



**CITY OF INDEPENDENCE  
(COI)  
DESIGN & CONSTRUCTION  
(D&C) MANUAL**

September 2023

<https://www.ci.independence.mo.us>

**Community Development  
Municipal Services**



**ADOPTION**

The Director of Community Development and the Municipal Services Director jointly adopt these standard design and construction specifications this 1<sup>st</sup> Day of October 2023.

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**Tom Scannell**

**Director, Community Development**

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**Lisa Reynolds**

**Director, Municipal Services**



# CITY OF INDEPENDENCE DESIGN MANUAL

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**SECTION 5200 STREETS**

The Construction and Material Specifications, titled Section 5200 Streets, approved and adopted on April 17<sup>th</sup>, 1996, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 5202 Functional Classification of Streets Remove section 5202.6 Residential Access Streets.**

**Sec. 5203.1 Design Criteria Remove the table and replace with the following:**

	<b>Major Arterial</b>	<b>Minor Arterial</b>	<b>Industrial/ Commercial Collector</b>	<b>Residential Collector</b>	<b>Residential Local</b>
<b>Number of Through Traffic Lanes</b>	4-6	2-4	2-3	2-3	2
<b>Minimum Width of Travel Lanes (excluding curb &amp; gutter)</b>	12 ft	12 ft	12 ft	11 ft	12 ft
<b>Number of Parking Lanes</b>	0	0	0	0-2	0-2
<b>Width of Parking Lanes</b>	0	0	0	8 ft	8 ft
<b>Width of Median</b>	0-16 ft	0-16 ft	0	0	0
<b>Right-of-Way Width</b>	100-140 ft	80 ft	60-80 ft	60 ft	50 ft
<b>Design Speed (mph)</b>	45-50	40	35	30	25
<b>Minimum Stopping Sight Distance</b>	400 ft-475 ft	275 ft-325 ft	225 ft-250 ft	200 ft	150 ft
<b>Minimum K Crest Vertical Curve</b>	61-84	44-84	29	19	12
<b>Minimum K Sag Vertical Curve</b>	79-96	64-96	49	37	26

	<b>Major Arterial</b>	<b>Minor Arterial</b>	<b>Industrial/ Commercial Collector</b>	<b>Residential Collector</b>	<b>Residential Local</b>
<b>Minimum Radii for Horizontal Curves</b>	1,091 ft (2% super)	700 ft	500 ft	300 ft	185 ft
<b>Minimum Horizontal Sight Distance</b>	Per AASHTO Requirements				
<b>Sidewalks</b>	1 sidewalk and 1 shared use path	1 sidewalk and 1 shared use path	2	2	2
<b>Minimum Distance Between Sidewalk/Path and Back of Curb</b>	8 ft	3 ft	3 ft	3 ft	3 ft
<b>Maximum Grade</b>	6%	7%	6%	8%	10%
<b>Minimum Grade</b>	1%	1%	1%	1%	1%
<b>Curb Return Radius</b>	35 ft	35 ft	35ft-commercial 50 ft-industrial	30 ft	25 ft
<b>Maximum Grade at Intersection w/ Stop</b>	--	--	--	3% (within 75 ft)	5% (within 50 ft)
<b>Minimum Grade across Intersection</b>	2%	2%	2%	2%	2%

**Sec. 5203.1 Design Criteria Add the following to NOTES:**

1. Design of roadway shall comply with AASHTO – A Policy on Geometric Design of Highways and Streets (the Green Book). Any conflict with the AASHTO Green Book and the above guidance, the more conservative criteria shall apply.
2. The minimum width of travel lanes may be reduced to 11 feet when approved by the City Engineer.
3. ADA criteria for crosswalks at intersections shall be followed.
4. Right of way requirements at intersections and ramps should allow for construction of curb ramps and/or pedestrian traffic signal components.
5. Residential collector and local streets shall not be gated.
6. Streets shall be centered in the right-of-way, unless approved by the City Engineer.

**Sec. 5203.3 Shoulder Gradients Modify the paragraph as follows:**

The finished grade within the limits of the right-of-way shall slope from 2% one-quarter (1/4) inch vertical to one (1) foot horizontal minimum to 4% one-half (1/2) inch vertical to one (1) foot horizontal maximum measured above the back of the curb **unless a sidewalk exists. Sidewalk slopes shall meet the minimum requirements of the Americans with Disabilities Act and Public Right-of-Way Accessibility Guidelines (PROWAG).** The grading gradients may be varied only upon written approval of the local governing agency. Back slopes beyond the R/W line shall be 3: 1 maximum, 4: 1 desirable.

**Sec. 5203.5 Off-Center Street Intersection Replace the paragraph as follows:**

Generally, intersection spacing shall meet the requirements of section 5203.1. Intersections of local streets with collector shall be reduced to a reasonable minimum but should, in general, be at least three hundred (300) feet apart, centerline to centerline, to preserve the traffic carrying capacity of collector, and to reduce the potential of accidents at such intersections. The street layout shall not isolate lands from existing public streets or roads, unless suitable access is provided, and such access is granted by easement or dedication to public use. Slight jogs in continuous streets at points of intersection with other streets shall not be permitted unless due to topography. Where offsets cannot be avoided, a minimum distance of one hundred twenty-five (125) feet shall be established between centerlines of the intersecting streets.

**Sec. 5203.13 Cul-De-Sacs Modify the paragraph as follows:**

At locations where streets are to be terminated and a vehicular connection between adjacent streets is not required, the termination shall be a cul-de-sac. Such cul-de-sac shall be constructed **to meet most recently adopted International Fire Code.**

**Sec. 5203.15 Driveway Grades Modify the paragraph as follows:**

Driveway grades shall conform to the typical section of the street within the right of way. Any deviations shall be approved by the local government official with the following limitations: Driveways shall attain a minimum elevation of six inches above the gutter elevation within the right of way with a maximum grade of 8%. **Where a sidewalk crosses a driveway, an ADA compliant cross slope must be maintained across the drive.** The algebraic difference in grades at the right-of-way on crest drives shall be 8% maximum and on sag drives shall be 12% maximum. The maximum driveway grade outside the right-of-way shall be 15%.

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**SECTION 5300 – INCIDENTAL CONSTRUCTION AND LOCAL BICYCLE FACILITY  
DESIGN GUIDANCE**

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The Construction and Material Specifications, titled Section 5300 Incidental Construction and Local Bicycle Facility Design Guidance, approved and adopted on December 18<sup>th</sup>, 2002, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**SECTION 5500 – SANITARY SEWERS**

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The Design Criteria for Sanitary Sewers and Appurtenances, titled Section 5500 approved and adopted on April 17, 1996 by the Kansas City Metropolitan Chapter of the APWA is hereby adopted by reference as the Design Criteria for the City of Independence, Missouri, with the additions, insertions, deletions, and changes, if any, prescribed in the following sections of this Article.

**Sec. 5.02. – Additions, Insertions, Deletions, and Changes.**

The following numbered subsections and provisions of the approved edition of the APWA Design Criteria adopted by Section 5.01, are hereby amended to read as follows:

**Sec. 5504.1 Gravity Lines Amend the first paragraph as follows:**

All public sewer lines shall be at least 8 inches in diameter. The downstream sewer pipe shall have the same or larger nominal diameter as the upstream pipe unless otherwise approved by the reviewing authority. All public sewers shall be designed to have a mean velocity of not less than 2.7 feet per second when flowing full. The maximum mean velocity, when flowing full should be less than 10 feet per second. For maximum mean velocities greater than 10 feet per second special consideration shall be given to protection against erosion. **With velocities 20 feet per second or above, the sewer shall be fitted with concrete restraints at 15 foot intervals along the slope to limit movement of the pipe or shall be restrained joint pipe.** All public sewers shall be designed to carry the design flow at full depth.

**Sec. 5504.1 Gravity Lines Amend the last paragraph as follows:**

Exceptions to these minimum slopes may be in the upper reaches of lateral sewers where minimum size pipes will flow only partially full. **A sealed engineering report must be provided with computations of the anticipated flow velocities of the daily and peak hourly flow rates.** For a low density residential area, a sewer serving less than thirty houses shall have a minimum slope of 0.76 percent and a sewer serving less than ten houses shall have a minimum slope of one percent. Unless approved by the Director, **oversized sewers will not be approved to justify using flatter slopes.**

**Sec. 5505.1 Gravity Lines Amend section C Location to read as follows:**

**C. Location:**

2. Easements: Where public sanitary sewers are located outside of existing rights-of-way, a minimum permanent easement of **fifteen (15) feet (7.5 feet from the centerline in each direction)** and the necessary temporary construction easement shall be provided. **Easements wider than fifteen feet may be required when conditions warrant.** In addition, provisions shall be made

for access to maintain the entire sanitary sewer system. The types and sizes of equipment used for sewer maintenance shall be considered for both manhole location and access easements.

**An easement for a public sewer located along a private road should include the width of the road plus the area between the main and the roadway plus an additional seven and one half (7.5) feet on the side of the sewer opposite the roadway.**

**Sec. 5505.2 Force Mains Amend the last paragraph as follows:**

Force mains shall be placed at least forty-two (42) inches below the finished ground and generally may follow the topography of the terrain. The location of force mains with respect to water mains and other utilities, aerial crossings, and stream crossings and steep grades shall be the same as for gravity sewers. **Force mains shall not be tapped.**

**Sec. 5507.1 Lift Stations General Add the following before list:**

Lift stations shall only be used with approval of the Director of Municipal Services.

**Sec. 5507.2 Lift Stations Types Amend section to read as follows:**

**A. Dry Well:**

- (1) Flooded suction
- (2) Wet well submersible pump

**CITY OF INDEPENDENCE, MISSOURI  
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**SECTION 5600 – STORM DRAINAGE SYSTEMS AND FACILITIES DESIGN**

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The Construction and Material Specifications, titled Section 5600, approved and adopted on February 16, 2011, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 5601.5 System Types and Applications Amend the fourth paragraph in A to read as follows:**

**A. General Guidelines:**

The engineered drainage system shall begin where the tributary area reaches 2 acres. All provisions shall apply if or when property greater than 2 acres are replatted into minor lots.

**Sec. 5601.5 System Types and Applications Amend A.4 to read as follows:**

**(4) Stormwater Management:** New development or redevelopment as defined in Section 5601.2 shall incorporate stormwater management measures to control runoff from the site. Allowable runoff from a site may be limited by the need to minimize downstream flood damage, prevent erosion, and/or minimize impacts to the ecology and water quality of the downstream drainage system. It is recognized for site-level runoff controls to be effective, consistent application across a watershed is necessary to realize measurable benefits along the downstream system. **The City has adopted the Default Strategy: Comprehensive Protection method.**

**a. Default Strategy: Comprehensive Protection**

Peak runoff control shall be provided for the 1%, 10% and 50% chance storms and volumetric and/ or extended detention control of the 90% mean annual event storm for broad protection of the receiving system, including channel erosion protection and flood peak reductions over a range of return periods. Performance standards and sizing criteria are provided in Section 5608.

**Sec. 5604.1 Inlet Design Add section D as follows:**

**D. Grate Inlets:** Plastic drainage inlets/manholes/junction boxes as well as grate inlets, slotted drains, trench drains, and similar structures shall not be constructed on any public storm sewer system. Plastic (PVC) drainage inlets, manholes and junction boxes as well as grate inlets, slotted drains, and trench drains are discouraged on private storm drainage systems but may be allowed when site constraints make construction of a curb inlet or side opening area inlet impractical. In such cases, plastic drainage inlets/manholes/junction boxes, grate inlets, slotted drains and trench drains may be approved if all of the following conditions are met:

- (1) When used in parking areas, ponding depth must not exceed 7-inches in depth in parking stalls or 9-inches in drive aisles during the 1% storm event assuming that the inlet or drain is 100% blocked.
- (2) A minimum of 1-foot freeboard to any building opening is maintained during the 1% storm event assuming that the inlet is 100% blocked.
- (3) For unpaved areas, the inlet or drain is in a mowed/maintained area to minimize blockages by vegetative debris.
- (4) A standard curb or area inlet must be provided within the limits of the property downstream of the plastic drainage inlet, grate inlet, slotted drain, or trench drain that will intercept the design flow in the event that the inlet/drain is 100% blocked. This condition will be waived where overflows from a blocked inlet/drain will discharge to a stream corridor, improved or unimproved drainage ditch, or other drainage facility capable of conveying the overflow and not negatively impact other property owners or street right of way.
- (5) Plastic drainage inlets, manholes, and junction boxes shall be a minimum diameter of 18-inches in diameter.
- (6) Plastic drainage inlets, manholes, and junction structures shall generally be located outside of vehicular areas.

**Sec. 5605.3 Stream Preservation and Buffer Zones Delete sections A and B 1 and 2 and replace with the following:**

- A. Default Approach:** See Chapter 7, article 5 of City Code for stream buffer and setback regulations. All regulations must be followed.

**Sec. 5605.12 Bank Stabilization Projects Amend section A to read as follows:**

- A.** Bank stabilization projects should generally be limited to cases where existing buildings or infrastructure face significant property damage or safety issues. Projects to stabilize banks to facilitate reductions in buffer widths for new construction should be avoided. **A geotechnical report shall be provided that analyzes the failure mode of the streambank and provides recommendations to stabilize the bank.**

**Sec. 5608.7 Additional Requirements Add the following sections:**

- C. Drainage Easement Restrictions:** Whenever the approved storm water management plan calls for the passage or storage of floodwaters, surface runoff or excess storm water along lot lines, the grading of all such lots shall be prescribed on said plan and established for the passage or storage of storm water. Within these areas, no structure or fence, planting or other material shall be placed or permitted to remain which may damage or interfere with the performance of storm water features, easements; or buffer areas or which may change the direction of flow of storm water or drainage channels; or which may obstruct or retard the flow of water through the storm water features in these areas. Utility easements shall be located and platted so that

utility systems, when installed, will not conflict with storm drainage easements.

- D. Post Construction Certification:** Prior to the letter of acceptance, the project designer, or other party approved by the Director, must certify that the detention facility is fully functional and has been installed in accordance with the approved plans. For Developments not requiring a letter of acceptance, the certification shall be made prior to issuance of a Final Certificate of Occupancy or Certificate of Compliance.

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**SECTION 5700 STRUCTURES**

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The Construction and Material Specifications, titled Section 5700 Structures, approved and adopted on April 17<sup>th</sup>, 1996, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**SECTION 5900  
UTILITY COORDINATION FOR CAPITAL IMPROVEMENTS PROJECTS**

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The Construction and Material Specifications, titled Section 5900 Utility Coordination for Capital Improvements Projects, approved and adopted on March 17<sup>th</sup>, 2010, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**MANUAL OF BEST MANAGEMENT PRACTICES FOR STORMWATER QUALITY**

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The Design Criteria for Stormwater Quality, titled Manual of Best Management Practices for Stormwater Quality published on October 2012 by the Kansas City Metropolitan Chapter of the APWA and Mid-America Regional Council (MARC) is hereby adopted by reference as the Design Criteria for the City of Independence, Missouri, with the additions, insertions, deletions, and changes, if any, prescribed in the following sections of this Article.

**Sec. 4.2 The Level of Service Method Amend the last paragraph of the section to read as follows:**

To determine the LS for a development, the site must be classified as either undeveloped or redeveloped because different procedures are used for each classification. A project is classified as redevelopment when it meets the qualifications **outlined in APWA 5601.3. All other sites follow the procedure for previously undeveloped sites. Sites that qualify for the regional detention basin option shall provide a minimum level of service of five (5).**

**Sec. 6.05 – Maintenance and Repair of Private Stormwater Management Facilities**

**A. General Information:** Proper planning and maintenance of stormwater management facilities (SWM facilities) is essential for effective flood control, water quality management, and the health, safety and welfare of the public. SWM facilities shall include any private stormwater detention, retention, or BMPs. Maintenance of SWM facilities shall include both routinely scheduled activities and non-routine repairs that may be required after heavy storm events or as a result of other unforeseen problems. A proposed inspection and maintenance agreement shall be submitted to the City for all private on-site storm water discharge control facilities prior to the approval of the storm water management plan. Such agreement shall be in form and content acceptable to the City and shall be the responsibility of the private owner. The agreement shall identify any and all parties responsible for maintaining the SWM facilities. Possible arrangements for the maintenance responsibilities may include the following:

1. Use of homeowner associations,
2. Private maintenance by development owner when stormwater facility serves one (1) commercial or industrial property, or
3. Use of business associations.

**A. Required Maintenance Agreement:** All SWM Facility maintenance agreements shall contain, without limitation, the following provisions:

- (1) A description of the property on which the SWM Facility is located.
- (2) The responsible party or parties for maintaining all SWM Facilities.
- (3) Access for the responsible party or parties to maintain all SWM Facilities, as well as right of access to the City as provided in other sections of this Article and City Code.
- (4) An attachment showing the locations and dimensions of all SWM Facilities.
- (5) A statement declaring all properties which will be served by the SWM Facility are granted rights to construct, use, reconstruct, repair, and maintain access to the facility.

- (6) Minimum frequency and levels of maintenance to be done.
- (7) Itemized anticipated annual maintenance expenditures, periodic major maintenance items, facility replacement costs, and expected facility lifetime, to ensure the responsible party may better plan for future maintenance costs.
- (8) Any and all resources available to provide maintenance.
- (9) Any and all prohibited practices and homes or business association enforcement processes for restoration of the SWM Facilities.
- (10) Any and all enforceable rights of the City in the event that the responsible party fails or is unable to perform any of the obligations of the Maintenance Agreement.
- (11) A statement that no amendments to the agreement will become effective unless approved by the City.

**B. Formation of Homes or Business Association:** In the event that the owner or Developer is required to form a homes or business association prior to the sale of any lots, said homes or business association covenants shall include, or reference, the provisions of the approved Maintenance Agreement. Such covenants shall include:

- (1) Mandatory membership into the association for each parcel served by the facility which shall be transferable to all owners in succession, and
- (2) Provisions collecting maintenance costs for all SWM Facilities.

**C. Notice on Plat or Title:** The final plat and homes or business association shall include a deed restriction containing language approved by the Director to provide notice of the presence and maintenance obligations of a SWM Facility. Said deed restriction shall be recorded with the Jackson County Recorder of Deeds at the time of recording the final plat or approval of the final plans. The notice shall run with the land. Failure to provide sufficient notice of the deed restriction to any purchaser prior to transferring any interest in the property shall be in violation of this Chapter. The notice shall be in a form approved by the Director and substantially as set forth below:

"Notice: This site includes Stormwater Management Facilities, as defined and regulated in the Independence Design Manual. Restrictions on the use or alteration of the said Facilities may apply. This property is also subject to the obligations and requirements of the Stormwater Management Facility Maintenance Agreement approved by the City."

When the proposal involves a final plat, this notice shall appear on the face of the plat, as recorded. When the proposals do not involve a final plat, the notice shall be in the form of a Declaration of Restrictions recorded with the Jackson County Recorder of Deeds, and the notice shall include the legal description of the property, the current owner, the application date and other reference to the project, and the notarized signature of the property owner or owners.

**D. Maintenance Inspections:** Regular inspections of stormwater control measures and drainage facilities are key to maintaining a properly functioning and safe drainage system. The property

owners of all SWM Facilities, except for distributed Facilities serving individual residential lots, must submit a maintenance certification report to the City, at the minimum of one (1) year following initial certification, and subsequently every three (3) years thereafter, or as required by the Director. The maintenance certification report shall be completed and sealed by a certified professional or registered professional engineer in the State of Missouri. Professional certification programs must be approved by the Director. Such maintenance certification report shall document each item including, but not limited to, the need for removal of silt, litter and other debris, grass cutting, removal of undesirable vegetation, and replacement of landscape vegetation. Any maintenance needs found must be addressed in a timely manner, as determined by the Director, and the inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the SWM Facility.

- E. City Inspection:** The City may establish an inspection program, including but not limited to: routine inspections, random inspections, inspections based upon complaints or other notice of possible violations, inspection of drainage basins or areas identified as higher than typical sources of sediment or other pollutants, inspections of businesses or industries of a type associated with higher than usual discharges of pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of state or federal water quality standards or the City's NPDES Stormwater permit, and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to, reviewing maintenance and repair records, sampling discharges, surface water, groundwater, and material or water in drainage control facilities, and evaluating the condition of drainage control facilities and other Stormwater management practices.
- F. Right of Entry for Inspection:** When any Stormwater Management Facility is installed on private property, or when any new connection is made between private property and a public storm sewer system, the property owner shall grant to the City in a manner and form acceptable to the Director, the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when the City has a reasonable basis to believe that a violation of this Ordinance is occurring or has occurred, and to enter when necessary for abatement of a public nuisance or correction of a violation of this Ordinance.
- G. Records of Installation and Maintenance:** Parties responsible for the operation and maintenance of a SWM facility shall make records of the installation and of all maintenance and repairs and shall retain the records for at least five (5) years. These records shall be made available as digital files, such as PDF, Microsoft Word, or email. These records shall be made available to the Director during inspection of the Facility and at other reasonable times upon request.
- H. Failure to Maintain:** If a responsible party fails or refuses to meet the requirements of the maintenance covenant, the Director, after reasonable notice, may correct a violation of the Standards or maintenance needs by performing all necessary work to place the SWM Facility in proper working condition. In the event the SWM Facility becomes a danger to public safety or public health, the Director shall notify the party responsible for maintenance of the SWM Facility in writing. Upon receipt of that notice, the responsible person shall have thirty (30) days to effect maintenance and repair of the SWM Facility in an approved manner. In the event of an emergency, when the Director determines that the SWM Facility poses an immediate danger to life or property, no notification period shall be required prior to beginning

mitigation work. After proper notice, the Director may enforce the maintenance provisions of this Chapter with any or all of the following enforcement measures as allowed by City Code:

- (1) **Notice of Violation:** The Director is authorized to serve a Notice of Violation or order on any person or entity responsible for maintaining the Facility. Such Notice shall order abatement of the violation by the responsible person or entity.
- (2) **Lien on Property:** The Director may assess the owner(s) of the Facility for the cost of repair work and any penalties; and the cost of the work shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes by the county.
- (3) **Administrative Fines:** The Director may levy administrative fines against any person or nondomestic source that is found to have violated this chapter or City code. Administrative fines may be added to the next utility service bill or separately invoiced.
- (4) The Director may use any other enforcement mechanism as listed in City Code.

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**MANUAL OF TRAFFIC SIGNAL DESIGN CRITERIA**

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**A. General Requirements**

The requirements herein set forth shall adhere to the design of all publicly financed or privately financed traffic signal systems, and traffic signal systems to be installed in the public street right-of-way or on other public property under the jurisdiction of the City of Independence (City). All work shall conform to the requirements set forth in this article and the latest edition of the *Manual on Uniform Traffic Control Devices* (MUTCD).

**B. Traffic Signal Systems**

Traffic signal systems shall consist of the signal controller, signal poles, signal heads, cable, conduit, detection, communication equipment, and any other appurtenances not herein expressly stated, that are required to provide a complete, operable traffic signal system. Components and equipment of the system shall be approved by the City Traffic Engineer.

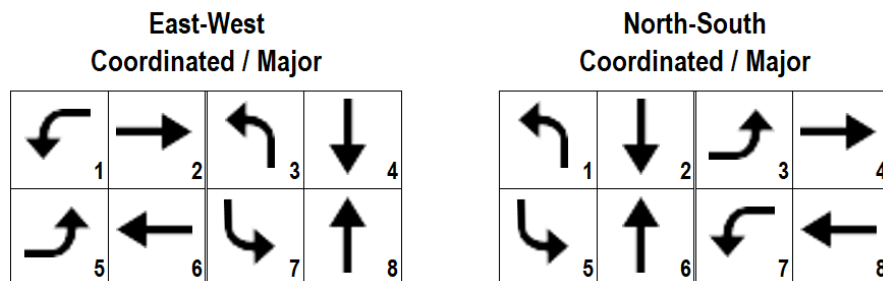
**C. Design Criteria**

The criteria specified within has been established to provide uniform procedures to aid the design engineer (Engineer) in preparing improvement plans for projects in the City. These criteria are not intended to be comprehensive so as to restrict the Engineer from utilizing innovative design; however, they may be modified only with prior authorization of the City Traffic Engineer.

**D. Signal Phasing**

Traffic signal phasing shall be proposed and deliberated with the City Traffic Engineer, prior to plan approval. Traffic signal phasing will be illustrated on the plans using a NEMA diagram. The City uses two standard phasing sequences, depending on whether the major roadway or coordinated movements are north-south or east-west, as shown in Figure 1:

Figure 1 – Standard Phasing Sequences



### **E. Signal Heads**

All vehicular traffic signal heads shall be sized, located, and placed in accordance with the MUTCD and backplates shall be provided, unless otherwise indicated by the City Traffic Engineer.

All traffic signal and pedestrian indications shall be LED. Pedestrian signal heads shall be countdown.

### **F. Emergency Vehicle Preemption**

Emergency vehicle preemption equipment (Opticom) shall be shown on the signal plans and designed for all directions of traffic at an intersection, including private driveway approaches. Opticom discriminators shall be placed on far-side mast-arms, unless otherwise specified by City Traffic Engineer. Final placement shall be approved by the City Traffic Engineer.

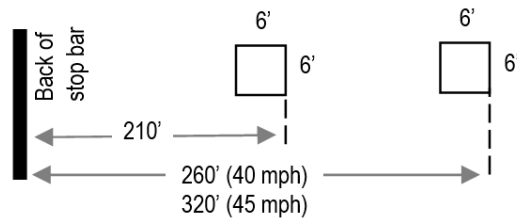
### **G. Vehicle Detection**

Video detection shall be used for stop-line detection at all signalized intersections, unless otherwise specified by the City Traffic Engineer. The video detection system type and manufacturer shall be approved by the City Traffic Engineer. Detection cameras should be mounted to the signal mast arm via a six-foot riser arm centered over the middle of the intersection approach, or to the luminaire arm attached to the signal pole, if one is available or existing. The manufacturer's representative shall be consulted to determine the proper placement of the video cameras; and documentation shall be obtained from the manufacturer's representative indicating that the placement is acceptable. In addition to the video detectors, detection zones should also be illustrated and numbered on the signal plan. Detection zones are typically shown 6' x 50', centered in the lane, with the leading end of the zone two feet in advance of the stop line.

### **H. Detector Loops**

Detector loops shall only be used for advance detection, and shall be 6' x 6', placed centered in the lane. Advance detector loops shall only be used on streets with posted speeds of 40-mph or more and shall be placed at standard distances as illustrated in Figure 2 (measured from the back of the stop bar to the back of the loop).

Figure 2 – Loop Detector Placement



### I. Traffic Signal Boxes

Pull boxes should be provided whenever conduit changes direction and adjacent to poles and traffic signal cabinets. Pull boxes should be used adjacent to detector loop locations for the splicing of loop wire to the lead-in cable. The type of box used is based on the number of conductors entering the box, as referenced in the below Table 1:

Table 1 – Box Type Criteria

Conductors Entering Box	Required Box Size
0-22	(Class 1) 17" W x 30" L x 22" D
23-68	(Class 2) 24" W x 36" L x 26" D
>68	(Class 3) 30" W x 48" L x 36" D

Pull boxes should be installed at least 1 foot 6 inches from the back of curb to the center of the box and no closer than 2 feet to any pole. Pull boxes shall not be located within a sidewalk or shared use path. The distance between traffic signal boxes shall not exceed 200 feet to facilitate the pulling of cable. Traffic signal box lids (including interconnect) shall be labeled "TRAFFIC SIGNALS".

### J. Conduit

All conduit for traffic signal installations shall be either Schedule 40 polyvinyl chloride (PVC) conduit or Schedule 40 high density polyethylene (HDPE) conduit. Material requirements for conduit that will remain exposed—such as an above-ground run to the power supply—shall be specified and approved by Independence Power & Light.

Signal conduit that extends from signal poles to adjacent pull boxes shall consist of a minimum of 3-inch conduit. Signal conduit that extends from the signal controller to the adjacent pull box should consist of two 4-inch conduits. Any conduit crossing the street should be a minimum of 4 inches. Signal conduit for advance detectors and interconnect cable should typically be 2-inch

conduit.

Street lighting cable is permitted in signal conduit runs and boxes. The conduit sizes shown in Table 2 are typical applications. No street lighting cable should run through, or terminate in, the traffic signal controller cabinet.

At new installations where interconnect is **not** required, an additional 2-inch conduit run from the controller to the adjacent pull box (with pull string) should be included for potential future interconnect.

The Engineer shall verify that the signal conduit is properly sized so that no more than 40 percent of the conduit cross-sectional area is filled. For estimating conduit quantities, center-to-center distances should be used, as referenced in the below Table 2:

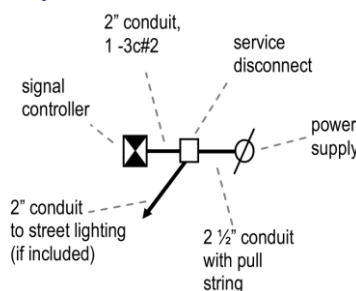
Table 2 – Conduit Sizes

Advance Detection	2"
Interconnect	2"
Signal Poles to Adjacent Pull Box	3"
Signal Cabinet to Adjacent Pull Box	2-4"
Street Crossing	4"

### K. Power Supply

The Engineer shall coordinate and verify the location of the proposed power supply with Independence Power & Light, or the appropriate utility company, to ensure availability of service. A service disconnect shall be located between the controller and the power supply. The service disconnect shall be located as close to the power supply as possible. Any and all 2-inch conduit with a pull string should extend from the power supply to the service disconnect. Any and all 2-inch conduit with a 3-conductor cable should extend from the service disconnect to the cabinet as shown in the below Figure 3:

Figure 3 – Power Supply / Conduit Layout



## **L. Signal Poles & Foundations**

Signal poles shall be located a minimum of 6 feet from the back of curb to the center of the pole. Where there is no curb, signal poles shall be located a minimum of 6 feet from edge of pavement to the center of the pole. However, no signal pole, pole base, or appurtenance shall be located within 2 feet of the face of curb or edge of shoulder. Signal poles shall not be located in a median or channelizing island. When pedestrian signal heads are used, signal poles with push buttons should be placed at locations that comply with all Americans with Disabilities Act (ADA) provisions, to the maximum extent possible. The City does not require that signal poles be aligned with the crosswalk locations; however it shall be required that the pedestrian signal head remain visible for all pedestrian traffic.

Pole foundations, except pedestals, should be flush-mounted Type B except in locations without curb and locations where the posted speed limit is greater than 45 mph. At these locations, a Type A foundation, with a conical base that extends above ground, shall be used, unless otherwise required by maximum bolt pattern described on the standard drawings.

All pole foundations, except pedestals, at an intersection shall be of the same type.

Astro Brackets shall be used for attaching signal heads to poles.

## **M. Controller & Cabinet Assembly**

Controller Cabinets shall be located adjacent to and behind the sidewalk or at least 10 feet from the back of curb to the center of the cabinet, where no sidewalk exists. In locations where no curb exists, the controller shall be placed more than 10 feet from the edge of pavement to the center of the controller where possible.

The controller type and manufacturer shall be approved by the City Traffic Engineer. The controller should be delivered to the City in advance of installation for programming. A note regarding delivery to the City shall be referenced on the plans.

## **N. Wiring**

The City has standardized the number of conductors required for the various types of traffic signal equipment.

Vehicle signal heads should be supplied by 7-conductor cable. Typically, the City uses two cables per through-phase and one per left-turn phase for the vehicle signal heads, regardless of how many heads are on the mast arm or the signal pole. The first through-phase cable shall terminate at the head mounted on the pole shaft, and the second through-phase cable shall extend to the end of the mast arm, with the mast arm through heads being fed by jumpers.

Pedestrian signal heads and pushbutton detectors, when used, should be fed by separate cables extending from the controller to the signal pole: 1 (one) 5-conductor for each pedestrian head on

the pole, and 1 (one) 2-conductor for each pushbutton detector on the pole.

Detector lead-in cable (for advance detection) should consist of 2-conductor shielded cable. Detector loop wire should consist of single-conductor PVC/nylon with tube jacket.

The Interconnect cable type shall be as shown on preliminary and final plans.

Street lighting cable for traffic signals shall consist of 1-2c No. 8 AWG wire from the power supply to the luminaire. Street lighting cable for luminaires on signal poles should be spliced inside the pull box adjacent to the pole. If street light poles are integrated with the traffic signal system, the street light poles should have break-away accommodations and be wired according to the City's Street Lighting Standards and Specifications. In estimating quantities, cable slack shall be computed according to the below Table 3:

Table 3 – Cable Slack Estimation

Pull-Box: Termination	3'
Pull-Box: Pass Through	6'
Controller	8'
Pedestrian Push Button	9'
Pedestrian Signal head	10'
Vehicular Signal head	13'
Service Disconnect	12'

The City shall take preference of right-turn overlaps to be hard-wired. This shall be constructed by connecting the yellow and green arrows in the signal head to appropriate field terminals.

Splicing of cables shall not be allowed. The City Traffic Engineer shall be inclined to object final inspection and require facilities to be reconstructed in an approved manner.

### **O. Timing**

Traffic signal timings will be provided by the Engineer or the City and will not be referenced or illustrated on the plans.

### **P. Overhead Signs**

Typically, the overhead street name signs should be placed between the signal pole and the first vehicle signal head.

The Engineer will compute the sign dimensions and show them on the plans. Lettering sizes are included in the City's standard plans.

## **Q. Traffic Signal Interconnect**

At locations specified by the City Traffic Engineer or where a new traffic signal is to be constructed within a half-mile of a new or existing traffic signal, interconnection of the traffic signals shall be required and installed in accordance to the specifications within Section M. Box labeling and spacing shall be installed in accordance to the specifications within Section I.

At new installations where interconnect is not required, future interconnect conduit shall be installed in accordance to the specifications within Section J.

Traffic signal interconnection type shall be approved by the City Traffic Engineer.

## **R. Plan Requirements**

Traffic signal plan requirements shall be consistent with the most recent edition of the MoDOT Standard Plans for Highway Construction and Specifications.

## **S. Conflicts**

Where conflicts between MoDOT standards, City Code, and these requirements are present, the Engineer shall determine an appropriate resolution after meeting with all pertinent City departments to determine the appropriate requirements to follow.

**CITY OF INDEPENDENCE, MISSOURI  
DESIGN MANUAL**

**TRAFFIC CALMING POLICY**

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**INTRODUCTION**

The City of Independence Traffic Calming Program reflects the City's commitment to safe, family-friendly communities and quality neighborhoods and is a guide used by staff to gather information for requests regarding neighborhood traffic safety concerns. This program will be a cooperative effort by four City departments (Municipal Services, Police, Fire, and Community Development) and the public. The Traffic Engineering group of Municipal Services will work with the Police Department and residents in a distinctive, cooperative, and comprehensive effort to identify traffic problems in their neighborhoods and seek appropriate solutions. Citizen participation is encouraged and is an important part of all traffic safety programs.

The purpose of this program is to address neighborhood traffic concerns on residential local and residential collector streets in working towards a safer roadway network. The goal of the program is to promote safe, family-friendly, and quality neighborhoods by reducing the negative impact of traffic in residential areas through education, enforcement, engineering, and emergency response.

**Goals and Objectives**

- Promote safe and quality neighborhoods
- Promote open and transparent communication between the City and the public
- Promote family-friendly communities
- Provide a formal application process to be filled out by the public
- Provide direction and expectations to the public making requests
- Provide a clear, consistent approach to address traffic concerns
- Provide engineering, enforcement, and educational solutions
- Provide specific criterion for implementation of traffic calming measures
- Reduce the negative impacts of vehicular traffic
- Reduce traffic crash frequency and severity
- Enhance the street environment

Specific action will be taken to address neighborhood traffic concerns identified through a Traffic Calming Program Study that can be initiated through a request form.

**TRAFFIC STUDY REQUEST**

Requests for a Traffic Calming Program study may be initiated by any of the following:

Residents, property owners, or neighborhood associations may request a study be conducted by submitting an application and signed petition to the Municipal Services City Traffic

Engineer. Upon receipt of a valid application, staff will prepare a petition for the applicant to distribute. The petition will list the property ownership facing the street segment(s) listed on the application in the areas of concern and adjacent properties with no other access (i.e. No Outlet or Dead End streets). A street segment is defined as that part of a street between successive intersecting streets and shall be a minimum of 600 feet, measured from the middle of each intersection. The petition must be returned with at least fifty percent (50%) support from property ownership along the impacted area. For impact areas adjacent to more than 20 properties, 10 valid signatures will be required. Petitions will be reviewed by City staff for validity by verifying signatures of property ownership to County maintained records.

Police Department, Fire Department, Schools, or other similar public service agencies may request that studies be undertaken to solve a specific concern with respect to traffic and pedestrian safety.

City staff may initiate a study to solve a specific concern with respect to vehicular traffic, pedestrian, bicycle safety, or operations. This concern may be identified through data collection and monitoring.

At a minimum the request should identify: the applicant; the purpose of the study; location; description of the perceived problem (i.e. excessive traffic speed or traffic volume, time of day the problem occurs, specific location, etc.); and a neighborhood representative (person of contact for the neighborhood). The neighborhood representative may be the applicant or someone designated by the residents to represent the community. This person will also be responsible for the organization of petitions and coordinating any associated neighborhood meetings with the City's Traffic Engineer and other City Departments involved.

Each request will be recorded into the City's database of Traffic Calming Requests. Upon receipt of a valid study request, City staff will contact the neighborhood representative to arrange a neighborhood meeting, if necessary, where City staff, including a representative of the Police Department (when applicable), Fire Department (when applicable), and residents can discuss the Traffic Calming Program, boundaries of the impact area, and solicit their input about the submitted request. The impact area includes properties which may be affected by actions taken to mitigate the concerns expressed in the request. Impact areas may include a single street segment or multiple streets depending on the nature of the concern. City staff will attempt to clarify the nature and extent of the perceived problem at this initial meeting (e.g. excessive speed, high traffic volume, cut-through traffic, and whether the problem is at mid-block or at an intersection).

After discussion with the applicant and/or neighborhood representatives, additional information and data will be gathered to help recognize the concern, rank the priority in relation to other concerns, and identify what action and treatment(s), if any, should be implemented. Data collected may include street width, street classification, availability of parking, fronting land uses, presence of bicycle or pedestrian routes, sidewalks, locations and proximity of parks and schools, vehicular and pedestrian counts, crash records, travel speeds, and other appropriate information to assist in addressing the concern.

When the necessary information and data has been acquired to assess the situation identified in the request and a clear understanding of the concern discussed with the applicant has been established, a study will be completed by City staff to determine which course of action or combination of actions should be taken: education, enforcement, and/or engineering. The results and

recommendations of the study will be presented at a neighborhood meeting to be organized by the neighborhood representative.

One year after the establishment of any safety zone or the installation of physical measures, a follow-up traffic study will be conducted to assess the impact. Depending on the results of this study, additional action may be required in any or all of the three areas. Not all traffic concerns can be mitigated by education, enforcement, engineering, or some combination of the three.

### **The Four E's of Traffic Safety**

**Education:** Neighborhood Meetings, Radar Speed Trailer, Changeable Message Signs, Neighborhood Newsletters, Informational pamphlets, City Web-Site, Government Access Channel;

**Enforcement:** Assigned enforcement areas are conducted by all officers of the Traffic Unit, Scheduled return enforcement of completed program areas, Random enforcement of areas with a low volume of violators, Establishment of neighborhood traffic safety zones, Increased traffic fines;

**Engineering:** Review areas for atypical circumstances, perform engineering study of impacted area, investigate geometric modifications to the street which may include construction of recommended traffic calming measures identified by the Institute of Transportation Engineers (ITE) and/or the Federal Highway Administration;

**Emergency Response:** Review impacts related to response times when engineering solutions are under consideration, proposed design or recommended from the engineering study.

## **EDUCATION**

Whether the study finds a problem exists or not, a neighborhood meeting should be coordinated through the neighborhood representative where City staff has the opportunity to educate the public on the Traffic Calming Program and the results of the study. For any case, these actions promote safe and quality neighborhoods for all users of residential streets.

If the study does not identify an existing problem, City staff will attempt to raise public awareness and convey reasonable traffic expectations in residential neighborhoods through education. The local traffic conditions will be explained to the residents and sources of traffic safety information will be presented (city web-site, informational pamphlets, government access channel, etc). Another application into the program for the same area may not be submitted within two years from the date the traffic study was completed, unless the City Traffic Engineer determines there have been significant changes to the transportation system that would impact future applications.

If there is an occasional problem identified during the course of study that doesn't warrant enforcement or engineering measures, means of improving neighborhoods by reducing the negative impact of traffic through education will be discussed. Typically, most of the vehicles using residential streets are people who reside in the neighborhood. The City in conjunction with the Police Department will attempt to educate the residents on non-invasive methods of deterring traffic problems within a neighborhood. These methods may include traffic safety campaigns,

message boards, and radar speed display units. Neighborhood traffic safety campaigns usually consist of personalized letters or general flyers that are distributed to all residents in the neighborhood. The letters and flyers may cite statistics on speeding, cut-through traffic, or other findings summarized in the study for the area and appeal for compliance with traffic laws. Message boards may be used to raise driver awareness regarding traffic concerns in the area. Radar speed display units can be used to remind drivers that they are speeding, thus encouraging compliance with the speed limit. If an education approach is recommended in the study, but not a traffic enforcement zone or engineered treatments, another application into the program for the same area may not be submitted within two years from the date the traffic study was completed, unless the City Traffic Engineer determines there have been significant changes to the transportation system that would impact future applications.

If the problem is severe enough that enforcement and/or engineering treatments are recommended, the education techniques described above will still be discussed. The combination of education with enforcement and/or engineering is a benefit to the residents and an important aspect of the program. Since enforcement and engineering treatments may be recommended and not be supported, education could be the only initiative explored.

## **ENFORCEMENT**

Enforcement strategies to relieve traffic concerns validated by the traffic study must be supported by the majority of the residents within the impact area. If the public has indicated a majority interest in enforcement techniques discussed at the neighborhood meeting, City staff may coordinate with the Police Department to pursue increased presence and ticketing in the area.

Assigned enforcement areas are conducted by all officers of the special operations unit with scheduled return enforcement of completed program areas and random enforcement of areas with a low volume of violators.

Some areas where problems persist may be designated Traffic Enforcement Zones by the Municipal Services and Police Department. These areas would have permanent signs installed advising drivers of the area status and increased fines if stopped for traffic violations in that area, for a maximum two-year period. To be designated a Traffic Enforcement Zone, the area must be recommended by City staff, the Police Department, and the local residents. The City will contact the designated applicant or neighborhood representative and request a petition prior to action. The neighborhood representative must submit a signed petition in favor of designating the area a Traffic Enforcement Zone to Municipal Services. The petition must clearly state what it is for (in favor of Traffic Enforcement Zone for the street(s) “location”) and the petition must be signed by at least 70% of the properties within the impact area. The City will review the petition for validity and check the signatures of the property owners against property ownership records maintained by the County. The petition must be submitted within 30 days of the petition request or it shall be considered unsuccessful. A Traffic Enforcement Zone will be removed after two years of installation. At the request of the Police Department or at the request of a resident within the neighborhood with a resident petition signed by at least 70% of the residents within the original impact area the Traffic Enforcement Zone may remain in place.

Upon any applied enforcement technique or unsuccessful petition, another application to the Traffic Calming Program for the same area cannot be submitted within two years from the date the traffic study was completed, unless the City Traffic Engineer determines there have been significant changes to the transportation system that would impact future applications.

## **ENGINEERING**

### **Background**

If all education and enforcement initiatives are unsuccessful or inappropriate due to the nature of the concern (e.g. cut-through traffic); the use of traffic calming treatments may be considered. Traffic calming is characterized as the combination of mainly physical measures that reduce the negative effects of motor vehicles, alter driver behavior, and improve conditions for non-motorized street users. It is the retrofitting of physical measures into the roadway to reduce traffic speeds and cut-through traffic, thereby generally making the street environment more safe and pleasant for pedestrians, other drivers, and residents. Traffic calming is not route modification, traffic control devices (notably STOP signs and speed limit signs that require enforcement), and streetscape. By contrast, traffic calming measures are intended to be self-enforcing. Traffic calming, by its nature, will impact neighborhoods and residents within the neighborhood the most. Thus, the implementation of any traffic calming treatment without overwhelming local support can have significant backlash. Traffic calming has several significant benefits, as well as, some drawbacks. Summarized below are a few benefits and disadvantages of traffic calming.

#### **Benefits of Traffic Calming:**

- Reducing speed
- Reducing traffic volume
- Reducing collision frequency and severity
- Increased safety for non-motorized users of the street
- Enhancing the street environment
- Reducing cut-through vehicle traffic
- Increase in quality of life
- Incorporates the preferences and requirements of people using the area along street(s)
- Reducing the negative impacts of vehicles on the environment and the neighborhood
- Reducing the need for police enforcement, hence reducing costs (cost is offset by the reduced need for police enforcement)

#### **Disadvantages of Traffic Calming:**

- Increased emergency response times
- Vehicles may be damaged and people injured by inappropriate driver behavior (e.g., driving too fast or inattentive)
- Snow removal is more difficult and time consuming
- Installation & maintenance costs
- Additional signs and lighting may be required
- Increased maintenance, especially where landscaping is included
- Annoying to some residents (noise and inconvenience)
- Some treatments can restrict resident access

Traffic calming treatments have been implemented in the United States since before the 1980's. In some countries these same treatments have been used long before the 1970's. Many of the successful traffic calming treatments used are into their second and third generation. There are more than 25 treatments commonly used around the world. Many of these treatments are used in the United States. The most effective traffic calming treatments are those that deflect vehicles vertically, horizontally, or both. Some of the treatments applicable for use are available for viewing online through the [Federal Highway Administration, Safety: Toolbox of Individual Traffic Calming Measures](#). These techniques include Horizontal Deflection, Vertical Deflection, or other measures. City staff may determine to use one or more of these treatments as a possible solution for traffic concerns. However, the Traffic Calming Program Study must show there is a need for traffic calming devices and that the street is suitable for treatment. Temporary devices may be utilized when appropriate to verify suitability of a permanent solution or to gauge public reaction before implementing the permanently recommended solution, when insufficient funds are available for permanent construction, or as a short term initiative due to temporary major traffic generating events or nearby construction on a parallel system.

### Qualification

Traffic calming treatments are typically the most expensive means of mitigation and have the most significant impact to residents. For these two reasons, all traffic calming treatments must be overwhelmingly supported by the citizens within the impact area and meet certain qualifications for implementation.

Not all streets are suitable for traffic calming treatments. Suitability is based on speed, volume, street classification, and several other criteria. To be qualified for traffic calming treatments a street must meet the following requirements and score more than 50 points on the point rating system described in Tables 1 and 2:

Streets classified as residential "local" or "collector", meeting the following criteria:

- No more than 2 travel lanes or 40 ft pavement width
- Horizontal curve of 300 ft radius or greater
- Vertical curve with adequate stopping sight distance
- Grade of 8 percent or less
- Posted speed limit of 30 mph or less
- No more than 5 percent long wheel-base vehicles
- Not on a primary emergency response route, snow route, or transit route

### Residential Local Street Point Criteria

The point criteria for local streets are described in the following table:

Criteria	Point Assignments for Residential Local Street
Speed	3 Points shall be assigned for each mph over the posted speed limit based upon the 85 <sup>th</sup> percentile speed [(85 <sup>th</sup> percentile speed – posted speed limit) x 3 points]
Volume	1 Point shall be assigned for every 200 vehicles of daily traffic [ADT/200]

Pedestrian Routes & Bikeway	10 Points shall be assigned for not having continuous sidewalk on either side of the street 5 Points shall be assigned for only having sidewalk on one side of the street 5 Points shall be assigned if the street is a bicycle route (signed or unsigned)
Correctible Crashes	Correctible crashes shall be evaluated for a 3-year period and should include the Impact Area and all intersecting approaches (within 150 feet) of the study area: 1 Points shall be assigned for each Property Damage Only crash 3 Points shall be assigned for each Personal Injury crash 6 Points shall be assigned for each Fatal crash
Pedestrian Generators	5 Points shall be assigned for every school, park, community center, and church located within 1000' of the project area (10 Points if Elementary or Middle School)
Driveway Density	1 Point shall be assigned for every 20 driveway access points within the impact area

**TABLE 1**

### Residential Collector Street Point Criteria

The point criteria for collector streets are described in the following table:

<b>Criteria</b>	<b>Point assignments for Residential Collector Street</b>
Speed	3 Points shall be assigned for each mph over the posted speed limit based upon the 85 <sup>th</sup> percentile speed [(85 <sup>th</sup> percentile speed – posted speed limit) x 3 points]
Volume	1 Point shall be assigned for every 300 vehicles of daily traffic [ADT/300]
Pedestrian Route & Bikeway	15 Points shall be assigned for not having continuous sidewalk on either side of the street 5 Points shall be assigned for only having sidewalk on one side of the street 5 Points shall be assigned if the street is a bicycle route (signed or unsigned)
Correctible Crashes	Correctible crashes shall be evaluated for a 3-year period and should include the Impact Area and all intersecting approaches (within 150 feet) of the study area: 1 Points shall be assigned for each Property Damage Only crash 3 Points shall be assigned for each Personal Injury crash 6 Points shall be assigned for each Fatal crash
Pedestrian Generators	5 Points shall be assigned for every school, park, community center, and church located within 500' of the project area (10 Points if Elementary or Middle School)
Driveway Density	1 Point shall be assigned for every 10 driveway access points within the impact area

**TABLE 2**

### Concept

If the residents support the use of traffic calming measures (as indicated at neighborhood meetings), the project meets the requirements for traffic calming, and is recommended by the results of the study; a conceptual traffic calming plan will be developed. The conceptual plan will be presented at a neighborhood meeting to describe/illustrate the recommended treatment(s). The conceptual plan is Staff's recommendation, but should not be considered the only solution or final solution. Upon discussion, residents may desire alternate treatments, modifications to the recommendation, or no treatment at all. Revisions may be made by the City as a result of this meeting and presented in another neighborhood meeting, if required.

### **Petition**

After the conceptual plan has been established, the City will contact the designated neighborhood representative and request a petition prior to implementation. The neighborhood representative must submit a signed petition in favor of implementing the conceptual traffic calming measure(s) presented in the last neighborhood meeting to the Municipal Services Traffic Engineering Group. The petition must clearly state what it is for (in favor of implementing/constructing traffic calming measure "type" for the street "location"). The petition must be signed by at least 70% of the properties within the impact area and by each of the property owners immediately adjacent to the proposed traffic calming devices. For instance, if a speed hump is to be installed in front of a resident's house, the resident must agree to it. The City will review the petition for validity and check the signatures of the property owners against property ownership records maintained by the County. The petition must be submitted within 30 days of the petition notice or it shall be considered unsuccessful. If the petition is unsuccessful, another application into the program for the same area may not be submitted within two years from the date the traffic study was completed, unless the City Traffic Engineer determines there have been significant changes to the transportation system that would impact the recommendation.

### **Priority**

Traffic calming projects recommended as a result of a study are programmed on an as recommended basis, utilizing funds that would otherwise be available for street improvements. Programming funds for Traffic Calming projects will be based on a ranking system and available funding. A ranking system will prioritize projects based on rating scores received from the study plus points that incorporate funding and time. A project will be awarded 2 points for every year, up to 5 years (10 total points) it remains on the project list. If a project is partially or wholly funded by the applicant/neighborhood residents, a point is awarded for each percent of the total estimated project cost funded above 50%, for a maximum 50 points if 100% funded. If a project does not get programmed within 5 years, it will be dropped from the system and an application may be resubmitted.

### **Design**

The project will be designed according to standard City procedures, generally conforming to practices set forth by the Institute of Transportation Engineers (ITE) and/or the American Municipal Services Association (APWA).

### **Construction**

The project will be let, constructed, and inspected following standard City procedures.

## **Modification/Removal**

Traffic calming measures may be removed or modified after a one-year period for any of the following reasons:

- Resident request, with sufficient supporting documentation

If residents of the impact area feel the strategy has not achieved the goals defined in the public process and are significantly dissatisfied, they can submit a petition for modification or removal that has been signed by over 50% of the properties within the pre-defined impact area. Upon receipt of a valid petition the City will develop a proposal (which may include the removal of the measure or measures) to be presented in a public meeting. After the meeting, the City will request a petition be submitted by the residents within the impact area in favor of the modification/removal proposal to the Municipal Services Traffic Engineering group. The petition must clearly state what it is for (in favor of modification/removal of traffic calming measure “type” for the street “location”). The petition must be signed by at least 70% of the property owners within the impact area. The City will review the petition for validity and check the signatures of the property owners against property ownership records maintained by the County. The petition must be submitted within 30 days of the petition request. If the petition is unsuccessful, the request will be dismissed and further application for modification/removal may be initiated after 12 months. If the request is granted, the neighborhood will be responsible for funding the cost to remove or modify the traffic calming measure. When traffic calming measures are removed the area will not be considered for traffic calming for a minimum of three years after removal.

Traffic calming measures may be removed or modified for any of the following reasons:

- Public Safety issues are identified after installation, with sufficient and supporting documentation; or
- If unacceptable impacts are identified through a subsequent traffic study; or
- If a street improvement project is planned and would significantly alter or improve roadway features

## **Emergency Response**

In the event an engineering solution has been recommended by City staff and a conceptual plan has been developed, Police and Fire Departments shall evaluate impacts to response times based on the design concept of the recommended solution. If in the process of evaluation, the recommended devices are deemed overly detrimental to emergency response times the project may be significantly altered or eliminated to provide adequate response times to the Impact Area or surrounding area.





# CITY OF INDEPENDENCE CONSTRUCTION MANUAL

# CITY OF INDEPENDENCE, MISSOURI CONSTRUCTION MANUAL

## SECTION 1. GENERAL PROVISIONS

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### Sec. 1.01. - General.

The provisions in this section shall be applicable to all public improvement projects within the limits of the City of Independence. The provisions shall apply to all parts of the Technical Specifications.

### Sec. 1.02. - Referenced Standards.

1. Where in these specifications the following abbreviations are used, they shall be understood to mean as follows:

<b>A.A.S.H.T.O.</b>	-	American Association of State Highway Transportation Officials
<b>A.C.I.</b>	-	American Concrete Institute
<b>A.I.S.C.</b>	-	American Institute of Steel Construction
<b>A.P.W.A.</b>	-	Kansas City Metropolitan Chapter of the American Public Works Association
<b>A.R.E.A.</b>	-	American Railway Engineering Association
<b>A.S.T.M.</b>	-	American Society for Testing and Materials
<b>A.N.S.I.</b>	-	American National Standards Institute
<b>A.W.W.A.</b>	-	American Water Works Association
<b>C.R.S.I.</b>	-	Concrete Reinforcing Steel Institute
<b>M.C.I.B.</b>	-	Mid-West Concrete Industry Board, Inc.
<b>M.H.T.C.</b>	-	Missouri Highway and Transportation Commission
<b>M.U.T.C.D.</b>	-	Manual of Uniform Traffic Control Devices

2. The serial designation of each reference shall be the latest year of adoption or revision, unless otherwise specified.

### Sec. 1.03. - Definitions.

1. In these specifications the following words or terms are used, they shall be interpreted as follows:

**BOND** shall mean performance, maintenance, and statutory bonds and other instruments of security furnished by the Contractor and his surety in accordance with these specifications.

**CITY** shall mean the City of Independence, Missouri.

**CONSTRUCTION SPECIFICATIONS** are the complete directions, provisions, and

requirements contained in the Standard Specifications and Standard Drawings.

**CONTRACTOR** shall mean the individual, firm, partnership, joint venture, corporation, or association contracting with the City, or private owner, to perform the work.

**DAY** shall mean a calendar day of twenty-four (24) hours measured from midnight to the next midnight.

**DESIGN ENGINEER** shall mean a licensed engineer under contract to the developer or the City of Independence for the purpose of preparing and sealing engineering design drawings and specifications for a specific public improvement project.

**DIRECTOR** shall mean the Director of Municipal Services.

**DESIGN AND CONSTRUCTION MANUAL** shall mean the Design Manual, Standard Drawings and Standard Specifications as adopted by the City.

