

4.9

PROTECTION AND RESTORATION OF EXISTING FACILITIES AND PROPERTY

4.9.1 **General:** Any existing facilities which fall in the line of the work such as asphalt entrances, street pavement, curbs, gutters and sidewalks, fences, underground pipes, conduits, utilities, and landscaping shall be restored in kind by the Contractor, unless otherwise directed, in accordance with the specifications contained herein governing the various types of services involved

4.9.2 **Cutting and Removing:** The pavements, entrances, curbs, gutters and sidewalks, etc. shall be cut vertically along the lines forming the trench in such manner as not to damage the adjoining pavement. The portion to be removed shall be broken up in a manner that will not cause damage to the pavement outside the limits of the trench, however, any pavement damaged by the Contractors operations outside the limits of the trench shall be replaced by the Contractor without cost to the Owner. All waste material resulting from the above operations shall be removed immediately from the site of the work.

4.9.3 **Restoration of the Existing Pavements, Curbs, Gutters and Sidewalks:** The Contractor shall replace any pavement etc. removed or damaged with the same type and depth of pavement etc. as that which is adjoining, including gravel base material except where specific resurfacing requirements are called for in the Contract Documents or the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the pavement Owner.

Unless otherwise required by the permit, the Contractor shall provide temporary gravel surfaces in good condition within one day after backfill over the pipe has been placed and unless otherwise required shall complete repairs within thirty days from the date of notification to proceed with the restoration of the surface over any portion of the trench.

4.9.4 **Restoration of Existing Gravel Roads:** The Contractor shall replace any gravel removed on a gravel road with the same type of gravel as that which is adjoining to a minimum depth of six inches. The Contractor shall provide this gravel surface in good condition within one day after backfill over the pipe has been placed. The gravel shall be graded, sprinkled and rolled to provide a smooth compacted surface satisfactory to the City. Restoration shall be to a condition equal to or better than conditions existing prior to Contractor's undertaking of the work.

4.9.5 **Restoration of Irrigation and Drainage Systems:** Where the work involves changes in or protection of irrigation or drainage systems, and appurtenance structures and facilities, the Contractor will be required to conduct his operations in such manner and sequence as not to interfere with the proper delivery or disposal of water, and the Contractor shall at all times cooperate with irrigation districts, drainage districts, corporate or individual owners, or users in providing for the continuance of established use and disposal of water. The Contractor shall restore any part of irrigation drainage system destroyed as a result of his operations to the same or better condition, the facility was in prior to his work. The Contractor shall be responsible for all claims as a result of improper restoration of facilities and for all claims caused by his negligence. This shall include any silting of downstream channels, piping, ponds, etc.

4.9.6 **Restoration of Existing Fences:** The Contractor shall restore existing fences and gates disturbed during construction operations to pre-construction conditions or better. If existing fencing material,

including fabric, poles, etc., is damaged, the Contractor shall furnish new fencing material to match the existing material.

4.9.7 Restoration of Landscaping: The Contractor shall restore landscaped areas disturbed during construction operations to pre-construction conditions or better. Turf areas disturbed shall be restored with new sod. Trees and bushes in developed landscaping areas removed during construction shall be replaced to same location. The Contractor shall replace any vegetation which dies as a result of construction with new vegetation of comparable size, species and quality as existing vegetation. Ponds, streams, rock features or other landscaping items disturbed or damaged shall be repaired or replaced to match pre-construction conditions or better

4.9.8 Restoration and Reseeding of Agricultural Areas: The Contractor shall restore and reseed all areas disturbed during construction operations to pre-construction conditions or better. The type of reseeded and extent shall be determined in the field.

4.10 BOOSTER STATIONS

4.10.1 Culinary Water Booster Station: Booster station design must conform to Wellsville City Standards & Specifications, local building and electrical codes and the Utah State Division of Drinking Water, Rules & Guidance on Pump Station Design.

Design drawings for the culinary water pump station must be prepared by the Project Engineer and submitted to the City, State and County for approvals.

Booster station design must include a split block building with a color approved by the city. Lockable steel doors are required and the building must include adequate ventilation for mechanical equipment and motors. Ventilation ducts must be thermostatically controlled to turn off or close during winter use. The building must also be equipped with a thermostatically controlled natural gas heater.

The pump station design must include telemetry/SCADA consistent with Wellsville City's existing infrastructure monitoring equipment. Telemetry supplier must be "Remote Control" (no substitute).

Although a duplex system is required, a third stand alone pump must be given to the City to install when one of the duplex pumps need to be removed for maintenance. This will ensure the pump station will provide adequate capacity to meet peak demands and fire flows at all times.

A backup generator is required on all pump stations. The generator must be natural gas powered and manufactured by "Generac"; substitutes must be approved by the City. The generator must be housed separately from the pump and surrounded by a block wall or concrete enclosure. The enclosure must include an architectural iron gate wide enough for a forklift to remove the generator and must include stucco finish matching the pump station.

Access must be provided for maintenance vehicles to service the booster station and must include an access road and a concrete pad in front of the entrance to the building.

Sewer Lines and
Appurtenances

DIVISION 5

5.1

GENERAL CONSTRUCTION REQUIREMENTS

5.1.1 Materials Handling: All sewer pipe, manhole sections, castings and appurtenances shall be transported, handled and stored in a manner which will insure proper installation in an undamaged condition. The Contractor shall replace all material found to be defective or which has been damaged. This includes the replacement of material found to be defective prior to expiration of the guarantee period.

5.1.2 Material Requirements: Unless specifically designated otherwise in each case, all materials and equipment furnished for permanent installation in the work shall conform to applicable standard specifications and shall be new, unused and undamaged when installed or otherwise incorporated in the work. No material or equipment shall be used by the Contractor for any purpose other than that intended or specified. All materials not conforming to these specifications shall be specifically approved in writing by the City Engineer prior to delivery to the jobsite.

Any material or equipment found by the Inspector not conforming with City Standards and Specifications is subject to rejection.

5.1.3 Inspection: All work and materials, from the beginning of the construction until the completion and acceptance of the proposed project shall be subject to inspection by Wellsville City or its authorized representative, at their convenience. The Inspector shall have access to the work at all times. Any work found by the Inspector not conforming with Approved Plans and/or these City "Standards and Specifications" is subject to rejection.

The Contractor shall notify the City 48 hours prior to the start of construction.

5.2
TRENCH EXCAVATION

5.2.1 **General:** The work included under "Trench Excavation" shall include: every operation necessary for excavation of all materials of whatever nature within the designated limits of the trenches; maintaining the excavation by shoring, bracing or other accepted methods and its removal; providing for the uninterrupted flow of surface water or sewage during construction; and protecting all pipes, conduits, culverts, bridges and all other public and private property which may be endangered by the work.

5.2.2 **Trenching:**

- A. *Alignment:* Trench excavation for pipe installation shall be performed to the alignment and grade as indicated on the plans or as required by the City Engineer.
- B. *Tunneling:* Tunneling or boring will be required to preserve existing pavements.
- C. *Pavement Removal* (if permitted by written approval of the City): All pavement removal shall be in accordance with the applicable City, County or State Standards and permits.
- D. *Trench Width:* Trenches shall be excavated to a width which will provide adequate working space for proper pipe installation, jointing and embedment. Minimum sidewall clearance shall be 6 inches and the maximum sidewall clearance shall be 12 inches, measured from the outside wall of the installed pipe at a depth of 12 inches above the pipe.
- E. *Limitation of Excavation:* Except by expressed written permission of the City, the maximum length of open trench shall be 300 feet, or the distance necessary to accommodate the amount of pipe installed in a single day (including open excavation, pipe laying and appurtenances, construction and backfill which has not been temporarily resurfaced).
- F. *Trenching by Machine or by Hand:* The use of mechanical equipment will be permitted except in places where machines may cause damage to existing structures above or below ground, in which case, hand methods shall be employed.
- G. *Structure Protection:* The Contractor shall provide temporary support, adequate protection and maintenance of all underground and surface structures, pipes, drains, sewers and other obstructions affected by the construction work. Any structure that has been disturbed shall be restored or replaced.

5.2.3 **Dewatering:** All excavation shall be dewatered before any construction is undertaken therein. Concrete shall be placed only upon dry, firm foundation material and pipe shall be laid only in dry trenches.

5.2.4 **Blasting:** The Contractor's responsibility with respect to the use of explosives during blasting includes compliance with all laws, rules and regulations of the Federal, State, the City and the insurer, governing the keeping, storage, use, manufacture, sales, handling, transportation or other distribution of explosives. All operations involving the handling, storage and use of explosives shall be conducted with every precaution by trained, reliable workers under satisfactory supervision. Blasts shall not be fired until all persons in the vicinity have had ample notice and have reached

positions out of danger therefrom. The Contractor shall advise the Engineer, all utility companies, the Wellsville City, City Police, the Cache County Public Works Department, the Cache County Sheriff's Department and any public body that should be advised in advance as to when and where charges are to be set off.

5.2.5 Safety:

- A. Excavations shall be performed, protected and supported as required for safety and in the manner set in the Chapter, "Excavations, Trenching and Shoring" of the Utah Occupational Safety and Health Standard for Construction. Additional precautions shall be implemented if deemed necessary by the City and shall be at the expense of the Contractor.
- B. The Contractor shall furnish and maintain all necessary safety equipment, such as barrier signs, warning lights and guards to provide adequate protection for persons and property during all phases of construction.
- C. The Contractor shall give reasonable notice to the owners of public or private property and utilities when such property and utilities are within the construction area.
- D. The Contractor shall at all times observe and comply with all Federal, State and local laws, ordinances and regulations which will in any manner affect the work.

5.3 PIPE EMBEDMENT

5.3.1 General: The pipe shall be carefully bedded as specified on Approved Plans and/or shall meet the requirements of these City "Standards and Specifications".

5.3.2 Rigid Pipe:

- A. *Suitable Subgrade:* The trench bottom shall be constructed to provide a firm and stable support for the entire length of the pipe. The pipe subgrade shall be shaped to fit the bottom of the pipe for a width of ½ the diameter of the pipe. Each joint shall be properly bedded to insure uniform and continuous bearing along the pipe. Initial backfill shall be placed a minimum of 12 inches above the top of the pipe. Selected backfill material consisting of earth or sand, free of stones larger than 2-1/2 inches, hard clods, frozen material or other debris shall be placed in the trench simultaneously on each side of the pipe in 6 inch lifts for the full width of the trench in such a manner as not to damage or disturb the pipe. The density of subgrade material shall be ninety-five percent (95%) of maximum density as determined by ASTM D-1557 (Modified Proctor).
- B. *Unsuitable Subgrade:* Whenever unsuitable subgrade material is encountered that requires over-excavation (excavation more than 6 inches below the bottom of the pipe) trenches shall be over-excavated at least 1/4 the diameter of the pipe (6 inches minimum) in depth and stabilized with 1/2" to 1-1/2" clean angular rock. Bedding material shall then be placed in compliance with Section 5.3.3.

5.3.3 Rigid Pipe Bedding Material: Bedding material of 6 inches minimum shall be required. This material shall be 1/4" to 1" clean, angular rock. This same material shall be used for haunching. Haunching shall be placed to the springline of the pipe. Selected backfill material consisting of earth or sand, free of stones larger than 1 (one) inch, hard clods, frozen material or other debris shall be placed in the trench simultaneously on each side of the pipe for the full width of the trench in such a manner as not to damage or disturb the pipe. The density of bedding material shall be ninety-five percent (95%) of maximum density as determined by ASTM D-1557 (Modified Proctor).

5.3.4 Flexible Pipe Bedding Material: Bedding, one fourth the diameter of the pipe (6" minimum) shall be required. This material shall be 1/4" to 1" clean, angular rock. This same material shall be used for haunching. Haunching shall be placed to the spring line of the pipe. Selected backfill material consisting of earth or sand, free of stones larger than 3/4 inch, hard clods, frozen material or other debris shall be placed in the trench simultaneously on each side of the pipe for the full width of the trench in such a manner as to not damage or disturb the pipe. The density of backfilled material shall be 95% of maximum density in roadway areas and 90% of maximum density in off-road areas as determined by ASTM D-1557 (Modified Proctor).

5.3.5 Required Material One (1) Foot above the Pipe: Material placed for a minimum depth of one foot above the top of the pipe shall meet the same requirements for bedding rigid or flexible pipe including quality of material and compaction.

5.4 SEWER PIPE

5.4.1 General: This section covers the installation of all sanitary sewer pipe, fittings, manholes and appurtenances. No connection to existing structures shall be made without approval of the City.

5.4.2 Concrete Sewer Pipe

- A. **Materials:** All concrete pipe shall be made using Type V cement. Admixtures and pozzolans may be used only with approval of City Engineer.
- B. **Non-Reinforced Concrete Pipe:**
 - 1. Shall be Class 3 non-reinforced concrete sewer pipe conforming to ASTM C-14.
 - 2. Joints shall be of the bell-and-spigot, compression type rubber gasket design conforming to ASTM C-443.
- C. **Reinforced Concrete Pipe:**
 - 1. Shall be used for sanitary sewers 18 inches in diameter and larger.
 - 2. Shall be Class III, minimum, reinforced concrete sewer pipe conforming to ASTM C-76. Reinforcement shall be circular.
 - 3. Joints shall be of the bell-and-spigot, compression type rubber gasket design conforming to ASTM C-443.

5.4.3 Ductile Iron Sewer Pipe

- A. **Ductile Iron Pipe:** Shall be a minimum wall thickness of Class 50 and conform to ASTM A-746. Cement-mortar or bituminous lining shall be specified on the Approved Plans.
- B. **Fittings:** Shall be ductile iron and conform to ANSI A21.10. Fittings shall be consistent with the specified pipe.
- C. **Joints:** Shall conform to ANSI A21.11 and shall be mechanical or push-on type.

5.4.4 Polyvinyl Chloride (PVC) Pipe:

- A. **Materials:** All PVC sewer pipe shall be made from PVC plastic conforming to ASTM D-1784 Class 12454-B or 12454-C.
- B. **PVC Sewer Pipe:** PVC sewer pipe will be permitted for installation up to 27 inch diameter and shall conform to the requirements of ASTM D-3034, Class SDR 35 for pipe sizes 4" thru 15" and ASTM F-679 for pipe sizes 18" thru 27".
- C. **Joints:** Joints shall be bell-and-spigot compression type with flexible elastomeric seals conforming to the requirements of ASTM D-3212.
- D. **Fittings:** All fittings shall conform to ASTM D-1784. The strength class shall be not less than the strength class of any adjoining pipe.

- E. Low-Head Pressure PVC Sewer Pipe: Shall conform to AWWA C-900. Minimum wall thickness shall be DR-18 or Pressure Class 150. Joints shall be bell-and-spigot type with integral bell gasketed joints.
- F. Installation: The pipe shall be installed in accordance with the requirements of ASTM D-2321 and as specified herein and as shown on the "Pipe Installation Detail" contained herein.

5.4.5 Pipe Laying: All work shall be in accordance with the following related standards and these specifications.

- A. *Concrete Sewer Pipe:* As per manufacturer's recommendations for pipe installation.
- B. *Ductile Iron Pipe:* AWWA C-600 "Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances".
- C. *PVC Sewer Pipe:* ASTM D-2321 "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe". ASTM D-2855 "Standard Recommended Practice for Making Solvent-Cement Joints with PVC Pipe and Fittings".
- D. *General Requirements:*

1. Piping shall be laid to the alignment and grades indicated on approved construction drawings within the following limits provided that such variation does not result in a level or reverse grade:

Alignment	1 inch per 100 feet
Grade	+/- ½ inch

2. Install pipe of size, material, strength, class and joint type with embedment as shown on the Approved Construction Plans and conforming to these Wellsville City "Standards and Specifications".
3. Pipe shall be laid in a straight line at a uniform grade between manholes.
4. Pipe laying shall begin at the lowest elevation and proceed upstream with the bell end of bell-and-spigot pipe positioned upstream.
5. The interior of all pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until the work has been accepted.
6. Pipe shall not be laid in water nor under unsuitable weather or trench conditions.
7. All field cuts shall be made at right angles to the axis of the pipe. All pipe shall be filed to remove roughness.
8. All connections between two piping materials or between two field cuts of the same material shall be made with adapters designed and intended for that specific purpose and shall be approved by the City.

9. All joint preparation and jointing operations shall comply with the recommendation of the pipe manufacturer.
10. Whenever pipe laying is stopped, the open end of the pipe shall be plugged with a watertight plug and the trench shall be properly backfilled to protect the pipe from floating.
11. If adjustment of position of a pipe length is required after being laid, it shall be removed and rejoined.
12. Any pipe that has floated shall be removed from the trench and the pipe shall be relaid as directed by the City.
13. In addition to the above general requirements, all pipe installation shall comply to the specific requirements of the pipe manufacturer.

5.5
TRENCH BACKFILL

- 5.5.1 General:** The work included under "Trench Backfill" shall include every operation above the pipe embedment zone. The density of backfilled material shall be 95% of maximum density in roadway areas and 90% of maximum density in off road areas as determined by ASTM D-1557 (Modified Proctor).
- 5.5.2 Backfilling:** All backfilling shall be in accordance with the applicable City, County or State Standards, permits and as designed on the Approved Plans. On-site materials may be used for backfilling if approved by the City. All construction within State rights-of-way must have the approval of UDOT including backfill material and placement.
- 5.5.3 Pavement Replacement:** All pavement replacement shall be in accordance with the applicable City, County or State Standards, permits and/or as designated on Approved Plans.

5.6 MANHOLES

5.6.1 General: Manholes shall be watertight, precast, reinforced manholes, complete with adapter rings, frame, cover, pipe connections, ladder, concrete sections, cast-in-place base or prefabricated base. Monolithic concrete manholes may be allowed subject to approval by the City. Manholes shall be constructed at the locations indicated and in accordance with details as shown on the Approved Plans and/or Standard Detail Drawings.

5.6.2 Precast Reinforced Concrete Manholes: Manholes shall conform to ASTM C-478 and the Standard Detail Drawing for "Precast Manholes".

Precast base sections shall include a base riser section with integral floor and shall be supplied with a flexible pipe connector conforming to ASTM C-923. Precast reinforced concrete cone sections shall be of the ECCENTRIC type.

Manholes deeper than 16 feet shall have precast reinforced concrete cone sections of the ECCENTRIC type.

All joints and lift holes shall be sealed with non-shrinking grout or a continuous bead of bituminastic material. In wet areas both sides of the joint shall be grouted.

5.6.3 Cast-in-place Concrete Manholes: Cast-in-place bases shall have a 28-day minimum compressive strength of 2500 psi and contain not less than 5-1/2 bags of Type II or V cement per cubic yard and shall conform with the Standard Specification for Portland Cement ASTM C-150.

Cast-in-place bases over live main lines shall have a 24-hour cure period before stacking sections on the poured base.

Wall, cone sections and risers shall be precast reinforced concrete conforming to ASTM C-478 and the Standard Detail Drawing for "Cast-in-Place Manholes". Precast reinforced concrete cone sections shall be of the ECCENTRIC type.

All joints and lift holes shall be sealed with non-shrinking grout or a continuous bead of bituminastic material. In wet areas both sides of the joint shall be grouted.

Manholes deeper than 16 feet shall have precast reinforced concrete cone sections of the ECCENTRIC type.

5.6.4 Manhole Castings: All castings shall be cast iron rings and covers conforming to ASTM A-48 Class 30. Castings shall be cleaned and painted with an asphalt coating prior to delivery to the site. All castings shall have a combined minimum weight of 400 pounds with the cover approximately 150 pounds and the ring approximately 250 pounds. The foundry name and casting number shall appear on the casting.

Covers shall be in accordance with the following:

- A. Covers shall be 24 inches in diameter.

- B. Covers shall be vented with a pick-hole for opening. Vent holes shall not be larger than 5/8" diameter.
 - C. All covers shall be marked "SEWER".
 - D. Watertight seal down covers shall be of the gasket and bolt down type, with countersunk, hexagonal bolts.
- 5.6.5 Manhole Steps:** Manholes that are more than 4 feet deep shall have sections provided with plastic encapsulated steel or fiber glass reinforced plastic steps cast-in-place, with maximum spacing of 16 inches.
- 5.6.6 Subgrade:** Manholes are to be constructed on a stable foundation capable of supporting the loads imposed.
- 5.6.7 Cast-in-Place Manhole Bases:**
- A. The base shall be a continuous pour of concrete.
 - B. Cast-in-place bases shall be at least 6 inches in thickness below the invert and shall extend at least 6 inches radially outside of the outside dimensions of the precast manhole wall section. The base shall extend at least 6 inches above the bottom of the wall section on the outside of the wall section.
 - C. The initial precast wall section shall be supported on concrete blocks and adjusted to proper alignment and grade prior to pouring of the base.
 - D. The precast wall section shall not bear directly on any of the pipes.
 - E. Precast Base Sections: Precast base sections shall be placed so as to be fully and uniformly supported in proper alignment.
- 5.6.8 Inverts:** All inverts, precast bases, cast-in-place bases or connections to existing manholes shall meet the following requirements:
- A. Invert channels shall be smooth with a uniform grade from inflow to outflow pipe flowlines.
 - B. Minimum drop through manholes shall be 0.2 feet at all alignment changes of 45 degrees or greater.
 - C. Changes in flow direction shall be smooth, uniform and made with the longest radius possible.
 - D. The cross-sectional shape of the invert channels shall match the lower halves of the inflow and outflow pipes.
 - E. All openings around pipes shall be grouted to form a permanent watertight seal such as with grout.
 - F. The pipe shall protrude into the manhole a maximum of 4 inches.

- 5.6.9 Wall Sections:** Precast sections shall be placed and aligned to provide vertical sides.
- 5.6.10 Joints:** All joints between sections, grade rings and castings shall be sealed with a continuous bead of watertight bituminastic material or non-shrinking grout. All manholes installed in wet areas shall have joints and lift holes grouted on the outside of the manhole in addition to standard sealing procedures.
- 5.6.11 Backfilling:** Backfill according to Section 5.5.
- 5.6.12 Placing Castings:**
- A. In Roadways: Top of castings shall be set to the grade of the finished road surface. Castings shall be fully and uniformly supported. Wedges or shims used to elevate castings shall be brick or metal with concrete placed for uniform support. Collars around manholes shall be either a concrete collar, 12 inches wide maximum, or an asphalt hot-mix to match existing paving.
 - B. Off Roadways: All manholes shall be set to the grade shown on Approved Plans or as directed by the City Engineer or Inspector.
- 5.6.13 Stubs:** All stubs shall be plugged with watertight plugs at the end of pipes outside of the manhole.
- 5.6.14 Over Existing Sewers:** Manholes to be built on an existing sewer shall be constructed in such a manner as will not disrupt service of the 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 grouted in such a manner as to produce a smooth and acceptable finish. Any portion of the existing sewer damaged shall be repaired or replaced by the Contractor.
- 5.6.15 Protection During Construction:** A plywood bottom or plugs shall be placed in manholes during construction to prevent debris from entering sewer lines.
- 5.6.16 Drop Manholes:** Drop manhole connections, as indicated on Approved Plans or as required whenever the elevation differences between the flow lines of the inflow pipe and the outflow pipe exceed 18 inches, shall conform to the Standard Detail Drawing for "Drop Manholes" or Approved Plans. All drop manholes shall be constructed with an outside drop unless specifically authorized by the City.

5.7
LATERALS

5.7.1 **General:** This section covers the connection of laterals to main sewer lines. Any alterations to this specification shall be approved by the City prior to connection.

5.7.2 **Connection Requirements:**

A. Type of Connection

1. In all cases, a manhole shall be used to connect sewer lines 8 inches and larger to existing sewer mains.
2. The connection of sewer laterals to sewer mains shall be made by installing a "wye" branch or a "saddle" fitting made specifically for lateral-sewer main connections.

"Saddle" fittings shall be banded securely onto the pipe with stainless steel bands and encased in concrete. The hole cut into the sewer line wall shall be sized to avoid any flow restrictions between the fitting and pipe.

B. Installation: All lateral connections shall be in accordance with these Wellsville City "Standards and Specifications":

1. All connections shall be left uncovered until inspected by the City Inspector.
2. Service connections shall be bedded, backfilled and compacted as per pipe specifications or as directed by the City Inspector.
3. All sewer lines shall remain in service while connections are made.
4. Any damage to existing sewer manholes or lines during connections shall be corrected by the Contractor as directed by the City.
5. The invert of all sewer laterals at the point of connection shall be at or above the springline of the sewer main.

5.7.3 **Lateral Requirements:**

A. Installation:

1. Material and construction requirements of laterals shall be in accordance with these Wellsville City "Standards and Specifications" and the Standard Detail Drawing for "Typical Service Connection".
2. The City shall be notified 24 hours prior to installation of the sewer lateral.
3. 4 inch laterals shall be laid at a minimum slope of 2%. Variations are to be reviewed by the City Inspector.

