UC Davis Health Facility Standards - Civil

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EXCAVATION AND FILL 31 23 00

A. GEOTECHNICAL REQUIREMENTS

1. Excavation, earthwork and fill shall comply with the requirements of a site-specific geotechnical investigation and report prepared in conformance with Section 1803 of the CBC.

B. EROSION CONTROL

1. One (1) Acre or More: If the limits of disturbed soil is one (1) acre or more, a Stormwater Pollution Prevention Plan (SWPPP), and Notice of Intent (NOI), shall be prepared and uploaded to the California State Water Resources Control Board's electronic SMARTS system.
2. Less Than One (1) Acre: SWPPPs are not required for projects under one (1) acre, unless they are part of a larger development encompassing over one acre. For projects less than one (1) acre, an Erosion and Sediment Control Plan shall be prepared by or under the direction of and stamped by a Registered Civil Engineer licensed in the State of California. Best Management Practices, BMPs, shall comply with the requirements of the California Stormwater Quality Association (CASQA) and the California Stormwater Best Management Practice (BMP) Handbook, current edition.

C. SITE CLEARING

1. Site Clearing, if required, shall include removal of all vegetation including trees, stumps and roots to a depth of 36", shrubs, and brush unless designated to be protected in place. Vegetation shall not be burned on site. Clearing of debris including rocks, loose concrete, bricks, wood, metal, junk and garbage, shall be disposed of at an appropriate landfill.

D. EXCAVATIONS

1. Excavations, including earthwork and grading, shall comply with the requirements of Section 1804 of the CBC and an approved Geotechnical Report. Grading plans shall be prepared by, or under the direction of, and stamped by a Registered Civil Engineer licensed in the State of California. Grading Plans shall specify protections for existing adjacent properties and on-site facilities, improvements and trees slated to remain.
2. Prior to any excavation, existing utilities shall be marked in the field.
3. Excavated soil suitable for re-use shall be stockpiled in an area designated for stockpiling with appropriate erosion and dust control measures. Excess soil or soil unfit for re-use shall be removed from the site.
4. Shoring, if required, shall comply with the requirements of Section V, Chapter 2 of Cal/OSHA and an approved Geotechnical Report.
5. Excavations into the groundwater table will require dewatering in accordance with state and local requirements.

E. FILL

1. Fill shall comply with the requirements of Section 1804 of the CBC and an approved Geotechnical Report. Fill material shall not contain environmental contaminants, asbestiform fibers, or construction debris.
2. General fill: Stripped topsoil or expansive soil material with clay is not usable in landscape areas (under topsoil) or non-structural areas. General fill shall be free of lumps, rocks, debris and large organic material in accordance with an approved Geotechnical Report.
3. Engineered Fill: Clean, non-expansive (i.e., no clay), well-graded, slightly cohesive soil material usable as structural backfill. Soil characteristics shall be in accordance with the approved

Geotechnical Report including Percent Passing No. 200 Sieve, Liquid Limit (LL), Plasticity Index (PI), and Expansion Index. Engineered fill shall be clean of rocks, debris, and organic large organic material and in accordance with an approved Geotechnical Report.

F. BACKFILL AND COMPACTION

1. Place and compact fill material in lifts not exceeding 8” unless otherwise specified in an approved Geotechnical Report. Optimum moisture content of fill material shall be maintained in accordance with the requirements of an approved Geotechnical Report.
2. Structures: Subgrade at foundations shall be prepared in accordance with the requirements of the CBC and an approved Geotechnical Report.

TRENCH AND BACKFILLING 31 23 33

A. GEOTECHNICAL REQUIREMENTS

1. Trenching and backfilling shall comply with the requirements of a site-specific geotechnical investigation and report prepared in conformance with Section 1803 of the CBC.

B. TRENCHING

1. Trenching into the groundwater table shall require dewatering in accordance with state and local requirements.
2. Trenches deeper than 5’ shall be shored in accordance with Cal/OSHA requirements. Alternatively, the ground above 5’ from the bottom of the trench shall be sloped at a ratio of 4 (horizontal) to 1 (vertical) or as otherwise specified in an approved Geotechnical Report.
3. Trenching under the dripline of existing trees shall be performed by hand using hand or pneumatic tools only. No tree roots shall be cut unless approved by a certified Arborist.
4. Maximum allowable open trench is 600 linear feet at any one time. All trenches are to be covered at the end of the workday. All trench plates must have non-skid epoxy coating.

C. BACKFILL AND COMPACTION

1. Comply with the requirements of Section 31 23 00 Excavation and Fill and an approved Geotechnical Report.
2. Utility trenches to include a minimum 6-inches of sand below and 12-inches of sand above the pipe unless otherwise noted.

BASES, BALLASTS AND ASPHALT PAVING 32 10 00

A. GENERAL

1. Roadway and parking pavement sections are to be designed by a licensed Geotechnical Engineer pursuant to the Traffic Index associated to the roadway or parking lot (based on anticipated axle loads, parking volume, vehicle type, loading, and use), in accordance with Caltrans Highway Design Manual, latest edition, for a 20-year lifespan. Materials and installation shall conform to the Caltrans Standard Specifications and Plans, latest edition, unless otherwise required by the University Representative. Traffic signs and pavement markings shall conform to California’s Manual on Uniform Traffic Control Devices (MUTCD), latest edition.
2. Aggregate base material and placement shall comply with the requirements of Caltrans Section 26. Asphalt concrete shall comply with the requirements of Caltrans Section 39. Seal coats shall comply with the requirements of Caltrans Section 37.