**ENGINEER** shall mean the City Engineer, or any Engineer, Architect or Agent designated by the Director of Community Development.

**INSPECTOR** shall mean an authorized representative of the Community Development Director who has been assigned to assure conformance to the requirements of the design drawings and specifications by the Contractor.

**MATERIALS** are any processed, manufactured, or natural items placed in the work.

**OREQUAL:** In order to establish a basis of quality for items of the work, certain processes, equipment, proprietary products or materials and their manufacturer may be mentioned by name. Such mention is not intended to exclude other processes, equipment, proprietary products or materials and their manufacturer, provided they are proven by the Contractor, to the satisfaction of the Engineer, to be equal in quality and performance to the name specified prior to their inclusion in the work.

**PERMIT** shall mean the official document issued by the City, authorizing the construction of an improvement, subject to City inspection, control and approval.

**PLANS** are the official drawings, Standard Drawings, profiles, and typical cross sections approved or furnished by the Engineer which show the location, character, dimensions, and details of the work.

**PRIVATE OWNER** shall mean the individual, corporation, partnership, joint venture, association or other legal entities paying all costs associated with the construction of an improvement under a permit granted by the City.

**STANDARD DRAWINGS** shall mean the official standard drawings approved by the Director and adopted by the City Council.

**STANDARD SPECIFICATIONS** shall mean the official standard specifications approved by the Director and adopted by the City Council.

**STREET** shall mean the whole area within the legally established right-of-way limits.

**SUBGRADE** is that portion of the construction area which has been pre-pared, as specified, and upon which a layer of specified material, sub-base course, base course, pavement, or other improvement is to be placed.

**TRAFFIC CONTROL** shall mean any and all such devices as signs, pavement markings, barricades or other devices necessary for the temporary or permanent regulation, guidance, or warning of traffic as it travels on the public right-of-way in accordance with the Manual on Uniform Traffic Control Devices (**MUTCD**).

**WORK OR THE WORK** shall mean the furnishing of all labor, materials, equipment and other incidentals, necessary for the successful completion and the carrying out of all duties and obligations imposed by the permit or contract.

2. Where not inconsistent with the context, words used in the present tense include the future, words in the plural number include the singular number and words in the singular number include the plural number. The words "will", "shall", and "must" is always mandatory and not merely directory.
3. Whenever the words as directed, as required, as permitted, or words of like meaning are utilized it shall be understood that the directions, requirements, or permission of the Director is intended. Similarly, the words approved, acceptable, and satisfactory shall refer to approval by the Director.

**CITY OF INDEPENDENCE, MISSOURI  
CONSTRUCTION MANUAL**

**SECTION 2. CONTRACT AND PERMITTING PROVISIONS**

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**Sec. 2.01. - General Conditions.**

This Article governs general provisions regarding the execution of all construction projects within the limits of the City of Independence.

All public improvements, including those by private developers, constructed within the City shall be in accordance with the current Standard Details (hereinafter, the "Standard Details") and the minimum design standards and specifications set forth in these specifications.

**Sec. 2.02. - Shop Drawings and Information.**

- A.** All materials and equipment to be supplied and installed under any contract or public improvements permit are subject to approval by the Engineer or Construction Manager. The shop drawings are required for quality assurance, reference during construction and for future reference during repairs, alterations, or other City maintenance activities. Shop drawing submittals shall be in accordance with this Section. For this purpose, the Contractor shall provide the Engineer with three copies of shop and other supplemental drawings or a digital copy. All Shop Drawing Submittals shall be accompanied by a transmittal form accurately indicating the materials being transmitted using terminology and notations of these Specifications and Drawings. The Contractor is required to present such drawings and other information in an orderly manner and each delivery of such material to the Engineer. When catalogue pages are submitted, applicable items shall be clearly identified. The current revision, issue number and date shall be indicated on all drawings and other descriptive data.

The ordering or installation of any of the above-described equipment or material prior to the return to the Contractor of drawings approved by the Engineer or Construction Manager will be done at the risk of the Contractor and same may be subject to removal and replacement. Shop drawings shall not be issued for use until after approval with the date of approval noted on the tracing. No work shall be done until the drawings have been so approved.

- B.** All shop drawings shall be submitted to the Engineer seven or more days before installation of the materials or structures. One set will be returned showing corrections required, if any. Revised copies shall be resubmitted after correction until approved. The Owner shall not be responsible for errors on shop drawings, even though approved, or for quantities on bills of material which may be included. Any failure of the Engineer to correct errors on working drawings, or approval or implied approval thereof, shall not relieve the Contractor of the full responsibility for the safe and adequate execution of the work in accordance with the plans and specifications.
- C.** For Precast Concrete structures, shop drawings shall be certified by the manufacturer to be in conformance with the project plans and specifications. The contractor shall check the shop drawings are in conformance with the project plans and specifications

and sign them. The City does not plan to routinely review the shop drawings for privately funded projects but reserves the right to review the shop drawings and inform the developer's engineer of any necessary changes. If the City has comments on the shop drawings, a response shall be made to the developer's engineer within five working days after the receipt of the shop drawings. In either case, a letter will be mailed to the developer's engineer, authorizing the contractor to proceed with construction.

- D.** For Retaining Walls, shop drawings shall be submitted for all retaining walls greater than four feet in height whether privately or publicly maintained. The shop drawings must include appropriate structural analysis of the wall and be sealed by a registered professional engineer. Shop drawings shall be certified by the manufacturer to be in conformance with the project plans and specifications. The contractor shall check the shop drawings are in conformance with the project plans and specifications and sign them. The KCMMB must approve concrete mix designs prior to use in any publicly maintained structure.
- E.** For reinforcing steel, shop drawings shall include whatever diagrams or drawings are necessary to supplement the reinforcing details of the plans, including any special features or variations from details as shown or to serve the convenience of the Contractor; order bills of bars shall include diagrams for the bonding of each bar not to be used straight.
- F.** For mix designs, the Engineer may require mix designs for materials such as removable flowable fill and asphaltic concrete.

**Sec. 2.03. - Bond and Maintenance Guarantee.**

- A.** The Contractor shall provide a bond for faithful performance of the contract and for persons performing labor or furnishing materials in connection therewith, with sureties satisfactory to the Owner and in the form provided. This performance bond shall be in the full amount of the contract and shall have as surety thereon a company authorized to do business in the State of Missouri, qualified as acceptable surety for United States government deposits, and acceptable to the Owner.
- B.** The Contractor will guarantee that the equipment, materials and workmanship furnished under the contract will be as specified and will be free from defect for a period of two years from the date of final City acceptance. In addition, the equipment or materials furnished by the Contractor shall, upon receipt of notice from the Owner, be repaired or replaced without expense to the Owner, and the Contractor shall save the Owner harmless from any damage from faulty workmanship or materials installed under the contract.
- C.** If within ten (10) days after the mailing of a notice in writing to the Contractor or his agent, the said Contractor shall neglect to make or undertake with due diligence to make the aforesaid repairs, the City is hereby authorized to make such repairs at the Contractor's expense; provided, however, that in case of an emergency where in the judgment of the City delay would cause serious loss, hazard, or damage, repairs may be made without notice being sent to the Contractor; and the Contractor shall pay the cost thereof.

#### **Sec. 2.04. - Cooperation With Others.**

The Contractor and subcontractors will be expected to cooperate with forces of the City, utility companies or other contractors who may be working in the area. Contractor shall, as far as possible, arrange work schedules and dispose of materials so as not to interfere with the operations of other contractors or others engaged upon the project or nearby. The Contractor shall also join his or her work to that of others in a proper manner, in accordance with the spirit and intent of the contract documents and perform his or her work in proper sequence in relation to that of other contracts.

#### **Sec. 2.05. - Supervision and Inspection.**

- A.** The work herein considered is to be constructed in accordance with the contract documents.

Wherever the words "directed, permitted, approved, acceptable, satisfactory," or words or phrases of similar import occur in the contract documents, they shall be understood to be functions of the Engineer and to be exercised at the Engineer's discretion.

- B.** Methods of construction and procedure shall be of the Contractor's own selection, provided no requirement of the contract documents is violated and the work is completed within the time allowed.

Approval of the Engineer or Construction Manager of any construction device or method, or absence of disapproval, shall not relieve the Contractor of full responsibility for any failure thereof and shall not connote and is not intended to connote that the Owner will direct the manner in which the work is to be performed under the contract.

- C.** All materials and every process of manufacture and construction shall be subject to inspection at all times and the Engineer, or any representative shall have free access to all operations. The Contractor shall provide necessary facilities for inspecting workmanship and testing of materials, and the Engineer shall have the right to select suitable samples of materials for testing and examination, which the Contractor shall supply without charge. In case such samples must be shipped to some other point for inspection or testing, the Contractor shall box or crate samples as necessary and shall deliver them at points designated for shipment, without charge. Omission of inspection shall not relieve the Contractor of any obligation to produce the work required by plans and specifications.

- D.** The Contractor shall furnish to the Engineer any information concerning the nature or source of any material or equipment or part thereof which the Contractor proposes to use. Tests may be conducted where, in the opinion of the Owner or Engineer, such are necessary. Where the Contractor desires to propose for use in the work any material or product as an alternative or equivalent to a material or product specified herein, the Contractor will be required to submit samples to a testing bureau designated by the Engineer or Construction Manager and shall pay the cost of such testing and analysis as may be required to determine the suitability of such materials and products.

#### **Sec. 2.06. - Easements and Rights-Of-Way.**

- A.** The project will be constructed through easements obtained by the Owner and/or on public rights-of-way. The Contractor shall confine operations to construction limits shown on

the plans and be responsible for obtaining, at no expense to the Owner, any additional space required. The Contractor shall confine work on private property to easements obtained in advance by the Owner. Disturbed areas shall be restored as stated in the contract documents.

- B.** The Contractor shall be responsible for any loss suffered by adjacent property owners as a result of, or by reason of, the work done and shall indemnify and save the Owner harmless from any such loss on private property.
- C.** In case work is to be done in State right-of-way, a permit is to be obtained by the Contractor from the Missouri State Highway Department, 5117 East 31st Street, Kansas City, Missouri 64128.

**Sec. 2.07. - Location of Utilities.**

- A.** All known utilities such as gas, water, telephone, power, television cable, sanitary and storm sewers, will have been located on the plans to the best of the Owner's knowledge, but the Contractor shall ascertain in the field the exact location of all such utilities, including individual services, if any exist, and shall be fully responsible for the replacement of damaged utility, either public or private.
- B.** Special emphasis is placed upon the necessity that care shall be exercised to prevent damage to existing structures, overhead lines and underground lines, and pipes lying within or adjacent to construction or storage areas, and where indicated on plans. The Contractor shall make every effort to locate all underground facilities, by contacting utility owners or otherwise locating pipelines, conduit, and structures in advance of earthwork operations. The Contractor will be responsible for repair of all damage to existing facilities during the contract, even if done by a subcontractor.
- C.** Should there be on or under the property buildings, poles, wires, pipes, sewers, conduits or similar structures which the Contractor would desire removed or relocated, either temporarily or permanently, it will be the responsibility of the Contractor to accomplish such action unless otherwise specifically provided.

**Sec. 2.08. - Facilities At Site.**

- A.** The Contractor shall have at all times copies of the plans and specifications at the work site and shall require each foreman to have at the work site a copy of that part of the plans and specifications which pertain to the work when the construction is in progress to confer with the Engineer or any representatives, and to receive such directions or approvals as the Engineer may desire to give.
- B.** The Contractor shall provide power for lighting, operation of the equipment, testing, or for any other uses required for the proper completion of the work. Water for and in connection with the work, including testing of pipes, drinking, or for any other use as may be required for the proper completion of the work to be performed, shall be provided by the Contractor.
- C.** The Contractor shall provide, maintain and enforce the use of approved sanitary facilities for employees. Toilets shall be of the chemically treated type to comply with the City Health Department and with City ordinances. To the extent possible, toilet shall be obscured from public view. The Contractor shall maintain these temporary facilities in a neat and sanitary condition and supply with toilet paper. The Contractor

shall be responsible for the removal of such temporary toilet facilities when the work is completed and shall be constrained to commit no public or private nuisance.

- D.** Care shall be exercised to protect all equipment and material during the storage period at work site, during and after installation, and prior to acceptance. Right-of-way for existing streets and highways shall not be used for storage areas. Cooperation with the Owner and other contractors or utilities to maintain the project site in a well-ordered condition shall be required. The Contractor shall coordinate delivery of materials and supplies with the program of construction so that an undue amount of storage space is not required on site.
- E.** The Contractor shall provide, erect, maintain and remove when so requested, all scaffolding, staging, platforms, flooring guards, railings, stairs, etc., as required for the protection of workers and the public, and to provide properly for all operations of construction and inspection. Compensation for all facilities at the site shall be covered by the amounts paid for completed construction as provided under the bid items in the Proposal.
- F.** If explosives are to be used in the construction, on-site storage shall be in a secure manner, clearly marked, as approved by the Independence Fire Department. On-site explosive storage shall be in care of competent watchers at all times.
- G.** Utmost care shall be taken to establish and maintain the best possible relationship with adjacent and surrounding property owners. Special care shall be taken where fences are to be breached on private property to contact owners and insure proper protection of anything within the enclosure. The Contractor shall maintain the site and operate so as to avoid creating a public nuisance.
- H.** Work shall be conducted so as to avoid and eliminate unnecessary noise, dust and dirt. Attention shall be directed to the condition of roadways in use by equipment associated with the construction and should muddy conditions develop, the Contractor shall keep public roadways clean to the best possible extent.
- I.** The Contractor's signs shall be placed in locations so as not to interfere with or obstruct the view of traffic or operations of construction; placement shall comply with MUTCD and directions of the Engineer. Signs shall be removed promptly upon completion of the project, or as the need for them is ended.
- J.** Upon completion of the work of construction, and before acceptance, all surplus material, temporary structures and debris shall be removed and the premises left in a sightly condition. No separate payment shall be made for final cleaning up, but shall be included in amounts paid for the completed work as bid.

**Sec. 2.09. - Safety Practices and Accident Prevention.**

- A.** The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work. In the performance of the contract, the Contractor and subcontractors shall comply with and observe all of the requirements of the Federal Occupational Safety and Health Act (OSHA), and all rules and regulations published in connection therewith. The Contractor shall provide

equipment and medical facilities as are necessary to supply first aid to anyone who may be injured in connection with the project. Provisions must also be made for the immediate removal and hospitalization in case of emergency.

Anyone acting in a supervisory capacity should have authority to order such emergency action.

- B.** Precaution shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws, building and construction codes and the like shall be observed. Machinery and equipment and other hazards shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are consistent with applicable law or regulation.
- C.** The Contractor shall provide, erect, and maintain all safeguards and take all necessary precautions for the protection of the work and the safety of the public. All damage, injury or loss to any property caused, directly or indirectly, by the Contractor, or agent of the Contractor, shall be remedied by the Contractor. The Contractor's responsibilities, in this regard, remain until the work is complete.

**Sec. 2.10. - Traffic Safety.**

- A.** The Contractor shall be required to submit a traffic control plan to the Engineer for approval prior to beginning any work on the project. The flow of traffic in streets and access to private property shall be reasonably maintained at all times.
- B.** When working in the traveled way, the Contractor shall provide adequate and suitable barriers, signs, warning lights, flaggers, and all other equipment necessary to direct and reroute traffic and protect the public from moving or stationary vehicles, equipment, and materials, and other obstructions. Also, adequate protective warning lights and signs shall be provided to warn of any obstruction or excavation in the street, and easement area. All barricades, signs, lights, and other protective devices in public right-of-way and easements shall be installed and maintained in conformity with applicable statutory requirements, the latest edition of the "Manual on Uniform Traffic Control Devices", these specifications.
- C.** Traffic control devices on arterial roadways shall not be in-place prior to 8:30 a.m. or after 4:00 p.m. unless otherwise authorized by the Traffic Engineer. In the event the Contractor is not maintaining a safe roadway, the City may take action to improve the roadway conditions at the Contractor's expense.

**Sec. 2.11. - Explosives and Blasting.**

- A.** No explosives shall be used without written permission secured in advance from the Owner. Before using explosives, the Contractor shall comply with all requirements of law and obtain a blasting permit, which requires a separate insurance certificate to be filed with the Owner.
- B.** Before obtaining any explosives, the Contractor shall become familiar with all state statutes governing the storage and use of explosives, and the requirements of the City, and shall govern the operations according to the regulations thereof. The time of placing, size and firing of charges shall at all times be subject to the approval of the Engineer, but the Contractor shall be fully responsible for any damage resulting from

their use.

**Sec. 2.12. - Existing Thoroughfares.**

- A. The Contractor shall not close any thoroughfare without the written consent of the Director of Municipal Services/Engineering of the City of Independence, Missouri.
- B. All operations shall be conducted in such manner as to insure the least possible obstruction to traffic. Open trenches shall be bridged where necessary, and personnel employed to direct traffic through construction areas. If it should become necessary to close a section of an existing road or street and a detour is required to accommodate the traveling public, or for use of the Contractor, the work of constructing the detour shall be done by the Contractor to the satisfaction of the Engineer. Such detour shall be constructed so as to be safe and to cause no unreasonable delay in public travel.

**Sec. 2.13. - Insurance Requirements.**

The Contractor shall not commence work under this contract until he or she has obtained all insurance required under this section and elsewhere in the contract documents, such as exceptional insurance requirements outlined in the Contract Special Provisions, and such insurance has been approved by the Owner. The Owner shall be named as an additional insured on the policies and certificates. Any and all certificates of insurance must be approved and on file with the City Clerk before work commences under this contract. Should the Owner so request, copies of policies may be required for examination. The following are the required insurance coverages:

**A. Worker's Compensation Insurance.**

The Contractor shall comply with the Worker's Compensation laws of the state, including the site of construction, and furnish to the Owner a certificate of evidence that he or she has complied with all such laws and that he or she has paid all contributions required by the state thereunder.

In the event that any class of employees engaged in hazardous work at the site of the project under this contract does not come under the protection of the Worker's Compensation Act of the state, including the site of construction, the Contractor shall provide and shall cause each subcontractor to provide adequate insurance coverage for the protection of such employees. The Contractor shall be required to carry Employer's Liability Insurance.

**B. General Liability.**

The Contractor shall have insurance for both General Liability with Excess Coverage, Umbrella, Premises and Operations, Broad Form contractual, Broad Form property damage, and Automotive Liability to at least the following limits:

Bodily Injury	\$ 300,000.00	per person
	\$ 2,000,000.00	per occurrence
Property Damage	\$ 2,000,000.00	per occurrence

Equal limits of coverage must be provided by the Contractor in an Owner's Protective Liability Policy and endorsements covering subcontractors or evidence of insurance in

force must be provided by each subcontractor before that subcontractor commences work.

**C. Special Insurance Requirements.**

1. If blasting is required, provisions of Chapter 17 shall be followed, including permit, insurance, seismograph and notification.
2. Builder's Risk will be required for protection against vandalism and malicious mischief when the construction involves a building when there is a probable risk of loss exceeding \$25,000.00. When equipment and/or materials of \$25,000.00 or more are involved, Inland Marine Insurance may be required to protect such items in transit.
3. When construction work is required on railroad property, the Contractor shall obtain, pay for and maintain a Protective Liability Insurance contract for and in behalf of each railroad involved and as specified in the Special Provisions.

**Sec. 2.14. - As-Built Drawings.**

As-built, or record, drawings are required and will serve as a permanent record of construction details.

- A. The Contractor shall submit complete record drawings as final as-built drawings. All changes in the contract work, added work, and work deleted, shall be shown in contrasting colors on these record drawings.
- B. The Contractor shall maintain a set of record drawings at the job site. These shall be kept current and legible and be available for the inspection of the Engineer at all times.
- C. Upon substantial completion of the project work, the Contractor shall submit these marked-up drawings for the approval of the Engineer. The Engineer shall be the sole judge of the acceptability of these drawings as submitted.
- D. Receipt and approval of as-built record drawings shall be a prerequisite for Contractor's final payment on the contract. Drawings shall be submitted in both digital and hard copy format. The digital format shall include PDF and CAD files. The hard copy shall be full size.

**Sec. 2.15. - Acceptance of Work.**

No part of the construction will be finally accepted until the entire contract shall have been completed. Upon final completion of the work, the Engineer will make final inspection and when it is found that the Contractor has completed the entire contract in accordance with the contract documents, the Owner will thereupon issue a formal order of acceptance and the final pay estimate will be rendered.

**Sec. 2.16. - Contract Requirements.**

1. Contract Specifications.

The contract specifications, sometimes referred to as, "the contract documents", include the

Invitation to Bid, the Instructions to Bidders, the Contract Agreement, the Payment, Performance and/or Maintenance Bond, the Specifications and Special Provisions, supplementary provisions or addenda as may be issued, the Proposal and the plans or contract drawings. The specifications referred to herein are the City of Independence Standard Specifications. The specifications shall govern the materials furnished and work performed in the construction of the work covered by the contract based thereon, are divided, classified, designated, and arranged as shown in the Standard Specifications in effect at the time of letting. All the contract documents are intended to be cooperative and to describe and provide for a complete work. A requirement occurring in one is as binding as though occurring in all. Should there be any lack of accord in the various documents, the Project Special Provisions prevail over the Specifications and the Specifications prevail over the plans.

Applicable codes and standards referred to in these specifications shall establish minimum requirements for equipment, materials and construction and shall be superseded by more stringent requirements of drawings and specifications when and where they occur.

**2. Plans (Contract Drawings).**

- A.** The Contract Drawings or "Plans" on which the contracts are to be based are to be supplemented by additional shop drawings.
- B.** The Contractor will be provided, at no cost, a maximum of five (5) sets of contract specifications and plans. Additional sets of these documents will be supplied at the cost of printing, materials and delivery.

**3. Contract General Intent.**

The general intent of the contract document and provisions thereof is that the Contractor shall, for the compensation set forth, furnish all plant, equipment, tools, labor, materials, superintendence, things and services, assurances and guarantees, assumptions of risk and responsibilities; shall begin promptly and proceed expeditiously and continuously without cessation or shutdown of work unless specifically approved in writing by the Owner; shall construct, complete and ready for its intended purposes, within accordance with the contract documents; that the prices proposed and bid by the Contractor and accepted by the Owner are agreed to be fair, full and complete compensation; and that time is of the essence in the contract fulfillment.

**4. Contractor's Responsibility.**

- A.** The Contractor explicitly understands and agrees that the Owner is in no way responsible for the cost to the Contractor of the work, nor for the cost of the risks involved in executing the work, and that the payments herein provided include compensation for all risks as well as for all completed construction. It is expressly understood that the Contractor is in all respects an independent contractor for this work and is in no respect an agent, servant or employee of the Owner. The Contractor specifically represents that in performing work covered by this agreement he or she is the sole employer of all labor to be furnished in the performance of this work and that, within the meaning of all federal and state unemployment compensation, insurance or other laws and all State Worker's Compensation Acts, the contractor's employees and the employees of all subcontractors are not employees of the Owner for any purpose whatsoever; also

that the Contractor accepts exclusive liability for all contributions, taxes, interest and penalties necessarily paid by the Owner under unemployment compensation, insurance or other laws on account of all persons employed by the Contractor or any subcontractors hereunder, and the Contractor hereby agrees to reimburse the Owner for all contributions, taxes, interest, penalties, if any, necessarily paid by the Owner under unemployment compensation, insurance or other laws covering employees of the Contractor or any subcontractors.

- B.** The Contractor agrees to pay in full for all furnished materials and for all employed labor for the work or any part thereof, and to save the Owner free and harmless from any lien for work or labor performed, or materials or supplies furnished in the performance of the work under this agreement, and from every claim, demand or lien arising from or growing out of any act or thing done or suffered by the contractor or any agent, servants or subcontractors, and any employees **in**, about or connected with the construction of the work aforesaid. The Contractor agrees to pay and discharge all bills and claims against the Contractor in any way incurred in connection with the work herein provided for; it being intended hereby to cover the payment of all items, whatsoever their nature, **in** addition to items which entitle the claimant to a lien upon any property of said Owner by virtue of the laws of the State of Missouri.
- C.** The Contractor shall require any subcontractors deemed a transient employer as defined by State law to show proof of having filed a financial assurance instrument with the State Director of Revenue and to show proof that the subcontractor holds a current valid certificate of insurance for worker's compensation coverage in Missouri prior to the subcontractor performing any work under the Contract. If required by the State Director of Revenue or the State Director of the Division of Worker's Compensation, the Contractor will withhold all or any part of payment to the subcontractor to satisfy State law.
- D.** The Contractor agrees to comply in all respects with the requirements of law relating to furnishing reports and statements, or as may be reasonably required by the Owner.
- E.** It shall be the responsibility of the Contractor to examine the site of the work to determine the amount of work to be done in connection with the construction herein specified, the quantities of material required, and the construction equipment and labor necessary for the performance of the contract. By submission of a proposal for this work, the Contractor represents that he or she has investigated the character of the work and conditions which may be encountered, and the quantities and types of related work not covered by unit prices and agrees that the data furnished herein is merely informative and represents the best information available at the time of advertising for bids. The Contractor understands that such information or data is furnished to the bidder without guarantee of its accuracy and that variations from the indicated amounts or types of work, other than that covered by contract unit prices, required to complete the contract will not entitle the Owner to any credits or the Contractor to any extra payment.
- F.** All construction methods and tools shall meet all State of Missouri safety requirements and comply with commonly accepted standards for safety and health of personnel engaged in construction work.

**5. Compliance With Laws, Permits, Licenses and Taxes.**

- A.** The Contractor shall conform to and comply with all applicable laws, bylaws, regulations, and ordinances with regard to all and every action and operation and shall require conformity and compliance of all subcontractors and employees in such a manner as to save the Owner harmless. The Contractor shall secure and be financially responsible for all permits, licenses, approvals, acceptances, etc., relative to the conduct of all work and shall give all notices necessary to the due and lawful prosecution of the work. Fees for required City permits for work within the construction limits will be waived.
- B.** The City is exempt from sales tax. This includes purchases by contractors for City projects. The City will provide a certificate to contractors for their use in obtaining the sales tax exemption. Contractors are to prepare their bids for City projects without including sales tax.

**6. Patents.**

All fees or royalties for any patented article or operation of construction used in this work or any part thereof, or any materials, tools, implements, machinery, fixtures, or anything used by the Contractor, shall be included in the price stipulated in the contract for the work and the Contractor shall protect and hold harmless the Owner against all demands for such fees, royalties and claims.

**7. Personal Liabilities.**

In carrying out any of the provisions of a contract or in exercising any power or authority granted to them thereby, there shall be no personal liability upon any member, agent or representative of the Owner. No act or failure to act on the part of the Engineer or any agent of the Owner, payment for the work in whole or in part, extension of time or possession taken of the work, shall operate as a waiver of any right to damages therein provided for; nor shall waiver or breach of contract be held to be a waiver of any other or subsequent breach.

**8. Subletting or Assigning Contract.**

- A.** The Contractor shall not sublet, sell, transfer, assign or otherwise dispose of the contract or contracts or any portion thereof, or of the Contractor's right, title or interest therein, without written consent of the Engineer. Request for permission to sublet, assign or otherwise dispose of any portion of the contract shall be in writing and shall be accompanied by evidence that the organization which will perform the work is particularly experienced and equipped for such work.
- I.** In case such consent is given, the Contractor will be permitted to sublet a portion thereof, but the Contractor shall perform work amounting to not less than 50% of the total contract cost, except that any items designated by the Engineer as specialty items so performed by subcontract may be deducted from the total contract cost before computing the amount of work required to be performed by the Contractor.

The value of the work sublet will be determined by multiplying the number of units of any contract item sublet by the unit price as set forth in the original contract, or by a price agreed to by the Engineer or Construction Manager

where no unit price is included in the contract for the work sublet. Approval of the subcontract is in no way approval of the unit prices in the subcontract. The subcontractor shall perform the work described in the subcontract agreement. The Contractor shall furnish the Owner a signed copy of the subcontract on request.

- B.** No subcontracts or transfer of contract shall in any case release the Contractor of his or her liability under the contract and bonds.

**9. Notice To Proceed.**

- A.** Upon receipt of contract documents fully executed by the Owner, the Contractor shall immediately proceed with activities pertaining to the work, such as specified coordination submittals and required conferences. The Contractor shall not move onto the site until the Owner has issued a written Notice to Proceed.
- B.** The Notice to Proceed will be issued upon completion of (a) receipt of acceptable copies of contract documents, insurance policies, and certificates, (b) acceptance of specified coordination submittals, i.e., Construction Schedule, Schedule of Values, etc., and (c) the conclusion of initial coordination conferences. The date of Notice to Proceed shall be that on which the Contractor may move onto the site, unless otherwise set forth in the said notice, which date will not be more than thirty days after the date of contract, unless Owner and Contractor agree upon a longer time. The completion time of contract shall be the number of calendar days stated in the Contract Agreement, beginning with the date of Notice to Proceed, or date stated therein, exclusive of the period between December 15 and March 15.

**10. Construction Schedule.**

- A.** Within ten days after signing the Contract Documents, the Contractor shall furnish the Engineer a Critical Path Method (CPM) Schedule. The Contract shall be broken down into major phases or items of work, with beginning and completion dates for each phase or item shown. The order of completion of the various parts shall be of sufficient detail to demonstrate to the Engineer the adequacy of the program to complete the construction within the time provided.
- B.** The Schedule shall be submitted and approved by the Engineer or Construction Manager before a Notice to Proceed is to be issued. No payment shall be made to the Contractor on any estimate until such a program of construction has been submitted and approved.
- C.** Should it become evident at any time during the construction that operations will, or may, fall behind the schedule of the approved program of construction, the Contractor shall promptly submit revised written schedules setting out changes in operations, methods, equipment, added amount of labor or of working shifts, night work, etc., by which lost time shall be made up and shall confer with the Engineer until an approved modification of the original program is secured. Should operations actually fall behind to an extent that the completion of the work within the fixed time would appear doubtful, the Owner may request the Contractor to add equipment and construction forces or to increase the working hours per week. No payments on any estimates shall be made after such a request is made until an approved modification of the program has been provided by the Contractor. Execution of the work according to the accepted

program of construction, or approved modifications thereof shall be an obligation of the Contractor at all times during the life of the contract.

#### **11. Contract Provisions Concerning Time.**

- A.** The construction herein provided for is to be completed within certain times as set forth in the contract documents. Calendar days specified in the contract exclude the period between December 15 and March 15. No payment shall be made to the Contractor on account of any delays whatsoever, no matter by what or by whom caused, even by other contractors on the same work, or by reason of the Engineer's acts in giving directions, in rejecting materials, methods or workmanship, or by seasons, weather or stream fluctuations. The amount provided in the contract for payment for the work items is understood and agreed to include and cover all expenses due to delays. Extensions of time for completion will be granted under the following conditions:
1. If the Owner should, in writing, direct deferment of the beginning of work beyond the formal date to begin work, or if the Owner should order the work closed down or temporarily discontinued, corresponding extensions of time would be granted with due consideration for changed working conditions incident to seasons and weather.
  2. If the final contract cost, as increased by duly executed change order(s), exceeds the total contract cost based on the estimated quantities as given in the Proposal, the time of completion will be set forward a number of working days in the proportion that such excess cost bears to the cost based on estimated quantities.
  3. The Contractor is requested to bring to the attention of the Engineer, by letter, during the progress of the work, the occurrence of events which the Contractor considers may warrant extension of time under the conditions of the contract. If the contract is not completed within the time stipulated, the Contractor shall, at the conclusion of the work, present a written statement to the Engineer concerning all matters of time extensions.
  4. The amount of all extensions of time, for whatever reason drafted, shall be determined by the Engineer or Construction Manager with due consideration of working seasons and working conditions. In general, only actual and not constructive or hypothetical days of delay will be considered. The Owner shall have authority to draft additional extensions of time as the Owner may deem advisable and justifiable. Approved time extensions shall be added to the March 15 date if the current contract time expires, or time extensions extend, to the period between December 15 and March 15.
  5. If the Contractor fails to complete the work within the time fixed by the contract or extensions thereof, and if the Owner shall nevertheless permit the Contractor to continue and complete the same, such per mission shall neither modify nor waive any liability of the Contractor for damages arising from noncompliance of the work within the said time, but all liabilities shall continue in full force against the Contractor.
- B.** With only the exceptions outlined herein, all work under any contract shall be completed and ready for operation within the time listed in the Proposal after the issuance of Notice to Proceed.

**12. Liquidated Damages.**

- A.** If the Contractor shall neglect, refuse or fail to complete the work within the time set forth above, or any proper extension thereof granted by the Owner, the Contractor shall pay to the Owner the amount specified in the Special Provisions for each day the entire work is incomplete. Said obligation of the Contractor is not a penalty but is liquidated damages for loss to the City and the public, after the expiration of the time stipulated in the contract, as adjusted by duly executed change orders, and will be deducted from any money due the Contractor under the contract. The Contractor and the surety of record shall be liable for any and all liquidated damages.
- B.** The Contractor shall forfeit, as a penalty to the City of Independence, Missouri, Ten Dollars (\$10.00) for each worker employed for each calendar day or portion thereof, if such worker is paid less than the prevailing wage rate as set forth in the specifications for any work done under a given contract, or by any subcontractor working under such contract. (The prevailing wage rates are included in Contract Special Provisions.) In addition to the penalty, progressive contract payment shall be withheld until there is compliance with the prevailing wage rate.

**13. Construction Procedure.**

- A.** The Engineer and the Contractor shall discuss and follow mutually agreed methods and procedures. Practices shall be as established in the industry and best modern methods in accordance with the contract requirements as set forth herein.
- B.** All workers, mechanics, tradesmen, artisans and other employees engaged on the work by the Contractor shall be trained and skilled in their various occupations. All plant, tools and equipment of every kind shall be suitable in character and ample in quantity and capacity to carry out and complete the work of the contract in the required times and according to approved program of construction. The Contractor shall supply all materials and work incidental to the construction included under the contract, notwithstanding minor omissions in the plans and specifications. Materials and workmanship of every kind shall conform to all the requirements of these specifications and wherever not explicitly described shall conform to best current practices.
- C.** The Contractor shall perform the contracted work in proper sequence relative to the work of other contractors and to the acts or operations of the Owner. No deviation from the plans or specifications will be permitted, unless authorized in writing by the Engineer or Construction Manager.

**14. Taking Over Work and Withholding Payments.**

- A.** If the Contractor shall become insolvent or be declared bankrupt, or commit any act of bankruptcy or insolvency, or if it should become evident to the Engineer that the Contractor is not making proper progress to insure completion within the specified time, or is prosecuting the work with insufficient, inadequate or unsuitable plant and equipment, or has failed to make good rejected work or materials, the Owner shall have the right, without violation of contract, after giving the Contractor seven days' notice in writing, to undertake itself either by administration or by letting

contract(s) to other parties, the completion of the said work which is being thus neglected, or to supplement the Contractor's work and operations by supplying additional plant, equipment, materials or labor.

- B.** In addition to the percentage of payments to be temporarily retained by the Owner, pending completion of the work, the Owner shall have the right to withhold sufficient amounts of any payment otherwise due the Contractor to cover failure of the Contractor to make proper payment on amounts past due and payable for just claims for labor, materials and services applied to the work of the contract, and for defective work not remedied. The Owner shall have the right to act as agent for the Contractor in disbursing such withheld funds to the party or parties entitled thereto, and in case of such disbursements shall render the Contractor a full accounting for all such funds.
- C.** The Owner shall not be obligated to take any such action and the failure of the Owner to act under this and similar clauses of the specifications shall not relieve the Contractor from any responsibilities, obligations or liabilities resulting from failure to complete the contract within the times prescribed.

#### **15. Salvage of Materials Removed.**

The Contractor shall carefully remove all materials designated to be salvaged and reused in a manner to prevent damage. Any damaged material will be replaced at the Contractor's expense, if so designated. Materials shall be protected and stored on site until ready for reuse as approved by the Engineer or Construction Manager.

#### **16. Use of Completed Work.**

The Owner may, prior to the completion of all the work performed by the Contractor, or acceptance thereof by the Owner, enter upon and use any portion of said work without any compensation or payment whatever to the Contractor for any delay in the work caused by such use. Such taking possession and use shall not be deemed as acceptance of the work so taken and used, or any part thereof.

#### **17. Change In Amounts of Work.**

- A.** The Owner shall have the right to increase or diminish the quantity, to change the order, or to dispense with portions of the work at any time without impairing the contract and without changing the unit prices to be paid. In case of the reduction in amount of work, no payment will be made on account of work not done if the total amount paid to the Contractor for the entire contract, exclusive of added line items, is as much as 80% of the total bid as included in the Contractor's Proposal. If the total amount is less than 80%, an allowance to be fixed by the Engineer or Construction Manager will be paid due to the administration and plant costs.
- B.** The Owner shall have the right to eliminate from the contract at the bid price minor items on which bids may appear to the Engineer unreasonably unbalanced and to provide for the construction by unclassified work, or otherwise. A minor item shall be one involving not more than approximately 2% of the total of the contract, or for which probable quantities cannot be estimated in advance.

- C. In case of increase in amount of work, payment for such increase at the unit price bid for the work of the classes so increased shall be full compensation for the work done. When changes to work not covered in the contract documents and involving added cost occur, they will be performed only on a written change order signed by the Contractor and duly processed by the Owner. All costs and indirect costs, including overhead, bond and profit shall be submitted as a maximum cost figure on this change order. The Contractor shall not proceed with any work under a change order requiring additional materials or costs until written approval is given by the Engineer or Construction Manager or Construction Manager.
- D. The Owner may at or prior to contract award appropriate up to ten percent more than the contract value to be reserved for change orders to the project. Administrative change orders may be processed for the contract up to appropriation amounts. Administrative change orders may be for unit price extensions, cost plus additions or negotiated prices, and are to be in written form approved by the City Manager and attested by the City Clerk. All other change orders require approval by the City Council.

**18. New Items.**

- A. The Owner shall have the right to require the Contractor to perform work or supply materials essential to the completion of the work, of a class or type not provided for in the contract documents, or not included and covered under classifications for which price payments are provided in the contract. This work shall be added as a new line item.
- B. When a new item is ordered, it shall be paid for as the Owner may elect, either by a lump sum or by unit prices mutually agreed upon by the Owner and the Contractor in writing, or, if such agreement cannot be made or the Owner so elects, on the basis of estimated cost to the Contractor of constituent unfabricated materials, including fuel, or applied labor, and of liability insurance for labor, plus 20% thereof to cover and include Contractor's profit, superintendence, overhead and indirect expense, including interest on borrowed money and premiums on bonds, and for the use of plant, equipment, tools and appliances.

Where manufactured or fabricated materials or articles are to be purchased for installation, or some of the work is done by subcontract, the Contractor shall estimate 5% over and above the Contractor's costs of such items instead of 20%. For such work, plant and tools shall be provided of the same general character as employed for similar kinds of operations on the project.

- C. The Contractor shall not begin any work for which new items are provided in the contract without written approval from the Engineer.

**19. Notice Of Claims for Extra Compensation.**

Should any conditions arise which in the Contractor's opinion will require any claims or demands for extra or additional compensation above that fixed by the contract, or on which he or she contemplates bringing claims for such extra compensation, the Contractor shall promptly and before incurring any expenses, notify the Owner in

writing of the conditions and circumstances and that such claims are anticipated. The Contractor agrees that any claims made without such advance notice, and not presented in such a way as to enable the Engineer to observe conditions as they occur and to verify expenses as they occur and to determine with certainty the correctness of such claims and of the expenses involved, are waived and shall be null and void. The Contractor shall not proceed with any work requiring added compensation until written approval is given by the Engineer or Construction Manager.

## **20. Liabilities, Damages and Accidents.**

- A.** The Contractor shall assume and be responsible for and shall indemnify, protect and save harmless the Owner against any and all claims, demands or causes of action by any party or parties whatsoever for loss, injury or damage of any kind or character, either to persons or to property, directly or indirectly arising out of his/her operations or the acts or omissions of the contractor, any agents or workers. The Contractor shall pay all judgments obtained by reason of accidents, injuries or damages in any suit or suits against the Owner, including all legal costs, court expenses and other like expenses; the Contractor shall have the option of assuming the sole defense of such suits.
- B.** The Contractor shall assume all risks of loss and damage to the Contractors property and to property in his/her custody and to the property of any employees, agents and servants, howsoever caused; all risks of damage resulting from the death of or injury to himself/herself, any agents and servants, while engaged in said work and while traveling to and from the same; and he/she agrees to hold the Owner free and harmless from all loss, cost and expense on account thereof; and agrees to indemnify and save harmless the Owner from all loss, cost and expense arising or growing out of any injury to any employee of the Owner caused by the negligence of the Contractor or any employees; also from all loss, cost and expense arising or growing out of any injury to any person while upon the premises of the Owner caused by the negligence of the Contractor, or any employee; also from all loss, cost and expense arising or growing out of any damage to any property, whether belonging to the Owner or not.
- C.** All delivered materials and portions of completed work shall be deemed to have become the property of the Owner, but the Contractor shall store materials and shall be responsible for and shall maintain partly or wholly finished work during the continuance of the contract, and until final acceptance of the work covered by the contract. If any materials or parts of the work be lost, damaged or destroyed by any means whatsoever, the Contractor shall satisfactorily repair and replace the same at his or her own cost.

## **21. Methods of Payment.**

- A.** Partial (Progress) Payments:
  - 1.** Payments will be made at unit prices shown in the Proposal, with work in place as described in the contract documents as a basis for making monthly pay estimates. Before the first application for payment, the Contractor shall submit to the Engineer a schedule of values of the various portions of the work, including quantities, aggregating the total contract sum, divided according to

subcontractors and prepared in such form as the Engineer and the Contractor may agree upon, and supported by such data to substantiate its correctness as the Engineer may require. Each item in the schedule of values shall include its proper share of overhead and profit and this schedule, when approved, shall be used only as a basis for the Contractor's application for payment.

2. At least fifteen days before each payment will fall due, the Contractor shall submit to the Owner an itemized application for payment, supported to the extent required by the Engineer or Construction Manager by receipts or vouchers showing payments for materials and labor, payments to subcontractors, and such other evidence of the right to payment as the Engineer may direct. On or about the first day of the month, the Engineer will make an estimate of the value of the total work done. After each estimate shall have been approved by the Owner, the Owner shall pay to the Contractor, within fifteen (15) days, 90% of the amount of such estimated sum, less the sum of all previous payments. No payments will be made on account of materials not to be incorporated in the work. Progress payments will be made to the Contractor based on ninety percent (90%) of the value of the work satisfactorily completed and for the unused material on hand at the time of the progress estimate. After the contract is fifty percent (50%) completed, payments may be increased by the full value of the additional work satisfactorily completed.

The retained percentage will be withheld by the City until final payment is authorized by the Director, except that when the work is stated as substantially complete in writing, the Engineer may reduce the retained percentage to an amount equal to two hundred percent of the remaining minor items to be completed.

3. As directed in writing by the Engineer or Construction Manager, adjustments may be made in the estimates for quantities shown under each bid item at the unit prices named in the Proposal, so long as these adjustments do not result in an excess of the total contract amount.
  4. It is agreed by the Contractor that any payments or advancements of funds to be made to the Contractor under provisions of this agreement shall not be assigned or pledged by Contractor unless consent in writing is first obtained from the Owner.
- B. Force Account may be applied under the following conditions:**
1. Force account work will be measured and paid for on a Contractor's cost, plus a percentage basis.
  2. The "Contractor's cost" is hereby defined for purposes of this Article to be, and shall include, the amounts required to pay subcontractors, plus the costs of Contractor's as follows:
    - a. Labor Costs:
      - (1) The payroll cost for all workers such as foremen, mechanics, craftsmen and laborers.

- (2) All incidental labor expenses incurred as a direct result of the performance of the work, including payroll taxes, worker's compensation, pension and retirement allowances and social security insurance or other regular payroll charges on same.
- b. Material and Equipment Costs:
  - (1) The cost of all materials and equipment required, delivered to the construction site, which are not furnished by Owner or others.
  - (2) Sales and use taxes applicable to such materials and equipment.
- c. Supplemental Costs:
  - (1) Rental for all power-driven equipment at agreed-upon rates shall be charged against Force Account work only for the actual time which the equipment is used specifically therefore.
  - (2) Transportation charges necessarily incurred in connection with such equipment which is not already on the site.
  - (3) Cost of power, fuel, lubricants, and water required for such equipment (may be included in agreed- upon rate).
  - (4) Additional cost for surety bonds, liability and property damage, and other insurance required, where cost is necessarily increased by coverage of the Force Account Work.
- d. The above definitions and requirements apply equally to work done by subcontractors, suppliers and manufacturers.
- e. The percentage which shall be added to the several items of Contractor's cost are as follows:
 

(1) Amounts Paid to Subcontractors	-	5%
(2) Labor Costs	-	0%
(3) Material and Equipment Costs	-	10%
(4) Supplemental Costs	-	0%
3. The above percentages shall be understood to include all other costs and full compensation for profit, overhead, superintendence, field office expense and all other elements of cost not included in the "Contractor's cost," as herein defined.
4. The Contractor shall keep and present in an acceptable form an accurate account with vouchers of the several items of cost, including those of subcontractors performing Force Account work.
5. Rejected materials shall be removed promptly from the vicinity of the work and the Contractor shall promptly remove, reconstruct, replace and make good as may be directed, without charge, any defective work. If in the judgment of the Engineer, the defective work would perform within an allowable tolerance, the Contractor may be given the choice of receiving reduced payment for the work or removing and replacing the defective work. Oversight or error of judgment of inspectors, or previous acceptance, shall not relieve the Contractor from the obligation to make good defects whenever discovered. If the Contractor does not make corrections of

such condemned work and remove rejected materials within a reasonable time, as fixed by written notice, the Owner may make removals and corrections and charge the expense to the Contractor.

**C. Late Payment Clause:**

If the Owner fails to make a monthly pay estimate thirty (30) days after approval by the Engineer or Construction Manager, in addition to other remedies available to the Contractor, then interest shall be added to each payment at the maximum legal rate, commencing on the first day after said payment is due and continuing until the payment is received by the Contractor. The legal rate of interest shall be as specified in R.S.Mo 34.057.

**22. Acceptance and Final Payment.**

- A.** Upon determination by the Engineer or Construction Manager that all work has been completed in accordance with the contract, and approval of as-built plans submitted for record, the Owner will accept the project as such by an approved Letter of Acceptance.
- B.** When the work has been so completed and certified by the Owner, a final estimate will be executed and submitted, which will provide payment to the Contractor for the entire sum due as set forth in the contract documents, including all amounts previously retained by the Owner. All prior partial estimates and payments shall be subject to correction by the Owner in this final estimate and payment.
- C.** Payments for the work will be made by check by the City of Independence, Missouri, as herein specified.

**23. Dimensions, Gradient and Alignment.**

The Contractor shall verify in the field all dimensions and elevations which require connections to existing structures and utilities and for modifications inside existing structures. Benchmarks are shown on the plans; however, control stakes shall not be furnished by the Engineer or Construction Manager. The Contractor shall make whatever measurements and alignments he or she may find necessary or convenient to enable him or her to construct each element of the work in the correct position to correspond to the information shown on the plans given by the Engineer or Construction Manager during the progress of the work.

Elevations shown on the drawings and referred to in the contract documents are based on benchmarks shown. The Contractor shall employ competent personnel for making position, gradient and alignment determinations, and measurements. All monuments, benchmarks, reference points and stakes shall be carefully preserved. In case of destruction, the Contractor shall be charged with resulting expense of replacement. The Contractor shall be responsible for any mistakes or loss of time caused by unnecessary loss or disturbance of monuments, benchmarks, reference points and stakes.

**Sec. 2.17. - Private Construction of Public Works.**

All streets, storm sewers, sanitary sewers and related construction shall require a permit and conform to the City of Independence Technical Specifications and Design Criteria for Public

Improvement Projects. Residential private improvements shall be inspected by the City.

No construction of any private street or public improvement project shall be undertaken until the following criteria and requirements have been fully met:

1. Plans and specifications for the private construction of public works projects, including but not limited to streets, drainage systems, sewers, or thoroughfares to be dedicated to and maintained by the City of Independence, Missouri, shall be submitted to and approved by the Community Development Director or designee. Approved plans will expire one year (12 months) from the date of approval without permit application and beginning of construction of improvements.
2. A permit shall be obtained authorizing the construction mentioned and set forth in the plans and specifications submitted.
3. No permit shall be issued until the applicant has paid a permit fee for sanitary sewers, storm sewers, and street projects, such funds to be payable to the Director of Finance and Administration, and to be used to defray the cost of inspecting the progress of the work on said project. Additionally, the applicant shall pay a plan review fee the first time the plans and specifications are reviewed and each time after they are reviewed on two separate instances.
4. The Final Plat submitted for recording.
5. Copies of the Stormwater Pollution Prevention Plan (SWPPP) must be on file with the City.
6. A Land Disturbance permit and National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) permit must be obtained for any construction activity which will result in a land disturbance of more than one (1) acre.
7. A US Army Corps of Engineers permit (404) and a Water Quality Certification (401) must be obtained if any land disturbance will occur below the ordinary high-water mark of Jurisdictional Waters of the U.S.
8. The Design Engineer shall submit shop drawings, digital project drawings and CAD files.
9. No construction shall be accomplished, and the permit provided for herein shall not be issued until a maintenance bond in an amount equal to seventy-five percent (75%) of the cost of construction shall be posted with the City of Independence, guaranteeing against defects in construction of any public improvements project, including but not limited to street, storm and sanitary sewers and curbs, and materials used for a period of two (2) years after acceptance by the City of said public improvements project; and further guaranteeing and insuring that such construction shall be accomplished in a workman-like manner, and further protecting the City of Independence, Missouri, and insuring said City from any loss or damage.
10. In those instances where the City is required to obtain a permit to allow the applicant to make connection(s) to the facilities of others, the applicant will provide a performance bond acceptable to the Community Development Director to the City

equal to the cost of the proposed construction and a certificate of insurance naming the City as additional insured for damage to the property of another person in the amount of not less than One Hundred Thousand Dollars (\$100,000.00) for any one accident.

- 11.** No construction work shall be commenced until the permit provided for has been issued and a written notice to proceed shall have been issued by the Engineer or Construction Manager.
- 12.** Following the issuance of the permit provided for herein, actual construction operations shall not be started until at least five (5) working days after the Engineer has been notified as to the time, location and scope of the construction.
- 13.** Detention basins or approved interim facilities shall be constructed prior to the development of any impervious area.

Compliance with the above shall constitute the minimum requirements necessary to receive a construction permit. The Community Development Director may cause additional requirements to be met prior to the issuance of a permit. All construction work may be stopped at any time by the Engineer or Construction Manager or an agent, when in the opinion of the Engineer, the workmanship, materials used, or procedures of work do not meet the requirements or comply with the City codes, ordinances, specification and procedures for such work. All work accomplished by means of a permit issued under this Article shall be subject to final inspection and approval for City maintenance by the Engineer or Construction Manager.

**CITY OF INDEPENDENCE, MISSOURI  
CONSTRUCTION MANUAL**

**SECTION 2100 – GRADING AND SITE PREPARATION**

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The Construction and Material Specifications, titled Section 2100 Grading and Site Preparation, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 2101.4. Clearing, Grubbing, and Site Preparation Construction Amend by adding the following:**

**A.** Erosion and Sediment Control: Erosion control measures shall be in place prior to the commencing of any work on the site. If the erosion control measures are not effective or not approved by the Director or their designee, all clearing, grubbing, and other sitework shall be halted until such time as the erosion control measures are approved.

**B.** Limits of Work: Areas that are not to be cleared are outlined on the plans and noted as "No Clearing" or "N. C.".

**C.** Protection of Greenery, Existing Structures and Private Facilities: Stream setback areas shall be protected in accordance with the approved plans using standard orange barricade fencing material. The fencing shall be four (4) feet in height and supported by metal channel posts spaced at a maximum of eight (8) feet on center. The fencing shall remain erect and secure throughout all construction phases.

**L.** Mailboxes: Where conflicting with the necessary operations of the construction, mailboxes shall be temporarily reset in a location accessible to both the mail carrier and the patron. The contractor shall properly reset mailboxes at designated locations prior to final acceptance of the work. Damaged mailboxes shall be replaced by the Contractor.

**M.** Fences: Existing fence shall be removed as specified or as shown on the Plans or as directed by the Engineer. Removed fencing may be used for temporary fencing only with the Engineer's approval. Fences interfering with construction and located within public right-of-way or as may be allowed for in permits or agreements, may be removed by the Contractor only if the opening is provided with a temporary gate that will be maintained in a closed position except to permit passage of equipment and vehicles unless otherwise specified. Fences within temporary construction easements may be removed by the Contractor provided that temporary fencing is installed in such a manner as to serve the purpose of the fencing removed.

The Contractor shall locate and record all fence corners prior to removal. The remaining fencing shall be terminated at an existing post, or a new corner post shall be set as shown on the plans. All fencing removed shall be restored by the Contractor to a condition equal to or better than that existing prior to construction unless otherwise specified.

The Contractor is liable for loss and costs associated with stray animals caused by the removal or improper construction of temporary or permanent fencing.

**O.** Subsurface obstruction of Pipeline Trenches: All damaged drainage pipe shall be replaced with the same type, grade and class as exists prior to the damage.

**Sec. 2102.2. Grading Definitions Amend by adding the following:**

**H.** Embankment or Backfill:

4. All required embankments shall be constructed using suitable materials, as herein defined, procured from excavations made on the project site and from the borrow site as required to complete the grading work. All borrow must be as approved by the Engineer.

**J.** Waste or Excess: Except as otherwise indicated or approved by the Engineer, all excess excavated materials shall be disposed of by the Contractor away from the site of the work. The disposal and waste and excess excavated materials, including hauling, shall be at the Contractor's expense.

**Sec. 2102.3. Grading Construction Replace "A" with the following:**

In general, the moving of utility facilities, which conflicts with the improvements, will be done by the respective controlling utility at its own expense and at no cost to the Contractor. The Contractor shall notify the owners of each utility identified on the plans, prior to the start of any construction. The work by these utilities may be completed before the Contractor progresses to the points affected. Under some circumstances, however, the work of the utilities may have to be performed during the Contractor's construction. It shall be the responsibility of the Contractor to coordinate the work with that of the utility so as to cause the least possible delay in the work. No utility facilities, public or private, shall be moved to accommodate the Contractor's equipment or method of operation when such facility does not interfere with the improvement under construction, or, to be constructed, unless the Contractor has agreed to pay for all costs of such removal and replacement and the utility has granted permission.

Plans show utility information supplied by the various utilities. The location, depth and size of each facility shown on the plans is approximate only and is not guaranteed. The failure to show such facilities on the plans shall not relieve the Contractor of any responsibility for the protection and preservation of such utilities.

The Contractor shall be responsible for taking proper measures to support, sustain and protect existing pipes, conduits, poles, wires and other apparatus under, over, along, across or otherwise affected by the work. If such pipes, conduits, poles, wires or apparatus are damaged through carelessness or neglectful action of the Contractor, they will be repaired by the authorities having control of same, but the cost of such repairs shall be paid by the Contractor.

The Contractor shall enlist the assistance of the affected agencies in the location of their facilities. The Contractor will not be responsible to any agency for the cost of such assistance in the location of its facilities. If any underground facility, not shown on the plans nor located by the utility agency, is damaged by the Contractor, the Contractor shall be responsible for exercising good judgment and for taking such action as is reasonable and necessary to mitigate damages.

The Contractor shall also make every reasonable effort to protect private facilities. These facilities, which include the private service lines on private property, may not be shown on the plans. When these facilities are disturbed or damaged by the work, the Contractor shall make necessary arrangements for repairs to the facilities for continuous service prior to the close of that work day.

**Add the following Section: Sec. 2100.1 - Linear Grading**

**1. Description.**

This work shall consist of grading work necessary to bring the roadway or sidewalk to the required grade and cross section within reasonable tolerances. The work shall also include the following:

- A.** Construction of all inlet and outlet ditches and roadway drainage within the linear grading limits unless otherwise provided for in the contract.
- B.** Construction of entrances and approaches.
- C.** Breaking up and satisfactory removal or incorporation into the roadway of all gravel, aggregate or bituminous surfaces.
- D.** Compaction of the roadway subgrade within linear grading limits.

