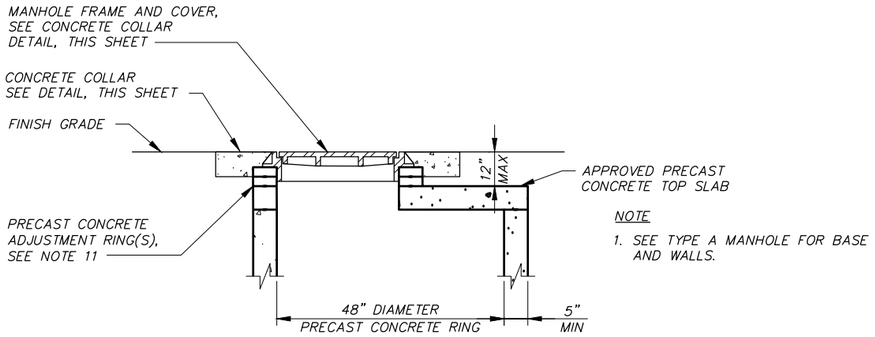


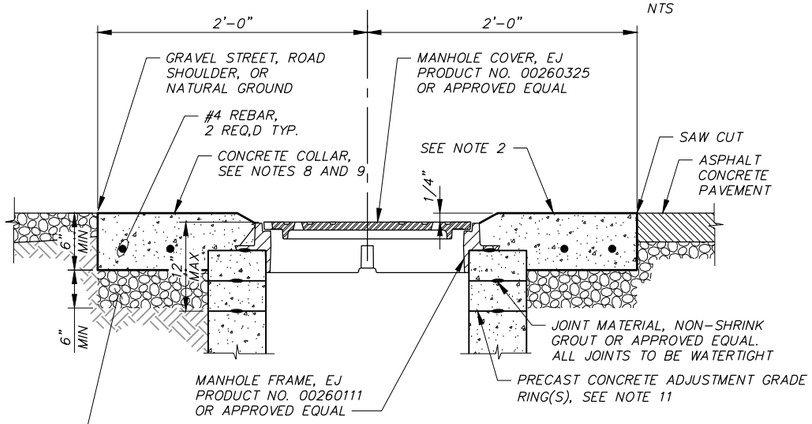
NOTE

1. SEE TYPE A MANHOLE FOR BASE AND WALLS.

SANITARY SEWER TOP SLAB MANHOLE

TYPE B

NTS



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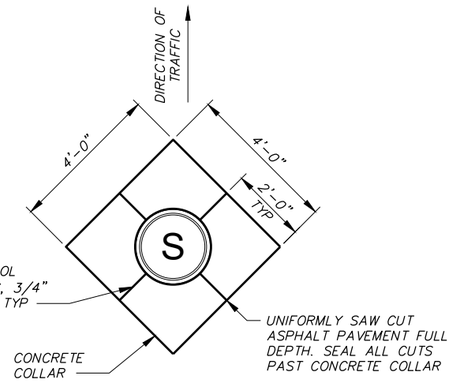


PLAN

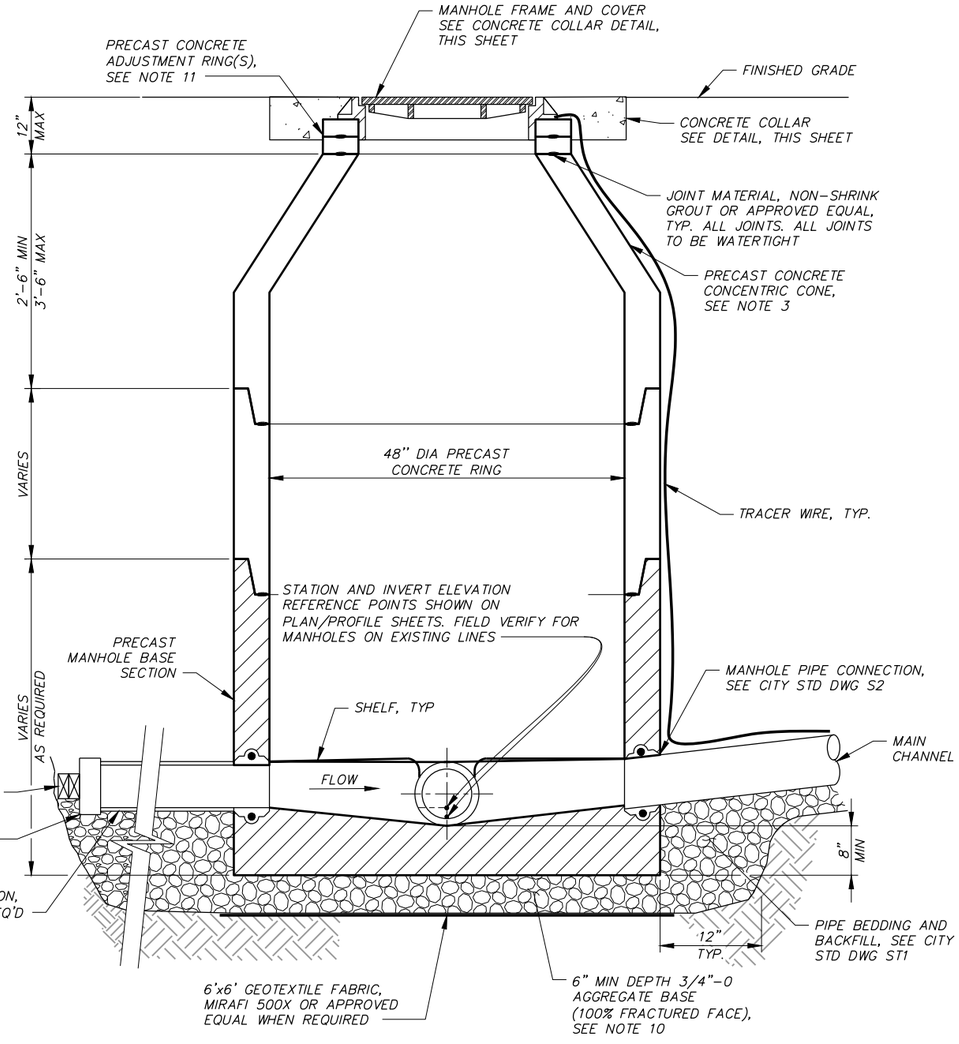
REQUIREMENTS FOR CONCRETE COLLARS

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4000 PSI CONCRETE.
2. COLLAR TO BE FORMED SQUARE.
3. SMOOTH BROOMED FINISH REQUIRED.
4. APPLY CONCRETE CURING COMPOUND.
5. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

CONCRETE COLLAR DETAIL

(IN GRAVEL STREETS, NATURALGROUND OR ASPHALT PAVEMENT)

NTS



STANDARD SANITARY SEWER MANHOLE

TYPE A

NTS

NOTES

1. ALL MANHOLES SHALL BE PRECAST MANHOLE UNITS CONFORMING TO ASTM C478.
2. ANY GAPS, HOLES, ROUGH SPOTS, ETC, IN THE CHANNELS SHALL BE FILLED OR REPAIRED IN THE FIELD.
3. MANHOLES SHALL BE TYPE A UNLESS MANHOLE DEPTH IS LESS THAN 5 FEET. MANHOLES LESS THAN 5 FEET IN DEPTH SHALL BE TYPE B UNLESS OTHERWISE CALLED FOR ON THE DESIGN DRAWINGS. MANHOLE DEPTH SHALL BE AS MEASURED FROM FINISHED GRADE TO INVERT OF PIPE.
4. PRIOR TO MANUFACTURING MANHOLES, THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS, PIPE INVERT ELEVATIONS, PIPE ORIENTATION, AND MANHOLE DEPTH. CONTRACTOR SHOULD ALSO NOTE THAT PIPE SLOPES ARE CALCULATED TO CENTER OF THE MANHOLE.
5. WHERE THE DISTANCE BETWEEN INLET PIPE INVERT AND MANHOLE CHANNEL INVERT IS GREATER THAN 2 FEET A DROP MANHOLE SHALL BE USED.
6. ALL PRECAST MANHOLE BASE SECTIONS SHALL HAVE FACTORY CAST FLOW CHANNELS UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
7. MANHOLE STEPS NOT PERMITTED.
8. CONCRETE COLLAR REQUIRED AFTER PLACEMENT OF ACP.
9. ALL MANHOLES SHALL HAVE A CONCRETE COLLAR REGARDLESS OF BEING INSTALLED ON PAVED OR GRAVEL STREETS, ROAD SHOULDER, OR NATURAL GROUND.
10. COMPACT ALL AGGREGATE BASE (100% FRACTURED FACE) TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
11. FOR ADJUSTMENTS LESS THAN 2" GROUT BETWEEN FRAME AND TOP OF CONCRETE OR ADJUSTMENT RINGS. ADJUSTMENTS 2" AND GREATER SHALL BE MADE WITH PRECAST CONCRETE RINGS.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

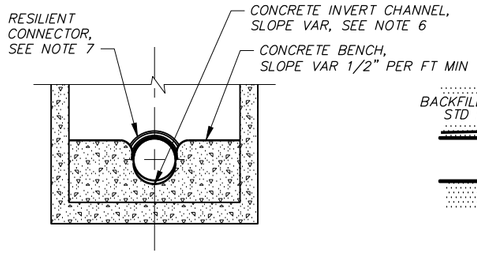
SANITARY SEWER MANHOLE

FIGURE

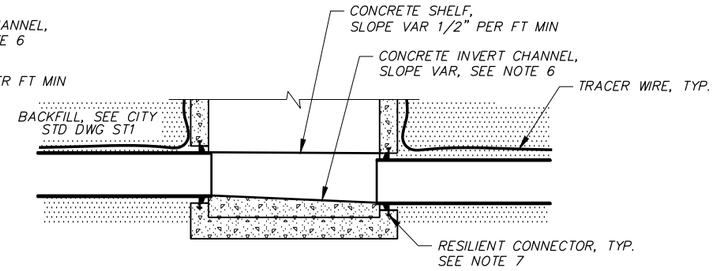
S1

NOTES

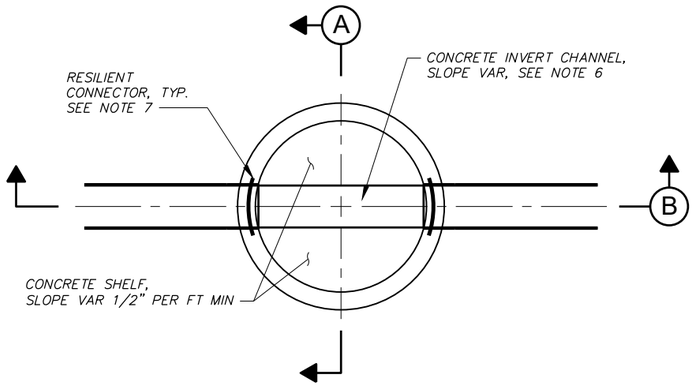
1. ALL PRECAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. MANHOLE BASE SECTIONS SHALL BE PRECAST UNLESS OTHERWISE APPROVED BY CITY.
3. ALL CONCRETE SHALL BE COMMERCIAL GRADE, 4000 PSI CONCRETE.
4. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE DESIGN DRAWINGS.
5. MAXIMUM PIPE DIAMETER VARIES WITH PIPE MATERIAL.
6. INVERT CHANNELS SHALL BE CONSTRUCTED TO PROVIDE SMOOTH SLOPES AND RADII TO OUTLET PIPE.
7. RESILIENT CONNECTOR SHALL BE THE X-CEL CONNECTOR AS MANUFACTURED BY A-LOK PRODUCTS, INC. OR APPROVED EQUAL. IN ADDITION, THE FIELD SLEEVE AS MANUFACTURED BY A-LOK PRODUCTS, INC. OR APPROVED EQUAL SHALL BE USED WHEN CONNECTING TO AN EXISTING MANHOLE. ALL CONNECTORS AND FIELD SLEEVES, INCLUDING GROUT IF ANY, SHALL BE INSTALLED PER THE CONNECTOR MANUFACTURERS RECOMMENDATIONS TO ENSURE A FLEXIBLE CONNECTION IS MAINTAINED.



SECTION A



SECTION B



PLAN

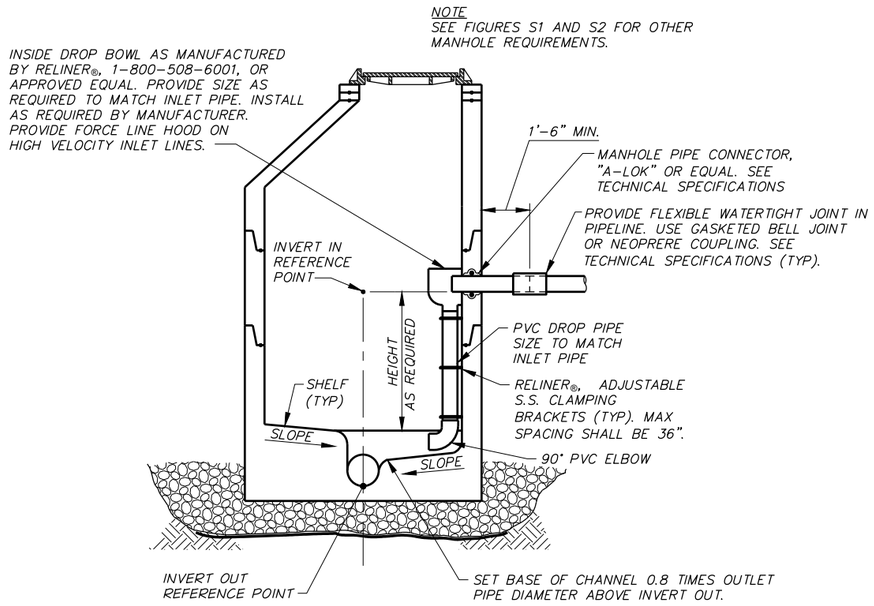
FLEXIBLE PIPE TO MANHOLE CONNECTION

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

PIPE TO MANHOLE CONNECIONS

FIGURE
S2



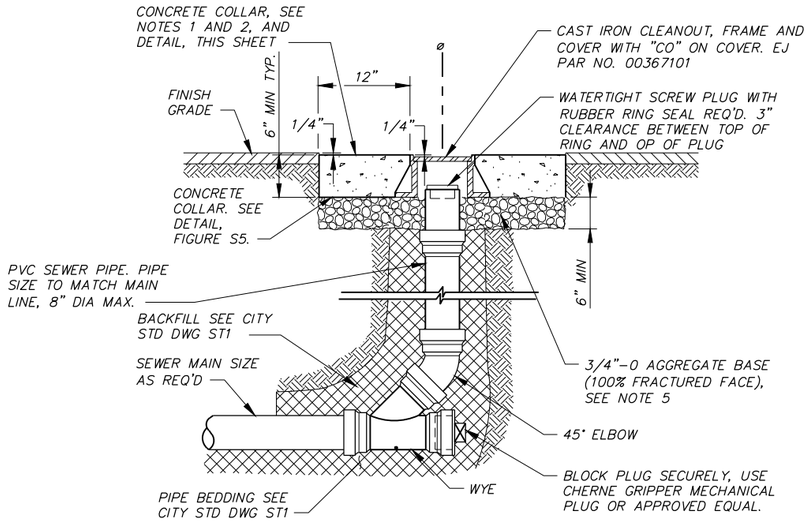
DROP PRECAST MANHOLE

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

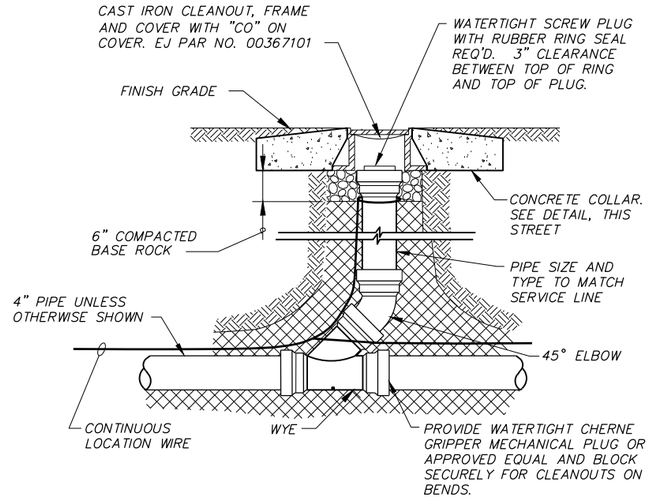
DROP PRECAST MANHOLE

FIGURE
S3



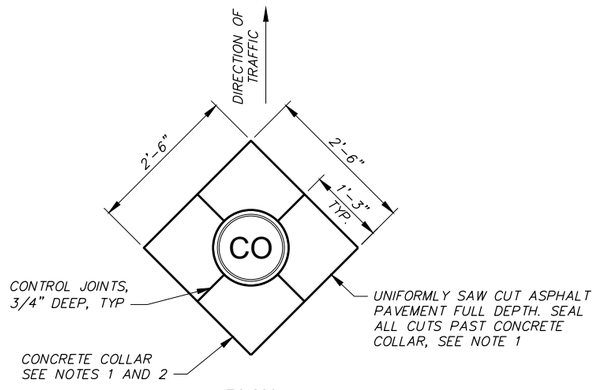
GRAVITY SEWER MAIN LINE CLEANOUT

NTS



SEWER SERVICE LINE CLEANOUT

NTS



PLAN

REQUIREMENTS FOR CONCRETE COLLARS

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4000 PSI CONCRETE.
2. COLLAR TO BE FORMED SQUARE.
3. SMOOTH BROOMED FINISH REQUIRED.
4. APPLY CONCRETE CURING COMPOUND.
5. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

