JULY 1, 2024

BOZEMAN MT

City of Bozeman Modifications to Montana Public Works Standard Specifications Seventh Edition

DRAFT

DRAFT 7-1-2024

AMENDMENT SUMMARY

Revision No.	Date	Section	Description
1	3/1/2024	-	Draft of comprehensive update
2	7/1/2024	-	Final draft

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FOREWORD

Because the City of Bozeman has unique requirements which are not addressed in the *"Montana Public Works Standard Specifications"* (MPWSS), Seventh Edition, April, 2021, the *"City of Bozeman Modifications To Montana Public Works Standard Specifications"* was created. This document addresses those specific requirements which the City of Bozeman has pertaining to Public Works projects which are not addressed in the MPWSS. All Public Works projects for the City of Bozeman shall be done in accordance with MPWSS and City of Bozeman Modifications to MPWSS.

Where a City of Bozeman modification to MPWSS does not exist for a particular Section or Standard Drawing of MPWSS, it shall be assumed the work is to be completed in accordance with the appropriate MPWSS Section or Standard Drawing. When a City of Bozeman modification to a MPWSS Section or Standard Drawing does exist, the requirements of that modification supersede the related MPWSS requirement. Some additional Sections and Standard Drawings have been developed specifically for the City of Bozeman to address items that do not exist within MPWSS.

Each Section of the MPWSS that has been modified is listed in the Table of Contents of the *"City of Bozeman Modifications To Montana Public Works Standard Specifications."* The entire Section from the MPWSS has not been rewritten for these modifications. Instead, modifications are indicated for a specific subsection, paragraph, sentence, or drawing.

Appendix A of these modifications contains a list of approved copper connections. Appendix B contains a list of modified Standard Drawings to be used within the City of Bozeman. The list also contains a list of MPWSS Standard Drawings that are useable as shown in MPWSS.

It is the intent of the City of Bozeman to revise this document on an as-needed basis. Written comments on the *"City of Bozeman Modifications To Montana Public Works Standard Specifications"* may be submitted to the City Engineer.

Projects that utilize funding from the City of Bozeman require specific bidding and contracting documents including, but not limited to, Instructions to Bidders and Special Provisions. These documents shall be obtained from the City of Bozeman Engineering Division.

Additional copies of the City of Bozeman Modifications to Montana Public Works Standard Specifications may be obtained from the City of Bozeman Engineering Division located at 20 E. Olive Street in Bozeman, Montana.

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SECTION 01500

CONSTRUCTION AND TEMPORARY FACILITIES

PART 1 – GENERAL

1.4 HAUL ROUTES

Add the following:

B. Be responsible for dust and vehicle off-tracking control, providing all equipment and personnel for the work. Furnish Engineer name(s) and telephone number(s) of the person(s) responsible for dust and vehicle off-tracking control during evenings and weekends. If the person cannot be contacted, Owner or City of Bozeman may, at Contractor expense, perform the work or contract the work out. Assure all storm water pollution prevention permits are approved, and any required erosion control devices are in place before beginning any land disturbance.

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SECTION 01570

CONSTRUCTION TRAFFIC CONTROL

PART 1 – GENERAL

1.2 REQUIREMENTS

Add the following:

B. Obtain any necessary permits from the City of Bozeman, prior to performing work within City right-of-way and furnish a Traffic Control Plan for City of Bozeman review and approval when applicable.

1.3 NOTIFICATIONS

Add the following:

D. Notify City Engineering Division, police department, fire department, ambulance services, and bus companies of any planned street closures a minimum of 24 hours before closing any street.

Add the following:

1.4 STANDARD DRAWINGS

A. The following standard drawings are applicable to this section and are included in Appendix B of these standards.

Drawing	Description
COB 01570-1	Traffic Control Minimum Standard, Urban Work Site: 4-Lane Road, Work Site Blocking One Lane
COB 01570-2	Traffic Control Minimum Standard, Urban Work Site: 2-Lane Road, Work Site on Centerline Blocking Both Lanes
COB 01570-3	Traffic Control Minimum Standard, Urban Work Site: 4-Lane Road, Work Site on Centerline Blocking Inside Lanes
COB 01570-4	Traffic Control Minimum Standard, Urban Work Site:

Drawing	Description
	2-Lane Road, Work Site Blocking One Lane
COB 01570-5	Traffic Control Minimum Standard, Rural Work Site: Work Adjacent to the Present Traveled Way
COB 01570-6	Traffic Control Minimum Standard, Rural Work Site: Work On the Present Traveled Way
COB 01570-7	Pedestrian Traffic Control for Temporary Sidewalk Closure
COB 01570-8	Sidewalk Closure with Detour

PART 4 – MEASUREMENT AND PAYMENT

4.1 PAYMENT

Add the following:

D. Measurement and payment for Construction Traffic Control will be made only if listed as a separate item in the bid documents. If not listed in the contract as a bid item, Construction Traffic Control shall be considered an incidental cost to be included in other items in the contract requiring Traffic Control to complete that item.

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SECTION 01580

TEMPORARY WATER SUPPLY

PART 1 – GENERAL

1.1 DESCRIPTION

A. ***Replace with the following*:**
Provide temporary water service to all residential and commercial service connections interrupted by water system replacement or extension projects except as provided herein. The Contractor shall verify with the Engineer and Owner at least 72 hours (excluding weekends and holidays) prior to the suspension of service to the areas where consumers will require a temporary water supply. Temporary water service shall include temporary service for commercial or residential fire protection unless otherwise approved by the City of Bozeman Fire Department.

B. ***Replace with the following*:**
The Contractor shall not disrupt a residential water service on weekends or holidays or outside the hours of 9:00 am to 4:00 pm on weekdays without providing temporary water. The Contractor shall provide homes that are subject to more than two water shutdowns with temporary water.

The Contractor also shall not disrupt service to commercial customers unless:

1. The Contractor obtains an authorization letter from the property owner and business owner (if different) at least 7 days prior to the interruption of service. The owners shall agree in the letter to the time and dates of the interruption of the water service and;

2. The Contractor submits the authorization letter and a comprehensive work plan to the Engineer for approval that details the planned methodology to be used to ensure the commercial facility is not out water for more than the time detailed in the above letter.

1.3 SUBMITTALS

Add the following:

C. Temporary water shop drawings and plans shall be approved by the City of Bozeman prior to installation.

PART 3 – EXECUTION

3.1 GENERAL

D. ***Replace with the following:***
Fire protection is included unless specifically approved otherwise by the City of Bozeman Fire Department. The Fire Department may require the Contractor to provide personnel for continuous “fire watch” in lieu of temporary fire service connections.

Add the following:

F. Only City of Bozeman personnel are allowed to operate water main valves and hydrants.

3.2 LOCATING CURB STOPS

A. ***Replace with the following:***
The Contractor shall be solely responsible for all activities related to locating and exposing curb stop valves to the individual properties. Curb stop valves shall only be operated by Water Department personnel. Existing conditions shall be identified and noted by the Contractor. Any existing condition that is suspected to indicate a defect of the curb stop valve, box, or service shall be reported immediately to the Engineer.

3.3 LAWN WATERING CONNECTIONS

A. ***Replace with the following:***

Each house connection shall be equipped with a wye or splitter with a valve to allow for lawn watering. Plastic fittings are not permitted. The connection to each customer shall require a short section of high-pressure flexible rubber hose at the connection point. House- to-house connections are not permitted. All connections shall be from the approved temporary water system. Additionally, each service must have a backflow prevention fitting.

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SECTION 01590

TEMPORARY WASTEWATER BYPASS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies the requirements for temporary sewer bypass pumping operations to maintain existing sanitary wastewater flows in projects affecting active sanitary sewer systems.

B. General Sanitary Sewer Bypass Pumping Requirements

1. Existing flows for all sanitary sewer facilities in the Project area must be maintained at all times.

2. Contractor shall provide all labor, materials, equipment, temporary power, monitoring, and supervision to temporarily bypass pump sewage flows around the Contractor's work.

3. The Contractor shall have the entire bypass pumping system in place and tested before beginning actual bypass pumping of any sewage.

4. The bypass system must include means to monitor the pumps, such that the Contractor is notified in the event of a system failure, whether it be pump, power, or other cause. Contractor must have an Emergency Response Plan in the event of system failure.

5. The Contractor may elect to provide continuous (24 hours a day, 7 days a week) on-site observation of the bypass pumping system, in lieu of monitoring the pumps, at their own expense.

6. The Contractor shall provide the services of an individual who shall reside within a 20-minute drive radius, shall be on-call 24 hours a day, and who will maintain the sewer bypass system. This person shall be capable of repairing the system and keeping the system operational at all times. This person shall also provide daily routine inspection of the entire bypass pumping and piping system. The Contractor shall provide that individual's phone number(s) to the Owner and Engineer.

1.2 SUBMITTALS

A. Shop drawings shall be submitted in accordance with MPWSS and the City of Bozeman Modifications to MPWSS.

B. The Contractor shall submit an emergency spillage and cleanup action plan for all sewage spills to the Engineer for review prior to beginning construction. It shall include, but not be limited to, a remediation plan that indicates what labor, equipment, and resources will be used to restore the site to the condition prior to the spillage.

C. The Contactor shall submit drawings and complete design data showing methods and equipment proposed for sewer bypass pumping for review by Engineer and by affected agencies (MDT, etc.). Sewer bypass pumping plans shall include the following information:

1. Drawings indicating the location of the temporary pumping location, sewer plugs, bypass lines, and discharge location.

2. Capacity of pumps, backup pumps, primers, and standby equipment.

3. Pump curves showing pump operating range.

4. Design calculations proving adequacy of the system and selected equipment including static head, pipe size selection, friction losses, and flow velocity.

5. Temporary and standby power source.

6. Staffing plan.

7. Monitoring plan.

8. Traffic Control Plan or measures to facilitate traffic over discharge lines and around the bypass pumping system without damage, if any traffic will be impacted. Work in Montana Department of Transportation (MDT) right-of-way shall include a traffic control plan that meets MDT standards, which shall be submitted for review and approval at least two weeks prior to beginning work. Where discharge lines cross sidewalks or other pedestrian areas, provide ADA accessible ramps over the lines or install the lines below grade.

9. Detailed Emergency Response Plan for pump or power failure, or other unanticipated event that would affect bypassing.

1.3 BYPASS SYSTEM DESIGN AND CONSIDERATIONS

A. Sequencing. The Contractor shall sequence the work to maintain flow through the existing sewer mains while installing the new sewer mains or lining the existing main such that bypass pumping is minimized.

B. Flow Data. It is the responsibility of the Contractor to provide for the design, construction, and operation of an adequate and properly functioning bypass pumping system. It is also the responsibility of the Contractor to perform any additional testing or gathering of flow data beyond what is provided in the Contract Documents. The Contractor shall coordinate with any businesses on bypass pumping their sewer flow around the work zone as required for construction or perform the work outside of business hours.

C. Backwater. If the bypass pumping system results in backwater in the upstream collection system, the portion of the upstream system which had flows backed up shall be jetted out prior to project completion to remove any settled solids. The RPR and Contractor shall monitor the sewage level at the pump location and thereby determine potential extent of backwater to determine the length of upstream sewer to be cleaned. The Contractor shall have all necessary plugs and pumps in place in order to account for these backwater conditions.

D. Protection. In areas where sewer flows are bypassed, all bypassed flows shall be discharged in a downstream sanitary sewer manhole as approved by the Engineer. No bypassing to the ground surface, receiving waters, storm drains, or any bypassing which results in groundwater contamination or potential health hazards shall be permitted.

E. Bypass Piping and Facilities Location. The Contractor shall install all bypass pumping and piping equipment within the public right-of-way where possible. Any bypass pumping facilities installed on private property shall require written permission from the property owner and shall be submitted to the Engineer for final approval. The Contractor shall coordinate bypass piping locations with any businesses affected by bypass operations.

F. Bypass Pumping Scheduling. The sewer bypass system shall be in place prior to any work beginning that requires bypass pumping and shall remain in operation until post construction sewer video inspection work is complete and reviewed by the Engineer, if applicable. The system must operate at all times for the sections

of sewer pipe and manholes being replaced, including evenings, weekends, and holidays (i.e. 24 hours per day, 7 days per week). No sewer services shall be taken out of service to complete this work. Bypass pumping is not to commence on the Friday of any week.

G. Weather. It is the responsibility of the Contractor to keep the bypass pumping system fully operational at all times. The Contractor shall provide the means and methods to keep the system from freezing. Freeze protection will be incidental to the temporary bypass work.

H. Ramps. In order to maintain pedestrian access, ramps shall be installed over all bypass piping that cross sidewalks and/or known pedestrian routes. When crossing streets, the Contractor shall provide all ramps, traffic control, monitoring, and notices required by the City of Bozeman and MDT as applicable. Ramps shall be designed for H20 loading and include cold mix asphalt transitions at each end of the ramp to provide for a smooth and safe passage of traffic at 15 mph. Avoid disturbance of existing asphalt and concrete surfaces and repair of any damaged surface shall be considered incidental. Ramps at pedestrian crossings shall be ADA compliant.

I. Permitting. Contractor shall obtain all permits required for work within the City of Bozeman and MDT right-of-way as applicable.

J. Water. The water used for the pressure testing of all bypass lines may originate from City of Bozeman fire hydrants as approved by the Engineer. If a direct connection to City of Bozeman water is used to fill the bypass pipe, an air gap must be present between the effluent end of the water source and the influent end of the bypass pipe or pump. This air gap must meet all DEQ standards and shall prevent the backflow of water from the pipe to the hydrant. The use of a backflow prevention valve assembly does not meet the requirements for an air gap.

1.4 COORDINATION

A. All utility companies shall be contacted prior to commencing any excavation work or work below grade. The Contractor shall adhere to any guidelines or regulations by utility companies set forth in this document or through any subsequent communications.

B. The Contractor shall contact MDT before commencing any type of bypass pumping within the MDT right-of-way. At least one week of notice shall be given before any bypass pumping is commenced. All traffic control shall be setup and

is subject to inspection by MDT and by the Engineer prior to commencing bypass pumping.

PART 2 – PRODUCTS

2.1 MATERIALS

A. The Contractor shall provide all temporary pumps, power, backup power, backup pumps, conduits, and any other equipment needed for the sewer bypass pumping system. Contractor shall furnish the necessary labor and supervision to set up and operate the system.

B. All pump drivers and generators shall have a noise suppressor exhaust systems and/or other sound attenuation to reduce noise levels to less than 60 dB when measured at the nearest property line.

C. Pumps and bypass lines shall be of adequate capacity and size to handle all sewer flows. The temporary bypass system shall be capable of conveying peak wet weather flow with the largest pumping unit out of service. The temporary bypass system shall have a redundant power source capable of running the system with the largest power unit out of service.

D. The Contractor shall restore each manhole and surface around the manhole to original condition and repair or replace any damage to the manhole to the satisfaction of the Owner.

E. The Contractor shall maintain sufficient equipment and materials on-site to ensure continuous and successful operation of the bypass system. Standby pumps shall be fueled, or powered, and operational at all times. The Contractor shall maintain a sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping, and other parts or system hardware on-site to ensure immediate repair or modification of any part of the system as necessary.

F. The temporary bypass lines shall be restrained or welded joint and the pipe shall have a minimum operating pressure rating of 80 pounds per square inch (psi) or double the operating pressure (whichever is greater).

G. Ramps in in streets shall be low profile such as Godwin Temporary Road Ramps or approved equal.

PART 3 – EXECUTION

3.1 Pressure Testing

A. All bypass piping shall be pressure tested in accordance with the water main pressure testing requirements of MPWSS and the City of Bozeman Modifications to MPWSS, except that the pressure test shall be completed at 60 psi or double the operating pressure (whichever is greater). A passing pressure test for a 2-hour duration shall be completed before placing the bypass pumping system in operation for each separate setup. Testing shall only be conducted with the RPR present.

3.2 Sewer Bypass Requirements

A. During bypass pumping, sewage shall not be leaked, dumped, or spilled onto any area outside the sanitary sewer system. When bypass pumping operations are complete, all piping shall be flushed, drained, and pigged into the sanitary sewer system prior to disassembly. When disassembling the pipe, avoid draining any excess water from the pipe onto the ground or any area outside the sanitary sewer system.

3.3 Damages

A. The Contractor shall repair without cost to the Owner any public or private property damage that may result from the Contractor's negligence; inadequate or improper installation, maintenance, and operation of the bypass system; and from sewage spillage.

3.4 Flow Control

A. When bypass pumping is required, the Contractor shall supply the pumps, conduits, and other equipment to divert the flow of sewage around the area in which work is to be performed. The bypass pumping system shall be of sufficient capacity to convey existing flows plus additional flow that may occur during peak flow periods or from precipitation or infiltration and shall be constructed of such materials that will prevent leakage during the pumping operation. The Contractor will be responsible for furnishing the necessary labor and supervision to set up and operate the bypass pumping system.

B. When flow in a sewer main is plugged, blocked, or bypassed; sufficient precautions must be taken to protect the sewer main from damage that might result from sewer surcharging. Further, precautions must be taken to ensure that sewer flow control operations do not cause flooding or damage to public or

private property being served by the sewers involved. In the event sewage accidentally drains onto the surface, the Contractor shall immediately stop the overflow, notify the Owner and Engineer, and take the necessary action to clean up and disinfect the spillage to the satisfaction of the Owner and Engineer. If overflow occurs onto public or private property, the Contractor shall wash down, clean up, and disinfect the spillage to the satisfaction of the Owner and private property owner. The Contractor shall report any and all overflows to the Owner and Engineer, immediately.

PART 4 – MEASUREMENT AND PAYMENT

4.1 General

A. Measurement for the complete temporary wastewater bypass system shall be on a Lump Sum Basis and will include all incidentals to complete the temporary system.

END OF SECTION

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SECTION 01700

CONTRACT CLOSEOUT

PART 1 – GENERAL

1.1 CLEANUP

Add the following:

B. Contractor shall provide personnel to remove utility covers for any required pre-paving, final, or warranty inspections.

1.4 WARRANTIES AND BONDS

Add the following:

B. Prior to acceptance of the publicly maintained infrastructure, the Contractor shall post a Maintenance Bond with the Owner equal to 20% of the actual cost of the improvements to correct any deficiencies in workmanship and/or materials which are found within the warranty period. The City of Bozeman shall be named as a dual oblige on the bond. The City of Bozeman expressly reserves the right to draft the Maintenance Bond for repairs not completed by the Property Owner, Developer, or Contractor within 30 calendar days of being advised that repairs are required. The Commencement Date for the Maintenance Bond shall be the date of acceptance by the City of Bozeman on the Certificate of Completion and Acceptance. The Maintenance Bond shall remain in full force for the two-year period following this date, however if the expiration date of the Maintenance Bond falls between November 16 and May 15, the expiration date of the Maintenance Bond shall be the following June 30. Maintenance Bonds may be in the form of a Surety Bond or a Certified Check. Refer to the City of Bozeman Fire Service Line Standard for fire service bonding requirements.

C. The Contractor shall guarantee all work for a period of two years from the date of acceptance by the City of Bozeman on the Certificate of Completion and Acceptance. The Warranty shall remain in full force for the two-year period following this date, however if the expiration date of the Warranty falls between November 16 and May 15, the expiration date of the Warranty shall be the following June 30. Refer to the City of Bozeman Fire Service Line Standard for fire service warranty requirements.

SECTION 02112

REMOVAL OF EXISTING PAVEMENT, CONCRETE CURB, SIDEWALK, DRIVEWAY AND/OR STRUCTURES

PART 3 – EXECUTION

3.1 GENERAL

Add the following:

D. Exercise care in removal of existing tree roots that conflict with the work. Tree roots shall be removed by saw cutting the roots to a neat line at the extent of the excavation. Remove only the minimum amount of roots necessary in order to complete the work.

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SECTION 02113

ADJUSTING EXISTING MANHOLES, LAMPHOLES, INLETS, WATER VALVE BOXES, WATER SERVICES AND FIRE HYDRANTS TO GRADE

PART 1 – GENERAL

1.2 STANDARD DRAWINGS

Replace with the following:

A. The following standard drawings are applicable to this section and are included in Appendix B of these standards.

Drawing	Description
COB 02113-1	Manhole Adjustment
COB 02113-2	Water Valve Adjustment

PART 2 – PRODUCTS

2.1 GENERAL

Add the following:

B. East Jordan Iron Works Model 69 screw type adjustable risers may be used to adjust existing valve boxes to grade. Do not use these adjustable risers on new valve boxes; add mid-section extensions to provide correct valve box adjustment.

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SECTION 02221

TRENCH EXCAVATION AND BACKFILL
FOR PIPELINES & APPURTENANT STRUCTURES

PART 1 - GENERAL

1.3 STANDARD DRAWINGS

Replace with the following:

A. The following standard drawings are applicable to this section. Drawings labeled "COB" are included in Appendix B of these standards. Asterisked drawings are not included, but are published in Appendix A of the Montana Public Works Standard Specifications (MPWSS), Seventh Edition.

Drawing	Description
COB 02221-1	Typical Utility Trench
COB 02221-1A	Flowable Fill Backfill Detail
02221-2*	Pipe Bedding Alternate

PART 2 – PRODUCTS

2.1 PIPE BEDDING MATERIALS

A. TYPE 1 PIPE BEDDING

3. ***Replace with the following:***
Provide Type 1 Bedding consisting of imported sand, sandy gravel, or fine gravel having a maximum 3/4 inch size and a maximum plasticity index of 6, determined by AASHTO T89 and T90 or by ASTM D4318.

4. ***Delete this paragraph.***

5. ***Delete this paragraph.***

B. ***Add the following***: Flowable fill is required for trench excavations in streets that are designated as arterial or collector unless alternative backfill has been approved by the City Engineer.

PART 3 – EXECUTION

3.1 PROTECTION OF EXISTING PROPERTIES

A. General

1. ***Add the following:*** Replace any tree, bush, hedge, planter or similar vegetation or landscaping damaged during the course of the work with a planting equal to that damaged in kind, size, and location. The contract warranty period for performance applies also to the instances described herein.

4. ***Modify this section as follows:*** Do not cut and replace existing services from the mains to private property which interfere with trenching operations unless the work has been specifically approved by the City of Bozeman Water/Sewer Department. If approved, the cost for this work will be the responsibility of the CONTRACTOR. Do not interrupt water service for more than four hours.

   Install a temporary service connection approved by the City of Bozeman Water Department if service is interrupted for a longer period. Protect temporary services from freezing or interruptions of use during the construction period.

3.6 TRENCH FILLING AND BACKFILLING

C. Trench Backfill

4. Watering

c. ***Add the following requirements***: Water from the City of Bozeman's municipal system may only be obtained from the metered service located at the Vehicle Maintenance Facility, 1814 N. Rouse Ave. The Contractor shall reimburse the City Water Department for the cost of the water used at a rate determined by the Water Department.

D. Replacement of Unsuitable Backfill Material

1. ***Modify this section as follows:*** Remove and dispose of excavated soils

that are saturated and cannot be readily conditioned or dried to be made suitable, contain deleterious materials or have characteristics that, in the opinion of the ENGINEER, render the soils unsuitable as backfill.

Add the following:

G. Quality Assurance Testing

1. Compaction testing frequency and location.

a. Compaction testing shall be done on each lift of backfill material.
b. Mainline trench backfill tests shall be done within the first 100 feet of a mainline trench operation and at no more than 200-foot intervals thereafter.
c. All service lateral trench backfills shall be tested within the right-of-way and utility easements. A minimum of one compaction test shall be done on each lift for service lateral trenches.
d. Compaction testing around all manholes and valve boxes shall be done independently of the main line.
e. Testing shall be done by the project Engineer. The Engineer shall furnish testing documentation to City of Bozeman upon completion of construction.

SECTION 02230

STREET EXCAVATION, BACKFILL AND COMPACTION

PART 3 - EXECUTION

3.7 SUBGRADE PREPARATION AND COMPACTION

Add the following:

D. Quality Assurance Testing
   1. Compaction testing frequency and location.
      a. Compaction testing shall, as a minimum, be required for the top 6-inches of subgrade which are to be paved or covered with curb, gutter, or sidewalk.
      b. Compaction tests shall be required at no more than 50-foot intervals.
      c. Testing shall be done by the project Engineer.

3.8 EMBANKMENT PLACEMENT AND COMPACTION

Add the following:

C. Quality Assurance Testing
   1. Compaction testing frequency and location.
      a. Compaction testing shall be done on each lift of backfill material including areas which are part of a road embankment or are to be paved, covered with curb, gutter, or sidewalk.
      b. Compaction tests shall be required at no more than 50-foot intervals.
      c. Testing shall be done by the project Engineer.

3.9 SUBEXCAVATION/REPLACEMENT BELOW SUBGRADE

Add the following:

F. Quality Assurance Testing
   1. Compaction testing frequency and location.
      a. Compaction testing shall be done on each lift of backfill material.
      b. Compaction tests shall be required at no more than 50-foot intervals.

c. Testing shall be done by the project Engineer. The Engineer shall furnish testing documentation to City of Bozeman upon completion of construction.

SECTION 02234

SUB BASE COURSE

PART 2 – PRODUCTS

2.1 GENERAL

Add the following:

B. Limit use of recycled concrete and/or asphalt in the sub base course to a maximum of 50% by weight. Recycled material shall be mechanically blended to assure thorough mixing.

PART 3 – EXECUTION

3.3 FIELD DENSITY REQUIREMENTS

Add the following:

B. Quality Assurance Testing

1. Compaction testing frequency and location.

a. Compaction testing shall be done on each lift of fill material including areas which are to be paved, covered with curb, gutter, or sidewalk.
b. Compaction tests shall be required at no more than 50-foot intervals.
c. Testing shall be done by the project Engineer. The Engineer shall furnish testing documentation to City of Bozeman upon completion of construction.

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SECTION 02235

CRUSHED BASE COURSE

PART 2 - PRODUCTS

2.1 GENERAL

Add the following:

B. Limit use of recycled concrete and/or asphalt in the crushed base course to a maximum of 50% by weight. Recycled material shall be mechanically blended to assure thorough mixing.

2.2 CRUSHED BASE MATERIAL

Add the following:

E. When available, incorporate reclaimed glass cullet into the base course material. A minimum of 3% and a maximum of 15% of the base course material shall be reclaimed glass. The reclaimed glass shall be crushed so that 100% of the crushed glass passes a 3/8-inch screen. No more than 10% of the material retained on an individual sieve 1/4 inch or larger shall be glass, based upon visual examination and weight.

PART 3 – EXECUTION

3.3 FIELD DENSITY REQUIREMENTS

Add the following:

D. Quality Assurance Testing

1. Compaction testing frequency and location.

a. Compaction testing shall be done on each lift of fill material including areas which are to be paved, covered with curb, gutter, or sidewalk.
b. Compaction tests shall be required at no more than 50-foot intervals.
c. Testing shall be done by the project Engineer. The Engineer shall

furnish testing documentation to City of Bozeman upon completion of construction.

SECTION 02502

ASPHALT PRIME AND/OR TACK COAT

PART 2 – PRODUCTS

2.1 GENERAL

A. Unless otherwise specified, furnish asphalt material grade and typed as specified below.

3. ***Revise this section as follows:***
Unless otherwise specified in the contract documents, do not use type SS-1h emulsified asphalt. Furnish Emulsified Asphalt, SS-1 meeting the requirements of Table 1 in this section for all asphalt tack coat applications.

SECTION 02504

ASPHALT SEAL COAT

PART 3 – EXECUTION

3.3 CONSTRUCTION METHODS

D. Application of Asphalt Material

Add the following:

9. Building paper shall be applied to the surface of any street drain inlet, water valve box, manhole cover, monument box, or other similar item, prior to beginning asphalt application on the street. For any such item not adequately covered by paper, the Contractor must re-open or clean as necessary any asphalt to the satisfaction of the City Engineer prior to final payment. It is the sole responsibility of the Contractor to dispose of all building paper or other material used for covering manholes, valve boxes, monument markers, etc.

E. Application of Seal Coat Material

4. ***Replace with the following:***
Immediately after spreading, roll the aggregate with self-propelled, pneumatic-tired rollers. Roll in a longitudinal direction, beginning at the outer edges of the treatment and working toward the center. Overlap the previous strip by about one-half the roller width. Do not allow the roller speed to exceed 7 mph during initial rolling, or 15 mph after initial rolling. Complete the first rolling of the aggregate within one-half hour of it being spread. Continue rolling until a smooth, thoroughly compacted surface is obtained. Roll at least three complete passes with each roller. If the seal coat is finished in partial widths at a time, leave 4 to 6 inches of the inside edge uncovered with aggregate to permit overlap of asphaltic material when the remaining portion of the surface is treated.

5. ***Replace with the following:***
Unless otherwise specified in the contract documents, the City of Bozeman will remove and dispose of all loose aggregate from the pavement after the work is completed for projects done under contract to the City.

3.4 PROTECTION OF SIDE STREET STRUCTURES AND TRAFFIC CONTROL

Add the following:

C. It is the sole responsibility of the Contractor to furnish and post "No Parking" signs along both sides of the street(s) intended for seal coating. The "No Parking" signs shall be posted at 100-foot intervals and securely fastened to their support posts. (Wood laths may be used.) It is also the responsibility of the Contractor to remove and dispose of all "No Parking" signs and their supports immediately after the seal coating operations have been completed on each street. "No Parking" signs shall be posted 24 hours in advance of seal coating operations. The Contractor shall notify the public as to the proposed streets to be seal coated and the corresponding dates of the construction activities. The Contractor shall be responsible for removing all vehicles from streets to be seal coated. Traffic will be allowed onto streets upon completion of the seal coat street improvements. However, traffic will be required to operate at 15 mph for a period of 48 hours following completion of the seal coat. It is the responsibility of the Contractor to erect, maintain and remove the temporary speed control signs for the appropriate streets.

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SECTION 02510

ASPHALT CONCRETE PAVEMENT

PART 2 – PRODUCTS

2.2 PLANT MIX AGGREGATES

Add the following:

J. Reclaimed glass may be added to the aggregate for plant mix. A maximum of 3% crushed glass may be blended in the mix. The glass shall be crushed so that 100% of the glass passes a 3/8-inch sieve, and no more than 8% passes a No. 200 sieve. If glass is used in the mix, 1% hydrated lime (by weight) shall be added to the mix as an anti-stripping agent. Hot plant mix asphalt with glass is limited to binder or base courses and is not to be used in surface or friction courses.

2.3 ASPHALT BINDER MATERIAL

A.

1. ***Replace with the following:***
Grades: Unless otherwise specified in the Contract Documents, the type and grade of asphalt cement shall be performance grade 58-28 (AASHTO Performance Graded Binder Specification MP-1).

PART 3 – EXECUTION

3.14 PATCHING

B. Surface Preparation

3. ***Add the following:***

f. If hot plant mix asphalt is not available, temporarily patch the pavement using a 3000 psi (minimum) concrete (M-3000 or C-3000), with a minimum thickness of 3 inches. Remove the temporary patches and replace with hot mix asphalt when it becomes available.

g. Thickness of the pavement patch will equal that of the existing pavement, unless otherwise approved.

3.16 SPREADING AND FINISHING:

A. Spread and finish meeting the following requirements:

2. ***Replace with the following:***
The maximum lift thickness is 3 inches (compacted depth) for surface courses and 4 inches (compacted depth) for base courses***.***

DRAFT 7-1-2024

SECTION 02528

CONCRETE CURB AND GUTTER

PART 1 – GENERAL

1.1 DESCRIPTION

B. ***Replace with the following:***
The following standard drawings are applicable to this section and are included in Appendix B of these standards.

Drawing	Description
COB 02528-1	Standard Curb and Gutter

PART 3 – EXECUTION

3.6 STRIPPING FORMS AND FINISHING

B. Finishing

3. ***Replace with the following:***
After finishing and brooming, stamp a mark into the concrete to mark sewer and/or water service lines. The mark shall be either a "W" for water or an "S" for sewer. The mark shall be 3" tall and stamped a minimum of ¼" into the face of the curb. The marking shall locate the end of the stubbed service at a 90-degree angle to the curb.

DRAFT 7-1-2024

SECTION 02529

CONCRETE SIDEWALKS, DRIVEWAYS, APPROACHES, CURB TURN FILLETS, VALLEY GUTTERS, AND MISCELLANEOUS NEW CONCRETE CONSTRUCTION

PART 1 – GENERAL

1.2 REFERENCES

A. ***Replace with the following:***

The following standard drawings are applicable to this section. Drawings labeled "COB" are included in Appendix B of these standards. Asterisked drawings are not included, but are published in Appendix A of the Montana Public Works Standard Specifications (MPWSS), Seventh Edition.

Drawing	Description
COB 02529-1	Double Gutter Detail for Street Intersections
COB 02529-2	Standard Fillet
COB 02529-3	Type I Street Monument
02529-4*	(not used)
COB 02529-5A	Drive Approach, Non-Arterial with Boulevard
COB 02529-5B	Drive Approach, Arterial with Boulevard
COB 02529-5C	Approach with Sidewalk Adjacent to Curb
02529-6*	Retrofit Drive Approach
COB 02529-7A	Alley Approach, with Boulevard
COB 02529-7B	Alley Approach, with Curb Walk
COB 02529-8A	Accessibility Ramp Detail
COB 02529-8B	Accessibility Ramp Detail - Notes
02529-9*	(not used)

Drawing	Description
COB 02529-10	Mail Box Mounting for Curbline Delivery
COB 02529-11	Publicly Maintained Sidewalk
COB 02529-12	Asphalt Trail
COB 02529-13	Concrete Trail
COB 02529-14	Gravel Trail

PART 2 – PRODUCTS

2.4 GRAVEL BASE MATERIAL

Add the following:

B. Washed rock material meeting the following Table of Gradations may be used as base material.

Table of Gradations - Washed Rock Base Material

Percentage by Weight Passing Square Mesh Sieves

Sieve Size	% Passing
1”	100
3/4"	90-100
3/8"	10-55
No. 4	0-10

2.5 CURING AND PROTECTIVE COATING MATERIALS

Add the following:

C. The curing compound used on colored concrete shall be a high solid acrylic cure, Day/Chem Aggre-Gloss J-25 (manufactured by Dayton Superior) or approved equal.

PART 3 – EXECUTION

3.1 GENERAL

B. ***Revise as follows:***
The use of slip form machines is allowed for items in this section unless otherwise prohibited by Engineer.

3.8 JOINTS

C. ***Revise as follows:***
Divide sidewalk into sections using contraction joints formed by a jointing tool or other approved methods. Extend the contraction joints into the concrete for at least one-fourth its depth and make the joints approximately 1/8 inch wide. Unless otherwise directed, space contraction joints at maximum 10-foot intervals or a distance equal to the sidewalk width, whichever is less. In continuous sidewalk runs, install expansion joints at the location of every fifth contraction joint. For machine-placed sidewalk, install expansion joints with a maximum spacing of 150 feet.

3.11 MISCELLANEOUS NEW CONCRETE CONSTRUCTION

C. ***Add the following:***
Detectable warning plates shall be either cast iron or ductile iron.

DRAFT 7-1-2024

SECTION 02581

PAVEMENT MARKINGS AND MARKERS
(PRE-FORMED PLASTIC, PAINTS AND ENAMELS)

PART 1 – GENERAL

Add the following:

1.2 STANDARD DRAWINGS

A. The following standard drawings are applicable to this section and are included in Appendix B of these standards.

Drawing	Description
COB 02581-1	Typical Pavement Markings, Type A Crossings
COB 02581-2	Typical Pavement Markings, Type B Crossings

PART 2 – PRODUCTS

2.1 PREFORMED PLASTIC PAVEMENT MARKING MATERIAL

A. ***Add the following:***
Pre-formed plastic pavement marking material to be PreMark manufactured by Ennis-Flint® or approved equal.

D. ***Replace with the following:***
Assure plastic pavement markings for inlay into new asphaltic surfaces are capable of being applied just before the final rolling of the new surface and can be rolled into place with conventional pavement rollers. For inlay applications, assure the plastic and adhesive are not damaged by pavement temperatures exceeding 150° F or by water on roller drums. Ensure that the pavement markings are installed according to manufacturer's recommendations.

Add the following:

2.3 EPOXY PAVEMENT MARKING PAINT

A. Furnish and apply epoxy paint in accordance with the applicable sections of Standard Specifications for Road and Bridge Construction, Montana Department of Transportation, latest edition including any supplements.

SECTION 02660

WATER DISTRIBUTION SYSTEMS

PART 1 – GENERAL

1.4 STANDARD DRAWINGS

A. ***Replace with the following***:
The following standard drawings are applicable to this section. Drawings labeled "COB" are included in Appendix B of these standards. Asterisked drawings are not included, but are published in Appendix A of the Montana Public Works Standard Specifications (MPWSS), Seventh Edition.

Drawing	Description
COB 02660-1	Thrust Blocking for Water Main Fittings
02660-2*	Water and Sewer Main Separation
COB 02660-3	Thrust Blocking for Water Main Valves
COB 02660-4	Fire Hydrant
COB 02660-5	Hydrant Location Detail
COB 02660-6	Water Service Line
COB 02660-7	Blowoff Valve
COB 02660-8	Hydrant Barrier Posts
COB 02660-9	Typical Valve/Tee Restraint
COB 02660-10	Water Main Crossing Below Existing Sewer Main
COB 02660-11	Buried Pipe Insulation
COB 02660-12	Standard Fire Service for Class I, II and III Systems
COB 02660-13	Standard Fire Service for Class IV and V Systems
COB 02660-14A	Domestic Water Service, 4" and Larger (Profile)
COB 02660-14B	Domestic Water Service (Plan)

Drawing	Description
COB 02660-14C	Domestic Water Service, 3” Meter (Profile)
COB 02660-15A	Domestic Water Service, 2" and Smaller (Profile)
COB 02660-15B	Domestic Water Service, 2" and Smaller (Plan)
COB 02660-16	Water and Sewer Location Standards
COB 02660-17	Irrigation Meter Pit for 1½” and 2” Services
COB 02660-18	Irrigation Meter Pit for ¾” and 1” Services

PART 2 – PRODUCTS

2.1 GENERAL

E. ***Add the following:***
The only pipe materials allowed in the City of Bozeman are ductile iron pipe for water mains and 4-inch and larger services and copper for all other services.

2.2 PIPE MATERIALS

B. Ductile Iron Pipe

1. ***Revise as follows:***
Furnish a minimum of Class 51 wall thickness meeting AWWA C151, American National Standard for Ductile Iron Pipe for 12" diameter pipe and smaller. For pipe sizes greater than 12", furnish as specified in the contract documents. Use underground pipe having mechanical or push-on joints meeting AWWA C111. Use underground fittings having mechanical joints meeting AWWA C111. Use restrained joint pipe for all stream crossings and for pipe installed in casings. Ductile iron pipe shall be provided with metallic zinc coating in accordance with ISO 8179, unless a soils corrosivity analysis indicates that zinc coating is not required as documented by Engineer and approved by City of Bozeman. The Ductile Iron Pipe Research Association (DIPRA) Design Decision Model (DDM) shall be used to determine appropriate corrosion mitigation measures when a corrosivity analysis is performed.

3. Fittings
Delete the use of gray-iron fittings and add the following requirements:

All fittings must be manufactured in accordance with applicable AWWA standards at ISO 9001-2000 approved manufacturing facilities. These manufacturing facilities must be covered under periodic audits by third party accreditation bodies for evaluations. These evaluations shall include manufacturing processes, quality control, corrective and preventative actions, and document control. In addition, distribution centers must be audited by Third Party Approval Agencies for periodic confirmation tests and surveillance audits. These periodic confirmation tests and surveillance audits shall document continuation of product approvals by auditing the entire quality systems including design, infrastructure, system implementation, distribution, training, quality control and assurance, and document control. All fittings must be manufactured in accordance with NSF 61. The exterior of all fittings must be provided with the same corrosion mitigation measures as the adjacent pipe.

4. Joints

a. ***Revise as follows***:
Assure the fitting interior is cement mortar lined meeting AWWA C104, or fusion-bonded epoxy lined meeting ANSI/AWWA C116/A21.16. Use compact fittings having a rated working pressure of 350 psi following manufacturer recommended laying lengths.

b. ***Revise as follows:***
Restrained joint systems and mechanical restrained joint fittings shall be installed for all stream crossings, pipe installed in casings, and where specifically indicated in the drawings. Restrained joints may also be allowed in applications not specifically identified in the drawings in lieu of concrete thrust blocks with Engineer approval.

1) ***Revise as follows:***
Restrained Mechanical Joint Fittings shall be Megalug mechanical joint restraint, manufactured by EBAA Iron Sales; or Uni-flange Series 1400 retainer glands, manufactured by Ford Meter Box Company; or MJ Field Lok® Series DI, manufactured by US Pipe; or Sigma One-Lok Series SLD, manufactured by Sigma Corporation; or MJ Tufgrip TLD Series 1000, as manufactured by Tyler Union; or approved equal.

Restrained Flange Adapters shall be Megaflange restrained flange adapter, manufactured by EBAA Iron Sales; or approved equal.

2) Revise as follows:
Restrained bell and spigot joints shall be Field Lok® 350 Gaskets manufactured by US Pipe; or Flex-Ring or Lok-Ring, manufactured by AMERICAN Ductile Iron Pipe; or Sure Stop 350 gasket, manufactured by McWane Ductile; or approved equal.

5. Couplings
Delete the use of cast iron and gray iron sleeves.

C. Polyvinyl Chloride (PVC) Pressure Pipe
Delete the use of this pipe material for water lines

D. Water Service Pipe
Revise as follows:

1. Use copper or ductile iron pipe in water service line construction as specified in the contract documents and meeting the following specifications.

   a. Furnish service pipe of the size or sizes specified. A water line is designated a service line or water main based on its use, not its size. Generally, a line serving a single building or facility is considered a service line; a line serving more than one building, or intended to serve more than one building or facility is generally designated a water main. The standard sizes of services are 3/4", 1", 1½", 2", 4", 6", or 8". The minimum size of a fire service is 1".

   b. Furnish and install the service pipe from the main to the location of the curb stop and curb box as shown on the approved plans. Install the water service lines in accordance with City of Bozeman Standard Drawings 02660-6 and 02660-14A and where applicable with "City of Bozeman Fire Service Line Standard", City of Bozeman Standard Drawings 02660-12 and 02660-13.

   c. Copper Service Pipe

1) Use copper, type K annealed, meeting AWWA Standard C800. Use straight lengths for 1.5” and 2” services.
2) No connection couplings are permitted from the corporation stop to the curb stop for ¾" and 1" services.
3) Furnish one of the following copper to copper compression connection couplings: Mueller H-15403N; Ford C44-xx-Q style; or AY McDonald 74758Q for 3/4", 1", 3/4" x 1", and 1" x 1 1/2".

2.3 TAPPING SLEEVES AND VALVES:
Revise as follows:

A. Tapping sleeves shall be ductile iron or stainless steel, split-sleeve, mechanical joint type with end and side gaskets. They shall have a Class 125, ANSI B16.1 outlet flange. They shall be rated for a minimum of 200 psi working pressure and shall contain a threaded plug for testing purposes on the neck or body of the tapping sleeve. Gaskets shall be manufacturers' standard suitable for use in potable water systems. Bolts and nuts shall be Cor-Ten, Dura-Bolt, or stainless steel. The sleeve shall be Model H-615 or H-304, as manufactured by Mueller Company; or “SST” Stainless Steel Tapping Sleeve with full gasket and ductile iron or stainless steel flanged outlet, as manufactured by Romac Industries; or FAST Stainless Steel Tapping Sleeve with full gasket and stainless steel flange, as manufactured by Ford, unless otherwise approved by the City of Bozeman.

B. Tapping valves shall be as specified in Section 02660 2.8 A. 3, with flanged inlets compatible with the flange of the tapping sleeve and mechanical joint outlet. Tapping valves shall be iron body, bronze mounted gate valves with non-rising stems with design, construction and pressure rating conforming to AWWA Specification C509. Stem seals shall be double "O" ring seals designed so that the seal above the stem collar can be replaced with the valve under pressure in full open position.

C. The tapping sleeve and valve shall be furnished and installed by the Contractor and the wet tap made by the City of Bozeman Water Department with the cost paid by the Contractor. The Contractor shall excavate the existing main at the location to be tapped to confirm the appropriate pipe dimensions prior to ordering the fittings. The tapping sleeve shall be installed with the outlet set on the horizontal plane. A concrete thrust block shall be installed behind the tee.

2.4 CORPORATION STOPS

A. ***Revise as follows:***

Furnish 300 psig ball valve brass corporation stops with inlet end to suit tapping requirements and conductive compression connection outlet for type K copper tubing. Furnish either Mueller B-25008N, Ford FB1000-x-Q, or A.Y. McDonald 74701BQ corporation stops.

2.5 SERVICE CLAMPS

A. ***Revise as follows***:
Furnish flat, double strap, bronze metal service clamps (service saddles) with Neoprene gaskets and corporation stop threads. Use Mueller BR 2 B Series, Ford 202B, or AY McDonald 3825.

2.6 CURB STOPS

A. ***Revise as follows:***
Furnish curb stops with ball type curb valves with Minneapolis pattern screw box mounts for 3/4", 1", 1½", and 2" services, with 90º open to close operation. Furnish curb stops that conform to the following:

Service Size	Curb Valve and Curb Stop
3/4"	Ford Ball Valve Curb Stop B44-333-M-Q 1½" Minneapolis Thread, Mueller B-25155N 1½" Minneapolis Thread, or A.Y. McDonald 76104Q, part number 5182-035
1"	Ford Ball Valve Curb Stop B44-444-M-Q 1½" Minneapolis Thread, Mueller B-25155N 1½" Minneapolis Thread, or A.Y. McDonald 76104Q, part number 5182-192
1½"	Ford Ball Valve Curb Stop B44-666-M-Q 2" Minneapolis Thread, Mueller B-25155N 2" Minneapolis Thread, or A.Y. McDonald 76104Q, part number 5182-137
2"	Ford Ball Valve Curb Stop B44-777-M-Q 2" Minneapolis Thread, Mueller B-25155N 2" Minneapolis Thread, or A.Y. McDonald 76104Q, part number 5182-081

2.7 CURB BOXES
Revise as follows:

A. Furnish Minneapolis pattern base, extension type curb boxes having 7-foot extended lengths. Provide 5-foot stationary rods in all curb boxes. Use the

following curb boxes:

¾" and 1" Curb Stops:	Mueller H-10388N curb box 1 ¼" top with a 2 ½" base tapping (with a 2 ½" x 1 ½" standard black hex bushing and 5/8" stationary rod) Ford EM2-70-58 curb box 1 ¼" top with a 2 ½" base tapping (with a 2 ½" x 1 ½" standard black hex bushing and 9/16" stationary rod)
1 ½" and 2" Curb Stops:	Mueller H-10304N curb box 2" top with 3" base tapping (with a 3" x 2" standard black hex bushing and ¾" stationary rod that fits with 2" top section) Ford EM2-70-67 curb box 1 ½" top with a 2" base tapping (with a 2" x 1 ½" standard black hex bushing and 9/16" stationary rod)

B. Center and place the top section of a valve box lid over all curb boxes that fall within asphalt pavement.

2.8 VALVES

A. Gate Valves
Revise as follows:

1. Gate valves shall be used for all lines from 4" up to and including 20". Furnish gate valves for underground installation equipped with a 2-inch square operating nut for key operation. All valves are to open counterclockwise. Valves are to be equipped with mechanical joints for pipe connections.

2. Furnish ductile iron resilient wedge gate valves that conform to the following:

Size	Gate Valve
< 12"	Mueller 2360
< 12"	American Flow Control Series 2500
< 12"	Kennedy 8572/8571
< 20"	East Jordan FlowMaster
14"-20"	Mueller 2361
14"-20"	American Flow Control Series 2500
14"-20"	Kennedy 7572/7571

3. Bolts and nuts for the stuffing box, wrench nut cap screw, and bonnet shall be Type 304 stainless steel. Valve body shall have epoxy coating on interior and exterior surfaces.

B. Butterfly Valves

1. ***Revise as follows:***
Furnish Class 250, rubber seated, butterfly valves for water distribution systems sized 24" and larger, meeting AWWA C504 requirements. Valves to be equipped with mechanical joint ends and lubricated screw type operators designed for underground service. Furnish butterfly valves by Mueller, Kennedy, ValMatic Series 2000, or M&H. All fasteners shall be Type 304 stainless steel.

Add the following:

C. OS & Y Valves

1. For service lines 4" and larger, furnish a UL listed flanged Kennedy, American Flow Control, or Mueller OS & Y valve as the first fitting inside the building. For fire service lines 2" and smaller, furnish a NIBCO T-104-0 OS & Y valve as the first fitting inside the building. Bolts and nuts for the stuffing box, wrench nut cap screw, and bonnet shall be Type 304 stainless steel.

2.9 VALVE BOXES
Add the following:

B. Valve boxes shall be East Jordan Iron Works 8560 series. Valve box lids for fire service lines shall be East Jordon Iron Works Product Number 06800029 or approved equal.

2.10 FIRE HYDRANTS
Revise as follows:

B. ***Revise as follows:***
Furnish hydrants with 5¼" valve openings, flanged inlet, one 5" storz connection and two 2½" hose connections. Storz connectors to be by Harrington Company. Assure hose nozzle threads meet ASA Specification B26 for National Standard Fire Hose Coupling Screw Threads, 7½ threads per inch. Furnish National Standard operating nut. Furnish hydrants opening counterclockwise and having

an arrow on the hydrant top designating the opening direction. Furnish Mueller Super Centurion 250 model hydrants or Waterous 5 ¼" Pacer model hydrants per Water Department specifications, or East Jordan WaterMaster 5CD250, or Kennedy K81D hydrant. Furnish Mueller Defender Security Device, with locks keyed to City of Bozeman Standard, for each hydrant installed.

D. ***Revise as follows***
Paint the hydrant portion above the ground line red. Furnish hydrants so that there is a minimum of 6½' of cover over the hydrant lead unless specified otherwise on the approved plans.

2.13 WATER MAIN INSULATION

C. ***Revise as follows:***
Furnish extruded polystyrene rigid board foam with a compressive strength of 60 psi at 10% deformation. Insulation shall have a closed cell structure with an R Value of 5 per inch of thickness. Maximum water absorption shall be 0.1% by volume. Insulation shall be Dupont™ Styrofoam™ Brand Highload 60, or approved equal.

2.14 FLUSHING HYDRANTS
Delete this section.

2.15 YARD HYDRANTS
Delete this section.

2.16 BLOWOFF HYDRANTS

A. ***Revise as follows:***
Furnish blowoff in accordance with City of Bozeman Standard Drawing No. 02660-7, Typical Blowoff.

Add the following:

2.17 METER PITS

A. Meter pit installations may be allowed for certain service lines such as for irrigation systems. The use of meter pits must be specifically approved by the Water Superintendent. If the use of a meter pit is allowed, the following Manufacturers are approved: Mueller, A.Y. McDonald, and Ford. The Meter Department shall approve specific models proposed for use on a case-by-case basis. If approved, furnish meter pit in accordance with City of Bozeman

Standard Detail 02660-17, Irrigation Meter Pit, 1-1/2” and 2” Services or City of Bozeman Standard Detail 02660-18, Irrigation Meter Pit, 3/4" and 1” Services.

Add the following:

2.18 “NO-LEAD” BRASS

A. Brass components of waterworks materials in contact with potable water shall be of No-Lead Alloy (UNS/CDA No. C89833). Components that do not come in contact with potable water shall be UNS/CDA No. C83600-85-5-5-5 and shall conform to AWWA Standard C800 (ASTM B-62 and ASTM B-584).

PART 3 – EXECUTION

3.2 PIPE INSTALLATION FOR WATER MAINS

B. Laying of Pipe

9. ***Revise as follows***:

Construct reaction or thrust blocks at all tees, tapping tees, plugs, valves (except tapping valves and hydrant auxiliary valves that are part of a hydrant assembly), reducers, caps, vertical bends, and at horizontal bends deflecting 22 ½° or more. Limit using metal rods or straps for thrust restraint to those specified on the plans, or where the use of concrete thrust blocks would be impractical. Do not use metal rods or straps unless specifically approved by the City of Bozeman. Construct reaction blocks from concrete having a minimum compressive strength of 3,000 pounds per square inch at 28 days. Place blocking between undisturbed ground and the fitting to be anchored, as shown on Standard Drawing 02660-1. The size of thrust (gravity) blocks for vertical bends will be as designed by the Engineer. Place the blocking so that pipe and fitting joints are accessible for repair.

