2016 Provo Specifications and Standard Details
(Supplement to the APWA Manual of Standard Plans, 2012)

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provo
PUBLIC WORKS

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 and Specifications, 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 Specifications and Standard Details that require the APWA plans to be altered or replaced. This document also serves to identify any modifications to or replacement of APWA plans.

The structure of this document follows the same basic structure of the APWA 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 plan is an equivalent of the APWA plan or that the APWA plan has been modified. Each plan that is either modified from the APWA plan or replaces the APWA plan is included, as part of this document.
2. Description – The description of the plan (shown on this document) is essentially identical to the description of the APWA document, with the inclusion of reference to the accepted plan, shown in parentheses.
    a. (APWA Plan ###) indicates that the APWA plan is accepted in its entirety.
    b. (Modification of APWA Plan ###) indicates that the APWA plan has either been modified or replaced. The modified plan is included in this document.
    c. (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.
    d. (Provo Standard Detail) indicates that the APWA drawing has been completely replaced by a Provo drawing.

This document is intended to be altered periodically to ensure that the most current Provo City Specifications and Standard Details 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

REVISDED 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

REVISDED 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

END OF SECTION

SECTION 32 12 05M
BITUMINOUS CONCRETE

This Section modifies a portion of Section 32 12 05 entitled "Bituminous Concrete" as outlined below.

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

D. RAP or ROSP: Free of detrimental quantities of deleterious materials, with a minimum sand equivalent value of 50.

1. Allowed up to 15 percent by weight and by binder replacement with no change in specified binder grade.
2. Allowed from 15 to 25 percent by weight and by binder replacement, if the binder grade is adjusted according to AASHTO M3323 to meet the specified binder grade.

Delete Table 4 from Article 2.4, paragraph B and replace with the following:

Table 4 - Master Grading Bands

Sieve	Dense					Open	Friction	
	DM-1	DM-3/4N	DM-3/4	DM-1/2	DM-3/8	OM-1/2	FM-1	FM-2
1 inch	100							
3/4 inch		100	100				100	
1/2 inch	75 - 91	74 - 99		100		100	90 - 100	100
3/8 inch		69 - 91	75 - 91		100	93 - 100	60 - 100	90 - 100
No. 4	47 - 61	49 - 65	46 - 62	60 - 80	60 - 80	36 - 44	15 - 40	30 - 50
No. 8		33 - 47				14 - 21	4 - 12	5 - 15
No. 16	23 - 33	21 - 35	22 - 34	28 -42	28 -42			
No. 50	12 - 22	6 - 18	11 - 23	11 - 23	11 - 23			2 - 5
No. 200	3 - 7	2 - 6	3 - 7	3 - 7	3 - 7	2 - 4	2 - 5	

NOTES

(a) It is assumed fine and coarse aggregate have same bulk specific gravity.

(b) Friction Mixture, ASTM D 3515.

(c) DM-3/4N is 100% crushed.

(d) Gradation is expressed in percent passing by weight, ASTM C 136. Percentage of fines passing No. 200 sieve determined by washing, ASTM C 117.

Delete Article 2.4, paragraph C.4 and replace with the following:

4. Voids in the mineral aggregate (VMA) at N_{design} based upon the bulk specific gravity of the aggregate at oven dry (OD) condition.

Nominal Maximum Size*	Voids (VMA)
37.5 mm	11.5 to 13 percent
25.0 mm	12.5 to 14 percent
19.0 mm	13.5 to 15 percent
12.5 mm	14.5 to 16 percent
9.5 mm	16.5 percent minimum

* Maximum size is one sieve larger than the nominal maximum size.

END OF SECTION

SECTION 32 12 16.13M
PLANT-MIX ASPHALT PAVING

REVISDED 12-08-2015

This Section modifies a portion of Section 32 12 16.13 entitled “Plant-Mix Asphalt Paving” as outlined below.

Delete Article 1.5, paragraph A and replace with the following:

D. Temperature:.
   1. Do not pave until air temperature is 45 deg F. and rising.
   2. Cease paving if air temperature falls below 50 deg F.
   3. Do not pave if wind or ground cools mix material before compaction.

END OF SECTION

SECTION 33 05 05M
DUCTILE IRON PIPE

REVISDED 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 723)

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

REVISDED 12-08-2015

Add the following to Article 1.2 (page 779)

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 782)

2.8 ACCESSORIES

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

Add the following to Article to 3.4 (page 782)

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 and at all main line valves. Wire to be brought up outside of valve box and stubbed into valve box 3 inches below the lid through a hole cut into the valve box. Tracer wire does not need to be brought up at shut off valves to fire hydrants. However it should be brought up at the hydrant.

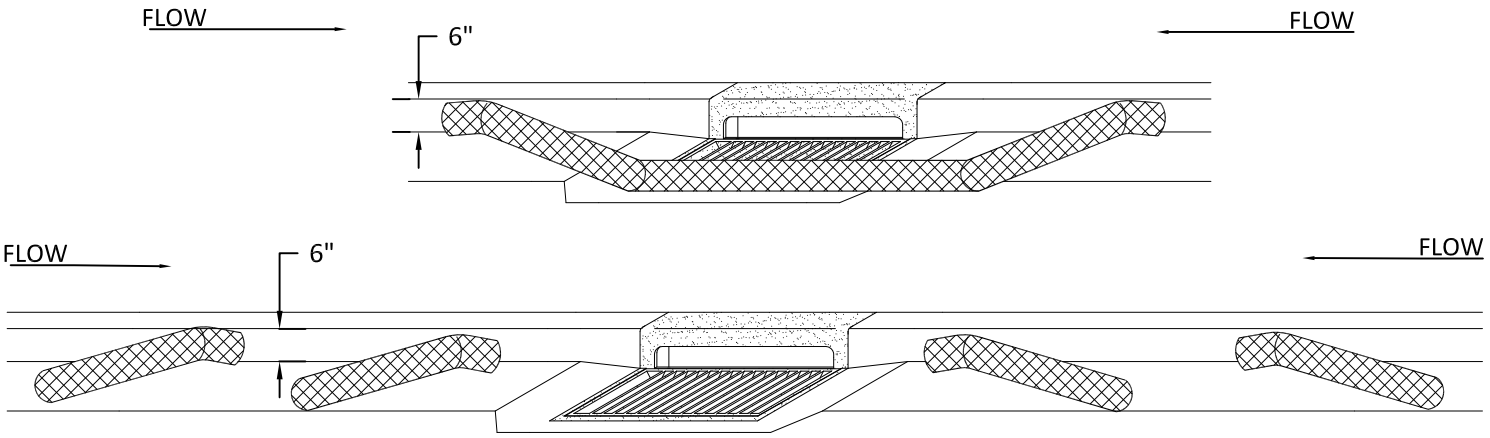
Add the following to Article to 3.10 (page 785)

3.10 INSTALLATION – WATERMAIN LOOP (SYPHON)

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

END OF SECTION

DETAILS



- BAGS SHALL FIT TIGHTLY AGAINST THE FACE OF THE CURB.
- BAGS SHALL NOT EXTEND IN ROAD MORE THAN 1 FOOT.
- RESHAPE BAGS AS NEEDED, REPLACE IF TORN.
- STEEP GRADES WILL REQUIRE MORE CHECK DAMS ALONG THE CURB AND GUTTER.
- INSPECT DAILY.
- REMOVE SEDIMENT WHEN IT REACHES ONE-THIRD OF GRAVEL BAG HEIGHT.
- CLEAN CURB AND GUTTER AND REMOVE GRAVEL BAG AT THE END OF THE PROJECT.

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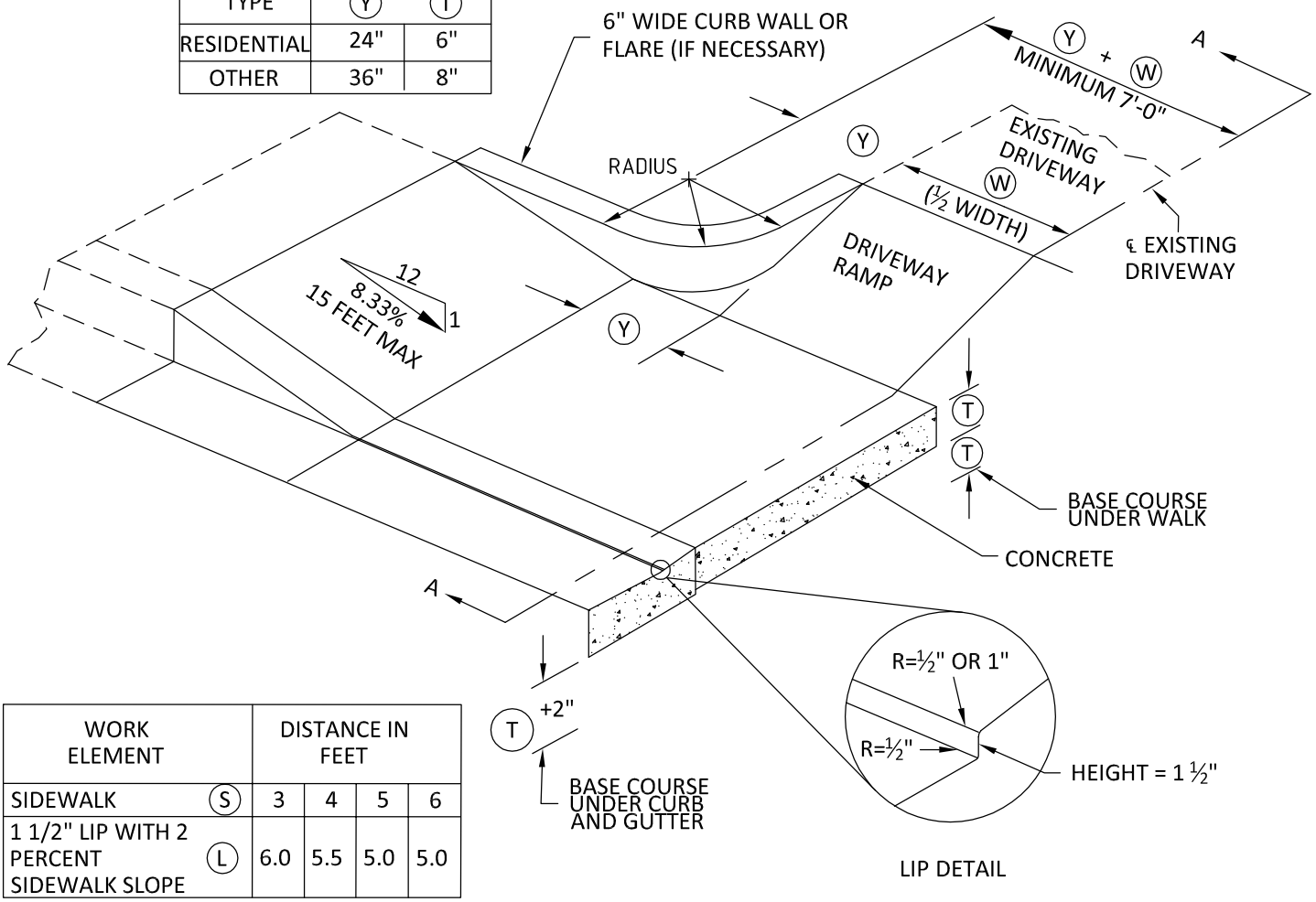
GRAVEL SOCK INLET PROTECTION

STANDARD DETAIL
P-124

NOT TO SCALE

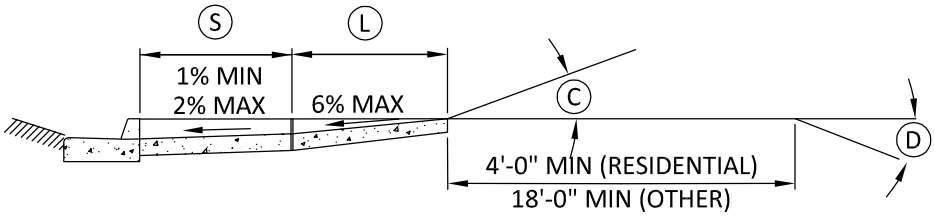
REVISED DATE: 10/15/15

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



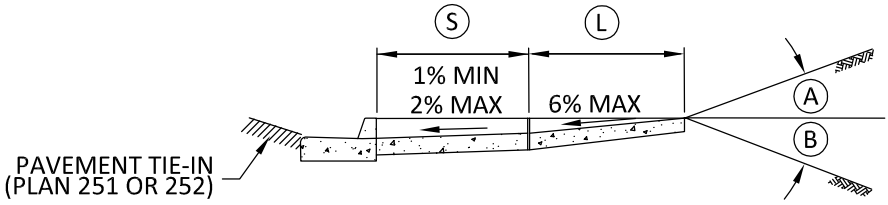
WORK ELEMENT	DISTANCE IN FEET			
SIDEWALK (S)	3	4	5	6
1 1/2" LIP WITH 2 PERCENT SIDEWALK SLOPE (L)	6.0	5.5	5.0	5.0

OBLIQUE



STREET TYPE	BREAK OVER ANGLE (MAX) (C)	(D)
RESIDENTIAL	16%	6%
OTHER	6%	2%

SECTION A-A - APPROACH REQUIRING SERVICE TRUCK ACCESS



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

SECTION A-A - TYPICAL DRIVEWAY APPROACH

provo PUBLIC WORKS 2016

DIP DRIVEWAY APPROACH

STANDARD DETAIL
P-215
NOT TO SCALE
REVISED DATE: 11/25/15

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. **PRODUCTS**
   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: ½-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 31 23 26.
   B. Concrete Placement: APWA Section 03 30 10.
      1) Install expansion joints vertical, full depth, with top of filler set flush with concrete surface.
      2) Install contraction joints vertical, 1/8-inch wide or ¼ 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).
      3) Provide ½-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.

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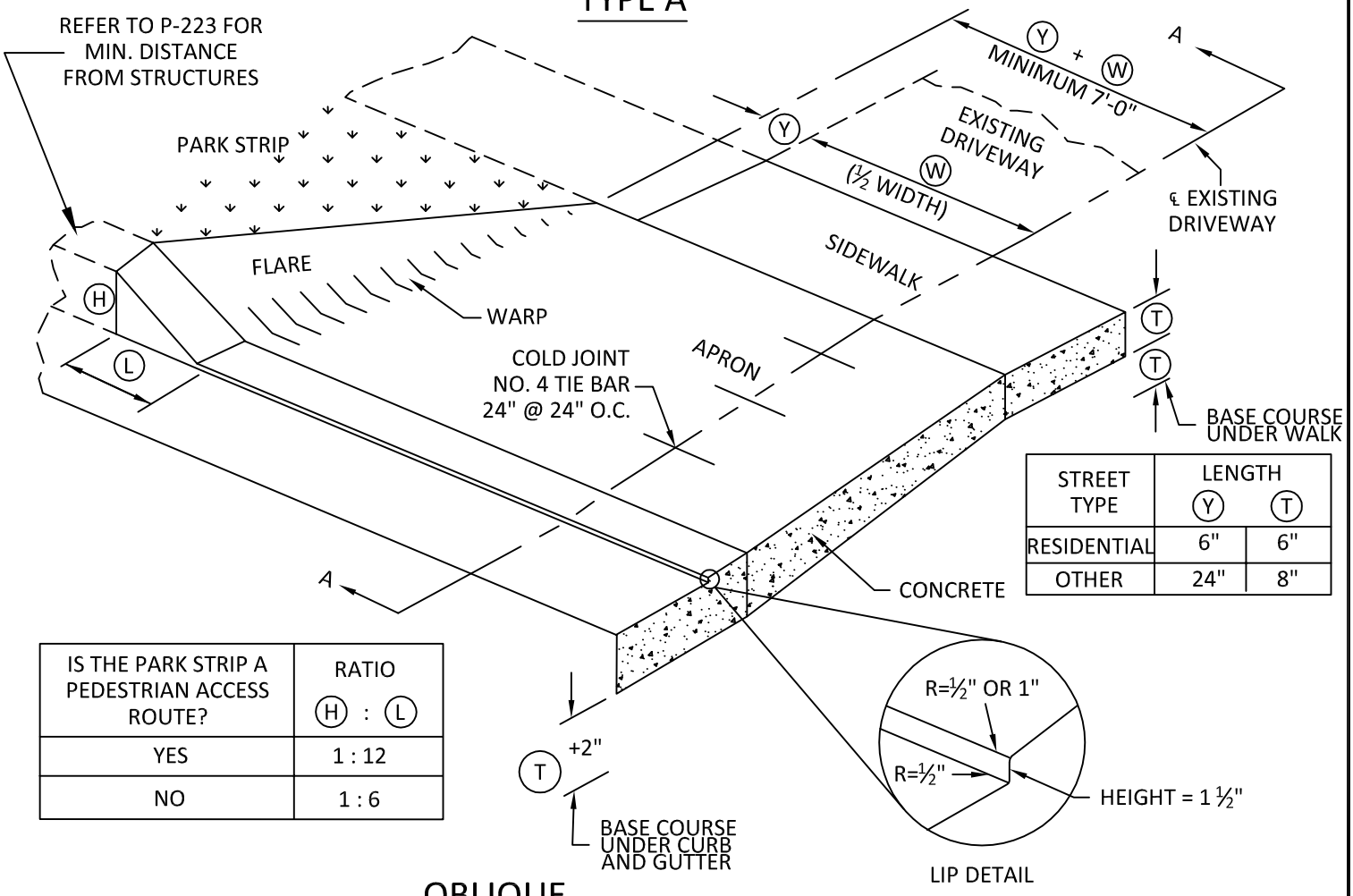
DIP DRIVEWAY APPROACH

STANDARD DETAIL
P-215
NOT TO SCALE
REVISED DATE: 11/25/15

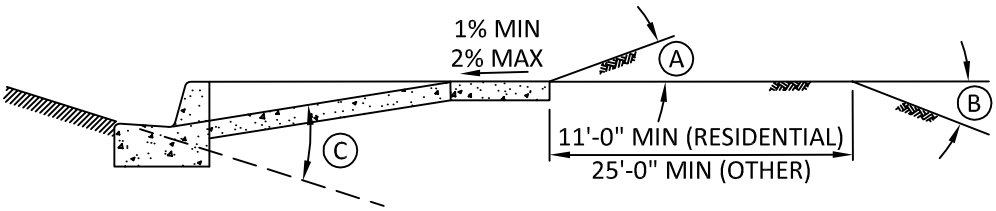
TYPE A



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

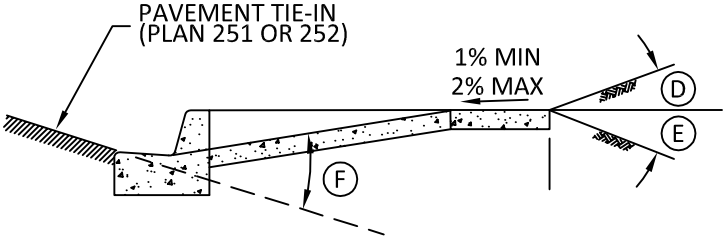
IS THE PARK STRIP A PEDESTRIAN ACCESS ROUTE?	RATIO H : L
YES	1 : 12
NO	1 : 6

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%

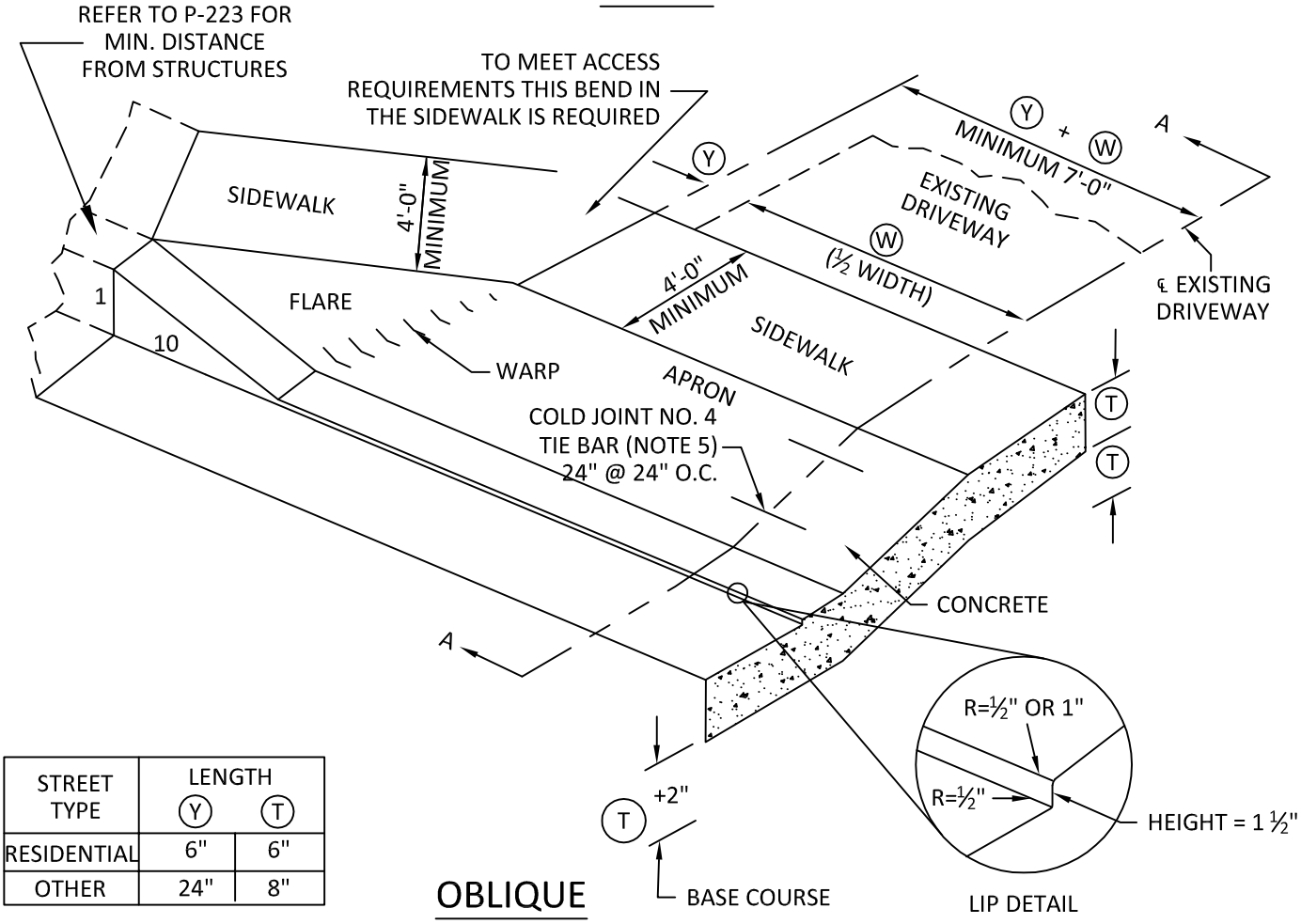
SECTION A-A - TYPICAL DRIVEWAY APPROACH

provo PUBLIC WORKS 2016

FLARE DRIVEWAY APPROACH

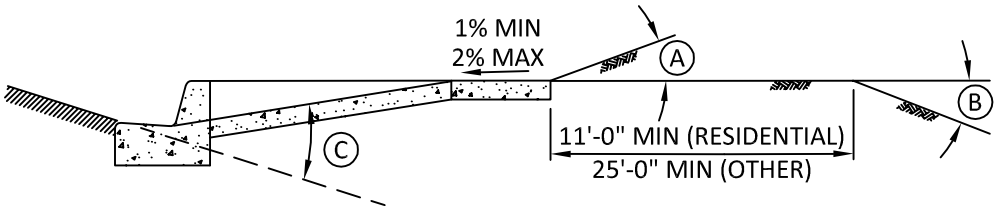
STANDARD DETAIL
P-221a
NOT TO SCALE
REVISED DATE: 11/25/15

TYPE B



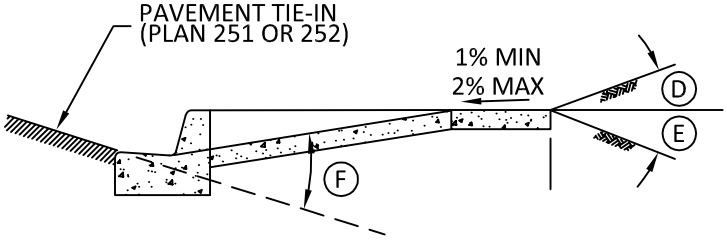
STREET TYPE	LENGTH Y	LENGTH T
RESIDENTIAL	6"	6"
OTHER	24"	8"

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

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FLARE DRIVEWAY APPROACH

STANDARD DETAIL
P-221b
NOT TO SCALE
REVISED DATE: 11/25/15

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:
      1) Grades may have a 6 percent change in slope over a 11 feet wheel base run for both crest or sag vertical curves.
      2) Where heavy truck use and fire truck access applies, or to improve design speed, design grades should be cut in half.
      3) Specific uses or site conditions may require profile design submittal for review and acceptance.
   C. Additional requirements are specified in APWA Section 32 16 13.

2. **PRODUCTS**
   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: ½-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 31 23 26.
   B. Reinforcement: Not required if driveway apron is constructed without a cold joint.
   C. Concrete Placement: APWA Section 03 30 10.
      1) Install expansion joints vertical, full depth, with top of filler set flush with concrete surface.
      2) Install contraction joints vertical, 1/8-inch wide or ¼ 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).
      3) Provide ½-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.

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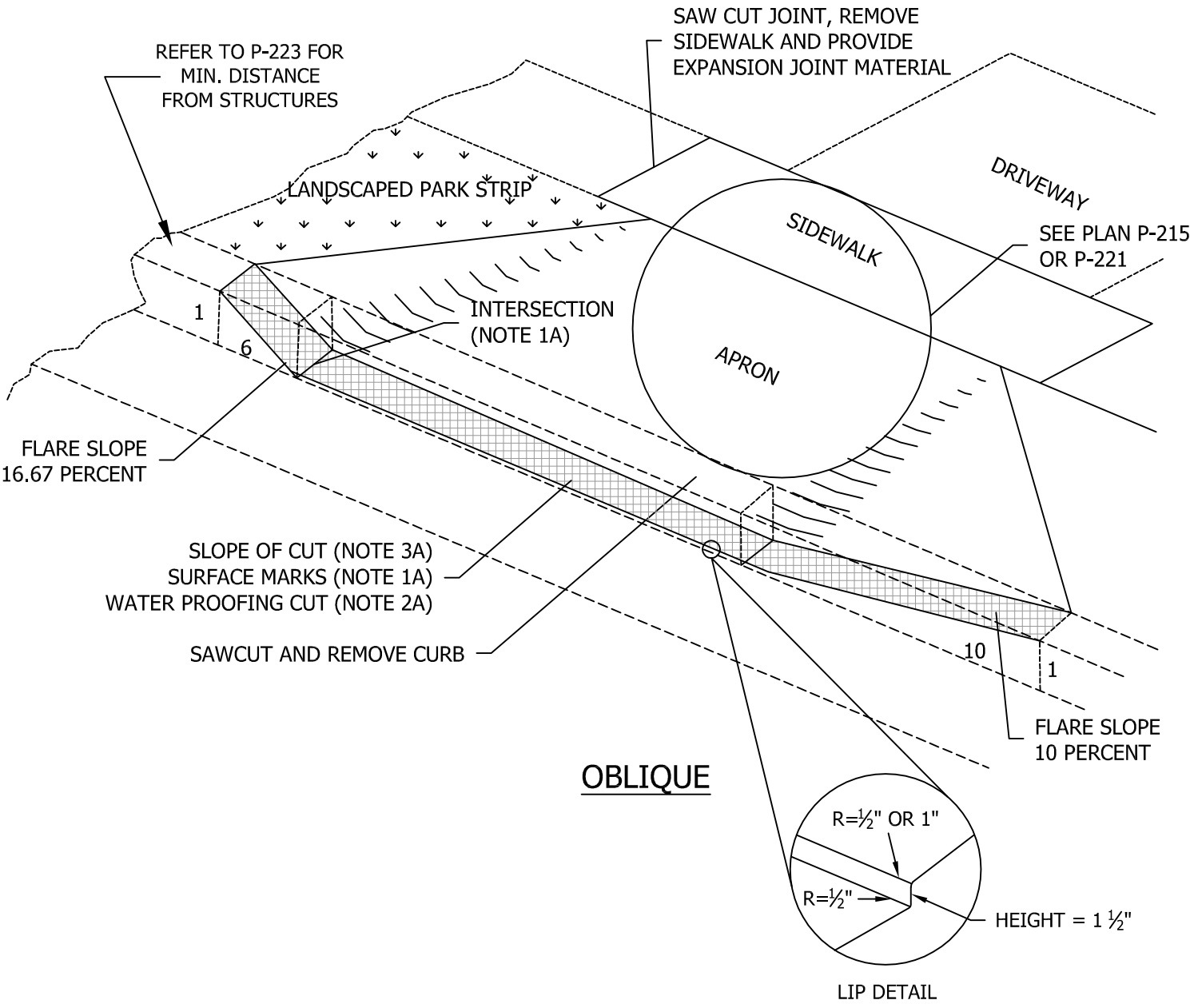
FLARE DRIVEWAY APPROACH

STANDARD DETAIL
P-221
NOT TO SCALE
REVISED DATE: 11/25/15



SHEET 1 OF 2

provo PUBLIC WORKS 2016

SAW-CUT DRIVEWAY APPROACH

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 Plan 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. **PRODUCTS**
   A. Water repellant: Penetrating compound, APWA Section 07 19 00.
   B. Expansion Joint Filler: ½-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, cut the curb off so the slope of curb cut as measured parallel to the flow line is as follows.
      1) 8.33 percent (1:12) if curb borders a surface used by pedestrians.
      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.