CONCRETE COLLAR DETAIL

NTS

NOTES

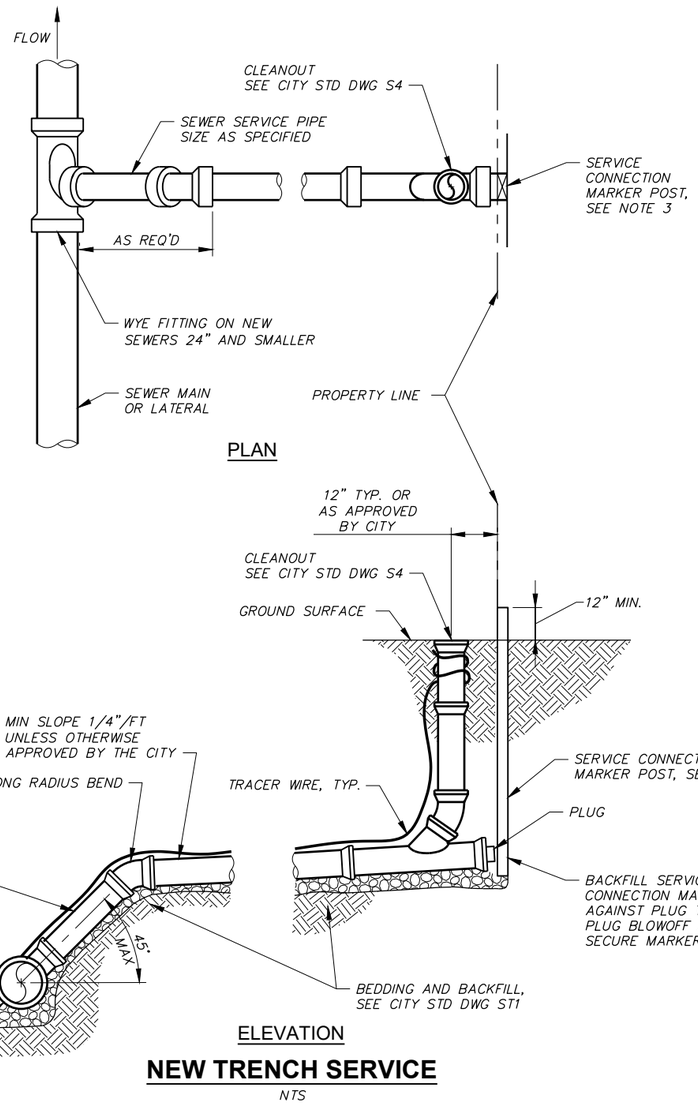
1. CONCRETE COLLAR REQUIRED AFTER PLACEMENT OF ACP. WHERE A SERVICE LINE CLEANOUT IS INSTALLED OUTSIDE OF ASPHALT CONCRETE PAVING AT THE EDGE OF THE RIGHT-OF-WAY AS REQUIRED BY CITY STD DWG S5, A CONCRETE COLLAR IS NOT REQUIRED.
2. ALL CLEANOUTS SHALL HAVE A CONCRETE COLLAR IF INSTALLED ON GRAVEL STREET, ROAD, ON SHOULDER, OR NATURAL GROUND. EXCEPTION FOR RESIDENTIAL CONSTRUCTION: IF CLEANOUT IS INSTALLED ON PRIVATE PROPERTY, CONCRETE COLLAR REQUIREMENTS MAY BE WAIVED BY OWNER.
3. SEWER CLEANOUT RISER SIZE AND MATERIAL TO MATCH CARRIER PIPE.
4. CASTING SHALL MEET AASHTO H20 REQUIREMENT.
5. COMPACT ALL AGGREGATE BASE (100% FRACTURED FACE) TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
6. MANHOLES SHALL BE INSTALLED WHEREVER POSSIBLE. CLEANOUTS SHALL ONLY BE INSTALLED WHEN APPROVED BY THE CITY.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SEWER CLEANOUTS

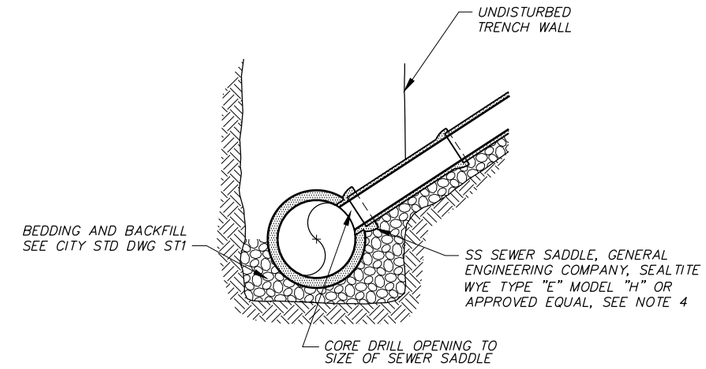
FIGURE

S4



NEW TRENCH SERVICE

NTS



EXISTING SEWER SERVICE TAP

NTS

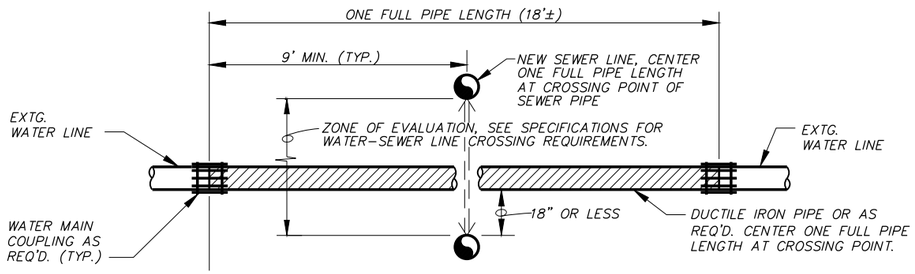
NOTES

1. PIPE AND FITTINGS SHALL BE COMPATIBLE. ONLY MANUFACTURED FITTINGS SHALL BE USED.
2. CONTRACTOR SHALL MAXIMIZE DEPTH OF THE SEWER SERVICE LATERAL AT THE PROPERTY LINE. SEWER SERVICE INVERT DEPTHS AT THE RIGHT-OF-WAY OR EASEMENT LINE SHALL BE SUFFICIENTLY DEEP SUCH THAT ALL POINTS ON THE PROPERTY CAN BE SERVICED BY SEWER PIPE HAVING A MINIMUM SLOPE OF 1/4" PER FOOT AND MEETING ALL REQUIREMENTS OF THE OREGON PLUMBING SPECIALTY CODE CURRENT EDITION INCLUDING MINIMUM COVER REQUIREMENTS. IN NO CASE SHALL THE SEWER SERVICE LATERAL HAVE LESS THAN 4 FEET OF COVER AT RIGHT OF WAY OR EASEMENT LINE, UNLESS OTHERWISE APPROVED BY THE CITY.
3. SERVICE CONNECTION MARKER POST SHALL BE 2"x4" (10' LONG) PRESSURE TREATED FIR. EXPOSED AREA SHALL BE PAINTED GREEN. THE DEPTH FROM THE FINISHED GRADE TO THE INVERT OF THE LATERAL SHALL BE CLEARLY MARKED IN WEATHER RESISTANT, FADE RESISTANT INK. BURIED END SHALL BE SET AT INVERT OF THE SERVICE LATERAL.
4. SEWER SADDLE:
   - 4.1. SEAT SADDLE IN PLACE TO FIT OUTSIDE SURFACE OF CARRIER PIPE AND TO FORM WATERTIGHT SEAL
   - 4.2. SEWER SADDLE AND SERVICE LATERAL TEE SHALL NOT PROTRUDE INTO PIPE.
5. SERVICE LATERALS 8" AND LARGER SHALL BE CONNECTED TO THE SEWER MAIN LINE AT A MANHOLE UNLESS OTHERWISE APPROVED BY THE CITY.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SEWER SERVICE CONNECTION

FIGURE
S5



NOTE
ALL BACK FILL IN AREA OF WATER-SEWER CROSSING TO A DEPTH 12" ABOVE THE TOP OF THE HIGHEST PIPE SHALL BE 3/4"-0 BASE ROCK COMPACTED TO 95% OF ASTM D-698 LABORATORY DENSITY

WATER-SEWER CROSSING

(NEW SEWER LINE CONSTRUCTION)

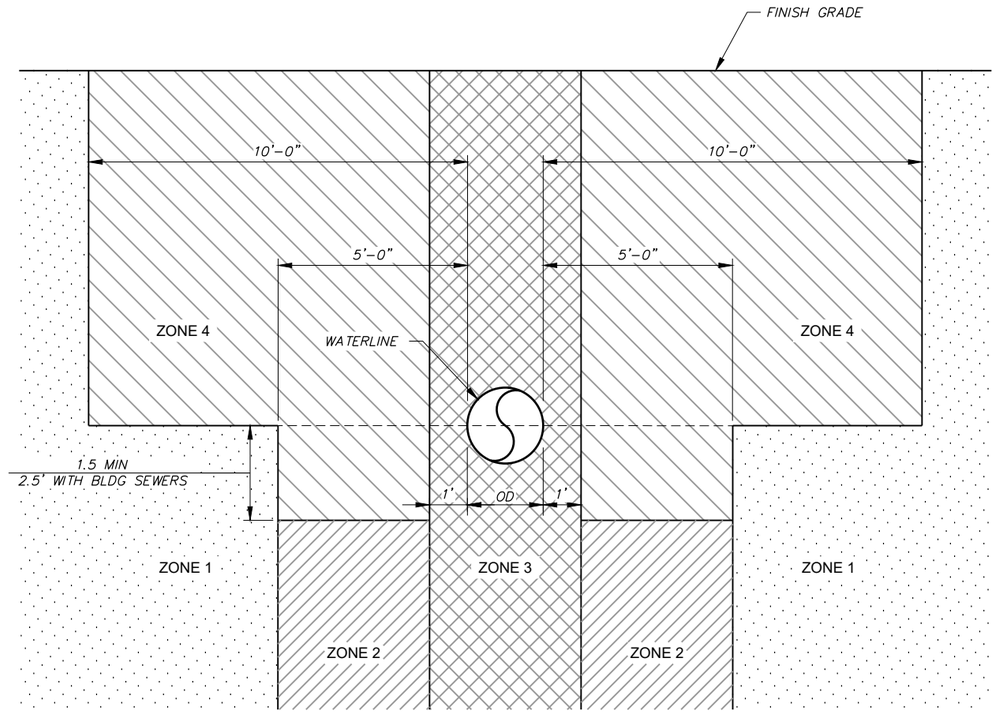
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER - SEWER CROSSING

FIGURE

S6



SEWER LINE ZONES

	ZONE 1	SEWER LINE CAN BE LAID IN THIS AREA WITH NO SPECIAL REQUIREMENTS OF EITHER CONSTRUCTION OR MATERIALS.
	ZONE 2	INSTALLING A SEWER LINE IN THIS ZONE IS NOT ADVISABLE AND MUST BE JUSTIFIED IN EACH CASE. WATER LINE SHOULD BE LOCATED ON A BENCH OF UNDISTURBED EARTH WHEN CONSTRUCTED CONCURRENTLY IN A COMMON TRENCH WITH SEWER LINE.
	ZONE 3	INSTALLING A SEWER MAIN DIRECTLY OVER A WATER MAIN OR DIRECTLY UNDER A WATER MAIN IN THIS ZONE IS PROHIBITED SINCE TAPPING, OPERATION, AND MAINTENANCE OF EACH LINE WOULD BE IMPAIRED.
	ZONE 4	SEWER LINE CONSTRUCTION IN THIS ZONE WOULD GENERALLY NOT BE PERMITTED. EACH INSTALLATION MUST BE JUSTIFIED. IF CONSTRUCTION WAS PERMITTED, PRESSURE PIPE MATERIALS FOR THIS SEWER LINE WOULD BE REQUIRED.

NOTE
THE CONTRACTOR SHALL MEET ALL THE REQUIREMENTS OF THE DEQ, INCLUDING OAR 340 DIVISION 52.

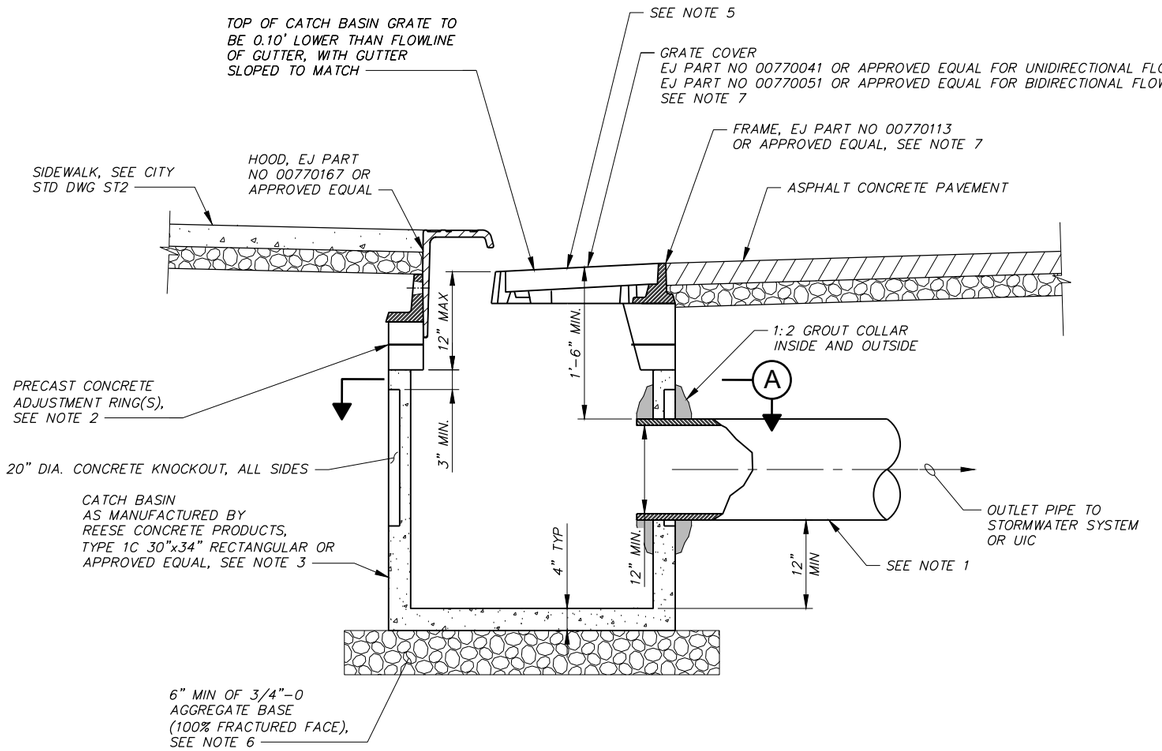
WATER - SEWER LINE SEPARATION

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER - SEWER LINE SEPARATION

FIGURE
S7

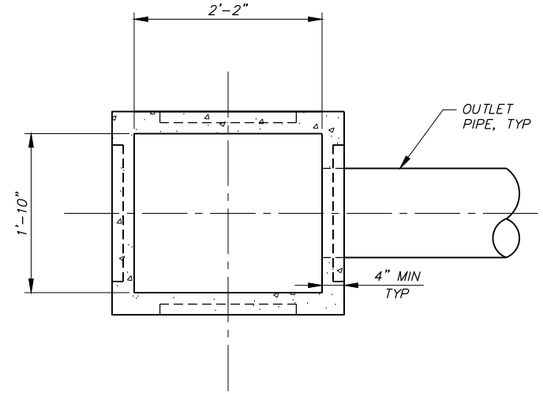


STORM DRAIN CATCH BASIN

NTS

NOTES

1. MINIMUM PIPE BURY TO BE 30" UNLESS OTHERWISE APPROVED BY CITY. NUMBER OF PIPES CONNECTING TO CATCH BASIN SHALL NOT EXCEED 3. MINIMUM PIPE SIZE SHALL BE 12".
2. FOR ADJUSTMENTS LESS THAN 2" GROUT BETWEEN FRAME AND TOP OF CONCRETE OR ADJUSTMENT RINGS. ADJUSTMENTS 2" AND GREATER SHALL BE MADE WITH PRECAST CONCRETE RINGS.
3. WIRE REINFORCED PRECAST CATCH BASIN SHALL BE REQUIRED WHEN 3–12" PIPES ARE TO BE CONNECTED AND SHALL CONFORM TO ASTM C913.
4. CONTRACTOR TO INSTALL EROSION AND SEDIMENT CONTROL PROTECTION DURING CONSTRUCTION PER CURRENT DEQ STANDARDS.
5. CATCH BASIN GRATES AND FRAMES NOT LOCATED IN CURB AND GUTTER REQUIRE CITY APPROVAL.
6. COMPACT ALL AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
7. AREA DRAIN CATCH BASINS LOCATED IN PAVED AREAS SHALL BE INSTALLED WITH A RECTANGULAR ADA GRATE (EJ PART NO 00775036) AND A NON SLOPING FRAME (EJ PART NO 00777011)
8. INSPECTION REQUIREMENTS: CONTRACTOR SHALL SET A STRING LINE FOR THE TOP BACK OF CURB. CITY REPRESENTATIVE SHALL WITNESS THAT THE STRING LINE IS DIRECTLY ABOVE INSIDE FACE OF THE CONCRETE RISER RING.



SECTION A

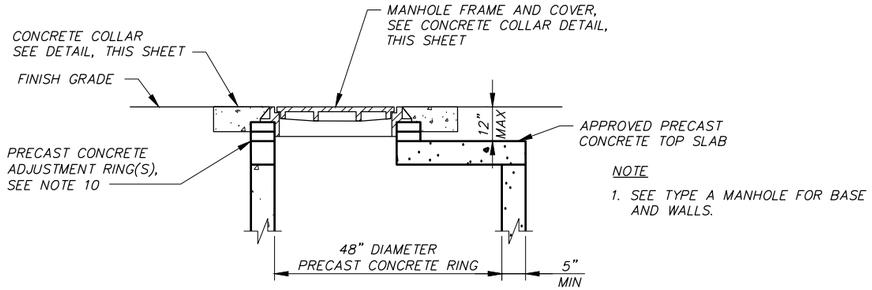
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

STORM DRAIN CACH BASIN

FIGURE

SD1



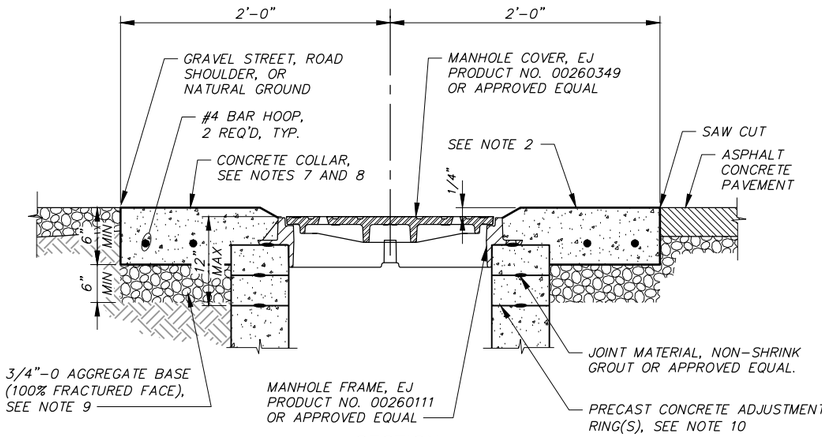
NOTE

1. SEE TYPE A MANHOLE FOR BASE AND WALLS.

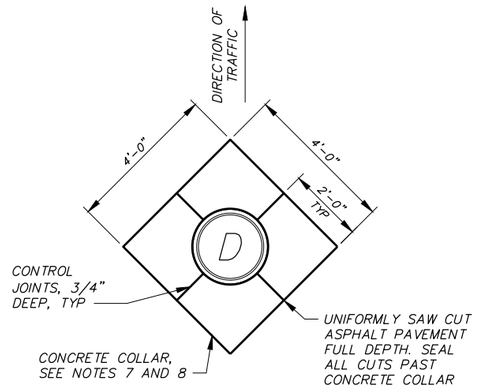
STORM DRAIN TOP SLAB MANHOLE

TYPE B

NTS



SECTION



PLAN

REQUIREMENTS FOR CONCRETE COLLARS:

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4000 PSI CONCRETE.
2. COLLAR TO BE FORMED SQUARE.
3. SMOOTH BROOMED FINISH REQUIRED.
4. APPLY CONCRETE CURING COMPOUND.
5. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

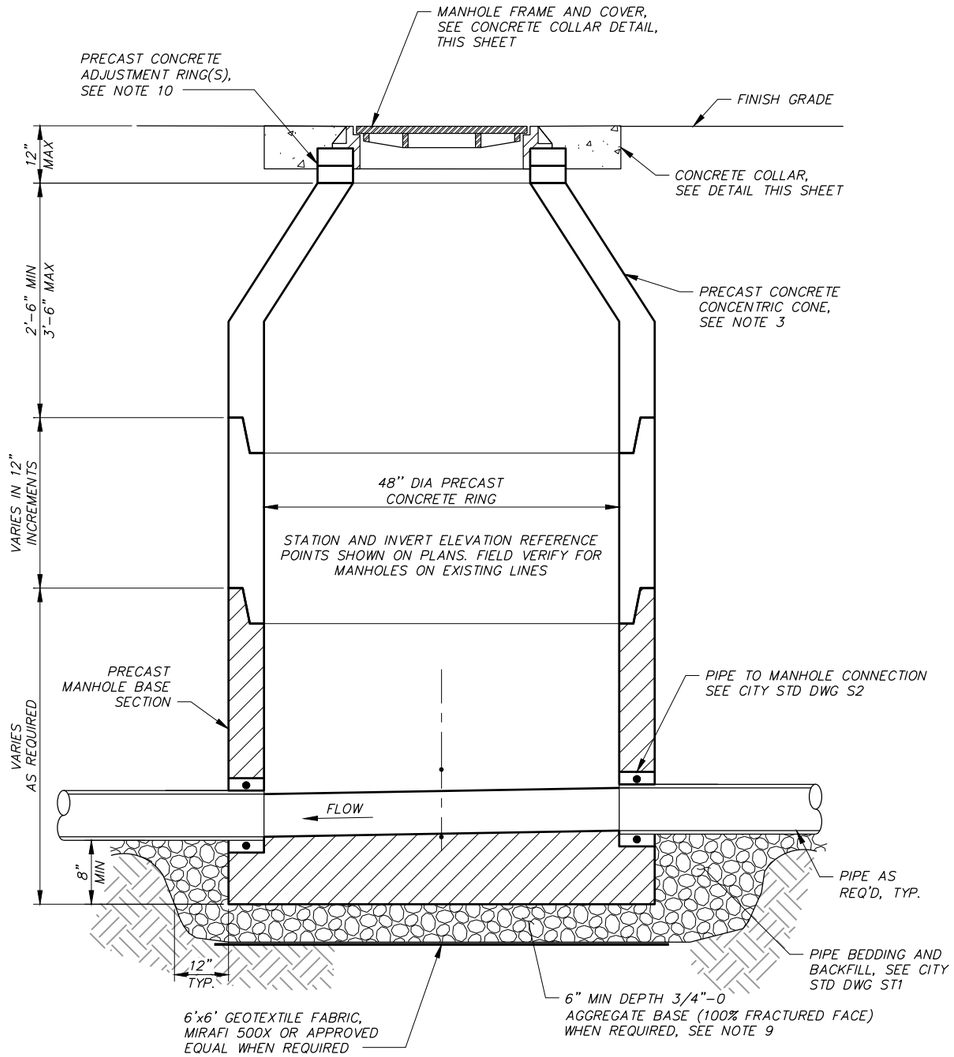
CONCRETE COLLAR DETAIL

(IN GRAVEL STREETS, NATURAL GROUND OR ASPHALT PAVEMENT)

NTS

NOTES

1. ALL MANHOLES SHALL BE PRECAST MANHOLE UNITS CONFORMING TO ASTM C478.
2. ANY GAPS, HOLES, ROUGH SPOTS, ETC, IN THE INVERT CHANNELS SHALL BE FILLED OR REPAIRED IN THE FIELD.
3. CONE SECTION SHALL BE TYPE A UNLESS MANHOLE DEPTH IS 5.5 FEET OR LESS. MANHOLES 5.5 FEET OR LESS IN DEPTH SHALL BE TYPE B UNLESS OTHERWISE CALLED FOR ON THE DESIGN DRAWINGS.
4. PRIOR TO MANUFACTURING MANHOLES THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS, PIPE INVERT ELEVATIONS, PIPE ORIENTATION, AND MANHOLE DEPTH. CONTRACTOR SHOULD ALSO NOTE THAT PIPE SLOPES ARE CALCULATED TO CENTER OF THE MANHOLE.
5. ALL PRECAST MANHOLE BASE SECTIONS SHALL HAVE FACTORY CAST FLOW CHANNELS UNLESS OTHERWISE APPROVED BY THE CITY.
6. MANHOLE STEPS NOT PERMITTED.
7. CONCRETE COLLAR REQUIRED AFTER PLACEMENT OF ACP.
8. ALL MANHOLES SHALL HAVE A CONCRETE COLLAR REGARDLESS OF BEING INSTALLED ON PAVED OR GRAVEL STREET, ROAD SHOULDER, OR NATURAL GROUND.
9. COMPACT ALL AGGREGATE BASE (100% FRACTURED FACE) TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
10. FOR ADJUSTMENTS LESS THAN 2" GROUT BETWEEN FRAME AND TOP OF CONCRETE OR ADJUSTMENT RINGS. ADJUSTMENTS 2" AND GREATER SHALL BE MADE WITH PRECAST CONCRETE RINGS.



STANDARD STORM DRAIN MANHOLE

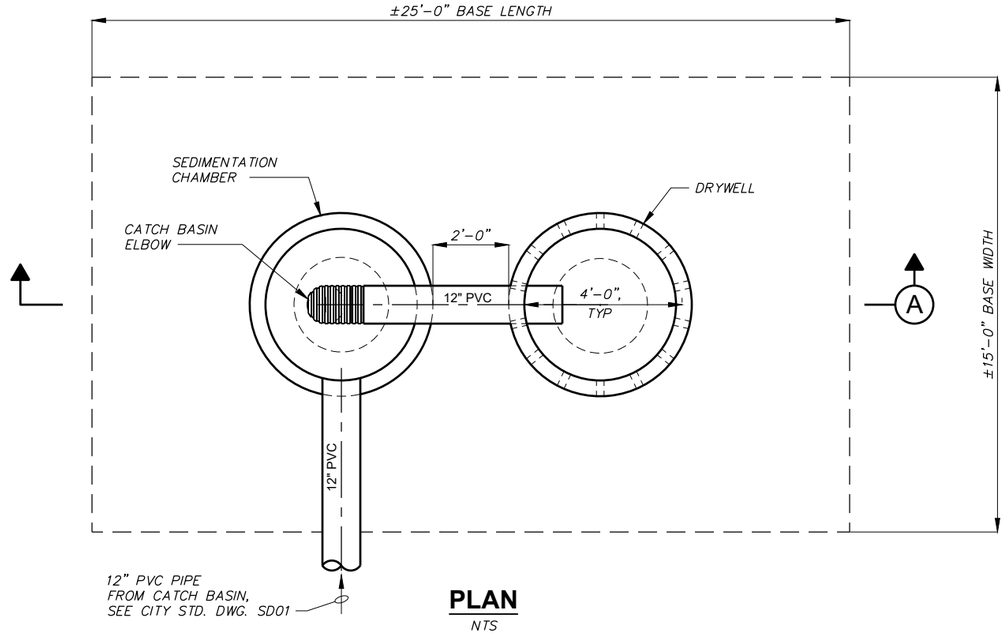
TYPE A

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

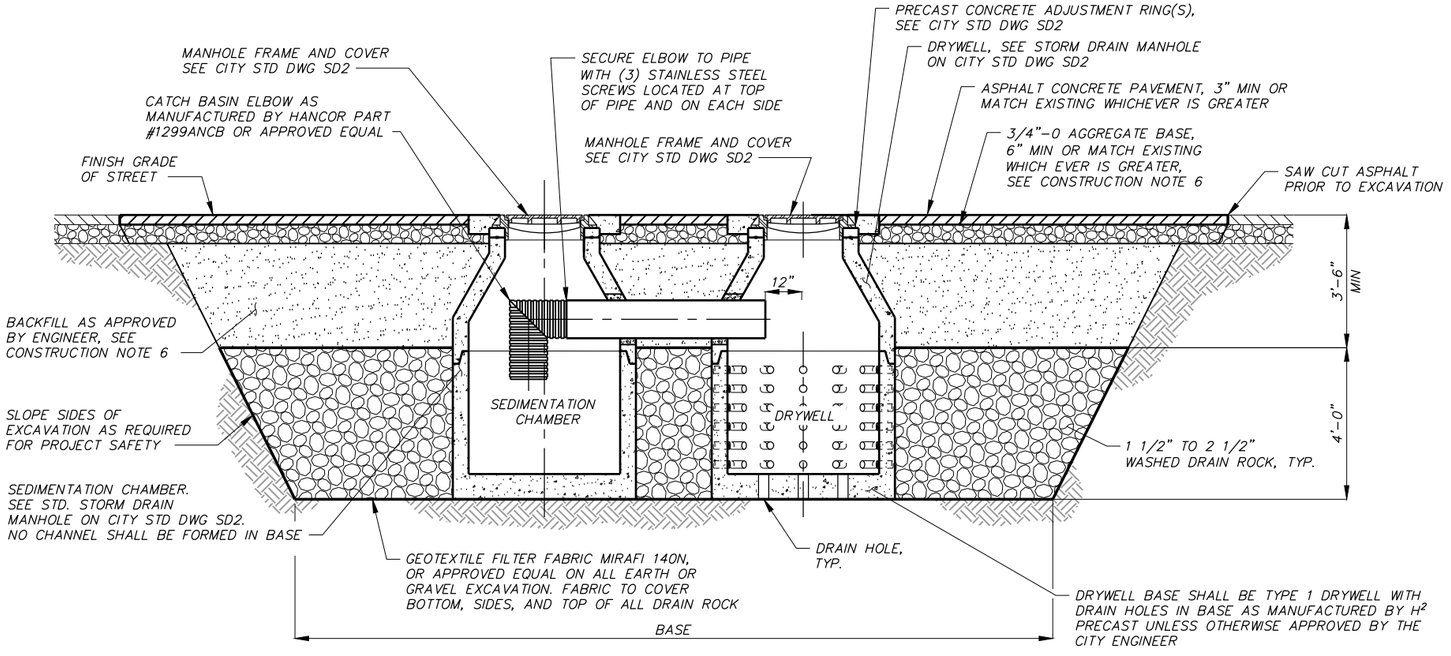
STORM DRAIN MANHOLE

FIGURE
SD2



PLAN

NTS



SECTION A

NTS

DESIGN NOTES

1. DRYWELL DRAINAGE AREA DESIGNED FOR 25 YEAR EVENT USING TYPE II STORM EVENT WITH A TIME OF CONCENTRATION OF 5 MIN.
2. DRYWELL DESIGNED TO DRAIN 12,600 SQUARE FEET OF STREET AREA.
3. MINIMUM BASE AREA OF 12'x20'.
4. ASSUMES POORLY GRADED SAND WITH SILT WITH A DESIGN INFILTRATION RATE OF 5" PER HOUR. SHOULD SOIL CONDITIONS SUCH AS CALICHE, HARD PAN, CLAY, SILT, ECT. BE ENCOUNTERED, THE CONTRACTOR SHALL NOTIFY THE CITY IMMEDIATELY. THE ACTUAL SIZE OF THE EXCAVATED AREA MAY BE ADJUSTED TO ACCOMMODATE DIFFERENT SOIL TYPES.
5. GROUNDWATER MUST BE A MINIMUM 5' BELOW BASE OF DRYWELL.
6. DRYWELLS SHALL NOT BE INSTALLED WITHIN THE 2-YEAR TIME OF TRAVEL OF AN EXISTING IRRIGATION OR DRINKING WELL. WHERE A 2-YEAR TIME OF TRAVEL HAS NOT BEEN IDENTIFIED, DRYWELLS SHALL NOT BE INSTALLED WITHIN 500' OF THE WELL.

CONSTRUCTION NOTES

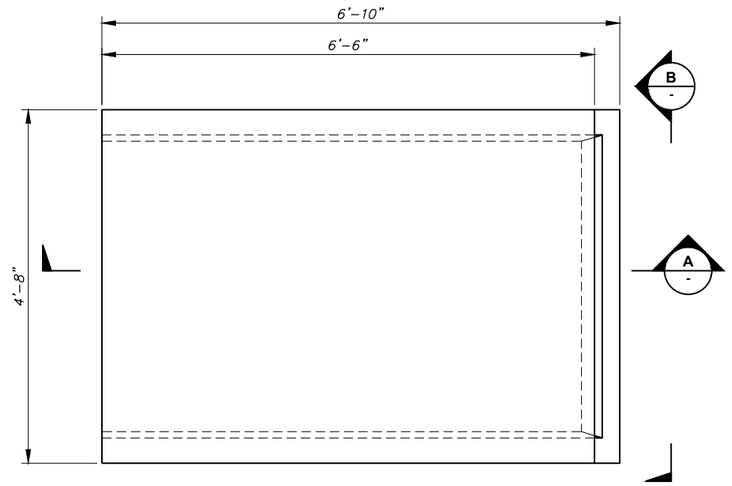
1. SOIL STABILITY WILL DETERMINE THE PLACEMENT OF SEDIMENTATION CHAMBER AND DRYWELL. EXCAVATION SHALL NOT RESULT IN CURB, SIDEWALK, OR OTHER STRUCTURES TO BE UNDERMINED.
2. PRECAST SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C478.
3. ACTUAL LOCATION OF DRYWELL TO BE APPROVED BY CITY PRIOR TO CONSTRUCTION.
4. SEAL ALL PIPE PENETRATIONS WATERTIGHT WITH NONSHRINK GROUT.
5. PRECAST SECTIONS TO BE PLACED ON NATIVE UNDISTURBED SOIL.
6. ALL AGGREGATE BASE AND BACKFILL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SEDIMENTATION CHAMBER AND DRYWELL

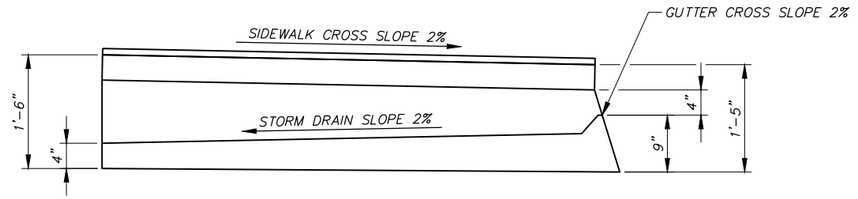
FIGURE

SD3

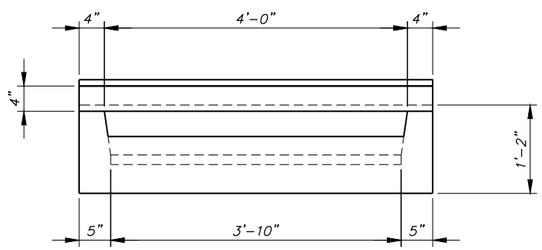


NOTE
1. SPECIAL CURB INLET TYPE 2 SHALL BE AS MANUFACTURED BY WILBERT PRECAST, SPECIAL CURB INLET TYPE 2, MODEL NO. 1840 OR APPROVED EQUAL.

PLAN



SECTION A



SECTION B

REBAR
#4 BAR AT 10" OC, EW, IN LID
#4 U-BAR AND #4 BAR STRAIGHTS IN BASE AT 10" OC

SPECIAL CURB INLET TYPE 2

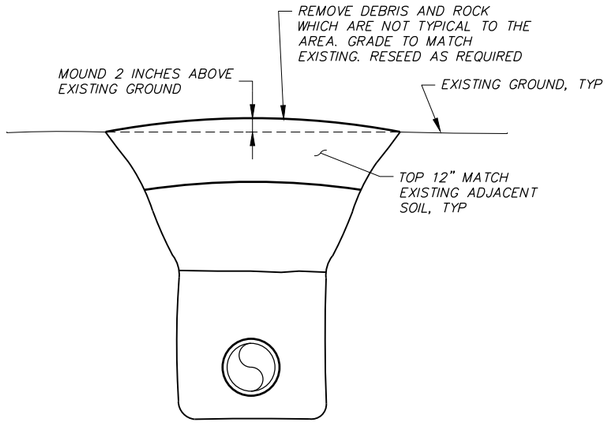
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

CURB INLET

FIGURE

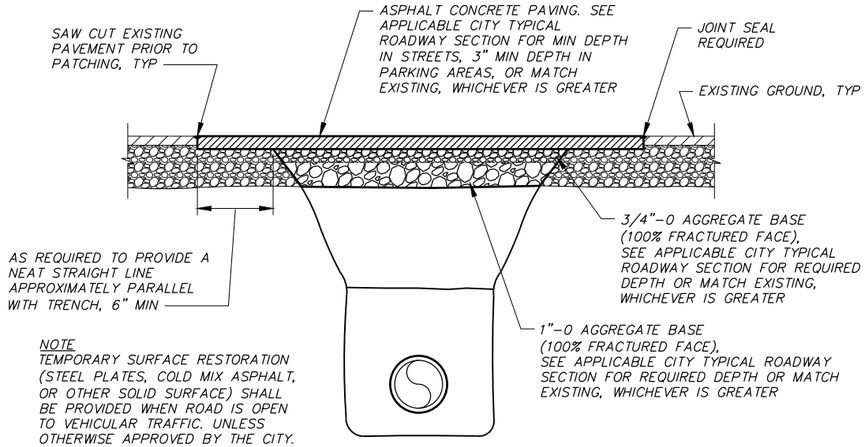
SD4



SURFACE RESTORATION

NATURAL SURFACES

NTS

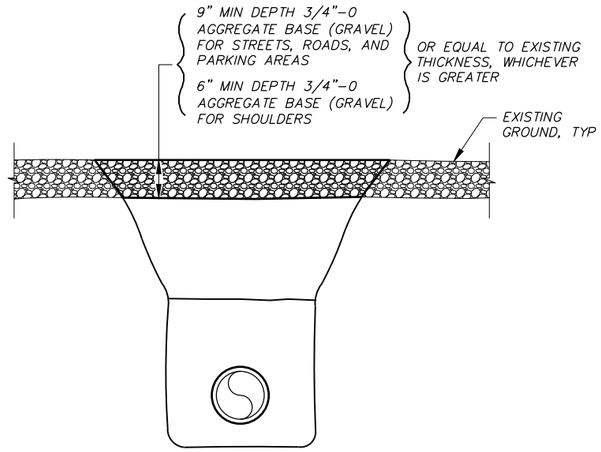


NOTE
TEMPORARY SURFACE RESTORATION (STEEL PLATES, COLD MIX ASPHALT, OR OTHER SOLID SURFACE) SHALL BE PROVIDED WHEN ROAD IS OPEN TO VEHICULAR TRAFFIC. UNLESS OTHERWISE APPROVED BY THE CITY.