B. *Cleanouts:* Cleanouts shall be installed at property lines, 50 foot intervals and at all changes in direction greater than 45 degrees. Cleanout risers shall be the same size as the lateral and shall be connected to wyes in the lateral. Concrete support blocks shall be poured around

wyes for cleanouts. Cleanouts shall be in accordance with the Standard Detail Drawing for "Typical Service Connection".

5.8
ACCEPTANCE TESTS

5.8.1 General: The Contractor shall perform all pipeline flushing, testing, televising of the installed pipelines and vacuum testing of the manholes. The Contractor shall notify the City 48 hours in advance of any proposed testing operation. After the Contractor has cleaned the lines he shall give the City 48 hours advance notice that the system is ready for air testing.

Visual inspection, air leakage, deflection and television inspection shall be performed on all installed sewer lines prior to acceptance. Additional tests may be required by the City. Defects designated by the City Engineer or Inspector shall be repaired prior to acceptance of the sewer lines.

5.8.2 Visual Inspection:

- A. *Public Sewer Lines:* Each section of sewer line between manholes shall be straight and uniformly graded with no damaged pipe, misaligned or displaced joints or other defects. All sections of pipe shall be cleaned with a pressure jet to remove all dirt, debris and obstructions. The Contractor shall furnish suitable assistance to the City Engineer or Inspector.
- B. *Laterals:* All connections, lines and appurtenances shall be examined by the City prior to backfilling. All sections of pipe shall be free of dirt, debris and obstructions.

5.8.3 Air Tests:

- A. *Requirements:* Following cleaning an "Air Test" shall be performed on the full length of each public sewer line installed with the following requirements:
 - 1. The Contractor shall give the City 48 hours notice of any test to be performed on the system.
 - 2. All air tests shall be observed by the Inspector, unless the air test is performed by a "Testing Firm" which the City and City Engineer approves prior to the testing.
 - 3. Each section tested shall be noted on an "Air Test" form to be submitted to the City. Acceptances, failures, reasons for failure and retests shall be shown on the form.
 - 4. All sewer pipe shall be tested after the completed backfill.
 - 5. All air tests are to include laterals when installed in conjunction with the sewer main.
 - 6. All stubs are to be air tested.
 - 7. All repairs indicated by any unsuccessful tests shall be made and the tests repeated until the successful performance of all tests is achieved.
- B. *Method of Testing:* The method of "Air Testing" gravity sewer lines shall be as follows:
 - 1. Clean test section by water jet.

2. Plug all pipe outlets with suitable test plugs bracing each plug securely if needed.
3. Raise the internal pressure in the test section to 4.0 psig.
4. After the pressure is reached, allow the pressure to stabilize. This usually takes 2 to 5 minutes, depending on the pipe size.
5. Disconnect the air supply and allow the test pressure to decrease to no less than 3.5 psig. Starting pressure may be greater than 3.5 psig.
6. Determine the time that is required for the internal air pressure to drop from 3.5 psig to 2.5 psig.
7. If the time period is less than the Minimum Test Time Required (see attached ASTM minimum test time chart) locate and repair problem and retest.

5.8.4 Deflection Test: All flexible and semi-rigid pipe shall be tested for deflection, joint displacement, or other obstruction by passing a rigid mandrel through the pipe by hand. The test shall be conducted after the final backfill has been in place at least 30 days, but prior to any resurfacing. The mandrel test shall comply with the specific procedures required in Section 306-1.4.6 of the SSPWC, except for the additional provision that the mandrel shall be a full circle, solid cylinder, or a rigid, non-adjustable, odd-numbered leg (9 leg minimum) steel cylinder, approved by the Engineer as to design and manufacture.

5.8.5 Vacuum Testing Manholes:

- A. *General:* All manholes shall be vacuum tested for leaks that would allow sewage water to flow from the manhole or permit groundwater to enter the manhole.
- B. *Method of Testing:* The procedure for vacuum testing manholes by the negative air pressure test shall be as follows:
 1. All lift holes shall be plugged.
 2. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.
 3. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
 4. A vacuum of 10 inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of mercury.
 5. The manhole shall pass if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches of mercury meets or exceeds the values indicated in Table 1 below.

6. If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

TABLE 1
MINIMUM TEST TIMES FOR VARIOUS MANHOLE DIAMETERS

Depth (ft)	<u>Diameter, inch</u>								
	30	33	36	42	48	54	60	66	72
	Time (seconds)								
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

TABLE II
SPECIFICATION TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

1 Pipe Dia. (in.)	2 Min. Time (min: sec)	3 Length for Min. Time (ft)	4 Time for Longer Length (sec)	<u>Specification Time for Length (L) Shown (min:sec)</u>							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48

1 Pipe Dia. (in.)	2 Min. Time (min: sec)	3 Length for Min. Time (ft)	4 Time for Longer Length (sec)	<u>Specification Time for Length (L) Shown (min:sec)</u>							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

TABLE III
SPECIFICATION TIME REQUIRED FOR A 0.5 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

1 Pipe Dia. (in.)	2 Min. Time (min: sec)	3 Length for Min. Time (ft)	4 Time for Longer Length (sec)	<u>Specification Time for Length (L) Shown (min:sec)</u>							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57

1 Pipe Dia. (in.)	2 Min. Time (min: sec)	3 Length for Min. Time (ft)	4 Time for Longer Length (sec)	<u>Specification Time for Length (L) Shown (min:sec)</u>							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
36	17:00	66	15.384 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

5.8.6 Television Inspection: The Developer or Contractor, prior to final acceptance by the City, shall have the new facilities televised and provide the City with a VHS video cassette for the City to review. The City will notify the Developer or Contractor of the condition thereof. The Contractor shall thereupon immediately make any repairs or corrections required by the City. The video cassette shall become a part of the City's records.

5.9 CLEANUP

- 5.9.1** **General:** All surplus materials, tools and any temporary structures shall be removed from the construction site by the Contractor. All rubbish, dirt or excess earth from the excavation shall be removed by the Contractor at the earliest possible date and the construction site left clean and acceptable to the construction Inspector.

Standard Detail Drawings

DIVISION 6

STANDARD DETAIL DRAWINGS

FOR

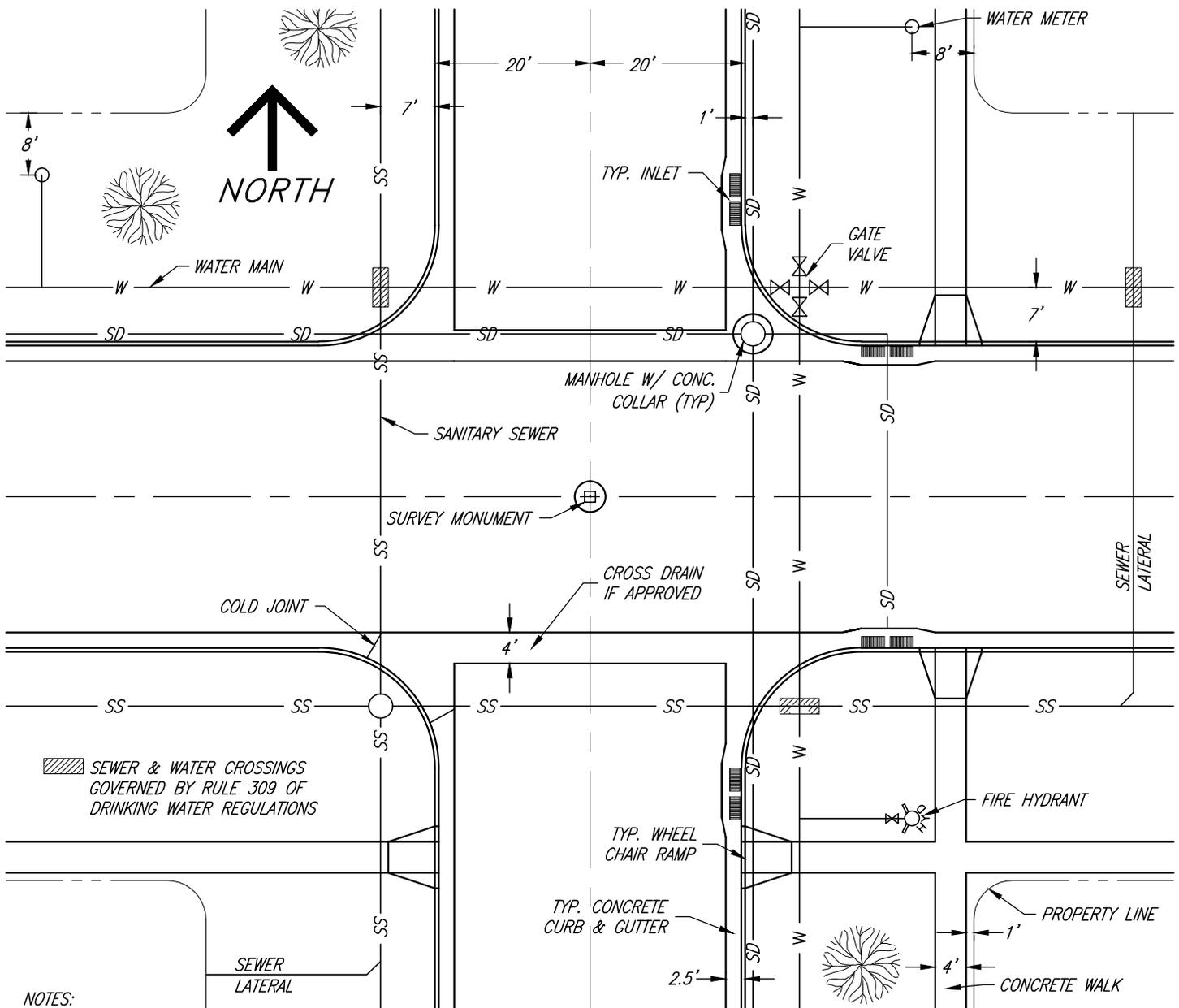
ROAD IMPROVEMENTS



WELLSVILLE CITY CORPORATION

INDEX

- | | |
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| <i>R1 - TYPICAL INTERSECTION WITH CURB & GUTTER</i> | <i>R18 - DOUBLE GUTTER - INLET BOX "B"</i> |
| <i>R2 - TYPICAL INTERSECTION WITHOUT CURB</i> | <i>R19 - HIGH BACK CURB INLET BOX</i> |
| <i>R3 - 99' WIDE ROADWAY CROSS-SECTION (WITH CURB)</i> | <i>R20 - HIGH BACK CURB INLET BOX</i> |
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| <i>R7 - MEANDERING SIDEWALK</i> | <i>R24 - HIGH BACK CURB INLET BOX</i> |
| <i>R8 - UTILITY TRENCH</i> | <i>R25 - HIGH BACK CURB INLET BOX</i> |
| <i>R9 - PAVEMENT PATCHING DETAILS</i> | <i>R26 - CULVERT COMPACTION & BACKFILL</i> |
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| <i>R14 - PEDESTRIAN ACCESS DETAILS (SWALE)</i> | <i>R31 - EXCELSIOR MAT INSTALLATION</i> |
| <i>R15 - DRIVEWAY DETAILS</i> | <i>R32 - STRAW BALE INSTALL FOR EROSION CONTROL</i> |
| <i>R16 - CONCRETE PAVEMENT JOINTS</i> | <i>R33 - SILT FENCE DETAIL</i> |
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SEWER & WATER CROSSINGS GOVERNED BY RULE 309 OF DRINKING WATER REGULATIONS

NOTES:

1. SANITARY SEWER LINES MAY VARY FROM THE LOCATION SHOWN. IN NO CASE SHALL THE SANITARY SEWER OR LATERAL BE LAID LESS THAN 10 FEET FROM A PARALLELING POTABLE WATER LINE (INCLUDING SERVICE LINES). ALL SEWER LINES AND MANHOLES SHALL BE INSTALLED AT A MINIMUM OF 4 FEET FROM THE EDGE OF ALL CURBS AND GUTTERS WHEREVER POSSIBLE. SANITARY SEWER LINES SHALL BE INSTALLED ON THE EAST AND NORTH SIDE OF STREET.
2. WHEN A SANITARY SEWER AND A WATER LINE CROSS, THE TOP OF THE SANITARY SEWER SHALL BE NO LESS THAN 18 INCHES BELOW THE BOTTOM OF THE WATER LINE. SEE RULE 309-211 OF UTAH'S PUBLIC DRINKING WATER REGULATIONS.
3. WATER VALVES AND FIRE HYDRANTS SHALL BE LOCATED AS APPROVED BY THE CITY (5 FOOT MINIMUM SEPARATION BETWEEN WATER LINE AND ANY OTHER UTILITY).
4. NO WATER LINE SMALLER THAN 8 INCH DIAMETER SHALL BE INSTALLED WITHOUT APPROVAL OF THE CITY. NO WATER CONNECTION SHALL BE MADE WITHOUT APPROVAL OF THE CITY.
5. SIDEWALK ON BOTH SIDES OF THE STREET MAY BE REQUIRED BY THE CITY.
6. CURB AND GUTTER ON BOTH SIDES OF THE STREET MAY BE REQUIRED BY THE CITY.
7. ROADS TO BE GRADE TO SUBGRADE PRIOR TO INSTALLATION OF WATER & SEWER UTILITY LINES.
8. SEWER LINES TO DEAD END WITH MANHOLE UNLESS OTHERWISE SPECIFIED BY CITY ENGINEER.



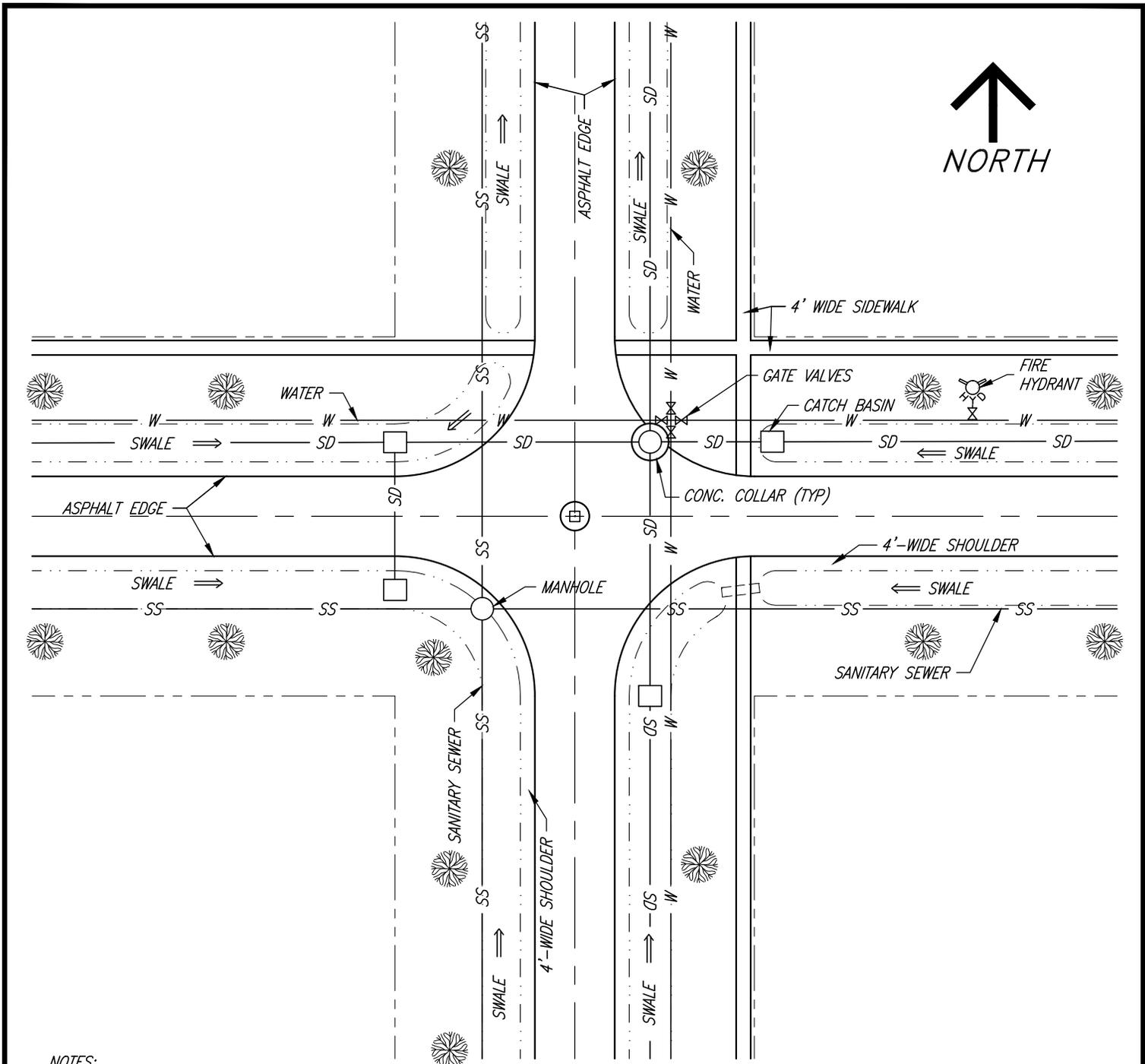
CONSULTING ENGINEERS

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South Ogden, Utah 84403 (801) 476-9767

WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

TYPICAL INTERSECTION WITH CURB & GUTTER

SHEET:
R1
OF 1 SHEETS
0



NOTES:

1. SANITARY SEWER LINES MAY VARY FROM THE LOCATION SHOWN. IN NO CASE SHALL THE SANITARY SEWER OR LATERAL BE LAID LESS THAN 10 FEET FROM A PARALLELING POTABLE WATER LINE (INCLUDING SERVICE LINES).
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5. ROADS TO BE GRADED TO SUBGRADE PRIOR TO INSTALLATION OF WATER & SEWER UTILITY LINES.
6. SEWER LINES TO DEAD END WITH MANHOLE UNLESS OTHERWISE SPECIFIED BY CITY ENGINEER.



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**WELLSVILLE CITY CORPORATION
 ROAD IMPROVEMENTS STANDARDS**

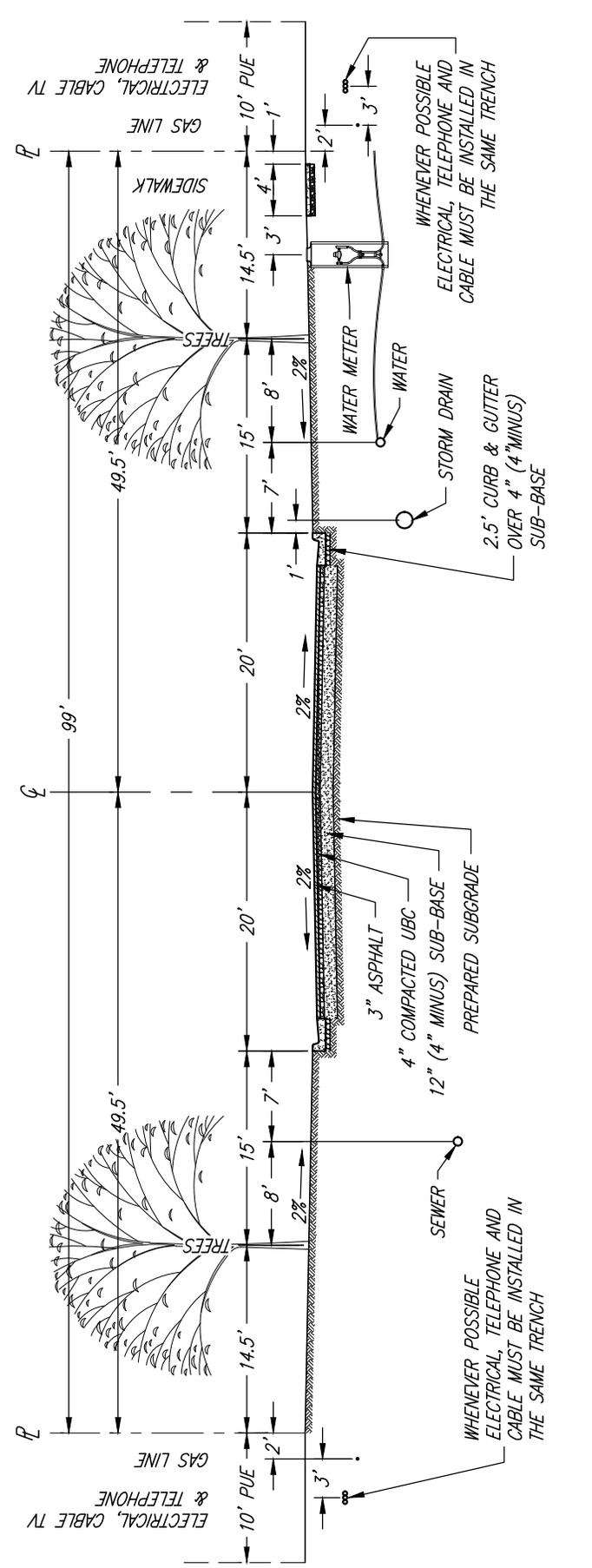
TYPICAL INTERSECTION WITHOUT CURB

SHEET:

R2

OF 1 SHEETS
 0

NOTE:
ROADS TO BE GRADED TO SUBGRADE PRIOR TO
INSTALLATION OF WATER & SEWER UTILITY LINES



99' ROADWAY CROSS-SECTION (WITH CURB)

N.T.S.



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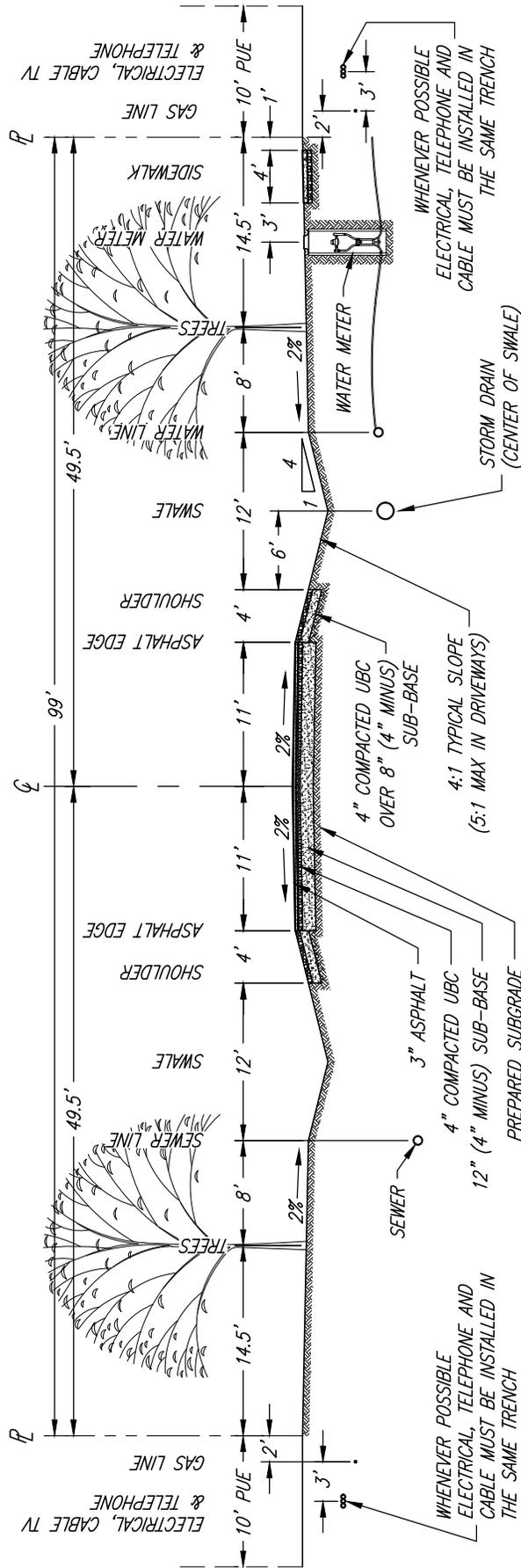
1716 East 5600 South
South Ogden, Utah 84403 (801) 476-9767

WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

99' WIDE ROADWAY CROSS-SECTION (WITH CURB)

SHEET:
R3
OF 1 SHEETS
0

NOTE:
ROADS TO BE GRADED TO SUBGRADE PRIOR TO
INSTALLATION OF WATER & SEWER UTILITY LINES



99' ROADWAY CROSS-SECTION

N.T.S.