CONCRETE PAVING 32 13 13

A. GENERAL

1. When the scope of the work is limited to relatively small areas, the guidelines specified in Standard Specification Section 01 73 29 Cutting and Patching shall take precedence.
2. Mockups are to be requested at the University Representative's discretion.
3. Mockups are required for site concrete work including individual mockups for each paving finish, seat walls, retaining walls, and stem walls. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for details and execution.
    a. Build minimum of 5'x5' mockups of full-thickness sections of concrete paving.
    b. Site wall mockups shall be a minimum of 5' in length.
    c. Anticipate that up to two (2) samples of each type of concrete may be required to establish accepted colors and finishes.
    d. Cast samples from accepted materials identical to those to be used on site.
    e. Mockups shall demonstrate typical finished edge, joints (including expansion joints with sealant), special design details (reveals, skateboard deterrents, multiple finishes, shiners etc.), surface finishes, texture, and color, curing, and standard of workmanship.
    f. Build mockups where directed by the University Representative and retain onsite until final acceptance or as directed by the University Representative.
    g. Mockups must be approved by the University Representative prior to installation of site concrete. Refabricate samples until accepted. Accepted samples shall serve as standard for subsequent work. Mockups must be completed for review a minimum of calendar days prior to scheduled site concrete installation.
4. Refer to Drawings section of UC Davis Health's Standard Specifications for typical sidewalk details.
5. Develop PSI, Max Aggregate and Slump limits with various admixtures.
6. Exposed Aggregate Sidewalks and Flatwork
    a. General Requirements: Application of the following exposed aggregate concrete specification is primarily intended to be used in conjunction with new building construction or extensive hardscape developments where an accepted uniform concrete finish and overall appearance for exterior concrete hardscape is desired. This specification, therefore, applies to the new sidewalks, pathways, courtyards, and plaza areas of and surrounding new buildings on the UC Davis Health campus. Additionally, when existing campus facilities are undergoing renovation and replacement of sidewalks, pathways, courtyards and similar areas, evaluation of utilizing this specification is required.
    b. Scope of Work: Exterior concrete sidewalks, pathways, courtyards, and plazas shall conform to the following design criteria.
        1) Consist of concrete panels with 12"-wide smooth banded perimeter sections surrounding interior sections of exposed aggregate.
        2) Width, length and spacing of individual concrete panel sections to be a function of the surrounding physical requirements and constraints and shall attempt to incorporate the desired architectural theme.
    c. Materials
        1) Coarse aggregate: Cache Creek 3/8" x number 8 pea gravel, (1,650 lbs., 9.94 cubic feet, +/- 5% by volume).

2) Stone color: Red, black, brown and a minor amount of white, evenly distributed. Note: Contractor to coordinate with the University Representative regarding mix and finish. This may require, at the discretion of the University Representative, that a sample panel be provided by the Contractor for evaluation and approval by the University Representative.
3) Reference mix design: Mix Number X8W6041A (Teichert Cache Creek Plant), or equal.

d. Broom swept, smooth finish sidewalks and flatwork
1) General Requirements: Application of the following smooth finish concrete specification is primarily intended to be used at minor walkways. Verify locations with the University Representative.
a) Finish: Medium broom finish swept perpendicular to direction of path.

e. Expansion joints in concrete paving
1) Expansion joints are to be construction and finished with Silica Sand 20 Mesh from Cascade Rock of Sacramento (or equal) over tooled Sikaflex 2C NS EZ (or equal) over capped with 'zip strip' (or equal) plastic separation cap over 3/8" fiber expansion joint. Silica sand shall be applied liberally and adhered to sealant immediately after installation.

TACTILE WARNING SURFACE 32 17 26

A. Truncated Domes

1. Materials: Concrete dome tiles with integral color and spacing per CBC.
2. Color:
   a. At new onsite locations where all connecting crosswalks are to be new installations, the federal yellow color shall be selected. In specialty paving areas where paving color is dark, dome tile color shall be contrasting per CBC.
   b. At locations connecting to existing truncated dome installations to remain, the color shall be selected from the manufacturer's standard colors to match existing.
   c. At locations within the right-of-way, color shall be per City requirements.
   d. Wet set-in mortar bed as standard.

UTILITY ORGANIZATION CRITERIA 33 05 10

A. UTILITY ORGANIZATION

1. All utilities shall be organized to the greatest extent possible into logical utility corridors in order to maintain code required separation and ease of access. A utility corridor is defined as an area that is accessible by the required maintenance equipment and void of heavy vegetation.
   a. The utility corridor shall be a minimum of 10 feet wide and be accessible by a backhoe.
   b. Utility mains shall be located a minimum of 20 feet from any structures. If a 20-foot clearance cannot be achieved, consult with the University Representative. Structural zones of influence shall be considered when placing utilities and determining depth and pipe materials.
2. Utility lines shall be aligned to remain outside of the full grown tree drip line of all existing and proposed trees when feasible. When not feasible, obtain approval from PO&M and campus architect for proposed clearances.
3. For utilities not covered by State Health Standards, utility lines shall maintain 12 inches of clearance from other existing or planned utilities unless in a designed joint trench.

4. Underground utilities are to maintain a minimum 4 feet clearance from any heating, steam, and steam condensate piping.