SURFACE RESTORATION

PAVED SURFACES

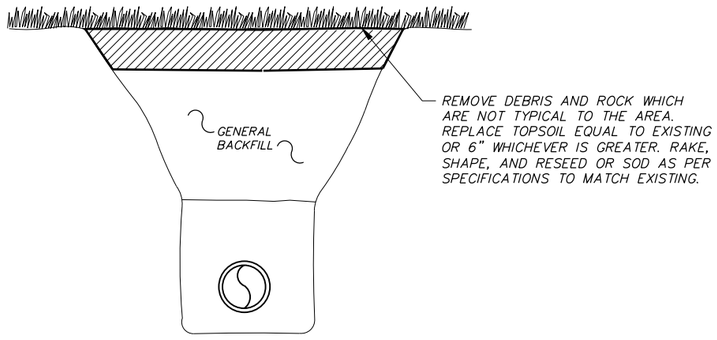
NTS



SURFACE RESTORATION

GRAVEL SURFACES

NTS



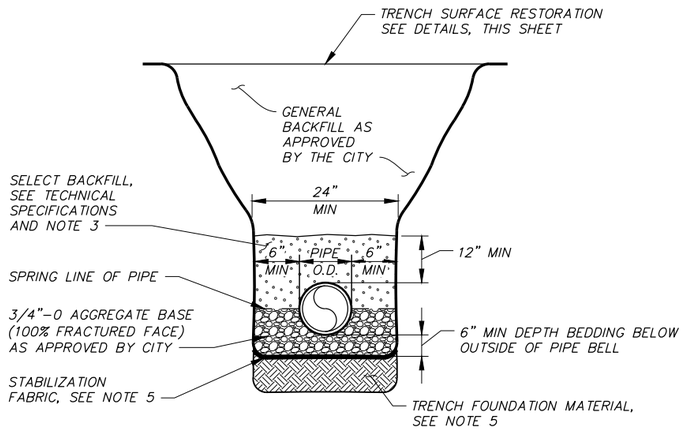
TRENCH RESTORATION

LAWNS & LANDSCAPED AREAS

NTS

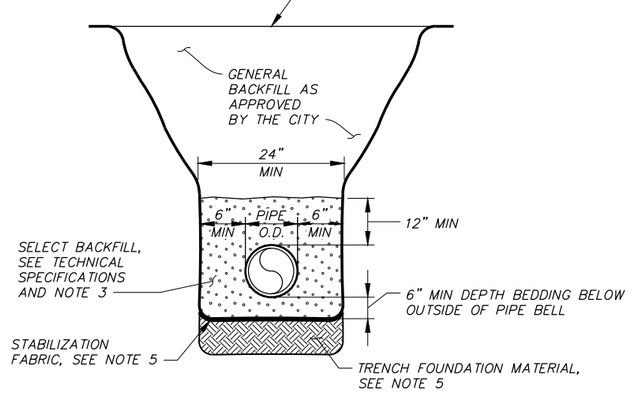
TRENCH BEDDING AND BACKFILL NOTES

1. SURFACING OF PAVED AREAS SHALL COMPLY WITH CITY STANDARD STREET DRAWINGS.
2. ALL BACKFILL MATERIAL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D1557 AND SHALL BE PLACED AND COMPACTED IN 6" LIFTS, UNLESS NOTED OTHERWISE.
3. BACKFILL FROM PIPE BOTTOM TO 12-INCHES ABOVE PIPE SHALL BE COMPACTED TO 85% MAXIMUM DRY DENSITY PER ASTM D1557. COMPACTION BY HAND TAMPING WILL BE ALLOWED IF 85% DENSITY IS ACHIEVED. OTHERWISE MECHANICAL TAMPING WILL BE REQUIRED.
4. BACKFILL INSPECTION/TESTING
   - TRENCH DEPTH OF LESS THAN 1 FT VISUAL INSPECTION BY CITY.
   - TRENCH DEPTH GREATER THAN 1 FT:
     -- BELOW FINISH AGGREGATE BASE (100% FRACTURED FACE) GRADE: 1 TEST PER 300 FT OF TRENCH AND EVERY 1.5 FT OF FILL.
     -- AT FINISH AGGREGATE BASE (100% FRACTURED FACE) GRADE: 1 TEST PER 300 FT OF TRENCH OR 2 TESTS PER STREET CROSSING.
   - IF BACKFILL MATERIAL OR COMPACTION EQUIPMENT CHANGES, COMPACTION TESTING SHALL IMMEDIATELY BE PERFORMED TO VERIFY THAT DENSITY IS BEING ACHIEVED.
5. STABILIZATION FABRIC AND IMPORTED FOUNDATION MATERIAL SHALL BE REQUIRED WHERE NATURAL SOIL CONDITIONS IN THE BOTTOM OF THE TRENCH ARE UNSUITABLE FOR PROPER PIPE INSTALLATION.



SEWER AND STROM DRAIN LINE TRENCH BEDDING AND BACKFILL

NTS



WATER LINE TRENCH BEDDING AND BACKFILL

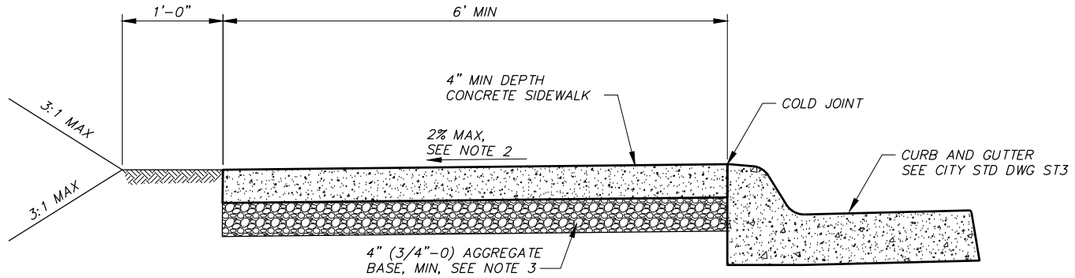
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

TRENCH BEDDING, BACKFILL, AND SURFACE RESTORATION

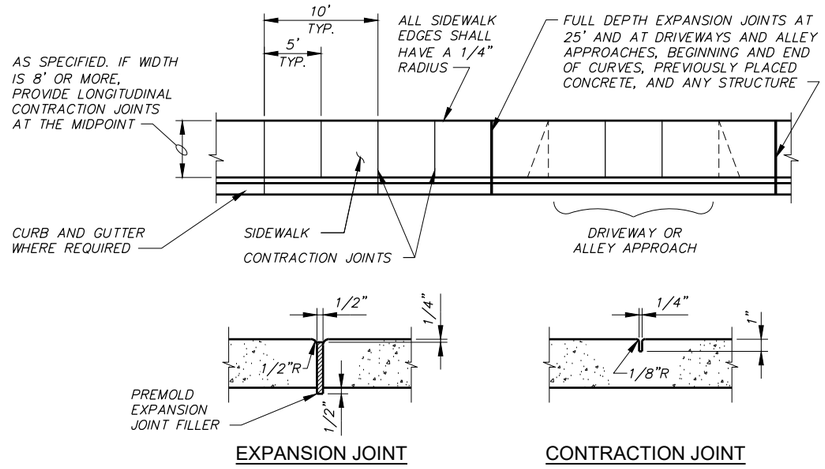
FIGURE

ST1



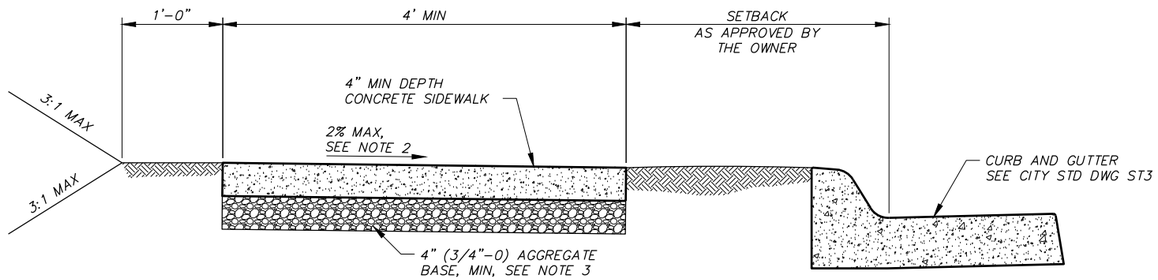
SIDEWALK SECTION

NTS



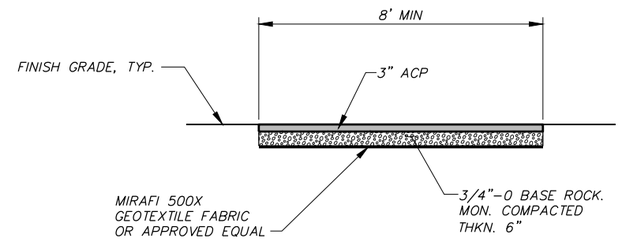
SIDEWALK JOINTING DETAILS

NTS



SIDEWALK SECTION WITH SETBACK

NTS



MULTI-USE PATH

NTS

NOTES

1. PROVIDE EXPANSION JOINTS AROUND POLES, BOXES, AT THE ENDS OF EACH DRIVEWAY, AROUND ANY FIXTURES WHICH PROTRUDE THROUGH THE SIDEWALK, AND BETWEEN ANY STRUCTURE IMMEDIATELY ADJACENT TO THE SIDEWALK.
2. TO INSURE SLOPES DO NOT EXCEED MAXIMUM ALLOWABLE SLOPES, IT IS RECOMMENDED TO SET SLOPES LOWER THAN MAXIMUM ALLOWABLE SLOPES AS FOLLOWS:
   - FOR 2% MAX, SET SLOPE AT 1.5%
   - FOR 8.33% MAX, SET SLOPE AT 7.5%

   SIDEWALK WITH SLOPES EXCEEDING MAXIMUM ALLOWABLE VALUES SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.
3. COMPACT AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
4. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4,000 PSI CONCRETE.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

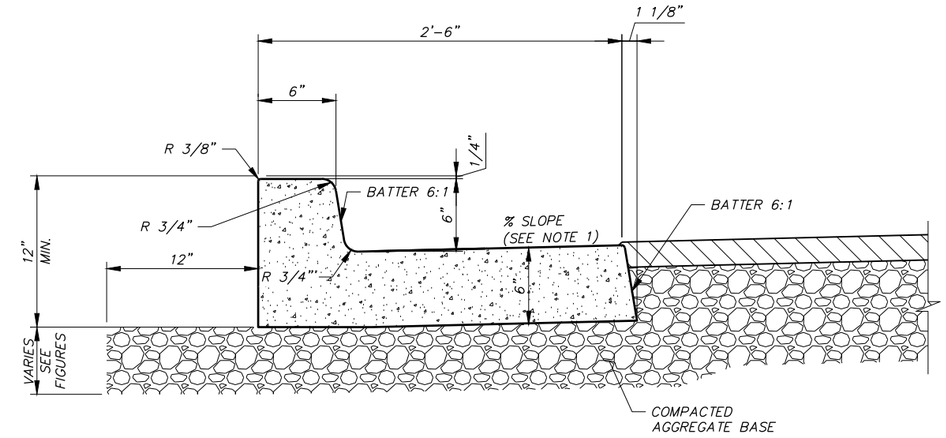
SIDEWALK DETAILS

FIGURE

ST2

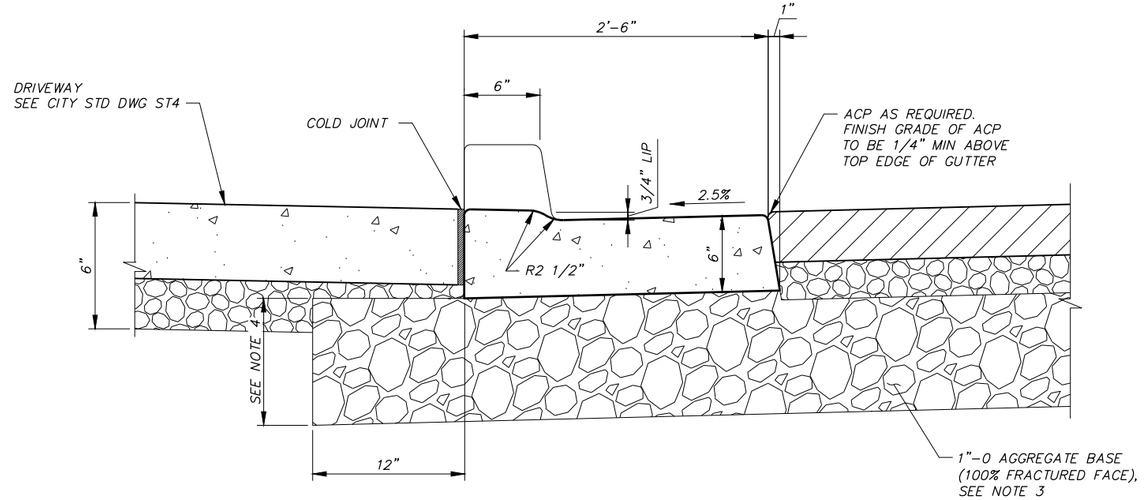
NOTES

1. GUTTER CROSS SLOPE SHALL BE MINIMUM 2% AND MAXIMUM 3% UNLESS OTHERWISE APPROVED BY THE CITY.
2. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4,000 PSI CONCRETE.
3. COMPACT AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
4. AGGREGATE BASE THICKNESS BELOW CURB AND GUTTER SHALL BE 6" THICK.
5. SEE CITY STD DWG XXX FOR CURB AND GUTTER JOINT REQUIREMENTS.
6. CONCRETE SHALL BE TROWELED SMOOTH PRIOR TO APPLYING BROOM FINISH.
7. INSPECTION CRITERIA:
   - 7.1. COMPLETED CURB AND GUTTER SHALL NOT CAUSE PUDDING ISSUES. PUDDLE WIDTH SHALL NOT EXCEED 75% OF THE GUTTER WIDTH AND PUDDLE LENGTH SHALL NOT EXCEED 2'.
   - 7.2. CROSS SLOPE OF THE GUTTER SHALL BE A MINIMUM OF 1.5% AND A MAXIMUM OF 3.5% AS MEASURED BY A 2' ELECTRONIC LEVEL.
   - 7.3. THERE SHALL BE NO BREAK POINTS OR REVERSE SLOPE IN THE GUTTER CROSS SLOPE AS MEASURED BY A 2' ELECTRONIC LEVEL. THE MAXIMUM ALLOWABLE GAP BETWEEN THE LEVEL AND THE GUTTER SURFACE SHALL BE 1/8".
   - 7.4. WHEN A 6 FOOT LONG STRAIGHTEDGE IS LAID ON THE TOP FACE OF THE CURB OR ON THE SURFACE OF THE GUTTER, THE SURFACE SHALL NOT VARY MORE THAN 0.02 FEET FROM THE EDGE OF THE STRAIGHTEDGE EXCEPT AT GRADE CHANGES OR VERTICAL CURVES.
   - 7.5. THE CONTRACTOR SHALL CONSTRUCT ALL CURB AND GUTTER WITHIN 0.02 FEET OF TRUE LINE, WITHIN 0.02 FEET OF ESTABLISHED SURFACE GRADE, CROSS SECTION, SLOPE, AND WITHIN 0.02 FEET OF SPECIFIED THICKNESS.
8. WHEN INSTALLING NEW CURB AND GUTTER ON AN EXISTING PAVED STREET, THE ASPHALT SHALL BE CUT A MINIMUM OF 2 FEET FROM THE EDGE OF THE GUTTER OR AS NEEDED TO ACHIEVE COMPACTION OF THE AGGREGATE BASE BY MECHANICAL MEANS.



STANDARD CURB AND GUTTER

NTS



CURB AND GUTTER AT DRIVEWAY

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

CURB AND GUTTER

FIGURE

ST3

NOTES

1. RESIDENTIAL DRIVEWAYS AND SIDEWALKS SECTIONS THROUGH DRIVEWAYS SHALL HAVE A MINIMUM NOMINAL THICKNESS OF 6".

2. CONCRETE FOR COMMERCIAL USE AND ALLEY APPROACHES SHALL HAVE A MINIMUM NOMINAL THICKNESS OF 8". ALL CONCRETE SHALL BE COMMERCIAL GRADE 4,000 PSI CONCRETE.

3. THE 2% CROSS-SLOPE OF SIDEWALK IS MEASURED FROM HORIZONTAL. THE 12:1 SLOPE OF SIDEWALK TRANSITION TO DRIVEWAY/ALLEY IS RELATIVE TO THE RUNNING SLOPE OF THE SIDEWALK. THE SLOPE OF THE APRON IS MEASURED RELATIVE TO HORIZONTAL, SEE NOTE 7.

4. THE DRIVEWAY SHALL NOT BE PLACED INTEGRAL WITH THE SIDEWALK, CURB, OR ANY DRIVEWAY TRANSITION SLAB AND SHALL BE ISOLATED WITH FULL DEPTH EXPANSION JOINTS.

5. DRIVEWAY CONTROL JOINS (NOT SHOWN) SHALL BE SPACED AT A MAXIMUM ON CENTER SPACING EQUAL TO THE SIDEWALK WIDTH OR TO MATCH EXISTING SIDEWALK CONTROL JOINT SPACING, WHICHEVER IS LESS.

6. DRIVEWAY WIDTH SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

   6.1. DRIVEWAYS SHALL NOT BE LOCATED CLOSER THAN 5 FEET TO SIDE PROPERTY LINES.

   6.2. DRIVEWAYS SHALL BE LOCATED A MINIMUM DISTANCE FROM CURB RETURNS AS REQUIRED BY TECHNICAL SPECIFICATIONS SECTION 5 STREETS SECTION 1.1.Q.5.

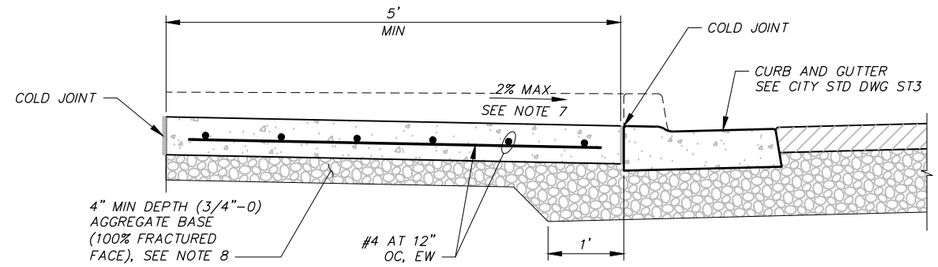
   6.3. MAXIMUM DRIVEWAY WIDTH SHALL BE 50% OF THE PROPERTY FRONTAGE OR 50 FEET WHICHEVER IS LESS. ADDITIONALLY, WHERE ROADSIDE SWALES ARE PRESENT, THE DRIVEWAY WIDTH SHALL IN NO CASE LIMIT THE SWALE CUMULATIVE LENGTH TO LESS THAN50% OF THE PROPERTY FRONTAGE.

