

2024 Provo Standard Drawing Details
(Supplement to the APWA Manual of Standard Plans, 2017)



PREFACE

The primary purpose of this document is to clearly define the current engineering standards to be used in Provo City. Provo City has adopted the 2012 APWA Manual of Standard Plans, however, while the City recognizes the extensive effort that APWA has executed to create a document that can be widely used across many municipalities, there are specific differences between many APWA standards and Provo City Standards. This document serves to identify any modifications to or replacement of APWA Specifications and Manual of Standard Plans.

Provo City has modified some of the APWA Specifications to reflect local requirements. The following modified specifications have been included as a part of this document:

Section 01 55 26M – Traffic Control

Section 31 05 13M – Common Fill

Section 32 12 05M – Bituminous Concrete

Section 32 16 13M – Driveway, Sidewalk, Curb, Gutter

Section 33 05 05M – Ductile Iron Pipe

Section 33 11 00M – Water Distribution and Transmission

The structure of the remainder of this document follows the same basic structure of the APWA Manual of Standard Plans Table of Contents; however, there are some differences. Following is an explanation of the structure of this document:

1. Numbering – The plan numbers listed refer to the APWA plan number. A plan number having a prefix of “P-” means that the APWA plan has been modified or replaced by the Provo City Standard included as part of this document. The Provo City Standard drawing may replace more than one APWA drawing. In this case the P drawing number may not match the APWA number.
2. Description – The title of the plan with reference to the accepted plan, shown in parentheses.
 - a. (APWA Plan ####) indicates that the APWA plan is accepted in its entirety.
 - b. (Provo Standard Detail) indicates that the APWA drawing has been completely replaced by a Provo drawing.
 - c. (Replaced by Provo City Standard Detail P- ####) indicates that the APWA plan has been replaced by a Provo City Standard that replaces multiple APWA plans and the P number does not match the APWA number.
 - d. (Do Not Use) indicates that the APWA plan is not typically used in Provo City. The specified plan may be used in Provo City only after written consent is granted from the Public Works Director or his/her designee.

This document is intended to be altered periodically to ensure that the most current Provo City Standards are available for public use. This document will be revised and published on the City’s web site annually, during the first week of January.

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SPECIFICATIONS

SECTION 01 55 26M TRAFFIC CONTROL

REVISED 12-08-2015

Delete section 01 55 26 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Traffic control Requirements

1.2 RELATED SECTIONS

- A. Section 01 11 00S: Scope of Work

1.3 REFERENCES

- A. AASHTO Roadside Design Guide, Current Edition
- B. ASTM D 4956: Retroreflective Sheeting for Traffic Control.
- C. ATSSA: American Traffic Safety Services Association, Inc.
- D. Instructions to Flaggers. Publication of UDOT.
- E. MUTCD: Manual on Uniform Traffic Control Devices, Current Edition.
- F. Work Zone Traffic Control Guide: Publication of the Utah LTAP Center.
- G. ADA: Americans with Disabilities Act.

1.4 SUBMITTALS

- A. Traffic Control Plan at least 10 days prior to commencement of any portion of the WORK.
- B. Flagger or traffic control technician certificates when requested by ENGINEER.

1.5 SPECIAL TRAFFIC CONTROL PROVISIONS

A. IN GENERAL:

1. Unless otherwise approved by the ENGINEER, CONTRACTOR shall maintain at least one 12-foot wide travel lane for each direction of travel at all times.
2. Full road and/or intersection closures will only be approved under extreme circumstances as determined by the ENGINEER. Street and/or lane closure fees may be assessed for closures determined to be for CONTRACTOR convenience in completing the Work.

3. If a lane, intersection, or road closure is approved by the ENGINEER, the CONTRACTOR shall be required to provide advance public notification. This shall be done using electronic message boards (variable message signs) at the beginning and end of each reach to be closed, and in all four directions at intersections, as well as flyers to the residents in the vicinity. The CONTRACTOR shall post both types of messages at least 7 days prior to closure.
4. A copy of the approved Traffic Control Plan shall be maintained on the job site at all times.
5. Unless otherwise approved by the Engineer, CONTRACTOR shall remove all traffic control devices from roadway at the end of each day. All advance warning signs not being used should be turned around until the traffic control placement the following day.
6. CONTRACTOR shall implement traffic control measures to safely and properly secure the work area, equipment, residents, and personnel throughout the duration of the project. This requirement also applies to portions of the work being performed by subcontractors.

B. INTERSECTIONS:

1. Use uniformed police officer when construction activities are impacting an operating signalized intersection.
2. Use of flaggers at a signalized intersection is permitted only when signals have been turned to red flash mode or are inoperable.
 - a. Control each approach by separate flaggers.
 - 1) Flaggers can control only two lanes of approach traffic.
 - a) Third lane control permitted when left or right turn bays are present.
 - b. Coordinate all modifications to signal operations with the Provo City Traffic Engineer.
3. For unsignalized intersections – provide a certified flagger for each approach.
4. Existing left turn lanes may be used for through traffic movement when the need to reduce the through traffic to one lane at the approach to signalized intersections. Install appropriate channelization and install “No Left Turn” signs stating “Bus Exception” message.

C. ACCESS:

1. CONTRACTOR shall provide access to all affected properties except for durations of less than 8 hours. In all cases:
 - a. Provide alternate access whenever normal access is blocked and an alternate access method is possible.

- b. Notify property owners 48 hours in advance of change or loss of access detailing duration and frequency of access closures.

D. PARKING RESTRICTIONS:

1. CONTRACTOR shall be responsible to notify residents and/or businesses of any necessary parking restrictions that may be required to complete the Work.
2. CONTRACTOR shall post “NO PARKING” signs every 50 feet 24 hours in advance of the anticipated need for parking restrictions.

E. PUBLIC TRANSIT:

1. CONTRACTOR shall contact the Utah Transit Authority (UTA) and coordinate necessary alternations in UTA’s bus service. Details of alternate bus routes are to be submitted with the Traffic Control Plan.
2. CONTRACTOR shall keep bus stops open and clear of debris and minimize disruption to current bus services in and around bus stops.

F. MOMENTARY PARTIAL OR COMPLETE LANE CLOSURE AUTHORIZATION (WITHOUT PERMIT):

1. Provide flagger when work momentarily affects travel lanes. Example: A backhoe maneuvering in a travel lane outside of the construction work zone.
 - a. Activities requiring momentary partial or complete lane closures shall be kept to a minimum. Lane closure fees may be assessed as determined appropriate by the ENGINEER for excessive momentary closures.

1.6 TRAFFIC CONTROL PLAN

- A. CONTRACTOR shall develop and submit a Traffic Control Plan which satisfies OWNER’s requirements and shall conform to the requirements of this section and the requirements, limitations, and phasing identified in Construction Documents. Traffic Control Plan to be created using the recommendations and guidelines outlined in the following resources. Resolve discrepancies between resources in descending order as shown:
 1. MUTCD.
 2. Work Zone Traffic Control Guide
 3. ATSSA
- B. CONTRACTOR shall be responsible to provide a Traffic Control Plan for all phases, segments, and portions of the WORK including items of the WORK performed by Subcontractors.
- C. The Traffic Control Plan shall be prepared using CAD software showing the appropriate scale and space relationship between traffic control devices and intersections, high volume driveways, and other pertinent roadway features.
- D. OWNER may require that the Traffic Control Plan be produced, signed, and sealed by a professional engineer licensed in the State of Utah at no additional cost to the OWNER.

- E. CONTRACTOR shall coordinate with the Provo City Traffic Engineer in the preparation and implementation of the Traffic Control Plan.
- F. Include the following documentation as part of the traffic control plan:
 - 1. Written description and phasing.
 - 2. Drawing showing phasing (if required for clarity)
 - 3. Drawing showing placement of traffic control devices.
- G. Show how to move pedestrians through or around the Work site.
- H. Show how traffic control at signalized intersections will be addressed.
- I. Provide concrete barrier or other positive protection for workers and all hazards located within the AASHTO clear zone for approach traffic.
- J. Meet grade, slope and protection requirements of the Americans with Disabilities Act (ADA).

1.7 TRAFFIC CONTROL TECHNICIAN

- A. Certified by UDOT, ATSSA, or Associated General Contractors (AGC).
- B. Authority
 - 1. Obtains and uses all labor, equipment, and materials necessary to maintain traffic control.
 - 2. Changes traffic control operations according to the approved traffic control plan.
- C. Responsibilities and Duties
 - 1. Oversees all traffic control operations.
 - 2. Will be present and active participant during the installation, maintenance, and removal of Temporary Traffic Control Devices.
 - 3. Implements the Traffic Control Plan.
 - 4. Remains available 24 hours a day, seven days a week, and can be on-site within 30 minutes of notification.
 - 5. Corrects deficiencies immediately upon verbal or written notification from Engineer or his representative.
 - 6. Document the traffic control activities and inspections on a form acceptable to the Engineer. Inspect at least four times each day with at least one of the inspections conducted during nighttime hours:
 - a. Before beginning of shift
 - b. At mid-shift
 - c. Half-hour after shift ends
 - d. At midpoint of the off-shift period

7. Coordinate project traffic control with emergency services and local law enforcement agencies.
8. Inspect and document traffic control inspections twice each day when no construction work is being done.
 - a. Once during daylight hours and once during nighttime hours.
 - b. Conduct inspections a minimum of eight hours apart.
9. Submit traffic control activities and inspection forms each week on a day and time acceptable to the ENGINEER.
10. Monitor traffic queue lengths and adjust advanced warning signs to provide adequate warning to the actual back of queue resulting from construction activities.

1.8 FLAGGER

- A. Certified by ATSSA, AGC, or UDOT.
- B. Equipment:
 1. 24" X 24" "Stop/Slow" sign.
 2. 6" to 8" long red wand for night flagging.
 3. Light plant for night flagging.
- C. Clothing:
 1. Clothed; full length pants and long or short sleeved shirt.
 2. Hard toed shoes.
 3. Lime green, orange, or red-orange hardhat and vest.
 4. Night clothing to be reflectorized.

PART 2 PRODUCTS

2.1 PAVEMENT MARKINGS, SIGNS, BARRICADES

- A. MUTCD.
- B. Channelizing Devices: Crash worthy plastic cones, drums and barricades.
 1. Only drums, barricades, and vertical panels will be allowed for nighttime use. No cones will be allowed for nighttime use.
- C. Reflective Sheeting: ASTM D 4956.

- D. Pavement Markings: Section 32 17 23.
1. Temporary striping: by CONTRATOR
 2. Permanent striping: by CONTRACTOR
 - a. ENGINEER will provide layout for new pavement striping where striping has been completely removed.
 - b. CONTRACTOR shall be responsible to provide traffic control for ENGINEER during striping layout operations
 3. Permanent rumble strips: by CONTRACTOR
 - a. To follow installation of permanent striping and requires restriping following grinding of rumble strips.

PART 3 EXECUTION

3.1 FLAGGING

- A. MUTCD
- B. ATSSA

3.2 TRAFFIC CONTROL DEVICES

- A. Install traffic control devices before work activities begin.
- B. Maintain devices to ensure proper, continuous function.
- C. Wash devices weekly unless conditions warrant more frequent cleaning.
- D. Replace damaged devices missing any part of the message or background.
- E. Remove when no longer needed.
- F. Concrete barriers are not to be used as road closure devices.

END OF SECTION

**SECTION 31 05 13M
COMMON FILL**

REVISED 12-08-2015

Delete Article 2.2 GRANULAR BORROW in its entirety and replace with the following:

2.1 GRANULAR BORROW

- A. Classification: A-1-a
- B. Non-Plastic, well graded, 3-inch maximum

Delete Article 2.5 NATIVE in its entirety and replace with the following:

2.5 NATIVE

- A. Material obtained from Excavation may be used as fill, provided that the material meets the specifications for BORROW outlined in this Section and provided that all organic material, rubbish, debris, and other objectionable materials are removed.
- B. CONTRACTOR shall provide material testing data, i.e. gradation analysis, Atterburg limits, appropriate proctor, etc. on a weekly basis as a minimum, or upon request by the ENGINEER, or if a noticeable change to the NATIVE material being excavated is observed.
- C. It shall be the CONTRACTOR's responsibility to verify the suitability of NATIVE material prior to backfilling operations. Failure to comply with these specifications for trench backfill may result in rejections of portions of the WORK where backfill is not in compliance.

Delete Article 2.7 SAND in its entirety and replace with the following:

2.7 SAND

- A. Use cyclone sand or equivalent.
- B. Do not use pea gravel, recycled RAP, squeegee, or crushed fines.
- C. Friable river or bank aggregate, free of loam and organic matter.
- D. Meet the following gradation:

Sand Gradation	
Sieve Size	Percent Passing
3/8 inch	100
No. 100	1-10

Delete Article 2.8 GRAVEL in its entirety and replace with the following:

2.8 GRAVEL

- A. Use 100 percent crushed mineral aggregate.
- B. Meet the following gradation:

Gravel Gradation	
Sieve Size	Percent Passing
1.5 inch	100
1 inch	95 to 100
1/2 inch	25 to 60
No. 4	0 to 10
No. 200	0 to 5

Delete Article 2.10 SLAG, PUMICE, SCORIA in its entirety and replace with the following:

2.10 SLAG, PUMICE, SCORIA

- A. Not Allowed.

END OF SECTION

SECTION 32 12 05M
BITUMINOUS CONCRETE
 REVISED 8-22-23

This Section modifies portions of Section 32 12 05 entitled “Bituminous Concrete” (Amendment 1 - APWA 2017 as outlined below).

Add to Article 1.4, paragraph B.2 the following:

- a. Hot mix plant must fall within a 25-mile maximum radius from the job site.

Delete Article 1.4, paragraph C.7 and replace with the following:

- 7. Binder target percentage, dust to binder ratio, and the following as applicable.
 - a. For Superpave mix design provide (1) voids in the mineral aggregate (VMA), (2) voids filled with bituminous binder (VFA), and (3) Hamburg Wheel Tracker results.
 - b. For Marshall mix design provide (1) tensile strength ratio (moisture sensitivity), (2) voids in the mineral aggregate (VMA), (3) stability, (4) flow, (5) voids in the bituminous mix, (6) voids filled with bituminous binder (VFA), (7) virgin binder replacement, (8) RAP asphalt content, and (9) effective asphalt content.

Add to Article 1.6, paragraph E.1 the following:

Table 2 – Pay Factors – Marshall Mix Design						
Criteria	Pay Factor	Range of Mean of Deviations of Test Results from the Binder and Gradation Targets in Percentage Points				
		500 Tons	1,000 Tons	1,500 Tons	2,000 Tons	≥2,500 Tons
Binder Content	1.00	0.00–0.70	0.00-0.54	0.00-0.46	0.00-0.41	0.00-0.38
	0.975	0.71–0.80	0.55-0.61	0.47-0.52	0.42-0.46	0.39-0.43
	0.95	0.81–0.90	0.62-0.68	0.53-0.58	0.47-0.52	0.44-0.47
	0.90	0.91-1.00	0.69-0.75	0.59-0.64	0.53-0.56	0.48-0.52
	0.85	1.01–1.10	0.76-0.82	0.65-0.69	0.57-0.61	0.53-0.56
1/2" and larger Sieve	1.00	0.0-10.9	0.0-7.3	0.0-6.5	0.0-5.6	0.0-5.2
	0.975	11.00-12.9	7.4-8.3	6.6-7.1	5.7-6.3	5.3-5.8
	0.95	13.0-13.9	8.4-9.3	7.2-7.9	6.4-7.0	5.9-6.4
	0.90	14.0-14.9	9.4-10.3	8.0-8.7	7.1-7.7	6.5-7.1
	0.85	15.0-16.0	10.4-11.3	8.8-9.5	7.8-8.4	7.2-7.7
3/8" Sieve	1.00	0.0-9.9	0.0-6.9	0.0-5.9	0.0-5.3	0.0-4.9
	0.975	10.0-10.9	7.0-7.8	6.0-6.6	5.4-6.9	5.0-5.5
	0.95	11.0-11.9	7.9-8.7	6.7-7.3	6.0-6.6	5.6-6.1

	0.90	12.0-13.9	8.8-9.6	7.4-8.0	6.7-7.2	6.2-6.6
	0.85	14.0-15.0	9.7-10.5	8.1-8.9	7.3-7.9	6.7-7.2
No. 4 Sieve	1.00	0.0-9.9	0.0-6.7	0.0-5.7	0.0-5.2	0.0-4.8
	0.975	10.0-11.0	6.8-7.6	5.8-6.3	5.3-5.8	4.9-5.4
	0.95	11.1-11.9	7.7-8.5	6.4-6.9	5.9-6.4	5.5-5.9
	0.90	12.0-12.9	8.6-9.4	7.0-7.5	6.5-7.0	6.0-6.5
	0.85	13.0-14.0	9.5-10.2	7.6-8.0	7.1-7.6	6.6-7.0
No. 8 Sieve	1.00	0.0-7.9	0.0-5.6	0.0-4.8	0.0-4.3	0.0-4.0
	0.975	8.0-8.9	5.7-6.3	4.9-5.4	4.4-4.8	4.1-4.5
	0.95	9.0-9.9	6.4-7.0	5.5-6.0	4.9-5.3	4.6-4.9
	0.90	10.0-10.9	7.1-7.7	6.1-6.6	5.4-5.8	5.0-5.4
	0.85	11.0-12.0	7.8-8.5	6.7-7.2	5.9-6.4	5.5-5.8
No. 16 Sieve	1.00	0.0-7.9	0.0-5.2	0.0-4.6	0.0-4.2	0.0-3.9
	0.975	8.0-8.9	5.3-5.8	4.7-5.1	4.3-4.6	4.0-4.3
	0.95	9.0-9.9	5.9-6.4	5.2-5.6	4.7-5.1	4.4-4.7
	0.90	10.0-10.9	6.5-7.0	5.7-6.1	5.2-5.5	4.8-5.1
	0.85	11.0-12.0	7.1-7.6	6.2-6.6	5.6-5.9	5.2-5.4
No. 50 Sieve	1.00	0.0-6.9	0.0-4.3	0.0-3.8	0.0-3.4	0.0-3.2
	0.975	7.0-7.9	4.4-4.8	3.9-4.1	3.5-3.8	3.3-3.5
	0.95	8.0-8.9	4.9-5.3	4.2-4.5	3.9-4.1	3.6-3.8
	0.90	9.0-9.9	5.4-5.8	4.6-4.9	4.2-4.4	3.9-4.1
	0.85	10.0-11.0	5.9-6.4	5.0-5.5	4.5-4.9	4.2-4.5
No. 200 Sieve	1.00	0.0-3.0	0.0-2.4	0.0-2.0	0.0-1.8	0.0-1.7
	0.975	3.1-3.5	2.5-2.7	2.1-2.2	1.9-2.0	1.8-1.9
	0.95	3.6-4.0	2.8-3.0	2.3-2.4	2.1-2.2	2.0-2.1
	0.90	4.1-4.5	3.1-3.3	2.5-2.7	2.3-2.4	2.2-2.3
	0.85	4.6-5.0	3.4-3.6	2.8-3.0	2.5-2.6	2.4-2.5

NOTES

(a) Test binder content using a burn-off oven, ASTM D6307.

(b) Determine aggregate gradation by extraction. ASTM D5444.

Add to Article 2 the following:

2.1 Binder

A. Asphalt Cement (AC)

1. Performance graded asphalt binder (PGAB) may be substituted for asphalt cement as follows.

Asphalt Cement	Substitute
AC-10	PG 58-28
AC-20	PG 64-22

Delete Article 2.3, paragraph D and replace with the following:

D. RAP or ROSP: Free of detrimental quantities of deleterious materials.

1. Allowed up to 15 percent by weight of RAP or binder, whichever is lesser, with no change in specified binder grade.
2. Allowed from 15 to 25 percent by weight of RAP or binder, whichever is lesser, if the binder grade is adjusted according to AASHTO M323 to meet the specified binder grade.
3. Determine RAP binder content by chemical extraction.

Add to Article 2.4, paragraph B with the following:

Table 4A - Master Grading Band limits - Marshall Mix Design							
Sieve	Aggregate Grade						
	DM-1	DM-3/4	DM-1/2	DM-3/8	OM-1/2	FM-1	FM-1/2
1 inch	100						
3/4 inch		100				100	
1/2 inch	75 - 91		100		100	90 - 100	100
3/8 inch		75-91		100	93 - 100	60 - 100	90 - 100
No. 4	47 - 61	46-62	60 - 80	60 - 80	36 - 44	15 - 40	30 - 50
No. 8					14 - 21	4 - 12	5 - 15
No. 16	23 - 33	22-34	28 - 42	28 - 42			
No. 50	12 - 22	11-23	11 - 23	11 - 23			2 - 5
No. 200	3 - 7	3-7	3 - 7	3 - 7	2 - 4	2 - 5	

NOTES

- (a) Gradation is expressed in percent passing by weight. ASTM C136. Percentage of fines passing No. 200 sieve determined by washing, ASTM C117.
- (b) Friction Mixture, ASTM D 3515.
- (c) The alpha portion of the grade designator (DM, OM, FM) represents dense mix, open mix, and friction mix. The numerical portion (1, 3/4, 1/2) represents the *maximum* sieve size.

Add to Article 2.4, paragraph D with the following:

D. **Design Parameters:** Table 6, determined by AI MS2.

Table 6 - Mix Design Parameters			
Criteria		Marshall	
Mix Designator	(a)	50 blow	75 blow
Compaction (blows)	(b)	50	75
Compaction (gyrations)		-	
Design Air Void Target, percent		3.5	
Stability, lbs., minimum	(c)	1200	1800

Flow, in 0.01 inch units (d)	10-18	
Voids in Mineral Aggregate (VMA), percent, minimum, relative to maximum or nominal sieve size grading and calculated using Gsb (dry) for virgin aggregate and RAP aggregate	ASTM D 6927	
	Nominal Grading	
	1	13.0
	3/4	14.0
	1/2	15.0
RAP or ROSP specific gravity for calculations	Gsb (dry) by chemical extraction	
Dust to Binder Ratio, maximum	1.6	
Tensile Strength Ratio (moisture sensitivity), minimum (e)	0.80	
Rutting (Hamburg rut test) (f)		
Road Class I	-	-
Road Class II	-	-
Road Class III	-	-
NOTES		
(a) Road Class is defined in Section 32 01 31		
(b) 100Nd mix is for very high traffic applications only as defined by ENGINEER. 100Nd mix is intended for lower lift applications or surface applications with proactive seal coat program.		
(c) Number of compaction blows each end of specimen.		
(d) Design Density Target: ASTM D 2041. Percent of maximum theoretical specific gravity		
(e) Stability, Flow, Voids: ASTM D 6927.		
(f) Tensile Strength Ratio (moisture sensitivity): ASTM D 4867. Use freeze thaw conditioning. Compact test specimen to seven (7) percent plus or minus one (1) percent air voids.		
(g) With testing performed at temperatures representing the <u>specified</u> binder grade in the Hamburg rut test, the average rut depth of two (2) mix design test samples is less than amount shown for the respective Road Classes.		

END OF SECTION

**SECTION 32 16 13M
DRIVEWAY, SIDEWALK, CURB, GUTTER**

Delete Article 3.1 and replace with the following:

3.1 CONSTRUCTION EQUIPMENT

A. Slip Form Machines:

1. Placement must produce required cross-section, line, grade, finish, and jointing as specified for formed concrete.
2. If results are not acceptable, remove and replace work with formed concrete.
3. Slip Form must be used for curb and gutter lengths over 200 feet, unless written approved is given by ENGINEER.

END OF SECTION

**SECTION 33 05 05M
DUCTILE IRON PIPE**

REVISED 12-08-2015

Add the following to Article 1.1 (page 723)

1.1 SECTION INCLUDES

- B. Polyethylene wrap and tracer wire

Add the following to Article 2.1, A (page 724)

2.1 PIPE AND FITTING

- A. Buried Applications:
 - 7. Polyethylene wrap for all pipe and fitting, ANSI/AWWA C105/A21.5-10
 - 8. Tracer Wire: #14 UF-G direct bury blue or red tracer wire.

END OF SECTION

SECTION 33 11 00M
WATER DISTRIBUTION AND TRANSMISSION

REVISED 12-08-2015

Add the following to Article 1.2 (page 781)

1.2 REFERENCES

- B. AWWA Standards:
ANSI/AWWA C105/A21.5-10 Installation of Polyethylene wrap

Add the following to Article to 2.8 (page 784)

2.8 ACCESSORIES

- I. Tracer Wire: #14 UF-G direct bury blue tracer wire.

Add the following to Article to 3.4 (page 785)

3.4 INSTALLATION – PIPE AND FITTINGS

- C. Ductile Iron Pipe: AWWA C600.
 - 1. Apply eight (8) mil thick polyethylene wrap
- I. Tracer Wire required on all water lines. Wire to surface at base of fire hydrants.

Add the following to Article to 3.10 (page 787)

3.10 INSTALLATION – WATERMAIN LOOP (SYPHON)

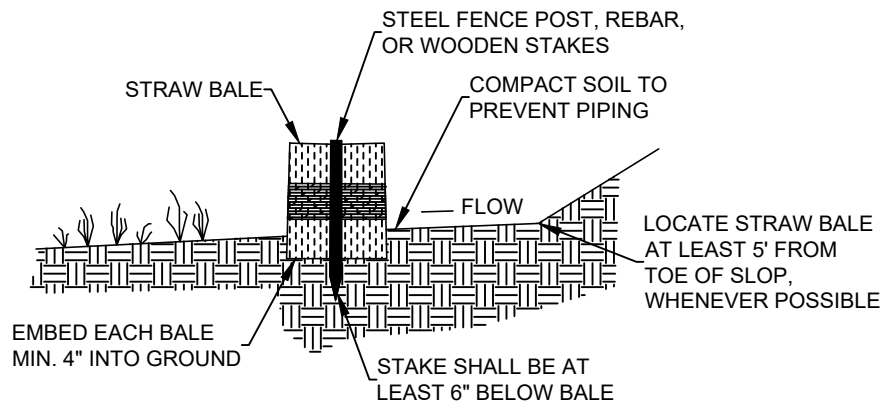
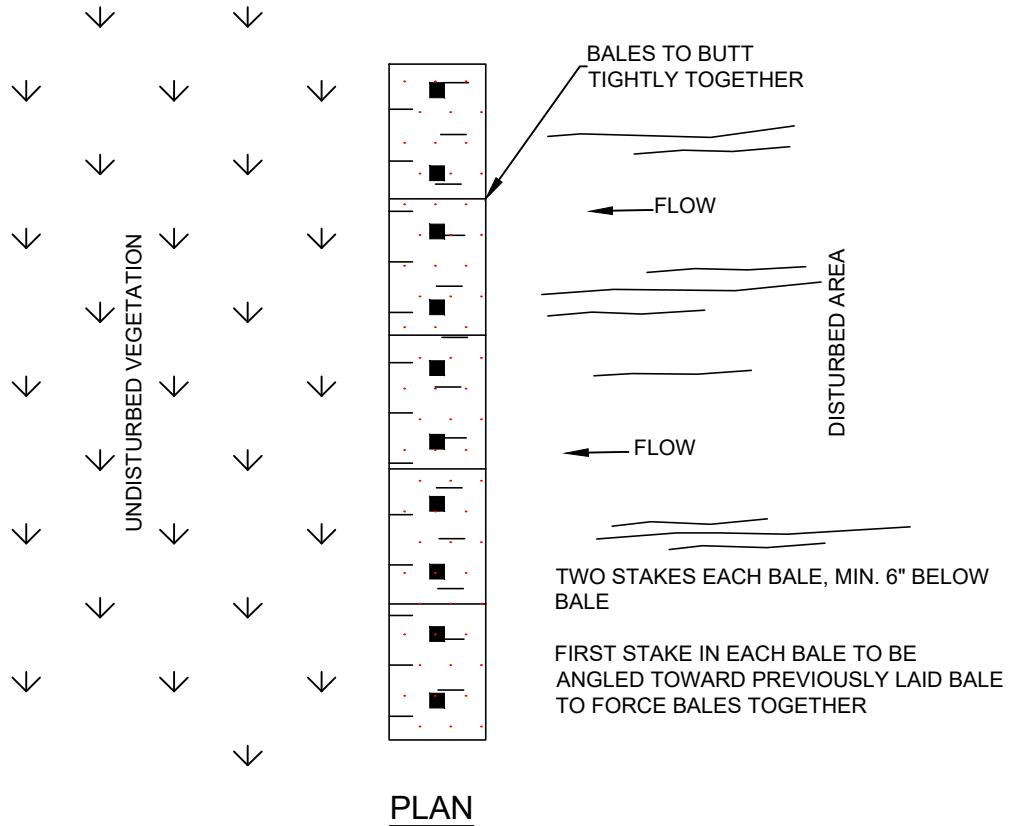
- G. Apply eight (8) mil thick polyethylene wrap to Ductile Iron Pipe and Fittings

END OF SECTION

DRAWINGS

NARRATIVE:

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Straw Bale Barrier

1. GENERAL

- A. Description. A temporary sediment barrier consisting of a row of entrenched and achored straw bales.
- B. Application. To intercept and detain small amounts of sediment from small disturbed areas. To decrease the velocity of sheet flows and low-to moderate-level channel flows.

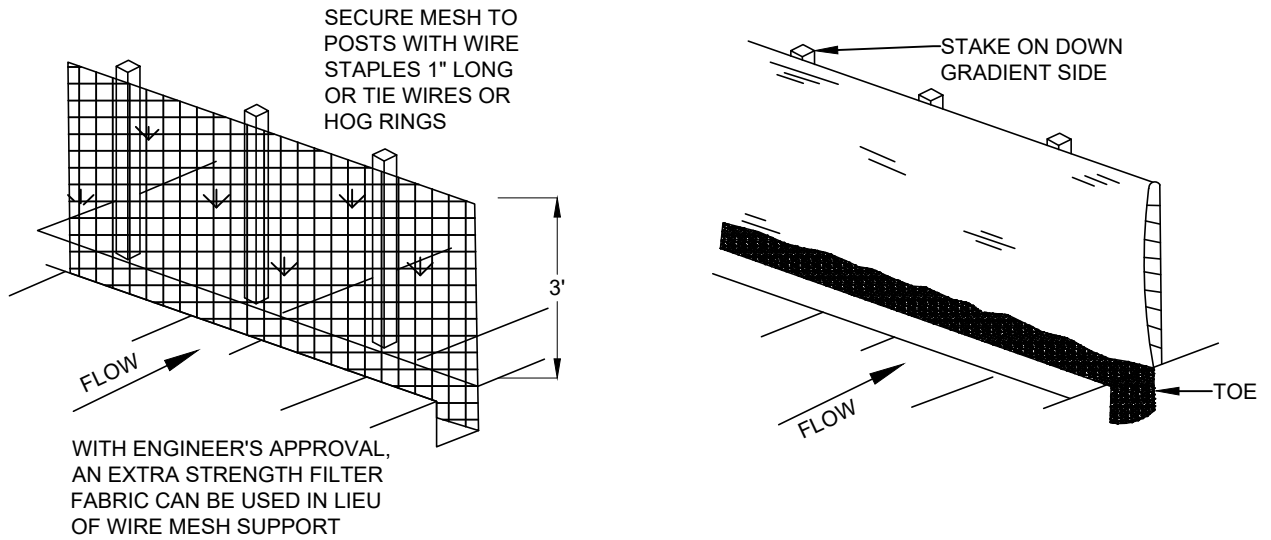
2. PRODUCT (not used)

3. EXECUTION

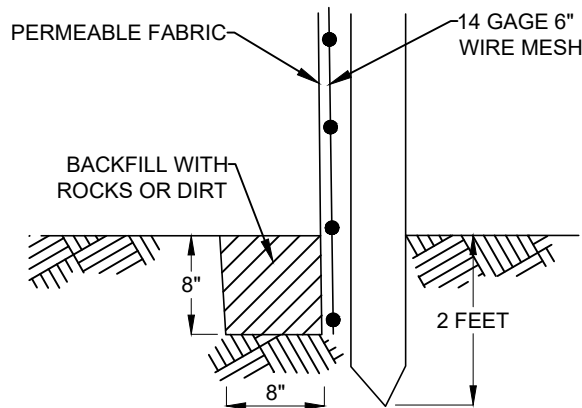
- A. Place bales lengthwise in a single row, with ends of adjacent bales tightly abutting each other for the following conditions:
 - A.1. Perimeter Control: Place barrier at down gradient limits of disturbance.
 - A.2. Sediment Barrier: Place barrier at toe of slope or soil stockpile.
 - A.3. Protection of Existing Waterways: Place barrier at top of stream bank.
 - A.4. Area inlet protection: See Provo City Plan P-124.3.
- B. Wire-bound or string-tie all bales. Install so straw bindings are oriented around the sides rather than along the top and bottom of the bale (to prevent deterioration of bindings).
- C. Chink the gaps between bales (filled by wedging) with straw to prevent unfiltered water from flowing through the gaps. Loose straw scatter over the area immediately uphill from the straw bale barrier tends to increase barrier efficiency.
- D. When bales are installed at the toe of slope, whenever possible place bales 5-feet or more away from slope for increased storage capacity.
- E. Remove straw bale barriers when they have served their usefulness, but not before the up-slope areas have been permanently stabilized.
- F. Maintenance:
 - F.1. Inspect straw bale barrier after every large storm event, at a minimum twice monthly, and with every SWPPP inspection required by the UPDES permit (if applicable).
 - F.2. Pay close attention to the repair of damaged bales, end runs, and undercutting beneath bales.
 - F.3. Bales must be promptly repaired or replaced when they have deteriorated.
 - F.4. Remove sediment deposits when the level of deposition reaches $\frac{1}{2}$ the height of the bale(s).
 - F.5. Realign bales when necessary to provide a continuous barrier and fill gaps.
 - F.6. Recompact soil around bales as necessary to prevent piping.

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INSTALLATION SWEQUENCE



TOE DETAIL

Silt Fence Barrier

1. GENERAL

- A. Description. A temporary sediment barrier consisting of an entrenched, permeable filter fabric stretched across and attached to supporting posts.
- B. Application. To intercept sediment from disturbed areas of limited extent.
 - B.1. Perimeter Control: Place barrier at down gradient limits of disturbed area.
 - B.2. Sediment Barrier: Place barrier at toe of slope or soil stockpile.
 - B.3. Protection of Existing Waterways: Place barrier at top of stream bank. Do not place silt fence within stream banks.
 - B.4. Inlet Protection: see Provo City Plan P-124.3.

2. PRODUCT

- A. Fabric. Synthetic filter fabric shall be a permeable sheet of propylene, nylon, polyester, or polyethylene yarn. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 deg F to 120 deg F.
- B. Burlap. 10 ounces per square yard of fabric.
- C. Posts. At least 2"x2" wood, or 1.33 pounds per linear foot steel with a minimum length of 5 feet, or steel posts with projections for fastening wire to them.

3. EXECUTION

- A. See attached plan for sequencing. Install wire mesh first.
- B. Secure the fabric toe in a minimum 8"x8" trench.
- C. When attaching two silt fences together, place the end of post of the second fence insider the end post of the first fence. Rotate both posts at least 180 degrees to create a tight seal with the filter fabric. Drive both posts into the ground and bury the flap in the trench.
- D. When used to control sediments from a steep slope, place silt fences away from the toe of the slope for increased holding capacity. A minimum of 5 feet from the slope is required where feasible.
- E. Maintenance:
 - E.1. Inspect silt fence barrier after every storm event, at a minimum twice monthly, and with every SWPPP inspection required by the UPDES permit (if applicable). During prolonged rainfall, inspect daily.
 - E.2. Should be fabric on a silt fence decompose or become ineffective while a barrier is still necessary, replace the fabric promptly.
 - E.3. Remove sediment deposits when the level of deposition reaches $\frac{1}{2}$ the height of the fence, or when deposition deforms the fence and hinders its ability to provide adequate protection.
 - E.4. Re-anchor fence as necessary to prevent shortcutting.
 - E.5. Inspect for runoff bypassing ends or undercutting barriers.

SHEET 2 OF 2



SILT FENCE

STANDARD DETAIL

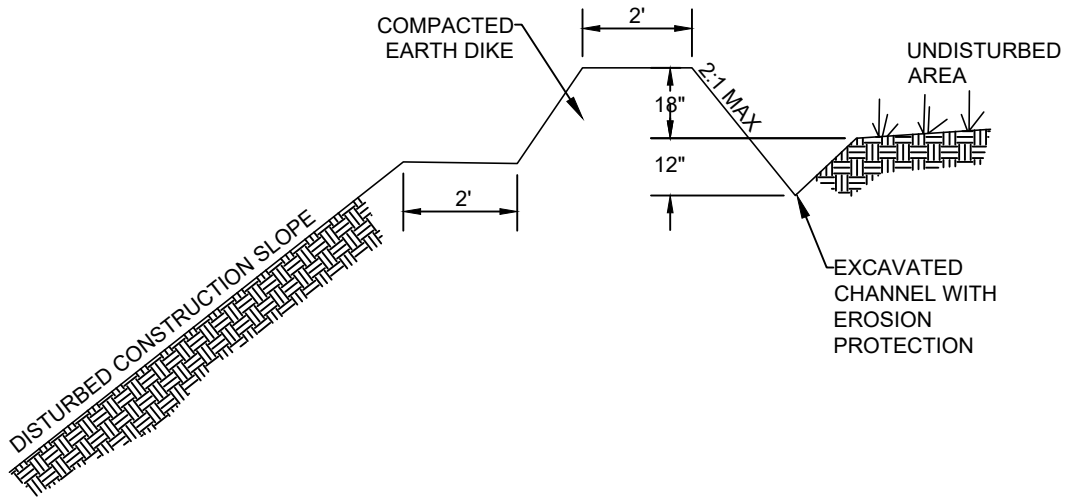
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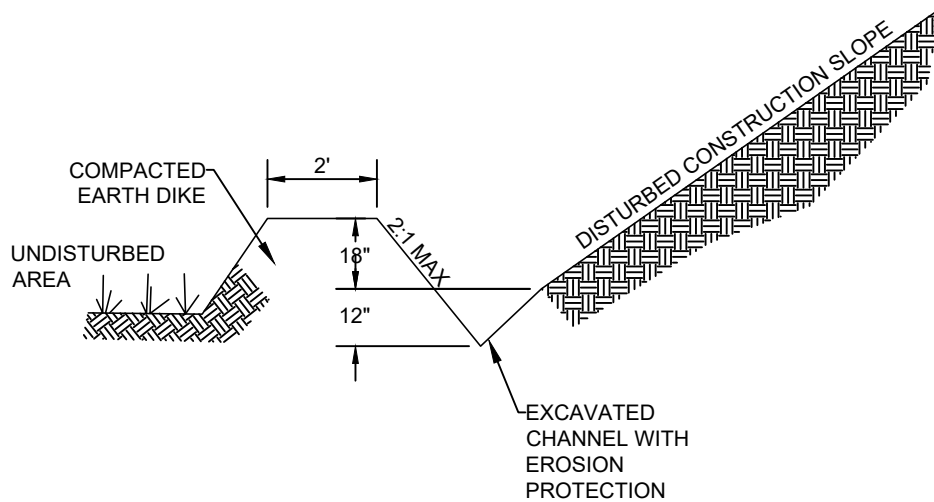
REVISED DATE: 10/15/17

NARRATIVE:

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TOP OF SLOPE (TYP)



BASE OF SLOPE (TYP)

Diversion Dike

1. GENERAL

- A. Description. A temporary ridge of compacted soil located at the top or base of a sloped disturbed area.
- B. Purpose. To intercept up gradient runoff and convey around construction site, and to divert sediment laden runoff.

2. PRODUCT (Not used)

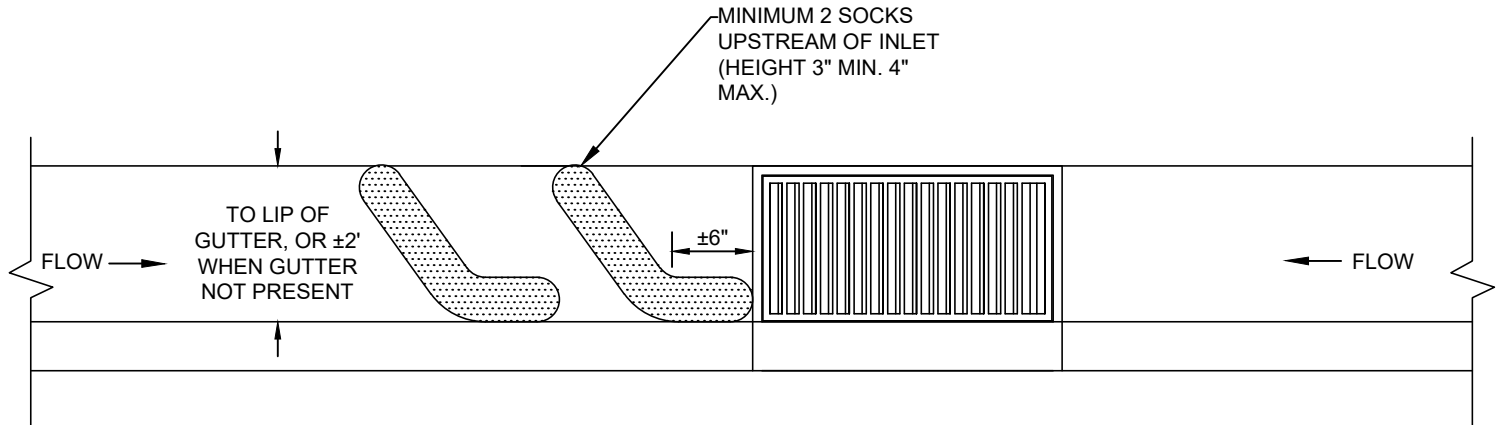
3. EXECUTION

- A. Potential construction locations.
 - A.1. Upstream of construction slope to intercept runoff and convey to controlled discharge point away from disturbed slope..
 - A.2. At base of soil stockpile or construction slope to capture sediment.
 - A.3. Around perimeter of disturbed areas to capture sediment.
- B. Locate the dike where it will not be damaged by construction operations and traffic.
- C. Clear and grub dike area, and construct dike before construction begins.
- D. Excavate channel and place soil for dike on down gradient side.
- E. Shape and machine compact excavated soil to form ridge.
- F. Place erosion protections (such as rock rip rap) at outlet. Stabilize the channel and ridge with mulch, gravel, or vegetative cover. Temporary or permanent seeding and mulch shall be applied to the dike within 15 days of construction.
- G. Calculations for sizing and armoring are required if area discharging to the diversion dike is over $\frac{1}{2}$ acre, or if the channel slope exceeds 2%.
- H. Maintenance:
 - H.1. Inspect after every storm event, at a minimum twice monthly, and with every SWPPP inspection required by the UPDES permit (if applicable). During prolonged rainfall, inspect daily.
 - H.2. Look for runoff breaching the dike or eroding the channel or side slopes.
 - H.3. Check discharge point for erosion or bypassing of flows.
 - H.4. Repair and stabilize the dike, channel, and outlet immediately whenever erosion, breaching, or bypassing is occurring.
 - H.5. Check for and repair any traffic damage immediately.

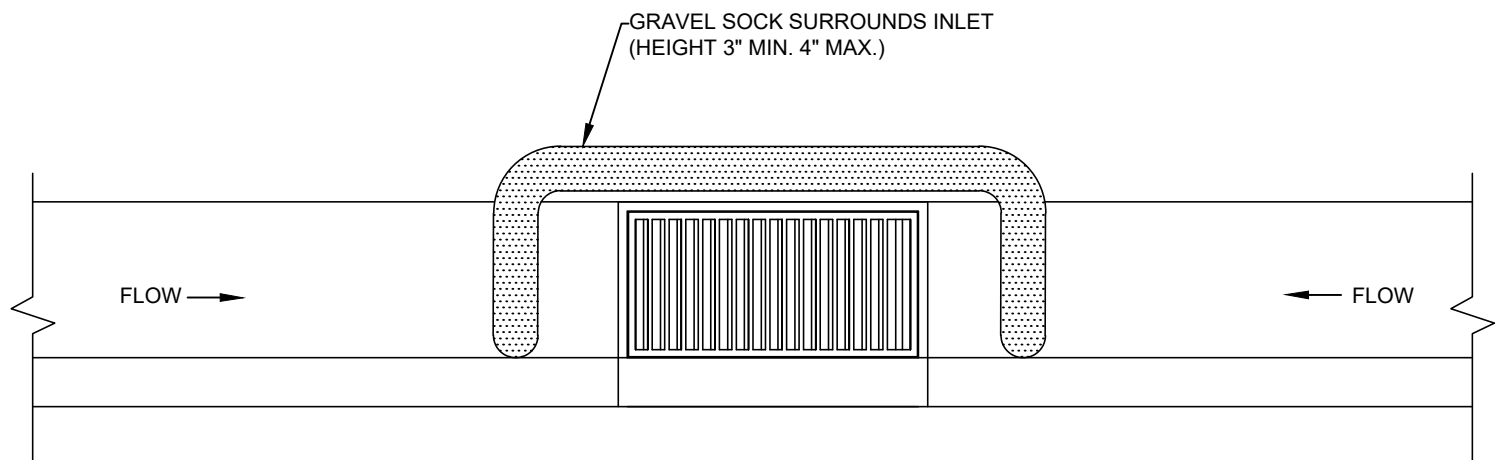
SHEET 2 OF 2

NARRATIVE:

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ON-GRADE INLET PROTECTION



SUMP INLET PROTECTION

Inlet Protection - Gravel Sock

1. GENERAL

- A. Description. Placement of gravel sock upstream of curb inlets to filter water runoff.
- B. Application. Used at inlets in paved or unpaved areas where up gradient area is to be disturbed by construction activities.

2. PRODUCT (not used)

3. EXECUTION

- A. Provide inlet protection, except when blocking the inlet would cause excessive flooding or undesirable results. Notify Provo City storm water staff immediately for concurrence if inlet protection is to be removed.
- B. Prepare gravel sock (or other media approved by City storm water staff) in accordance with the manufacturers recommendation.
- C. On-grade inlet protection:
 - C.1. Install at least two (2) gravel socks upstream of the inlet, as shown on the attached plan.
 - C.2. Gravel sock shall butt tightly against the face of the curb, with $\pm 6"$ of the sock against the curb to ensure a tight fit. The remainder of the sock is placed at an angle away from the curb to trap runoff between the sock and the curb.
 - C.3. The sock should be 3-4" high, allowing excessive flows to flow either around or over the sock prior to overtopping the curb.
- D. Sump inlet protection:
 - D.1. Install sock around around the entire perimeter of the inlet, leaving a min. 3" between the grate and sock.
 - D.2. Gravel sock shall butt tightly against the face of the curb on both sides of the inlet.
 - D.3. The sock should be 3-4" high, allowing excessive flows to flow over the sock prior to overtopping the curb.
- E. Maintenance:
 - E.1. Inspect inlet protection after every large storm event, at a minimum twice monthly, and with every SWPPP inspection required by the UPDES permit (if applicable).
 - E.2. Remove sediment accumulated when it reaches 2-inches in depth.
 - E.3. Replace media and/or sock when damage has occurred or when it has stopped functioning as intended.
 - E.4. Expect minor ponding after rain between maintenance. If ponding is deeper than 2-inches, either sediment has accumulated and needs to be removed, or the media and/or sock is plugged and needs to be replaced.

SHEET 2 OF 2



*INLET PROTECTION -
GRAVEL SOCK*

STANDARD DETAIL

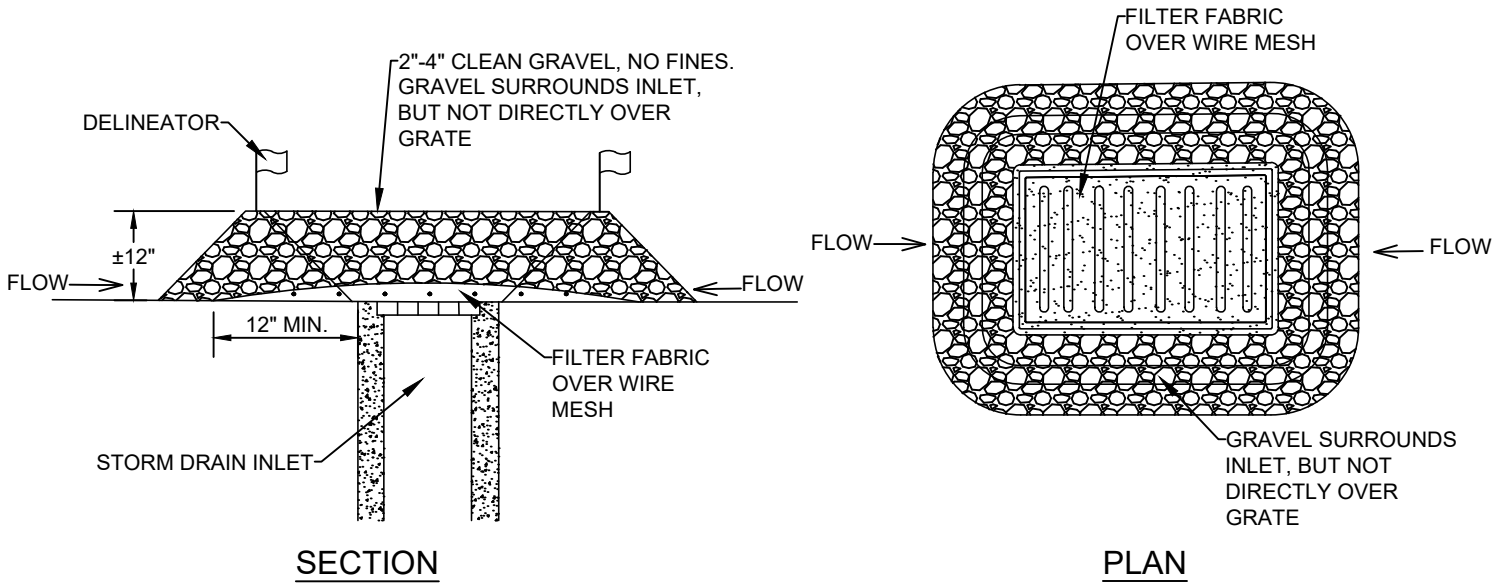
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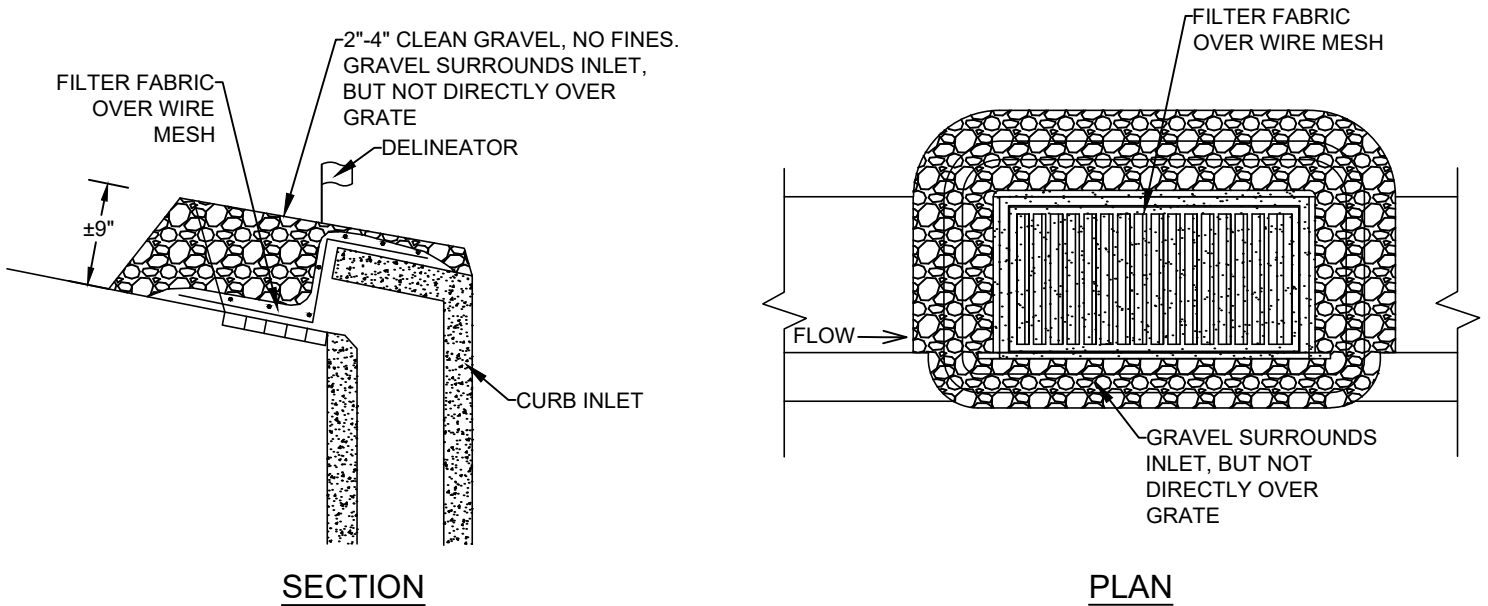
REVISED DATE: 9/28/17

NARRATIVE:

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AREA DRAIN PROTECTION



CURB INLET PROTECTION

Inlet Protection - Gravel

1. GENERAL

- A. Description. Placement of gravel filter around storm drain inlet for filter water runoff.
- B. Application. Used at inlets in paved or unpaved areas where up gradient area is to be disturbed by construction activities.