In lieu of concrete thrust blocks, thrust restraint may be provided in accordance with section 02260.2.2.B.4.b, for all fittings and joints that require thrust restraint, except for cut-in or tapping tees (for mains or services) and bends on service lines inside building foundations, unless specifically prohibited by the City of Bozeman. Install the mechanical restraints in accordance with manufacturer’s specifications and at all joints as specified by the Engineer.

D. Pipe Jointing

1. Rubber Gasket, “Push-On” Joints
Add the following:

b. All sections of newly installed water main shall provide continuity for electrical current. In order to provide continuity, insert a minimum of three brass or bronze conductive wedges in the joints of ductile iron pipe. Insert a copper wedge between cast iron and ductile iron pipe joints in accordance with manufacturer's recommendations. Conduct a continuity test of new mains when required by the Engineer or City of Bozeman.

3. Connections to Existing Mains
Add the following:

c. All wet taps to water mains in use shall be made by the City of Bozeman Water Department at the expense of the Contractor. The Contractor shall pressure test tapping tees prior to tapping by the Water Department. The tapping tees shall be hydrostatically pressurized to a minimum pressure of 200 psi, and the testing apparatus shall be in place for verification by the Water Department tapping personnel. City personnel will verify test results prior to tapping. Contractor shall be responsible for supplying and installing tapping tee, connection sleeves, spool pieces, and all other appurtenances required for connections. Contractor shall provide means, methods, and labor to set and remove tapping equipment. City of Bozeman requires 24-hour notice and an appointment (scheduled time) for tapping services. No taps will be made after 3:00 p.m. Contractor shall be ready at scheduled tapping appointment time. If Contractor is not ready at scheduled time, City personnel will leave and Contractor shall reschedule with the required 24-hour notice. No consideration will be given to Contractor's inability to be ready at the scheduled tapping time.

d. All dry taps or connections shall be made by the Contractor. Any new or existing valve which controls water in the municipal system shall be operated by City of Bozeman personnel only.

e. The Contractor is responsible for 24-hour advance notification, in writing, to all affected customers of a water main shut-down. The

written notification is to include the date, time and estimated duration of interrupted service. The written notification is also to include the name and phone number of the Contractor's representative who is coordinating the shut-down as well as the phone number of the City of Bozeman Water Department. All commercial customers affected by the water main shut-down must sign a notification sheet acknowledging that they have been informed of the date and time of the shut-down. The City of Bozeman reserves the right to determine the likely duration of the main shut-down based on the proposed work and Contractor experience and require the installation of temporary water services by the Contractor.

f. Clean and disinfect temporary water systems in accordance with the requirements for cleaning and disinfecting new water mains. Do not connect existing services to the temporary system until bacteriological tests show successful disinfection. Provide backflow protection at the point of connection of the temporary system to the municipal system, and at each point of connection of the temporary water system to the individual services.

g. Remove any existing blow-offs or temporary flushing hydrants upon completion of the connection to the existing main, and install a brass plug upon removal of the corporation stop.

3.3 POLYETHYLENE ENCASEMENT

Revise as follows:

A. Polyethylene encasement is required unless a soils corrosivity analysis indicates that encasement is not required as documented by Engineer and approved by City of Bozeman. The Ductile Iron Pipe Research Association (DIPRA) Design Decision Model (DDM) shall be used to determine appropriate corrosion mitigation measures when a corrosivity analysis is performed. When installed for corrosion protection, wrap all direct bury cast or ductile iron pipe and fittings including hydrants, valve boxes, curb boxes, and all other metal parts and surfaces, in polyethylene encasement.

B. Polyethylene encasement for use with ductile iron pipe shall meet all the requirements for ANSI/AWWA C105/A21.5, *Polyethylene encasement for Ductile Iron Pipe Systems*, and shall be V-Bio™ Enhanced Polyethylene Encasement.

C. The polyethylene encasement shall be overlapped one foot in each direction at

joints and secured in place around the pipe, and any wrap at tap locations shall be taped tightly prior to tapping and inspected for any needed repairs following the tap.

D. Polyethylene is required between fittings and concrete thrust blocks in all circumstances.

Add the following:

3.3.5 DETECTABLE BURIED WARNING TAPE

A. Install 6" wide detectable warning tape centered over all water mains, service lines, and hydrant leads. Install tape a minimum of 18" and maximum of 24" below finish grade.

3.3.6 TRACER WIRE

A. Install #12 AWG insulated copper clad steel tracer wire along water mains around curves or bends in the water main where the horizontal location of the water main cannot be determined as a straight line between water valves. Tracer wire on mains is to be brought to the surface alongside the hydrants to be installed that are closest to the bends. Tracer wire shall not be brought to the surface in valve boxes, unless project does not include new hydrants.

3.3.7 WATER MAIN TESTING PLAN

A. A Water Main Testing Plan shall be submitted by the Contractor to the City Engineering Office for approval prior to construction. The plan shall specify the proposed sequence of testing and the methods and procedures which will be used to complete the tests.

B. Any existing or new water main valves which are used to take water from the City of Bozeman distribution system for the purpose of filling, testing, chlorination or flushing, shall be operated by the City of Bozeman Water Department personnel only, with the Contractor requesting such operation with adequate advanced notice of at least 24 hours. All existing water main valves are to be operated only by City of Bozeman Water Department personnel.

C. The Contractor shall be prepared to execute the testing plan upon City arrival and shall have adequate personnel to operate internal valves and hydrants for the new lines to be tested. The Contractor shall make sure that the appropriate valves are open within the project and large service valves are closed.

D. The testing plan shall include the following items, in addition to others outlined in Section 3.4:

1. Filling
   a. The position (open or closed) of each valve on the project for each segment to be filled.
   b. Identify the valve(s) that will be operated by the City of Bozeman.
   c. Where and how air will be relieved from the line when filling.

2. Flushing
   a. The position (open or closed) of each valve on the project for each segment to be flushed.
   b. Identify the valve(s) that will be operated by the City of Bozeman.
   c. Location, size and number of taps or hydrants required to meet minimum flushing velocities
   d. Where the flushing water will be discharged.

3. Hydrostatic and Leakage Testing
   a. The position (open or closed) of each valve on the project for each segment to be tested.
   b. Where and how air will be relieved from the line.
   c. Test pressure for each segment to be tested.
   d. Location of pressure gauges and method of pressurizing each segment.

4. Disinfection
   a. The position (open or closed) of each valve on the project for each segment to be filled.
   b. Identify the valve(s) that will be operated by the City of Bozeman.
   c. Where and how air will be relieved from the line when filling.
   d. Method of disinfection and amount of chlorine or calcium hypochlorite granules.
   e. How and where chlorinated water will be disposed.

5. Bacteriological Test
   a. Location(s) where samples will be taken.

3.4 TESTING, CLEANING & DISINFECTING WATER MAINS, VALVES & FITTINGS

A. Hydrostatic and Leakage Testing

1. ***Revise as follows:***
Perform hydrostatic and leakage testing accordance with AWWA C600. Once the pipe is laid and backfilled, test for at least 2 hours, all newly laid pipe, or any valved section at the highest point along the test section. Test to a hydrostatic pressure 2.0 times the normal operating pressure at the test point, but in no case less than a minimum gage pressure of 200 psi (1379 kPa) or greater that the pressure rating of the pipe being tested. Do not test more than 1,000 linear feet (305 m) of pipeline at one time, unless approved by the Engineer.

2. ***Add the following:***
Assure that the testing gauge is marked in increments no greater than 10 psi.

4. ***Revise as follows:***
Conduct the leakage test concurrently with the hydrostatic pressure test for 2 hours. Leakage is defined as (1) the quantity of water supplied into the pipe, or any valved section thereof, necessary to maintain pressure within 5 PSI of the specified test pressure (after the pipe has been filled with water and purged of air) for the duration of the 2 hour test period, and (2) the quantity of water supplied into the pipe, or any valved section thereof, required to return the pressure to the specified test pressure at the end of the 2 hour test period.

Add the following:

11. Chlorination, testing, and sampling shall comply with AWWA Standard C651-92. There shall be no allowable leakage for resilient seat gate valves. Hydrostatic and leakage testing shall not be conducted concurrently with chlorination of water mains. All heavily chlorinated water must be flushed from the system prior to pressurizing the new mains.

12. Any existing or new water main valves which are used to take water from the City of Bozeman distribution system for the purpose of filling, testing, chlorination or flushing, shall be operated by the City of Bozeman Water Department personnel only, with the Contractor requesting such operation with adequate advanced notice of at least 24 hours. All existing water main valves are to be operated only by City of Bozeman Water Department personnel.

13. Allow five days after placement of concrete for thrust blocks before

performing hydrostatic or leakage testing. If high-early strength concrete is used, allow two days after placement of concrete before performing hydrostatic or leakage testing. Provide adequate cold blocking as required for all thrust blocks that will not have the necessary curing time prior to testing.

14. For sections of mains that cannot be hydrostatically tested, assure that all joints are visually inspected for leakage under line working pressure by City of Bozeman representative prior to backfilling.

B. Cleaning Water Mains

Add the following:

5. Any existing or new water main valves which are used to take water from the City of Bozeman distribution system for the purpose of filling, testing, chlorination or flushing, shall be operated by the City of Bozeman Water Department personnel only with the Contractor requesting such operation with adequate advanced notice of at least 24 hours. All existing water main valves are to be operated only by City of Bozeman Water Department personnel.

6. Install an adequately-sized corporation stop on all main stubs longer than 20 feet to allow for the flushing of the stubs (see Table 1 MPW Section 02660). Following completion of all tests, remove corporation stops, install brass plugs, and assure plugs do not leak after main has been charged. A representative from the City of Bozeman must witness this work.

C. Disinfecting Water Mains

3. Methods of Chlorination

a. ***Add the following:***

3) Hypochlorite Granule Method

a) The tablet method consists of placing calcium hypochlorite granules (tablets shall not be used) in the water main as it is being installed and then filling the main with potable water when installation is completed. This method may be used only if the pipes and appurtenances are kept clean and dry during construction.

b) Placing of calcium hypochlorite granules. During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-foot intervals. The quantity of granules shall be as shown in Table 2.

c) Warning: This procedure must not be used on solvent welded plastic or on screwed-joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

d) When installation has been completed, fill the main with water at a velocity not exceeding 1 fps. Take precautions to assure that air pockets are eliminated. Leave this water in the pipe for at least 24 hours. If the water temperature is less than 41° F, leave the water in the pipe for at least 48 hours. Position valves so that the chlorine solution in the main being treated will not flow into water mains in active service.

TABLE 2
OUNCES OF CALCIUM HYPOCHLORITE GRANULES TO BE PLACED AT BEGINNING OF MAIN AND AT EACH 500-FT INTERVAL

Pipe Diameter d, (in.)	Calcium Hypochlorite Granules (oz.)
4	1.7
6	3.8
8	6.7
10	10.5
12	15.1
14 and larger	D^2 x 15.1

Where D is the inside pipe diameter in feet D = d/12

4. Final Flushing

Add the following:

b. Contractor shall be responsible for the proper disposal of all chlorinated water. Water that will be discharged to storm drains, surface water, or other sensitive areas shall be de-chlorinated.

D. Bacteriological Tests

1. ***Revise this section as follows:***
After final flushing and before the water main is placed in service, test a sample, or samples, collected from the main(s) for turbidity and organisms. Collect at least one sample for every 1,200 feet of new main and from each branch.

a. Once the water main has been flushed following the successful completion of chlorination and pressure testing, the water line must be refilled with water and allowed to sit a minimum of 24 hours prior to the collection of samples for bacteriological tests. A second set of samples is to be taken a minimum of 24 hours after the first set of samples. Samples shall be taken in accordance with AWWA Standard C651-92. New water mains shall be placed in service by City of Bozeman personnel only.

b. Collect samples from new water mains out of service lines or temporary taps. Samples may only be taken out of fire hydrants or flushing hydrants if approved in advance by the City of Bozeman. If hydrants are approved as sample locations, operate hydrants using the auxiliary valves or curb stops to prevent groundwater from entering hydrant. Assure that hydrants are kept from freezing during testing.

c. Following the completion of bacteriological tests, assure that all temporary piping has been removed, and all temporary corporation stops have been removed and replaced with brass plugs.

3.6 VALVES

A. ***Add the following:***
For butterfly valves, set the operating nut on the west side of mains that run north-south, and on the north side of mains that run east-west.

C. Valve Thrust Blocks

1. ***Revise as follows:***
Install valves with thrust blocks and anchor rods meeting City of Bozeman Standard Drawing 02660-3 requirements. Thrust blocks are required on all valves size 6" and larger, except for tapping valves and hydrant auxiliary valves attached to the hydrant shoe flange. In lieu of concrete thrust blocks, thrust restraint may be provided utilizing Megalug®, Uni-Flange™, MJ Field Lok® Series DI, or approved equal joint restraints.

3.7 FIRE HYDRANTS

B. ***Revise as follows:***
Provide drainage at the hydrant base by placing clean gravel under and around it. Place gravel at least 1 foot on all sides from the base of the hydrant to at least 6 inches above the drain opening. Brace the hydrant against undisturbed earth at the trench end with concrete backing as detailed on the plans. In lieu of concrete thrust blocks, thrust restraint may be provided utilizing Megalug®, Uni-Flange™, or approved equal joint restraints. Furnish hydrants with the specified gate valves. Install hydrants meeting City of Bozeman Standard Drawings 02660-4 and 02660-5. Where no curb exists or the minimum distance of three feet behind the curb cannot be met or there is no other adequate protection, install protective barrier posts in accordance with City of Bozeman Standard Drawing 02660-8 when required by the Water Superintendent. Protect the hydrant from damage during installation and backfilling operations. Hydrants may be subject to replacement by the Contractor if any of the protective paint coating is damaged during installation. If hydrant extensions are required, only one coupler will be allowed on the operating rod.

3.8 SERVICE LINE INSTALLATION

A. ***Revise as follows:***
Provide all work and materials for the complete service line installation, including trench excavation and backfill; making the water main tap; furnishing and installing the corporation stop, curb stop and box, service clamp where necessary, and service line with fittings as required to make the connections to the stops. Provide a minimum of 6½ feet and a maximum of 8 feet of cover measured as noted on City of Bozeman Standard Drawing No. 02660-6. Use compression fittings for all service line fittings. Do not use sweat or solder fittings. Use a continuous length of pipe with no couplings between the corporation stop and the curb stop for 3/4" and 1" services.

B. ***Revise as follows:***

Mark the water service line stub end using a steel fence post painted blue, 6.5 feet long, buried 2.5 feet in the ground. Set post 1' from curb box. After bacteriological tests have passed and the test results have been submitted to the Water Department, open all curb stops in the presence of the Engineer to assure the service lines are flushed and all corporation stops are open. All main line valves are to be operated by Water Department personnel only.

Add the following:

D. Service line installation from the end of the stub into the building shall be as per City of Bozeman Standard Drawings 02660-12 or 02660-15. Service lines shall not be installed from the end of the stub into the building until the main line has been accepted by the City and placed into service. The water service line from the stub into the building may be reduced in size, however the size reduction must be made within 18" of the curb stop or outside valve. Connections to existing stubs (either for domestic or fire service) that have remained dormant or unused longer than 6 months may require re-flushing or disinfection at the discretion of the Water Superintendent prior to being placed into service. The Water Superintendent may require bacteriological testing to assure that the dormant line has not become contaminated.

3.9 TAPPING

A. ***Revise as follows:***

Tap the newly installed water mains unless specified otherwise. Provide a minimum distance of 18" between service taps. The City of Bozeman Water Department will tap any existing water mains. For taps on existing mains, the Contractor is responsible for scheduling and coordinating with the Water Department. The Contractor will be charged a fee for each tap made by the Water Department. All taps on existing mains require tapping saddles and corporation stops to be supplied and installed by the Contractor prior to tapping of the main by the Water Department.

B. ***Revise as follows:***

Perform tapping using an approved tapping machine using clean, sharp drill taps and/or shell cutters. 3/4-inch and 1-inch taps may be made directly into the barrel of ductile iron pipe without using service saddles. Direct tap into the pipe barrel to the depth exposing a maximum three threads of the corporation stop. Taps greater than 1" on a 6" line require the use of saddle clamps. Taps 4" and larger to existing water mains which are 4" and larger require the use of a tapping sleeve and valve.

3.10 WATER MAIN INSULATION

A. ***Revise as follows:***

Install insulation on the new water main when crossing under, over, or within 6 feet of culverts that are open to the air, or in cases where less than 6.5 feet of cover is provided. Install insulation the full width of the trench excavation. Install insulation on sides of the trench extending down to undisturbed subgrade when directed by Engineer. See City of Bozeman Standard Drawing No. 02660-11A. A minimum of 2” of rigid polystyrene foam insulation material is required, with an additional 2” required for every additional foot of cover lost. Stagger joints for two 1” thick sheets.

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SECTION 02720

STORM DRAIN SYSTEMS

PART 1 – GENERAL

1.2 CERTIFICATION BY MANUFACTURER

Add the following:

B. All Precast Concrete Products shall be manufactured by a supplier that is certified by one of the following, NPCA (National Precast Concrete Association), PCI (Precast / Prestressed Concrete Institute), or ACPA (American Concrete Pipe Association). Plant must be certified prior to and during production of precast.

1.4 STANDARD DRAWINGS

A. ***Replace with the following:***
The following standard drawings are applicable to this section. Drawings labeled "COB" are included in Appendix B of these standards. Asterisked drawings are not included, but are published in Appendix A of the Montana Public Works Standard Specifications (MPWSS), Seventh Edition.

Drawing	Description
COB 02720-1A	36" Standard Storm Drain Inlet
COB 02720-1B	Standard Square Storm Drain Inlet
COB 02720-1C	Combination Manhole and Curb Inlet
02720-2*	(not used)
COB 02720-3	Sanitary Sewer and Storm Drain Manhole
COB 02720-4	Standard Straight Manhole
02720-5*	(not used)
02720-6*	Precast Manhole Bases
02720-7*	Typical Manhole Channel Details
02720-8*	(not used)

Drawing	Description
02720-9*	(not used)
02720-10*	Storm Drain Service Line
COB 02720-11	Concrete Storm Drainage Outlet and Inlet Chases
COB 02720-12	Detention Pond Outlet Control Structure

PART 2 – PRODUCTS

2.1 GENERAL

A. ***Add the following:*** All public storm drain systems shall be constructed with reinforced concrete pipe or with solid-wall SDR-35 PVC Pipe or Schedule 40 PVC pipe. PVC Pipe may only be used for pipe sizes 36" in diameter or less.

2.3 MANHOLES

D. Frames and Covers

1. ***Revise as follows:***
Furnish D & L Foundry A-1178 ring and cover or East Jordan Iron Works 3771/3772 series ring and cover, or approved equal. Furnish 7" rings unless otherwise approved by the City Engineer. Assure that all covers have two pick holes, 1" minimum, 1 ¼ " maximum diameter. Cover lettering shall be "Storm Drain". Covers shall have a City of Bozeman logo cast into the cover. The design of the logo to be approved by the Street Superintendent.

2.4 INLETS AND CATCH BASINS

A. ***Replace with the following:***
Unless otherwise approved, furnish either of the following frames and grates: Neenah R-3067-L, Deeter #2047L, D & L Foundry I-3517, or East Jordan Iron Works 7030 with T1 back and Type M6 grate. Inlet castings shall have a logo cast into the curb piece stating "Dump no Waste, Drains to Waterways" or similar. For catch basins at sag locations, use East Jordan Iron Works Type M7 grate or approved equal.

Add the following:

2.5 DRY WELLS

A. Dry wells shall be provided with either locking covers or interior steps.

PART 3 – EXECUTION

3.1 PIPE AND SERVICE LINE INSTALLATION

Add the following:

F. Install detectable buried warning tape centered over all storm sewer mains and service lines. Install tape a minimum of 18” and maximum of 24” below finish grade.

3.2 MANHOLES

A. Construction

1. ***Revise as follows:***
Construct manholes to the specified dimensions. Unless otherwise shown on the plans, do not form channels in storm drain manholes. Assure that the lowest pipe invert is 9" higher than the base of the manhole.

2. Joint all connections between manhole walls and base between wall sections making the manhole watertight. For pipe to manhole joints, use gasketed, flexible, watertight connections that will accommodate differential settlement unless grouting is approved by the City of Bozeman and specified. Acceptable options for pipe connections to manholes are as follows:

a. Compression-Type Flexible Connector: A resilient, flexible connection, cast into manhole wall, providing 10 degrees deflection.

b. Boot-Type Flexible Connector: A flexible, watertight connection consisting of a rubber gasket or boot, metal expansion ring, and a metal take-up clamp.

c. If flexible connectors are not used, the pipe shall be centered

within the hole and the annular space shall be completely sealed with non-shrink, non-metallic grout complying with ASTM C1107.

3.3 INLETS AND CATCH BASINS

Add the following:

C. Adjustment slots of curb inlet curb sections shall be sealed with grout.

3.5 TESTS

Add the following:

D. T.V. Inspection

1. All storm drains are required to be inspected using a television camera before final acceptance. All television inspections of new storm drains shall be done by the City of Bozeman Sewer Department at Contractor expense unless otherwise approved by the Water/Sewer Superintendent. Schedule inspections with the Sewer Department a minimum of one week in advance. De-watering equipment must be shut down a minimum of 24 hours prior to the television inspection to allow groundwater to return to typical levels. Adequately flush the storm drain lines prior to each television inspection. T.V. inspection of dry lines is not acceptable. A storm drain line will be considered deficient and unacceptable if:

    a. the alignment is outside the specified limits;

    b. water ponds in any section to a depth equal to or greater than a value 2 times the grade tolerance specified herein under Section 02720 3.1 E. 1.; or

    c. the pipe has visible defects such as open joints, pinched gaskets, cracked barrels or bells, or similar defects.

    Correct any deficiencies and schedule a re-inspection by the Sewer Department. Storm drain lateral lines (inlet lines) may be subject to the same T.V. inspection requirements as storm drain mains at the discretion of the Water/Sewer Superintendent.

DRAFT 7-1-2024

SECTION 02725

DRAINAGE CULVERTS

PART 1 – GENERAL

Add the following:

1.4 STANDARD DRAWINGS

A. The following standard drawings are applicable to this section and are included in Appendix B of these standards.

Drawing	Description
COB 02725-1	Culvert Debris Rack

PART 2 - PRODUCTS

2.1 GENERAL

E. ***Revise as follows:***
All culverts shall be reinforced concrete pipe with flared-end sections unless otherwise approved by the City Engineer.

2.2 PIPE MATERIALS

B. Corrugated Metal Pipe
Delete the use of this pipe material for drainage culverts

C. ***Delete this section.***

DRAFT 7-1-2024

SECTION 02730

SANITARY SEWER COLLECTION SYSTEMS

PART 1 – GENERAL

1.2 CERTIFICATION BY MANUFACTURER

Add the following:

B. All Precast Concrete Products shall be manufactured by a supplier that is certified by one of the following, NPCA (National Precast Concrete Association), PCI (Precast / Prestressed Concrete Institute), or ACPA (American Concrete Pipe Association). Plant must be certified prior to and during production of precast.

1.4 STANDARD DRAWINGS

A. ***Replace with the following:***
The following standard drawings are applicable to this section. Drawings labeled "COB" are included in Appendix B of these standards. Asterisked drawings are not included, but are published in Appendix A of the Montana Public Works Standard Specifications (MPWSS), Seventh Edition.

Drawing	Description
02730-1*	Nomograph for Air Testing Gravity Sewer Mains
COB 02730-2	Sanitary Sewer Service Line
COB 02730-3	Deep Sanitary Sewer Service Line
COB 02730-4	Sanitary Sewer Cleanout
COB 02730-5	Standard Drop Manhole

PART 2 – PRODUCTS

2.1 GENERAL

A. ***Replace with the following:***
Furnish new sewer pipe and fittings as specified in the Contract Documents and meeting the materials and testing requirements of this Section. Furnish in-line

wye branches of the same material and design as the sewer pipe unless specified otherwise. Saddle-type fittings are allowed only upon approval by the Sewer Superintendent. Pipe strength classifications are shown on the plans and/or are listed in the Contract Documents. Do not use tee branches unless specifically approved by the City of Bozeman.

2.2 PIPE MATERIALS

A. Polyvinyl Chloride (PVC) Pipe

2. Gravity Sewer Pipe

a. ***Replace with the following:***
Furnish gravity sewer pipe meeting one of the following requirements:

1) ASTM-3034, "Standard Specifications for Polyvinyl Chloride Sewer pipe and Fittings", with an SDR of 35 8" - 15" for main and service lines.
2) ASTM F679, T-1 wall thickness (SDR 35), "Standard Specifications for PVC Large Diameter Plastic Gravity Sewer Pipe and Fittings" 18" – 27".
3) SDR 26 PVC pipe for 4" and 6" service lines.

3. ***Replace with the following:***
Pressure Sewer Pipe

a. Furnish pressure sewer pipe meeting the requirements of Paragraph 2.2.C.

5. Fittings

a. ***Replace with the following:***
Assure wye fittings for connecting service lines are of the same material, construction, and joint design as the main sewer pipe.

C. High Density Polyethylene (HDPE) Pipe
Add the following:

4. HDPE pipe may not be used except for certain applications approved by the City of Bozeman.

2.3 MANHOLES

A. General
Add the following:

2. Do not use flat-top (straight) manholes unless specifically called out on the plans or in the Contract Documents. Unless noted otherwise, flat-top manholes are only to be used when the distance from the rim to the invert is less than 6 feet.

D. Frames and Covers

1. ***Replace with the following:***
Furnish D & L Foundry A-1178 ring and cover, or East Jordan Iron Works 3771/3772 series ring and cover, or approved equal. Furnish 7” rings unless otherwise approved by the City Engineer. Assure that all covers have two pick holes, 1" minimum, 1 ¼" maximum diameter. Cover lettering shall be “Sanitary Sewer”. Covers shall have a City of Bozeman logo cast into the cover. The design of the logo to be approved by the Sewer Superintendent.

E. Concrete Base
Add the following:

2. Manhole bases shall be precast concrete. Poured-in-place bases may only be used for cut-in manholes if approved by the Sewer Superintendent.

Add the following:

2.5 GRAVITY SEWER MAIN COUPLINGS

A. Provide couplings meeting the requirements of Paragraph 2.4.

PART 3 – EXECUTION

3.1 PIPE AND SERVICE LINE INSTALLATION

B. Laying Pipe
Delete references to tee fittings.

E. Tolerances

1. ***Revise as follows:***
Install the pipe within 1/2" of the specified alignment and within 1/4" of the specified grade, provided that such variation does not result in a level or reverse sloping invert.

2. ***Add the following:***
Variation of the alignment within the given tolerances shall only be acceptable provided that such variation does not result in a level or reverse sloping invert.

Add the following:

F. Install 6” wide detectable buried warning tape centered over all sanitary sewer mains and service lines. Install tape a minimum of 18” and maximum of 24” below finish grade.

G. TRACER WIRE

1. Install #12 AWG insulated copper clad steel tracer wire along pressure sewer pipe (force mains). The distance between tracer wire access points shall in general not exceed 1,000 feet.

3.2 MANHOLES

A. Construction
Add the following:

4. Method of connecting to existing manholes or creating new junctions between mains shall be as approved by the City of Bozeman on a case-by-case basis. Break-in connections to existing manholes shall only be used where the structure can reasonably accommodate the pipe sizes and angles. Break-in connections to existing manholes shall be made by using a core drilling machine. Trim off and remove all excess gasket material inside manholes. Existing manholes shall be removed and replaced where existing structures would need excessive modifications for connection.

5. Install adjusting rings on each manhole to bring the manhole rim elevation to match the existing or specified ground elevations. A maximum of 12" of adjusting rings are permitted. Concrete adjusting

rings shall be reinforced with the same percentage of steel as the riser and top. Manufactured adjusting rings shall be Cretex Pro-Ring, HDPE Ladtech System, or approved equal. To adjust the rim to match the slope of a street, use rubber-composite tapered adjusting rings. Install Ram-Nek or approved equal joint sealant compound between the first adjusting ring and the top of the manhole, between each adjusting ring, and between the last adjusting ring and the manhole frame.

3.3 SANITARY SEWER SERVICE LINES

A. ***Replace with the following:***

Construct service lines in accordance with City of Bozeman Standard Drawing No. 02730-2 or, if authorized by the Engineer, City of Bozeman Standard Drawing No. 02730-3. Install the service line to a point 8 feet past the property line unless shown or specified otherwise on the plans. Plug the end of the service line with a stopper and gasket, using a gasket of the same type used for pipe jointing. Do not grout the plugs. For multiple service lines installed in the same trench, maintain a minimum of 2 feet clear between each service line and service tap. For service lines connected to existing mains, use Schedule 40 PVC pipe with solvent weld joints or SDR 26 PVC pipe with gasketed joints, and provide all equipment, material, labor and incidentals necessary to install the service line from the main to the building. The City of Bozeman Sewer Department shall make all main taps for new sewer services connected to existing mains, at the Contractor's expense. Inserta Tees© may be used for service line connections to existing mains.

3.4 TESTS

A. ***Add the following:***

At least 24 hours prior to beginning sewer main and manhole tests, provide a testing schedule to the Engineer and the City Engineering Office for approval. Specify the proposed sequence of testing and the methods and procedures which will be used to complete the tests.

D. Water Test

1. ***Add the following:***

If the water test method is used, verify groundwater levels at the time of testing by installing piezometers or test pits in the immediate area of the sewer line that is being tested.

E. Air Test (Alternative)

7. ***Replace with the following:***
For test sections exceeding the maximum lengths, either shorten the test section to an allowable length; test according to Uni-Bell Standard Uni-B-6-98; or use the water test.

Add the following:

8. If the air test method is used to test the sewer mains, test manholes for leakage by filling each manhole with water to the top of the manhole. Measure the leakage by checking the water level drop in the manhole over a four-hour period. Allow time to soak the manholes in advance of performing tests. The allowable leakage for manholes is 0.1 gal/hr/ft-dia/ft-head.

G. T.V. Inspection

1. ***Revise this section as follows:***
All sewers are required to be inspected using a television camera before final acceptance. All television inspections of new sewers shall be done by the City of Bozeman Sewer Department at Contractor expense unless otherwise approved by the Water/Sewer Superintendent. Schedule inspections with the Sewer Department a minimum of one week in advance. De-watering equipment must be shut down a minimum of 24 hours prior to the television inspection to allow groundwater to return to typical levels. Adequately flush the sewer lines prior to each television inspection. T.V. inspection of dry sewer lines is not acceptable. A sewer line will be considered deficient and unacceptable if:

   a. the alignment is outside the specified limits,

   b. water ponds in any section to a depth equal to or greater than a value 2 times the grade tolerance specified herein under Section 02730 3.1 E.1, or

   c. the pipe has visible defects such as open joints, pinched gaskets, cracked barrels or bells, or similar defects.

Correct any deficiencies and schedule a re-inspection by the Sewer Department. Sanitary sewer service lines may be subject to the same T.V. inspection requirements as sanitary sewer mains at the discretion of the Sewer Superintendent.

Add the following:

K. Manhole Vacuum Testing

1. Vacuum testing of manholes may be done in lieu of water testing. Testing shall be done in accordance with "ASTM C1244-05a, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill", with the exception that the testing shall be done after backfilling.

DRAFT 7-1-2024

Add the following new section:

SECTION 09810

STREET SIGNS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section describes the furnishing, fabrication, installation, removal and resetting of street signs. Signs are to be specified and placed in accordance with these and other specifications, the Standard Drawings, and in the locations as shown on plans or as directed by the Engineer.

1.2 REFERENCES

A. MUTCD Manual on Uniform Traffic Control Devices

1.3 STANDARD DRAWINGS

A. The following standard drawings are applicable to this section and are included in Appendix B of these standards.

Drawing	Description
COB 09810-1	Sign Installation Standards
COB 09810-2	Dead End Barricade
COB 09810-3	Standard Street Marker Sign Location

1.4 DEFINITIONS

A. The following definitions define the signing work to be done when the respective terms are used in the Contract.

1. NEW: Signs designated "New" are to be furnished new and erected at the locations specified.

2. REUSE: Signs designated "Reuse" are to be removed from the existing post or posts and remounted on a new post or posts at the locations specified.

3. REPLACE: Signs designated "Replace" are to be removed and replaced with the specified "New" standard signs, including new post or posts, at the existing or specified new locations.

4. RESET: Signs designated "Reset" are to be removed and reset at the locations specified using the existing sign faces and supports.

5. REMOVE: Signs designated "Remove" are to be removed, to include the sign or sign assembly and sign supports.

PART 2 - PRODUCTS

2.1 POSTS

A. Use 2" perforated square tube 14-gauge galvanized steel posts for all sign posts unless otherwise specified on the plans. Use Telspar or approved equal sign posts. Anchor posts as shown on Standard Drawing 09810-1.

2.2 STREET NAME MARKER SIGNS

A. Provide street marker (D-3) signs which meet all applicable MUTCD Standards. For publicly maintained streets, use white lettering on a green background. For privately maintained streets, use white lettering on a blue background. For ground-mounted signs, furnish 9” flat-blade aluminum sign blanks, 0.08 inches thick. Provide a 1/4" white border around the edge of the sign. Use white Highway Font letters for the street name. Lettering for street names shall be mixed-case consisting of an initial upper-case letter followed by lower-case letters. Letter height is specified as the height of the initial upper-case letter. The nominal loop height of the lower-case letters shall be ¾ the height of the initial upper-case letter. Street names shall have 6-inch letters, and 3-inch letters for street abbreviations or city sections (e.g. Street, Avenue, Road). Attach signs back-to-back on sign post with two 3/8" drive rivets with 1” backing washers. For overhead signs, blank and letter sizes shall be determined by engineering design and shall meet the requirements of the MUTCD.

2.3 REGULATORY, WARNING, CONSTRUCTION, AND GUIDE SIGNS

A. Assure that all signs meet applicable MUTCD Standards. Furnish construction grade aluminum sign blanks, 0.08 inches thick. Attach signs to the posts with a

minimum of two 3/8" drive rivets with backing washers. For signs smaller than 18”x18”, use 3/8” x 1” washers; for larger signs use 3/8” x 1.5” washers.

2.4 SIGN POST FOUNDATION SLEEVES

A. Furnish 2¼” non-perforated 12-gauge galvanized steel square tube foundation sleeves for all sign posts. Use “Telspar Quik Punch” or approved equal. Install sleeves in concrete anchor as shown on Standard Drawing 09810-1.

2.5 REFLECTIVE SHEETING

A. Reflective sheeting for signs shall be Type IV (“High Intensity Prismatic”) or better.

2.6 DELINEATORS

A. For flexible delineators, use Flex-Stake Series 750 for surface mount and Flex-Stake Series 670 for ground mount, or approved equal.

PART 3 - EXECUTION

3.1 SIGN INSTALLATION

A. Assure that all signs are installed according to MUTCD Standards. Locate signs as shown on the plans or as directed by the Engineer. Assure that signs are installed plumb, at the correct height, and with the edge of the sign a minimum of two feet from the face of the curb or edge of pavement.

3.2 SIGN REMOVAL OR REPLACEMENT

A. As directed by the Engineer, salvage existing signs designated to be removed or replaced to the site specified by the City of Bozeman. Properly dispose of all signs designated for removal or replacement which have not been designated for salvage.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. The following are pay items for the work covered under this section. Full compensation includes the provision all materials, tools, labor and equipment

necessary to complete the item and all incidental work related thereto, whether specifically mentioned herein or not.

1. NEW SIGNS: Measurement of signs is per each sign installed. Payment for signs is made at the contract unit price bid per each sign installed, which includes furnishing and installing sign posts and sign faces and all other work necessary or incidental for completion of the item.

2. REUSE SIGNS: Measurement of signs is per each sign installed. Payment for signs is at the contract unit price bid per each sign reused. Such price or prices and payment will be full compensation for furnishing and erecting the new sign supports and remounting the sign, removing and disposing of the existing sign supports, and backfilling of removal sites.

3. REPLACE SIGNS: Measurement of signs is per each sign replaced. Payment for signs is at the contract unit price bid per each sign replaced. Such price or prices and payment will be full compensation for removing and disposing of the existing sign and furnishing and erecting the new sign supports and sign faces.

4. RESET SIGNS: Measurement of signs is per each sign reset. Payment will be made at the contract unit price bid per each sign reset. Such price and payment will be full compensation for all work and materials including dismantling and removal, resetting, furnishing, and installing break away devices (if required), breakdown of foundation material and backfill of removal sites, and all incidentals necessary to complete the work. When not provided for in the contract, reset signs will not be paid for directly but will be considered incidental to and included in payment for other items in the contract.

5. REMOVE SIGNS: Measurement of signs is per each sign removed. Payment will be made at the contract unit price bid per each sign removed. Such price and payment will be full compensation for removing each sign and supports, removal from the project, breakdown of foundation material, and backfilling removal sites.

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ADJUSTABLE RISERS FOR VALVE BOXES

Section	Brand	Model	Size
02113	East Jordan Iron Works	Model 69 Screw Type Adjustable Riser	N/A

DI RESTRAINED JOINTS

Section	Brand	Model	Size
02660	American	Ductile Iron Pipe Flex-Ring	N/A
02660	American	Ductile Iron Pipe Lok-Ring	N/A
02660	EBBA Iron Sales	Megalug Mechanical Joint Restraint	N/A
02660	EBBA Iron Sales	Megaflange Restrained Flange Adapter	N/A
02660	Ford Meter Box Company	Uni-flange Series 1400 Retainer Glands	N/A
02660	Sigma Corporation	One-Lok Series SLD	N/A
02660	US Pipe	MJ Field Lok Series DI	N/A
02660	US Pipe	350 Gaskets for Push On Joints	N/A
02660	Tyler Union	MJ Tufgrip TLD Series 1000	N/A
02660	McWane Ductile	Sure Stop 350 Gasket	N/A

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TAPPING SLEEVES

Section	Brand	Model	Size
02660	Mueller	H-615 MJ Tapping Sleeve	N/A
02660	Mueller	H-304 MJ Tapping Sleeve	N/A
02660	Romac Industries	SST with Ductile Iron Flanged Outlet	N/A
02660	Ford	FAST Stainless Steel Tapping Sleeve	N/A

SERVICE CLAMPS

Section	Brand	Model	Size
02660	Mueller	BR2B Series Service Saddles Double Strap	N/A
02660	Ford	202B Double Strap Brass Saddles	N/A
02660	A.Y. McDonald	3825 Double Bronze Bale Saddles	N/A

GATE VALVES

Section	Brand	Model	Size
02660	Mueller	2360 Resilient Wedge Gate Valve	< 12”
02660	American	Series 2500 Ductile Iron Resilient Wedge Gate Valve	< 12”
02660	Kennedy	Model 8571/8572	< 12”

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Section	Brand	Model	Size
		Resilient Wedge Gate Valve	
02660	Mueller	2361 Resilient Wedge Gate Valve	14”-20”
02660	American	Series 2500 Ductile Iron Resilient Wedge Gate Valve	14”-20”
02660	Kennedy	Model 7571/7572 Resilient Wedge Gate Valve	14”-20”
02660	East Jordan Iron Works	Flowmaster	< 20”

BUTTERFLY VALVES

Section	Brand	Model	Size
02660	Mueller	Class 250B/150B Lineseal Series	N/A
02660	M&H	Class 250B/150B Style 4500/1450 Series	N/A
02660	Kennedy	Class 250B/150B Style 4500/1450 Series	N/A
02660	Val-Matic	American-BFV Series 2000	N/A

OUTSIDE SCREW & YOKE VALVES

Section	Brand	Model	Size
02660	American Flow Control	Series 3500 Resilient Wedge OS&Y Gate Valves	≥ 4”

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Section	Brand	Model	Size
02660	Kennedy	C509 Flanged OS&Y	≥ 4”
02660	Mueller	R-2361-6 Flanged Ends OS&Y	≥ 4”
02660	NIBCO	T-104 US&Y Bronze Gate Valve	≤ 2”

VALVE BOXES

Section	Brand	Model	Size
02660	East Jordan Iron Works	8560 Series	N/A
02660	East Jordan Iron Works	Product 06800029	N/A

FIRE HYDRANTS

Section	Brand	Model	Size
02660	American	AVK Series 2780 Nostalgic Hydrant	N/A
02660	Mueller	Super Centurion 250	N/A
02660	Mueller	Defender Security Device	N/A
02660	Kennedy	Model K81D Hydrant	N/A
02660	Waterous	5 ¼” Pacer	N/A
02660	East Jordan Iron Works	WaterMaster 5CD250	N/A

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WATER MAIN INSULATION

Section	Brand	Model	Size
02660	Dupont	Styrofoam Brand Highload 60	N/A

METER PITS

Section	Brand	Model	Size
02660	Mueller	Specific Models Approved by Case	N/A
02660	Ford	Specific Models Approved by Case	N/A
02660	A.Y. McDonald	Specific Models Approved by Case	N/A

POLYETHYLENE ENCASEMENT

Section	Brand	Model	Size
02660	V-Bio	Enhanced Polyethylene Encasement	N/A

THRUST RESTRAINTS

Section	Brand	Model	Size
02660	US Pipe	Megalug	N/A
02660	US Pipe	Uni-Flange	N/A
02660	Sigma	MJ Field Lok Series D1	N/A
02660	Sigma	Field Lok 350 Gaskets	N/A

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MANHOLE RINGS/COVERS

Section	Brand	Model	Size
02720	D&L Foundry	A-1778 Ring and Cover	N/A
02720	East Jordan Iron Works	Models 3771/3772	N/A
02730	Cretex	Pro-Ring Manhole Adjusting Rings	N/A
02730	LadTech	HDPE Manhole Adjustment Rings	N/A
02730	Ram-Nek	RN101 Performed Flexible Plastic Gasket Strips	N/A

STREET SIGNS

Section	Brand	Model	Size
09810	Flex Stake	Series 750 Surface Mount Delineators	N/A
09810	Flex Stake	Series 670 Ground Mount Delineators	N/A
09810	Telspar	Sign Posts	N/A
09810	Telspar	Quick Punch 2 ¼" non-perforated 12 gauge galvanized steel square tube foundation	N/A

COPPER TO COPPER UNIONS

Section	Brand	Model	Size
N/A	A.Y. McDonald	74758Q Compression 3 Piece Union	¾"

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Section	Brand	Model	Size
N/A	Ford	C44-33Q Compression 3 Piece Union	¾”
N/A	Mueller	H-15403N Compression 3 Piece	¾”
N/A	A.Y. McDonald	74758Q Compression 3 Piece Union	1”
N/A	Ford	C44-44Q Compression 3 Piece Union	1”
N/A	Mueller	H-15403N Compression 3 Piece	1”
N/A	A.Y. McDonald	74758Q Compression 3 Piece Union	1 ½”
N/A	Ford	C44-66Q Compression 3 Piece Union	1 ½”
N/A	Mueller	H-15403N Compression 3 Piece	1 ½”
N/A	A.Y. McDonald	74758Q Compression 3 Piece Union	2”
N/A	Ford	C44-77Q Compression 3 Piece Union	2”
N/A	Mueller	H-15403N Compression 3 Piece	2”
N/A	A.Y. McDonald	74758Q Compression 3 Piece Union	¾” X 1”
N/A	Mueller	H-15403N Compression 3 Piece	¾” X 1”

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Section	Brand	Model	Size
N/A	A.Y. McDonald	74758Q Compression 3 Piece Union	1" X 1 ½"

COPPER TO COPPER 90'S

Section	Brand	Model	Size
N/A	A.Y. McDonald	74761Q Compression 90 Degree Connector	1 ½"
N/A	Mueller	H-15526N Compression 90 Degree Connector	1 ½"
N/A	A.Y. McDonald	74761Q Compression 90 Degree Connector	2"
N/A	Mueller	H-15526N Compression 90 Degree Connector	2"

COPPER TO THREADED END CAP

Section	Brand	Model	Size
N/A	Mueller	H-15428N Compression x MIP Thread	½"
N/A	Mueller	H-15428N Compression x MIP Thread	¾"
N/A	Mueller	H-15428N Compression x MIP Thread	1"
N/A	Mueller	H-15428N Compression x MIP Thread	1 ¼"

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Section	Brand	Model	Size
N/A	Mueller	H-15428N Compression x MIP Thread	1 ½”
N/A	Mueller	H-15428N Compression x MIP Thread	1 ½”
N/A	Mueller	H-15428N Compression x MIP Thread	1 ¾”
N/A	Mueller	H-15428N Compression x MIP Thread	2”

STRAIGHT STOPS

Section	Brand	Model	Size
N/A	A.Y. McDonald	76100MWQ Compression Straight Stop	¾”
N/A	Mueller	B-24350N Compression Straight Stop	¾”
N/A	A.Y. McDonald	76100MWQ Compression Straight Stop	1”
N/A	Mueller	B-24350N Compression Straight Stop	1”
N/A	A.Y. McDonald	76100MWQ Compression Straight Stop	1 ½”

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Section	Brand	Model	Size
N/A	Mueller	B-24350N Compression Straight Stop	1 ½”
N/A	A.Y. McDonald	76100MWQ Compression Straight Stop	2”
N/A	Mueller	B-24350N Compression Straight Stop	2”

ANGLE STOPS

Section	Brand	Model	Size
N/A	A.Y. McDonald	74602BQ Compression Angle Stops	¾”
N/A	Mueller	B-24258N Compression Angle Stops	¾”
N/A	A.Y. McDonald	74602BQ Compression Angle Stops	1”
N/A	Mueller	B-24258N Compression Angle Stops	1”
N/A	A.Y. McDonald	74602BQ Compression Angle Stops	1 ½”
N/A	Mueller	B-24276N Compression Angle Stops	1 ½”
N/A	A.Y. McDonald	74602BQ Compression Angle Stops	2”
N/A	Mueller	B-24276N Compression Angle Stops	2”

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CORPORATION STOPS

Section	Brand	Model	Size
02660	A.Y. McDonald	74701BQ Ball Corps Stop	¾”
02660	Mueller	B-25008N Ball Corps Stop	¾”
02660	Ford	FB10003Q Ball Corps Stop	¾”
02660	A.Y. McDonald	74701BQ Ball Corps Stop	1”
02660	Mueller	B-25008N Ball Corps Stop	1”
02660	Ford	FB10004Q Ball Corps Stop	1”
02660	A.Y. McDonald	74701BQ Ball Corps Stop	1 ½”
02660	Mueller	B-25008N Ball Corps Stop	1 ½”
02660	Ford	FB10006Q Ball Corps Stop	1 ½”
02660	A.Y. McDonald	74701BQ Ball Corps Stop	2”
02660	Mueller	B-25008N Ball Corps Stop	2”
02660	Ford	FB10007Q Ball Corps Stop	2”

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CURB STOPS

Section	Brand	Model	Size
02660	A.Y. McDonald	76104Q Ball Valve Minneapolis Thread	¾”
02660	Mueller	B-25155N Ball Valve Minneapolis Thread	¾”
02660	Ford	B44-333MQ Ball Valve Minneapolis Thread	¾”
02660	A.Y. McDonald	76104Q Ball Valve Minneapolis Thread	1”
02660	Mueller	B-25155N Ball Valve Minneapolis Thread	1”
02660	Ford	B44-444MQ Ball Valve Minneapolis Thread	1”
02660	A.Y. McDonald	76104Q Ball Valve Minneapolis Thread	1 ½”
02660	Mueller	B-25155N Ball Valve Minneapolis Thread	1 ½”
02660	Ford	B44-666MQ Ball Valve Minneapolis Thread	1 ½”
02660	A.Y. McDonald	76104Q Ball Valve Minneapolis Thread	2”
02660	Mueller	B-25155N Ball Valve Minneapolis Thread	2”
02660	Ford	B44-777MQ Ball Valve Minneapolis Thread	2”

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CURB BOXES

Section	Brand	Model	Size
02660	Ford	EM2-70-58, 1 ¼" top with 2 ½ base tapping	¾"
02660	Mueller	H-10388N, 1 ¼" top with 2 ½ base tapping	¾"
02660	Ford	EM2-70-58, 1 ¼" top with 2 ½ base tapping	1"
02660	Mueller	H-10388N, 1 ¼" top with 2 ½ base tapping	1"
02660	Ford	EM2-70-67, 1 ½" top with 2" base tapping	1 ½"
02660	Mueller	H-10304N, 2" top with 3" base tapping	1 ½"
02660	Mueller	H-10304N, 2" top with 3" base tapping	2"

SADDLES

Section	Brand	Model	Size
02660	A.Y. McDonald	3825 Service Clamps	4"
02660	Ford	202B-540 Service Clamps	4"
02660	Mueller	BR2B0474IP Service Clamps	4"
02660	A.Y. McDonald	3825 Service Clamps	6"
02660	Ford	202B-750 Service Clamps	6"

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Section	Brand	Model	Size
02660	Mueller	BR2B0684IP Service Clamps	6”
02660	A.Y. McDonald	3825 Service Clamps	8”
02660	Ford	202B-962 Service Clamps	8”
02660	Mueller	BR2B0899IP Service Clamps	8”
02660	A.Y. McDonald	3825 Service Clamps	10”
02660	Ford	202B-1212 Service Clamps	10”
02660	Mueller	BR2B1104IP Service Clamps	10”
02660	A.Y. McDonald	3825 Service Clamps	12”
02660	Ford	202B-1438 Service Clamps	12”
02660	Mueller	BR2B1314IP Service Clamps	12”

Note: Other copper connectors may be approved by the Water Superintendent on a case-by-case basis.

Appendix B
City of Bozeman
Standard Drawings

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Complete list of Standard Drawings to be used with the City of Bozeman Modifications to Montana Public Works Standard Specifications, Seventh Edition:

Drawing	Description
COB 01570-1	Traffic Control Minimum Standard, Urban Work Site: 4-Lane Road, Work Site Blocking One Lane
COB 01570-2	Traffic Control Minimum Standard, Urban Work Site: 2-Lane Road, Work Site on Centerline Blocking Both Lanes
COB 01570-3	Traffic Control Minimum Standard, Urban Work Site: 4-Lane Road, Work Site on Centerline Blocking Inside Lanes
COB 01570-4	Traffic Control Minimum Standard, Urban Work Site: 2-Lane Road, Work Site Blocking One Lane
COB 01570-5	Traffic Control Minimum Standard, Rural Work Site: Work Adjacent to the Present Traveled Way
COB 01570-6	Traffic Control Minimum Standard, Rural Work Site: Work On the Present Traveled Way
COB 01570-7	Pedestrian Traffic Control for Temporary Sidewalk Closure
COB 01570-8	Sidewalk Closure with Detour
COB 02113-1	Manhole Adjustment
COB 02113-2	Water Valve Adjustment
COB 02221-1	Typical Utility Trench
COB 02221-1A	Flowable Fill Backfill Detail
02221-2*	Pipe Bedding Alternate
02222-1*	Trench Plug Excavation

* Not included - refer to MPWSS Standard Drawings. The noted drawings were adopted by the City of Bozeman with no modifications.

** Not used – MPWSS Standard Drawing not adopted by City of Bozeman

Appendix B
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Drawing	Description
COB 02528-1	Standard Curb and Gutter
COB 02529-1	Double Gutter Detail for Street Intersections
COB 02529-2	Standard Fillet
COB 02529-3	Type I Street Monument
02529-4**	(not used)
COB 02529-5A	Drive Approach, Non-Arterial with Boulevard
COB 02529-5B	Drive Approach, Arterial with Boulevard
COB 02529-5C	Approach with Sidewalk Adjacent to Curb
02529-6*	Retrofit Drive Approach
COB 02529-7A	Alley Approach, with Boulevard
COB 02529-7B	Alley Approach, with Curb Walk
COB 02529-8A	Accessibility Ramp Detail
COB 02529-8B	Accessibility Ramp Detail - Notes
02529-9**	(not used)
02529-10*	Mail Box Mounting for Curbline Delivery
COB 02529-11	Publicly Maintained Sidewalk
COB 02529-12	Asphalt Trail
COB 02529-13	Concrete Trail
COB 02529-14	Gravel Trail
COB 02581-1	Typical Pavement Markings, Type A Crossings

* Not included - refer to MPWSS Standard Drawings. The noted drawings were adopted by the City of Bozeman with no modifications.

