August 1, 2023

East Helena Engineering Standards

prepared by
Robert Peccia & Associates
3147 Saddle Drive, Helena, MT

prepared for
City of East Helena
East Helena, MT

CITY OF EAST HELENA ENGINEERING STANDARDS

TABLE OF CONTENTS

ACRONYMS **4**

CHAPTER 1: GENERAL PROVISIONS **6**

1.1 Jurisdiction 6
1.2 Standards 6
1.3 Approved "Or Equal" Items 6
1.4 City Fees 6
1.5 Guarantee for Equipment, Materials, and Workmanship 6
1.6 Interim Use 6
1.7 Final Acceptance 7

CHAPTER 2: WATER SYSTEMS **9**

2.1 Design Requirements 9
2.2 Design Report 9
2.3 Water Service Area 9
2.4 Offsets 9
2.5 Water Mains 9
2.6 Valves 10
2.7 Valve Boxes 11
2.8 Fire Hydrants 11
2.9 Water Service 11
2.10 Tapping City Water 13
2.11 Pipe Bedding 13
2.12 Warning Tape 13
2.13 Tracer Wire 14
2.14 Marker Posts 14
2.15 Sanitary Connections 14
2.16 Couplings 14
2.17 Irrigation 14

CHAPTER 3: SANITARY SEWER SYSTEMS **17**

3.1 Design Requirements 17
3.2 Design Report 17
3.3 Wastewater Service Area 17
3.4 Sanitary Sewer Main 17
3.5 Manholes 18
3.6 Sanitary Sewer Main Materials 18
3.7 Installation 18
3.8 Water Line Crossings 19
3.9 Sanitary Sewer Service Lines 19
3.10 Non-Sanitary Connections to Sanitary Sewer Main 20
3.11 Tapping 20
3.12 Metering When Not on City Water 20

CHAPTER 4: LIFT STATIONS **22**

4.1 Design Requirements 22
4.2 Design Report 22
4.3 Construction Standards 22

CHAPTER 5: STORM DRAINAGE SYSTEMS 27

5.1 DESIGN REQUIREMENTS 27
5.2 CONSTRUCTION STANDARDS 27

CHAPTER 6: TRANSPORTATION SYSTEMS 30

6.1 DESIGN REQUIREMENTS 30
6.2 CONSTRUCTION STANDARDS 32

CHAPTER 7: HAULED WASTEWATER DISPOSALS (INCLUDING RV DUMP STATIONS) 35

7.1 PURPOSE 35
7.2 DEFINITIONS 35
7.3 ACCEPTABLE WASTEWATER DISPOSAL 35
7.4 PROHIBITED WASTEWATER DISPOSAL 35
7.5 PERMITTING 36
7.6 DISCHARGE REQUIREMENTS 36
7.7 FEES 36

CHAPTER 8: DRY UTILITES 38

8.1 CONSTRUCTION STANDARDS 38

STANDARD DRAWINGS

NEW WATER SERVICE ..... FIGURE 01
FIRE HYDRANT INSTALLATION ..... FIGURE 02
WATER MAIN VERICAL ADJUSTMENT ..... FIGURE 03
WATER SERVICE ENTRANCE ..... FIGURE 04
WATER SERVICE CONFIGURATIONS ..... FIGURE 05
VALVE SETTING ..... FIGURE 06
STANDARD MANHOLE ..... FIGURE 07
DROP MANHOLE ..... FIGURE 08
MANHOLE COVER, COLLAR & ADJUSTMENT ..... FIGURE 09
SANITARY SEWER SERVICE LINE INSTALLATION ..... FIGURE 10
CLEANOUT AND COVER ..... FIGURE 11
CONCRETE COLLAR ..... FIGURE 12
TRENCH PLUG ..... FIGURE 13
UTILITY TRENCH ..... FIGURE 14
UTILITY TRENCH DETAIL ..... FIGURE 14A
THRUST BLOCKING ..... FIGURE 15
DRIVEWAY APPROACH ..... FIGURE 16
CONCRETE CURB AND GUTTER ..... FIGURE 17
LAYDOWN CURB ..... FIGURE 18
CONCRETE VALLEY GUTTER ..... FIGURE 19

CONCRETE SIDEWALK..... FIGURE 20
TYPICAL PEDESTRIAN CROSSING..... FIGURE 21
PEDESTRIAN RAMP ..... FIGURE 22
PRECAST CONCRETE PINDOWN CURB ..... FIGURE 23
SIGN AND POST INSTALLATION..... FIGURE 24
STREET SIGN LOCATION ..... FIGURE 25
COMBINATION MANHOLE AND INLET ..... FIGURE 26
CURB INLET ..... FIGURE 27
VALLEY GUTTER INLET ..... FIGURE 28
INLET APRON ..... FIGURE 29
SUBSURFACE DRAIN SUMP ..... FIGURE 30
TYPICAL CULVERT SECTION..... FIGURE 31
TYPICAL COLLECTOR ROAD SECTION ..... FIGURE 32
IRRIGATION METER PIT ..... FIGURE 33
TURNAROUND ..... FIGURE 34

APPENDICES

APPENDIX A……HAULED WASTEWATER DISPOSAL APPLICATION

Acronyms

ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
BMP	Best Management Practice
DEQ	Montana Department of Environmental Quality
HDPE	High Density Polyethylene Pipe
MDT	Montana Department of Transportation
MPWSS	Montana Public Works Standard Specifications
PVC	Polyvinyl Chloride Pipe
PWD	Public Works Department
RCP	Reinforced Concrete Pipe
WWTP	Wastewater Treatment Plant

CHAPTER I

GENERAL PROVISIONS

CHAPTER 1: GENERAL PROVISIONS

1.1 Jurisdiction

A. These Standards govern public works projects within the jurisdictional area of the City Council of the City of East Helena.

1.2 Standards

A. All systems shall be constructed in accordance with the current edition of the City of East Helena Engineering Standards (this document), the most current edition of the Montana Public Works Standards and Specifications (MPWSS) as modified by the City of East Helena Special Provisions, or other standards referenced elsewhere in this document. Any conflicts or differences in these documents shall be resolved in favor of the City of East Helena Engineering Standards.

B. See East Helena Engineering Standards Drawings for more details and figures relative to the Engineering Standards.

1.3 Approved "Or Equal" Items

A. "Or Equal" items must be submitted to the City Engineer for consideration.

1.4 City Fees

A. Any party desiring to connect to the water or wastewater system shall be subject to Development Fees as established by City Ordinance Nos. 282 and 283.

1.5 Guarantee for Equipment, Materials, and Workmanship

A. The Contractor shall guarantee all materials and equipment furnished and construction work performed for maintenance and repair work on City infrastructure for a period of 1-year from the date of written acceptance of the work by the City of East Helena.

B. The required one-year warranty period for the final improvements begins on the date of final written acceptance of the installed infrastructure. Any required repairs to the utilities systems approved for interim use will also have a warranty for a one-year period following the final acceptance.

1.6 Interim Use

A. If a developer or owner wishes to begin construction of structures in an approved subdivision or any other property that has required infrastructure improvements, the Public Works Department will require the following items be completed prior to the interim or final use of the facilities:

1. Water, sewer, and storm water utilities must be completely installed, inspected, tested and accessible to City personnel.
2. All temporary and permanent BMP's must be functional and maintained not only at the time of interim acceptance but through final site stabilization.
3. A comprehensive walkthrough with the Public Works Department, City Engineer, Engineer of Record, and developer.

4. Certification from the Engineer of Record that all utilities have been completed in substantial accordance with the plans and specifications. This certification must include a punch list of items that remain to be completed upon the installation of the finished grade or pavement.
5. Copies of required tests throughout construction including but not limited to:

    a. Log and tape of TV sewer inspection
    b. Bacteriological tests
    c. Pressure tests
    d. Other testing as required.

6. Electronic and paper as-built drawings certified by a professional engineer of the underground public utilities to be accepted.
7. Timely repair or replacement of failures due to material problems and/or workmanship.
8. A schedule for the completion of the improvements
9. Copies of inspection logs and construction photographs
10. Record all easements not included in the public right-of-way for the water and sewer.
11. Dedicate all right-of-way to the City for the part of the subdivision that is proposed.
12. Complete roads to finished grade and emergency vehicle accessible.

1.7 Final Acceptance

A. Final acceptance of the water, sewer, storm water, and street systems will occur upon completion and acceptance of all required infrastructure installation. Final acceptance will be granted by the City Engineer upon completion of the following items:

    1. A comprehensive walkthrough with the Public Works Department, City Engineer, Engineer of Record, and developer.
    2. Flow testing the curb, gutter, and asphalt road.
    3. Completion of all punch list items.
    4. Inspection and repair of previously accepted facilities found to be out of compliance with the interim acceptance conditions. The City of East Helena reserves the right to require re-inspection and repair of the conditionally accepted infrastructure if damage from final construction is suspected.
    5. Final certification from the engineer of record that the entire development has been completed in substantial accordance with the approved plans and specifications.
    6. Complete set of daily logs and construction photographs.
    7. Copies of all required testing.

B. Final acceptance of a completed utility system component may be granted prior to completion of the infrastructure development as a whole if the City of East Helena is provided with a financial guarantee (in the form of a bond or irrevocable letter of credit) that the remaining infrastructure components will be completed within a specific time frame and that the completed infrastructure operates independently of the guaranteed portion.

CHAPTER II

WATER SYSTEMS

CHAPTER 2: WATER SYSTEMS

2.1 Design Requirements

A. Water systems shall be designed, constructed, and tested in accordance with the current editions of *Circular DEQ-1* – Montana Department of Environmental Quality –Standards for Water Works and the Montana Public Works Standard Specifications (MPWSS).

2.2 Design Report

A. Design reports must be prepared by or reviewed by a professional engineer licensed in the state of Montana.

B. Engineering Design and the Design Report shall meet the minimum requirements of *MDEQ Circular 1.*

C. Design Report shall include design fire flow requirements, average day demand, max day demand, and system pressures.

2.3 Water Service Area

A. The official water service area for the City is that area of the City within the boundaries of the City and currently served by City Water, any areas presently served outside the City and any subsequently approved amendments thereto.

B. All lots created within the City of East Helena shall be served by the City of East Helena public water supply system. no separate water supply systems are permitted within the City of East Helena.

2.4 Offsets

A. Water mains and appurtenances shall maintain horizontal and vertical offsets as required in MDEQ Circular 1. Horizontal offset shall be a minimum of 10 feet from outside edge to outside edge. Vertical offset shall be a minimum of 18 inches from outside edge to outside edge.

B. All underground electrical, gas, phone, fiber, and cable lines must be installed at least three (3) feet horizontally and one (1) foot vertically from water mains and services.

2.5 Water Mains

A. Hydraulic Analysis – The design of all water mains shall be based on a hydraulic analysis showing demands and pressures, unless otherwise approved by the City Engineer. Water mains shall maintain a minimum normal working pressure of 35 psi and a minimum pressure under all flow conditions of 20 psi.

B. Fire Flows – Water mains shall be designed to provide adequate fire flows unless otherwise approved by the City Engineer. Fire flow requirements are 3,000 gpm for three hours.

C. Diameter – the minimum size of a water main providing fire protection and serving fire hydrants shall be 8-inches in diameter (fire hydrant leads shall be a minimum of 6-inches in diameter). Larger mains may be required to meet fire flow and minimum pressure requirements.

D. Piping

1. PVC – DR18 (Pressure Class 235 psi) pipe conforming to AWWA C-900 Standards.
2. Ductile Iron – Shall meet current MPWSS material and construction requirements.
3. HDPE – DR11 (Pressure Class 160 psi)

    a. Shall only be used in directional drill applications.
    b. Directionally drilled HDPE shall incorporate engineered expansion and contraction restraints, approved by the City Engineer.

4. Other – Only use as approved by the City Engineer.
5. Water main materials shall remain constant through all phases of a project or development, unless otherwise approved by the City Engineer.

E. Joints

1. Shall be push-on.
2. Use nitrile gaskets for areas with hydrocarbon contamination.
3. Pipe shall be oversized to meet or exceed the inside diameter of connecting pipes.

F. Fittings

1. Shall be Ductile Iron.
2. Shall be MJ.
3. Shall meet AWWA C-153 and be Class 350.
4. Provide thrust blocks in accordance with the MPWSS.

G. Mechanical Joint Restraints

1. Shall be Megalug, or approved equal.
2. Mechanical joint restraints shall be provided in addition to MPWSS thrust blocking requirements for all water main fittings, including valves, tees, crosses, caps, plugs, reducers and bends equal to or greater than 11-1/4°.

2.6 Valves

A. Gate Valves

1. Shall be used for installations 12 inches and smaller.
2. Shall be Mueller Resilient Wedge Gate Valves, or an approved equal, conforming to AWWA C-509 Standards.
3. Tapping valves shall be MJ x FL for connection to the tapping sleeve.

B. Butterfly Valves

1. Shall be used for installations larger than 12 inches.

2. Shall be Class 250B MJ x MJ Mueller Lineseal Butterfly Valves, or equal, conforming to AWWA C-504 Standards.

C. Valves shall close in the clockwise direction.

D. All other valves shall be MJ x MJ.

2.7 Valve Boxes

A. Shall be cast iron, slip type adjustment.

1. Tyler 6855 or 7126 series;
2. Star VB-0007; or
3. Equal as approved by the City Engineer.

B. Extensions with a centering donut shall be provided and installed for valves on mains with more than 7-foot of bury.

2.8 Fire Hydrants

A. Shall be installed with the pumper nozzle facing the pavement.

B. Shall be installed a minimum of 3'-6" behind the curb.

C. Shall close in the clockwise direction.

D. Shall be covered until placed in service.

E. Shall be manufactured by Kennedy. Hydrant body shall be painted "DRESS BLUE" (Sherwin-Williams 9176). Top of hydrant and hydrant caps shall be painted "MINDFUL GREY" (Sherwin-Williams 7016).

2.9 Water Service

A. Service Pipe

1. Shall be SIDR 7 (200 psi) polyethylene pipe conforming to AWWA C-901 (up to 2 inches in diameter).
2. Shall be DR-18 PVC pipe conforming to AWWA C-900 (greater than 2 inches in diameter).

B. Service Saddles

1. Shall be BR2 series Mueller Brass, or equal as approved by the City Engineer.

C. Corporation Stop and Curb Stop Valves

1. Curb stops shall not be located in sidewalks, driveways, or within 5 feet of approaches.
2. Shall be Ford or Mueller.
3. The corporation shall be tapped at a 45-degree vertical angle on the pipe, measured from the horizontal.

D. Service Fittings

1. Shall be Mueller Insta-Tite or 110 Series compression fittings, or equal approved by the City Engineer.
2. If larger than 1-inch and smaller than 4-inch, stainless steel inserts shall be used if recommended by manufacturer.

E. Curb Boxes

1. Shall be 6-inch diameter, round irrigation valve box with green lid labeled "WATER SERVICE".
2. Shall be installed 1'-0" from the property line.

F. Water Meters

1. Shall be Sensus iPERL (up to 1-inch diameter water service)
2. Shall be approved by the City Engineer for services greater than 1-inch in diameter.
3. Shall be purchased from the City of East Helena PWD.
4. Shall be installed by a certified plumber. Once installed, the City will inspect the meter and approve service.

G. Meter Pits/Vaults

1. May be installed where approved by the City Engineer.
2. For new or reconstructed services up to 1-inch in nominal size:

    a. Mueller Thermo-coil meter pits with side-locking composite lids and insulation pads
    b. Ford Coil Pitsetter meter pits with plastic bottom plate, insulation pads, and side-locking composite lids.
    c. Or approved equal by the City Engineer.

3. For new or reconstructed services 1.25-inch to 2-inch in nominal size:

    a. Mueller EZ Vault or approved equal with side-locking composite lids and insulation pads shall be used for new 1.25-inch and 2-inch. Meters shall have travel to within 18 inches of the surface.

4. For new or reconstructed services larger than 2-inch in nominal size:

    a. Meters will require a custom meter pit sized appropriately to accommodate the isolation valves, meter(s), and pertinent backflow prevention device(s). The proposed meter pit design shall include steps and shall be submitted to the City Engineer for review and approval prior to construction.

5. Maintenance bypass lines or other branches shall not be installed before the meter.
6. Backflow preventers shall meet the requirements of the latest version of the Uniform Plumbing Code and be placed downstream of meters.
7. Installation Location

    a. Shall be located 3 to 5 feet inside of the property line.
    b. Shall not be located in driveways, sidewalks, or within 5 feet of approaches.

c. No obstructions shall be placed within a 3-foot minimum radius around the meter pit to ensure access to the pit.

2.10 Tapping City Water

A. Tapping Water Mains

1. Water Main Extension
   a. Contractors or developers extending an existing water main via hot tapping will be required to pay all costs included with the tapping of the main, but no additional fee will be required by the City of East Helena.

2. Service Tapping Charge
   a. Any person desiring to make a service connection to existing water mains must pay for the cost of tapping in advance as follows:

Service Tap Size (Nominal Pipe and Corporation Cock Diameters)	**Tapping Fee**
3/4" Service Tap or 1" Service Tap to 3/4" Meter	$200.00
1" Service Tap to 1" Meter	$350.00
1-1/4" Service Tap	$500.00
1-1/2" Service Tap	$750.00
2" Service Tap	$1,000.00

   b. For service lines exceeding 2 inches in nominal diameter, the fee will be the 2" service fee charge plus and additional $1,000.00 for each inch over 2 inches in diameter.

3. Permit
   a. Any person wanting to tap into the City water system for service shall apply for a permit prior to laying any service or other water pipe.
   b. The uniform permit fee is $10.00 and shall be collected by the City Clerk in advance of any tapping.

4. Tapping Sleeves
   a. Shall be Romac SST III, or equal approved by the City Engineer for service lines or main extensions larger than 4-inch.
   b. Bolts for flange connection on tapping sleeves shall be stainless steel.

2.11 Pipe Bedding

A. Shall be placed in accordance with City of East Helena Standard Drawings, Figure 14.

B. Shall be haunched under pipe with shovel.

C. Shall be a Type 1 Bedding meeting MPWSS requirements.

2.12 Warning Tape

A. Shall be a minimum of 5 mils thick.

B. Shall be 3 inches wide.

C. Shall conform to APWA colors.

D. Shall be buried 12 to 24 inches below the final grade.

2.13 Tracer Wire

A. Shall be 12 AWG TW direct-bury solid copper wire with cross-linked polyethylene insulation.

B. Shall be approved for direct bury.

C. Shall be taped every 5 feet to the top of the water main.

2.14 Marker Posts

A. Shall be used when a main is located outside a paved surface.

B. Shall be APWA compliant Rhino TriView™1, or approved equal.

C. Shall be installed at a maximum spacing of 150 feet.

D. Shall be installed at every valve or valve cluster and every change in direction.

2.15 Sanitary Connections

A. Defined as a section of new main connecting back to an existing main which cannot be pressure tested or bacteriologically tested.

B. Restraining couplings shall not be used at connections to existing cast iron pipe.

C. The length of sanitary connections shall be limited as much as possible in length and shall be submitted to City Engineer for review and approval prior to construction.

2.16 Couplings

A. Romac Macro series, or equal as approved by the City Engineer.

B. Restrained couplings shall not be used when connecting to cast iron pipe.

2.17 Irrigation

A. Backflow Prevention

1. Irrigation lines shall have either an above-grade vacuum breaker or below-grade reduced pressure zone (RPZ) valve for backflow prevention.
2. Backflow prevention shall meet the requirements of the latest version of the Uniform Plumbing Code.

B. Irrigation Meter Pits

1. The City may require irrigation meter pits to be installed under certain circumstances.
2. Shall be precast manholes with monolithic base. Manholes shall meet ASTM C478.
3. Shall have a cast iron frame and cover.
4. Shall include pipe supports installed inside the meter pit vault.
5. No obstruction shall be located within 4’ of the meter pit to allow for access.
6. See Standard Drawings, Figure 33 for more details.

CHAPTER III

SANITARY SEWER SYSTEMS

CHAPTER 3: SANITARY SEWER SYSTEMS

3.1 Design Requirements

A. Sanitary sewer systems shall be designed, constructed, and tested in accordance with the current editions of *Circular DEQ-2* – Montana Department of Environmental Quality – Design Standards for Wastewater Facilities and the Montana Public Works Standard Specifications (MPWSS).

3.2 Design Report

A. Design reports must be prepared by or reviewed by a professional engineer licensed in the state of Montana.

B. Engineering Design and the Design Report shall meet the minimum requirements of *MDEQ Circular 2.*

C. Design Report shall include average daily flows, peak hour flow criteria, wastewater flow rates, peaking factors, pipe slopes, pipe sizes, and velocities.

3.3 Wastewater Service Area

A. The official wastewater service area for the City is that area of the City within the boundaries of the City and currently served by City sewer, any areas presently served outside the City and any subsequently approved amendments thereto.

B. All lots created within the City of East Helena shall be served by the City of East Helena public sanitary sewer system. No separate sanitary sewer systems are permitted within the City of East Helena.

3.4 Sanitary Sewer Main

A. Slope – Gravity sewer mains shall be installed with slope adequate to maintain flow velocities of at least 2.0 feet per second (fps) when depth of flow is at or below 0.3 of the sewer main inside diameter, based on Manning's equation with an "n" value of 0.013. Recommended minimum pipe slopes listed in Section of *MDEQ Circular 2* will be considered adequate.

B. Capacity – Public sanitary sewers and appurtenances shall be designed to accommodate peak hourly flows, while flowing no more than half full when no additional connections are possible and a quarter full when future growth is anticipated. The development must upsize the existing mains if the capacity of the sewer main is calculated to be three quarters full. The City may require, at its discretion, the capacity of the sewer to be increased.

C. Diameter – Gravity sewer mains shall have a minimum diameter of 8 inches. Increasing the diameter in order to meet the minimum pipe slope requirements will not be allowed.

D. Flow Direction – All sewer pipes shall be labeled as to the flow direction on all construction drawings.

E. Accessibility – Sewer mains shall be installed in public right-of way wherever possible. Where mains cannot be installed in ROW a 20' wide exclusive easement with a 14' all-weather surface

road and turnaround according to Standard Drawings, Figure 34 must be constructed in the easement.

F. Sanitary sewer mains shall be flushed and TV inspected prior to City acceptance.

3.5 Manholes

A. Diameter

1. Shall be a minimum of 48-inch diameter for bury depths less than 13 feet.
2. Shall be a minimum of 60-inch diameter for bury depths greater than 13 feet.

B. All manholes shall be precast concrete meeting ASTM C478. Structural strength shall withstand H-20 design load. All manholes installed on lines 15 inches or larger in diameter must have a polyurea liner, or equal as approved by the City Engineer, installed to protect against hydrogen sulfide gas.

C. All sanitary sewer manholes shall be installed in accordance with City of East Helena Standard Drawings, Figure 09 and applicable MPWSS Drawings.

D. Manhole covers shall be labeled "SANITARY SEWER".

3.6 Sanitary Sewer Main Materials

A. Gravity sanitary sewer pipe 8 inches to 15 inches in diameter shall be:

1. PVC meeting ASTM D3034, SDR-35 for bury depths up to 14 feet. For bury depths greater than 14 feet, PVC meeting ASTM D3034, SDR-26.

B. Gravity sanitary sewer pipe 18 inches and larger in diameter shall be:

1. PVC meeting ASTM D679, PS46 or ASTM F794 for bury depths up to 14 feet. For bury depths greater than 14 feet, PVC meeting ASTM D679, PS115 or ASTM F794

C. Other pipe materials shall be approved by the City Engineer.

3.7 Installation

A. Alignment and Grade – Public sanitary sewers shall be installed with a straight alignment and grade between manholes as required in MPWSS.

B. Location – Municipal wastewater system facilities shall be designed and constructed so that all such facilities are readily accessible for maintenance and repair. In addition, such facilities shall be situated so as to preclude the entrance of surface water into said facilities. All sewer mains shall be centered in the right-of-way or easement to the greatest extent possible.

C. Depth – Sanitary sewers shall be buried to a depth sufficient to prevent freezing and shall have a minimum depth of 4 feet. Shallower depths may be allowed by the City of East Helena Public Works Department if suitable pipe insulating provisions have been made.

D. Extension - Any extension of an existing City sanitary sewer main must be extended through the entire frontage length of the property to be served, with a standard manhole located at the terminus of the new sewer main. Sewer main extensions shall include all manholes, clean-outs and appurtenances deemed necessary by the City.

3.8 Water Line Crossings

A. Vertical Separation at Crossings

A. A minimum of 18" vertical separation is required when a sanitary sewer main crosses above or below a water main, measured outside to outside of pipe.
B. Less than 18" vertical separation may be allowed with specific authorization from the Montana Department of Environmental Quality and the City of East Helena Public Works Department.
C. No exception of the minimum 18" vertical separation requirement is permitted when the sewage pipe is a force main.

B. Parallel Separation of Sanitary Sewer Mains and Water Mains

A. A minimum of 10 feet of horizontal separation is required when a sanitary sewer main and water main are installed parallel, measured from outside of pipe to outside of pipe.
B. Less than 10 feet of horizontal separation may be allowed with specific authorization from the Montana Department of Environmental Quality and the City of East Helena Public Works Department.

