETAILS

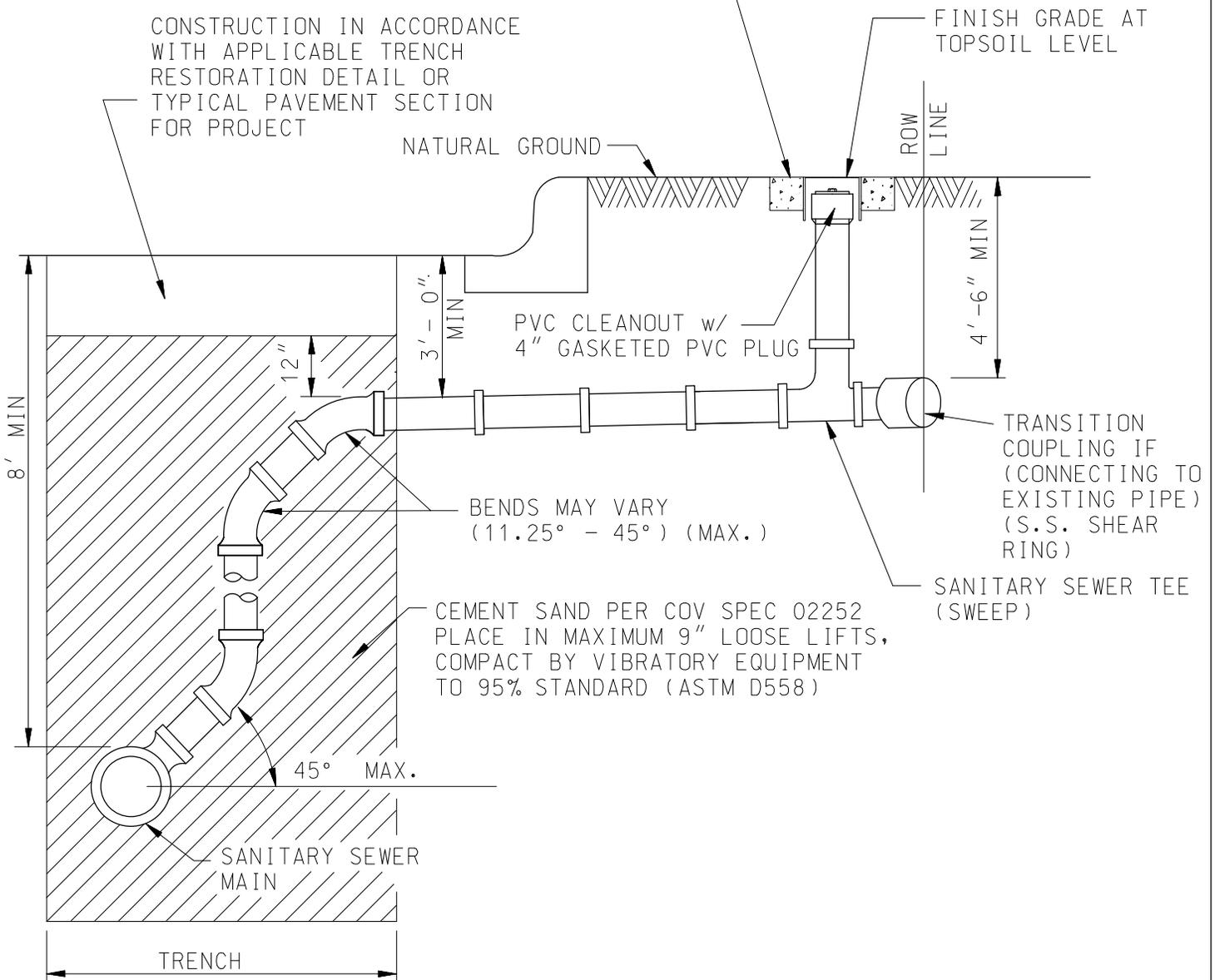
DATE: 4/2012
REVISED
DATE: 6/12/18

SAN - 2

GENERAL NOTES

1. MAINTAIN MINIMUM 6" CLEARANCE FROM WATER LINE AND CENTER ONE JOINT OF SEWER PIPE ON WATER LINE.
2. SEE SINGLE AND DOUBLE SERVICE DETAIL FOR TOP VIEW.
3. STACKS IN THE 12 O'CLOCK POSITION ARE PROHIBITED.
4. STACKS ARE ONLY ALLOWED IF MAIN LINE IS A MINIMUM OF 8' DEEP.
5. IF INSTALLED IN PAVED AREAS; DRIVEWAYS, SIDEWALKS, ETC; CAP AND BOOT TO BE CAST IRON.
6. IN NON-PAVED AREAS, PLACE 2 - #4 BARS, 18" DEEP ON EITHER SIDE OF CLEAN-OUT.
7. BACKFILL SERVICE UNDER CURB AND GUTTER AND SIDEWALK/DRIVEWAY IN ACCORDANCE W/PAVED AREA BACKFILL DETAILS.

FOR PAVED AREAS: 11" DIA. CONCRETE RING, 6" THICK W/ #3 BARS @ 8" O.C.B.W.



SANITARY SEWER SERVICE STACK DETAIL

STANDARD CONSTRUCTION DETAILS

DATE: 4/2012
 REVISED DATE: 6/12/18

SAN - 3

GENERAL NOTES

1. MANHOLE TOP SHALL BE SET 6" ABOVE GRADE IN OPEN FIELDS, 3" ABOVE GRADE FOR LARGE GRASSED; LANDSCAPED AREAS, AND FLUSH WITH THE FINISHED GRADE WHEN BETWEEN THE BACK OF CURB AND SIDEWALK.
2. MANHOLE TO BE VACUUM TESTED AFTER COMPLETION.
3. SEAL MANHOLE TO BASE WITH MANUFACTURES GASKET OR APPROVED SEALANT.
4. EPOXY ALL EXPOSED CONCRETE IN MANHOLE w/JEFFCOAT 326 OR VERSA FLEX FE 100 w/VF30 PRIMER PER MANUFACTURES RECOMMENDATIONS
5. PROVIDE 8" OF COMPACTED CEMENT STABILIZED SAND BENEATH MANHOLE BASE.
6. MANHOLE LIDS SHALL NOT HAVE PICK-HOLES. BOLTED AND GASKETED LIDS ONLY PERMITTED IN DITCHES AND FLOODPLAINS.
7. MANHOLES TO BE BACKFILLED WITH CEMENT SAND FROM EDGE OF MANHOLE TO UNDISTURBED GROUND.
8. NON-SHRINK GROUT REQUIRED BETWEEN THROAT RINGS AND LID AND OVER INVERT (1" MIN.)

30" CLEAR OPENING MANHOLE FRAME AND COVER CONFORMING TO COV SPEC. 02603. FRAME AND COVER TO CONFORM TO ASTM A48, CLASS 30 AND BE AASHTO H-20 LOAD RATED.

MANHOLES SHALL INCLUDE A CONCRETE DISC AROUND TOP OF MANHOLE. SHALL BE 32" RADIUS CIRCLE (MEASURED FROM CENTER OF MANHOLE), POURED TO THE BEARING SHOULDER OF MANHOLE, MINIMUM 12" THICK, CLASS "A" CONCRETE, REINFORCE WITH #4 REINFORCEMENT BARS AT 8" O.C.E.W. ONE LAYER.

FILL DIRT AROUND MANHOLE AT 10:1 SLOPE

VARIES SEE NOTE 1

SLOPE 10:1

#4 x 24" TIE BARS @ 18" O.C. REQUIRED FOR CONCRETE PAVED AREAS. OMIT FOR ASPHALT PAVED AREAS. 1 - #4 CIRCULAR REBAR IN CONCRETE DISC PER 12" DEPTH.

CEMENT STABILIZED SAND FULL DEPTH PER COV SPEC 02252. PLACE IN MAX. 8" LOOSE LIFTS. COMPACT BY VIBRATORY EQUIPMENT TO 95% STANDARD (ASTM D558) (BOTH ROADWAY & NATURAL GROUND)

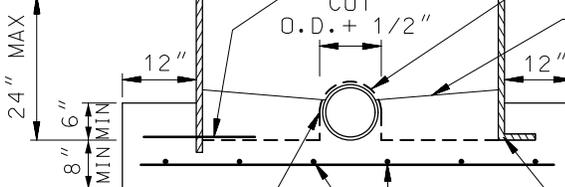
WATER STOP GASKET WITH STAINLESS STEEL CLAMPS CONFORMING TO C-923

ANCHORING OPTION 1: 18" LONG #4 BAR @ 18" O.C. THROUGH MANHOLE BASE. SEE OPPOSITE SIDE FOR OPTION 2.

SEWER PIPE PER PLAN

CUT OUT MANHOLE TO SET OVER PIPE

BEGIN INVERT AT 3/4 PIPE DIA., SLOPE 1/2"/FT



#4 BARS @ 12" O.C. BOTH WAYS

ANCHORING OPTION 2: PER MANUFACTURED LIP ON MANHOLE BASE EMBEDDED IN CONCRETE BASE. SEE OPPOSITE SIDE FOR OPTION 1.



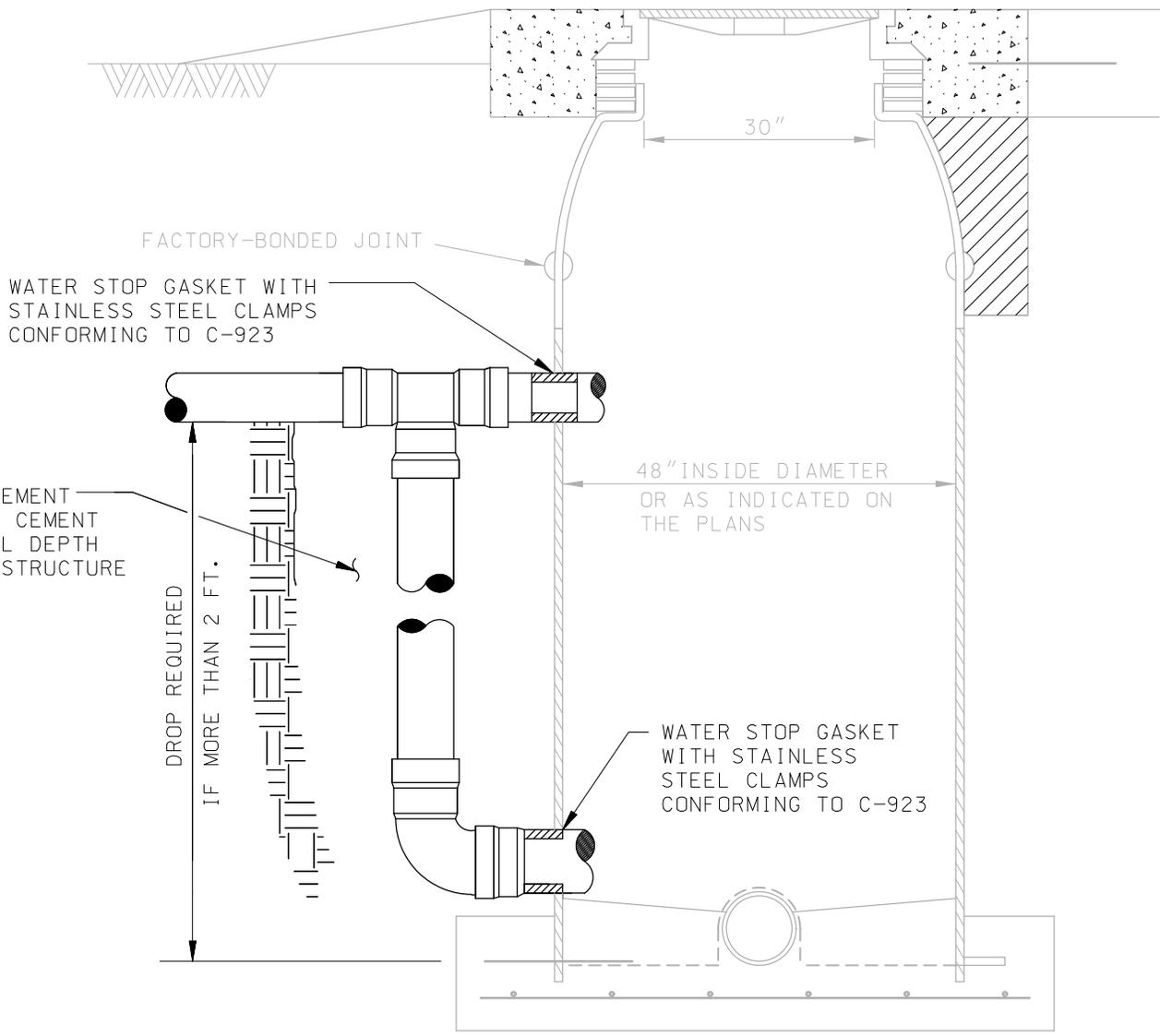
MANHOLE DETAIL

STANDARD CONSTRUCTION DETAILS

DATE: 4/2012

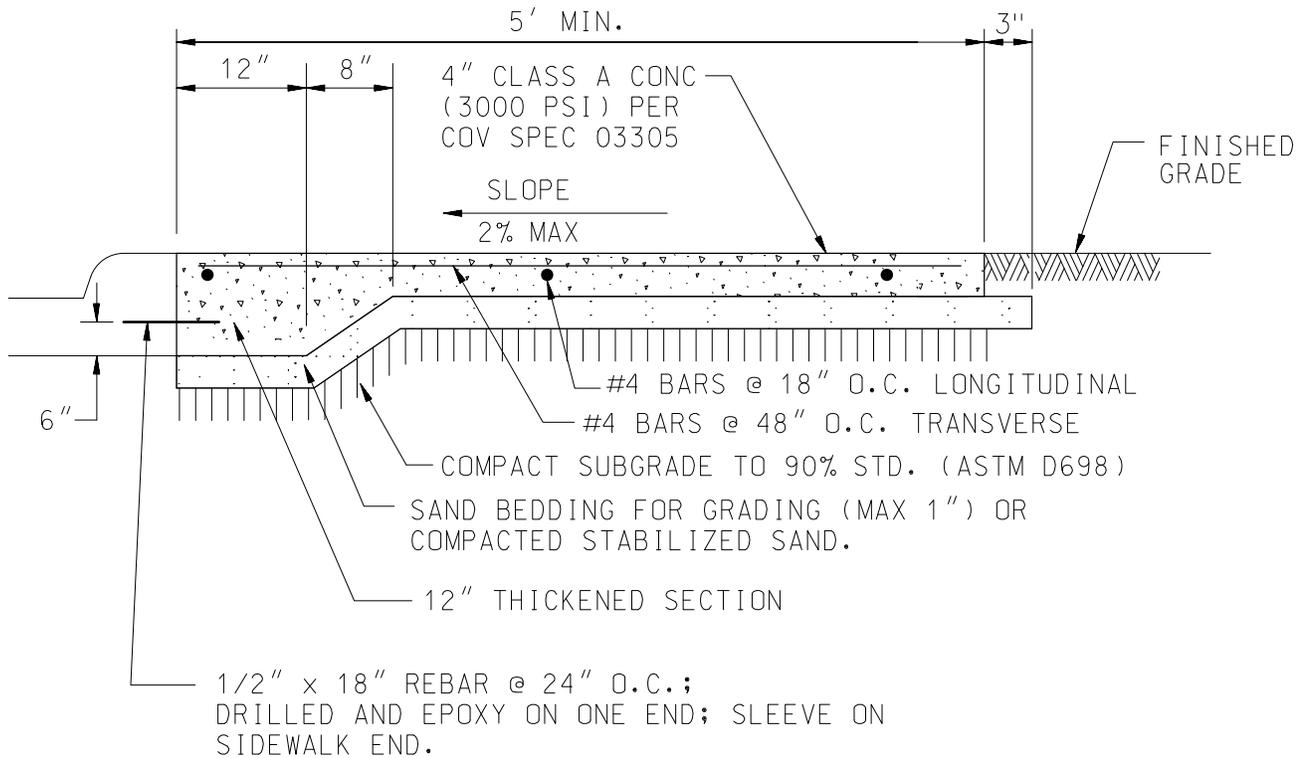
REVISED DATE: 6/12/18

SAN - 4



GENERAL NOTES

1. PROVIDE 1" DEEP OR 1/4" THE THICKNESS OF THE CONCRETE, TOOLED CONTRACTION JOINTS AT SPACING EQUAL TO SIDEWALK WIDTH.
2. PROVIDE EXPANSION JOINTS PER DETAIL AT DRIVEWAY RAMPS, PEDESTRIAN RAMPS AND AT 40' INTERVALS.
3. FINISH EXPOSED EDGES WITH 1/4" RADIUS.
4. ALL REBAR TO BE SET ON BAR CHAIRS. PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE; NO BRICKS, BROKEN CONCRETE, ROCKS, ETC.



CONCRETE SIDEWALK
(ADJACENT TO ST. CURB)

STANDARD CONSTRUCTION DETAILS

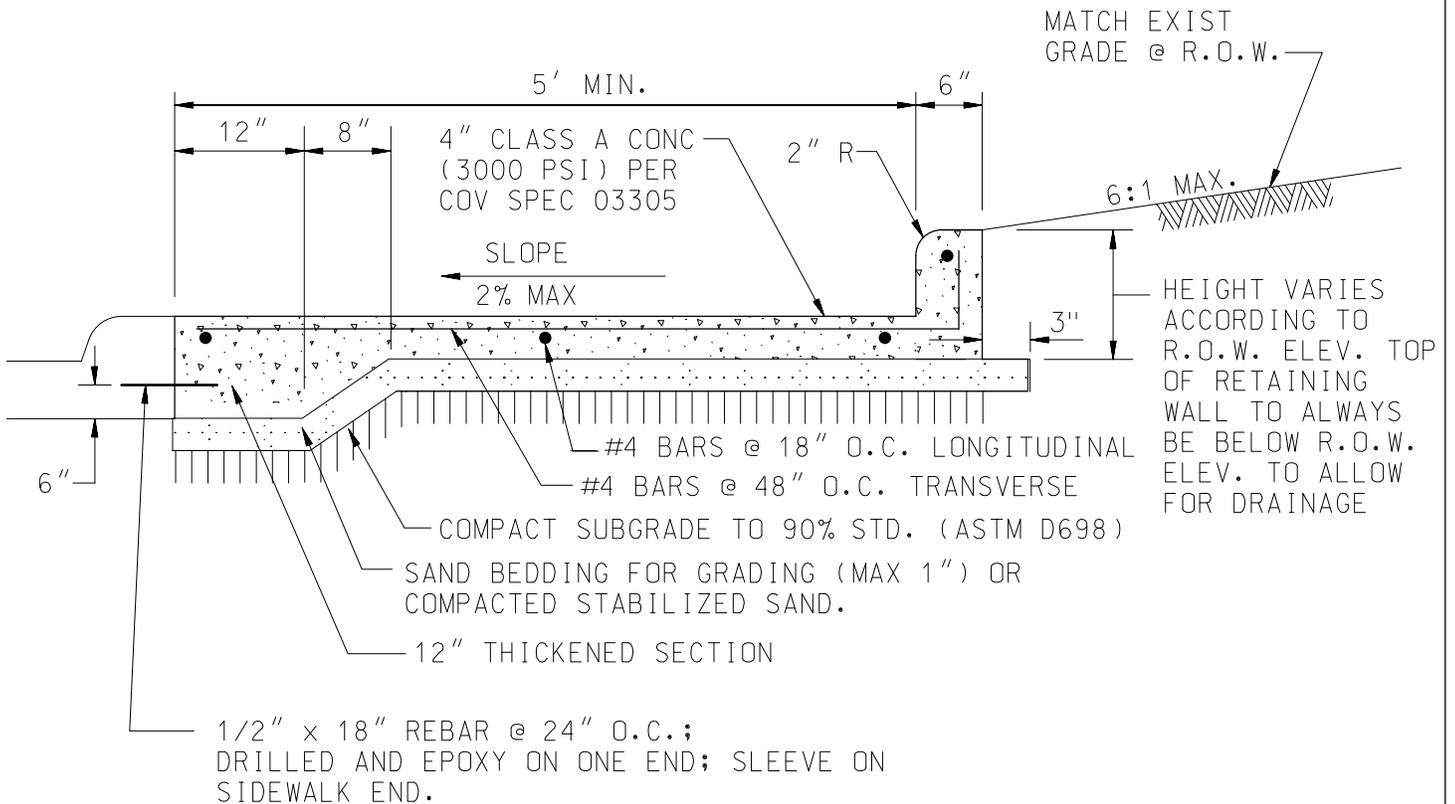
DATE: 4/2012

REVISED
DATE: 9/17/18

PAV - 1

GENERAL NOTES

1. PROVIDE 1" DEEP OR 1/4" THE THICKNESS OF THE CONCRETE, TOOLED CONTRACTION JOINTS AT SPACING EQUAL TO SIDEWALK WIDTH.
2. PROVIDE EXPANSION JOINTS PER DETAIL AT DRIVEWAY RAMPS, PEDESTRIAN RAMPS AND AT 40' INTERVALS.
3. FINISH EXPOSED EDGES WITH 1/4" RADIUS.
4. ALL REBAR TO BE SET ON BAR CHAIRS. PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE; NO BRICKS, BROKEN CONCRETE, ROCKS, ETC.



