

# STANDARDS AND SPECIFICATIONS

## *SUMMARY OF DRAFT 2019 REVISIONS*

March 29, 2019

Provided below is a summary of draft revisions to the *City of Bend Standards and Specifications*, adopted March 1, 2018. Text in **bold underline** has been added. Text in ~~strikethrough~~ has been removed.

## **PART II DESIGN STANDARDS**

### ***DESIGN SUBMITTAL REQUIREMENTS***

#### **2.3.1 Streets – Plan and Profile**

- **Conceptual locations of driveway approaches.**

#### **2.4.2 Drawing Creation and Layout – Paragraph 2**

- **Drawings will be available to the public, therefore individual company or engineering firm copyrights will not be permitted to be included on plans.**

#### **2.4.19 City Standard Template – New Section**

- **An example plan set for Tier III ROW permits is provided as Part VII – Appendix A – Example Tier III ROW Plan Set.**

#### **2.8 Right of Way Permit Expiration – New Section**

- **After any Engineering Permit (i.e., Right-of-Way Permits, Grading Permits, Rock Crushing Permits, Sewer Water Analyses, Traffic Analyses, etc.) has been submitted to the City for review but prior to issuance, the permit will expire after 180 days of inactivity. After a permit is issued, an inspection must be called in within 180 days from the date of issuance and construction must be completed within 365 days from the date of issuance or the permit will expire. Permit extensions requests must be submitted in writing for City Engineer approval.**

## **ROADWAY**

### **3.4.2.3 Alleys – 3rd paragraph**

- The City may require that alleys be designed and stamped by a professional engineer as part of any permit application.

### **3.6.2.4 Design Details – 1st paragraph**

- Curb ramps must be designed to fit the site and must be detailed on constructions plans. The design must provide sufficient horizontal and vertical control and the drawings annotated to ensure that ramp conforms to federal, state, and local accessibility standards. Curb ramps with corresponding grades and transitions must be designed to ensure proper drainage of the intersection. Grades including running slopes and cross slopes must be noted on each quarter delta of the curb return. The City may require that curb ramps be designed and stamped by a professional engineer as part of any permit application.

### **3.6.4 Driveways**

- Where a driveway is proposed across the street from another driveway, alley, or street, the path of travel should be aligned, where possible.
- Concrete driveway ~~aprons~~ approaches are required on all new construction or reconstruction where sidewalk or curb is exiting or proposed. Asphalt driveways are permitted where sidewalk or curb is not existing or proposed, as approved by the City Engineer. New alleys or reconstructed alleys must have a driveway approach at the intersection of the alley and roadway. ~~New alleys or reconstructed alleys must have a driveway approach at the intersection of the alley and roadway.~~

### **3.6.7 Curb Painting – Entire New Section**

Curbs shall be painted yellow for a total of 20 feet approaching a stop sign.

Curbs shall be painted red for a total of 20 feet at fire hydrants, 10 feet on either side of the hydrant.

Paint shall be high performance latex, designed for streets and parking lots. The paint must meet federal specification TT-P-01952E Type II. The paint should be

suitable for surfaces such as Portland cement concrete, bituminous cement concrete, asphalt, tar, and previously painted areas of these type surfaces. Colors must meet Traffic Standards for the Traffic Yellow and OSHA Safety Red. Examples of common colors and their FED-STD-595 color chip Yellow – #33538 and Red – #31136.

The curb must be prepared for the paint application. Any organic material near the curb shall be removed, existing loose paint shall be scraped off, and oil spills shall be cleaned.

Acceptable methods of cleaning the curb surface are high pressure washing and/or hand scrubbing using clean water and clean water to rinse. Surface shall be clean and completely dry before application of paint starts. Curb shall be painted from the top seam of the curb (sidewalk or planter strip edge) to a point even with the driving surface and within the limits specified by the City of Bend and its representative.

Paint areas shall be protected (masked, taped or both) to prevent dripping or over spray of paint onto the sidewalk or street surfaces and to provide clean/straight edges.

Apply the paint per manufacturer's specifications, or typically when the weather is between 60 and 80 degrees Fahrenheit and overnight temps do not drop below freezing for optimal adhesion. Choose a day when the weather is dry and when the wind is not blowing to avoid the wind carrying the paint and to prevent blowing debris onto the freshly painted surface.

### 3.7 Temporary Traffic Control – Paragraph 2

Traffic Control Plans (TCP's) shall be provided for review with the ROW permit submittal submitted at the Pre-Construction Meeting for City Engineer approval. TCP's for small projects without pre-construction meetings shall be submitted with a Lane/Street Closure Permit application. Footnote 1: Note that Right-of-Way Permits



and, if applicable, Lane/Street Closure Permits, are required for all work within public right-of-way. Applications are available on the City's Public Works Dept. webpage.

### 3.8.5 Pavement Sections – Paragraph 1

Pavement Sections must meet the pavement design standards in Section 11.4 and comply with the following standards, **or as specified in a stamped geotechnical report as approved by the City Engineer:**

**a. Alleys shall be 4 inches of pavement and a minimum of 6 inches of base rock.**

### 3.8.6(k) Full, Modified, and T-cut Patching Standards

All pavement overcuts shall be sealed using hot crack seal methods ~~an ODOT approved edge sealing tack material and clean sand blanket.~~ Hot crack seal must be consistently applied throughout, four (4) to six (6) inches in width.

## ***SANITARY SEWER***

### 4.1 Sewer Main – Paragraph 4

**Ninety degree fittings for sewer mains are not permitted, unless otherwise specified.**

### 4.1.6 Minimum Grade (Gravity) – Paragraph 1

Designers shall use the following minimum grades (based on PVC Manning's  $n=0.013$ , velocity 2 ft/sec at 50% flowing full). **Reference OAR 340 Division 52 for additional information:**

Pipe Inner Diameter (inches)	Slope (feet per 100 feet)
<b>4</b>	<b><u>1.5 min, 2 typ</u></b>
<del>Less than 6</del>	<del>0.25 per foot</del> <b><u>0.75</u></b>
6	0.60
8	0.40
10*	0.25
12	0.19
16	0.14
18	0.11
21	0.09



24	0.08
30	0.06

#### 4.1.13 Marking Tape and Locate Wire – Paragraphs 1-4

Marking tape will be minimum 2 inches wide, APWA green, **and** stretchable to a minimum of seven times its original size. ~~Two courses of detectable are required: one on top~~

**The marking tape of shall be installed 12 inches above the pipe** ~~zone material, and the second 12 inches below subgrade or ground level.~~ Marking tape is required on all lines **mains and laterals.**

**In addition to the requirement described above, pressure and vacuum sewer mains shall be wrapped with marking tape a minimum of 4 wraps per 20 lineal feet of main.**

A #12 minimum tracer locate wire shall be installed ~~on all sewer force,~~ **within a 1-inch conduit directly above vacuum** and pressure and vacuum sewer lines and all sewer mains, **centered on the main.** **Tracer wire is not required on gravity main installations.** **Tracer wire shall be installed directly above gravity, vacuum,** and pressure sewer service laterals **services per OSS 00445.11(e) and 0045.48.** Tracer locate wire shall be tested for continuity prior to pipe burial.

- Added table to summarize information above

#### 4.2 Manholes (Gravity) – Paragraph 3 - 5

~~Manholes shall be solid wall HDPE or lined reinforced concrete. All reinforced concrete manholes must be lined with an approved sulfide resistant material. Manholes located on interceptors as identified in an approved Master Plan shall be a minimum of 60-inches in diameter and made of HDPE.~~ **Manholes located on mains larger than 12 inches in diameter or at a pressure/gravity sewer intersection may be required to be lined for corrosion resistance. The manhole can either be a Xypex manhole, Armorock manhole, or equivalent approved by the City Engineer.**





- Manholes for all piping in excess of 12-inch diameter, or manholes that have three or more inverts ~~more than a single pipe entering~~ **three or more inverts** must be 60-inch in diameter and use an eccentric cone configuration with the manhole opening located over a point opposite the outlet pipe.
- **Existing 48-inch-diameter manholes are not required to be replaced with 60-inch-diameter manholes when additional invert(s) are added. The existing and new inverts shall be separated by a minimum of 12 inches in all directions.**

### 4.3 Sewer Services – Paragraph 3

- **Ninety degree fittings for sewer services are not permitted, unless otherwise specified.**

### 4.4.14 Lift Station Standards – Entire Section

- **An example plan set for lift station design is provided as Part VII – Appendix B – Example Lift Station Plan Set.**

## ***WATER***

### 5.1.1 Minimum Size – Paragraph 1

- **Distribution mains shall be either 8 inches or 12 inches in diameter.**  
**Transmission mains shall be minimum 16 inches in diameter.**

### 5.1.2 Marking Tape – Paragraph 1

- Marking tape is required on all mains. ~~Detectable~~ **Marking** tape must be **minimum** 2 inches wide, APWA blue, and stretchable to a minimum of seven times its original size. The **marking** tape must be installed at the top of the pipe zone material, 12 inches minimum above the main, centered on the main.

### 5.1.3 Materials – Table

Minimum class requirements:

Pipe Diameter (I.D.)	Class
6-inches to 12-inches	52
14 <b><u>16-inch</u></b> and larger	50



### 5.1.4 Location – Paragraph 1

- All water lines must be located in public right-of-way, unless otherwise approved by the City Engineer. Public easements across private property will not be allowed unless approved by the City Engineer. Any public water lines (domestic water services, fire services, or private water mains) entering into private property requires premise isolation (backflow devices) at the right of way. The location of the premise isolation shall be on private property, unless otherwise approved by the City Engineer. **Backflow devices will be permitted within a building on a case-by-case basis.** ~~For domestic water services, the City's ownership ends at the meter, with the City owning only the meters 1-inch and smaller. City's ownership for fire services ends at the right of way.~~

### 5.2 Service Lines – Paragraphs 9 and 11

- Water services not being used, needing to be upsized or needing to be relocated within in a parcel are required to be removed back to the main and the pipe removed from the right of way. **The City requires that the corp stop shall be removed from the main and the main be plugged, unless otherwise approved by the City Engineer or designee.**
- **A Reduced Pressure Backflow Assembly will be required at the service connection when non-potable water services (i.e., COIC irrigation) and City water services exist at the same project site, per State regulations.**

### 5.5 Water Meters – Paragraphs 1- 5

- All water service lines must have a meter **box and** assembly placed **a minimum of 1 foot** outside of hard surfaces (concrete and asphalt) unless approved by the City Engineer. **Where meter boxes are unable to be located outside hardscape, an expansion joint shall be installed 12-inches around the entire perimeter of the meter box. When meter boxes are located in sidewalks with tree wells, the meter box shall be located a minimum of 6 feet from the tree well.**

**New meters installed at** commercial and industrial properties **must be one-inch minimum** ~~are not to have meters less than 1-inch.~~

**Commercial water meters shall be installed on residential projects that have three dwelling units or more.**







Meters that are 3 inches or larger will be either a Sensus Omni or HisMag **HbMag**.

**For domestic water services, the City's ownership ends at the meter,** ~~with the City owning only the meters 1-inch and smaller. City's ownership ends at the ROW.~~

### 5.5.3 Vaults and Meter Boxes, Including Insulation

The following, or an approved equal, are the only approved meter boxes for services for 2-inch and smaller. All meter boxes must be at least tier 8 or equal. **Meter boxes shall not have mouse holes.**

Brand	Box	Lid
Armorcast	BOX –17x 30 x 18 Fiberglass	LID-1730 Polymer with cast iron meter reader lid
Old Castle	Concrete polymer with flare wall 47 x 30 x 18	Concrete polymer with DI Reader door 47 x 30
Quazite	<del>Mousehole</del> Polymer concrete; flared L 17 x 30 x 18	Quazite H20 17 x 30

### 5.6.3 Hydrants General

- Each hydrant shall be connected to the main with a 6-inch-diameter ductile iron branch with a 6-inch shutoff gate valve ~~located no further than 3 feet from the center of the main~~ using a restrained MJ x MJ connection.

### 5.6.4 Location – Paragraph 3

- A hydrant shall be positioned within 100 feet of an FDC when required by the Fire Marshall.**

## ***STORMWATER***

### 6.2.2 Drainage Facility Testing – Number 5 and on

- 5. Public and private swale facilities shall conform to the following testing criteria:**
  - a. Install the swale per the approved plans, specifications and applicable construction guidelines. The EOR shall witness the construction of these facilities to ensure the drain rock quantity is being placed per the design, has sufficient void capacity, and is constructed per the City of Bend's**





**standards and specifications, if applicable. Pictures shall be taken and provided with the EOR's certification.**

**b. Introduce stormwater into the swale per COSM Appendix 4E (Swale Flood Test) or 4F (Pond Flood Test).**

6. Infiltration testing. **Post-construction infiltration testing is required. Regardless of infiltration determination/testing, it is required that the EOR certify that all stormwater infiltrate from drywells/swales within 72 hours per COSM requirements.**

**a. For drywells, draw down measurements shall be performance to determine** an infiltration rate shall be tested and recorded during the drywell testing, tested in 5-minute increments for 20 minutes (obtaining 4 recorded draw down measurements). An average infiltration will be determined from the draw down measurements and compared to the design infiltration used in the calculations.

**b. For swales, infiltration shall be testing in conformance to the COSM Appendix 4D (Single-Ring Infiltrometer test), or other City approved method**

**i. If design infiltration rates are not met during testing, the EOR shall determine how to 1) increase infiltration rates or 2) back calculate the facility design with the measured infiltration rate to determine if the facility has adequate capacity including a safety factor.**

7. At the project closeout, private or public, the EOR will be required to certify the testing and construction of the drainage facilities, that they meet **the performance standards under** the stamped and approved design. Stormwater certification shall include

a. All testing documents

i. Recorded amount of water discharged into the facility, with start time and end time.

ii. Draw down measurements. Depth of water at end of test with depth of water at 5-foot increments for 20 minutes duration, or until the facility is dry.



iii. Construction inspection forms and pictures. Private and public project will not be approved by the City without this certification.

b. Certification letter. The letter shall be stamped by the project EOR **on company letterhead** as conforming to the approved construction document and identifying design assumptions are true in the completed facility.

~~Swale shall be tested in conformance to these standards or the COSM.~~ Swale and drywell failure is determined if the facility cannot 1) contain volumes during the test, 2) if the facility is unable to infiltrate at the design infiltration rate (dictated in the construction documents or the storm water report) and 3) if the stormwater rises to the highest perforation in the drywell. It is the burden of the EOR to have the drainage facilities work in accordance to the design criteria approved on the construction documents.

Private and Public drainage facilities shall be tested for volume in conformance to a method determined by the EOR and in conformance to COSM and that all storm systems work in conformance to the engineer's design. The City will require the design verified with private system as a failure criterion, test criteria No. 5.

**The standard testing form to be submitted to the City is provided on the next page.**

- Included new testing form.

### 6.3.1 Treatment Controls

- The following treatment controls are required by the City, in descending order of preference. The treatment controls selected for a specific site shall address the pollutants expected for that site, along with the specific geotechnical conditions of the site. Projects within major drainage basins adjacent to the river or drainage basins containing MS4 system shall address pollutants of concerns for the river, which is nitrogen limited. **Pollutants of concern in the river through the City of Bend related to stormwater include: sediment/turbidity, pH, dissolved oxygen, and chlorophyll**  
**a. Pretreatment for Underground Injection Controls should focus on spill control.** These controls shall be designed to the guidelines included in the standard drawings, and the COSM, with the City's standard drawings configurations and sizing taking precedence in case of a discrepancy. Treatment trains are encouraged as appropriate.



- Added paragraph 2 and Table 6-1 Preferred Stormwater Strategies by Area
- Table 6-2: Removed footnote 2.

## ***FRANCHISE UTILITIES***

### **8.1.1 General**

- The City of Bend prefers that franchise utilities including, but not limited to, those required for electric, communication, lighting and cable television services and related facilities be installed underground, where possible. The developer shall make all necessary arrangements with the serving utility to provide the underground services. All above-ground equipment shall not obstruct clear vision areas and safe intersection sight distance for vehicular traffic.

### **8.5 Small Wireless Facilities**

- Added entire section (previously adopted by City Council).

## ***GEOTECHNICAL ENGINEERING***

### **11.4.5 Minimum AC Thickness – Entire Section**

- Deleted entire section and replaced with "Refer to Section 3.8.5 Pavement Sections for minimum AC thickness."

## **PART III SPECIAL PROVISIONS TO OREGON STANDARD SPECIFICATIONS**

### ***PART 00400 DRAINAGE AND SEWERS***

#### **Section 00405.12 – Bedding**

- REPLACE the contents of this section with the following: For all pipes, unless otherwise directed, furnish ¾"-0" base aggregate conforming to 02630.10.

#### **Section 00405.13 Pipe Zone Material**

- REPLACE the contents of this section with the following: For all pipes, unless otherwise directed, furnish ¾"-0" base aggregate conforming to 02630.10.

#### **Section 00445 – Sanitary, Storm, Culvert, Siphon, and Irrigation Pipe**

##### **00445.43(c) PVC Pipe**

- Fittings, plugs, and caps shall be installed in pipe in the manner described within these specifications or by the approval of the City Engineer, or his/her representative. For dissimilar pipes, (e.g. C-900 to 3034), a hard PVC transition type adapter coupling **or a Maxx Adaptor, or approved equal,** shall be used. Special conditions encountered for which suitable adapter couplings are not available, shall be referred to the City Engineer for consideration of an approved method. Fern-co and Calder Coupling type fitting will not be allowed.

### ***PART 00700 WEARING SURFACES***

#### **Section 00706.23 Rollers**

- Deleted the section

#### **Section 00706.48 Rolling**

- Deleted the section

### ***PART 00800 PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES***

#### **Section 00851 - Pavement Marking Removal**

- 00851.40 General - ~~Remove non-durable pavement markings by hydroblasting or steel shot blasting so that the pavement surface is not damaged below a depth of 1/8 inch.~~



~~Remove durable markings by steel shot blasting or grinding the pavement surface to a depth no greater than 1/8 inch, creating a smooth, flat slot of uniform depth.~~

**Remove pavement markings by hydroblasting, steel shot blasting, or grinding so that the pavement surface is not damaged below a depth of 1/8 inch, creating a smooth, flat slot of uniform depth.**

**If a road is chip sealed, any pavement marking removal will require a slurry seal, or other approved method. If the pavement surface is damaged below a depth of 1/8 inch, the City may require additional pavement repair beyond slurry seal.**

## ***PART 01100 WATER SUPPLY SYSTEM***

### **Section 01140 Potable Water Pipe and Fittings**

- 01140.10 Materials: ~~Mechanical joint water main fittings with accessories, 4-inch through 36-inch, shall be manufactured from ductile iron (DI) in accordance with and meeting all applicable terms and provisions of standards ANSI A21.53 and AWWA C153 and ANSI/AWWA C 111/A21.11, current revisions. Ductile iron mechanical joint fittings 4-inch through 24-inch shall be rated for 350 psi working pressure, and 30- and 36-inch shall be rated for 250 psi working pressure. Mechanical joint fittings with flanged branches shall be rated for 250 psi working pressure, and 4-inch through 12-inch minimum size fittings UL listed and marked for Fire Main Equipment. Cement-lined and seal-coated fittings shall meet ANSI A21.4 and AWWA C104 standards. All coated and lined fittings shall meet requirements of NSF-61. Ductile iron pipe and fittings shall be provided by the following approved manufacturers: Tyler Pipe, Union, Clow, and American Cast Iron Pipe Co.~~
- Deleted word "flanged" from 4th bullet

### **Section 01150 – Potable Water Valves**

- 01150.10(B) Butterfly Valves – Butterfly valves shall meet the requirements of AWWA C-504 latest revision, Class 150-B mechanical joint etc., except worm gear operators are not permitted. To reduce the number of different valves in the system, the Mueller line seal seat in body, or equal, shall be the preferred valve. **The valve can be domestic or non-domestic, unless contractually obligated otherwise.** Where 18





inches of cover cannot be obtained from operating nut to finish grade, butterfly valves shall be required. Butterfly valves shall be used on all water lines of 10-inch size and larger, or where 24 inches of cover cannot be obtained on smaller mains.

## **01150.10 Materials (d)(4) Meters**

- The meter will have no moving parts and constructed of a noncorrosive material. The Meter will utilize an electromagnetic or ultrasonic measurement system. The meter must meet federal low lead requirements and be compliant with American water works Standard C-700, C-710, NSF/ANSI Standard 61 Annex F-G. The meter must be capable of measuring water flow in Cubic Feet and show reverse flow. The meter must operate with a maximum working pressure of 175 psi without leakage, damage or effect on accuracy. A ¾" meter will have an allowable pressure loss not to exceed 7 PSI at 30 GPM. A 1" meter will have an allowable pressure loss of 4 PSI at 30 GPM. The ¾" meter shall guarantee 1.5% accuracy rate at normal operating flows of 3 GPM for the service life of the meter. The 1" meter shall guarantee 1.5% accuracy rate at normal operating flows of 4 GPM for the service life of the meter. The meter will fit within the City of Bend Premises Isolation Program specification. The meter and register must be fully compatible with all ACLARA MTU firmware, factory constructed NICOR ends, Extended Range 2-way transmitting system and the newest available version of ACLARA MTU. The meters must be currently approved with a tested meter type scaling by ACLARA. The meter shall also be 9" lay length for ¾" meters and 11-inch lay length for 1" meters. ~~Meters shall be Hersey 400 Series II with translator register or Sensus SR II with I.C.E. or approved equal. The register shall indicate flow in cubic feet. All meters shall include Itron Transponder.~~

## **Section 01170 Potable Water Service Connections, 2 Inch and Smaller**

- 01170.10 Materials (G) Meter box lids shall be set 12 inches behind the sidewalk and 18 inches to 24 inches behind the curb where there is no sidewalk. Meter boxes are to be located between the curb and sidewalk and located in outside hard surfaces, where possible.



## PART VI STANDARD DRAWINGS

### ROADWAY

#### R-1 Typical Street Cross Section

- Table ("c" curb) 7" / 16" 47"
- Note 7 – new alley row and paved width will be 20' wide. ~~Alley paved width will vary when paved in existing row.~~ Where alleys are installed in existing row, the paved width will equal the row width or up to 2 feet less than the row width. 1-foot wide buffers on each side of the alley may be left unpaved where alleys are installed in existing row.
- Added note 11 – Pavement sections should be provided per the table on this standard, or as specified in a stamped geotechnical report as approved by the city engineer

#### R-3 Standard Curb

- Added note 5 – Curb and gutter is required when gutter slope is between 0.5% and 0.75%.

#### R-6A Typical Perpendicular Curb Ramp

- Diagram – curb exposure to be minimum ~~4-inches~~ 3-inches (6-inch preferred) between ramps unless otherwise approved.
- Note 2 – ~~where a 4-foot wide ramp is not feasible, the width may be reduced, but not less than 3' wide; however the slope of the flares must not exceed 8/33%~~
- Diagram – removed all call outs to PROWAG guidelines.

#### R-6B Typical Parallel Curb Ramp

- Diagram – removed all call outs to PROWAG guidelines.

#### R-8 Standard Street Sign Names

- Table – replace entire table. Added principal legend with descending strokes
- Note 2(a) – sign substrate: sheet aluminum (gauge 0.80 for ground-mount) with rounded corners







- Note 2(b) – retroreflective sheeting: green background with white legend using: HIP/Type G for ground-mounted signs, and diamond grade/Type G2 for signs mounted overhead
- Note 2(e) – Bottom street signs (closest to the regulatory/stop sign) shall be ~~single~~ double sided with predrilled holes
- Note 2(f) – Top street sign shall be ~~double~~ single sided.
- Note 6 – where private streets intersect with public streets, install a black on yellow private drive sign with 4-inch capital letters (ODOT sign policy sign #OW14-3) directly below the private street name sign (or on a separate post, if not at an intersection)
- Note 8 – Confirm sign size with City Engineer for signs on existing traffic signal poles or mast arms.

## R-9 Standard Street Sign Placement

- Diagram – 3-inch typ or depth of prvt sign rider
- Diagram – Private sign OW14-3 (when applicable)
- Added notes 1 and 2: 1) set to MUTCD specs see R-8 for COB street name sign requirements, 2) check that sign is not obscured by vegetation, trim if needed.

## R-10 Trench in Improved Area

- Moved note “Areas less than 8’ wide to meet compaction efforts per 00745.49(e)” to the asphalt section
- Diagram note – All other testing to comply with specification 00330.43 and 00405.46(c)
- Note 2 – Concrete shall be cut and replaced to the nearest joint(s).

## R-11 Trench in Unimproved Area

- Diagram note – Screened 3” minus class “D” “A” or “C”; Areas less than 8’ wide to meet compaction efforts per ~~00745.49(e)~~ 00405.46(c).
- Added typical trench in full road reconstruct or new proposed roads
- Note 1 – Class D backfill shall be pit run or bar run material, well graded from coarse to fine. The maximum dimension shall be 3 inches.
- Note 2 – All compaction to comply with specification section 00330.43 and 00405.46(c).
- Note 3 – Unimproved area consists of any portion of the ROW that has not been improved to a city standard and consists mostly of native vegetated areas. Unimproved





areas also include areas within the landscape strip, PUEs, and under proposed and/or full reconstructed streets, as indicated in this standard.

## **R-14 Standard Catch Basin**

- Moved to stormwater section, strm-12

## **R-14A Existing Catch Basin Pavement Resurfacing**

- Moved to stormwater section, strm-14

## **R-17 Standard Catch Basin Grate**

- Moved to stormwater section, strm-13

## **R-25 Median End Detail**

- Diagram note – standard or mountable curb per R-3
- Diagram note – install a ~~removable reflective candle stick~~ yellow Flexstake TM 750 with two reflective strips delineator on the end of the bullnose and where the median begins using concrete anchor (redhead or equivalent)

## **R-26 Local Curb Extensions**

- Added note 2 – As required by the City Engineer, install yellow flexstake TM 750 delineator for plow signage at curb extensions.

## **R-27 Gravel Construction Entrance**

- Moved to Erosion section, E-8 – no change to the drawing

## **R-29 Accessible Parking – Angle**

- Revised entire drawing to meet ODOT standards.

## **R-40 Pavement Markings**

- Added notes to Stop Bar 1' White Bar: Not required at local/local intersections; not required in front of marked crosswalks
- Added note to Standard Crosswalk Two 1' White Bars: Install at controlled approach

## **R-41 Pavement Markings**

- Added note to Staggered Continental Crosswalk 2' White Bars: Install at uncontrolled approach





## **R-42 Pavement Markings**

- Revised the on-street parking detail “P”
- SCH: **Install at school speed zone sign on arterial and collector roads**
- Revised BM-D3 to WD-2; revised separations between lines from 6’ and 3’ to 6’ and 2’.

## **R-43 Pavement Markings**

- Added BD – Bike Detector
- Sharrows: **Arrow may be turned in direction of travel.**
- Consolidated E-LA and E-RA drawings into one detail. No changes to content. Added note: Use E-LA for left turns and E-RA for right turns.

## **R-44 Turn Lane Marking Layout**

- Note 3 – When used for a short turn lane (**<40’**), the 2<sup>nd</sup> (downstream) arrow may be omitted based on engineering judgement.
- ~~A downstream arrow and~~ **An ONLY symbol is only** required where a through lane approaching an intersection becomes a mandatory turn lane.

## **R-45 Intersection Pavement Marking Layout**

- **Note: Use W if <4’ shoulder (no bike lane); use W-2 if a bike lane exists.**
- **Stop bar not required at local/local intersections**
- Changed YB to NDY
- Removed arrows on local streets

## **R-46 Bike Lane Markings**

- Green (optional); **required at high visibility locations per City Engineer**

## **R-47 Crosswalk Markings**

- Added NDY marking
- Standard Crosswalk Bars at **4-Way Controlled** Intersection

## ***SANITARY SEWER***

### **S-1 Profile of Typical Sewer Main Installation**

- Note 3 – for pressure and vacuum sewer mains only, tracer wire shall be installed within a 1-inch conduit centered on top of the main, **as close to the main as possible.** The





main shall be wrapped with marking tape a minimum of 4 wraps per 20 feet of main.

**Tracer wire is not required on gravity sewer main.**

- Note 4 – place tracer wire on pressure sewer ~~mainline and services~~ per section 00445.11 (e) and 00445.48.

## **S-2 Gravity Sewer Services**

- Diagram note – Position tee and bend to locate service connection invert at or above springline of sewer as shown; **wyes are not to be used**
- Diagram note – **4" cleanout at property line; access to be C-900 PVC pipe, 18" min, with cast iron cap marked "sewer" flush with ground surface. Use a brooks 1 RT valve box in traffic areas.**
- Diagram note – **2" min PVC pipe or pressure-treated 2x4 service marker; painted green; expose pipe 2' above ground; depth to invert to be marked**
- Diagram note – **Slope as specified per 4.1.6**
- Diagram note – deleted duplicate note "removable plug or cap"

## **S-3a Standard Sewer Manhole Ring and Cover**

- Note 3 – **Hinged manhole lids are not permitted unless otherwise approved by the city engineer.**
- Note 4 – **Locks are to be used on the lid when the lid is located outside a roadway if required by the city engineer. If a lock is required, the lock shall be Titus Swiftwist, or equal.**
- Note 5 – **all manhole lids shall be placed outside the path of travel on sidewalks and driveway approaches.**

## **S-3B Standard Sewer Manhole**

- Precast rings – precast rings 2", 3", **4"**, 6" and **8"**; max height **12"** 8" ; **max 3 rings**

## ***WATER***

### **W-1 Water Main Typical Profile**

- Diagram – updated note references on the diagram to match the footnotes
- Note 3 – Mega-lugs and field lok gaskets, **or approved equal**, are approved for restrained joints.



#### **W-4 Residential Water Service Installation**

- Note 5 – where meters are placed in meter banks, a permanent address tag provided by the contractor shall be placed on the meter box.

#### **W-5D Meter Installation in Sidewalks**

- New drawing

#### **W-7 Typical Hydrant**

- Note 2 – MJ x MJ tee or MJ x MJ x swivel (optional) with 6-inch valve at the mainline
- Diagram – depth of bury 6'- 4' max (note 7)
- Diagram – removed mainline tee 6" side outlet flanged
- Added Note 7 – Bury depth is max 4 feet. Use 45 degree or 22.5 degree bends to adjust accordingly.

#### **W-8 Hydrant Location and Clear Zone**

- Deleted Note 5 – ~~When hydrants are within 54 inches of a property-tight sidewalk, the hydrant pad shall be poured to the edge of the sidewalk.~~
- Added Note 5 – The curb shall be painted red for a total of 20 feet, centered on the hydrant.