**2. Construction Requirements.**

- A.** The roadway shall be brought to the required grade and cross section within reasonable tolerances by back sloping, ditching, removing stone and boulders from the roadbed surface, or any other work necessary, including drifting and hauling of any excavated material. Gradual deviation in alignment will be permitted, if necessary to center an existing drainage structure that is to be used in place. A reasonable tolerance in grade will be defined as a final grade that is uniform in appearance, free of sharp breaks or humps, and within 6 inches of plan grade.
- B.** All ditches, including inlet and outlet ditches, shall be cut to grades that will properly drain. The required cross section for inlet and outlet ditches leading to or from structures shall be of a width no less than the width of the floor or the diameter of the structure being served. Finishing operations shall continue until the roadbed is free from sharp breaks in alignment and grade, and until the roadbed has been shaped to the required cross section.

**3. Measurement and Payment.**

- A.** Measurement of Linear Grading will be made to the nearest 1/10 linear foot.
- B.** Entrances and approaches will be measured along the centerline of each facility, regardless of the width to be constructed, beginning at the

shoulder line of the road that is being entered and extending to the point of zero cut or embankment of the entrance or approach. Measurement will be made to the nearest 10 feet for each facility and totaled to the nearest 100 feet.

- C.** The accepted quantities of linear grading will be paid for at the contract unit price for the specified work, including unclassified excavation, and embankment and compaction, furnishing and placing any required borrow material, foundation treatment, and disposal of the existing subgrade and excess excavation off the job site. No direct payment shall be made for borrow as it shall be considered subsidiary to "Linear Grading".
- D.** Approximate earthwork quantities, unclassified excavation, and embankment (Grading) are shown on the Plans for contractor information. The plan quantity of "Linear Grading" listed in the Bid will be the pay quantity unless an authorized change in street length is made.
- E.** No other measurement or payment will be made for grading of drives, side street intersection grading to curb returns (side street grading beyond curb returns included in main line street quantity), incidental grading, excavation for pipe or structures, subgrade preparation or compaction of earthwork.

**CITY OF INDEPENDENCE, MISSOURI  
CONSTRUCTION MANUAL**

**SECTION 2150 – EROSION AND SEDIMENT CONTROL**

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The Construction and Material Specifications, titled Section 2150 Erosion and Sediment Control, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**2151.3 General Requirements Compliance with NPDES Permits Amend to read as follows:**

The Contractor will obtain a National Pollutant Discharge Elimination System (NPDES) permit and other similar local water pollution control permits as required. Where such permits are required, the Contractor will provide a Stormwater Pollution Prevention Plan (SWPPP) which has been prepared by the Engineer or other qualified professional. The Contractor shall comply with all requirements of such permits and the SWPPP and shall enforce compliance with such requirements by all Subcontractors. The Contractor shall complete the required certification forms for coverage under the relevant permit and shall notify all Subcontractors in writing of the requirements of the SWPPP, obligate them under contract to comply, and enforce compliance during the work.

**2151.20 General Requirements Construction near Rivers, Streams, and Waterbodies Amend to read as follows:**

Construction operations in or near rivers, streams, and other water impoundments shall have a stream buffer plan approved by the Engineer or other qualified professional. Stream buffer requirements can be found in Chapter 7, Article 5 of City Code. Stream crossings shall be limited to those approved by the Engineer or other qualified professional.

**CITY OF INDEPENDENCE, MISSOURI  
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**SECTION 2200 – PAVING**

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The Construction and Material Specifications, titled Section 2200 Paving, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 2203.3 Aggregate Base Course Materials Add the following:**

A. MoDOT Type 5 aggregate may be used for untreated aggregate layer in lieu of the material specified in this paragraph.

**Sec. 2208.3 Portland Cement Concrete Pavement Materials Amend to read as follows:**

A. Concrete: Delete subsections 1 through 6 and replace with the following:

“All concrete materials within the Right-of-Way shall conform to the KCMMB Specifications.”

**CITY OF INDEPENDENCE, MISSOURI  
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**SECTION 2300 – INCIDENTAL CONSTRUCTION**

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The Construction and Material Specifications, titled Section 2150 Erosion and Sediment Control, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 2301.3 Standard sidewalks, sidewalk ramps, driveways, and bicycle/pedestrian paths Materials Amend to read as follows:**

A. Concrete: Concrete shall conform to the requirements of KCMMB 4k specifications.

**Sec. 2304 Concrete Paver Stones Delete.**

**Sec. 2307.3 Fencing Materials Amend to read as follows:**

A. All materials used for the installation of a permanent chain link fence shall be new material conforming to Section 1043 of the Missouri Standard Specification for highway construction except concrete for posts shall be approved KCMMB 4k mix.

**Sec. 2307.3 Fencing Materials Add to read as follows:**

C. Except at athletic fields, or as otherwise approved by the Engineer, all fence fabric shall be 11 gauge.

**Add the following Section: Sec. 2300.1 - Retaining Walls.**

1. This section governs the furnishing of all labor, equipment, tools, materials and the performance of all work necessary to construct retaining walls.
2. Retaining walls shall be constructed of either reinforced cast-in-place concrete or Big Block/Large Block, unless otherwise approved by the Engineer.
3. KCMMB 4k concrete walls shall be constructed in accordance with standard details in Article 4 of this chapter, or plans approved by the Engineer.
4. Reinforced cast-in-place concrete Retaining Walls shall be measured to the nearest one tenth of a cubic foot and paid to the nearest one tenth of a cubic yard. Big Block/Large Block Retaining Walls will be measured to the nearest one tenth square foot of face area, excluding footing, and paid to the nearest square foot.

**Add the following Section Sec. 2300.2 - Water Service.**

1. This section governs the furnishing of all labor, equipment, tools, materials, and the performance of all necessary work to construct Water Service facilities.
2. Adjustment of water service lines, valves and meters shall be as shown on the contract drawings or directed by the Engineer or Construction Manager.
3. Pipe shall conform to the latest federal specifications for Type K flexible copper tubing. Fittings shall be brass flared compression fittings. Existing piping between the existing shoulder line and limits of the grading shall be carefully exposed and raised or lowered as directed by the Engineer or Construction Manager to clear construction by this contract. Existing copper piping material may be reused, except new pipe and fittings shall be installed as required to lengthen the service line or replace existing iron pipe or damaged services. In cases where street construction is being performed, any service found to be iron (galvanized) pipe under the pavement will be replaced from the City's water main to the City's right-of-way line. A new cut-off valve will be installed at a point on public right-of-way one foot (1') from the property line. All work above is to be inspected by the Water Department's Engineering Staff prior to backfilling.
4. Relocate meter and meter vault or tile to the indicated position outside the right of way line. Existing meter tile and casting, meeting Water Department specifications, may be reused if in undamaged condition. Replace with new material if damaged. All work above is to be inspected by the Water Department's Engineering Staff prior to backfilling.
5. All adjusted or relocated water service lines shall be pressure tested at line pressure before backfilling the trench. Repair all leaks and retest service.
6. Notify the property owner or tenant twenty-four (24) hours before beginning work on any planned water service line or meter adjustment.
7. The Contractor shall relocate or adjust the top elevation of all water service cut-off valves as required, or as directed by the Engineer or Construction Manager. All such valves shall be located on the existing service line at a point one foot (1') behind the new curb, or if no curb is to be constructed, at a point on public right of way one foot (1') from the property line. All work above is to be inspected by the Water Department's Engineering Staff prior to backfilling.
8. All excavation, trenching and backfill specified herein shall be in accordance with Article 3 of the Public Works Manual.
9. All service line, meter well, or cut-off valve adjustments or replacements shall be in compliance with the most current Rules and Regulations of the

Water Department.

10. Water service lines shall be measured to the nearest one tenth of a foot and paid to the nearest foot. Meter and valve adjustments shall be measured and paid per each.

**CITY OF INDEPENDENCE, MISSOURI  
CONSTRUCTION MANUAL**

**SECTION 2400 – SEEDING AND SODDING**

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The Construction and Material Specifications, titled Section 2400 Seeding and Sodding, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 2401.2 Seeding Materials Amend to read as follows:**

M. Planting Dates: All seeding work shall be done between the dates of February 1 and April 15 for spring planting or August 15 and October 15 for fall planting.

**Sec. 2401.3 Seeding Construction Amend to read as follows:**

J. Maintenance Period: The Contractor shall be responsible for maintaining the installed grass seed and sod for 2 years.

**Sec. 2402.2 Sodding Materials Amend to read as follows:**

I. Planting Dates: All seeding and planting work shall be done between the dates of February 1 and April 15 for spring planting or August 15 and October 15 for fall planting. Winter dormant planting can be done at the risk of the contractor.

**Sec. 2402.3 Sodding Construction Amend to read as follows:**

H. Maintenance Period: The Contractor shall be responsible for maintaining the installed grass seed and sod for 2 years.

**Sec. 2403.2 Native Grasses Materials Amend to read as follows:**

A. The seed mix will be in conformance with the APWA MARC Manual of Best Management Practices for Stormwater Quality or an appropriate alternative as approved by the City.

**Sec. 2403.3 (C). Native Grasses Construction Amend to read as follows:**

C. Spread and crimp 2,000 lbs per acre of clean straw or hay within seven days of seeding. All native seeding areas steeper than 6:1 shall be blanketed with double-sided, biodegradable straw mat.

**Sec. 2403.3 Native Grasses Construction Amend to read as follows:**

D. All native seed shall be watered at a rate of 1-inch per week for the first growing season. Reseeding may be necessary when first seeding does not produce a vigorous stand.

**Sec. 2403.3 Native Grasses Construction Amend to read as follows:**

G. Contractor shall apply selective herbicides as approved with the landscaping plans to prevent the establishment of invasive and noxious species as identified by City Code, State Law, Missouri Department of Conservation, or other local authorities.

**Sec. 2403.3 Native Grasses Construction Add following sections:**

I. All native seeding requires a cover crop as follows: Spring plantings; use oats at a rate of 15 lb/acre. Fall plants; use winter wheat at a rate of 15 lb/ acre.

J. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage or obstructions, the Engineer shall be notified before planting.

K. Dormant seeding (Dec 15-Mar 31) is recommended whenever possible to achieve optimal results.

**CITY OF INDEPENDENCE, MISSOURI  
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**SECTION 2500 – SANITARY SEWERS**

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The Construction and Material Specifications, titled Section 2500 Sanitary Sewers, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 2502.2 Materials Pipe, Fittings, Joints, Coatings and Linings** Add the following at the beginning of section B:

B. Ductile-Iron Pipe and Fittings: ductile iron pipe (DIP) shall only be used with approval of the Director of Municipal Services.

**Sec. 2502.2 Materials Pipe, Fittings, Joints, Coatings and Linings** Amend to read as follows:

C. Polyvinyl chloride (PVC) Pressure Rated Plastic Pipe (SDR) and Fittings

2. Materials: The pipe shall be made of PVC plastic pipe having a cell classification of 12A54 B or 12A54 C as defined in ASTM D 1784 and have a minimum wall thickness not less than SDR 26.

D. Type PSM polyvinyl chloride (PVC) Sewer Pipe and Fittings:

3. Design: Pipe shall have an integral bell and spigot joint. Wall thickness shall be SDR 26 or SDR 21 as shown on plans.

5. Fittings: Fittings defined as tee (T) or wye (Y) connections suitable for assembly to four (4) inch or six (6) inch building service lines shall be bell-end with a minimum wall thickness conforming to SDR 26 and shall be furnished by the pipe manufacturer. A special design is required for service connections 8 inches and larger.

E. Reinforced Concrete Pipe and Fittings:

1. Reinforced Concrete Pipe shall not be allowed.

**Sec. 2502.2 Materials Pipe, Fittings, Joints, Coatings and Linings** add to read as follows:

J. Vitrified Clay Pipe:

1. Vitrified Clay Pipe shall not be allowed.

K. Corrugated Metal Pipe:

1. Corrugated Metal Pipe shall not be allowed.

**Sec. 2505.2 Installation General** Amend to read as follows:

H. Tees, Wyes and Building Service Lines:

5. Service lines shall be located at the points shown on the plans, or designated by the Engineer, and shall be constructed from the sewer main at least to the right-of-way or easement line adjacent to the property to be served prior to construction of the street. No service line shall be connected directly to a manhole. The Contractor shall be certain that the service line locations have been staked in advance of the construction of any sewer serving any property which will require sanitary sewer service and, in case such locations have not been so designated, shall stop the sewer construction until the necessary service line locations have been obtained and marked. Service lines shall not be backfilled until the location of each has been recorded on the as-built plans to be submitted to the City Engineer for a permanent record. Service lines shall be capped according to manufacturer's specification for watertight fitting.

J. Pressure Sewers (Force Main):

All pressure sewers shall be installed with required pipe embedment to depths shown on the Plans (not less than 42 inches) and to a continuous slope when not shown. Approved air relief valves shall be installed at all locations shown on the Plans or where required by the Engineer.

All force mains shall be installed with warning tape and tracer wire for in-ground identification. Tape lettering shall include the words "CAUTION FORCE MAIN LINE BURIED BELOW" printed at regular intervals. The tape shall be installed 12 to 18 inches directly above the pipe and at least 6" below grade. Tracer wire shall be installed continuously along the new facility route with access points placed every 300 hundred feet maximum. Tracer wire should be brought to the ground surface at the access points. Access points may include valve boxes, handholes, manholes, vaults or other covered access devices. Access point covers shall be clearly marked with the type of facility.

**Sec. 2505.2 Installation General Add to read as follows:**

- O. Anchors: Pipelines shall be anchored in accordance with the table below:

<b>PIPELINE ANCHORS</b>	
<b>Percent Grade</b>	<b>Center to Center Max Spacing (FT)</b>
15-35	36
35-46	24

The anchor shall be constructed of cast-in-place concrete. Concrete anchors shall have a minimum thickness of twelve (12) inches. The anchor shall extend not less than one (1) foot into undisturbed earth on the sides and bottom and one (1) foot above top of pipe. In incompressible material, the above dimensions may be six (6) inches each side and bottom. The anchor shall support a joint fitting.

**Sec. 2509.3 Manholes and Special Structures Materials Add to read as follows:**

- D. Precast Concrete:

10. Joint Sleeves: All precast manhole joints shall be wrapped with Infi-Shield® Gator Wrap or approved equivalent. The manhole surface to be covered shall be free of dirt, sharp points and moisture. The wrap shall be applied according to the manufacturer's

recommendations, and shall cover the joints between all sections and the entire surface of the adjustment rings, with overlap onto the manhole of four (4) to six (6) inches.

H. Corrosion Protection: Corrosion protection shall be used in pressure systems or when specified on the Drawings or Modifications to Detailed Specifications. The Drawings shall specify one of the following systems to be used.

1. Epoxy Manhole Liner: Following construction, the interior of the manhole or special structure shall be coated with an epoxy liner meeting the following requirements:

- a. The epoxy manhole liner shall be chemical resistant (below a pH of 2.0), VOC compliant, moisture tolerant, 100% solids, two (2) component epoxy system with the following properties:

ASTM	PSI
Flexural Strength [ASTM D790]:	>10,000 psi
Comprehensive Strength [ASTM D695]:	>10,000 psi
Tensile Strength [ASTM D638]:	>7,000 psi
Adhesion:	Concrete Substrate Failure
Abrasion Resistance [Tabor Coefficient, ASTM D4060]:	<95 mg loss

- b. The manhole shall be coated with the epoxy manhole liner from the base to the cone and with the Flexible Epoxy Grade Adjustment and Frame Seal Liner from the cone to the frame.

2. Plastic Liner: The interior of the manhole or special structure shall be constructed with a plastic manhole liner meeting the following requirements:

a. Material:

- i. Manufacture plastic liner sheet, joint, corner and weld strips from high molecular weight thermoplastic polymer compounded to make permanently flexible material suitable for use as protective liner in concrete pipe or other concrete structures. Polyvinyl chloride resin shall constitute not less than 99 percent by weight of resin used in formulation. Copolymer resins will not be permitted.
- ii. Plastic liner sheets including locking extensions, joints, corners, and welding strips shall be free of cracks, cleavages or other defects adversely affecting protective characteristics of material.
- iii. Except at shop welds, plastic liner sheets, joint, corner, and weld strips shall have the following properties when tested at 77°F ± 5°F:

PROPERTY	ASTM TEST METHOD	CHEMICAL RESISTENCE TEST	
		INITIAL	AFTER (1)
Tensile strength, min	D 412, Die B	2200 psi	2100 psi

Elongation at break, min	D 412, Die B	200%	200%
Shore Durometer, Type D	D 2240, within 1 second	50-60	+5
Weight Change	Note 2	-----	+1.5%

- 1) For 112 days in chemical solutions
- 2) Specimen shall be 1-inch by 3-inch sample sheet thickness, taken from sheet or strip prior to final acceptance of work.

d. Thickness of Material: Minimum thickness of PVC sheet and strip shall be as follows:

<b>MATERIAL</b>	<b>THICKNESS (in)</b>
Sheet, integral locking	0.065
Sheet, plain	0.094
Joint Strip	0.094
Wield Strip	0.125

**CITY OF INDEPENDENCE, MISSOURI  
CONSTRUCTION MANUAL**

**SECTION 2600 – STORM SEWERS**

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The Construction and Material Specifications, titled Section 2600 Storm Sewers, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**Sec. 2601.2 Referenced Standards Delete.**

**Sec. 2602.2(A) Pipe Sewer Construction Materials** Add to read as follows:

"3. Joints

- c. External Joint Wrap: Gator wrap or approved equal shall be applied on all joints.

**Sec. 2602.2(B) Pipe Sewer Construction Materials** Add to read as follows:

"B. Corrugated Metal Pipe (CMP):

- 1. Corrugated metal pipe shall not be used for public infrastructure. Aluminum alloy corrugated metal pipe shall only be used with approval of the Director of Municipal Services.

**Sec. 2602.2(D) Pipe Sewer Construction Materials** Amend to read as follows:

"D. High Density Polyethylene (HDPE) Pipe:

- 3. Joints: Pipe joints shall consist of in-line integral bell and spigot with rubber gasket that meets ASTM F477. Bell shall span over three spigot corrugations. Watertight joints shall be provided which meet a 10.8 psi laboratory test in accordance with ASTM Test method D3212."

**Sec. 2602.2(E) Pipe Sewer Construction Materials** Add to read as follows:

"E. Dual Walled Polypropylene Pipe

- 5. Joints: Pipe joints shall consist of in-line integral bell and spigot with rubber gasket that meets ASTM F477. Bell shall span over three spigot corrugations. Watertight joints shall be provided which meet a 10.8 psi laboratory test in accordance with ASTM Test method D3212."

**Sec. 2602.2(F) Pipe Sewer Construction Materials** Add to read as follows:

"E. Dual and Triple Walled Polypropylene Pipe

5. Joints: Pipe joints shall consist of in-line integral bell and spigot with rubber gasket that meets ASTM F477. Bell shall span over three spigot corrugations. Watertight joints shall be provided which meet a 10.8 psi laboratory test in accordance with ASTM Test method D3212."

**Sec. 2602.2 Materials Add to read as follows:**

G. Smooth Interior Corrugated Polyethylene Pipe.

1. Smooth interior corrugated polyethylene pipe shall conform to the requirements of AASHTO M-294. This pipe shall not be used under public streets.
2. Joints shall be made with split couplings corrugated to match the pipe corrugations. A neoprene gasket shall be utilized with the coupling to provide a soil tight joint.
3. A manufacturer's certification that the product was manufactured, tested and supplied in accordance with these specifications shall be furnished to the City prior to materials being placed in service.

**Sec. 2602.3 Construction Amend to read as follows:**

B. Laying and Jointing:

1. Handling and Protection: All pipe shall be protected during installation against shock and free fall, and be installed without cracking, chipping, breaking, bending, or damage to coating materials. Damaged pipe materials shall be replaced with new materials, except as repair may be permitted by the Engineer.
2. Grade Control: Maximum deviation from plan line or grade of any pipe after installation and backfilling shall not be greater than 0.1 foot. All pipe shall have a continuous slope free from depressions that will not drain. The Contractor shall establish such grade control devices as are necessary to maintain the above tolerances.
3. Laying: The laying of pipe in finished trenches shall be commenced at the lowest point and installed with the bell end forward or upgrade. All pipe shall be laid with ends abutting and true to line and grade. They shall be carefully centered so that when laid they will form a sewer with a uniform invert.
4. Bedding: The class of bedding required shall be as indicated on the plans or standard details. Bedding shall be rodded, spaded, and compacted as necessary to provide firm uniform support for the pipe; and not subject it to settlement or displacement.

Pipeline anchors shall be installed at no greater than a thirty-six feet (36') maximum spacing on all pipelines installed at greater than a twenty percent (20%) grade. The pipe line anchors shall be non reinforced concrete with a four feet (4') minimum width. The anchor length shall be the trench width, with a minimum length of two feet (2'). The concrete thickness below and above the pipeline shall be as follows:

Pipe Size	Thickness
-----------	-----------

8"	7"
10"	11"
12"	15"
Above 12"	24"

5. Jointing: Preparatory to making pipe joints, all surfaces of the portions of the pipe to be jointed shall be clean and dry. Lubricants, primers, adhesives, etc., that are used shall be compatible with the jointing material recommended or specified. All bell and spigot ends of concrete pipe shall be primed prior to application of a trowel able bitumastic plastic compound.

No pipes may be trimmed unless by order of the Engineer. Pipes having defects that do not cause their rejection shall be so laid as to place these defects where they will be of least consequence.

Trenches shall be kept water-free and as dry as possible during bedding, laying and jointing, and for as long a period as required to protect the pipe joints and concrete in structures.

As soon as possible after the joint is made, sufficient material shall be placed alongside each side of the pipe to offset conditions that might tend to move the pipe off line and guide.

a. Concrete Pipe:

- (1) Plastic joint sealant shall be applied to the tongue or spigot prior to its insertion into the bell or groove. A sufficient amount of sealant shall be used to fill the annular joint space with some squeeze out. Wipe the outside surface of the joint with additional material to assure a complete seal.
- (2) Mortar: When cement mortar is used the joint surface shall be clean and soaked with water immediately before the joint is made. A layer of mortar shall be placed in the lower portion of the bell or groove of the installed pipe and on the upper portion of the tongue or spigot of the pipe section to be installed. The tongue or spigot shall then be inserted into the bell or groove of the installed pipe until the mortar is squeezed out on both the interior and exterior surfaces. The annular joint space shall be completely filled and the abutting joint sections flush and even, with excess mortar struck off.
- (3) Flexible Gaskets: Flat gaskets may be cemented to the pipe tongue or spigot. O-ring gaskets shall be recessed in a groove on the pipe tongue or spigot and confined by the bell or groove after the joint is completed. Roll-on gaskets shall be placed around the tongue or spigot and rolled into position as the joint is assembled. Flat gaskets and O-ring gaskets shall be lubricated as recommended by the manufacturer.

- b. Corrugated Steel Pipe: Corrugated metal pipe shall not be used for public infrastructure. Aluminum alloy corrugated metal pipe shall only be used with approval of the Director of Municipal Services.
- c. Connection to Structures: Pipe connecting to structures shall be cut parallel with the inside face of the structure for structures having plane walls and parallel with the spring line of the pipe for structures having curved walls. Projection of the pipe beyond the inside face shall not exceed 1 inch (25 mm) (measured at the spring line for structures having curved walls).

**Sec. 2602.3 Construction Amend to read as follows:**

- C. Backfill: All trenches and excavations shall be backfilled with suitable material placed and compacted in conformance with Section 2102.6 entitled "Embankment."
  - 1. All Pipe: Granular bedding material shall be placed to the springline of the pipe, and may, at the Contractor's option, be placed to a point six inches (6") above the top of the pipe. Material shall be placed in 6 inch (maximum) lifts; and compacted by rodding, spading, or vibratory compaction as necessary to provide uniform contact with the pipe and trench to prevent settlement or displacement. Select soil backfill may be used in lieu of granular bedding material above the springline of the pipe. The select material shall be placed in 6 inch (maximum) lifts and shall be compacted to not less than 95% of maximum density at optimum moisture  $\pm$  2.0% as determined by ASTM D698 or within the tolerance of the moisture range for the type of material being used as determined by the Engineer.
  - 2. Backfilling under areas to be paved and existing pavement from the top of the pipe embedment as shown on the approved standard drawings to a point at grade, backfill material shall be untreated aggregate meeting the requirements of Chapter 20 Article 6 and compacted to 95% maximum density as determined by ASTM 698.
  - 3. Other Backfill: From a point six inches (6") above the top of the pipe to a point at grade, backfill material shall be placed in such a manner so as to obtain 90% of maximum density at optimum moisture  $\pm$  2.0% or within the tolerance of the moisture range for the type of material being used as determined by the Engineer. Lift thickness shall be within the capability of the compaction equipment used, but not greater than twenty-four inches (24").
  - 4. Backfilling around a structure must be done in a manner that will maintain the integrity of the structure.
    - a. No backfill shall be placed over or around any structure until the concrete or mortar has attained a minimum strength of 2,000 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 or unbalanced backfill or by the use of equipment on or near a structure will be the responsibility of the Contractor.
    - c. No excavated rock larger than four inches (4") maximum dimension shall be placed within one foot (1') of the exterior surface of any structure.

**Sec. 2603.3 Construction Details Amend to read as follows:**

**C. Sewer Pipe Installation**

1. Pipe shall be placed inside the casing to the plan line and grade by the use of wood skids or other equivalent methods. The wood shall be pressure treated with creosote, pentachlorophenol, or salt-type preservative in accordance with AWWA C2. Cut surfaces shall be given two (2) heavy brush coats of the same preservative. The wood skids shall be securely fastened to the sewer pipe with stainless steel straps.
2. End seals shall be constructed after the sewer pipe is installed and approved. A two inch (2") diameter weephole shall be installed in the downstream end.
3. If specified, the annular space between the casing and sewer pipe shall be filled with sand blown in, so that all space is filled without disturbing the alignment and grade of the sewer pipe.

**Sec. 2604.2 Materials Amend to read as follows:**

**B. Concrete Materials:** Concrete, whether reinforced or non-reinforced, shall conform to MCIB Specifications and to the requirements therein for the MCIB Mix Number specified. Concrete shall be mixed and transported in accordance with Section 501 of the latest edition of the Missouri Standard Specifications for Highway Construction.

**Sec. 2604.2 Materials Add to read as follows:**

**I. Reinforced Concrete Box Culverts:** The work covered by this section of the specifications covers the installation of concrete work complete in strict accordance with this section of the Specifications and the Standard Specifications for State Road and Bridge Construction, State Highway Commission of Missouri or Kansas and the applicable drawings. All concrete shall conform to Section 2604.2 of these specifications entitled 'Material'.

**Sec. 2606.1 Measurement Amend to read as follows:**

- I. Riprap:** By the square yard by actual field measurement of authorized placement.
- L. Sodding:** Sodding will be measured horizontally in linear feet along the centerline of storm sewer pipe. Regardless of width of disturbed areas or type sod used. Sodding 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 operation areas will not be measured for payment but shall be restored to a condition equal to or better than that existing prior to construction. Each area measured will be measured as either seeding or sodding, but not as both. When sewer ends in grassed area, measurement will be made only to centerline of manhole.
- M. Seeding:** Seeding will be measured horizontally in linear feet along the centerline of storm sewer pipe, regardless of the width of disturbed areas 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 operation areas will not be measured for payment but shall be restored to a condition equal to or better than that existing prior to construction. Each area measured will be measured either as seeding or sodding, but not as both. When sewer ends in grassed area, measurement will be made only to centerline of manhole.

**CITY OF INDEPENDENCE, MISSOURI  
CONSTRUCTION MANUAL**

**SECTION 2700 – STRUCTURES**

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The Construction and Material Specifications, titled Section 2700 Structures, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**CITY OF INDEPENDENCE, MISSOURI  
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**SECTION 2800 – STREET LIGHTS**

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The Construction and Material Specifications, titled Section 2800 Street Lights, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.

**CITY OF INDEPENDENCE, MISSOURI  
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**SECTION 2900 – WATERLINES**

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The Construction and Material Specifications, titled Section 2900 Waterlines, approved and adopted on February 15, 2017, by the Kansas City Metropolitan Chapter of the APWA, is hereby adopted for use within the Standard Specifications of the City of Independence, Missouri with the additions, insertions, deletions, and changes, if any, prescribed in the below sections.



# CITY OF INDEPENDENCE

## STANDARD DETAILS

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**INDEPENDENCE**  
\* MISSOURI \*

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**INDEPENDENCE**  
\* MISSOURI \*

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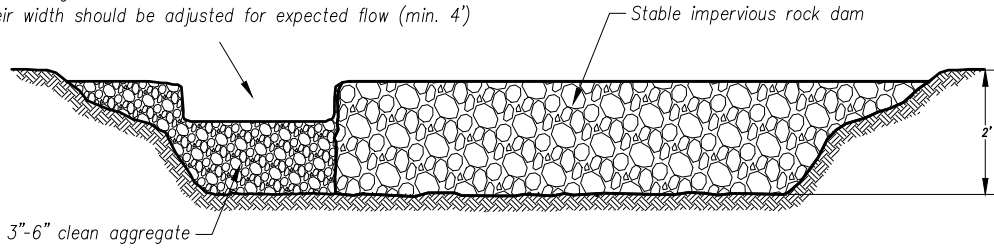
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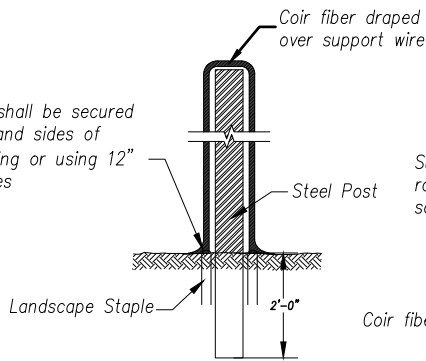
# INDEPENDENCE MUNICIPAL SERVICES

To increase flow path construct 1' deep weirs at alternating ends of each baffle.  
Weir width should be adjusted for expected flow (min. 4')

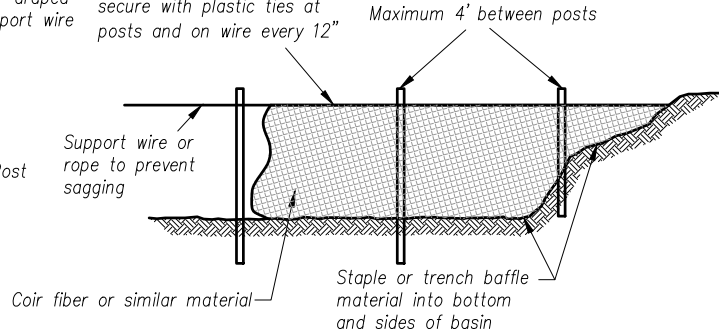


Option A - Rock with Weir

Baffle material shall be secured to the bottom and sides of basin by trenching or using 12" landscape staples



Drape baffle material over support wire or rope and secure with plastic ties at posts and on wire every 12"

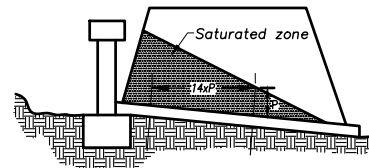


Option B - Coir Fiber Material

Anti- Seepage Collar Notes:

1. Connections between the anti-seepage collar and the barrel must be watertight.
2. P = projection distance. Sized as required to achieve at least a 10% increase in seepage length.
3. 14xP = Max. spacing between collars.
4. Collars shall generally be placed in the middle third of the embankment, and within the saturated zone.
5. All materials to be in accordance with construction material specifications.
6. When specified on the plans, coating of collars shall be in accordance with construction material specifications.
7. Unassembled collars shall be marked by painting or tagging to identify matching pairs.
8. The lap between the two half sections and between the pipe and connecting band shall be caulked with asphalt mastic at the time of installation.
9. Each collar shall be furnished with two (2) 1/2" diameter rods with standard tank lugs for connecting the collars to the pipe.
10. For bands and collars, modification of the details shown may be used providing equal water tightness is maintained and detailed drawings are submitted and approved by the Engineer prior to delivery.
11. Two other types of anti-seep collars are:
  - a. Corrugated metal, similar to above, except shop welded to a 4 ft. section of the pipe and connected to the pipe with connecting bands.
  - b. Concrete, 6 inches thick, formed around the pipe with #3 rebar spaced 15".

BAFFLE DETAILS



ANTI-SEEPAGE COLLAR LOCATIONS

CORRUGATED METAL ANTI-SEEPAGE COLLAR DETAIL

Drawing Not to Scale

BAFFLE  
DETAILS

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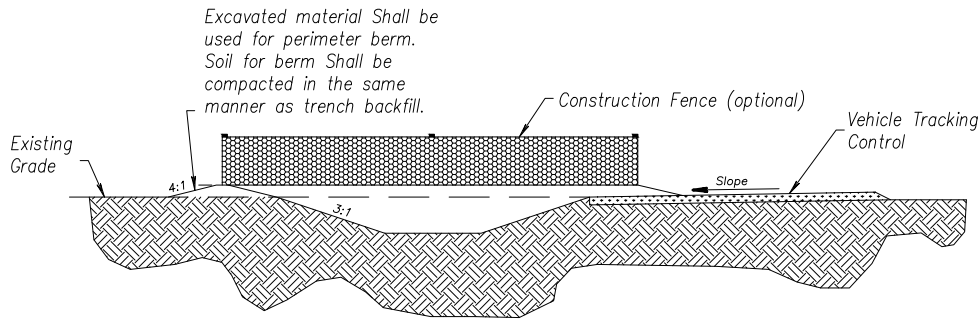
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1-01

# INDEPENDENCE MUNICIPAL SERVICES



CONCRETE WASHOUT

Notes for Concrete Washout:

1. Concrete washout areas shall be installed prior to any concrete placement on site.
2. Concrete washout area shall include a flat subsurface pit sized relative to the amount of concrete to be placed on site. The slopes leading out of the subsurface pit shall be 3:1. The vehicle tracking pad shall be sloped towards the concrete washout area.
3. Vehicle tracking control is required at the access point to all concrete washout areas.
4. Signs shall be placed at the construction site entrance, washout area and elsewhere as necessary to clearly indicate the location(s) of the concrete washout area(s) to operators of concrete trucks and pump rigs.
5. A one-piece impervious liner may be required along the bottom and sides of the subsurface pit in sandy or gravelly soils.

Maintenance for Concrete Washout:

1. Concrete washout materials shall be removed once the materials have filled the washout to approximately 75% full.
2. Concrete washout areas shall be enlarged as necessary to maintain capacity for wasted concrete.
3. Concrete washout water, wasted pieces of concrete and all other debris in the subsurface pit shall be transported from the job site in a water-tight container and disposed of properly.
4. Concrete washout areas shall remain in place until all concrete for the project is placed.
5. When concrete washout areas are removed, excavations shall be filled with suitable compacted backfill and topsoil, any disturbed areas associated with the installation, maintenance, and/or removal of the concrete washout areas shall be stabilized.

Drawing Not to Scale



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**CONCRETE**  
**WASHOUT**

REVISED: DATE

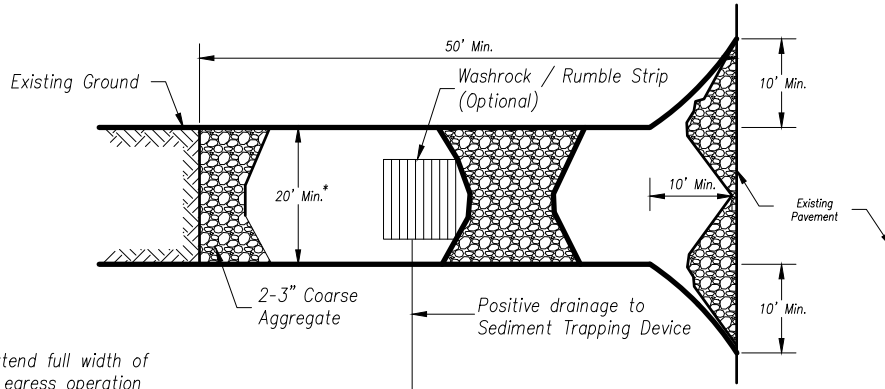
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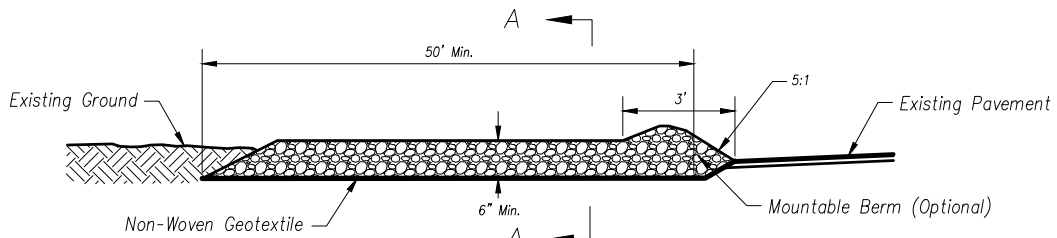
1-02

# INDEPENDENCE MUNICIPAL SERVICES

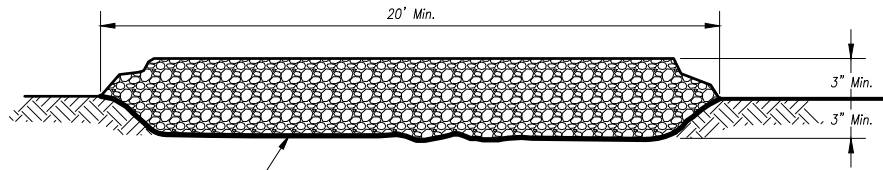


\* - Must extend full width of ingress and egress operation

Plan View  
Not to Scale



Side Elevation  
Not to Scale



Section A-A  
Not to Scale

### CONSTRUCTION ENTRANCE

Notes for Construction Entrance:

1. Construction entrance must be installed prior to grading
2. Avoid locating on steep slopes, at curves on public roads, or downhill of disturbed area.
3. Remove all vegetation and other unsuitable material from the foundation area, grade, and crown for positive drainage.
4. If slope is toward the public road, construct a 6- to 8-inch high ridge with 3H:1V side slopes across the foundation approximately 15 feet from the edge of the public road to divert runoff from it.
5. Install pipe under the entrance if needed to maintain drainage ditches along public roads.
6. Place stone to dimensions and grade as shown on plans. Leave surface sloped for drainage.
7. Divert all surface runoff and drainage from the entrance to a sediment control device.
8. If conditions warrant, place geotextile fabric on the graded foundation to improve stability.

Maintenance for Construction Entrance:

1. Reshape entrance as needed to maintain 6' depth. Top dress with clean aggregate as needed.
2. Remove mud or sediment tracked on public roads immediately.

Drawing Not to Scale



### CONSTRUCTION ENTRANCE

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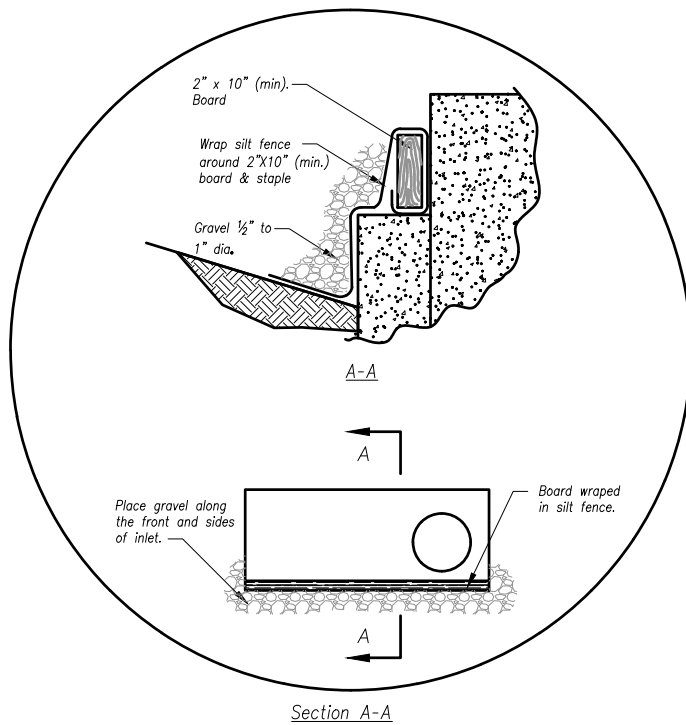
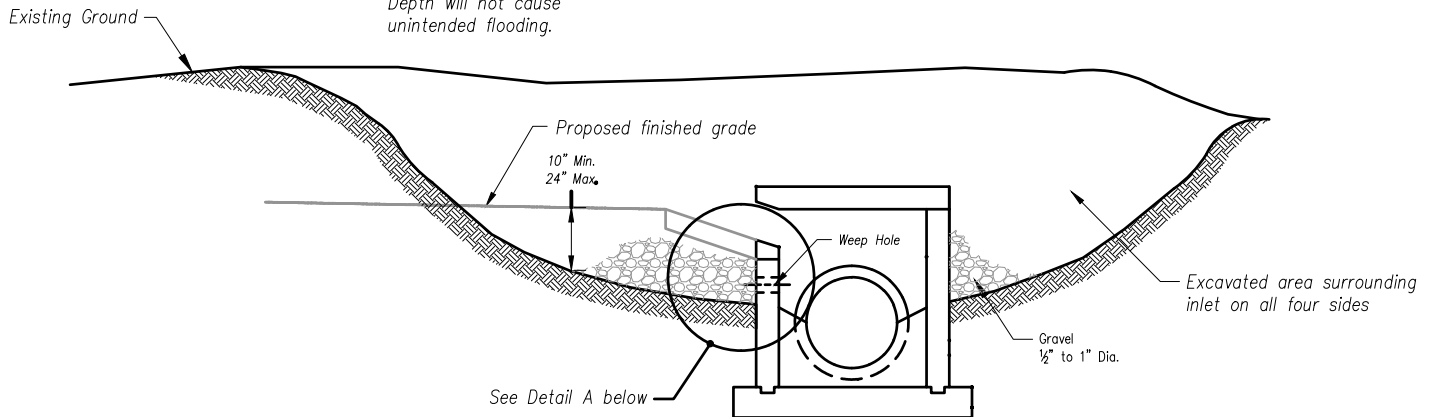
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# INDEPENDENCE MUNICIPAL SERVICES

\* Contractor shall field verify that Pounded Water Depth will not cause unintended flooding.



**Notes:**

1. Immediately following inlet construction and prior to construction of curb and inlet throat, protect inlet opening by installing 2" X 10" (min.) board wrapped in silt fence. Structures shall have excavated storage area on all four sides to allow settling of sediment (Early Stage Curb Inlet)
2. When inlet is completed and curb poured, filter socks or approved equal shall be used (Late Stage Curb Inlet). Straw wattles are not approved for curb inlet use.
3. Contractor to field verify ponding water shall not create a traffic hazard.

**Maintenance:**

1. Remove deposited sediment from excavated storage areas when available storage has been reduced by 20%.
2. Remove deposited sediment from filter socks or similar when any accumulation of sediment is visible.
3. Repair or replace as necessary to maintain function and integrity of installation.
4. Prior to placement, all debris, rock, wood, and vegetation shall be cleared.
5. Log/sock placed on pavement shall be weighted down with gravel/sand ballast.

Drawing Not to Scale



**ON GRADE CURB  
INLET PROTECTION  
(Sheet 1 of 2)**

REVISED: DATE

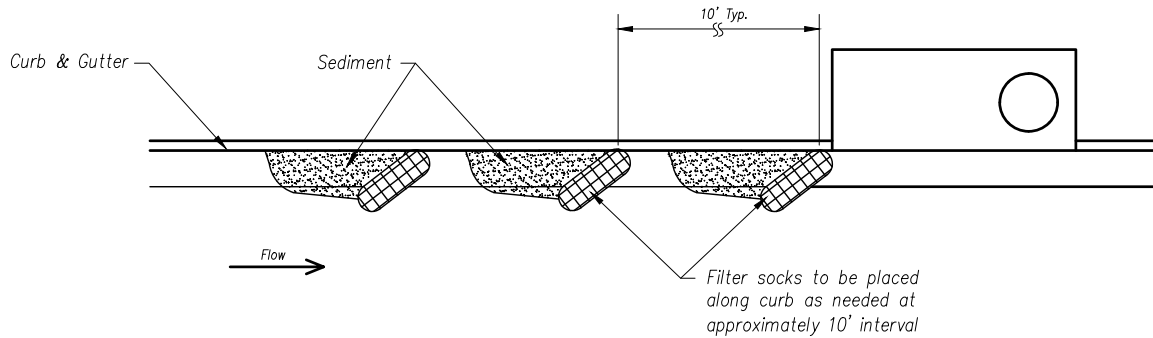
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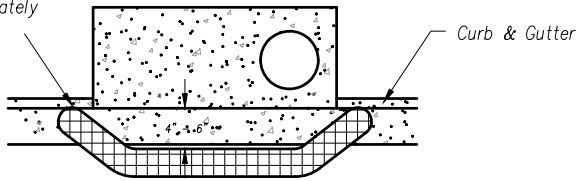
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# INDEPENDENCE MUNICIPAL SERVICES

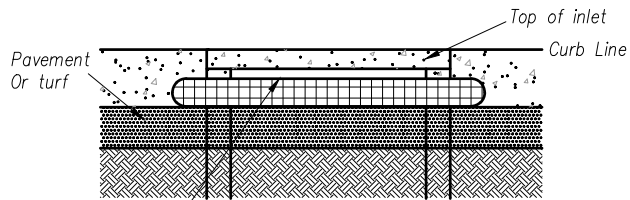


On Grade Curb Inlet Protection

Filter sock is to have a tight curb contact with no gaps and extend approximately 6" beyond inlet opening.



Top View



Height of filter sock should not be above the top of the inlet.

Front View

Sump Inlet Sediment Filter

Drawing Not to Scale



CURB INLETS  
PROTECTION  
(Sheet 2 Of 2)

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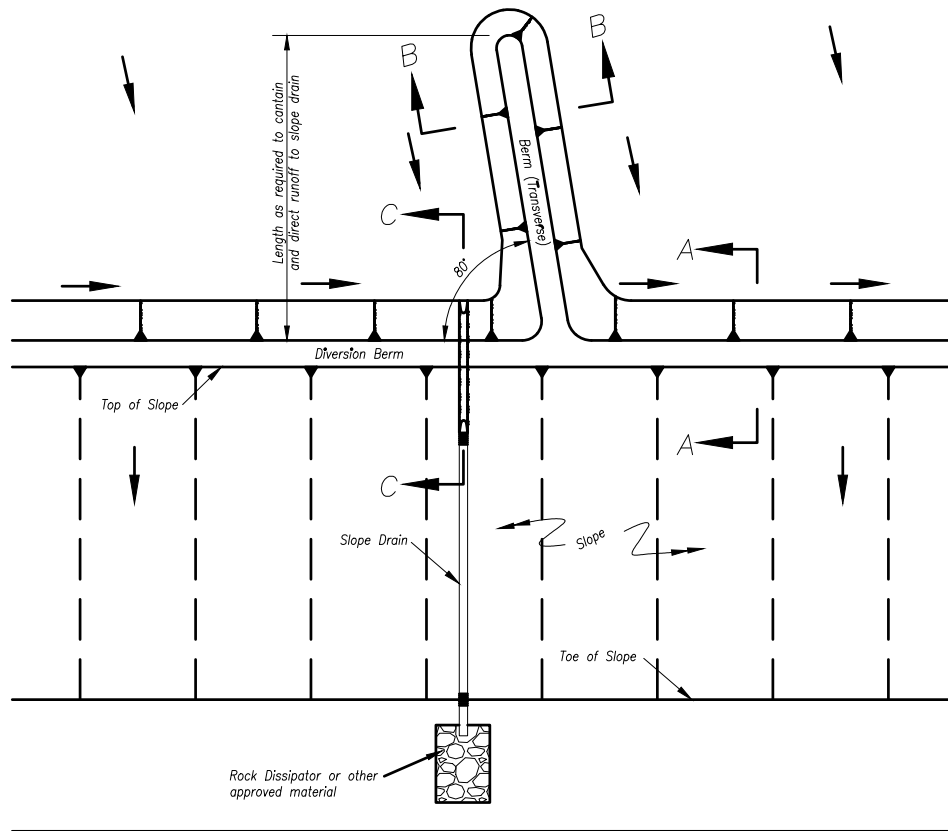
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DATE: 7/15/22

1-05

# INDEPENDENCE MUNICIPAL SERVICES



TYPICAL PLAN VIEW OF DIVERSION BERM AND SLOPE DRAIN

Notes for Diversion Berm:

1. Slope drains are optional, but may be required by the engineer if the berm is at the top of a steep slope.
2. Diversion berms must be installed as a first step in the land-disturbing activity and must be functional prior to upslope land disturbance.
3. The berm should be adequately compacted to prevent failure.
4. Temporary or permanent seeding and mulch shall be applied to the berm immediately following its construction.
5. Place the berm so to minimize damages by construction operations and traffic.
6. The berm must discharge to a temporary sediment trap or stabilized area.
7. All trees, brush, stumps, obstructions and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of diversion.
8. The diversion shall be excavated or shaped to line, grade and cross-section as required to meet the criteria specified herein, free of irregularities which will impede flow.
9. Fills shall be compacted as needed to prevent unequal settlement that would cause damage in the completed diversion. Fill shall be composed of soil which is free from excessive organic debris, rocks or other objectionable materials.

Maintenance:

1. Berm shall be reshaped, compacted, and stabilized as necessary to maintain its function.
2. Breaches in the berm shall be repaired immediately.

Drawing Not to Scale



**DIVERSION BERM**  
(Sheet 1 of 3)

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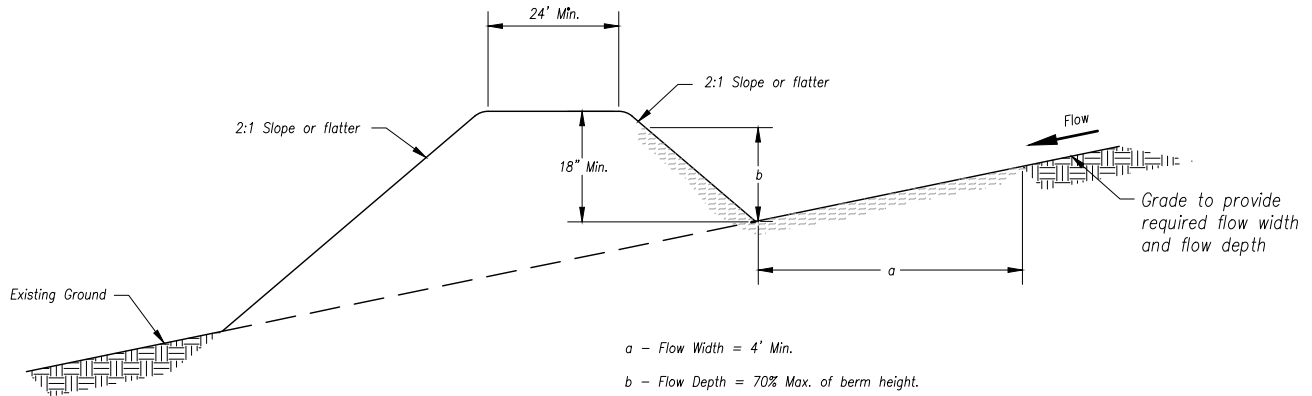
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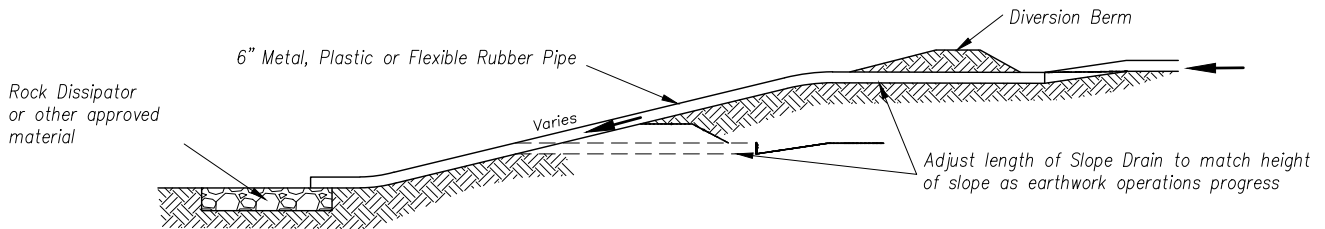
# INDEPENDENCE MUNICIPAL SERVICES

## Section A-A

TYPICAL PROFILE OF DIVERSION BERM



TYPICAL PLAN VIEW OF DIVERSION BERM



Notes for Slope Drain:

1. Slope Drain and Diversion Berm may be used on either project foreslopes or project backslopes.
2. Discharge of Slope Drains shall be into stabilized ditch or area, or into Sediment Basin.
3. Pipe shall be secured in place as approved by Engineer.

Drawing Not to Scale



**DIVERSION BERM**  
(Sheet 2 of 3)

REVISED: DATE

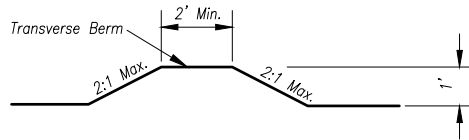
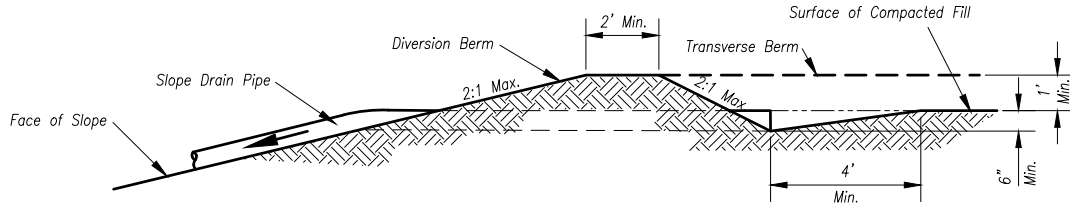
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1-07

# INDEPENDENCE MUNICIPAL SERVICES



TYPICAL PROFILE OF TRANSVERSE DIVERSION BERM WITH SLOPE DRAIN

Maintenance:

1. Accumulation of any visible sediment at the inlet and outlet shall be removed within 24 hours after each rain event.
2. Outlet conditions shall be repaired if scour is observed. Leaking or damaged section of pipe shall be repaired immediately.
3. Barriers directing water to the inlet shall be monitored for continuity and effectiveness.
4. Leaking or damaged sections of pipe shall be repaired immediately.