CONCRETE SIDEWALK
(ADJACENT TO ST. CURB)
(WITH ATTACHED CURB)

STANDARD CONSTRUCTION DETAILS

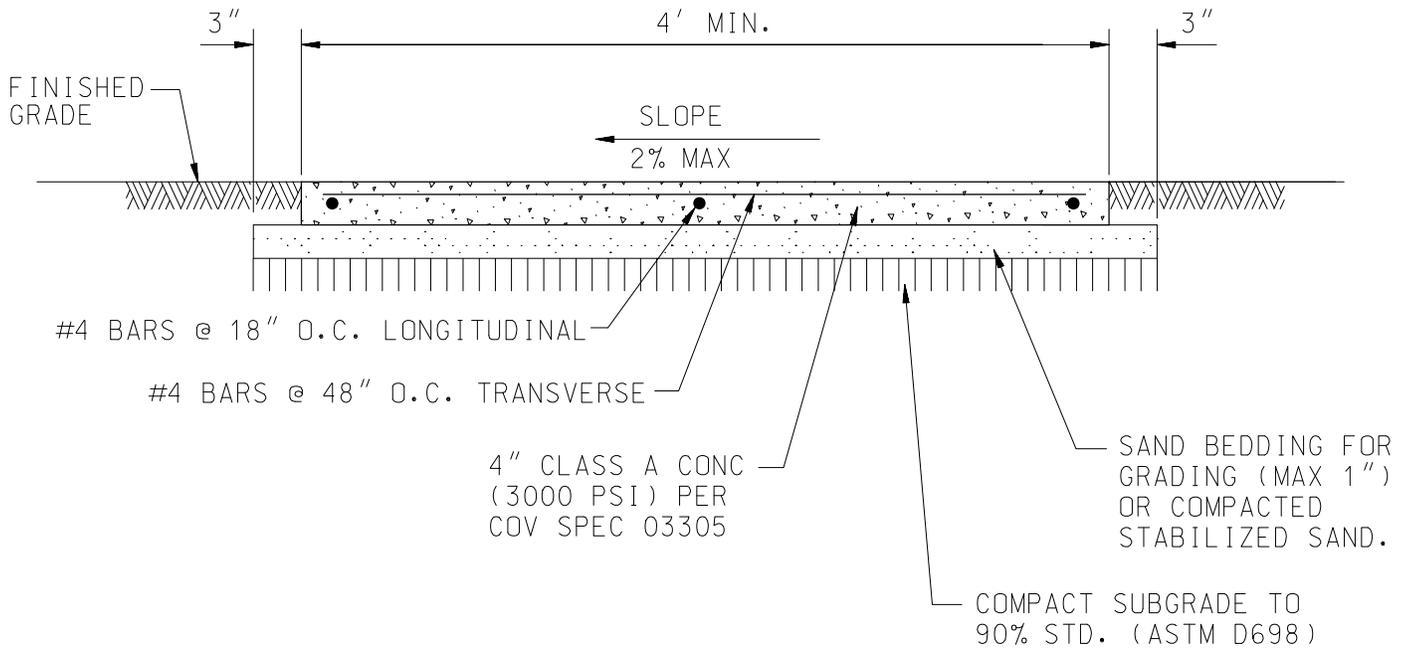
DATE: 4/2012

REVISED
DATE: 9/17/18

PAV - 2

GENERAL NOTES

1. PROVIDE 1" DEEP OR 1/4" THE THICKNESS OF THE CONCRETE, TOOLED CONTRACTION JOINTS AT SPACING EQUAL TO SIDEWALK WIDTH.
2. PROVIDE EXPANSION JOINTS PER DETAIL AT DRIVEWAY RAMPS, PEDESTRIAN RAMPS AND AT 40' INTERVALS.
3. FINISH EXPOSED EDGES WITH 1/4" RADIUS.
4. ALL REBAR TO BE SET ON BAR CHAIRS.
PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE;
NO BRICKS, BROKEN CONCRETE, ROCKS, ETC.



CONCRETE SIDEWALK
(REMOTE FROM ST. CURB)

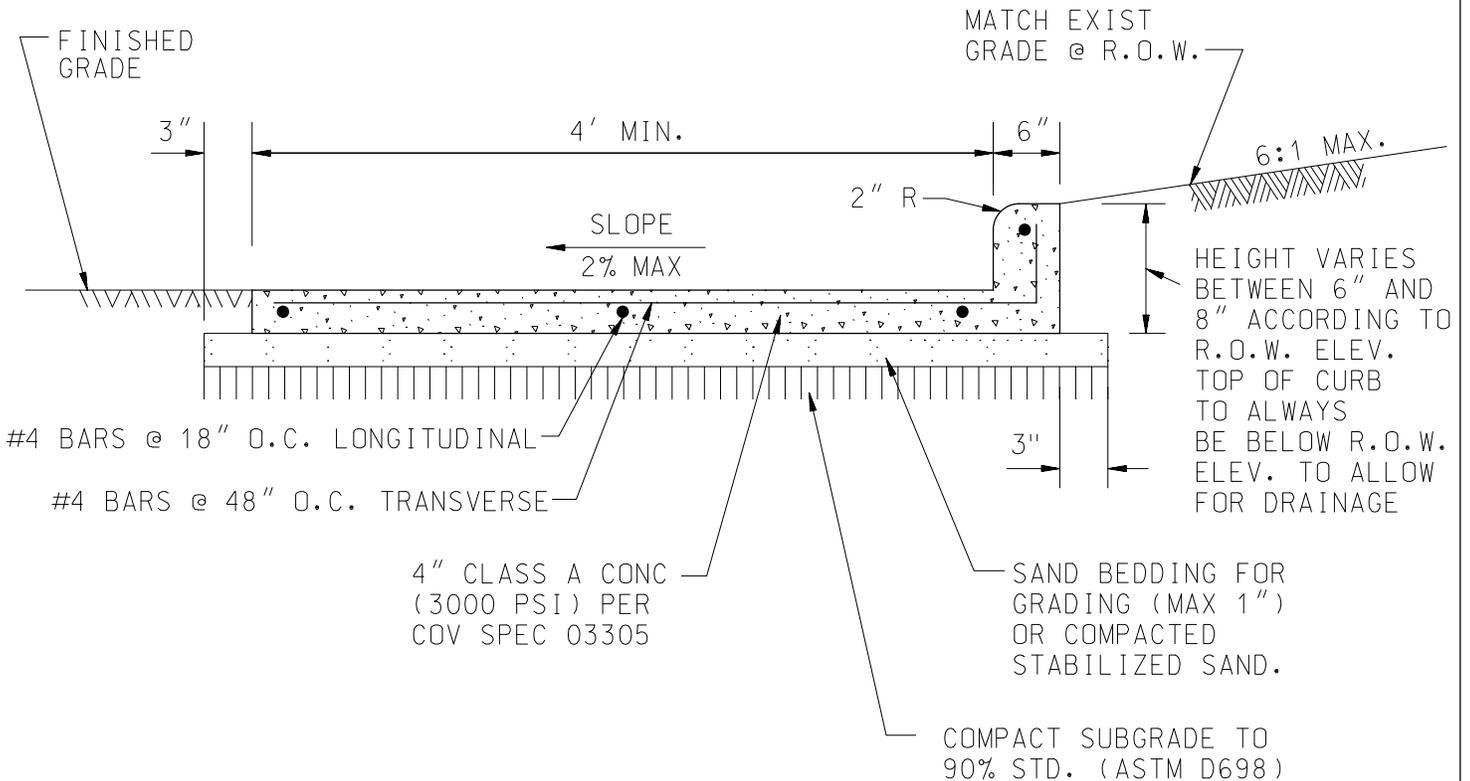
STANDARD CONSTRUCTION DETAILS

DATE: 4/2012
REVISE
DATE: 1/2014

PAV - 3

GENERAL NOTES

1. PROVIDE 1" DEEP OR 1/4" THE THICKNESS OF THE CONCRETE, TOOLED CONTRACTION JOINTS AT SPACING EQUAL TO SIDEWALK WIDTH.
2. PROVIDE EXPANSION JOINTS PER DETAIL AT DRIVEWAY RAMPS, PEDESTRIAN RAMPS AND AT 40' INTERVALS.
3. FINISH EXPOSED EDGES WITH 1/4" RADIUS.
4. ALL REBAR TO BE SET ON BAR CHAIRS. PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE; NO BRICKS, BROKEN CONCRETE, ROCKS, ETC.



CONCRETE SIDEWALK
(REMOTE FROM ST. CURB)
(WITH ATTACHED CURB)

STANDARD CONSTRUCTION DETAILS

DATE: 4/2012

REVISE DATE: 1/2014

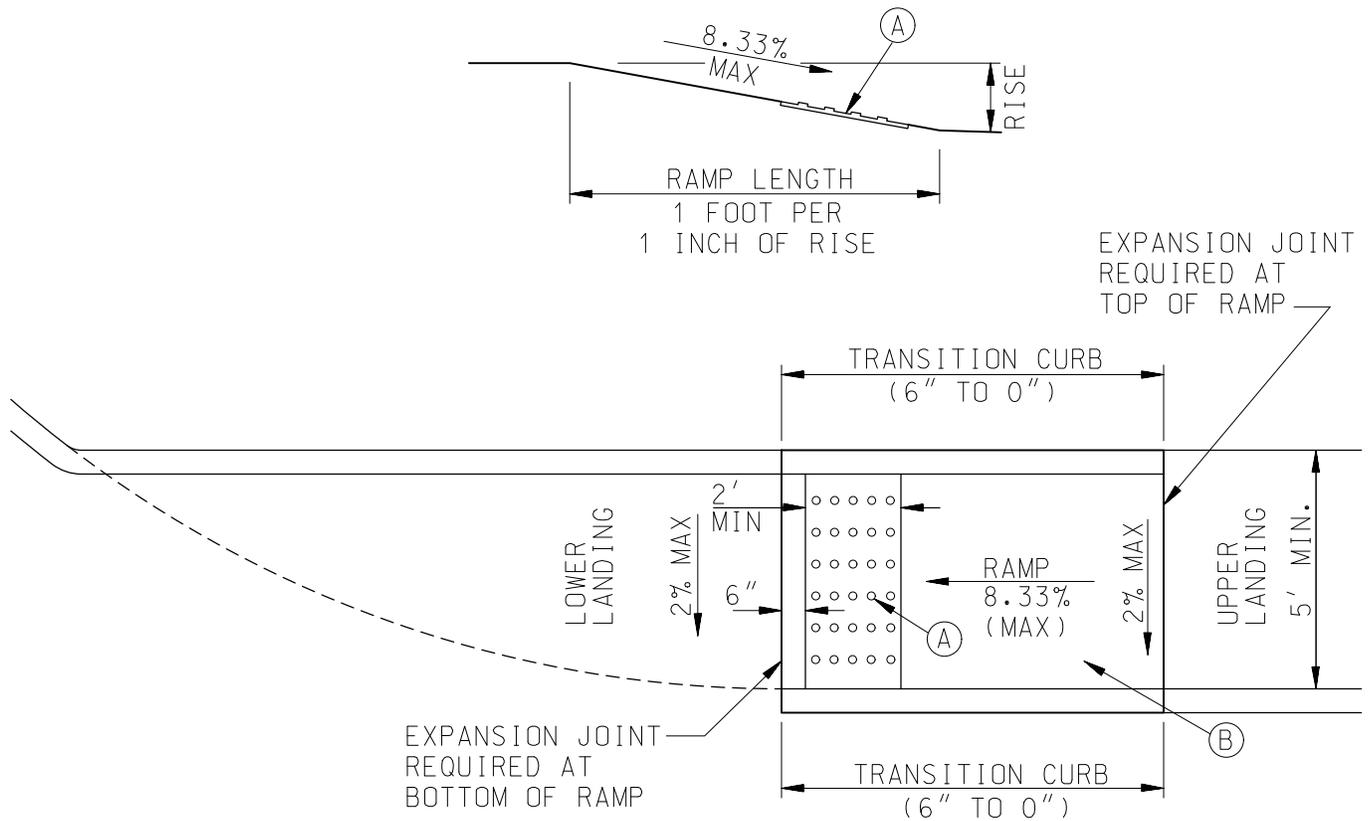
PAV - 4

GENERAL NOTES

1. MAXIMUM LONGITUDINAL SLOPE FOR THE UPPER AND LOWER LANDING SHALL BE 1:20 (5%)
2. MAXIMUM LONGITUDINAL SLOPE FOR THE RAMP SHALL BE 1:12 (8.33%)
3. MAXIMUM LONGITUDINAL SLOPE FOR THE ACCESSIBLE ROUTE SHALL BE 1:20 (5%)
4. MAXIMUM CROSS SLOPE FOR THE LANDINGS, RAMP AND ACCESSIBLE ROUTE SHALL BE 1:50 (2%)
5. NO GROOVING OF RAMPS.

Ⓐ TRUNCATED DOME DETECTABLE WARNINGS SHALL BE CAST IN PLACE PRODUCT BY ADA, INC. OR APPROVED EQUAL. www.adatile.com/castinplace.php.

Ⓑ COLORING & TEXTURING OF THE REMAINING PORTION OF RAMP SURFACE IS NOT REQUIRED.



DIRECTIONAL RAMP
WITHIN RADIUS

STANDARD CONSTRUCTION DETAILS

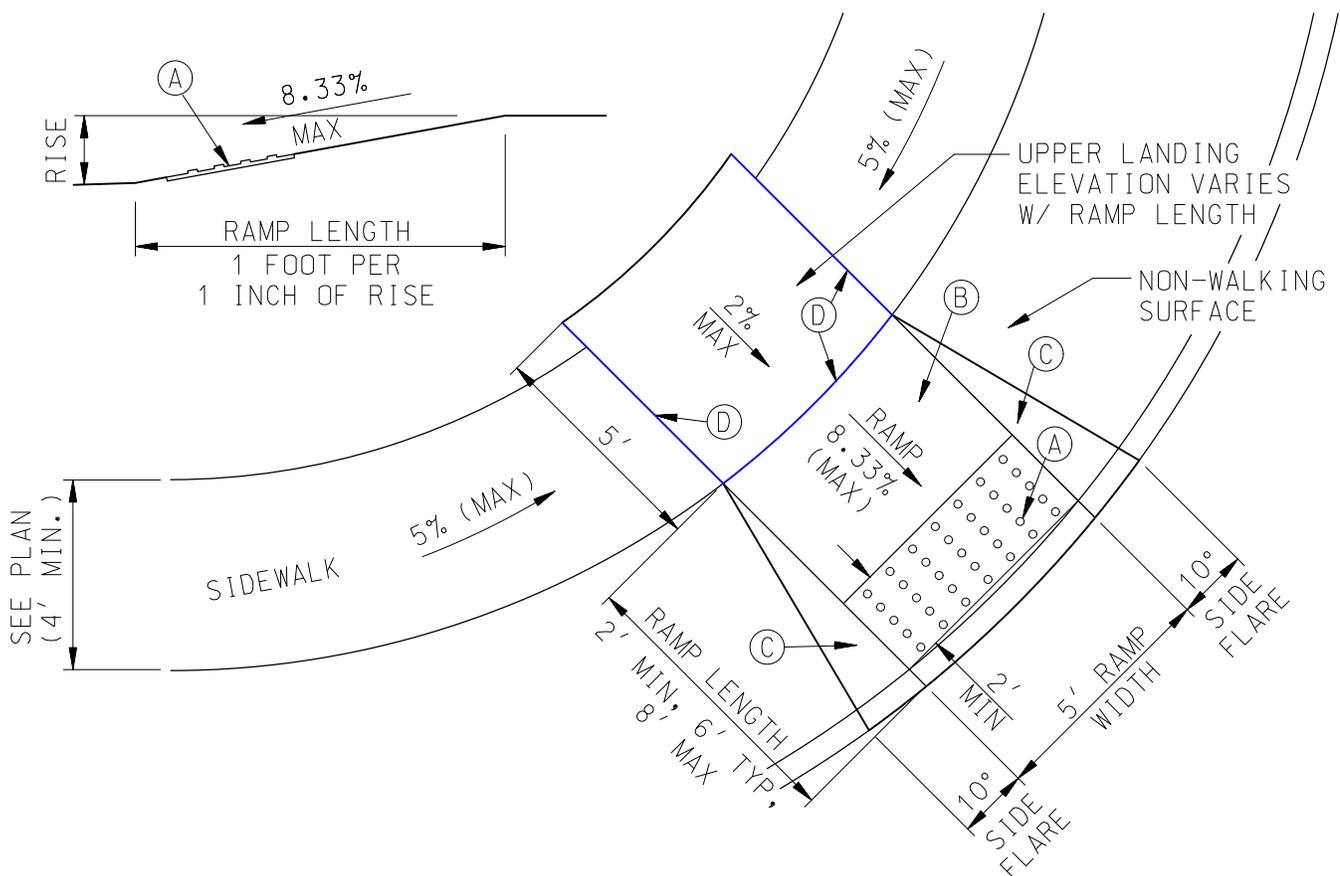
DATE:
4/2012

PAV - 5

GENERAL NOTES

1. MAXIMUM LONGITUDINAL SLOPE FOR THE UPPER AND LOWER LANDING SHALL BE 1:20 (5%)
2. MAXIMUM LONGITUDINAL SLOPE FOR THE RAMP SHALL BE 1:12 (8.33%)
3. MAXIMUM LONGITUDINAL SLOPE FOR THE ACCESSIBLE ROUTE SHALL BE 1:20 (5%)
4. MAXIMUM CROSS SLOPE FOR THE LANDINGS, RAMP AND ACCESSIBLE ROUTE SHALL BE 1:50 (2%)
5. NO GROOVING OF RAMPS.

