CITY OF BOZEMAN MODIFICATIONS TO

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS

SIXTH EDITION

PREPARED BY

CITY OF BOZEMAN ENGINEERING DEPARTMENT

Approved March 31, 2011

Authorized by Ordinance No. 1611, April 5, 2004
Including Addendum No. 1 Approved 8/26/13
Including Addendum No. 2 Approved 4/20/15
Including Addendum No. 3 Approved 8/1/2017

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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), Sixth Edition, April, 2010, 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 of MPWSS it shall be assumed the work is to be completed in accordance with the appropriate MPWSS Section. When a City of Bozeman modification to the MPWSS does exist the requirements of that modification supersede the related MPWSS requirement. The same holds true for City of Bozeman Standard Drawings; however, there are some City of Bozeman Standard Drawings which do not replace or supersede the MPWSS Standard Drawing but are additional drawings created specifically for the City of Bozeman.

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 MPWSS Standard Drawings followed by "Deleted", "Replaced", or "Active". "Deleted" indicates that the drawing is not to be used. "Replaced" indicates that the drawing has been replaced by a City of Bozeman Standard Drawing and "Active" means that the drawing is useable as shown in MPWSS. Appendix B contains a list of City of Bozeman Standard Drawings.

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. A form for submitting suggested changes can be found in Appendix E.

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

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INSTRUCTIONS TO BIDDERS

Any contract documents for which the City of Bozeman acts as the contracting agent,(i.e., signatory to the contract), shall include the following additions or changes to the Montana Public Works Standard Specifications.

BID QUANTITIES Bidders must satisfy themselves by personal examination of the locations of the proposed work and by such other means as they may prefer as to the correctness of any quantities.

The estimated unit quantities of the various classes of work to be done under this contract are approximate and are to be used only as a basis for estimating the probable cost of the work and for comparing the proposals offered for the work. The Contractor agrees that, during progress of the work, the Owner may find it advisable to omit portions of the work, to increase or decrease the quantities as may be deemed necessary or desirable, that the actual amount of work to be done and materials to be furnished may differ from the estimated quantities, and that the basis for payment under this contract shall be the actual amount of work done and the materials furnished.

The Contractor agrees that he will make no claim for damages, anticipated profits or otherwise on account of any difference which may be found between quantities of work actually done and the estimated quantities.

BID REQUIREMENTS The Bidder is expected to base his bid on materials and equipment complying fully with the plans and specifications and, in the event he names in his bid materials or equipment which do not conform, he will be responsible for furnishing materials and equipment which fully conform at no change in his bid price.

Before submitting a proposal, each Contractor should read the complete Contract Documents (including all addenda), specifications and plans, including all related documents contained herein, all of which contain provisions applicable not only to the successful Bidder, but also to his subcontractors.

EXAMINATION Examine documents and conditions at existing site carefully. No extra payments will be given for conditions which can be determined by examining documents and existing conditions.

QUESTIONS Submit to Engineer. Replies will be issued to Bidders of record as addenda. Engineer and Owner shall not provide nor be responsible for any oral clarification.

PROPOSAL

1. The Bidder shall submit his proposal on the forms bound in these Contract Documents. Neither the proposal nor any other pages bound herein or attached hereto shall be detached.

2. Proposals shall be in a sealed envelope and addressed to:

Clerk of Commission
City Hall
121 N. Rouse Avenue
P.O. Box 1230
Bozeman, MT 59771-1230

The envelope shall also contain the following information:

a. Name of Project
b. Name of Contractor
c. Montana Certificate of Contractor Registration Number
e. Acknowledge Receipt of Addendum No.:__,__,__,
f. In the lower left-hand corner of the envelope print of type: BID DOCUMENTS - DO NOT OPEN UNTIL 2:00 P.M., on _____, 201_.

3. Proposals shall be made in accordance with the following instructions:

a. Submit one copy of the complete bound documents in an opaque sealed envelope. DO NOT REMOVE THE PROPOSAL NOR ANY OTHER PAGES FROM THE BOUND CONTRACT DOCUMENT.
b. Bids shall be made in ink upon the unaltered Bid Proposal Form supplied with these documents.
c. All blank spaces must be properly filled.
d. The total bid price must be stated in both writing and in figures. In case of a discrepancy between unit price and total bid price, the unit prices or lump sum prices shall be used in computing the total bid price.
e. The proposal form shall contain no addition, conditions, stipulations, erasures, or other irregularities.
f. The proposal must acknowledge receipt of all addenda issued.
g. The proposal must be signed in ink and display the Bidder's name, address, and correct Montana Contractor's Registration Number.

SIGNING OF BIDS

a. Bids which are not signed by individuals making them shall have attached thereto a Power of Attorney evidencing authority to sign the bid in the name of the person for whom it is signed.
b. Bids which are signed for a co-partnership shall be signed by all of the co-partners or by any attorney-in-fact. If signed by an attorney-in-fact, there shall be attached to the bid a Power of Attorney evidencing authority to sign the bid.

c. Bids which are signed for a corporation shall have the correct corporate name thereof signed in handwriting or in typewriting and the signature of the president or other authorized officer of the corporation shall be manually written below the written or typewritten corporate name following the work:

By:

Corporate Seal:

Title:

d. If bids are signed for any other legal entity, the authority of the person signing for such legal entity should be attached to the bid.

TELEGRAPHIC MODIFICATION Any Bidder may modify his bid by telegraphic communication at any time prior to the scheduled closing time for receipt of bids. The telegraphic communication shall not reveal the bid price, but shall only provide the addition or subtraction from the original proposal. Telegraphic proposal modifications must be verified by letter. This written confirmation shall be received no later than three (3) working days following the bid opening or no consideration will be given to the telegraphic modification.

LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT The successful Bidder, upon his failure or refusal to execute and deliver the contract and bonds required within ten (10) days after he has received notice of the acceptance of his bid, shall forfeit to the Owner as liquidated damages for such failure or refusal, the security deposited with his bid, as provided in 18-1-204 Montana Code Annotated.

GROSS RECEIPTS WITHHOLDING In accordance with Section 15-50-206, Montana Code Annotated, the City of Bozeman must withhold one percent (1%) of incremental payments due the Contractor for remittance to the Department of Revenue for any contracts greater than $5,000.00.

CITY OF BOZEMAN BUSINESS LICENSE All Contractors conducting work within the City of Bozeman are required to have a current Business License. Applications for Business Licenses may be obtained at City Hall, 121 N. Rouse Avenue, Bozeman, Montana.

SPECIAL PROVISIONS

Any contract documents for which the City of Bozeman acts as the contracting agent, (i.e., signatory to the contract), shall include the following additions or changes to the Montana Public Works Standard Specifications.

1. GENERAL

All work shall be performed in accordance with applicable sections of the Montana Public Works Standard Specifications, Fourth Edition (MPWSS-6th), published April, 2010, including all addenda, which by this reference are hereby included as part of this specification as modified herein by the City of Bozeman.

All correspondence and official authorization concerning the work shall be with the City Engineer or his designated representatives as identified at the preconstruction meeting. Any changes in the work or schedule not authorized by the above shall be deemed as unauthorized and shall be done at Contractor's risk at no cost to the Owner. All damages, reparations, and costs thus incurred during the progress of such unauthorized work shall be borne exclusively by the Contractor.

2. AWARD OF CONTRACT

The award of the contract, if awarded, will be made within the period specified in the Invitation to Bid to the lowest responsible Bidder whose bid complies with all the requirements prescribed herein. The successful Bidder will be notified by letter, mailed to the address shown on the bid, that his bid has been accepted and that he has been awarded a contract. The bid schedules may be awarded as a single total combined contract, may be awarded singly as separate contracts, or in any combination of schedules which result in the lowest project cost to the Owner.

3. TIME OF COMMENCEMENT AND COMPLETION DATE

The beginning of the contract time shall be stated in a written NOTICE TO PROCEED written by the City Engineer to the Contractor. In establishing the date when contract time begins, the Engineer will consider that the contract time begins following delivery of the NOTICE TO PROCEED. The contract time will expire automatically the number of calendar days stated as contract time, except as the contract time may be extended by change order. A Notice to Proceed may be given at any time within thirty days after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the seventy-fifth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

4. LIQUIDATED DAMAGES

Subject to the provisions of the contract documents, the Owner shall be entitled to liquidated damages for failure of the Bidder to complete the work within the specified contract time.

The Bidder agrees to pay liquidated damages for compensation to the Owner for expenses incurred by the Owner during the contract time overrun.

As compensation for expenses incurred, the Contractor shall be assessed a liquidated damage of $200.00 per calendar day for each day that the work remains uncompleted beyond the contract period. Liquidated damages shall be paid by deduction from monthly progress payments and the final payment.

5. COST LIMITATIONS

The Owner reserves the right to eliminate or reduce certain proposal items from the project following the bid opening to make the project financially feasible with the limitations of the funds allocated for this project. The determination of which items shall be eliminated shall be the responsibility of the Owner.

6. NAMES, PRODUCTS AND SUBSTITUTIONS

Where products or materials are specified by manufacturer, trade name, or brand, such designations are intended to indicate the required quality, type, utility, and finish. Requests for proposed substitution shall include complete specifications and descriptive data to prove the equality of proposed substitutions. Substitutions shall not be made without the written approval of the Owner. No substitutions will be considered until after contract award.

7. APPROVAL OF EQUIPMENT AND MATERIAL

The Contractor shall furnish to the Owner or its Engineer for approval the name of the manufacturer of machinery, mechanical and other equipment and materials which he contemplates using in execution of the work, together with the performance capacities and such other information which may be pertinent or required by the Owner.

8. BIDDER'S QUALIFICATIONS

The Contractor shall show evidence that he has the finances, organization, and equipment to perform the work with a limited number of subcontractors. The Contractor will be required to have a full-time resident General Superintendent on the job at all times while the work is in progress. He shall be in a position to direct the work and make decisions either directly or through immediate contact with his superior. Absence or incompetence of the Superintendent shall be reason for the Owner to stop all work on the project.

9. WARRANTY

If, within two years after acceptance of the work by the Owner, any of the work is found to be defective or not in accordance with the Contract Documents, and upon written notice form the Owner, the Contractor shall correct any work beginning within seven (7) calendar days of said written notice. Should the Contractor fail to respond to the written notice within the designated time, the Owner may correct the work at the expense of the Contractor.

10. SCHEDULING

Prior to or at the PRECONSTRUCTION CONFERENCE, the Contractor shall provide the City Engineer the following schedules:

A. A practicable CONSTRUCTION PROGRESS SCHEDULE showing the order, timing, and progress in which the Contractor proposes to prosecute the work. This schedule shall be in bar graph, CPM or PERT format. The schedule shall be updated and re-submitted as necessary to reflect project changes.

B. A PAYMENT SCHEDULE showing the anticipated amount of each monthly payment that will become due the Contractor in accordance with the Construction Progress Schedule.

11. PRECONSTRUCTION CONFERENCE

After the contract(s) have been awarded, but before the start of construction, a preconstruction conference will be held at the site of the project for the purpose of discussing requirements on such matters as project supervision, on-site inspection, progress schedules and reports, payrolls, payment to contractors, contract change orders, insurance, safety, and any other items pertinent to the project. The Contractor shall arrange to have all supervisory personnel and a representative from each of the affected utility companies connected with the project on hand to meet with a representative of the Owner to discuss the project and any problems anticipated.

12. SHOP AND FABRICATION DRAWINGS

The Contractor shall prepare and submit fabrication drawings, design mix information, material testing compliance data, and other data in accordance with the General Conditions. Following review, the Contractor shall resubmit copies of any drawings which required revision or correction.

Any review by the Owner will not relieve the Contractor from responsibility for errors or omissions, inadequate design performance requirements, schedule requirements, and proper operation of any item required under the Contract. Not withstanding any such review, Contractor shall remain solely responsible for full and complete performance in accordance with the terms, conditions, provisions, drawings and specifications set forth in the Contract Documents.

13. UNDERGROUND UTILITIES

The Contractor shall be responsible for checking with the Owners of the underground utilities such as the City, County, power and telephone companies, etc., as to the location of their underground installations in the project area. The Contractor shall be solely responsible for any damage done to these installations due to failure to locate them or to properly protect them when their location is known.

It shall be solely the responsibility of the Contractor to fully coordinate his work with the agencies and to keep them informed of his construction activities so that these vital installations are fully protected at all times.

A Montana One-Call system (1-800-424-5555) has been established to facilitate requests for underground facility location information. The Contractor is cautioned that all utilities may not be on this system.

14. EASEMENTS, RIGHTS-OF-WAY, ADJOINING PROPERTY

The Contractor shall contain all of his construction operations within the easements and rights-of-way unless written approval is secured from the Owner of the adjoining property or written approval is given by the Owner to utilize the adjacent land area.

15. TRAFFIC CONTROL

A. GENERAL The Contractor shall at all times conduct his operations so that there is a minimum interruption in the use of City streets affected by the work. Exact procedures in this respect shall be established in advance of construction with the City Engineer.

Barricade function, design and construction shall conform to the latest edition of the Manual on Uniform Traffic Control Devices and the Standard Specifications for Road and Bridge Construction of the State Highway Commission of Montana, latest edition.

Should construction of the project require the closure of any streets, roads or highways or require night-time or long-term traffic control, the Contractor shall be required to prepare a detailed TRAFFIC CONTROL PLAN to address the methods and means of controlling traffic under the specific conditions. In regards to closures, the plan shall include specific details on traffic detours and estimated duration of the closures. Details of signing, barricades, flagging and other traffic control devices shall be included, and the TRAFFIC CONTROL PLAN shall be approved by the City Engineer or his designated representative prior to construction.

B. TRAFFIC ACCESS Construction work shall be programmed by the Contractor so that local traffic will have continuous access within one block of any given property. It shall be the responsibility of the Contractor to notify all residents in the area of programmed work of street closures, parking requirements and restriction, and any other conditions, a minimum of twenty-four (24) hours prior to beginning work within the affected area. All signing, barricades, and other traffic control measures shall be provided by the Contractor.

C. WARNING SIGNALS All streets, roads, highways and other public thoroughfares which are closed to traffic shall be protected by means of effective barricades on which shall be placed, mounted or affixed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section.

All open trenches and other excavations within the construction area shall be provided with suitable barriers, signs and lights to the extent that adequate public protection is provided. All abrupt grade changes greater than one inch which traffic is required to pass over, and obstructions, including but not limited to material stockpiles and equipment, shall be similarly protected.

All barricades and obstructions shall be illuminated by means of warning lights at night. All lights used for this purpose shall be kept burning from sundown to sunrise.

16. DISPOSAL, EROSION, WATER POLLUTION, AND SILTATION CONTROL

The Contractor is responsible for proper disposal of all waste soils and materials unless otherwise directed herein. Where waste materials are disposed on private property not owned by the Contractor, evidence of property owner's written permission shall be obtained and provided to the Owner. Contractor shall comply with all local, state, and federal laws and regulations pertaining to erosion control, fill in wet lands, and floodplains. The Contractor shall dispose of all refuse and discarded material in an approved location.

The Contractor shall exercise every reasonable precaution throughout the life of the project to prevent pollution or siltation of rivers, streams or impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful wastes shall not be discharged into or alongside of rivers, streams, impoundments or into natural or manmade channels leading thereto. In addition, the Contractor shall conduct and schedule his operations to avoid muddying or silting of rivers, streams or impoundments. The Contractor shall meet the requirements of the applicable regulations of the Department of Fish, Wildlife and Parks, Department of Environmental Quality and other State or Federal regulations relating to the prevention or abatement of water pollution and siltation.

The Contractor's specific attention is directed to the Montana Water Pollution Control Act and the Montana Stream Preservation Act. The Contractor shall be responsible for obtaining any required discharge permits associated with erosion control and groundwater dewatering operations. Contractor's responsibility shall include all cleanup, restoration, etc., of any detention or discharge areas.

17. PROTECTION OF EXISTING PAVEMENT

All equipment shall be fitted with pads on the outriggers and other accessories as necessary to prevent damage to existing pavement during the course of the project. Any damages to pavement shall be corrected by the Contractor, at his expense, in a manner directed by the Engineer.

18. OPERATION OF EXISTING AND NEW VALVES

All existing City of Bozeman water main valves shall be operated by authorized personnel of the City of Bozeman only. The Contractor shall not operate any existing valves without the written consent of the City of Bozeman. When new or existing valves are used to take water from the City of Bozeman water distribution system, they shall be operated by City of Bozeman personnel only.

19. SALVAGEABLE ITEMS

Any items removed from the existing system under the terms of this contract shall remain the property of the City of Bozeman and shall be delivered to a site specified by the City of Bozeman. Should the City of Bozeman choose not to accept any salvageable items, then the Contractor shall dispose of those items at his expense at a site or landfill acceptable to the Engineer. Any costs for the above work shall be at the Contractor's expense.

20. ACCESS TO RECORDS

The Contractor shall allow access to any books, documents, papers or records which are directly pertinent to this Contract by the Owner, State or Federal agencies, or any of their duly authorized representatives for the purpose of making an audit, examination, excerpts or transcriptions.

21. INSURANCE

Insurance coverages required under this contract shall extend, at a minimum, to the end of the contract time.

SECTION 01500

CONSTRUCTION AND TEMPORARY FACILITIES

1.4 ***Revise this section as follows:*** 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.

SECTION 01570

CONSTRUCTION TRAFFIC CONTROL

1.3 NOTIFICATIONS

Add the following:

D. Notify 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 section:

1.4 STANDARD DRAWINGS

Refer to the following Standard Drawings in Appendix C:

City of Bozeman Standard Drawing No. 01570-1, Traffic Control, Minimum Standard, Urban Work Site, 4 Lane Road, Work Site Closing One Lane
City of Bozeman Standard Drawing No. 01570-2, Traffic Control, Minimum Standard, Urban Work Site, 2 Lane Road, Work Site On Centerline
City of Bozeman Standard Drawing No. 01570-3, Traffic control, Minimum Standard, Urban Work Site, 4 Lane Road, Work Site On Centerline Partially Blocking Inside Lanes
City of Bozeman Standard Drawing No. 01570-4, Traffic Control, Minimum Standard, Urban Work Site, 2 Lane Road, 1 Lane Partially or Fully Closed By Work Area
City of Bozeman Standard Drawing No. 01570-5, Traffic Control, Minimum Standard, Rural Work Site, Work Adjacent to The Present Traveled Way
City of Bozeman Standard Drawing No. 01570-6, Traffic Control, Minimum Standard, Rural Work Site, Utility Work On or Across the Present Traveled Way
City of Bozeman Standard Drawing No. 01570-7, Pedestrian Traffic Control for Temporary Sidewalk Closure
City of Bozeman Standard Drawing No. 01570-8, Sidewalk Closure with Detour

4.1 PAYMENT

Add the following section:

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.

SECTION 01580

TEMPORARY WATER SUPPLY

1.1 DESCRIPTION

A. ***Replace this section with***: Provide temporary water service to all residential and commercial service connections interrupted by water system replacement or extension projects. 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.

3.1 GENERAL

D. ***Replace this section with***: 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.

3.2 LOCATING CURB STOPS

A. ***Replace this section with***: 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 this section with***: 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.

SECTION 01700

CONTRACT CLOSEOUT

1.1 CLEANUP ***Add the following requirement:***

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 requirement:

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 two-year 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 thirty 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 after November 16, the expiration date of the Maintenance Bond shall be June 30 of the following year. Maintenance Bonds may be in the form of a Surety Bond or a Certified Check.

SECTION 02112

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

3.1 GENERAL

Add the following section:

D. Exercise care in removal of existing tree roots that conflict with the work. Tree roots shall be removed by sawcutting 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.

SECTION 02113

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

1.2 STANDARD DRAWINGS

Delete: Standard Drawing No. 02213-1, Manhole Adjustment Detail
Delete: Standard Drawing No. 02213-2, Water Valve Adjustment Detail
Add: City of Bozeman Standard Drawing No. 02213-1, Manhole Adjustment Detail
Add: City of Bozeman Standard Drawing No. 02213-2, Water Valve Adjustment Detail

PART 2 - PRODUCTS

2.1 GENERAL

Add the following section:

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.

SECTION 02221

TRENCH EXCAVATION AND BACKFILL
FOR PIPELINES & APPURTENANT STRUCTURES

2.1 PIPE BEDDING MATERIALS

A. TYPE 1 PIPE BEDDING

2. ***Modify this section as follows:*** 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.

2.3 FLOWABLE FILL

A. If used, Flowable Fill is to meet the requirements of Section 2225, Flowable Fill.

Add the following:

1. 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.

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. 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.
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.

SECTION 02234

SUB BASE COURSE

PART 2 PRODUCTS

2.1 GENERAL

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

SECTION 02235

CRUSHED BASE COURSE

PART 2 PRODUCTS

2.1 GENERAL

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

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.

SECTION 02502

ASPHALT PRIME AND/OR TACK COAT

PART 2 PRODUCTS

2.1 GENERAL

A. Unless otherwise specified in the contract documents, do not use type SS-1h emulsified asphalt.

SECTION 02504

ASPHALT SEAL COAT

3.2 CONSTRUCTION METHODS

B. Weather Limitations

Add the following requirements:

2. Do not perform seal coat work if the local radio weather forecast includes a probability of precipitation greater than 45% within the intended schedule of operations for the day. Regardless of the weather forecast, seal coat work may be suspended if impending adverse weather conditions occur in the vicinity of the work.

D. Application of Asphalt Material

Add the following requirements:

7. 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. ***Revise this section as follows:*** 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. ***Add 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 requirements:

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.

SECTION 02510

ASPHALT CONCRETE PAVEMENT

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. Grades: ***Add the following requirement:*** 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).

3.14 PATCHING

B. Surface Preparation ***Add the following requirements:***

3. d. Tack coat all existing asphalt edges prior to placing new asphalt concrete.

e. 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.

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

3.16 SPREADING AND FINISHING: ***Revise this section as follows:***

A. Spread and finish meeting the following requirements:

1. The maximum lift thickness is 3 inches (compacted depth) for surface courses and 4 inches (compacted depth) for base courses

SECTION 02528

CONCRETE CURB AND GUTTER

1.1 DESCRIPTION

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

Delete: Standard Drawing No. 02528-1, Standard Curb and Gutter
Delete: Standard Drawing No. 02528-2, Drive-over Curb and Gutter
Add: City of Bozeman Standard Drawing 02528-1, Integral Concrete Curb and Gutter

3.2 FOUNDATION PREPARATION

D. ***Revise as follows:*** For new street construction or street reconstruction, place gravel base course for the street 9" beyond the back of curb.

3.6 STRIPPING FORMS AND FINISHING

B. Finishing ***Add the following requirement:***

3. 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.

SECTION 02529

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

1.2 REFERENCES

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

Delete: Standard Drawing No. 02529-1, Double Gutter Detail for Street Intersection
Delete: Standard Drawing No. 02529-2, Standard Fillet
Delete: Standard Drawing No. 02529-3, Type I Street Monument
Delete: Standard Drawing No. 02529-4, Type II Street Monument
Delete: Standard Drawing No. 02529-5A, Boulevard Driveway Approach
Delete: Standard Drawing No. 02529-5B, Curb Walk Driveway Approach
Delete: Standard Drawing No. 02529-7B, Curb Walk Alley Approach
Delete: Standard Drawing No. 02529-8, Accessibility Ramp
Delete: Standard Drawing No. 02529-9, Swale Crossing
Add: City of Bozeman Standard Drawing No. 02529-1, Double Gutter Detail for Street Intersection
Add: City of Bozeman Standard Drawing No. 02529-2, Standard Fillet
Add: City of Bozeman Standard Drawing No. 02529-3, Type I Street Monument
Add: City of Bozeman Standard Drawing No. 02529-5, Driveway Approach With Sidewalk Adjacent to Curb
Add: City of Bozeman Standard Drawing No. 02529-7B, Curb Walk Alley Approach
Add: City of Bozeman Standard Drawings No. 02529-8, Pedestrian Ramp
Add: City of Bozeman Standard Drawings No. 02529-8A, Blended Transition Pedestrian Ramp
Add: City of Bozeman Standard Drawing No. 02529-11, Residential Driveway Approach
Add: City of Bozeman Standard Drawing No. 02529-12, Non-Residential Driveway Approach.
Add: City of Bozeman Standard Drawing No. 02529-13, Non-Residential Driveway Approach for Arterial Streets.
Add: City of Bozeman Standard Drawing No. 02529-14, Concrete Storm Drainage Outlet and Inlet Chases
Add: City of Bozeman Standard Drawing No. 02529-15, Publicly-Maintained Sidewalk
Add: City of Bozeman Standard Drawing No. 02529-16, Asphalt Pathway Typical Section
Add: City of Bozeman Standard Drawing No. 02529-17, Concrete Class 1 Trail
Add: City of Bozeman Standard Drawing No. 02529-18, Class 2 Trail

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 requirement:

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.

3.8 JOINTS.

C. Revise this section 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

Add the following requirement:

B. Construct all curb ramps with detectable warning surfaces in conformance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Detectable warning plates shall be either cast iron or ductile iron.

SECTION 02581

PAVEMENT MARKINGS AND MARKERS
(PREFORMED PLASTIC, PAINTS AND ENAMELS)

1.2 STANDARD DRAWINGS

Add the following Standard Drawings which are applicable to this section:

City of Bozeman Standard Drawing No. 02581-1, Typical Pavement Markings for Pedestrian Crossings
City of Bozeman Standard Drawing No. 02581-2, Typical Pavement Markings for School Crossings

2.1 PREFORMED PLASTIC PAVEMENT MARKING MATERIAL

A. ***Add the following:*** Pre-formed plastic pavement marking material to be Premark Plus® manufactured by Flint Trading Inc. or approved equal.

D. ***Revise this section as follows:*** 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. Insure that the pavement markings are installed according to manufacturer's recommendations.

Add the following:

2.3 EPOXY PAVEMENT MARKING PAINT

A. Furnish and install 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 02582

REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS

1.1 DESCRIPTION

D. ***Revise this section as follows:*** Furnish thermoplastic that is hydrocarbon based. Furnish thermoplastic material that, while on the roadway surface and at any natural ambient temperature, will exist in a hard solid state with cold ductility that permits normal movement with the road surface without chipping and or cracking.

3.4 APPLICATION

A. 2. Extruded (Inlaid) ***Add the following:***

d. Unless otherwise specified in the contract documents, all transverse pavement markings and words and symbols shall be 400 mils thick, and all longitudinal lines shall be 270 mils thick.

SECTION 02660

WATER DISTRIBUTION

1.4 STANDARD DRAWINGS

Delete: Standard Drawing No. 02660-3, Thrust Blocking for Water Main Valves
Delete: Standard Drawing No. 02660-4, Fire Hydrant Setting
Delete: Standard Drawing No. 02660-5, Hydrant Location Detail
Delete: Standard Drawing No. 02660-6, Water Service Line
Delete: Standard Drawing No. 02660-7, Blowoff Valve
Add: City of Bozeman Standard Drawing No. 02660-3, Thrust Blocking for Water Main Valves
Add: City of Bozeman Standard Drawing No. 02660-4, Fire Hydrant
Add: City of Bozeman Standard Drawing No. 02660-5, Hydrant Location Detail
Add: City of Bozeman Standard Drawing No. 02660-6, Water Service Line
Add: City of Bozeman Standard Drawing No. 02660-7, Typical Blowoff
Add: City of Bozeman Standard Drawing No. 02660-8, Hydrant Barrier Posts
Add: City of Bozeman Standard Drawing No. 02660-10, Typical Valve/Tee Restraint
Add: City of Bozeman Standard Drawing No. 02660-11, Water Main Crossing Below Existing Sewer Main
Add: City of Bozeman Standard Drawing No. 02660-12, Water Service Line, 4" and Larger
Add: City of Bozeman Standard Drawing No. 02660-12A, Typical Riser Configuration
Add: City of Bozeman Standard Drawing No. 02660-13, Standard Fire Service Line Installation, Class I, II, and III Systems
Add: City of Bozeman Standard Drawing No. 02660-14, Standard Fire Service Line Installation, Class IV and V Systems
Add: City of Bozeman Standard Drawing No. 02660-15, Water Service Line from Curb Stop to Building (Lines 2" and Smaller)
Add: City of Bozeman Standard Drawing No. 02660-16, Water and Sewer Main and Services Location Standards
Add: City of Bozeman Standard Drawing No. 02660-17, Water Service Interior Clearances
Add: City of Bozeman Standard Drawing No. 02660-18, Irrigation Meter Pit, ¾" or 1"
Add: City of Bozeman Standard Drawing No. 02660-19, Irrigation Meter Pit, 1 ½" or 2"

2.2 PIPE MATERIALS

B. Ductile Iron Pipe

1. ***Revise as follows:*** Furnish 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.

2. ***Revise as follows:*** 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. If restrained joints at fittings are required, use Megalug mechanical joint restraint or Megaflange restrained flange adapter, manufactured by EBBA Iron Sales, or Uni-flange Series 1400 retainer glands, manufactured by Ford Meter Box Company, MJ Field Lok® Series DI, manufactured by US Pipe, Field Lok® 350 Gaskets for push-on joints, manufactured by US Pipe, Sigma One-Lok Series SLD manufactured by Sigma Corporation, or approved equal.

4. Fittings ***Delete the use of gray-iron fittings, 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.

5. 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. Assure the fitting exterior is bituminous tar coated 1 mil thick 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.

6. Couplings ***Delete the use of cast iron or gray iron sleeves. Add the following requirements:***

a. 4) Furnish one of the following copper to copper compression connection couplings: Mueller H15403; Ford C44-xx-Q style; or AY McDonald 4758Q for 3/4", 1", 3/4" x 1", and 1" x 1 1/2". No connection couplings are permitted from the corporation stop to the curb stop for ¾" and 1" services.

5) Hymax® couplings shall not be used.

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

D. Concrete Cylinder Pipe ***Delete the use of this pipe material for water lines***

E. Water Service Pipe ***Revise this section 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. Unless otherwise shown on the plans, furnish and install the service pipe from the main to 8 feet past the property line with a curb stop and curb box installed 8 feet past the property line. Install the water service lines in accordance with City of Bozeman Standard Drawings 02660-6 and 02660-12 and where applicable with "City of Bozeman Fire Service Line Standard", City of Bozeman Standard Drawings 02660-13 and 02660-14.

   c. Copper Service Pipe

      1) Use copper, type K annealed, meeting AWWA Standard C800. Use straight lengths for 1.5” and 2” services.

   d. Polyethylene Service Pipe ***Delete the use of this pipe material for permanent water lines.***

   e. Ductile Iron Pipe

      1) Use ductile iron pipe for water service lines that are 4" in diameter or larger. Furnish ductile iron pipe which conforms to the requirements of Section 02660.

2.3 TAPPING SLEEVES AND VALVES: ***Revise this section 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 as manufactured by Mueller Company, Model H-615 or H-304, or as manufactured by Romac Industries, “SST” Stainless Steel Tapping Sleeve with ductile iron flanged outlet; 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 ***Revise this section as follows:***

1. 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 B25008, Ford FB1000-x-Q, or A.Y. McDonald 4701BQ corporation stops.

2.5 SERVICE CLAMPS ***Revise this section as follows:***

1. 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 ***Revise this section as follows:***

1. 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-25155 1½" Minneapolis Thread, or A.Y. McDonald 6104Q, part number 4182-035
1"	Ford Ball Valve Curb Stop B44-444-M-Q 1½" Minneapolis Thread, Mueller B-25155 1½" Minneapolis Thread, or A.Y. McDonald 6104Q, part number 4182-192
1½"	Ford Ball Valve Curb Stop B44-666-M-Q 2" Minneapolis Thread, Mueller B-25155 2" Minneapolis Thread, or A.Y. McDonald 6104Q, part number 4182-137

2" Ford Ball Valve Curb Stop B44-777-M-Q 2" Minneapolis Thread, Mueller B-25155 2" Minneapolis Thread, or A.Y. McDonald 6104Q, part number 4182-081

2.7 CURB BOXES ***Revise this section as follows:***

1. 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 H10388 curb box 1 ¼" top with a 2 ½" base tapping (with a 2 ½" x 1 ½" standard black hex bushing a 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 a 9/16" stationary rod)

   1 ½" and 2" Curb Stops:
   Mueller H10304 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) or A.Y. McDonald Model 5624

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

2.8 VALVES

A. Gate Valves ***Revise this section as follows:***

3. 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. Furnish Mueller 2360 valves or American Flow Control Series 2500 Ductile Iron Resilient Wedge Gate valves for sizes 12" and smaller, and Mueller 2361 or American Flow Control Series 2500 Ductile Iron Resilient Wedge Gate valves for sizes 14" to 20", or American AVK Series 65 Ductile Iron Resilient Wedge Gate Valves for sizes 4" through 12", Series 45 for 14" and 16" valves, and Series 55 for 18" and 20" valves, or Kennedy 8572/8571 for 12" and smaller and 7572/7571 for 14" to 20". Bolts and nuts for the stuffing box, wrench nut cap screw, and bonnet shall be Type 304 stainless steel.

B. Butterfly Valves ***Revise this section as follows:***

1. 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 section:

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 requirement:***

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 this section as follows:***

B. 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.

D. 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. Furnish Mueller Super Centurion 250 model hydrants or Waterous 5 ¼" Pacer model hydrants per Water Department specifications, or American AVK Series 2780 Nostalgic Fire Hydrant, or Kennedy K81D hydrant. Furnish Mueller Defender Security Device, with locks keyed to City of Bozeman Standard, for each hydrant installed.

Add the following section:

2.13 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, AY Mc Donald, and Ford. The Meter

Department shall approve specific models proposed for use on a case-by-case basis.

Add the following sections:

2.14 "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).

2.15 INSULATION

A. Insulation for water pipelines shall be expanded polystyrene rigid board foam plastic with a compressive strength of 60 psi at 10% deformation, minimum.

3.2 PIPE INSTALLATION FOR WATER MAINS

C. Laying of Pipe ***Revise as follows:***

10. 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 22½° 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 utilizing Megalug® , Uni-Flange™ , MJ Field Lok® Series DI, Field Lok® 350 Gaskets for push-on joints, manufactured by US Pipe, Sigma One Lok Series SLD manufactured by Sigma Corporation, or approved equal joint restraints, for all fittings 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 requirement:***

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 requirements:***

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. 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. 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.

d. 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.

e. 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.

f. 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.

Add the following section:

D. Pipe insulation

1. If the Water Superintendent has allowed water pipe to be installed with less than 6.5 feet of cover, provide insulation as directed by the Engineer.

2. Provide insulation as directed by the Engineer where water pipes cross any storm drains or culverts.

3.3 POLYETHYLENE ENCASEMENT

A. ***Revise this section as follows***: Polyethylene encasement or other corrosion protection is not required unless corrosive soils are encountered or anticipated. When specified 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.

Add the following new section:

3.3.5 DETECTABLE BURIED WARNING TAPE

A. Install 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.

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

A. Hydrostatic and Leakage Testing

1. ***Add the following:*** The required minimum hydrostatic pressure for any test is 200 psi.

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

4. ***Revise this section 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 requirements:

11. Chlorination, testing, and sampling shall comply with AWWA Standard C651-92. There shall be no allowable leakage for resilient seat gate valves. At least 24 hours prior to beginning water main tests, a testing schedule shall be submitted by the Contractor to the City Engineering Office for approval. The schedule shall specify the proposed sequence of testing and the methods and procedures which will be used to complete the tests. 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 at least 24 hours in advance. 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 requirements:***

5. Prior to any main flushing the City of Bozeman Engineering Office shall be notified and provided with a flushing schedule and plan a minimum of 24 hours in advance of any main flushing. The City of Bozeman Fire Department shall be allowed adequate access to conduct pressure and flow testing of fire hydrants during the flushing process.

6. 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 at least 24 hours in advance. All existing water main valves are to be operated only by City of Bozeman Water Department personnel.

7. Install an adequately-sized corporation stop on all main stubs longer than 10 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. 1) Tablet Method ***Revise this section as follows:***

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^{o}, 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

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 1200 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 requirement:*** 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 this section 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 this section 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 ***Revise this section as follows:***

A. 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. 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.

C. 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 ***Revise this section as follows:***

A. 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. 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.

SECTION 02720

STORM DRAIN SYSTEMS

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

Delete: Standard Drawing No. 02720-1, 30" Standard Storm Drain Inlet
Delete: Standard Drawing No. 02720-3, Sanitary Sewer and Storm Drain Manhole
Delete: Standard Drawing No. 02720-4, Standard Straight Manhole
Delete: Standard Drawing No. 02720-5, 48" Standard Manhole
Delete: Standard Drawing No. 02720-8, Standard Cast Iron Cover
Delete: Standard Drawing No. 02720-9, Standard 24" Cast Iron Ring
Add: City of Bozeman Standard Drawing No. 02720-1, 36" Standard Storm Drain Inlet
Add: City of Bozeman Standard Drawing No. 02720-1A, Standard Square Storm Drain Inlet
Add: City of Bozeman Standard Drawing No. 02720-1B, Combination Manhole and Curb Inlet
Add: City of Bozeman Standard Drawing No. 02720-3, Sanitary Sewer and Storm Drain Manhole
Add: City of Bozeman Standard Drawing No. 02720-4, Standard Straight Manhole
Add: City of Bozeman Standard Drawing No. 02720-11, Storm Drain Debris Rack

2.1 GENERAL

A. ***Add the following:*** All culverts shall be reinforced concrete with flared-end sections unless otherwise approved by the City Engineer. All public storm drain systems shall be constructed with reinforced concrete pipe or with solid-wall SDR-35 PVC Pipe or Schedule 40 ~~or corrugated~~ PVC pipe for pipe sizes 36" and less, ~~or with HP Storm Pipe manufactured by Advanced Drainage Systems, Inc., for pipe sizes 24" and less.~~

2.2. PIPE MATERIALS

E. MANHOLES

d. Frames and Covers

1. ***Revise this section 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.

F. INLETS AND CATCH BASINS ***Revise this section as follows:***

a. 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 section:

G. DRY WELLS

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

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 this section 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.

3.5 TESTS

Add the following requirement:

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 1) the alignment is outside the specified limits, 2) 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 3) 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.

SECTION 02730

SANITARY SEWER COLLECTION SYSTEMS

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

Delete: Standard Drawing No. 02720-3, Sanitary Sewer and Storm Drain Manhole
Delete: Standard Drawing No. 02720-4, Standard Straight Manhole
Delete: Standard Drawing No. 02720-5, 48" Standard Manholes Showing Two Types of Cone Sections
Delete: Standard Drawing No. 02720-8, Standard Cast Iron Cover
Delete: Standard Drawing No. 02720-9, Standard 24" Cast Iron Ring
Delete: Standard Drawing No. 02730-2, Sanitary Sewer Service Line
Delete: Standard Drawing No. 02730-3, Deep Sanitary Sewer Service Line
Add: City of Bozeman Standard Drawing No. 02730-3, Deep Sanitary Sewer Service Line
Add: City of Bozeman Standard Drawing No. 02660-16, Water and Sewer Main and Services Location Standards
Add: City of Bozeman Standard Drawing No. 02720-3, Sanitary Sewer and Storm Drain Manhole
Add: City of Bozeman Standard Drawing No. 02720-4, Standard Straight Manhole
Add: City of Bozeman Standard Drawing No. 02730-2, Sanitary Sewer Service Line
Add: City of Bozeman Standard Drawing No. 02730-4, Sanitary Sewer Cleanout
Add: City of Bozeman Standard Drawing No. 02730-5, Standard Drop Manhole

2.1 GENERAL

A. ***Revise this section as follows:*** 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 ***Delete the use of High Density Polyethylene (HDPE) Pipe and Corrugated PVC pipe for sanitary sewers***

A. Polyvinyl Chloride (PVC) Pipe

2. Gravity Sewer Pipe

a. ***Revise this section as follows:*** 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".
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.

5. Fittings ***Revise this section as follows:***

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

2.3 MANHOLES

A. General

1. ***Add the following:*** 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. ***Revise this section 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 "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.

3.1 PIPE AND SERVICE LINE INSTALLATION

D. 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.

Add the following:

F. Install 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.

3.2 MANHOLES

A. Construction

2. ***Add the following requirements:*** Unless otherwise approved by the City of Bozeman, make all break-in connections to existing manholes by using a core drilling machine. Trim off and remove all excess gasket material inside manholes.

3. ***Revise this section as follows:*** 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. Furnish concrete adjusting rings reinforced with the same percentage of steel as the riser and top, or HDPE adjusting rings. 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. ***Revise this section as follows:*** 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 requirements:*** 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 requirement:*** 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 (Alternate)

9. ***Revise this section as follows:*** 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 requirement:

10. 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 1) the alignment is outside the specified limits, 2) 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 3) 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 section:

J. 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.

Add the following new section:

SECTION 09810

STREET SIGNS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section is furnishing, fabrication, installation and the removing and resetting of signs in accordance with these and other specifications, the Standard Drawings, and in the location as shown on the plans or as directed by the Engineer.

1.2 REFERENCES

MUTCD Manual on Uniform Traffic Control Devices

1.3 STANDARD DRAWINGS

Standard Drawings in Appendix C applicable to this section are as follows:

City of Bozeman Standard Drawing No. 09810-1, Sign Installation Standards
City of Bozeman Standard Drawing No. 09810-2, Dead End Barricade
City of Bozeman Standard Drawing No. 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 where 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. Payment for these items is full compensation for providing 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.