3.9 Sanitary Sewer Service Lines

A. Gravity sewer service piping shall be:

1. PVC meeting ASTM D3034, SDR-35 & -26
2. PVC Schedule 40 – Solvent Weld or SBR Gasket Joint for normal installations
3. PVC Schedule 40 for water main or water service crossing
4. PVC Schedule 40 with acrylonitrile butadiene (NBR) gaskets for installations in areas of hydrocarbon contamination.

B. Pressure sewer service piping shall be:

1. PVC Pressure Pipe, ASTM D2241, Class 200 SDR-21.

C. Installation

1. All sanitary sewer service lines must be so arranged that the discharge from each separately owned house premises, or buildings on separate lots is a separate service line that connects to the main.
2. The owner of each house or premises is liable for the charges for the wastewater service provided by the City to that owner's house or premises.
3. Sewer services up to 12 inches in diameter shall utilize a PVC in-line wye. Sewer services greater than 12 inches in diameter shall utilize an “Inserta-Tee”.
4. All sewer service lines shall be installed in accordance with MPWSS with a minimum of 4 feet of cover from the top of service pipe to final finished grade.

5. At all locations where sewer service lines are installed beneath new curb, the face of the curb shall be stamped with an "S" in lettering at least 3 inches tall, for marking the sewer service location.
6. All service line crossings under existing curbs by tunneling are prohibited.

3.10 Non-Sanitary Connections to Sanitary Sewer Main

A. Residential floor drains connecting to sanitary sewer mains shall meet all MDEQ requirements. Residential floor drains not connecting to sanitary sewer mains shall drain to daylight outside of the building. Residential subsurface floor drains are not permitted.

B. Commercial floor drains shall be reviewed and approved by the City Engineer on a case-by-case basis.

3.11 Tapping

A. Existing Mains

1. Taps on existing sewer mains should be in the upper quadrant of the pipe in the 10 o'clock or 2 o'clock positions with an "Inserta-Tee."
2. The party wishing to tap the sewer main shall be responsible for all costs associated with tapping the main, unless otherwise approved by the City of East Helena or the City Engineer.

3.12 Metering When Not on City Water

A. For new city sewer services or extensions which do not use the city water system or whose water consumption or wastewater discharge is not otherwise metered, the East Helena Public Works Director shall require the installation of a suitable metering device in order to determine an equitable charge for sewer services.

CHAPTER IV

LIFT STATIONS

CHAPTER 4: LIFT STATIONS

4.1 Design Requirements

A. Lift Stations shall be designed, constructed, and tested in accordance with the current editions of *Circular DEQ-2* – Montana Department of Environmental Quality – Design Standards for Wastewater Facilities and the Montana Public Works Standard Specifications (MPWSS).

4.2 Design Report

A. Design reports must be prepared by or reviewed by a professional engineer licensed in the state of Montana.

B. Engineering Design and the Design Report shall meet the minimum requirements of *MDEQ Circular 2.*

C. Design Report shall include average daily flows, peak hour flow criteria, wastewater flow rates, peaking factors, pipe slopes, pipe sizes, velocities, wet well volume, pump run times, pump horsepower.

4.3 Construction Standards

A. Manufacturer

1. Flygt;
2. or Equal as approved by The City Engineer.
   a. Design Engineer shall provide all necessary information to justify the product as equal.
   b. Design Engineer shall submit a list of 3 lift stations of the type proposed which have been in operation at least 5 years.
   c. and The City of East Helena reserves the right to accept or reject the proposed lift station.

B. Pump Type

1. Submersible
   a. Model: Flygt Concertor
   b. Or equal as approved by the City Engineer.

C. Redundancy

1. At a minimum, all lift stations shall run as a duplex system.

2. Triplex systems may be required by the City Engineer for large lift stations or lift stations requiring specialty items.

3. Each motor shall include a VFD.

D. Influent Pipe

1. Spigot end shall extend 6-inches beyond interior of wet well wall.

E. Pressure Pipe

1. Pressure sewer piping (force mains) shall be PVC meeting ASTM D2241, SDR-26, pressure class 160 psi.

F. Access Road

1. 12-foot minimum width paved for access by sewer maintenance vehicles
2. Access approach from street per Standards

G. Approaches onto Public Right-of-Way

1. Projects proposing an approach onto public right-of-way shall submit to the City a report certified by a professional engineer addressing the following conditions, both present and future:
   a. Truck turning movements
   b. Vehicular site vision
   c. Pedestrian conflicts
   d. Intersection level of service

2. Approach permits must be obtained prior to beginning work within the public right-of-way. Permits are subject to fees and approval per City Resolution.

3. Approaches affecting state-designated roadways shall also be approved by the state department of transportation.

4. Approaches shall satisfy all applicable emergency service requirements.

H. Bypass

1. Shall have a dedicated valve.
2. Shall connect downstream of the lift station check valves.
3. Provide a cam-lock style connection with cap.

I. Electrical Wiring

1. Shall be water resistant inside the lift station and enclosure.
2. On-site generator required.

   a. Make of generator shall be Generac.
   b. Natural gas fueled.
   c. Noise emissions not to exceed 65 dbA at 20 feet from the power supply.
   d. Shall be installed inside the building.
   e. Shall include an appropriately sized transfer switch, manufactured by the same manufacturer as the generator.
   f. Shall include an O&M manual Manufacturer shall perform training at startup.

3. Alarms

    a. Pump shall be integrated into the existing SCADA system by the City's telemetry provider.

    b. Alarm Conditions
        i. High water
        ii. Low water
        iii. Seal failure (if applicable)
        iv. Power interruption
        v. High motor temp
        vi. Running on back-up power
        vii. VFD fail (each pump)

4. Controls

    a. Each pump shall have:
        i. Hour meter
        ii. Discharge pressure gauge tap and valve.
    b. Pump run alternator.
    c. Amperage meter on each leg of the electrical wiring.
    d. Lightning protection for the power supply.
    e. Level control
        i. Primary control – Pressure transducer
        ii. Backup control –float switch system, shall be installed and function if primary control is lost.
    f. Transfer switch and control panels shall be placed in the building.

5. Lighting

    a. Exterior illumination shall be provided and connected to the power supply.
    b. Street lighting shall not be considered adequate to meet this requirement.

J. Enclosures

1. Building

    a. Designed and constructed in accordance with East Helena Building codes.
    b. CMU Block (split face finish)

2. Walls

    a. 8-foot floor to ceiling height (min)

3. Roof

    a. Gable style
    b. Trusses spaced at 24-inch maximum.
    c. Designed to meet local snow load requirements.
    d. 4:12 slope
    e. 5/8-inch OSB sheathing

f. Metal roofing

4. Other

   a. Steel door with deadbolt lock
   b. Heating and air circulation systems
   c. Ceiling mounted industrial lights.
   d. All other necessary materials for a finished building

5. Submittals by Design Engineer required for City of East Helena approval:

   a. Structural plans
   b. Mechanical plans
   c. Electrical plans
   d. Heating and air circulation

K. Fencing

1. 6-foot chain link security
2. 3-foot-wide personnel gate
3. 12-foot-wide gate with two 6-foot leaves
4. Shall provide adequate room for access and facility maintenance.
5. 3-foot minimum offset from all structures and appurtenances.
6. Gate placement shall promote maintenance vehicle access for pump removal.
7. Gate installations shall include duckbill style gate holdbacks.

L. Landscaping

1. 4-inches of clean 1-inch minus gravel or other landscaping rock as approved by the City Engineer for areas outside of public right-of-way.
2. Areas inside public right-of-way shall meet the requirements of the City of East Helena Municipal Code.

CHAPTER V

STORM DRAINAGE SYSTEMS

CHAPTER 5: STORM DRAINAGE SYSTEMS

5.1 Design Requirements

A. A grading and drainage plan is required and subject to approval by the City Engineer.

B. Storm drainage systems shall be designed, constructed, and tested in accordance with the current editions of Circular DEQ-8 – Montana Department of Environmental Quality – Montana Standards for Subdivision Storm Water Drainage and the Montana Public Works Standard Specifications (MPWSS).

C. All storm water drainage systems must not discharge into any sanitary sewer facility and must be certified by a professional engineer.

D. Plans for the conveyance and detention of storm water shall be submitted for review and approval by the City Engineer.

E. All storm water drainage improvements shall be certified by a professional engineer in the State of Montana as having been constructed in accordance with the MPWSS and the approved plans and specifications prior to acceptance by the City.

F. Storm Drainage Systems for subdivisions and developments shall meet the requirements of the East Helena Subdivision Regulations.

5.2 Construction Standards

A. Curb and Gutter

1. Required for all public streets, unless otherwise approved by the City Engineer.
2. Temporary roadside ditches are not permitted to convey stormwater prior to installation of curb and gutter.
3. Curbs and gutters of adjoining properties must be extended in conformance with current specifications of local and state authorities.
4. For curb and gutter details, see Standard Drawings, Figure 17. For laydown curb details, see Standard Drawings Figure 18.

B. Valley Gutters

1. Shall be constructed in accordance with MPWSS.
2. Minimum width shall be 3 feet.
3. Valley gutters are required for storm water control at intersections where a storm water system is not accessible.
4. For concrete valley gutter details, see Standard Drawings, Figure 19.

C. Storm Water Conveyance Pipe

1. PVC ASTM D3034, SDR-35.
2. Reinforced Concrete Pipe with rubber gasket joints.
3. Shall be a minimum of 12 inches in diameter.
4. Storm water conveyance pipe shall not be buried greater than 15 feet deep.

5. HDPE and metal pipe are not allowed unless approved by the City Engineer.

D. Manholes

1. Shall be precast concrete meeting ASTM C478.
2. Shall meet H-20 load ratings.
3. Covers for storm water manholes shall be labeled "STORM SEWER".
4. Covers for combination manhole/inlets shall be D&L Foundry C-1172 or approved equal. Covers shall have "OUTFALL TO STREAM, DUMP NO POLLUTANTS" forged in the grate. See Standard Drawings, Figure 26 for more detail.

E. Culverts and Bridges

1. Shall be adequately sized and installed where drainage channels intersect any street or road right-of-way or easement.
2. Culverts, inlets, storm water conveyance pipe, ditches, swales, and other drainage facilities shall be sized to accommodate the 25-year, 24-hour storm event for the upstream drainage area without overtopping the roadway.
3. Culverts and bridges shall be analyzed for impacts to adjacent properties and the roadway for the 100-year, 24-hour storm event.
4. See Standard Drawings, Figure 31 for typical culvert section details.

F. Storm Water Inlets

1. Inlets shall be located to intercept the major curb flow at the point curb flow capacity is exceeded by the storm runoff. Inlets should be aligned with lot lines wherever possible.
2. Storm water inlet spacing in any roadway shall be designed so that the water spread shall not exceed half the distance to the centerline of the road from the gutter flowline for the 25-year, 24-hour storm event.
3. Storm water inlets and spacing shall be analyzed for impacts to adjacent properties and the roadway for the 100-year, 24-hour storm event.
4. See Standard Drawings, Figure 27 for curb inlet details.
5. See Standard Drawings, Figure 28 for valley gutter inlet details.
6. Provide concrete aprons at all inlets per Standard Figure 29.

G. Storm Water Detention Systems

1. Shall be capable of detaining the 25-year, 24-hour storm event.
2. Shall provide an adequate outlet system via a pipe or spillway and must provide for adequate dispersal of water from the outlet to surface water without flooding or adversely affecting adjacent or downstream properties.
3. Detention systems shall be analyzed for impacts to adjacent properties and the roadway for the 100-year, 24-hour storm event.

H. All storm water improvements shall be warrantied for one year after final acceptance of improvements by the City.

CHAPTER VI

TRANSPORTATION STANDARDS

CHAPTER 6: TRANSPORTATION SYSTEMS

6.1 Design Requirements

A. The arrangement, type, extent, width, grade, and location of all streets must be considered in their relation to existing and planned streets, topographical conditions, public convenience and safety, and the proposed uses of the land to be served by them.

B. At a minimum, roads must meet the design specifications in **Table 6.1**.

Table 6.1: Minimum Road Design Standards

Minimum Design Standards	Private Roads	Collector Roads	Local Roads
Minimum Right-of-Way Width	N/A	68’	66’
Minimum Roadway Width (from Top Back of Curb to Top Back of Curb)	36’	42’	40’
Minimum Boulevard Width	N/A	7’	7’
Minimum Sidewalk Width	N/A	5’	5’
Minimum Distance from Back of Sidewalk to Right-of-Way Line	N/A	1’	1’
Minimum Curb Radius or Edge of Pavement at Intersections	15’	25’	15’
Maximum Grades	10%	8%	10%
Minimum Grades	0.5%	0.5%	0.5%
Minimum Crown Cross Slope	2%	3%	2%
Approaches onto Public Roads a) Minimum Sight Distance b) Minimum Width c) Maximum Grade for 20’	 a) 150’ b) 36’ c) 5%	 a) 200’ b) 42’ c) 5%	 a) 150’ b) 40’ c) 5%
Curvature a) Design Speed b) Maximum Curve c) Minimum Radius	 a) N/A b) N/A c) N/A	 a) 30 mph b) 23 c) 249’	 a) 20 mph b) 53.5 c) 107’
Cul-de-sacs/Turnarounds a) Maximum Road Length b) Cul-de-sac: Minimum Outside Right-of-Way Radius c) Cul-de-sac: Minimum Outside Roadway Radius d) “T” Turnaround: Backup Lengths (two required)	 a) N/A b) N/A c) 48’ d) 60’ each	 a) N/A b) N/A c) N/A d) N/A	 a) 800’ b) 58’ c) 48’ d) 60’ each
New Bridges a) Curb to Curb Widths b) Boulevard c) Sidewalk	 a) 36’ b) N/A c) N/A	 a) 42’ b) N/A c) 5’	 a) 40’ b) N/A c) N/A

C. Turnarounds

1. Either a cul-de-sac or "T" (Hammerhead) turnaround shall be provided where streets terminate. See Standard Drawings, Figure 34 for more turnaround details.

D. Street Maintenance

1. The lands included in all streets, avenues, and alleys must be dedicated to the public for public use.
2. Unless the City of East Helena specifically accepts responsibility for maintenance, the lands included in all streets, avenues, and alleys shall be owned and maintained by an approved property owner's association.

E. Driveways

1. Residential driveways shall not have direct access to state highways unless approved by the Montana Department of Transportation (MDT).
2. Residential driveways shall not have direct access onto arterial or collector streets, unless otherwise approved.
3. Any subdivision road access onto a state highway must be approved by MDT.
4. For driveway approach details, see Standard Drawings, Figure 16.

F. Half Streets

1. Half streets are prohibited. If an existing half street is adjacent to a tract to be subdivided, the other half of the street must be platted within the new subdivision.

G. Intersections

1. The alignment of all streets, roads, and intersections must provide adequate sight distances and visibility based on the designed operating speeds of the intersecting roadways.
2. Streets must intersect at 90-degree angles except when topography prohibits this alignment. The angle of an intersection may be no less than 60 degrees to the centerline of the roadway being intersected.
3. Two streets meeting a third street form opposite sides must be offset a minimum of 125 feet for local roads and 300 feet for arterials or collectors.
4. No more than two streets may intersect at one point.
5. Intersections of local streets with major arterials or highways are discouraged.
6. Hilltop intersections are prohibited unless no alternatives exist. Intersections on local roads within 100 feet of a hilltop are prohibited. Intersections on arterial and collector roads within 200 feet of a hilltop are prohibited. If no alternative to a hilltop intersection exists, additional traffic control devices will be required.
7. The grade approaches to major highways may not exceed 5% unless otherwise approved.

H. Street Names

1. Names of new streets or roads aligned with existing streets must be the same as those of the existing streets.
2. Proposed street names may not duplicate or cause confusion with existing street names.

6.2 Construction Standards

A. General

1. Roadway systems shall be constructed in accordance with the current edition of the Standards and MPWSS.

B. Materials

1. All new or reconstructed roads shall be paved with a minimum of 3 inches of Type B asphalt and constructed in accordance with current MPWSS.
2. All new or reconstructed roads shall include a minimum of 9 inches of 1-1/2” minus crushed base course.
3. Chip seal aggregate shall meet the gradation as show in in section 02504 of MPWSS for 3/8” seal coat aggregate.
4. Asphalt tack coat shall be emulsified asphalt, CRS-2.

C. Alleys

3. Alley public right-of-way shall be a minimum of 20 feet wide.
4. Alley road width shall be a minimum of 14 feet wide.
5. At a minimum, alleys shall be surfaced with 6 inches of 3/4" minus crushed base course meeting MPWSS gradations.

D. Street Signs

6. Shall be 0.808-gauge aluminum double sided 6-inch-tall blades with green background, white trim, and white text. Text shall be 4-inch-tall upper case B series. Blades shall have standard radius corners with no punch.
7. Shall be located with a minimum of 2 feet of clearance from face of curb to edge of sign.
8. Where parking or pedestrian movements occur, the sign shall be mounted with a minimum clearance of 7 feet from ground surface to bottom of the primary sign panel.
9. Shall include slip base assembly.
10. Shall be encased in 12-inch diameter non-reinforced concrete foundation. Foundation shall be a minimum of 3 feet in depth.
11. See Standard Drawings, Figure 24 for sign and post installation details.
12. See Standard Drawings, Figure 25 for street sign location details.

E. Pavement Markings

1. Shall be epoxy paint for centerlines, bike lanes and outside lane lines outside of major intersections.
2. Shall be inlaid thermoplastics or approved thermoplastic alternatives for crosswalks, stop bars, words, symbols, and intersection striping.

F. Chip Seal

1. All new or reconstructed roads must be chip sealed in accordance with MPWSS.
2. All chip seal coats must be completed within one year after paving is completed, or as directed by the City, to allow for proper curing of the asphalt surfacing.

G. Mailboxes

1. When required by the United States Postal Service, developers must provide an off-street area for mail delivery.

CHAPTER VII

TRUCKED AND HAULED WASTE

CHAPTER 7: Hauled Wastewater Disposals (including RV Dump Stations)

7.1 Purpose

A. The purpose of this section is to establish uniform standards for permitting the discharge of hauled waste to be discharged into the City of East Helena's wastewater treatment system.

B. The standard is intended to include both discharges that occur at the wastewater treatment plant site and discharges that occur at designated disposal locations which discharge into the collection system.

C. This policy is not intended to include the disposal of septage waste. Septage waste will generally not be accepted by the City of East Helena. Anyone desiring to dispose of septage waste into the City of East Helena wastewater system must have prior approval from the City Engineer on a case-by-case basis.

7.2 Definitions

A. **Biological Oxygen Demand (BOD):** BOD is the amount of oxygen required to stabilize biodegradable organic matter under aerobic conditions.

B. **Discharge Monitoring Report (DMR):** DMR is a federal regulatory term for a water pollution report prepared by facilities discharging to surface waters.

C. **Hauled Wastewater:** Sewage, domestic wastewater, or other types of wastewater that are generated from a source that is not connected to the City of East Helena's Wastewater Treatment System; and are transported to a disposal location that is connected to the City of East Helena's Wastewater Treatment System for disposal.

D. **Montana Pollutant Discharge Elimination System (MPDES):** The system for issuing permits for the discharge of pollutants from point sources into waters of the State of Montana.

E. **Resource Conservation and Recovery Act (RVRA):** Federal law governing the disposal of solid waste and hazardous waste.

7.3 Acceptable Wastewater Disposal

A. RV black and grey water storage tanks.

B. Wastewater generated from portable toilets.

7.4 Prohibited Wastewater Disposal

A. Septage, unless prior approval is provided by the City Engineer.

B. Wastewater from restaurant oil/grease traps.

C. Wastewater with a BOD_5 demand exceeding 2,500 mg/L.

D. Wastewater with pH above 12.5 or less than 5.5 standard units.

E. Wastewater treatment sludge or biosolids.

F. Wastewater classified as an industrial waste.

G. Hazardous wastes as defined in the Federal Resource Conservation and Recovery Act.

7.5 Permitting

A. To become an authorized Hauled Wastewater Disposal permit holder, applicants must complete the Hauled Wastewater Disposal application and pay the required permit fee. The Hauled Wastewater Disposal application can be found in **Appendix A.**

7.6 Discharge Requirements

A. Discharge of hauled waste must be performed at the designated areas set forth in the permit.

B. Hauled waste received off the WWTP site must be measured by a meter accessible by the City of East Helena.

C. All waste shall be declared on the discharge/manifest forms provided and shall not contain a prohibited discharge.

7.7 Fees

A. Permit fee shall be $200 for two (2) years.

B. Disposal Usage shall be $0.05 per gallon.

D. Permit holders must maintain their account with the City of East Helena in good standing. Any user not paying their account within 20 days of the billed due date will not be allowed further use of the disposal location until such time as the account is paid in full.

CHAPTER VIII

DRY UTILITIES

CHAPTER 8: DRY UTILITES

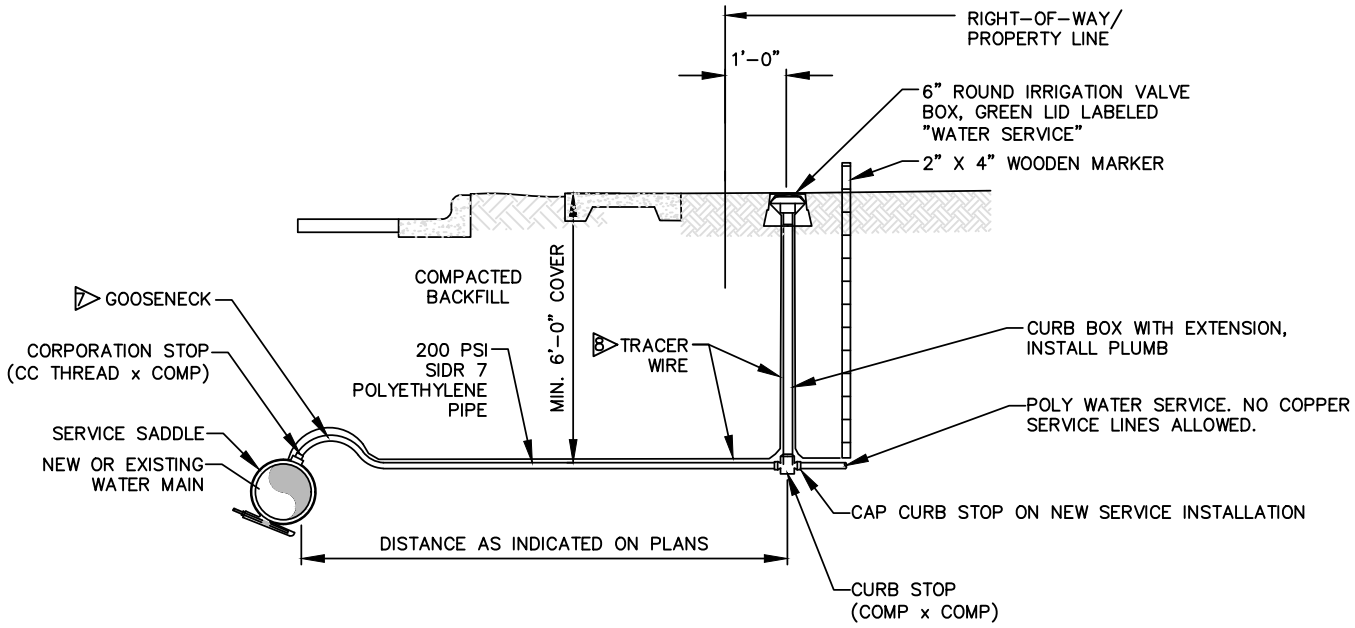
8.1 Construction Standards

A. All underground electrical, gas, phone, fiber optic, and TV cable lines must be buried at a minumum depth of 24 inches.

B. All underground electrical, gas, phone, fiber optic, and TV cable lines must be installed at least 5 feet horizontally from any water main or service, sanitary sewer main or service, or storm sewer mains, unless otherwise approved by the City Engineer.

C. Microtrenching in the public right-of-way within the City of East Helena is prohibited.

STANDARD DRAWINGS



NOTES:

1. CORPORATION STOPS SHALL BE FORD OR MUELLER.
2. CURB STOPS SHALL BE FORD OR MUELLER.
3. THIS DETAIL APPLIES TO SERVICES THAT ARE 2" IN DIAMETER OR SMALLER. SERVICE LINES OVER 2" ARE INSTALLED SIMILAR TO WATER MAINS.
4. WATER SERVICE LINES SHALL BE CONNECTED/INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED.
5. BEDDING MATERIAL WITHIN 6–INCHES OF THE SERVICE LINE SHALL BE TYPE 1 PIPE BEDDING.
6. THE CURB BOX SHALL BE INSTALLED 1'–0" FROM THE PROPERTY LINE.
7. THE GOOSENECK IN THE SERVICE LINE AT THE CONNECTION TO THE CORPORATION STOP SHALL BE MADE IN THE HORIZONTAL PLANE.
8. TRACER WIRE TO EXTEND FROM MAIN TO STRUCTURE WATER SERVICE ENTRANCE.
9. CURB STOPS SHALL NOT BE LOCATED IN SIDEWALKS, DRIVEWAYS, OR WITHIN 5'–0" OF APPROACHES.
10. THE CORPORATION SHALL BE TAPPED AT 45° VERTICAL ANGLE ON THE PIPE (MEASURED FROM THE HORIZONTAL).
11. CONCRETE AND/OR PAVEMENT REMOVAL AND REPLACEMENT SHALL BE PROVIDED AS NECESSARY.
12. MINIMUM 6'–0" COVER SHALL BE MAINTAINED ALONG THE ENTIRE SERVICE LINE.
13. NO EXTENSION RODS ALLOWED IN CURB BOX.
14. SERVICE CONNECTIONS MUST BE INSPECTED BY CITY PERSONNEL AND ARE SUBJECT TO FEE(S) PER CITY ORDINANCE.

