

Chapter 9-1

INTRODUCTION

POLICIES AND PROCEDURES FOR PUBLIC IMPROVEMENT PROJECTS

FOR THE CITY OF MONTROSE, COLORADO

Sections:

9-1-1: Purpose

9-1-2: Design Policy

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9-1-1: Purpose

The purpose of these Engineering Specifications is to provide **minimum** standards to safeguard life and limb, health, property and public welfare by regulating the design of, construction of, choice of materials used for, location of, maintenance and use of all public improvements and common facilities and have been prepared to assist engineers preparing plans for public improvement projects in the City of Montrose (City). These include, but are not limited to, sanitary sewer systems, water supply systems, private utility service lines to water and sewer, public and private storm drainage systems, public and private streets, open space, parks and recreation facilities, traffic control devices, public and private parking lots and appurtenances thereto. All equipment and material shall be new unless approved by the City.

As used throughout Title 9 of the City of Montrose Regulations Manual, references to “Engineer,” “Project Engineer,” “Design Engineer,” “Developer’s Engineer,” “Engineer of Record,” “Geotechnical Engineer,” and “Consulting Engineer” are used interchangeably and shall refer to Professional Engineers currently registered as such by the State of Colorado. References to “Contractor” include the constructing agency physically performing the improvement works, including City organizations.

These Engineering Specifications represent **minimum** requirements and design values. A copy of this manual, construction plans, construction specifications, storm water management plan, and all approved permits must be on the construction site at all times. Additional requirements of higher design values, commensurate with conditions, may be required by the City Engineer if, in his or her judgment, they are in the best interest of the City. Variations may be permitted based solely on sound engineering practice and will be reviewed and approved by the City Engineer on an individual basis. Such variations must be requested in writing along with sufficient documentation supporting the request.

- (A) **Adopted Standards.** All applicable specifications of agencies or organizations listed below are made a portion of these Engineering Specifications by reference and shall be the latest edition or revision thereof. Whenever a conflict exists between any of the above standards, the City Engineer shall decide which shall govern.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	Americans with Disabilities Act regulations
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
APWA	American Public Works Association
ASA	American Standards Association
ATSSA	American Traffic Safety Services Association
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
AWWA	American Water Works Association

CDPHE	Colorado Department of Public Health and Environment
CDOT	Colorado Department of Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
MUTCD	Manual on Uniform Traffic Control Devices
ITE	Institute of Traffic Engineers
UFC	Uniform Fire Code
UDFCD	Urban Drainage and Flood Control District

- (B) **Quality Control.** The Contractor is responsible for quality control of all work performed and shall implement whatever procedures, methods, testing, surveying, and supervision are required to ensure that the work conforms to the Construction Plans, Specifications, and Contract Documents.
- (C) **Quality Assurance.** The entity responsible (e.g. Developer or general contractor) for administering the construction of public facilities shall provide a quality assurance program. This program shall include systematic inspection and testing of the work and materials during construction to assure the Owner and the City that the Contractor is providing work that is in conformance with the City approved plans and specifications.

9-1-2: Design Policy

- (A) **General.** All proposed construction shall follow the guidance of planning documents (Master Plans, Comprehensive Plans, Corridor Plans, Transportation Plans, etc.) adopted by the City. The City Engineer or designee shall review and approve the plans and specifications for proposed extensions of or changes in, street, water, storm, and sanitary sewer systems and shall coordinate the approvals of various other City departments and public agencies prior to the beginning of any construction. These design criteria have been compiled to ensure that plans and specifications are reviewed and approved on a fair basis, and that uniformity exists in construction of the system.

It is not the intent of these criteria to regulate the design engineer, but rather to provide guidelines and **minimum** design values that should be used in typical situations.

All plans and specifications submitted for checking and approval for construction must have been prepared by or under the direct supervision of a Professional Engineer currently registered and licensed to practice engineering in the State of Colorado.

- (B) **Construction Plan Requirements.** All plans must be submitted to the Community Development Department for review distribution and shall conform to the minimum legibility and quality control requirements of this Section. Any drawing submitted that does not substantially meet this specification will not be accepted for review.

