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CITY OF JEFFERSON

STANDARD SANITARY SEWER SPECIFICATIONS



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STANDARD SANITARY SEWER SPECIFICATIONS

SS-1.0 GENERAL

SS-1.1 Description: Sanitary sewer construction shall consist of furnishing all labor, materials and equipment for the complete installation of sewers and appurtenances in accordance with the City Standard Drawings, Plans, General Provisions and Covenants, Street Specifications and Standards, and these Specifications.

SS-1.2 Specification Modifications: It is understood that throughout this section these specifications may be modified or deleted by appropriate items in the Special Provisions or notes on the contract drawings.

SS-1.3 Revisions of Standards: When reference is made to a Standard Specification (ASTM, AWWA, *State of Missouri Code of State Regulations (CSR)*) the specification referred to shall be understood to mean the latest revision of said specification as amended at the time of the Notice to Bidders, except as noted on the Plans or in the Special Provisions.

SS-2.0 MATERIALS AND TESTING

SS-2.1 Scope: This section governs the furnishing of all pipe, fittings and other materials as required to complete the work as shown on the Plans and as provided for in the Special Provisions. The materials specified are to be used under normal conditions. Vitrified clay, HDPE, and fiberglass reinforced pipe may be approved *on a case-by-case basis* for special applications if installed by manufacturer's recommendations.

SS-2.2 General:

- a. Requirements: Furnish pipe of materials, joint types, sizes, and strength class indicated and specified. Higher strengths may be furnished at Contractor's option, at no additional cost to the Owner.
- b. Manufacturer: The manufacturer shall be experienced in the design, manufacture and commercial supplying of the specific material.
- c. Inspection and Testing: To be performed by the manufacturer's quality control personnel in conformance with applicable standards. Testing may be witnessed by Owner, Engineer, or approved independent testing laboratory. Upon request of the

Owner, and prior to delivery, the Contractor shall provide three (3) copies of certified test reports indicating that material does conform to the specifications.

SS-2.3 Ductile Iron Pipe: Conform to ANSI A21.51, except as otherwise specified herein.

- a. Design: Design of pipe shall be in accordance with ANSI A21.50 laying conditions B or F. Minimum wall thickness shall be for Class 2.
- b. Joints: Mechanical and push-on joints for ductile iron pipe and fittings shall conform to the requirements of ANSI A21.11.
- c. Gaskets shall be neoprene or other synthetic rubber material. Natural rubber gaskets will not be acceptable. Gaskets shall be rated for intended use (gravity sewer or pressure main).
- d. Fittings: Fittings shall be in accordance with ANSI A21.10 and shall have a pressure rating of not less than that specified for pipe. Fittings used with ductile iron pipe shall be ductile iron. Fittings for pipe with mechanical joints shall have mechanical joints. Fittings for pipe with push-on joints shall be either mechanical joint or push-on joint.
- e. Lining: Polyethylene in accordance with ANSI/ASTM D 1248 or two component epoxy per manufacturer's recommendations. Cement-mortar lining is not acceptable.
- f. Coating: Bituminous per manufacturer's recommendations.
- g. Furnish all specials, taps, plugs and wall fittings as required.

SS-2.4 Poly Vinyl Chloride (PVC) Sewer Pipe: Conform to ASTM D-3034 *for pipe 15-inch and less and ASTM F679 for sizes 18-inch and greater, except as otherwise specified herein.* Building sewer (lateral) pipe is specified in the City Plumbing Code.

- a. General: Furnish maximum pipe lengths manufactured by the supplier, except fittings, closures and specials.
- b. Design: The minimum wall thickness for PVC Pipe shall conform to SDR-35. Pipe bedding shall conform to ASTM D-2321 for Class I materials. *For deep excavations (over 12 feet) consideration should be given for pipe of greater wall thickness (SDR26 or greater).*

- c. Joints: Flexible gasketed joints shall be compression type with a gasket confined in either the spigot end or the bell end of the pipe. Rubber gasket rings shall conform to the requirements of ASTM D-1869. Gaskets shall be neoprene or other synthetic material. Natural rubber gaskets will not be acceptable.
- d. Fittings: Fittings defined as tee connections suitable for assembly to 4-inch or 6-inch house or building sewers connection to existing sewer mains shall be saddle-type fittings of PVC Plastic. Connections to new or inactive sanitary sewers shall be with wye fittings.

SS-2.5 Sanitary Sewer Forcemain: Shall be PVC and conform to the requirements of ANSI/AWWA C900-89. Pressure Class 200.

- a. Bends in sanitary sewer forcemain shall be by restrained joint ductile iron fittings restrained in accordance with manufacturer's recommendations. Sanitary sewer forcemain shall be installed with locating tracer wire. Tracer wire shall be insulated THNN, 12 gauge copper wire. All wire shall be joined by use of wire clamps. These connections shall be sealed and taped to create a watertight connection. Tracer wire shall be secured to the top of the main by tape a minimum of 3 times in each standard length of pipe. Tracer wire shall be looped to the top of valve boxes for access and at ends for conductivity.
- b. Where sanitary sewer forcemains must cross watermains, the forcemain shall be installed below the watermain with not less than an 18 inch separation. *Forcemains must also maintain a 10-foot horizontal separation from water mains measured pipe edge to pipe edge. Where this separation is not possible, alternatives must be approved by the Engineer and shall adhere to 10 CSR 8.120 (10) (C).*
- c. Buried gate valves on forcemains two (2") inch through twelve (12") inch inclusive shall be Mueller Gate Valves, mechanical joint, resilient seated wedge disk or equal. Valve shaft shall have an "O" ring seal with a two (2") inch square operating nut. Valve shall open in a counter-clockwise direction. Buried gate valves shall have valve boxes which shall be two-piece, twenty-four (24") inch, screw type, bottom section and sixteen (16") inch screw type, top section with lid marked "SEWER".

SS-2.6 Reinforcing Steel: Reinforcing steel shall be placed as shown on the Plans and shall conform to ASTM Specifications as follows:

- a. Bars and rods shall be deformed billet-steel conforming to ASTM A-615, Grade 40.
- b. Welded wire fabric shall conform to ASTM A-185, Grade 40.
- c. Fabricated steel bar and rod mats shall conform to ASTM A-184. Bar material shall conform to ASTM A-615, Grade 40.
- d. Smooth bars shall be round carbon steel bars conforming to ASTM A-306, Grade 60.

SS-2.7

Manhole Materials:

- a. General: Manholes shall conform to the applicable City Standard Drawing. All new manholes must be precast as defined in these specifications and applicable City Standard Drawings.
- b. Brick and mortar manholes: Repair to existing brick manholes use materials as follows:
 - 1. Mortar: Mortar and plaster casting for masonry manhole units shall be two parts Portland Cement to one part Masonry Cement to six parts plaster sand mixed with the least amount of potable water necessary to provide a workable mortar.
 - 2. Brick: Clay brick shall conform to ASTM C-32, Grade SS or SM. For Grade SM, the maximum water absorption by 5-hour boiling shall not exceed 12.0 percent for individual brick or 9.0 percent for the average of five bricks.
- c. Precast Concrete: Precast concrete manholes shall conform to ASTM C-478. Joints shall be of material as specified for reinforced concrete pipe joints or a bitumastic material or performed flexible joint sealants applied in accordance with manufacturer's recommendations.
- d. Cast in Place Concrete: Concrete used shall conform to applicable City Standard Drawing.
- e. Waterproofing: Waterproofing will be required to all manholes. The bitumen shall consist of two coats of asphalt or coal-tar pitch, H.B. Tnemecol (Coal Tar) Series 46-465 or equal. Asphalt shall conform to the requirements of ASTM D-449. Coal-tar pitch shall conform to the requirements of ASTM D-450.

- f. Flexible connectors designed to produce a positive watertight connection for pipes entering precast manholes shall be provided. These connectors shall be the “A-LOK” produced by A-LOK Products, Inc. or approved equal.
- g. Interior coating: Where manholes are subject to excessive hydrogen sulfide exposure, the City requires manholes be lined with a one-part urethane Tnemec Series 434 Perma-Shield H2S or equal. Interior coating shall be applied prior to delivery to the site and touched up where necessary.

SS-2.8 Manhole Castings:

- a. General: Cast-iron rings, covers and steps conform to the applicable City Standard Drawings. The castings shall meet or exceed the following requirements:
- b. Iron Castings:
 1. Iron castings shall conform to the requirements of ASTM A-48, Class 30.
 2. Castings shall be clean and whole, and without blow or sand holes or any other surface defects which would impair serviceability. Plugging or filling of holes or other defects will not be permitted.
 3. Parting fins and pouring gates shall be removed.
 4. Castings shall be thoroughly cleaned and painted with two coatings asphaltum paint before being delivered to the site.

SS-2.9 Bedding Aggregate: All materials used for crushed stone pipe bedding shall conform to applicable City Standard Drawings.

SS-2.10 Water Stops: Water stops must be installed in accordance with City Standards.

SS-3.0 GRADING AND SITE PREPARATION

SS-3.1 Scope: This section governs the furnishings of all labor, equipment tools, materials, and the performances of all work for clearing, grubbing, and demolition, wholly or in any part, at locations shown on the Plans, or as provided for in the Special Provisions. Clearing, grubbing and demolition

shall be done only to that extent which is necessary for the prosecution of the construction of the sewers.

SS-3.2

Definitions:

- a. Clearing: Clearing shall consist of removing all vegetable matter, such as trees, brush, down timber, rotten wood, rubbish and other objectionable combustible materials, found on or above the surface of the site. It may include removing fences, lumber, waste dumps and trash, and the salvaging of such of the materials as may be specified. This item shall include the disposal of the debris resulting from the clearing operations.
- b. Grubbing: Grubbing shall consist of removing and disposing of stumps, roots, buried trees and brush, wood piling, wood curb planking, wood culverts, wood catch basins and drains, and wood stairs appearing on or below the surface of the ground which has not been included in section entitled "Clearing".
- c. Demolition: Demolition shall consist of demolishing, removing, disposing, or incorporating into backfill all non-vegetable matter appearing above, on, or below the ground surface. This shall include all material derived from the demolition of Portland Cement Concrete items such as base courses, curbs, curb and gutters, sidewalks, floors, steps, driveways, drainage structures of all sorts, fences, and other miscellaneous items such as foundations or wall of any sort, and iron or steel items, and shall include all asphaltic items such as pavement and base courses.

SS-3.3

Construction Details:

- a. Limits of Work: The limits for clearing, grubbing and demolition shall, in no case, extend beyond the limits of the right-of-way, city property lines, or easements, unless otherwise specified on the Plans or Special Provisions.
- b. Protection of Existing Facilities: The Contractor shall be responsible for protecting any improvement of any agency, public or private, in the vicinity of clearing, grubbing or demolition operations. When necessary the Contractor shall enlist the assistance of the affected agencies in the location of their facilities. The Contractor will not be responsible for the cost to any agency for assistance in the location of its facilities, but he shall be responsible for the cost of all damages to such facilities arising because of his carelessness or negligence.

1. Private Sewer Facilities: The Contractor shall make every reasonable effort to protect private sewer facilities. They are not shown on the Plans. When these facilities are disturbed or damaged by the work, the Contractor shall make necessary repairs to the facilities for continuous service prior to the close of the work day.
2. Property Pins: All property or lot corner pins or stakes shown on the Plans and disturbed by this construction will be properly referenced by the Contractor prior to removal, and reset by the Contractor upon completion of the project.

SS-3.4 Clearing: Clearing shall be performed in advance of the construction operation so as not to delay the progress of the work. The refuse resulting from clearing shall be hauled to a waste site secured by the Contractor, or if permitted by the Special Provisions may be burned in the area indicated on the Plans in such a manner as to meet all applicable requirements of the Federal, State, County and Municipal regulations concerning health, safety and public welfare.

SS-3.5 Grubbing: Grubbing shall be kept abreast of the “Clearing” as nearly as the sequence of operations may permit. All stumps, roots, and other objectionable material within the disturbed area shall be removed to a depth of at least twelve (12) inches below the finished grade elevation. Disposal of debris from grubbing shall be as described in “Clearing” above.

SS-3.6 Demolition: If portions of existing improvements are to be left in place, the limits of pavement removal shall be laid out as neat, straight lines a minimum distance of six (6) inches beyond the anticipated edges of excavation. If the pavement removal limits are approximately parallel to and three (3) feet or less from an existing pavement joint, previous cut, or curb, the limits of removal shall be extended to the joint, cut, or curb. Sufficient portions of the pavement shall be removed to provide for the proper grade and alignment of the new construction. Disposal of debris from demolition shall be described in SS-3.4 “Clearing”.

SS-3.7 Environmental Protection Procedures:

- a. General: Contractor shall take all measures to minimize disturbed areas. Compliance with the following procedures for protection of existing greenery is required.
- b. Trees: All reasonable effort shall be made to save as many trees as possible. If trees can be saved by trimming, this shall be done in accordance with acceptable pruning practices. Any tree removed

shall be replaced with like species of nursery stock outside the temporary Sewer Right-of-Way.

All trees within 30 feet of either side of sewer centerline which are specifically to be removed or saved have been marked on the Plans with the following notations.

1. Trees marked "S" shall be saved.
 2. Trees "Xed" out shall be removed.
- c. Shrubbery, Small Plants and Flowers: Prior to the start of construction, property owners will be notified of the proposed starting date. One purpose of this notification is so that the property owners may remove any shrubbery, small plants or flowers that they, the property owners, desire to save.

SS-4.0 PIPE LAYING, JOINTING AND TESTING

SS-4.1 Scope: This section governs the furnishing of all labor, equipment, materials and tools for the installation of all pipes, fittings, specials and appurtenances as shown on the Plans, City Standard Drawings or as provided for in the Special Provisions.

SS-4.2 Handling:

- a. Handle pipe materials and fittings in a manner to insure installation in sound and undamaged condition. Do not drop or bump. Use slings, lifting lugs, hooks, and other devices designed to project pipe, joint elements and coatings. In handling plastic pipe of ten (10) feet in length or greater, a double sling will be required unless otherwise approved by the Engineer.
- b. Ship, move and store with provisions to prevent movement or shock contact with adjacent units.

SS-4.3 Installation:

- a. All work shall be in accordance with the following standards:

ASTM D-2321 - Underground installation of flexible Thermoplastic Sewer Pipe.

AWWA C-600 - Installation of Cast Iron Water Mains.

b. Utilize equipment, methods and materials insuring installation to lines and grades indicated.

1. ~~Batter Boards and Laser:~~ The Contractor shall provide and maintain in good working order, on the site, at all times, a laser beam ~~or a gauge rod of sufficient length to reach from the invert of the sewer pipe being laid to the top line strung on the three batter boards.~~ The gauge rod shall be graduated and numbered each foot of its entire length. ~~The gauge rod shall be equipped with either a plumb line or two spirit levels and the utmost care used to insure a truly vertical gauge rod at the time the reading is taken and pipe is being set.~~ In the event a laser beam is used to control line and grade for the pipe laying operation, the laser must be checked at the beginning of each day and at least once between manholes and at any other time the Engineer deems necessary to insure the proper line and grade of the pipe.

Maintain the following tolerances from true alignment and grade:

Alignment	3 inches
Grade	1 inch

Joint deflection shall not exceed the maximum allowable deflection per joint according to ASTM C-425, ASTM C-594 and AWWA C-600. Only one correction for alignment and/or grade shall be made between adjacent manholes.

2. Except where pipe sections are being encased in concrete, no pipe is to be supported by blocks.

3. All transition in sewer main line, *pipe size* and grade must be within a manhole.

~~3.4.~~ *Curvilinear alignment of sewers for diameters over 24-inches can be considered by the Engineer on a case-by-case basis subject to 10 CSR 20-8.120.*

c. Install pipe of size, material, strength class, and joint type with embedment as shown on the Plans.

Reinforced concrete pipe with elliptical reinforcement shall be installed and positioned in accordance with the pipe manufacturer's pipe markings indicating top and bottom pipe.

Where velocities greater than 15 feet/second are attained, special provisions shall be made to protect against displacement by erosion and impact.

- d. Pipes installed on grades in excess of 20% shall be anchored securely with concrete anchors spaced as follows:

<u>Grade</u>	<u>Maximum Anchor Spacing</u>
20% - 35%	36 ft.
35% - 50%	24 ft.
greater than 50%	16 ft.

- e. Insofar as possible, commence laying at downstream end of line and install pipe with spigot or tongue end downstream.
- f. Clean interior of all pipe, fittings, and joints prior to installation. Exclude entrance of foreign matter during discontinuance of installation. Close open ends of pipe with snug fitting closures. ~~Do not let water fill trench.~~ Include provisions to prevent flotation should water control measures prove inadequate. *Water entering the trench shall be removed in accordance with USCoE and MDNR permits until the work is completed. The sewer shall not be used to transport trench water, rock or debris.* Remove water, sand, mud and other undesirable materials from trench before removal of end cap.
- g. Install pipe only when weather and trench conditions are suitable. Do not lay in water. Brace or anchor pipe as required to prevent displacement after establishing final position.
- h. *Sewers built adjacent to or crossing streams shall be in accordance with 10CSR 20(8)*
- g.i. *Protection of water supplies: Sewer mains shall be installed a minimum distance of 10-feet from water mains measured pipe edge-to-edge. Where this separation is not possible, alternatives must be approved by the Engineer and shall adhere to 10 CSR 8.120 (10) (C).*

SS-4.4

Pipe Bedding, Haunching and Initial Backfill: The sewer trench shall be carried to a point not less than four (4) inches below bottom of pipe bell. Crushed stone bedding, compacted to full width of trench, shall than be placed and compacted to bottom of pipe with proper allowance for bell joints. After each length of pipe being laid has been shoved “home” and placed in proper alignment, it shall be securely anchored and held in position by crushed stone deposited simultaneously on each side of the

pipe. This crushed stone backfill shall extend to a point not less than six (6) inches above the top of the pipe bell. If unstable conditions are encountered and it is determined by the Engineer that the bedding specified will not provide suitable support for the pipe, additional excavation to the limits determined by the Engineer will be required. This additional excavation shall be backfilled with crushed stone material approved by the Engineer.

a. Rigid pipe. Bedding Classes A, B, C, or crushed stone, as described in ASTM C12, shall be used and carefully compacted for all rigid pipe provided the proper strength pipe is used with the specified bedding to support the anticipated load based on the type of soil encountered and potential groundwater conditions.

b. Ductile iron pipe. Embedment materials for bedding and initial backfill, as described in ASTM A746 for Type 1 through Type 5 laying conditions, shall be used for ductile iron pipe provided the proper strength pipe is used with the specified bedding to support the anticipated load based on the type of soil encountered and potential groundwater conditions.

c. Plastic pipe. Embedment materials for bedding, haunching, and initial backfill, Classes I, II, or III, as described in ASTM D2321, shall be used and carefully compacted for all flexible pipe provided the proper strength pipe is used with the specified bedding to support the anticipated load based on the type of soil encountered and potential groundwater conditions.

d. Composite pipe. Except as described in ASTM D2680, the bedding, haunching, and initial backfill requirements for composite pipe shall be the same as for plastic pipe

SS-4.5 Jointing:

a. General Requirements:

1. Locate joints to provide for differential movements at changes in type of pipe embedment, concrete collars, and structures. Support pipe from wall of manhole to first joint in normal sewer trench with concrete cradle structurally continuous with base slab or footing.
2. Clean and lubricate all joint and gasket surfaces with lubricant recommended by pipe manufacturer.
3. Utilize methods and equipment capable of fully homing or making up joints without damage.
4. Check joint opening and deflection for specification limits.
5. Examine each piece of pipe prior to installation for soundness and specification compliance.

- b. Provisions for Jointing Concrete Pipe: Check gasket position and condition after assembly with feeler gauge prior to installation of next section.
- c. Provisions for Jointing Cast Iron and Ductile Iron Pipe:
 - 1. Conform with AWWA C-600.
 - 2. Paint suspected damaged portions with turpentine and dust cement to check for cracks. Remove turpentine and cement by washing when crack test is satisfactorily completed. If cracks are found, the pipe shall be rejected.
 - 3. Check gasket position and condition after assembly prior to installation of next pipe section.
 - 4. Rubber Gasketed Joints: Check gasket position and condition after assembly with feeler gauge prior to installation of next section.
 - 5. Provisions for Jointing RPM Pipe: Check gasket position and condition after assembly prior to installation of next pipe section.
 - 6. Provisions for Jointing PVC Pipe: Check gasket position and condition after assembly prior to installation of next pipe section.

SS-4.6 Cutting: Cut in neat workmanlike manner without damage to pipe. Observe specifications regarding joint locations. Smooth cut by power grinding to remove burrs and sharp edges. Repair lining as required and approved.

SS-4.7 Temporary Plugs:

- 1. Plugs: Provide and install plugs as manufactured by pipe supplier or as fabricated by Contractor if approved. Plugs shall be watertight against heads up to twenty (20) feet of water. Secure plugs in place in a manner to facilitate removal when required to connect pipe.
- 2. Location: Plugs shall be installed as specified or where shown on Plans. Also the open end of the sewer shall be plugged at the end of the work day with a suitable mechanical plug to prevent entry of foreign material until work is resumed.

SS-4.8

Connections to Existing Pipelines and Structures:

- a. Connect pipe to existing structures and pipelines where indicated. Observe pertinent articles of specifications pertaining to joint locations.
- b. Prepare structure by making an opening with at least two (2") inches clearance all around fitting to be inserted. Connector gasket shall be placed on pipe. Pipe shall be positioned in manhole wall prior to grouting. Opening between pipe and manhole shall be filled with an expansive grout in such a manner that a watertight condition will result.
- c. Manholes to be built on an existing sewer shall be constructed in such a manner as will not disturb services of existing sewer. The manhole base, walls and invert shall be completed before the top half of the sewer pipe is cut or broken away. Rough edges of the pipe thus exposed shall be covered with expansive grout, in such a manner as to produce a smooth and acceptable finish. Any portion of the existing sewer damaged by the Contractor shall be repaired at no expense to the City.
- d. Connections between different pipe materials shall be made using proprietary transition coupling unless otherwise specified on the Plans.
- d.e. *Service connections to sewer mains are governed by the City Plumbing Code. Provisions include: Service connections to the sewer main shall be watertight and not protrude into the sewer. Service Saddles are approved on a case-by-case basis and if used, it shall be a device designed to join with the types of pipe which are to be connected. All materials used to make service connections shall be compatible with each other and with the pipe materials to be joined and shall be corrosion proof.*

SS-5.0 MANHOLES AND SPECIAL STRUCTURES

SS-5.1 Scope: This section governs the furnishing of all labor, equipment, tools and materials, and the performance of all work incidental to the construction of manholes, drop manholes and special sewer structures complete with covers, steps, fittings and appurtenances as required in accordance with the Plans, Special Provisions, and City Standard Plans.

SS-5.2 General: As used herein special structures refers to manholes on large sewers, special junction structures, metering stations, siphons and similar

structures constructed on the pipeline. Manholes and special structures may be constructed of precast concrete sections, cast-in place concrete on existing mains or where space does not permit a precast manhole.

SS-5.3

Construction:

- a. General: Manholes and special structures shall be constructed at locations indicated and in accordance with details as shown on the Plans or City Standard Drawings.
- b. Precast Wall and Reducing Cone Sections: Handle with care to avoid damage to joint ends of each section. Damaged sections may be subject to rejection at the discretion of the Engineer. When using O-ring joints, care shall be exercised in placing the O-ring on the spigot end, and lowering the bell section on to the spigot end so that a watertight seal is obtained.

When using bitumastic joints both spigot and bell ends shall be primed with solvent material compatible to the adhesive in the mastic. Approved bitumastic material shall completely fill the joints so that a minimum of one-fourth inch bead of material is visible after jointing, to be smoothed off after completion of the jointing operation.

When a flexible preformed butyl rubber or bituminous polymer compounded with modifiers is used to seal jointed sections of manholes, the extrusion of sealant from the joint is not required. The vertical spacing between manhole sections shall not exceed one-fourth inch. Preformed joint sealers remain flexible at temperatures as low as 0 degrees Fahrenheit.

All bitumastic materials or preformed flexible joint sealants shall not be applied to wet or damp surfaces.

- c. Cast-in-Place: Consolidate concrete with mechanical vibrators to eliminate entrapped air voids and rock pockets. Forms shall be supported in such a manner as to prevent any movement of the forms while concrete is being cured. Any movement of the forms may be cause for rejection.
- d. Invert Channels: *Pipes must discharge into channels. Dishcharge onto benches is not allowed.* Alignment of the invert channels shall be as shown on the Contract Drawings. When no specific details and dimensions are given, changes in flow direction shall be smooth, uniform and made with the longest radius possible. The cross section shape of invert channels shall match the lower halves

of the entering and exiting pipes. The surfaces of the channels shall be steel-troweled to produce a dense, smooth surface. When filling openings around pipes through manhole walls, mortar and/or masonry units shall be placed so that the resulting joints are watertight. Mortar used in the joint closure shall not interfere with the invert channel.

SS-5.4 Curing: Cast-in-place concrete shall be adequately protected from freezing and loss of moisture for the first 24 hours. The curing methods and materials to be used shall be approved by the Engineer.

SS-5.5 Manhole Rings: All rings for manhole covers shall be set to match the existing surfaces, except in flood plains where the Plans indicate that the ring is to be set at an elevation higher than existing ground. Each ring shall be set on a full mortar bed of bitumastic material, if approved by the Engineer. If masonry units are used to adjust rings to grade, the masonry work shall conform to Section SS-5.3 (d) of these specifications.

SS-5.6 Waterproofing: Two coats of an asphalt or coal-tar pitch waterproof coating shall be applied to the exterior of all structures from base to manhole ring. The coating shall be applied in sufficient quantity so that no bare or thin spots show. The coating shall be applied in sufficient time to permit proper curing prior to backfilling the excavation. Proper methods and materials shall be used during backfilling to prevent damage to the coating. Any damage to the coating which does occur shall be immediately repaired.

Where manholes may be flooded street runoff or high water, the Engineer will specify gasketed or bolt-down manhole covers.

SS. 5.7 Manhole Installation near water ways: *Manholes shall be located and installed so that they do not interfere with the free discharge of stream flood flows.*

SS. 5.8 Manhole Installation near water mains: *Manholes shall be installed a minimum distance of 10-feet from any existing or proposed water mains. Where this separation is not possible, alternatives must be approved by the Engineer and shall adhere to 10 CSR 8.120 (10) (C).*

SS-6.0 PIPE ENCASEMENT AND COLLARS AND AERIAL SEWERS

SS-6.1 Scope: This section governs the furnishing of all labor, equipment, tools and materials, and the performance of all work for the encasement of pipe

in concrete or installation of concrete collars at locations shown on the Plans.

SS-6.2 General: Tools or partial encasement of pipe in concrete shall be used where the required safe supporting strength cannot be obtained by other bedding methods. Concrete encasement shall also be provided at locations to protect public water supplies or where there exists the possibility that standard bedding may be eroded by currents of water under and around the pipe.

SS-6.3 Materials:

a. Concrete: Concrete whether reinforced or nonreinforced shall be approved by the Engineer.

Reinforcing: Reinforcing steel used in concrete encasements shall be ASTM A-615, Grade 40.

SS-6.4 Construction: Concrete encasement shall be constructed at locations indicated and in accordance with details as shown on the Plans or City Standard Drawings. Start and terminate encasement at a pipe joint. Suitably support and block pipe to maintain position and prevent flotation. Form to dimensions indicated or construct full width of trench.

a. Joints: If a single section of encasement is not constructed continuously (concrete is not placed in a single deposit) construction joints shall be provided in the encasement to coincide with pipe joints. Construction joints shall be keyed continuously around the encasement. Longitudinal reinforcement shall be continuous through construction joints.

b. Curing: Concrete encasement shall be protected and cured so as to prevent excessive evaporation of moisture or freezing.

c. Backfilling: Backfill trench only after concrete encasement has obtained a minimum of 2000 psi and can sufficiently support the loads imposed by backfill and backfill operations.

SS - 6.5 Aerial sewers are considered only on a case-by-case basis and must conform to 10CSR 20-8.120(9)

SS-7.0 BACKFILL

SS-7.1 Scope: This section governs the furnishings of all labor, equipment, tools and materials, and the performance of all operations necessary for the

proper replacement of backfill material in pipe trenches and around structures as required by the Plans and Special Provisions.

General:

- a. Unless otherwise specified, all sewer trenches and excavation around structures shall be backfilled to the original surface of the ground with earth, earth and rock or other acceptable material. *Debris, frozen material, large clods, stones, organic matter or other unstable materials shall not be used for final backfill.* When earth and rock is used it shall be placed and thoroughly consolidated with sufficient earth to completely fill all voids between the rocks. The Contractor shall so sort and stockpile the excavated material so that the proper material is available for backfill.
- b. The backfill material shall be compacted to a minimum of 80.0 percent of optimum density as determined by the Standard Proctor Test or shall be compacted to a density equivalent to the density of the immediate adjoining soil. The top six inches of backfill in street right-of-way shall be compacted to a minimum density of 95.0 percent of optimum density as determined by the Standard Proctor Test. Backfill material shall be placed and compacted only when its moisture content is within 2.0 percent of optimum moisture content as determined by Standard Proctor Test.
- c. The combination of the thickness of the layer, the method of compaction and the type of compaction equipment shall be at the discretion of the Contractor subject to obtaining the densities as specified above.
- d. The quality of the compactions shall be subject to compaction tests when deemed necessary by the Engineer.

It shall be the Contractor's responsibility to make necessary excavation in order to accommodate compaction tests at locations specified by the Engineer. The compaction tests will be performed at no cost to the Contractor. If the quality of the compaction does not meet the above requirements, the material will be removed and replaced to meet the above requirement, at the expense of the Contractor.
- e. Commercial sand backfill shall not be used.

- f. In areas marked "Garden" or "Flower Garden" on the Plans, the topsoil as excavated shall be stockpiled and replaced to original elevation, location and depth.
- g. Backfill material shall be carefully placed to avoid damage or displacement of sewer or structures.
- h. Backfill shall not be placed when material contains frost, is frozen, or a blanket of snow prevents proper compaction. Backfill shall not contain waste material, trees, organic material, rubbish, etc.

SS-7.2

Backfill of Pipe Trenches:

- a. The area below a plane six inches above the top of pipe bell shall be backfilled in accordance with the specifications for "Pipe Bedding".
- b. Backfill above a plane six inches above the top of pipe bell shall be made with suitable earth, earth and rock, or other acceptable material except that the area below a plane one foot above the pipe bell shall not contain any excavated rock. When earth and rock is used, the maximum dimension of the rock shall not exceed twelve inches.

SS-7.3

Backfill Around Structure:

- a. No backfill shall be placed over or around any structure until the concrete or mortar therein has attained a minimum strength 2000 psi and can sufficiently support the loads imposed by the backfill without damage.
- b. The Contractor shall use utmost care to avoid any wedging action between the side of the excavation and the structure that would cause any movement of the structure. Any damage caused by premature backfill or by the use of equipment on or near a structure will be the responsibility of the Contractor.
- c. Backfill shall be placed and compacted on all sides of the structure simultaneously, and operations shall be so conducted that the backfill is always at approximately the same elevation on all sides of the structure.
- d. No excavated rock larger than four (4) inches maximum dimension shall be placed within one (1) foot of the exterior surface of any structure.

SS-8.0 TUNNELING, BORING AND JACKING

SS-8.1 Scope: This section governs the furnishing of all labor, materials and equipment, and the performance of all operations necessary for the construction of tunnels complete with lining, bulkheads and sand fill at locations shown on the Plans or where constructed at the Contractor's option when approved to pass the utilities, streets or obstructions without open excavation.

SS-8.2 Tunnel Cross Section: Construct circular in cross section of size indicated. Alternate size and shape may be submitted for approval subject to the following:

- a. Best suited to proposed method of excavation and lining.
- b. Clear cross-sectional area not less than clear area of circular section indicated.
- c. Invert at grade consistent with adjoining open cut construction.

SS-8.3 Materials:

- a. Steel Liner Plate: Steel tunnel liner plates shall be Armco "Standard", Commercial Shearing and Stamping Company "Commercial", Republic "Truscon Paneled Out", or equal and shall be galvanized in accordance with ASTM A-123. The design and shape of the liner plates shall be such that assembly can take place entirely from within the tunnel liner. The outside diameter shall be four (4') feet and the minimum wall thickness shall be United States Standard Gauge 12 (0.1046 inches). Sufficient sections shall be provided with one and one-half (1 ½") inch or larger grouting holes, located near the centers, so that when the plates are installed there will be one line of holes on either side of the tunnel and one at the crown. The holes in each line shall not be more than nine (9') feet apart and, unless otherwise approved, shall be staggered. Bolts and nuts shall conform to ASTM A-153, A-307, A-325 and A-449 as applicable.
- b. Steel Casings: Steel casings for bored or jacked construction shall be steel pipe conforming to ASTM A-139 with minimum diameter as shown on the Plans.
 - 1. Minimum wall thickness shall be in accordance with the following table:

Diameter	<u>Nominal Wall Thickness</u>
-----------------	--------------------------------------

<u>of Casing</u>	<u>Under Railroads</u>	<u>All Other Uses</u>
24"	0.406"	0.281"
26"	0.438"	0.281"
28"	0.469"	0.312"
30"	0.469"	0.312"
32"	0.500"	0.312"
34"	0.500"	0.312"
36"	0.500"	0.344"

2. Steel shall be Grade B under railroads and Grade A on all other uses.

c. Joints:

1. Steel liner plates shall have bolted joints in both longitudinal and circumferential planes. Stagger longitudinal joints in adjacent rings when assembling.

2. Steel pipe shall have welded joints in accordance with AWWA C-206.

SS-8.4

Construction:

a. General: Before starting work, complete details of the method of operation and liner materials to be used shall be submitted to the Engineer. The sewer, in the area to be tunneled, bored or jacked, shall be completed before the construction of adjacent portions of the same sewer lateral. The purpose of this requirement is to allow for slight discrepancies in alignment and grade which may occur in the tunneled, bored or jacked installation, so minor adjustments in the adjacent sewer can be made. The maximum allowable deviation in alignment and grade of sewer pipe shall be as shown on the Construction Plans.

b. Excavation: Excavate by approved methods applicable to materials encountered. Boring operations shall be performed by experienced crews using a rotary-type boring machine designed especially for this purpose. Include dewatering and chemical soil stabilization or grouting if necessary due to existing field conditions. Conduct excavation in a manner to prevent disturbing the overlaying and adjacent material.

c. Lining: Assemble liner plates immediately following the excavation. Advance casing continuously with excavation. When liner plates are being installed, care shall be taken to maintain alignment, grade and circular shape of the tunnel. All voids between linear and surrounding earth shall be filled with grout

forced in under pressure. The grout shall consist of two parts of sand to one part of Portland Cement, mixed with sufficient water to maintain a freely pouring consistency. As the pumping through any hole is stopped, it shall be plugged to prevent the backflow of grout. After lining installation is complete it shall be cleaned of all debris and all leaks which allow flowing or seeping water into tunnel shall be stopped.

- d. End Seals: Construct end seals after sewer pipe has been permanently placed inside casing, tested and approved. Brick shall be in accordance with ASTM C-32, Grade SS or SM and mortar in accordance with ASTM C-270.
- e. Casing spacers: Carrier pipe shall be supported inside the casing pipe per the City Standard Drawings.

SS-9.0 ACCEPTANCE TESTS FOR SEWERS

SS-9.1 Scope: This section governs the furnishing of all labor, equipment, tools and materials, and the performance of any or all acceptance tests as required by the Plans, Special Provisions, and these specifications.

SS-9.2 Acceptance Tests for Gravity Sewers:

SS-9.2.1 Visual Inspection:

1. Contractor shall clean pipe of excess mortar, joint sealant and other dirt and debris prior to inspection.
2. Sewer will be inspected by flashing a light between manholes and/or by physical passage where space permits. Determine from illumination and/or physical inspection the presence of any misaligned, displaced or broken pipe and the presence of visible infiltration or other defects.
3. Correct defects as required prior to conducting leakage tests.

SS-9.2.2 Exfiltration Leakage Test to be performed on the full length of all lines prior to acceptance.

1. Contractor may perform leakage testing by exfiltration on sewer pipe larger than eighteen (18") inches I.D.

2. Furnish all labor, equipment, tools and materials required including bulkheads, water and all miscellaneous items required to perform the tests.
3. Test all sewer pipe over eighteen (18) inches I.D. after either the completed backfill or partial backfill sufficient to stabilize the position of the pipe in both alignment and grade is accomplished. Contractor may select sections of the project for testing at any time by notifying the Engineer 24 hours in advance.
4. Perform at depths of water as measured above centerline of pipe of not less than two (2) feet or more than ten (10) feet (consideration shall be given for water table above said centerline).
5. Maintain test as necessary to locate all leaks but not less than two hours.
6. Repeat as necessary after repair of leaks and defects until leakage, as measured, does not exceed 0.15 gallons per inch of internal diameter per hour per 100 feet of pipe length (~~200~~ 100 gal/inch of I.D./day/mile).
7. Protect manholes and other structures by means of bulkheads to prevent bursting pressures from being applied inside the structure.
8. Dewater pipe upon completion of testing.

SS-9.2.3 Air Leakage Test to be performed on the full length of all lines prior to acceptance.

1. Contractor may perform air tests for all pipe sizes.
2. Furnish all facilities required including necessary piping connections, test pumping equipment, pressure gauges, bulkheads, regulator to avoid over-pressurization and all miscellaneous items required.
 - a. The pipe plug for introducing air to the sewer line shall be equipped with two taps. One tap will be used to introduce air into the line being tested, through suitable valves and fittings, so that the input air may be regulated. The second tap will be fitted with valves and fittings to accept a pressure test gauge indicating internal pressure in the sewer pipe. An additional valve and fitting will be incorporated on the tap used to check internal pressure so that a second test gauge may be attached to the internal pressure tap. The

pressure test gauge will also be used to indicate loss of air pressure due to leaks in the sewer line.

- b. The pressure test gauge shall meet the following minimum specifications:

Size (Diameter)	4 ½ inches
Pressure Range	0-15 P.S.I.
Figure Intervals	1 P.S.I. increments
Minor Subdivisions	0.05 P.S.I.
Pressure Tube	Bourdon tube or diaphragm ±0.25% of maximum scale reading
Dial	White coated aluminum with black lettering, 270 degree arc and mirror edge
Pipe Connection	Low male ½" N.P.T.

Calibration data will be supplied with all pressure test gauges. Certification of pressure test gauge will be required from the gauge manufacturer. This certification and calibration data will be available to the Engineer whenever air tests are performed.

- 3. Test each reach of sewer pipe between manholes after completion of the installation of pipe and appurtenances and the backfill of sewer trench.
- 4. Plug ends of line and cap or plug all connections to withstand internal pressure. One of the plugs provided must have two taps for connecting equipment. After connecting air control equipment to the air hose, monitor air pressure so that internal pressure does not exceed 5.0 psig. After reaching 4.0 psig, throttle the air supply to maintain between 4.0 and 3.5 psig for at least two (2) minutes in order to allow equilibrium between air temperature and pipe walls. During this time, check all plugs to detect any leakage. If plugs are found to leak, bleed off air, tighten plugs, and again begin supplying air. After temperature has stabilized, the pressure is allowed to decrease to 3.5 psig. At 3.5 psig, begin timing to determine the time required for pressure to drop to 2.5 psig. If the time, in seconds, for the air pressure to decrease from 3.5 psig to 2.5 psig is greater than that shown on the table below, the pipe shall be presumed free of defects.

Pipe	Required Time	Maximum Required
------	---------------	------------------

<u>Size</u>	<u>Per 100 LF</u>	<u>Time</u>
8"	70 sec.	227 sec.
10"	110 sec.	283 sec.
12"	158 sec.	340 sec.
15"	248 sec.	425 sec.
18"	356 sec.	510 sec.
21"	485 sec.	595 sec.
24"	634 sec.	680 sec.
27"	765 sec.	765 sec.
30"	851 sec.	851 sec.
33"	935 sec.	935 sec.

If air test fails to meet above requirements, repeat test as necessary after all leaks and defects have been repaired. Prior to acceptance all constructed sewer lines shall satisfactorily pass the low pressure air test.

5. In areas where ground water is known to exist, install a one-half inch diameter capped pipe nipple, approximately ten (10") inches long, through manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, ground water level shall be determined by removing pipe cap, blowing air through pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to pipe nipple. The hose shall be held vertically and a measurement of height in feet of water shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings.

SS-9.3 Acceptance Tests for Pressure Sewage Forcemains:

- a. Perform hydrostatic pressure and leakage tests. Conform to AWWA C-600 procedures as modified herein. Test shall apply to all pressure sewers. Perform after backfilling.
- b. Test separately in segments between sectionalizing valves, between a sectionalizing valve and a test plug, or between test plugs. Select test segments such that adjustable seated valves are isolated for individual checking. Contractor shall furnish and install test plugs at no additional cost to the Owner, including all anchors, braces and other devices to withstand hydrostatic pressure on plugs.

Contractor shall be responsible for any damage to public or private property caused by failure of plugs. Limit full rate of line to available venting capacity.

- c. Pressure Test: Conduct at 1.5 times maximum operating pressure determined by following formula:

$$P_{pt} = 0.650 (OP-GE) \text{ in which}$$

P_{pt} = test pressure in psi at gauge elevation

OP = operating pressure in feet as indicated for highest elevation of the hydraulic gradient on each section of the line.

GE = elevation in feet at center line of gauge. Perform satisfactorily prior to determining leakage.

- d. Leakage Test: Conduct at maximum operating pressure determined by following formula:

$$P_{lt} = 0.433 (OP-GE) \text{ in which}$$

P_{lt} = test pressure in psi at gauge elevation

OP and GE = as in previous article.

1. All joints shall be watertight and free from leaks.

- e. Deflection Test:

Gravity pipeline ~~of~~ flexible materials shall also be tested by pulling a mandrel. The test shall be conducted not less than ~~one (1) month~~ *thirty days* after backfill has been properly installed. The maximum allowable deflection shall not exceed five (5) percent of the pipe's internal diameter. *The test shall be performed without mechanical pulling devices.*

Mandrel testing shall be performed on ~~a~~ *all flexible sewer main installed. minimum of 25% of the pipeline. The sections tested will be determined by the City.*

If ~~one~~ *a* section of line fails the test, the City *will evaluate the sewer main and recommend a repair. may require all sections of pipeline be tested.* The *repair and* additional testing shall be done *by the Contractor* at no additional cost to the City.

Any pipeline found not conforming to these requirements shall be replaced by the Contractor at no additional cost to the City, and shall then be retested. The City may, prior to the end of the

warranty (guarantee) period, conduct another deflection test with City personnel. Any pipeline found not conforming to these requirements shall be replaced by the Contractor at no additional cost to the City, and the Contractor shall provide an additional warranty (guarantee) for not less than two (2) years for that portion of pipeline so replaced.

The City also reserves the right to conduct deflection tests on any sewer installation.

Mandrell shall be similar or equal to the "Wortco 9-Arm Mandrell" five (5) percent deflection for flexible or semi-rigid pipe as approved by the Engineer.

SS-9.4 Acceptance Test for Manholes

All manholes shall be vacuum tested by the contractor at his expense. Appropriate equipment and manpower will be furnished by the Contractor for this purpose.

When vacuum testing manholes, the following criteria are to be used:

1. This method is applicable to precast manholes only.
2. All lift holes shall be plugged with an approved non-shrink grout.
3. Manholes are to be tested after assembly and before backfilling. No standing water shall be allowed in the manhole excavation which may affect the accuracy of the test.
4. All pipes and other openings into the manhole shall be plugged and securely braced to prevent displacement of the plugs while the vacuum is drawn.
5. Installation and operation of vacuum equipment shall be in accordance with equipment specifications and instructions provided by the manufacturer.
6. The test head may be placed in the cone section of the manhole. The frame-cone joint will be visually inspected by the engineer.
7. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. The time for the vacuum to drop to 9 inches of mercury shall be recorded.

8. Acceptance for four (4) foot diameter manholes shall be defined as when the time to drop to 9 inches of mercury meets or exceeds the following:

<u>Manhole Depth</u>	<u>Diameter</u>	<u>Time to Drop 1" of HG</u>
10 ft. or less	4 ft.	60 seconds
10 ft. to 15 ft.	4 ft.	75 seconds
15 ft. to 20 ft.	4 ft.	90 seconds

9. For manholes five (5) foot in diameter, add an additional 15 seconds and for manholes six (6) foot in diameter, add an additional 30 seconds to the time requirements for four (4) foot diameter manholes.

If the manhole fails to test, necessary repairs shall be made with a non-shrink grout while the vacuum is still being drawn. Re-testing shall proceed until a satisfactory test is obtained.

SS-10.0 SEEDING

SS-10.1 Scope: This section governs the furnishing of all labor, equipment, tools and materials, and the performance of all work for seeding, complete as specified in the Special Provisions and/or as shown on the Plans. All grassed areas disturbed which lie outside the Contractor's normal trenching operation areas shall be restored to a condition equal to or better than existing prior to construction. All provisions of Section TS-9 shall apply except as amended herein.

SS-10.2 The seeding mixture used to seed areas off street right-of-ways that are not maintained shall be as follows:

<u>Kind of Seed</u>	<u>Min. Pure Live Seed (%)</u>	<u>Rate Lbs Per Acre</u>
Alta Fescue or Kentucky 31 Fescue (Festuca Eliator Var. Arundines)	75	90
Rye Grass (Lolium Perenne 80 or L. Miltiflorum)	80	50
	Total	140#/acre

SS-10.3 Sowing shall be accomplished by use of an approved mechanical seeder or drill (hand spreader can be used in small area), making sure that successive seed strips overlap to provide uniform coverage. Seed should be drilled to a depth of one-half (1/2") inch.

SS-11.0 PAVEMENT REPLACEMENT

SS-11.1 Scope: This Section covers the furnishing of all labor, equipment, tools and materials, and the performance of all work for the replacement of pavement including sidewalks, driveways, and curbing, as specified on the Plans in the Special Provisions.

SS-11.2 Definitions: Pavement, as used herein, shall include Portland Cement Concrete (PCC), asphaltic concrete, asphaltic and lime or cement treated surface courses, and other similar types of construction, including sidewalks, driveways, and curbing. Replacement, as used herein, shall mean reconstruction of the entire structural section of all pavements removed in excavated areas, including sidewalks, driveways, and curbing, and reconstruction or restoration of damaged pavement surfaces outside of excavation limits.

SS-11.3 General: In all areas of pavement removal replace pavement upon completion of sewer installation. All pavement not designated for removal that is damaged by the Contractor's operations shall be required, restored or replaced depending upon the degree of damage.

Prior to pavement replacement, all edges that were previously cut but have been subsequently damaged, shall be re-cut, and all adjacent undermined and heaved pavement shall be removed to the edge of the undisturbed trench.

SS-11.4 Pavement Replacement:

a. General: Removed pavement shall be replaced in conformance with the typical sections shown on the City Standard Drawings, Plans, and Technical Street Specifications, the requirements specified in the Special Provisions, and will generally be replaced in kind. Replacement shall include construction of all courses upon the subgrade for a complete pavement structural section. Restoration of damaged surfaces shall be as directed by the Engineer. Final pavement joints must be parallel or perpendicular to the street centerline.

b. Subgrade Compaction: Subgrade compaction shall conform to SS-7.0.

SS-12.0 MEASUREMENTS AND PAYMENTS

SS-12.1 Scope: This section covers the method of measurement and basis of payment for the furnishing of all labor, equipment, tools and materials and for the performance of all related work necessary to complete the sewer and appurtenances.

SS-12.2 Method of Measurement: The amount of completed and accepted work shall be measured or determined as follows:

1. Pipe Sewer:
 - a. Open Trenched: Measurement of various size, type and depth pipe sewer will be in linear feet, as listed on the Bid, based on the true length of pipe computed from inside wall to inside wall of manholes along centerline of pipe sewer. Depth range as listed on the Bid and shown on the Plans is the average trench depth between adjacent manholes and will not be measured unless changed field conditions result in a change in the Plans by the Engineer.
 - b. Tunneled, Bored or Jacked: Measurement will be made in linear feet for the applicable size of cast iron pipe sewer, tunneled, bored or jacked as listed in the Bid, based on the true length of pipe shown on the Plans, unless changed in the field by the Engineer.
2. Manholes: Measurement will be made for the applicable type, size and depth of manholes as listed in the Bid. The manhole depth shall be determined by measuring from top of casting to outlet pipe flowline.
3. Encasement: Standard concrete encasement will be measured in linear feet for the applicable size pipe, as listed in the Bid. Concrete collars will be measured as one (1') linear foot of concrete encasement based on true length of encasement along the centerline of pipe.
4. Seeding: Seeded areas will be measured horizontally in linear feet along centerline of sewer, regardless of width of disturbed area or type of seed used. Seeding will be measured only when centerline of sewer lies in grassed areas to be seeded, as shown on the Plans. When centerline of sewer lies in areas that are not grassed, such as street paving, driveways, parking areas, gardens, etc., no measurement will be made. Areas that are disturbed which lie outside the Contractor's normal trenching areas will not be measured for payment, but shall be restored to condition equal to or better than that existing prior to construction. When sewer ends

in a grassed area, measurement will be made only to centerline of manhole.