- (A) TRUNCATED DOME DETECTABLE WARNINGS SHALL BE CAST IN PLACE PRODUCT BY ADA, INC. OR APPROVED EQUAL. www.adatile.com/castinplace.php.
- (B) COLORING & TEXTURING OF THE REMAINING PORTION OF RAMP SURFACE IS NOT REQUIRED.
- (C) IF WING IS ATTACHED TO CONCRETE, SLOPE NOT TO EXCEED 10%.
- (D) EXPANSION JOINT REQUIRED.



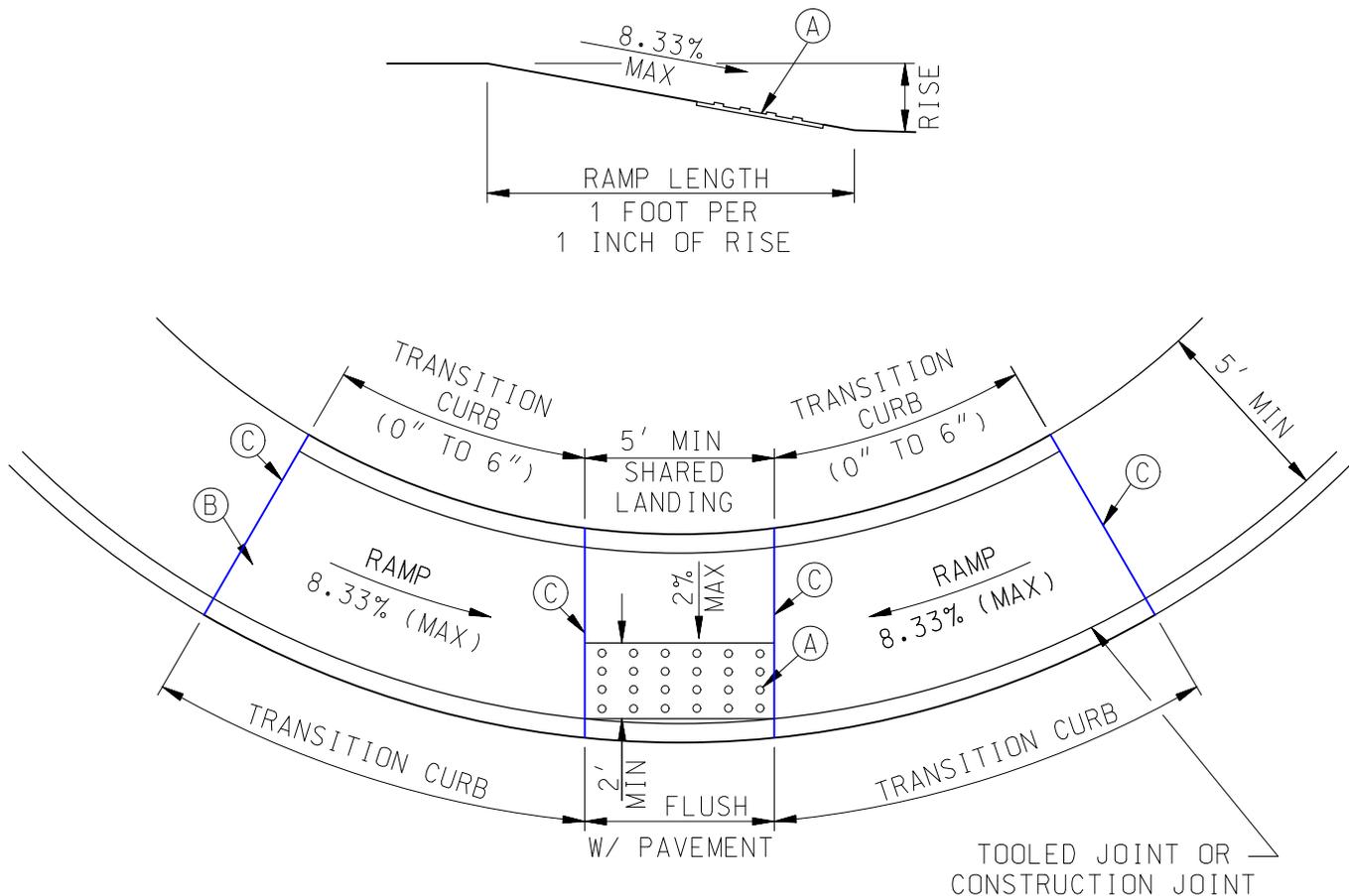
GENERAL NOTES

1. MAXIMUM LONGITUDINAL SLOPE FOR THE UPPER AND LOWER LANDING SHALL BE 1:20 (5%)
2. MAXIMUM LONGITUDINAL SLOPE FOR THE RAMP SHALL BE 1:12 (8.33%)
3. MAXIMUM LONGITUDINAL SLOPE FOR THE ACCESSIBLE ROUTE SHALL BE 1:20 (5%)
4. MAXIMUM CROSS SLOPE FOR THE LANDINGS, RAMP AND ACCESSIBLE ROUTE SHALL BE 1:50 (2%)
5. NO GROOVING OF RAMPS.

(A) TRUNCATED DOME DETECTABLE WARNINGS SHALL BE CAST IN PLACE PRODUCT BY ADA, INC. OR APPROVED EQUAL. www.adatile.com/castinplace.php.

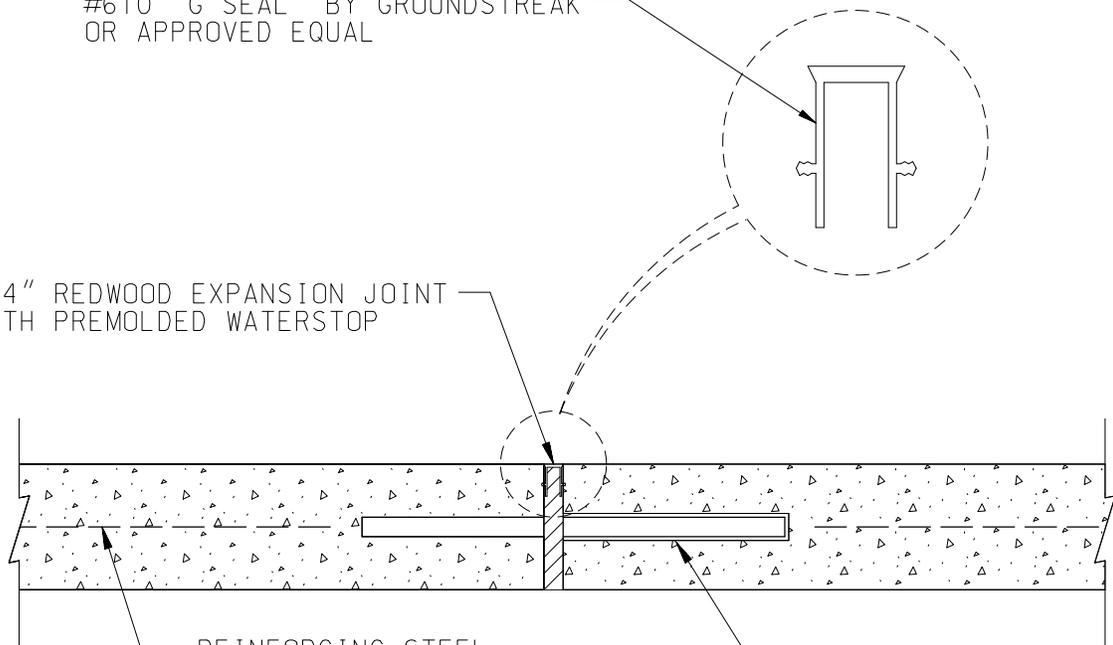
(B) COLORING & TEXTURING OF THE REMAINING PORTION OF RAMP SURFACE IS NOT REQUIRED.

(C) EXPANSION JOINT REQUIRED



PREMOLDED WATERSTOP
 VINYLEX VX-SEAL MODEL VX-750,
 #610 "G SEAL" BY GROUNDSTREAK
 OR APPROVED EQUAL

3/4" REDWOOD EXPANSION JOINT
 WITH PREMOLDED WATERSTOP



REINFORCING STEEL

1/2" X 24" LONG, SMOOTH
 DOWELS AT 18" O.C.
 SLEEVE ON ONE END.



EXPANSION JOINT DETAIL

STANDARD CONSTRUCTION DETAILS

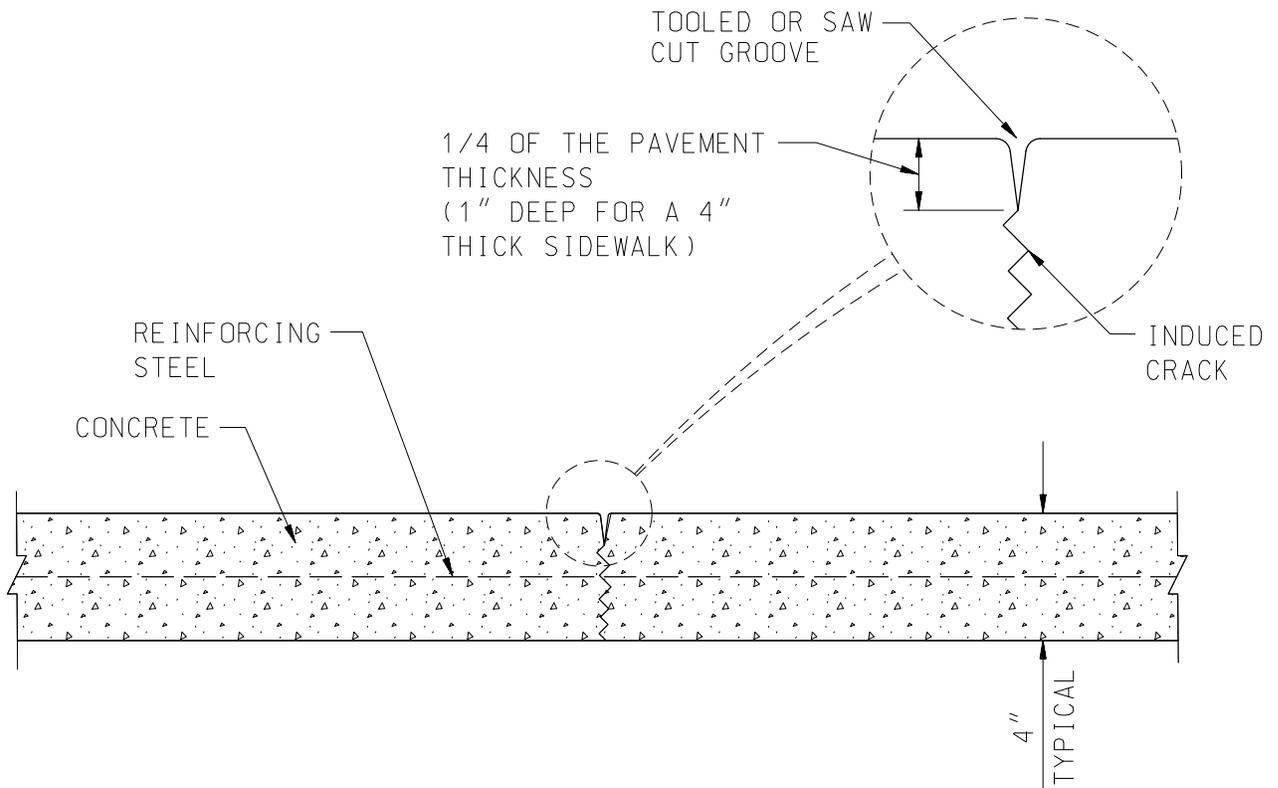
DATE: 4/2012

REVISE DATE: 1/2014

PAV - 8

GENERAL NOTES

1. TOOLED OR SAW CUT CONTRACTION JOINTS SHALL BE AT REGULAR INTERVALS THROUGHOUT THE PAVEMENT AT EVEN INTERVALS BETWEEN EXPANSION JOINTS AS INDICATED ON THE PLAN. FOR SIDEWALKS LESS THEN 6 FEET WIDE, THE JOINT SPACING SHALL EQUAL THE SIDEWALK WIDTH.
2. JOINTS SHALL BE SPACED SO THAT THE RESULTING PANELS ARE SQUARE. IN NO CASE SHOULD THE LENGHT OF A PANEL EXCEED 1.5 TIMES THE WIDTH.



TOOLED CONTRACTION
JOINT DETAIL

STANDARD CONSTRUCTION DETAILS

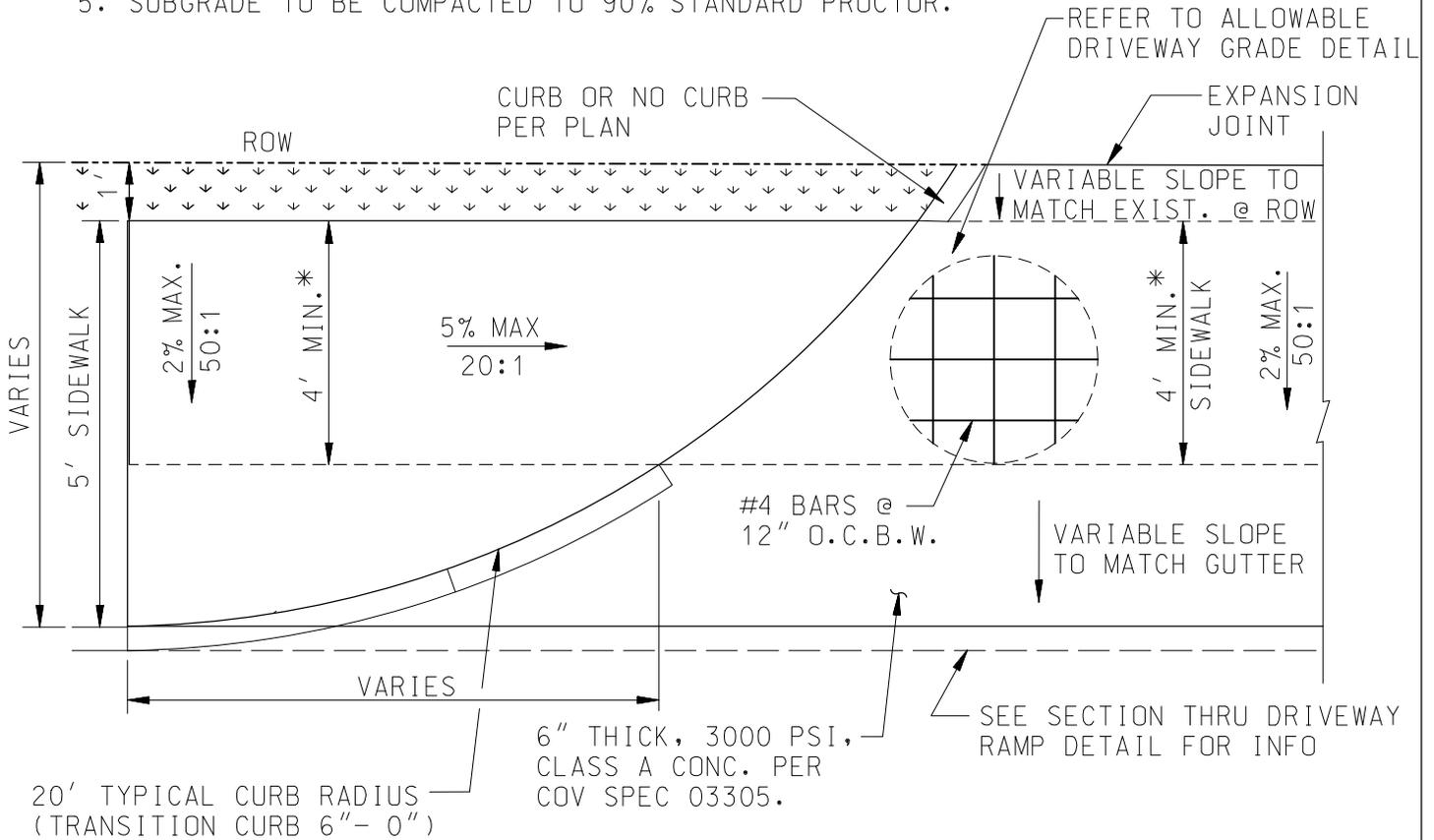
DATE: 4/2012
REVISED
DATE: 9/17/18

PAV - 9

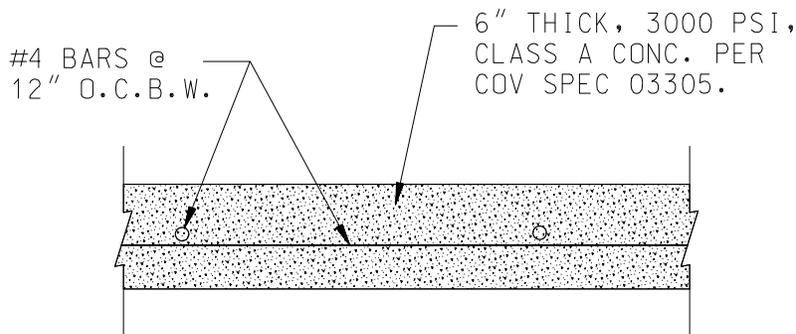
GENERAL NOTES

1. USE CONSTRUCTION JOINT DETAIL IF JOINING TO EXISTING CONCRETE DRIVEWAY. USE EXPANSION JOINT DETAIL AT RIGHT OF WAY LINE.
2. ALL REBAR TO BE SET ON BAR CHAIRS. PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE; NO BRICKS, BROKEN CONCRETE, ROCKS, ETC.
3. SAND BEDDING FOR GRADING (MAX 1") OR COMPACTED STABILIZED SAND.
4. CHAIRS MUST SUPPORT REBAR DURING CONSTRUCTION PROCESS.
5. SUBGRADE TO BE COMPACTED TO 90% STANDARD PROCTOR.