7. TO ENSURE SLOPES DO NOT EXCEED ALLOWABLE SLOPES. IT IS RECOMMENDED TO SET SLOPES LOWER THAN MAXIMUM ALLOWABLE SLOPES AS FOLLOWS:

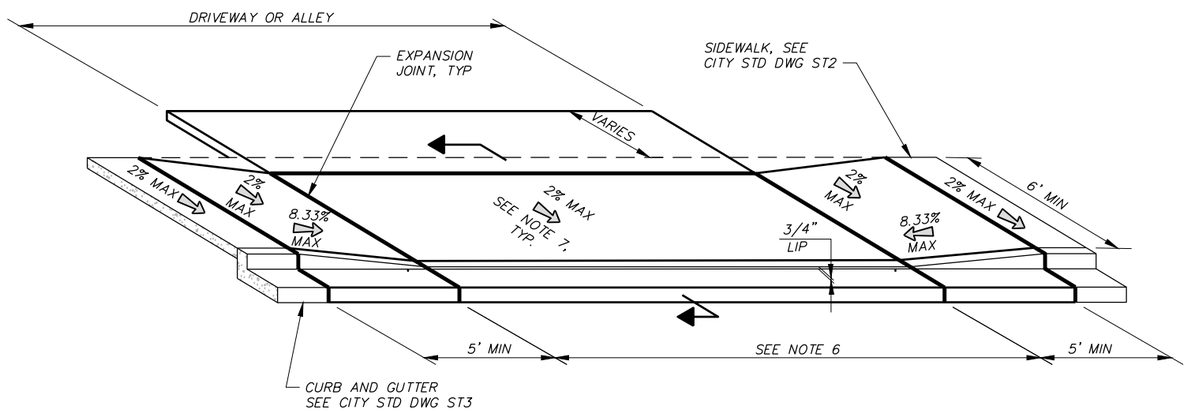
   - FOR 2% MAX, SET SLOPE AT 1.5%
   - FOR 8.33% MAX, SET SLOPE AT 7.5%

   DRIVEWAYS WITH SLOPES EXCEEDING MAXIMUM ALLOWABLE VALUES SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.

8. COMPACT AGGREGATE BASE (100% FRACTURED FACE) TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.



SECTION VIEW



DRIVEWAY RAMP

ISOMETRIC VIEW

NTS

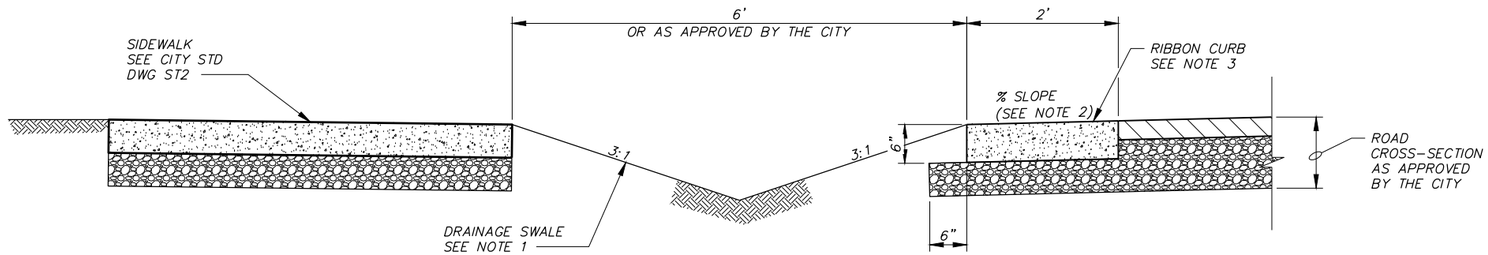
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

DRIVEWAY AND ALLEY RAMPS

FIGURE

ST4

NOTES
1. SLOPE SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY. DRAINAGE SWALE SHALL BE PLANTED WITH GRASS OR SOD OVER A MINIMUM OF 6" OF THE TOP SOIL.
2. NORMAL SLOPE SHALL BE 2.5% AND MAY VARY WITH THE CITY'S APPROVAL.
3. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4,000 PSI CONCRETE.



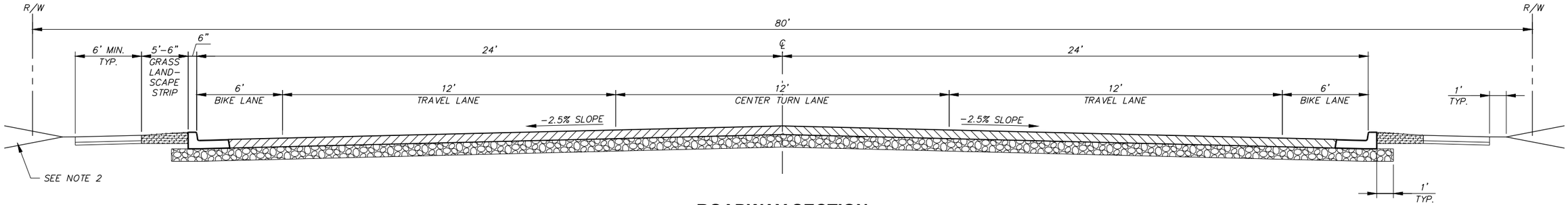
RIBBON CURB AND DRAINAGE SWALE

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

RIBBON CURB DRAINAGE SWALE

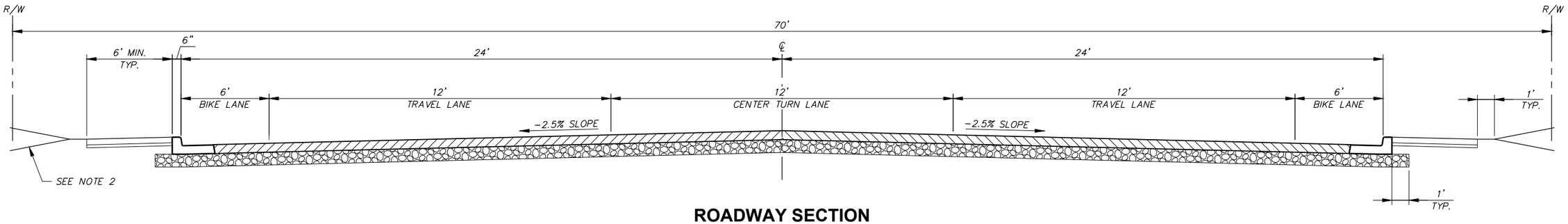
FIGURE
ST5



ROADWAY SECTION

80 FT. RIGHT-OF-WAY

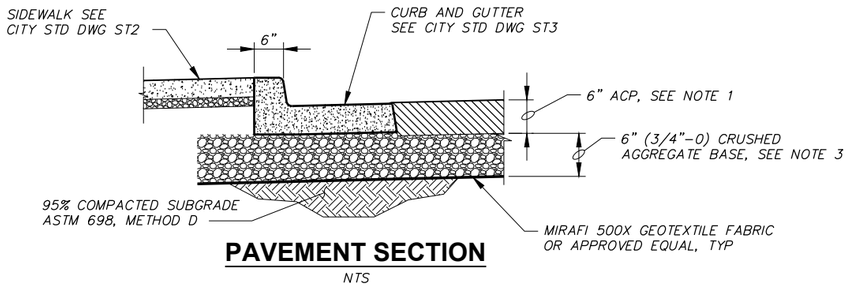
NTS



ROADWAY SECTION

70 FT. RIGHT-OF-WAY

NTS



PAVEMENT SECTION

NTS

NOTES

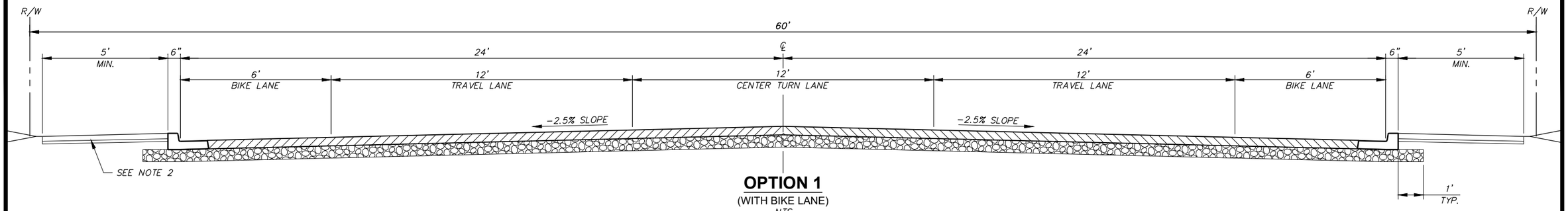
1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 2, 3" LIFTS.
2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
3. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

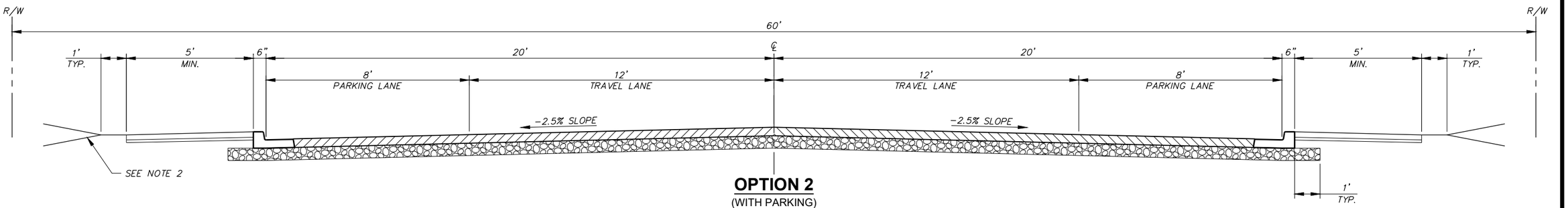
ARTERIAL CROSS SECTION

FIGURE

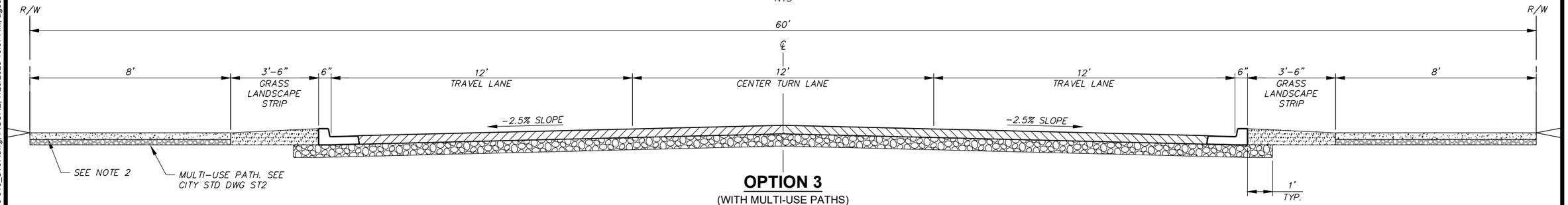
ST6



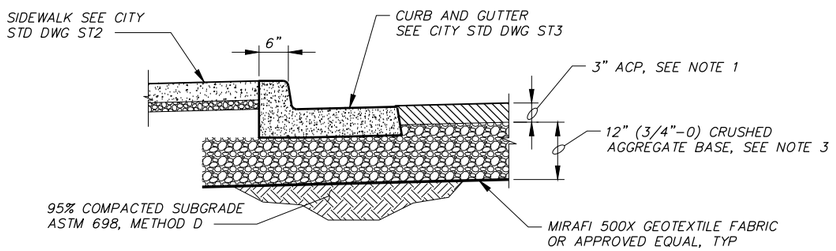
OPTION 1
(WITH BIKE LANE)
NTS



OPTION 2
(WITH PARKING)
NTS



OPTION 3
(WITH MULTI-USE PATHS)
NTS



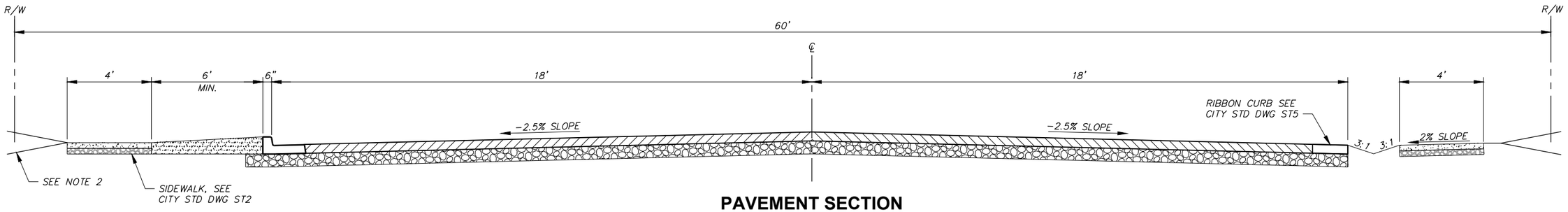
PAVEMENT SECTION
NTS

NOTES
1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 1 LIFT.
2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
3. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

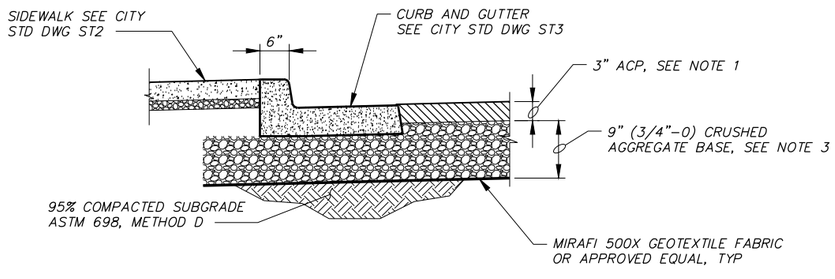
COLLECTOR CROSS SECTION

FIGURE
ST7



PAVEMENT SECTION

NTS



NOTES

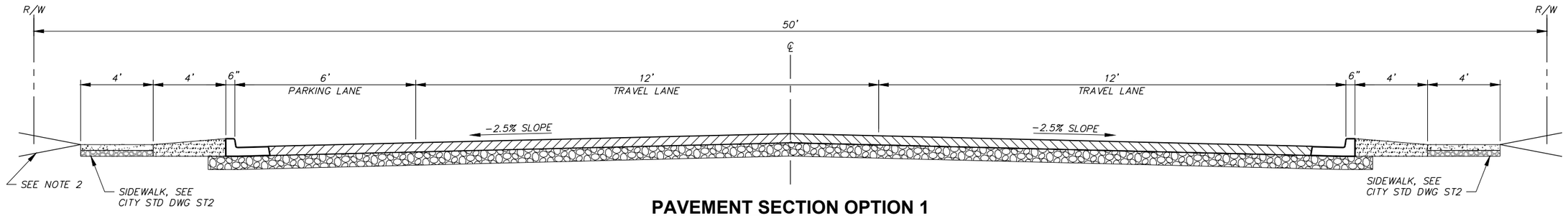
1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 1 LIFT.
2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
3. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

NEIGHBORHOOD COLLECTOR

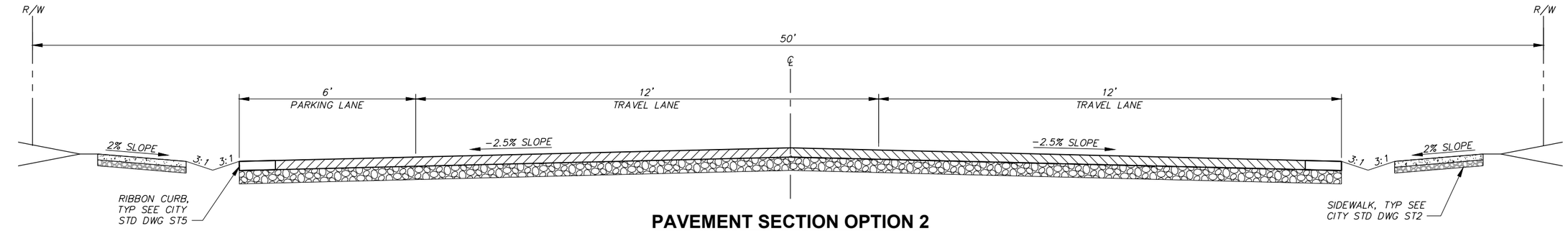
FIGURE

ST8



PAVEMENT SECTION OPTION 1

NTS

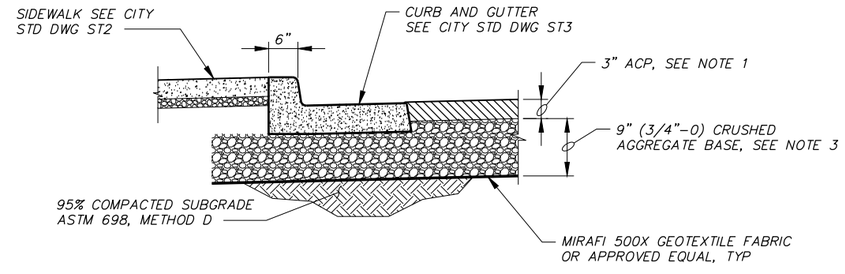


PAVEMENT SECTION OPTION 2

NTS

NOTES

1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 1 LIFT.
2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
3. SLOPES SHALL NOTE EXCEED 3:1 UNLESS APPROVED BY THE CITY. DRAINAGE SWALE SHALL BE PLANTED WITH GRASS OR SOD OVER A MINIMUM OF 6" OF TOP SOIL.
4. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.
5. ON STREET PARKING RESTRICTED TO ONE SIDE OF ROADWAY. PROVIDE NO PARKING SIGNS AS REQUIRED BY THE CITY ENGINEER.