Drawing Not to Scale



**TRANSVERSE  
DIVERSION BERM**  
(Sheet 3 of 3)

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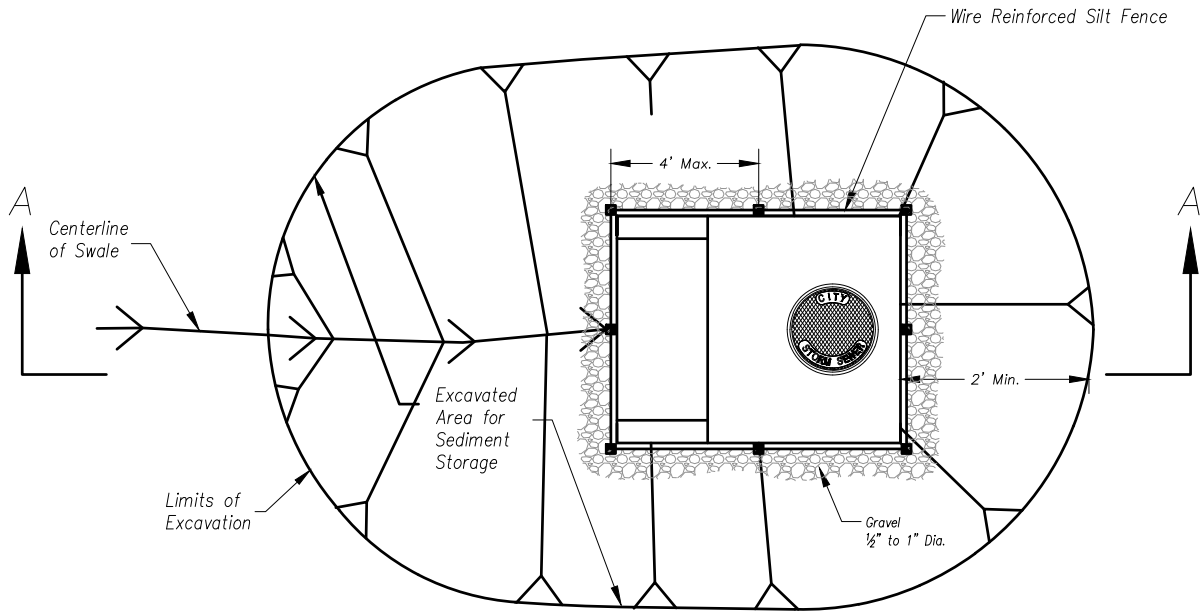
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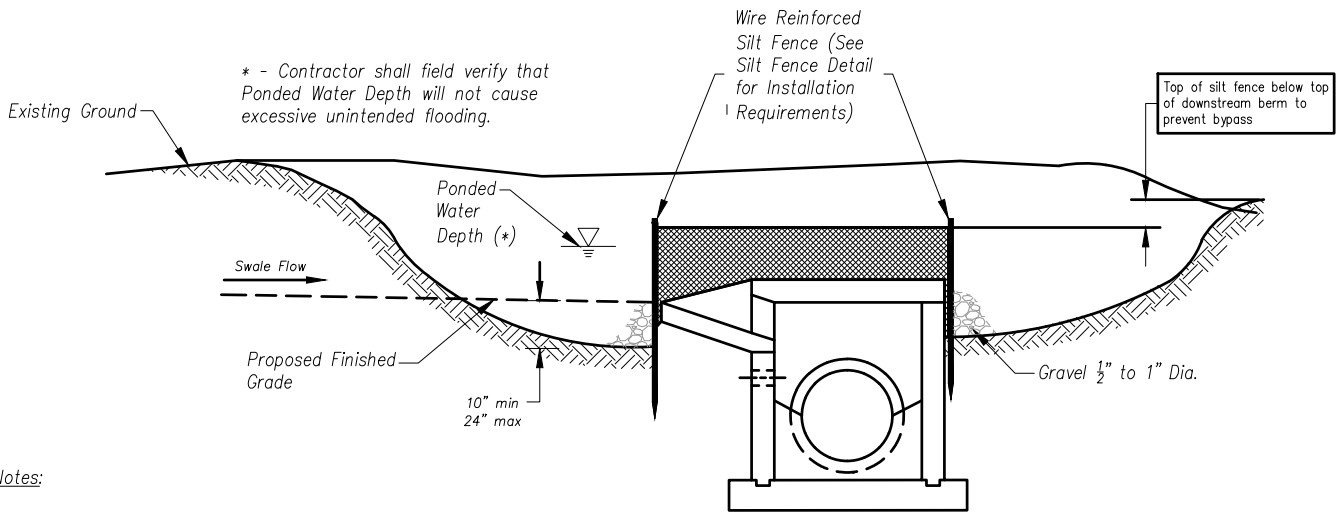
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1-08

# INDEPENDENCE MUNICIPAL SERVICES



Plan



Section A-A

**Notes:**

1. Early Stage Area Inlet Sediment Barrier to be installed immediately after inlet or junction box is constructed.
2. Silt fence shall remain in place until excavated area is removed and Late Stage Area Inlet is being installed.
3. Backfill excavated area ONLY after final grading of the site. Stabilization of the site is to immediately follow.
4. Wire reinforced silt fence may be used in place of silt fence attached to wood frame.
5. Prior to placement, all debris, rock, wood, and vegetation shall be cleared.
6. Log/sock placed on pavement shall be weighted down with gravel/sand ballast.

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## EARLY STAGE AREA INLETS

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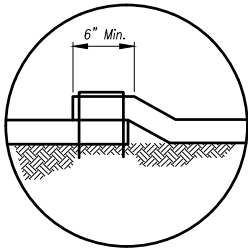
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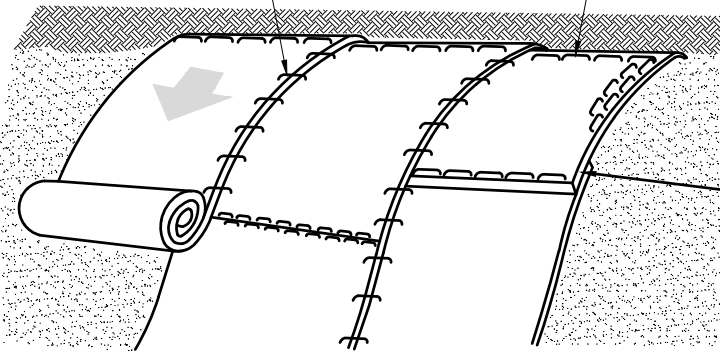
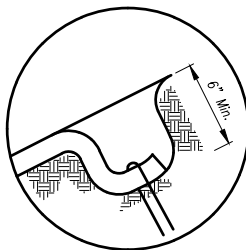
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# INDEPENDENCE MUNICIPAL SERVICES

Longitudinal Seam



Anchor Slot

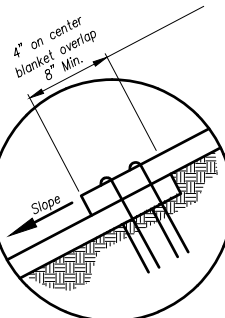


General Notes:

1. Chapter 20 Article 3 of City code shall be referenced to select type of blanket or mat to be used.
2. Typical anchors and pattern/spacing shall be installed according to the manufacturers instructions.
3. LONGITUDINAL SEAMS: The edges of the blanket or mat should overlap each other a minimum of 6 inches, with anchors catching the edges of both blankets.

Maintenance:

1. Torn or degraded product shall be repaired or replaced, unless such degradation is within the functional longevity specified by the manufacturer.
2. Edges or seams that are loose or frayed shall be secured.

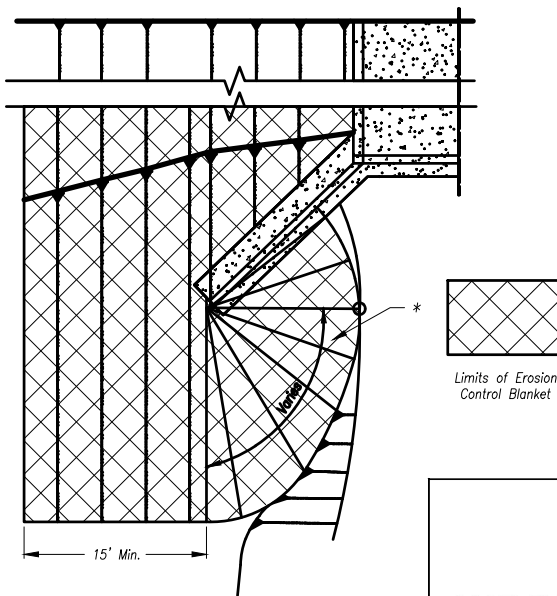


Splice Seam

Installation on Slopes:

\* - Erosion Control Blanket or TRM may be omitted if the area is immediately covered by a permanent slope protection (where directed by the plans)

Installation Around Culvert Slope



Partial Box Culvert Plan

Notes for Installation on Slopes:

1. Erosion Control Blankets and TRMs shall be laid in the direction of the slope. In order for the blanket to be in contact with the soil, lay blanket loosely, avoiding stretching.
2. ANCHOR SLOTS: The top of the blanket should be "slotted in" at the top of the slope and anchored in place with anchors 6 inches apart. The slots should be 6 inches wide x 6 inches deep with the blanket anchored in the bottom of the slot, then backfilled, tamped and seeded.
3. SPLICE SEAM: When splices are necessary, overlap end a minimum of 8 inches in direction of water flow. Stagger splice seams.
4. TERMINAL FOLD: The bottom edge of the blanket shall be turned under a minimum of 4 inches, then anchored in place with anchors 9 inches apart.

Drawing Not to Scale

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MISSOURI

**EROSION CONTROL  
BLANKET**  
(Sheet 1 of 2)

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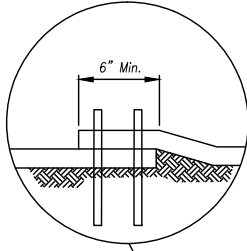
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# INDEPENDENCE MUNICIPAL SERVICES

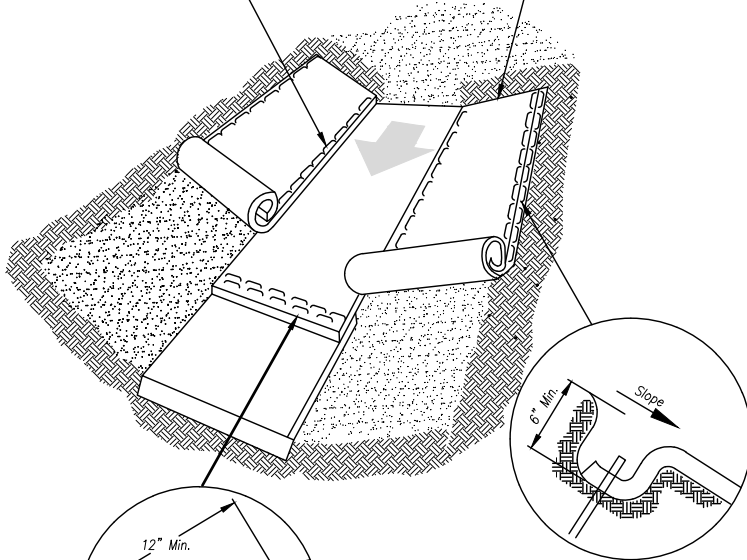
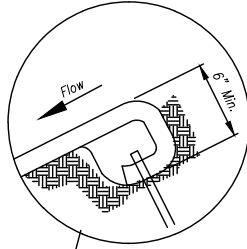
## Notes for Installation in Channels:

1. TRMs shall be laid in the direction of the flow, with the first course at the centerline of channel, where applicable. In order for the mat to be in contact with the soil, lay the mat loosely, avoiding stretching.
2. ANCHOR FOLD: The top of the mat should be folded under, buried and secured with wood or other approved anchors placed 6 inches apart. The top edge of the mat should be buried in a slot 6 inches wide x 6 inches deep, anchored in the bottom of the slot, backfilled, and the mat folded over the top as shown in detail.
3. SPLICE SEAM: When splices are necessary, overlap and a minimum of 12 inches in direction of water flow. Stagger splice seams.
4. CHECK SLOTS: Establish check slots transverse to slope every 30 feet. The slots should be 6 inches wide x 6 inches deep. The mat shall be cut to a length 12 inches beyond the slot. The top of the downstream mat shall be slotted in, secured and buried similar to the edge anchor fold. The upstream mat shall then cover the slot and be anchored as shown.
5. EDGE ANCHORS: Lay outside edge of mat into trench at top of the slope and anchor.
6. TERMINUS: The bottom edge of the mat shall be anchored.

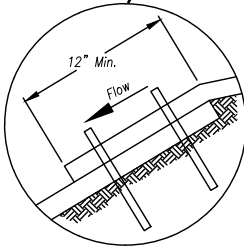
Longitudinal Seam



Anchor Fold

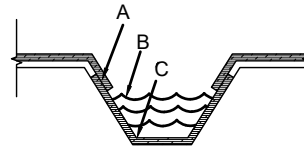


Edge Anchor

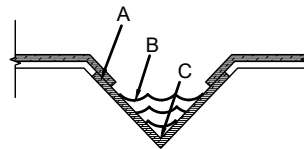


Splice Seam

Installation in Channels



Trapezoidal Channel



V Channel

### Critical Points:

- A - Overlaps and seams;
- B - Projected water line;
- C - Channel bottom / side slope vertices;

Drawing Not to Scale



**EROSION CONTROL**  
**BLANKET**  
(Sheet 2 of 2)

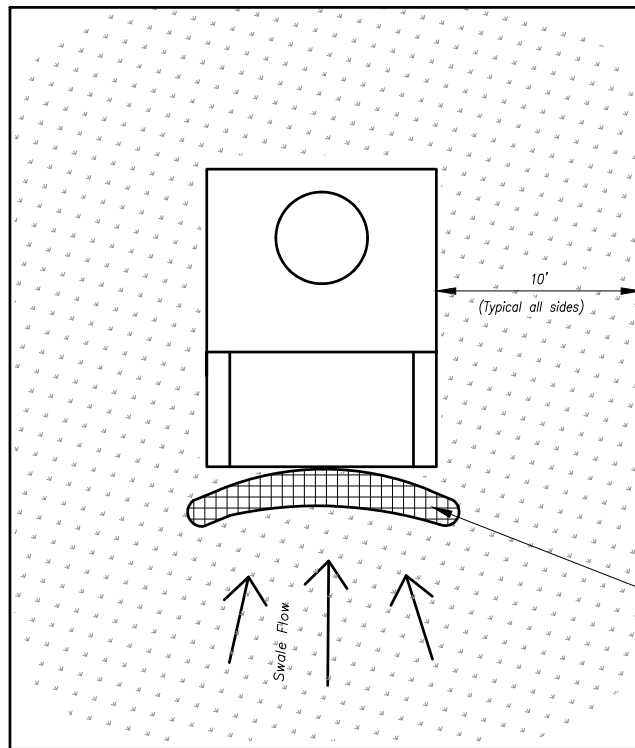
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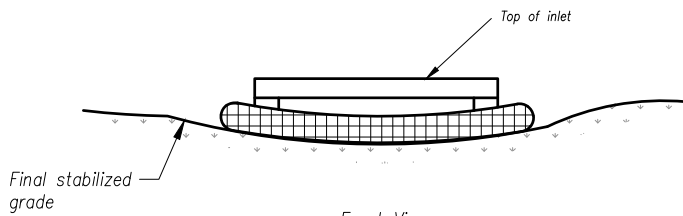
# INDEPENDENCE MUNICIPAL SERVICES



Plan

10'  
(Typical all sides)  
Stabilized Buffer consisting of vegetation or approved Erosion Control Project

Place biodegradable log, staked wattles or other approved sediment control device in front of each inlet opening. (Not to be placed in throat of inlet).



Front View

Maintenance:

1. Remove deposited sediment from excavated storage areas when available storage has been reduced by 20%
2. Remove deposited sediment from filter socks or similar when any accumulation of sediment is visible.
3. Repair or replace as necessary to maintain function and integrity of installation.

Drawing Not to Scale



LATE STAGE  
AREA INLETS

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# INDEPENDENCE MUNICIPAL SERVICES

## MULCH OR COMPOST FILTER BERMS

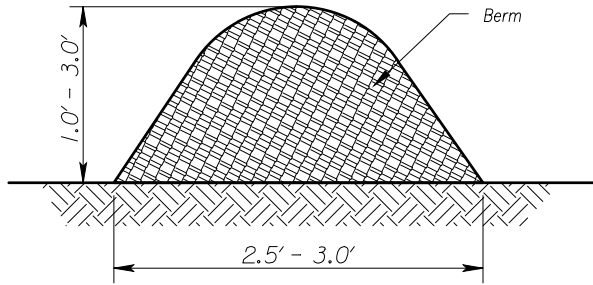


Figure 1  
(Perimeter Control)

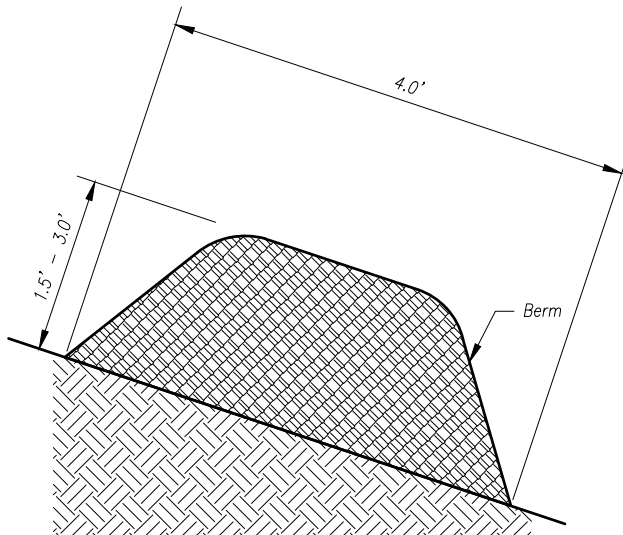


Figure 2  
(Steep Slopes)

### Notes for Mulch and Compost Filter Berm:

1. The sediment control berm shall be placed uncompacted in a windrow at locations shown on the plans or as directed by the engineer.
2. Parallel to the base of the slope, or around the perimeter of the other affected areas, construct a 1 to 3 foot high by 2.5 to 3 foot wide berm (see Figure 1). For maximum water treatment ability or for steep slopes, construct a 1.5 to 3 foot high trapezoidal berm that is a minimum of 4 feet wide at the base (see Figure 2). In extreme conditions, or where specified by the engineer, a second berm shall be constructed at the top of the slope. Engineer will specify berm requirements.
3. If berm is to be left as permanent or part of the natural landscape, the compost berm may be seeded during application for permanent vegetation.
4. Do not use compost or wood mulch berms in any runoff channels or concentrated flow areas.
5. Wood mulch shall consist of tree and shrub debris resulting from clearing and grubbing and shall be ground by the mechanical means such as a chipper, hammermill, tub grinder or other approved method. Mulch sizing varies with a maximum width of 2" and a maximum length of 10"

### Maintenance for Mulch and Compost Filter Berm:

1. Berm shall be reshaped and material added as necessary to maintain function and dimensions.
2. Breaches in the berm shall be repaired promptly.

Drawing Not to Scale



## MULCH OR COMPOST FILTER BERMS

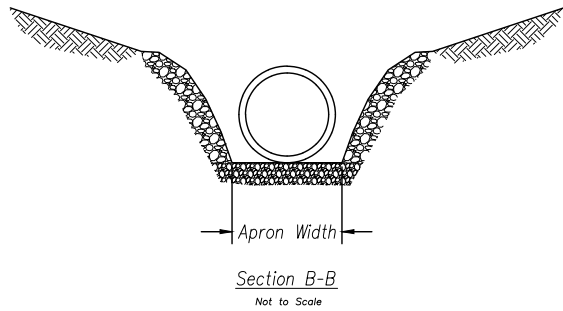
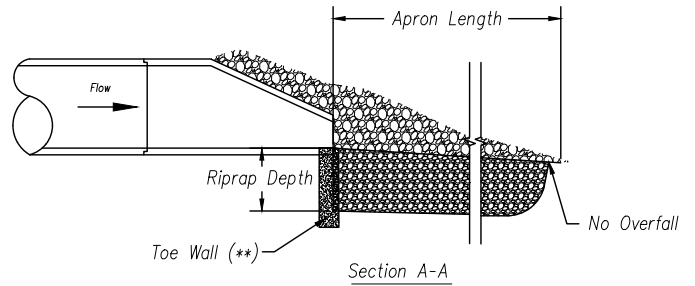
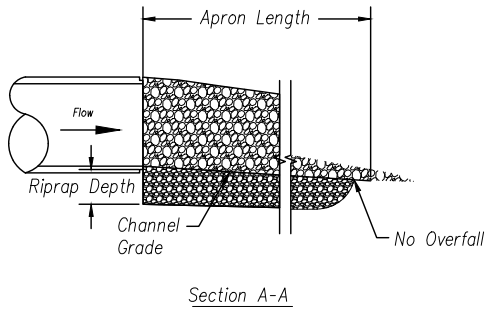
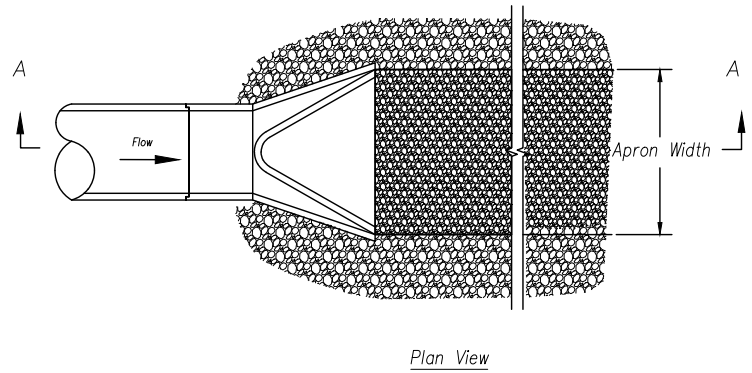
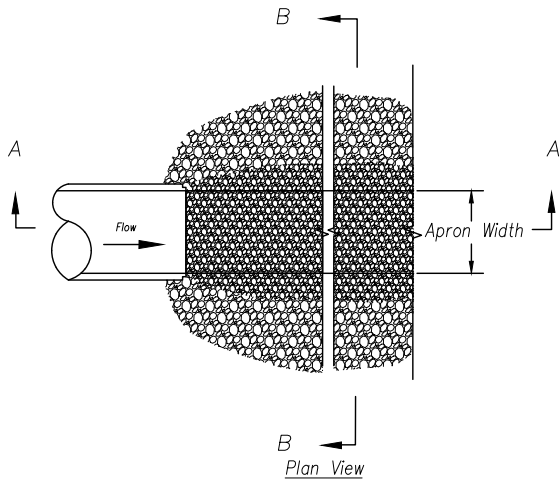
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BY: \_\_\_\_\_ INITIALS \_\_\_\_\_

DRAWN BY: \_\_\_\_\_ AEO \_\_\_\_\_

DATE: \_\_\_\_\_ 7/14/22 \_\_\_\_\_

# INDEPENDENCE MUNICIPAL SERVICES



OUTLET PROTECTION W/O END SECTION

OUTLET PROTECTION WITH END SECTION

Notes:

1. Rock all sides steeper than 3:1
2. Stabilize all disturbed areas downstream of outlet to the limits of disturbance
3. Alternative outlet protection and slope stabilization measures may be used with approval by the Engineer.
4. Install riprap apron so that it is no higher than flowline of pipe.
5. Reference APWA Specification 2650 for rock type, size, and placement.

Drawing Not to Scale



## OUTLET PROTECTION

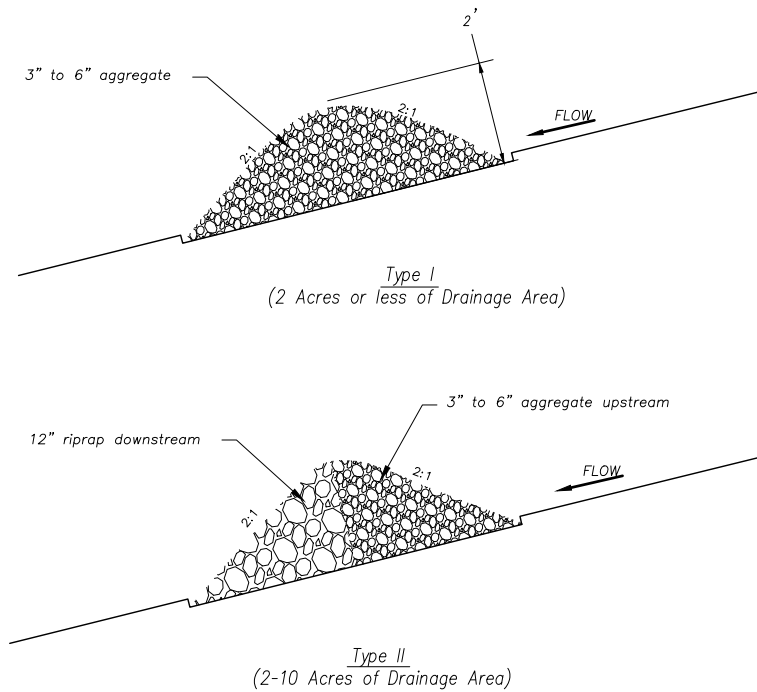
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# INDEPENDENCE MUNICIPAL SERVICES



## ROCK DITCH CHECK

### Notes:

1. Rock check dams shall be used only for drainage areas less than 10 acres unless approved by the City Engineer
2. Geotextile may be installed as directed by the engineer.

### Maintenance:

1. Remove and dispose of sediment deposits when the deposit approaches  $\frac{1}{2}$  the height of the ditch check.
2. Replace and reshape as necessary to maintain function and integrity of installation.

Drawing Not to Scale



ROCK DITCH CHECK  
(Sheet 1 of 2)

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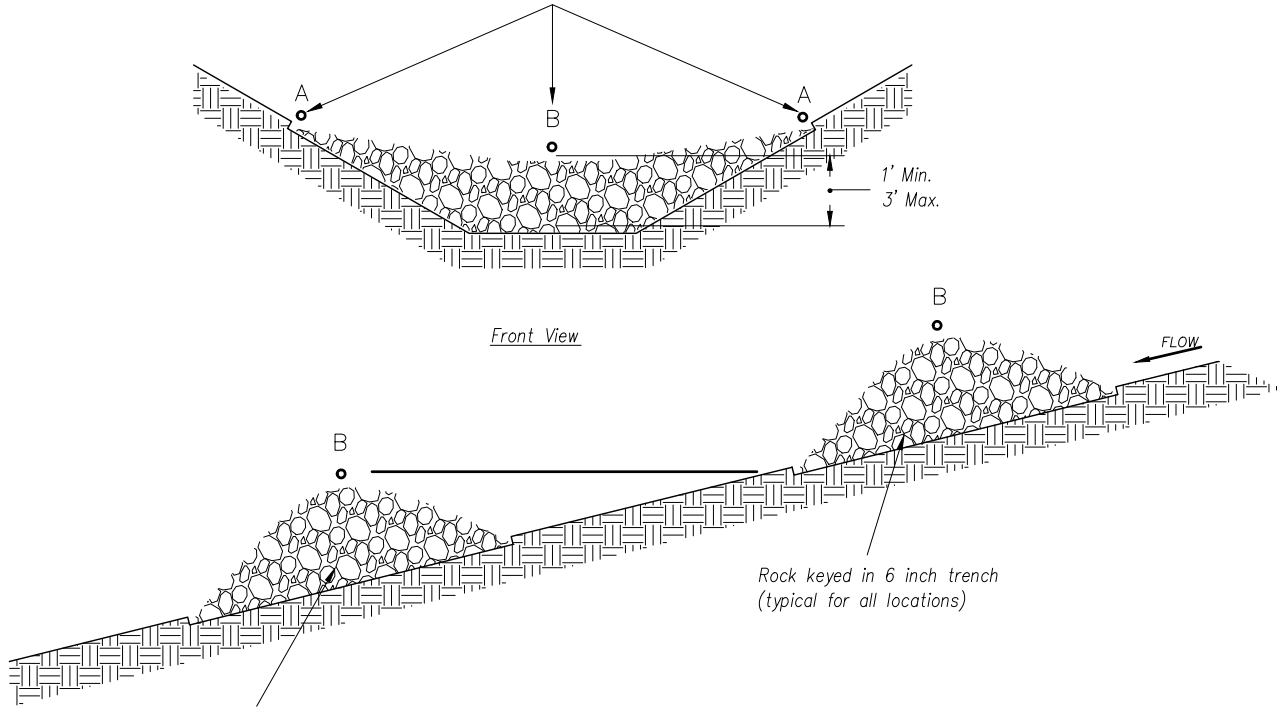
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DATE: 11/18/21

1-15

# INDEPENDENCE MUNICIPAL SERVICES

Elevation at end Points "A" must be minimum 6"  
higher than elevation of flow line at point "B"



Place downstream structure such that Point "B" is approximately level with the toe elevation of the upstream structure

Spacing Between Check Dams (all types)

EXAMPLE DITCH CHECK SPACING FOR STANDARD HEIGHTS (FT.)		
DITCH $\frac{C}{S}$ SLOPE %	SPACING FOR 9" EFF. HEIGHT	SPACING FOR 18" EFF. HEIGHT
0.5	150	300
1.0	75	150
1.5	50	100
2.0	37	75
2.5	30	60
3.0	25	50
3.5	21	43
4.0	19	38
4.5	16	33
5.0	15	30
5.5	13	27
6.0	12	25
6.5	11	23
7.0	10	21
7.5	10	20
8.0	9	19
8.5	9	18
9.0	8	17
9.5	8	16
10.0	7	15

Drawing Not to Scale



## ROCK DITCH CHECK SPACING (Sheet 2 of 2)

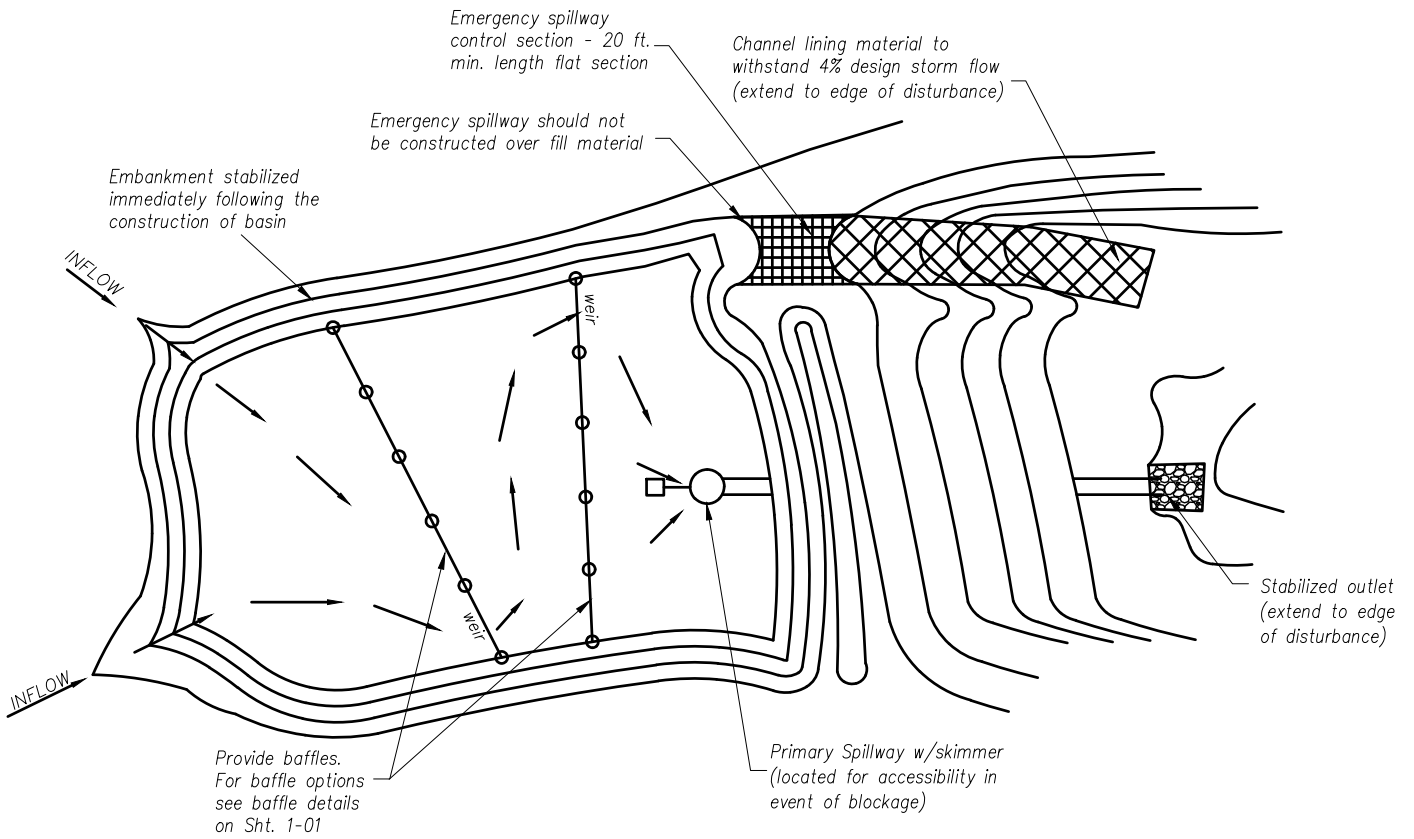
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# INDEPENDENCE MUNICIPAL SERVICES



*Plan View (\*)*  
Not to Scale

Sediment Basin Notes:

1. Interior baffles shall be provided to reduce short-circuiting of the basin. See Sht. 1-01 for approved baffle options.
2. Emergency spillways to be located in a non-fill location when feasible and shall be lined with a non-erodible material such as Riprap or Turf Reinforcement Mat.
3. When directed, sediment basins shall be fenced using construction fence or other material for safety reasons and include warning signs, reading: "Danger - KEEP OUT".

Drawing Not to Scale



**INDEPENDENCE**  
\* MISSOURI \*

**SEDIMENT BASIN**  
(Sheet 1 of 3)

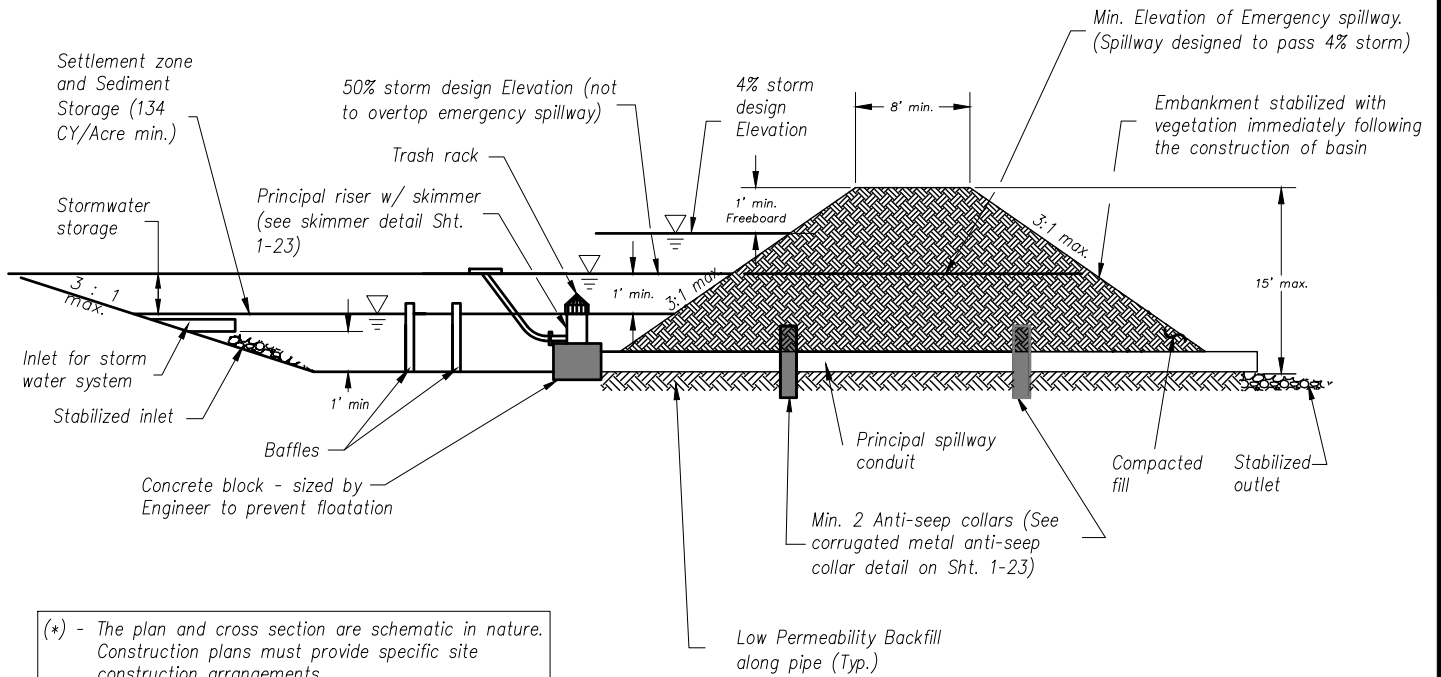
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# INDEPENDENCE MUNICIPAL SERVICES



(\* ) - The plan and cross section are schematic in nature. Construction plans must provide specific site construction arrangements.

Cross Section (\*)

Maintenance:

1. The contractor must inspect sediment basin every two weeks and after any significant storm events; rocks clogged with sediment shall be cleaned or replaced.
2. Remove sediment and restore the basin to its original dimensions when sediment accumulates to 20% of the storage capacity.
3. Immediately repair any erosion damage to the embankment and outlets.
4. Repair and/or replace baffles as necessary to maintain function and integrity of installation.
5. Keep outlet, skimmer, and pool area free of all trash and other debris.

Drawing Not to Scale



**SEDIMENT BASIN SECTION**  
(Sheet 2 of 3)

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DATE: \_\_\_\_\_ 11/18/21 \_\_\_\_\_

# INDEPENDENCE MUNICIPAL SERVICES

## Sediment Basin Design Summary (\*\*)

Design Item	Basin #1	Basin #2	Units	Notes
<i>Site Data:</i>				
Tributary Drainage Area to Pond			Acres	
50% (2 yr) Design Flow			cfs	
4% (25 yr) Design Flow			cfs	
<i>Pond Data:</i>				
Minimum Sediment Storage Volume			cu yd	134 cy/acre required minimum
Provided Sediment Storage Volume			cu yd	
Bottom Elevation			Ft	
Sediment Cleanout Elevation			Ft	Elevation equal to 20% of original design volume
Top of Riser Elevation			Ft	Top of dry storage volume
Emergency Spillway Elevation			Ft	at or above Q-2 elevation. 1.0 ft min above principal spillway
Top of Dam Elevation			Ft	1.0 ft min above Q-25 elevation
<i>Basin Shape Data:</i>				
A = Area at Normal Pool			SF	
L = Length of Flow Path			Ft	
We = Effective Width = A/L			Ft	
Length to Width Ratio = L/We				
<i>Principal Spillway Data:</i>				
Riser Pipe dia			in	15" min. Size for 2 year flow minimum
Barrel Pipe dia			in	15" min. Size for 2 year flow minimum
Concrete Base size for Riser Pipe			CY	Size to prevent flotation. 1.25 safety factor required
Skimmer Size				Designer to provide specific details and calculations per application to dewater in 48 to 72 hours
<i>Emergency Spillway Data:</i>				
Design Depth in Spillway			ft	
Design Velocity in Spillway			ft/sec	
Lining Material				Designer to provide specific details and calculations per application
(**) - Required on all Sediment Basin Plan Sheets				



**SEDIMENT BASIN SUMMARY**  
(Sheet 3 of 3)

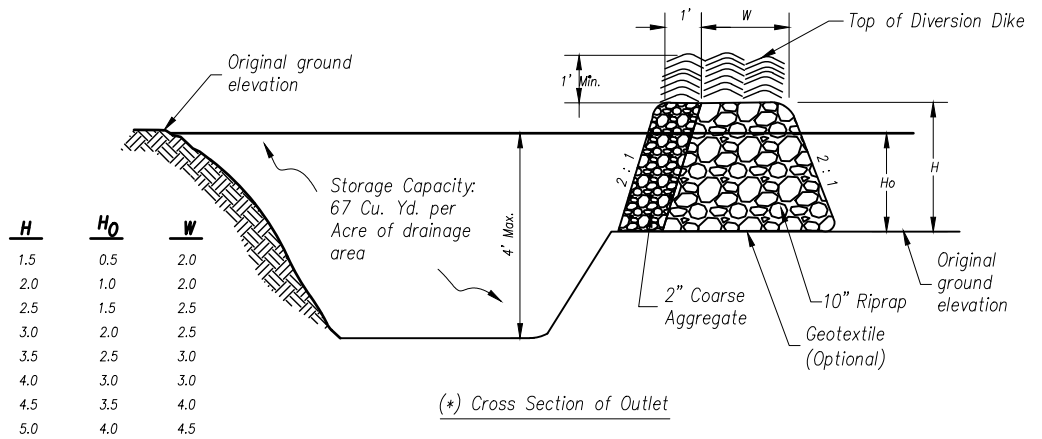
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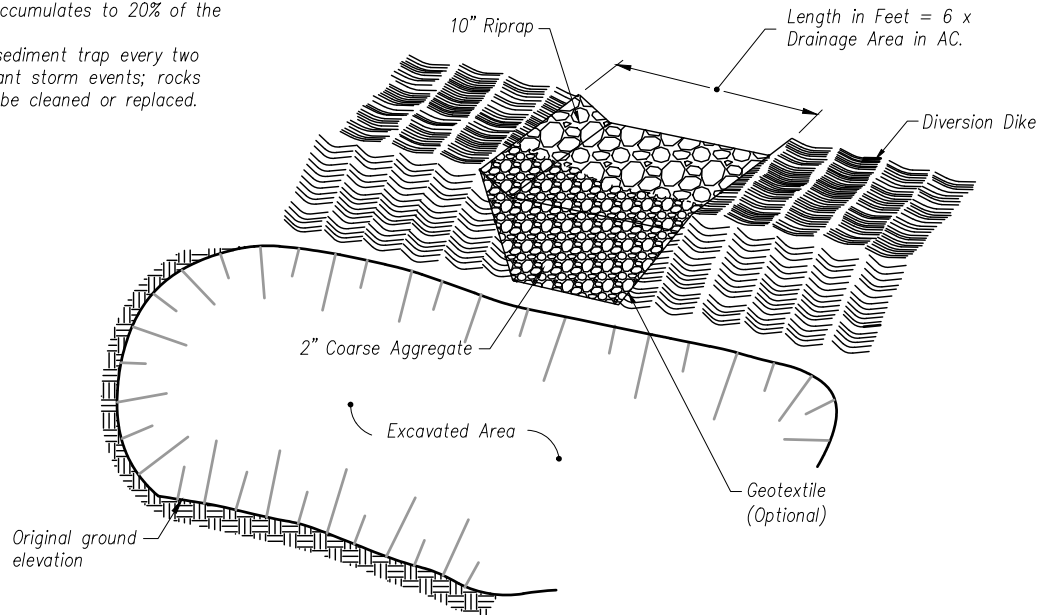
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# INDEPENDENCE MUNICIPAL SERVICES



Maintenance for Sediment Trap:

1. Check sediment traps after periods of significant runoff.
2. Remove sediment and restore the trap to its original dimensions when sediment accumulates to 20% of the storage capacity.
3. The contractor must inspect sediment trap every two weeks and after any significant storm events; rocks clogged with sediment shall be cleaned or replaced.



Notes for Sediment Trap:

1. The area under the embankment shall be cleared, grubbed, and stripped of any vegetation and root mat.
2. Fill material for the embankment shall be free of roots or other woody vegetation, organic material, large stones, and other objectionable material. The embankment should be compacted in 6-inch layers by traversing with construction equipment.
3. The earthen embankment shall be stabilized immediately after installation.
4. Construction operations shall be carried out to minimize erosion and water pollution.
5. The structure shall be removed and the area stabilized when the upslope drainage area has been stabilized.
6. All cut and fill slopes shall be 2H : 1V or flatter, except for excavated, wet storage areas which may not be at a maximum 1H : 1V grade.

(\*) - The perspective view and cross section are schematic in nature. Construction plans must provide specific site construction arrangements.

Drawing Not to Scale



**SEDIMENT TRAP**  
(Sheet 1 of 2)

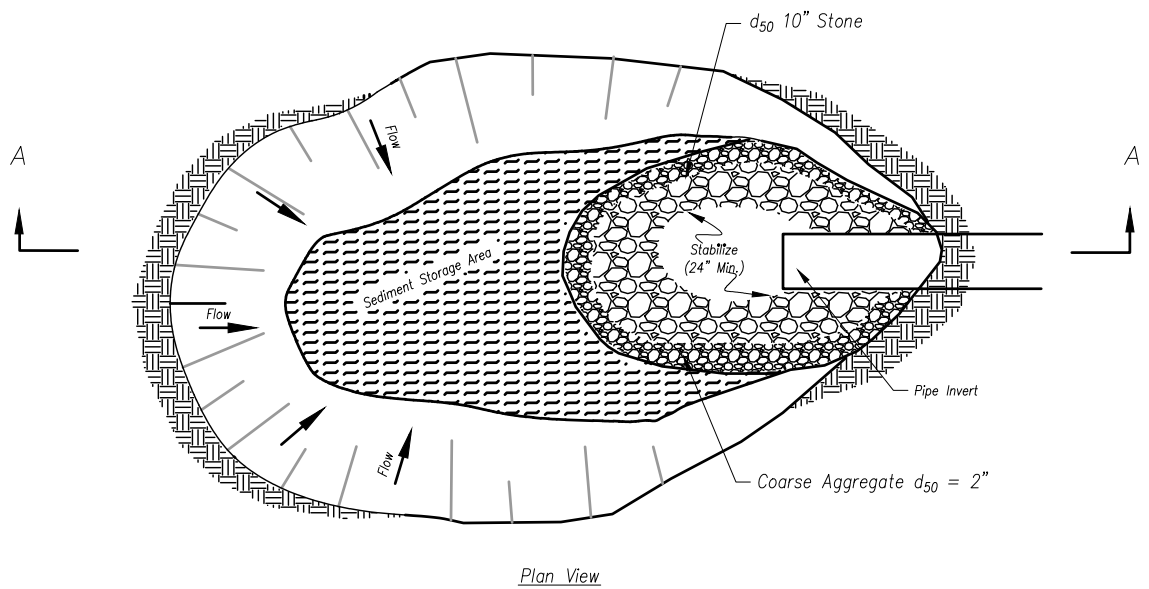
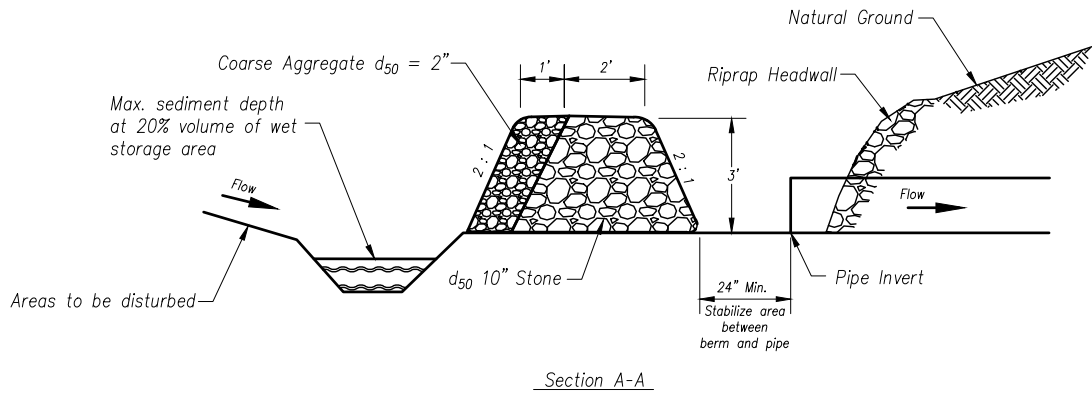
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# INDEPENDENCE MUNICIPAL SERVICES



Notes for Sediment Trap at Culvert Opening:

1. The inlet protection device shall be constructed in a manner that will facilitate clean-out and disposal of trapped sediment and minimize interference with construction activities.
2. The inlet protection devices shall be constructed in such a manner that any resultant ponding stormwater will not cause excessive inconvenience or damage to adjacent areas or structures.
3. Geometry of the design will be a horseshoe shape around the culvert inlet.
4. The toe of the riprap shall be no closer than 24" from the culvert opening to provide an acceptable emergency outlet for flows from larger storm events.
5. Storage requirements equivalent to that of temporary sediment trap.
6. 67 C.Y./Acre wet storage below base of stone.
7. 67 C.Y./Acre dry storage from base of stone to top of stone berm.

Drawing Not to Scale



**SEDIMENT TRAP AT  
CULVERT OPENING  
(Sheet 2 of 2)**

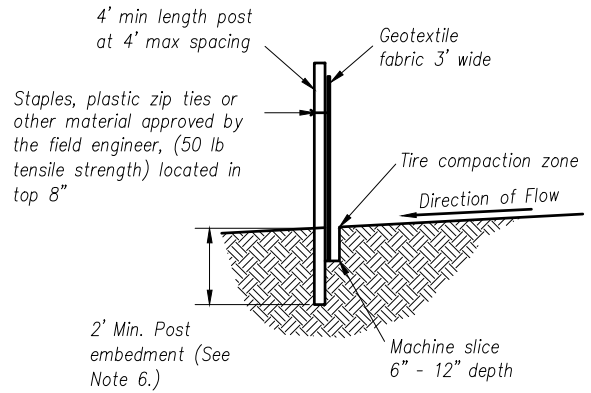
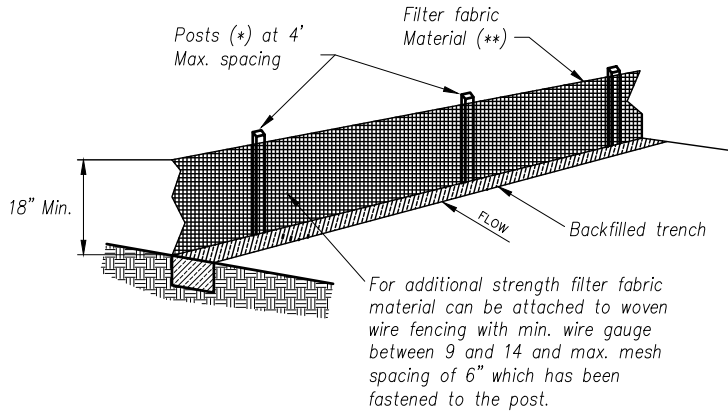
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# INDEPENDENCE MUNICIPAL SERVICES



- (\*) POSTS
- MIN. LENGTH 4'
  - HARDWOOD 1 3/16" x 1 3/16"
  - NO.2 SOUTHERN PINE 2 5/8" x 2 5/8"
  - STEEL 1.33 LB/FT

(\*\*) - Geotextile Fabric shall meet the requirements of AASHTO M288

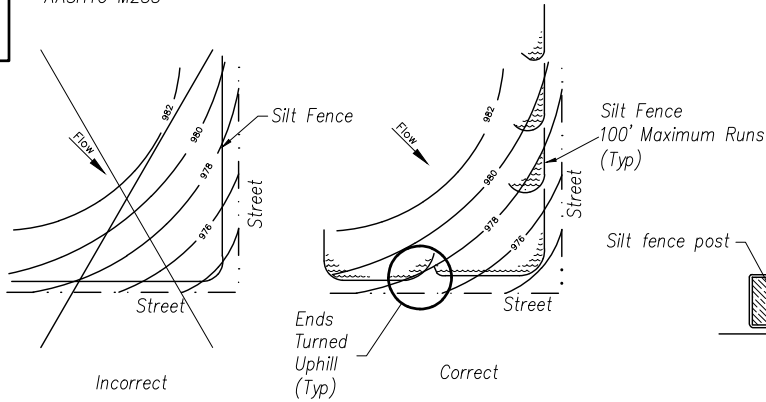
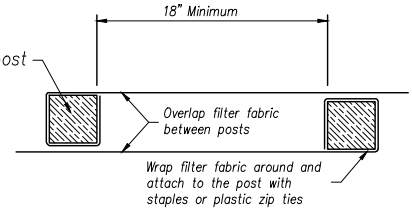


Figure A



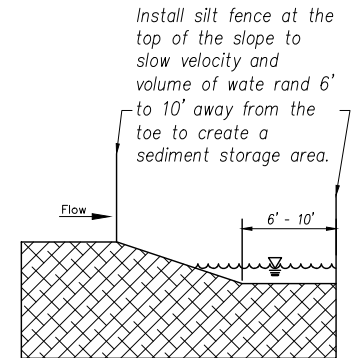
JOINING FENCE SECTIONS

Notes:

1. In order to contain water, the ends of the silt fence must be turned uphill (Figure A).
2. Long perimeter runs of silt fence must be limited to 100'. Runs should be broken up into several smaller segments to minimize water concentrations (Figure A).
3. Long slopes should be broken up with intermediate rows of silt fence to slow runoff velocities.
4. Attach fabric to upstream side of post.
5. Install posts a minimum of 2' into the ground.
6. Trenching will only be allowed for small or difficult installation, where slicing machine cannot reasonably be used.
7. Silt fence shall not be used for ditches.

Maintenance:

1. Remove and dispose of sediment deposits when the deposit approaches 1/3 the height of silt fence
2. Any section of silt fence which has been undermined or toppled must be replaced immediately with rock ditch check.



Drawing Not to Scale



## SILT FENCE

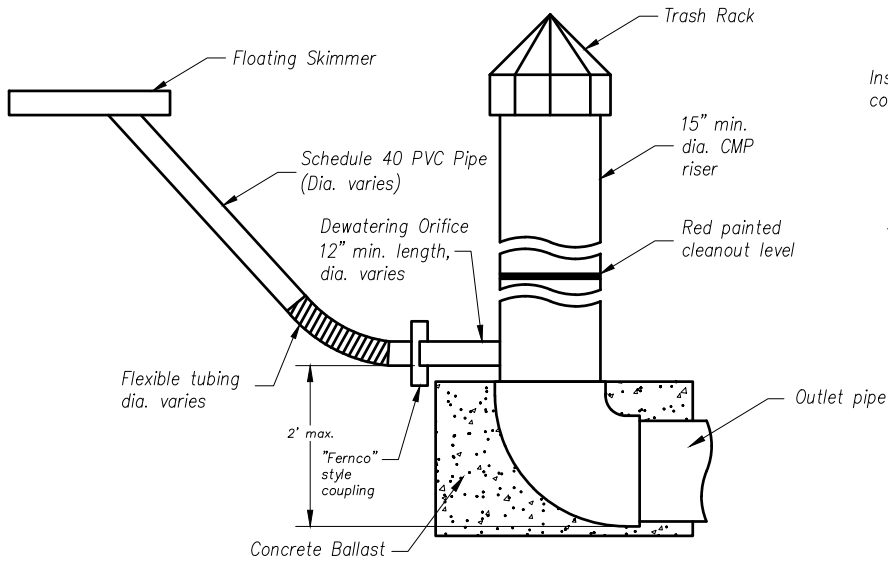
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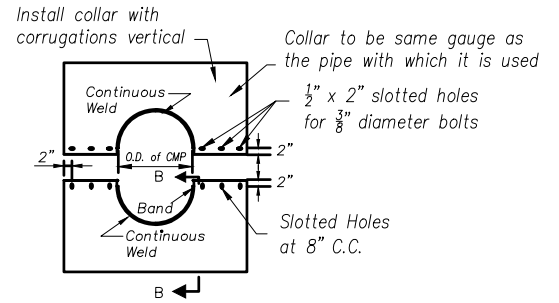
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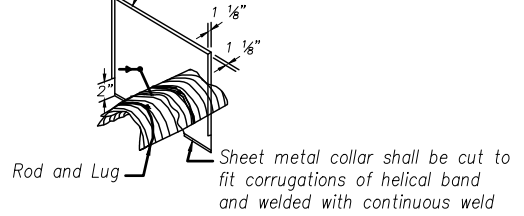
# INDEPENDENCE MUNICIPAL SERVICES



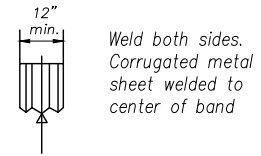
PRINCIPAL SPILLWAY DETAIL



Weld  $1 \frac{1}{8}$ " x  $1 \frac{1}{8}$ " angles to collar or bend 90° angle  $1 \frac{1}{8}$ " wide as shown

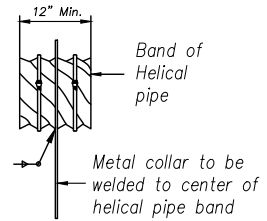


ISOMETRIC VIEW

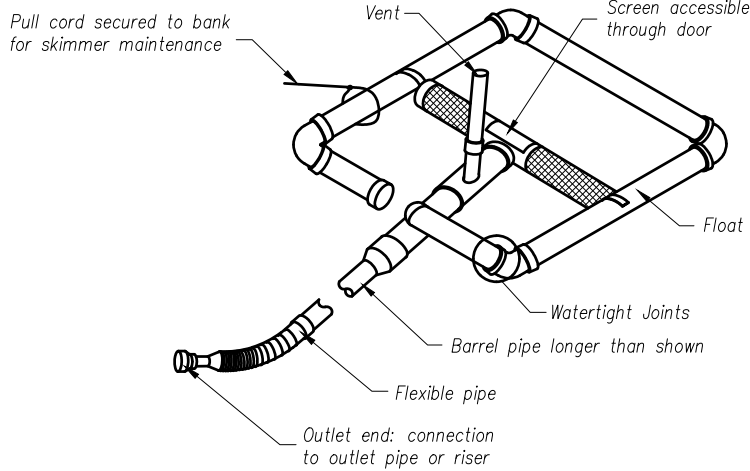


SECTION B-B

Size and spacing of slotted openings shall be the same as shown for CM collar. Use rods and lugs to clamp bands securely to pipe.