B. POTHOLING

1. Record drawings and as built plans, when available, shall be reviewed against all survey data so that all potential utilities are shown on the design documents. Utilities shall be potholed that may be exposed during construction, at utility crossings, and at points of connection. Potholing shall be performed during or prior to the design stage of the project regardless of project delivery method. When feasible, provide a 3D model of all potholed utilities to the engineer and client.

UTILITY LINE SIGNS, MARKERS AND FLAGS 33 05 26

A. GENERAL

1. All utility trenches shall have utility markers and tape for warning and locating purposes.

UTILITY METERS 33 05 33

A. GENERAL

1. The utility meters shall be placed on all water services and as applicable for other campus utilities that require metering or monitoring. Meters are to be integrated with campus BMS as coordinated with mechanical engineer.

WATER DISTRIBUTION 33 11 00

A. GENERAL

1. Design velocities shall not exceed 5ft/s during normal operation and 15ft/s during fire flows.
2. Valving at Service Connections shall be the following:
    a. <2 inch – Corp stop at main.
    b. 2 inch – Gate valve on service at main.
    c. >2 inch – Three valve tee.
3. GPS coordinates for all installed valves are to be provided to PO&M for documenting.
4. A building’s non-potable water system shall be created by installing a backflow prevention device at a tee, downstream of the domestic water service backflow prevention device.
5. Where pipes have conflicts or critical crossings with other facilities, a detail or profile shall be shown on the plans. Details shall accurately show any depth transitions or fittings required to make connections. Any deviation in alignment (horizontal or vertical), such as an under-crossing or over-crossing shall be noted on the plans and contain a detail specific to each location. The detail shall show plan and profile views and include all relevant details, such as modified backfill materials, air vacuum/release valves, fittings, and type of pipe.
6. Plans shall note the location of all tie-ins and type of shutdown required, i.e. routine, large, or major. Valves shall be numbered per UC Davis Health’s valve numbering system, consult with the University Representative for specific requirements.

7. Large or critical use facilities shall have dual service connections. Services shall be fed from looped water mains. All domestic services shall have a valve immediately ahead of the water meter location. Each building or facility shall have a dedicated service connection and each service connection shall be metered. Minimum service size is 1 inch.

Service Connections

Service Size	Hot tap permitted	At the main line connection point
< 2 inch	Yes	Corporation stop on service line
2 inch	Yes	Gate valve on service line
> 2 inch	No*	Three valve tee*

   a. *If main line isolation valves are already present nearby, the University Representative may allow service to be installed with a hot tap with a valve on the service line.
   b. Flexible connections shall be used when connecting to asbestos cement pipe. The domestic water service to the building or facility shall include reduced pressure principal backflow prevention device(s) installed outside and above ground. The device shall be installed downstream of the domestic water meter (between the facility and the meter).
   c. Irrigation services shall be connected to the utility water system with a separate water meter. Meters are to be integrated with campus BMS as coordinated with mechanical engineer. If the irrigation service must be connected to the domestic water system with a separate water meter. Meters are to be integrated with campus BMS as coordinated with mechanical engineer. (e.g., for areas not serviced by utility water), it shall include reduced pressure backflow prevention device(s) installed outside and above ground. All tees require three valves and crosses require four valves. A valve may not be required on any leg of a tee or cross if another valve is within 150 feet. All high points require combination air/vacuum release valve.
   d. Reduced Pressure Backflow Preventer (RPBP) are to have insulated exterior jacket that can accommodate testing the design. Refer to mechanical campus design guide for additional details.

8. New installations shall use restrained joint fittings. Provide number of restraints and pipe length per manufacturer's table at changes in pipe direction, changes in pipe sizes, dead end stops and at valves. Thrust blocks should only be used if connecting to existing unrestrained pipe or fittings and be explicitly shown on the plans, including location and thrust block size. Provisions shall be made to ensure that pipe joints, fittings and valves are not covered by the thrust block concrete.
9. For utilities not covered by State Health Standards, separation shall never be less than 1 foot.
10. All water pipe, fittings, valves, fire hydrants, and other appurtenances shall be installed in accordance with the American Water Works Association (AWWA), ANSI-61.
11. Water supply service requirements and any work affecting off-site water facilities shall be in accordance with the requirements of the City of Sacramento Utility Services.
12. Water pipes installed in paved areas shall be designed to withstand the external earth load and the AASHTO H-20 vehicle live load.
13. Pipe material less than ½-inch shall be copper tubing per ASTM B88, Type K, annealed.
14. Pipe material ½-inch to 3-inch shall be HDPE AWWA C901 DR 11 (Class 200).
15. Pipe material larger than 3-inch shall be ductile iron AWWA C151 / A21.51 or PVC AWWA C900. For larger distribution projects HDPE Pressure Class 250 ANSI/AWWA C906 may be used.

16. Pipe shall have a locating wire taped to the top of the pipe to facilitate location after installation.
17. For pipes 4” and larger, all plugs, caps, tees, or bends with a deflection greater than eleven and a quarter degrees (11¼°) shall be supported by concrete thrust blocks or mechanically restrained joints.
18. Pipe bedding material shall be sand extending at least 6-inches below the pipe, 12-inches above, and 12-inches on the sides.
19. Backflow Prevention Assemblies shall be in accordance with the requirements of Title 17 of the California Administrative Code and listed and approved by the USC Foundation for Cross-Connection Control and Research. Backflow devices must be installed such that the device is readily accessible for testing and maintenance and shall be located as close as practical to the point of service delivery (meter). As a minimum, backflow prevention assemblies shall be sized equivalent to the diameter of the service connection and shall be located above ground.
    a. Potable water backflow devices shall be lead-free reduced pressure assemblies.
    b. Fire water backflow devices shall conform to the requirements of 33 11 00.
    c. Above ground pipe at backflow preventers to include insulation blankets.
20. Following disinfection, the entire system shall be isolated, and a hydrostatic pressure test conducted. The chlorinated water may be used to perform the test.
21. New pipe, fittings and valves required for connection but not included in the hydrostatic pressure testing and disinfection procedures shall be disinfected prior to connection in accordance with AWWA Standard C651 relating to “Connections Equal to or Less Than One Pipe Length”.