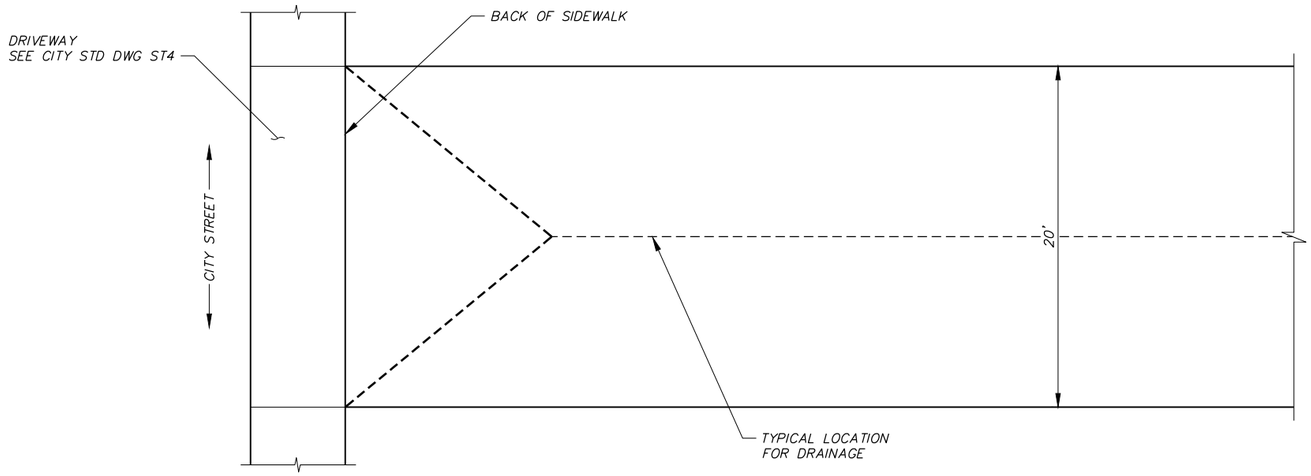


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

LOCAL 50 FOOT RIGHT-OF-WAY SECTION WITH SIDEWALK

FIGURE

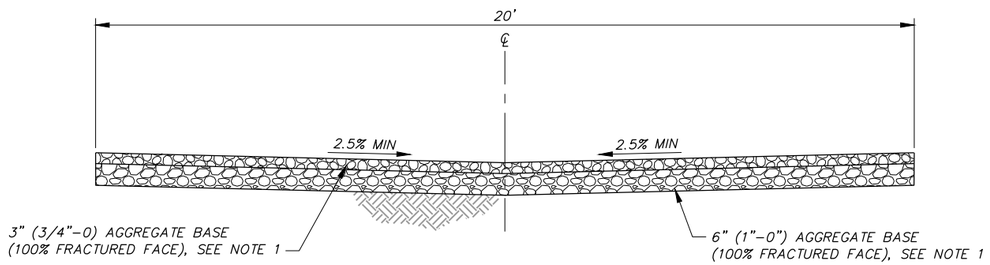
ST9



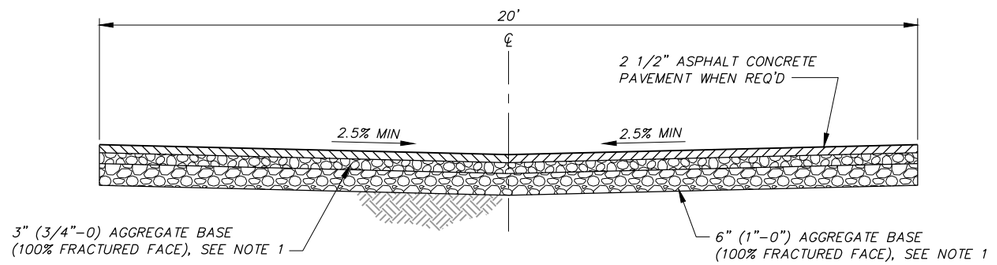
PLAN
NTS

NOTE

1. COMPACT AGGREGATE BASE (100% FRACTURED FACE) AND SUBGRADE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.



UNPAVED SECTION
NTS

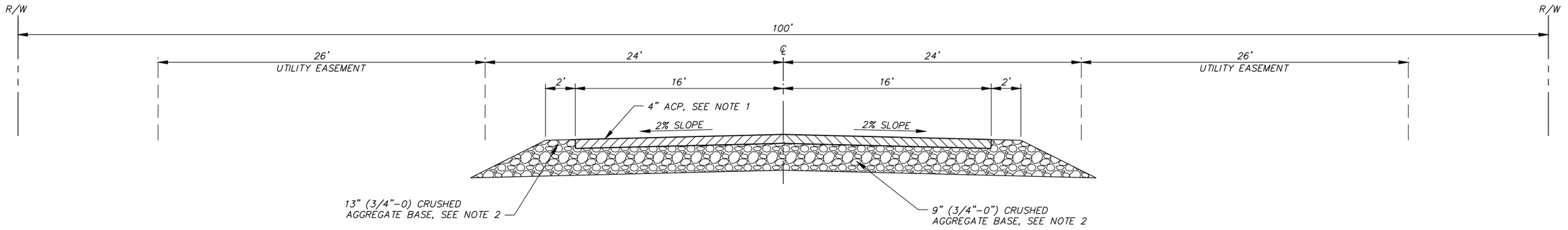


PAVED SECTION
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

ALLEY

FIGURE
ST10



NOTES
1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 2, 2" LIFTS.

2. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.

PAVEMENT SECTION

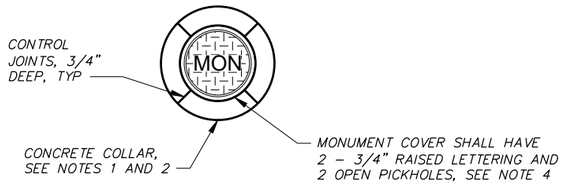
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

PORT OF MORROW ROAD SECTION

FIGURE

ST11



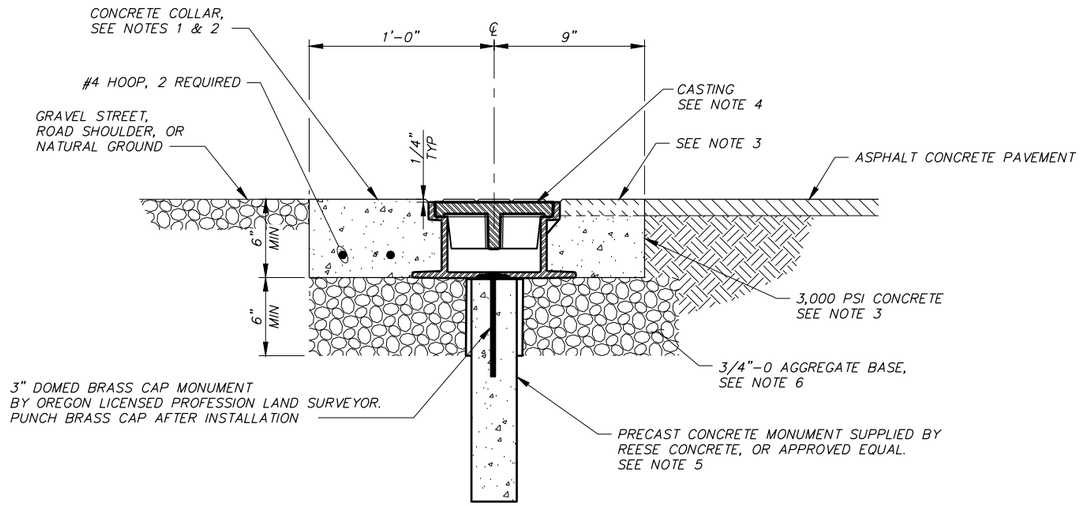
PLAN

REQUIREMENTS FOR CONCRETE COLLARS

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4000 PSI CONCRETE.
2. COLLAR TO BE FORMED CIRCULAR HAVING A DIAMETER OF 18" IN PAVED SURFACES AND 24" OTHERWISE.
3. SMOOTH BROOMED FINISH REQUIRED.
4. APPLY CONCRETE CURING COMPOUND.
5. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

CONCRETE COLLAR DETAIL

NTS



MONUMENT BOX DETAIL

NTS

NOTES

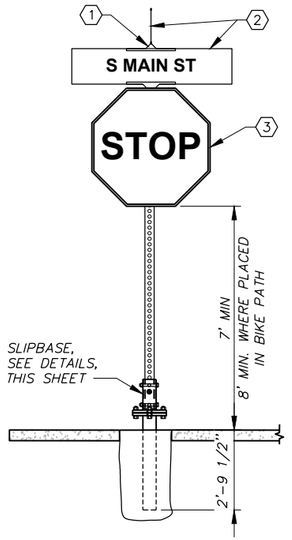
1. CONCRETE COLLAR REQUIRED IF THE MONUMENT AND MONUMENT BOX IS SET AFTER PAVEMENT WORK IS PERFORMED. IF THE MONUMENT AND MONUMENT BOX IS SET PRIOR TO PAVEMENT WORK THEN CONCRETE COLLAR IS NOT REQUIRED. SEE NOTE 3
2. ALL MONUMENTS SHALL HAVE A CONCRETE COLLAR IF INSTALLED ON GRAVEL STREET, ROAD SHOULDER, OR NATURAL GROUND.
3. IF MONUMENTS ARE SET PRIOR TO PAVEMENT WORK, CONCRETE MAY BE LEFT 2" BELOW FINISH GRADE AND FINISHED WITH ACP.
4. CASTING FRAME AND COVER SHALL BE EAST JORDAN PRODUCT #00368004 OR APPROVED EQUAL MEETING AASHTO H20 REQUIREMENTS.
5. PRECAST CONCRETE MONUMENT SHALL BE 5" MINIMUM DIAMETER SCHEDULE 125 PVC PIPE, 18" IN LENGTH, WITH 6" OF #3 REBAR CENTERED BELOW THE BRASS CAP.
6. COMPACT ALL AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

MONUMENT BOX

FIGURE

ST12



KEY NOTES

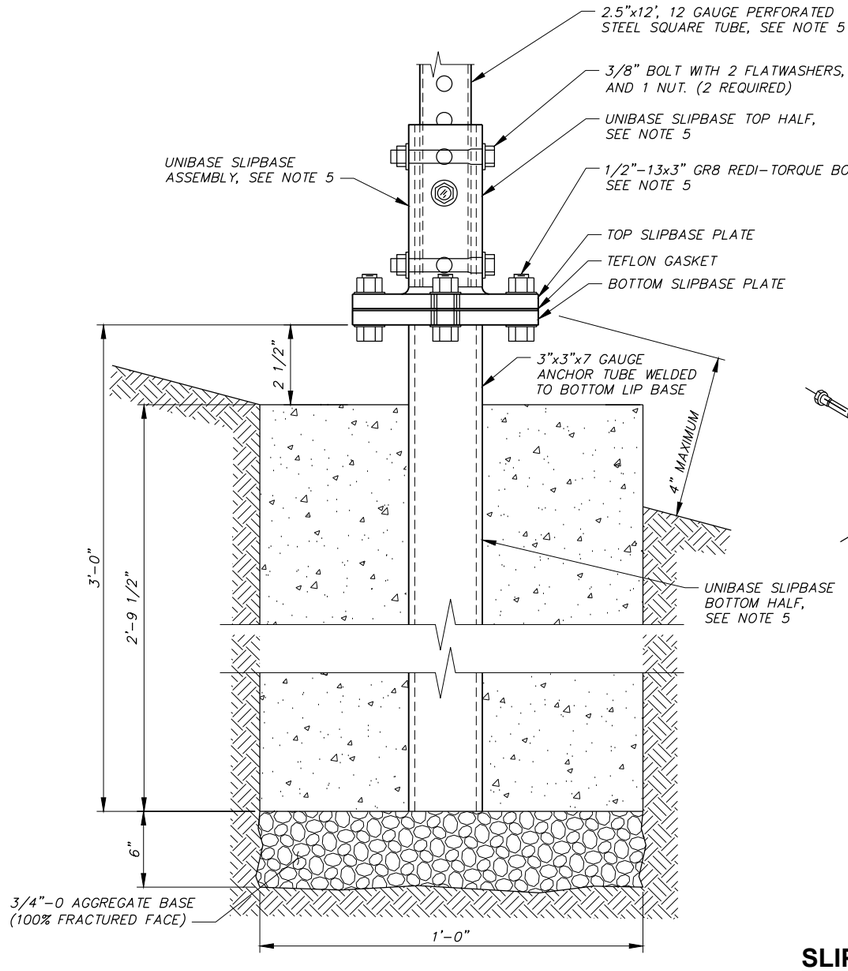
1. STREET NAME SIGN BRACKET SHALL BE ZUMAR 90° CROSS BRACKET FOR EXTRUDED BLADE, OR APPROVED EQUAL.
2. STREET NAME SIGNS SHALL BE MUTCD SIGN NO. D3-1, OR APPROVED EQUAL (VARIES X 6" MIN). CAPITAL LETTERS SHALL BE 4" IN HEIGHT AND LOWER CASE LETTERS SHALL BE 3" IN HEIGHT.
3. STOP SIGN SHALL BE MUTCD SIGN NO. R1-1 (30"X30"), OR APPROVED EQUAL

NOTES

1. STOP SIGN SHALL BE PLACED ON THE RIGHT SIDE OF THE ROADWAY, 4-FEET IN ADVANCE OF THE PROPOSED OR EXISTING CROSSWALK OR AS DIRECTED BY ENGINEER.
2. ORIENT SIGNS TO BEST FIT FIELD CONDITIONS.
3. SIGN SUPPORT SHALL BE PERFORATED STEEL SQUARE TUBE.
4. NO PERIODS SHALL FOLLOW ABBREVIATIONS ON STREET SIGNS.

TYPICAL TRAFFIC SIGN

NTS

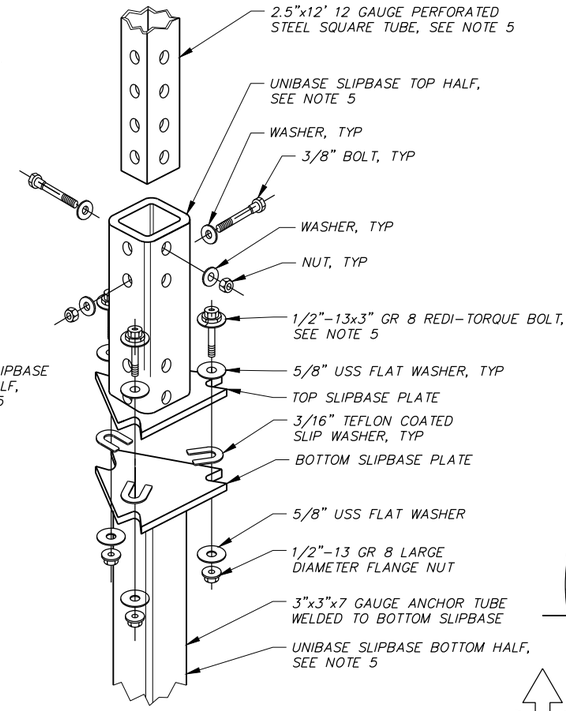


SLIPBASE ELEVATION

NTS

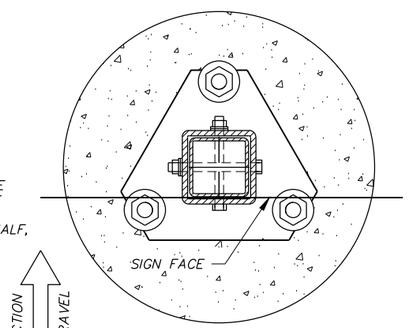
NOTES

1. MATERIAL GRADE FOR BASE HARDWARE CONNECTION SHALL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATION AND BASED ON CRASH TESTING.
2. SLIPBASE STEEL SHALL BE HOT DIPPED GALVANIZED OR APPROVED EQUAL.
3. FOOTING CONCRETE SHALL BE COMMERCIAL GRADE 3,000 PSI CONCRETE.
4. ALL SLIPBASES SHALL BE PRE-ASSEMBLED BY THE MANUFACTURER AND SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
5. TRAFFIC SAFETY PART NUMBERS:
   - UNIBASE SLIPBASE ASSEMBLY - KIT-SLIPBASEODOT36
   - UNIBASE SLIPBASE TOP HALF - DP00384
   - UNIBASE SLIPBASE BOTTOM HALF - DP00385
   - 2.5"x12', 12 GUAGE POST - DP00313
   - UNIBASE SLIPBASE REDI-TORQUE MATCH PLATE HARDWARE KIT - DP00387



SLIPBASE EXPLODED VIEW

NTS



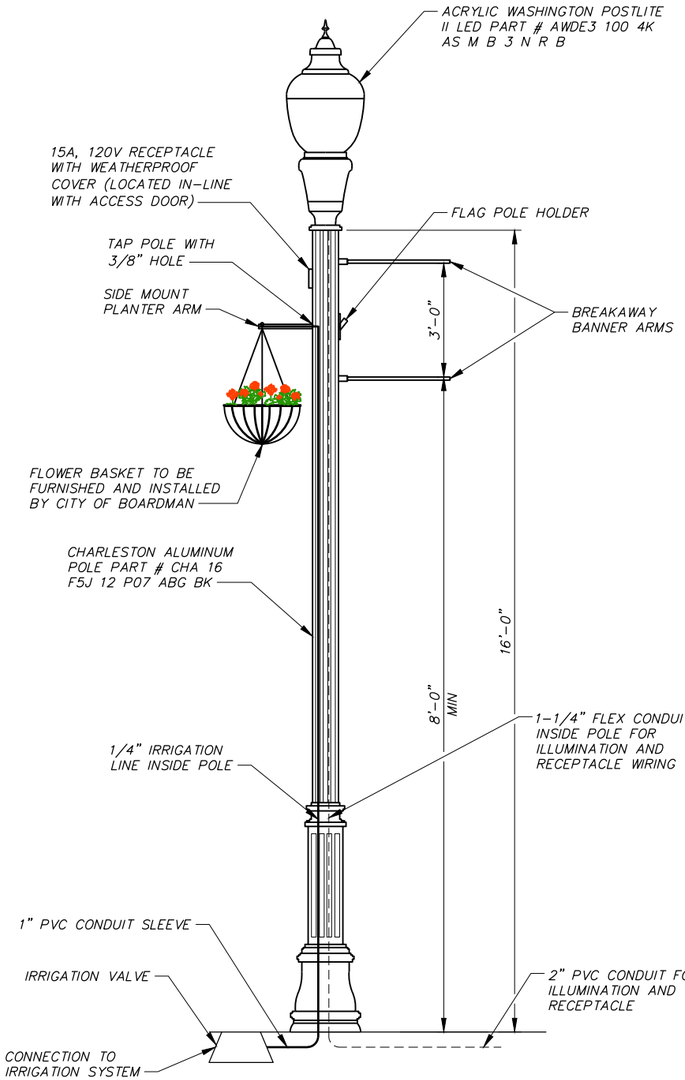
SLIPBASE PLAN

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

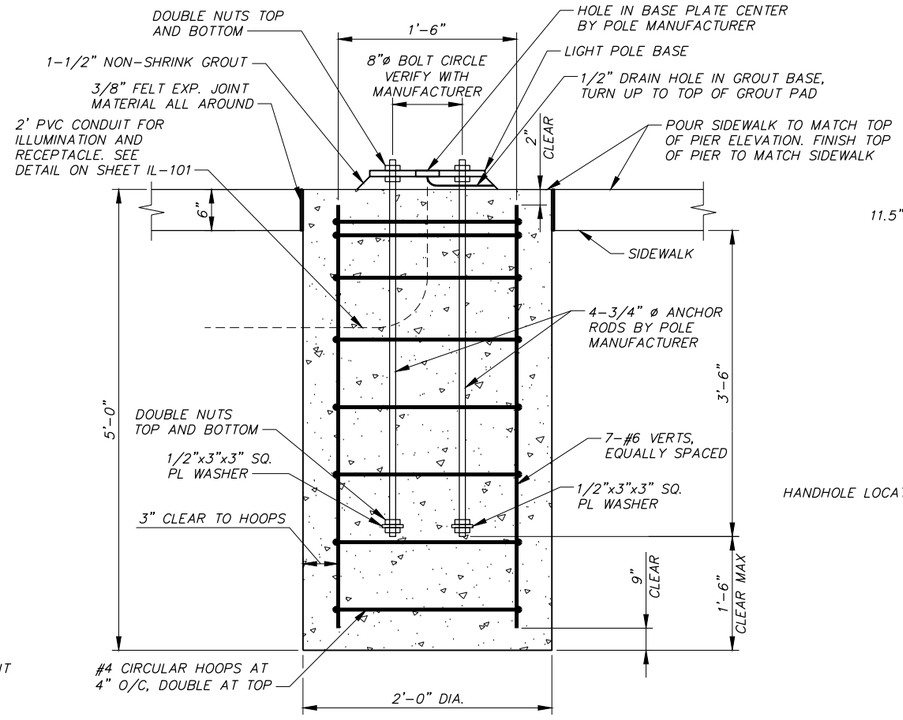
SIGNS

FIGURE
ST13



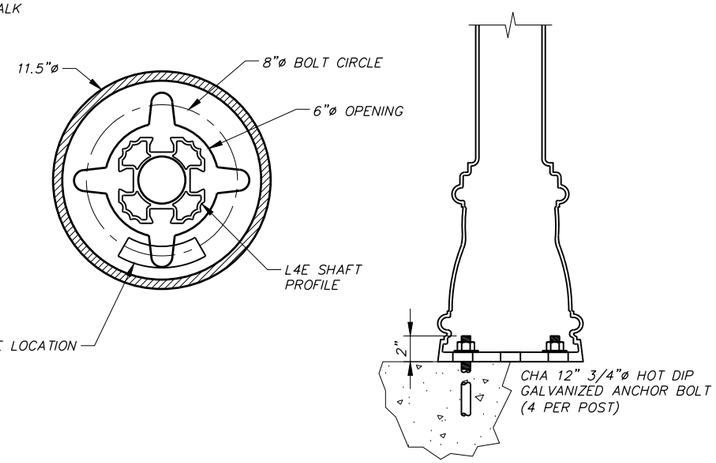
TYPICAL ORNAMENTAL POST-TOP LIGHT POLE INSTALLATION