PARTIAL ELEVATION



SKIMMER DETAIL (Typ.) \*

\* Designer to provide specific details per application (e.g. pipe sizes, screen sizes, perforation, etc.) as required.

Drawing Not to Scale



## SPILLWAY AND SKIMMER DETAILS

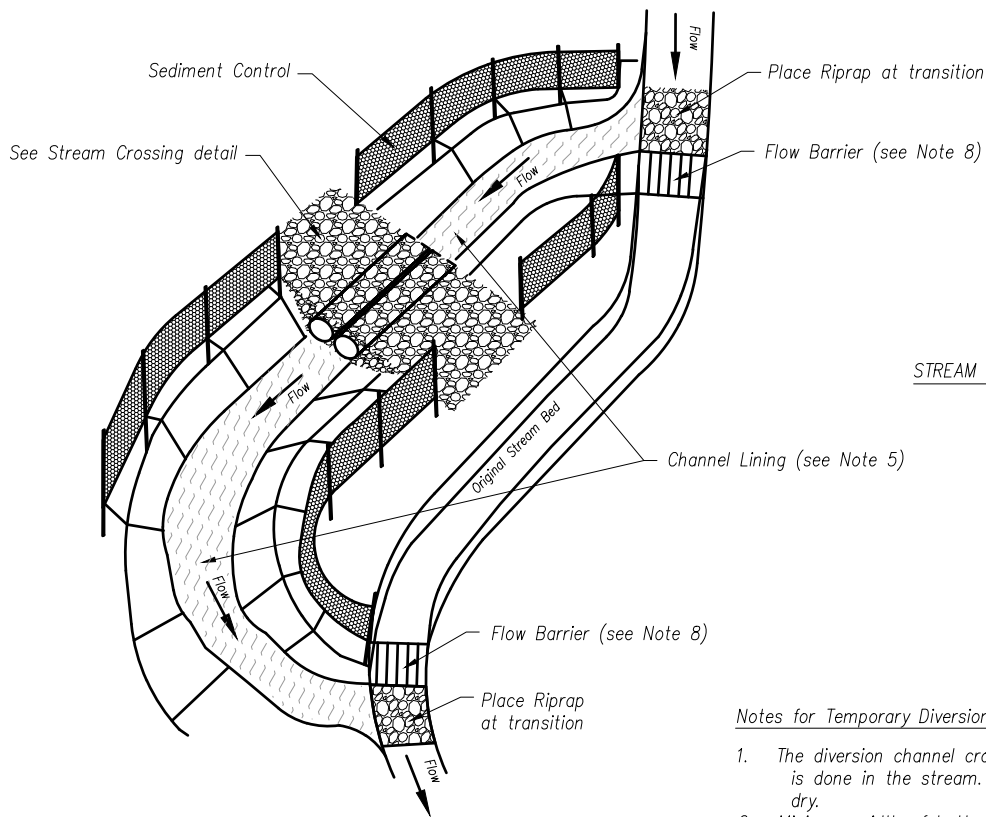
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# INDEPENDENCE MUNICIPAL SERVICES



STREAM DIVERSION CHANNEL

Notes for Temporary Diversion Channel:

1. The diversion channel crossing must be operational before work is done in the stream. Construction will be performed in the dry.
2. Minimum width of bottom shall be 6 feet or equal to bottom width of existing streambed, whichever is less.
3. Maximum steepness of side slopes shall be 2H:1V. Depth and grade may be variable, dependent on site conditions, but shall be sufficient to ensure continuous flow of water in diversion.
4. Channel must be lined with riprap or turf reinforcement mat depending on the expected velocity and shear stress in the channel.
5. Stream diversion liners shall be secured at the upstream and downstream sides with non-erodible weights such as riprap. These weights shall allow normal flow of the stream. Soil shall not be mixed with stream diversion weights. Weights may also be needed along the diversion's length to secure liner.
6. Stream diversion liners shall be entrenched at the top of slopes along with a sediment control BMP.
7. Non-erodible materials such as riprap, Jersey barriers, sand bags, plywood, or sheet piling shall be used as flow barriers to divert the stream away from its original channel and prevent or reduce water backup into the construction area.
8. Stream should be re-diverted only after backfilling and re-stabilization of original streambed and banks is completed.

Drawing Not to Scale



STREAM DIVERSION CHANNEL

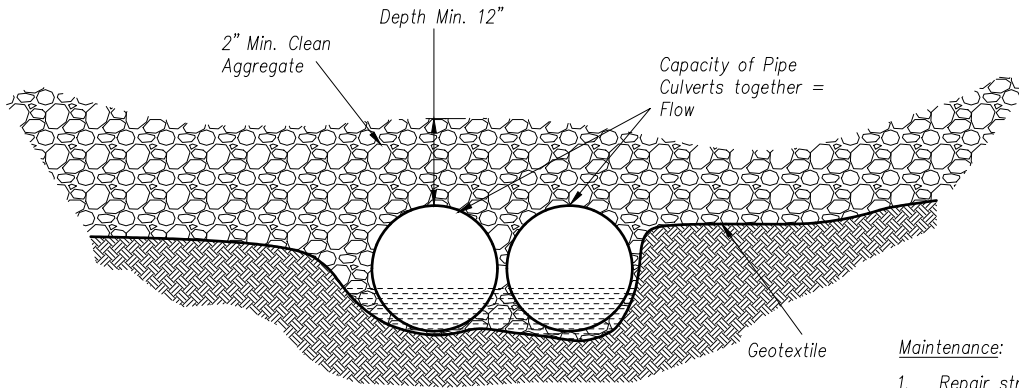
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# INDEPENDENCE MUNICIPAL SERVICES



ELEVATION

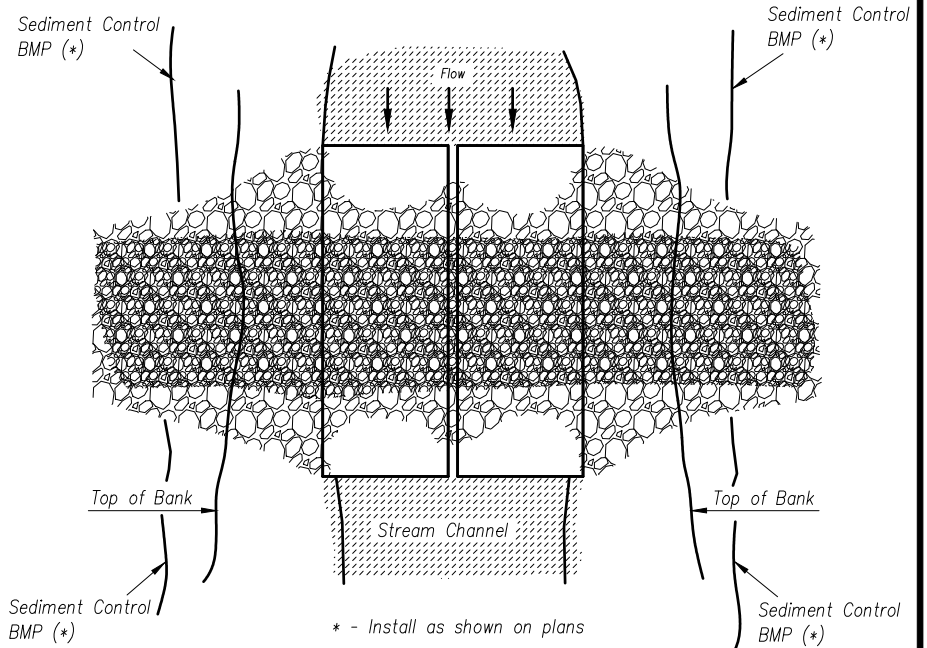
Maintenance:

1. Repair stream bank erosion by stabilizing with erosion control BMPs such as erosion control blankets.
2. For in-stream degradation, armor the culvert outlet(s) with riprap to dissipate energy.
3. If sediment or debris is accumulating upstream of the crossing, remove as needed to maintain the functionality of the crossing.
4. If a temporary crossing is requiring excessive maintenance, replacement with a larger culvert or alternate design may be necessary.

Notes for Temporary Stream Crossing:

1. Clearing and excavation of the stream bed and banks shall be kept to a minimum.
2. Place one pipe, buried 6" into the stream bottom, at the lowest point of the channel to allow the passage of aquatic organisms. Additional pipes shall be placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overtopping the crossing. (See Specification for more information).
3. Geotextile shall be placed on the streambed and streambanks prior to placement of the pipe culvert and aggregate. The geotextile shall cover the streambed and extend a minimum of 6 inches and a maximum of 1 foot beyond the end of culvert and bedding material. Filter cloth reduces settlement and improves crossing stability.
4. The culvert shall extend a minimum of 1 foot beyond the upstream and downstream tow of the aggregate placed around the culvert. In no case shall the culvert exceed 40 feet in length.
5. The culvert shall be covered with a minimum of 1 foot of aggregate. If multiple culverts are used, they shall be separated by at least 12" of compacted aggregate fill.
6. As soon as crossing is no longer needed, all structures including culverts, bedding and geotextile materials shall be removed. Removal of the structure and clean-up of the area shall be accomplished without construction equipment working in the channel.
7. Upon removal of the structure, the stream and banks shall immediately be shaped to its original cross-section and properly stabilized. Take care to minimize the amount of sediment lost into the stream.

TEMPORARY STREAM CROSSING



PLAN VIEW

Drawing Not to Scale



## TEMPORARY STREAM CROSSING

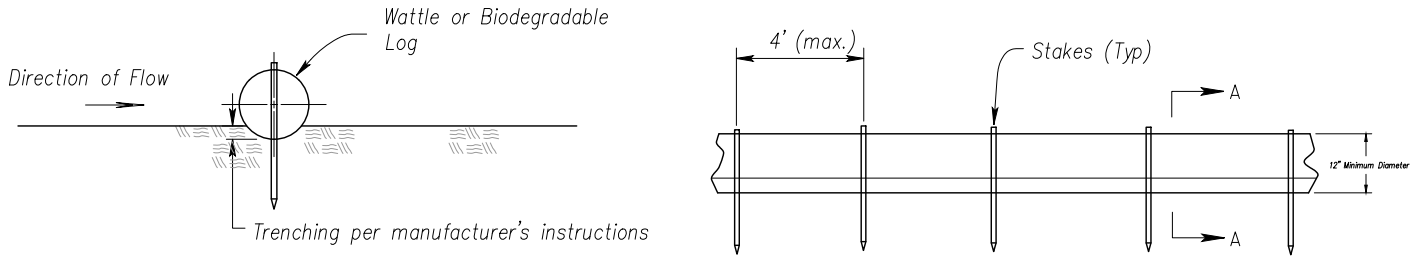
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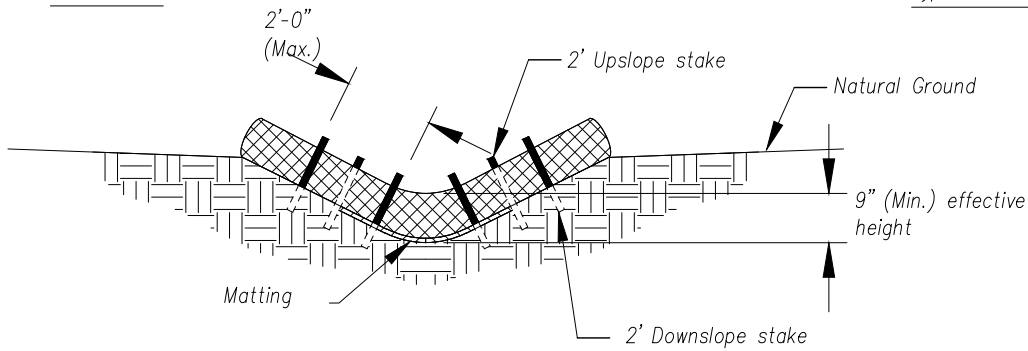
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# INDEPENDENCE MUNICIPAL SERVICES

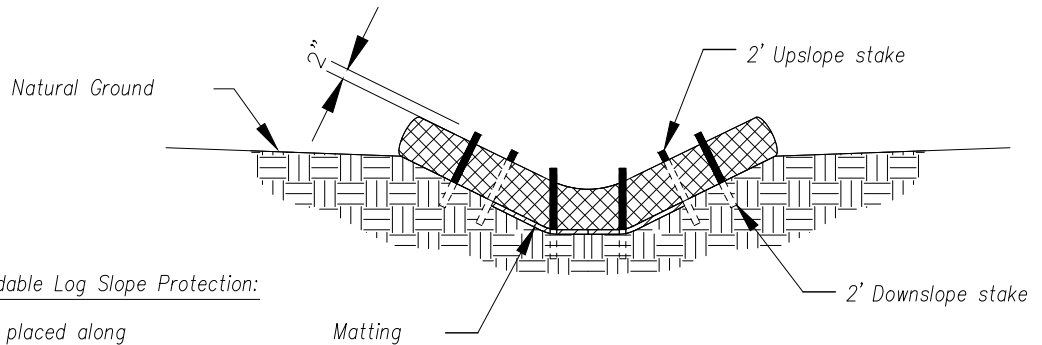


Section A-A

Typical Elevation



TYPICAL SECTION  
VEE DITCH



TYPICAL SECTION  
TRAPEZOIDAL DITCH

Notes for Wattles and Biodegradable Log Slope Protection:

1. The Slope barriers shall be placed along contour liners, with a short section turned upslope at each end of the barrier. The maximum length of the slope barrier shall not exceed 250 feet, and the barrier ends need to be staggered.
2. Install wattles and biodegradable logs per manufacturer's instructions.
3. Spacing of stakes per manufacturer's instructions with 4' max. spacing. Length of stakes shall be a minimum of 2 times the diameter of the log with minimum of 24".
4. Install a minimum of two upslope stakes and 4 downslope stakes.

Drawing Not to Scale



## WATTLES AND BIODEGRADABLE LOG

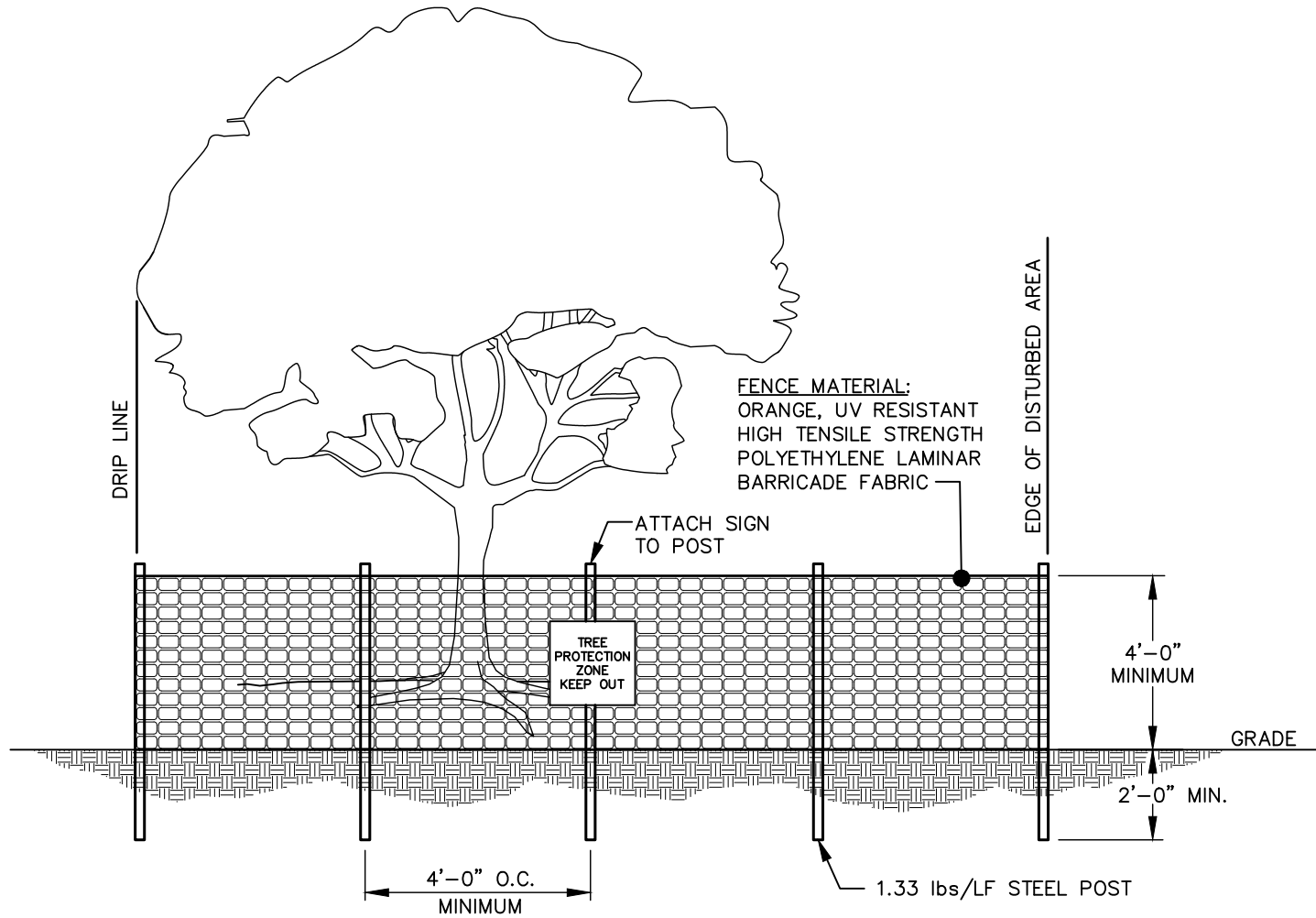
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INDEPENDENCE MUNICIPAL SERVICES



**NOTES:**

1. ALL PLANTS DESIGNATED TO BE SAVED SHALL BE PROTECTED BY FENCING, AS ILLUSTRATED.
2. INSTALL TREE PROTECTION FENCE AT TREE DRIP LINE OR AT EDGE OF DISTURBED AREA, AS SHOWN ON PLANS, PRIOR TO COMMENCEMENT OF CONSTRUCTION.
3. SPACE TREE PROTECTION ZONE SIGNS A MINIMUM OF ONE EVERY 300 FEET. THE SIZE OF EACH SIGN MUST BE A MINIMUM OF 2' x 2' AND BE VISIBLE FROM BOTH SIDES OF THE FENCE. THE SIGN MUST CONTAIN THE FOLLOWING LANGUAGE IN BOTH ENGLISH & SPANISH: "TREE PROTECTION ZONE, KEEP OUT".
4. THERE SHALL BE NO STORAGE OF MATERIAL WITHIN THE BOUNDARIES OF THE TREE PROTECTION FENCING.
5. TREE PROTECTION FENCING SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.

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**TREE PROTECTION**

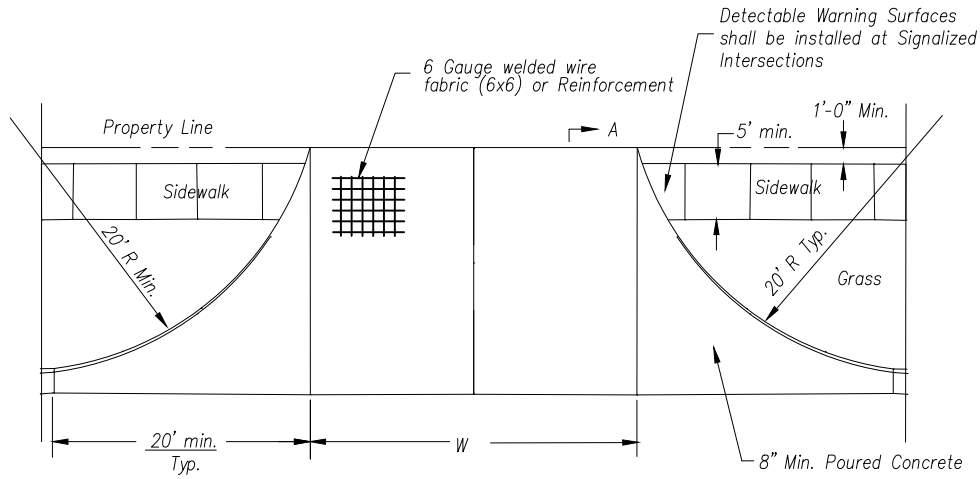
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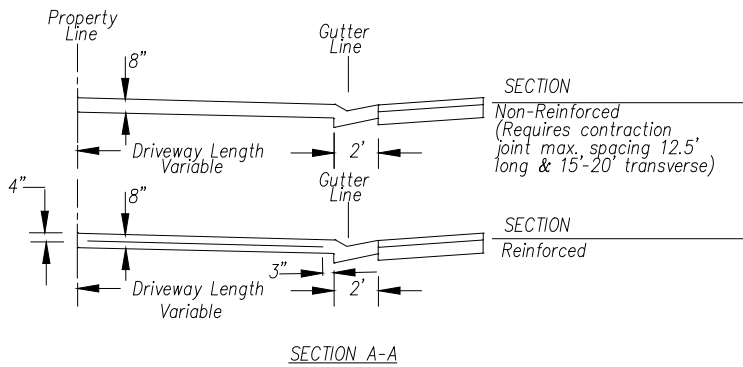
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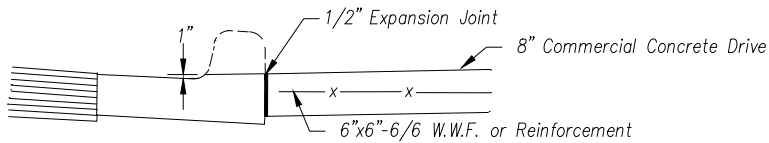
# INDEPENDENCE MUNICIPAL SERVICES



TYPICAL DRIVEWAY PLAN



SECTION A-A



Notes:

1. The top 6" of driveway subgrade shall be compacted to 95% of standard maximum density.
2. The portion of the drive within street R.O.W. shall be KCMMB4K concrete.
3. Expansion joint filler and joint sealing compound shall conform to Kansas City APWA Standard Specifications Section 2209.2.
4. Curing membranes shall conform to Kansas City APWA Standard Specifications Section 2301.5.
5. Curb transitions on driveway flares are considered part of the driveway.
6. In Central Business District, 6 x 6-W2.9 x W2.9 reinforcing shall be placed in center of slab thickness.
7. Contraction joints shall be spaced at 12' max. both directions.

Drawing Not to Scale



**COMMERCIAL  
DRIVEWAYS**

REVISED: DATE

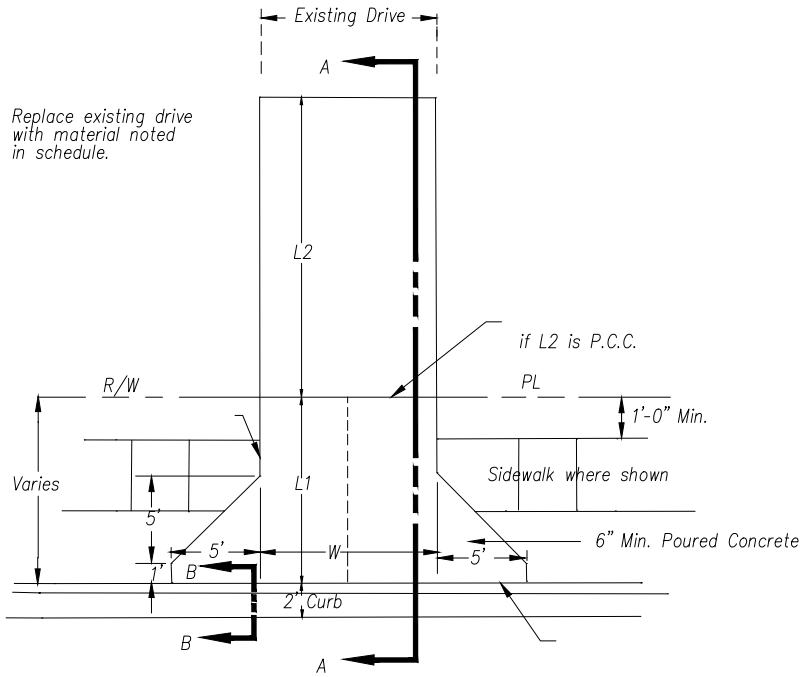
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DRAWN BY: AEO

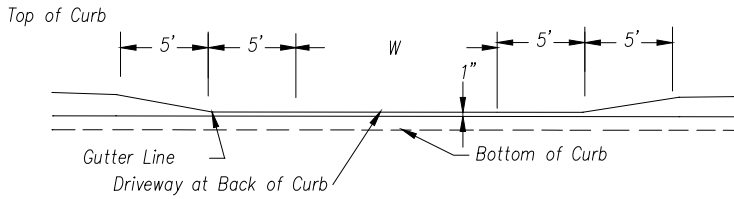
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2-01

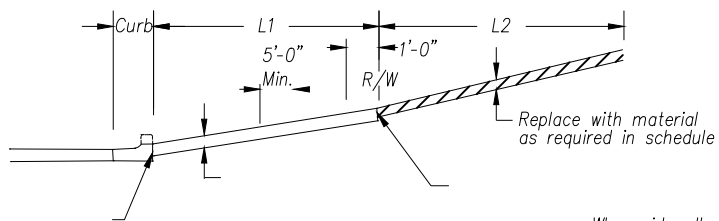
# INDEPENDENCE MUNICIPAL SERVICES



Typical Driveway Plan



Typical Driveway Elevation



Section A-A

\*\* When sidewalks are required, 2% max. slope shall be maintained through driveway

Drawing Not to Scale



RESIDENTIAL DRIVEWAYS

REVISED: DATE

BY: INITIALS

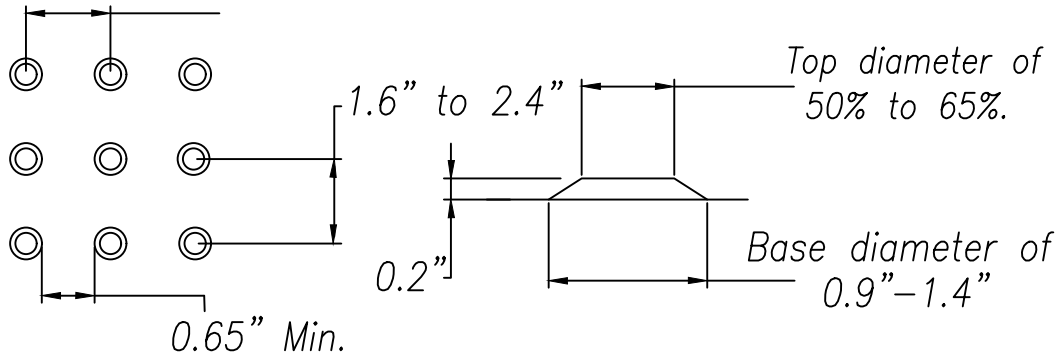
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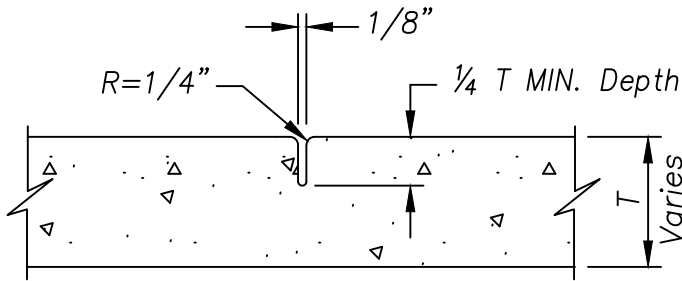
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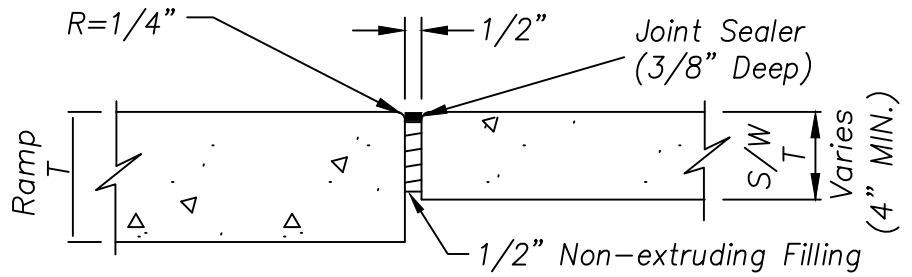
INDEPENDENCE MUNICIPAL SERVICES



*Detectable Warning  
Dome Spacing Section*



*Contraction Joint*



*Isolation Joint*

*Joint Details*

Drawing Not to Scale



INDEPENDENCE  
\* MISSOURI \*

Curb Ramp  
Misc. Details

REVISED: DATE

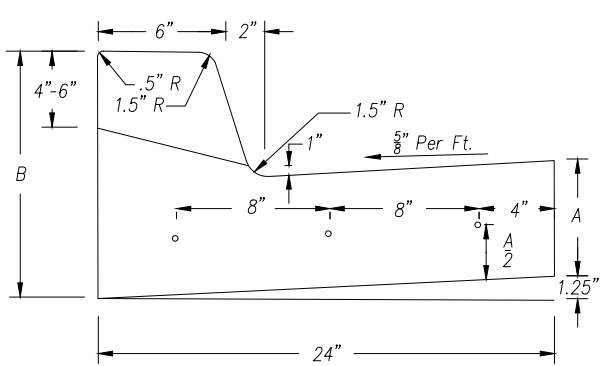
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DATE: 7/29/22

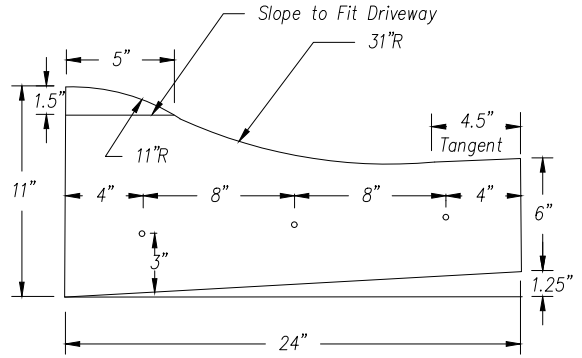
2-04

# INDEPENDENCE MUNICIPAL SERVICES

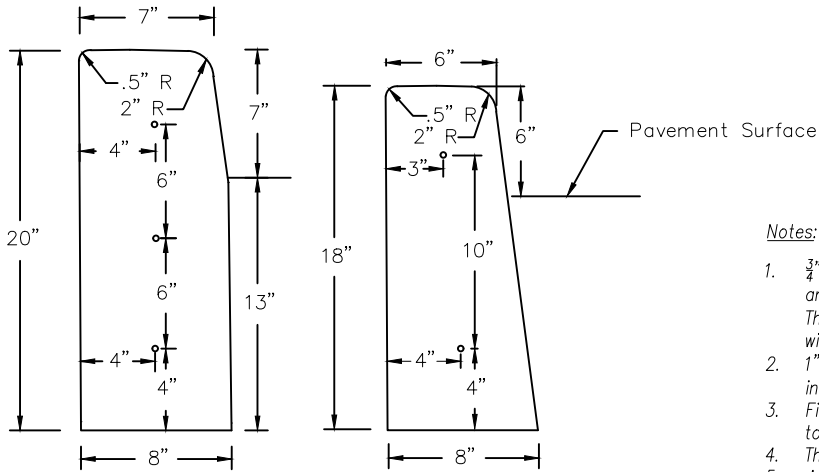


TYPE	A	B	CU.YD./LF
6"	6"	13"	.0493
8"	8"	15"	.0611

CONCRETE CURB-TYPE I



CONCRETE CURB-TYPE II



TYPE	CU.YD./LF
6"	.0324
7"	.0403

CONCRETE CURB-TYPE III

Notes:

1.  $\frac{3}{4}$ " Expansion joints placed at Radii Points & Structures and at 150' intervals with 2' lengths of #5 smooth dowels. The dowels will be greased and wrapped on alternate ends with expansion tubes.
2. 1" deep Contraction joints installed at approximately 10' intervals.
3. Fix dowels with bar chairs or equal. Note #3 applies only to Types I, II, & V-B.
4. The concrete mix shall be KCMMB 4K.
5. All dowels and tie bars shall be epoxy coated.
6. White curing compound must be applied uniformly to the concrete surface immediately after final finishing.
7. 4" Type 5 aggregate base shall be used.

Drawing Not to Scale



CURBS TYPES I,  
II, AND III

REVISED: DATE

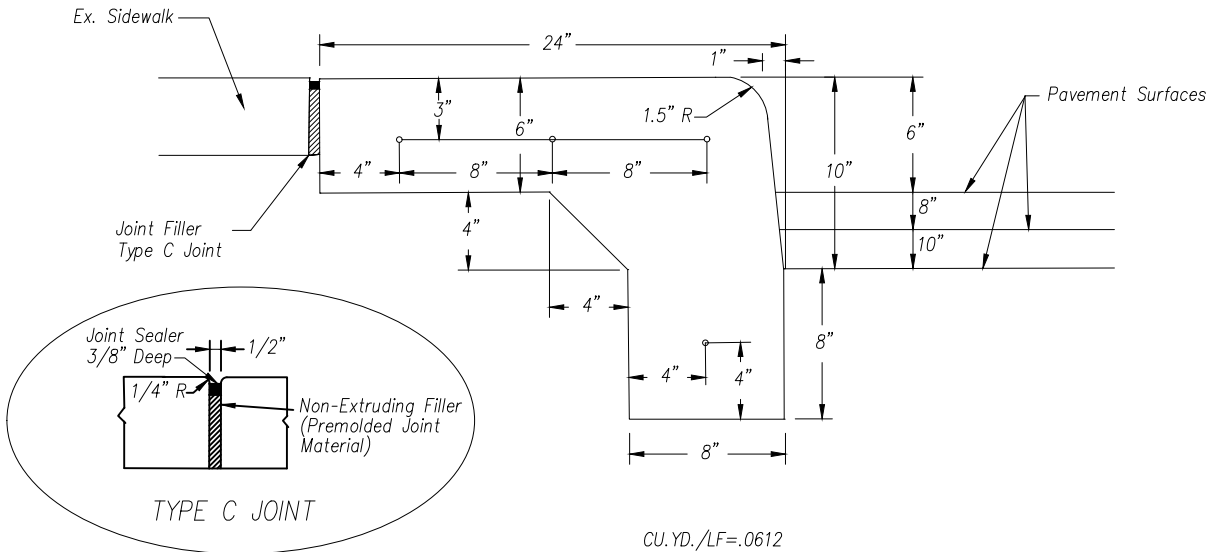
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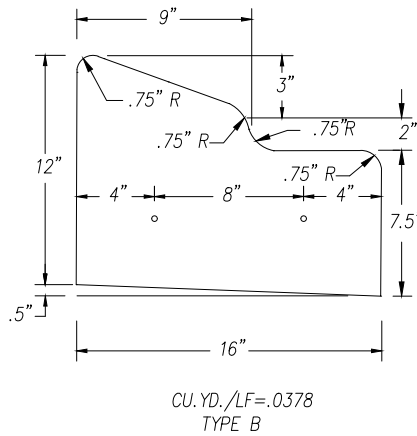
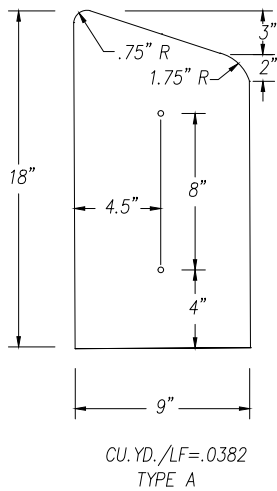
DATE: 7/19/22

2-05

# INDEPENDENCE MUNICIPAL SERVICES



## CONCRETE CURB-TYPE IV



## CONCRETE CURB-TYPE V

Drawing Not to Scale



CURBS TYPES  
IV AND V

REVISED: DATE

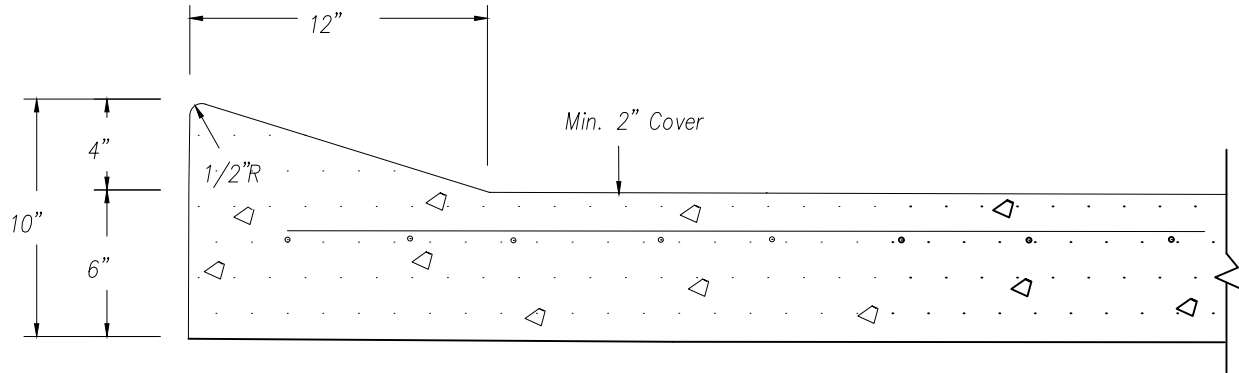
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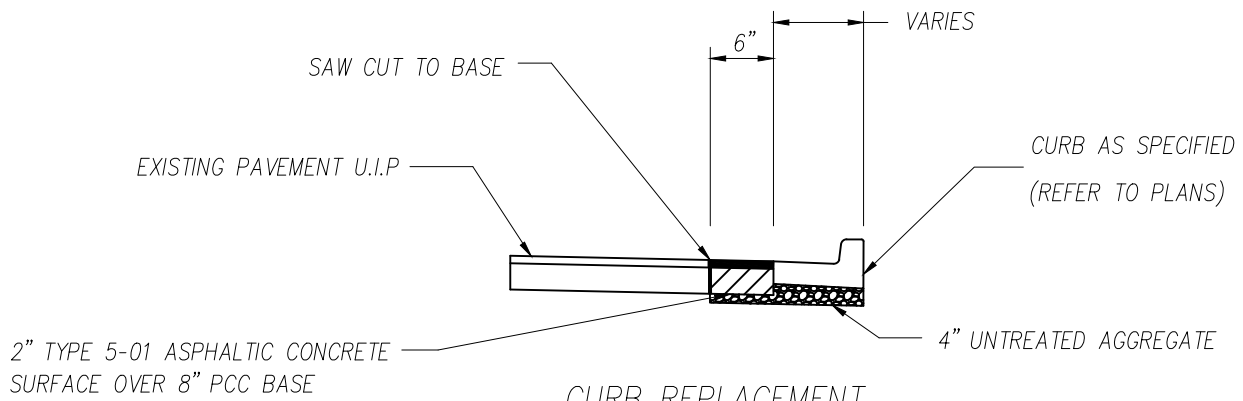
DATE: 7/19/22

2-06

INDEPENDENCE MUNICIPAL SERVICES



INTEGRAL CURB



CURB REPLACEMENT

Drawing Not to Scale



INTEGRAL CURB & CURB REPLACEMENT

REVISED: DATE

BY: INITIALS

DRAWN BY: AEO

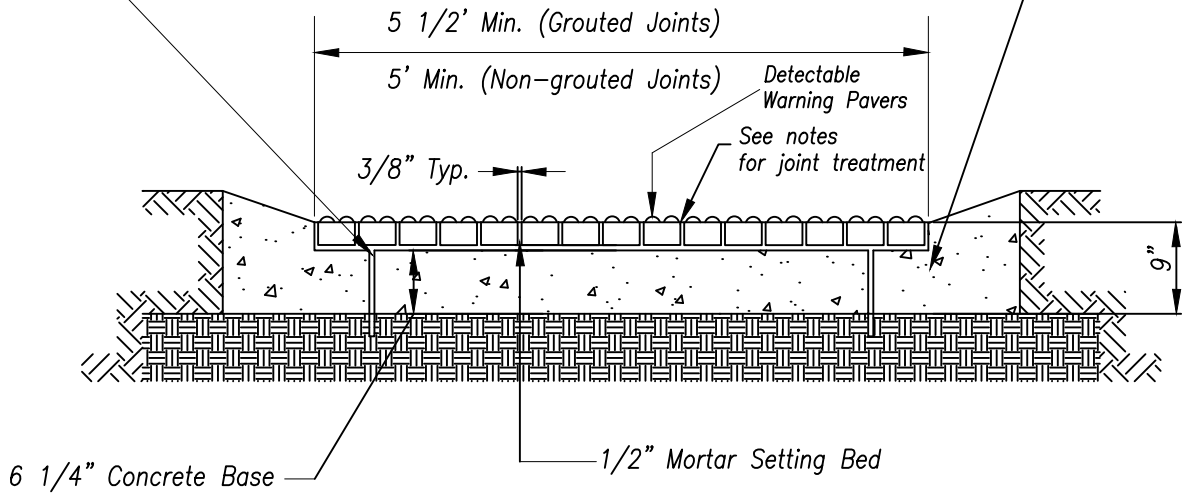
DATE: 7/19/22

2-07

INDEPENDENCE MUNICIPAL SERVICES

Mortar shall be placed in the holes left from the forms

Concrete base and adjacent sidewalk shall be constructed monolithically.



Brick Installation Detail

Paver Brick Notes:

1. Paving Brick shall be 2 1/4" x 3 5/8" x 7 5/8" if grouted and 2 1/4" x 4" x 8" if non-grouted Endicott Clay Products Co., Handicap Detectable Warning Pavers, Medium Inspot #46 color, or approved equal and shall meet the requirements of ASTM C902 for Class SX Type 1 and ASTM C1272.
2. The bricks shall be saw cut only and any brick shall not be less than 25% of a full brick.
3. Type M mortar shall be used for the setting bed and optional grouted joints in accordance with ASTM C270, Table 1 (Masonry Cement only). Broom Masons Sand into non-grouted joints after brick placement. The maximum allowable non-grouted joint width shall be 1/8".
4. Detectable warning surface to extend a minimum of 2 ft. in direction of travel.

Drawing Not to Scale



INDEPENDENCE  
 \* MISSOURI \*

Detectable Warning  
 Brick Detail

REVISED: DATE

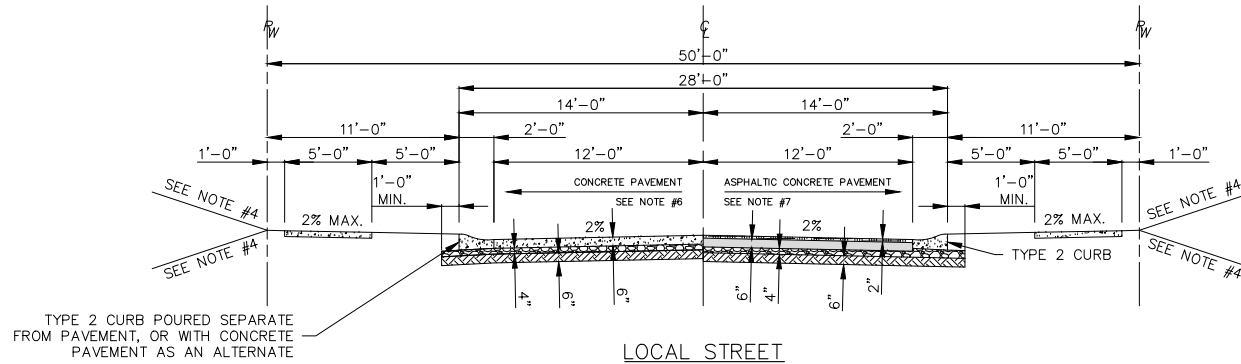
BY: INITIALS

DRAWN BY: AEO

DATE: 7/29/22

2-08

# INDEPENDENCE MUNICIPAL SERVICES



**NOTES:**

1. ALL PAVEMENT THICKNESSES ARE MINIMUM.
2. SEE MOST CURRENT AASHTO ROADSIDE DESIGN GUIDE FOR CLEAR ZONE REQUIREMENTS.
3. FOR CONCRETE PAVEMENTS, CONTRACTOR SHALL SUBMIT DETAILS, ETC. FOR APPROVAL. SEE MoDOT CURRENT STANDARD DRAWINGS AND THE CONCRETE PAVEMENT ASSOCIATION DETAILS FOR GUIDELINES.
4. FOR EACH BACKSLOPE AND FILL SLOPE USE 4:1 SLOPE FOR CUTS AND FILLS ≤ 5 FEET. FOR CUTS AND FILLS > 5 FEET USE 3:1 SLOPE. USE 2-4% FOR PARKWAY GREENSPACE.
5. SEE DETAIL SHEET TBD FOR JOINT TYPES.
6. PORTLAND CONCRETE PAVEMENT SHALL BE KCMMB 4K.
7. ASPHALTIC CONCRETE SURFACE SHALL BE TYPE 5. TYPE 3 MAY BE USED WITH DIRECTOR APPROVAL.
8. COMPACTED SUBGRADE SHALL BE 95% OF STANDARD MAXIMUM DENSITY. 18" DEPTH UNDER DIVIDED ARTERIAL STREETS AND MAJOR ARTERIAL STREETS, 6" UNDER ALL OTHER TYPES OF STREETS.
9. REFER TO CHAPTER 14 (UNIFIED DEVELOPMENT ORDINANCE) FOR SIDEWALK LOCATION REQUIREMENTS PER ZONED USE DESIGNATION.
10. AGGREGATE BASE SHALL BE MoDOT TYPE 5 OR EQUIVALENT.

- CONCRETE
- TYPE 5 ASPHALTIC CONCRETE SURFACE
- TYPE 5 ASPHALTIC CONCRETE BASE
- AGGREGATE BASE
- COMPACTED SUBGRADE

Drawing Not to Scale



LOCAL STREET  
CROSS SECTION

REVISED: DATE

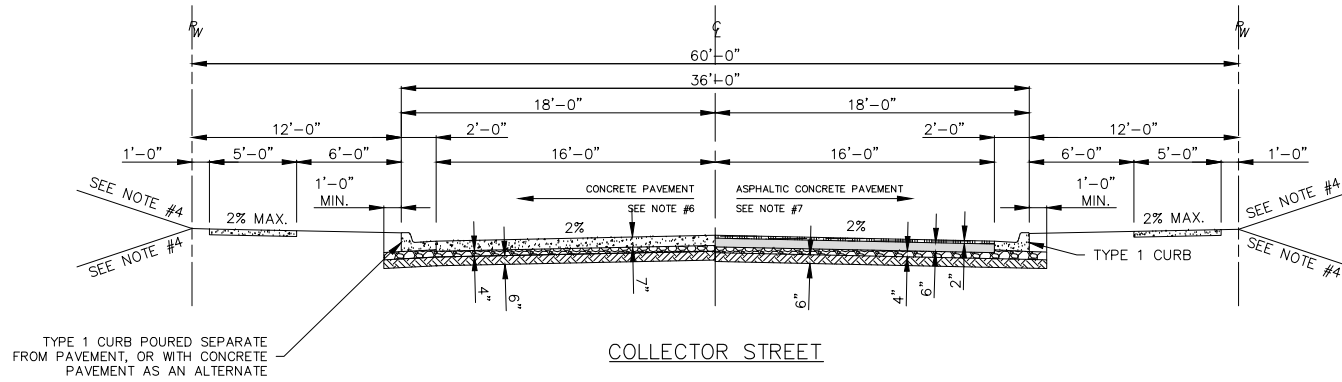
BY: INITIALS

DRAWN BY: AEO

DATE: 7/21/22

2-09

# INDEPENDENCE MUNICIPAL SERVICES



**NOTES:**

1. ALL PAVEMENT THICKNESSES ARE MINIMUM.
2. SEE MOST CURRENT AASHTO ROADSIDE DESIGN GUIDE FOR CLEAR ZONE REQUIREMENTS.
3. FOR CONCRETE PAVEMENTS, CONTRACTOR SHALL SUBMIT DETAILS, ETC. FOR APPROVAL. SEE MoDOT CURRENT STANDARD DRAWINGS AND THE CONCRETE PAVEMENT ASSOCIATION DETAILS FOR GUIDELINES.
4. FOR EACH BACKSLOPE AND FILL SLOPE USE 4:1 SLOPE FOR CUTS AND FILLS ≤ 5 FEET. FOR CUTS AND FILLS > 5 FEET USE 3:1 SLOPE. USE 2-4% FOR PARKWAY GREENSPACE.
5. SEE DETAIL SHEET TBD FOR JOINT TYPES.
6. PORTLAND CONCRETE PAVEMENT SHALL BE KCMMB 4K.
7. ASPHALTIC CONCRETE SURFACE SHALL BE TYPE 5. TYPE 3 MAY BE USED WITH DIRECTOR APPROVAL.
8. COMPACTED SUBGRADE SHALL BE 95% OF STANDARD MAXIMUM DENSITY. 18" DEPTH UNDER DIVIDED ARTERIAL STREETS AND MAJOR ARTERIAL STREETS, 6" UNDER ALL OTHER TYPES OF STREETS.
9. REFER TO CHAPTER 14 (UNIFIED DEVELOPMENT ORDINANCE) FOR SIDEWALK LOCATION REQUIREMENTS PER ZONED USE DESIGNATION.
10. AGGREGATE BASE SHALL BE MoDOT TYPE 5 OR EQUIVALENT.

- CONCRETE
- TYPE 5 ASPHALTIC CONCRETE SURFACE
- TYPE 5 ASPHALTIC CONCRETE BASE
- AGGREGATE BASE
- COMPACTED SUBGRADE

Drawing Not to Scale



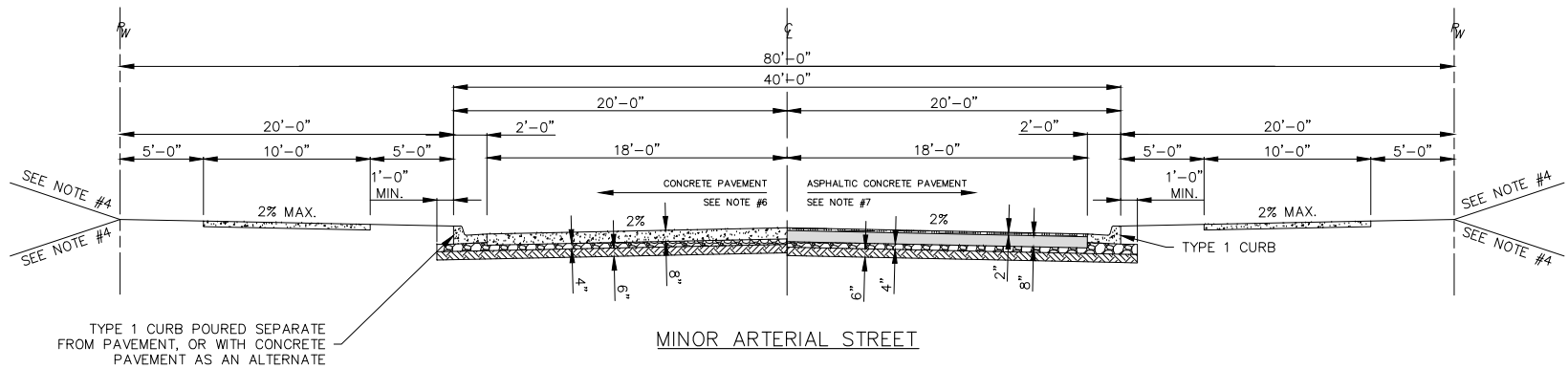
## COLLECTOR STREET CROSS SECTION

REVISED: DATE

BY: INITIALS

DRAWN BY: AEO

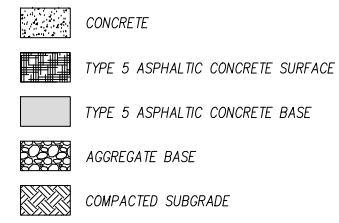
DATE: 7/21/22



TYPE 1 CURB POURED SEPARATE FROM PAVEMENT, OR WITH CONCRETE PAVEMENT AS AN ALTERNATE

**NOTES:**

1. ALL PAVEMENT THICKNESSES ARE MINIMUM.
2. SEE MOST CURRENT AASHTO ROADSIDE DESIGN GUIDE FOR CLEAR ZONE REQUIREMENTS.
3. FOR CONCRETE PAVEMENTS, CONTRACTOR SHALL SUBMIT DETAILS, ETC. FOR APPROVAL. SEE MoDOT CURRENT STANDARD DRAWINGS AND THE CONCRETE PAVEMENT ASSOCIATION DETAILS FOR GUIDELINES.
4. FOR EACH BACKSLOPE AND FILL SLOPE USE 4:1 SLOPE FOR CUTS AND FILLS ≤ 5 FEET. FOR CUTS AND FILLS > 5 FEET USE 3:1 SLOPE. USE 2-4% FOR PARKWAY GREENSPACE.
5. SEE DETAIL SHEET TBD FOR JOINT TYPES.
6. PORTLAND CONCRETE PAVEMENT SHALL BE KCMMB 4K.
7. ASPHALTIC CONCRETE SURFACE SHALL BE TYPE 5. TYPE 3 MAY BE USED WITH DIRECTOR APPROVAL.
8. COMPACTED SUBGRADE SHALL BE 95% OF STANDARD MAXIMUM DENSITY. 18" DEPTH UNDER DIVIDED ARTERIAL STREETS AND MAJOR ARTERIAL STREETS, 6" UNDER ALL OTHER TYPES OF STREETS.
9. REFER TO CHAPTER 14 (UNIFIED DEVELOPMENT ORDINANCE) FOR SIDEWALK LOCATION REQUIREMENTS PER ZONED USE DESIGNATION.
10. AGGREGATE BASE SHALL BE MoDOT TYPE 5 OR EQUIVALENT.



Drawing Not to Scale



**MINOR ARTERIAL STREET  
CROSS SECTION**

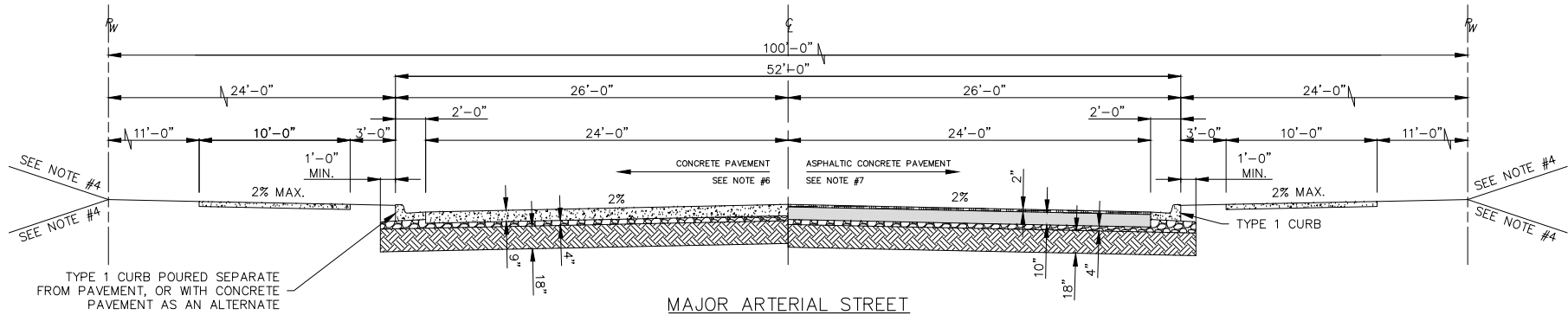
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BY: INITIALS

DRAWN BY: AEO

DATE: 7/21/22

# INDEPENDENCE MUNICIPAL SERVICES



- NOTES:**
1. ALL PAVEMENT THICKNESSES ARE MINIMUM.
  2. SEE MOST CURRENT AASHTO ROADSIDE DESIGN GUIDE FOR CLEAR ZONE REQUIREMENTS.
  3. FOR CONCRETE PAVEMENTS, CONTRACTOR SHALL SUBMIT DETAILS, ETC. FOR APPROVAL. SEE MoDOT CURRENT STANDARD DRAWINGS AND THE CONCRETE PAVEMENT ASSOCIATION DETAILS FOR GUIDELINES.
  4. FOR EACH BACKSLOPE AND FILL SLOPE USE 4:1 SLOPE FOR CUTS AND FILLS ≤ 5 FEET. FOR CUTS AND FILLS > 5 FEET USE 3:1 SLOPE. USE 2-4% FOR PARKWAY GREENSPACE.
  5. SEE DETAIL SHEET TBD FOR JOINT TYPES.
  6. PORTLAND CONCRETE PAVEMENT SHALL BE KCMMB 4K.
  7. ASPHALTIC CONCRETE SURFACE SHALL BE TYPE 5. TYPE 3 MAY BE USED WITH DIRECTOR APPROVAL.
  8. COMPACTED SUBGRADE SHALL BE 95% OF STANDARD MAXIMUM DENSITY. 18" DEPTH UNDER DIVIDED ARTERIAL STREETS AND MAJOR ARTERIAL STREETS, 6" UNDER ALL OTHER TYPES OF STREETS.
  9. REFER TO CHAPTER 14 (UNIFIED DEVELOPMENT ORDINANCE) FOR SIDEWALK LOCATION REQUIREMENTS PER ZONED USE DESIGNATION.
  10. AGGREGATE BASE SHALL BE MoDOT TYPE 5 OR EQUIVALENT.