#### **W-10 1" and 2" Standard Air Release Valve – Traffic Areas**

- New drawing

#### **W-10A 1" Standard Air Release Valve ~~2" Standard Air Release Valve~~**

- Revised drawing to incorporate a 233 Vault instead of a water meter box.
- Revised majority of drawing

#### **W-10B 2" Standard Air Release Valve**

- New drawing

#### **W-13A 2" & Larger Double Check Valve Assembly**

- Deleted Note 6 – ~~PIV and FDC not to be installed in vault lid.~~
- Updated location of the property line on the drawing
- Revised size of vault 687 577-WA for 4-inch pipe



**W-13B Fire Vault**

- Note 4 – **PIV not to be used in-lieu of isolation gate valve at property line.**

**W-15B 2.5" + Reduced Pressure Backflow Assembly**

- Note 1 – This drawing is for reference only. Install per plumbing code and building department requirements **or as by manufacturer's requirements.**
- Diagram note – ~~hot box, hydrocowl or equal~~ **1060 ASSE class 1; watts box safe-t-cover, hot box, or equal.**

**W-21 Fire Gate**

- Diagram – 16' **minimum (varies depending on road width)**

**W-23 Standard 2" Blow Off Assembly (~~2" - 6" Mains~~)**

- Note 4 – Temporary blow-off is one removed at the end of project construction **water line testing and installation and prior to project paving.** A permanent blow-off remains on the project after acceptance.
- Diagram – 2" brass **or rigid copper pipe**
- Diagram – 2" brass **or compression** 90 degree bend
- Diagram – **After chlorination flush, install 2" flange adaptor with 2.5" NFS fire thread with fire thread cap. All fittings to be brass.**

**W-24 Standard 4" And 6" Blow Off Assembly (~~8" And Larger Mains~~)**

- Note 4 – Temporary blow-off is one removed at the end of project construction **water line testing and installation and prior to project paving.** A permanent blow-off remains on the project after acceptance.
- Diagram – Concrete brooks box replaced PVC standpipe.
- Diagram – 4" brass **or ductile iron pipe**
- Diagram – **After chlorination flush, install 4" flange adaptor reduced down to 2.5" NFS fire thread with fire thread cap. All fittings to be brass.**

BLOW OFF SIZES REQUIRED	
MAIN SIZE	BLOW OFF SIZE
<del>2" TO</del> <b><u>BELOW 6"</u></b>	2" (SEE DRG W-23)





<del>6" - 8" - 12"</del>	4"
<del>12" AND UP 14" - 18"</del>	6" <u>HYDRANT</u>
20" AND UP	PER ENGINEER

## W-30 Water Valve Box And Extension Assembly

- Added note 10 – All valve boxes shall be placed outside the path of travel on sidewalks and driveway aprons.
- Diagram note – operator extension 1.5" schedule 80 steel pipe shaft

## Erosion

### E-1 Sediment Fence Detail

- Replaced 'filter fabric' with 'geotextile fabric' throughout the standard drawing
- Added turned end and post spacing connection details
- Diagram - top view – moved stakes to opposite side of the sediment fence. Stakes should be placed on the downhill side of slope, unless they are sewn-in.

### E-2 Inlet Protection

- Removed drawing from standards and specifications

### E-8 Gravel Construction Entrance

- Moved from roadway section, R-27 – no change to the drawing

## Stormwater

### STRM-8 Stormwater Manhole Lid Detail

- Note 1 – Privately owned drywells and sediment manholes shall not use a City of Bend manhole lid.
- Added note 2 – Hinged manhole lids are not permitted unless otherwise approved by the city engineer.
- Added note 3 – All manhole lids shall be placed outside the path of travel on sidewalks and driveway aprons.







## **STRM-12 Standard Catch Basin**

- Moved from roadway section, R-14
- Removed word "double" from title 'standard double catch basin'
- Updated inlet type to G-2, CG-2; removed G-1 and CG-1
- Updated grate detail and added reference to STRM-13

## **STRM-13 Standard Catch Basin Grate**

- Moved from roadway section, R-17 – no change to the drawing

## **STRM-14 Existing Catch Basin Pavement Resurfacing**

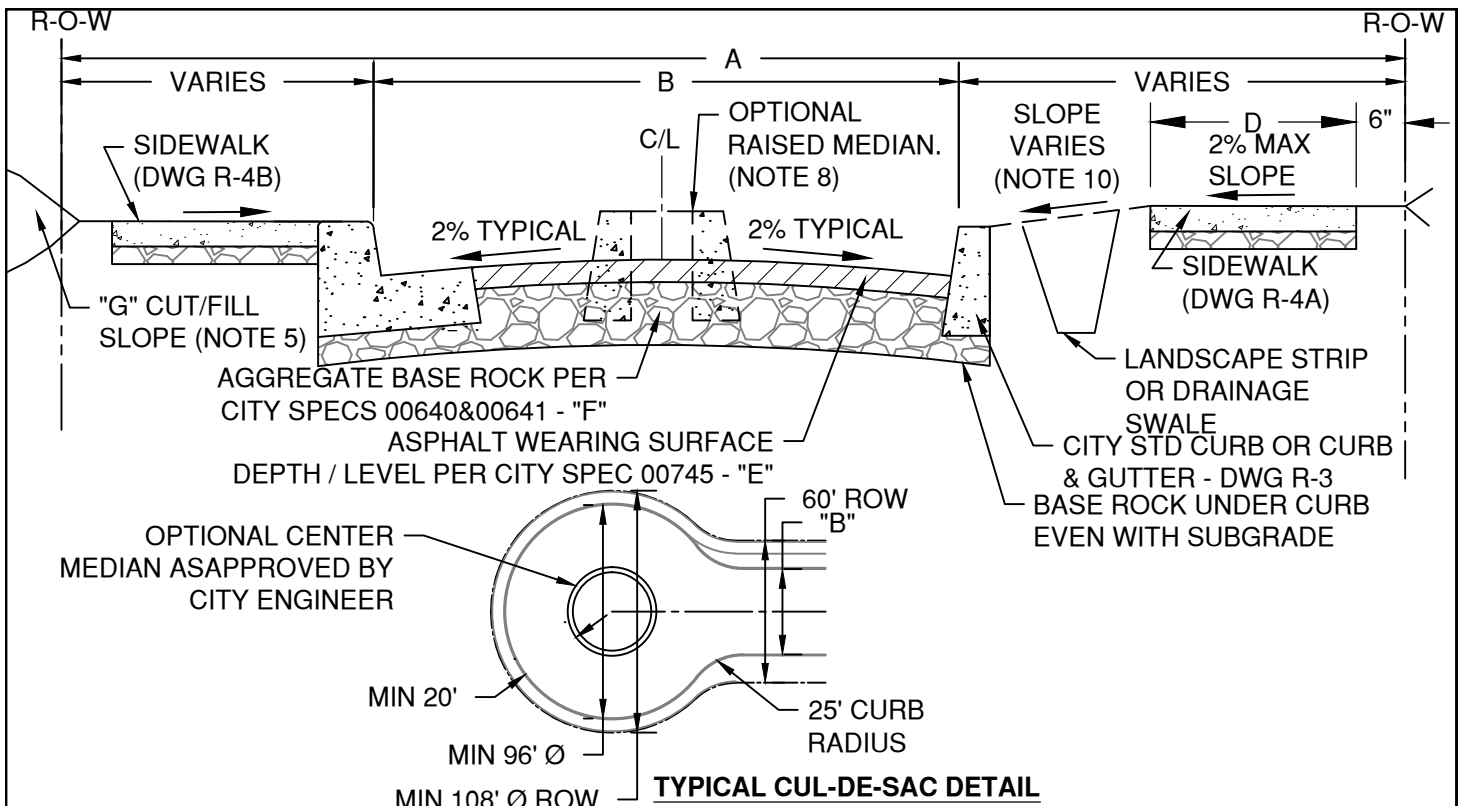
- Moved from roadway section, R-14a

## ***LANDSCAPE***

### **L-20 Tree Well Detail**

- New drawing




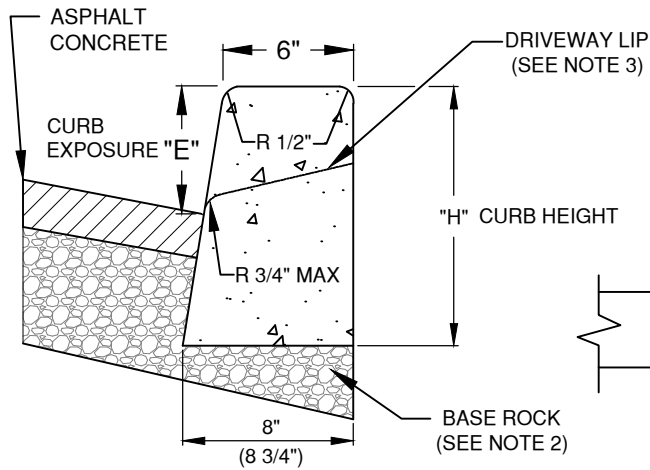


STREET TYPE	"A" ROW	"B" STREET	"C" CURB	"D" SIDEWALK	"E" AC DEPTH/LEVEL	"F" BASE	"G" CUT/FILL
ARTERIAL	100'	52'-76'	7"/16"	6'	8" - LEVEL IV	10"	4H:1V
COLLECTOR	80'	52'-60'	6"/14"	6'	6" - LEVEL III	8"	4H:1V
LOCAL	60'	24'-36'	6"/12"	5'/6'	4" - LEVEL III	6"	2H:1V
INDUSTRIAL LOCAL	60'	36'-44'	6"/12"	5'	4" - LEVEL III	8"	2H:1V
CUL-DE-SAC	Ø108'	Ø96'	6"/12"***	5'	4" - LEVEL III	6"	2H:1V
ALLEY	20'	20' (note 7)	--	--	4" - LEVEL III	6"	2H:1V

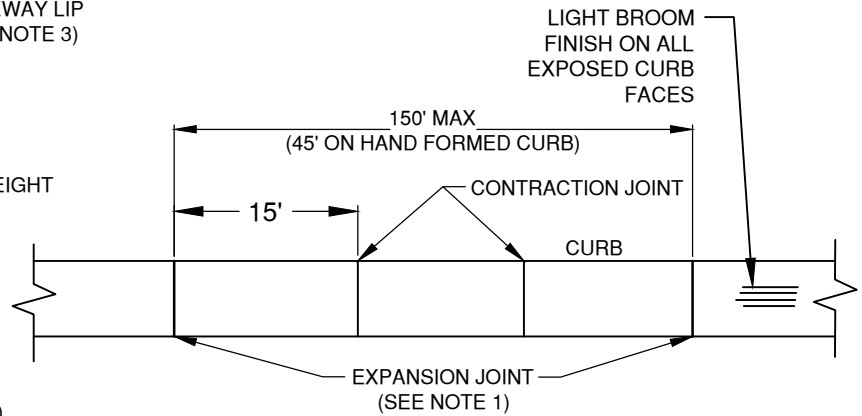
**NOTES:**

- STREET WILL BE CENTERED IN THE RIGHT OF WAY UNLESS OTHERWISE APPROVED BY CITY ENGINEER.
- SIDEWALKS SHALL BE INSTALLED PROPERTY TIGHT ON BOTH SIDES OF THE ROAD UNLESS OTHERWISE APPROVED.
- SIDEWALK GRADE MUST MATCH STREET GRADES WHEN GREATER THAN 5.0%. SIDEWALKS SHALL COMPLY WITH PROWAG GUIDELINES.
- RETAINING WALLS ARE NOT PERMITTED WITHIN THE ROW UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
- MAX 1.5H:1V CUT SLOPES PERMITTED IN ROCK CUTS WHEN APPROVED BY A GEOTECHNICAL ENGINEER.
- SUBGRADE FOR STREET AND SIDEWALK SHALL BE COMPACTED TO 95% RELATIVE MAXIMUM DENSITY PER CITY STD 00330
- NEW ALLEY ROW AND PAVED WIDTH WILL BE 20' WIDE. WHERE ALLEYS ARE INSTALLED IN EXISTING ROW, THE PAVED WIDTH WILL EQUAL THE ROW WIDTH OR UP TO 2 FEET LESS THAN THE ROW WIDTH. 1-FOOT WIDE BUFFERS ON EACH SIDE OF THE ALLEY MAY BE LEFT UNPAVED WHEN ALLEYS ARE INSTALLED IN EXISTING ROW.
- RAISED MEDIANS ARE AT THE CITY ENGINEER'S DISCRETION ON ARTERIALS & COLLECTORS.
- IMPROVEMENT STANDARDS ARE BASED ON ZONE AND STREET CLASSIFICATION. REFERENCE THE BEND DEVELOPMENT CODE, SECTION 3.4 PUBLIC IMPROVEMENT STANDARDS FOR ADDITIONAL DETAIL.
- THE CROSS SECTION OF THE PLANTER STRIP BETWEEN THE CURB AND RIGHT OF WAY SHALL NOT BE STEEPER THAN 4H:1V TO PROVIDE A RECOVERABLE ROADSIDE SLOPE. 2% TYPICAL / PREFERRED.
- PAVEMENT SECTIONS SHOULD BE PROVIDED PER THE TABLE ON THIS STANDARD, OR AS SPECIFIED IN A STAMPED GEOTECHNICAL REPORT AS APPROVED BY THE CITY ENGINEER.

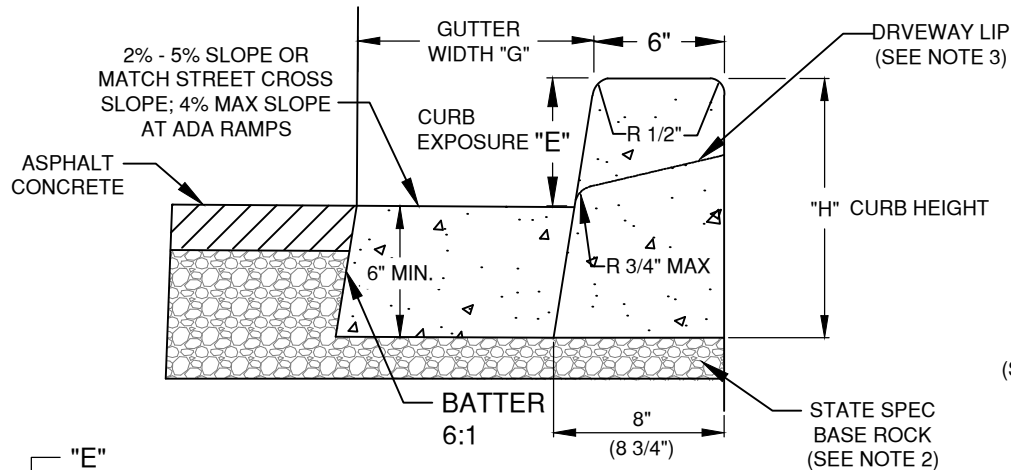
DRAWN CJH		 CITY OF BEND	<b>CITY OF BEND</b> STANDARD DRAWING 710 NW WALL ST., BEND, OREGON 97701		SCALE NTS
DIV ROADWAY					DATE 3/31/19
REV	DATE				APPR
					STD DWG R-1
			<b>TYPICAL STREET CROSS-SECTIONS</b>		



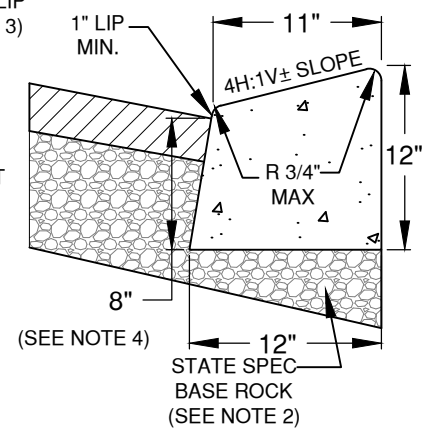
**CITY STANDARD CURB**



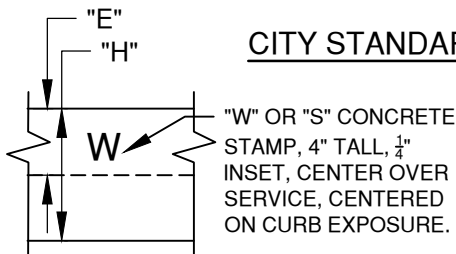
**CURB EXPANSION & CONTRACTION JOINTS**



**CITY STANDARD CURB AND GUTTER**



**CITY MOUNTABLE CURB**



**CURB SERVICE STAMP**

ROAD CLASS	CURB HEIGHT - H (INCHES)	CURB EXPOSURE - E (INCHES)	GUTTER WIDTH - G (INCHES)
ARTERIAL	16	7	12
COLLECTOR	14	6	18
LOCAL	12	6	18

**NOTES:**

CONCRETE SHALL BE PER SPECIFICATION SECTION 00440 AND CONTAIN NO ADDITIVES TO CAUSE RAPID SETTING, 4% - 7% AIR ENTRAINMENT REQUIRED.

1. EXPANSION JOINTS REQUIRED AT END OF RADII, DRIVEWAY APRONS, POINTS OF CURVATURE, AND NO GREATER THAN 150' MAXIMUM.
2. STATE SPEC BASE ROCK UNDER CURB AS REQUIRED TO MATCH BOTTOM OF STREET SECTION OR A MINIMUM OF 4" THICK, WHICHEVER IS GREATER. COMPACT PER SPECIFICATION SECTION 00641.44
3. SLOPE DRIVEWAY TOWARD STREET. 3/4" MAXIMUM LIP AT GUTTER, 1" ON COLLECTORS AND ARTERIALS.
4. MOUNTABLE CURB PERMITTED ON LOCAL STREET CUL-DE-SACS, ALLEYS, AND WHERE PERMITTED BY THE CITY ENGINEER. WHERE SIDEWALK ABUTS CURB, SIDEWALK SHALL BE MIN. 6" THICK (DRIVEWAY APRON STANDARDS)

**5. CURB AND GUTTER IS REQUIRED WHEN GUTTER SLOPE IS BETWEEN 0.5% - 0.75%.**

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STD DWG R-3

STD DWG R-6A

DETECTABLE WARNINGS. DETECTABLE WARNING SURFACES COMPLYING WITH R304 SHALL BE PROVIDED, WHERE A CURB RAMP, LANDING, OR BLENDED TRANSITION CONNECTS TO A STREET.

SIZE. DETECTABLE WARNING SURFACES SHALL EXTEND 24 in. MINIMUM IN THE DIRECTION OF TRAVEL AND THE FULL WIDTH OF THE CURB RAMP (EXCLUSIVE OF FLARES), THE LANDING, OR THE BLENDED TRANSITION.

ALIGNMENT. THE ROWS OF TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE SHALL BE ALIGNED TO BE PERPENDICULAR OR RADIAL TO THE GRADE BREAK BETWEEN THE RAMP, LANDING, OR BLENDED TRANSITION AND THE STREET.

COUNTER SLOPES. THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF A CURB RAMP, LANDING, OR BLENDED TRANSITION SHALL BE 5% MAXIMUM

GRADE BREAKS. GRADE BREAKS AT THE TOP AND BOTTOM OF PERPENDICULAR CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF RAMP RUN. AT LEAST ONE END OF THE BOTTOM GRADE BREAK SHALL BE AT THE BACK OF CURB. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF CURB RAMPS, BLENDED TRANSITIONS, LANDINGS, AND GUTTER AREAS WITHIN THE PEDESTRIAN ACCESS ROUTE. SURFACE SLOPES THAT MEET THE GRADE BREAKS SHALL BE FLUSH.

SURFACE DISCONTINUITIES. SURFACE DISCONTINUITIES SHALL NOT EXCEED 0.5 in. MAXIMUM. VERTICAL DISCONTINUITIES BETWEEN 0.25 in. AND 0.5 in. MAXIMUM SHALL BE BEVELED AT 1:2 MINIMUM. THE BEVEL SHALL BE APPLIED ACROSS THE ENTIRE LEVEL CHANGE.

NOTE: THE CITY OF BEND PREFERS A GUTTER LIP AT THE RAMP TO BE FLUSH WITH ASPHALT.

#### PARALLEL CURB RAMPS

RUNNING SLOPE. THE RUNNING SLOPE SHALL BE 8.3% MAXIMUM BUT SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15.0 ft.

CROSS SLOPE. THE CROSS SLOPE SHALL BE 2% MAXIMUM.

DIVERGING SIDEWALKS. WHERE A PARALLEL CURB RAMP DOES NOT OCCUPY THE ENTIRE WIDTH OF A SIDEWALK, DROP-OFFS AT DIVERGING SEGMENTS SHALL BE PROTECTED.

WIDTH. THE CLEAR WIDTH OF LANDINGS BLENDED TRANSITIONS, AND CURB RAMPS, EXCLUDING FLARES, SHALL BE 4.0 ft. MINIMUM.

NOTE: 5.0 ft. WIDE RAMPS ARE PREFERRED BY THE CITY OF BEND.

SURFACES. SURFACES OF CURB RAMPS, BLENDED TRANSITIONS, AND LANDINGS SHALL COMPLY WITH R301. GRATINGS, ACCESS COVERS, AND OTHER APPURTENANCES SHALL NOT BE LOCATED ON CURB RAMPS, LANDINGS, BLENDED TRANSITIONS AND GUTTERS WITHIN THE PEDESTRIAN ACCESS ROUTE.

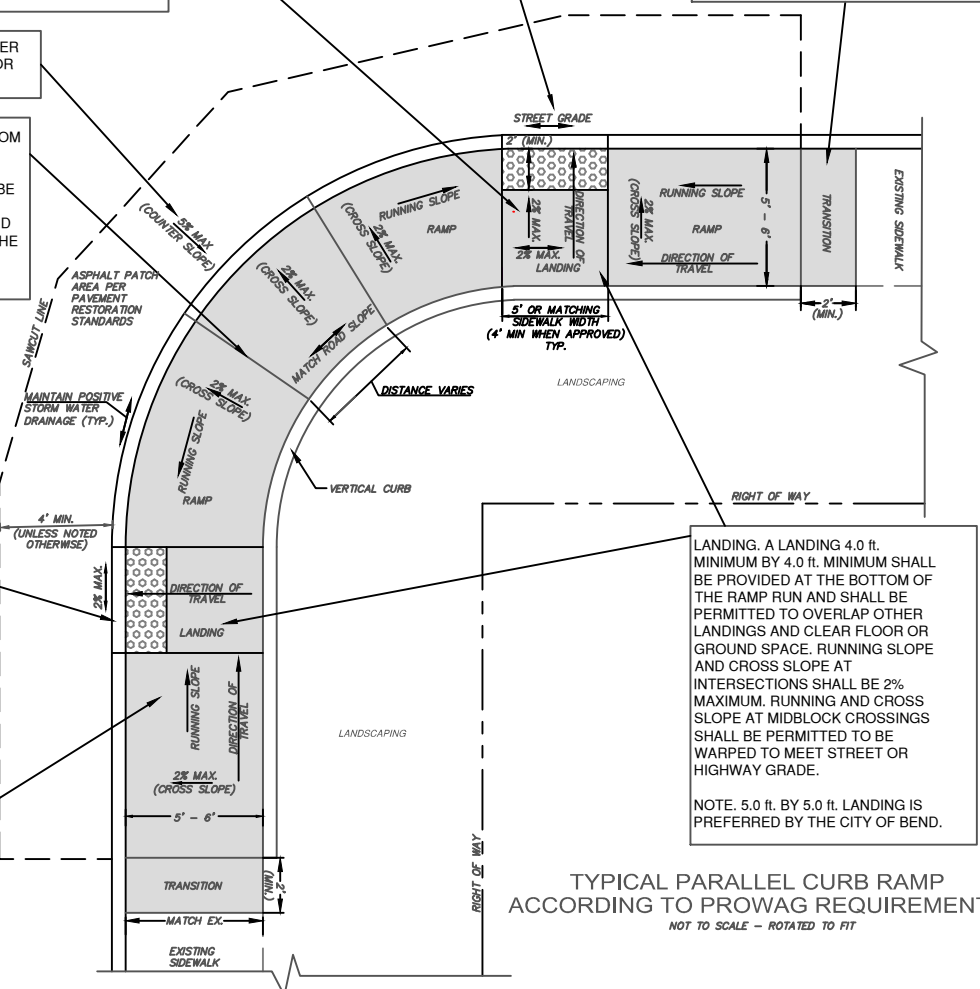
#### NOTES:

- THESE ARE THE PROWAG AS CONSTRUCTED REQUIREMENTS. SLOPES USED FOR DESIGN ARE SIGNIFICANTLY LESS THAN THESE MAXIMUMS TO ALLOW FOR CONSTRUCTION TOLERANCES, UNLESS NOTED OTHERWISE.
- THIS IS INTENDED AS A SUMMARY OF PROWAG REQUIREMENTS. SEE THE PROWAG DOCUMENT FOR THE COMPLETE REQUIREMENTS.
- ANGLE POINT ALTERNATE IS ONLY ALLOWED WHEN DIRECTIONAL RAMPS ARE NOT POSSIBLE AND MUST BE APPROVED BY THE CITY ENGINEER.
- DESIGN SLOPES: RAMPS AND LANDINGS SHALL BE DESIGNED NOT TO THE MAX SLOPE ALLOWED UNDER PROWAG. DESIGN SLOPES SHALL MATCH THE FOLLOWING: WHERE PROWAG PERMITS 8.33% MAX SLOPE (12:1 RUN/RISE), DESIGN SHALL BE 7.5%. WHERE PROWAG PERMITS 2% MAX SLOPE (48:1 RUN/RISE), DESIGN SHALL BE 1.5%.
- WHERE SIDEWALKS ARE CONSTRUCTED OUTSIDE THE RIGHT OF WAY, A PUBLIC ACCESS EASEMENT MUST BE RECORDED OVER THE PRIVATE PROPERTY ENCROACHMENT.
- 6 INCHES OF CONCRETE AND 4 INCHES OF STATE SPEC AGGREGATE BASE, COMPACTED TO 95%, ARE REQUIRED FOR CONSTRUCTION OF CURB RAMPS. CONCRETE SHALL CONFORM TO CITY CONCRETE SPECIFICATIONS 00440.12

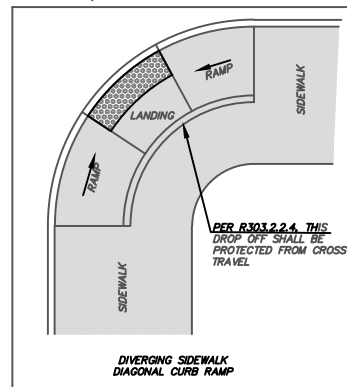
CROSS SLOPE. THE CROSS SLOPE OF RAMPS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 2% MAXIMUM.

PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL. WHERE PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROAD SHALL BE 5% MAX.

TRANSITION PANEL FROM RAMP TO EXISTING SIDEWALK (WHERE REQUIRED TO MATCH EX. SIDEWALK CROSS SLOPE). MAX. GRADES ARE NOT SPECIFIED BY PROWAG. ADJUST LENGTH AS NEEDED TO PROVIDE SMOOTH TRANSITION. IF PROPOSED MATCH LINE LOCATION FALLS WITHIN 2 FEET FROM AN EXISTING JOINT IN THE SECTION OF SIDEWALK TO REMAIN, THE EXISTING WALK SHALL BE REMOVED BACK TO THE NEXT JOINT.



TYPICAL PARALLEL CURB RAMP  
ACCORDING TO PROWAG REQUIREMENTS  
NOT TO SCALE - ROTATED TO FIT



TYPICAL DIAGONAL CURB RAMP  
REQUIRES CITY APPROVAL FOR CONSTRUCTION  
ACCORDING TO PROWAG REQUIREMENTS  
NOT TO SCALE - ROTATED TO FIT

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REV DATE



CITY OF BEND

## CITY OF BEND STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

### TYPICAL PARALLEL CURB RAMP

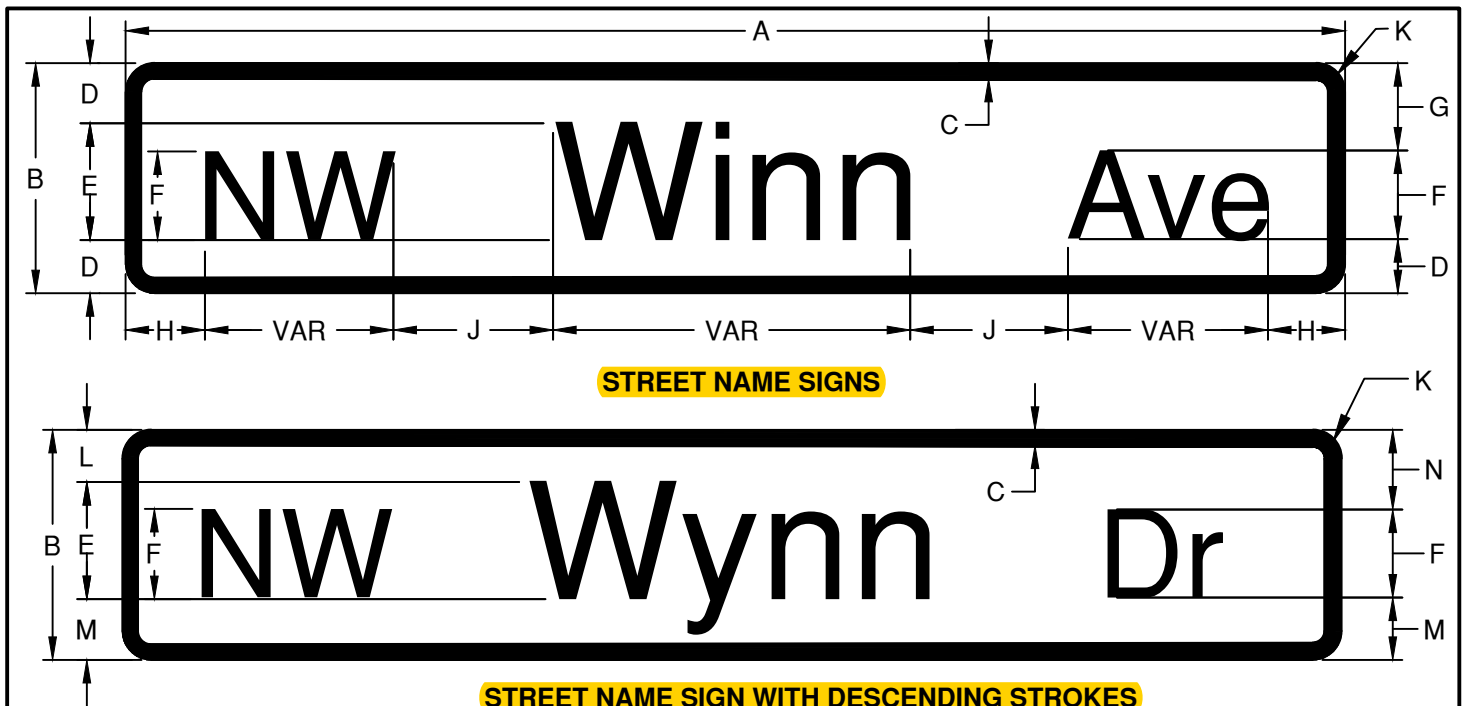
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STD DWG R-6B