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

99' WIDE ROADWAY CROSS-SECTION

SHEET:

R4

OF 1 SHEETS

0

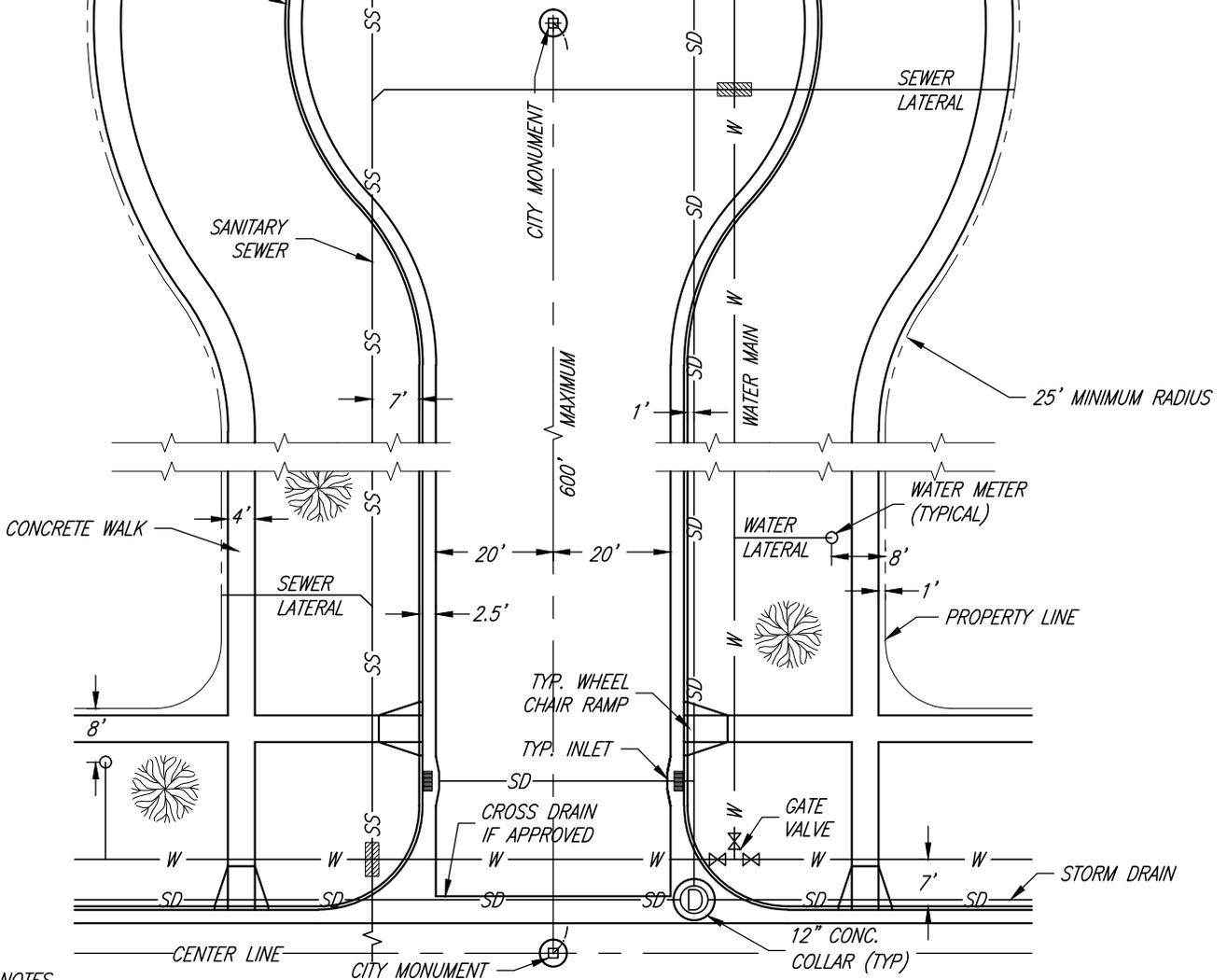
SEWER & WATER CROSSINGS GOVERNED BY RULE 309 OF DRINKING WATER REGULATIONS

TYP. CONCRETE CURB & GUTTER

FIRE HYDRANT (SEE NOTE BELOW)

DOUBLE INLET CATCH BASIN (SEE NOTE BELOW)

100' MINIMUM DIAMETER OF ASPHALT



GENERAL NOTES

1. IF CUL-DE-SAC IS LOCATED AT A HIGH POINT, INSTALL A FIRE HYDRANT. AT A LOW POINT, HYDRANT NEED IS DETERMINED BY SPACING.
2. IF CUL-DE-SAC IS LOCATED AT A LOW POINT A DOUBLE INLET CATCH BASIN IS REQUIRED.
3. THE MAXIMUM ALLOWABLE LENGTH OF A CUL-DE-SAC MUST BE 600- FEET AND THE MINIMUM ASPHALT RADIUS MUST BE 50- FEET.
4. ROADS TO BE GRADED TO SUBGRADE PRIOR TO INSTALLATION OF WATER & SEWER UTILITY LINES.
5. SEWER LINES TO DEAD END WITH MANHOLE UNLESS OTHERWISE SPECIFIED BY CITY ENGINEER.



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

TYPICAL CUL-DE-SAC WITH CURB

SHEET:

R5

OF 1 SHEETS

0

SUBDIVISION BOUNDARY

SEWER & WATER CROSSINGS GOVERNED BY RULE 309 OF DRINKING WATER REGULATIONS

FIRE HYDRANT (SEE NOTE BELOW)

DOUBLE INLET CATCH BASIN (SEE NOTE BELOW)

100' MINIMUM DIAMETER OF ASPHALT REQUIRED

12' LANDSCAPED DRAINAGE SWALE

17.5' LANDSCAPE

4' SHOULDER

177'

SEWER LATERAL

CITY MONUMENT

600' MAXIMUM BETWEEN MONUMENTS

SANITARY SEWER

16'

16'

WATER MAIN

25' MINIMUM RADIUS

CONCRETE WALK

4'

SEWER LATERAL

4'

SHOULDER

8'

WATER LATERAL

WATER METER (TYPICAL)

8'

1'

PROPERTY LINE

TYP. WHEEL CHAIR RAMP

CULVERT

11'

11'

GATE VALVE

STORM DRAIN

10' ϕ OF DITCH

TYP. INLET

SD MANHOLE (TYP)

CENTER LINE

CITY MONUMENT

GENERAL NOTES

1. IF CUL-DE-SAC IS LOCATED AT A HIGH POINT, INSTALL A FIRE HYDRANT. AT A LOW POINT, HYDRANT NEED IS DETERMINED BY SPACING.
2. IF CUL-DE-SAC IS LOCATED AT A LOW POINT A DOUBLE INLET CATCH BASIN IS REQUIRED.
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4. ROADS TO BE GRADED TO SUBGRADE PRIOR TO INSTALLATION OF WATER & SEWER UTILITY LINES.
5. SEWER LINES TO DEAD END WITH MANHOLE UNLESS OTHERWISE SPECIFIED BY CITY ENGINEER.



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

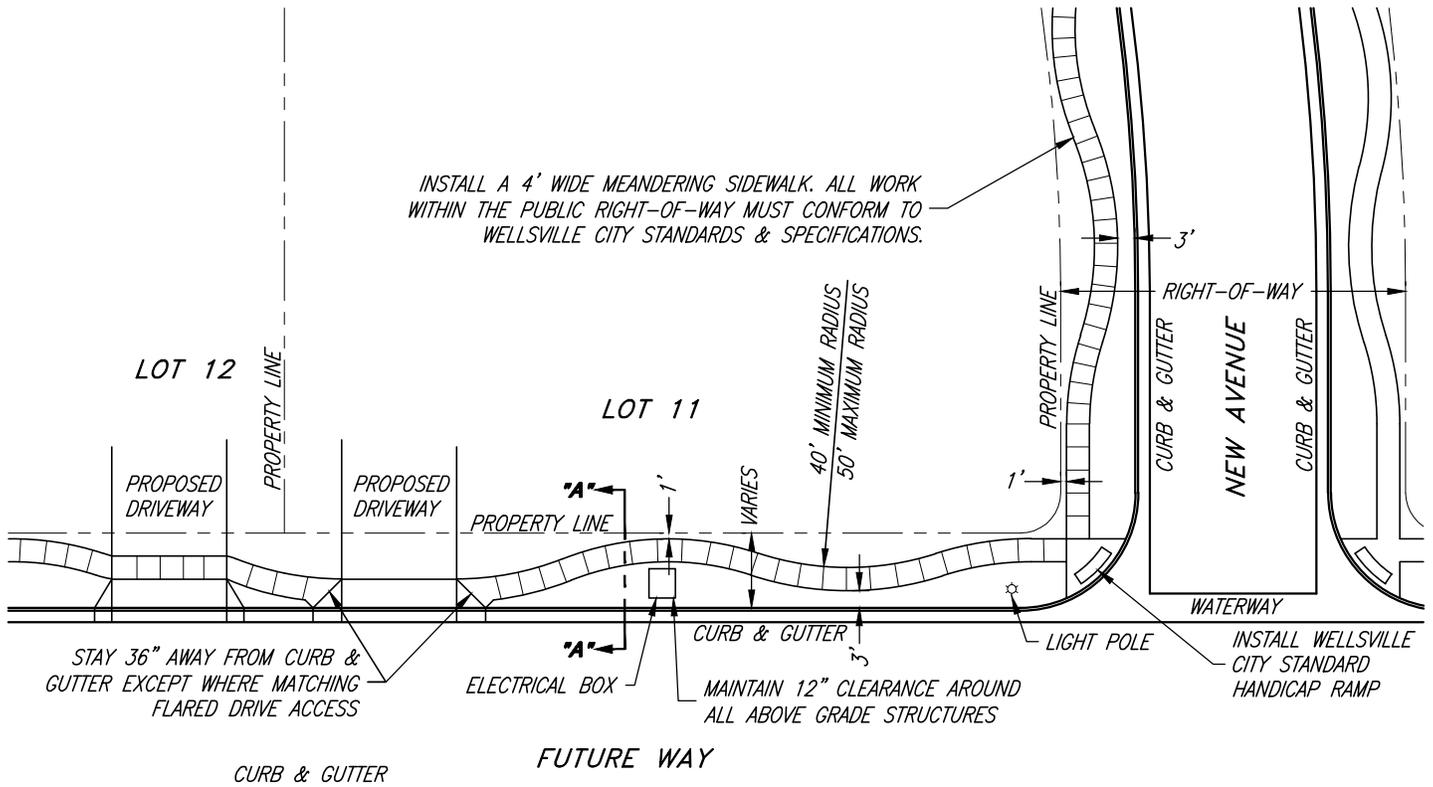
CUL-DE-SAC DETAIL WITHOUT CURB

SHEET:

R6

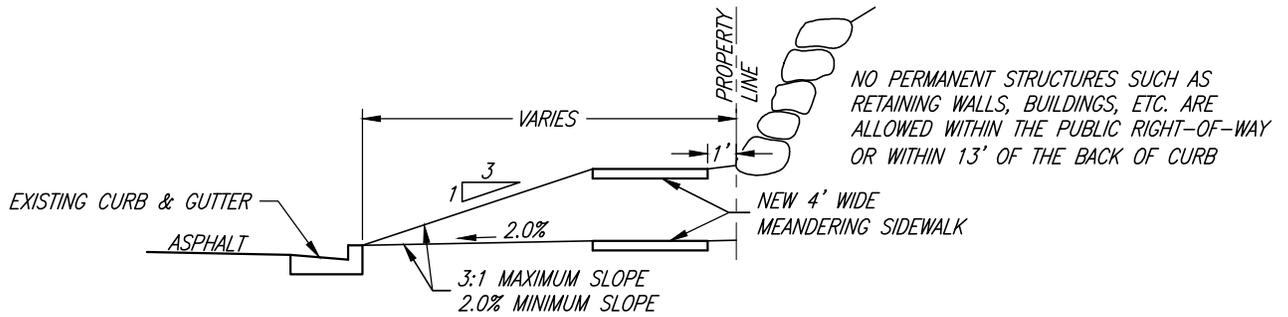
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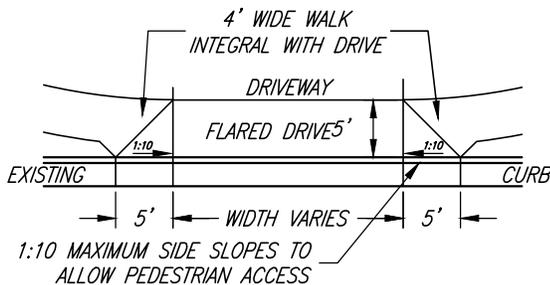
MEANDERING SIDEWALK-TYPICAL LAYOUT (PLAN VIEW)

N.T.S.



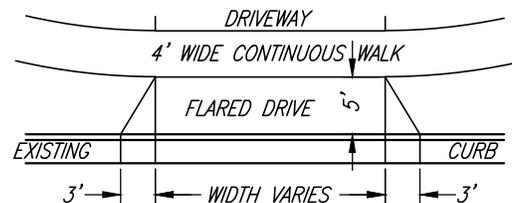
CROSS SECTION "A-A"

N.T.S.



FLARED DRIVE APPROACH W/ INTEGRAL WALK

N.T.S.



FLARED DRIVE APPROACH W/ CONTINUOUS WALK

N.T.S.



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**WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS**

MEANDERING SIDEWALK

SHEET:

R7

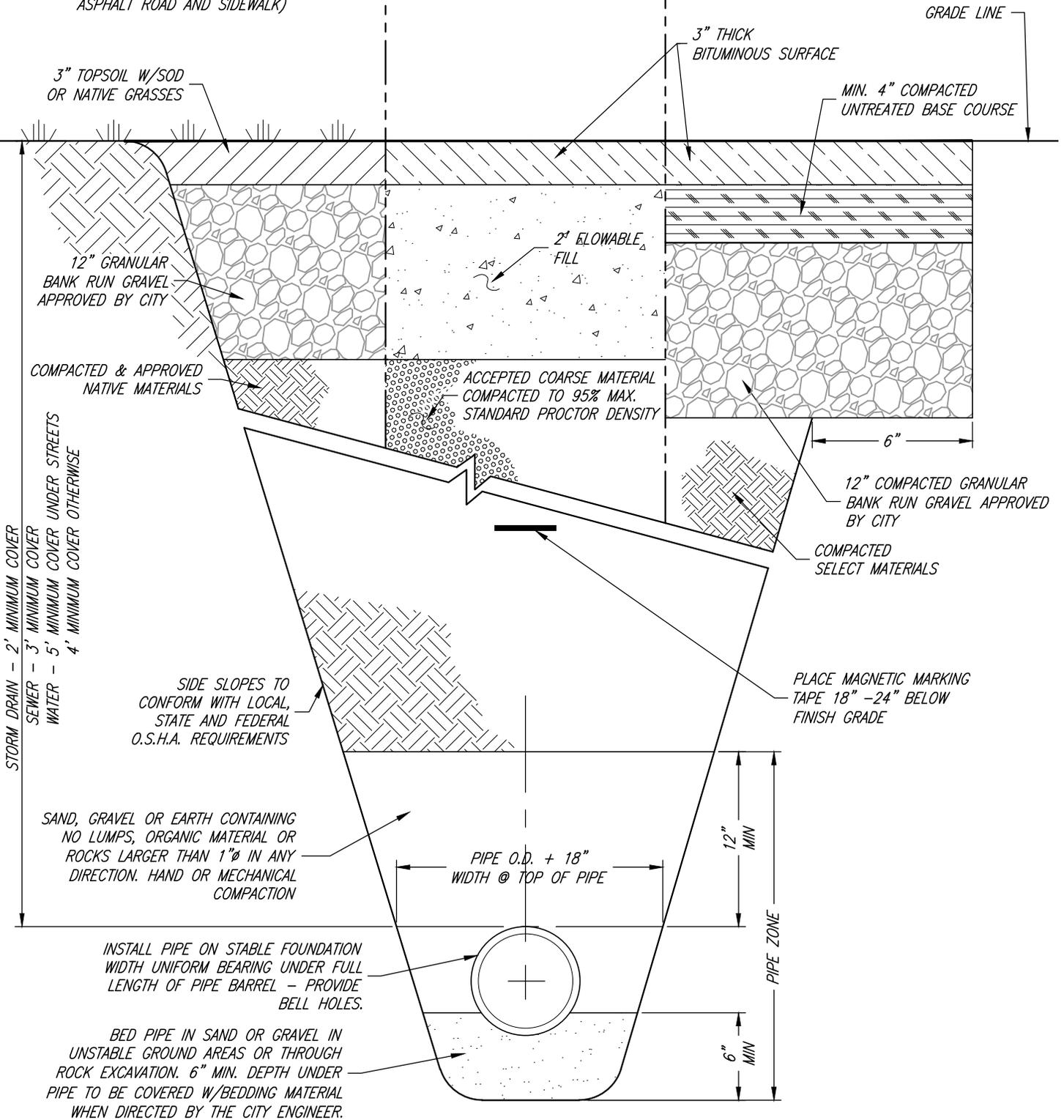
OF 1 SHEETS

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LANDSCAPE AREA
(LOCATED BETWEEN
ASPHALT ROAD AND SIDEWALK)

EXIST. ROAD

NEW ROAD



NOTES:

1. UTILITIES CROSSING ACROSS EXISTING CITY AND STATE ROADS SHALL BE BORED AND CASED. OPEN TRENCHING ACROSS CITY ROADS MUST BE APPROVED BY THE CITY, OPEN TRENCHING ACROSS STATE ROADS MUST BE APPROVED BY UDOT.
2. WATER LINES TO MAINTAIN MINIMUM OF 10' HORIZONTAL AND 18' VERTICAL SEPARATION FROM ALL EXIST. AND FUTURE SEWER LINES.



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

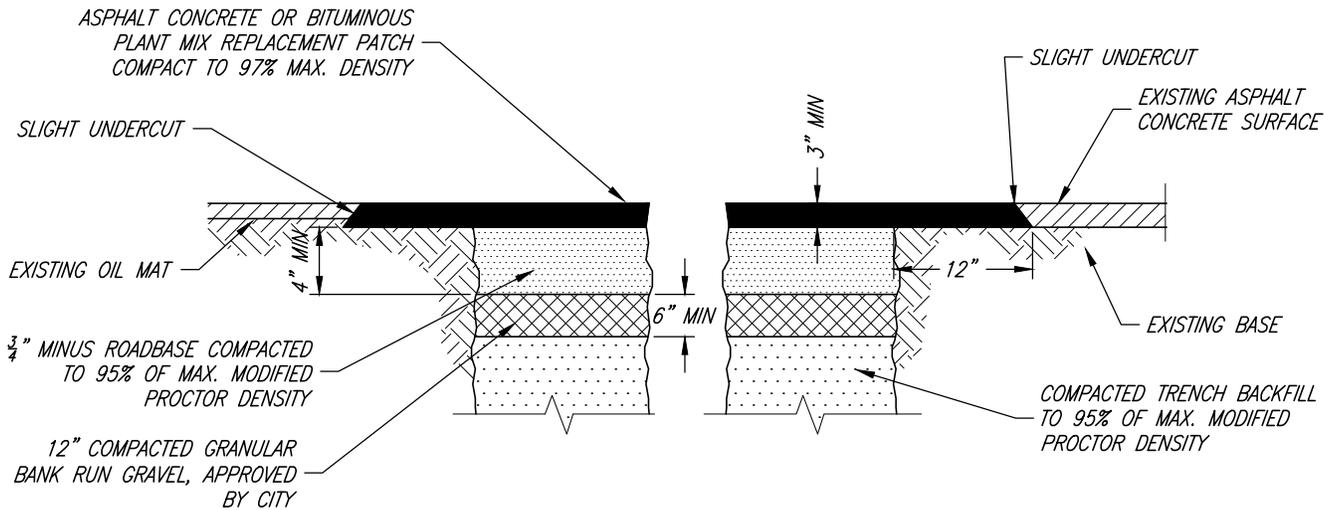
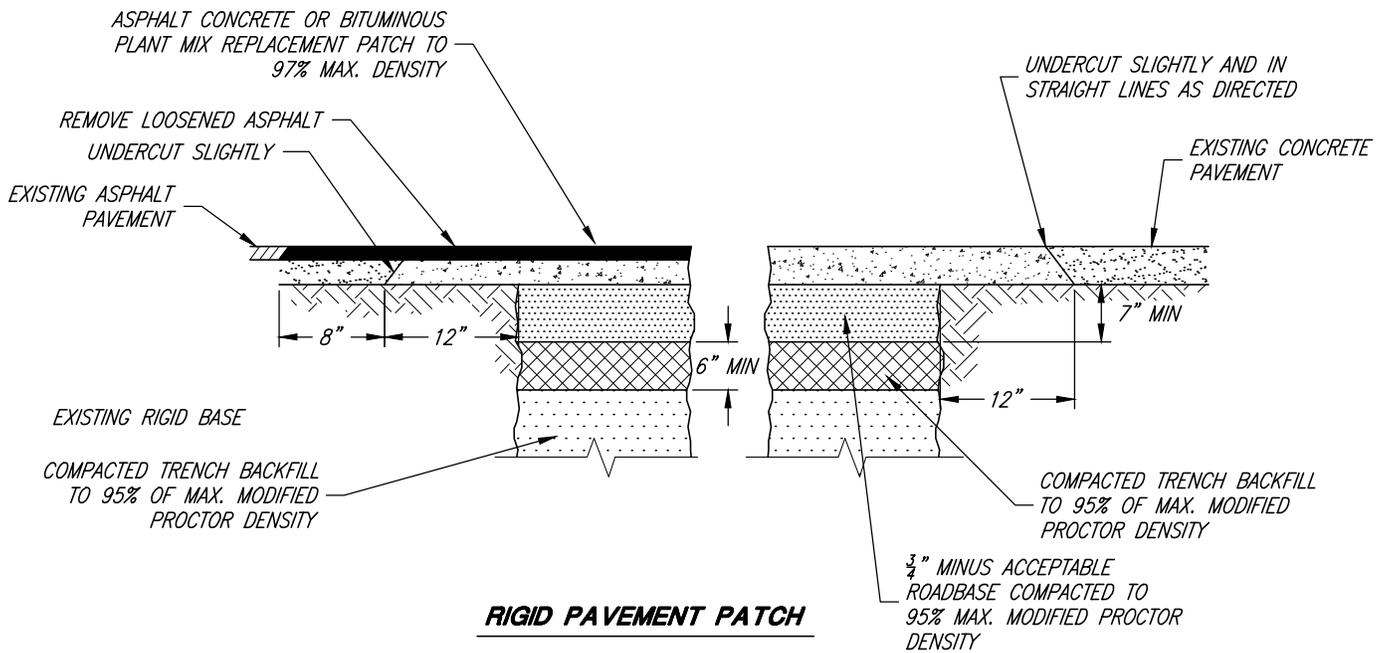
UTILITY TRENCH

SHEET:

R8

OF 1 SHEETS

0



GENERAL NOTE:

CONCRETE MIX SHALL BE CLASS 4000 HIGH EARLY STRENGTH CONCRETE MEETING THE REQUIREMENTS OF THESE SPECIFICATIONS.



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

PAVEMENT PATCHING DETAILS

SHEET:

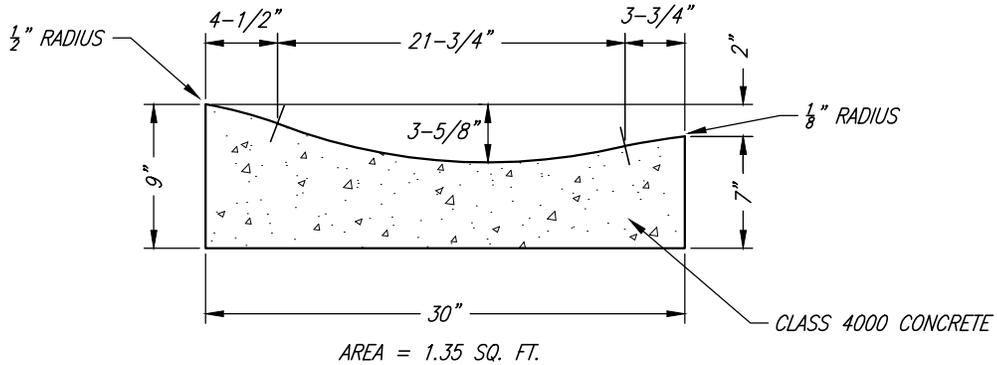
R9

OF 1 SHEETS

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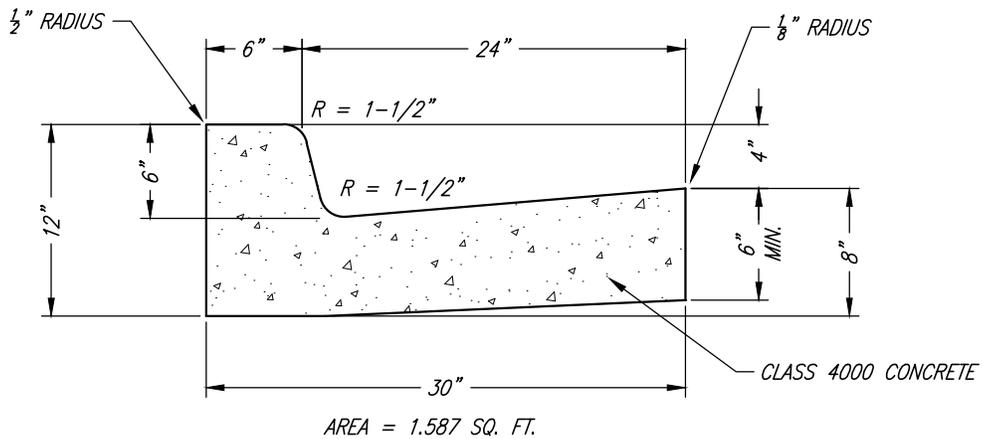
NOTE:

MAX 10' TOOLED CONTROL JOINTS, EXPANSION JOINTS AT 50 FEET UNLESS OTHERWISE APPROVED.