** Not used – MPWSS Standard Drawing not adopted by City of Bozeman

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Drawing	Description
COB 02581-2	Typical Pavement Markings, Type B Crossings
COB 02660-1	Thrust Blocking for Water Main Fittings
02660-2*	Water and Sewer Main Separation
COB 02660-3	Thrust Blocking for Water Main Valves
COB 02660-4	Fire Hydrant Setting
COB 02660-5	Hydrant Location Detail
COB 02660-6	Water Service Line
COB 02660-7	Blowoff Valve
COB 02660-8	Hydrant Barrier Posts
COB 02660-9	Typical Valve/Tee Restraint
COB 02660-10	Water Main Crossing Below Existing Sewer Main
COB 02660-11	Buried Pipe Insulation
COB 02660-12	Standard Fire Service for Class I, II and III Systems
COB 02660-13	Standard Fire Service for Class IV and V Systems
COB 02660-14A	Domestic Water Service, 4" and Larger (Profile)
COB 02660-14B	Domestic Water Service (Plan)
COB 02660-14C	Domestic Water Service, 3” Meter (Profile)
COB 02660-15A	Domestic Water Service, 2" and Smaller (Profile)
COB 02660-15B	Domestic Water Service, 2" and Smaller (Plan)
COB 02660-16	Water and Sewer Location Standards

* Not included - refer to MPWSS Standard Drawings. The noted drawings were adopted by the City of Bozeman with no modifications.

** Not used – MPWSS Standard Drawing not adopted by City of Bozeman

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Standard Drawings

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Drawing	Description
COB 02660-17	Irrigation Meter Pit, 1½" and 2" Services
COB 02660-18	Irrigation Meter Pit, ¾" and 1" Services
COB 02720-1A	36" Standard Storm Drain Inlet
COB 02720-1B	Standard Square Storm Drain Inlet
COB 02720-1C	Combination Manhole and Curb Inlet
02720-2*	24" Standard Riser Inlet
COB 02720-3	Sanitary Sewer and Storm Drain Manhole
COB 02720-4	Standard Straight Manhole
02720-5*	(not used)
02720-6*	Precast Manhole Bases
02720-7*	Typical Manhole Channel Details
02720-8**	(not used)
02720-9**	(not used)
02720-10*	Storm Drain Service Line
COB 02720-11	Concrete Storm Drainage Outlet and Inlet Chases
COB 02720-12	Detention Pond Outlet Control Structure
COB 02725-1	Culvert Debris Rack
02730-1*	Nomograph for Air Testing Gravity Sewer Mains
COB 02730-2	Sanitary Sewer Service Line
COB 02730-3	Deep Sanitary Sewer Service Line

* Not included - refer to MPWSS Standard Drawings. The noted drawings were adopted by the City of Bozeman with no modifications.

** Not used – MPWSS Standard Drawing not adopted by City of Bozeman

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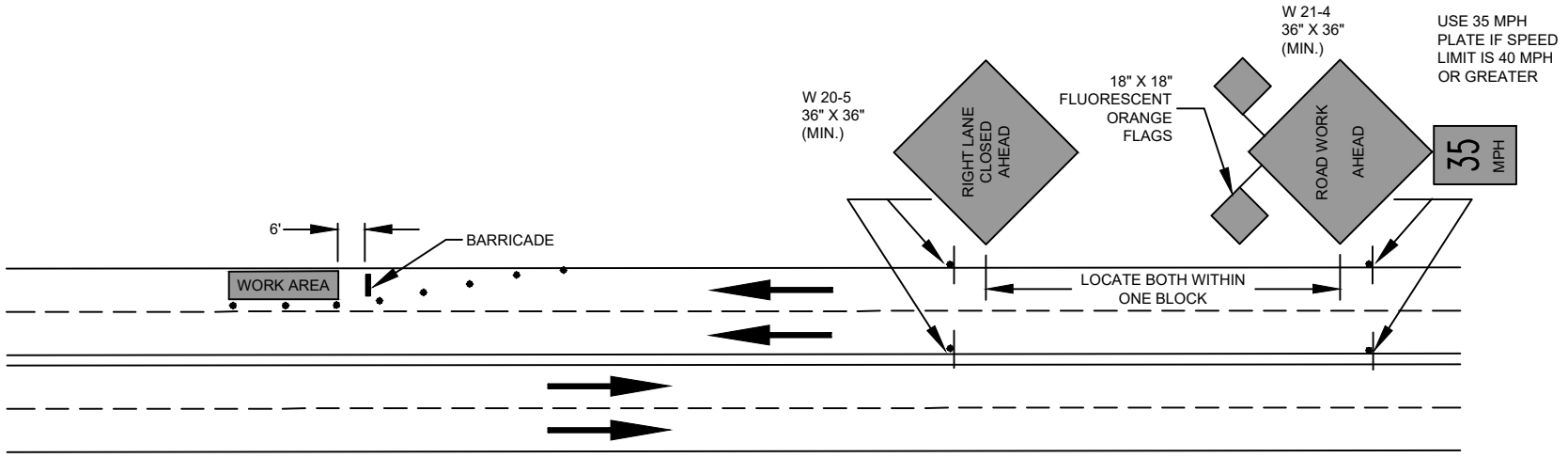
Drawing	Description
COB 02730-4	Sanitary Sewer Cleanout
COB 02730-5	Standard Drop Manhole
COB 09810-1	Sign Installation Standards
COB 09810-2	Dead End Barricade
COB 09810-3	Standard Street Marker Sign Location
COB Figure A	Typical Street Section, Local Street
COB Figure B	Typical Street Section, Collector Street
COB Figure C	Typical Street Section, Arterial Street

* Not included - refer to MPWSS Standard Drawings. The noted drawings were adopted by the City of Bozeman with no modifications.

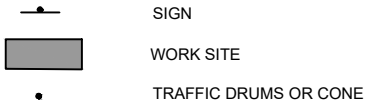
** Not used – MPWSS Standard Drawing not adopted by City of Bozeman



SPEED LIMIT	TAPER LENGTH	CONE SPACING
25	125'	25'
30	180'	30'
35	245'	35'
40	320'	40'

NOTES:

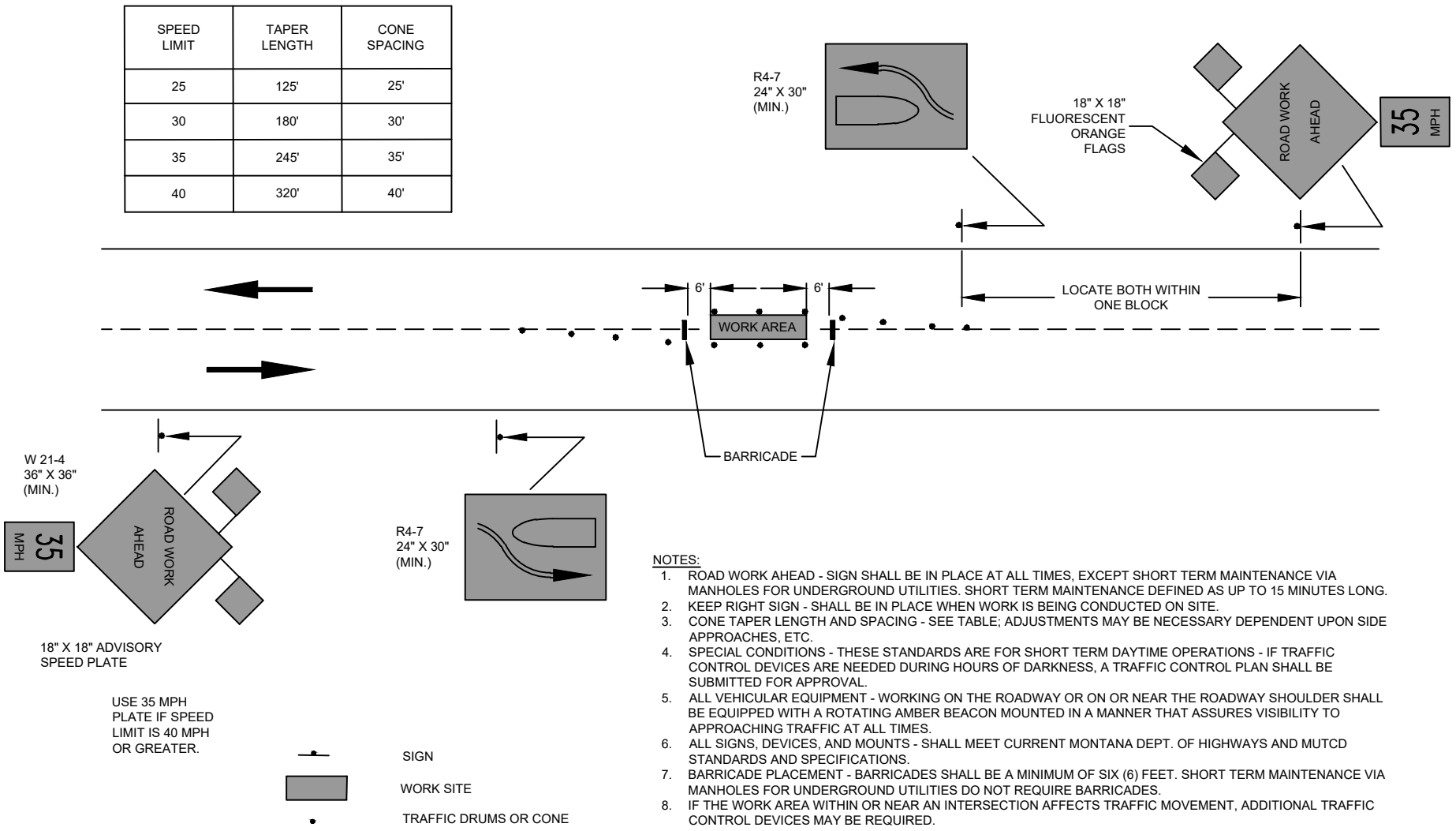
1. ROAD WORK AHEAD - SIGN SHALL BE IN PLACE AT ALL TIMES, EXCEPT SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES. SHORT TERM MAINTENANCE DEFINED AS UP TO 15 MINUTES LONG.
2. RIGHT LANE CLOSED SIGN - SHALL BE IN PLACE WHEN WORK IS BEING CONDUCTED ON SITE; SHALL NOT BE IN USE AT UNATTENDED SITES.
3. CONE TAPER LENGTH AND SPACING - SEE TABLE; ADJUSTMENTS MAY BE NECESSARY DEPENDENT UPON SIDE APPROACHES, ETC.
4. SPECIAL CONDITIONS - THESE STANDARDS ARE FOR SHORT TERM DAYTIME OPERATIONS - IF TRAFFIC CONTROL DEVICES ARE NEEDED DURING HOURS OF DARKNESS, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED FOR APPROVAL.
5. ALL VEHICULAR EQUIPMENT - WORKING ON THE ROADWAY OR ON OR NEAR THE ROADWAY SHOULDER SHALL BE EQUIPPED WITH A ROTATING AMBER BEACON MOUNTED IN A MANNER THAT ASSURES VISIBILITY TO APPROACHING TRAFFIC AT ALL TIMES.
6. ALL SIGNS, DEVICES, AND MOUNTS - SHALL MEET CURRENT MONTANA DEPT. OF HIGHWAYS AND MUTCD STANDARDS AND SPECIFICATIONS.
7. BARRICADE PLACEMENT - BARRICADES SHALL BE A MINIMUM OF SIX (6) FEET. SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES DO NOT REQUIRE BARRICADES.
8. IF THE WORK AREA WITHIN OR NEAR AN INTERSECTION AFFECTS TRAFFIC MOVEMENT, ADDITIONAL TRAFFIC CONTROL DEVICES MAY BE REQUIRED.



DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD, URBAN WORK SITE: 4-LANE ROAD, WORK SITE BLOCKING ONE LANE	NO. 01570-1 FEB. 2024

SPEED LIMIT	TAPER LENGTH	CONE SPACING
25	125'	25'
30	180'	30'
35	245'	35'
40	320'	40'



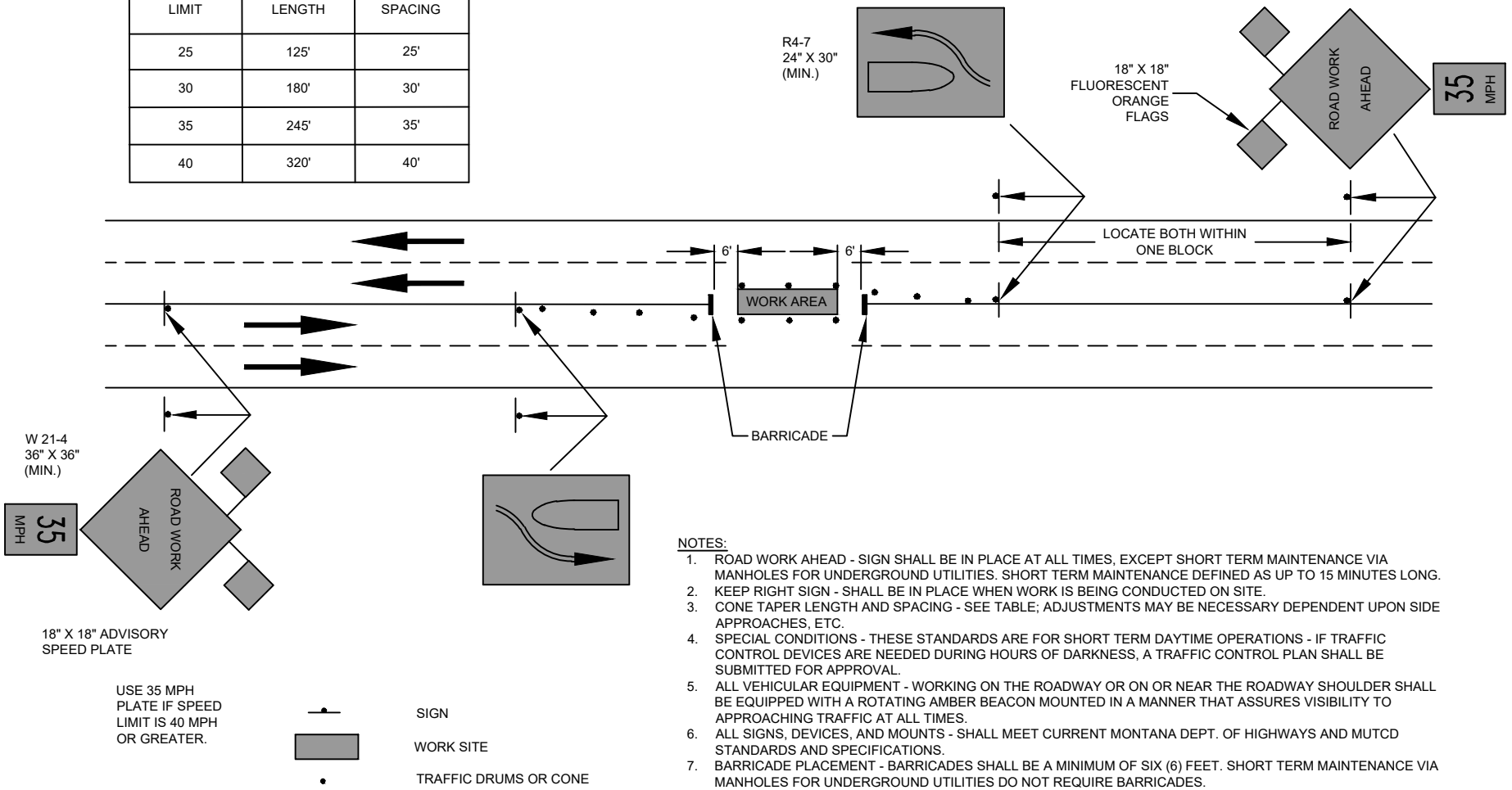
NOTES:

1. ROAD WORK AHEAD - SIGN SHALL BE IN PLACE AT ALL TIMES, EXCEPT SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES. SHORT TERM MAINTENANCE DEFINED AS UP TO 15 MINUTES LONG.
2. KEEP RIGHT SIGN - SHALL BE IN PLACE WHEN WORK IS BEING CONDUCTED ON SITE.
3. CONE TAPER LENGTH AND SPACING - SEE TABLE; ADJUSTMENTS MAY BE NECESSARY DEPENDENT UPON SIDE APPROACHES, ETC.
4. SPECIAL CONDITIONS - THESE STANDARDS ARE FOR SHORT TERM DAYTIME OPERATIONS - IF TRAFFIC CONTROL DEVICES ARE NEEDED DURING HOURS OF DARKNESS, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED FOR APPROVAL.
5. ALL VEHICULAR EQUIPMENT - WORKING ON THE ROADWAY OR ON OR NEAR THE ROADWAY SHOULDER SHALL BE EQUIPPED WITH A ROTATING AMBER BEACON MOUNTED IN A MANNER THAT ASSURES VISIBILITY TO APPROACHING TRAFFIC AT ALL TIMES.
6. ALL SIGNS, DEVICES, AND MOUNTS - SHALL MEET CURRENT MONTANA DEPT. OF HIGHWAYS AND MUTCD STANDARDS AND SPECIFICATIONS.
7. BARRICADE PLACEMENT - BARRICADES SHALL BE A MINIMUM OF SIX (6) FEET. SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES DO NOT REQUIRE BARRICADES.
8. IF THE WORK AREA WITHIN OR NEAR AN INTERSECTION AFFECTS TRAFFIC MOVEMENT, ADDITIONAL TRAFFIC CONTROL DEVICES MAY BE REQUIRED.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD, URBAN WORK SITE: 2-LANE ROAD, WORK SITE ON CENTERLINE BLOCKING BOTH LANES	NO. 01570-2 FEB. 2024

SPEED LIMIT	TAPER LENGTH	CONE SPACING
25	125'	25'
30	180'	30'
35	245'	35'
40	320'	40'



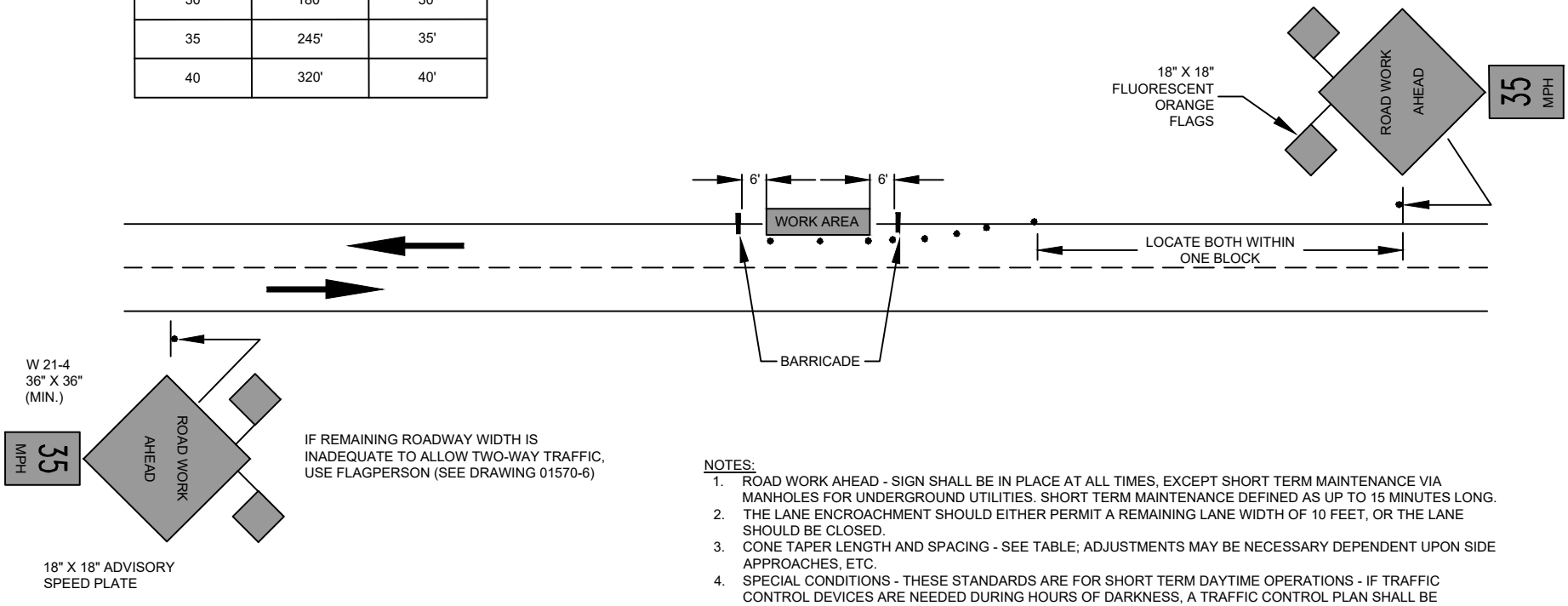
NOTES:

1. ROAD WORK AHEAD - SIGN SHALL BE IN PLACE AT ALL TIMES, EXCEPT SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES. SHORT TERM MAINTENANCE DEFINED AS UP TO 15 MINUTES LONG.
2. KEEP RIGHT SIGN - SHALL BE IN PLACE WHEN WORK IS BEING CONDUCTED ON SITE.
3. CONE TAPER LENGTH AND SPACING - SEE TABLE; ADJUSTMENTS MAY BE NECESSARY DEPENDENT UPON SIDE APPROACHES, ETC.
4. SPECIAL CONDITIONS - THESE STANDARDS ARE FOR SHORT TERM DAYTIME OPERATIONS - IF TRAFFIC CONTROL DEVICES ARE NEEDED DURING HOURS OF DARKNESS, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED FOR APPROVAL.
5. ALL VEHICULAR EQUIPMENT - WORKING ON THE ROADWAY OR ON OR NEAR THE ROADWAY SHOULDER SHALL BE EQUIPPED WITH A ROTATING AMBER BEACON MOUNTED IN A MANNER THAT ASSURES VISIBILITY TO APPROACHING TRAFFIC AT ALL TIMES.
6. ALL SIGNS, DEVICES, AND MOUNTS - SHALL MEET CURRENT MONTANA DEPT. OF HIGHWAYS AND MUTCD STANDARDS AND SPECIFICATIONS.
7. BARRICADE PLACEMENT - BARRICADES SHALL BE A MINIMUM OF SIX (6) FEET. SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES DO NOT REQUIRE BARRICADES.
8. IF THE WORK AREA WITHIN OR NEAR AN INTERSECTION AFFECTS TRAFFIC MOVEMENT, ADDITIONAL TRAFFIC CONTROL DEVICES MAY BE REQUIRED.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD, URBAN WORK SITE: 4-LANE ROAD, WORK SITE ON CENTERLINE BLOCKING INSIDE LANES	NO. 01570-3 FEB. 2024

SPEED LIMIT	TAPER LENGTH	CONE SPACING
25	125'	25'
30	180'	30'
35	245'	35'
40	320'	40'



IF REMAINING ROADWAY WIDTH IS INADEQUATE TO ALLOW TWO-WAY TRAFFIC, USE FLAGPERSON (SEE DRAWING 01570-6)

USE 35 MPH PLATE IF SPEED LIMIT IS 40 MPH OR GREATER.

SIGN

WORK SITE

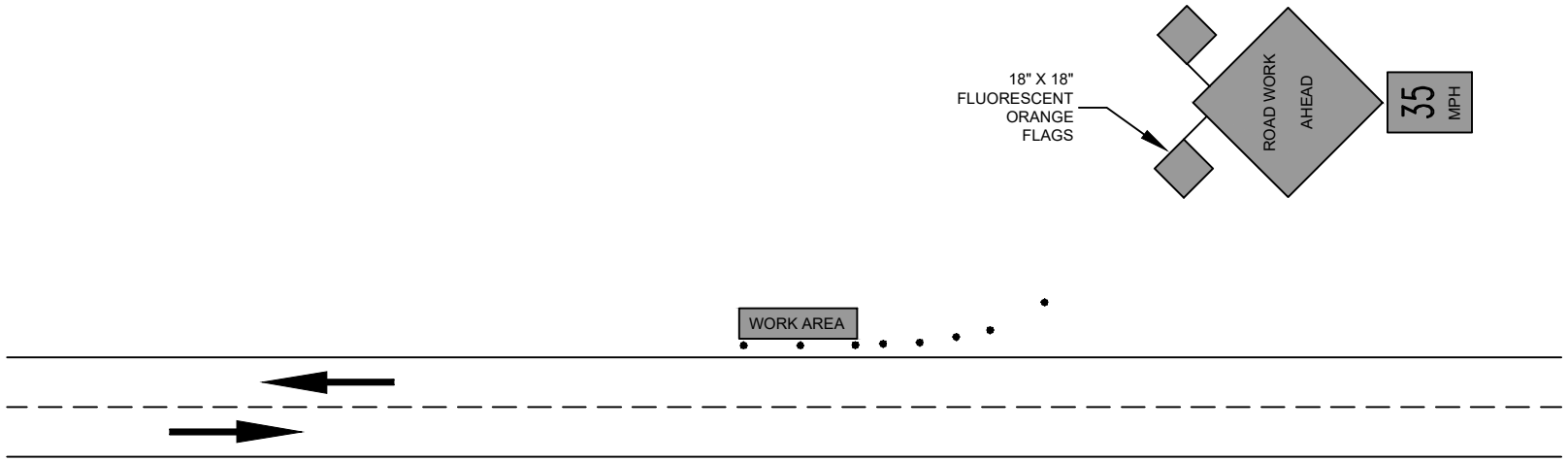
TRAFFIC DRUMS OR CONE

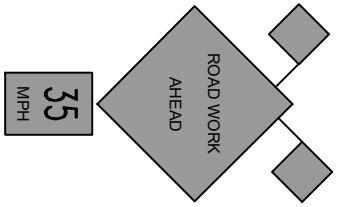
NOTES:

1. ROAD WORK AHEAD - SIGN SHALL BE IN PLACE AT ALL TIMES, EXCEPT SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES. SHORT TERM MAINTENANCE DEFINED AS UP TO 15 MINUTES LONG.
2. THE LANE ENCROACHMENT SHOULD EITHER PERMIT A REMAINING LANE WIDTH OF 10 FEET, OR THE LANE SHOULD BE CLOSED.
3. CONE TAPER LENGTH AND SPACING - SEE TABLE; ADJUSTMENTS MAY BE NECESSARY DEPENDENT UPON SIDE APPROACHES, ETC.
4. SPECIAL CONDITIONS - THESE STANDARDS ARE FOR SHORT TERM DAYTIME OPERATIONS - IF TRAFFIC CONTROL DEVICES ARE NEEDED DURING HOURS OF DARKNESS, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED FOR APPROVAL.
5. ALL VEHICULAR EQUIPMENT - WORKING ON THE ROADWAY OR ON OR NEAR THE ROADWAY SHOULDER SHALL BE EQUIPPED WITH A ROTATING AMBER BEACON MOUNTED IN A MANNER THAT ASSURES VISIBILITY TO APPROACHING TRAFFIC AT ALL TIMES.
6. ALL SIGNS, DEVICES, AND MOUNTS - SHALL MEET CURRENT MONTANA DEPT. OF HIGHWAYS AND MUTCD STANDARDS AND SPECIFICATIONS.
7. BARRICADE PLACEMENT - BARRICADES SHALL BE A MINIMUM OF SIX (6) FEET. SHORT TERM MAINTENANCE VIA MANHOLES FOR UNDERGROUND UTILITIES DO NOT REQUIRE BARRICADES.
8. IF THE WORK AREA WITHIN OR NEAR AN INTERSECTION AFFECTS TRAFFIC MOVEMENT, ADDITIONAL TRAFFIC CONTROL DEVICES MAY BE REQUIRED.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD, URBAN WORK SITE: 2-LANE ROAD, WORK SITE BLOCKING ONE LANE	NO. 01570-4 FEB. 2024





18" X 18" ADVISORY
SPEED PLATE

SIGN

WORK SITE

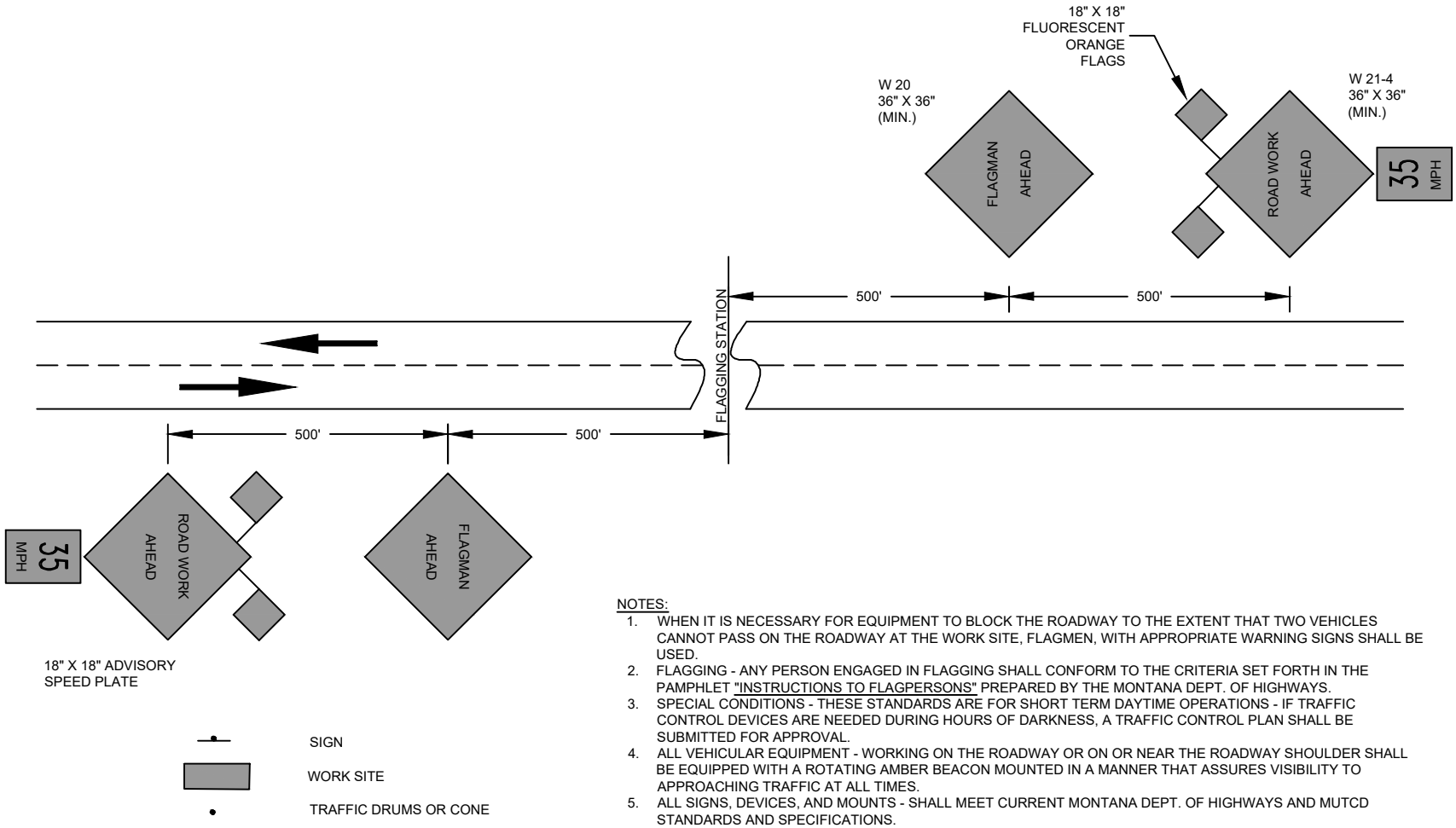
TRAFFIC DRUMS OR CONE

NOTES:

1. SIGN ASSEMBLY SHALL BE DISPLAYED AT A DISTANCE OF NOT MORE THAN 1000 FEET NOR LESS THAN 750 FEET FROM END OF WORK SITE.
2. SPECIAL CONDITIONS - THESE STANDARDS ARE FOR SHORT TERM DAYTIME OPERATIONS - IF TRAFFIC CONTROL DEVICES ARE NEEDED DURING HOURS OF DARKNESS, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED FOR APPROVAL.
3. ALL VEHICULAR EQUIPMENT - WORKING ON THE ROADWAY OR ON OR NEAR THE ROADWAY SHOULDER SHALL BE EQUIPPED WITH A ROTATING AMBER BEACON MOUNTED IN A MANNER THAT ASSURES VISIBILITY TO APPROACHING TRAFFIC AT ALL TIMES.
4. ALL SIGNS, DEVICES, AND MOUNTS - SHALL MEET CURRENT MONTANA DEPT. OF HIGHWAYS AND MUTCD STANDARDS AND SPECIFICATIONS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD, RURAL WORK SITE: WORK ADJACENT TO THE PRESENT TRAVELED WAY	NO. 01570-5 FEB. 2024

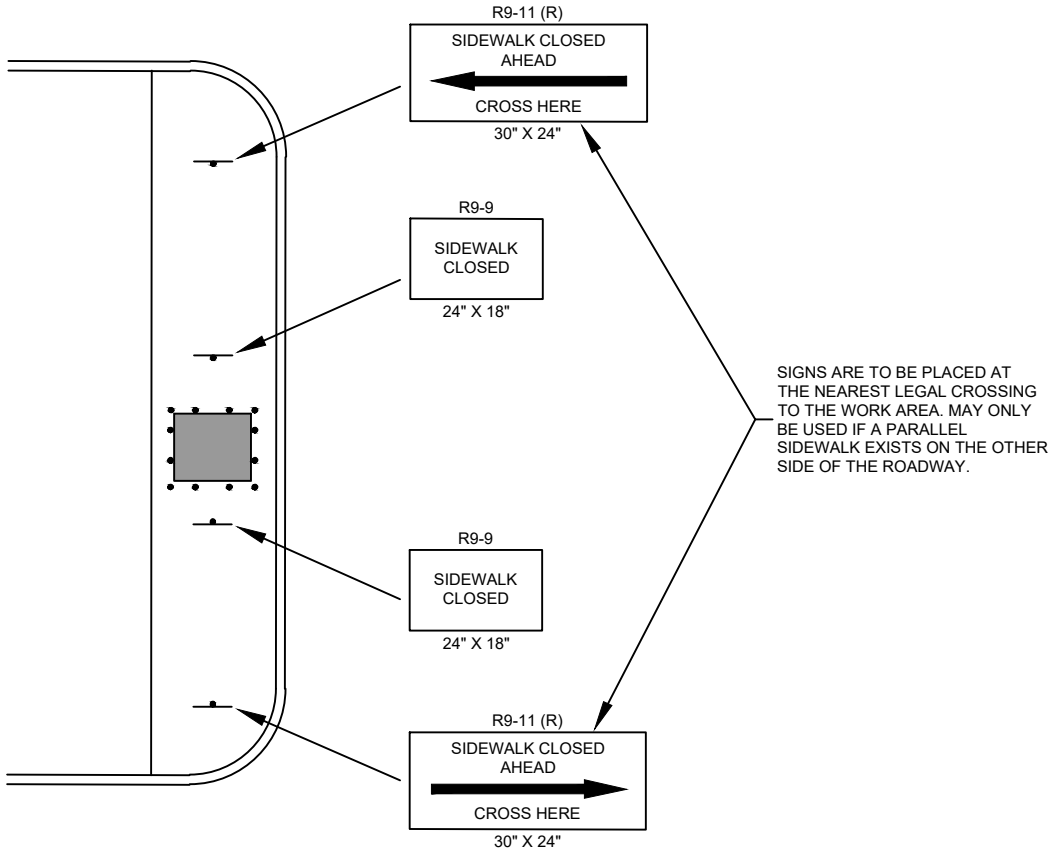


NOTES:

1. WHEN IT IS NECESSARY FOR EQUIPMENT TO BLOCK THE ROADWAY TO THE EXTENT THAT TWO VEHICLES CANNOT PASS ON THE ROADWAY AT THE WORK SITE, FLAGMEN, WITH APPROPRIATE WARNING SIGNS SHALL BE USED.
2. FLAGGING - ANY PERSON ENGAGED IN FLAGGING SHALL CONFORM TO THE CRITERIA SET FORTH IN THE PAMPHLET "INSTRUCTIONS TO FLAGPERSONS" PREPARED BY THE MONTANA DEPT. OF HIGHWAYS.
3. SPECIAL CONDITIONS - THESE STANDARDS ARE FOR SHORT TERM DAYTIME OPERATIONS - IF TRAFFIC CONTROL DEVICES ARE NEEDED DURING HOURS OF DARKNESS, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED FOR APPROVAL.
4. ALL VEHICULAR EQUIPMENT - WORKING ON THE ROADWAY OR ON OR NEAR THE ROADWAY SHOULDER SHALL BE EQUIPPED WITH A ROTATING AMBER BEACON MOUNTED IN A MANNER THAT ASSURES VISIBILITY TO APPROACHING TRAFFIC AT ALL TIMES.
5. ALL SIGNS, DEVICES, AND MOUNTS - SHALL MEET CURRENT MONTANA DEPT. OF HIGHWAYS AND MUTCD STANDARDS AND SPECIFICATIONS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD, RURAL WORK SITE: WORK ON THE PRESENT TRAVELED WAY	NO. 01570-6 FEB. 2024



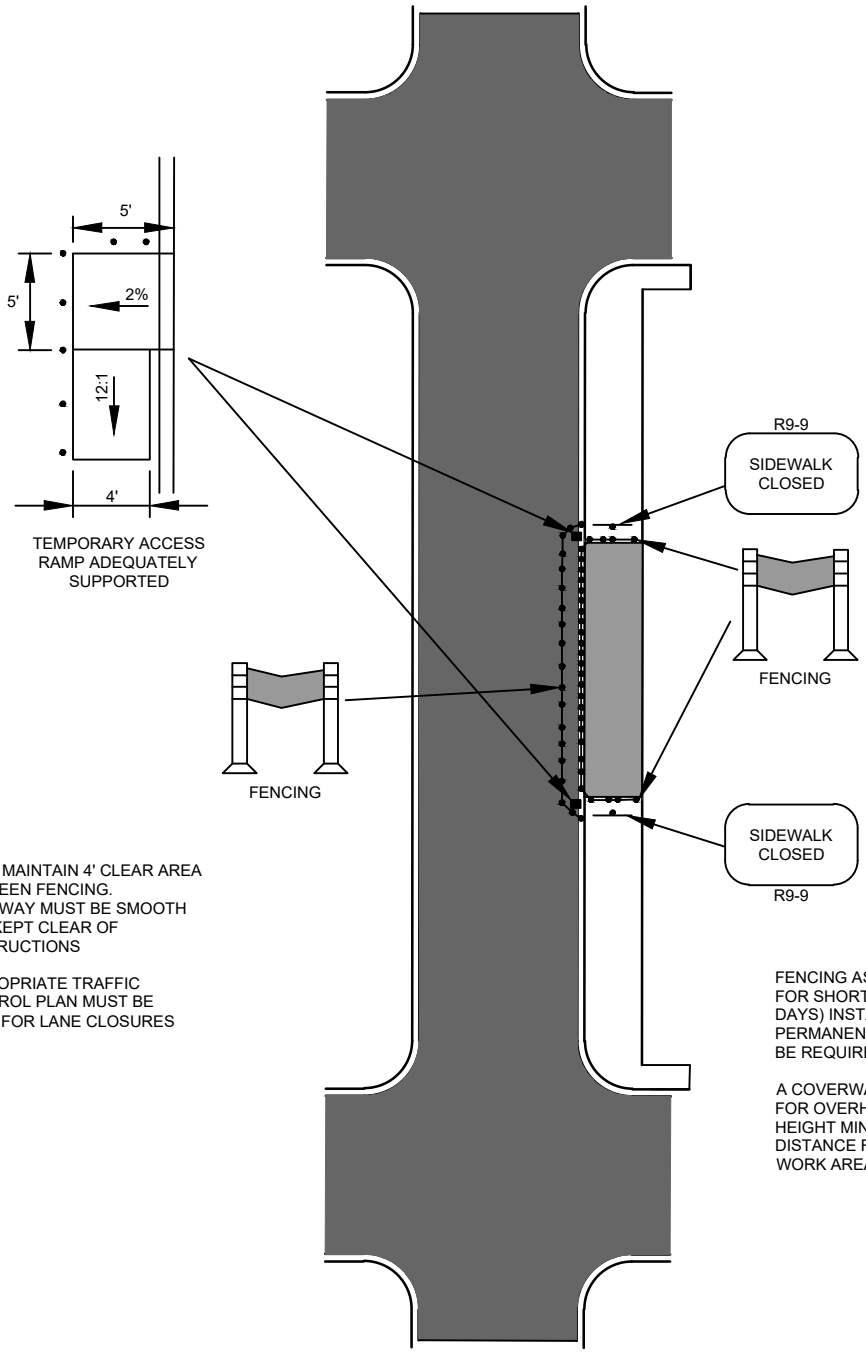
SIGN

WORK SITE

TRAFFIC DRUMS OR CONE

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	PEDESTRIAN TRAFFIC CONTROL FOR TEMPORARY SIDEWALK CLOSURE	NO. 01570-7 FEB. 2024



MUST MAINTAIN 4' CLEAR AREA BETWEEN FENCING. WALKWAY MUST BE SMOOTH AND KEPT CLEAR OF OBSTRUCTIONS

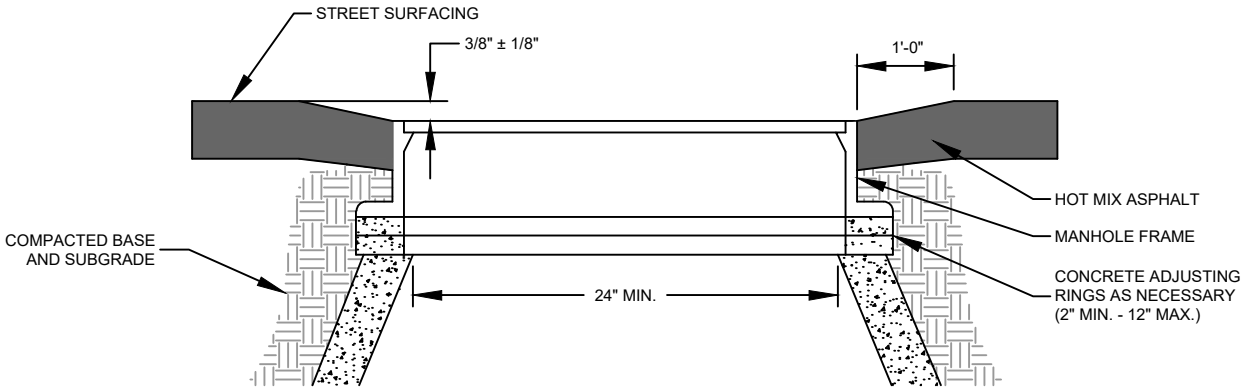
APPROPRIATE TRAFFIC CONTROL PLAN MUST BE USED FOR LANE CLOSURES

FENCING AS SHOWN MAY USED FOR SHORT TERM (LESS THAN 30 DAYS) INSTALLATION. MORE PERMANENT STRUCTURES WILL BE REQUIRED FOR LONGER TERM.

A COVERWALK MAY BE REQUIRED FOR OVERHEAD OPERATIONS (IF HEIGHT MINUS 10' EXCEEDS DISTANCE FROM WALK WAY TO WORK AREA)

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SIDEWALK CLOSURE WITH DETOUR	NO. 01570-8 FEB. 2024

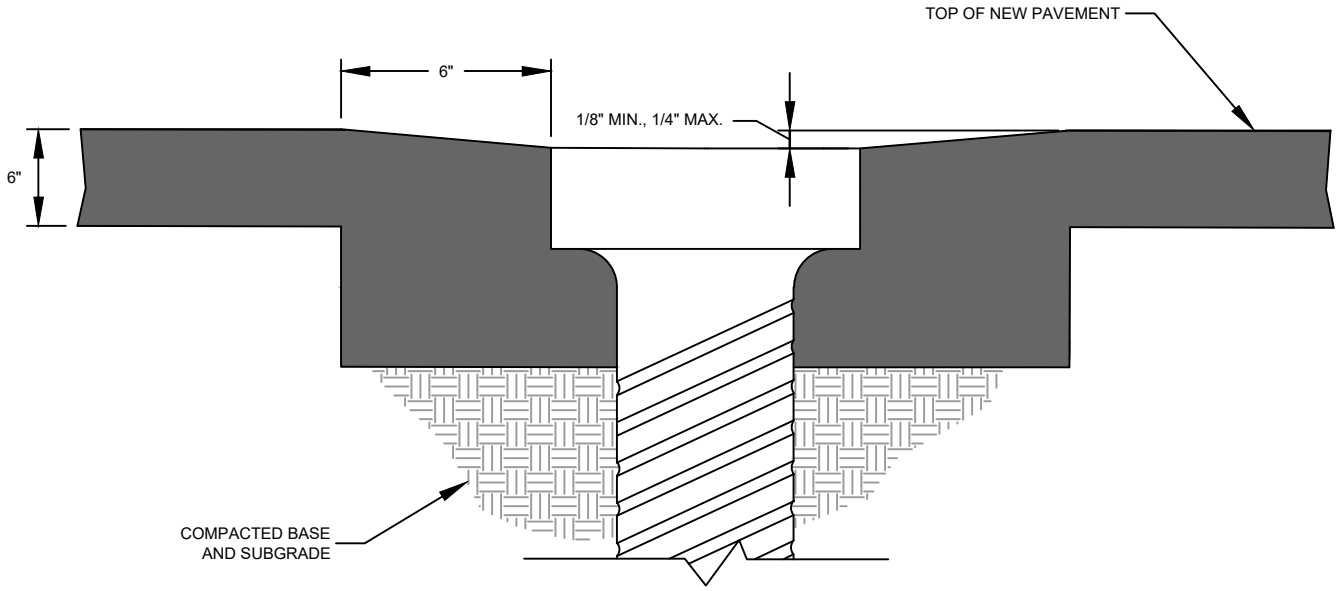


NOTES:

1. ADJUST MANHOLES UPWARD WITH ADJUSTING RINGS UNDER FRAME.
2. ADJUST MANHOLE DOWNWARD BY REMOVING CONE AND BARREL SECTIONS AS NECESSARY AND REPLACING WITH SECTIONS OF LENGTH REQUIRED TO MATCH GRADE.
3. SLOPE MANHOLE FRAME AS REQUIRED TO MATCH SLOPE OF STREET.
4. FINAL MANHOLE ADJUSTMENT SHALL BE MADE BEFORE PAVING.
5. ALL JOINTS BETWEEN MANHOLE SECTIONS, TOP CONE, ADJUSTING RINGS, AND MANHOLE RING SHALL BE WATERTIGHT. JOINT MATERIAL SHALL BE "RAM-NEK" OR APPROVED EQUAL.
6. MANHOLE RING AND COVER SHAL BE ADJUSTED TO MATCH FINAL CROWN AND GRADE OF STREET. USE PRECAST CONCRETE FABRICATOR OR APPROVED EQUAL CONCRETE ANGLED ADJUSTMENT RINGS TO OBTAIN REQUIRED ANGLE.
7. MANHOLE RING AND COVER: USE D&L FOUNDRY A-1178 RING COVER, OR EAST JORDAN IRON WORKS 3771/3772 SERIES RING COVER, OR APPROVED EQUAL.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	MANHOLE ADJUSTMENT	NO. 02213-1 FEB. 2024

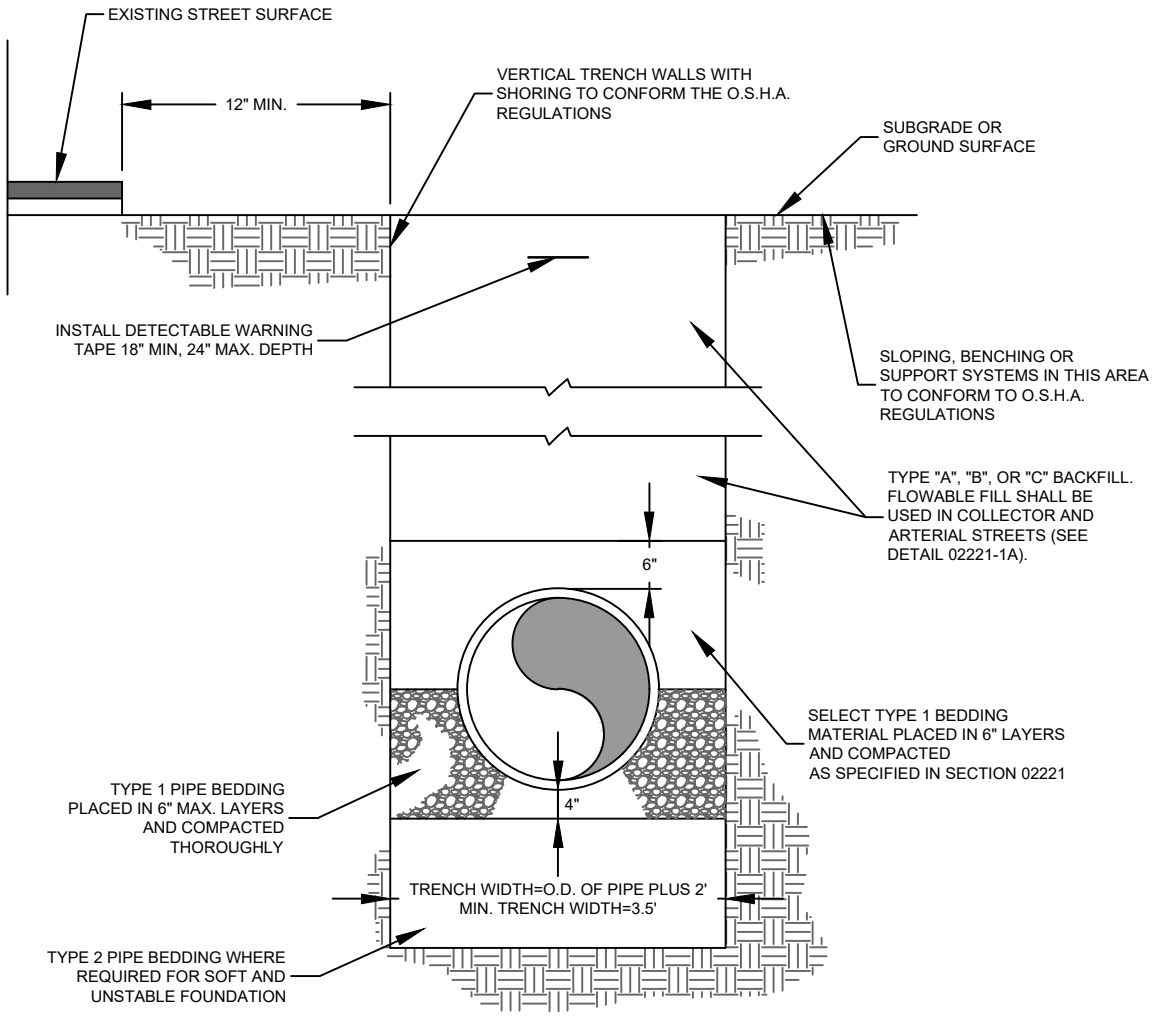


NOTES:

1. ADJUST WATER VALVES UPWARD OR DOWNWARD AS REQUIRED. FINAL ADJUSTMENT SHALL BE MADE AFTER PAVING AND BEFORE SEAL COATING.
2. EAST JORDAN IRON WORKS ADJUSTABLE SCREW-TYPE RISERS MAY BE USED TO RAISE OR ADJUST EXISTING VALVE BOXERS ONLY.
3. VALVE BOX ADJUSTMENT SHOWN IS DESIGNATED AS TYPE II WATER VALVE ADJUSTMENT. TYPE I WATER VALVE ADJUSTMENT IS SIMILAR EXCEPT WITH A CONCRETE COLLAR.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER VALVE ADJUSTMENT	NO. 02213-2 FEB. 2024

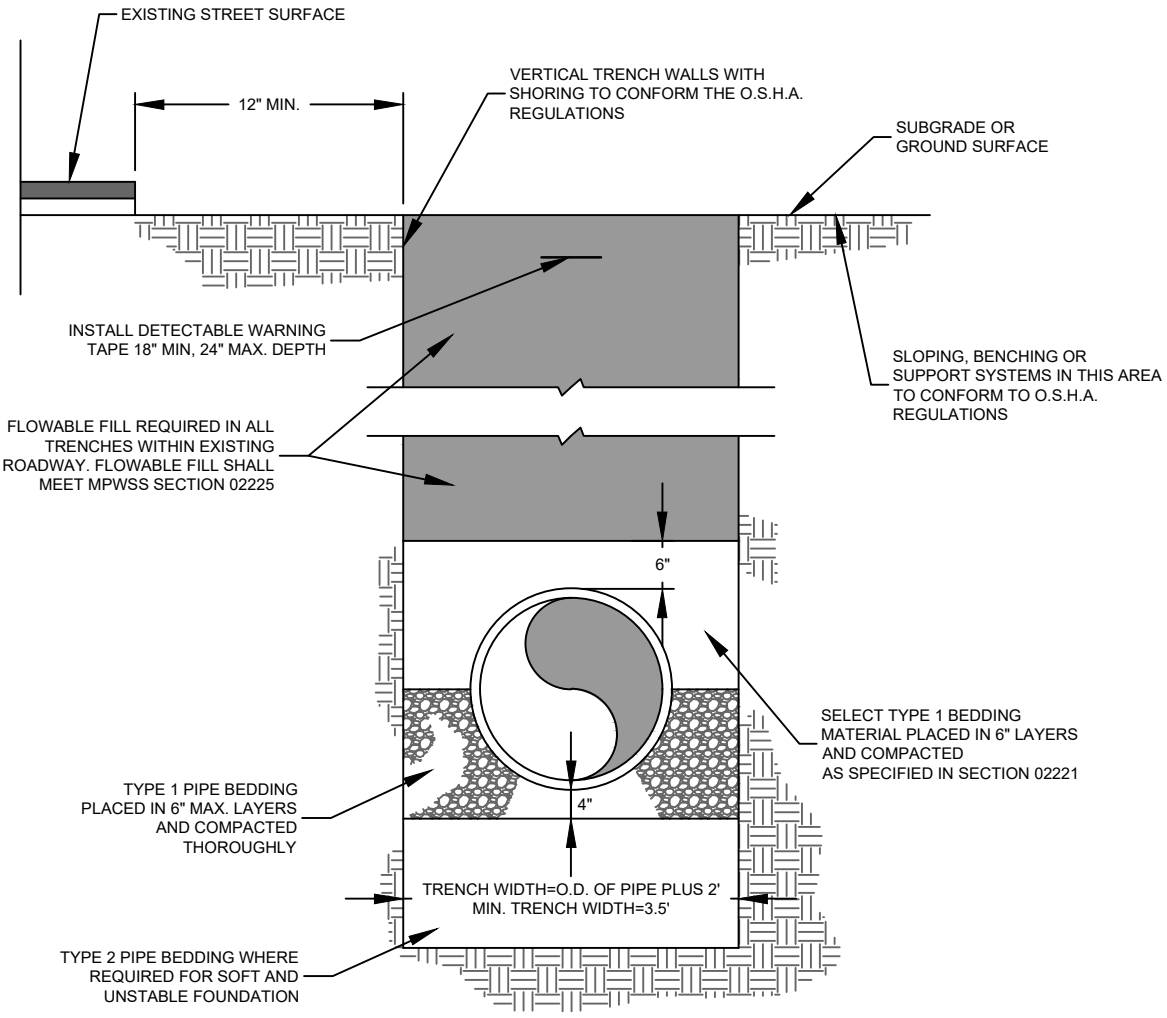


NOTES:

1. WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING. WHERE NEAT LINE IS LESS THAN 3' FROM EDGE OF EXISTING PAVEMENT OR CURB AND GUTTER SECTION, REMOVE AND REPLACE ENTIRE PAVEMENT SECTION BETWEEN TRENCH AND EDGE OF PAVEMENT.
2. WHERE INTER-DUCT IS INSTALLED IN SEPARATE TRENCH USE STANDARD TRENCH DETAIL WITH 42' DEPTH OF BURY.
3. SEE CONTRACT SPECIAL PROVISIONS FOR ANY MODIFICATIONS TO STANDARD TRENCH MATERIALS AND/OR OTHER TRENCH DESIGN FEATURES.
4. EXCAVATIONS SHALL CONFORM TO O.S.H.A. CONSTRUCTION STANDARDS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL UTILITY TRENCH	NO. 02221-1 FEB. 2024

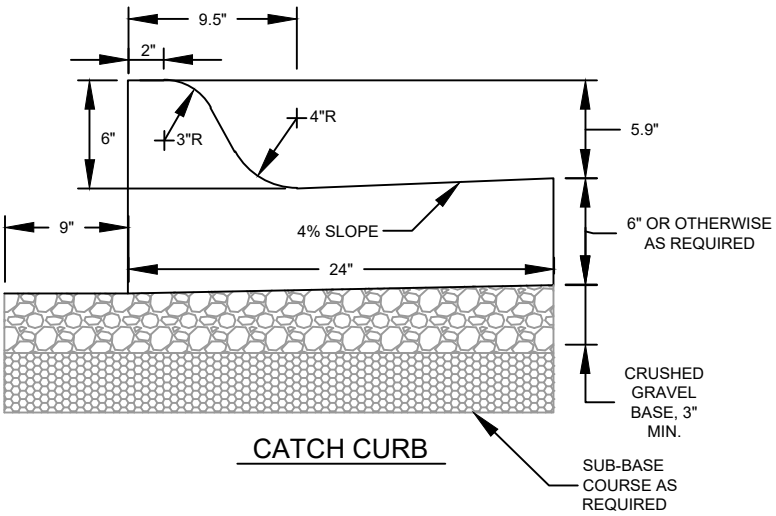


NOTES:

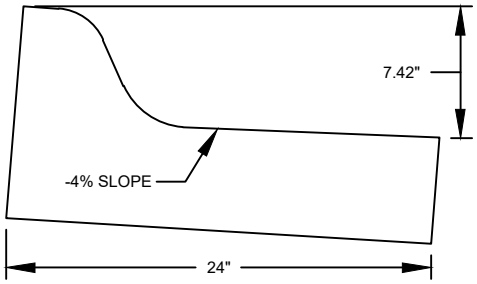
1. FLOWABLE FILL SHALL BE USED AS SHOWN FOR ALL UTILITY TRENCHES CUT INTO EXISTING COLLECTOR AND ARTERIAL STREETS.
2. WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING. WHERE NEAT LINE IS LESS THAN 3' FROM EDGE OF EXISTING PAVEMENT OR CURB AND GUTTER SECTION, REMOVE AND REPLACE ENTIRE PAVEMENT SECTION BETWEEN TRENCH AND EDGE OF PAVEMENT.
3. WHERE INTER-DUCT IS INSTALLED IN SEPARATE TRENCH USE STANDARD TRENCH DETAIL WITH 42' DEPTH OF BURY.
4. SEE CONTRACT SPECIAL PROVISIONS FOR ANY MODIFICATIONS TO STANDARD TRENCH MATERIALS AND/OR OTHER TRENCH DESIGN FEATURES.
5. EXCAVATIONS SHALL CONFORM TO O.S.H.A. CONSTRUCTION STANDARDS.