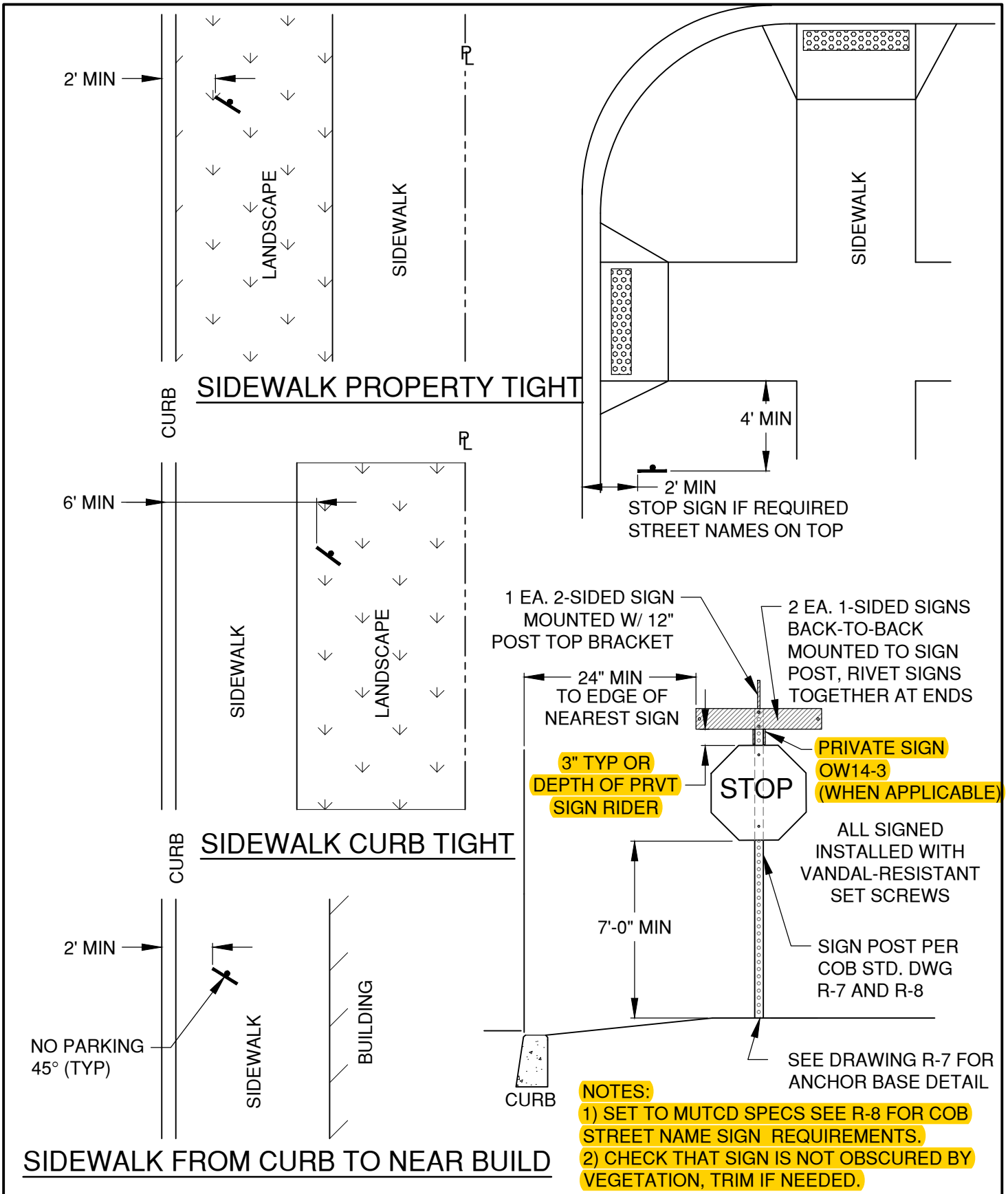



SIGN LOCATION	DIMENSIONS												
	A	B	C	D	E	F	G	H	J	K	L	M	N
LOCAL	VAR	8	0.375	2	4C	3C	3	3 MIN	3	1	1.75	2.25	2.75
COLLECTOR/ ARTERIAL ≤ 40MPH	VAR	12	0.5	3	6C	4.5C	5	4.5 MIN	4.5	1.5	2.75	3.25	4.75
COLLECTOR/ ARTERIAL > 40 MPH	VAR	18	0.75	5	8C	6C	7.67	5.33 MIN	6	1.875	5	5	7.67
OVERHEAD	VAR	24	1	6	12C	9C	10	9 MIN	9	2.25	5	6	9.50

**Notes:**

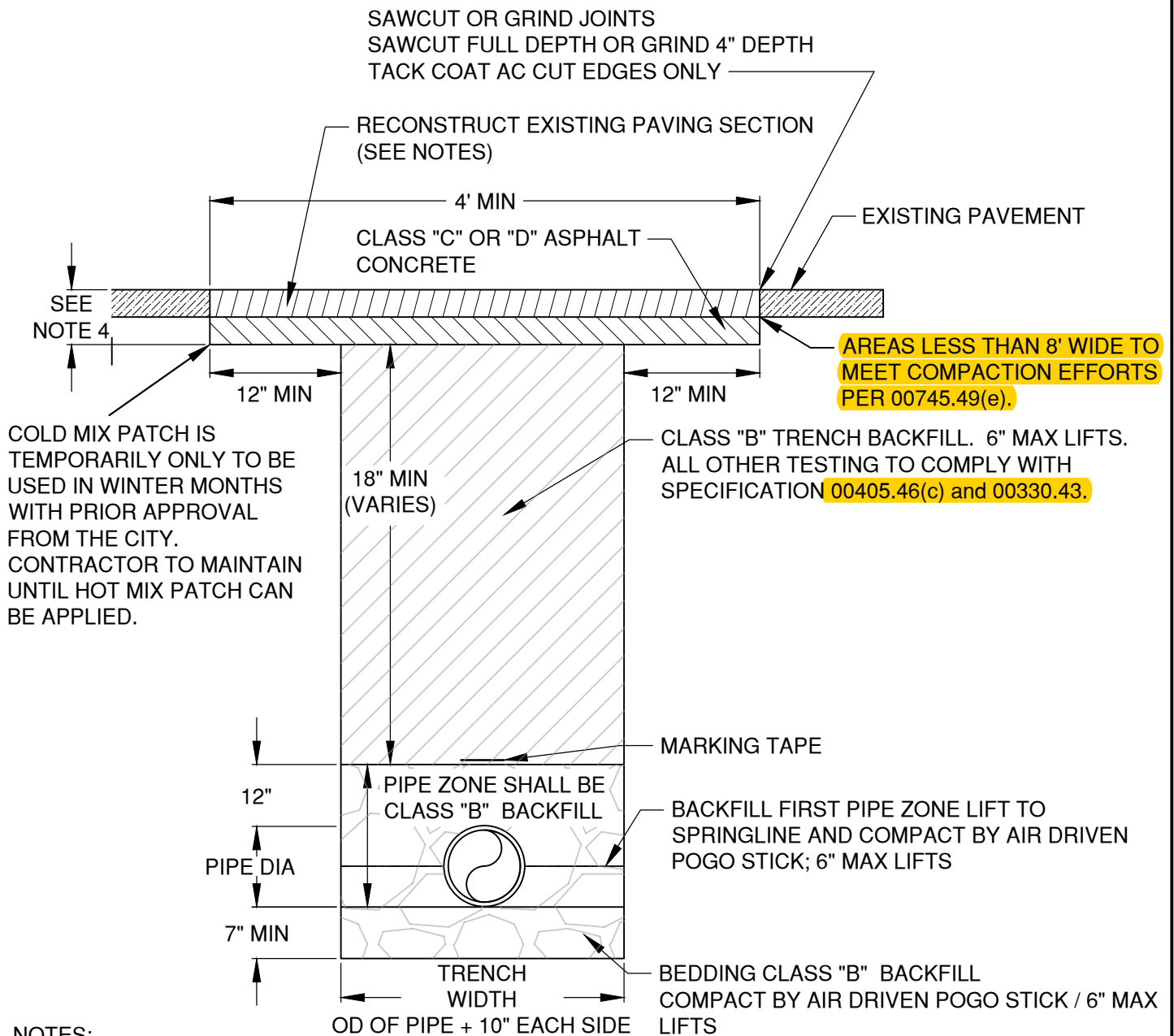
- Signs installed along public streets shall be fabricated and installed to conform to the MUTCD and City of Bend specifications.
- Unless otherwise specified, street name signs shall be fabricated as follows:
  - Sign Substrate: sheet aluminum (gauge 0.80 for ground-mount) with rounded corners
  - Retro-reflective Sheeting: Green background with White legend, using HIP/Type G for ground-mounted signs, and Diamond grade/Type G2 for signs mounted overhead;
  - Lettering shall be lower-case with initial upper-case letters;
  - Series C 2000 Font, with lettering and letter spacing per the Federal Highway Administration's Standard Alphabets as shown in the current edition of the Standard Highway Signs and Pavement Markings Manual. (\* Except for overhead signs, where signs exceed 36" long, series B2000 font shall be used);
  - Bottom street signs (closest to the regulatory/stop sign) shall be double sided with predrilled holes. Signs shall be riveted back to back on the square tube post, centered on the post.
  - Top street sign shall be single-sided.
- All signs shall be reviewed and approved by the City of Bend Engineering Department prior to fabrications and installation.
- Typical installation includes 2-inch square tube caps with 90-degree angle brackets on 2-inch perforated square tube steel posts. Use 5- or 6-inch blade mounts for signs less than 36" wide; 12-inch mounts for signs 36-inches or wider or over 6-inches high. See Standard Drawings R-7 and R-9.
- Sign widths vary with legend. Where site constraints limit available space, reduced letter height, font style, line spacing, or edge spacing will be considered. Reductions in spacing between letters or words is not permitted.
- Where private streets intersect with public streets, install a black on yellow PRIVATE DR sign with 4-inch capital letters (ODOT Sign Policy sign #OW14-3) directly below the private street name sign (or on a separate post, if not at an intersection).
- For additional information, refer to MUTCD Section 2A and 2D, and City of Bend technical specification Section 00940.
- Confirm sign size with City Engineer for signs on existing traffic signal poles or mast arms.

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REV	DATE	APPR		STANDARD STREET NAME SIGNS				APPR	
								STD DWG R-8	



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			DATE 3/31/19
			APPR
		STANDARD STREET SIGN PLACEMENT	STD DWG R-9





NOTES:

1. CDF/CLSM - COMPLY WITH SPECIFICATION 00442
2. ALL EXISTING AC OR PCC PAVEMENT SHALL BE SAWCUT PRIOR TO REPAVING. CONCRETE SHALL BE CUT AND REPLACED TO THE NEAREST JOINT(S).
3. CONCRETE PAVEMENT SHALL BE REPLACED WITH CONCRETE TO A MINIMUM THICKNESS OF 6" OR TO THE THICKNESS OF REMOVED PAVEMENT, WHICHEVER IS GREATER
4. PLACE AC A MINIMUM THICKNESS AS SPECIFIED FOR MINIMUM PAVEMENT FOR STREET CONSTRUCTION OR TO THE THICKNESS OF REMOVED PAVEMENT, WHICHEVER IS GREATER. 2" LIFTS MAXIMUM FOR PLACEMENT
5. ALL COMPACTION TO COMPLY WITH SPECIFICATION SECTION 00330.43
6. THE FINAL 18" OF BACKFILL MAY BE CLASS B BACKFILL PROVIDED THE FINAL 4" TO FINISH GRADE IS PLACED AS HOT MIX ASPHALT CONCRETE PER SPECIFICATION SECTION 00745

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STANDARD DRAWING

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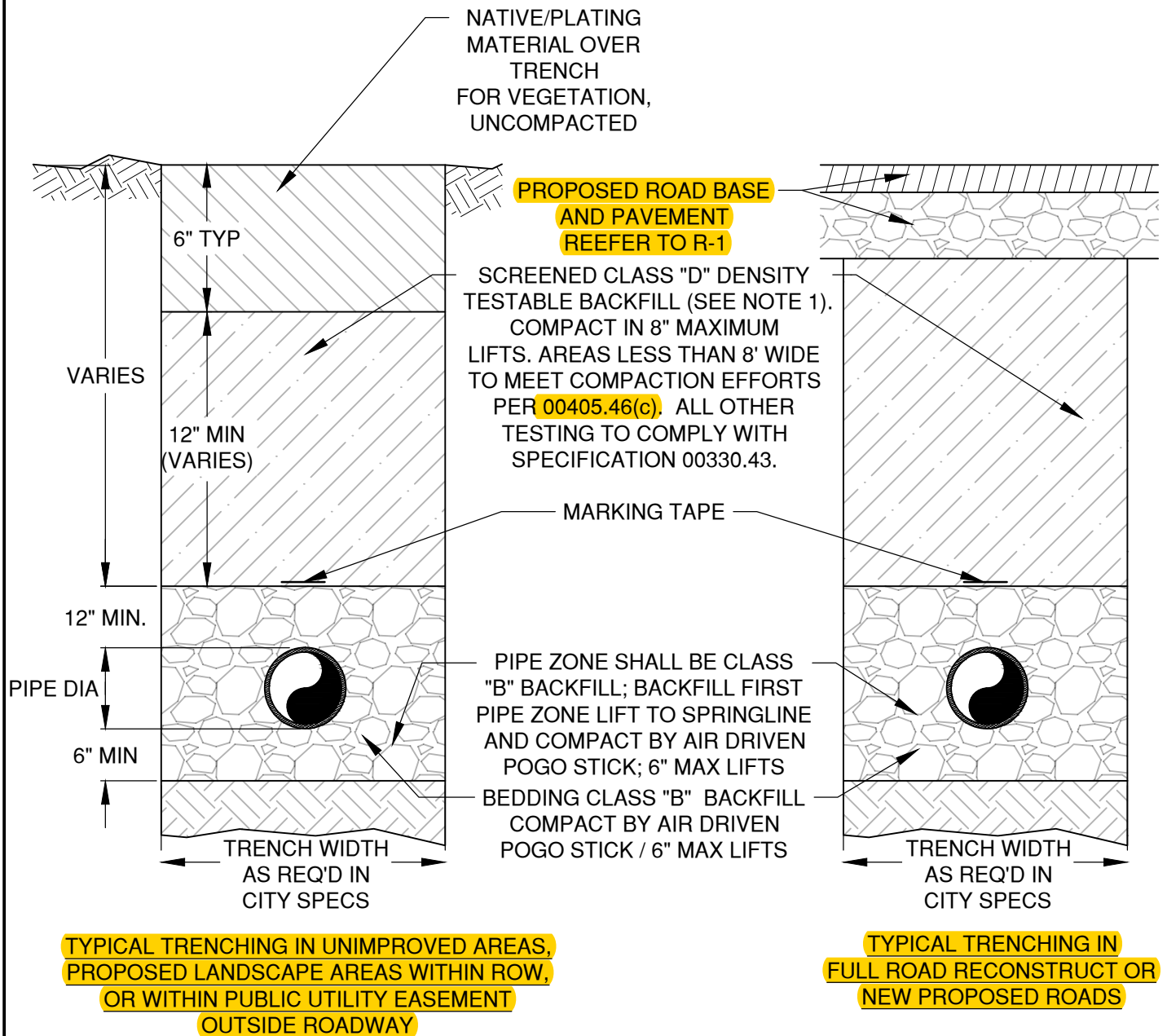
TRENCH IN EXISTING PAVEMENT

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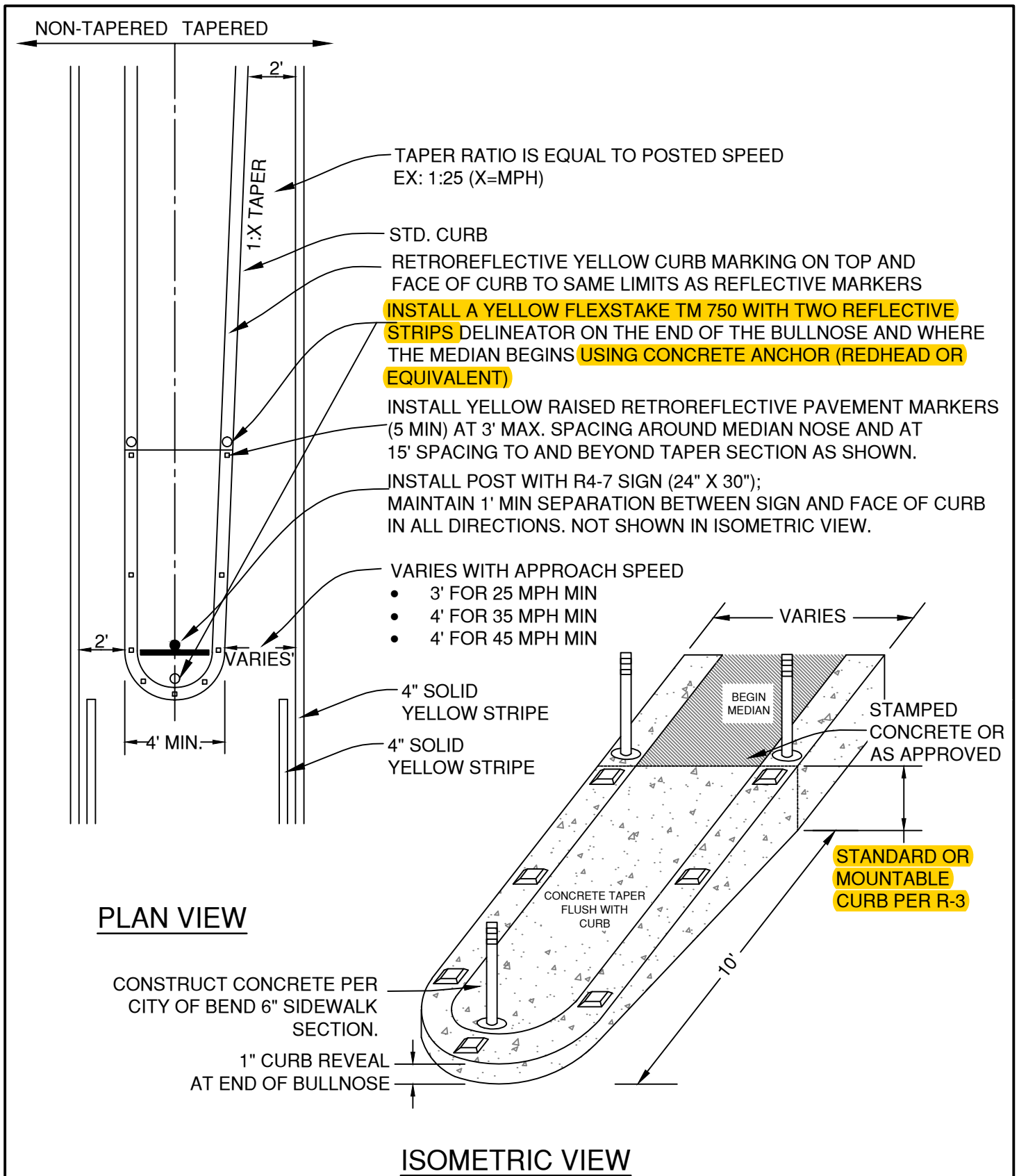
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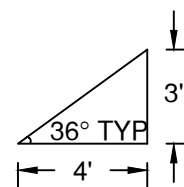
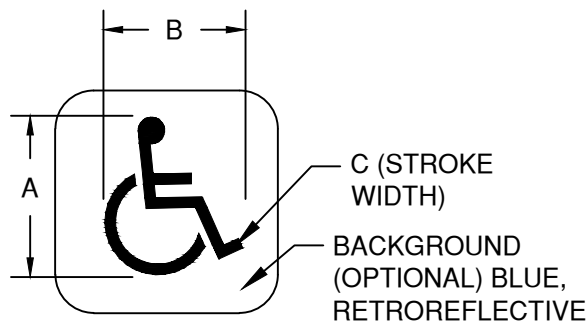
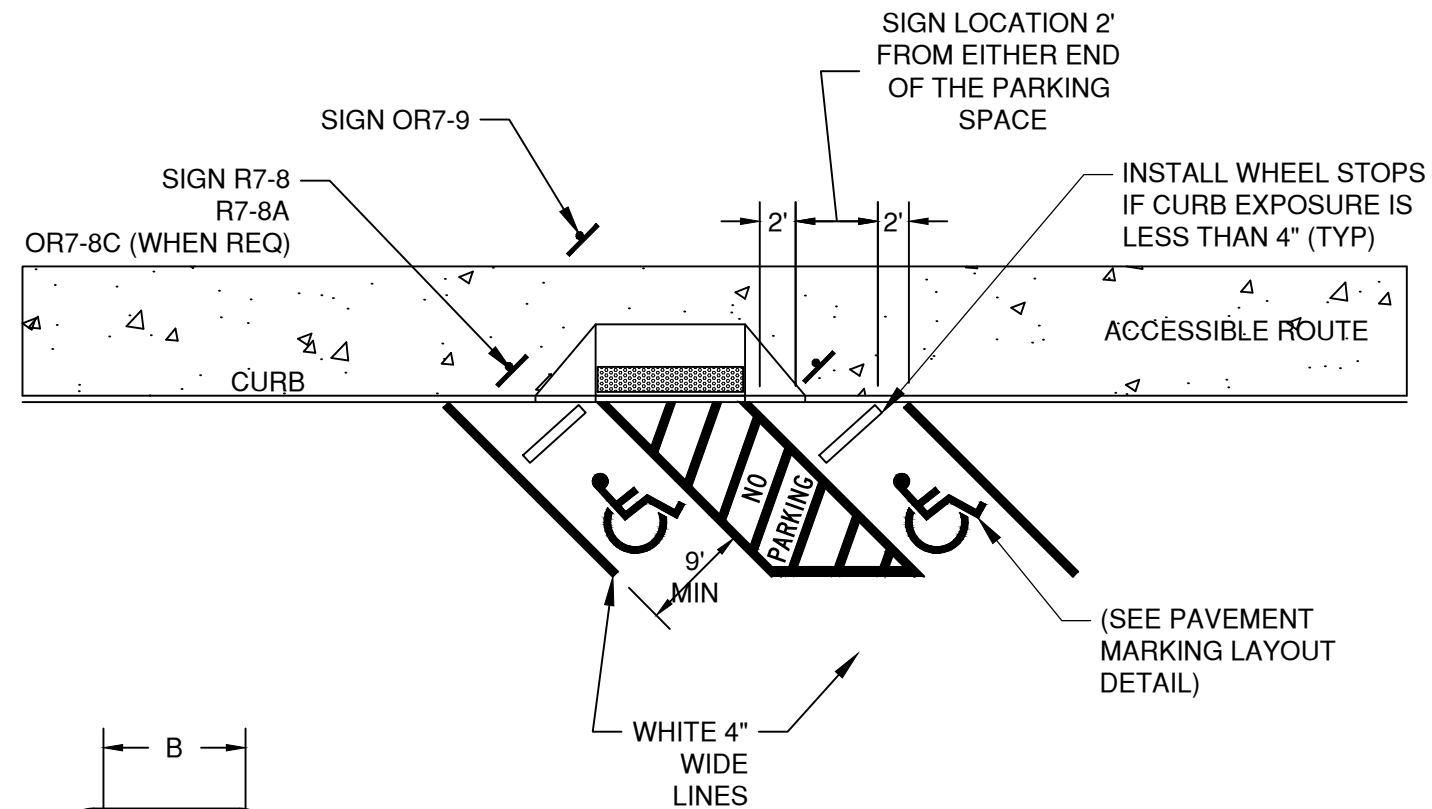
#### NOTES:

1. CLASS D BACKFILL SHALL BE PIT RUN OR BAR RUN MATERIAL, WELL-GRADED FROM COARSE TO FINE. THE MAXIMUM DIMENSION SHALL BE 3 INCHES.
2. ALL COMPACTION TO COMPLY WITH SPECIFICATION SECTION 00330.43 and 00405.46(c).
3. UNIMPROVED AREA CONSISTS OF ANY PORTION OF THE ROW THAT HAS NOT BEEN IMPROVED TO A CITY STANDARD AND CONSISTS MOSTLY OF NATIVE VEGETATED AREAS. UNIMPROVED AREAS ALSO INCLUDE AREAS WITHIN THE LANDSCAPE STRIP, PUEs, AND UNDER PROPOSED AND/OR FULLY RECONSTRUCTED STREETS, AS INDICATED IN THIS STANDARD.

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DIV ROADWAY			DATE 3/31/19
REV DATE			APPR
	CITY OF BEND	<b>TRENCH IN UNIMPROVED AREAS</b>	STD DWG R-11



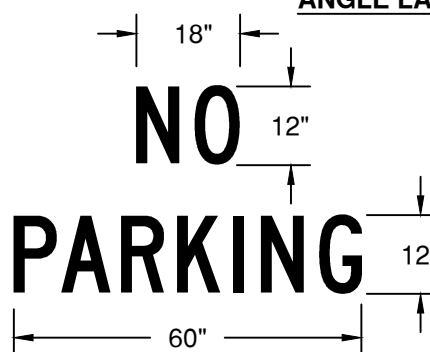
DRAWN LJC		<p>CITY OF BEND</p> <p>STANDARD DRAWING</p> <p>710 NW WALL ST., BEND, OREGON 97701</p> <p>MEDIAN END DETAIL</p>	SCALE NTS
DIV ROADWAY			DATE 3/31/19
REV DATE			APPR
	CITY OF BEND		STD DWG R-25



**ACCESS AISLE ANGLE LAYOUT**

LEGEND	DIMENSIONS (INCHES)		
	A	B	C
MINIMUM	28	24	3
STANDARD	41	36	4

**PAVEMENT MARKING LAYOUT**



**NOTE:**

1. THIS IS ONE EXAMPLE OF AN ACCESSIBLE PARKING CONFIGURATION. REFER TO ODOT ACCESSIBLE PARKING STANDARDS FOR ADDITIONAL DETAILS AND OTHER CONFIGURATIONS.
2. ALL SIGNS AND PLACEMENT SHALL CONFORM TO ODOT STANDARDS.

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DIV	ROADWAY
REV	DATE



CITY OF BEND

**CITY OF BEND**

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701



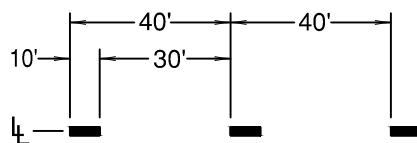
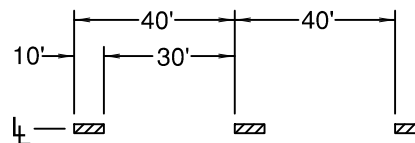
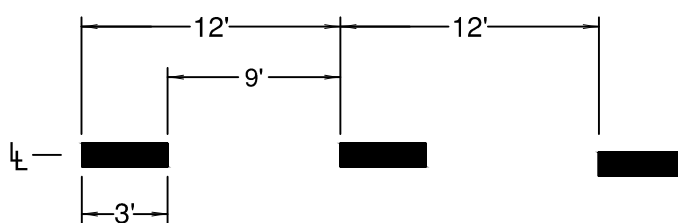
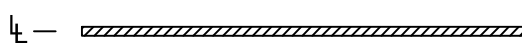
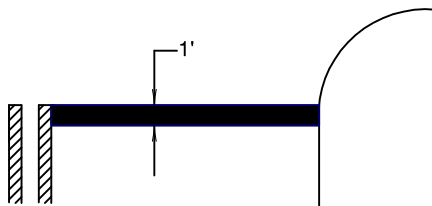
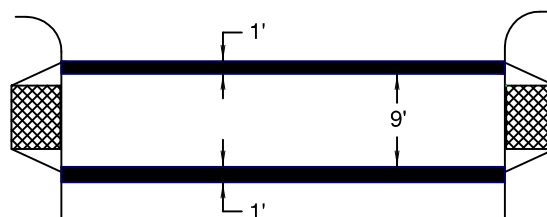

**ACCESSIBLE PARKING - ANGLE**

SCALE NTS

DATE 3/31/19

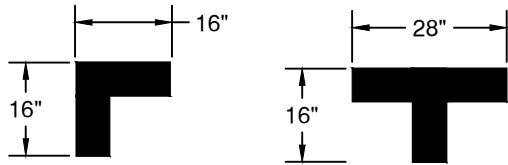
APPR

STD DWG R-29

<div>W</div> <div></div> <div>4" WHITE LINE</div>	<div>W-2</div> <div></div> <div>8" WHITE LINE</div>	
<div>WB</div> <div></div> <div>4" WHITE BROKEN LINE</div>	<div>YB</div> <div></div> <div>4" YELLOW BROKEN LINE</div>	
<div>DLL-2</div> <div></div> <div>8" WHITE LANE DROP LINE</div>	<div>Y</div> <div></div> <div>4" YELLOW LINE</div>	
<div>S</div> <div></div> <div>STOP BAR 1' WHITE BAR</div> <div>INSTALL PER STANDARD DRAWING R-45 INSTALL AS TYPE B-HS PREFORMED THERMOPLASTIC NOT REQUIRED AT LOCAL/LOCAL INTERSECTIONS NOT REQUIRED IN FRONT OF MARKED CROSSWALKS</div>	<div>CW</div> <div></div> <div>STANDARD CROSSWALK TWO 1' WHITE BARS</div> <div>INSTALL PER STANDARD DRAWING R-47 INSTALL AS TYPE B-HS PREFORMED THERMOPLASTIC INSTALL AT CONTROLLED APPROACH</div>	
<div>DRAWN CJH</div> <div>DIV ROADWAY</div> <div>REV DATE</div> <div></div> <div>CITY OF BEND</div>	<div>CITY OF BEND</div> <div>STANDARD DRAWING</div> <div>710 NW WALL ST., BEND, OREGON 97701</div> <div>PAVEMENT MARKINGS</div>	<div>SCALE NTS</div> <div>DATE 3/31/19</div> <div>APPR</div> <div>STD DWG R-40</div>

<div>NDY</div> <div><p>4" space</p><p>Thru traffic side →</p></div> <div>NARROW DOUBLE NO-PASS TWO 4" YELLOW LINES</div>	<div>DY</div> <div><p>1' space</p><p>For left turn lane (thru traffic side → )</p><p>For Centerline</p></div> <div>DOUBLE NO-PASS TWO 4" YELLOW LINES</div>	
<div>WD</div> <div><p>8'</p><p>6'</p><p>2'</p></div> <div>4" WHITE DOTTED LINE</div> <div>For lane extensions</div>	<div>WD-2</div> <div><p>8'</p><p>6'</p><p>2'</p></div> <div>8" WHITE DOTTED LINE</div> <div>For lane extensions and bike lane extensions</div>	
<div>NPL</div> <div><p>10'</p><p>30'</p><p>40'</p><p>40'</p><p>4" space</p><p>Increasing Stationing →</p></div> <div>NO-PASS LEFT 4" YELLOW LINES</div>	<div>TWL</div> <div><p>40'</p><p>30'</p><p>40'</p><p>4" space</p><p>Thru Traffic Side →</p></div> <div>TWO-WAY LEFT TURN 4" YELLOW LINES</div>	
<div>CW-SC</div> <div><p>3' min. to 5' max. (adjust spacing to miss wheel tracks)</p><p>Varies</p><p>9'</p><p>2'</p><p>Varies</p></div> <div>STAGGERED CONTINENTAL CROSSWALK 2' WHITE BARS</div> <div>Install per Standard Drawing R-47; INSTALL AS TYPE B-HS PREFORMED THERMOPLASTIC; INSTALL AT UNCONTROLLED APPROACH</div>	<div>TM-(X)</div> <div><p>Narrow Double Yellow Line</p><p>36°</p><p>3'</p><p>4'</p><p>angle orientation for field layout</p><p>1'</p><p>6' min.</p><p>4"</p><p>X'</p></div> <div>TRANSVERSE MEDIAN BARS 1' YELLOW BARS AT 20' SPACING</div> <div>X = 20', Typical (40' spacing may be used where median length exceeds 200')</div>	
<div>DRAWN CJH</div> <div>DIV ROADWAY</div> <div>REV DATE</div> <div></div> <div>CITY OF BEND</div>	<div>CITY OF BEND</div> <div>STANDARD DRAWING</div> <div>710 NW WALL ST., BEND, OREGON 97701</div> <div>PAVEMENT MARKINGS</div>	<div>SCALE NTS</div> <div>DATE 3/31/19</div> <div>APPR</div> <div>STD DWG R-41</div>

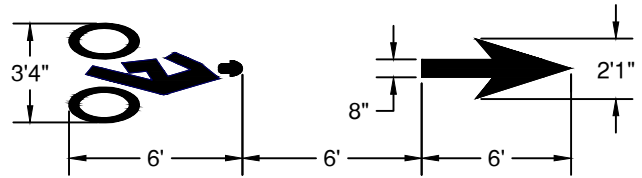
P



### ON-STREET PARKING DETAIL (white)

PARKING STALL DESIGNATION REQUIRES CONFORMANCE TO PROWAG  
Install in Type B - HS Preformed Thermoplastic or Methyl Methacrylate (MMA)