- (1) All grading, erosion control, drainage, utility, and street plans shall conform to the minimum design criteria set forth in these specifications. One (1) complete set of plans, on twenty-four by thirty-six inch (24" x 36") sheets, shall be submitted to the Community Development Department for Municipal Services review. Allow at least three (3) weeks for review and processing. Once the plans have been reviewed, written comments shall be returned to the Community Development Department for correction of plans.
 - (2) Construction drawings shall contain the information necessary, presented in a clear and legible manner, to construct the utility. The Engineer shall coordinate the location of all proposed water distribution, sanitary sewer collection, and storm drain lines within existing or proposed utility easements and road rights-of-way. In addition, the Engineer shall coordinate the location of all other utilities with appropriate utility companies and agencies.
 - (3) It is the Engineer's responsibility to prevent utility conflicts associated with proposed construction. Investigative work associated with the accurate location of existing utilities is the sole responsibility of the Engineer. Sound Subsurface Utility Engineering (SUE) practice shall guide the Engineer.
- (C) **Drafting Standards for Paper.** Plans submitted to the Community Development Department shall be direct prints on twenty-four by thirty-six inch (24" x 36") paper. Photocopies or telefacsimile reproductions are not acceptable for plan review, but may be submitted for information or preliminary review purposes.
- (1) All information must be contained within the borders of each sheet.
 - (2) Additional construction plan sheets that include aerial photography, photographs, or reproductions of photographs behind plan view drawings may be used for graphical referencing, but shall not replace required plan view sheets. All construction plan sheets required in Section 9-1-2(F) shall be submitted without the previously referenced graphics.
- (D) **Drawings on Electronic Media.** Drawings submitted on electronic media must conform to all the requirements of this Section, and with the following requirements.
- (1) Document must be compatible with City software.
 - (2) Documents created on compatible software shall be submitted in standard file formats. For example, AutoCAD documents shall be submitted in DWG format. The City Engineering Department must be able to work with the submitted media in order to recommend revisions. The Engineer shall be aware of compatibility issues associated with differing software versions.
 - (3) All correspondence is to be received in Microsoft Word or pdf format.

- (4) All CAD documents submitted must be in standard AutoDesk – AutoCAD DWG format. These documents must be free of any third party software restrictions. Restrictions must be purged from files before submitting to the City.
- (E) **Construction Drawings.** Submitted drawings shall clearly convey the intent of the proposal. The drawings shall show sufficient adjacent area to give relation of new facilities to existing facilities. The drawings shall be generated from actual field surveys referenced to section and quarter section corners and other official survey controls points. Vertical datum for surveys shall be National Geodetic Vertical Datum 29 (NGVD 29). Horizontal control shall be based on New Mexico Meridian Plane Coordinate Grid, South Zone North American Datum of 1983 (NAD 83) by a minimum of two coordinate points. Traverse closure shall be at least 1:5000. Fences shall not be used as the basis of surveys.

The following shall be shown on each page of all drawings:

- (a) Project Name
 - (b) Owner's name, address, phone number
 - (c) Vicinity Map
 - (d) Title Block (right margin of sheet preferred).
 - (e) North Arrow: North shall point to the top or to the left margin of the sheet. Other details and drawings on the sheet shall be oriented consistently with the North arrow.
 - (f) Vertical Scale: 1" = 5' (1" = 10' may be used in areas which have average slopes over 5%).
 - (g) Horizontal Scale: minimum, 1" = 50'
 - (h) Date and Revisions: The original date of the plans and any subsequent revisions must be shown in the title block.
 - (i) Name, address, and telephone number of professional engineer or firm.
 - (j) Professional Engineer's Seal, Signature and Date.
- (F) **Overall Site Plan.** Site Development Plans shall contain the following public improvement facilities, features, and components:
- (1) Sanitary Sewer Plan and Profile
 - (2) Water Plan and Profile
 - (3) Storm Sewer and/or Surface Drainage Plan and Profile
 - (4) Street Plan and Profile