DRAFT

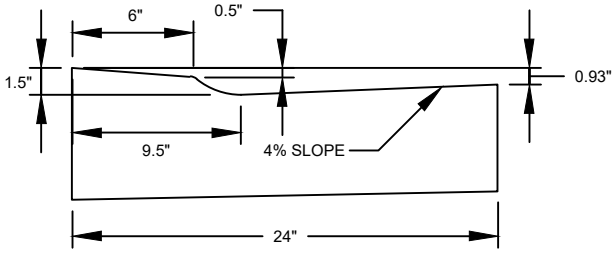
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	FLOWABLE FILL BACKFILL DETAIL	NO. 02221-1A FEB. 2024



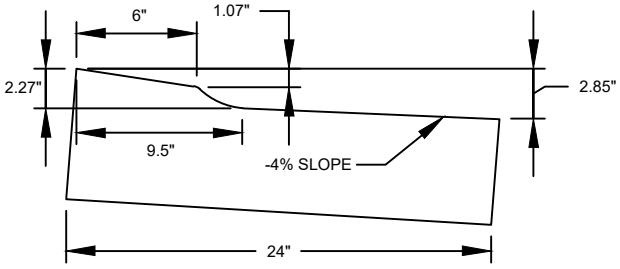
CATCH CURB



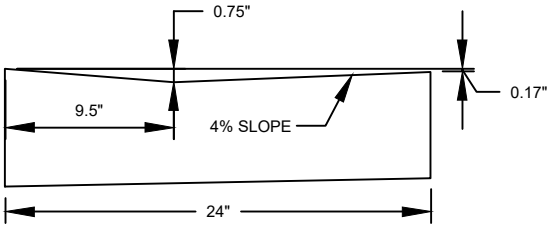
SPILL CURB



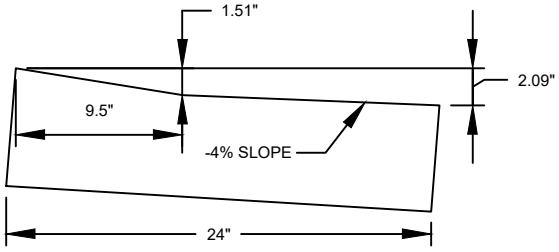
CATCH DROP CURB FOR DRIVEWAYS



SPILL DROP CURB FOR DRIVEWAYS



CATCH DROP CURB FOR PEDESTRIAN RAMPS



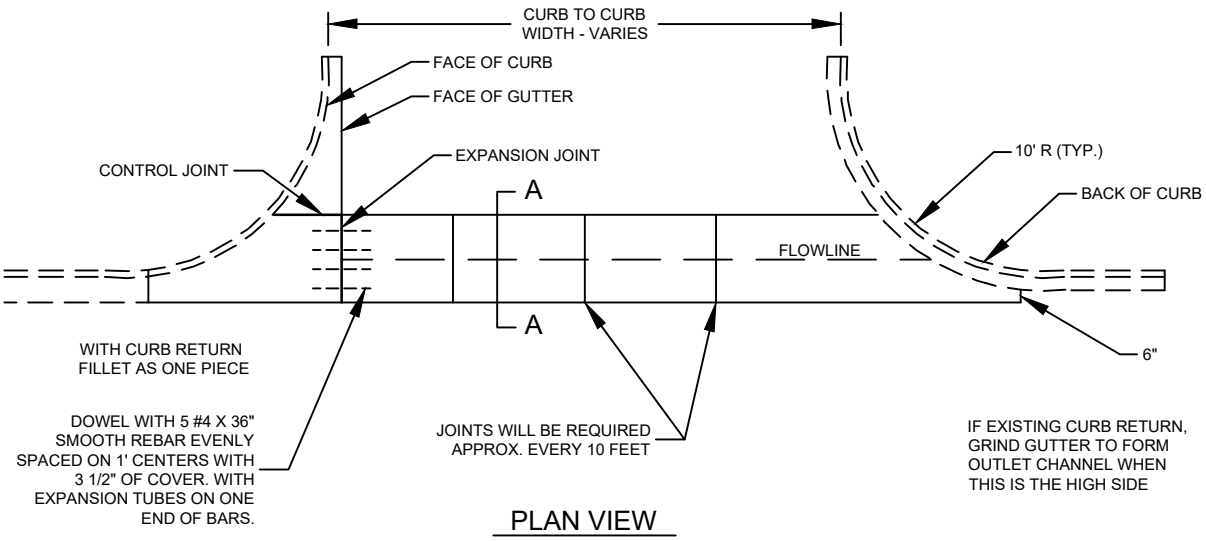
SPILL DROP CURB FOR PEDESTRIAN RAMPS

NOTES:

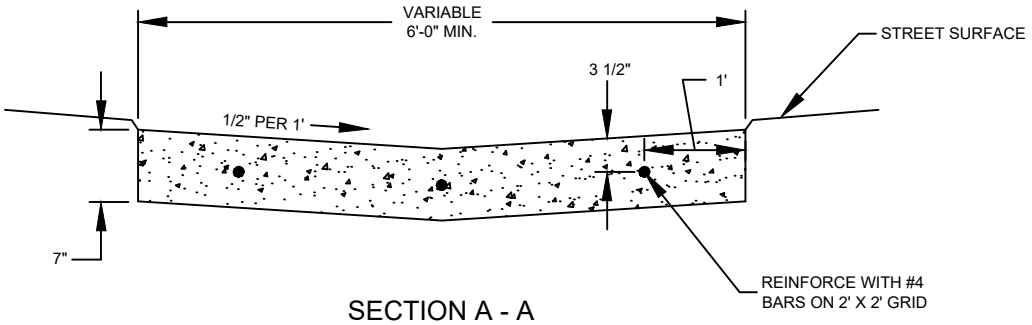
1. SUBGRADE OR BASE COURSE COMPACTION SHALL CONFORM TO SECTION 02230 (MPWSS).
2. CONTRACTION JOINTS SHALL BE PLACED AT 10' INTERVALS AND SHALL HAVE A MINIMUM DEPTH OF 3/4" AND MINIMUM WIDTH OF 1/8".
3. 1/2" EXPANSION JOINT MATERIAL SHALL BE PLACED AT ALL P.C.S, P.T.S, CURB RETURNS AND AT NOR MORE THAN 300' INTERVALS. THE EXPANSION MATERIAL SHALL EXTEND THROUGH THE FULL DEPTH OF THE CURB AND GUTTER.
4. NO CURB AND GUTTER SHALL BE PLACED WITHOUT A FORM AND/OR STRINGLINE INSPECTION BY THE CITY ENGINEERING DIVISION.
5. CONCRETE SHALL BE M-4500.
6. CRUSHED GRAVEL BASE SHALL MEET THE REQUIREMENTS OF SECTION 02235 (MPWSS) FOR CURB AND GUTTER REPLACEMENT PROJECTS, WASHED ROCK MAY BE USED FOR THE GRAVEL BASE.
7. STANDARD CATCH CURB SHALL MATCH DIMENSIONS OF MONTANA DEPARTMENT OF TRANSPORTATION DETAILED DRAWING NUMBER 609-05.
8. STANDARD CATCH CURB MOLD MAY BE ROTATED ABOUT LIP OF GUTTER TO CONSTRUCT SPILL CURBS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD CURB & GUTTER	NO. 02528-1 FEB. 2024



PLAN VIEW

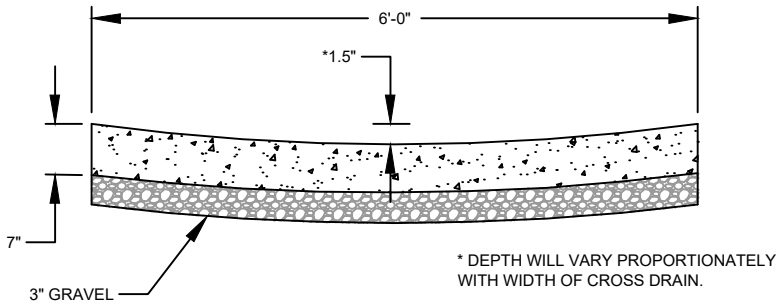


SECTION A - A

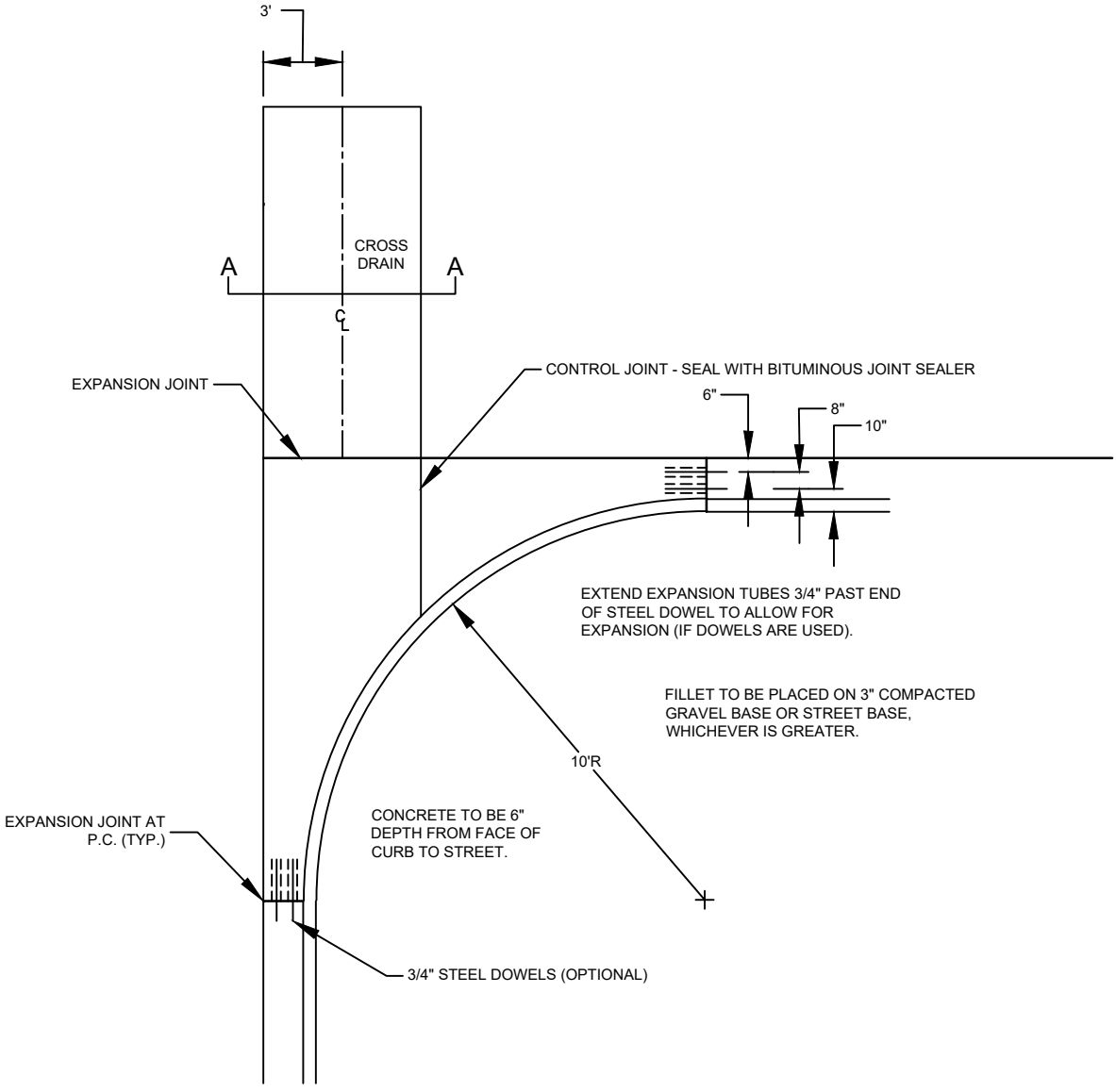
NOTE:
1. THE WIDTH WITH PROPORTIONAL INVERT MAY VARY TO SATISFY THE DESIGN REQUIREMENTS OF INDIVIDUAL APPLICATIONS. FINISHED STREET SURFACE TO BE 1/8" TO 1/4" ABOVE EDGES OF DOUBLE GUTTER.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DOUBLE GUTTER DETAIL FOR STREET INTERSECTIONS	NO. 02529-1 FEB. 2024

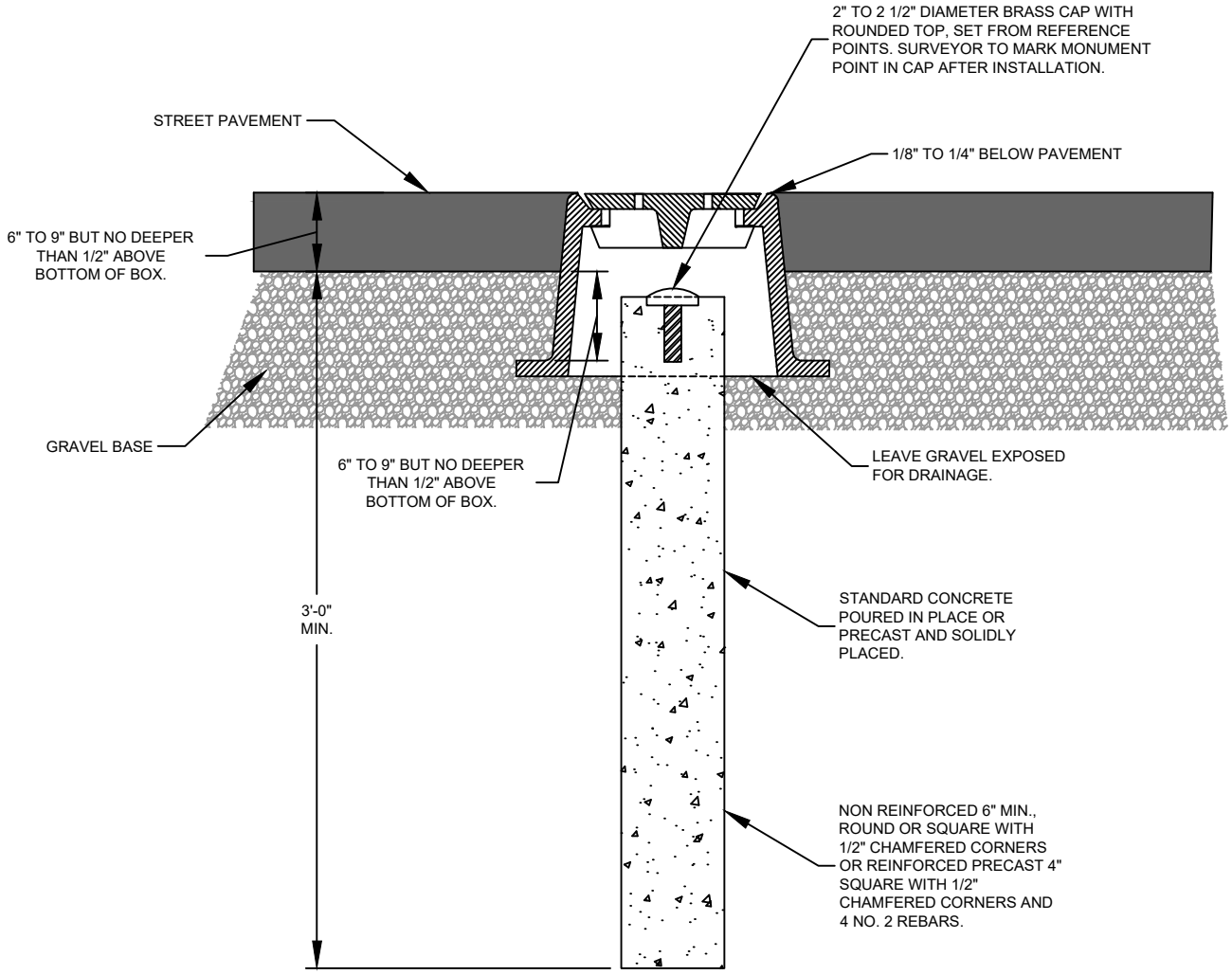


SECTION A - A



DRAFT

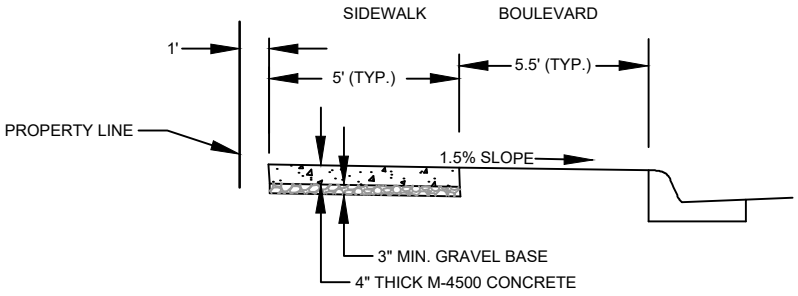
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD FILLET	NO. 02529-2 FEB. 2024



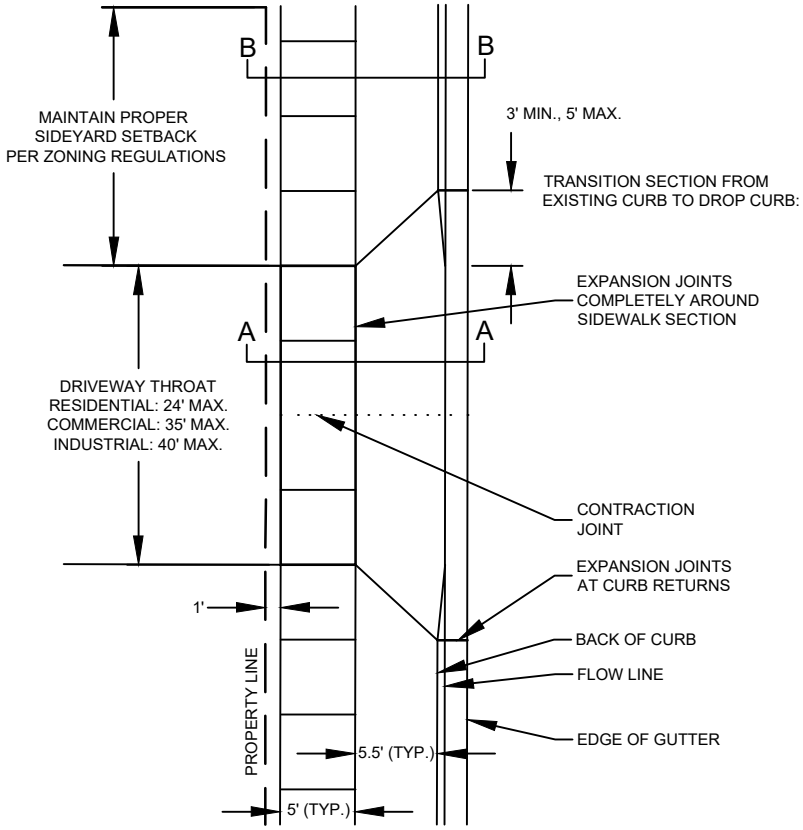
NOTE:
1. MONUMENT BOX TO BE INLAND FOUNDRY CO. PATTERN NO. 1034 OR APPROVED EQUAL.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPE I STREET MONUMENT	NO. 02529-3 FEB. 2024

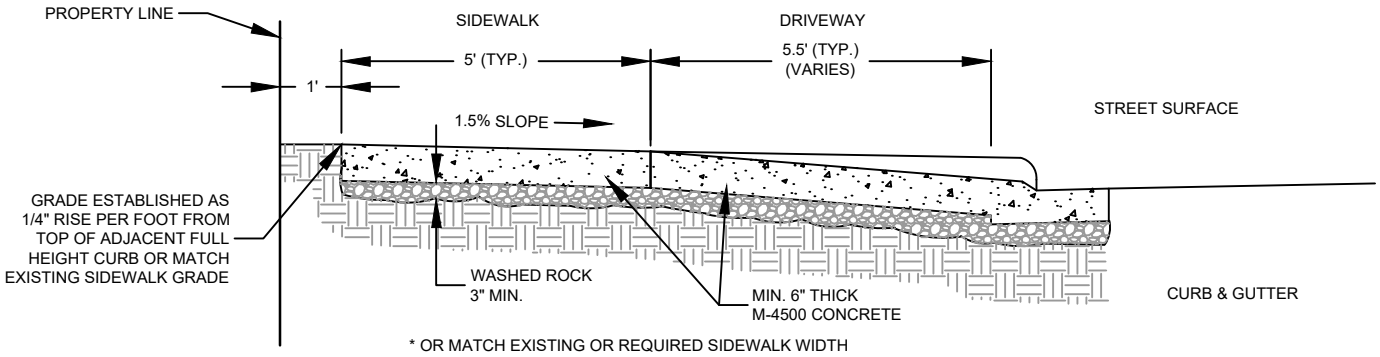


SECTION B - B



NOTES:

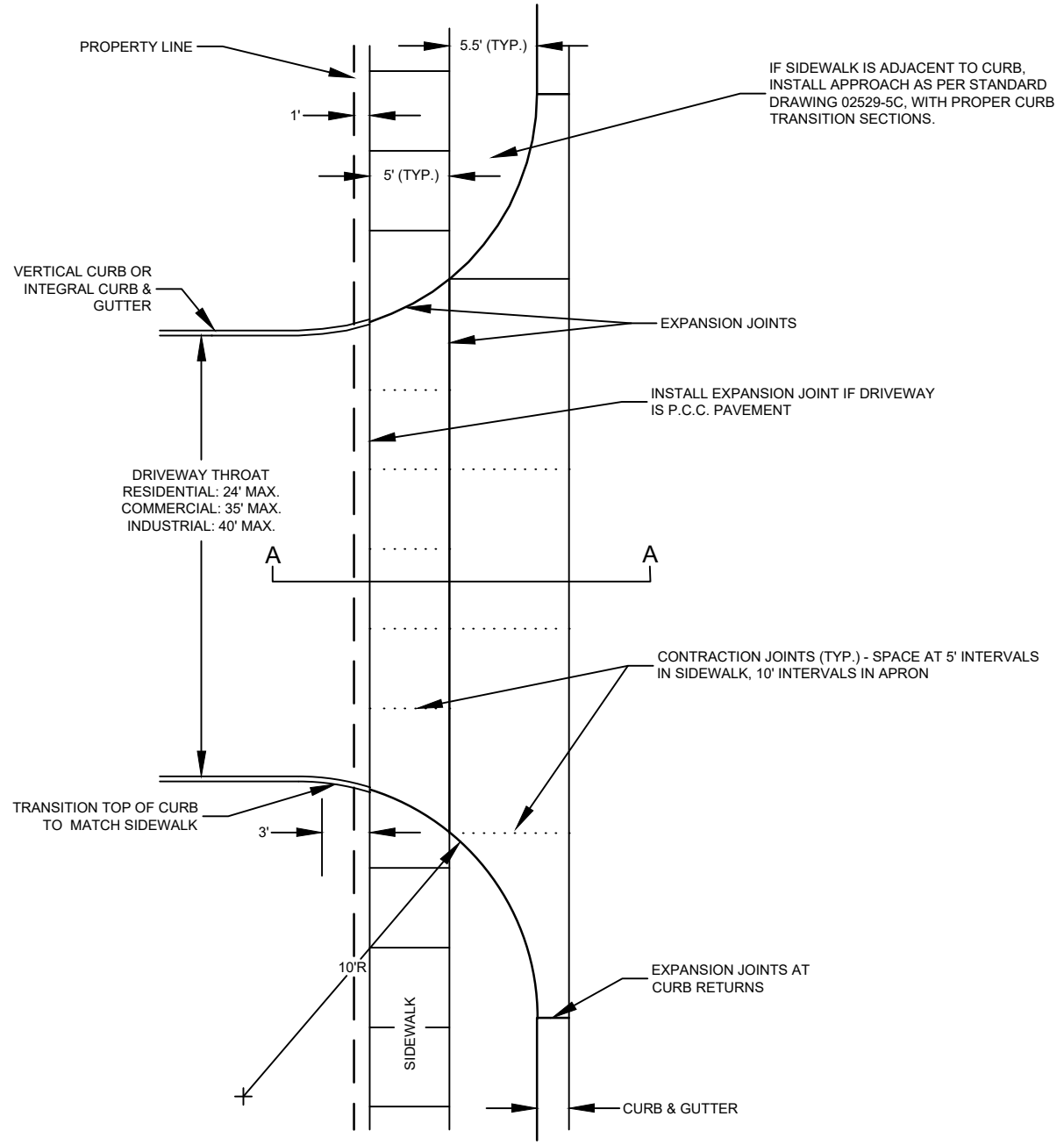
1. CURB & APRON POURED MONOLITHIC UNLESS OTHERWISE APPROVED.
2. SIDEWALK CONTRACTION JOINTS SPACED AT 5' INTERVALS - MIN. DEPTH 1". EXPANSION JOINTS TO BE PLACED AT 25' INTERVALS.
3. CONTRACTION JOINTS TO BE SPACED AT 10' INTERVALS IN CURB AND GUTTER.
4. EXPANSION JOINT MATERIAL SHALL BE 1/2" THICK PRE-FORMED BITUMINOUS TREATED FIBERBOARD FILLER ALL CURB REPLACEMENT SHALL BE DONE WITH INTEGRAL CURB AND GUTTER UNLESS OTHERWISE APPROVED.

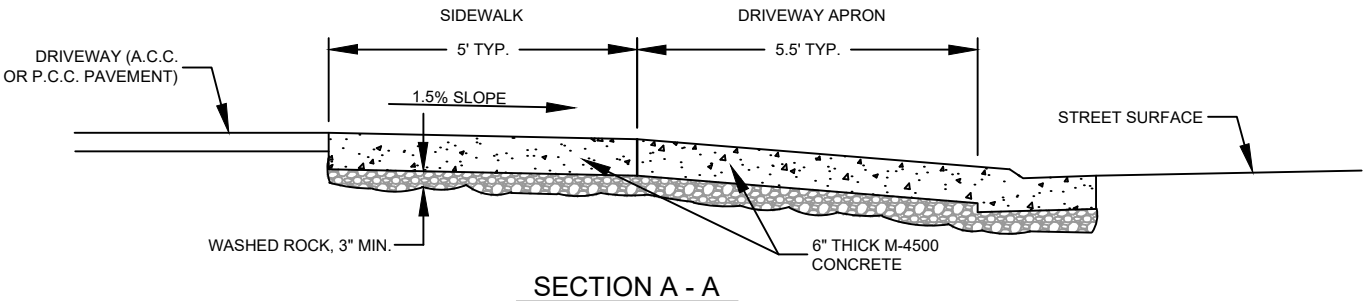


SECTION A - A

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DRIVE APPROACH, NON-ARTERIAL WITH BOULEVARD	NO. 02529-5A FEB. 2024

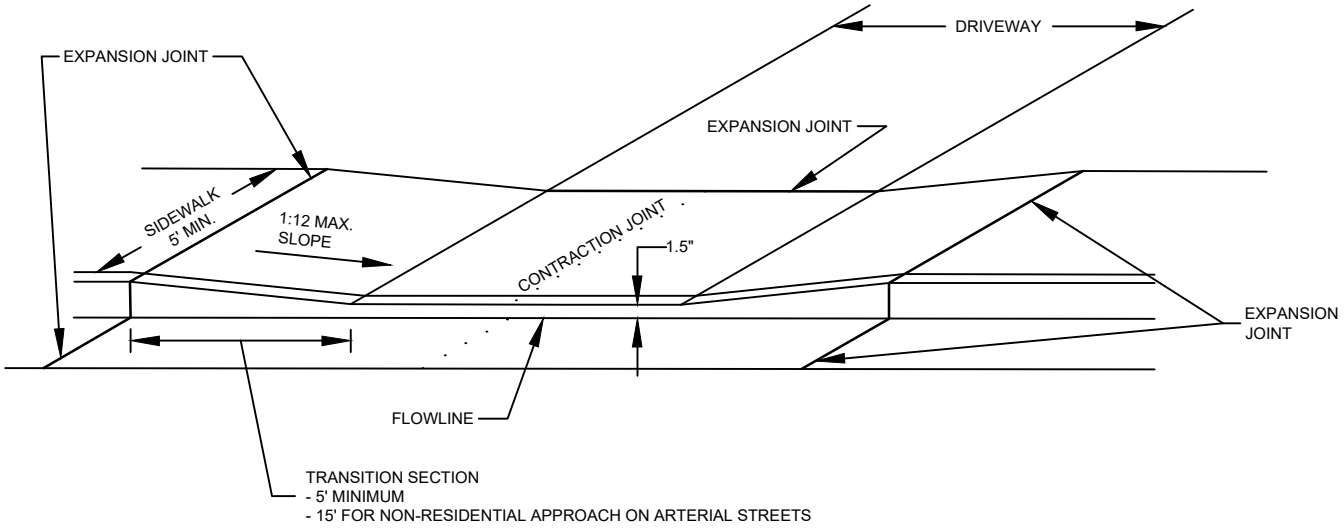


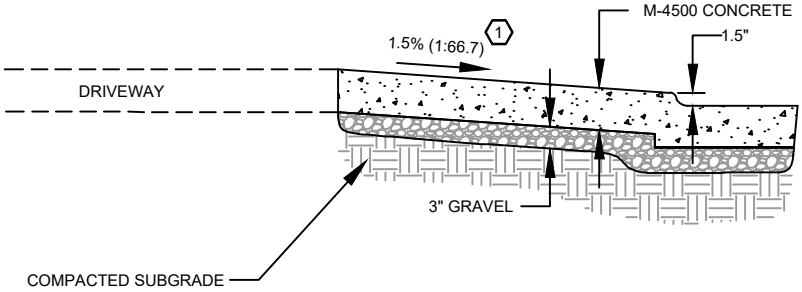


SECTION A - A

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DRIVE APPROACH, ARTERIAL WITH BOULEVARD	NO. 02529-5B FEB. 2024





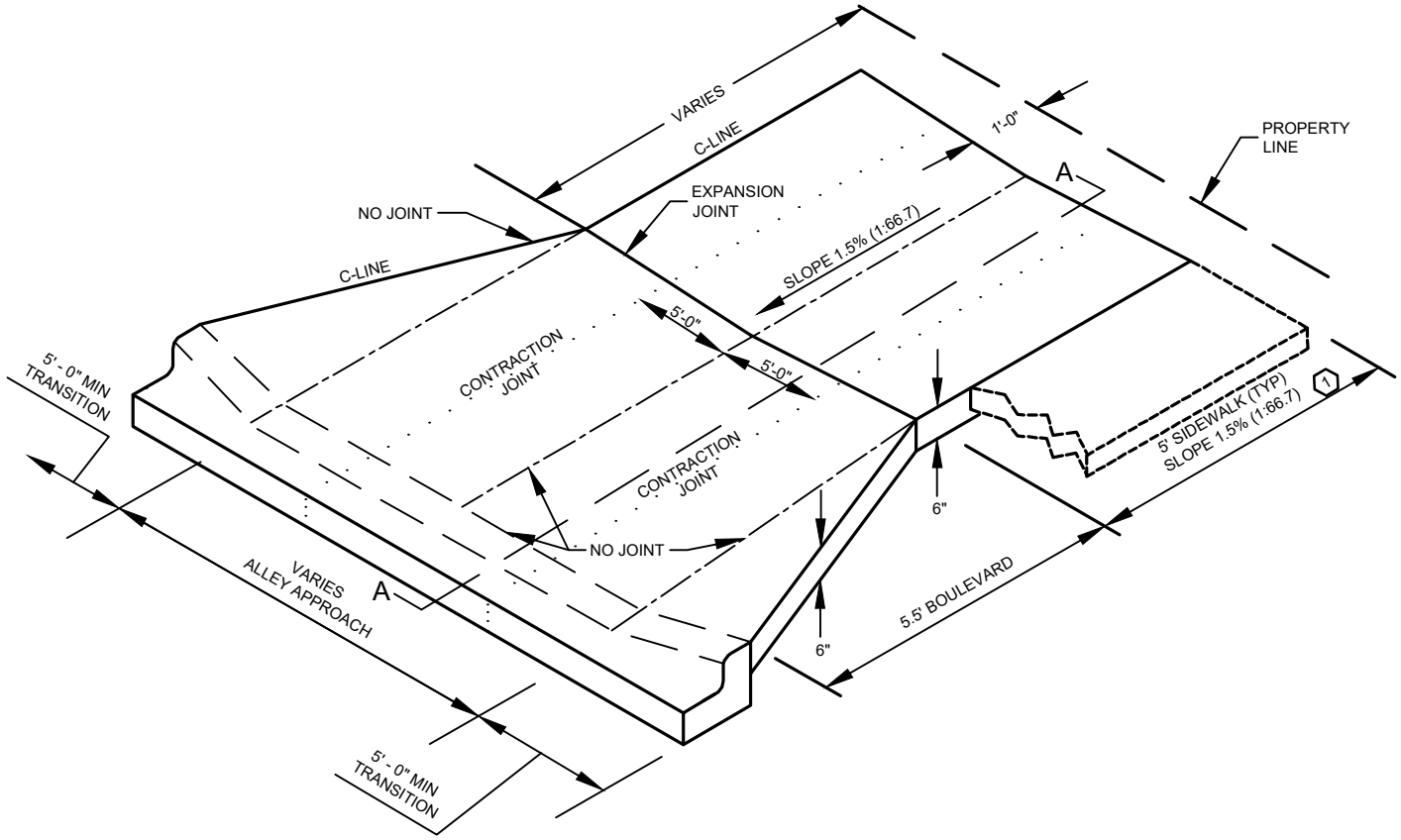
SECTION VIEW

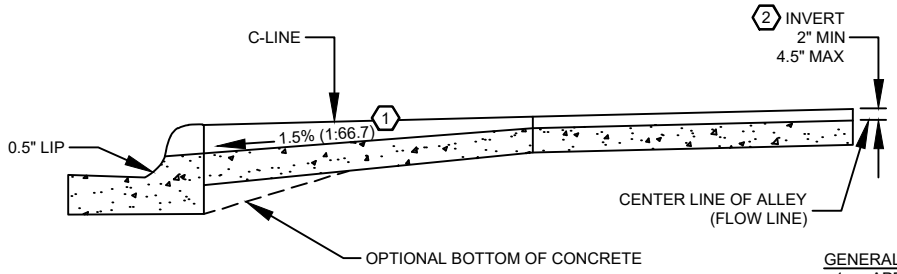
KEY NOTES:

1. PREFERRED CROSS SLOPE IS 1.5%, MAXIMUM CROSS SLOPE IS 2%.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	APPROACH WITH SIDEWALK ADJACENT TO CURB	NO. 02529-5C FEB. 2024





SECTION A - A

GENERAL NOTES:

1. APPROACH WILL BE PLACED MONOLITHICALLY.
2. TAPERS SHALL BE 5' IN LENGTH MINIMUM.
3. JOINTS MAY VERY DEPENDING UPON WIDTH OF APPROACH AND WALK. JOINTS IN THE FLOWLINE ARE TO BE AVOIDED, BUT IF NECESSARY FLOWLINE JOINT SHALL BE SEALED WITH AN APPROVED JOINT SEALER.
4. BOULEVARDS THAT EXCEED 12' IN DEPTH REQUIRE A TRANSVERSE JOINT.

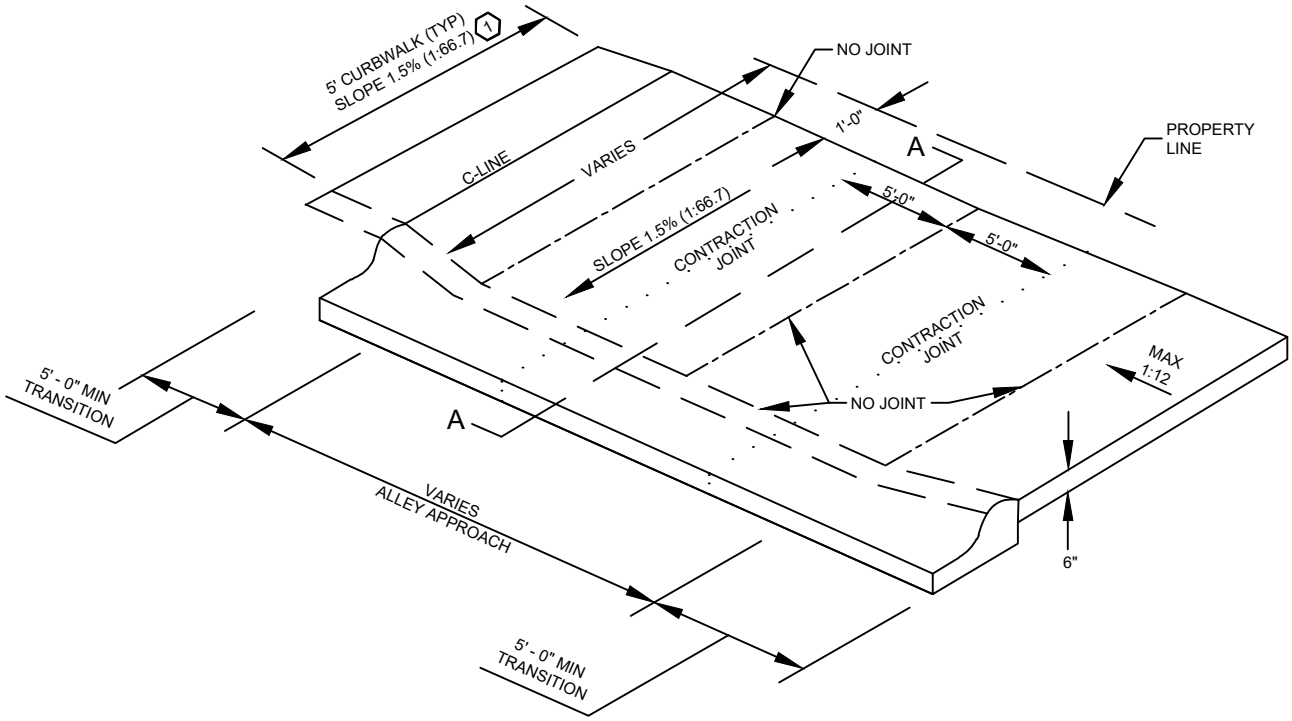
KEY NOTES:

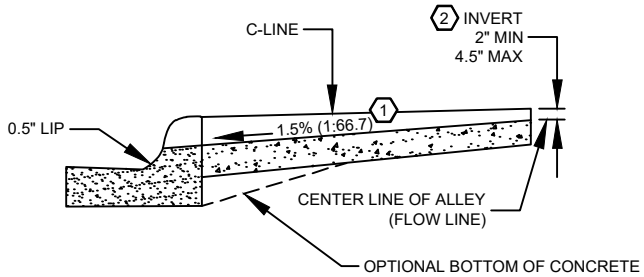
(1) PREFERRED CROSS SLOPE IS 1.5%, MAXIMUM CROSS SLOPE IS 2%.

(2) INVERTED ALLEY APPROACH AS REQUIRED FOR DRAINAGE. 2" MINIMUM, 4.5" MAXIMUM.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	ALLEY APPROACH, WITH BOULEVARD	NO. 02529-7A FEB. 2024





SECTION A - A

GENERAL NOTES:

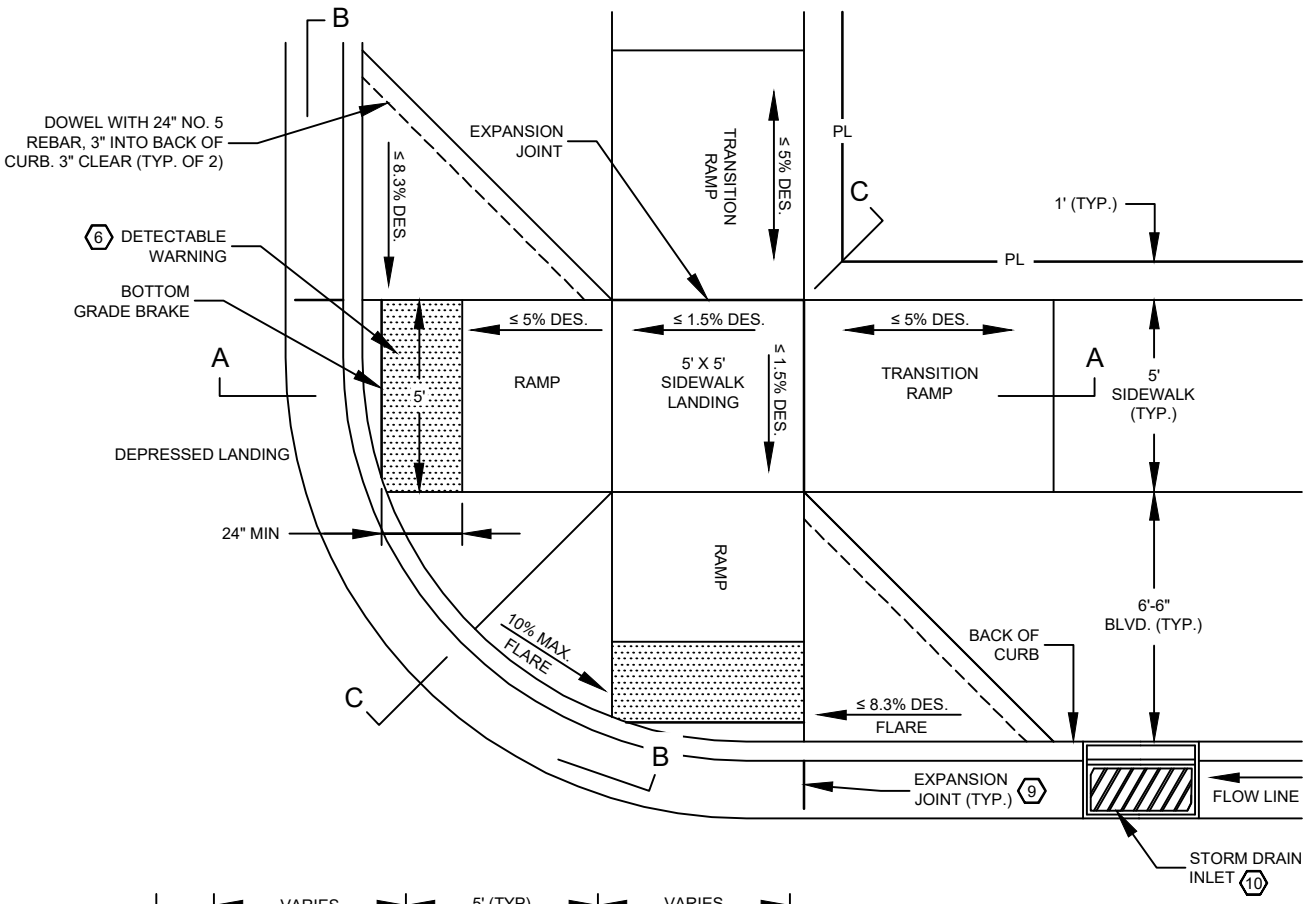
1. APPROACH WILL BE PLACED MONOLITHICALLY.
2. TAPERS SHALL BE 5' IN LENGTH MINIMUM.
3. JOINTS MAY VERY DEPENDING UPON WIDTH OF APPROACH AND WALK. JOINTS IN THE FLOWLINE ARE TO BE AVOIDED, BUT IF NECESSARY FLOWLINE JOINT SHALL BE SEALED WITH AN APPROVED JOINT SEALER.

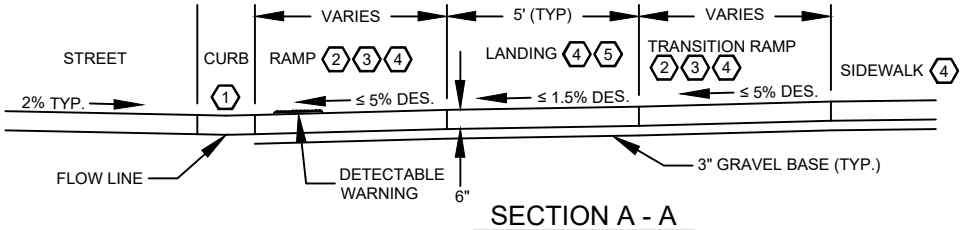
KEY NOTES:

1. PREFERRED CROSS SLOPE IS 1.5%, MAXIMUM CROSS SLOPE IS 2%.
2. INVERTED ALLEY APPROACH AS REQUIRED FOR DRAINAGE. 2" MINIMUM, 4.5" MAXIMUM.