RPA

SCALE: NONE

SHEET TITLE

NEW WATER SERVICE

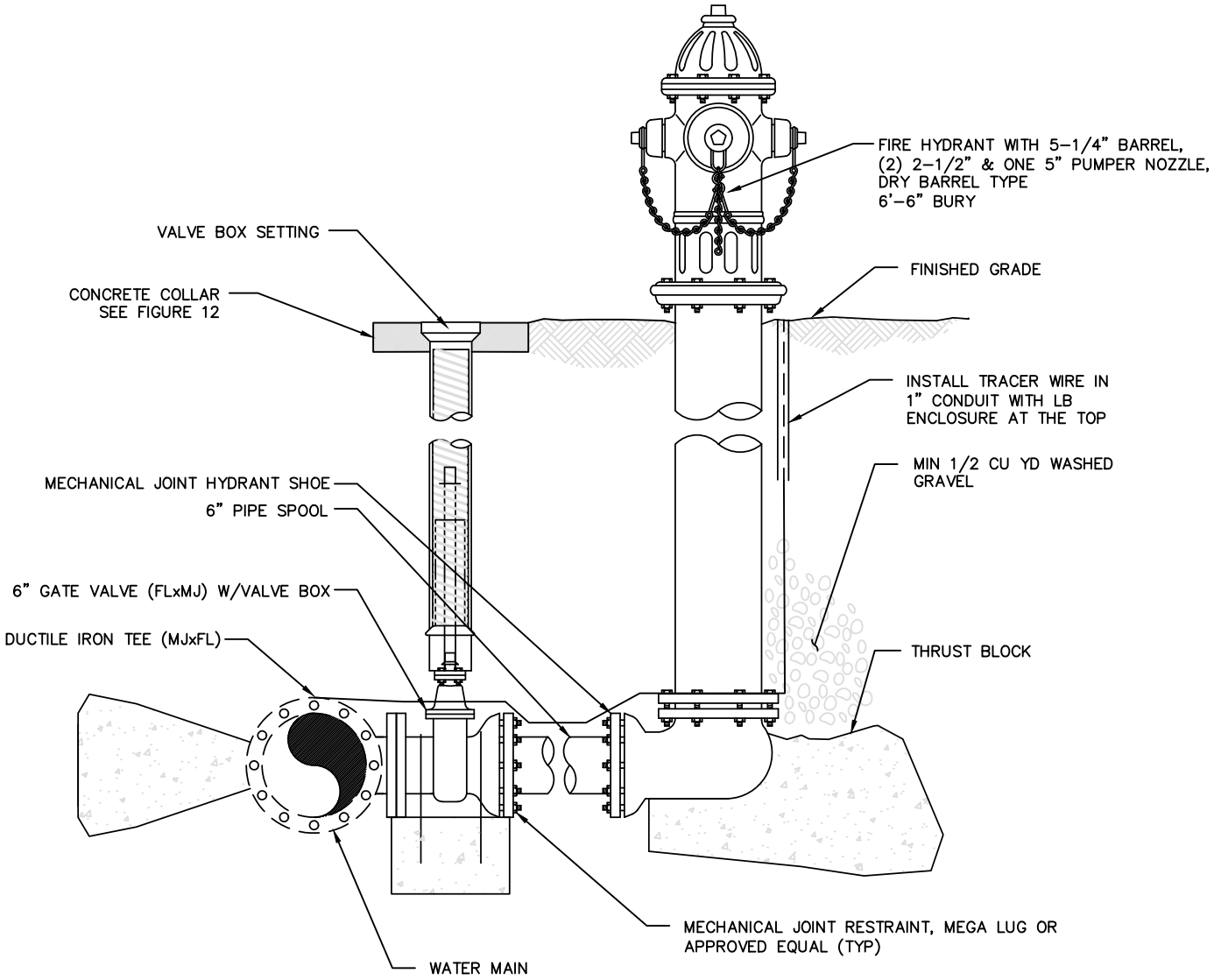
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

01



NOTES:

1. INSTALL HYDRANT W/PUMPER NOZZLE FACING THE PAVEMENT.
2. THRUST RESTRAINTS SHALL BE PROVIDED IN THE FORM OF CONVENTIONAL CONCRETE THRUST BLOCKS ON THE VALVE & HYDRANT.
3. HYDRANT SHALL BE INSTALLED A MIN OF 3'–6" BEHIND THE CURB.
4. HYDRANTS SHALL CLOSE IN THE CLOCKWISE DIRECTION.
5. HYDRANTS TO BE MANUFACTURED BY KENNEDY.
6. HYDRANT BODY SHALL BE PAINTED DRESS BLUE (SHERWIN WILLIAMS 9176) AND THE CAP AND TOP OF HYDRANT SHALL BE PAINTED MINDFUL GRAY (SHERWIN WILLIAMS 7016).

RPA

SCALE: NONE

SHEET TITLE

FIRE HYDRANT INSTALLATION

PROJECT TITLE

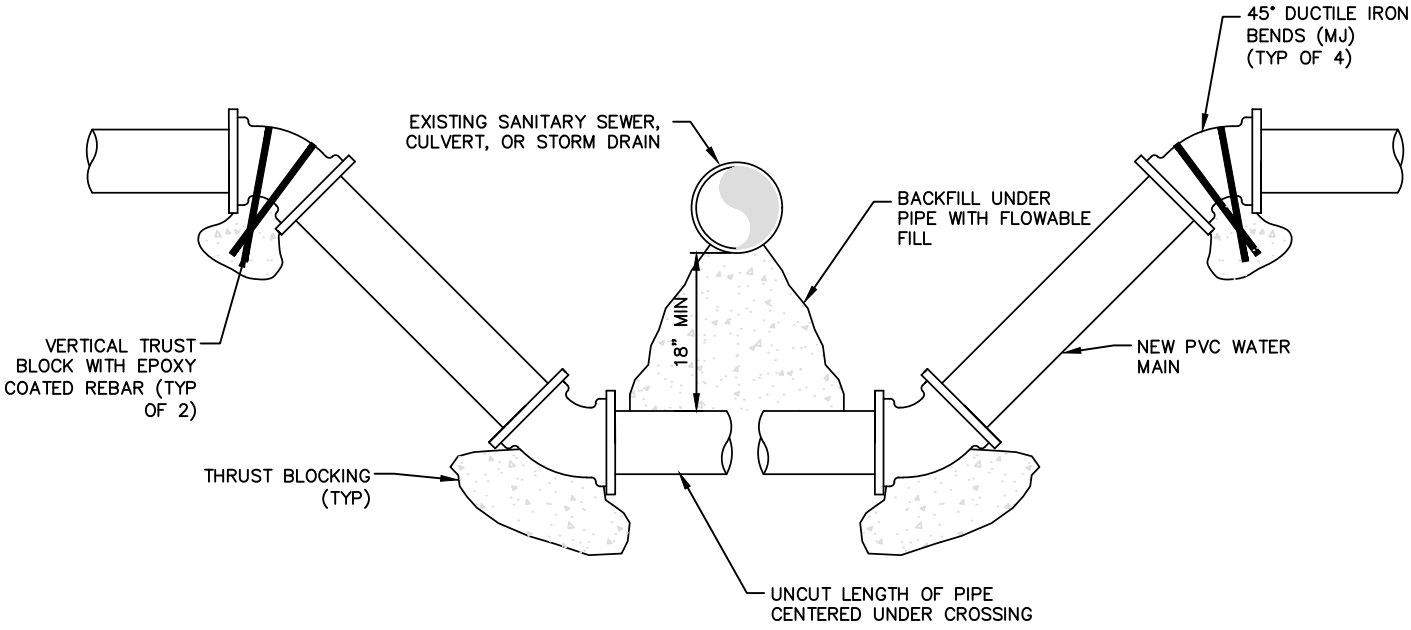
STANDARD DRAWINGS

East Helena, Montana

FIGURE

02

F:\water\EHLN19\Standard Drawings\02_FIRE HYDRANT INSTALLATION.dwg Jul 18, 2023



NOTES:

1. DURING CROSSINGS, STRUCTURAL SUPPORT OF THE SEWER OR STORM DRAIN SHALL BE PROVIDED TO PREVENT DAMAGE TO ANY EXISTING PIPES.

RPA

SCALE: NONE

SHEET TITLE

WATER MAIN VERTICAL ADJUSTMENT

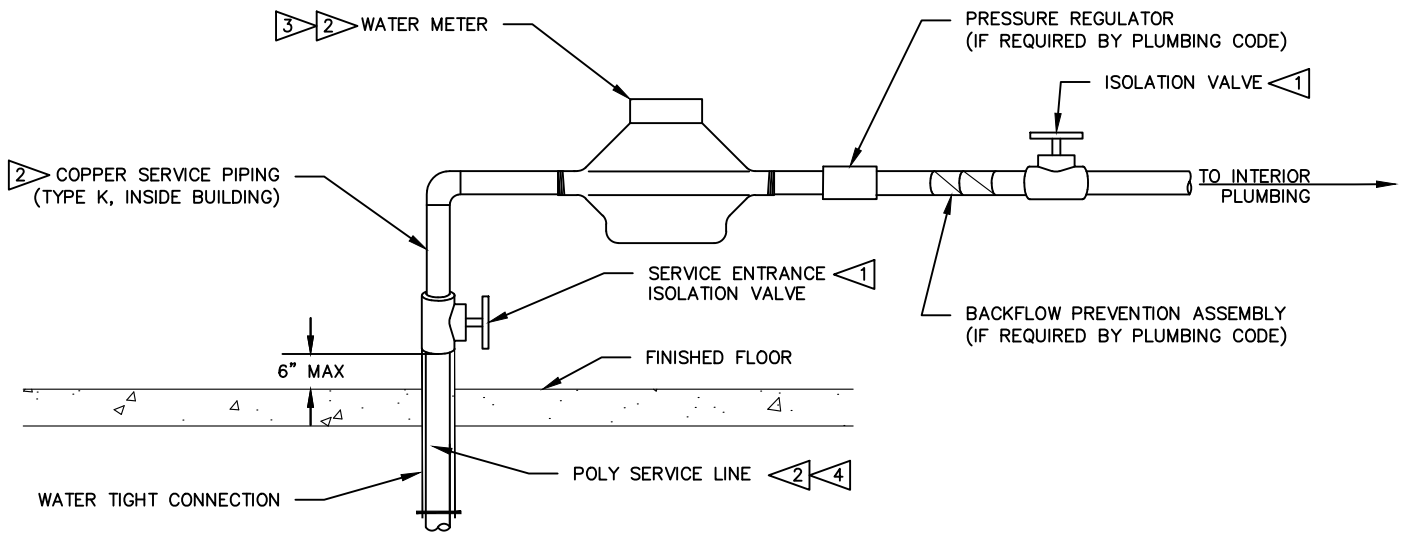
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

03



CONSTRUCTION NOTES:

1. THE FIRST FITTING INSIDE THE BUILDING AND THE ISOLATION VALVE DOWNSTREAM OF THE METER SHALL BE UL LISTED VALVES SIZED THE SAME AS THE SERVICE LINE.
2. METER AND SERVICE PIPING SHALL BE SIZED ACCORDING TO THE TABLE BELOW. METERS SHALL BE PURCHASED FROM THE CITY OF EAST HELENA PUBLIC WORKS DEPARTMENT.
3. **METER SHALL BE LOCATED WITHIN 4'-0" OF CRAWL SPACE OPENING.**
4. THE INCOMING SERVICE LINE SHALL BE A MINIMUM OF 6'–0" BELOW FINISHED GRADE.
5. ALL SERVICE LINE APPURTENANCES SHALL HAVE A MINIMUM WORKING PRESSURE OF 175 PSI.
6. WATER SERVICE LINES AND FIRE SERVICE LINES SHALL BE TWO SEPARATE SERVICES.

POLY SERVICE PIPE SIZE (SIDR 7. 200 PSI)	COPPER SERVICE PIPE SIZE (TYPE K)	METER SIZE*
1"	3/4"	3/4"
1¼"	1"	1"
2"	1½"	1½"

*SEE CITY OF EAST HELENA ORDINANCE 8–3–1, SECTION F.2. FOR METER SIZING REQUIREMENTS

RPA

SCALE: NONE

SHEET TITLE

WATER SERVICE ENTRANCE

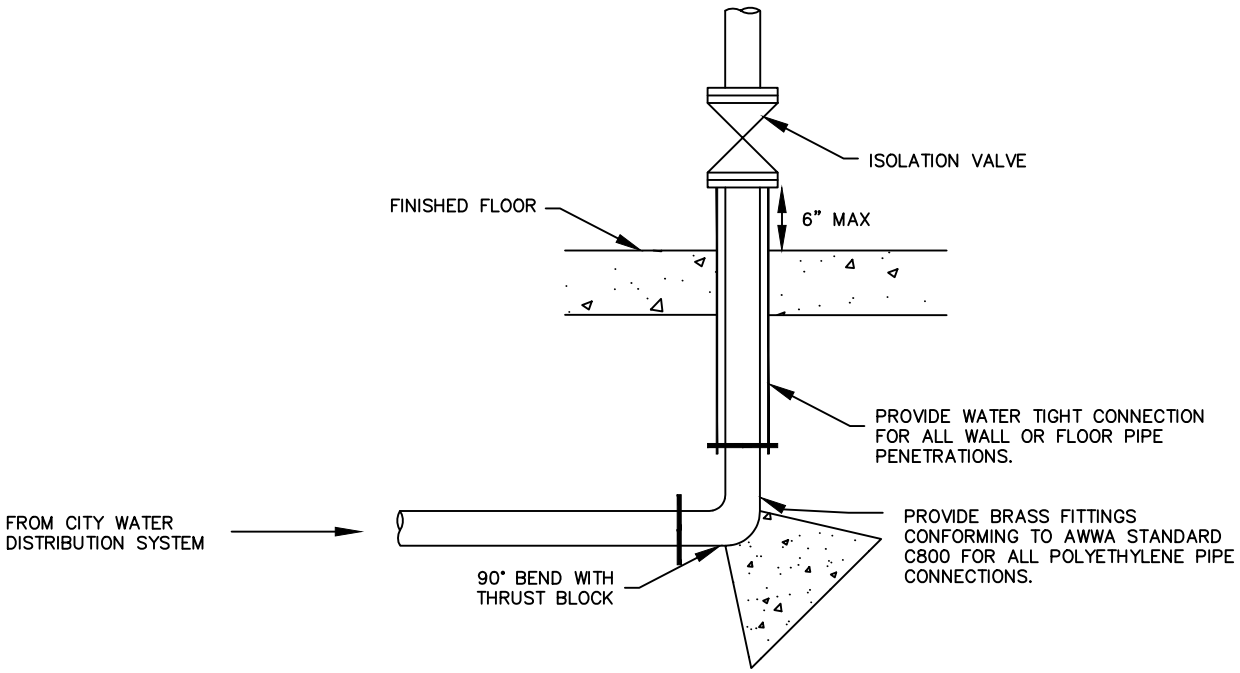
PROJECT TITLE

STANDARD DRAWINGS

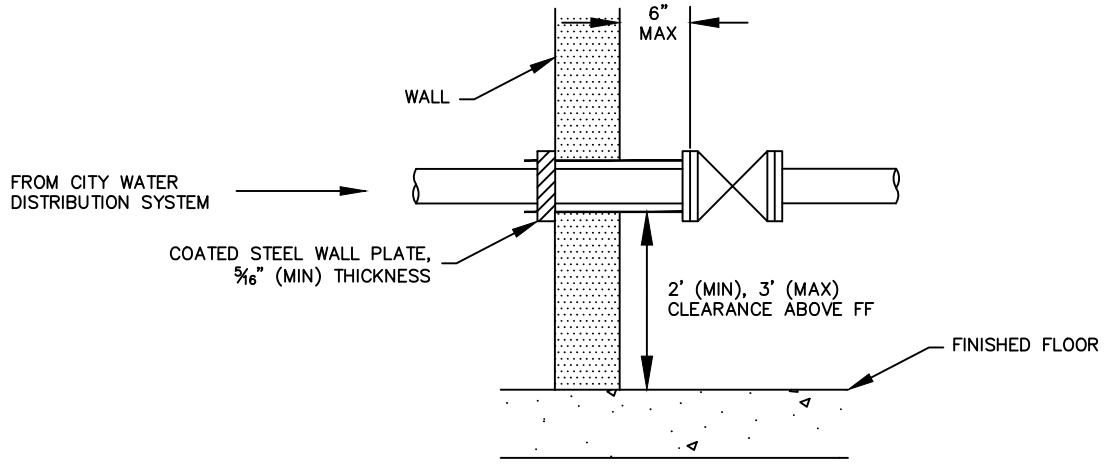
East Helena, Montana

FIGURE

04



FLOOR PENETRATION



WALL PENETRATION

F:\water\EHLN19\Standard Drawings\05_WATER SERVICE ENTRANCE CONFIGURATIONS.dwg Jul 18, 2023

RPA

SCALE: NONE

SHEET TITLE

WATER SERVICE ENTRANCE CONFIGURATIONS

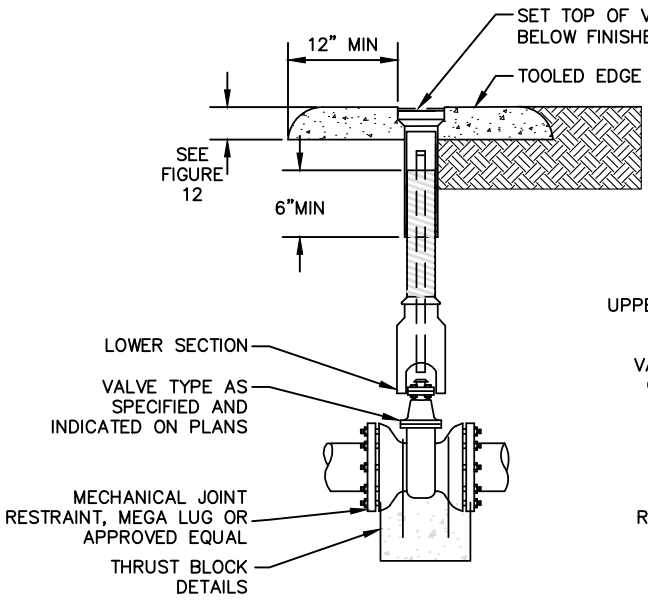
PROJECT TITLE

STANDARD DRAWINGS

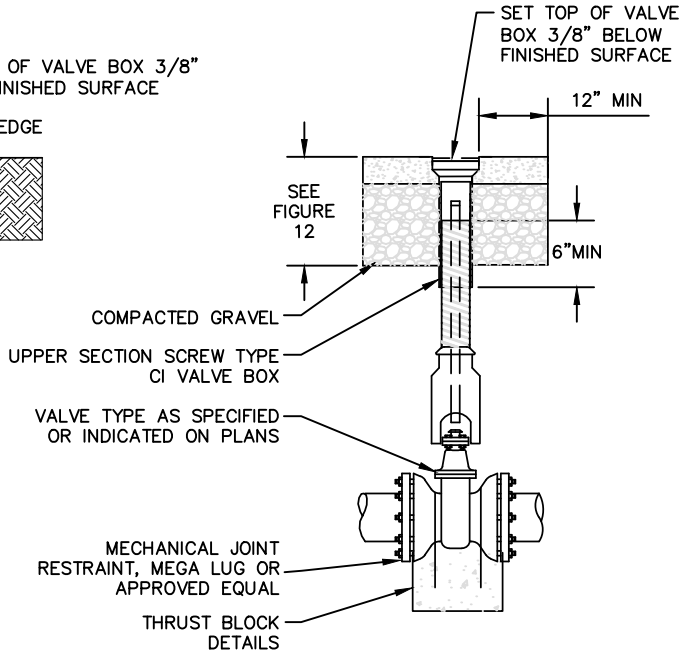
East Helena, Montana

FIGURE

05



SHOULDER OR DIRT ROAD



PAVED/ UNIMPROVED AREAS

NOTES:

1. ADJUST VALVE BOXES UPWARD OR DOWNWARD AS REQUIRED.
2. CONCRETE COLLARS SHALL BE POURED IN PLACE AT EACH WATER VALVE. IN PAVED AREAS CONCRETE COLLARS SHALL BE POURED AFTER PAVING. SEE FIGURE 12 FOR CONCRETE COLLAR DETAILS.
3. COMPACT ALL BACKFILL AROUND THE VALVE BOX UPPER SECTION BY MEANS OF HAND TAMPING.
4. ANY VALVE BOX UNCOVERED BY FINAL GRADING OPERATION SHALL BE PROVIDED WITH A CONCRETE COLLAR AS PER ABOVE DETAIL.
5. VALVES SHALL CLOSE IN THE CLOCKWISE DIRECTION.

RPA

SCALE: NONE

SHEET TITLE

VALVE SETTING

PROJECT TITLE

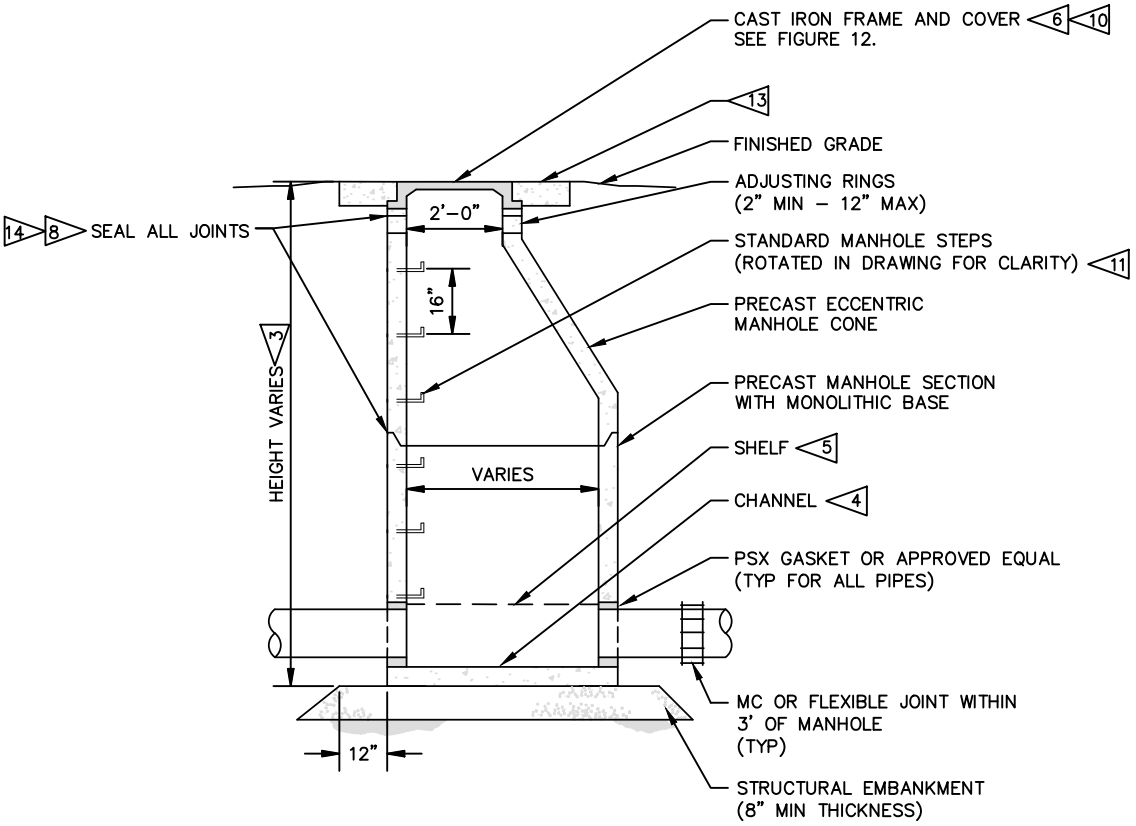
STANDARD DRAWINGS

East Helena, Montana

FIGURE

06

F:\water\EHLN19\Standard Drawings\06_VALVE SETTING.dwg Jul 18, 2023



CONSTRUCTION NOTES:

1. PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM C478.
2. PROVIDE 3" GROUT SPACE AROUND ALL PIPE. ALL JOINTS SHALL BE GROUTED WATERTIGHT.
3. IF MANHOLE IS LESS THAN 6'–0", OMIT ECCENTRIC CONE AND PROVIDE PRECAST STANDARD STRAIGHT MANHOLE WITH FLAT LID, RISER SECTION, AND COVER.
4. CHANNEL SHALL BE HALF THE DIAMETER OF THE PIPE. CONSTRUCT PER MPW.
5. CONCRETE SHELVES SHALL SLOPE TOWARD THE CHANNEL AT 1" PER FOOT.
6. MANHOLE COVER SHALL BE MARKED "SEWER" FOR THE WASTEWATER MANHOLES.
7. NEW MANHOLES SHALL BE COATED WITH AN EXTERIOR DAMPPROOFING; BITUMINOUS COAT OR COAL TAR EPOXY.
8. JOINT MATERIAL SHALL BE "RUBBER–NEK" OR APPROVED EQUAL.
9. FINISHED MANHOLES SHALL BE IN COMPLIANCE WITH LATEST EDITION OF MPWSS STANDARD SPECIFICATIONS.
10. FIELD SET COVER FLUSH W/ PAVEMENT, CONCRETE AND GRASS OR LAWN SURFACE. FIELD SET COVER 3" BELOW GRADE IN GRAVEL SURFACE.
11. STEPS SHALL BE PLACED AT 90° TO THE LINE OF SEWER PIPE WHERE APPLICABLE.
12. PROVIDE ALL SHORING NECESSARY TO PROTECT EXISTING STRUCTURES AND INFRASTRUCTURE.
13. INSTALL 12" COLLAR (6" THICK) AROUND COVER. INSTALL 2 REBAR HOOPS (#4 BAR).
14. WRAP EXTERIOR MANHOLE JOINTS WITH HIGH STRENGTH, WATERTIGHT ADHESIVE TAPE. ADHESIVE TAPE SHALL BE EZ–WRAP OR APPROVED EQUAL.