NTS



ORNAMENTAL LIGHT POLE FOUNDATION DETAIL

NTS



BASE PLATE DETAIL

NTS

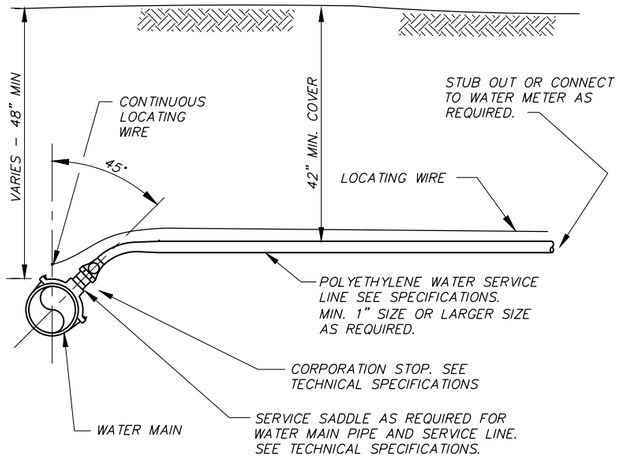
NOTE

1. LIGHTS MUST BE SPACED 150 FEET APART FROM EACH OTHER. ALL CORNERS OF INTERSECTION MUST HAVE LIGHT.

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

ILLUMINATION

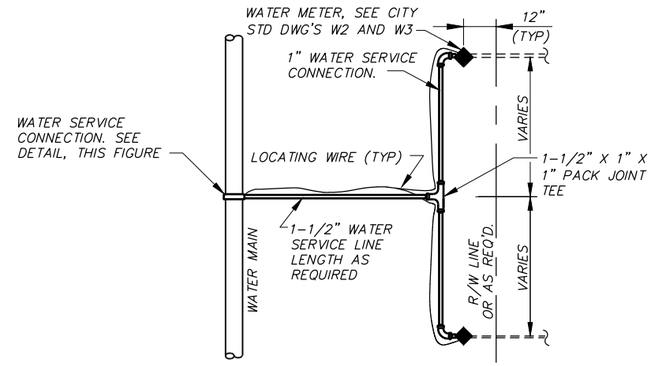
FIGURE
ST14



SECTION

TYPICAL SERVICE CONNECTION DETAIL

NTS

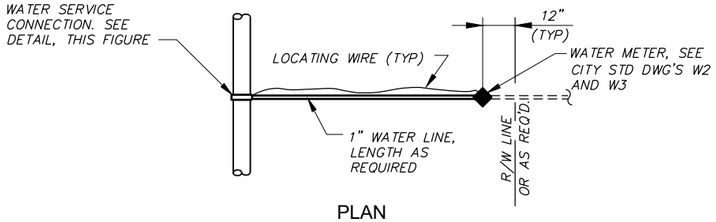


PLAN

NOTE
THIS LAYOUT IS SCHEMATIC ONLY. EACH LOCATION WILL REQUIRE SOME VARIATION OF DETAIL SHOWN.

MULTIPLE WATER SERVICES

NTS



PLAN

NOTE
THIS LAYOUT IS SCHEMATIC ONLY. EACH LOCATION WILL REQUIRE SOME VARIATION OF DETAIL SHOWN.

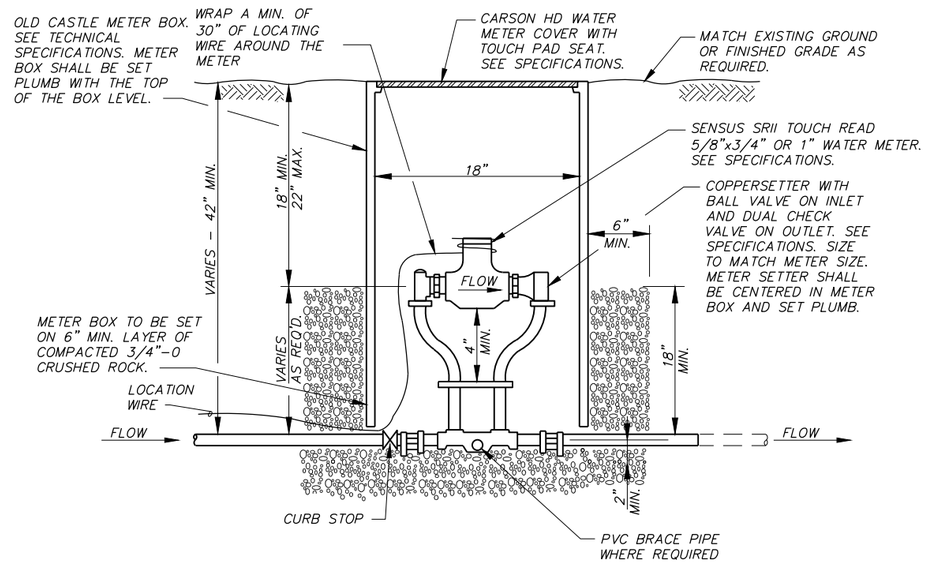
SINGLE WATER SERVICE LINE

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER SERVICE LINE SECTION AND PLAN DETAILS

FIGURE
W1



NOTE
ALL INSULATION FOR WATER METERS WILL BE COMPLETED BY THE CITY.

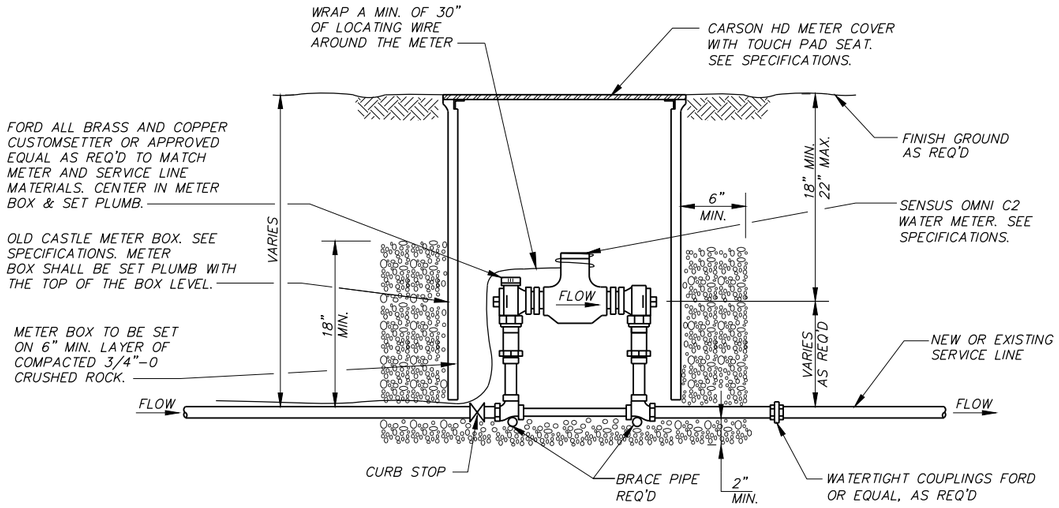
TYPICAL 1" OR SMALLER WATER METER INSTALLATION

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER METER DETAILS
1" OR SMALLER

FIGURE
W2



NOTE
ALL INSULATION FOR WATER METERS WILL BE COMPLETED BY THE CITY.

TYPICAL 1 1/2" OR 2" WATER METER INSTALLATION

(USING COPPER CUSTOM SETTER)

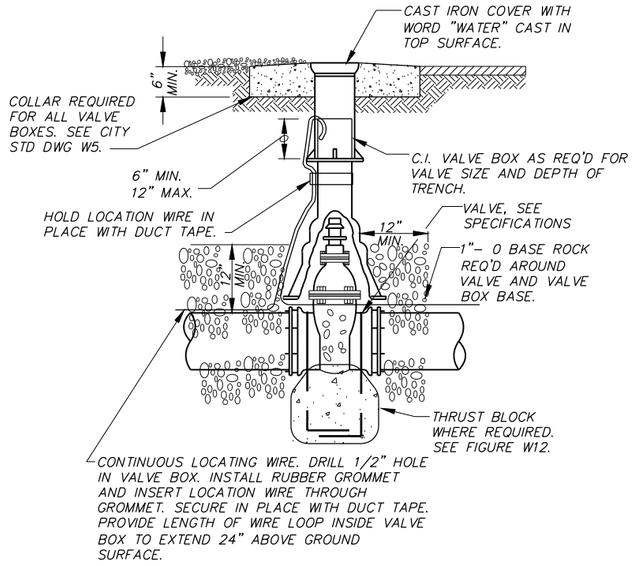
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER METER DETAILS
1 1/2" OR 2"

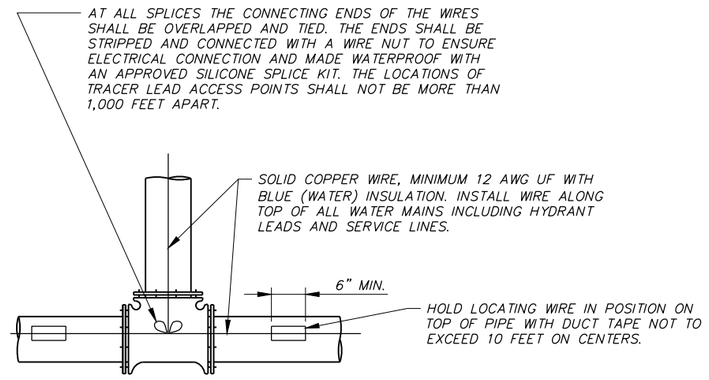
FIGURE

W3



VALVE BOX DETAIL

NTS



CONTNUOUS LOCATING WIRE DETAIL

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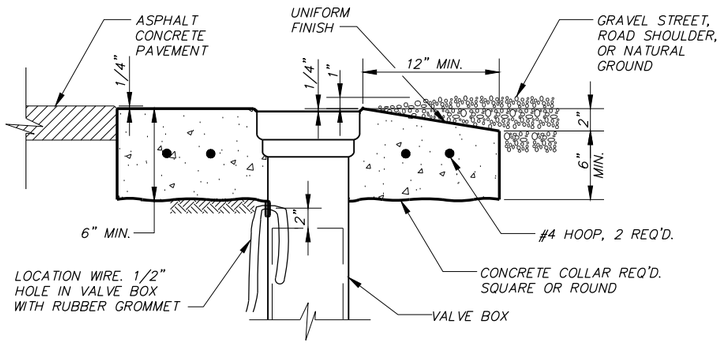
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

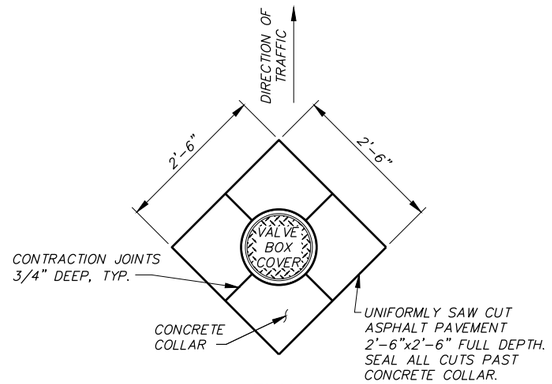
VALVE BOX AND CONTINUOUS LOCATING WIRE DETAIL

FIGURE

W4



TYPICAL SECTION



PLAN

REQUIREMENTS FOR CONCRETE COLLARS

1. *CONCRETE : 3/4", 7 SACK, 4000 PSI AT 28 DAYS, 2" TO 4" SLUMP, 4-7% AIR.*
2. *COLLAR TO BE FORMED AND UNIFORMLY SHAPED.*
3. *SMOOTH BROOMED FINISH REQUIRED.*
4. *CONTRACTOR TO STAMP OR TOOL AN ARROW, 6 INCHES IN LENGTH INTO THE CONCRETE COLLAR INDICATING FLOW DIRECTION.*
5. *APPLY CONCRETE CURING COMPOUND.*
6. *PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.*

VALVE CONCRETE COLLAR DETAIL

IN ASPHALT STREETS, GRAVEL STREETS, OR NATURAL GROUND

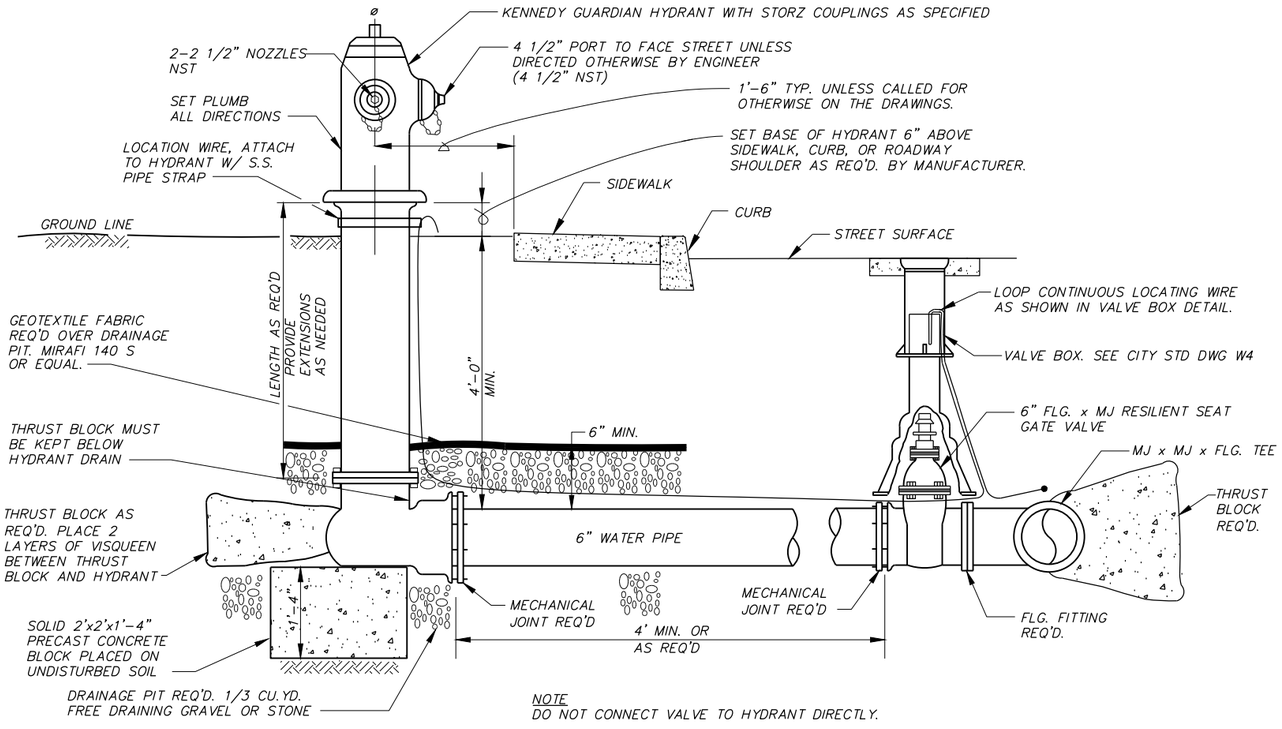
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

VALVE CONCRETE COLLAR DETAILS

FIGURE

W5



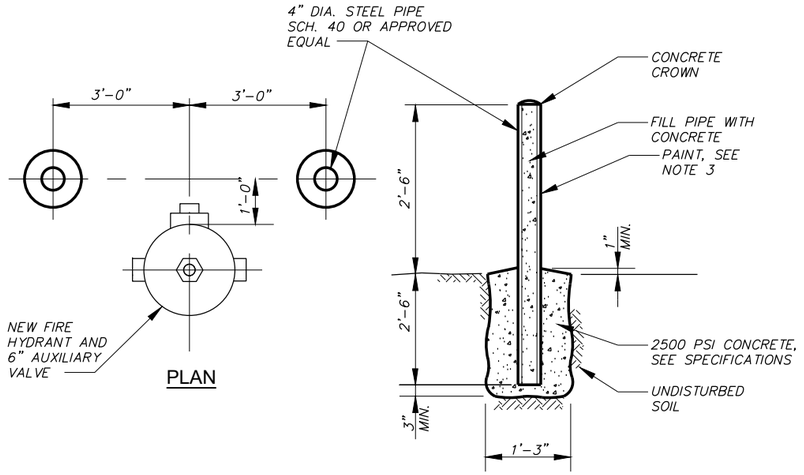
FIRE HYDRANT AND AUXILIARY VALVE DETAIL

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

FIRE HYDRANT AND AUXILIARY VALVE DETAIL

FIGURE
W6



PLAN

SECTION

NOTES
1. 4" DIAMETER STEEL PIPE SHALL BE PLUMB.
2. LOCATE PIPES EQUIDISTANT FROM FIRE HYDRANT.
3. PAINTING SHALL BE DONE ONLY AFTER SURFACE IS FREE OF RUST, OIL, AND GREASE. THE METAL SHALL BE PRIMED AND TWO FINISH COATS, YELLOW IN COLOR APPLIED.