- CONCRETE
- TYPE 5 ASPHALTIC CONCRETE SURFACE
- TYPE 5 ASPHALTIC CONCRETE BASE
- AGGREGATE BASE
- COMPACTED SUBGRADE

Drawing Not to Scale



## MAJOR ARTERIAL STREET CROSS SECTION

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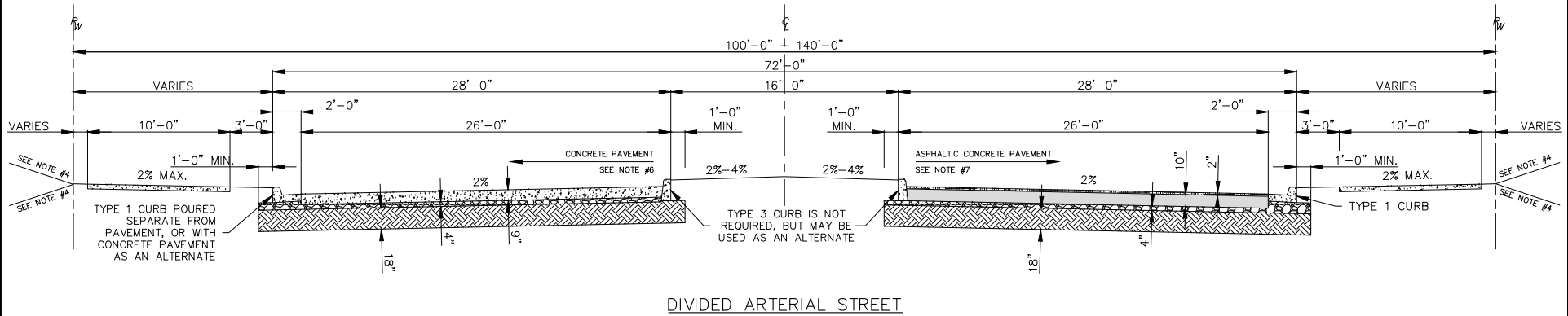
BY: INITIALS

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DATE: 7/21/22

2-12

# INDEPENDENCE MUNICIPAL SERVICES



**NOTES:**

1. ALL PAVEMENT THICKNESSES ARE MINIMUM.
2. SEE MOST CURRENT AASHTO ROADSIDE DESIGN GUIDE FOR CLEAR ZONE REQUIREMENTS.
3. FOR CONCRETE PAVEMENTS, CONTRACTOR SHALL SUBMIT DETAILS, ETC. FOR APPROVAL. SEE MoDOT CURRENT STANDARD DRAWINGS AND THE CONCRETE PAVEMENT ASSOCIATION DETAILS FOR GUIDELINES.
4. FOR EACH BACKSLOPE AND FILL SLOPE USE 4:1 SLOPE FOR CUTS AND FILLS ≤ 5 FEET. FOR CUTS AND FILLS > 5 FEET USE 3:1 SLOPE. USE 2-4% FOR PARKWAY GREENSPACE.
5. SEE DETAIL SHEET TBD FOR JOINT TYPES.
6. PORTLAND CONCRETE PAVEMENT SHALL BE KCMMB 4K.
7. ASPHALTIC CONCRETE SURFACE SHALL BE TYPE 5. TYPE 3 MAY BE USED WITH DIRECTOR APPROVAL.
8. COMPACTED SUBGRADE SHALL BE 95% OF STANDARD MAXIMUM DENSITY. 18" DEPTH UNDER DIVIDED ARTERIAL STREETS AND MAJOR ARTERIAL STREETS, 6" UNDER ALL OTHER TYPES OF STREETS.
9. REFER TO CHAPTER 14 (UNIFIED DEVELOPMENT ORDINANCE) FOR SIDEWALK LOCATION REQUIREMENTS PER ZONED USE DESIGNATION.
10. AGGREGATE BASE SHALL BE MoDOT TYPE 5 OR EQUIVALENT.

- CONCRETE
- TYPE 5 ASPHALTIC CONCRETE SURFACE
- TYPE 5 ASPHALTIC CONCRETE BASE
- AGGREGATE BASE
- COMPACTED SUBGRADE

Drawing Not to Scale



**DIVIDED ARTERIAL STREET  
CROSS SECTION**

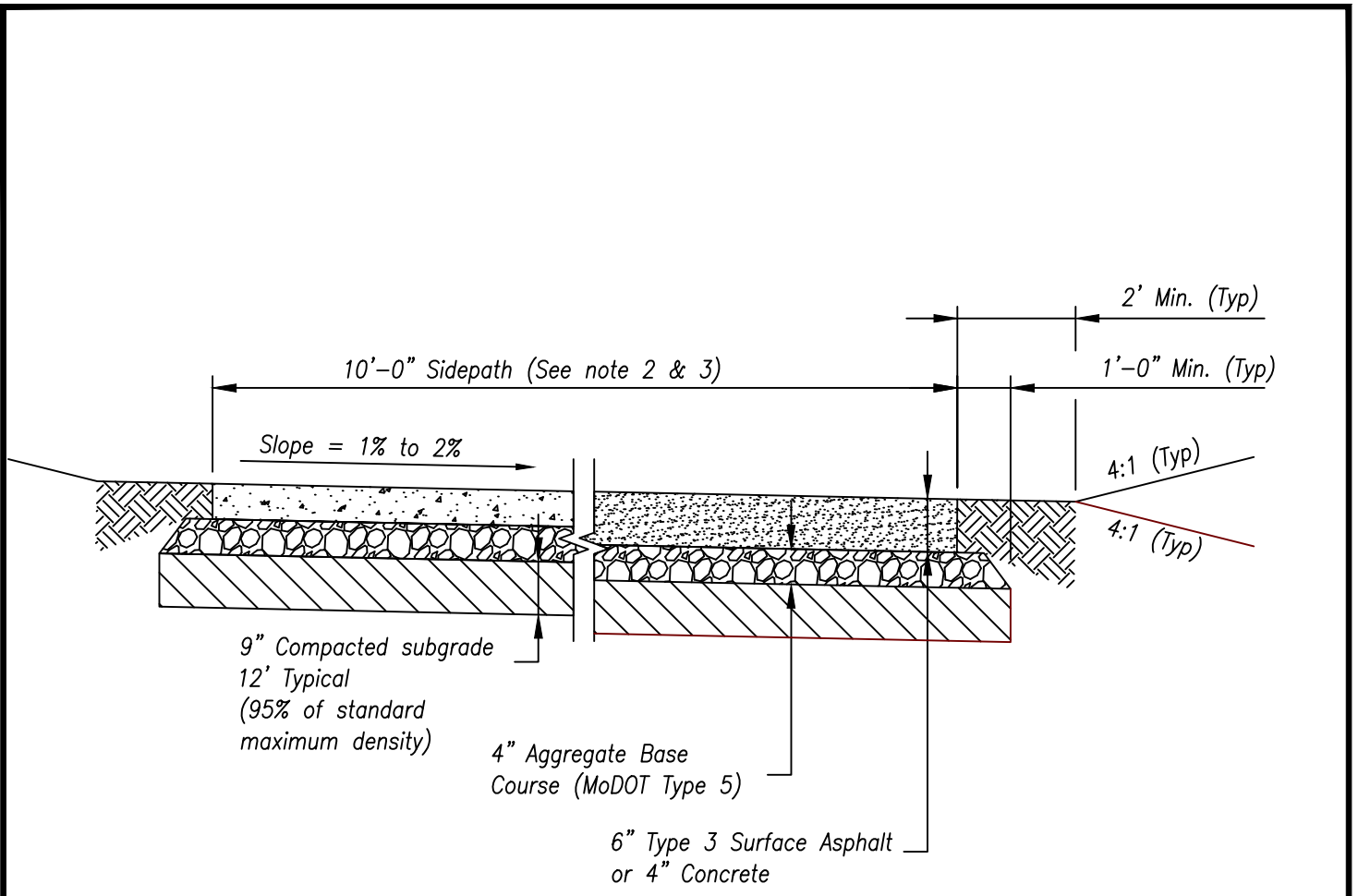
REVISED: DATE

BY: INITIALS

DRAWN BY: AEO

DATE: 7/21/22

2-13



Notes:

1. Concrete shall be used for the construction of the sidepath located within city street R.O.W. at the discretion of the City Engineer.
2. Sidepath width may be reduced to 8' in areas determined by the City Engineer.
3. See sidewalk Standard Detail for additional requirements.

Drawing Not to Scale



Shared-Use Path  
Detail

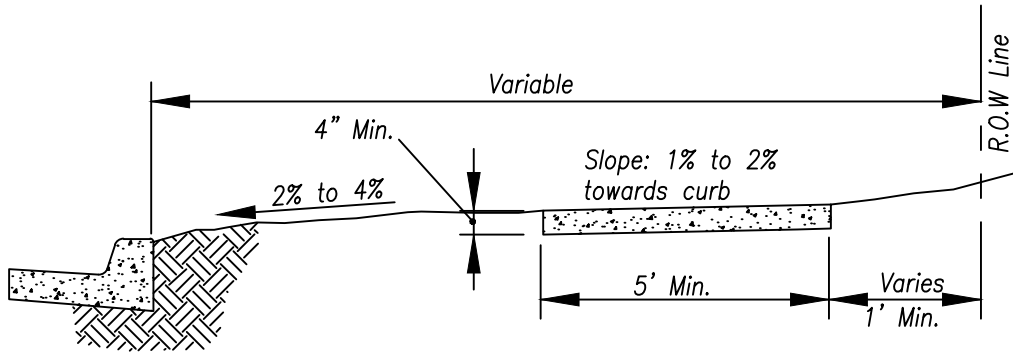
REVISED: DATE

BY: INITIALS

DRAWN BY: AEO

DATE: 7/29/22

# INDEPENDENCE MUNICIPAL SERVICES



1. Contraction joints shall be hand-tooled or sawed at right angles to the alignment of the sidewalk with the exception that sawing is required for sidewalks or sidepaths 8 feet in width or wider. Longitudinal joint spacing will match the width of the sidewalk (i.e., sidewalk 5 feet wide will have joints spaced at 5 feet)
2. Contraction joints will be 1/8" wide by 1" deep. If sidewalk thickness is increased the depth of the joint will be increased proportionally.
3. Expansion joints consisting of 1/2" thick preformed joint filler will have a maximum spacing of 100 feet for hand-poured sidewalk and a maximum spacing of 200 feet for machine-poured sidewalk. Expansion joints will also be required where the sidewalk abuts other structures. Expansion joints will fully separate the concrete on either side of the joint.
4. Where sidewalk is installed adjacent to a storm sewer structure, the sidewalk will be doweled into the structure using #4 rebar at 18" centers. Expansion material is not required where dowels are used. The thickness of the sidewalk will be increased to 6" to maintain 2" cover for the rebar.
5. KCMMB 4K concrete is required. Sidewalk construction will adhere to the City of Independence design standards.

Drawing Not to Scale



**INDEPENDENCE**  
★ MISSOURI ★

Sidewalk Detail

REVISED: \_\_\_\_\_ DATE \_\_\_\_\_

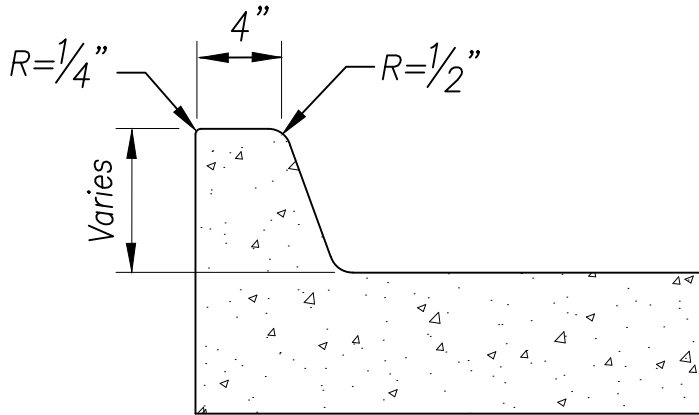
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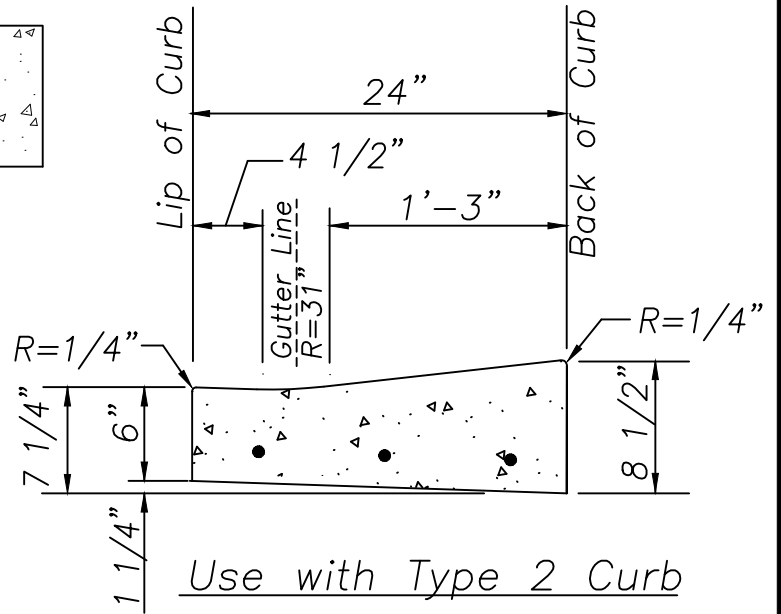
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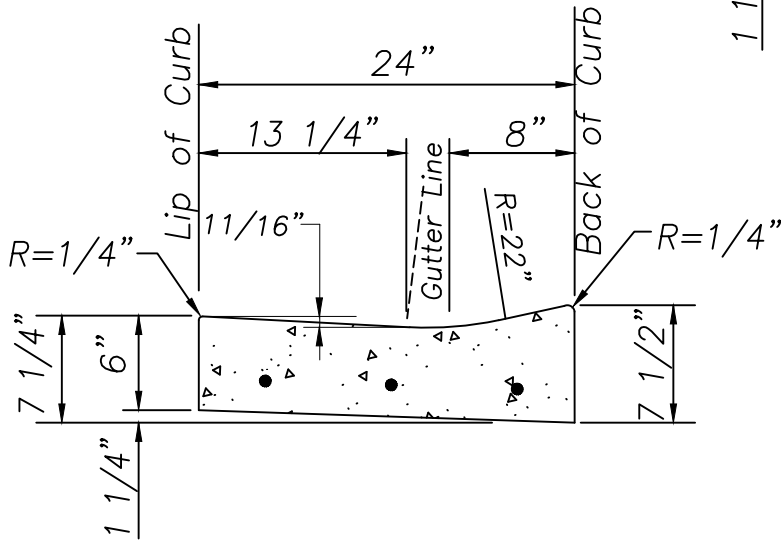
INDEPENDENCE MUNICIPAL SERVICES



Ramp Curb Detail



Use with Type 2 Curb



Use with Type 1 Curb

Drawing Not to Scale



INDEPENDENCE  
\* MISSOURI \*

Sidewalk Ramp  
Curb Details

REVISED: DATE \_\_\_\_\_

BY: INITIALS \_\_\_\_\_

DRAWN BY: AEO \_\_\_\_\_

DATE: 7/29/22 \_\_\_\_\_

## INDEPENDENCE MUNICIPAL SERVICES

1. All areas of pedestrian access route must be compliant with the Americans with Disabilities Act - Guidelines for Accessible Public Rights of Way. Exceptions must be approved by Engineer. All other areas of non-compliance shall be removed and corrected at the contractor's expense.
2. Plan Drawings shall include a Table of Elevations for all Points Labeled as **Elev.**
3. Key all Construction Joints or use Tie Bars #4 Epoxy Coated @ 12" O.C.
4. Longitudinal joint spacing to match width of sidewalk.
5. Isolation joints shall be placed where walk abuts driveways and similar structures, and 250' centers max.
6. Sidewalk Ramp shall be lengthened to provide ADA compliance slope.
7. Ensure the curb ramp maintains an 8.3% (1V:12H) maximum slope. The cross slope of the sidewalk, ramps, and landing shall be 1% to facilitate drainage and 2% maximum.
8. Detectable Warnings to Comply with ADA Requirements.
9. Landing for Type C ramp along the entire curb return is preferred, but may be shortened to minimum ADA complaint dimensions.
10. Detectable Warning Surfaces shall be brick red if cast-in-place replaceable panels or brick pavers. Detectable warning surfaces shall span the full width of the ramp or landing and be 24" deep.
11. Concrete Mix shall be KCMMB 4K.



INDEPENDENCE  
\* MISSOURI \*

Sidewalk Ramp  
General Notes

REVISED: DATE

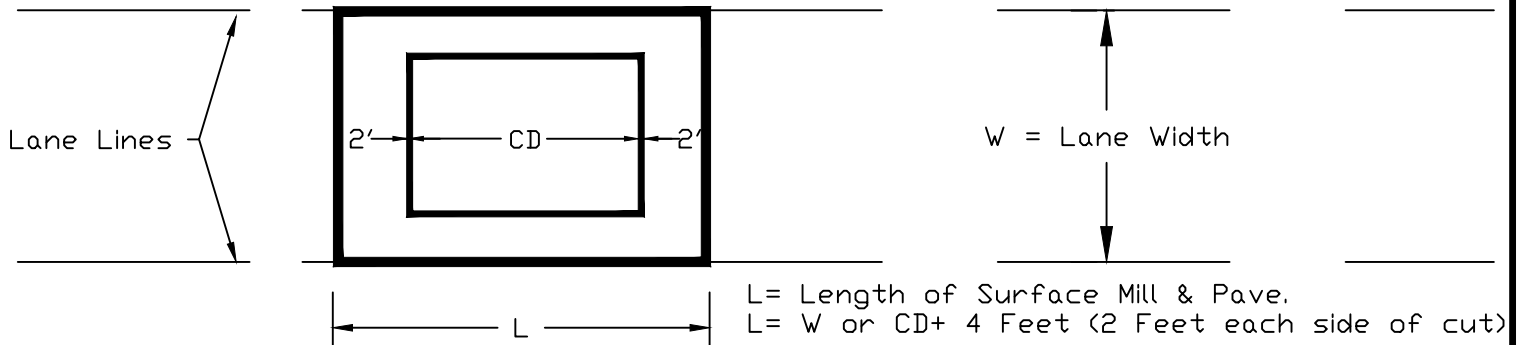
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DRAWN BY: AEO

DATE: 7/29/22

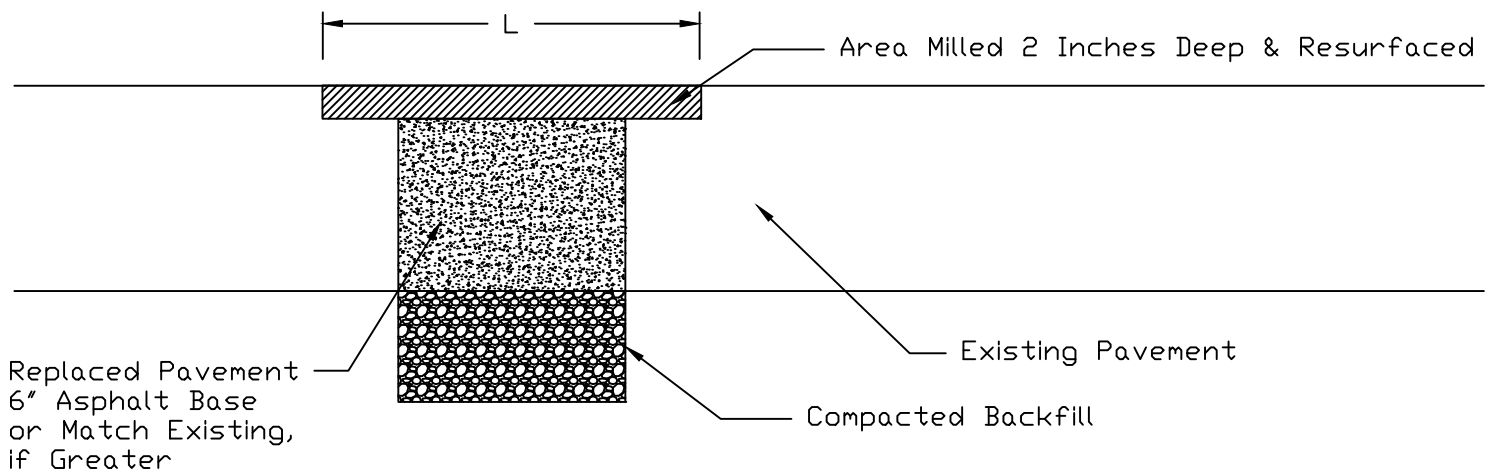
2-17

# INDEPENDENCE MUNICIPAL SERVICES



OVERCUT WILL NOT BE REQUIRED FOR CUTS NOT EXCEEDING EIGHT (8) INCHES IN WIDTH.

PLAN VIEW



SECTION VIEW

\*See Street Cut General Notes page for Notes & Specifications

Drawing Not to Scale



STREET CUT  
& REPAIR

REVISED: 03/24/2022

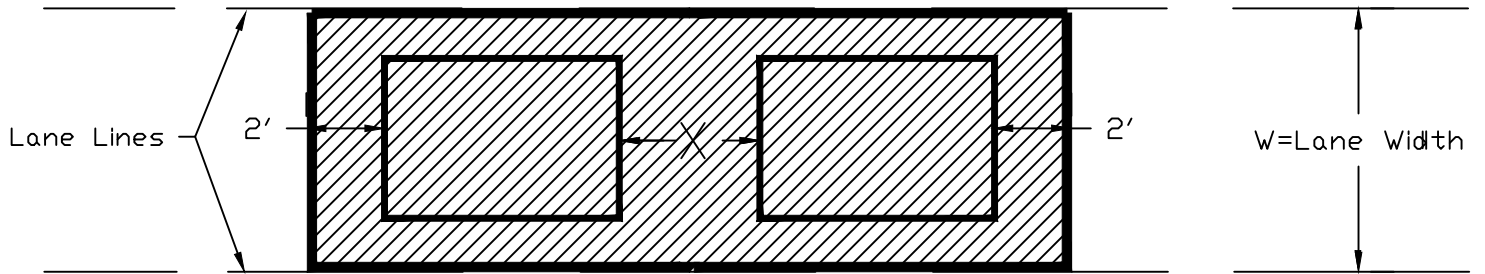
BY: AEJ

DRAWN BY: AEJ

DATE: 03/24/2022

2-18

INDEPENDENCE MUNICIPAL SERVICES



If Distance X is Less than W, then Entire Area Shaded will be Milled & Resurfaced.

\*See Street Cut General Notes page for Notes & Specifications

Drawing Not to Scale



MULTIPLE  
STREET CUTS

REVISED: 03/24/2022

BY: AEJ

DRAWN BY: AEJ

DATE: 03/24/2022

# INDEPENDENCE MUNICIPAL SERVICES

## General Notes:

1. All work shall conform to the latest City of Independence Standard Details and City Code. Excavations shall be protected at all times. Cuts in roadways shall be plated or temporarily filled and capped with cold mix asphalt when work is not being performed.
2. Permits are required before working in the right-of-way, which must be on site during work. Permit holder must have inspection of backfill or pmaermit will be void.
3. Excavations: the top dimension of the excavation shall be equal to or greater than the bottom dimension. (All sides of the excavation shall be vertical or lay back greater than vertical before beginning backfill.)
4. Bedding: utility bedding shall have granular bedding meeting city specifications. Bedding may extend no greater than 12-inches above utility.
5. Backfill: Backfill shall not be placed in water or mud. Clean graded rock or frozen material shall not be used as backfill. Backfill material and placement shall meet all city requirements. Utilities using untreated compacted aggregate will need to provide all compaction prior to completion of the permit.
6. Roadway surfaces: surfacing shall be of the same type of materials as the existing surface. The finished surface shall be flush with the surrounding surface and shall match the slope and contours of the surrounding pavement.
  - A. If the street cut is in a concrete street, the patch shall extend to the nearest joint in all directions. The patch shall be saw cut and all load transfer devices, expansion joints and reinforcing steel placed prior to placing the new concrete. The concrete shall be placed to the current thickness of pavement or ten inches, whichever is thicker.
  - B. If the pavement is asphalt, pavement shall be removed twelve (12) inches beyond the edge of the disturbed subgrade or pavement, whichever is greater. Pavement shall be milled 2" deep and resurfaced for full width of the lane that is cut and a minimum of ten (10) feet in length. Tack coat shall be applied, surface placed compacted, and joints sealed. If asphalt is not available at the time repairs are made, concrete may be brought to the surface as a temporary repair. Once asphalt is available, the mill and resurfacing shall be completed. Overlay of a full lane is required for a block when more than 20% of the block is patches from an active project or 50% of cumulation of all patches in a full lane for a block.
7. Repairs shall match existing street slope and grade, and shall be maintained for two (2) years or bond period.
8. Any pavement markings removed by the repairs must be replaced with like materials.
9. EXCAVATING IN STREET PAEMENTS WITHIN TWO YEARS OF CONSTRUCTION OR RESURFACING. The City will make available its proposed 2-year schedule of street construction and resurfacing to businesses that may require making streets cuts. If a street cut is made, for non-emergency purpose, within 2 years after a street is constructed or resurfaced, the following requirements will apply.

### A. Asphalted Surface Streets

- 1) The width & length of the surfaced area shall be as follows:
  - a. Width – Extend to the full lane or the length of the cut plus four feet, whichever is greater.
  - b. Length – Extend to the width of the affected lane or the length of the cut plus four feet, whichever is greater.

The area described above shall be milled to a depth of 2 inches and a 2-inch thick asphalt surface course shall be placed. This is shown in Detail 1.

- 2) Multiple street cuts separated less than the width of the affected lane shall be resurfaced with a single, contiguous patch. This is shown in Detail 2.

### B. For Concrete Streets

The entire slab shall be removed and replaced to the existing joints.

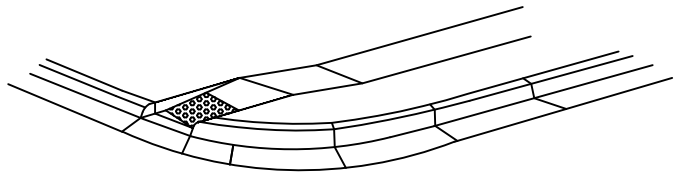
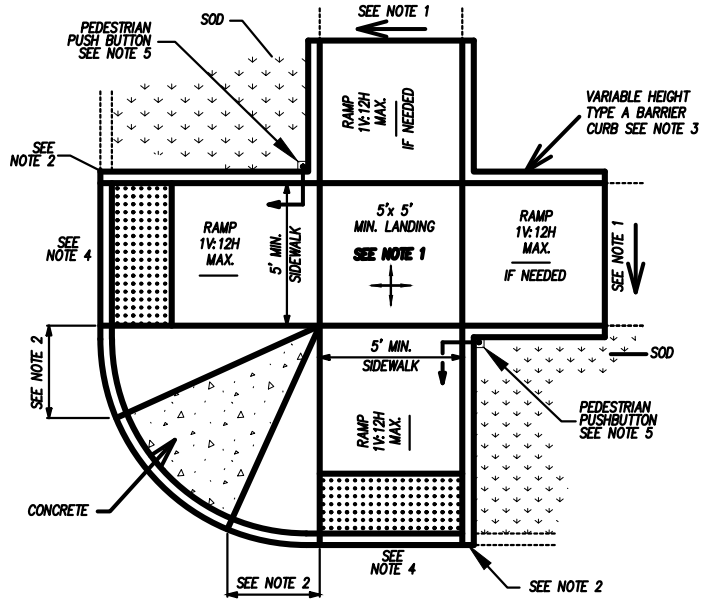


STREET CUTS  
GENERAL NOTES

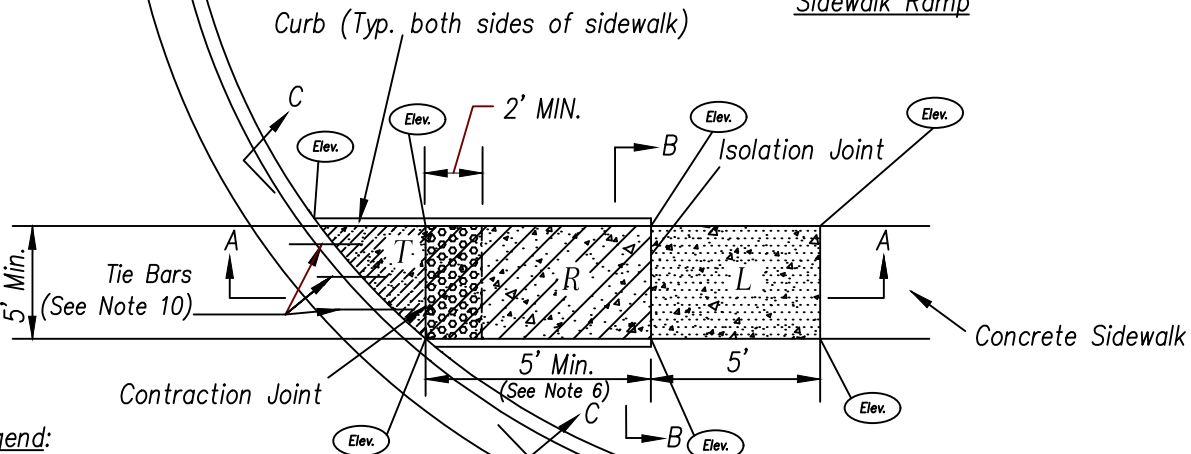
# INDEPENDENCE MUNICIPAL SERVICES

**NOTES:**

1. 1.0% MINIMUM, 2.0% MAXIMUM CROSS SLOPE.
2. VARIABLE HEIGHT VERTICAL CURB. IF TRAVERSABLE USE A MAX. 1V:10H FLARE MEASURED PARALLEL TO THE CURB LINE.
3. HEIGHT VARIES TO MEET EXISTING GROUND.
4. THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMP RUNS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 5% MAXIMUM.
5. THE FACE OF PEDESTRIAN PUSH BUTTONS SHALL BE OFFSET 0" FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.
6. SIDEWALK RAMP SHALL BE LENGTHENED TO PROVIDE ADA COMPLIANT SLOPE BUT NOT EXCEED 15 FT.
7. TYPE A RAMP MUST BE USED FOR ALL NEW CONSTRUCTION. TYPE A RAMP IS THE PREFERRED STYLE FOR ALL CONSTRUCTION.
8. SEE GENERAL NOTES SHEET 2-17 FOR ALL REQUIREMENTS.
9. SEE SECTION VIEW SHEET 2-24 FOR SECTIONS A, B & C.
10. Key ALL CONSTRUCTION JOINTS OR USE TIE BARS #4 EPOXY COATED @ 12" O.C.



Isometric View Type A Sidewalk Ramp



**Legend:**

- Ramp
- Landing
- Detectable Warning Surface\*
- Transition

\*Cement Mortar (Herringbone Pattern) if Paver Brick is used.

Drawing Not to Scale



Type A Sidewalk Ramp

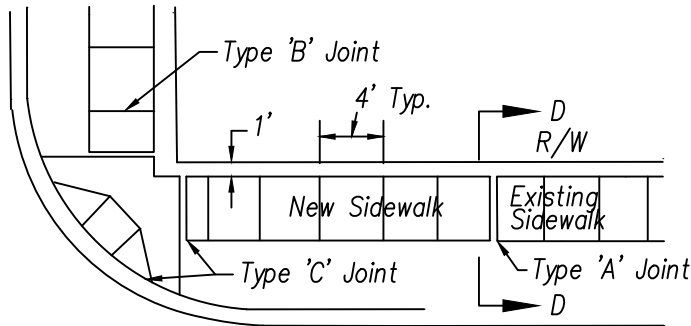
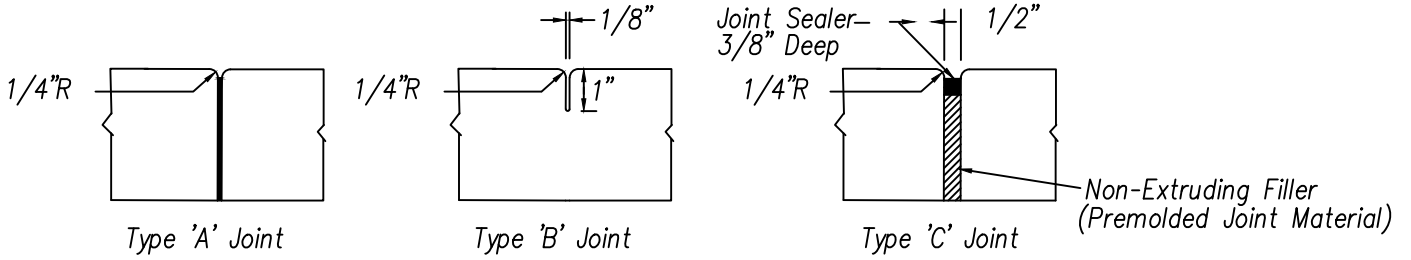
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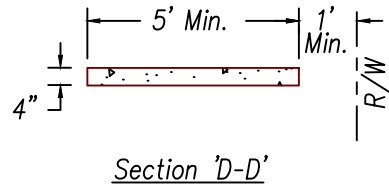
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DATE: \_\_\_\_\_ 7/29/22 \_\_\_\_\_

# INDEPENDENCE MUNICIPAL SERVICES



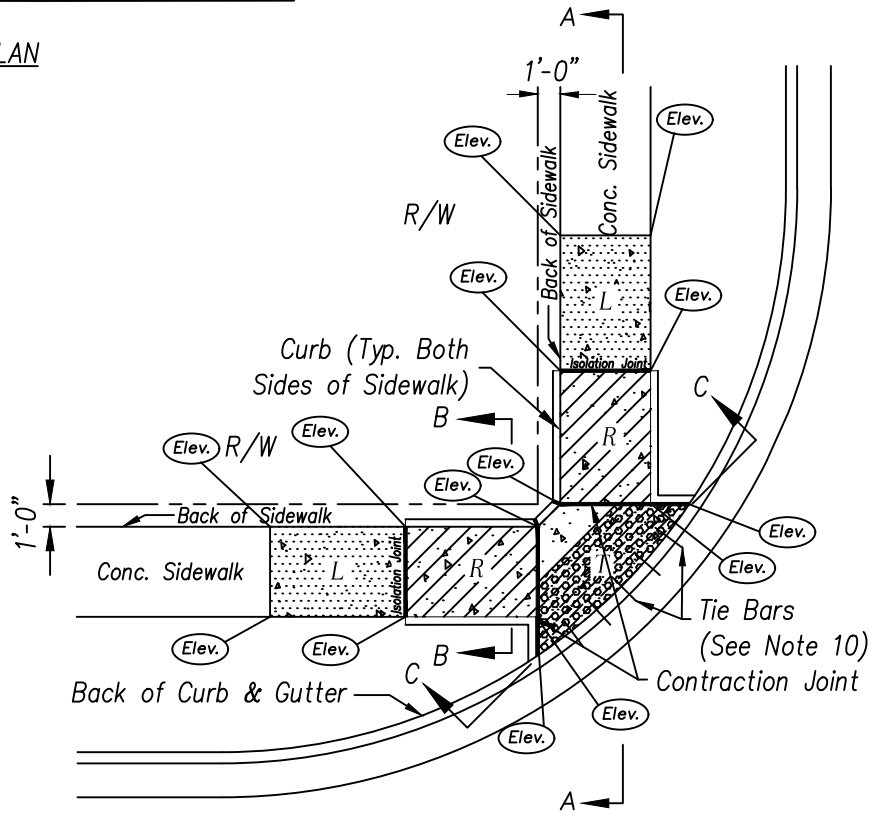
PLAN



Legend:

- Ramp
- Landing
- Detectable Warning Surface\*
- Transition

\*Cement Mortar (Herringbone Pattern) if Paver Brick is used.



Drawing Not to Scale

Notes:

1. Type B ramp can only be used for retrofit construction.
2. See General Notes Sheet 2-17 for all requirements.
3. See Section View Sheet 2-24 for Sections A, B & C.
6. Sidewalk ramp shall be lengthened to provide ADA compliant slope but not exceed 15 FT.
10. Key all construction joints or use tie bars #4 epoxy coated @ 12" O.C.



Type B Sidewalk Ramp

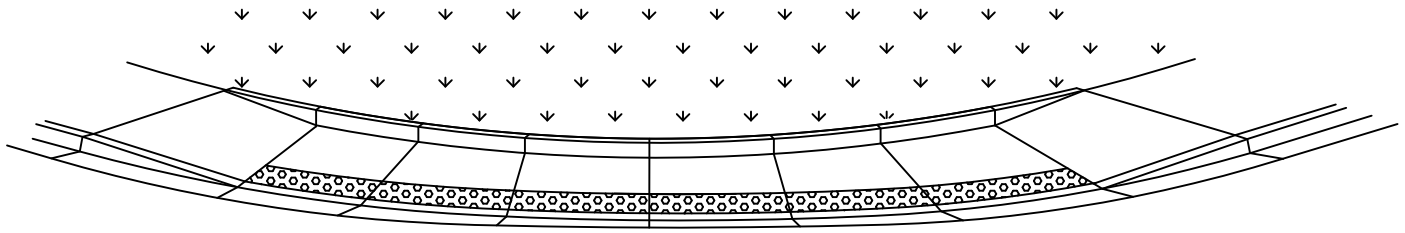
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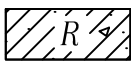

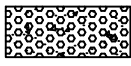

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# INDEPENDENCE MUNICIPAL SERVICES

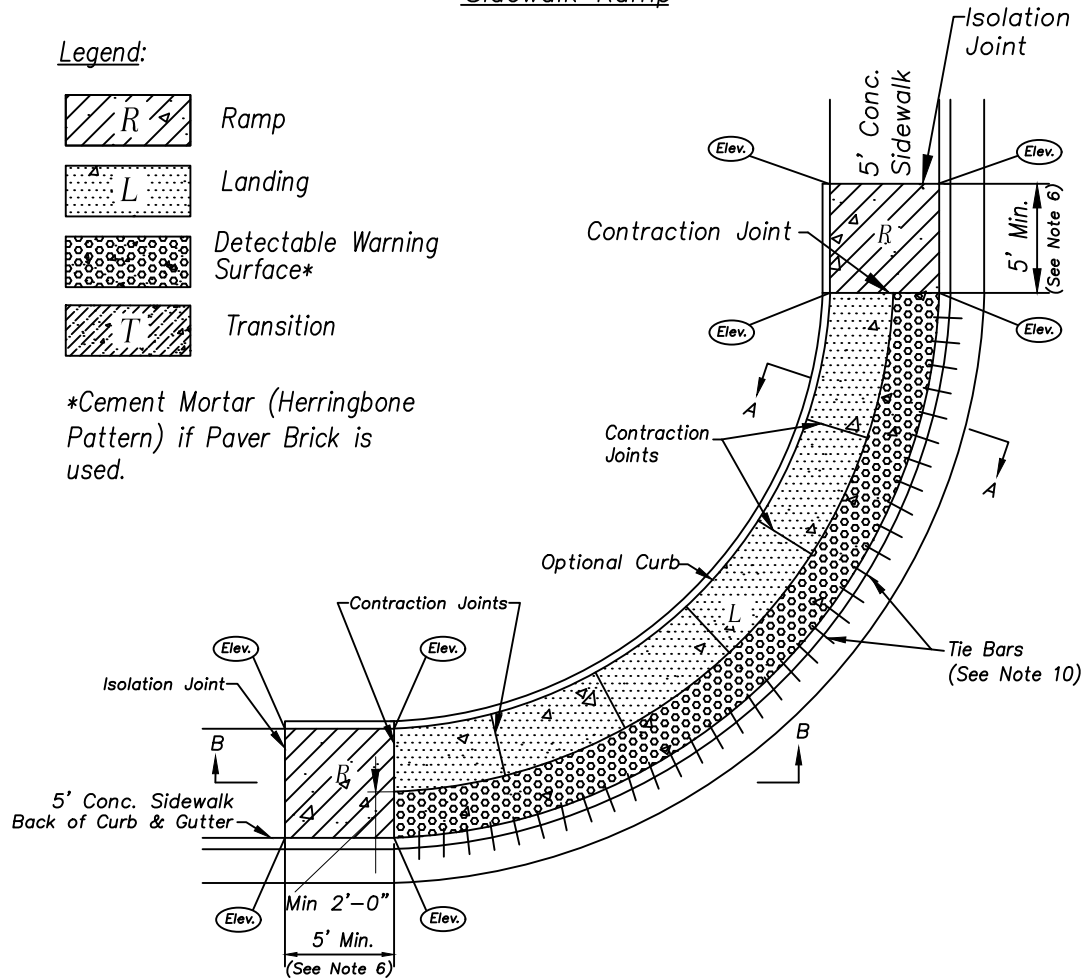


*Isometric View Type C  
Sidewalk Ramp*

**Legend:**

-  Ramp
-  Landing
-  Detectable Warning Surface\*
-  Transition

\*Cement Mortar (Herringbone Pattern) if Paver Brick is used.



**Notes:**

1. Type B ramp can only be used for retrofit construction.
2. See General Notes Sheet 2-17 for all requirements.
3. See Section View Sheet 2-24 for Sections A, B & C.
6. Sidewalk ramp shall be lengthened to provide ADA compliant slope but not exceed 15 FT.
10. Key all construction joints or use tie bars #4 epoxy coated @ 12" O.C.

Drawing Not to Scale



Type C Sidewalk Ramp

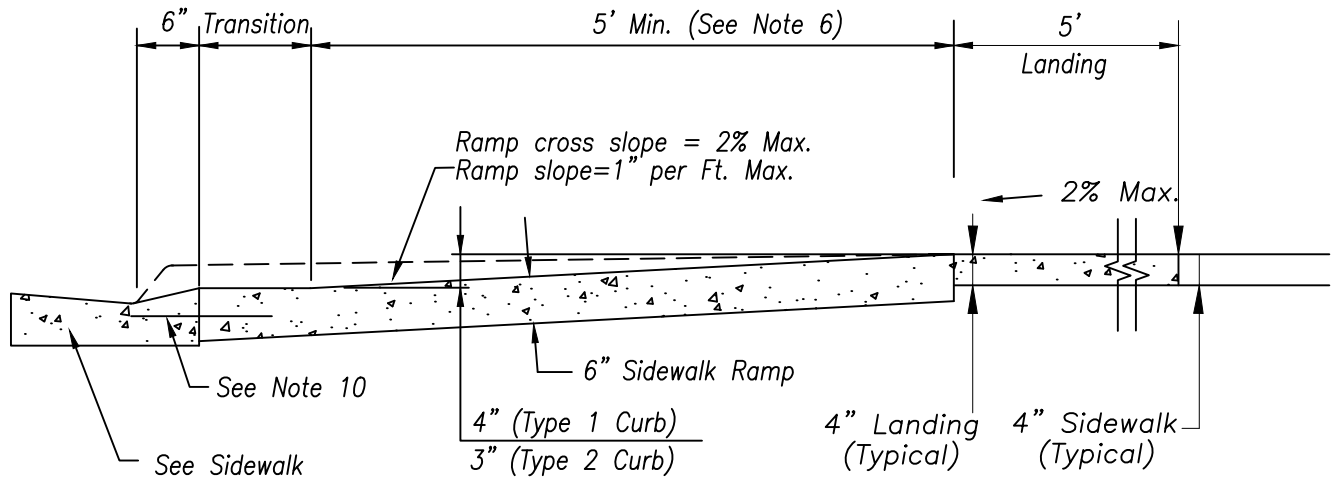
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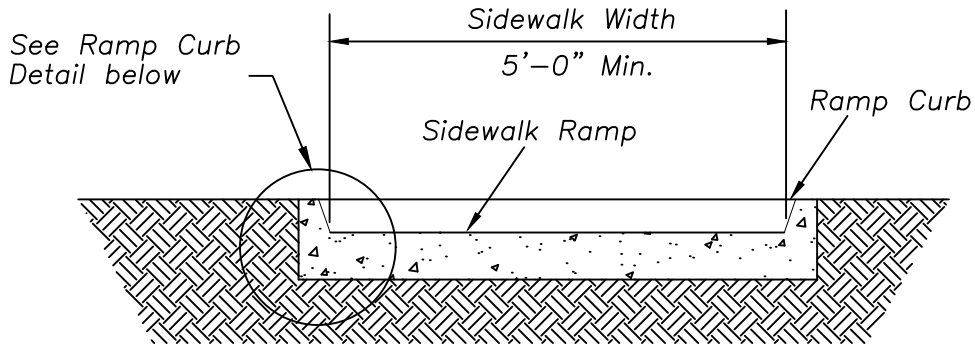
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DATE: 7/29/22

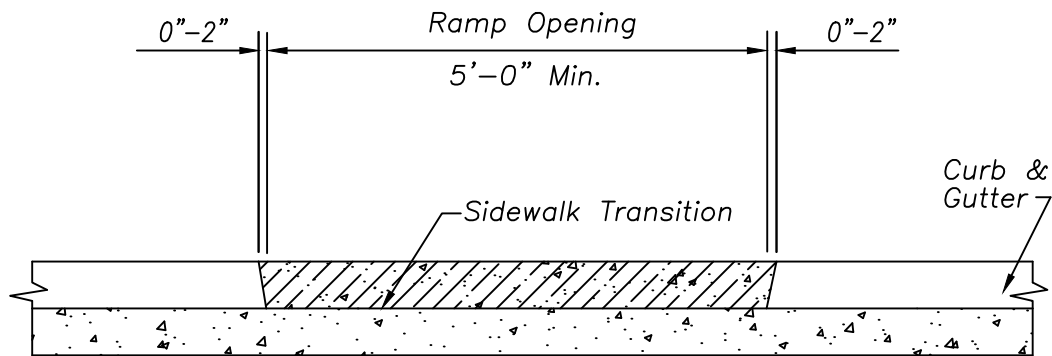
INDEPENDENCE MUNICIPAL SERVICES



Section A-A



Section B-B



Section C-C

Drawing Not to Scale

Notes:

- 2. See General Notes Sheet 2-17 for all requirements.
- 6. Sidewalk ramp shall be lengthened to provide ADA compliant slope but not exceed 15 FT.
- 10. Key all construction joints or use tie bars #4 epoxy coated @ 12" O.C.



Type A, B & C Sidewalk Ramp  
Section View

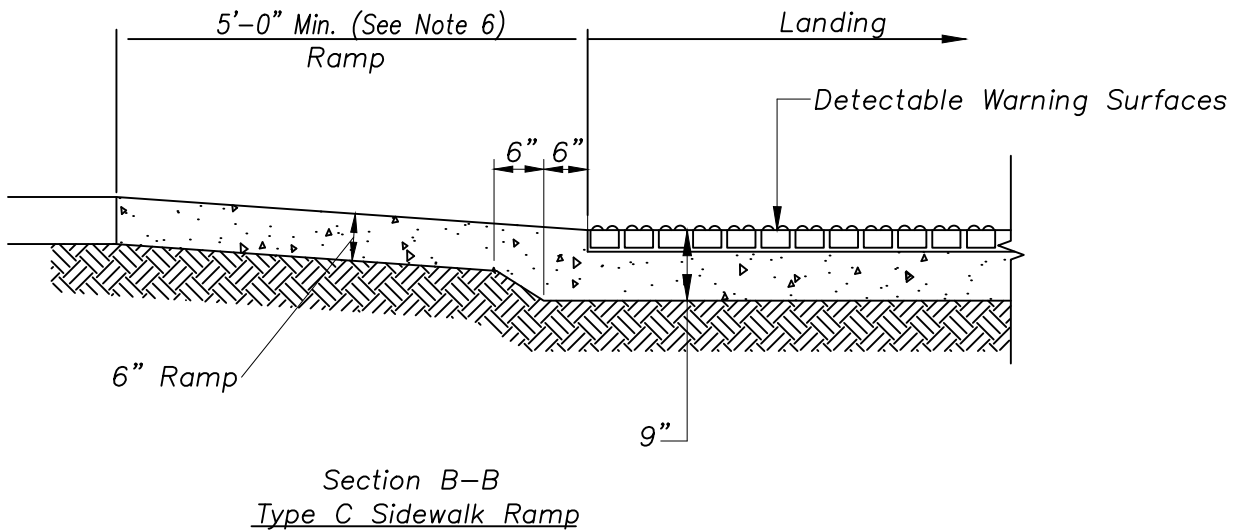
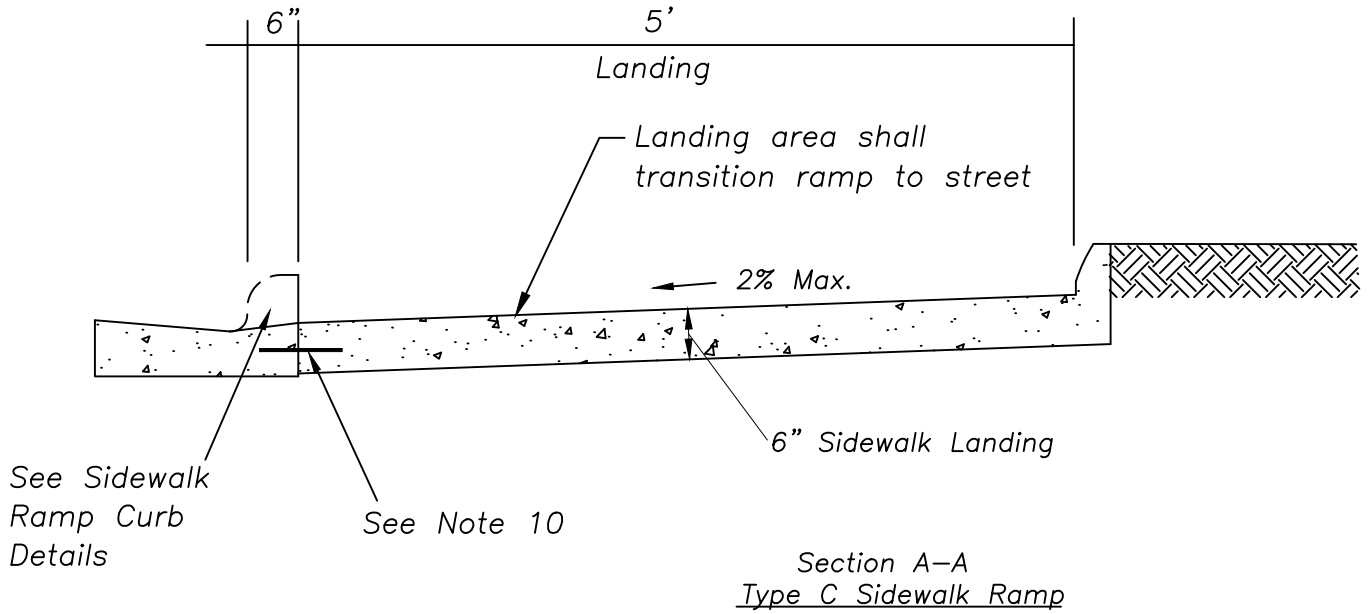
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DATE: \_\_\_\_\_ 7/29/22 \_\_\_\_\_

INDEPENDENCE MUNICIPAL SERVICES



Notes:

2. See General Notes Sheet 2-17 for all requirements.
3. See Section View Sheet 2-24 for Sections A, B & C.
6. Sidewalk ramp shall be lengthened to provide ADA compliant slope but not exceed 15 FT.
10. Key all construction joints or use tie bars #4 epoxy coated @ 12" O.C.

Drawing Not to Scale



Type C Sidewalk Ramp  
Section View

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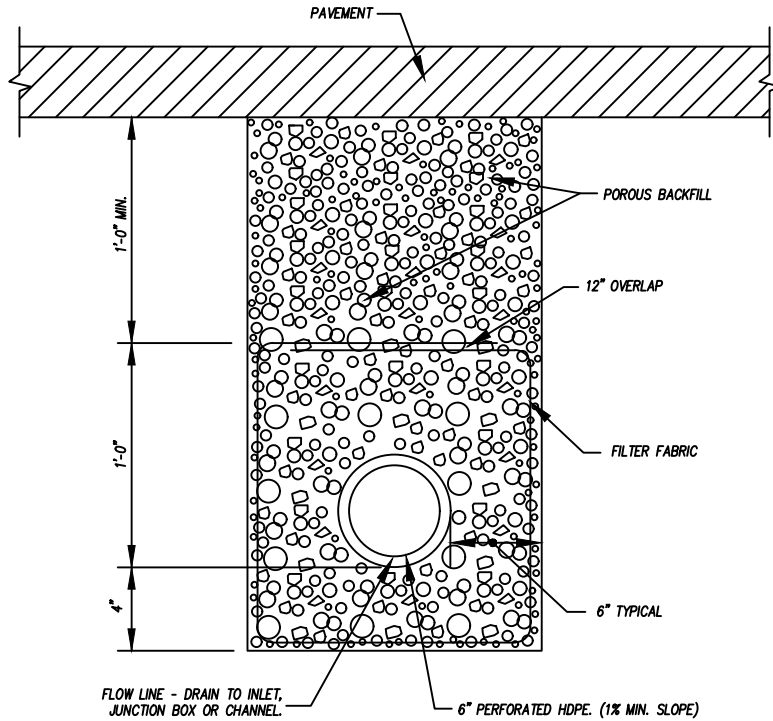
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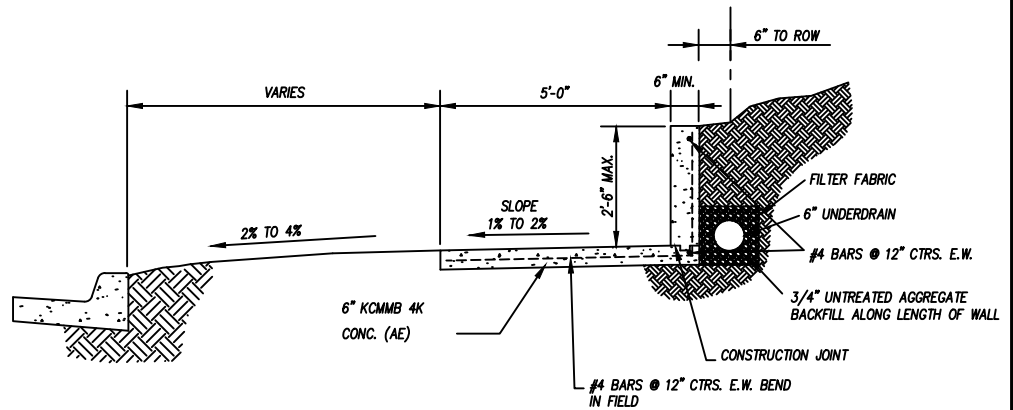
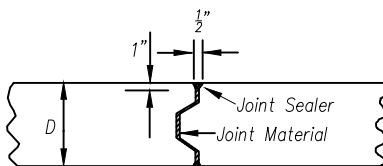
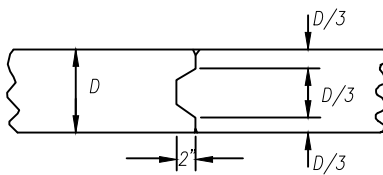


# INDEPENDENCE MUNICIPAL SERVICES



**Notes:**

1. Design calculations must be submitted for retaining walls with heights exceeding 24".
2. Handrail is required for retaining walls with heights of 30" or greater.
3. Expansion joint spacing is 90 feet maximum. Horizontal and vertical joints will align with each other. #5 smooth dowels, 24" in length, will be required at 12" centers for both horizontal and vertical joints.
4. Concrete: KCMMB 4k Concrete shall be used throughout. All vertical joints shall have a 1" wide preformed chamfer. Exposed edges of the wall shall have a 3/4" preformed chamfer.
5. Reinforcing: All reinforcing shall conform to ASTM A615, Grade 60, and shall be bent cold. All dimensions relative to reinforcing steel shall be centerline of bar unless otherwise noted. Minimum clearance of 2" shall be provided unless noted otherwise. All reinforcing steel shall be supported on fabricated steel bar supports at 3'-0".
6. All exposed concrete shall be provided with a plain finish.
7. Key all construction joints.
8. Stop underdrain at ends of sidewalk/ retaining wall.
9. Proposed underdrain pipe layout, flowline elevations, inlet connection points, and details shall be approved prior to construction.