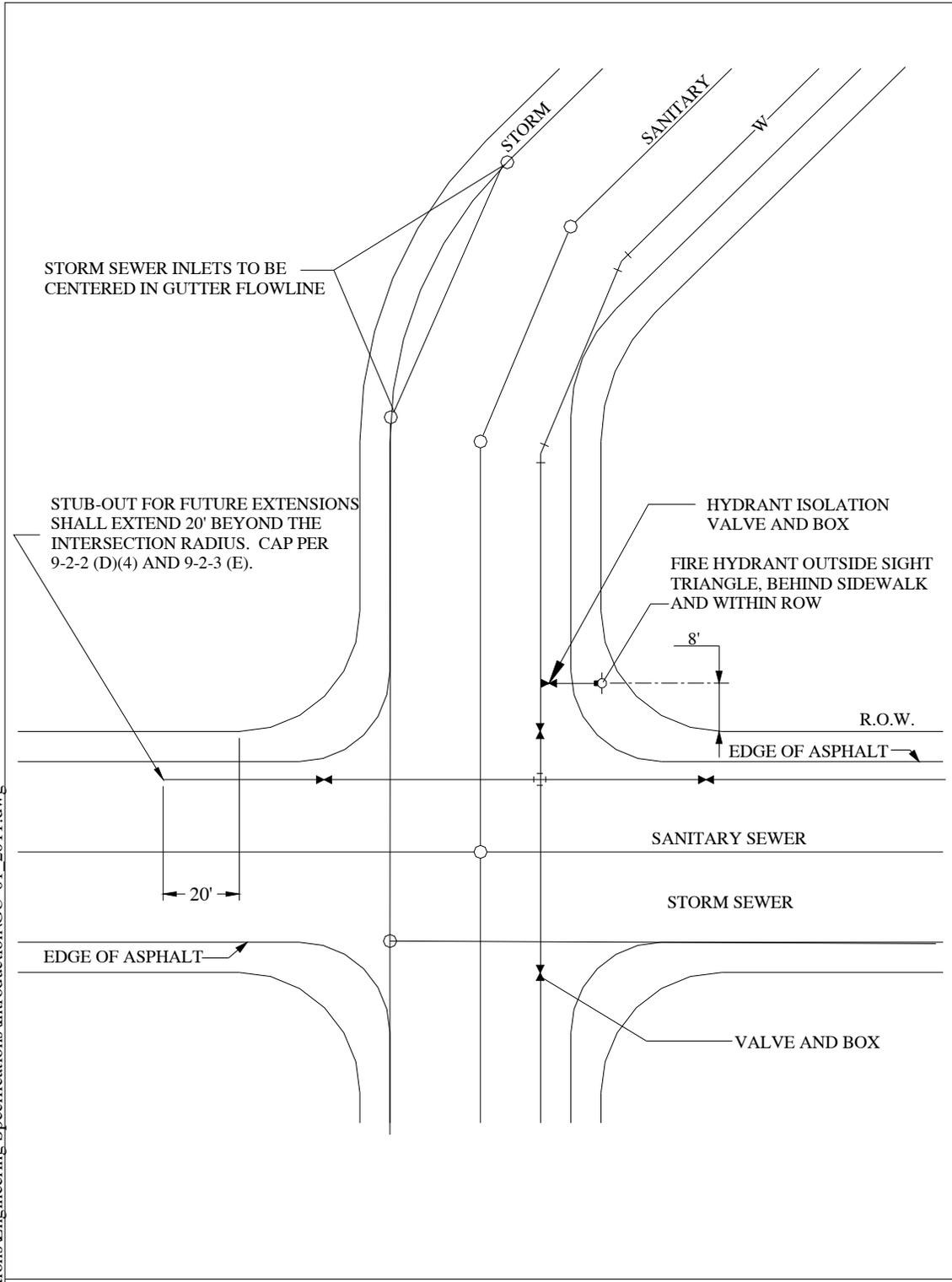
- (5) Traffic Control Plan
 - (6) Standard Details when Different from, or not included in, City Engineering Specifications
 - (7) Erosion Control and Storm Water Management Plan
 - (8) Property Lines
 - (9) Street Names and Easements with all Dimensions Including Lot Dimensions
 - (10) Existing Utilities and Structures
- (G) **Field Control.** It is the responsibility of the developer or designated representative to survey the proposed installation and set control stakes in accordance with approved plans. Construction will not be allowed or approved where, in the opinion of the City Engineer, proper control has not been established. The contractor shall be responsible for preserving and protecting all permanent benchmarks and survey monuments.
- (H) **Easement.** All public utilities shall be constructed within dedicated public easements with widths at least two (2) times the depth to the invert, or twenty (20) feet, whichever is greater. In a subdivision where the rear lot line abuts property outside of the subdivision on which there are not easements at least five (5) feet in width then, the easement or alley on the rear lot lines in the subdivision shall be at least twenty (20) feet in width.
- 9-1-3: Construction Policy**
- (A) **Engineered and Approved Plans.** Construction shall be accomplished in accordance with engineered construction plans for the work prepared under the direction of a professional engineer licensed in the State of Colorado and approved by the City. Plans shall meet or exceed City minimum design standards. Plans approved by the City are valid for a period of one year, after which the plans will require a cursory review to verify conformance to current City requirements. Construction of public improvements shall not begin without approved construction plans and written approval from the City Engineer.
- (B) **Inspection and Testing.** All construction of public improvements shall be subject to periodic inspection by the City Engineer and certain types of construction shall have continuous inspection. The City Engineer or authorized representative has authority to halt construction at any time and for any reason.
- (1) The responsible party shall coordinate construction inspections with the City Engineer. Requests for construction inspections shall be submitted at least forty-eight (48) hours in advance. Such request may be submitted in writing or by telephone, at the option of the City Engineer.