5. Rock: Measurement of the quantity of excavated rock will be in cubic yards, as listed in the Bid, based on the true lengths and depths as measured in the field. Payline width shall be the outside diameter of the pipe plus twelve (12") inches. The minimum payline width shall be twenty-four (24") inches.

SS-12.3 Basis of Payment

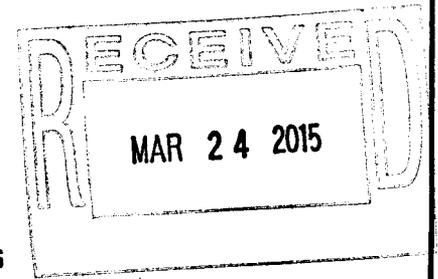
Payment for the completed and accepted work shall be made as follows:

1. Pipe Sewer:
 - a. Open Trenched: Payment will be made at the contract unit price per linear foot for the applicable size, type and depth of pipe sewer, as listed in the Bid. Such payment and price shall constitute full compensation for all labor, materials, equipment and for the performance of all work necessary to complete the sewer, including excavation, sheeting and shoring, dewatering, preparation of bedding, installation of pipe sewer, backfilling, compaction, disposal of excess materials and replacement of pavement.
 - b. Tunneled, Bored or Jacked: Payment will be made at the contract unit price per linear foot for cast iron pipe sewer, tunneled, bored or jacked as listed in the Bid. Such payment and price shall constitute full compensation for all labor, material, equipment and for the performance of all work necessary to complete the sewer, including all excavation, sheeting and shoring, dewatering, installation of casing pipe, tunnel liner plate, grouting, installation of carrier pipe, sand fill, end seals, backfilling compaction and disposal of excess material, including all cost of jacking and pit(s).
2. Manholes: Payment will be made at the contract unit price per each for the applicable type, size and depth of manholes as listed in the Bid. Such payment and price shall constitute full compensation for all work necessary to complete the manholes, including excavation, sheeting and shoring, dewatering, concrete base, manhole steps, manhole ring and cover, waterproofing, reinforced concrete, backfilling, compaction and disposal of excess material.

3. Encasement: Payment shall be made at the contract unit price per linear foot of encasement, for the applicable size pipe as listed in the Bid. Such payment shall constitute full compensation for all labor, materials, equipment and for the performance of all work necessary to complete the item, including reinforced concrete collars.
4. Seeding: Payment will be made at the contract unit price per linear foot for seeding, regardless of type of seed, as listed in the Bid. Such payment shall constitute full compensation for all labor, materials, equipment and work necessary to complete the item, including grading, tilling, fertilizing, seed application, compaction and mulching.
5. Rock: Payment will be made at the contract unit price per cubic yard, as listed in the Bid. Such payment and price shall constitute full compensation for all labor, material, equipment, and all work necessary to complete the rock removal.

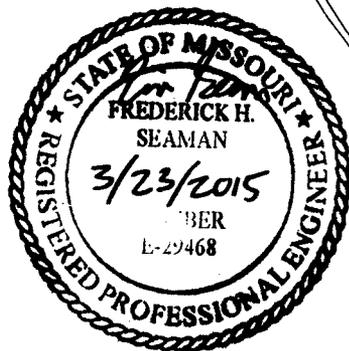
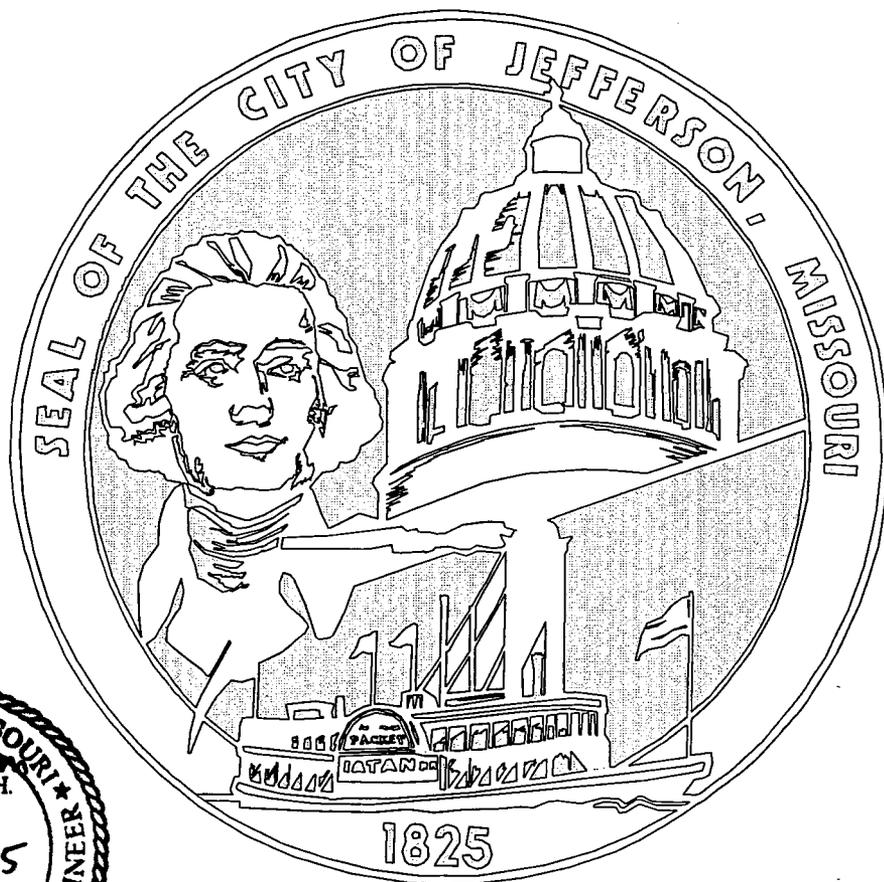
SS-13.0 SUBSIDIARY ITEMS

Section TS-30 shall apply.



CITY OF JEFFERSON STANDARD DRAWINGS

REVISED : 1/2013
7TH EDITION



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* Denotes Modification/Addition for year 2013
City of Jefferson Standards

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CITY OF JEFFERSON
STANDARD DRAWINGS
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PIPE EMBEDMENT

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PIPE EMBEDMENT	30.00
<u>SANITARY SEWER AND STORMWATER</u>	
PIPE EMBEDMENT DETAILS	30.01
CORRUGATED METAL PIPE SPECIFICATIONS & CONNECTING BAND SIZES.....	30.02

DIVISION IV

STORMWATER

DESCRIPTION:	SECTION NUMBER
<u>TYPE "A" & "C" INLETS</u>	41.00
<u>INLET NOTES, TYPE "A" & "C", AND</u>	
EDGE ANGLE ASSEMBLY DETAILS	41.01
DEFLECTOR DETAILS FOR TYPE "A" & "C" INLETS	41.02
TYPE "A" INLET DETAILS, (PLAN VIEW)	42.01
TYPE "A" INLET DETAILS, (SECTION A-A)	42.02
TYPE "A" INLET DETAILS, (SECTION B-B & C-C)	42.03
TYPE "C" INLET DETAILS, (PLAN VIEW)	43.01
TYPE "C" INLET DETAILS, (SECTION A-A)	43.02
TYPE "C" INLET DETAILS, (SECTION B-B & C-C)	43.03
TYPE "C" INLET ISOMETRIC VIEWS	43.04
<u>AREA INLETS & JUNCTION BOXES</u>	44.00
<u>JUNCTION BOX DETAILS</u>	44.01
AREA INLET DETAILS	44.02
GRATE INLET DETAILS	44.03
CONCRETE FLUME DETAILS	45.01
CONCRETE CHANNELS	46.01
IMPROVED CHANNELS	47.01
<u>CONCRETE END SECTION</u>	48.00
<u>CONCRETE END SECTION DETAILS</u>	48.01-48.03

* Denotes Modification/Addition for year 2013
City of Jefferson Standards

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For comments or corrections please E-Mail at: jcengineering@jeffcitymo.org


City of Jefferson
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
320 E. McCarty Street
Jefferson City, Missouri, 65101
Ph:(573)634-6410
Fax:(573)634-6562
CITY OF JEFFERSON
STANDARD DRAWINGS
REVISED EDITION: 1/2013

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INDEX OF SHEETS

DIVISION IV STORMWATER (continued)

Index of sheets for
A.P.W.A. Division III Standard Drawings,
As per City of Jefferson Ordinance No. 14154
requirements to follow.

<u>DRAWING NO.</u>	<u>DESCRIPTION</u>	<u>LATEST REVISION</u>
ESC-01	Temporary Construction Entrance	04/22/2003
ESC-02	Sodding	04/22/2003
ESC-03	Sodding Waterways	04/22/2003
ESC-04	Erosion Control Blanket - 1	04/22/2003
ESC-05	Erosion Control Blanket - 2	04/22/2003
ESC-06	Turf Reinforcement Mat Slope Installation	04/22/2003
ESC-07	Turf Reinforcement Mat Channel Installation	04/22/2003
ESC-08	Stakes, Staples, and Pins	04/22/2003
ESC-09	Staple Patterns for Rolled Erosion Control Products	04/23/2003
ESC-10	Sediment Fence	04/23/2003
ESC-11	Sediment Fence Installation Slicing Method	04/23/2003
ESC-12	Super Sediment Fence	04/23/2003
ESC-13	Straw Bale Barrier	04/23/2003
ESC-14	Compost Berm	04/23/2003
ESC-15	Rock Check Dam	04/23/2003
ESC-16	Triangular Silt Dike	04/23/2003
ESC-17	Geo-Ridge	04/23/2003
ESC-18	Silt Saver	04/23/2003
ESC-19	Sediment Fence Drop Inlet Protection	04/23/2003
ESC-20	Gravel and Wire Mesh Drop Inlet Sediment Trap	04/23/2003
ESC-21	Block and Gravel Drop Inlet Sediment Trap	04/23/2003
ESC-22	Excavated Drop Inlet Sediment Trap	04/23/2003
ESC-23	Sod Drop Inlet Sediment Trap	04/23/2003
ESC-24	Gravel Curb Inlet Sediment Trap	04/23/2003
ESC-25	Wooden Weir Curb Inlet Protection	04/23/2003

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STANDARD DRAWINGS
REVISED EDITION: 1/2013

INDEX OF SHEETS

DIVISION IV STORMWATER (continued)

Index of sheets for
 A.P.W.A. Division III Standard Drawings,
 As per City of Jefferson Ordinance No. 14154
 requirements to follow.

<u>DRAWING NO.</u>	<u>DESCRIPTION</u>	<u>LATEST REVISION</u>
ESC-26	Block and Gravel Curb Inlet Protection	04/23/2003
ESC-27	Culvert Inlet Sediment Trap	04/23/2003
ESC-28	Sediment Fence Culvert Inlet Protection	04/23/2003
ESC-29	Diversions	04/23/2003
ESC-30	Trapezoidal Grass-Lined Channel	04/23/2003
ESC-31	Infiltration Trench	04/23/2003
ESC-32	Temporary Slope Drain	04/23/2003
ESC-33	Temporary Sediment Trap	04/23/2003
ESC-34	Anti-Seep Collar	04/23/2003
ESC-35	Detention/Infiltration Basin	04/23/2003
ESC-36	Diversion Channel Crossing	04/23/2003
ESC-37	Flume Pipe Crossing	04/23/2003
ESC-38	Cofferdam Crossing	04/23/2003
ESC-39	Temporary Culvert Crossing	04/23/2003
ESC-40	Temporary Bridge Crossing	04/23/2003
ESC-41	Straw Bale/Sediment Fence Pit	04/23/2003
ESC-42	Dewater Box	04/23/2003
ESC-43	Dirt Bag	04/23/2003
ESC-44	Turbidity Curtain	04/23/2003
ESC-45	Turbidity Curtain Installations	04/23/2003

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 City of Jefferson Standards

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 CITY OF JEFFERSON
 STANDARD DRAWINGS
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DIVISION V SANITARY SEWER

<u>STANDARD MANHOLE DETAILS</u> (manholes for stormwater and sanitary sewer)	50.00
MANHOLE DETAILS	50.01
OUTSIDE DROP MANHOLE DETAILS	50.02
* INSIDE DROP MANHOLE DETAILS	50.03
MANHOLE INVERT DETAILS	50.04
SHALLOW MANHOLE DETAILS & ALTERNATE SLAB TOP MH ...	50.05
MANHOLE STEP & ALTERNATE BLOCK BASE DETAIL	50.06
MISC. SANITARY SEWER DETAILS	51.01-51.02
<u>SANITARY SEWER CLEANOUT DETAILS</u>	52.00
MISC. CLEANOUT DETAILS	52.01
MISC. CLEANOUT DETAILS & LAMPHOLE DETAIL	52.02

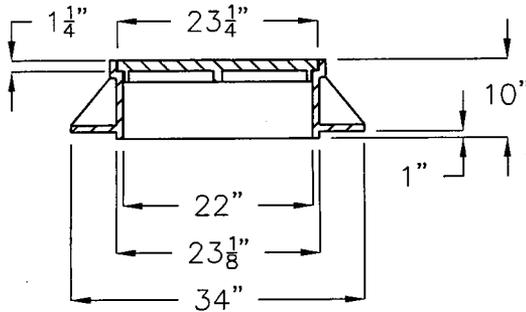
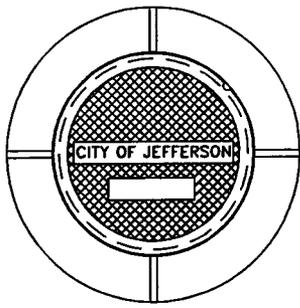
* Denotes Modification/Addition for year 2013
City of Jefferson Standards

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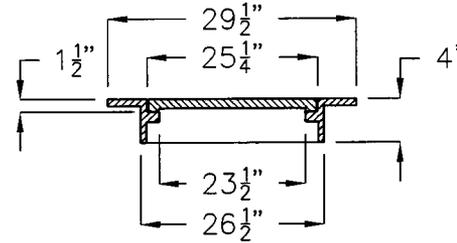
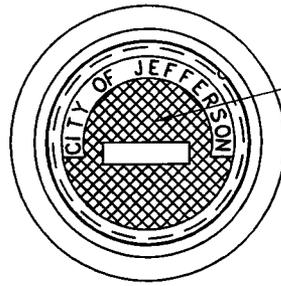

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STANDARD DRAWINGS
REVISED EDITION: 1/2013

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STANDARD MANHOLE FRAME

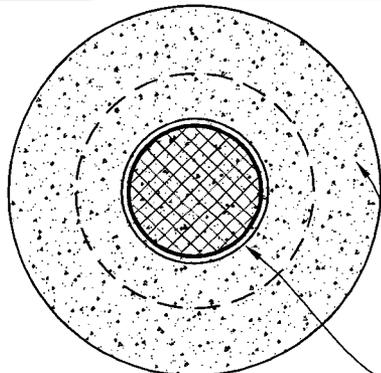
NOTES:
 STANDARD MANHOLE FRAME AND
 SOLID LID SHALL BE
 NEENAH R-1736 (OR EQUAL),
 WITH "CITY OF JEFFERSON"
 CASTED ON THE LID.
 TOTAL WEIGHT: FRAME AND
 SOLID LID = 460 POUNDS.
 GRATED LID SHALL BE
 NEENAH R-2421-A



ALTERNATE MANHOLE FRAME

NOTES:
 ALTERNATE MANHOLE FRAME AND
 SOLID LID SHALL BE
 NEENAH R-5900-F (OR EQUAL),
 WITH "CITY OF JEFFERSON"
 CASTED ON THE LID.
 TOTAL WEIGHT: FRAME AND
 SOLID LID = 205 POUNDS.
 GRATED LID SHALL BE
 NEENAH R-5901-F

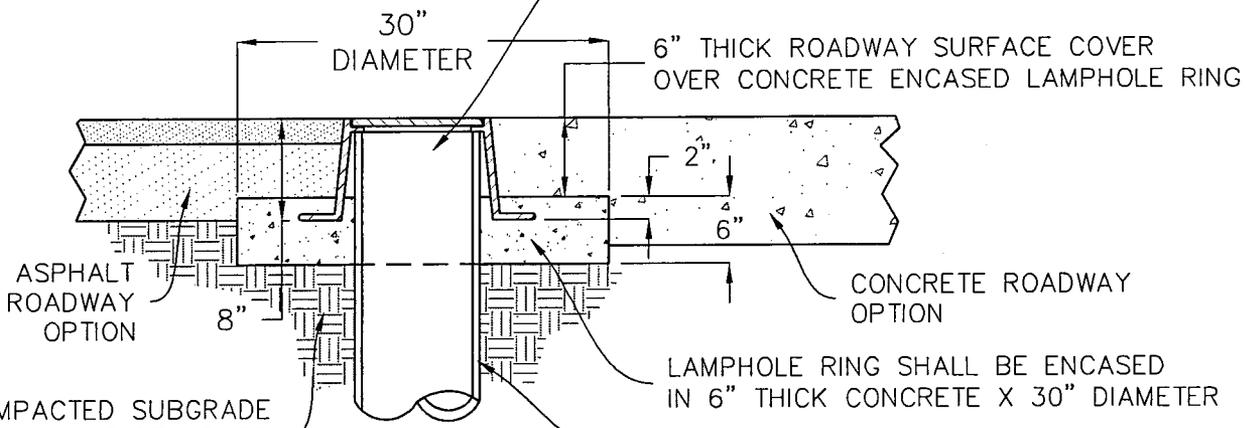
REVISION AND DESCRIPTION	
ADDED LAMPHOLE DETAIL	
NO:	1
DATE:	1/2010
CITY OF JEFFERSON MANHOLE FRAME AND LID	
STANDARD DETAILS	
CHECKED BY:	
DRAWN BY:	
DATE:	



4000 psi CONCRETE ENCASEMENT
 AROUND LAMPHOLE RING

PLAN VIEW

LAMPHOLE RING AND SOLID COVER
 SHALL BE DEETER: 1828, OR
 CLAY AND BAILY: 2238, OR APPROVED
 EQUAL.



SECTION VIEW

COMPACTED SUBGRADE
 TO 95% OF STANDARD
 MAXIMUM DENSITY

LAMPHOLE RING SHALL BE ENCASED
 IN 6" THICK CONCRETE X 30" DIAMETER

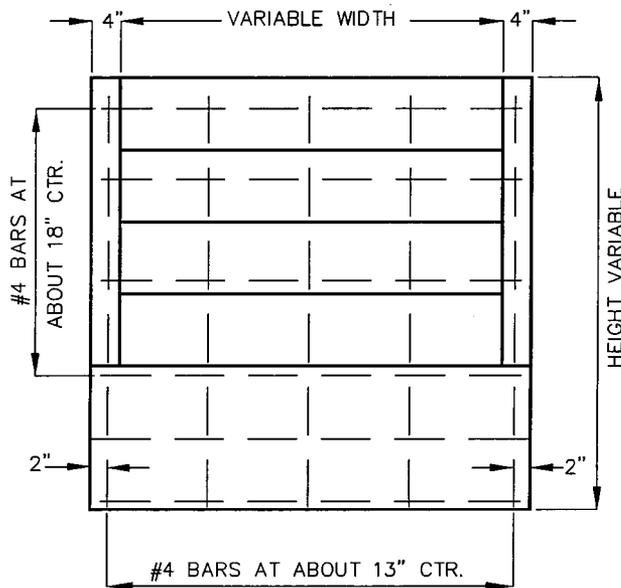
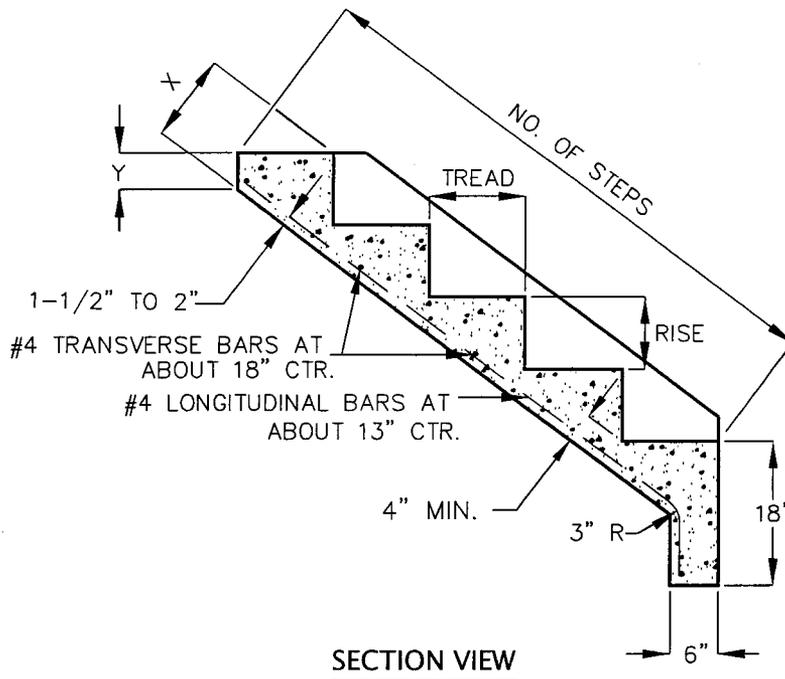
VERTICAL LAMPHOLE PIPE

LAMPHOLE INSTALLATION DETAIL

CITY OF JEFFERSON
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

Jefferson

SHEET NUMBER
1 OF 1
 SECTION
1.01



CONCRETE STEPS
LOOKING FROM
SIDEWALK

NOTES

FOR RESIDENTIAL APPLICATIONS

1. Minimum riser shall be 4", and maximum shall be no more than 7 3/4".
2. Minimum tread shall be 10 3/4".

FOR COMMERCIAL APPLICATIONS

1. Minimum riser shall be 4", and maximum shall be no more than 7".
2. Minimum tread shall be 11".

- Positive drainage shall be achieved on all treads, not to exceed 1/8" per foot.

NO.	DATE:	REVISION AND DESCRIPTION

CONCRETE STEP DETAILS	STANDARD DETAILS
--------------------------	------------------

CHECKED BY:	DRAWN BY:	DATE:
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SHEET NUMBER
1 OF 4
SECTION
2.01

NOTES:

1. Handrails are required on both sides of stairs and on ramps.
2. The top of the gripping surfaces of handrails shall be no less than 34" and no more than 38" vertically above the walking surface, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above the walking surface or stair nosings.
3. At the top of a stair flight, handrail shall extend horizontally above the landing for a minimum of 12" beginning directly above the first riser nosing. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.
4. At the bottom of a stair flight, handrail shall extend at the slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last riser nosing. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the hand rail of an adjacent stair flight.
5. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of the handrail gripping surfaces shall not be obstructed for more than 20% of their length.
6. Handrail gripping surfaces with a circular cross section shall have an outside diameter of not less than 1 1/4" and not more than 2". Handrail gripping surfaces with a non-circular cross section shall have a perimeter of not less than 4" or more than 6 1/4". The longest cross sectional dimension shall not exceed 2 1/4".
7. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20 percent of their length.
8. Refer to U.S. Department of Justice "2010 ADA Standards for Accessible Design" for additional information and or requirements.

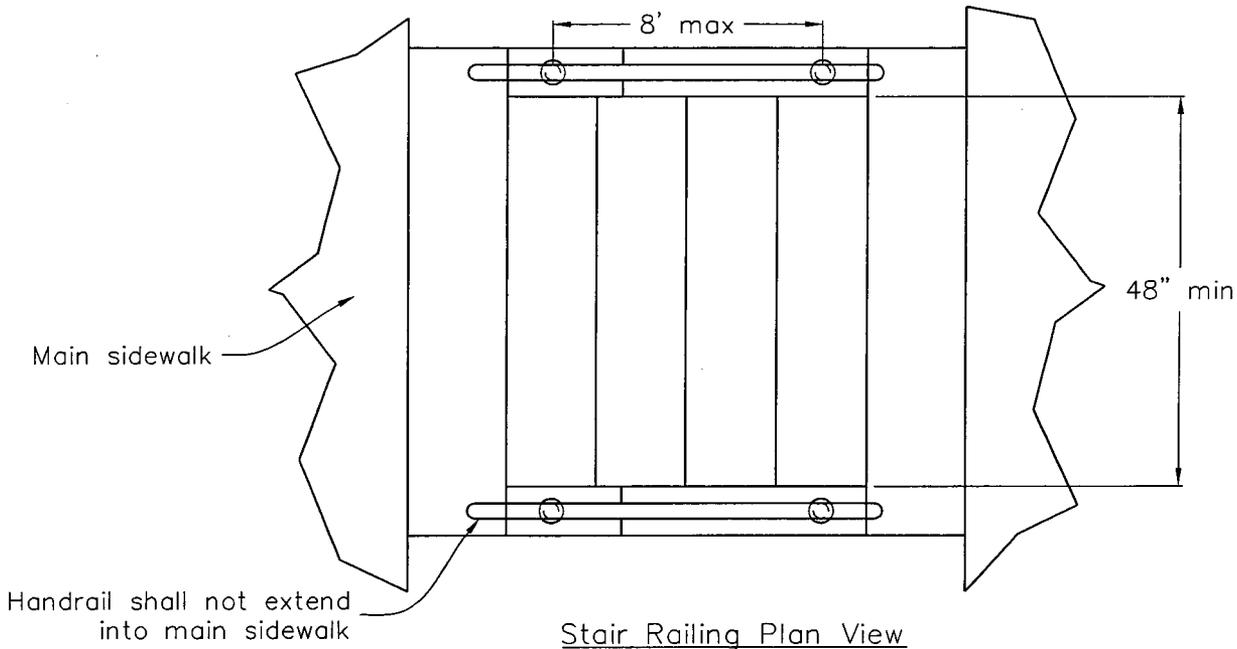
MATERIAL / FINISHES / INSTALLATION:

1. The material and finish requirements contained in this section are not meant to prohibit the use of manufactured railings which meet the requirements of ADA.
3. All fabricated railings shall be either 1 1/2" ϕ schedule 40 steel tubing (1.90 OD x .145 wall), or 1 1/2" x 1 1/2" x 11 GA. (.120 wall) steel tubing. Pedestrian/Bicycle Guard Railing may exceed these dimensions.
4. All welds shall be continuous and shall be ground smooth. The railing shall be free of slag, burrs, or other defects.
5. Expansion joints shall be placed in railings after every third post. The joints shall be constructed as shown in the Expansion Detail. Additional expansion joints and or specifically designed mounting bracket/elements may be necessary if the railing is installed on a curve.
6. All posts shall have a 1/4" weep hole immediately above the concrete surface.
7. All fabricated railings shall have a hot dipped galvanized finish or shall be powder coated. If powder coated, the color shall be black unless otherwise approved by the engineer.
8. When installed the posts of all railings shall be plumb.
9. The railings may be bolted to the concrete surface or may be mounted with grout in sockets formed or drilled in the concrete. Refer to the mounting details for additional information.

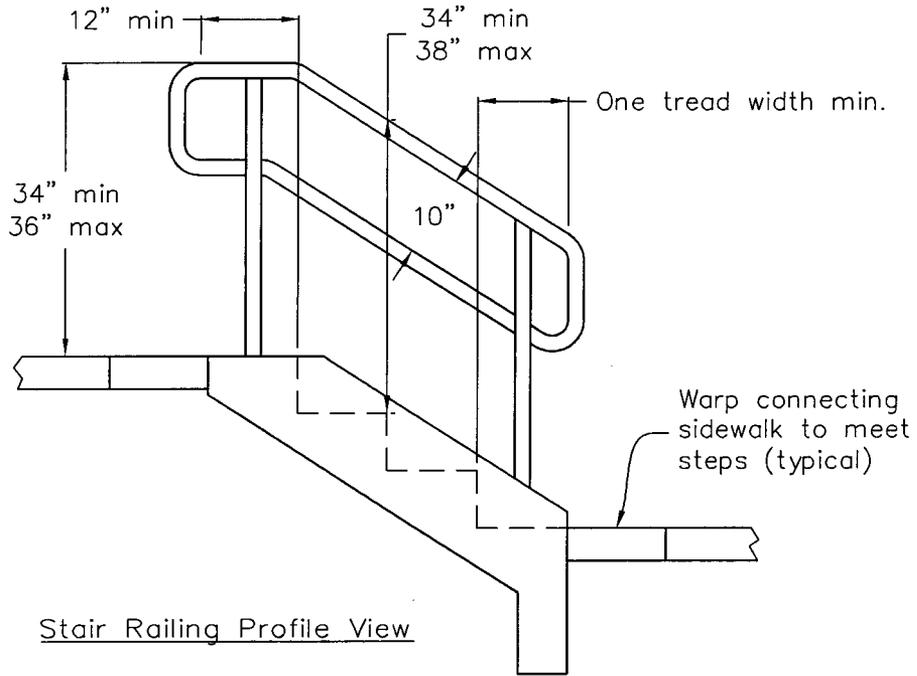
REVISION AND DESCRIPTION	
DATE:	
NO:	
HANDRAIL LAYOUT REQUIREMENTS	
STANDARD DETAILS	
CHECKED BY:	
DRAWN BY:	
DATE:	



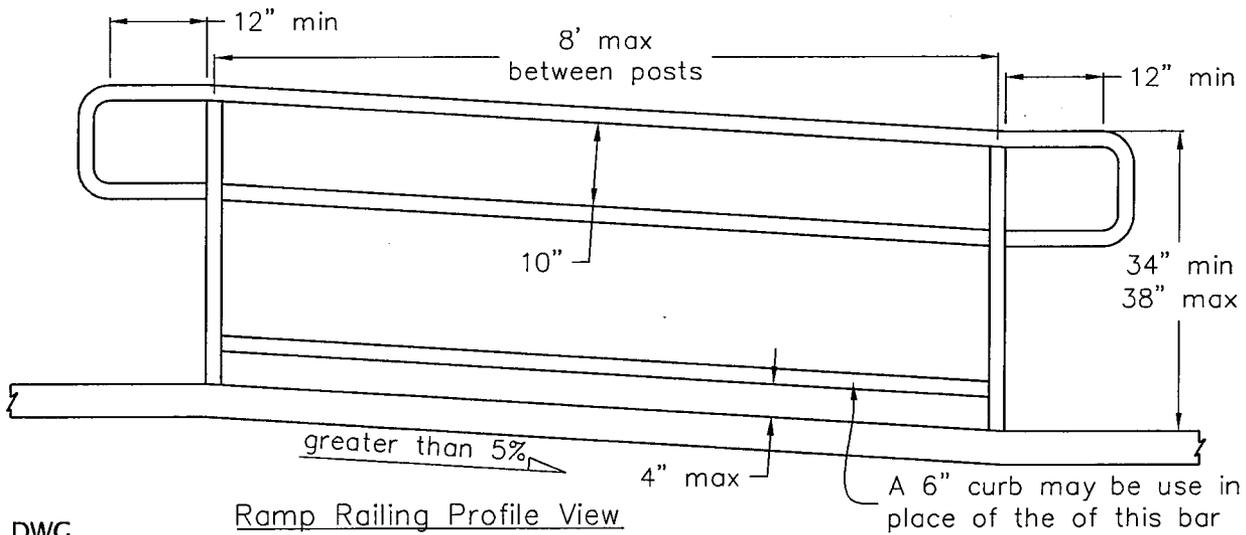
SHEET NUMBER
2 OF 4
 SECTION
2.02



Stair Railing Plan View



Stair Railing Profile View



Ramp Railing Profile View

NO.	DATE:	REVISION AND DESCRIPTION

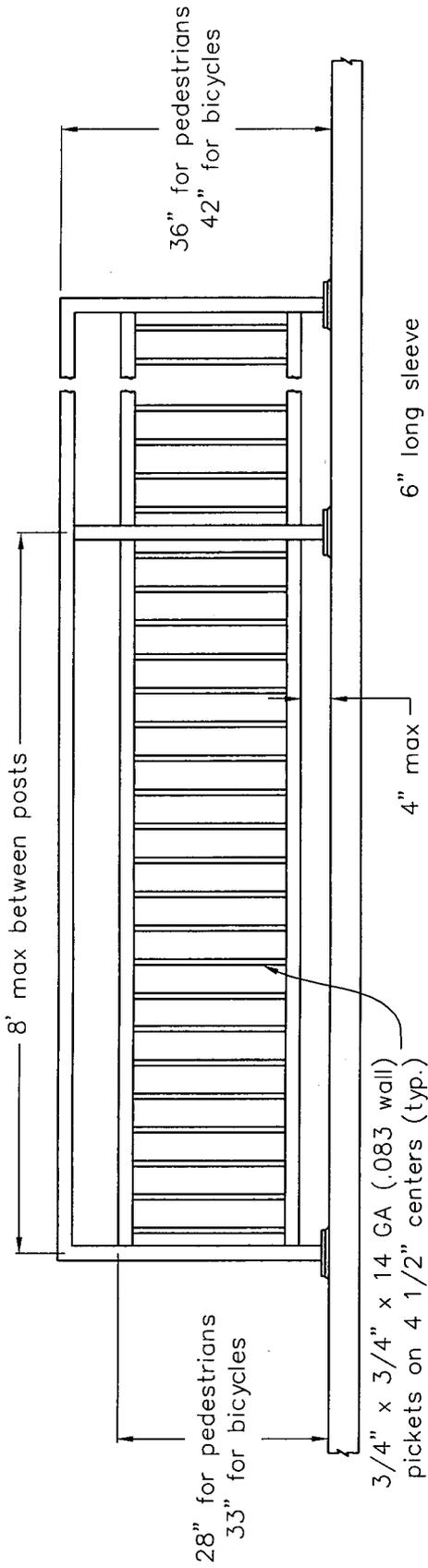
HANDRAIL LAYOUT REQUIREMENTS	STANDARD DETAILS
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CHECKED BY:	DRAWN BY:	DATE:
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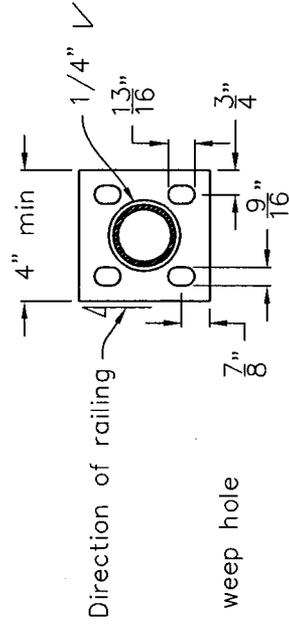
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Jefferson
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

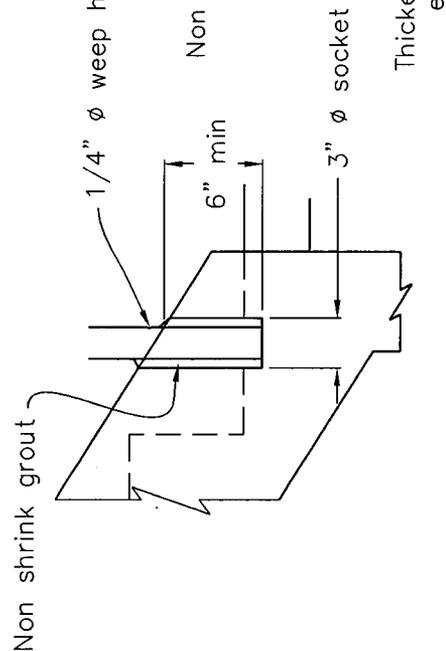
SHEET NUMBER
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SECTION
2.03



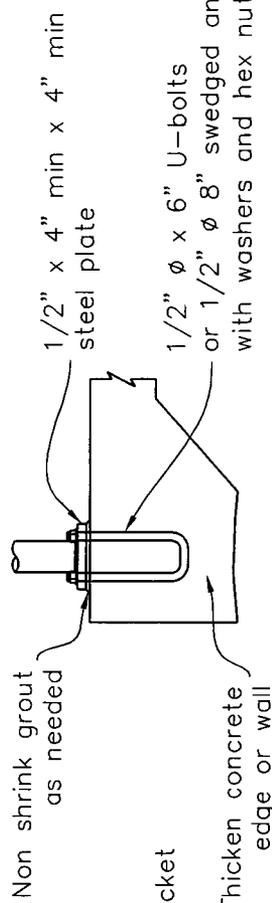
Pedestrian/Bicycle Guard
Railing Profile View



Expansion Detail

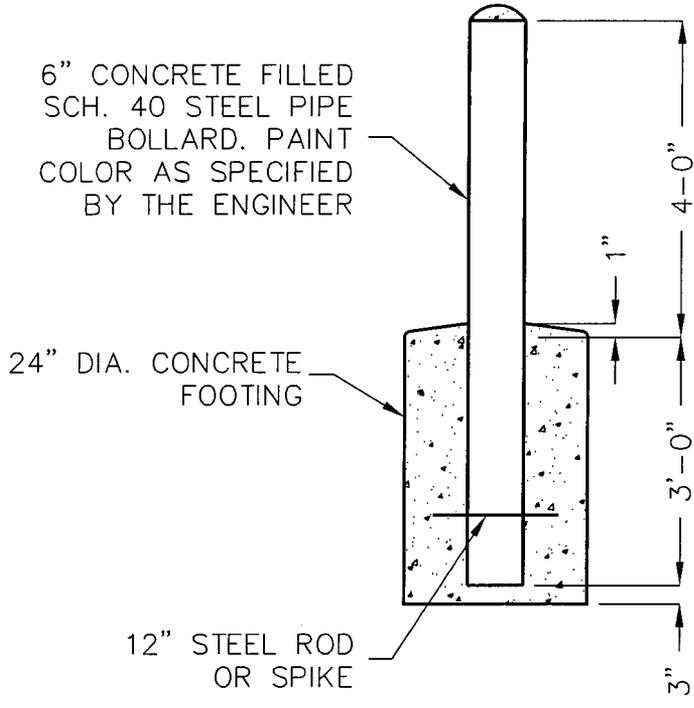


Mounting Detail A



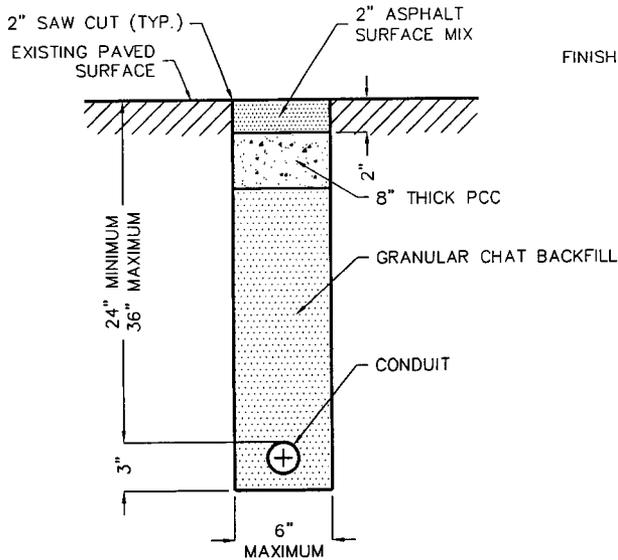
Mounting Detail B

 <p>Jefferson DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION</p>	SHEET NUMBER <p>4 OF 4 SECTION 2.04</p>		NO: _____ DATE: _____	REVISION AND DESCRIPTION
	CHECKED BY: _____ DRAWN BY: _____ DATE: _____	Pedestrian/Bicycle Guard Railing Requirements		

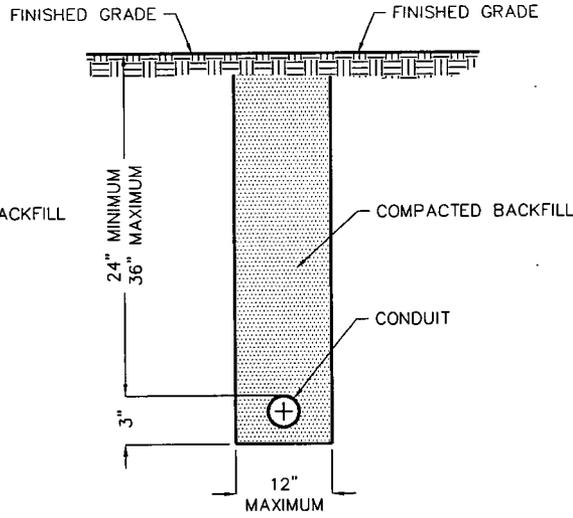


PIPE BOLLARD

NO:		DATE:		REVISION AND DESCRIPTION	
PIPE BOLLARD DETAIL		STANDARD DETAILS			
CHECKED BY:	DRAWN BY:	DATE:			
SHEET NUMBER					
1 OF 1					
SECTION					
3.01					

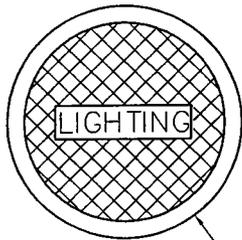


PAVED AREAS

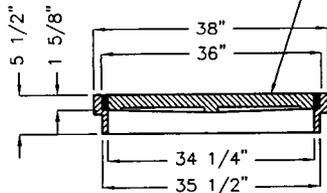


UNPAVED AREAS

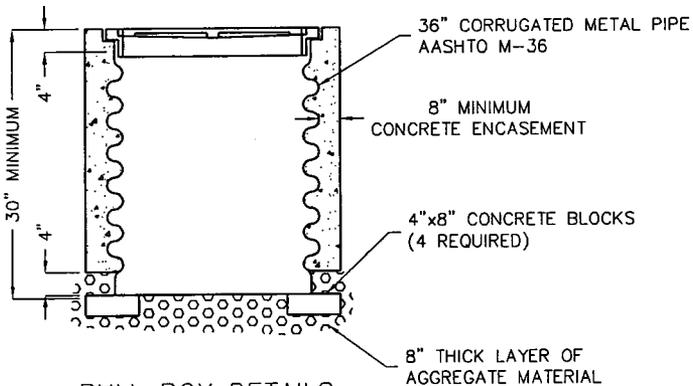
TRENCHING DETAILS



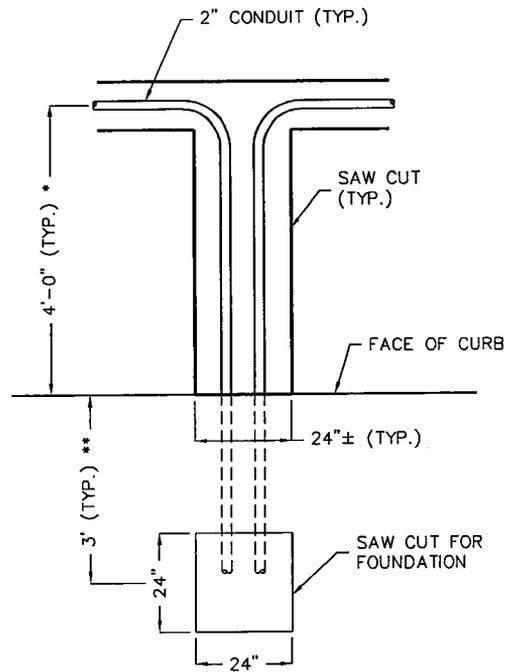
DEETER 1987 OR APPROVED EQUAL



PULL BOX LID DETAILS



PULL BOX DETAILS



TRENCH DETAIL AT POLE

TOP VIEW

* OFFSET SHALL BE ADJUSTED TO AVOID UTILITIES AND AS APPROVED BY THE ENGINEER

** EXCEPT AS NOTED ON THE PLANS

NO.	DATE	REVISION AND DESCRIPTION
1	12/2006	CHANGED TRENCH TO GRANULAR CHAT BACKFILL

TRENCHING DETAILS
STANDARD DETAILS

CHECKED BY:	
DRAWN BY:	
DATE:	

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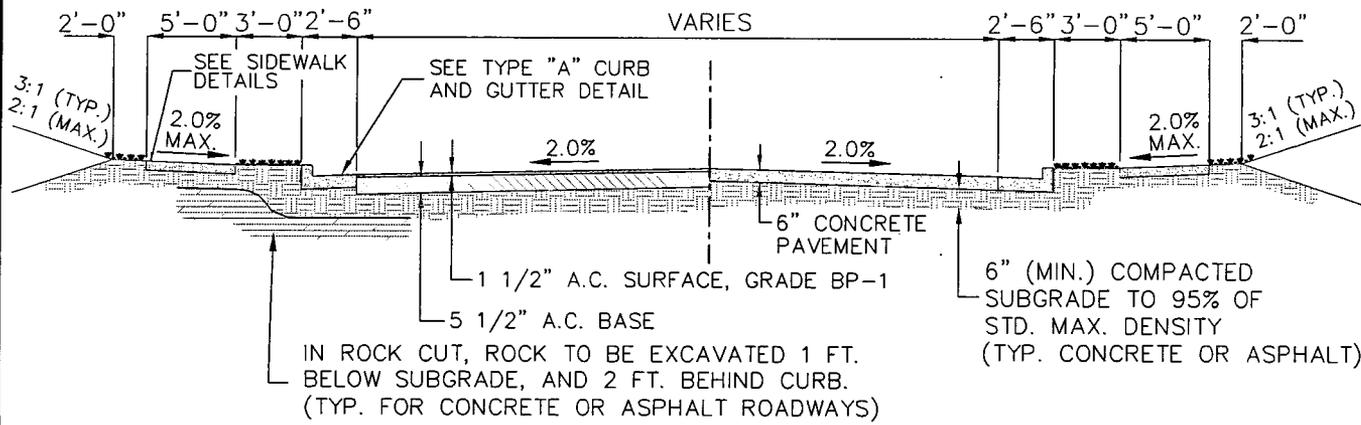


Jefferson

 DEPARTMENT OF PUBLIC WORKS

 ENGINEERING DIVISION

SHEET NUMBER
1 OF 1
SECTION
4.01

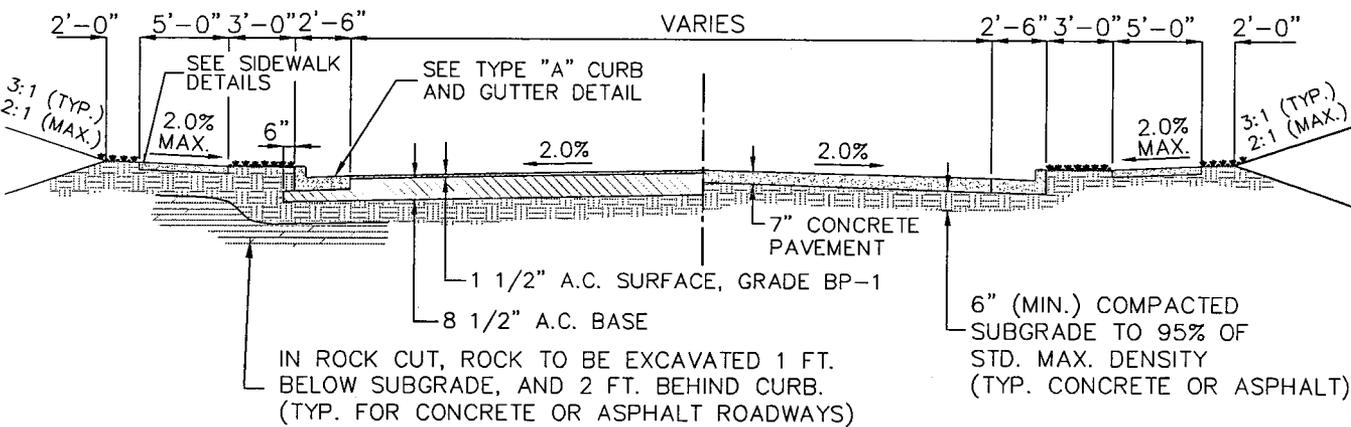


TYPICAL ASPHALT SECTION

TYPICAL CONCRETE SECTION

NOTE: MAXIMUM OF 4" COMPACTED A.C. BASE PER LIFT.

RESIDENTIAL STREET LAYOUT



TYPICAL ASPHALT SECTION

TYPICAL CONCRETE SECTION

NOTE: MAXIMUM OF 4" COMPACTED A.C. BASE PER LIFT.