Drawing Not to Scale



## RETAINING WALL

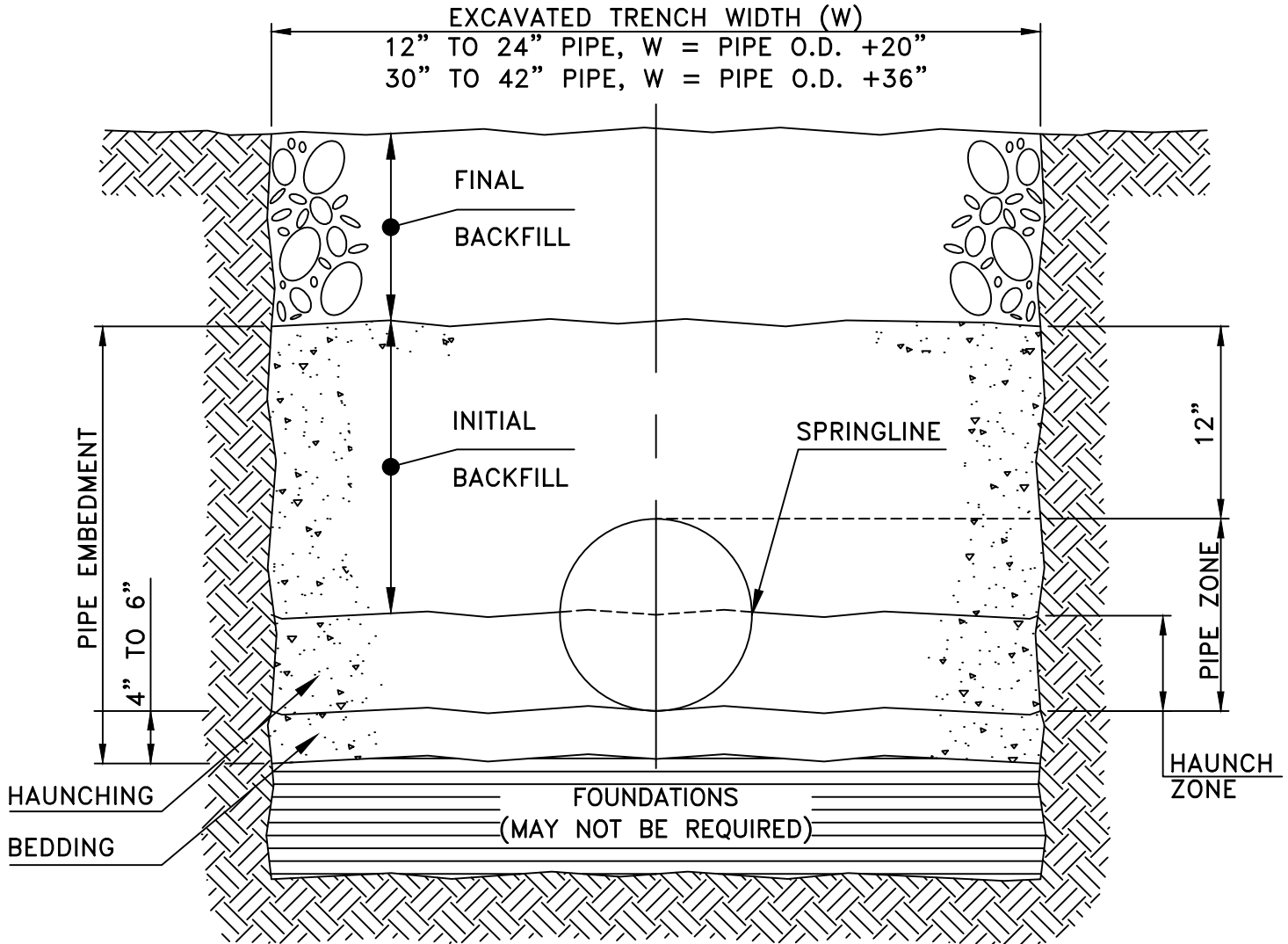
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DATE: \_\_\_\_\_ 7/22/22 \_\_\_\_\_

INDEPENDENCE MUNICIPAL SERVICES



- NOTE:
1. HDPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.
  2. USE MODOT GRADE 4 (GRADATION A) BEDDING MATERIAL. (SECTION 1009); INCLUDES ALL PIPE EMBEDMENT ALL PIPE EMBEDMENT, MoDOT SPECIFICATION FOR HIGHWAY CONSTRUCTION, YEAR 2004.
  3. CARE MUST BE EXERCISED TO INSURE PLACEMENT AND COMPACTION OF THE EMBEDMENT MATERIAL IN THE HAUNCHES. FOR LARGER DIAMETER PIPES (30" OR GREATER), EMBEDMENT MATERIALS SHOULD BE WORKED UNDER THE HAUNCHES BY HAND. 8" MAXIMUM LIFTS, COMPACTED TO 90% STANDARD PROCTOR DENSITY. THE MIDDLE OF THE BEDDING EQUAL TO 1/3 OF THE PIPE O.D. SHOULD BE LOOSELY PLACED WITH THE REMAINDER COMPACTED TO A MINIMUM OF 90% STANDARD PROCTOR DENSITY.

Drawing Not to Scale



INDEPENDENCE  
\* MISSOURI \*

HDPE BEDDING  
DETAIL

REVISED: 05/05/2022

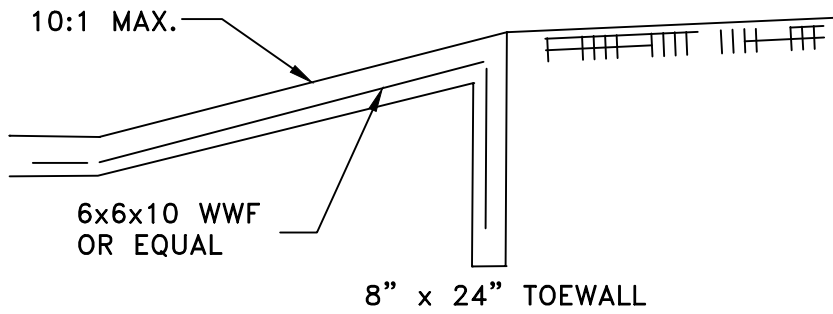
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DATE: 05/05/2022

3-01

INDEPENDENCE MUNICIPAL SERVICES



Drawing Not to Scale



LOW-LEVEL CROSSING  
DETAIL

REVISED: 05/05/2022

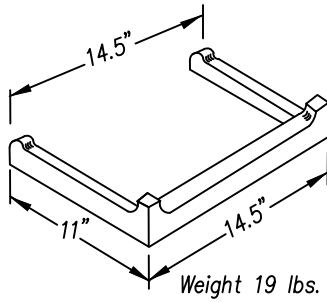
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DATE: 05/05/2022

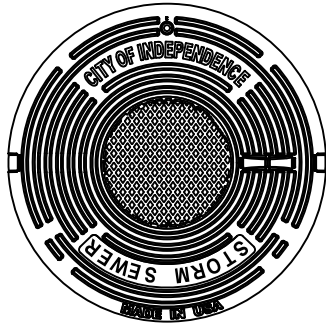
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INDEPENDENCE MUNICIPAL SERVICES

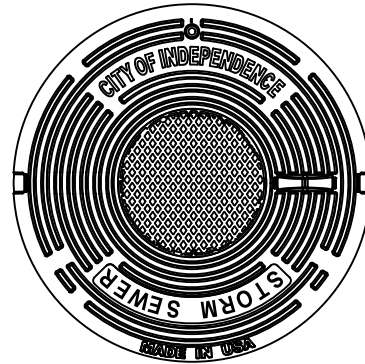


STEP

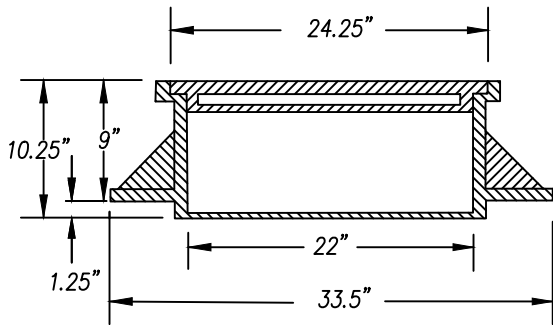
To Be Constructed as  
Approved By Engineer



Weight  
Lid-160 lbs.  
Ring-250 lbs.

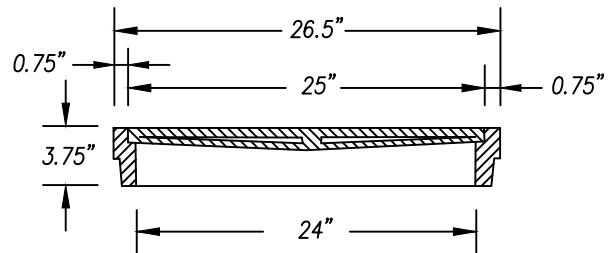


Weight  
Lid-75 lbs.  
Ring-55 lbs.



TYPE 2

Manhole Ring & Cover Clay & Bailey No. 2007 MR  
or Approved Equal.



TYPE 1

Manhole Ring & Cover Clay & Bailey No. 2004, Deeter 1593  
or Approved Equal.

Drawing Not to Scale



MANHOLE RINGS  
AND COVERS

REVISED: DATE

BY: INITIALS

DRAWN BY: AEO

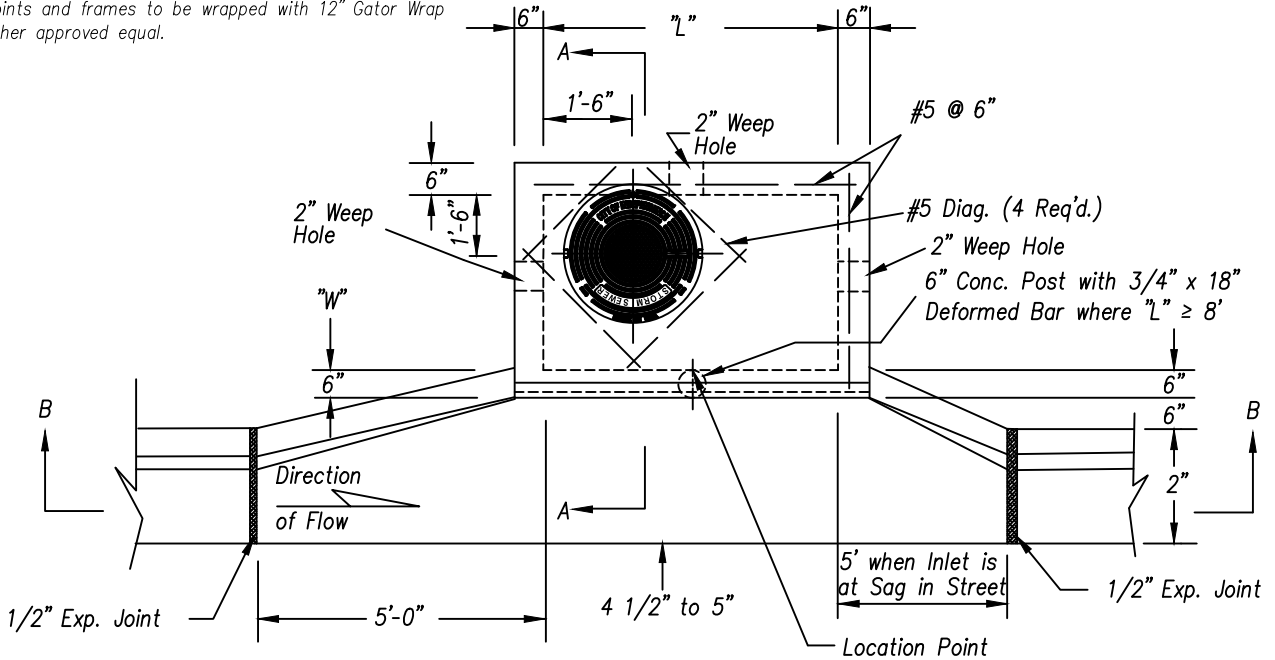
DATE: 11/19/21

3-03

# INDEPENDENCE MUNICIPAL SERVICES

Notes:

1. Expansion joints shall be hot or cold poured joint sealing compound or premolded expansion joint filler.
2. On-grade inlets shall conform to street grade and sump inlets shall be level.
3. Inlet location shall not conflict with ADA ramps or curb returns.
4. All concrete shall be KCMMB 4K.
5. Ring and lid shall be aligned with steps.
6. All joints and frames to be wrapped with 12" Gator Wrap or other approved equal.



All Weep Holes 24" Min. from top

\* When required by plans

TYPE A - Curb Inlet

TYPE B - Curb Inlet w/ Field Opening

Drawing Not to Scale



TYPE A & B  
INLETS

REVISED: DATE

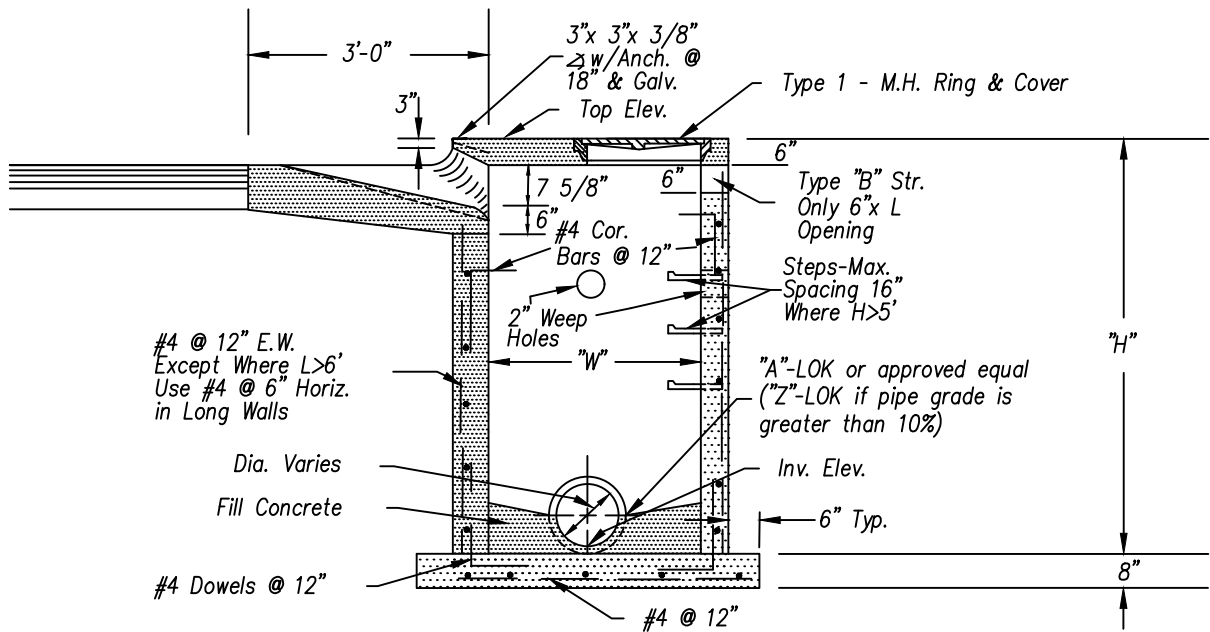
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DATE: 11/19/21

3-04

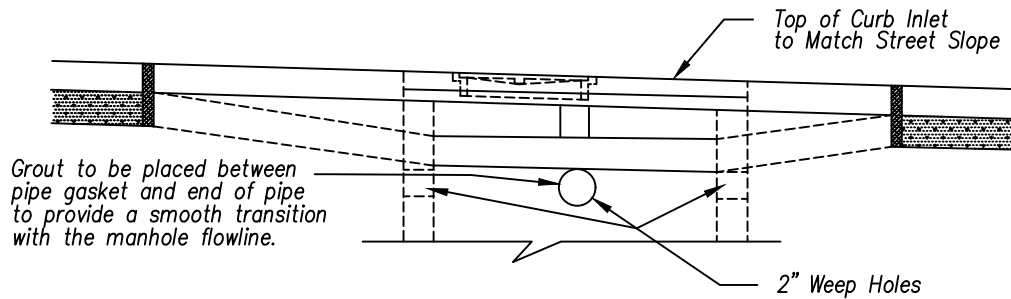
INDEPENDENCE MUNICIPAL SERVICES



Section A-A

TYPE A & B  
WEEP HOLE DETAIL

All Weep Holes 24" Min. from top



SECTION B-B

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TYPE A & B INLET  
SECTION VIEW

REVISED: \_\_\_\_\_ DATE \_\_\_\_\_

BY: \_\_\_\_\_ INITIALS \_\_\_\_\_

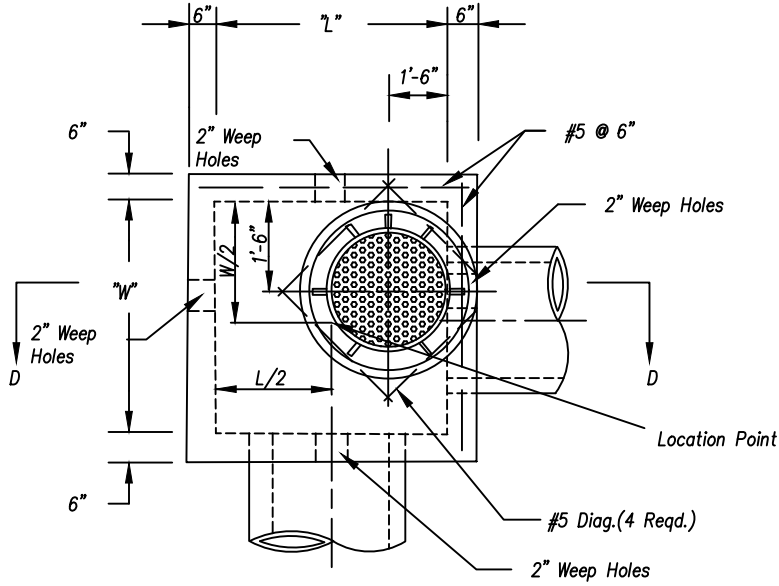
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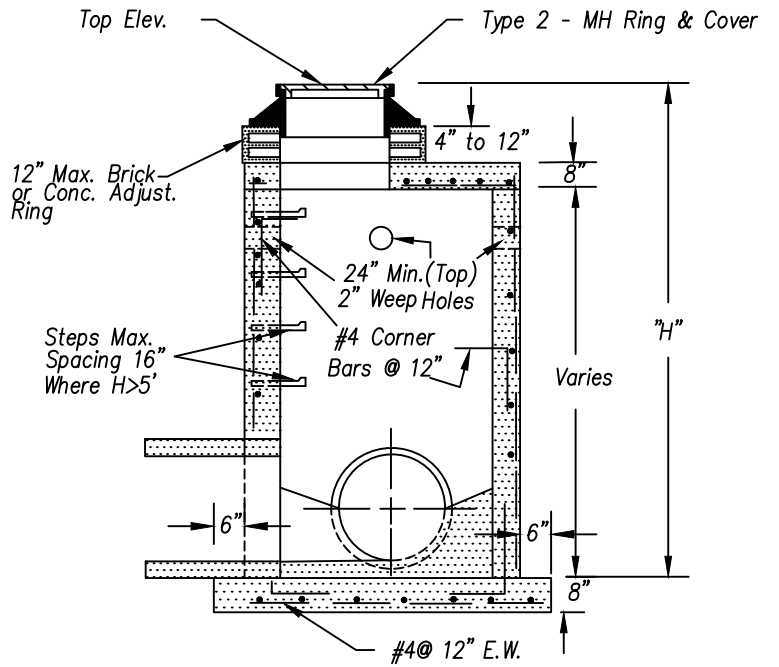
# INDEPENDENCE MUNICIPAL SERVICES



Note:  
See Type A & B InletS detail for general notes.

All Weep Holes 24" Min. from top

## TYPE D



### Section D-D

Drawing Not to Scale



### TYPE D JUNCTION BOX

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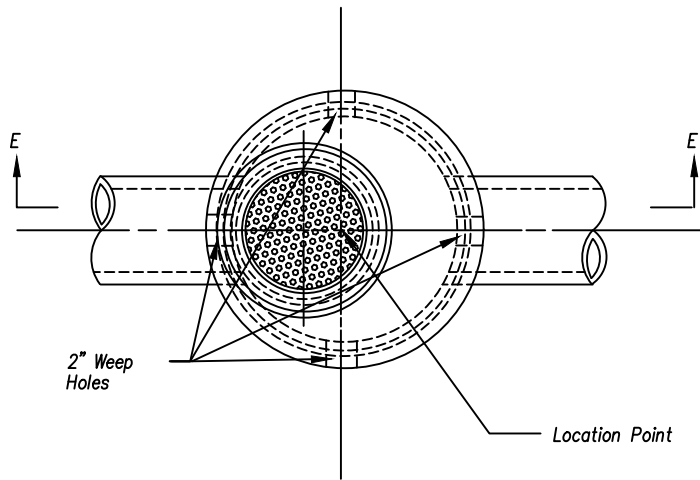
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DATE: 11/19/21

3-07

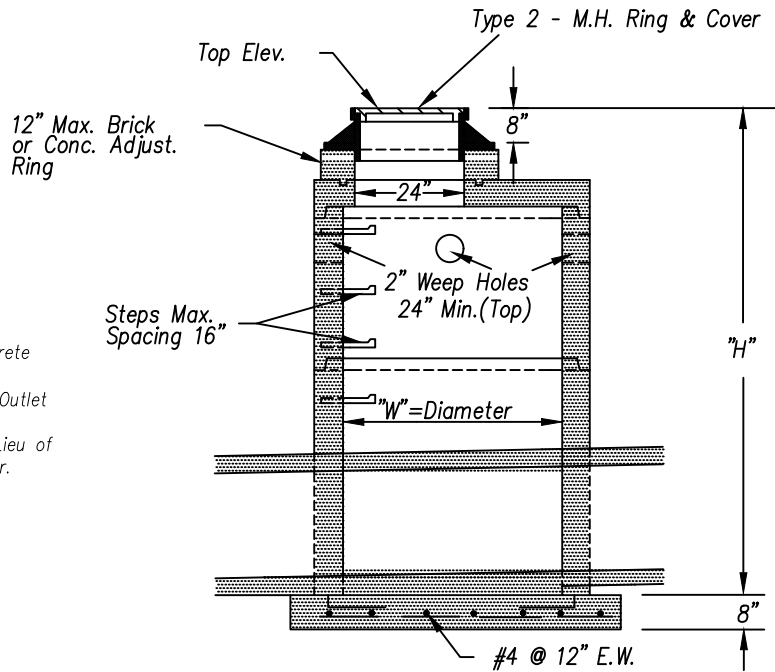
# INDEPENDENCE MUNICIPAL SERVICES



Note:  
See Type A & B Inlet detail for general notes.

All Weep Holes 24" Min. from top

## TYPE E



Notes:

1. Type E Structure is a Round Precast Concrete Manhole Junction Box - "W"=Diameter.
2. Manhole Ring & Cover to be located over Outlet Pipe of Structure.
3. Cast in place Structures may be used in Lieu of Precast with Prior Approval of the Engineer.
4. Concrete shall be KCMMB 4K.
5. Weep Holes shall be 2' Below the Top of Structure.

## Section E-E

Drawing Not to Scale



## TYPE E JUNCTION BOX

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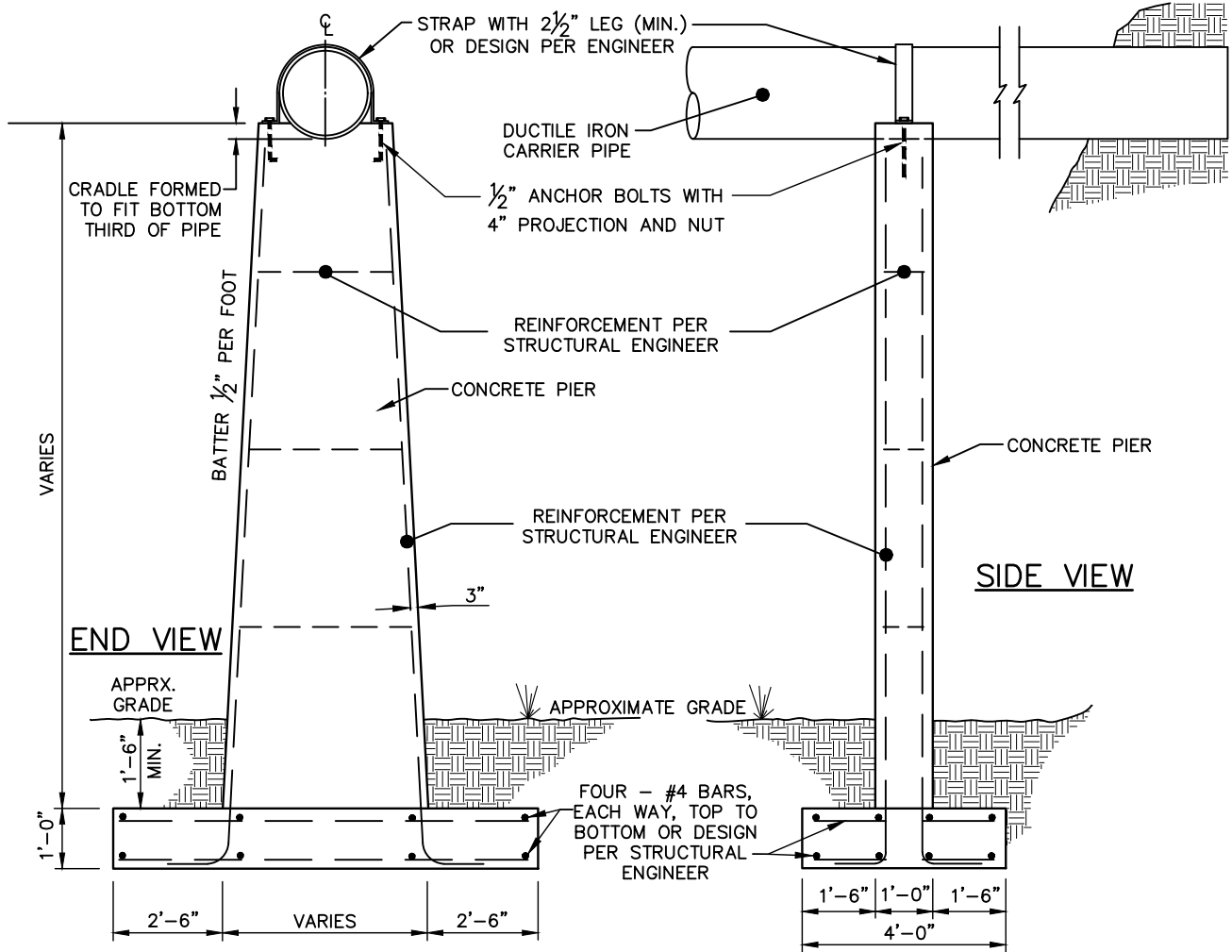
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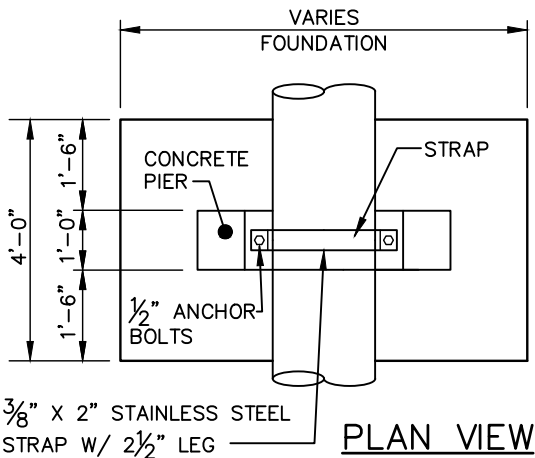
3-08

# INDEPENDENCE MUNICIPAL SERVICES



**NOTES:**

1. PIERS OVER 3 FEET IN HEIGHT TO BE REINFORCED.
2. BOTTOM OF PIPE MUST BE A MINIMUM OF 24 INCHES ABOVE NORMAL WATER LEVEL BUT NO LOWER THAN THE 50-YEAR FLOOD ELEVATION.
3. CAST-IN-PLACE CONCRETE SHALL BE FIELD TESTED.
4. AT A MINIMUM, ONE PIER MUST BE INSTALLED EVERY 20 FEET OR AS DIRECTED BY THE ENGINEER.
5. FOOTING DESIGN SHALL BE CONFIRMED BY LICENSED MISSOURI PROFESSIONAL ENGINEER.
6. SUBSURFACE CONDITIONS SHALL BE CONFIRMED BY LICENSED MISSOURI GEOTECH ENGINEER TO VERIFY LOADING.
7. PRECAST PIERS REVIEWED ON CASE BY CASE BASIS.
8. CARRIER PIPE SHALL BE DUCTILE IRON PIPE FROM UPSTREAM MANHOLE TO DOWNSTREAM MANHOLE AT THE AERIAL CROSSING.
9. PIER FOUNDATION SUPPORT TYPE SHALL BE DETERMINED BY LICENSED MISSOURI PE BASED ON SUBGRADE CONDITIONS AND AT EACH PIER LOCATION INUNDATED IN THE 100-YEAR DESIGN STORM EVENT INCLUDE FOUNDATION ANCHOR DESIGN.
10. EACH PIER EXPOSED TO THE 100-YEAR DESIGN STORM EVENT SHALL BE PROTECTED BY APPROPRIATELY SIZED RIP RAP THAT EXTENDS A MINIMUM OF 6- FEET BEYOND THE PIER.
11. STREAM BANK SLOPES BENEATH THE AERIAL CROSSING SHALL BE PROTECTED BY APPROPRIATELY SIZED RIP RAP AND EXTEND A MINIMUM OF 6- FEET BEYOND THE CENTERLINE OF THE PIPE UPSTREAM AND DOWNSTREAM. RIP RAP SHALL NOT BE ALLOWED IN THE STREAM BED.
12. STRUCTURAL CONCRETE USED FOR AERIAL CROSSING PIERS SHALL BE MCIB MIX NUMBER A558-1-2 (4,000 PSI 28-DAY STRENGTH) UNLESS APPROVED OTHERWISE.



**NOTE:**

1. STEEL SHALL BE GRADE 40.

Drawing Not to Scale



**INDEPENDENCE**  
\* MISSOURI \*

**AERIAL CROSSING**

REVISED: \_\_\_\_\_ DATE \_\_\_\_\_

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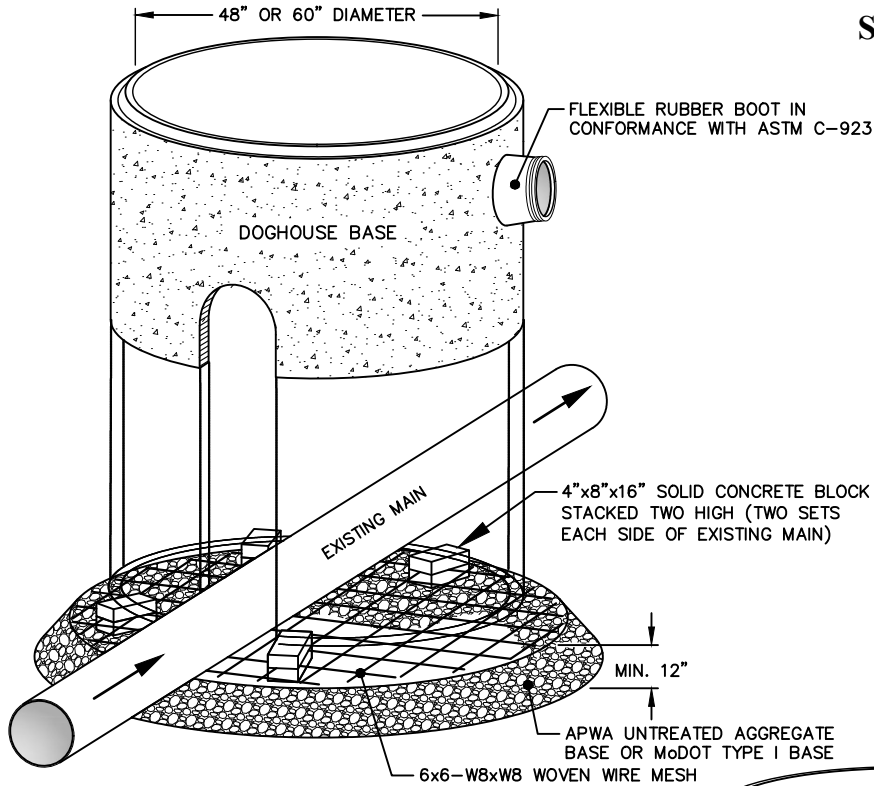
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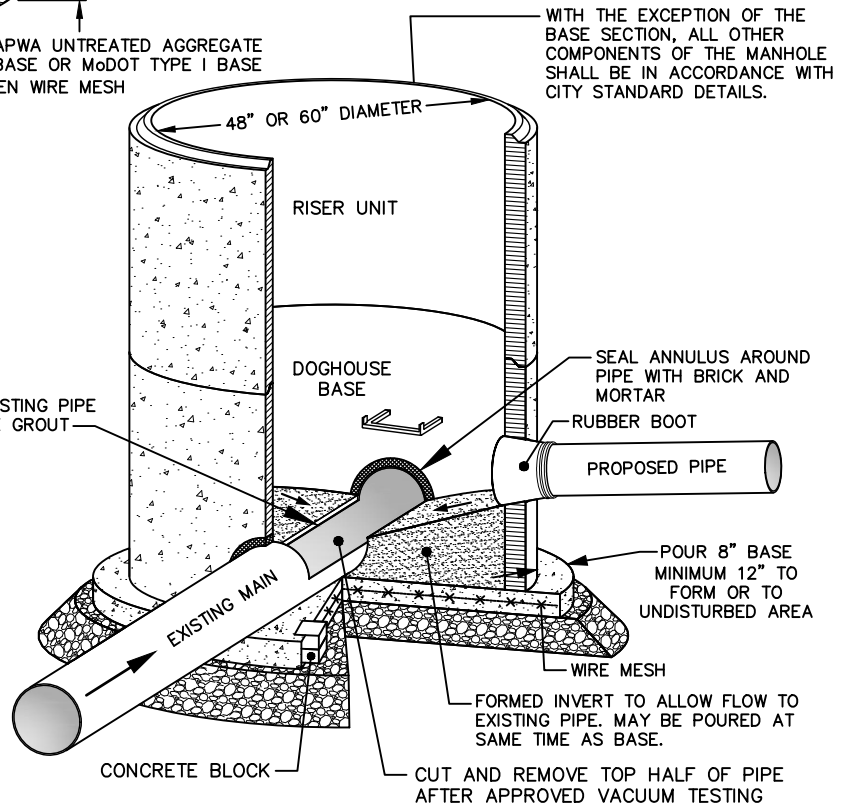
4-01

INDEPENDENCE MUNICIPAL SERVICES

STANDARD PRECAST CONCRETE DOGHOUSE MANHOLE



**BASE UNIT INSTALLMENT**



**INVERT INSTALLMENT**

Drawing Not to Scale

**NOTES:**

1. DOGHOUSE OPENINGS IN PRECAST UNITS SHALL HAVE A RADIUS OF 4 TO 8 INCHES LARGER THAN THE EXISTING PIPE DIAMETER.
2. CAST-IN-PLACE CONCRETE SHALL BE 4000 PSI, KCMMB.
3. ALL PRECAST MANHOLE COMPONENTS SHALL MEET ASTM C-478.
4. BENCH SHALL SLOPE UPWARD FROM THE SPRINGLINE TO THE PROJECTED LEVEL OF THE PIPE CROWN OR 8 INCHES ABOVE THE SPRINGLINE, WHICHEVER IS LESS.



**DOGHOUSE  
MANHOLE**

REVISED: DATE

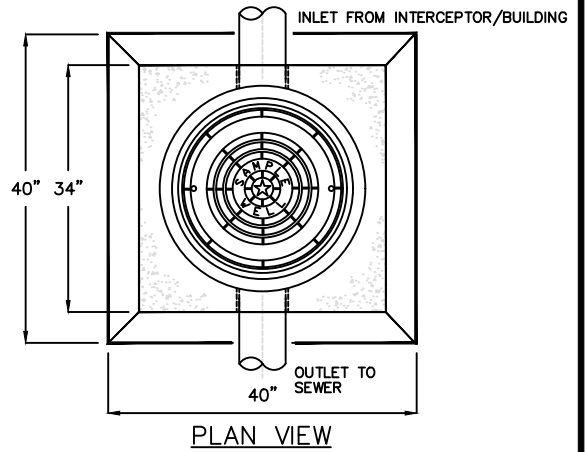
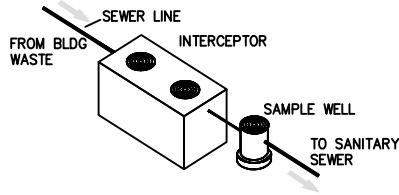
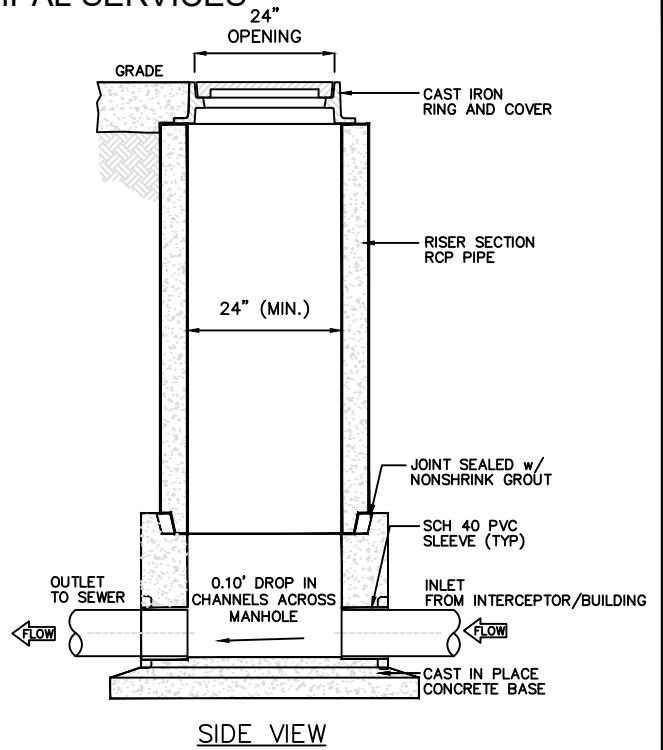
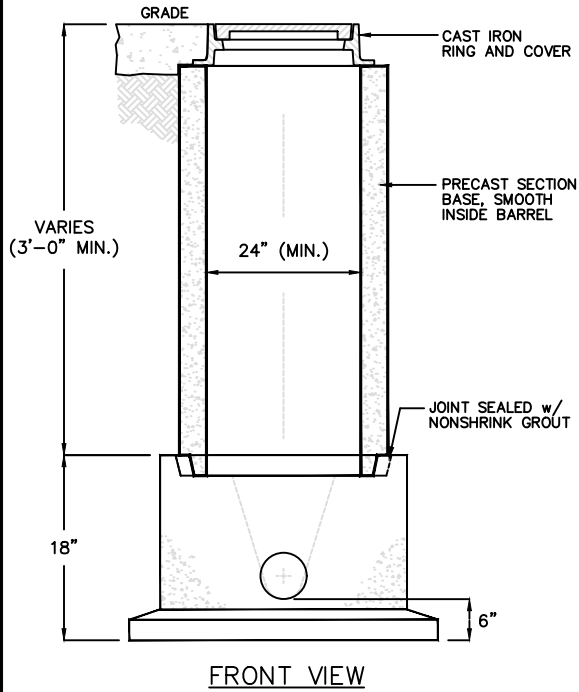
BY: INITIALS

DRAWN BY: AMV

DATE: 02/12/23

4-02

# INDEPENDENCE MUNICIPAL SERVICES



**NOTES:**

1. SAMPLING WELL MUST BE SET IN A CIRCULAR OR SQUARE CONCRETE PAD (1'-0" GREATER THAN OUTSIDE DIAMETER OF PIPE.)
2. INSIDE INSTALLATION NOT PERMITTED, WHERE OUTSIDE INSTALLATION IS POSSIBLE.
3. INSTALLATION INSIDE BLDG MUST BE POURED IN PLACE NO CONCRETE PIPE IS PERMITTED, (AIR-TIGHT COVER REQUIRED.)
4. LAWN INSTALLATION MUST BE 4" ABOVE FINISHED GRADE.
5. DRIVE & SIDEWALK INSTALLATION MUST BE BROUGHT TO FINISHED GRADE.
6. TO BE INSTALLED ON PRIVATE PROPERTY, IN AN ACCESSIBLE LOCATION TO CITY PERSONNEL.
7. WHEN MORE THAN ONE PRECAST SECTION IS USED, INSTALL SEAL AT JOINTS.
8. INSTALL SEAL UNDER COVER RING ENTIRELY AROUND MANHOLE.

**SPECIFICATIONS:**

- CONCRETE:** Class 1/II concrete with of design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth.
- C.I. CASTINGS:** Cast iron rings and grates are manufactured of grey cast iron conforming to ASTM A48 Class 30, Heavy-Duty AASHTO H20/HL93

Drawing Not to Scale



## GREASE SAMPLING WELL

REVISED: DATE

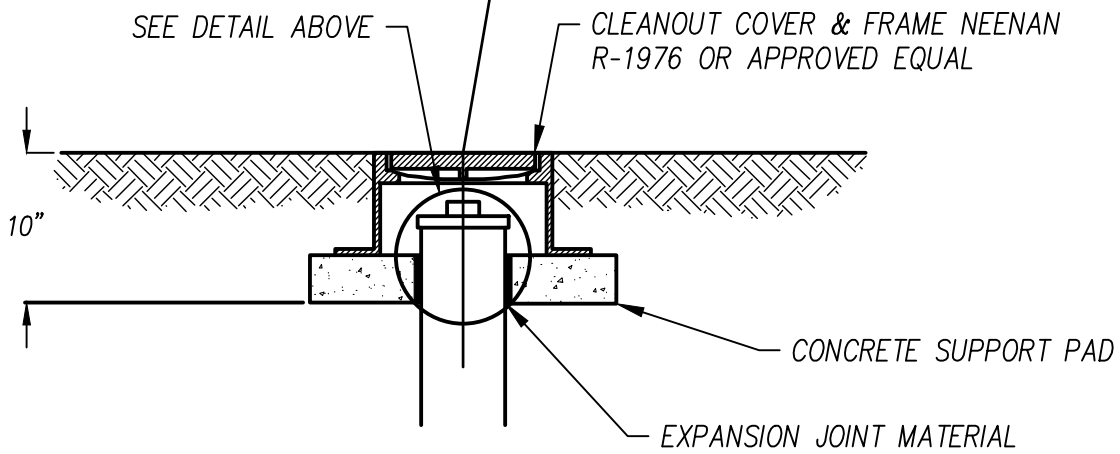
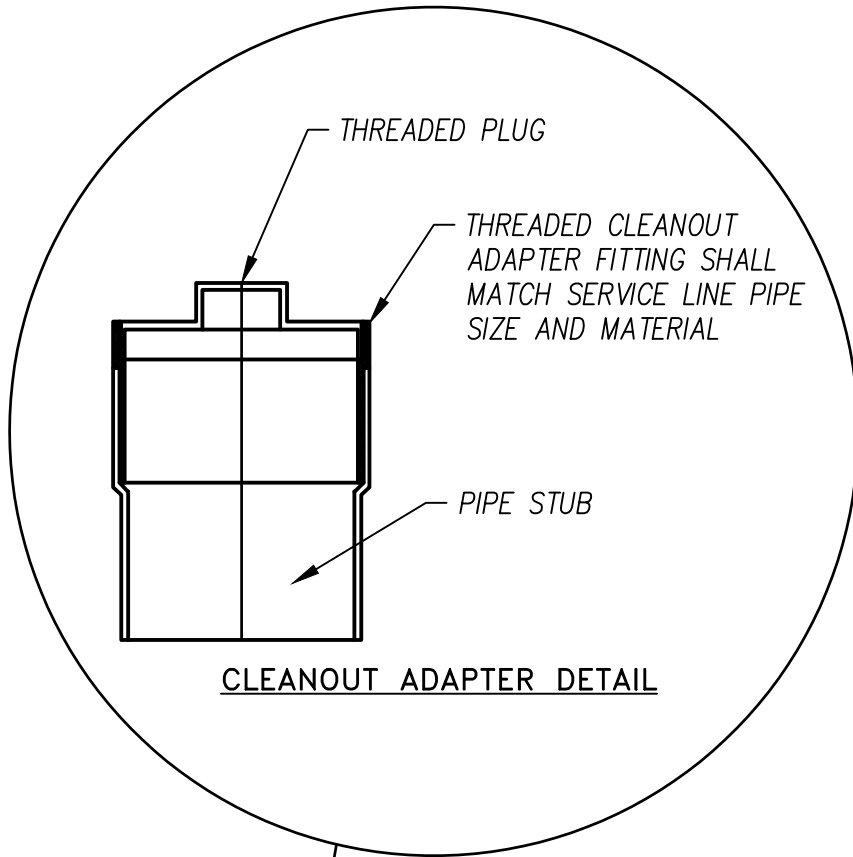
BY: INITIALS

DRAWN BY: AMV

DATE: 03/8/23

4-03

INDEPENDENCE MUNICIPAL SERVICES



Drawing Not to Scale



LAMPHOLE CLEANOUT -  
RING & COVER DETAIL

REVISED: DATE

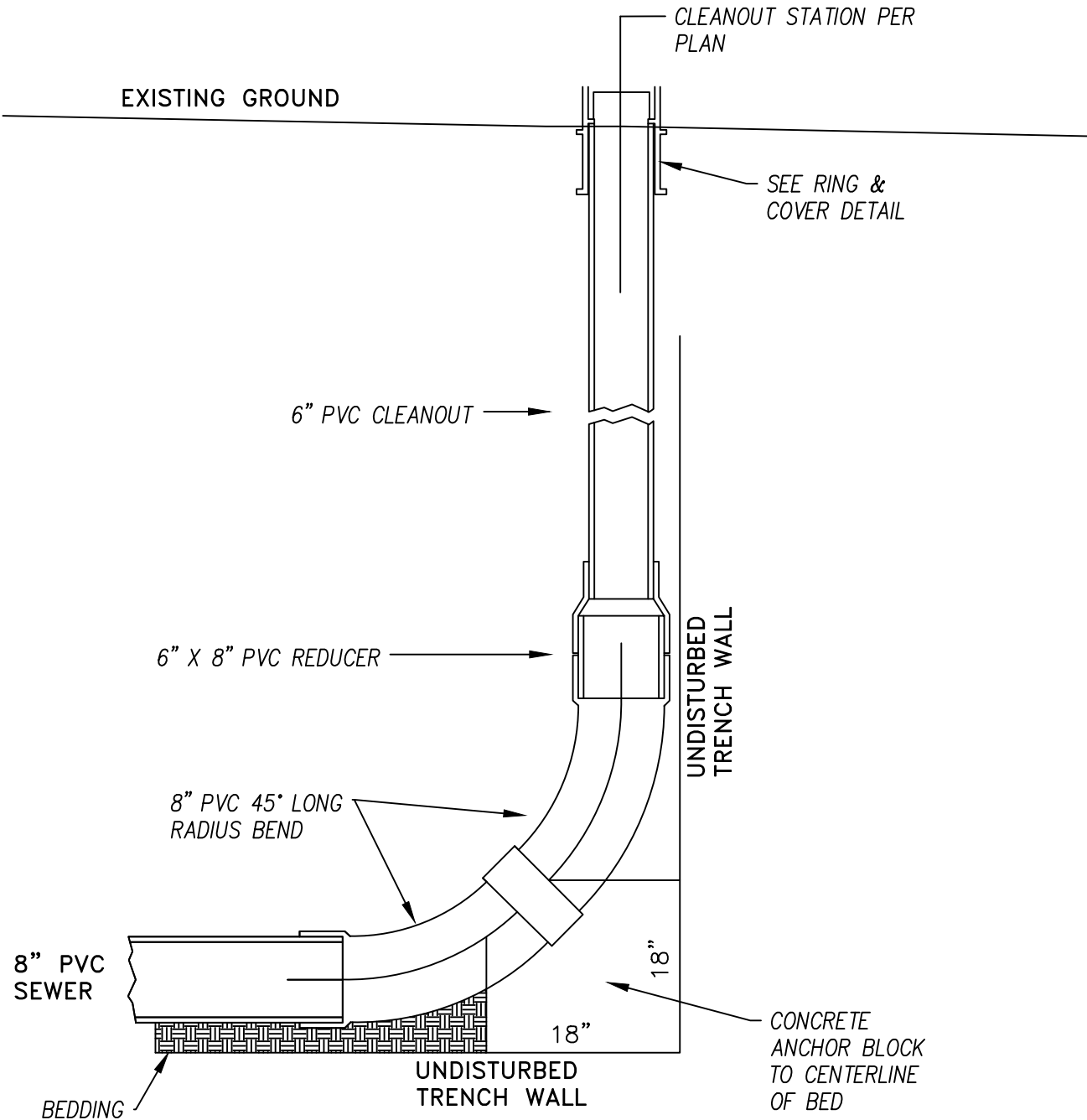
BY: INITIALS

DRAWN BY: INITIALS

DATE: DATE

4-04

INDEPENDENCE MUNICIPAL SERVICES



Drawing Not to Scale



INDEPENDENCE  
\* MISSOURI \*

LAMPHOLE  
DETAIL

REVISED: 06/09/2022

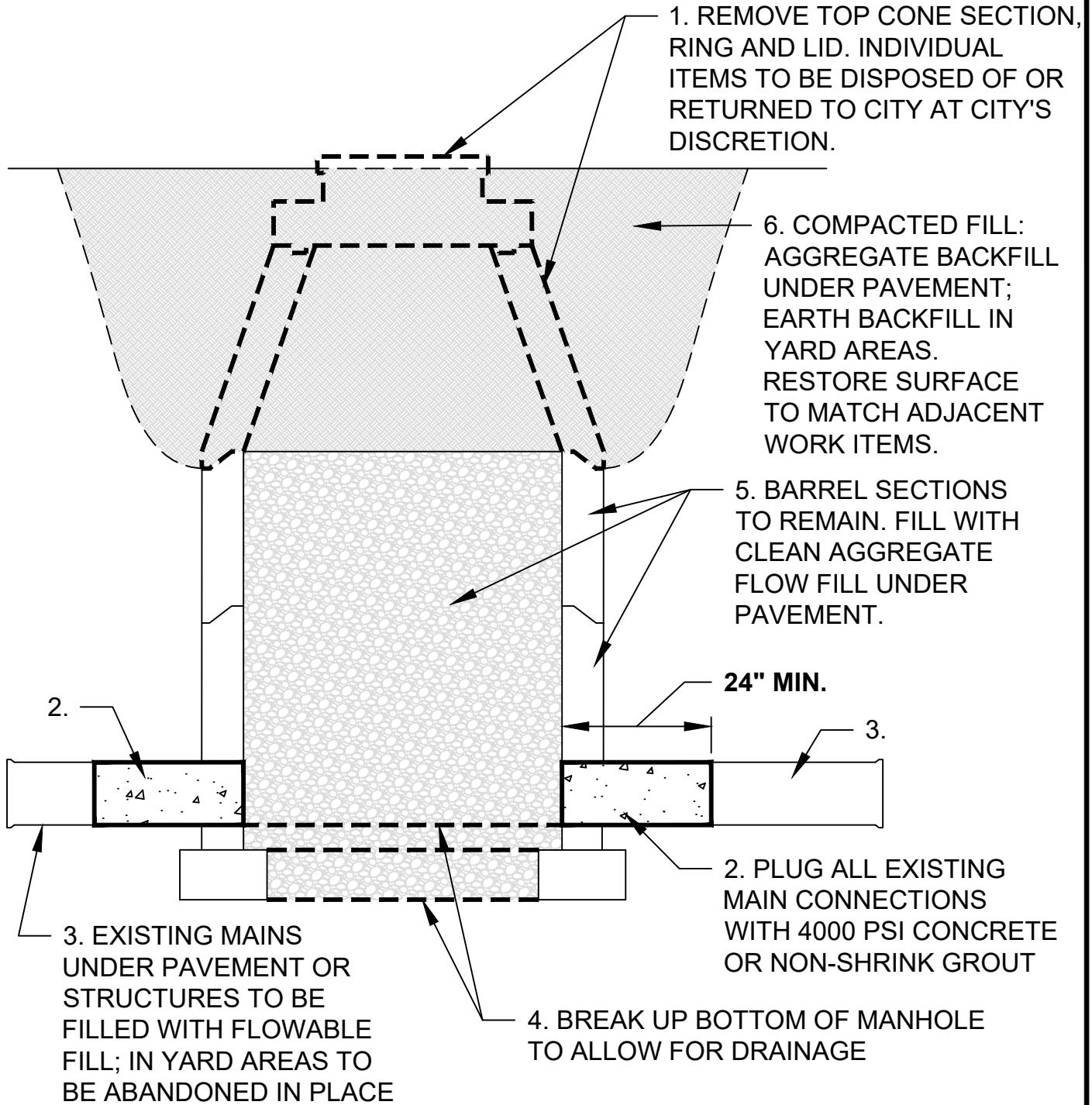
BY: AEJ

DRAWN BY: AEJ

DATE: 06/09/2022

4-05

INDEPENDENCE MUNICIPAL SERVICES



**MANHOLE AND PIPE ABANDONMENT**

Drawing Not to Scale



MANHOLE AND  
PIPE ABANDONMENT

REVISED: DATE

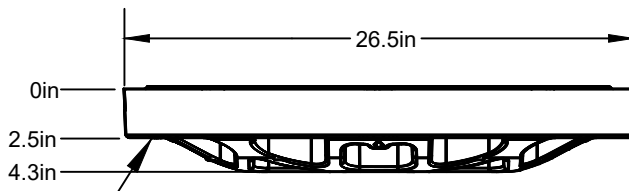
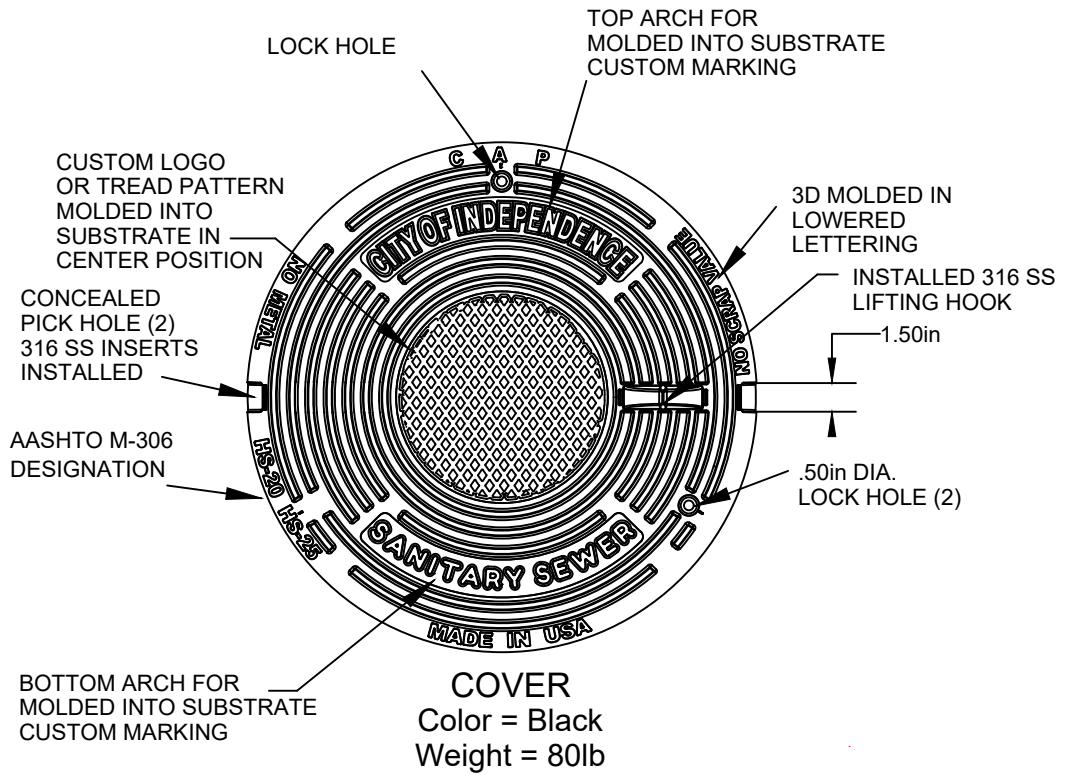
BY: INITIALS

DRAWN BY: AMV

DATE: 02/15/23

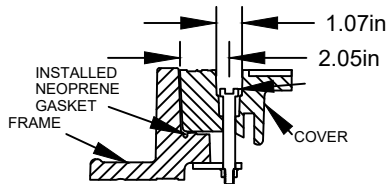
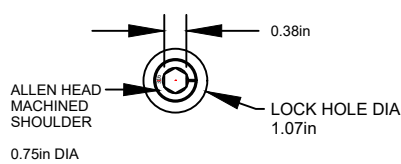
4-06

# INDEPENDENCE MUNICIPAL SERVICES



DATE OF MANUFACTURE (MM/DD/YY FORMAT)

## COVER SIDE



Drawing Not to Scale

**NOTE:**  
PADDLE LOCK MANHOLES ARE ONLY TO BE INSTALLED WITHIN GRASSY (NON-VEHICULAR) AREAS.



**PADDLE LOCK  
MANHOLE 1 of 2**

REVISED: DATE

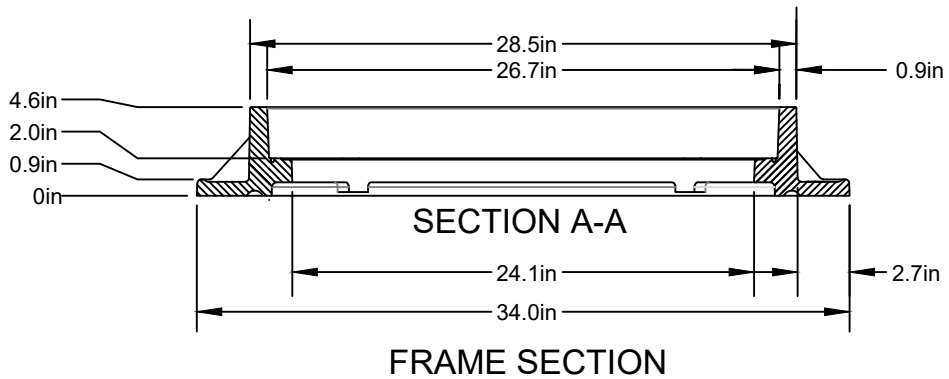
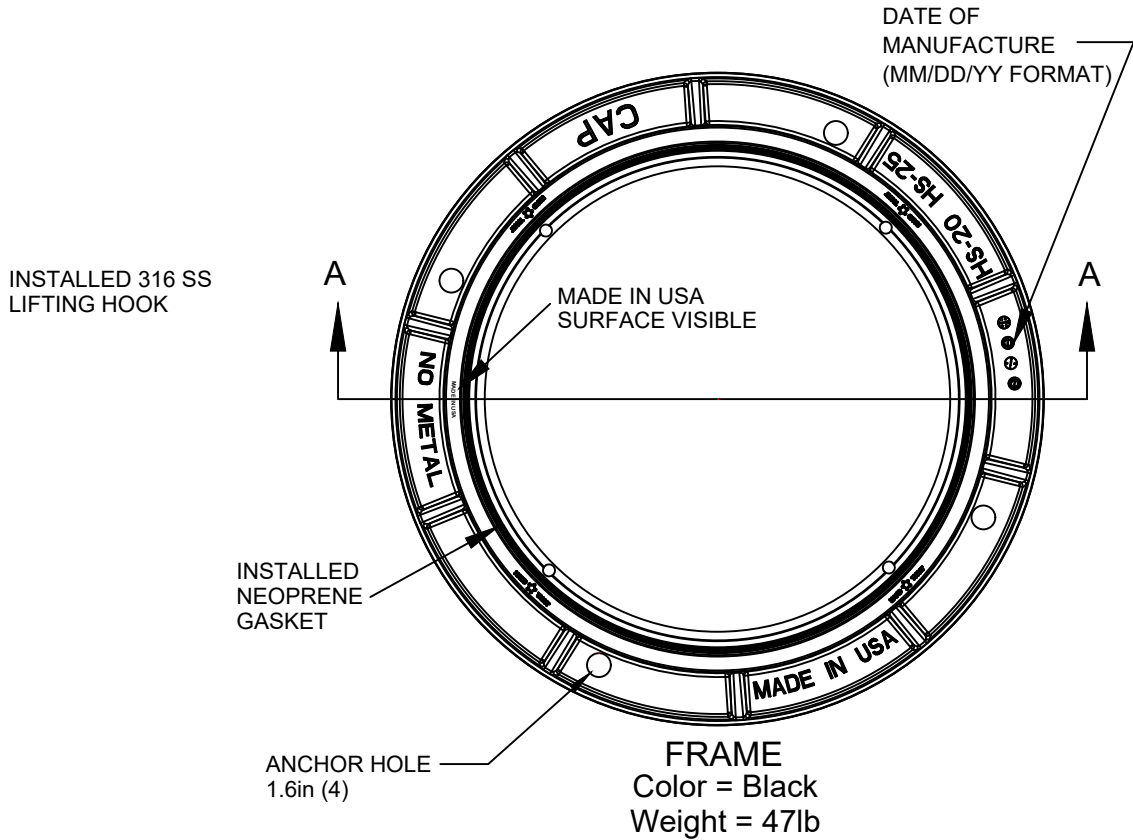
BY: INITIALS

DRAWN BY: AMV

DATE: 03/01/23

4-07

INDEPENDENCE MUNICIPAL SERVICES



Drawing Not to Scale

NOTE:  
PADDLE LOCK MANHOLES ARE ONLY TO BE INSTALLED WITHIN GRASSY (NON-VEHICULAR) AREAS.