FIRE SUPPRESION WATER DISTRIBUTION PIPING 33 11 19

A. GENERAL

1. Fire water piping is to be C900 or approved similar. All material shall be currently listed in the Underwriters Laboratories, Inc., Fire Protection Equipment List and/or the Factory Mutual Approval Guide for use as intended in underground fire line installations and shall be acceptable to the AHJ. Vertical piping, piping installed within 5 feet of the building, and piping under all footings and slabs shall be cast, stainless steel, or ductile iron.
2. All work shall be designed in accordance with the requirements of the most recent applicable editions of National Fire Protection Association (NFPA) 13 and 24, as well as the appropriate editions of the California Building Code and the California Fire Code, and the local jurisdiction having authority.
3. GPS coordinates for all installed valves are to be provided to PO&M for documenting.
4. Underground fire protection system shop drawings shall show all information required by NFPA 24. In addition, the shop drawings shall show the Soil Bearing Capacity of the soil as determined in the Soils Report and the location, design, and size of mechanical restraints.
5. Uniflanges shall not be used on vertical piping, above ground, or in the basement. Tops of vertical risers shall be rodded down to the 90-degree bend at the base of the riser. Horizontal risers shall be rodded back to deadman of sufficient size to secure the flanged fitting.
6. Fire Hydrants shall have 2.5-inch outlets and one 4.5-inch outlet. All outlets shall have a National Standard fire hose thread. Hydrants shall be wet barrel type Clow Valve Company model 2060 or approved equal.
    a. Install with the outlets facing the street and meeting the other requirements shown on the AHJ standard details and guidelines.
    b. Where subject to mechanical injury, protect hydrants with bollards.

c. Color code hydrants based on flow rate per NFPA 291 requirements.

7. Double Check Valves Assembly:
   a. A double check valve assembly and Fire Department Connection (FDC) is required on all fire lines.
   b. Location of this assembly must be approved by the Campus Architect and AHJ. Locate the assembly outside of the building in an accessible location mounted on a minimum 6-inch height concrete slab so that it remains clear of adjacent vegetation. Insulate the aboveground piping 6 inches and smaller with removable blanket insulation (fiberglass insulation is not acceptable).
   c. Where the backflow device is potentially subject to mechanical injury, protection shall be provided. The means of approved protection shall be arranged in a manner which will not interfere with the connection to inlets.
8. Fire department connection locations shall be approved by the AHJ.
   a. Systems with a flow demand of 500 gpm or less shall provide four-inch pipe mount by 2-1/2 inch (Siamese), brass, dual clapper, freestanding fire department inlet connections, one-inch cast lettering, brass finish with plugs and chains or sensible caps.
   b. Systems with a flow demand greater than 500 gpm shall provide six-inch pipe mount by 2-1/2 inch, 4-way, brass, four clapper freestanding fire department inlet corrections, one-inch cast lettering, brass finish. Inlet corrections shall be oriented in a quad arrangement.
   c. Maintain a 5-footclear radius around the fire department connection. Grade variation within this radius shall not exceed 1:12. The fire department connection arrangement shall be approved by the Campus Fire Marshal.
9. Provide mechanical restraints. Thrust blocks will not be permitted except for Fire Hydrants. Depth of bury for piping shall be a minimum of 36 inches under vehicular paving. Measurement is from the top of the pipe to grade.

DOMESTIC WATER PIPING DISINFECTION 33 13 00

A. GENERAL

1. No new mains shall be connected to existing mains until they have been disinfected and pressure tested. Chlorination and testing of the water systems shall be in accordance with AWWA C 651. Disinfecting the new system may be performed concurrently with hydrostatic testing.

SANITARY SEWERAGE UTILITIES 33 30 00

A. GENERAL

1. When sewers of uniform slope pass through a manhole, the slope will be maintained and the invert at the center of the manhole will be given. When sewers change slope at a manhole, incoming and outgoing invert elevations will be given. Provide sufficient drop through a manhole to compensate for energy loss caused by change of alignment. A minimum drop of 0.1 foot is required for a change of alignment greater than 30 degrees. When pipe sizes change at structures, design the inlet crown at least as high as the outlet crown.
2. Minimum velocity in each pipe segment shall be 2 feet per second, and a maximum velocity of 8 feet per second. Use Manning's formula to determine the relation of slope, design flow, velocity, and diameter. For design purposes, the "n" value is 0.013 for all main line materials. Size new main lines smaller than 12 inches in diameter to carry the projected flow at a depth not greater than 70% of the inside diameter of the pipe (i.e. use a d/D of 0.7). Size new main lines 12 inches in diameter and larger to carry the projected flow assuming the pipe runs full (i.e. d/D of 1.0).