APPENDIX A

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
STANDARD DRAWINGS

Drawing	Description	Status
2213-1	Manhole Adjustment Detail	Replaced
2213-2	Water Valve Adjustment Detail	Replaced
2221-1	Typical Utility Trench Detail	Active
2221-2	Pipe Bedding Alternate	Active
2222-1	Trench Plug Excavation Detail	Active
2528-1	Detail of Standard Curb and Gutter	Replaced
2528-2	Detail of Drive Over Curb and Gutter	Deleted
2529-1	Double Gutter Detail for Street Intersection	Replaced
2529-2	Standard Fillet	Replaced
2529-3	Type I Street Monument	Replaced
2529-4	Type II Street Monument	Deleted
2529-5 A	Boulevard Drive Approach Detail	Replaced
2529-5 B	Curb Walk Drive Approach Detail	Replaced
2529-6	Retrofit Drive Approach	Active
2529-7A	Boulevard Alley Approach Detail	Active
2529-7B	Curb Walk Alley Approach Detail	Replaced
2529-8	Accessibility Ramp	Replaced
2529-9	Swale Crossing	Deleted
2529-10	Mailbox Mounting For Curbline Delivery	Active
2660-1	Thrust Blocking for Water Main Fittings	Active
2660-2	Water And Sewer Main Separation	Active
2660-3	Thrust Blocking For Water Main Valves	Replaced
2660-4	Fire Hydrant Setting	Replaced
2660-5	Hydrant Location Detail	Replaced
2660-6	Water Service Line	Replaced
2660-7	Blowoff Valve	Replaced
2720-1	30" Standard Storm Drain Inlet	Replaced
2720-2	24" Standard Riser Inlet	Active
2720-3	Sanitary Sewer And Storm Drain Manhole	Replaced
2720-4	Standard Straight Manhole (ASTM C-478)	Replaced
2720-5	48" Standard Manhole (Cone Sections)	Deleted
2720-6	Precast Manhole Bases	Active
2720-7	Typical Manhole Channel Details	Active
2720-8	Standard Cast Iron Manhole Cover	Deleted
2720-9	Standard 24" Cast Iron Ring	Deleted
2720-10	Storm Drain Service Line	Active
2730-1	Nomograph For Air Testing Gravity SewerMains	Active
2730-2	Sanitary Sewer Service Line	Replaced
2730-3	Deep Sanitary Sewer Service Line	Deleted

APPENDIX B

CITY OF BOZEMAN STANDARD DRAWINGS

Drawing	Description
01570-1	Traffic Control, Minimum Standard, Urban Work Site, 4 Lane Road, Work Site Closing One Lane
01570-2	Traffic Control, Minimum Standard, Urban Work Site, 2 Lane Road, Work Site On Centerline
01570-3	Traffic Control, Minimum Standard, Urban Work Site, 4 Lane Road, Work Site On Centerline Partially Blocking Inside Lanes
01570-4	Traffic Control, Minimum Standard, Urban Work Site, 2 Lane Road, 1 Lane Partially or Fully Closed By Work Area
01570-5	Traffic Control, Minimum Standard, Rural Work Site, Work Adjacent to the Present Traveled Way
01570-6	Traffic Control, Minimum Standard, Rural Work Site, Utility Work On or Across the Present Traveled Way
01570-7	Pedestrian Traffic Control for Temporary Sidewalk Closure
01570-8	Sidewalk Closure with Detour
02213-1	Manhole Adjustment Detail
02213-2	Water Valve Adjustment Detail
02528-1	Integral Concrete Curb and Gutter
02529-1	Double Gutter Detail for Street Intersection
02529-2	Standard Fillet
02529-3	Type I Street Monument
02529-5	Driveway Approach With Sidewalk Adjacent to Curb
02529-7B	Curb Walk Alley Approach
02529-8	Pedestrian Ramp
02529-8A	Blended Transition Pedestrian Ramp
02529-11	Residential Driveway Approach and Sidewalk Details
02529-12	Non-Residential Driveway Approach
02529-13	Non-Residential Driveway Approach for Arterial Streets
02529-14	Concrete Storm Drainage Outlet and Inlet Chases
02529-15	Publicly-Maintained Sidewalk
02529-16	Asphalt Pathway Typical Section
02529-17	Concrete Class 1 Trail Typical Section
02529-18	Class 2 Trail Typical Section
02581-1	Typical Pavement Markings for Pedestrian Crossings (Type "A" Crossings)
02581-2	Typical Pavement Markings for School Crossings (Type "B" Crossings)
02660-3	Thrust Blocking For Water Main Valves
02660-4	Fire Hydrant
02660-5	Hydrant Location Detail
02660-6	Water Service Line
02660-7	Typical Blowoff

Drawing	Description
02660-8	Hydrant Barrier Posts
02660-10	Typical Valve/Tee Restraint
02660-11	Water Main Crossing Below Existing Sewer Main
02660-12	Standard Domestic Service Line Installation for Sizes 4" and Larger
02660-12A	Typical Riser Configuration
02660-13	Standard Fire Service Line Installation For Class I, II and III Systems
02660-14	Standard Fire Service Line Installation For Class IV and V Systems
02660-15	Water Service Line From Curb Stop to Building (Lines 2" and Smaller)
02660-16	Water and Sewer Main and Services Location Standards
02660-17	Water Service Interior Clearances
02660-18	Irrigation Meter Pit, ¾” or 1” Services
02660-19	Irrigation Meter Pit, 1 ½” or 2” Services
02720-1	36" Standard Storm Drain Inlet
02720-1A	Standard Square Storm Drain Inlet
02720-1B	Combination Manhole and Curb Inlet
02720-3	Sanitary Sewer and Storm Drain Manhole
02720-4	Standard Straight Manhole
02720-11	Storm Drain Debris Rack
02730-2	Sanitary Sewer Service Line
02730-3	Deep Sanitary Sewer Service Line
02730-4	Sanitary Sewer Cleanout
02730-5	Standard Drop Manhole
09810-1	Sign Installation Standards
09810-2	Dead End Barricade
09810-4	Standard Street Marker Sign Location

APPENDIX C

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

Drawing	Description
COB 01570-1	Traffic Control, Minimum Standard, Urban Work Site, 4 Lane Road, Work Site Closing One Lane
COB 01570-2	Traffic Control, Minimum Standard, Urban Work Site, 2 Lane Road, Work Site On Centerline
COB 01570-3	Traffic Control, Minimum Standard, Urban Work Site, 4 Lane Road, Work Site On Centerline Partially Blocking Inside Lanes
COB 01570-4	Traffic Control, Minimum Standard, Urban Work Site, 2 Lane Road, 1 Lane Partially Or Fully Closed By Work Area
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, Utility Work On or Across the Present Traveled Way
COB 01570-7	Pedestrian Traffic Control for Temporary Sidewalk Closure
COB 01570-8	Sidewalk Closure with Detour
COB 02213-1	Manhole Adjustment Detail
COB 02213-2	Water Valve Adjustment Detail
MPW 02221-1	Typical Utility Trench Detail
MPW 02221-2	Pipe Bedding Alternate
MPW 02222-1	Trench Plug Excavation Detail
COB 02528-1	Integral Concrete Curb And Gutter
COB 02529-1	Double Gutter Detail For Street Intersection
COB 02529-2	Standard Fillet
COB 02529-3	Type I Street Monument

COB 02529-5 Driveway Approach With Sidewalk Adjacent To Curb

MPW 02529-6 Retrofit Drive Approach

MPW 02529-7A Boulevard Alley Approach Detail

COB 02529-7B Curb Walk Alley Approach

COB 02529-8 Pedestrian Ramp

COB 02529-8A Blended Transition Pedestrian Ramp

MPW 02529-10 Mailbox Mounting for Curbline Delivery

COB 02529-11 Residential Driveway Approach and Sidewalk Details

COB 02529-12 Non-residential Driveway Approach

COB 02529-13 Non-residential Driveway Approach for Arterial Streets

COB 02529-14 Concrete Storm Drainage Outlet and Inlet Chases

COB 02529-15 Publicly-Maintained Sidewalk

COB 02529-16 Asphalt Pathway Typical Section

COB 02529-17 Concrete Class 1 Trail Typical Section

COB 02529-18 Class 2 Trail Typical Section

COB 02581-1 Typical Pavement Markings for Pedestrian Crossings

COB 02581-2 Typical Pavement Markings for School Crossings

MPW 02660-1 Thrust Blocking for Water Main Fittings

MPW 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	Typical Blowoff
COB 02660-8	Hydrant Barrier Posts
COB 02660-10	Typical Valve/Tee Restraint
COB 02660-11	Water Main Crossing Below Existing Sewer Main
COB 02660-12	Standard Domestic Service Line Installation for Sizes 4" and Larger
COB 02660-12A	Typical Riser Configuration
COB 02660-13	Standard Fire Service Line Installation For Class I, II And III Systems
COB 02660-14	Standard Fire Service Line Installation For Class IV And V Systems
COB 02660-15	Water Service Line from Curb Stop to Building (Lines 2" and Smaller)
COB 02660-16	Water And Sewer Main And Services Location Standards
COB 02660-17	Water Service Interior Clearances
COB 02660-18	Irrigation Meter Pit, ¾” or 1” Services
COB 02660-19	Irrigation Meter Pit, 1 ½” or 2” Services
COB 02720-1	36" Standard Storm Drain Inlet
COB 02720-1A	Standard Square Storm Drain Inlet
COB 02720-1B	Combination Manhole and Curb Inlet
MPW 02720-2	24” Standard Riser Inlet
COB 02720-3	Sanitary Sewer And Storm Drain Manhole
COB 02720-4	Standard Straight Manhole
MPW 02720-6	Precast Manhole Bases
MPW 02720-7	Typical Manhole Channel Details
MPW 02720-10	Storm Drain Service Line
COB 02720-11	Storm Drain Debris Rack

MPW 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

COB 09810-1 Sign Installation Standards

COB 09810-2 Dead End Barricade

COB 09810-4 Standard Street Marker Sign Location

City of Bozeman
Approved list of Copper Connections

COPPER TO COPPER UNIONS

BRAND	SIZE	TYPE	FACTORY NUMBER
A.Y. McDonald	¾”	Compression 3 piece	4758Q
Ford	¾”	Compression 3 piece	C44-33Q
Mueller	¾”	Compression 3 piece	H15403
A.Y. McDonald	1”	Compression 3 piece	4758Q
Ford	1”	Compression 3 piece	C44-44Q
Mueller	1”	Compression 3 piece	15403
A.Y. McDonald	1 ½”	Compression 3 piece	4758Q
Ford	1 ½”	Compression 3 piece	C44-66Q
Mueller	1 ½”	Compression 3 piece	H15403
A.Y. McDonald	2”	Compression 3 piece	4758Q
Ford	2”	Compression 3 piece	C44-77Q
Mueller	2”	Compression 3 piece	H15403
A.Y. McDonald	¾X1”	Compression 3 piece	4758Q
Mueller	¾X1”	Compression 3 piece	H15403
A.Y. McDonald	1X11/2”	Compression 3 piece	4758Q

COPPER TO COPPER 90’S

BRAND	SIZE	TYPE	FACTORY NUMBER
A.Y. McDonald	1 ½”	Compression	4761Q
Mueller	1 ½”	Compression	H15526
A.Y. McDonald	2”	Compression	4761Q
Mueller	2”	Compression	H15526

STRAIGHT STOPS

BRAND	SIZE	TYPE	FACTORY NUMBER
A.Y. McDonald	¾”	Compression	6100MWQ
Mueller	¾”	Compression	B24350
A.Y. McDonald	1”	Compression	6100MWQ
Mueller	1”	Compression	B24350
A.Y. McDonald	1 ½”	Compression	6100MWQ
Mueller	1 ½”	Compression	B24335
A.Y. McDonald	2”	Compression	6100MWQ
Mueller	2”	Compression	B24335

ANGLE STOPS

BRAND	SIZE	TYPE	FACTORY NUMBER
A.Y. McDonald	¾”	Compression	4602BQ
Mueller	¾”	Compression	B24258
A.Y. McDonald	1”	Compression	4602BQ
Mueller	1”	Compression	B24258
A.Y. McDonald	1 ½”	Compression	4602BQ
Mueller	1 ½”	Compression	B24276
A.Y. McDonald	2”	Compression	4602BQ
Mueller	2”	Compression	B24276

CORPORATION STOPS

BRAND	SIZE	TYPE	FACTORY NUMBER
A.Y. McDonald	¾”	Ball Corps	4701BQ
Mueller	¾”	Ball Corps	B25008
Ford	¾”	Ball Corps	FB10003Q
A.Y. McDonald	1”	Ball Corps	4701BQ
Mueller	1”	Ball Corps	B25008
Ford	1”	Ball Corps	FB10004Q
A.Y. McDonald	1 ½”	Ball Corps	4701BQ
Mueller	1 ½”	Ball Corps	B25008
Ford	1 ½”	Ball Corps	FB10006Q
A.Y. McDonald	2”	Ball Corps	4701BQ
Mueller	2”	Ball Corps	B25008
Ford	2”	Ball Corps	FB10007Q

CURB STOPS

BRAND	SIZE	TYPE	FACTORY NUMBER
A.Y. McDonald	¾”	Ball Valves/Minneapolis Thread	6104Q
Mueller	¾”	Ball Valves/Minneapolis Thread	B25155
Ford	¾”	Ball Valves/Minneapolis Thread	B44-333MQ
A.Y. McDonald	1”	Ball Valves/Minneapolis Thread	6104Q
Mueller	1”	Ball Valves/Minneapolis Thread	B25155
Ford	1”	Ball Valves/Minneapolis Thread	B44-444MQ
A.Y. McDonald	1 ½”	Ball Valves/Minneapolis Thread	6104Q
Mueller	1 ½”	Ball Valves/Minneapolis Thread	B25155

CURB STOPS

BRAND	SIZE	TYPE	FACTORY NUMBER
Ford	1 ½”	Ball Valves/Minneapolis Thread	B44-666MQ
A.Y. McDonald	2”	Ball Valves/Minneapolis Thread	6104Q
Mueller	2”	Ball Valves/Minneapolis Thread	B25155
Ford	2”	Ball Valves/Minneapolis Thread	B44-777MQ

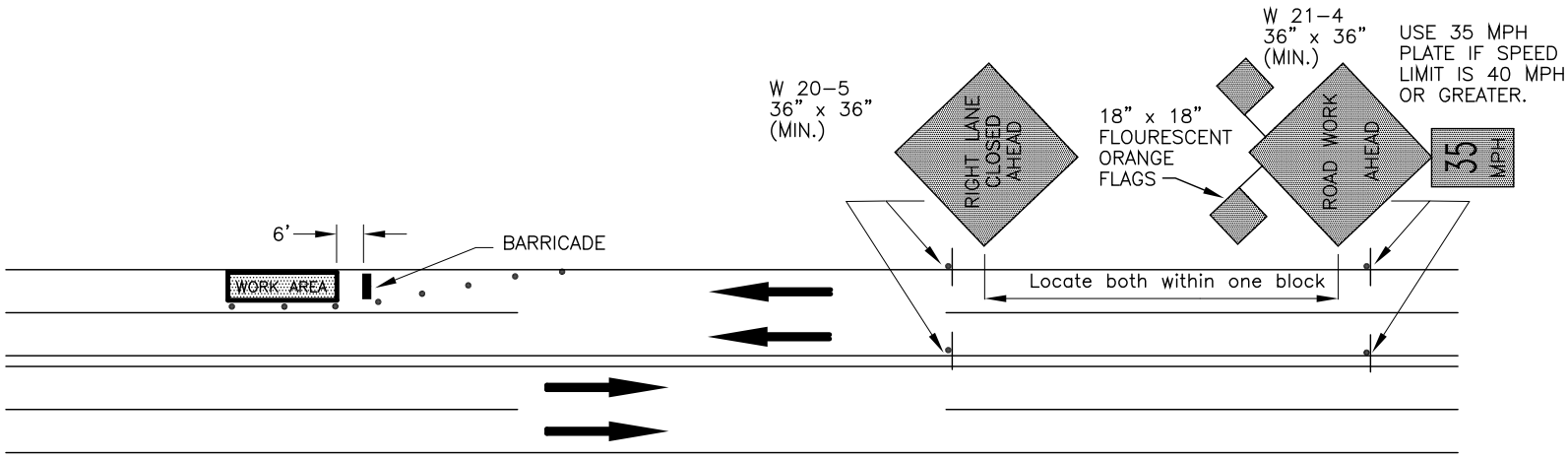
CURB BOXES

BRAND	SIZE	TYPE	FACTORY NUMBER
Mueller	All		H10388 with bushings as required

SADDLES

BRAND	SIZE	TYPE	FACTORY NUMBER
A.Y. McDonald	4”		2838
Ford	4”	for DIP	202B-540
Mueller	4”		BR2B0474IP
A.Y. McDonald	6”		2838
Ford	6”	for DIP	202B-750
Mueller	6”		BR2B0684IP
A.Y. McDonald	8”		2838
Ford	8”	for DIP	202B-962
Mueller	8”		BR2B0899IP
A.Y. McDonald	10”		2838
Ford	10”	for DIP	202B-1212
Mueller	10”		BR2B1104IP
A.Y. McDonald	12”		2838
Ford	12”	for DIP	202B-1438
Mueller	12”		BR2B1314IP

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



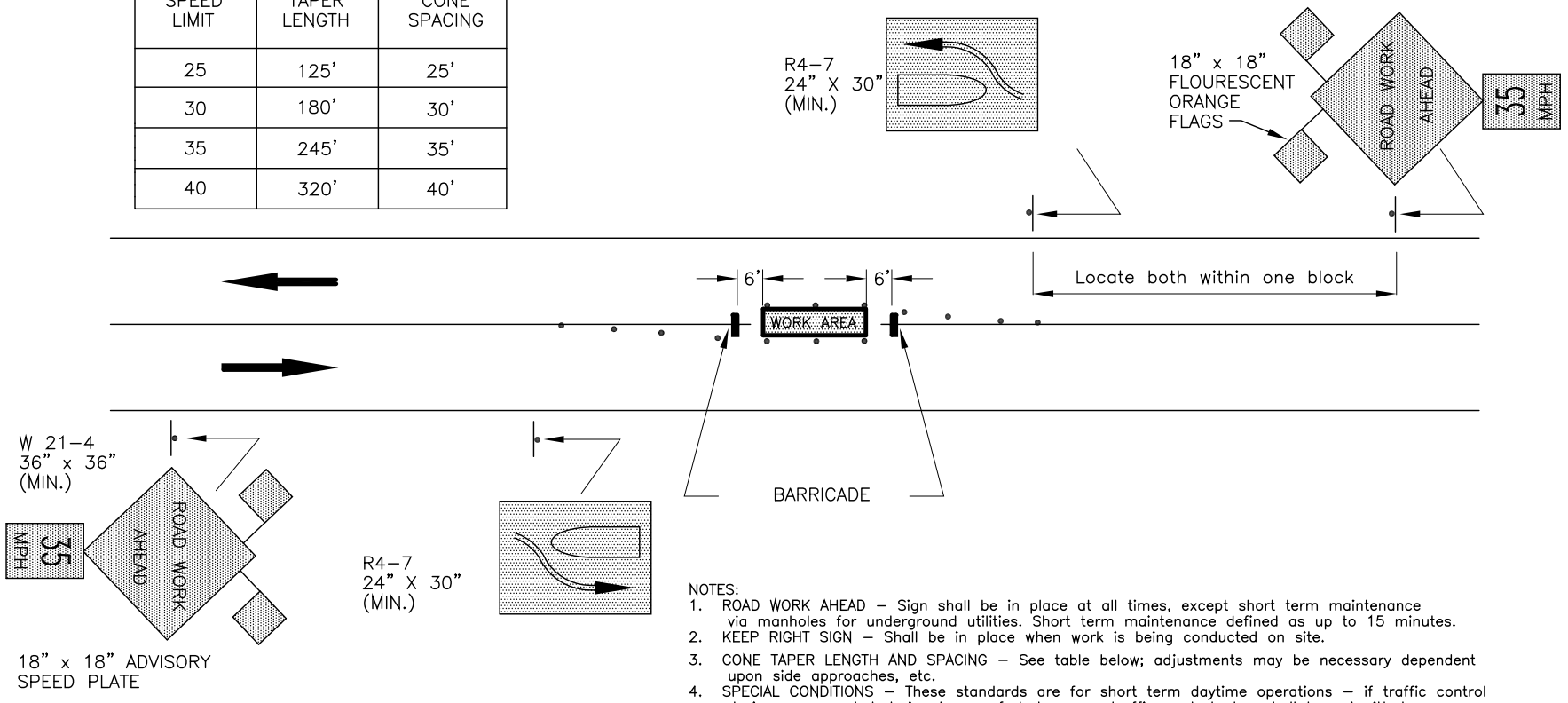
NOTES:

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 below; 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.

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

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD URBAN WORK SITE 4–LANE ROAD WORK SITE CLOSING ONE LANE	NO. 01570–1 AUG. 1994 Revised Feb. 1997

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



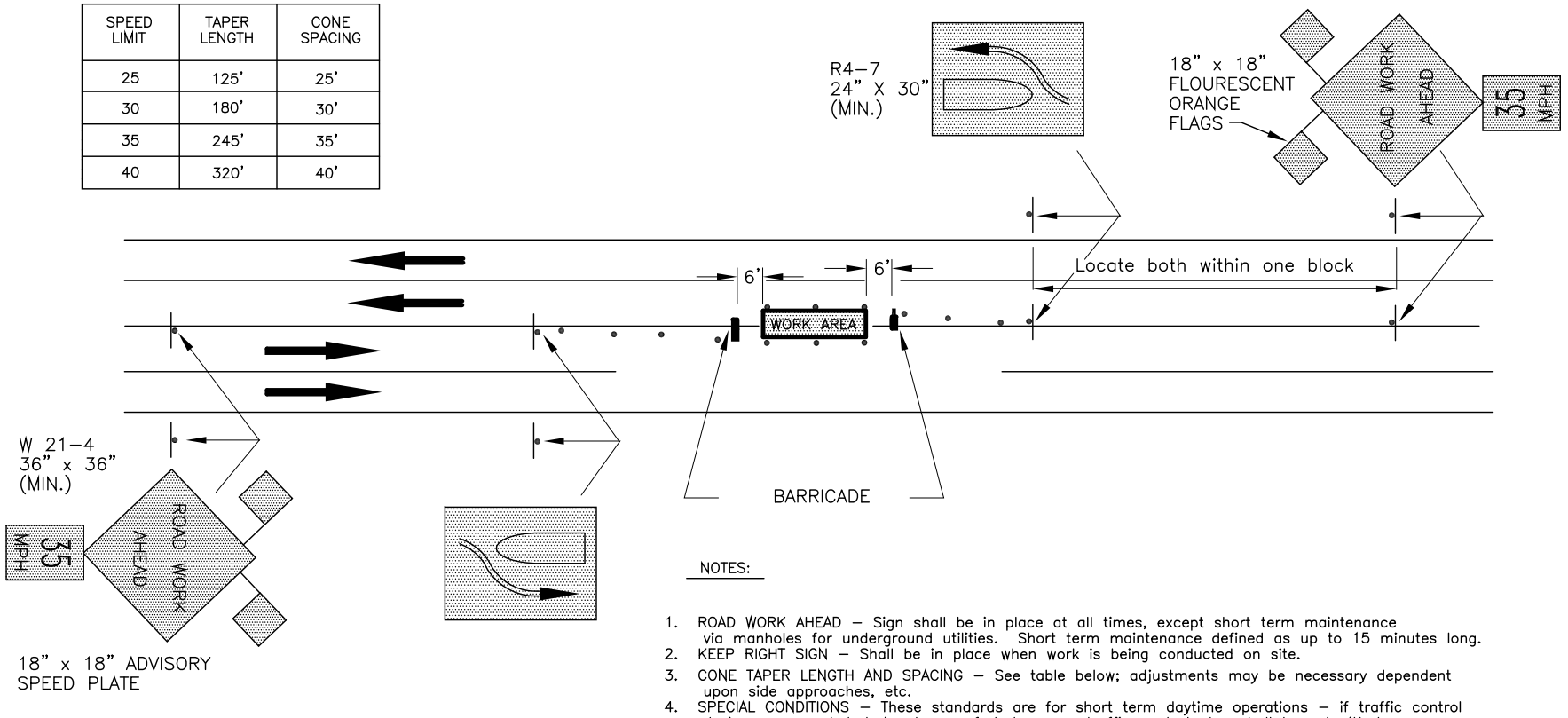
USE 35 MPH PLATE IF SPEED LIMIT IS 40 MPH OR GREATER.

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.
2. KEEP RIGHT SIGN – Shall be in place when work is being conducted on site.
3. CONE TAPER LENGTH AND SPACING – See table below; 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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD URBAN WORK SITE 2-LANE WORK SITE ON CENTERLINE	NO. 01570-2 AUG. 1994 Revised Feb. 1997

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



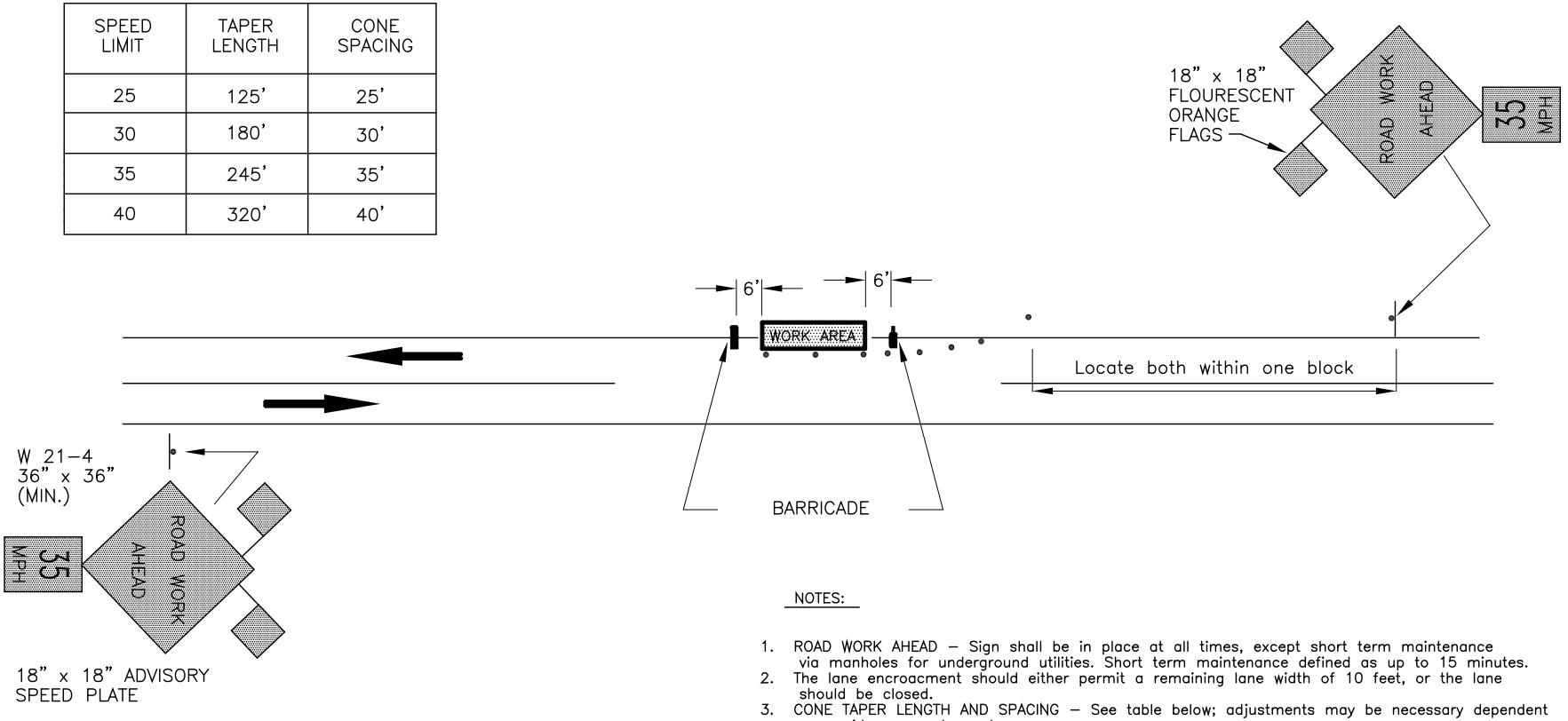
USE 35 MPH PLATE IF SPEED LIMIT IS 40 MPH OR GREATER.

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 below; 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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD URBAN WORK SITE 4-LANE WORK SITE ON CENTERLINE, PARTIALLY BLOCKING INSIDE LANES	NO. 01570-3 AUG. 1994 Revised Feb. 1997

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



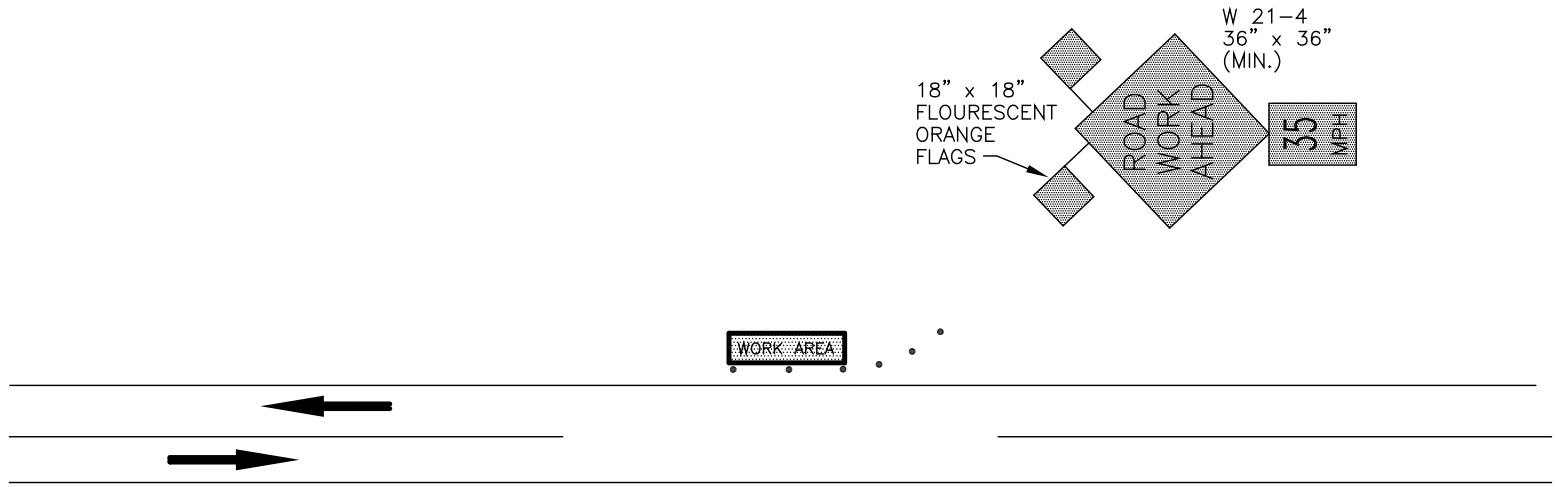
USE 35 MPH PLATE IF SPEED LIMIT IS 40 MPH OR GREATER.

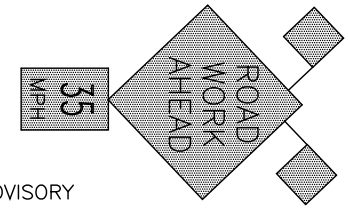
NOTE: IF REMAINING ROADWAY WIDTH IS INADEQUATE TO ALLOW TWO-WAY TRAFFIC, USE FLAGPERSON (SEE DRAWING NO. 6)

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.
2. The lane encroacment should either permit a remaining lane width of 10 feet, or the lane should be closed.
3. CONE TAPER LENGTH AND SPACING – See table below; 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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD URBAN WORK SITE 2-LANE ROAD, 1 LANE PARTIALLY OR FULLY CLOSED BY WORK AREA	NO. 01570-4 AUG. 1994 Revised Feb. 1997



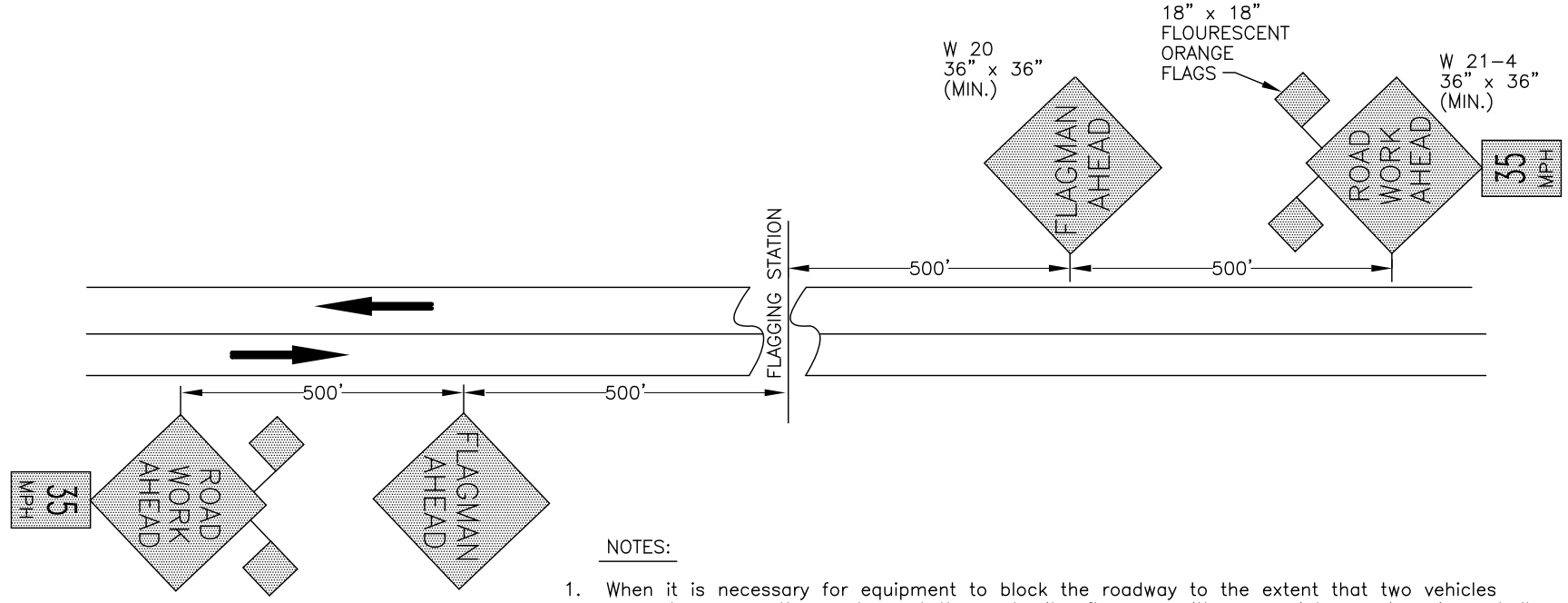


18" x 18" ADVISORY
SPEED PLATE

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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD RURAL WORK SITE WORK ADJACENT TO THE PRESENT TRAVELED WAY (PTW)	NO. 01570-5 AUG. 1994 Revised Feb. 1997

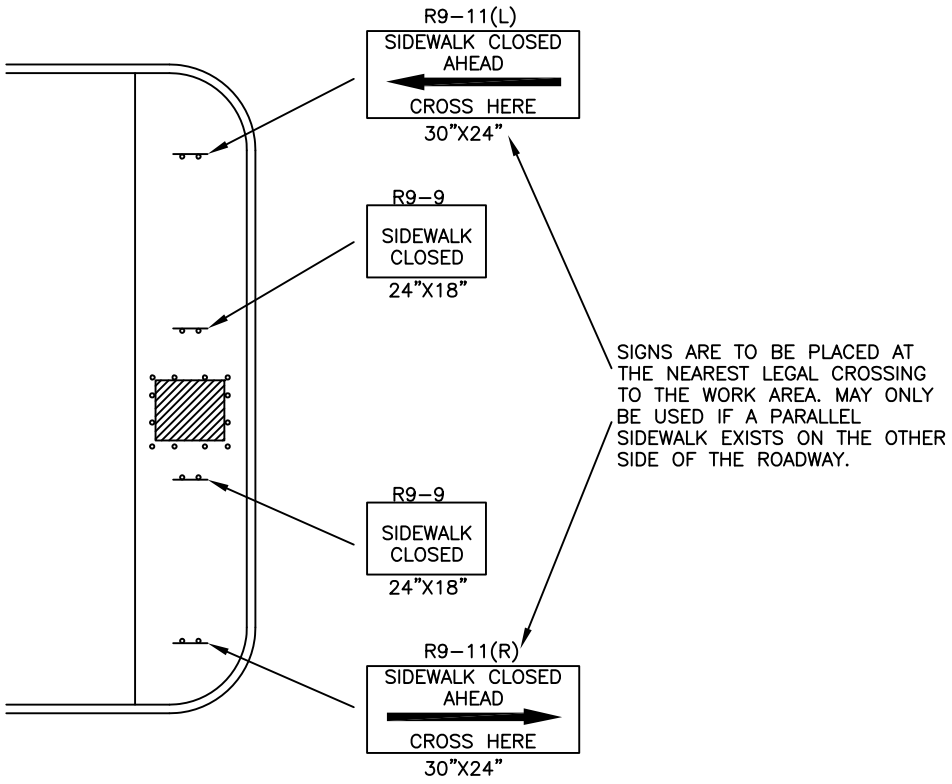


18" x 18" ADVISORY
SPEED PLATE

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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TRAFFIC CONTROL MINIMUM STANDARD RURAL WORK SITE UTILITY WORK ON OR ACROSS THE PRESENT TRAVELED WAY (PTW)	NO. 01570-6 AUG. 1994 Revised Feb. 1997

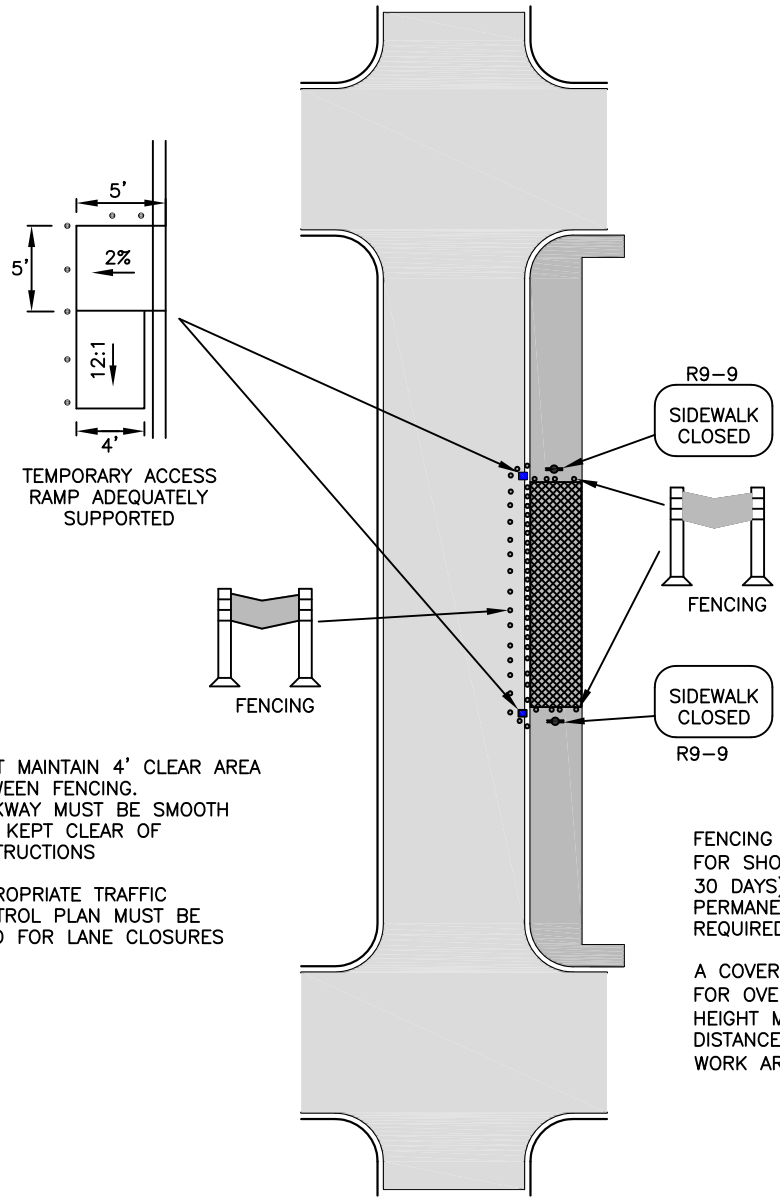


SIGN

WORK SITE

TRAFFIC DRUMS OR CONE

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	PEDESTRIAN TRAFFIC CONTROL FOR TEMPORARY SIDEWALK CLOSURE	NO. 01570-7 FEB 2007



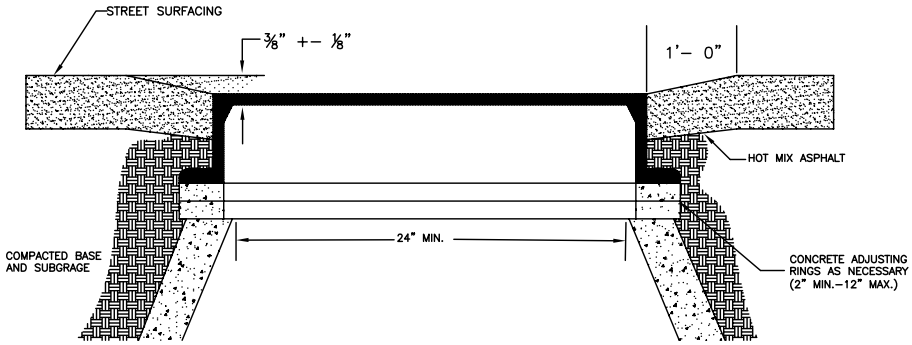
MUST MAINTAIN 4' CLEAR AREA BETWEEN FENCING. WALKWAY MUST BE SMOOTH AND KEPT CLEAR OF OBSTRUCTIONS

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)

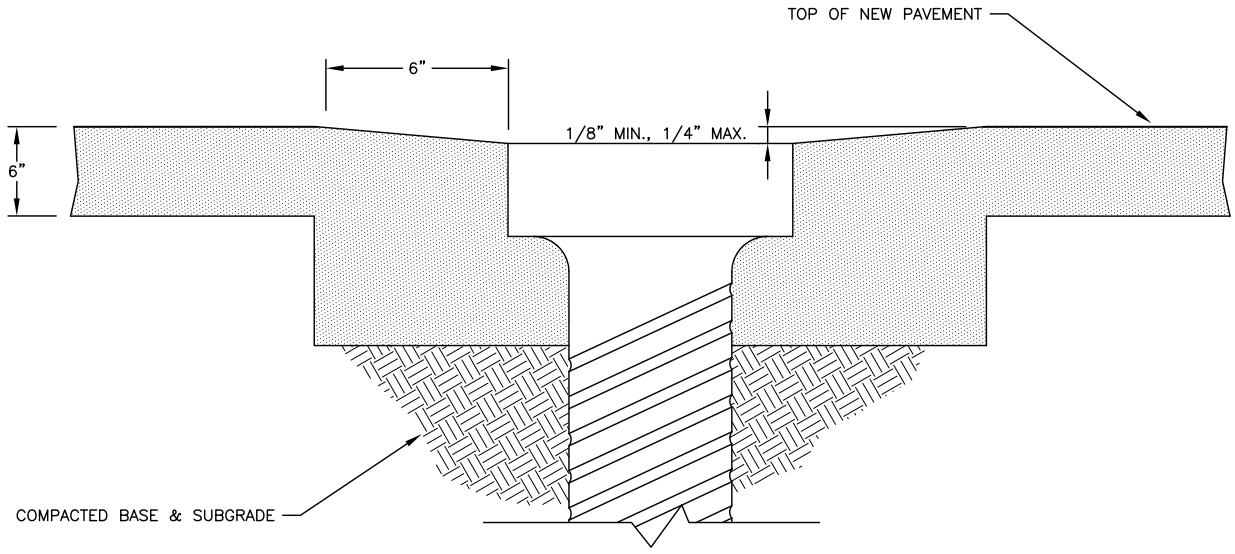
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SIDEWALK CLOSURE WITH DETOUR	NO. 01570-8 FEB 2007



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 mathch 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 Anderson Precast or approved equal concrete angled adjustment rings to obtain required angle.
7. Manhole ring and cover: use MCI 305 frame, 305A cover, IFCO 772 frame, 772-B cover, or Deeter 1025, or D & L A-1172 with 1" cover.