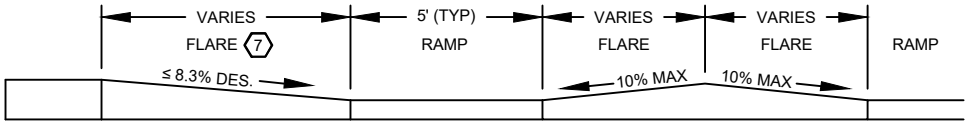
DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	ALLEY APPROACH, WITH CURB WALK	NO. 02529-7B FEB. 2024

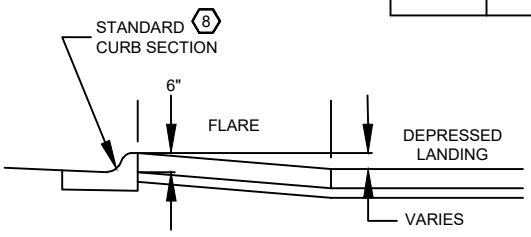




SECTION A - A



SECTION B - B



SECTION C - C

(SEE DRAWING 02529-8B FOR NOTES)

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: AS SHOWN	ACCESSIBILITY RAMP DETAIL	NO. 02529-8A FEB. 2024

GENERAL NOTES:

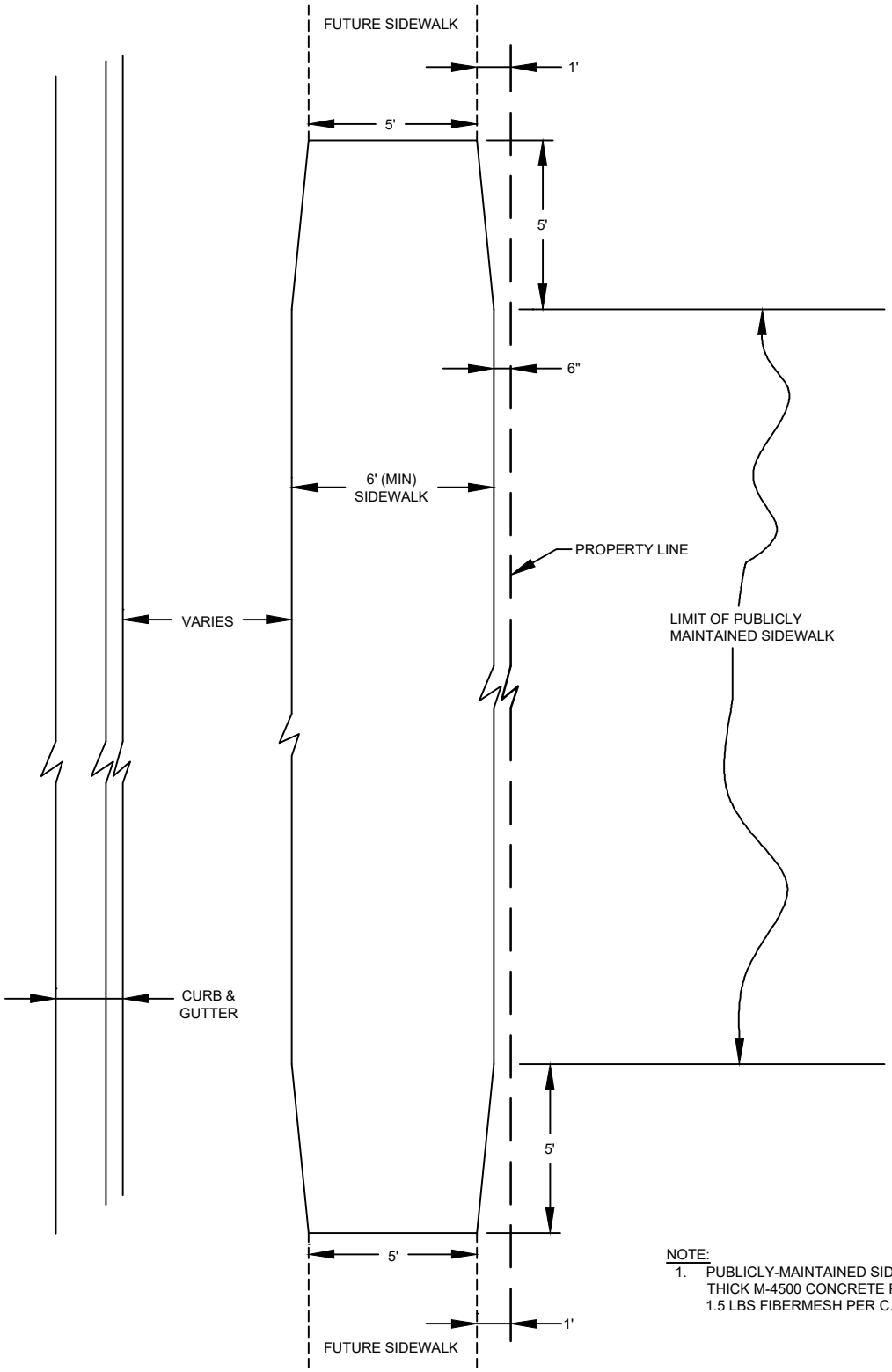
1. THIS DETAIL REPRESENTS A TYPICAL PEDESTRIAN RAMP LAYOUT FOR LOCAL STREETS AND INTERSECTIONS BETWEEN LOCAL STREETS AND COLLECTOR STREETS. DIMENSIONS MAY VARY DEPENDING ON SPECIFIC SITE CONDITIONS AND ALTERNATE LAYOUTS MAY BE ACCEPTABLE. PEDESTRIAN RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 608 OF MONTANA DEPARTMENT OF TRANSPORTATION DETAILED DRAWINGS, PUBLIC RIGHT OF WAY ACCESSIBILITY GUIDELINES (PROWAG), AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS.
2. REFER TO SECTION 608 OF MONTANA DEPARTMENT OF TRANSPORTATION DETAILED DRAWINGS FOR PEDESTRIAN RAMPS ON COLLECTOR AND ARTERIAL STREETS.
3. REINFORCE CONCRETE RAMPS WITH FIBERMESH™ AT A RATE OF 1-1/2 LBS./CY OR 6 X 6 X 10 GUAGE WIRE MESH.
4. RAMP AND CURB CAN BE PLACED MONOLITHICALLY.

KEY NOTES:

1. CURB SHALL NOT HAVE LIP OR OTHER CHANGES IN LEVEL AT TRANSITION TO RAMP.
2. THE DESIRABLE CROSS SLOPE IS 5% (1:20) OR FLATTER. THE MAXIMUM RUNNING RAMP SLOPE IS 8.3% (1:12).
3. THE MINIMUM WIDTH OF RAMP IS 5 FEET.
4. THE DESIRABLE CROSS SLOPE OF LANDING, RAMP OR SIDEWALK IS 1.5% (1:66.7). THE MAXIMUM CROSS SLOPE IS 2% (1:50).
5. THE MINIMUM LENGTH OF LANDING IS 5 FEET. THE LANDING WIDTH SHALL BE EQUAL TO RAMP WIDTH.
6. PROVIDE ADA COMPLIANT DETECTABLE WARNING SURFACES ON BOTTOM GRADE BREAK OF EACH RAMP. DETECTIBLE WARNING SHALL COVER THE ENTIRE WIDTH OF RAMP (EXCLUDING FLARED SIDES) AND BE A MINIMUM OF 2 FEET LONG IN THE DIRECTION OF TRAVEL. BOTTOM GRADE BREAK SHOULD GENERALLY BE LOCATED AT BACK OF CURB AND BOTH ENDS OF BOTTOM GRADE BREAK SHOULD BE LESS THAN 5 FEET FROM BACK OF CURB.
7. THE DESIRABLE SLOPE OF FLARE IS 8.3% (1:12) OR FLATTER. THE MAXIMUM SLOPE OF FLARE IS 10% (1:10).
8. FLARES BETWEEN RAMPS MAY NOT REACH FULL HEIGHT OF STANDARD CURB. CONSTRUCT STANDARD CURB SECTION BETWEEN RAMPS ONLY WHEN MAXIMUM FLARE SLOPE IS NOT EXCEEDED.
9. CURB EXPANSION JOINT SHALL NOT BE LOCATED IN RAMP.
10. STORM DRAIN INLET SHALL BE CONSTRUCTED "UPSTREAM" OF RAMPS. ALTERNATIVE LOCATIONS PERMITTED ONLY UPON APPROVAL BY CITY OF BOZEMAN.

DRAFT

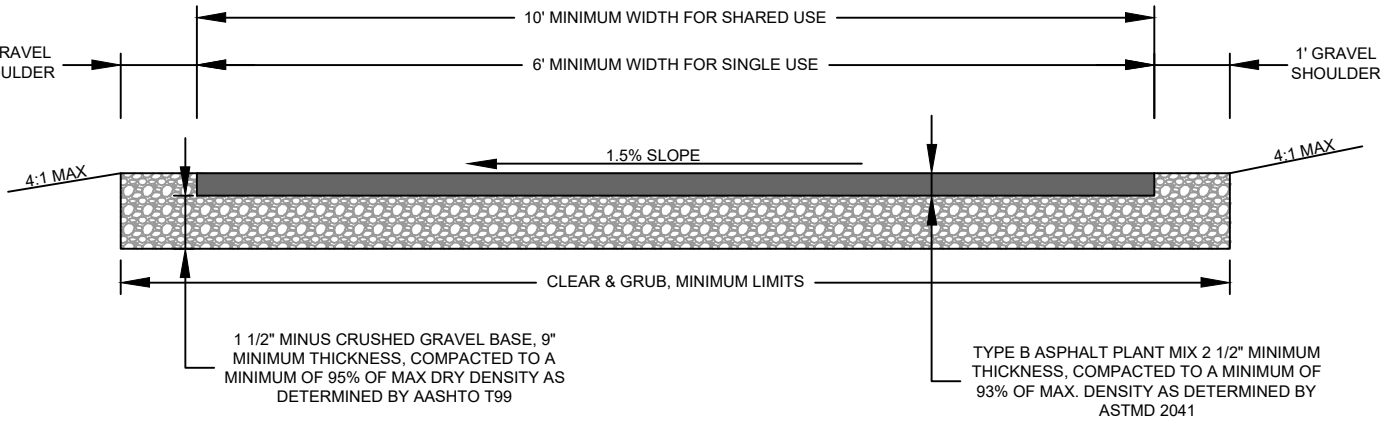
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	ACCESSIBILITY RAMP DETAIL - NOTES	NO. 02529-8B FEB. 2024



NOTE:
1. PUBLICLY-MAINTAINED SIDEWALKS TO BE 6" THICK M-4500 CONCRETE REINFORCED WITH 1.5 LBS FIBERMESH PER C.Y.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	PUBLICLY MAINTAINED SIDEWALK	NO. 02529-11 FEB. 2024

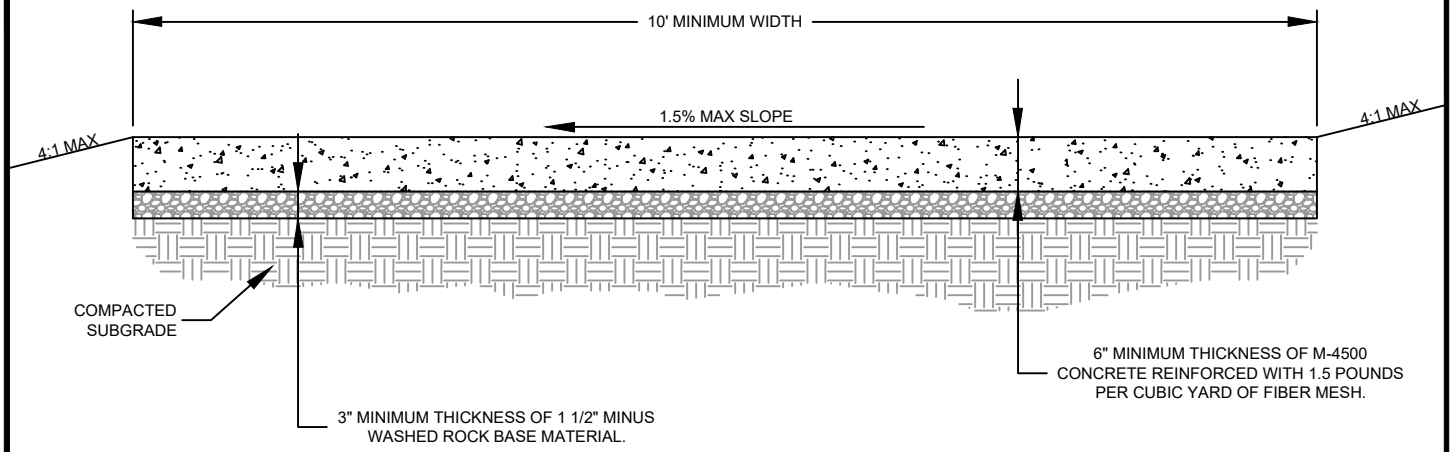


NOTES:

1. PATHWAYS SHALL ADHERE TO THE MINIMUM REQUIREMENTS NOTED ABOVE, SUBJECT TO A RECOMMENDATION FROM A GEOTECHNICAL ENGINEER FOR THICKER SECTION IN AREAS WHERE EXISTING SOILS ARE UNFAVORABLE.
2. A SOIL STERILANT SHALL BE APPLIED TO THE SUBGRADE PRIOR TO PLACEMENT OF THE GRAVEL BASE.
3. PREFERRED CROSS SLOPE IS 1.5%, MAXIMUM CROSS SLOPE IS 2%.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	ASPHALT TRAIL	NO. 02529-12 FEB. 2024

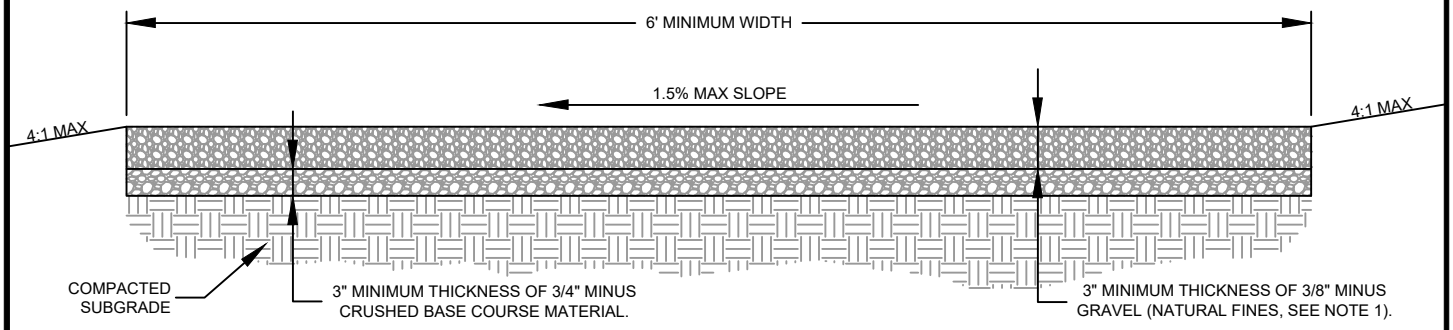


NOTES:

1. SPACE CONTRACTION JOINTS TO MATCH THE WIDTH OF TRAIL.
2. INSTALL EXPANSION JOINT MATERIAL AT EVERY FIFTH JOINT FOR THE FULL DEPTH OF CONCRETE.
3. FINISH CONCRETE WITH LIGHT BROOM FINISH.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	CONCRETE TRAIL	NO. 02529-13 FEB. 2024

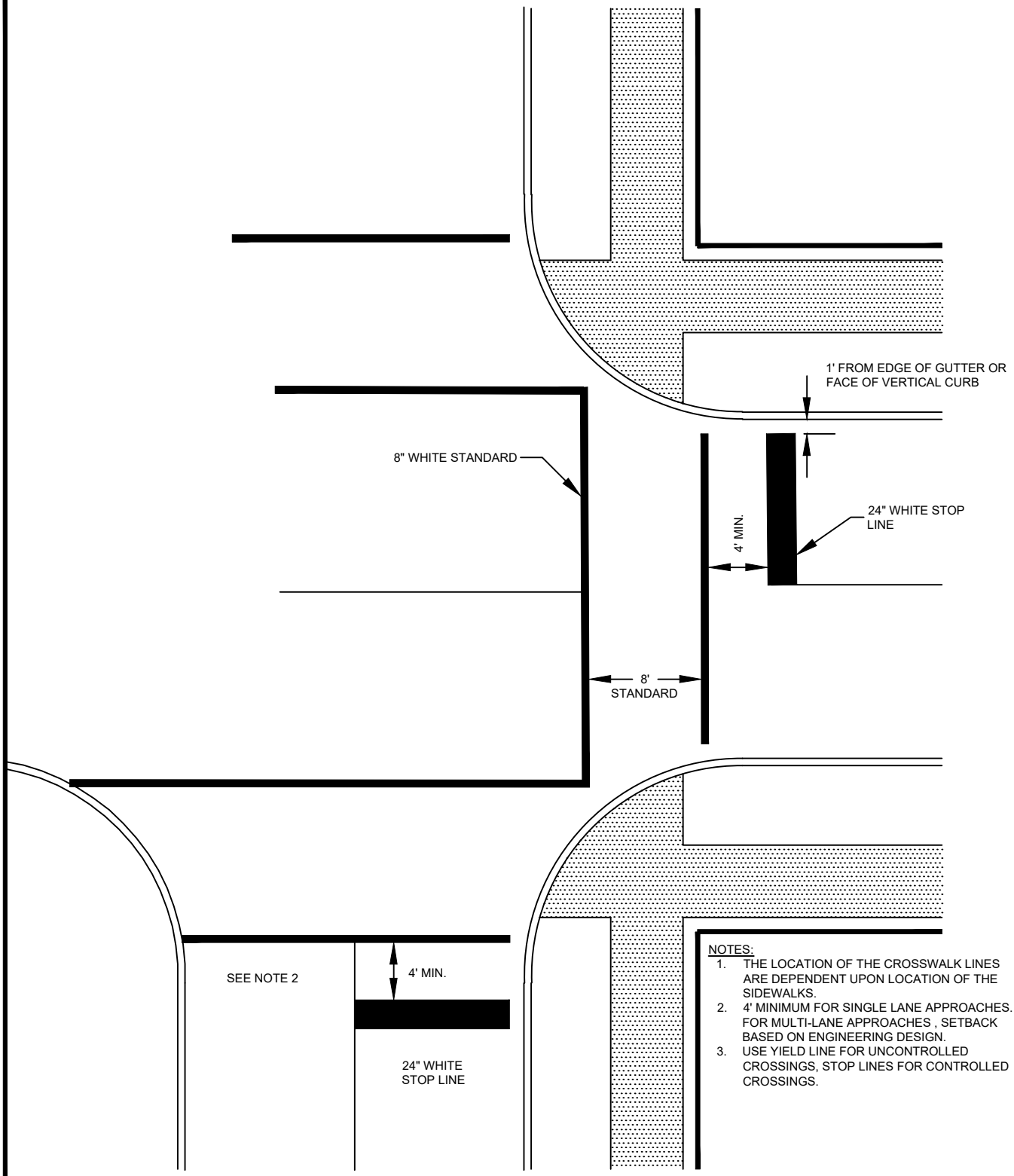


NOTES:

1. NATURAL FINES SHALL CONSIST OF 80% SAND, 10% SILT AND 10% CLAY.
2. A SOIL STERILANT SHALL BE APPLIED TO THE SUBGRADE PRIOR TO PLACEMENT OF THE GRAVEL BASE.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	GRAVEL TRAIL	NO. 02529-14 FEB. 2024

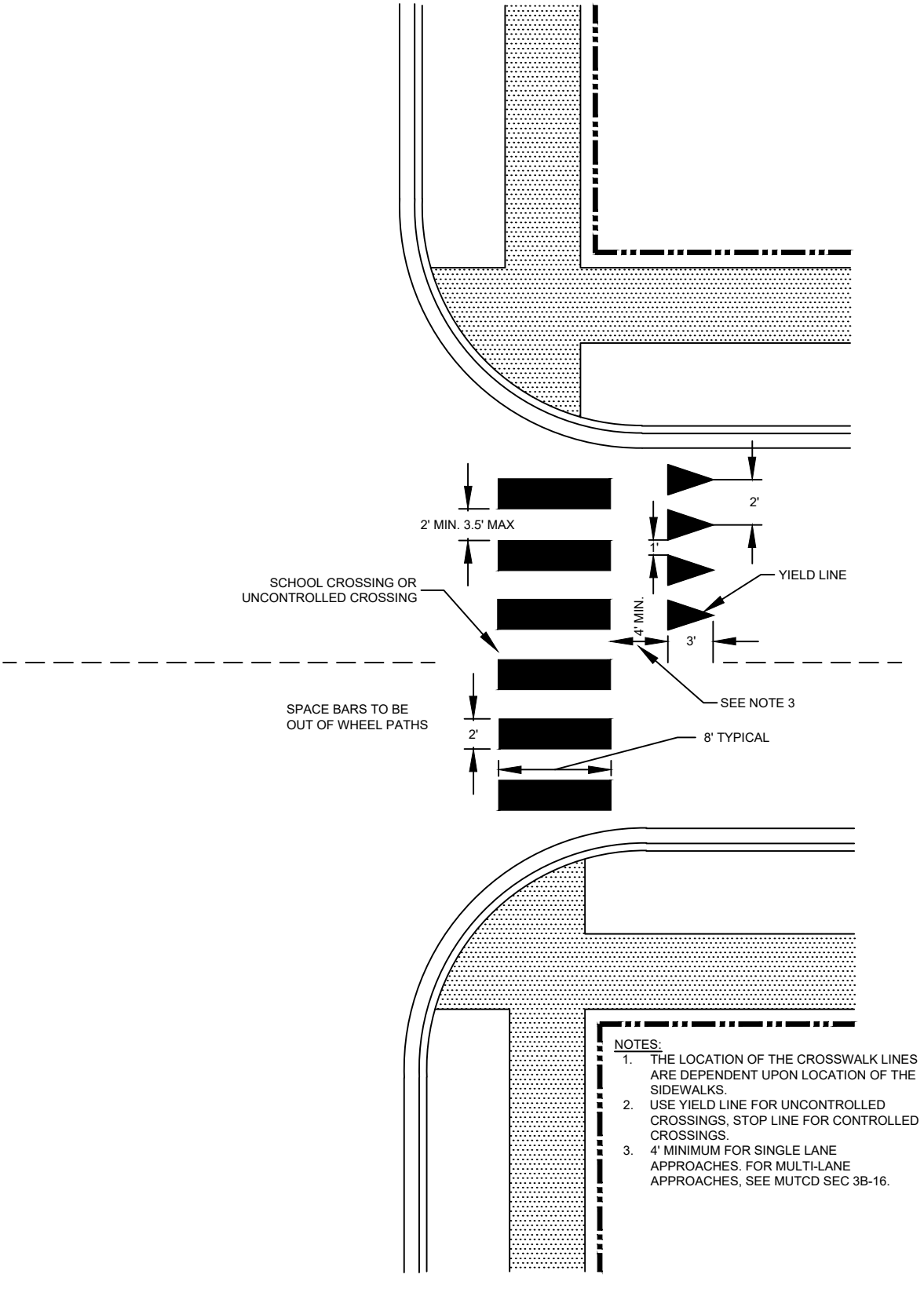


NOTES:

1. THE LOCATION OF THE CROSSWALK LINES ARE DEPENDENT UPON LOCATION OF THE SIDEWALKS.
2. 4' MINIMUM FOR SINGLE LANE APPROACHES. FOR MULTI-LANE APPROACHES , SETBACK BASED ON ENGINEERING DESIGN.
3. USE YIELD LINE FOR UNCONTROLLED CROSSINGS, STOP LINES FOR CONTROLLED CROSSINGS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL PAVEMENT MARKINGS, TYPE A CROSSINGS	NO. 02581-1 FEB. 2024

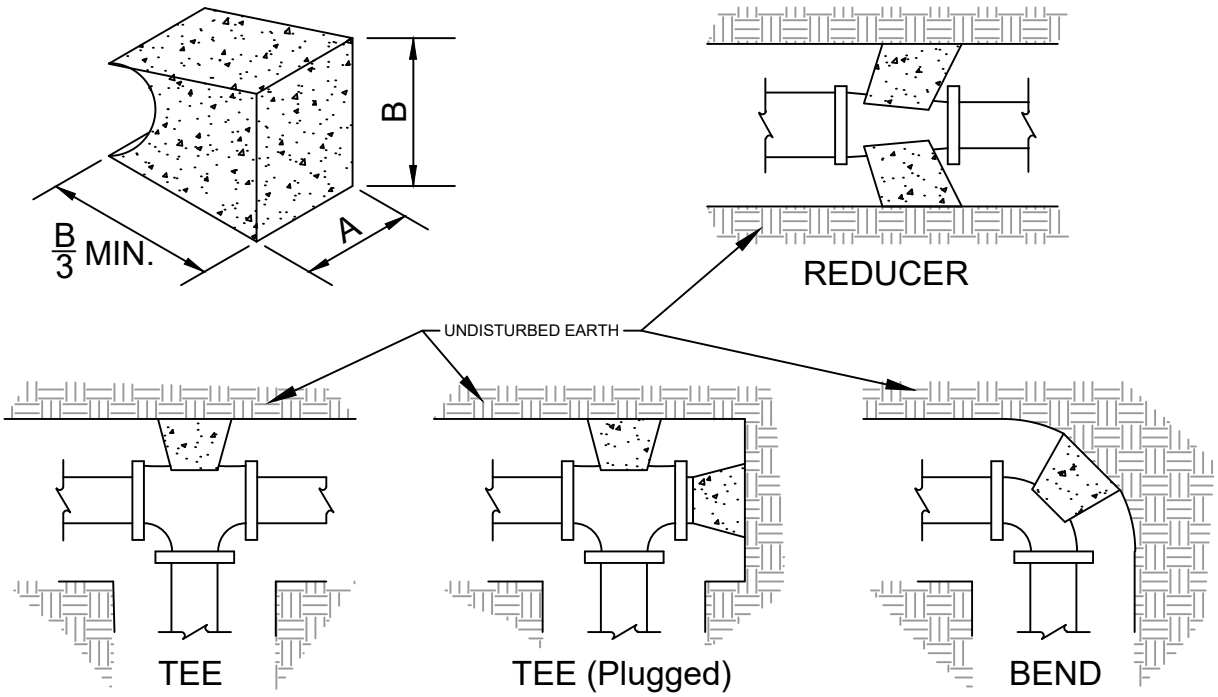


NOTES:

1. THE LOCATION OF THE CROSSWALK LINES ARE DEPENDENT UPON LOCATION OF THE SIDEWALKS.
2. USE YIELD LINE FOR UNCONTROLLED CROSSINGS, STOP LINE FOR CONTROLLED CROSSINGS.
3. 4' MINIMUM FOR SINGLE LANE APPROACHES. FOR MULTI-LANE APPROACHES, SEE MUTCD SEC 3B-16.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL PAVEMENT MARKINGS, TYPE B CROSSINGS	NO. 02581-2 FEB. 2024



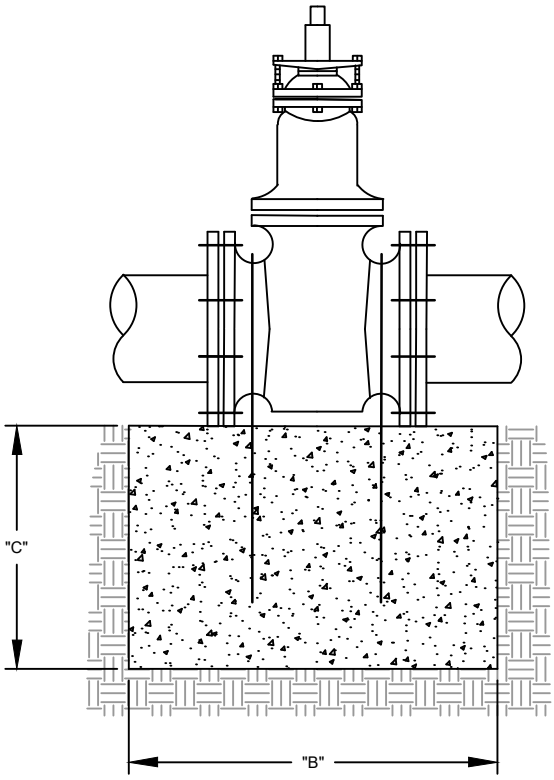
STANDARD DIMENSIONS FOR THRUST BLOCKING								
FITTING SIZES	TEES AND PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 22.5° BEND	
	A	B	A	B	A	B	A	B
4"	2'-1"	1'-9"	2'-6"	2'-1"	1'-10"	1'-6"	1'-4"	1'-1"
6"	3'-0"	2'-6"	3'-7"	2'-12"	2'-8"	2'-2"	1'-11"	1'-7"
8"	3'-11"	3'-4"	4'-8"	3'-11"	3'-5"	2'-11"	2'-6"	2'-1"
10"	4'-10"	4'-1"	5'-9"	4'-10"	4'-3"	3'-6"	3'-0"	2'-6"
12"	5'-9"	4'-10"	6'-10"	5'-9"	5'-0"	4'-3"	3'-7"	3'-0"
14"	6'-8"	5'-7"	7'-11"	6'-8"	5'-10"	4'-11"	4'-2"	3'-6"

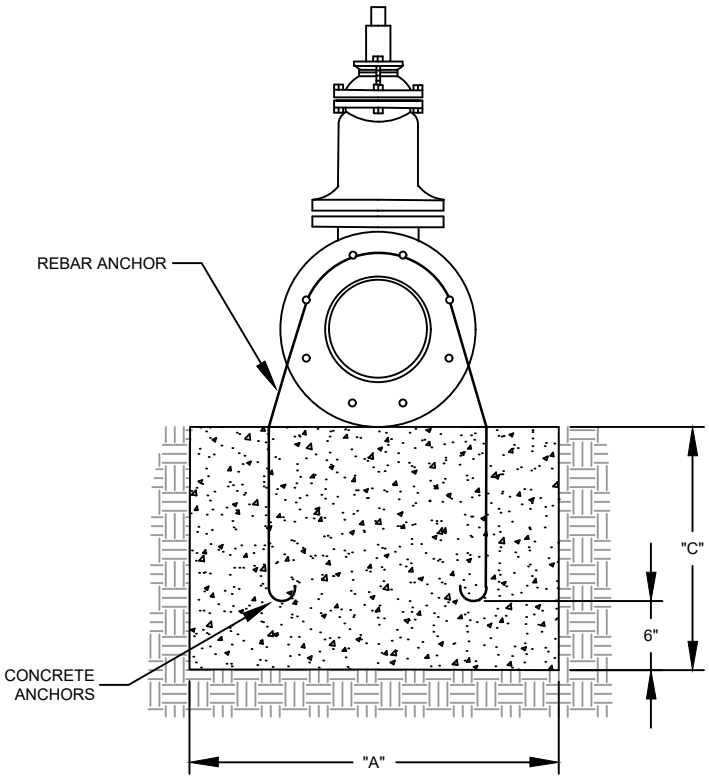
METRIC DIMENSIONS FOR THRUST BLOCKING								
FITTING SIZES	TEES AND PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 22.5° BEND	
	A	B	A	B	A	B	A	B
10cm	0.6	0.5	0.8	0.6	0.6	0.5	0.4	0.3
15cm	0.9	0.8	1.1	0.9	0.8	0.7	0.6	0.5
20cm	1.2	1.0	1.4	1.2	1.1	0.9	0.8	0.6
25cm	1.5	1.2	1.8	1.5	1.3	1.1	0.9	0.8
30cm	1.8	1.5	2.1	1.7	1.5	1.3	1.1	0.9
36cm	2.0	1.7	2.4	2.0	1.8	1.5	1.3	1.1

NOTES:
1. THESE TABLES ARE BASED ON 200 PSI (1,380 kpa) MAIN PRESSURE AND 2,000 PSF (9,800 kg/m^2) SOIL BEARING PRESSURE.
2. WRAP ALL FITTINGS WITH POLYETHYLENE.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	THRUST BLOCKING FOR WATER MAIN FITTINGS	NO. 02660-1 FEB. 2024





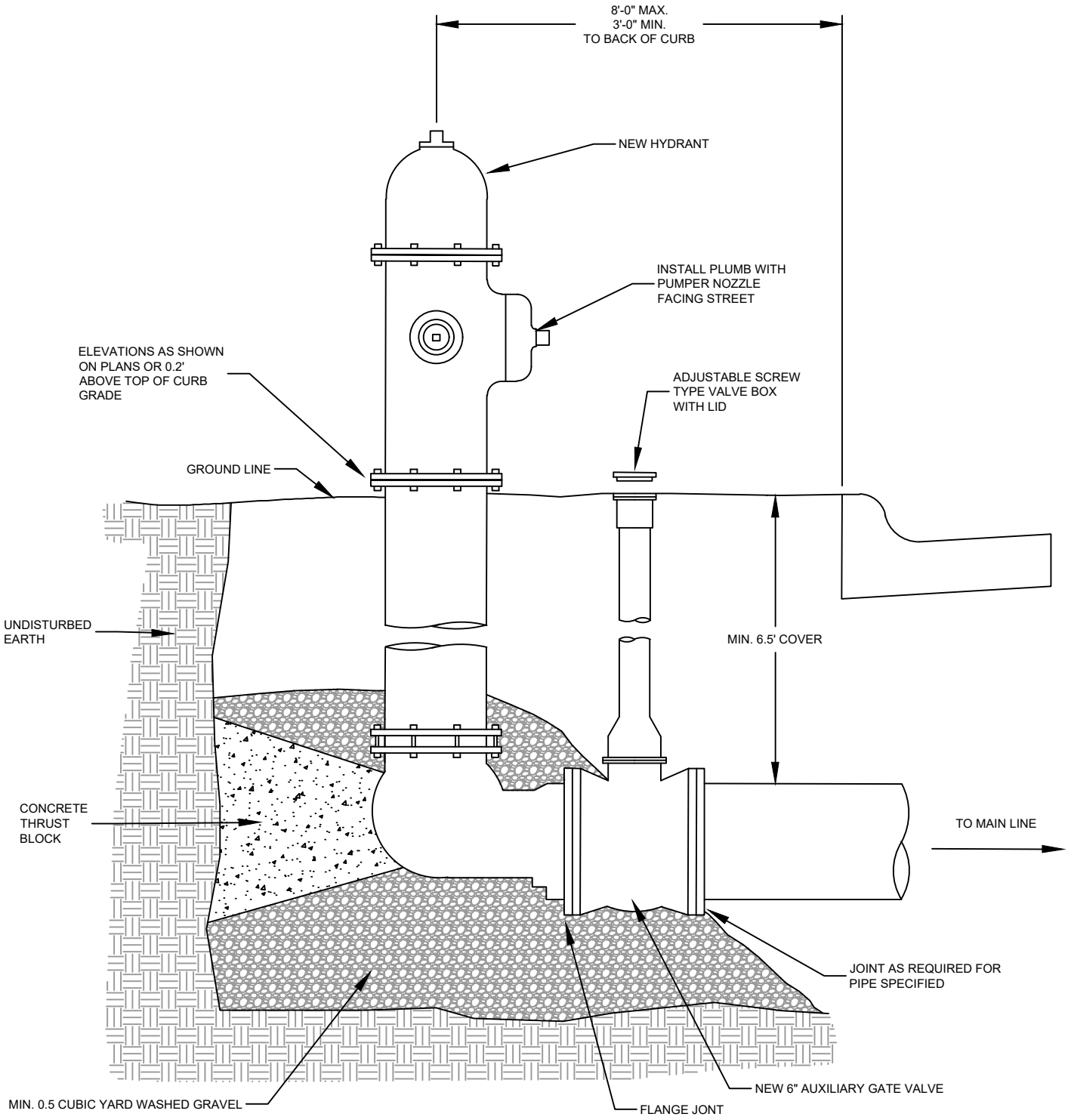
THRUST BLOCK DIMENSIONS

ANCHOR ROD SIZE	VALVE SIZE	100 PSI			150 PSI			200 PSI			250 PSI			300 PSI		
		"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"
1/2"	6" & 8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-7"
1/2"	10"	2'-0"	2'-0"	2'-0"	2'-6"	2'-6"	2'-0"	2'-9"	2'-6"	2'-6"	3'-0"	3'-0"	3'-0"	3'-7"	3'-0"	3'-0"
1/2"	12"	2'-3"	2'-0"	2'-0"	3'-0"	3'-0"	2'-8"	3'-5"	3'-0"	3'-0"	4'-3"	3'-0"	3'-0"	5'-1"	3'-0"	3'-0"
1"	14"	2'-3"	2'-0"	2'-0"	3'-5"	3'-0"	3'-0"	4'-6"	3'-0"	3'-0"	4'-0"	4'-0"	4'-0"	4'-9"	4'-0"	4'-0"
1 1/8"	16"	3'-0"	3'-0"	3'-0"	4'-4"	3'-0"	3'-0"	4'-1"	4'-0"	4'-0"	5'-1"	4'-0"	4'-0"	6'-1"	4'-0"	4'-0"
1 1/4"	18"	3'-8"	3'-0"	3'-0"	5'-5"	3'-0"	3'-0"	5'-1"	4'-0"	4'-0"	6'-4"	4'-0"	4'-0"	5'-9"	5'-0"	5'-0"
1 3/8"	24"	4'-4"	4'-0"	4'-0"	6'-5"	4'-0"	4'-0"	6'-6"	5'-0"	5'-0"	6'-5"	6'-0"	6'-0"	7'-8"	6'-0"	6'-0"

NOTES:
1. PRESSURES SHOWN ABOVE ARE MAXIMUM WORKING PRESSURES IN SYSTEM.
2. THRUST BLOCKING AND ANCHORS ARE REQUIRED ON ALL 6" VALVES AND LARGER UNLESS SPECIFIED BY THE ENGINEER. MEGALUG OR APPROVED EQUAL JOINT RESTRAINTS MAY BE USED IN LIEU OF CONCRETE THRUST BLOCKS. THRUST BLOCKS NOT REQUIRED ON TAPPING VALVES.
3. COAT RODS WITH "KOPPERS" BITUMASTIC NO. 50 COATING OR EQUAL.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	THRUST BLOCKING FOR WATER MAIN VALVES	NO. 02660-3 FEB. 2024

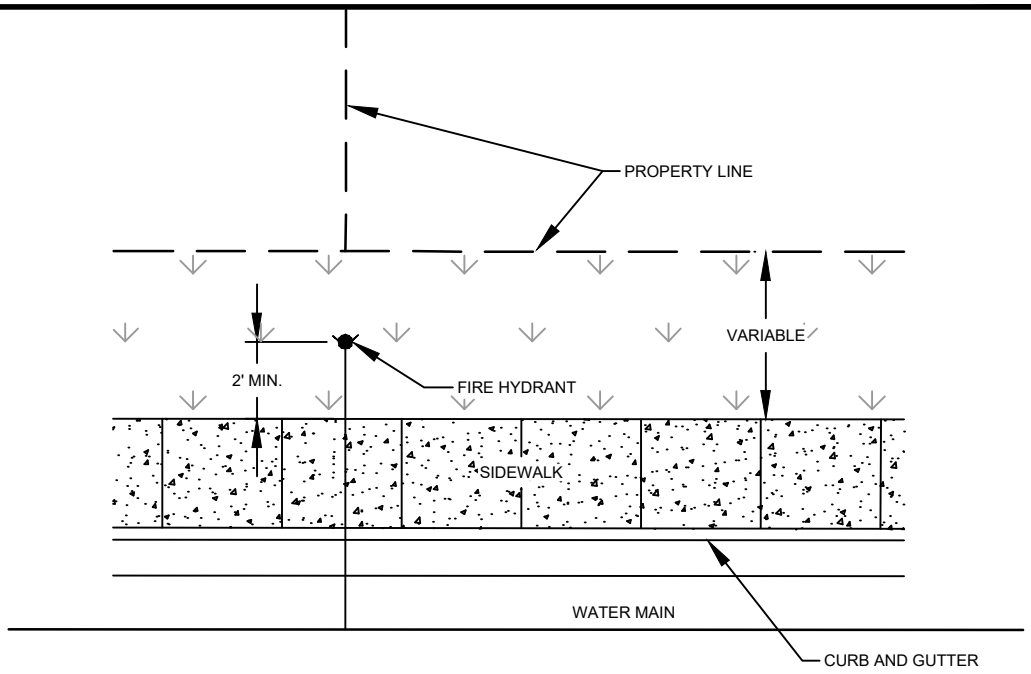


NOTES:

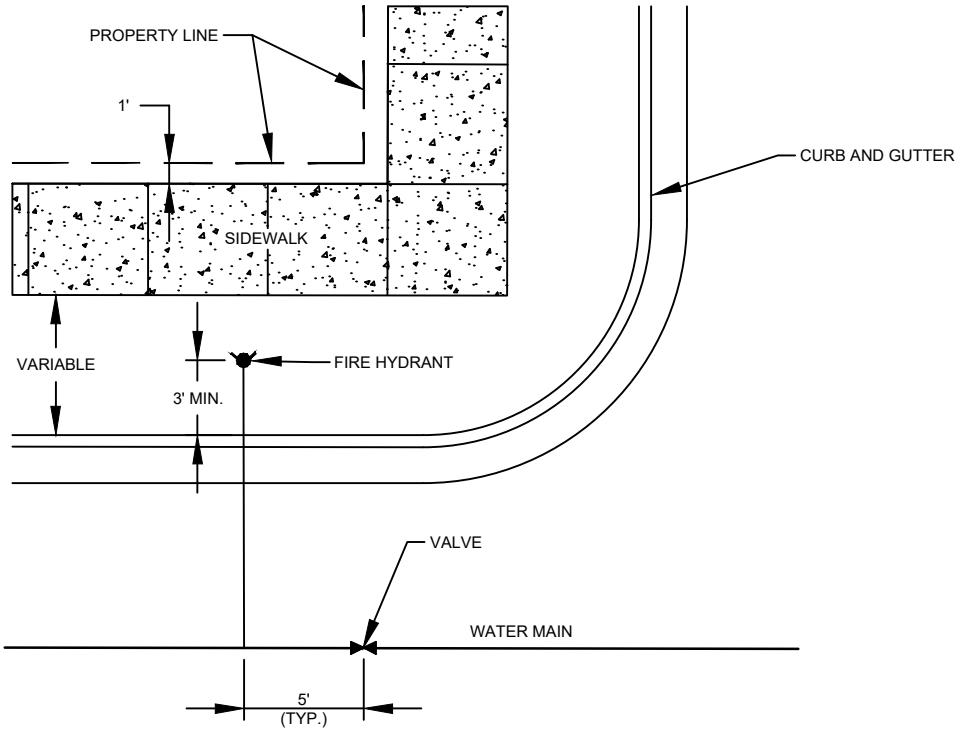
1. MEGALUG OR APPROVED EQUAL JOINT RESTRAINTS MAY BE USED IN LIEU OF CONCRETE THRUST BLOCK.
2. MINIMUM 4'-0" CLEAR ALL AROUND HYDRANT (TREES, HEDGES, BUSHED, ETC).
3. HYDRANT SHALL BE LOCATED A MINIMUM OF 2'-0" FROM EDGE OF SIDEWALKS

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	FIRE HYDRANT SETTING	NO. 02660-4 FEB. 2024



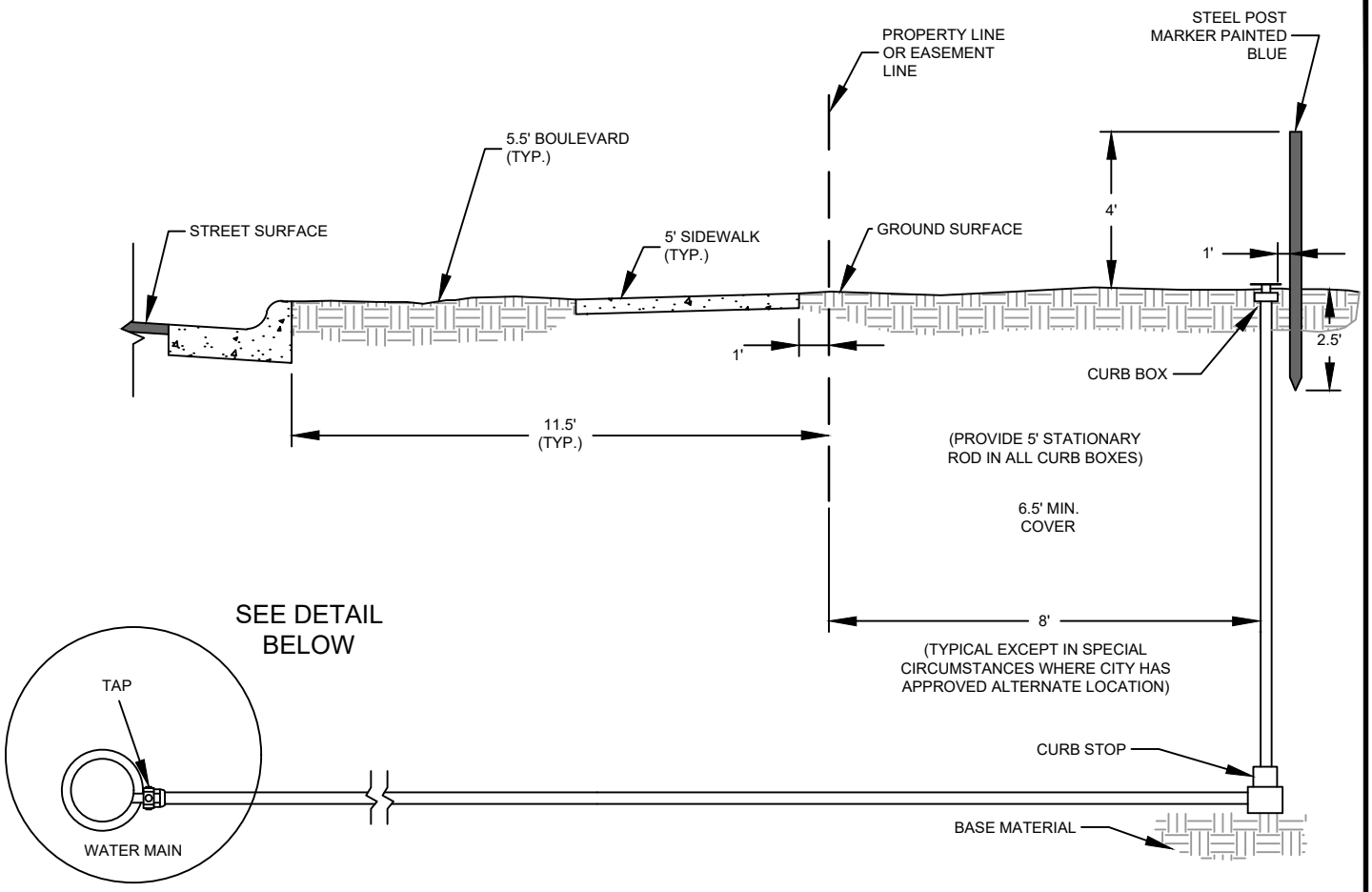
CURB WALK DETAIL

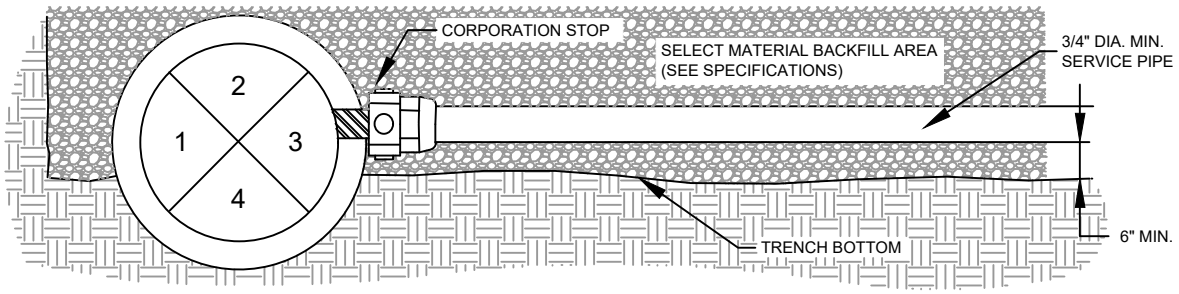


BOULEVARD WALK DETAIL

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	HYDRANT LOCATION DETAIL	NO. 02660-5 FEB. 2024





DETAIL OF A PROPERLY INSTALLED CORPORATION STOP

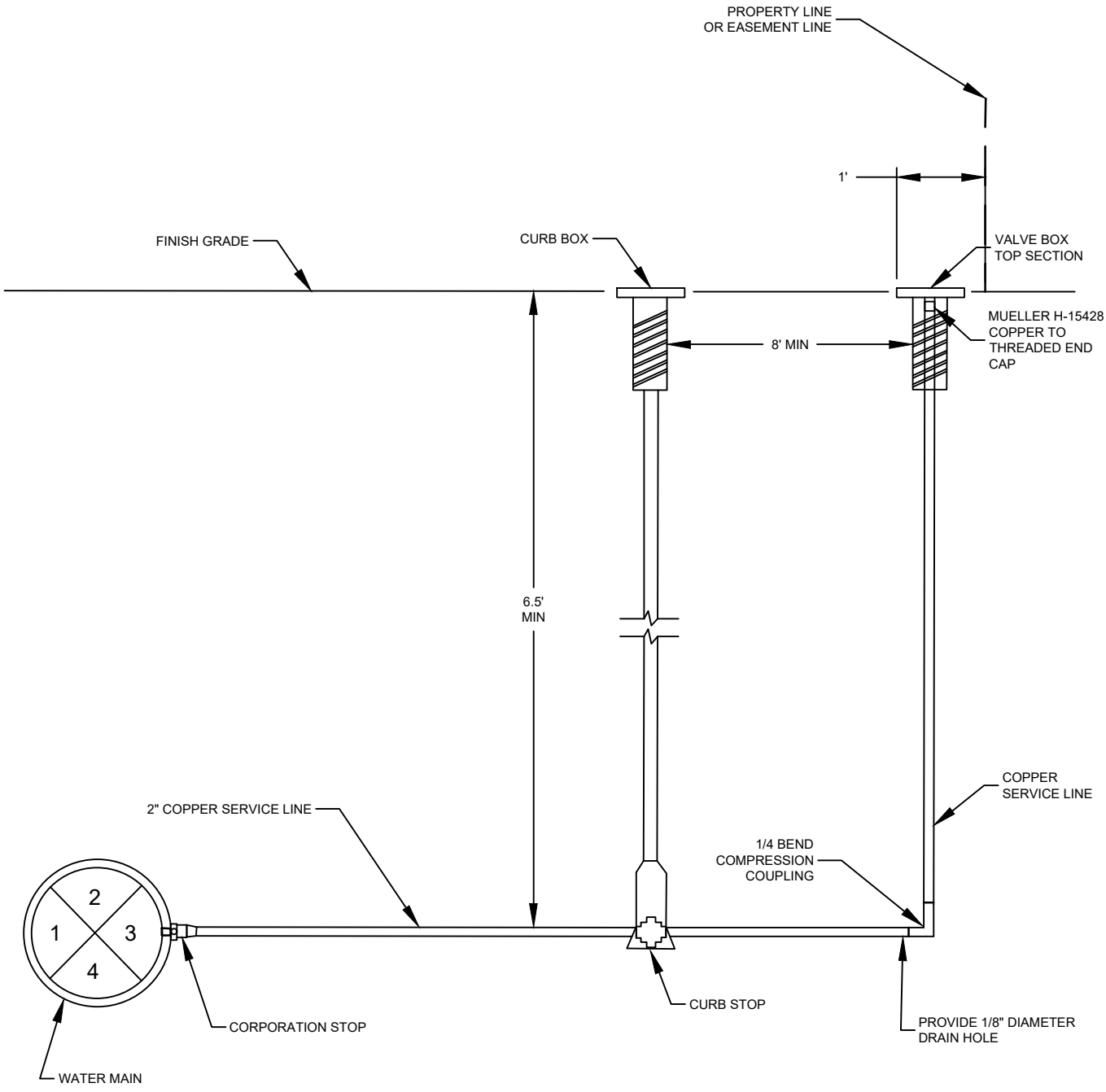
NOTES:

1. WATER SERVICE LINES SHALL HAVE A MINIMUM 6.5' COVER MEASURED FROM THE EXISTING GROUND SURFACE, EXCEPT THAT COVER SHALL BE MEASURED FROM CENTER LINE STREET GRADE WHEN SERVICE LINES ARE LAID TO A STREET SIDE WHICH HAS AN UPHILL SLOPE. WATER SERVICE LINES SHALL HAVE A MAXIMUM 7.5' COVER AT CURB STOP.
2. WATER SERVICE LINES SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED.
3. BEDDING SHALL BE 1" DIA. MAXIMUM WITHIN 6" OF SERVICE PIPE.
4. INSTALL CURB STOP SO THAT OPERATING KEY IS PARALLEL TO STREET IN OFF-POSITION.
5. NO COUPLINGS OR OTHER JOINTS ALLOWED ON SERVICE PIPE FROM CORPORATION STOP FOR 3/4" AND 1" SERVICES.
6. STRAIGHT COPPER PIPE SHALL BE USED FOR 1-1/2" AND 2" SERVICES.
7. TAP MAIN AT SPRINGLINE.
8. PROVIDE 5' STATIONARY ROD IN ALL CURB BOXES.
9. INSTALL DETECTABLE WARNING TAPE 18" TO 24" BELOW FINISHED GRADE OVER WATER SERVICE FROM MAIN TO CURB BOX.
10. IF TYPICAL CURB BOX LOCATIONS CANNOT BE MET (I.E. 8 FT SETBACK BEHIND PROPERTY LINE TO ACCOMMODATE DRY UTILITIES), ALTERNATE CRITERIA MAY BE APPLIED UPON APPROVAL OF THE CITY ENGINEERING DIVISION. THE FOLLOWING CONDITIONS SHOULD BE MET:

- CURB BOXES ARE PREFERABLY LOCATED ON OR NEAR THE PROPERTY OR EASEMENT LINE.
- SUITABLE LOCATIONS ARE PROVIDED FOR DRY UTILITIES THAT DO NOT CONFLICT WITH CURB BOXES OR ABILITY TO CONNECT TO SERVICE STUBS IN FUTURE.
- CURB BOXES MUST BE A MINIMUM OF 3 FEET FROM ALL FOUNDATIONS AND STRUCTURES.
- CURB BOXES ARE ACCESSIBLE TO BE TURNED ON AND OFF AT ALL TIMES AND MUST NOT BE LOCATED IN PARKING AREAS.
- SERVICE STUBS FOR FUTURE CONNECTION MUST NOT BE LOCATED IN PAVED AREAS.
- ALL CURB STOPS LOCATED IN PAVEMENT SHALL HAVE A VALVE BOX RISER AROUND THE TOP OF THE CURB STOP.