RPA

SCALE: NONE

SHEET TITLE

STANDARD MANHOLE

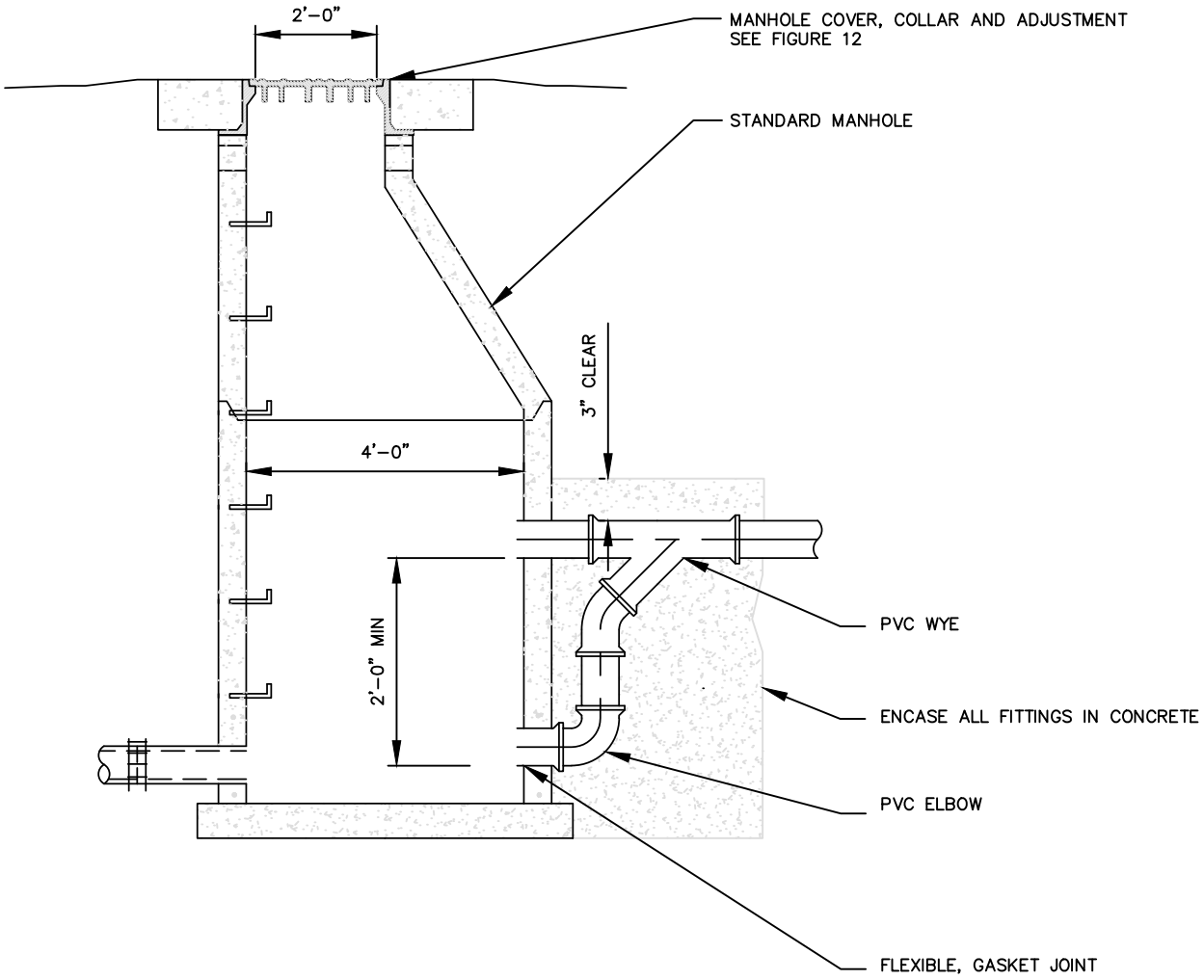
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

07



NOTES:

1. PROVIDE A DROP INLET WHENEVER THE PIPE INVERT IS MORE THAN 2'–0" ABOVE THE LOWEST MANHOLE INVERT.

SCALE: NONE

SHEET TITLE

DROP MANHOLE

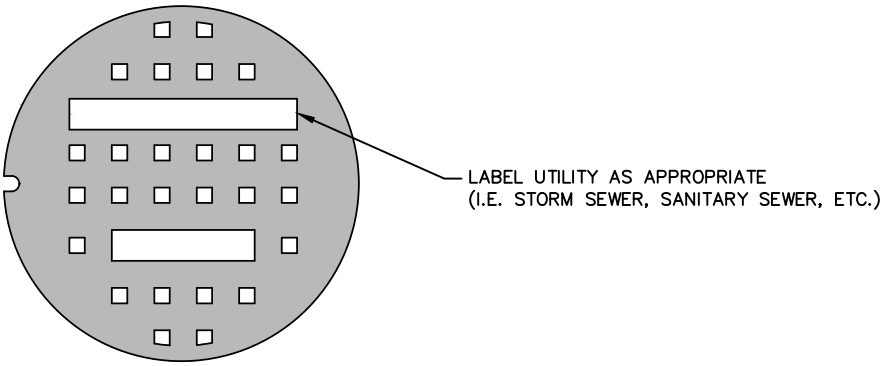
PROJECT TITLE

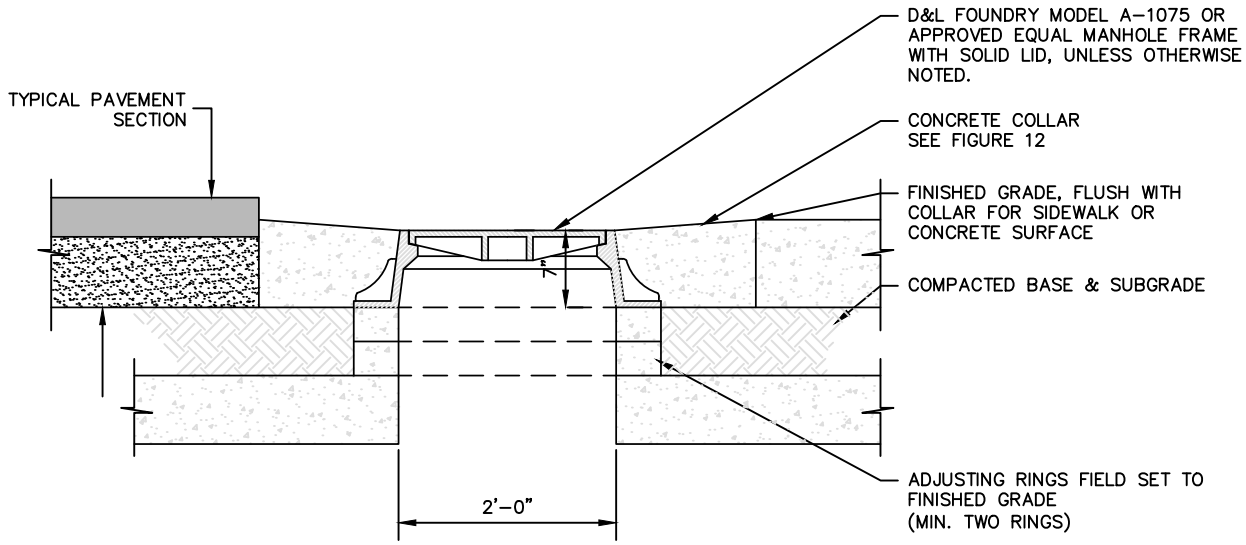
STANDARD DRAWINGS

East Helena, Montana

FIGURE

08





NOTES:

1. ADJUST MANHOLES UPWARD WITH CONCRETE ADJUSTMENT RINGS UNDER FRAME, 2" MINIMUM, 12" MAXIMUM.
2. SLOPE MANHOLE RING AS REQUIRED TO MATCH LONGITUDINAL & TRANSVERSE GRADE ON STREET. NO PAYMENT SHALL BE MADE FOR ADJUSTMENT OF NEW MANHOLES TO FINAL GRADE.
3. INSTALL CONCRETE COLLAR EXTENDING OUT FROM MANHOLE LID ON ALL SIDES, WHETHER IN STREET OR LANDSCAPED CONDITIONS. SEE FIGURE 12.
4. WATERPROOF MANHOLE RINGS & LIDS ARE REQUIRED ON MANHOLES LOCATED IN GUTTER LINES, FLOW LINES, OR OUTSIDE THE ROADWAY.
5. SANITARY SEWER MANHOLE LIDS IN LANDSCAPED AREAS SHALL BE SLOPED TO DRAIN AWAY FROM LID.

RPA

SCALE: NONE

SHEET TITLE

MANHOLE COVER, COLLAR & ADJUSTMENT

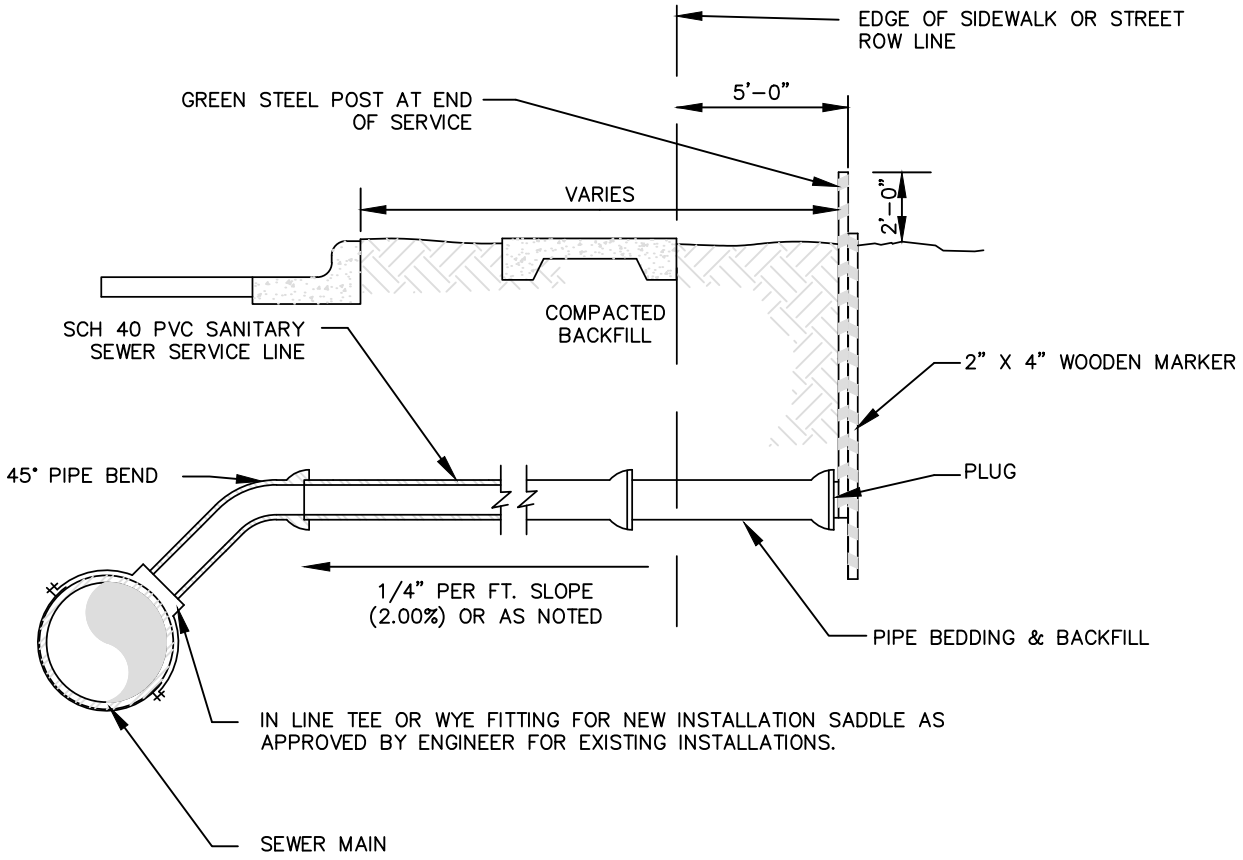
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

09



NOTES:

1. SERVICE CONNECTIONS MUST BE INSPECTED BY CITY PERSONNEL AND ARE SUBJECT TO FEE(S) PER CITY ORDINANCE.

RPA

SCALE: NONE

SHEET TITLE

SANITARY SEWER SERVICE LINE INSTALLATION

PROJECT TITLE

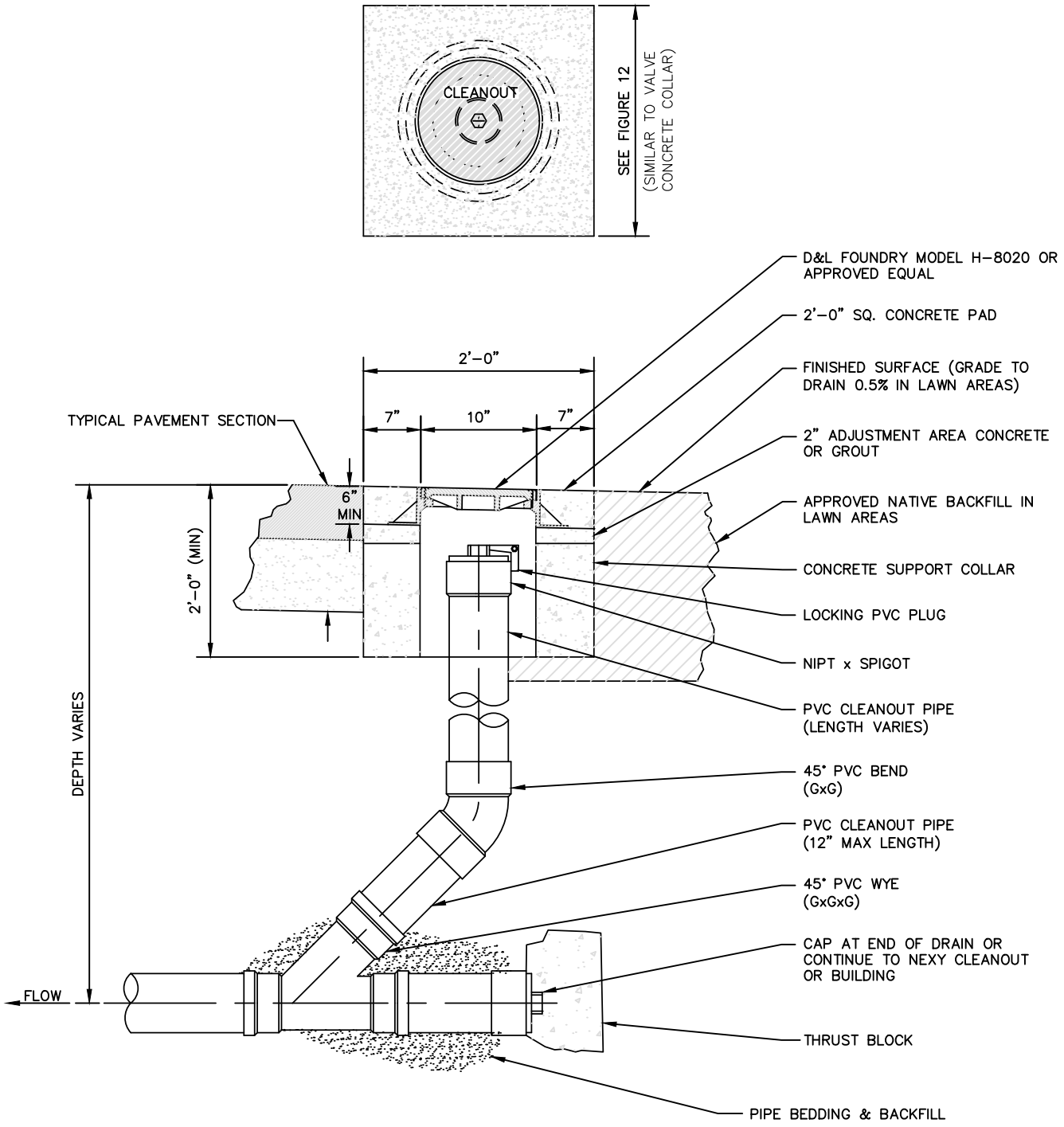
STANDARD DRAWINGS

East Helena, Montana

FIGURE

10

F:\water\EHLN19\Standard Drawings\10_SANITARY SEWER SERVICE LINE INSTALLATION.dwg Jul 18, 2023



NOTES:

1. STUB CLEANOUT 6" ABOVE GROUND SURFACE UNTIL FINAL LANDSCAPING/GRADING/PAVING IS COMPLETED, AT WHICH TIME THE STUB CLEANOUT SHALL BE LOWERED TO NO MORE THAN 6" BELOW FINAL GRADE.
2. ADJUST CLEANOUT COVER 1/4" BELOW FINISHED GRADE ON PAVED SURFACE.
3. CLEANOUT SHALL BE LOCATED 5 FT. FROM BUILDING FACE OR AS SPECIFIED ON THE PLANS.
4. PRECAST TRAFFIC BOXES MUST BE RATED FOR HS20 LOADING & MUST BE SUBMITTED FOR APPROVAL IF CLEANOUT IS PLACED IN ANY LOCATION WERE TRAFFIC MAY BE PRESENT.

RPA

SCALE: NONE

SHEET TITLE

CLEANOUT AND COVER

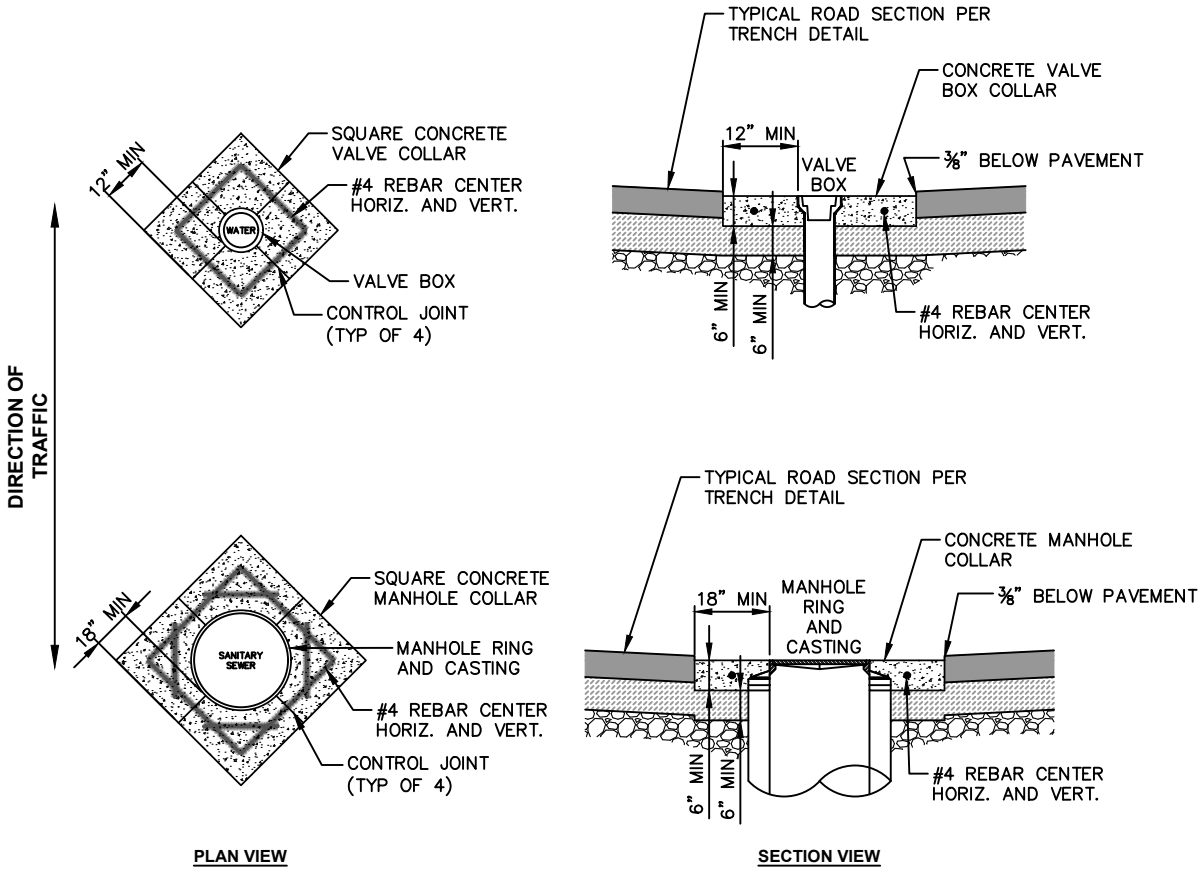
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

11



PLAN VIEW **SECTION VIEW**

NOTE:

1. ALL VISIBLE CONCRETE EDGES AND JOINTS SHALL BE ROUNDED WITH A ¼" RADIUS EDGING TOOL.
2. CONCRETE SHALL BE M–4000 WITH 3/4" MAX. AGGREGATE, MIN. 28 DAY STRENGTH OF 4000 PSI, 6% +/– 1.5% AIR ENTRAINMENT AND MAX SLUMP OF 4".
3. ALL EXISTING ASPHALT AND CONCRETE SHALL BE SAW CUT.
4. IF MANHOLE OR VALVE BOX IS LOCATED IN SIDEWALK OR CONCRETE SURFACE, CONCRETE COLLAR SHALL BE FLUSH WITH SURFACE.