* IF LOCATED IN TXDOT R.O.W.
 SIDEWALK WIDTH DETACHED - 5'
 SIDEWALK WIDTH ATTACHED - 6'



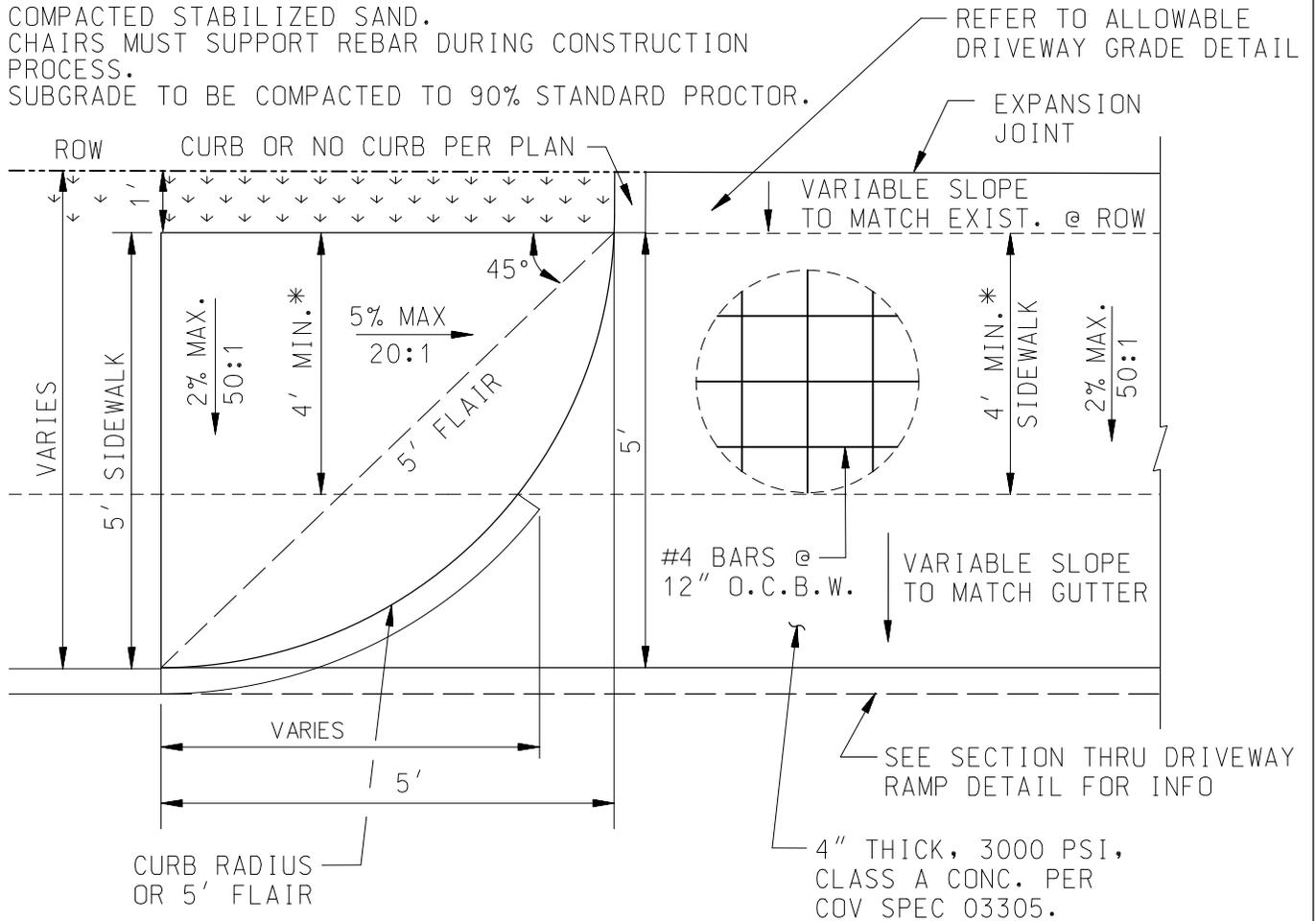
COMMERCIAL DRIVEWAY GRADING (WITH SIDEWALK/RAMP AT APPROACH)



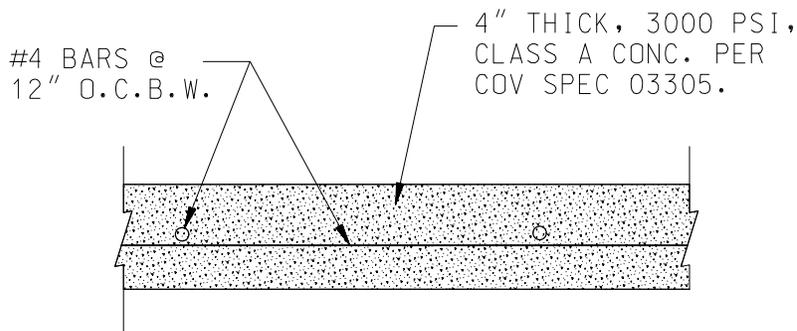
GENERAL NOTES

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3. SAND BEDDING FOR GRADING (MAX 1") OR COMPACTED STABILIZED SAND.
4. CHAIRS MUST SUPPORT REBAR DURING CONSTRUCTION PROCESS.
5. SUBGRADE TO BE COMPACTED TO 90% STANDARD PROCTOR.

* IF LOCATED IN TXDOT R.O.W.
 SIDEWALK WIDTH DETACHED - 5'
 SIDEWALK WIDTH ATTACHED - 6'



**RESIDENTIAL DRIVEWAY GRADING
 (WITH SIDEWALK AT APPROACH)**



RESIDENTIAL DRIVEWAY

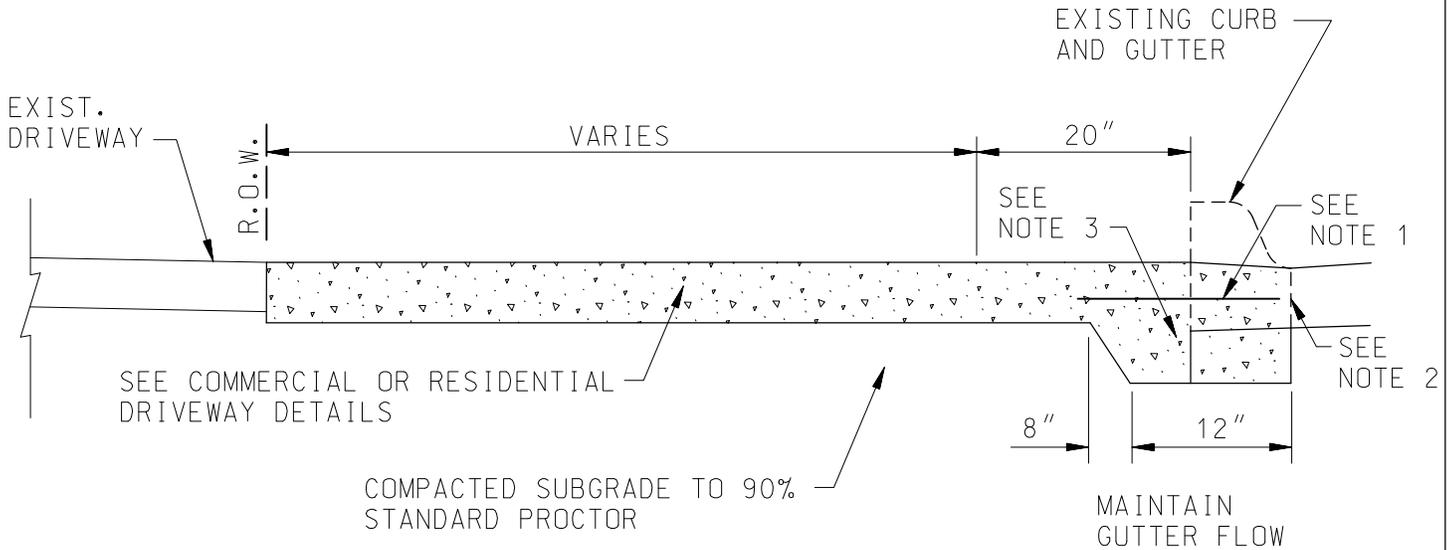
STANDARD CONSTRUCTION DETAILS

DATE: 4/2012
 REVISED
 DATE: 9/17/18

PAV - 11

GENERAL NOTES

1. 1/2" x 18" #4 REBAR @ 24" O.C.;
DRILLED AND EPOXY ON ONE END; SLEEVE ON DRIVEWAY END.
2. REMOVE CURB BY SAW CUT, FULL DEPTH OR REMOVE CURB AND GUTTER SECTION, POUR DRIVEWAY MONOLITHIC TO NEW CURB AND GUTTER.
3. THICKENED SECTION OF 12" @ EDGE OF CURB/STREET; TO EXTEND TO SAW CUT LINE.
4. ALL REBAR TO BE SET ON BAR CHAIRS.
PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE;
NO BRICKS, BROKEN CONCRETE, ROCKS, ETC.
CHAIRS MUST SUPPORT REBAR DURING CONSTRUCTION PROCESS.
5. FULL DEPT SAW CUT.



WHEN TYING TO HOT-MIX; SAW CUT ALONG EDGE OF STREET AND APON COMPLETION OF DRIVEWAY INSTALL HOT-MIX COLD LAY (1" DEEP MINIMUM) FROM CONCRETE TO EDGE OF PAVEMENT.



SECTION THRU
DRIVEWAY RAMP
(COMMERCIAL/RESIDENTIAL)

STANDARD CONSTRUCTION DETAILS

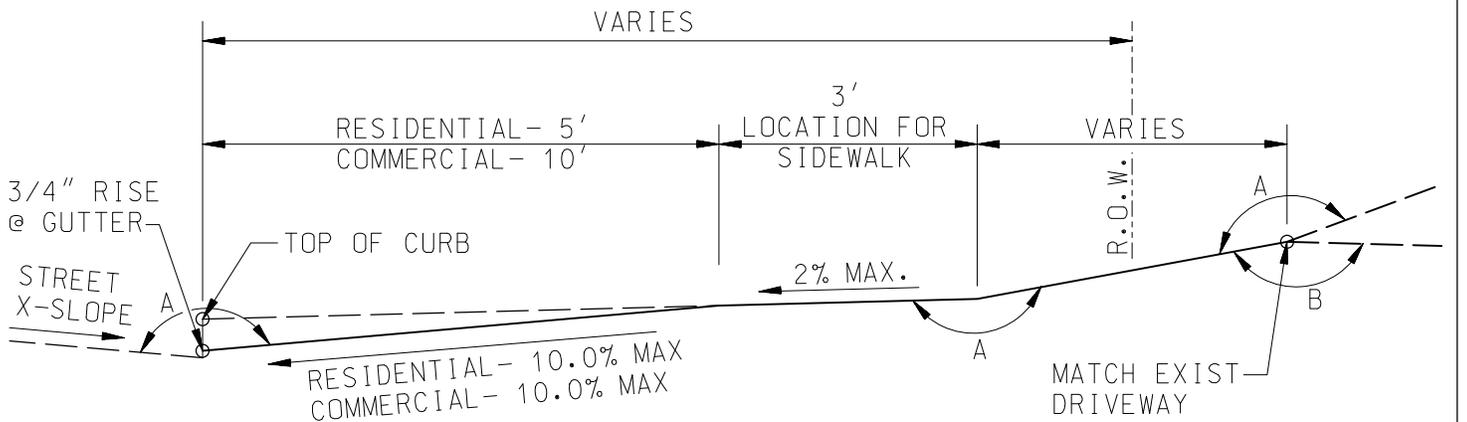
DATE: 4/2012

REVISED
DATE: 9/17/18

PAV - 12

GENERAL NOTES

1. DRIVEWAY GRADE MUST RISE TO TOP OF CURB ELEVATION WITHIN RIGHT OF WAY TO CONTROL DRAINAGE IN STREET GUTTER.



- (A) 8% MAX CHANGE IN GRADE (SAG PI)
 (B) 12% MAX CHANGE IN GRADE (CREST PI)



ALLOWABLE DRIVEWAY
 GRADE (SAG CONDITION)

STANDARD CONSTRUCTION DETAILS

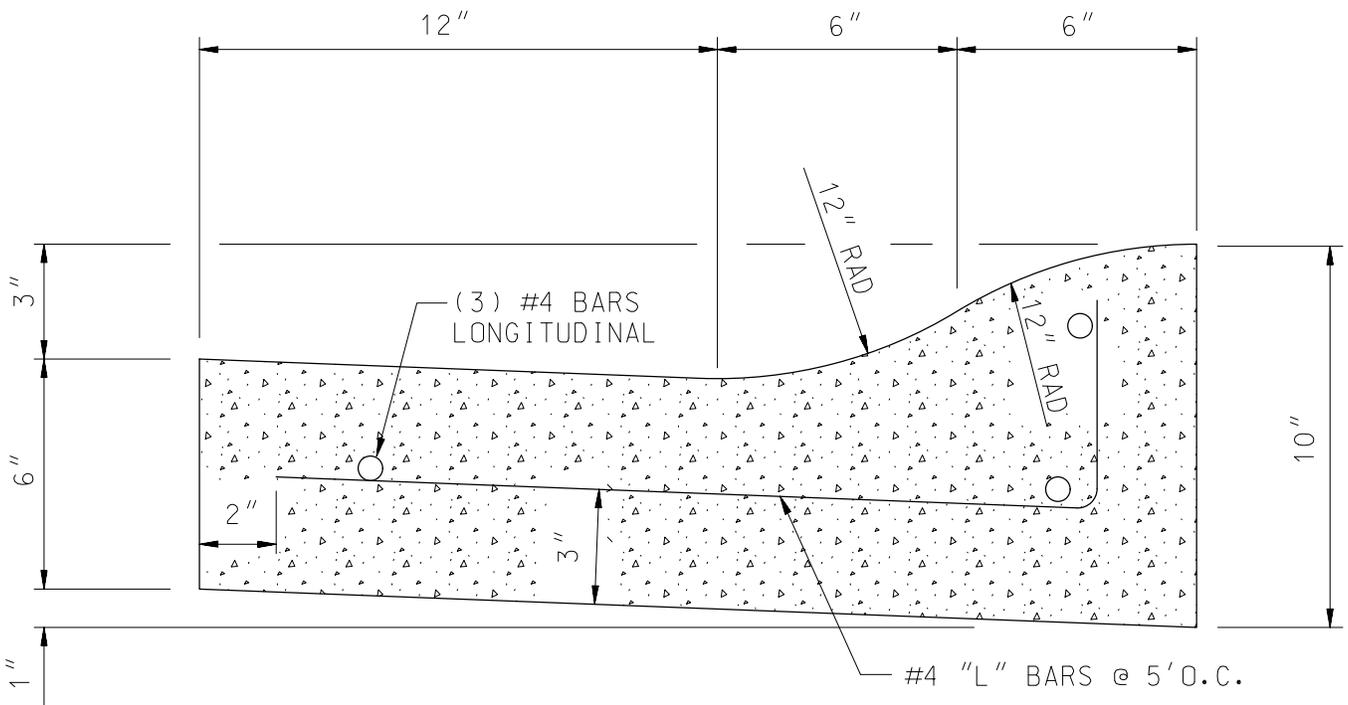
DATE: 4/2012

REVISED
 DATE: 3/05/18

PAV - 13

GENERAL NOTES

1. EXPANSION JOINT MATERIAL TO BE 3/4" PREMOLDED BITUMINOUS FELT, OR MATERIAL MEETING ASTM SPEC. D175-60T PROVIDED AT 40' INTERVALS. USE (3) 1/2" DOWELS WITH SLEEVES.
2. CONTRACTION JOINTS SHALL BE SCORED AT 10' INTERVALS; 1.5" THICK OR 1/4" THICKNESS OF GUTTER.
3. TRANSVERSE BARS MAY BE OMITTED IF CURB AND GUTTER IS MACHINE LAID.
4. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE TO BE 3,000 PSI AT 28 DAYS.
5. CONTRACTOR TO MARK THE CURB AT THE LOCATION OF ALL SEWER SERVICES, WATER SERVICES AND WATER VALVES USING A BRASS INSERT WATER-GBRSWTRMRKR SEWER-GBRSSWRMRKR.
6. ALL REBAR TO BE SET ON BAR CHAIRS. PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE; NO BRICKS, BROKEN CONCRETE, ROCKS, ETC.
7. WHEN REPLACING CURB AND GUTTER; PLACE 1-1/2 SACK CEMENT SAND; 6" DEEP, 1' BEHIND CURB, 95% STANDARD DENSITY, UNDER CURB.
8. BACKFILL CURB AND GUTTER WITH SELECT FILL; VOID OF ROCK, CONCRETE, ECT.
9. COMPACTED HMAC TO BE 1/8" ABOVE LIP OF GUTTER.



ROLL CURB DETAIL

STANDARD CONSTRUCTION DETAILS

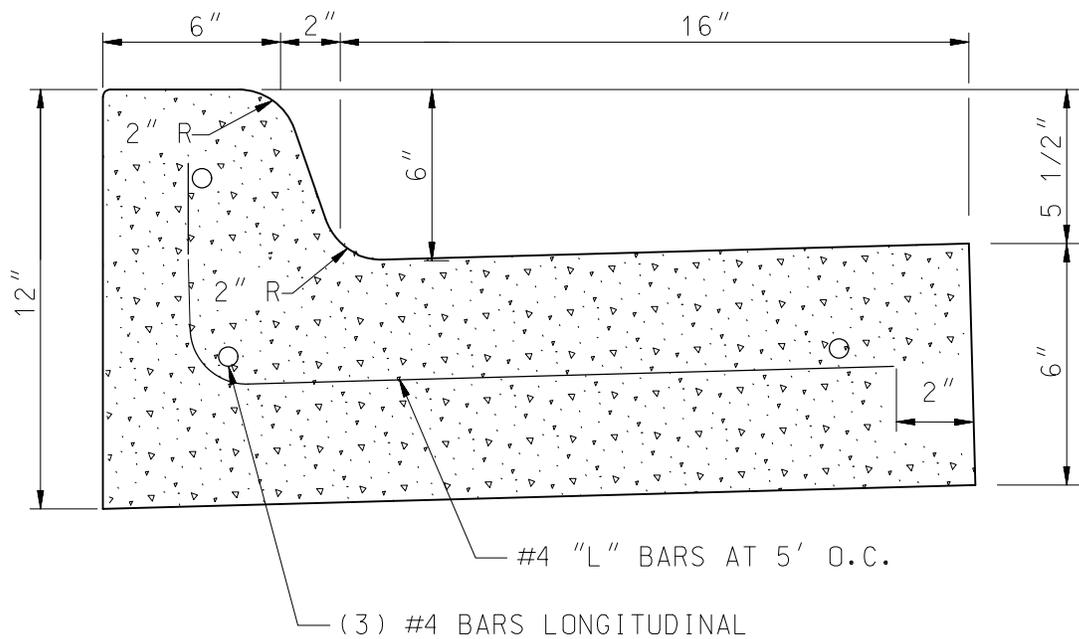
DATE: 4/2012

REVISED
DATE: 6/12/18

PAV - 14

GENERAL NOTES

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8. BACKFILL CURB AND GUTTER WITH SELECT FILL; VOID OF ROCK, CONCRETE, ECT.
9. COMPACTED HMAC TO BE 1/8" ABOVE LIP OF GUTTER.