3. Pipe material for gravity feed systems shall be VCP, HDPE, PVC C900, PVC C905, or SDR 26. Use standard bell and spigot pipe or butt fusion for connecting pipes. Use flexible connections to accommodate ground settling (e.g. pipe connections outside manholes and wet wells, and pipe connections outside of casings).
4. Pipe material for force main systems shall comply with the requirements for high-pressure water mains.
5. Pipe bedding material shall be sand extending at least 6-inches below the pipe, 12-inches above, and 12-inches on the sides.
6. Connection to Existing Campus Sewer Main
    a. Connect new mains to existing at existing manholes or by constructing a new manhole over the point of connection.
    b. Where an existing sewer main is to be extended, remove the existing plug, cleanout, or rodding inlet and install a manhole. The main may be extended without installation of a structure only if it is on the same line and grade, the pipe size and material are the same and the manhole spacing is adequate.
7. Inverted Siphons
    a. Inverted siphons shall be used only upon special approval after all other design options have been investigated.
    b. The siphon shall be designed with two barrels, with a gate system directing the flow towards either the primary or secondary barrel.
    c. Design to achieve a minimum velocity of 3 FPS maintained for several hours a day.
    d. Vertical curves shall be used for all change in slope (100 feet minimum).
    e. The rising slope of the downstream leg of the siphon shall be limited to 15%.
8. Sewer Force Mains
    a. Sewer force mains shall conform to the Water Construction Standards for water mains.
    b. Sewer force mains will be laid with a constant slope toward the pump station to allow for complete draining of the pipeline.
    c. Locator boxes will be placed at every horizontal change in alignment or a maximum of every 500 feet. Boxes shall have the lids clearly marked, “SEWER.”
9. Alignment
    a. Horizontal and vertical separation from Domestic Water lines must conform to the State of California, Department of Health Services, “Criteria for the Separation of Water and Sanitary Sewer.”
    b. All mains must be a minimum of five feet clear from all buildings, building overhangs, etc.
    c. Vertical curves or bend fittings in gravity sewer mains are not allowed.
10. Laterals
    a. Provide a separate lateral and cleanout for each building and structure within 10 feet of the structure.
    b. Cleanouts: Pipe extension to grade with compression type plug. Install curb box over riser pipe. Use precast concrete box Christy F8 with cast iron lid or approved equal in non-traffic areas and Christy G5 with cast iron lid or approved equal in traffic areas. Lids shall be marked “SEWER.”
    c. Sewer laterals serving buildings or facilities which have plumbing fixtures with flood level rim elevations located below the next upstream sewer manhole rim require an approved backwater valve. Fixtures above such elevation shall not discharge through the backwater

valve per UPC Section 409. Backwater valves shall be installed in a vault, pit or basement so the valve is easily accessible for maintenance. A cleanout must be installed within 5 feet downstream of the valve.

11. Sanitary Sewer Manholes
    a. A manhole is required at every horizontal or vertical change in alignment.
    b. Maximum distance between manholes is 300 feet.
    c. A manhole is required at the end of every main in excess of 200 feet in length.
    d. Manholes shall be constructed with eccentric cones.
    e. 60-inch diameter manholes are required for mains 18 inches or larger in diameter.
    f. The manhole will be designed such that the angle in the horizontal plain between the downstream and any incoming sewer is a minimum of 90 degrees.
    g. Stubs provided out of manholes for future extension will have rodding inlets provided when more than 20 feet of pipe is installed or where service laterals are connected to the stub.
    h. Standard drop manhole installations are required when the difference in elevation between the incoming and outgoing sewer is greater than 2 feet. While not encouraged, drop manholes may be required because of some physical restraints. They may not however, be used to merely avoid extra depth of trenching unless unusual circumstances exist. Upstream slope changes should be used to avoid the need for a drop manhole.
    i. When one drop connection is required, use a 60 inches diameter manhole. When two or more drop connections are required, use a 72 inches diameter manhole.
12. Industrial Waste Discharges
    a. Grease traps, grease and sand traps, grease interceptors, and sampling structures as may be required by UC Davis Health shall be shown on the plans submitted for approval.
    b. Food Service facilities must have a grease interceptor installed outside the facility in an area accessible for accessible for service vehicles.
    c. Trash enclosures and other outdoor pad areas used for washing will be plumbed to the sanitary sewer system at grease interceptor or other connection point approved by the University Representative. Preventive measures must be taken to eliminate the intrusion of any rainwater or surface runoff.
    d. Wash pad areas must be diked and/or sloped so that the smallest area possible drains to the sewer.
13. Lift Stations
    a. Lift stations will not be allowed where an acceptable alternative gravity route exists.
    b. Lift stations are to include general alarm integrated with campus BMS as coordinated with mechanical engineer.
    c. Design the lift station to serve the entire tributary at build-out densities in accordance with sewer system master plan, LRDP and I/I allowances. Lift stations shall be designed to have pump redundancy.
    d. All pumps, regardless of station type, will be non-clogging, capable of passing a minimum 3 inches diameter sphere.
    e. Lift stations are not allowed within traffic areas.
    f. Provide a reinforced concrete base slab sized adequately to counteract buoyancy. Provide supporting design calculations.
    g. Provide a single surface pad over site that incorporates lift station access, wet well access and supporting generator and fuel supply tanks, as necessary.