CITY OF BOZEMAN STANDARD DRAWING	Scale: None	MANHOLE ADJUSTMENT DETAIL	NO. 02213-1 Rev. April 2005



NOTES:

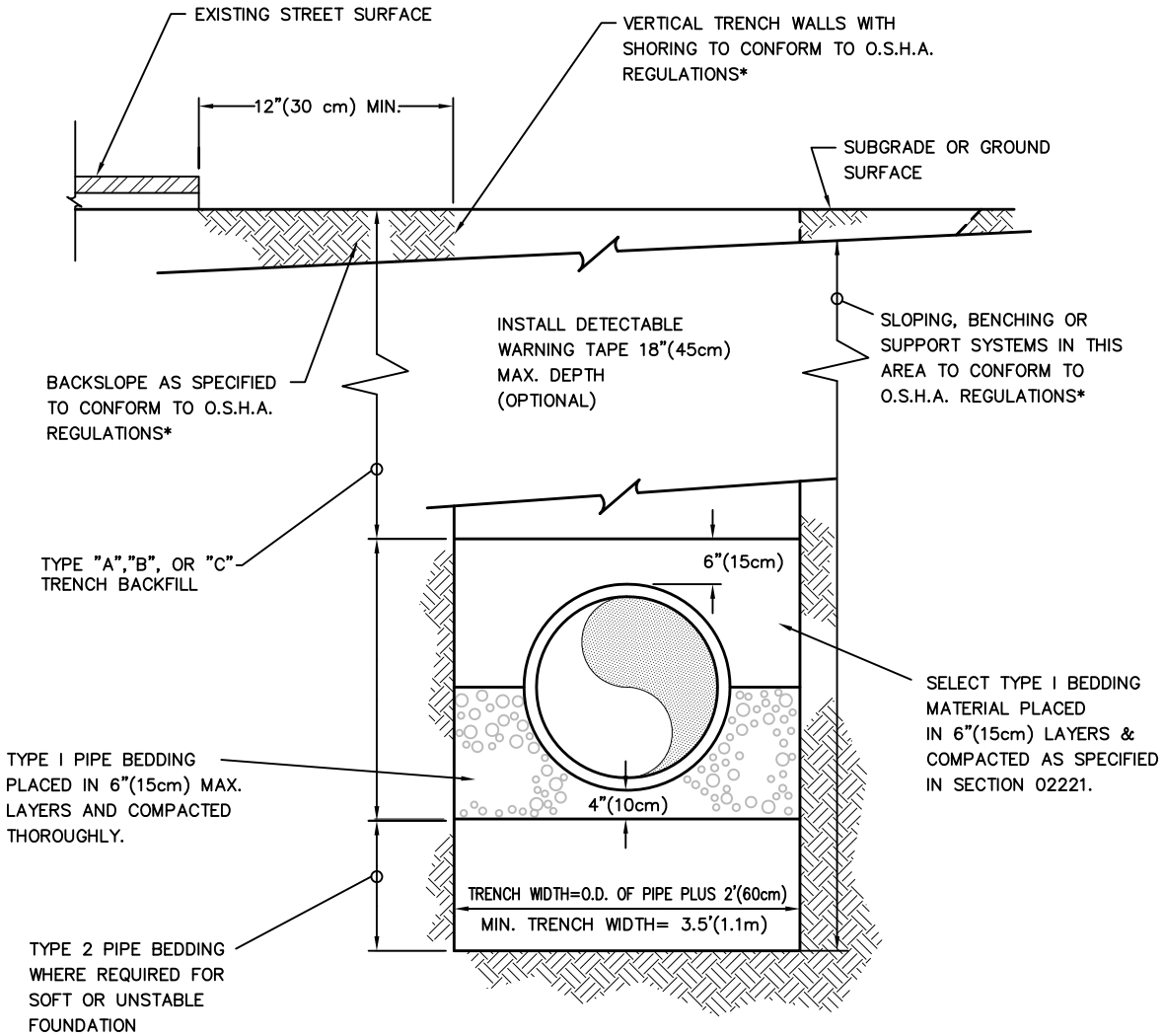
1. Adjust water valves upward or downward as required. Final adjustment shall be made after paving and before seal coating.

2. Model No. 69 8550 series, East Jordan Iron works adjustable screw–type risers may be used to raise or adjust existing valve boxes 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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER VALVE ADJUSTMENT DETAIL	NO. 02213–2 Feb. 2004

NOTE: WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIMUM OF 12" (30cm) FROM THE EDGE OF THE TRENCH OPENING. WHERE NEAT LINE IS LESS THAN 3' (0.9m) FROM EDGE OF EXISTING PAVEMENT OR CURB AND GUTTER SECTION, REMOVE AND REPLACE ENTIRE PAVEMENT SECTION BETWEEN TRENCH AND EDGE OF PAVEMENT.



NOTE: SEE CONTRACT SPECIAL PROVISIONS FOR ANY MODIFICATIONS TO STANDARD TRENCH MATERIALS AND/OR OTHER TRENCH DESIGN FEATURES

* SEE O.S.H.A. CONSTRUCTION STANDARDS FOR EXCAVATIONS.

REVISED: 10/25/02

CITY OF BILLINGS STANDARD SPECIFICATIONS	SCALE: NONE	TYPICAL UTILITY TRENCH DETAILS	STANDARD DRAWING NO. 02221–1

It is recognized that native materials which may be used for pipe bedding vary widely from area to area. Therefore, the following is offered as an alternate to the TYPE 1 pipe bedding specification in Section 02221: TRENCH EXCAVATION AND BACKFILL FOR PIPELINES AND APPURTENANT STRUCTURES. This alternate shall be used only if called for in the Special Provisions. It must be emphasized that no specification should be used without the engineer's evaluation of the particular situation.

TYPE 1 PIPE BEDDING *Type 1 pipe bedding, imported or naturally occurring on site, shall be gravel, gravel-sand mixture, or sand. The material shall be well graded and shall conform to the requirements for soil type GW (gravel, well graded) or SW (sand, well graded) of the Unified Soil Classification System (USCS) as delineated in ASTM D2487 except, at the discretion of the engineer, the material may contain up to a maximum of 12 percent passing the 200 sieve provided the plasticity index of the material is 6 or less. The maximum size gravel shall be 3/4-inch. The coefficient of uniformity for gravel shall be 4 or greater and a coefficient of curvature between 1 and 3. Sand shall have a coefficient of uniformity of 6 or greater and a coefficient of curvature between 1 and 3. Type 1 bedding shall consist of a minimum of 4 inches(10 cm), or 1/8 the outside diameter of pipe, whichever is greater, bedding material under the pipe; and the bedding material around and over the pipe to a point a minimum 6 inches (15cm) above the top of the pipe unless specified otherwise in the Special Provisions.*

The coefficient of uniformity is defined as the ratio of grain size diameter at 60% passing to the grain size diameter at 10% passing expressed as:

$$Cu = \frac{D_{60}}{D_{10}}$$

The coefficient of curvature is defined as the position of the square of the grain size diameter at 30% passing to the product of the grain size diameter at 10% passing times the grain size diameter at 60% passing expressed as:

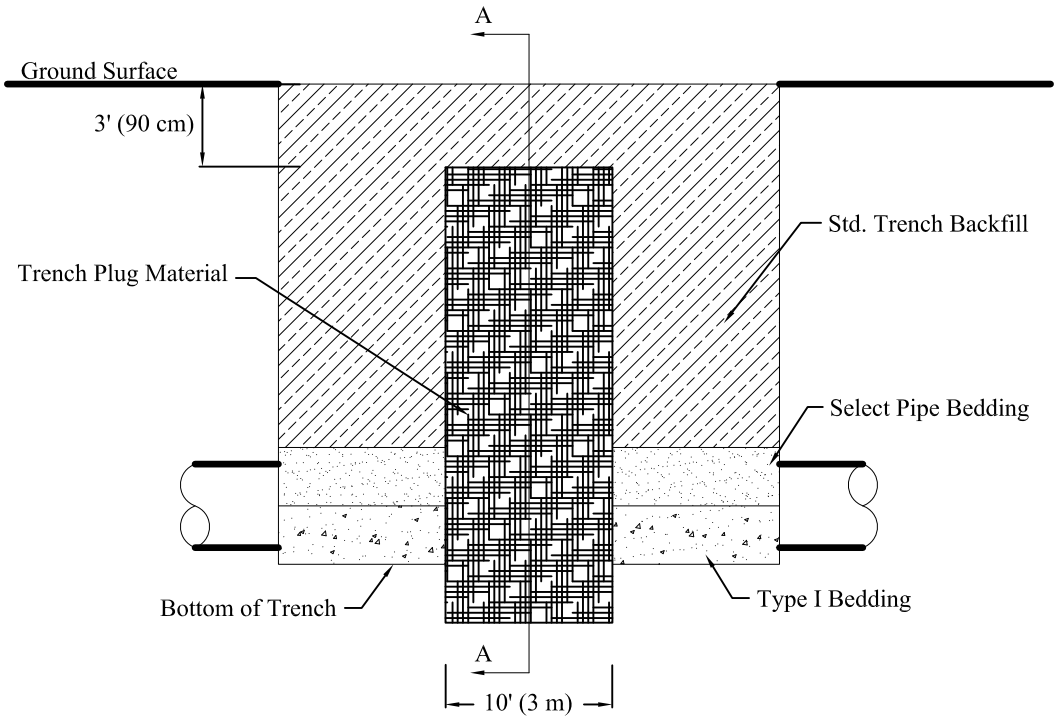
$$Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

Where the naturally occurring material contains voids which would allow migration, sand bedding material shall not be used.

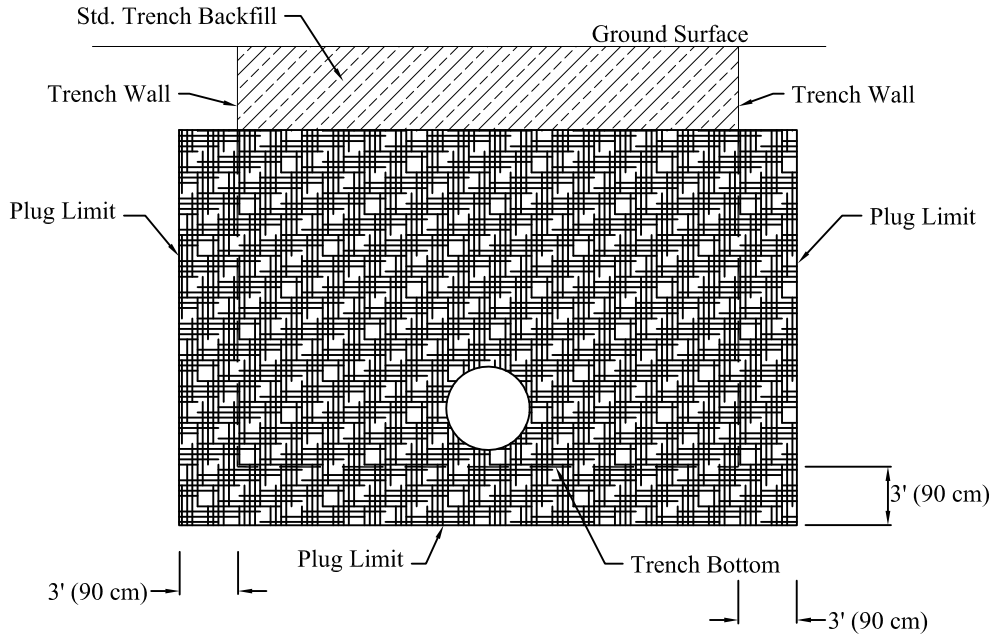
Bedding material under and around the pipe to 6 inches (15cm) above the top of the pipe shall be placed by hand or other careful manner so as not to disturb the pipe, in maximum layers of 6 inches (15cm) and compacted to a minimum of 85% Standard Proctor ASTM D698 R, AASHTO T-99. Special care shall be taken to assure complete compaction under the haunches of the pipe. Backfill material shall be placed in the trench for its full width on each side simultaneously. Water settling of this portion of the trench will not be allowed. The addition of water shall be limited to that required for optimum moisture for maximum compaction of the material.

REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	PIPE BEDDING ALTERNATE	STANDARD DRAWING NO. 02221-2

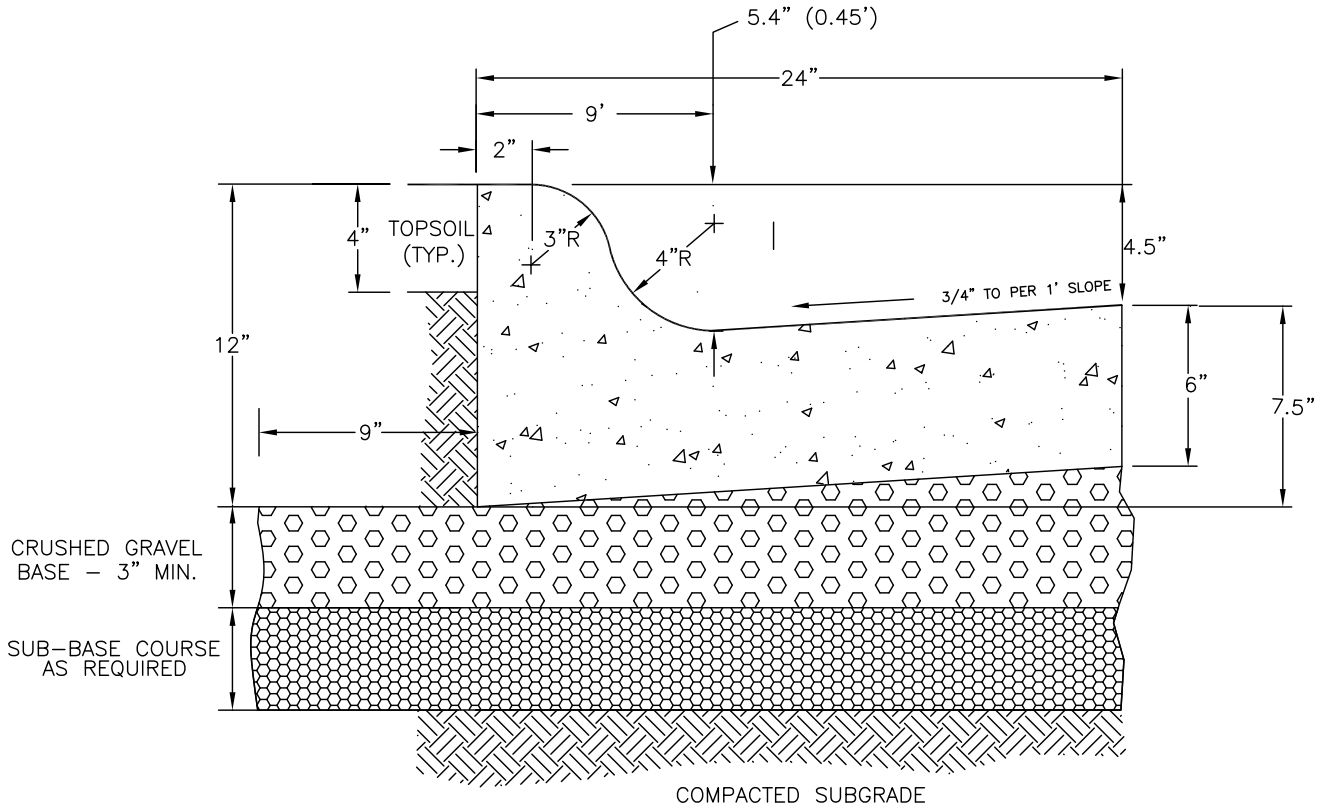


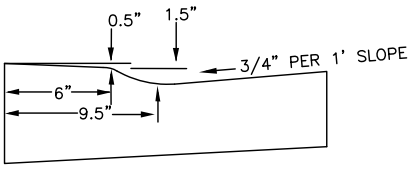
Section A-A



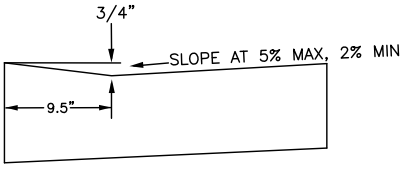
REVISED: 10/21/02

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	TRENCH PLUG EXCAVATION DETAIL	STANDARD DRAWING NO. 02222–1

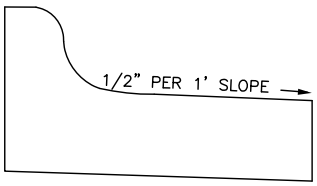




DROP CURB FOR DRIVEWAYS



DROP CURB FOR PEDESTRIAN RAMPS

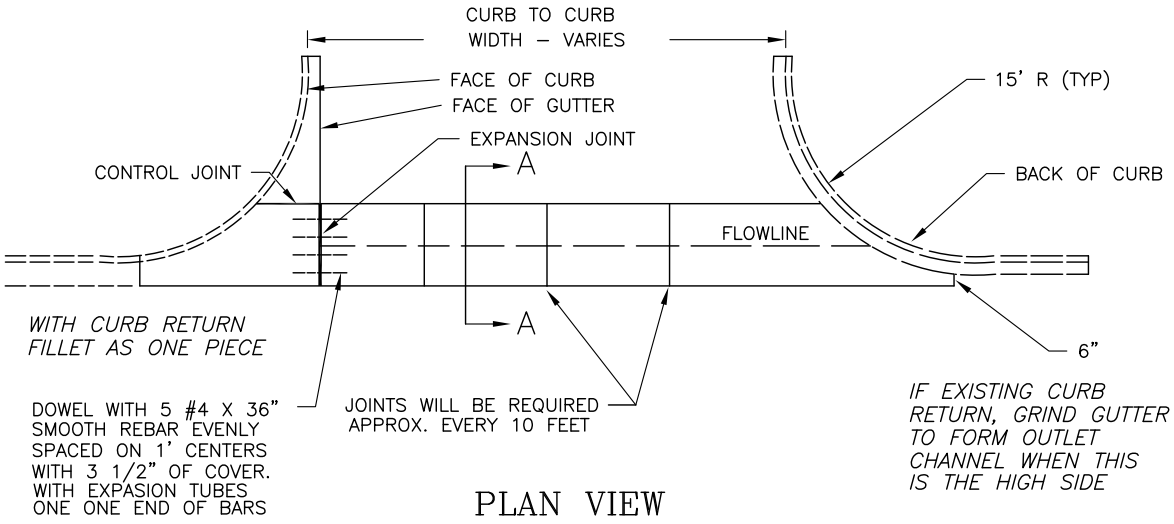


SPILL CURB

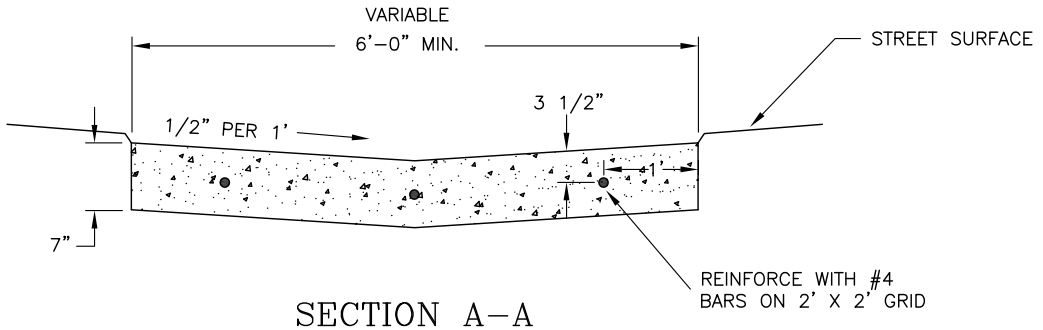
NOTES:

1. Subgrade or base course compaction shall conform to section 02230 (M.P.W. Specs., 1996 ed.)
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 not 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 final form inspection by the City Engineer or his representative.
5. Concrete shall be Class M–4000.
6. Crushed gravel base shall meet the requirements of Section 02235 (MPW SPECS, 2003 ed.) For curb and gutter replacement projects, washed rock may be used for the gravel base.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	INTEGRAL CONCRETE CURB & GUTTER	NO. 02528–1 Revised Mar. 2017



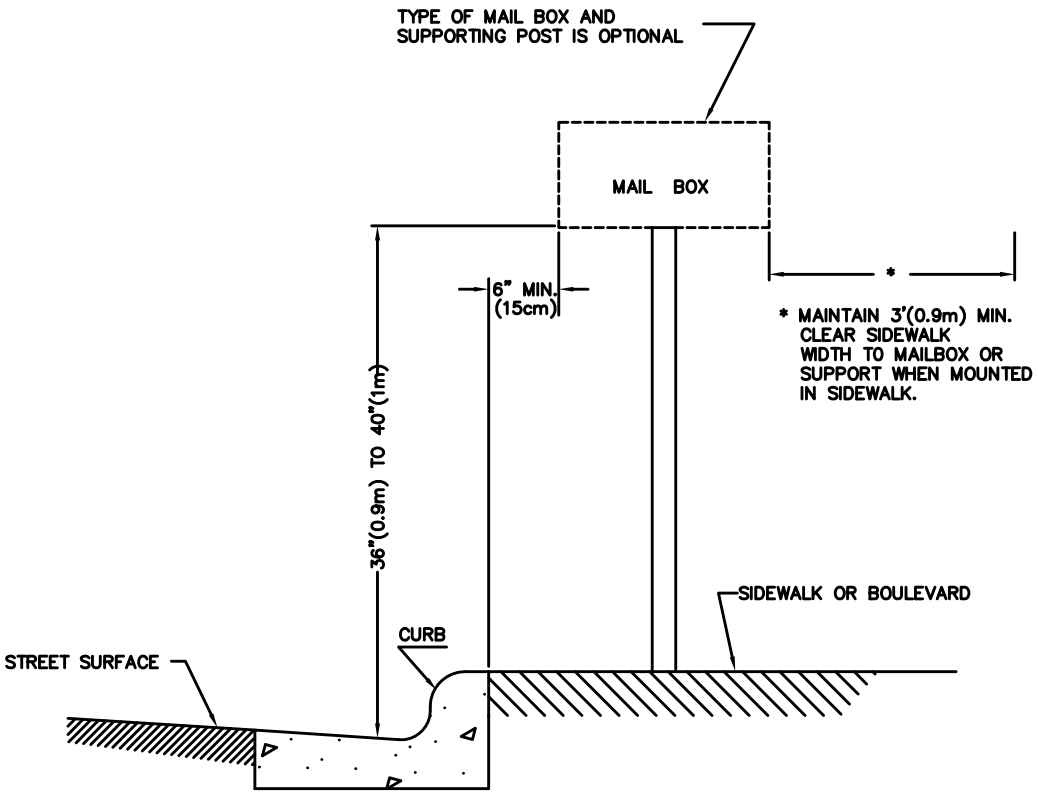
PLAN VIEW



SECTION A–A

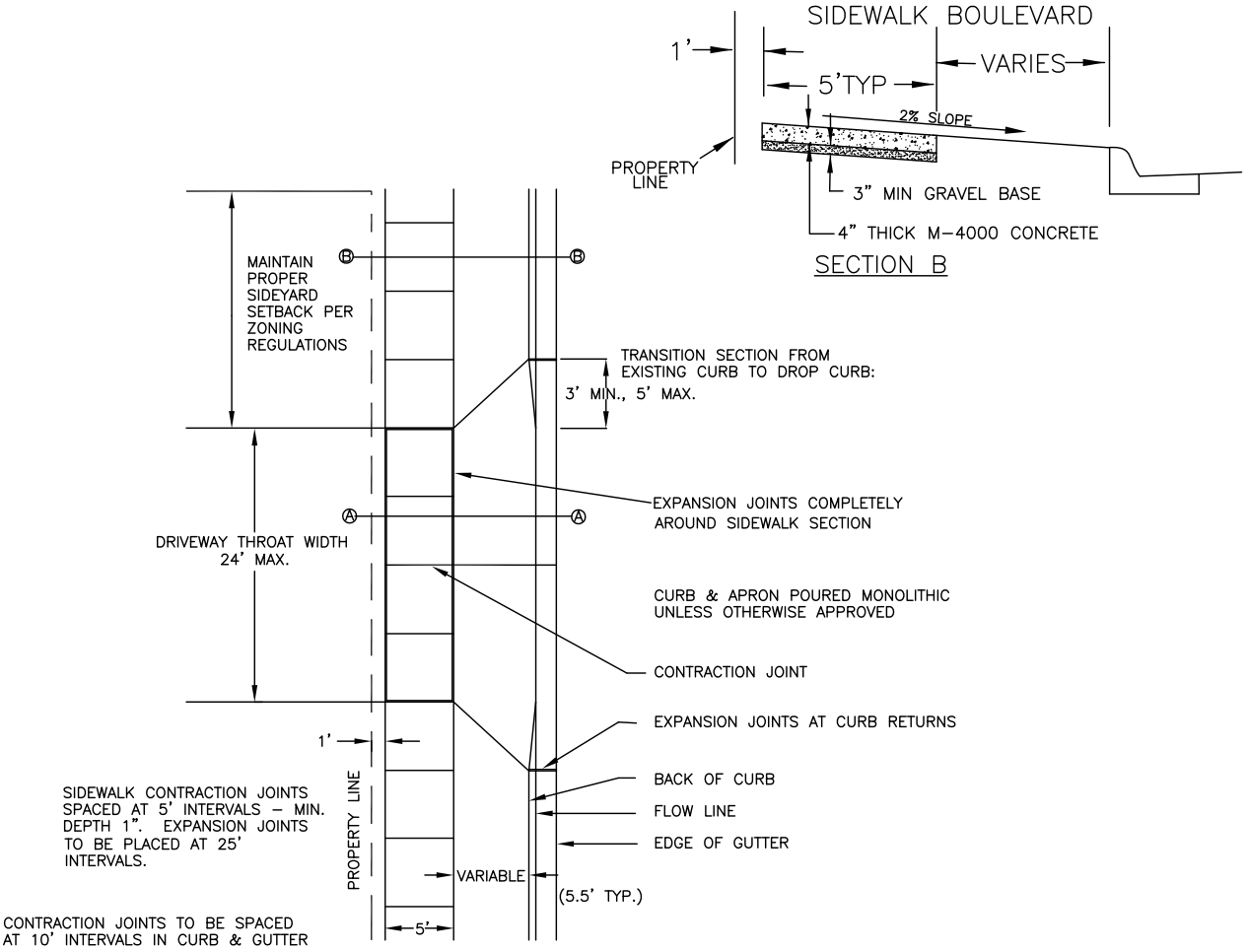
NOTES: THE WIDTH WITH PROPORTIONAL INVERT MAY VARY TO SATISFY THE DESIGN REQUIREMENTS OF INDIVIDUAL APPLICATIONS. FINISHED STREET SURFACE TO BE 1/8" TO 1/4" ABOVE EDGES OF DOUBLE GUTTER.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DOUBLE GUTTER DETAIL FOR STREET INTERSECTION	NO. 02529–1 DEC. 2003

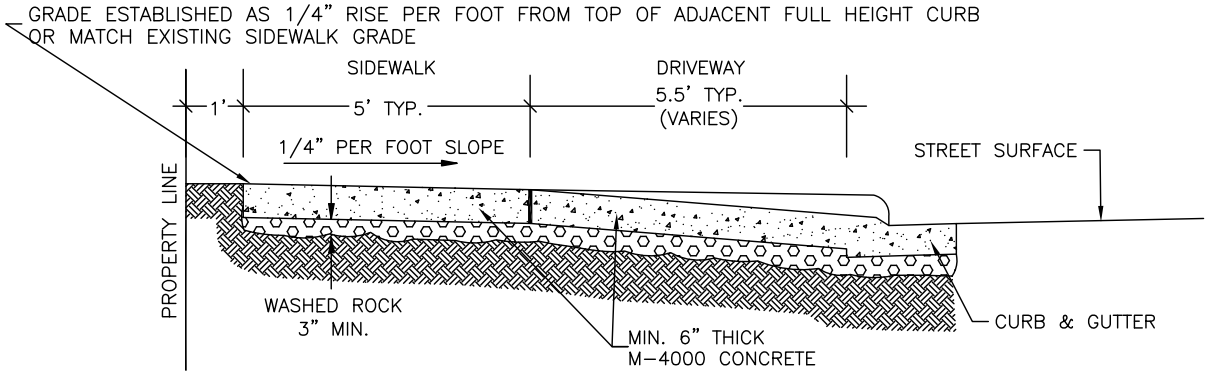


REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	MAIL BOX MOUNTING FOR CURBLINE DELIVERY	STANDARD DRAWING NO. 02529–10



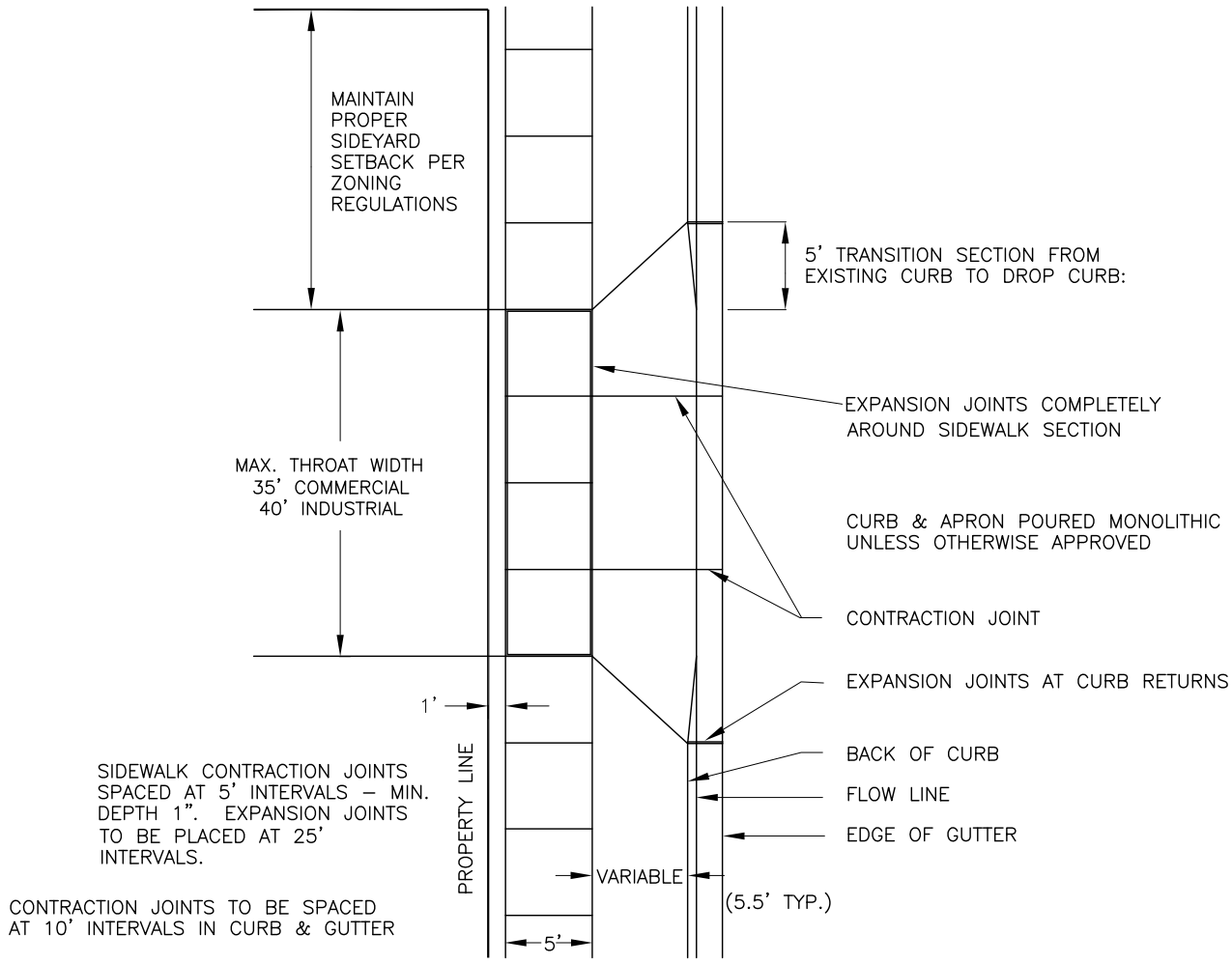
EXPANSION JOINT MATERIAL SHALL BE 1/2" THICK PRE-FORMED BITUMINOUS TREATED FIBERBOARD FILLER.
ALL CURB REPLACEMENT SHALL BE DONE WITH INTEGRAL CURB AND GUTTER UNLESS OTHERWISE APPROVED.



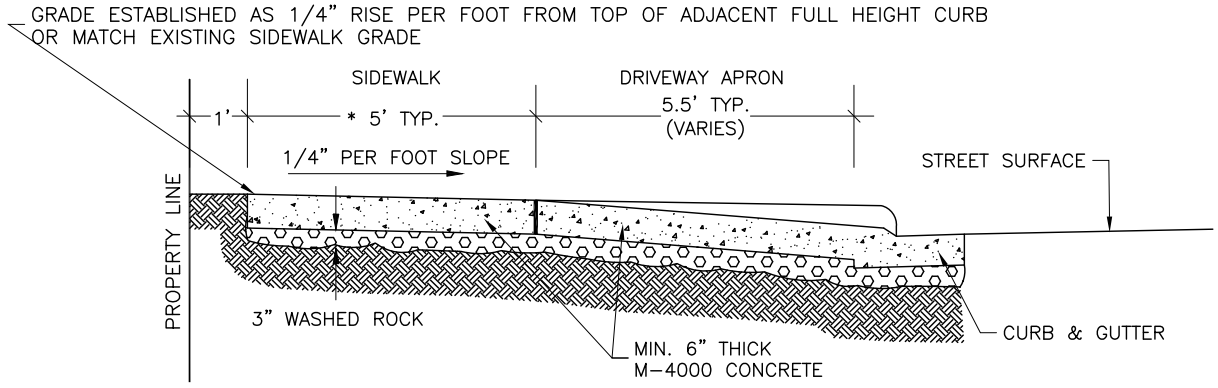
* OR MATCH EXISTING OR REQUIRED SIDEWALK WIDTH

SECTION A

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	RESIDENTIAL DRIVEWAY APPROACH AND SIDEWALK DETAILS	NO. 02529-11 DEC 2003

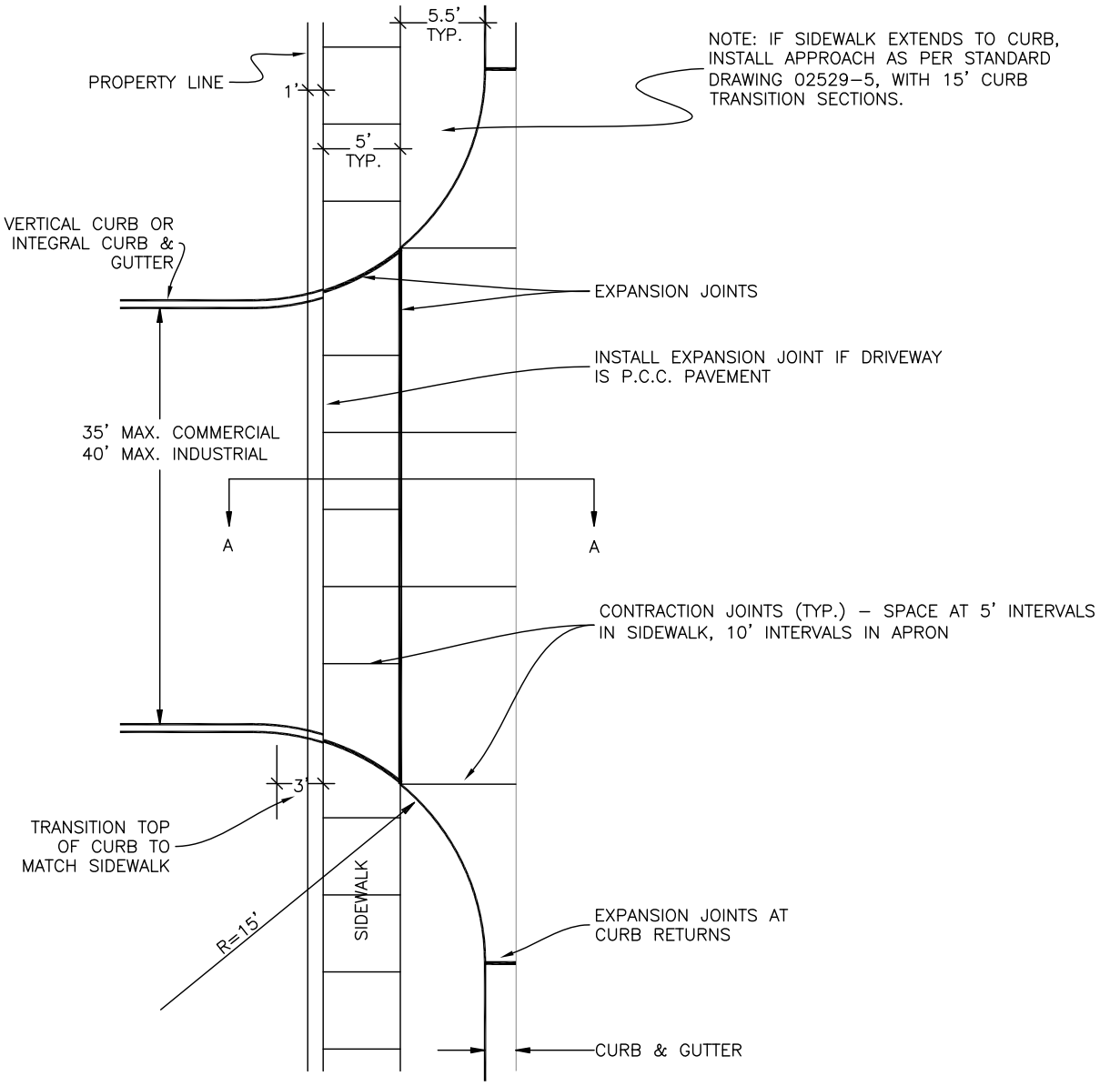


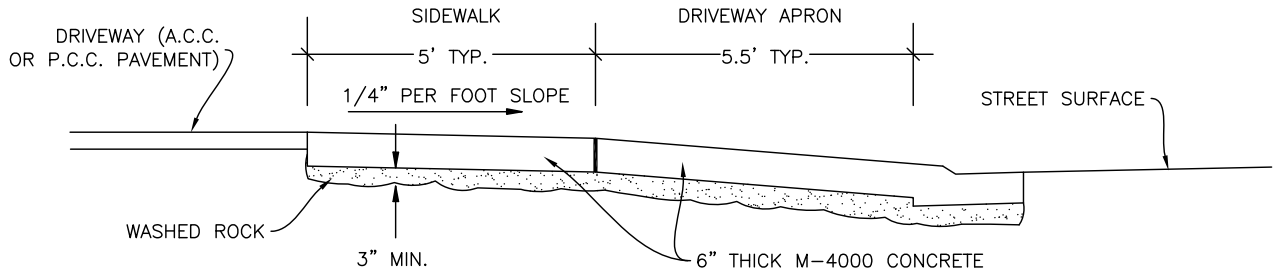
EXPANSION JOINT MATERIAL SHALL BE 1/2" THICK PRE–FORMED BITUMINOUS TREATED FIBERBOARD FILLER.
ALL CURB REPLACEMENT SHALL BE DONE WITH INTEGRAL CURB AND GUTTER UNLESS OTHERWISE APPROVED.