CONCRETE CURB &
GUTTER DETAIL

STANDARD CONSTRUCTION DETAILS

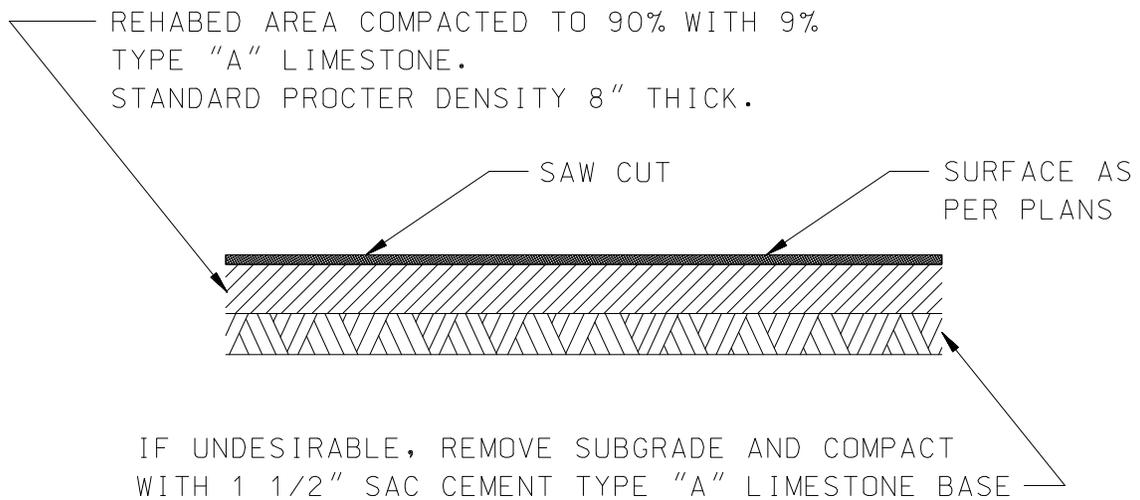
DATE: 4/2012

REVISED
DATE: 6/12/18

PAV - 15

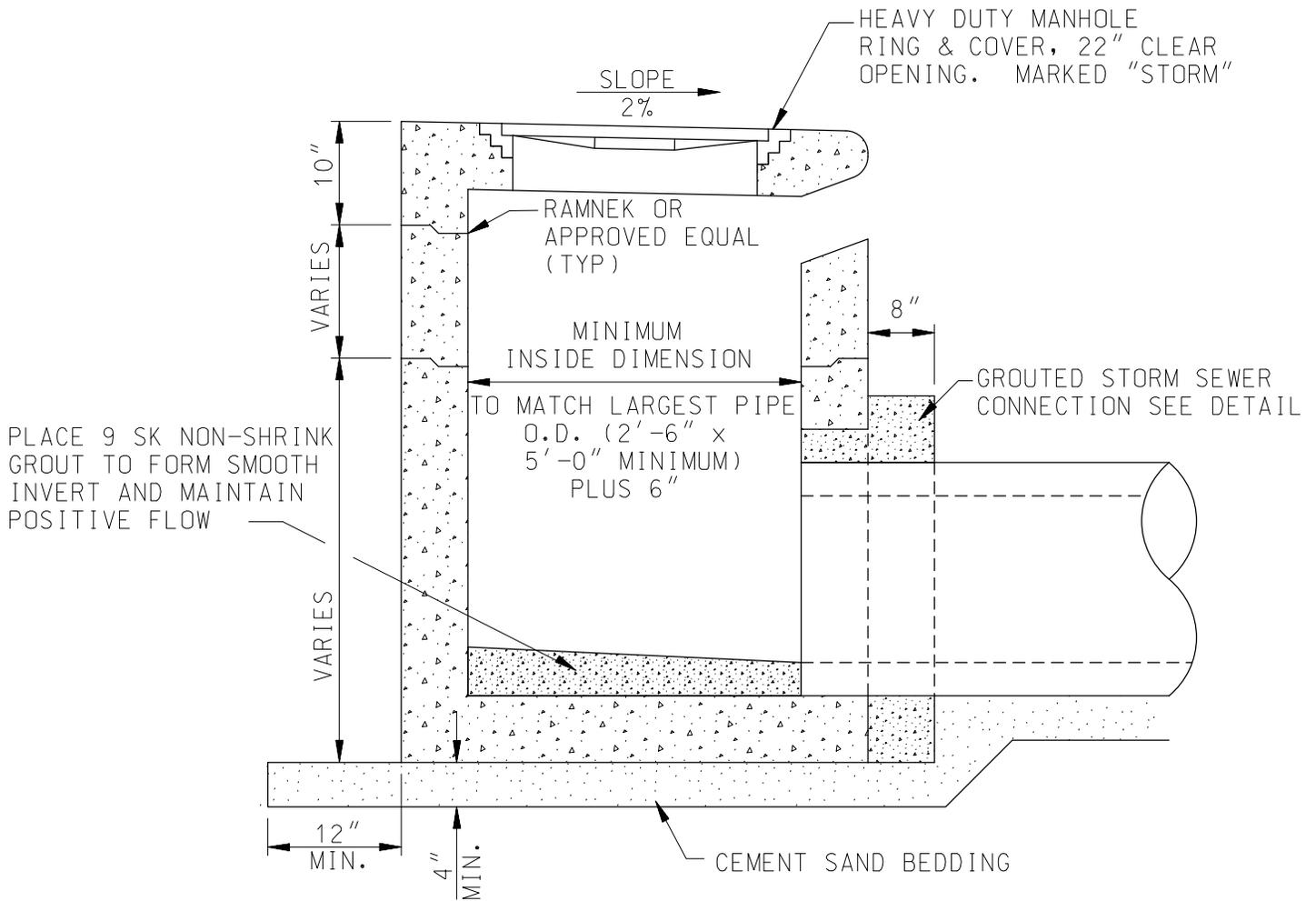
NOTE:

1. POINT REPAIRS TO BE PAID BY SQUARE YARD.
2. POINT REPAIR AREAS TO BE IDENTIFIED BY CITY.
3. AREAS NO SMALLER THAN 10' IN WIDTH AND 20' IN LENGTH.
4. USE OF RECLAIMER IS ACCEPTABLE.



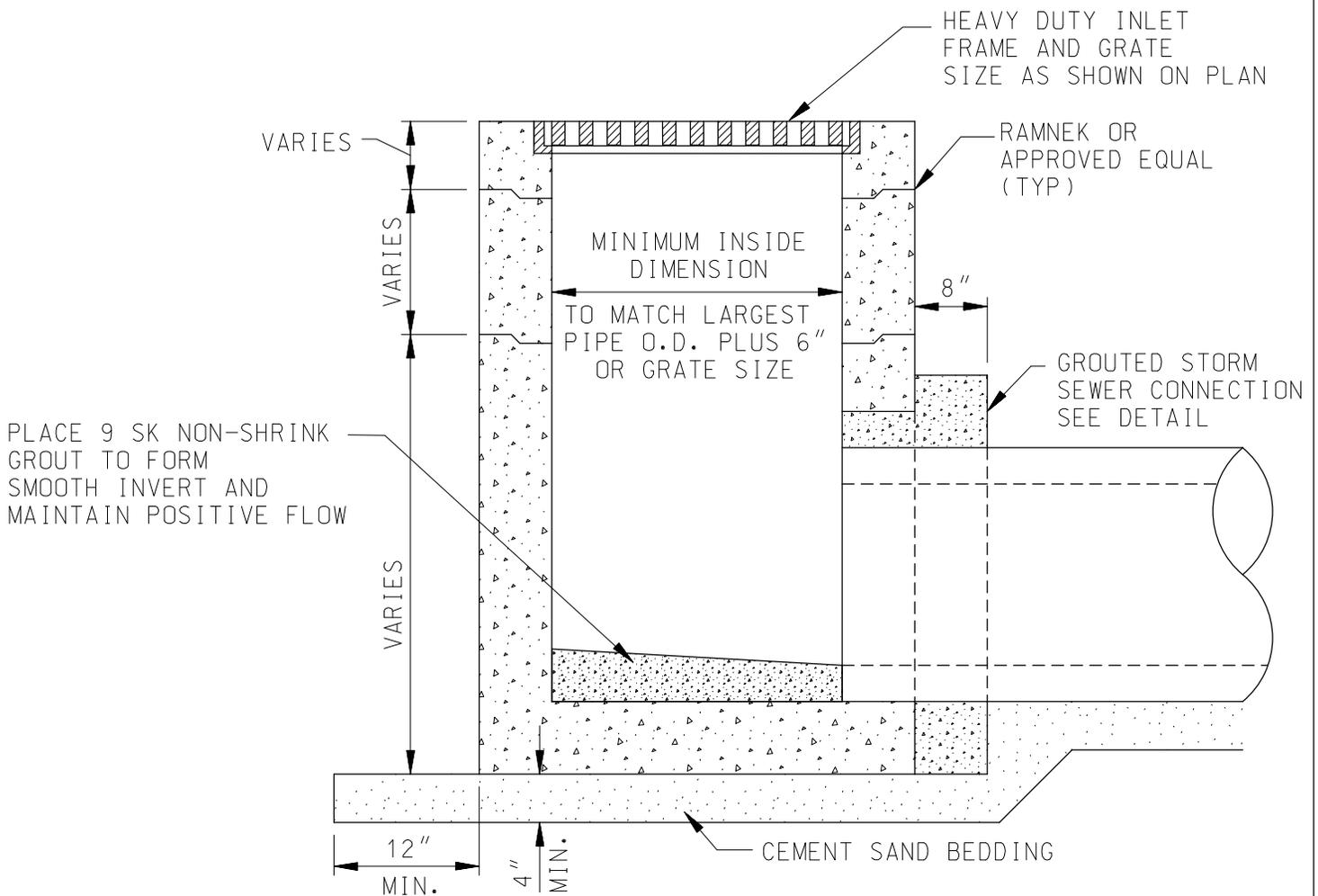
GENERAL NOTES

1. INSTALLATION OF PRECAST STRUCTURES SHALL BE PER MANUFACTURERS INSTRUCTIONS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF PRE-CAST STRUCTURES TO ENGINEER PRIOR TO ORDERING MATERIALS.
2. PRECAST STRUCTURE, RING, AND COVER SHALL BE DESIGNED FOR AASHTO HS-20 LOAD RATED.
3. PLACE RAMNEK OR EQUAL GASKET MATERIAL BETWEEN PRECAST STRUCTURES SECTIONS IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
4. BACKFILL AROUND BOX W/CEMENT STABILIZED SAND; 12" MINIMUM; TO WITHIN 6" TO FINISH GRADE.
5. BLOCK OUT AT THE STORM SEWER TIE-IN(S) SHALL BE FILLED W/3000 PSI, CLASS "A" CONCRETE, FLUSH WITH THE OUTSIDE WALL OF THE INLET.



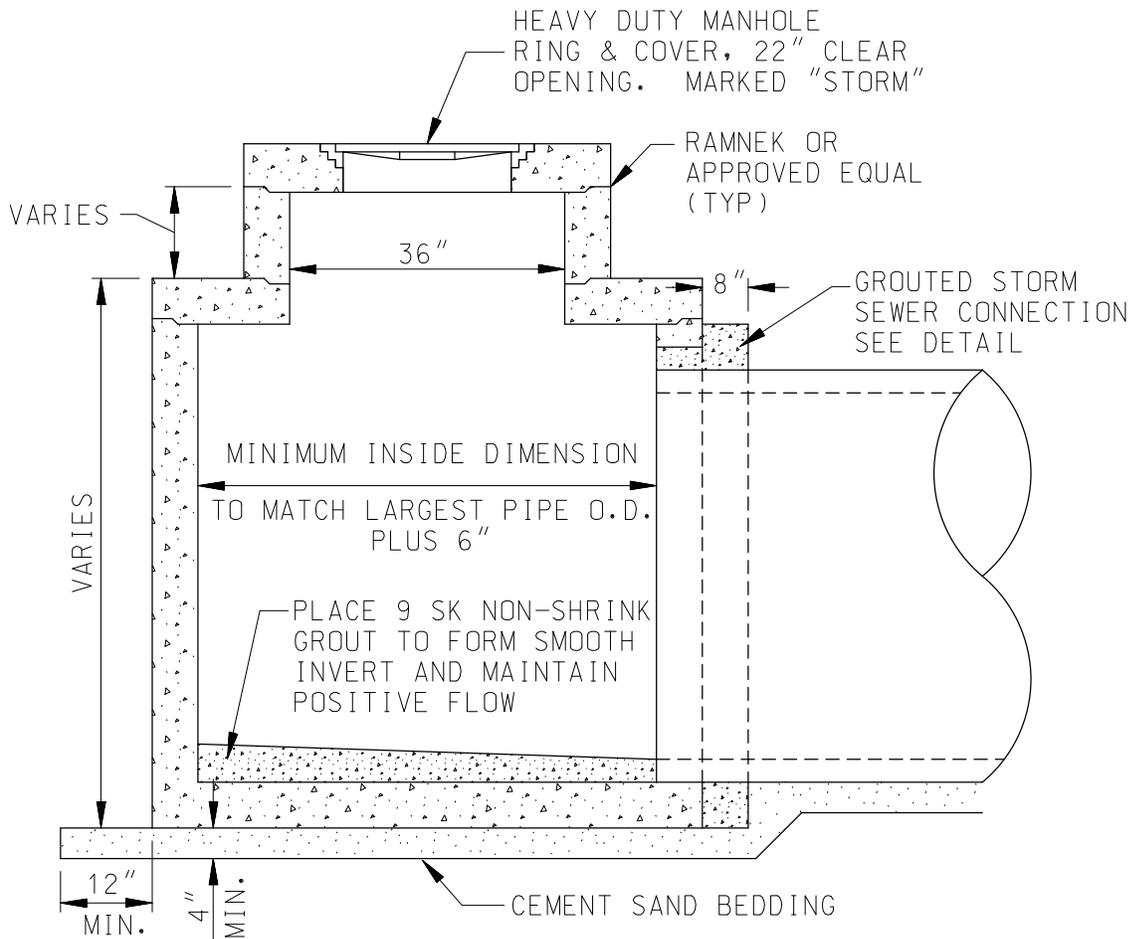
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5. BLOCK OUT AT THE STORM SEWER TIE-IN(S) SHALL BE FILLED w/3000 PSI, CLASS "A" CONCRETE, FLUSH WITH THE OUTSIDE WALL OF THE INLET.
6. IF THROAT RINGS ARE USED, SEE DETAIL (SAN-4) FOR CONCRETE AROUND MANHOLE RING AND LID.



STORM SEWER JUNCTION
BOX DETAIL
(PRECAST CONCRETE)

STANDARD CONSTRUCTION DETAILS

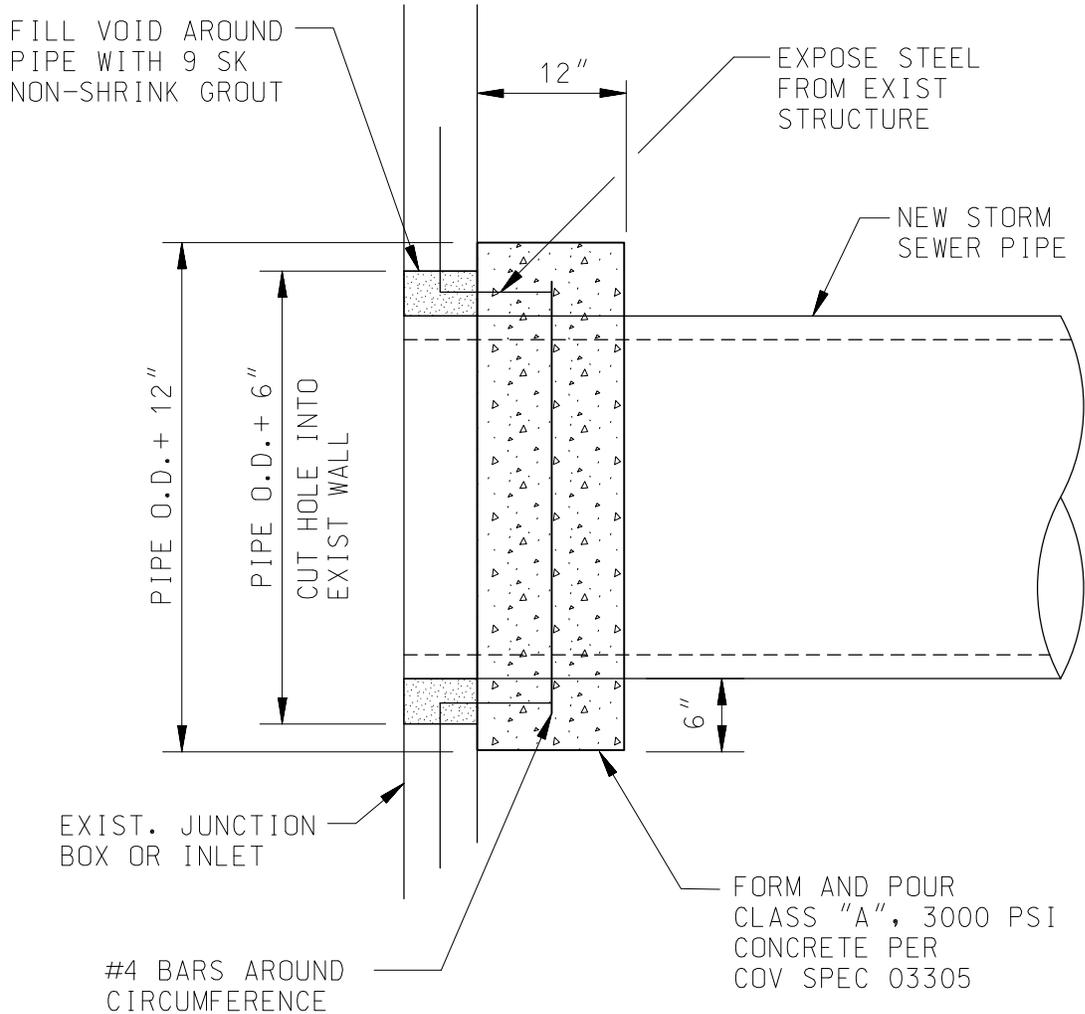
DATE: 4/2012

REVISE DATE: 1/2014

STM - 3

GENERAL NOTES

1. NEW PIPE TO BE SET FLUSH WITH INSIDE WALL OF EXIST STRUCTURE.
2. UTILIZE MASONRY MESH AROUND PIPE AND OPENING TO PREVENT CONCRETE SPILLAGE INTO STORM SEWER.



GRouted STORM SEWER
CONNECTION DETAIL
(NEW PIPE TO NEW/EXIST.
INLET OR JUNCTION BOX)

STANDARD CONSTRUCTION DETAILS

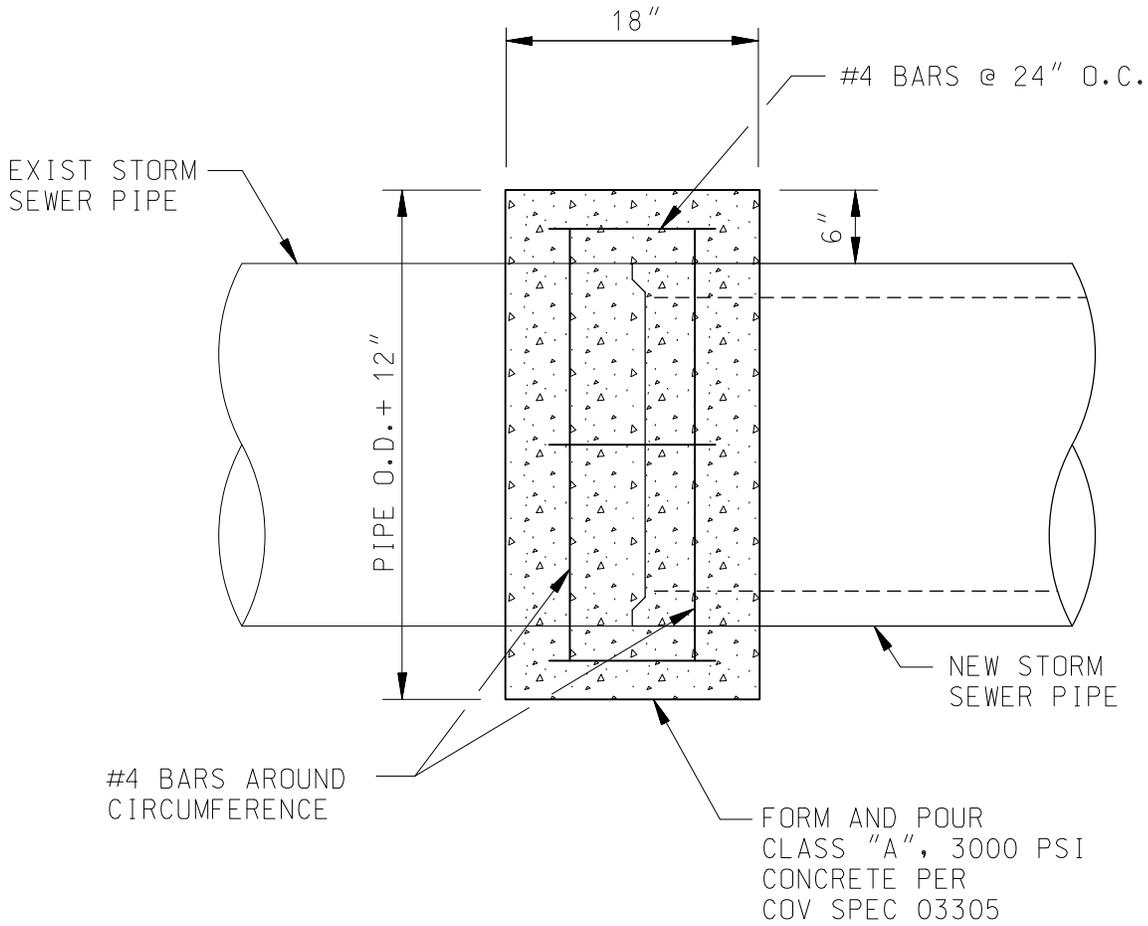
DATE: 4/2012

REVISE DATE: 3/2014

STM - 4

GENERAL NOTES

1. ANGLE OF PIPE NOT TO EXCEED 22-1/2°. IF GREATER, INSTALL JUNCTION BOX.
2. UTILIZE MASONRY MESH AROUND PIPE AND OPENING TO PREVENT CONCRETE SPILLAGE INTO STORM SEWER.