ARTERIAL STREET LAYOUT

REVISION AND DESCRIPTION	CHANGED AC. SURFACE FROM GRADE "C" TO "BP-1"
--------------------------	--

DATE:	3/2009
NO:	1

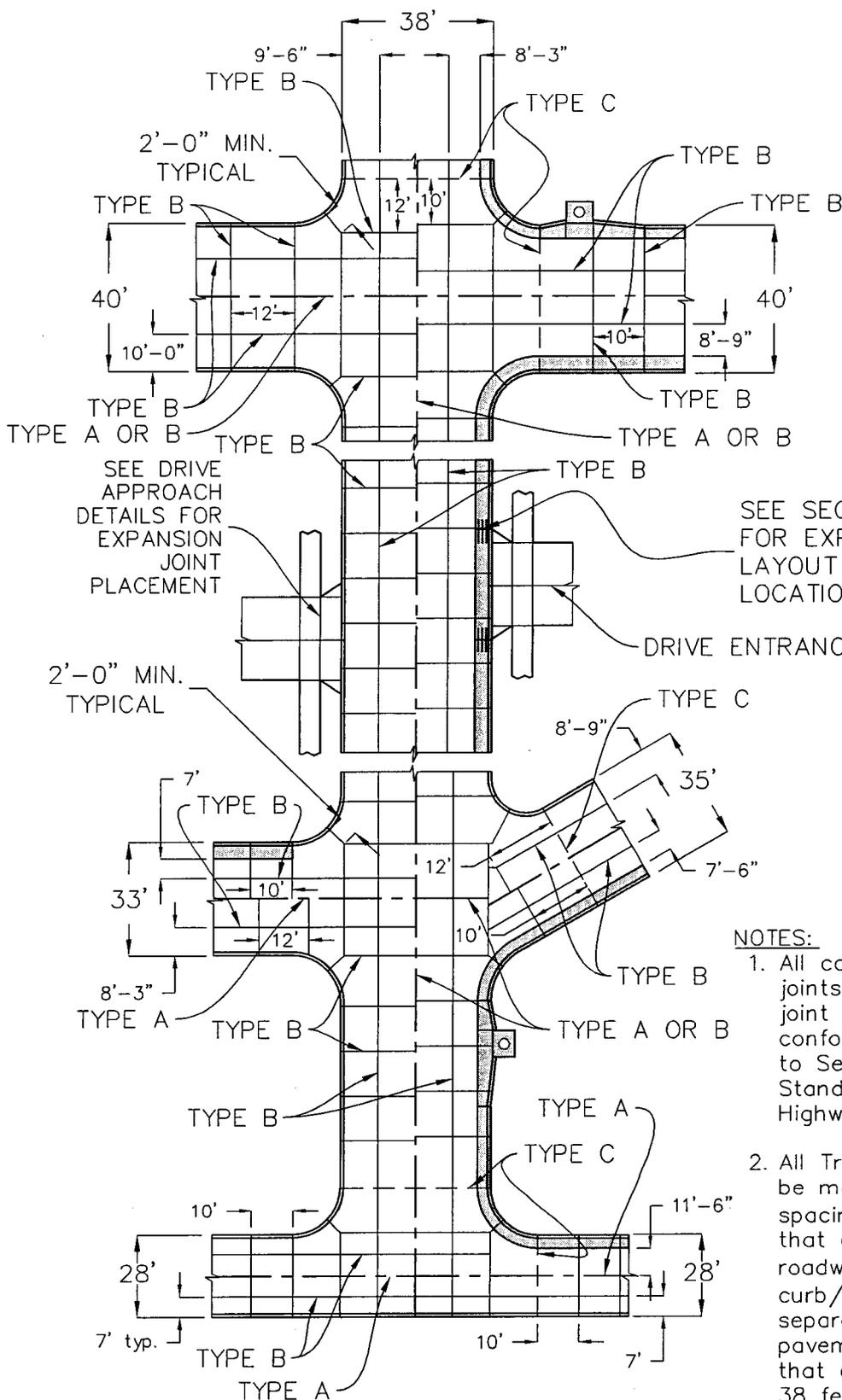
CITY OF JEFFERSON
STANDARD RESIDENTIAL, &
ARTERIAL STREET
LAYOUTS

CHECKED BY:	DRAWN BY:	DATE:
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SHEET NUMBER	2 OF 8
SECTION	20.02



**INTEGRAL ROADWAY/CURB
PAVEMENT JOINT LAYOUT**

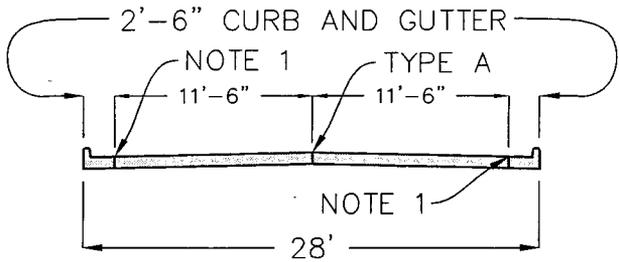
NOTE:
Varying longitudinal joint patterns may be used upon approval by the Engineer.

SEE SECTION 24.00
FOR EXPANSION JOINT
LAYOUT AT ENTRANCE
LOCATIONS

NOTES:
1. All control and sawed joints shall be filled with joint sealer. Sealer shall conform to Section 1057.5, Missouri Standard Specifications for Highway Construction.
2. All Transverse joints shall be maximum of 10 feet spacing's for roadways that are 28 feet wide, and roadway's that the curb/gutter is poured separately from roadway pavement for roadways that are 33 feet, 35 feet, 38 feet, and 40 feet wide.
3. All Transverse joints shall be maximum of 12 feet spacing's for roadways that are poured monolithically with the curb/gutter and are 33 feet, 35 feet, 38 feet, and 40 feet wide.

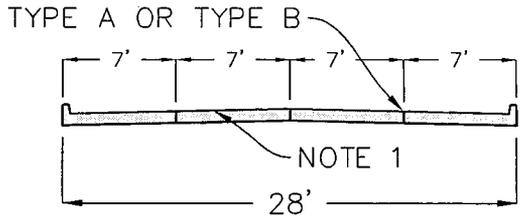
REVISION AND DESCRIPTION		ROADWAY PAVEMENT JOINT LAYOUT		STANDARD DETAILS	
NO:	DATE:	CHECKED BY:		DRAWN BY:	
		DATE:		DATE:	
SHEET NUMBER					
3 OF 8					
SECTION					
20.03					

REVISION AND DESCRIPTION			
DATE:			
NO:			
ROADWAY SECTION PAVEMENT JOINT LAYOUTS	STANDARD DETAILS		
CHECKED BY:	DRAWN BY:	DATE:	



JOINT LAYOUT WITH CURB AND GUTTER
POURED SEPERATELY

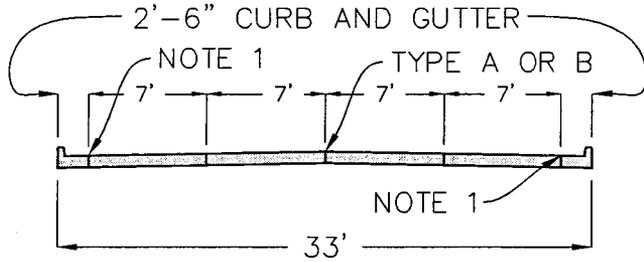
Transverse joint spacing shall be 10 ft. max.



JOINT LAYOUT WITH CURB AND GUTTER
INTEGRAL TO ROADWAY

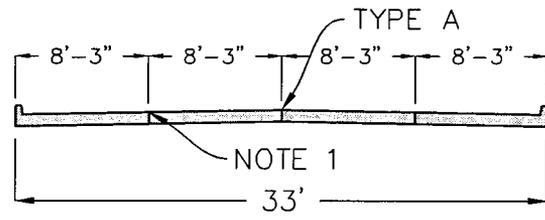
Transverse joint spacing shall be 10 ft. max.

28 FT. ROADWAY SECTION WIDTH



JOINT LAYOUT WITH CURB AND GUTTER
POURED SEPERATELY

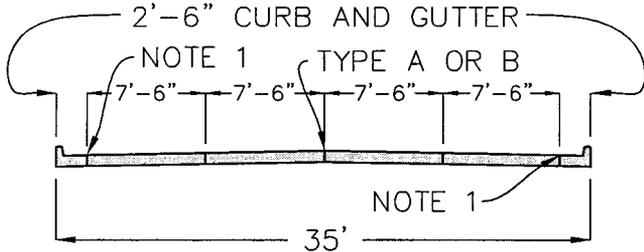
Transverse joint spacing shall be 10 ft. max.



JOINT LAYOUT WITH CURB AND GUTTER
INTEGRAL TO ROADWAY

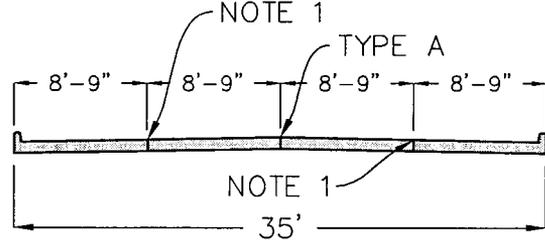
Transverse joint spacing shall be 12 ft. max.

33 FT. ROADWAY SECTION WIDTH



JOINT LAYOUT WITH CURB AND GUTTER
POURED SEPERATELY

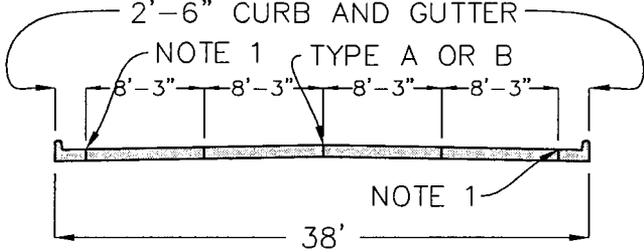
Transverse joint spacing shall be 10 ft. max.



JOINT LAYOUT WITH CURB AND GUTTER
INTEGRAL TO ROADWAY

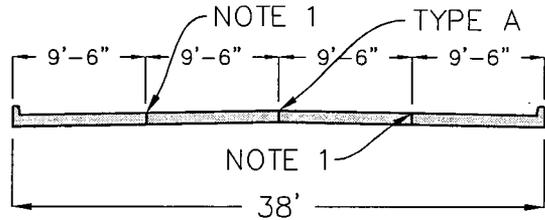
Transverse joint spacing shall be 12 ft. max.

35 FT. ROADWAY SECTION WIDTH



JOINT LAYOUT WITH CURB AND GUTTER
POURED SEPERATELY

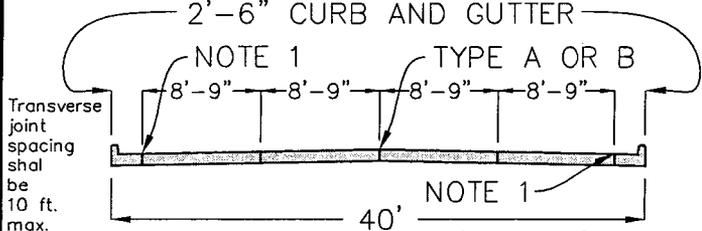
Transverse joint spacing shall be 10 ft. max.



JOINT LAYOUT WITH CURB AND GUTTER
INTEGRAL TO ROADWAY

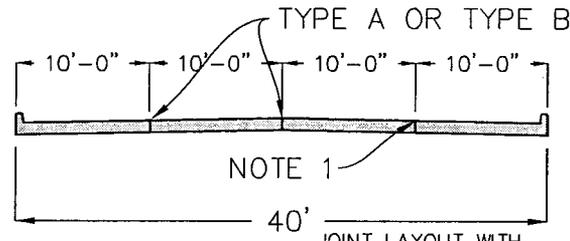
Transverse joint spacing shall be 12 ft. max.

38 FT. ROADWAY SECTION WIDTH



JOINT LAYOUT WITH CURB AND GUTTER
POURED SEPERATELY

Transverse joint spacing shall be 10 ft. max.



JOINT LAYOUT WITH CURB AND GUTTER
INTEGRAL TO ROADWAY

Transverse joint spacing shall be 12 ft. max.

40 FT. ROADWAY SECTION WIDTH

NOTES:

1. All control and sawed joints shall be filled with joint sealer. Sealer shall conform to Section 1057.5, Missouri Standard Specifications for Highway Construction.

20.01 DWG



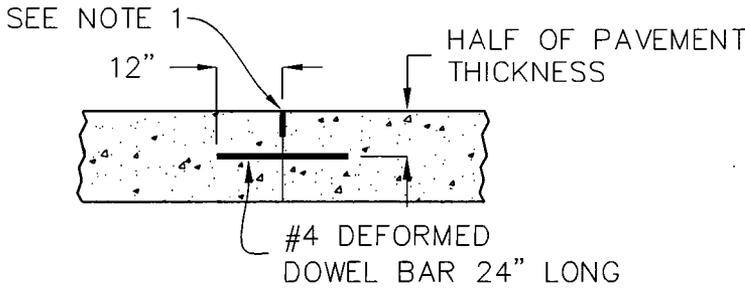
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SHEET NUMBER

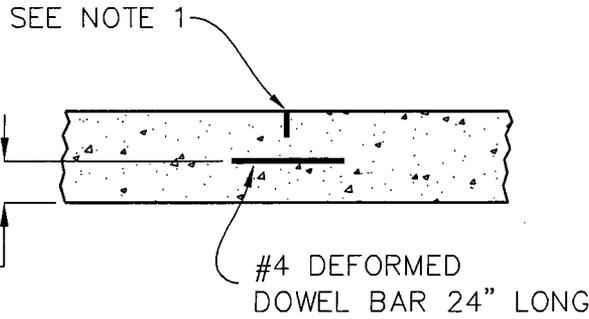
4 OF 8

SECTION

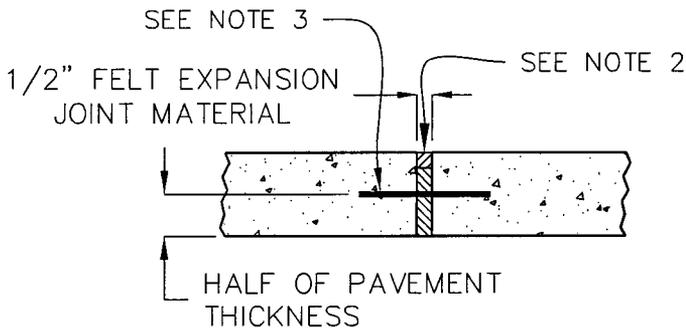
20.04



TYPE A
(CONSTRUCTION JOINT)



TYPE B
(CONTROL JOINT)

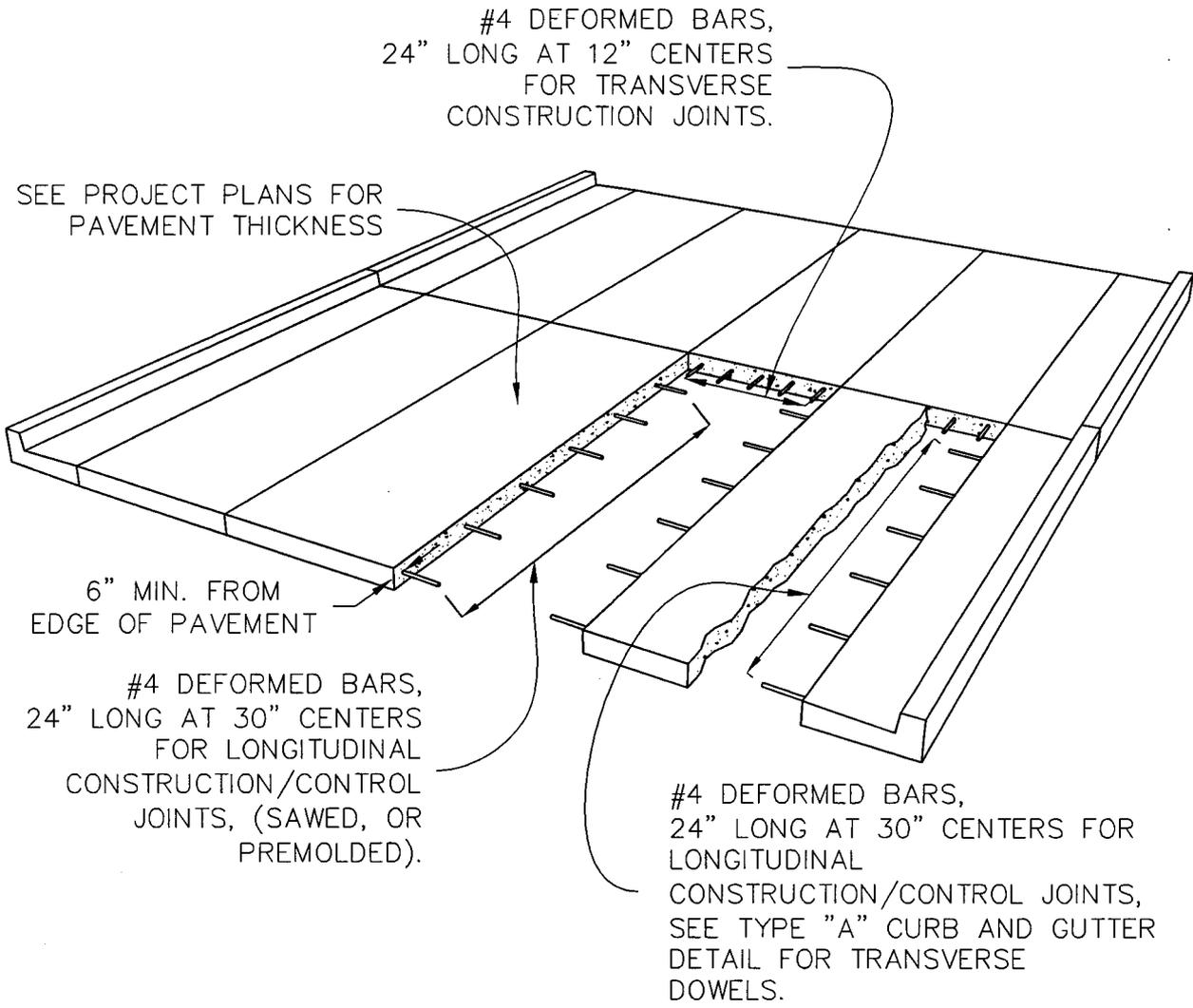


TYPE C
(EXPANSION JOINT DETAIL)

NOTES

1. CENTERLINE OF SAWED JOINT 3/16" MIN. WIDTH x 1/4 OF PAVEMENT THICKNESS.
2. REMOVE TOP 1/4 OF PAVEMENT THICKNESS OF THE EXPANSION JOINT MATERIAL AND FILL WITH JOINT SEALER THAT CONFORMS TO SECTION 1057.5 MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. 5/8"Ø x 18" LONG SMOOTH DOWEL BARS. THE DOWEL BARS SHALL BE GREASED AND WRAPPED ON ONE END WITH EXPANSION TUBES.
4. ALL CONTROL AND SAWED JOINTS SHALL BE FILLED WITH SEALER. SEALER SHALL CONFORM TO SECTION 1057.5 MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

NO: 1		DATE: 1/2010	REVISION AND DESCRIPTION: *** ADDED EXPANSION JOINT DETAIL
JOINT DETAILS		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	
SHEET NUMBER			
5 OF 8			
SECTION			
20.05			

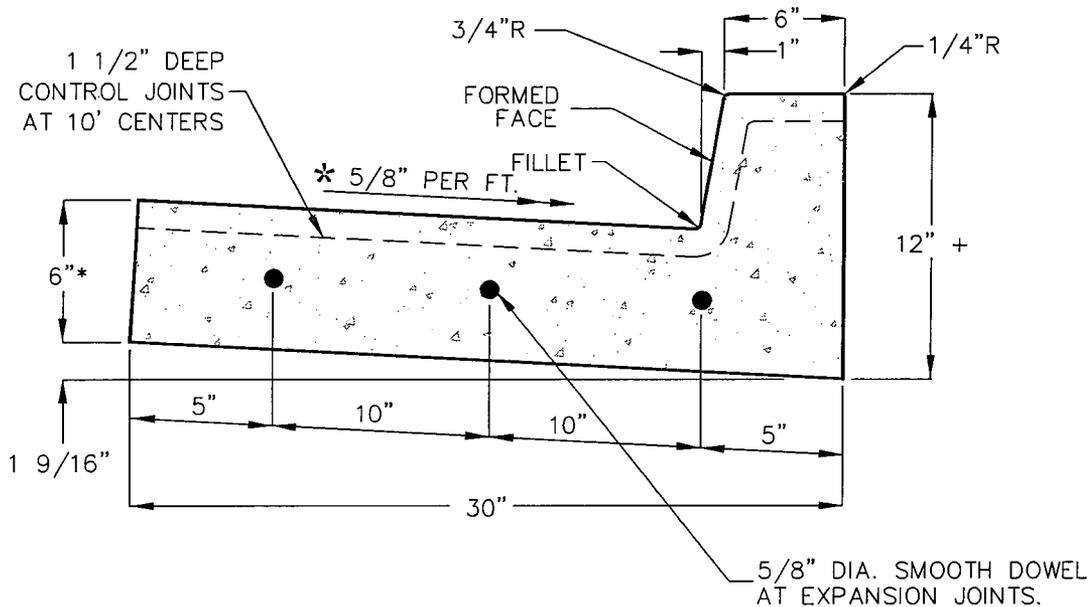


REINFORCEMENT FOR PCC PAVEMENT

NOTES:

1. EXPANSION JOINTS SHALL BE PLACED IN CURB AND GUTTER AT CURB RETURNS, INLET RETURNS, AND DRIVE APPROACHES. 3/4 INCH EXPANSION MATERIAL WITH 5/8"x24" SMOOTH DOWELS SHALL BE PLACED AT RADIUS POINTS. THESE DOWELS SHALL BE GREASED AND WRAPPED ON ONE END WITH EXPANSION TUBES.
2. REINFORCED JOINTS IN PCC PAVEMENT AS FOLLOWS:
 - A. TRANSVERSE SAWED JOINTS – NOT TIED.
 - B. TRANSVERSE CONSTRUCTION JOINTS – TIE WITH 1/2"x24" DEFORMED BARS AT 12 INCH CENTERS.
 - C. LONGITUDINAL CONSTRUCTION OF SAWED JOINTS – TIE WITH 1/2"x24" DEFORMED BARS AT 30 INCH CENTERS.
3. INSTALL DOWEL BARS AS SHOWN ON THE PLANS, OR A PARTICULAR DETAIL, OR AS DIRECTED BY THE ENGINEER.

	NO:	DATE:	REVISION AND DESCRIPTION
	1	1/2010	*** ADDED EXPANSION JOINT DETAIL
REINFORCEMENT FOR PCC PAVEMENT		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	
SHEET NUMBER		6 OF 8	
		SECTION	
		20.06	



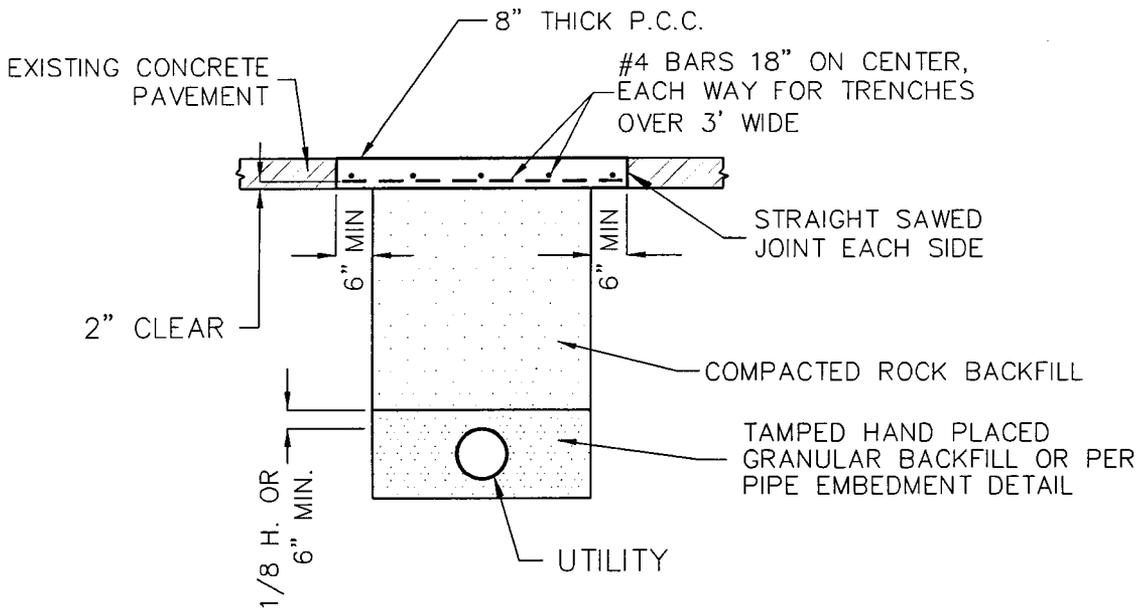
- * 6" MIN.— MATCH PAVEMENT THICKNESS OF P.C.C. PAVEMENT.
- ** 12" MIN.— INCREASE BY SAME AMOUNT GUTTER PAN INCREASES.

NOTES:

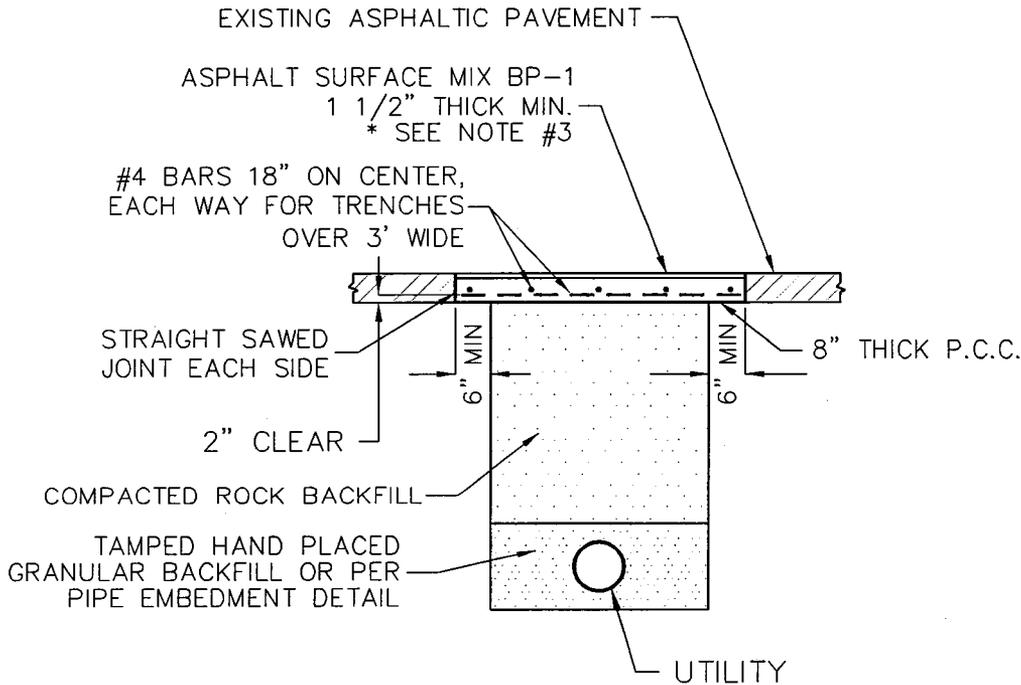
1. EXPANSION JOINTS SHALL BE INSTALLED AT CURB RETURN RADIUS POINTS AND AT DRIVE APPROACHES, THESE 1/2" FELT EXPANSION JOINTS SHALL HAVE 5/8" DIA. x 18" LONG SMOOTH DOWELS. THESE DOWELS SHALL BE GREASED AND WRAPPED ON ONE END WITH EXPANSION TUBES.
2. CONTROL JOINTS/CONTROL JOINTS MAY BE SAWED, OR PRE-FORMED.
- * 3. CURB PAN CAN BE CONSTRUCTED AT 2.0% CROSS SLOPE ON COMMERCIAL ROADWAY WHEN ASPHALT OPTION IS USED UNDER PROPOSED CURB, AND WHEN THE ROADWAY AND CURB IS CONSTRUCTED MONOLITHICALLY.
- * 4. WHEN PLANS ARE NOTED TO CONSTRUCT A TILT OUT PAN. THE GUTTER PAN SHALL BE TILTED OUT NO MORE THAN THE ADJOINING STREET CROSS SLOPE.

TYPE "A" CURB AND GUTTER

NO:		DATE:		REVISION AND DESCRIPTION	
1		8/2007		ADDED NOTE #4	
2		3/2009		REMOVED ALTERNATE RADIUS DIMENSIONS	
TYPE "A" CURB & GUTTER				STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:			
SHEET NUMBER					
7 OF 8					
SECTION					
20.07					



TYPICAL CONCRETE STREET SECTION



TYPICAL ASPHALT ROADWAY

NOTES:

1. ALL CONCRETE USED FOR PATCHING SHALL BE HIGH EARLY STRENGTH, AND MAY CONTAIN UP TO 4.0% NON-CALCIUM ACCELERATOR. (NON-CALCIUM ACCELERATOR SHALL BE APPROVED BY THE ENGINEER)
2. ALL CONCRETE MIXES MUST CONTAIN AIR ENTRAINMENT.
3. DURING WINTER MONTHS WHEN HOT MIX ASPHALT IS NOT AVAILABLE ONE OF TWO PROCESSES SHALL OCCUR FOR STREET CUTS:
 - A. IF EXISTING STREET OVERLAY IS MORE THAN 4 YEARS OLD: THE CONTRACTOR SHALL FILL THE STREET CUT TO THE SURFACE WITH CONCRETE AND NO ASPHALT CAP WILL BE PLACED. IN THIS CASE THE CONCRETE SHALL BE 9 1/2" THICK.
 - B. IF THE STREET HAS AN OVERLAY WHICH IS LESS THAN 4 YEARS OLD: THE CONTRACTOR SHALL CAP THE CUT WITH COLD MIX ASPHALT AND WILL THEN RETURN IN THE SPRING, WHEN HOT MIX IS AVAILABLE, AND REPLACE THE COLD MIX WITH HOT MIX.

NO:	DATE:	REVISION AND DESCRIPTION
1	3/2009	ADDED NOTE #3

STREET CUT
REPAIR FOR PATCHING &
BACKFILLING PAVED
STREETS & ALLEYS
STANDARD DETAILS

CHECKED BY:	DRAWN BY:	DATE:
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SHEET NUMBER
8 OF 8
SECTION
20.08

SIDEWALK NOTES:

The minimum width of continuous passage shall be 48 inches.

The cross slope of a sidewalk shall not exceed 2% (1/4" per foot). The slope may be toward or away from the street as needed to achieve positive drainage.

The sidewalk shall have sawed joints of a depth that is equal to 1/3 of the the sidewalk thickness. The joints are to be sawed at a spacing that is equal to the width of the sidewalk, or as directed by the engineer. In no instance shall the spacing measured in feet, exceed twice the sidewalk thickness measured in inches.

In all instances where the sidewalk crosses through a driveway or drive approach it shall be a minimum of 6" thick.

All sidewalks are to be constructed on a compacted subgrade (4" min). This requirement may be met with native material or granular material supplied by the contractor.

All concrete used for sidewalk construction shall have a 28 day compressive strength of 4000 psi.

The sidewalk surface shall have a non-slip broom finish that is perpendicular to the sidewalk.

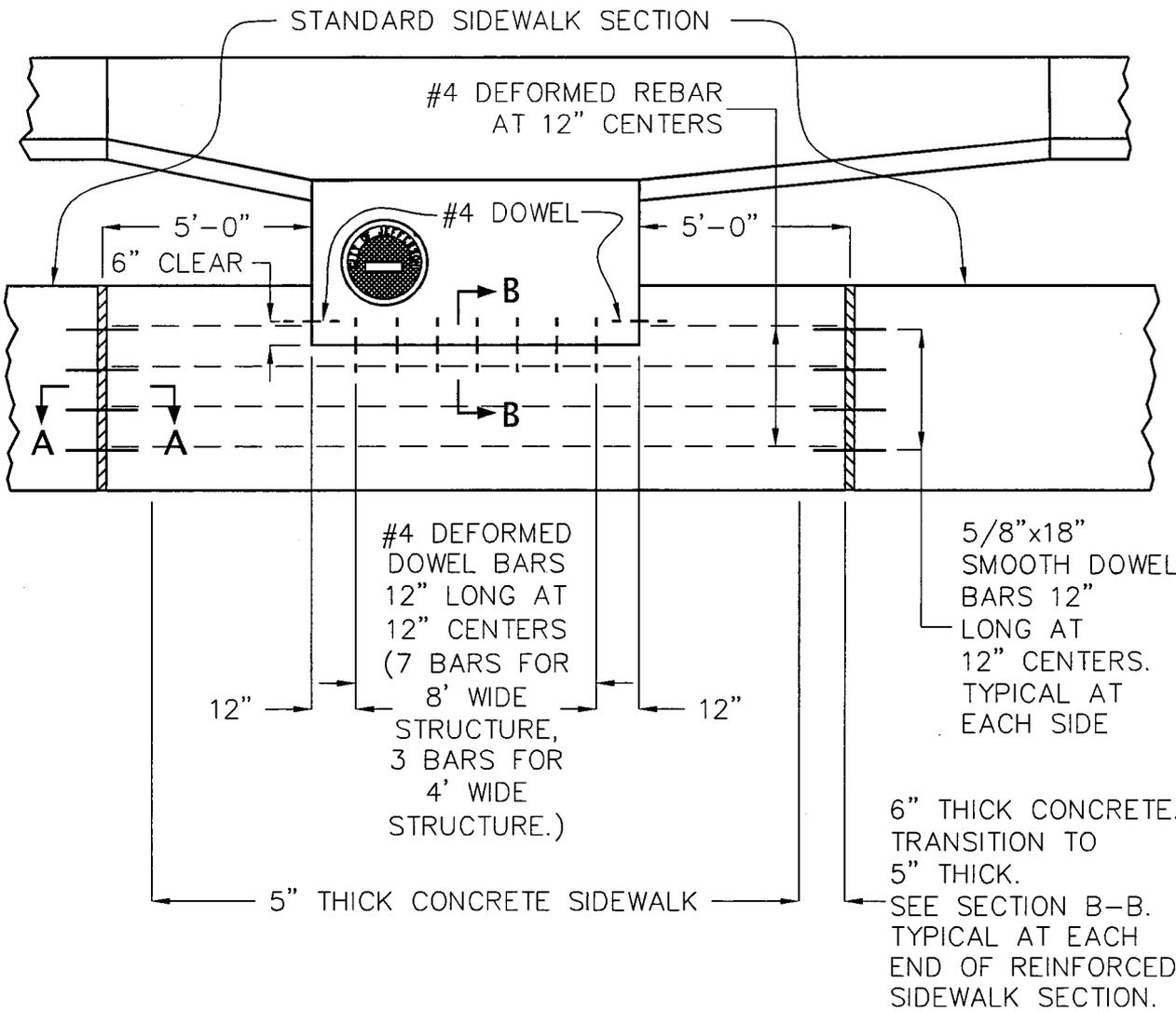
Sidewalks shall be cured as specified in section 502.6 of the 2004 Missouri Standard Specifications for Highway Construction.

Expansion joints shall be 1/2" pre molded joint filler (non extruding, Type B) and shall be placed as follows:

- a. in long runs at a maximum spacing of 300 feet
- b. where one sidewalk abuts another or the sidewalk abuts a sidewalk ramp
- c. where the sidewalk is parallel and adjacent to a rigid structure, not including curb and gutter.

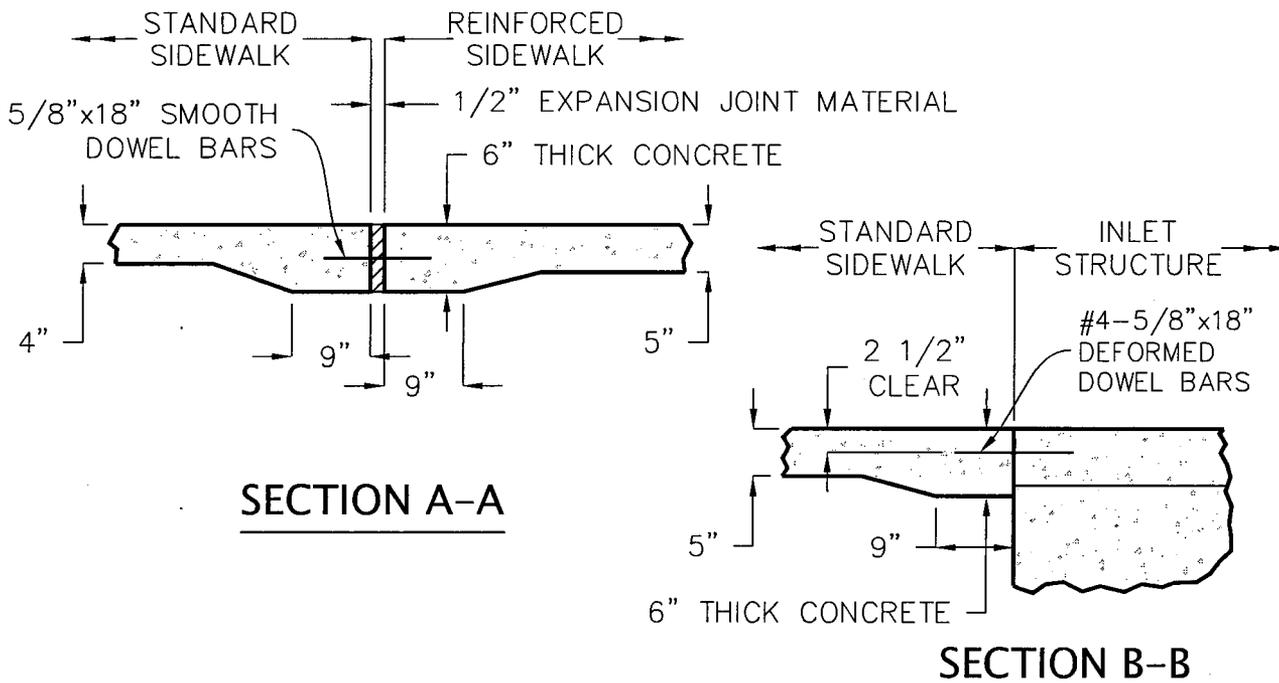
For A.D.A. ramp information, see Section: 23 in the City of Jefferson Standard Drawings Book for A.D.A. ramp specifications and details.

NO:		DATE:		REVISION AND DESCRIPTION	
SIDEWALK NOTES			STANDARD DETAILS		
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SHEET NUMBER					
1 OF 5					
SECTION					
22.01					

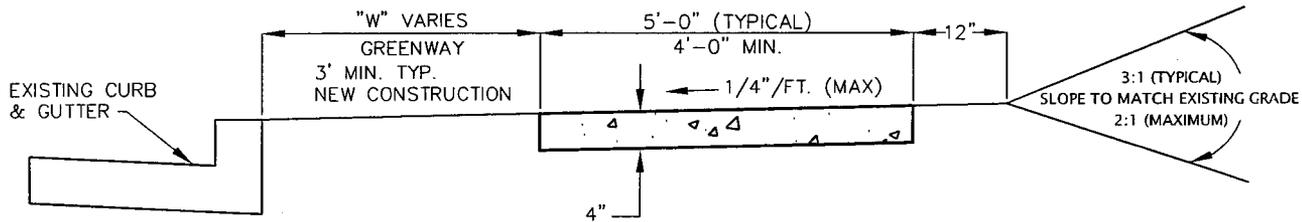


NO:	1	REVISION AND DESCRIPTION
DATE:	1/2010	NEW REQUIREMENT FOR SIDEWALKS AT INLET LOCATIONS
CHECKED BY:		REINFORCEMENT DETAILS FOR SIDEWALK AT INLET LOCATIONS
DRAWN BY:		
DATE:		

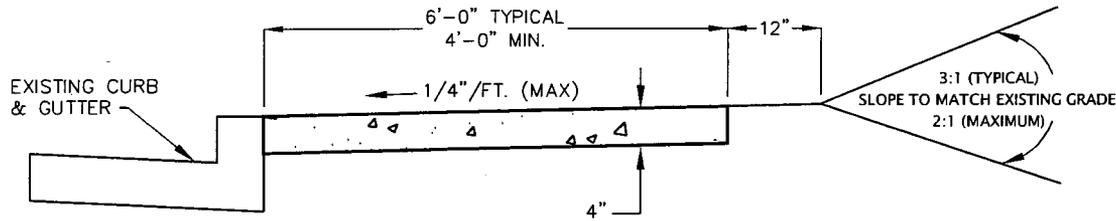
PLAN VIEW AND REINFORCEMENT FOR SIDEWALKS AT STORMWATER INLET/JUNCTION BOX LOCATIONS



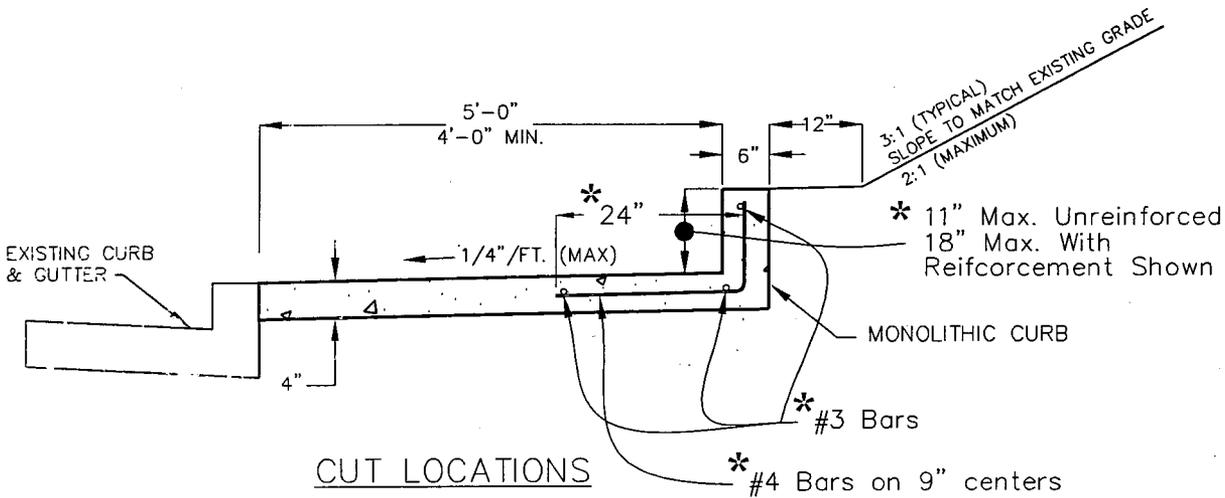
SHEET NUMBER
2 OF 5
SECTION
22.02



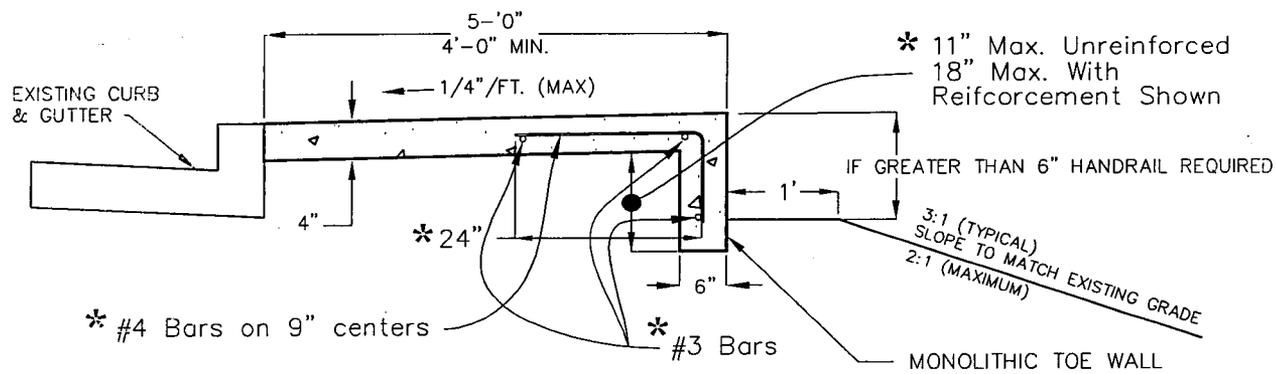
GREENWAY SECTION



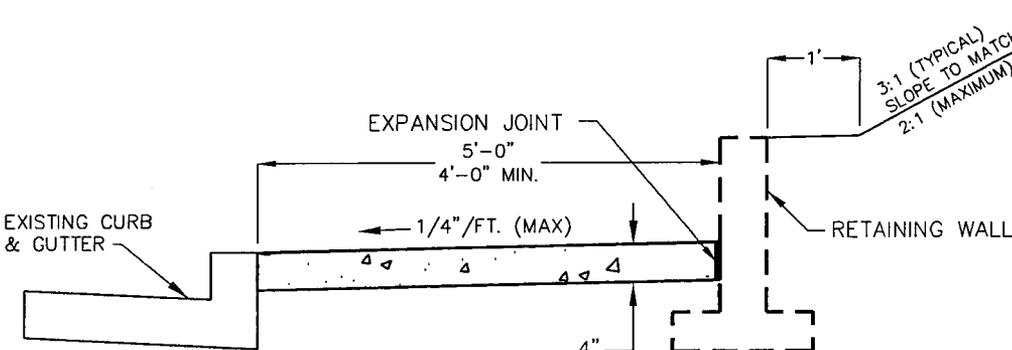
SIDEWALK AT BACK OF CURB SECTION



CUT LOCATIONS



STEEP FILL LOCATIONS



SIDEWALK WITH RETAINING WALL

NO:	DATE:	REVISION AND DESCRIPTION
1	1/2013	* ADDED REINFORCEMENT TO CURB WALLS

TYPICAL SIDEWALK SECTIONS	STANDARD DETAILS

CHECKED BY:	DRAWN BY:	DATE:
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City of **Jefferson**
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

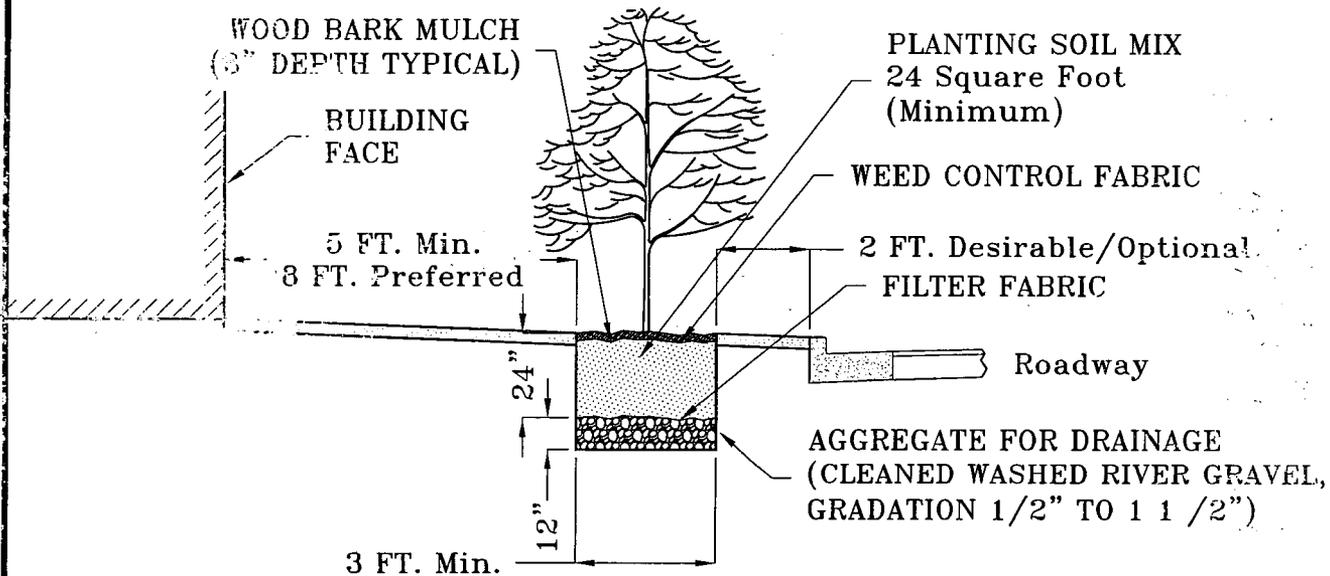
SHEET NUMBER
3 OF 5
SECTION
22.03

DOWNTOWN SIDEWALK FINISH

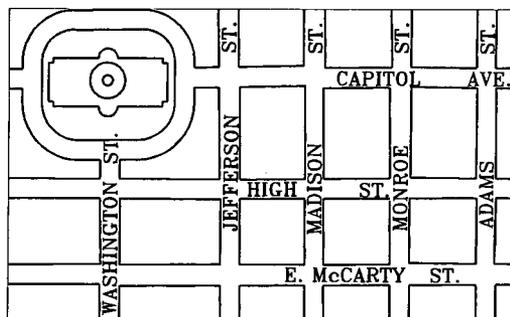
The sidewalk finish shall be an exposed Osage River aggregate. This finish is to be achieved on all exposed (non-colored) concrete construction including sidewalks, exposed foundations and accessible ramps.

Exposed Aggregate Finish: Expose Osage River aggregates and sand of pavement surfaces as follows:

1. Immediately after floating, spray-apply chemical surface retarder to pavement according to the manufacturer's written instructions.
 2. Cover with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
 3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon bristle broom.
 4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.
 5. Exposed Aggregate Concrete shall be sealed. Sealer to be approved by the Engineer.
- Contractor may achieve the exposed Osage River aggregate finish by other methods upon approval by the engineer.
 - Curb/Gutter and driveway approaches shall be of plain concrete, or other color variation approved by the director
 - All concrete shall have a 28 day compressive strength of 4000 psi.