ROLL GUTTER

TO BE USED ONLY IN SPECIAL CONDITIONS APPROVED BY THE CITY



HIGH-BACK CURB & GUTTER

(TYPE A)

NOTES:

1. ALL FORMED SURFACES SHALL BE FINISHED WITH NO HONEYCOMBING
2. PROVIDE 1/2 INCH RADIUS ON CONCRETE EDGES EXPOSED TO PUBLIC VIEW
3. ALL CURB & GUTTER IS TO BE BEDDED WITH A MIN OF 4" OF UNTREATED BASE COURSE. DO NOT USE GRAVEL OR SEWER ROCK



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

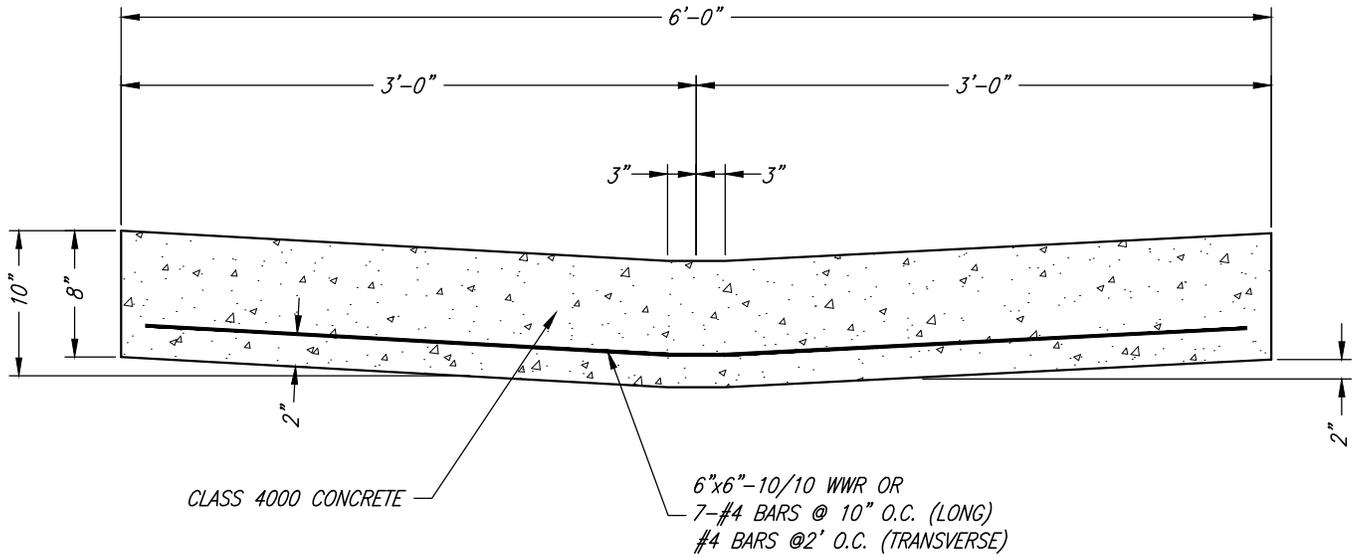
CURB AND GUTTER DETAILS

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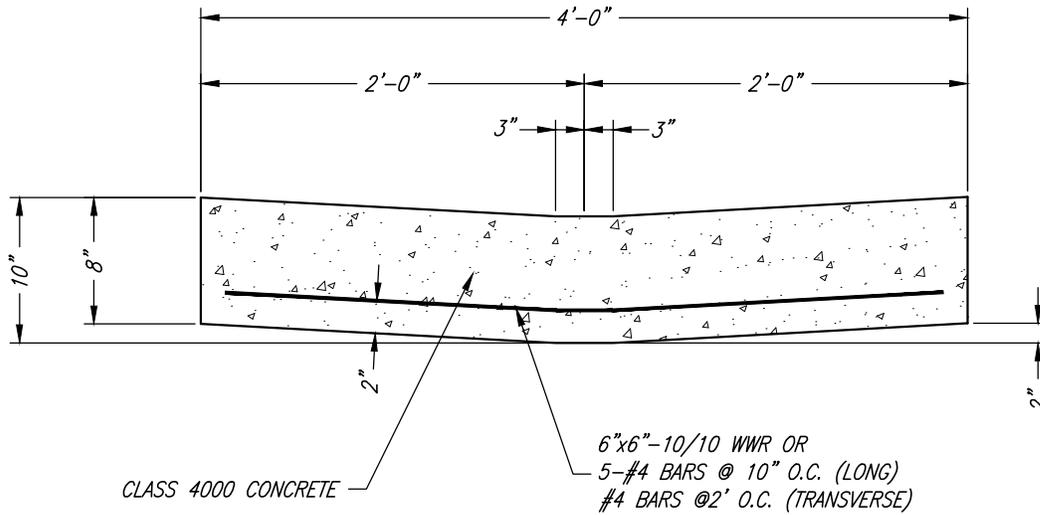
R10

OF 1 SHEETS

0



6' WATERWAY AT INTERSECTION



4' WATERWAY AT INTERSECTION

NOTE:

ALL DRAIN GUTTER IS TO BE BEDDED WITH MIN. OF 4" OF UNTREATED COMPACTED BASE COURSE. DO NOT USE GRAVEL OR SEWER ROCK



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**WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS**

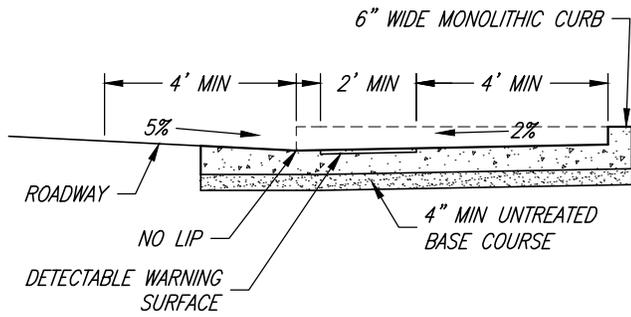
WATERWAY DETAILS

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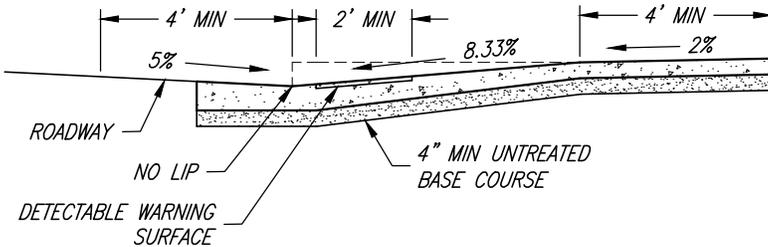
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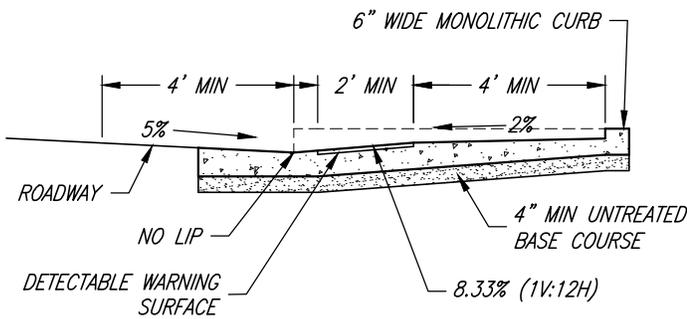
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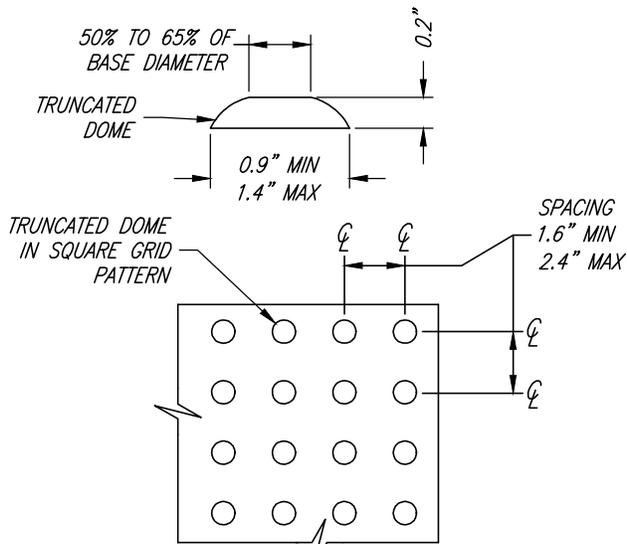
SECTION A-A



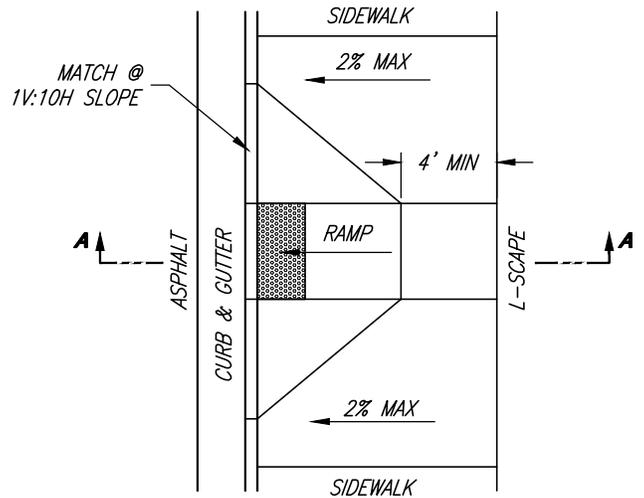
SECTION B-B



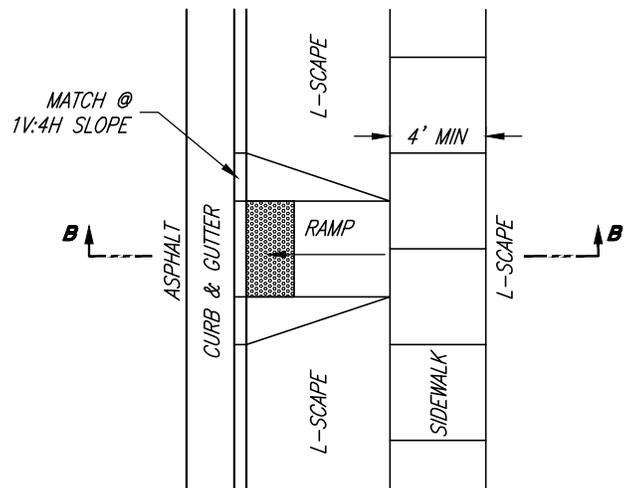
SECTION C-C



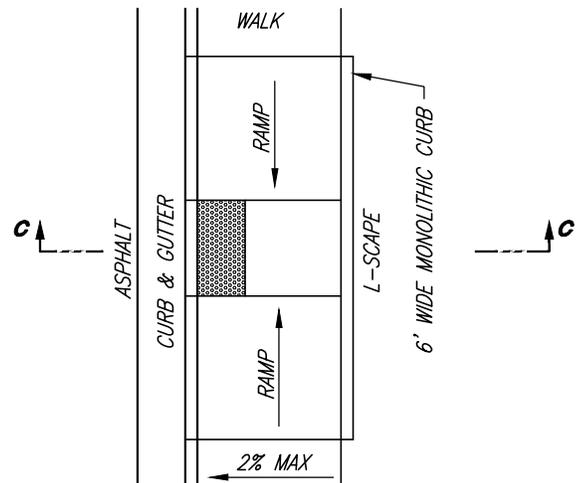
TRUNCATED DOME DETAIL



PERPENDICULAR PEDESTRIAN RAMP



PERPENDICULAR PEDESTRIAN RAMP



PARALLEL PEDESTRIAN RAMP

NOTE: CONTRACTOR TO SUBMIT DETECTABLE WARNING SURFACE PAVER, RIBBED PANEL, OR TILE DETAIL FOR CITY APPROVAL



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**WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS**

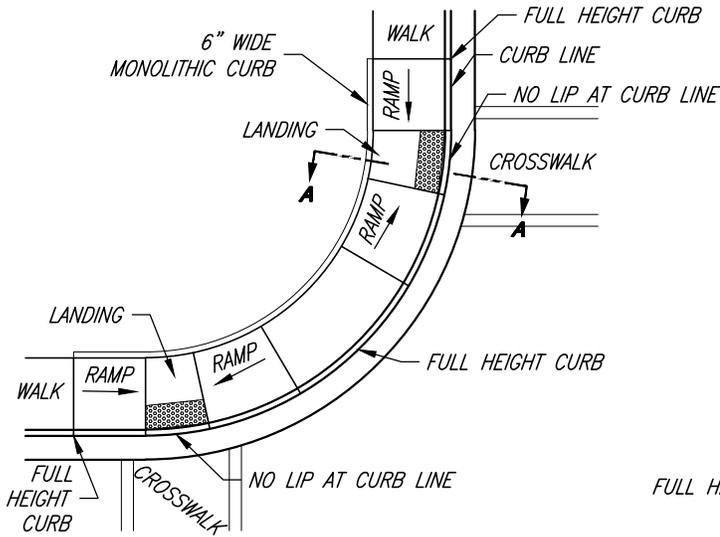
HANDICAP RAMP DETAILS

SHEET:

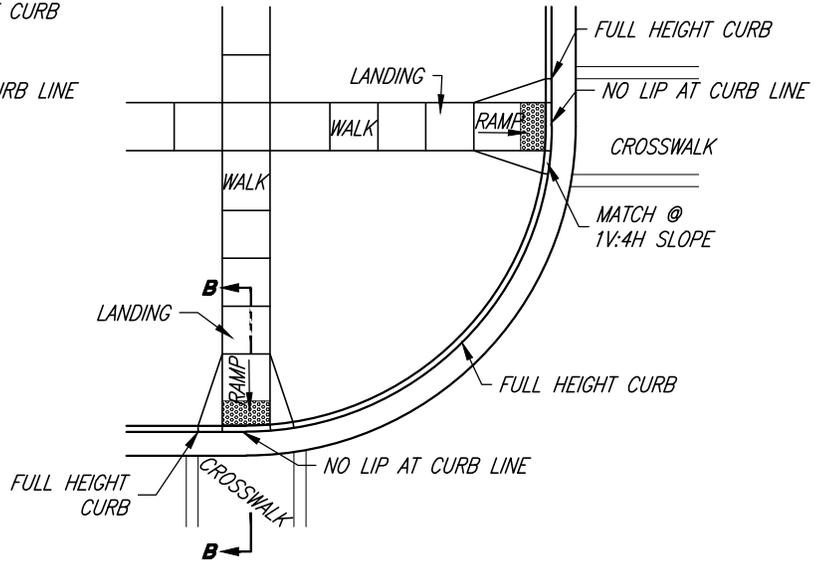
R12

OF 1 SHEETS

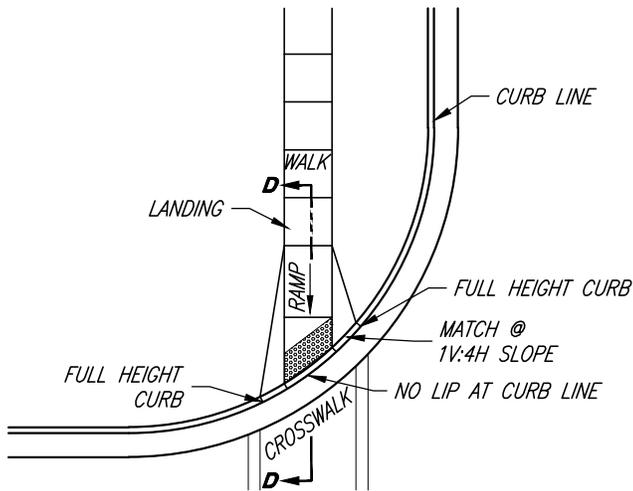
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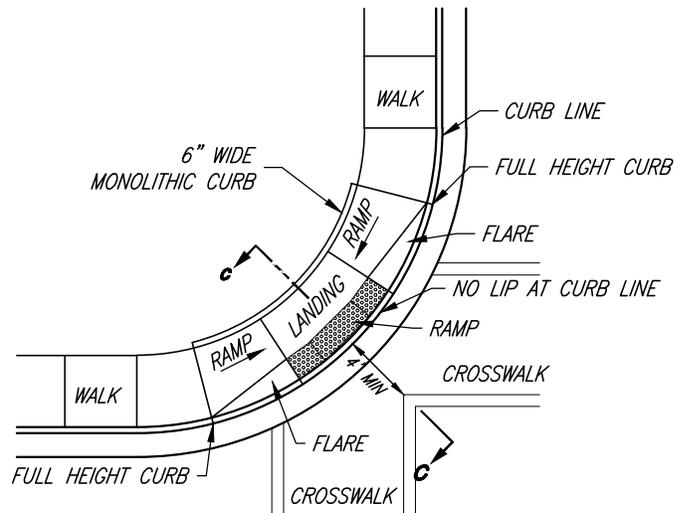
CORNER PEDESTRIAN RAMP (TWO RAMPS)



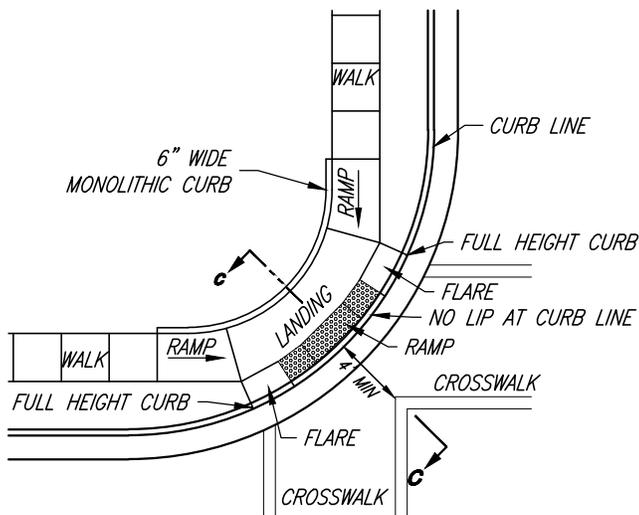
CORNER PEDESTRIAN RAMP (TWO RAMPS)



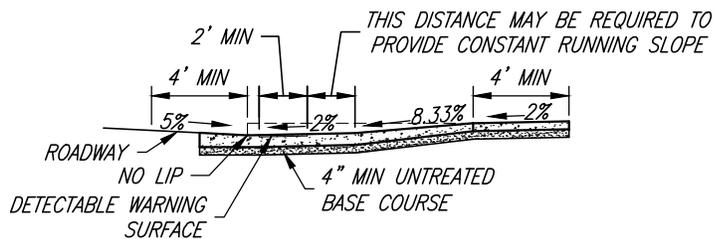
CORNER PEDESTRIAN RAMP (ONE RAMPS)



CORNER PEDESTRIAN RAMP



CORNER PEDESTRIAN RAMP



SECTION D-D

NOTES:

CONTRACTOR TO SUBMIT DETECTABLE WARNING SURFACE PAVER, RIBBED PANEL, OR TILE DETAIL FOR CITY APPROVAL.

ACCESSIBLE ROUTES TO CONFORM TO FEDERAL GUIDELINES FOR HANDICAP AND PEDESTRIAN ACCESS.

ALL FLATWORK TO CONFORM TO WELLSVILLE CITY STANDARDS & SPECIFICATIONS



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

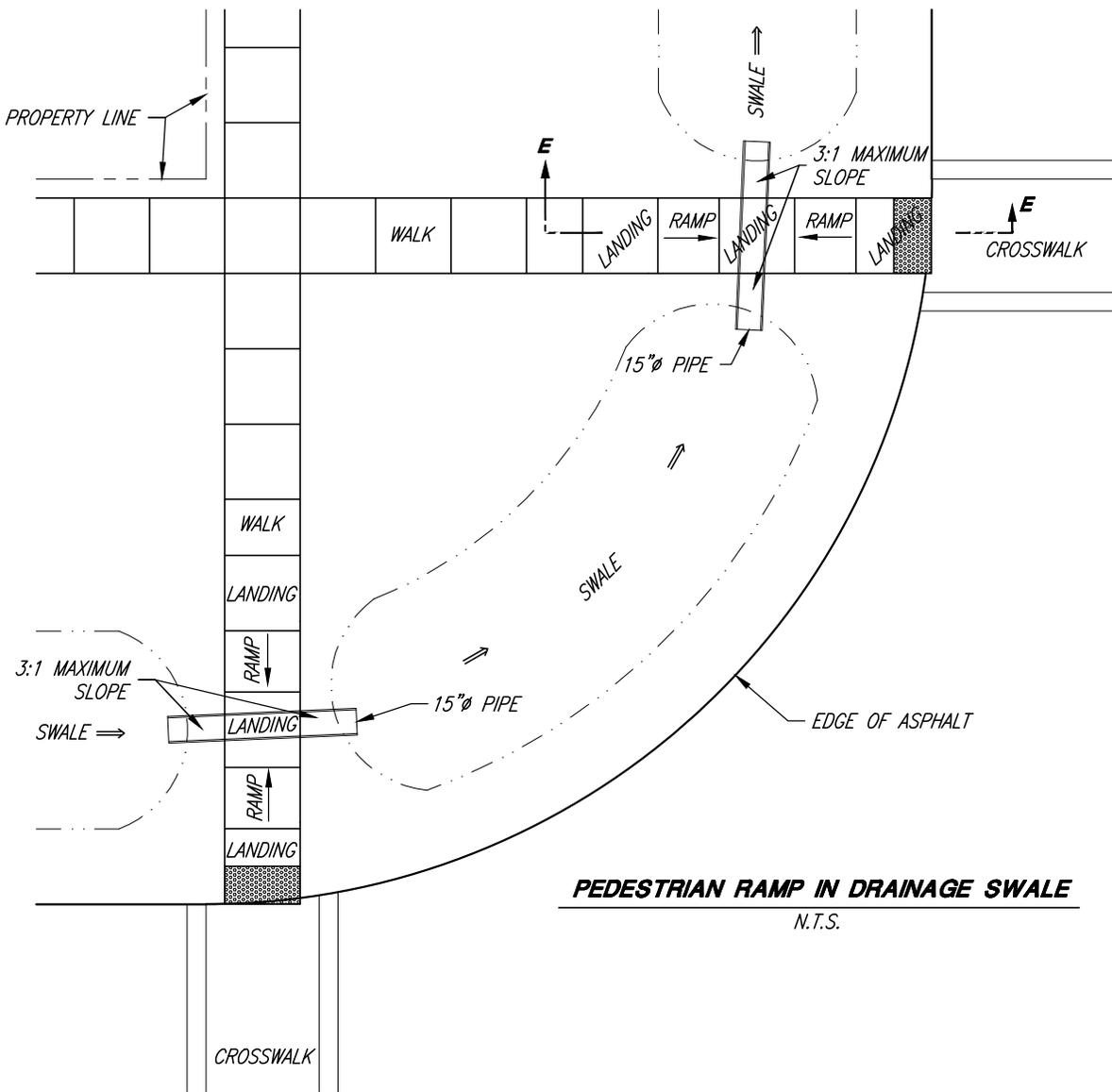
PEDESTRIAN ACCESS DETAILS

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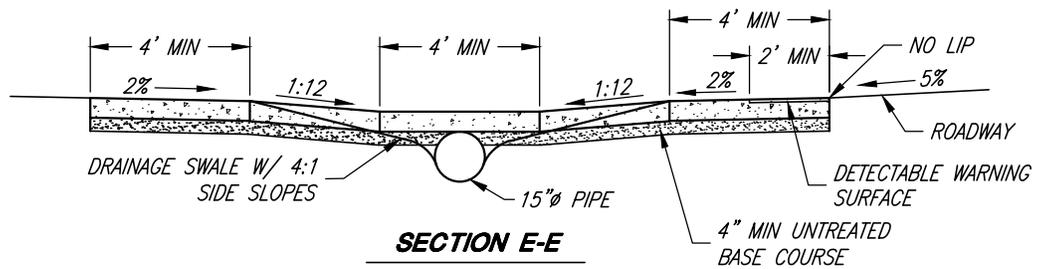
R13

OF 1 SHEETS

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PEDESTRIAN RAMP IN DRAINAGE SWALE
N.T.S.



SECTION E-E

NOTES:

CONTRACTOR TO SUBMIT DETECTABLE WARNING SURFACE PAVER, RIBBED PANEL, OR TILE DETAIL FOR CITY APPROVAL.

ACCESSIBLE ROUTES TO CONFORM TO FEDERAL GUIDELINES FOR HANDICAP AND PEDESTRIAN ACCESS.