- (2) The responsible party shall provide access to and means for proper inspection of all work. The responsible party and the City Engineer, or authorized representative, shall be present during all inspections. A final inspection shall not be conducted until all streets, easements, manholes, valve boxes, etc. are at finished grade.
 - (3) Whenever any portion of these specifications is violated, the City may order further construction to cease until all deficiencies are corrected. The notice to cease construction shall be in writing (Stop Work Order). If deficiencies are not corrected, performance shall be required of the contractor's surety.
 - (4) The City Engineer may require additional construction inspections as necessary to verify compliance with the provisions of these Engineering Specifications and other provisions of the City Code.
- (C) **Construction Procedures.** One week prior to commencement of construction, the contractor shall coordinate a pre-construction conference with the City Engineer to discuss the following:
- (1) General and specific requirements of the City engineering specifications.
 - (2) Quality Assurance testing schedule and procedures.
 - (3) Traffic Control Management
 - (4) Erosion Control and Storm Water Management (SWMP and CDPS Permit shall be available for review at the Pre-Construction meeting)
- (D) **As Built Information.** It is the responsible party's obligation to record, document, and certify the accuracy of the physical dimensions and any changes on a set of "As-Built" drawings. As-Built drawings may be field verified prior to approval and acceptance by the City. A PLS or PE shall document the following information to certify the construction plans as being constructed as-built.
- (1) Streets:
 - (a) Elevation check at one hundred fifty (150) foot intervals in each flow line along street, at the point of curb return of each radius, and at the center of each cross pan.
 - (b) Elevation of flowlines at each side of storm drain inlets.
 - (c) Elevations at all points shown on the cul-de-sac detail, and at the center and high points in the flowline.
 - (d) Elevations of street centerline at one hundred fifty (150) foot intervals.
 - (2) Sanitary and Storm Sewers:

- (a) Elevation of inverts at manholes, inlets, and outlets and any changes to proposed pipe grades.
 - (b) Pipe diameter, material type, length, and stationing from manholes. All sanitary sewer service connection location information.
 - (c) Rim elevations of all manholes and drainage inlet structures.
 - (d) Final detention pond and water quality pond capture volumes from cross sections and the final release rates per drainage criteria (PE certification only).
- (3) Water Mains:
- (a) Pipe diameter, material type, length between valves, and horizontal verification of water mains, valves, and fire hydrants.
 - (b) The locations of all service connections along the main.
- (E) **Submittal of As-Built Plans and Documents.** Final “As-Built” plans shall be clear, legible, and clean. Once approved by the City, the responsible party shall submit one (1) complete set of full size twenty-four by thirty-six inch (24” x 36”) As-Built plans including information required in Subsection (D) above. Electronic files shall be submitted to the City Community Development Department.