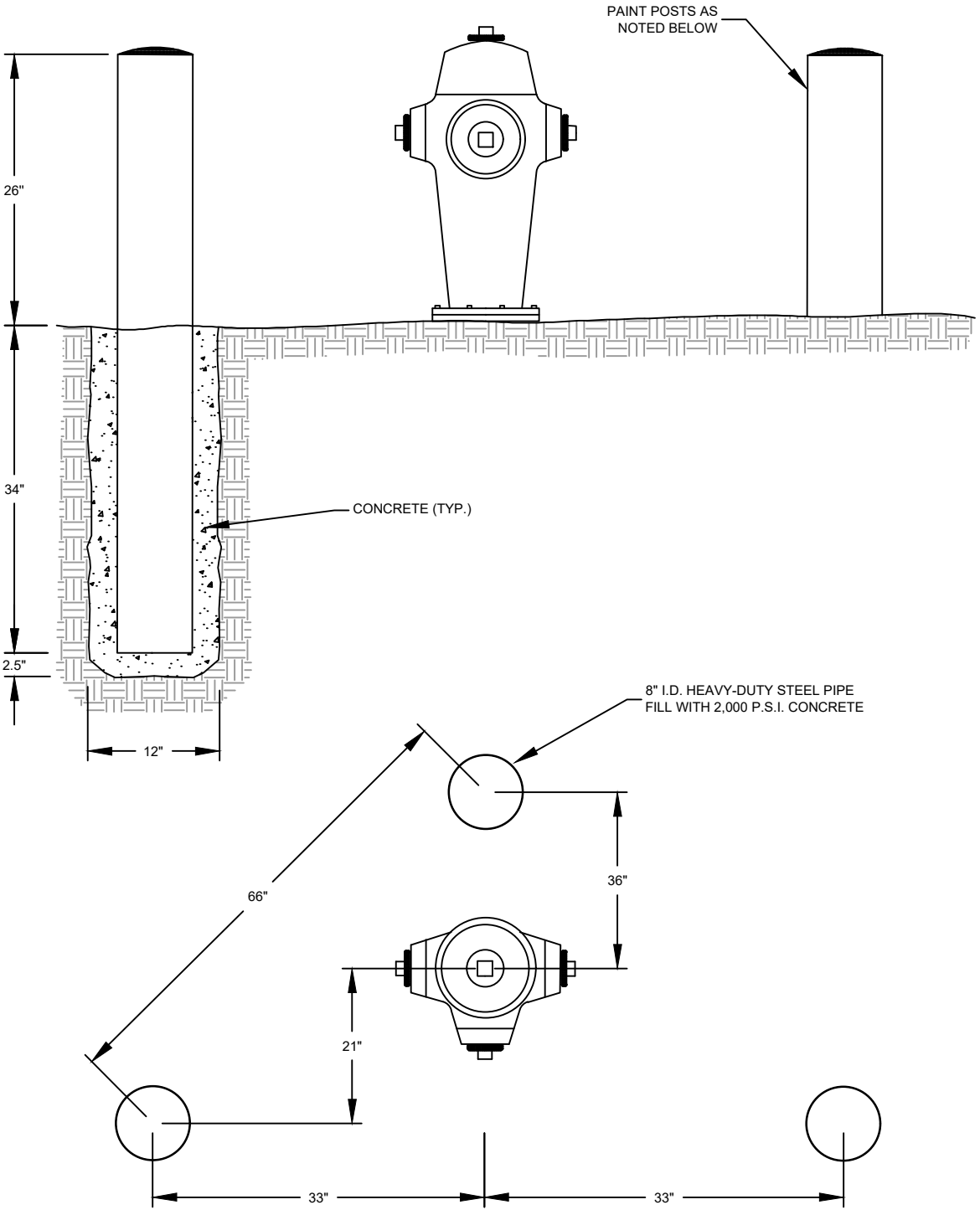
DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER SERVICE LINE	NO. 02660-6 FEB. 2024



DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	BLOWOFF VALVE	NO. 02660-7 FEB. 2024

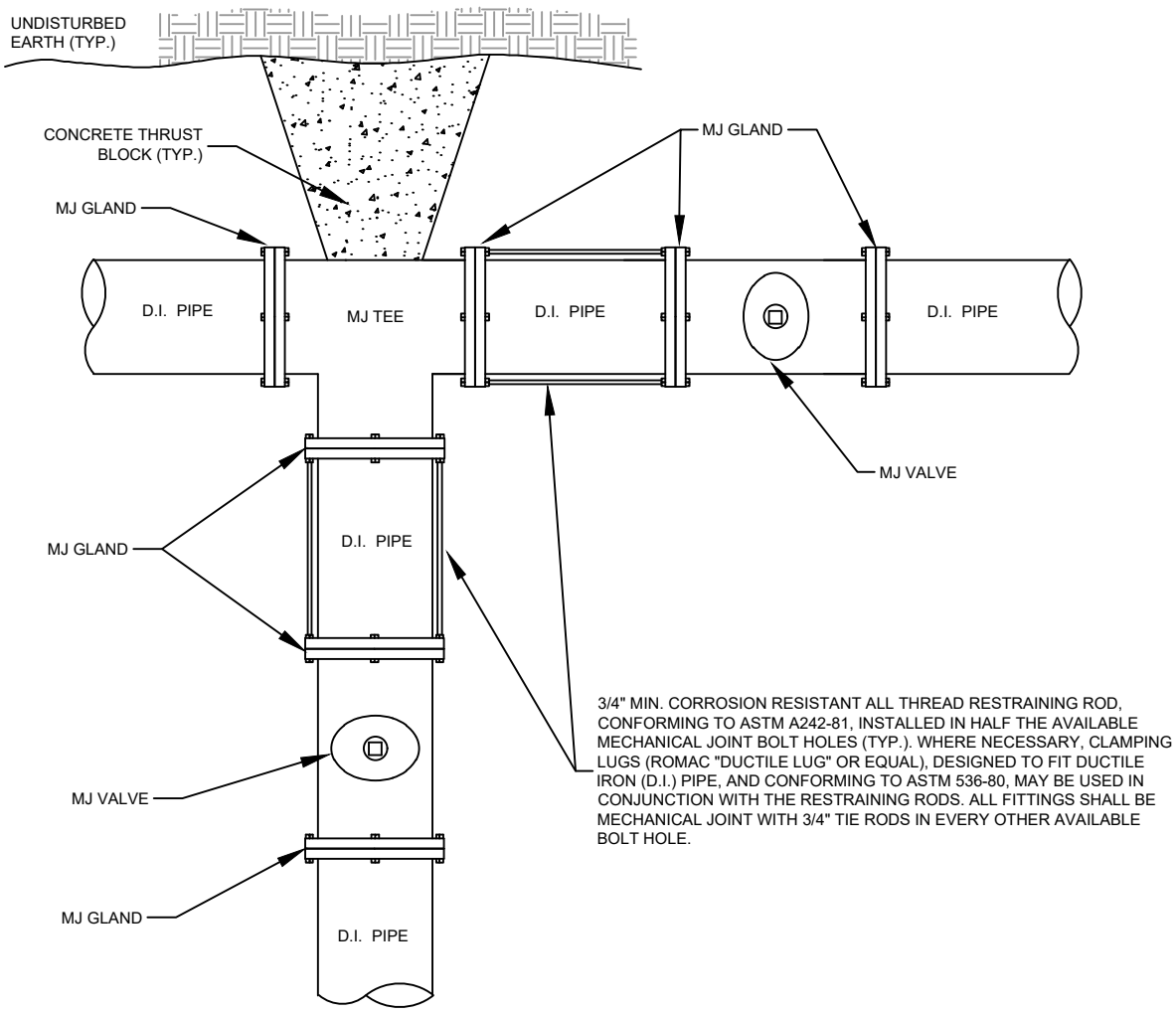


NOTES:

1. POST NOT REQUIRED WHERE NATURAL BARRIERS EXIST OR MINIMUM DISTANCE BEHIND CURB CAN BE MET.
2. PAINT POSTS WITH SHERWIN-WILLIAMS METALATEX SEMI-GLOSS COATING, SAFETY RED (B42 R38 620-4069).

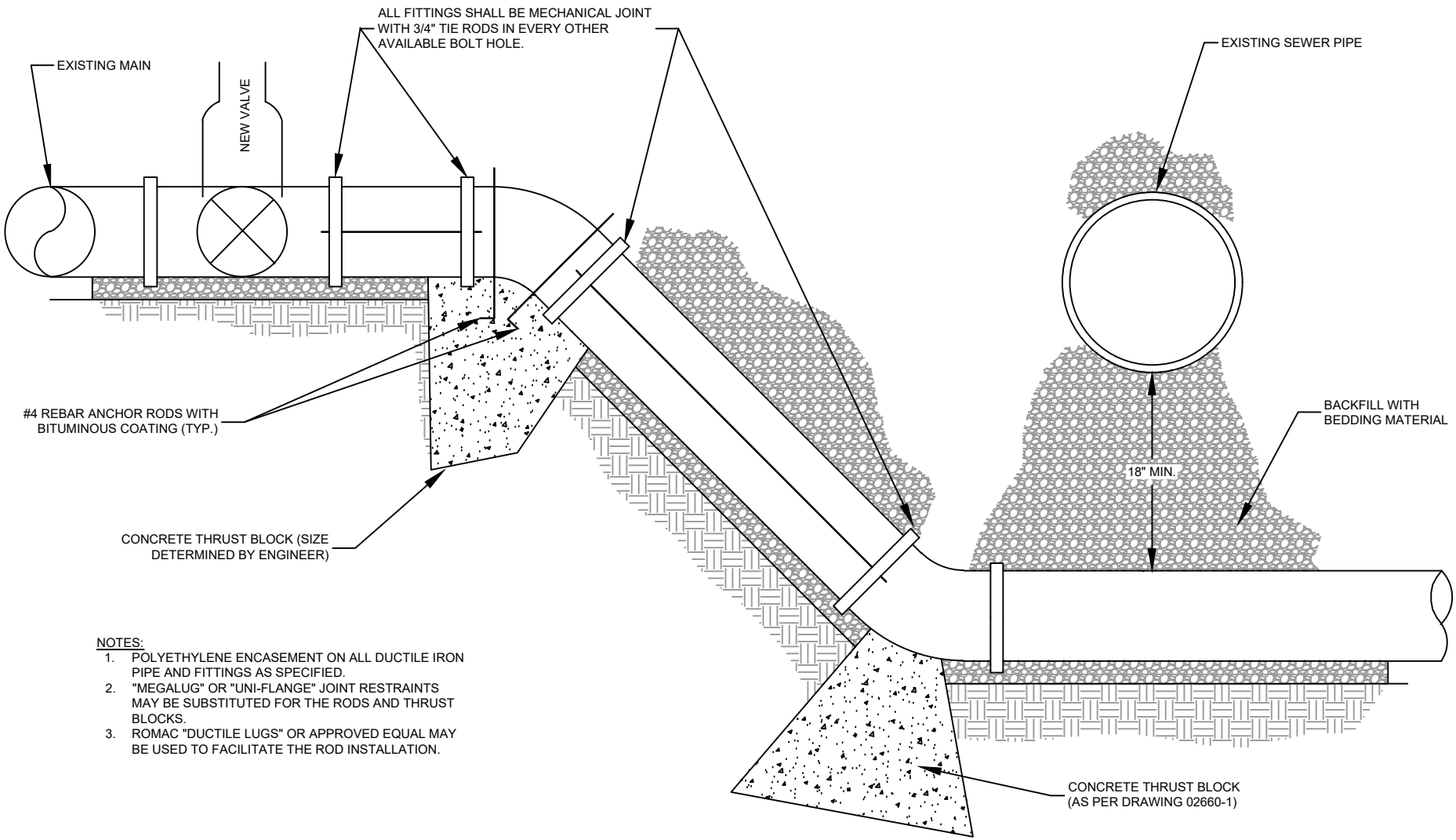
DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	HYDRANT BARRIER POSTS	NO. 02660-8 FEB. 2024



DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL VALVE/TEE RESTRAINT	NO. 02660-9 FEB. 2024

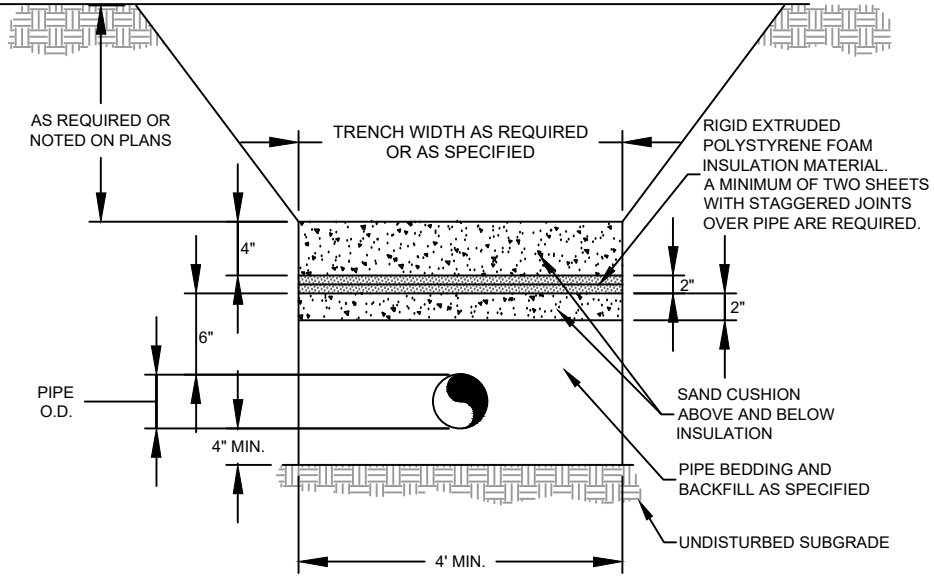


NOTES:

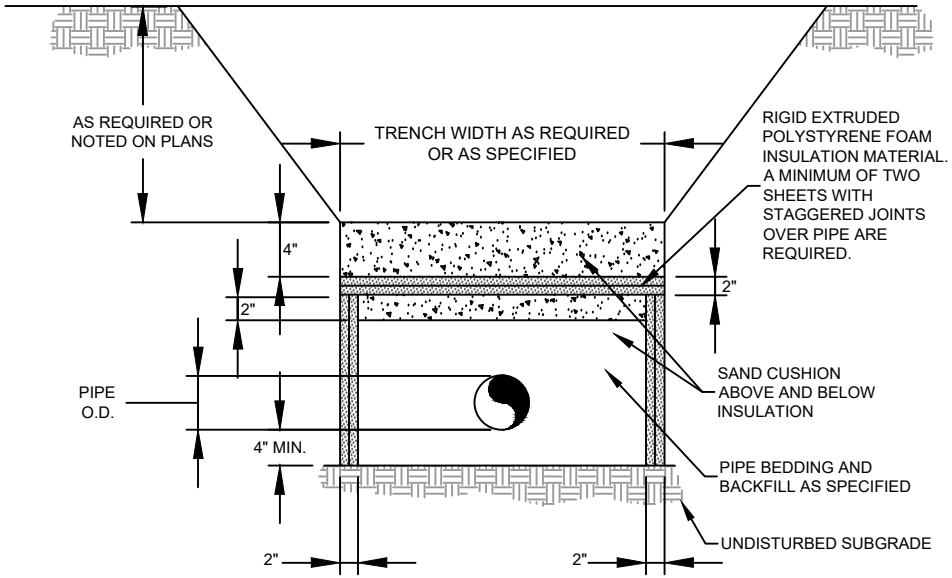
1. POLYETHYLENE ENCASEMENT ON ALL DUCTILE IRON PIPE AND FITTINGS AS SPECIFIED.
2. "MEGALUG" OR "UNI-FLANGE" JOINT RESTRAINTS MAY BE SUBSTITUTED FOR THE RODS AND THRUST BLOCKS.
3. ROMAC "DUCTILE LUGS" OR APPROVED EQUAL MAY BE USED TO FACILITATE THE ROD INSTALLATION.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER MAIN CROSSING BELOW EXISTING SEWER MAIN	NO 02660-10 FEB.2024



TYPICAL INSULATION DETAIL



NARROW TRENCH INSULATION DETAIL

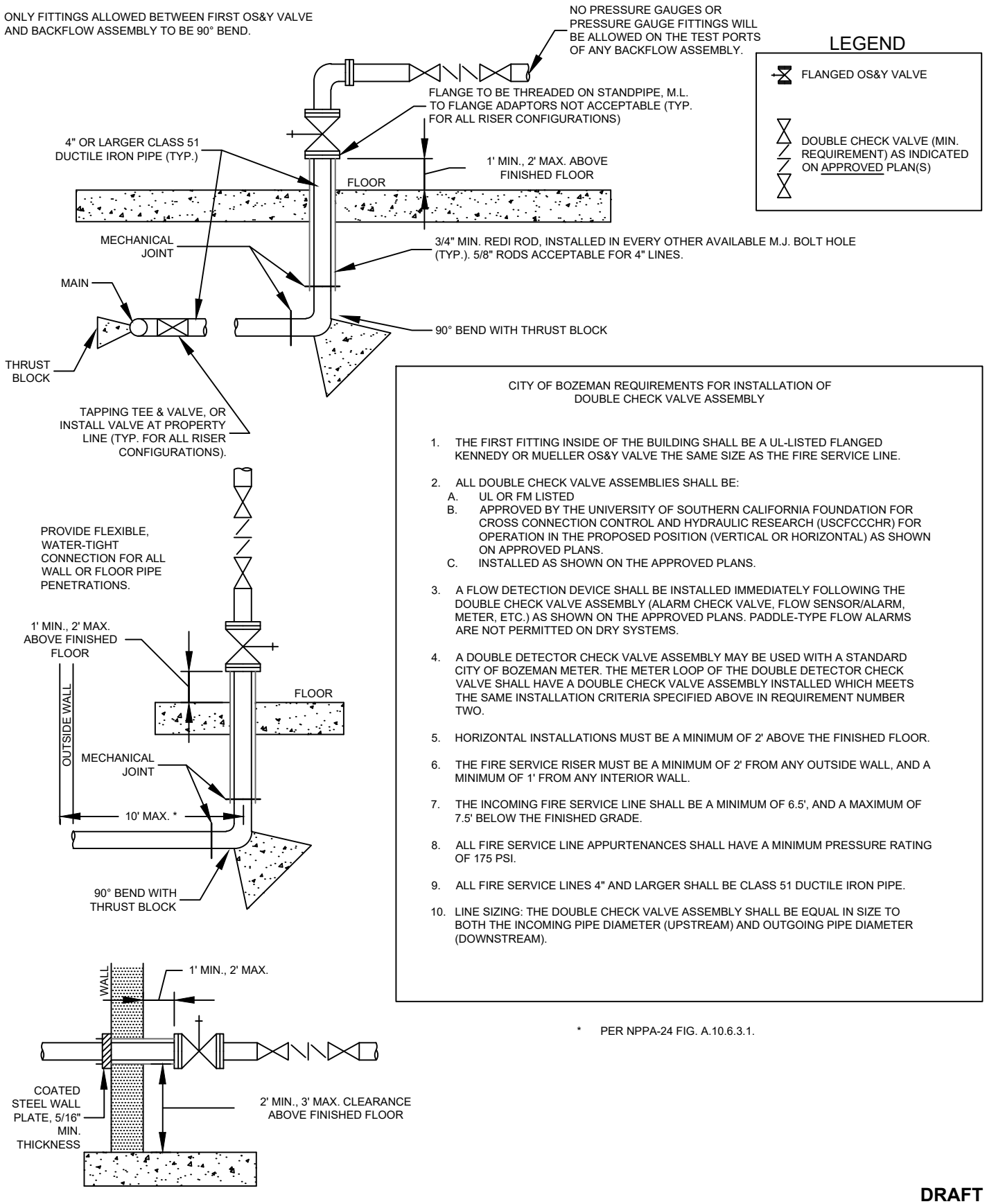
PIPE TYPE	MIN. COVER WITHOUT INSULATION (FT)	MIN. COVER WITH INSULATION (FT)
WATER	6.5'	4.5'
GRAVITY SEWER	5'	4'
SEWER FORCE MAIN	6'	5'

NOTES:

1. TYPICAL INSULATION DETAIL SHALL BE USED WHEN ADEQUATE PIPE COVER (SEE TABLE) CANNOT BE PROVIDED FOR FREEZE PROTECTION FOR A BURIED PIPE.
2. NARROW TRENCH INSULATION DETAIL MAY ONLY BE USED IF APPROVED BY CITY OF BOZEMAN.
3. INSULATE WHEN PIPES CROSS BENEATH CULVERTS FOR STORMWATER CONVEYANCE AND VERTICAL SEPARATION IS LESS THAN MINIMUM DEPTH OF COVER (SEE TABLE).
4. ENSURE THAT PIPE BEDDING, PIPE COVER, AND TRENCH WIDTH ARE CONSISTENT WITH SPECIFICATIONS.
5. INSTALL INSTALLATION FULL WIDTH OF TRENCH.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	BURIED PIPE INSULATION	NO. 02660-11 FEB. 2024



CITY OF BOZEMAN REQUIREMENTS FOR INSTALLATION OF DOUBLE CHECK VALVE ASSEMBLY

1. THE FIRST FITTING INSIDE OF THE BUILDING SHALL BE A UL-LISTED FLANGED KENNEDY OR MUELLER OS&Y VALVE THE SAME SIZE AS THE FIRE SERVICE LINE.
2. ALL DOUBLE CHECK VALVE ASSEMBLIES SHALL BE:
   A. UL OR FM LISTED
   B. APPROVED BY THE UNIVERSITY OF SOUTHERN CALIFORNIA FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH (USCFCCCHR) FOR OPERATION IN THE PROPOSED POSITION (VERTICAL OR HORIZONTAL) AS SHOWN ON APPROVED PLANS.
   C. INSTALLED AS SHOWN ON THE APPROVED PLANS.
3. A FLOW DETECTION DEVICE SHALL BE INSTALLED IMMEDIATELY FOLLOWING THE DOUBLE CHECK VALVE ASSEMBLY (ALARM CHECK VALVE, FLOW SENSOR/ALARM, METER, ETC.) AS SHOWN ON THE APPROVED PLANS. PADDLE-TYPE FLOW ALARMS ARE NOT PERMITTED ON DRY SYSTEMS.
4. A DOUBLE DETECTOR CHECK VALVE ASSEMBLY MAY BE USED WITH A STANDARD CITY OF BOZEMAN METER. THE METER LOOP OF THE DOUBLE DETECTOR CHECK VALVE SHALL HAVE A DOUBLE CHECK VALVE ASSEMBLY INSTALLED WHICH MEETS THE SAME INSTALLATION CRITERIA SPECIFIED ABOVE IN REQUIREMENT NUMBER TWO.
5. HORIZONTAL INSTALLATIONS MUST BE A MINIMUM OF 2' ABOVE THE FINISHED FLOOR.
6. THE FIRE SERVICE RISER MUST BE A MINIMUM OF 2' FROM ANY OUTSIDE WALL, AND A MINIMUM OF 1' FROM ANY INTERIOR WALL.
7. THE INCOMING FIRE SERVICE LINE SHALL BE A MINIMUM OF 6.5', AND A MAXIMUM OF 7.5' BELOW THE FINISHED GRADE.
8. ALL FIRE SERVICE LINE APPURTENANCES SHALL HAVE A MINIMUM PRESSURE RATING OF 175 PSI.
9. ALL FIRE SERVICE LINES 4" AND LARGER SHALL BE CLASS 51 DUCTILE IRON PIPE.
10. LINE SIZING: THE DOUBLE CHECK VALVE ASSEMBLY SHALL BE EQUAL IN SIZE TO BOTH THE INCOMING PIPE DIAMETER (UPSTREAM) AND OUTGOING PIPE DIAMETER (DOWNSTREAM).

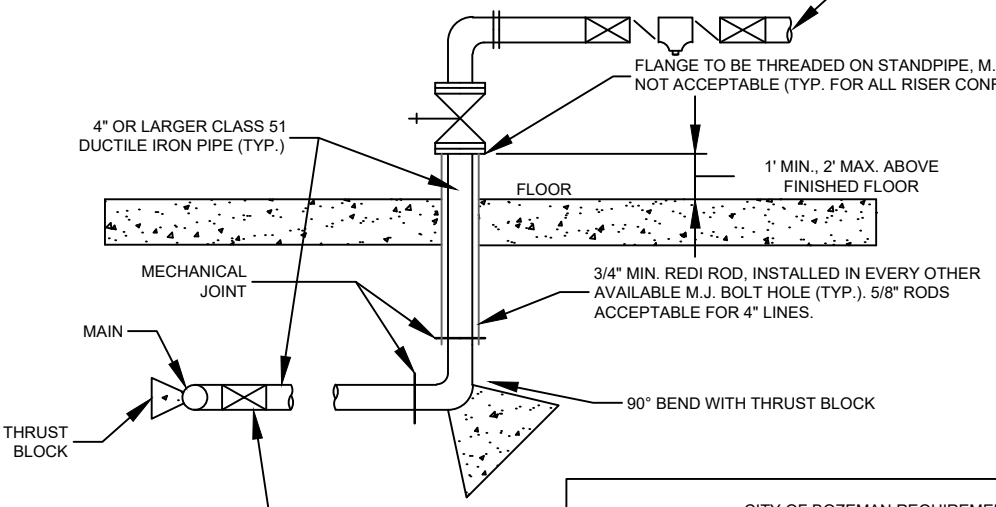
* PER NPPA-24 FIG. A.10.6.3.1.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD FIRE SERVICE FOR CLASS I, II, & III SYSTEMS	NO. 02660-12 FEB. 2024

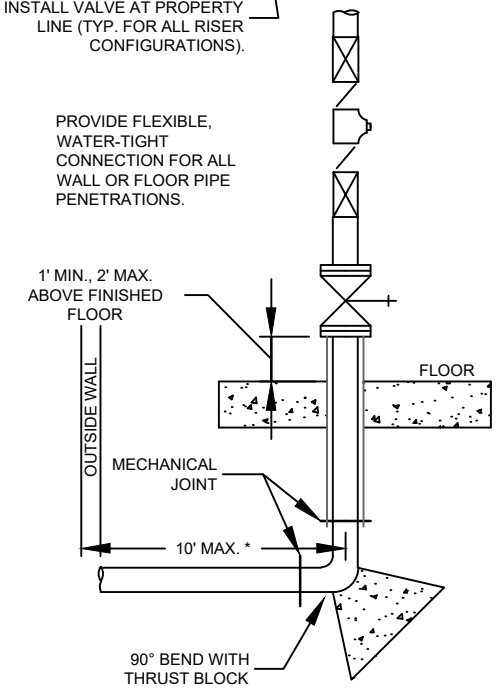
ONLY FITTINGS ALLOWED BETWEEN FIRST OS&Y VALVE AND BACKFLOW ASSEMBLY TO BE 90° BEND.

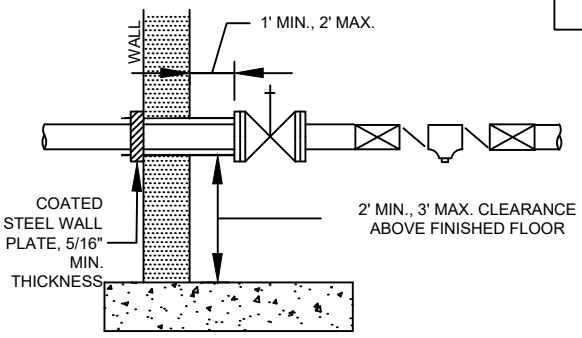
NO PRESSURE GAUGES OR PRESSURE GAUGE FITTINGS WILL BE ALLOWED ON THE TEST PORTS OF ANY BACKFLOW ASSEMBLY.



LEGEND

- FLANGED OS&Y VALVE
- REDUCED-PRESSURE BACKFLOW PREVENTION ASSEMBLY (MIN. REQUIREMENT) AS INDICATED ON APPROVED PLAN(S)





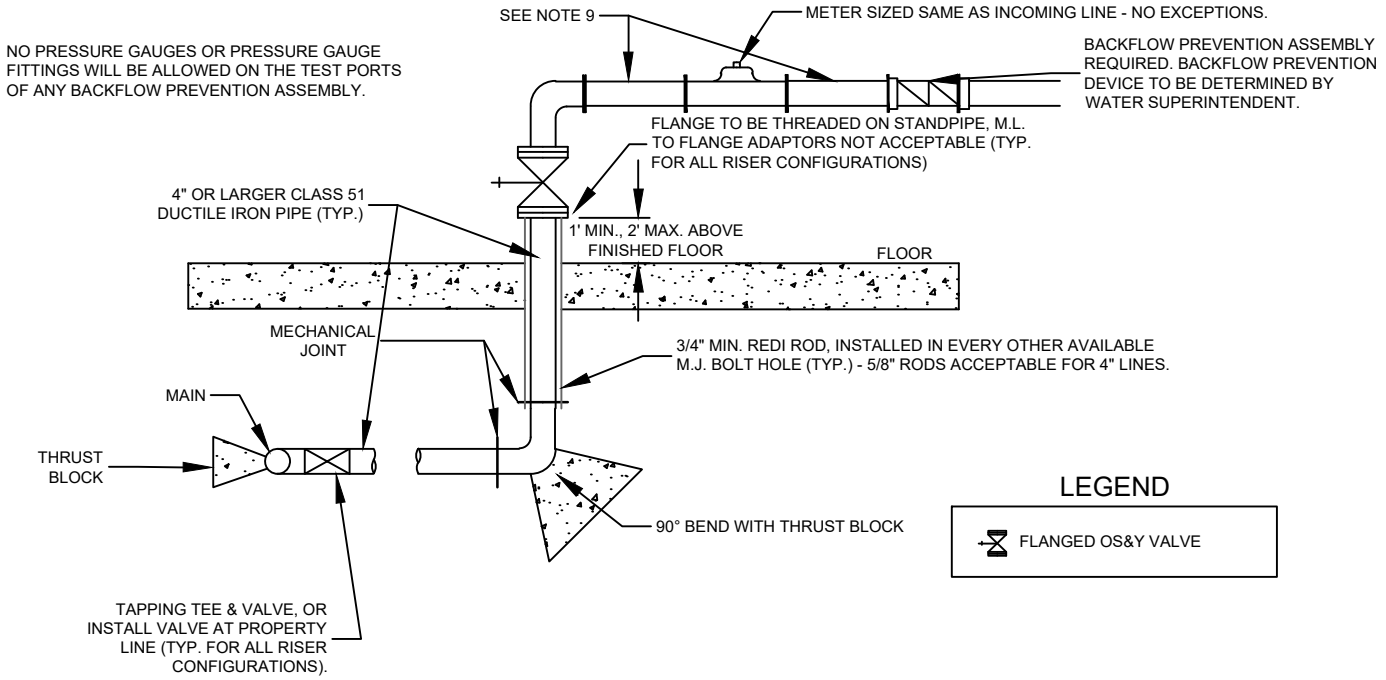
CITY OF BOZEMAN REQUIREMENTS FOR INSTALLATION OF REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY

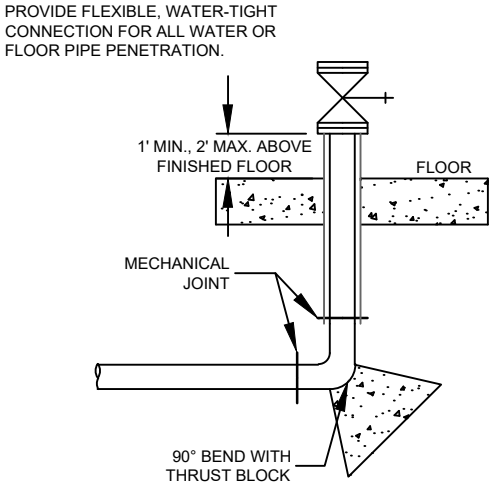
1. THE FIRST FITTING INSIDE OF THE BUILDING SHALL BE A UL-LISTED FLANGED KENNEDY OR MUELLER OS&Y VALVE THE SAME SIZE AS THE FIRE SERVICE LINE.
2. ALL REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLIES SHALL BE:
   A. UL OR FM LISTED
   B. APPROVED BY THE UNIVERSITY OF SOUTHERN CALIFORNIA FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH (USCFCCCHR) FOR OPERATION IN THE PROPOSED POSITION (VERTICAL OR HORIZONTAL) AS SHOWN ON APPROVED PLANS.
   C. INSTALLED AS SHOWN ON THE APPROVED PLANS.
3. A FLOW DETECTION DEVICE SHALL BE INSTALLED IMMEDIATELY FOLLOWING THE REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY (ALARM CHECK VALVE, FLOW SENSOR/ALARM, METER, ETC.) AS SHOWN ON THE APPROVED PLANS. PADDLE-TYPE FLOW ALARMS ARE NOT PERMITTED ON DRY SYSTEMS.
4. HORIZONTAL INSTALLATIONS MUST BE A MINIMUM OF 2' ABOVE THE FINISHED FLOOR.
5. THE FIRE SERVICE RISER MUST BE A MINIMUM OF 2' FROM ANY OUTSIDE WALL, AND A MINIMUM OF 1' FROM ANY INTERIOR WALL.
6. THE INCOMING FIRE SERVICE LINE SHALL BE A MINIMUM OF 6.5', AND A MAXIMUM OF 7.5' BELOW THE FINISHED GRADE.
7. ALL FIRE SERVICE LINE APPURTENANCES SHALL HAVE A MINIMUM PRESSURE RATING OF 175 PSI.
8. ALL FIRE SERVICE LINES 4" AND LARGER SHALL BE CLASS 51 DUCTILE IRON PIPE.
9. LINE SIZING: THE REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY SHALL BE EQUAL IN SIZE TO BOTH THE INCOMING PIPE DIAMETER (UPSTREAM) AND OUTGOING PIPE DIAMETER (DOWNSTREAM).
10. A DRAIN IS REQUIRED.

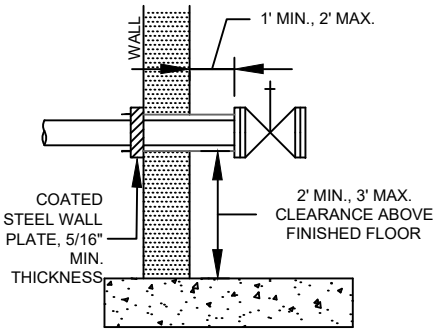
* PER NPPA-24 FIG. A.10.6.3.1.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD FIRE SERVICE FOR CLASS IV & V SYSTEMS	NO. 02660-13 FEB. 2024





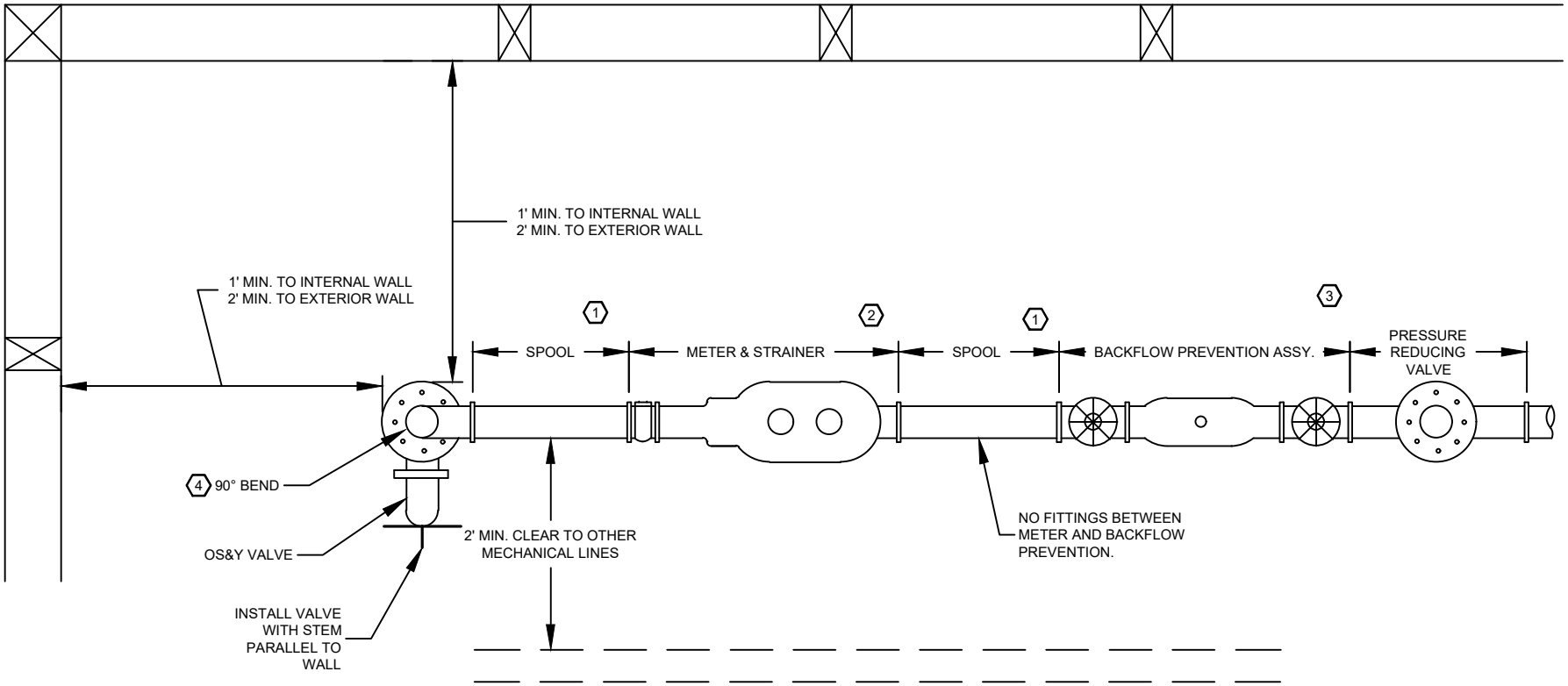


CITY OF BOZEMAN REQUIREMENTS FOR INSTALLATION OF BACKFLOW PREVENTION ASSEMBLY

1. THE FIRST FITTING INSIDE OF THE BUILDING SHALL BE A UL LISTED FLANGED KENNEDY OR MUELLER OS&Y VALVE THE SAME SIZE AS THE SERVICE LINE. COMBINATION STRAINER/METER IMMEDIATELY FOLLOWING OS&Y VALVE OR ELBOW ATTACHED DIRECTLY TO OS&Y VALVE -- METER MUST SET HORIZONTAL
2. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE:
   A. UL OR FM LISTED
   B. APPROVED BY THE UNIVERSITY OF SOUTHERN CALIFORNIA FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH (USCFCCCHR) FOR OPERATION IN THE PROPOSED POSITION (VERTICAL OR HORIZONTAL) AS SHOWN ON APPROVED PLANS.
   C. INSTALLED AS SHOWN ON THE APPROVED PLANS.
3. HORIZONTAL INSTALLATIONS MUST BE A MINIMUM OF 2' AND A MAXIMUM OF 3' ABOVE THE FINISHED FLOOR.
4. THE SERVICE RISER MUST BE A MINIMUM OF 2' FROM ANY OUTSIDE WALL.
5. THE INCOMING SERVICE LINE SHALL BE A MINIMUM 6.5', AND A MAXIMUM OF 7.5' BELOW THE FINISHED GRADE.
6. ALL SERVICE LINE APPURTENANCES SHALL BE A MINIMUM PRESSURE RATING OF 175 PSI.
7. ALL SERVICE LINES 4" AND LARGER SHALL BE CLASS 51 DUCTILE IRON PIPE.
8. LINE SIZING: THE BACKFLOW PREVENTION ASSEMBLY AND METER SHALL BE EQUAL IN SIZE TO BOTH THE INCOMING PIPE DIAMETER (UPSTREAM) AND OUTGOING PIPE DIAMETER (DOWNSTREAM). FOR EXAMPLE, A 4" SERVICE LINE SHALL HAVE A 4" METER AND BACKFLOW PREVENTION ASSEMBLY.
9. MAINTAIN MINIMUM STRAIGHT RUN PIPE UPSTREAM AND DOWNSTREAM OF METER / STRAINER ASSEMBLY IN ACCORDANCE WITH METER MANUFACTURER SPECIFICATIONS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DOMESTIC WATER SERVICE, 4" AND LARGER (PROFILE)	NO. 02660-14A FEB. 2024



PLAN VIEW

GENERAL NOTE:

1. ALL PIPE SHALL BE DUCTILE IRON UP TO PRESSURE REDUCING VALVE.

KEY NOTES:

(1) MAINTAIN MINIMUM STRAIGHT RUN PIPE.UPSTREAM AND DOWNSTREAM OF METER / STRAINER ASSEMBLY IN ACCORDANCE WITH METER MANUFACTURER SPECIFICATIONS.

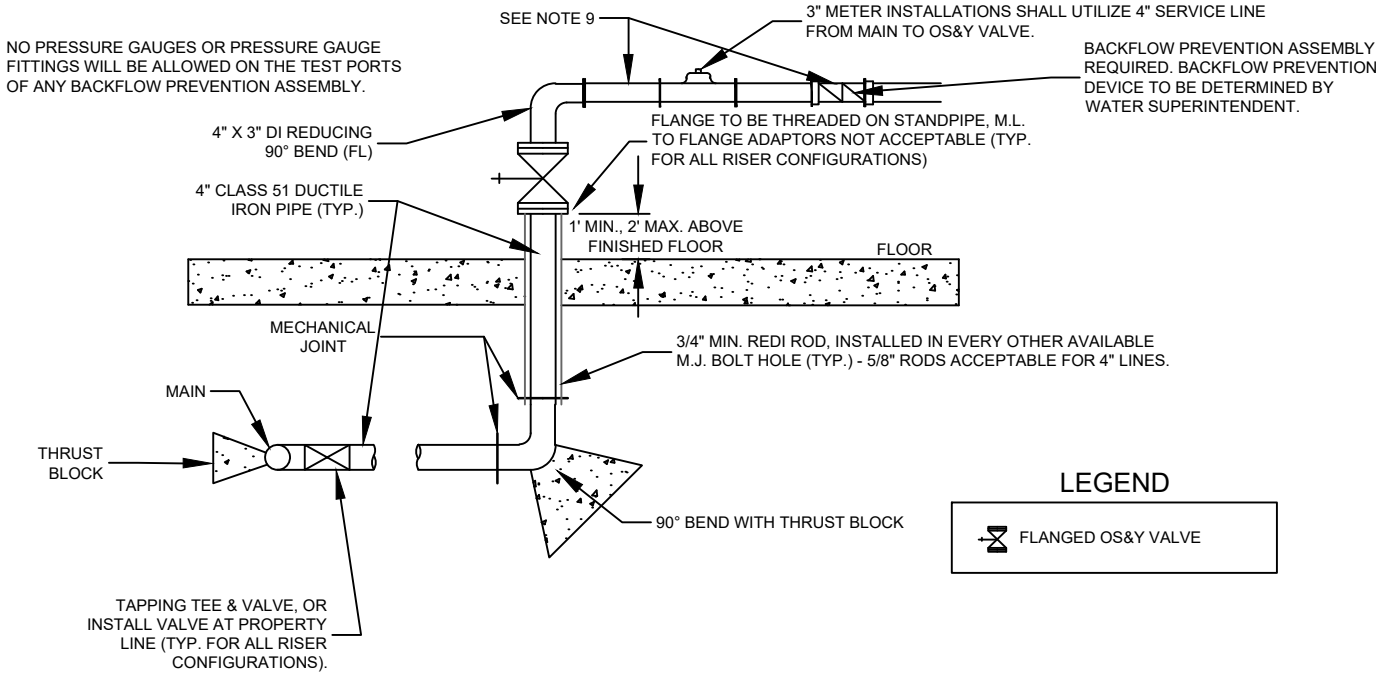
(2) METER MUST BE INSTALLED. HORIZONTAL STRAINER IS REQUIRED.

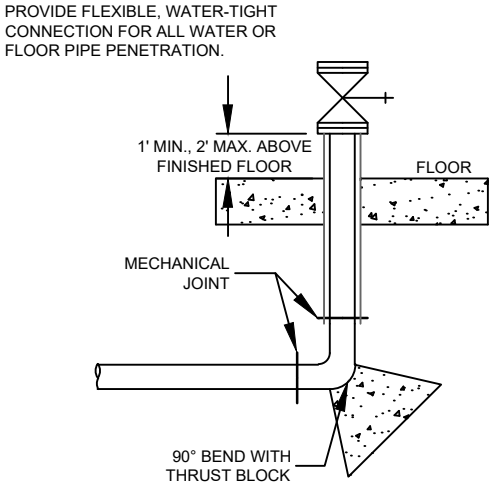
(3) BACKFLOW PREVENTION ASSEMBLIES MUST BE UL OR FM LISTED AND APPROVED BY USCFCCCHR.

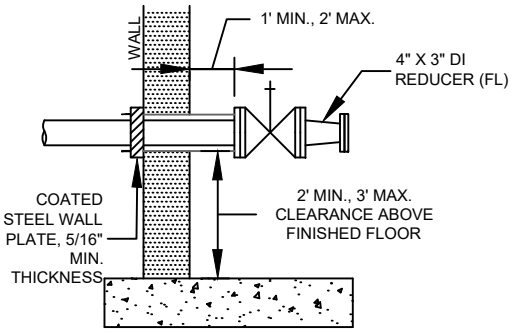
(4) FOR 3" METER INSTALLATIONS, USE 4" X 3" DI REDUCING 90° BEND. SERVICE LINE SHALL BE 4" FROM MAIN TO OS&Y VALVE.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DOMESTIC WATER SERVICE (PLAN)	NO. 02660-14B FEB. 2024





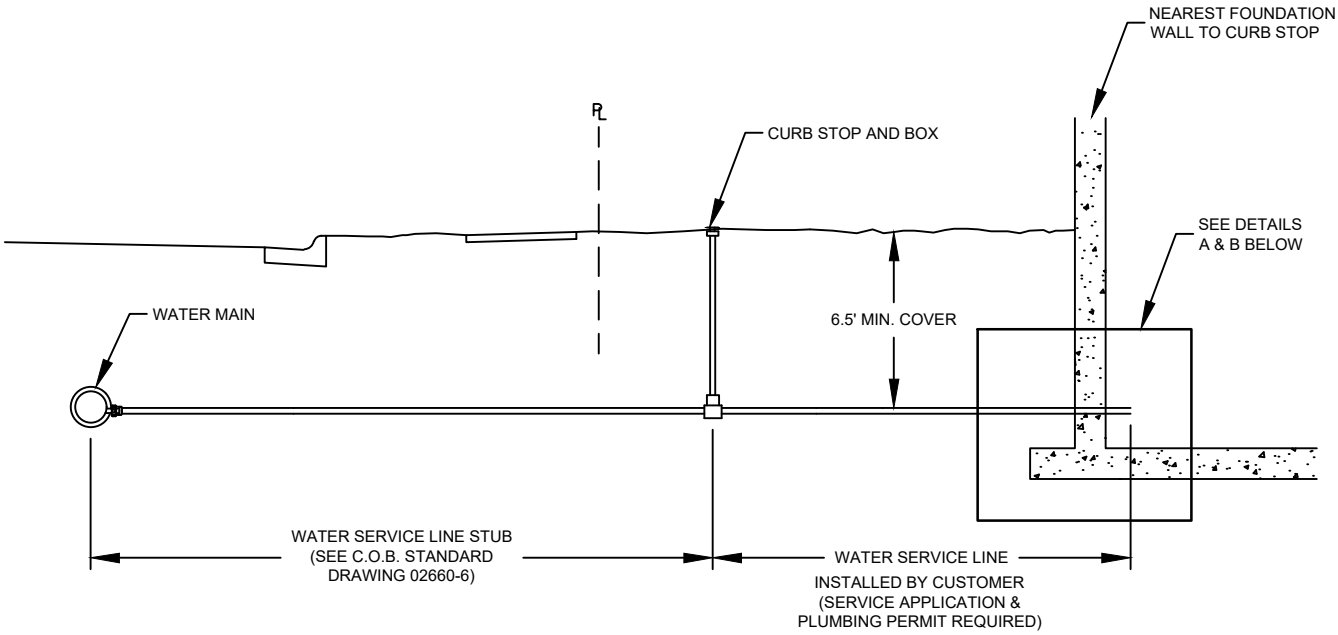


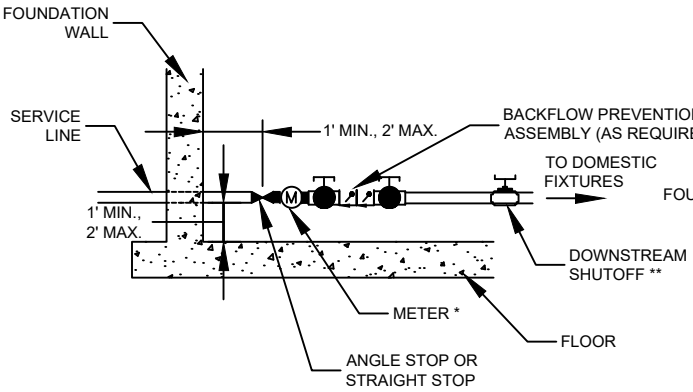
CITY OF BOZEMAN REQUIREMENTS FOR INSTALLATION OF BACKFLOW PREVENTION ASSEMBLY

1. THE FIRST FITTING INSIDE OF THE BUILDING SHALL BE A UL LISTED FLANGED KENNEDY OR MUELLER OS&Y VALVE THE SAME SIZE AS THE SERVICE LINE. COMBINATION STRAINER/METER IMMEDIATELY FOLLOWING OS&Y VALVE OR ELBOW ATTACHED DIRECTLY TO OS&Y VALVE -- METER MUST SET HORIZONTAL
2. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE:
   A. UL OR FM LISTED
   B. APPROVED BY THE UNIVERSITY OF SOUTHERN CALIFORNIA FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH (USCFCCCHR) FOR OPERATION IN THE PROPOSED POSITION (VERTICAL OR HORIZONTAL) AS SHOWN ON APPROVED PLANS.
   C. INSTALLED AS SHOWN ON THE APPROVED PLANS.
3. HORIZONTAL INSTALLATIONS MUST BE A MINIMUM OF 2' AND A MAXIMUM OF 3' ABOVE THE FINISHED FLOOR.
4. THE SERVICE RISER MUST BE A MINIMUM OF 2' FROM ANY OUTSIDE WALL.
5. THE INCOMING SERVICE LINE SHALL BE A MINIMUM 6.5', AND A MAXIMUM OF 7.5' BELOW THE FINISHED GRADE.
6. ALL SERVICE LINE APPURTENANCES SHALL BE A MINIMUM PRESSURE RATING OF 175 PSI.
7. ALL SERVICE LINES 4" AND LARGER SHALL BE CLASS 51 DUCTILE IRON PIPE.
8. LINE SIZING: THE BACKFLOW PREVENTION ASSEMBLY AND METER SHALL BE EQUAL IN SIZE TO BOTH THE INCOMING PIPE DIAMETER (UPSTREAM) AND OUTGOING PIPE DIAMETER (DOWNSTREAM). FOR EXAMPLE, A 4" SERVICE LINE SHALL HAVE A 4" METER AND BACKFLOW PREVENTION ASSEMBLY.
9. A MINIMUM OF FOUR (4) PIPE DIAMETERS OF STRAIGHT RUN PIPE IS REQUIRED UPSTREAM AND DOWNSTREAM OF THE METER/STRAINER ASSEMBLY.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DOMESTIC WATER SERVICE, 3" METER (PROFILE)	NO. 02660-14C MAY. 2024





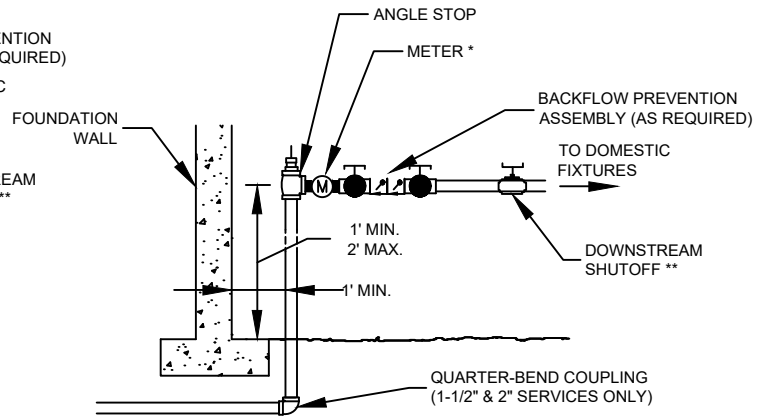
*METER SAME SIZE AS INCOMING LINE - NO EXCEPTIONS. METER MUST CONNECT DIRECTLY TO ANGLE OR STRAIGHT STOP AND BACKFLOW DEVICE.