* OR MATCH EXISTING OR REQUIRED SIDEWALK WIDTH

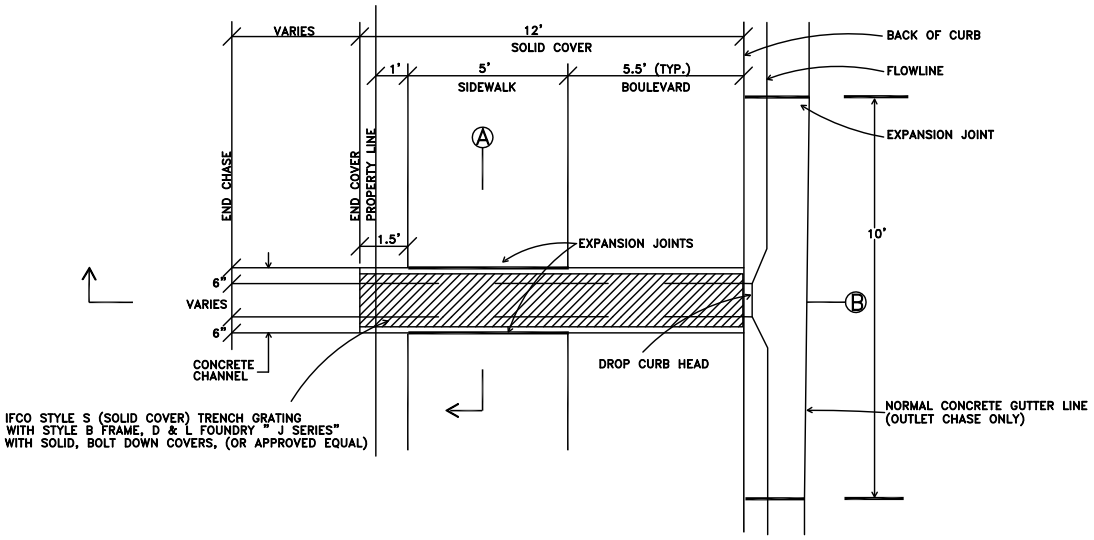
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	NON RESIDENTIAL DRIVEWAY APPROACH	NO. 02529–12 Dec. 2003



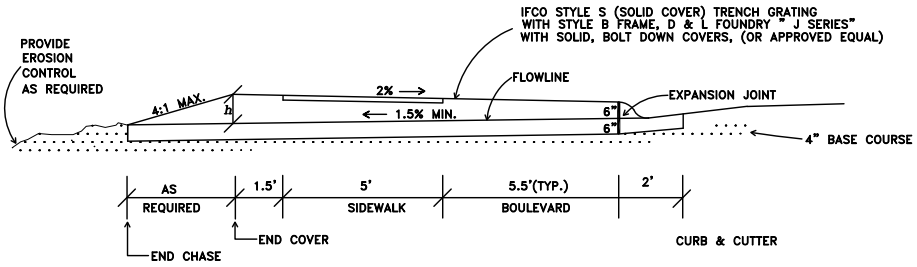


SECTION A–A

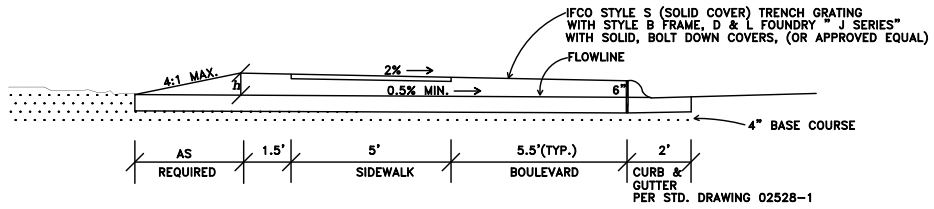
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	NON–RESIDENTIAL DRIVEWAY APPROACH FOR ARTERIAL STREETS	NO. 02529–13 Dec. 2003



PLAN VIEW – N.T.S.

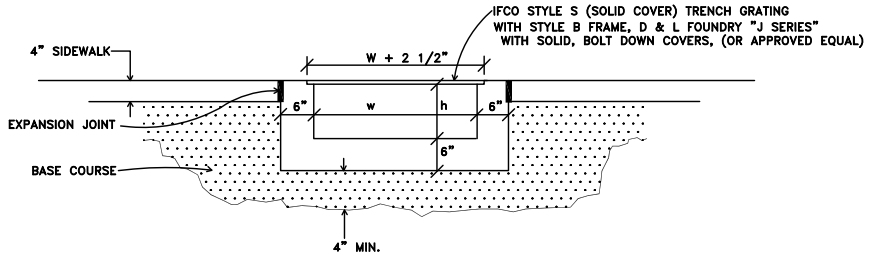


INLET CHASE



SECTION B – N.T.S.

OUTLET CHASE



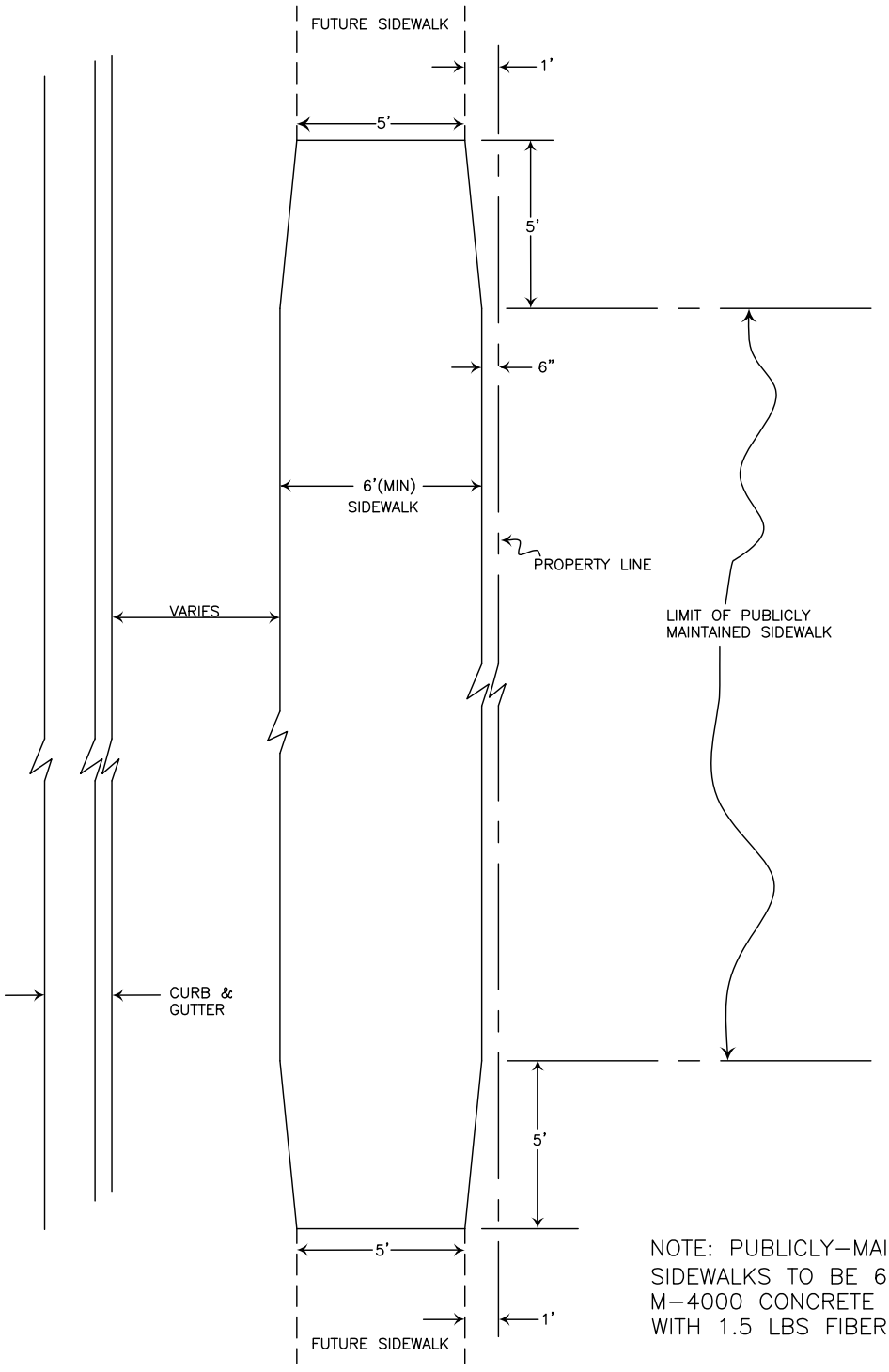
DIMENSIONS w AND h VARY, SIZE TO BE DETERMINED BY ENGINEER BASED ON 25-YEAR EVENT, BUT NO LESS THAN 6" AT CURB OPENING

CONCRETE SHALL BE M-4000

COVERS MUST BOLT DOWN TO FRAME

SECTION A – N.T.S.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	CONCRETE STORM DRAINAGE OUTLET AND INLET CHASES	NO. 02529-14 DEC. 2003 Rev: April 2005



NOTE: PUBLICLY-MAINTAINED SIDEWALKS TO BE 6" THICK M-4000 CONCRETE REINFORCED WITH 1.5 LBS FIBERMESH PER C.Y.

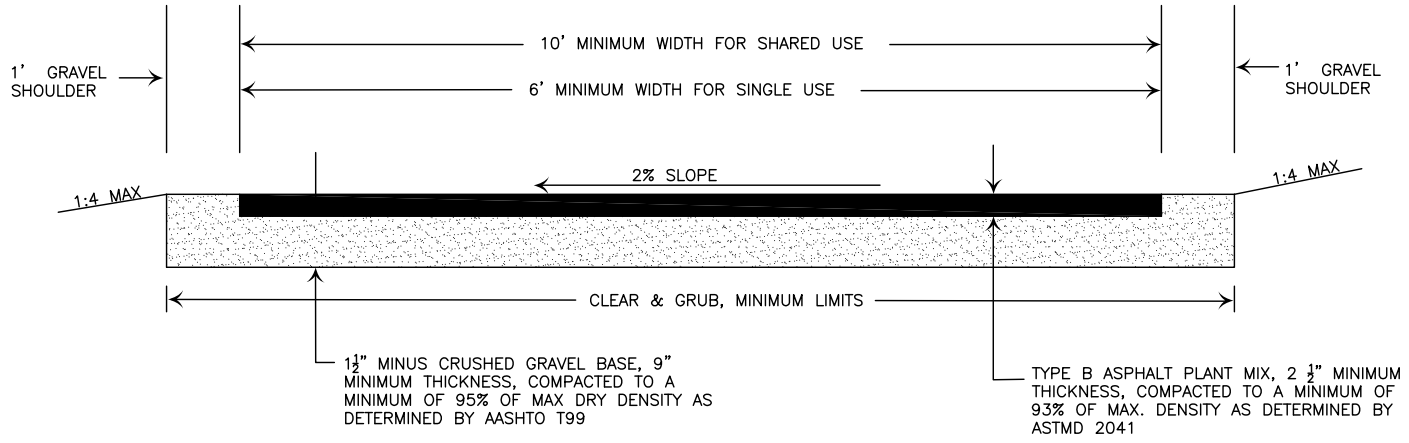
CITY OF BOZEMAN STANDARD DRAWING	SCALE: 1"= 5'	PUBLICLY-MAINTAINED SIDEWALK CONSTRUCTION STANDARD	NO. 02529-15 MARCH 2005

CITY OF BOZEMAN
STANDARD DRAWING

SCALE:
NONE

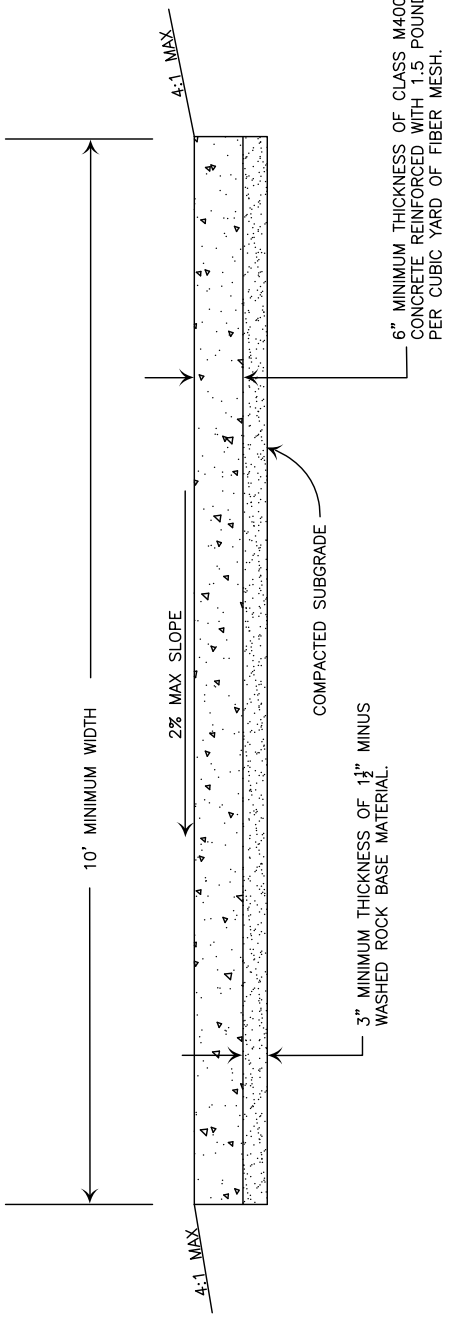
ASPHALT PATHWAY
TYPICAL SECTION

NO. 02529-16
JAN. 2006



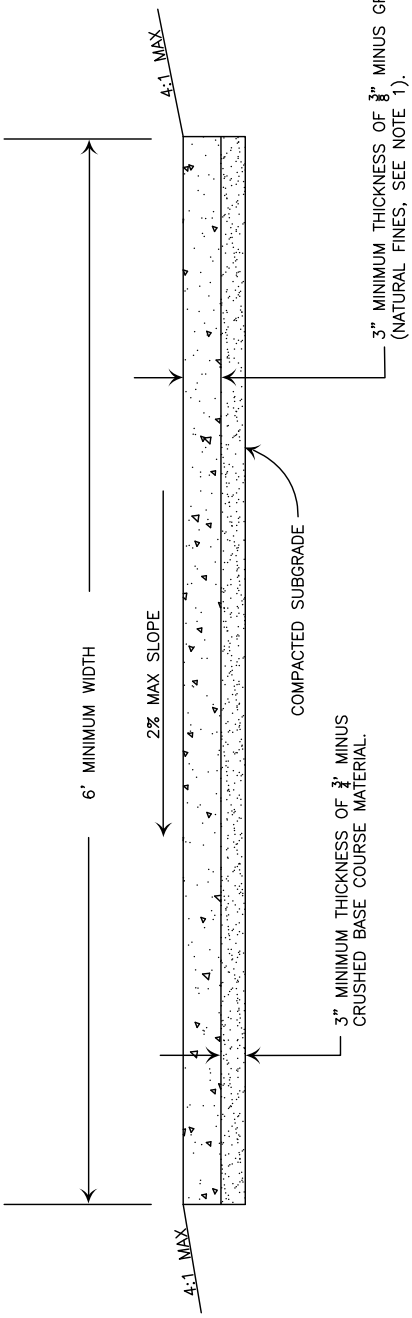
NOTES:

1. PATHWAYS SHALL BE DESIGNED TO SUPPORT A MINIMUM DESIGN LOAD OF 25,000 ESAL.
2. A SOIL STERILANT SHALL BE APPLIED TO THE SUBGRADE PRIOR TO PLACEMENT OF THE GRAVEL BASE.
3. A CONSTRUCTION SEAL SHALL BE APPLIED TO THE PAVED SURFACE IMMEDIATELY FOLLOWING FINAL ROLLING AT THE RATE OF 0.1 GALLON/SQUARE YARD.



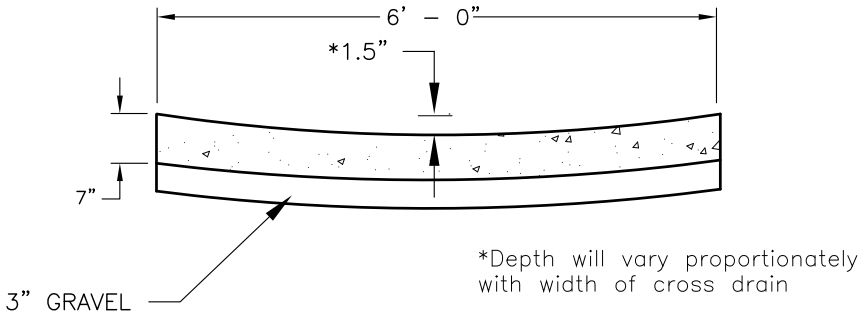
NOTES:
1. SPACE CONTRACTION JOINTS TO MATCH THE WIDTH OF TRAIL.
2. INSTALL EXPANSION JOINT MATERIAL AT EVERY FIFTH JOINT FOR THE FULL DEPTH OF CONCRETE.
3. FINISH CONCRETE WITH LIGHT BROOM FINISH.

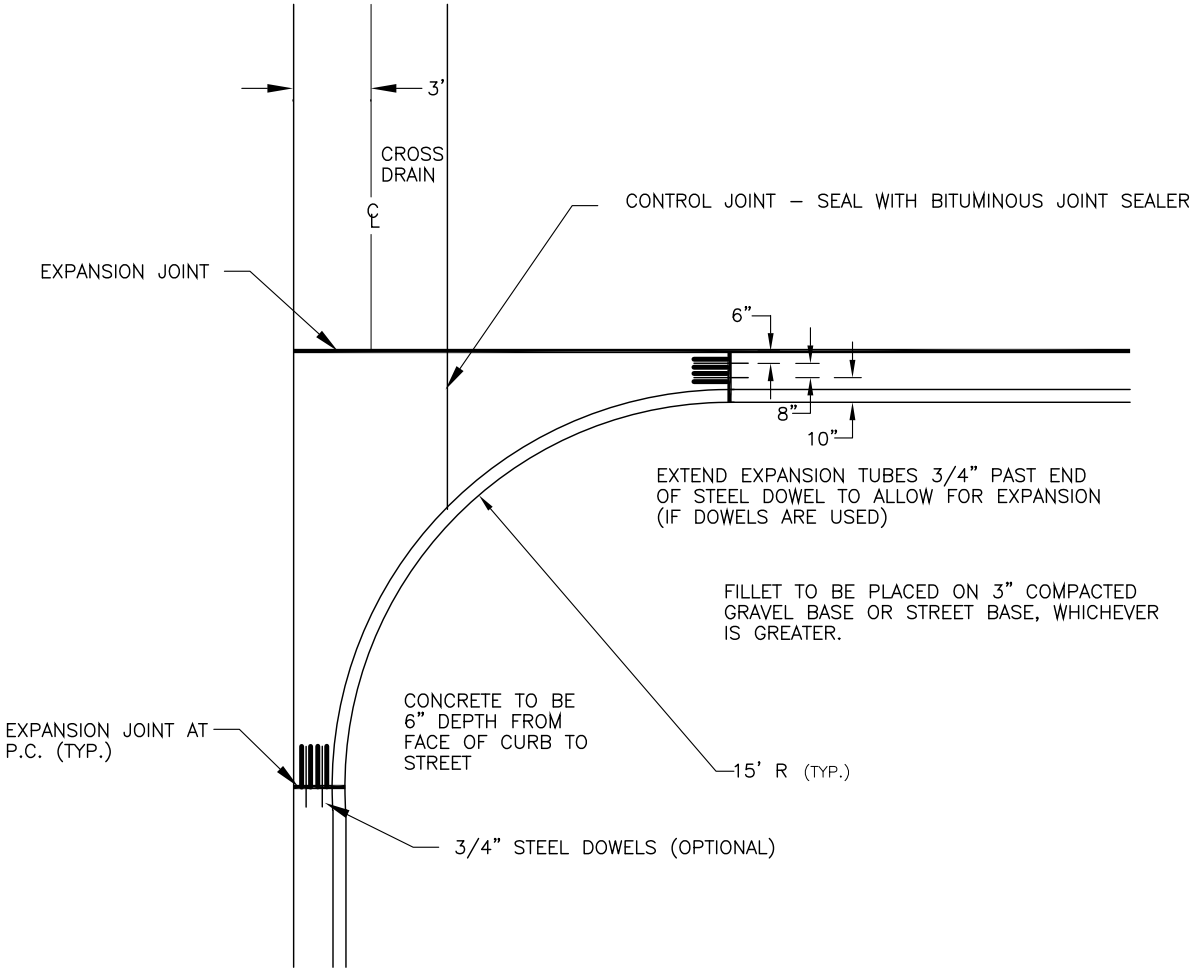
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	CONCRETE CLASS 1 TRAIL TYPICAL SECTION	NO. 02529-17 April 2006



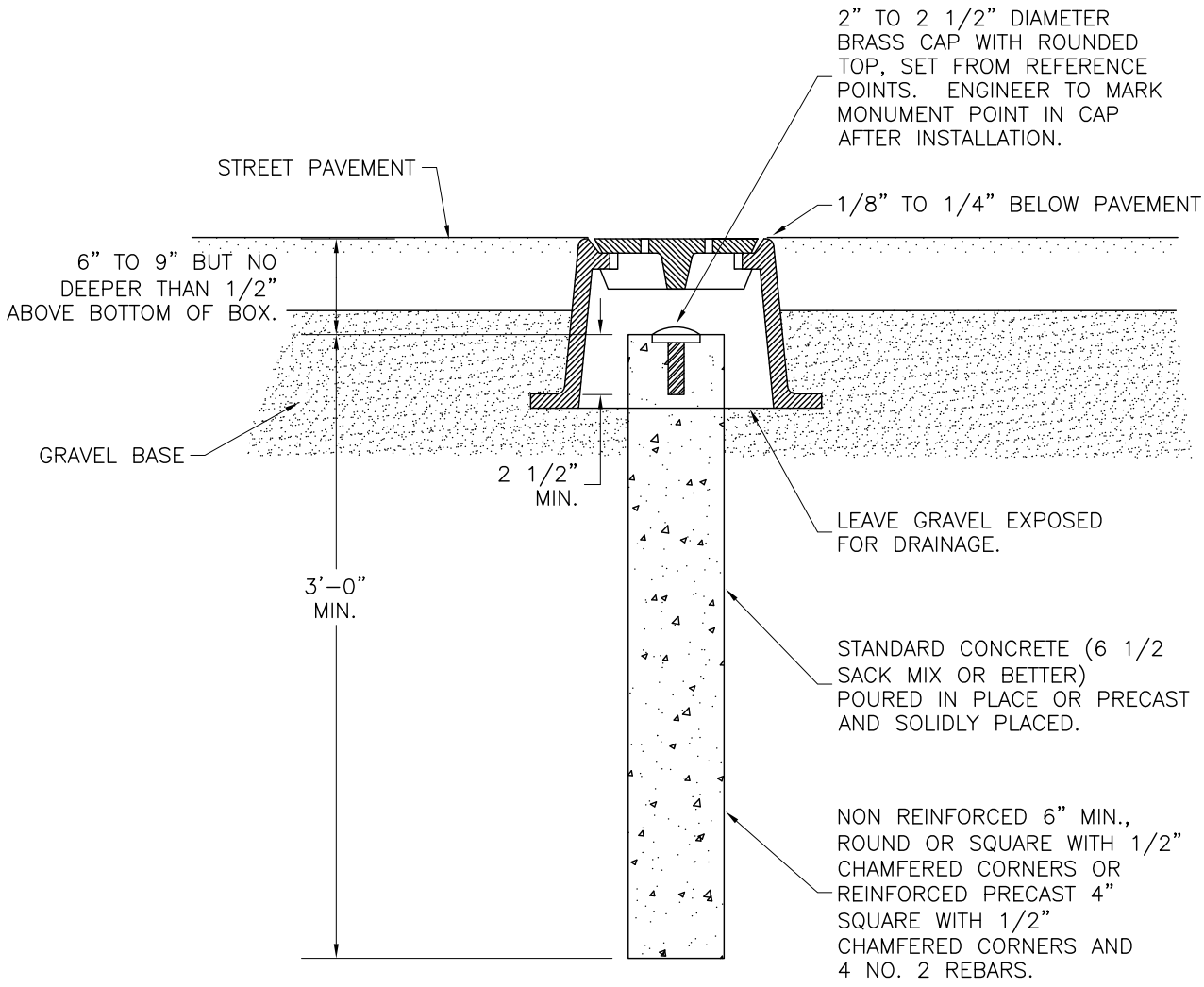
NOTES:
1. NATURAL FINES SHALL CONSIST OF 80% SAND, 10% SILT AND 10% CLAY.
2. A SOIL STERILANT SHALL BE APPLIED TO THE SUBGRADE PRIOR TO PLACEMENT OF THE GRAVEL BASE.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	CLASS II TRAIL TYPICAL SECTION	NO. 02529-18 April 2006





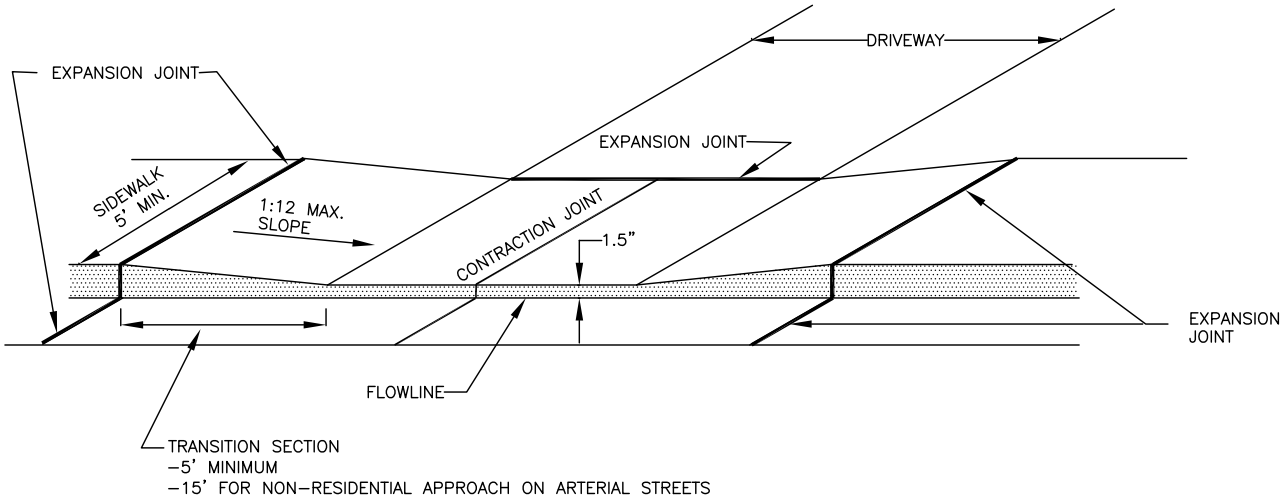
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD FILLET	NO. 02529–2 AUG. 1994

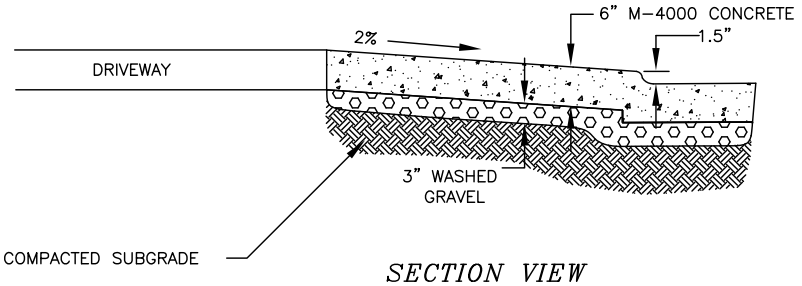


MONUMENT BOX

INLAND FOUNDRY CO. PATTERN NO. 1034 OR APPROVED EQUAL.

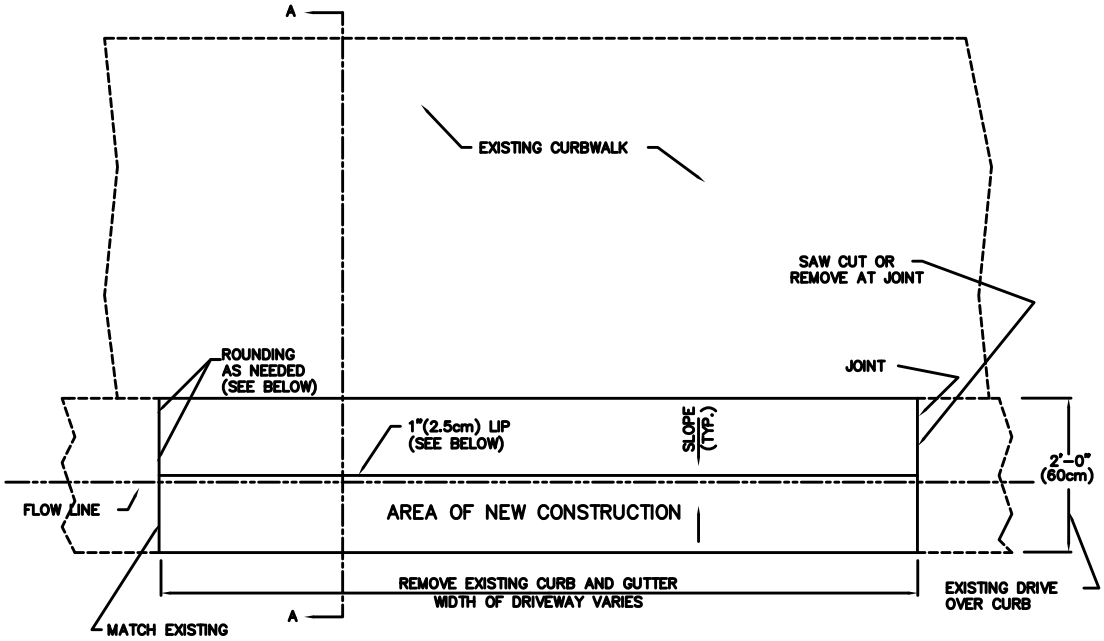
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPE I STREET MONUMENT	NO. 02529-3 Dec. 1999

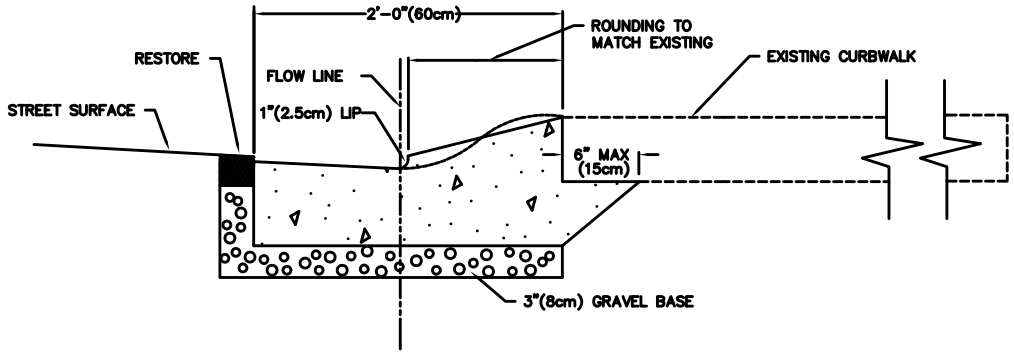




SECTION VIEW

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DRIVEWAY APPROACH WITH SIDEWALK ADJACENT TO CURB	NO. 02529–5 Revised Dec. 1999

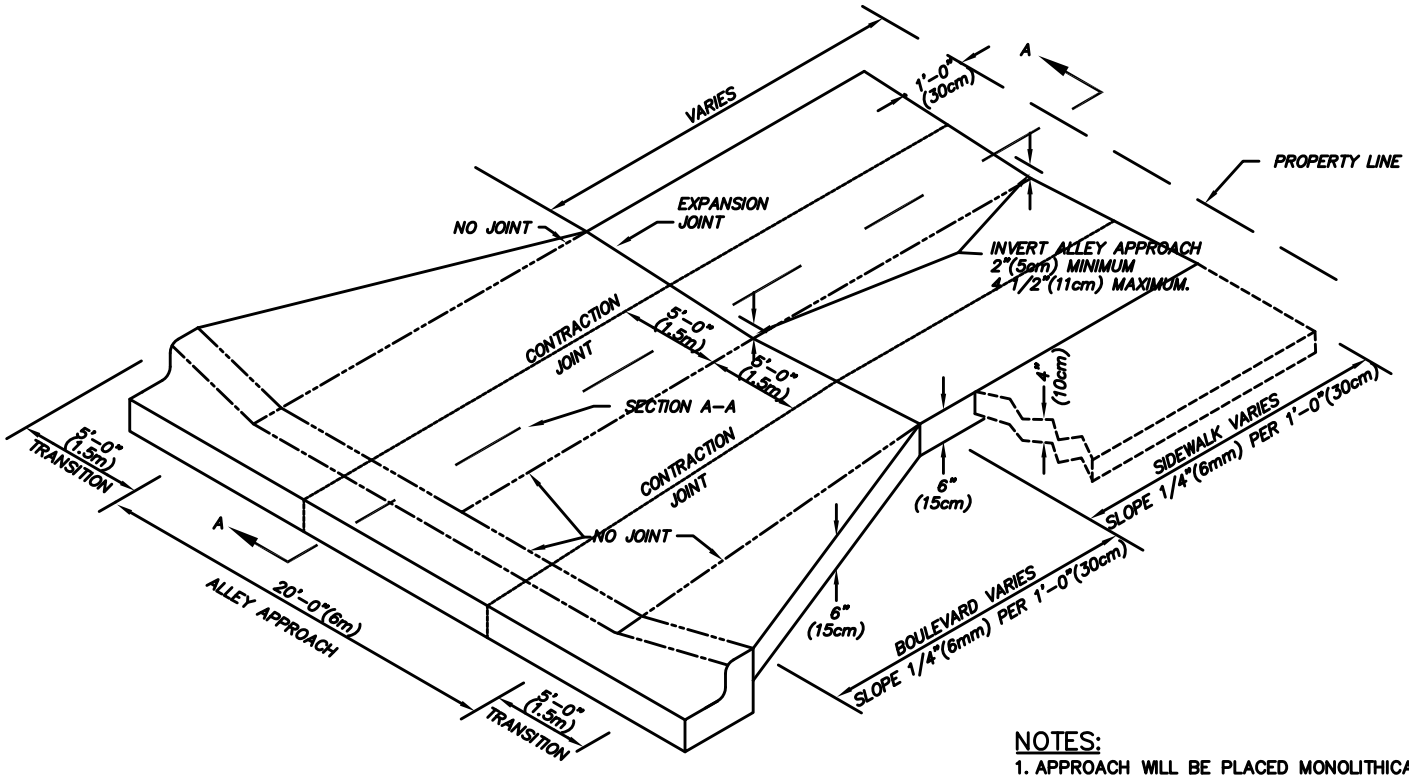




SECTION A–A

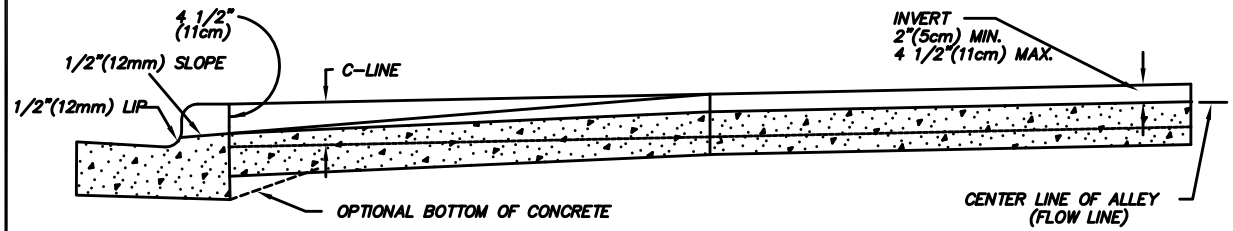
REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	RETROFIT DRIVE APPROACH	STANDARD DRAWING NO. 02529–6



NOTES:

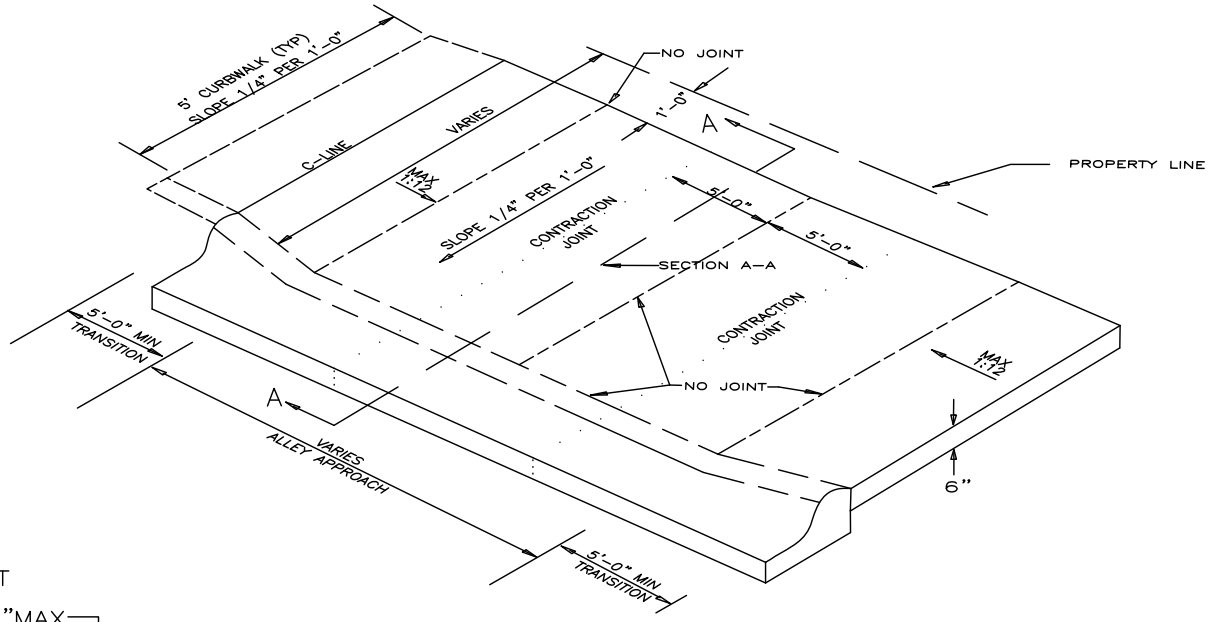
1. APPROACH WILL BE PLACED MONOLITHICALLY.
2. BOULEVARDS THAT EXCEED 12.0'(3.7m) IN DEPTH REQUIRE A TRANSVERSE JOINT.

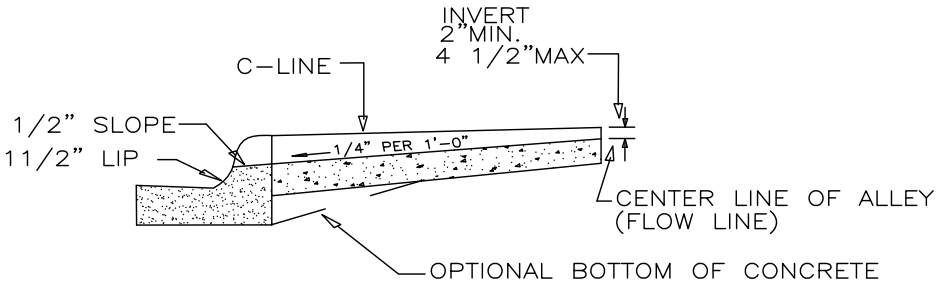


SECTION A-A

REVISED: 2/10/2000

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	BOULEVARD ALLEY APPROACH DETAIL (WITH FLAIR SECTIONS)	STANDARD DRAWING NO. 02529-7A



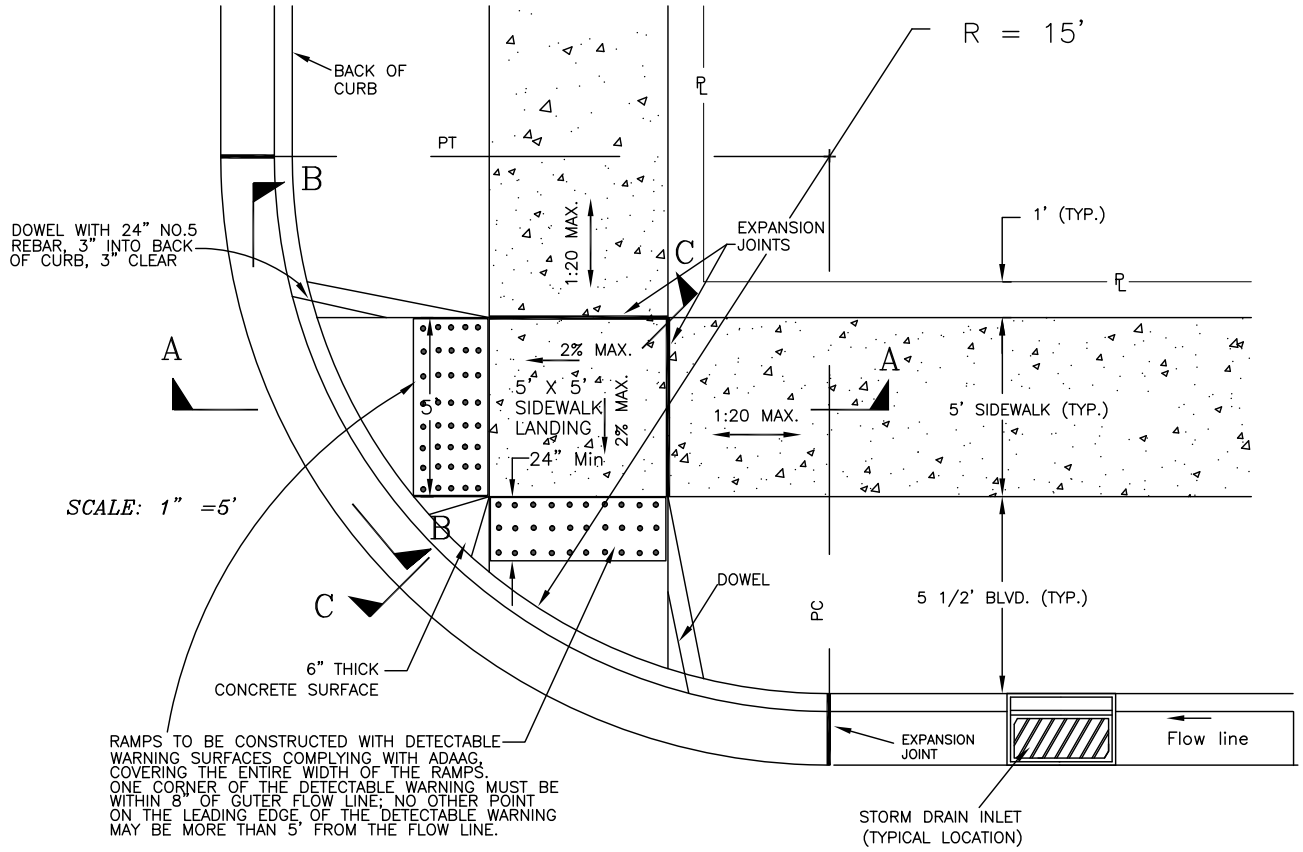


SECTION A-A

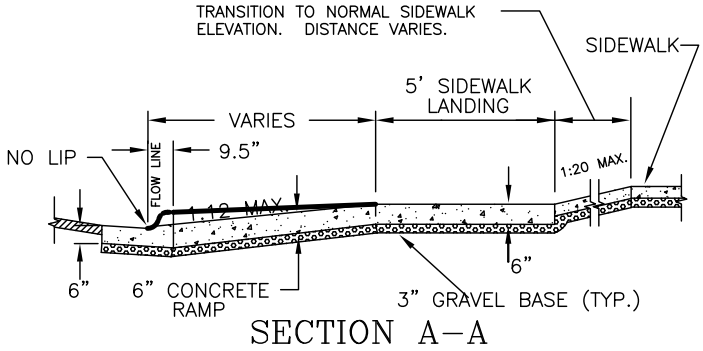
NOTES:

1. APPROACH WILL BE PLACED MONOLITHICALLY
2. TAPERS SHALL BE 5' IN LENGTH MINIMUM
3. JOINTS MAY VARY 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 (THIS NOTE ALSO APPLIES TO DRAWING 02529-7A).