2. PRODUCT (not used)

3. EXECUTION

- A. Place $\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch opening wire mesh over the inlet grate existing one foot past the grate in all directions. For curb inlets, also place wire mesh over curb opening.
- B. Place permeable filter fabric over the mesh
- C. Berm the gravel (2-inch to 4-inch in size, without fines) to the depths shown on the attached details, forming a wall around the grate on all sides. Slope sides so that area over the grate and curb opening are not covered by gravel.
- D. The filter fabric immediately over the grate needs to remain exposed so it can be visually inspected.
- E. Place at least two brightly colored delineators (such as painted staking laths or flags) on top of the gravel inlet protection to signify the gravel should not be graded or moved.
- F. Maintenance:
 - F.1. Inspect inlet protection after every large storm event, at a minimum twice monthly, and with every SWPPP inspection required by the UPDES permit (if applicable).
 - F.2. Remove sediment accumulated when it reaches 4-inches in depth.
 - F.3. Replace filter fabric and clean or replace gravel when clogging is apparent.
 - F.4. Gravel shall be bermed in a clean and orderly fashion per plan. Loose gravel over the grate or surrounding the inlet shall be promptly removed.

SHEET 2 OF 2



***INLET PROTECTION -
GRAVEL***

STANDARD DETAIL

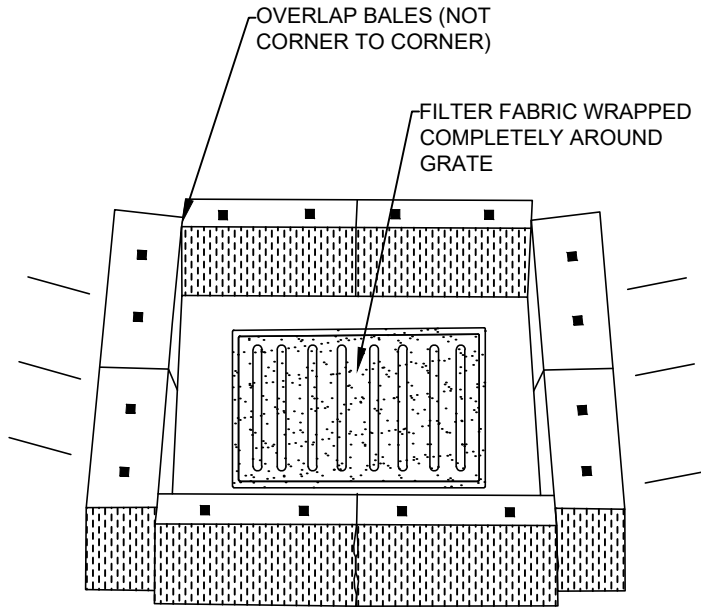
P-124b

NOT TO SCALE

REVISED DATE: 9/28/17

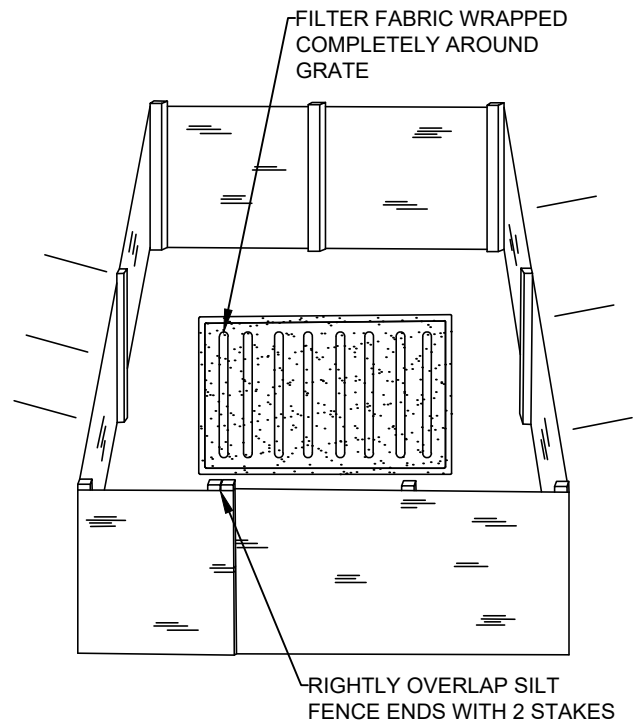
NARRATIVE:

THIS PLAN MAY BE USED FOR THE CONSTRUCTION OF A STORM WATER BEST MANAGEMENT PRACTICE (BMP). IT IS NOT INCLUSIVE OF ALL PRACTICES AVAILABLE AND IS ONLY SPECIFIC TO THE CONSTRUCTION OF THIS TYPE. MAINTENANCE OF THIS TYPE OF INSTALLATION IS IMPORTANT AND SHOULD BE CONTINUOUSLY MONITORED BY THE CONTRACTOR AND ENGINEER. DETAILS SHOWN HERE HIGHLIGHT IMPORTANT PARTS OF CONSTRUCTION, AND MAY BE MODIFIED AS NEEDED IN CONSULTATION WITH CITY STORM WATER STAFF.



STRAW BALE BARRIER

(SEE PLAN NO. 121 FOR INSTALLATION)



SILT FENCE

(SEE PLAN NO. 122 FOR INSTALLATION)

Inlet Protection - Gravel

1. GENERAL

- A. Description. Placement of gravel filter around storm drain inlet for filter water runoff.
- B. Application. Used at inlets in paved or unpaved areas where up gradient area is to be disturbed by construction activities.

2. PRODUCT (not used)

3. EXECUTION

- A. Place $\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch opening wire mesh over the inlet grate existing one foot past the grate in all directions. For curb inlets, also place wire mesh over curb opening.
- B. Place permeable filter fabric over the mesh
- C. Berm the gravel (2-inch to 4-inch in size, without fines) to the depths shown on the attached details, forming a wall around the grate on all sides. Slope sides so that area over the grate and curb opening are not covered by gravel.
- D. The filter fabric immediately over the grate needs to remain exposed so it can be visually inspected.
- E. Place at least two brightly colored delineators (such as painted staking laths or flags) on top of the gravel inlet protection to signify the gravel should not be graded or moved.
- F. Maintenance:
 - F.1. Inspect inlet protection after every large storm event, at a minimum twice monthly, and with every SWPPP inspection required by the UPDES permit (if applicable).
 - F.2. Remove sediment accumulated when it reaches 4-inches in depth.
 - F.3. Replace filter fabric and clean or replace gravel when clogging is apparent.
 - F.4. Gravel shall be bermed in a clean and orderly fashion per plan. Loose gravel over the grate or surrounding the inlet shall be promptly removed.

SHEET 2 OF 2



*INLET PROTECTION -
FENCE OR STRAW BALE*

STANDARD DETAIL

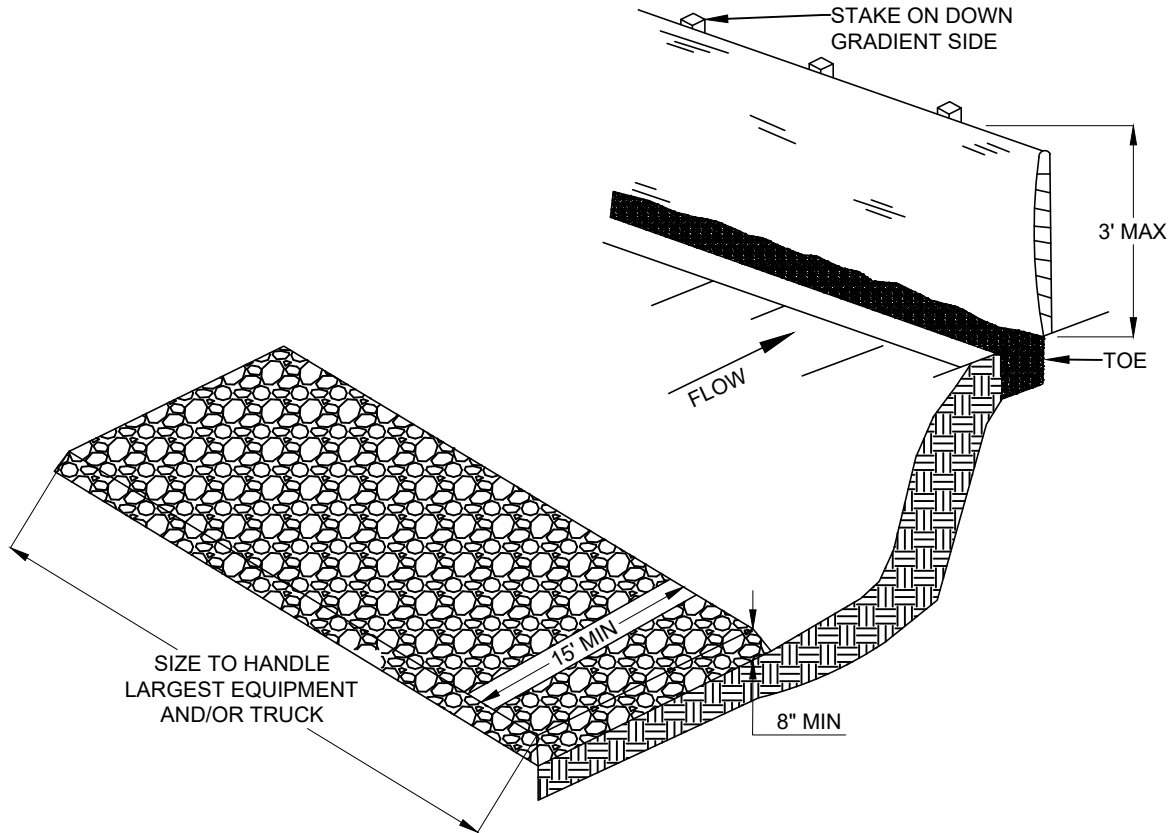
P-124c

NOT TO SCALE

REVISED DATE: 10/15/17

NARRATIVE:

THIS PLAN MAY BE USED FOR THE CONSTRUCTION OF A STORM WATER BEST MANAGEMENT PRACTICE (BMP). IT IS NOT INCLUSIVE OF ALL PRACTICES AVAILABLE AND IS ONLY SPECIFIC TO THE CONSTRUCTION OF THIS TYPE. MAINTENANCE OF THIS TYPE OF INSTALLATION IS IMPORTANT AND SHOULD BE CONTINUOUSLY MONITORED BY THE CONTRACTOR AND ENGINEER. DETAILS SHOWN HERE HIGHLIGHT IMPORTANT PARTS OF CONSTRUCTION, AND MAY BE MODIFIED AS NEEDED IN CONSULTATION WITH CITY STORM WATER STAFF.



SHEET 1 OF 2

STANDARD DETAIL

P-125

NOT TO SCALE

REVISED DATE: 10/15/17

Diversion Dike

1. GENERAL

- A. Description. A temporary stabilized pad of gravel for general washing of equipment and construction vehicles. Intended solely for sediment control. Cannot be utilized for washing equipment or vehicles that may cause contamination of runoff (such as fertilizer equipment or concrete equipment).
- B. Application. At any site where regular washing of vehicles and equipment will occur. May also be used as a filling point for water trucks, limiting erosion caused by overflow or spillage of water.

2. PRODUCT (Not used)

3. EXECUTION

- A. Wash down areas for vehicles should be located as close as possible to the stabilized construction entrance, to minimize picking up dirt and mud after the vehicle has been washed down.
- B. Clear and grub area, and grade down to provide maximum slope of 1 percent away from paved roadway.
- C. Compact subgrade.
- D. Place filter fabric under gravel pad consisting of 2-4" coarse aggregate (no fines). Gravel pad shall be a minimum of 8" thick.
- E. Gravel pad should be sized for the largest equipment and/or truck used onsite to fit comfortably on the pad. Additional area is recommended to increase percolation and mitigate against excessive standing water.
- F. Place silt fence on sides of wash down area (not entrance and exit).
- G. Maintenance:
 - G.1. Inspect daily for loss of gravel or sediment build-up.
 - G.2. Top dressing additional stone or removing, cleaning, and replacing the stone will be required when accumulated mud or sediment impedes the effectiveness of the wash down area.
 - G.3. Keep the wash area in a condition which will prevent tracking or flowing of mud onto public rights-of-way.
 - G.4. Repair any structures used to trap sediments.
 - G.5. Inspect adjacent area for sediment deposit and install additional controls as necessary.
 - G.6. Maintain silt fence as outlined in Plan P-122.

SHEET 2 OF 2



*EQUIPMENT AND VEHICLE
WASH DOWN AREA*

STANDARD DETAIL

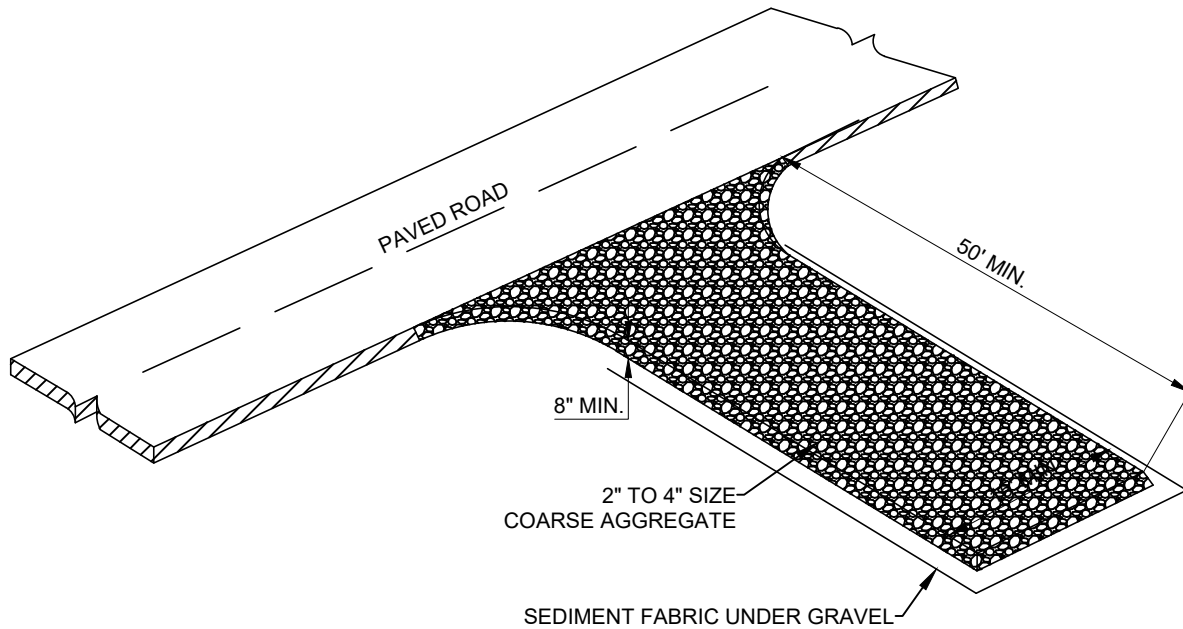
P-125

NOT TO SCALE

REVISED DATE: 10/15/17

NARRATIVE:

THIS PLAN MAY BE USED FOR THE CONSTRUCTION OF A STORM WATER BEST MANAGEMENT PRACTICE (BMP). IT IS NOT INCLUSIVE OF ALL PRACTICES AVAILABLE AND IS ONLY SPECIFIC TO THE CONSTRUCTION OF THIS TYPE. MAINTENANCE OF THIS TYPE OF INSTALLATION IS IMPORTANT AND SHOULD BE CONTINUOUSLY MONITORED BY THE CONTRACTOR AND ENGINEER. DETAILS SHOWN HERE HIGHLIGHT IMPORTANT PARTS OF CONSTRUCTION, AND MAY BE MODIFIED AS NEEDED IN CONSULTATION WITH CITY STORM WATER STAFF.



Stabilized Roadway Entrance

1. GENERAL

- A. Description. A temporary stabilized pad of gravel for controlling equipment and construction vehicle access to the site.
- B. Application. At any site where vehicles and equipment enter the public right of way.

2. PRODUCT (Not used)

3. EXECUTION

- A. Clear and grub area, and grade down to provide maximum slope of 1 percent away from paved roadway.
- B. Compact subgrade.
- C. Place filter fabric under gravel pad consisting of 2-4" coarse aggregate (no fines). Gravel pad shall be a minimum of 8" thick.
- D. Maintenance:
 - D.1. Prevent tracking or flow of mud into the public right-of-way.
 - D.2. Inspect daily for loss of gravel or sediment build-up.
 - D.3. Top dressing additional stone or removing, cleaning, and replacing the stone will be required when accumulated mud or sediment impedes the effectiveness of the wash down area.
 - D.4. Inspect adjacent roadway for sediment deposit and implement additional controls as necessary (such as street sweeping), to keep the public roadway free of accumulated sediment and debris.
 - D.5. Expand stabilized area as required to accommodate activities.

SHEET 2 OF 2



*STABILIZED ROADWAY
ENTRANCE*

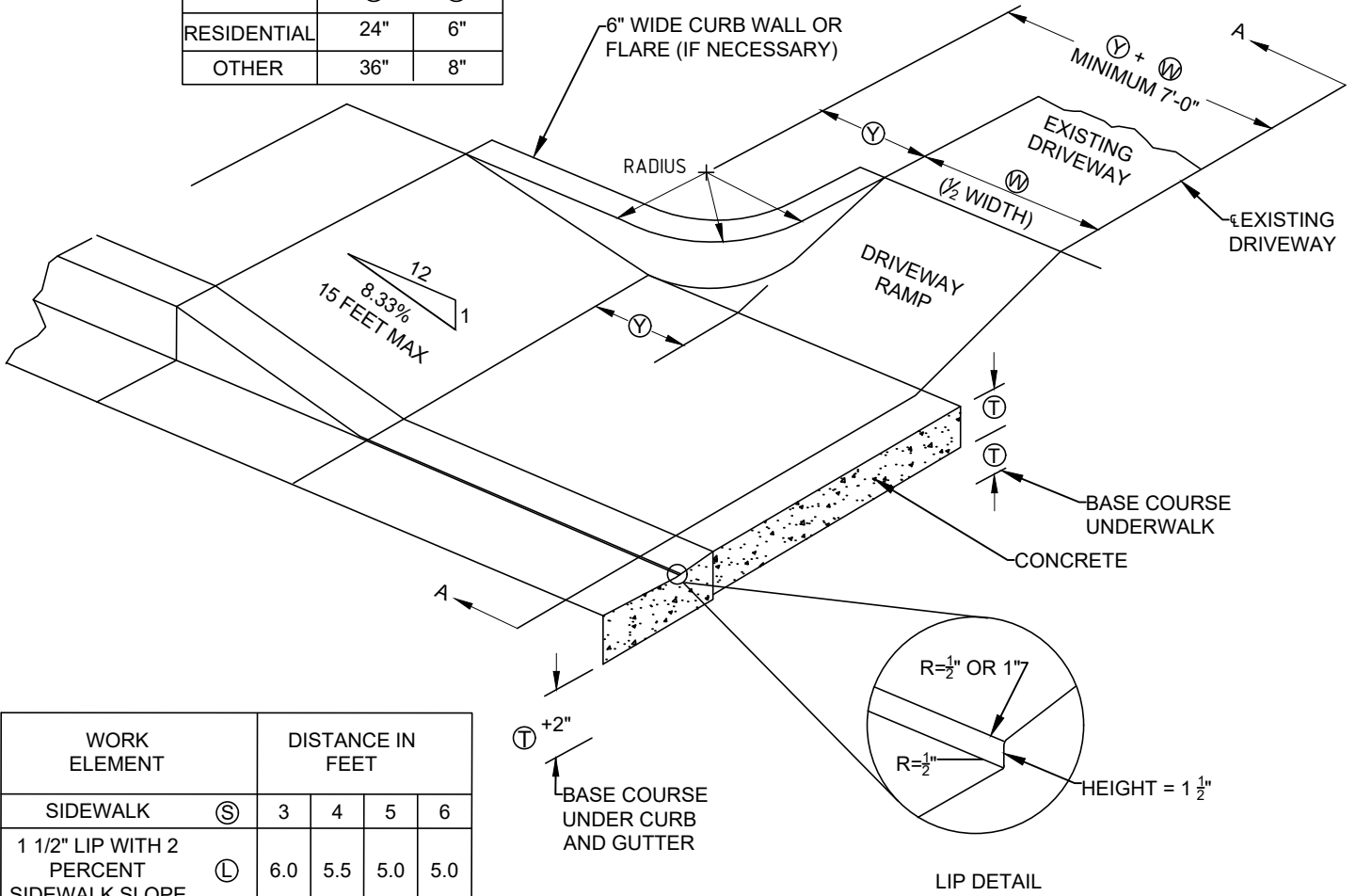
STANDARD DETAIL

P-126

NOT TO SCALE

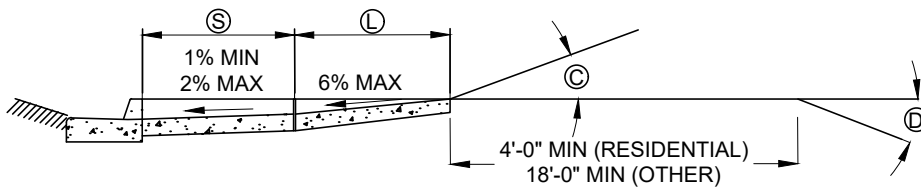
REVISED DATE: 10/15/17

STREET TYPE	LENGTH	
	Ⓨ	Ⓣ
RESIDENTIAL	24"	6"
OTHER	36"	8"



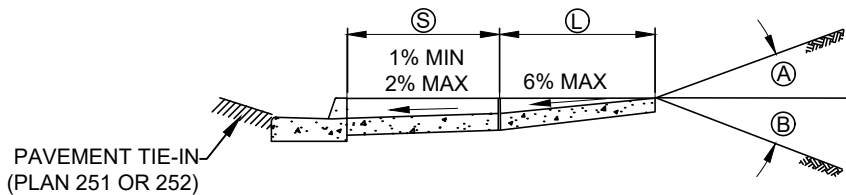
WORK ELEMENT	DISTANCE IN FEET				
		3	4	5	6
SIDEWALK Ⓢ					
1 1/2" LIP WITH 2 PERCENT SIDEWALK SLOPE Ⓛ		6.0	5.5	5.0	5.0

OBLIQUE



STREET TYPE	BREAK OVER ANGLE (MAX)	
	Ⓢ	Ⓣ
RESIDENTIAL	16%	6%
OTHER	6%	2%

SECTION A-A - APPROACH REQUIRING SERVICE TRUCK ACCESS



STREET TYPE	BREAK OVER ANGLE (MAX)	
	Ⓢ	Ⓣ
RESIDENTIAL	16%	12%
OTHER	6%	8%

SECTION A-A - TYPICAL DRIVEWAY APPROACH

SHEET 1 OF 2

Dip Driveway Approach

1. GENERAL

- A. Variance from specified dimensions and slopes must be acceptable to the engineer. System configuration may be changed at ENGINEER's discretion.
- B. Additional requirements are specified in APWA Section 32 16 13.

2. PRODUCT

- A. Base Course: Untreated base course. APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
- B. Expansion Joint Filler: 1/2-inch thick type F1 full depth. APWA Section 32 13 73.
- C. Concrete: Class 4000. APWA Section 03 30 04. If necessary, provide concrete that achieves design strength in less than 7 days. Use caution; however as concrete crazing (spider cracks) may develop if air temperature exceeds 90 degrees F.
- D. Reinforcement: Galvanized or epoxy coated, deformed, 60 ksi yield grade steel, ASTM A 615.
- E. Concrete Curing Agent: Clear Membrane forming compound with fugitive dye (Type ID Class A), APWA Section 03 39 00.

3. EXECUTION

- A. Base Course Placement: APWA Section 32 05 10. Maximum lift thickness before compaction is 8-inches when using riding equipment or 6-inches when using hand held equipment. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 32 23 26.
- B. Concrete Placement: APWA Section 03 30 10.
 - B.1. Install expansion joints vertical, full depth, with top of filler set flush with concrete surface.
 - B.2. Install contraction joints vertical, 1/8-inch wide or 1/4 slab thickness if the slab is greater than 8-inches thick. Maximum length to width ratio for non-square panels is 1.5 to 1. Maximum panel length (in feet) is 1.5 times the slab thickness (in inches).
 - B.3. Provide 1/2-inch radius edges. Apply a broom finish. Apply a curing agent.
- C. Protection and Repair. Protect concrete from deicing chemicals during cure. Repair construction that does not drain. If necessary, fill flow-line with water to verify.

SHEET 2 OF 2

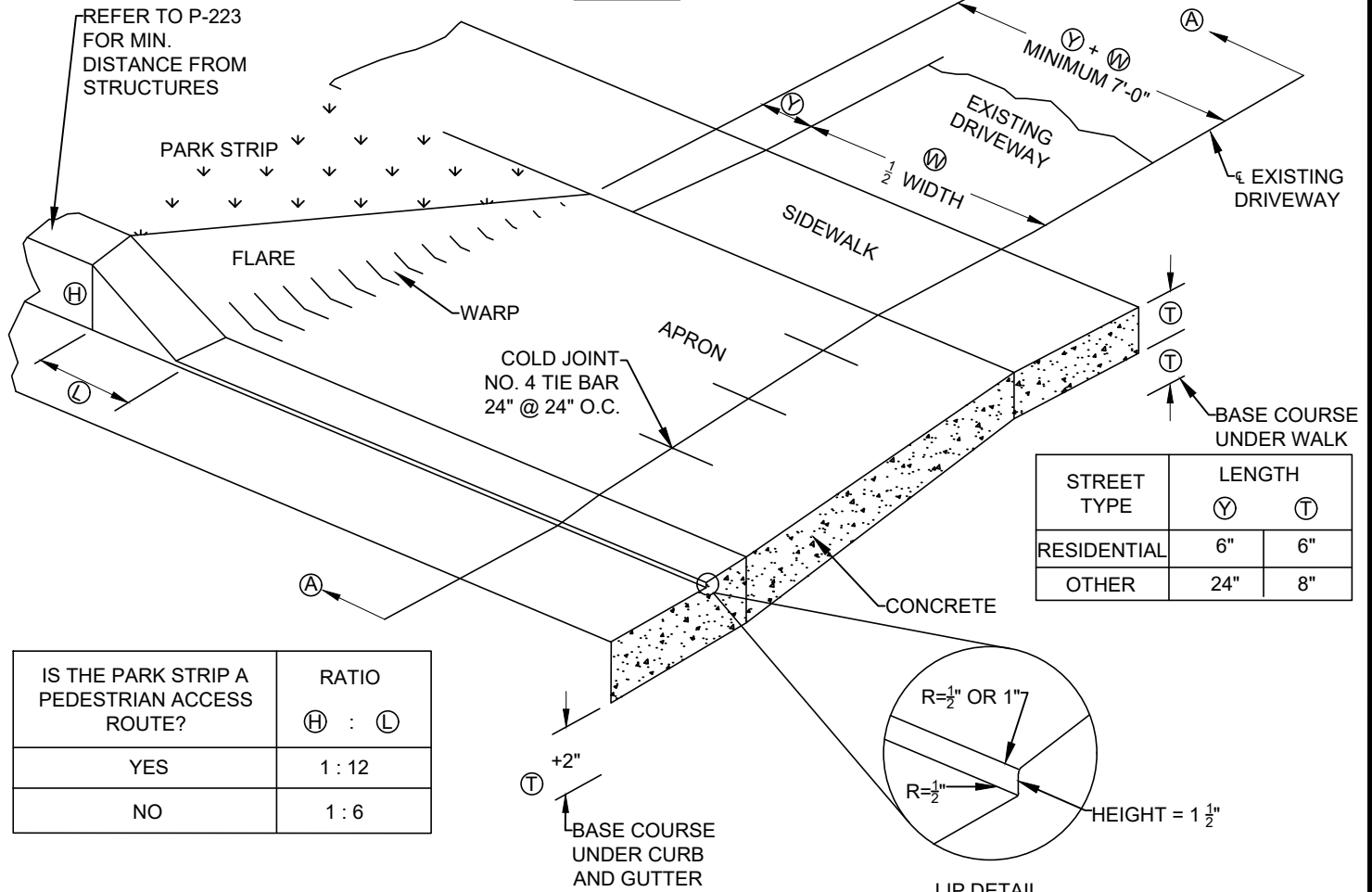
STANDARD DETAIL

P-215

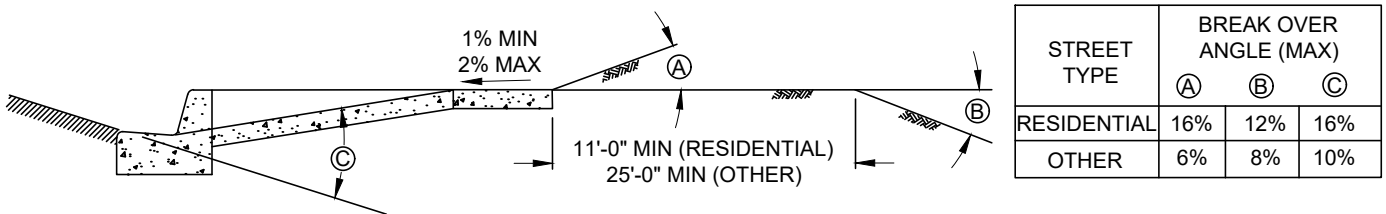
NOT TO SCALE

REVISED DATE: 11/25/15

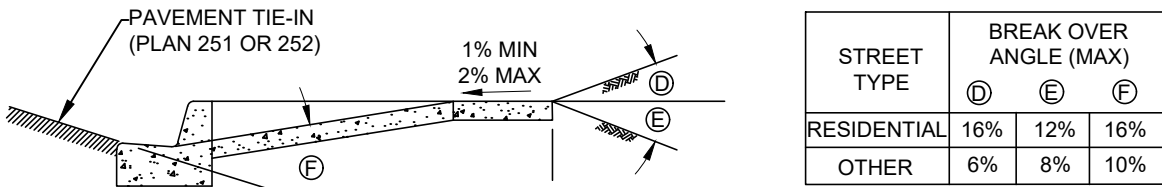
TYPE A



OBLIQUE



SECTION A-A - APPROACH REQUIRING SERVICE TRUCK ACCESS



SECTION A-A - TYPICAL DRIVEWAY APPROACH

SHEET 1 OF 3

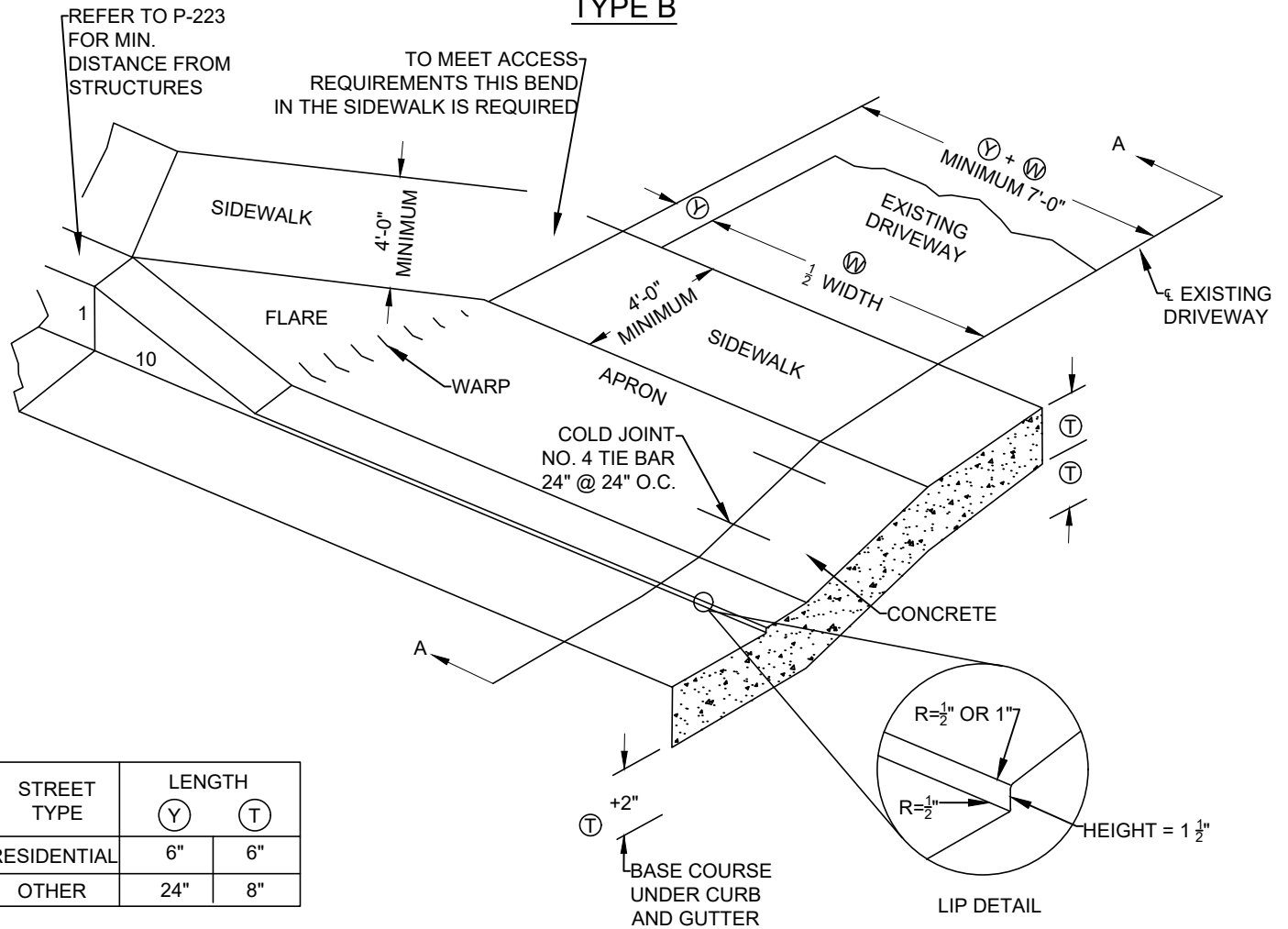
STANDARD DETAIL

P-221a

NOT TO SCALE

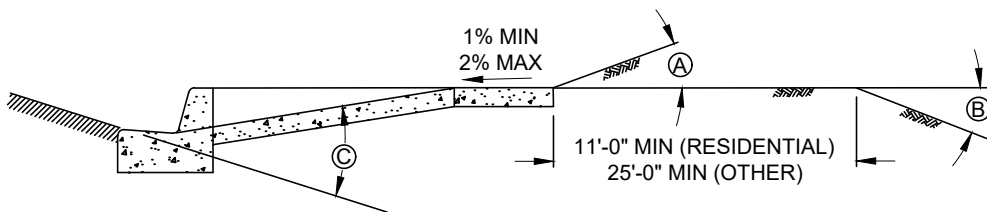
REVISED DATE: 11/25/15

TYPE B



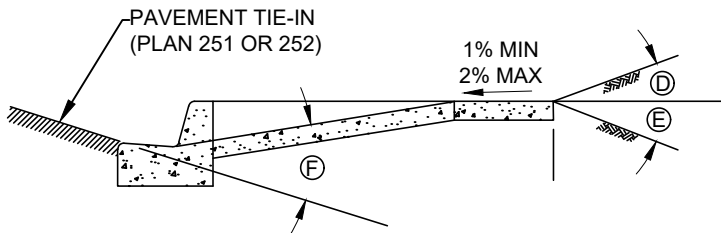
STREET TYPE	LENGTH	
	(Y)	(T)
RESIDENTIAL	6"	6"
OTHER	24"	8"

OBLIQUE



STREET TYPE	BREAK OVER ANGLE (MAX)		
	(A)	(B)	(C)
RESIDENTIAL	16%	12%	16%
OTHER	6%	8%	10%

SECTION A-A - APPROACH REQUIRING SERVICE TRUCK ACCESS



STREET TYPE	BREAK OVER ANGLE (MAX)		
	(D)	(E)	(F)
RESIDENTIAL	16%	12%	16%
OTHER	6%	8%	10%

SECTION A-A - TYPICAL DRIVEWAY APPROACH

SHEET 2 OF 3

Flare Driveway Approach

1. GENERAL

- A. Variance from specified dimensions and slopes must be acceptable to the ENGINEER. System configuration may be changed at ENGINEER's discretion.
- B. Field Changes to Slope Requirements:
 - B.1. Grades may have a 6 percent change in slope over a 11 feet wheel base run for both crest or sag vertical curves.
 - B.2. Where heavy truck use and fire truck access applies, or to improve design speed, design grades should be cut in half.
 - B.3. Specific uses or site conditions may require profile design submittal for review and acceptance.
- C. Additional requirements are specified in APWA 32 16 13.

2. PRODUCT

- A. Base Course: Untreated base course. APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
- B. Expansion Joint Filler: 1/2-inch thick type F1 full depth. APWA Section 32 13 73.
- C. Concrete: Class 4000. APWA Section 03 30 04. If necessary, provide concrete that achieves design strength in less than 7 days. Use caution; however as concrete crazing (spider cracks) may develop if air temperature exceeds 90 degrees F.
- D. Reinforcement: Galvanized or epoxy coated, deformed, 60 ksi yield grade steel, ASTM A 615.
- E. Concrete Curing Agent: Clear Membrane forming compound with fugitive dye (Type ID Class A), APWA Section 03 39 00.

3. EXECUTION

- A. Base Course Placement: APWA Section 32 05 10. Maximum lift thickness before compaction is 8-inches when using riding equipment or 6-inches when using hand held equipment. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 32 23 26.
- B. Reinforcement: No required if driveway apron is constructed without a cold joint.
- C. Concrete Placement: APWA Section 03 30 10.
 - C.1. Install expansion joints vertical, full depth, with top of filler set flush with concrete surface.
 - C.2. Install contraction joints vertical, 1/8-inch wide or 1/4 slab thickness if the slab is greater than 8-inches thick. Maximum length to width ratio for non-square panels is 1.5 to 1. Maximum panel length (in feet) is 1.5 times the slab thickness (in inches).
 - C.3. Provide 1/2-inch radius edges. Apply a broom finish. Apply a curing agent.
- D. Protection and Repair. Protect concrete from deicing chemicals during cure. Repair construction that does not drain. If necessary, fill flow-line with water to verify.

SHEET 3 OF 3



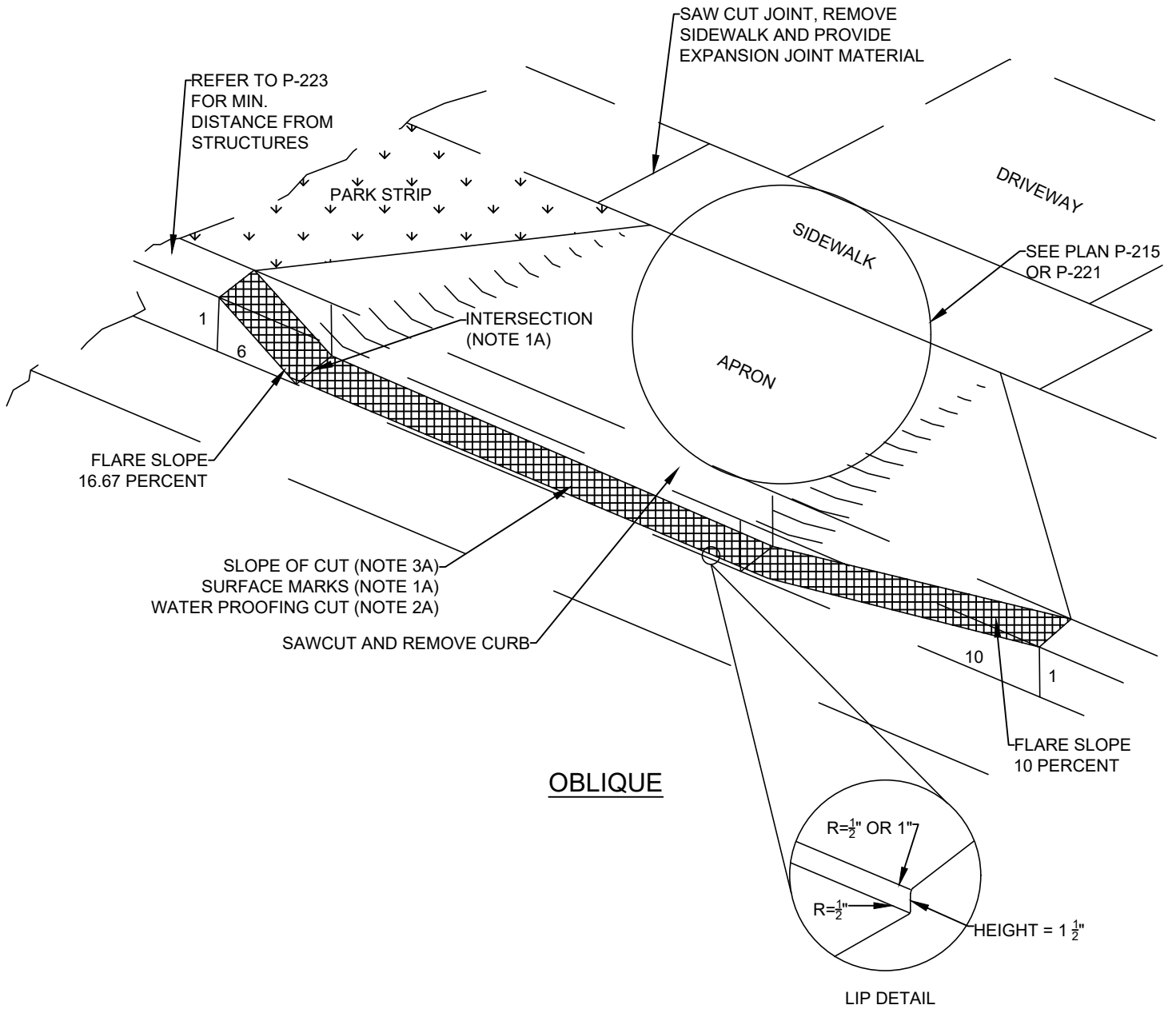
FLARE DRIVEWAY APPROACH

STANDARD DETAIL

P-221

NOT TO SCALE

REVISED DATE: 11/25/15



SHEET 1 OF 2

STANDARD DETAIL

P-222

NOT TO SCALE

REVISED DATE: 11/25/15

Saw-cut Driveway Approach

1. GENERAL

- A. The drawing shows sawing off and removing a curb for the construction of a new driveway approach. Additional requirements are specified in Plan 215 or Pan 221 for constructing driveway approach after curb is removed.
- B. The slope of the right flare is required if a pedestrian access route abuts the curb. The slope of the left flare is required if a pedestrian access route does not abut the curb.
- C. Variance from specified slopes must be acceptable to the ENGINEER.

2. PRODUCT

- A. Water Repellant: Penetrating compound, APWA Section 07 19 00.
- B. Expansion Joint Filler: 1/2-inch thick type F1 full depth. APWA Section 32 13 73.

3. EXECUTION

- A. At the apron, cut the curb off so the slope of the curb cut as measured perpendicular to the flow line is 16.67 percent (1:6). Unless specified otherwise, make the curb cut intersect the flow line.
- B. At the flare, cur the curb off so the slope of curb cut as measured parallel to the flow line is as follows.
 - B.1. 8.33 percent (1:12) if curb borders a surface used by pedestrians.
 - B.2. 16.67 percent (1:6) if curb does not border a surface used by pedestrians.
- C. No over-cutting where cuts merge. Grind sawed surface so no blade marks remain.
- D. Water Proofing: Apply full coverage water repellant over cut concrete.
- E. Expansion Joint: Vertical, full depth, with top of filler set flush with concrete surface.

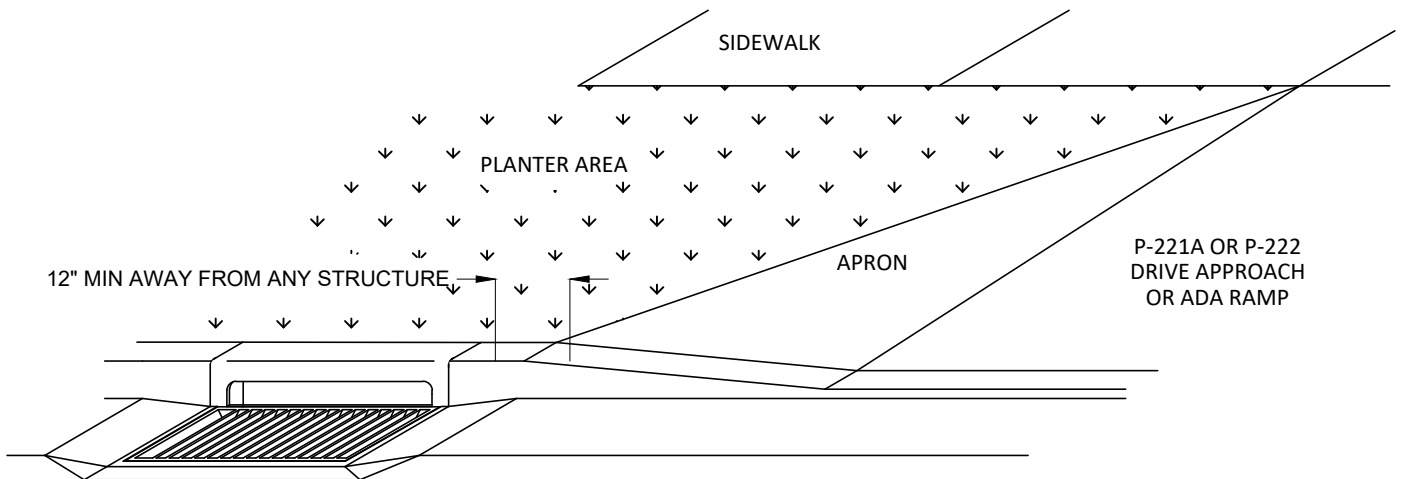
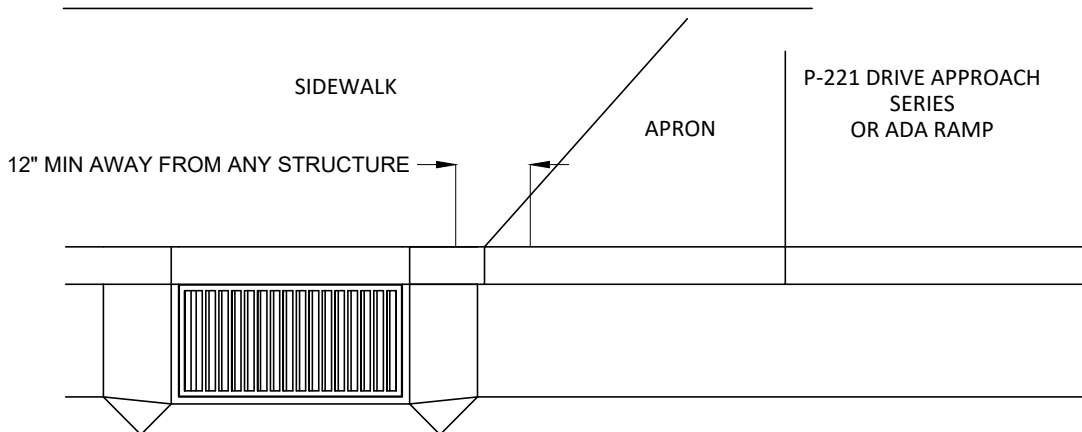
SHEET 2 OF 2

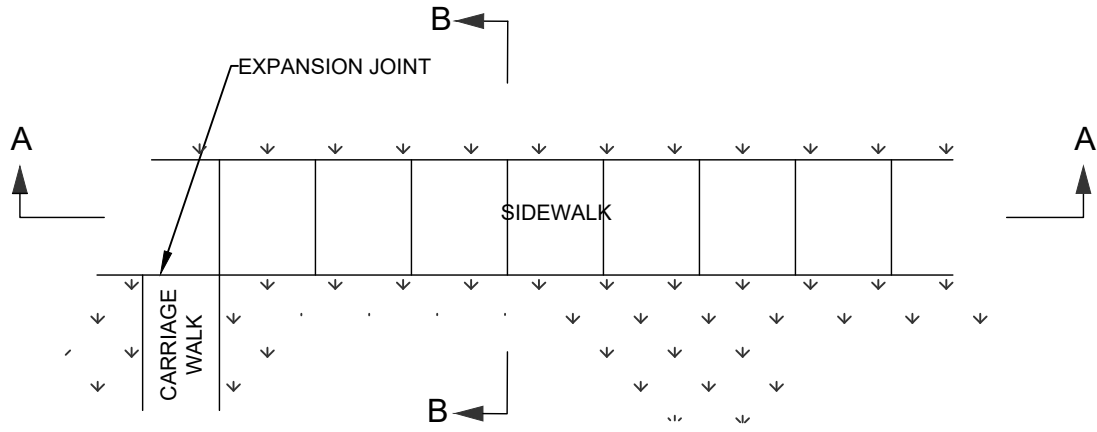
STANDARD DETAIL

P-222

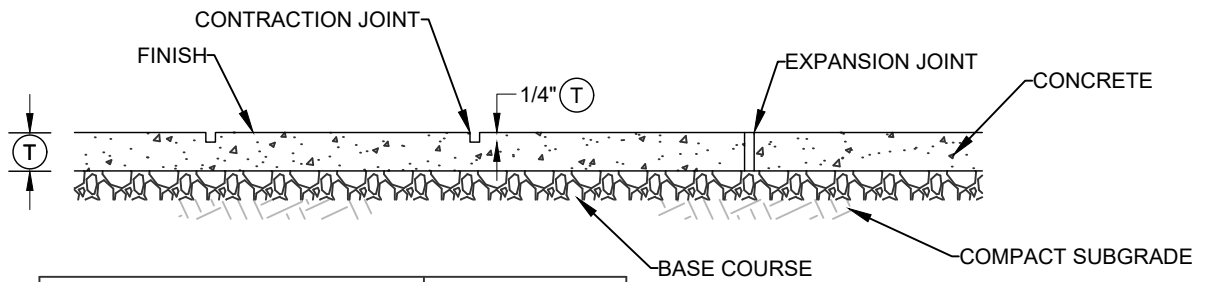
NOT TO SCALE

REVISED DATE: 11/25/15





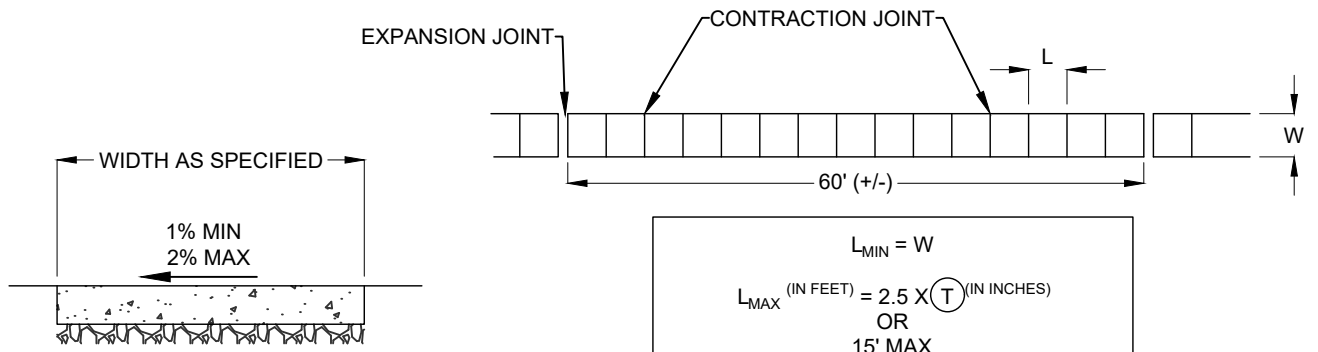
PLAN



STREET TYPE	(T)
RESIDENTIAL (WITH PARK STRIP)	5"
RESIDENTIAL (NO PARK STRIP)	5"
OTHER	
REPLACING EXISTING SIDEWALK	MATCH EXISTING (5" MIN.)

SEE DRIVEWAY APPROACH PLANS FOR SIDEWALK THICKNESS AT DRIVEWAYS

SECTION A-A



SECTION B-B

SIDEWALK JOINT DETAIL

Sidewalk

1. GENERAL

- A. Variance from specified dimensions and slopes must be acceptable to the ENGINEER. System configuration may be changed at ENGINEER's discretion.
- B. Additional requirements are specified in APWA Section 32 16 13.

2. PRODUCT

- A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
- B. Expansion Joint Filler: 1/2-inch thick type F1 full depth, APWA Section 32 13 73.
- C. Concrete: Class 4000, APWA Section 03 30 04. If necessary, provide concrete that achieves design strength in less than 7 days. Use caution; however, as concrete crazing (spider cracks) may develop if air temperature exceeds 90 degrees F.
- D. Concrete Curing Agent: Clear membrane forming compound with fugitive dye (Type ID Class A), APWA Section 03 39 00.

3. EXECUTION

- A. Base Course Placement: APWA Section 32 05 10. Maximum lift thickness before compaction is 8-inches when using riding equipment or 6-inches when using hand held equipment. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
- B. Concrete Placement: APWA Section 03 30 10.
 - B.1. Install expansion joints vertical, full depth, with top of filler set flush with concrete surface.
 - B.2. Install contraction joints vertical, 1/8-inch wide or 1/4 slab thickness if the slab is greater than 8-inches thick. Maximum length to width ratio for non-square panels is 1.5 to 1. Maximum panel length (in feet) is 1.5 times the slab thickness (in inches).
 - B.3. Provide 1/2-inch radius edges. Apply a broom finish. Apply a curing agent.