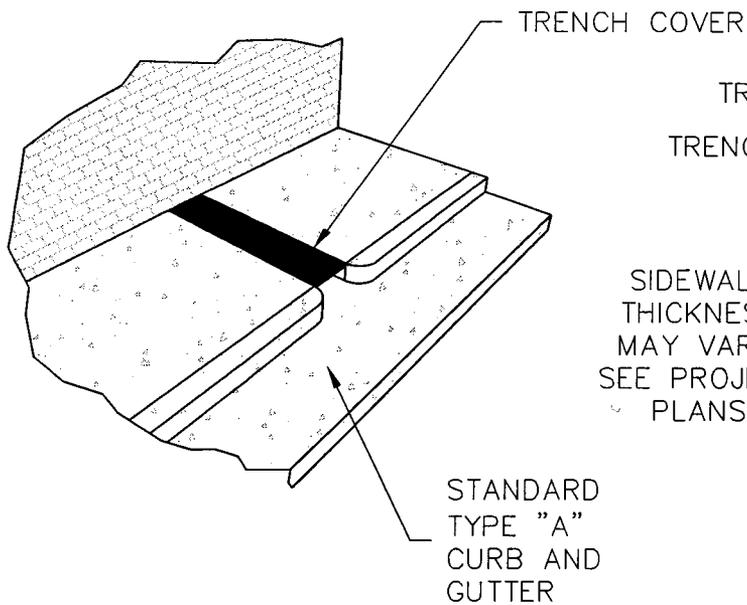


DOWNTOWN TREE WELL AND PROMENADE DETAIL

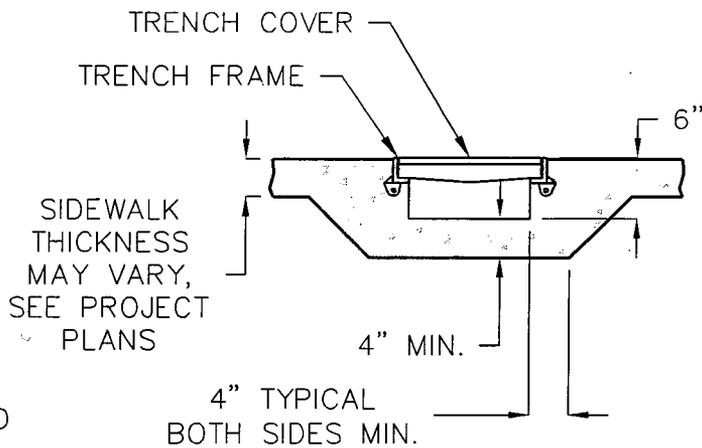


Area Where Exposed Aggregate Finish is Required

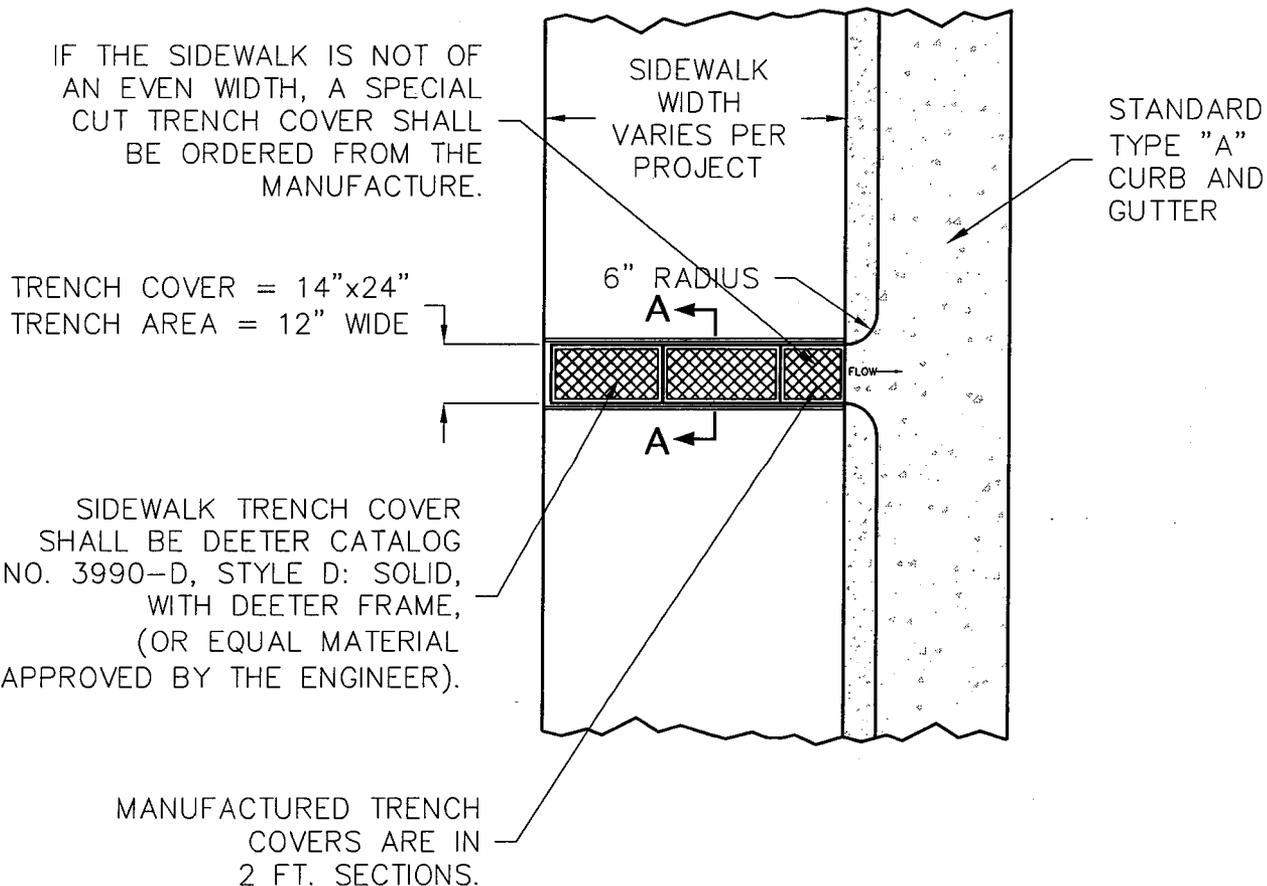
NO:	DATE:	REVISION AND DESCRIPTION:
CITY OF JEFFERSON DOWNTOWN TREE WELL & PROMENADE DETAILS		
DATE:	DRAWN BY:	
SHEET NUMBER		
4 OF 5		
SECTION		
22.04		



ISOMETRIC VIEW



SECTION A-A



SIDEWALK TRENCH DRAIN
(Plan View)

NO:	DATE:	REVISION AND DESCRIPTION:

SIDEWALK TRENCH DRAIN

CHECKED BY:	DRAWN BY:	DATE:



SHEET NUMBER
5 OF 5
SECTION
22.05

A.D.A. RAMP NOTES:

Sidewalk ramps shall be provided at all street intersections and commercial drive approaches where there is existing or proposed sidewalk and curb and as directed by the engineer. All ramps inclusive of the flares shall be 6" thick.

Sidewalk ramps shall be a minimum of 48" wide exclusive of the flared sides. The ramps are to have a maximum longitudinal slope of 1:12. In the instance where an intersecting sidewalk abuts a sidewalk ramp the slope of the ramp flare shall be a maximum of 1:10.

All ramps shall have a landing a minimum of 48" square whose slope does not exceed 2% in any direction.

Sidewalk ramps should not be aligned with drainage structures.

All ramps shall be constructed prior to the sidewalk construction unless otherwise approved by the engineer.

A.D.A. RAMP DETECTABLE WARNING PANELS

All A.D.A. ramps, in locations where the sidewalk intersects a commercial entrance having a traffic control sign or signal, or where the sidewalk intersects a street, or alley, shall have detectable warning panels.

Place truncated A.D.A. ramp detectable warning panels at the base of the curb ramp. Install panels across full width of ramp, a minimum of 24" in depth, and set back 2"-6" from the back of curb/bottom of ramp. (see ramp details)

At ramps abutting large curb radii where the transition area between the back of curb and the start of the ramp exceeds 5 feet the detectable warning panels shall be placed radially to the curb.

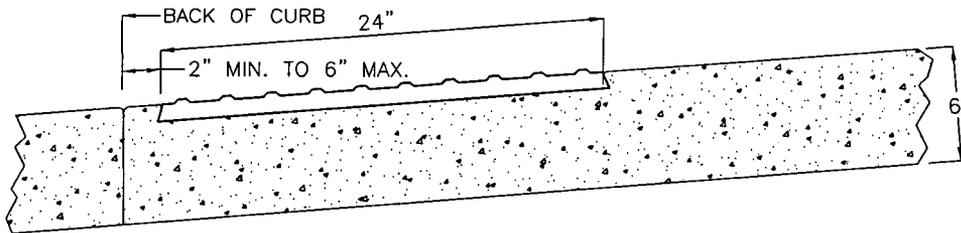
The proposed panels shall be one of the following:

- MASCO CASTinTACT warning panels as manufactured by Masons Supply Company, (503-234-4321).
- Detectable Warning Plates as manufactured by Neenah Foundry Company, (800-558-5075).
- ADA Arcis Tactile panels as manufactured by Arcis Corp., (503-647-5042).

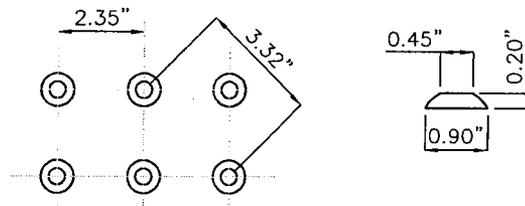
Other panels may be used upon approval by the city engineer.

The Contractor shall follow the manufactures recommendations for the installation of the panels. The panels shall match the slope of the ramp and shall be placed such that no vertical displacement occurs between the panel and the surrounding concrete.

The panels are to be red in color, and may be made up of 2'x2', 2'x2.5', or 2'x3' panels.



CROSS SECTION OF DETECTABLE WARNING PANEL



AMERICANS WITH DISABILITIES ACT 4.29.2 STANDARDS

TRUNCATED DOME DETAILS

NO:	NO:	NO:	NO:
**1	**1	**1	**1
DATE:	DATE:	DATE:	DATE:
3/2009	3/2009	3/2009	3/2009
REVISION AND DESCRIPTION	REVISION AND DESCRIPTION	REVISION AND DESCRIPTION	REVISION AND DESCRIPTION
ADDED OPTIONAL A.D.A. PANEL NOTES			

A.D.A. RAMP INFORMATION/DETAILS	A.D.A. RAMP INFORMATION/DETAILS
STANDARD DETAILS	STANDARD DETAILS

CHECKED BY:	DRAWN BY:	DATE:

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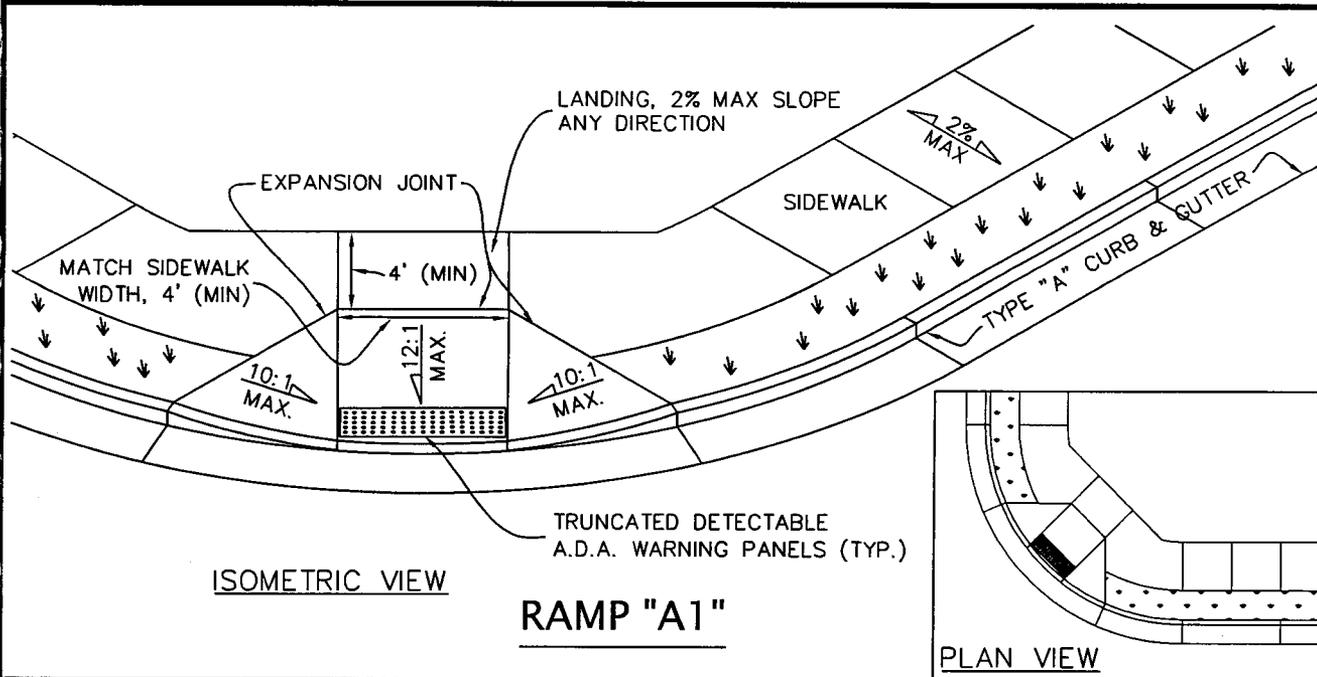


Jefferson

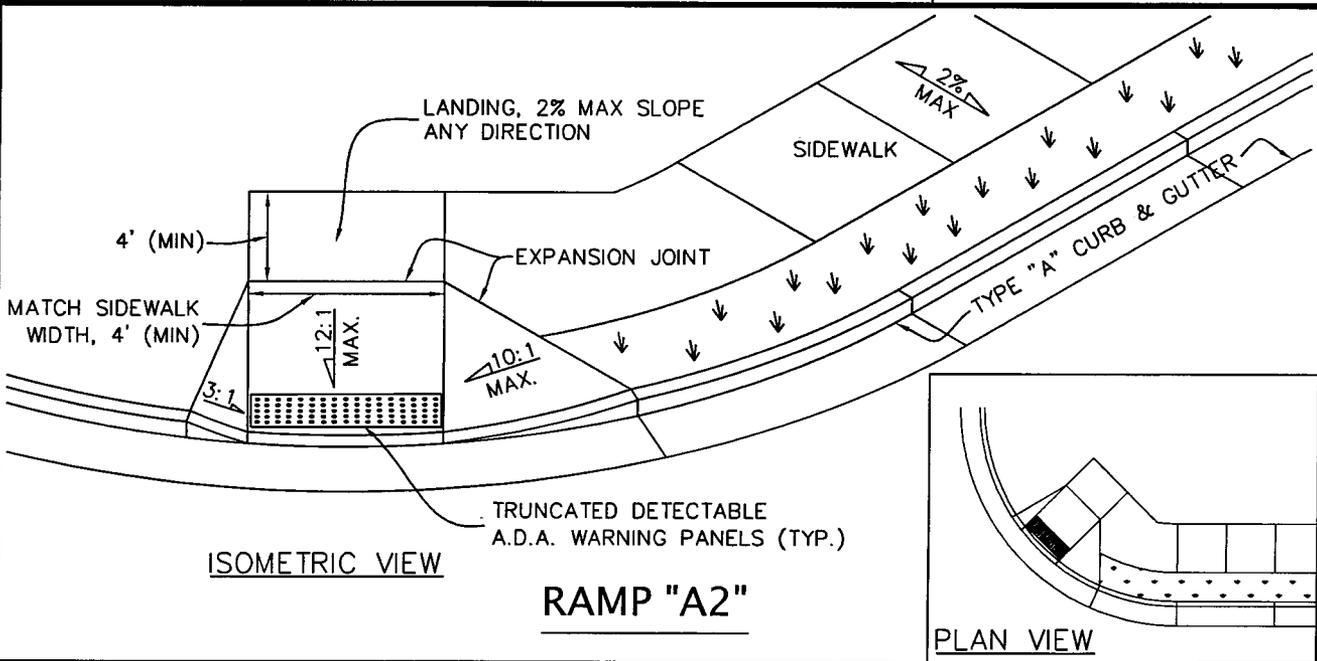
 DEPARTMENT OF PUBLIC WORKS

 ENGINEERING DIVISION

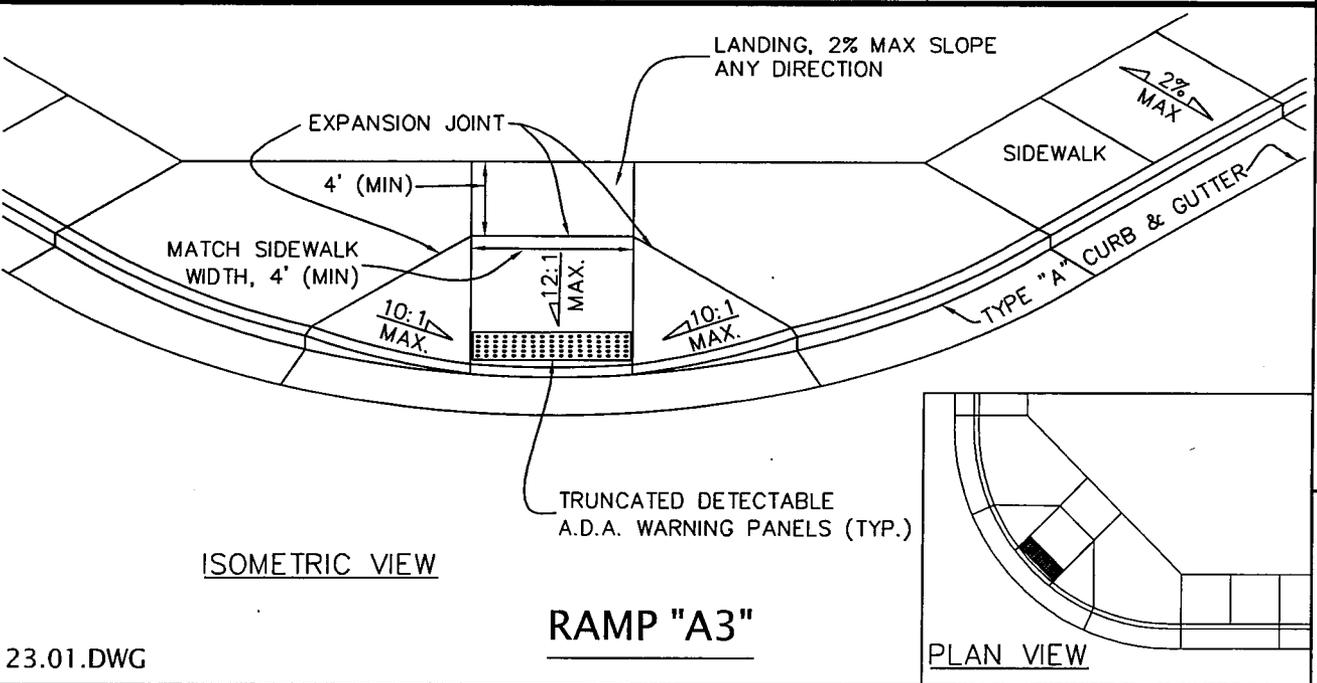
SHEET NUMBER
1 OF 8
SECTION
23.01



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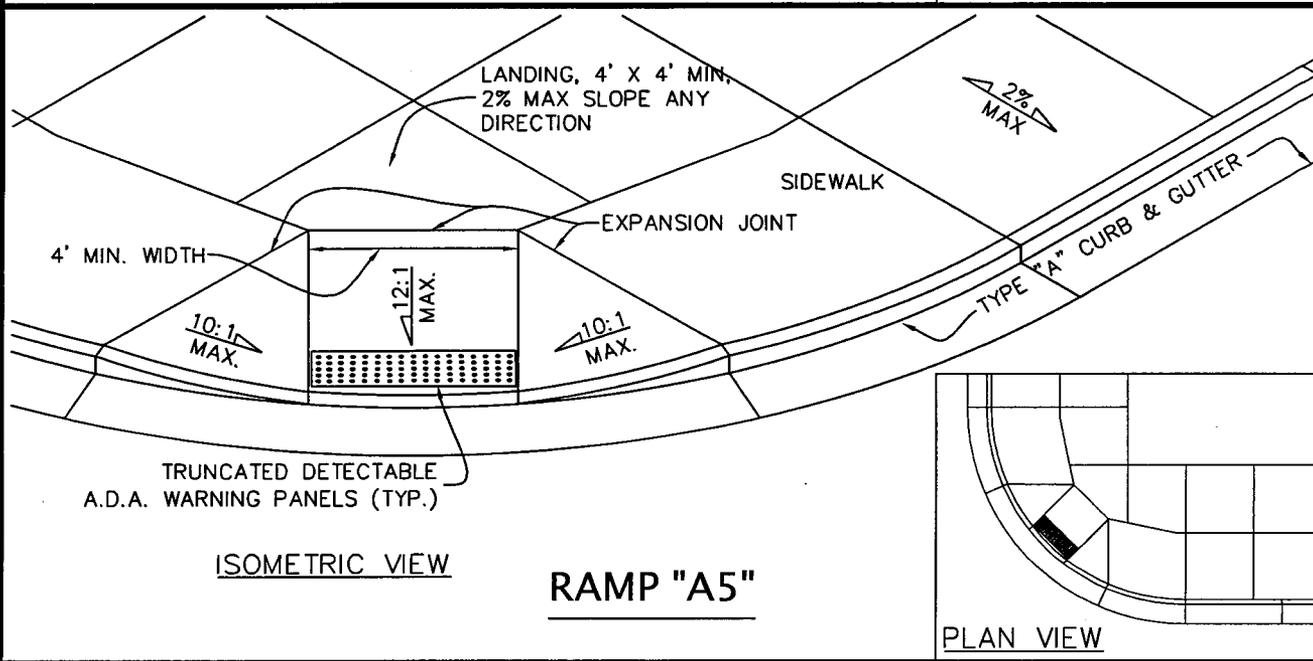
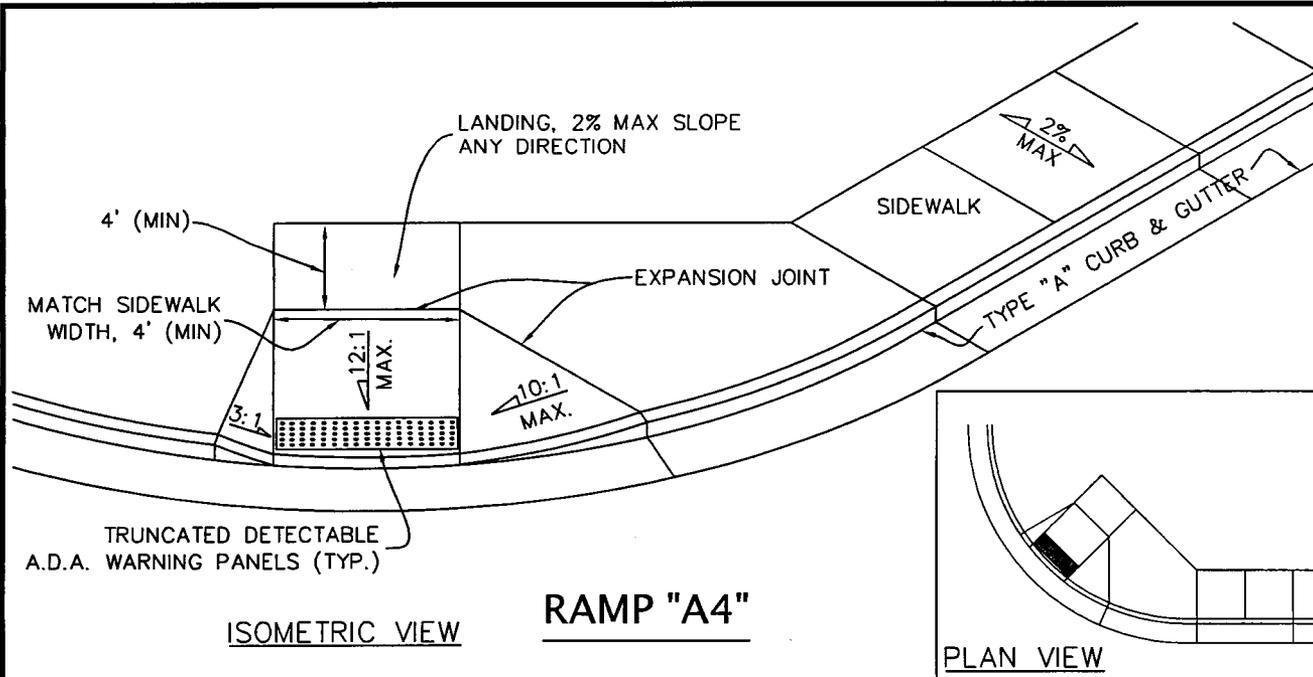
CHECKED BY:	SIDEWALK RAMP DETAILS	STANDARD DETAILS
DRAWN BY:		
DATE:		



CHECKED BY:	SIDEWALK RAMP DETAILS	STANDARD DETAILS
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City of Jefferson
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

SHEET NUMBER
2 OF 8
SECTION
23.02

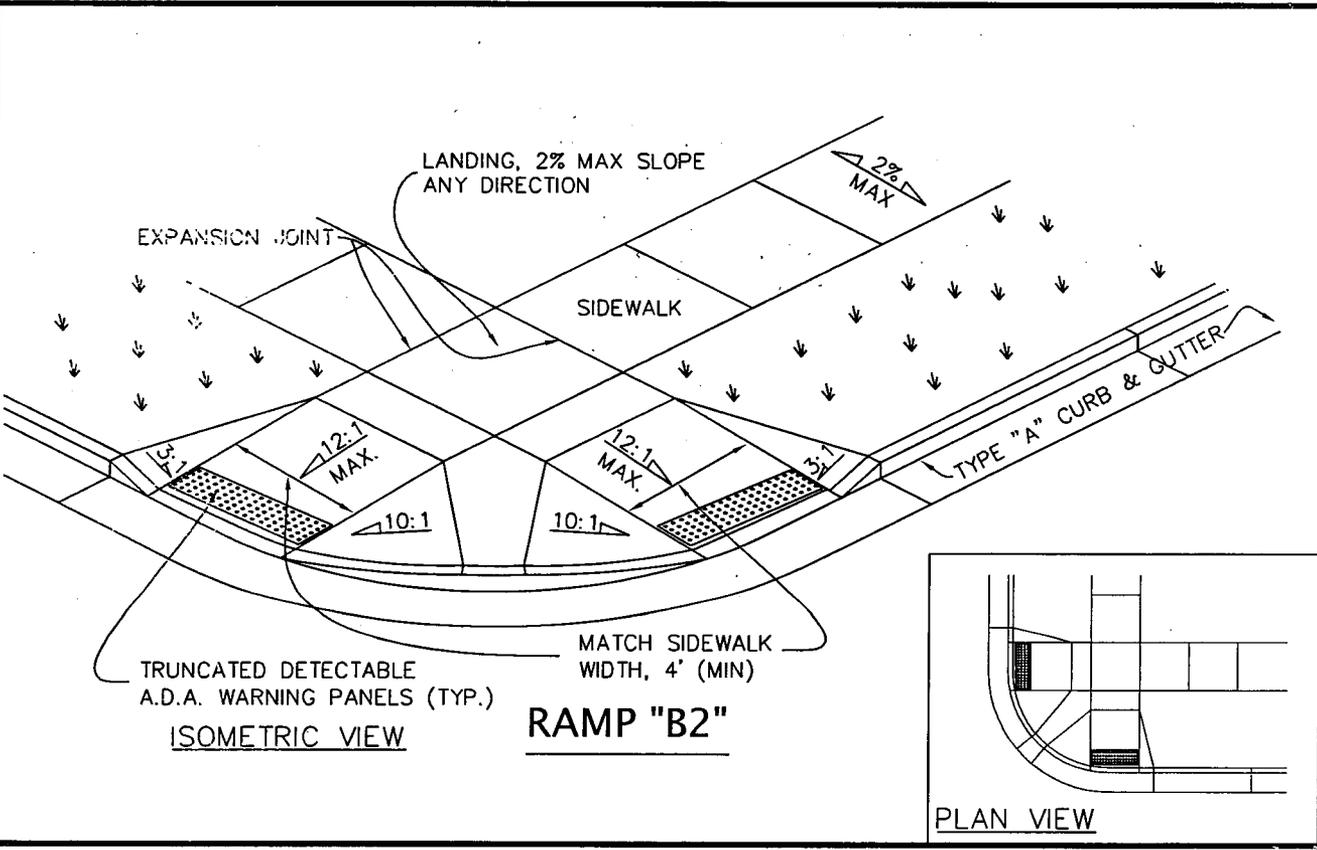
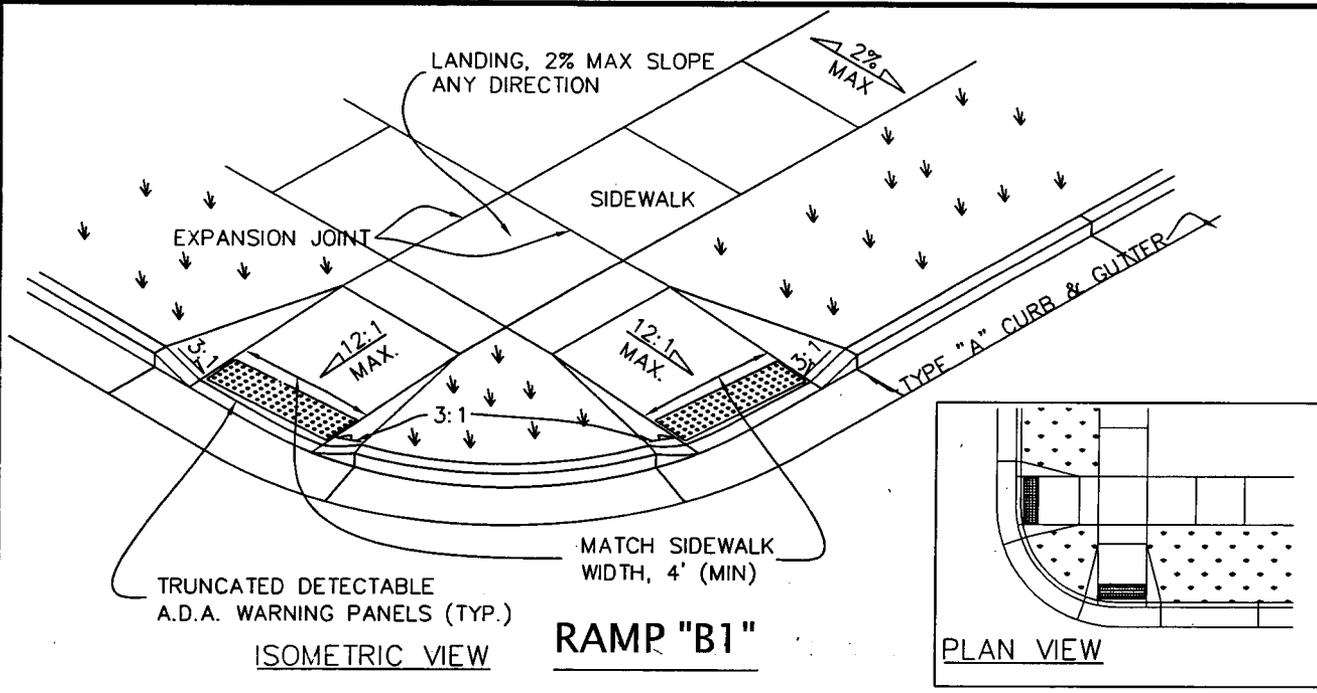


NO.	DATE:	REVISION AND DESCRIPTION

SIDEWALK RAMP DETAILS		STANDARD DETAILS
CHECKED BY:		
DRAWN BY:	DPB	
DATE:	3-06	



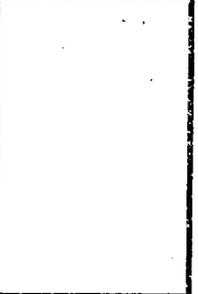
SHEET NUMBER
3 OF 8
SECTION
23.03



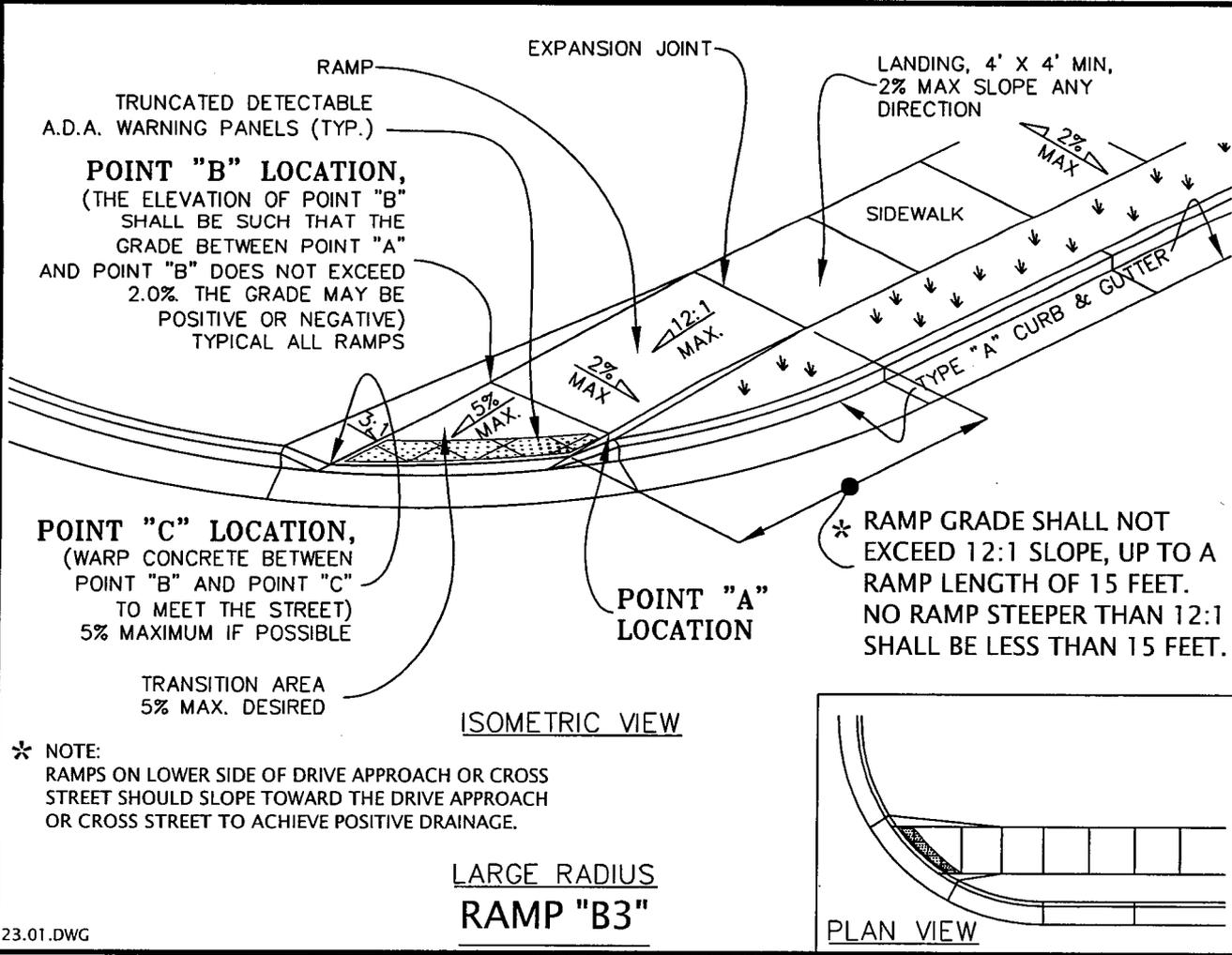
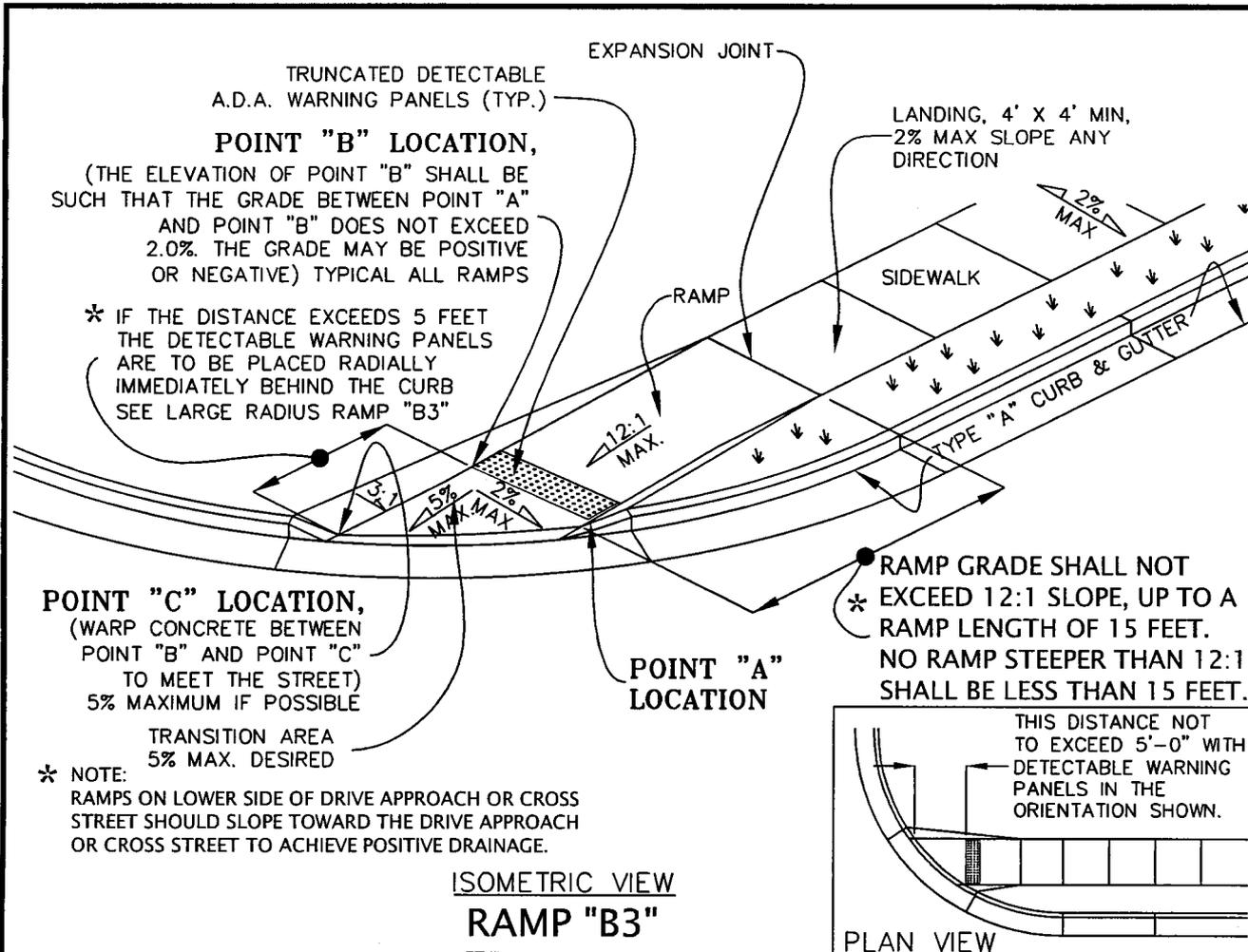
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SIDEWALK RAMP DETAILS	STANDARD DETAILS
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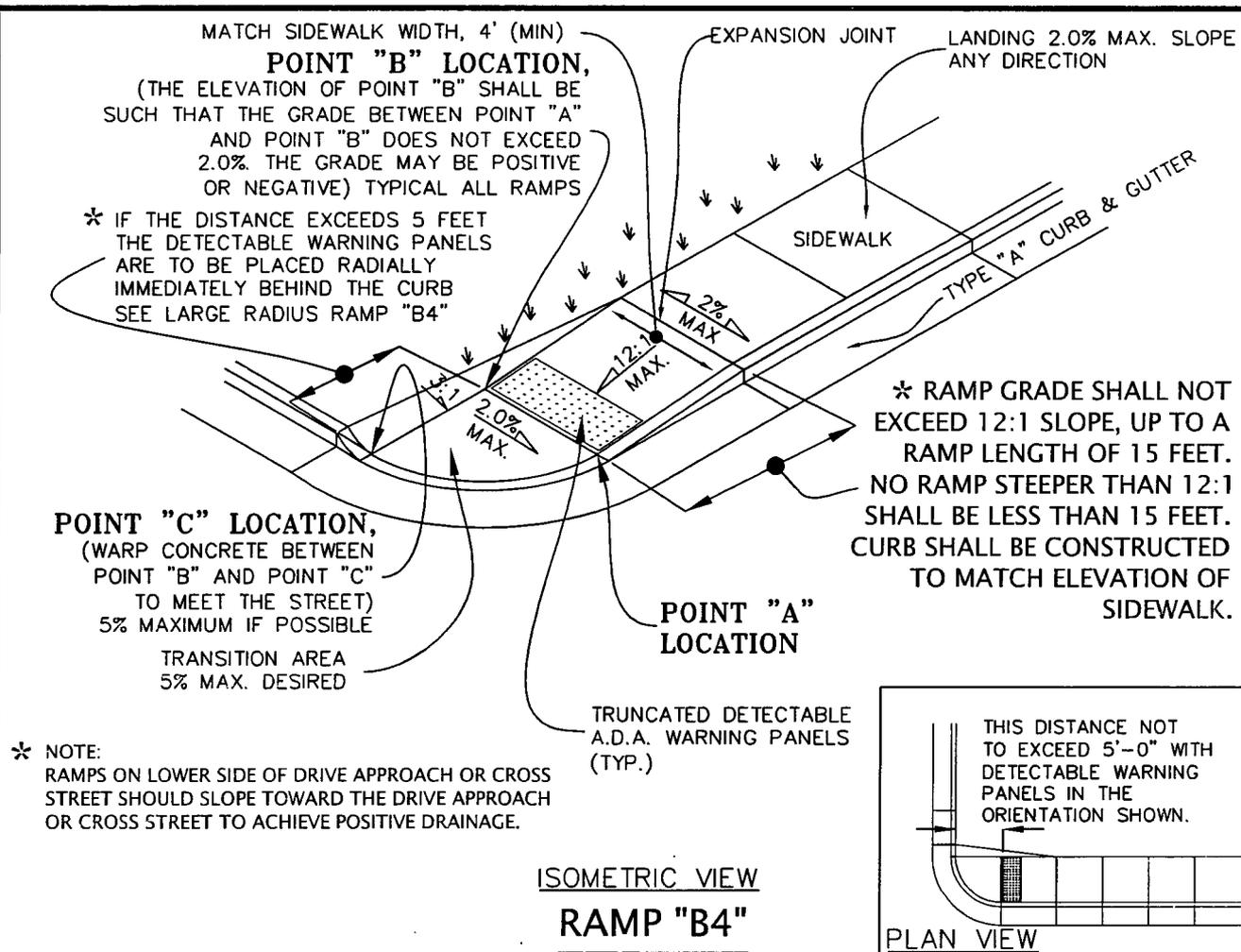
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SHEET NUMBER
4 OF 8
 SECTION
23.04

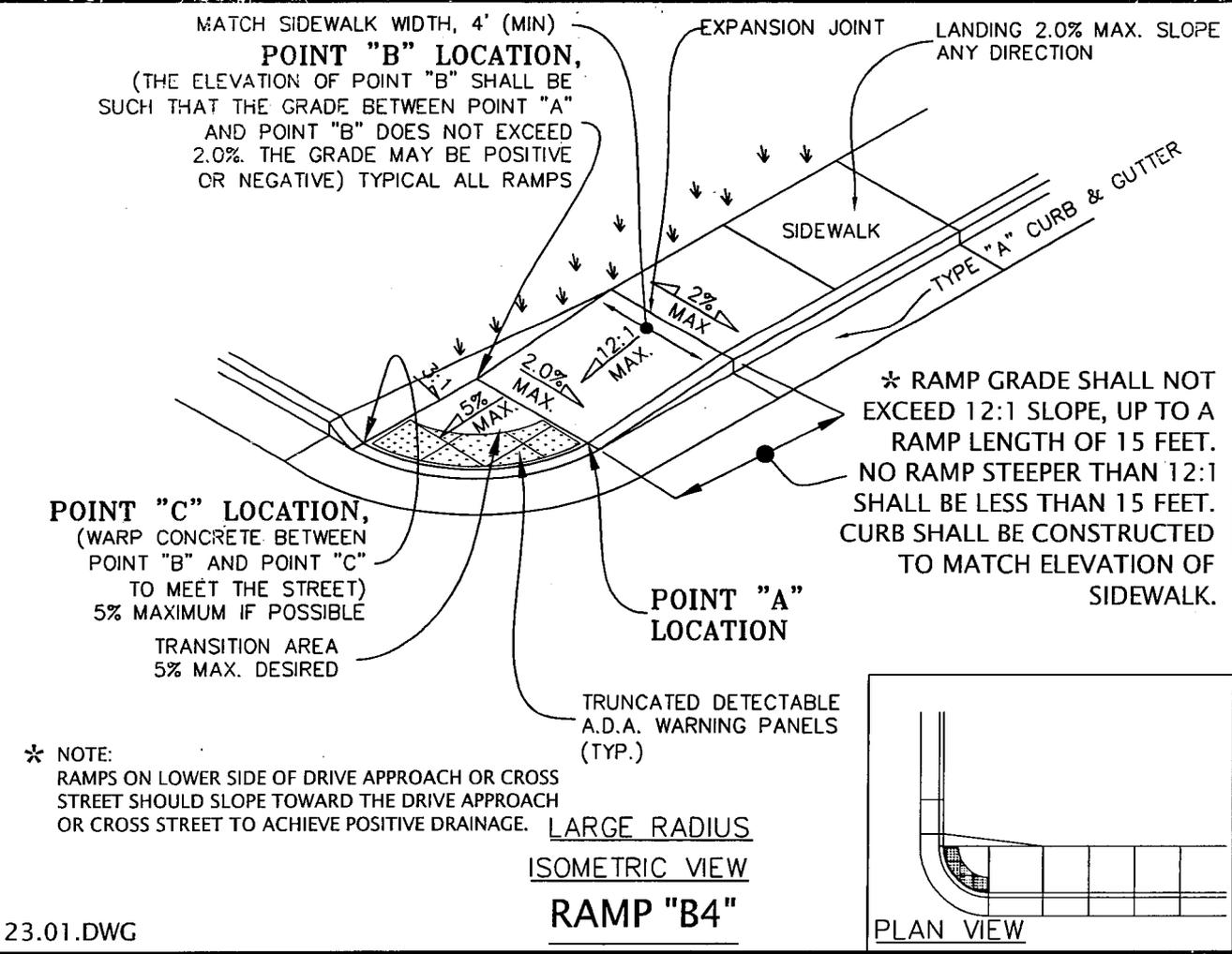


NO:	1	REVISION AND DESCRIPTION	
	1/2013		* NOTE: A.D.A. RAMP GRADES/LENGTHS
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NO:		REVISION AND DESCRIPTION	
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DRAWN BY:	DPB		
DATE:	3-06		
		Jefferson DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION	
SHEET NUMBER		5 OF 8	
		SECTION	
		23.05	



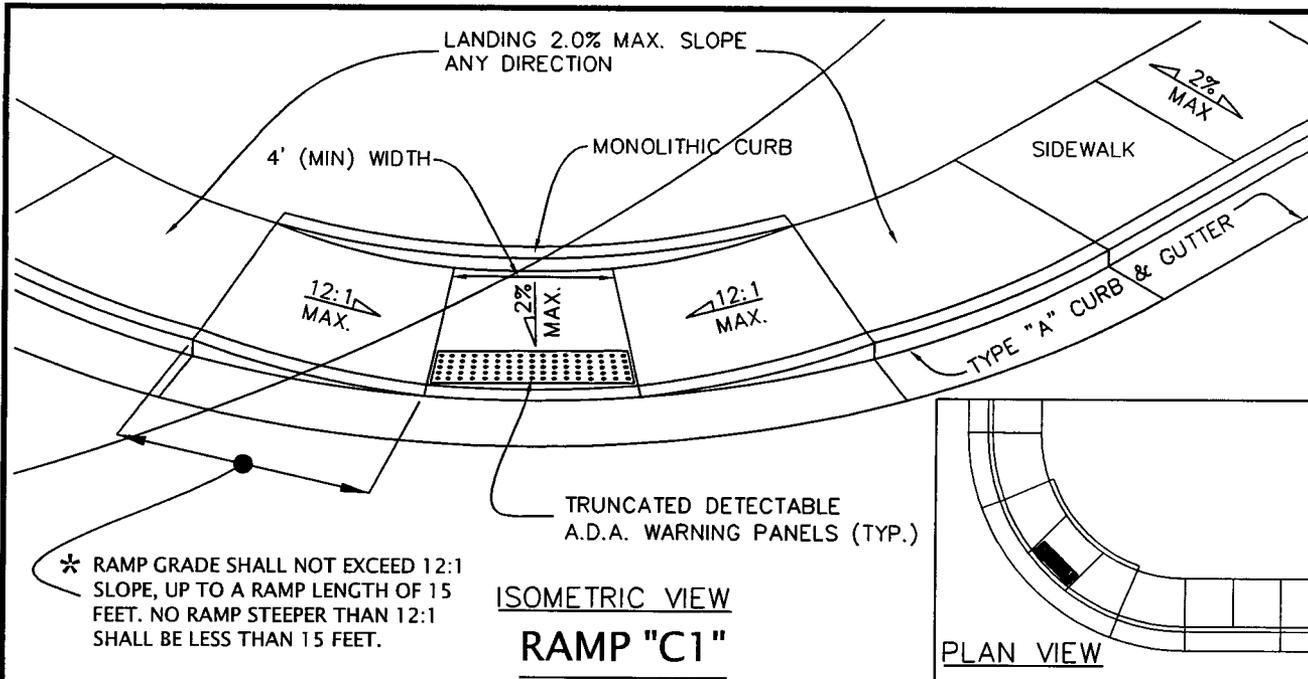
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1	1/2013	* NOTE: A.D.A. RAMP GRADES/LENGTHS