**DOWNSTREAM SHUT OFF VALVE MUST BE SEPARATE FROM BACKFLOW DEVICE.

DETAIL A

TYPICAL WALL PENETRATION (N.T.S)

NOTE: METER SIZED SAME AS INCOMING LINE - NO EXCEPTIONS.



DETAIL B

TYPICAL FLOOR PENETRATION (N.T.S)
(CRAWL SPACE)

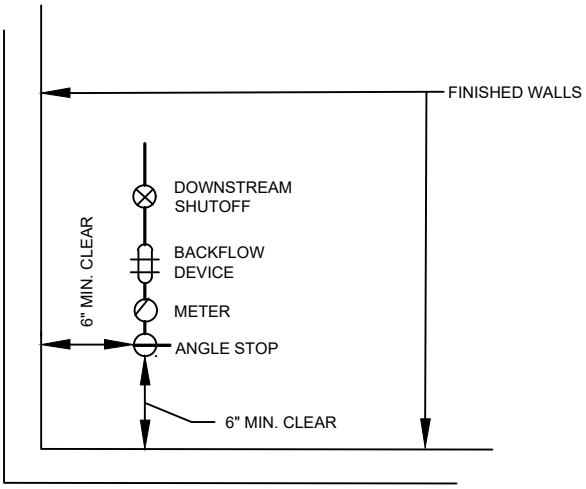
NOTES:

1. WATER SERVICE LINE INSTALLATIONS SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF BOZEMAN WATER SUPERINTENDENT.
2. SERVICE LINES SHALL BE TYPE K COPPER FOR 3/4", 1", 1 1/2", AND 2" SERVICES. SEE STANDARD DRAWING NO. 02660-14A AND 14B FOR 4" AND LARGER DOMESTIC SERVICE LINES. SERVICE LINES BETWEEN 2" AND 4" ARE NOT ALLOWED.
3. STRAIGHT COPPER TUBING SHALL BE USED FOR 1 1/2" AND 2" SERVICES.
4. SERVICE LINES SHALL BE BEDDED 3" UNDER AND OVER THE PIPE WITH SAND. NATIVE MATERIAL MAY BE USED AS BEDDING IF IT CONFORMS TO THE REQUIREMENTS OF MONTANA PUBLIC WORKS STANDARD DRAWING 02221-2 AND DOES NOT CONTAIN ANY MATERIAL LARGER THAN 3/4".
5. PROVIDE FLEXIBLE, WATER TIGHT CONNECTION FOR ALL WALL OR FLOOR PIPE PENETRATIONS.
6. METERS SHALL BE INSTALLED BY THE CITY WATER DEPARTMENT AT CUSTOMERS' EXPENSE.
7. NO SERVICE LINE SHALL BE BACKFILLED UNTIL IT HAS BEEN INSPECTED AND APPROVED BY THE WATER DEPARTMENT.
8. CONTACT CITY OF BOZEMAN WATER DEPARTMENT FOR APPROVED LIST OF COPPER CONNECTIONS.
9. WATER SERVICE LINE MAY BE REDUCED TO A SMALLER SIZE THAN THE WATER SERVICE STUB. REDUCTION MUST BE MADE WITHIN 18" OF CURB STOP.
10. METER, BACKFLOW PROTECTION, AND INCOMING SERVICE LINE MUST ALL BE THE SAME SIZE.
11. IF TYPICAL CURB BOX LOCATIONS CANNOT BE MET (I.e. 8 FT SETBACK BEHIND PROPERTY LINE TO ACCOMMODATE DRY UTILITIES), ALTERNATE CRITERIA MAY BE APPLIED UPON APPROVAL OF THE CITY ENGINEERING DIVISION. THE FOLLOWING CONDITIONS SHOULD BE MET:

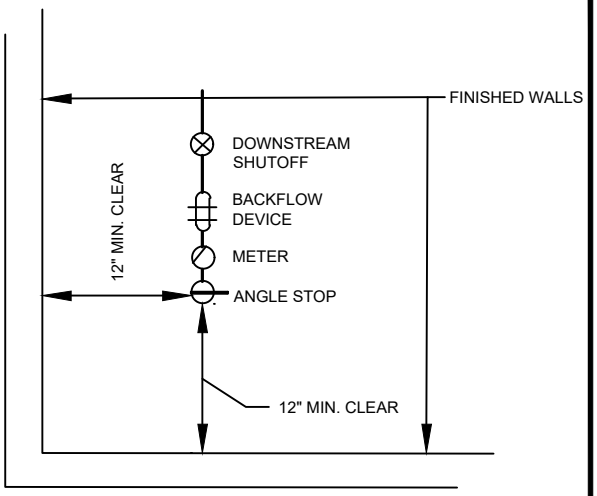
- CURB BOXES ARE PREFERABLY LOCATED ON OR NEAR THE PROPERTY OR EASEMENT LINE.
- SUITABLE LOCATIONS ARE PROVIDED FOR DRY UTILITIES THAT DO NOT CONFLICT WITH CURB BOXES OR ABILITY TO CONNECT TO SERVICE STUBS IN FUTURE.
- CURB BOXES MUST BE A MINIMUM OF 3 FEET FROM ALL FOUNDATIONS AND STRUCTURES.
- CURB BOXES ARE ACCESSIBLE TO BE TURNED ON AND OFF AT ALL TIMES AND MUST NOT BE LOCATED IN PARKING AREAS.
- SERVICE STUBS FOR FUTURE CONNECTION MUST NOT BE LOCATED IN PAVED AREAS.
- ALL CURB STOPS LOCATED IN PAVEMENT SHALL HAVE A VALVE BOX RISER AROUND THE TOP OF THE CURB STOP.

DRAFT

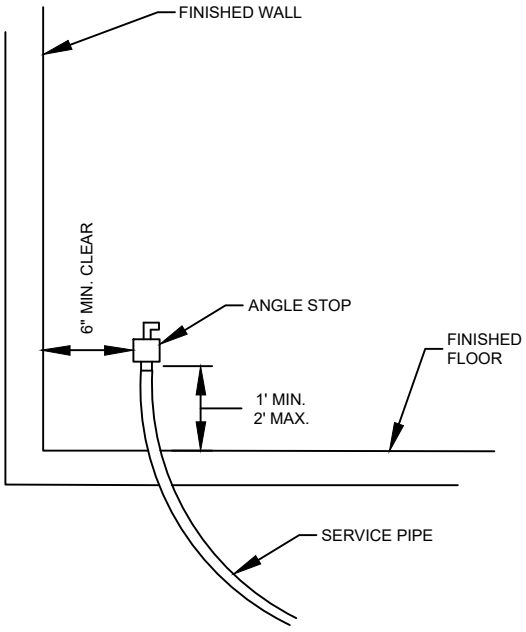
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DOMESTIC WATER SERVICE, 2" AND SMALLER (PROFILE)	NO. 02660-15A FEB. 2024



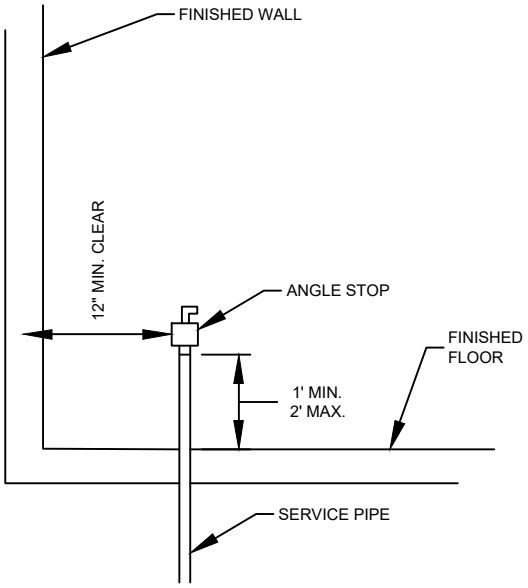
3/4" AND 1" COPPER SERVICES
PLAN VIEW



1 1/2" AND 2" COPPER SERVICES
PLAN VIEW



3/4" AND 1" COPPER SERVICES
PROFILE VIEW

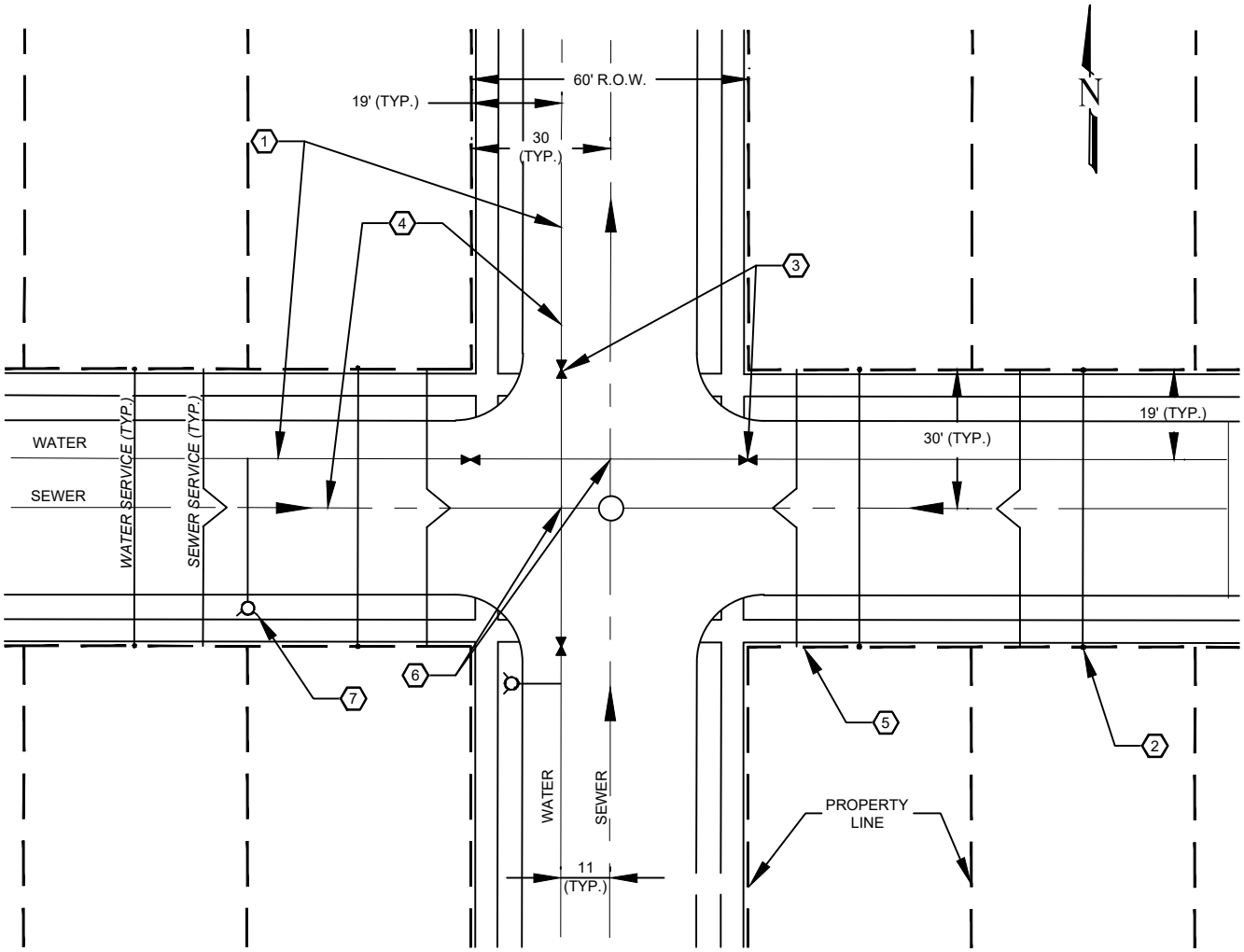


1-1/2 " AND 2" COPPER SERVICES
PROFILE VIEW

NOTE:
1. PROVIDE FLEXIBLE, WATER-TIGHT SEAL FOR ALL FLOOR PENETRATIONS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DOMESTIC WATER SERVICE, 2" AND SMALLER (PLAN)	NO. 02660-15B FEB. 2024

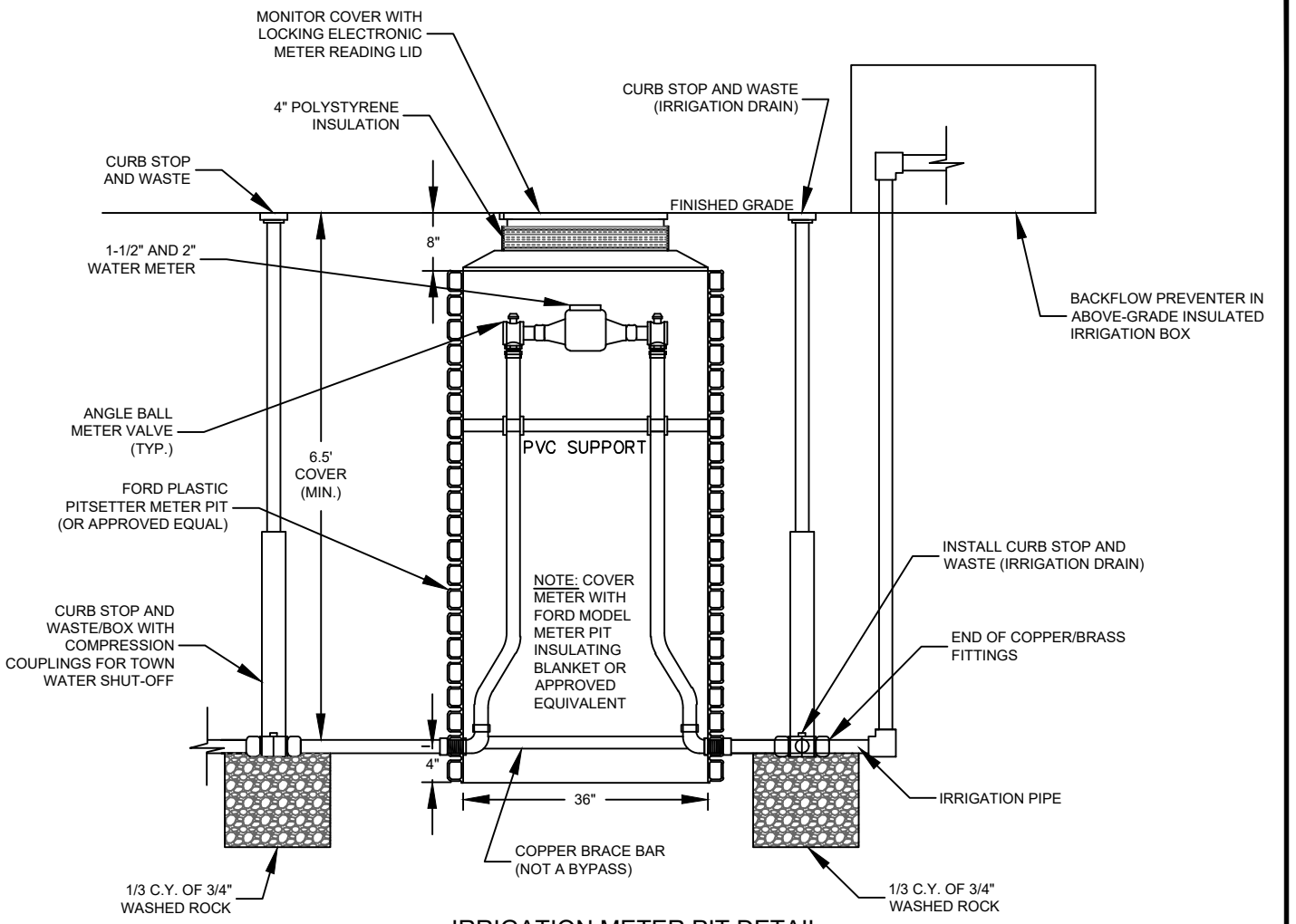


KEYNOTES:

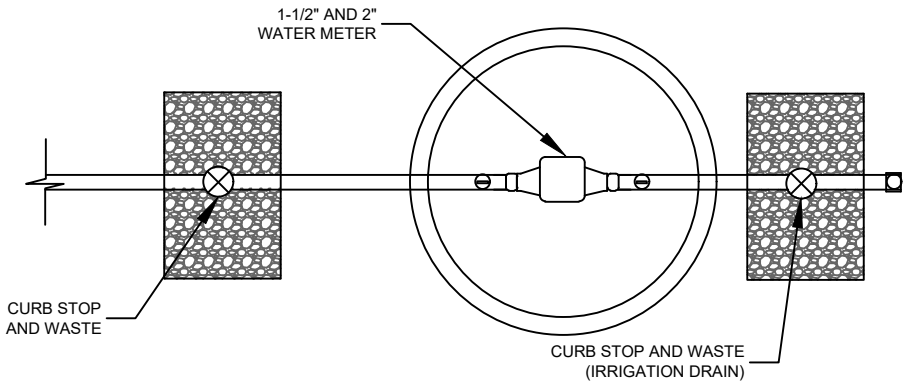
1. WATER MAINS LOCATED 19' FROM THE NORTH OR WEST RIGHT-OF-WAY PROPERTY LINE FOR STREETS 35' IN WIDTH OR GREATER. WATER MAINS LOCATED 5.5' WEST OR NORTH OF STREET CENTERLINE FOR STREETS LESS THAN 35' IN WIDTH (BACK OF CURB-BACK OF CURB).
2. WATER SERVICE STUB LOCATED AT CENTER OF LOT; SEE C.O.B. STANDARD DRAWING NO. 02660-6 FOR DETAILS.
3. WATER MAIN VALVES LOCATED AT PROPERTY LINE.
4. SEWER MAINS LOCATED ON STREET CENTERLINE FOR STREETS 35' IN WIDTH OR GREATER. SEWER MAINS LOCATED 5.5' EAST OR SOUTH OF STREET CENTERLINE FOR STREETS LESS THAN 35' IN WIDTH.
5. SEWER SERVICE STUB LOCATED 15' UPSTREAM FROM DOWNSTREAM PROPERTY LINE.
6. WATER & SEWER MAIN CROSSING; SEE M.P.W. STANDARD DRAWING NO. 02660-2 FOR DETAILS.
7. HYDRANTS LOCATED 5' FROM VALVE OR ON PROPERTY LINES EXTENDED FOR MID-BLOCK LOCATIONS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER AND SEWER LOCATION STANDARDS	NO. 02660-16 FEB. 2024



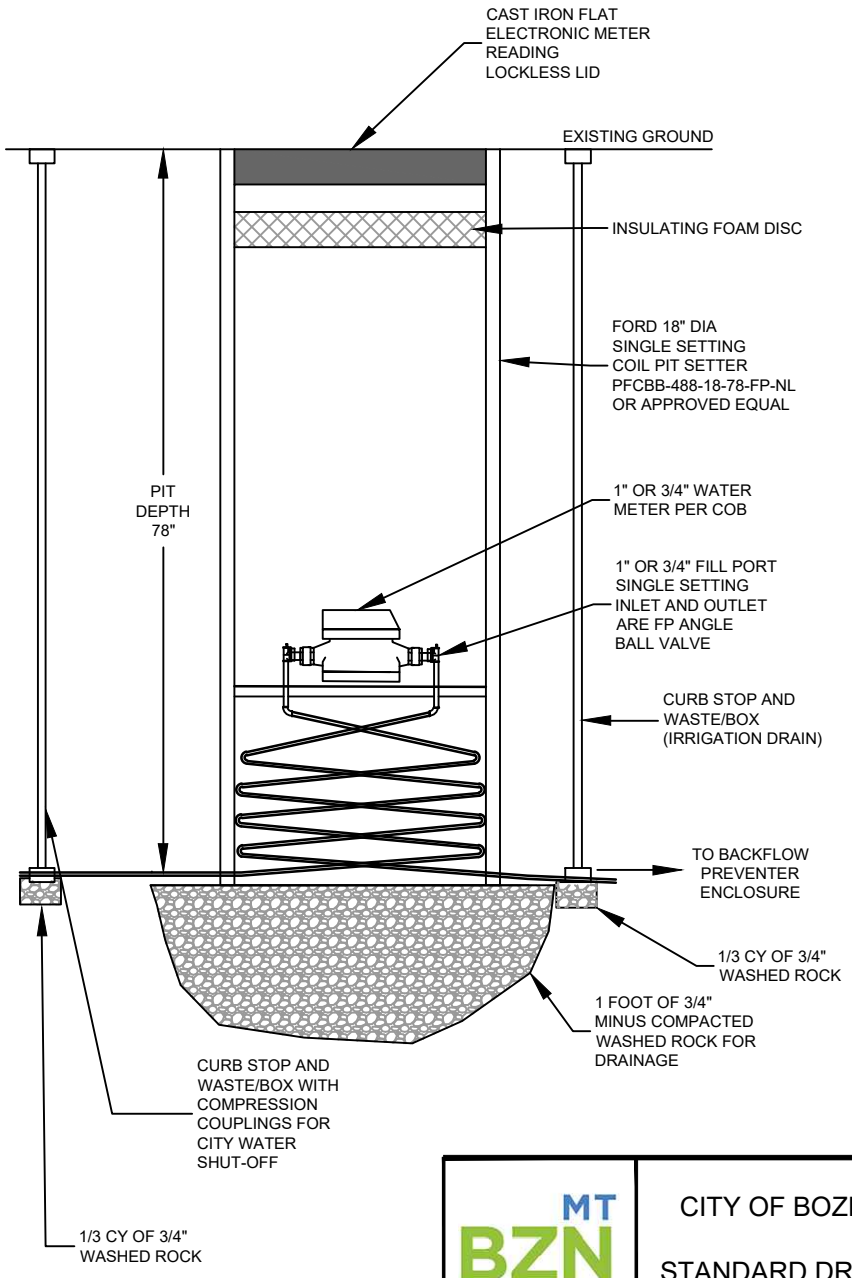
IRRIGATION METER PIT DETAIL

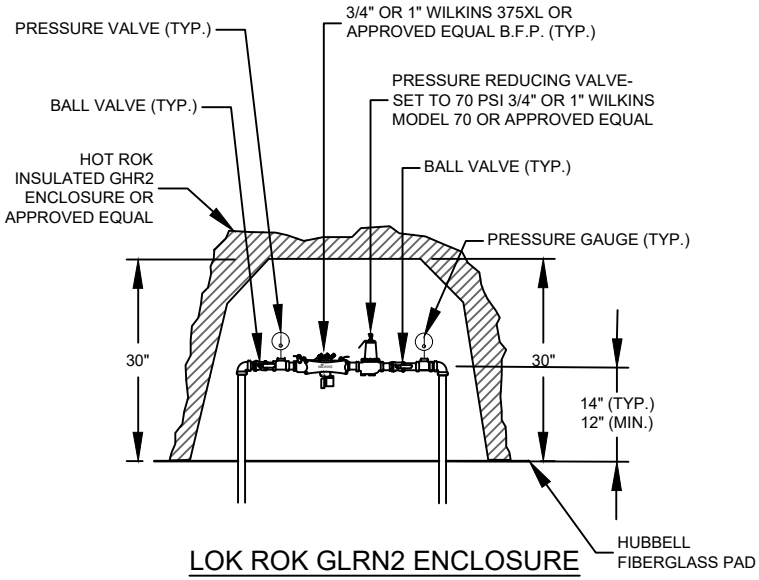


IRRIGATION METER PIT DETAIL - PLAN VIEW

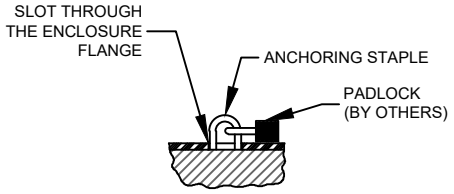
DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	IRRIGATION METER PIT, 1-½" AND 2" SERVICES	NO. 02660-17 FEB. 2024



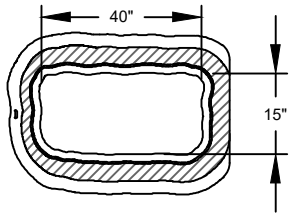


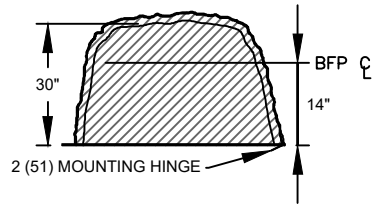
LOK ROK GLRN2 ENCLOSURE



LOCKING DETAIL

LIFT OFF STYLE (2 PLACES)
HINGED STYLE (1 PLACE)

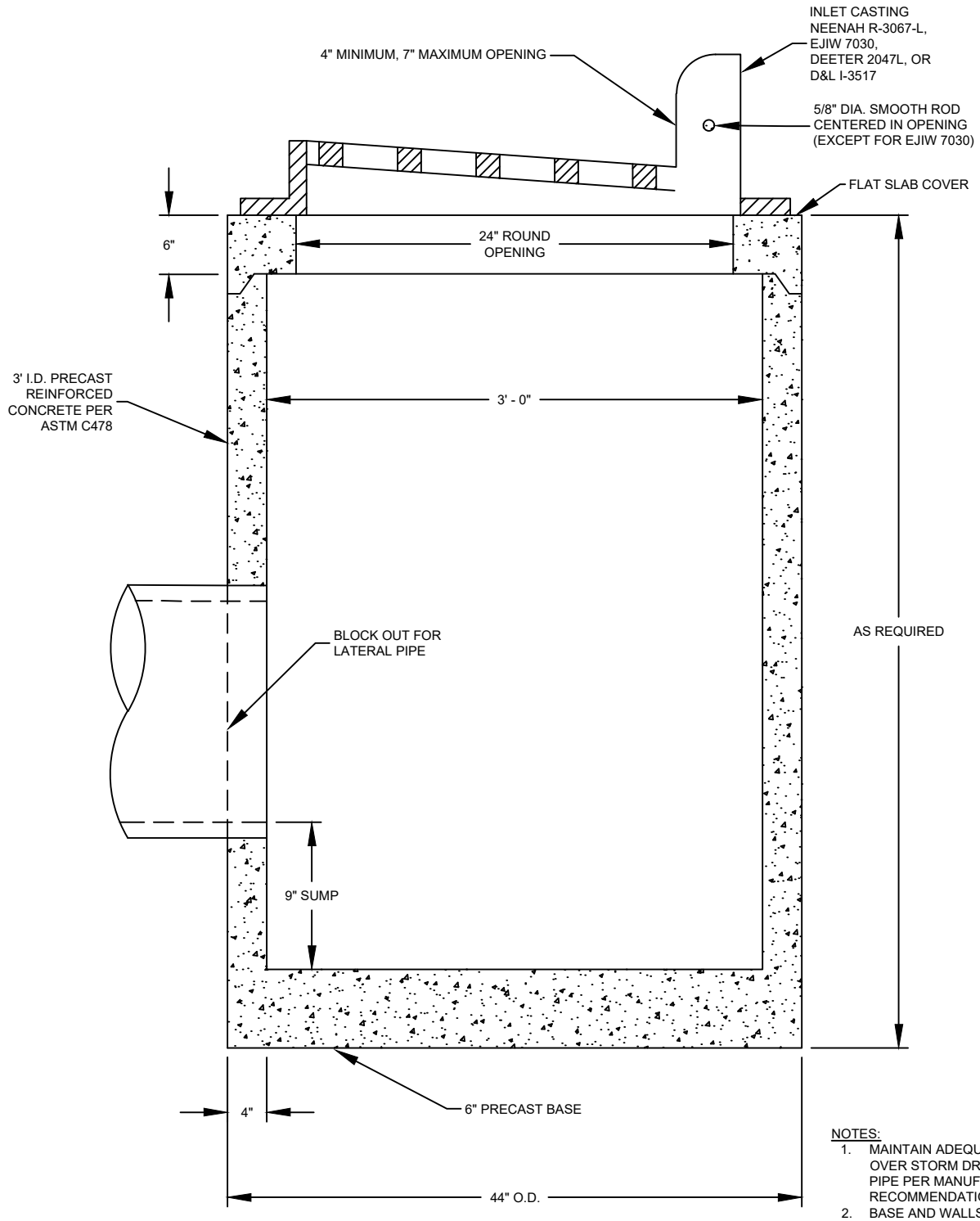




HINGED STYLE

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	IRRIGATION METER PIT, $\frac{3}{4}$" AND 1" SERVICES	NO. 02660-18 FEB. 2024

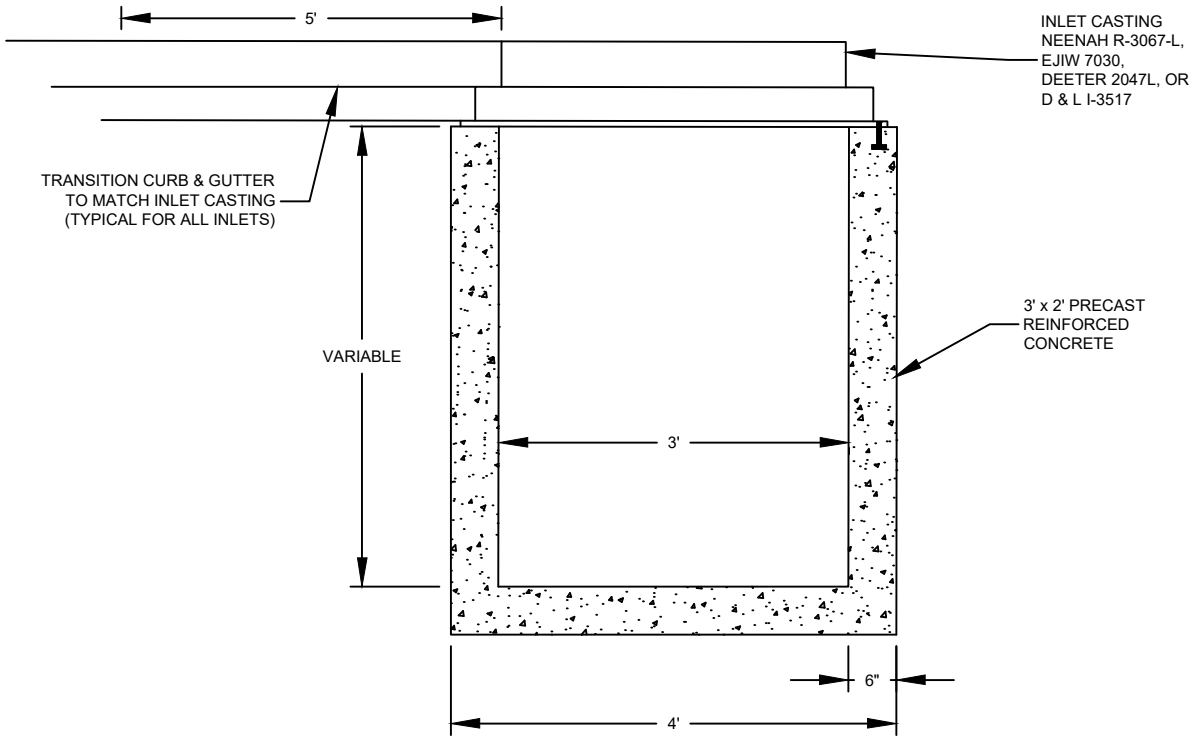


NOTES:

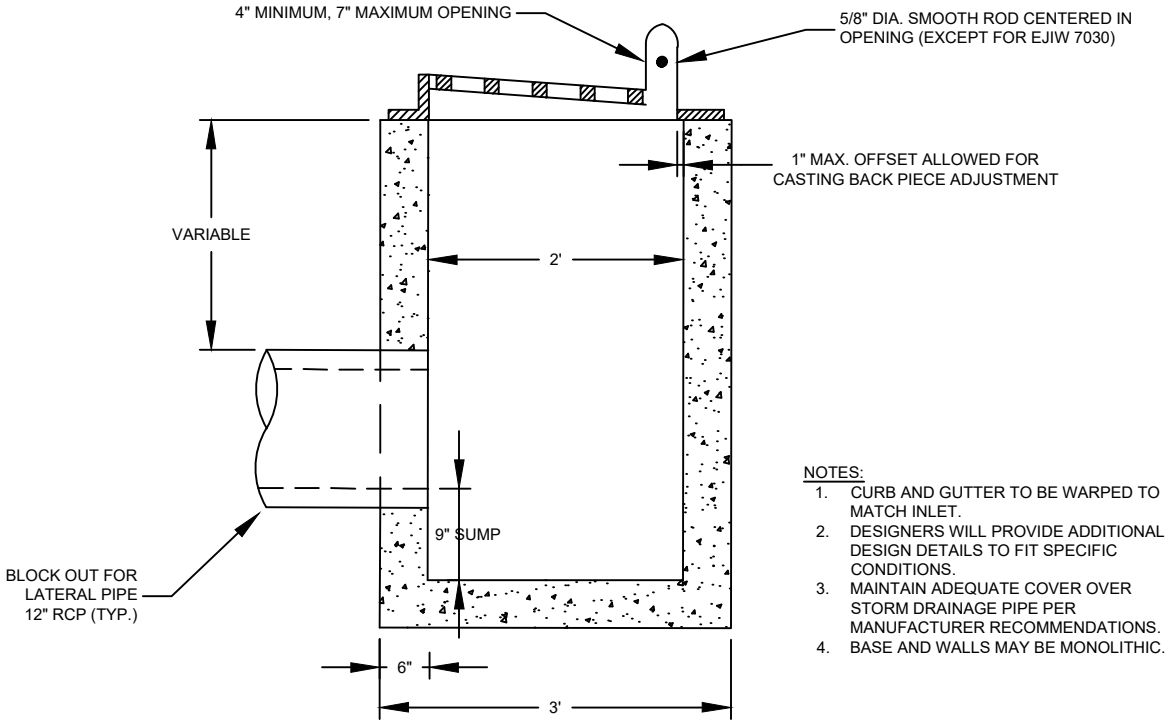
1. MAINTAIN ADEQUATE COVER OVER STORM DRAINAGE PIPE PER MANUFACTURER RECOMMENDATIONS.
2. BASE AND WALLS MAY BE MONOLITHIC.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	36" STANDARD STORM DRAIN INLET	NO. 02720-1A FEB. 2024



FRONT VIEW



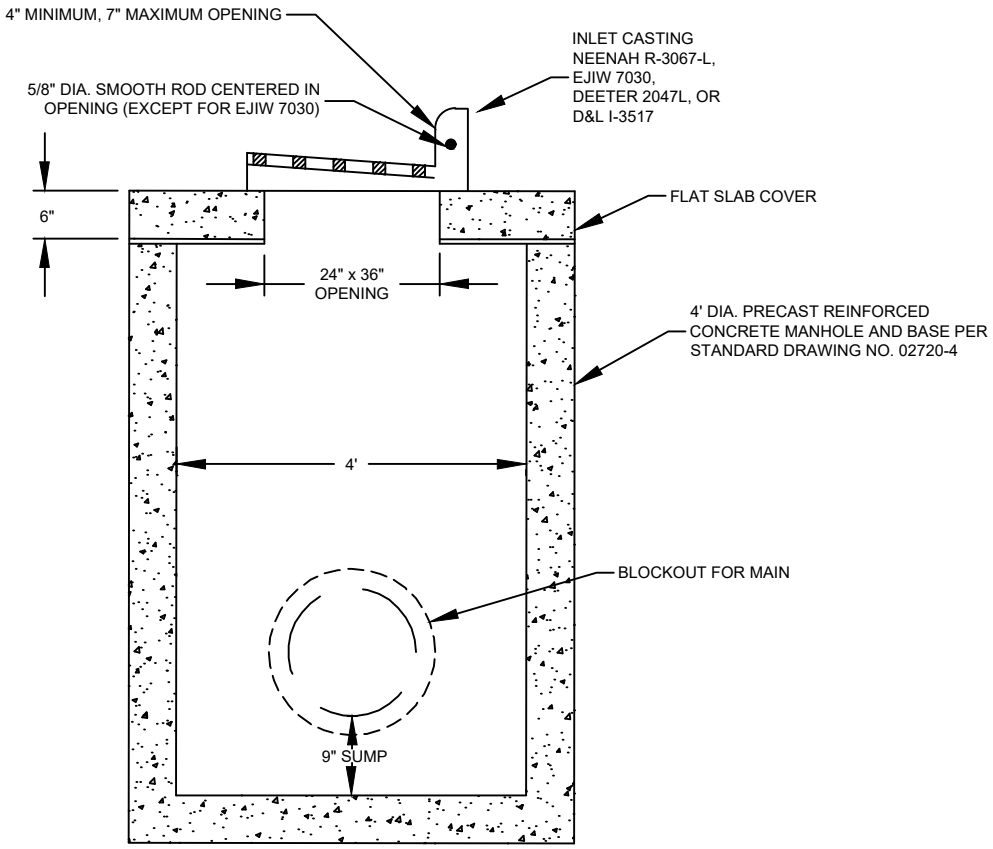
NOTES:

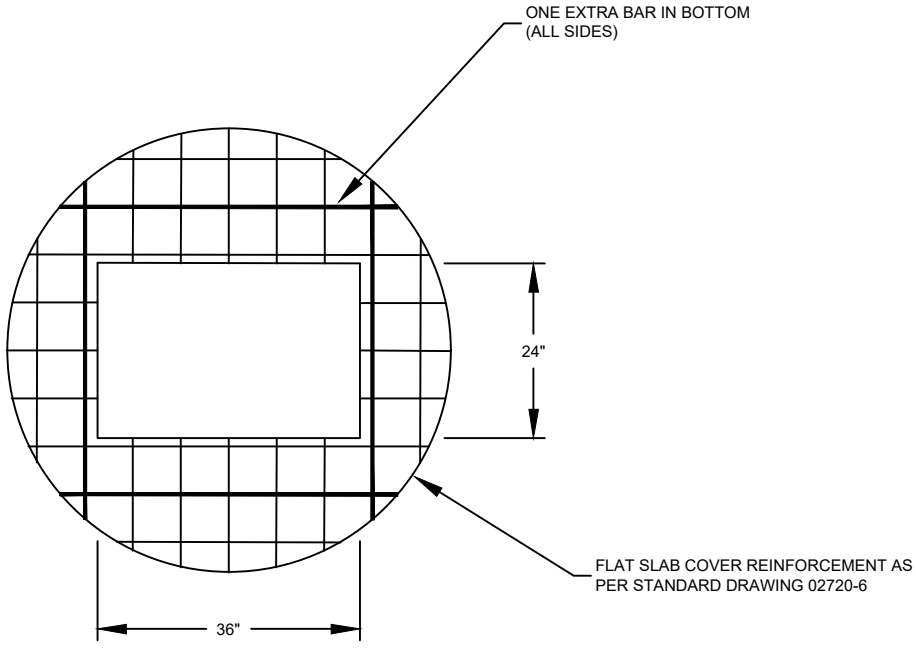
1. CURB AND GUTTER TO BE WARPED TO MATCH INLET.
2. DESIGNERS WILL PROVIDE ADDITIONAL DESIGN DETAILS TO FIT SPECIFIC CONDITIONS.
3. MAINTAIN ADEQUATE COVER OVER STORM DRAINAGE PIPE PER MANUFACTURER RECOMMENDATIONS.
4. BASE AND WALLS MAY BE MONOLITHIC.

SIDE VIEW

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD SQUARE STORM DRAIN INLET	NO. 02720-1B FEB. 2024



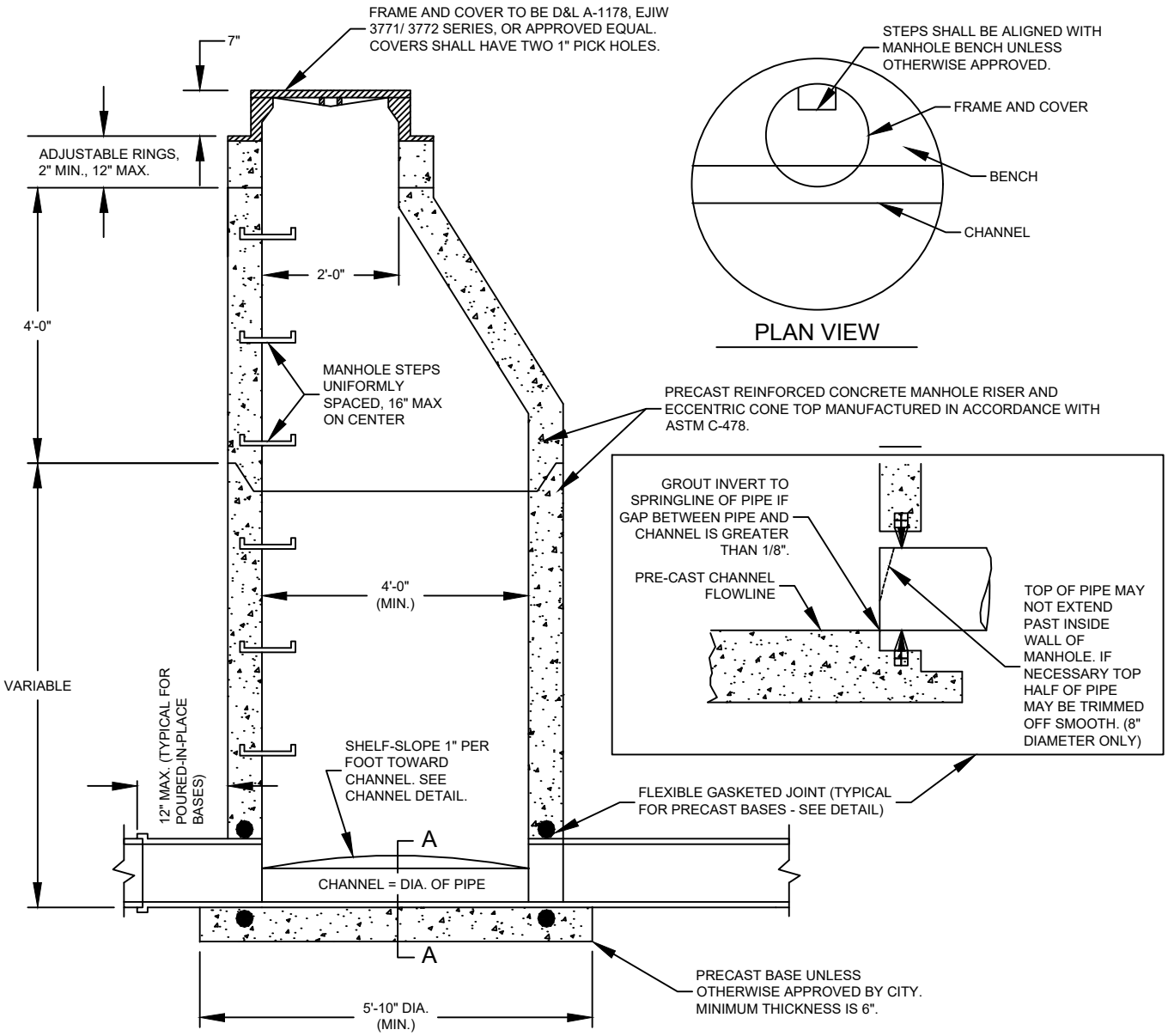


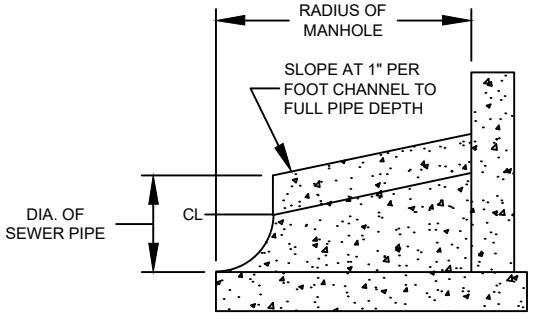
NOTES:

1. MAINTAIN ADEQUATE COVER OVER STORM DRAINAGE PIPE PER MANUFACTURER RECOMMENDATIONS.
2. BASE AND WALLS MAY BE MONOLITHIC.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	COMBINATION MANHOLE AND CURB INLET	NO. 02720-1C FEB. 2024





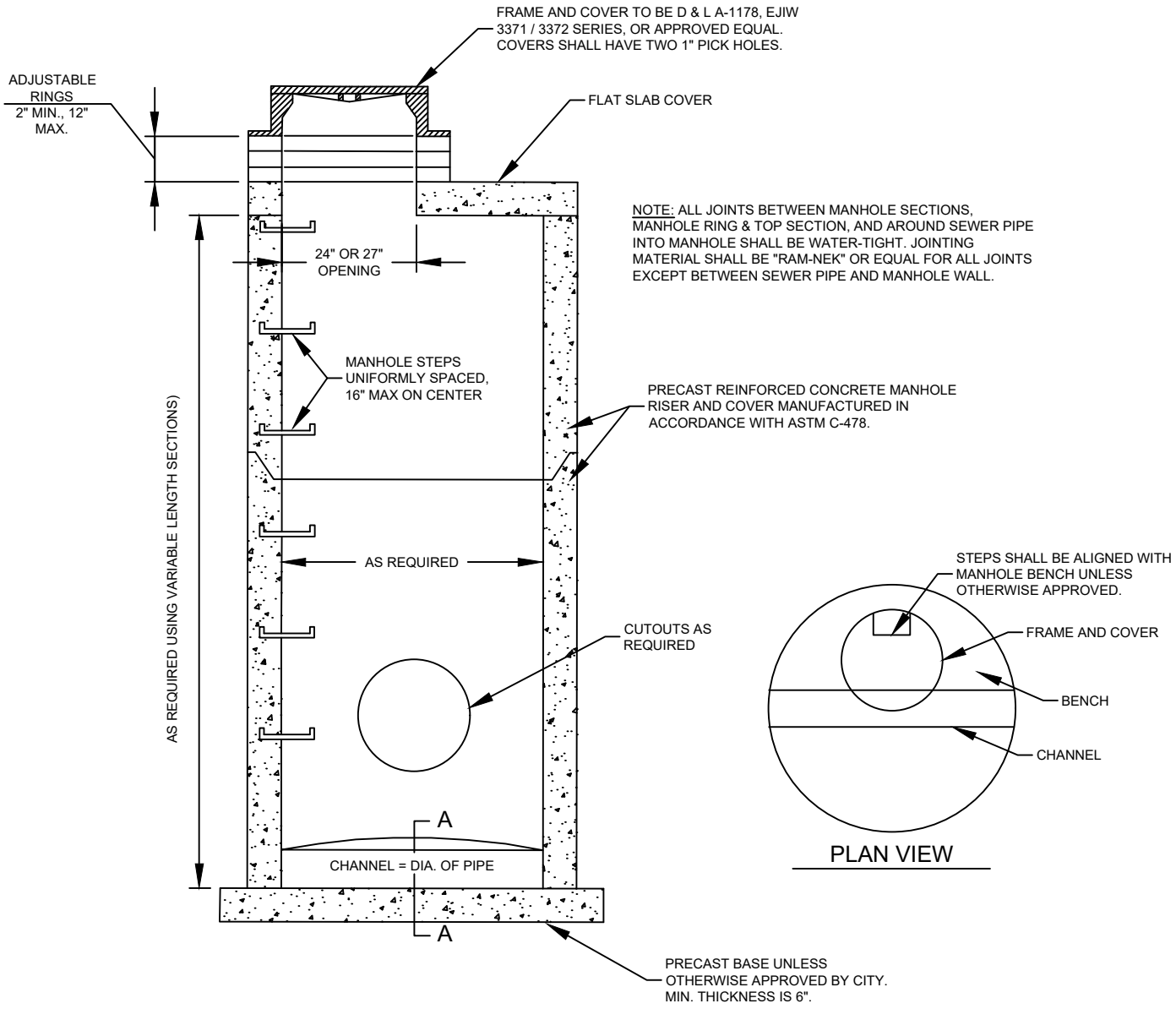
SECTION A - A

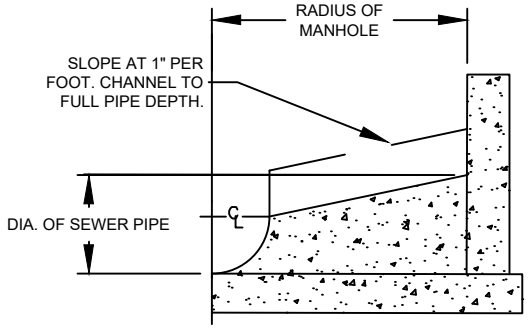
NOTES:

1. ALL JOINTS BETWEEN MANHOLE SECTIONS, MANHOLE RING & TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM-NEK" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE.
2. STORM DRAIN MANHOLES SHALL NOT HAVE FORMED CHANNELS AND THE LOWEST PIPE INVERT SHALL BE 9" HIGHER THAN BOTTOM OF MANHOLE.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SANITARY SEWER AND STORM DRAIN MANHOLE	NO. 02720-3 FEB. 2024





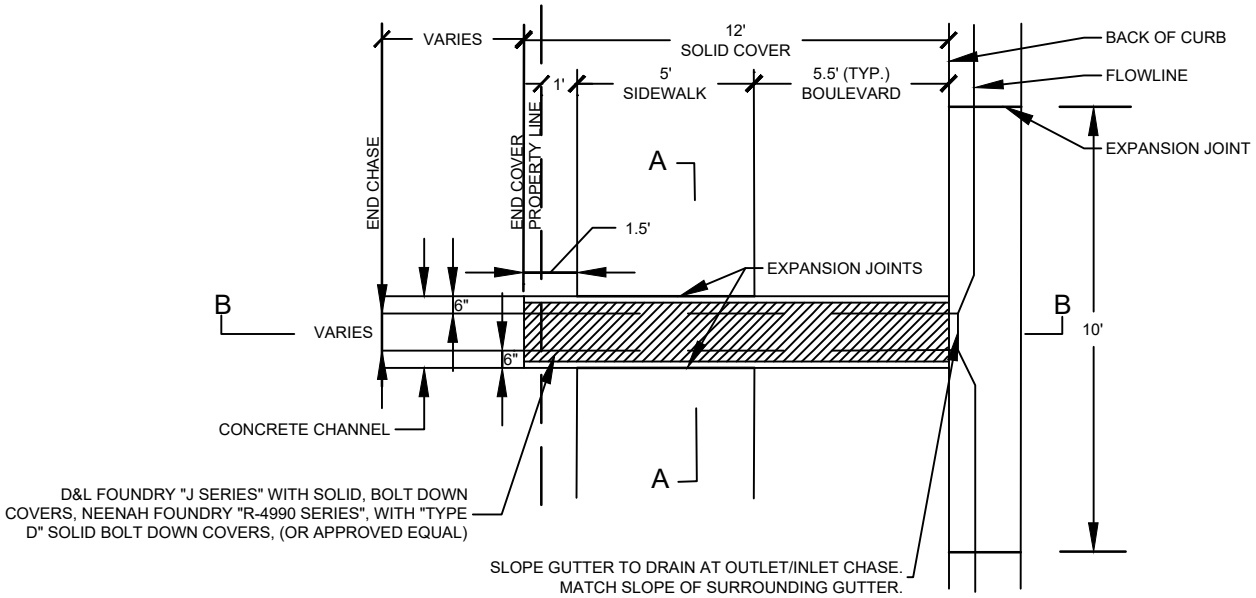
SECTION A - A

NOTES:

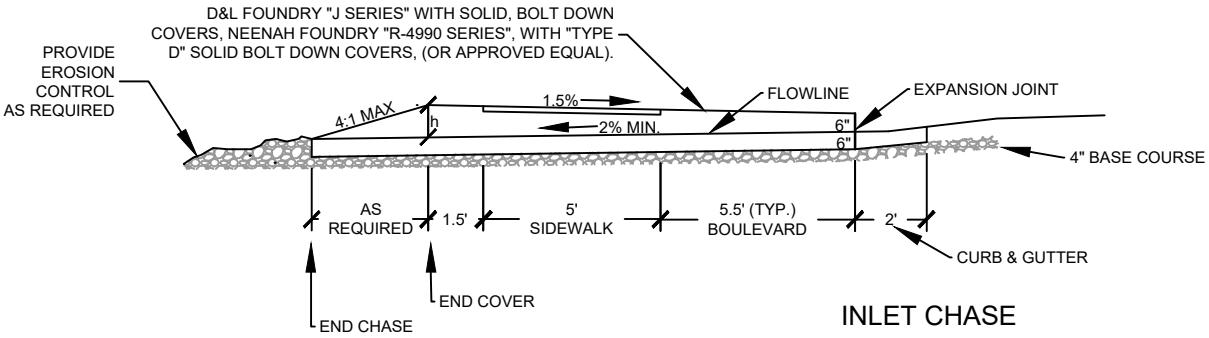
1. ALL JOINTS BETWEEN MANHOLE SECTIONS, MANHOLE RING & TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATER-TIGHT. JOINTING MATERIAL SHALL BE "RAM-NEK" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE WALL.
2. STORM DRAIN MANHOLES SHALL NOT HAVE FORMED CHANNELS AND THE LOWEST PIPE INVERT SHALL BE 9" HIGHER THAN BOTTOM OF MANHOLE.