SHEET 2 OF 2



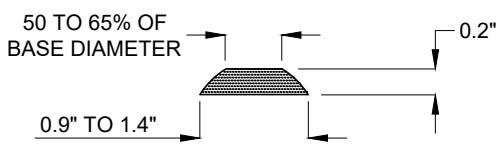
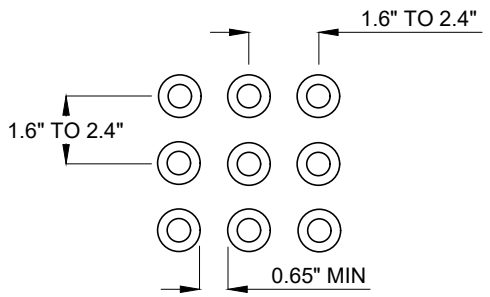
SIDEWALK

STANDARD DETAIL

P-231

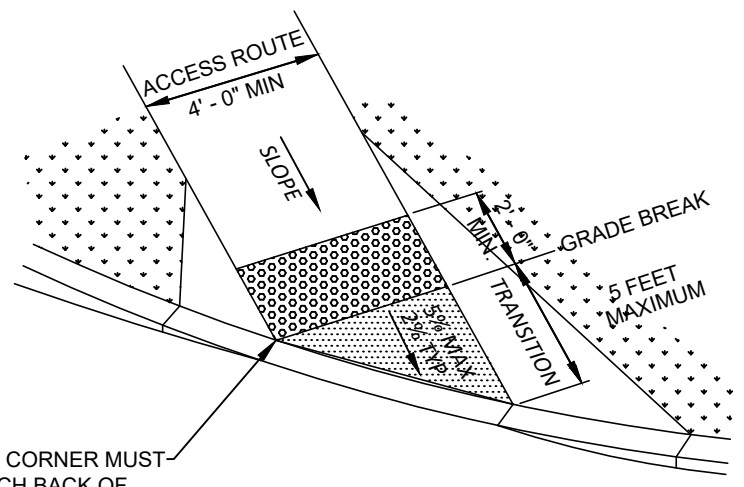
NOT TO SCALE

REVISED DATE: 08/2023



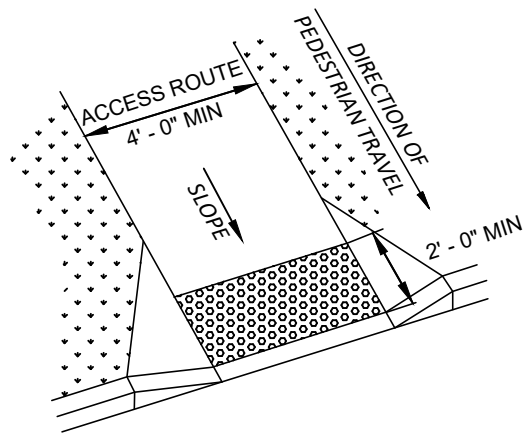
SECTION

TRUNCATED DOME DETAIL

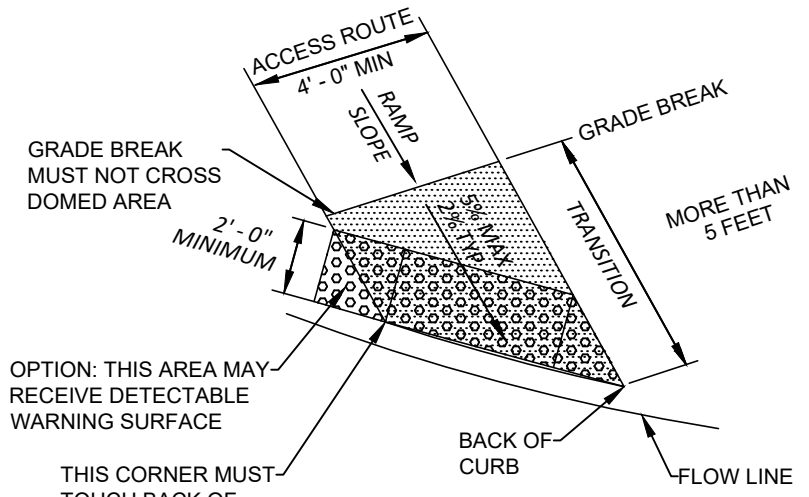


THIS CORNER MUST TOUCH BACK OF CURB LINE

TRANSITION 1



PERPENDICULAR ASSEMBLY



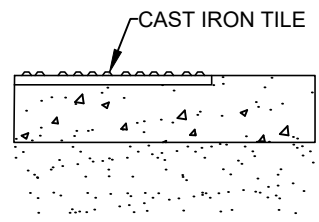
GRADE BREAK MUST NOT CROSS DOMED AREA

OPTION: THIS AREA MAY RECEIVE DETECTABLE WARNING SURFACE

THIS CORNER MUST TOUCH BACK OF CURB LINE

TRANSITION 2

NON-PERPENDICULAR ASSEMBLY



STYLE T

Detectable Warning Surface

1. GENERAL

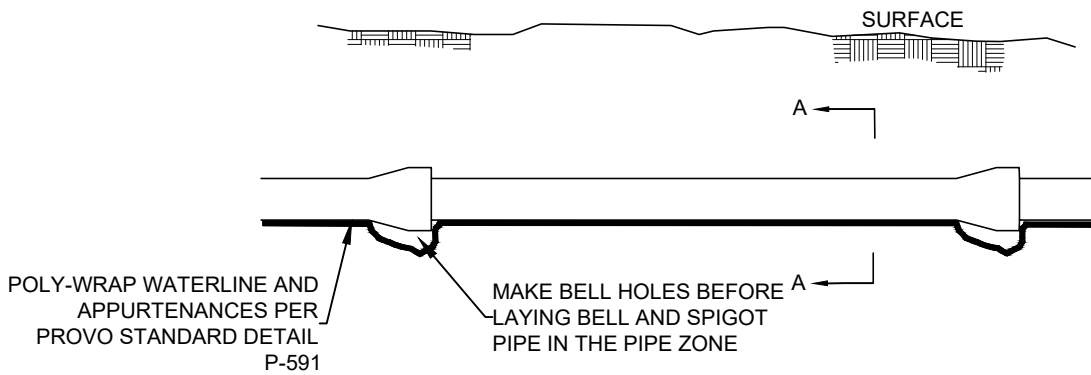
- A. Detectable warnings consist of a surface of truncated domes aligned in a square or radial grid pattern with dome size, dome spacing, contrast and panel size as indicated.
- B. definitions and supplemental requirements are specified in APWA Section 32 16 14.

2. PRODUCT

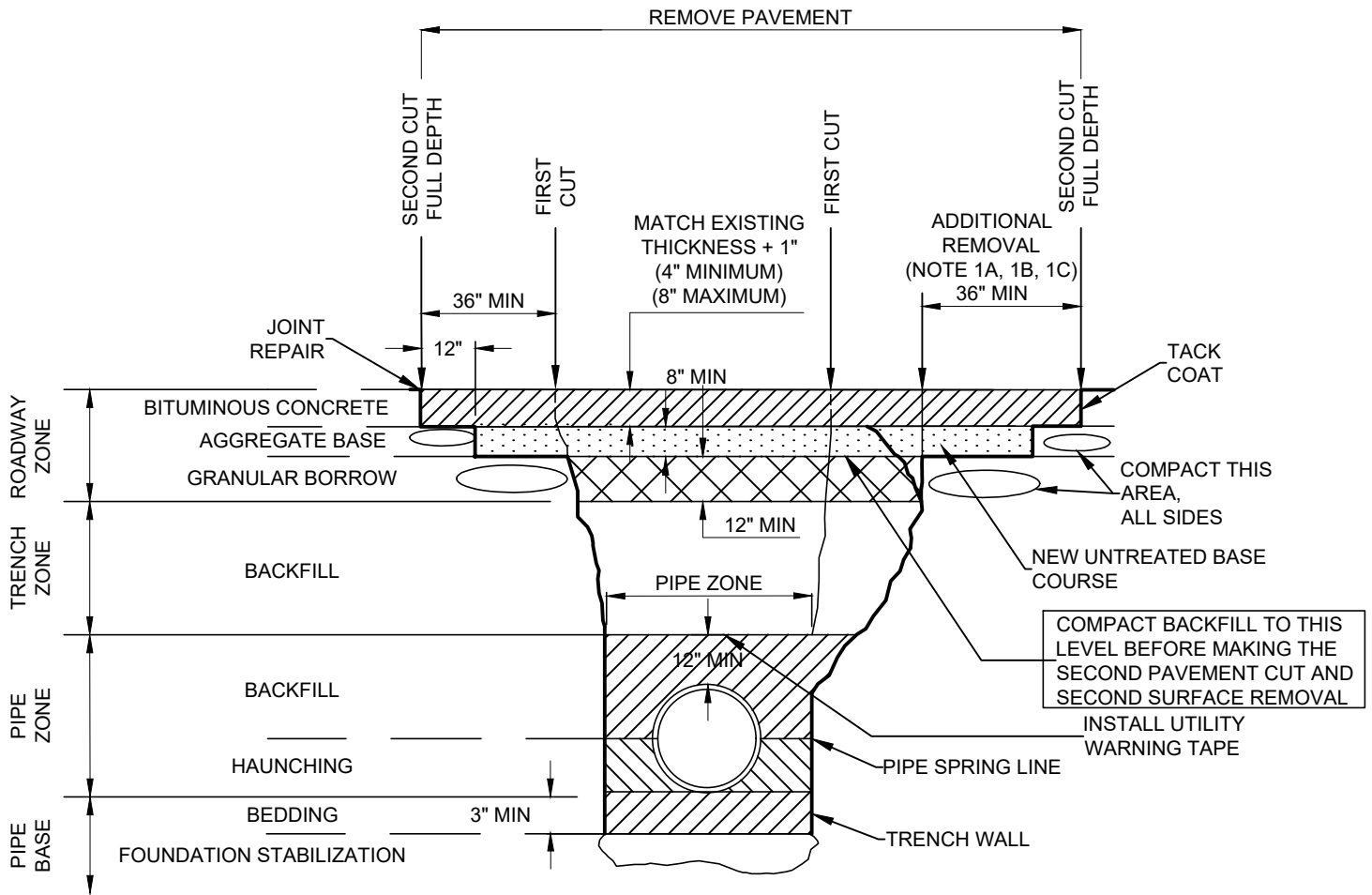
- A. Cast Iron Panels:
 - A.1. Must not be cut or manipulated. When resizing is needed, panel must be remanufactured.
 - A.2. Radius Panels are required on all radius curbs.
 - A.3. See Standard Plan P-235 for installation.

3. EXECUTION

- A. Layout:
 - A.1. Joints Between Units: $\frac{3}{16}$ inch or manufacturer's recommendation.
 - A.2. Flares: Do not install detectable warning units on flared surfaces.
 - A.3. Alignment: Where a ramp, turning space, or blended transition provides access to the street continuously around a corner, align the vertical rows of truncated domes to be perpendicular or radial to the grade break between the ramp and the street for a 4 feet minimum width for each crosswalk served.
 - A.4. Transition 1 or 2: Selection is by ENGINEER unless indicated elsewhere.
 - A.5. At Rail Crossings: The edge of the detectable warning surface nearest the rail crossing is 6 feet minimum and 15 feet maximum from the center line of the nearest rail.



ELEVATION VIEW



STORM DRAIN	
LOCATION IN TRENCH	REQUIRED MATERIAL
PIPE BASE	
FOUNDATION STABILIZATION	COMMON FILL
BEDDING	GRAVEL OR UNTREATED BASE COURSE
PIPE ZONE	
HAUNCHING	GRAVEL
BACKFILL	GRAVEL
TRENCH ZONE	
BACKFILL	BORROW OR FLOWABLE FILL*
ROADWAY ZONE	
GRANULAR BORROW	GRANULAR BORROW
AGGREGATE BASE	UNTREATED BASE COURSE
BITUMINOUS CONCRETE	BITUMINOUS CONCRETE

WATER LINE	
LOCATION IN TRENCH	REQUIRED MATERIAL
PIPE BASE	
FOUNDATION STABILIZATION	COMMON FILL
BEDDING	SAND
PIPE ZONE	
HAUNCHING	SAND
BACKFILL	SAND
TRENCH ZONE	
BACKFILL	BORROW OR FLOWABLE FILL*
ROADWAY ZONE	
GRANULAR BORROW	GRANULAR BORROW
AGGREGATE BASE	UNTREATED BASE COURSE
BITUMINOUS CONCRETE	BITUMINOUS CONCRETE

SANITARY SEWER	
LOCATION IN TRENCH	REQUIRED MATERIAL
PIPE BASE	
FOUNDATION STABILIZATION	COMMON FILL
BEDDING	GRAVEL OR UNTREATED BASE COURSE
PIPE ZONE	
HAUNCHING	GRAVEL
BACKFILL	GRAVEL
TRENCH ZONE	
BACKFILL	BORROW OR FLOWABLE FILL*
ROADWAY ZONE	
GRANULAR BORROW	GRANULAR BORROW
AGGREGATE BASE	UNTREATED BASE COURSE
BITUMINOUS CONCRETE	BITUMINOUS CONCRETE

SHEET 1 OF 2



TRENCH BACKFILL AND SURFACE RESTORATION

STANDARD DETAIL

P-255

NOT TO SCALE

REVISED DATE: 11/25/15

Trench Backfill & Surface Restoration

1. GENERAL

- A. The offset for the second asphalt cut shall be measured from the edge of the final trench wall which may result from undermining of the asphalt or sloughing of the trench wall during the construction process as shown in the detail.
- B. If a saw cut in the direction of vehicular travel is within a wheel path, ENGINEER may order additional pavement removal so saw cut falls outside of a wheel path.
- C. If the width of existing pavement left in place between trenches and/or curb and gutter, waterways, edge of pavement, etc. is less than 3 feet, CONTRACTOR shall remove the additional existing pavement and restore pavement according to the typical pavement restoration details.
- D. Install pipe in the center of the trench or no closer than 6-inches from the wall of the pipe to the wall of the trench.

2. PRODUCT

- A. Common Fill: Section 31 05 13M. Maximum particle size 2-inches.
- B. Gravel: Section 31 05 13M. Do not use pea gravel or recycled RAP aggregate.
- C. Untreated Base Course: Untreated base course, Grade $\frac{3}{4}$, APWA Section 32 11 23.
- D. Sand: Section 31 05 13M. Do not use pea gravel or recycled RAP aggregate.
- E. Flowable Fill: APWA Section 31 05 15. Target is 60 psi in 28-days and 90 psi maximum in 28 days. Material must flow easily requiring no vibration for consolidation.
- F. Borrow: Section 31 05 13M. Maximum particle size 3-inches.
- G. Granular Borrow: Section 31 05 13M. Maximum particle size 3-inches.
- H. Tack Coat: APWA Section 32 12 13.
- I. Bituminous Concrete: AC-10-DM-3/4. Section 32 12 05M.
- J. Utility Warning Tape: Install between pipe zone and trench zone. Minimum tape width 3-inches.

3. EXECUTION

- A. Excavate the Pipe Zone: Width is measured at the pipe spring line and includes an necessary sheathing. Provide width recommended by pipe manufacturer. Follow manufacturer's recommendations when using trench boxes.
- B. Foundation Stabilization: Get ENGINEER's permission before installing common fill. Vibrate to stabilize. Installation of stabilization-separation geotextile will be required to separate backfill material and native subgrade materials if common fill cannot provide a working surface or prevent soils migration.
- C. Pipe Base Placement: APWA Section 32 05 10. Maximum lift thickness before compaction is 8-inches when using riding equipment or 6-inches when using hand held equipment. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
- D. Flowable Fill: Where Required, place controlled low strength material in the trench, APWA Section 31 05 15. Cure to initial set before placing aggregate base or asphalt pavement. Prevent pipe floatation by installing in lifts and providing pipe restraints as required by pipe manufacturer. Reset pipe to line and grade if pipe "floats" out of position.
- E. Trench Backfill: DO NOT USE sewer rock, pea gravel, or recycled RAP aggregate as trench backfill. Water jetting is NOT allowed. Submission of quality control compaction test result data developed for haunching areas may be requested by ENGINEER at any time. Provide results of tests immediately upon request. Native material obtained from excavation may be used as fill upon removal of organic material, rubbish, debris, and other objectionable materials are removed.
- F. Task Coat: Clean all horizontal and vertical surface. Apply full coverage.
- G. Asphalt Pavement: Match existing thickness plus 1 inch but not more than 6-inches on local streets or 8-inches on collector and arterial streets (as identified by Provo City). Install in lifts no greater than 3-inches after compaction. Compact to 94 percent of ASTM D 2041 (rice density) plus or minus 2 percent. If asphalt pavement is substituted for concrete substrate, omit rebar and provide 1.25-inches of pavement for each 1-inch of concrete substrate substituted.
- H. Concrete Substrate: Cure to initial set before placing new asphalt concrete patch.
- I. Reinforcement: Required if thickness of existing Portland-cement concrete substrate is 6-inches or greater. Not required if (1) less than 6-inches thick, (2) if existing concrete is deteriorating, (3) if excavation is less than 3 feet square, of (4) if asphalt pavement is substituted for Portland-cement concrete substrate.
- J. Surface Restoration:
 - J.A. Landscaped Surface: Rake to match existing grade. Replace vegetation to match pre-construction conditions. Follow APWA Section 32 92 00 (turf or grass).
 - J.B. Paved Surface: Do not install asphalt or concrete surfacing until trench compaction is acceptable to ENGINEER. Follow APWA Section 33 05 25 (asphalt surfacing).
- K. Joint Repair: If a Crack Occurs at a connection to the existing pavement or at any street fixture, flush and seal the crack per APWA Plan 265.
- L. Patch Repair: Repair patch if any of the following conditions within the patch occur.
 - L.A. Pavement surface distortion exceeds $\frac{1}{4}$ -inch deviation in 10-feet. Repair option: Plane off surface distortions. Coat planed surfaces with a cationic or anionic emulsion that complies with APWA Section 32 12 03.
 - L.B. Cracks at least 1-foot long and 1/4-inch wide occur more often than 1 in 10 square feet. Repair option: Crack seal, APWA Section 32 01 17.
 - L.C. Asphalt raveling is greater than 1 square foot per 100 square feet. Repair Option: Mill and inlay.

SHEET 2 OF 2



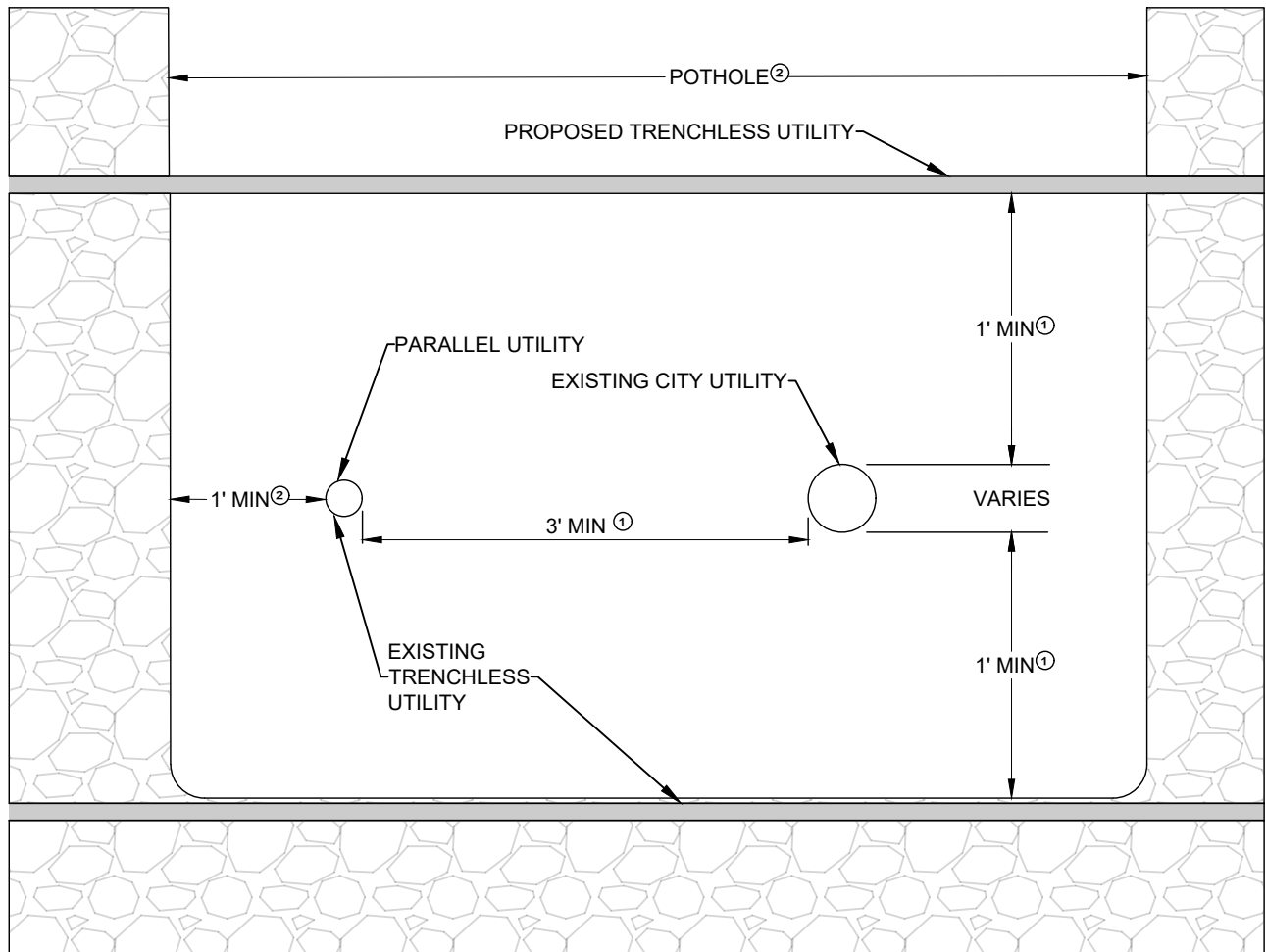
TRENCH BACKFILL AND SURFACE RESTORATION

STANDARD DETAIL

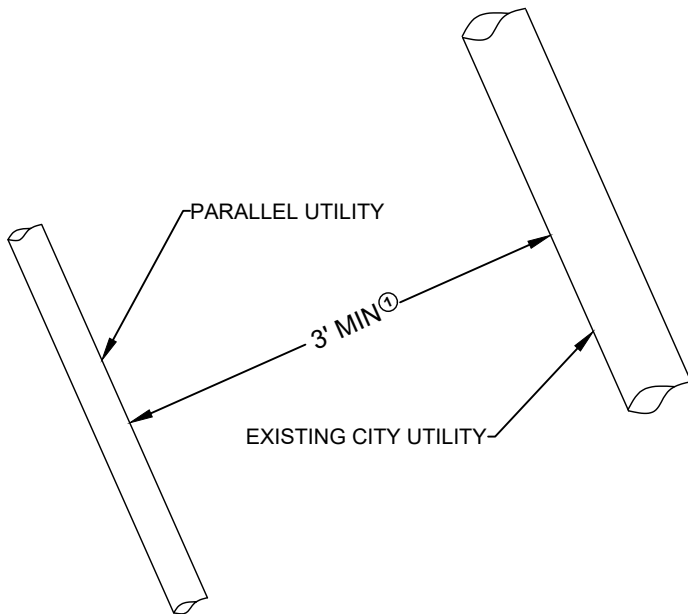
P-255

NOT TO SCALE

REVISED DATE: 11/25/15



CROSS SECTION



PLAN VIEW PARLLEL UTILITY INSTALLATION

- ① Provide 1 foot minimum vertical clearance and 3 foot horizontal clearance edge to edge between city utility and trenchless utility.
- ② Expose city utility at crossing location for a minimum of 1 foot on all sides prior to trenchless installation.

Trenchless Utility Installation

1. GENERAL

- A. All city utilities shall be potholed and exposed for one foot (1') on all sides.
- B. All parallel utilities shall be a minimum of three feet (3') from a city utility.
- C. Utilities should be buried between 36" and 48".
- D. If location of trenchless utility differs from what is represented on the permit, a new permit showing the revised location will be required.

2. PRODUCT

- A. If adequate compaction cannot be achieved around a city utility that has been potholed, flowable fill will be required.

3. EXECUTION

- A. Each utility shall be windowed and a person shall witness the trenchless utility crossing the existing utilities.
- B. Minimum 24 hour notice is required of any installation of a trenchless utility past a city utility.
- C. Pothole restoration shall conform to Provo City Standard P-255, "TRENCH BACKFILL AND SURFACE RESTORATION". If proper compaction cannot be obtained, flowable fill may be required.

SHEET 2 OF 2



*TRENCHLESS UTILITY
INSTALLATION*

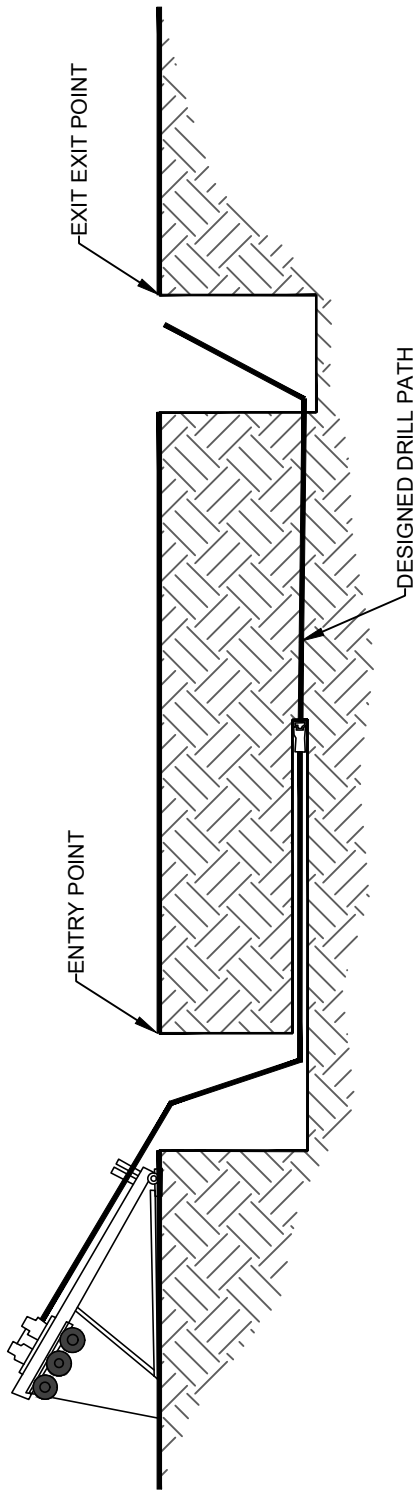
STANDARD DETAIL

P-257

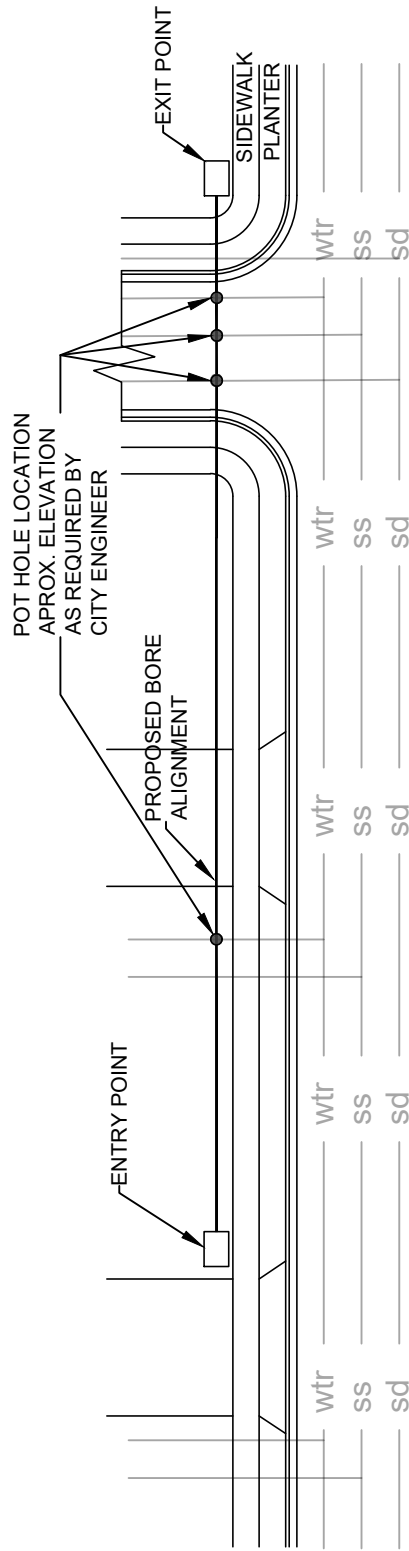
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REVISED DATE: 08/2023

PLAN REQUIREMENTS



PLAN REQUIREMENTS

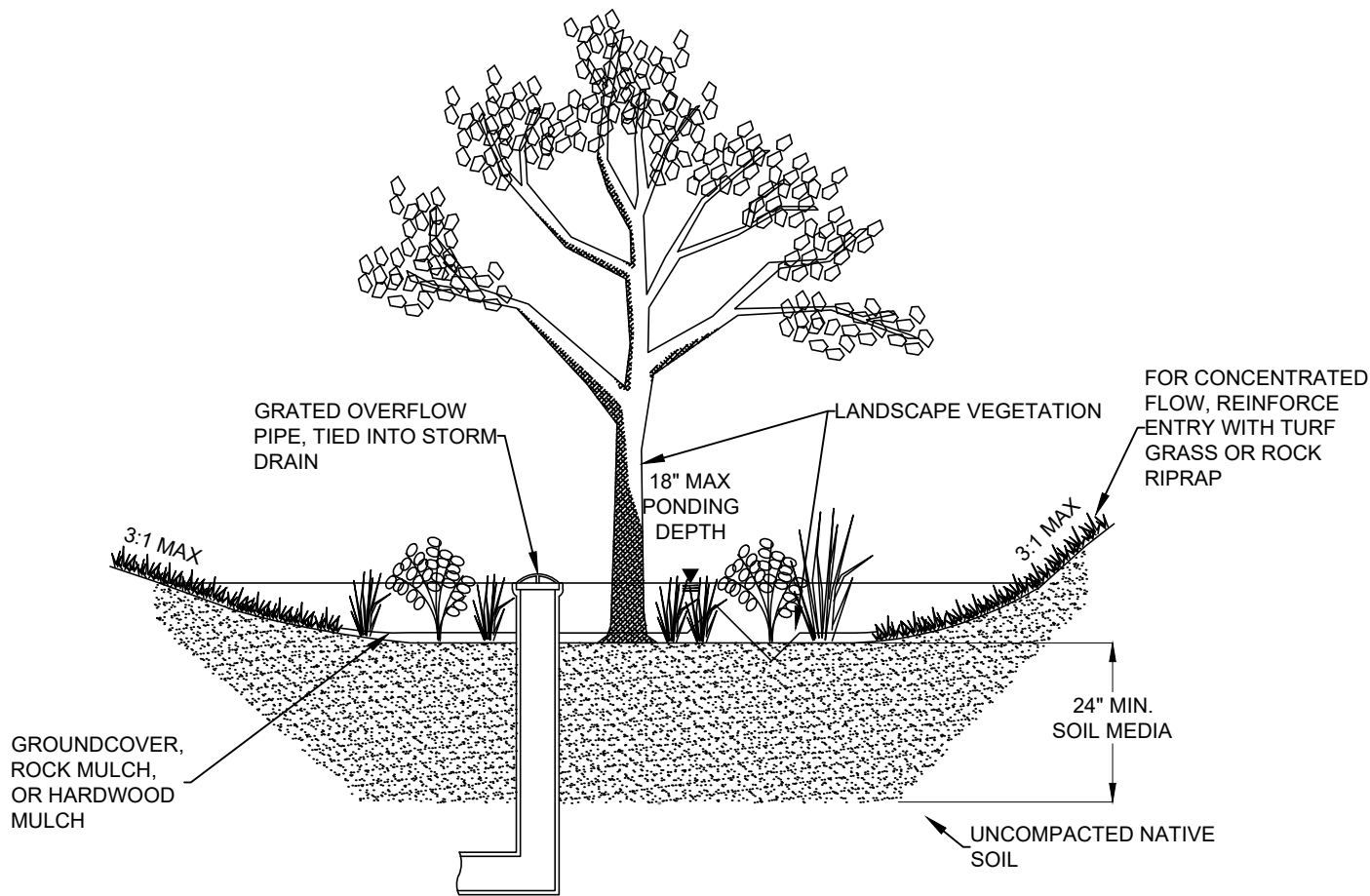


PLAN REQUIREMENTS

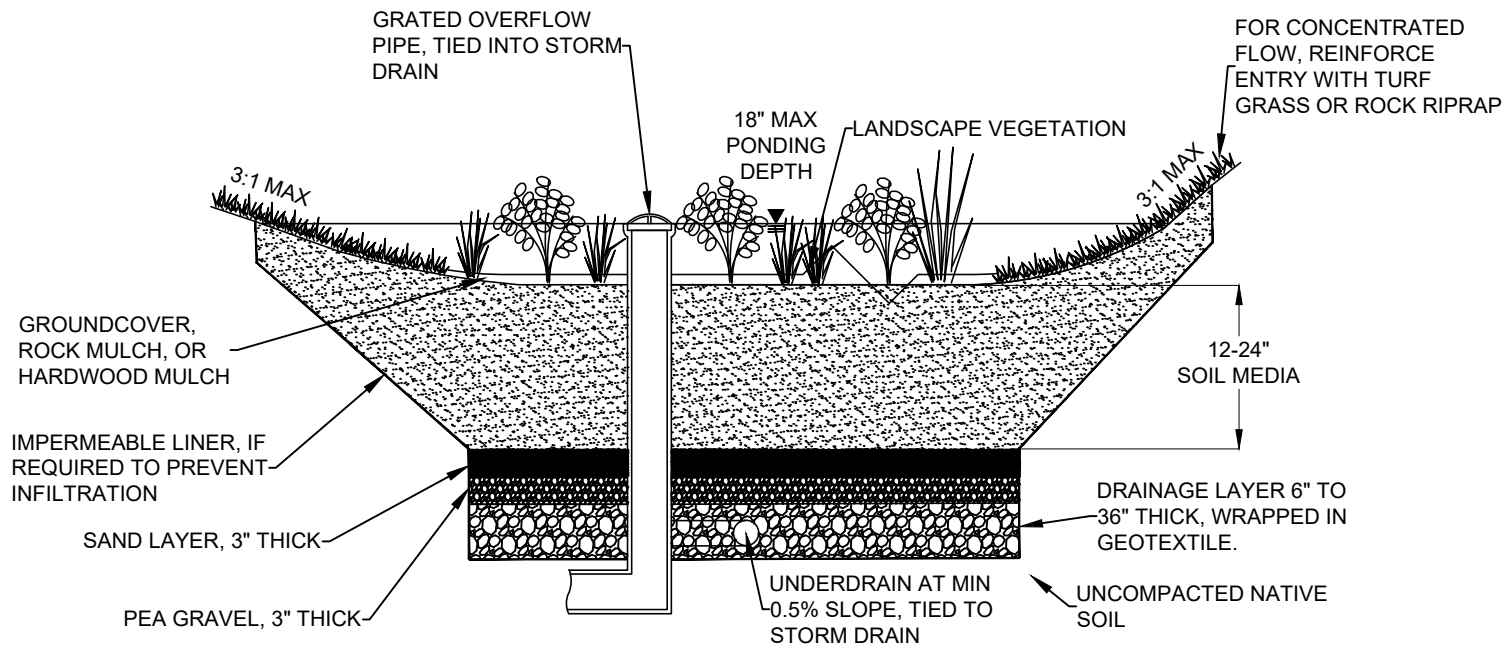
1. ENGINEERED DRAWINGS.
2. ENTRY AND EXIT POINTS MUST BE CLEARLY IDENTIFIED.
3. IDENTIFY CURB, GUTTER, AND SIDEWALK REMOVAL LOCATIONS, AND QUANTITIES.
4. IDENTIFY PROPOSED BORE DEPTH, LENGTH, AND ALIGNMENT. MINIMUM BORE DEPTH OF 36".
5. IDENTIFY LOCATION AND DEPTHS OF EXISTING CITY UTILITIES, INCLUDING, WATER, SEWER, STORM DRAIN, AND POWER.
6. TRAFFIC CONTROL PLAN
7. ADDITIONAL INFORMATION AS REQUIRED BY CITY ENGINEER.

NOTES

1. MAINTAIN MINIMUM SEPARATION OF 2 FOOT VERTICALLY AND HORIZONTALLY FROM EXISTING CITY UTILITIES.
2. CITY UTILITIES THAT ARE WITHIN 2 FEET OF BORE ARE TO BE WINDOWED AND OBSERVED AS BORE CROSSES UTILITY.
3. PERPENDICULAR CROSSINGS ARE REQUIRED FOR CITY UTILITIES.
4. PRIVATE UTILITY CROSSINGS ARE TO BE COORDINATED WITH THE CORRESPONDING OWNER.
5. APPROVED SET OF PLANS AND PUBLIC WORKS PERMIT ARE REQUIRED TO BE ON JOB SITE AT ALL TIMES.
6. COORDINATE ANY PLAN CHANGES THROUGH THE CITY ENGINEER PRIOR TO CONSTRUCTION.



RETENTION AND INFILTRATION



FILTRATION WITH UNDERDRAIN

SHEET 1 OF 2
STANDARD DETAIL P-301a
NOT TO SCALE
REVISED DATE: Sep-2020

Rain Garden

1. GENERAL

A. Submit before use:

- A.A. Soil Media: Certification from supplier or testing from native or amended soil, showing material meets requirements specified below.
- A.B. Sand, Pea Gravel, Sewer Rock, Rock Mulch, Rock Riprap: Name of supplier and source.
- A.C. Underdrain, Geotextile, Impermeable Liner, Hardwood Mulch: Sample and manufacturer's certification that material meets requirements specified below.

2. PRODUCT

- A. Landscape Vegetation: See Section 15.20, Provo City Code for landscape vegetation requirements. Refer to the Utah DEQ'S *A Guide to Low Impact Development within Utah* for additional guidance on plant selection in BMPs. Minimum 65% vegetative cover. Wood mulch only allowed where design floods are diverted around or ponded within rain garden (not conveyed through with velocity). Rain gardens requiring impermeable liner or underdrains shall be located at least 5' from trees or large, woody shrubs with roots that may compromise the liner or clog the underdrain.
- B. Soil Media: Native, amended, or engineered soil with organics to support plant growth, maximum 5% clay, minimum 60% gravelly sand or sand, with a long-term (safety factor applied) infiltration rate of at least 1 in/hr at 85% compaction.
- C. Sand Layer: Sand Per Utah Chapter APWA Specification 31 05 13.
- Pea Gravel: 3/8" to 1/2" pea gravel per Utah Chapter APWA Specification 31 05 13.
- E. Drainage Layer: ASTM Size 3-4 Sewer Rock per Utah Chapter APWA Specification 31 05 13.
- F. Underdrain: Min. 4" schedule 40 perforated PVC pipe, or equivalent with prior City approval.
- G. Geotextile: Drainage Geotextile per Utah Chapter APWA Specification 31 05 19. Class A if the drainage layer is very sharp and angular; otherwise, Class B.
- H. Impermeable Liner: Impermeable, nonbiodegradable, inert to soil chemicals, resistant to molds, mildew, acids and alkalis, and within a pH range of 3 to 12.
- I. Rock Riprap: Loose-placed riprap per Utah Chapter APWA Specification 31 37 00.
- J. Rock Mulch: Decorative rock at least 1" in diameter.
- K. Hardwood Mulch: Well-aged, hardwood mulch placed at least 3" thick.

3. EXECUTION

- A. Rain garden native subgrades shall not be compacted, and heavy construction equipment shall not be allowed within the rain garden footprint.
- B. Install all utilities prior to constructing the rain garden. Avoid BMP footprint when possible.
- C. Construction of rain garden shall commence after adjacent and tributary areas are stabilized.
- D. If no or only light compaction occurred on native soil during adjacent construction, loosen native subgrade (e.g. scarify top 6-9" of native soil with an excavator bucket). If significant compaction occurred, excavate 1' deep by 1' wide trenches every 6' and backfill with sand.
- I. If underdrain is required, inspect elevations prior to installation to ensure min. 0.5% slope. Follow manufacturer's recommendations for geotextile overlapping around drainage layer.
- J. If impermeable liner is required, inspect subgrade and remove items that may puncture.
- K. Install soil media in maximum 18" lifts, with only light compaction (85% maximum).
- L. Adhere to approved construction SWPPP, including any BMPs required to protect the rain garden during construction. If silt or other debris enters the rain garden during construction, remove before construction resumes.

SHEET 2 OF 2



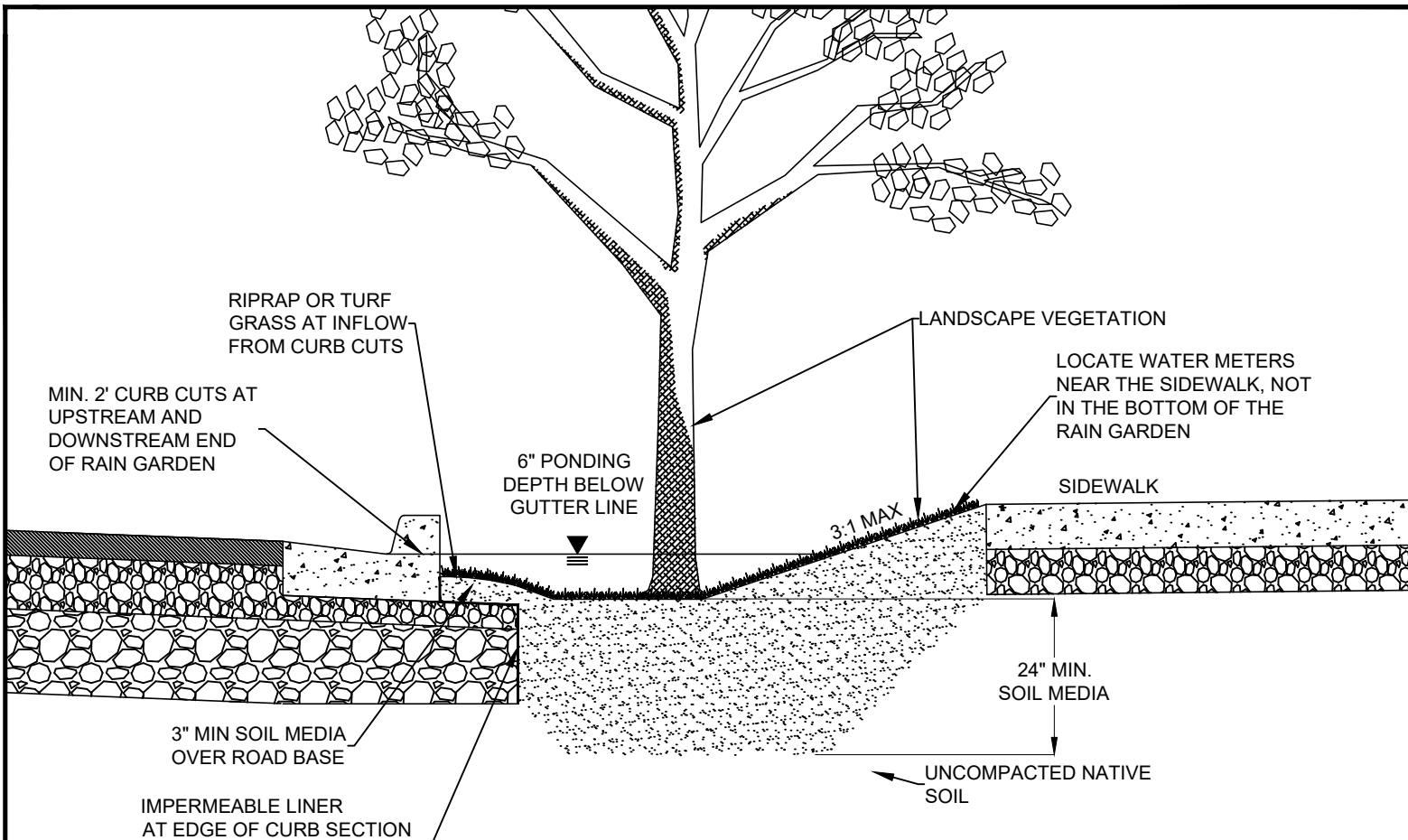
RAIN GARDEN

STANDARD DETAIL

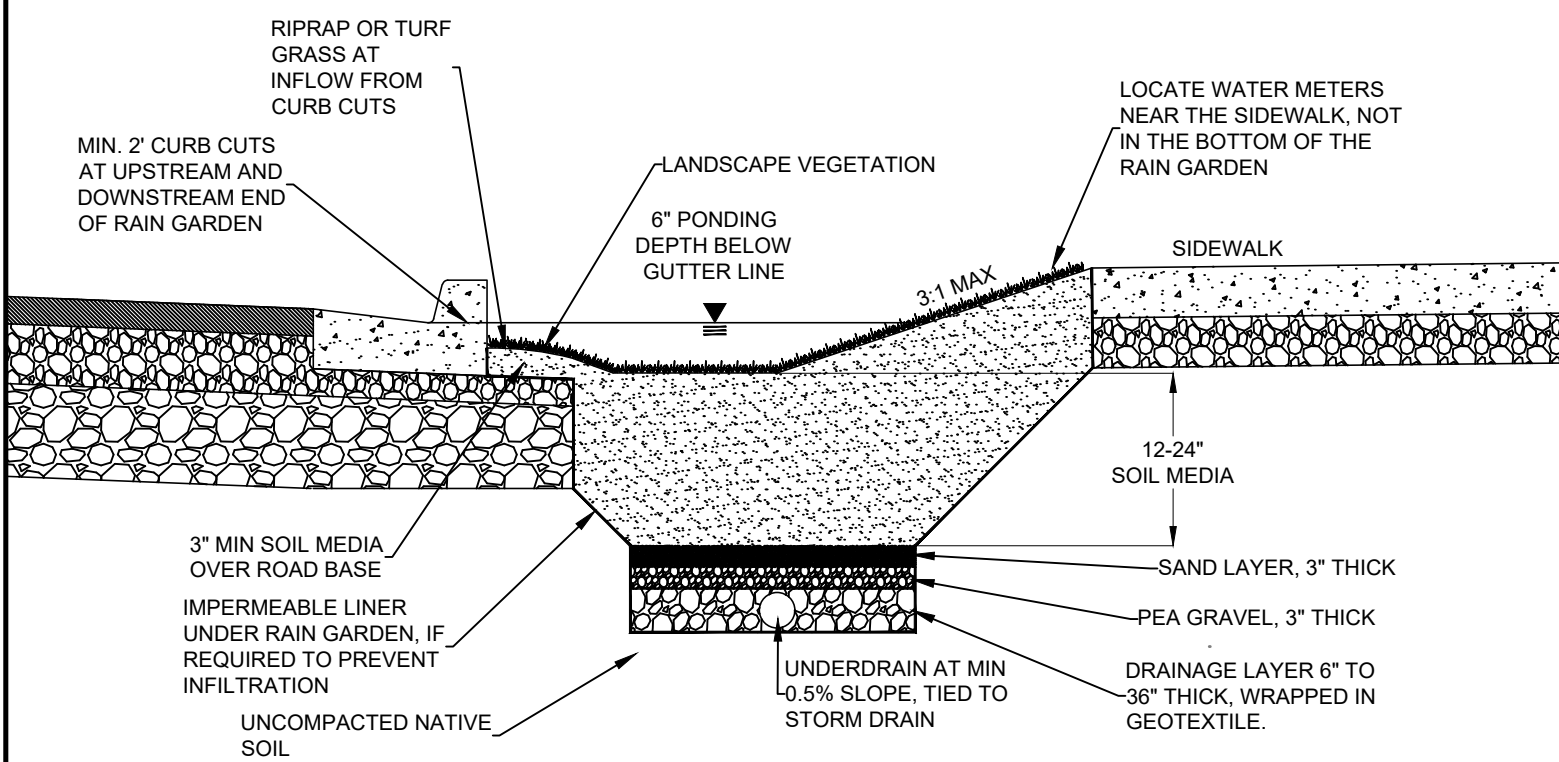
P-301a

NOT TO SCALE

REVISED DATE: Sep-2020



RETENTION AND INFILTRATION



FILTRATION WITH UNDERDRAIN

SHEET 1 OF 2
STANDARD DETAIL P-301b
NOT TO SCALE
REVISED DATE: Sep-2020



*RAIN GARDEN IN STREET
PLANTER STRIP*

Rain Garden in Street Parkway

1. GENERAL

A. Submit before use:

- A.1. Soil Media: Certification from supplier or testing from native or amended soil, showing material meets requirements specified below.
- A.2. Sand, Pea Gravel, Sewer Rock, Rock Mulch, Riprap: Name of supplier and source.
- A.3. Underdrain, Geotextile, Impermeable Liner: Sample and manufacturer's certification that material meets requirements specified below.

2. PRODUCTS

- A. Landscape Vegetation: See Section 15.20.120 - Parkways, Provo City Code for vegetation requirements. Refer to the Utah DEQ's *A Guide to Low Impact Development within Utah* for additional guidance on plant selection within BMPs. Minimum 65% vegetative cover. Either (a) turf grass or (b) rock mulch and low maintenance plants that do not require regular pruning must be installed for new residential developments, for ease of maintenance by homeowner. No wood mulch allowed in rain gardens in street planter strips. Rain gardens requiring impermeable liner or underdrains shall be located at least 5' from trees or large, woody shrubs with roots that may compromise the liner or clog the underdrain.
- B. Soil Media: Native, amended, or engineered soil with organics to support plant growth, maximum 5% clay, minimum 60% gravelly sand or sand, with a long-term (safety factor applied) infiltration rate of at least 1 in/hr at 85% compaction.
- C. Sand Layer: Sand per Utah Chapter APWA Specification 31 05 13.
- D. Pea Gravel: 3/8" to 1/2" pea gravel per Utah Chapter APWA Specification 31 05 13.
- E. Drainage Layer: ASTM Size 3-4 Sewer Rock per Utah Chapter APWA Specification 31 05 13.
- F. Underdrain: Min. 4" schedule 40 perforated PVC pipe, or equivalent with prior City approval.
- G. Geotextile: Drainage Geotextile per Utah Chapter APWA Specification 31 05 19. Class A if the drainage layer is very sharp and angular; otherwise, Class B.
- H. Impermeable Liner: Impermeable, nonbiodegradable, inert to soil chemicals, resistant to molds, mildew, acids and alkalis, and within a pH range of 3 to 12.
- J. Rock Riprap: Loose-placed riprap per Utah Chapter APWA Specification 31 37 00.
- K. Rock Mulch: Decorative rock at least 1" in diameter.

3. EXECUTION

- A. Rain garden native subgrades shall not be compacted, and heavy construction equipment shall not be allowed within the rain garden footprint.
- B. Install all utilities (including gas and communication/power conduits) prior to constructing the rain garden. Locate with consideration of the rain garden's drainage characteristics.
- C. Construction of rain garden shall commence after adjacent and tributary areas are stabilized.
- D. If no or only light compaction occurred on native soil during adjacent construction, loosen native subgrade (e.g. scarify top 6-9" of native soil with an excavator bucket). If significant compaction occurred, excavate 1' deep by 1' wide trenches every 6' and backfill with sand.
- I. If underdrain is required, inspect elevations prior to installation to ensure min. 0.5% slope. Follow manufacturer's recommendations for geotextile overlapping around drainage layer.
- J. If impermeable liner is required, inspect subgrade and remove items that may puncture.
- K. Install soil media in maximum 18" lifts, with only light compaction (85% maximum).
- L. Adhere to approved construction SWPPP, including any BMPs required to protect the rain garden during construction. If silt or other debris enters the rain garden during construction, remove before construction resumes.