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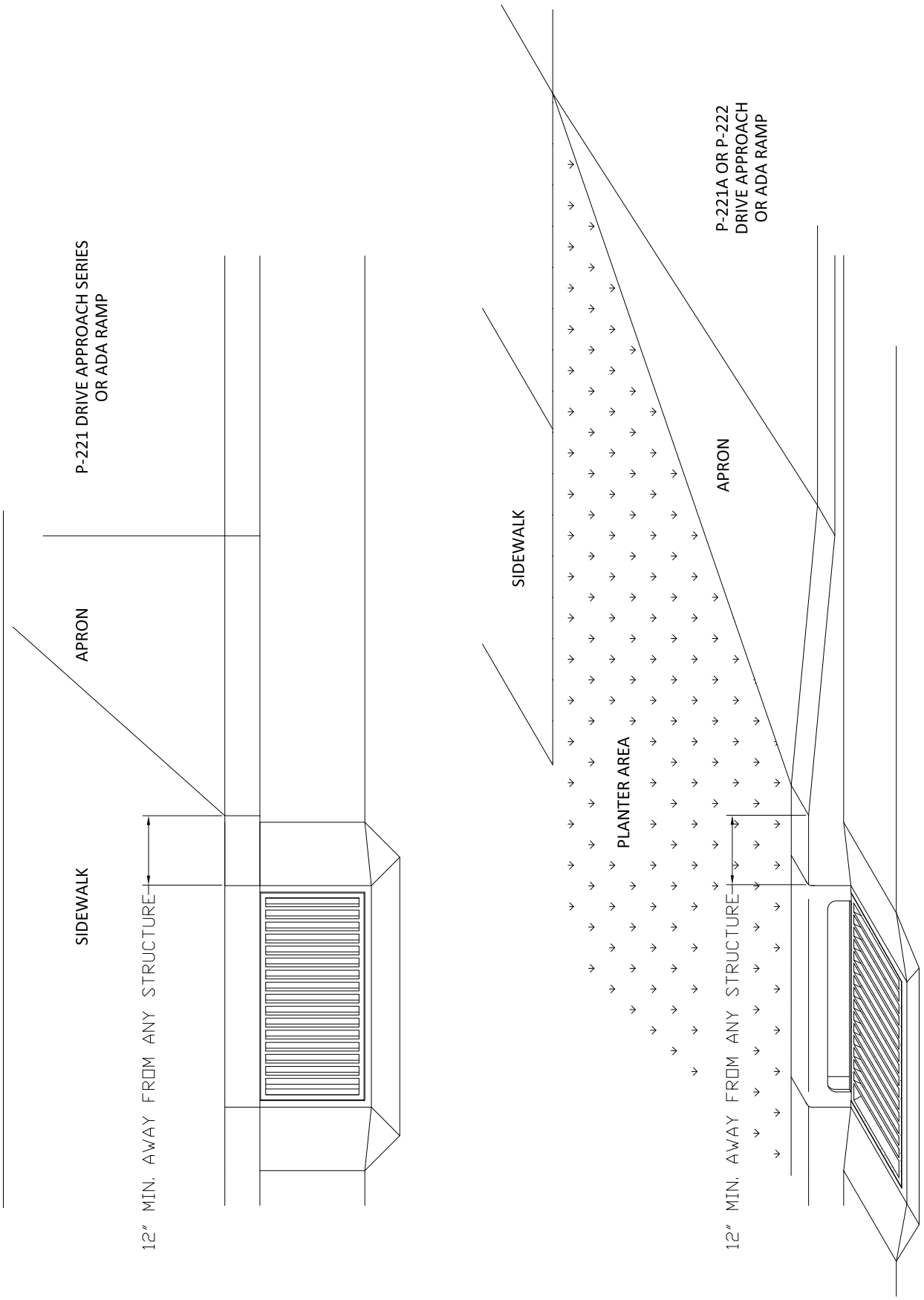
SAW-CUT DRIVEWAY APPROACH

STANDARD DETAIL
P-222
NOT TO SCALE
REVISED DATE: 11/25/15

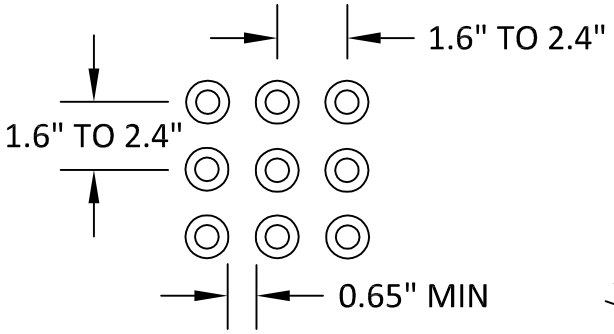


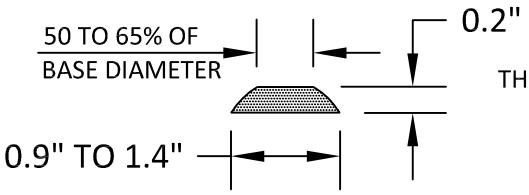
SHEET 1 OF 1

PUBLIC WORKS
2016

STORM DRAIN INLET FROM DRIVE APPROACH

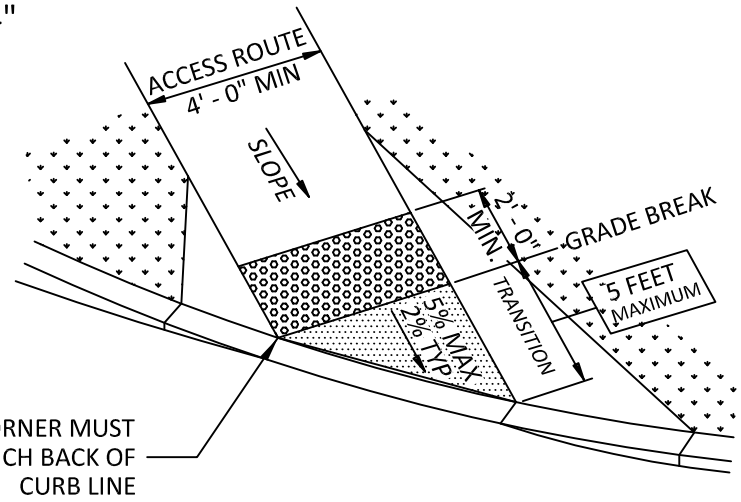
STANDARD DETAIL
P-223
NOT TO SCALE
REVISED DATE: 03/17/11



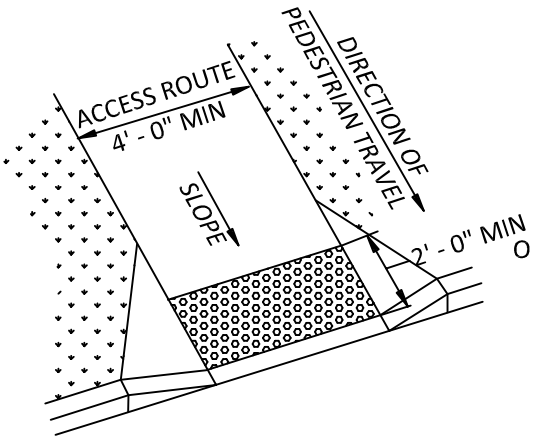


SECTION

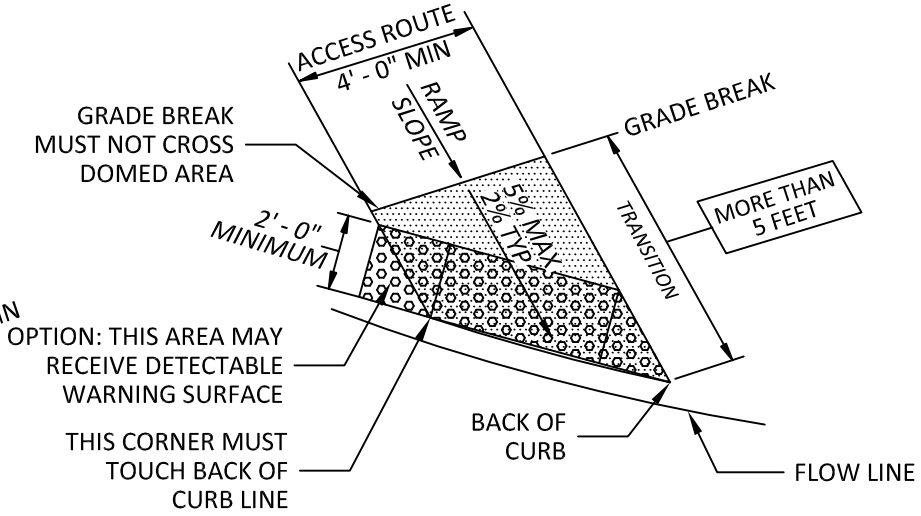
TRUNCATED DOME DETAIL



TRANSITION 1

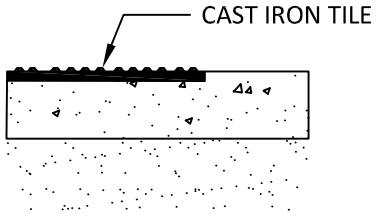


PERPENDICULAR ASSEMBLY



TRANSITION 2

NON-PERPENDICULAR ASSEMBLY



STYLE T

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DETECTABLE WARNING SURFACE

STANDARD DETAIL
P-238
NOT TO SCALE
REVISED DATE: 11/25/15

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. **PRODUCTS**
   A. Cast Iron Panels:
      1) Must not be cut or manipulated. When resizing is needed, panel must be remanufactured.
      2) Radius Panels are required on all radius curbs.
      3) See Standard Plan P-235 for installation.
3. **EXECUTION**
   A. Layout:
      1) Joints Between Units: 3/16 inch maximum or manufacturer's recommendation.
      2) Flares: Do not install detectable warning units on flared surfaces.
      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.
      4) Transition 1 or 2: Selection is by ENGINEER unless indicated elsewhere.
      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.

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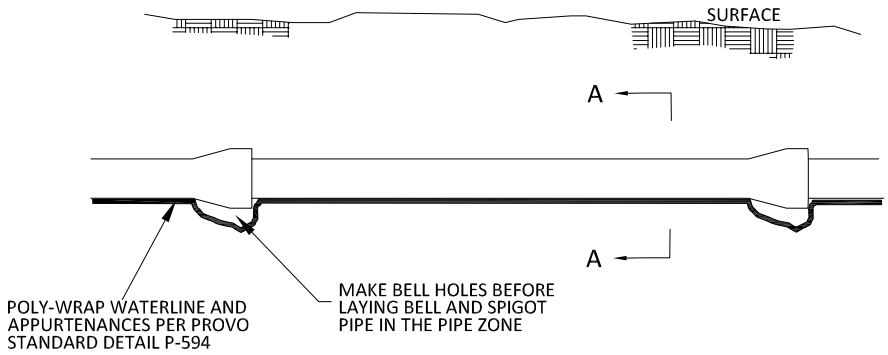
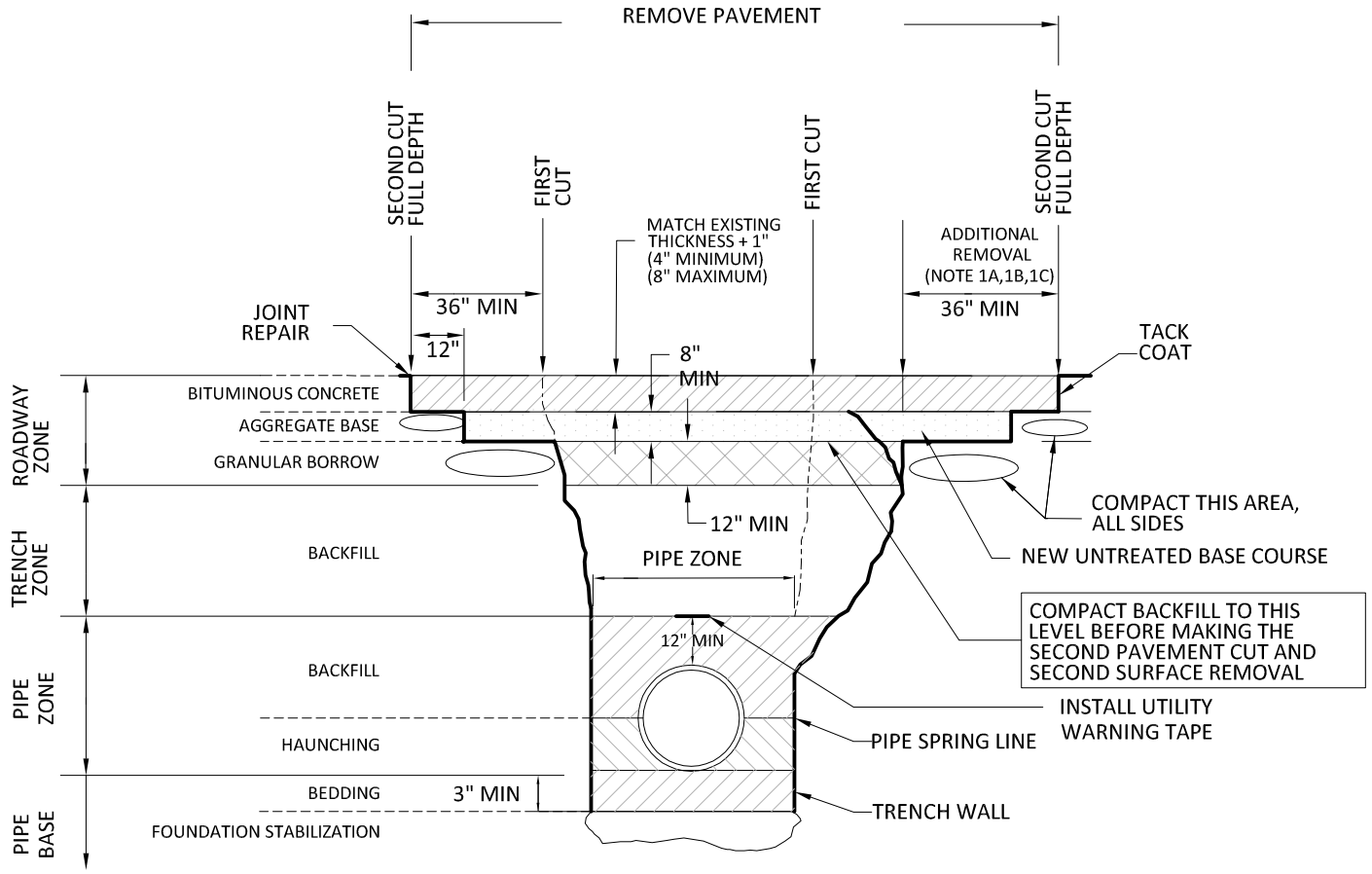
DETECTABLE WARNING SURFACE

STANDARD DETAIL
P-238
NOT TO SCALE
REVISED DATE: 11/25/15



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

*PER ENGINEER APPROVAL

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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, edges 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. PRODUCTS

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 ¾, 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 13.13.

I. Bituminous Concrete: AC-10-DM-3/4. Section 32 12 05M.

J. Utility Warning Tape: Install between pipe zone and trench zone.

3. EXECUTION

A. Excavate the Pipe Zone: Width is measured at the pipe spring line and includes any 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. Tack Coat: Clean all horizontal and vertical surfaces. Apply full coverage.

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TRENCH BACKFILL AND SURFACE RESTORATION

STANDARD DETAIL
P-255
NOT TO SCALE
REVISED DATE: 11/25/15

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, or (4) if asphalt pavement is substituted for Portland-cement concrete substrate.

J. Surface Restoration:

1) Landscaped Surface: Rake to match existing grade. Replace vegetation to match pre-construction conditions. Follow APWA Section 32 92 00 (turf or grass).

2) 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.

1) Pavement surface distortion exceeds ¼-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.

2) Cracks at least 1-foot long and ¼-inch wide occur more often than 1 in 10 square feet. Repair option: Crack seal, APWA Section 32 01 17.

3) Asphalt raveling is greater than 1 square foot per 100 square feet. Repair option: Mill and inlay.

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TRENCH BACKFILL AND SURFACE RESTORATION

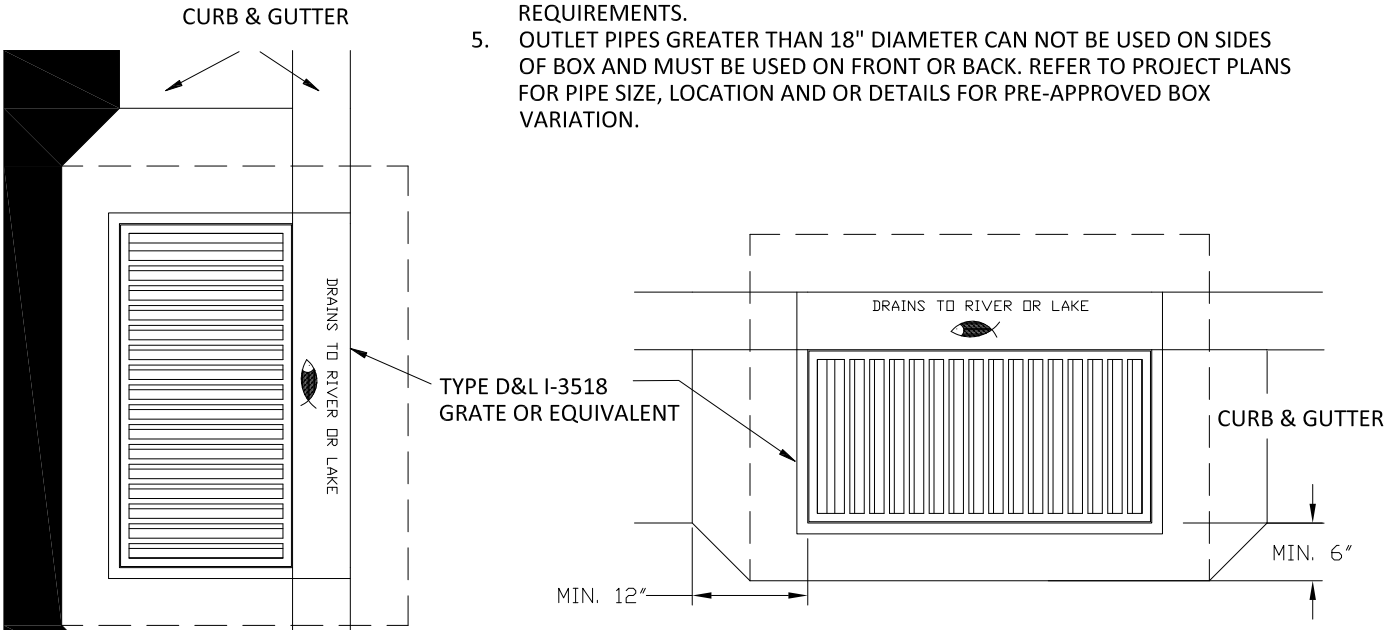
STANDARD DETAIL
P-255

NOT TO SCALE

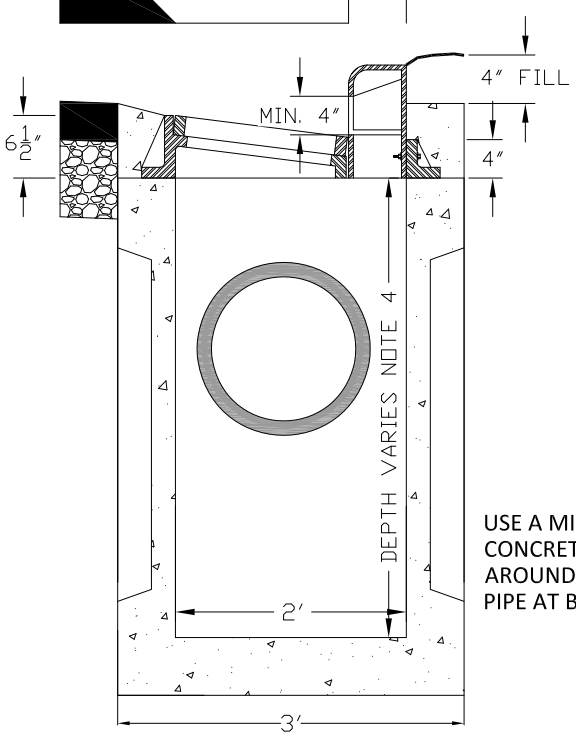
REVISED DATE: 11/25/15

NOTE:

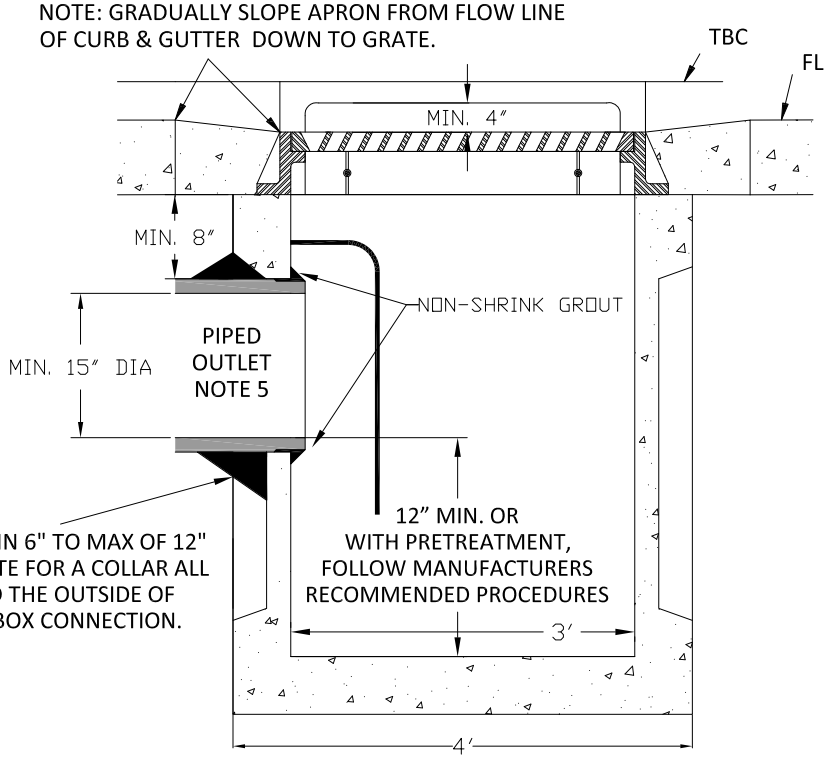
1. FOR GRATE & FRAME DETAILS SEE D.&L. SUPPLY CATALOG #I-3518 OR EQUIVALENT.
2. REQUIRED STAMPED HOOD, DRAINS TO RIVER OR LAKE WITH FISH LOGO.
3. ALL BOXES AND FRAMES MUST SUPPORT A HS-20 LOADING.
4. REFER TO APPROVED PROJECT PLANS FOR SUMP DEPTH AND BOX SIZE REQUIREMENTS.
5. OUTLET PIPES GREATER THAN 18" DIAMETER CAN NOT BE USED ON SIDES OF BOX AND MUST BE USED ON FRONT OR BACK. REFER TO PROJECT PLANS FOR PIPE SIZE, LOCATION AND OR DETAILS FOR PRE-APPROVED BOX VARIATION.



NOTE: GRADUALLY SLOPE APRON FROM FLOW LINE OF CURB & GUTTER DOWN TO GRATE.



SIDE ELEVATION



FRONT ELEVATION

SHEET 1 OF 1

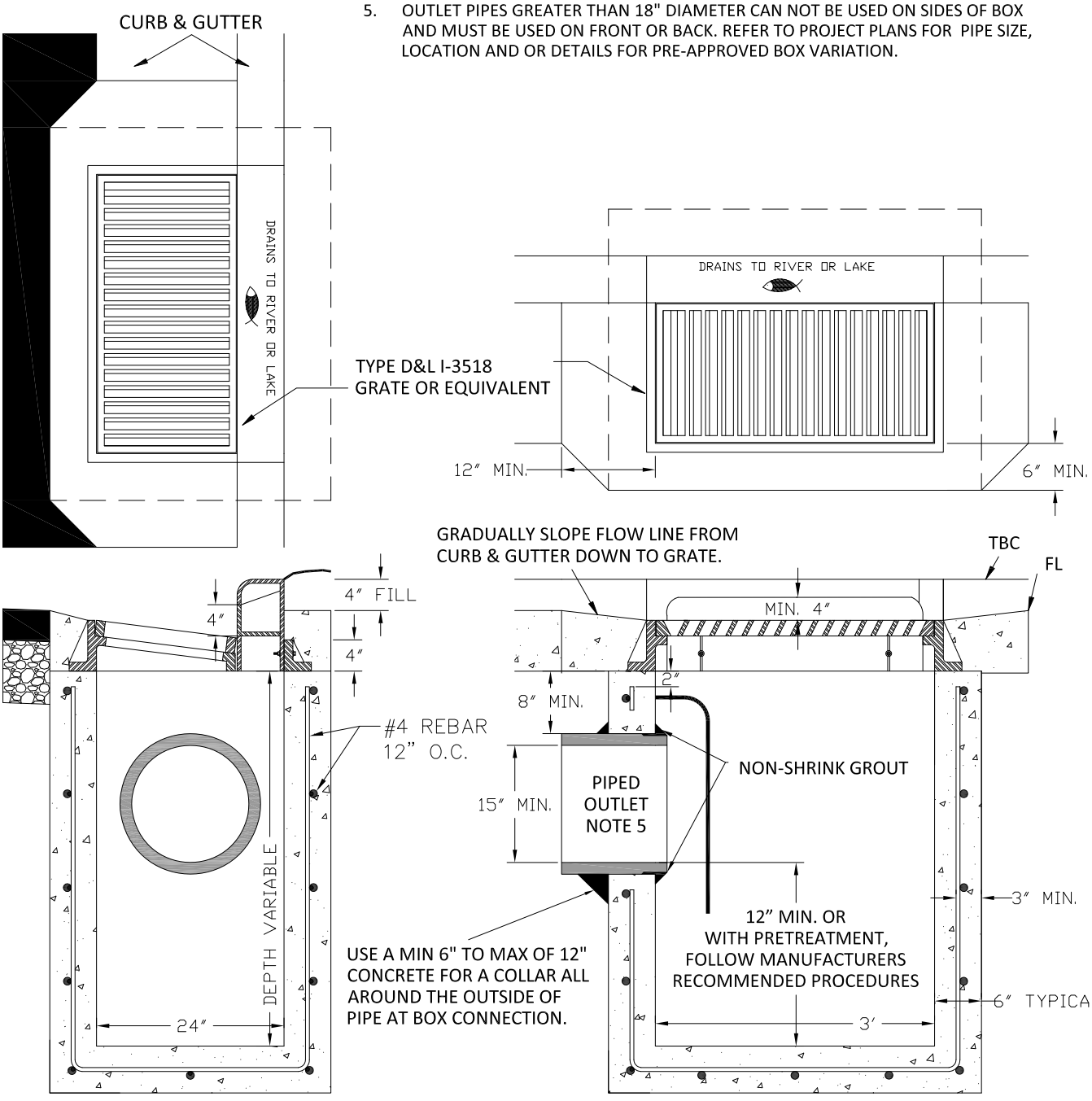
provo PUBLIC WORKS 2016

PRE-CAST CURB FACE AND INLET BOX

STANDARD DETAIL
P-315a
NOT TO SCALE
REVISED DATE: 11/04/15

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 APPROVED PROJECT PLANS FOR SUMP DEPTH AND BOX SIZE REQUIREMENTS.
5. OUTLET PIPES GREATER THAN 18" DIAMETER CAN NOT BE USED ON SIDES OF BOX AND MUST BE USED ON FRONT OR BACK. REFER TO PROJECT PLANS FOR PIPE SIZE, LOCATION AND OR DETAILS FOR PRE-APPROVED BOX VARIATION.



SIDE ELEVATION

FRONT ELEVATION

SHEET 1 OF 1

provo PUBLIC WORKS 2016

CAST-IN-PLACE CURB FACE AND INLET BOX

STANDARD DETAIL

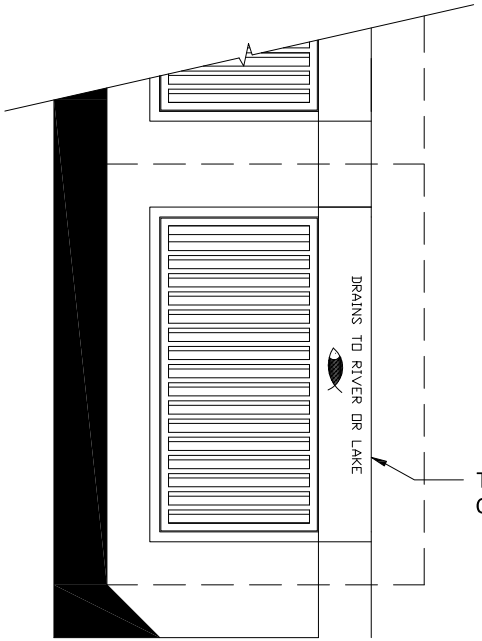
P-315b

NOT TO SCALE

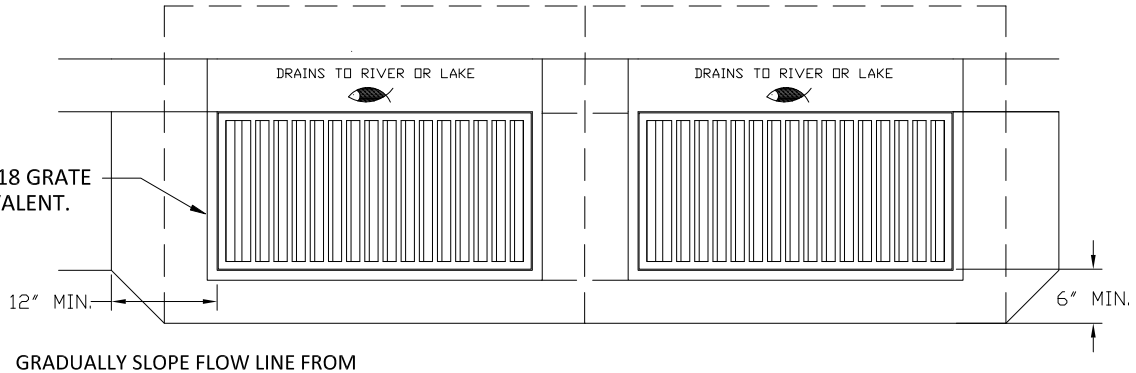
REVISED DATE:11/04/15

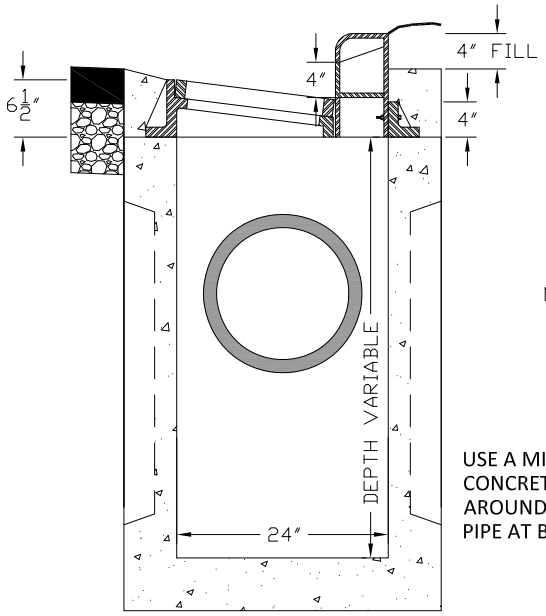
provo PUBLIC WORKS
2016

DOUBLE PRE-CAST CURB FACE AND INLET BOX

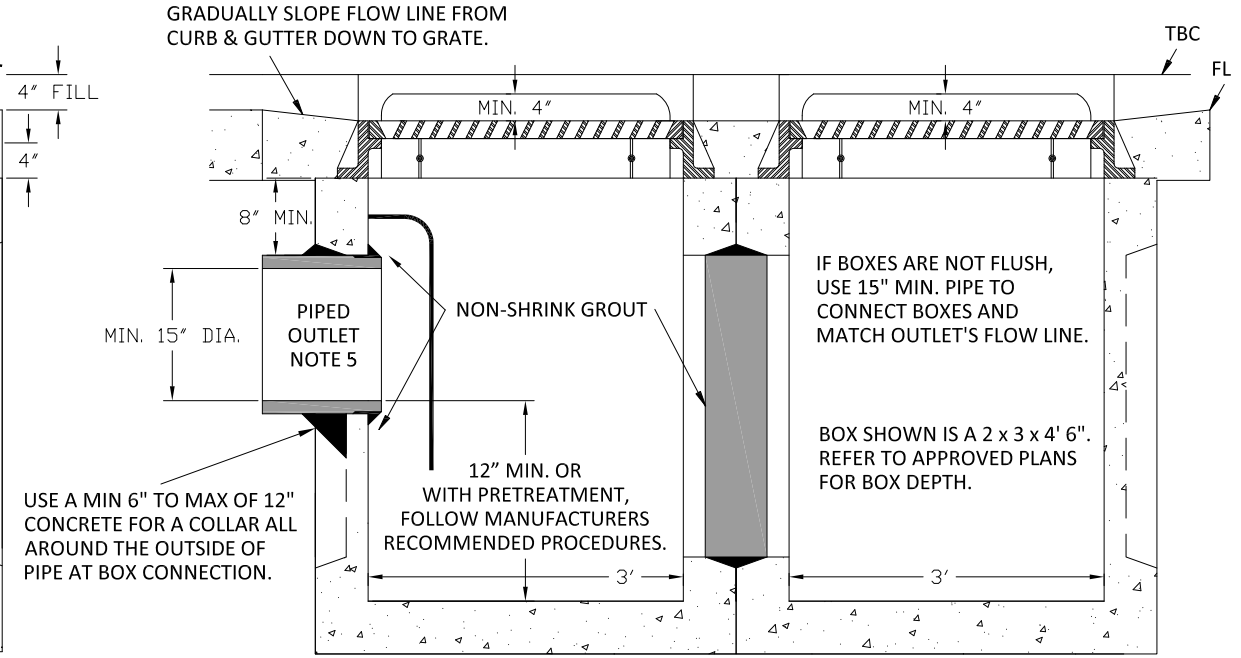


NOTE:
1. FOR GRATE & FRAME DETAILS SEE D.&L. SUPPLY CATALOG #I-3518 OR EQUIVALENT.
2. REQUIRED STAMPED HOOD, DRAINS TO RIVER OR LAKE WITH FISH LOGO.
3. ALL BOXES AND FRAMES MUST SUPPORT A HS-20 LOADING.
4. REFER TO APPROVED PROJECT PLANS FOR SUMP DEPTH AND BOX SIZE REQUIREMENTS.
5. OUTLET PIPES GREATER THAN 18" DIAMETER CAN NOT BE USED ON SIDES OF BOX AND MUST BE USED ON FRONT OR BACK. REFER TO PROJECT PLANS FOR PIPE SIZE, LOCATION AND OR DETAILS FOR PRE-APPROVED BOX VARIATION.