RPA

SCALE: NONE

SHEET TITLE

CONCRETE COLLAR

PROJECT TITLE

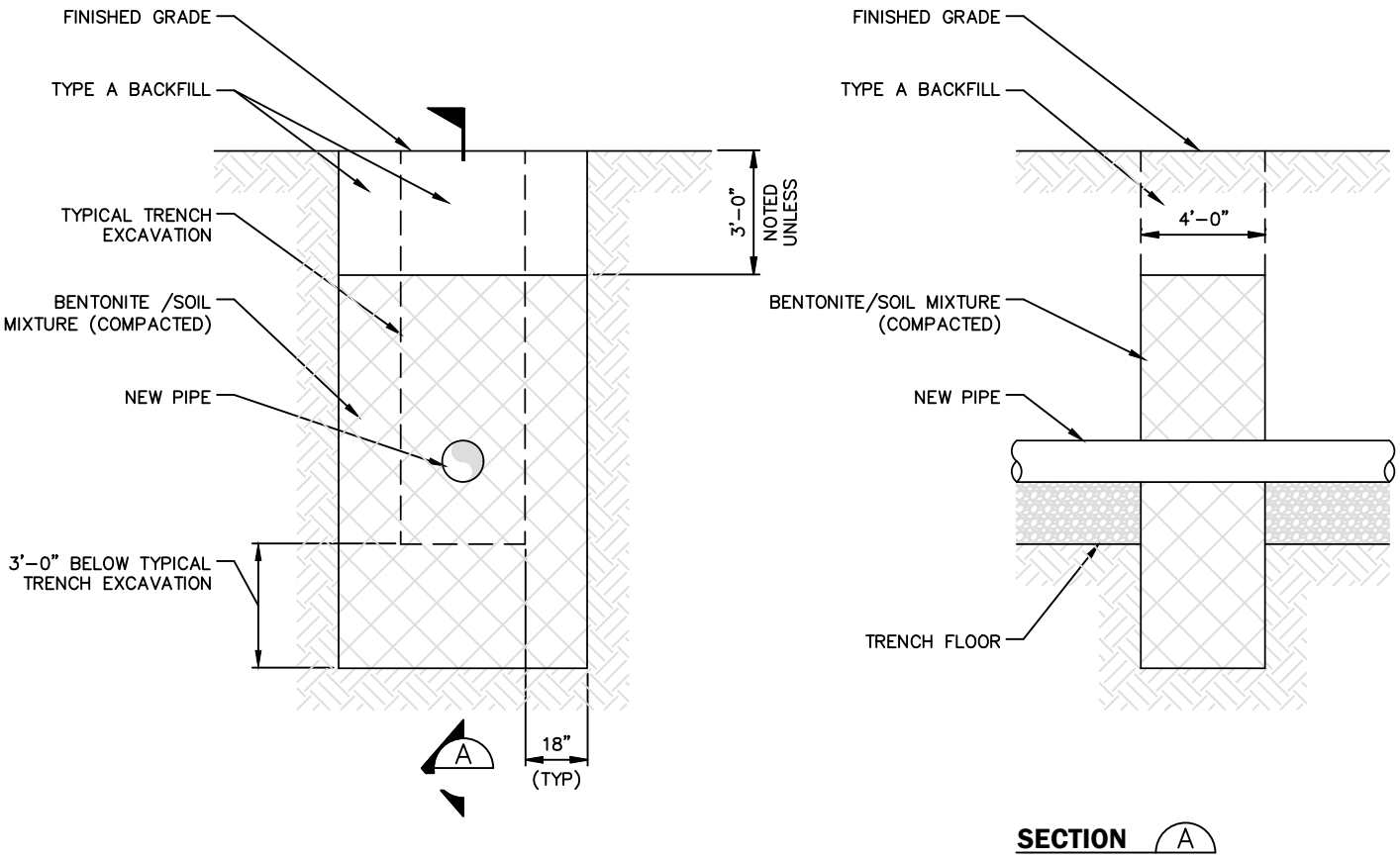
STANDARD DRAWINGS

East Helena, Montana

FIGURE

12

F:\water\EHLN19\Standard Drawings\12_CONCRETE COLLAR.dwg Jul 18, 2023



NOTES:

1. THE PURPOSE OF THE TRENCH WATER STOP IS TO PREVENT TYPE 1 & TYPE 2 BEDDING FROM BECOMING A CONDUIT FOR GROUNDWATER.
2. PROVIDE THE MIXTURE PROPORTIONING OF THE BENTONITE MATERIAL WITH ON–SITE LEAN CLAYS. ALL TRENCH WATER STOPS SHALL BE CONSTRUCTED TO HAVE AN IN–PLACE PERMEABILITY RATE OF 1x10–7 CM/SECOND OR LESS. THE A MIX PROPORTION DESIGN & CERTIFIED TESTING RESULTS FROM A PROFESSIONAL LAB INDICATING THE CONFORMANCE WITH THIS PERMEABILITY RATE SHALL BE SUBMITTED.
3. TRENCH WATER STOPS SHALL BE INSTALLED AT A MINIMUM OF 400'–0" APART, OR CROSSINGS OF STREAMS, DITCHES, OR OTHER SOURCES OF GROUNDWATER.

RPA

SCALE: NONE

SHEET TITLE

TRENCH PLUG

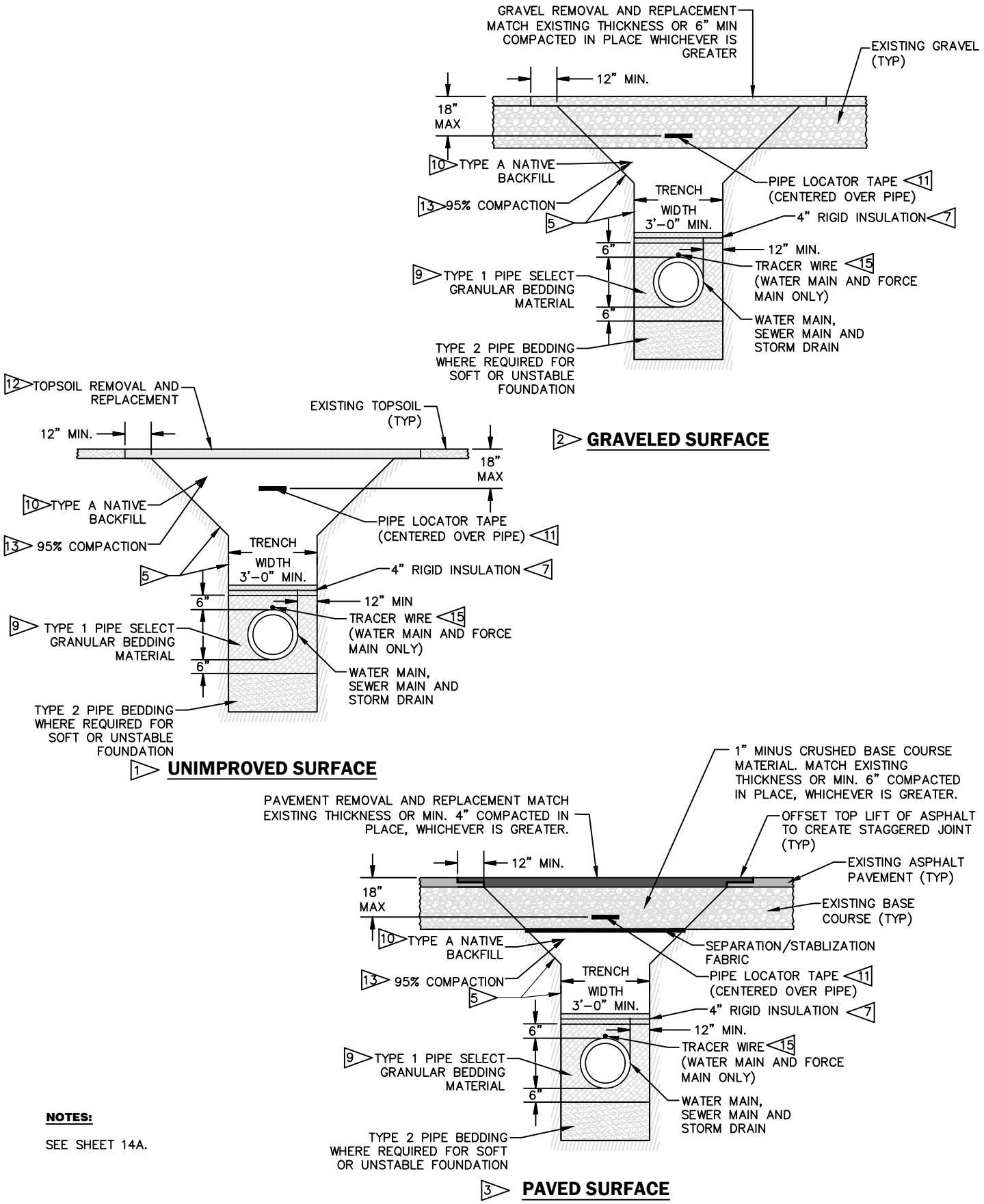
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

13



NOTES:

SEE SHEET 14A.

RPA

SCALE: NONE

SHEET TITLE

UTILITY TRENCH

PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

14

CONSTRUCTION NOTES:

1> WHERE TRENCH PASSES THROUGH UNIMPROVED SURFACES THE TOPSOIL SHALL BE REMOVED AND REPLACED A MAXIMUM OF 20' FROM THE CENTERLINE OF THE PIPE. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES BEYOND THIS WIDTH AT THEIR OWN EXPENSE.

2> WHERE TRENCH PASSES THROUGH EXISTING GRAVEL THE GRAVEL SHALL BE REMOVED AND REPLACED A MAXIMUM OF 10' FROM THE CENTERLINE OF THE PIPE. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES BEYOND THIS WIDTH AT THEIR OWN EXPENSE.

3> WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MAXIMUM OF 5' FROM THE CENTERLINE OF THE PIPE. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES BEYOND THIS WIDTH AT THEIR OWN EXPENSE.

4. VERIFY THAT COMPACTION METHODS ARE COMPARABLE WITH PIPE MANUFACTURER'S RECOMMENDATIONS. ANY DAMAGE TO THE PIPE WILL BE THE CONTRACTOR'S RESPONSIBILITY.

5> TRENCH SHALL BE CONSTRUCTED TO OSHA SPECIFICATIONS FOR EXCAVATION. DRAWINGS DO NOT SHOW TRENCH DIMENSIONS OR BACKSLOPES THAT MAY BE REQUIRED. CONTRACTOR REQUIRED TO DETERMINE WHICH OSHA SPECIFICATIONS ARE APPLICABLE.

6. CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL SPOILS.

7> INSTALL 4" OF RIGID INSULATION (BLUEBOARD OR APPROVED EQUAL) THE FULL WIDTH OF THE TRENCH WHEN BURY TO TOP OF PIPE IS LESS THAN 6'–0".

8. ALL ROCKS GREATER THAN 12" IN ANY DIMENSION SHALL BE HAULED OFF SITE AND DISPOSED OF PROPERLY.

9> NO ROCKS OR LUMPS LARGER THAN 2" IN ANY DIMENSION SHALL BE ALLOWED WITHIN 6" OF THE PIPE.

10> USE SUITABLE NATIVE MATERIAL FOR BACKFILL. SEE TECHNICAL SPECIFICATIONS FOR CONDITIONS REQUIRING IMPORTED TRENCH BACKFILL.

11> USE LABELED AND COLOR–CODED TAPE FOR THE APPROPRIATE UTILITY PIPE, PLACED 18" MAXIMUM BELOW FINISHED SURFACE.

12> SEED, FERTILIZE, AND MULCH ALL DISTURBED AREAS WHICH ARE NOT PAVED, CONCRETED, OR GRAVELED PER SPECIFICATIONS.

13> COMPACTION REFERS TO PERCENT OF MAXIMUM DENSITY DETERMINED BY A STANDARD PROCTOR. ASTM D 698–91. TRENCHES EXCEEDING 10 FEET IN DEPTH SHALL BE COMPACTED TO 98% OF MAXIMUM DENSITY PER ASTM D 698–91.

14. FINISHED GRADE MUST MATCH THE ORIGINAL EXISTING GRADE WHERE PIPE IS INSTALLED UNLESS OTHERWISE NOTED.

15> TRACER WIRE SHALL BE 12 AWG TW DIRECT–BURY SOLID COPPER WIRE WITH CROSS–LINKED POLYETHYLENE INSULATION.

RPA

SCALE: NONE

SHEET TITLE

UTILITY TRENCH DETAILS

PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

14A

RPA

SCALE: NONE

SHEET TITLE

THRUST BLOCKING

PROJECT TITLE

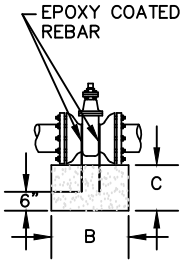
STANDARD DRAWINGS

East Helena, Montana

FIGURE

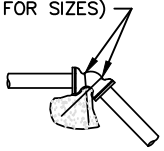
15

VOLUME OF THRUST BLOCK IN CUBIC YARDS (VERTICAL BENDS)			
FITTING SIZE (INCHES)	BEND ANGLE		
	45°	22–1/2°	11–1/4°
4	0.8	0.3	0.1
6	2.0	0.8	0.3
8	3.0	1.1	0.4
10	4.5	1.7	0.7
12	6.4	2.4	1.0
14	8.6	3.2	1.3
16	11.1	4.2	1.7
18	14.1	5.3	2.2
20	17.3	6.6	2.7
24"	24.2	9.2	3.8



VERTICAL BEND REBAR		
FITTING SIZE	ROD SIZE	EMBEDMENT
12" AND LESS	#6	30"
14" – 16"	#8	36"
18" – 20"	#10	36"
24"	#11	42"

EPOXY COATED REBAR OVER FITTING AND EMBEDDED IN CONCRETE (SEE TABLE FOR SIZES)

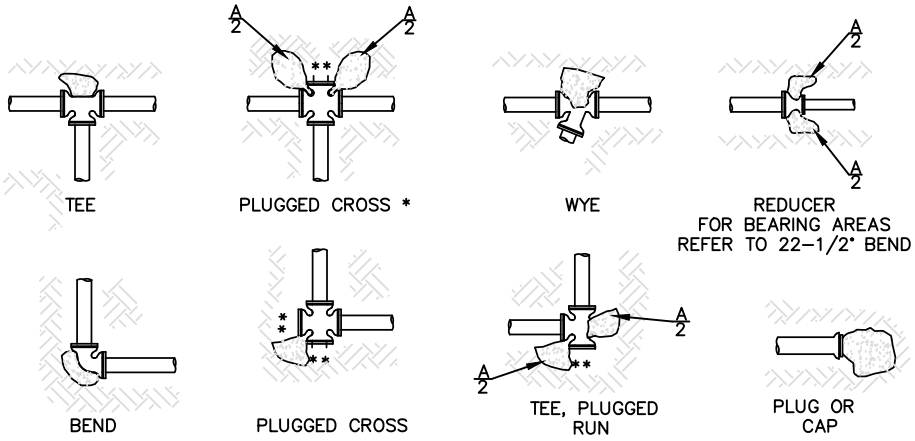


VERTICAL BEND

BEARING AREA OF THRUST BLOCKS IN SQFT (HORIZONTAL BENDS)							
FITTING SIZE (INCHES)	TEE, WYE, PLUG, OR CAP	90° Bend, PLUGGED CROSS	TEE, PLUGGED RUN		BEND ANGLE		
			A 1	A 2	45°	22–1/2°	11–1/4°
4	1.3	1.8	1.3	1.8	1.0	1.0	–
6	3.0	4.2	3.0	4.2	2.3	1.2	1.0
8	5.3	7.6	5.3	7.6	4.1	2.1	1.0
10	8.3	11.8	8.3	11.8	6.4	3.3	1.6
12	12.0	17.0	12.0	17.0	9.2	4.7	2.4
14	16.3	23.1	16.3	23.1	12.5	6.4	3.2
16	21.4	30.2	21.4	30.2	16.3	8.3	4.2
18	27.0	32.0	27.0	32.0	20.7	10.5	5.3
20	33.4	47.2	33.4	47.2	25.5	13.0	6.5
24	40.3	55.0	40.3	55.0	35.7	18.0	9.0

NOTE: DIMENSION 'A' IS WIDTH OF THRUST BLOCK (PERPENDICULAR TO PAGE)

VALVE THRUST BLOCK DIMENSIONS							
VALVE SIZE	REBAR SIZE	100 PSI			150 PSI		
		A	B	C	A	B	C
4"	#6	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
6"	#6	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
8"	#6	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
10"	#6	2.0'	2.0'	2.0'	2.5'	2.5'	2.0'
12"	#6	2.3'	2.0'	2.0'	3.0'	3.0'	2.7'
14"	#8	2.3'	2.0'	2.3'	3.4'	3.0'	3.0'
16"	#9	3.0'	3.0'	2.9'	4.3'	3.0'	3.0'
18"	#10	3.7'	3.0'	3.0'	5.4'	3.0'	3.0'
20"	#10	3.9'	3.3'	3.3'	5.7'	3.3'	3.3'
24"	#11	4.3'	4.0'	4.0'	6.4'	4.0'	4.0'

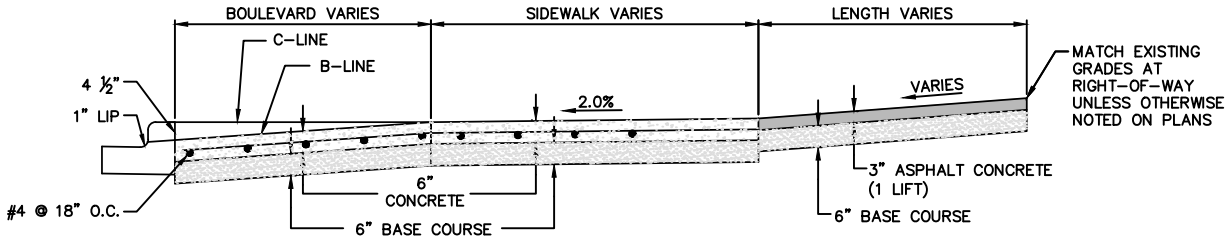


*EACH AREA (A/2) IS 1/2 OF TABULATED TOTAL AREA

** RESTRAINED PLUG

THRUST BLOCK NOTES:

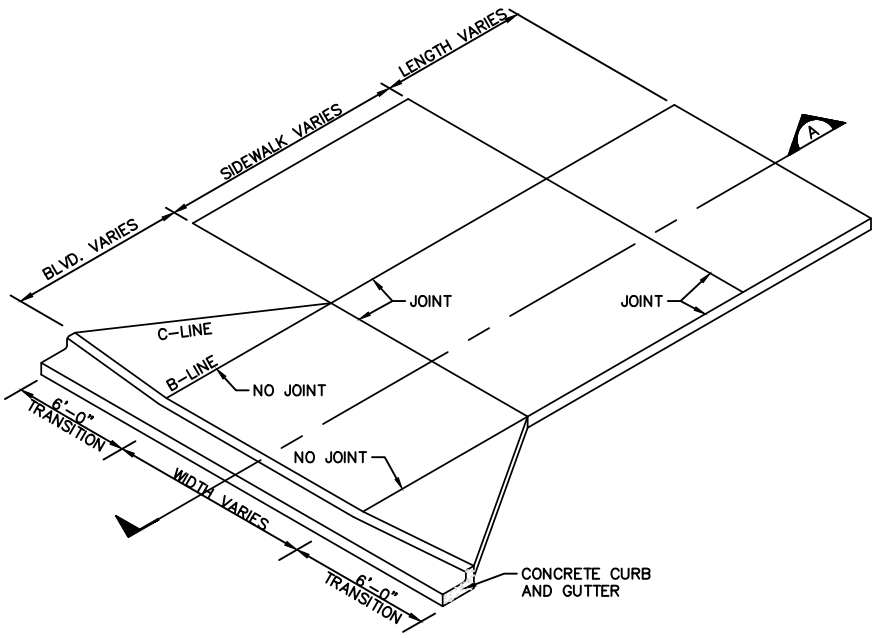
1. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES.
2. POUR THRUST BLOCKING AGAINST UNDISTURBED EARTH.
3. REQUIRED VOLUMES AND BEARING AREAS SHALL BE AS SHOWN IN THE TABLE AND ADJUSTED, IF NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS OF 2000 LBS/SQFT.
4. BEARING AREAS FOR HORIZONTAL BEND THRUST BLOCKS ARE BASED ON TEST PRESSURE OF 150 PSIG AND AN ALLOWABLE SOIL BEARING STRESS OF 2000 LBS/SQFT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES USE THE FOLLOWING:
   $B_1 = B(13.33)(P_1/2000)$ WHERE:
   P_1 = ACTUAL TEST PRESSURE, PSIG
   B_1 = COMPUTED BEARING AREA
   B = BEARING AREA FROM TABLE
5. THRUST BLOCK VOLUMES FOR VERTICAL BENDS HAVING UPWARD RESULTANT THRUSTS ARE BASED ON TEST PRESSURE OF 150 PSIG AND THE WEIGHT OF CONCRETE = 4050 LBS/CU YD. TO COMPUTE VOLUMES FOR DIFFERENT TEST PRESSURES USE THE FOLLOWING:
   ACTUAL VOLUME = (TEST PRESSURE/150) X (TABLE VOLUME).
6. VERTICAL BENDS HAVING DOWNWARD RESULTANT THRUSTS AND HORIZONTAL BENDS, HAVE THE SAME THRUST BLOCK REQUIREMENTS.
7. BEARING AREAS, VOLUMES, AND SPECIAL BLOCKING DETAILS SPECIFIED OR SHOWN ELSEWHERE IN THESE PLANS TAKE PRECEDENCE OVER THIS STANDARD DETAIL.
8. THRUST BLOCK BEARING AREA SHALL NOT BE LESS THAN 1.0 SQFT.
9. TEST PRESSURES ARE INDICATED IN THE SPECIFICATIONS AND THE ALLOWABLE SOIL BEARING STRESS IS 2000 LBS/SQFT.
10. CONTRACTOR SHALL PROVIDE THRUST BLOCKING FOR ALL BURIED FITTINGS AND VALVES.



SECTION A

NOTES:

1. PLACE #4 REBAR @ 18" O.C. SUPPORTED BY 3" TALL CHAIRS IN ALL 6" CONCRETE.
2. SEE MPWSS 02529 FOR JOINT REQUIREMENTS.



RPA

SCALE: NONE

SHEET TITLE

DRIVEWAY APPROACH

PROJECT TITLE

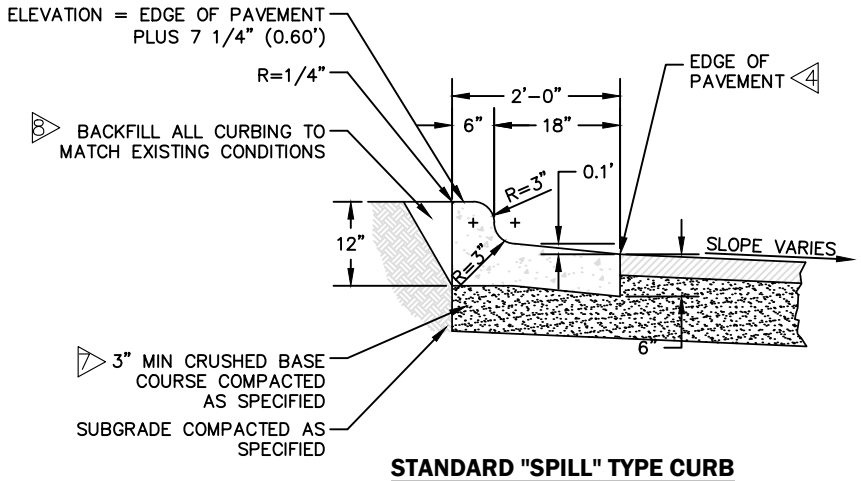
STANDARD DRAWINGS

East Helena, Montana

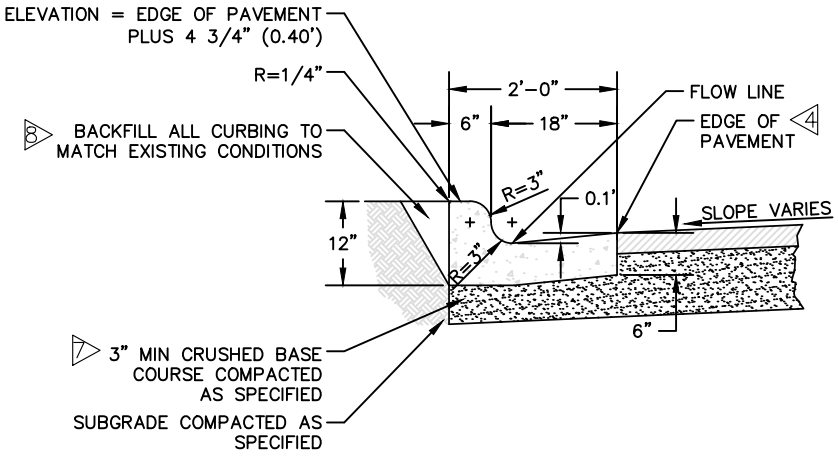
FIGURE

16

F:\water\EHLN19\Standard Drawings\16_DRIVEWAY APPROACH.dwg Jul 18, 2023



STANDARD "SPILL" TYPE CURB



STANDARD "CATCH" TYPE CURB

NOTES:

1. CONTRACTION JOINTS SHALL BE PLACED EVERY 10 FT. IN ACCORDANCE WITH MPWSS 02528. CONTRACTION JOINTS SHALL BE 1 TO 1 ½" DEEP.
2. EXPANSION JOINTS OF 1/2 IN. PRE FORMED MASTIC MATERIAL SHALL BE PLACED AT THE FOLLOWING LOCATIONS: PC'S & PT'S OF CURVE, GRADE BREAKS, JUNCTIONS WITH EXISTING CONCRETE, OPPOSITE TO OR AT EXPANSION JOINTS IN ADJACENT CONCRETE, AT MAXIMUM 300 FT. INTERVALS, 4 IN. ON EITHER SIDE OF A DRAINAGE STRUCTURE, AND AT OTHER LOCATIONS AS SPECIFIED BY THE ENGINEER.
3. UNLESS OTHERWISE SPECIFIED IN THESE PLANS; CONSTRUCTION MATERIALS & PROCEDURES SHALL CONFORM TO MPWSS CURRENT EDITION.

4 FINISHED PAVEMENT SURFACE SHALL BE 1/8" TO 1/4" ABOVE LIP OF CURB ON STANDARD "CATCH" TYPE CURBS & FLUSH WITH END OF CURB ON STANDARD "SPILL" TYPE CURBS.

5. ALL CURBS TO BE "CATCH" TYPE, UNLESS OTHERWISE NOTED.
6. TRANSITION FROM "CATCH" TO "SPILL" CURBS OVER A 10'-0" TRANSITION CENTERED ON THE DIVIDING LINE SHOWN ON THE PLAN SHEET.

7 BASE COURSE BELOW CURB & GUTTER SHALL BE A MINIMUM 3 INCHES THICK OR THE BALANCE OF THE TYPICAL SECTION, WHICH EVER IS GREATER.