SHEET 2 OF 2



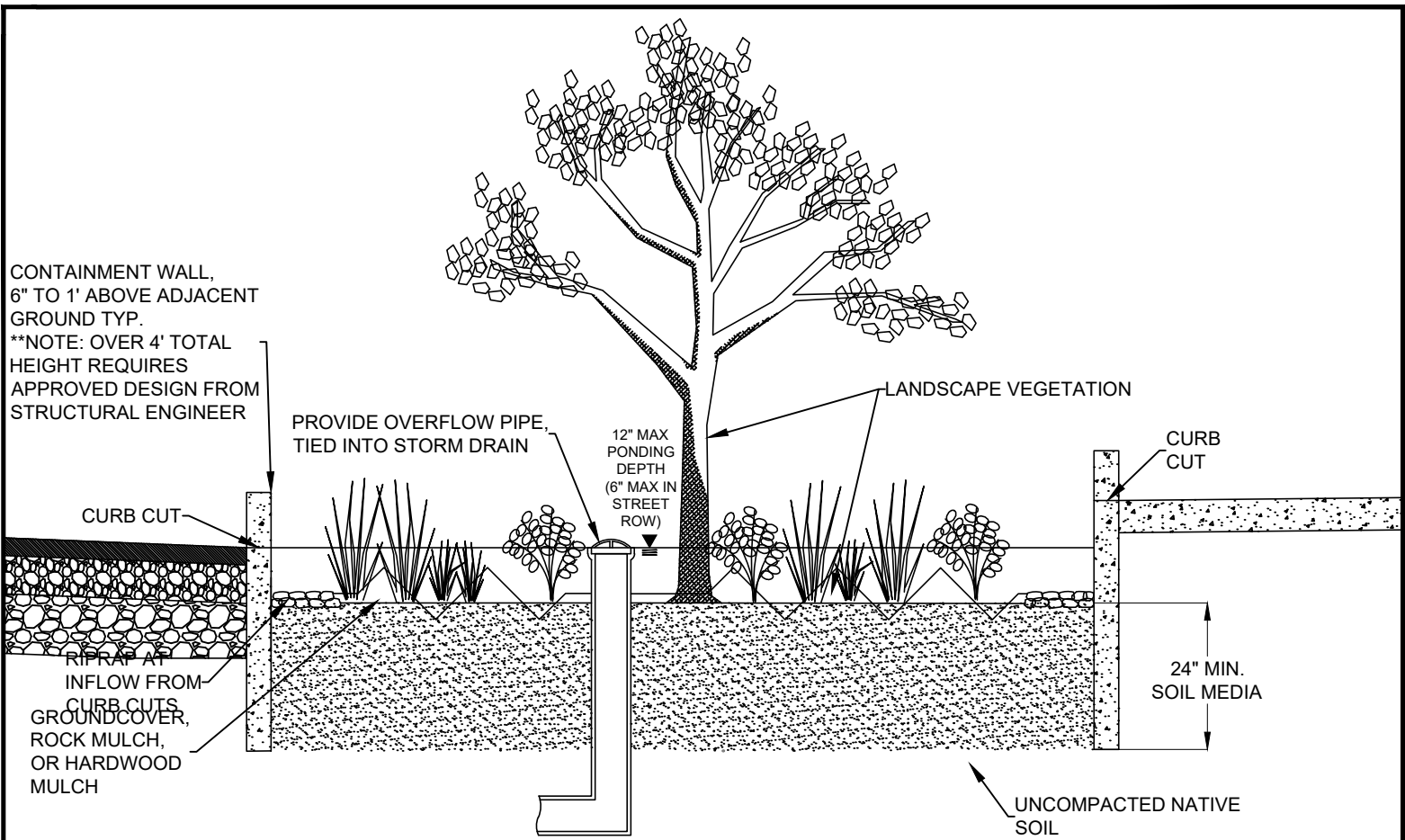
***RAIN GARDEN IN STREET
PLANTER STRIP***

STANDARD DETAIL

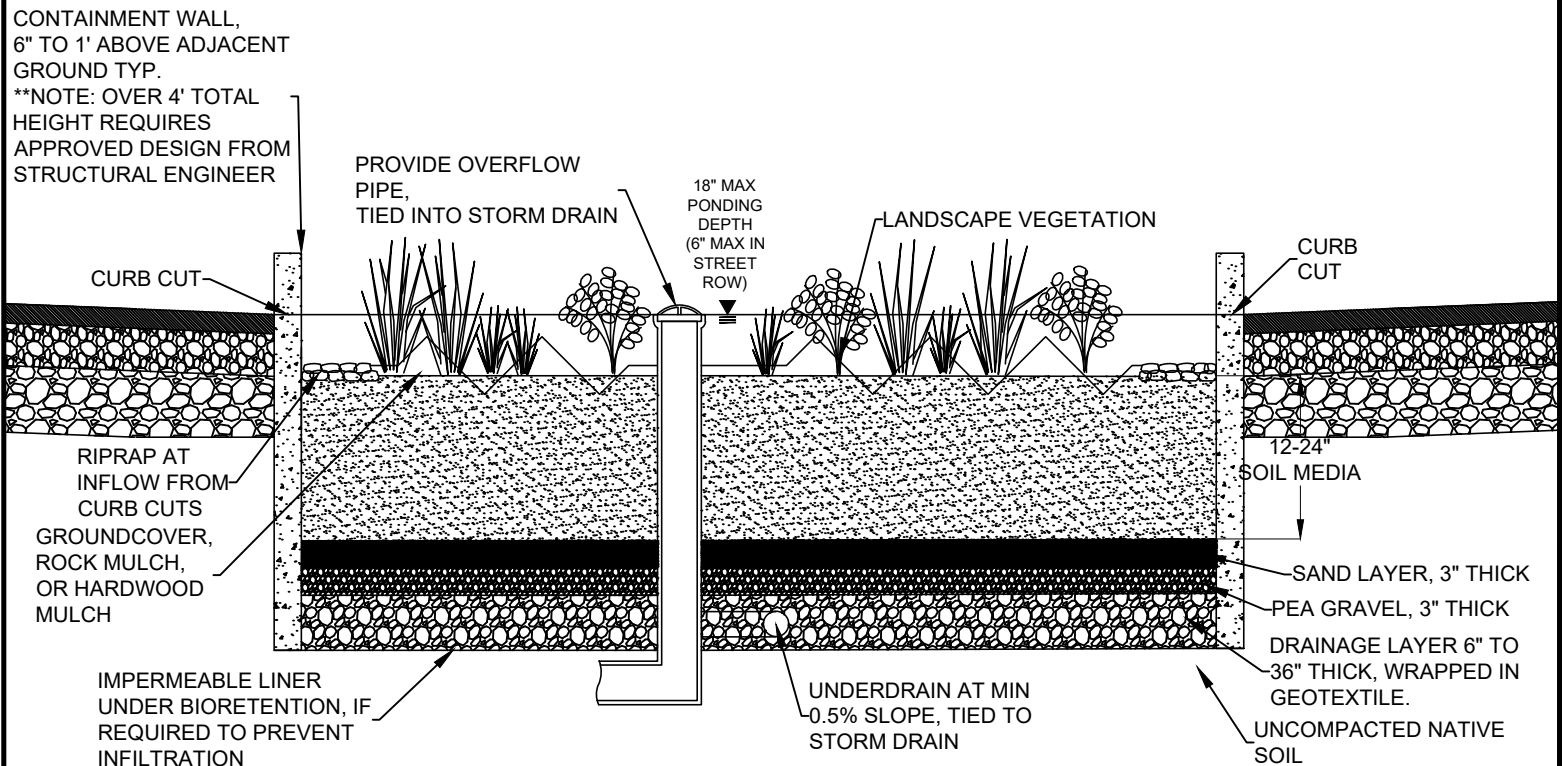
P-301b

NOT TO SCALE

REVISED DATE: Sep-2020



RETENTION AND INFILTRATION



FILTRATION WITH UNDERDRAIN

SHEET 1 OF 2

STANDARD DETAIL

P-302

NOT TO SCALE

REVISED DATE: Sep-2020

Bioretention Cell

1. GENERAL

A. Submit before use:

- A.1. Soil Media: Certification from supplier or testing from native or amended soil, showing material meets requirements specified below.
- A.2. Sand, Pea Gravel, Sewer Rock, Rock Mulch, Rock Riprap: Name of supplier and source.
- A.3. Underdrain, Geotextile, Impermeable Liner, Hardwood Mulch: Sample and manufacturer's certification that material meets requirements specified below.

2. PRODUCTS

- A. Landscape Vegetation: See Section 15.20, Provo City Code for landscape vegetation requirements. Refer to the Utah DEQ's *A Guide to Low Impact Development within Utah* for additional guidance on plant selection within BMPs. Minimum 65% vegetative cover. Wood mulch only allowed where design floods are diverted around or ponded within bioretention cell (not conveyed through with velocity). No wood mulch in cells in street planter strips. Bioretention cells requiring impermeable liner or underdrains shall be located at least 5' from trees or large, woody shrubs with roots that may compromise the liner or clog the underdrain.
- B. Soil Media: Native, amended, or engineered soil with organics to support plant growth, maximum 5% clay, minimum 60% gravelly sand or sand, with a long-term (safety factor applied) infiltration rate of at least 1 in/hr at 85% compaction.
- C. Sand Layer: Sand per Utah Chapter APWA Specification 31 05 13.
- D. Pea Gravel: 3/8" to 1/2" pea gravel per Utah Chapter APWA Specification 31 05 13.
- E. Drainage Layer: ASTM Size 3-4 Sewer Rock per Utah Chapter APWA Specification 31 05 13.
- F. Underdrain: Min. 4" schedule 40 perforated PVC pipe, or equivalent with prior City approval.
- G. Geotextile: Drainage Geotextile per Utah Chapter APWA Specification 31 05 19. Class A if the drainage layer is very sharp and angular; otherwise, Class B.
- H. Impermeable Liner: Impermeable, nonbiodegradable, inert to soil chemicals, resistant to molds, mildew, acids and alkalis, and within a pH range of 3 to 12.
- I. Rock Riprap: Loose-placed riprap per Utah Chapter APWA Specification 31 37 00.
- J. Rock Mulch: Decorative rock at least 1" in diameter.
- K. Hardwood Mulch: Well-aged, hardwood mulch placed at least 3" thick.

3. EXECUTION

- A. Native subgrades under bioretention shall not be compacted, and heavy construction equipment shall not be allowed within the bioretention cell footprint.
- B. Install all utilities prior to constructing the bioretention. Avoid BMP footprint when possible.
- C. Construction of bioretention cell shall commence after adjacent and tributary areas are stabilized.
- D. If no or only light compaction occurred on native soil during adjacent construction, loosen native subgrade (e.g. scarify top 6-9" of native soil with an excavator bucket). If significant compaction occurred, excavate 1' deep by 1' wide trenches every 6' and backfill with sand.
- I. If underdrain is required, inspect elevations prior to installation to ensure min. 0.5% slope. Follow manufacturer's recommendations for geotextile overlapping around drainage layer.
- J. If impermeable liner is required, inspect subgrade and remove items that may puncture.
- K. Install soil media in maximum 18" lifts, with only light compaction (85% maximum).
- L. Adhere to approved construction SWPPP, including any BMPs required to protect the bioretention cell during construction. If silt or other debris enters the bioretention cell during construction, remove before construction resumes.

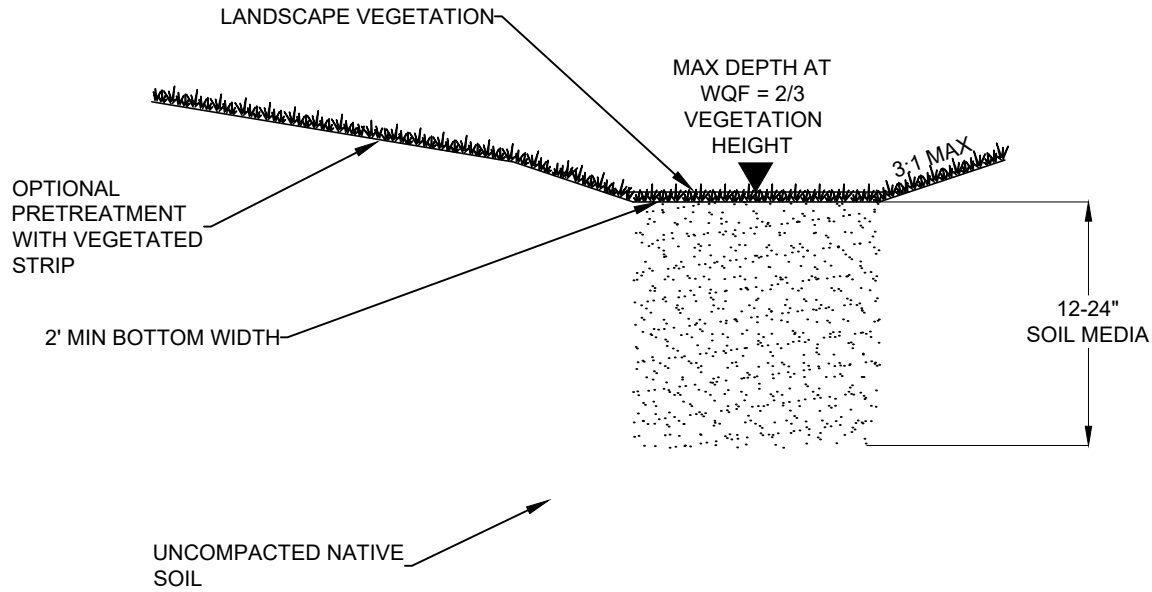
SHEET 2 OF 2

STANDARD DETAIL

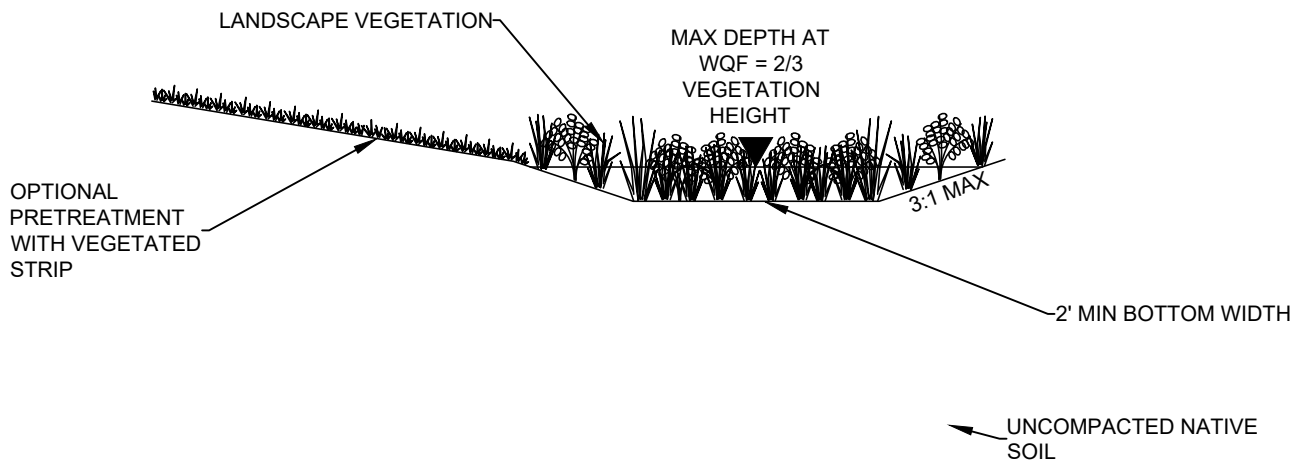
P-302

NOT TO SCALE

REVISED DATE: Sep-2020



BIOFILTRATION AND INFILTRATION



BIOFILTRATION ONLY

Bioswales

1. GENERAL

A. Submit before use:

A.1. Soil Media: Certification from supplier or testing from native or amended soil, showing material meets requirements specified below.

2. PRODUCTS

A. Landscape Vegetation: See Section 15.20, Provo City Code for landscape vegetation requirements. Refer to the Utah DEQ's *A Guide to Low Impact Development within Utah* for additional guidance on plant selection within BMPs. Minimum 65% vegetative cover. Wood mulch not allowed in bioswales due to the swale being intended to convey flow with velocity.

B. Soil Media: Native, amended, or engineered soil with organics to support plant growth, maximum 5% clay, minimum 60% gravelly sand or sand, with a long-term (safety factor applied) infiltration rate of at least 1 in/hr at 85% compaction.

C. Rock Mulch: Decorative rock at least 1" in diameter. Size rock to withstand design velocities.

3. EXECUTION

A. Bioswales using the bottom section shall have a longitudinal slope of 1% or greater. See design plans for design slope.

B. Bioswale native subgrades shall not be compacted if infiltration is required, and heavy construction equipment shall not be allowed within the bioswale footprint.

C. Install all utilities (including gas and communication/power conduits) prior to constructing the bioswale. Locate with consideration of the bioswale's drainage characteristics.

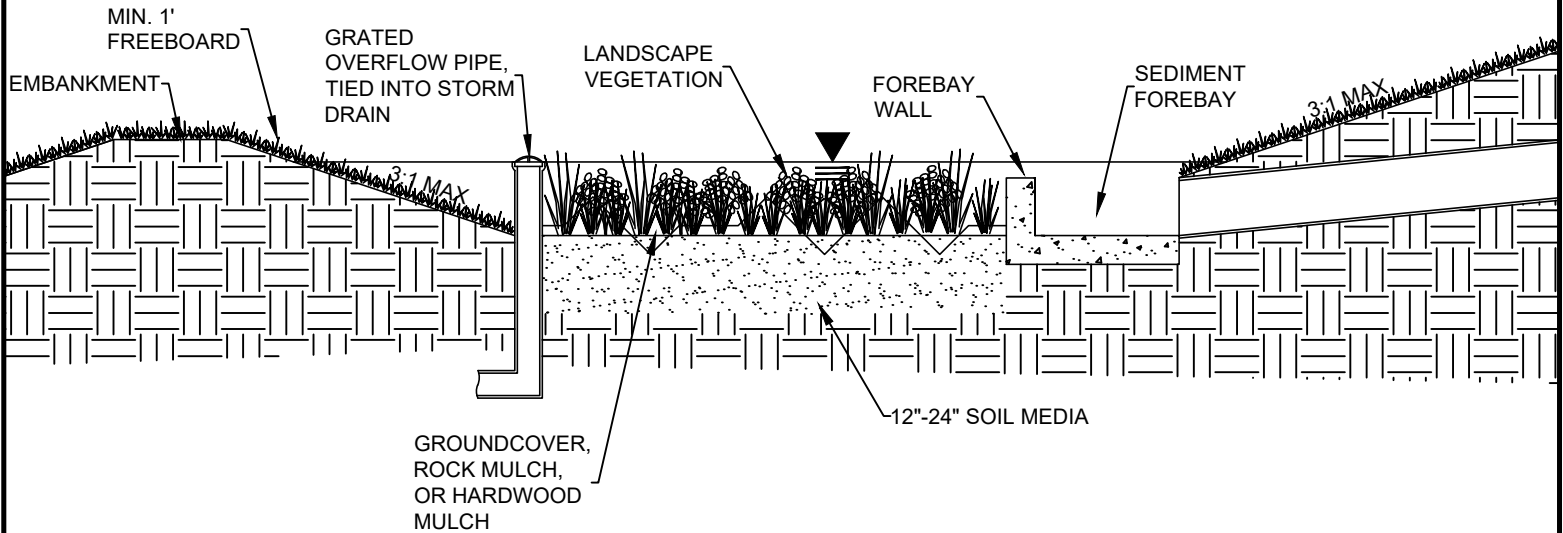
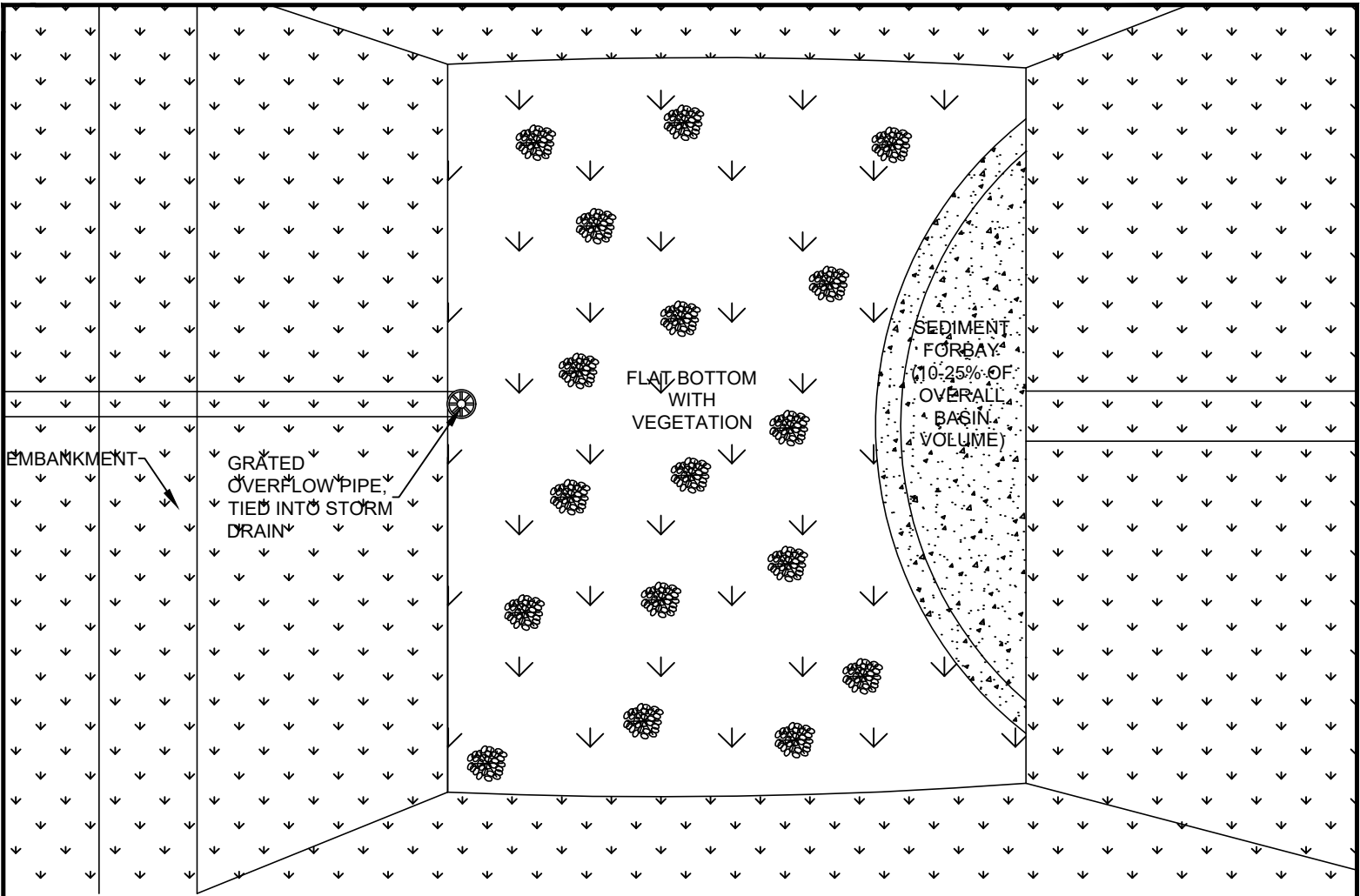
D. Construction of bioswale shall commence after adjacent and tributary areas are stabilized.

E. For infiltration bioswales: If no or only light compaction occurred on native soil during adjacent construction, loosen native subgrade (e.g. scarify top 6-9" of native soil with an excavator bucket). If significant compaction occurred, excavate 1' deep by 1' wide trenches every 6' and backfill with sand.

I. Install soil media in maximum 18" lifts, with only light compaction (85% maximum).

J. Adhere to approved construction SWPPP, including any BMPs required to protect the rain garden during construction. If silt or other debris enters the rain garden during construction, remove before construction resumes.

SHEET 2 OF 2



SHEET 1 OF 2

STANDARD DETAIL

P-304

NOT TO SCALE

REVISED DATE: Sep-2020

Infiltration Basin

1. GENERAL

A. Submit before use:

- A.1. Soil Media: Certification from supplier or testing from native or amended soil, showing material meets requirements specified below.
- A.2. Rock Mulch: Name of supplier and source.
- A.3. Hardwood Mulch: Sample and manufacturer's certification that material meets requirements specified below.

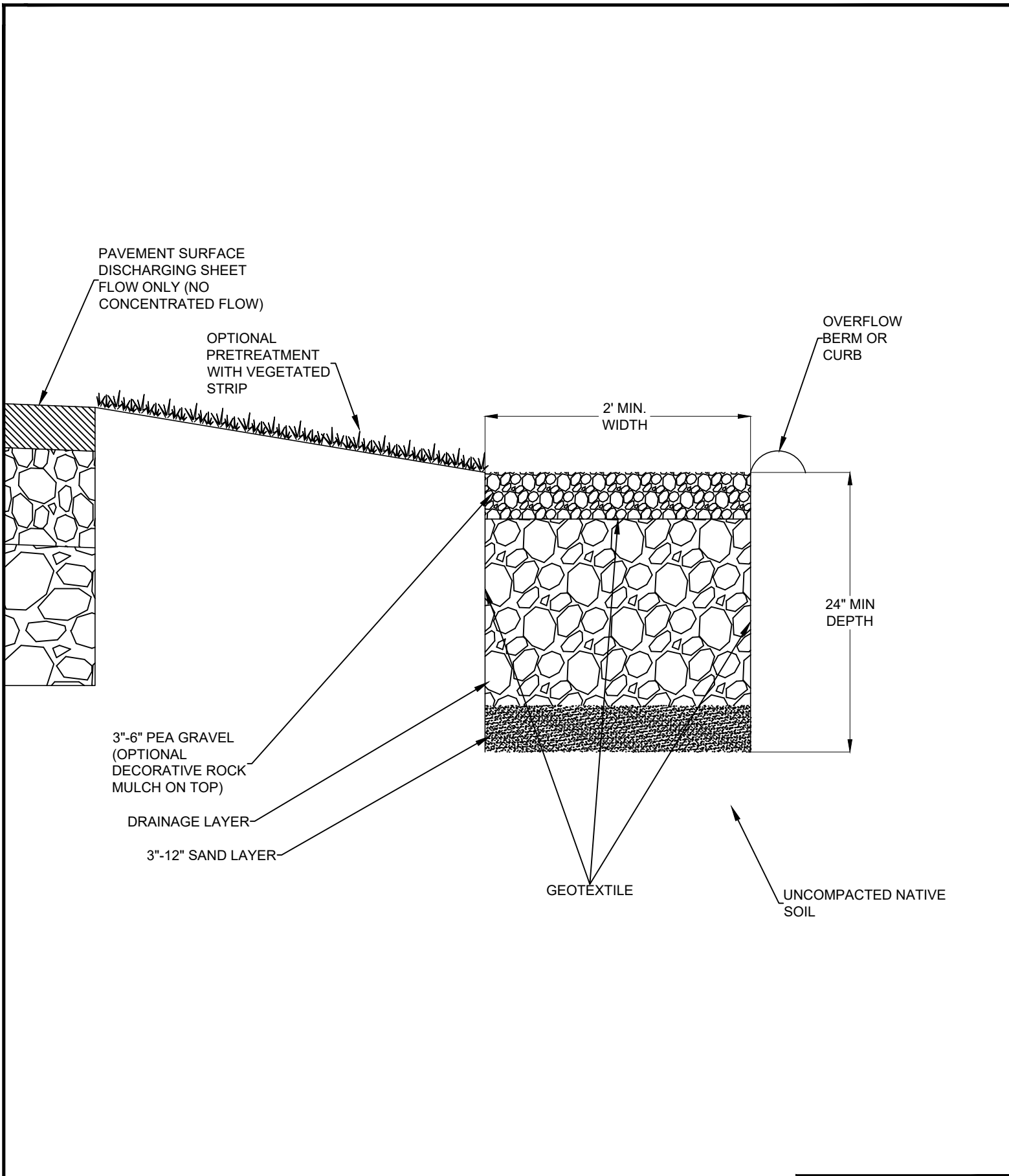
2. PRODUCTS

- A. Landscape Vegetation: See Section 15.20, Provo City Code for landscape vegetation requirements. Refer to the Utah DEQ's *A Guide to Low Impact Development within Utah* for additional guidance on plant selection in BMPs. Minimum 65% vegetative cover.
- B. Soil Media: Native, amended, or engineered soil with organics to support plant growth, maximum 5% clay, minimum 60% gravelly sand or sand, with a long-term (safety factor applied) infiltration rate of at least 1 in/hr at 85% compaction.
- C. Rock Mulch: Decorative rock at least 1" in diameter.
- D. Hardwood Mulch: Well-aged, hardwood mulch placed at least 3" thick.

3. EXECUTION

- A. Infiltration basin native subgrades shall not be compacted, and heavy construction equipment shall not be allowed within the rain garden footprint.
- B. Install all utilities prior to constructing the basin. Avoid BMP footprint when possible.
- C. Construction of infiltration basin shall commence after adjacent and tributary areas are stabilized.
- D. If no or only light compaction occurred on native soil during adjacent construction, loosen native subgrade (e.g. scarify top 6-9" of native soil with an excavator bucket). If significant compaction occurred, excavate 1' deep by 1' wide trenches every 6' and backfill with sand.
- I. Install soil media in maximum 18" lifts, with only light compaction (85% maximum).
- J. Adhere to approved construction SWPPP, including any BMPs required to protect the rain garden during construction. If silt or other debris enters the rain garden during construction, remove before construction resumes.

SHEET 2 OF 2



Infiltration Trench

1. GENERAL

A. Submit before use:

- A.1. Sand, Pea Gravel, Sewer Rock: Name of supplier and source.
- A.2. Geotextile: Sample and manufacturer's certification that material meets requirements specified below.

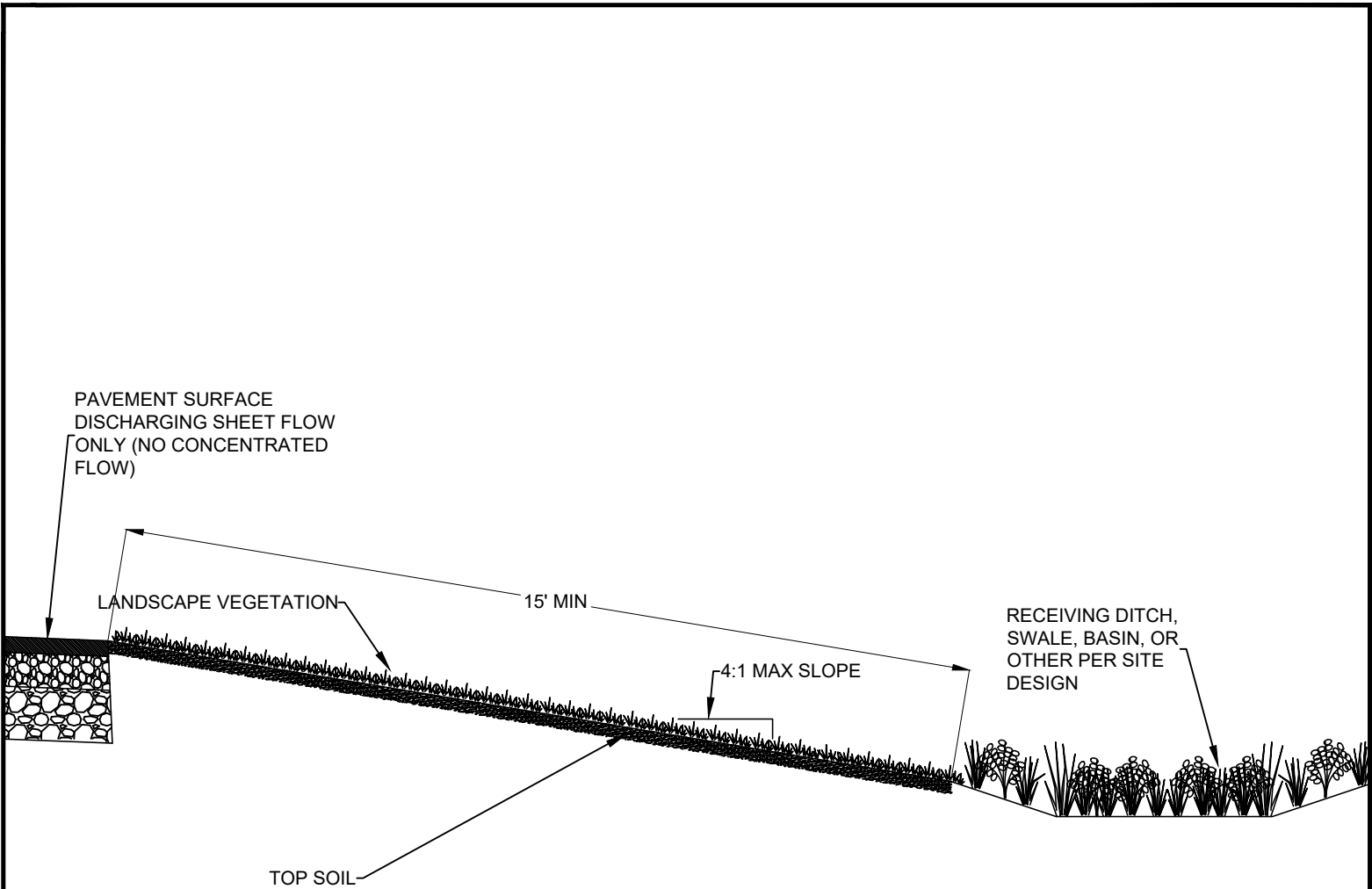
2. PRODUCTS

- A. Sand Layer: Sand per Utah Chapter APWA Specification 31 05 13.
- B. Pea Gravel: 3/8" to 1/2" pea gravel per Utah Chapter APWA Specification 31 05 13.
- C. Drainage Layer: ASTM Size 3-4 Sewer Rock per Utah Chapter APWA Specification 31 05 13.
- D. Geotextile: Drainage Geotextile per Utah Chapter APWA Specification 31 05 19. Class A if the drainage layer is very sharp and angular; otherwise, Class B.
- E. Rock Mulch (optional): Decorative rock at least 1" in diameter.

3. EXECUTION

- A. Native subgrades under trench shall not be compacted, and heavy construction equipment shall not be allowed within the infiltration trench footprint.
- B. Install all utilities prior to constructing the trench. Avoid BMP footprint when possible.
- C. Construction of infiltration trench shall commence after adjacent and tributary areas are stabilized.
- D. If no or only light compaction occurred on native soil during adjacent construction, loosen native subgrade (e.g. scarify top 6-9" of native soil with an excavator bucket). If significant compaction occurred, excavate 1' deep by 1' wide trenches every 6' and backfill with sand.
- I. Follow manufacturer's recommendations for geotextile overlapping.
- J. Infiltration trenches longitudinal slopes shall be 1% max. No longitudinal slope preferred.
- K. Adhere to approved construction SWPPP, including any BMPs required to protect the infiltration trench during construction. If silt or other debris enters the trench during construction, remove before construction resumes.

SHEET 2 OF 2



Vegetated Strip

1. GENERAL

A. Submit before use:

A.1. Top Soil: Certification from supplier or testing from native or amended soil, showing material meets requirements specified below.

2. PRODUCTS

A. Landscape Vegetation: See Section 15.20, Provo City Code for landscape vegetation requirements. Refer to the Utah DEQ's *A Guide to Low Impact Development within Utah* for additional guidance on plant selection within BMPs. Minimum 80% vegetated cover.

B. Top Soil: Per Utah Chapter APWA Specification 31 05 13.

3. EXECUTION

A. Vegetated strips shall have a maximum slope of 4:1, and minimum length of 15'. See design plans for design slope and length.

B. Install all utilities (including gas and communication/power conduits) prior to constructing the vegetated strip. Locate with consideration of the vegetated strip and receiving water body's drainage characteristics.

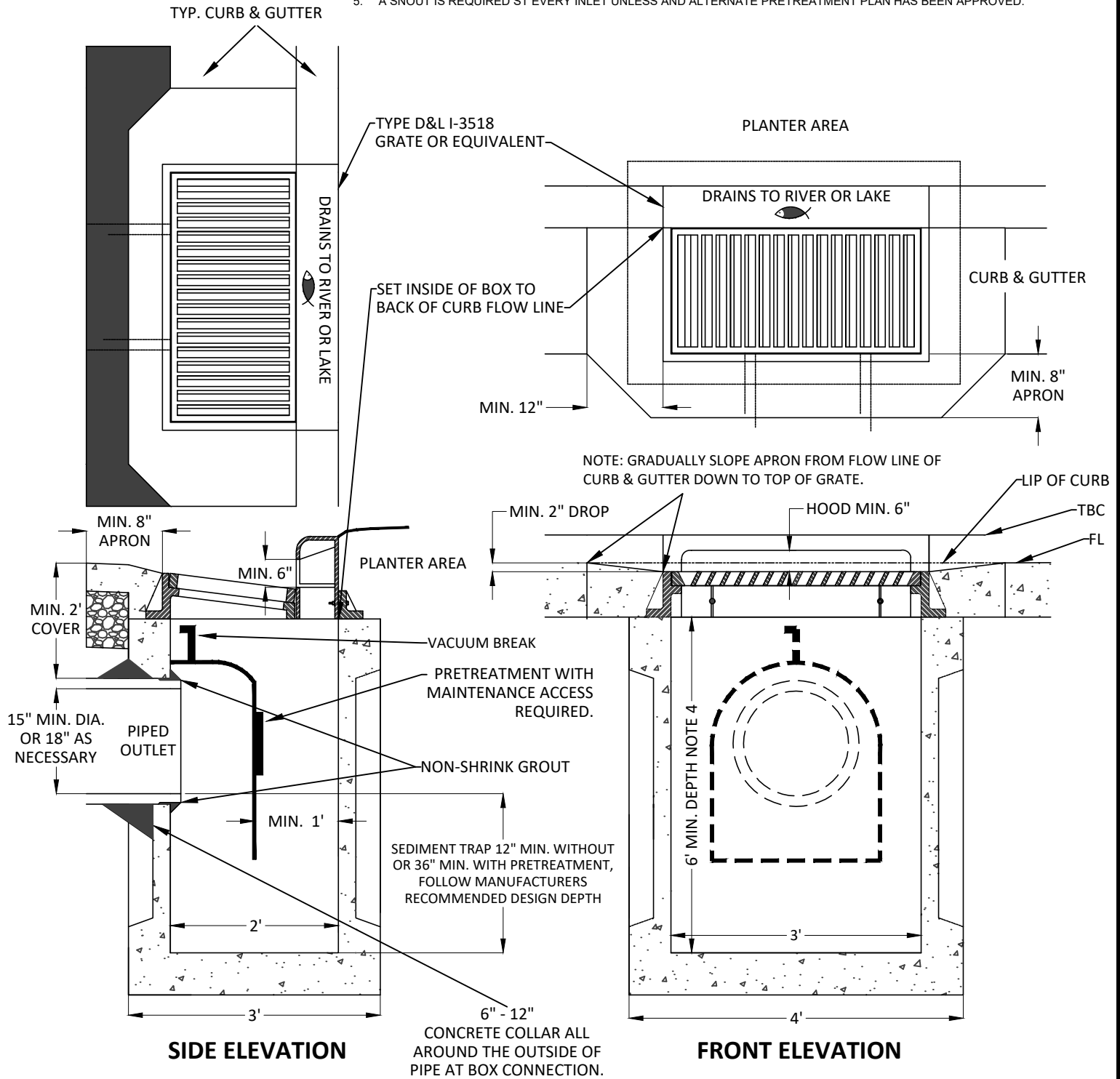
C. Construction of vegetated strip shall commence after adjacent and tributary areas are stabilized.

D. Adhere to approved construction SWPPP, including any BMPs required to protect the rain garden during construction. If silt or other debris enters the rain garden during construction, remove before construction resumes.

SHEET 2 OF 2

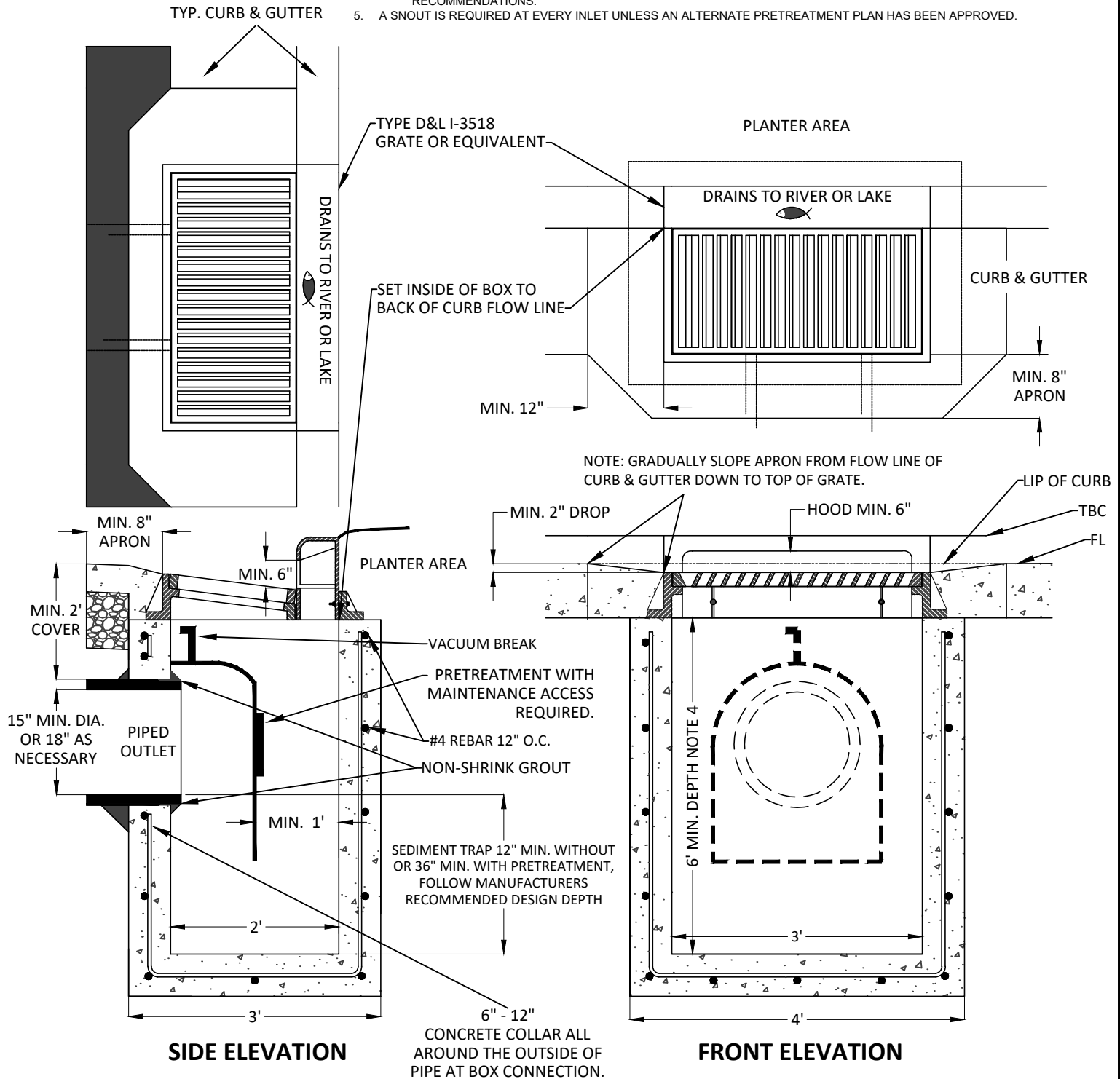
NOTE:

1. FOR GRATE & FRAME DETAILS SEE D.&L. SUPPLY CATALOG #I-3518 OR EQUIVALENT.
2. REQUIRED STAMPED HOOD, "DRAINS TO RIVER OR LAKE" WITH FISH LOGO.
3. ALL BOXES AND FRAMES MUST SUPPORT A HS-20 LOADING.
4. REFER TO THE APPROVED PROJECT PLANS FOR PIPE SIZE, LOCATION, SEDIMENT DEPTH, PRETREATMENT AND OTHER STRUCTURE DESIGN REQUIREMENTS.
 - 4.1. 15" DIA. PIPE LATERAL MIN. BOX INSIDE DEPTH IS 6 FEET AND FOLLOWS PRETREATMENT MANUFACTURERS RECOMMENDATIONS.
 - 4.2. 18" DIA. PIPE AS NECESSARY. BOX INSIDE DEPTH IS 7 FEET AND FOLLOWS PRETREATMENT MANUFACTURERS RECOMMENDATIONS.
 - 4.3. 24" DIA. SPECIAL APPROVAL IS REQUIRED IN ADDITION TO INLET STRUCTURE DESIGN. THE MIN. DEPTH FROM OUT LET PIPE FLOW LINE TO FLOOR OF INLET BOX IS 6.0 FEET
 5. A SNOOT IS REQUIRED ST EVERY INLET UNLESS AND ALTERNATE PRETREATMENT PLAN HAS BEEN APPROVED.



NOTE:

1. FOR GRATE & FRAME DETAILS SEE D.&L. SUPPLY CATALOG #I-3518 OR EQUIVALENT.
2. REQUIRED STAMPED HOOD, "DRAINS TO RIVER OR LAKE" WITH FISH LOGO.
3. ALL BOXES AND FRAMES MUST SUPPORT A HS-20 LOADING.
4. REFER TO THE APPROVED PROJECT PLANS FOR PIPE SIZE, LOCATION, SEDIMENT DEPTH, PRETREATMENT AND OTHER STRUCTURE DESIGN REQUIREMENTS.
 - 4.1. 15" DIA. PIPE LATERAL, MINIMUM DEPTH FROM OUTLET OF PIPE FLOW LINE TO FLOOR OF INLET BOX IS 3.75 FEET OR DEEPER. FOLLOW PRETREATMENT MANUFACTURERS RECOMMENDATIONS. MIN. BOX INSIDE DEPTH IS 6 FEET.
 - 4.2. 18" DIA. PIPE AS NECESSARY, MINIMUM DEPTH FROM OUTLET OF PIPE FLOW LINE TO FLOOR OF INLET BOX IS 4.5 FEET OR DEEPER. FOLLOW PRETREATMENT MANUFACTURERS RECOMMENDATIONS. MIN. BOX INSIDE DEPTH IS 7 FEET.
 - 4.3. 24" DIA. SPECIAL APPROVAL IS REQUIRED IN ADDITION TO INLET STRUCTURE DESIGN. THE MINIMUM DEPTH FROM OUTLET PIPE FLOW LINE TO FLOOR OF INLET BOX IS 6.0 FEET. FOLLOW PRETREATMENT MANUFACTURERS RECOMMENDATIONS.
5. A SNOOT IS REQUIRED AT EVERY INLET UNLESS AN ALTERNATE PRETREATMENT PLAN HAS BEEN APPROVED.



SHEET 1 OF 1

STANDARD DETAIL

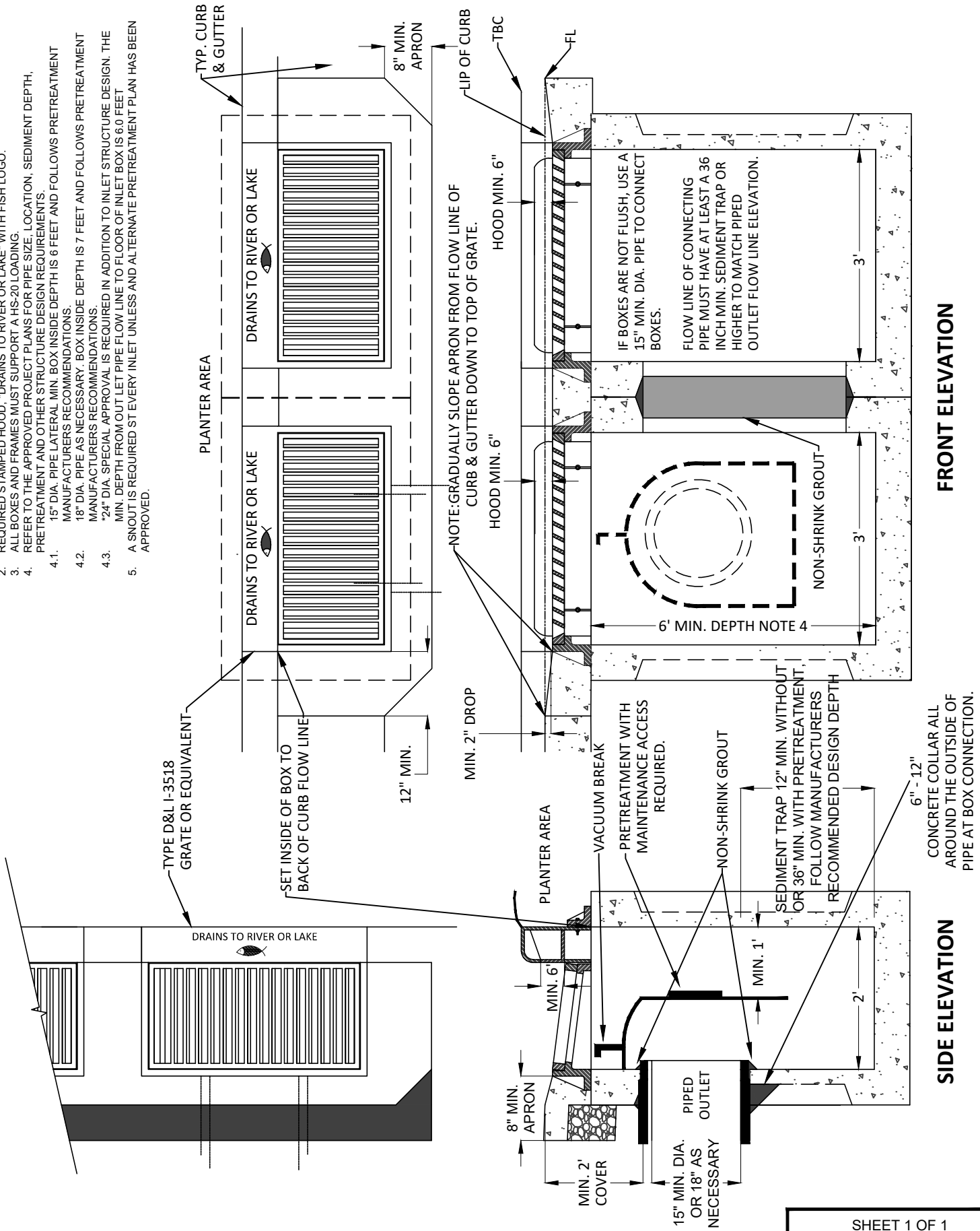
P-315b

NOT TO SCALE

REVISED DATE: 09/26/19

NOTE:

1. FOR GRATE & FRAME DETAILS SEE D&L SUPPLY CATALOG #I-3518 OR EQUIVALENT.
2. REQUIRED STAMPED HOOD, "DRAINS TO RIVER OR LAKE" WITH FISH LOGO.
3. ALL BOXES AND FRAMES MUST SUPPORT A HS-20 LOADING.
4. REFER TO THE APPROVED PROJECT PLANS FOR PIPE SIZE, LOCATION, SEDIMENT DEPTH, PRETREATMENT AND OTHER STRUCTURE DESIGN REQUIREMENTS.
 - 4.1. 15" DIA. PIPE LATERAL MIN. BOX INSIDE DEPTH IS 6 FEET AND FOLLOWS PRETREATMENT MANUFACTURERS RECOMMENDATIONS.
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5. A SNOOT IS REQUIRED ST EVERY INLET UNLESS AND ALTERNATE PRETREATMENT PLAN HAS BEEN APPROVED.



FRONT ELEVATION

SIDE ELEVATION

CONCRETE COLLAR ALL AROUND THE OUTSIDE OF PIPE AT BOX CONNECTION.

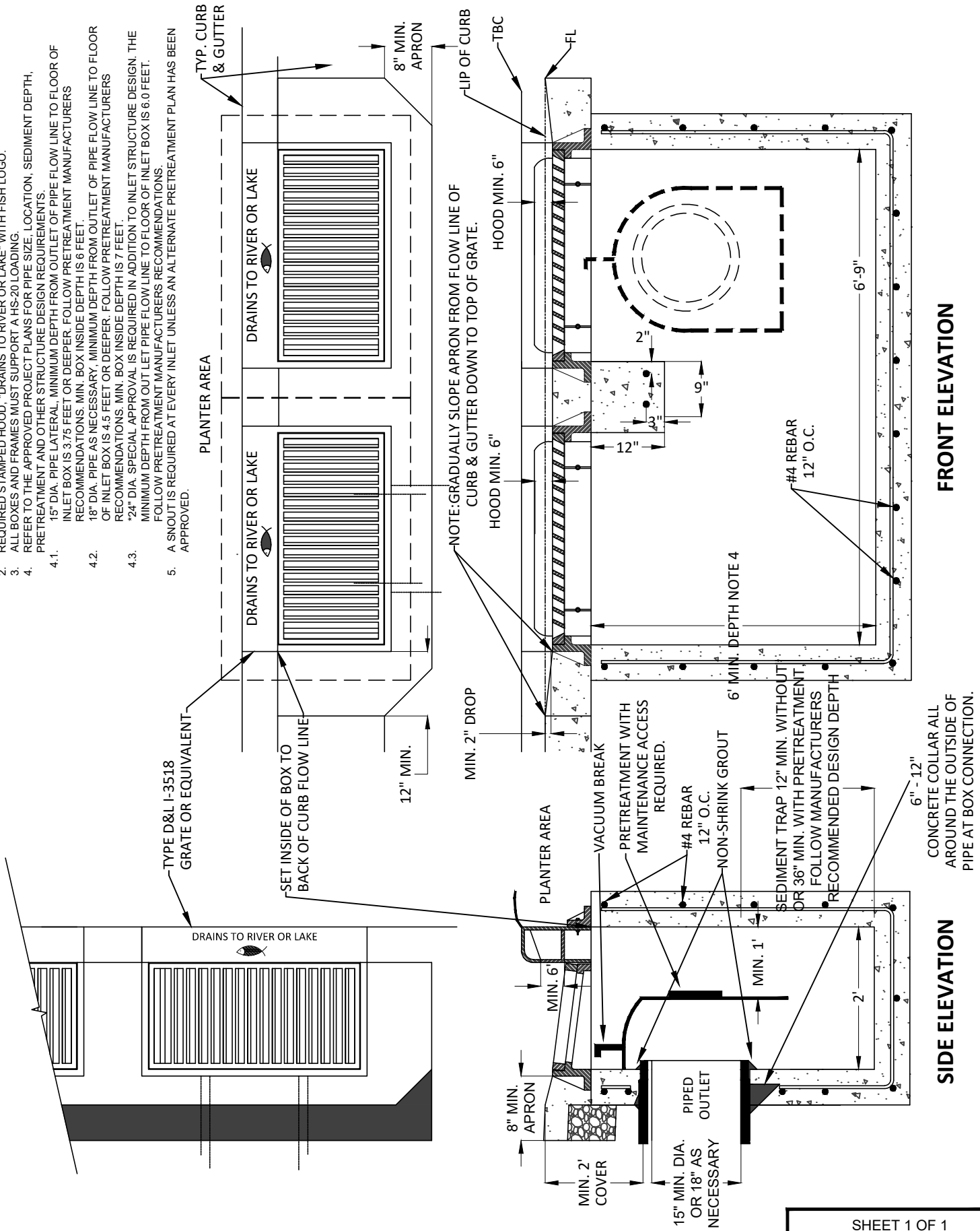
SHEET 1 OF 1
STANDARD DETAIL P-315c
NOT TO SCALE
REVISED DATE: 09/26/19



*DOUBLE PRE-CAST CURB
FACE AND INLET BOX*

NOTE:

1. FOR GRATE & FRAME DETAILS SEE D.&L. SUPPLY CATALOG #L-3518 OR EQUIVALENT.
2. REQUIRED STAMPED HOOD, "DRAINS TO RIVER OR LAKE" WITH FISH LOGO.
3. ALL BOXES AND FRAMES MUST SUPPORT A HS-20 LOADING.
4. REFER TO THE APPROVED PROJECT PLANS FOR PIPE SIZE, LOCATION, SEDIMENT DEPTH, PRETREATMENT AND OTHER STRUCTURE DESIGN REQUIREMENTS.
- 4.1. 15" DIA. PIPE LATERAL, MINIMUM DEPTH FROM OUTLET OF PIPE FLOW LINE TO FLOOR OF INLET BOX IS 3.75 FEET OR DEEPER. FOLLOW PRETREATMENT MANUFACTURERS RECOMMENDATIONS. MIN. BOX INSIDE DEPTH IS 6 FEET.
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5. A SNOOT IS REQUIRED AT EVERY INLET UNLESS AN ALTERNATE PRETREATMENT PLAN HAS BEEN APPROVED.