SIDE ELEVATION



FRONT ELEVATION

STANDARD DETAIL
P-315c
NOT TO SCALE
REVISED DATE: 11/04/15

SHEET 1 OF 1

provo PUBLIC WORKS

2016

DOUBLE CAST-IN-PLACE CURB FACE AND INLET BOX

STANDARD DETAIL

P-315d

NOT TO SCALE

REVISED DATE: 12/02/15

SHEET 1 OF 1

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 APPROVED PROJECT PLANS FOR SUMP DEPTH AND BOX SIZE REQUIREMENTS.
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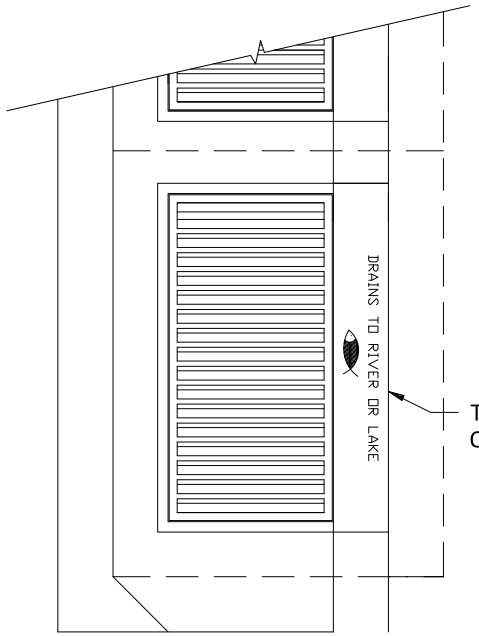
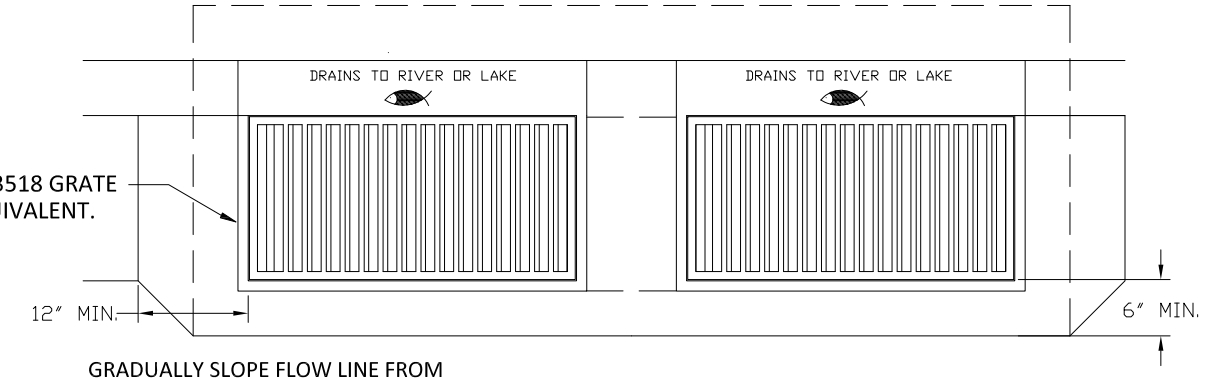
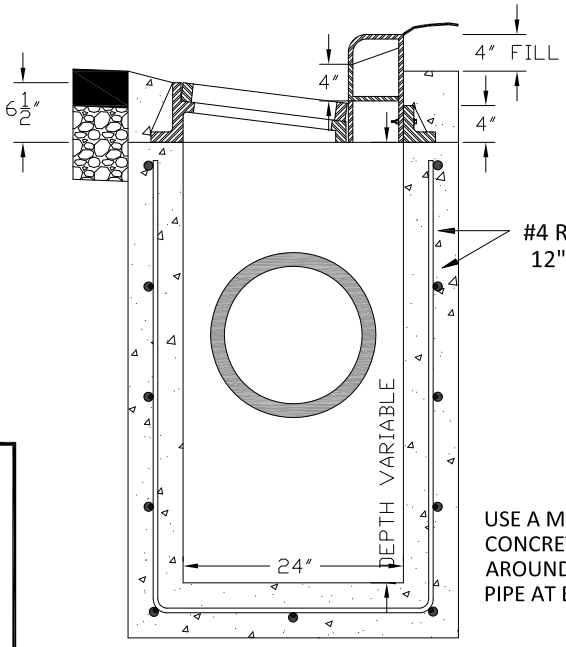
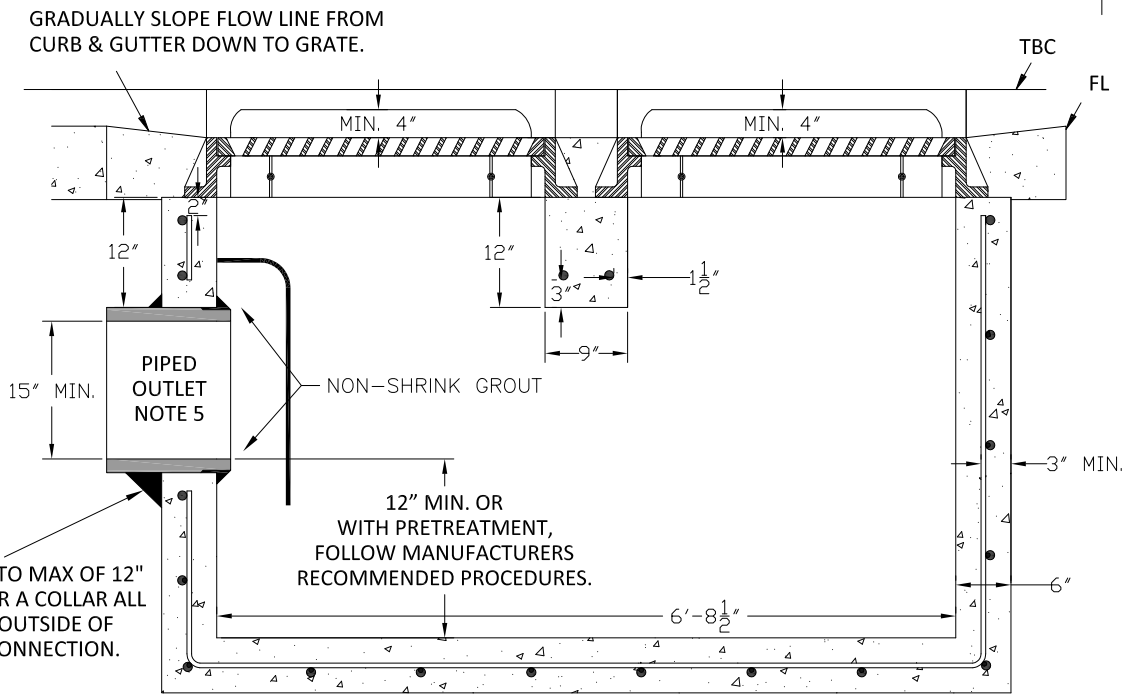




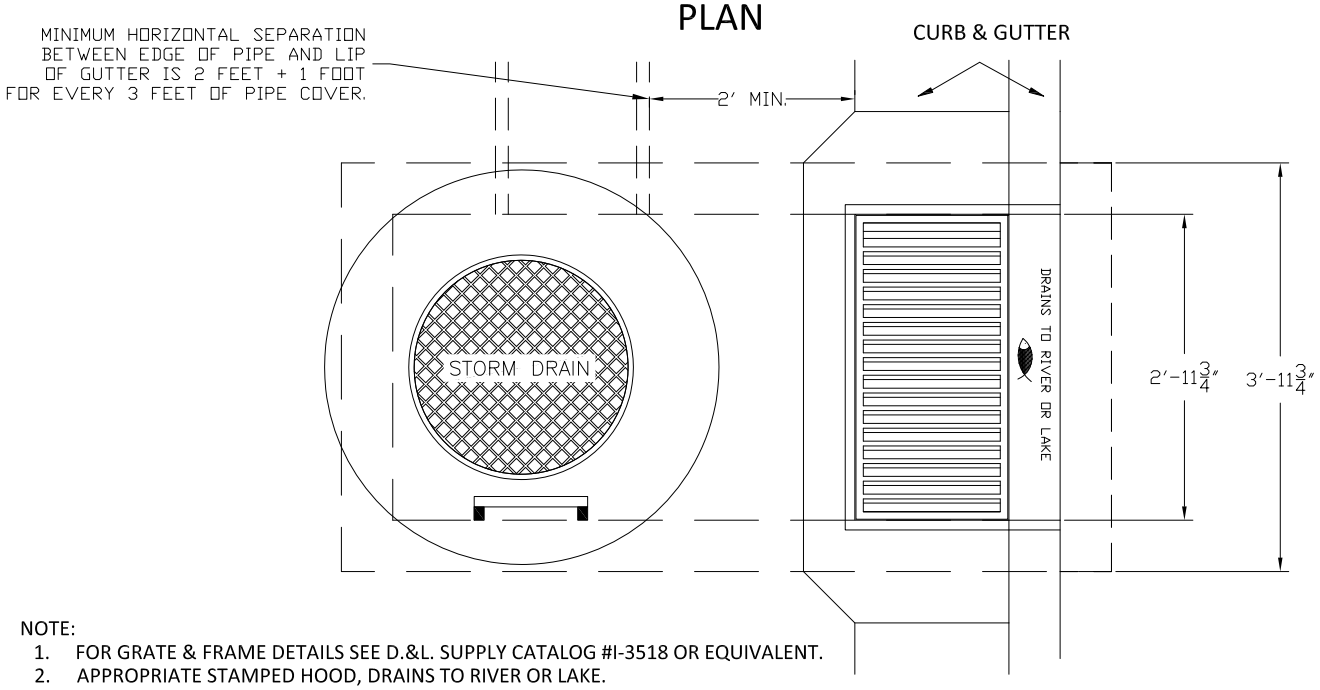


SIDE ELEVATION



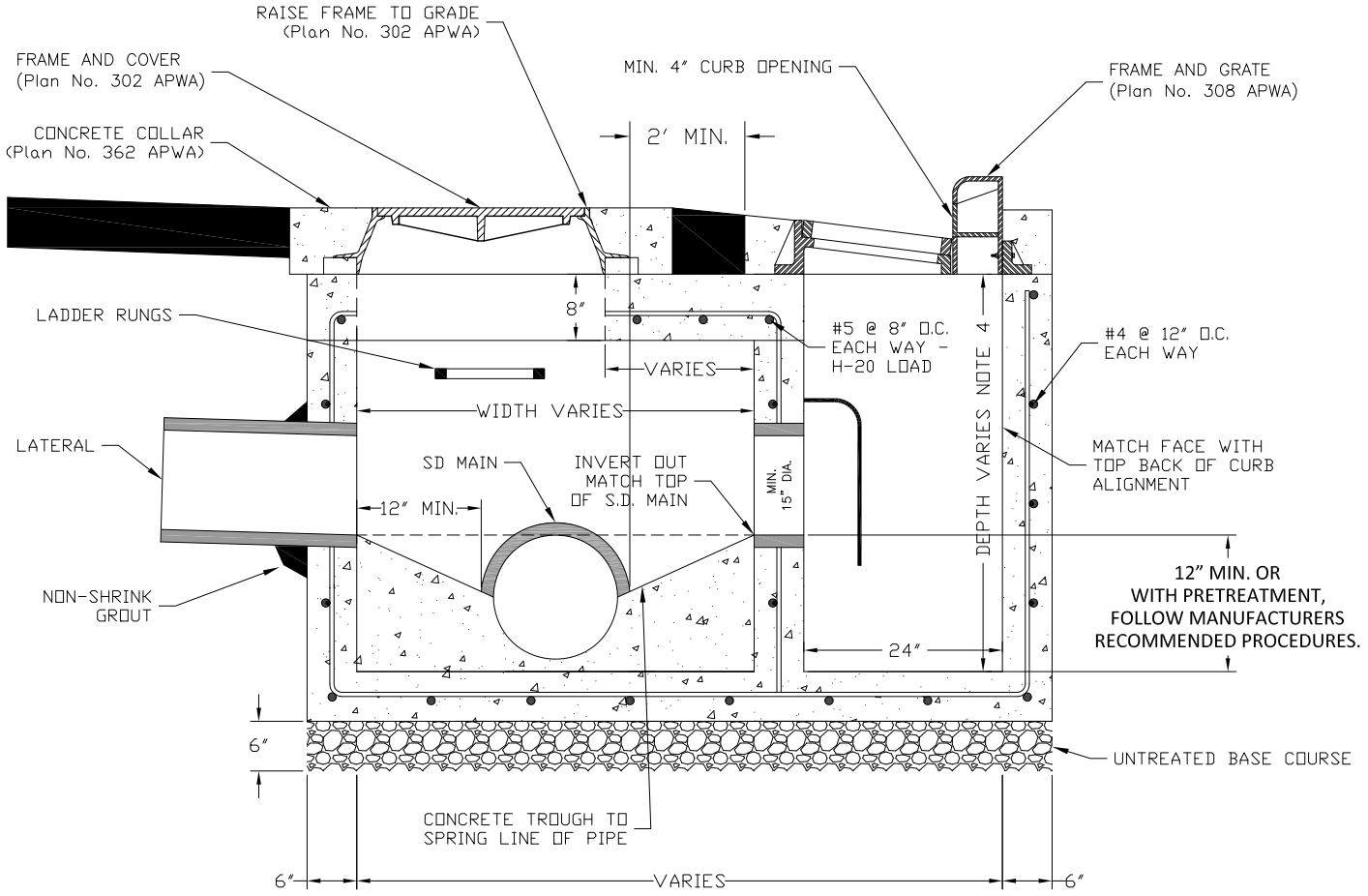
FRONT ELEVATION

PLAN



NOTE:

1. FOR GRATE & FRAME DETAILS SEE D.&L. SUPPLY CATALOG #I-3518 OR EQUIVALENT.
2. APPROPRIATE STAMPED HOOD, DRAINS TO RIVER OR LAKE.
3. BOX MUST SUPPORT A HS-20 LOADING.
4. REFER TO APPROVED PROJECT PLANS FOR SUMP DEPTH AND BOX SIZE REQUIREMENTS.



CROSS-SECTION

PUBLIC WORKS
2016

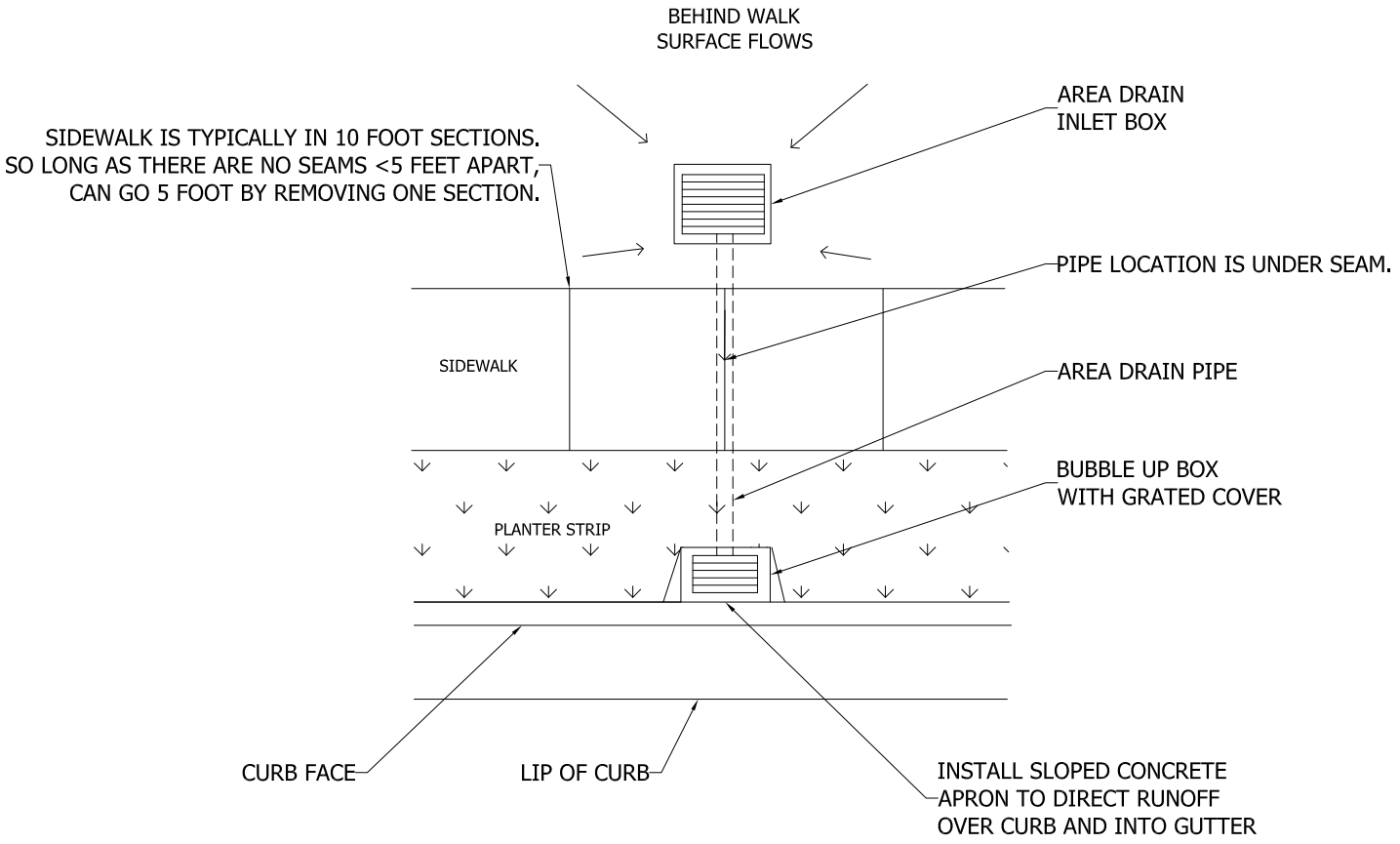
COMBINATION INLET/ CLEANOUT BOX

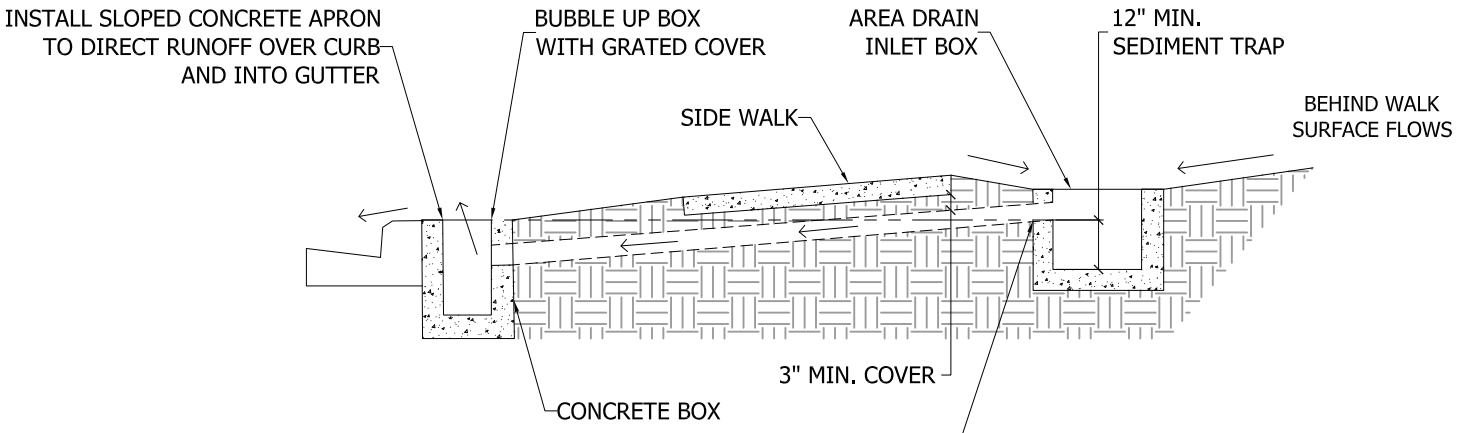
SHEET 1 OF 1

STANDARD DETAIL
P-316

NOT TO SCALE

REVISED DATE: 11/04/15





1. A PRETREATMENT DEVICE IS REQUIRED PRIOR TO DISCHARGE INTO PUBLIC SYSTEMS.
2. FLOW LINE OF OUTLET PIPE IS ALWAYS HIGHER THAN BUBBLE UP TOP OF GRATE ELEVATION.

provo PUBLIC WORKS
2016

AREA DRAIN BUBBLE UP

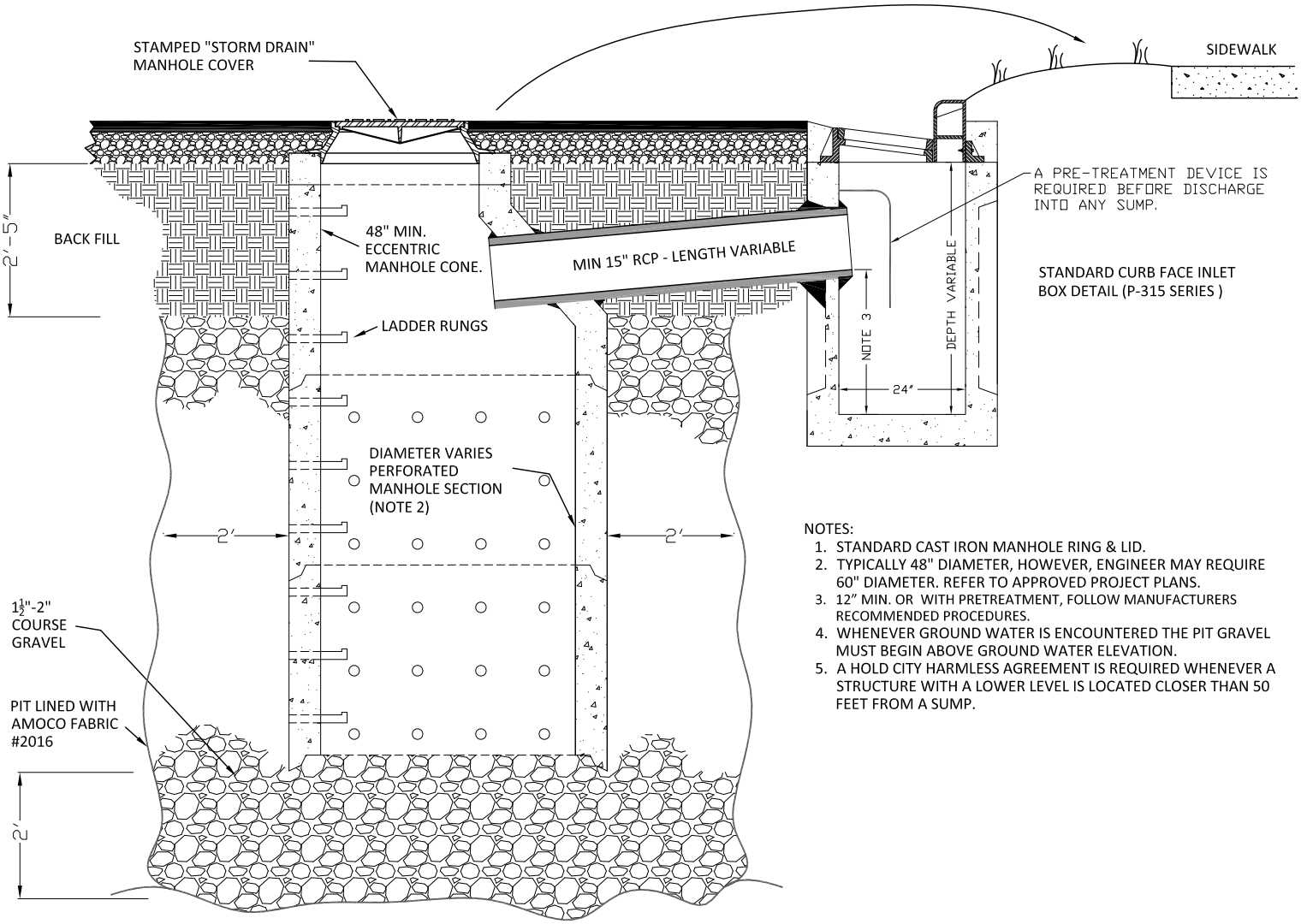
SHEET 1 OF 1

STANDARD DETAIL
P-372

NOT TO SCALE

REVISED DATE: 12/17/15

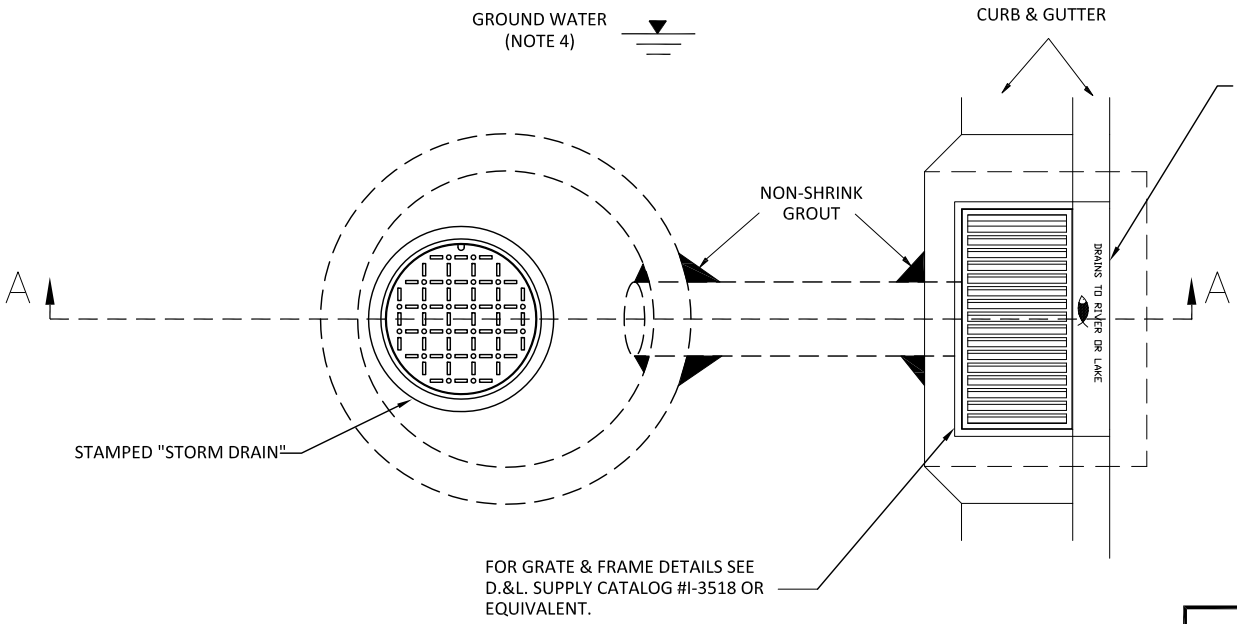
MANHOLE MAY ALSO BE PLACED BEHIND IN PLANTER AREA IF APPROVED BY ENGINEER.



STANDARD CURB FACE INLET BOX DETAIL (P-315 SERIES)

NOTES:

1. STANDARD CAST IRON MANHOLE RING & LID.
2. TYPICALLY 48" DIAMETER, HOWEVER, ENGINEER MAY REQUIRE 60" DIAMETER. REFER TO APPROVED PROJECT PLANS.
3. 12" MIN. OR WITH PRETREATMENT, FOLLOW MANUFACTURERS RECOMMENDED PROCEDURES.
4. WHENEVER GROUND WATER IS ENCOUNTERED THE PIT GRAVEL 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.



SHEET 1 OF 1

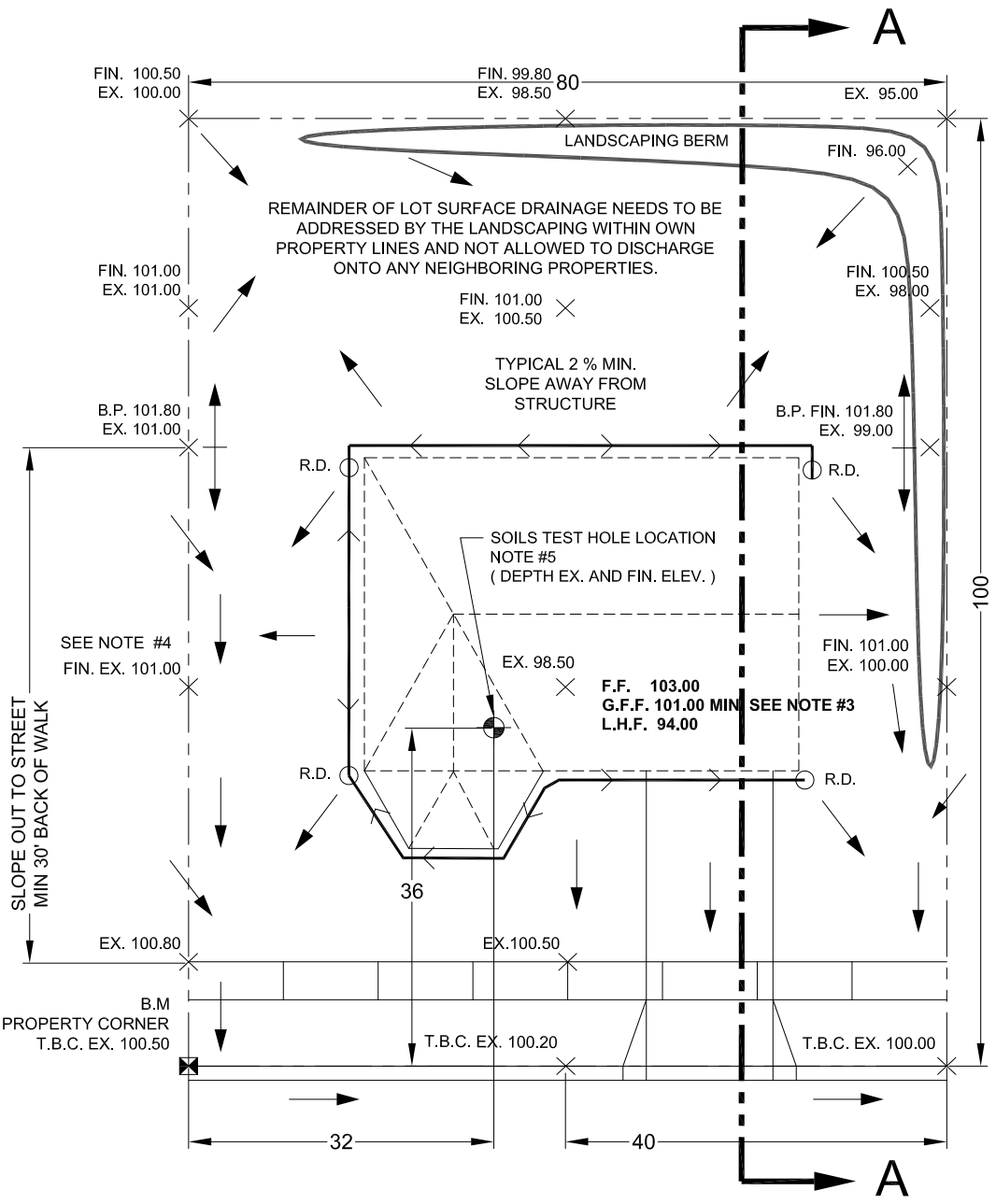
provo PUBLIC WORKS 2016

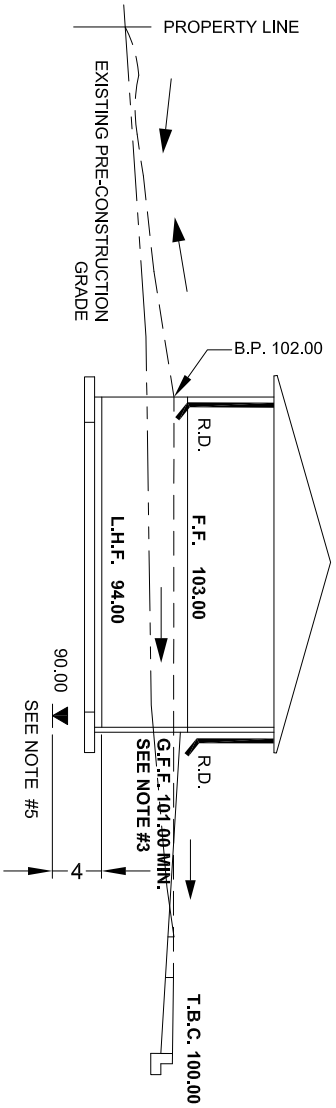
CURB AND GUTTER - DROP INLET AND SUMP

STANDARD DETAIL
P-375

NOT TO SCALE

REVISED DATE: 11/04/15





LEGEND

- B.P. - BREAK POINT
- T.B.C.- TOP BACK OF CURB
- DIRECTION OF FLOW ARROW
- GROUND WATER LEVEL
- E.X. - EXISTING OR PRE-CONSTRUCTION ELEVATION
- SPOT ELEVATIONS (40 FOOT MAXIMUM DISTANCE APART FOR SPOT ELEVATIONS)
- B.M. - BENCH MARK, LOWEST TOP OF WALK OR PERMANENT FEATURE
- R.D. - ROOF DOWN SPOUT (DISCHARGE ROOF WELL BEYOND FOOTING BOUNDARIES)

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

provo PUBLIC WORKS 2016

LOT GRADING PLAN

STANDARD DETAIL
P-390
NOT TO SCALE
REVISED DATE: 10/29/13

Lot grading plan notes

1. **GENERAL**
   A. 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 proposal with existing and final elevation information.