9-1-4: General Utility Details

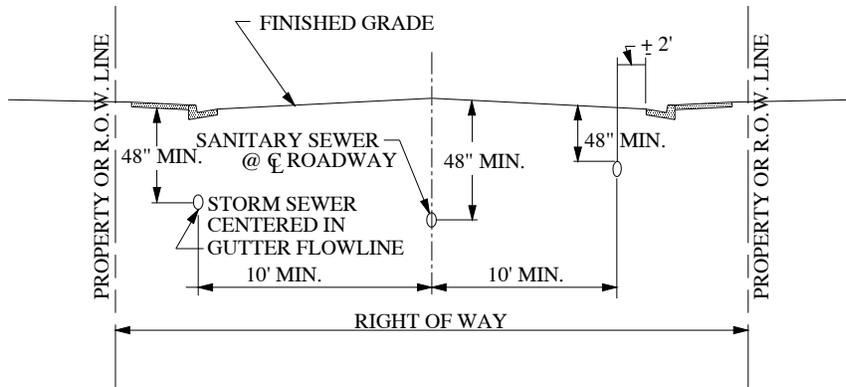
- GU-01 Utility Plan for Streets
- GU-02 Street Cross Section
- GU-03 Trench Detail
- GU-04 Water and Sewer Line Crossings
- GU-05 Standard Pipe Casing/Non-Restrained Joints
- GU-06 Standard Pipe Casing/Restrained Joints



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TYPICAL UTILITY PLAN FOR STREETS

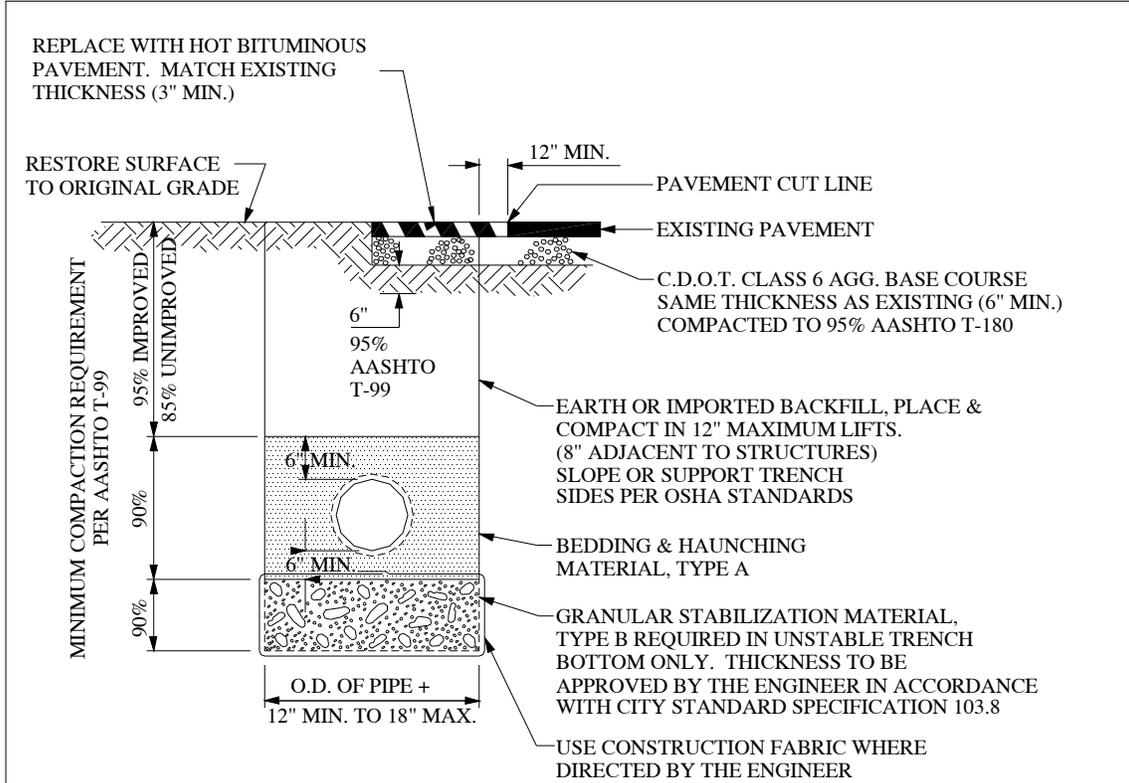
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TYPICAL STREET CROSS SECTION

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MAXIMUM PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES			
SIEVE SIZE	PIPE BEDDING & HAUNCHING MATERIAL (TYPE A)	GRANULAR STABILIZATION MATERIAL (SCREENED OR CRUSHED ROCK TYPE B)	IMPORTED MATERIAL (TO BE USED WHERE SPECIFIED OR DIRECTED BY THE ENGINEER)
12 INCH	---	---	100
2 INCH	---	100	---
1 INCH	100	---	---
NO 4	---	15 MAX	---
NO 200	20 MAX	---	3% - 20%