FRONT ELEVATION

SIDE ELEVATION

SHEET 1 OF 1

STANDARD DETAIL
P-315d

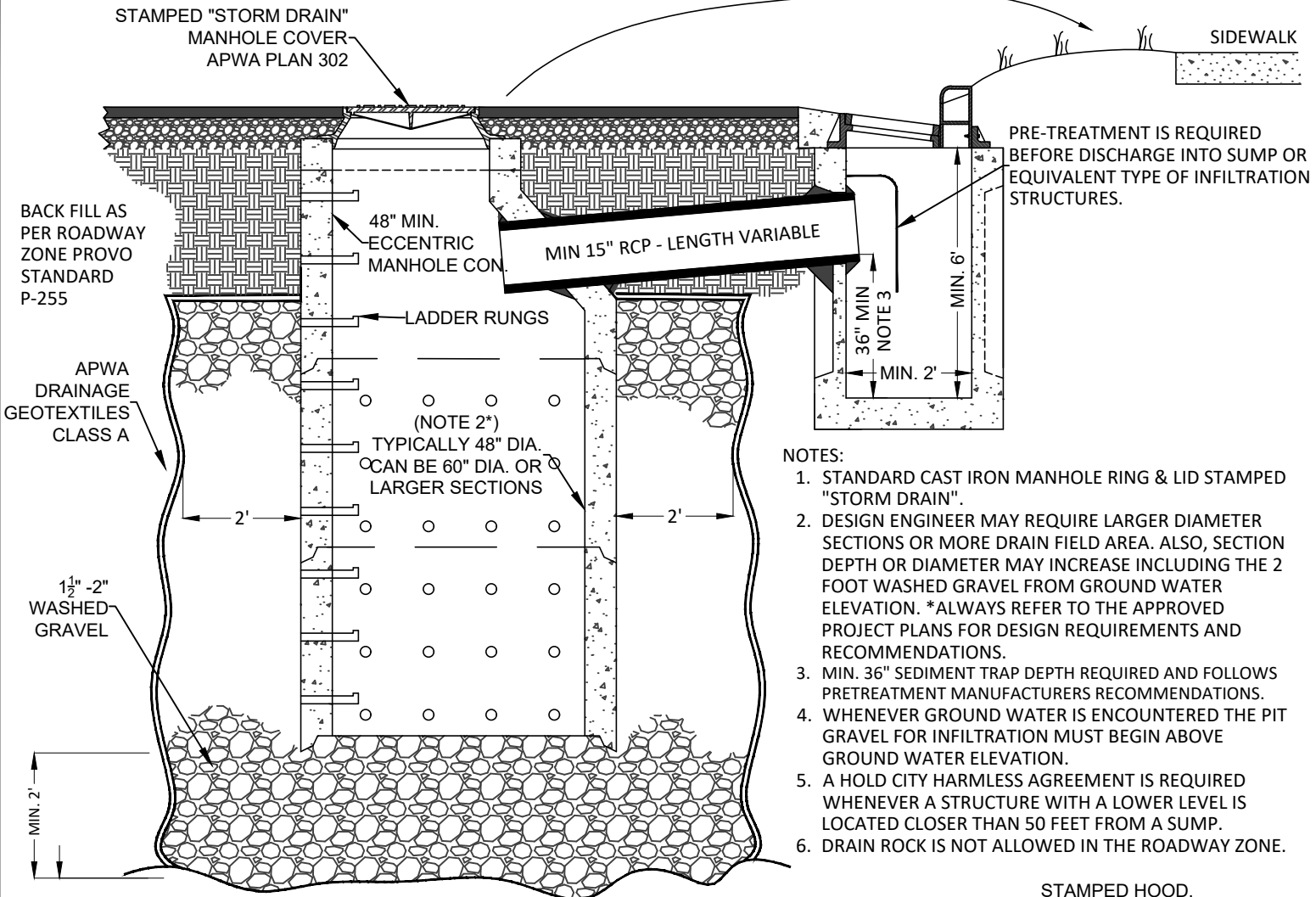
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REVISED DATE: 09/26/19

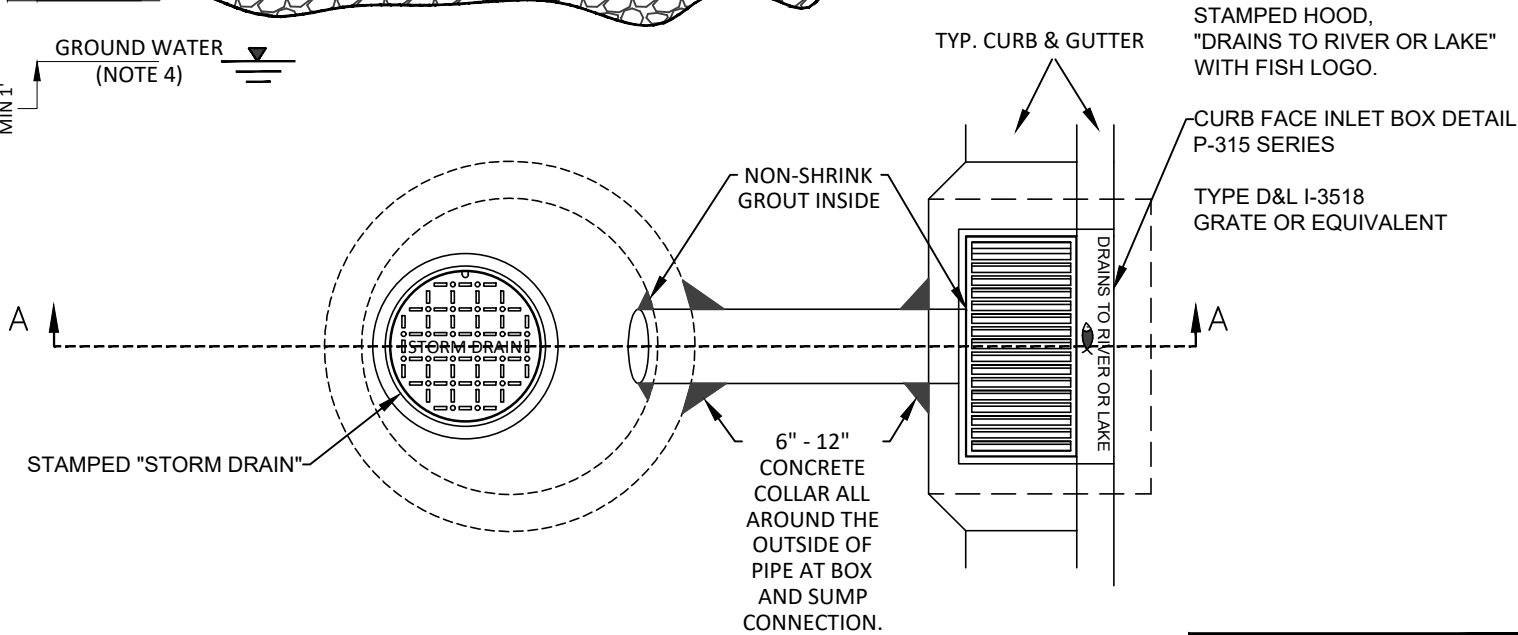


*DOUBLE PRE-CAST CURB
FACE AND INLET BOX*

MANHOLE MAY ALSO BE PLACED BEHIND IN PLANTER AREA IF APPROVED BY ENGINEER.



- NOTES:
1. STANDARD CAST IRON MANHOLE RING & LID STAMPED "STORM DRAIN".
 2. DESIGN ENGINEER MAY REQUIRE LARGER DIAMETER SECTIONS OR MORE DRAIN FIELD AREA. ALSO, SECTION DEPTH OR DIAMETER MAY INCREASE INCLUDING THE 2 FOOT WASHED GRAVEL FROM GROUND WATER ELEVATION. *ALWAYS REFER TO THE APPROVED PROJECT PLANS FOR DESIGN REQUIREMENTS AND RECOMMENDATIONS.
 3. MIN. 36" SEDIMENT TRAP DEPTH REQUIRED AND FOLLOWS PRETREATMENT MANUFACTURERS RECOMMENDATIONS.
 4. WHENEVER GROUND WATER IS ENCOUNTERED AT THE PIT GRAVEL FOR INFILTRATION MUST BEGIN ABOVE GROUND WATER ELEVATION.
 5. A HOLD CITY HARMLESS AGREEMENT IS REQUIRED WHENEVER A STRUCTURE WITH A LOWER LEVEL IS LOCATED CLOSER THAN 50 FEET FROM A SUMP.
 6. DRAIN ROCK IS NOT ALLOWED IN THE ROADWAY ZONE.

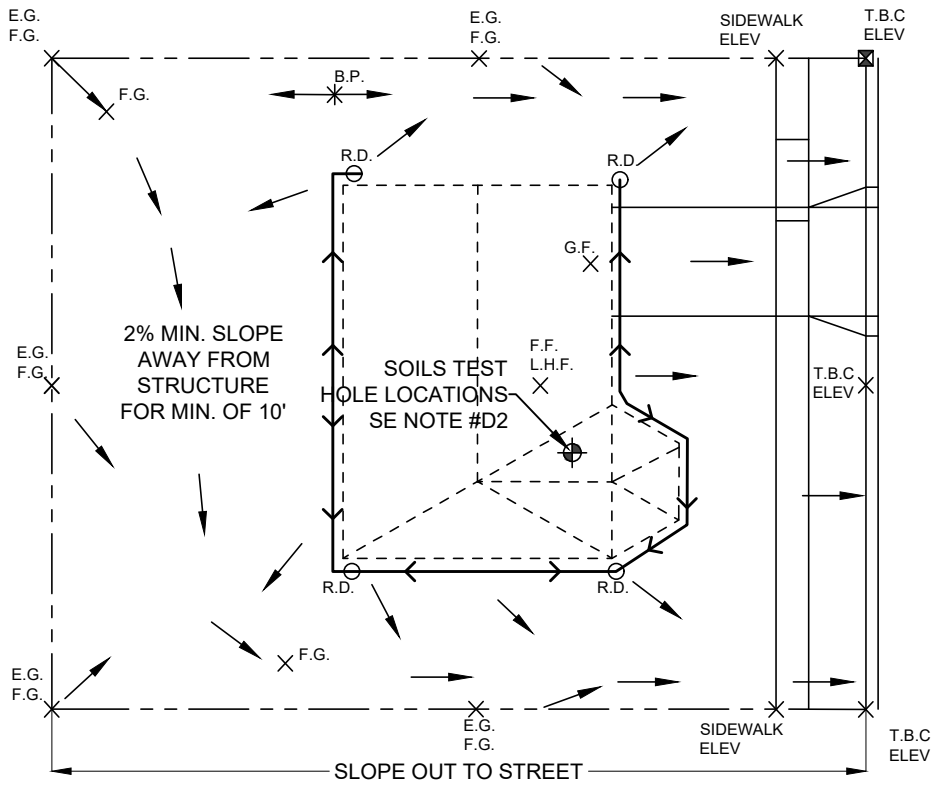


SHEET 1 OF 1
STANDARD DETAIL P-375
NOT TO SCALE
REVISED DATE: 10/08/18

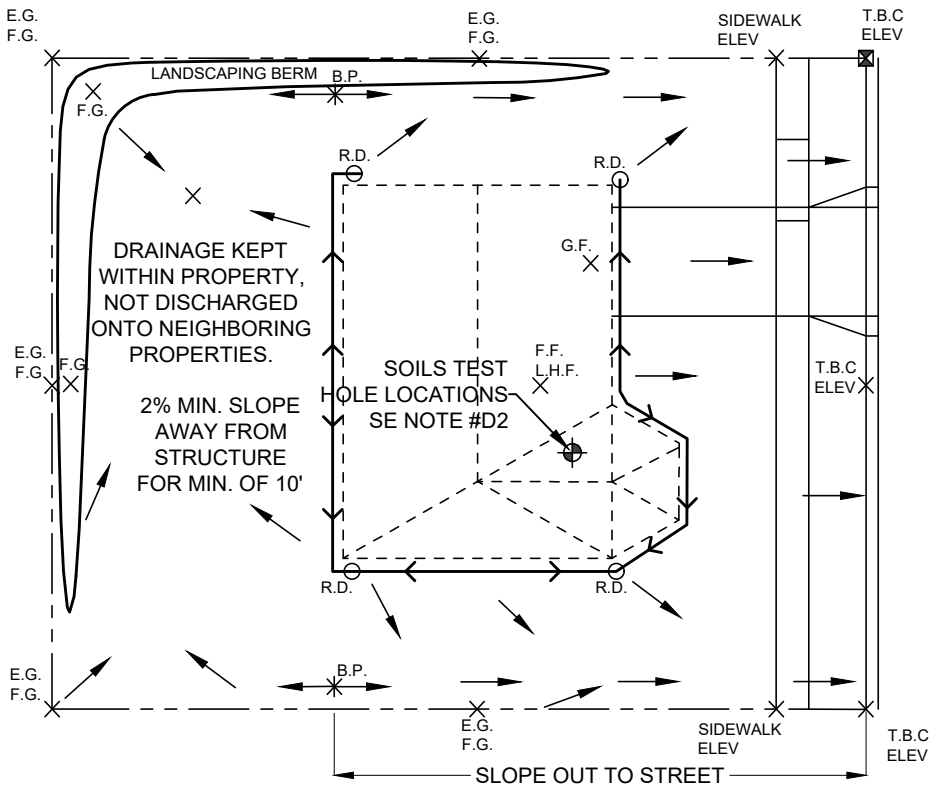


*CURB AND GUTTER -
DROP INLET AND SUMP*

TYPE 1 LOT



TYPE 2 LOT



- LEGEND**
- ↔ B.P. - BREAK POINT
 - ⊠ T.B.C. - TOP BACK OF CURB
 - G.F. - GARAGE FLOOR
 - L.H.F. - LOWEST HABITABLE FLOOR
 - F.F. - FINISH FLOOR
 - F.G. - FINISH GRADE
 - E.G. - EXISTING OR PRE-CONSTRUCTION GRADE
 - FLOW DIRECTION
 - ⊠ BENCHMARK (T.B.C. OR PERMANENT FEATURE)
 - R.D. - ROOF DRAIN

REFER TO SHEET P-390 2 OF 2 FOR ADDITIONAL NOTES

REFER TO SHEET P-319 FOR LOT GRADING PORFILES

SHEET 1 OF 2

Lot Grading Plan Notes

1. GENERAL

A. Per Section 18.03.080, Provo City Code, it shall be the responsibility of the property owner to ensure that the private drainage generated within the private property is adequately handled and does not create a nuisance on neighboring properties. Provide a site grading plan with existing and final elevation information.

2. PRODUCT (not used)

3. EXECUTION

- A. Drain as much surface flows, especially hard (impervious) surfaces, as possible out to the street fronting the lot. This includes the following; all front of building, as much roof as possible, driveway, walks, and so forth. Any areas unable to be sloped to the street shall be addressed within own lot boundaries and not discharged into any neighboring properties.
- B. Garage floor (G.F.) shall follow the requirements detailed in Provo standard drawing P-394.
- C. Identify existing spot elevations for at least 5-6 different locations, especially along the property boundary to ensure adequate tie in to neighboring properties. Provide final grade elevations for same spots, significant grade changes, and other locations necessary to show intended grading design.
- D. Any time there is a lower level in a structure a soils engineer letter may be requested to determine the ground water elevations relative to the basement floor. Refer to the Storm Drainage Systems Design and Management Manual for requirements for lowest habitable floor elevations in relation to groundwater. Identify all test hole locations and depths relative to the benchmark (i.e. top of curb at property corner, or other permanent feature).

SHEET 2 OF 2



LOT GRADING PLAN

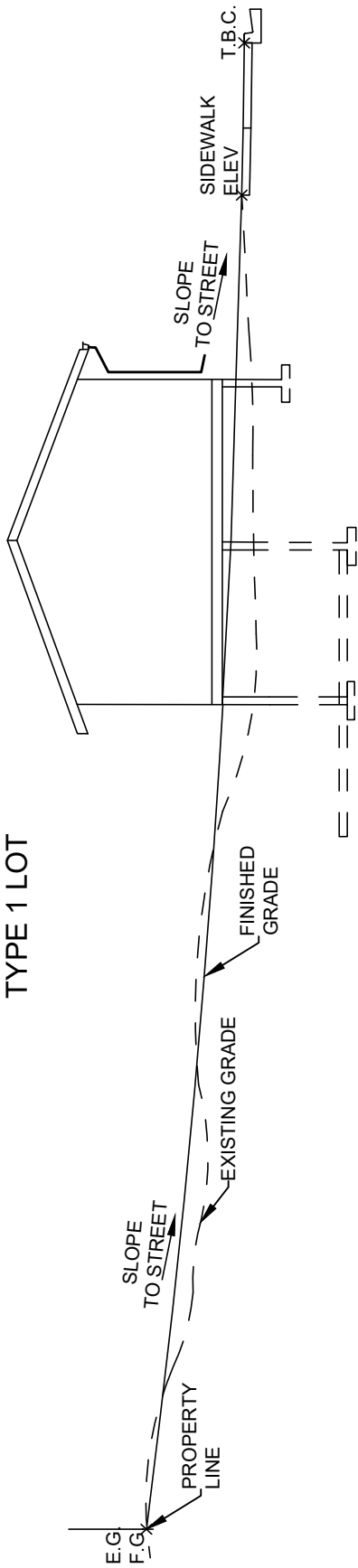
STANDARD DETAIL

P-390

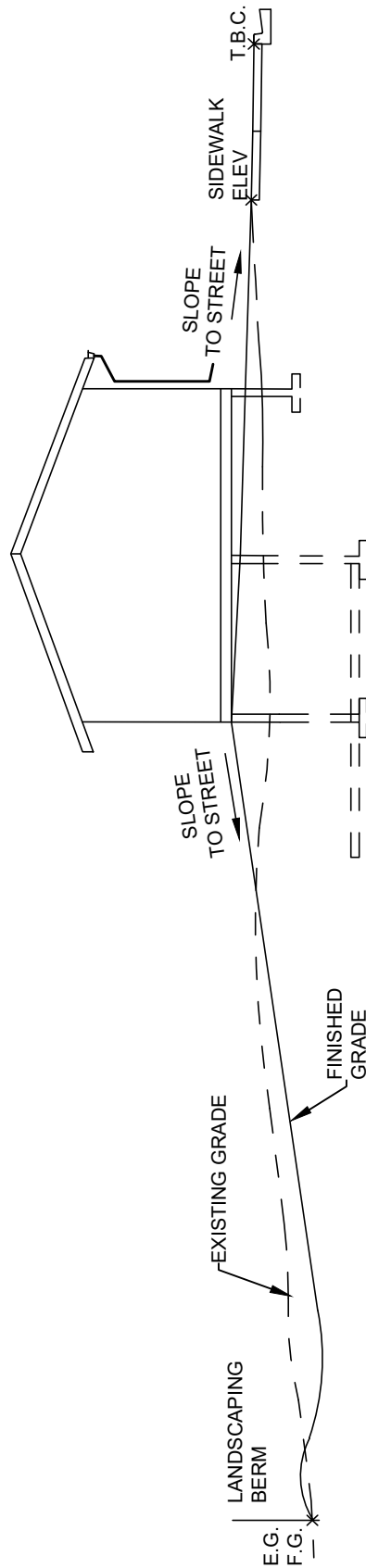
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REVISED DATE: 10/08/19

TYPE 1 LOT



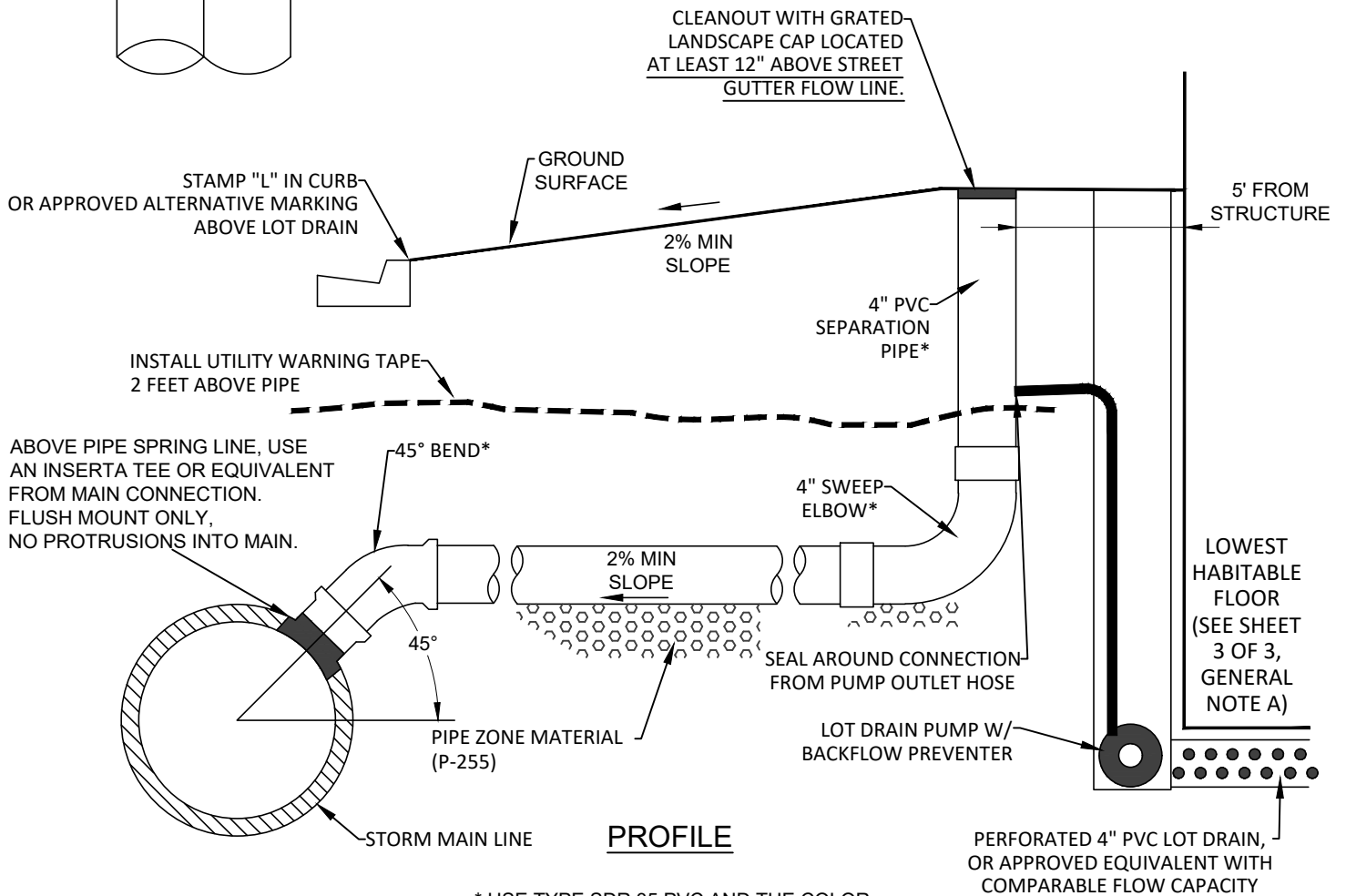
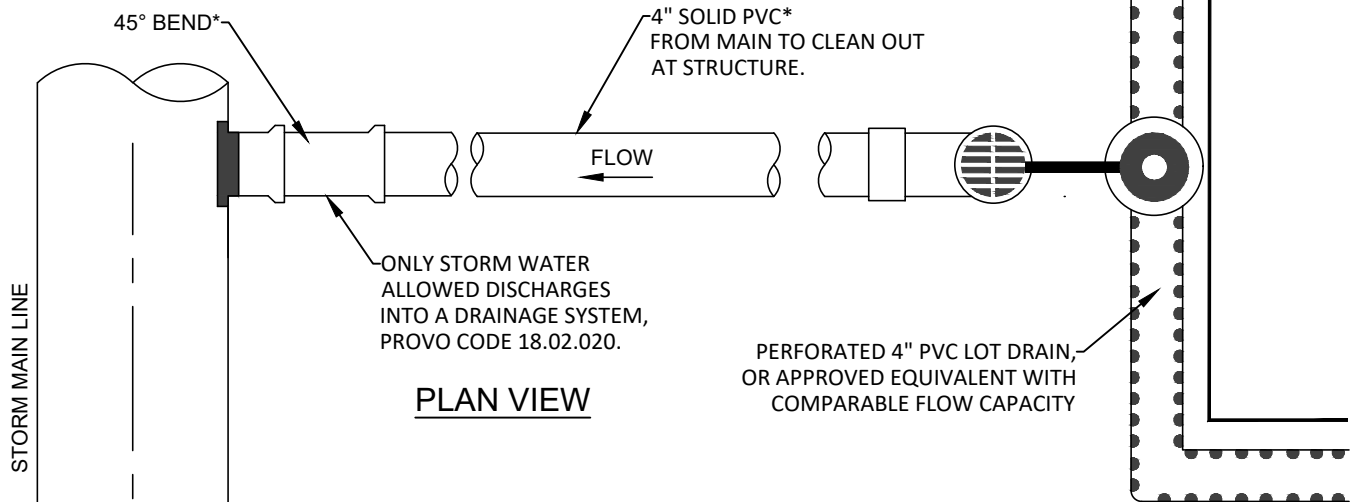
TYPE 2 LOT



PLAN REQUIREMENTS

1. Existing and proposed grades (label and extend past property lines).
2. Elevations on key structural points, walls, slabs, driveways, garage, etc.
3. Retaining wall locations, and engineered design if required.
4. Other requirements as per geotechnical investigation reports if required.

- DO NOT USE WITHOUT PRIOR APPROVAL



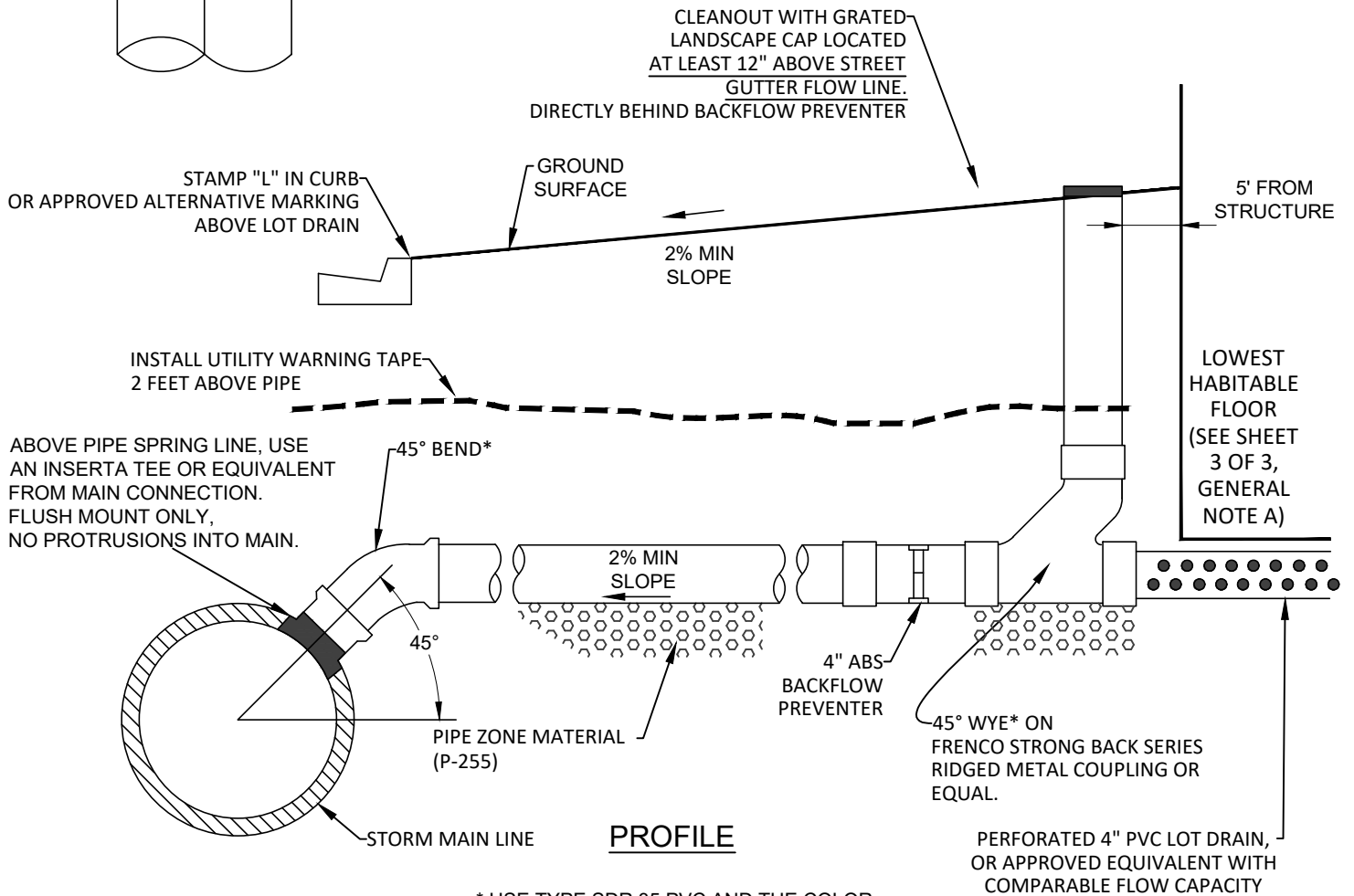
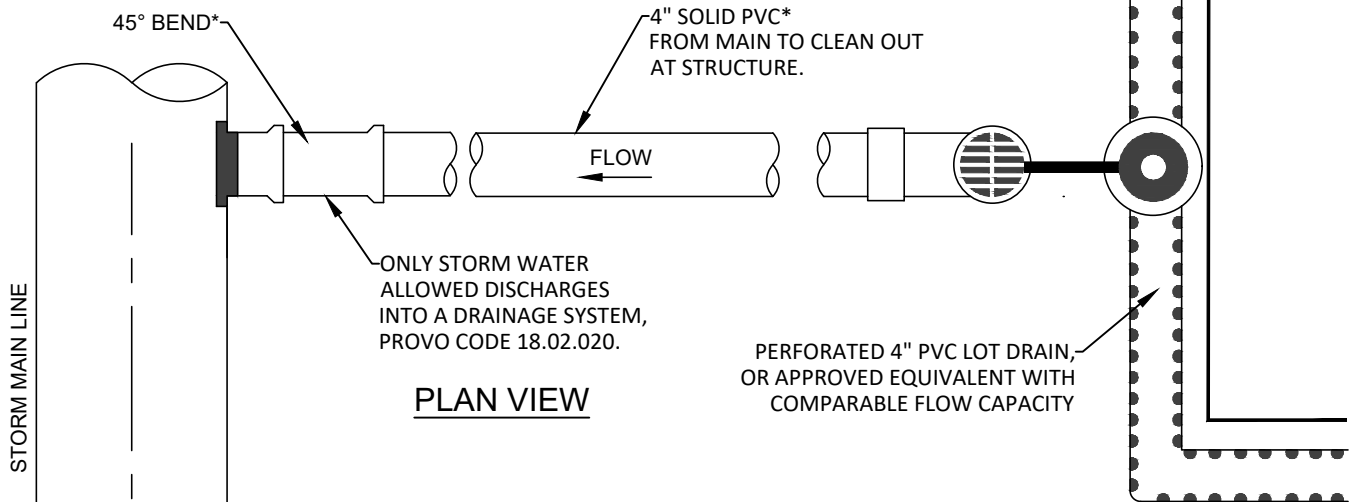
* USE TYPE SDR 35 PVC AND THE COLOR **WHITE** FOR ALL LOT DRAIN LATERAL PIPING

SHEET 1 OF 3
STANDARD DETAIL P-392a
NOT TO SCALE
REVISED DATE: 10/07/2019



LOT DRAIN LATERAL WITH DRAIN PUMP

- DO NOT USE WITHOUT PRIOR APPROVAL



* USE TYPE SDR 35 PVC AND THE COLOR **WHITE** FOR ALL LOT DRAIN LATERAL PIPING

SHEET 2 OF 3

STANDARD DETAIL

P-392b

NOT TO SCALE

REVISED DATE: 10/07/19

Lot Drain Lateral

1. GENERAL

A. Standard Drawings P-392a and P-392b may be used under the following conditions:

- A.A. Lot drains are sometimes required by IBC to drain backfilled areas around buildings in areas with tight native soils. Lot drains are not intended to drain high groundwater. The lowest habitable floor is recommended to be a minimum of 4 feet above groundwater elevations. Provo City may require a site specific geotechnical report identifying groundwater elevations and minimum FF elevations, to be reviewed and approved by the City Engineer or their designee.
 - A.B. Standard Drawing P-392a - The top of the landscape grate on the separation pipe shall be a minimum of 12 inches above the gutter flow line.
 - A.C. Standard Drawings P-392b - This drawing can only be used if (a) the storm drain main is designed to convey the City design storm with the HGL below top of pipe, AND (b) the lowest habitable floor is a minimum of 2 feet above the top of storm drain main at the lot drain connection. Otherwise, P-392a must be used.
- B. It is unlawful for any person to cause or allow the discharge into a water body or storm drainage system, either directly or indirectly, of any substance not comprised entirely of storm water, refer to Provo City code 18.02.020 for prohibited discharges.
- C. Minimum distance between lot drain connections to the storm main shall be 4 feet.
- D. Minimum required grade of lot drain is 2%.
- E. Clean-outs shall be installed at a minimum every 100 feet and wherever there is a change in slope or direction of pipe lateral and within 5 feet from structure.
- F. If building construction is not imminent, terminate at a clean-out a minimum of 12 feet inside the property line. Cap and mark white for future connection.

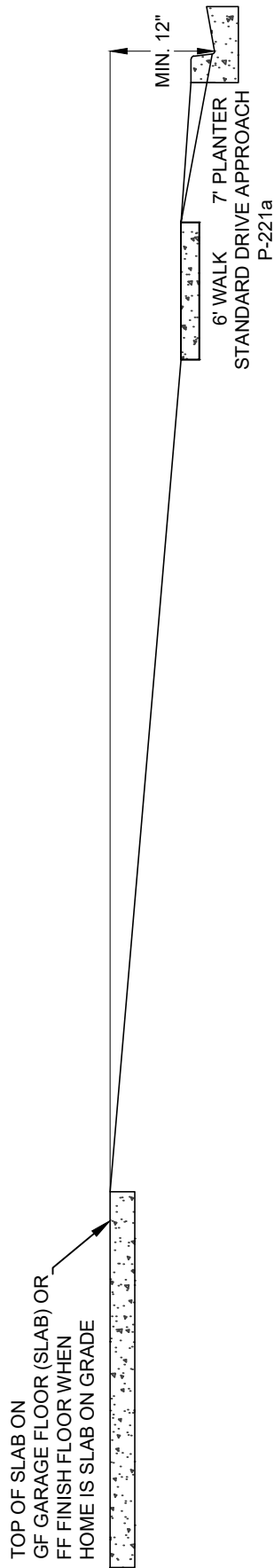
2. PRODUCT

- A. Lot drains shall use type SDR 35 PVC. The color of the pipe and fittings shall be white.
- B. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
- C. Backfill: Common fill, Provo Section 31 05 13M. Maximum particle size 2-inches.
- D. Pipe Zone: Gravel, Provo Section 32 05 13M.
- E. Lot Drain Mainline Connections: 45 degree bend and Inserta Tee or equivalent.

3. EXECUTION

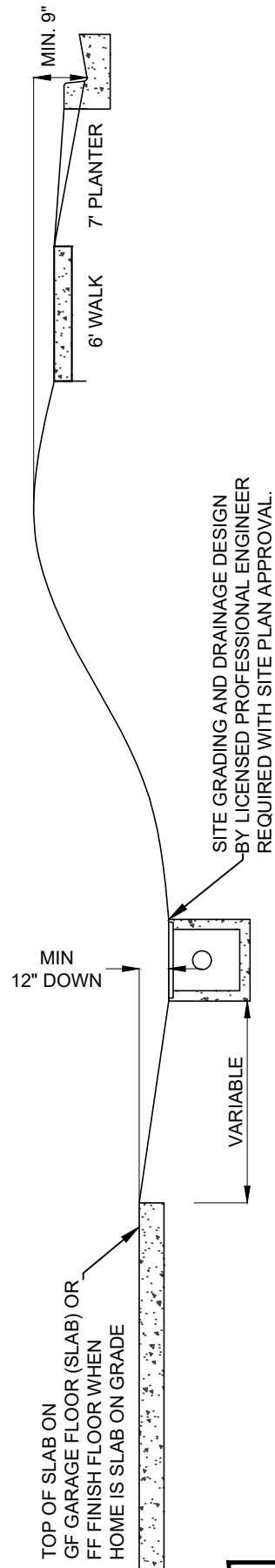
- A. Before installation, secure acceptance by ENGINEER for all pipe, fittings, and couplings to be used.
- B. Core and remove plug from storm main. Do not break into storm main for connection.
- C. Use an Inserta Tee or equivalent for a water tight connection at storm main. Protrusion into storm main pipe past inner wall is not allowed.
- D. CONTRACTOR shall have ALL connections inspected and surveyed by Provo City before backfilling.
- E. Provide backfill and surface restoration per Plan P-255.

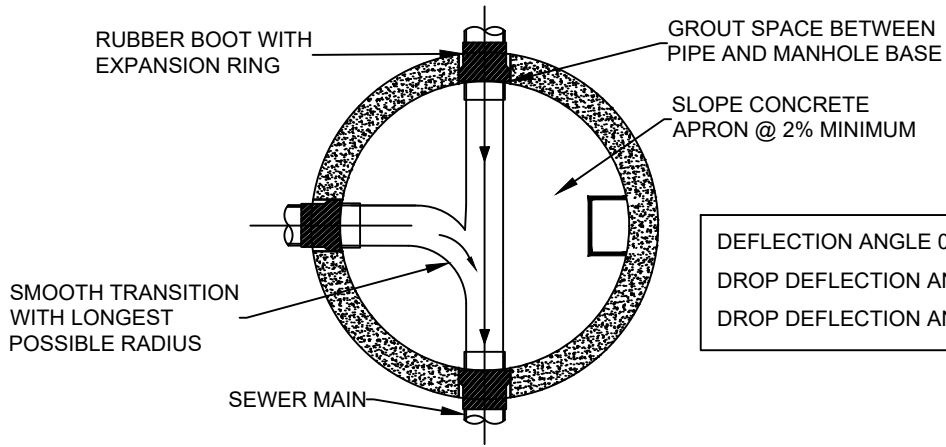
OPTION 1
(STANDARD)



FOR EXISTING DRIVE APPROACH TYPES,
REFER TO THE APPROPRIATE PROVO CITY
P-221 SERIES FOR DETAILS AND NOTES

OPTION 2
(ONLY FOR USE WHEN APPROVED BY CITY ENGINEER
OR THEIR DESIGNEE WITH A SITE PLAN APPROVAL.)





DEFLECTION ANGLE 0° - 75° = 0.1'
 DROP DEFLECTION ANGLE 75° - 90° = 0.2'
 DROP DEFLECTION ANGLE > 90° = 0.3 DROP

PLAN VIEW

IN PAVED AREAS SET COLLAR AROUND MH RING 1/8" LOWER THAN FINISH GRADE AT OUTER EDGE. IN UNPAVED AREAS, SET SMH LID 6" ABOVE EXISTING GROUND OR AS DIRECTED.

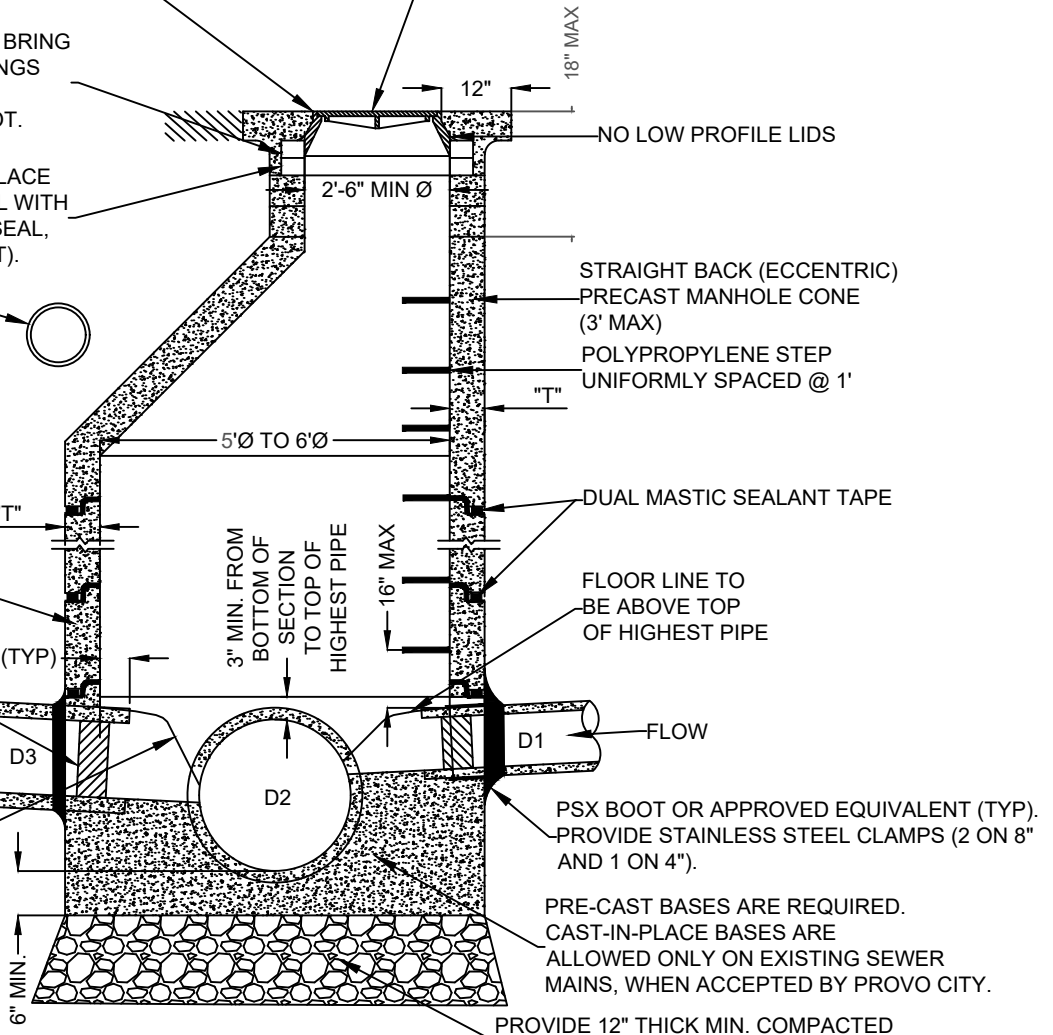
PROVIDE PRECAST RINGS TO BRING COVER TO PROPER ELEV. (RINGS CANNOT BE USED TO ADJUST MH COVER MORE THAN 1 FOOT.

GROUT GRADE RINGS IN PLACE WITH CONCRETE AND SEAL WITH RUBBERIZED SEAL (KENT SEAL, RAM NECK OR EQUIVALENT).

WATER MAIN

WALL THICKNESS (T)	
SMH DIA	T (INCHES)
5'	6"
6'	7"

D&L A-1180 (OR EQUAL) 30" MANHOLE RING AND COVER TO BE 1/8" BELOW TOP OUTER EDGE OF CONCRETE OR ASPHALT COLLAR. LID TO BE VENTED CROSS HATCH STYLE WITH "SEWER" CAST INTO TOP SURFACE.



STANDARD PRECAST MANHOLE SECTIONS (DEPTH VARIES)

TEMPORARY PLUG ALL CONNECTING PIPES (TYP)

FLOW

LIP OF GROUT CHANNEL

6" MIN.

SECTION VIEW

PSX BOOT OR APPROVED EQUIVALENT (TYP). PROVIDE STAINLESS STEEL CLAMPS (2 ON 8" AND 1 ON 4").

PRE-CAST BASES ARE REQUIRED. CAST-IN-PLACE BASES ARE ALLOWED ONLY ON EXISTING SEWER MAINS, WHEN ACCEPTED BY PROVO CITY.

PROVIDE 12" THICK MIN. COMPACTED GRAVEL BASE UNDER MH BASE.

SHEET 1 OF 2

STANDARD DETAIL

P-411

NOT TO SCALE

REVISED DATE: 10/24/22



STANDARD MANHOLE

Trench Backfill & Surface Restoration

1. GENERAL

- A. The drawing shows typical pipe connections. Refer to construction drawings for connection locations or refer to field location of existing piping to construct connections.
- B. If grade allows, inverts of D1 and D3 shall match the 0.75 depth point of D2. Otherwise as approved by Provo City.
- C. Manhole Size
 - C.A. Manhole diameter is determined by design and varies from 5 feet to 6 feet.
 - C.B. Diameter is 6 feet minimum: For sewers over 24 inches, or when directed by Provo City.
- D. Standards apply to private and public systems.

2. PRODUCT

- A. Gravel: Use 1 inch minus gravel.
- B. Backfill: Common fill, Provo Section 31 05 13M. Maximum particle size 2-inches.
- C. Concrete: Class 4000, APWA Section 03 30 04.
- D. Cone and Wall Sections: Conform to ASTM C-478.
- E. Riser and Reducing Riser: ASTM C 478
- F. Grout: 2 parts sand to 1 part cement mortar, ASTM C 1329.
- G. Stabilization-Separation Geotextile: Moderate or high at CONTRACTOR's choice, APWA Section 31 05 19.

3. EXECUTION

- A. Sewer rock or a granular backfill borrow in a geotextile wrap.
- B. Base Course Placement: APWA Section 32 11 23. Maximum lift thickness is 8-inches before compaction. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
- C. Poured in Place: If manhole is to be poured in place, follow the same pattern as shown except use 10 inch minimum wall and base thickness.
- D. Invert Cover: During construction, place invert covers over the top of pipe in manholes that currently convey sewerage. See Plan P-412.
- E. Pipe Connections: Grout around all pipe openings.
- F. Pipe Seal: Install rubber-based pipe seals on all plastic pipes when connecting plastic pipes to manholes. Hold water-stop in place with stainless steel bands.
- G. Joints: Place flexible dual mastic sealant tape in all riser joints. Finish with grout and ensure manhole is watertight.
- H. Adjustment: If the required manhole adjustment is more than 1'-0", remove the cone and grade rings and adjust the manhole elevation with the appropriate manhole section, the cone section, and the grade rings or plastic form to make frame and lid match finish grade.
- I. Finish: Provide smooth and neat finishes on interior of cones, shafts, and rings. Imperfect moldings or honeycombs will not be accepted.
- J. Backfill: Provide backfill against the manhole shaft. Pea gravel and recycled RAP aggregate is NOT ALLOWED. Water jetting is NOT allowed. Adhere to all backfilling and surface restoration requirements included in Plan P-255.
- K. After all grading around manhole has been completed and final surfacing is in place, remove debris and temporary plugs.

SHEET 2 OF 2



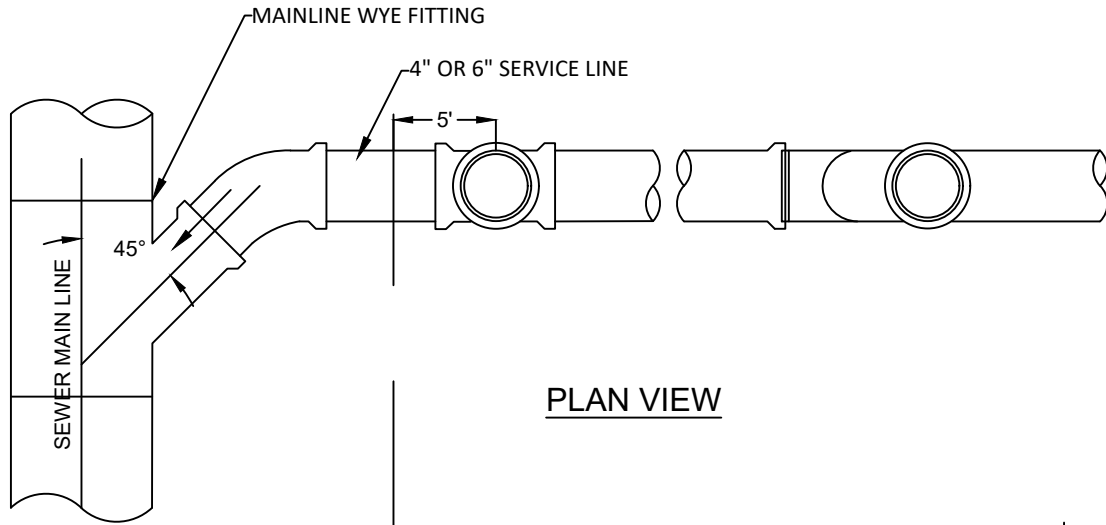
STANDARD MANHOLE

STANDARD DETAIL

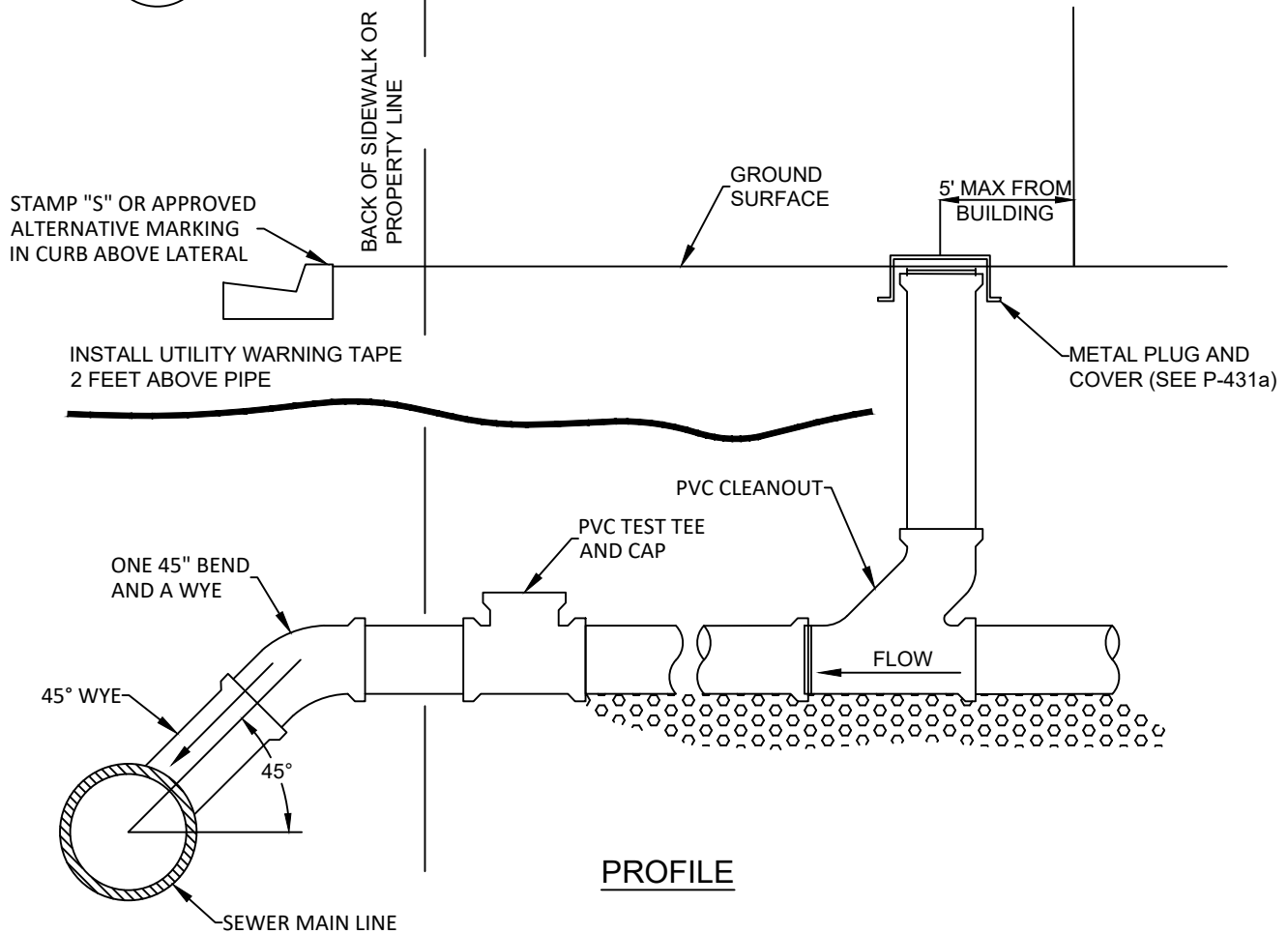
P-411

NOT TO SCALE

REVISED DATE: 10/24/22



PLAN VIEW

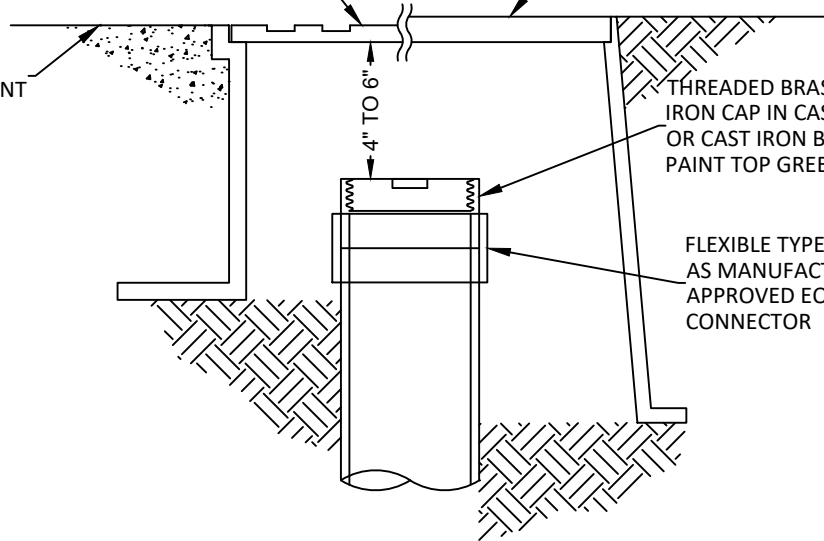


PROFILE

INSTALL FRAME AND COVER IN PAVED AREAS.
(CAST IRON CONFORMING TO ASTM
A48 CLASS 30, D&L SUPPLY H-8030
OR APPROVED EQUAL) (TRAFFIC AREA)

INSTALL SPRINKLER
IRRIGATION
BOX IN UNPAVED AREAS

CONCRETE OR
ASPHALT PAVEMENT



THREADED BRASS OR CAST
IRON CAP IN CAST IRON BODY
OR CAST IRON BLIND CAP.
PAINT TOP GREEN.