2. **EXECUTION**
   A. Drain as much impervious surface area and surface flows as possible out to the street fronting the lot. This includes the following; all front of building, as much roof as possible, drive way, walks, and so forth. All remainder is then to be addressed within own lot boundaries and not discharged into any neighboring properties.
   B. Garage finish floor is to be a minimum of 12 inches higher than the flow line of gutter, refer to Provo standard drawing P-394.
   C. Identify existing spot elevations of 5-6 different locations spaced 20 feet apart on site with no more than 40 feet maximum spacing. Provide final grade elevations for same spots and others where grade changes significantly.
   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. There must be at least 4 feet separation from the basement and the identified high ground water elevation. Please, refer to the soils letter request document for other minimal requirements. Identify all test hole locations and depths relative to a permanent feature on lot. IE top of curb at property corner, top of walk, water meter, top of fire hydrant, man hole etc.

provo PUBLIC WORKS 2016

LOT GRADING PLAN NOTES

STANDARD DETAIL
P-390
NOT TO SCALE
REVISED DATE: 12/02/15

LOT GRADING PLAN

1. DESCRIPTION: 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 PROPOSAL WITH EXISTING AND FINAL ELEVATION INFORMATION.

2. APPLICATION: DRAIN AS MUCH IMPERVIOUS SURFACE AREA AS POSSIBLE TO SURFACE FLOW OUT TO THE STREET FRONTING THE LOT. THIS INCLUDES ALL FRONT OF HOME, AS MUCH ROOF RUNOFF AS POSSIBLE, DRIVE WAY, WALKS, AND SO FORTH. ANY REMAINDER IS THEN TO BE ADDRESSED WITHIN OWN LOT BOUNDARIES AND NOT DISCHARGE INTO ANY NEIGHBORING PROPERTIES.

3. INSTALLATION/APPLICATION CRITERIA:
   A. GARAGE FINISH FLOOR IS TO BE A MINIMUM OF 12 INCHES HIGHER THAN FLOW LINE OF GUTTER, PROVO STANDARD DRAWING P-394.
   B. IDENTIFY EXISTING ELEVATIONS OF 5-6 DIFFERENT LOCATIONS SPACED 20 FEET APART ON SITE WITH NO MORE THAN 40 FEET MAXIMUM SPACING BETWEEN THE SPOT ELEVATIONS.
   C. ANY TIME THERE IS A PROPOSED LOWER LEVEL IN A STRUCTURE A SOILS LETTER MAY BE NEEDED TO DETERMINE THE GROUND WATER ELEVATION. PLEASE REFER TO SOILS LETTER REQUEST DESCRIPTION FOR MINIMUM REQUIREMENTS.
      C.1. TIE DOWN THE SOILS TEST HOLE LOCATION FROM A PERMANENT FEATURE ON THE PROPOSED SITE (IE. TOP OF CURB, TOP OF WALK, PROPERTY CORNER, FIRE HYDRANT, WATER METER, MAN HOLE...ETC.).
      C.2. CALL OUT THE START ELEVATION AND DEPTH EXPLORED FOR THE SOILS REPORT. THIS DEPTH MUST BE A MINIMUM OF 4 FEET BELOW THE FINISH FLOOR ELEVATION OF THE LOWEST LEVEL.
      C.3. CALL OUT THE GROUND WATER ELEVATION. THE FINISH FLOOR ELEVATION OF THE LOWEST LEVEL MUST BE AT LEAST 4 FEET ABOVE THE GROUND WATER ELEVATION.

provo PUBLIC WORKS
2016

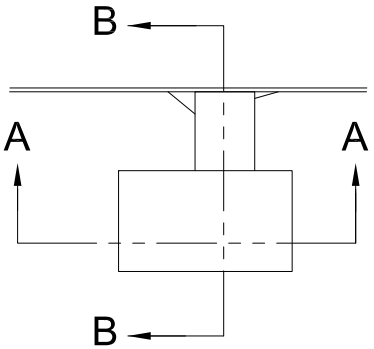
LOT GRADING PLAN NOTES

STANDARD DETAIL
P-390
NOT TO SCALE
REVISED DATE: 12/02/15

provo PUBLIC WORKS

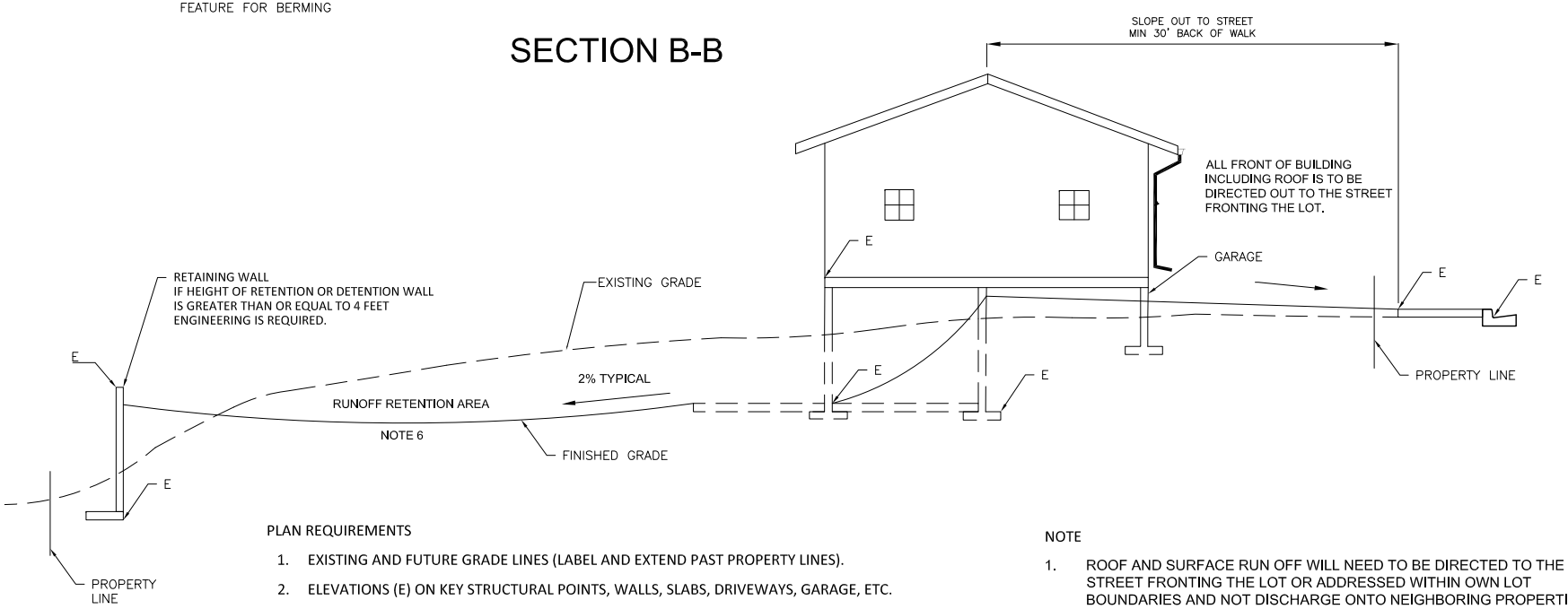
2016

LOT GRADING PLAN PROFILES



SECTION A-A

SECTION B-B



PLAN REQUIREMENTS

1. EXISTING AND FUTURE GRADE LINES (LABEL AND EXTEND PAST PROPERTY LINES).
2. ELEVATIONS (E) ON KEY STRUCTURAL POINTS, WALLS, SLABS, DRIVEWAYS, GARAGE, ETC.
3. RETAINING WALLS WITH CROSS SECTION AND ENGINEER'S SEAL OR CERTIFICATION.
4. WATERWAYS SUCH AS DITCHES, CANALS, DRAINAGE SWALES, SUMPS, ETC.
5. OTHER REQUIREMENTS AS PER GEOTECHNICAL INVESTIGATION REPORTS IF REQUIRED.
6. THIS AREA MUST BE OF SUFFICIENT SIZE FOR THE AMOUNT OF SURFACE WATER COLLECTED ON SITE

NOTE

1. ROOF AND SURFACE RUN OFF WILL NEED TO BE DIRECTED TO THE STREET FRONTING THE LOT OR ADDRESSED WITHIN OWN LOT BOUNDARIES AND NOT DISCHARGE ONTO NEIGHBORING PROPERTIES.
2. FOR DRIVE APPROACH REFER TO PROVO STANDARD P-394 OPTION 1

STANDARD DETAIL

P-391

NOT TO SCALE

REVISED DATE: 10/22/15

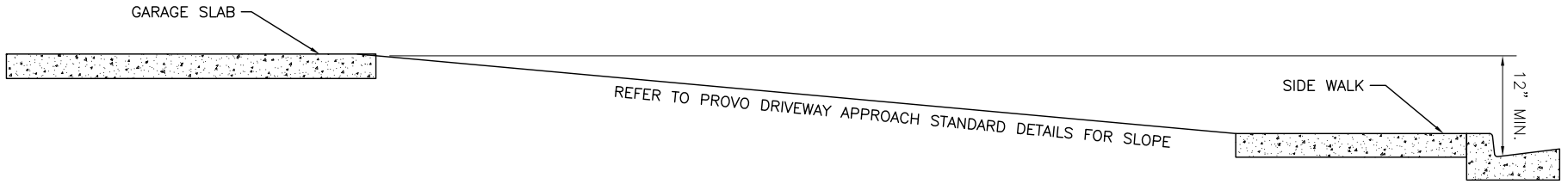
SHEET 1 OF 1

provo PUBLIC WORKS

2016

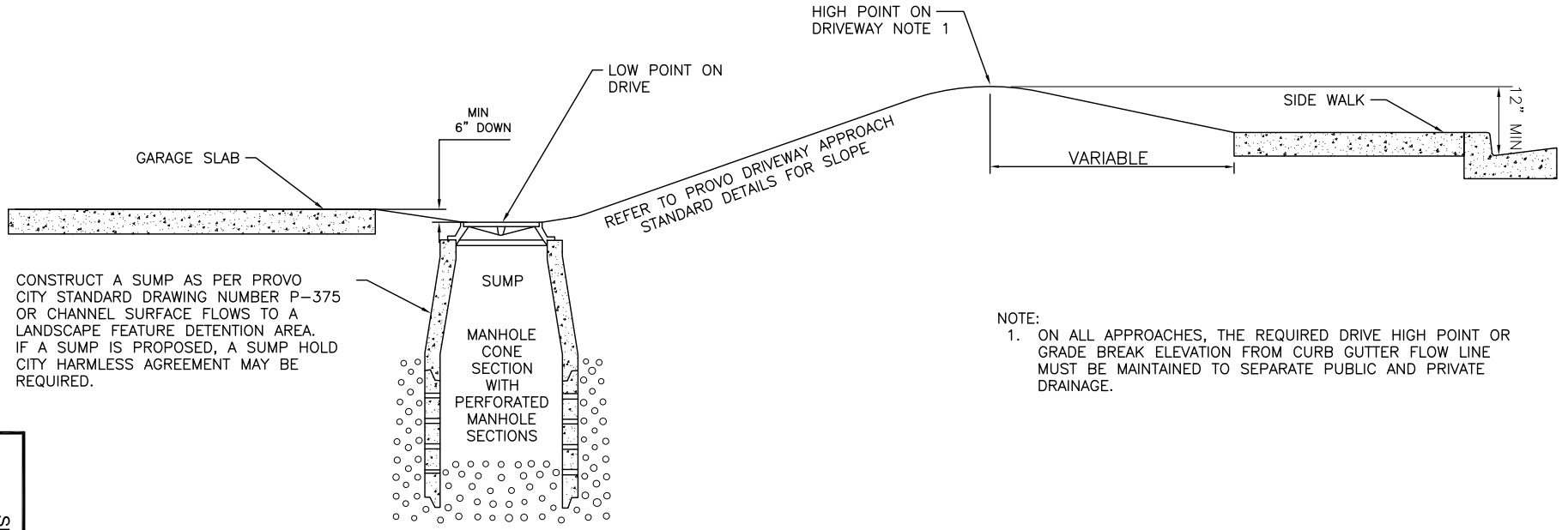
DRIVEWAY DRAINAGE PROFILES

OPTION 1 (PREFERRED)



FOR DIFFERENT APPROACH TYPES REFER TO THE APPROPRIATE PROVO CITY DRIVE APPROACH DETAIL

OPTION 2



NOTE:

1. ON ALL APPROACHES, THE REQUIRED DRIVE HIGH POINT OR GRADE BREAK ELEVATION FROM CURB GUTTER FLOW LINE MUST BE MAINTAINED TO SEPARATE PUBLIC AND PRIVATE DRAINAGE.

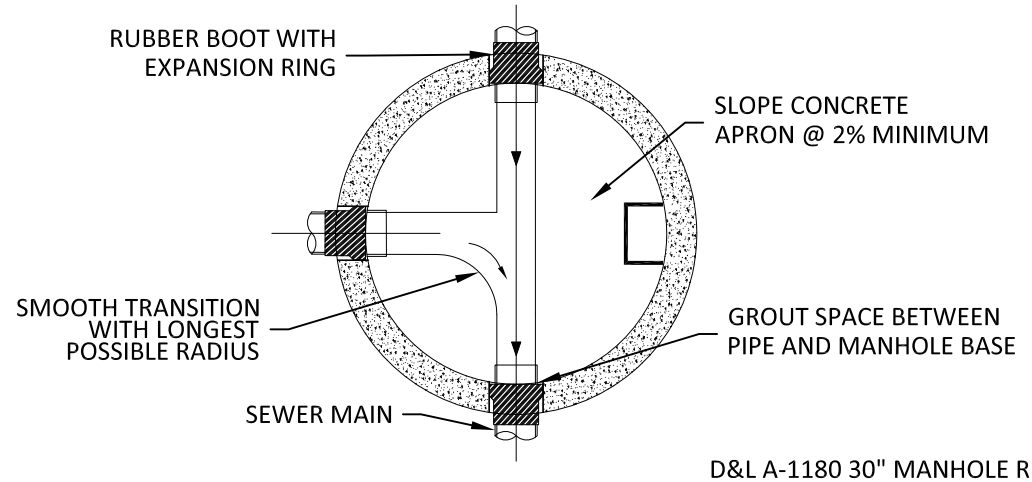
STANDARD DETAIL

P-394

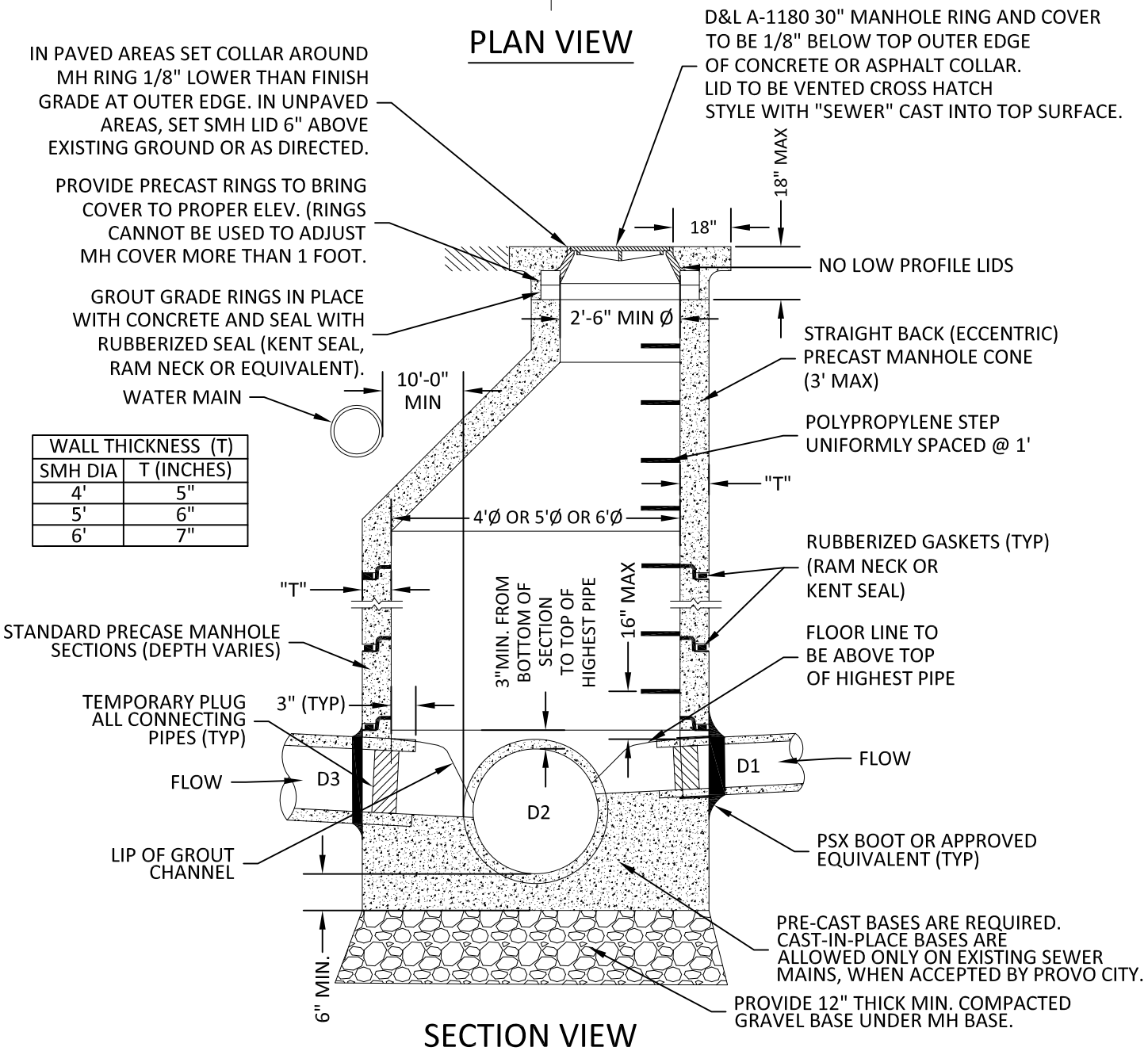
NOT TO SCALE

REVISED DATE: 09/22/15

SHEET 1 OF 1



PLAN VIEW



WALL THICKNESS (T)	
SMH DIA	T (INCHES)
4'	5"
5'	6"
6'	7"

SECTION VIEW

SHEET 1 OF 2

provo PUBLIC WORKS 2016

STANDARD MANHOLE

STANDARD DETAIL
P-411
NOT TO SCALE
REVISED DATE: 11/25/2015

Sanitary sewer manhole

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.

1) Diameter is 5 feet. Use of 4 feet diameter manholes in private systems or when approved by Provo City when site constraints dictate.

2) Diameter is 6 feet: For sewers over 24 inches, or when directed by Provo City.

2. PRODUCTS

A. Gravel: Use 1 inch minus gravel.

B. Backfill: Common fill, APWA 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. Reinforcement: Deformed, 60 ksi yield grade steel, ASTM A 615.

G. Grout: 2 parts sand to 1 part cement mortar, ASTM C 1329.

H. Stabilization-Separation Geotextile: Moderate or high at CONTRACTOR's choice, APWA Section 31 05 19.

3. EXECUTION

A. Foundation Stabilization: Get ENGINEER's permission to use a sewer rock or a granular backfill borrow in a geotextile wrap to stabilize an unstable foundation.

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 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 gasket-type sealant in all riser joints. Finish with grout.

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.

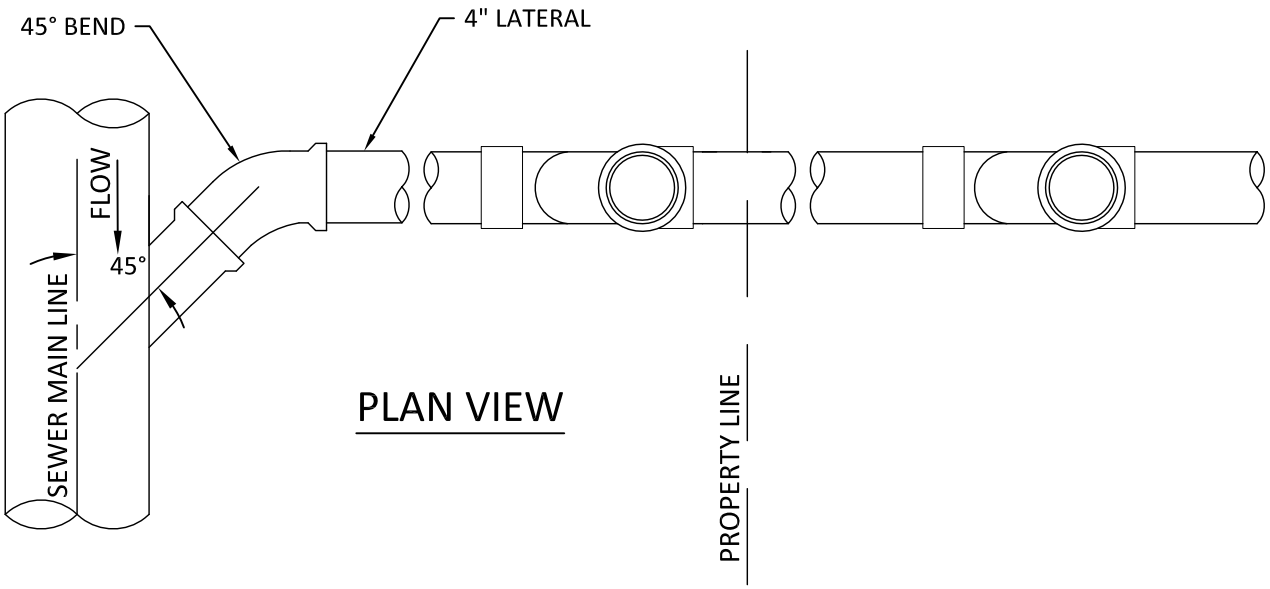
J. Backfill: Provide backfill against the manhole shaft. Pea gravel and recycled RAP aggregate is NOT ALLOWED. Water jetting is NOT allowed. Adhere to all backfilling and surface restoration requirements included in Plan P-255.

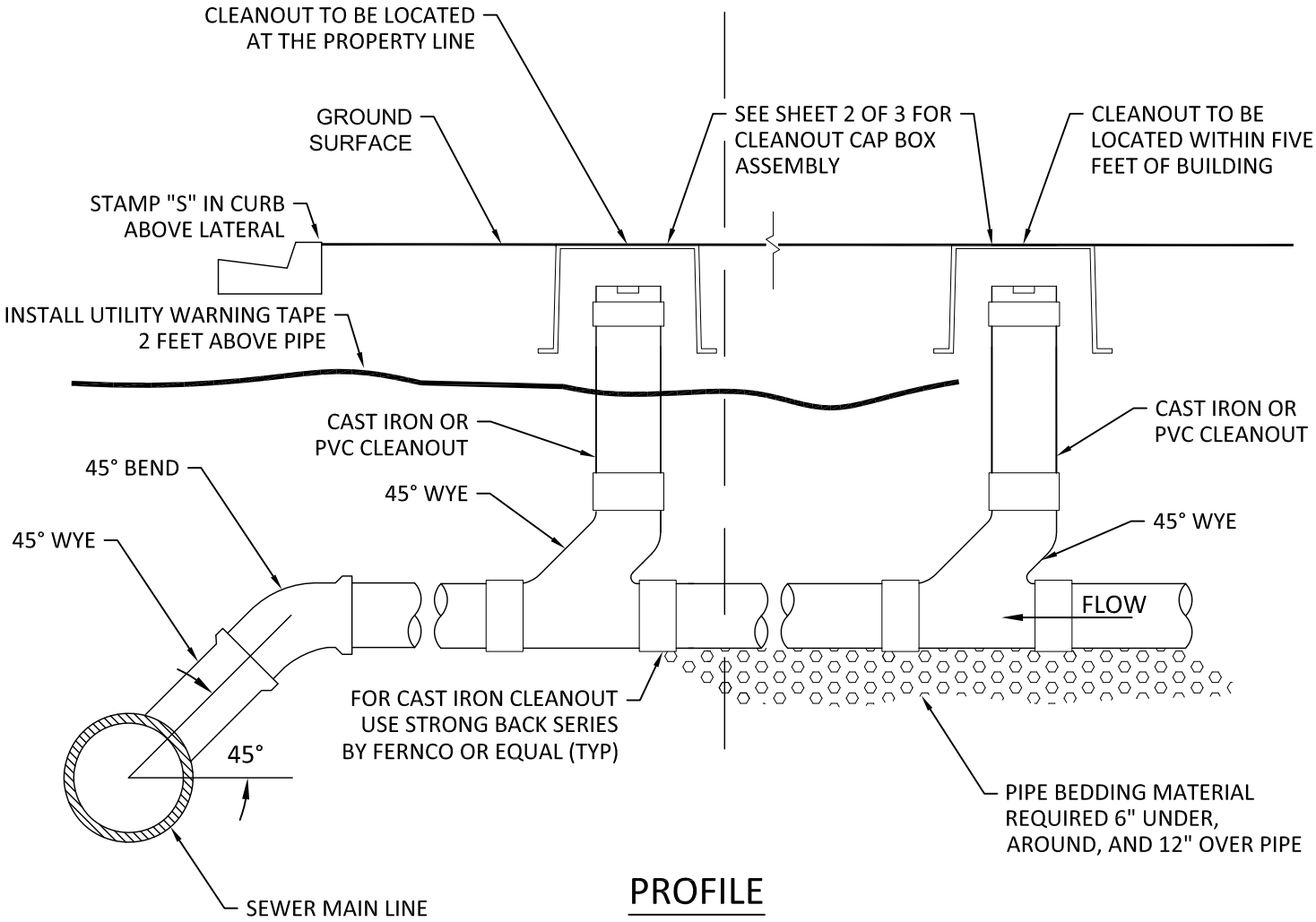
K. After all grading around manhole has been completed and final surfacing is in place, remove debris and temporary plugs.

provo PUBLIC WORKS 2016

STANDARD MANHOLE

STANDARD DETAIL
P-411
NOT TO SCALE
REVISED DATE: 11/25/2015

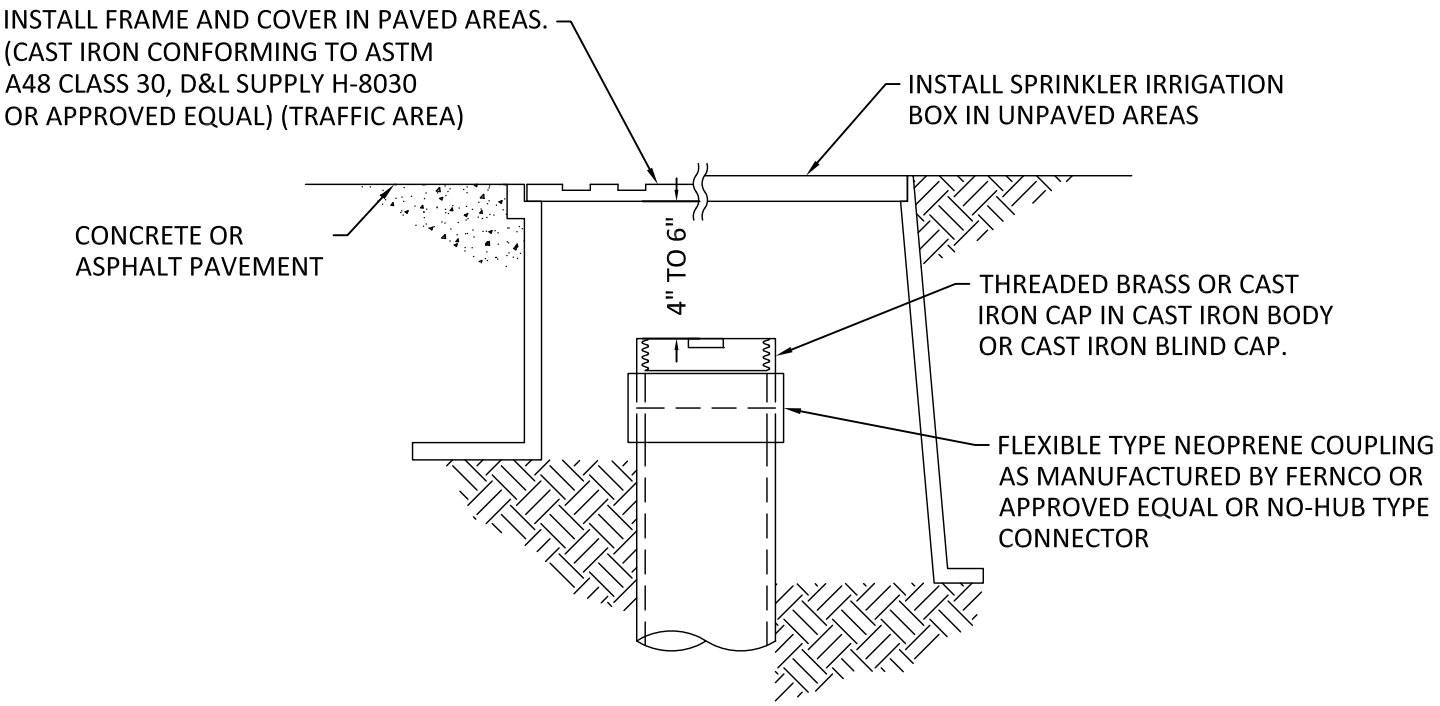




provo PUBLIC WORKS 2016

STANDARD SEWER SERVICE CONNECTION AND CLEAN-OUT

STANDARD DETAIL
P-431a
NOT TO SCALE
REVISED DATE: 11/25/2015



provo PUBLIC WORKS 2016

STANDARD SEWER SERVICE CONNECTION AND CLEAN-OUT

STANDARD DETAIL
P-431b
NOT TO SCALE
REVISED DATE: 11/25/2015

Sewer lateral connection

1. GENERAL

A. Laterals shall be 4 inch diameter minimum. 6" lateral or larger lateral required for buildings with more than 5 equivalent residential units. Separate laterals required for each building. Provo City approval required for all combined sewer laterals.