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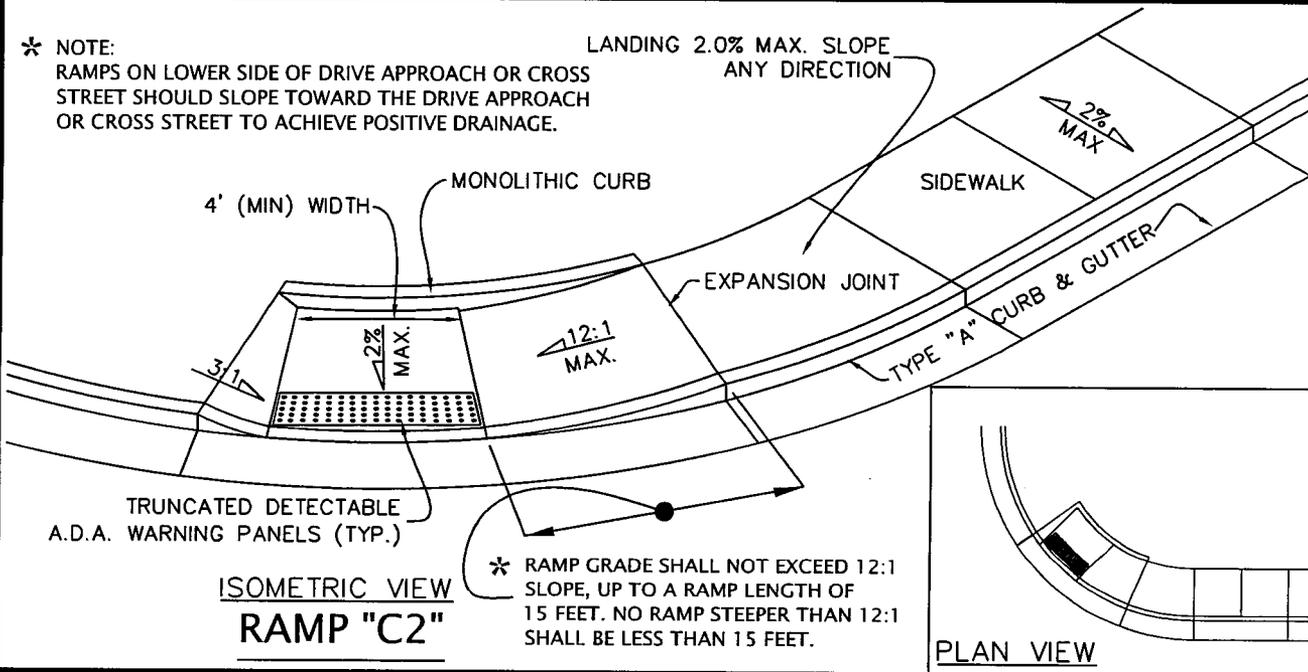


City of **Jefferson**
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER 6 OF 8 SECTION 23.06
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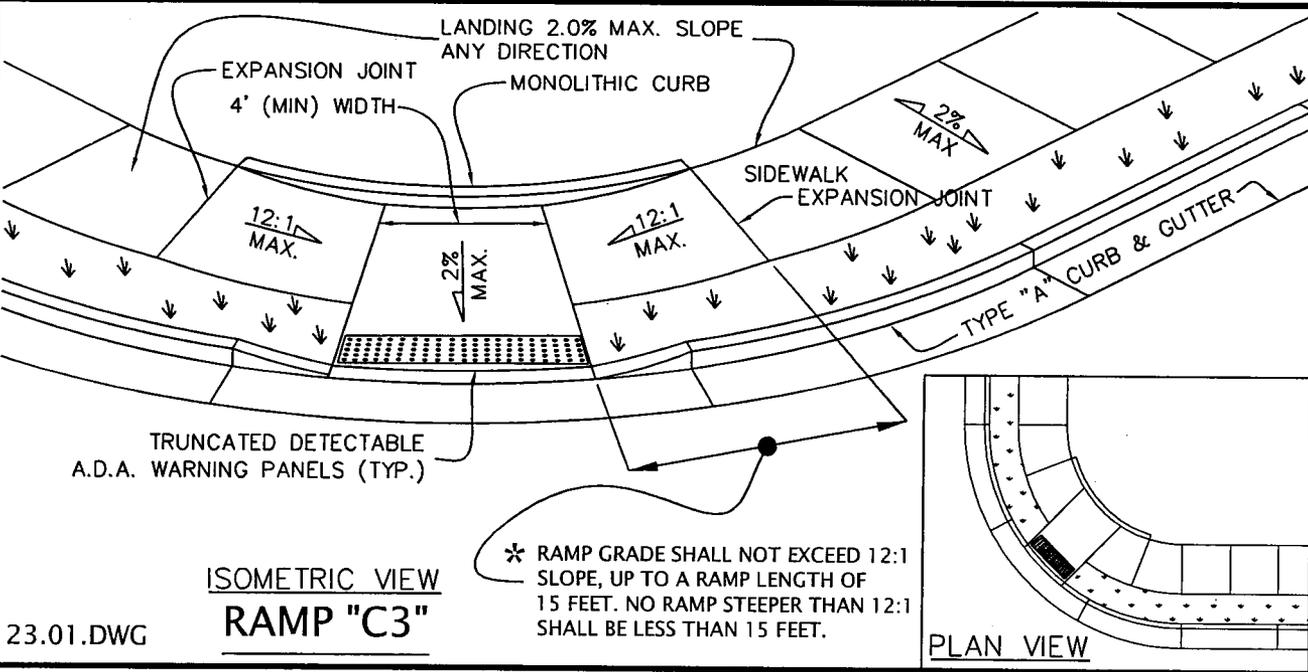
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1	1/2013	* NOTE: A.D.A. RAMP GRADES/LENGTHS



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	DPB	3--06

SIDEWALK RAMP DETAILS

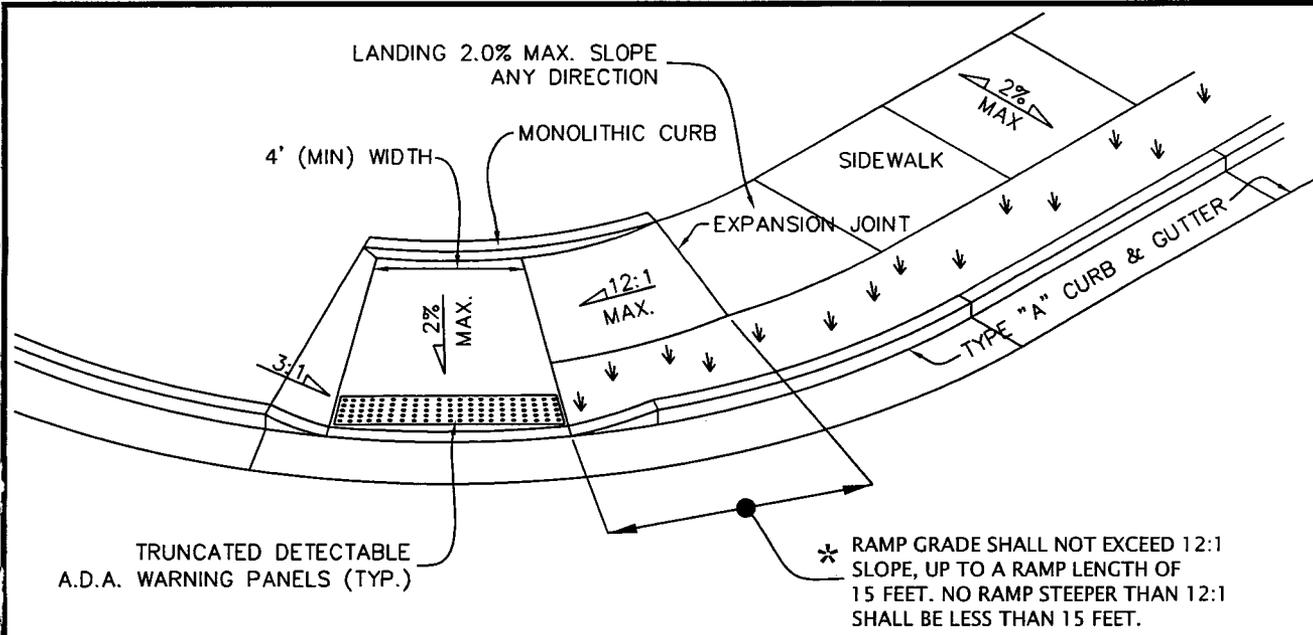
STANDARD DETAILS



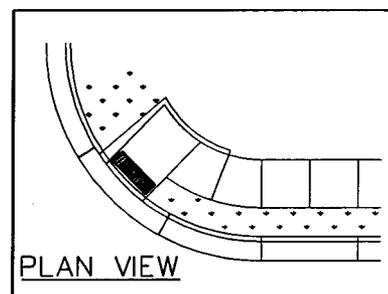
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City of Jefferson
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER
7 OF 8
SECTION
23.07



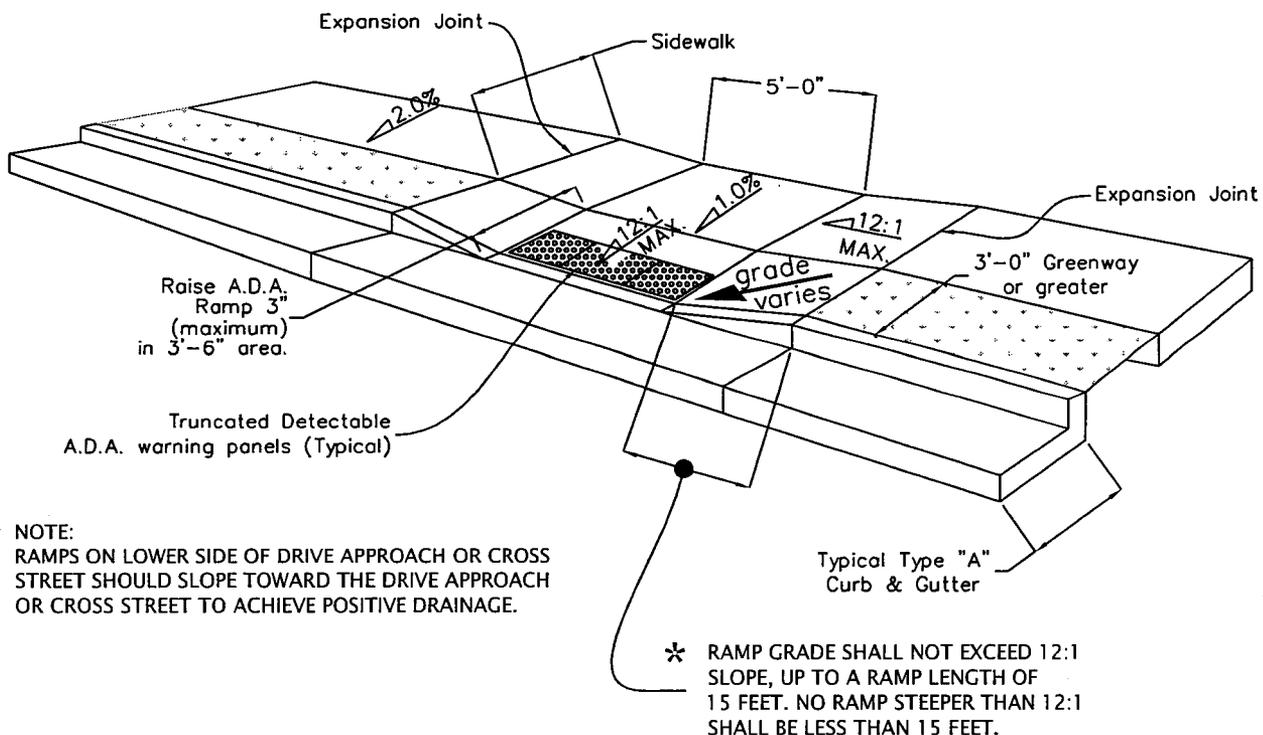
ISOMETRIC VIEW
RAMP "C4"



NO:	1	REVISION AND DESCRIPTION
DATE:	1/2013	* NOTE: A.D.A. RAMP GRADES/LENGTHS

SIDEWALK RAMP DETAILS	STANDARD DETAILS
-----------------------	------------------

CHECKED BY:	DPB	DATE:	3-06
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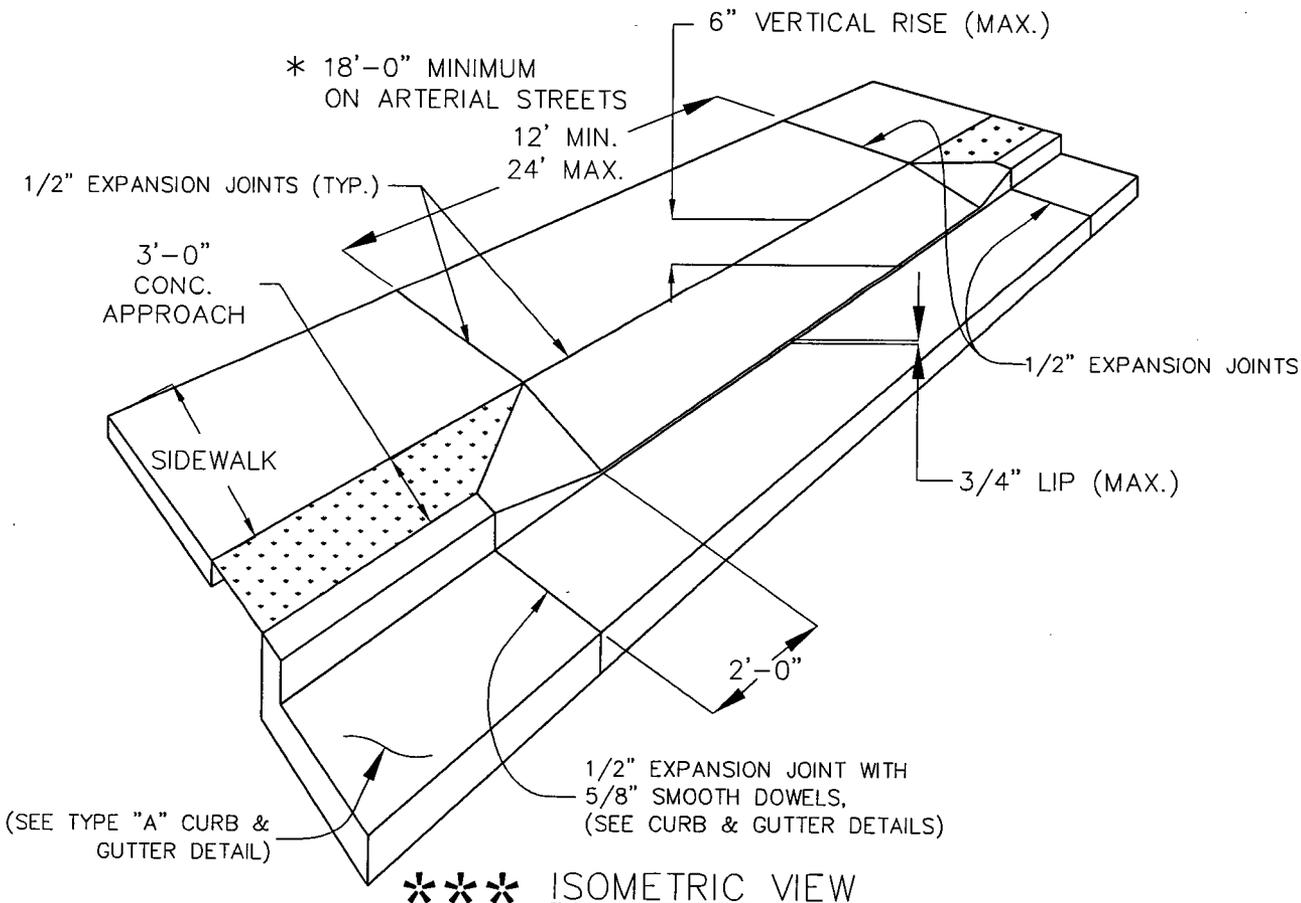
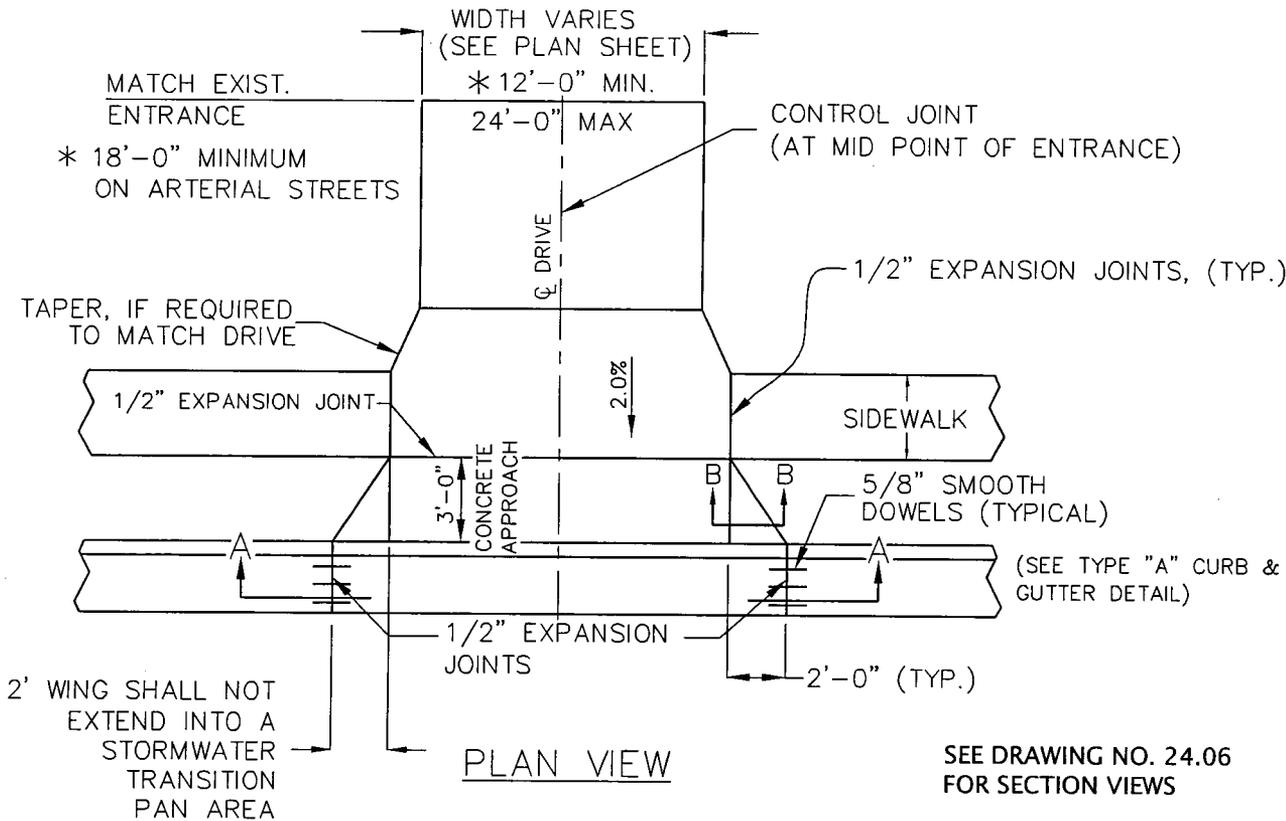
ISOMETRIC VIEW
RAMP "C5"

* NOTE:
RAMPS ON LOWER SIDE OF DRIVE APPROACH OR CROSS STREET SHOULD SLOPE TOWARD THE DRIVE APPROACH OR CROSS STREET TO ACHIEVE POSITIVE DRAINAGE.

NOTES:
See Ramp "C3" if Greenway width is less than 3'-0"

City of **Jefferson**
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER	8 OF 8
SECTION	23.08



RESIDENTIAL DRIVE APPROACH LAYOUT FOR NEW ROADWAY CONSTRUCTION

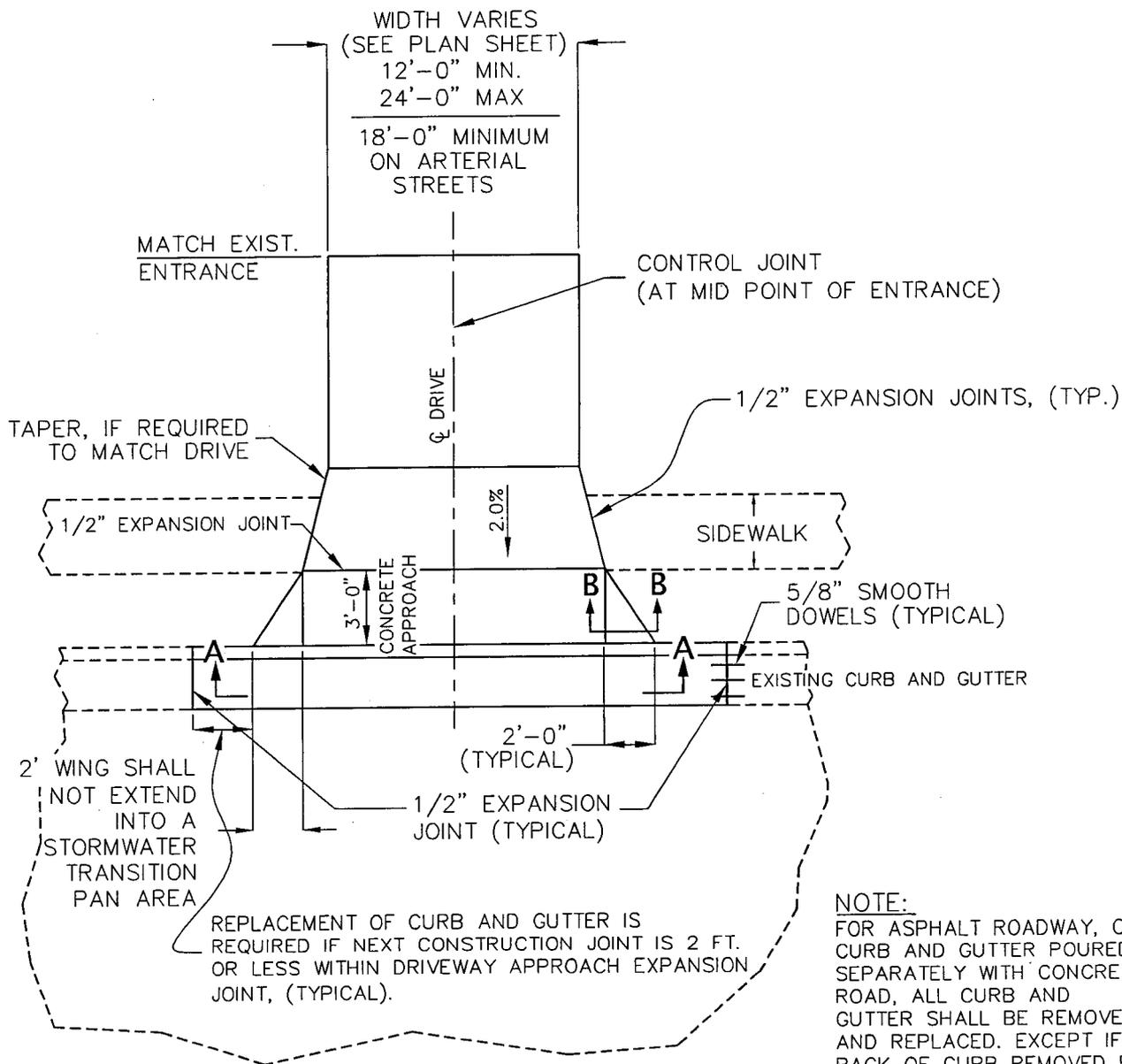
NO:	DATE:	REVISION AND DESCRIPTION
1	1/2010	*** ADDED ISOMETRIC VIEW

RESIDENTIAL DRIVE APPROACH DETAILS FOR NEW ROADWAY CONSTRUCTION

CHECKED BY:	DRAWN BY:	DATE:
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SHEET NUMBER
1 OF 7
SECTION
24.01



RESIDENTIAL DRIVE APPROACH
LAYOUT FOR EXISTING CONCRETE OR
ASPHALT ROADWAY WITH
CONCRETE CURB & GUTTER

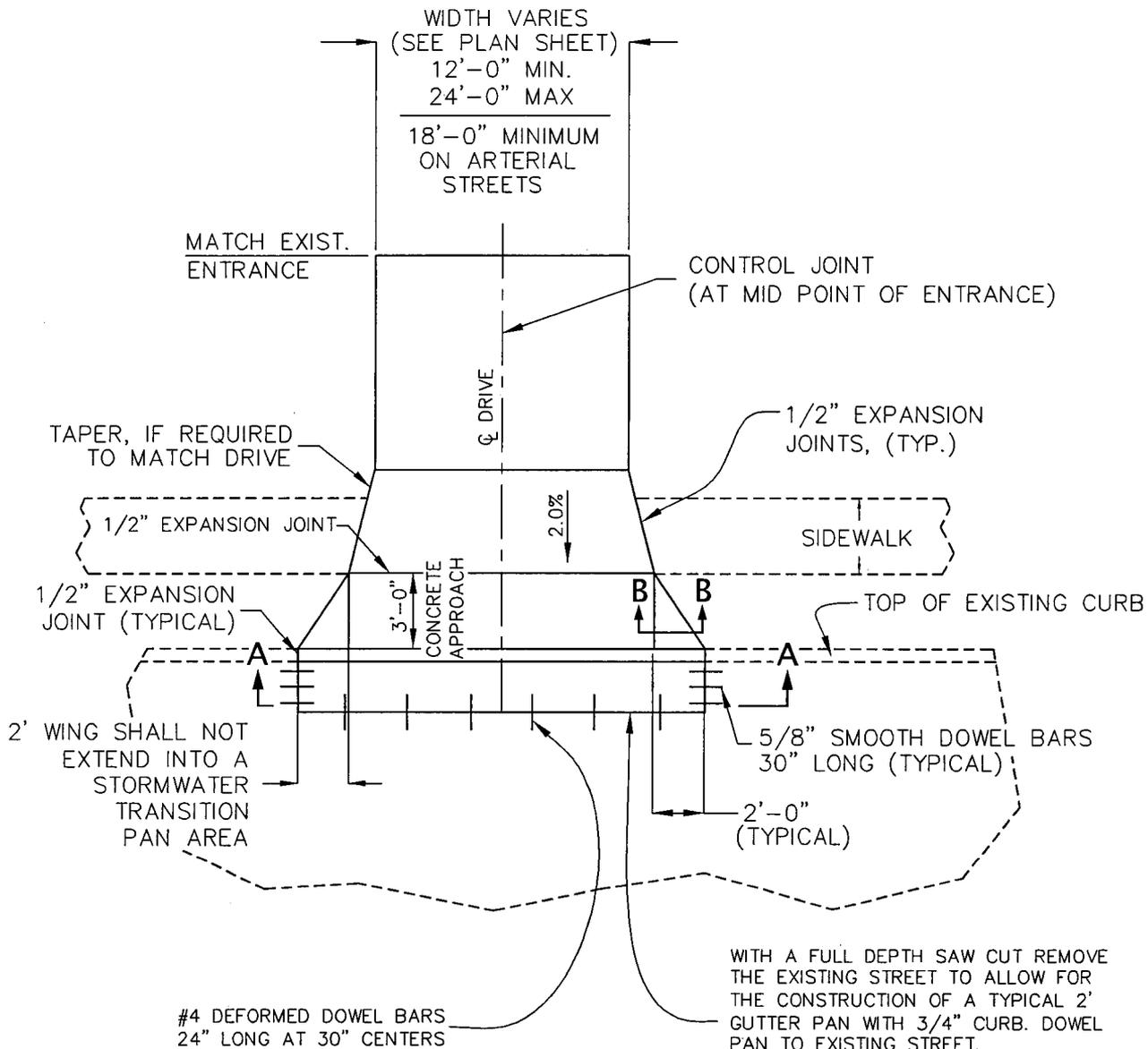
NO:	DATE:	REVISION AND DESCRIPTION

RESIDENTIAL DRIVE
APPROACH DETAILS FOR
EXISTING CONCRETE OR
ASPHALT ROADWAYS WITH
CURB AND GUTTER

CHECKED BY:	DRAWN BY:	DATE:



SHEET NUMBER
2 OF 7
SECTION
24.02



WITH A FULL DEPTH SAW CUT REMOVE THE EXISTING STREET TO ALLOW FOR THE CONSTRUCTION OF A TYPICAL 2' GUTTER PAN WITH 3/4" CURB. DOWEL PAN TO EXISTING STREET. IN LIEU OF CREATING A PAN SECTION THE BACK OF CURB MAY BE REMOVED BY APPROVED MECHANICAL METHODS WHICH LEAVES THE GUTTER FLOW LINE INTACT.

RESIDENTIAL DRIVE APPROACH
LAYOUT FOR EXISTING MONOLITHIC
CONCRETE ROADWAY

NO:	REVISION AND DESCRIPTION

RESIDENTIAL DRIVE
APPROACH DETAILS
FOR EXISTING
MONOLITHIC
CONCRETE ROADWAYS

CHECKED BY:	DRAWN BY:	DATE:



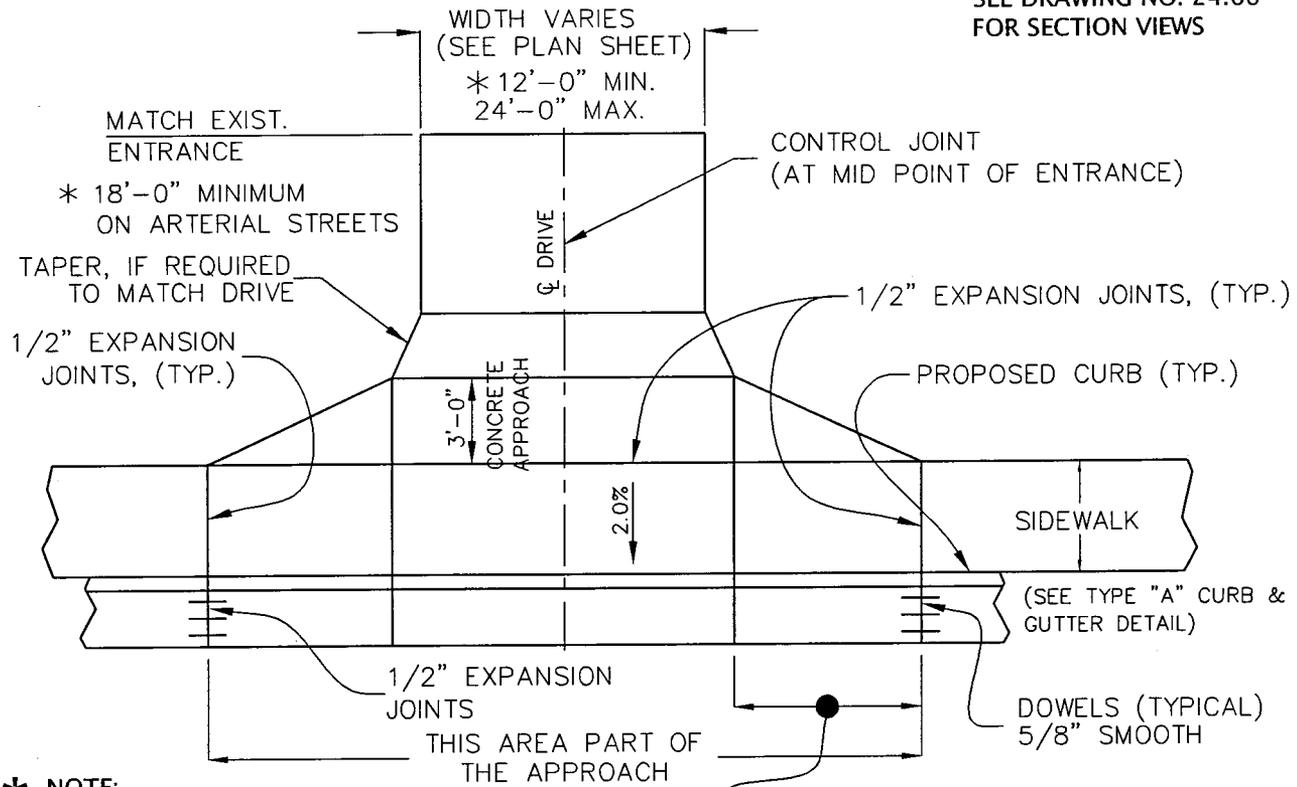
Jefferson

 DEPARTMENT OF PUBLIC WORKS

 ENGINEERING DIVISION

SHEET NUMBER
3 OF 7
SECTION
24.03

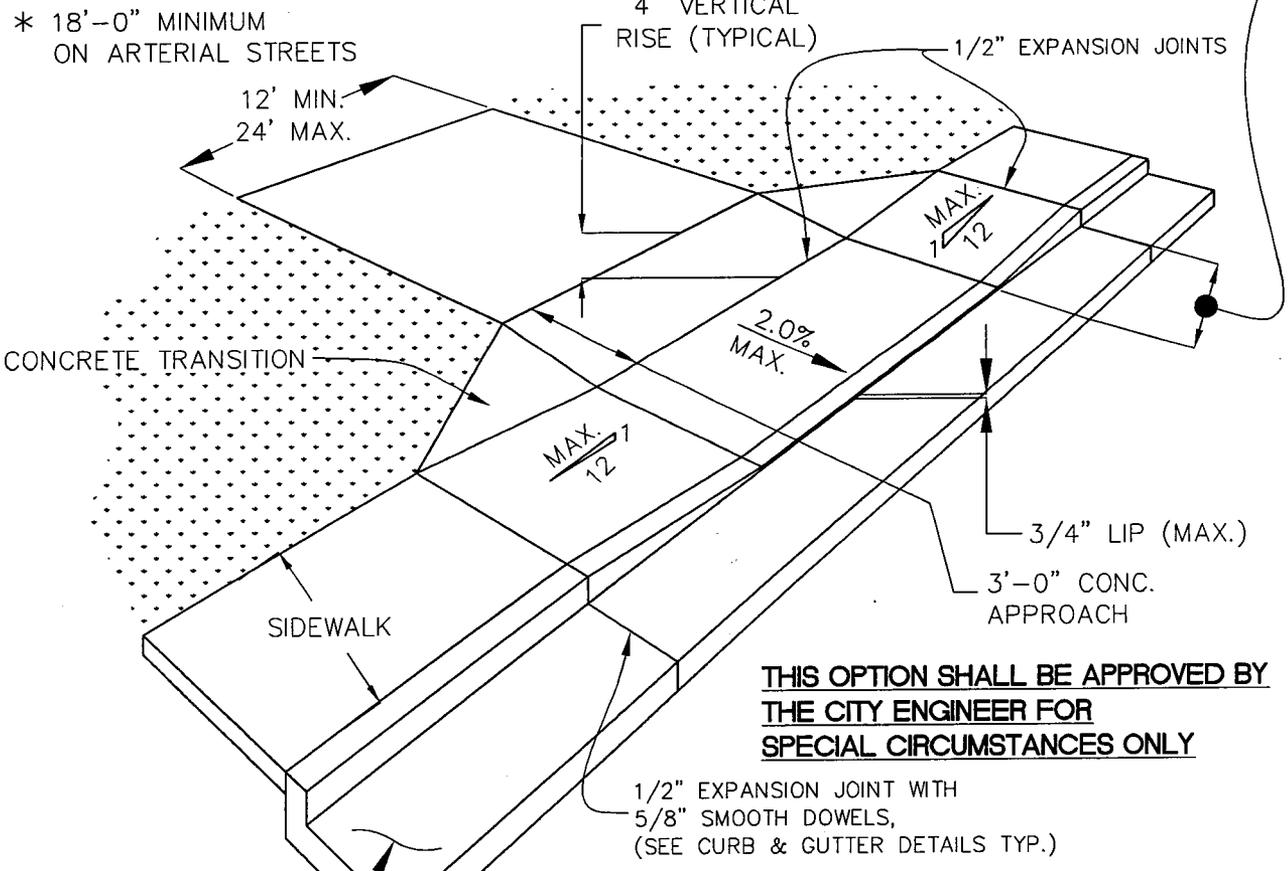
SEE DRAWING NO. 24.06 FOR SECTION VIEWS



* NOTE:
RAMPS ON LOWER SIDE OF DRIVE APPROACH OR CROSS STREET SHOULD SLOPE TOWARD THE DRIVE APPROACH OR CROSS STREET TO ACHIEVE POSITIVE DRAINAGE.

* RAMP GRADE SHALL NOT EXCEED 12:1 SLOPE, UP TO A RAMP LENGTH OF 15 FEET. NO RAMP STEEPER THAN 12:1 SHALL BE LESS THAN 15 FEET.

PLAN VIEW



THIS OPTION SHALL BE APPROVED BY THE CITY ENGINEER FOR SPECIAL CIRCUMSTANCES ONLY

1/2" EXPANSION JOINT WITH 5/8" SMOOTH DOWELS, (SEE CURB & GUTTER DETAILS TYP.)

***** OPTION #1 RESIDENTIAL DRIVE APPROACH WITH SIDEWALK BEHIND CURB**

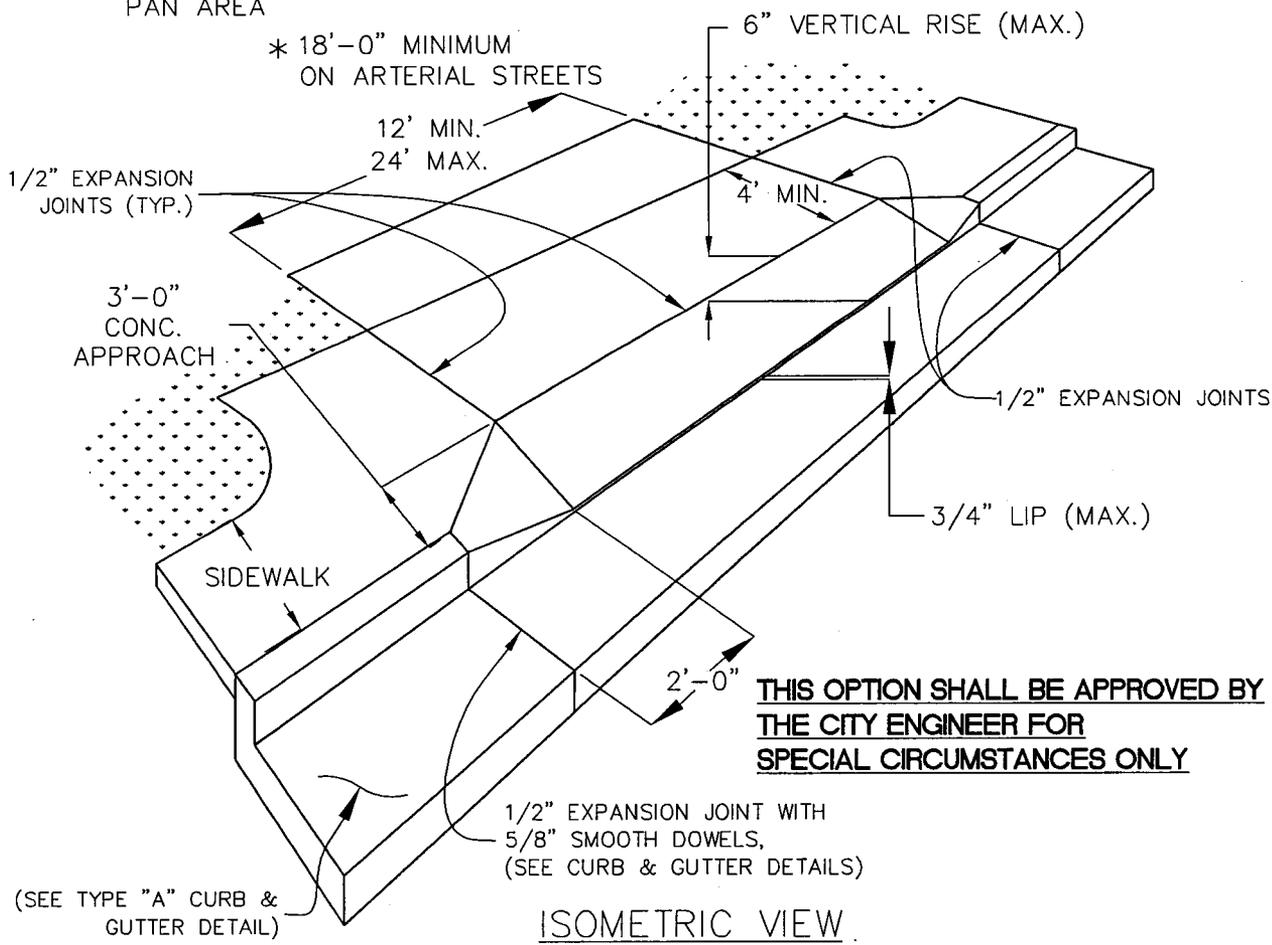
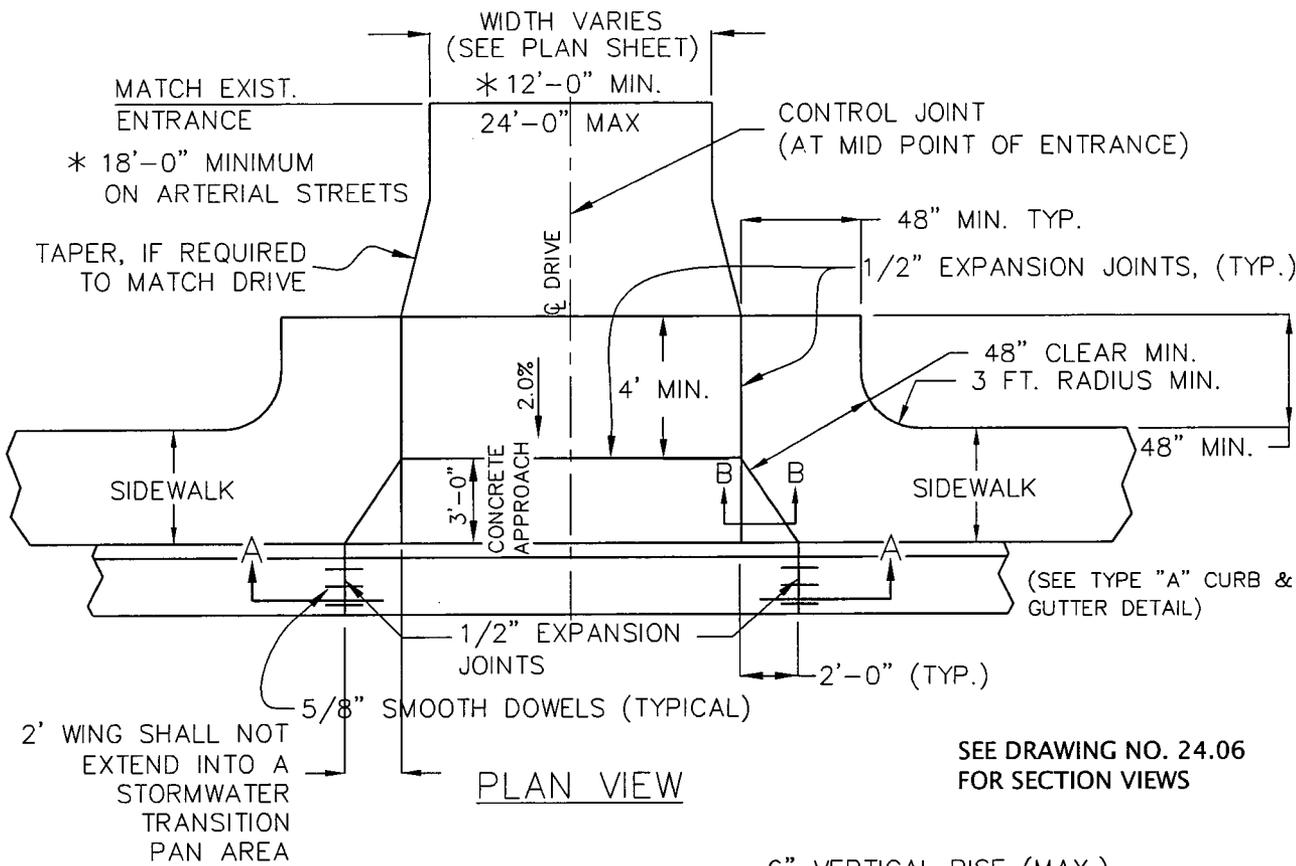
NO.	DATE	REVISION AND DESCRIPTION
1	1/2010	*** UPDATED FOR OPTIONAL SIDEWALK LAYOUT
2	1/2013	* NOTE: A.D.A. RAMP GRADES/LENGTHS

RESIDENTIAL DRIVE APPROACH DETAILS LOCATIONS IN WHICH EXISTING SIDEWALK IS BEHIND CURB

CHECKED BY:
DRAWN BY:
DATE:



SHEET NUMBER
4 OF 7
SECTION
24.04

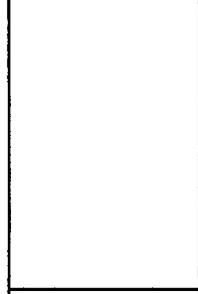


*** OPTION #2 RESIDENTIAL DRIVE APPROACH WITH SIDEWALK BEHIND CURB

NO:	DATE:	REVISION AND DESCRIPTION
1	1/2010	*** UPDATED FOR OPTIONAL SIDEWALK LAYOUT

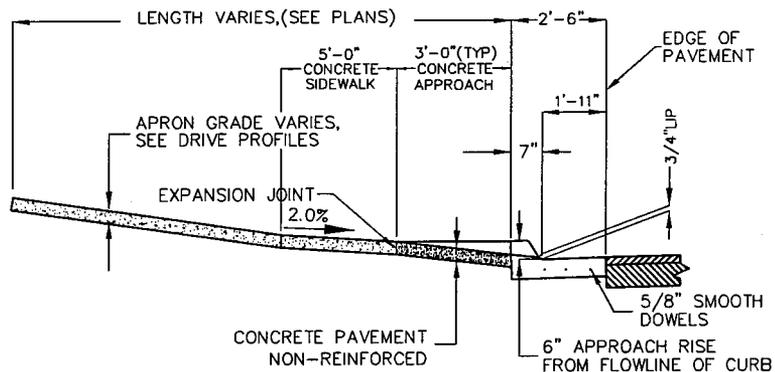
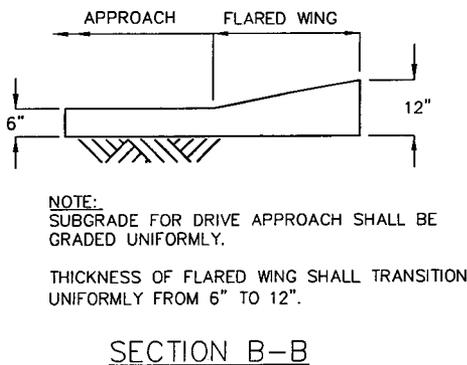
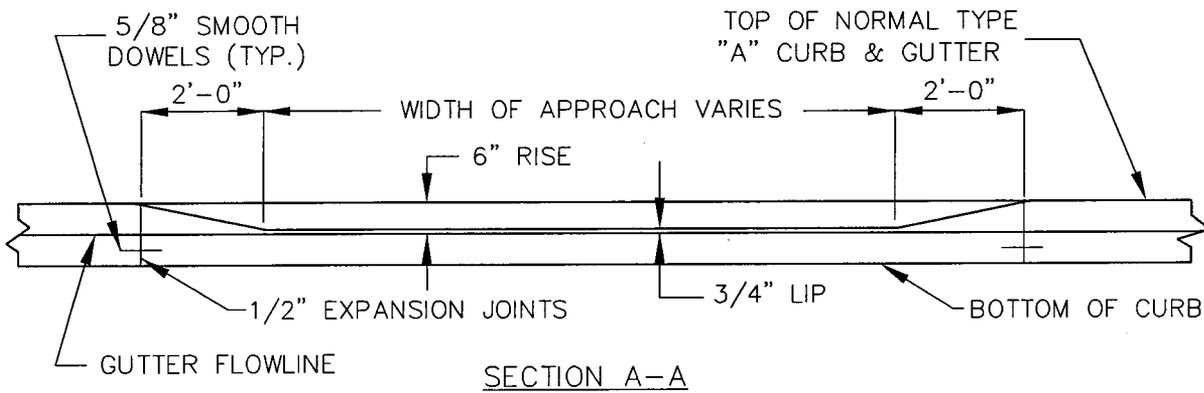
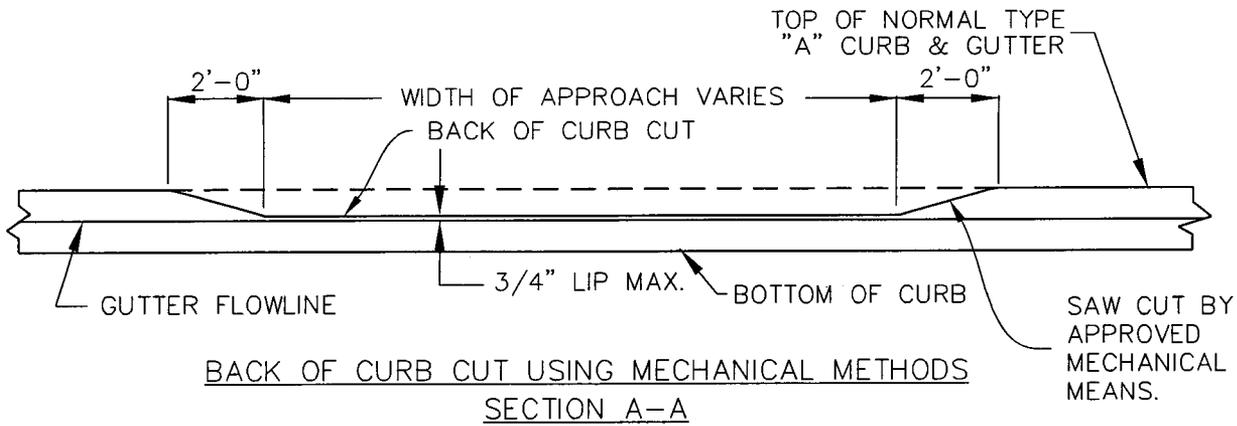
RESIDENTIAL DRIVE APPROACH DETAILS LOCATIONS IN WHICH EXISTING SIDEWALK IS BEHIND CURB

CHECKED BY:	DRAWN BY:	DATE:
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City of Jefferson
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

SHEET NUMBER
 5 OF 7
 SECTION
 24.05



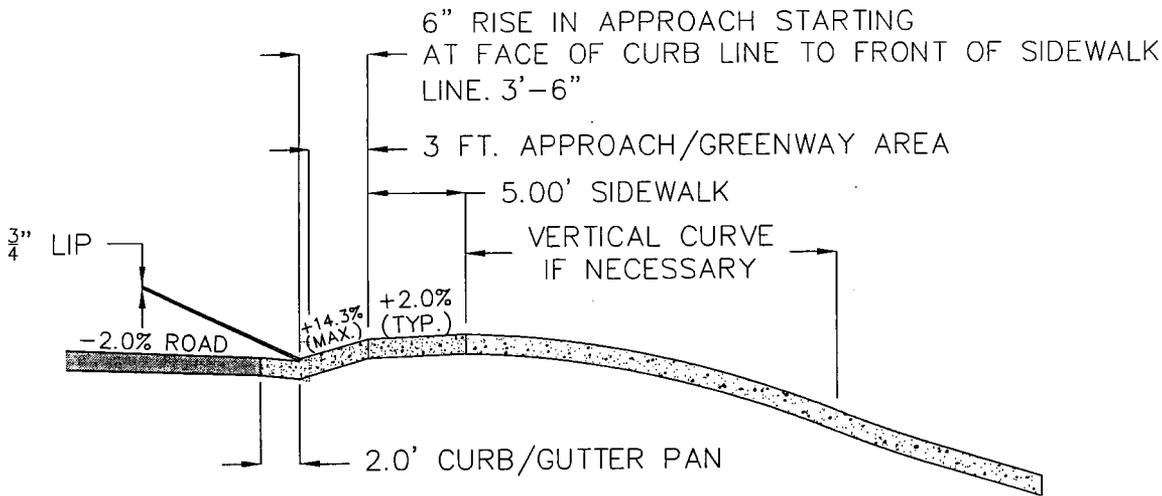
NO.	DATE:	REVISION AND DESCRIPTION

RESIDENTIAL DRIVE SECTIONS

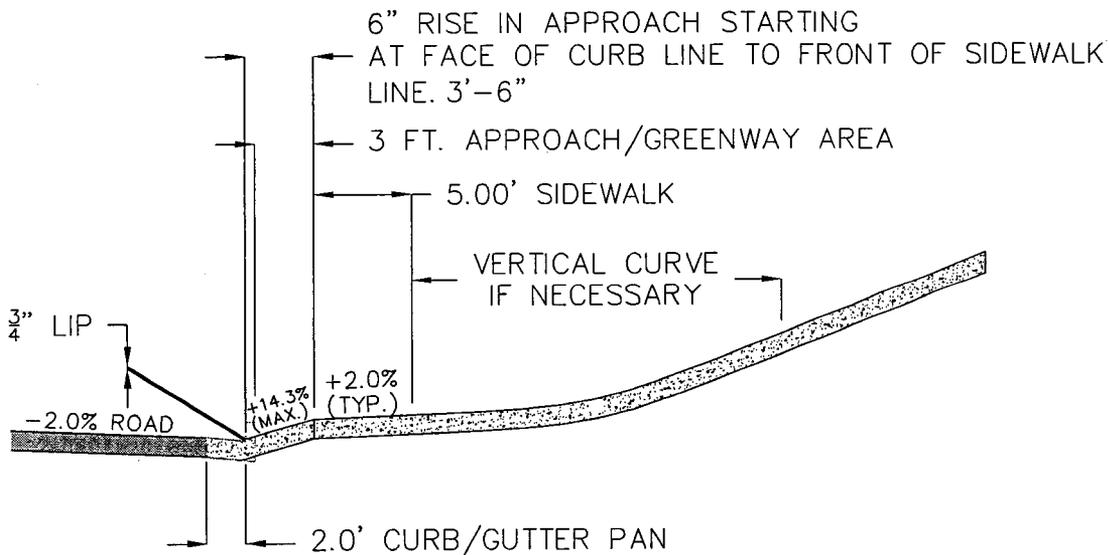
CHECKED BY:	DRAWN BY:	DATE:
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Jefferson
CITY OF JEFFERSON
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER
6 OF 7
SECTION
24.06



STANDARD DRIVEWAY DOWNGRADE PROFILE LAYOUT WITH 3'-0" GREENWAY AND 5'-0" SIDEWALK



STANDARD DRIVEWAY UPGRADE PROFILE LAYOUT WITH 3'-0" GREENWAY AND 5'-0" SIDEWALK

NOTES:
 THE CONTRACTOR SHALL BUILD THE DRIVEWAY SO THAT VEHICLES WILL NOT "BOTTOM OUT" OR "DRAG" WHILE DRIVING UP/DOWN THE DRIVEWAY.