8 ALL NEW CURB SHALL BE BACKFILLED IN SUCH A MANNER AS TO MATCH EXISTING OR NEW ADJACENT AREAS.

RPA

SCALE: NONE

SHEET TITLE

CONCRETE CURB & GUTTER

PROJECT TITLE

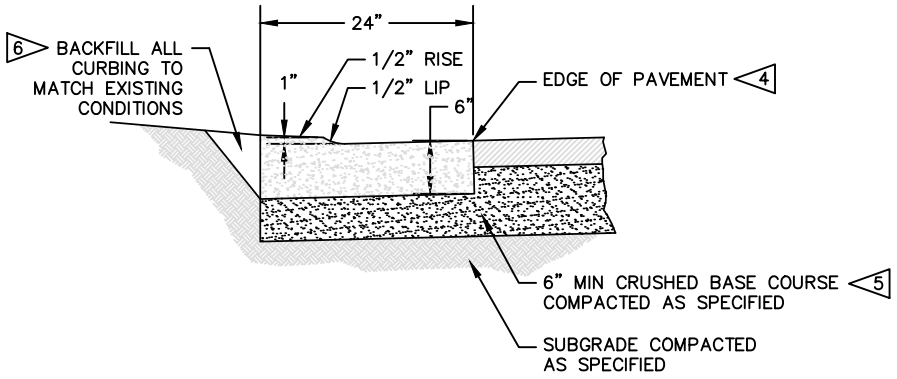
STANDARD DRAWINGS

East Helena, Montana

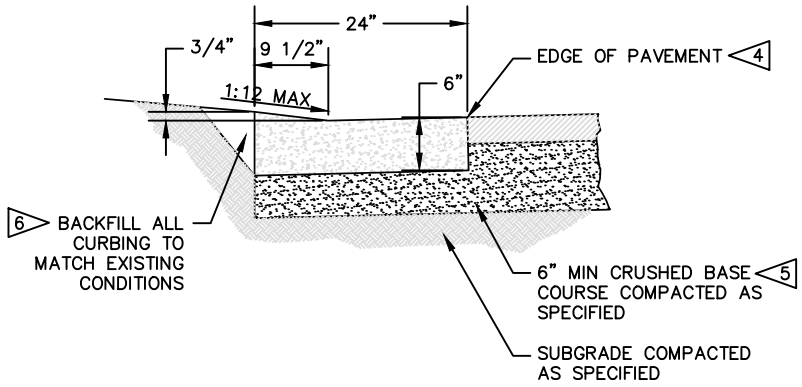
FIGURE

17

F:\water\EHLN19\Standard Drawings\17_CONCRETE CURB & GUTTER.dwg Jul 18, 2023



STANDARD DRIVEWAY & DUMPSTER LAYDOWN CURB



STANDARD HANDICAP RAMP LAYDOWN CURB

NOTES:

1. CONTRACTION JOINTS SHALL BE PLACED EVERY 10 FT. IN ACCORDANCE WITH MPWSS 02528. CONTRACTION JOINTS SHALL BE 1 TO 1 ½" DEEP.
2. EXPANSION JOINTS OF 1/2 IN. PRE FORMED MASTIC MATERIAL SHALL BE PLACED AT THE FOLLOWING LOCATIONS: PC'S & PT'S OF CURVE, GRADE BREAKS, JUNCTIONS WITH EXISTING CONCRETE, OPPOSITE TO OR AT EXPANSION JOINTS IN ADJACENT CONCRETE, AT MAXIMUM 300 FT. INTERVALS, 4 IN. ON EITHER SIDE OF A DRAINAGE STRUCTURE, AND AT OTHER LOCATIONS AS SPECIFIED BY THE ENGINEER.
3. CONSTRUCTION MATERIALS & PROCEDURES SHALL CONFORM TO MPWSS CURRENT EDITION.

4 FINISHED PAVEMENT SURFACE SHALL BE 1/8" TO 1/4" ABOVE LIP OF CURB ON STANDARD "CATCH" TYPE CURBS & FLUSH WITH END OF CURB ON STANDARD "SPILL" TYPE CURBS.

5 BASE COURSE BELOW CURB & GUTTER SHALL BE A MINIMUM 3 INCHES THICK OR THE BALANCE OF THE TYPICAL SECTION, WHICHEVER IS GREATER.

6 ALL NEW CURB SHALL BE BACKFILLED IN SUCH A MANNER AS TO MATCH EXISTING OR NEW ADJACENT AREAS.

RPA

SCALE: NONE

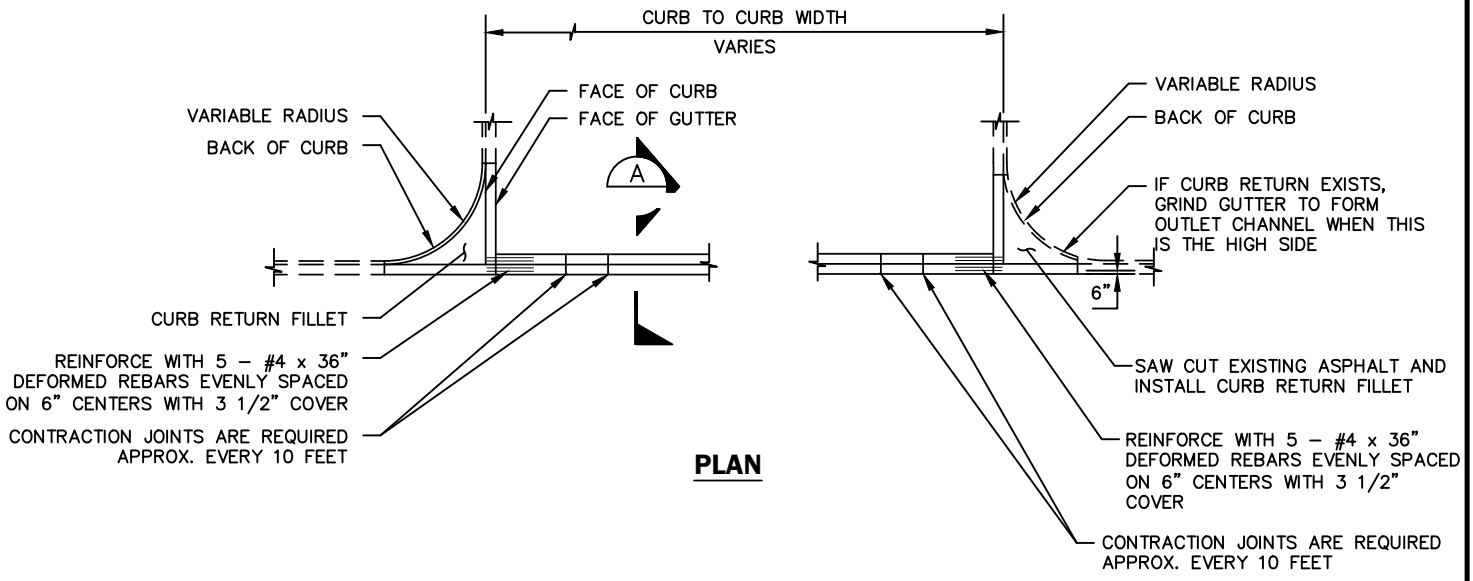
SHEET TITLE
LAYDOWN CURB

PROJECT TITLE
STANDARD DRAWINGS
East Helena, Montana

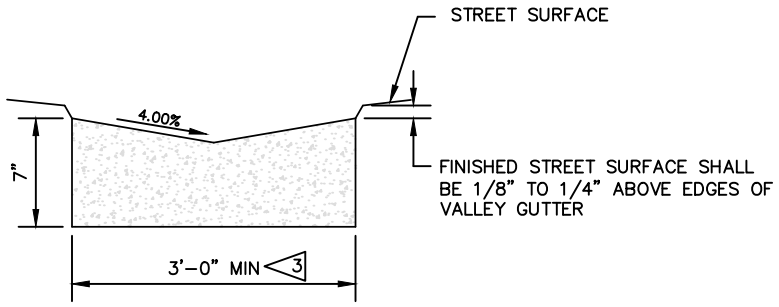
FIGURE
18

CURB RETURN FILLET REQUIRED FOR NEW CURB & GUTTER INSTALLATIONS (TYPICAL)

EXISTING CURB & GUTTER INSTALLATION WITHOUT CURB RETURN FILLET



PLAN



SECTION A

NOTES:

1. INSTALL REINFORCEMENT AT ALL CONSTRUCTION JOINTS.
2. CONTRACTION JOINTS ARE 1/8" MIN. AND 3/8" MAX. IN WIDTH. FORM JOINTS BY SAWING OR SCORING TO A MINIMUM DEPTH OF 1". FORM SCORED JOINTS BY A TOOL WHICH WILL LEAVE ROUNDED CORNERS AND DESTROY AGGREGATE INTERLOCK TO A MINIMUM DEPTH OF 1".

3 DIMENSIONS WILL VARY DEPENDING ON FLOW CONDITIONS.

RPA

SCALE: NONE

SHEET TITLE

CONCRETE VALLEY GUTTER

PROJECT TITLE

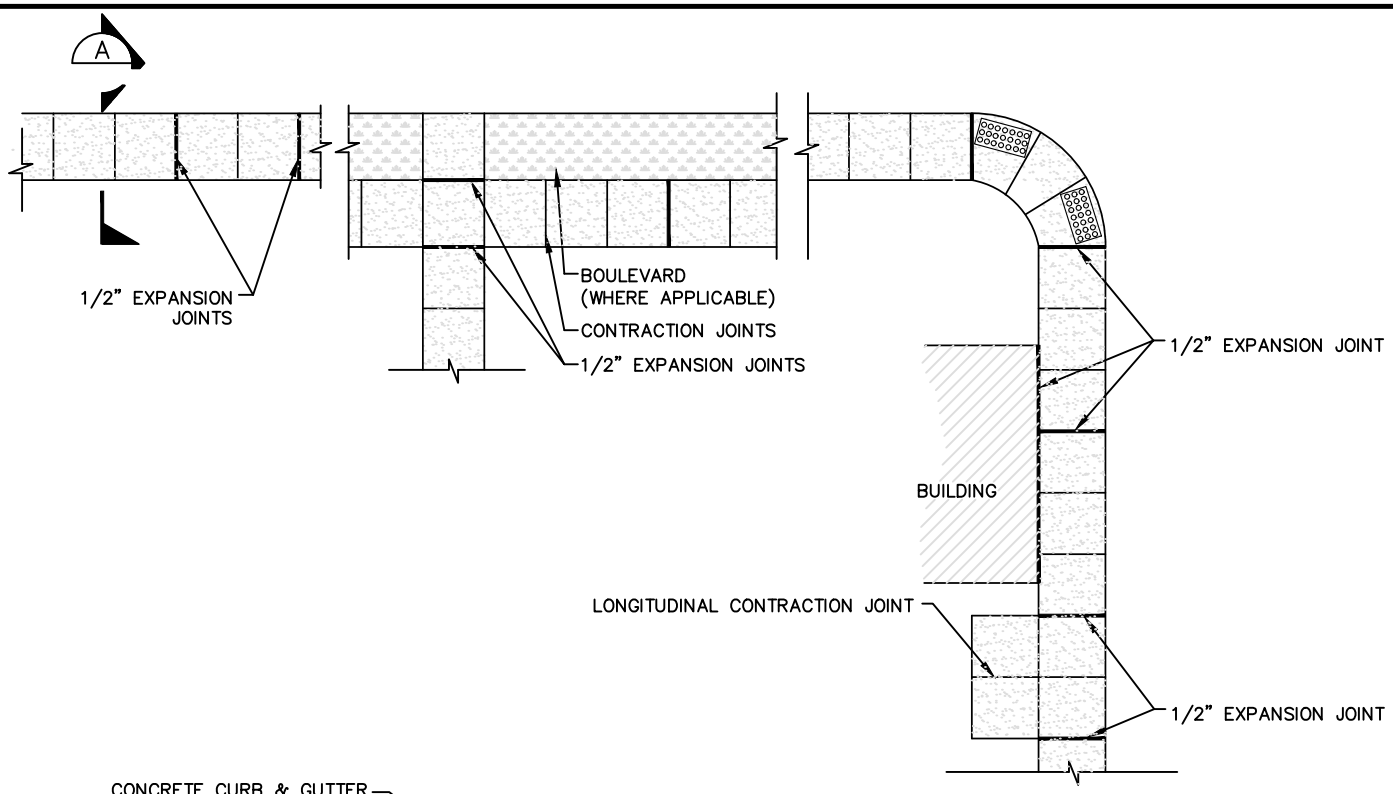
STANDARD DRAWINGS

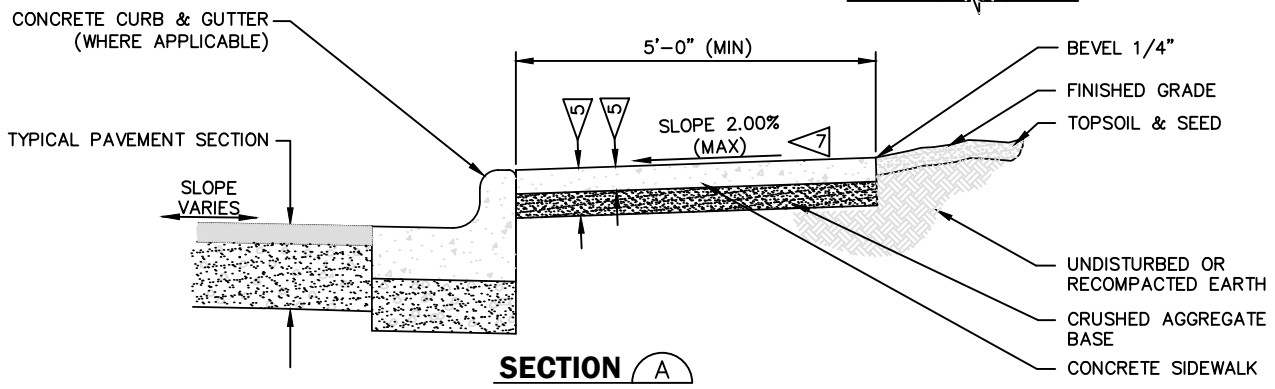
East Helena, Montana

FIGURE

19

F:\water\EHLN19\Standard Drawings\19_CONCRETE VALLEY GUTTER.dwg Jul 20, 2023





SECTION A

NOTES:

1. PREFORMED SEMI-RIGID, CLOSED-CELL POLYPROPYLENE FOAM JOINT FILLER SHALL BE INSTALLED AT EXPANSION JOINTS FOR THE FULL THICKNESS OF THE SIDEWALK & WILL BE USED AT ALL JOINTS BETWEEN NEW CONCRETE SIDEWALK & STRUCTURES IN PLACE.
2. ALL JOINTS SHALL BE STRAIGHT AND PERPENDICULAR TO THE CENTERLINE & SURFACE OF THE SIDEWALK. ALL JOINTS, WHERE APPLICABLE, SHALL ALIGN WITH LIKE JOINTS IN ADJOINING WORK. JOINTS SHALL BE USED TO OUTLINE ALL PANELS IN THE SIDEWALK, WHICH SHALL BE, SO FAR AS POSSIBLE, SQUARE.
3. CONTRACTION JOINTS SHALL NOT BE MORE THAN 1/8" WIDE AND NOT LESS THAN 1" IN DEPTH & MAY BE CUT BY A GROOVE FORMING TOOL. CONTRACTION JOINTS WITHIN SIDEWALKS SHALL BE REQUIRED AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK OR CENTERLINE CONTRACTION JOINT WIDTH. CONTRACTION JOINTS SHALL HAVE A BEVELED 1/4" RADIUS.
4. ALL SIDEWALKS WIDER THAN 5'-0" SHALL HAVE A LONGITUDINAL CONTRACTION JOINT IN THE CENTERLINE OF THE SIDEWALK.
5. UNLESS OTHERWISE SPECIFIED, ALL SIDEWALKS SHALL BE 4" THICK & SHALL BE UNDERLAIN WITH 6" THICK BASE COURSE AS SPECIFIED OR 3/4" MINUS WASHED ROCK. WHERE SIDEWALKS CROSS DRIVEWAY APPROACHES, OR OTHER TRAFFIC AREAS, THE SIDEWALK SHALL BE 6" THICK UNDERLAIN BY 6" THICK BASE COURSE. ALL 6" THICK CONCRETE TO BE REINFORCED WITH #4 REBAR AT 18" O.C. EACH WAY. SEE FIGURE 16.
6. EXPANSION JOINTS IN SIDEWALKS SHALL BE REQUIRED AT 50'-0" INTERVALS O.C. FOR STRAIGHT SECTIONS. EXPANSION JOINTS ARE NECESSARY AT CHANGES IN SIDEWALK SLOPES, INTERCEPTS WITH DRIVEWAYS, OTHER SIDEWALKS & AT BEGINNING & ENDING LOCATIONS ON EACH POINT-OF-CURVATURE FOR RADII GREATER THAN 10'-0"
7. SLOPE SIDEWALKS 2.00% TO GUTTER OR BOULEVARD.
8. ALL NEW SIDEWALKS SHALL BE BACKFILLED IN SUCH A MANNER AS TO MATCH EXISTING OR NEW ADJACENT AREAS.
9. COMPACT ALL SUBGRADE AND BASE COURSE MATERIALS TO 95% OF STANDARD PROCTOR.
10. FOR SLAB AREAS, CONTRACTION OR CONSTRUCTION JOINTS SHALL BE SPACED A MINIMUM OF 8'-0" ON CENTER.
11. ALL NEW SIDEWALKS SHALL BE BROOM FINISHED. NO STAMPING, COLORING, OR OTHER EMBELLISHMENTS ARE ALLOWED.

RPA

SCALE: NONE

SHEET TITLE

CONCRETE SIDEWALK

PROJECT TITLE

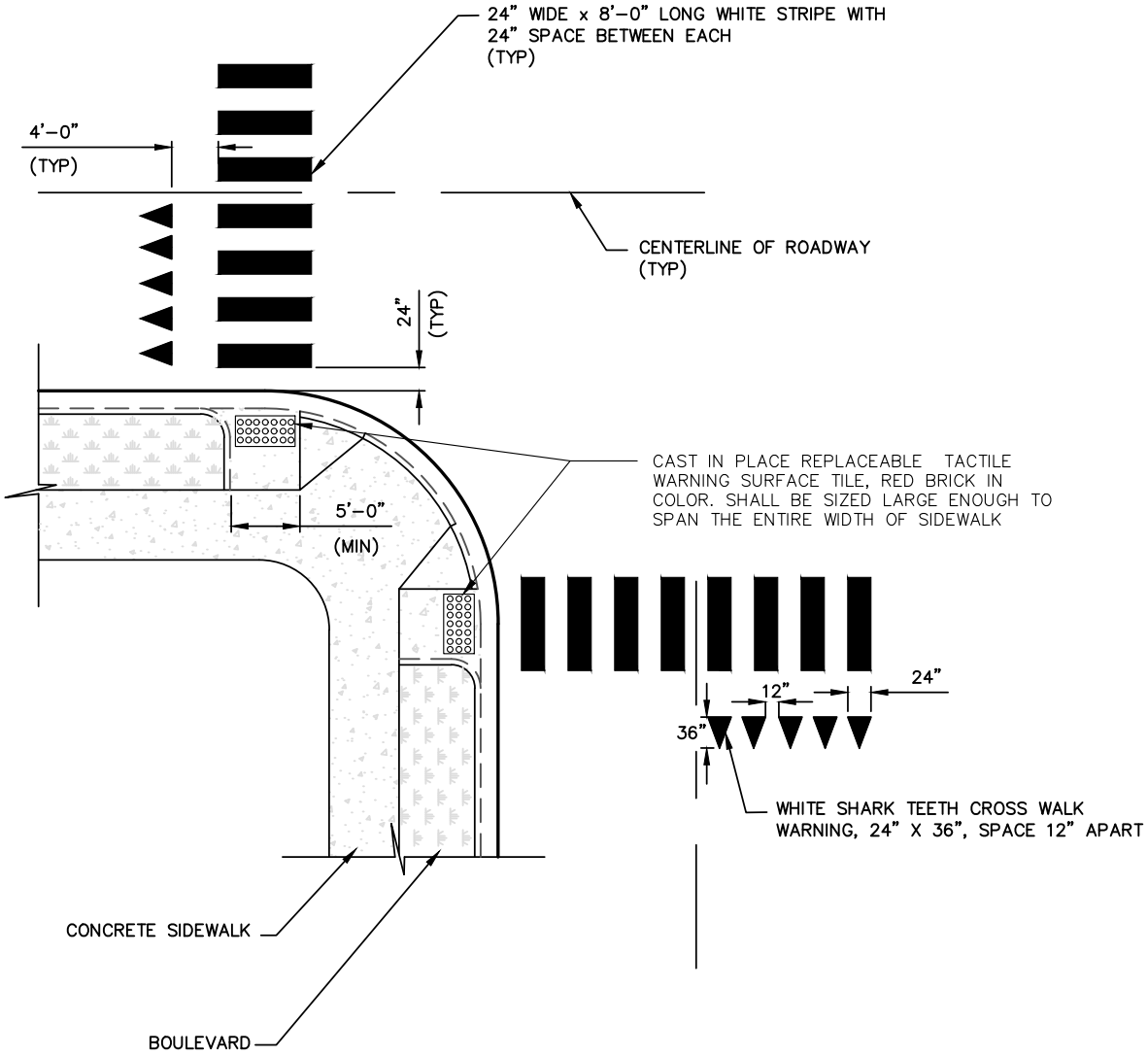
STANDARD DRAWINGS

East Helena, Montana

FIGURE

20

F:\water\EHLN19\Standard Drawings\20_CONCRETE SIDEWALK.dwg Jul 20, 2023



NOTES:

1. CROSSWALK LOCATIONS VARY. LOCATIONS AND STRIPING DIMENSIONS ARE DEPENDANT UPON THE ORIENTATIONS OF THE SIDEWALK AND CURB RAMPS.
2. CROSSWALK AND SHARK TEETH MARKINGS (ONLY) SHALL BE REFLECTIVE THERMOPLASTIC. MATERIALS AND APPLICATION SHALL CONFORM TO SECTIONS 620 AND 714 OF THE MONTANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS (CURRENT EDITION). THERMOPLASTIC MARKING MATERIAL SHALL BE EXTRUDED INTO CUT OR GROUND GROOVES (INLAID).
3. QUANTITIES OF STRIPES ARE DEPENDANT ON WIDTH OF ROAD.
4. PEDESTRIAN RAMPS SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT/ACCESSIBILITY GUIDELINES FOR BUILDING AND FACILITIES.