FLEXIBLE TYPE NEOPRENE COUPLING
AS MANUFACTURED BY FERNCO OR
APPROVED EQUAL OR NO-HUB TYPE
CONNECTOR

Sewer Lateral Connection

1. GENERAL

- A. Laterals shall be 4-inch diameter minimum. A 6-inch or larger lateral is required for buildings with more than five equivalent residential units with a separate 4-inch lateral off the 6-inch to each unit.
- B. Provide separate laterals for each unit. Provo City approval required for all combined sewer laterals.
- C. Minimum distance between 4-inch lateral connection shall be 4 feet.
- D. Required grade of sewer laterals (ABS and PVC pipe) is 2%. Where it is impractical to run the sewer laterals at 2% due to the depth of the sewer main, a 6-inch or larger sewer lateral may be run a 1% grade when approved by Provo City.
- E. Clean-outs shall be installed every 100 feet, and where there is a change in slope or direction of the lateral and within 5' of the building.
- F. Distance between sewer laterals and water service lines shall be 10 feet.
- G. Individual grinder pump systems require Provo City approval. Gravity flow required from property to main with a cleanout at transition.

2. PRODUCT

- A. Sewer laterals shall be green or black in color. Do not use white.
- B. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
- C. Backfill: Common fill, Provo Section 31 05 13M. Maximum particle size 2-inches.
- D. Pipe Zone: Gravel, Provo Section 31 05 13M.
- E. Provide agency approved connection for all laterals connecting to lines 8" in diameter or less.
- F. Stainless steel and brass straps required for saddles.
- G. Strong back RC series by Fernco with four stainless steel clamps or equal required for all plain end pipe connections.
- H. Lateral Mainline Connections: All 4-inch connections to the main must be constructed with one 45 degree bend and wye. Direct nose-on connections to main are used when connecting to an existing main line. All nose-on work is to be inspected by city personnel.
- I. Manhole Mainline Connections: All 6-inch and larger laterals on commercial or multi-family laterals require a manhole at the connection to the public main.

3. EXECUTION

- A. Before installation, secure acceptance by ENGINEER for all pipe, fittings, and couplings to be used.
- B. Tape wrap pipe as required by soil conditions.
- C. Core and remove plug from sewer main. Do not break into sewer main to make connection.
- D. CONTRACTOR shall have all connections inspected and surveyed by Provo City before backfilling.
- E. CONTRACTOR shall perform water test for lateral as directed by Provo City Inspector.
- F. Provide backfill and surface restoration per Plan P-255.



*STANDARD SEWER
SERVICE CONNECTIONS
AND CLEAN-OUT*

SHEET 3 OF 3

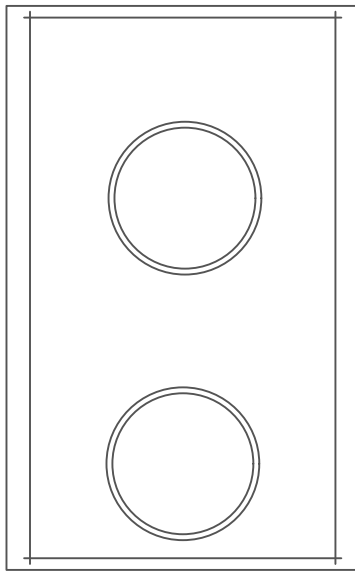
STANDARD DETAIL

P-431

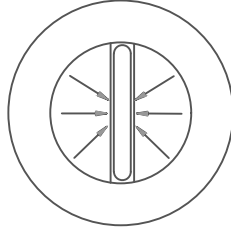
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REVISED DATE: 10/24/22

GREASE TRAP



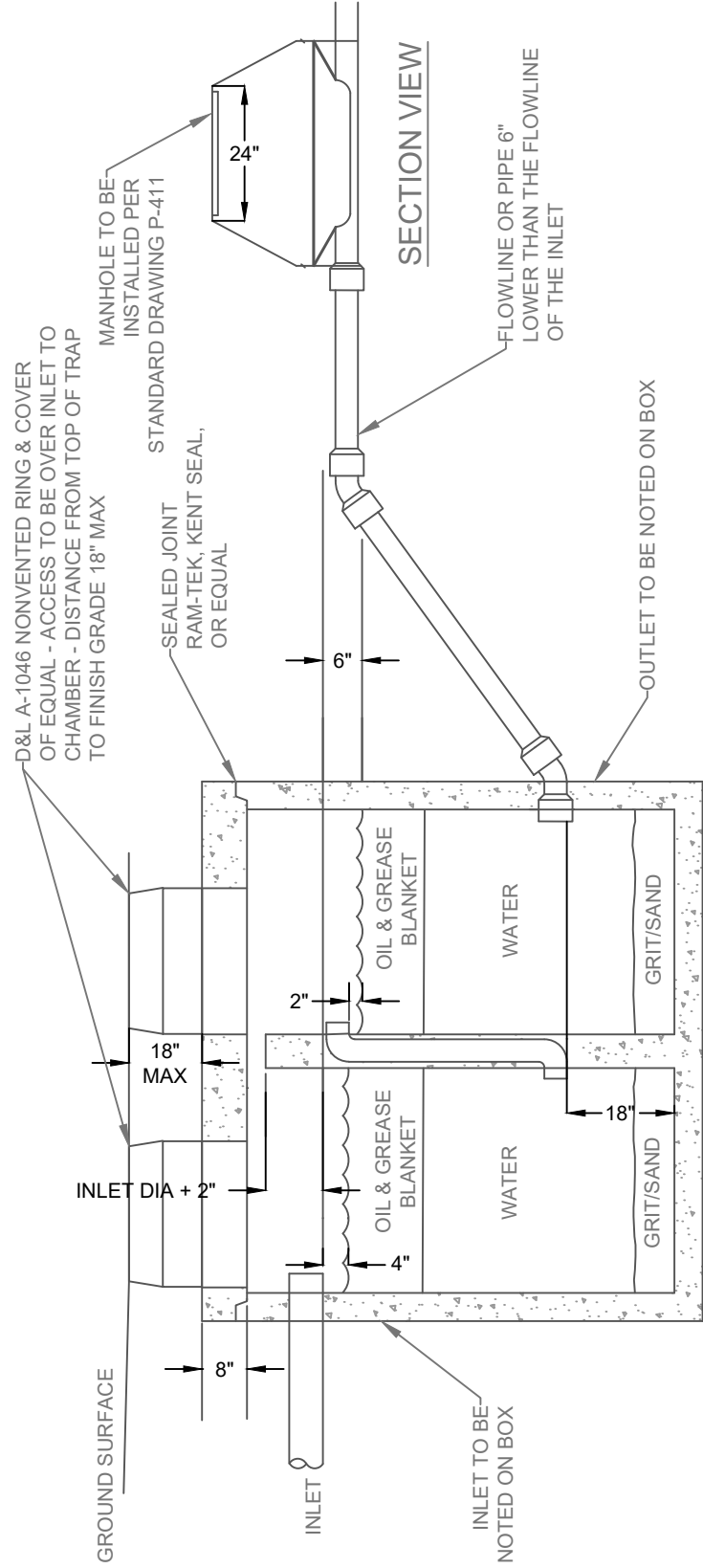
POUR CONCRETE AROUND SEWER LATERAL IN BASE OF 48" OR LARGER MANHOLE CONE. CUT OUT A MINIMUM OF 24" FROM THE TOP OF LATERAL. SLOPE CONCRETE TO HOLE AT MIN 2%.



SAMPLING MANHOLE

PLAN VIEW

PLAN VIEW



SECTION VIEW

SECTION VIEW

D&L A-1046 NONVENTED RING & COVER OF EQUAL - ACCESS TO BE OVER INLET TO CHAMBER - DISTANCE FROM TOP OF TRAP TO FINISH GRADE 18" MAX

MANHOLE TO BE INSTALLED PER STANDARD DRAWING P-411

SEALING JOINT RAM-TEK, KENT SEAL, OR EQUAL

FLOWLINE OR PIPE 6" LOWER THAN THE FLOWLINE OF THE INLET

OUTLET TO BE NOTED ON BOX

INLET TO BE NOTED ON BOX

Grease Interceptor

1. GENERAL

- A. Before backfilling around concrete box, secure inspection of installation by ENGINEER.
- B. Deep boxes are to be avoided whenever possible.
- C. Large traps will require three lids for access to clean.
- D. Sand-oil separator to be located outside parking garages in accessible location.
- E. Grease and sand/oil interceptors, as described by the international plumbing code (IPC), shall be required of any commercial user when the WRF determines they are necessary for the proper handling of wastewater containing FOGS in excessive amounts. Such interceptors shall not be required for residential dwelling units.
- F. Any commercial user utilizing a three (3) compartment sink shall be required to have either a grease interceptor or grease trap installed at its own expense and shall be required to comply with maintaining the device as outlined in the Provo City Sewer Use Ordinance and Pretreatment Program.
- G. All newly constructed commercial structures, strip malls, multi-tenant planned occupied buildings, or planned unoccupied buildings, shall install independent six-inch (6") wastewater discharge lines stubbed out within each designated future food establishment unit. If a new source commercial structure, strip mall, or multi-tenant building has planned occupancy by one or more businesses that do not generate FOG, and therefore do not need a grease interceptor, and the owner of the structure does not facilitate the installation of independent six-inch (6") wastewater discharge line and install a common interceptor, then no future food establishments shall be permitted, unless facilities are retrofitted for independent lines.
- H. Alternate traps may be submitted for approval. Provide product information including removal rates.
- I. All newly constructed "stand-alone" commercial structures, strip malls, multi-tenant planned occupied buildings, where a three (3) compartment sink will be utilized, will be required to install a grease interceptor.
- J. Grease traps are only allowed in place of grease interceptors when in the opinion of the manager it is physically impossible to install a grease interceptor outside of the building or business. As such, a variance request from the owner or lessee of the property must be made to Provo City Pretreatment with a certification letter from a duly licensed Utah plumber or engineer.

2. PRODUCT

- A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
- B. Backfill: Common fill, Provo Section 31 05 13M. Maximum particle size 2-inches.
- C. Concrete: Class 4000, APWA Section 03 30 04.
- D. Reinforcement: Deformed, 60 ksi yield grade steel, ASTM A 615.
- E. PVC Pipe: APWA Section 33 05 07.
- F. Box extenders to be used to keep top of box within 18 inches of ground surface.

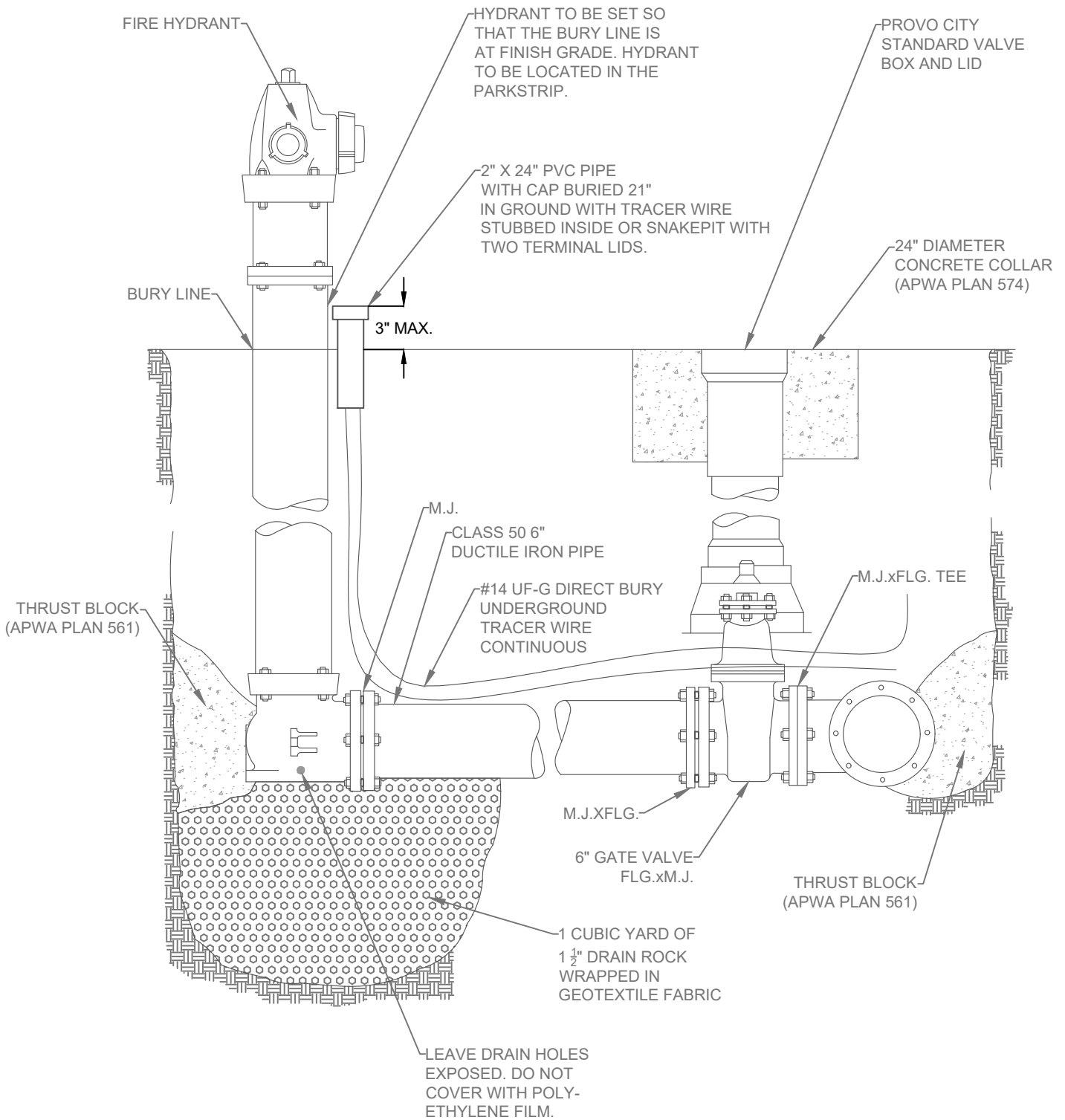
3. EXECUTION

- A. Base Course Placement: APWA Section 32 11 23. Maximum lift thickness is 6-inches before compaction. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 32 23 26.
- B. Reinforcement Placement: APWA Section 03 20 00.
- C. Concrete Placement: APWA Section 03 30 20. Provide 1/2-inch radius edges.
- D. Apply a broom finish. Apply a curing agent.
- E. Fill annular space around pipe wall penetrations with waterproof sealer.
- F. Backfill: Provide backfill against the box walls. Pea gravel and recycled RAP aggregate is NOT ALLOWED. Water jetting is NOT ALLOWED. Adhere to all backfilling and surface restoration requirements included in Plan P-255.



*GREASE TRAP/SAND/OIL
SEPARATOR AND
SAMPLING MANHOLE*

SHEET 2 OF 2
STANDARD DETAIL P-441
NOT TO SCALE
REVISED DATE: 11/25/15



SHEET 1 OF 2

STANDARD DETAIL

P-511

NOT TO SCALE

REVISED DATE: Aug. 2020

Fire Hydrant With Valve

1. GENERAL

- A. Before backfilling, secure inspection of installation by ENGINEER.
- B. Additional requirements are specified in APWA 33 11 00.
- C. On dead end line, locate shut off valve within 18 feet from the fire hydrant.

2. PRODUCT

- A. New materials only. Relocation of Hydrants not allowed.
- B. Hydrant: Dry barrel, AWWA C502; Waterous WB-67, Mueller A-423 or AVK 2780 Nostalgic.
- C. Polyethylene Wrap: All metal including pipe, couplings, joints, and valves shall be sleeved or wrapped with 8 mil. Polyethylene film.
- D. Thrust Blocks: Concrete Class 4000, APWA Section 03 30 04. Sakrete is not allowed for thrust blocks.
- E. Reinforcement: Deformed, 60 ksi yield grade steel, ASTM A 615.
- F. Backfill: Provo Section 31 05 13M. Maximum particle size 2-inches.
 - F.A. Sand Bedding: All waterlines are to be bedded in sand for a distance of one foot on all sides.
 - F.B. Drain Rock: ASTM Size No. 3 (2" to 1") or larger.
 - F.C. Other Type of Common Fill: per specification.
- G. Geotextile: Stabilization-separation fabric, APWA Section 31 05 19.
- H. Color: Fire hydrant is to be factory coated red.
- I. Tracer Wire: #14 UF-G direct bury red or blue tracer wire required on all water lines. Wire to extend 24" above surface at base of fire hydrants.

3. EXECUTION

- A. Installation:
 - A.A. Provide at least 1 cubic yard of drain rock around drain hole at base of hydrant spool. Wrap geotextile around drain rock and tape geotextile to hydrant spool to prevent sitting of sewer rock.
 - A.B. Apply non-oxide grease to all buried metal surface. Wrap with polyethylene sheet and tape wrap.
 - A.C. Provide 12 inch sand bedding around all piping.
 - A.D. Notify fire department at (801) 852-6300 as soon as hydrant is placed in service.
- B. Thrust Blocks:
 - B.A. Before pouring concrete, wrap pipe system with polyethylene sheet to prevent bonding of concrete to pipe system.
 - B.B. Not required for flange or welded pipe systems.
- C. Provide backfill and surface restoration per Plan P-255.
- D. Operation of Valves: Provo City water valves to be operated only be Provo City Water Resources employees, even in emergencies. For assistance call (801) 852-6780

SHEET 2 OF 2



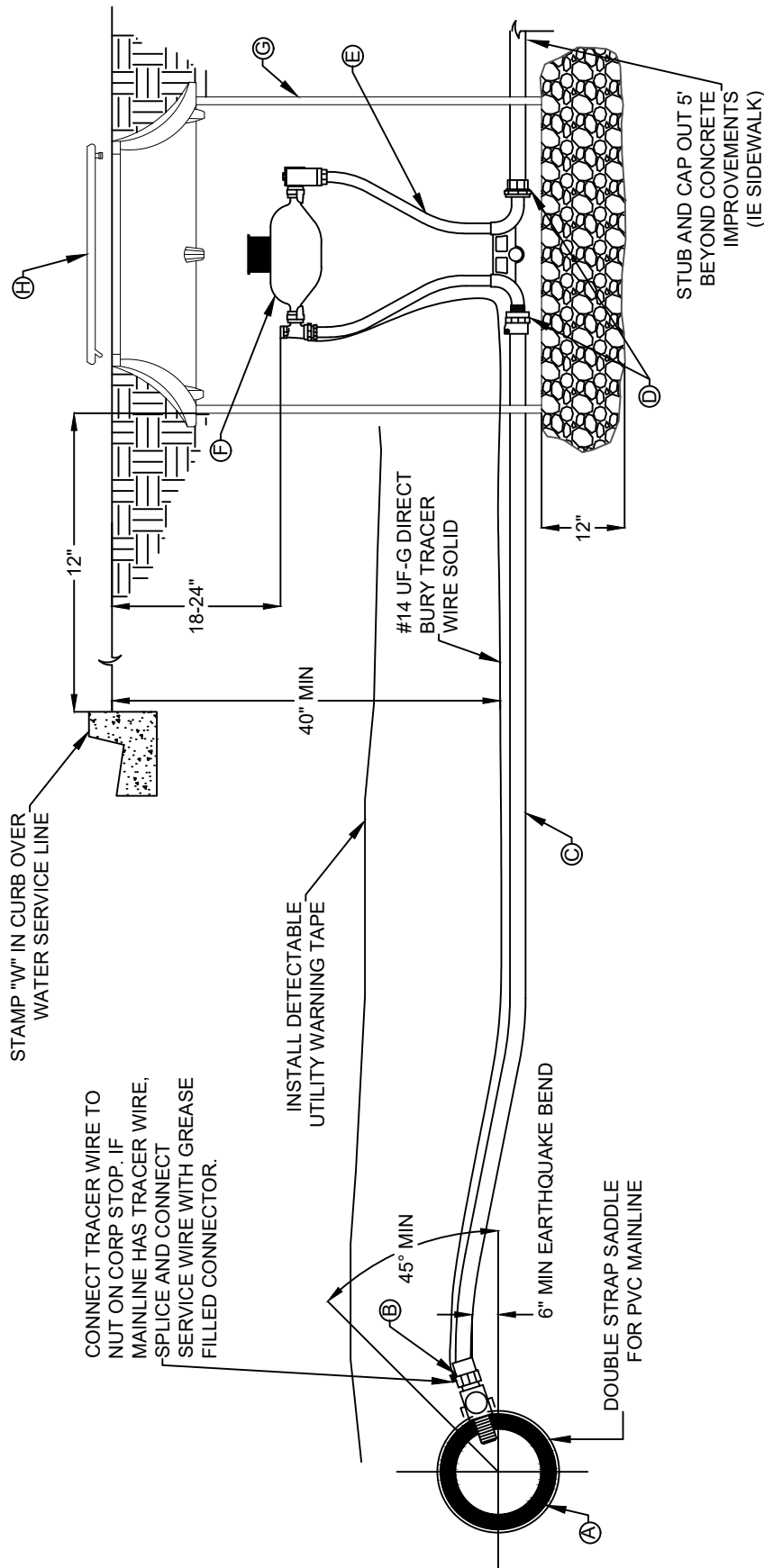
FIRE HYDRANT DETAIL

STANDARD DETAIL

P-511

NOT TO SCALE

REVISED DATE: Aug. 2020



LEGEND

No.	ITEM	DESCRIPTION
(A)	CONNECTION TO MAIN	USE DOUBLE STRAP BRASS SADDLE
(B)	CORPORATION STOP	BRASS WITH TRACER WIRE NUT (MUELLER OR FORD CC x COMPRESSION DIRECT TAP IN DUCTILE IRON) (IRON PIPE THREAD x COMPRESSION IN PVC SADDLE)
(C)	PIPE	1-inch COPPER - TYPE "K" SOFT OR BLUE PC 200, DR9 POLYETHYLENE TUBING MEETING AWWA C901 & NSF 61 WITH #14 TRACER WIRE AND METAL INSERTS
(D)	ADAPTER	BRASS - MALE x COMPRESSION
(E)	METER YOKE	1-inch COPPER - EQUIP WITH INLET VALVE, VERTICAL DUAL CHECK VALVE, STABILIZER BARS PERPENDICULAR TO SETTER, & SOLID BAR BETWEEN INLET & OUTLET AT BASE AND HALFWAY UP METER YOKE
(F)	METER	NEPTUNE AMI SMART METER WITH ANTENNA TO BE INSTALLED BY CITY. PROTECT FROM DAMAGE
(G)	METER BOX	CMP, OR WHITE HDPE (21" DIA x 30" HEIGHT (MIN))
(H)	RING AND LID	D&L FOUNDRY AND SUPPLY L-2244 RING WITH UNIVERSAL COVER FOR NEPTUNE R450 RADIO ANTENNA; D-6018-09 IN DRIVEWAYS AND CONCRETE

1" Meter

1. GENERAL

- A. Do not install meter in driveways, sidewalks or curb and gutter without express written permission from Provo City.
- B. In new subdivisions, stake lot corners prior to installation of water meters.
- C. In street surfaces or other vehicular traffic areas, (like driveway approaches), install the same type of meter box as required for 1 1/2" and 2" service meters. See Plan P-522.
- D. Above ground reduced pressure backflow prevention valve (RP) may be required in some applications. For more information, contact Provo City Cross Connections Program Coordinator at (801) 852-6788.
- E. To get access to water, contact Provo City at 311 for water meter to be installed. Access to water will be downstream and outside of the meter box. No jumpers allowed. Contractors will be fined for using jumpers.
- F. Maintain at least 2 feet between 1 inch service line taps. Maintain 4 feet between any connection that is larger than 1 inch and any other connection.

2. PRODUCT

- A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as base course without ENGINEER's permission.
- B. Backfill: Common fill, Provo Section 31 05 13M. Maximum particle size 2-inches.
- C. Castings: Grey iron class 35 minimum per ASTM A 48, coated with asphalt based paint or better.
- D. Fittings: Use compression fittings (no flare). Mueller or Ford only.
- E. Teflon tape and pipe dope to be used on all threaded pipe fittings.

3. EXECUTION

- A. Meter Placement:
 - A.A. Install the meter box centered between curb and sidewalk at center of lot (if there is no curb, install within 7' of the property line) and within the public right-of-way and in the center of the lot.
 - A.B. Do not install meters under driveway approaches, sidewalks, or curb and gutter.
- B. Bed service line and tracer wire in one foot of sand all directions.
- C. Meter Box: Set box so grade of the frame and cover matches the finish grade of the surrounding surface.
- D. Lid must be to grade before meter will be installed. Top of lid must be even with top of sidewalk or top of curb.
- E. Pipe Outside of Right-of-Way: Coordinate with utility agency or adjacent property owner for type of pipe to be used outside of right-of-way.
- F. Inspection: Before backfilling around meter box, secure inspection of installation by ENGINEER.
- G. Provide backfill and surface restoration per Plan P-255.
- H. Operation of Valves: Provo City water valves to be operated only by Provo City Water Resources employees, even in emergencies. For assistance call (801) 852-6780
- I. Before a meter is set, 1) a permit must be issued, 2) meter lid must be the right type and even with top of sidewalk or curb 3) meter yoke, lid, or can must not be damaged in any way 4) there must be a shut off valve downstream of the meter so that the meter can be turned on and checked for leaks. Failure to meet these criteria would necessitate a second visit by city personnel and contractor will be charged a re-inspection fee.

SHEET 2 OF 2



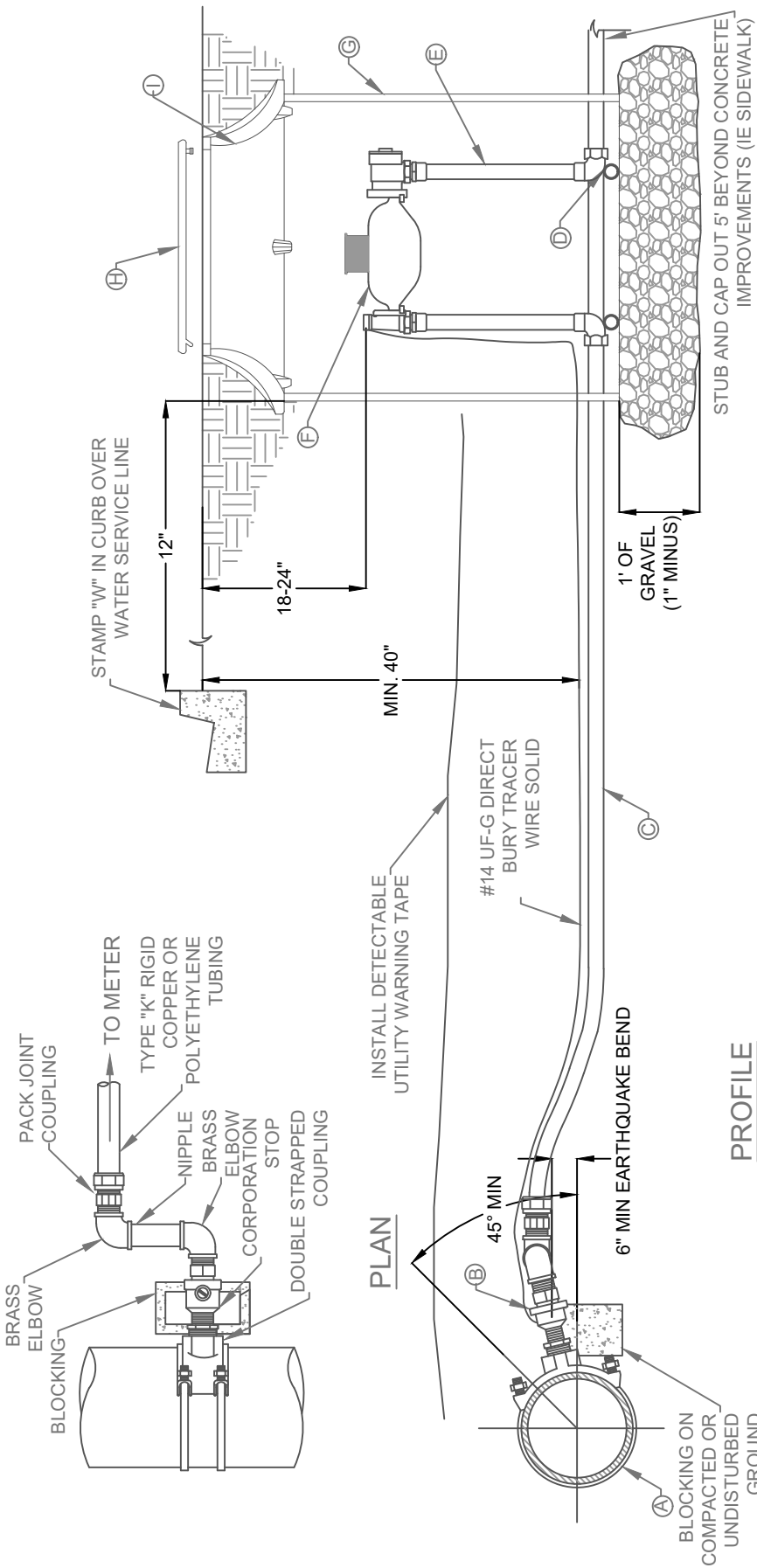
1" METER SERVICE

STANDARD DETAIL

P-521

NOT TO SCALE

REVISED DATE: 10/24/22



LEGEND		DESCRIPTION
No.	ITEM	
A	CONNECTION TO MAIN	USE DOUBLE STRAP BRASS SADDLE
B	CORPORATION STOP	BRASS WITH TRACER WIRE NUT (MUELLER OR FORD CC x COMPRESSION DIRECT TAP IN DUCTILE IRON) (IRON PIPE THREAD x COMPRESSION IN PVC SADDLE)
C	PIPE	1 1/2" OR 2" COPPER - TYPE "K" SOFT OR BLUE PC 200, DR9 POLYETHYLENE TUBING MEETING AWWA C901 & NSF 61 WITH #14 TRACER WIRE AND METAL INSERTS
D	ADAPTER	BRASS - MALE x COMPRESSION
E	METER YOKE	1 1/2" OR 2" COPPER - EQUIP WITH INLET VALVE, VERTICAL DUAL CHECK VALVE, STABILIZER BARS PERPENDICULAR TO SETTER, & SOLID BAR BETWEEN INLET & OUTLET AT BASE AND HALFWAY UP METER YOKE
F	METER	NEPTUNE AMI SMART METER WITH ANTENNA TO BE INSTALLED BY CITY. PROTECT FROM DAMAGE
G	METER BOX	WHITE HDPE (21" DIA x 30" HEIGHT (MIN))
H	RING AND LID	D&L FOUNDRY AND SUPPLY L-2244 RING WITH UNIVERSAL COVER FOR NEPTUNE R450 RADIO ANTENNA; D-6018-09 IN DRIVEWAYS AND CONCRETE

Water Service Lateral Layout 1 1/2" and 2"

1. GENERAL

- A. Do not install meter in driveways, sidewalks or curb and gutter without express written permission from Provo City.
- B. Where domestic use is applicable, use a standard City provided meter.
- C. Connections serving buildings of three (3) stories or more (not to include basements) may not utilize a dual check valve device installed at the meter yoke as protection. Above ground reduced pressure backflow prevention valve (RP) may be required in some applications. For more information, contact Provo City Cross Connection Program Coordinator at (801) 852-6788.
- D. To get access to water, contact Provo City at 311 for water meter to be installed. Access to water will be downstream and outside of the meter box. No jumpers allowed.
- E. Maintain at least 4 feet between any connection that is larger than 1 inch and any other connection.

2. PRODUCT

- A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as base course without ENGINEER's permission.
- B. Backfill: Common fill, Provo Section 31 05 13M. Maximum particle size 2-inches.
- C. Castings: Grey iron class 35 minimum per ASTM A 48, coated with asphalt based paint or better.
- D. Meter yoke to be same size as service line regardless of meter size.
- E. Teflon tape and pipe dope to be used on all threaded pipe fittings.

3. EXECUTION

- A. Meter Placement:
 - A.A. Install the meter box centered between curb and sidewalk (if there is no curb, install within 7' of the property line) and within the public right-of-way and in the center of the lot.
 - A.B. Do not install meters under driveway approaches, sidewalks, or curb and gutter.
- B. Bed service line in one foot of sand all directions.
- C. Meter Box: Set box so grade of the frame and cover matches the finish grade of the surrounding surface.
- D. Bypass Valve: Lock in off position.
- E. Blocking: Use clay brick or concrete block.
- F. Concrete Box:
 - F.A. Center frame and cover over water meter.
 - F.B. Allow 1-inch clearance around waterline where water line passes through concrete box wall. Seal opening with compressible seal.
- G. Pipe Outside of Right-of-Way: Coordinate with utility agency or adjacent property owner for type of pipe to be used outside of right-of-way.
- H. Inspection: Before backfilling around meter box, secure inspection of installation by ENGINEER.
- I. Provide backfill and surface restoration per Plan P-255.
- J. Operation of Valves: Provo City water valves to be operated only by Provo City Water Resources employees, even in emergencies. For assistance call (801) 852-6780

SHEET 2 OF 2



*WATER SERVICE LATERAL
LAYOUT 1 1/2" & 2"*

STANDARD DETAIL

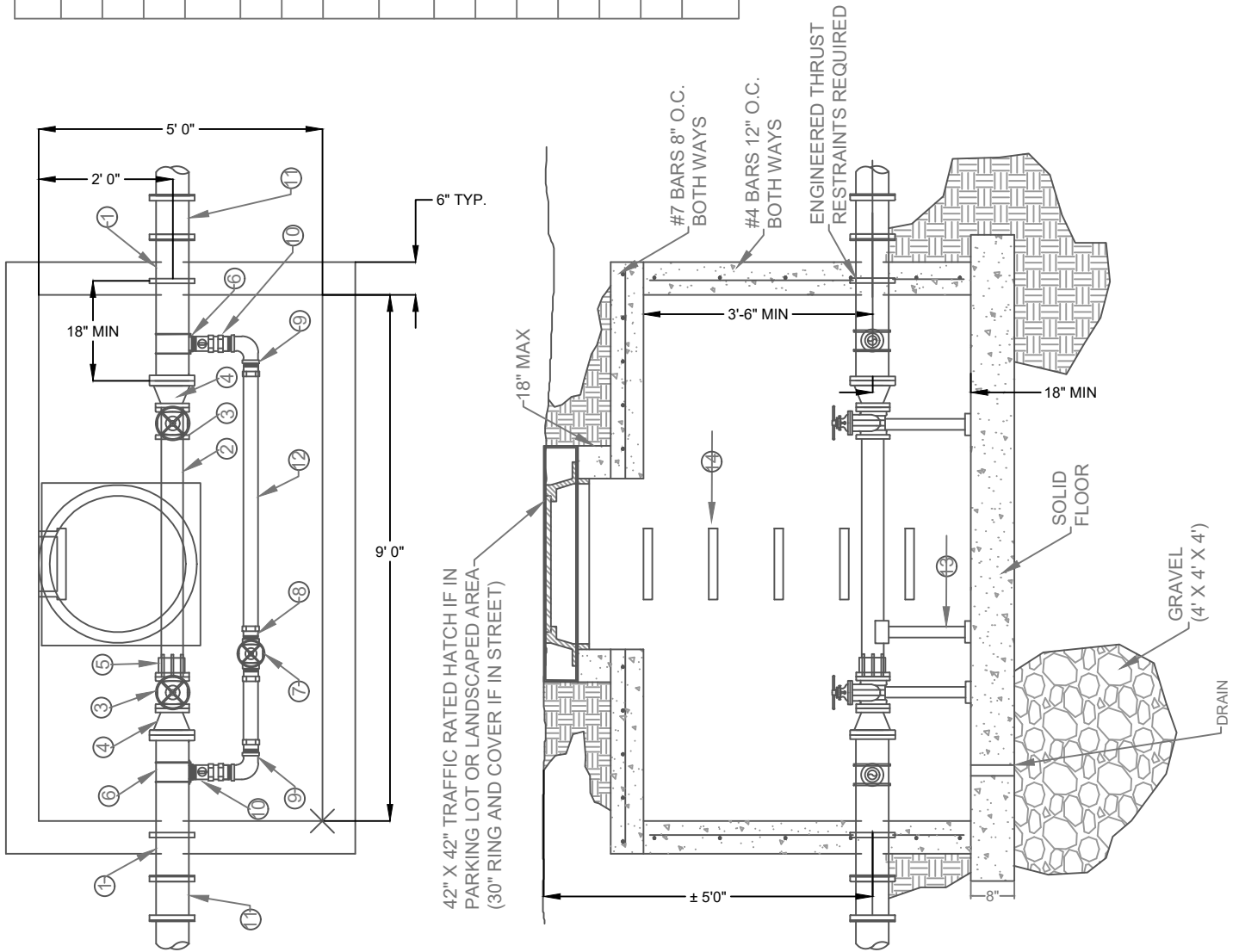
P-522

NOT TO SCALE

REVISED DATE: 10/24/22

FITTING SCHEDULE

No.	DESCRIPTION
①	FL X PLAIN END W/THRUST RING
②	48" FL X PLAIN END SPOOL
③	EPOXY COATED GATE VALVE WITH HANDWHEEL
④	REDUCER WHEN REQUIRED
⑤	FLANGED COUPLING ADAPTER OR COUPLER
⑥	DOUBLE STRAP BRASS/STAINLESS STEEL SADDLE
⑦	EPOXY COATED GATE VALVE WITH HANDWHEEL
⑧	IP X COMPRESSIONS ADAPTOR (TYP)
⑨	BRASS ELBOW
⑩	IP X COMPRESSION CORP STOP
⑪	SLEEVE
⑫	RIGID COPPER
⑬	PIPE SUPPORT FOR METER AND VALVES
⑭	POLYPROPYLENE STEPS (PARSON ENVIRONMENTAL P-14938 OR EQUAL).



42" X 42" TRAFFIC RATED HATCH IF IN PARKING LOT OR LANDSCAPED AREA (30" RING AND COVER IF IN STREET)

ENGINEERED THRUST RESTRAINTS REQUIRED

SHEET 1 OF 2

STANDARD DETAIL
P-525

NOT TO SCALE

REVISED DATE: 10/24/17

3", 4" and 6" Meter Vault and Piping

1. GENERAL

- A. Additional requirements are specified in APWA Section 33 12 16.
- B. Meter placement in street only with Provo City approval.
- C. If use is such that water cannot be shut off, a bypass with a backflow prevention device is required.
- D. Meter to be supplied and installed by Provo City.
- E. Backflow prevention assembly required in separate vault downstream of meter connection or in a mechanical room before any other connection.
- F. Other backflow requirements may apply. For more information, contact Provo City Cross Connection Program Coordinator at (801) 852-6788.
- G. To get access to water, contact Provo City at 311 for a water meter to be installed. Access to water will be downstream and outside of the meter box. No jumpers allowed.
- A. Maintain 4 feet between any connection that is larger than 1 inch and any other connection.

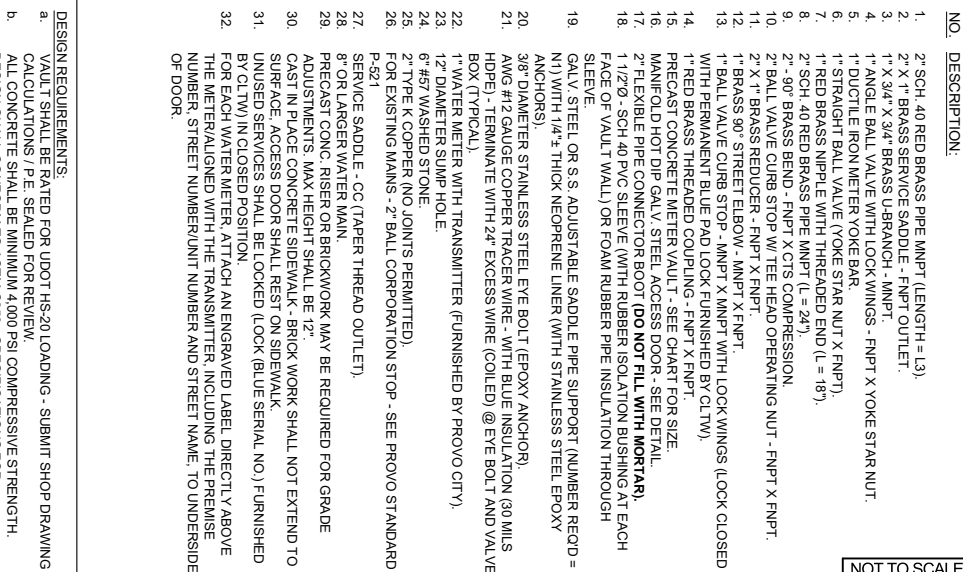
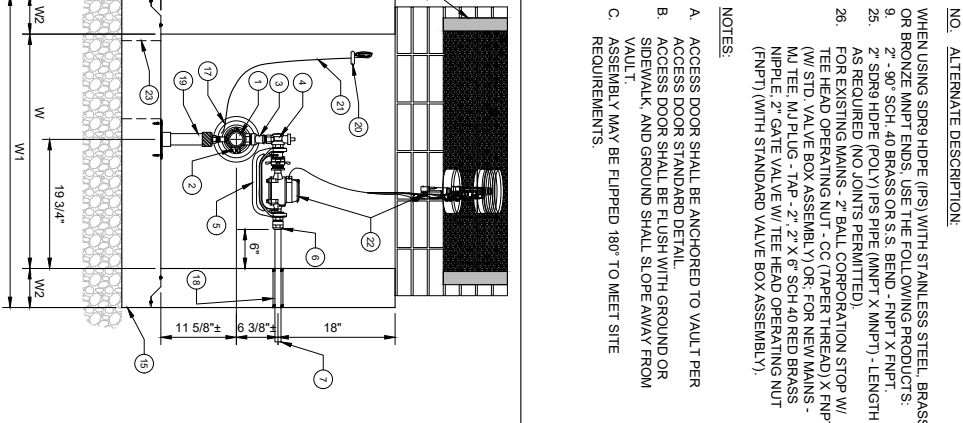
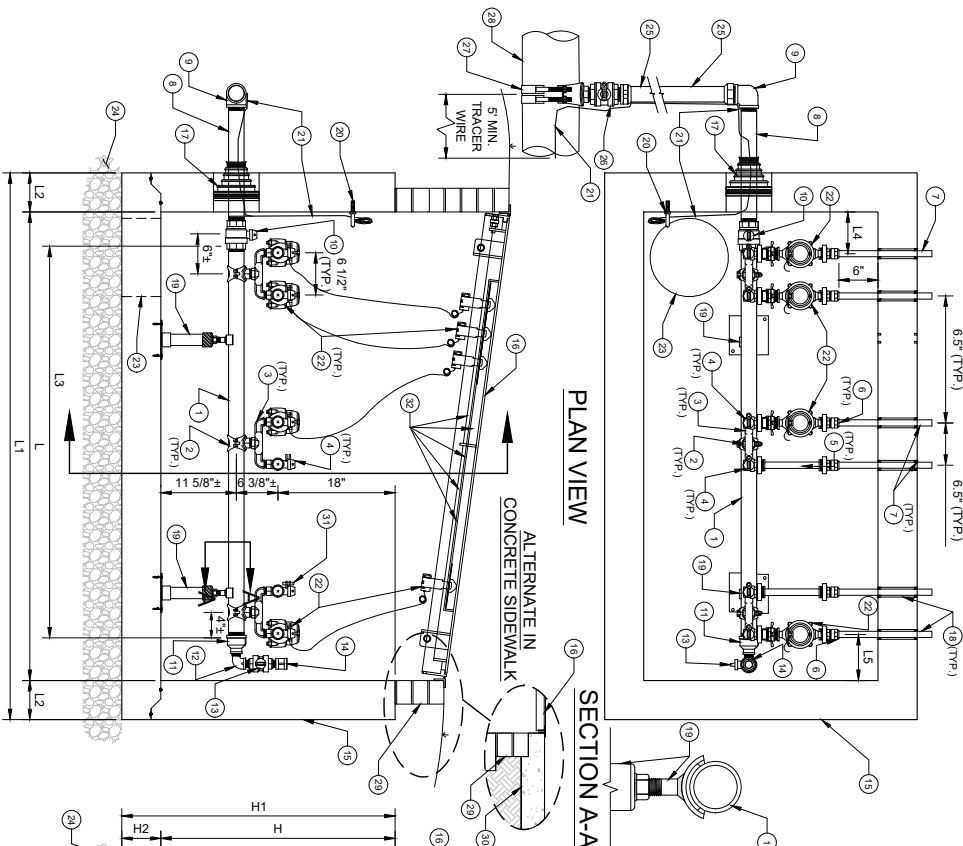
2. PRODUCTS

- A. Small Fittings: Brass. Do not use galvanized materials.
- B. Pipe Support: Adjustable pipe supports required.
- C. Backfill: Common fill, PROVO Section 31 05 13M. Maximum particle size 2-inches.
- D. Drain Gravel: Sewer rock, ASTM size no. 3 (2" to 1") or equal, PROVO Section 31 05 13M.

3. EXECUTION

- A. Control Valve: Install valve with valve box adjacent to main.
- B. Center frame and cover over water meter.
- C. Bed service line in one foot of sand all directions.
- D. Inspection: Before backfilling, secure inspection of installation by ENGINEER.
- E. Provide backfill and surface restoration per Plan P-255.
- F. Operation of Valves: Provo City water valves to be operated only by Provo City Water Resources employees, even in emergencies. For assistance call (801) 852-6780.

SHEET 2 OF 2



DIMENSIONS (INCHES)

VAULT (INSIDE)		WALL THICKNESS (MIN.)		FLOOR THICKNESS (MIN.)		NUMBER OF METERS (MAX.)	
L	W	H	L1	W1	H1	L2	H2
48	36	36	60	48	42	6	6
36	36	36	44	44	40	4	4

L3	N1
36	2
24	1

ALTERNATE DESCRIPTION:

WHEN USING SDR9 HDPE (PS) WITH STAINLESS STEEL, BRASS, OR BRONZE MNPT ENDS, USE THE FOLLOWING PRODUCTS:

- 2" - 90° SCH. 40 BRASS OR S.S. BEND - FNPT X FNPT
- 2" - 90° HDPE (POLY) IPS PIPE (MNPT X MNPT) - LENGTH AS REQUIRED (NO JOINTS PERMITTED)
- 2" SDR9 HDPE (POLY) IPS PIPE (MNPT X MNPT) - LENGTH AS REQUIRED (NO JOINTS PERMITTED)
- FOR EXISTING MAINS - 2" BALL CORPORATION STOP W/TEE HEAD OPERATING NUT - CC/TAPER THREADED X FNPT (W/ STD VALVE BOX ASSEMBLY), OR: FOR NEW MAINS - MNPT, 2" GATE VALVE W/ TEE HEAD OPERATING NUT (FNPT) (WITH STANDARD VALVE BOX ASSEMBLY).

NOTES:

- ACCESS DOOR SHALL BE ANCHORED TO VAULT PER ACCESS DOOR STANDARD DETAIL.
- ACCESS DOOR SHALL BE FLUSH WITH GROUND OR SIDEWALK, AND GROUND SHALL SLOPE AWAY FROM VAULT.
- ASSEMBLY MAY BE FLIPPED 180° TO MEET SITE REQUIREMENTS.

NO. DESCRIPTION:

- 2" SCH. 40 RED BRASS PIPE MNPT (LENGTH = L3)
- 2" X 1" BRASS SERVICE SADDLE - FNPT OUTLET
- 1" X 3/4" X 3/4" BRASS U-BRANCH - MNPT
- 1" ANGLE BALL VALVE WITH LOCK WINGS - FNPT X YOKE STAR NUT
- 1" DUCTILE IRON METER YOKE BAR
- 1" STRAIGHT BALL VALVE (YOKE STAR NUT X FNPT)
- 1" RED BRASS NIPPLE WITH THREADED END (L = 18")
- 2" SCH. 40 RED BRASS PIPE MNPT (L = 24")
- 2" - 90° BRASS BEND - FNPT X CTS COMPRESSION
- 2" BALL VALVE CURB STOP W/ TEE HEAD OPERATING NUT - FNPT X FNPT
- 2" X 1" BRASS REDUCER - FNPT X FNPT
- 1" BALL VALVE CURB STOP - MNPT X MNPT WITH LOCK WINGS (LOCK CLOSED WITH PERMANENT BLUE PAD LOCK FURNISHED BY CLTV)
- 1" RED BRASS THREADED COUPLING - FNPT X FNPT
- PRECAST CONCRETE METER VAULT - SEE CHART FOR SIZE
- MANIFOLD HOT DIP GALV. STEEL ACCESS DOOR - SEE DETAIL
- 2" FLEXIBLE PIPE CONNECTOR BOOT (DO NOT FILL WITH MORTAR)
- 1 1/2" Ø - SCH. 40 PVC SLEEVE WITH RUBBER ISOLATION BUSHING AT EACH FACE OF VAULT WALL) OR FOAM RUBBER PIPE INSULATION THROUGH SLEEVE
- GALV. STEEL OR S.S. ADJUSTABLE SADDLE PIPE SUPPORT (NUMBER RECD = N1) WITH 1/4" ± TENSILE NEOPRENE LINER (WITH STAINLESS STEEL EPOXY ANCHORS)
- 3/8" DIAMETER STAINLESS STEEL EYE BOLT (EPOXY ANCHOR)
- AWG #12 GAUGE COPPER TRACER WIRE - WITH BLUE INSULATION (30 MILS HOPEL - TERMINATE WITH 2" EXCESS WIRE (COILED) @ EYE BOLT AND VALVE BOX (TYPICAL))
- 1" WATER METER WITH TRANSMITTER (FURNISHED BY PROVO CITY)
- 12" DIAMETER SLUMP HOLE
- 6" #457 WASHED STONE
- 2" TPE K COMP (NO JOINTS PERMITTED)
- 2" TPE K COMP (NO JOINTS PERMITTED)
- FOR EXISTING MAINS - 2" BALL CORPORATION STOP - SEE PROVO STANDARD P-521
- SERVICE SADDLE - CC (TAPER THREAD OUTLET)
- 8" OR LARGER WATER MAIN
- 28' LARGER CONC. RISER OR BRICKWORK MAY BE REQUIRED FOR GRADE ADJUSTMENTS. MAX HEIGHT SHALL BE 12"
- CAST IN PLACE CONCRETE SIDEWALK - BRICK WORK SHALL NOT EXTEND TO SURFACE. ACCESS DOOR SHALL REST ON SIDEWALK.
- UNUSED SERVICES SHALL BE LOCKED (LOCK (BLUE SERIAL NO.) FURNISHED BY CLTV) IN CLOSED POSITION.
- FOR EACH WATER METER, ATTACH AN ENGRAVED LABEL DIRECTLY ABOVE THE METER ALIGNED WITH THE TRANSMITTER, INCLUDING THE PREMISE NUMBER, STREET NUMBER/UNIT NUMBER AND STREET NAME, TO UNDERSIDE OF DOOR.