h. Provide restrained flexible couplings on all outlet piping within 2 feet of the station wall.
i. All wet well components and all items in the wet well shall be non-corrosive plastic, stainless steel or other approved material.
j. Wet well to be minimum 72 inches in diameter with 4-hour capacity or as necessary to accommodate pumping equipment for submersible stations. Provide resilient-seat gate valve on inlet pipeline into wet well to provide wet well isolation.
k. Odor control systems shall be required.
l. Provide 6-inch PVC emergency by-pass system consisting of a suction line and a discharge line and a standpipe equipped with a cap and cam-lock connector. Bypass will be located in a vault. Standpipe connects to force main through an AWWA resilient-seat-gate valve with stainless steel trim and a check valve. The suction and discharge lines will have gate valves for isolation. Adequately support all piping.
m. Provide 1-inch minimum water service with reduced pressure backflow preventer and piping insulation.
n. Provide a minimum of two pumps and controls to alternate lead and lag pumping.
o. Provide hour meters for each pump that records pump run time, only if the motor is operating.
p. Provide a magnetic flow meter on the discharge of the pump station. Meters may be in an approved vault. Display will be installed in pump station control panel.
q. All pumps, motors, internal valves and piping, level indicators, control panel, will be assembled as a package. Supply and warranty will be through one company.

14. Submersible Pumping Stations
    a. The lift station will consist of a minimum of two submersible centrifugal sewage pumps, guide rails, wet well access, discharge seal and elbow, motor control center, starters, liquid level control system and all hardware necessary to make a complete working system. Supply and warranty will be through a single company. Standards are Xylem, Gorman Rupp Company or equal.
    b. The pumps will be electric, submersible, centrifugal non-clogging units capable of passing a 3-inch sphere. Pump and motor will be suitable for continuous operation at full name plate load while the motor is completely submerged, partially submerged or not submerged. All electrical equipment/panels will be above ground.
    c. Each pump will be furnished with a discharge connection system, which will permit removal and installation of pump without the need for the operator to enter the wet well.
    d. All hardware in wet well, chains, cables and slide rails will be 316 stainless steel.
15. Lift Station Piping and Valving
    a. When not included with package stations, all internal main lift station piping will be flanged or Victaulic to allow for disassembly.
    b. All main piping will have manual vents and drains to allow draining of sewage prior to piping disassembly.
    c. Resilient-seat-gate valves will be used in station discharge piping. If space does not permit isolation valves for each pump use 3-way valves.
    d. Main Pump Check Valves will be cast iron swing checks with externally weighted lever return. Check valve will not be installed in the vertical. Disc will be 316 stainless steel or cast iron with bronze trim. Pivot arm and bearing will be 316 stainless steel or cast iron with bronze trim. Pivot arm and bearing will be 316 stainless steel or bronze. Seat will be field replaceable with neoprene facing.

1) Electrical Equipment
   a) Free standing electrical service with transfer switch, with heavy duty electrical weatherproof enclosure securely mounted in a manner acceptable to the Director of Utilities, a minimum of 24” above the ground. Provide generator receptacle to match Utility Division standard or stand-by generator. Provide a concrete pad around steel supports.
   b) All pump motors will have solid state soft starters. They will be Allen-Bradley or approved equal and provided with solid state smart type motor starters with a pump control option used to provide ramp starting and stopping of motors. The controller will have the following start modes: soft start with selectable kick starts, current limit and full voltage.
   c) Interior Lighting: Provide all control panels with a fluorescent interior light of the same approximate width of the control panel located along the top of the panel. Provide light with a separate light switch.
   d) UPS: Provide an uninterruptible power supply sized for 150% of calculated load with sufficient battery backup time for 30 minutes of operation. Provide American Power Conversion, Best Power Products or equal.
   e) Selectors and Pushbuttons: Provide corrosion resistant 30mm selectors and pushbuttons by Allen-Bradley or Square-D.

STORM DRAINAGE UTILITIES 33 40 00

A. GENERAL

1. Size piping to accommodate a minimum of a minimum of 10-year storm event with overland flows to City right of way for larger storm events. Design velocity shall be a minimum of 2 ft/s and a maximum of 6 ft/s unless otherwise approved by the University Representative due to site and watershed constraints. Pipes shall be sized to carry the 10-year discharge with Hydraulic Grade Lines, HGL’s, 0.5-foot below rim or inlet grate elevations.
2. If stormwater detention is necessary, a 24-hour 10-year storm shall be used to size detention facilities prior to outlet to the City system.
3. Under the federal Clean Water Act, storm water discharges in California are regulated through the National Pollutant Discharge Elimination System (NPDES) permits overseen by the State Water Board. NPDES permits have been issued and enforced to the City and County of Sacramento through the Central Valley Regional Water Quality Board requiring regulation and management of urban stormwater runoff including that for new developments and significant redevelopment projects. Management of stormwater runoff including low impact development (LID) and treatment control measures shall be in accordance with the Stormwater Quality Design Manual issued for the City of Sacramento. See 33 46 00.
4. Pipe material shall be Class III RCP, HDPE, or PVC SDR-35 under normal loading conditions with proper cover. Where shallow cover or excessive loading is anticipated pipe design shall be presented to the University Representative for approval.
5. Pipe bedding material shall be sand or class 2 aggregate base extending at least 6-inches below the pipe, 12-inches above, and 12-inches on the sides.
6. Area drains, catch basins, and trench drains within pedestrian pathways shall conform to the opening requirements in Chapter 11B of the California Building Code and shall be sized to convey the 24-hour, 10-year flow for the watershed that they drain.
7. Area drains in planted areas shall have atrium grates.