RPA

SCALE: NONE

SHEET TITLE

TYPICAL PEDESTRIAN CROSSING

PROJECT TITLE

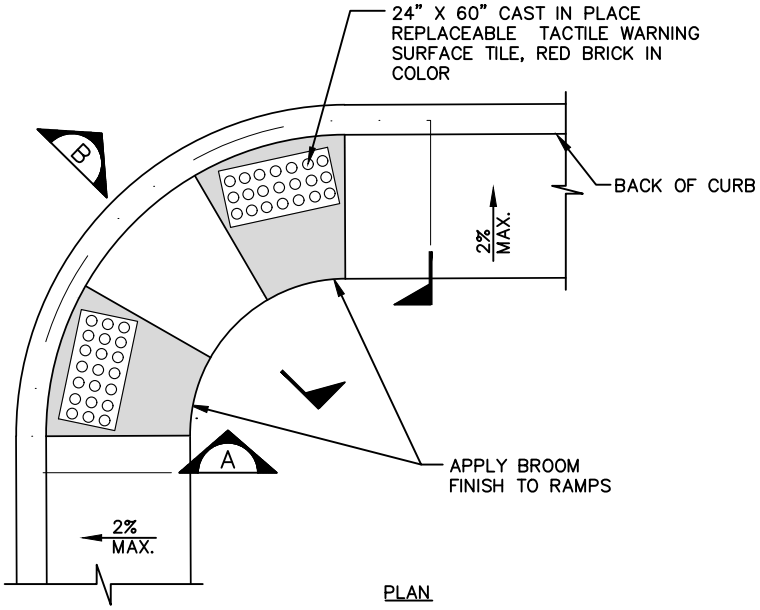
STANDARD DRAWINGS

East Helena, Montana

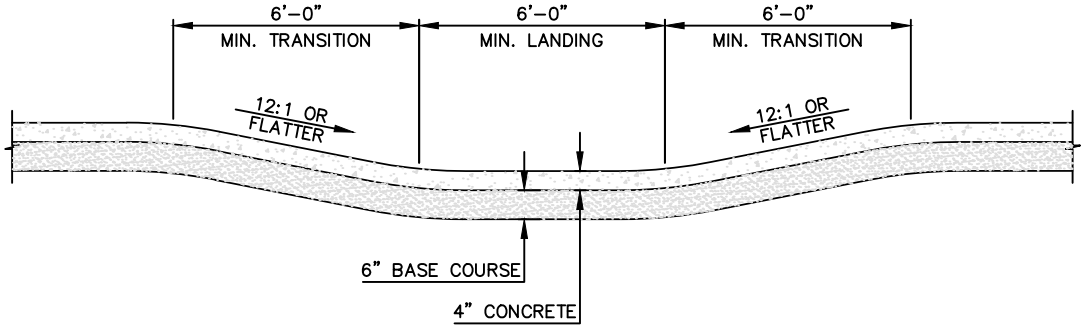
FIGURE

21

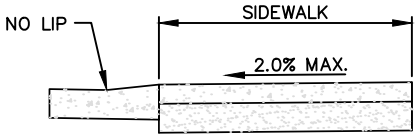
F:\water\EHLN19\Standard Drawings\21_TYPICAL PEDESTRIAN CROSSING.dwg Jul 18, 2023



PLAN



SECTION A



SECTION B

NOTES:

1. THIS DETAIL IS ONLY APPLICABLE IN AREAS WITH NO BOULEVARD.

RPA

SCALE: NONE

SHEET TITLE

PEDESTRIAN RAMP

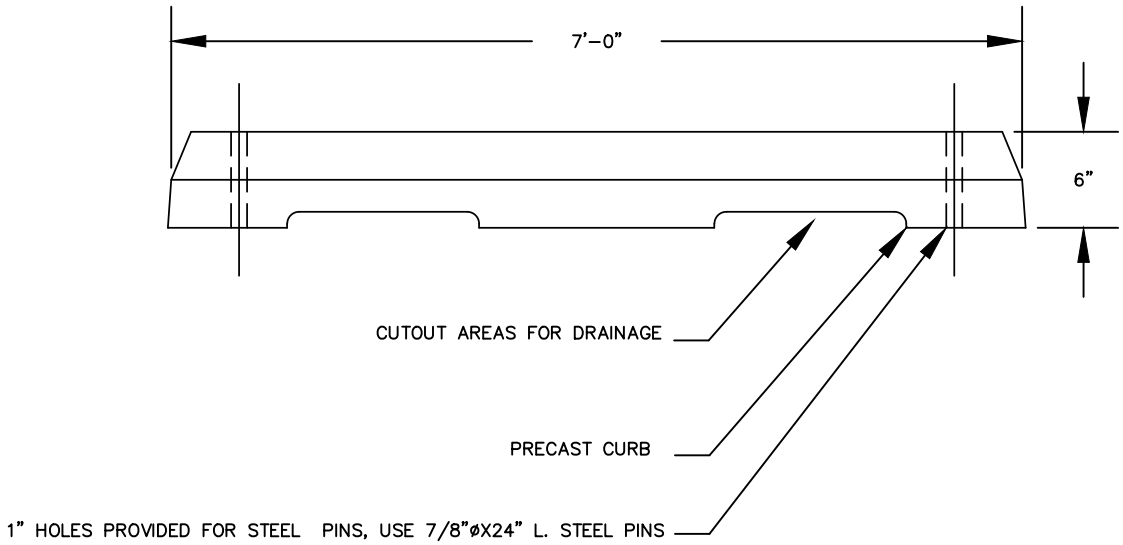
PROJECT TITLE

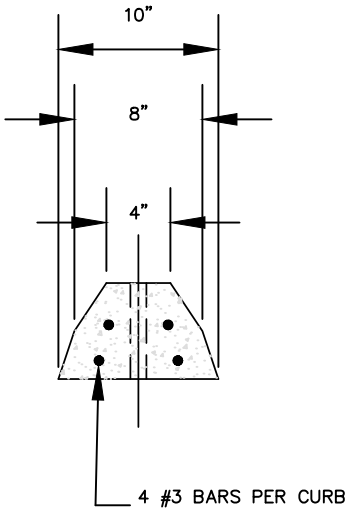
STANDARD DRAWINGS

East Helena, Montana

FIGURE

22





RPA

SCALE: NONE

SHEET TITLE

PRECAST CONCRETE PINDOWN CURB

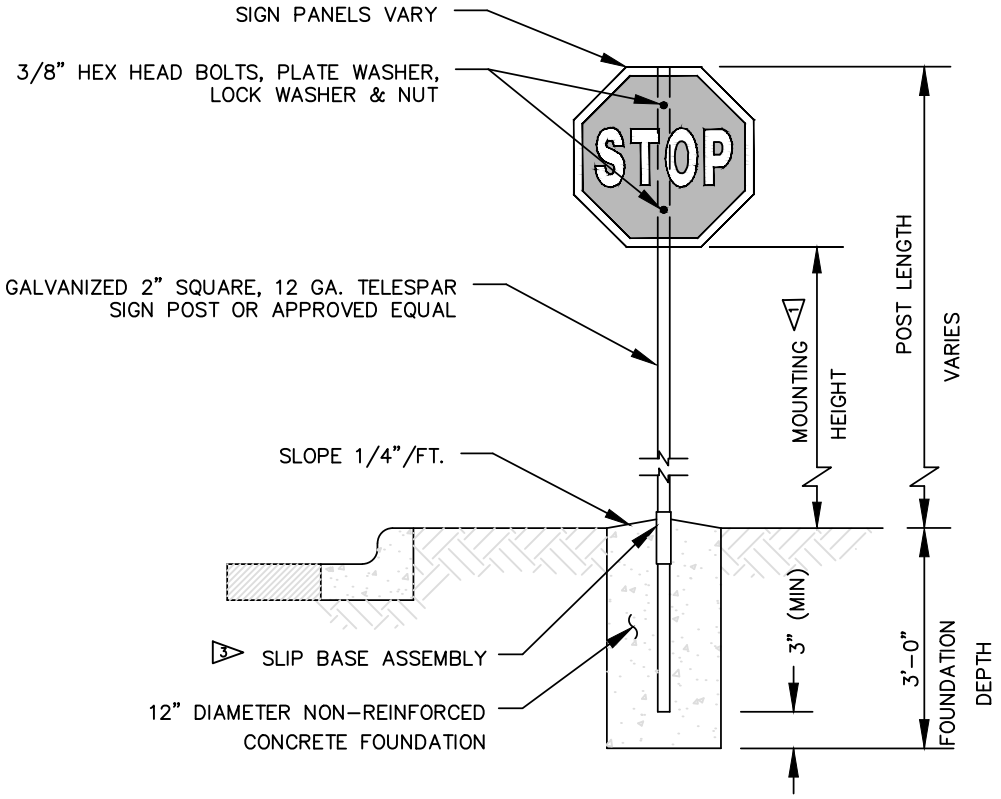
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

23



NOTES:

1. WHERE PARKING OR PEDESTRIAN MOVEMENTS OCCUR, THE SIGN SHALL BE MOUNTED WITH A MINIMUM CLEARANCE OF 7'-0" FROM GROUND SURFACE TO BOTTOM OF THE PRIMARY SIGN PANEL.

2. SIGN PANELS SHALL BE OF SHEET ALUMINUM. ALL SIGNS SHALL BE FABRICATED AND CONSTRUCTED IN ACCORDANCE WITH THE MDT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2014 EDITION.

3. ALL SIGNS SHALL BE PLACED WITH TELESPAR BOLTED SLIP BASE BREAKAWAY ANCHOR ASSEMBLY OR APPROVED EQUAL.

4. COLOR AND SHAPE OF SIGN PANELS SHALL BE IN ACCORDANCE WITH MUTCD, LATEST EDITION.

RPA

SCALE: NONE

SHEET TITLE

SIGN & POST INSTALLATION

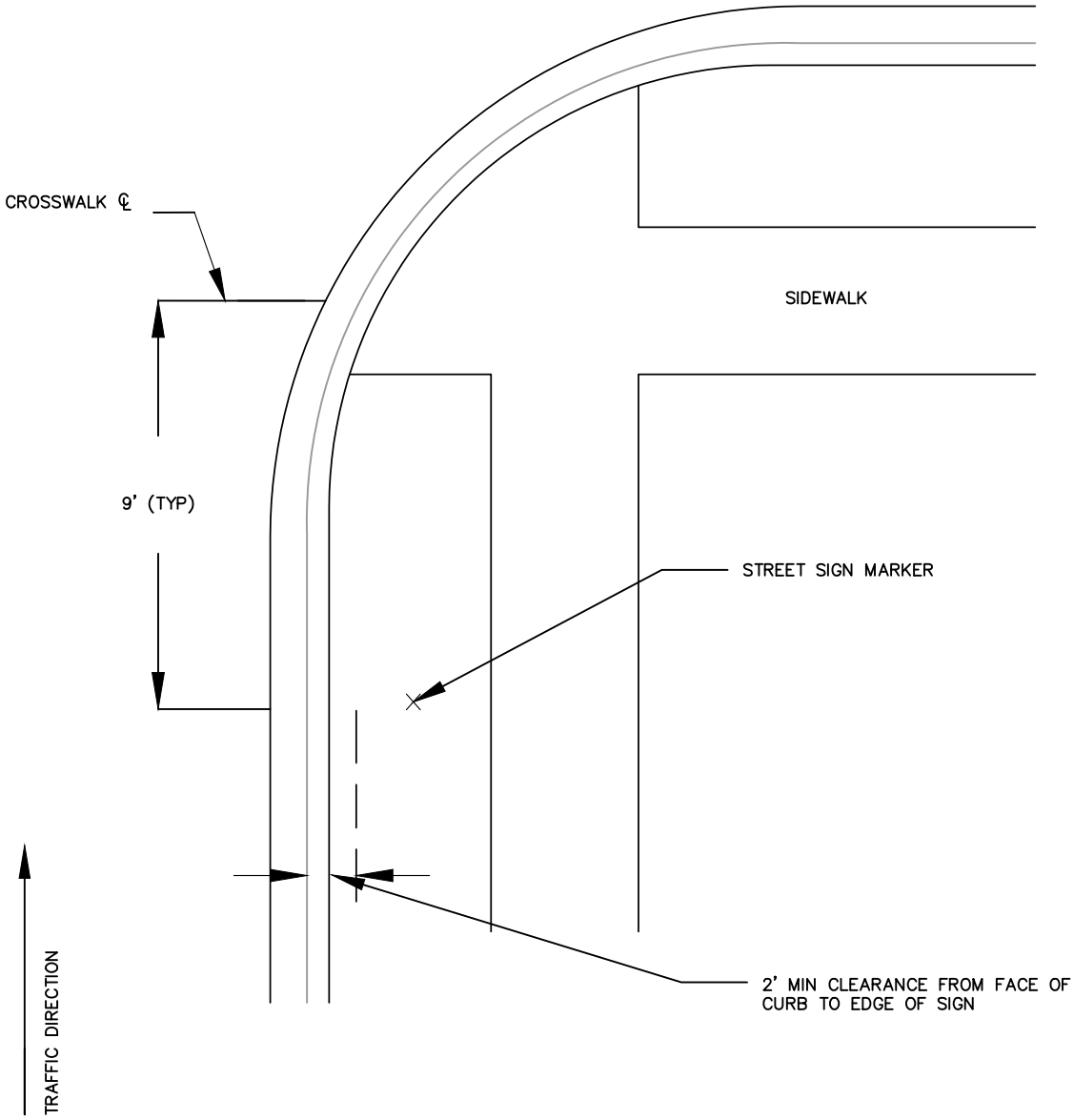
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

24



CONSTRUCTION NOTES:

1. STREET SIGNS SHALL BE .808 GAUGE ALUMINUM DOUBLE SIDED 6" TALL BLADES WITH GREEN BACKGROUND, WHITE TRIM AND WHITE TEXT. TEXT SHALL BE 4" TALL UPPER CASE B SERIES. BLADES SHALL HAVE STANDARD RADIUS CORNERS WITH NO PUNCH.

RPA

SCALE: NONE

SHEET TITLE

STREET SIGN LOCATION

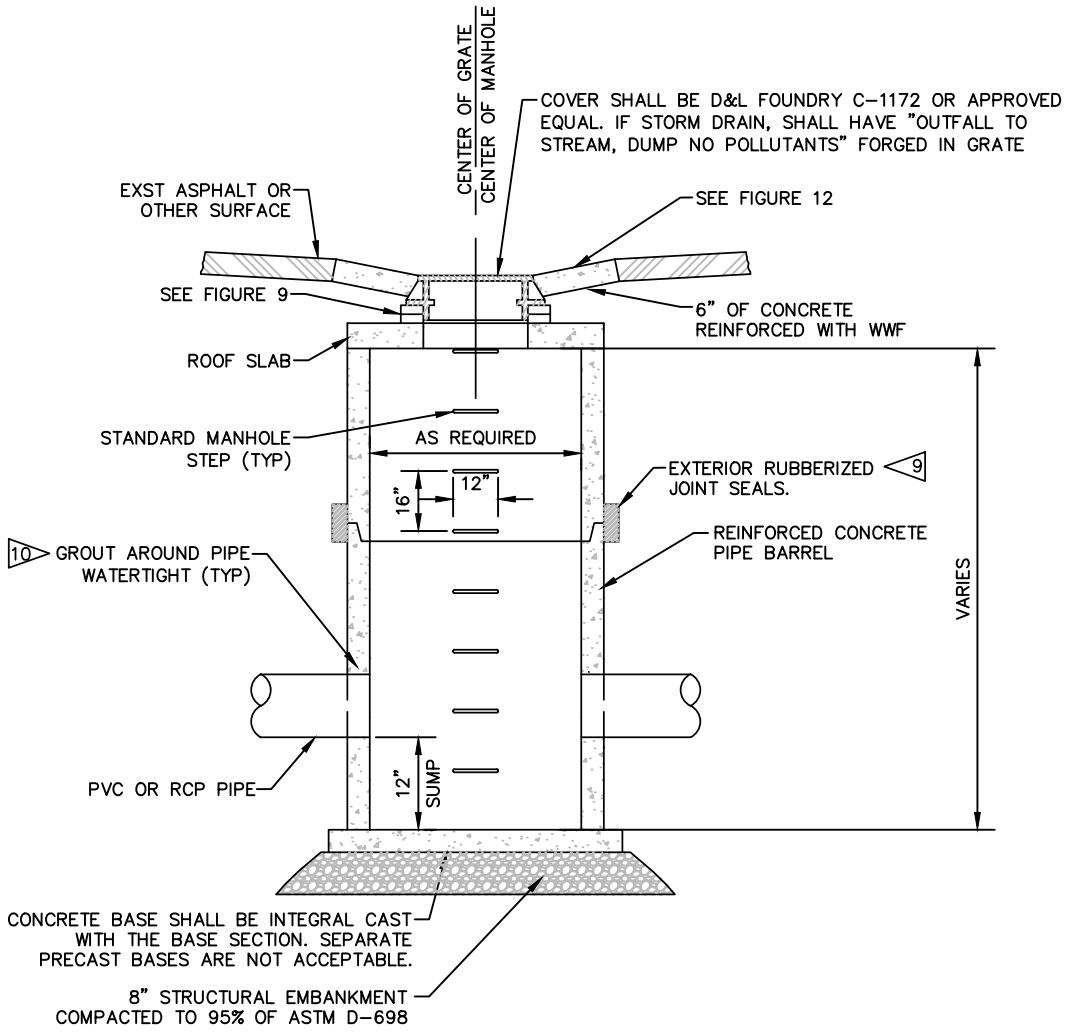
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

25



NOTES:

1. ALL GRATES SHALL BE D&L FOUNDRY C-1172 OR APPROVED EQUAL.
2. AS DESIGNED AND LAID OUT, GRATES ARE TO BE CENTERED ON MANHOLE BARREL.
3. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, AND MANHOLE FRAME SHALL BE WATERTIGHT. JOINT MATERIAL SHALL BE "RAM-NEK" OR EQUAL.
4. PRECAST REINFORCED CONCRETE MANHOLES SHALL CONFORM TO ASTM C-478.
5. ALL HOLES IN NEW MANHOLES SHALL BE CAST OR CORED.
6. ALL STORM MANHOLES SHALL BE STRAIGHT MANHOLES.
7. ADJUST FRAME AND GRATE TO MATCH CROWN AND GRADE OF STREET.
8. ALL MANHOLES SHALL BE CONSTRUCTED TO HANDLE HS-20 LOADING.

9 EXTERIOR RUBBERIZED JOINT SEALS, MEETING ASTM C-877. TYPE II WITH A MINIMUM WIDTH OF 9".

10 PSX GASKET SHALL BE USED ON ALL PVC PIPE PENETRATIONS.

RPA

SCALE: NONE

SHEET TITLE

COMBINATION MANHOLE & INLET

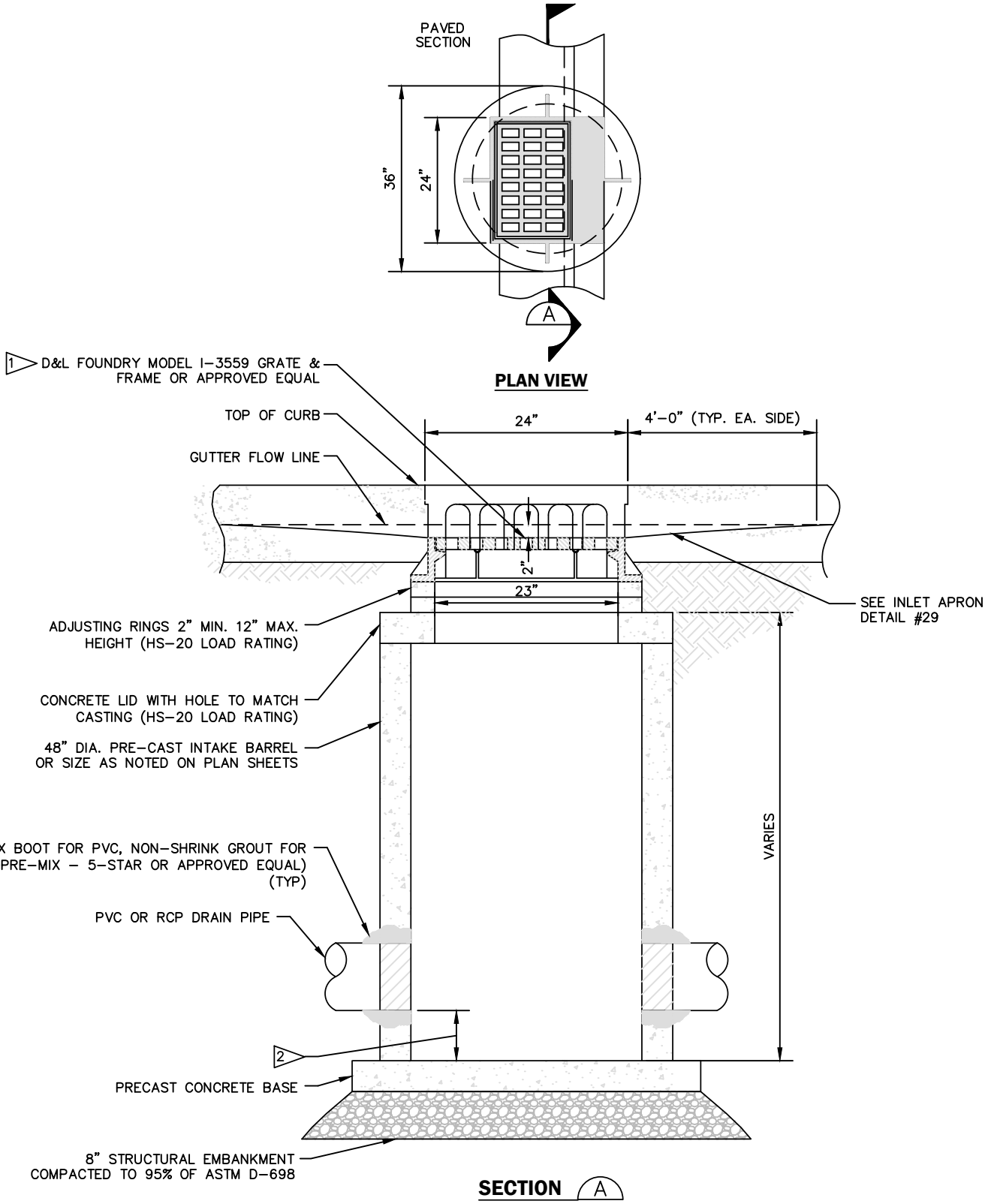
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

26



NOTES:

1. SET TOP OF CURB INLET GRATE 2" BELOW GUTTER GRADE. HANDWORK CONCRETE ON GUTTER FLOW LINE WITHIN 4'-0" ON EACH SIDE TO MATCH GRATE ELEVATION.
2. INLET BARREL SHALL INCLUDE A MINIMUM SUMP OF 12".

RPA

SCALE: NONE

SHEET TITLE

CURB INLET

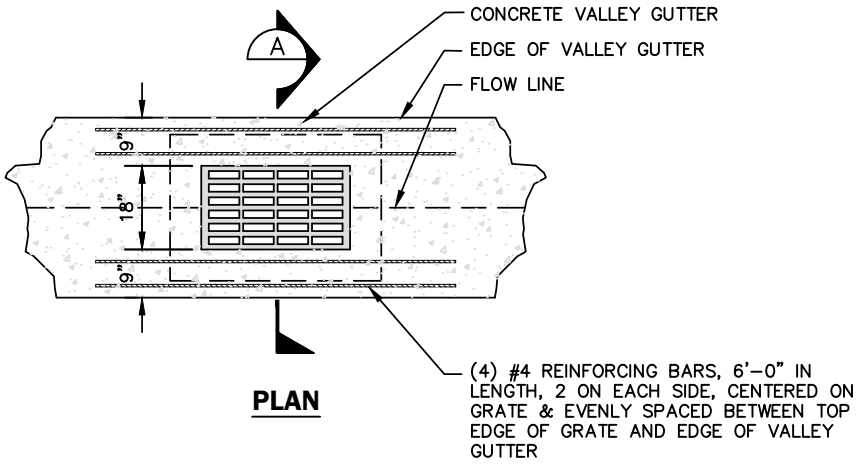
PROJECT TITLE

STANDARD DRAWINGS

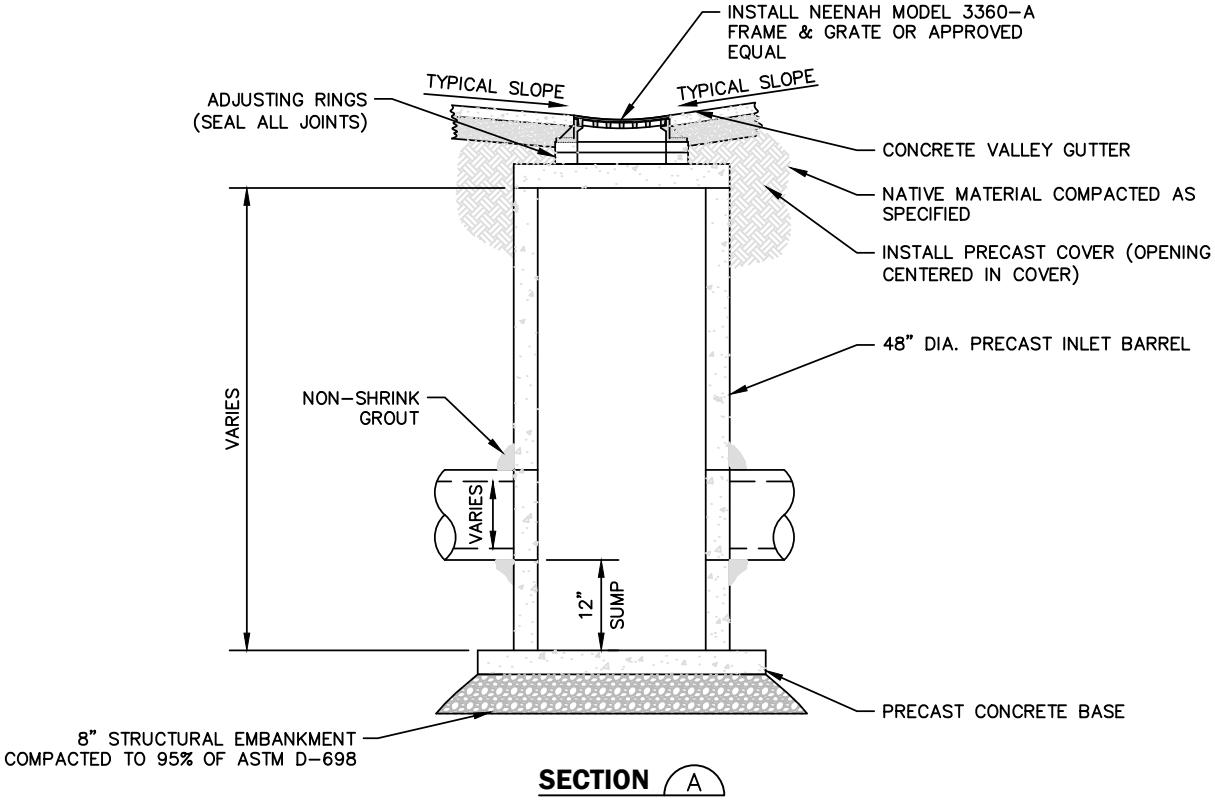
East Helena, Montana

FIGURE

27



PLAN



SECTION A

NOTES:

1. PRECAST REINFORCED CONCRETE MANHOLE BARREL MUST MEET ASTM C-478 STANDARDS.
2. ALL JOINTS SHALL BE WATERTIGHT. JOINT MATERIAL SHALL BE "RAM-NEK" OR APPROVED EQUAL.
3. PROVIDE A 3" GROUT SPACE ALL AROUND EACH CONNECTING PIPE.
4. ADJUST GRATE TO PROPER GRADE WITH ADJUSTMENT RINGS PRIOR TO PLACING CONCRETE.
5. MINIMUM SLAB THICKNESS BELOW PIPE SHALL BE 8" FOR POURED-IN-LACE BASE AND 6" FOR PRECAST BASE.
6. PLACE ADJUSTMENT RINGS & FIELD SET TO MATCH PAVEMENT/CONCRETE GRADES (MIN. 2", MAX, 12" RISE HEIGHT).