B. Laterals shall be extended from main lines to 12 feet inside of the property lines or 5 feet behind the sidewalk, whichever is greater.

C. Minimum distance between 4 inch lateral connections shall be 4 feet.

D. Required grade of sewer laterals 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 at 1% grade when approved by Provo City.

E. Clean-outs shall be installed every 100 feet, at the property line and within five feet from the building to be served.

F. If building construction is not imminent, construct the clean-out at the property line, extend the lateral 5' behind the sidewalk, cap and mark for future connection.

2. PRODUCTS

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, APWA Section 31 05 13M. Maximum particle size 2-inches.

C. Provide agency approved wye or tee with appropriate donut.

D. Stainless steel straps required.

E. Cast Iron: Strong back RC series by Fernco with four stainless steel clamps or equal required for all plain end pipe connections.

F. 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.

G. Manhole mainline connections: All 6 inch and larger 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. Remove core plug from sewer main. Do not break into sewer main to make connection.

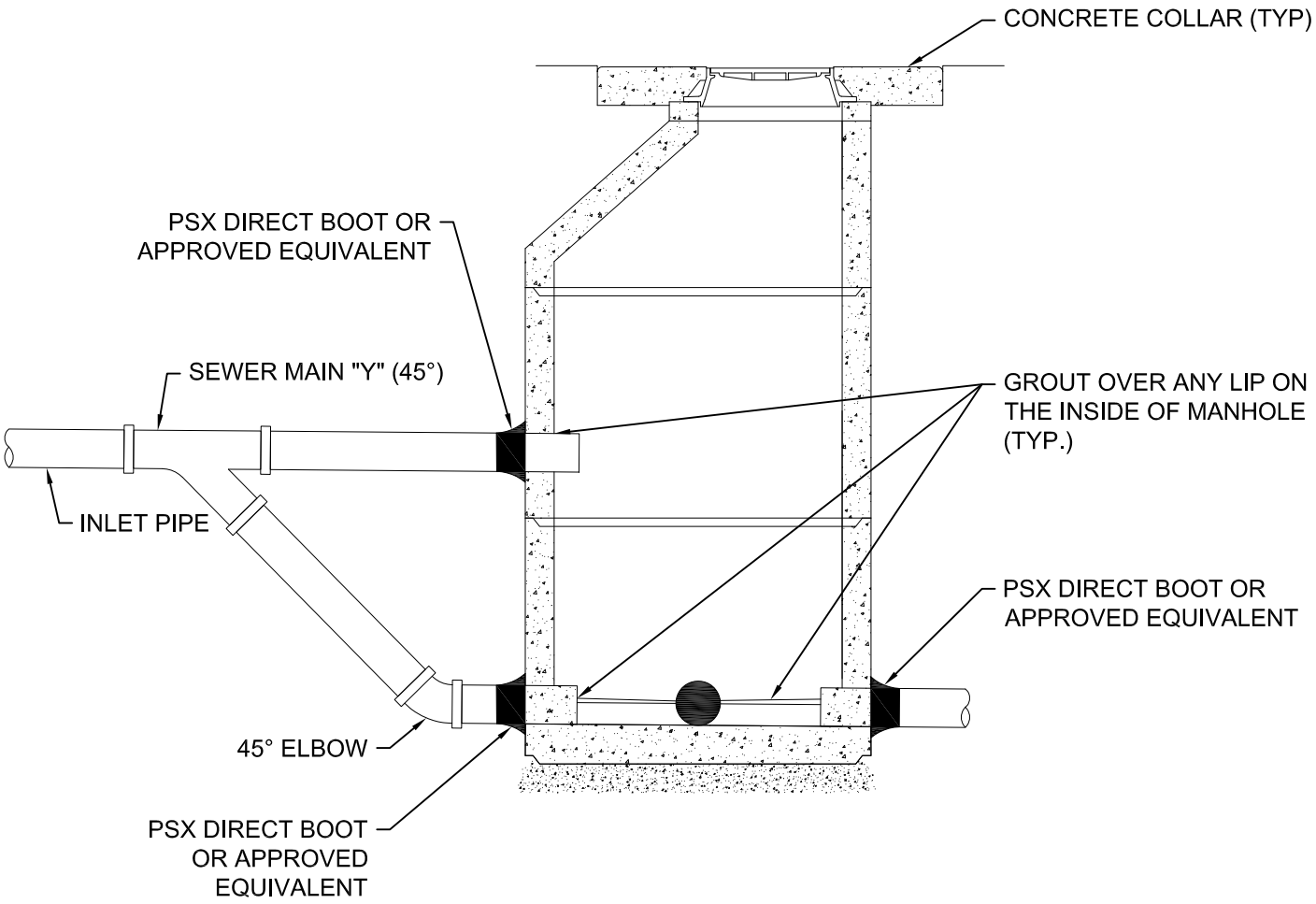
D. CONTRACTOR shall make connections with inspection by Provo City. Before backfilling, secure inspection of installation by ENGINEER.

E. Provide backfill and surface restoration per Plan P-255.

provo PUBLIC WORKS 2016

STANDARD SEWER SERVICE CONNECTION AND CLEAN-OUT

STANDARD DETAIL
P-431
NOT TO SCALE
REVISED DATE: 11/25/2015



provo PUBLIC WORKS 2016

PIPE DROP

STANDARD DETAIL
P-433
NOT TO SCALE
REVISED DATE: 11/25/2015

Pipe drop

1. **GENERAL**
   A. Manhole must meet all the requirements for a standard manhole (P-411) in addition to the drop manhole requirements.
   B. Size of drop pipe is to be the same diameter as sewer mainline pipe that it serves.
   C. Drop manholes only allowed with specific permission by Provo City.
2. **PRODUCTS**
   A. Concrete: Class 4000, APWA Section 03 30 04.
   B. Anchors: Use stainless steel anchors that are acceptable to ENGINEER.
3. **EXECUTION**
   A. At the match point, match the 3/4 diameter points of the pipes.
   B. Extend concrete encasement to first joint beyond excavation for drop connection.

provo PUBLIC WORKS 2016

PIPE DROP

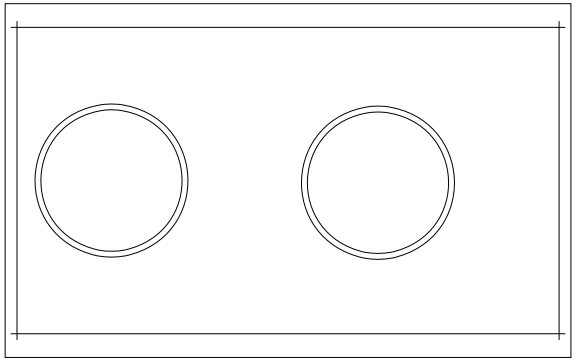
STANDARD DETAIL
P-433
NOT TO SCALE
REVISED DATE: 11/25/2015

provo PUBLIC WORKS

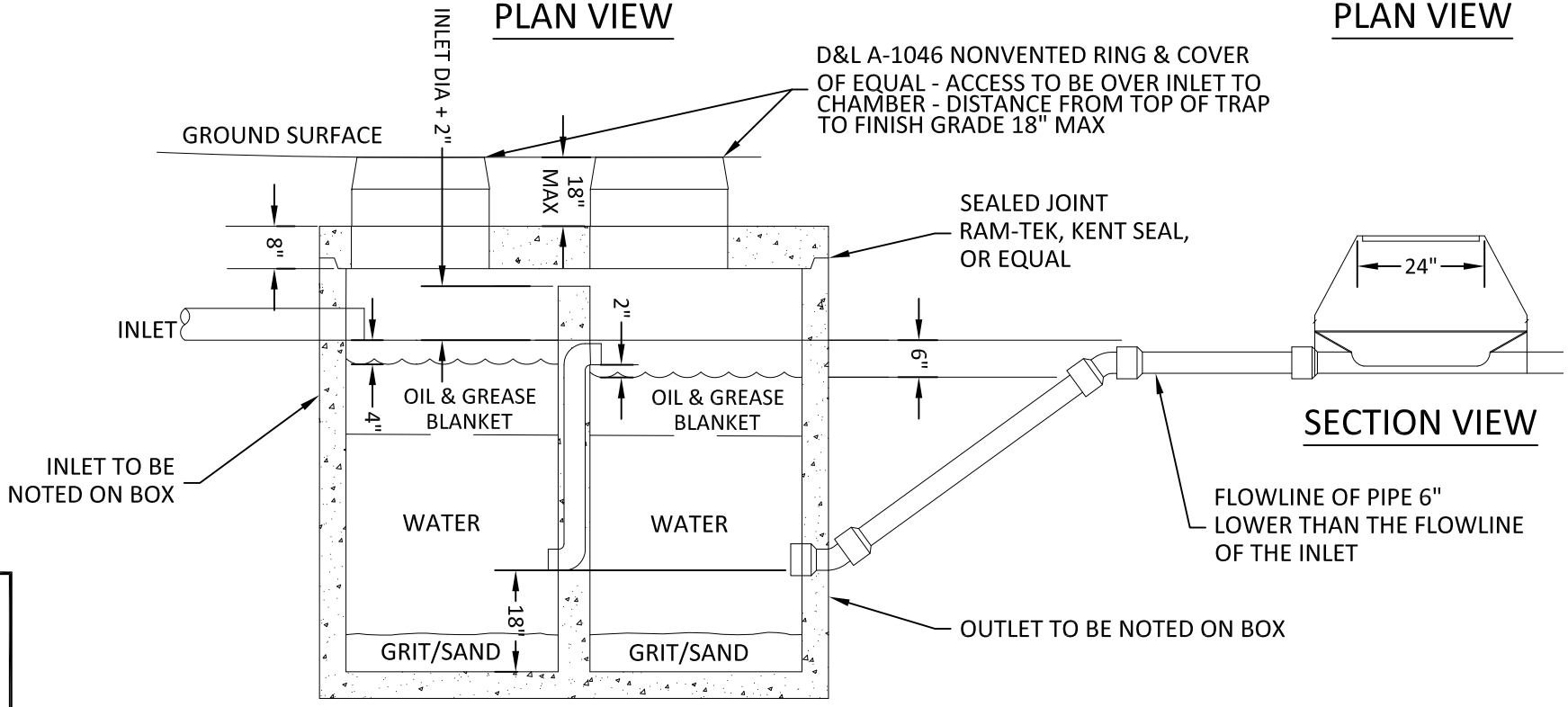
2016

GREASE TRAP AND SAMPLING MANHOLE

GREASE TRAP



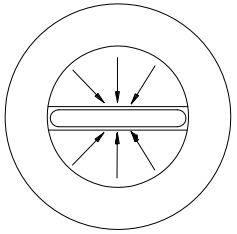
PLAN VIEW



SECTION VIEW

SAMPLING MANHOLE

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%.



PLAN VIEW

SECTION VIEW

STANDARD DETAIL

P-441

NOT TO SCALE

REVISED DATE: 11/25/2015

Grease trap

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. Carwashes to have a minimum 300 gallon sediment volume sump with BMP SNOUT® pretreatment device or equal upstream of separator per bay.

F. Automatic car washes will require a 600 gallon sediment volume sump with a BMP SNOUT® pretreatment device or equal upstream of separator per bay.

G. Size to be determined by Plumbing Code unless otherwise by Pretreatment Coordinator. 750 gallon minimum.

H. Alternate traps may be submitted for approval. Provide product information including removal rates.

2. PRODUCTS

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, APWA 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 it 6-inches before compaction. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.

B. Reinforcement Placement: APWA Section 03 20 00.

C. Concrete Placement: APWA Section 03 30 10. 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.

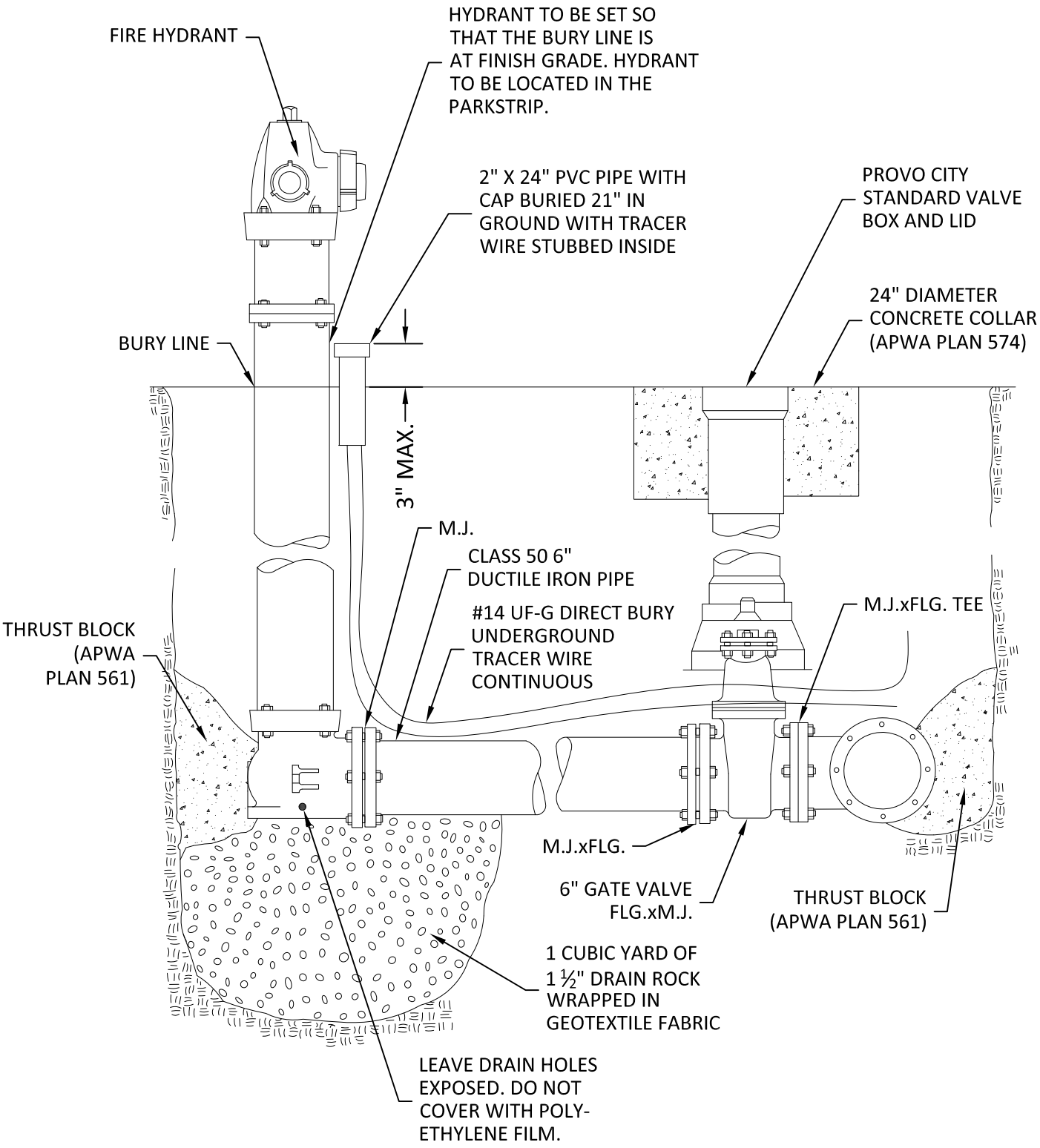
provo PUBLIC WORKS 2016

GREASE TRAP AND SAMPLING MANHOLE

STANDARD DETAIL
P-441

NOT TO SCALE

REVISED DATE: 11/25/2015



provo PUBLIC WORKS 2016

FIRE HYDRANT

STANDARD DETAIL
P-511
NOT TO SCALE
REVISED DATE: 11/10/2015

Fire hydrant with valve

1. GENERAL

A. Before backfilling, secure inspection of installation by ENGINEER.

B. Additional requirements are specified in APWA Section 33 11 00.

C. On dead end line, locate shut off valve within 18 feet from the fire hydrant.

2. PRODUCTS

A. Hydrant: Dry barrel, AWWA C502; Waterous WB-67, Mueller A-423 or AVK 2780 Nostalgic.

B. Polyethylene Wrap: All metal including pipe, couplings, joints, and valves shall be sleeved or wrapped with 8 mil. Polyethylene film.

C. Thrust Bocks: Concrete Class 4000, APWA Section 03 30 04.

D. Reinforcement: Deformed, 60 ksi yield grade steel, ASTM A 615.

E. Backfill: APWA Section 31 05 13M. Maximum particle size 2-inches.

1)Sand Bedding: All waterlines are to be bedded in sand for a distance of one foot on all sides.

2)Drain Rock: ASTM Size No. 3 (2" to 1 ") or larger.

3)Other Type of Common Fill: per specification.

F. Geotextile: Stabilization-separation fabric, APWA Section 31 05 19.

G. Color: Fire hydrant is to be factory coated red.

H. Tracer wire: #14 UF-G direct bury red or blue tracer wire required on all water lines. Wire to surface at base of fire hydrants and at all main line 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. Tracer wire does not need to be brought up at shut off valves to fire hydrants. However, it should be brought up at the hydrant as shown.

3. EXECUTION

A. Installation:

1)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 silting of sewer rock.

2)Apply non-oxide grease to all buried metal surfaces. Wrap with polyethylene sheet and tape wrap.

3)Provide 12 inch sand bedding around all piping.

4)Notify fire department at (801) 852-6300 as soon as hydrant is placed in service.

B. Thrust Blocks:

1)Before pouring concrete, wrap pipe system with polyethylene sheet to prevent bonding of concrete to pipe system.

2)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 by Provo City Water Resources employees, even in emergencies. For assistance call (801) 852-6780.

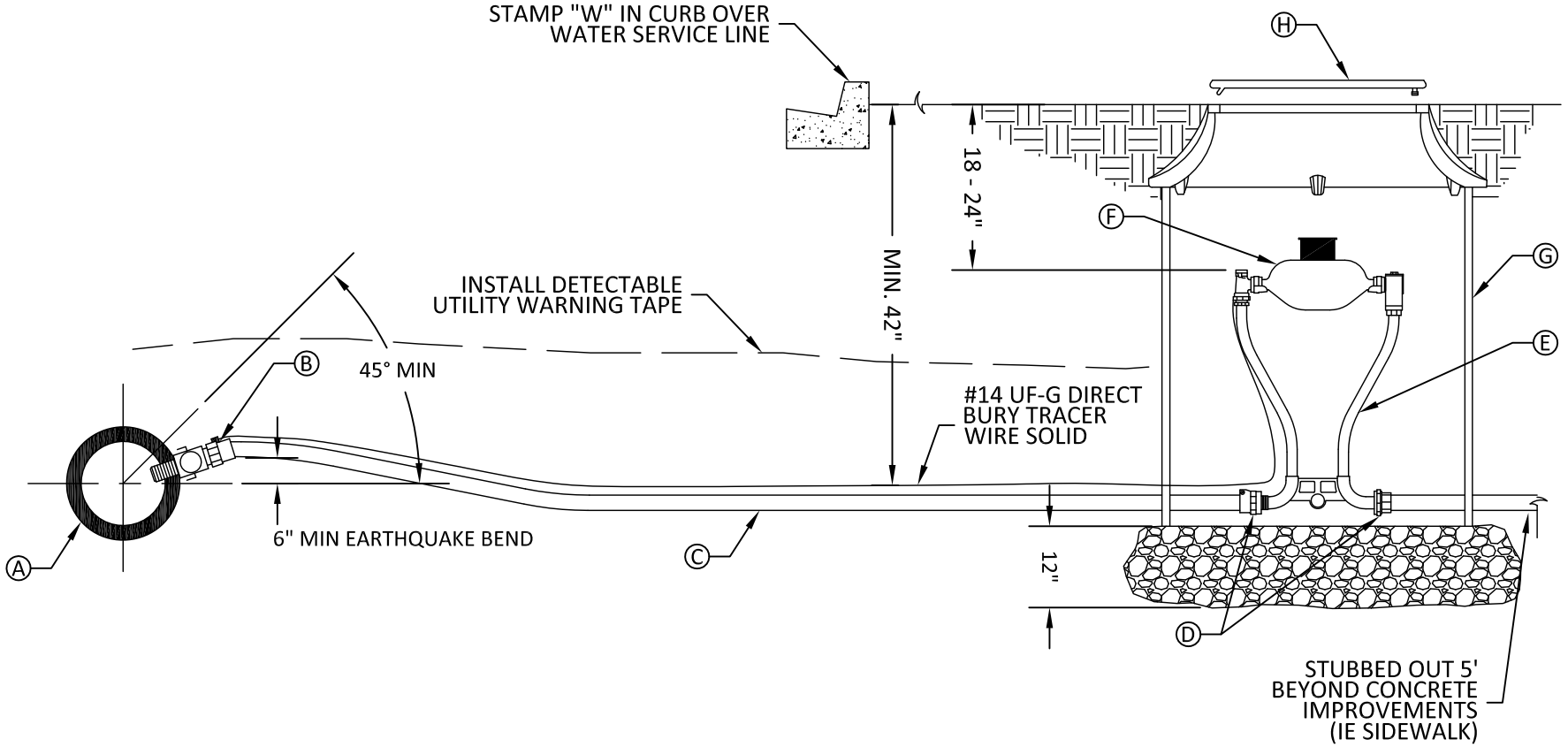
provo PUBLIC WORKS 2016

FIRE HYDRANT

STANDARD DETAIL
P-511
NOT TO SCALE
REVISED DATE: 11/25/2015

provo PUBLIC WORKS
2016

3/4" AND 1" METER



LEGEND		
No.	ITEM	DESCRIPTION
Ⓐ	CONNECTION TO MAIN	DIRECT TAP DUCTILE IRON / USE DOUBLE STRAP SADDLE ON PVC (PVC ALLOWED BY SPECIAL PERMISSION ONLY)
Ⓑ	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)
Ⓒ	PIPE	COPPER - TYPE "K" SOFT OR BLUE PC 200, DR9 POLYETHYLENE TUBING MEETING AWWA C901 & NSF 61 WITH #14 TRACER WIRE AND METAL INSERTS
Ⓓ	ADAPTER	BRASS - MALE x COMPRESSION
Ⓔ	METER YOKE	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
Ⓕ	METER	NEPTUNE AMI SMART METER WITH ANTENNA TO BE INSTALLED BY CITY. PROTECT FROM DAMAGE
Ⓖ	METER BOX	CMP, OR WHITE HDPE (21" DIA x 30" HEIGHT (MIN))
Ⓗ	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

STANDARD DETAIL
P-521
NOT TO SCALE
REVISED DATE: 11/25/2015

3/4" and 1" meter

1. GENERAL

A. Do not install meter in driveways, sidewalks or curb and gutter without express permission from Provo City.

B. 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.

C. 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 (801) 852-6780 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 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.

2. PRODUCTS

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, APWA 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:

1) 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.

2) 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. Lid must be to grade before meter will be installed.

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.

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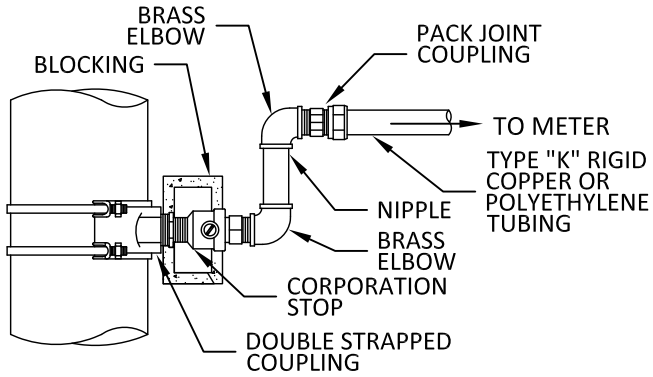
3/4" AND 1" METER

STANDARD DETAIL
P-521
NOT TO SCALE
REVISED DATE: 11/25/2015

provo PUBLIC WORKS

2016

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



PLAN

PROFILE

LEGEND

No.	ITEM	DESCRIPTION
Ⓐ	CONNECTION TO MAIN	USE DOUBLE STRAP BRASS SADDLE IN ALL CASES AND DOUBLE SWING WHEN USING RIGID COPPER TUBE
Ⓑ	CORPORATION STOP	BRASS - IRON PIPE THREAD WITH TRACER WIRE NUT
Ⓒ	PIPE	RIGID COPPER - OR PC 160, DR9 POLYETHYLENE TUBING MEETING AWWA C901 AND NSF61 WITH #14 TYPE UFTRACER WIRE AND METAL INSERTS.
Ⓓ	ADAPTER	BRASS - MALE x COMPRESSION
Ⓔ	METER YOKE	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. INCLUDE BYPASS.
Ⓕ	METER	NEPTUNE AMI SMART METER WITH ANTENNA TO BE INSTALLED BY CITY. PROTECT FROM DAMAGE
Ⓖ	METER BOX	CMP, CONCRETE, OR HDPE (30" DIA x 30" HEIGHT (MIN))
Ⓗ	RING AND LID	D&L FOUNDRY AND SUPPLY L-2244 RING WITH L-2240-24 COVER AND L-2336 30" ADAPTOR RING IN LANDSCAPE AREAS; B-5343 RING OR A-1180 WITH A-1180 COVER & RECESSED NEPTUNE R450 UNIVERSAL HOLE IN CONCRETE AREAS

STANDARD DETAIL

P-522

NOT TO SCALE

REVISED DATE: 11/25/2015

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

1. GENERAL

A. Turbine meters are required on all systems used exclusively for irrigation or fire protection.

B. Where domestic use is applicable, use a standard City provided meter.

C. 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 (801) 852-6780 for a water meter to be installed. Access to water will be downstream and outside of the meter box. No jumpers allowed.

E. Maintain 4 feet between any connection larger than 1 inch and any other connection.

2. PRODUCTS

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, APWA 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:

1) 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.

2) 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. Lid must be to grade before meter will be installed.

D. Bypass Valve: Lock in off position.

E. Blocking: Use clay brick or concrete block.

F. Concrete Box:

1) Center frame and cover over water meter.

2) 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, 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.

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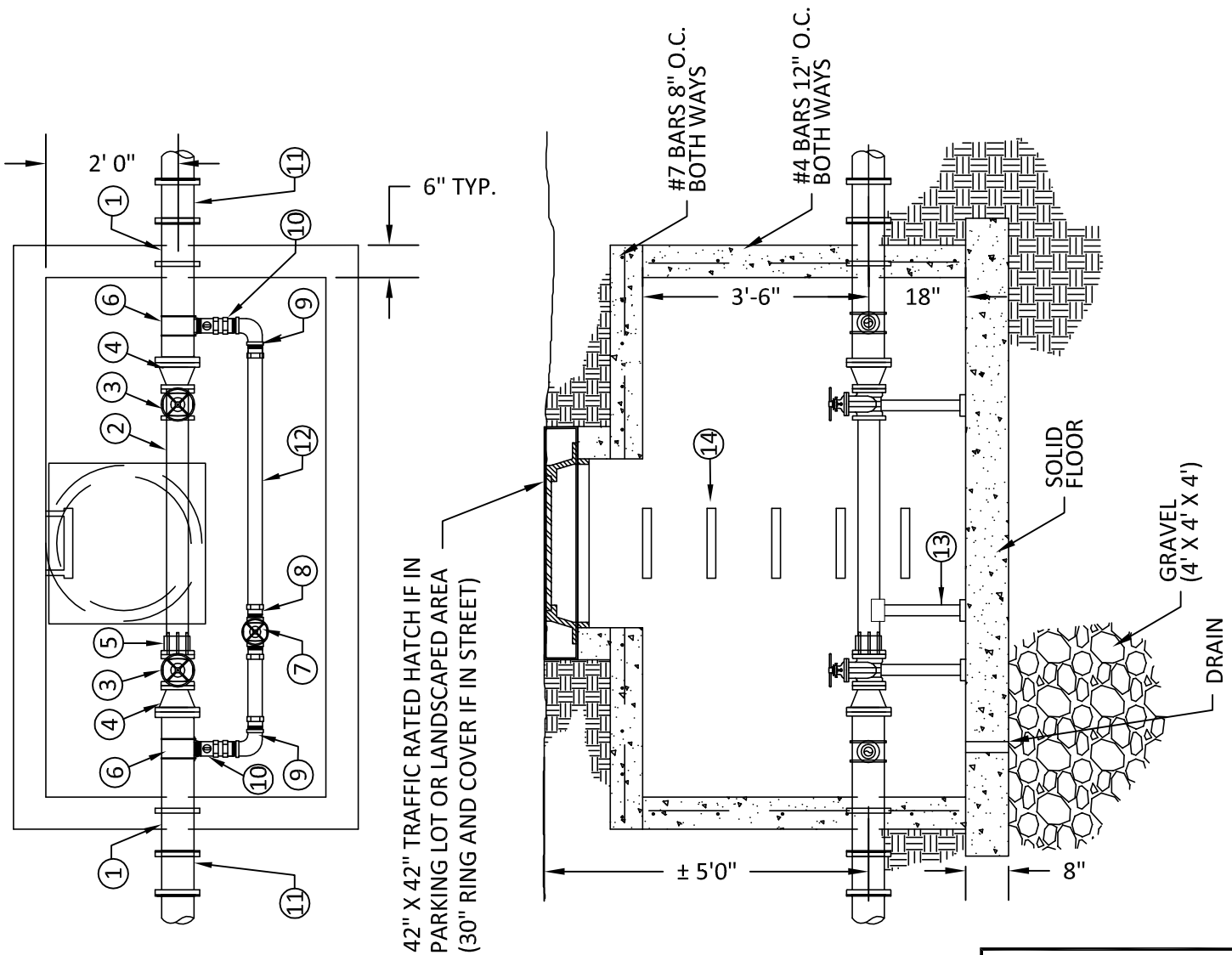
WATER SERVICE LATERAL LAYOUT 1 1/2" & 2"

STANDARD DETAIL
P-522
NOT TO SCALE
REVISED DATE: 11/25/2015

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 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.



provo PUBLIC WORKS

3", 4" AND 6" METER VAULT AND PIPING

STANDARD DETAIL
P-525
NOT TO SCALE
REVISED DATE: 11/25/2015

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

1. GENERAL

A. Configuration may be changed at ENGINEER's discretion.

B. Additional requirements are specified in APWA Section 33 12 16.

C. Meter placement in street only with Provo City approval.

D. If use is such that water cannot be shut off, a bypass with a backflow prevention device is required.

E. Meter to be supplied and installed by Provo City.

F. Backflow prevention assembly required in separate vault downstream of meter connection or in a mechanical room before any other connection.

G. Other backflow requirements may apply. For more information, contact Provo City Cross Connection Program Coordinator at (801) 852-6788.

H. To get access to water, contact Provo City at (801) 852-6780 for a water meter to be installed. Access to water will be downstream and outside of the meter box. No jumpers allowed.

I. 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.

2. PRODUCTS

A. Small Fittings: Brass. Do not use galvanized materials.

B. Blocking: Clay brick or concrete block.

C. Backfill: Common fill, APWA Section 31 05 13M. Maximum particle size 2-inches.

D. Drain Gravel: Sewer rock, ASTM size no. 3 (2" to 1") or equal, APWA 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.