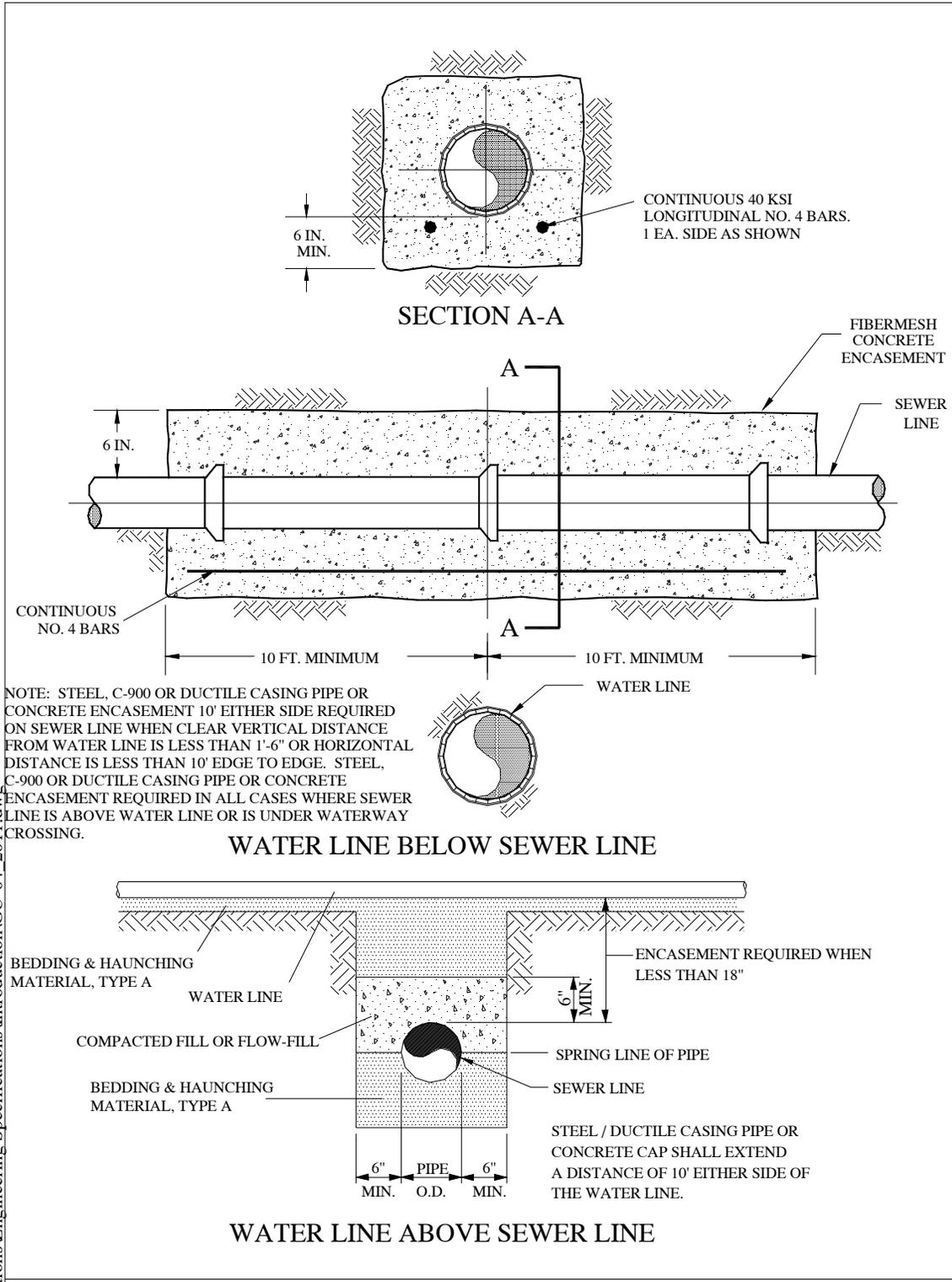
IMPORTED MATERIAL SHALL HAVE A MAXIMUM PLASTICITY INDEX (PI) OF 7.