ALL FLATWORK TO CONFORM TO WELLSVILLE CITY STANDARDS & SPECIFICATIONS



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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS

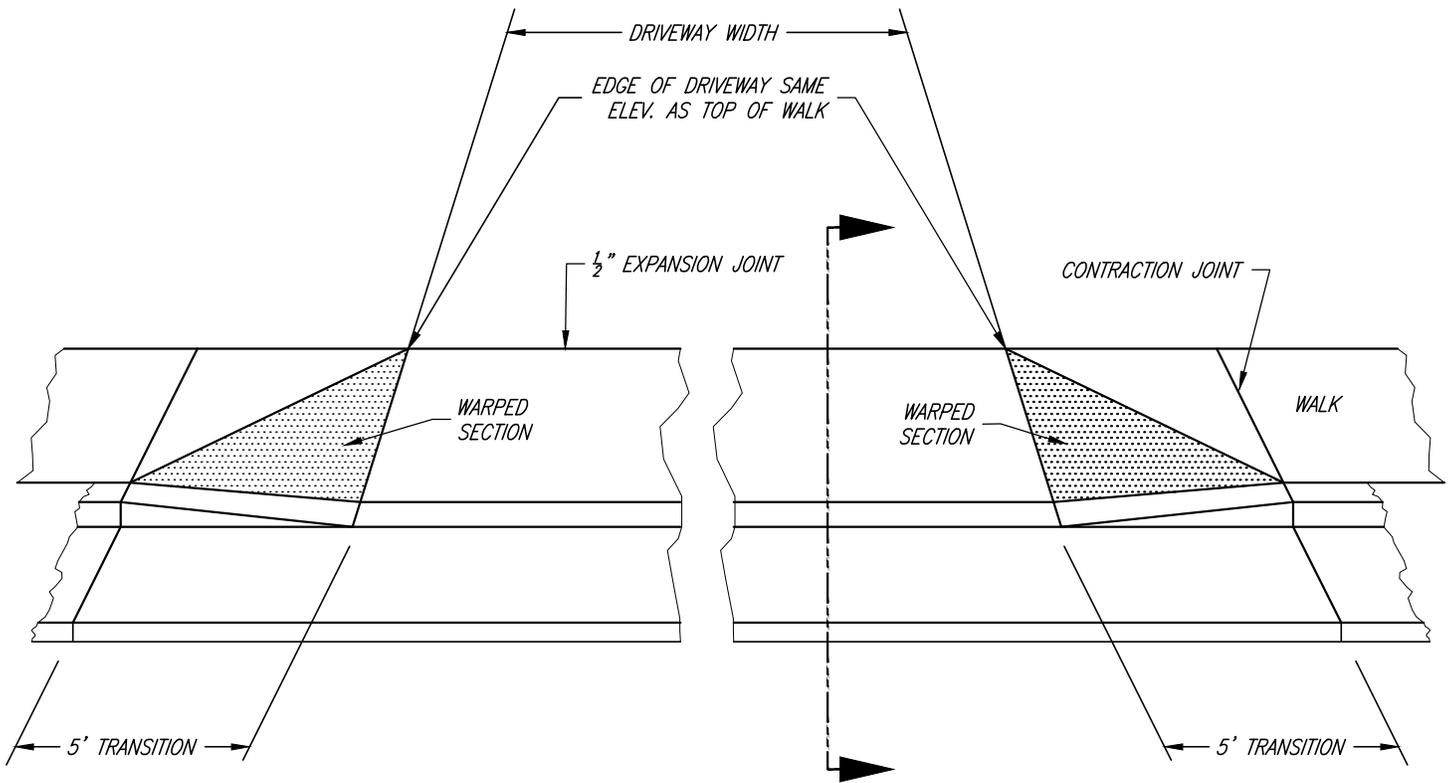
PEDESTRIAN ACCESS DETAILS (SWALE)

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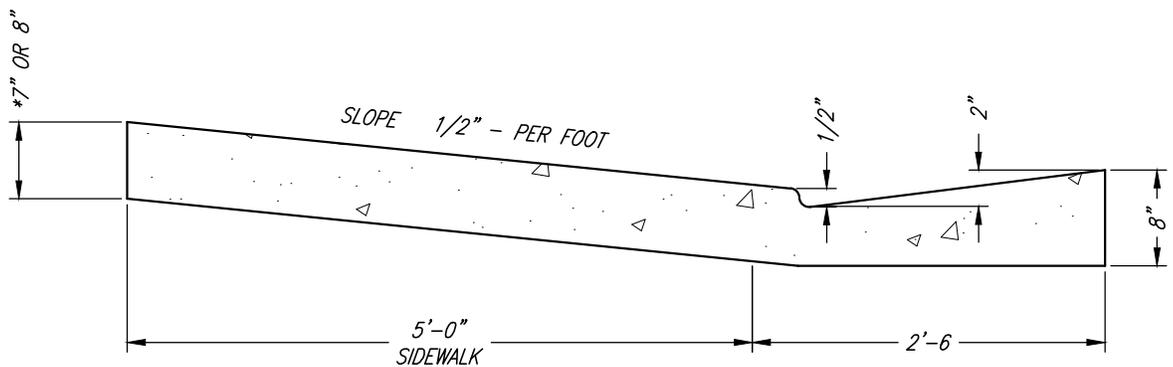
R14

OF 1 SHEETS

0



PERSPECTIVE VIEW



SECTION

***DRIVEWAY THICKNESS:**
 6" FOR RESIDENTIAL AREAS
 8" FOR COMMERCIAL AREAS
 AND PUBLIC ALLEYS

NOTE: ALL DRIVEWAYS ARE TO BE BEDDED WITH A MIN. OF 4" OF UNTREATED BASECOURSE.



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**WELLSVILLE CITY CORPORATION
 ROAD IMPROVEMENTS STANDARDS**

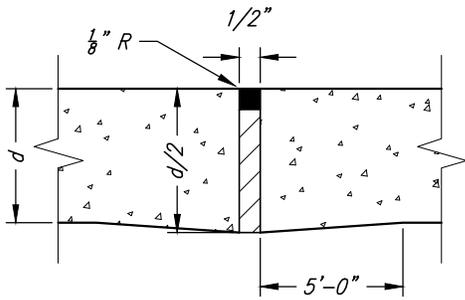
DRIVEWAY DETAIL

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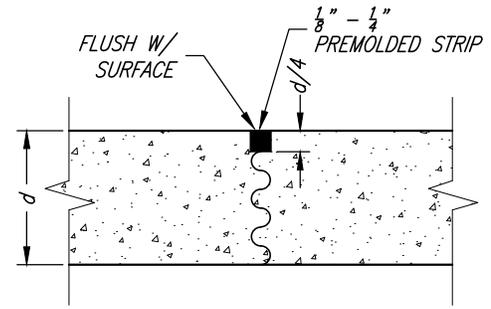
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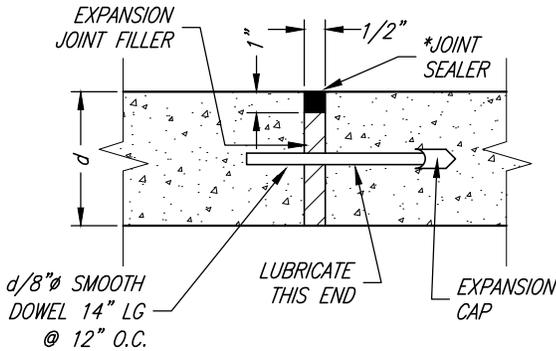
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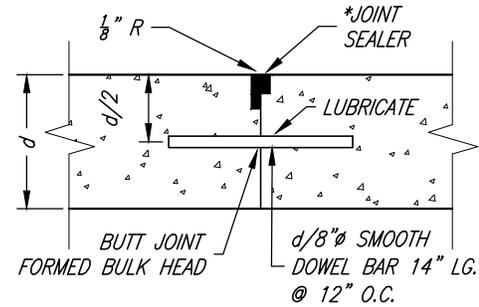
TYPE 'A' EXPANSION JOINT



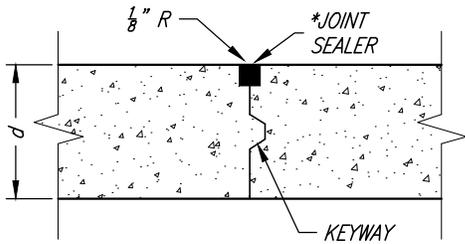
TYPE 'D' SAWED OR PREMOLDED STRIP LONGITUDINAL OR TRANSVERSE



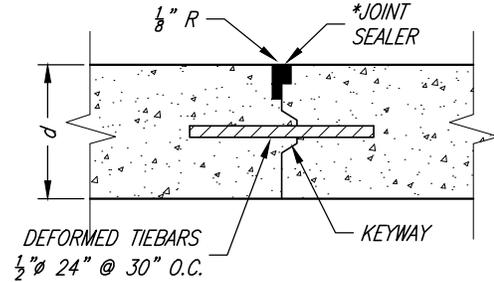
TYPE 'A' ALTERNATE EXPANSION JOINT



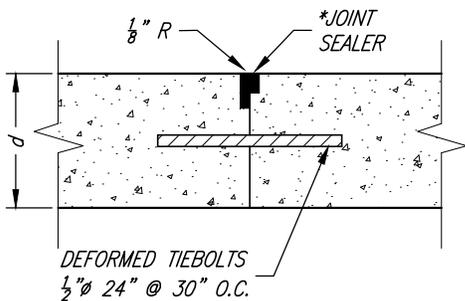
TYPE 'E' PLANNED TRAVERSE CONSTRUCTION JOINT



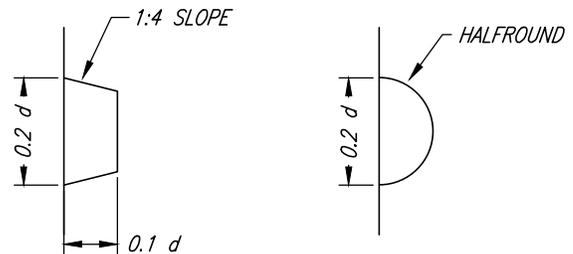
TYPE 'B' LONGITUDINAL CONSTRUCTION JOINT



TYPE 'F' EMERGENCY TRANSVERSE CONSTRUCTION JOINT



TYPE 'C' TIED BUTT LONGITUDINAL CONSTRUCTION JOINT



KEYWAYS FOR TYPED 'B' AND 'F'

**JOINT SEALER IS SUBJECT TO APPROVAL BY CITY ENGINEER AND DIRECTOR OF PUBLIC WORKS.*



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**WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS**

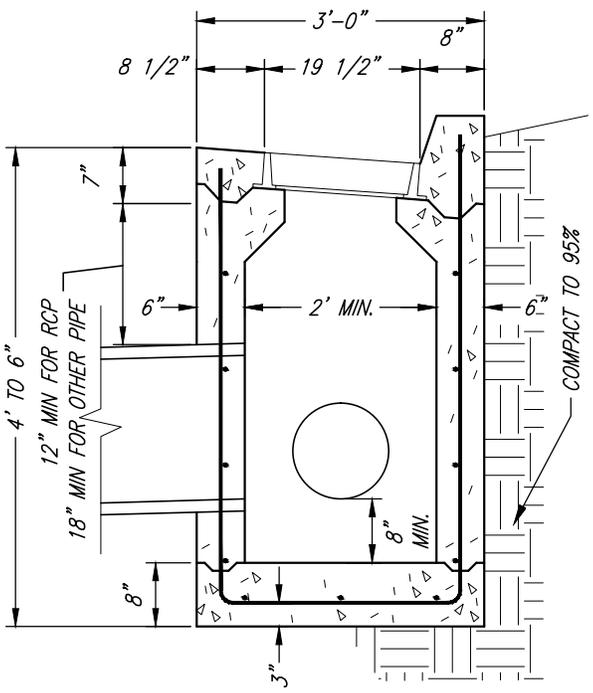
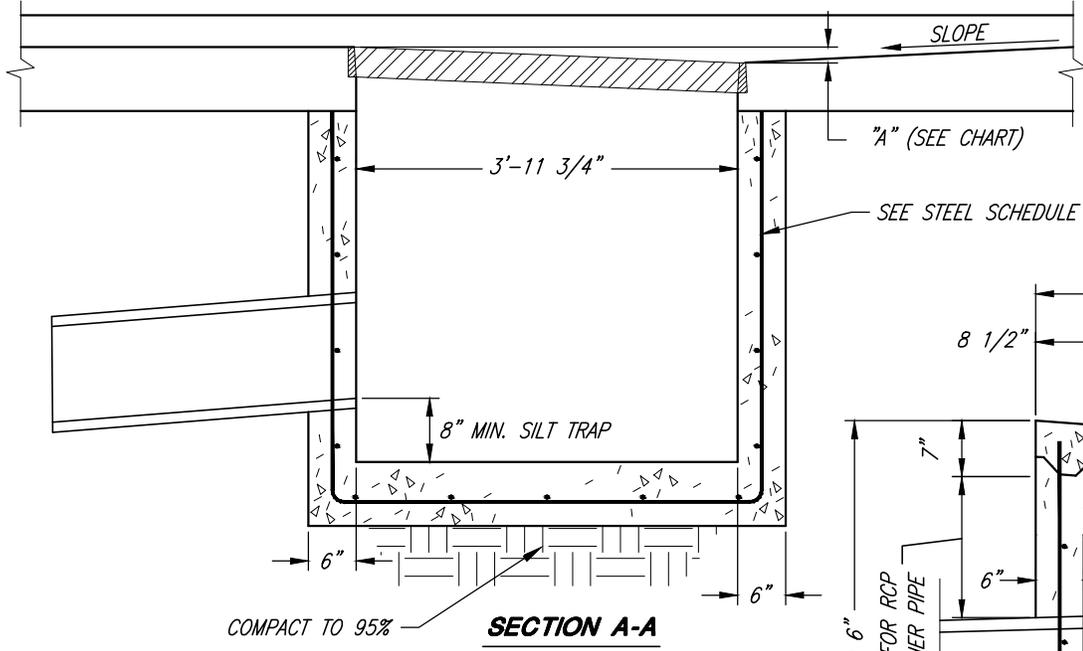
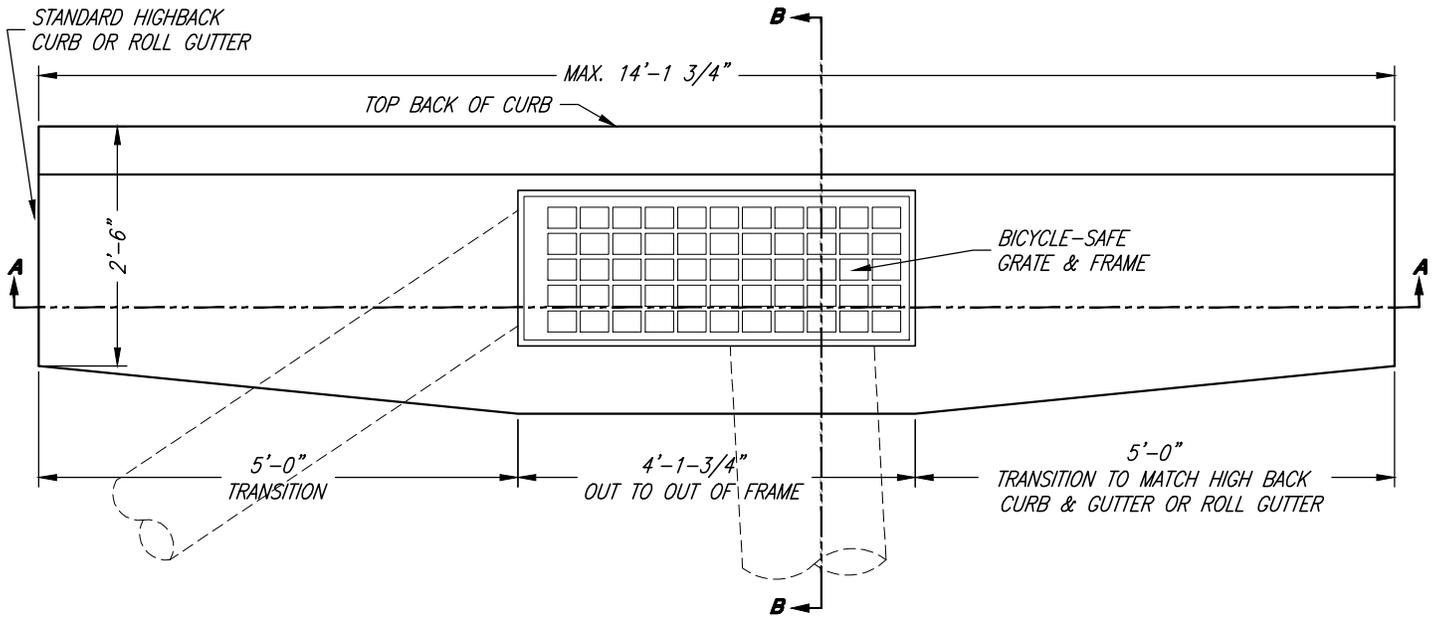
CONCRETE PAVEMENT JOINTS

SHEET:

R16

OF 1 SHEETS

0



SLOPE OF C&G	DISTANCE "A"
10-8%	2"
8-6%	1-1/2"
6-4%	1"
4-2%	1/2"
2-0%	0"

- NOTES:**
- THIS INLET BOX SHALL NOT BE USED WITHOUT EXPRESS APPROVAL OF THE PUBLIC WORKS DIRECTOR.
 - TOP TO BE POURED SEPARATE FROM WALLS. FLOOR MAY BE POURED WITH WALLS. ALL CONCRETE TO BE CLASS 4,000 WITH AIR ENTRAINMENT

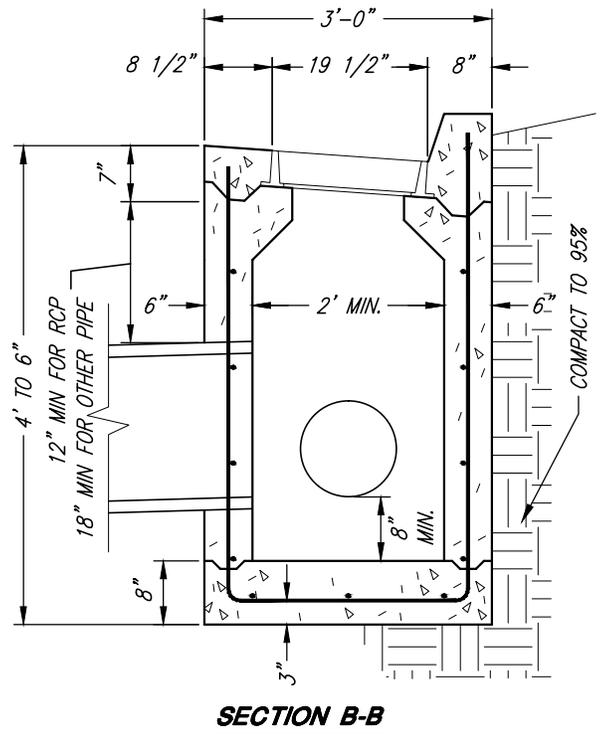
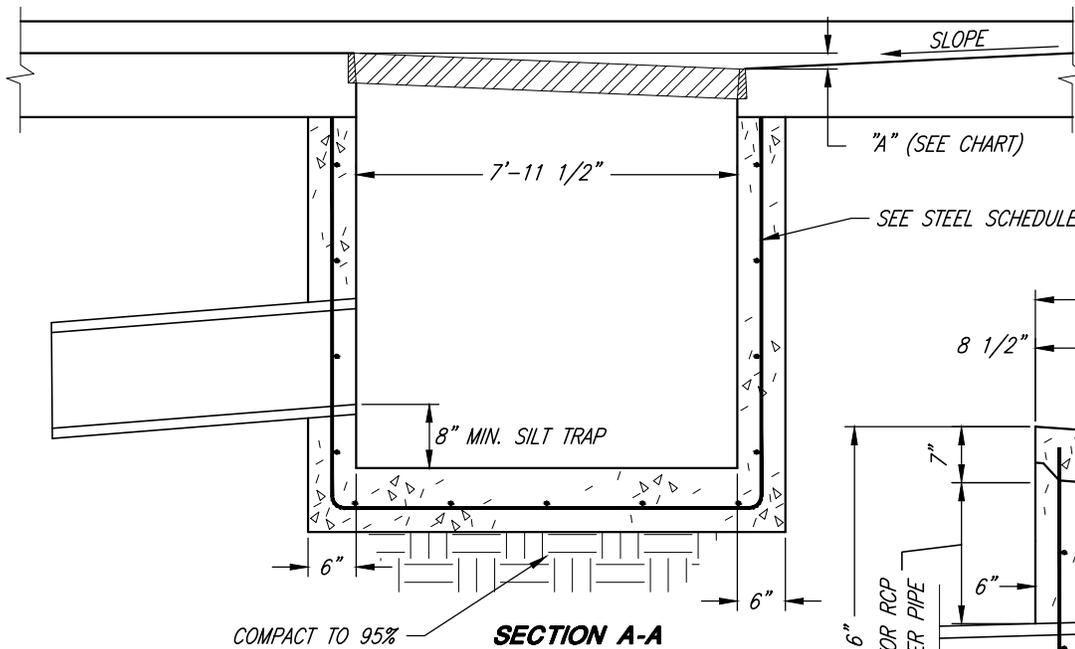
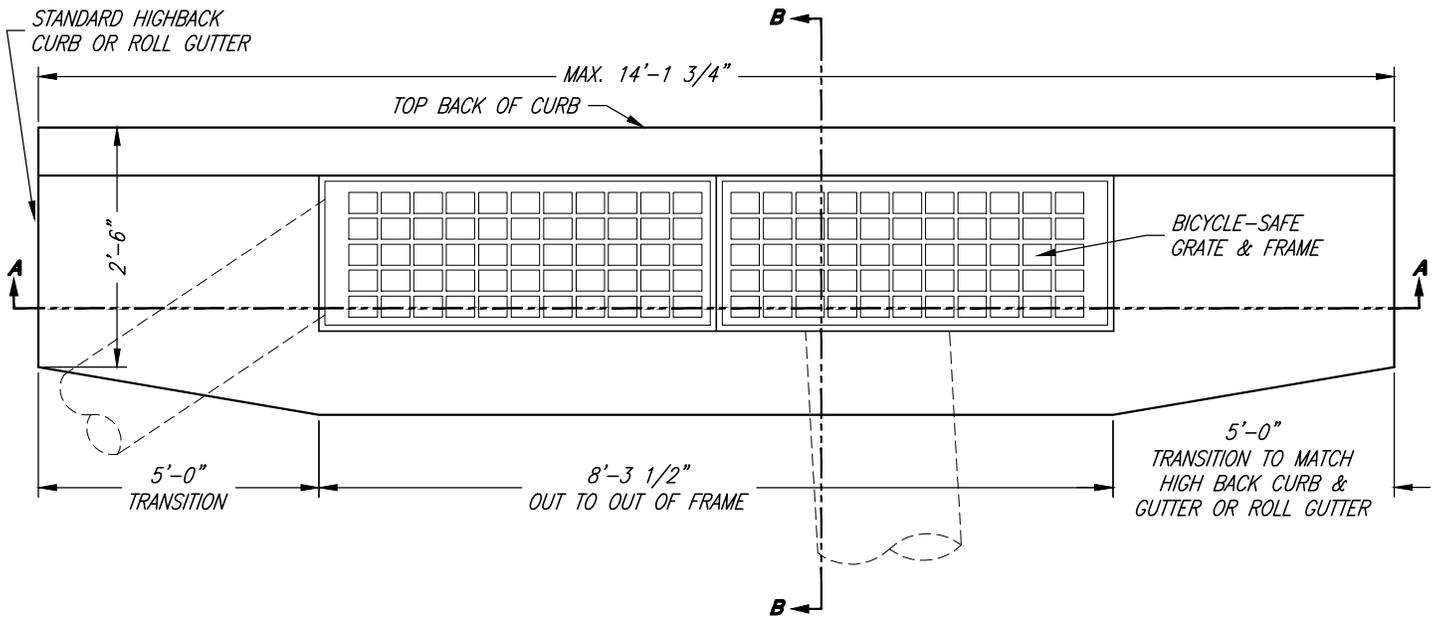
STEEL SCHEDULE

	VERT. STEEL	HORIZ. STEEL	WALL THICKNESS
0' TO 6'	#4@12" O.C.	#4@12" O.C.	6" WALL
6'-0" OR DEEPER, CHECK W/CITY ENGINEER			

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WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS
SINGLE GUTTER - INLET BOX

SHEET:
R17
 OF 1 SHEETS
 0



SLOPE OF C&G	DISTANCE "A"
10-8%	2"
8-6%	1-1/2"
6-4%	1"
4-2%	1/2"
2-0%	0"

NOTES:
 1. THIS INLET BOX SHALL NOT BE USED WITHOUT EXPRESS APPROVAL OF THE PUBLIC WORKS DIRECTOR.