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	CURB WALK ALLEY APPROACH DETAIL (WITH FLAIR SECTIONS)	NO. 02529-7B DEC 2003

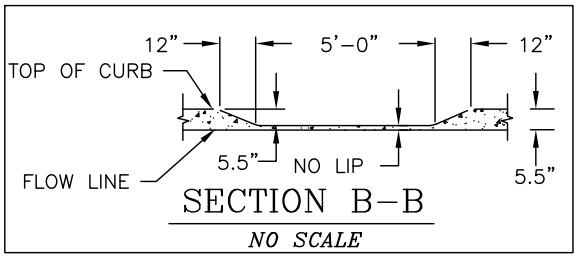


REINFORCE CONCRETE IN RAMPS WITH FIBERMESH™ AT A RATE IF 1 1/2 lbs./C.Y. OR WITH 6x6x10 GAUGE WIRE MESH



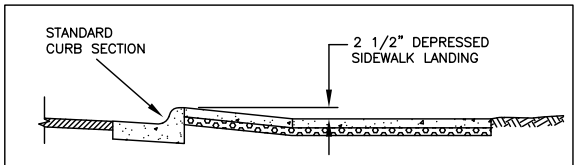
SECTION A–A

NO SCALE



SECTION B–B

NO SCALE



SECTION C–C

NO SCALE

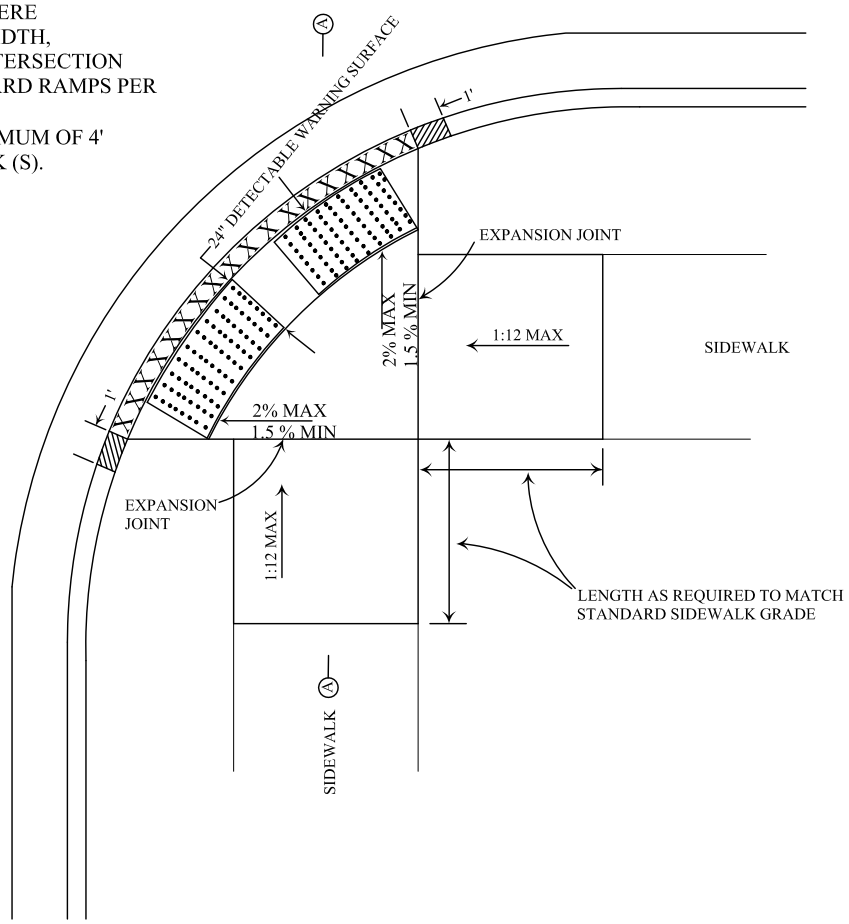
CONSTRUCTION NOTES:

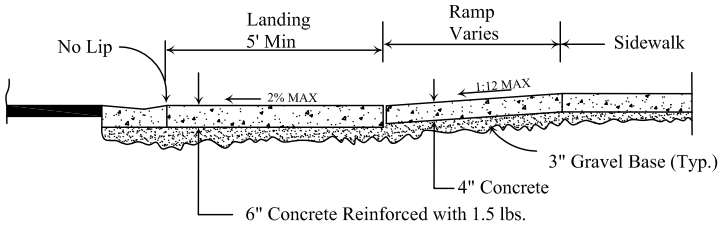
1. Standard applies to new construction, with max. curb R=15', and min. 5.5' boulevards.
2. Ramp and curb can be poured monolithically.
3. Storm drain inlets shall be constructed "upstream" of ramps. Alternative locations permitted only upon City Engineer's approval.
4. Ramp width shall be 5' minimum.
5. Sidewalk cross–slopes shall not exceed 2%.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: AS SHOWN	BOULEVARD SIDEWALK PERPENDICULAR PEDESTRIAN RAMP (15' MAX. RADIUS/5.5' MIN. BOULEVARD)	NO. 02529–8 NOV. 1995 Revised April 2006

USE BLENDED TRANSITION RAMP WHERE LIMITATIONS DUE TO BOULEVARD WIDTH, RIGHT-OF-WAY, CURB RADIUS, OR INTERSECTION ANGLE PREVENT THE USE OF STANDARD RAMPS PER C.O.B STANDARD DRAWING 02529-8
DETECTABLE WARNING TO BE A MINIMUM OF 4' WIDE, CENTERED ON THE CROSSWALK (S).

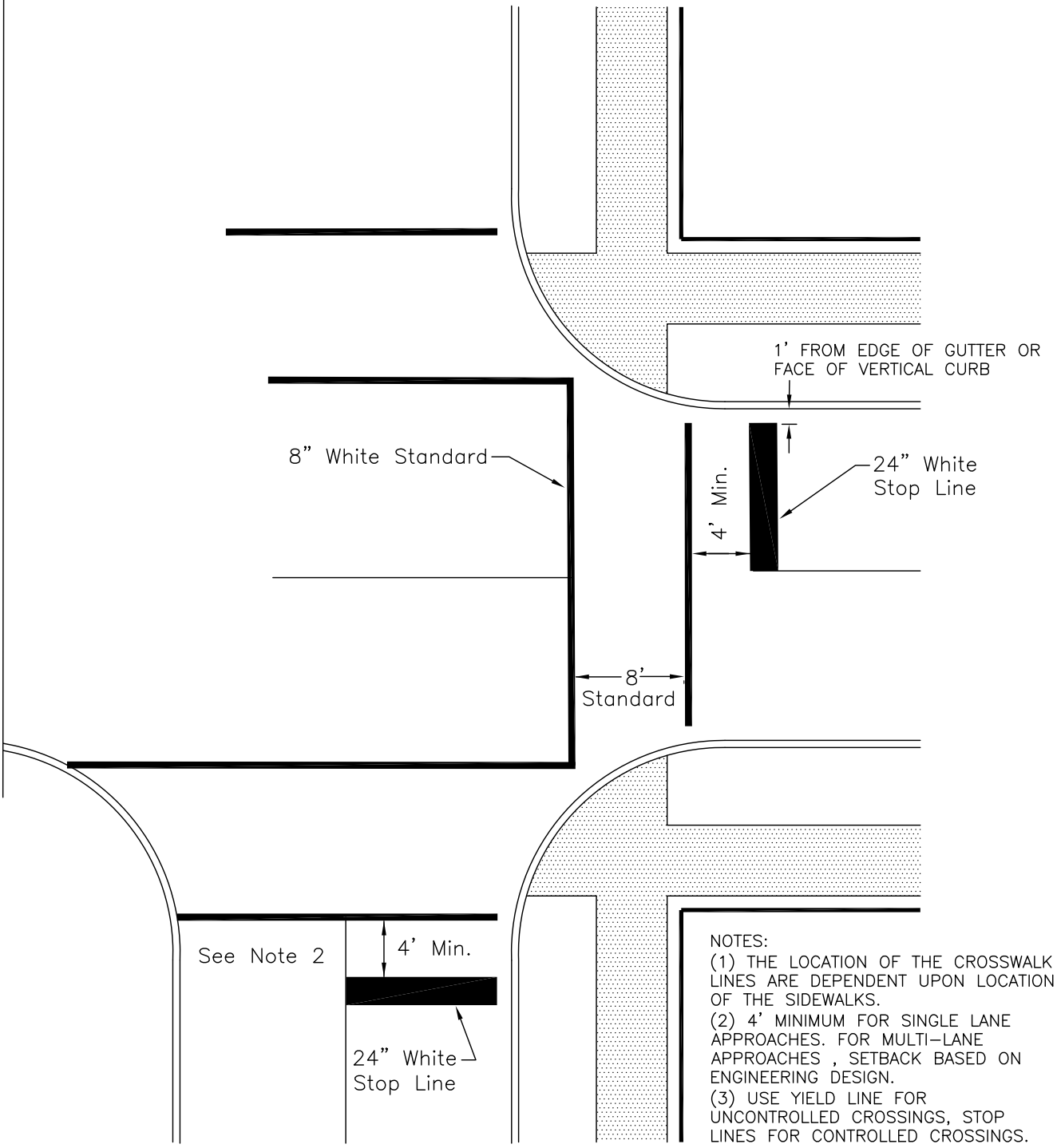
XXX Drop Curb
Curb Transition



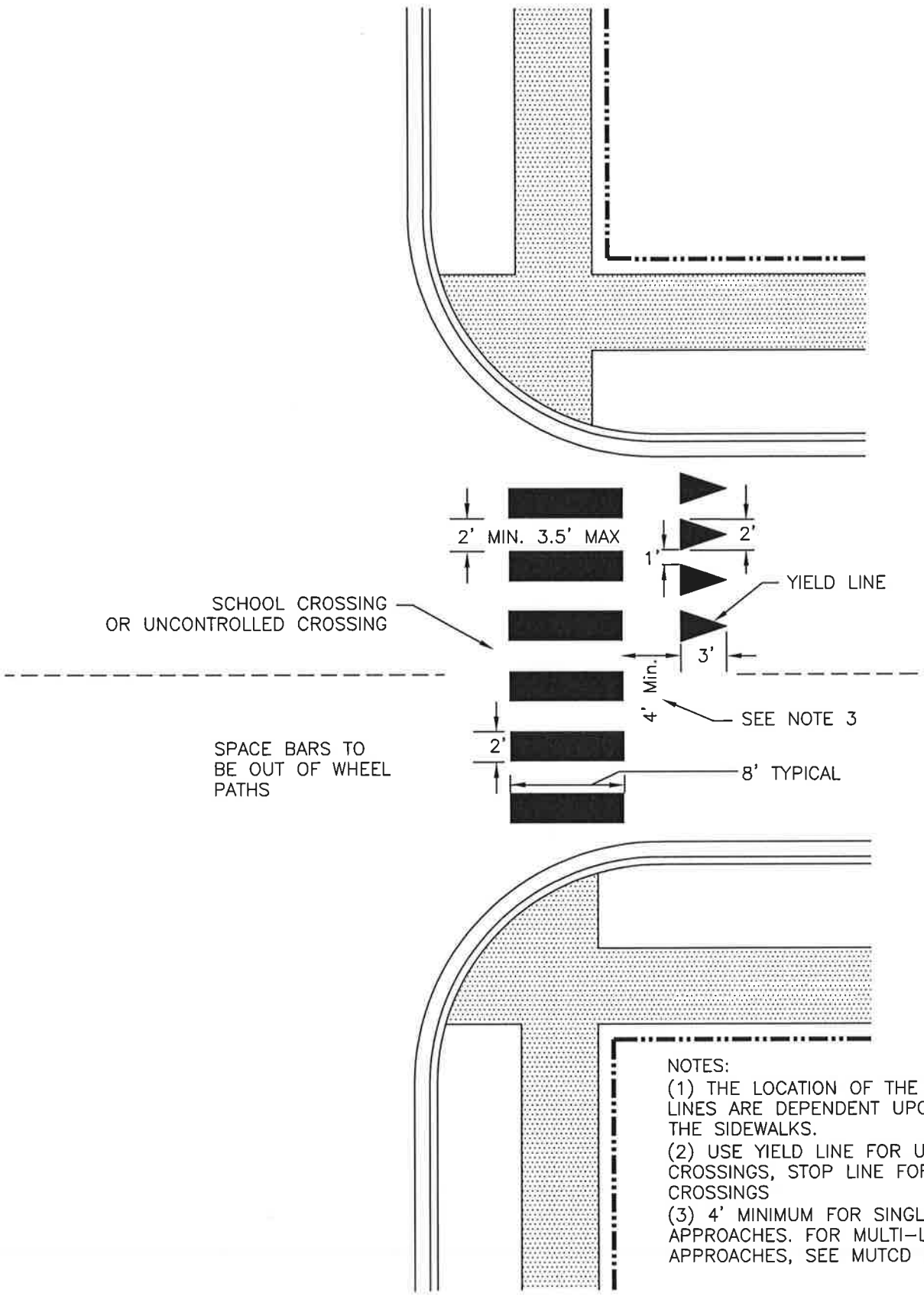


SECTION A-A
Not to Scale

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NOT TO SCALE	BLENDED TRANSITION PEDESTRIAN RAMP	NO. 02529-8A APRIL 2006



CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL PAVEMENT MARKINGS FOR PEDESTRIAN CROSSINGS (TYPE "A" CROSSINGS)	NO. 02581-1 FEB. 1996 Revised May 2017



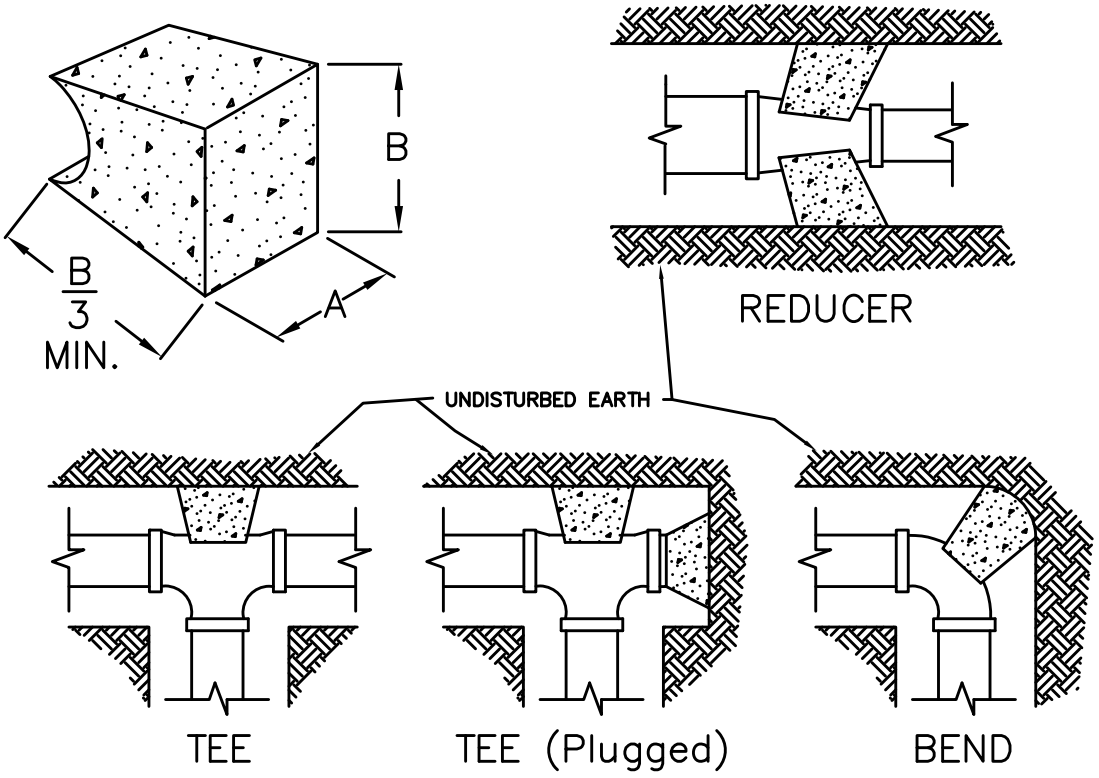
NOTES:

(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

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL PAVEMENT MARKINGS FOR SCHOOL/OR UNCONTROLLED CROSSINGS (TYPE "B" CROSSINGS)	NO. 02581-2 FEB. 1996 Revised May 2017



STANDARD DIMENSIONS FOR THRUST BLOCKING

FITTING SIZES	TEES & PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 22 1/2° BEND	
	A	B	A	B	A	B	A	B
4"	1'–7"	1'–2"	1'–9"	1'–6"	1'–8"	0'–10"	1'–7"	0'–6"
6"	2'–0"	1'–11"	2'–5"	2'–2"	1'–10"	1'–7"	1'–9"	0'–10"
8"	2'–8"	2'–6"	3'–2"	3'–0"	2'–5"	2'–1"	1'–9"	1'–6"
10"	3'–4"	3'–3"	4'–0"	3'–10"	3'–0"	2'–9"	2'–2"	1'–11"
12"	4'–0"	3'–10"	4'–8"	4'–8"	3'–8"	3'–3"	2'–7"	2'–3"
14"	5'–5"	3'–10"	6'–6"	4'–11"	4'–9"	3'–5"	3'–5"	2'–5"

METRIC DIMENSIONS FOR THRUST BLOCKING

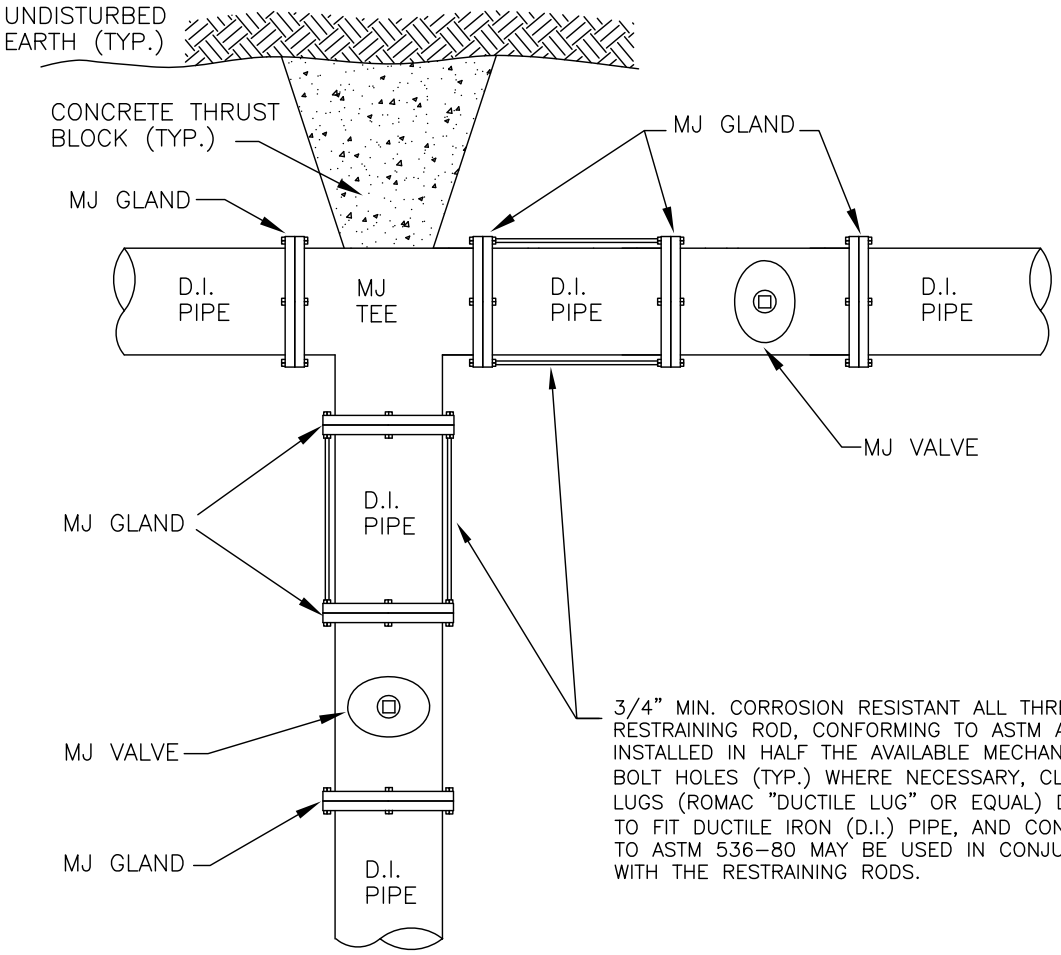
FITTING SIZES	TEES & PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 22 1/2° BEND	
	A	B	A	B	A	B	A	B
10cm	0.5m	0.4m	0.5m	0.5m	0.5m	0.3m	0.5m	0.2m
15cm	0.6m	0.6m	0.7m	0.7m	0.6m	0.5m	0.5m	0.3m
20cm	0.8m	0.8m	1.0m	0.9m	0.7m	0.6m	0.5m	0.5m
25cm	1.0m	1.0m	1.2m	1.2m	0.9m	0.8m	0.7m	0.6m
30cm	1.2m	1.2m	1.4m	1.4m	1.1m	1.0m	0.8m	0.7m
36cm	1.6m	1.2m	2.0m	1.5m	1.4m	1.0m	1.0m	0.7m

NOTES:

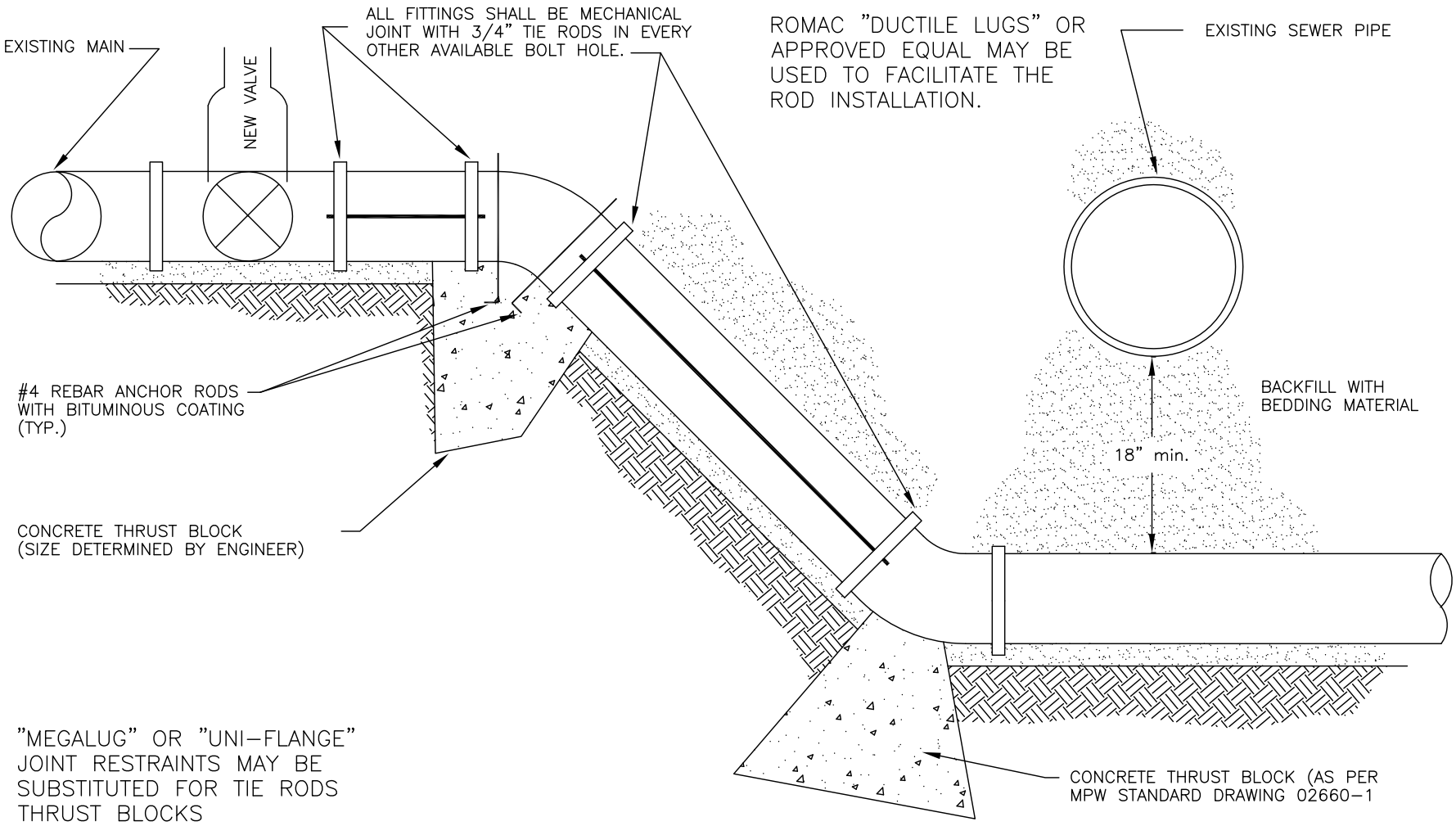
1. THESE TABLES ARE BASED ON 150 PSI(1030 kpa) MAIN PRESSURE 2000 PSF(9800 kg/m²) SOIL BEARING PRESSURE
2. WRAP ALL FITTINGS WITH POLYETHYLENE.

REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	THRUST BLOCKING FOR WATER MAIN FITTINGS	STANDARD DRAWING NO. 02660–1

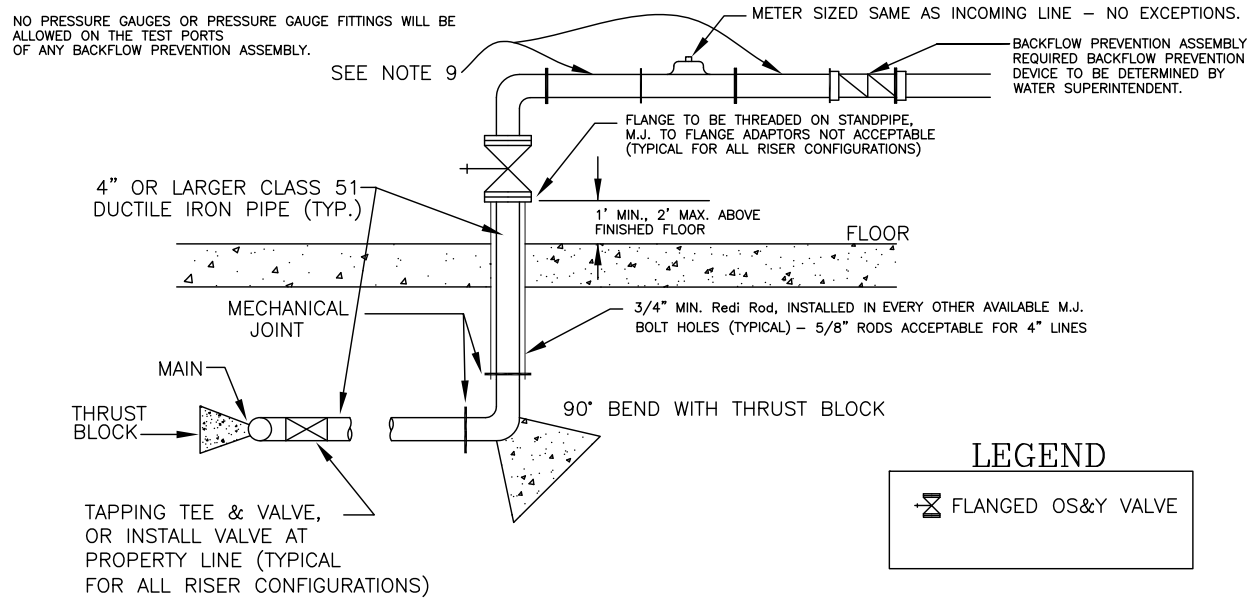


CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL VALVE/TEE RESTRAINT	NO. 02660–10 DEC 2003



NOTE: POLYETHYLENE ENCASEMENT ON ALL DUCTILE IRON PIPE AND FITTINGS AS SPECIFIED.

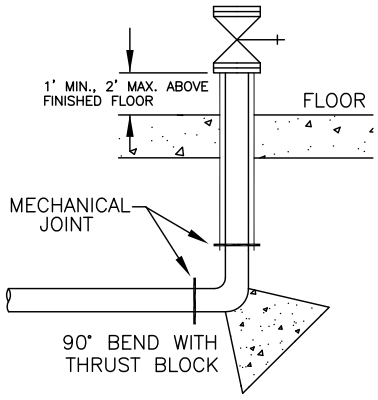
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER MAIN CROSSING BELOW EXISTING SEWER MAIN	NO. 02660-11 DEC 2003

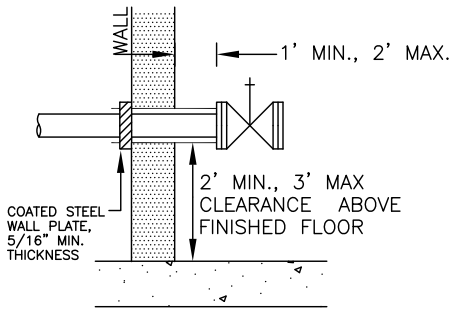


LEGEND

FLANGED OS&Y VALVE

PROVIDE FLEXIBLE, WATER–TIGHT CONNECTION FOR ALL WALL OR FLOOR PIPE PENETRATION.





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 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.

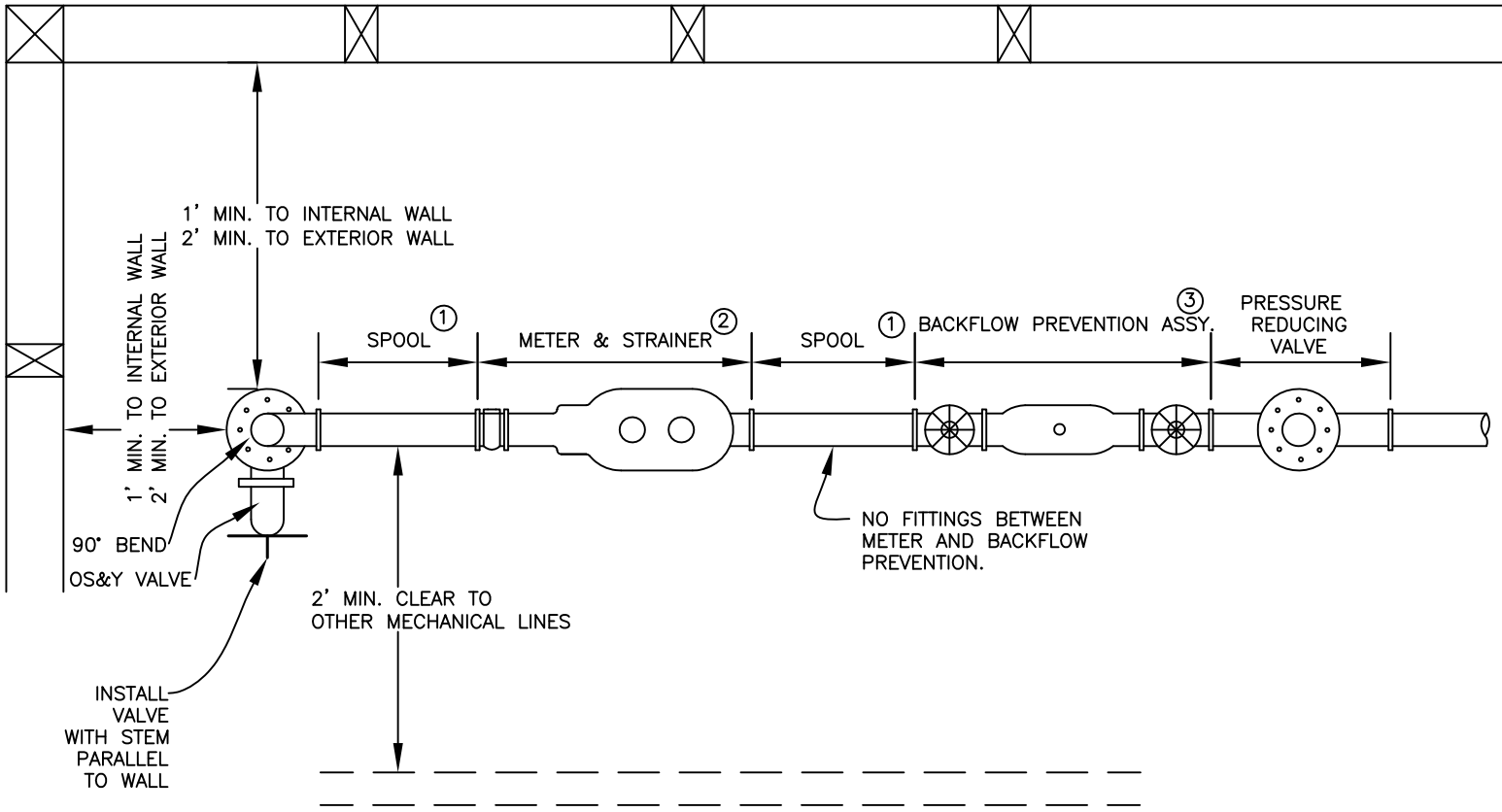
6. All service line appurtenances shall have a minimum pressure rating of 175 PSI.

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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER SERVICE LINE FOR SIZES 4" AND LARGER	NO. 02660–12 DEC 2003 REV: JAN 2015



PLAN VIEW

NOTES:

1. A MINIMUM OF FOUR (4) PIPE DIAMETERS OF STRAIGHT RUN PIPE IS REQUIRED UPSTREAM AND DOWNSTREAM OF THE METER \ STRAINER ASSEMBLY.
2. METER MUST BE INSTALLED HORIZONTAL. STRAINER IS REQUIRED.
3. BLACKFLOW PREVENTION ASSEMBLIES MUST BE UL OR FM LISTED AND APPROVED BY USCFCCCHR.
4. ALL PIPE SHALL BE DUCTILE IRON UP TO PRESSURE REDUCING VALVE.

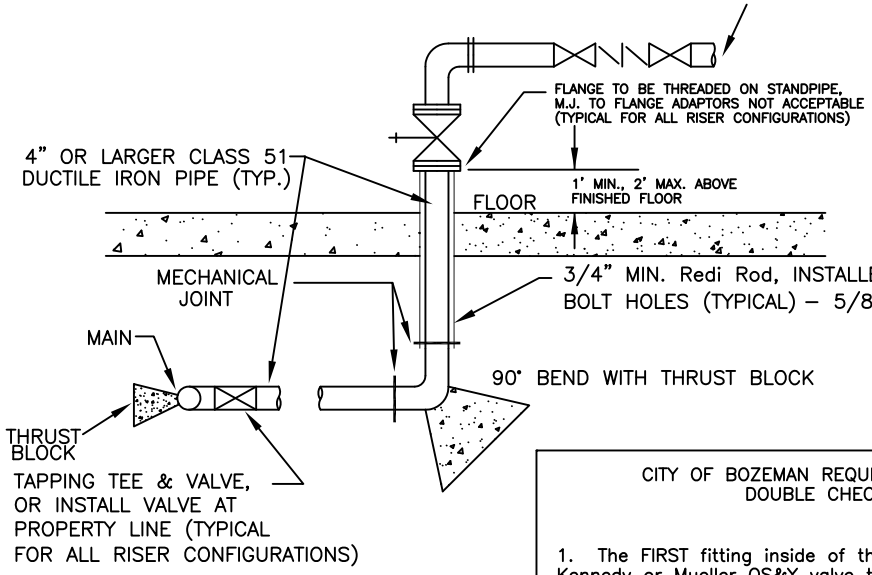
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL RISER CONFIGURATION 4" AND LARGER DOMESTIC SERVICE	NO. 02660-12A DEC 2003 REV: JAN 2015

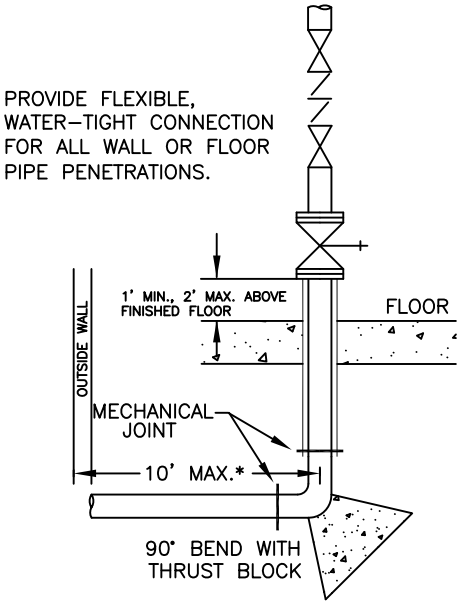
ONLY FITTINGS ALLOWED BETWEEN FIRST OS&Y VALVE AND BACKFLOW ASSEMBLY TO BE 90° BEND.

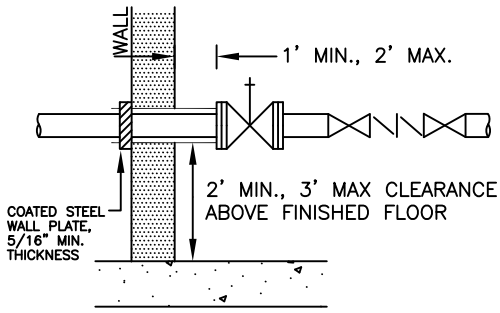
NO PRESSURE GAUGES OR PRESSURE GAUGE FITTINGS WILL BE ALLOWED ON THE TEST PORTS OF ANY BACKFLOW ASSEMBLY

LEGEND

- FLANGED OS&Y VALVE
- DOUBLE CHECK VALVE MIN. REQUIREMENT) AS INDICATED ON APPROVED PLAN(S)







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 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 6.5', and a max–imum of 7.5' below the finished grade.

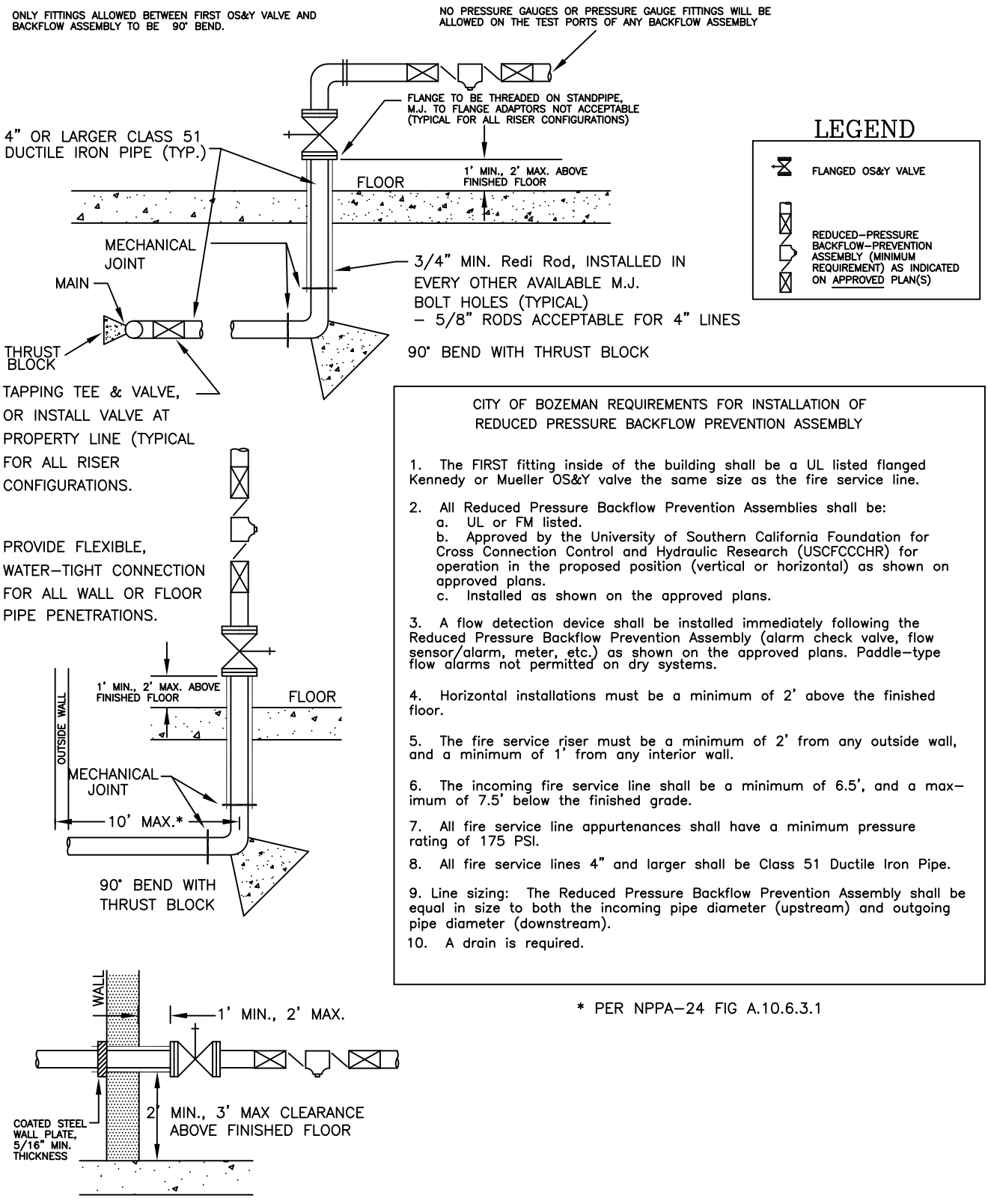
8. All fire service line appurtenances shall have a minimum pressure rating of 175 PSI.