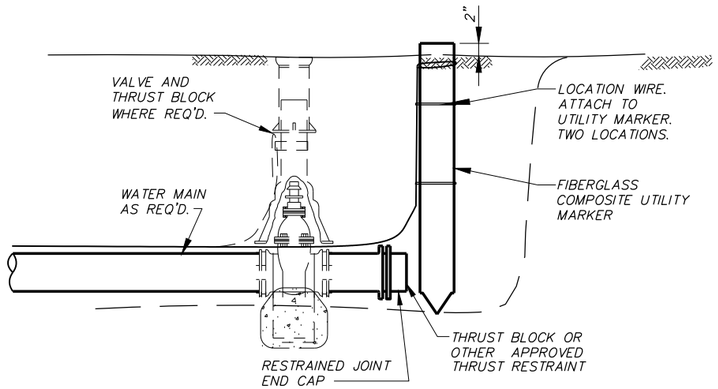
FIRE HYDRANT BARRICADE

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

FIRE HYDRANT BARRICADE

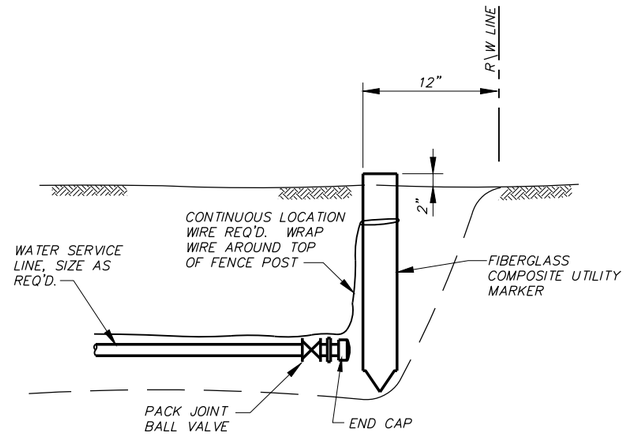
FIGURE
W7



NOTE
THE CONTRACTOR SHALL PROVIDE TWO REFERENCES FROM PERMANENT OBJECTS TO THE END OF WATER SERVICE LINE. THESE TIES SHALL BE SHOWN AND DIMENSIONED ON THE "RECORD DRAWINGS" PREPARED BY THE CONTRACTOR.

TYPICAL WATER MAIN STUB

SECTION
NTS



NOTE
THE CONTRACTOR SHALL PROVIDE TWO REFERENCES FROM PERMANENT OBJECTS TO THE END OF WATER SERVICE LINE. THESE TIES SHALL BE SHOWN AND DIMENSIONED ON THE "RECORD DRAWINGS" PREPARED BY THE CONTRACTOR.

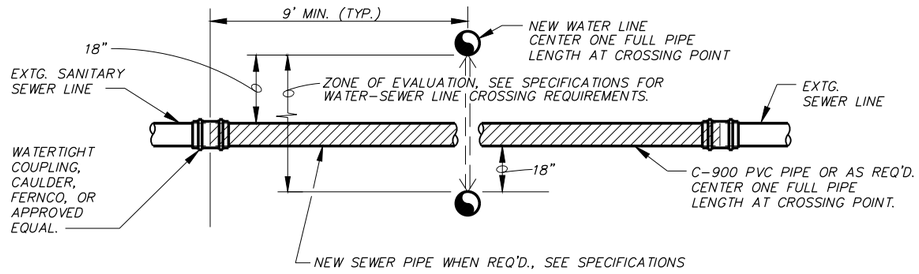
TYPICAL WATER SERVICE LINE STUB

SECTION
NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER MAIN AND SERVICE LINE STUB

FIGURE
W8



NOTES
1. PROVIDE SUPPORT BEAM WHEN REQUIRED. SEE SPECIFICATIONS.

2. ALL BACK FILL IN AREA OF WATER-SEWER CROSSING TO A DEPTH 12" ABOVE THE TOP OF THE HIGHEST PIPE SHALL BE 3/4"-0 BASE ROCK COMPACTED TO 95% OF ASTM D-698 LABORATORY DENSITY.

WATER-SEWER CROSSING

NEW WATER LINE CONSTRUCTION

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

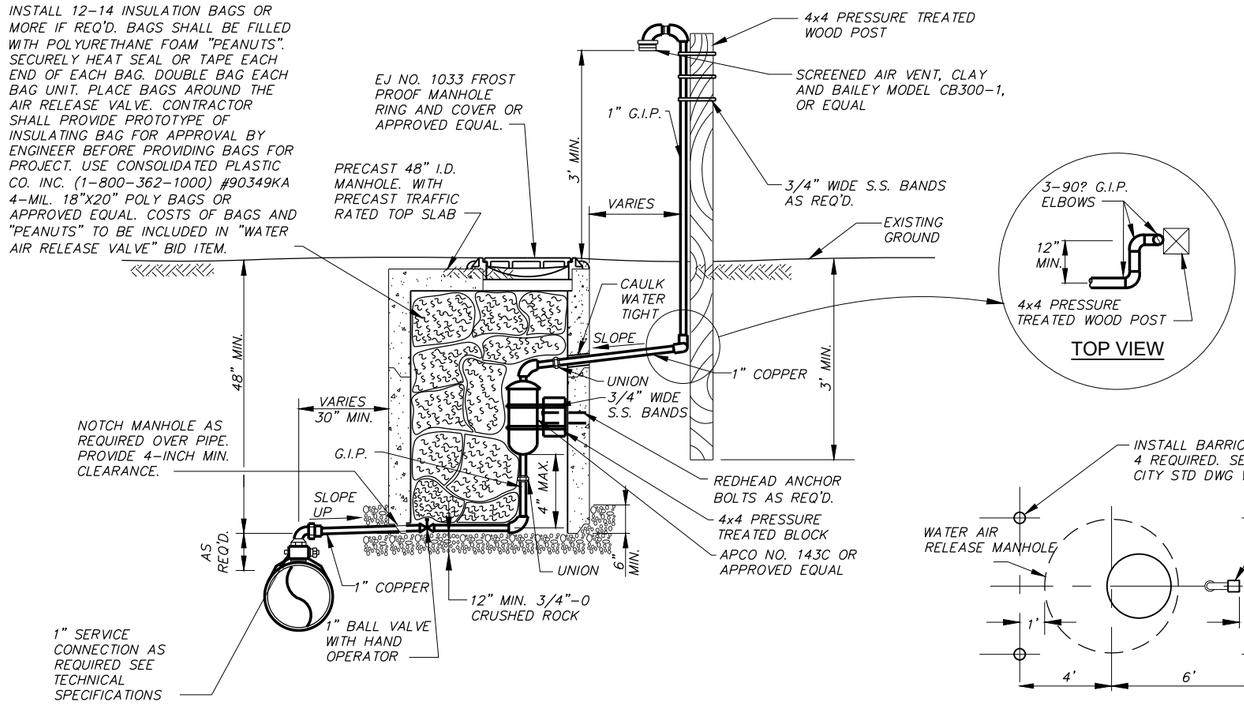
WATER-SEWER CROSSING

FIGURE

W9

NOTES

1. ALL AGGREGATE BASE (100% FRACTURED FACE) SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
2. COMBINATION AIR VALVE ASSEMBLIES SHALL BE INSTALLED AT HIGH POINTS ON TRANSMISSION WATER MAINS. COMBINATION AIR RELEASE ASSEMBLIES NEED NOT BE INSTALLED ON DISTRIBUTION WATER MAINS WHEN A WATER SERVICE LINE IS LOCATED AT THE HIGH POINT ON A WATER MAIN.



WATER AIR RELEASE VALVE

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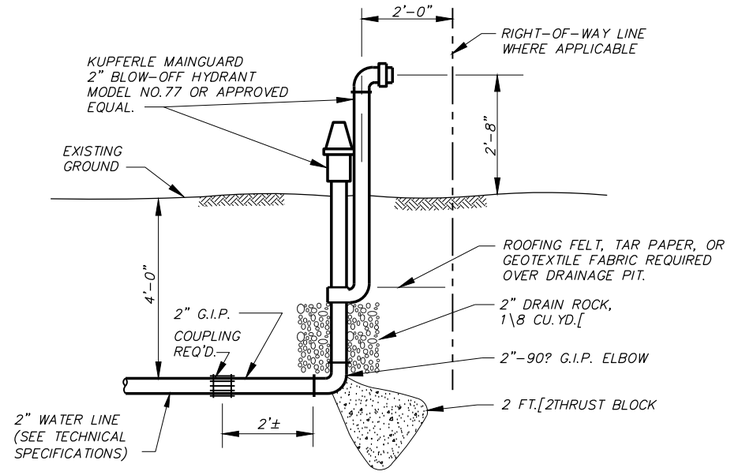
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER AIR RELEASE VALVE

FIGURE
W10



2" WATER LINE BLOW-OFF DETAIL

NTS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER LINE BLOW-OFF DETAIL

FIGURE
W11

THURST BLOCK NOTES

1. THRUST BLOCKS SHALL BE REQUIRED AT THE FOLLOWING LOCATIONS:
   - A. ALL CHANGES IN DIRECTION.
   - B. ALL DEAD–ENDS.
   - C. ALL VALVES 10–INCH AND LARGER (SIZE FOR CLOSED CONDITION).
   - D. AT OTHER LOCATIONS REQUIRED BY THE ENGINEER.
   - E. AT TEMPORARY DEAD ENDS DURIG PIPE INSTALLATION AS REQUIRED FOR TEMPORARY PRESSURE TESTING.
   - F. AT OTHER LOCATIONS REQUIRED BY THE CITY.
2. THRUST BLOCKS SHALL BE SIZED AS REQUIRED BY SOIL CONDITIONS AND DESIGN PRESSURE.
3. PLACE CONCRETE AGAINST UNDISTURBED TRENCH WALL.
4. CONCRETE SHALL BE 2,500 PSI MINIMUM.
5. ALL CONCRETE SHALL BE PLACED SO THAT PIPE, FITTING JOINTS, BOLTS AND NUTS, ETC., WILL BE ACCESSIBLE FOR REPAIRS.
6. PLACE TWO LAYERS OF VISQUEEN BETWEEN FITTING AND CONCRETE TO FACILITATE FUTURE REMOVAL OF THRUST BLOCK IF REQUIRED.
7. ANCHOR RODS SHALL BE 3/4" DIAMETER GALVANIZED STEEL RODS OR #6 EPOXY COATED REINFORCEMENT BAR, AASHTO M284, HAVING AN 18" MINIMUM EMBEDMENT IN CONCRETE.
8. THRUST BLOCKING SHALL BE SIZED FOR 150 PSI WATER PRESSURE
9. IF THE REQUIRED BEARING AREA IS LESS THAN 1 SQUARE FOOT, A THRUST BLOCK SHALL NOT BE REQUIRED.

DETERMINATION OF THRUST BLOCK BEARING AREA

NOTE
WHEN THRUST BLOCK BEARING AREA IS NOT SPECIFIED ON THE PLANS OR DETERMINED BY THE PROJECT ENGINEER, THE FOLLOWING PROCEDURE SHALL BE USED TO DETERMINE REQUIRED BEARING AREA.

1. DETERMINE THRUST (T) FOR TYPE OF FITTING OR JOINT AND SIZE OF PIPE, FROM TABLE NO. 1 OR TABLE NO. 3.
2. DETERMINE BEARING CAPACITY (B) OF SOIL FROM TABLE NO. 2.
3. DETERMINE REQUIRED BEARING AREA (A) AS FOLLOWS:
   $A = T - B$

EXAMPLE: DESIGN PRESSURE = 175 PSI
PIPE = 12"
FITTING = TEE
SOIL – SANDY GRAVEL
FROM TABLE NO. 1: T = 15,310 LB.
FROM TABLE NO. 2: B = 3000 LB/FT²

$$A = \frac{15{,}310 \times 1.75}{3{,}000} = 8.9 \text{ FT}^2$$

TABLE NO.1
THRUST AT FITTINGS IN POUNDS AT 100 PSI OF WATER PRESSURE

PIPE SIZE	TEES AND DEAD ENDS	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4"	1,850	2,610	1,420	720	394
6"	3,800	5,370	2,910	1,470	810
8"	6,580	9,300	5,040	2,550	1,372
10"	10,750	15,200	8,240	4,170	2,216
12"	15,310	21,640	11,720	5,940	3,128
14"	20,770	29,360	15,910	8,060	4,241
16"	26,880	38,010	20,590	10,430	5,468
18"	29,865	42,235	22,858	11,653	5,855

NOTE
FOR WATER PRESSURES DIFFERENT THAN 100 PSI, MULTIPLY THRUST FOUND IN TABLE NO. 1 BY REQUIRED PROPORTION.

EXAMPLE: DESIGN PRESSURE = 175 PSI. MULTIPLY VALUE IN TABLE BY 1.75

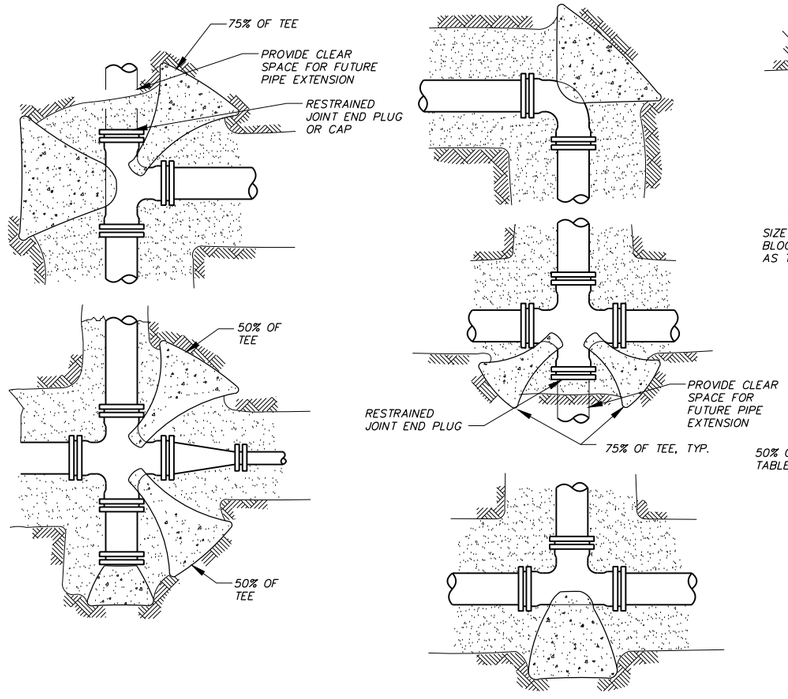
TABLE NO.2

SOIL	SAFE BEARING LOAD LB/FT²
SOFT CLAY	500
SILT	1,000
SAND	2,000
SAND AND GRAVEL	3,000
SAND AND GRAVEL CEMENTED WITH CLAY	4,000
HARD CLAY	4,000

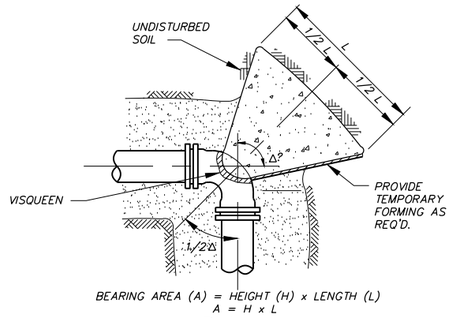
TABLE NO.3

SIDE THRUST PER 100 LB./SQ.IN. PRESSURE PER DEGREE OF DEFLECTION			
PIPE SIZE	SIDE THRUST-LB	PIPE SIZE	SIDE THRUST-LB
4"	N/A	14	377
6"	N/A	16	486
8"	N/A	18	665
10"	197	20	790
12"	278	24	1,150

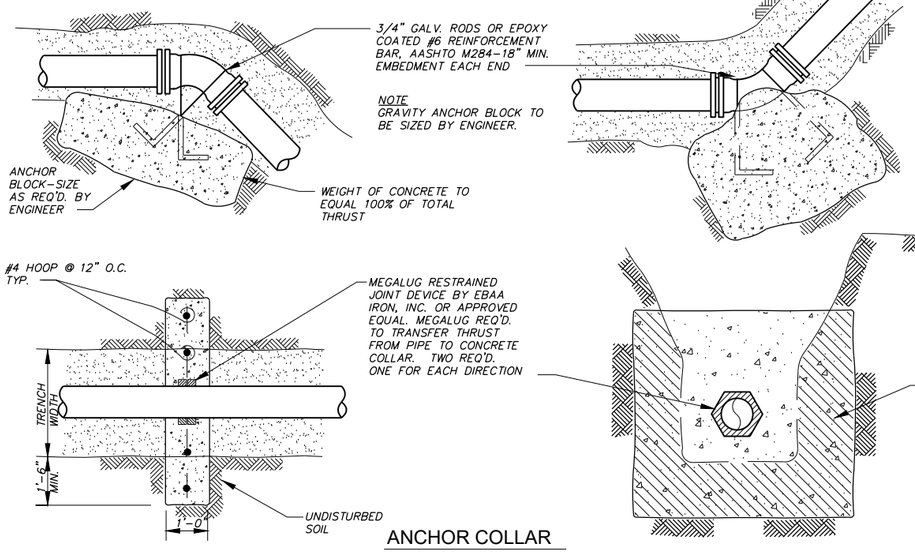
MULTIPLY THRUST BY DEGREE OF DEFLECTION TO OBTAIN TOTAL THRUST



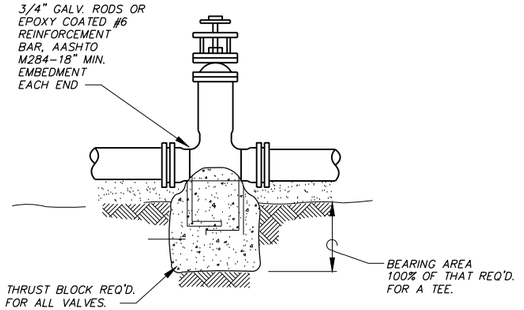
PLAN VIEWS



TYPICAL THRUST BLOCK DETAILS



ANCHOR COLLAR



NOTES
1. THRUST BLOCK IS NOT REQUIRED WHEN VALVE IS CONNECTED BY A FLANGED OR RESTRAINED JOINT CONNECTION TO ADJACENT FITTING OR PIPE WHICH HAS THE REQUIRED THRUST RESTRAINT.
2. THRUST BLOCK IS NOT REQUIRED ON 8" AND SMALLER VALVES UNLESS CALLED OUT OTHERWISE ON DRAWINGS.

TYPICAL THRUST BLOCK LOCATIONS

SECTION VIEWS

CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

THRUST BLOCK DETAILS

FIGURE
W12