STEEL SCHEDULE

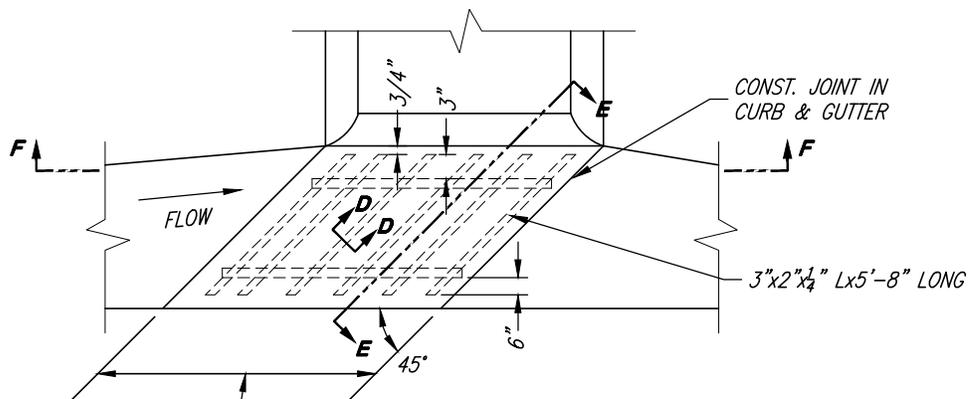
	VERT. STEEL	HORIZ. STEEL	WALL THICKNESS
0' TO 6'	#4@12" O.C.	#4@12" O.C.	6" WALL
6'-0" OR DEEPER, CHECK W/CITY ENGINEER			



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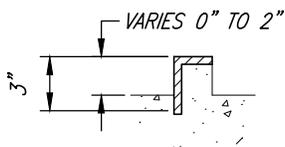
WELLSVILLE CITY CORPORATION
ROAD IMPROVEMENTS STANDARDS
DOUBLE GUTTER - INLET BOX "B"

SHEET:
R18
 OF 1 SHEETS
 0

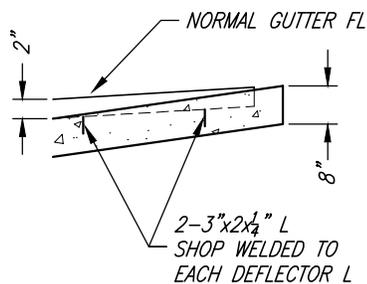


FOR L=4'; 5 SPA @ $10\frac{1}{8}" = 4'-2\frac{5}{8}"$
 FOR L=6'; 7 SPA @ $10\frac{11}{16}" = 6'-2\frac{3}{16}"$
 FOR L=8'; 10 SPA @ $9\frac{7}{8}" = 8'-2\frac{3}{4}"$
 FOR L=10'; 12 SPA @ $10\frac{1}{4}" = 10'-5"$

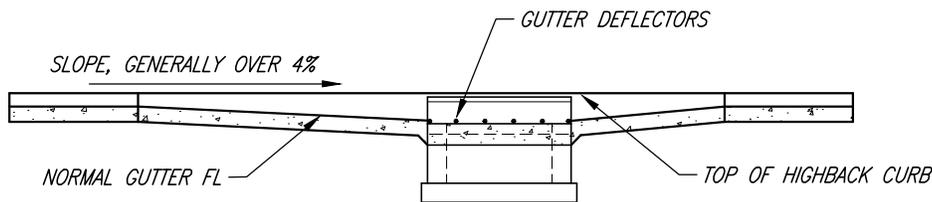
PLAN



SECTION D-D



SECTION E-E



SECTION F-F

GUTTER DEFLECTORS DETAIL

NOTES

1. BEFORE POURING CONCRETE, SUPPORT UNIT SECURELY IN FINAL POSITION BY ATTACHING TO METAL RODS DRIVEN INTO SUBGRADE OR BY OTHER SUITABLE MEANS
2. ASSEMBLY TO BE HOT DIP GALVANIZED.
3. TO BE USED WHERE DEFLECTOR CURB INLET IS SPECIFIED.



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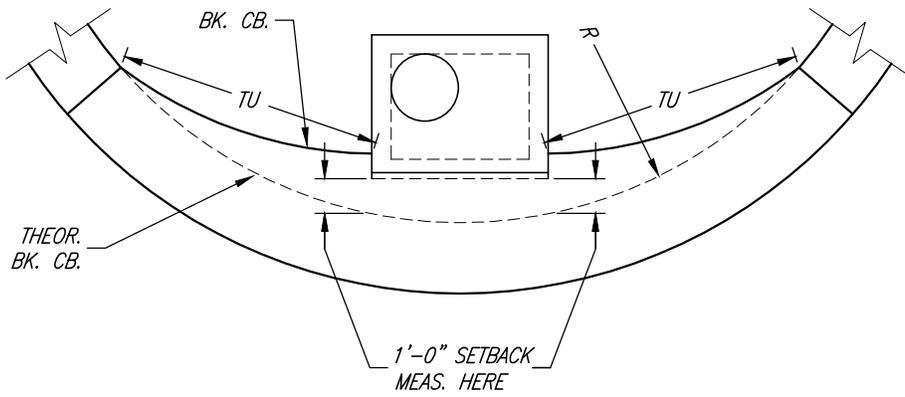
HIGHBACK CURB INLET BOX

SHEET:

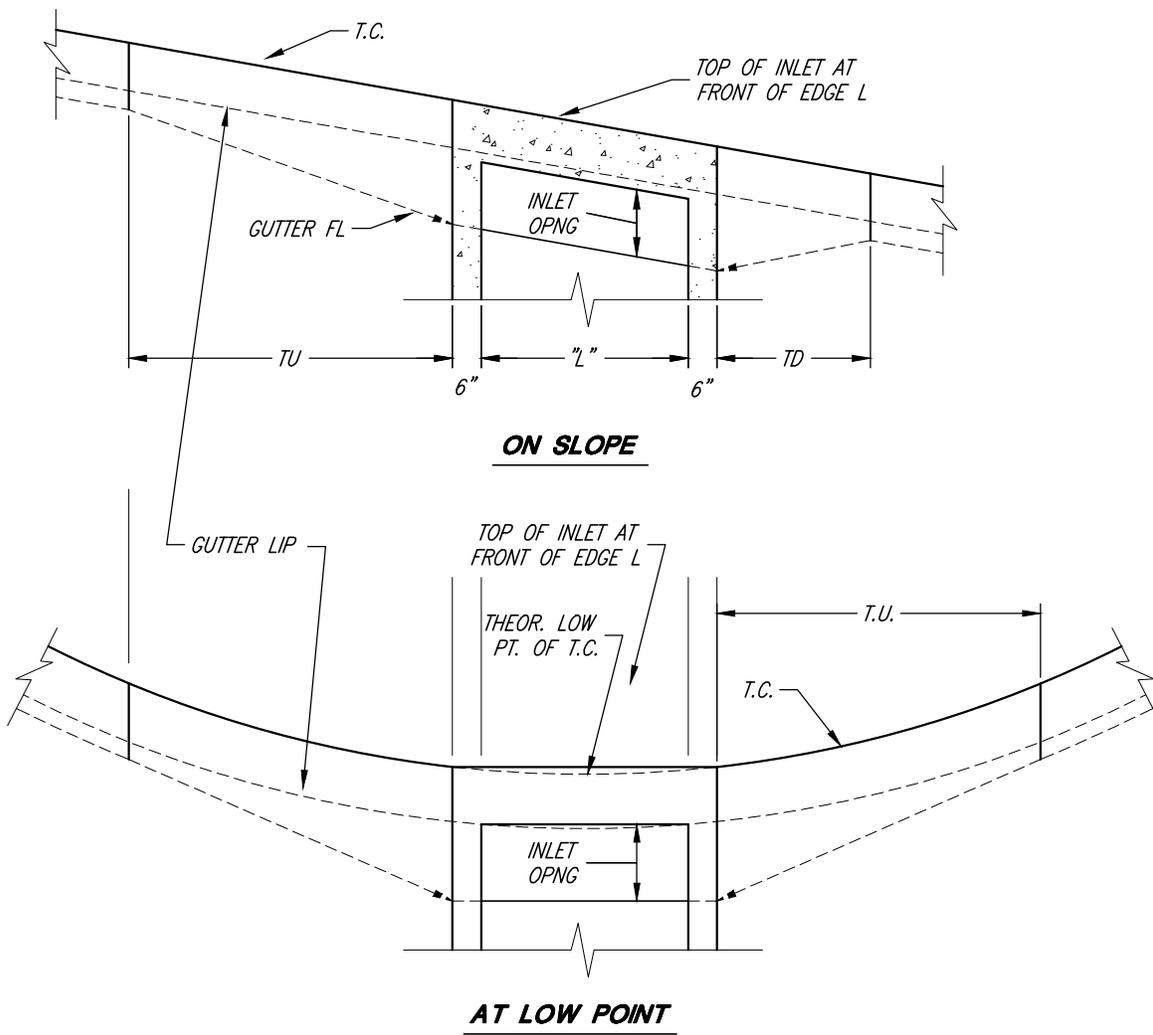
R19

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INLET SETTING ON CURB RETURN



INLET SETTING DIAGRAMS



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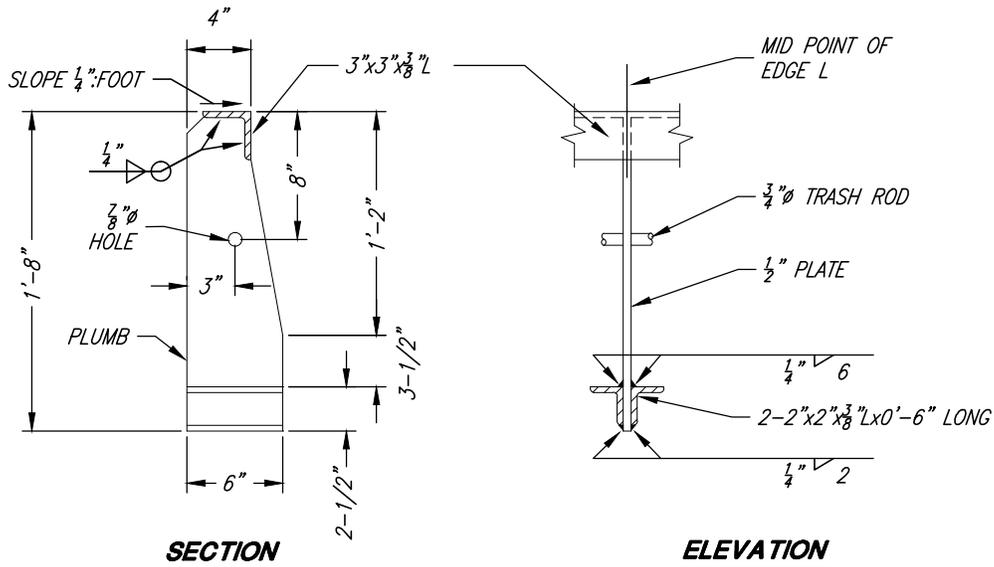
HIGHBACK CURB INLET BOX

SHEET:

R20

OF 1 SHEETS

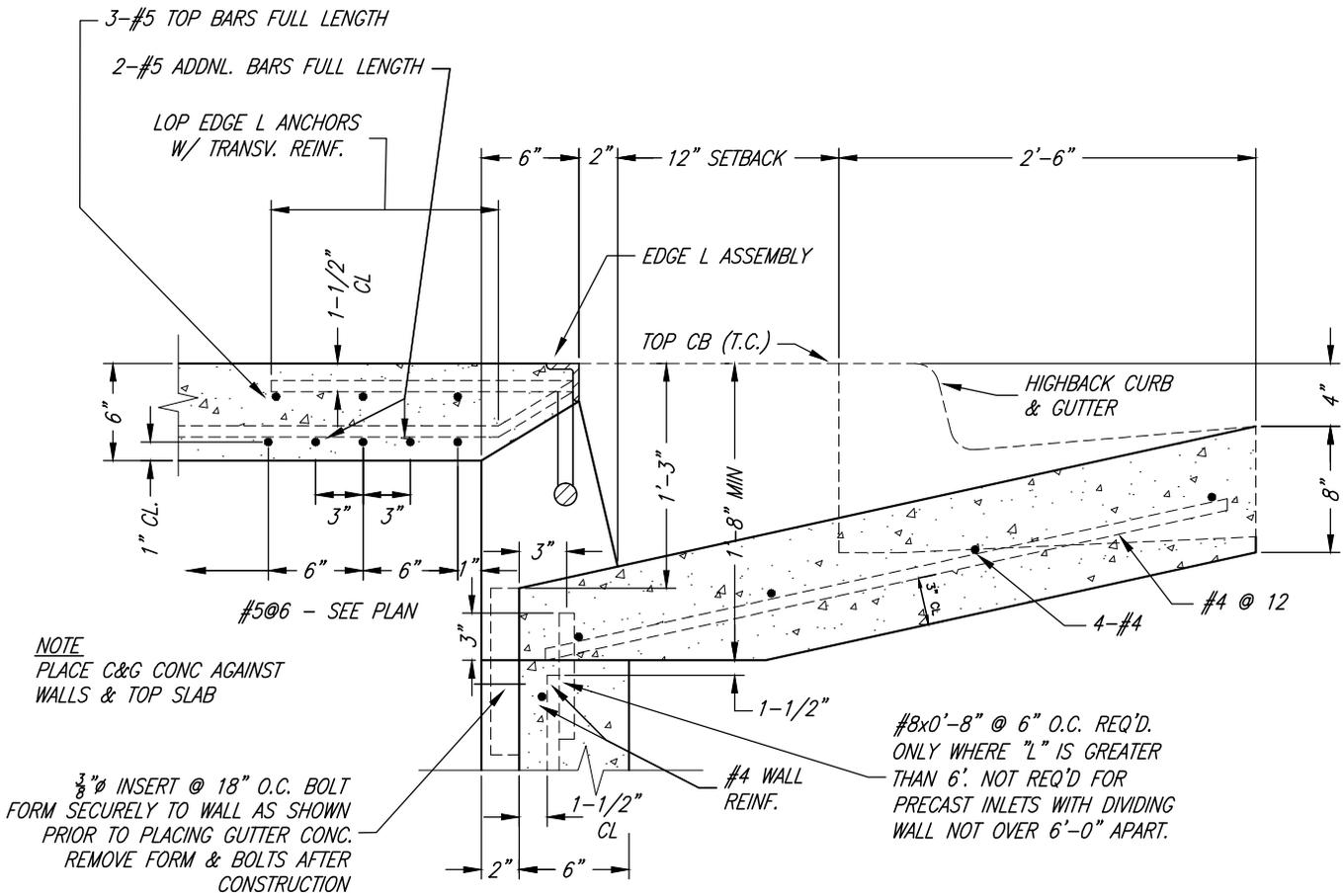
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SECTION

ELEVATION

CENTER SUPPORT FOR EDGE ANGLE ASSEMBLY



THROAT DETAIL



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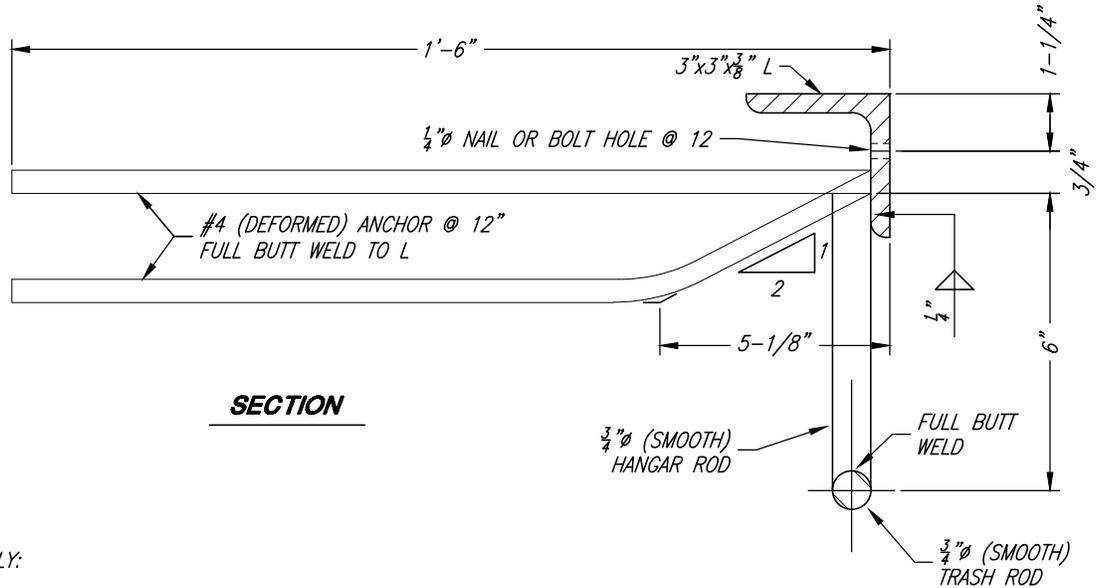
HIGHBACK CURB INLET BOX

SHEET:

R21

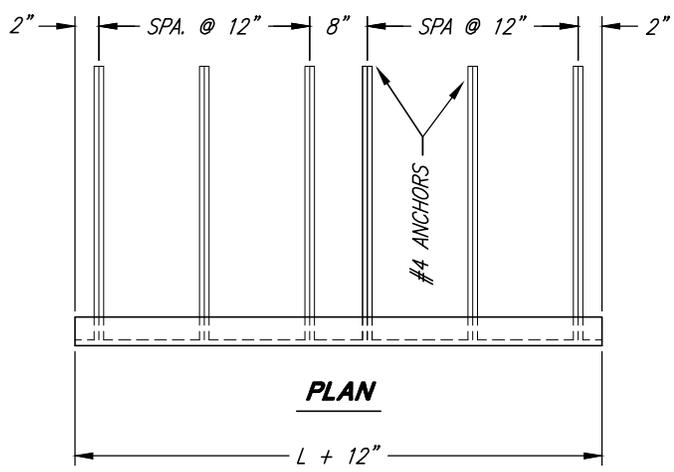
OF 1 SHEETS

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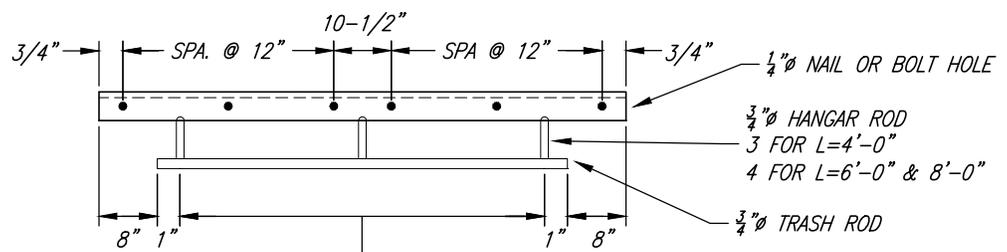


SECTION

- NOTES:**
1. **EDGE ANGLE ASSEMBLY:**
 - A. STRUCTURAL STEEL
 - B. EXPOSED STEEL SURFACES TO BE FINISHED SMOOTH
 - C. HOT DIP GALVANIZE ASSEMBLY, EXCEPT THAT GALV. NOT REQUIRED ON DEFORMED ANCHORS. CHIPPING NOT REQUIRED ON ANCHOR WELDS.
 2. **REINFORCEMENT:**
 - A. BEND AROUND MH RING & PIPE OPENINGS WHEREVER FEASIBLE. SEE PLAN.
 - B. PROVIDE #5 DIAG. AROUND PIPE OPENINGS, SAME AS FOR MH RING ON PLAN.



PLAN



- 2 SPA. @ 1'-10" FOR L=4'-0"
- 3 SPA. @ 1'-10 5/8" FOR L=6'-0"
- 4 SPA. @ 1'-11" FOR L=8'-0"
- 5 SPA. @ 1'-11 1/4" FOR L=10'-0"

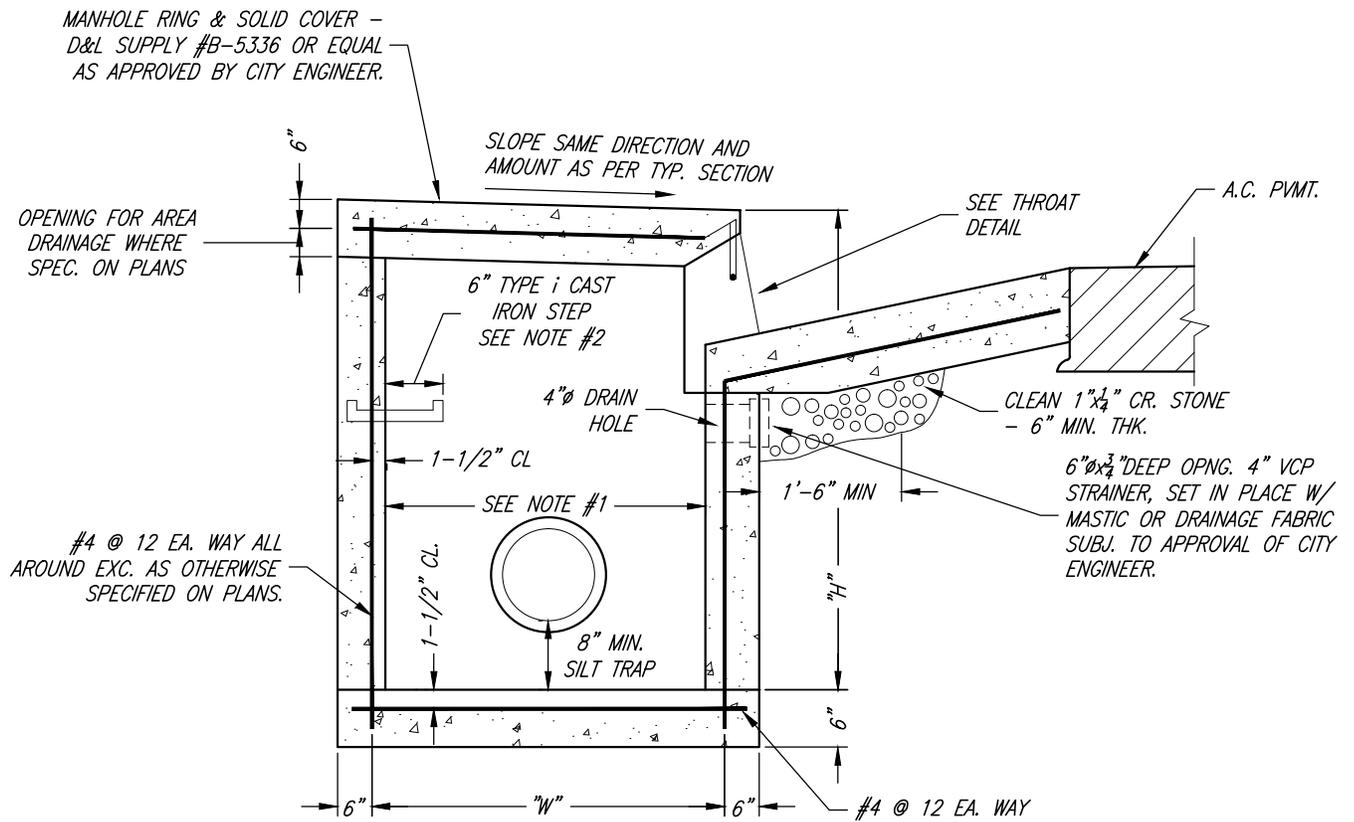
DETAIL OF EDGE ANGLE ASSEMBLY



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HIGHBACK CURB INLET BOX

SHEET:
R22
 OF 1 SHEETS
 0



NOTES:

1. FOR LONG, DEEP WALLS, BRACE TO RESIST EARTH COMPACTION STRESSES AS REQUIRED. REMOVE BRACES AT LEAST 5 DAYS AFTER CURB IS POURED.
2. CAST IRON STEPS - TOP STEP 24" BELOW TOP OF TOP SLAB., THEN @ 16" SPA. BOTTOM STEP TO BE ABOVE CROWN OF DISCHARGE PIPE. STAGGER STEPS 2" EACH WAY FROM C.L. MANHOLE RING. STEPS NOT REQUIRED WHERE "H" IS LESS THAN 4'.
3. FORM ALL INVERTS FOR SMOOTH FLOW THROUGH STRUCTURE.
4. BROOM FINISH TOP SLAB.