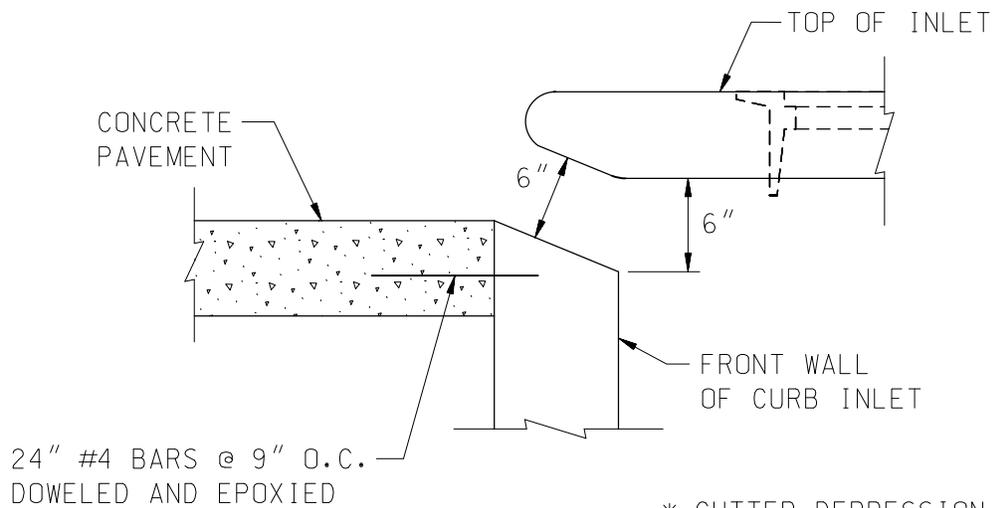
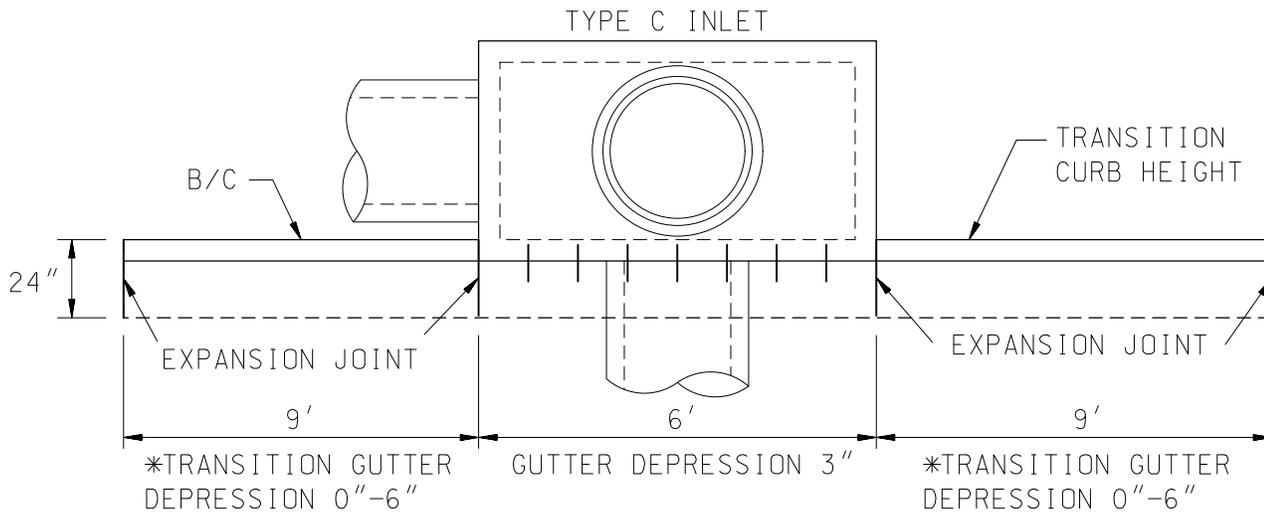
GRouted STORM SEWER
CONNECTION DETAIL
(CONCRETE COLLAR)

STANDARD CONSTRUCTION DETAILS

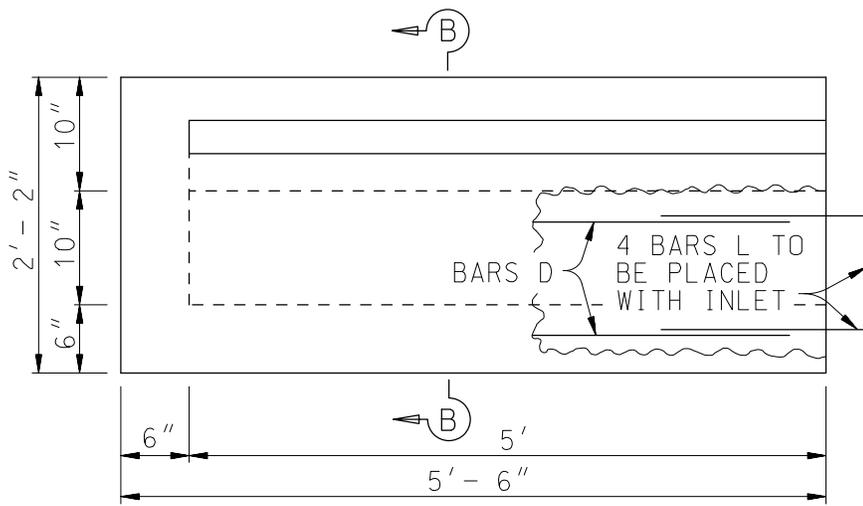
DATE: 4/2012

REVISE DATE: 3/2014

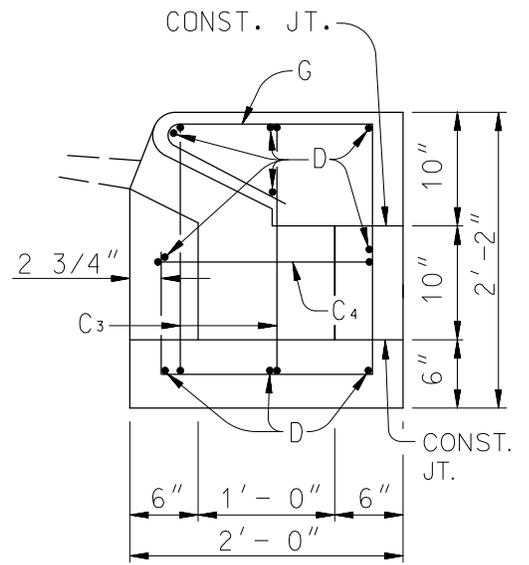
STM - 5



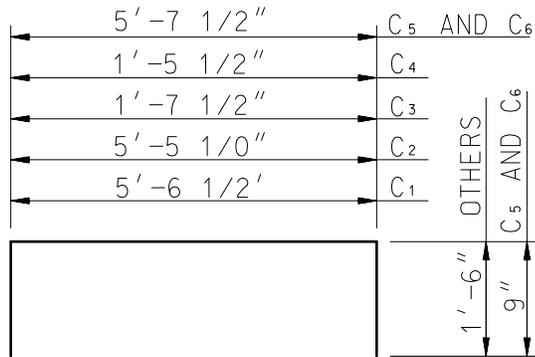
* GUTTER DEPRESSION SHALL NOT BE LOCATED WITHIN THE AREA OF A CURB RAMP/LANDING OR DRIVEWAY.



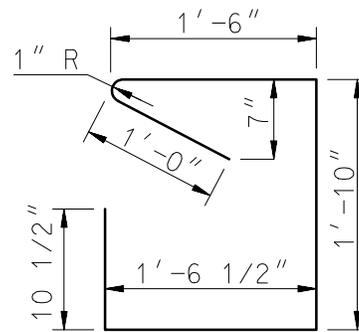
EXTENSION ELEVATION



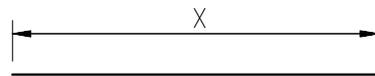
SECTION B-B



BARS C



BARS G

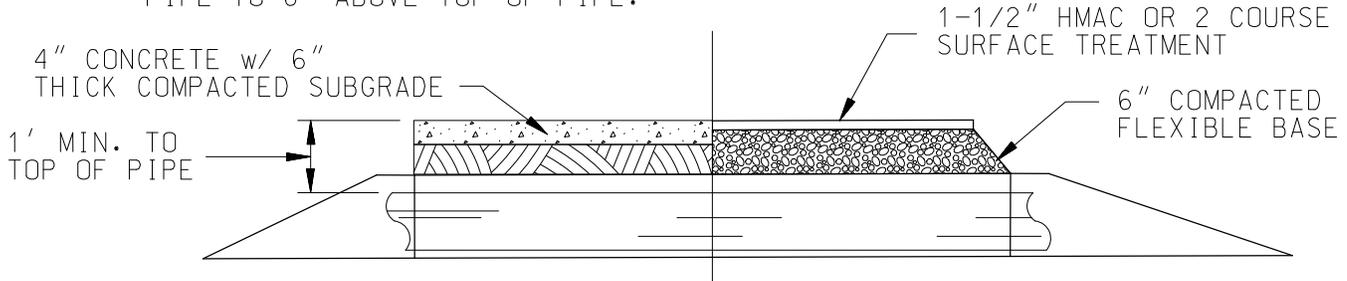


BARS D

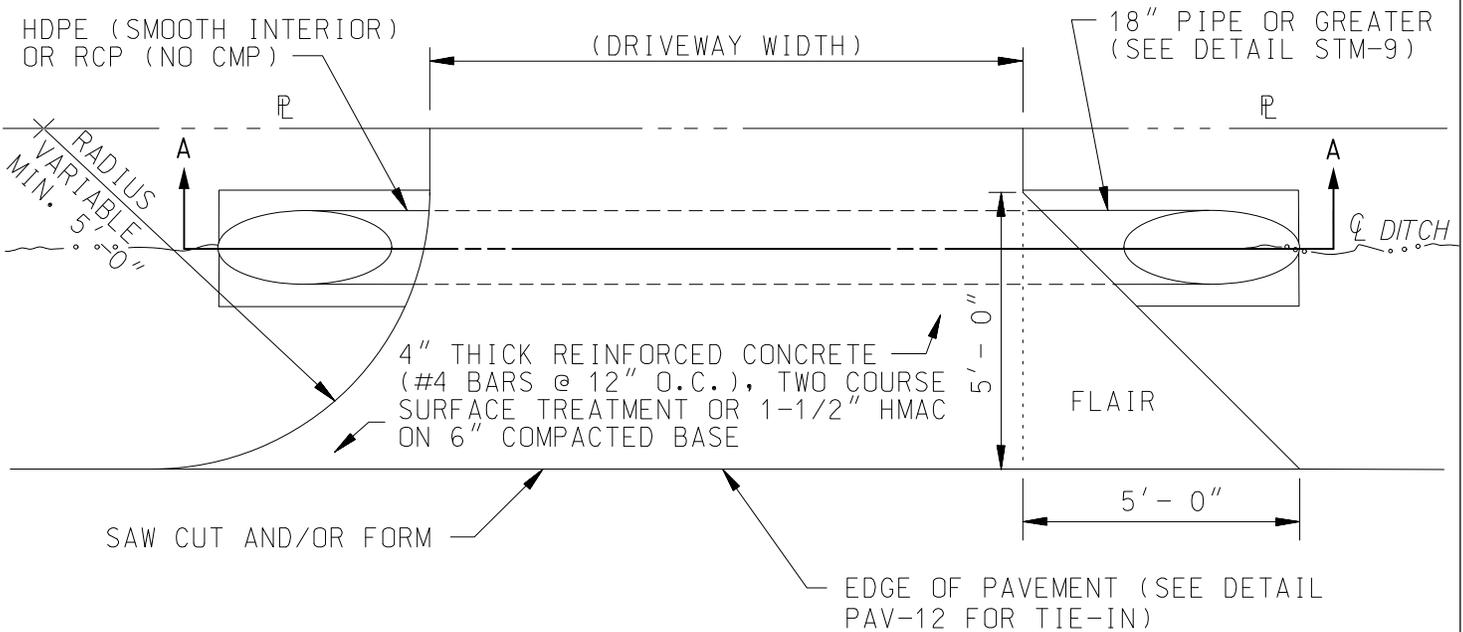
TYPE E EXTENSION

GENERAL NOTES

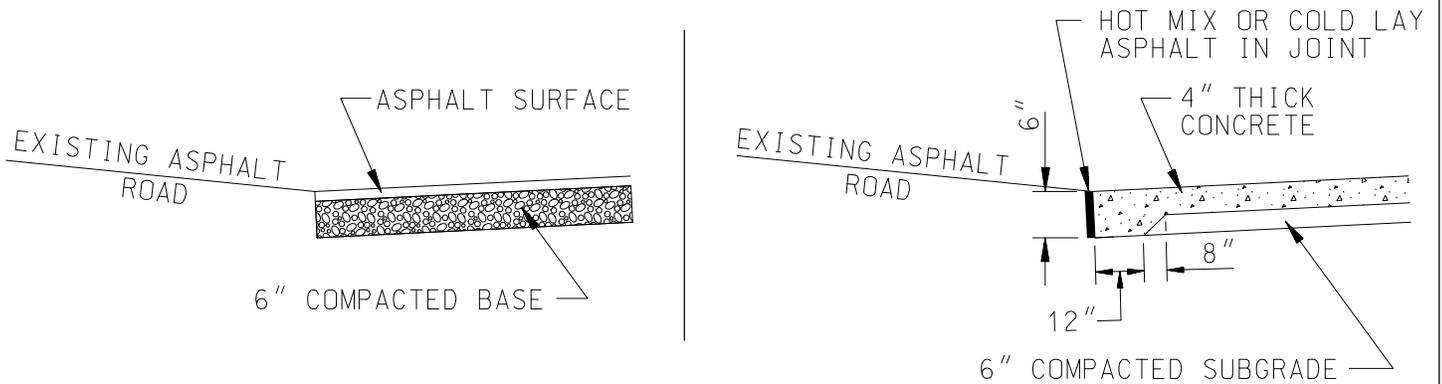
1. ALL REBAR TO BE SET ON BAR CHAIRS.
PLASTIC OR METAL BAR CHAIRS ARE ACCEPTABLE;
NO BRICKS, BROKEN CONCRETE, ROCKS, ECT.
2. EMBED PIPE IN 1-1/2" SAC CEMENT SAND 4" BELOW
PIPE TO 6" ABOVE TOP OF PIPE.



SECTION A-A



NOTE: SIZE OF PIPE AND FLOW TO BE SET BY CITY OF VICTORIA,
PIPE AND INSTALLATION BY DEVELOPER.



STREET TIE-IN



RESIDENTIAL OPEN DITCH
DRIVEWAY DETAIL

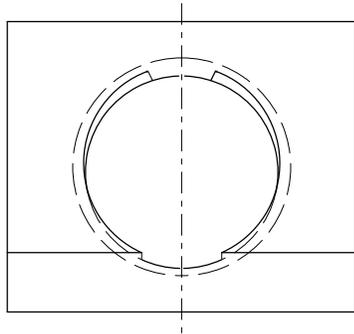
STANDARD CONSTRUCTION DETAILS

DATE: 4/2012
REVISED
DATE: 9/17/18

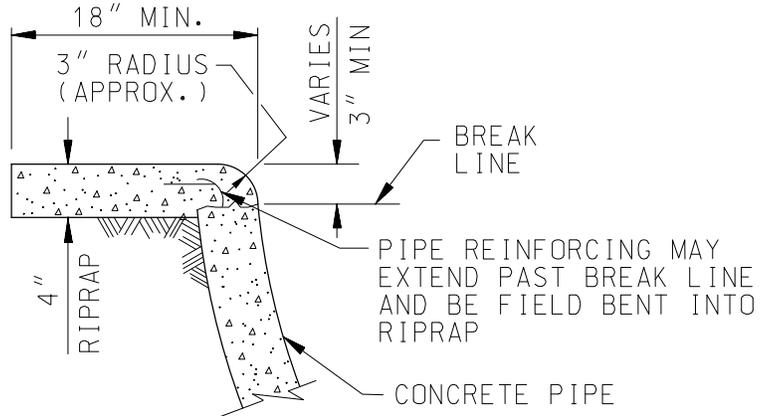
STM - 8

GENERAL NOTES

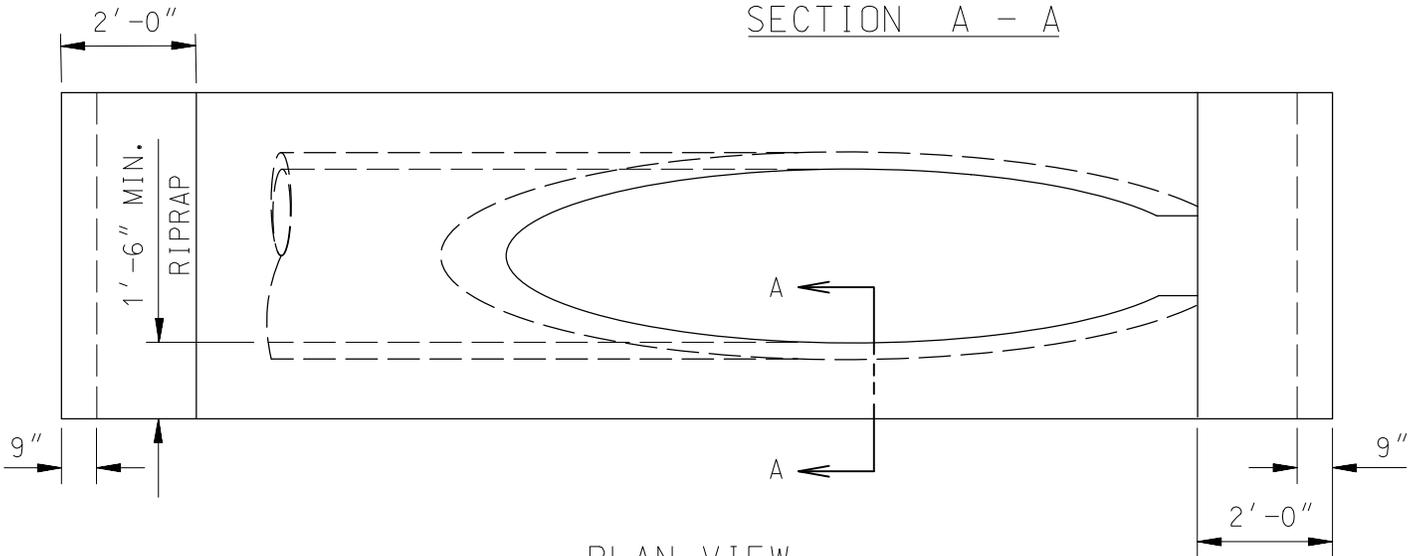
1. 30" PIPES AND GREATER REQUIRE CROSSPIPES.
2. PIPE SHALL BE RCP OR HDPE WITH CEMENT STABILIZED BACKFILL.
3. #3 REBAR @ 12" O.C. WITH "L" BAR AT TOE.