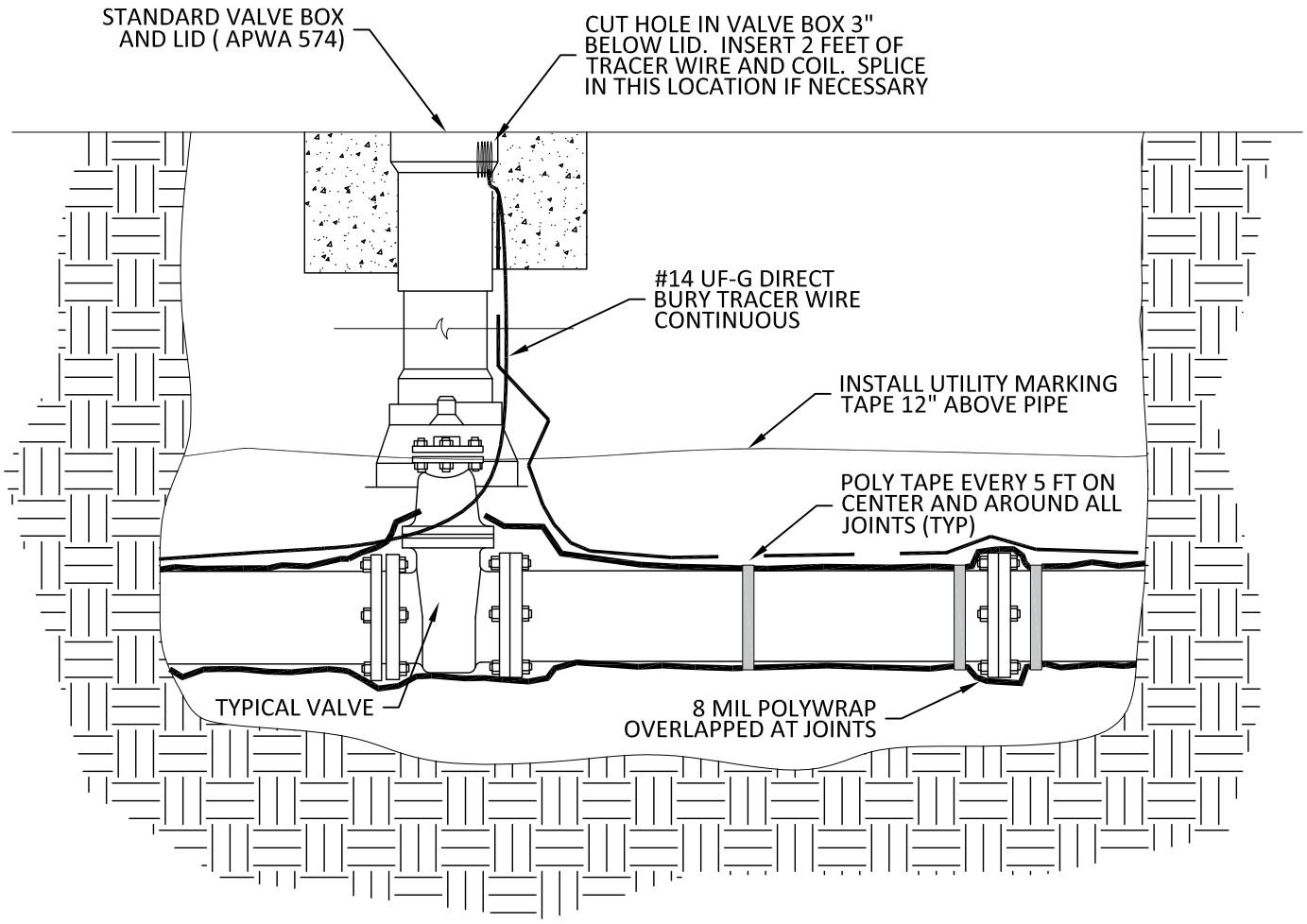
C. Bed service line in one foot of sand all directions.

D. Allow 1-inch clearance around waterline where water line passes through concrete box wall. Seal opening with compressible seal.

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.



provo PUBLIC WORKS
2016

WATER MAINLINE, POLYWRAP, & TRACER WIRE

STANDARD DETAIL
P-594
NOT TO SCALE
REVISED DATE: 11/25/2015

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.

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. Wire to surface at base of fire hydrants and at all main line 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. Tracer wire does not need to be brought up at shut off valves to fire hydrants. However, it should be brought up at the hydrant.

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, APWA Section 31 05 13. Maximum particle size 2-inches.

3. EXECUTION

A. Bed water mainline in one foot of sand all directions.

B. Poly Tape:

a. Tape around valves.

b. Tape any cuts or tears.

c. Tape wire on top center of pipe outside of the polywrap.

B. Place valves at property lines. On existing construction valves may be placed 3 feet from tee when expressly allowed by Provo City.

C. Provide 2 feet of excess wire inside valve box.

D. When splicing tracer wire, use a grease filled connector. All splices should occur within a valve box of 2 inch PVC pipe next to fire hydrants. Wire is to be continuous underground. Underground splices may only be used by specific permission from Provo City and must be inspected before backfill.

E. Inspection: Before backfilling, secure inspection of installation by ENGINEER.

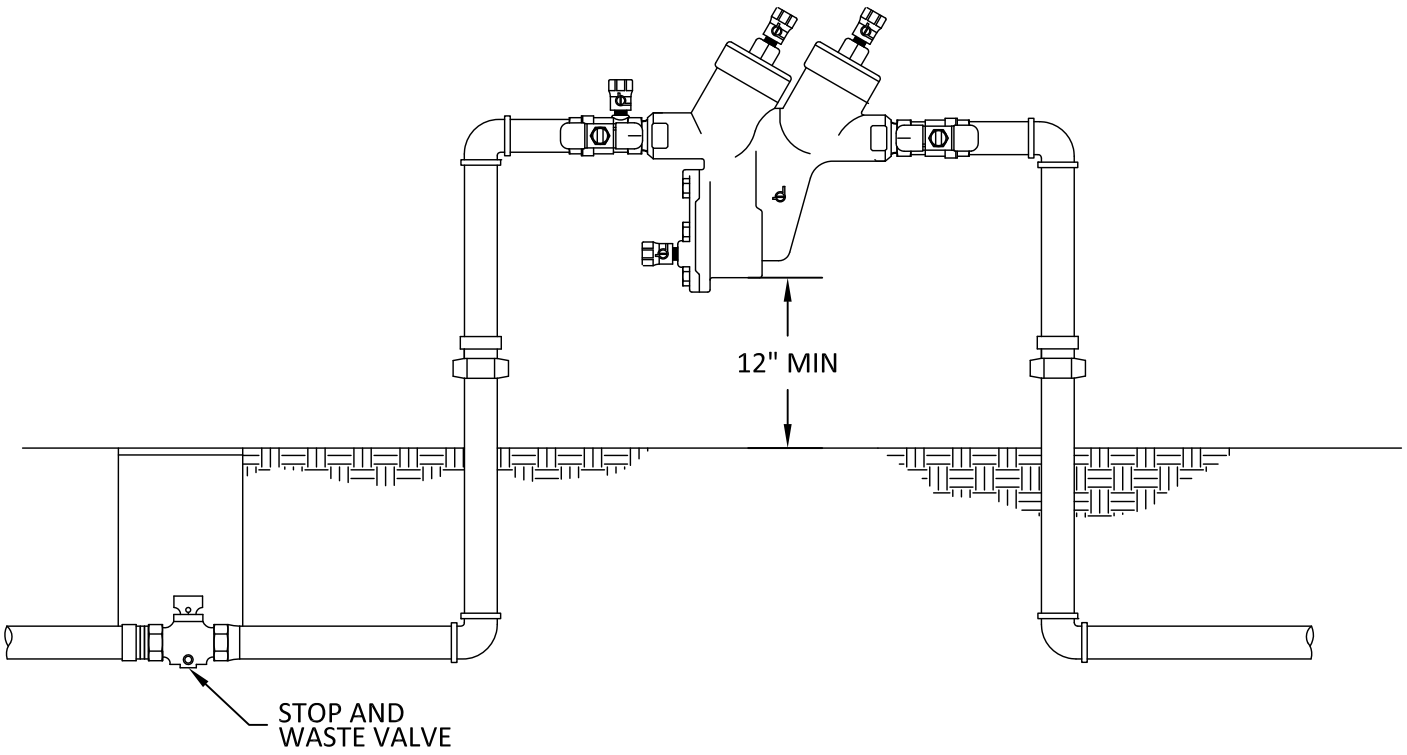
F. Provide backfill and surface restoration per Plan P-255.

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.

provo PUBLIC WORKS 2016

WATER MAINLINE, POLYWRAP, & TRACER WIRE

STANDARD DETAIL
P-594
NOT TO SCALE
REVISED DATE: 11/25/2015



DIRECTION OF FLOW ⟶

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.

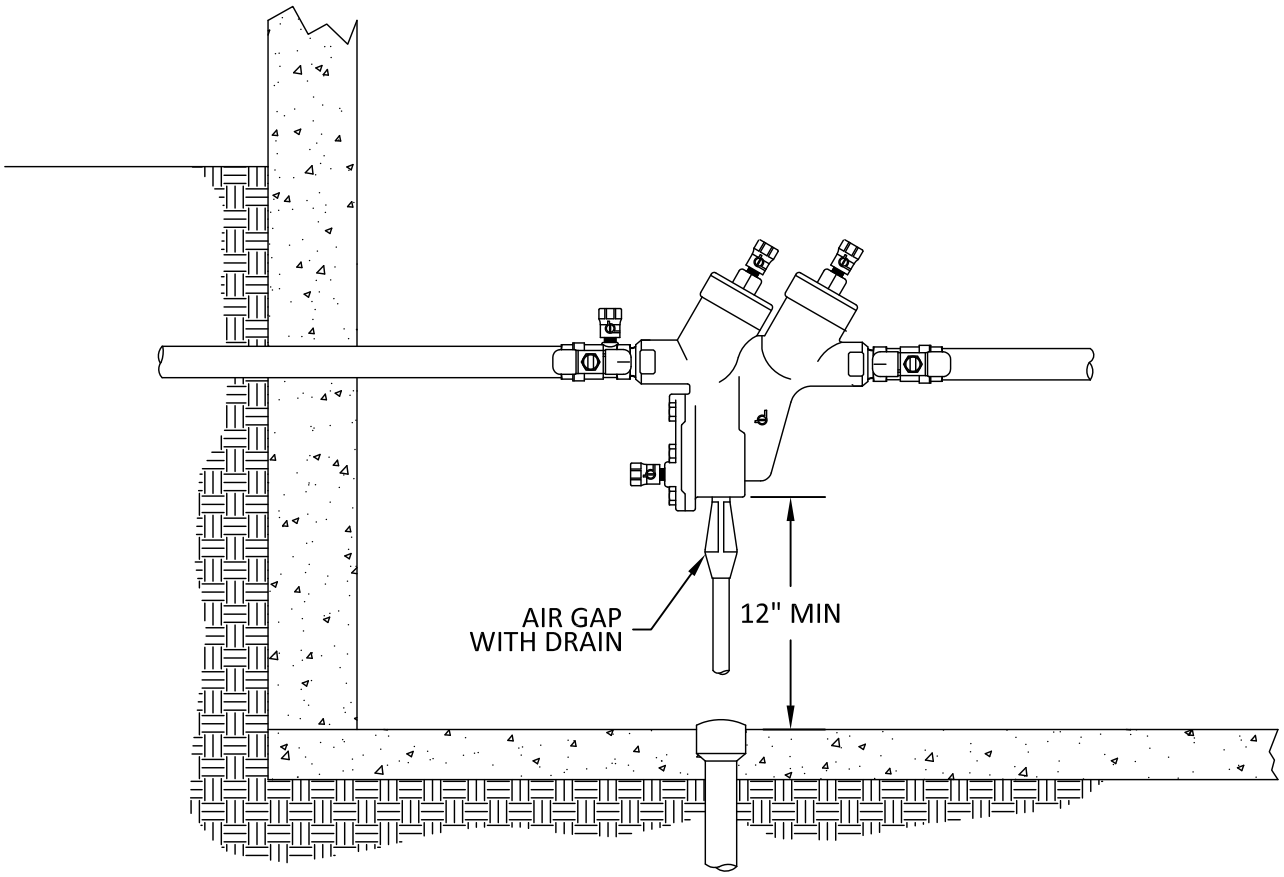
H. FOR NOTES RELATING TO ALL BACKFLOW ASSEMBLIES, REFER TO TECHNICAL SPECIFICATIONS ON PLAN P-631.

I. IF YOU HAVE ANY QUESTIONS OR NEED MORE INFORMATION, PLEASE CONTACT PROVO CITY CROSS CONNECTION CONTROL COORDINATOR (801) 852-6788.

provo PUBLIC WORKS
2016

OUTDOOR REDUCED PRESSURE PRINCIPAL ASSEMBLY (RP)

STANDARD DETAIL
P-631a
NOT TO SCALE
REVISED DATE: 11/25/2015



NOTES:

A. THE INDOOR 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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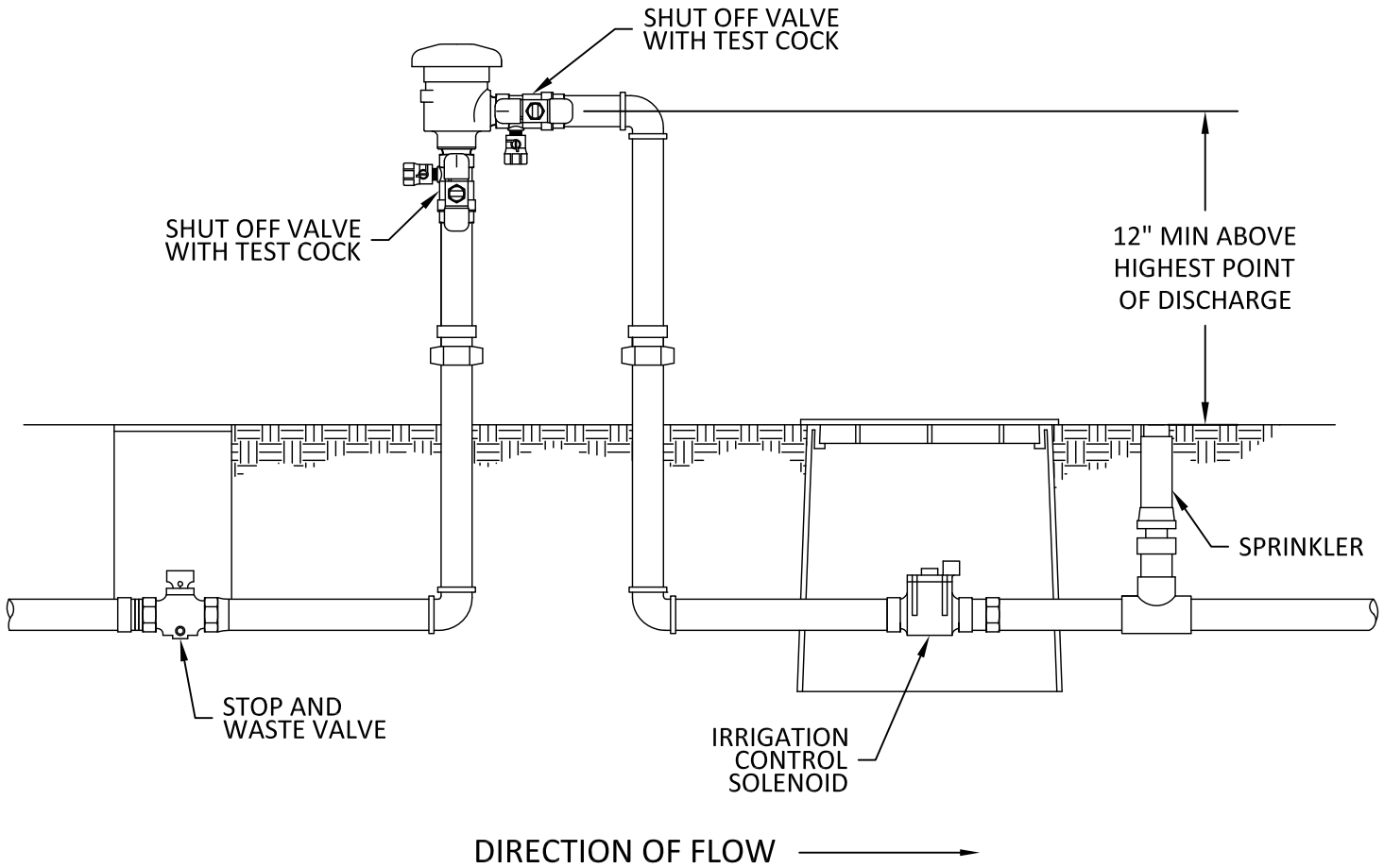
2016

INDOOR REDUCED PRESSURE PRINCIPAL ASSEMBLY (RP)

STANDARD DETAIL
P-631b
NOT TO SCALE
REVISED DATE: 11/25/2015



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.

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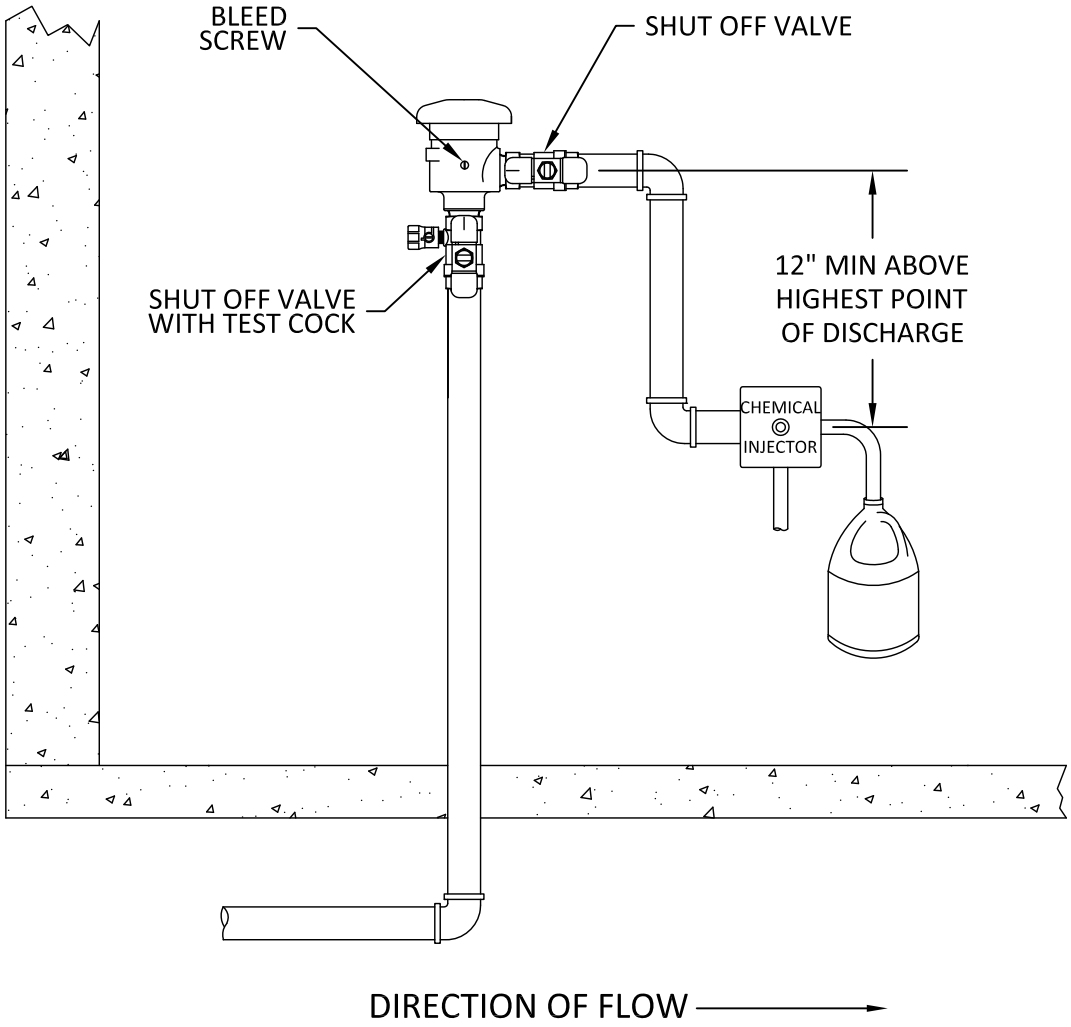
PRESSURE VACUUM BREAKER (PVB)

STANDARD DETAIL
P-631c
NOT TO SCALE
REVISED DATE: 11/25/2015



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.

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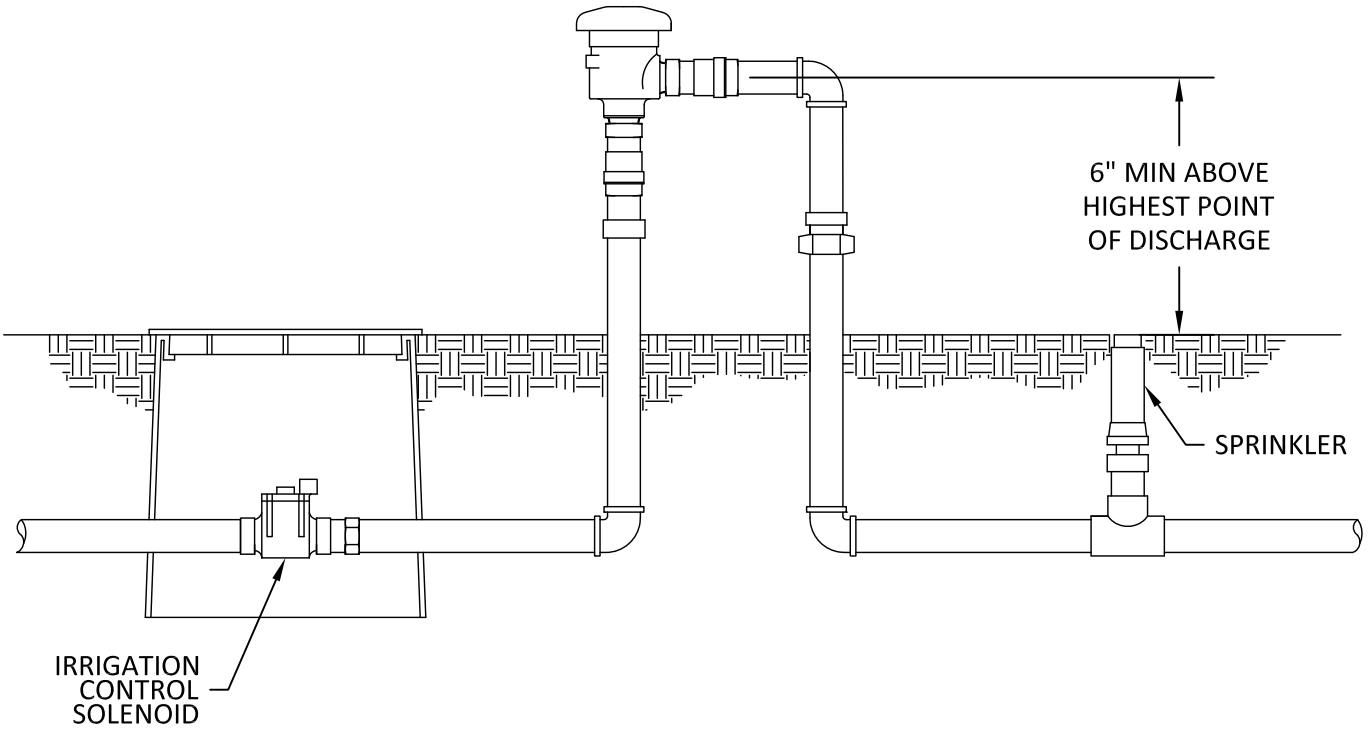
SPILL RESISTANT PRESSURE VACUUM BREAKER (SVB)

STANDARD DETAIL
P-631d
NOT TO SCALE
REVISED DATE: 11/25/2015



DIRECTION OF FLOW

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.

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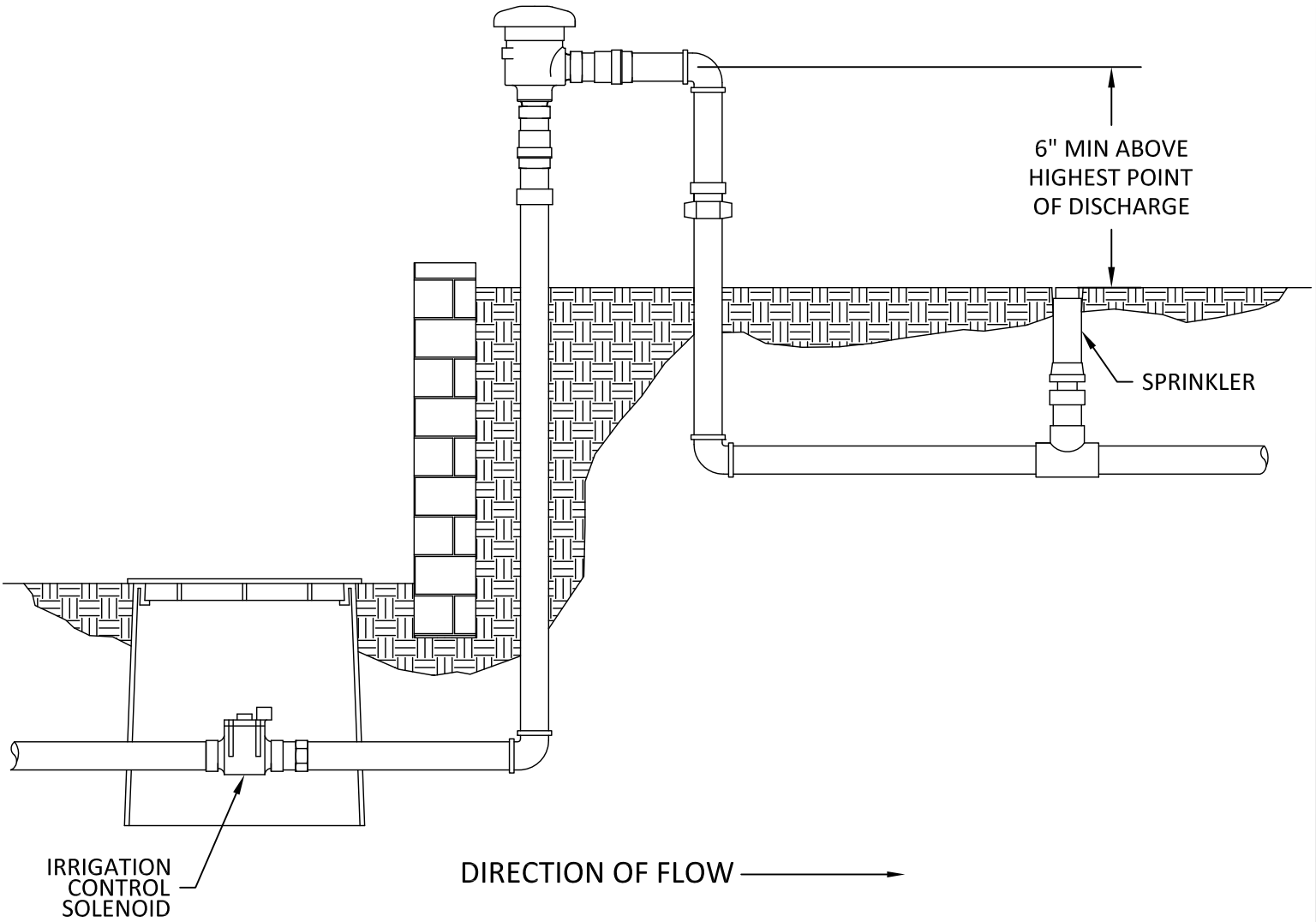
ATMOSPHERIC VACUUM BREAKER (AVB)

STANDARD DETAIL
P-631e
NOT TO SCALE
REVISED DATE: 11/25/2015



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.

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ATMOSPHERIC VACUUM BREAKER (AVB)

STANDARD DETAIL
P-631f
NOT TO SCALE
REVISED DATE: 11/25/2015

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 class (II or III) backflow technician 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 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 -

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).

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.

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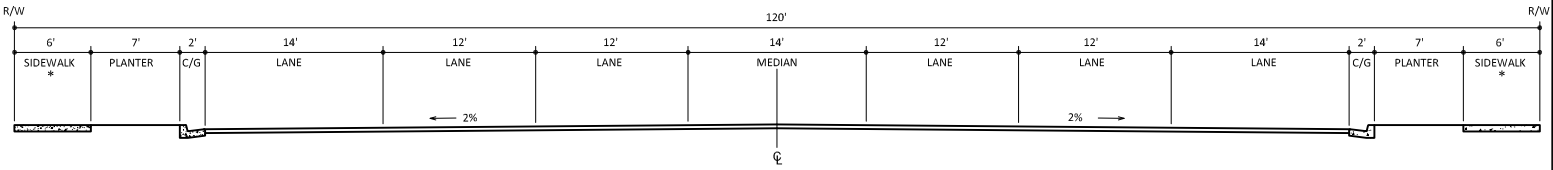
BACKFLOW PREVENTION ASSEMBLIES

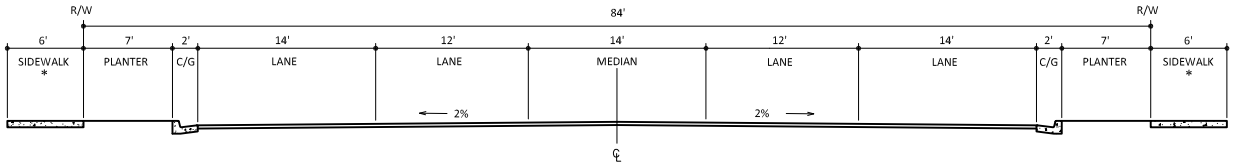
STANDARD DETAIL
P-631
NOT TO SCALE
REVISED DATE: 11/25/2015



120' SECTION (Arterial Street)

(90' PAVEMENT)

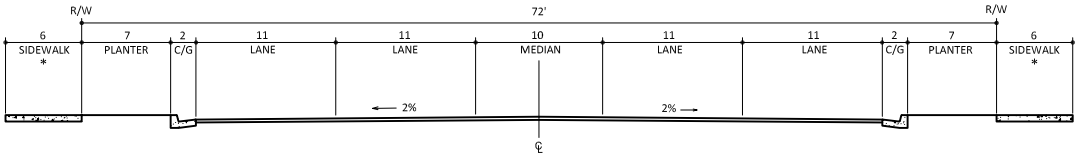
(> 40,700 ADT)



84' SECTION (Arterial Street)

(66' PAVEMENT)

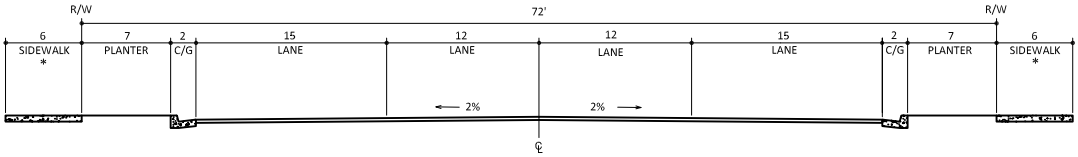
(> 18,100 ADT)



72' SECTION (Collector Street)

(54' PAVEMENT)

(> 12,000 ADT)



72' SECTION (Collector Street)

(54' PAVEMENT)

(> 12,000 ADT)

*SIDEWALK EASEMENTS SHALL BE REQUIRED FOR ALL TYPICAL SECTIONS WHERE SIDEWALKS ARE SHOWN OUTSIDE OF THE RIGHT-OF-WAY LINES.