SECTION B-B



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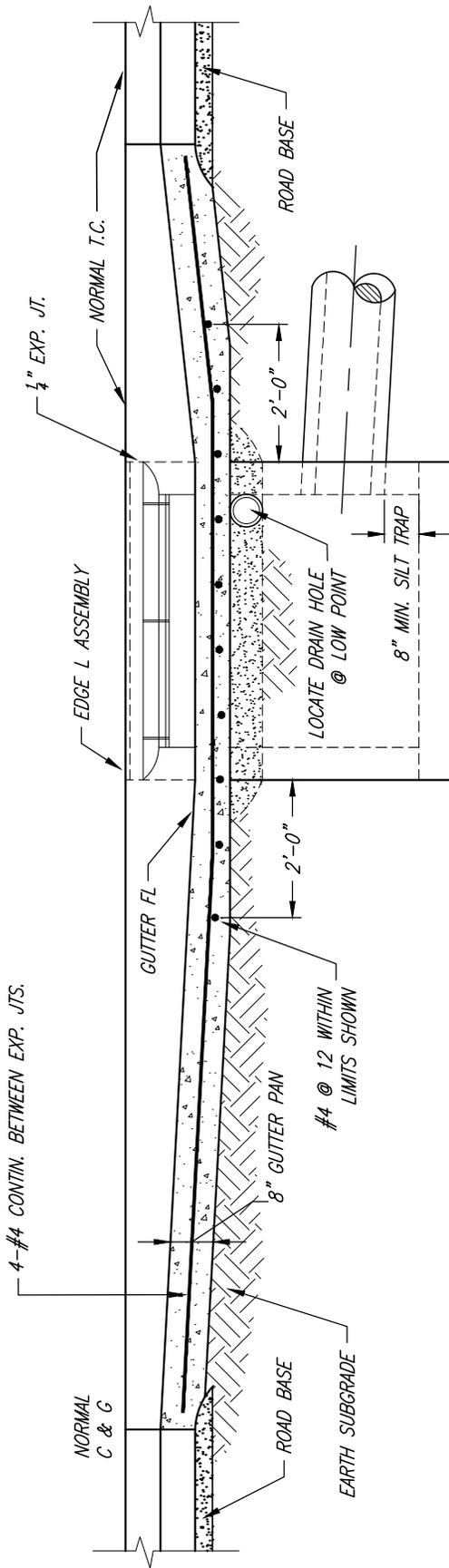
HIGHBACK CURB INLET BOX

SHEET:

R23

OF 1 SHEETS

0



NOTES:

1. CL PIPE AT INSIDE WALL TO BE AT CL WALL UNLESS OTHERWISE SPECIFIED. TRIM PIPE FLUSH WITH INSIDE WALLS.
2. BROOM FINISH TOP SLAB.
3. MIN COVER: 18" FOR CMP, 12" FOR RCP, 18" FOR NRCP OR CCP.

SECTION A-A



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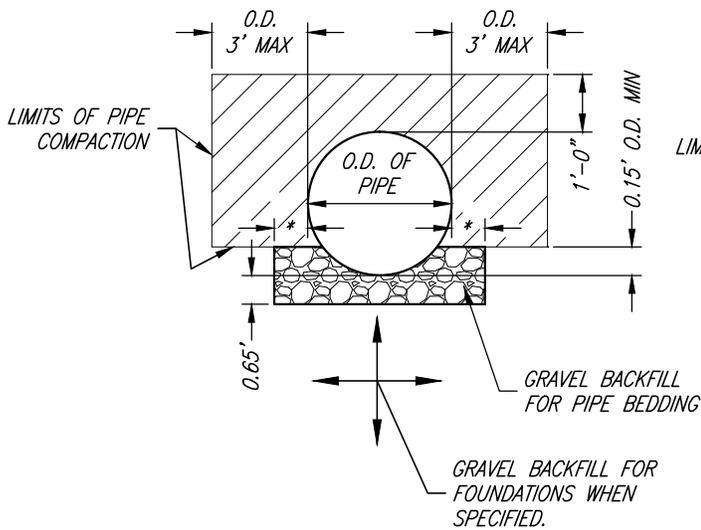
HIGHBACK CURB INLET BOX

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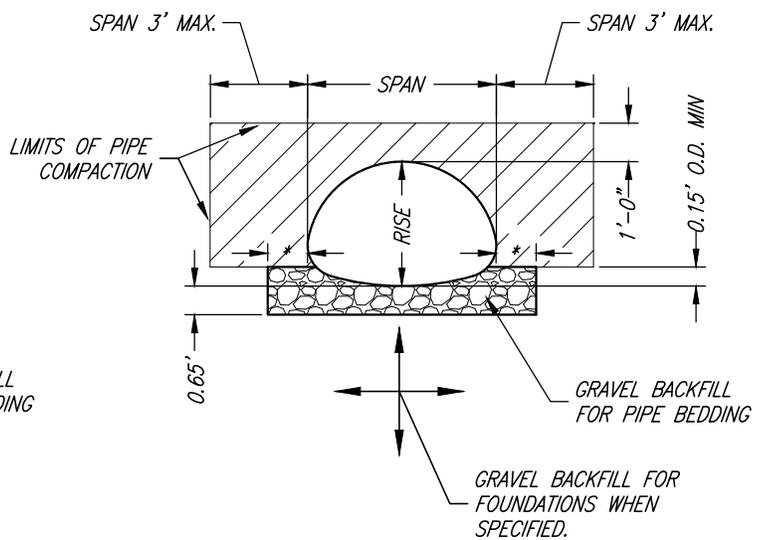
R24

OF 1 SHEETS

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INSTALLATION FOR METAL OR CONCRETE PIPE



TYPICAL PIPE-ARCH INSTALLATION

PIPE	SIZE (INCHES)	MIN. DISTANCE BETWEEN BARRELS
CIRCULAR PIPE	12" TO 24"	12"
CONCRETE & METAL (DIAMETER)	30" TO 96"	DIAM/2
PIPE-ARCH	18" TO 36"	12"
METAL ONLY (SPAN)	43" TO 142"	SPAN/3
	148" TO 199"	48"



BACKFILL MATERIAL PLACED IN 0.5' LOOSE LAYERS AND COMPACTED TO A MIN. OF 95% OF MAX. DENSITY.

NOTES:

PIPE COMPACTION LIMITS SHOWN ON THIS PLAN ARE FOR PIPE CONSTRUCTION IN AN EMBANKMENT. FOR PIPE CONSTRUCTION IN A TRENCH, THE HORIZONTAL LIMITS OF THE PIPE COMPACTION ZONE SHALL BE THE WALLS OF THE TRENCH.

O.D. IS EQUAL TO THE OUTSIDE DIAMETER OF A PIPE OF THE OUTSIDE SPAN OF A PIPE-ARCH. THE DIMENSIONS SHOWN AS O.D. WITH 3' AND 4' MAXIMUM SHALL BE O.D. UNTIL O.D. EQUALS 3' AND 4' AT WHICH POINT 3' AND 4' SHALL BE USED.

* 1'-0" FOR DIAMETERS 12" THROUGH 42" AND FOR SPANS THROUGH 50". 2'-0" FOR DIAMETERS GREATER THAN 42" AND FOR SPANS GREATER THAN 50".



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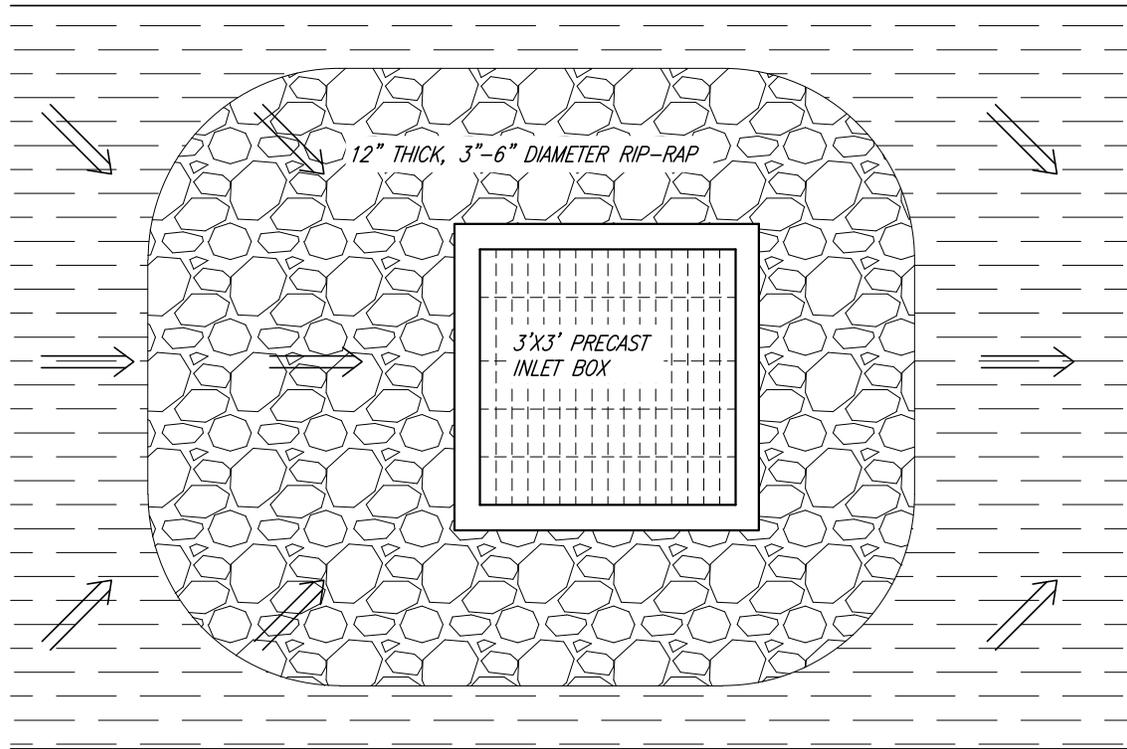
CULVERT COMPACTION & BACKFILL

SHEET:

R26

OF 1 SHEETS

0



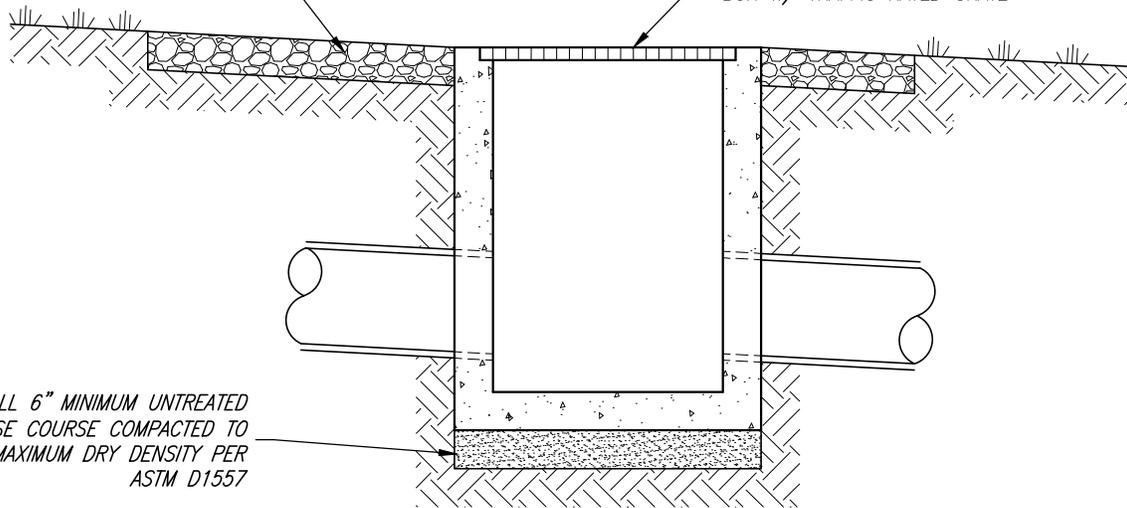
SWALE INLET BOX DETAIL - PLAN VIEW

N.T.S.

INSTALL 12" THICK, 3"-6" DIAMETER RIP-RAP UPSTREAM AND DOWNSTREAM OF INLET BOX. (SEE NOTES BELOW)

INSTALL 3'x3' PRECAST INLET BOX W/ TRAFFIC RATED GRATE

INSTALL 6" MINIMUM UNTREATED BASE COURSE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D1557



SWALE INLET BOX DETAIL - PROFILE VIEW

N.T.S.

NOTE:

THE RIP-RAP BLANKET MUST EXTEND 4- FEET UPSTREAM; AND 1- FOOT AROUND THE SIDES AND DOWNSTREAM OF THE INLET BOX, PER 1% SLOPE OF ROADWAY. THEREFORE, A ROADWAY GRADE OF 3% SLOPE WILL REQUIRE 12- FEET OF RIP-RAP UPSTREAM OF THE INLET BOX AND 3- FEET OF RIP-RAP ALONG THE SIDES AND DOWNSTREAM OF THE INLET BOX.



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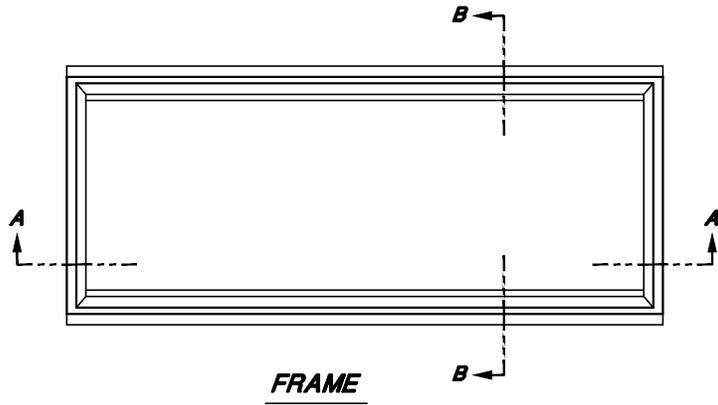
SWALE INLET BOX

SHEET:

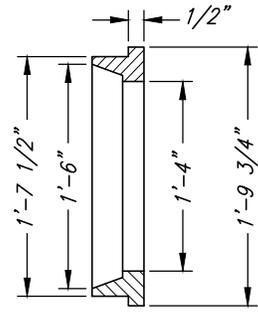
R27

OF 1 SHEETS

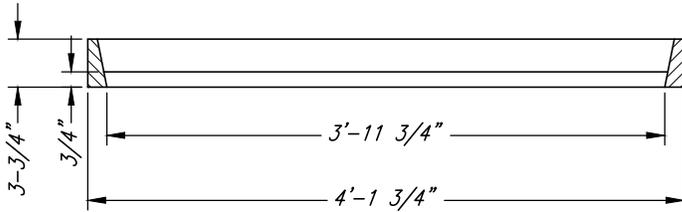
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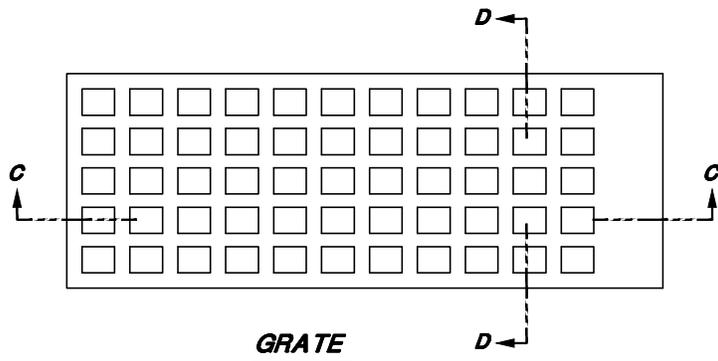
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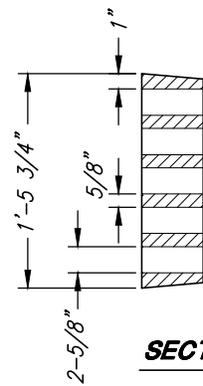
SECTION B-B



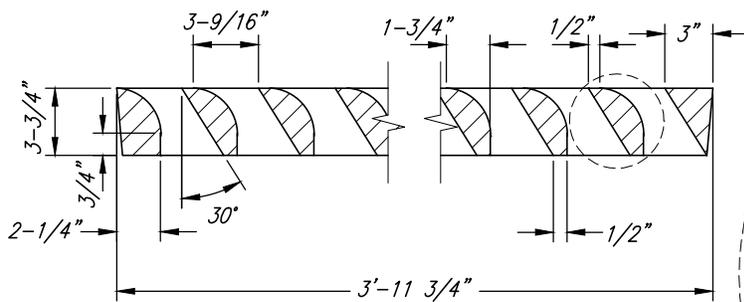
SECTION A-A



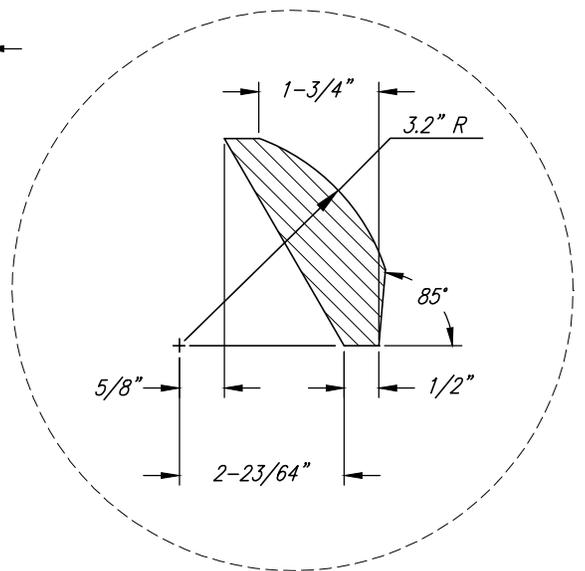
GRATE



SECTION D-D



SECTION C-C



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ROAD IMPROVEMENTS STANDARDS

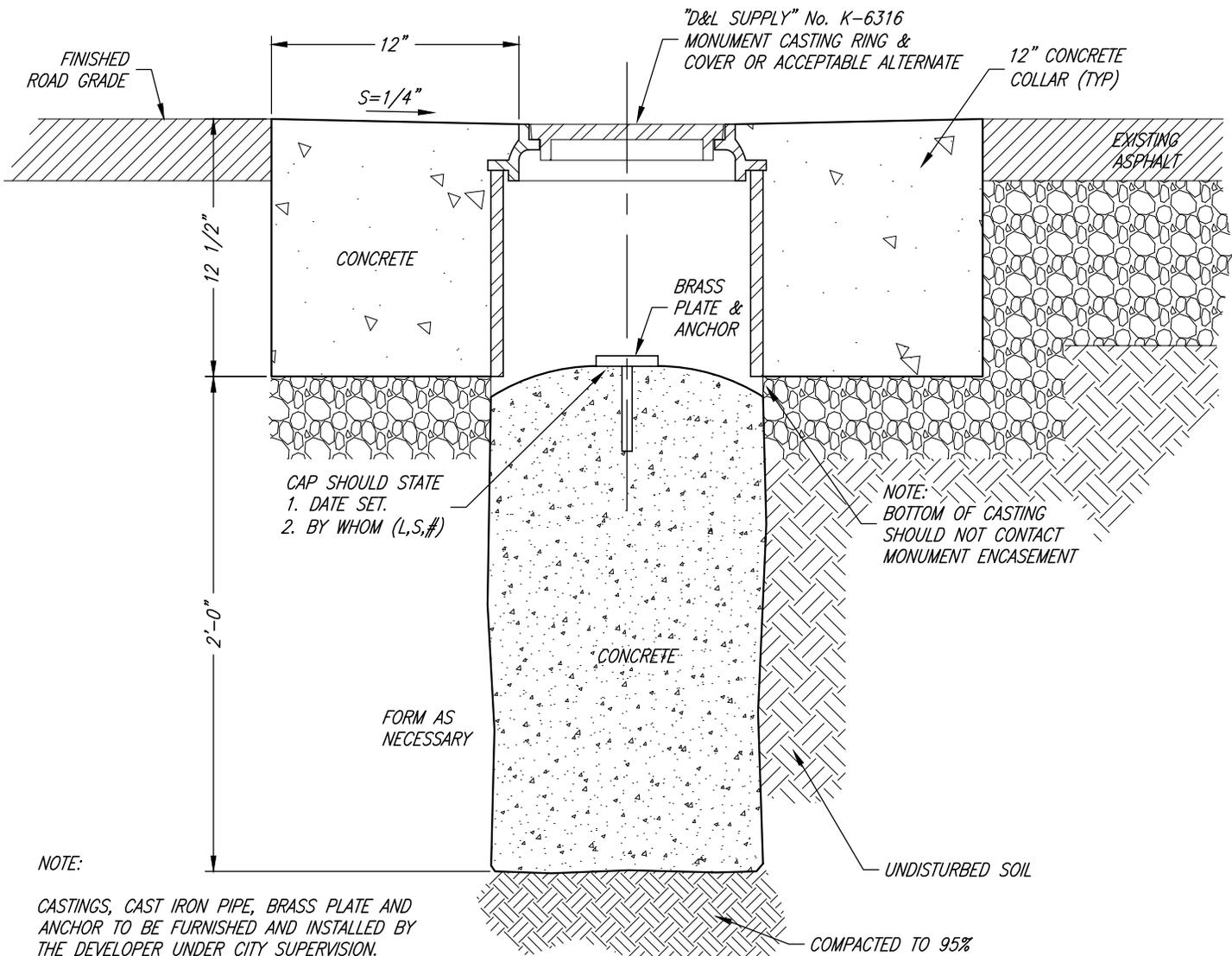
BICYCLE - SAFE GRATING & FRAME

SHEET:

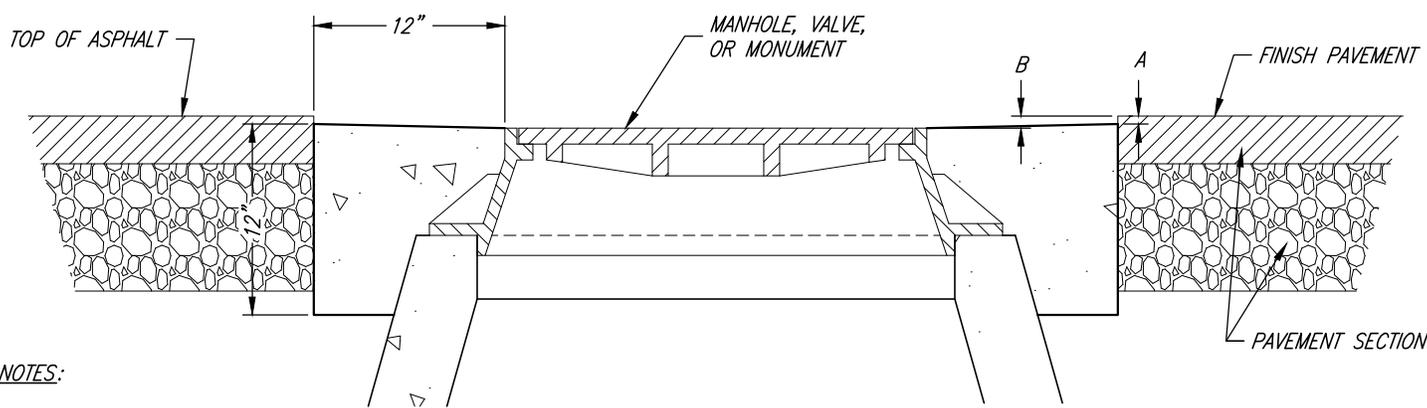
R28

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SURVEY MONUMENT DETAIL



1. ALL CONCRETE COLLARS TO BE INSTALLED WITHIN 14 DAYS AFTER PAVING.
2. COLLARS AROUND MANHOLES AND CULINARY WATER VALVES ARE TO BE ROUND.
3. COLLARS AROUND IRRIGATION VALVES ARE TO BE ROUND.