8. Connections to Existing Campus Storm Main
    a. Provide a manhole at building main lateral connection to the storm main on campus.
    b. For pipe penetrations through existing and new manholes, core through, install gasket around pipe, grout penetration on both sides and install a minimum of 6 inches around collar outside of the manhole penetration.
    c. Tap Connection - Use commercially manufactured wyes for branch connections. Field cutting into piping will not be permitted. Spring wyes into existing line and encase entire wye, plus 6 inches overlap, with not less than 6 inches of 3000 psi 28-day compressive strength concrete.
9. Storm Drain Manholes
    a. Maximum distance between manholes is 300 feet.
    b. A manhole is required at the end of every main in excess of 200 feet in length.
    c. Manholes shall be constructed with eccentric cones.
    d. 60-inch diameter manholes are required for mains 18 inches or larger in diameter.
    e. The manhole will be designed such that the angle in the horizontal plain between the downstream and any incoming sewer is a minimum of 90 degrees.
    f. Stubs provided out of manholes for future extension will have rodding inlets provided when more than 20 feet of pipe is installed or where service laterals are connected to the stub.
    g. Standard drop manhole installations are required when the difference in elevation between the incoming and outgoing sewer is greater than 2 feet. While not encouraged, drop manholes may be required because of some physical restraints. They may not however, be used to merely avoid extra depth of trenching unless unusual circumstances exist. Upstream slope changes should be used to avoid the need for a drop manhole.
    h. When one drop connection is required, use a 60 inches diameter manhole. When two or more drop connections are required, use a 72 inches diameter manhole.
10. For branch connections from side into existing 24 inch or larger piping, or to underground structures, cut opening into unit sufficiently large to allow 3 inches of concrete to be packed around entering connection. Cut ends of connection passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support or collar from connection to undisturbed ground. Use epoxy bonding compound as interface between new and existing concrete and piping materials.
11. Direct connections from depressed loading docks (truck wells) to storm drains are prohibited.
    a. Design drainage for new construction and/or redevelopment loading dock projects to minimize run-on and runoff of storm water. Loading areas must be sloped to direct flow towards a drain inlet connected directly to the sanitary sewer, or with a shutoff valve and sump with enough capacity to hold a spill while the valve is closed. Design to flow under gravity so the sump outlet is located at the upper portion of the sump to avoid creating a situation where water must be pumped out of the sump since most of the sewer/storm laterals are not very deep.
    b. Valves located in loading dock areas should be left open to facilitate drainage of storm water during normal conditions, and immediately closed in the event of a spill or sanitizing of the area.
12. Lift Stations
    a. Lift stations are discouraged and shall only be allowed with prior approval from the University Representative.

b. If list stations are required based on site conditions, lift stations shall be design with dual pumps for redundancy.
c. Each pump shall be sized to convey the 10-yr flow.
d. Lift stations are to include general alarm integrated with campus BMS as coordinated with mechanical engineer.

STORM MANAGEMENT 33 46 00

A. GENERAL

1. Management of stormwater runoff including low impact development (LID) and treatment control measures shall be in accordance with the Stormwater Quality Design Manual issued for the City of Sacramento.
2. New project sites shall be designed to minimize impervious areas.
3. Source Control measures shall be incorporated into the design of all new projects to prevent pollutants from contracting site run-off.
4. Stormwater Quality Treatment Measures
    a. Applicable stormwater quality treatment measures for new projects include permeable pavements, green-roofs, bioretention areas, and infiltration basins. Other measures are allowed if permitted by the state. LID measures are required for stormwater quality treatment
    b. Infiltration tests shall be performed for all new projects that are required to implement stormwater treatment measures.
    c. Stormwater quality treatment measures shall be designed to promote infiltration if feasible. Where infiltration is not feasible due to site conditions, flow-through design shall be used.
    d. Stormwater quality treatment measure locations shall be reviewed and approved by the Geotechnical Engineer prior to submission to the City for approval.
    e. Infiltration Measures
        1) Infiltration based measures shall be a minimum of 10 feet from building foundations and 10 feet vertically from the point of infiltration to the groundwater table.
    f. Flow-through treatment measures shall include underdrains.
    g. Overflow drains for planted treatment measures shall have beehive or atrium style grates.
    h. Bioretention Areas:
        1) The bioretention soil mix shall have an infiltration rate of 5 in/hr (min) after installation. This will require the laboratory testing infiltration rate to be greater than 5 in/hr. See the permitting agency requirements for more detailed bioretention soil media specifications
        2) Drawdown time shall be 12 hours
        3) Mulch or rock mulch shall be non-floatable.
        4) Sideslopes shall be 3:1

NATURAL GAS DISTRIBUTION 33 51 00

A. GENERAL

1. Metering
    a. The natural gas meter shall be installed at service connection to the building in an accessible location. Meter shall be capable of local and remote read-out per PG&E requirements.