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

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD FIRE SERVICE LINE INSTALLATION FOR CLASS I, II, & III SYSTEMS	NO. 02660–13 DEC 2003 REV: APRIL 2013

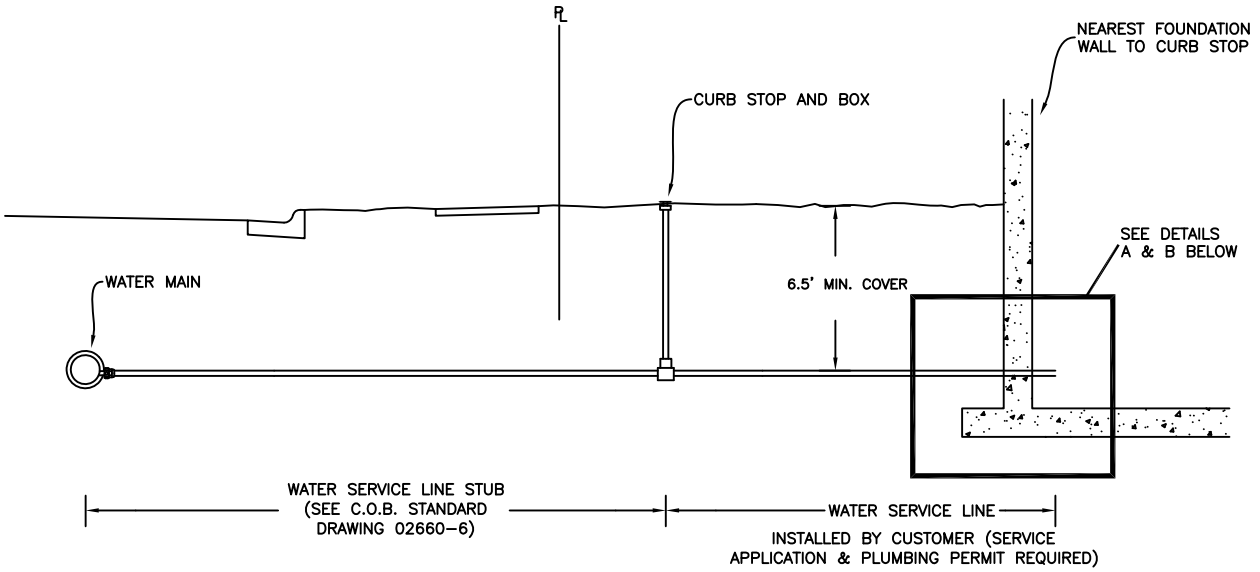


CITY OF BOZEMAN REQUIREMENTS FOR INSTALLATION OF REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY

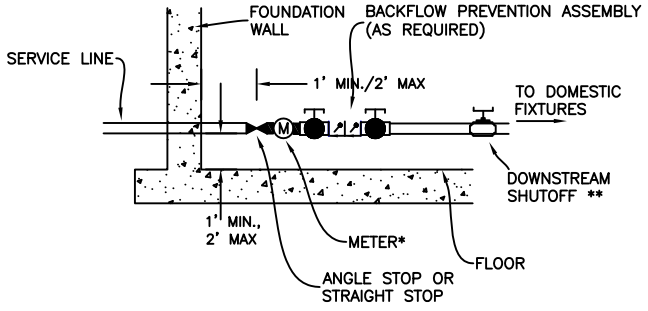
1. The FIRST fitting inside of the building shall be a UL listed flanged Kennedy or Mueller OS&Y valve the same size as the fire service line.
2. All Reduced Pressure Backflow Prevention Assemblies shall be:
   a. UL or FM listed.
   b. Approved by the University of Southern California Foundation for 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 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 max–imum 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

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD FIRE SERVICE LINE INSTALLATION FOR CLASS IV & V SYSTEMS	NO. 02660–14 Dec 2003 REV: APRIL 2013



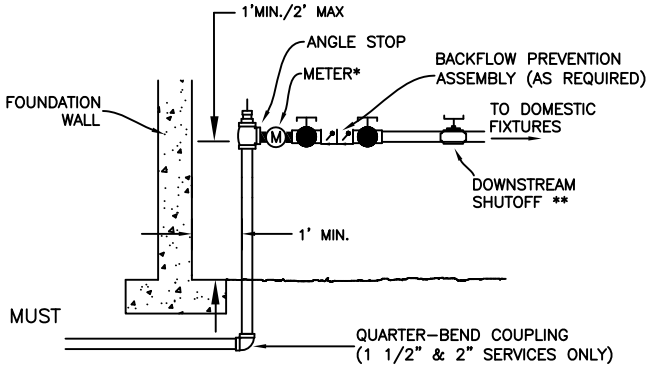
NOTE: METER SIZED SAME AS INCOMING LINE–NO EXCEPTIONS.



*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.)

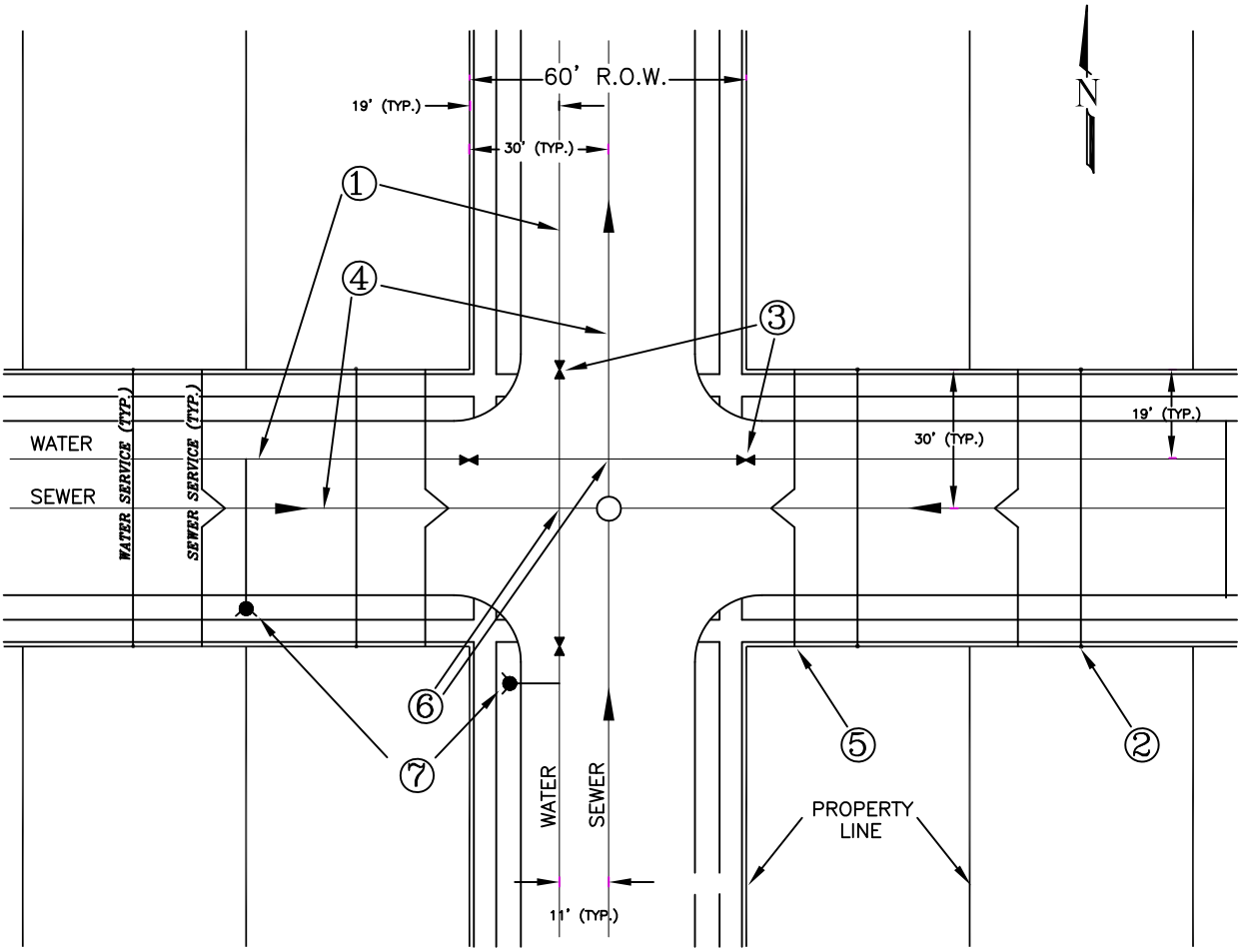


DETAIL B
TYPICAL FLOOR PENETRATION (N.T.S.)
(CRAWL SPACE)

INSTALLATION REQUIREMENTS:

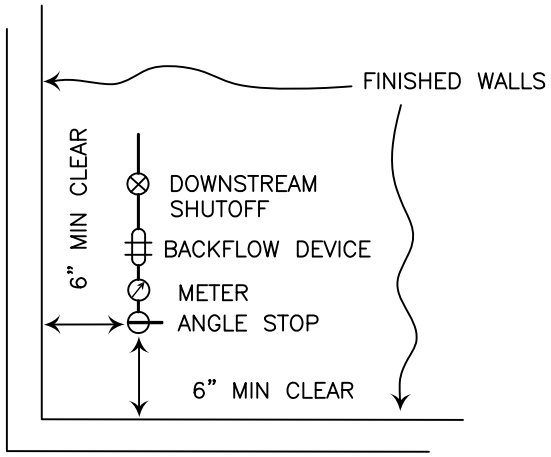
1. WATER SERVICE LINE INSTALLATIONS SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF BOZEMAN WATER SUPERINTENDANT.
2. SERVICE LINES SHALL BE TYPE K COPPER FOR 3/4", 1", 1 1/2", AND 2" SERVICES. SEE STANDARD DRAWING NO. 02660-12 FOR 4" AND LARGER DOMESTIC SERVICE LINES. SERVICE LINES BETWEEN 2" AND 4" 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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER SERVICE LINE FROM CURB STOP TO BUILDING (LINES 2" AND SMALLER)	NO. 02660-15 Dec. 2003 Rev. April 2006

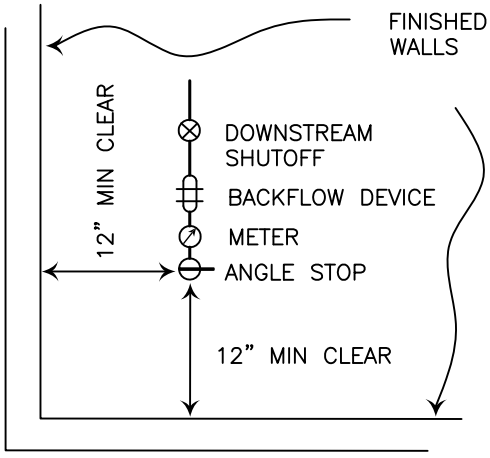


1. WATER MAINS LOCATED 19' FROM THE NORTH OR WEST RIGHT-OF-WAY PROPERTY LINE FOR STREETS 35' IN WIDTH OR GREATER. WATER MAINS LOCATED 5.5' WEST OR NORTH OF STREET CENTERLINE FOR STREETS LESS THAN 35' IN WIDTH (BACK OF CURB-BACK OF CURB)
2. WATER SERVICE STUB LOCATED AT CENTER OF LOT; SEE C.O.B. STANDARD 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.

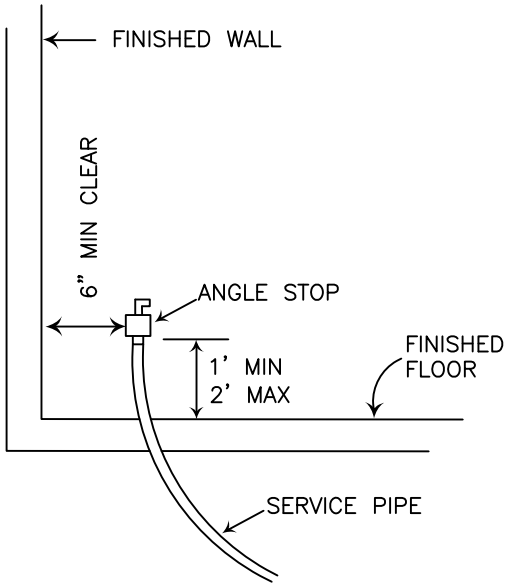
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER & SEWER MAIN AND SERVICES LOCATION STANDARDS	NO. 02660-16 Dec. 2003



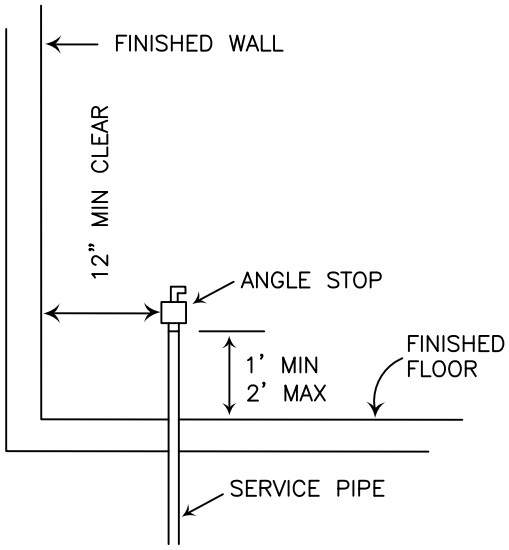
3/4" AND 1" COPPER SERVICES
PLAN VIEW



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



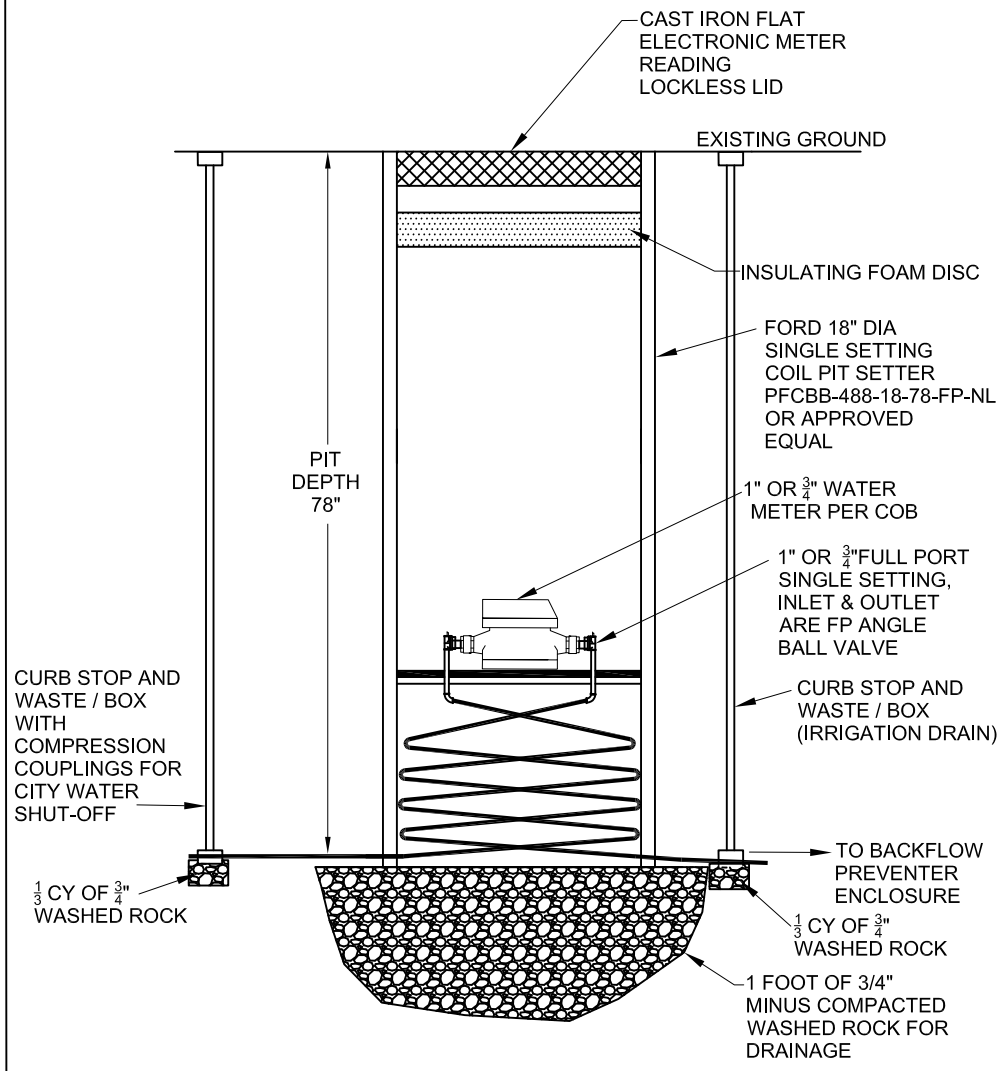
3/4" AND 1" COPPER SERVICES
PROFILE VIEW

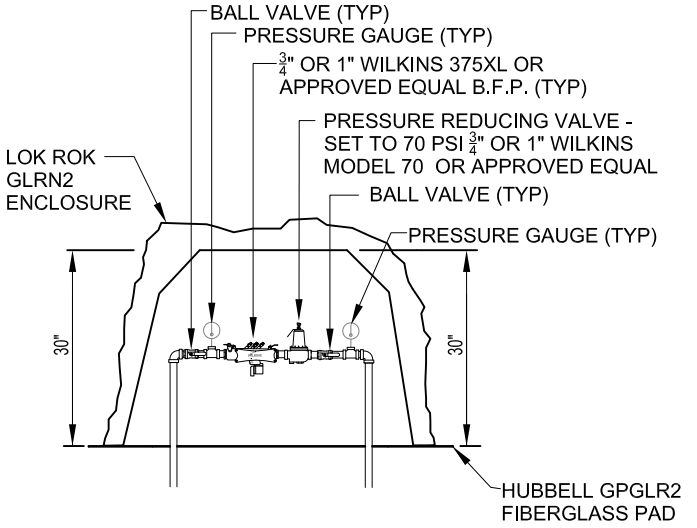


1 1/2" AND 2" COPPER SERVICES
PROFILE VIEW

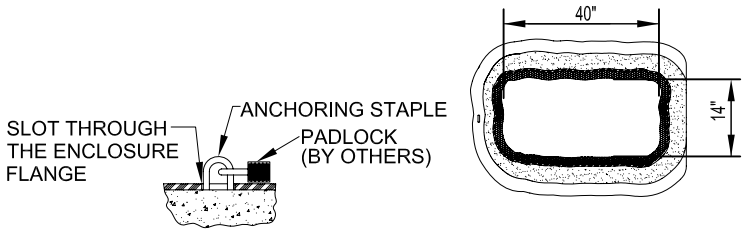
NOTE: PROVIDE FLEXIBLE, WATER-TIGHT SEAL FOR ALL FLOOR PENETRATIONS

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER SERVICE INTERIOR CLEARANCES	NO. 02660-17 APRIL 2005



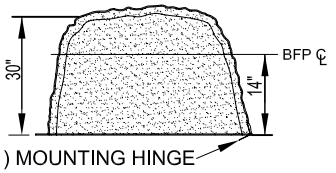


LOK ROK GLRN2 ENCLOSURE



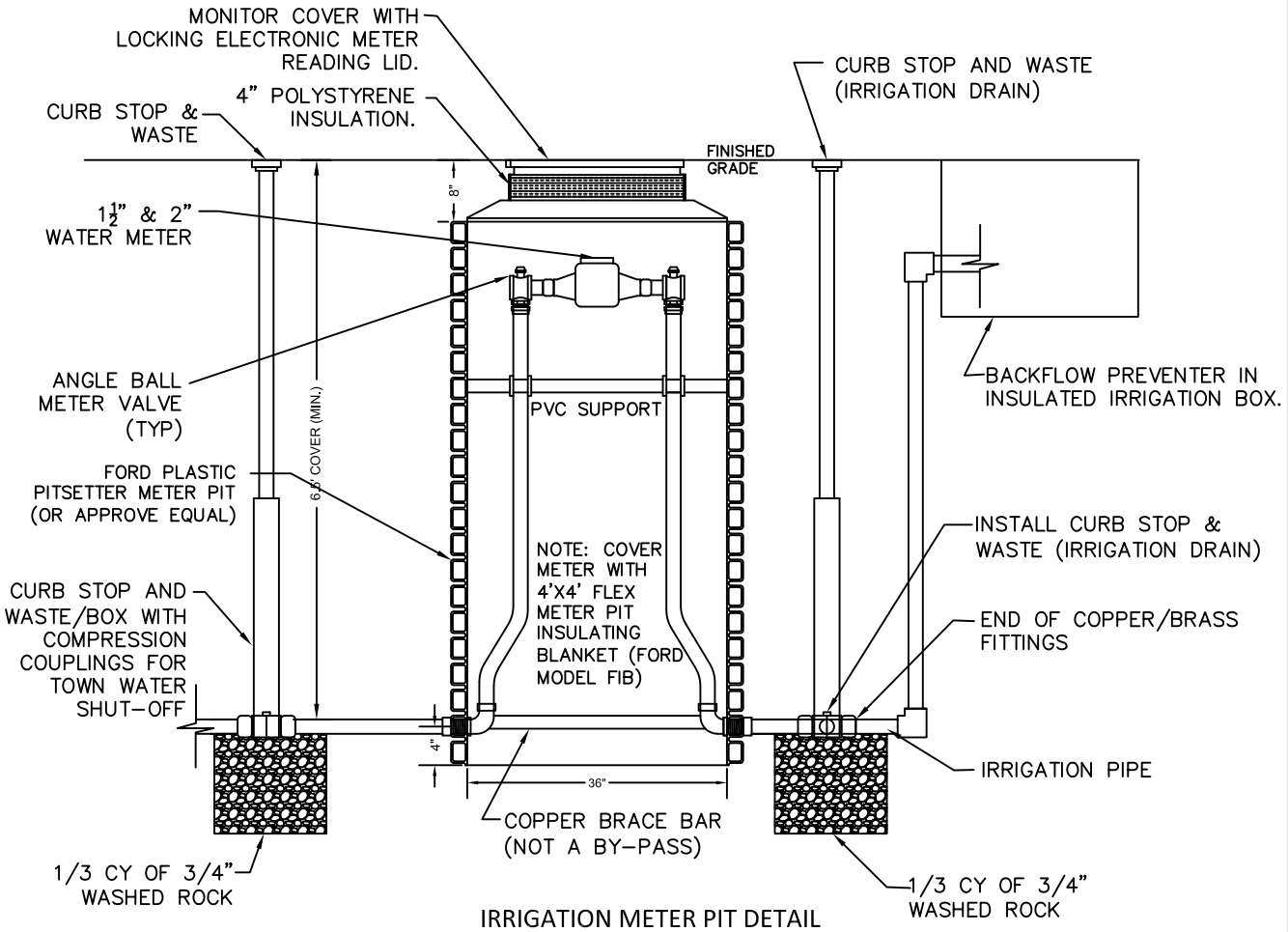
LOCKING DETAIL

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

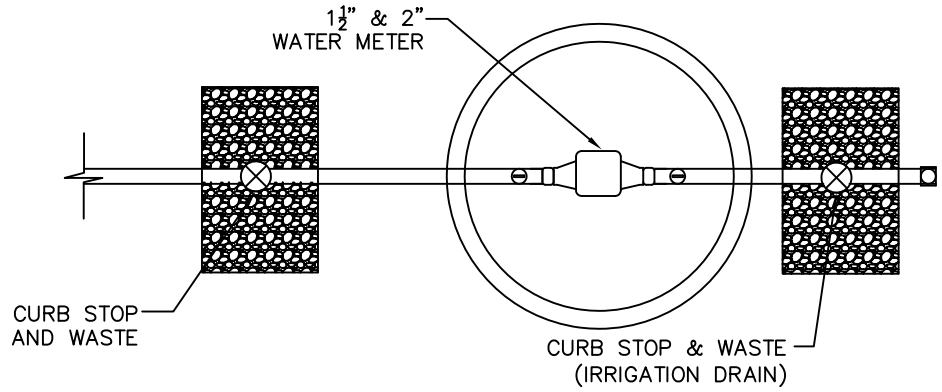


HINGED STYLE

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	IRRIGATION METER PIT FOR 3/4" OR 1" SERVICES	NO. 02660–18 APRIL 2017

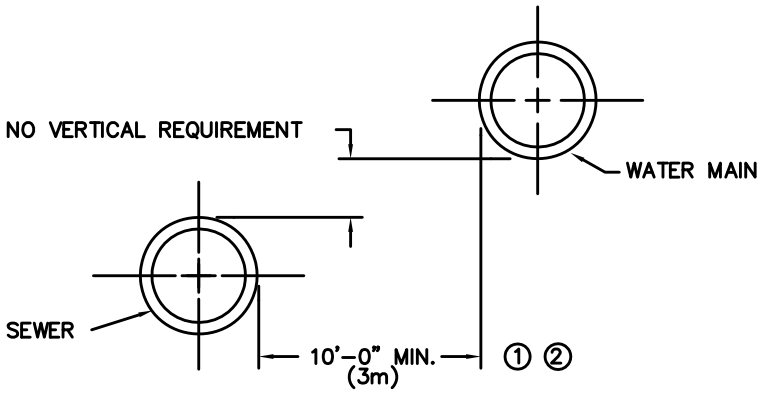


IRRIGATION METER PIT DETAIL

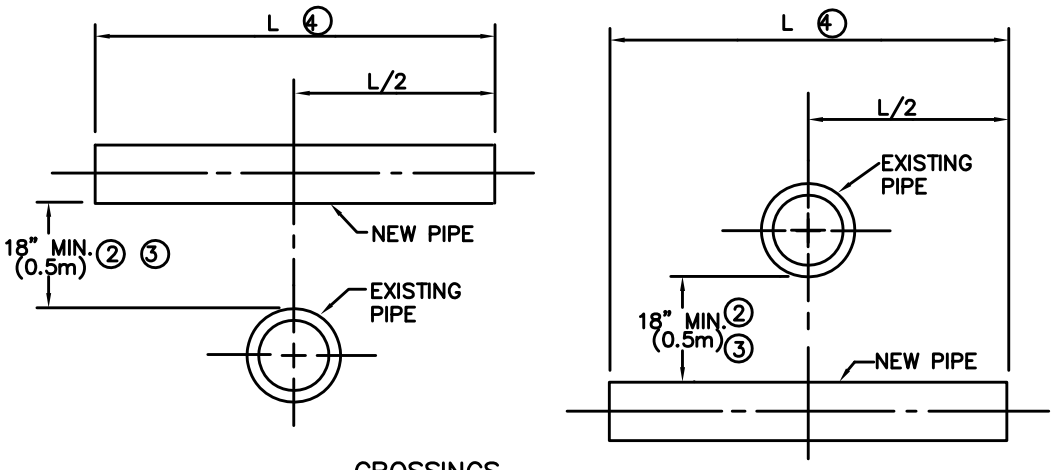


IRRIGATION METER PIT DETAIL - PLAN VIEW

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	IRRIGATION METER PIT FOR 1½" & 2" SERVICES	NO. 02660-19 APRIL 2017



PARALLEL ARRANGEMENT



CROSSINGS ⑤

NOTES:

① SPECIFIC MONTANA DEPART. OF HEALTH AND ENVIROMENTAL SCIENCES APPROVAL IS REQUIRED FOR A DISTANCE LESS THAN 10 FEET(3m) BETWEEN WATER MAIN AND GRAVITY SEWER.

② NO EXCEPTION TO THE MIN. SEPARATION REQUIREMENT IS PERMITTED WHEN THE SEWAGE CARRYING PIPE IS A FORCE MAIN.
AT CROSSINGS, ONE FULL LENGTH OF WATER MAIN PIPE SHALL BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE FORCE MAIN AS POSSIBLE.

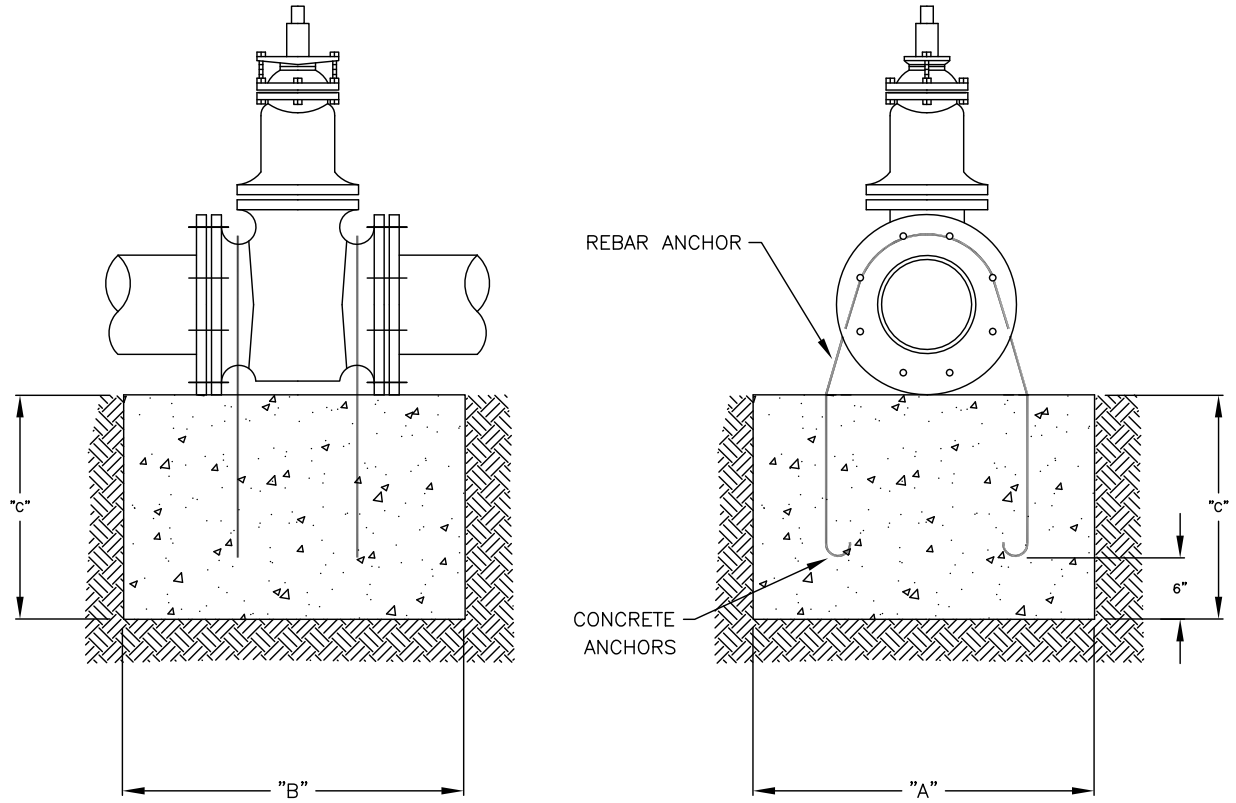
③ LESS THAN 18 INCHES(0.5m) OF SEPARATION IS PERMITTED WHEN THE GRAVITY SEWER AT THE CROSSING IS MADE FROM A SINGLE 20 FOOT(6.1m) LENGTH OF AWWA PRESSURE PIPE AND THE CROSSING ANGLE IS APPROXIMATELY 90 DEGREES.
SPECIFIC MONTANA DEPART. OF HEALTH AND ENVIROMENTAL SCIENCES APPROVAL IS REQUIRED FOR A VERTICAL SEPARATION OF LESS THAN 18 INCHES(0.5m) BETWEEN WATER MAIN AND SANITARY SEWER

④ "L" IS A STANDARD LENGTH OF PIPE AS SUPPLIED BY A PIPE MANUFACTURER.

⑤ ADEQUATE STRUCTURAL SUPPORT FOR PIPES AT CROSSINGS SHALL BE PROVIDED.

REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	WATER AND SEWER MAIN SEPARATION	STANDARD DRAWING NO. 02660-2



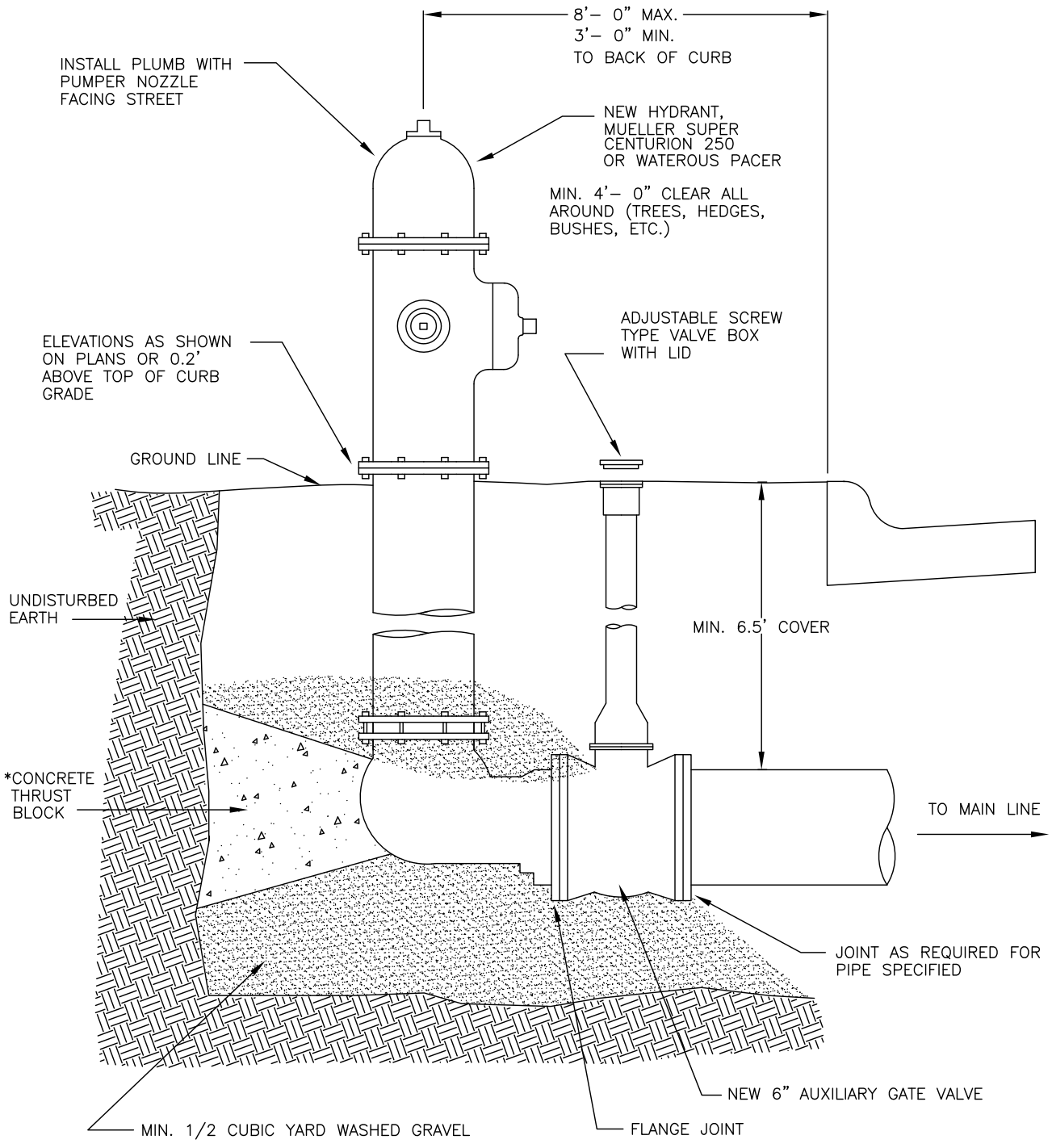
NOTE: COAT RODS WITH "KOPPERS" BITUMASTIC NO. 50 COATING OR EQUAL.

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"

NOTE: Pressures shown above are maximum working pressures in system.

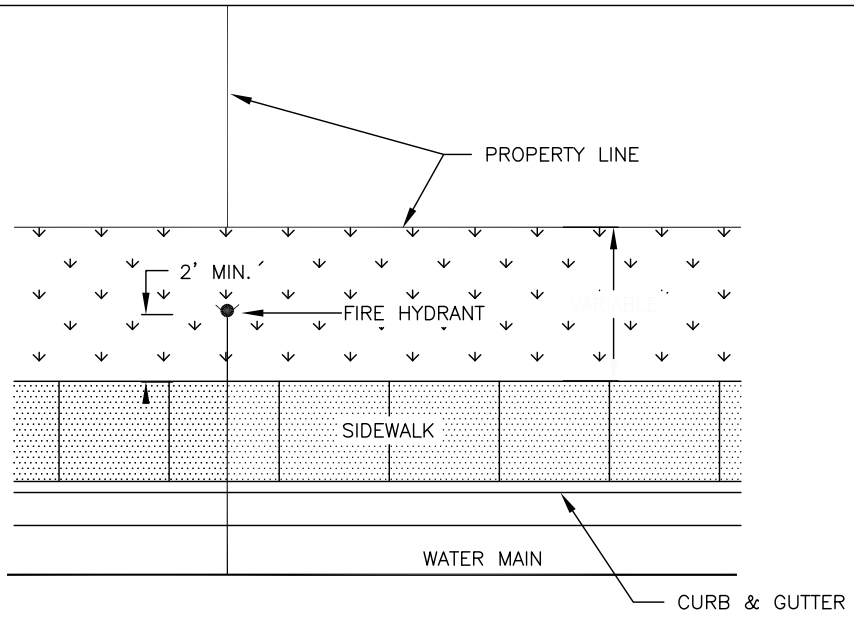
THRUST BLOCKING AND ANCHORS ARE REQUIRED ON ALL 6" VALVES AND LARGER UNLESS SPECIFIED BY THE ENGINEER. MEGA-LUG OR APPROVED EQUAL JOINT RESTRAINTS MAY BE USED IN LIEU OF CONCRETE THRUST BLOCKS. THRUST BLOCKS NOT REQUIRED ON TAPPING VALVES

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	THRUST BLOCKING FOR WATER MAIN VALVES	NO. 02660-3 DEC 2003

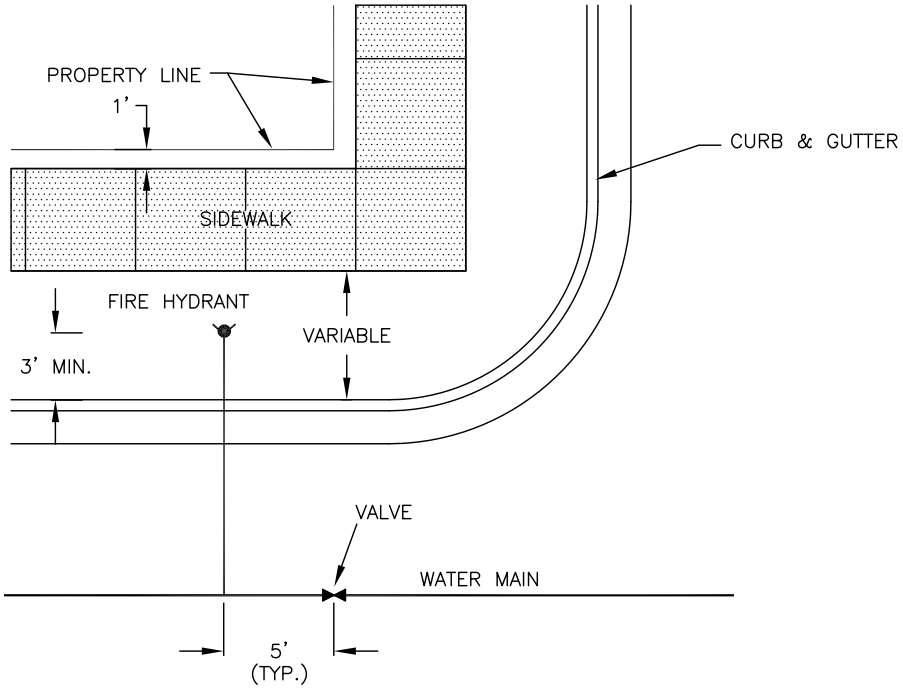


*MEGA–LUG OR APPROVED EQUAL JOINT RESTRAINTS MAY BE USED IN LIEU OF CONCRETE THRUST BLOCK

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	FIRE HYDRANT	NO. 02660–4 FEB 2008