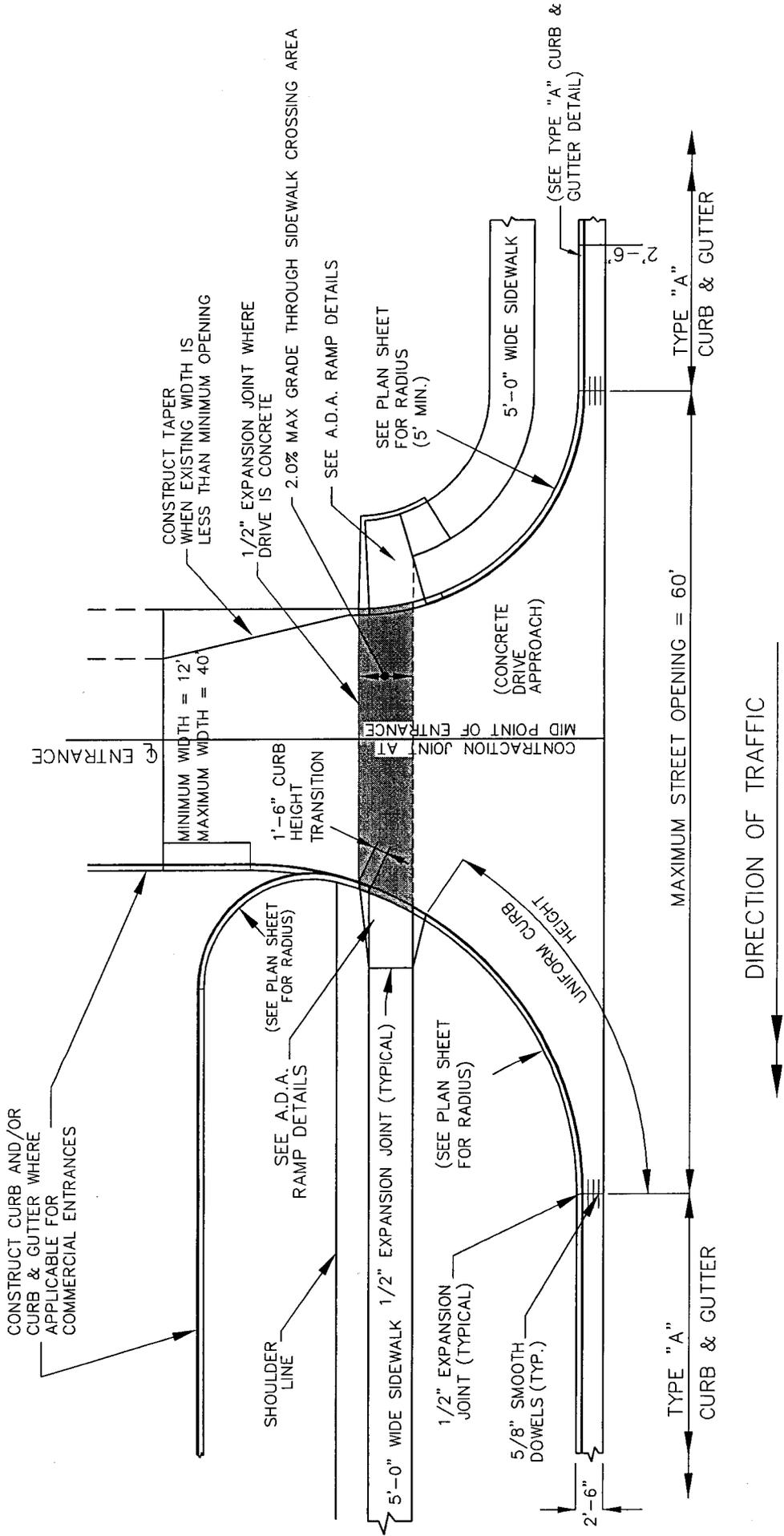
NO.	DATE	REVISION AND DESCRIPTION

STANDARD DRIVEWAY PROFILES FOR MAXIMUM DOWNGRADE/UPGRADE VERTICAL CURVES

CHECKED BY:	DRAWN BY:	DATE:



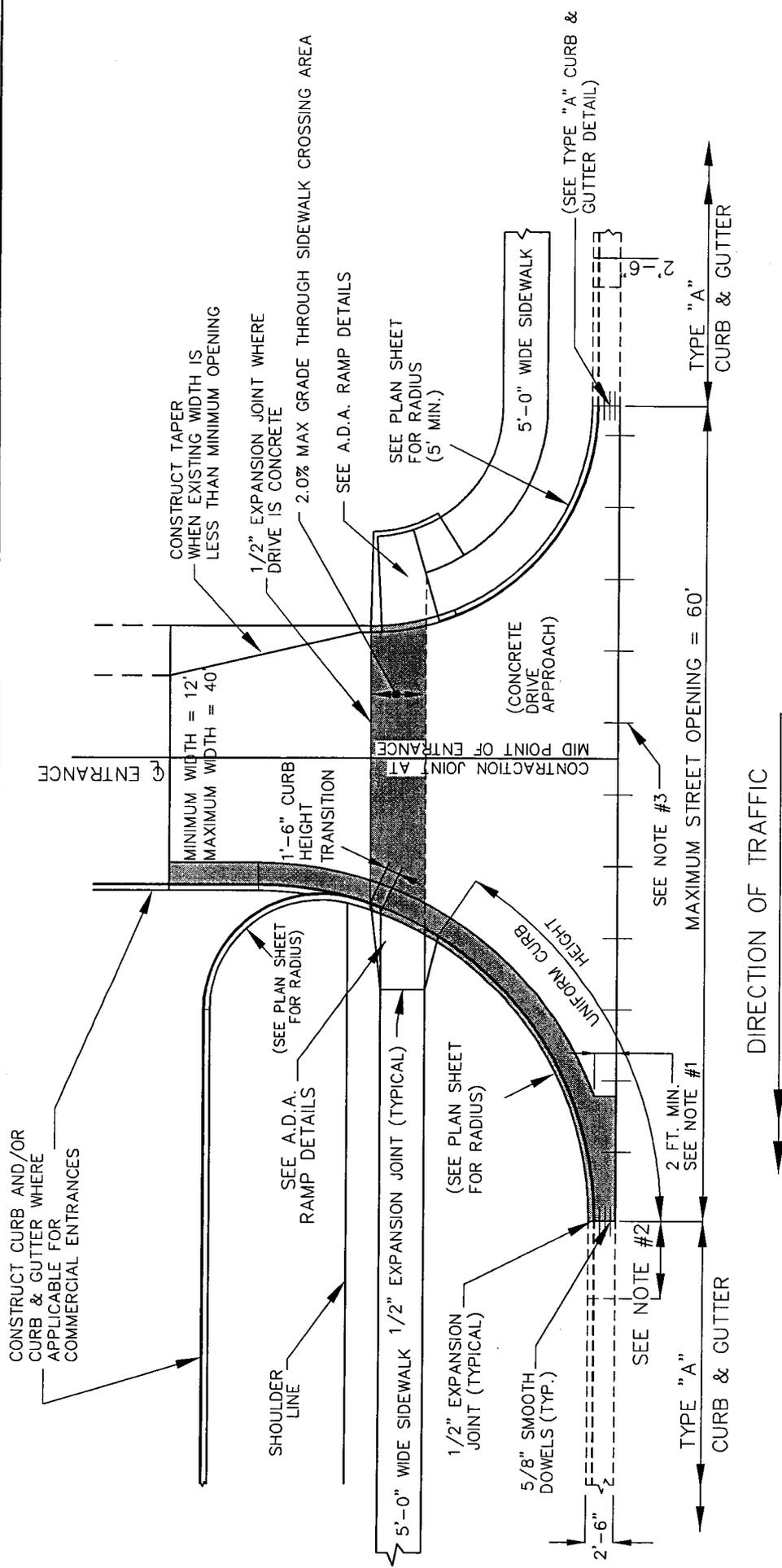
SHEET NUMBER
 7 OF 7
 SECTION
 24.07



COMMERCIAL ENTRANCE PLAN
LAYOUT FOR NEW ROADWAY CONSTRUCTION

SEE PAGE 20.06 FOR CONCRETE REINFORCEMENT REQUIREMENTS

CHECKED BY: DRAWN BY: DATE:	COMMERCIAL DRIVE APPROACH DETAILS	NO: 1	DATE: 12/2006	REVISION AND DESCRIPTION MODIFIED A.D.A. RAMP LAYOUT
	STANDARD DETAILS			
		SHEET NUMBER 1 OF 3 SECTION 25.01		



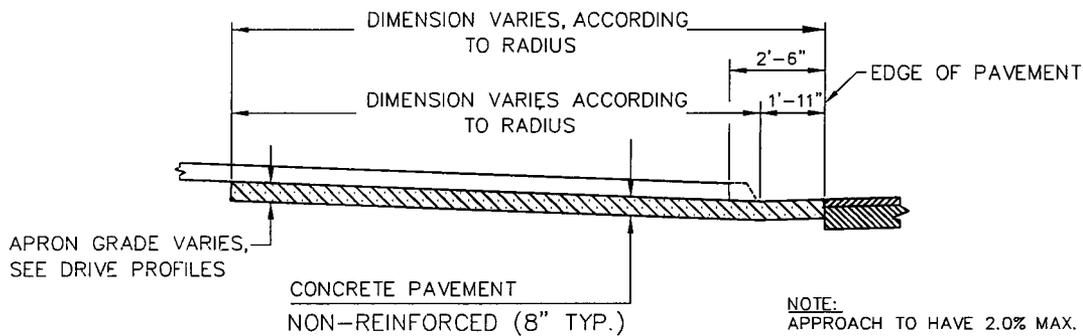
COMMERCIAL ENTRANCE PLAN

LAYOUT FOR EXISTING CONCRETE AND ASPHALT ROADWAY

- NOTES:**
1. IF CONCRETE APPROACH IS NOT POURED MONOLITHICALLY, AND THE CURB AND GUTTER IS POURED SEPARATELY IN THE APPROACH AREA, THE CURB AND GUTTER SHALL BE CONSTRUCTED AS SHOWN WITH A 2 FT. MINIMUM DISTANCE FROM THE FACE OF THE APPROACH.
 2. REPLACEMENT OF CURB AND GUTTER AND SIDEWALK IS REQUIRED IF EXISTING CONTROL JOINTS WITHIN 2 FT. OF APPROACH EXPANSION JOINT, (TYPICAL), (ASPHALT ROADWAY).
 3. #4 DEFORMED DOWEL BARS 24" LONG AT 30" SPACINGS. OMIT IF APPROACH IS ABUTTING ASPHALT ROADWAY.

SEE PAGE 20.06 FOR CONCRETE REINFORCEMENT REQUIREMENTS

<p style="font-size: 8px; margin: 0;">CITY OF JEFFERSON DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION</p>	SHEET NUMBER			REVISION AND DESCRIPTION
	2 OF 3			NO: 1 DATE: 12/2006 REVISION: MODIFIED A.D.A. RAMP LAYOUT
	SECTION			
	25.02			
	COMMERCIAL DRIVE APPROACH DETAILS			
	STANDARD DETAILS			
CHECKED BY:	DRAWN BY:			
DATE:				



TYPICAL SECTION OF COMMERCIAL ENTRANCE

NO: 1		REVISION AND DESCRIPTION
DATE: 4/2007		CHANGED COMMERCIAL CONCRETE DRIVE THICKNESS FROM 6" TO 8"
COMMERCIAL DRIVE SECTION		
CHECKED BY:	DRAWN BY:	DATE:
SHEET NUMBER		
3 OF 3		
SECTION		
25.03		

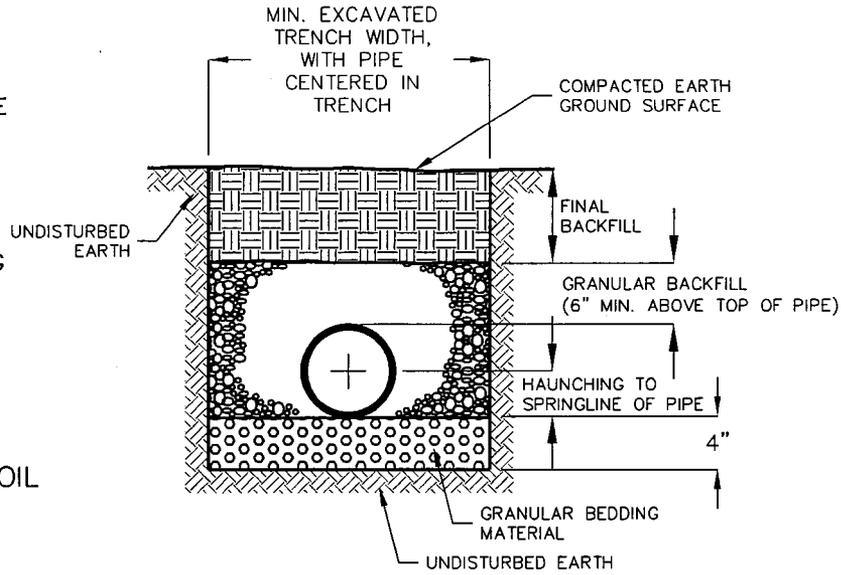
CONSTRUCTION SEQUENCE

1. PLACE BEDDING MATERIAL TO GRADE.
2. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
3. INSTALL PIPE TO GRADE.
4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE SPRINGLINE.
5. COMPLETE BACKFILL ACCORDING TO SPECIFICATIONS.

LEGEND



= UNDISTURBED SOIL

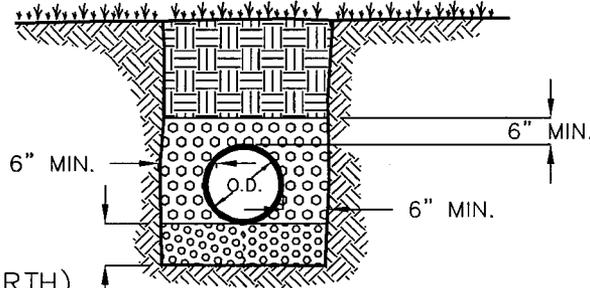


TYPICAL TRENCH DETAIL FOR H.D.P.E. PIPE INSTALLATION

ALL H.D.P.E. PIPE SHALL HAVE WATER TIGHT GASKET CONNECTIONS

SPECIFIED DIA OF PIPE (IN.)	MIN OVERFILL HEIGHT (FT)	MAX OVERFILL HEIGHT* (FT)	MIN. TRENCH WIDTH (IN.)
12	1	38	34
15	1	39	38
18	1	40	44
24	1	40	54
30	1	40	66
36	1	38	78
42	2	10	84
48	2	9	91

* MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.



**TYPICAL PIPE EMBEDMENT
R.C.P., C.M.P., V.C.P., P.V.C.**

GRADATION FOR GRANULAR BEDDING MATERIAL, ASTM STANDARD C33

	SIEVE SIZE	% PASSING
PASSING	3/4"	90 - 100%
PASSING	1/2"	-----
PASSING	3/8"	20 - 55%
PASSING	NO. 4	0 - 10%
PASSING	NO. 8	0 - 10%

NOTES:

1. ALL TRENCHES UNDER PAVED SURFACES SHALL BE BROUGHT TO THE LEVEL OF THE SUBGRADE WITH GRANULAR MATERIAL. UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
2. GRANULAR MATERIAL MAY CONSIST OF 1" CLEAN ROCK, OR GRADATION FOR GRANULAR BEDDING MATERIAL, ASTM STANDARD C33.

NO:	1	REVISION AND DESCRIPTION	REVISED TYPICAL PIPE EMBEDMENT FOR RCP, CMP, VCP, AND PVC
DATE:	8/2007		

SANITARY SEWER AND STORMWATER PIPE EMBEDMENT DETAILS

CHECKED BY:	DRAWN BY:	DATE:
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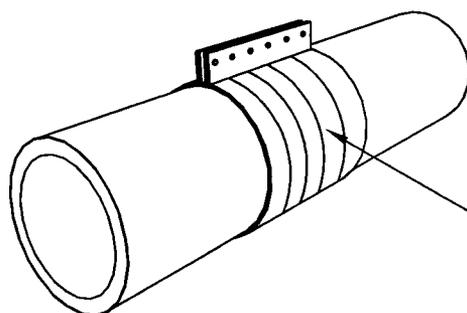


SHEET NUMBER
1 OF 1
SECTION
30.01

ALL CORRUGATED METAL PIPE SHALL BE TYPE 2 ANGULAR RIVETED ALUMINIZED STEEL

MINIMUM GAUGE SPECIFICATIONS FOR CORRUGATED METAL PIPE (CIRCULAR CULVERT PIPE)							
PIPE DIAMETER	2 2/3 CORR. GAUGE	MINIMUM COVER	3 x 1 CORR. GAUGE	MINIMUM COVER	BAND WIDTH	PIPE DIAMETER	
15"	16	12"	Hatched	12"	12"	15"	
18"						18"	
21"						21"	
24"						24"	
30"						30"	
36"	36"						
42"	14		12"		14	12"	42"
48"							48"
54"							54"
60"							60"
66"	66"						
72"	10	12"	14	12"	72"		
78"					78"		
84"					84"		
90"					90"		
96"					96"		
102"	Hatched		12"		12	24"	102"
108"							108"
114"							114"
120"							120"

MINIMUM GAUGE SPECIFICATIONS FOR CORRUGATED METAL PIPE (ARCHED CULVERT PIPE)							
PIPE ARCH SPAN & RISE	2 2/3 CORR. GAUGE	MINIMUM COVER	3 x 1 CORR. GAUGE	MINIMUM COVER	BAND WIDTH	PIPE ARCH SPAN & RISE	
17" x 13"	16	12"	Hatched	12"	12"	17" x 13"	
21" x 15"						21" x 15"	
24" x 18"						24" x 18"	
28" x 20"						28" x 20"	
35" x 24"						35" x 24"	
42" x 29"	14		12"		Hatched	12"	42" x 29"
49" x 53"							49" x 53"
57" x 38"							57" x 38"
64" x 43"							64" x 43"
60" x 46"	Hatched						12"
66" x 51"		66" x 51"					
73" x 55"		73" x 55"					
81" x 59"		81" x 59"					
87" x 63"		87" x 63"					
95" x 67"	12	12"	12	24"	95" x 67"		
103" x 71"					103" x 71"		
112" x 75"					112" x 75"		
117" x 79"					117" x 79"		
128" x 83"	10				12"	12	
137" x 87"		137" x 87"					
142" x 91"		142" x 91"					



CMP Connecting Bands:
 12"-48" DIA. PIPES AT 12" WIDE.
 54" -144" DIA. PIPES AT 24" WIDE.

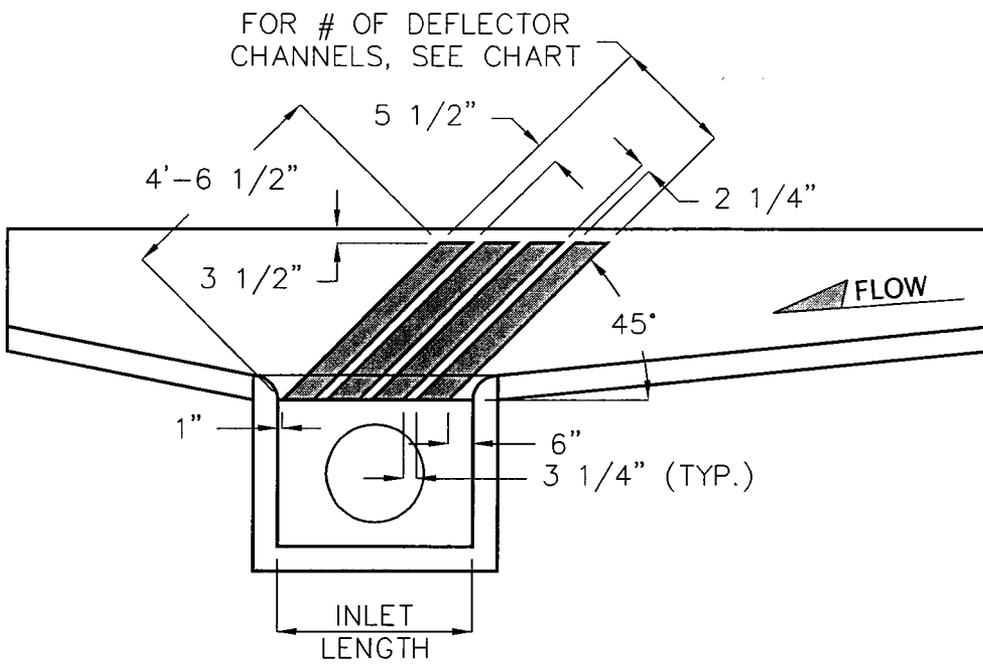
NO:	DATE:	REVISION AND DESCRIPTION

CMP MINIMUM PIPE SPECIFICATIONS AND CONNECTING BAND SIZES

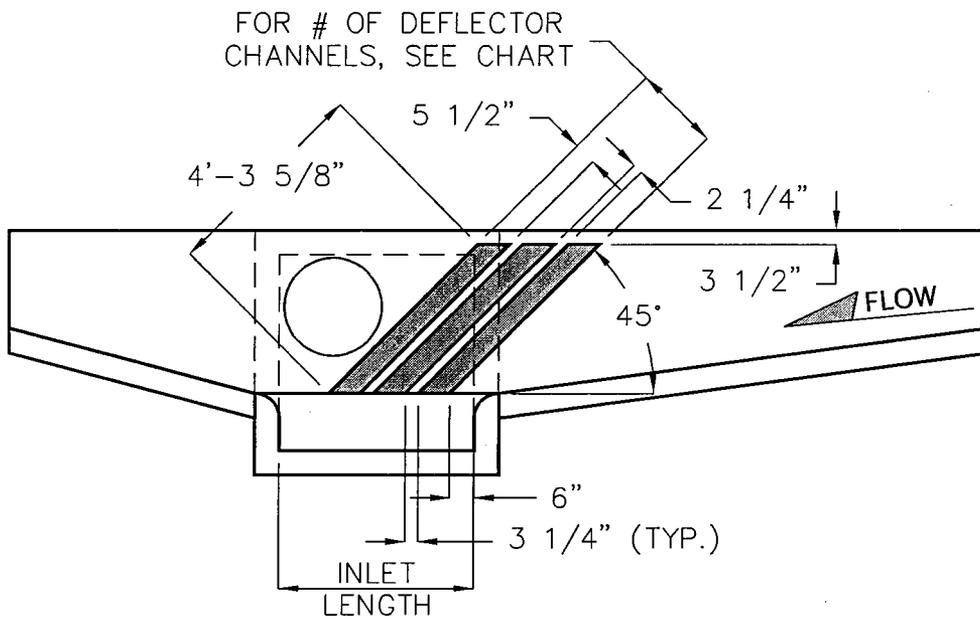
CHECKED BY:	DRAWN BY:	DATE:



SHEET NUMBER
 1 OF 1
 SECTION
 30.02

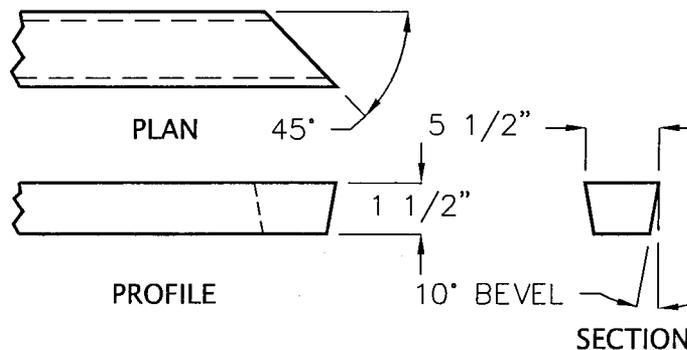


DEFLECTOR LAYOUT FOR TYPE "A" INLETS



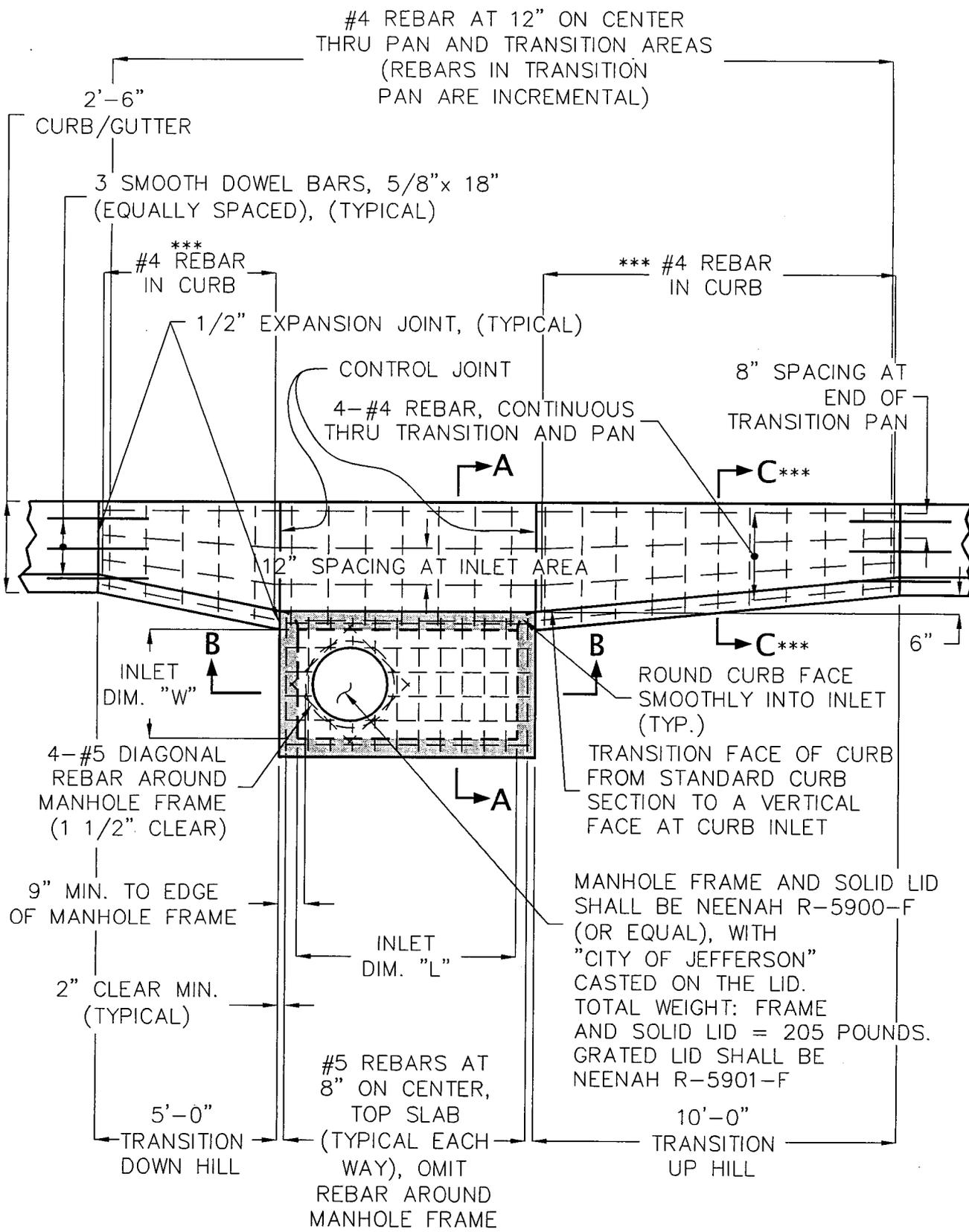
DEFLECTOR LAYOUT FOR TYPE "C" INLETS

INLET LENGTH	# OF DEFLECTOR CHANNELS	
	TYPE "A" INLET	TYPE "C" INLET
4'	4	3
6'	6	5
8'	8	7



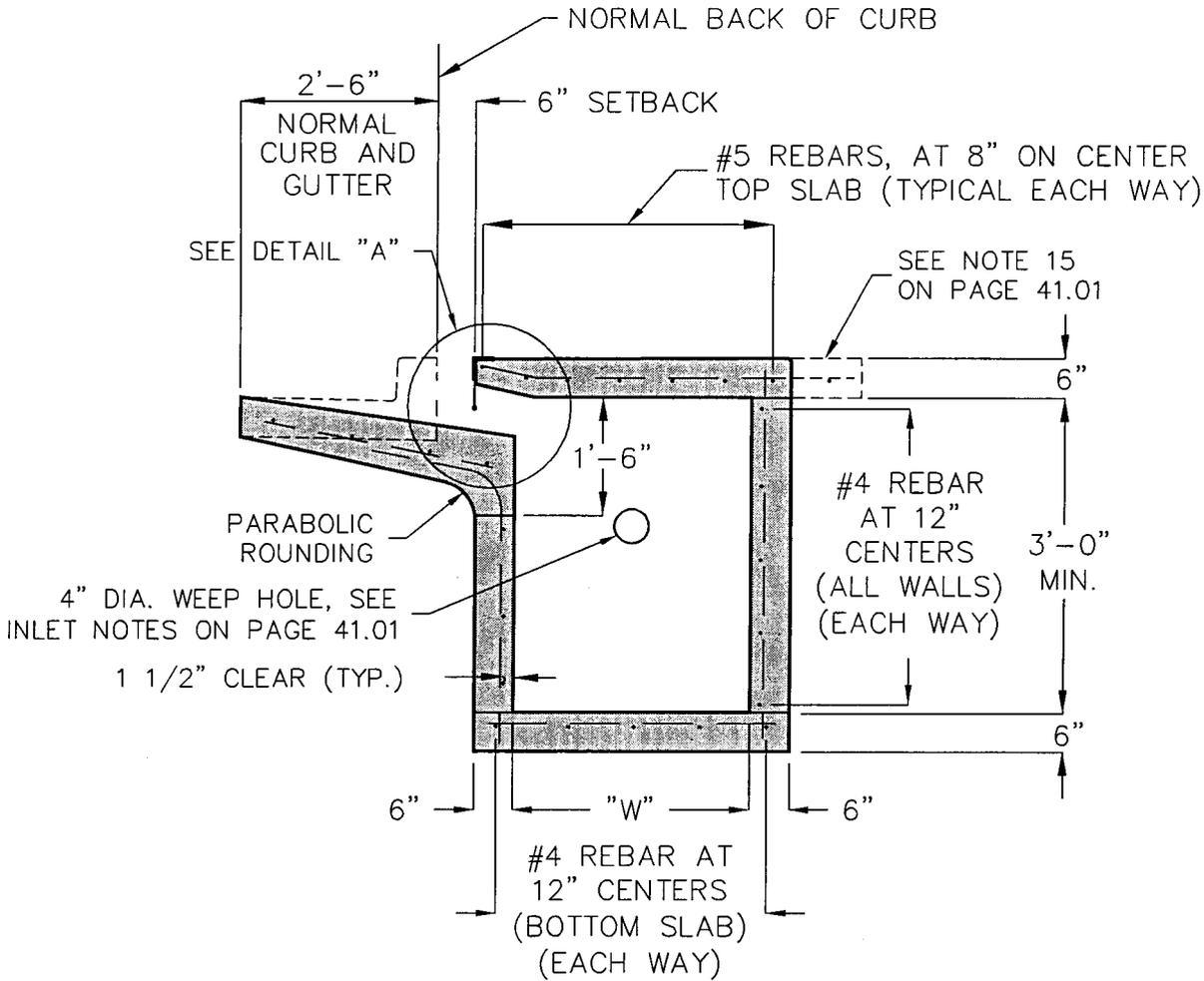
DEFLECTOR CHANNEL DETAILS

DEFLECTOR DETAILS FOR TYPE "A" & "C" INLETS		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	NO:	DATE:
REVISION AND DESCRIPTION			
 Jefferson DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION			
SHEET NUMBER			
2 OF 2			
SECTION			
41.02			

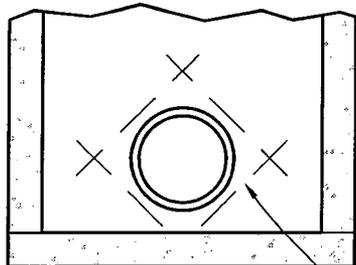


**PLAN VIEW AND REINFORCEMENT FOR
TYPE "A" INLET, AND TRANSITION PANS**

NO:	1	REVISION AND DESCRIPTION	REVISE DRAWINGS FOR CLARITY
	2	REVISION AND DESCRIPTION	*** ADDED #4 REBAR IN CURB
DATE:	8/2007	NO:	1
DATE:	1/2010	NO:	2
TYPE "A" INLET DETAILS		STANDARD DETAILS	
CHECKED BY:		DRAWN BY:	
		DATE:	
SHEET NUMBER			
1 OF 3			
SECTION			
42.01			



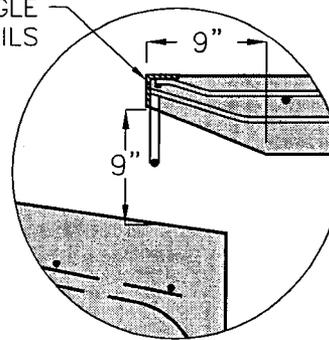
SECTION A-A



4-#4 REBAR PLACED
DIAGONALLY AROUND
STORM PIPE IN WALL
(1 1/2" CLEAR)

REINFORCEMENT AROUND
PIPE THRU
STRUCTURE WALL

SEE PAGE 41.01
FOR EDGE ANGLE
ASSEMBLY DETAILS

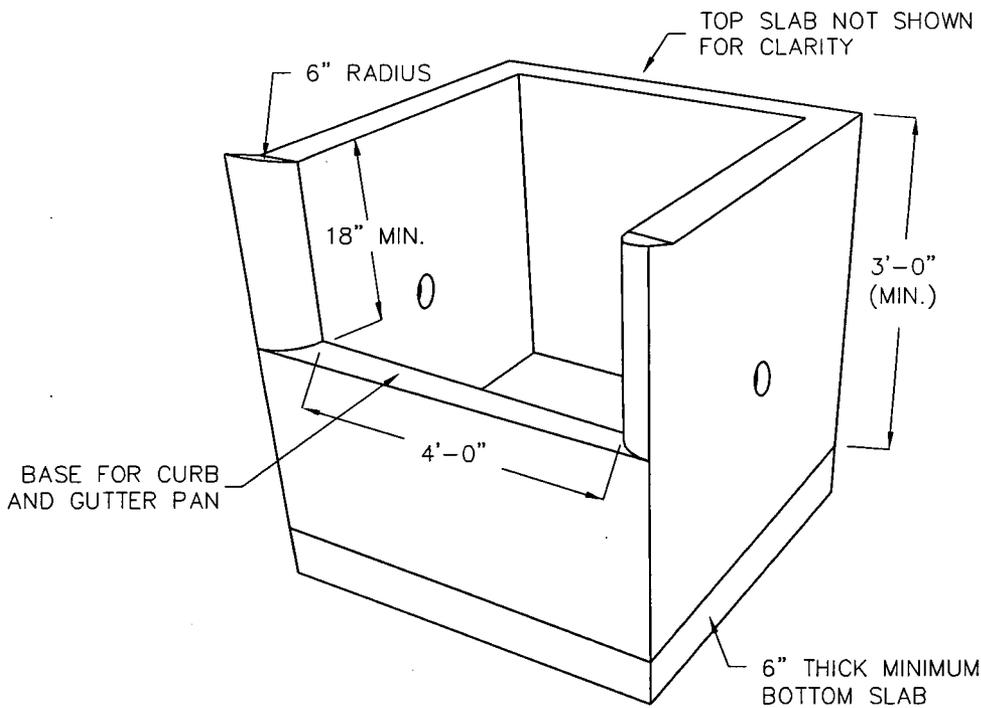


DETAIL "A"

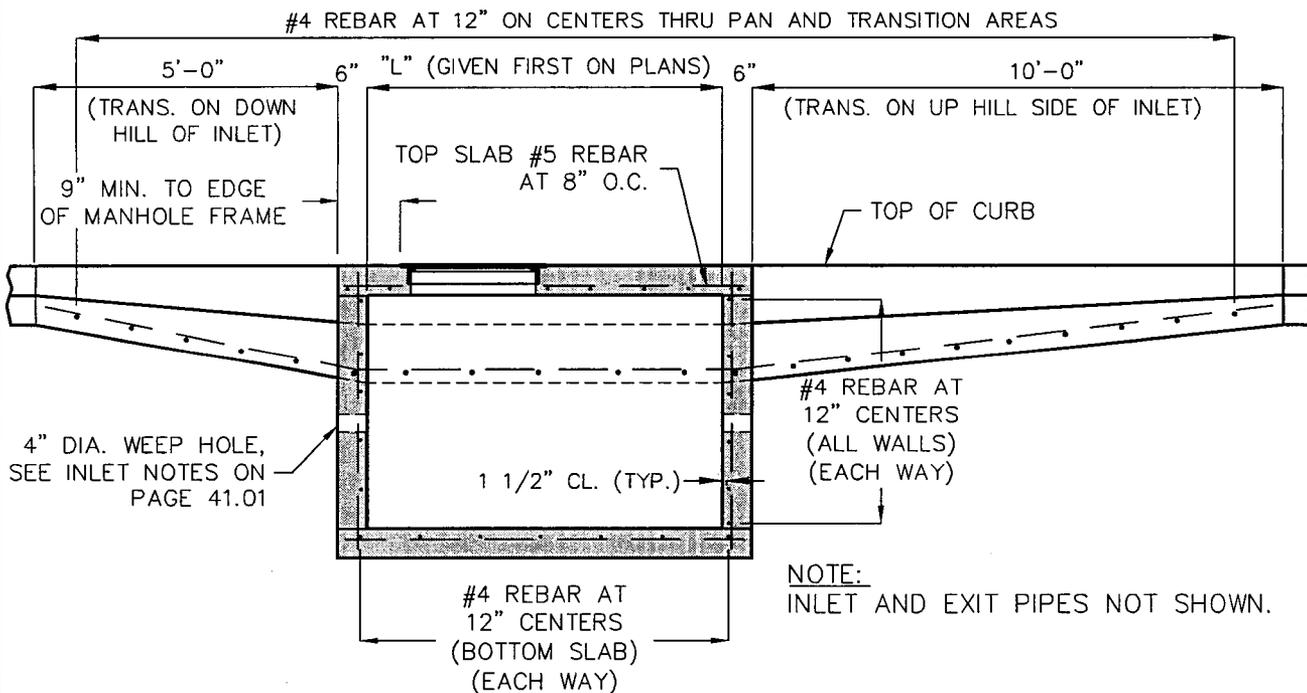
NOTES

1. Inlet and exit pipes not shown.
2. Minimum fall through inlet = 0.20'

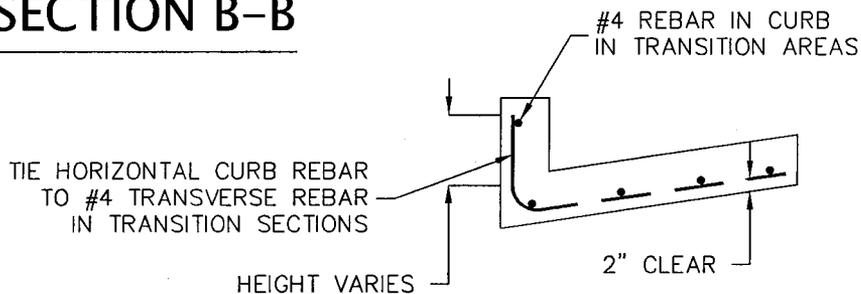
REVISION AND DESCRIPTION		NO:	DATE:
REVISED DRAWING FOR CLARITY		1	8/2007
TYPE "A" INLET DETAILS		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	
SHEET NUMBER		2 OF 3	
SECTION		42.02	



ISOMETRIC VIEW
 SHOWN WITHOUT PAN AND TOP SLAB



SECTION B-B



***** SECTION C-C**

NO:	DATE:	REVISION AND DESCRIPTION:
1	8/2007	REVISE DRAWINGS FOR CLARITY
2	1/2010	**** ADDED #4 REBAR IN CURB

TYPE "A" INLET SECTION B-B

STANDARD DETAILS

CHECKED BY:

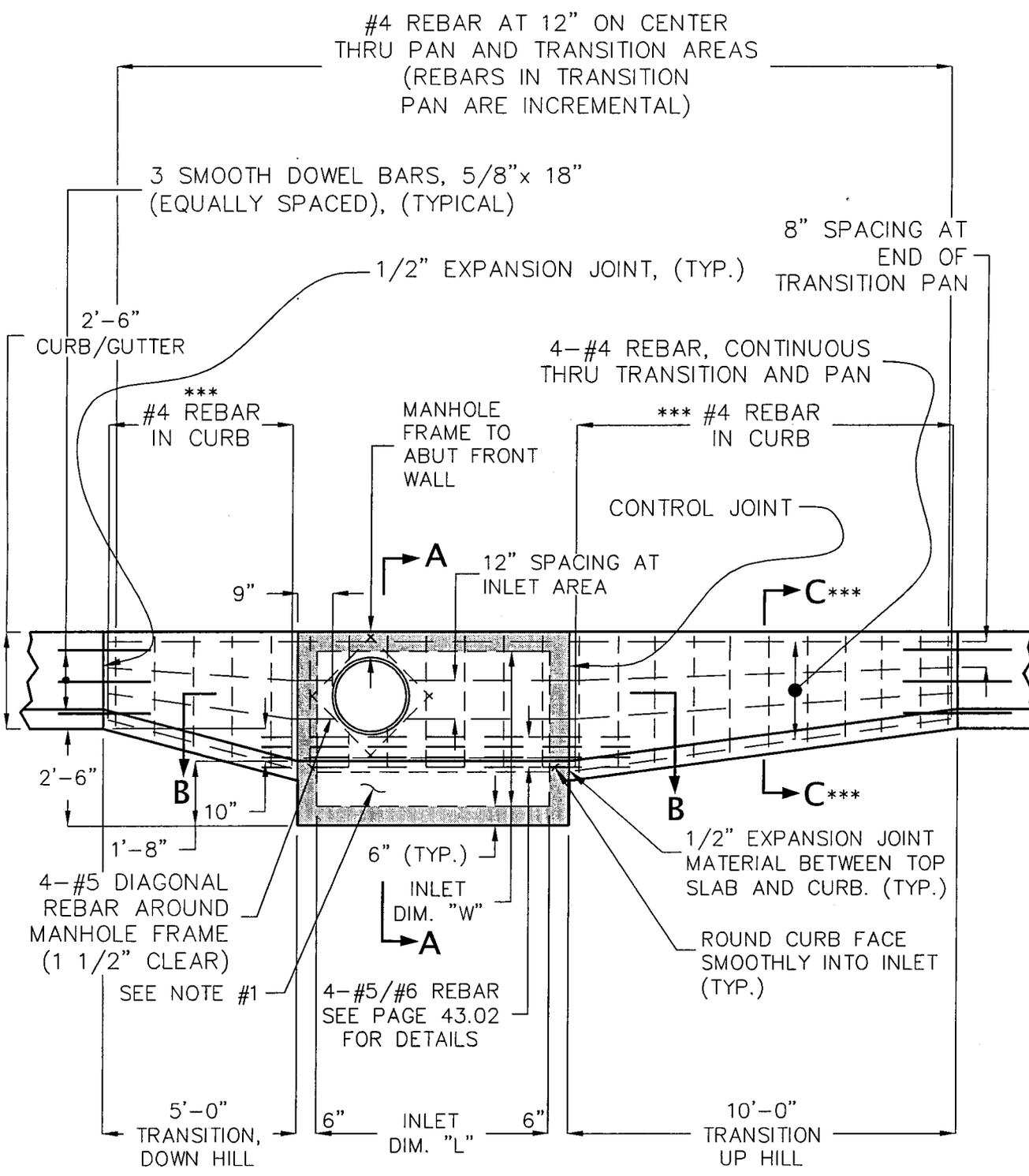
DRAWN BY:

DATE:

City of Jefferson
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

City of Jefferson
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

SHEET NUMBER
 3 OF 3
 SECTION
 42.03



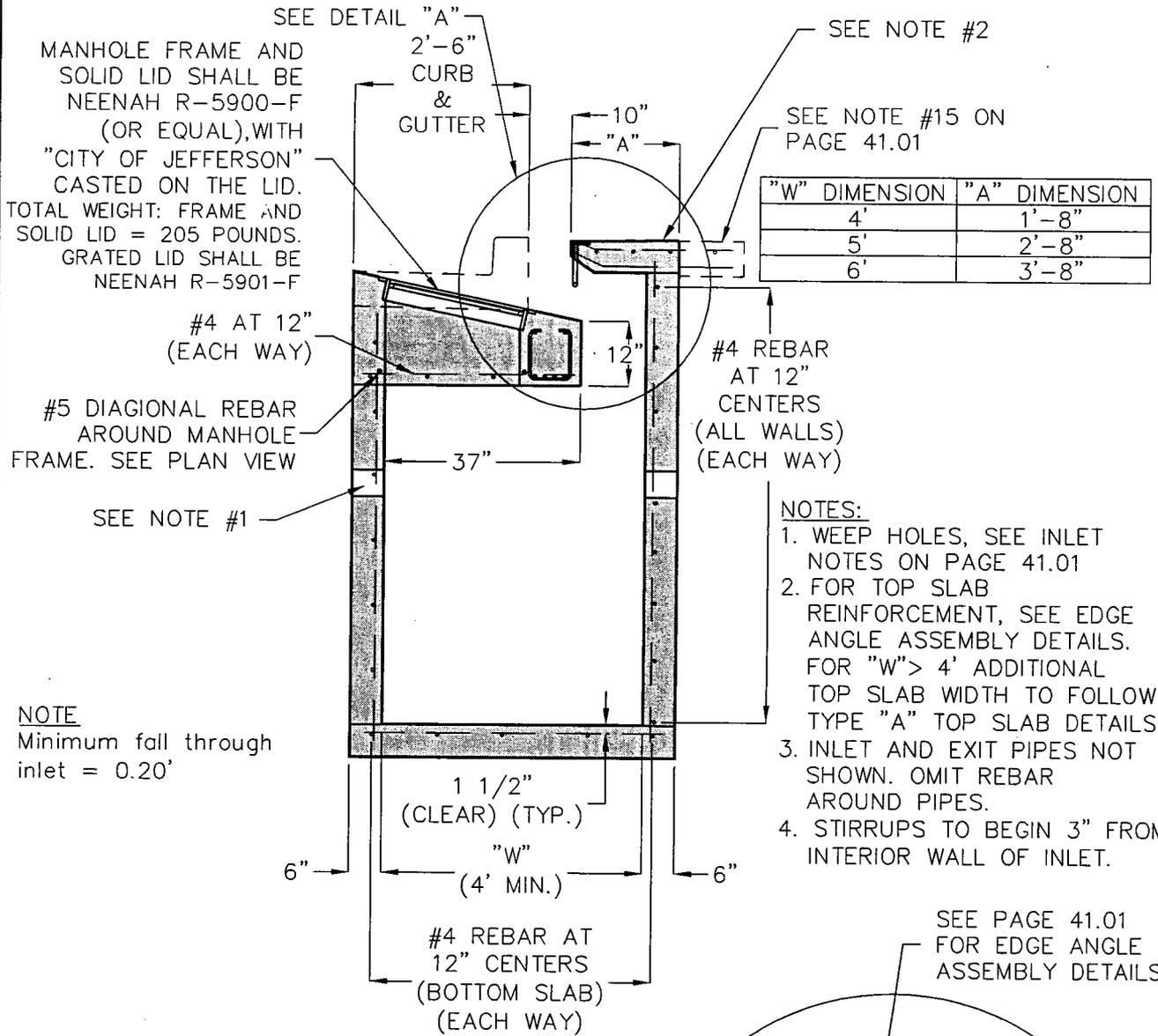
**PLAN VIEW AND REINFORCEMENT FOR
TYPE "C" INLET TRANSITION PANS**

NOTES:
1. FOR TOP SLAB REINFORCEMENT, SEE EDGE
ANGLE ASSEMBLY DETAILS.