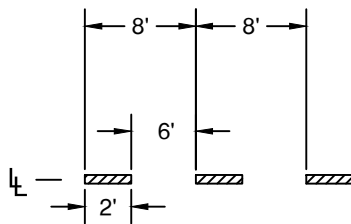
BS



### BIKE LANE STANDARD STENCIL (white)

Center marking within lane width  
Install in Type B - HS Preformed Thermoplastic  
For proportion details, see current version of FHWA Standard Highway Signs

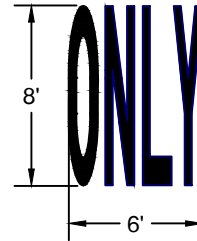
YD



### 4" YELLOW DOTTED LINE

For lane extensions  
Install in Paint

ON

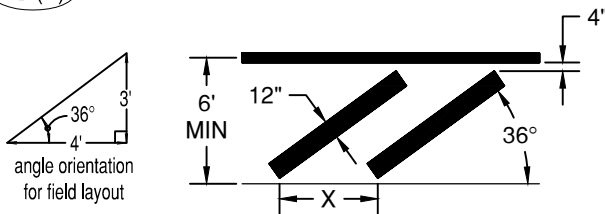


### ONLY (white)

Center marking within lane width  
Install in Type B - HS Preformed Thermoplastic  
For letter proportion details, see current version of FHWA Standard Highway Signs

TS-(X)

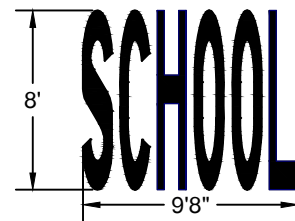
Direction of Traffic →



### TRANSVERSE SHOULDER BARS 1' WHITE BARS AT 20' SPACING

X = 20', Typical  
(40' spacing may be used where median length exceeds 200')  
Install in Paint

SCH

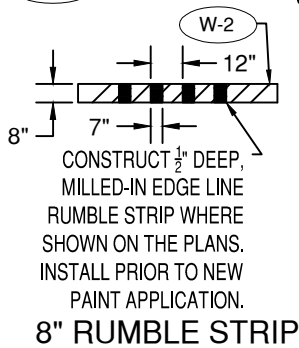


### SCHOOL (white)

Center marking within lane width  
Install in Type B - HS Preformed Thermoplastic  
For letter proportion details, see current version of FHWA Standard Highway Signs  
Install at school speed zone sign on arterial and collector roads

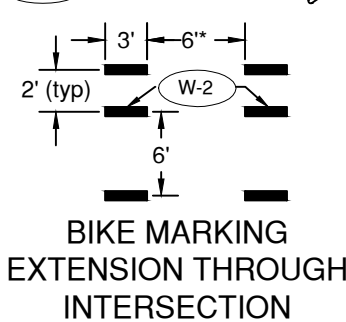
RMB

Direction of Traffic →



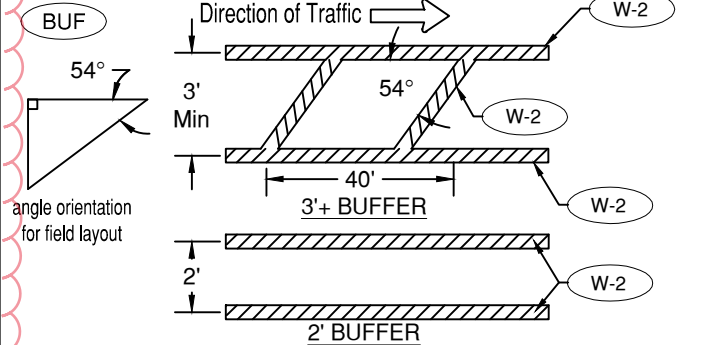
WD-2

Direction of Traffic →



\* 6' or bike lane width  
Install buffer stripes in Methyl Methacrylate (MMA)

BUF



Install buffer stripes in Methyl Methacrylate (MMA) / horizontal stripes parallel with traffic in paint

DRAWN CJH  
DIV ROADWAY  
REV DATE



CITY OF BEND

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STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

PAVEMENT MARKINGS

SCALE NTS

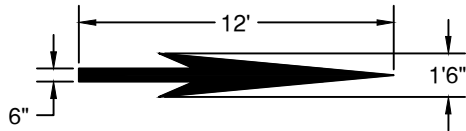
DATE 3/31/19

APPR

STD DWG R-42



E-SA

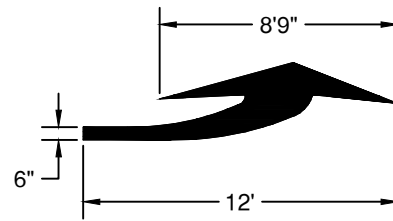


### ELONGATED STRAIGHT ARROW (white)

For arrow proportion details, see current version of FHWA Standard Highway Signs  
Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width

E-LA

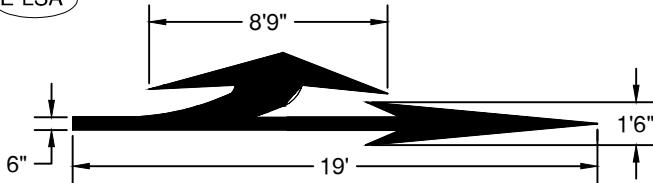
E-RA



### ELONGATED TURN ARROW (white)

For arrow proportion details, see current version of FHWA Standard Highway Signs  
Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width  
Use E-LA for Left Turn and E-RA for right turn.

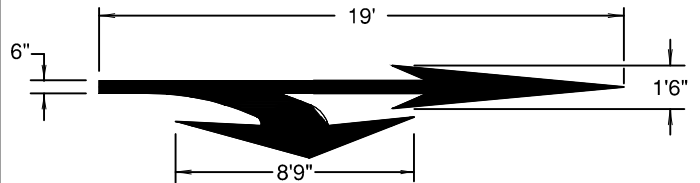
E-LSA



### ELONGATED LEFT TURN STRAIGHT ARROW (white)

For arrow proportion details, see current version of FHWA Standard Highway Signs  
Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width

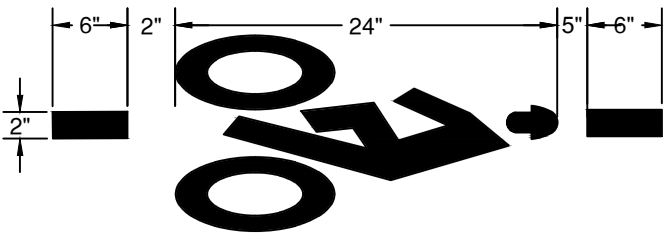
E-RSA



### ELONGATED RIGHT TURN STRAIGHT ARROW (white)

For arrow proportion details, see current version of FHWA Standard Highway Signs  
Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width

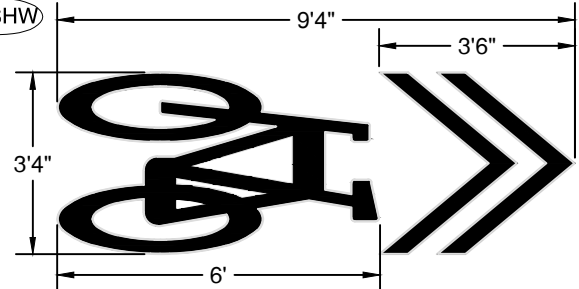
BD



### BIKE DETECTOR (WHITE)

Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width

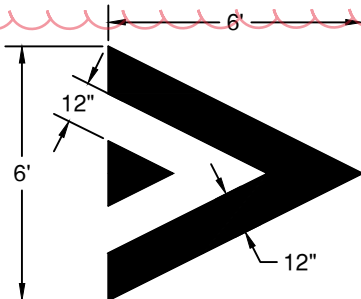
B-SHW



### SHARROWS (WHITE)

Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width  
Arrow may be turned in direction of travel.

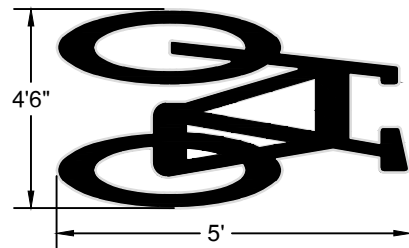
SB



### SPEED BUMP MARKING (WHITE)

Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width

BSS



### BIKE SYMBOL (WHITE)

Install in Type B - HS Preformed Thermoplastic  
Center marking within lane width

DRAWN CJH  
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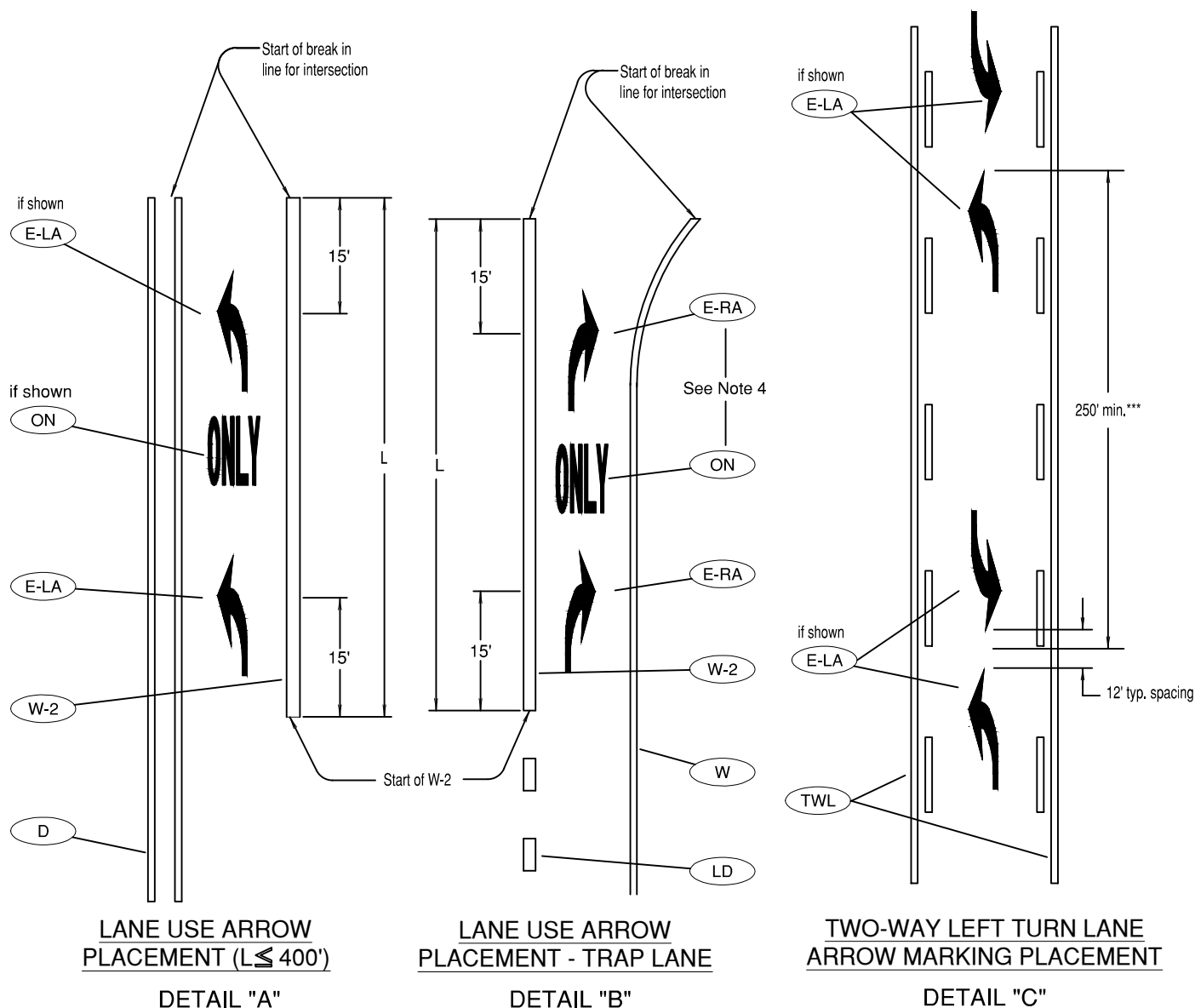
PAVEMENT MARKINGS

SCALE NTS

DATE 3/31/19

APPR

STD DWG R-43



#### General Notes:

- Center pavement marking legends within the lane.
  - Placement of lane use arrows with respect to the 8" wide white line (W-2) channelization shown in details "A", "B" and "C" apply to both left and right turn lanes.
  - When used for a short turn lane (<40'), the 2nd (downstream) arrow may be omitted.
  - An **ONLY** symbol is only required where a through lane approaching an intersection becomes a mandatory turn lane.
- \*\* When L is greater than 200', install 3rd lane use arrow at the midpoint of the turn lane.

To be accompanied by Standard Dwg. Nos. R-40 thru R-43

DRAWN CJH  
DIV ROADWAY  
REV DATE



CITY OF BEND

## CITY OF BEND STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

### TURN LANE MARKING LAYOUT

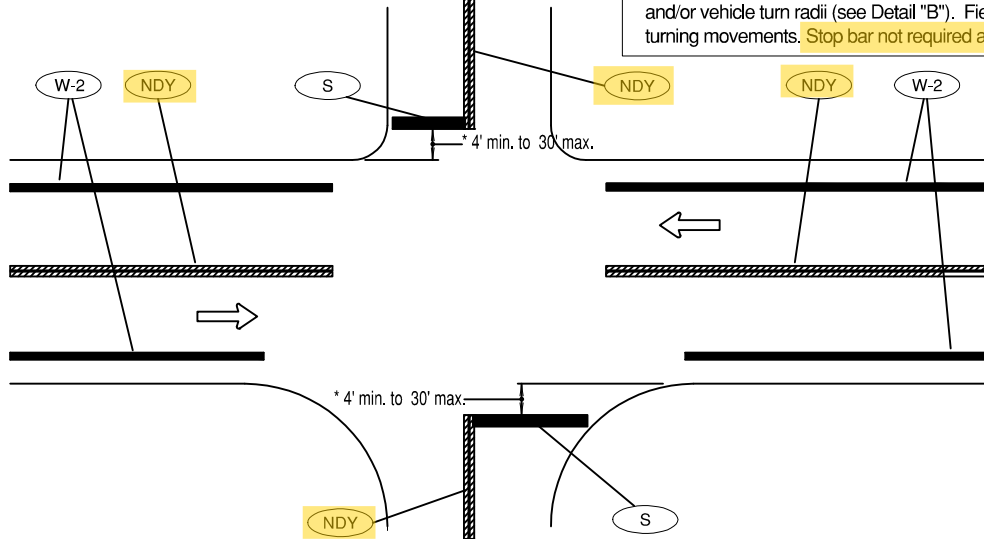
SCALE NTS

DATE 3/31/19

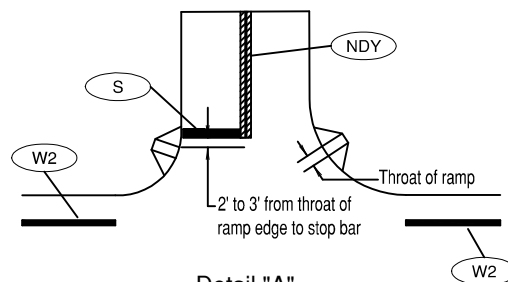
APPR

STD DWG R-44

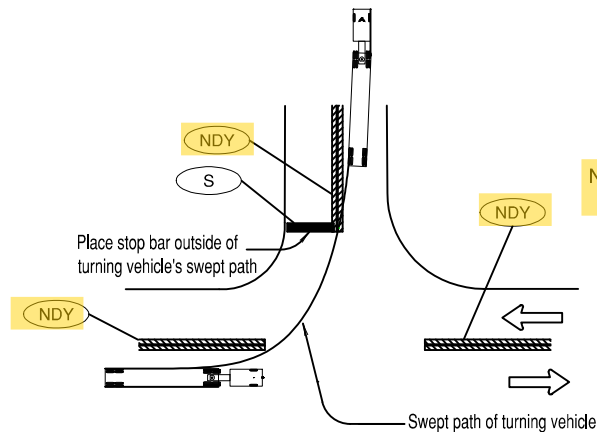
\* Stop bar shall be placed as near as possible to the intersecting traveled way. Locate stop bar 4' min. to 30' max. in advance of the extended fog line, edge of pavement, or curb face. Minimum stop bar distance may need to be increased, depending on location of pedestrian ramps (see Detail "A") and/or vehicle turn radii (see Detail "B"). Field verify sight distance and truck turning movements. **Stop bar not required at local/local intersections.**



**PAVEMENT MARKINGS FOR TYPICAL INTERSECTION**



**Detail "A"**  
**STOP BAR PLACEMENT WITH**  
**RESPECT TO PEDESTRIAN RAMP**



**Detail "B"**  
**STOP BAR PLACEMENT WITH**  
**RESPECT TO TURN RADIUS**

**NOTE: Use W if <4' shoulder (no bike lane).  
Use W-2 if a bike lane exists.**

To be accompanied by Standard Dwg. Nos. R-40 thru R-43

DRAWN CJH  
DIV ROADWAY  
REV DATE



CITY OF BEND

**CITY OF BEND**  
**STANDARD DRAWING**

710 NW WALL ST., BEND, OREGON 97701

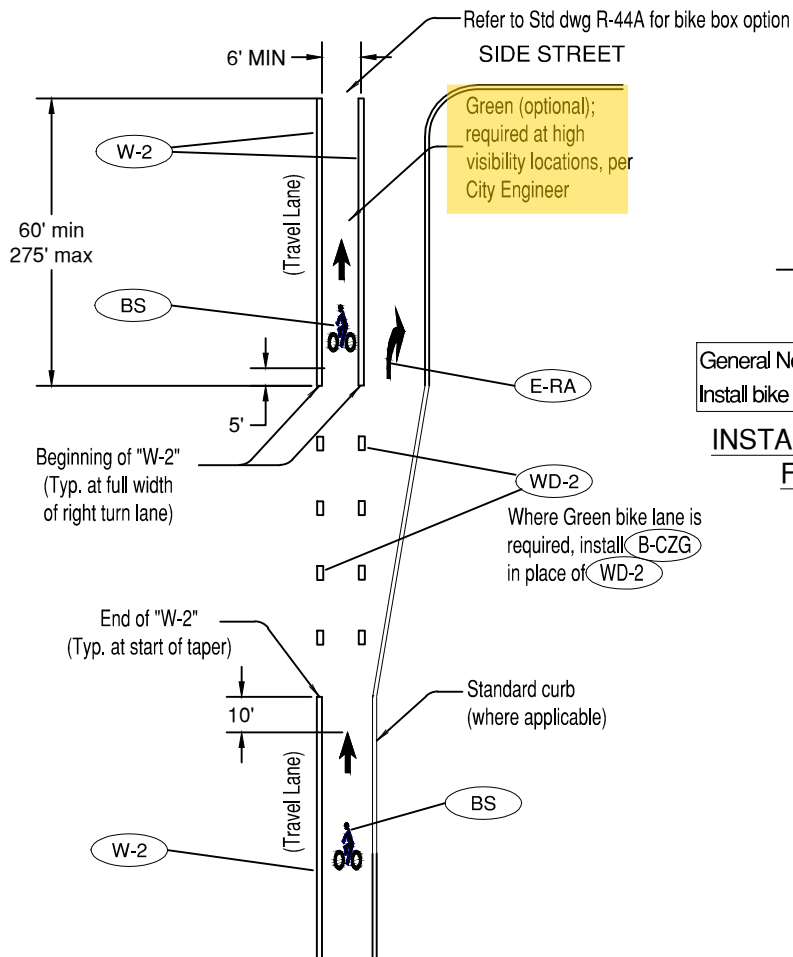
**INTERSECTION PAVEMENT MARKING LAYOUT**

SCALE NTS

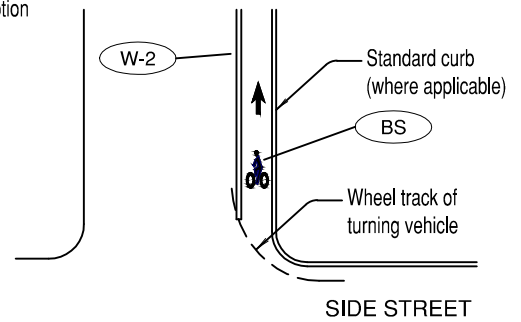
DATE 3/31/19

APPR

STD DWG R-45

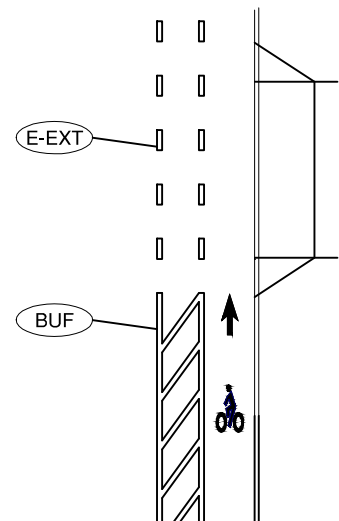


**INSTALLATION OF BIKE LANE STENCILS  
FOR BIKE LANE SEPARATED BY RIGHT TURN LANE**



**General Note:**  
Install bike lane stencil to avoid right turning vehicle wheel tracks.

**INSTALLATION OF BIKE LANE STENCILS  
FOLLOWING INTERSECTIONS**



**BUFFER BIKE LANE  
IN CONFLICT AREA**

To be accompanied by Standard Dwg. Nos. R-40 thru R-43 and R-44A

DRAWN CJH  
DIV ROADWAY  
REV DATE



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STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

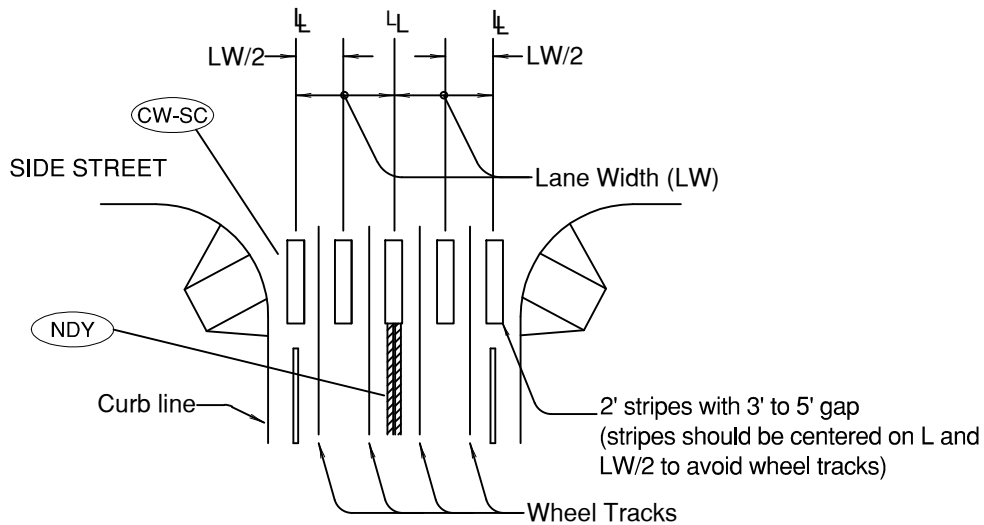
**BIKE LANE MARKINGS**

SCALE NTS

DATE 3/31/19

APPR

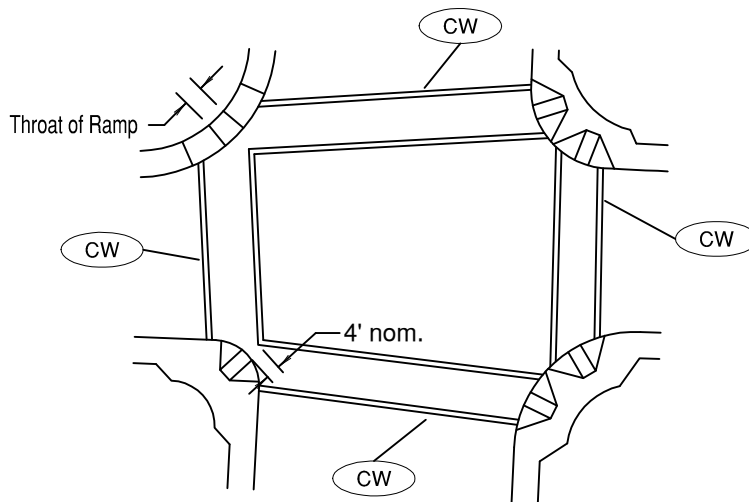
STD DWG R-46



### STAGGERED CONTINENTAL LAYOUT

#### General Note:

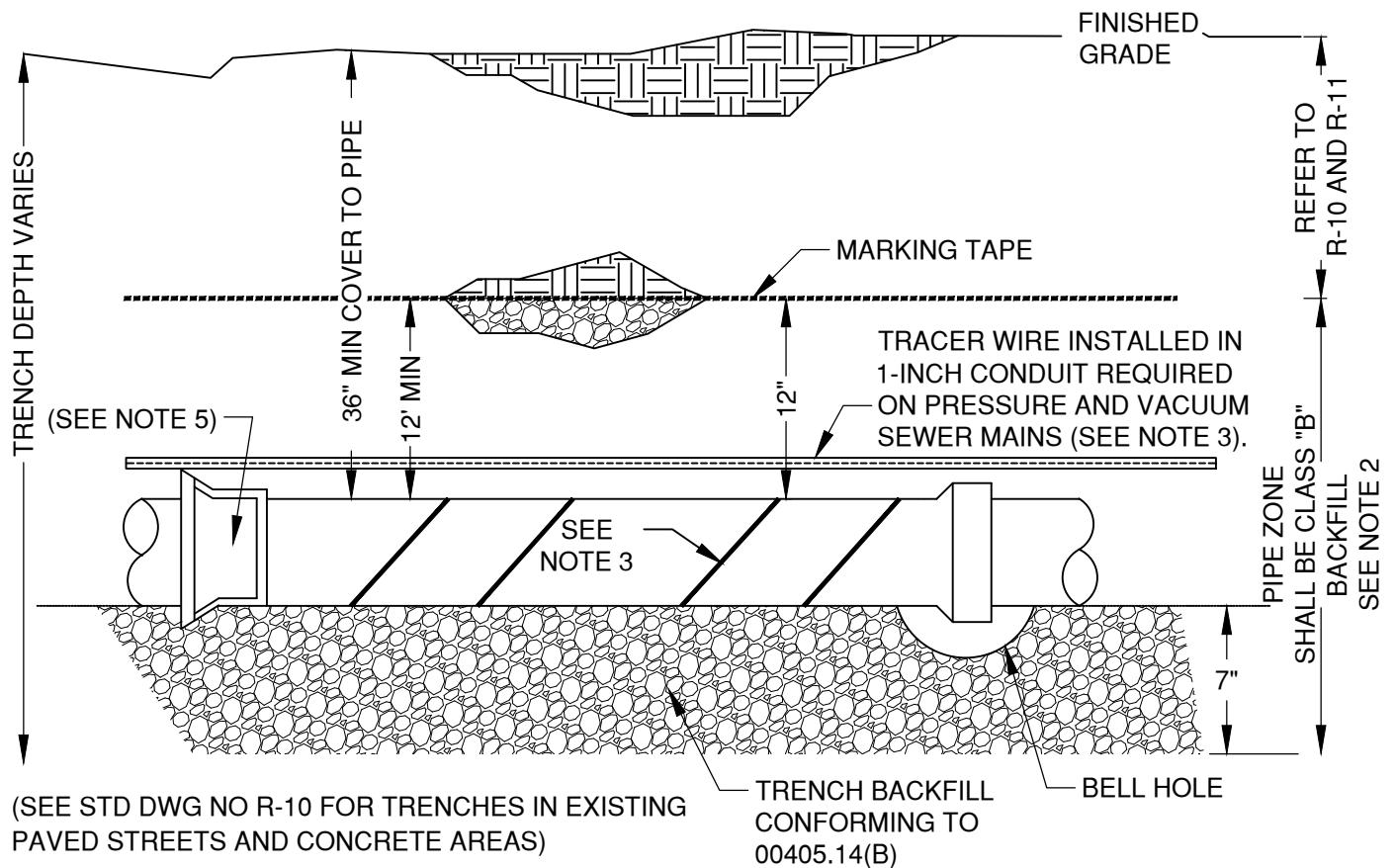
1. Install crosswalk bars such that the throat of the ADA ramp is entirely within crosswalk markings, or 5' back of extended fog line, edge of pavement, or curb face.



### STANDARD CROSSWALK BARS AT 4-WAY CONTROLLED INTERSECTION

To be accompanied by Standard Dwg. Nos. R-40 thru R-43

DRAWN	 CITY OF BEND	<b>CITY OF BEND</b> STANDARD DRAWING 710 NW WALL ST., BEND, OREGON 97701	SCALE NTS
DIV ROADWAY			DATE 3/31/19
REV DATE			APPR
		<b>CROSSWALK MARKINGS</b>	STD DWG R-47



#### NOTES:

1. SCREENED MAX 3" MINUS BACKFILL PER R-10 OR R-11, MECHANICALLY COMPACTED TO 95.0% OF AASHTO T-99-74. BACKFILL SHALL BE CAREFULLY AND THOROUGHLY TAMPED IN LAYERS.
2. PIPE ZONE BACKFILL MATERIAL PIPE SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 6". ALL PIPE ZONE MATERIAL SHALL BE  $\frac{3}{4}$ " MINUS ROCK CONFORMING TO OSS SPECIFICATIONS 00405.00 AND 02630.10.
3. FOR PRESSURE AND VACUUM SEWER MAINS ONLY, TRACER WIRE SHALL BE INSTALLED WITHIN A 1-INCH CONDUIT CENTERED ON TOP OF THE MAIN, **AS CLOSE TO THE MAIN AS POSSIBLE.** THE MAIN SHALL BE WRAPPED WITH MARKING TAPE A MIN OF 4 WRAPS PER 20 FEET OF MAIN. **TRACER WIRE IS NOT REQUIRED ON GRAVITY SEWER MAIN.**
4. PLACE TRACER WIRE ON GRAVITY, PRESSURE, AND VACUUM SEWER SERVICES PER SECTION 00445.11 (e) and 00445.48.
5. TRANSITION FITTING SHALL BE A HARD COUPLER WHERE CHANGING FROM ASTM 3034 OR ASTM F679 PIPE TO C-900 OR C905 PIPE
6. WHEN A SEWER LINE IS LOCATED ABOVE OR WITHIN 18" BELOW A WATERLINE, THE SEWER SHALL BE CONSTRUCTED WITH A MIN OF 20 LF OF AWWA C900 OR C905 PIPE CENTERED OVER THE WATERLINE PER OAR 333-061-0050 (9) AND BE APPROVED BY CITY/STATE.
7. WHEN INSTALLING A WATER LINE THAT CROSSES BELOW OR WITHIN 18 INCHES ABOVE AN EXISTING SEWER LINE, FOLLOW OAR 333-061-0050(9).