PADDLE LOCK  
MANHOLE 2 of 2

REVISED: DATE

BY: INITIALS

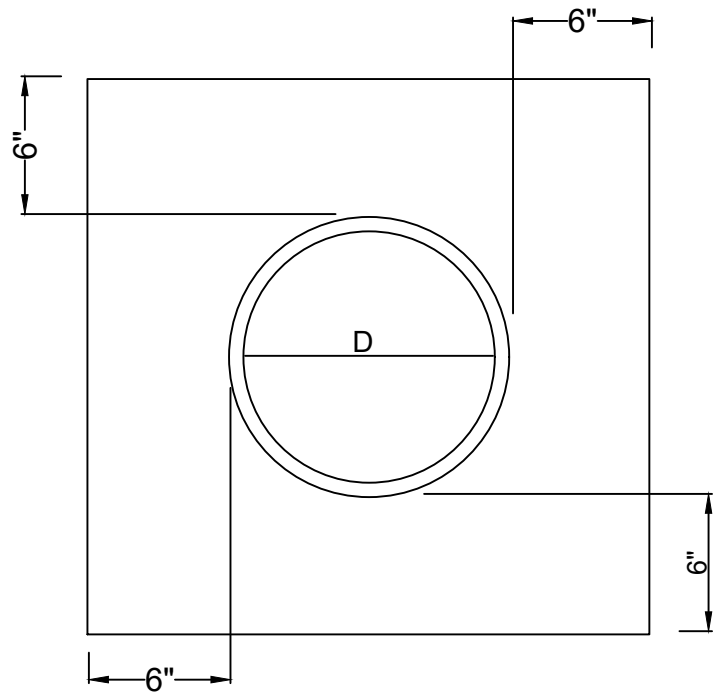
DRAWN BY: AMV

DATE: 03/01/23

4-08

# INDEPENDENCE MUNICIPAL SERVICES

PIPE SIZE	CU YD/FT
8"	.099
10"	.115
12"	.132
15"	.159
18"	.187
21"	.218
24"	.249
30"	.314
36"	.380
42"	.495
48"	.581
54"	.673
60"	.768

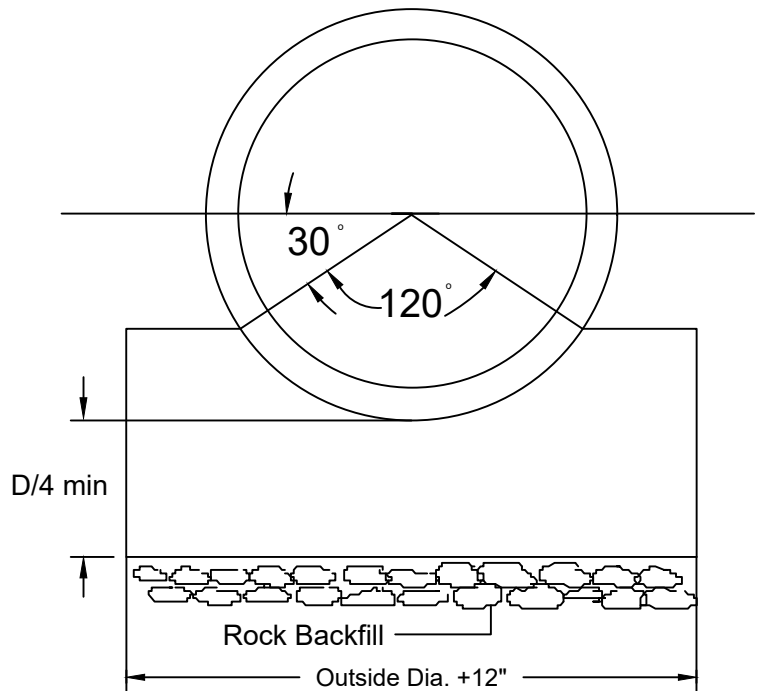


PIPE ENCASEMENT

**Notes:**

1. Concrete Mix shall meet 4,000 PSI.
2. Top of Encasement shall be Horizontal and at Right Angles with Flowline of Pipe.

PIPE SIZE	CU YD/FT
8"	.053
10"	.056
12"	.065
15"	.079
18"	.094
21"	.107
24"	.120
27"	.137
30"	.151
36"	.185
42"	.234
48"	.271
54"	.314
60"	.321



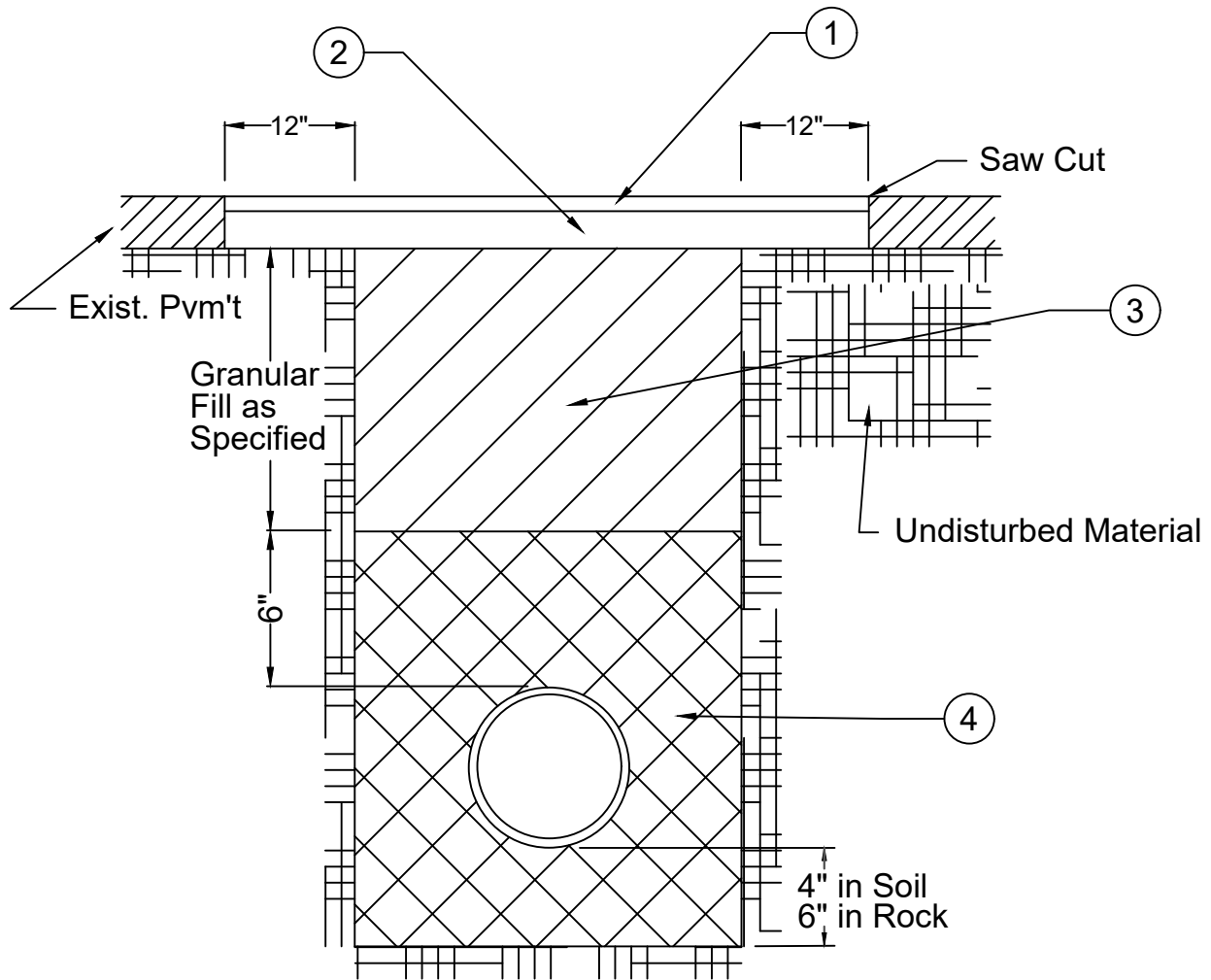
PIPE CRADLE

Drawing Not to Scale



PIPE ENCASEMENT AND  
PIPE CRADLE

INDEPENDENCE MUNICIPAL SERVICES



1. Two (2) inch Asphaltic Concrete Surface. *See Chapter 20 for Material Requirements.*
2. Eight (8) inch minimum 4KCMMB 4K or six (6) inch minimum Asphaltic Concrete Base (for large area patching only) if approved by the Director of Municipal Services; Four (4) inch Asphaltic Concrete Base will be permitted in residential asphalt driveway approaches.
3. Backfill Material shall meet Specifications for APWA Untreated Aggregate Base or MoDOT Type I Base.
4. Bedding Material shall meet the following gradation:
 

100% Passing	3/8" Sieve
30-40% Passing	#4 Sieve
0-4% Passing	#10 Sieve

Note:

The twelve (12) inch overcut will not be required for cuts not exceeding eight (8) inches in width.

Drawing Not to Scale



**INDEPENDENCE**  
\* MISSOURI \*

STREET CUT DETAIL

REVISED: 02/22/2022

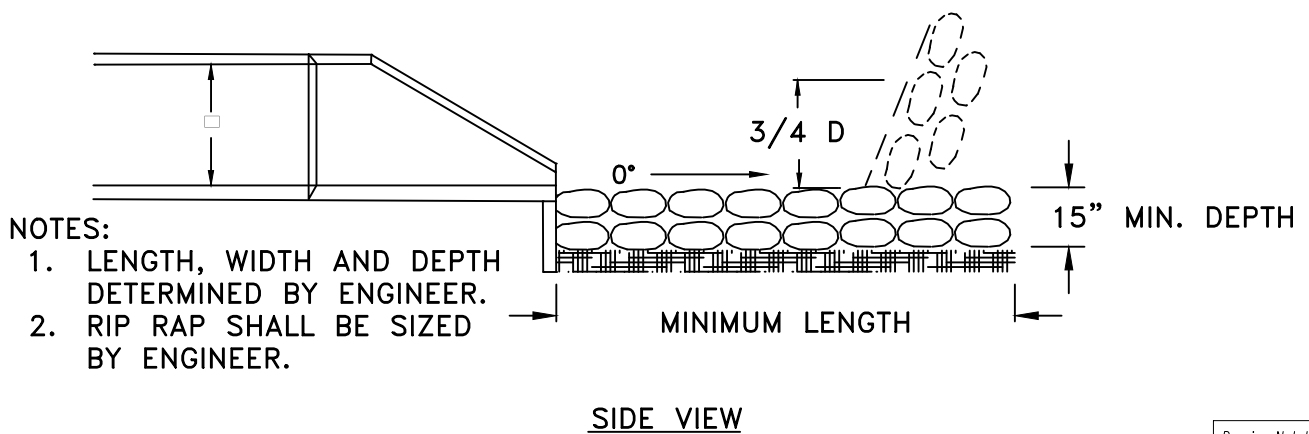
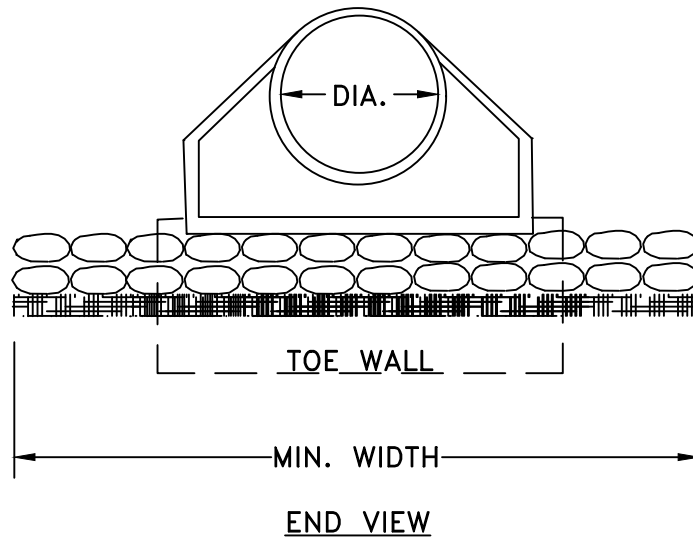
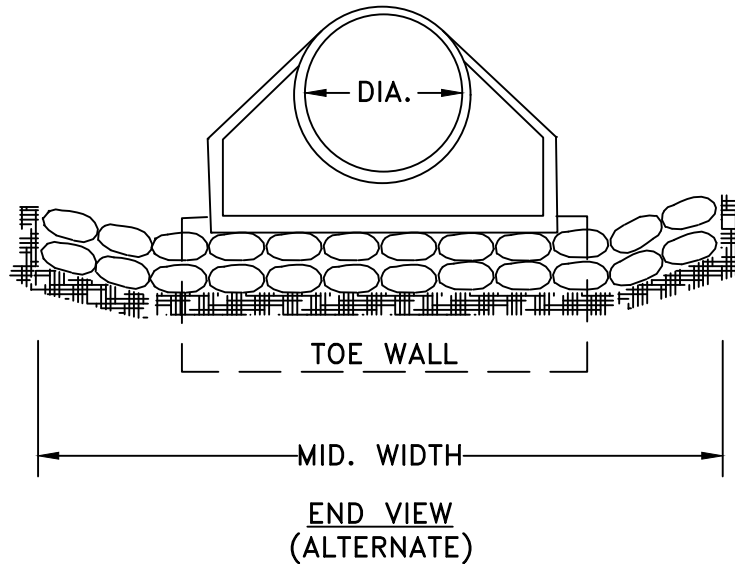
BY: AEJ

DRAWN BY: AEJ

DATE: 02/22/2022

4-10

INDEPENDENCE MUNICIPAL SERVICES



Drawing Not to Scale



RIP RAP AT PIPE OUTLETS  
- DETAIL

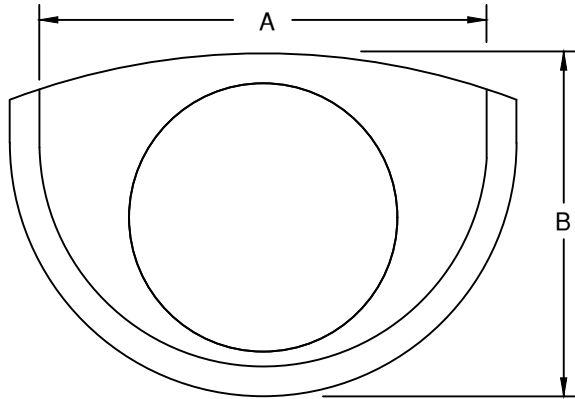
REVISED: 05-05-2022

BY: AEJ

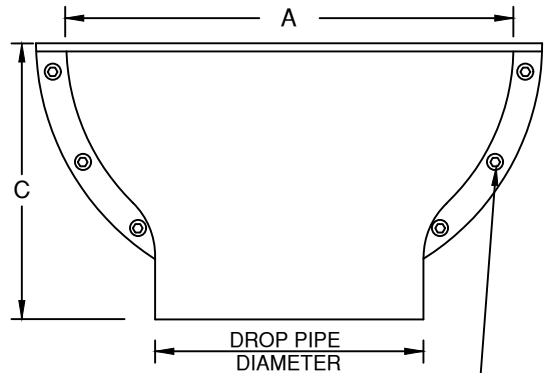
DRAWN BY: AEJ

DATE: 05-05-2022

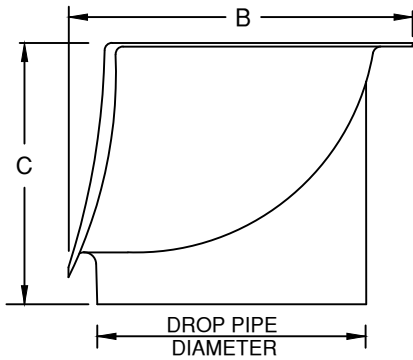
# INDEPENDENCE MUNICIPAL SERVICES



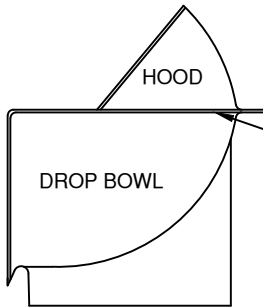
**DROP BOWL TOP VIEW**



**DROP BOWL FRONT VIEW**



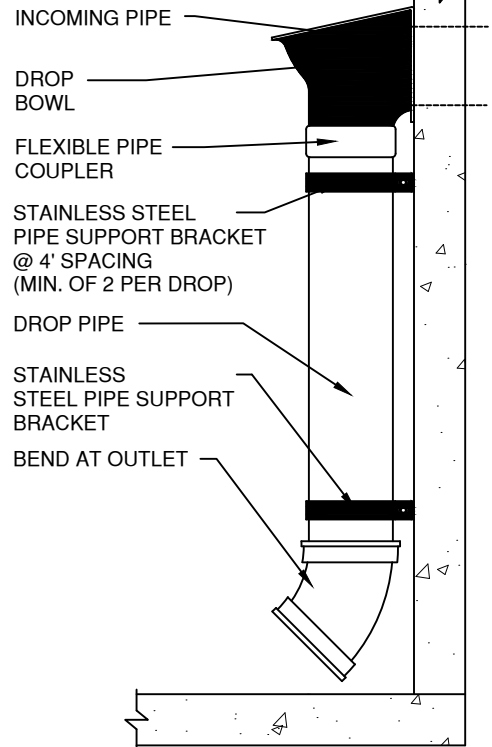
**DROP BOWL SIDE VIEW**



**OPTIONAL FORCE LINE HOOD**

DROP BOWL MOUNTS TO WALL WITH STAINLESS STEEL ANCHOR BOLT ASSEMBLIES

HOOD BOLTS TO DROP BOWL WITH INCLUDED STAINLESS STEEL BOLTS



**TYPICAL INSTALLATION**

### DROP BOWL SELECTION CHART

DROP PIPE DIAMETER	MANHOLE DIAMETER					
	FLAT WALL	4' DIA	5' DIA	6' DIA	7-8' DIA	9-12' DIA
4"	A4FDB	A4DB	A4DB	A4R96	A4R96	
6"	A6FDB	A6DB	A6DB	A6R96	A6R96	
8"	B8FDB	B8DB	B8DB	B8DBR84	B8DBR84	B8R144
10"	B10FDB	B10DB	B10DB	B10R96	B10R96	B10R144
12"	24/12FDB	24/12R60	24/12R60	24/12R60	24/12R96	24/12R144
15"	24/15FDB	24/15R60	24/15R60	24/15R60	24/15R96	24/15R144
18"	30/18FDB		30/18R60	30/18R60	30/18R96	30/18R144
21"	36/21FDB		36/21R60			36/21R144
24"	48/24FDB			48/24R72	48/24R96	48/24R144

### DROP BOWL DIMENSIONS

SERIES	DROP PIPE DIAMETER			ANCHOR BOLT QUANTITY & TYPE
	WIDTH "A"	DEPTH "B"	HEIGHT "C"	
A4	4"	12"	9.5"	4 - 1" TAMP-IN
A6	6"	12"	11.1"	4 - 1" TAMP-IN
B8	8"	18"	13.0"	4 - 1" TAMP-IN
B10	10"	18"	13.5"	4 - 1" TAMP-IN
24/12	12"	24"	16.5"	6 - 1" TAMP-IN
24/15	15"	24"	19.3"	6 - 1" TAMP-IN
30/18	18"	30"	23.5"	6 - 1" TAMP-IN
36/21	21"	36"	31.6"	8 - 3" WEDGE
48/24	24"	48"	30.5"	10 - 3" WEDGE

*Drawing Not to Scale*

INSIDE DROP BOWLS FABRICATED IN MARINE GRADE FIBERGLASS AND FINISHED IN GEL COAT.

USE STAINLESS STEEL PIPE BRACKETS TO SUPPORT DROP PIPE. EXTERNAL PIPE COUPLER REQUIRED. PROVIDE SWEEP AT DROP PIPE OUTLET.



**SANITARY SEWER  
INSIDE DROP BOWL**

REVISED: DATE

BY: INITIALS

DRAWN BY: AMV

DATE: 03/8/23

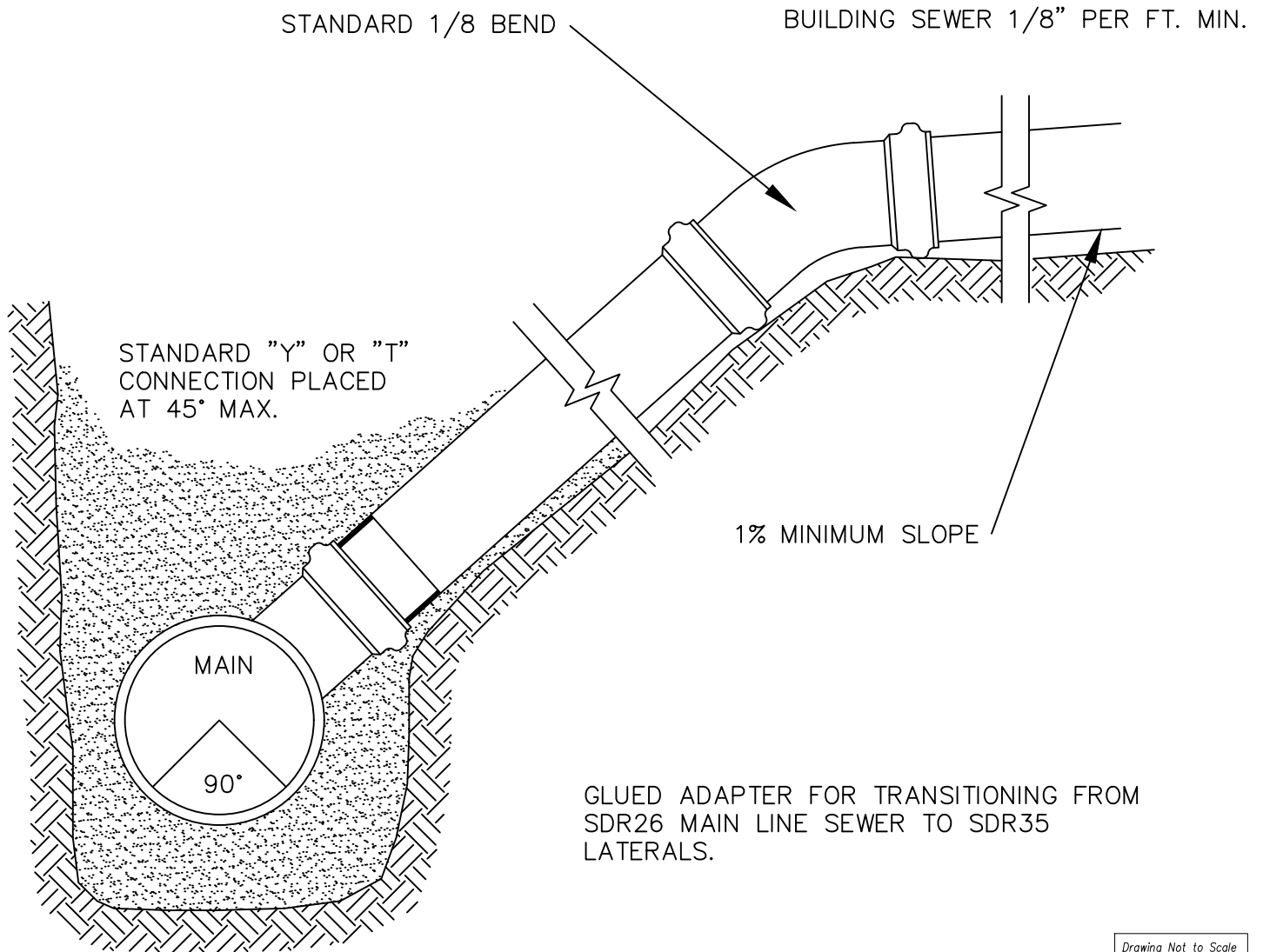
# INDEPENDENCE MUNICIPAL SERVICES

## NOTE:

MOULDED TEES ARE REQUIRED FOR ALL LATERALS ON NEW SEWER LINES. ALL LATERALS SHALL BE SDR35 PVC AND JOINTS SHALL BE GLUED WITH AN APPROVED ADHESIVE.

WYES SHALL BE PLACED TO SERVE EVERY BUILDING WITH LATERAL AT THE LOWER 1/3 OF THE PROPERTY.

NO TEES, WYES, OR SADDLES FOR LATERALS GREATER THAN 21 INCHES.



**INDEPENDENCE**  
\* MISSOURI \*

SANITARY SEWER  
LATERAL

REVISED: DATE

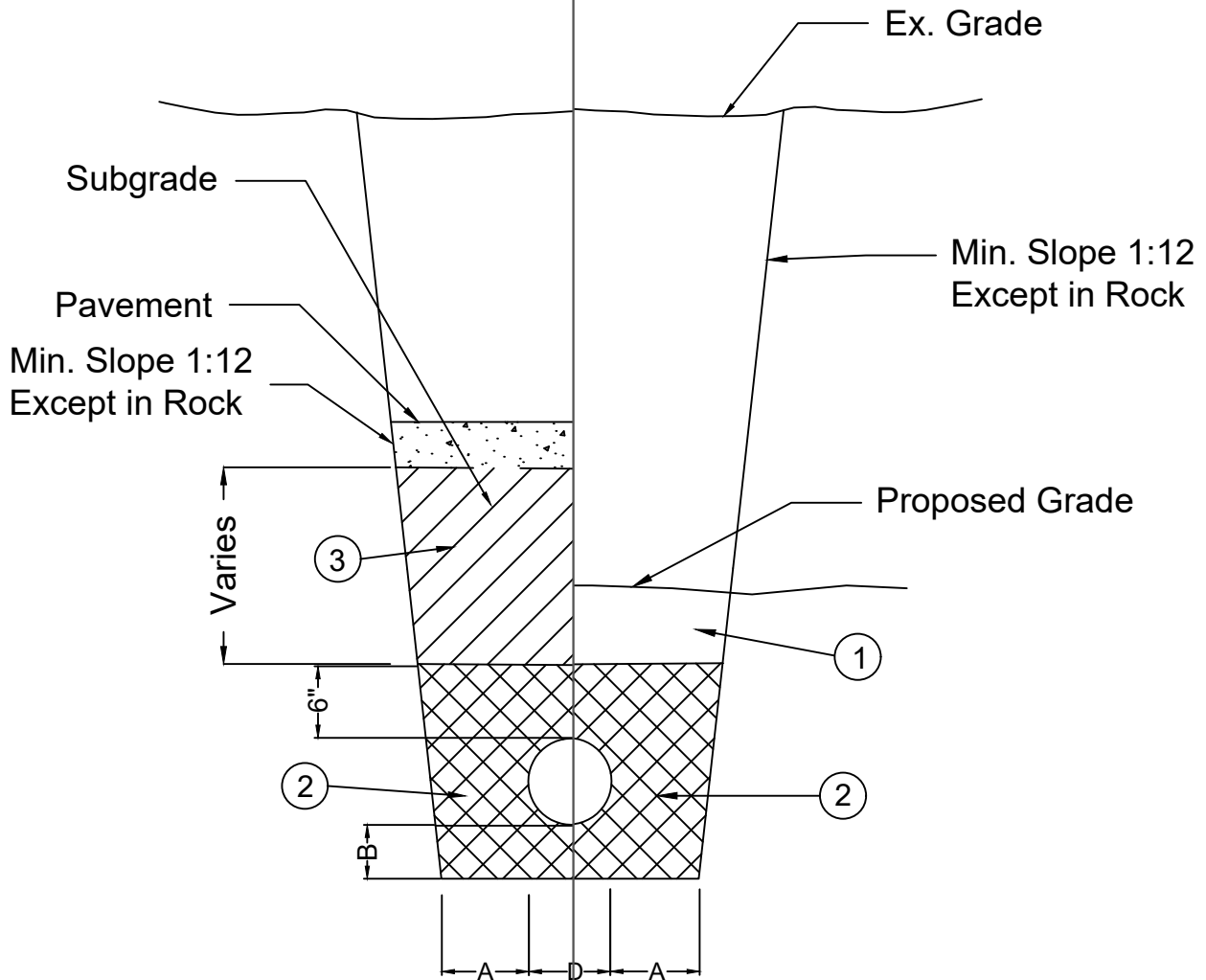
BY: AEJ

DRAWN BY: AEJ

DATE: DATE

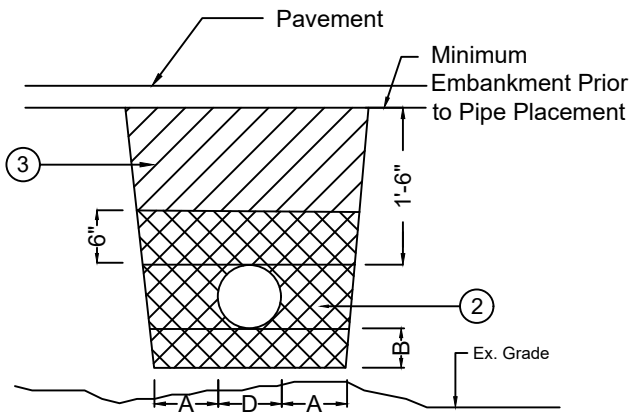
4-13

INDEPENDENCE MUNICIPAL SERVICES



Cut Detail - Under Pavement

Cut Detail - Outside of Pavement



Notes:

- ① Backfill Material shall be Earth Fill Compacted to 90% of Maximum Density in areas not under driving surfaces.
- ② Bedding Material shall meet the following Gradation:
 

100% Passing	-	3/8" Sieve
30% - 40% Passing	-	#4 Sieve
0% - 4% Passing	-	#10 Sieve
- ③ Backfill Material shall meet Specifications for A.P.W.A. Untreated Aggregate Base or MoDOT Type I Base.
- ④ Fill Detail:
  - A = The Larger of 9" or .6d
  - B = 4" in Soil - 6" in Rock
  - D = Diameter of Pipe

Drawing Not to Scale

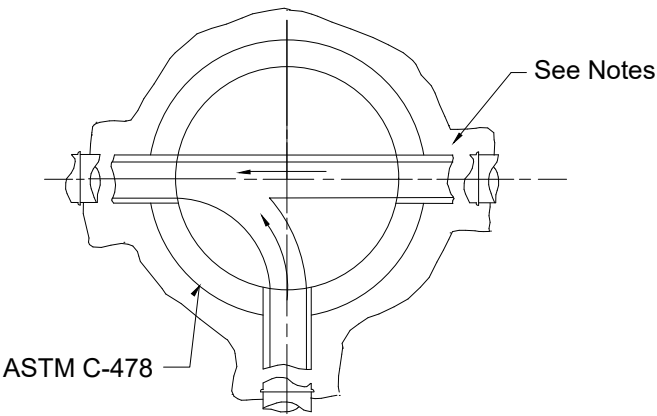
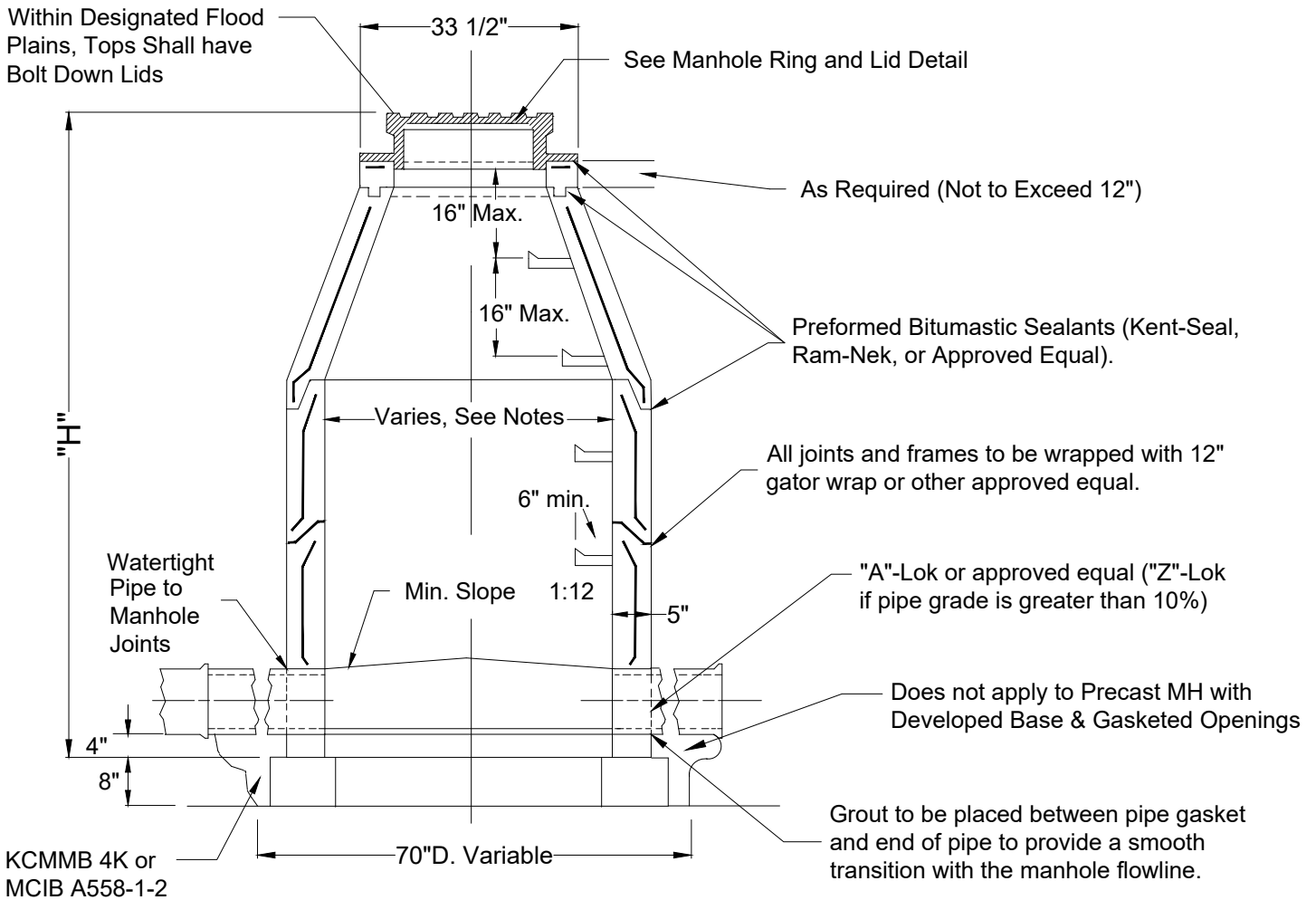


INDEPENDENCE  
\* MISSOURI \*

Sewer Pipe Trench Detail  
- Cut



# INDEPENDENCE MUNICIPAL SERVICES



## NOTES:

1. All Manholes Shall be Vacuum Tested.
2. A minimum of 0.20' Drop Required Between Inverts.
3. Sizing Requirements:
  - a. 48" MH for 8" to 21" Pipe.
  - b. 60" MH for 24" to 30" Pipe.
  - c. 72" MH for 36" to 42" Pipe.

Drawing Not to Scale



**STANDARD  
MANHOLE**

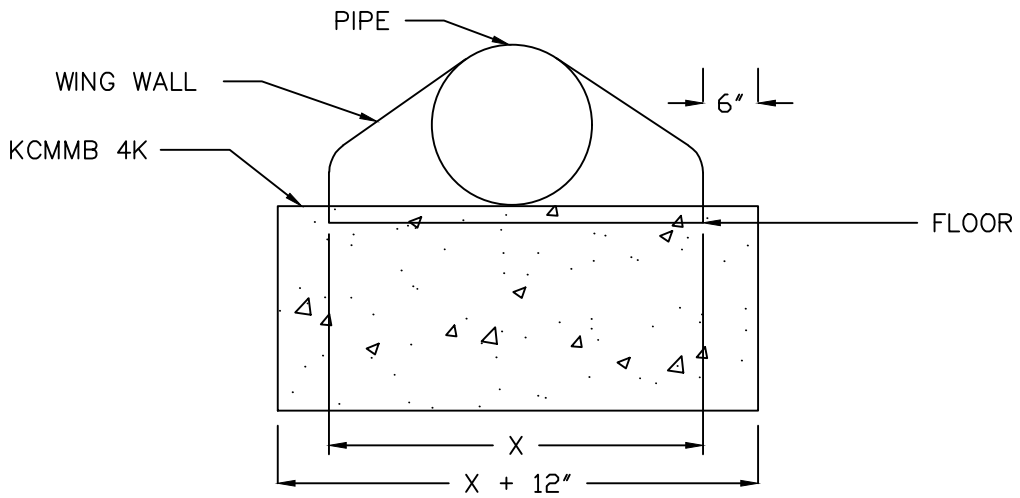
REVISED: 02/22/2022

BY: AEJ

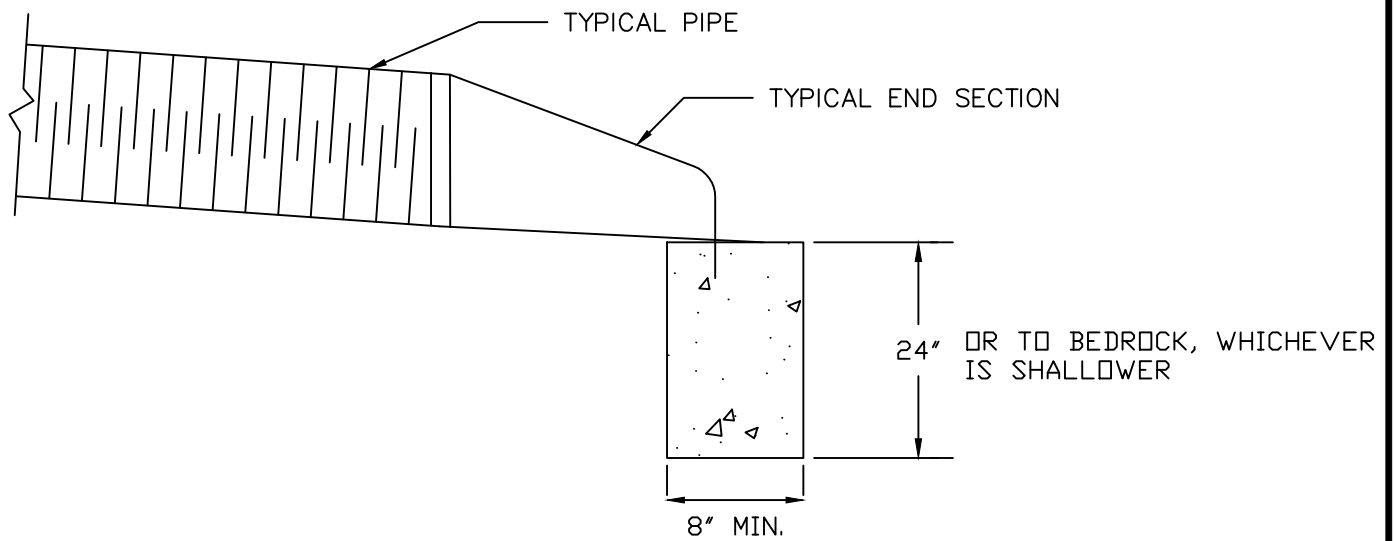
DRAWN BY: AEJ

DATE: 02/22/2022

INDEPENDENCE MUNICIPAL SERVICES



END VIEW



PLAN VIEW

Drawing Not to Scale



INDEPENDENCE  
\* MISSOURI \*

TOE WALL -  
DETAIL

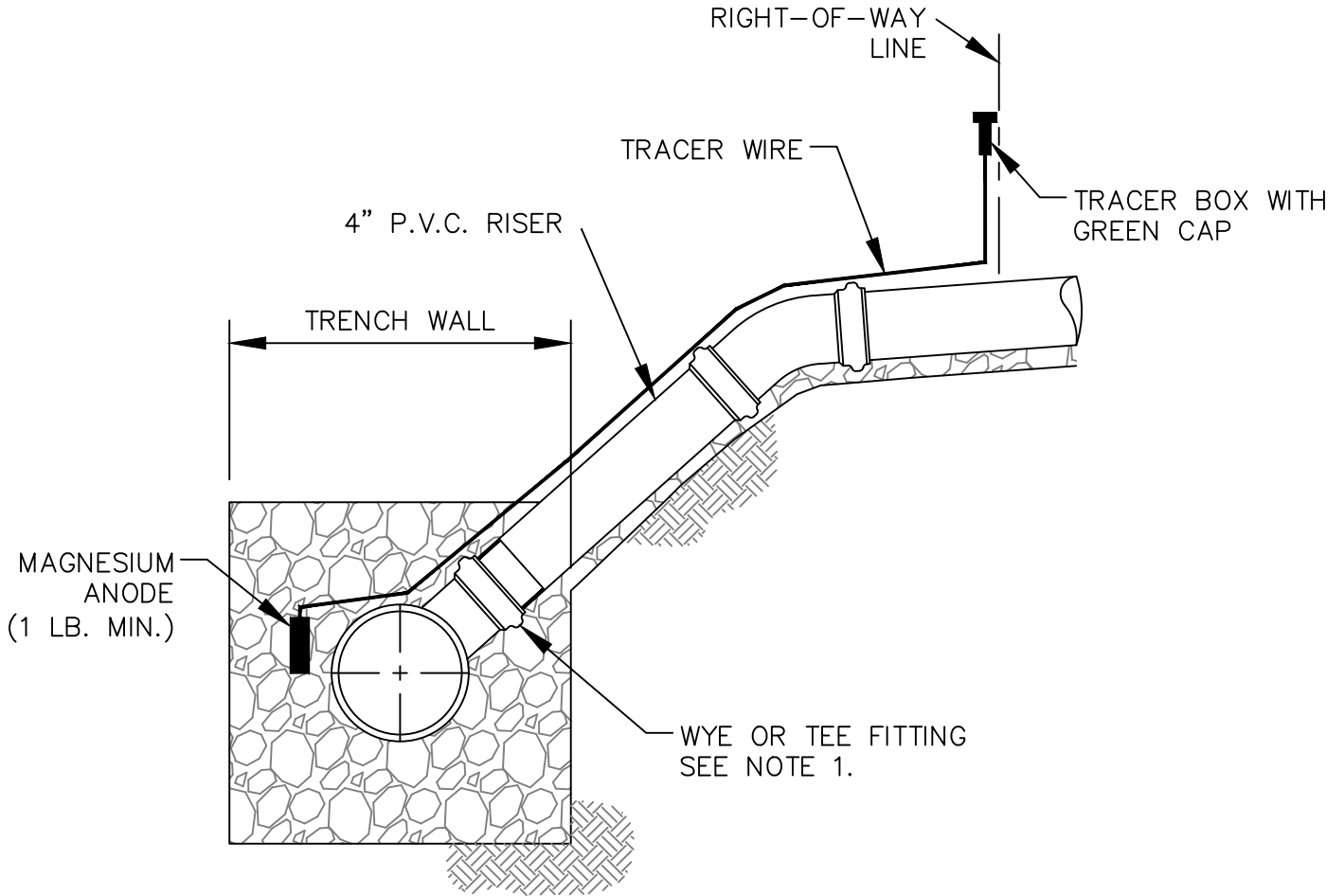
REVISED: 05/05/2022

BY: AEJ

DRAWN BY: AEJ

DATE: 05/05/2022

# INDEPENDENCE MUNICIPAL SERVICES



**NOTES:**

1. ALL NEW CONSTRUCTION OF SEWER STUBS AND TRACER BOXES SHALL BE TEMPORARILY MARKED WITH A MARKING STAKE, 48" ABOVE GRADE AND PAINTED GREEN.
2. TRACER WIRE IS REQUIRED ON ALL SANITARY SERVICE LINES FROM THE SEWER MAIN TO THE RIGHT-OF-WAY LINE. TRACER WIRE SHALL BE COPPERHEAD REINFORCED TRACER WIRE, #12 AWG, WITH APWA GREEN COLORED INSULATION OR APPROVED EQUAL. TRACER WIRE CAN BE SPLICED USING COPPERHEAD SNAKEBITE TWIST LOCK LSC CONNECTORS. TRACER WIRE SHALL BE TAPED TO THE TOP OF THE SEWER SERVICE STUB WITH PLASTIC TAPE EVERY 5'.
3. COPPERHEAD SNAKEBITE TRACER BOXES SHALL BE USED OR APPROVED EQUAL. TRACER BOX SHALL BE COLOR CODED APWA GREEN. TRACER BOX SHALL BE FLUSH WITH FINISH GRADE, DIRECTLY OVER THE SANITARY SEWER STUB AT THE RIGHT-OF-WAY LINE.

Drawing Not to Scale



**INDEPENDENCE**  
\* MISSOURI \*

TRACER WIRE FOR  
SEWER SERVICE  
CONNECTION

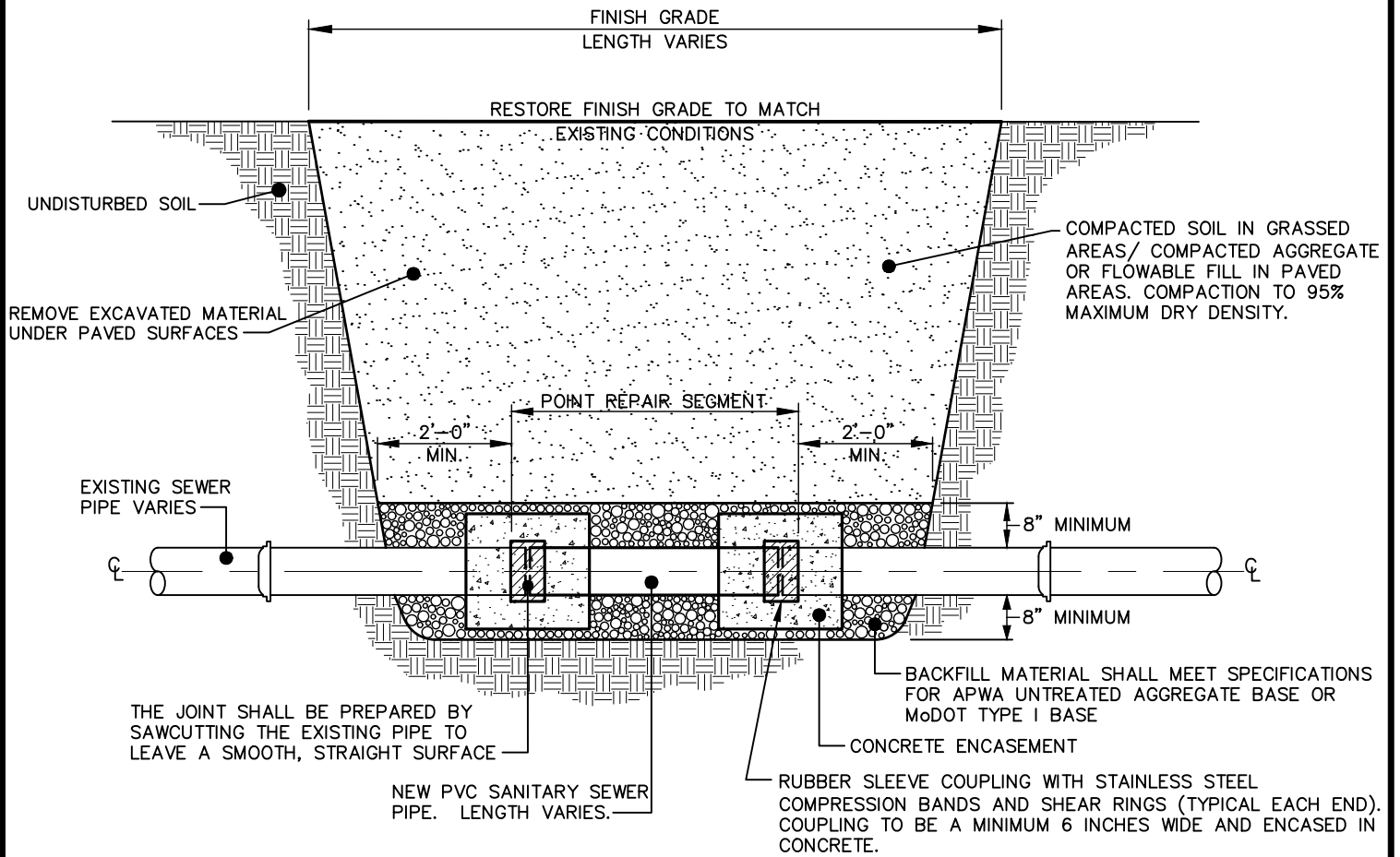
REVISED: DATE

BY: INITIALS

DRAWN BY: AMV

DATE: 03/10/2023

# INDEPENDENCE MUNICIPAL SERVICES



**SECTION VIEW**

Drawing Not to Scale



## TYPICAL SEWER POINT REPAIR

REVISED: DATE

BY: INITIALS

DRAWN BY: AMV

DATE: 02/27/2023