REVISION AND DESCRIPTION		TYPE "C" INLET DETAILS		CHECKED BY:	DRAWN BY:	DATE:
NO:	DATE:	STANDARD DETAILS				
1	8/2007					
2	1/2010					
REVISE DRAWING FOR CLARITY						
*** MODIFIED REBAR IN PAN						



SHEET NUMBER
1 OF 4
SECTION
43.01



MANHOLE FRAME AND SOLID LID SHALL BE NEENAH R-5900-F (OR EQUAL), WITH "CITY OF JEFFERSON" CASTED ON THE LID. TOTAL WEIGHT: FRAME AND SOLID LID = 205 POUNDS. GRATED LID SHALL BE NEENAH R-5901-F

#4 AT 12" (EACH WAY)

#5 DIAGONAL REBAR AROUND MANHOLE FRAME. SEE PLAN VIEW

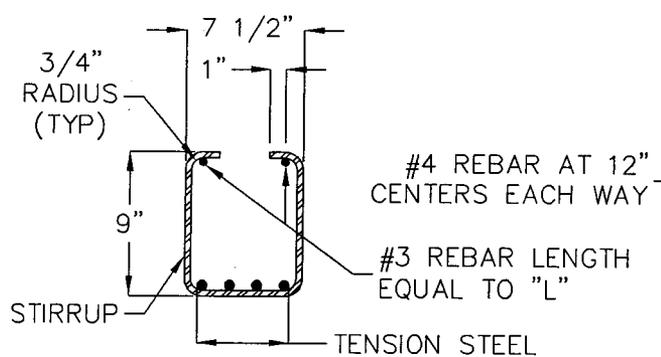
SEE NOTE #1

NOTE
Minimum fall through inlet = 0.20'

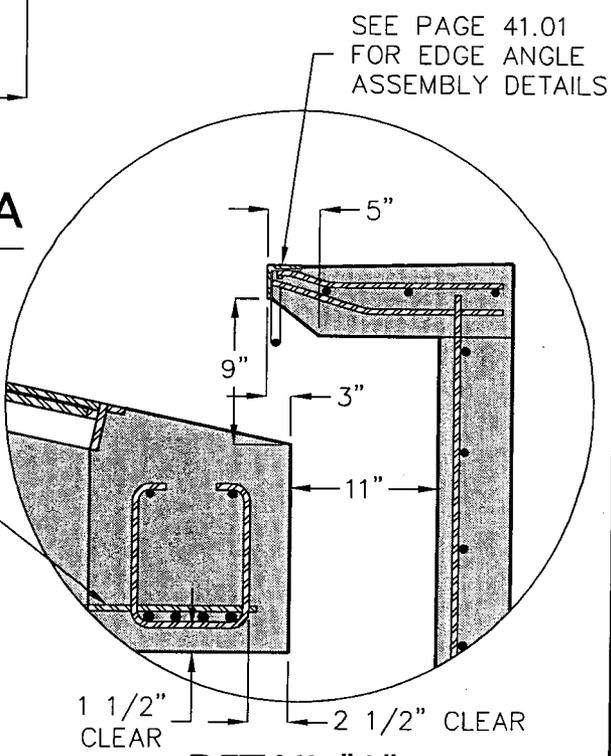
"W" DIMENSION	"A" DIMENSION
4'	1'-8"
5'	2'-8"
6'	3'-8"

- NOTES:
1. WEEP HOLES, SEE INLET NOTES ON PAGE 41.01
 2. FOR TOP SLAB REINFORCEMENT, SEE EDGE ANGLE ASSEMBLY DETAILS. FOR "W" > 4' ADDITIONAL TOP SLAB WIDTH TO FOLLOW TYPE "A" TOP SLAB DETAILS.
 3. INLET AND EXIT PIPES NOT SHOWN. OMIT REBAR AROUND PIPES.
 4. STIRRUPS TO BEGIN 3" FROM INTERIOR WALL OF INLET.

SECTION A-A



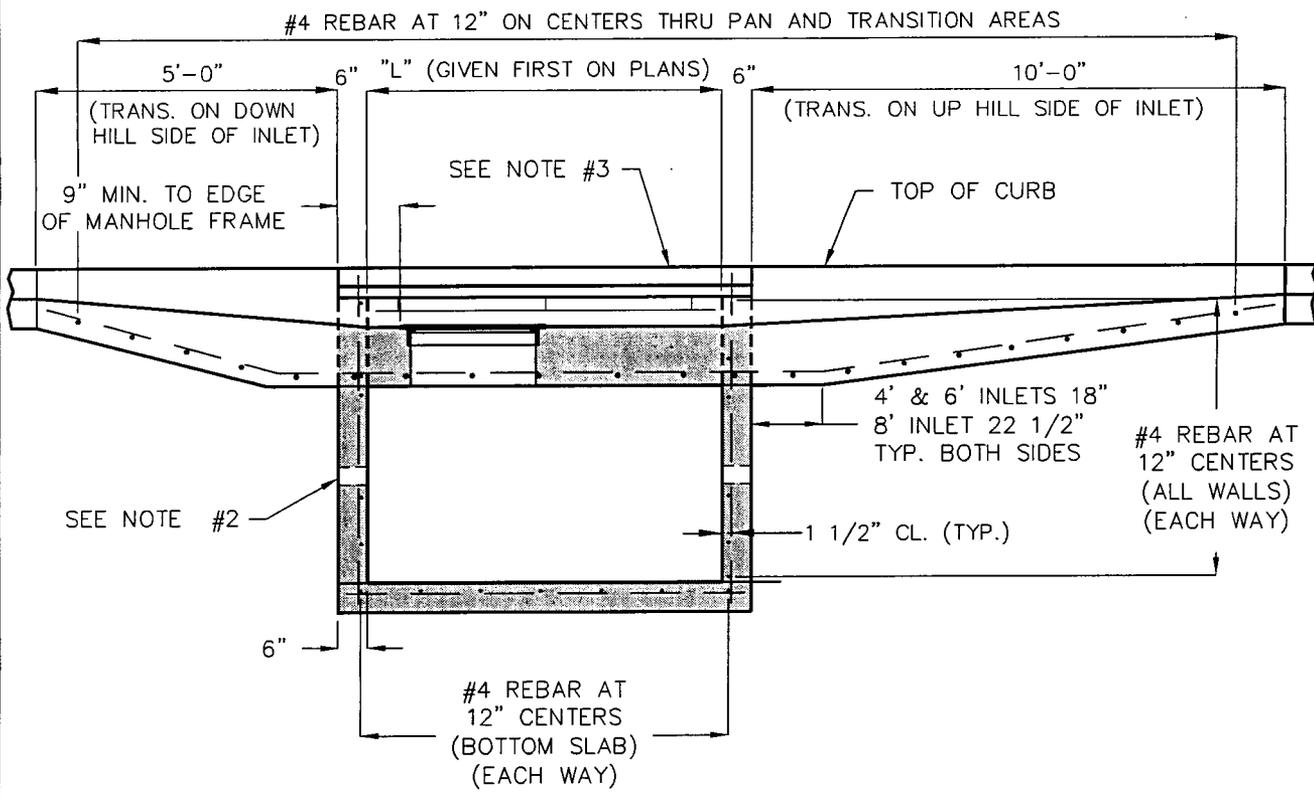
***** STIRRUP DETAIL**



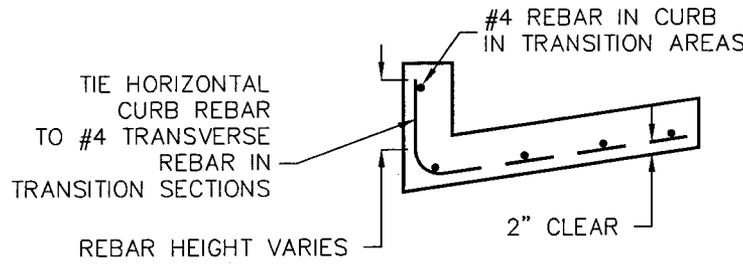
DETAIL "A"

INLET LENGTH	TENSION STEEL BAR SIZE	TENSION STEEL LENGTH	NUMBER OF #3 STIRRUPS	STIRRUP SPACING
4'	#5	96"	8	6"
6'	#5	120"	12	6"
8'	#6	153"	16	6"

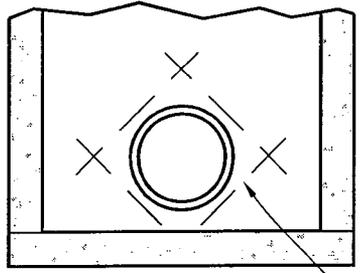
NO:	1	REVISION AND DESCRIPTION	ADDED STIRRUP/REINFORCEMENT IN PAN
	DATE:		1/2010
CHECKED BY:	DRAWN BY:	DATE:	TYPE "C" INLET DETAILS
			STANDARD DETAILS
			SHEET NUMBER
			2 OF 4
			SECTION
			43.02



SECTION B-B



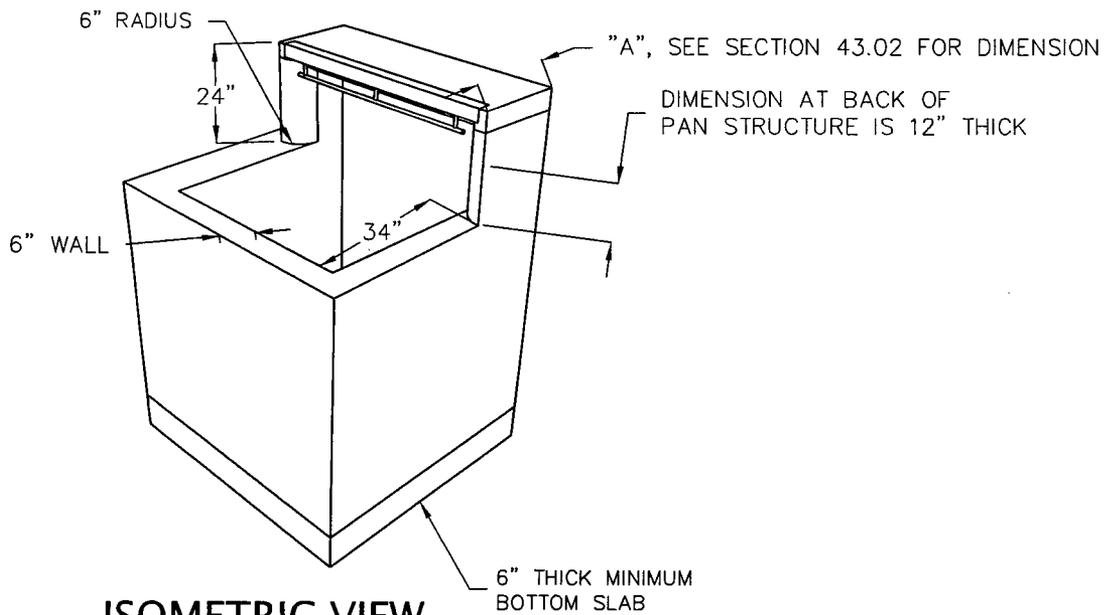
***** SECTION C-C**



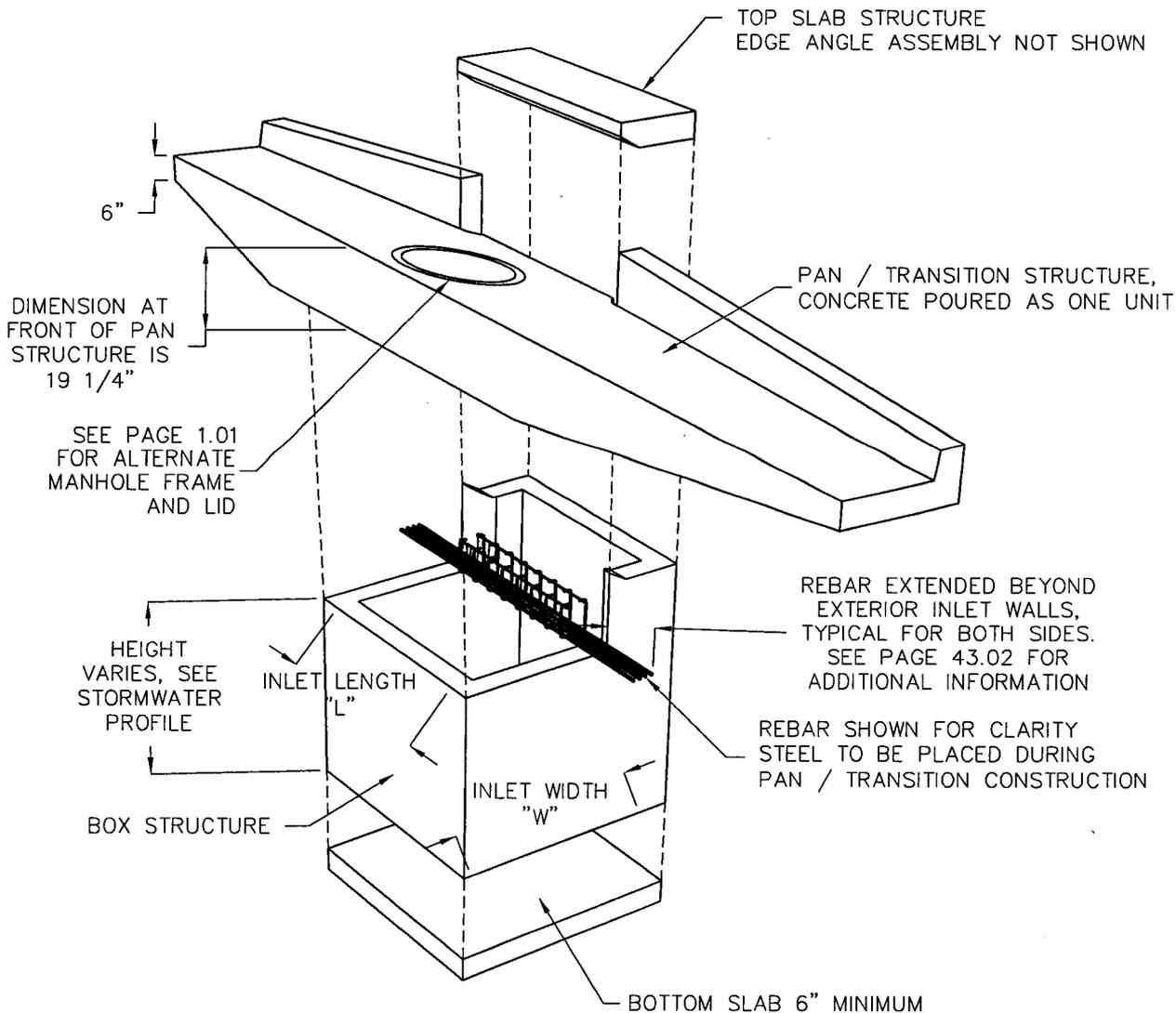
4-#4 REBAR PLACED
DIAGONALLY AROUND
STORM PIPE IN WALL
(1 1/2" CLEAR)
REINFORCEMENT AROUND
PIPE THRU
STRUCTURE WALL

- NOTES:**
- TENSION STEEL SHALL EXTEND OUTSIDE OF INLET WALL.
 - 4 FT AND 6 FT. INLETS; REBAR SHALL EXTEND 18" INTO TRANSITION FROM THE OUTSIDE INLET WALL.
 - 8 FT. INLETS; REBAR SHALL EXTEND 22 1/2" INTO TRANSITION FROM THE OUTSIDE INLET WALL.
 - WEEP HOLES, SEE INLET NOTES ON PAGE 41.01.
 - FOR TOP SLAB REINFORCEMENT, SEE EDGE ANGLE ASSEMBLY DETAILS.
 - INLET AND EXIT PIPES NOT SHOWN. OMIT REBAR AROUND PIPES.

NO:		REVISION AND DESCRIPTION	
DATE:		REVISE DRAWINGS FOR CLARITY	
NO: 1		8/2007	
NO: 2		1/2010	
TYPE "C" INLET SECTION B-B		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	
SHEET NUMBER		3 OF 4	
SECTION		43.03	



ISOMETRIC VIEW



ISOMETRIC VIEW SHOWING SEPERATE CONCRETE POURS

NO:	DATE:	REVISION AND DESCRIPTION:

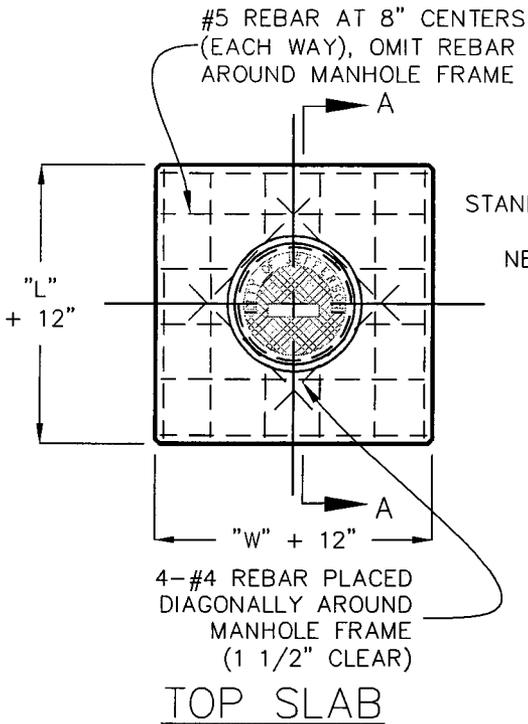
TYPE "C" INLET
ISOMETRIC VIEWS

STANDARD DETAILS

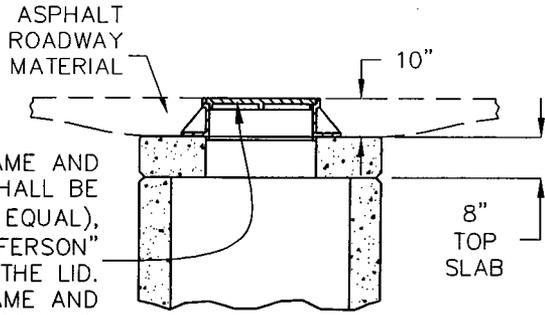
CHECKED BY:	DRAWN BY:	DATE: 1/2010
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Jefferson
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

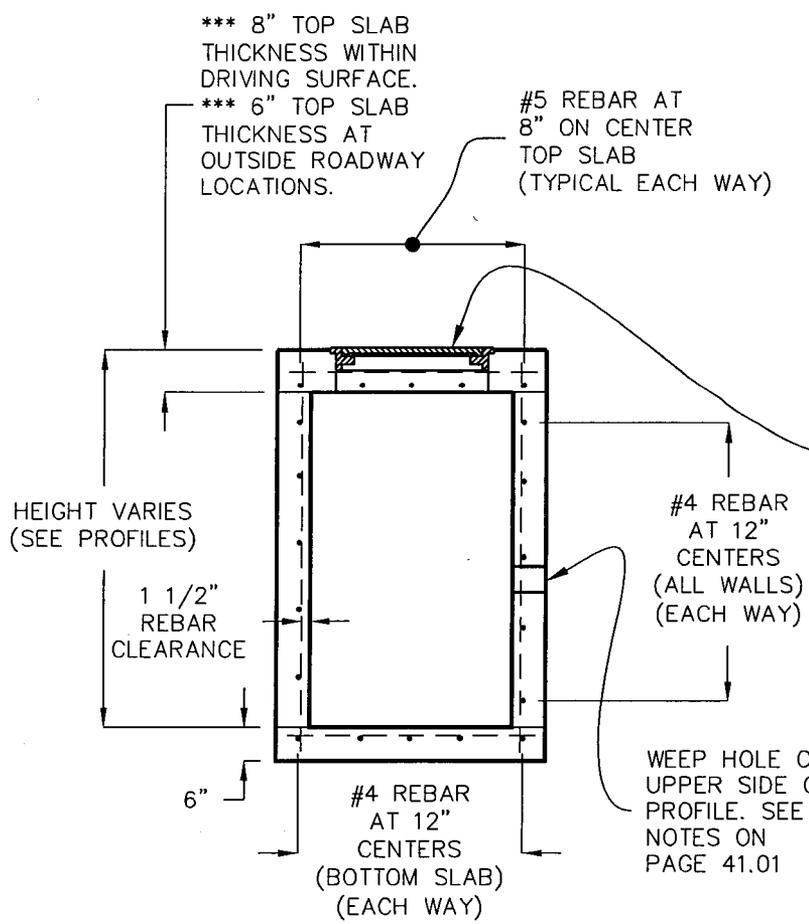
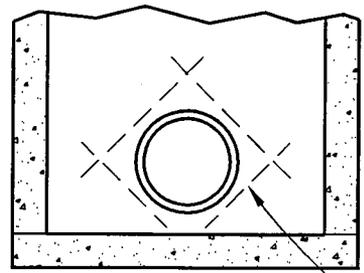
SHEET NUMBER
4 OF 4
SECTION
43.04



STANDARD MANHOLE FRAME AND SOLID LID SHALL BE NEENAH R-1736 (OR EQUAL), WITH "CITY OF JEFFERSON" CASTED ON THE LID. TOTAL WEIGHT: FRAME AND SOLID LID = 460 POUNDS. GRATED LID SHALL BE NEENAH R-2421-A



SECTION OF JUNCTION BOX IN ASPHALT ROADWAY LAYOUT



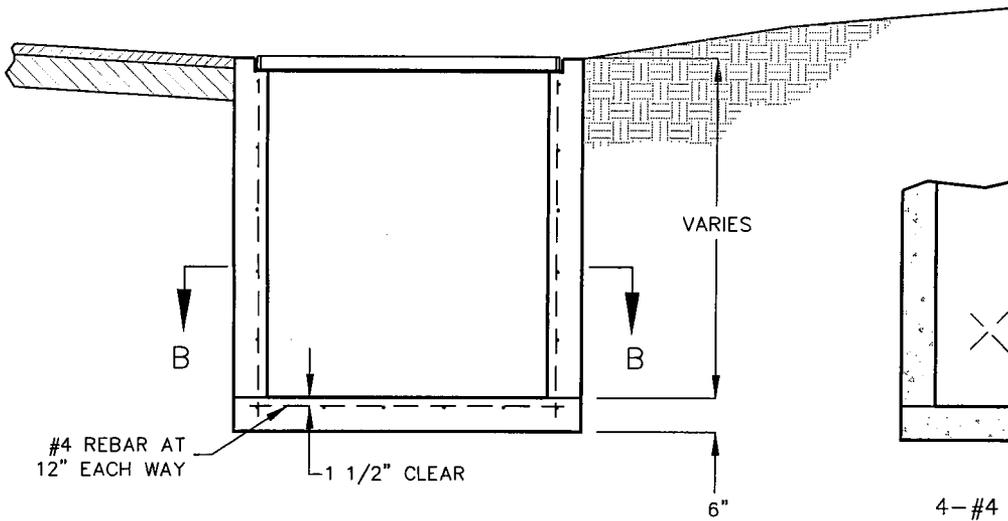
4-#4 REBAR PLACED DIAGONALLY AROUND STORM PIPE IN WALL (1 1/2" CLEAR)

REINFORCEMENT AROUND PIPE THRU STRUCTURE WALL

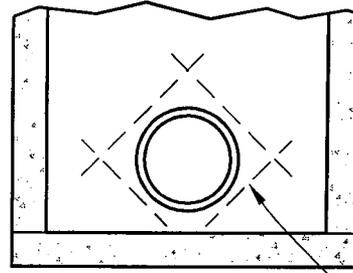
MANHOLE FRAME AND SOLID LID SHALL BE NEENAH R-5900-F (OR EQUAL), WITH "CITY OF JEFFERSON" CASTED ON THE LID. TOTAL WEIGHT: FRAME AND SOLID LID = 205 POUNDS. GRATED LID SHALL BE NEENAH R-5901-F

NOTE:
Minimum fall through inlet = 0.20'

NO. DATE:		REVISION AND DESCRIPTION	
1 1/2010		*** ADDED TOP SLAB THICKNESS REQUIREMENT	
JUNCTION BOX DETAILS		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	
 Jefferson DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION		SHEET NUMBER	
		1 OF 3	
		SECTION	
		44.01	



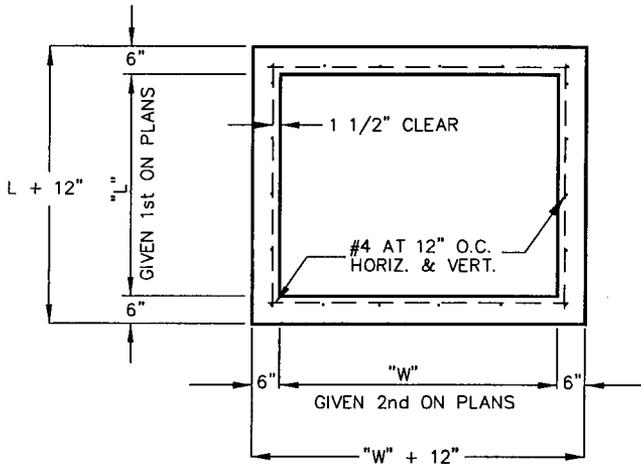
SECTION VIEW



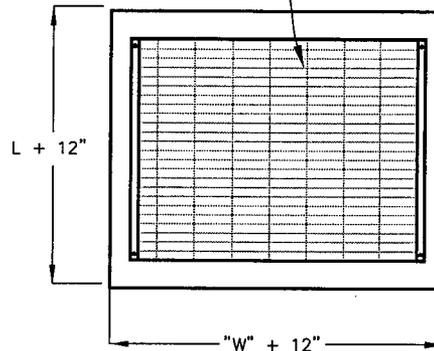
4-#4 REBAR PLACED
DIAGONALLY AROUND
STORM PIPE IN WALL
(1 1/2" CLEAR)

REINFORCEMENT AROUND
PIPE THRU
STRUCTURE WALL

GRATE SHALL BE APPROVED
BY THE ENGINEER



SECTION B-B



TOP VIEW

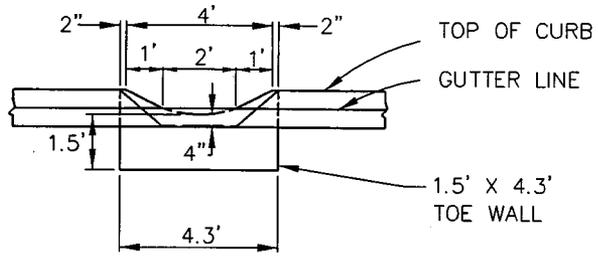
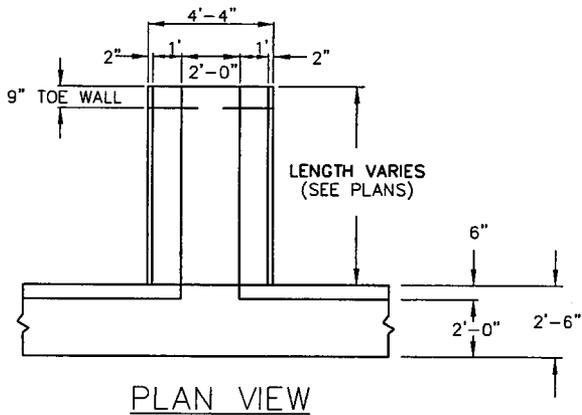
NOTE:
Minimum fall through inlet = 0.20'

GRATE INLET GENERAL NOTES:

BEND REINFORCEMENT AROUND PIPE OPENINGS
WHEREVER FEASIBLE. PROVIDE 4-#4 DIAGONALS
AROUND PIPE OPENINGS.

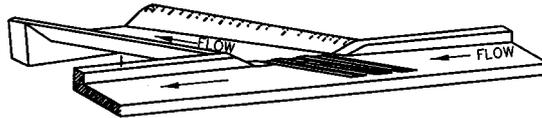
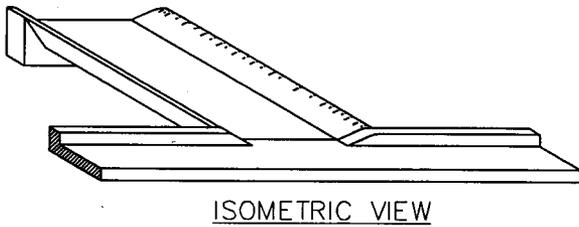
CENTER PIPE AT INSIDE FACE OF WALL TO BE AT
CENTER OF WALL UNLESS OTHERWISE SPECIFIED
TRIM PIPE FLUSH WITH INSIDE FACE OF WALLS.

NO.		DATE		REVISION AND DESCRIPTION	
CHECKED BY:			DRAWN BY:		
DATE:					
GRATE INLET DETAILS			STANDARD DETAILS		
SHEET NUMBER					
3 OF 3					
SECTION					
44.03					



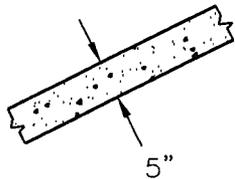
WHEN ON SLOPE, FLUME NEEDS TO BE ANGLED.

DEFLECTORS ARE REQUIRED WHEN SLOPE OF GUTTER IS 5% OR GREATER.



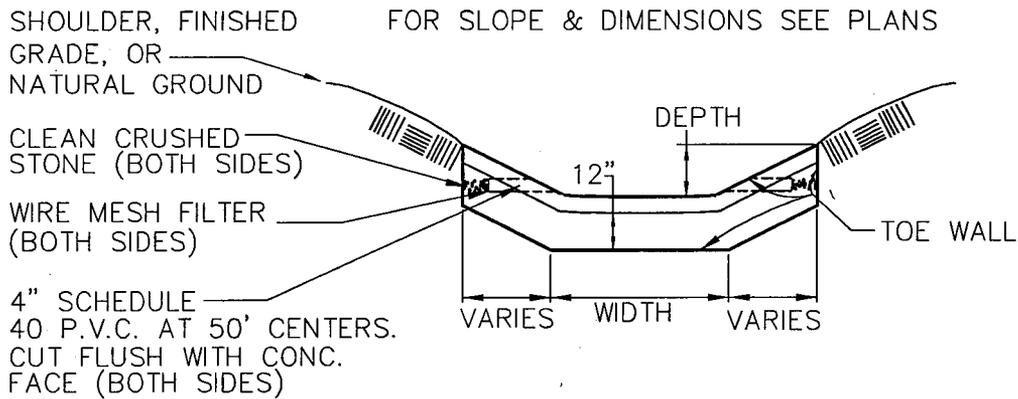
CONCRETE FLUME

REVISION AND DESCRIPTION		NO:		DATE:	
CONCRETE FLUME DETAILS		STANDARD DETAILS			
CHECKED BY:	DRAWN BY:	DATE:			
SHEET NUMBER					
1 OF 1					
SECTION					
45.01					



GENERAL NOTES:
 THE TOE WALL SHALL BE
 CONSTRUCTED AT OUTLET END
 OF DITCH LINER & AT 50-FOOT
 MAXIMUM SPACING. "SAW"
 JOINTS SHALL BE AT 10'
 INTERVALS, AND SEALED AS
 PER CITY STREET STANDARDS.

SECTION THRU CONCRETE LINER OR TOE WALL



TYPICAL FLAT-BOTTOM DITCH LINER

NO:	DATE:	REVISION AND DESCRIPTION

CONCRETE CHANNELS
STANDARD DETAILS

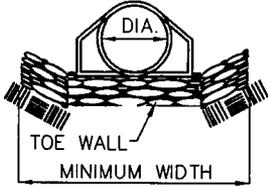
CHECKED BY:	DRAWN BY:	DATE:

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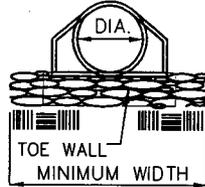

Jefferson
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION

SHEET NUMBER
1 OF 1
SECTION
46.01

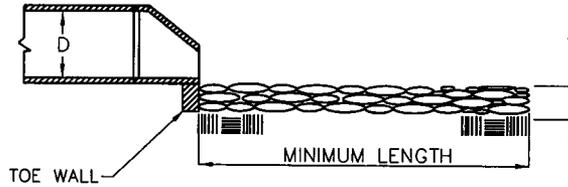
CONSTRUCT LINING ON BACKSLOPE AT CULVERT
OUTLET WHEN ROADWAY DITCH IS INTERCEPTED
AND FLOW IS CARRIED IN ROADWAY DITCH FOR
SOME DISTANCE (SEE PLAN SHEET FOR DISTANCE)



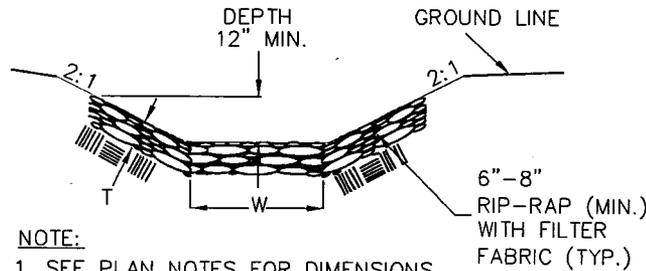
END VIEW
DISCHARGE INTO END OF CHANNEL



END VIEW
DISCHARGE INTO SIDE OF CHANNEL



SIDE VIEW
DISCHARGE INTO SIDE OF CHANNEL



- NOTE:
1. SEE PLAN NOTES FOR DIMENSIONS
 2. L=LENGTH ALONG CHANNEL
 3. NO DIRECT PAYMENT FOR EXCAVATION NECESSARY TO PLACE RIP-RAP

CHANNEL CROSS SECTION

GENERAL NOTES
A MINUS TOLERANCE OF 3" IN
WIDTH AND 1/2" IN THICKNESS
WILL BE PERMITTED. PLUS
TOLERANCES ARE NOT LIMITED.

ROCK LINING FOR CULVERT OUTLETS

ROCK FILL CHANNEL LINING FOR CONTROL
OF VELOCITIES TO 20 FEET PER SECOND

CULVERT SIZE, DIA./INCH	MINIMUM DEPTH AND WIDTH/FEET	MINIMUM LENGTH FEET	MINIMUM THICKNESS OF ROCK, FEET
18	1 X 4	12	1.0
24	1 X 6	14	1.0
30	1 X 7	16	1.0
36	1.5 X 9	18	1.0
42	2 X 10	20	1.5
48	2 X 12	20	1.5
54	2 X 13.5	22	1.5
60	2 X 15	25	1.5
66	2 X 18	25	2.0
72	2 X 20	30	2.0
84	2.5 X 25	35	2.5
96	2.5 X 30	40	2.5
108	3 X 32	40	2.5

ROCK LINING FOR CULVERT OUTLETS

CULVERT SIZE, DIA./INCH	MINIMUM DEPTH AND WIDTH/FEET	MINIMUM LENGTH FEET	ROCK LINING CU.YD.	EQUIVALENT PIPE ARCH CULVERT (APPROX.)	EQUIVALENT CONC. BOX CULV. (APPROX.)
18	1 X 4	12	2		
24	1 X 6	14	3		
30	1 X 7	16	4	8-5	2' X 1 1/2'
36	1.5 X 9	18	9	8-6	3' X 2'
42	2 X 10	20	15	8-7	3' X 3'
48	2 X 12	20	18	8-8	4' X 3'
54	2 X 13.5	22	22	8-9	4' X 4'
60	2 X 15	25	28	8-10	5' X 4'
66	2 X 18	25	33	8-11	5' X 5'
72	2 X 20	30	44	8-12	5' X 6'
84	2.5 X 25	35	81		6' X 6'
96	2.5 X 30	40	111		7' X 7'
108	3 X 32	40	142		8' X 8'

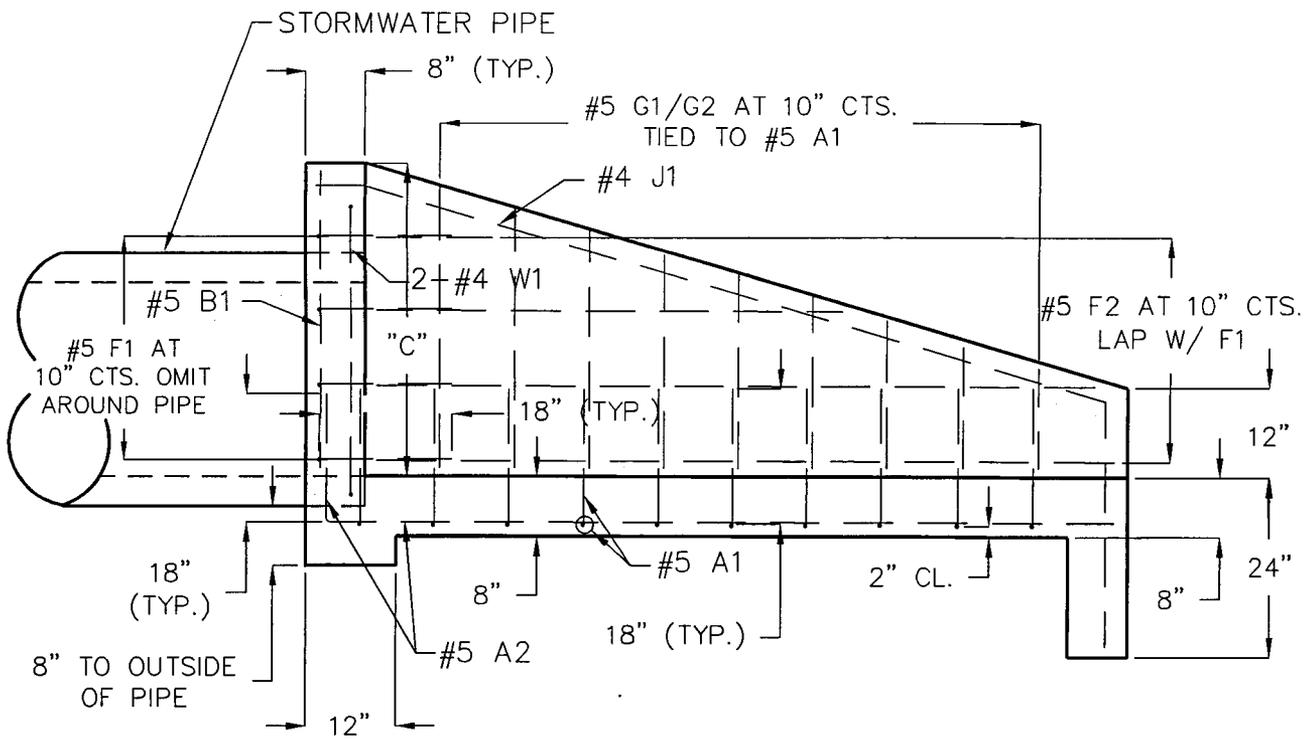
NO.	DATE:	REVISION AND DESCRIPTION

IMPROVED CHANNELS	STANDARD DETAILS
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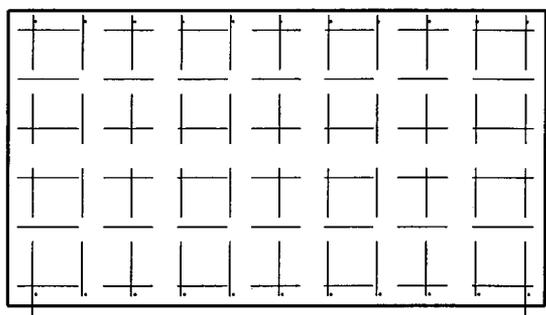
CHECKED BY:	DRAWN BY:	DATE:

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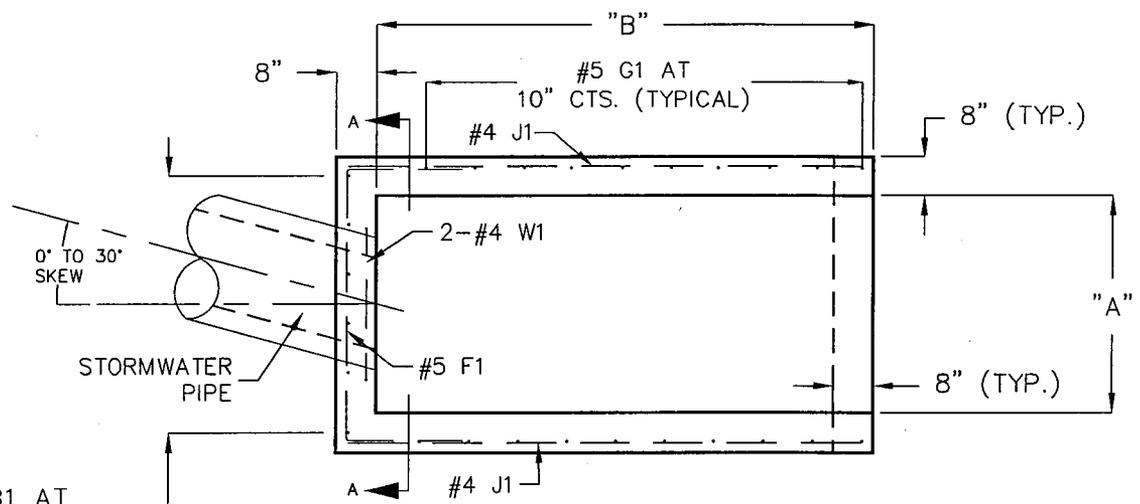
SHEET NUMBER
1 OF 1
SECTION
47.01



ELEVATION

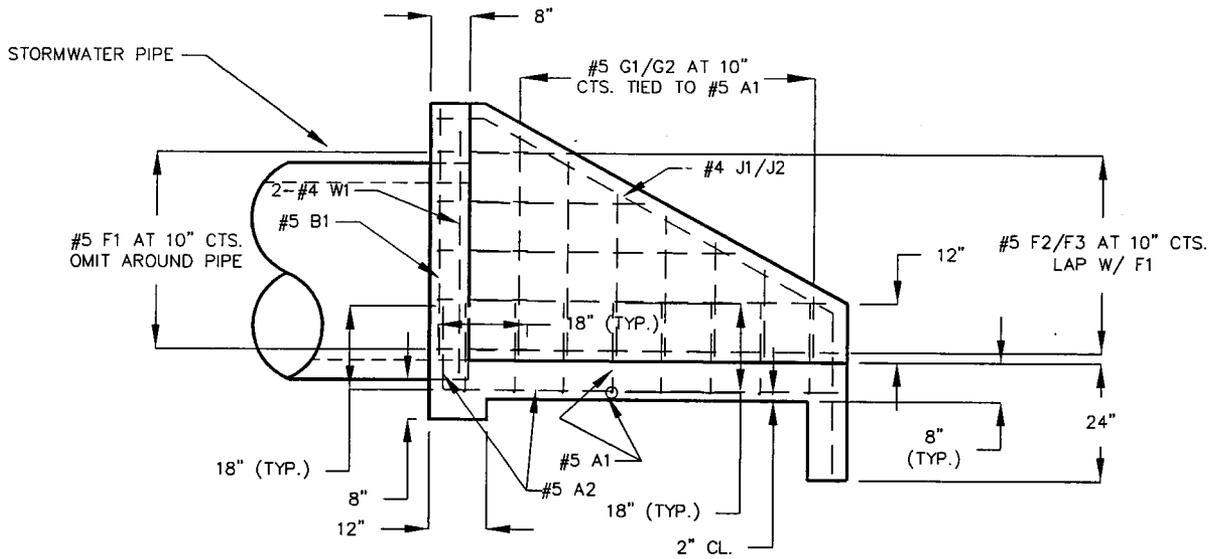


BOTTOM SLAB

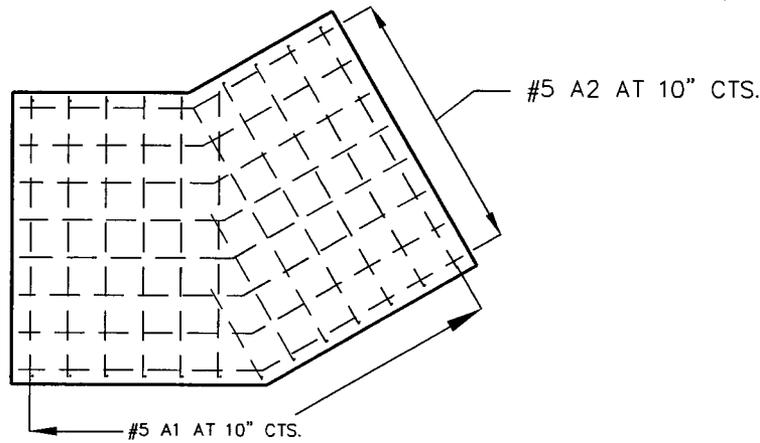


PLAN

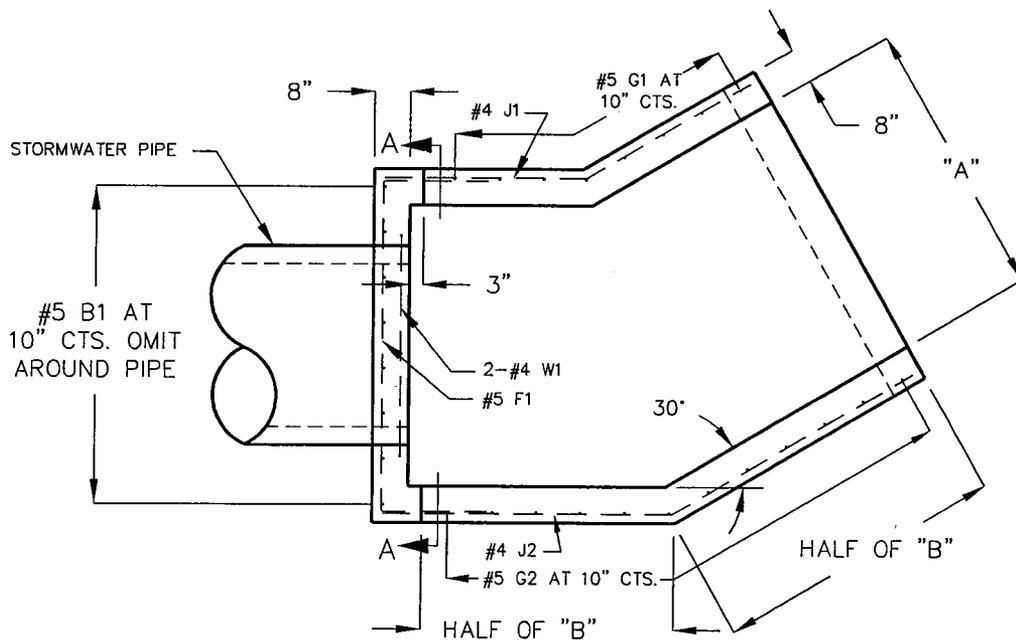
NO:	1	REVISION AND DESCRIPTION	Lowered pipe to be flush with bottom slab
	DATE:		8/2007
CONCRETE END SECTION DETAILS		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	
SHEET NUMBER		1 OF 3	
SECTION		48.01	



ELEVATION



BOTTOM SLAB



NO:	1	REVISION AND DESCRIPTION
DATE:	8/2007	Lowered pipe to be flush with bottom slab.