DRAWN LJC  
DIV SANITARY  
REV DATE



CITY OF BEND

## CITY OF BEND

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

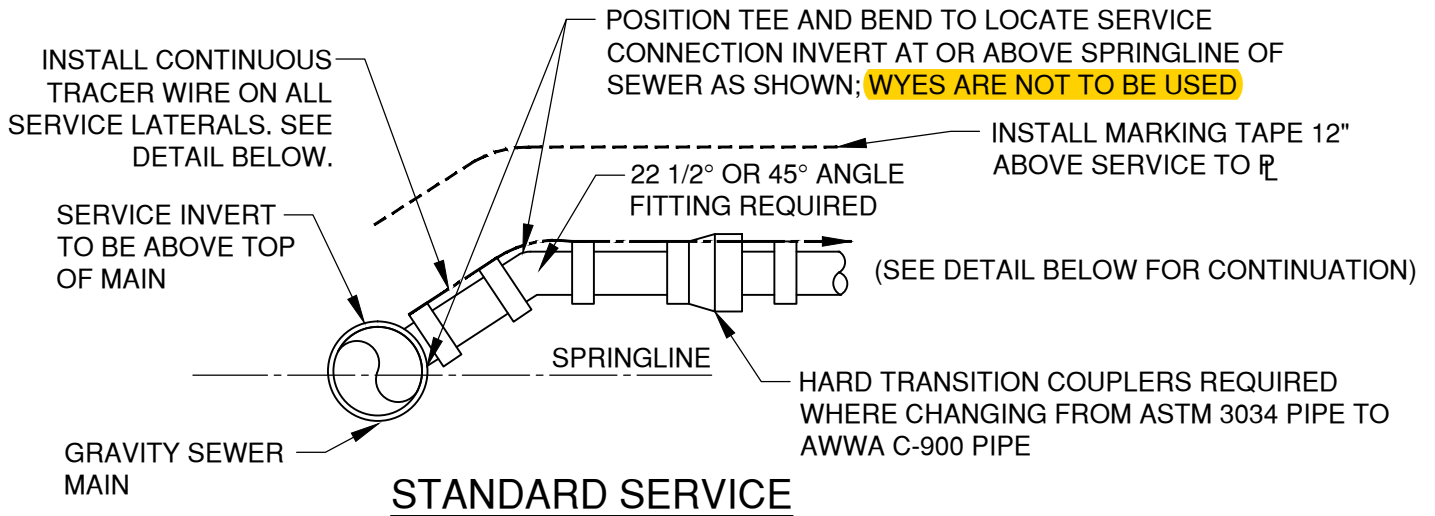
## PROFILE OF TYPICAL SEWER MAIN INSTALLATION

SCALE NTS

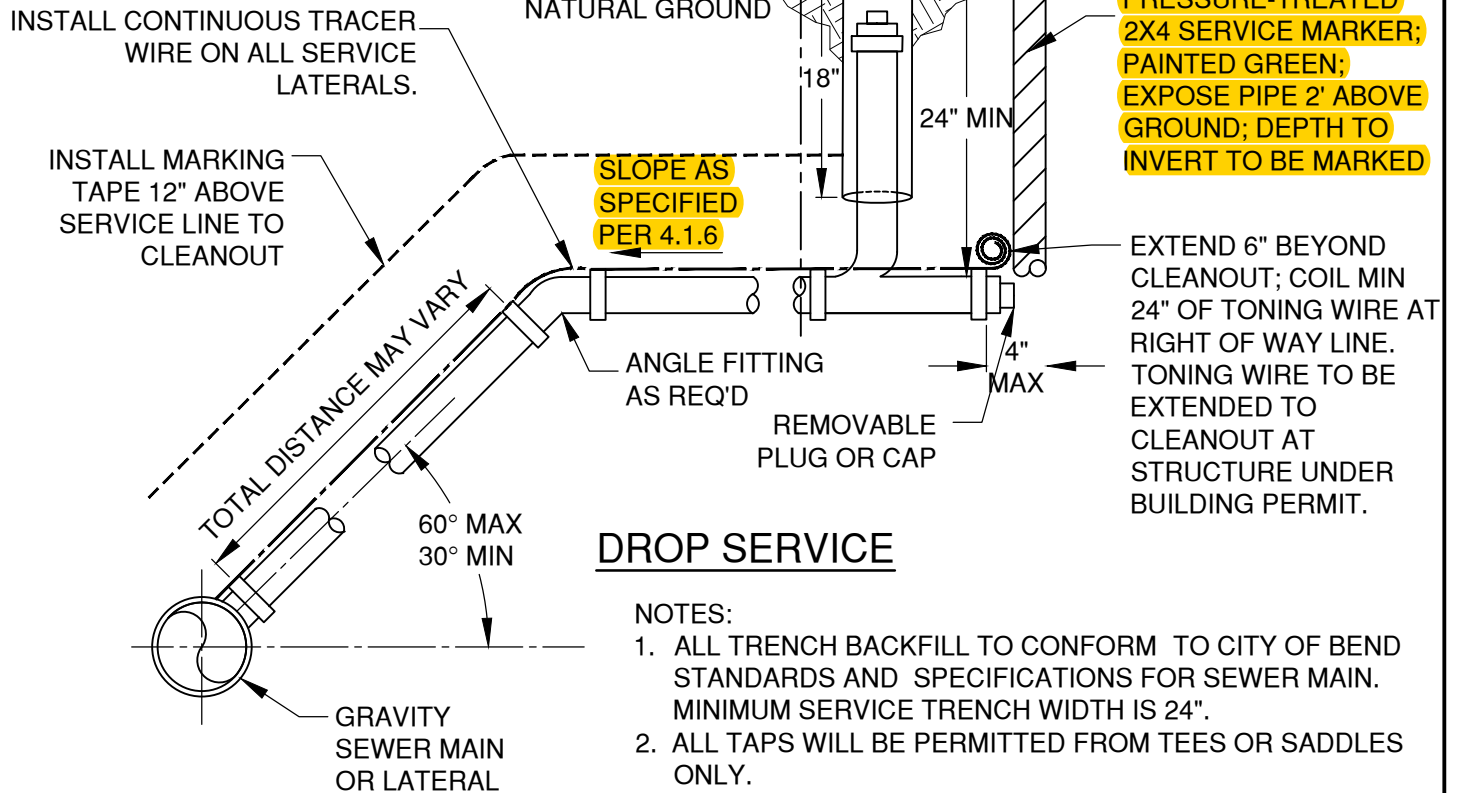
DATE 3/31/19

APPR

STD DWG S-1



**4" CLEANOUT AT PROPERTY LINE; ACCESS TO BE C-900 PVC PIPE, 18" MIN, WITH CAST IRON CAP MARKED "SEWER" FLUSH WITH GROUND SURFACE. USE A BROOKS 1 RT VALVE BOX IN TRAFFIC AREAS**



#### NOTES:

1. ALL TRENCH BACKFILL TO CONFORM TO CITY OF BEND STANDARDS AND SPECIFICATIONS FOR SEWER MAIN. MINIMUM SERVICE TRENCH WIDTH IS 24".
2. ALL TAPS WILL BE PERMITTED FROM TEES OR SADDLES ONLY.
3. WHEN HOT TAPPING AN EXISTING MAIN THE SADDLE AND TEE METHOD SHALL BE USED.
4. TRACER WIRE REQUIRED ON ALL SEWER SERVICES.
5. SEWER CONNECTION FROM THE PROPERTY LINE/ROW LINE TO THE CLEAN OUT NEAR THE BUILDING FOUNDATION REQUIRES A PLUMBING PERMIT.

DRAWN LJC  
DIV SANITARY  
REV DATE



CITY OF BEND

## CITY OF BEND

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

## GRAVITY SEWER SERVICES

SCALE NTS

DATE 3/31/19


APPR

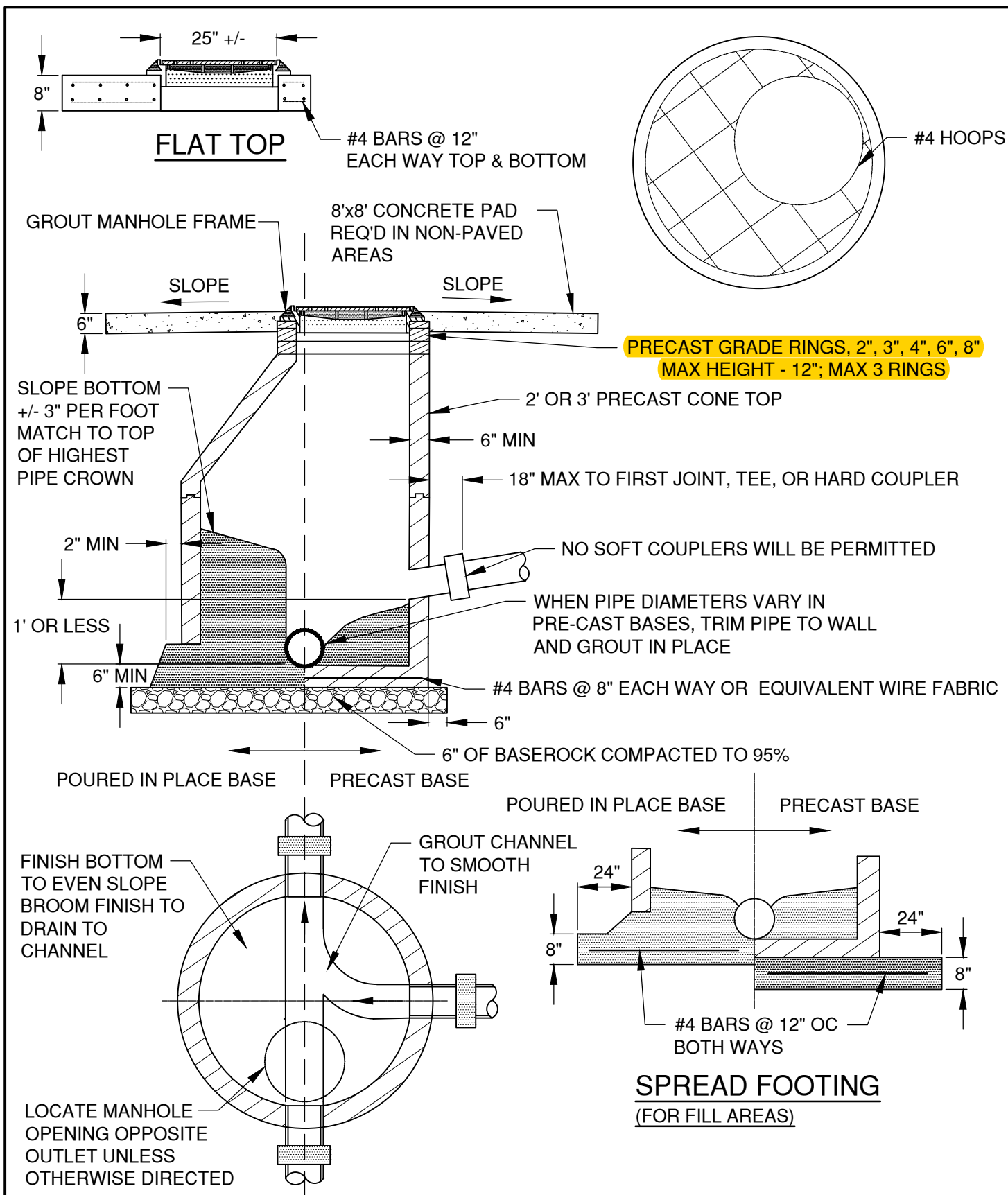
STD DWG S-2




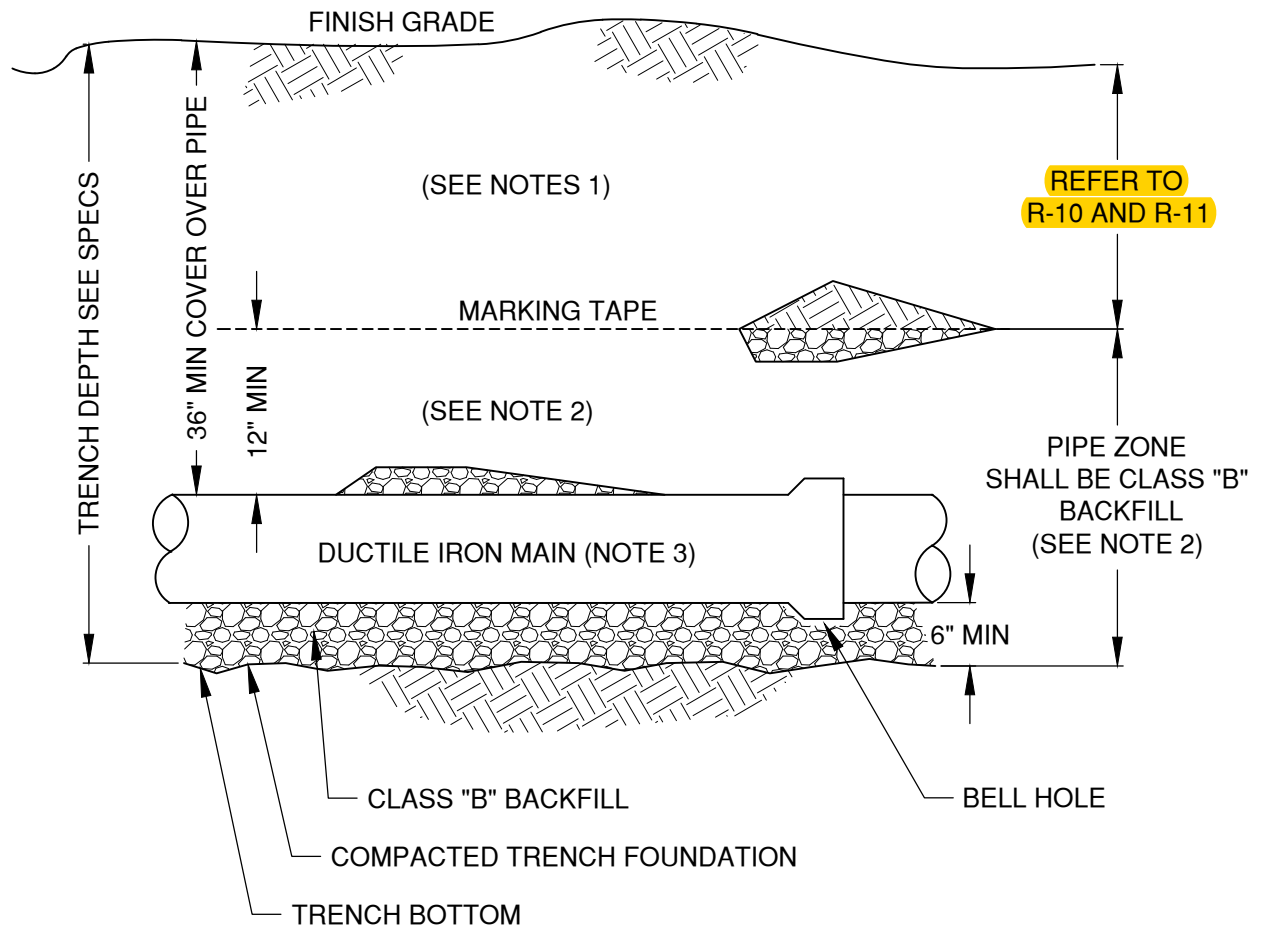


1. CITY SANITARY SEWER MANHOLE COVERS SHALL HAVE THE WORD "SEWER" CAST IN 2" RAISED LETTERS.
2. PRIVATE MANHOLE LIDS SHOULD NOT USE THE CITY OF BEND MANHOLE LID DETAIL.

- |              |      |   |                                     |  |              |
|--------------|------|---|-------------------------------------|--|--------------|
| DRAWN LJC    |      |  | CITY OF BEND                        |  | SCALE NTS    |
| DIV SANITARY |      |   | STANDARD DRAWING                    |  | DATE 3/31/19 |
| REV          | DATE |   | 710 NW WALL ST., BEND, OREGON 97701 |  | APPR         |
|              |      | CITY OF BEND  | STANDARD SEWER MANHOLE RING & COVER |  | STD DWG S-3A |




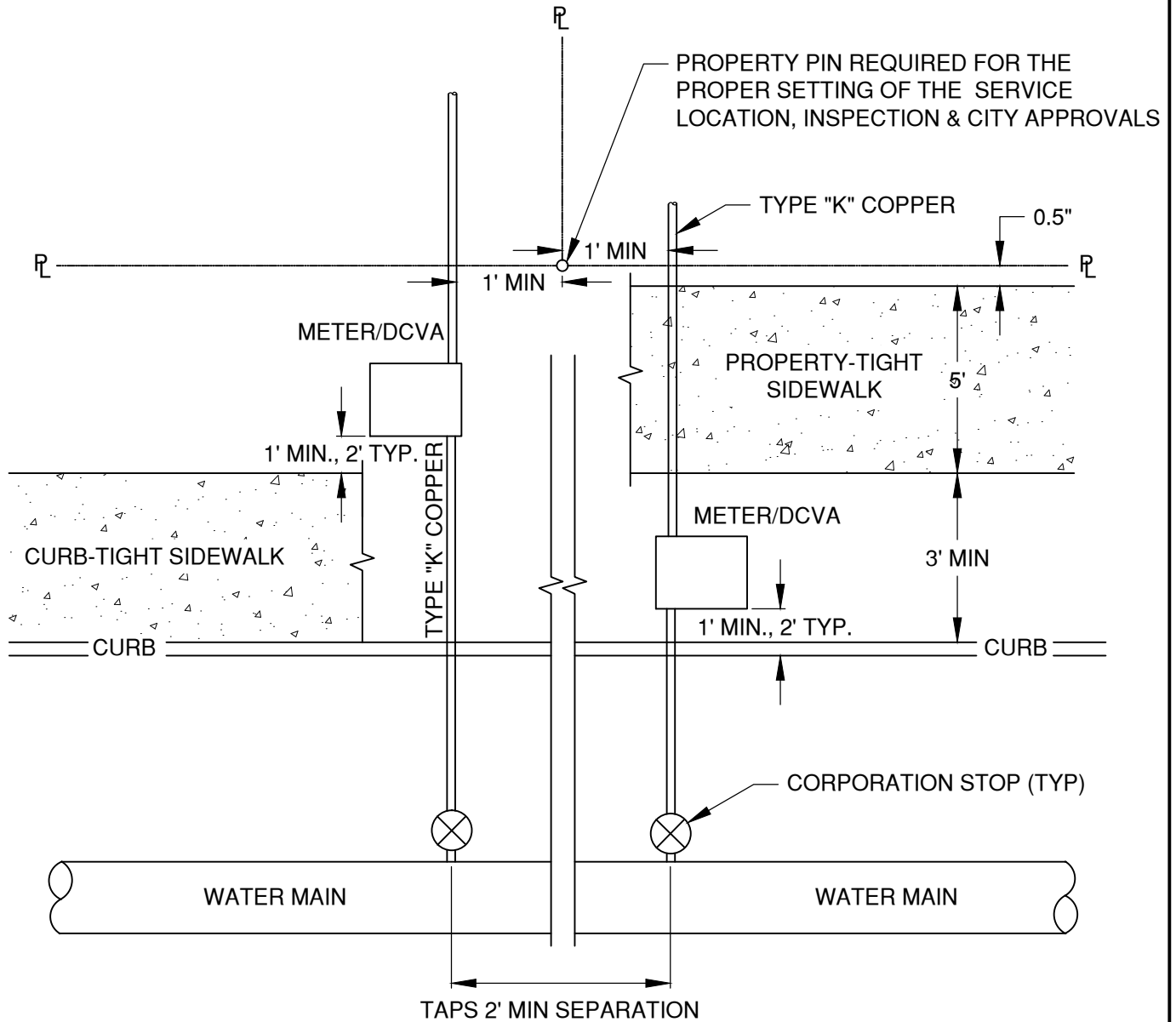
DRAWN LJC	 CITY OF BEND	<b>CITY OF BEND</b> STANDARD DRAWING 710 NW WALL ST., BEND, OREGON 97701	SCALE NTS
DIV SANITARY			DATE 3/31/19
REV DATE			APPR
		<b>STANDARD SEWER MANHOLE</b>	STD DWG S-3B



**NOTES:**

1. SCREENED MAX. 3" MINUS BACKFILL, PER R-10 AND R-11, MECHANICALLY COMPACTED TO 95.0% OF AASHTO T-99-74 SHALL BE CAREFULLY AND THOROUGHLY TAMPED IN LAYERS PER SECTION 00405.00.
2. SPECIFIED PIPE ZONE MATERIAL ABOVE, AROUND, AND BELOW PIPE SHALL BE CAREFULLY AND THOROUGHLY TAMPED IN LAYERS NOT EXCEEDING 6" SO THAT IT IS FULLY COMPACTED TO 95.0% OF AASHTO T-99-74 METHOD C. ALL PIPE ZONE MATERIAL SHALL BE  $\frac{3}{4}$ " MINUS ROCK CONFORMING TO OSS SPECIFICATIONS 00405.00 AND 01140.10.
3. MEGA-LUG AND FIELD LOK GASKETS, **OR APPROVED EQUAL**, ARE APPROVED FOR RESTRAINED JOINTS.
4. SEE DRW NO R-10 FOR TRENCHES IN EXISTING PAVED STREETS AND CONCRETE AREAS
5. WOOD BLOCKING IS NOT PERMITTED IN THE BACKFILLED TRENCH.

DRAWN LJC			CITY OF BEND	CITY OF BEND		SCALE NTS
DIV WATER				STANDARD DRAWING		DATE 3/31/19
REV	DATE			710 NW WALL ST., BEND, OREGON 97701		APPR
				WATER MAIN TYPICAL PROFILE		STD DWG W-1

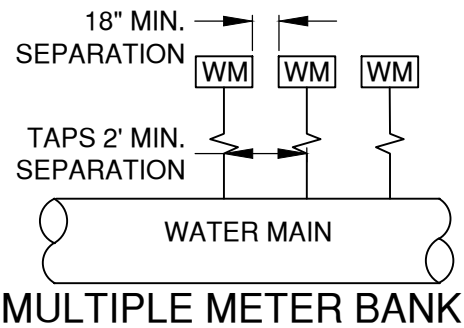


## TWO SERVICES SHARING ONE DITCH AT PROPERTY LINE

### NOTE:

1. WATER METER BOXES SHALL BE LOCATED IN LANDSCAPE AREAS, NOT IN HARDSCAPE (I.E. SIDEWALKS& DRIVEWAYS). EXCEPTIONS REQUIRE APPROVAL OF CITY ENGINEER
2. SET WATER SERVICES A MINIMUM OF 10' FROM ALL SANITARY, FRANCHISE, STORM, AND ELECTRICAL SERVICES.
3. METER SHALL MATCH SERVICE LINE SIZE OR ONE SIZE SMALLER.
4. A 1" TAP NEAR A BELL SECTION SHALL BE SEPARATED FROM THE BELL BY A MINIMUM OF 2'. TAPS LARGER THAN 1" IN SIZE SHALL BE SEPARATED FROM THE BELL BY A MINIMUM OF 3'.
5. WHERE METERS ARE PLACED IN METER BANKS, A PERMANENT ADDRESS TAG PROVIDED BY THE CONTRACTOR SHALL BE PLACED ON THE METER **BOX.**

### METER BOXES



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DIV WATER

REV DATE



CITY OF BEND

CITY OF BEND

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

RESIDENTIAL WATER SERVICE INSTALLATION

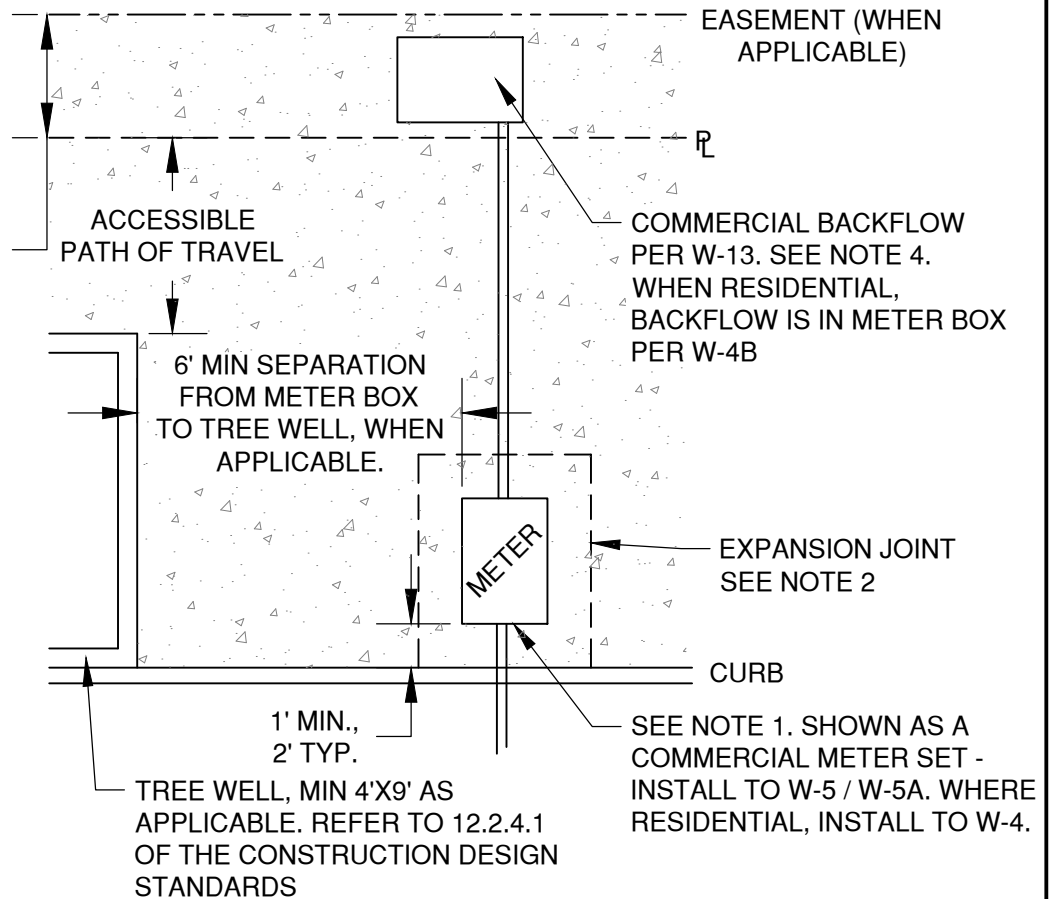
SCALE NTS

DATE 3/31/19

APPR

STD DWG W-4

SIDEWALK INSTALLATION  
WITHIN 5' PUBLIC ACCESS  
EASEMENT AS REQUIRED BY  
BEND CENTRAL DISTRICT.  
MAY NOT BE APPLICABLE FOR  
ALL PROJECTS.



TYPICAL INSTALLATION IN THE BEND  
CENTRAL DISTRICT OR WHERE WIDENED  
SIDEWALKS ARE REQUIRED BY  
DEVELOPMENT CODE. METERS TO BE  
PERMITTED WITHIN HARDSCAPE ONLY  
WHEN APPROVED BY THE CITY ENGINEER.

**NOTE:**

1. WATER METER BOXES SHALL BE LOCATED IN LANDSCAPE AREAS WHEN POSSIBLE. IF WATER METER BOX CAN BE LOCATED ON PRIVATE PROPERTY TO REMOVE IT FROM SIDEWALK, A UTILITY EASEMENT SHALL BE GRANTED TO THE CITY TO MAINTAIN THE METER.
2. AN EXPANSION JOINT IN THE SIDEWALK SHALL BE INSTALLED 12-INCH AROUND THE ENTIRE PERIMETER OF THE METER BOX.
3. STATE SPEC BASE ROCK SHALL BE COMPACTED TO 95% IMMEDIATELY BELOW AND FOR A MINIMUM OF 3 FEET AROUND THE METER BOX.
4. BACKFLOWS SHALL BE INSTALLED ON PRIVATE PROPERTY. WHERE BACKFLOW DEVICES CANNOT BE PLACED WITHIN LANDSCAPE, THE BOX SHALL BE INSTALLED OUTSIDE THE RIGHT OF WAY AND OUTSIDE A PUBLIC UTILITY EASEMENT. INSTALLATION OF BACKFLOW DEVICES WITHIN A BUILDING WILL BE GRANTED ON A CASE BY CASE BASIS BY THE CITY ENGINEER ONLY WHERE IT CAN BE ADEQUATELY SHOWN NOT TO FIT OUTSIDE THE BUILDING (EXAMPLE, THE BACKFLOW, AND THEREFORE THE VAULT, IS TOO LARGE TO FIT)
5. SET WATER SERVICES A MINIMUM OF 10' FROM ALL SANITARY, FRANCHISE, STORM, AND ELECTRICAL SERVICES. ALL TREE WELLS SHALL BE A MINIMUM 6 FEET FROM THE METER BOX INSTALLATION.
6. WATER METERS SHALL NOT BE PLACED WITHIN VEHICULAR SURFACES (DRIVEWAYS) WITHOUT CITY ENGINEER APPROVAL.

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DIV	WATER
REV	DATE



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**CITY OF BEND**

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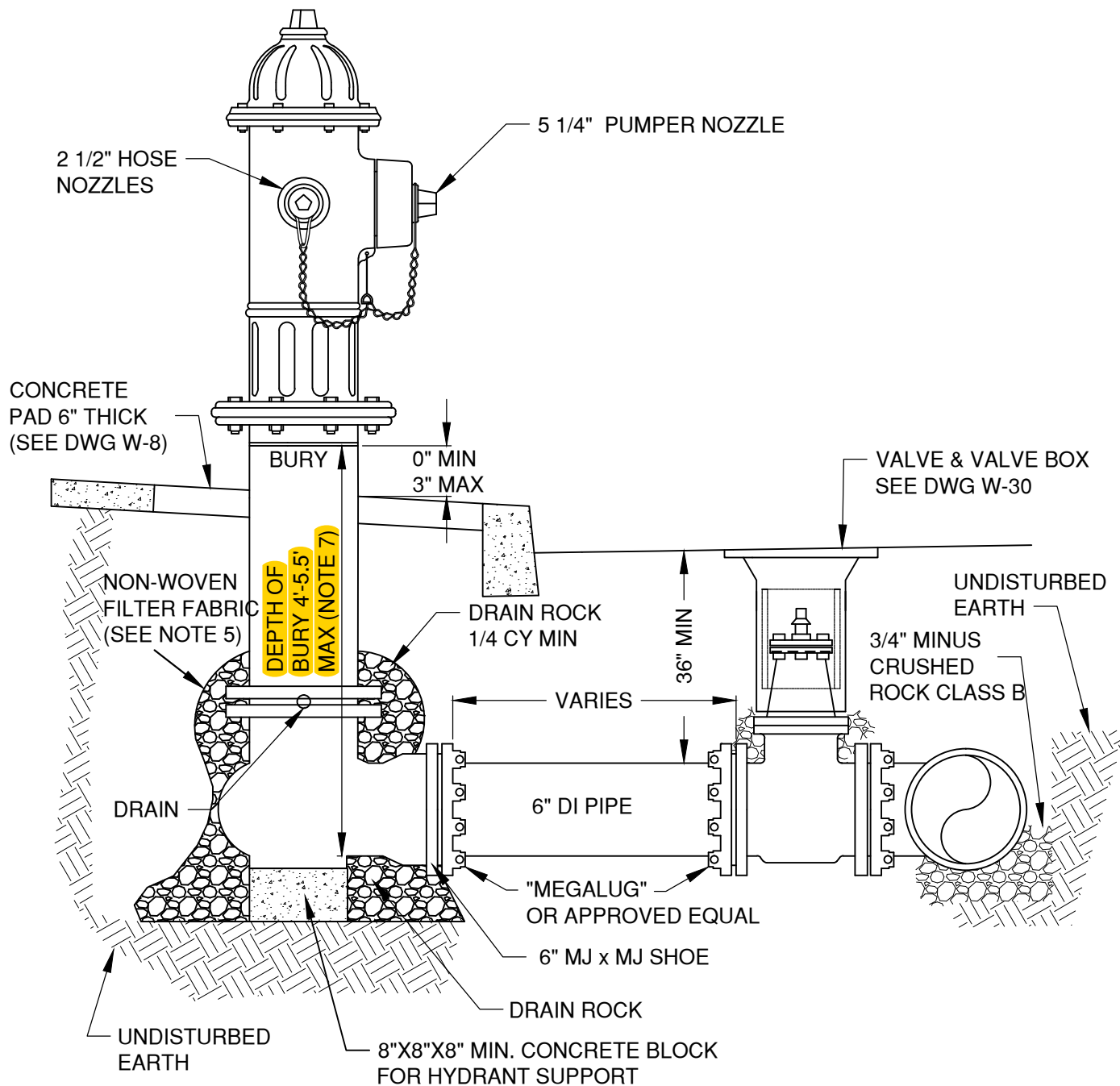
**METER INSTALLATION IN SIDEWALKS**

SCALE NTS

DATE 3/31/19

APPR

STD DWG W-5D



NOTES:

1. ALL PIPES SHALL HAVE RESTRAINED JOINTS.
2. MJ x MJ TEE OR MJxMJxSWIVEL (OPTIONAL) WITH 6-INCH VALVE AT THE MAINLINE.
3. FINISH GRADE OF HYDRANT SHALL BE SET AT BURY LINE TO A MAXIMUM OF 3" BELOW BURY LINE. NO HYDRANT EXTENSIONS PERMITTED ON NEW INSTALLATIONS.
4. SET HYDRANT PLUMB. COMPACT ALL BACKFILL PER SPECIFICATIONS.
5. NON-WOVEN SEPARATION FILTER FABRIC (OSS TABLE 02320-4) INSTALLED BETWEEN UNDISTURBED EARTH AND DRAINROCK PRIOR TO BACKFILL.
6. HYDRANTS SHALL BE MANUFACTURER'S RED. NO OTHER COLOR IS PERMITTED.
7. BURY DEPTH IS MAX 5.5' FEET. USE 45 DEGREE OR 22.5 DEGREE BENDS TO ADJUST ACCORDINGLY.