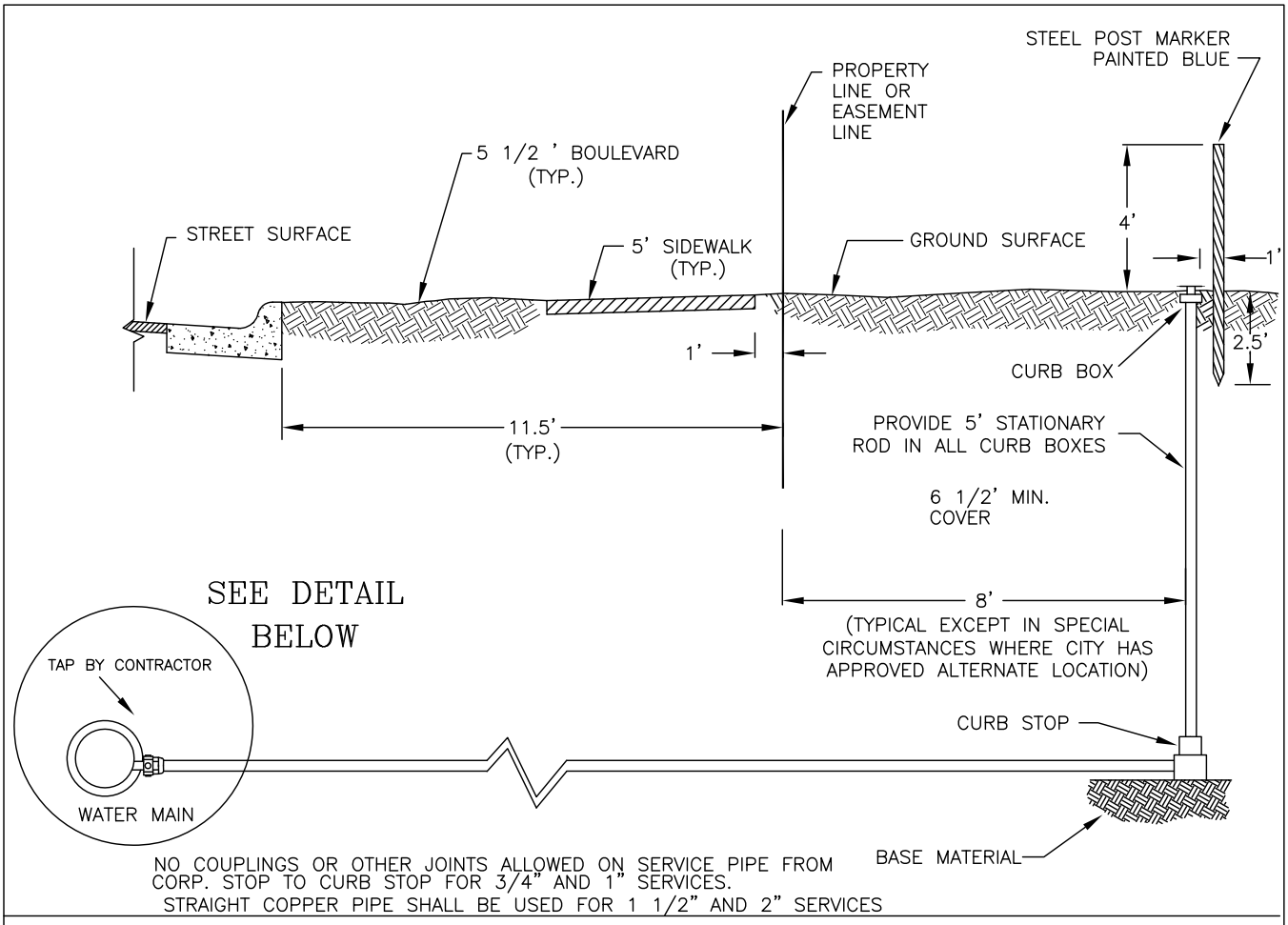


CURB WALK DETAIL



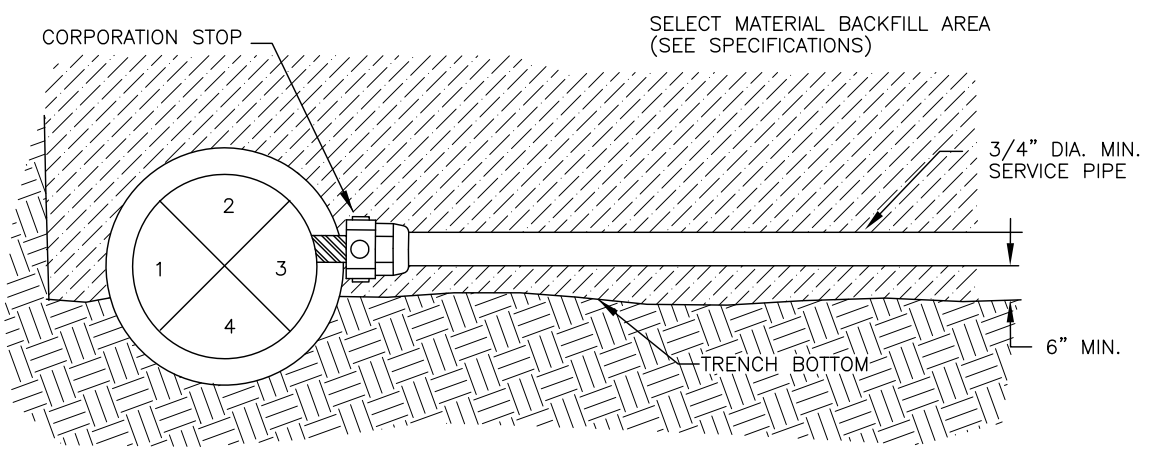
BOULEVARD WALK DETAIL

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	HYDRANT LOCATION DETAIL	NO. 02660-5 Dec 2003



NO COUPLINGS OR OTHER JOINTS ALLOWED ON SERVICE PIPE FROM CORP. STOP TO CURB STOP FOR 3/4" AND 1" SERVICES.
STRAIGHT COPPER PIPE SHALL BE USED FOR 1 1/2" AND 2" SERVICES

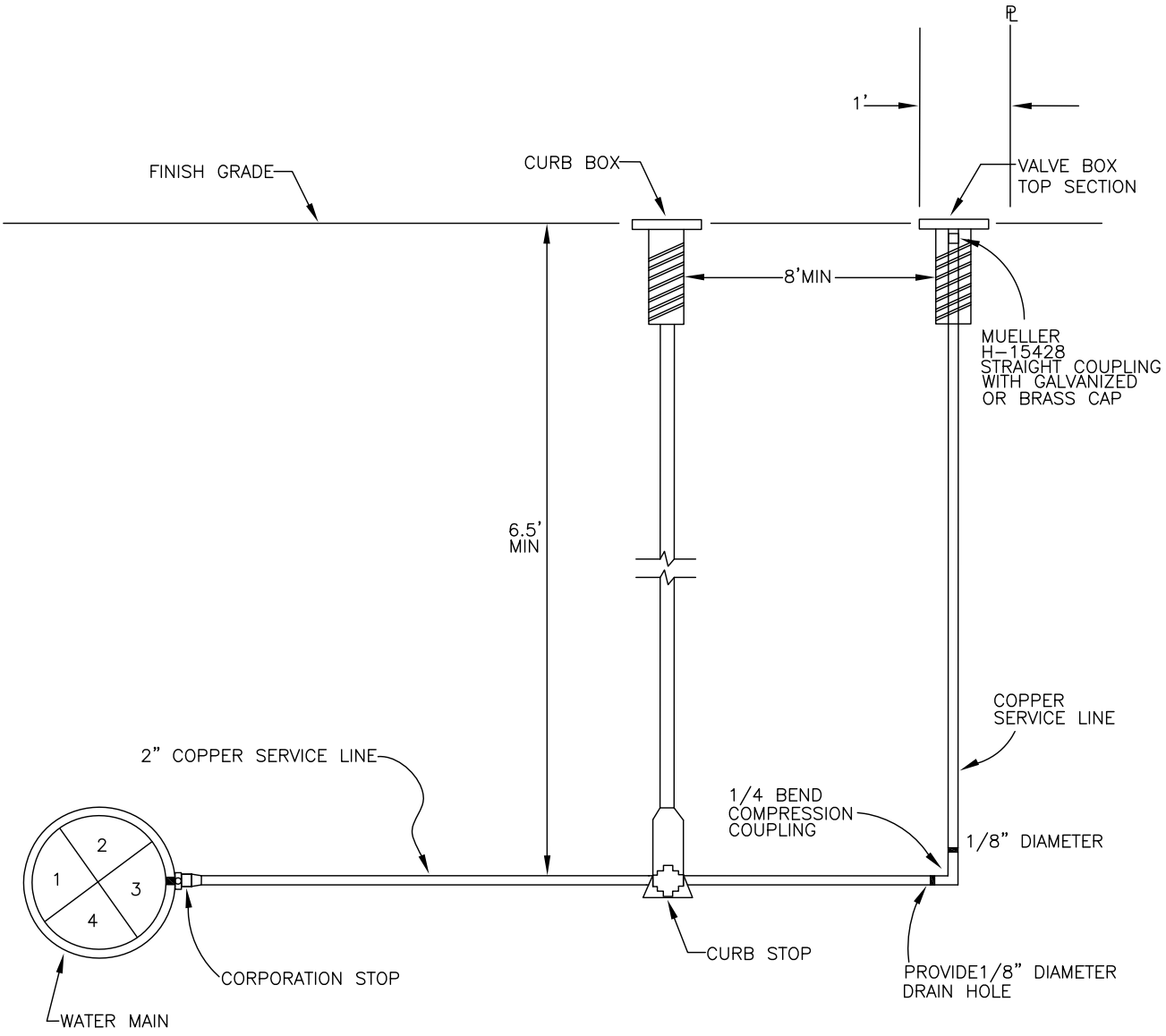
DETAIL OF A PROPERLY INSTALLED CORPORATION STOP. TAP MAIN AT SPRINGLINE.



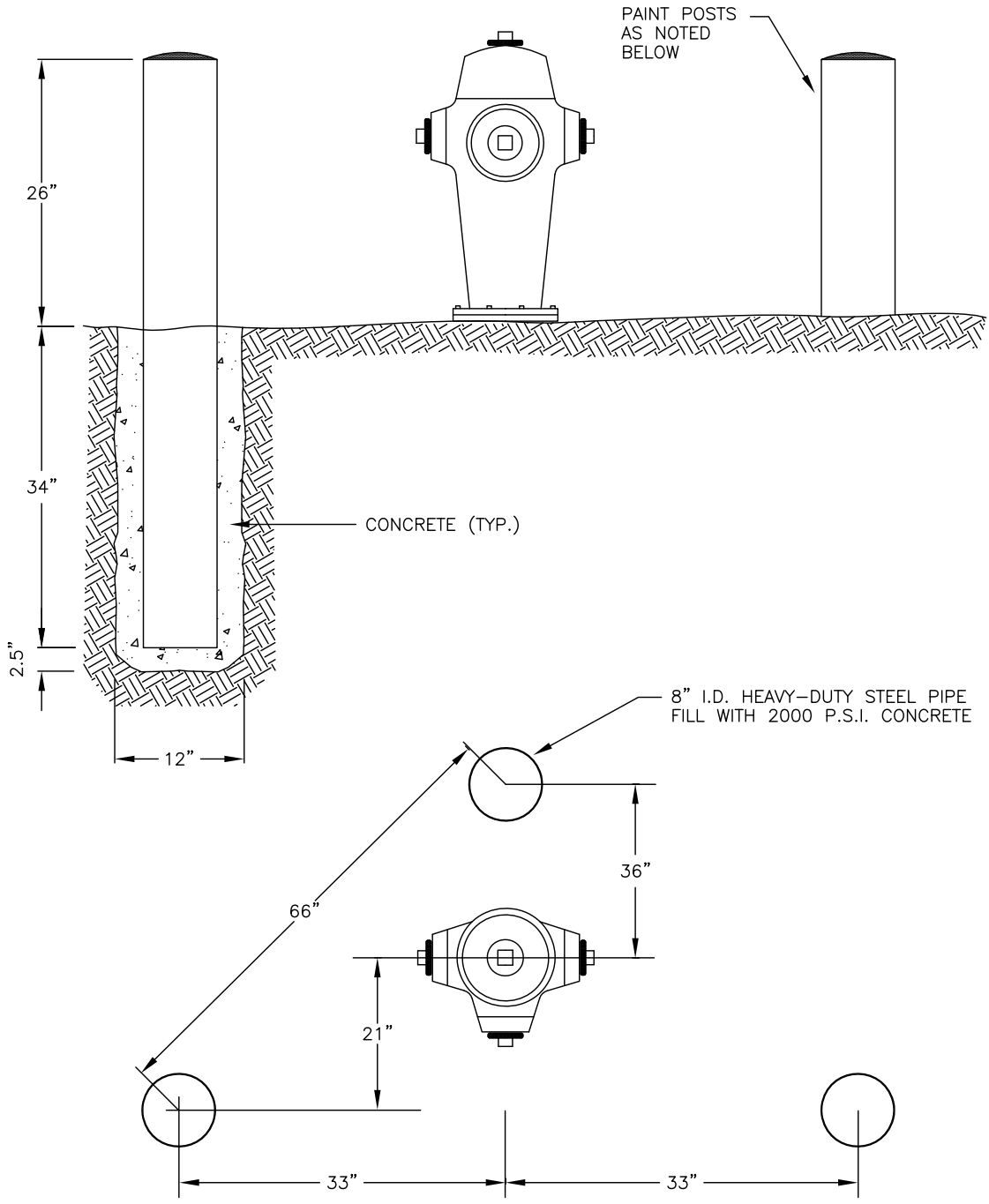
GENERAL NOTES:

1. WATER SERVICE LINES SHALL HAVE A MINIMUM 6 1/2 FOOT 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 1/2 FOOT 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.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	WATER SERVICE LINE	NO. 02660–6 DEC 2003

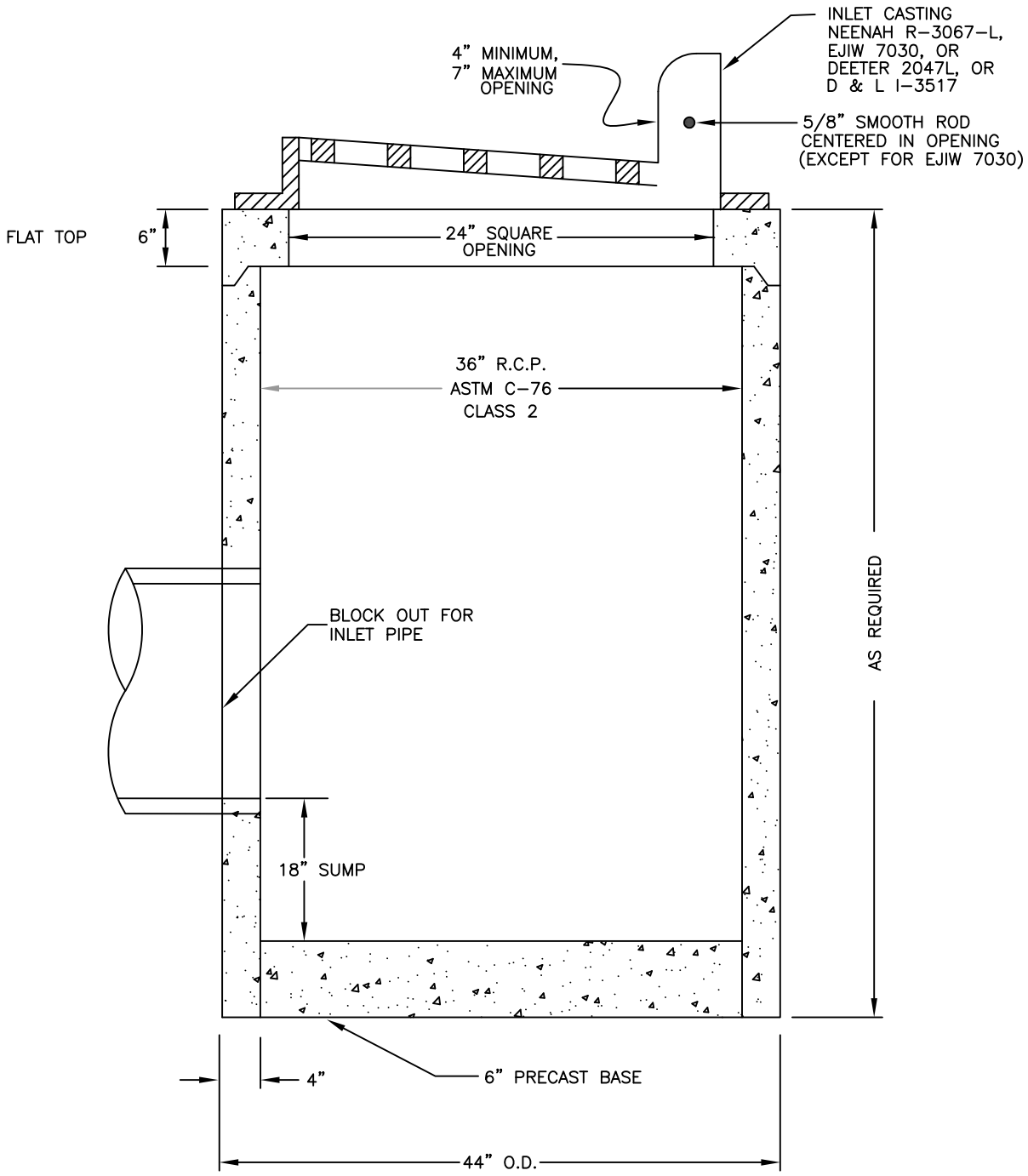


CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL BLOWOFF	NO. 02660-7 Dec. 2003

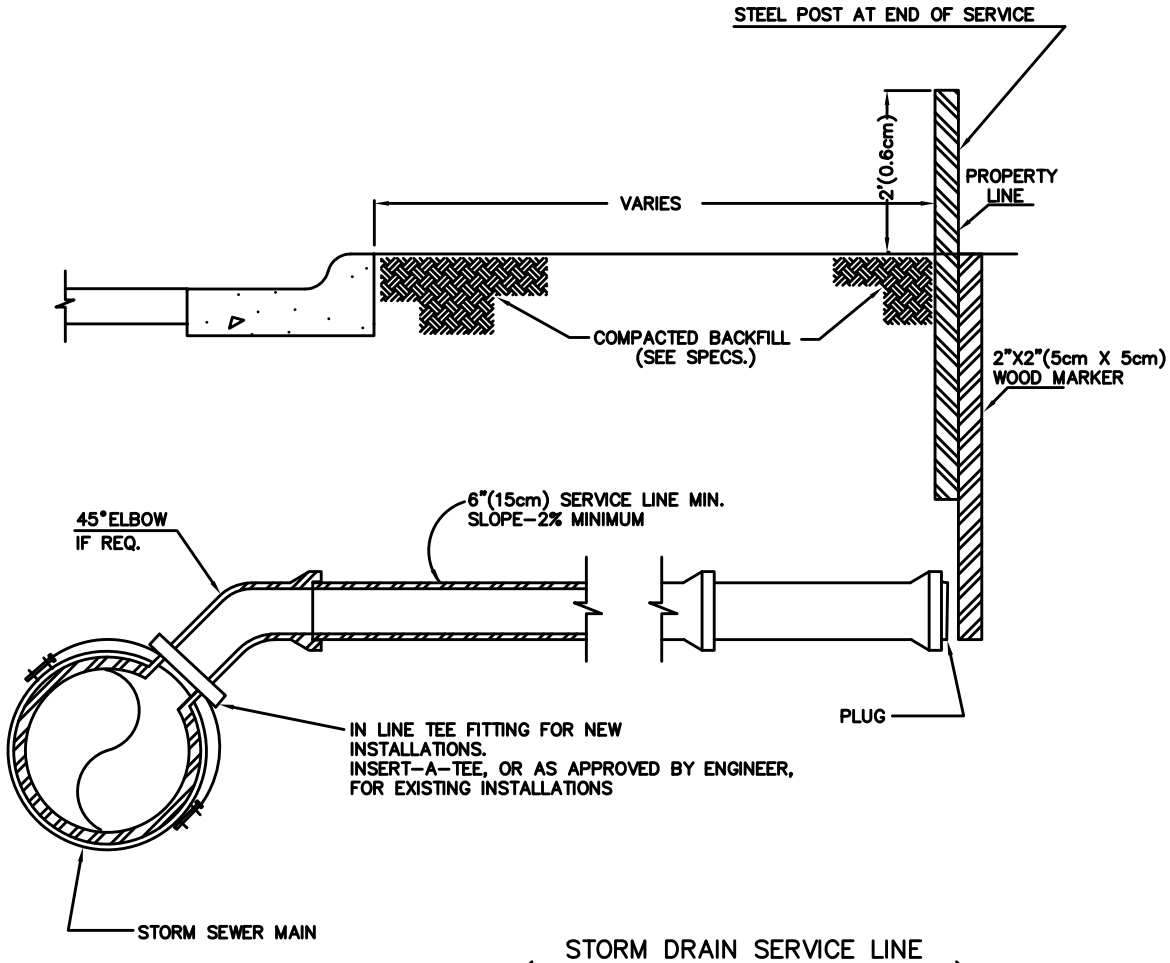


NOTE: POST NOT REQUIRED WHERE NATURAL BARRIERS EXIST.
PAINT POSTS WITH SHERWIN-WILLIAMS METALATEX SEMI-GLOSS COATING, SAFETY RED (B42 R38 620-4069).

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	HYDRANT BARRIER POSTS	NO. 02660-8 DEC 2003



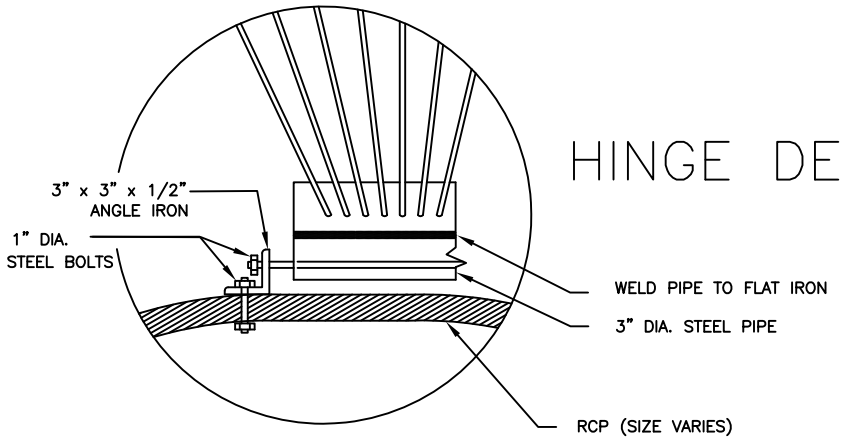
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	36" STANDARD STORM DRAIN INLET	NO. 02720-1 Dec. 2003 Rev. March 2017



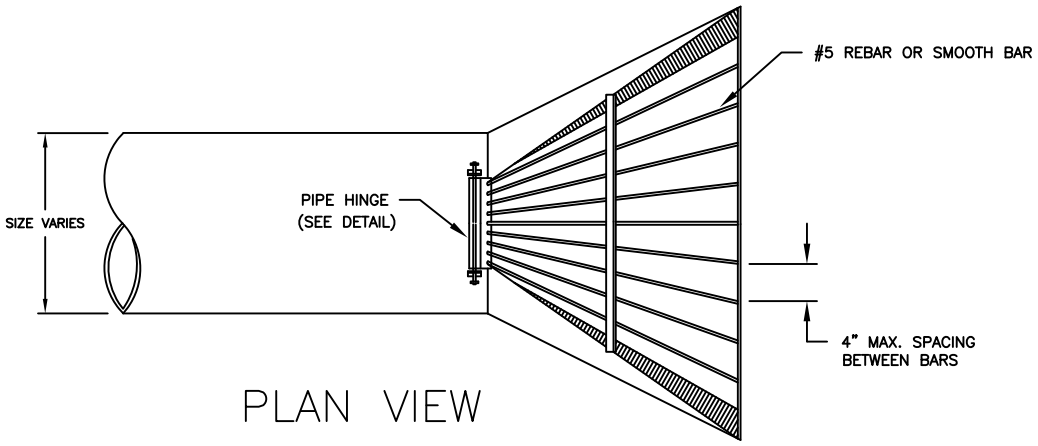
STORM DRAIN SERVICE LINE
(PRIVATE PROPERTY CONNECTION)

REVISED: 2/17/2000

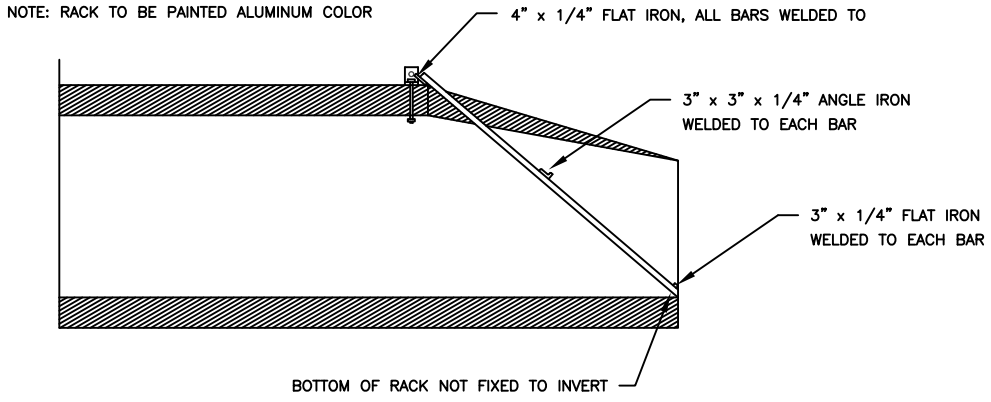
MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	STORM DRAIN SERVICE LINE	STANDARD DRAWING NO. 02720-10



HINGE DETAIL

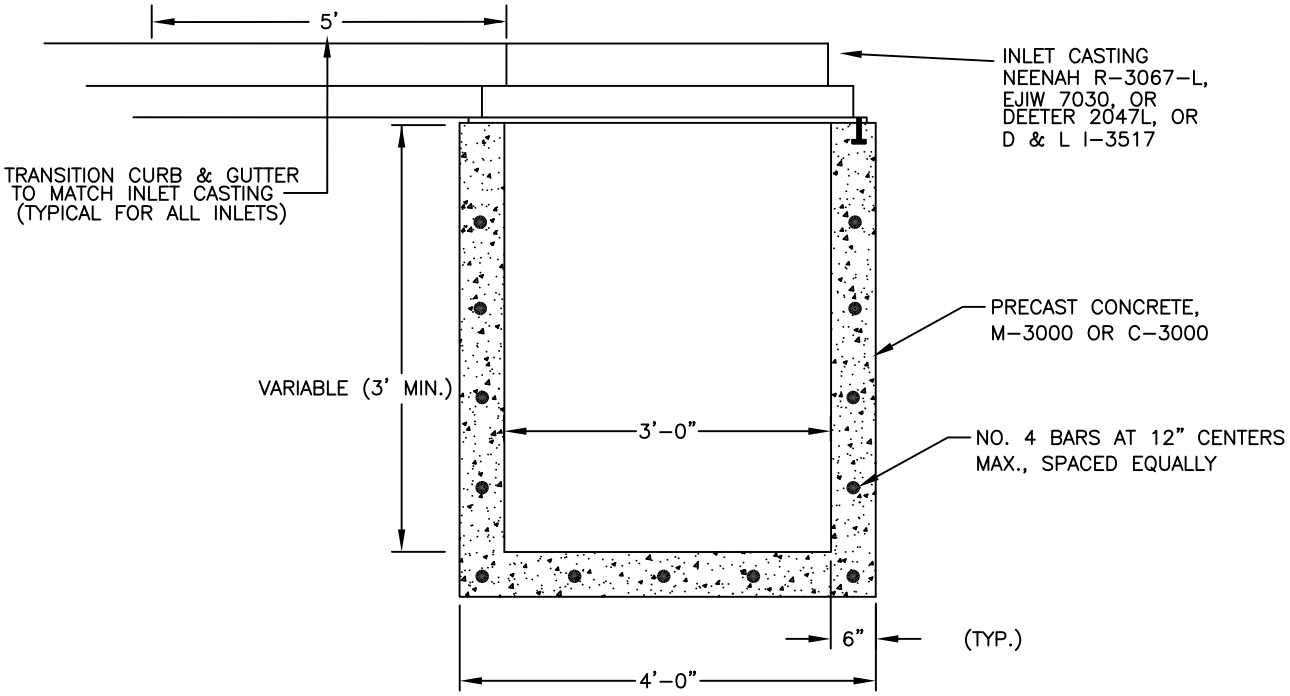


PLAN VIEW

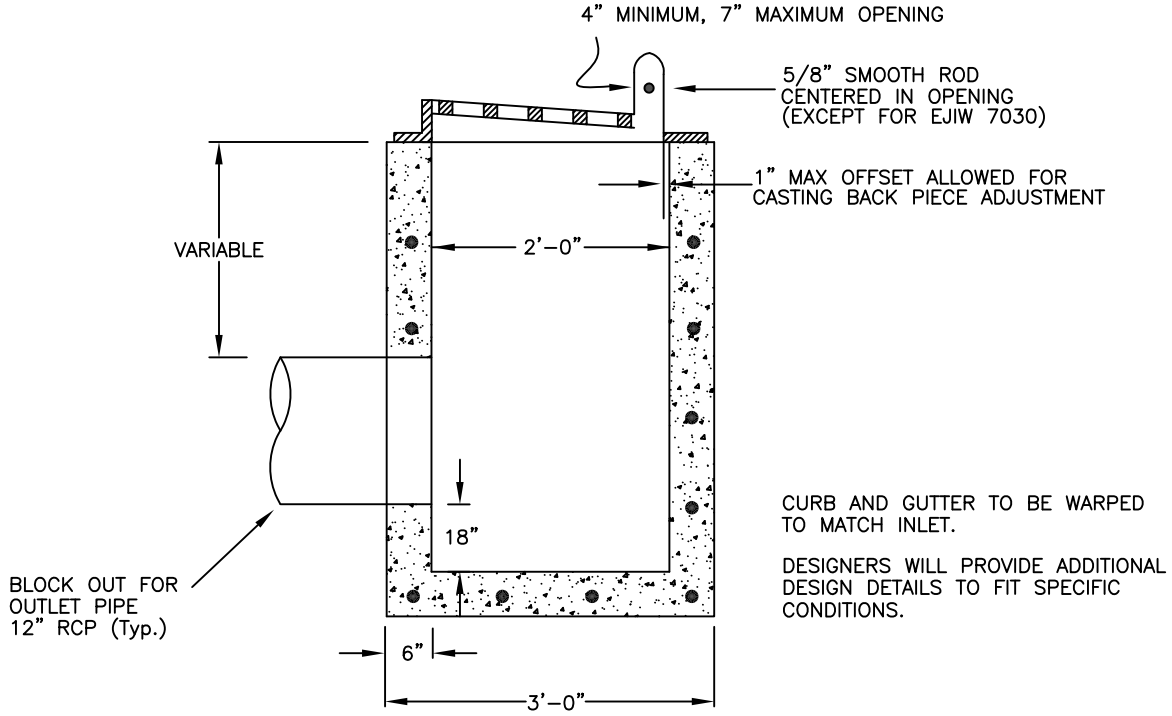


SECTION VIEW

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STORM DRAIN DEBRIS RACK	NO. 02720-11 DEC. 2003

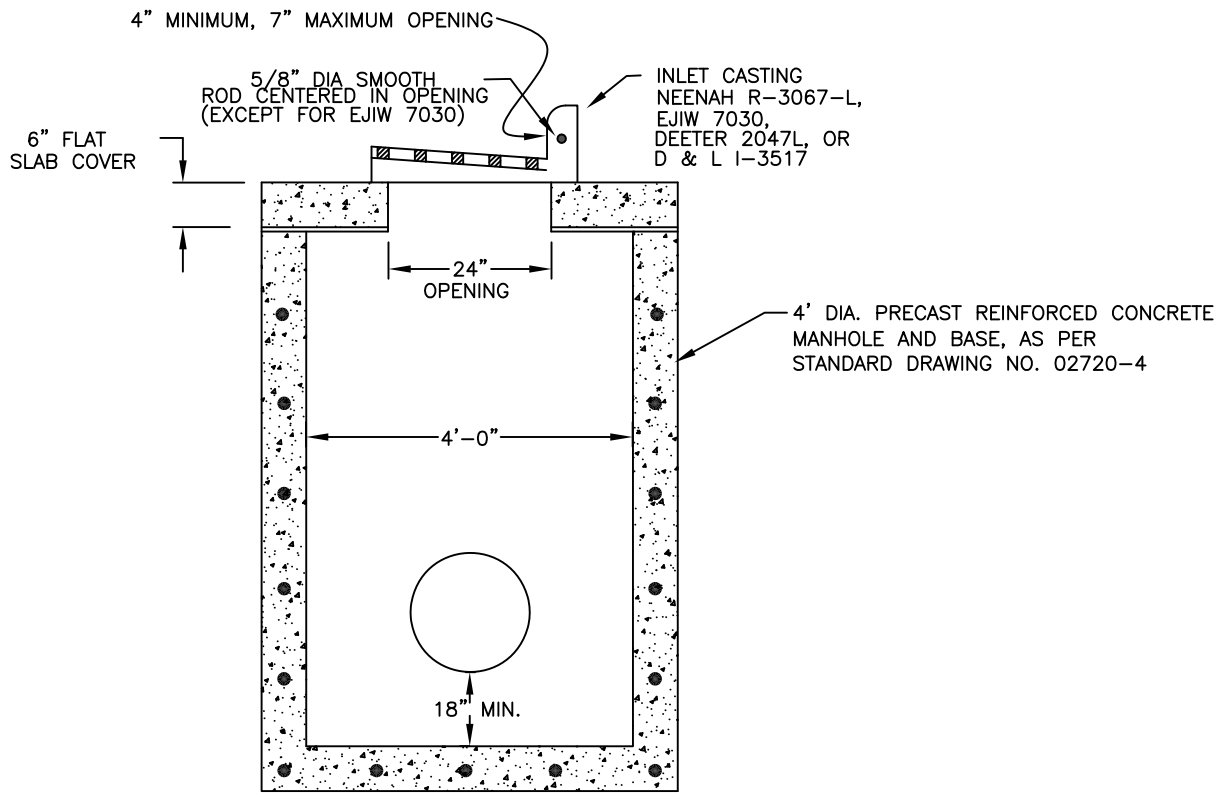


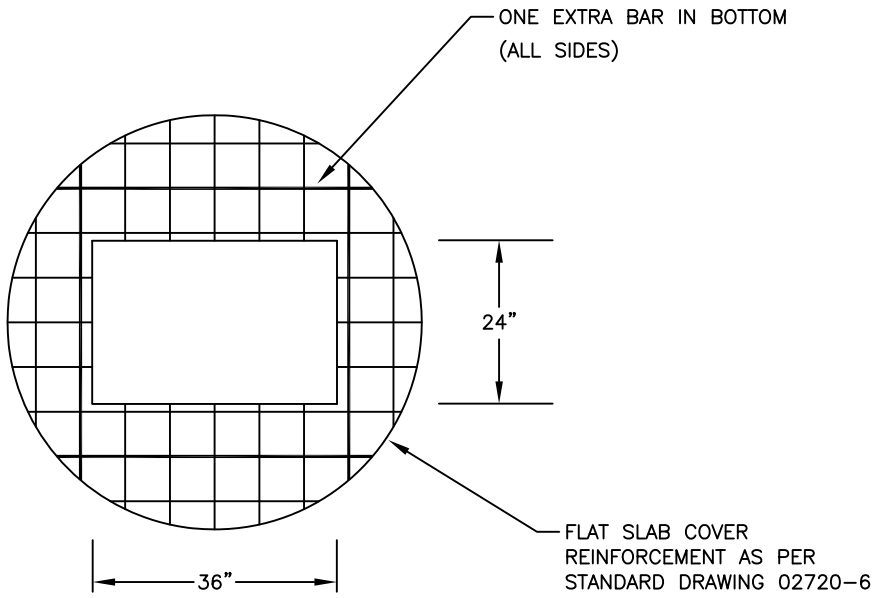
FRONT VIEW



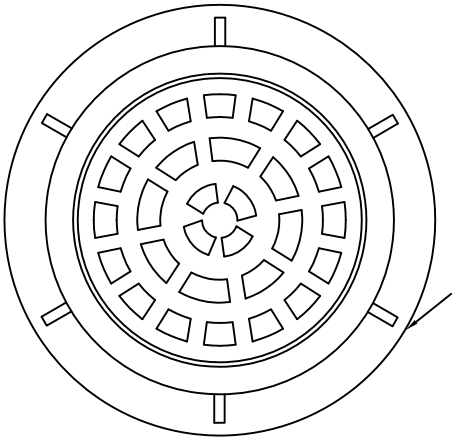
SIDE VIEW

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD SQUARE STORM DRAIN INLET	NO. 02720-1A Dec. 2003 Rev MAR 2017

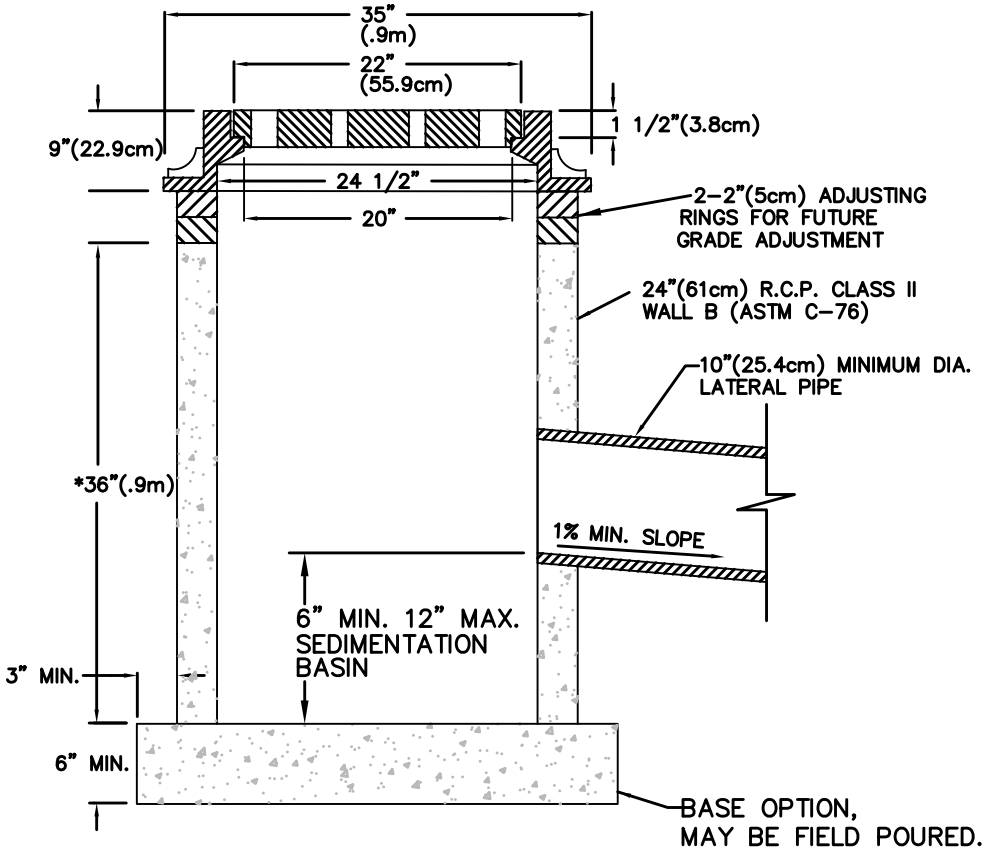




CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	COMBINATION MANHOLE AND CURB INLET	NO. 02720-1B DEC.2003 REV: MAR 2017



PLAN



SECTION

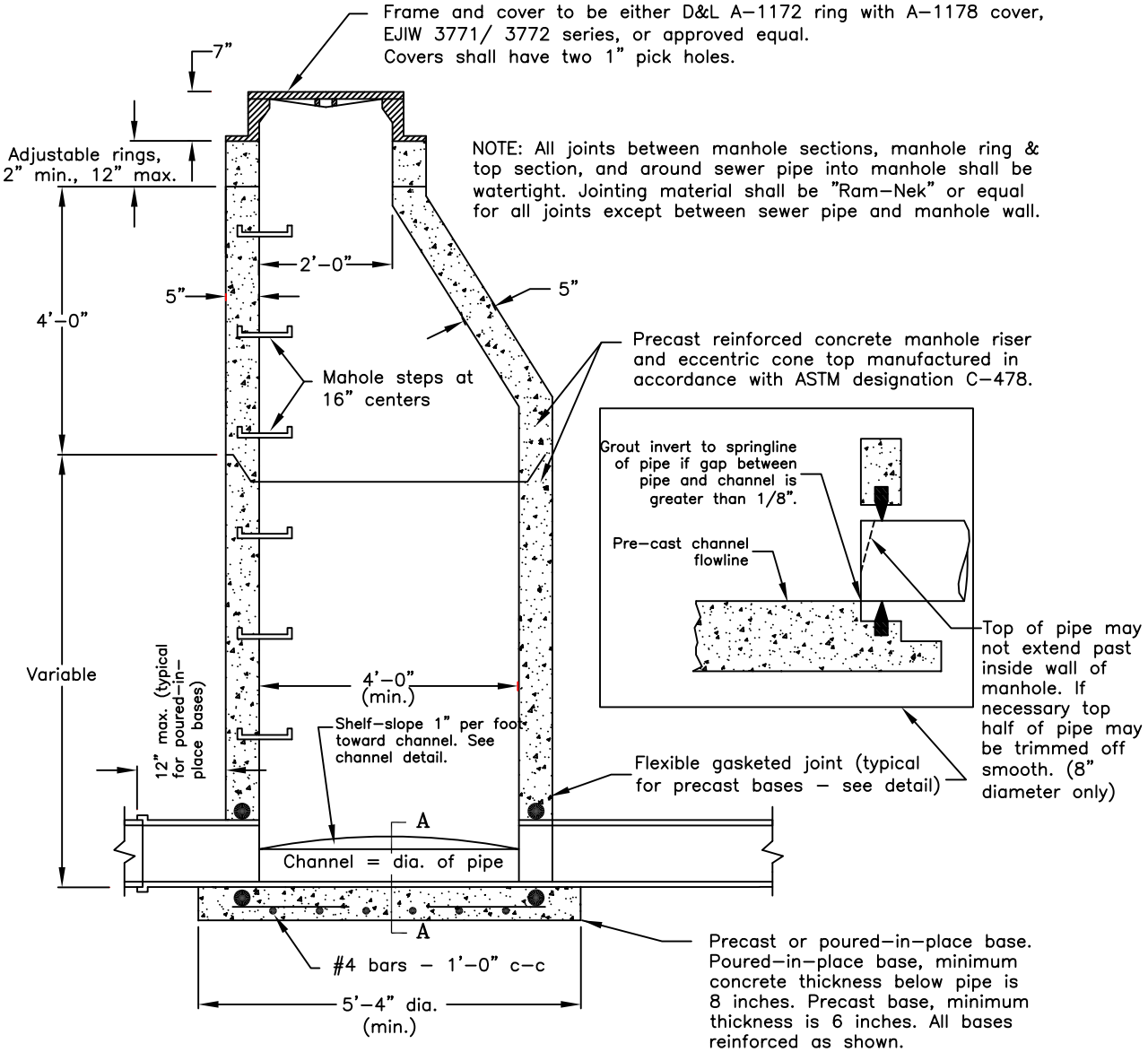
* STANDARD, EXCEPT AS OTHERWISE NOTED ON THE PLAN – PROFILE SHEET.

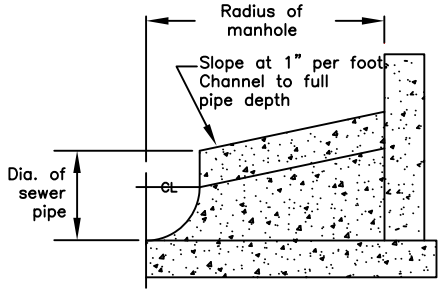
NOTE:

FOR INSTALLATION IN GRAVEL ALLEYS PIPE INVERT MUST BE 6" MIN. ABOVE BASE. SHELF ON BASE NOT REQUIRED.