CHECKED BY:	DRAWN BY:	DATE:

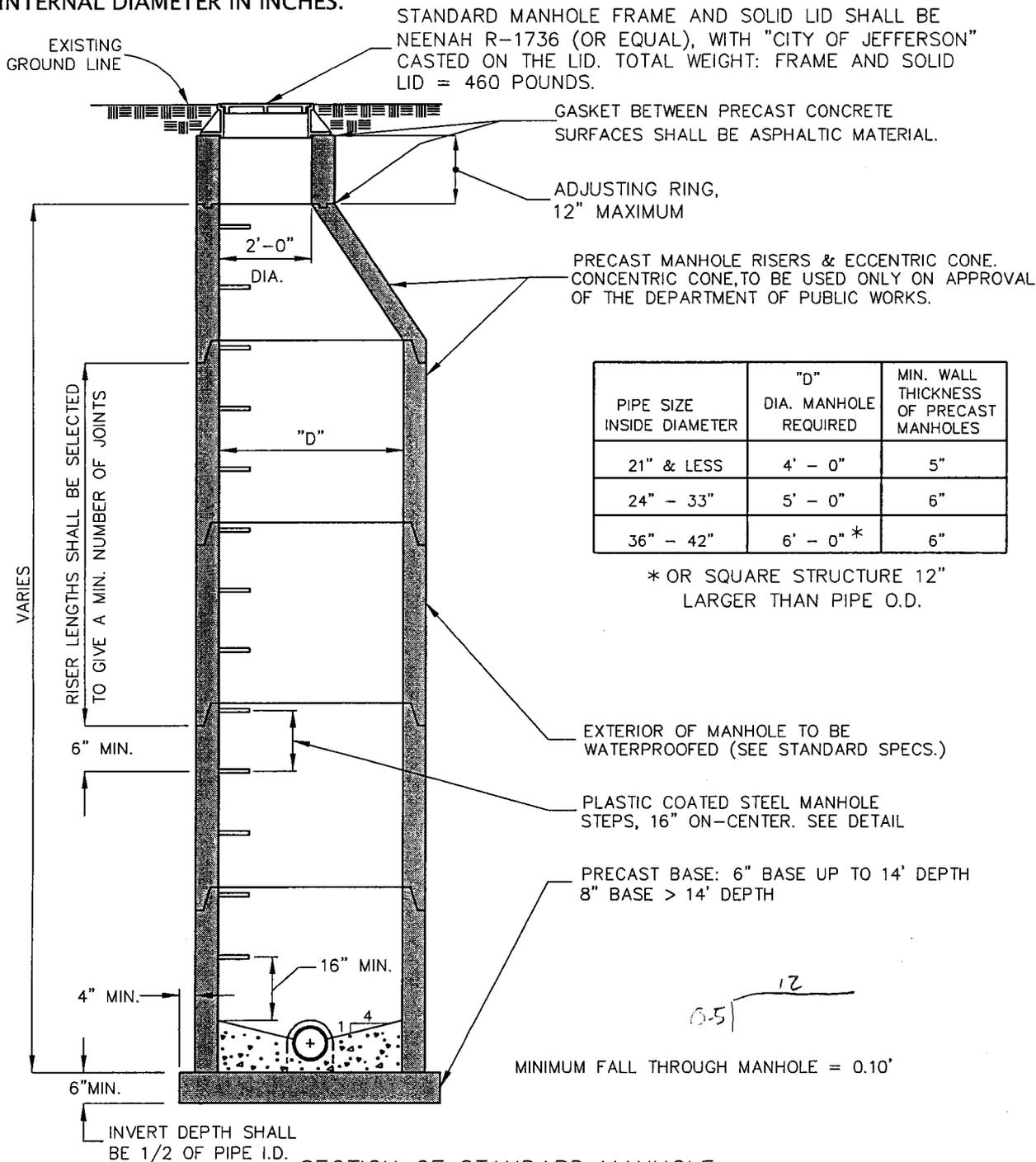
CONCRETE END SECTION DETAILS
STANDARD DETAILS



SHEET NUMBER
2 OF 3
SECTION
48.02

MANHOLE NOTES:

1. ALL REQUIRED PIPE OPENINGS SHALL BE PLANT CAST IN M.H. UNITS. FIELD ALTERATIONS OF OPENINGS WILL BE PERMITTED, PROVIDED WALLS ARE SCORED WITH A MASONRY SAW TO A DEPTH SUFFICIENT TO SEVER REINFORCING STEEL. A CHIPPING HAMMER MAY THEN BE USED TO REMOVE CONCRETE. **OPENINGS FORBIDDEN AT MANHOLE JOINTS**
2. USE PRECAST BASE AND RISER WITH A-LOK (OR EQUIVALENT) CONNECTOR OR, POURED BASE AND PRECAST RISER WITH A-LOK (OR EQUIVALENT) FOR MAX. GRADE OF 15%. USE Z-LOK (OR EQUIVALENT) FOR GRADES OVER 15%.
3. MIN. DISTANCE BETWEEN ANY TWO ADJACENT PIPES SHALL BE 4".
4. GROUT PIPES INTO PLACE WITH EXPANSIVE GROUT.
5. MANHOLE TOP ADJUSTMENT SHALL BE ACCOMPLISHED BY THE USE OF CONCRETE OR HDPE ADJUSTING RINGS.
- * 6. REINFORCEMENT SHALL MEET AASHTO M199, SECTION 14.4. CIRCUMFERENTIAL REINFORCEMENT SHALL CONSIST OF EITHER ONE OR TWO LINES OF STEEL. THE TOTAL AREA OF REINFORCEMENT PER VERTICAL FOOT SHALL NOT BE LESS THAN 0.0025 TIMES THE INTERNAL DIAMETER IN INCHES.

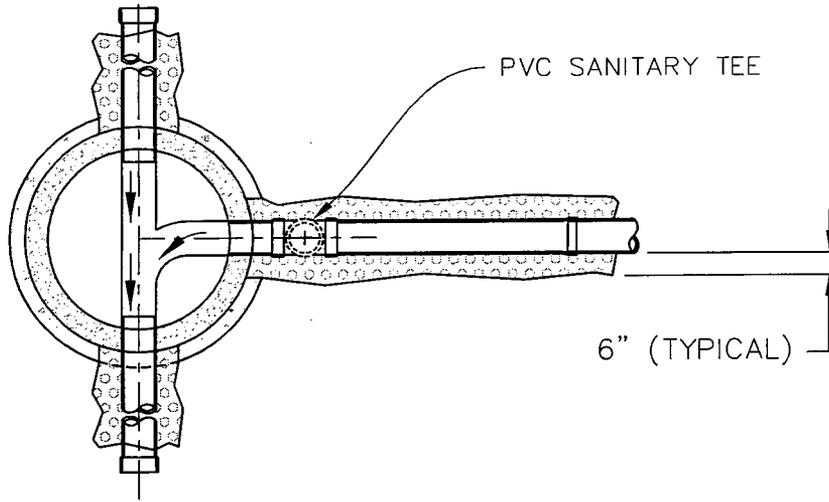


PIPE SIZE INSIDE DIAMETER	"D" DIA. MANHOLE REQUIRED	MIN. WALL THICKNESS OF PRECAST MANHOLES
21" & LESS	4' - 0"	5"
24" - 33"	5' - 0"	6"
36" - 42"	6' - 0" *	6"

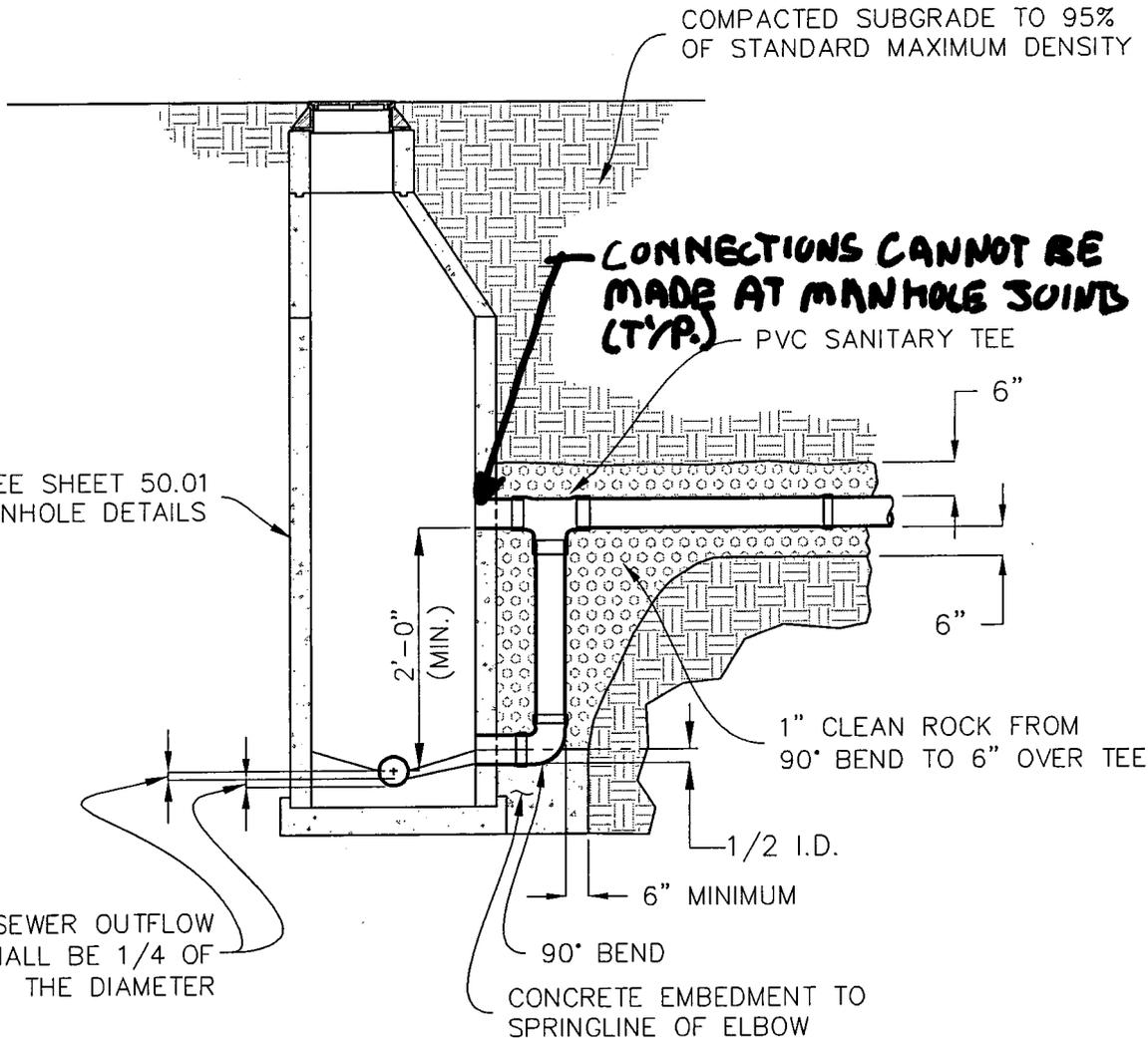
* OR SQUARE STRUCTURE 12" LARGER THAN PIPE O.D.

SECTION OF STANDARD MANHOLE

NO:	DATE:	REVISION AND DESCRIPTION
1	8/2007	ADDED NOTE #6
2		2' DIA. AND 6' DEPTH TO LINE 1.
MANHOLE DETAILS		STANDARD DETAILS
CHECKED BY:	DRAWN BY:	DATE:
SHEET NUMBER 1 OF 6 SECTION 50.01		



PLAN



OUTSIDE SECTION

STANDARD OUTSIDE DROP MANHOLE

NO:	DATE:	REVISION AND DESCRIPTION
1	7/2007	REVISED RISER PIPE EMBEDMENT FROM CONCRETE TO 1" CLEAN ROCK
2		Must ADD PIPE CONNECTOR

OUTSIDE DROP
MANHOLE DETAILS

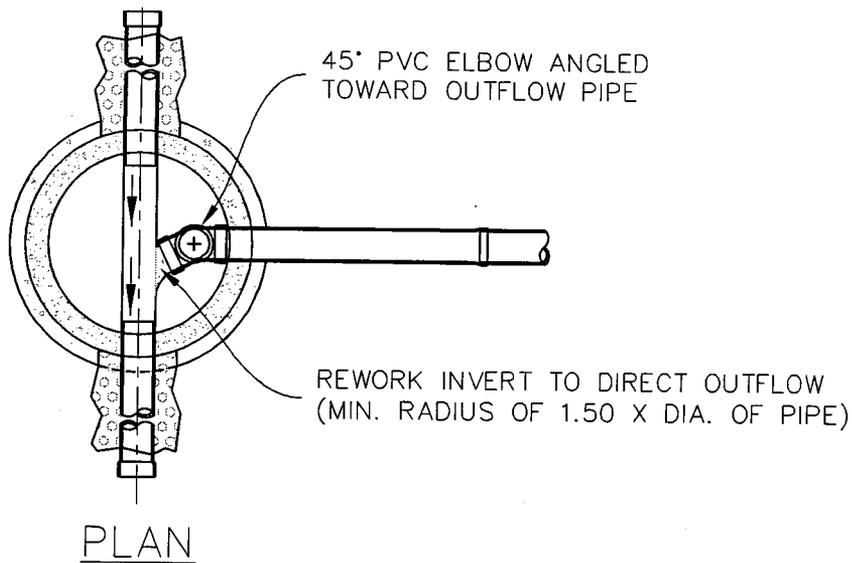
CHECKED BY:	DRAWN BY:	DATE:
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City of Jefferson
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER
2 OF 6
SECTION
50.02

NOTE.

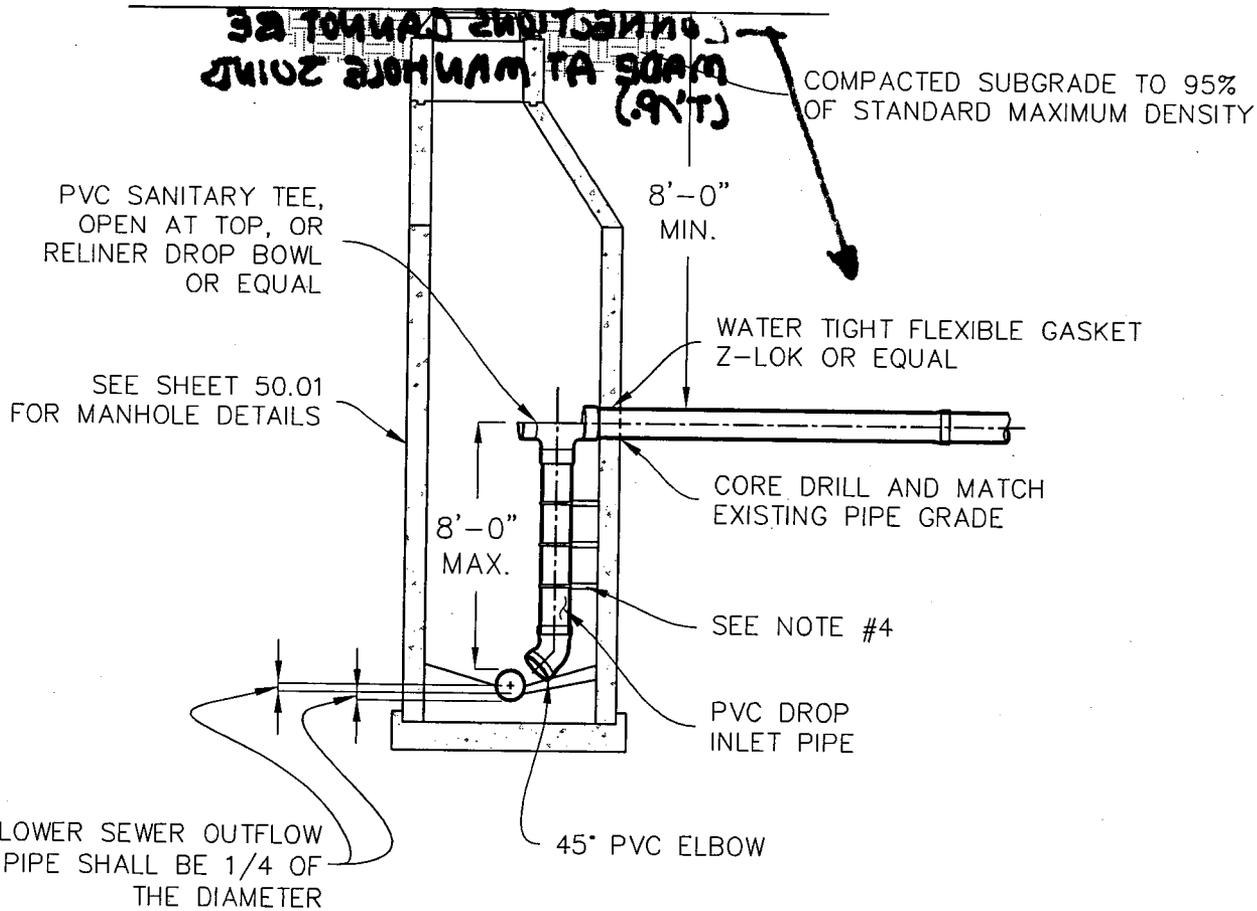
NOTE: 5 AND VERIFY THE CONNECTION



PLAN

NOTES:

1. INSIDE DROP CONNECTION ONLY ALLOWED WITH PUBLIC WORKS DEPARTMENT APPROVAL.
2. DROP INLET PIPE SHALL BE THE SAME SIZE AND MATERIAL AS SEWER LINE.
3. DROP INLET PIPE MAY BE ADJUSTED TO A MAXIMUM OF 5% DEFLECTION.
4. SECURE PVC PIPE TO MANHOLE WALL WITH STAINLESS STEEL PIPE BRACKETS/STRAPS AND STAINLESS STEEL BOLTS. BRACKETS/STRAPS SHALL BE A MINIMUM OF 6" FROM ANY PIPE JOINT. BRACKETS/STRAPS SHALL BE PLACED 4 FT. MINIMUM APART. THERE SHALL BE A MINIMUM OF 2 BRACKETS/STRAPS.



PROFILE OF INSIDE DROP MANHOLE

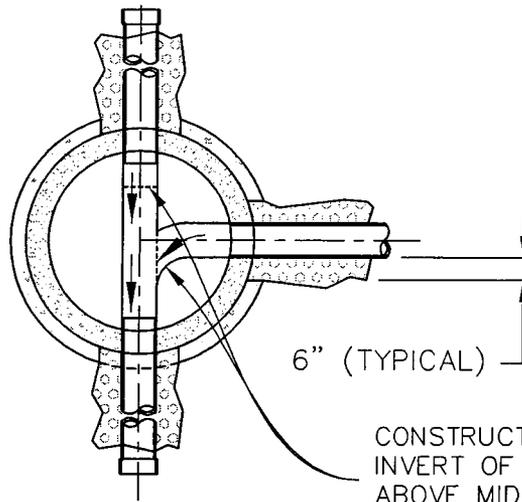
NO:	DATE:	REVISION AND DESCRIPTION

INSIDE DROP
MANHOLE DETAILS

CHECKED BY:	DRAWN BY:	DATE:
		1/2013

City of **Jefferson**
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

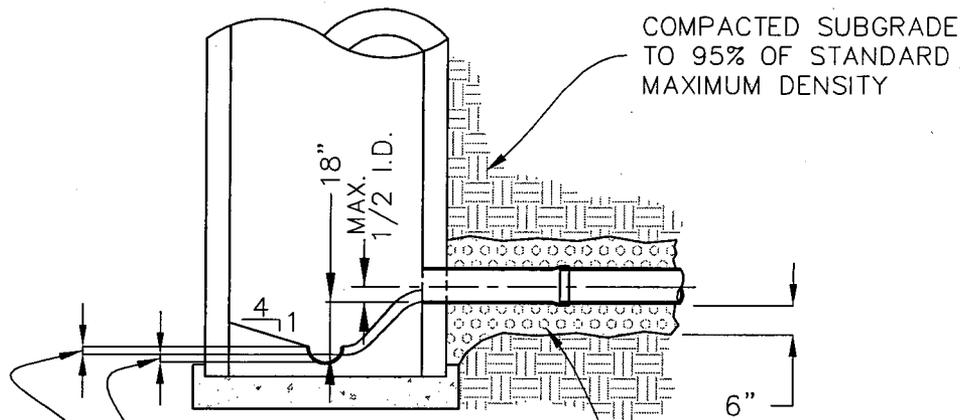
SHEET NUMBER
3 OF 6
SECTION
50.03



6" (TYPICAL)

CONSTRUCT SPILLWAY WHERE
INVERT OF UPPER SEWER IS
ABOVE MID HEIGHT OF
LOWER SEWER

PLAN



COMPACTED SUBGRADE
TO 95% OF STANDARD
MAXIMUM DENSITY

6"

1" CLEAN ROCK,
MINIMUM

LOWER SEWER OUTFLOW
PIPE SHALL BE 1/4 OF
THE DIAMETER

INSIDE SECTION

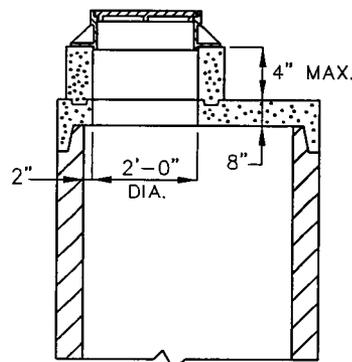
NO:	DATE:	REVISION AND DESCRIPTION
1	7/2007	REVISED RISER PIPE EMBEDMENT FROM CONCRETE TO 1" CLEAN ROCK

MANHOLE DETAILS

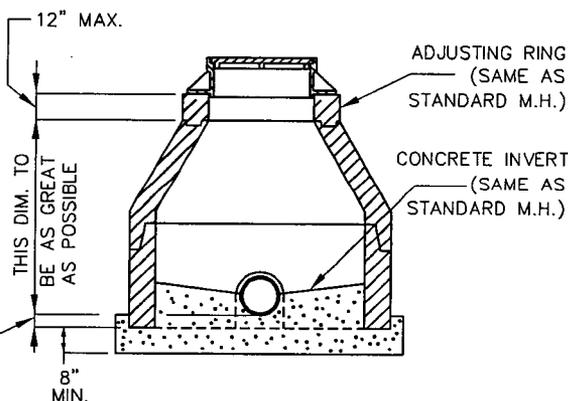
CHECKED BY:	DRAWN BY:	DATE:



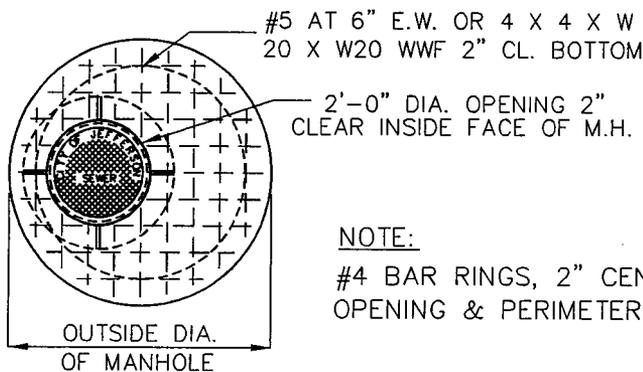
SHEET NUMBER
4 OF 6
SECTION
50.04



SECTION
ALTERNATE SLAB TOP



SECTION
SHALLOW 4'-0" DIA. M.H.



PLAN

NOTE:
#4 BAR RINGS, 2" CENTERLINE OF
OPENING & PERIMETER OF SLAB

NOTES:
STANDARD MANHOLE FRAME AND
SOLID LID SHALL BE
NEENAH R-1736 (OR EQUAL),
WITH "CITY OF JEFFERSON"
CASTED ON THE LID.
TOTAL WEIGHT: FRAME AND
SOLID LID = 460 POUNDS.
GRADED LID SHALL BE
NEENAH R-2421-A

NO:	DATE:	REVISION AND DESCRIPTION
1	7/2007	REVISED RISER PIPE EMBEDMENT FROM CONCRETE TO 1" CLEAN ROCK

MANHOLE DETAILS

CHECKED BY:	DRAWN BY:	DATE:
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City of Jefferson
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER
5 OF 6
SECTION
50.05

CRADLE UNDER PIPE & UP TO 1/6 OF PIPE O.D. ABOVE BOTTOM OF PIPE.

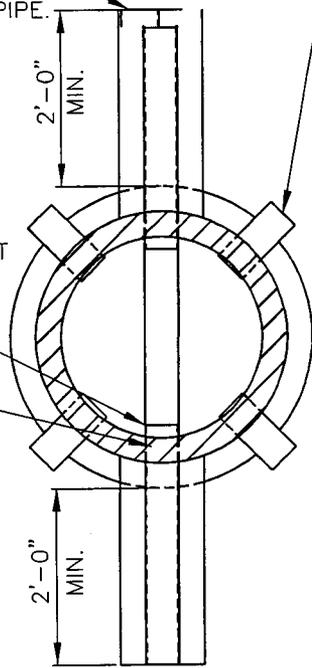
WHEN BASE AND INVERT ARE PLACED AT THE SAME TIME, INLET AND OUTLET PIPES AND BOTTOM RISER OF M.H. SHALL BE SET ON SOLID CONCRETE BLOCKS.

PIPE SHALL PROJECT COMPLETELY INTO MANHOLE 3" MAXIMUM.

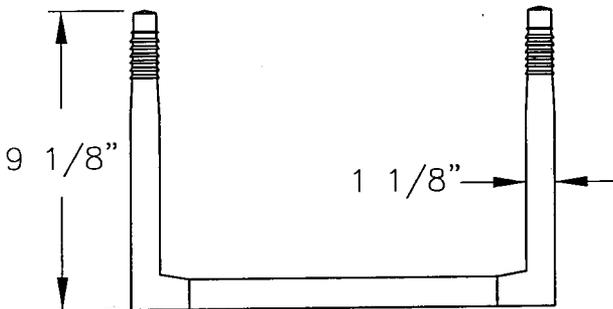
OPTIONAL: CONCRETE BLOCK BASE:

SUBJECT TO PRIOR APPROVAL OF THE PUBLIC WORKS DEPARTMENT.

MANHOLE WATER STOP GASKET & CLAMP (TYP.)



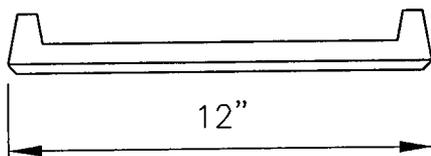
NO.		DATE:	REVISION AND DESCRIPTION
MANHOLE DETAILS		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	



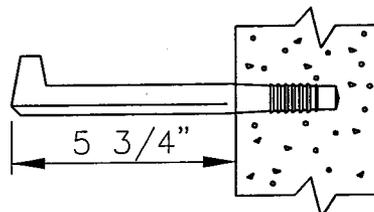
MANHOLE STEP DETAIL

MANHOLE STEP TO BE M.A. INDUSTRIES INC. #PS-1 OR EQUIVALENT TO BE INSTALLED IN MANHOLES GREATER THAN 10 FT.

TOP VIEW

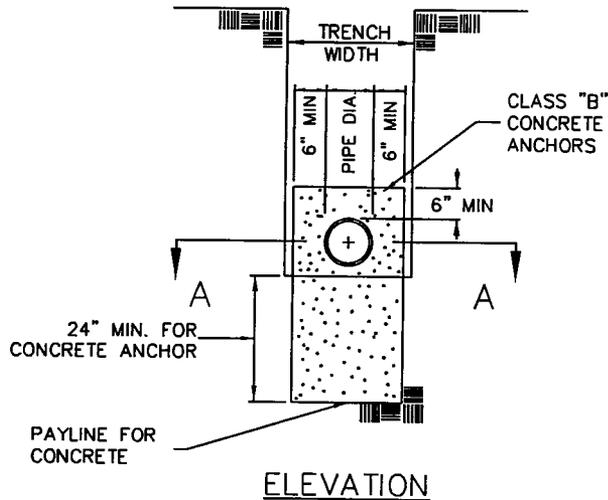
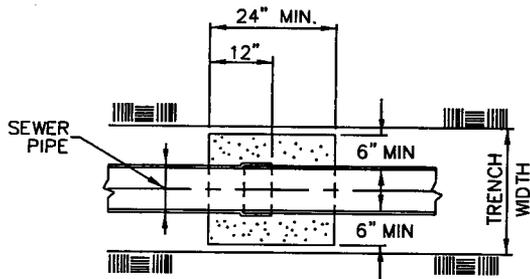
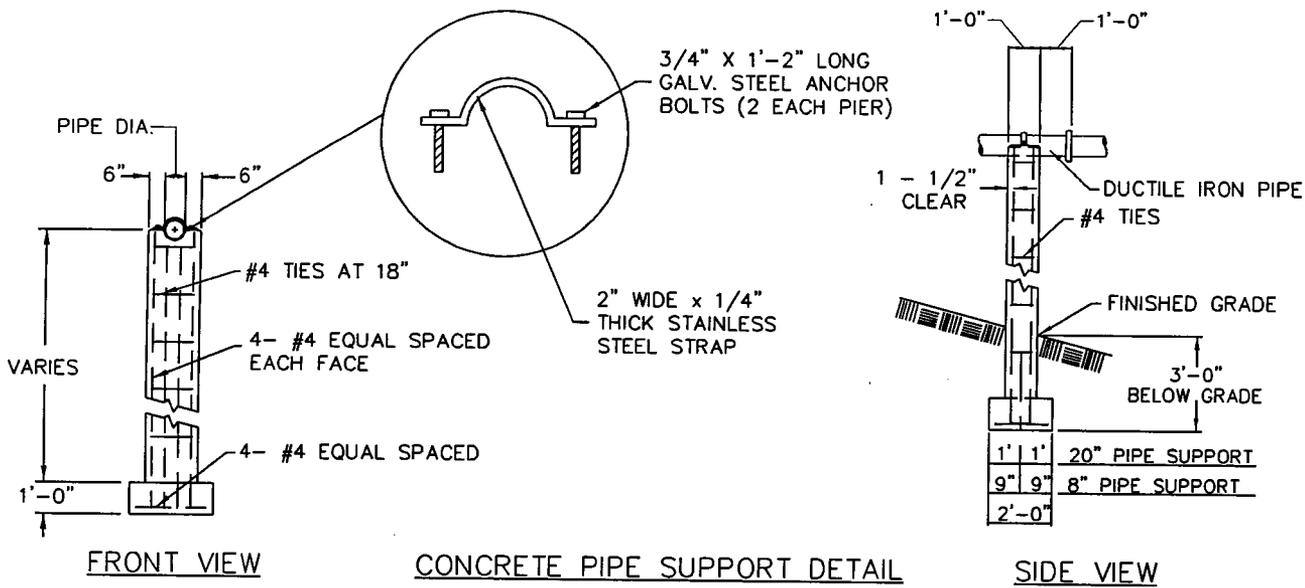


FRONT VIEW



SIDE VIEW



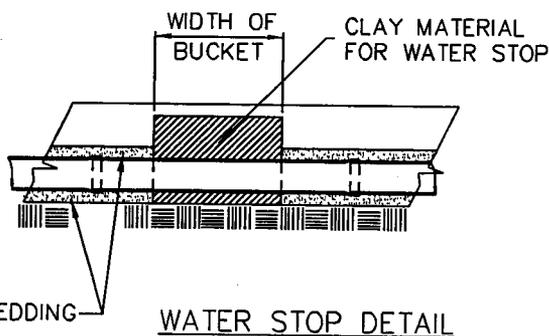


CONCRETE ANCHOR
DETAIL

GRADATION FOR GRANULAR BEDDING MATERIAL ASTM STANDARD C33		
	SIEVE SIZE	% PASSING
PASSING	3/4"	90 - 100%
PASSING	1/2"	-----
PASSING	3/8"	20 - 55 %
PASSING	NO. 4	0 - 10 %
PASSING	NO. 8	0 - 10 %

WHEN IN:

1. DIRT, GRADE APPROX. 8' WITHOUT GRANULAR MATERIAL & BACK FILL WITH DIRT (OR CLAY)
2. ROCK, GRADE DITCH APPROX. 8' WITH DIRT,(OR CLAY) & BACK FILL WITH DIRT (OR CLAY)
3. WET AREAS PLACE DITCH BLOCKS APPROX. 100' APART BETWEEN MANHOLES, IN DRIER AREAS PLACE ONE (1) DITCH BLOCK BETWEEN MANHOLES.



NO:	DATE:	REVISION AND DESCRIPTION
1	1/2006	Added Stainless Steel Strap Size

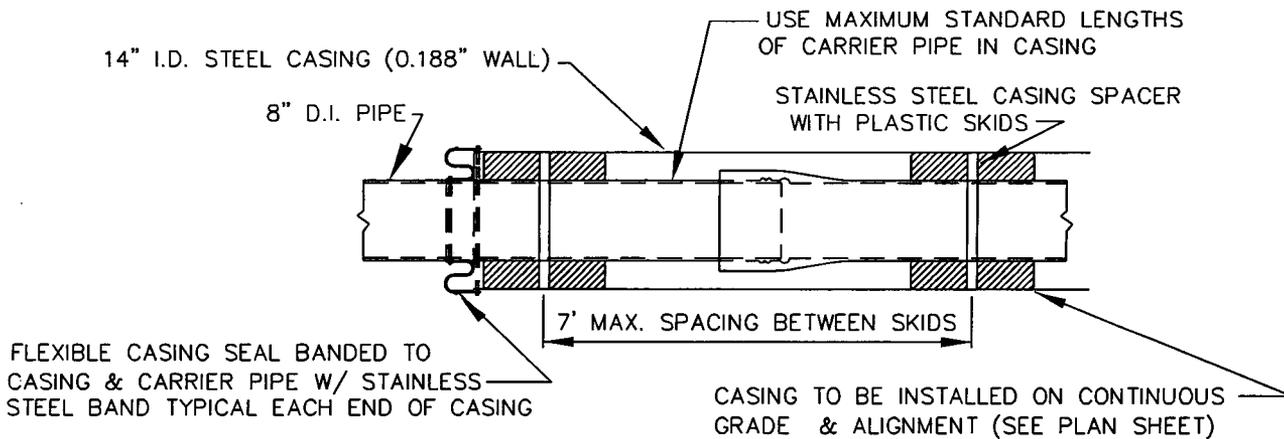
CHECKED BY:	DRAWN BY:	DATE:

MISC. SANITARY SEWER
DETAILS

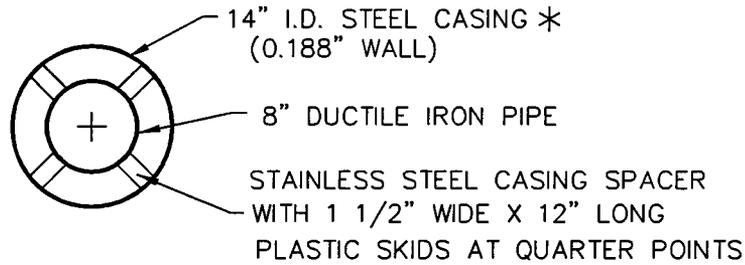
STANDARD DETAILS



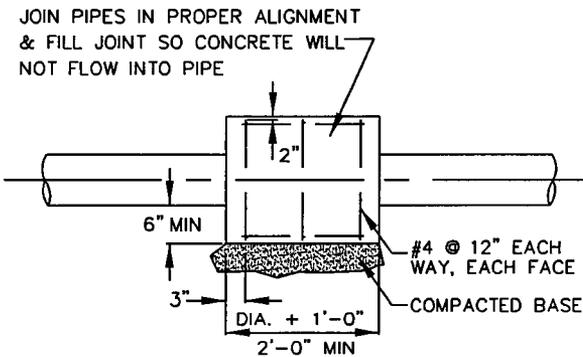
SHEET NUMBER
1 OF 2
SECTION
51.01



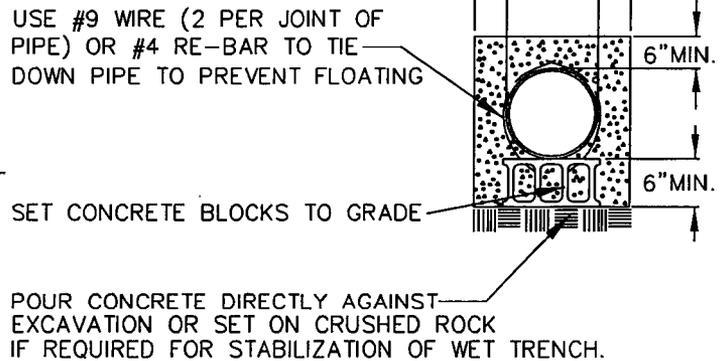
SECTION THRU STEEL CASING



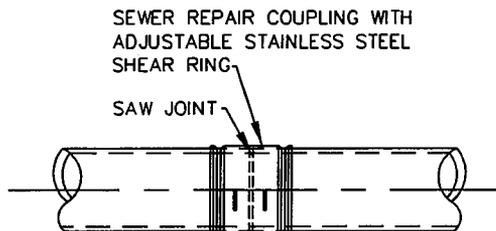
FRONT VIEW OF CASING



CONCRETE COLLAR



CONCRETE ENCASEMENT DETAIL



COUPLING DETAIL

NOTE:

1. USE MANUFACTURERS GASKETED FITTINGS. FOR OTHER MAIN TYPES.
2. GAP BETWEEN SAW ENDS MUST BE SMALL AS POSSIBLE WITH A MAX. OF 1/2" FOR VCP PIPE.

NO.	DATE:	REVISION AND DESCRIPTION

MISC. SANITARY SEWER DETAILS	STANDARD DETAILS
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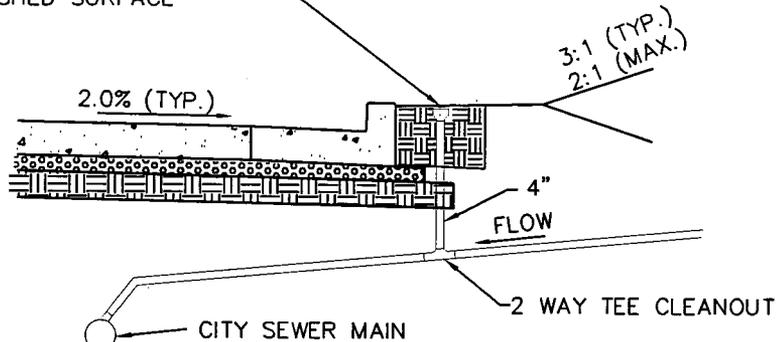
CHECKED BY:	DRAWN BY:	DATE:
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City of **Jefferson**
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER
2 OF 2
SECTION
51.02

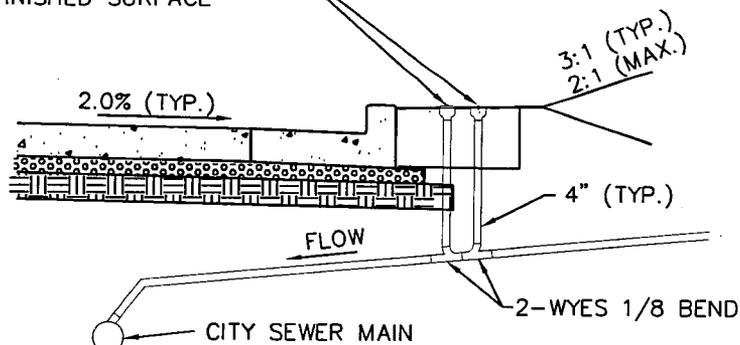
THREADED COUNTERSUNK
CLEANOUT AND CAP FLUSH
WITH FINISHED SURFACE



ALL LATERAL CONNECTIONS TO THE
MAIN SHALL BE MADE WITH WYE
FITTINGS.

OUTSIDE CLEANOUT DETAIL
FOR $\leq 2'$ OF COVER

THREADED COUNTERSUNK
CLEANOUT AND CAP FLUSH
WITH FINISHED SURFACE

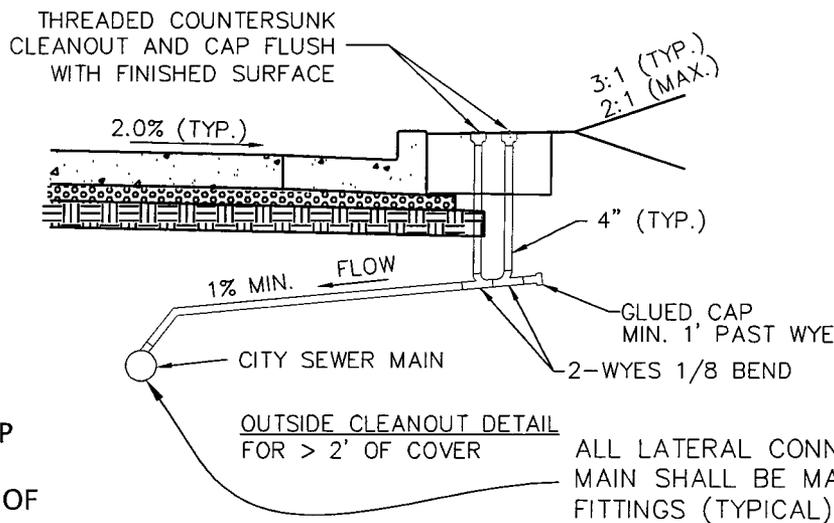
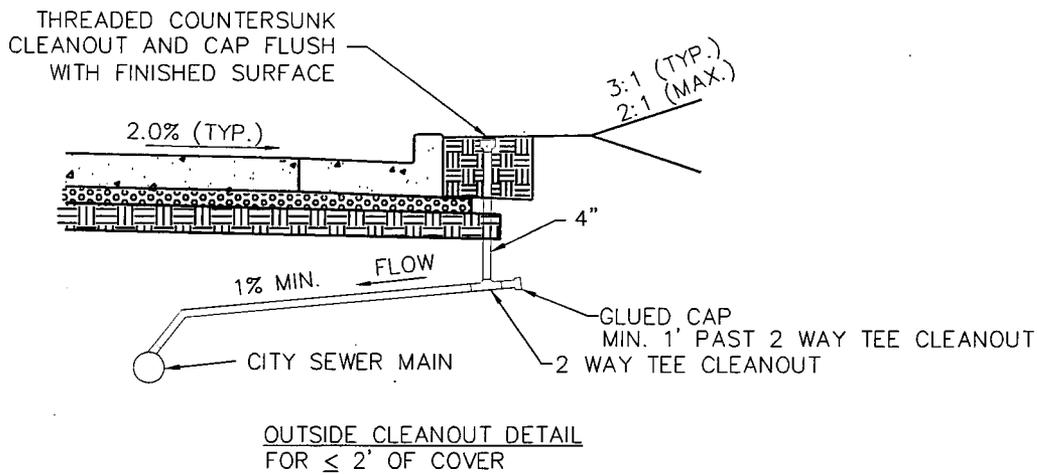


ALL LATERAL CONNECTIONS TO THE
MAIN SHALL BE MADE WITH WYE
FITTINGS.

OUTSIDE CLEANOUT DETAIL
FOR $> 2'$ OF COVER

NOTE:
USE WATER STOP GASKETS AT
INTERSECTIONS OF PIPES AND
MANHOLES. SEE SS-2, FOR
A-LOK AND Z-LOK LOCATION
INFORMATION.

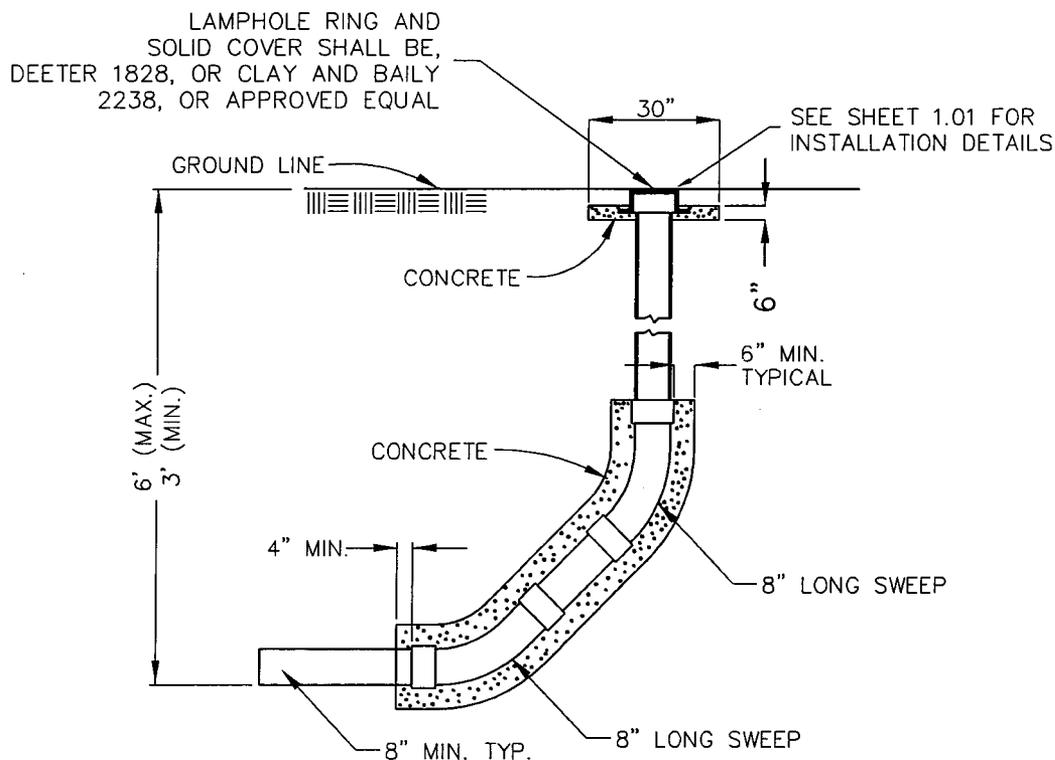
REVISION AND DESCRIPTION		NO:	DATE:
MISC. CLEANOUT DETAILS		STANDARD DETAILS	
CHECKED BY:	DRAWN BY:	DATE:	
SHEET NUMBER			
1 OF 2			
SECTION			
52.01			



NOTE:
USE WATER STOP
GASKETS AT
INTERSECTIONS OF
PIPES AND
MANHOLES.

FUTURE STUB DETAIL

ALL LATERAL CONNECTIONS TO THE
MAIN SHALL BE MADE WITH WYE
FITTINGS (TYPICAL).



STANDARD LAMP HOLE

NO:	REVISION AND DESCRIPTION
1	SPECIFIED LAMP HOLE RING AND SOLID LID
2	CHANGED STD. LAMP HOLE MAX. DEPTH TO 6 FT
DATE:	
8/2007	
1/2013	
CHECKED BY:	
DRAWN BY:	
DATE:	
MISC. CLEANOUT DETAILS	
STANDARD DETAILS	

City of
Jefferson
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

SHEET NUMBER
2 OF 2
SECTION
52.02