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DIV	WATER
REV	DATE



CITY OF BEND

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710 NW WALL ST., BEND, OREGON 97701

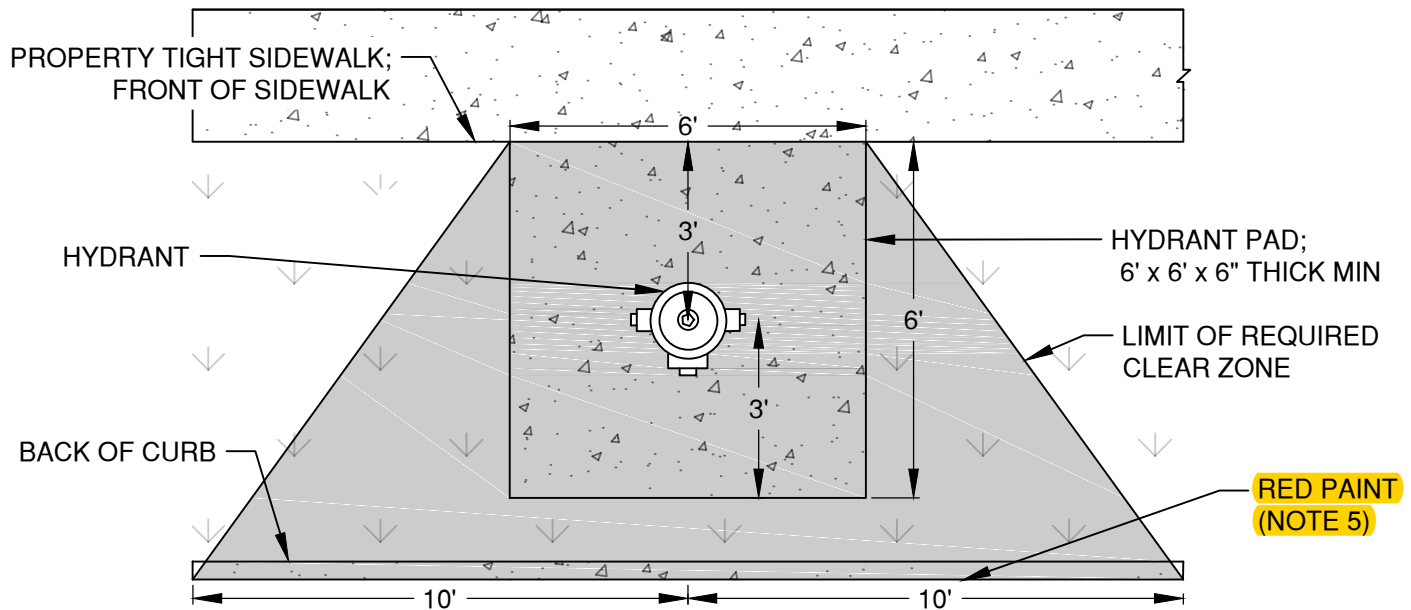
TYPICAL HYDRANT

SCALE NTS

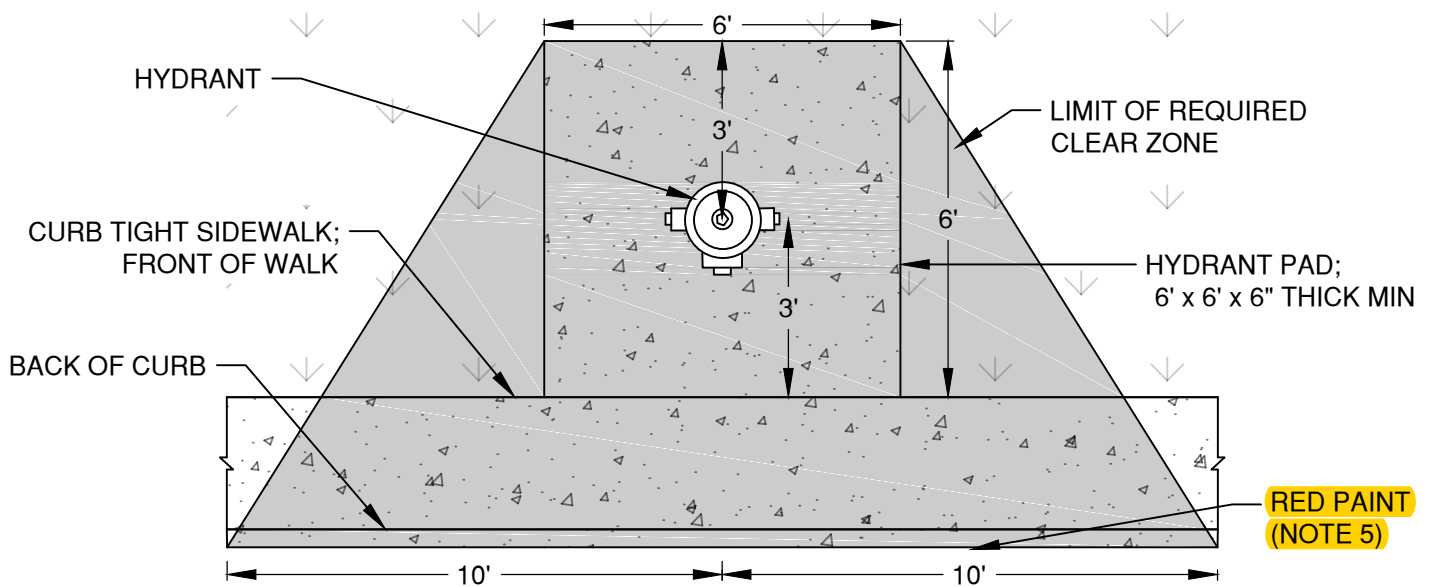
DATE 3/31/19

APPR

STD DWG W-7



PROPERTY TIGHT SIDEWALK HYDRANT LOCATION AND CLEAR ZONE  
PLAN VIEW



CURB TIGHT SIDEWALK HYDRANT LOCATION AND CLEAR ZONE  
PLAN VIEW

NOTES:

1. THE CLEAR ZONE PROHIBITS PARKING, FENCES, TREES, RETAINING WALLS, OR OTHER STRUCTURES THAT COULD INTERFERE WITH OPERATION OF HYDRANT. GRASS, MULCH, BARKDUST, AND GROUND COVER IS PERMITTED.
2. PROPERTY OWNERS SHOULD BE AWARE THAT GROUND COVER COULD BE DAMAGED WHEN THE HYDRANT IS USED OR WHEN HYDRANT MAINTENANCE IS PERFORMED.
3. CONCRETE PADS ARE TO BE A MINIMUM OF 6" THICK AND BE POURED AND PLACED ON 2" MIN. COMPACTED BASE ROCK PER SECTION OSS 00400.00
4. THERE SHALL BE A MINIMUM 4 FOOT CLEAR TRAVEL WIDTH ON SIDEWALKS ADJACENT TO HYDRANTS.
5. THE CURB SHALL BE PAINTED RED FOR A TOTAL OF 20 FEET, CENTERED ON THE HYDRANT.

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DIV WATER  
REV DATE



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HYDRANT LOCATION AND CLEAR ZONE

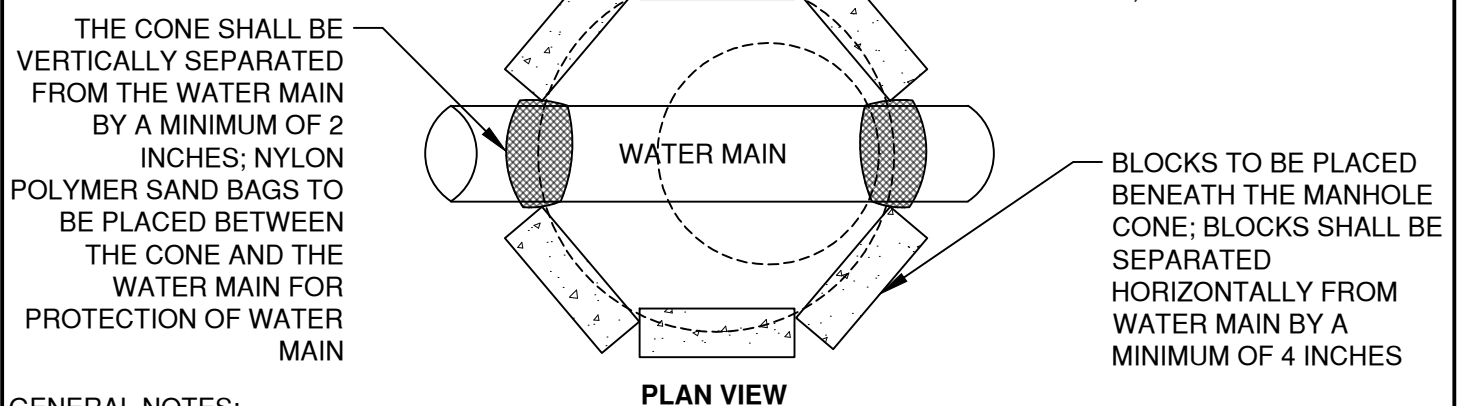
SCALE NTS

DATE 3/31/19

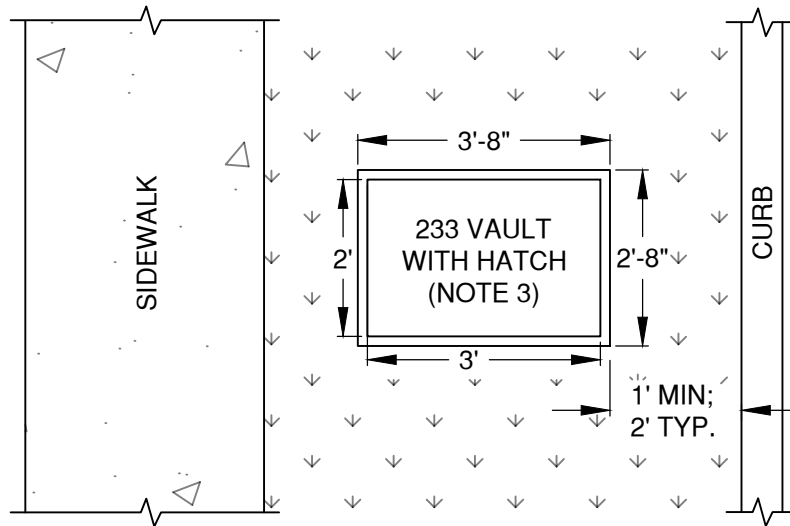
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STD DWG W-8

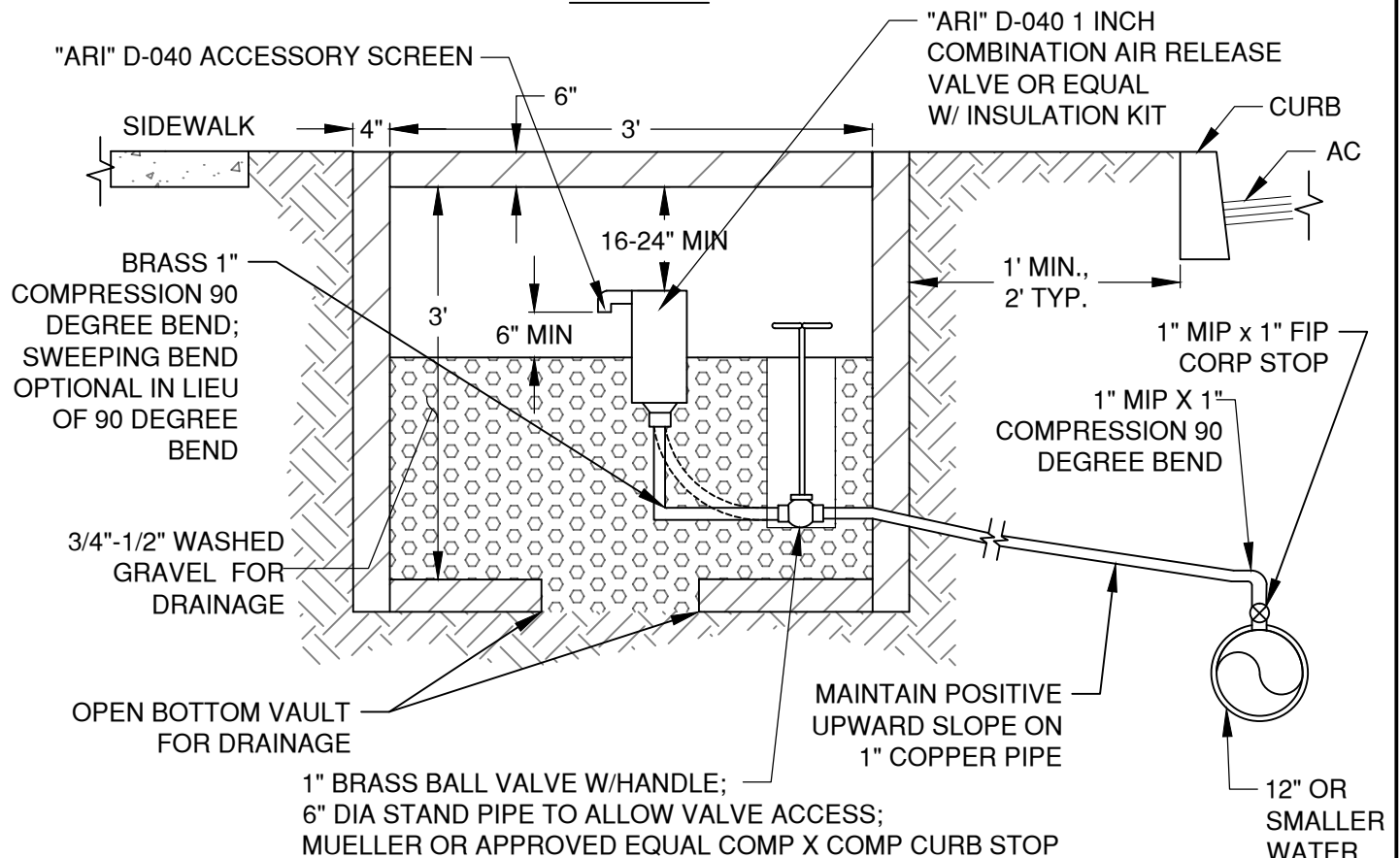




DRAWN LJC			<p align="center"><b>CITY OF BEND</b></p> <p align="center">STANDARD DRAWING</p> <p align="center">710 NW WALL ST., BEND, OREGON 97701</p>	SCALE NTS
DIV WATER				DATE 3/31/19
REV	DATE			APPR
		CITY OF BEND	1" & 2" STANDARD AIR RELEASE VALVE - TRAFFIC AREA	STD DWG W-10



**AIR RELEASE VALVE LOCATION  
PLAN VIEW**



**GENERAL NOTES:**

1. AIR RELEASE OR COMBINATION VALVES SHALL BE INSTALL AT ALL HIGH POINTS. WHERE THE HIGH POINT IS AT THE TOP OF A LONG ASCENT (1,250 FEET+) A COMBINATION AIR/VACUUM VALVE SHALL BE INSTALLED.
2. IF 1" AIR RELEASE VALVE IS INSTALLED IN TRAFFIC AREA, INSTALL PER DRG W-10.
3. VAULT SHALL BE ADVANCED PRECAST PRODUCT 233 VAULT WITH 2'X3' HATCH AND OPEN BOTTOM, OR APPROVED EQUAL.

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710 NW WALL ST., BEND, OREGON 97701

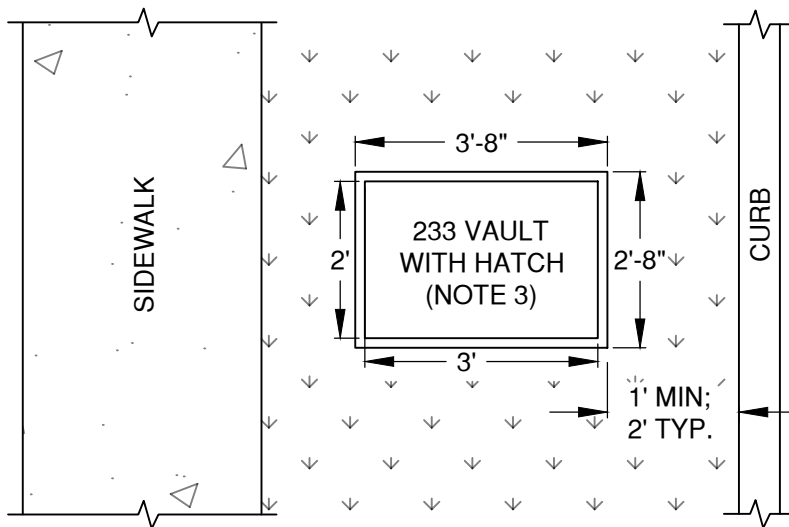
**1" STANDARD AIR RELEASE VALVE**

SCALE NTS

DATE 3/31/19

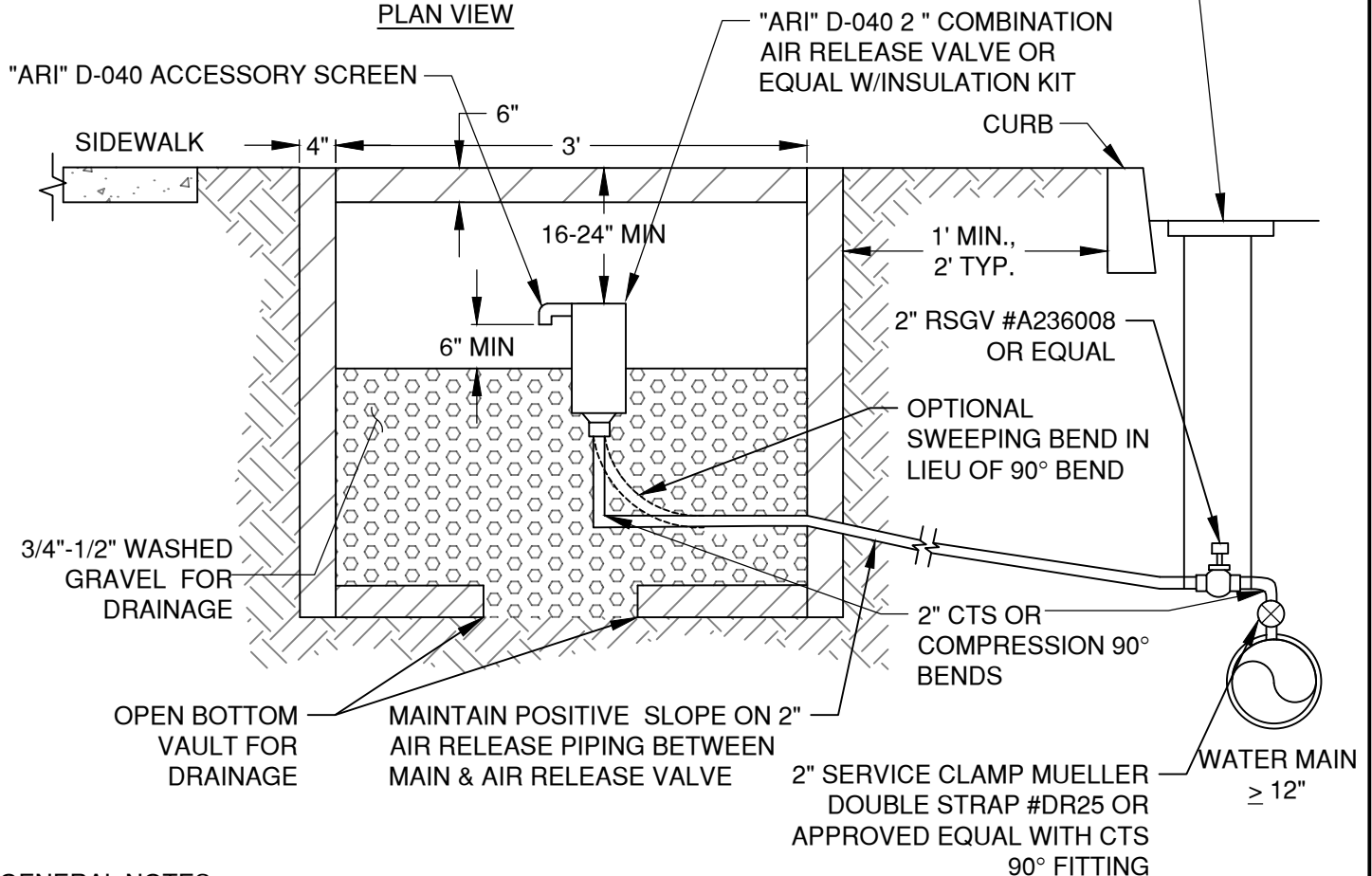
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STD DWG W-10A



**AIR RELEASE VALVE LOCATION  
PLAN VIEW**

STANDARD VALVE BOX  
PER DWG W-30



**GENERAL NOTES:**

1. AIR RELEASE OR COMBINATION VALVES SHALL BE INSTALL AT ALL HIGH POINTS. WHERE THE HIGH POINT IS AT THE TOP OF A LONG ASCENT (1,250 FEET+) A COMBINATION AIR/VACUUM VALVE SHALL BE INSTALLED.
2. USE DRG W-10B FOR 2" AIR RELEASE VALVES LOCATED IN TRAFFIC AREAS.
3. VAULT SHALL BE ADVANCED PRECAST PRODUCT 233 VAULT WITH 2'X3' HATCH AND OPEN BOTTOM, OR APPROVED EQUAL.

DRAWN	LJC
DIV	WATER
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	4/8/18



CITY OF BEND

**CITY OF BEND**

STANDARD DRAWING

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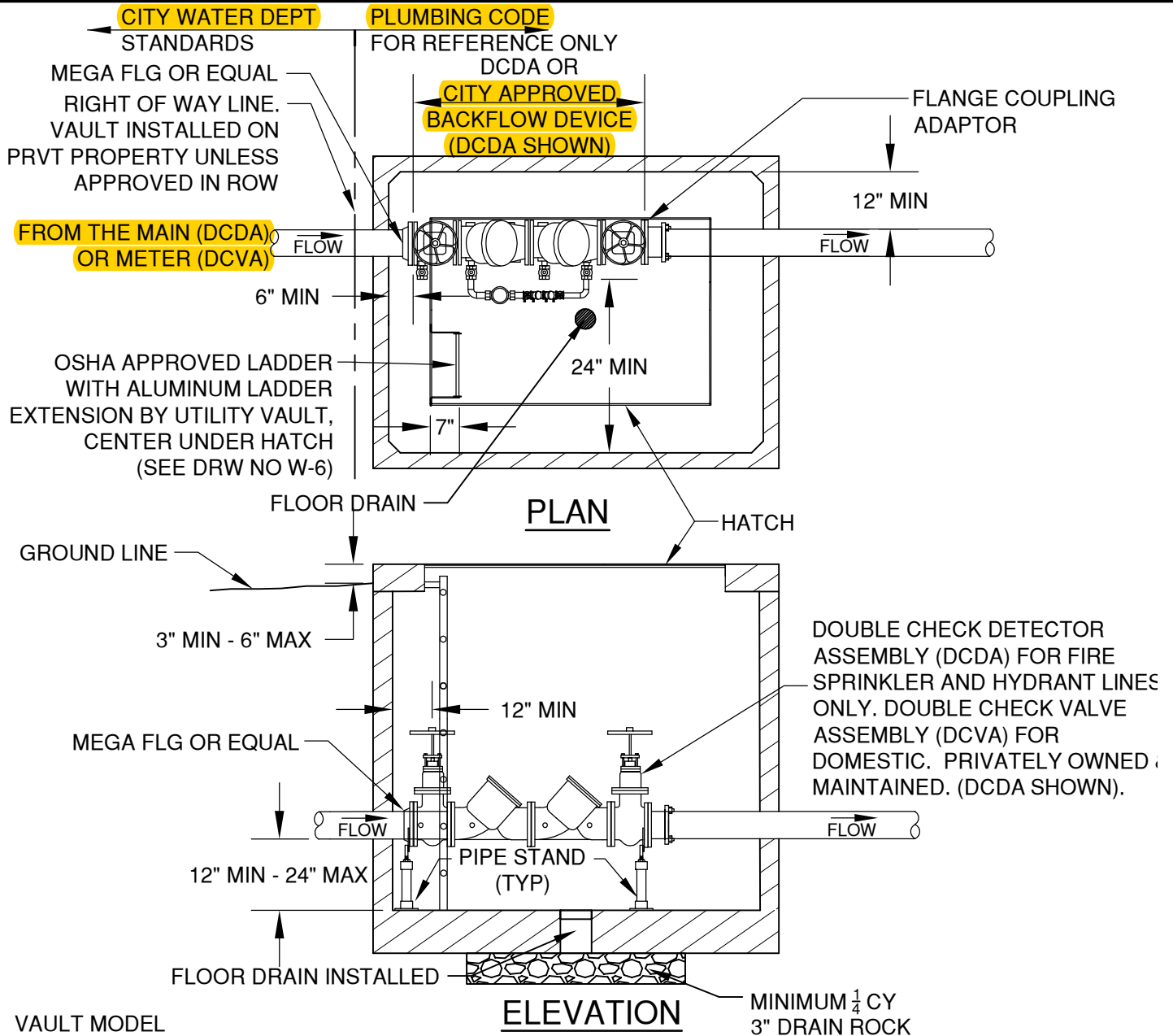
**2" STANDARD AIR RELEASE VALVE**

SCALE NTS

DATE 3/31/19

APPR

STD DWG W-10B



#### VAULT MODEL

PIPE SIZE	UTILITY VAULT OR EQUAL		BILCO DOOR OR EQUAL
	W/ FDC*	W/O FDC	
3		660-WA	J-5AL
4	676-WA	577-WA	J-5AL
6	687-WA	676-WA	J-5AL
8	5106-LA	687-WA	JD-3AL
10	5106-LA	5106-LA	JD-3AL

\* FOR FIRE SPRINKLER VAULTS, REFER TO W-13B. FIRE SPRINKLER VAULTS INSTALLED IN RIGHT OF WAY OR UTILITY EASEMENT ONLY WHEN APPROVED BY CITY ENGINEER

#### NOTES:

- ENGINEER TO PROVIDE RESTRAIN DETAIL FOR ALL PIPE ENTERING & EXITING VAULT
- CONTRACTOR TO SEAL ALL OPENINGS IN VAULT WITH NON-SHRINK GROUT PRIOR TO BACKFILLING
- CONDUIT BROUGHT TO VAULT FOR PUMP POWER AND DETECTOR WIRING.
- ENGINEER OF RECORD DESIGN TO BE PROVIDED WITH PERMIT.
- VAULT AND LID TO BE TRAFFIC RATED
- ALL FIRE LINES SHALL HAVE THE VAULT & DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) INSTALLED CONCURRENTLY FOR TESTING & DISINFECTION TO THE CITY MAIN.

DRAWN CJH

DIV WATER

REV DATE



CITY OF BEND

## CITY OF BEND

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

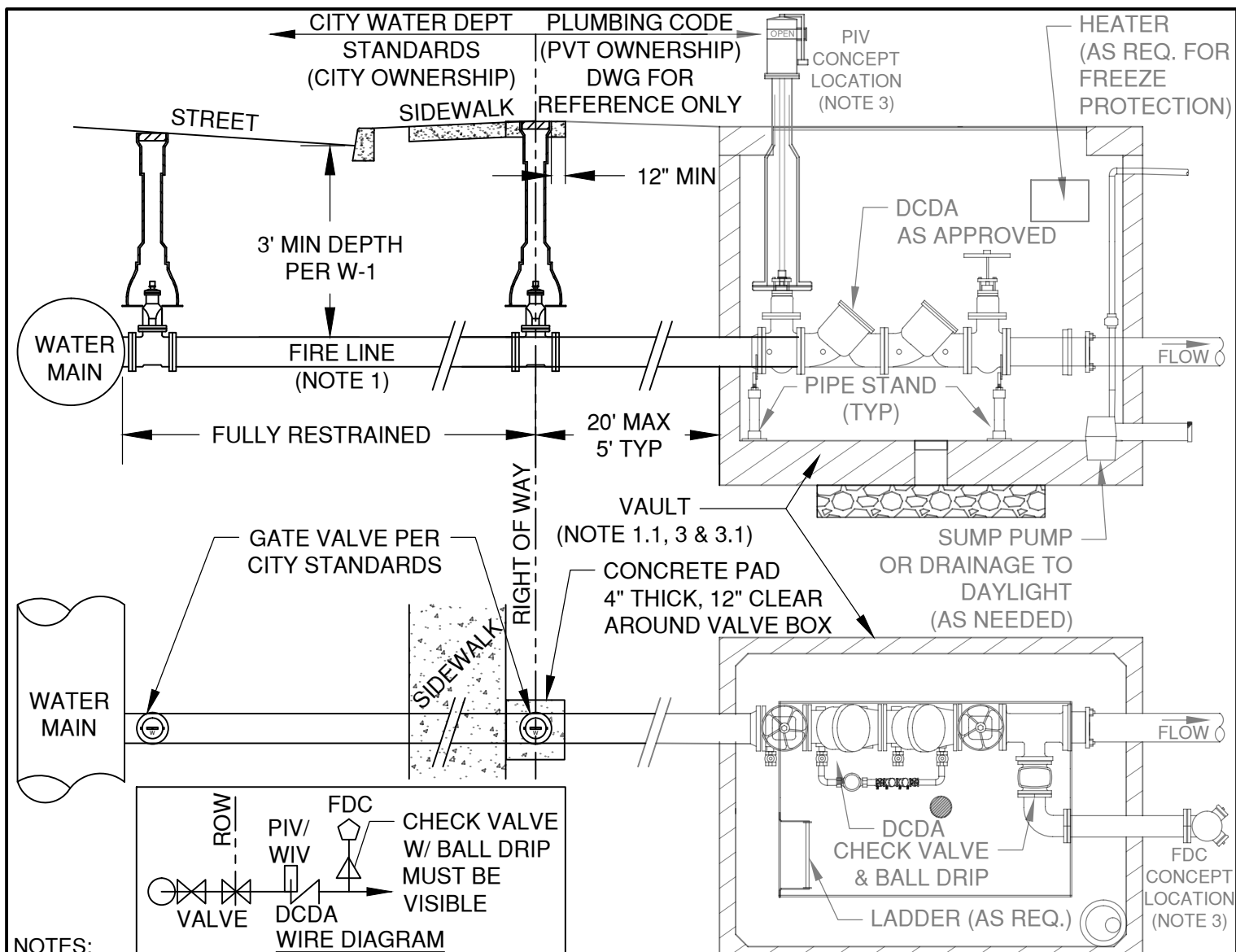
### 2" & LARGER DOUBLE CHECK VALVE ASSEMBLY

SCALE NTS

DATE 3/31/19

APPR

STD DWG W-13A



#### NOTES:

1. FIRE VAULT AND DCDA IS SHOWN FOR REFERENCE ONLY. VAULT AND PLUMBING BEYOND THE GATE VALVE SHALL BE INSTALLED PER PLUMBING CODE AND INSPECTED BY THE BUILDING DEPARTMENT.
  - 1.1. WHERE FIRE VAULT IS APPROVED BY CITY ENGINEER TO BE WITHIN THE RIGHT OF WAY OR PUBLIC EASEMENT, VAULT SIZES ON W-13A SHALL APPLY AND "FOR REFERENCE NOTES" ON THIS SHEET WOULD APPLY.
2. FIRE LINE TO BE 4" MIN DUCTILE IRON WATER MAIN PER CITY OF BEND SPECIFICATIONS. FIRE LINE TO BE SIZED BY ENGINEER UNDER A RIGHT OF WAY PERMIT.
3. VAULT TO BE SIZED BY ENGINEER IN CONFORMANCE TO BUILDING/FIRE/PLUMBING CODE, MEETING THE DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) MANUFACTURER'S INSTALLATION SPECIFICATIONS.
  - 3.1. WHERE BUILDING IS WITHIN 20 FEET OF THE RIGHT OF WAY LINE, AND AS APPROVED BY THE BUILDING OFFICIAL, THE DCDA CAN BE WITHIN THE BUILDINGS MECHANICAL ROOM. ACCESS TO THE MECHANICAL ROOM TO BE PROVIDED BY AN EXTERIOR DOOR WITH KNOX BOX.
  - 3.2. VAULTS ARE TO BE PLACED OUT OF HARD SURFACES (SIDEWALKS, DRIVEWAYS/ROADWAYS, ECT.)
4. POST INDICATOR VALVE (PIV) AND FIRE DEPARTMENT CONNECTION (FDC) TO BE LOCATED IN CLEAR VIEW OF THE FRONTAGE STREET, WITH THE FDC LOCATED WITHIN AN ALLOWABLE DISTANCE FROM A HYDRANT. PIV AND FDC MAY BE MOUNTED ON THE BUILDING IN CONFORMANCE WITH THE FIRE CODE AND AS APPROVED. PIV AND FDC CAN BE MOUNTED OUTSIDE THE VAULT OR THROUGH THE VAULT LID PROVIDED THEY DON'T INTERFERE WITH VAULT ACCESS AND THE PENETRATIONS ARE GROUTED AND DON'T NEGATE THE STRUCTURAL INTEGRITY OF THE VAULT. **PIV NOT TO BE USED IN-LIEU OF ISOLATION GATE VALVE AT PROPERTY LINE.**
5. ALL ELECTRICAL TO VAULT AND PIV TO BE INSTALLED PER BUILDING AND FIRE CODE AS REQUIRED.