ALL BACKFILL MATERIAL SHALL BE PLACED FULL WIDTH IN 12" MAX. LIFTS (8" LIFTS ADJACENT TO STRUCTURES) AND COMPACTED TO THE MIN. RELATIVE DENSITIES SHOWN.

NOTE: NATIVE MATERIAL MAY BE USED IN LIEU OF GRANULAR BEDDING & HAUNCHING MATERIAL IF APPROVED BY THE ENGINEER AND THE NATIVE MATERIAL IS IN COMPLIANCE WITH SIZE REQUIREMENTS FOR "TYPE A".

TYPICAL TRENCH DETAIL

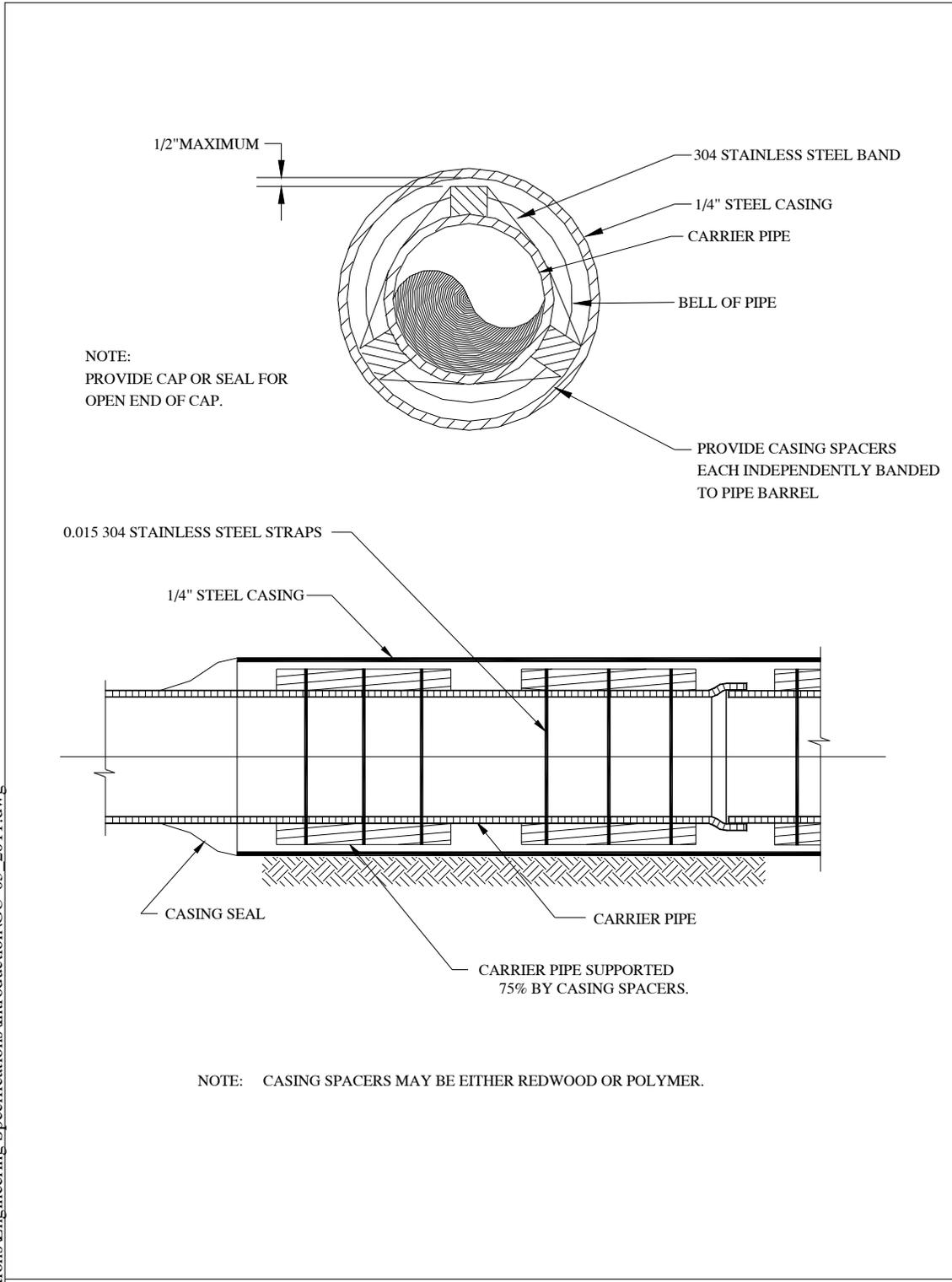
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TYPICAL WATER AND SEWER LINE CROSSINGS