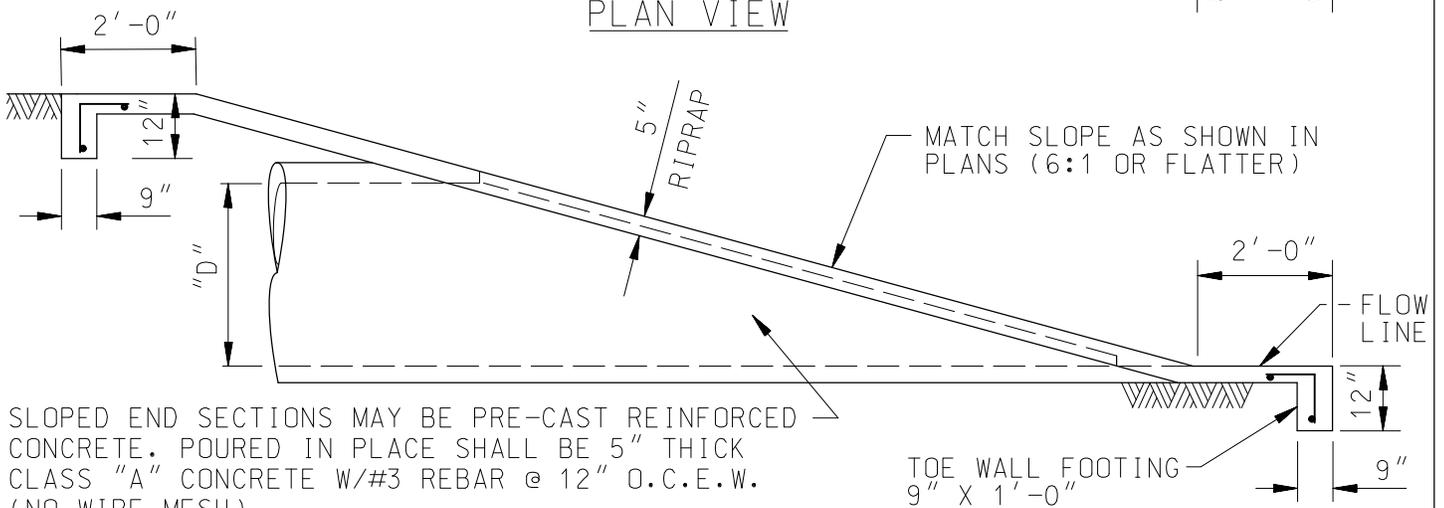
END VIEW



SECTION A - A



PLAN VIEW



SLOPED END SECTIONS MAY BE PRE-CAST REINFORCED CONCRETE. POURED IN PLACE SHALL BE 5" THICK CLASS "A" CONCRETE W/#3 REBAR @ 12" O.C.E.W. (NO WIRE MESH)



**SLOPED END SECTION
DETAIL
(18" PIPE DIAMETER
OR GREATER)**

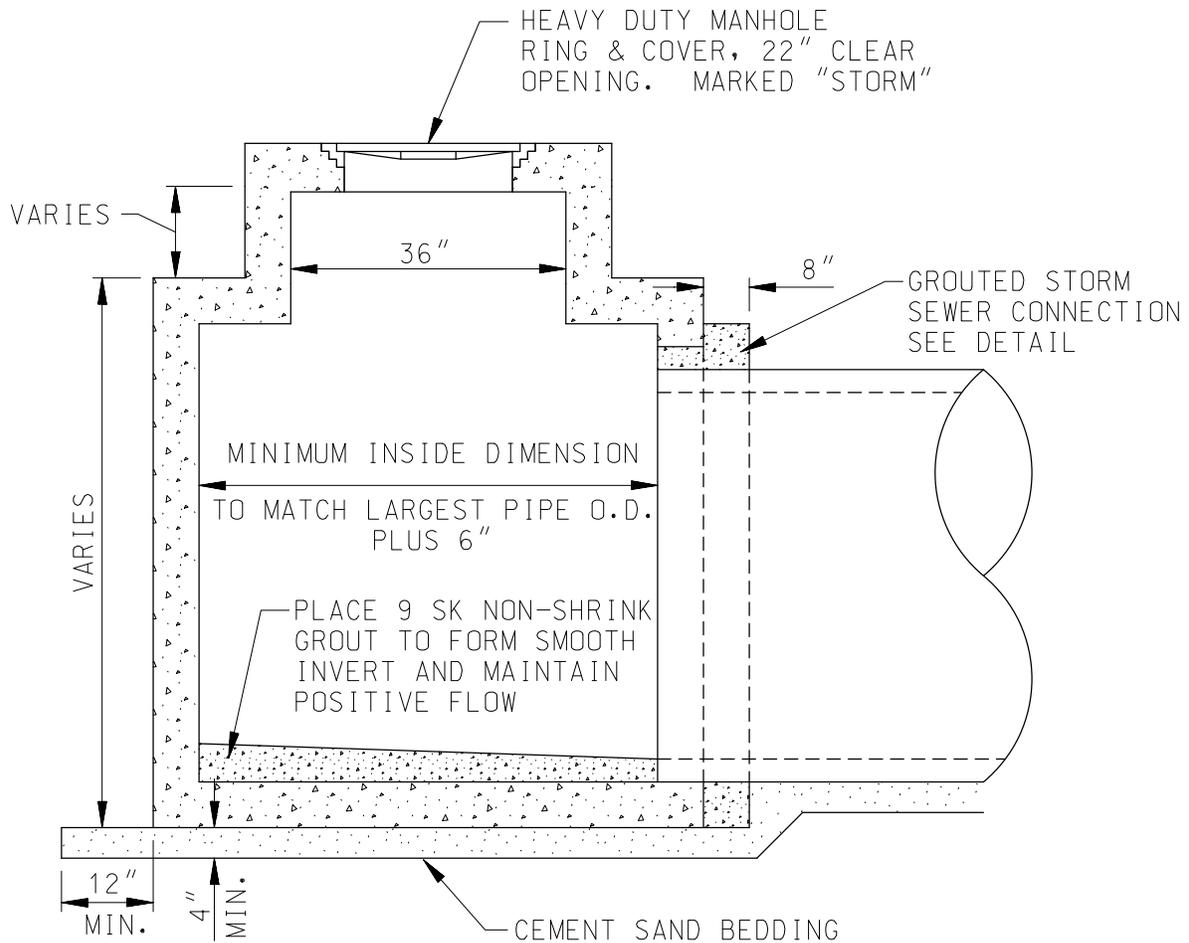
STANDARD CONSTRUCTION DETAILS

DATE: 4/2012
REVISED DATE: 6/12/18

STM - 9

GENERAL NOTES

1. CAST IN PLACE JUNCTION BOX/INLET SHALL MEET TXDOT 2014 STANDARD SPECIFICATIONS, IN ROADWAY, BOX CONSIDERATED AS ITEM 465.
2. WALL THICKNESS SHALL BE 6" THICK W/#4 REBAR @ 12" O.C.E.W. W/12" "L" BARS.
3. CONCRETE BOTTOM SHALL BE 8" THICK W/#4 REBAR @ 12" O.C.E.W. W/12" "L" BARS.
4. IF THROAT RINGS ARE USED, SEE DETAIL (SAN-4) FOR CONCRETE AROUND RING AND LID.
5. BACKFILL AROUND BOX W/CEMENT STABILIZED SAND 12" MINIMUM AND TO 6" TO FINISH GRADE.
6. EXCAVATED SIDES SHALL NOT BE USED AS BACK FORM; BOX TO BE FORMED ALL SIDES.
7. PRIOR TO BOTTOM CONCRETE "SET", CUT "V" (WATER STOP) NOTCH IN WALL LOCATIONS.



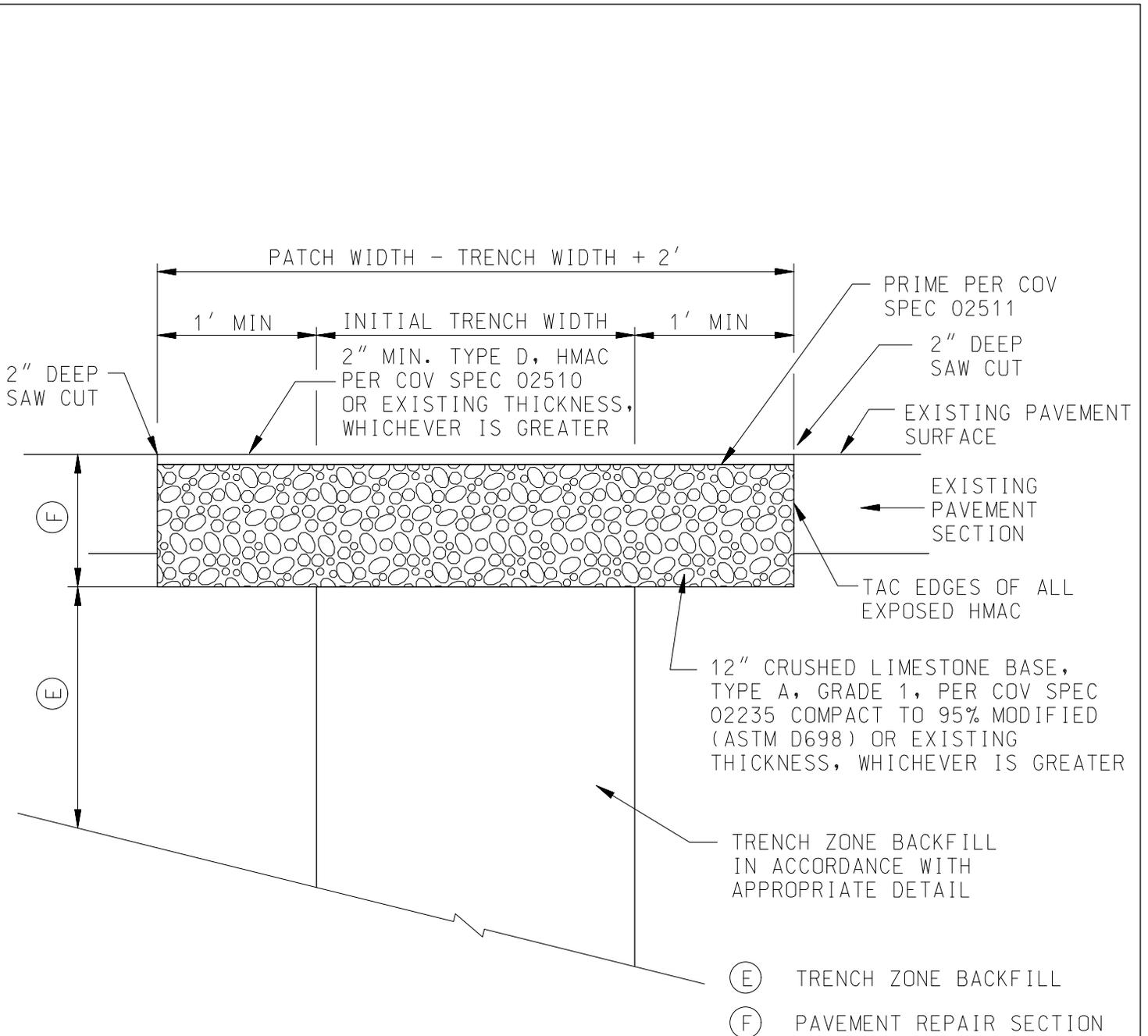
STORM SEWER JUNCTION
BOX DETAIL
(CAST IN PLACE)

STANDARD CONSTRUCTION DETAILS

DATE: 6/12/18

REVISED
DATE:

STM - 10

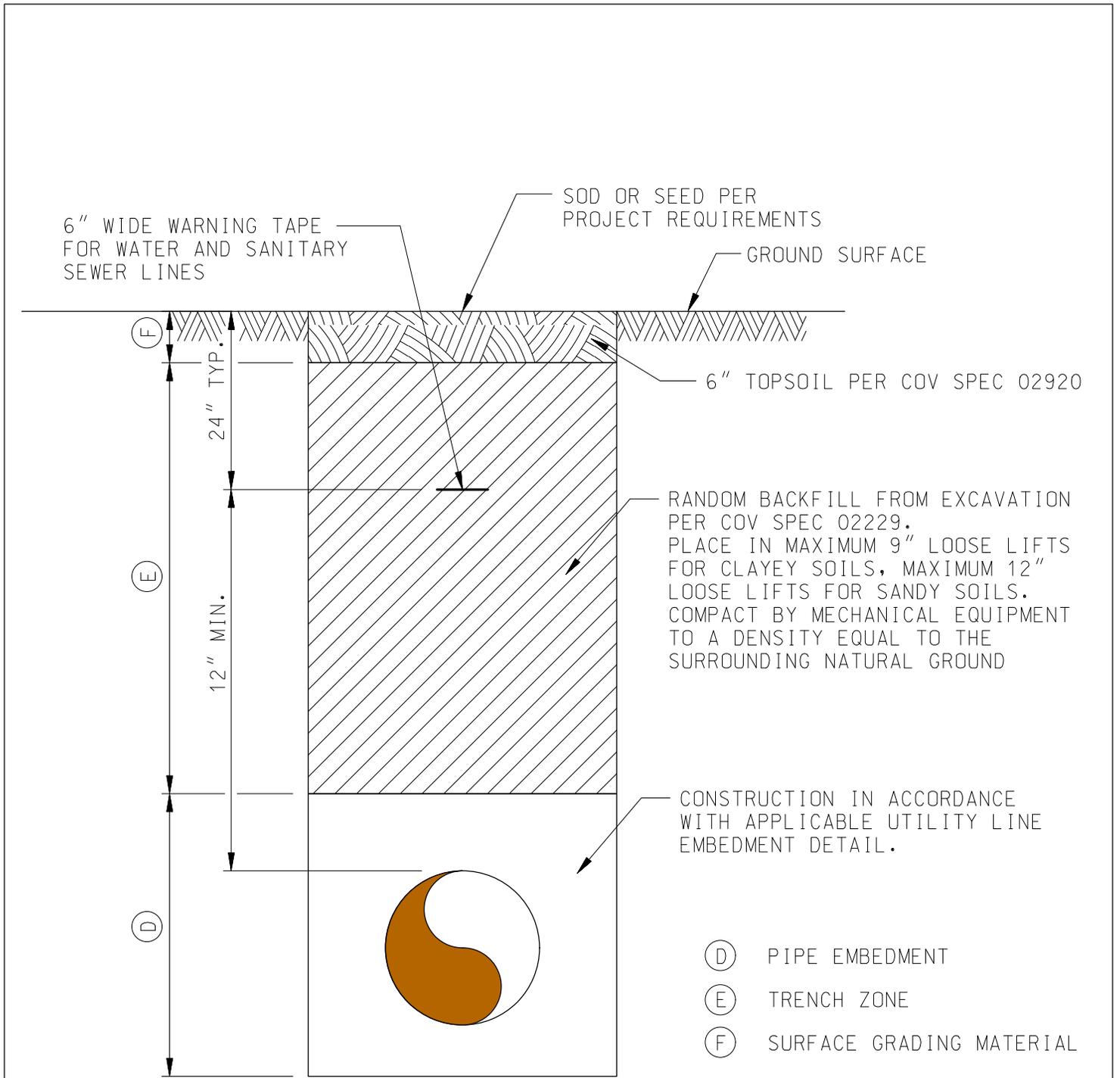


PERMANENT TRENCH RESTORATION DETAIL (EXISTING FLEXIBLE PAVEMENT AREAS)

STANDARD CONSTRUCTION DETAILS

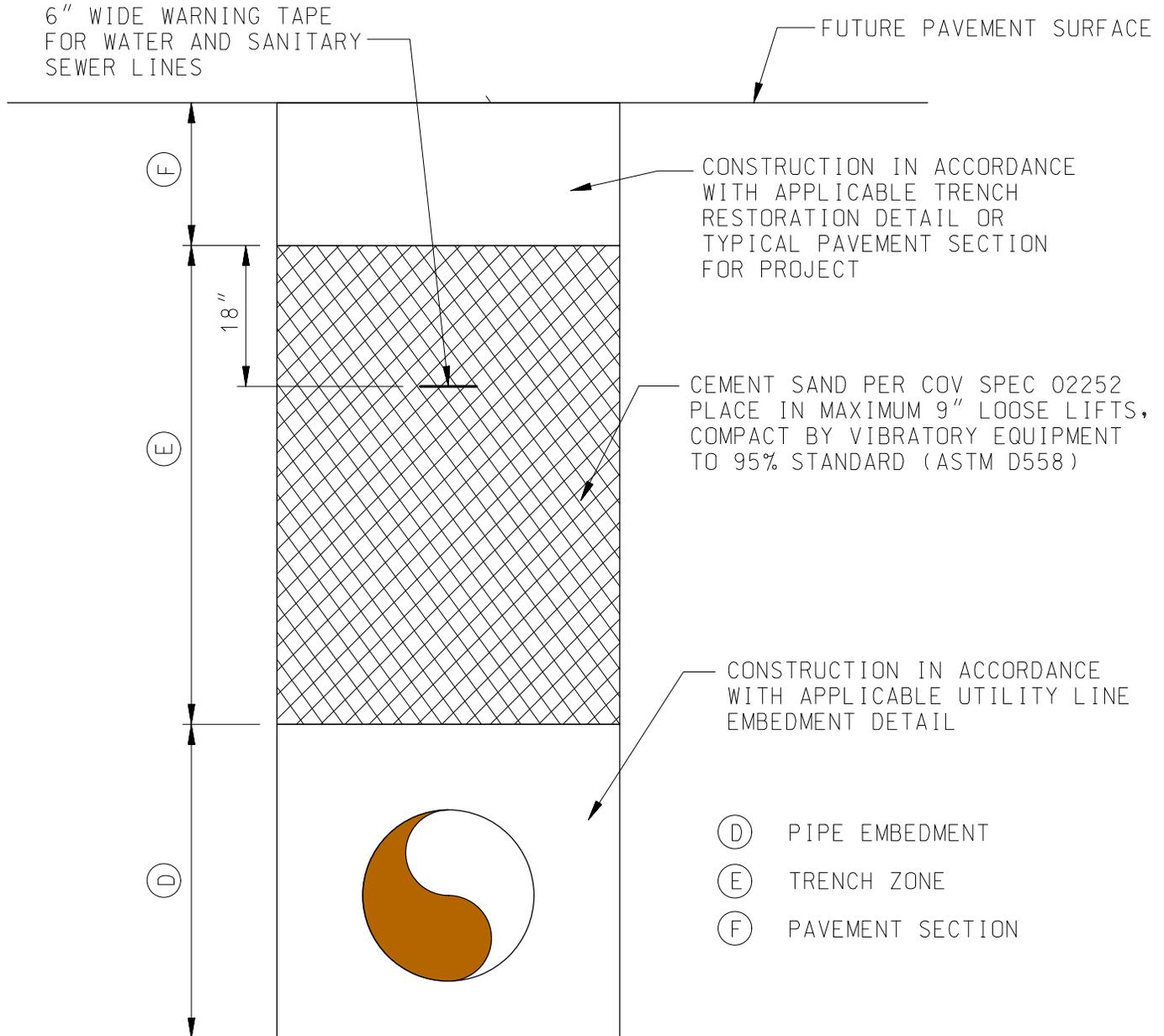
DATE: 4/2012
 REVISE DATE: 1/2014

BAC - 1



GENERAL NOTES

- PAVED AREA DEFINED AS ANY PART OF TRENCH ZONE WITHIN 2' FROM OUTSIDE BACK OF CURB OR EDGE OF ROAD. PAVED AREAS INCLUDE STREETS, DRIVEWAYS AND PARKING LOTS.