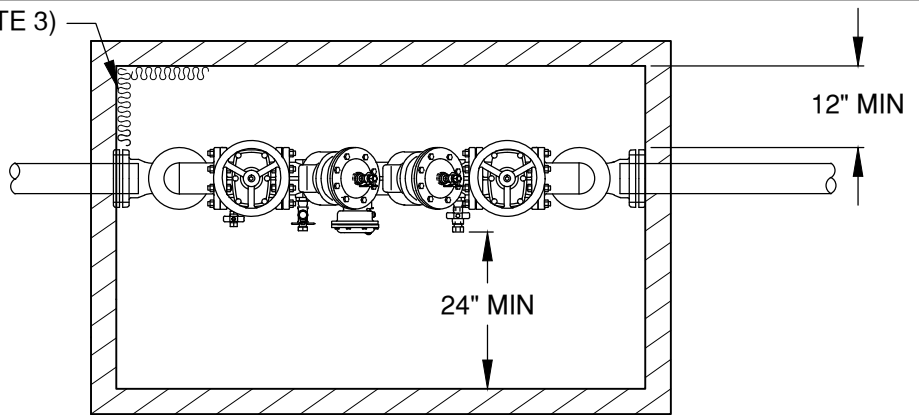
DRAWN CJH DIV WATER REV DATE	 CITY OF BEND	CITY OF BEND STANDARD DRAWING 710 NW WALL ST., BEND, OREGON 97701 <b>FIRE SPRINKLER LINE</b>	SCALE NTS DATE 3/31/19 APPR STD DWG W-13B
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# DRAWING IS FOR REFERENCE ONLY

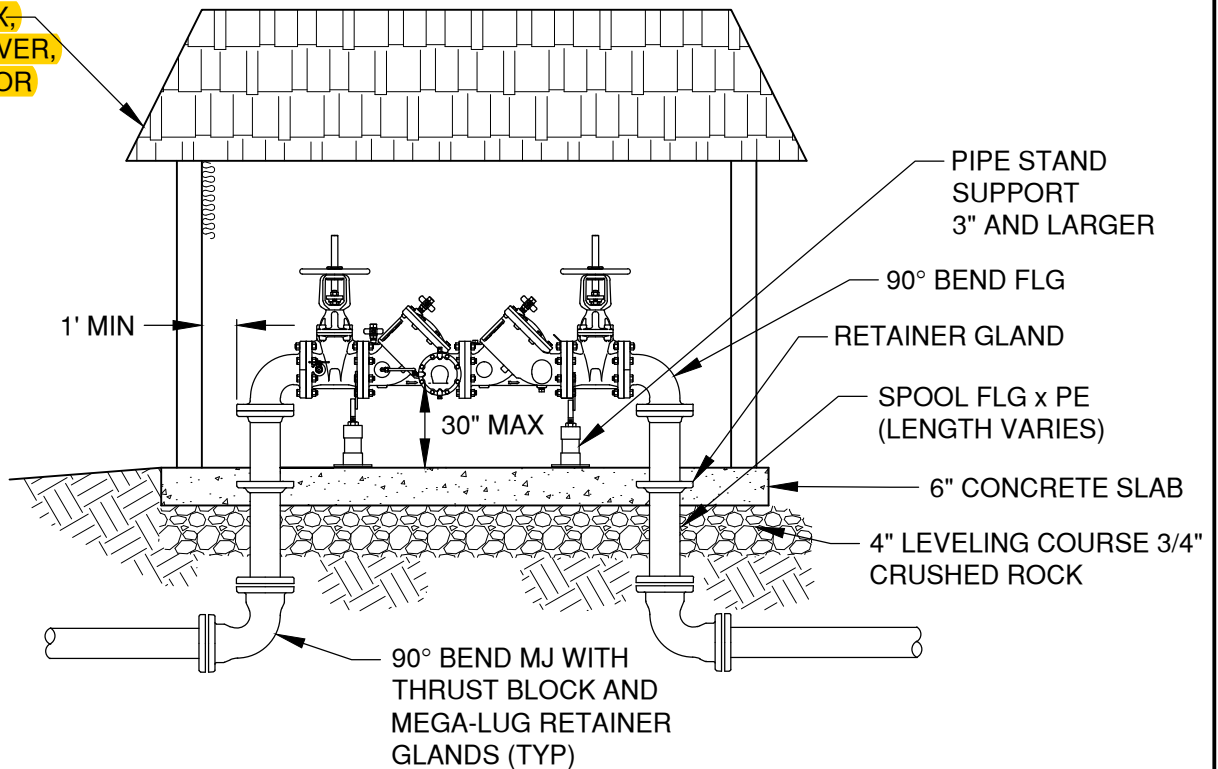
WHERE THE STRUCTURE IS PROPOSED  
OUTSIDE THE RIGHT OF WAY OR  
UTILITY EASEMENT

(SEE NOTE 3)



**PLAN**

1060 ASSE  
CLASS 1;  
WATTS BOX,  
SAFE-T-COVER,  
HOT BOX, OR  
EQUAL



**PROFILE**

## NOTES:

1. THIS DRAWING IS FOR REFERENCE ONLY. INSTALL PER PLUMBING CODE AND BUILDING DEPARTMENT REQUIREMENTS **OR AS BY MANUFACTURER'S REQUIREMENTS.**
2. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED HORIZONTALLY UNLESS APPROVED FOR OTHER ORIENTATION
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VAULT INSTALLATIONS
4. STRUCTURE TO BE INSULATED AND HAVE A HEAT SOURCE TO KEEP ENCLOSURE AT 40°F (NFPA 13-4-5.4.1.1)
5. ENCLOSURE SHALL INCLUDE A BORE SIGHTED DRAIN TO DAYLIGHT CAPABLE OF DRAINING A FULL RELIEF VALVE DISCHARGE. MAKE/MODEL/SIZE WILL DICTATE THE SIZE OF THE ENCLOSURE.
6. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL BE FLANGED
7. HIGH OR LOW HAZARD CONNECTIONS SHALL BE IDENTIFIED AND VERIFIED WITH CITY CROSS CONNECTION SPECIALIST

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REV DATE



CITY OF BEND

**CITY OF BEND**

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

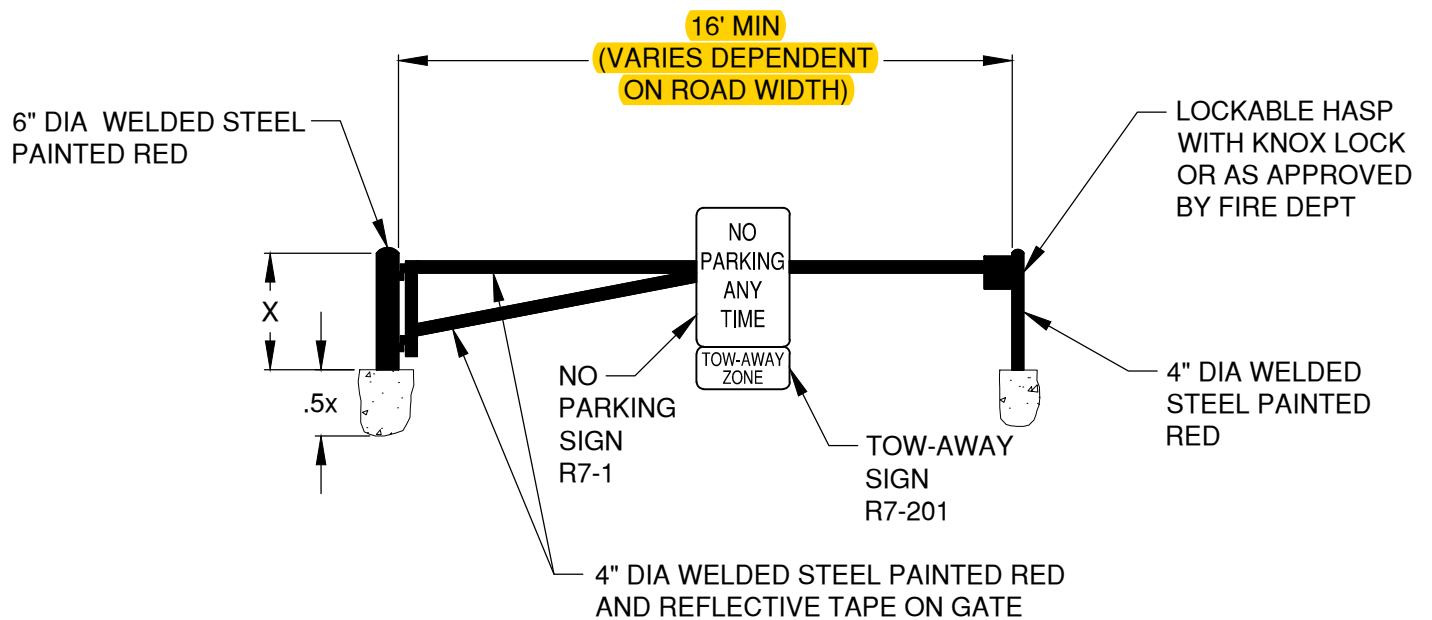
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DATE 3/31/19

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STD DWG W-15B

**2 1/2" + REDUCED PRESSURE BACKFLOW ASSEMBLY**



## FIRE ACCESS GATE

DRAWN LJC  
DIV ROADWAY  
REV DATE



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STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

FIRE GATE

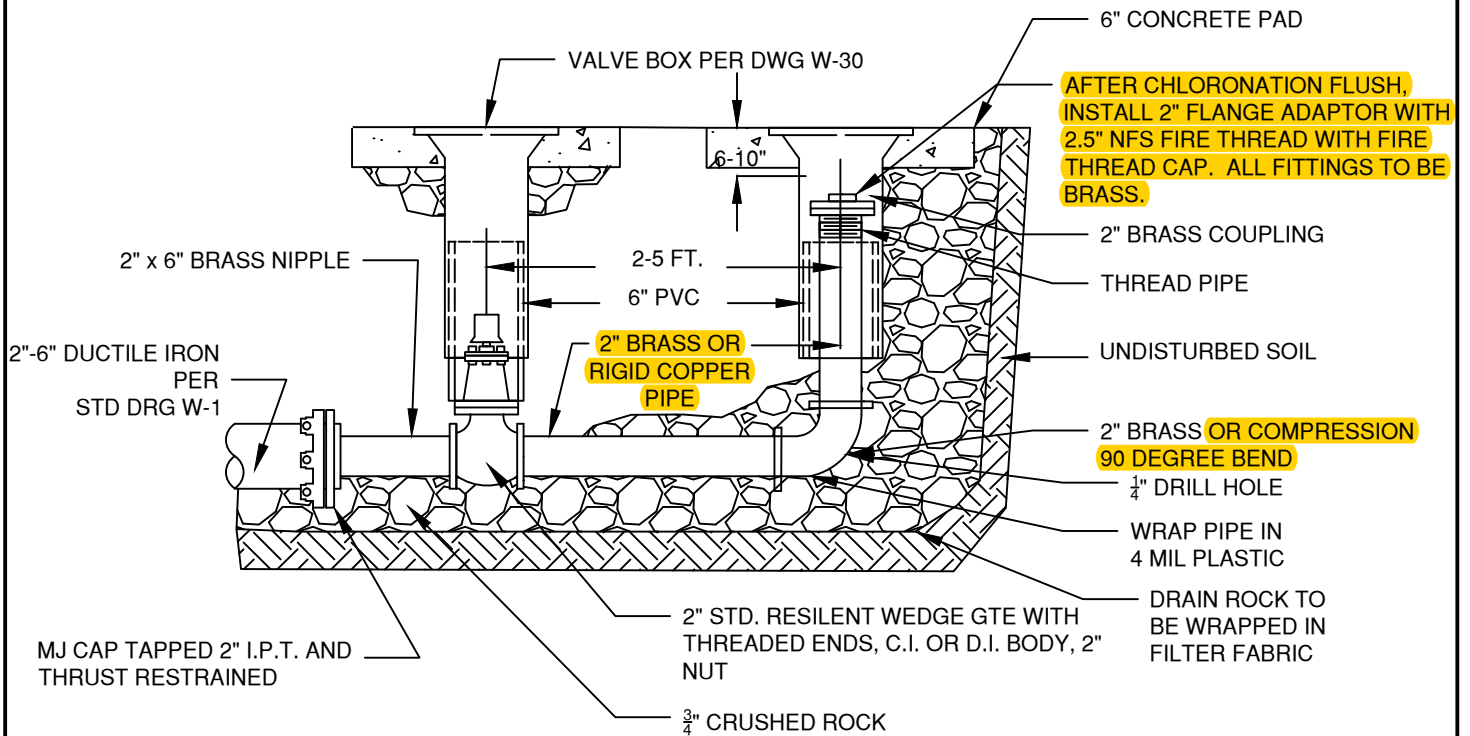
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DATE 3/31/19

APPR


STD DWG W-21

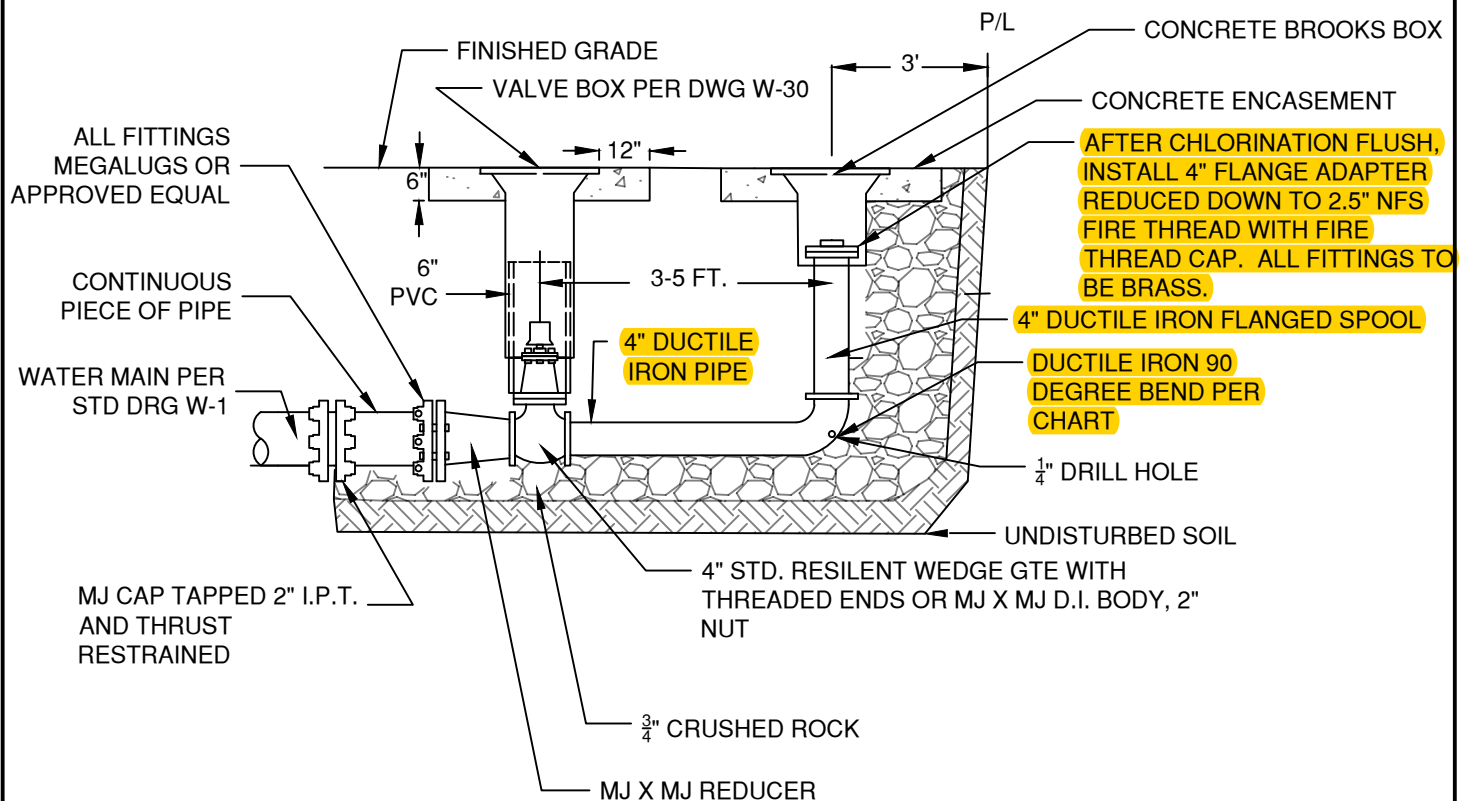




#### NOTES:

1. USE CITY STANDARD VALVE BOXES, LIDS, AND 6" PVC EXTENSION.
2. BLOW-OFF UNIT SHALL BE BACKFILLED WITH 3/4" MINUS CRUSHED ROCK AND COMPACTED TO 95% OF MAX. DENSITY AS DETERMINED BY AASHTO T-180.
3. ON TEMPORARY BLOW-OFFS ONLY, AN MJ CAP TAPPED 4" OR 6" MAY BE SUBSTITUTED FOR REDUCER.
4. TEMPORARY BLOW-OFF IS ONE REMOVED AT THE END OF WATER LINE TESTING AND INSTALLATION AND PRIOR TO PROJECT PAVING. A PERMANENT BLOW-OFF REMAINS ON THE PROJECT AFTER ACCEPTANCE.
5. PLACE BLOW-OFF STANDPIPE 3' INSIDE ROW LINE AT THE END OF STREET (2' FROM BARRICADE).
6. USE CITY STANDARD VALVE BOX, LID, AND 6" PVC EXTENSION FOR BLOW-OFF VALVE.
7. BLOW OFF RISER TO BE ONE CONTINUOUS PIECE.
8. USE EBAA IRON "MEGALUG" OR APPROVED EQUAL RETAINER GLAND ON MJ CAP. RESTRAIN PER ENGINEER.
9. 2" PVC PLUG WITH SQUARE NUT TO BE HAND TIGHTENED ONLY.

DRAWN LJC			CITY OF BEND	CITY OF BEND		SCALE NTS
DIV WATER				STANDARD DRAWING		DATE 3/31/19
REV	DATE			710 NW WALL ST., BEND, OREGON 97701		APPR
				STANDARD 2" BLOW-OFF ASSEMBLY		STD DWG W-23



BLOW OFF SIZES REQUIRED	
MAIN SIZE	BLOW OFF SIZE
6" AND BELOW	2" (SEE DWG W-23)
8" - 12"	4"
ABOVE 12"	HYDRANT

#### NOTES:

1. USE CITY STANDARD VALVE BOXES, AND LIDS.
2. BLOW-OFF UNIT SHALL BE BACKFILLED WITH 3/4" MINUS CRUSHED ROCK AND COMPACTED TO 95% OF MAX. DENSITY AS DETERMINED BY AASHTO T-180.
3. ON TEMPORARY BLOW-OFFS ONLY, AN MJ CAP TAPPED 4" OR 6" MAY BE SUBSTITUTED FOR REDUCER.
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7. BLOW OFF RISER TO BE ONE CONTINUOUS PIECE.
8. USE EBAA IRON "MEGALUG" OR APPROVED EQUAL RETAINER GLAND ON MJ CAP. RESTRAIN PER ENGINEER.

DRAWN LJC  
DIV WATER  
REV DATE  
1



CITY OF BEND

## CITY OF BEND STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

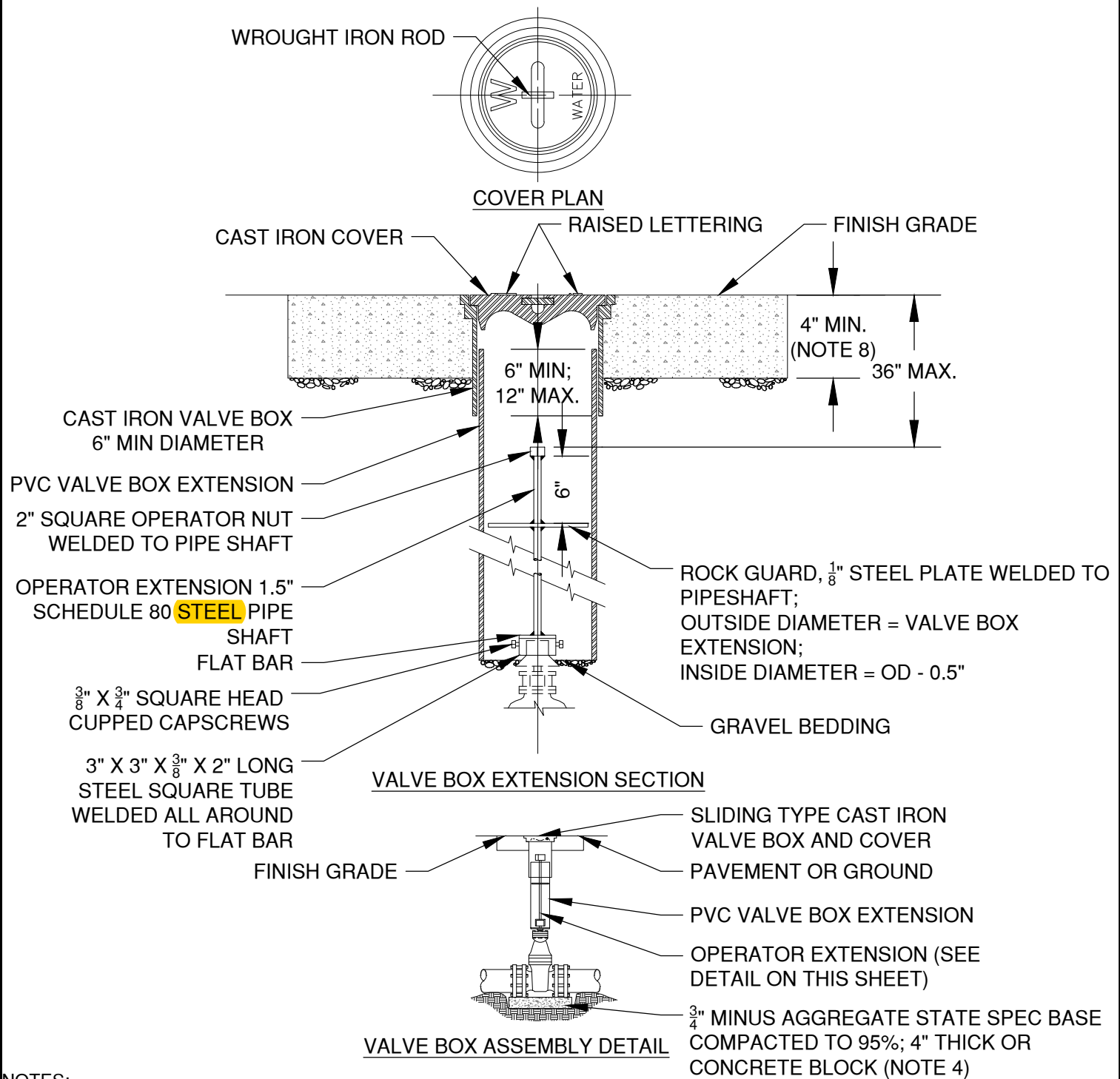
### 4" BLOW-OFF DETAIL

SCALE NTS

DATE 3/31/19


APPR

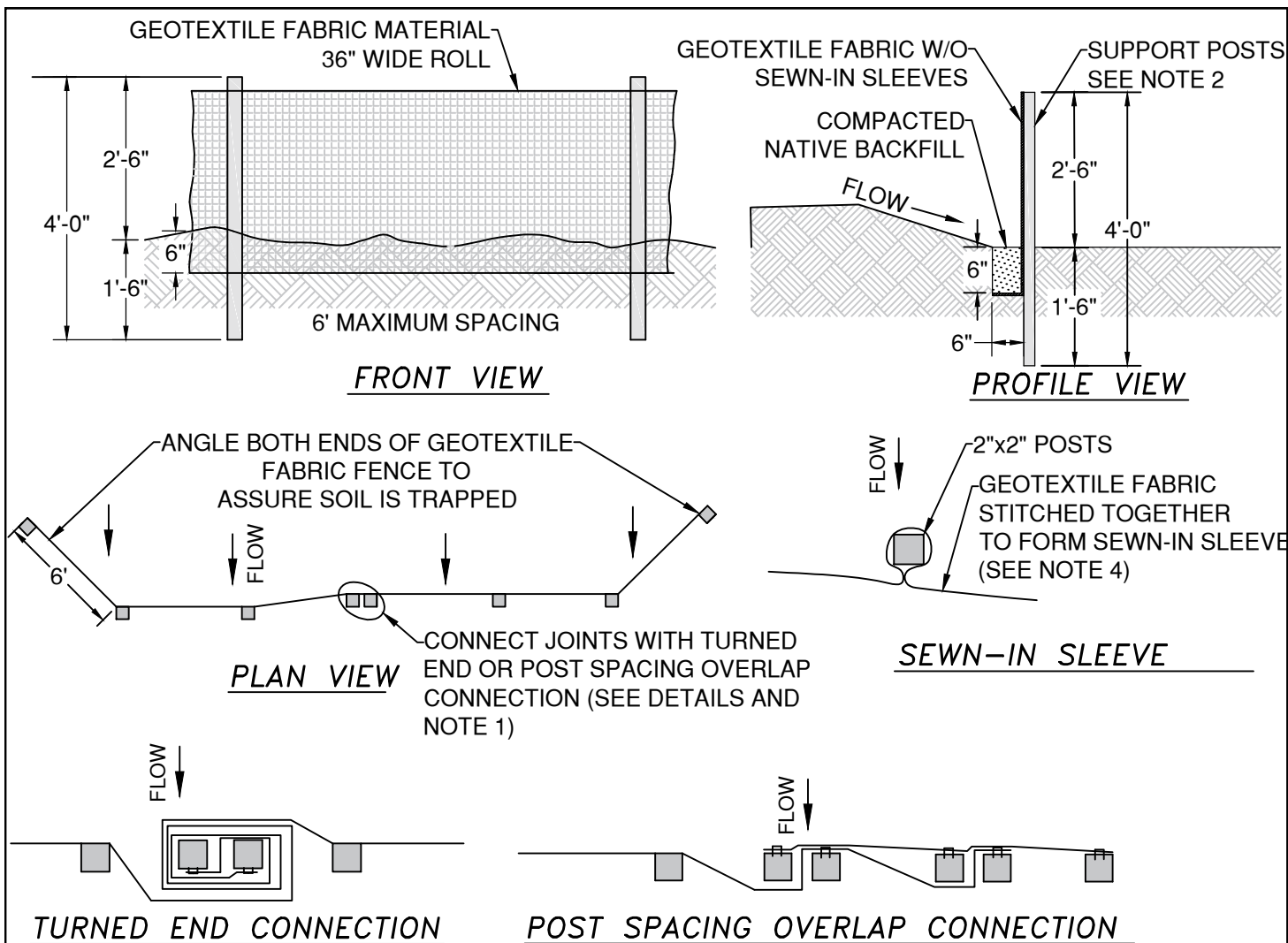
STD DWG W-24



**NOTES:**

1. VALVE BOX NOT TO REST ON OPERATING ASSEMBLY.
2. OPERATOR EXTENSION REQUIRED WHEN VALVE NUT IS DEEPER THAN 4' FROM FINISH GRADE.
3. CENTER VALVE BOX ON AXIS OF OPERATOR NUT.
4. VALVES 12" AND SMALLER TO BE INSTALLED WITH COMPACTED AGGR. BASE ON UNDISTURBED GROUND. VALVES GREATER THAN 12" SHALL BE INSTALLED ON 4" THICK PRECAST CONCRETE BLOCK.
5. WELDS SHALL BE MINIMUM 0.5" ALL AROUND.
6. HOT DIP GALVANIZE OPERATOR EXTENSION AFTER FABRICATION.
7. CASTING SHALL MEET H2O LOAD REQUIREMENT.
8. PROVIDE CONCRETE OR ASPHALT PAD (24" SQUARE, 4" THICK), WHEN REQUIRED.
9. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.
10. **ALL VALVE BOXES SHALL BE PLACED OUTSIDE THE PATH OF TRAVEL ON SIDEWALK AND DRIVEWAY APRONS.**

DRAWN LJC DIV WATER REV DATE	 CITY OF BEND	<p align="center"><b>CITY OF BEND</b></p> <p align="center">STANDARD DRAWING</p> <p align="center">710 NW WALL ST., BEND, OREGON 97701</p> <p align="center"><b>VALVE BOX AND OPERATOR EXTENSION ASSEMBLY</b></p>	SCALE NTS DATE 3/31/19 APPR STD DWG W-30
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#### NOTES:

1. THE GEOTEXTILE FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, GEOTEXTILE SHALL BE SPliced TOGETHER AT A SUPPORT POST UTILIZING A TURNED END OR POST SPACING OVERLAP CONNECTION.
2. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND INSTALLED INTO THE GROUND 18 INCHES MIN. FENCE POSTS SHALL BE 2" X 2" FIRE, PINE, OR STEEL AND INSTALLED ON THE DOWNHILL SIDE OF THE GEOTEXTILE FABRIC. THE GEOTEXTILE FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE SLOPE CONTOURS, TO MAXIMIZE PONDING EFFICIENCY WHERE FEASIBLE.
3. BURY BOTTOM OF THE GEOTEXTILE FABRIC 6 INCHES BELOW GRADE. BACKFILL AND COMPACT.
4. WHEN SEWN-IN SLEEVES ARE USED, THE POSTS SHALL BE INSTALLED WITHIN THE SLEEVE ON THE UPHILL SIDE GEOTEXTILE FABRIC.
5. GEOTEXTILE FABRIC FENCE SHALL BE REMOVED WHEN IT HAS SERVED ITS USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED.
6. GEOTEXTILE FABRIC FENCES SHALL BE INSPECTED BY APPLICANT/CONTRACTOR AFTER EACH RAIN OR SNOW EVENT AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
7. MAXIMUM RECOMMENDED FENCE WIDTH IS 500 FEET. MAXIMUM TRIBUTARY AREA IS 0.25 ACRE PER 100' OF FENCE. MAXIMUM RECOMMENDED SLOPE LENGTH IS 100'.