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TYPICAL STREET SECTIONS

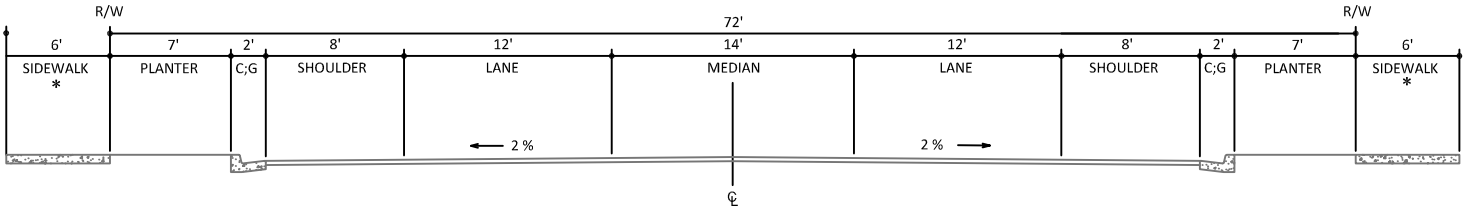
SHEET 1 OF 1

STANDARD DETAIL

P-900

NOT TO SCALE

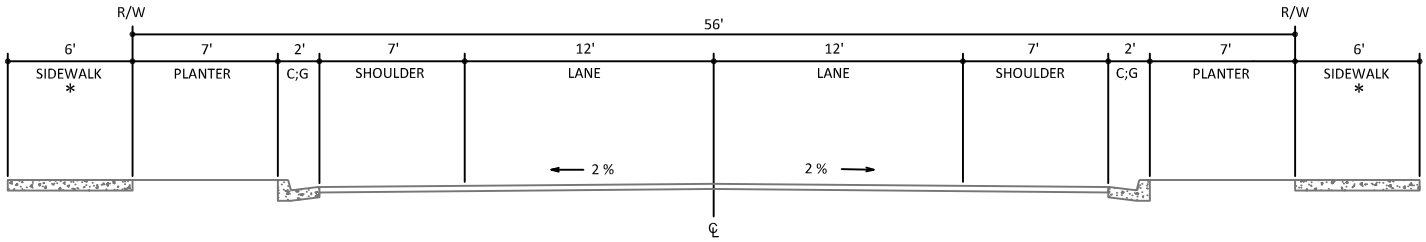
REVISED DATE: 11/125/15



3 LANE (Collector Street)

(54' PAVEMENT)

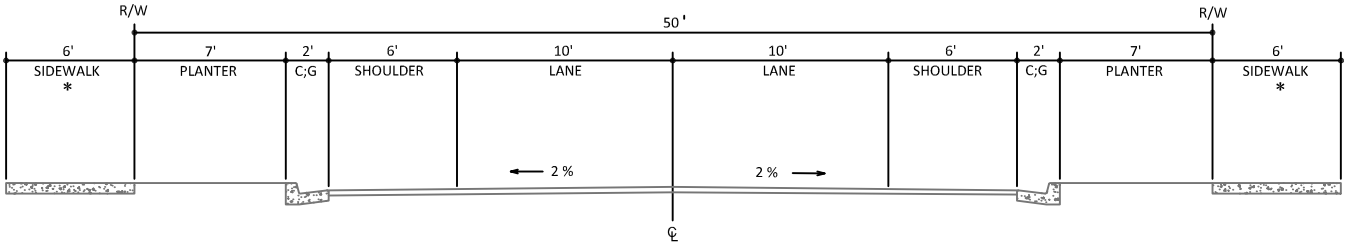
(< 12,000 ADT)



LOCAL STREET

(38' PAVEMENT)

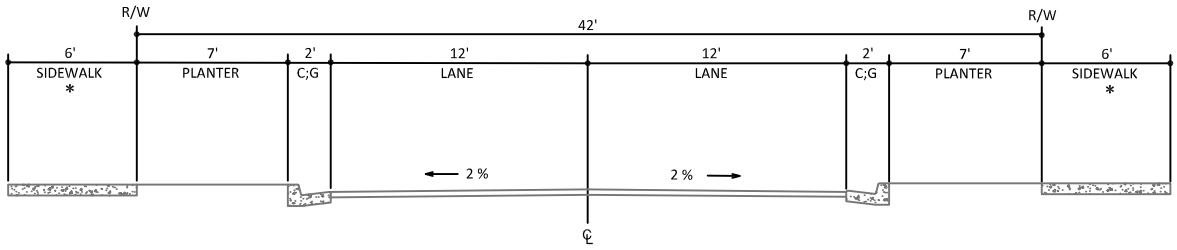
(> 500 ADT)



LOCAL STREET

(32' PAVEMENT)

(< 500 ADT)



LOCAL STREET (without on street parking)

(24' PAVEMENT)

(< 500 ADT)

SHEET 1 OF 1

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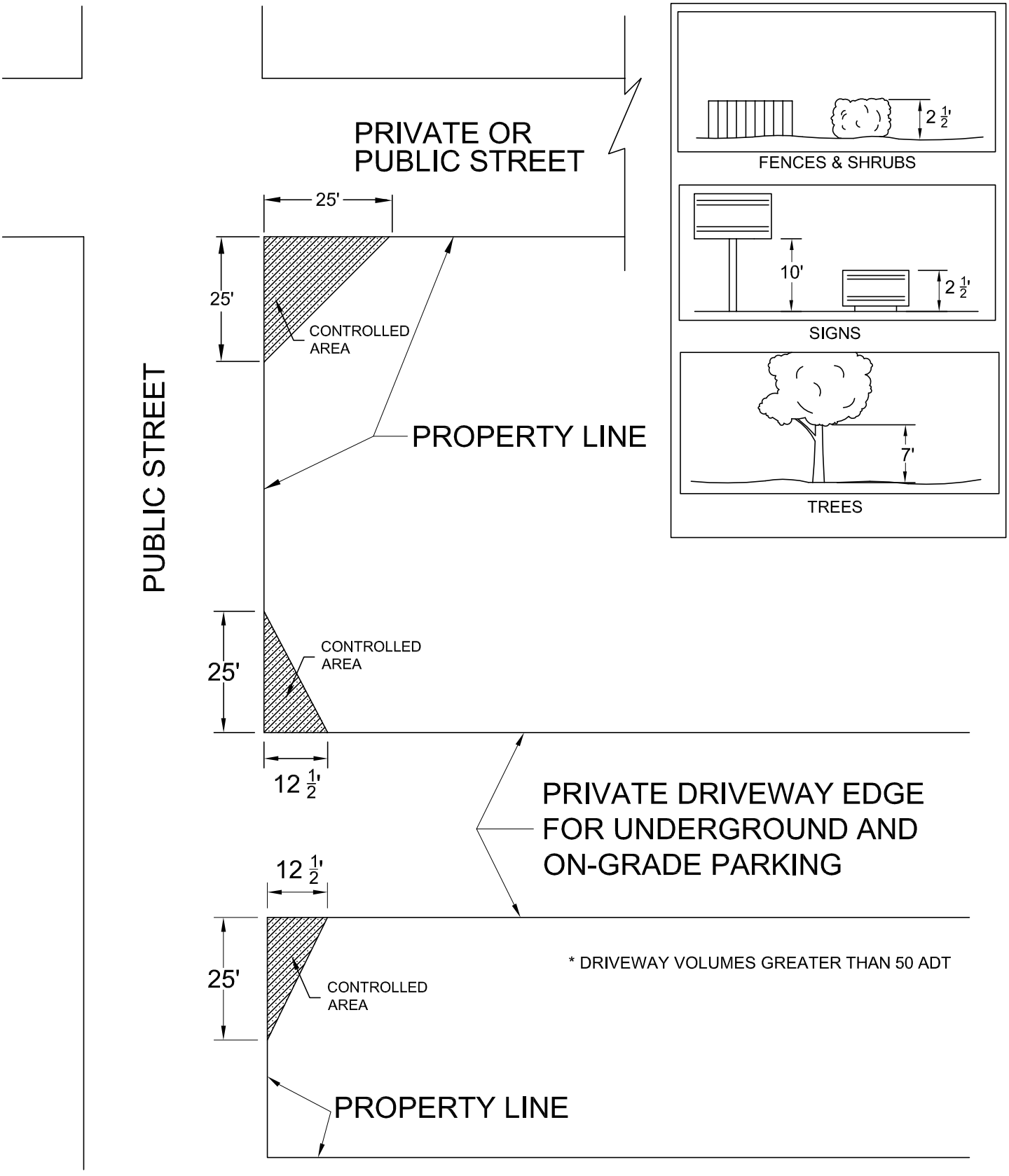
TYPICAL STREET SECTIONS

STANDARD DETAIL

P-901

NOT TO SCALE

REVISED DATE: 11/25/15



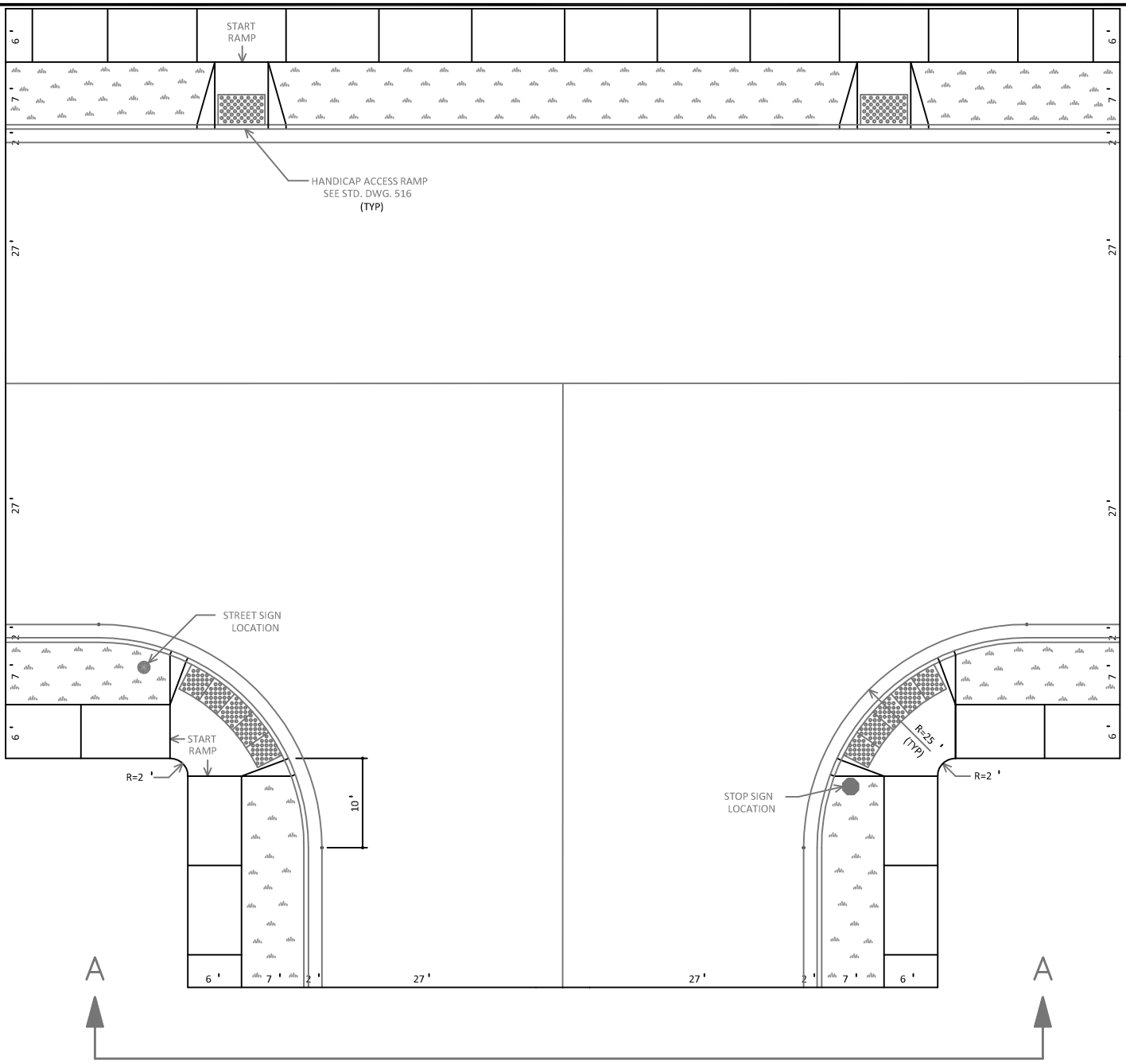
* DRIVEWAY VOLUMES GREATER THAN 50 ADT

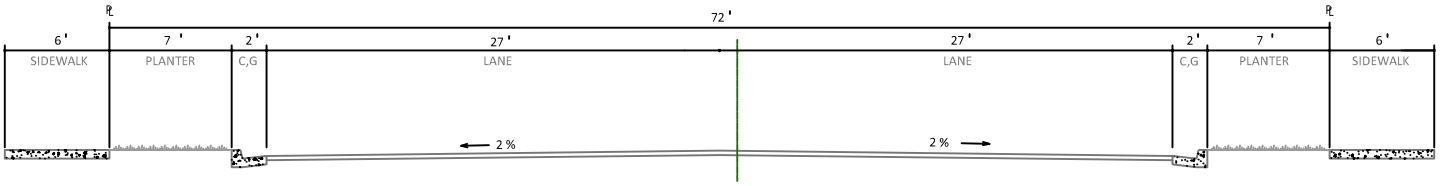
SHEET 1 OF 1

provo PUBLIC WORKS 2016

CLEAR VISION REQUIREMENTS

STANDARD DETAIL
P-902
NOT TO SCALE
REVISED DATE: 11/25/15





SECTION A-A

COLLECTOR STREET TO COLLECTOR STREET (>12,000 ADT)

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

PUBLIC WORKS
2016

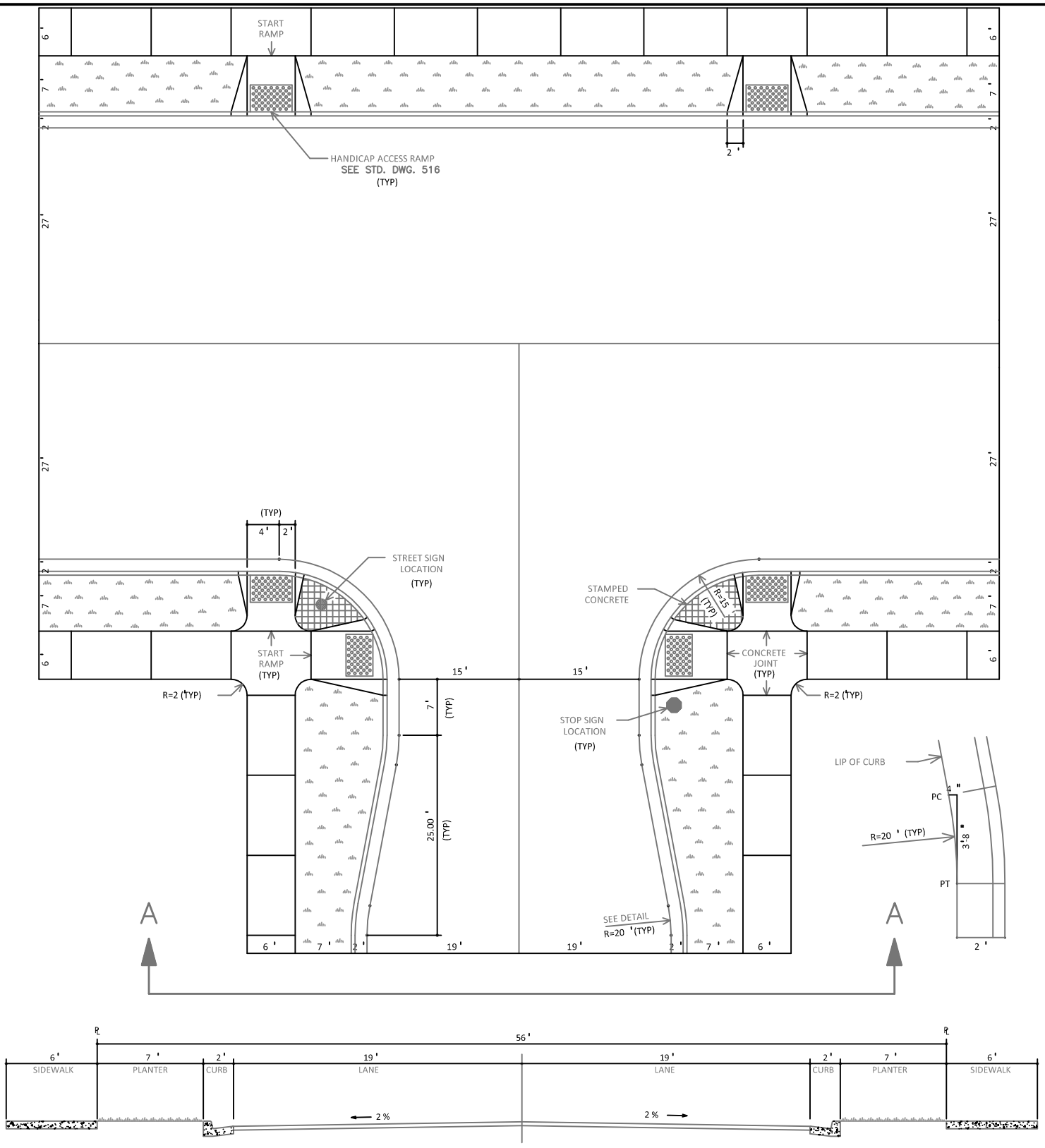
TYPICAL COLLECTOR STREET T-INTERSECTION

SHEET 1 OF 1

STANDARD DETAIL
P-903

NOT TO SCALE

REVISED DATE: 11/25/15



SECTION A-A

LOCAL STREET TO COLLECTOR STREET (> 500 ADT)

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

SHEET 1 OF 1

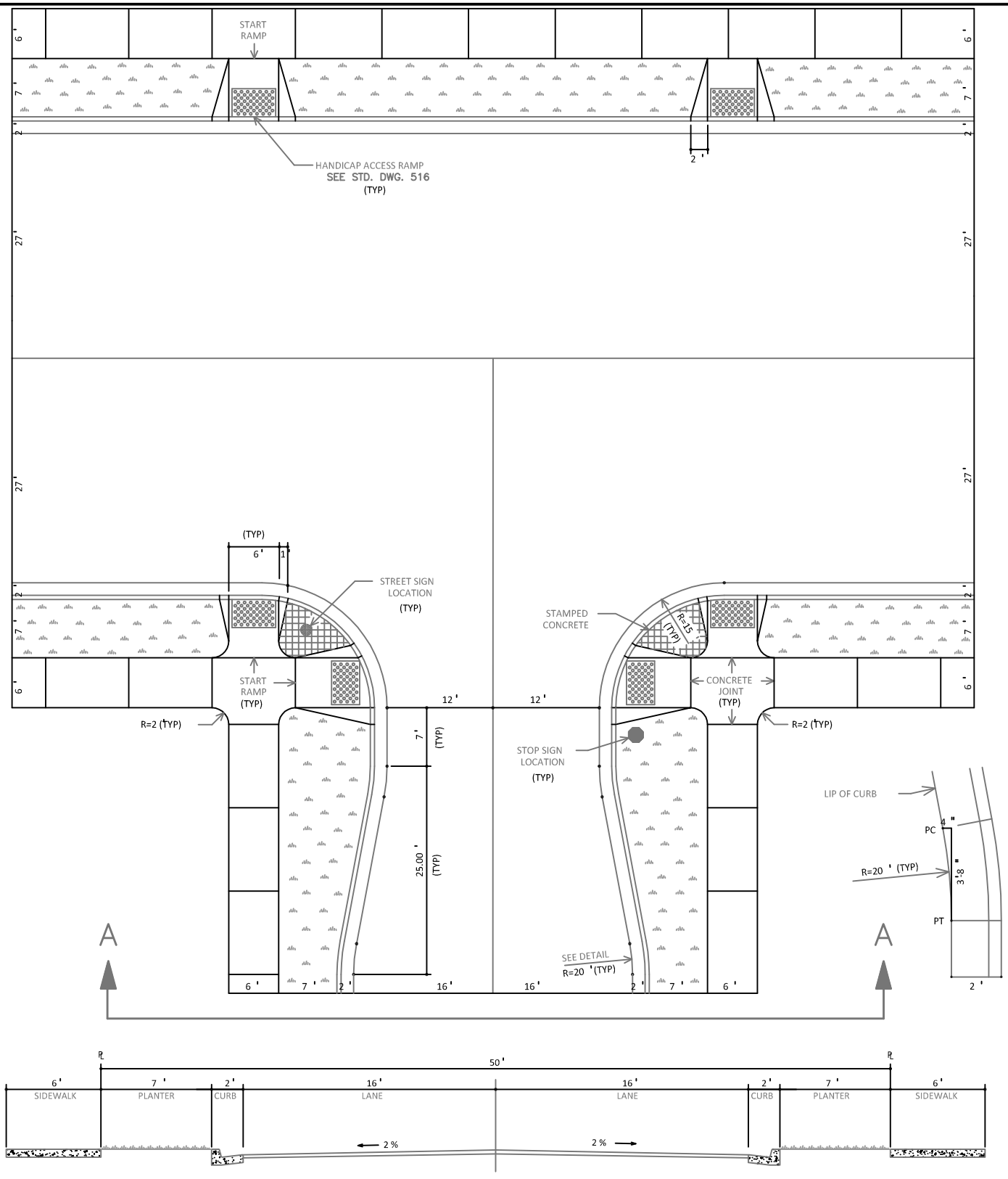
provo PUBLIC WORKS 2016

TYPICAL LOCAL STREET T-INTERSECTION

STANDARD DETAIL
P-904

NOT TO SCALE

REVISED DATE: 11/25/15



SECTION A-A

LOCAL STREET TO COLLECTOR STREET (< 500 ADT)

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

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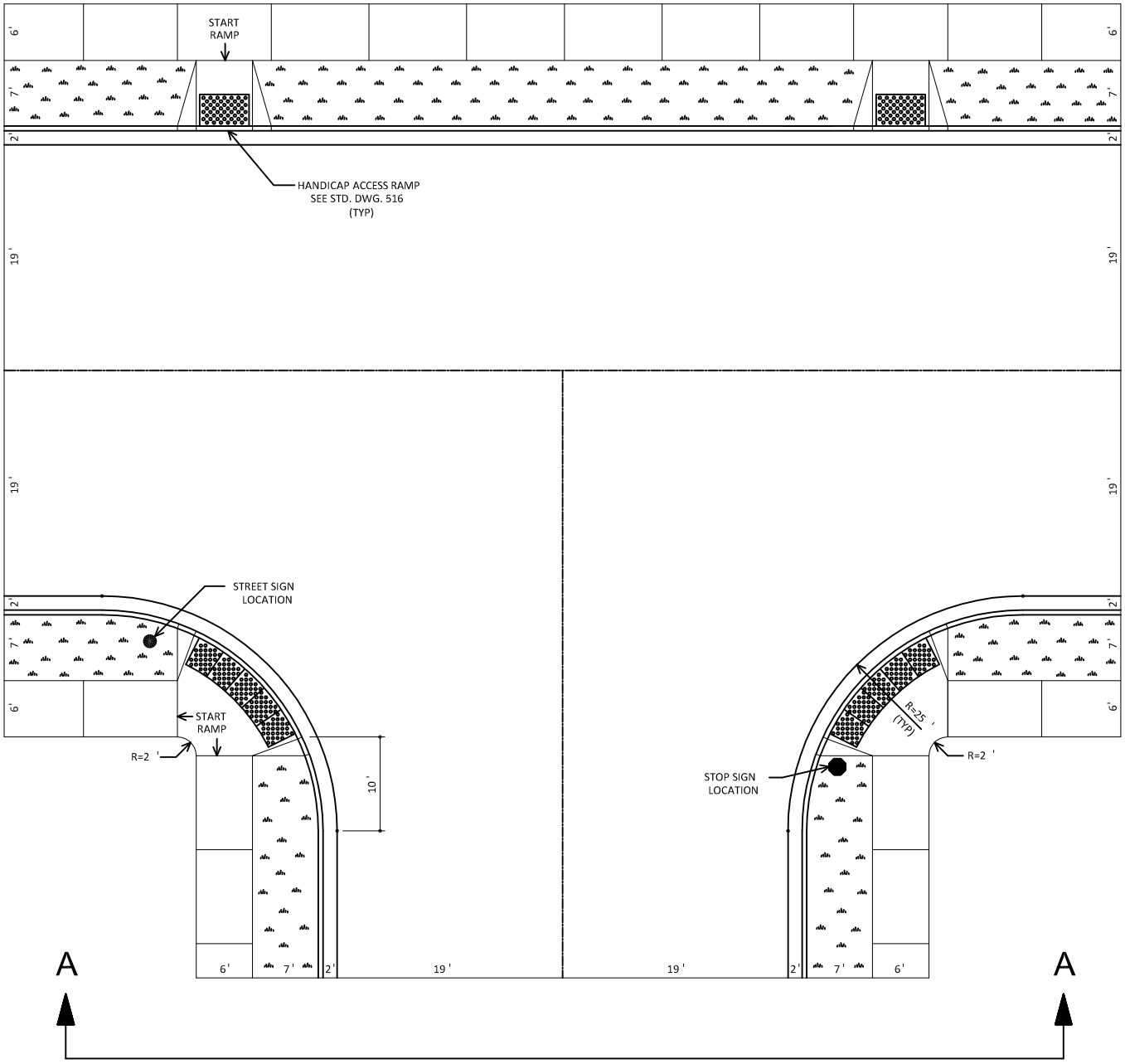
TYPICAL LOCAL STREET T-INTERSECTION

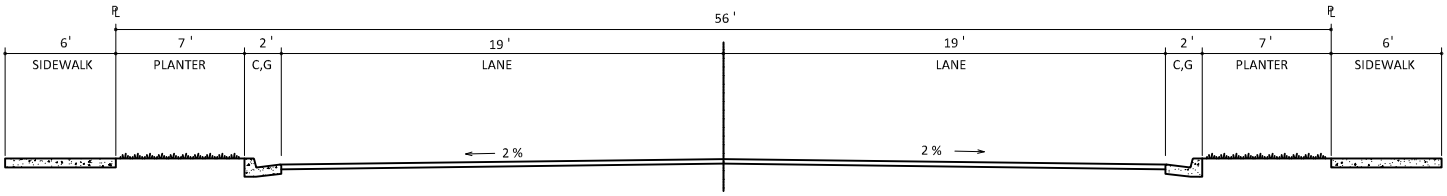
SHEET 1 OF 1

STANDARD DETAIL
P-905

NOT TO SCALE

REVISED DATE: 11/25/15





SECTION A-A

LOCAL STREET TO LOCAL STREET (< 500 ADT)

*REQUIRES CITY ENGINEER APPROVAL

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

SHEET 1 OF 1

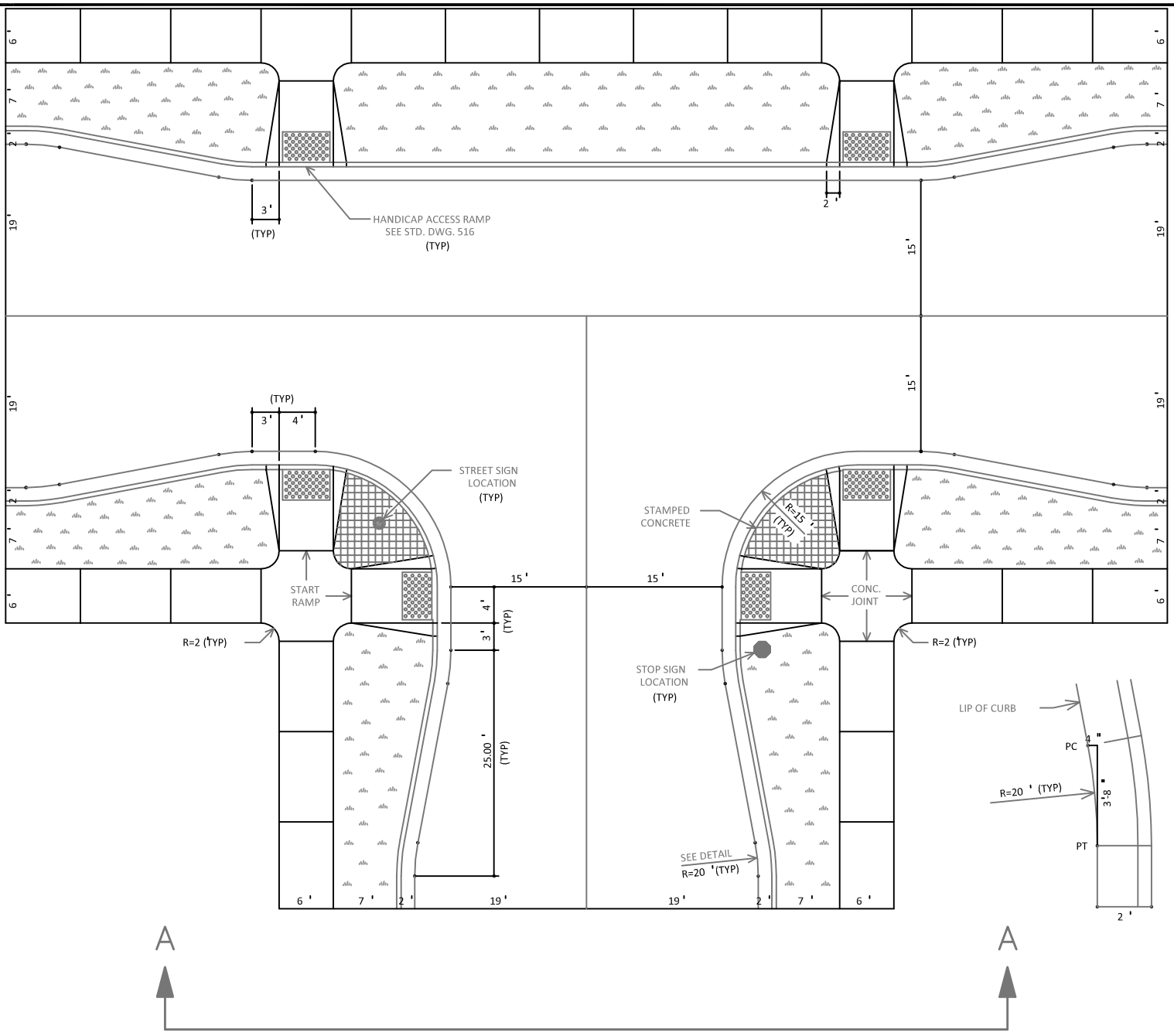
provo PUBLIC WORKS 2016

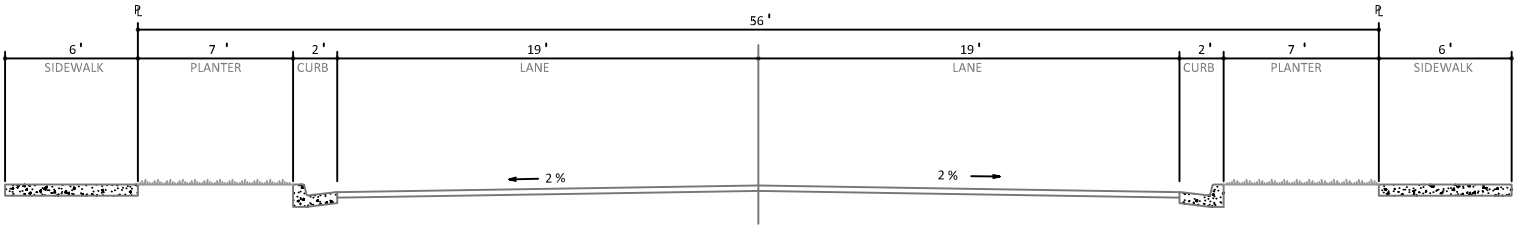
TYPICAL LOCAL STREET T-INTERSECTION

STANDARD DETAIL
P-906

NOT TO SCALE

REVISED DATE: 11/25/15





SECTION A-A

LOCAL STREET TO LOCAL STREET (< 500 ADT)