DESIGN REQUIREMENTS:

- VAULT SHALL BE RATED FOR UDOT HS-20 LOADING - SUBMIT SHOP DRAWING/ CALCULATIONS / P.E. SEALED FOR REVIEW.
- ALL CONCRETE SHALL BE MINIMUM 4,000 PSI COMPRESSIVE STRENGTH.
- DESIGN SHALL CONFORM TO ASTM C859 - SPECIFICATIONS FOR "UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURE"
- STEEL REINFORCING DESIGN SHALL CONFORM TO ASTM C857.
- REBARS SHALL BE GRADE 60 PER ASTM A615.
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
- PIPE PENETRATIONS SHALL BE ISOLATED FROM PIPE WITH FLEXIBLE CONNECTORS (MANHOLE BOOTS) OR WITH RUBBER ISOLATION BUSHINGS.
- PRECAST VAULT COMPONENTS SHALL HAVE MARKINGS PER ASTM C478 REQUIREMENTS.

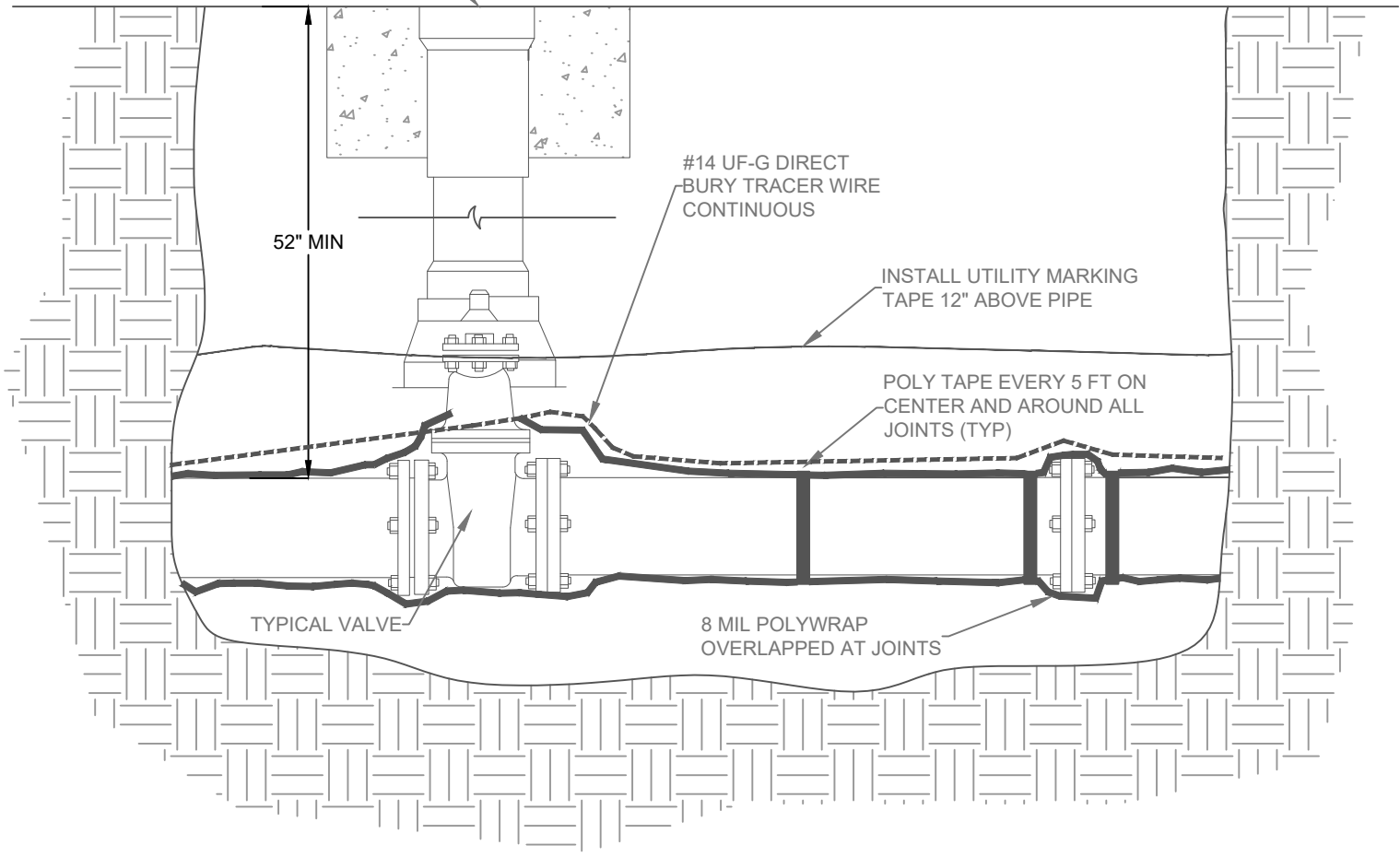
NOT TO SCALE

STANDARD DETAIL

P-531

VERSION 1.0
DATE MODIFIED 10/2023

STANDARD VALVE BOX AND LID (APWA 574)



52" MIN

#14 UF-G DIRECT BURY TRACER WIRE CONTINUOUS

INSTALL UTILITY MARKING TAPE 12" ABOVE PIPE

POLY TAPE EVERY 5 FT ON CENTER AND AROUND ALL JOINTS (TYP)

TYPICAL VALVE

8 MIL POLYWRAP OVERLAPPED AT JOINTS

SHEET 1 OF 2

*WATER MAINLINE,
POLYWRAP, & TRACER WIRE*

STANDARD DETAIL
P-594

NOT TO SCALE

REVISED DATE: Aug. 2020

Water Mainline, Polywrap, & Tracer Wire

1. GENERAL

- A. Maintain at least 2 feet between 1 inch and ¾ inch service line taps. Maintain 4 feet between any connection that is larger than 1 inch and any other connection.
- B. Waterline installation to meet all requirements of Sections 33 05 05M and 33 11 00M.
- C. Waterline shall be installed within the street section in the location shown on Provo Standard Drawing P-914, unless otherwise approved.

2. PRODUCTS

- A. Pipe: All city maintained pipe in rights-of-ways or easements shall be ductile iron. C900 PVC Pipe may be allowed with approval from director.
- B. Polywrap: All metal including pipe, couplings, joints, and valves shall be sleeved or wrapped with 8 mil. Polyethylene.
- C. Tracer Wire: #14 UF-G direct bury red or blue tracer wire required on all water lines. Provide wire at base of fire hydrants. Provide excess wire to extend 24" above finished grade.
- D. Tape: Use poly tape around pipe and tracer wire at all joints and at ±5 foot intervals.
- E. Bolts: Use all stainless steel bolts.
- F. Backfill: Common fill, PROVO Section 31 05 13M. Maximum particle size 2-inches.
- G. Double offset butterfly valves required for valves greater than 12".

3. EXECUTION

- A. Bed water mainline in one foot of sand all directions.
- B. Pull polywrap tight around pipe and tape with poly tape.
- C. Poly Tape:
 - a. Tape around valves.
 - b. Tape any cuts or tears.
 - c. Tape wire on top center of pipe outside of the polywrap.
- C. Place valves at property lines. On existing construction valves may be placed 3 feet from tee when expressly allowed by Provo City.
- D. When splicing tracer wire, use a grease filled connector. Wire is to be continuous underground where practical. Underground splices must be inspected before backfill. All tracer wire shall be tested for continuity by an independent tester and written certification of continuity provided to Provo City inspectors prior to requesting continuity testing by Provo City. A re-inspection fee will be charged for any failed continuity test conducted by Provo City. Entire length of tracer wire shall be tested and approved by City prior to paving.
- E. Inspection: Before backfilling, secure inspection and GPS of installation by City.
- F. Provide backfill and surface restoration per Plan P-255.
- G. Operation of Valves: Provo City water valves to be operated only by Provo City Water Resources employees, even in emergencies. For assistance call (801) 852-6780.



*WATER MAINLINE,
POLYWRAP, & TRACER WIRE*

SHEET 2 OF 2

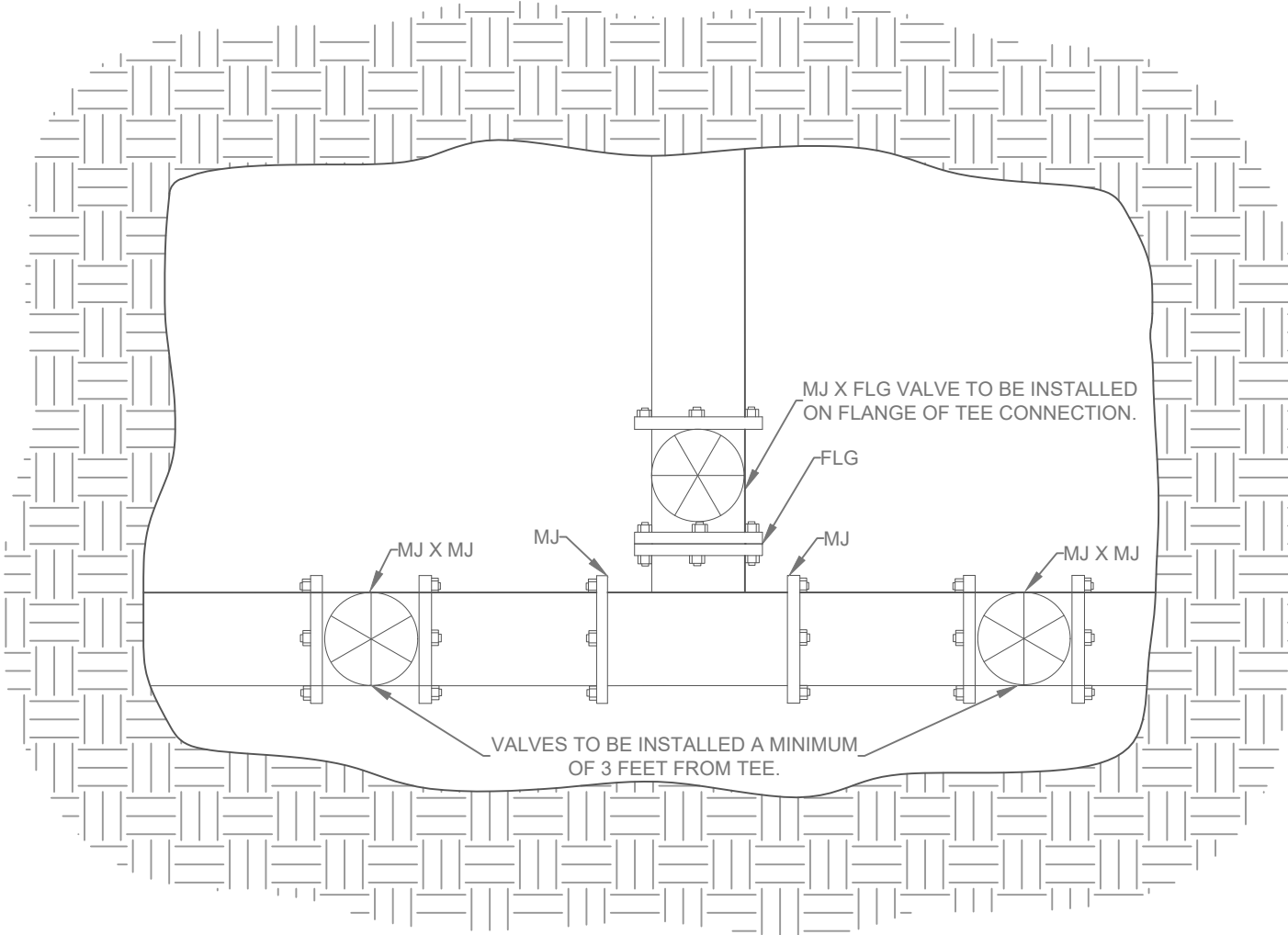
STANDARD DETAIL

P-594

NOT TO SCALE

REVISED DATE: Aug. 2020

PLAN VIEW



SHEET 1 OF 2

STANDARD DETAIL
P-595

NOT TO SCALE

REVISED DATE: Oct-2021

Water Mainline, Polywrap, & Tracer Wire

1. GENERAL

A. Waterline installation to meet all requirements of Sections 33 05 05M and 33 11 00M.

2. PRODUCTS

- A. Pipe: All city maintained pipe in rights-of-ways or easements shall be ductile iron. Use ductile iron pipe for fire lines. All privately maintained pipe in public rights-of-ways shall be ductile iron.
- B. Polywrap: All metal including pipe, couplings, joints, and valves shall be sleeved or wrapped with 8 mil. Polyethylene.
- C. Tracer Wire: #14 UF-G direct bury red or blue tracer wire required on all water lines. Provide wire at base of fire hydrants and at all valves. Wire to be brought up outside of valve box and stubbed into valve box 3 inches below the lid through a hole cut in the valve box. Provide excess wire to extend 24" above finished grade.
- D. Tape: Use poly tape around pipe and tracer wire at all joints and at ± 5 foot intervals.
- E. Bolts: All bolts need to be covered in FMH grease.
- F. Backfill: Common fill, PROVO Section 31 05 13M. Maximum particle size 2-inches.
- G. Double offset butterfly valves required for valves 12" or greater.
- H. Sakrete is not allowed for thrust blocks.

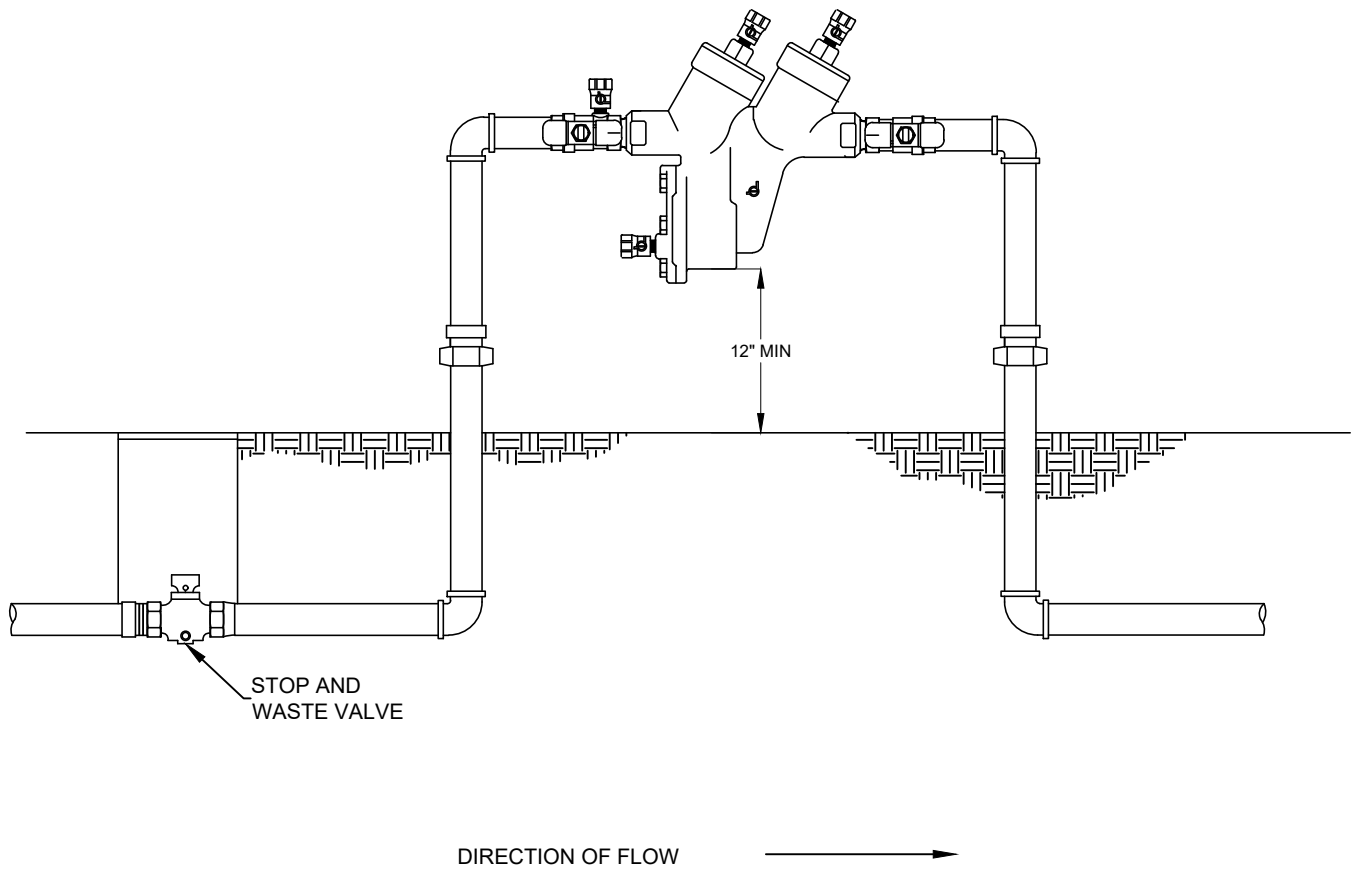
3. EXECUTION

- A. Bed water mainline in one foot of sand all directions.
- B. Pull polywrap tight around pipe and tape with poly tape.
- C. Poly Tape:
 - a. Tape around valves.
 - b. Tape any cuts or tears.
 - c. Tape wire on top center of pipe outside of the polywrap.
- C. Place valves at property lines. On existing construction valves may be placed 3 feet from tee when expressly allowed by Provo City.
- D. When splicing tracer wire, use a grease filled connector. Wire is to be continuous underground where practical. Underground splices must be inspected before backfill.
- E. Inspection: Before backfilling, secure inspection of installation by ENGINEER.
- F. Provide backfill and surface restoration per Plan P-255.
- G. Operation of Valves: Provo City water valves to be operated only by Provo City Water Resources employees, even in emergencies. For assistance call (801) 852-6780.



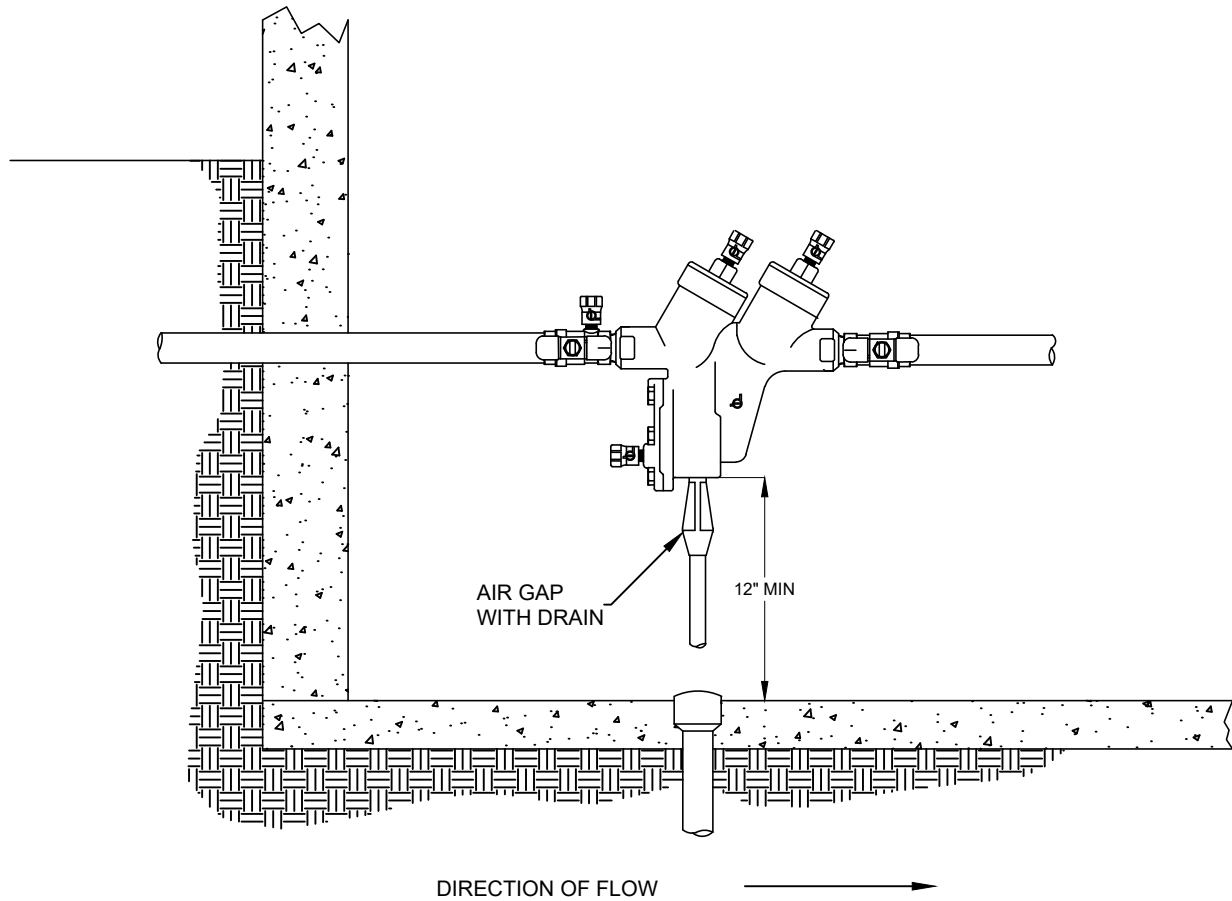
WATER MAINLINE TEE

SHEET 2 OF 2
STANDARD DETAIL P-595
NOT TO SCALE
REVISED DATE: Oct-2021



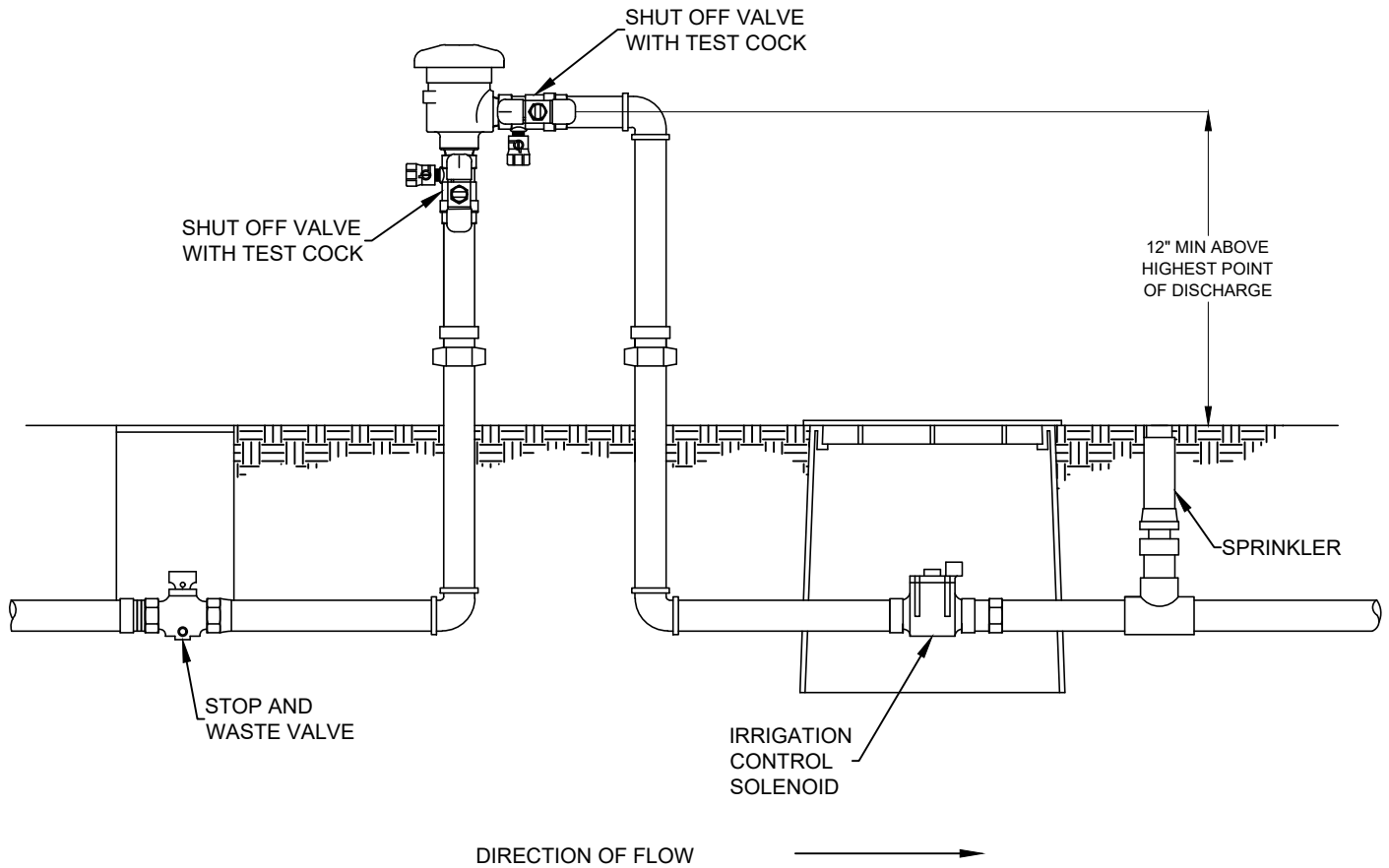
NOTES:

- A. THE OUTDOOR REDUCED PRESSURE PRINCIPAL ASSEMBLY/REDUCED PRESSURE ZONE (RP) BACKFLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND VANDALISM.
- B. THE BOTTOM OF THE ASSEMBLY SHALL BE A MINIMUM OF 12 INCHES ABOVE THE GROUND OR FLOOR. THE ASSEMBLY OWNER, WHEN NECESSARY SHALL PROVIDE DEVICES OR STRUCTURES TO FACILITATE TESTING, REPAIR AND MAINTENANCE.
- C. THE BODY OF THE ASSEMBLY SHALL NOT BE CLOSER THAN 12 INCHES TO ANY WALL, CEILING OR ENCUMBRANCE AND SHALL BE ACCESSIBLE FOR TESTING, REPAIR AND MAINTENANCE.
- D. RP BACKFLOW ASSEMBLIES SHALL NOT BE INSTALLED IN A PIT.
- E. THE RELIEF VALVE OF THE ASSEMBLY SHALL NOT BE DIRECTLY CONNECTED TO ANY WASTE DISPOSAL LINE, INCLUDING SANITARY SEWER AND STORM DRAIN.
- F. RP BACKFLOW ASSEMBLIES SHALL BE MAINTAINED AS AN ASSEMBLY. TWO (2) TURN OFF VALVES, FOUR (4) TEST CLOCKS.
- G. THE ASSEMBLY SHALL BE INSTALLED IN A HORIZONTAL POSITION UNLESS SPECIFICALLY DESIGNED FOR VERTICAL USE.
- H. FOR NOTES RELATING TO ALL BACKFLOW ASSEMBLIES, REFER TO TECHNICAL SPECIFICATIONS ON PLAN P-631.
- I. IF YOU HAVE ANY QUESTIONS OR NEED MORE INFORMATION, PLEASE CONTACT PROVO CITY CROSS CONNECTION CONTROL COORDINATOR (801) 852-6788.



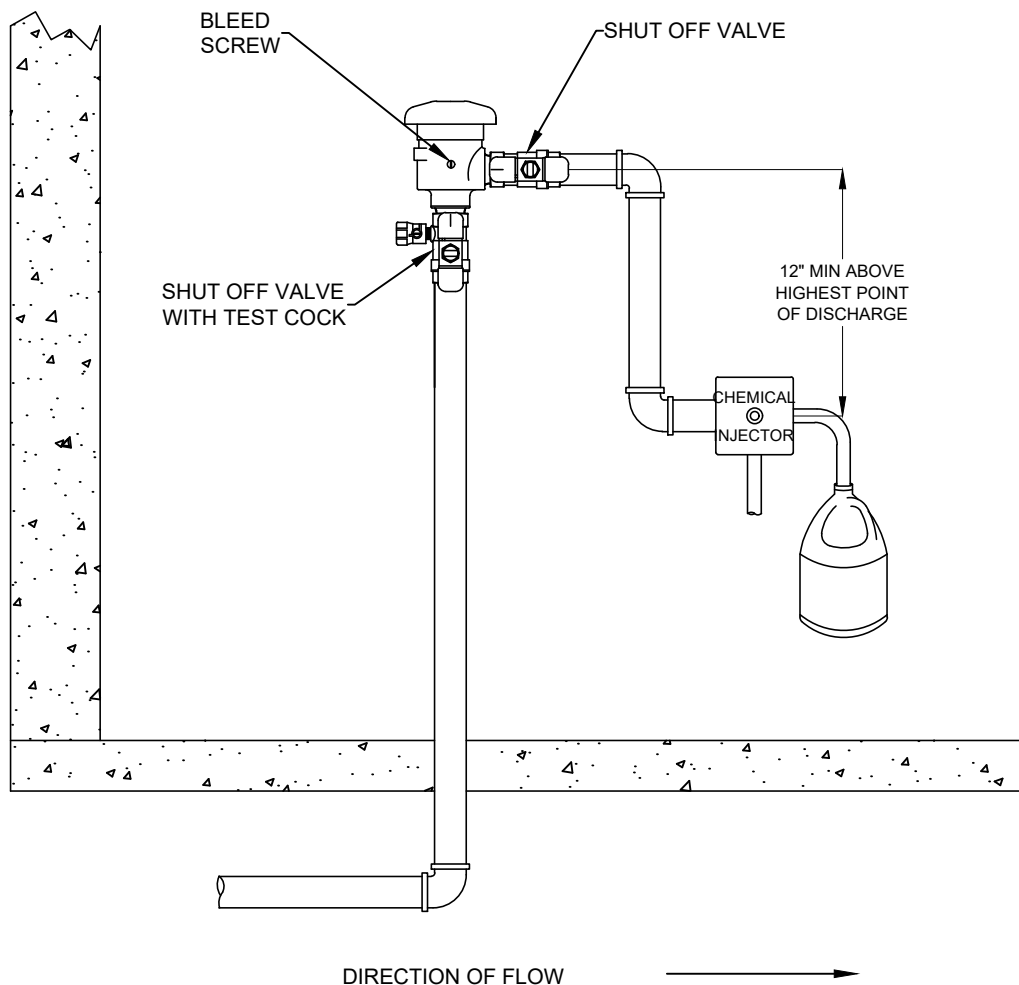
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- A. THE INDOOR REDUCED PRESSURE PRINCIPAL ASSEMBLY/REDUCED PRESSURE ZONE (RP) BACKFLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND VANDALISM.
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- J.



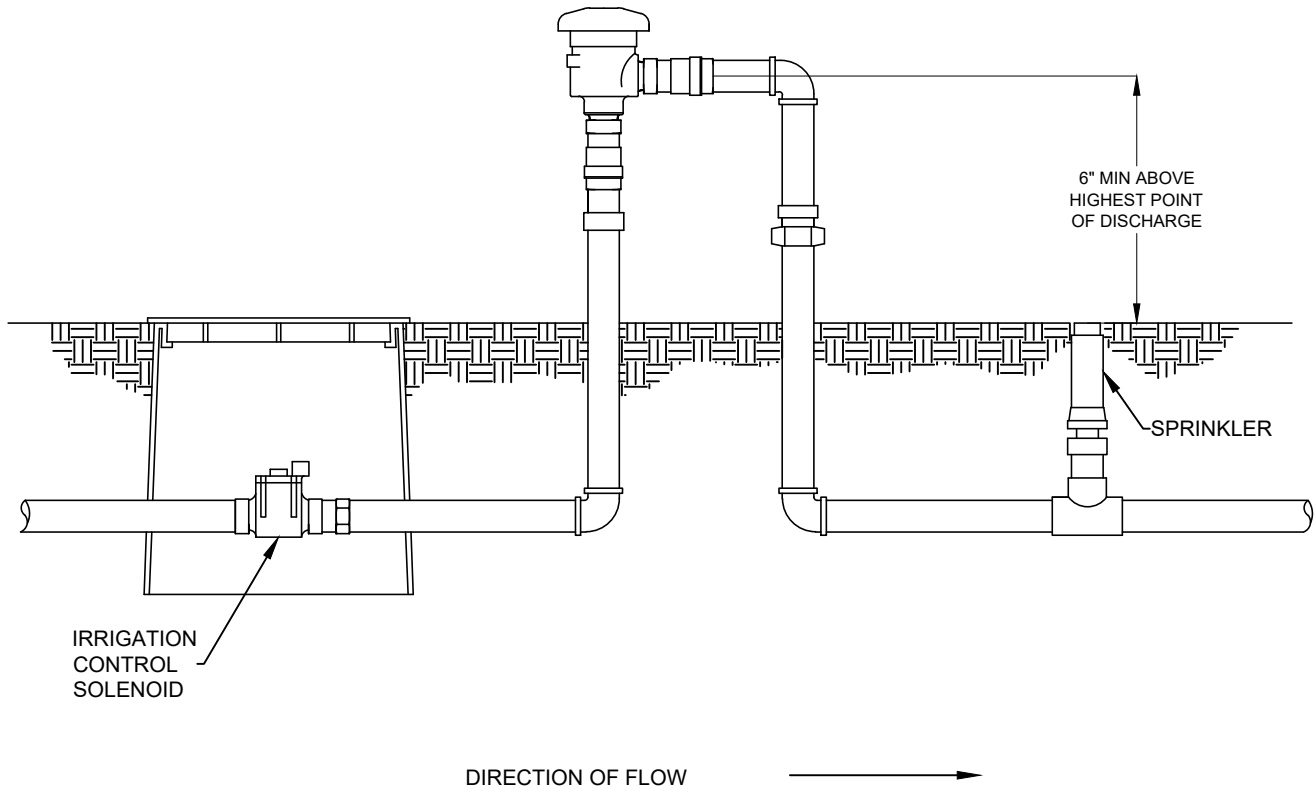
NOTES:

- A. THE PRESSURE VACUUM BREAKER (PVB) SHALL NOT BE INSTALLED IN AN AREA THAT COULD BE SUBJECTED TO BACK PRESSURE.
- B. THE ASSEMBLY SHALL BE INSTALLED A MINIMUM OF 12 INCHES ABOVE THE HIGHEST POINT OF USE.
- C. THE ASSEMBLY SHALL BE READILY ACCESSIBLE FOR TESTING, REPAIR AND MAINTENANCE.
- D. THE ASSEMBLY SHALL NOT BE INSTALLED BELOW GROUND (VAULT OR PIT).
- E. THE PVB SHALL BE MAINTAINED AS AN ASSEMBLY.
- F. THE PVB SHALL BE INSTALLED IN A VERTICAL POSITION.
- G. THE PVB MAY BE INSTALLED WITH DOWNSTREAM VALUES.
- H. FOR NOTES RELATING TO ALL BACKFLOW ASSEMBLIES, REFER TO TECHNICAL SPECIFICATIONS ON PLAN P-631.
- I. IF YOU HAVE ANY QUESTIONS OR NEED MORE INFORMATION, PLEASE CONTACT PROVO CITY CROSS CONNECTION CONTROL COORDINATOR (801) 852-6788.



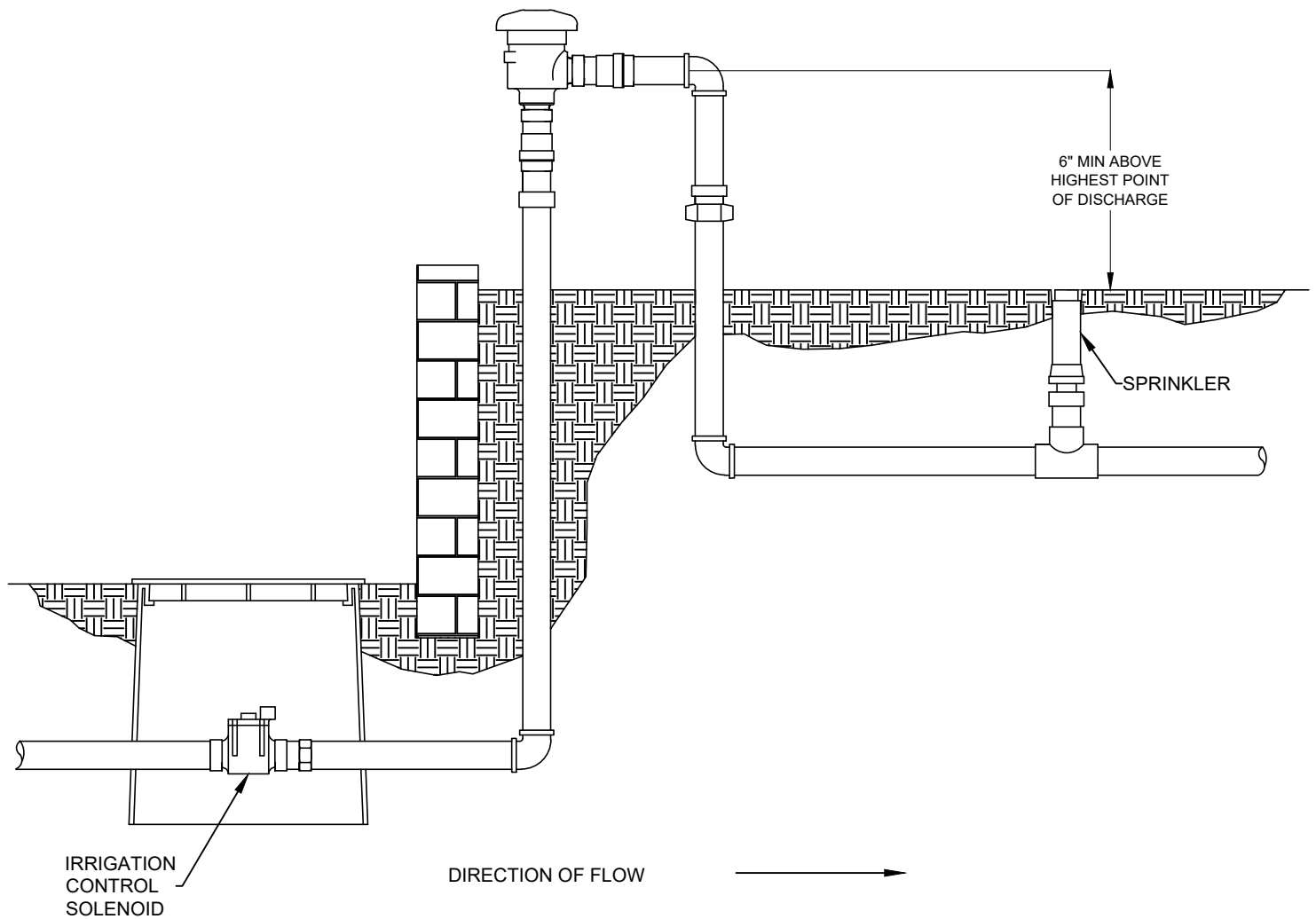
NOTES:

- A. THE SPILL RESISTANT PRESSURE VACUUM BREAKER (SVB) SHALL NOT BE INSTALLED IN AN AREA THAT COULD BE SUBJECTED TO BACK PRESSURE.
- B. THE ASSEMBLY SHALL BE INSTALLED A MINIMUM OF 12 INCHES ABOVE THE HIGHEST POINT OF USE.
- C. THE ASSEMBLY SHALL BE READILY ACCESSIBLE FOR TESTING, REPAIR AND MAINTENANCE.
- D. THE ASSEMBLY SHALL NOT BE INSTALLED BELOW GROUND (VAULT OR PIT).
- E. THE SVB SHALL BE MAINTAINED AS AN ASSEMBLY.
- F. THE SVB SHALL BE INSTALLED IN A VERTICAL POSITION.
- G. THE SVB MAY BE INSTALLED WITH DOWNSTREAM VALUES.
- H. FOR NOTES RELATING TO ALL BACKFLOW ASSEMBLIES, REFER TO TECHNICAL SPECIFICATIONS ON PLAN P-631.
- I. IF YOU HAVE ANY QUESTIONS OR NEED MORE INFORMATION, PLEASE CONTACT PROVO CITY CROSS CONNECTION CONTROL COORDINATOR (801) 852-6788.



NOTES:

- A. THE ATMOSPHERIC VACUUM BREAKER (AVB) SHALL NOT BE INSTALLED IN AN AREA THAT COULD BE SUBJECTED TO BACK PRESSURE OR BACK DRAINAGE.
- B. THE AVB SHALL NOT BE INSTALLED WHERE IT MAY BE SUBJECTED TO CONTINUOUS PRESSURE FOR MORE THAN 12 CONSECUTIVE HOURS.
- C. THE AVB SHALL BE INSTALLED A MINIMUM OF 6 INCHES ABOVE THE HIGHEST POINT OF USE.
- D. THE AVB SHALL BE INSTALLED ON THE DISCHARGE SIDE OF THE LAST CONTROL VALVE.
- E. THE AVB SHALL BE INSTALLED IN A VERTICAL POSITION.
- F. INSPECT AT LEAST ONCE A YEAR, REMOVE POPPET HOOD AND VISUALLY INSPECT SEAL AND POPPET.
- G. FOR NOTES RELATING TO ALL BACKFLOW ASSEMBLIES, REFER TO TECHNICAL SPECIFICATIONS ON PLAN P-631.
- H. IF YOU HAVE ANY QUESTIONS OR NEED MORE INFORMATION, PLEASE CONTACT PROVO CITY CROSS CONNECTION CONTROL COORDINATOR (801) 852-6788.



NOTES:

- A. THE ATMOSPHERIC VACUUM BREAKER (AVB) SHALL NOT BE INSTALLED IN AN AREA THAT COULD BE SUBJECTED TO BACK PRESSURE OR BACK DRAINAGE.
- B. THE AVB SHALL NOT BE INSTALLED WHERE IT MAY BE SUBJECTED TO CONTINUOUS PRESSURE FOR MORE THAN 12 CONSECUTIVE HOURS.
- C. THE AVB SHALL BE INSTALLED A MINIMUM OF 6 INCHES ABOVE THE HIGHEST POINT OF USE.
- D. THE AVB SHALL BE INSTALLED ON THE DISCHARGE SIDE OF THE LAST CONTROL VALVE.
- E. THE AVB SHALL BE INSTALLED IN A VERTICAL POSITION.
- F. INSPECT AT LEAST ONCE A YEAR, REMOVE POPPET HOOD AND VISUALLY INSPECT SEAL AND POPPET.
- G. FOR NOTES RELATING TO ALL BACKFLOW ASSEMBLIES, REFER TO TECHNICAL SPECIFICATIONS ON PLAN P-631.
- H. IF YOU HAVE ANY QUESTIONS OR NEED MORE INFORMATION, PLEASE CONTACT PROVO CITY CROSS CONNECTION CONTROL COORDINATOR (801) 852-6788.

Backflow Prevention Assemblies

1. GENERAL

- A. Prior to the installation of any backflow prevention assembly, the Property Owner must be notified that the installation of a backflow prevention assembly may create a closed system, thereby creating a thermal expansion hazard. A thermal expansion device must be installed.
- B. If any unapproved backflow prevention assembly is found within any water system, that assembly shall be removed and replaced with a state approved assembly.
- C. All backflow assemblies shall be tested within 10 days of initial use.
- D. All backflow assemblies shall be tested at least once a year.
- E. All backflow assemblies shall be tested whenever relocated or repaired.
- F. A copy of the test report must be sent to the Provo City.
- G. Testers must have a current backflow assembly tester certificate.

2. PRODUCTS

- A. Provide Outdoor or Indoor Reduced Pressure Principle Assembly (RP), Pressure Vacuum Breaker (PVB), Spill Resistant Pressure Vacuum Breaker (SVB), or Atmospheric Vacuum Breaker (AVB) per Provo City Standards.
- B. Doublecheck assemblies are not allowed on landscape irrigation in Utah.
- C. Above ground outdoor systems need to be galvanized steel, ductile iron or copper. No PVC allowed.

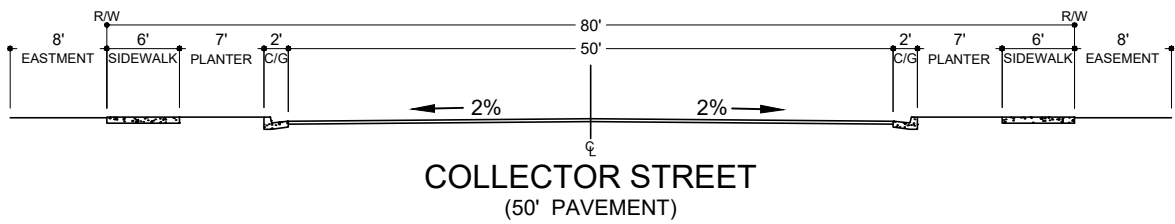
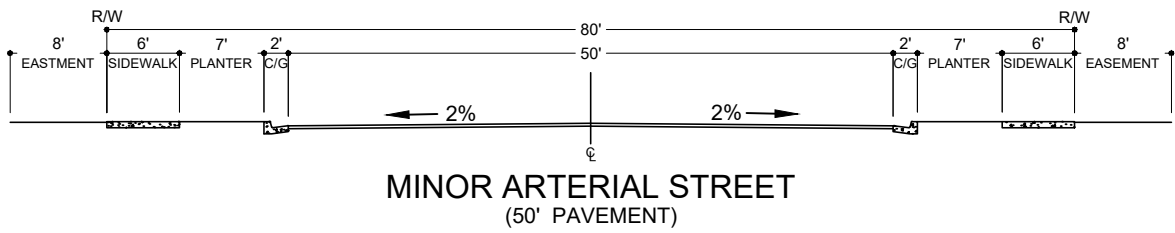
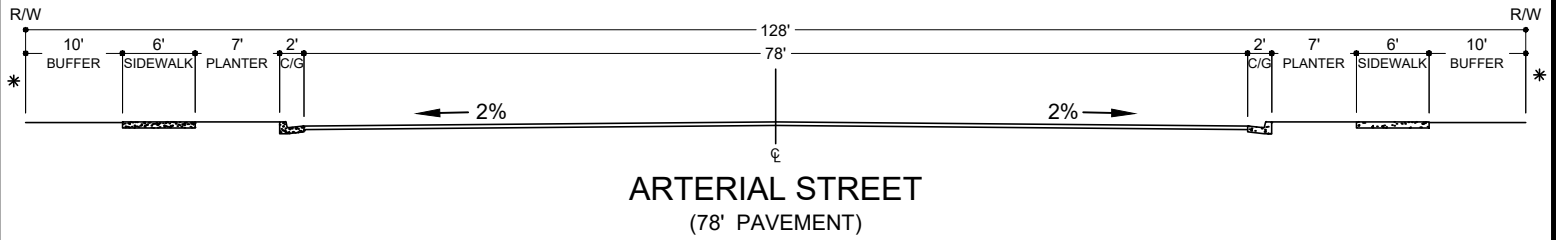
3. EXECUTION

- A. Backflow Prevention Assembly type shall be approved by Provo City prior to installation.
- B. Follow installation instructions on the backflow prevention assembly drawing.
- C. Air Gap -
 - C.1. The Air gap shall be a minimum of one inch, or twice the diameter of the incoming pipe (within 10 pipe diameters of termination of the line).
 - C.2. Where the air gap is within two pipe diameters (horizontal measurement) of a wall, the air gap shall be increased to three times the incoming pipe diameter. High hazard air gaps shall be inspected on an annual basis.