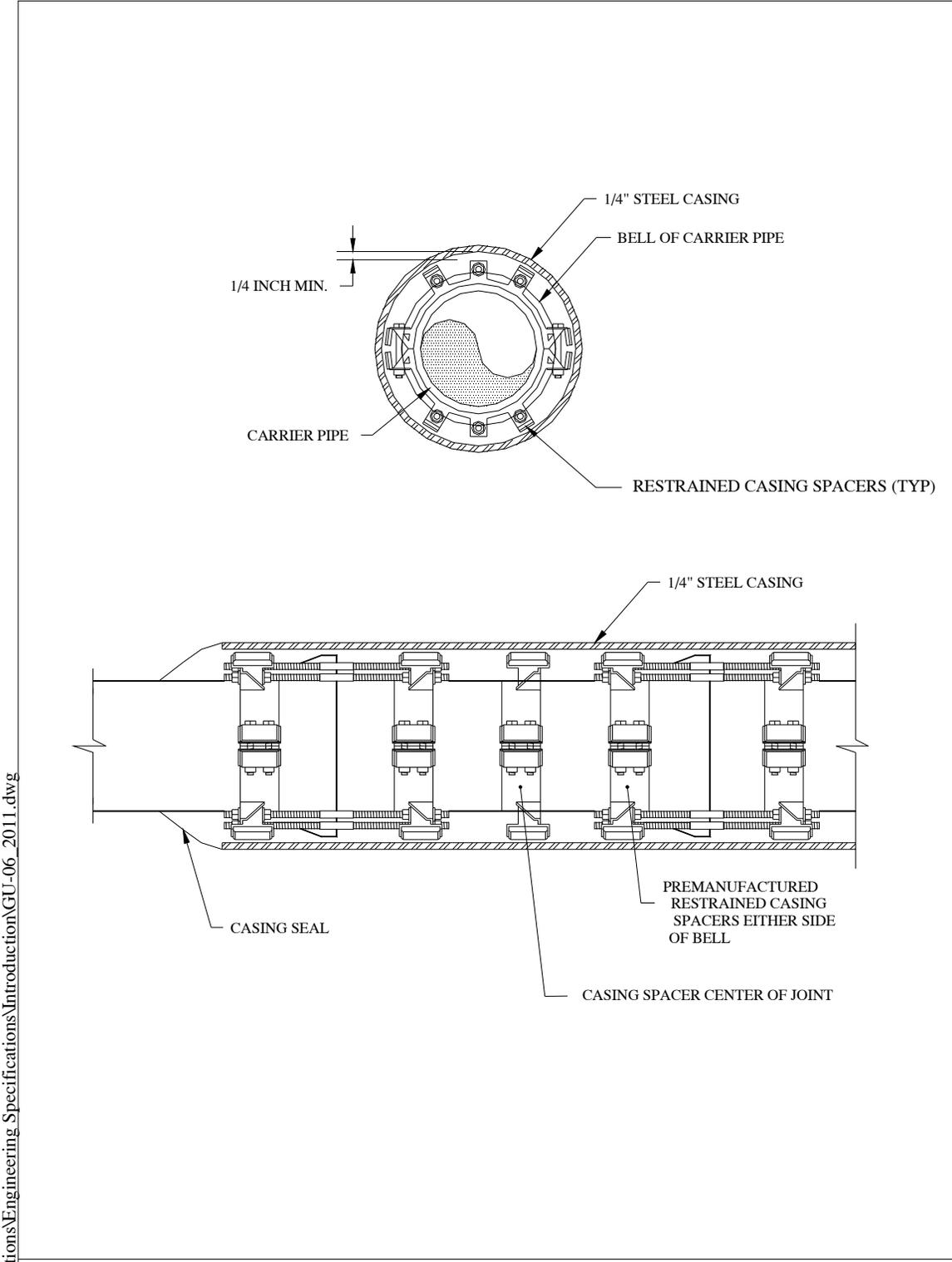
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STANDARD PIPE CASING / NON-RESTRAINED JOINTS

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STANDARD PIPE CASING / RESTRAINED JOINTS

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