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

provo PUBLIC WORKS 2016

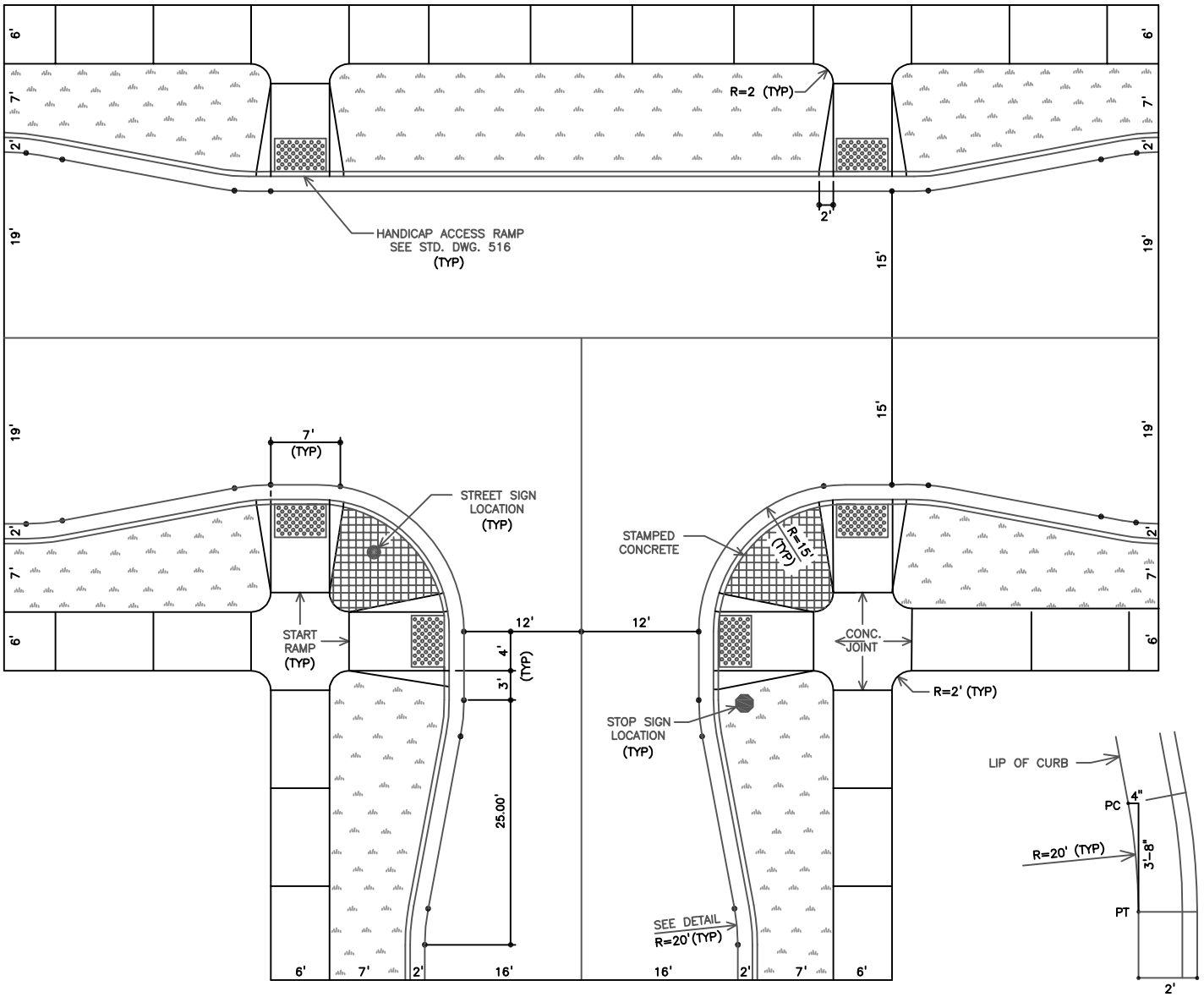
TYPICAL LOCAL STREET T-INTERSECTION

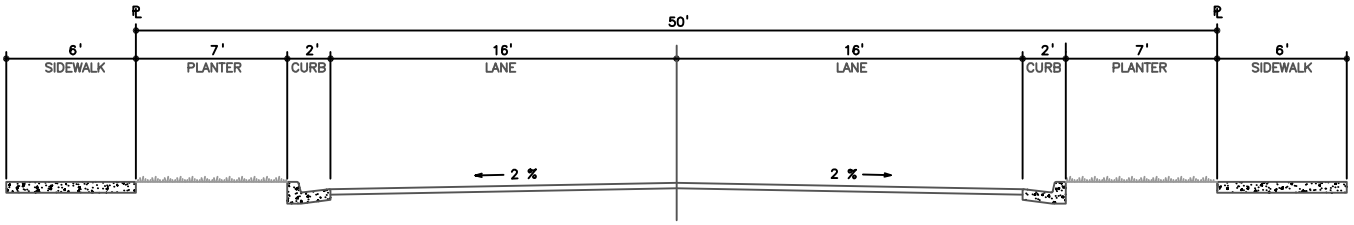
SHEET 1 OF 1

STANDARD DETAIL
P-907

NOT TO SCALE

REVISED DATE: 11/25/15





SECTION A–A

LOCAL STREET TO LOCAL STREET (< 500 ADT)

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

provo PUBLIC WORKS 2016

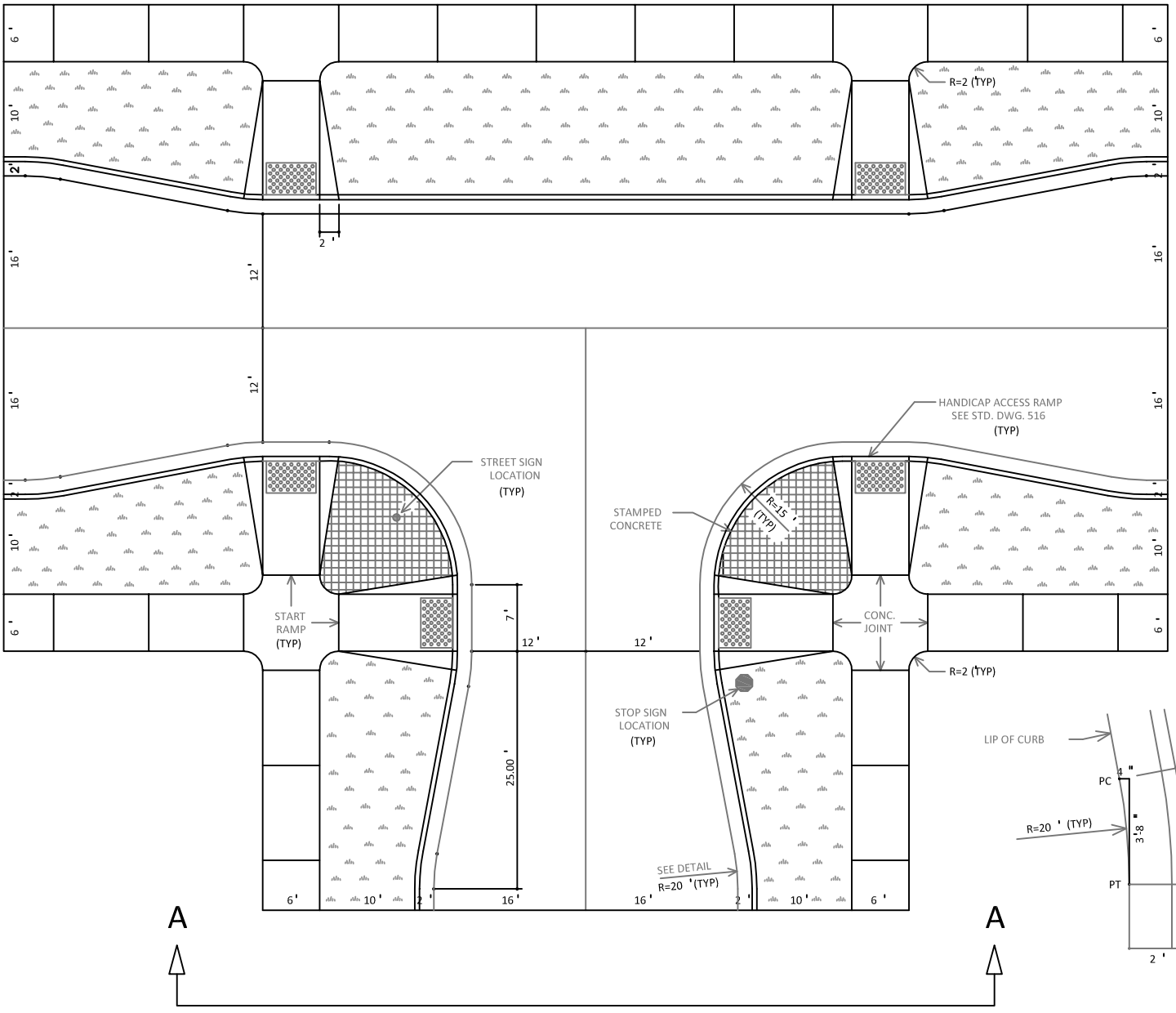
TYPICAL LOCAL STREET T-INTERSECTION

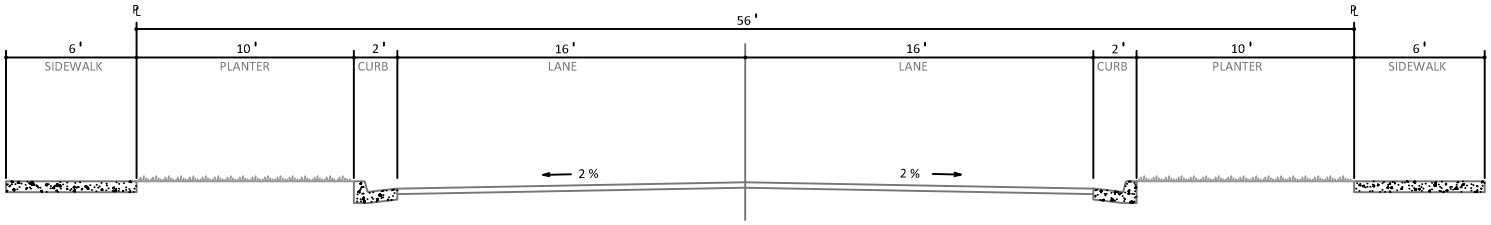
SHEET 1 OF 1

STANDARD DETAIL
P-908

NOT TO SCALE

REVISED DATE: 11/25/15





SECTION A-A

LOCAL STREET TO LOCAL STREET (< 500 ADT)

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

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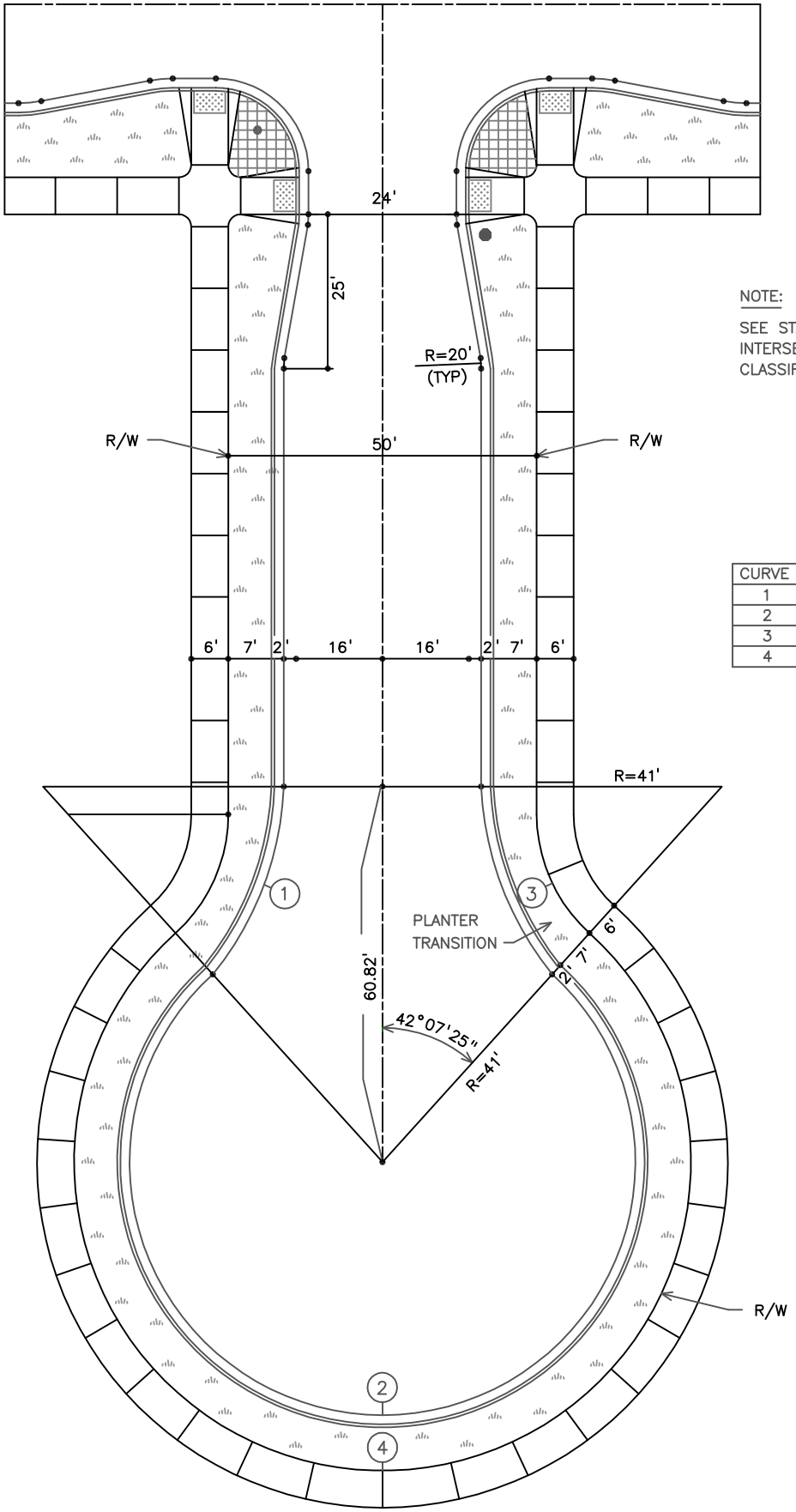
TYPICAL LOCAL STREET T-INTERSECTION

SHEET 1 OF 1

STANDARD DETAIL
P-909

NOT TO SCALE

REVISED DATE: 11/25/15



NOTE:

SEE STANDARD DRAWINGS 903 THROUGH 909 FOR INTERSECTION DETAILS DEPENDANT ON THE STREET CLASSIFICATION.

CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH	CHORD	TANGENT
1	41.000'	47°52'35"	34.260'	33.272'	18.201'
2	41.000'	275°45'10"	197.325'	55.000'	-----
3	25.926'	47°52'35"	21.664'	21.039'	11.510'
4	50.000'	275°45'10"	240.640'	67.073'	-----

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PUBLIC WORKS
2016

CUL-DE-SAC WITH PLANTER

SHEET 1 OF 1

STANDARD DETAIL
P-910

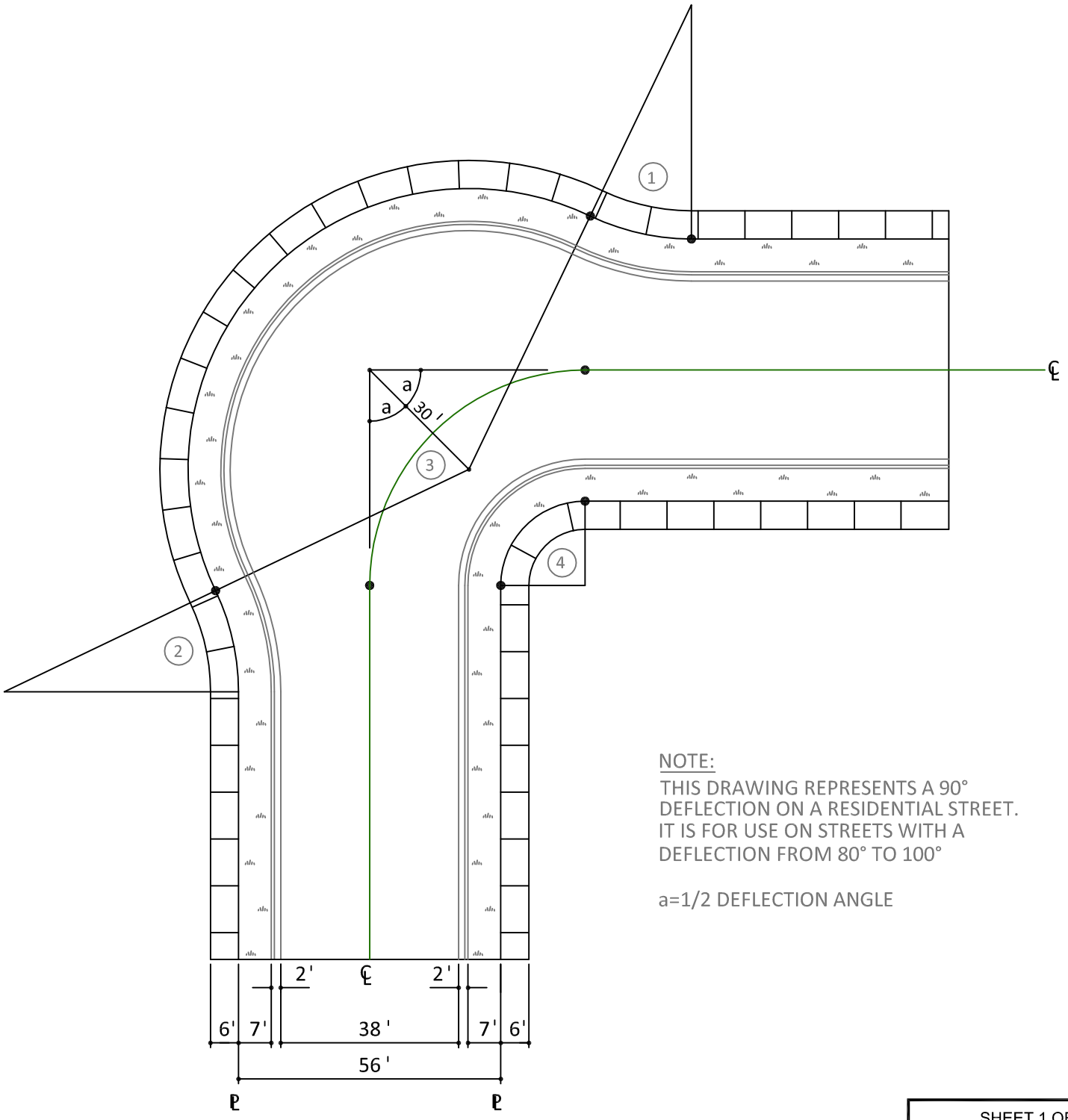
NOT TO SCALE

REVISED DATE: 11/25/15

CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH	CHORD
1&2	50.00 '	25° 35 10 ''	22.33 '	22.14 '
3	60.00 '	141° 10 20 ''	147.84 '	113.18 '
4	25.00 '	90° 00 00 ''	39.27 '	35.36 '

DO NOT USE WITHOUT ENGINEER'S PERMISSION.



NOTE:
THIS DRAWING REPRESENTS A 90° DEFLECTION ON A RESIDENTIAL STREET. IT IS FOR USE ON STREETS WITH A DEFLECTION FROM 80° TO 100°

a=1/2 DEFLECTION ANGLE

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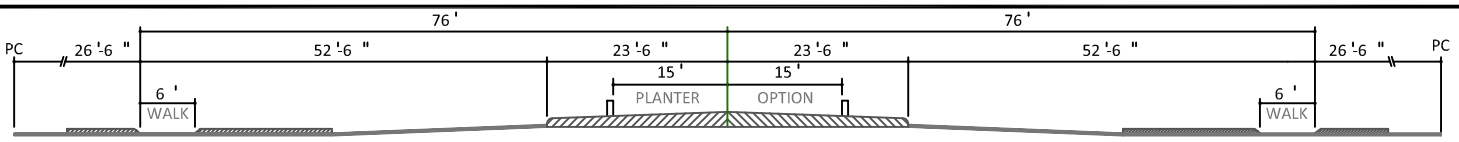
KNUCKLE INTERSECTION

SHEET 1 OF 1

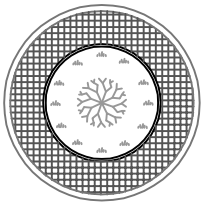
STANDARD DETAIL
P-911

NOT TO SCALE

REVISED DATE: 11/25/15



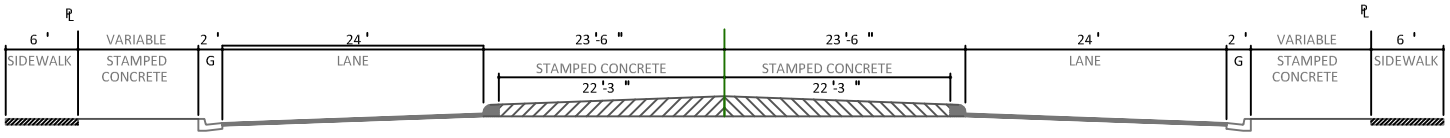
SECTION B-B



PLANTER OPTION

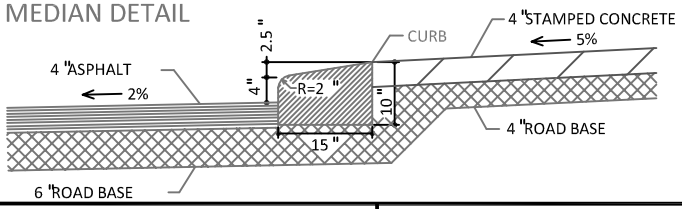
SIGNS

CHANNELIZING ISLAND DETAIL



SECTION A-A

MEDIAN DETAIL

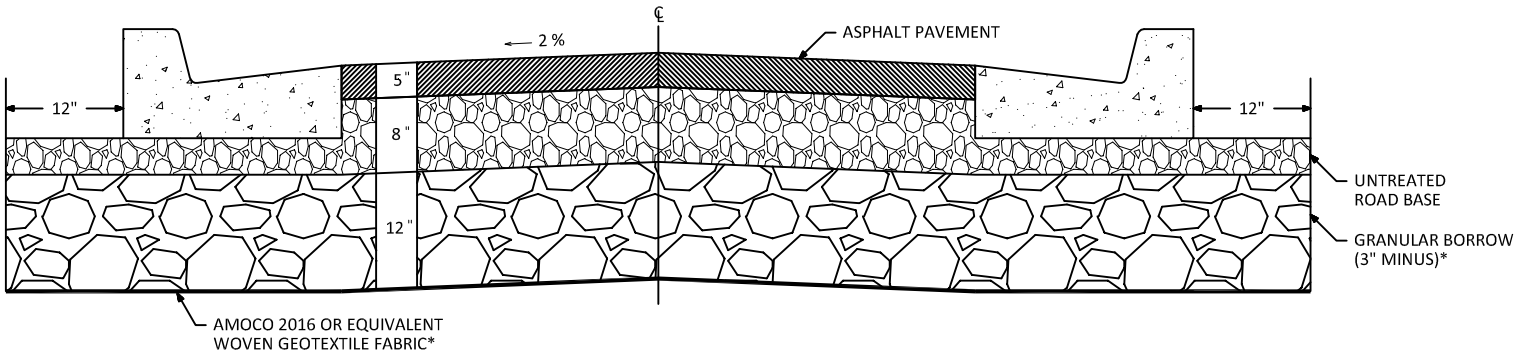


SHEET 1 OF 1

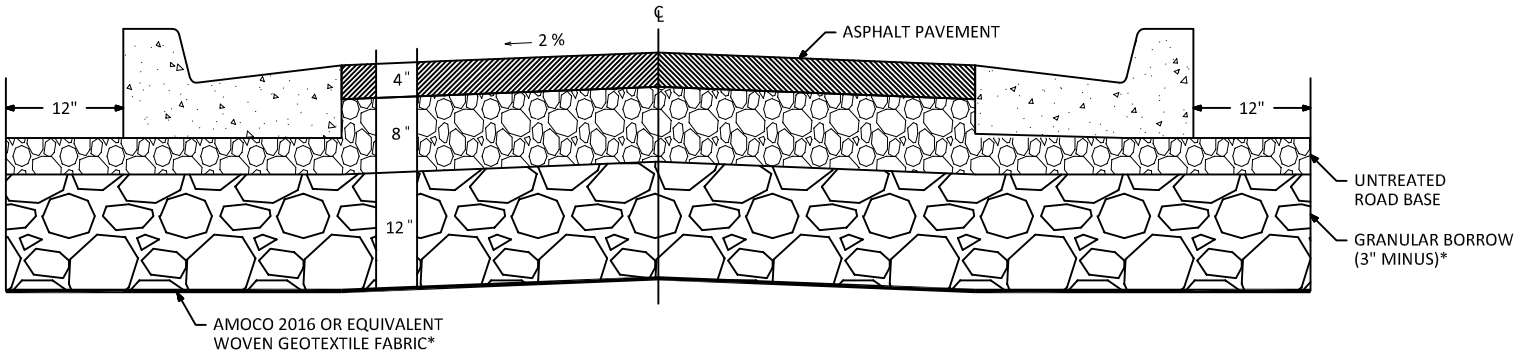
provo PUBLIC WORKS 2016

LOCAL STREET ROUNDABOUT

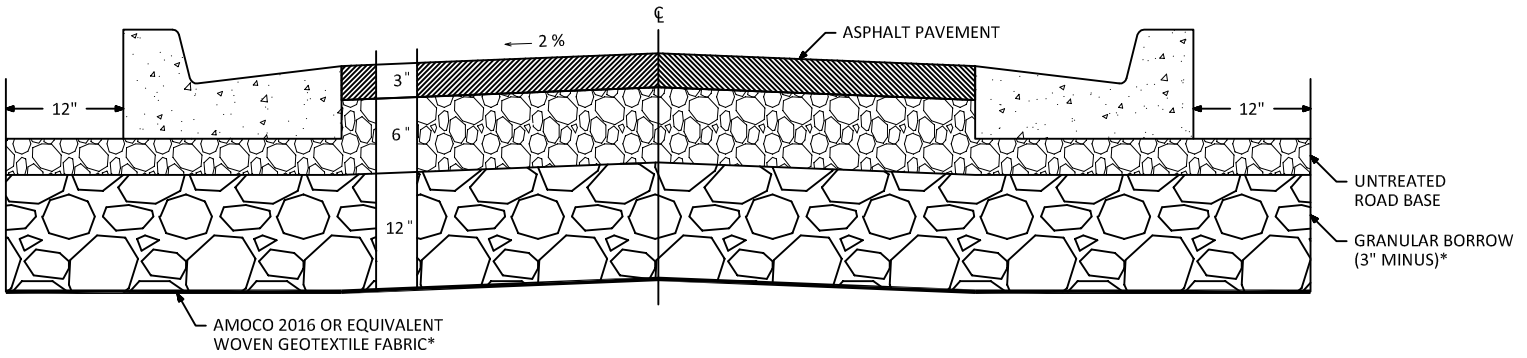
STANDARD DETAIL
P-912
NOT TO SCALE
REVISED DATE: 11/25/15



ARTERIAL STREETS



COLLECTOR STREETS



LOCAL/PRIVATE STREETS

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

SHEET 1 OF 1

provo PUBLIC WORKS 2016

MINIMUM PAVEMENT DESIGN

STANDARD DETAIL
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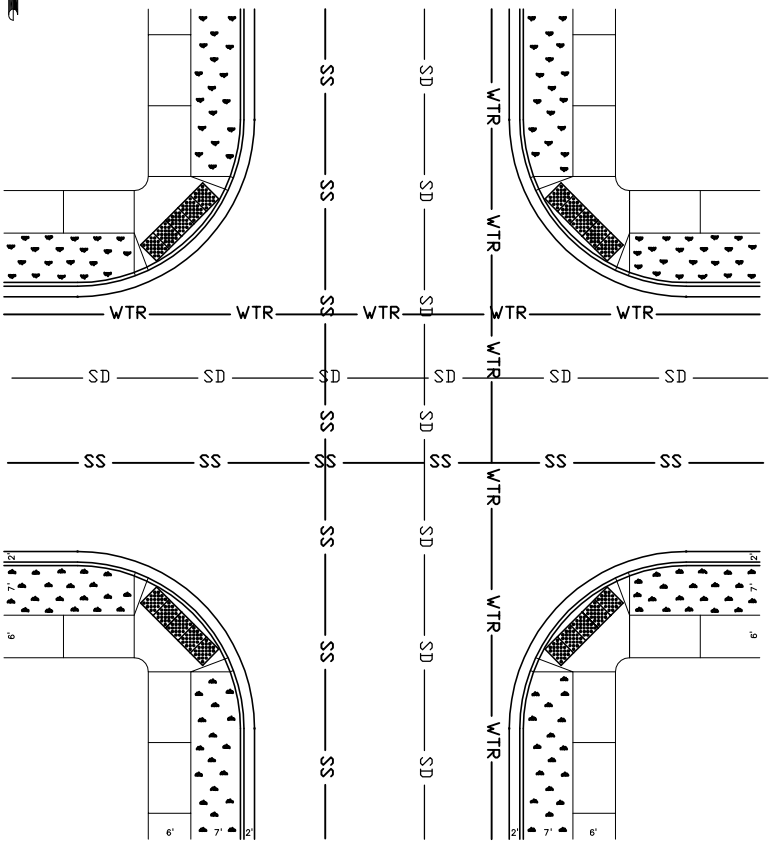
REVISED DATE: 11/25/15

NOTES:

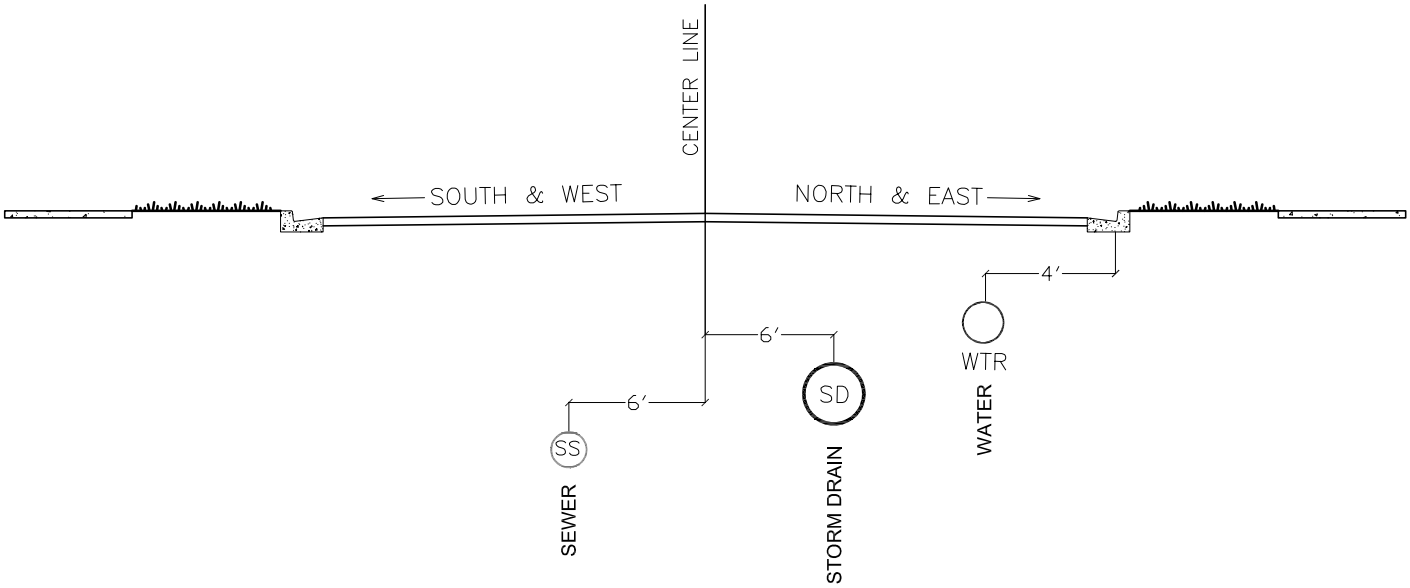
WATER LINES: TYPICALLY 4' FROM THE FACE OF CURB ON THE NORTH AND EAST SIDES OF THE ROAD.

SEWER LINES: TYPICALLY 6' FROM CENTER LINE OF ROAD ON THE SOUTH AND WEST SIDES OF THE ROAD.

STORM DRAIN: TYPICALLY 6' FROM CENTER LINE OF ROAD ON THE NORTH AND EAST SIDES OF THE ROAD.



PLAN VIEW



CROSS SECTION

provo PUBLIC WORKS 2016

UTILITY LOCATION IN CITY R.O.W.

SHEET 1 OF 1

STANDARD DETAIL

P-914

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