RPA

SCALE: NONE

SHEET TITLE

VALLEY GUTTER INLET

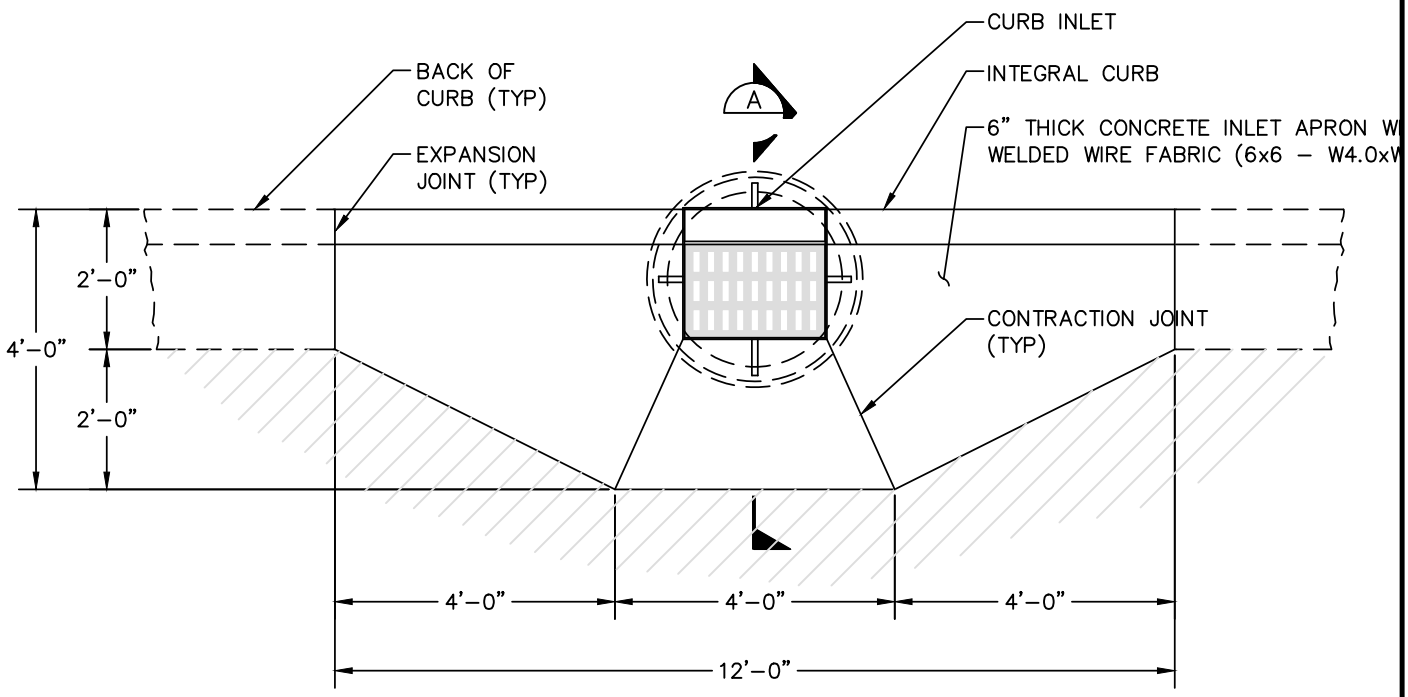
PROJECT TITLE

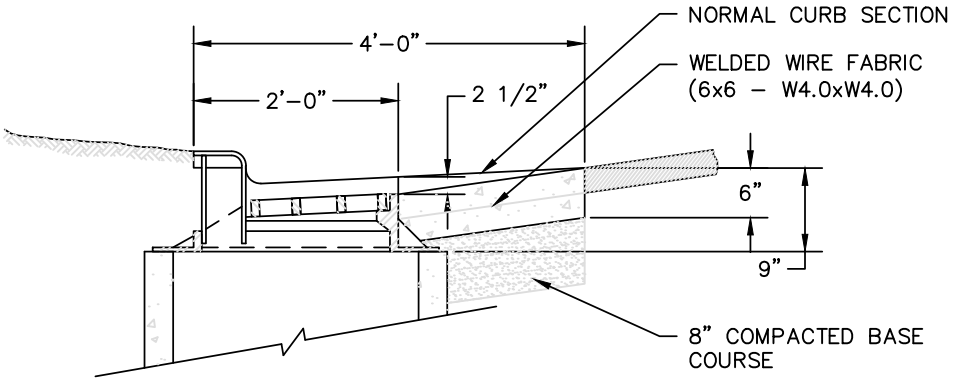
STANDARD DRAWINGS

East Helena, Montana

FIGURE

28





SECTION (A)

NOTES:

1. PROVIDE CONCRETE INLET APRONS AT ALL INLETS.

RPA

SCALE: NONE

SHEET TITLE

INLET APRON

PROJECT TITLE

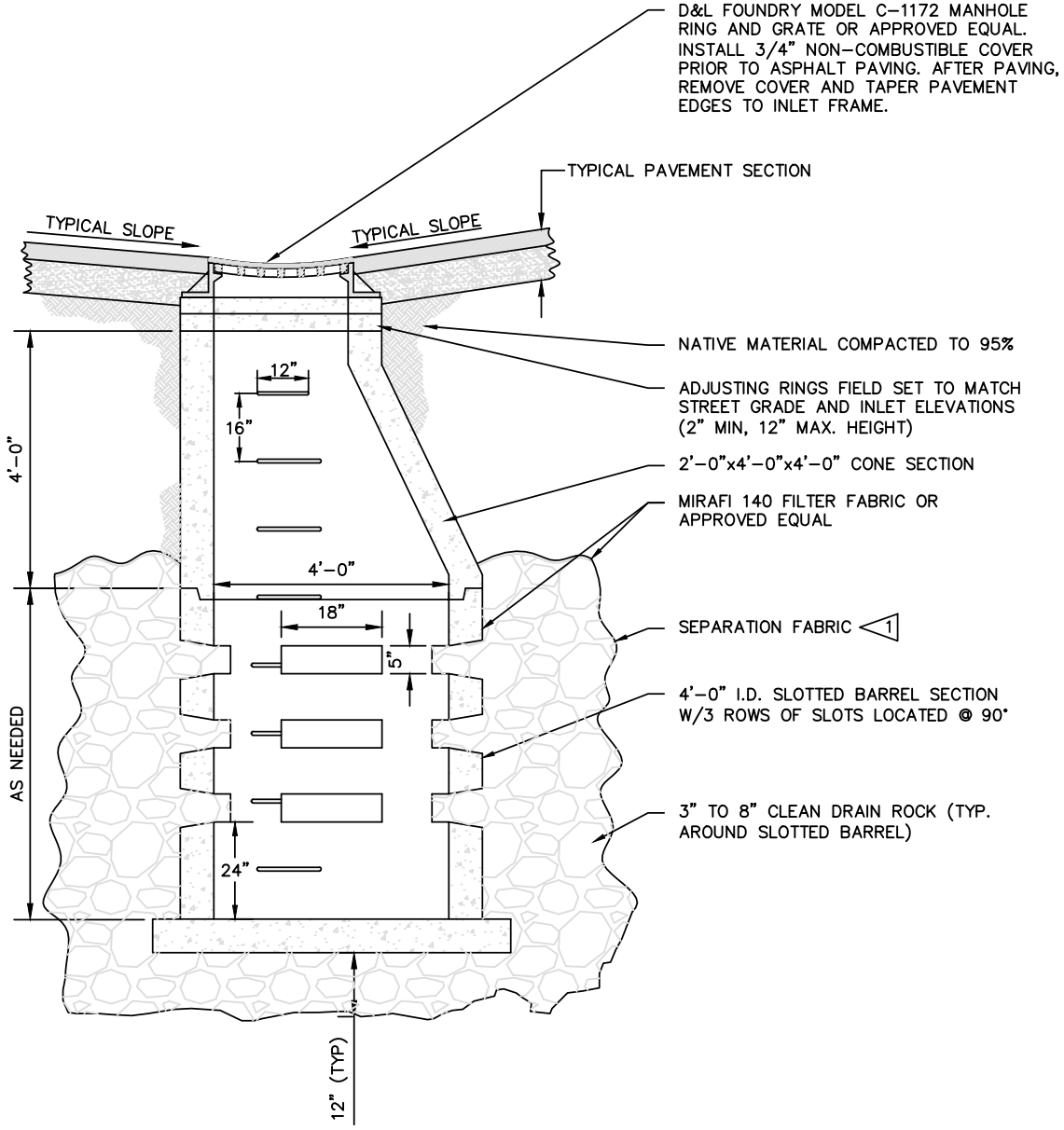
STANDARD DRAWINGS

East Helena, Montana

FIGURE

29

F:\water\EHLN19\Standard Drawings\29_INLET APRON.dwg Jul 18, 2023



CONSTRUCTION NOTES

1. SEPARATION FABRIC SHALL BE MIRAFI 500X, OR APPROVED EQUAL.
2. THIS FIGURE IS INTENDED FOR USE ON EXISTING STREETS ONLY. USE ON NEW STREETS AND SUBDIVISIONS IS PROHIBITED UNLESS PRIOR APPROVAL FROM THE CITY ENGINEER HAS BEEN GRANTED.

RPA

SCALE: NONE

SHEET TITLE

SUBSURFACE DRAIN SUMP

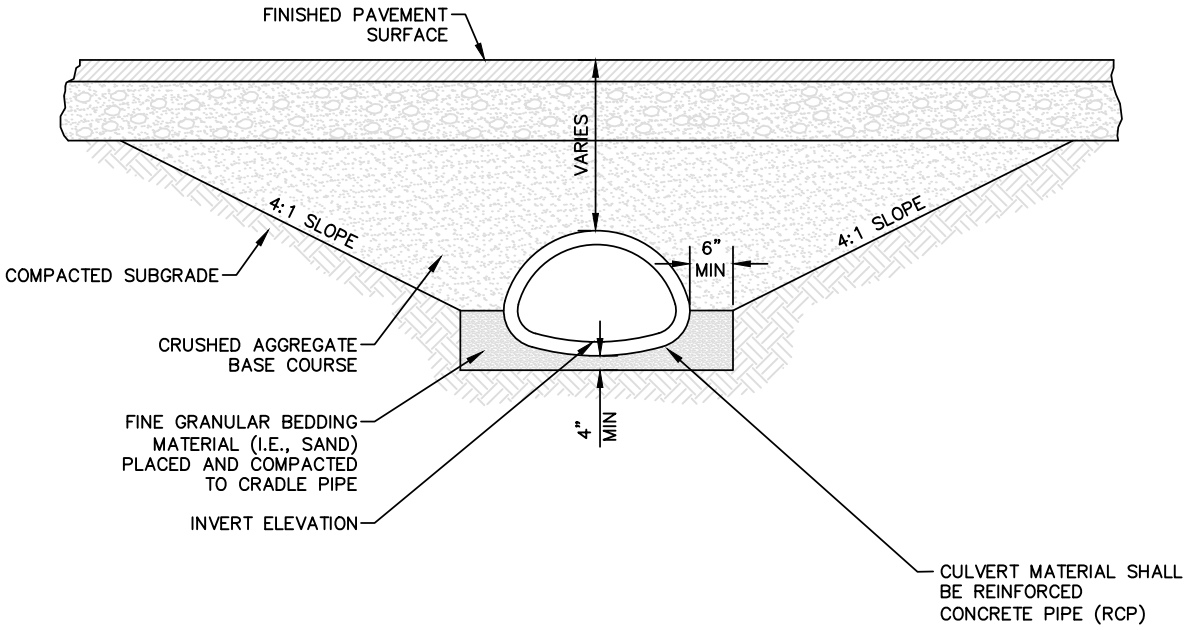
PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

30



RPA

SCALE: NONE

SHEET TITLE

TYPICAL CULVERT SECTION

PROJECT TITLE

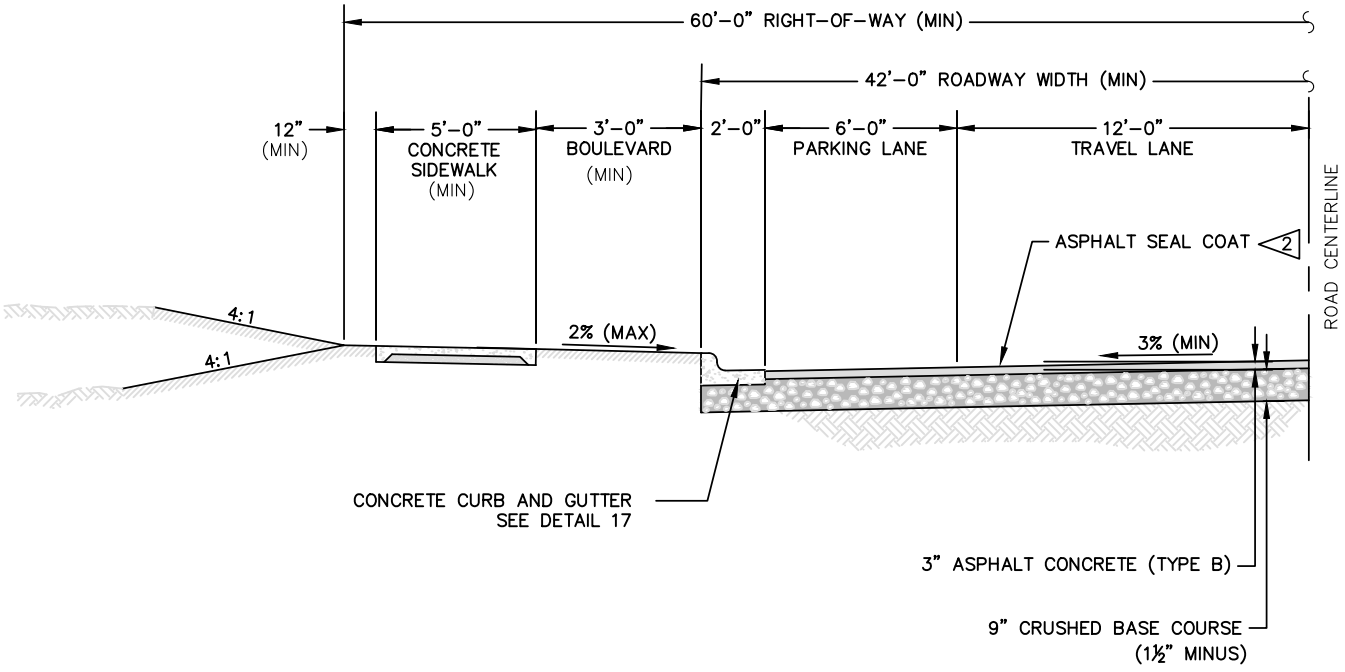
STANDARD DRAWINGS

East Helena, Montana

FIGURE

31

F:\water\EHLN19\Standard Drawings\31_TYPICAL CULVERT SECTION.dwg Jul 18, 2023



NOTES:

1. SEE CURRENT EAST HELENA SUBDIVISION REGULATIONS FOR MINIMUM COLLECTOR AND LOCAL ROAD SLOPE AND WIDTH REQUIREMENTS.

2. ASPHALT SEAL COATING SHALL CONSIST OF A SINGLE APPLICATION OF ASPHALT MATERIAL ON THE PREPARED ASPHALT SURFACE FOLLOWED BY SPREADING A SEAL COAT AGGREGATE. MATERIALS, APPLICATION RATES AND PROCESS SHALL MEET THE REQUIREMENTS OF THE LATEST MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS).

3. CHIP SEAL AGGREGATE SHALL MEET THE GRADATION AS SHOWN IN SECTION 02504 OF MPWSS FOR ⅜" SEAL COAT AGGREGATE.

4. ASPHALT TACK COAT SHALL BE EMULSIFIED ASPHALT, CRS-2.

5. ALL CHIP SEAL COATS MUST BE COMPLETED WITHIN ONE (1) YEAR AFTER PAVING IS COMPLETED, OR AS DIRECTED BY THE CITY, TO ALLOW FOR PROPER CURING OF THE ASPHALT SURFACING.

RPA

SCALE: NONE

SHEET TITLE

TYPICAL COLLECTOR ROAD SECTION

PROJECT TITLE

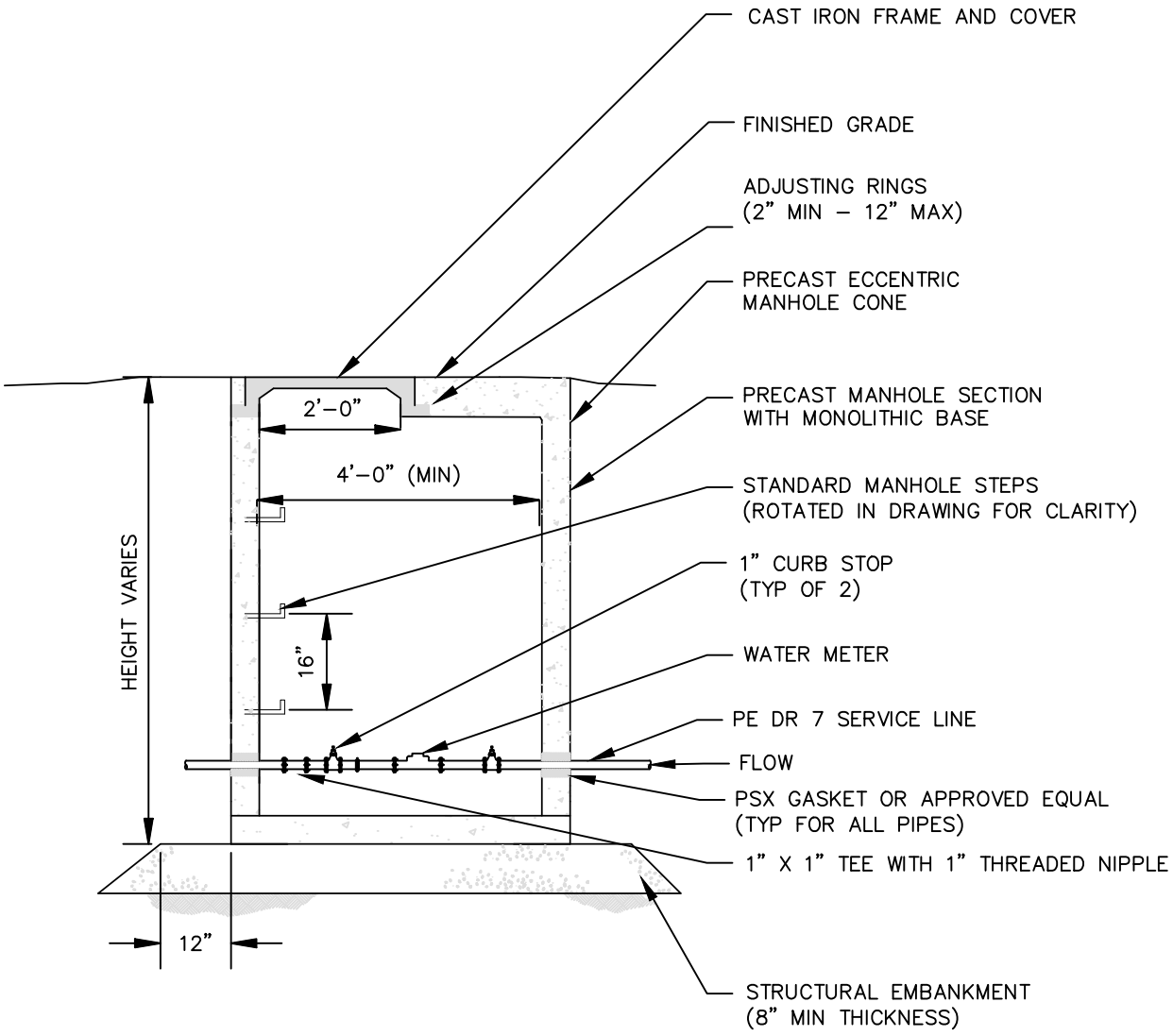
STANDARD DRAWINGS

East Helena, Montana

FIGURE

32

F:\water\EHLN19\Standard Drawings\32_TYPICAL ROAD SECTION.dwg Jul 18, 2023



NOTES:

1. FOR STRUCTURES MAINTAINED BY THE CITY, THE LID SHALL BE FLAT WITH LID CENTERED ON THE STRUCTURE AND VALVES SHALL BE LOCATED DIRECTLY BELOW THE LID.
2. NO OBSTRUCTION SHALL BE LOCATED WITHIN 4' OF THE METER PIT TO ALLOW FOR ACCESS.
3. PIPE SUPPORTS SHALL BE INSTALLED INSIDE THE METER PIT VAULT.
4. PIPE SIZES MAY VARY. THE CITY WILL REVIEW ALL PROPOSED IRRIGATION METER PIT DESIGNS.

RPA

SCALE: NONE

SHEET TITLE

IRRIGATION METER PIT

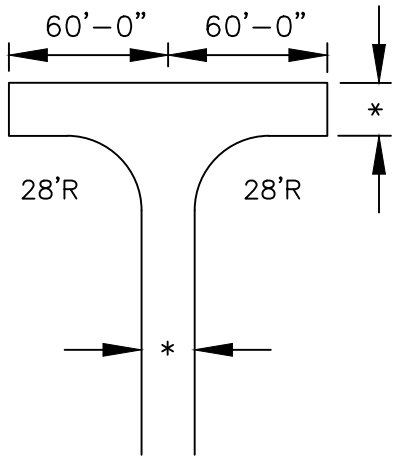
PROJECT TITLE

STANDARD DRAWINGS

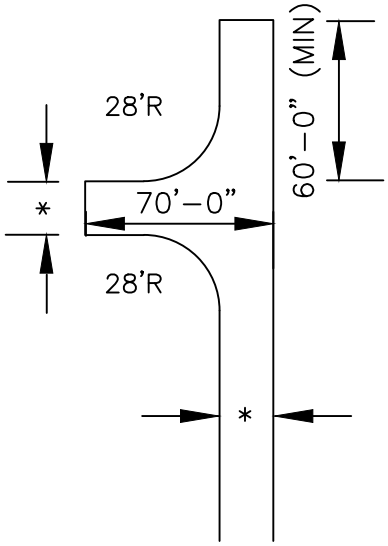
East Helena, Montana

FIGURE

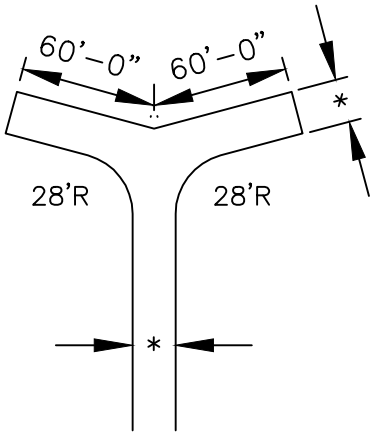
33



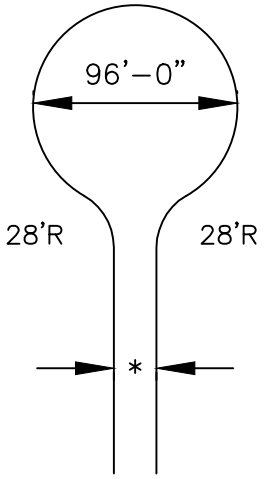
120' HAMMERHEAD



120' HAMMERHEAD ALTERNATIVE



ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD



96' CUL–DE–SAC

NOTES:

1. TURN AROUNDS ARE BASED ON THE INTERNATIONAL FIRE CODE INSTITUTE APPLICATION MANUAL.

* ALL STREET DIMENSION ARE BASED ON CITY STREET STANDARDS AND ARE FROM FACE OF CURB.

RPA

SCALE: NONE

SHEET TITLE

TURNAROUND

PROJECT TITLE

STANDARD DRAWINGS

East Helena, Montana

FIGURE

34

APPENDIX A

HAULED WASTEWATER DISPOSAL APPLICATION

City of East Helena
306 E. Main Street
East Helena, MT 59635
(406) 227-5321

HAULED WASTEWATER DISPOSAL APPLICATION

Applicant Information

Company Name: _____

Owner(s): _____

Address: _____
Street Address *Apartment/Unit #*

_____
City *State* *ZIP Code*

Phone: _____ Email: _____

Type of Wastewater to be Hauled: ☐ RV Black and Grey Water Storage Tank ☐ Wastewater Generated from Portable Toilets ☐ Other

If Other, please explain: _____

_____

Other hauled wastewater(s) must be approved by the City of East Helena.

Proposed Discharge Location: ☐ City of East Helena Wastewater Treatment Plant

☐ Other

Discharge Address if Other: _____

_____

Disclaimer and Signature

Prior to signing, please read and understand Chapter 7: Hauled Wastewater Disposals of the City of East Helena Engineering Standards.

I certify that this information is complete to the best of my knowledge.

If this application is approved and a permit is received, I understand that hauling unapproved waste shall be cause for termination of the waste hauling permit.

Signature: _____ Date: _____