*BACKFLOW PREVENTION
ASSEMBLIES*

SHEET 7 OF 7
STANDARD DETAIL P-631
NOT TO SCALE
REVISED DATE: 11/10/16

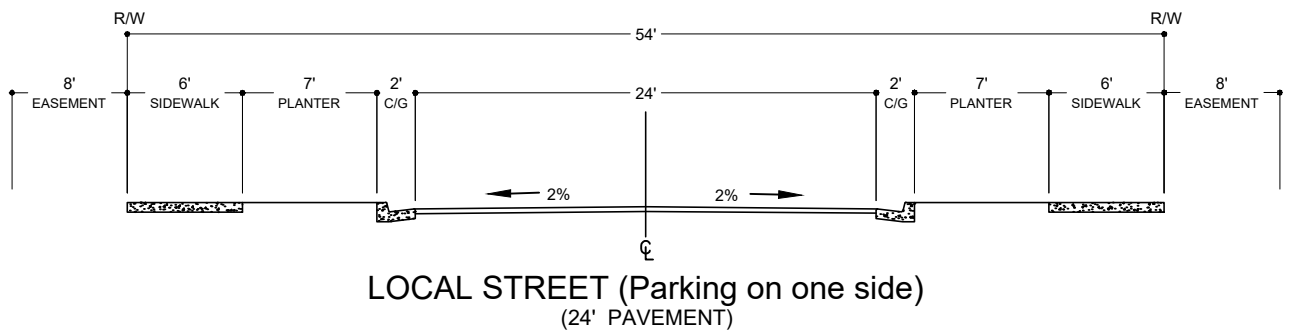
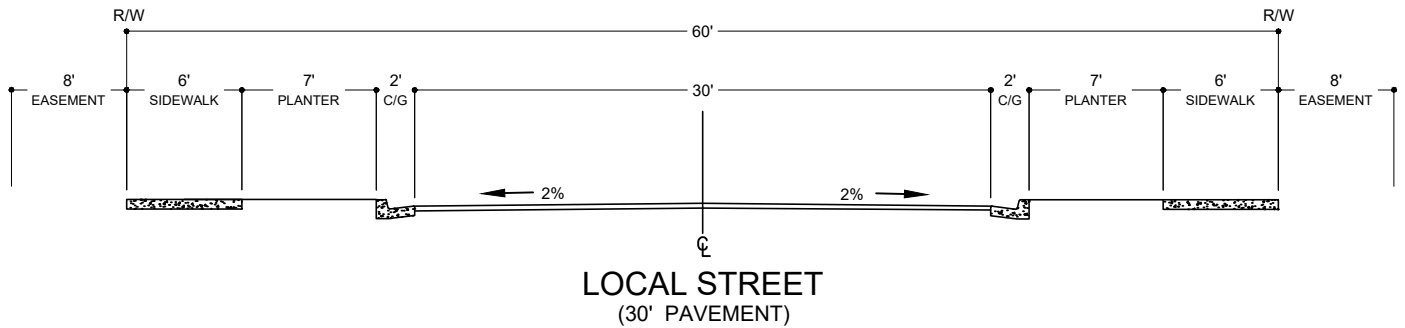
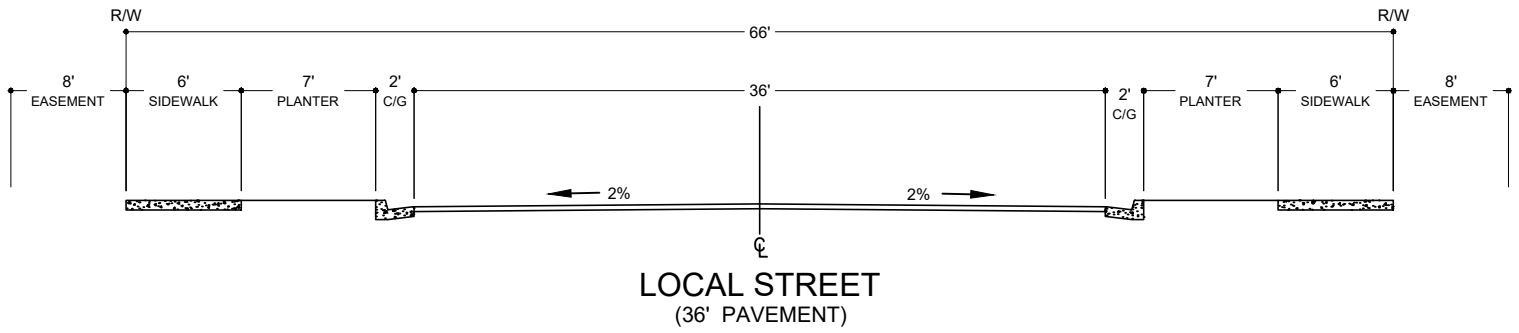


NOTE:
* 8' PUBLIC UTILITY EASEMENT

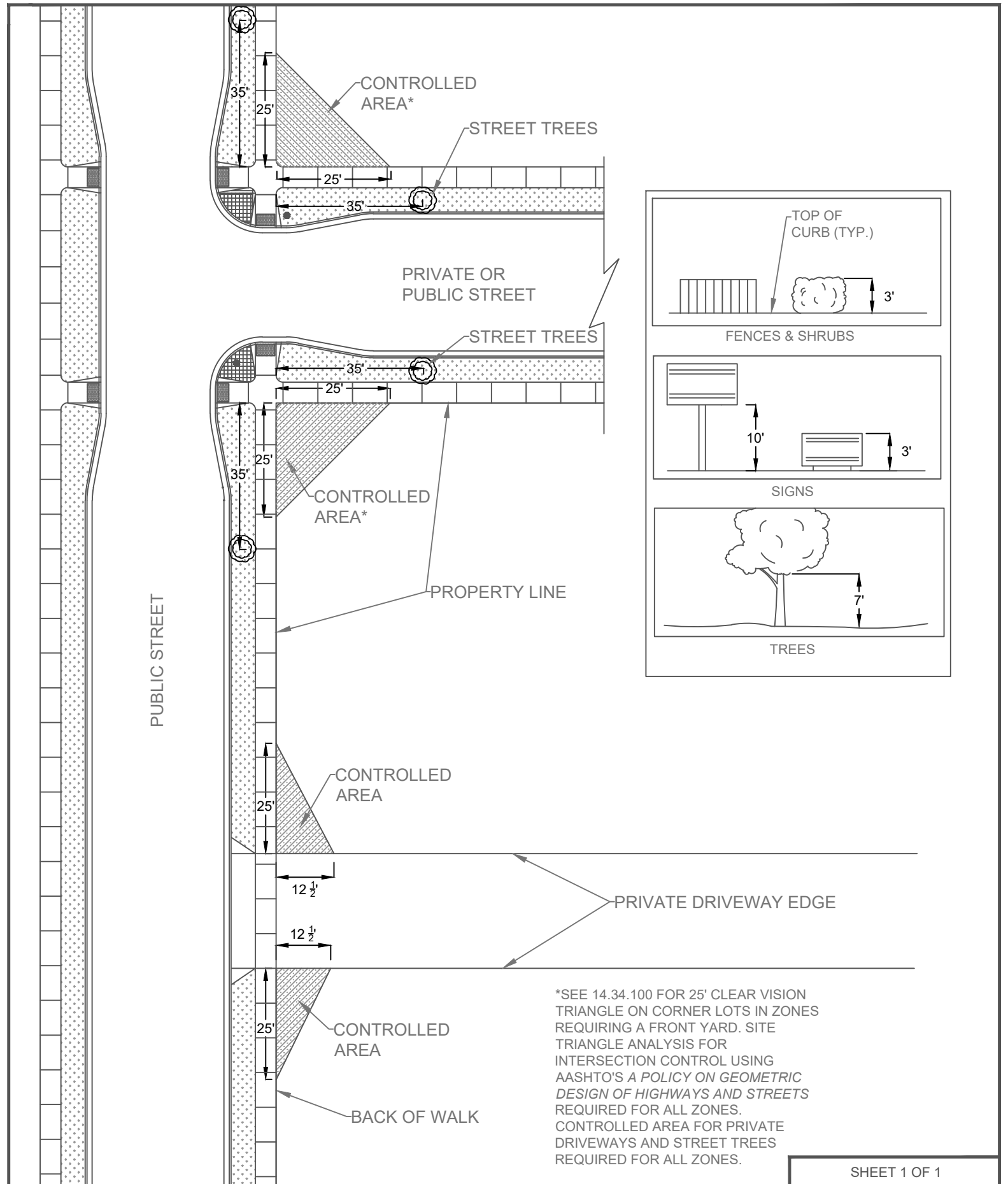
SHEET 1 OF 1
STANDARD DETAIL P-900
NOT TO SCALE
REVISED DATE: 4/20/19

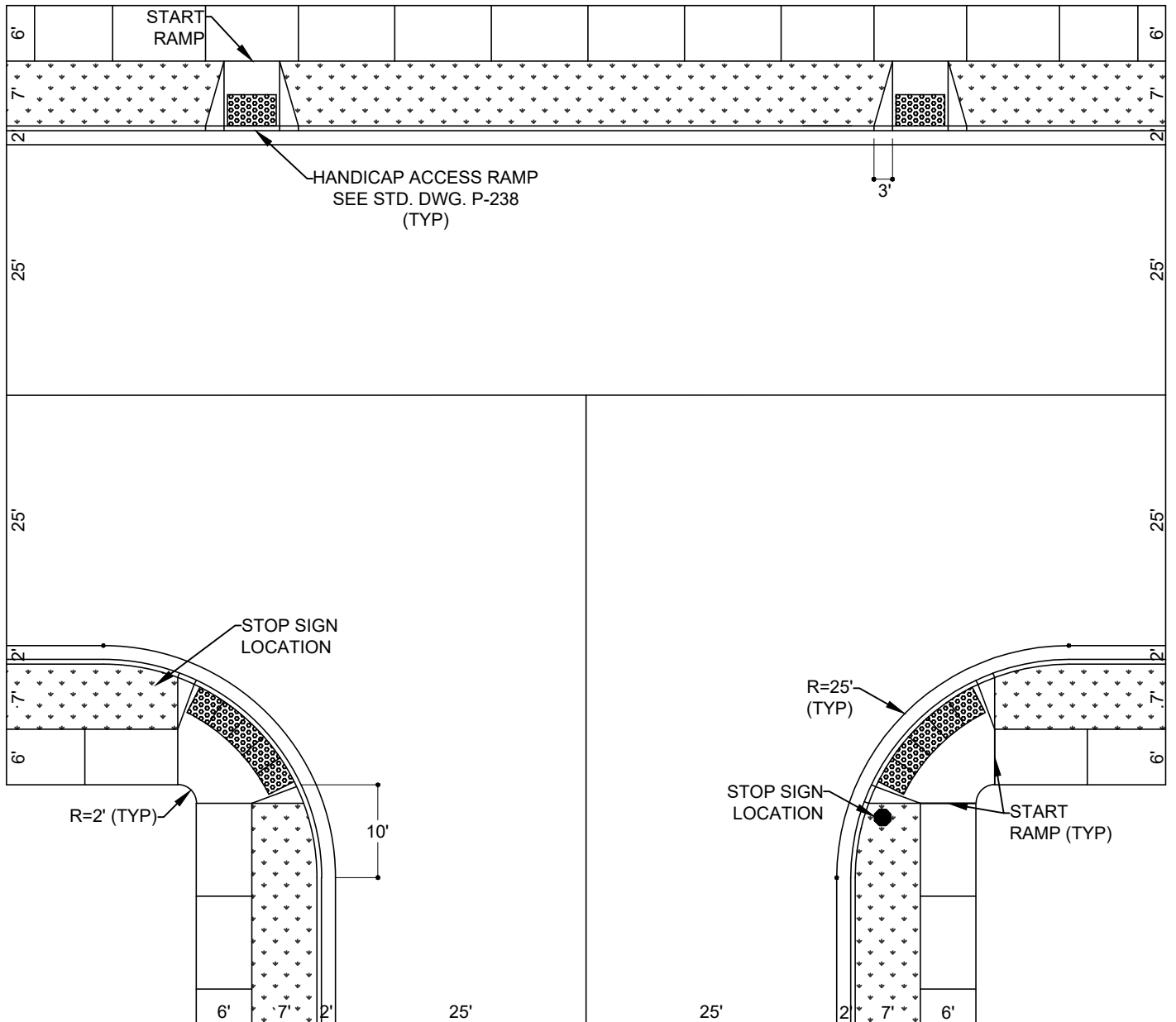


*TYPICAL STREET
SECTIONS*



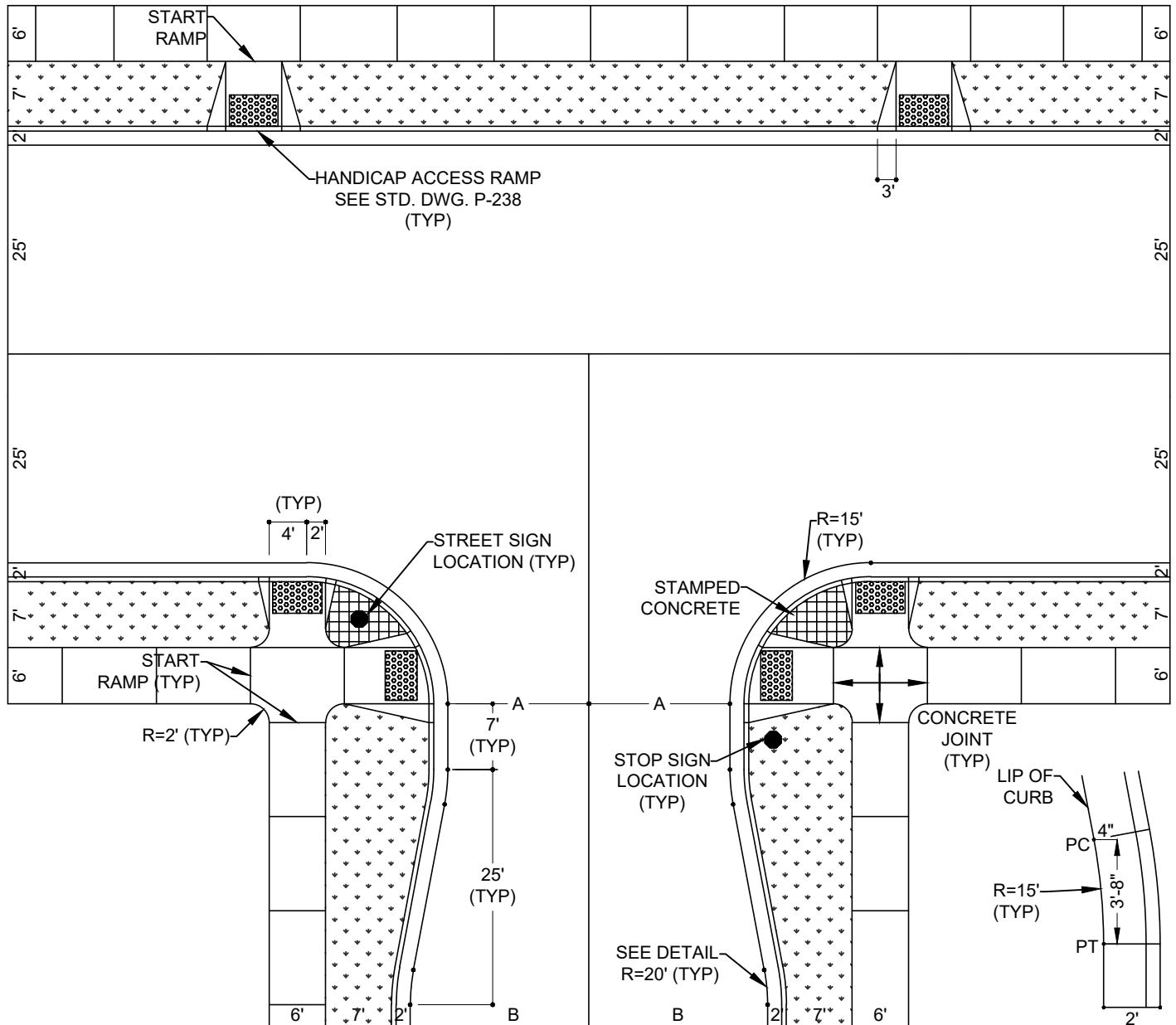
NOTE:
8' PUBLIC UTILITY EASEMENT





COLLECTOR STREET TO COLLECTOR STREET

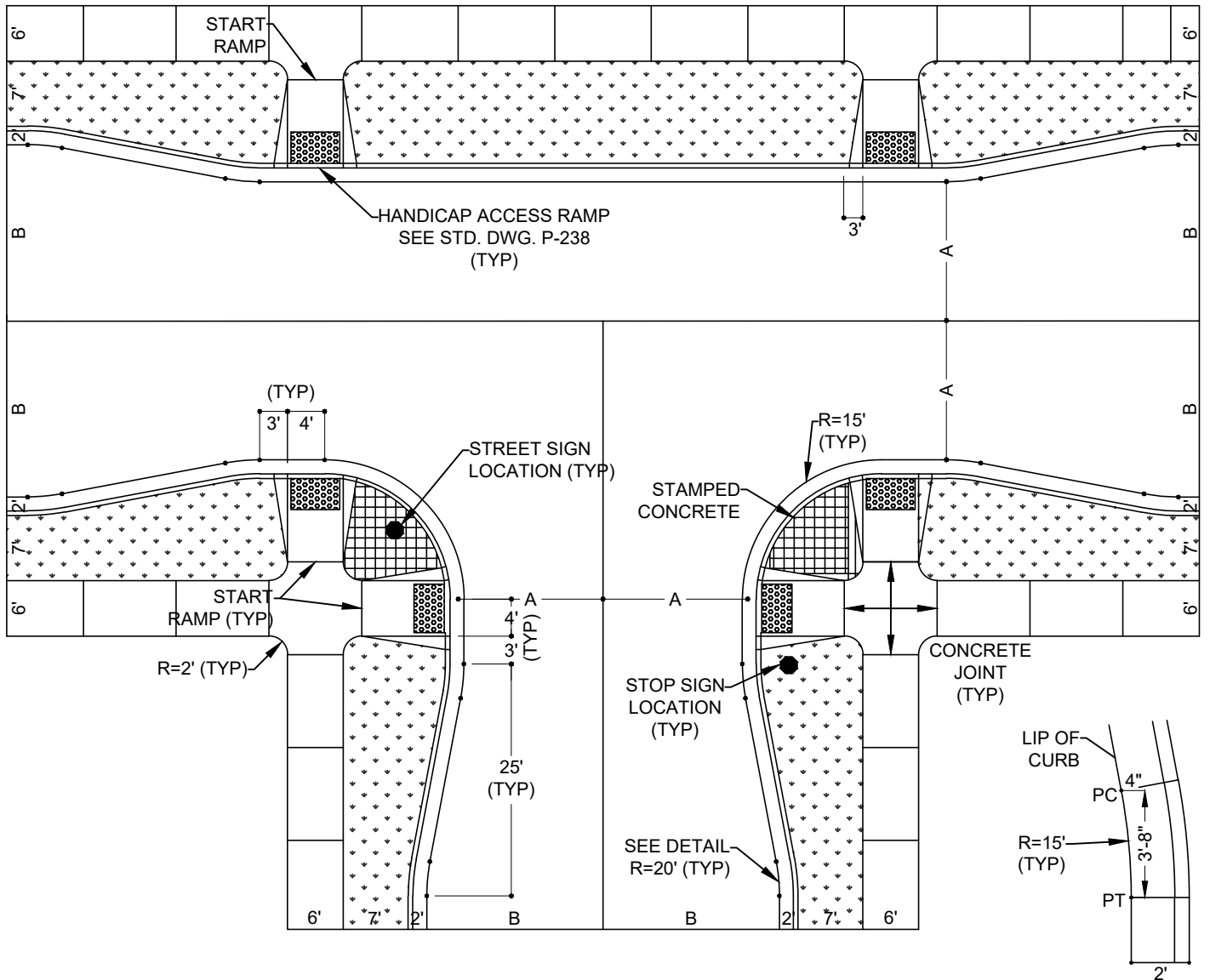
NOTE: HANDICAP ACCESSIBLE RAMPS SHALL BE PROVIDED AT ALL CROSSING LOCATIONS.



ROAD WIDTH		
	A	B
30' PAVEMENT	12'	15'
36' PAVEMENT	14'	18'

MODIFICATIONS TO THIS STANDARD MUST BE APPROVED BY THE CITY ENGINEER

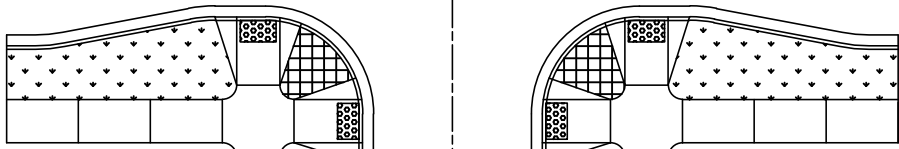
NOTE: HANDICAP ACCESSIBLE RAMPS SHALL BE PROVIDED AT ALL CROSSING LOCATIONS.



ROAD WIDTH		
	A	B
30' PAVEMENT	12'	15'
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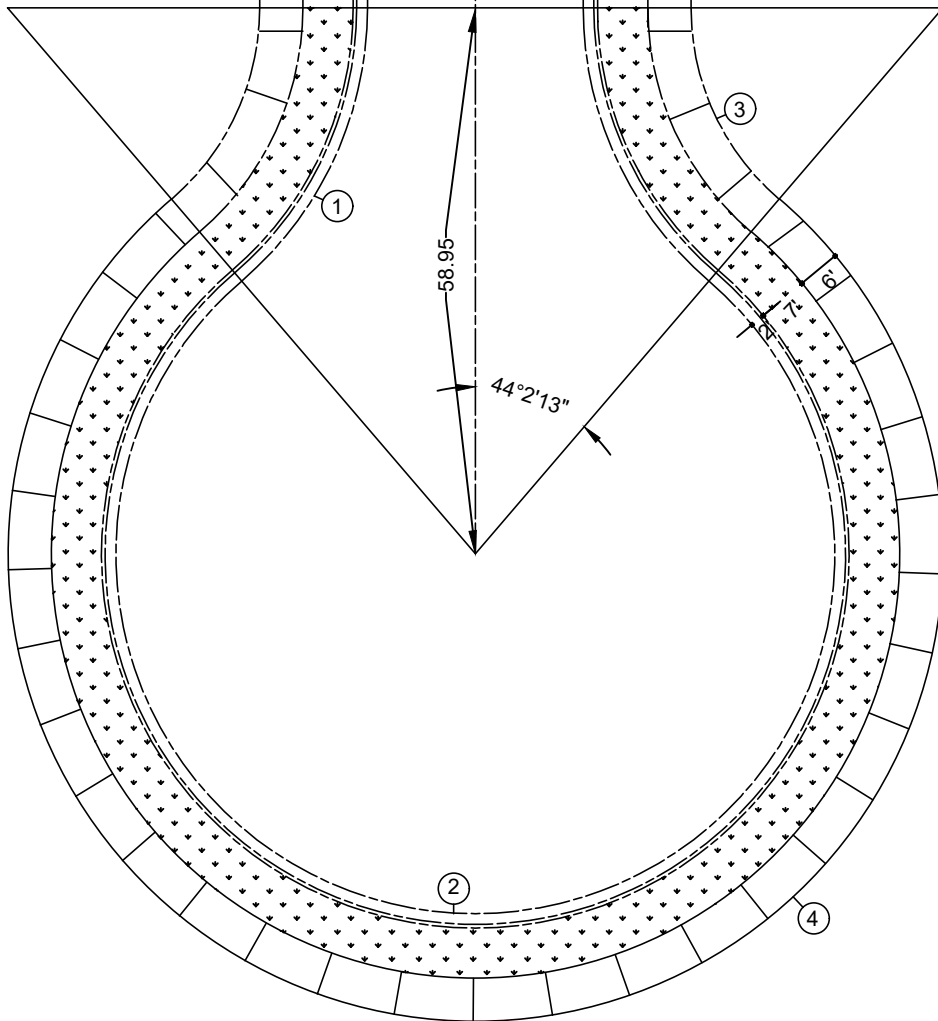
MODIFICATIONS TO THIS STANDARD MUST BE APPROVED BY THE CITY ENGINEER

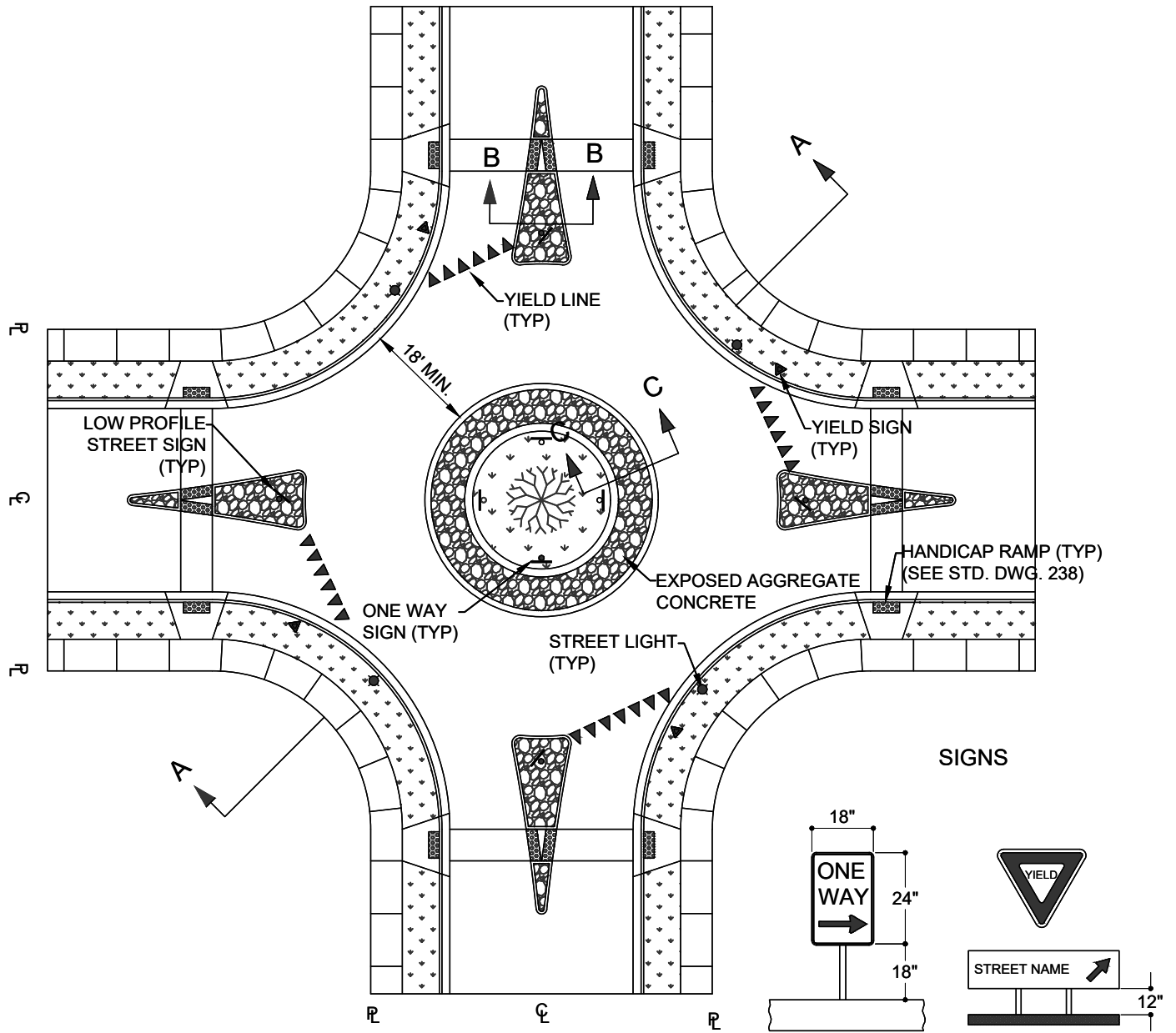
NOTE: HANDICAP ACCESSIBLE RAMPS SHALL BE PROVIDED AT ALL CROSSING LOCATIONS.



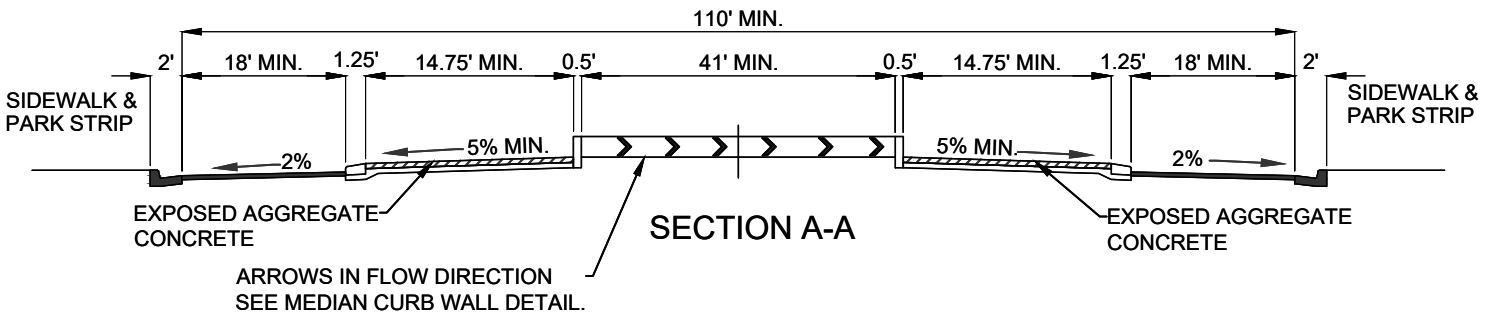
NOTE:
SEE STANDARD DRAWINGS 904 THROUGH 909 FOR
INTERSECTION DETAILS DEPENDANT ON THE STREET
CLASSIFICATION.

CURVE TABLE	
CURVE	RADIUS
1	41.00°
2	41.00°
3	26.00°
4	56.00°

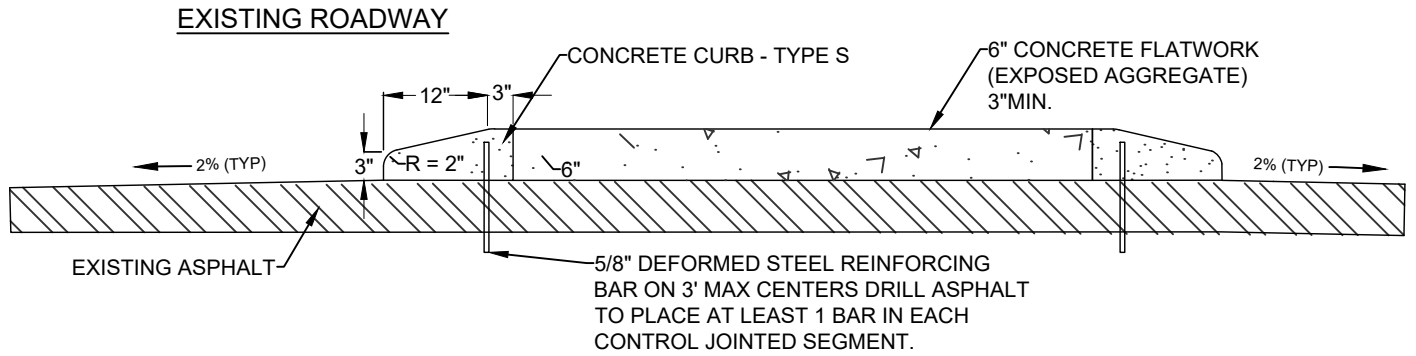
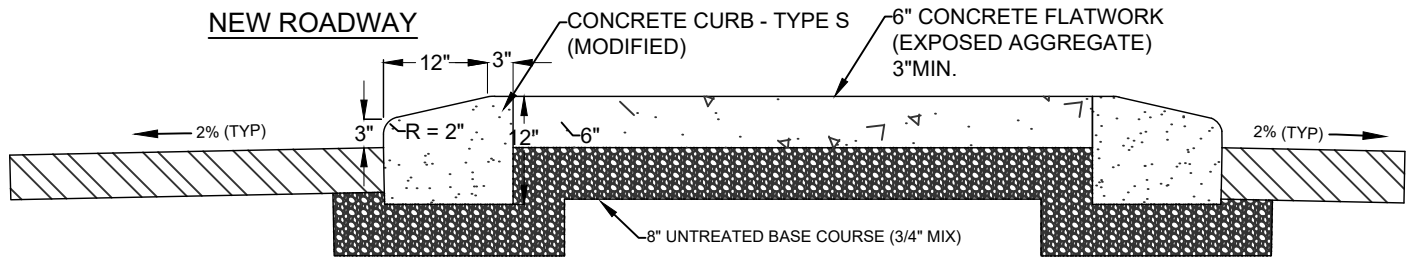




CHANGES CAN BE MADE
BASED ON DESIGN VEHICLE.

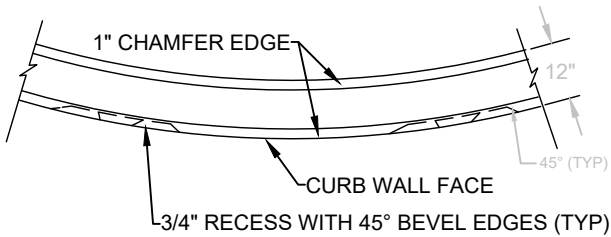


SECTION B-B

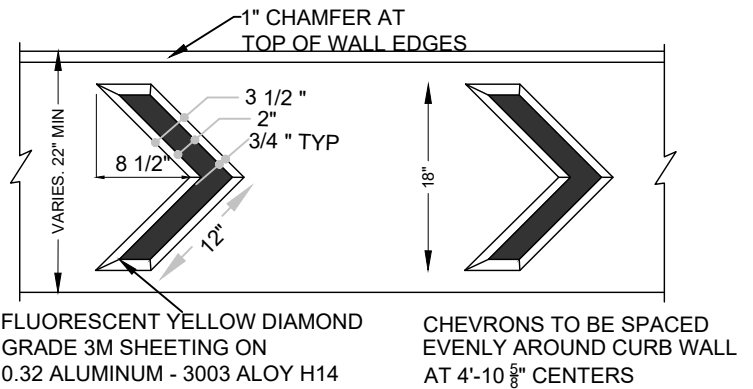


MEDIAN CURB WALL

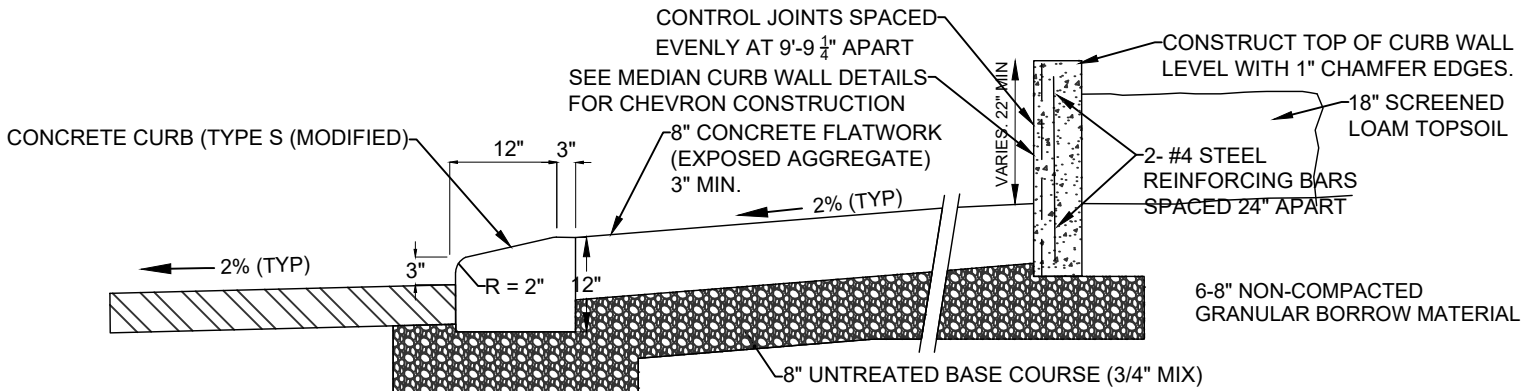
TOP VIEW



ELEVATION VIEW



SECTION C-C



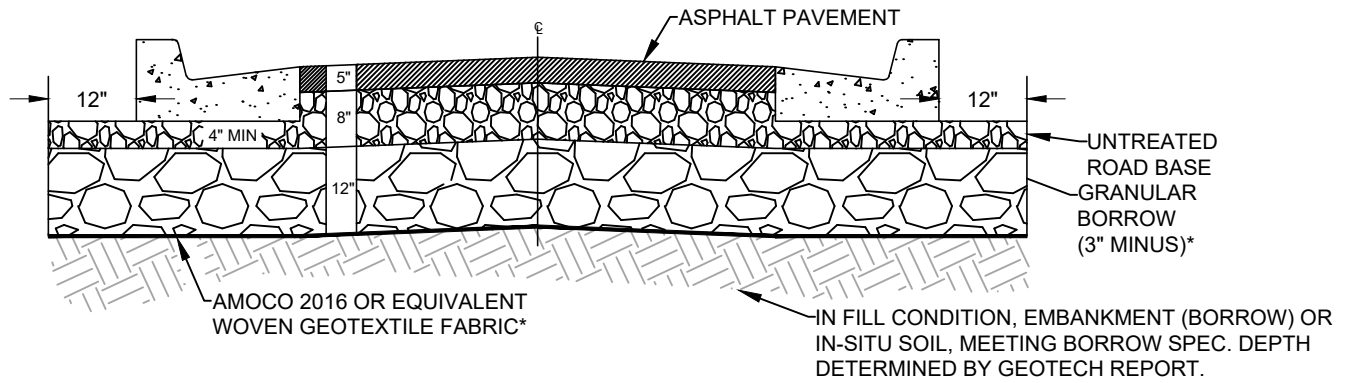
SHEET 2 OF 2

STANDARD DETAIL

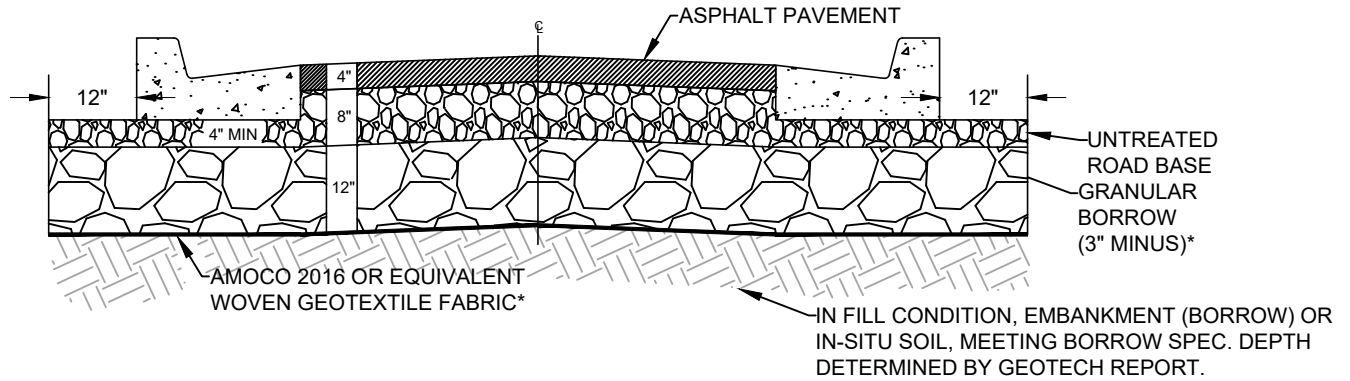
P-912

NOT TO SCALE

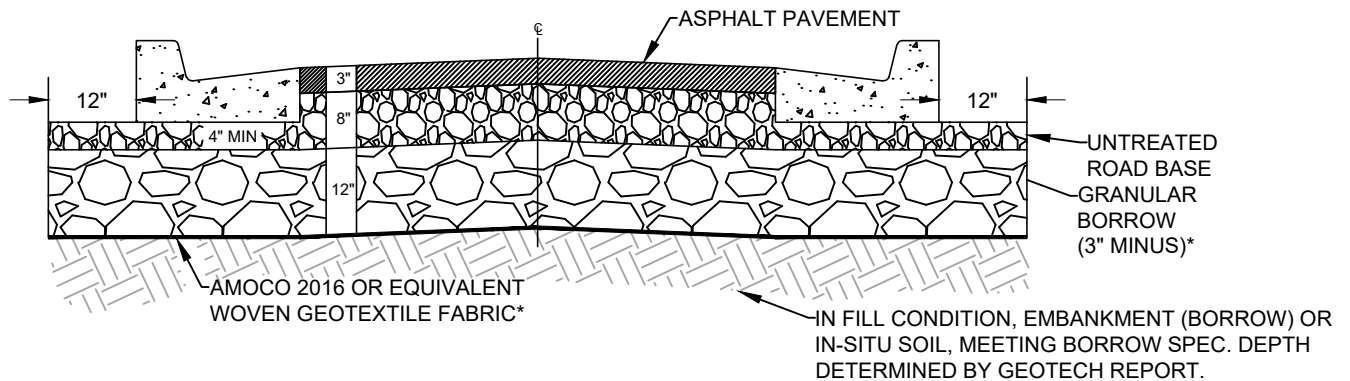
REVISED DATE: 08/2023



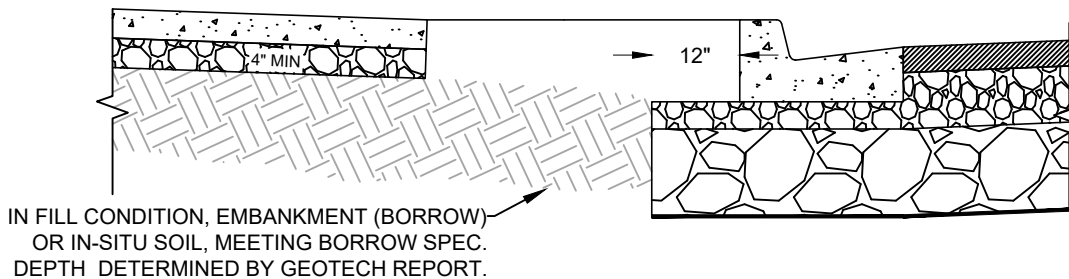
ARTERIAL STREETS



COLLECTOR STREETS

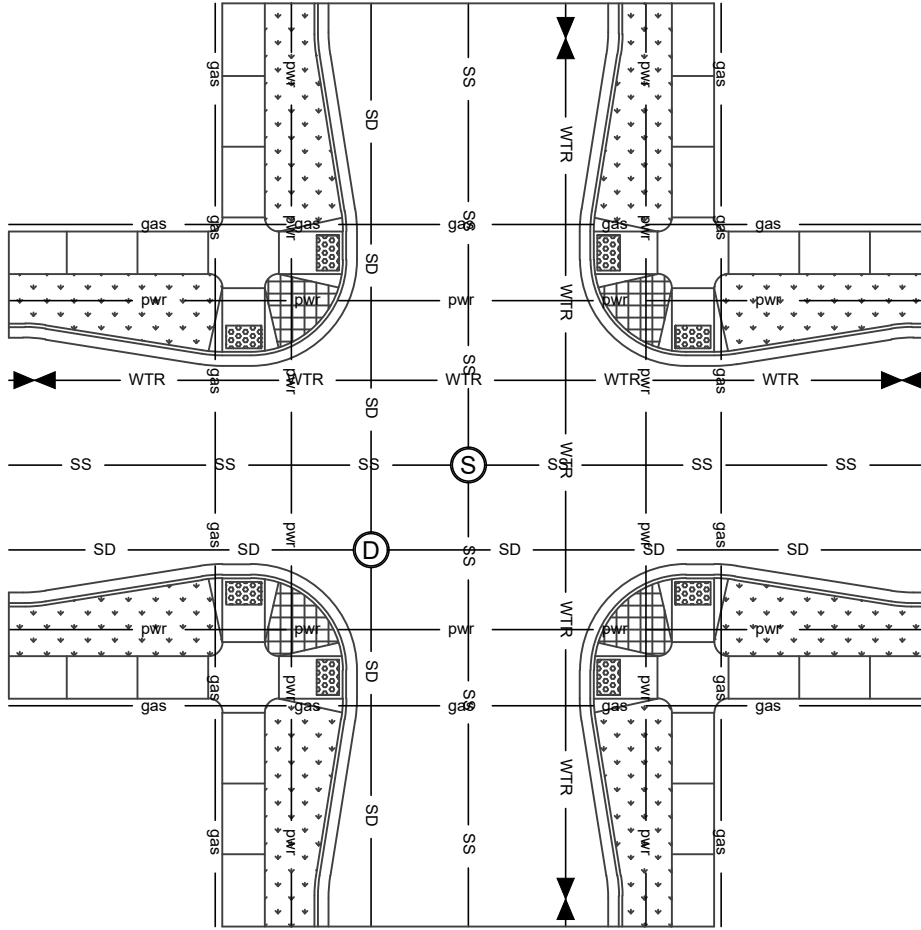


LOCAL/PRIVATE STREETS



TYPICAL SIDE DETAIL

*REQUIRED IN SENSITIVE LANDS, OR AS REQUIRED BY CITY ENGINEER



PLAN VIEW

NOTES:

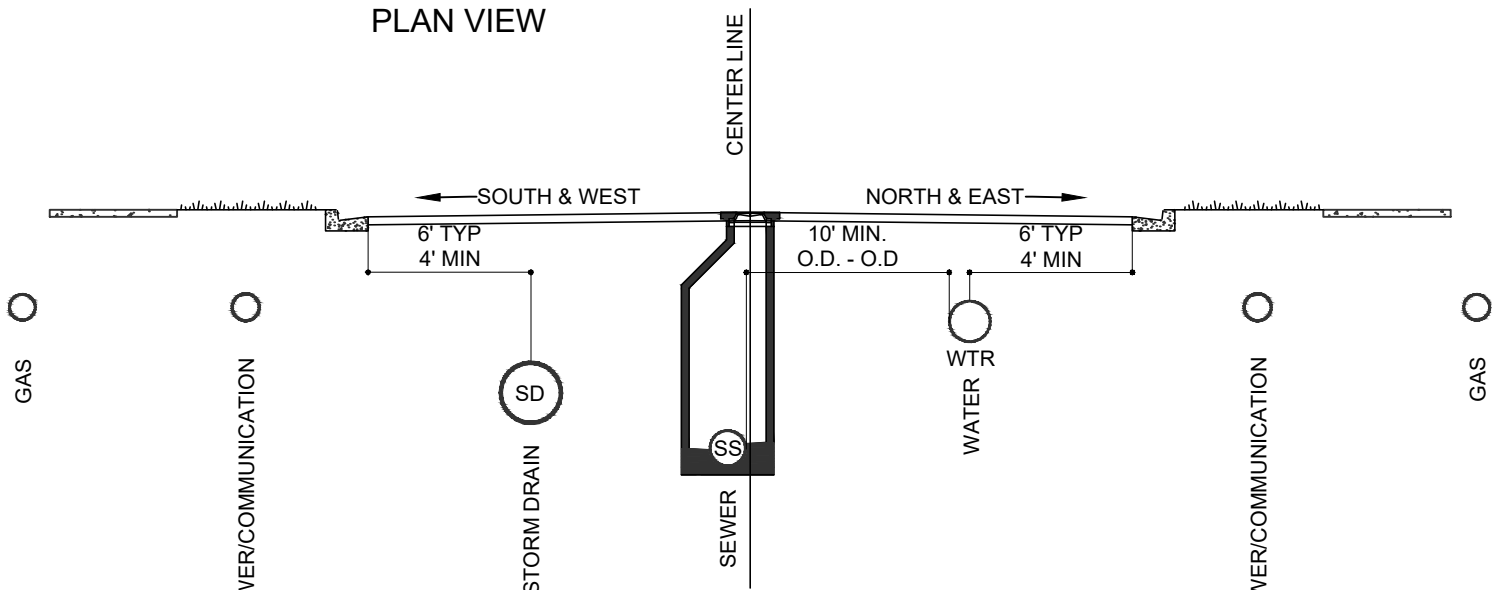
WATER LINES: 6' FROM THE LIP OF CURB ON THE NORTH AND EAST SIDES OF THE ROAD.

SEWER LINES: ON CENTER LINE OF ROAD.

STORM DRAIN: 6' FROM THE LIP OF CURB ON THE SOUTH AND WEST SIDES OF THE ROAD.

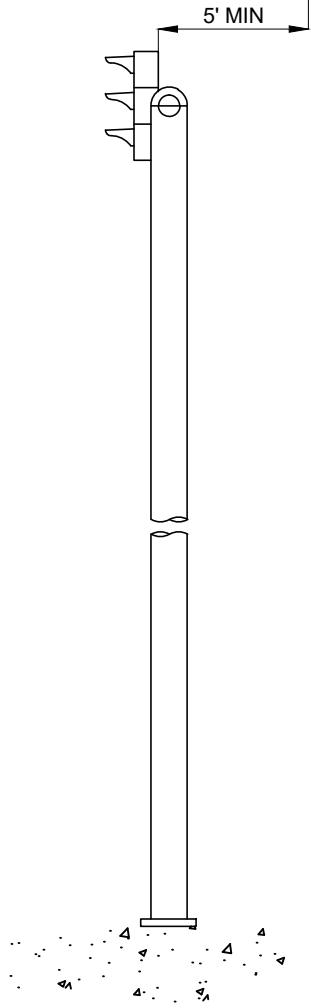
DETAIL DOES NOT APPLY TO 24' ASPHALT WIDTH ROADS.

BURY DEPTH FOR COMMUNICATION UTILITIES SHOULD BE BETWEEN 36-INCHES AND 48-INCHES.

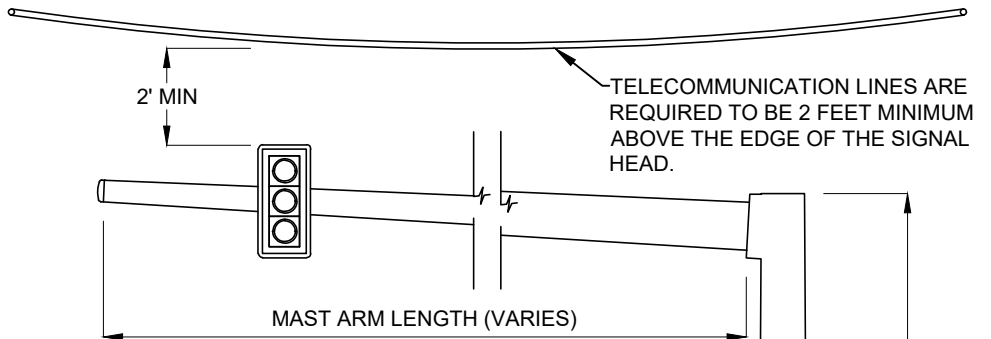


CROSS SECTION

TELECOMMUNICATION LINES ARE REQUIRED TO BE 5 FEET MINIMUM BEHIND THE SIGNAL HEAD.



SIDE VIEW



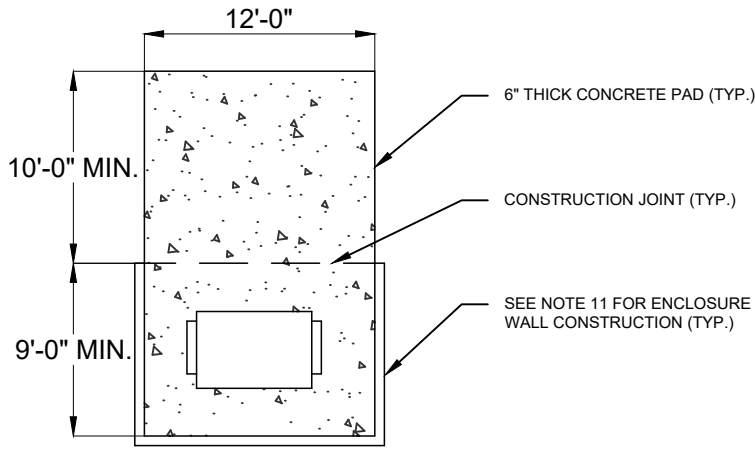
TELECOMMUNICATION LINES ARE REQUIRED TO BE 2 FEET MINIMUM ABOVE THE EDGE OF THE SIGNAL HEAD.

20'

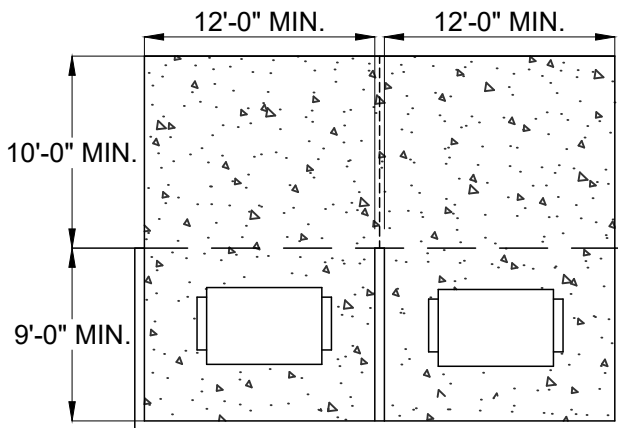
FRONT VIEW

NOTES:

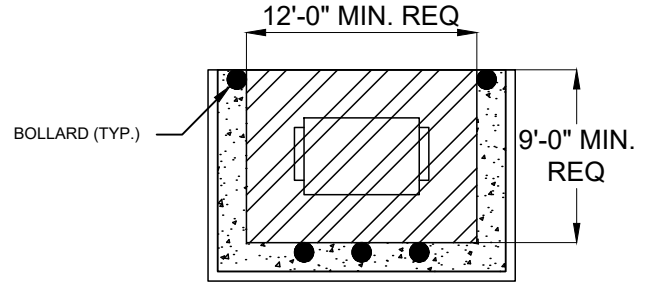
THIS STANDARD IS TO BE FOLLOWED AT ALL CURRENT AND FUTURE SIGNALIZED INTERSECTIONS



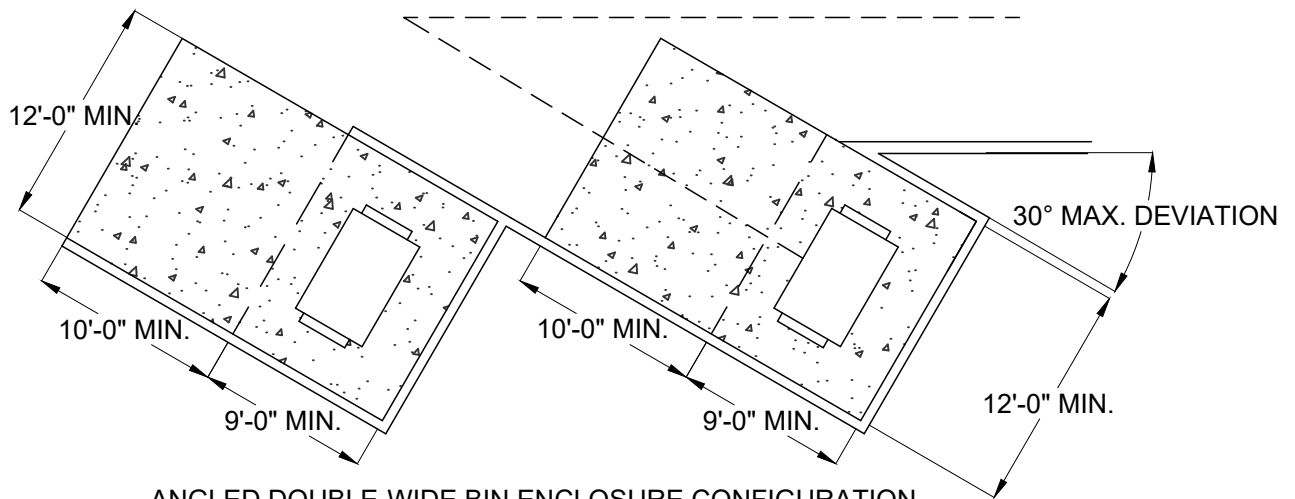
SINGLE-WIDE BIN ENCLOSURE CONFIGURATION



DOUBLE-WIDE BIN ENCLOSURE CONFIGURATION



**RECOMMENDED BOLLARDS
SEE NOTE 13**



ANGLED DOUBLE-WIDE BIN ENCLOSURE CONFIGURATION

1. SINGLE-WIDE BIN ENCLOSURES SHALL HAVE A NET ENCLOSURE OPENING OF 12 FEET.
2. DOUBLE-WIDE BIN ENCLOSURES SHALL HAVE A NET ENCLOSURE OPENING OF 24 FEET WITHOUT MIDWALLS. ALTHOUGH NOT PREFERRED, DOUBLE-WIDE BIN ENCLOSURES CAN BE DESIGNED WITH MIDWALLS WITH A NET ENCLOSURE WIDTH OF 12 FEET ON EACH SIDE OF MIDWALL.
3. ENCLOSURES MAY BE DESIGNED WITH AN OPENING LESS THAN 12 FEET IF CONTAINER IS PLACED ON ROLLERS TO BE PULLED OUT FOR SOLID WASTE COLLECTION.
4. MULTI-UNIT RESIDENTIAL DEVELOPMENTS MAY BE DESIGNED WITH A TRIPLE WIDE ENCLOSURE TO ACCOMMODATE RECYCLING ADDITIONAL ENCLOSURES MAY BE NECESSARY DEPENDING ON NUMBER OF UNITS. .
5. TRIPLE-WIDE ENCLOSURES SHALL HAVE A NET ENCLOSURE OPENING OF 36 FEET AND SHALL BE DESIGNED WITHOUT MIDWALLS, GATES, HINGES, AND MOUNTING HARDWARE SHALL NOT INTRUDE UPON MINIMUM NET ENCLOSURE OPENING.
6. GATES, HINGES, & MOUNTING HARDWARE SHALL BE INSTALLED SO THERE IS A MIN. 9 FOOT DEPTH CREATED WITHIN EACH ENCLOSURE.
7. GATES, HINGES, AND MOUNTING HARDWARE SHALL NOT INTRUDE UPON MINIMUM NET ENCLOSURE OPENING SO THERE IS A MINIMUM 12' WIDTH WITHIN EACH ENCLOSURE.
8. CONTRACTION JOINTS MAY BE EITHER SCORED OR SAWCUT 1-INCH DEEP.
9. BINS THAT ARE VISIBLE FROM A PUBLIC ROADWAY SHALL HAVE ENCLOSURE GATES THAT SCREEN THE BINS FROM PUBLIC VIEW
10. ENCLOSURES SHALL BE PLACED SO THAT THERE IS AT LEAST 45 FEET OF CLEARANCE BETWEEN THE ENTRANCE OF THE ENCLOSURE AND ANY OTHER OBSTRUCTIONS.
11. ENCLOSURE WALLS SHALL BE TALL ENOUGH AND MADE OF A MATERIAL SO THAT THE BIN IN EACH ENCLOSURE IS BLOCKED FROM PUBLIC VIEW.
12. MAINTAIN A 15' MIN. OVERHEAD CLEARANCE FOR ACCESS TO TRASH ENCLOSURE
13. RECOMMENDED BOLLARDS TO PROTECT ENCLOSURE WALLS. BOLLARD DESIGN REQUIRES A MIN. 9' X 12' INSIDE OPERATIONAL SPACE.