TRENCH ZONE BACKFILL
DETAIL (FUTURE PAVED OR
EXISTING PAVED AREAS)

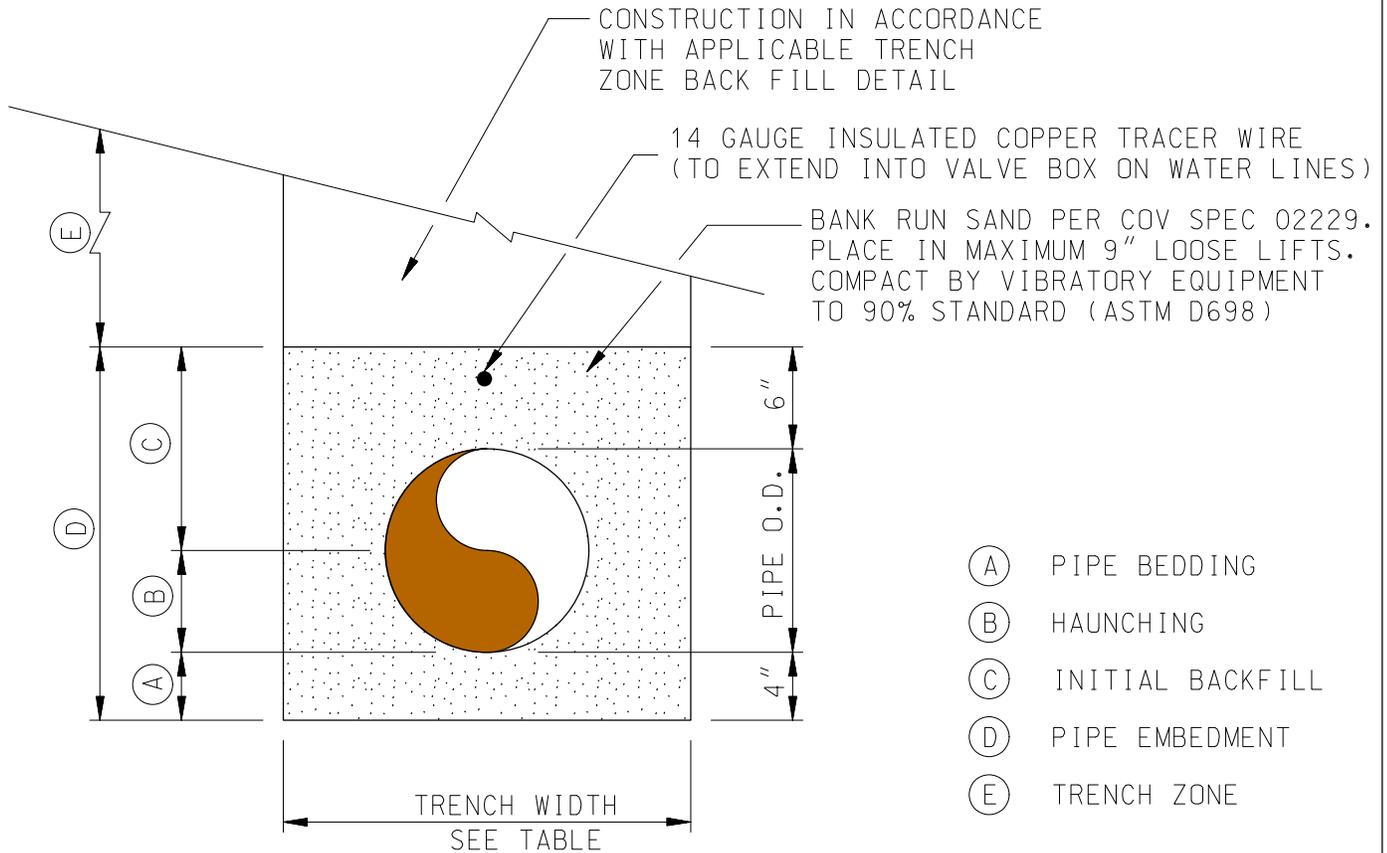
STANDARD CONSTRUCTION DETAILS

DATE:
4/2012

BAC - 3

TRENCH WIDTH TABLE

NOMINAL PIPE SIZE (INCHES)	MINIMUM TRENCH WIDTH	MAXIMUM TRENCH WIDTH
Less than 24"	O.D. + 12"	O.D. + 36"
24" to 30"	O.D. + 18"	O.D. + 42"
Greater than 30"	O.D. + 24"	O.D. + 48"



WATER

- TRACER WIRE TO BE ATTACHED TO PIPE (DUCT TAPE IS ACCEPTABLE).
- TRICER WIRE SPLICED w/DRYCON 63315 (DBSR)

SEWER

- 4" WIDE GREEN AND SILVER SANITARY SEWER CAUTION TAPE.



UTILITY LINE EMBEDMENT
DETAIL
(FOR PUBLIC WATER &
SANITARY SEWER LINES)

STANDARD CONSTRUCTION DETAILS

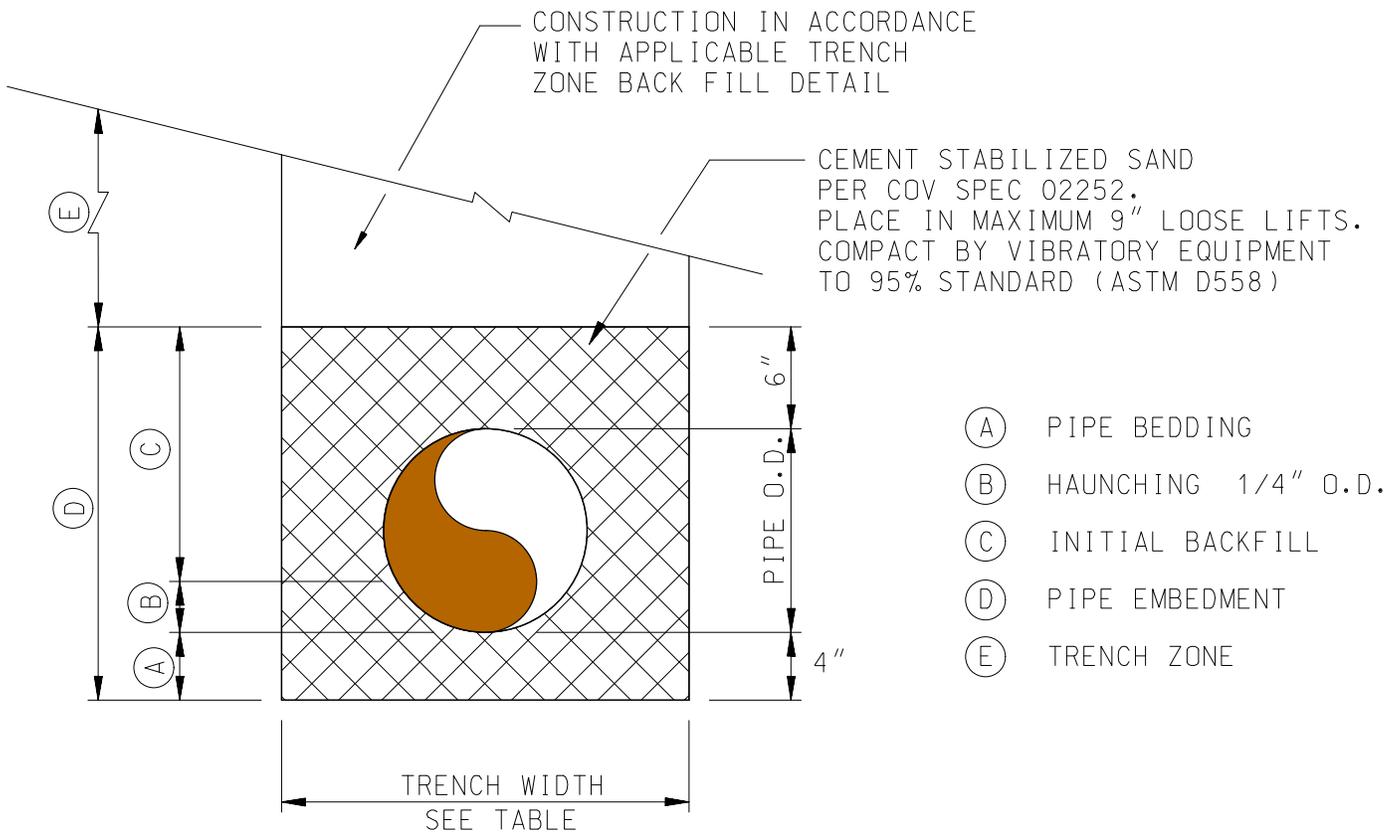
DATE: 4/2012

REVISED
DATE: 6/12/18

BAC - 4

TRENCH WIDTH TABLE

NOMINAL PIPE SIZE (INCHES)	MINIMUM TRENCH WIDTH	MAXIMUM TRENCH WIDTH
Less than 24"	O.D. + 12"	O.D. + 36"
24" to 30"	O.D. + 18"	O.D. + 42"
Greater than 30"	O.D. + 24"	O.D. + 48"



BACKGROUND TO BE GREEN
OR BLUE HI INTENSITY
GRADE REFLECTIVE

STREET NAMES ARE TO
BE WHITE 4" SERIES

BLOCK NUMBERS AND SUFFIXES
ARE TO BE WHITE 2" SERIES
NUMERALS AND LETTERS

SIGN PER LEGEND

2.0' (MIN)

7' MIN - 8' MAX

TEXAS UNIVERSAL TRIANGULAR
SLIPBASE SYSTEM PER TXDOT
SHT. SMD (SLIP - 1) - 02

NATURAL
GROUND

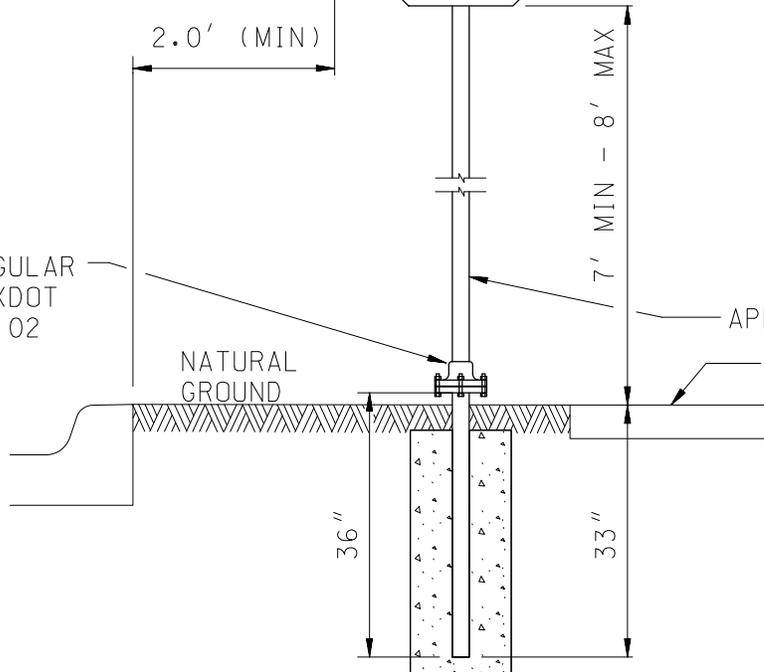
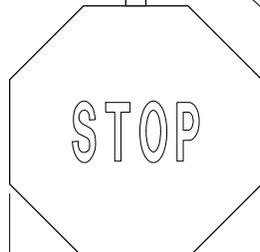
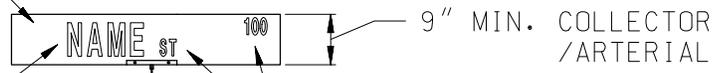
APPROVED STEEL POST

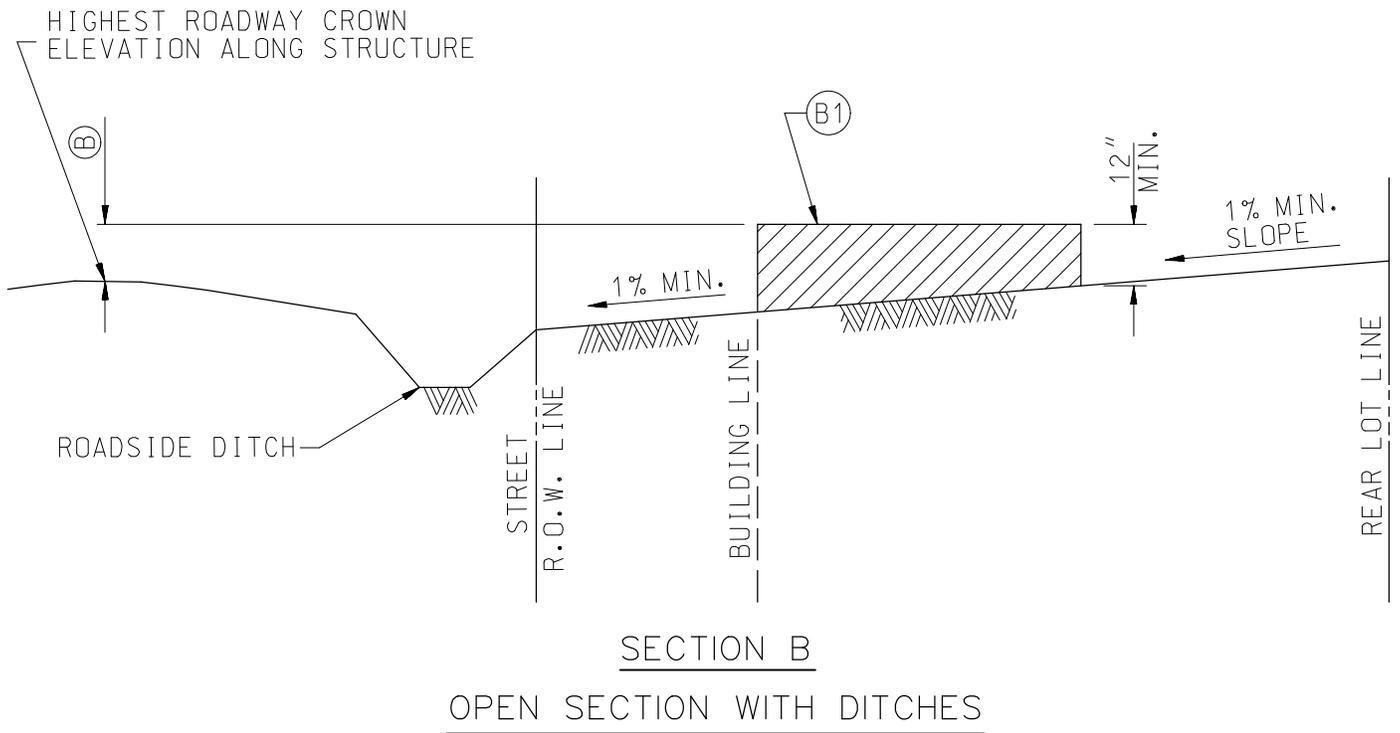
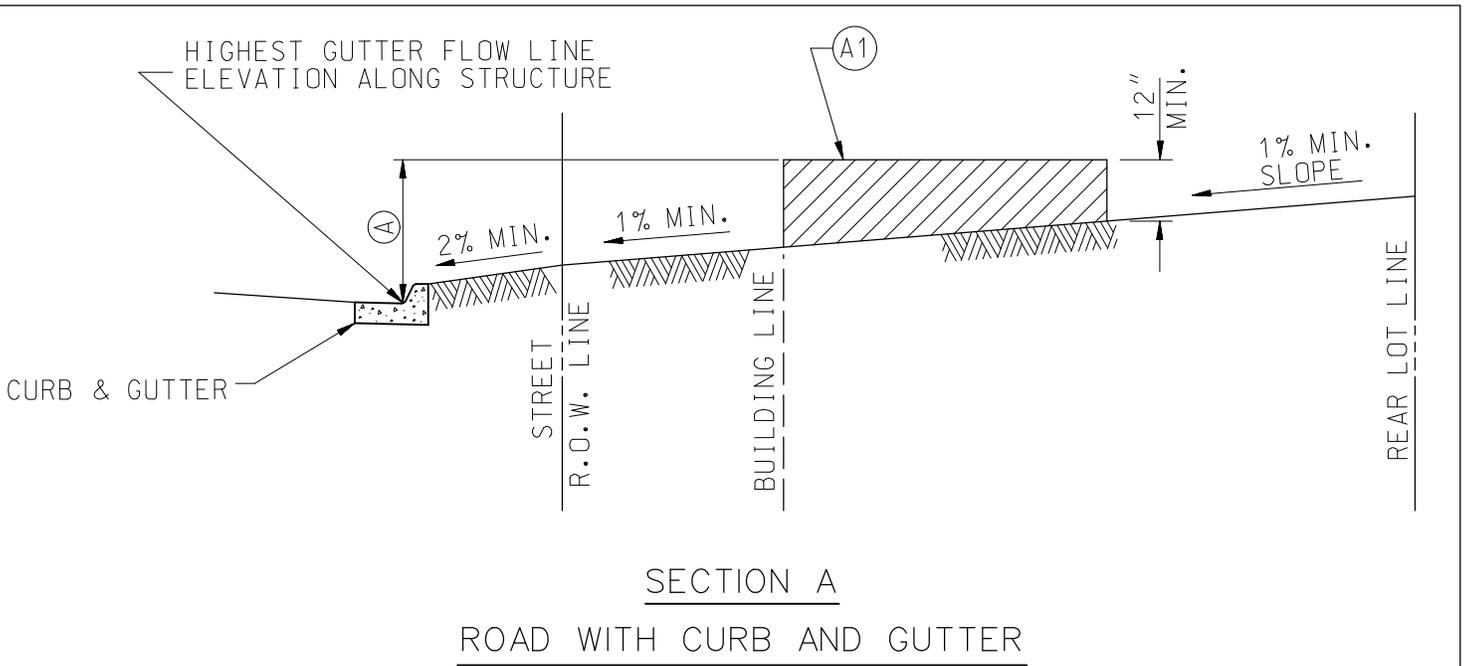
SIDEWALK

36"

33"

12" DIA X 30"
CONCRETE
FOUNDATION





Ⓐ RESIDENTIAL - 30" MIN.
COMMERCIAL - 20" MIN.

Ⓐ1 LOWEST FIN. FLOOR OF LIVING SPACE
LOWEST FIN. FLOOR OF STRUCTURE

Ⓑ RESIDENTIAL - 24" MIN.
COMMERCIAL - 12" MIN.

Ⓑ1 LOWEST FIN. FLOOR OF LIVING SPACE
LOWEST FIN. FLOOR OF STRUCTURE



RESIDENTIAL AND
COMMERCIAL LOT GRADING

STANDARD CONSTRUCTION DETAILS

DATE:
4/2012

MISC - 2