CONCRETE COLLAR DETAIL

PAVEMENT DIMENSION TABLE

DESCRIPTION	NEW ROAD	OVERLAY
A ASPHALT TO CONCRETE	1/2"	1/4"
B ASPHALT TO RING	3/4"	1/2"



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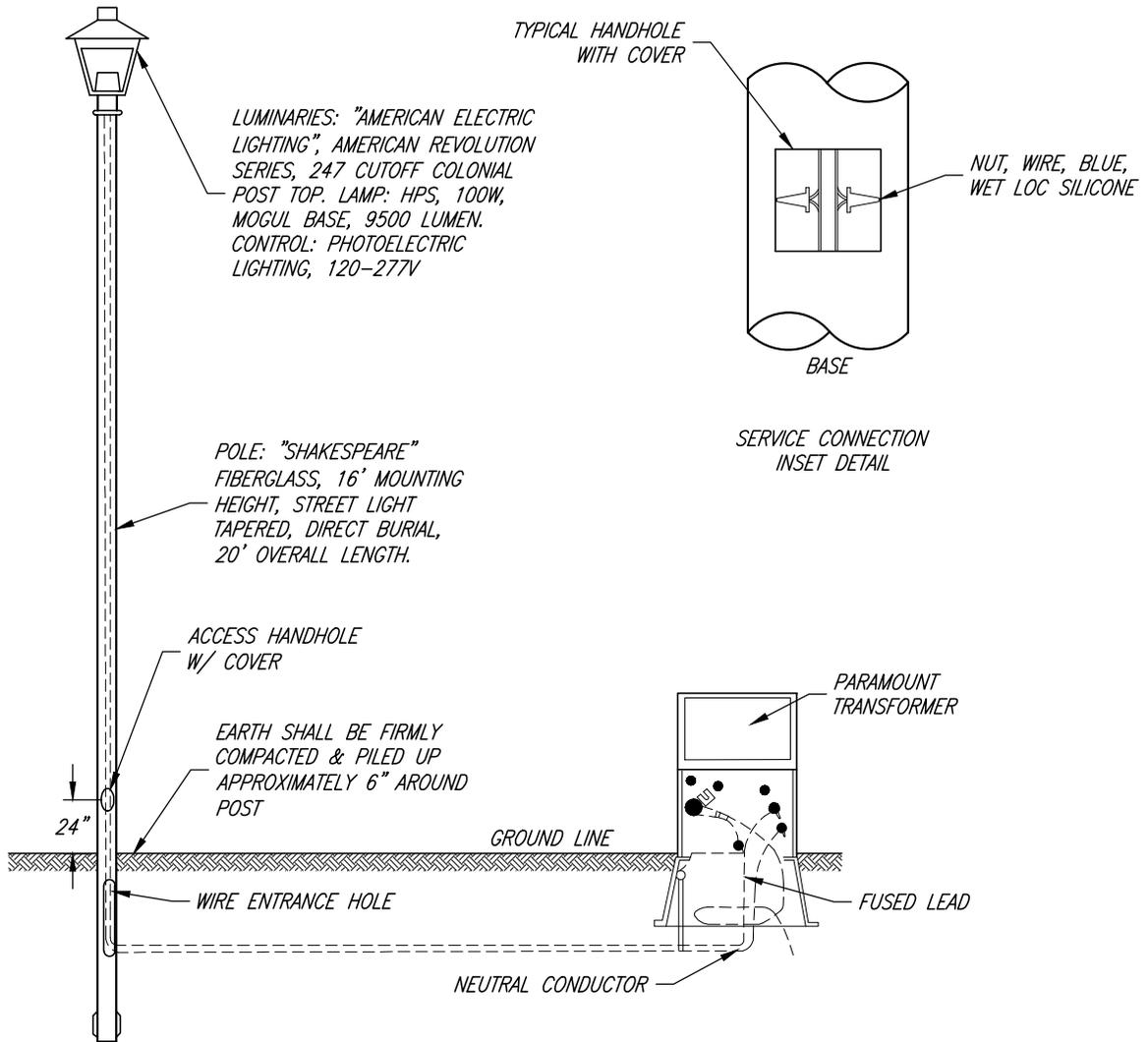
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STREET MONUMENT & CONC. COLLAR DETAILS

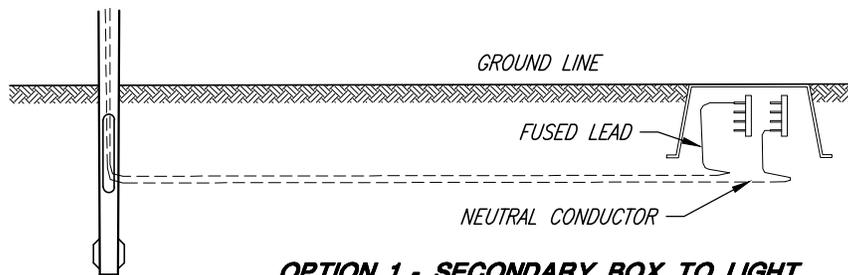
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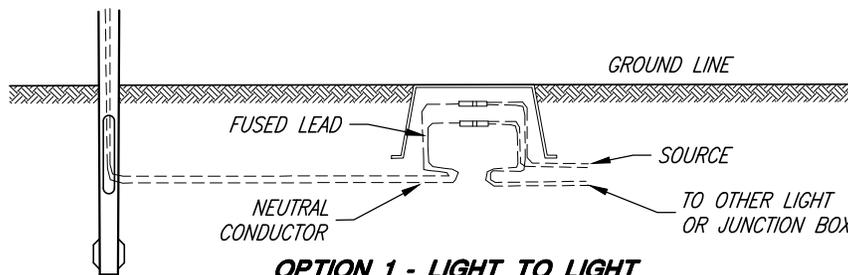
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OPTION 1 - TRANSFORMER TO LIGHT



OPTION 1 - SECONDARY BOX TO LIGHT



OPTION 1 - LIGHT TO LIGHT



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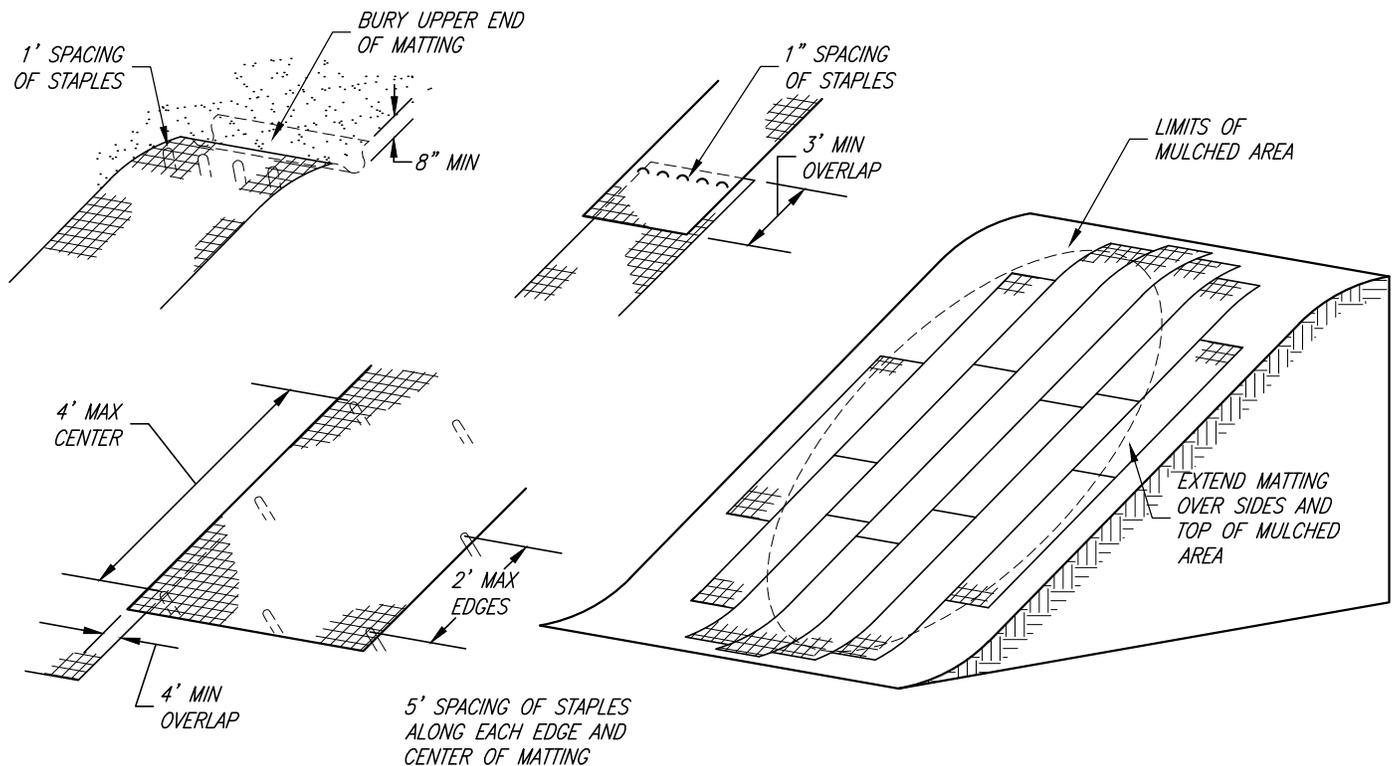
STREET LIGHT DETAIL

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THE SOIL MUST BE REASONABLY SMOOTH. GULLIES AND RILLS MUST BE FILLED AND COMPACTED. ROCKS OR OTHER OBSTRUCTIONS WHICH RISE ABOVE THE LEVEL OF THE SOIL OR MULCH MUST BE REMOVED.

DUE TO THE DIFFICULTY OF PLACING WOOD EXCELSIOR MATTING AND ITS LESS PREDICTABLE RESULTS IN CONTROLLING EROSION, JUTE MATTING IS PREFERRED.

- EXCELSIOR BLANKETS SHALL CONSIST OF MACHINE PRODUCED MATS OR CURLED WOOD EXCELSIOR, 80% OF WHICH HAVE AN 8" OR LONGER FIBER LENGTH. IT SHALL BE OF CONSISTENT THICKNESS WITH THE FIBER EVENLY DISTRIBUTED OVER THE ENTIRE AREA OF THE BLANKET. THE TOP SIDE OF EACH BLANKET SHALL BE COVERED WITH A 3" BY 1" WEAVE OF TWISTED KRAFT PAPER OR BIODEGRADABLE PLASTIC MESH THAT HAS A HIGH WET STRENGTH. BLANKETS SHALL BE FIRE AND SMOLDER RESISTANT AND CONTAIN NO CHEMICAL ADDITIVES. BLANKETS SHALL BE IN 3-FOOT BY 150-FOOT ROLLS OR IN 4-FOOT BY 180-FOOT ROLLS.
- IF THE WOOD EXCELSIOR MAT IS TO BE APPLIED WITHOUT OTHER MULCHES, THE MINIMUM THICKNESS OF MAT SHALL BE 1-1/2".
- IF THE WOOD EXCELSIOR MAT IS TO BE APPLIED OVER OTHER MULCHES, THE MINIMUM THICKNESS SHALL BE 1/2".
- AFTER SITE PREPARATION AND SEEDING (IF ANY), THE ROLLS OF WOOD EXCELSIOR MATTING SHALL BE ROLLED ONTO THE SURFACE FROM THE TOP OF THE SLOPE TO THE BOTTOM OF THE SLOPE, NEVER ALONG THE CONTOUR.
- THE UPPER END OF EACH BLANKET SHALL BE BURIED IN A TRENCH AT LEAST 8" DEEP, AND THE TRENCH SHALL BE BACKFILLED AND TAMPED.
- STAPLES SHALL BE APPLIED AT 2' ON CENTER ALONG THE SIDES OF THE BLANKET AND 4 FEET ON CENTER ALONG THE CENTER OF THE BLANKET.
- BLANKETS PLACED SIDE-TO-SIDE SHALL BE SNUGLY BUTTED TOGETHER TO PREVENT RILLING AND GULLYING ALONG THE JOINT.
- BLANKETS PLACED END-TO-END SHALL BE OVERLAPPED. THE TOP OF THE LOWER BLANKET SHALL BE PLACED IN AN 8" DEEP TRENCH WHICH SHALL THEN BE BACKFILLED AND TAMPED. THE LOWER END OF THE UPPER BLANKET SHALL BE OVERLAPPED ONTO THE LOWER BLANKET, AND STAPLES SHALL BE PLACED THROUGH BOTH BLANKETS.
- STAPLES SHALL BE OF HEAVY GAUGE WIRE, 0.091" IN DIAMETER OR GREATER, WHICH HAVE BEEN BENT INTO A "U" SHAPE, WITH LEGS AT LEAST 8" LONG, AND A 1" CROWN. LONGER STAPLES ARE REQUIRED IN LOOSE OR SANDY SOIL.



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EXCELSIOR MAT INSTALLATION

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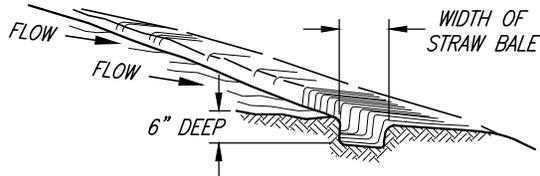
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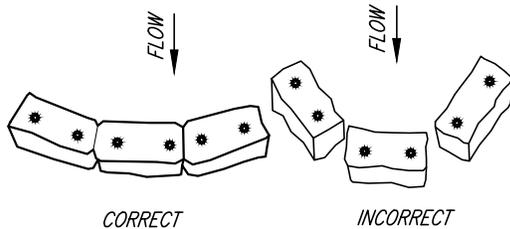
MATERIALS:

- STRAW BALES BOUND WITH WIRE OR TWINE.
- WOOD OR STEEL STAKES 4' LONG MIN. (2"x2" WOOD, REBAR OR STEEL PICKETS, 2 STAKES PER BALE)

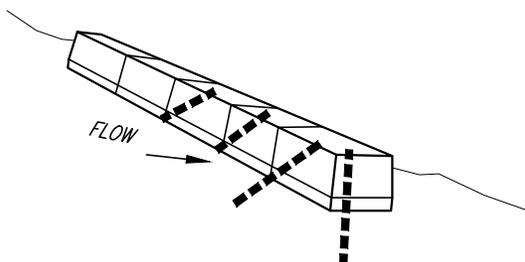


1. DIG A 6"x2' TRENCH. ALIGN TRENCH ALONG CONTOUR, BUT CURVED SLIGHTLY UPHILL SO RUNOFF CANNOT ESCAPE AROUND THE END BALES (SEE (2.) BELOW)

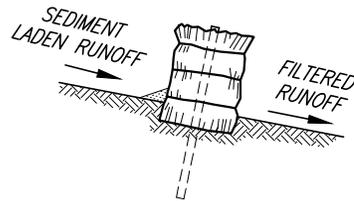
2. PLACE BALES IN TRENCH WITH ENDS TIGHTLY ABUTTED.



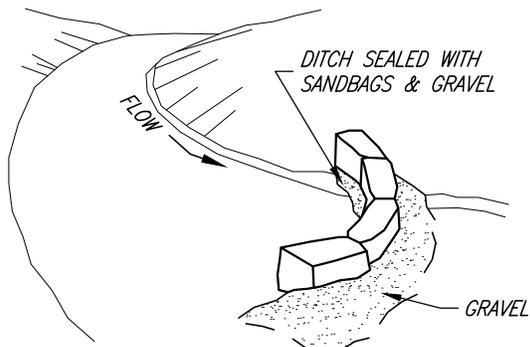
3. ANCHOR EACH BALE WITH 2 STAKES HAMMERED 1-1/2' TO 2' INTO THE GROUND. ANGLE FIRST STAKE IN EACH BALE TOWARD THE PREVIOUSLY LAID BALE.



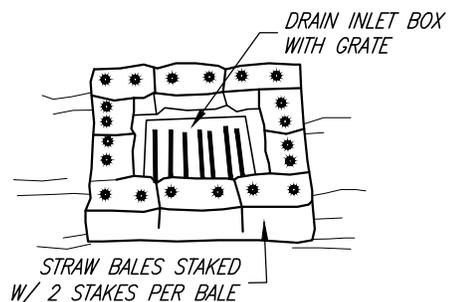
4. WEDGE LOOSE STRAW BETWEEN BALES. BACKFILL AND COMPACT THE EXCAVATED SOIL AGAINST THE UPHILL SIDE OF BARRIER.



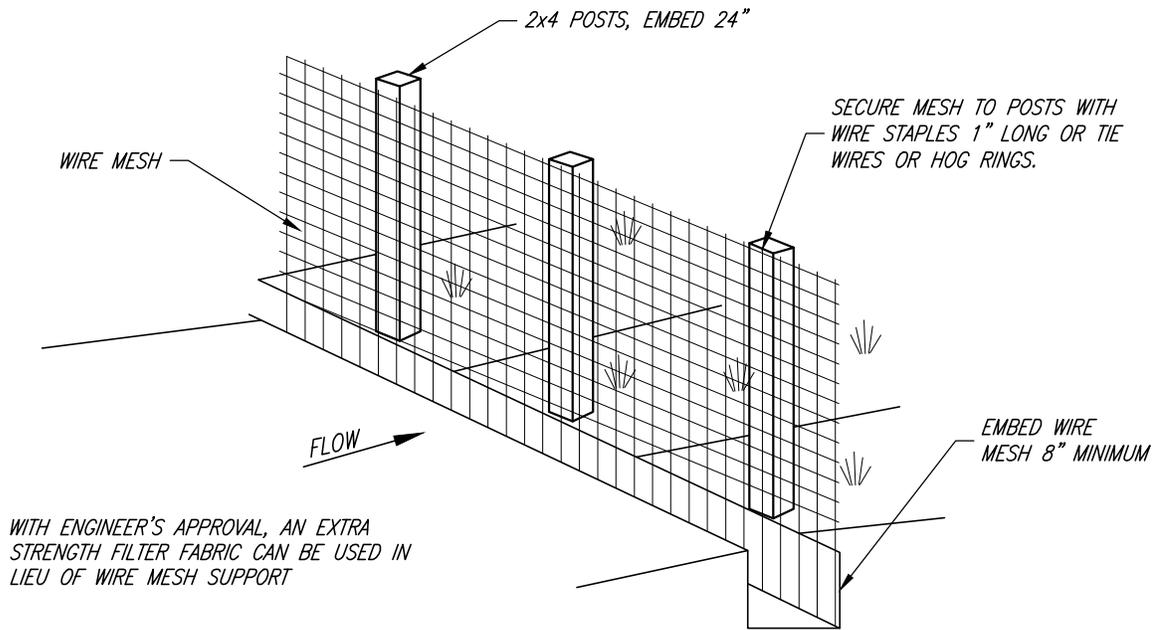
WHEN INSTALLING BALES ON PAVEMENT, PILE GRAVEL OR ROCK BEHIND THE BALES TO HOLD THEM IN PLACE.



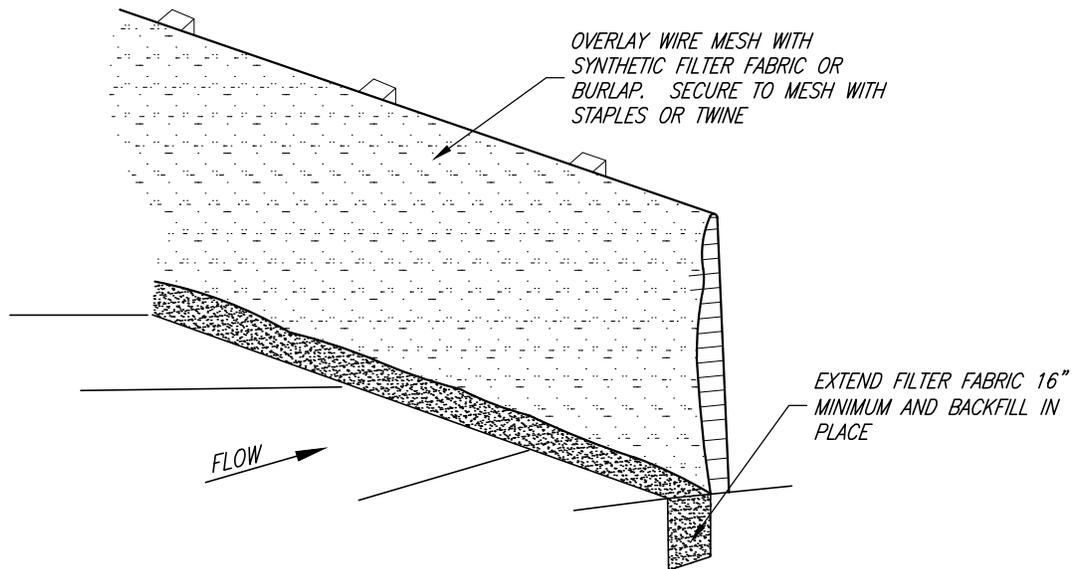
- INSPECT PERIODICALLY AND AFTER EACH STORM. REPLACE DAMAGED BALES; RE-ANCHOR DISPLACED ONES.
- CLEAN OUT SEDIMENT BEFORE IT REACHES THE TOP OF BALES.
- DEPOSIT THE SEDIMENT WHERE IT WILL NOT ENTER A DRAINAGE WAY.



STRAW BALE/RAIN INLET SEDIMENT FILTER



STEP ONE - WIRE MESH



STEP TWO - FILTER FABRIC

NOTES:

SILT FENCES MUST BE INSPECTED WEEKLY OR AFTER HEAVY RAINS. FIX BROKEN, DAMAGED OR PORTIONS THAT HAVE BEEN RUN OVER AS NEEDED.

REMOVE SEDIMENT DEPOSIT AS NECESSARY TO ENSURE FILTER FABRICS ABILITY TO FILTER RUNOFF.



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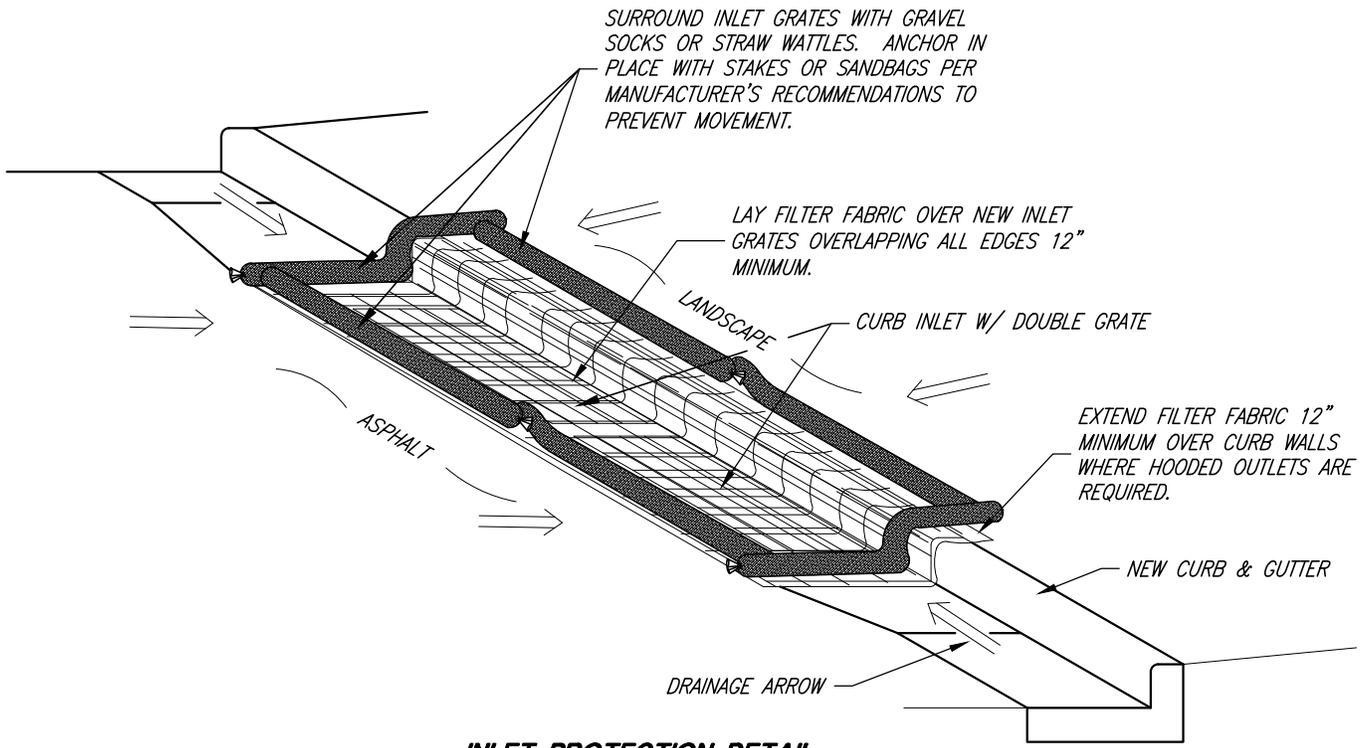
SILT FENCE DETAIL

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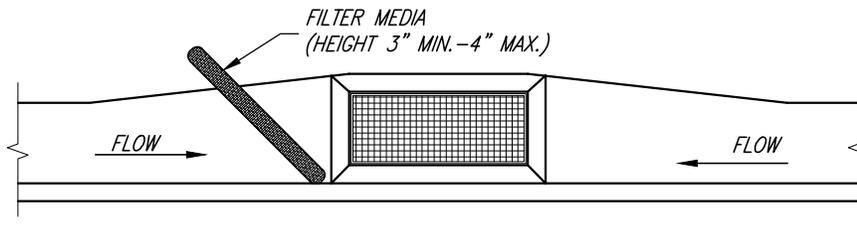
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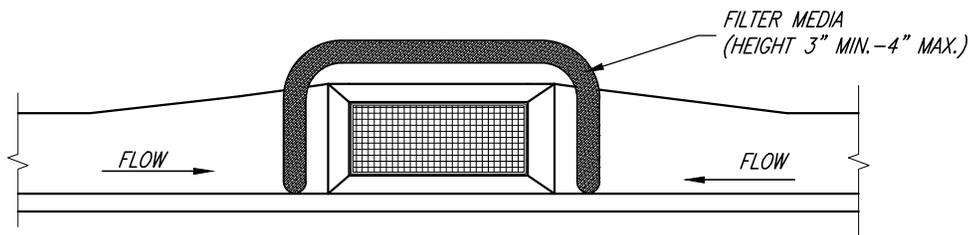
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INLET PROTECTION DETAIL



ON-GRADE INLET PROTECTION DETAIL



DROP INLET PROTECTION DETAIL

NOTES:

- INSPECT PERIODICALLY AND AFTER EACH STORM REPLACE OR REPAIR DAMAGED SEDIMENT BARRIER; RE-ANCHOR DISPLACED ONES.
- REMOVE SEDIMENT BEFORE IT REACHES THE TOP OF SEDIMENT BARRIERS.
- DEPOSIT THE SEDIMENT WHERE IT WILL NOT ENTER A DRAINAGE WAY.



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GRAVEL SOCK - INLET PROTECTION

SHEET:

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