2/2000

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	24" STANDARD RISER INLET	STANDARD DRAWING NO. 02720-2

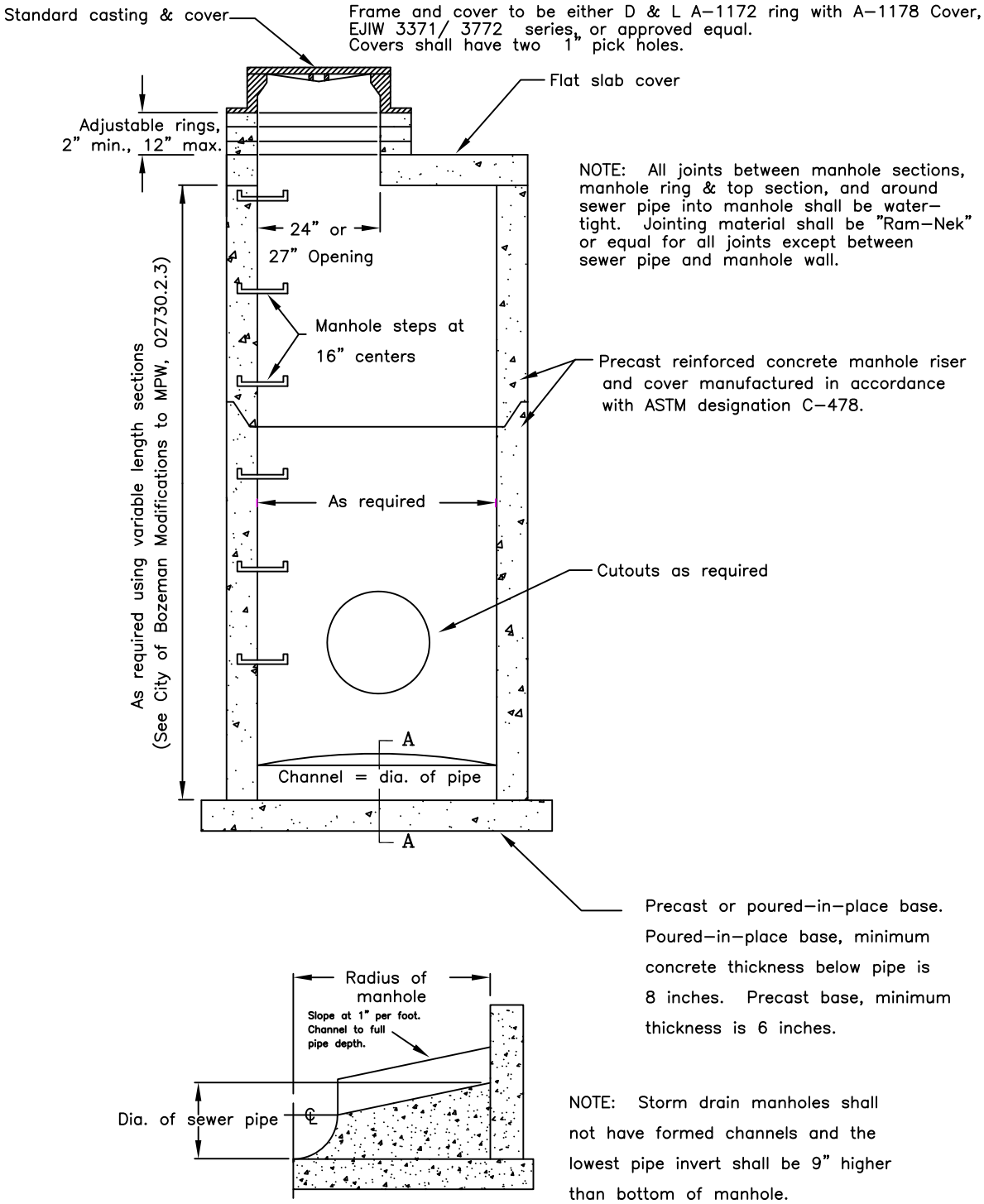




SECTION A–A

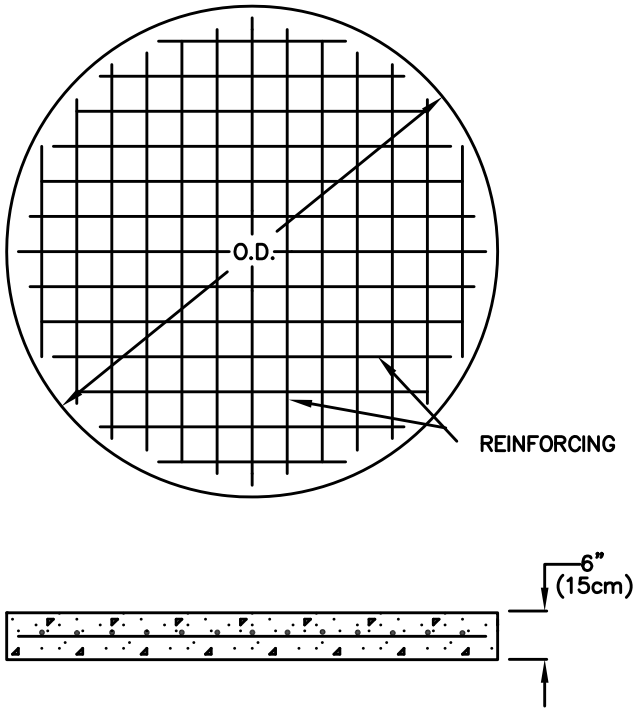
NOTE: Storm drain manholes shall not have formed channels and the lowest pipe invert shall be 9" higher than bottom of manhole.

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SANITARY SEWER AND STORM DRAIN MANHOLE	NO. 02720–3 DEC. 2003 Rev. MAR 2017



SECTION A–A

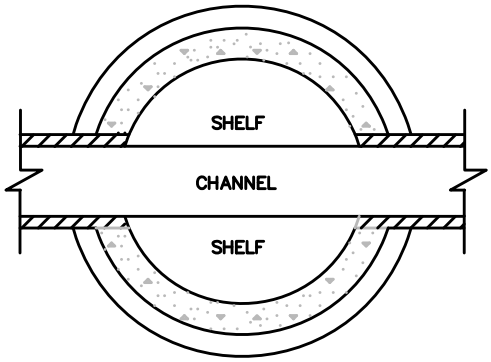
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD STRAIGHT MANHOLE	NO. 02720–4 DEC. 2003 REV: MAR 2006

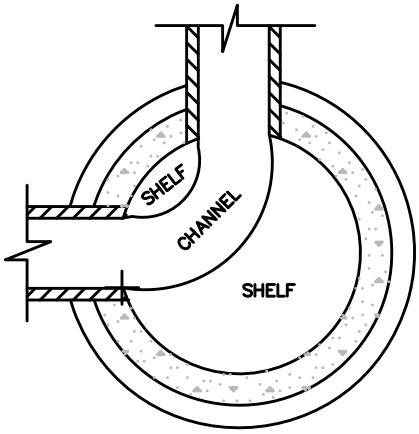


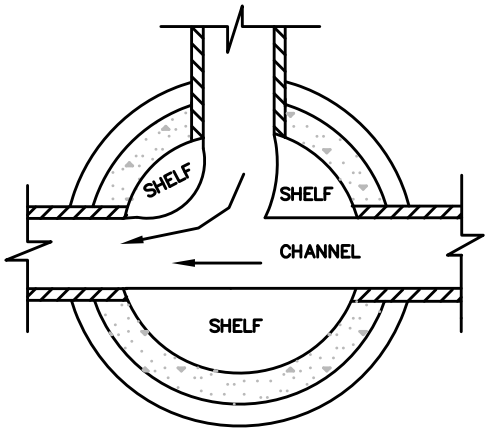
SIZE	O.D.	REIN.	WT.
48" (122cm)	64" (163cm)	#4@8" EACH WAY (#4@20cm)	1675# (760kg)
54" (137cm)	71" (180cm)	#4@8" EACH WAY (#4@20cm)	4125# (1870kg)
60" (152cm)	78" (198cm)	#4@8" EACH WAY (#4@20cm)	4975# (2260kg)
72" (183cm)	92" (234cm)	#4@6" EACH WAY (#4@15cm)	6925# (3140kg)

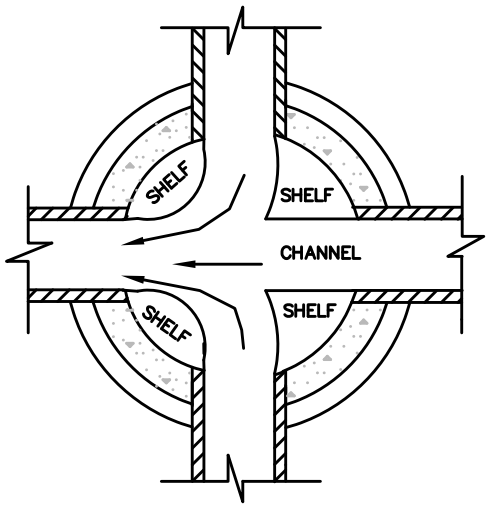
REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	PRECAST MANHOLE BASES 48", 54", 60", 72"	STANDARD DRAWING NO. 02720-6







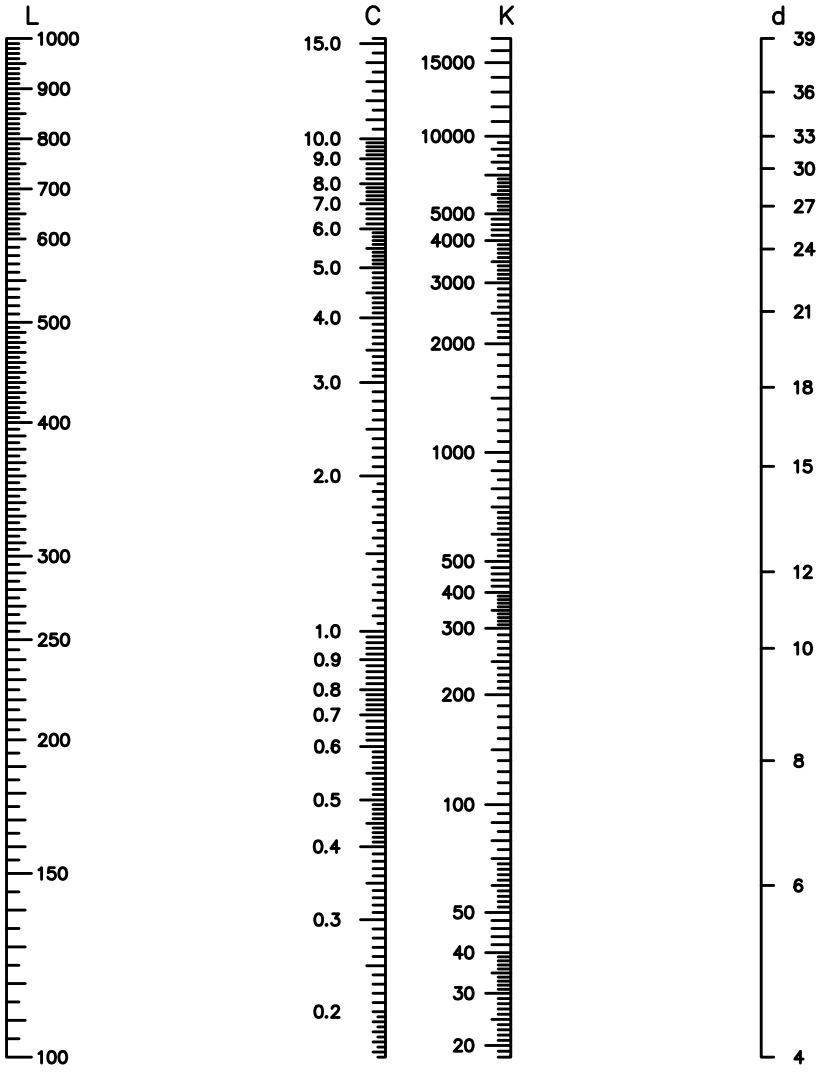


NOTES:

1. SLOPE ALL SHELVES TO CHANNEL AT 1" PER FOOT (8cm per meter).
2. SEE PLAN–PROFILE SHEETS FOR SLOPE OF CHANNEL.

REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	TYPICAL MANHOLE CHANNEL DETAILS	STANDARD DRAWING NO. 02720–7

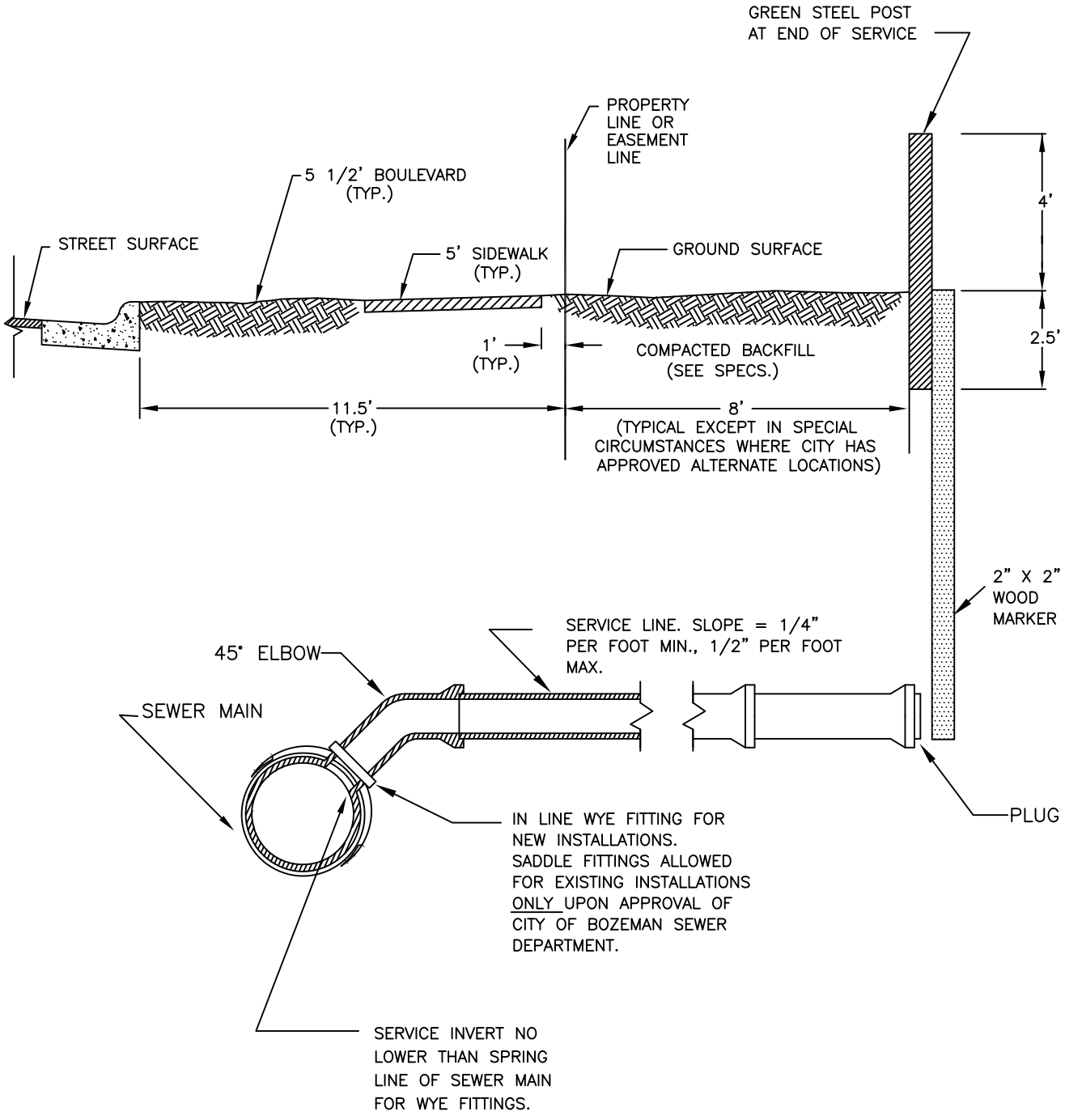


The nomograph shown on this page may be used to compute the specification time even if several different pipe diameters are included in one test. Draw a straight line connecting the diameter on the "d" scale with the corresponding length of pipe of that diameter under test on the "L" scale. Each line will cross the "K" and "C" scales. The corresponding values of "K" and "C" for each diameter – length combination under test are read and recorded. All the "K" values are totaled, as are the "C" values. Total "K" governs if the total of "C" is less than 1.0 in which case, total "K" value equals the time in seconds that the pipeline under test should take before the pressure falls from 3.5 to 2.5 psig. If total "C" is greater than 1.0, total "K" is divided by total "C" to obtain the specification time in seconds.

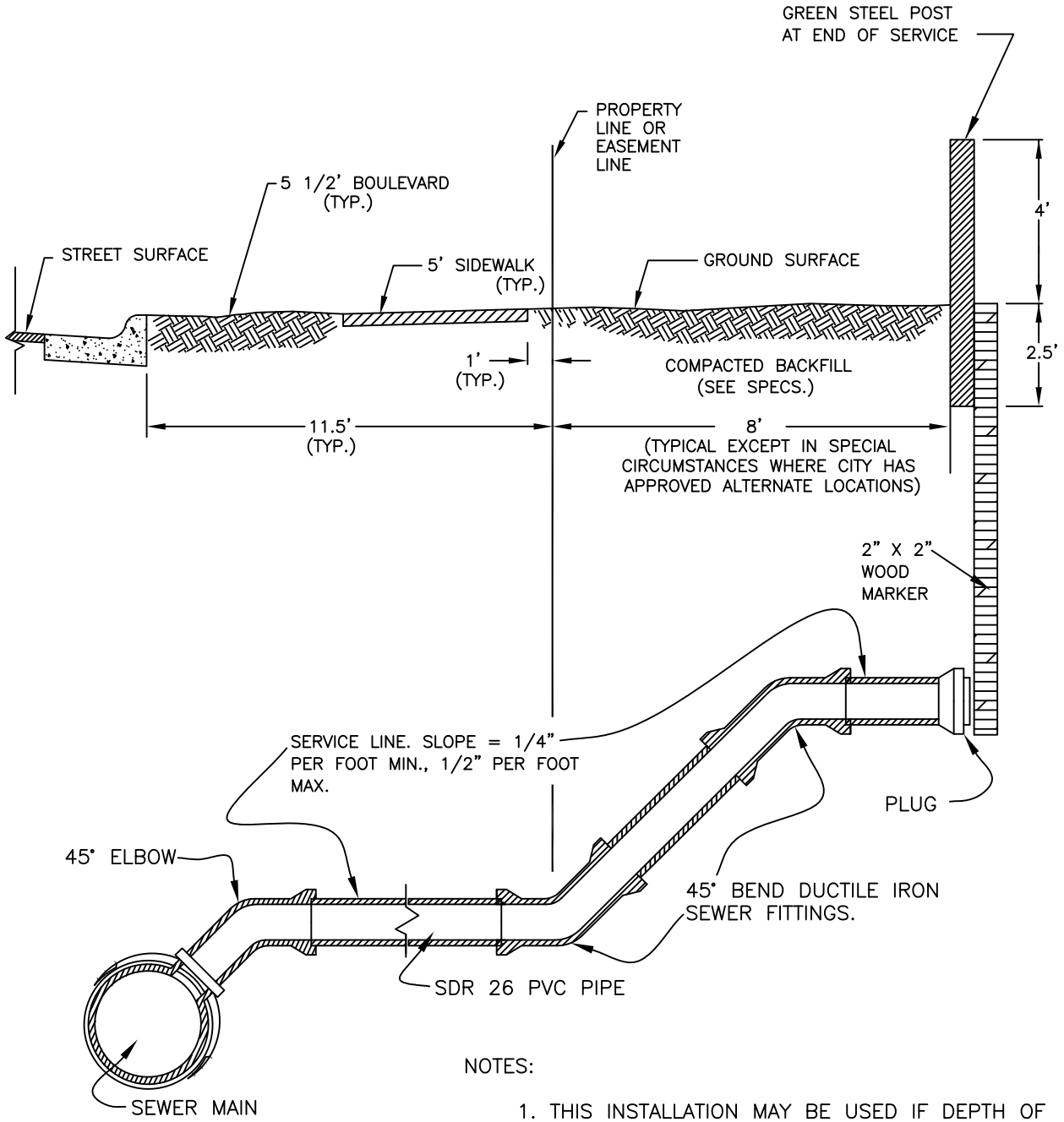
NOTE: This nomograph is applicable to pipe test section lengths within the limits specified in Section 02722.3.3.3.2 of the specifications. For test lengths beyond the specified limits, refer to specifications for additional information.

REVISED: 12/27/95

MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS	SCALE: NONE	NOMOGRAPH FOR AIR TESTING GRAVITY SEWER MAINS	STANDARD DRAWING NO. 02730–1



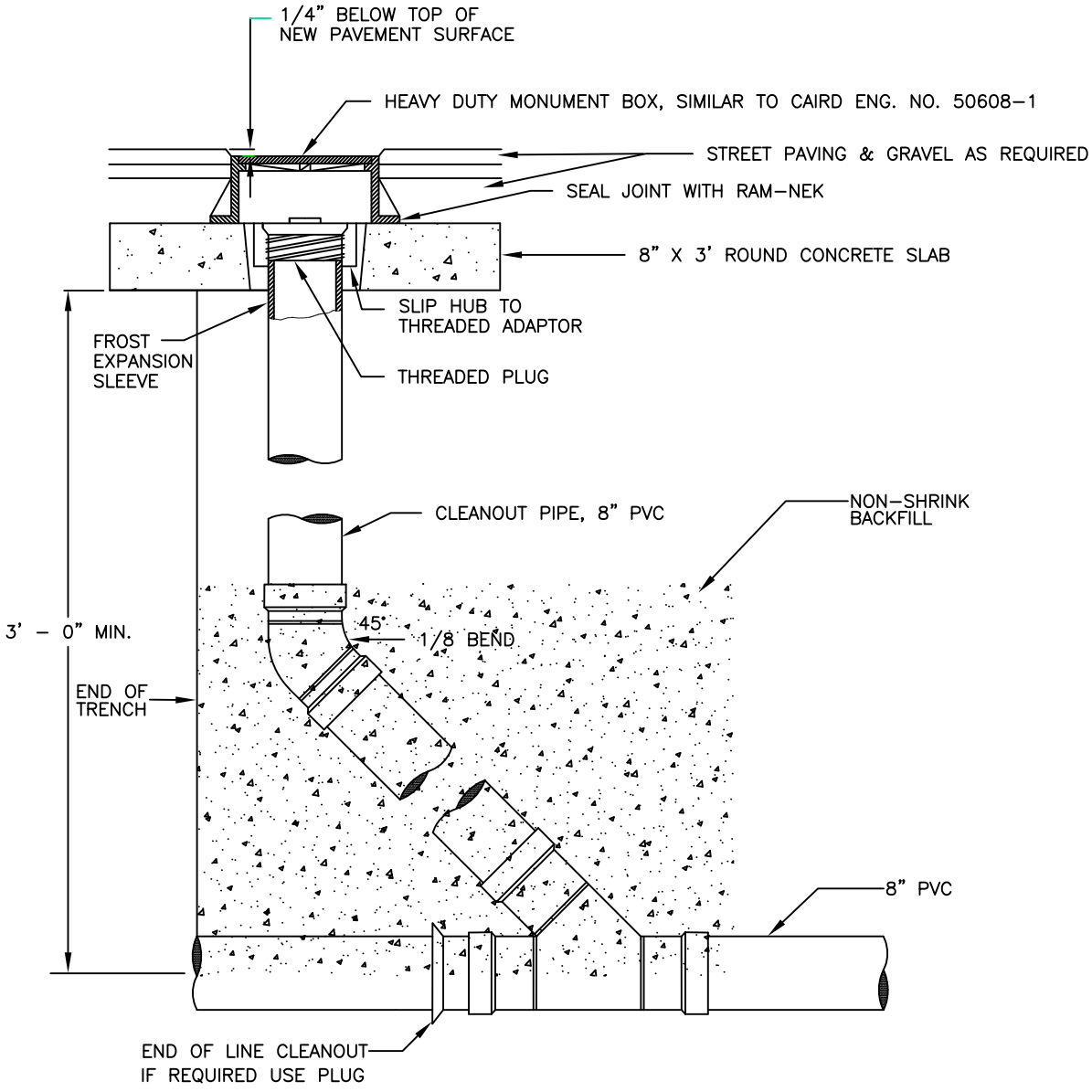
CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SANITARY SEWER SERVICE LINE	NO. 02730-2 DEC. 2003



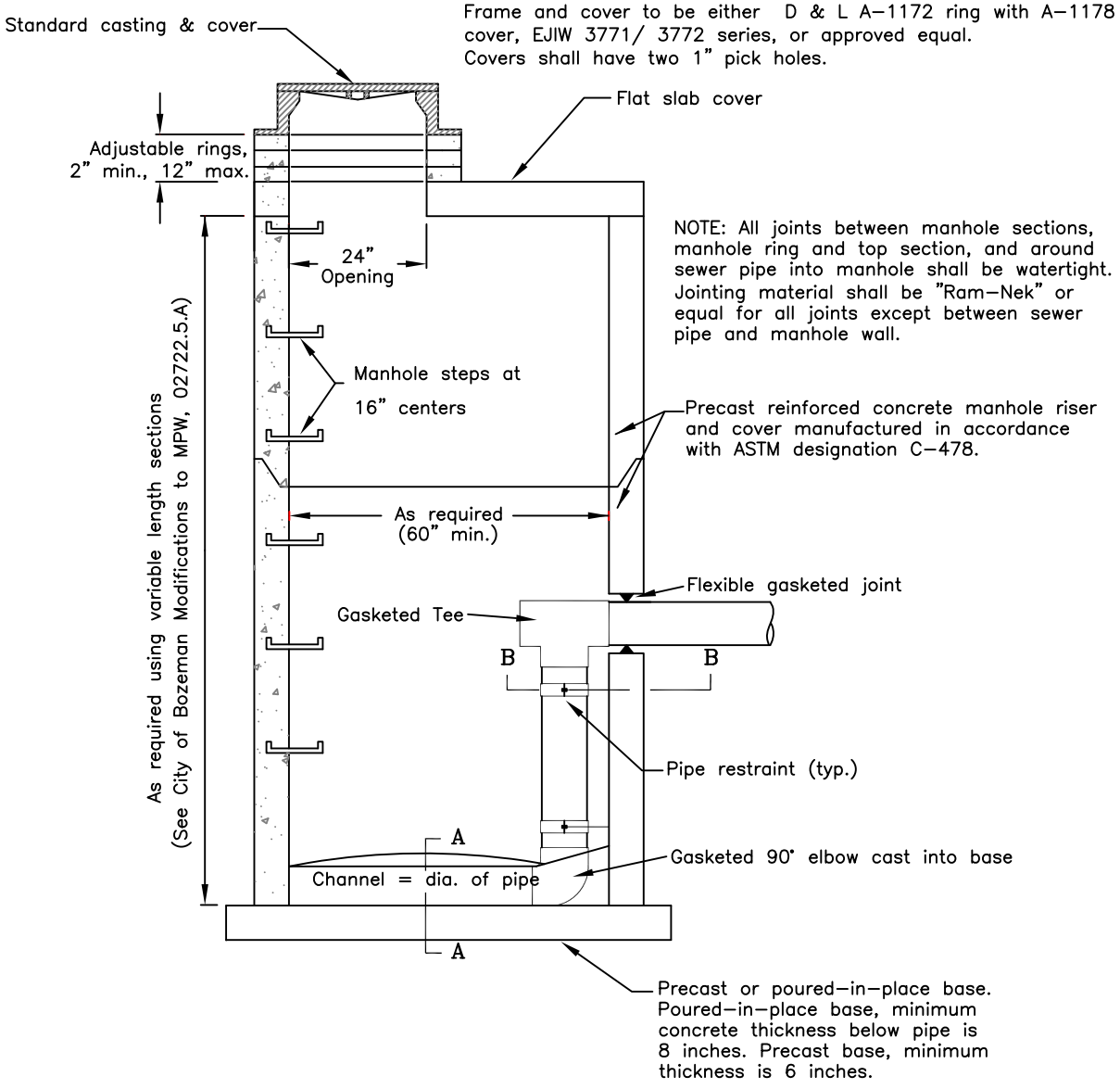
NOTES:

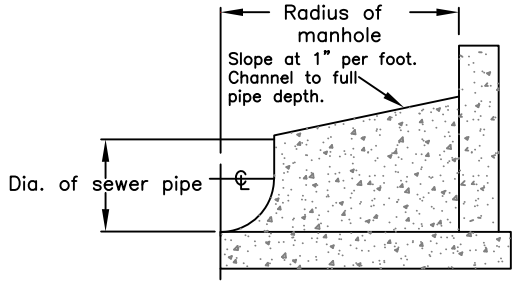
1. THIS INSTALLATION MAY BE USED IF DEPTH OF COVER AT STUB END WILL EXCEED 6.5' WITH STANDARD INSTALLATION (PER STANDARD DRAWING 02730–2)
2. MIN. DEPTH OF COVER SHALL BE 5' AT END OF SERVICE STUB. ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING REQUIRED ELEVATION OF STUB.
3. DUCTILE IRON FITTINGS SHALL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

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DEEP SANITARY SEWER SERVICE LINE	NO. 02730–3 OCT. 2014

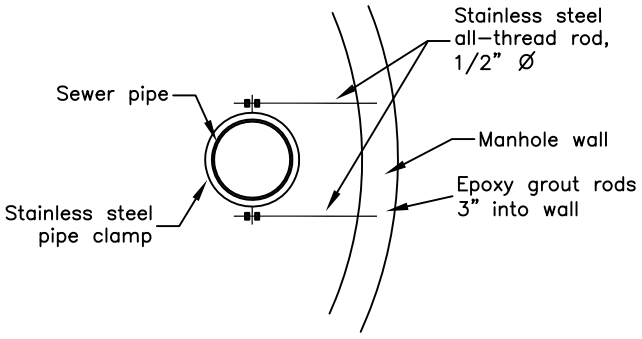


CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SANITARY SEWER CLEANOUT	NO. 02730-4 DEC. 2003



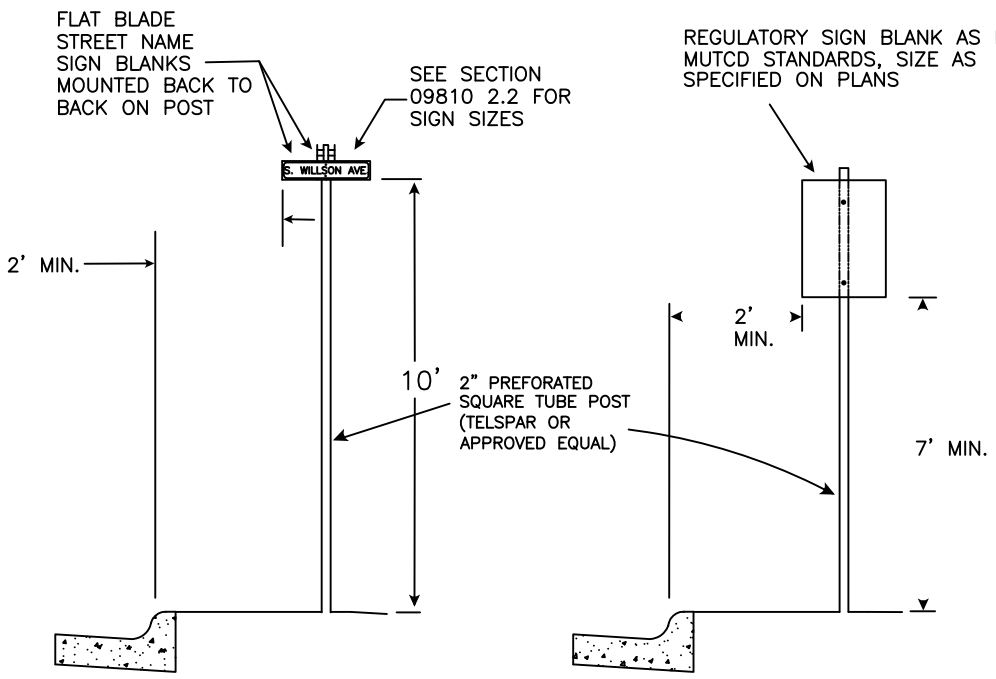


SECTION A–A



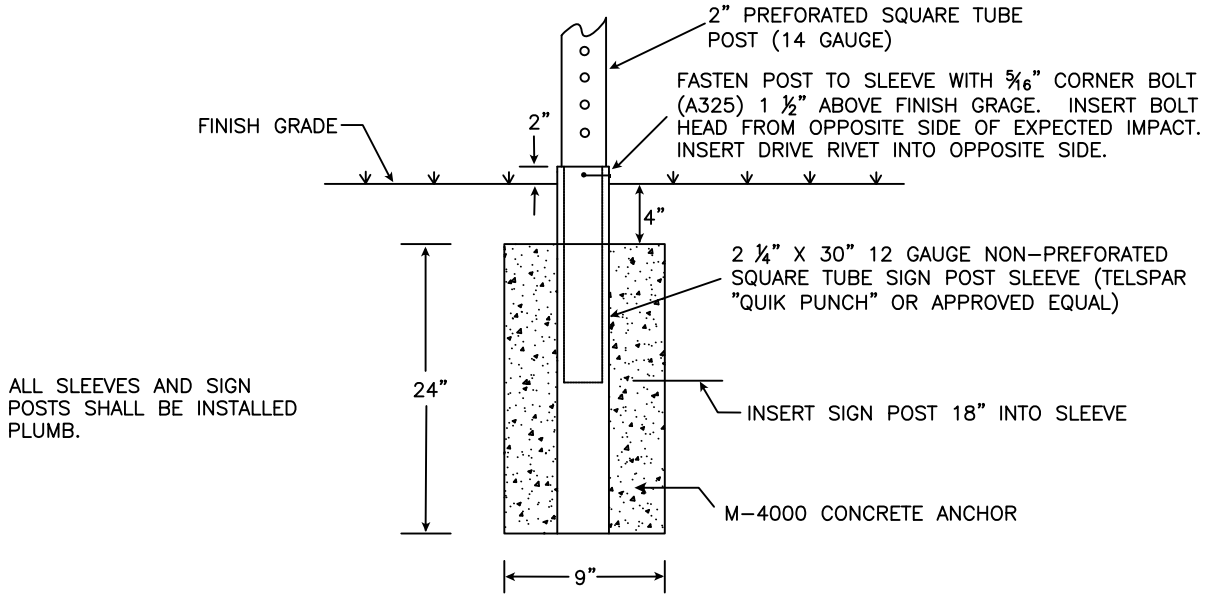
SECTION B–B

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	STANDARD DROP MANHOLE	NO. 02730–5 DEC. 2003 Rev. March 2006



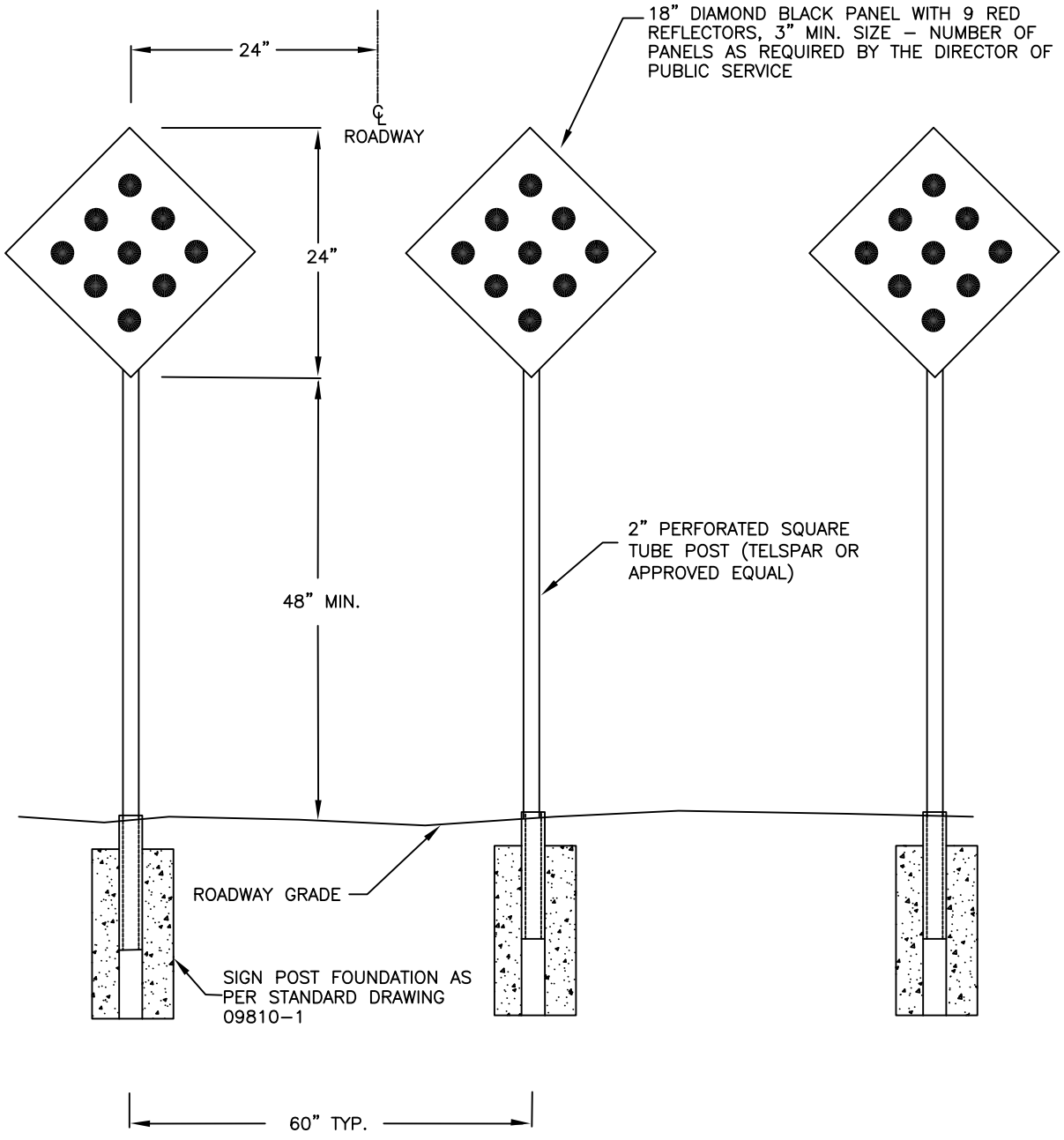
ATTACH SIGNS TO POST WITH 3/8" DRIVE RIVETS (MIN. 2 PER SIGN)

STREET MARKER SIGN REGULATORY SIGN



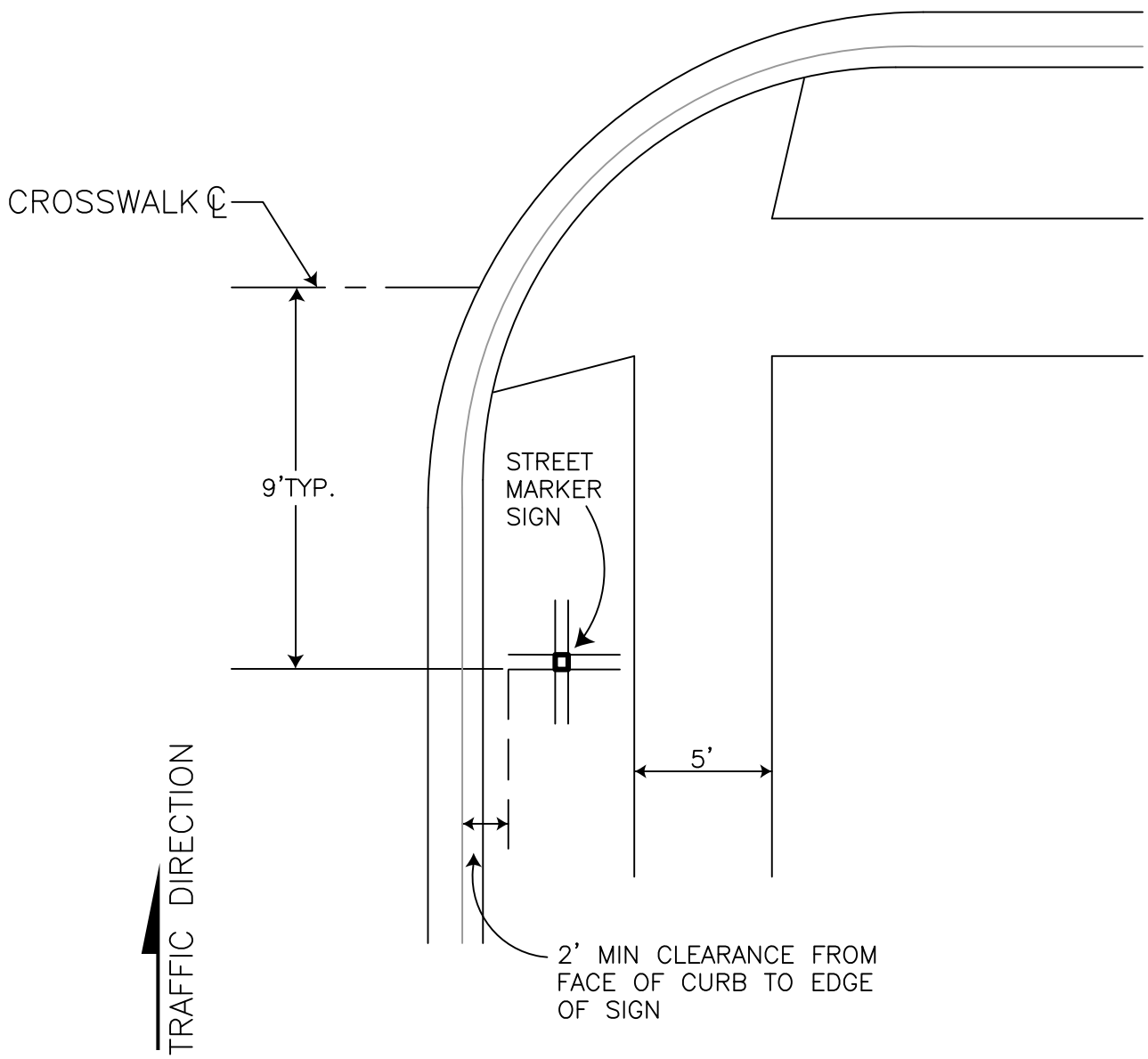
SIGN POST FOUNDATION DETAIL

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	SIGN INSTALLATION STANDARDS	NO. 09810-1 AUG. 1994 Revised 6/2002



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

CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	DEAD END BARRICADE DETAIL	NO. 09810–2 AUG. 1994 Revised 6/2002



CITY OF BOZEMAN STANDARD DRAWING	SCALE: NONE	TYPICAL STREET MARKER SIGN LOCATION	No. 09810–4 Sept. 2002