DRAWN LJC  
DIV STORM  
REV DATE  
4/9/18



CITY OF BEND

## CITY OF BEND

STANDARD DRAWING

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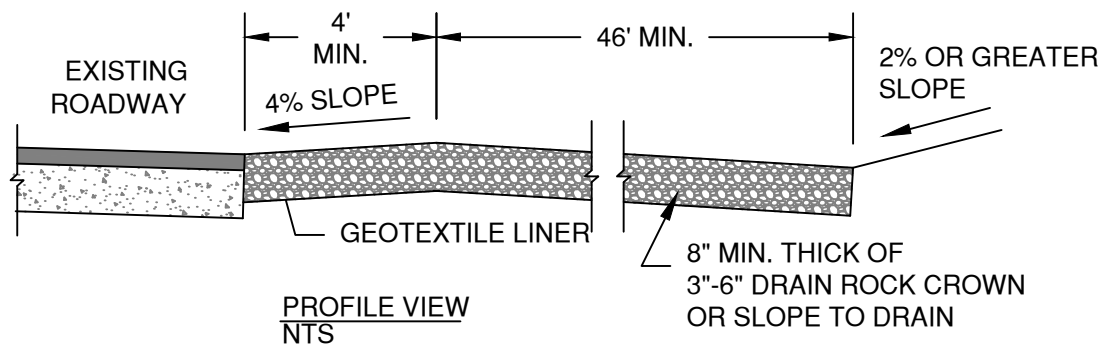
## SEDIMENT FENCE DETAIL

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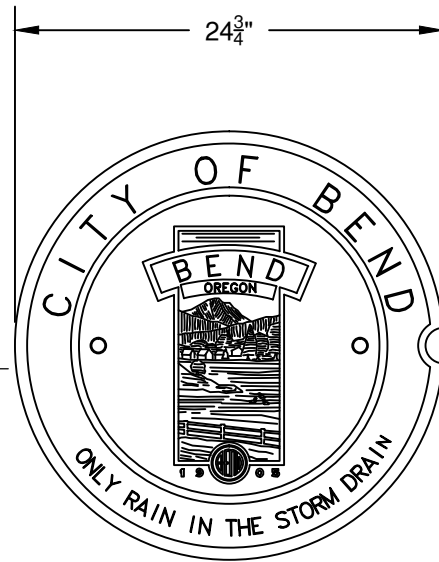
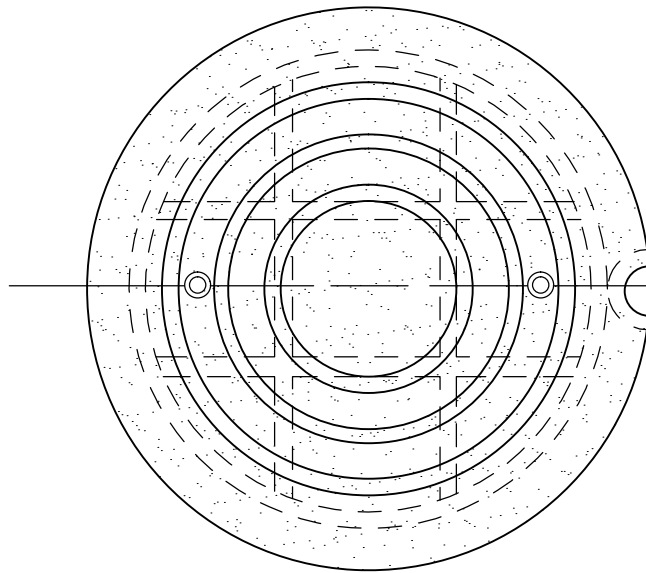
STD DWG E-1



1. CONSTRUCTION ENTRANCE TO BE INSTALLED PRIOR TO ANY OTHER WORK ON SITE AND IS APPLICABLE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED.
2. TRUCK WASH WATER MAY BE REQUIRED ON SITE TO PREVENT TRACKING ONTO EXISTING ROADWAY.
3. THE CONSTRUCTION AND USE OF THIS ENTRANCE IN NO WAY NEGATES THE CONTRACTOR'S RESPONSIBILITIES TO PREVENT TRACKING OF MATERIAL ONTO EXISTING ROADWAY.
4. MUST BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR DIRECT FLOW OF MUD/SEDIMENT ONTO STREETS. PERIODIC TOP DRESSING WITH STONE AND/OR CLEANOUT OR REPAIR SHALL BE NECESSARY.
5. ANY MATERIAL THAT STILL MAKES IT ONTO THE ROAD MUST BE SWEEPED UP IMMEDIATELY.

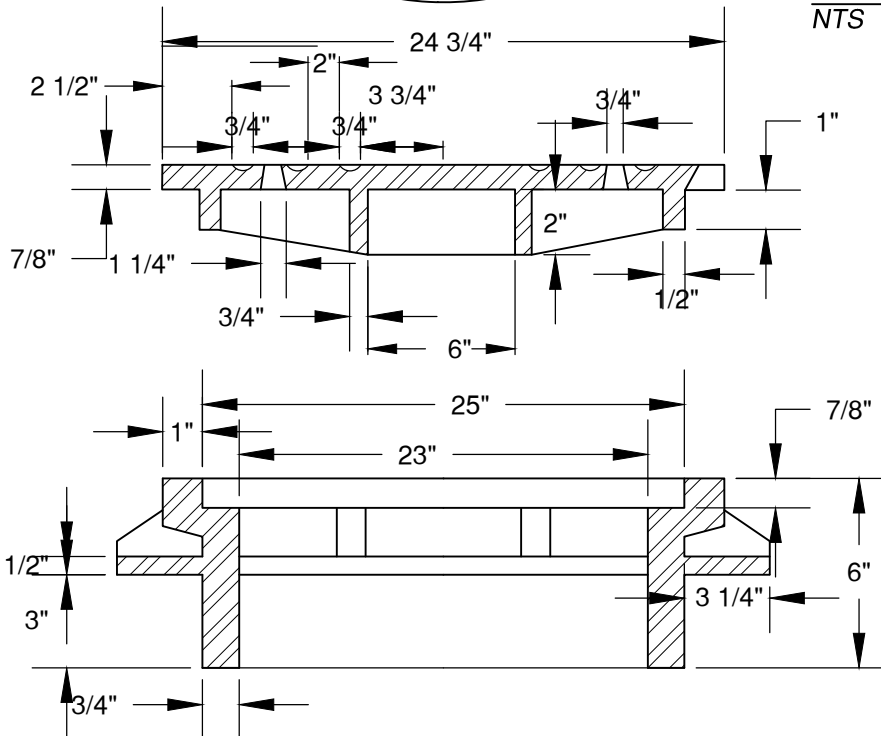
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DIV EROSION			710 NW WALL ST., BEND, OREGON 97701		GRAVEL CONSTRUCTION ENTRANCE		DATE 3/31/19
REV	DATE						APPR
1							STD DWG E-8

PREVIOUSLY R-27



STORMWATER MANHOLE LID DETAIL

NTS



NOTE:

1. MANHOLE LID ONLY TO BE USED ON CITY OF BEND PUBLIC DRYWELLS AND SEDIMENTATION MANHOLES. PRIVATELY OWNED DRYWELLS AND SEDIMENT MANHOLES SHALL NOT USE A CITY OF BEND MANHOLE LID.
2. HINGED MANHOLE LIDS ARE NOT PERMITTED UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
3. ALL MANHOLE LIDS SHALL BE PLACED OUTSIDE THE PATH OF TRAVEL OF SIDEWALKS AND DRIVEWAY APRONS.

DRAWN LJC  
DIV STORM  
REV DATE



CITY OF BEND

CITY OF BEND

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

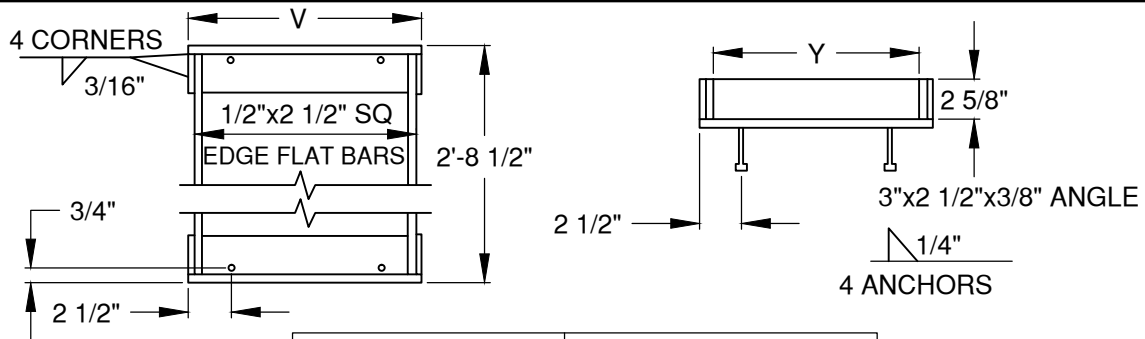
STORMWATER MANHOLE LID DETAIL

SCALE NTS

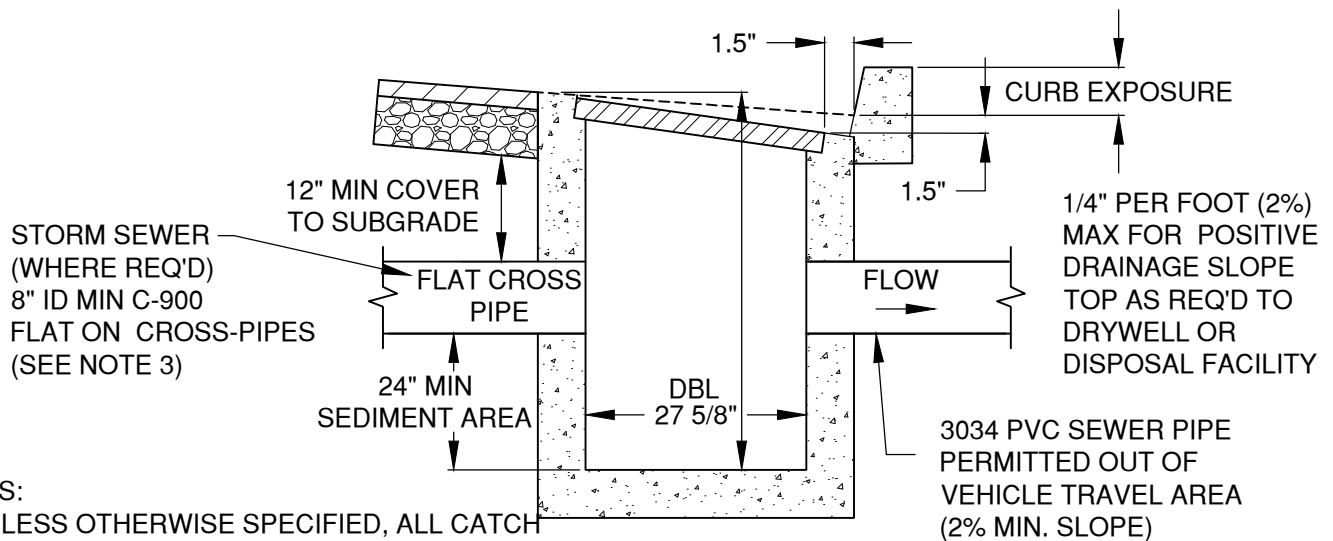
DATE 3/31/19

APPR

STD DWG STRM-8

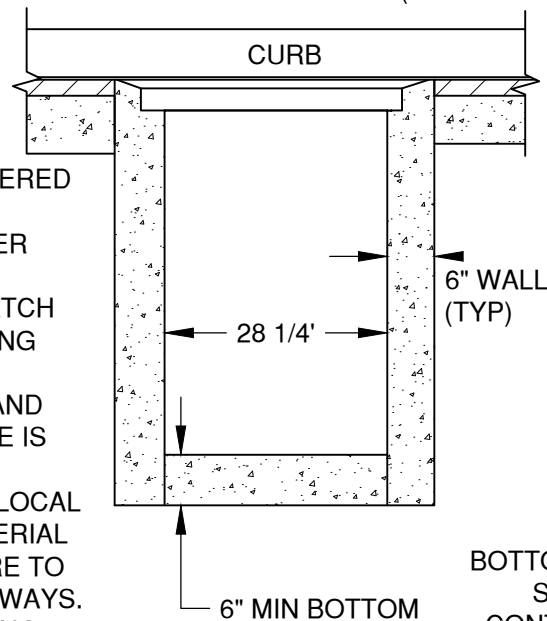


	FRAME		GRATE (STRM- 13)		
INLET TYPE	V	Y	Y1	NO OF BARS	TYPE
G-2, CG-2	2' - 4 3/4"	2' - 3 3/8"	1' - 1 1/2"	8	2"

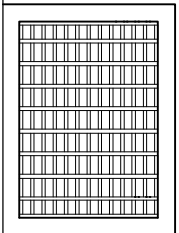


#### NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL CATCH BASINS TO BE DOUBLE CATCH BASIN
2. BACKFILL TO BE COMPACTED TO 95% OF OPTIMUM PER SPECIFICATION SECTION 00330.43
3. CROSS PIPE ELEV MAY REQUIRE OTHER UTILITIES (SEWER, WATER, ETC) TO BE LOWERED TO PROVIDE MINIMUM SEPARATIONS
4. ALL PIPE CONNECTIONS TO BE GROUTED PER SPECIFICATION SECTION 0470.40
5. CONTRACTOR IS RESPONSIBLE TO KEEP CATCH BASIN CLEAN AND FREE OF SEDIMENT DURING CONSTRUCTION
6. CONTRACTOR IS RESPONSIBLE TO COVER AND BARRICADE ALL CATCH BASINS UNTIL GRATE IS INSTALLED
7. STANDARD CATCH BASINS ARE LIMITED TO LOCAL STREETS AND SHALL NOT BE USED ON ARTERIAL & COLLECTOR ROADWAYS. CURB INLETS ARE TO BE USED ON ARTERIAL & COLLECTOR ROADWAYS.
8. SEE DRG R-14A FOR PAVEMENT RESURFACING



**DETAIL SHOWING GRATE ORIENTATION TO CURB LINE. SEE STD DRG STRM-13 FOR GRATE DETAIL**



**BOTTOM MAY BE POURED SEPARATELY AT CONTRACTOR'S OPTION**

DRAWN LJC  
DIV STORM  
REV DATE  
4/9/18



CITY OF BEND

**CITY OF BEND**

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

**STANDARD CATCH BASIN**

SCALE NTS

DATE 3/31/19

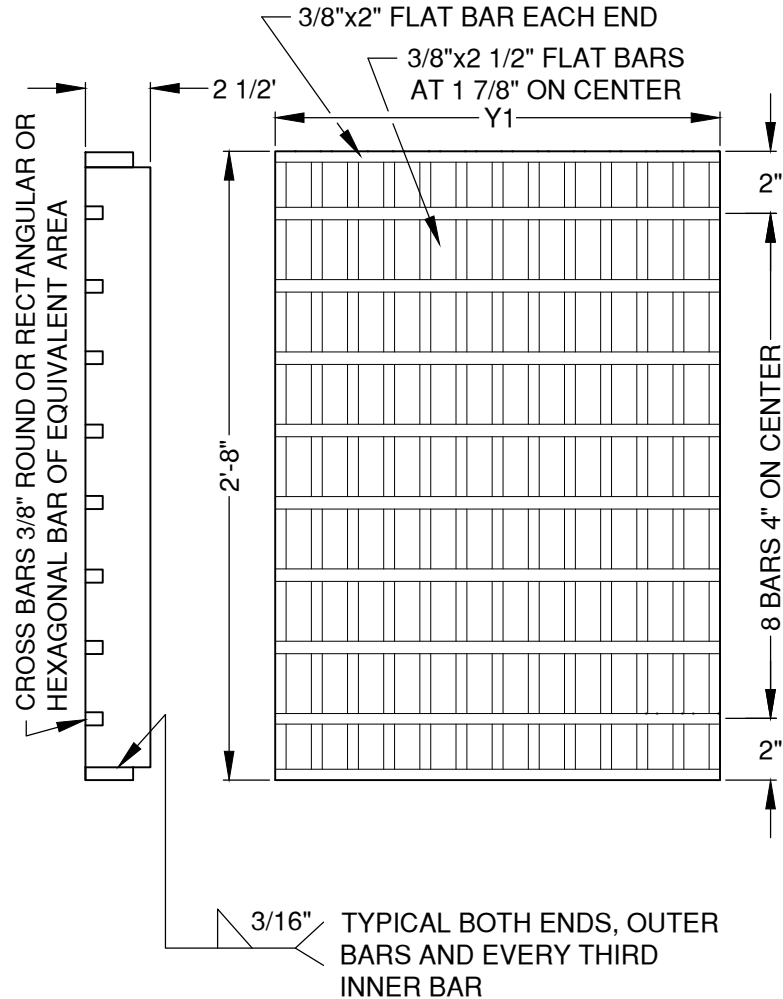
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STD DWG **STRM-12**

**PREVIOUSLY R-14**



# GRATE



INLET TYPE	FRAME		GRATE			
	V (STRM-12)	Y (STRM-12)	Y1	NO. OF BARS	TYPE	REMARKS
G-2, CG-2	2'-4 3/4"	2'-3 3/8"	1'-1 1/2"	8	2"	2-GRATES

## NOTES:

- 3/8" CROSS BARS SHALL BE FLUSH WITH THE GRATE SURFACE AND MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.
- MUST MEET PROWAG STANDARD R302 WHEN IN THE PEDESTRIAN PATH OF TRAVEL.
- SEE STANDARD DRG STRM-12 FOR STANDARD CATCH BASIN INSTALLATION

DRAWN LJC  
DIV STORM  
REV DATE



CITY OF BEND

CITY OF BEND

STANDARD DRAWING

710 NW WALL ST., BEND, OREGON 97701

STANDARD CATCH BASIN GRATE

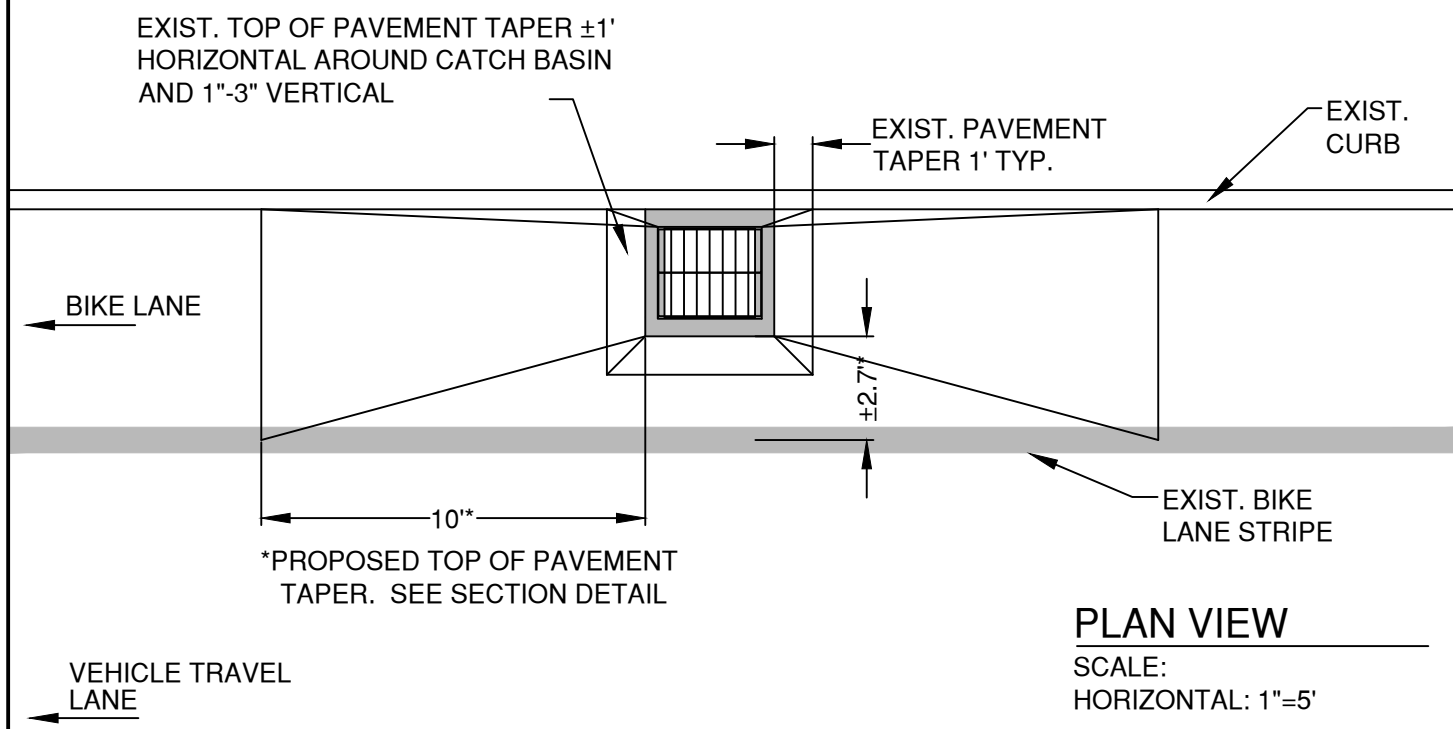
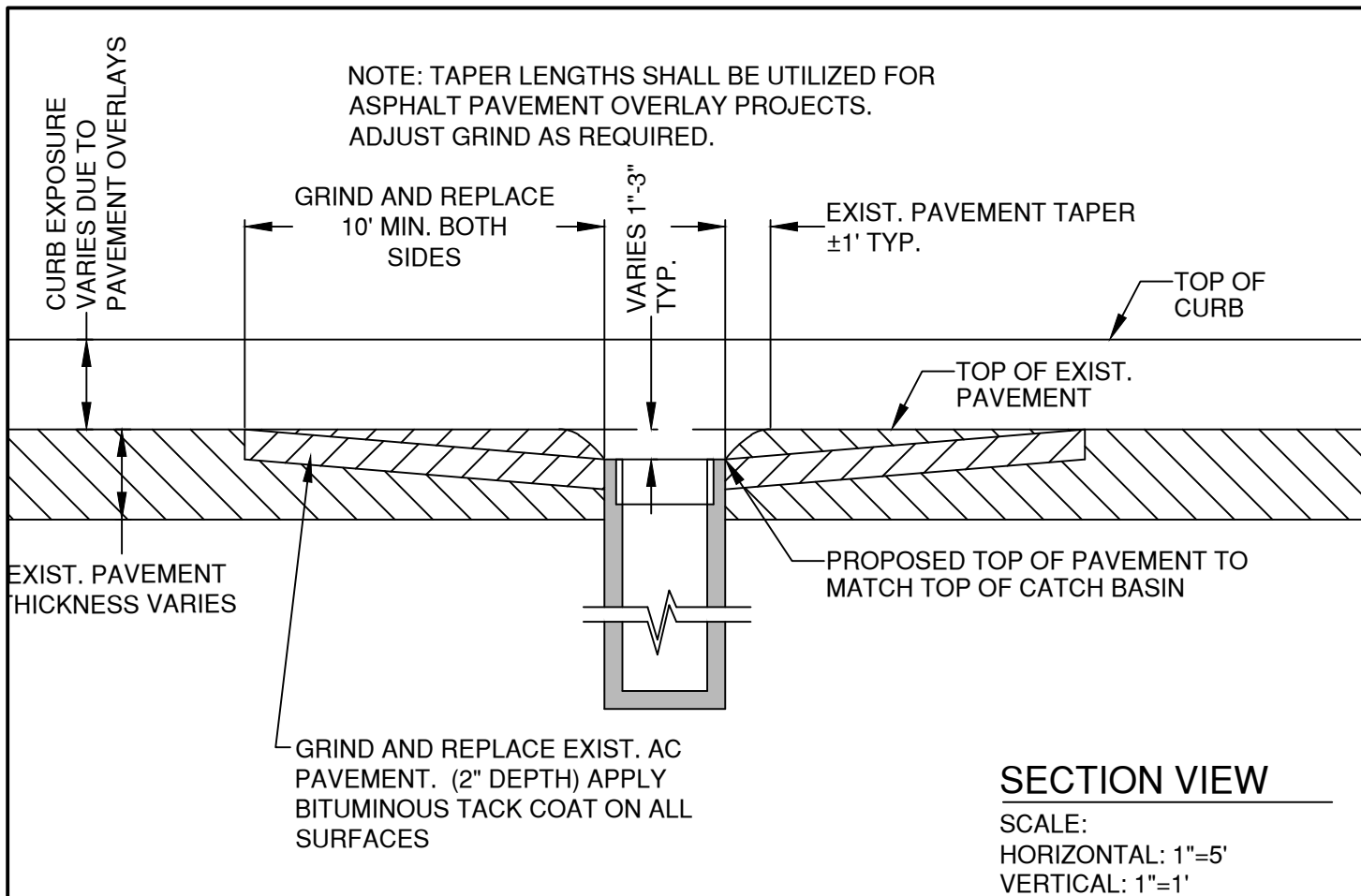
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DATE 3/31/19

APPR

STD DWG STRM-13

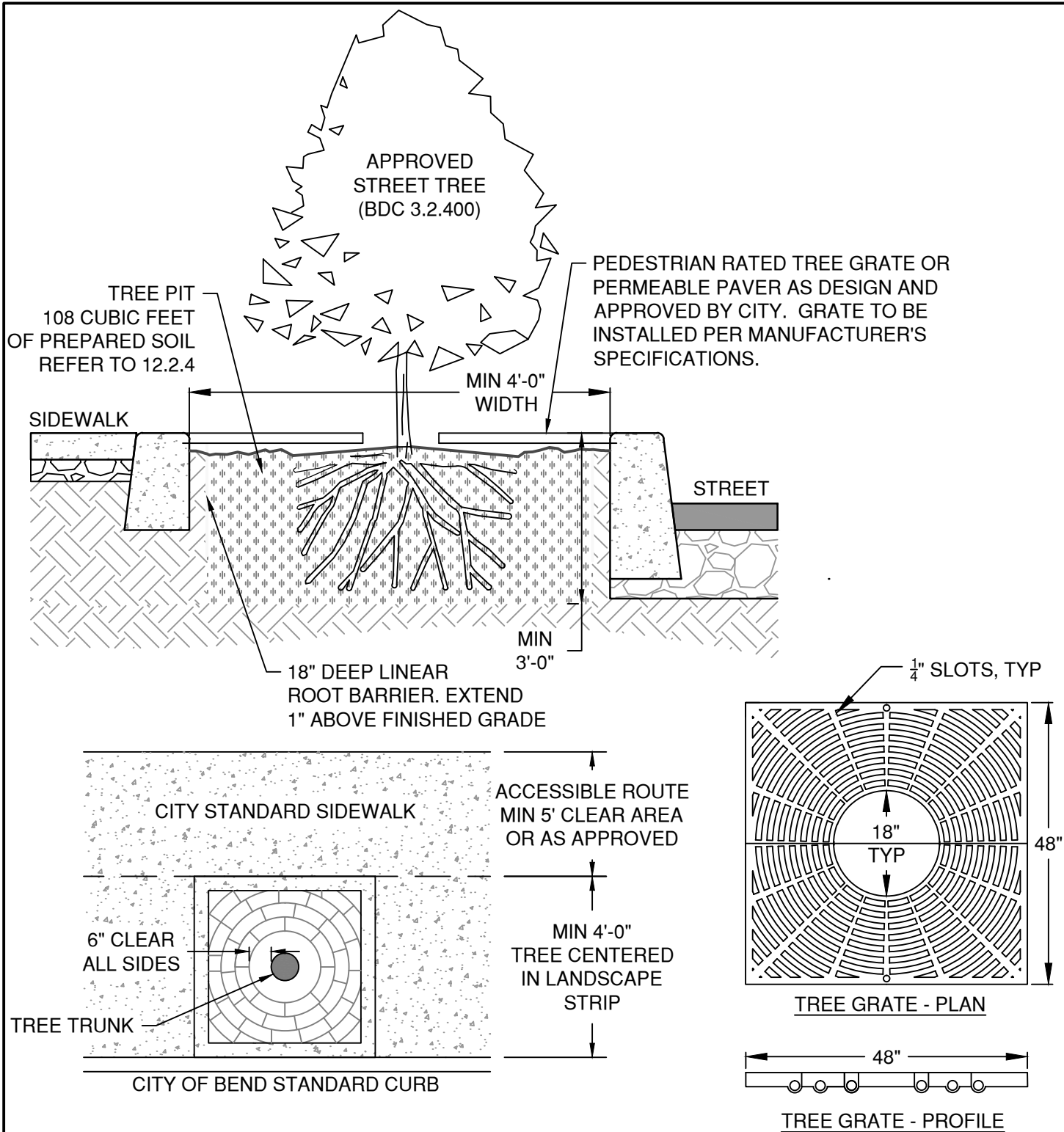
PREVIOUSLY R-17



DRAWN LJC DIV STORM REV DATE	 CITY OF BEND	CITY OF BEND STANDARD DRAWING 710 NW WALL ST., BEND, OREGON 97701	SCALE NTS
			DATE 3/31/19
			APPR STD DWG STRM-14


## EXISTING CATCH BASIN PAVEMENT RESURFACING

PREVIOUSLY R-14A



**NOTES:**

1. MINIMUM TREE WELL DIMENSIONS DICTATED BY BEND DEVELOPMENT CODE 12.2.4.1.
2. VEGETATION WITHIN THE TREE WELL SHALL HAVE DRIP SYSTEM IRRIGATION INSTALLED PER L-15.
3. TREE GRATE SHALL BE EJ 8954 PLAZA SET, OR APPROVED EQUAL.

DRAWN LJC	 CITY OF BEND	CITY OF BEND STANDARD DRAWING 710 NW WALL ST., BEND, OREGON 97701	SCALE NTS
DIV LNDSCP			DATE 3/31/19
REV DATE			APPR
		<b>TREE WELL DETAIL</b>	STD DWG L-20



## **PART VII APPENDICES**

### ***APPENDIX A – EXAMPLE TIER III ROW PLAN SET***

- Added example cover sheet and construction notes to be used on Tier III ROW permits

### ***APPENDIX B – EXAMPLE LIFT STATION PLAN SET***

- Added example lift station plan set to be used as directed by the City of Bend