DRAFT

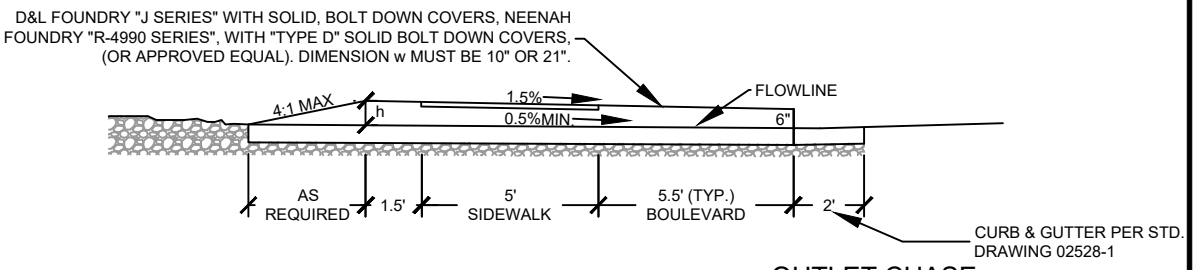
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD STRAIGHT MANHOLE	NO. 02720-4 FEB. 2024



PLAN VIEW - N.T.S.

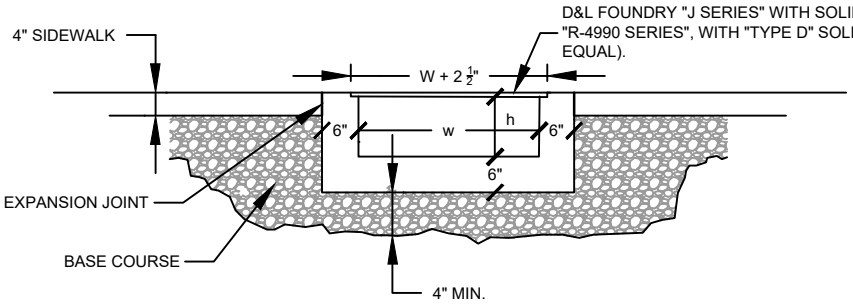


INLET CHASE



SECTION B - N.T.S.

OUTLET CHASE

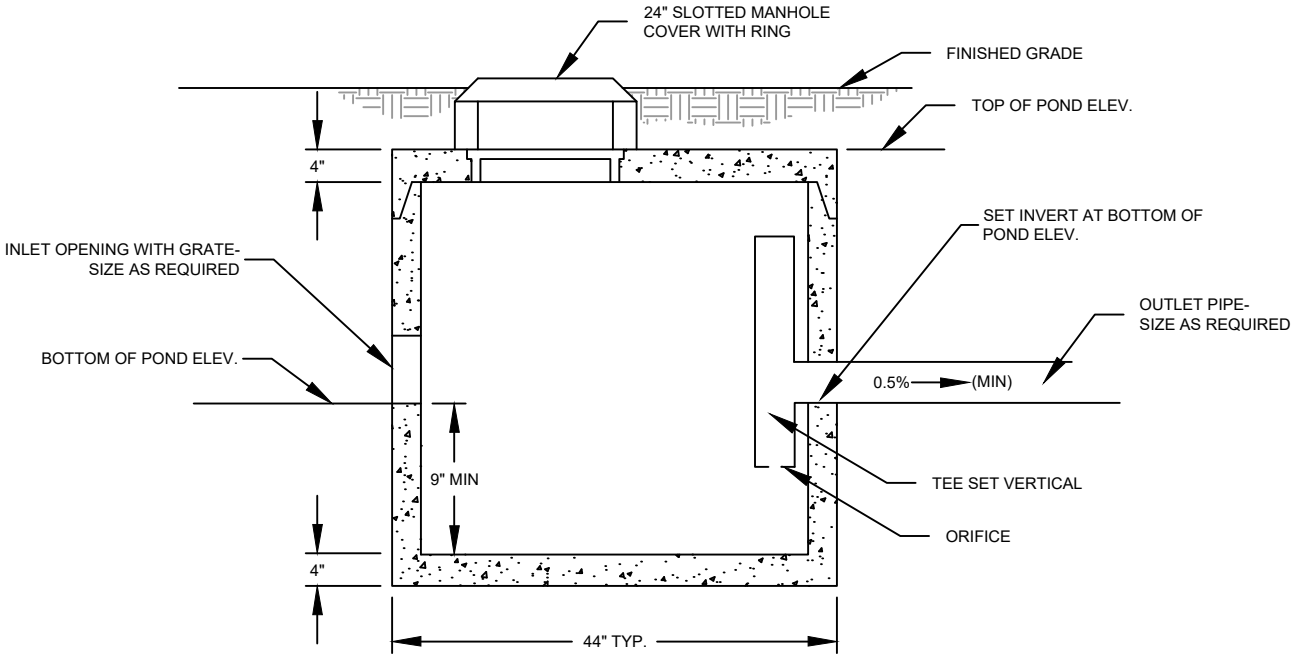


NOTES:
1. DIMENSIONS w AND h VARY, SIZE TO BE DETERMINED BY ENGINEER BASED ON 25-YEAR EVENT, BUT NO LESS THAN 6" AT CURB OPENING.
2. CONCRETE TO BE M-4500.
3. COVERS MUST BOLT DOWN TO FRAME.
4. DIMENSION w MUST BE 10" OR 21".

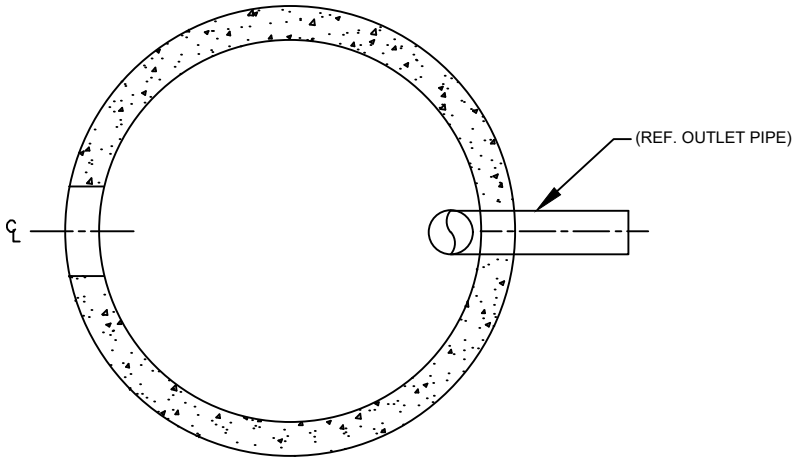
SECTION A - N.T.S.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	CONCRETE STORM DRAINAGE OUTLET AND INLET CHASES	NO. 02720-11 FEB. 2024



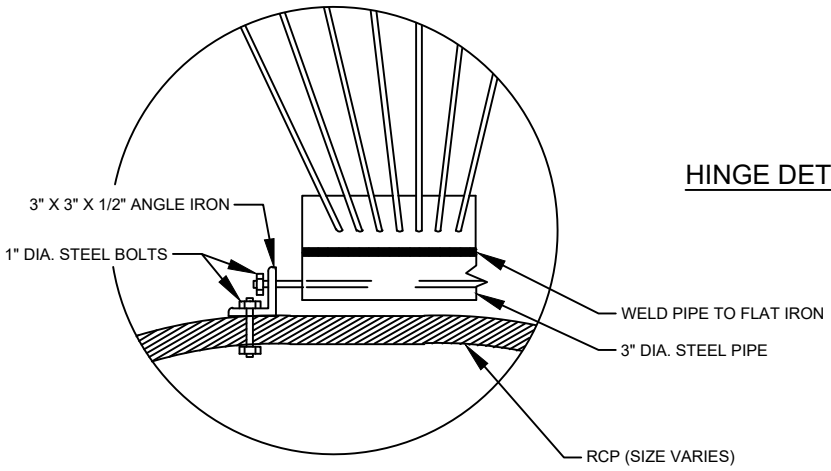
SIDE VIEW



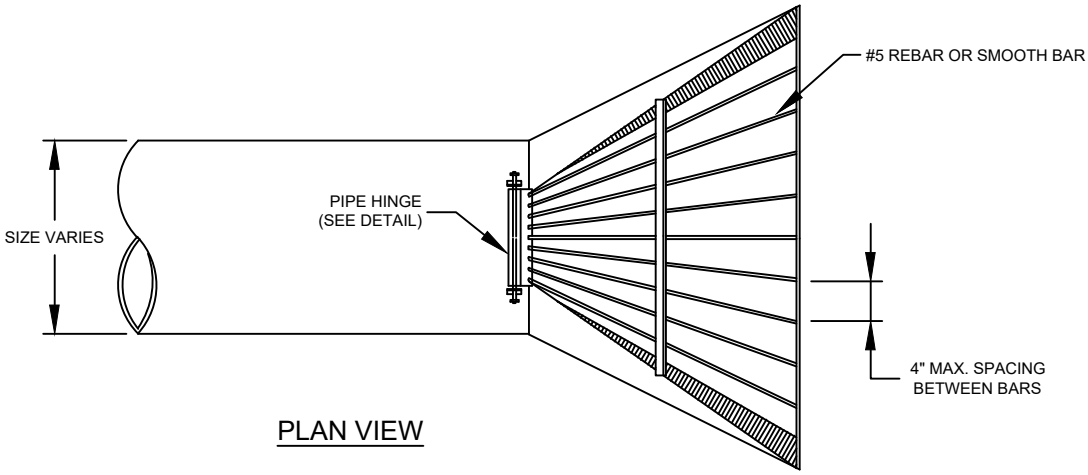
TOP VIEW

DRAFT

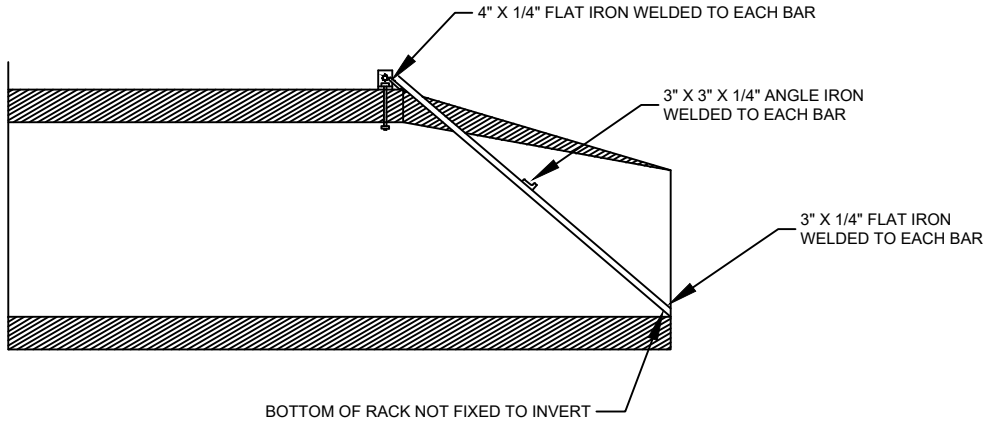
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DETENTION POND OUTLET CONTROL STRUCTURE	NO. 02720-12 FEB. 2024



HINGE DETAIL



PLAN VIEW

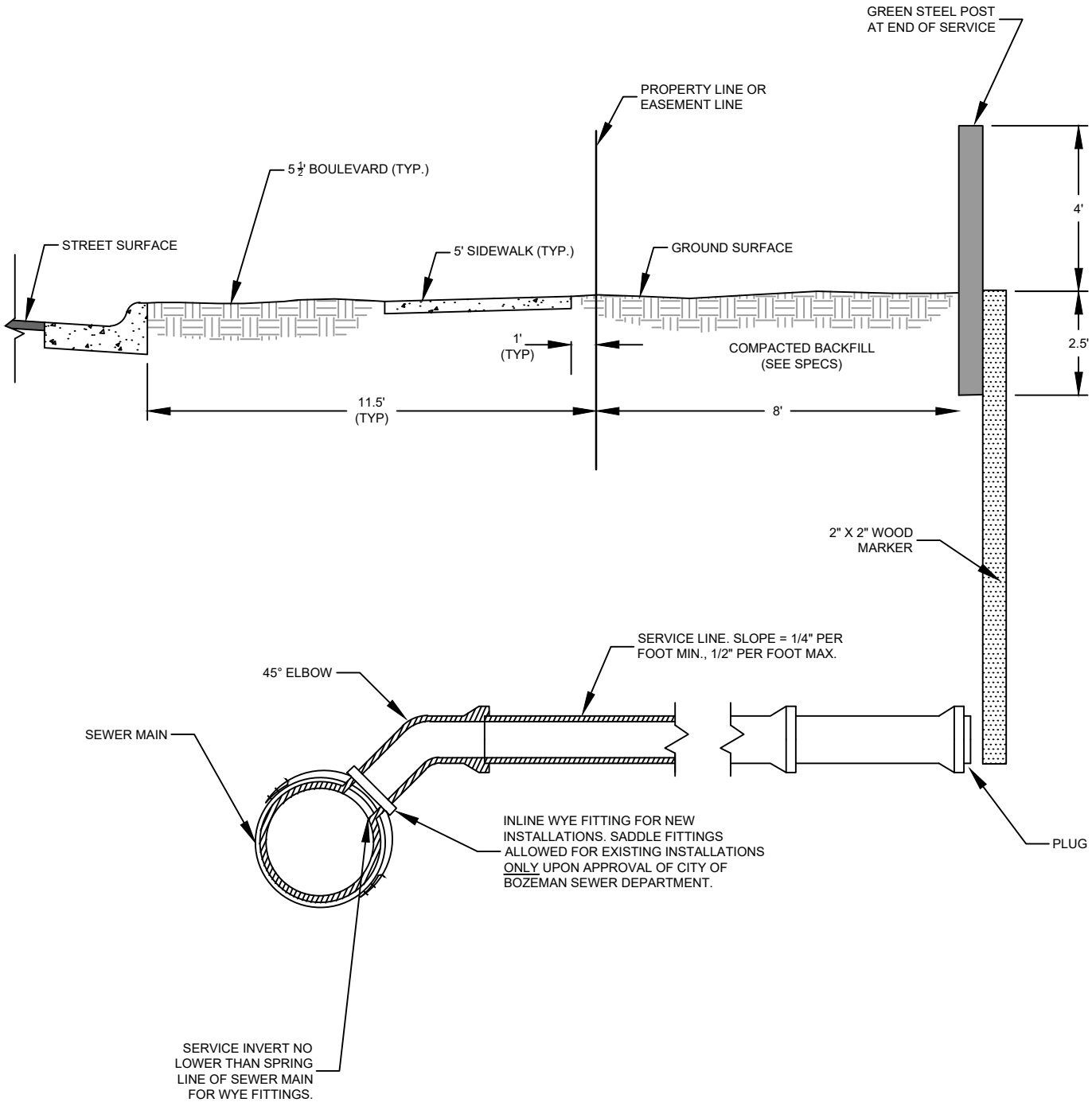


SECTION VIEW

NOTE:
1. RACK TO BE PAINTED ALUMINUM COLOR.

DRAFT

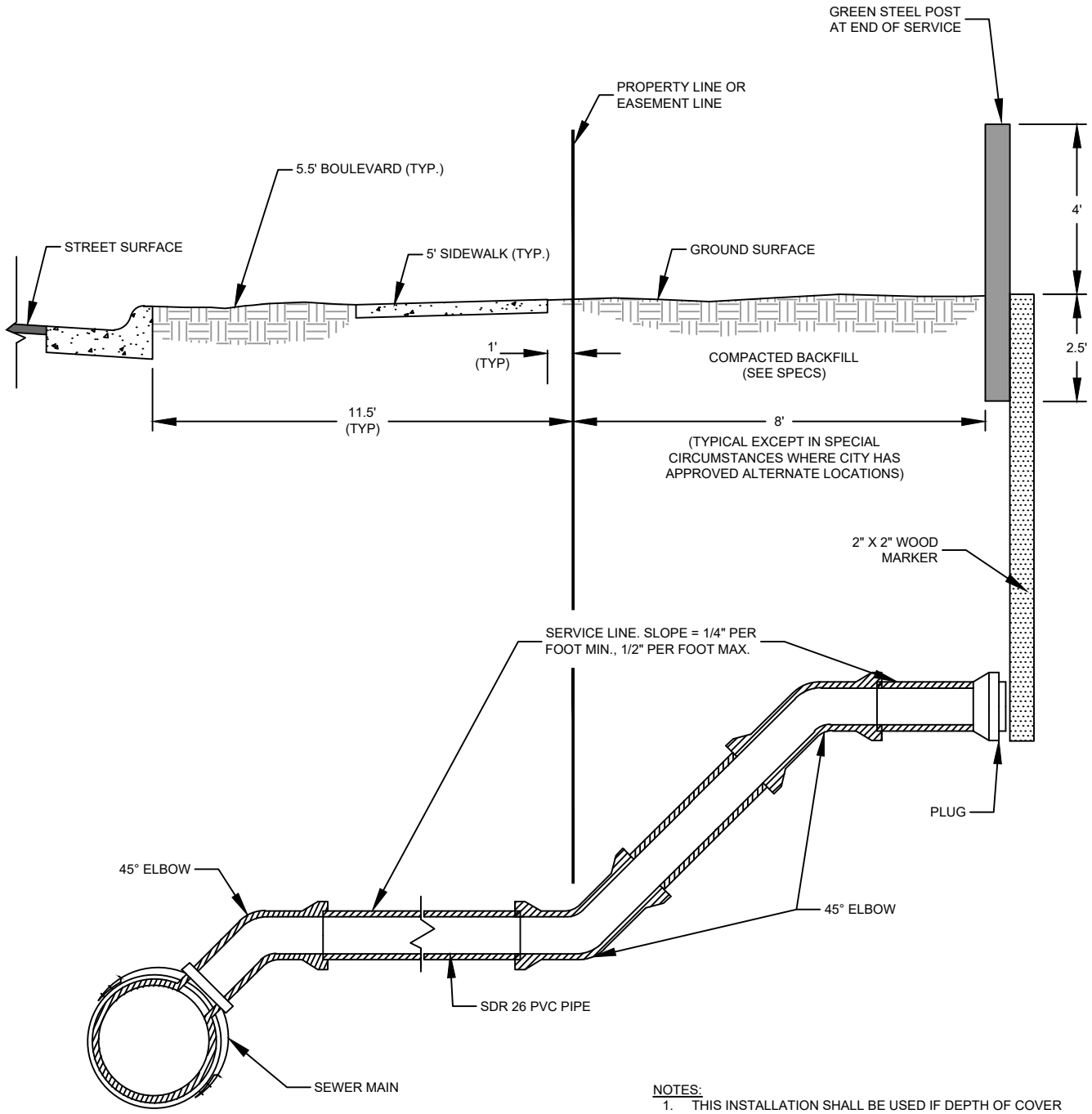
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	CULVERT DEBRIS RACK	NO. 02725-1 FEB. 2024



NOTE:
1. IF DEPTH OF COVER AT STUB END WILL EXCEED 6.5' FOLLOW STANDARD DRAWING NO. 02730-3.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SANITARY SEWER SERVICE LINE	NO. 02730-2 FEB. 2024

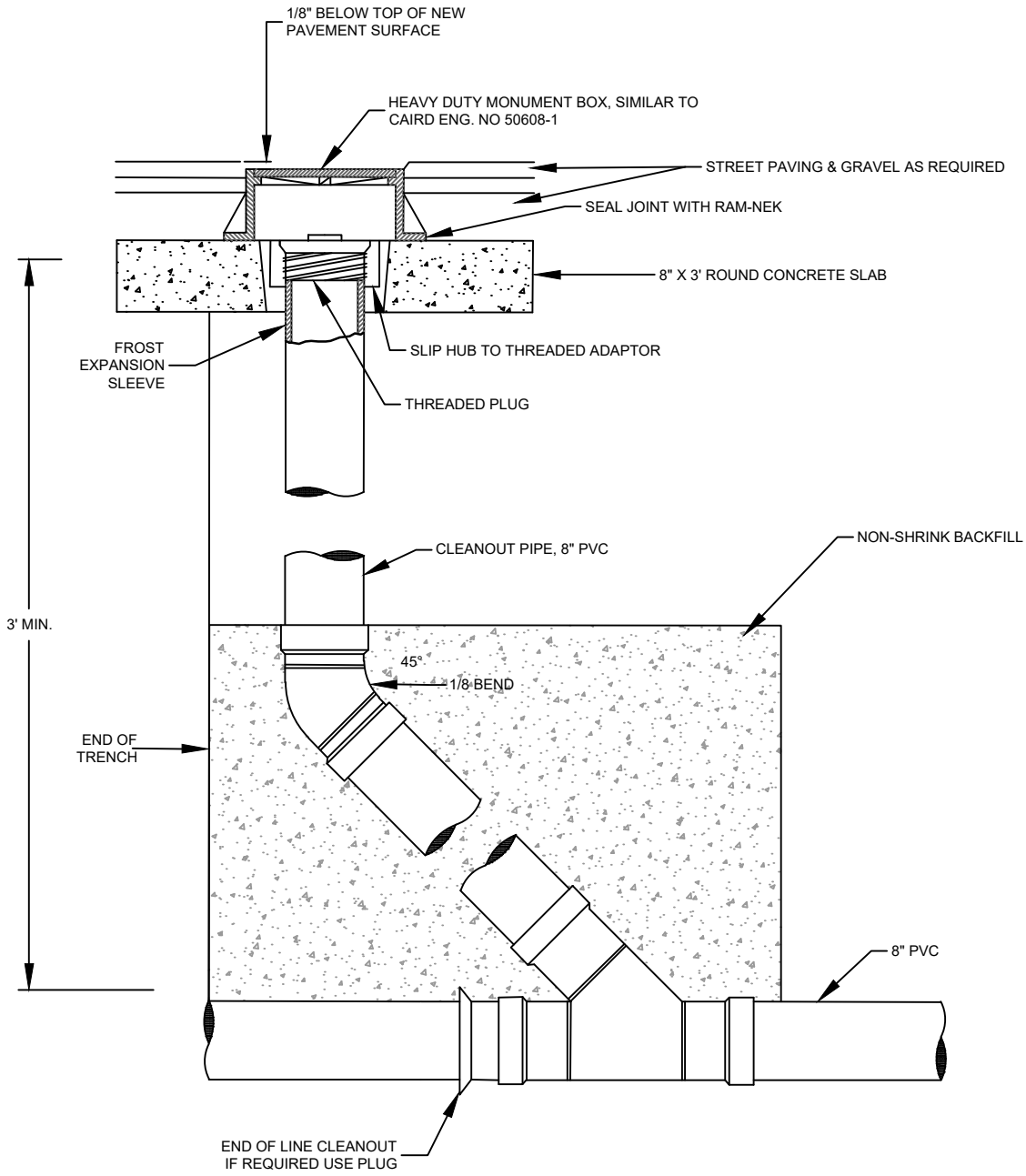


NOTES:

1. THIS INSTALLATION SHALL BE USED IF DEPTH OF COVER AT STUB END WILL EXCEED 6.5' WITH STANDARD INSULATION (PER STANDARD DRAWING 02730-2) UNLESS AN ALTERNATIVE IS APPROVED BY THE CITY ENGINEER.
2. MIN. DEPTH OF COVER SHALL BE 5' AT END OF SERVICE STUB. ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING REQUIRED ELEVATION OF STUB.
3. DUCTILE IRON FITTINGS SHALL BE HARCO GASKET X GASKET OR APPROVED EQUAL.

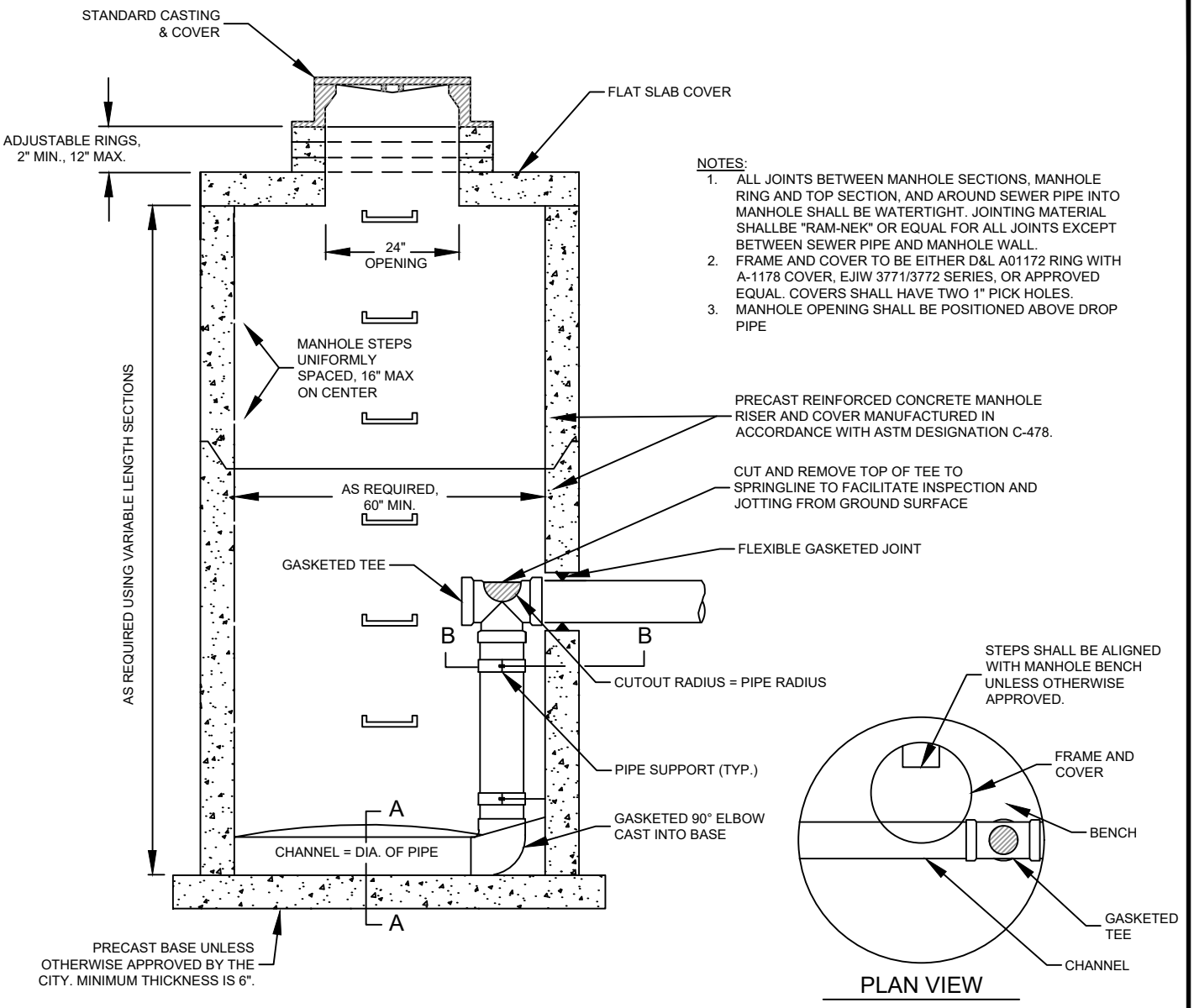
DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DEEP SANITARY SEWER SERVICE LINE	NO. 02730-3 FEB. 2024



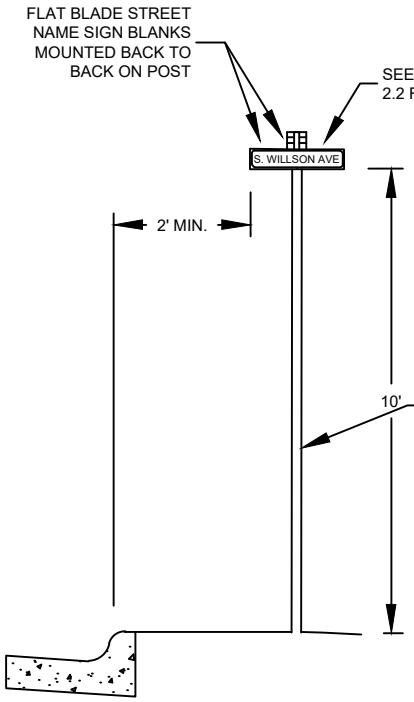
DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SANITARY SEWER CLEANOUT	NO. 02730-4 FEB. 2024

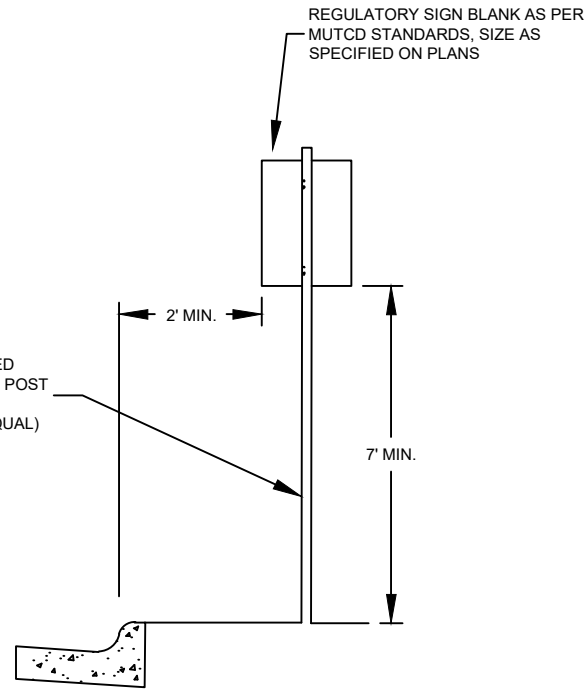


DRAFT

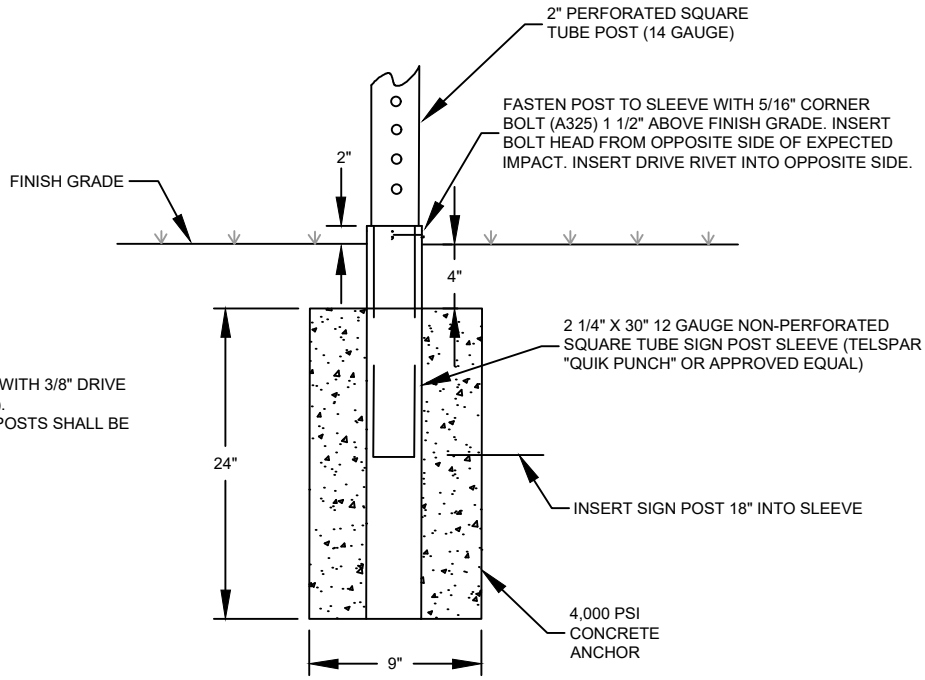
MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD DROP MANHOLE	NO. 02730-5 FEB. 2024



STREET MARKER SIGN



REGULATORY SIGN

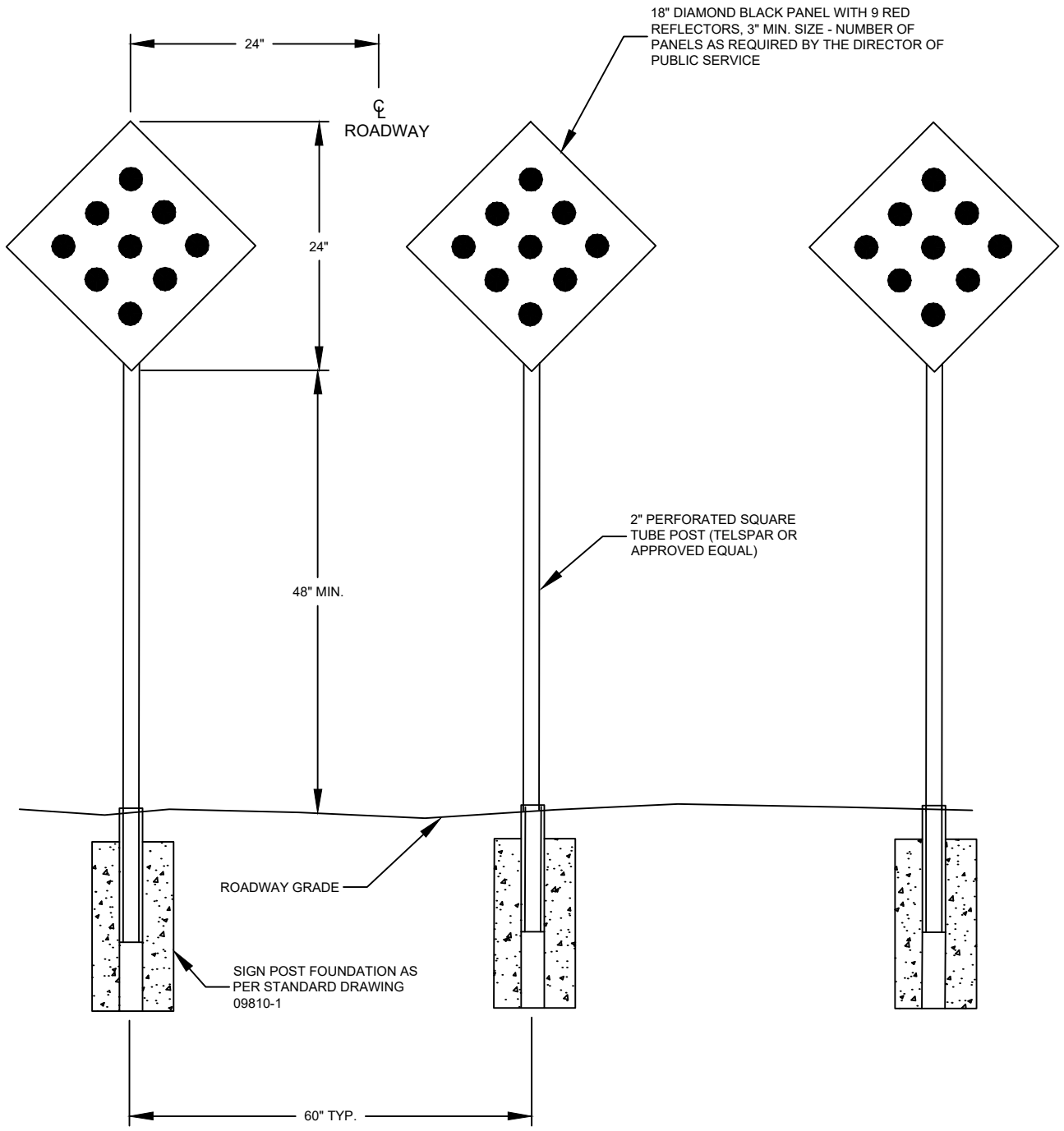


NOTES:
1. ATTACH SIGNS TO POST WITH 3/8" DRIVE RIVETS (MIN. 2 PER SIGN).
2. ALL SLEEVES AND SIGN POSTS SHALL BE INSTALLED PLUMB.

SIGN POST FOUNDATION DETAIL

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SIGN INSTALLATION STANDARDS	NO. 09810-1 FEB. 2024

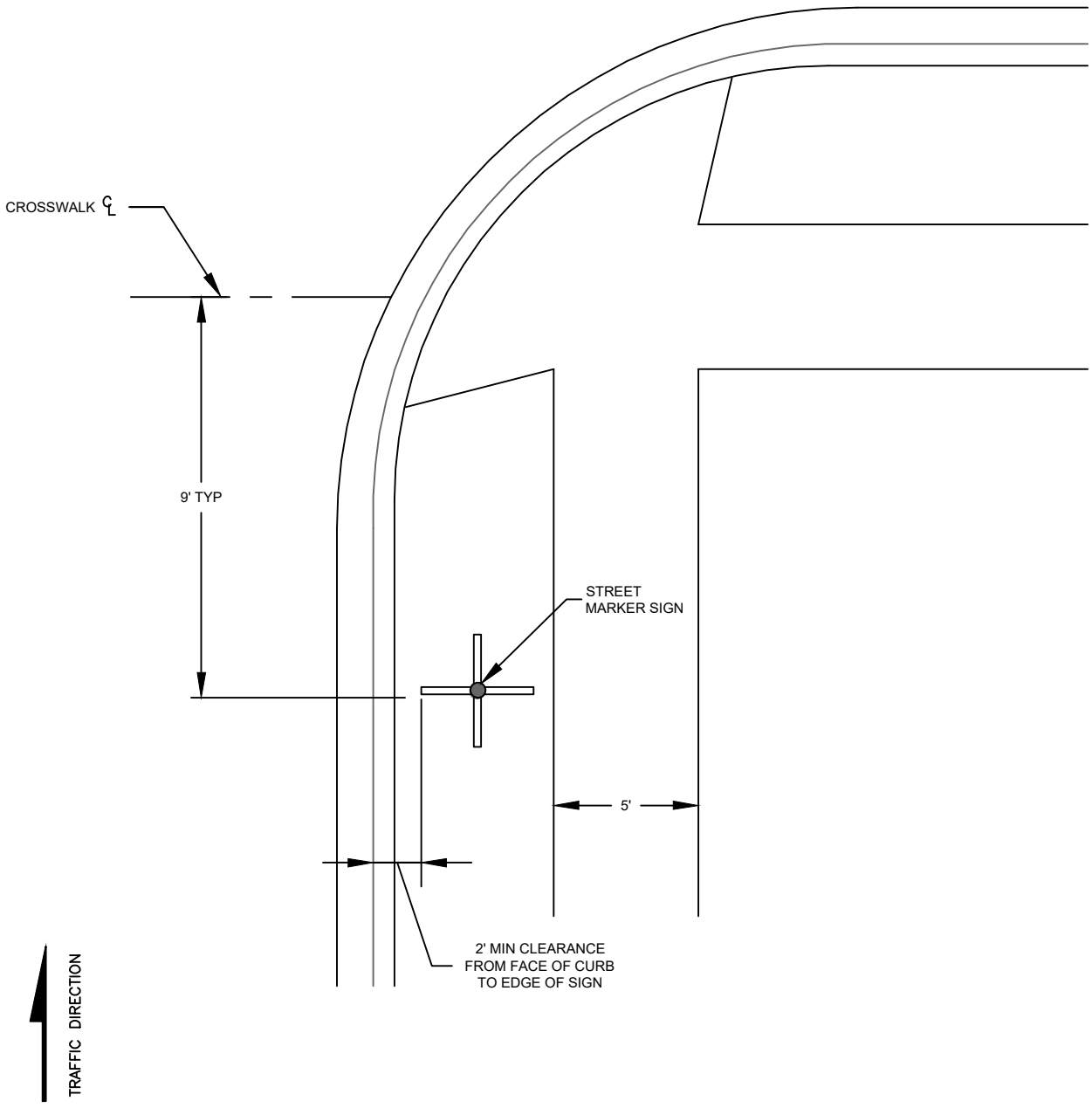


NOTES:

1. SIGN BLANKS SHALL BE CONSTRUCTION GRADE ALUMINUM, 0.08 INCH THICK, WITH ENGINEER GRADE REFLECTIVE SHEETING.

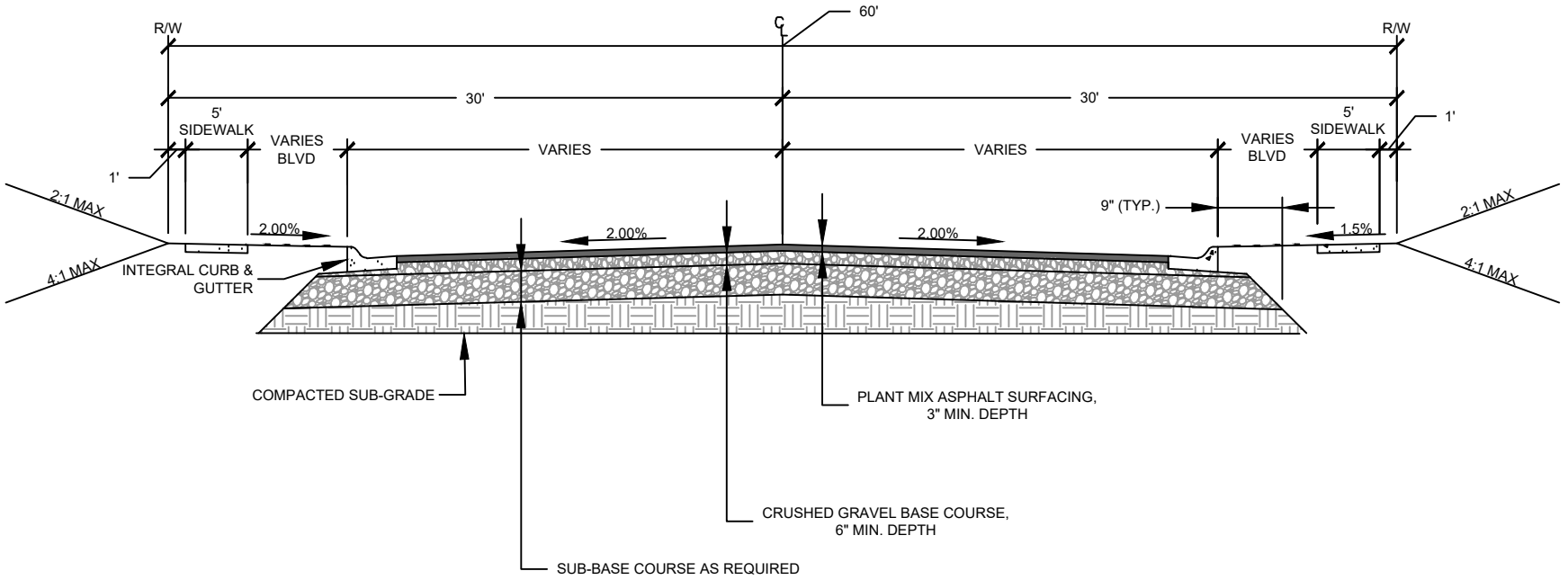
DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DEAD END BARRICADE DETAIL	NO. 09810-2 FEB. 2024



DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD STREET MARKER SIGN LOCATION	NO. 09810-3 FEB. 2024

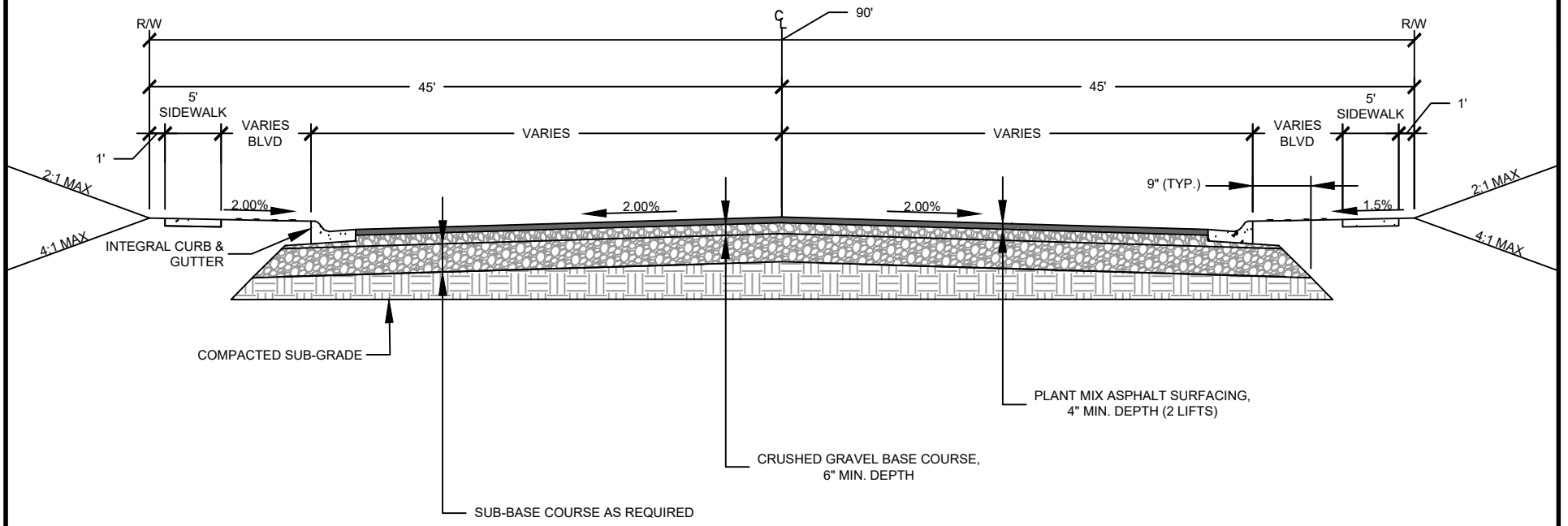


NOTES:

1. PAVEMENT AND BASE COURSE THICKNESS SHALL BE DETERMINED BY THE DESIGN ENGINEER BASED ON SITE SOIL CONDITIONS AND AT LEAST THE 20 YEAR PERFORMANCE PERIOD TRAFFIC VOLUME.
2. THE SPECIFIC RIGHT-OF-WAY AND BACK OF CURB STREET WIDTH WILL BE DETERMINED ON A CASE BY CASE BASIS THROUGH THE SUBDIVISION REVIEW PROCESS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	LOCAL STREET STANDARD	FIG. A FEB. 2024

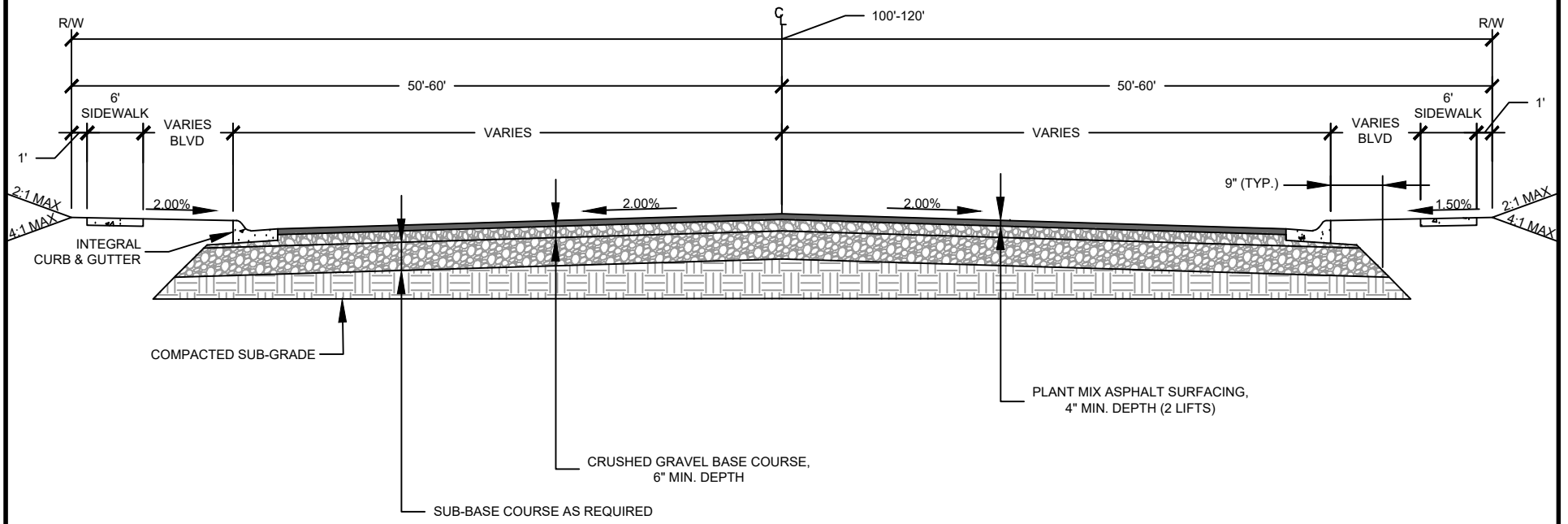


NOTES:

1. PAVEMENT AND BASE COURSE THICKNESS SHALL BE DETERMINED BY THE DESIGN ENGINEER BASED ON SITE SOIL CONDITIONS AND AT LEAST THE 20 YEAR PERFORMANCE PERIOD TRAFFIC VOLUME.
2. THE SPECIFIC RIGHT-OF-WAY AND BACK OF CURB STREET WIDTH WILL BE DETERMINED ON A CASE BY CASE BASIS THROUGH THE SUBDIVISION REVIEW PROCESS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	COLLECTOR STREET STANDARD	FIG. B FEB. 2024



NOTES:

1. PAVEMENT AND BASE COURSE THICKNESS SHALL BE DETERMINED BY THE DESIGN ENGINEER BASED ON SITE SOIL CONDITIONS AND AT LEAST THE 20 YEAR PERFORMANCE PERIOD TRAFFIC VOLUME.
2. THE SPECIFIC RIGHT-OF-WAY AND BACK OF CURB STREET WIDTH WILL BE DETERMINED ON A CASE BY CASE BASIS THROUGH THE SUBDIVISION REVIEW PROCESS.

DRAFT

MT BZN	CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	ARTERIAL STREET STANDARD	FIG. C FEB. 2024