2. Steel Pipe
    a. Pipe - Black steel, Schedule 40 with X-Trucoat, Greenline, or equal, factory wrap on buried lines.
    b. Fittings:
        1) Buried: HDPE pressure class 235.
        2) Above Ground: Welding, or malleable iron threaded.
3. Valves
    a. Underground: Valves under three inches shall be threaded and made up with threaded nipples, in a vise, before inserting into the line by welding. Valves three inches and larger shall be generally flanged and attached to slip-on welding flanges.
    b. Lubricated plug cock: 1 inch and larger, Rockwell 115, Walworth, or equal. Provide lubricated plug cock for all below grade applications. Extend lubrication port and valve handle to a minimum of 6 inches below grade in valve box.
    c. Corporation stops of dissimilar metal shall not be used.
4. Unions
    a. Underground: Unions shall not be used.
    b. Above ground: Flanged or threaded metal-to-metal shall be used.
    c. Dielectric (insulated) unions shall be installed only when necessary at designated points for cathodic protection.
    d. Regulators and meters shall be protected from damage.
5. Corrosion Control - In order to provide protection of metal pipe from external, internal and atmospheric corrosion, provide an external protective coating and a cathodic protection system designed to protect the pipeline in its entirety.
    a. Field Wrapping with cold-applied tape
        1) coating odd shapes containing bolts, voids, or hard-to-wrap surfaces, two coats of mastic-type primer shall be used, with special care to assure that all surfaces are coated without introducing voids or pockets.
        2) The bare metal surface to be wrapped must be dry and cleaned of rust, dirt, oil, and weld slag. Whenever tape wrap is applied over yard wrap, the outer coating of Kraft paper, whitewash, mica, flakes, protective plastic outer wrap, etc., shall be removed.
        3) Plastic coated pipe, prime area to be wrapped plus a minimum length of 4 inches from the cutback edge. Tape shall be applied by first lapping over approximately one tape width of the prepared end of the wrap. The wrap should be spiraled along the line, with each spiral overlapping the previous spiral by one-half the tape width plus one-quarter inch, to assure a double thickness at all points. The tape should be applied with enough tension to achieve a tightly bonded smooth wrap, free of wrinkles or voids. Do not over-stretch.
    b. Asphalt Coating - Small defects (less than 3 inches across) - slight damage where the asphalt wrap is still bonded to the pipe and no penetration has occurred may be repaired by a single patch. Prepare the surface of the asphalt wrap by removing the outside coating with a wire brush, prime and apply the single layer of tape so that it extends 2 inches beyond the damaged area in all directions. If penetration of the asphalt wrap has occurred or the bond has been broken, all loose wrapping shall be removed to the bare pipe. The area shall be primed, and the standard spiral wrap applied. Large defects (greater than 3 inches across) - if the pipe coating is still bonded and penetration has not occurred, prepare the surface by removing the outside coating with a wire brush, prime, and wrap tape completely around

pipe, extended two inches beyond the damaged area on each side. If penetration of the coating has occurred or the bond has been broken, all loose or damaged coating shall be removed. Prime and apply the first layer of tape, patch fashion, and the next layer shall use the standard spiral wrap, extending 2 inches beyond the damaged area.

c. Plastic or Tape Coating - On plastic-coated pipe, repairs shall be treated as a large defect by wrapping completely around the pipe as required. The entire plastic surface to be coated shall be cleaned. On tape-coated pipe, repairs shall be done by removing the outer wrap several inches back from the area of defect, then prime and apply tape to the damaged area. It is not necessary to remove the inner wrap.

6. Qualification of Welders - Only welders who are currently qualified in accordance with the following may perform welds on a gas pipeline:
   a. Section IX of the American Society of Mechanical Engineers Association (ASME) Boiler and Pressure Vessel Code.
   b. Section 3 of American Petroleum Institute (API) Standard 1104
   c. Appendix C of Federal Register, Vol. 35, No. 161.
7. Underground Clearance - Sufficient clearance shall be maintained between mains and other underground structures to:
   a. Permit installation and operation of maintenance and emergency control devices such as leak clamps.
   b. Permit installation of service laterals to both the mains and to other underground structures.
   c. Provide heat damage protection from other underground facilities such as steam or electric power lines. This is especially critical for cathodically protected pipeline, which must be isolated from underground foreign piping.
8. Plastic Pipe
   a. No plastic natural gas lines shall be accepted without prior approval of the University Representative.
9. Service Lines (plastic)
   a. 24 inch minimum of cover in streets; 18 inch minimum of cover otherwise.
   b. For main connections, a protective sleeve designed for the specific type of connection shall be used to reduce stress concentrations.
   c. At building wall, the transition from plastic pipe to more rigid piping should be protected from shear and bending as at the main connection. Where possible the trench bottom should be compacted and smoothed, where not possible, some other method of continuous support for the service line should be provided over the disturbed soil.
   d. The service line shall be graded to drain any possible condensate into the main.
   e. Each service line shall be installed to minimize anticipate piping strain and external loading.
   f. Each service line shall have a service line valve.
10. Piping shall be installed with sufficient clearance, or shall be insulated from any source of heat, such as steam or electric power lines, particularly when installed in common trenches.
    a. Plastic pipe shall be laid on undisturbed soil, well compacted soil, well tamped soil, or other continuous support. Blocking shall not be used to support pipe.
    b. Piping shall be installed with sufficient slack to provide for possible contraction.
    c. Piping shall be installed with enough clearance to allow proper maintenance and to protect against damage that might result from proximity to other structures.

d. Bends should be free of buckles, cracks, or other damage, and may not be deflected to a radius smaller than the minimum recommended by the manufacturer.

11. Valve installation - Designed to protect the plastic material against excessive torsion or shearing load when the valve is operated and from any other secondary stresses that might be exerted through the valve or its enclosure. Prevent excessive strains at valve installations by:
    a. Use a valve having low operating torque.
    b. Anchor the valve body to resist twisting.
    c. Make the transition from plastic to metal some distance from the valve. Any transition shall be supported by undisturbed or well compacted soil, by bridging or by sleeve encasement. Transition pieces 2 feet long will usually provide sufficient stabilization.
    d. Use rigid pipe casing fastened to the valve. Casing pieces 2 feet long will usually provide stabilization.
    e. Use a metallic pipe sleeve rigidly connected to the valve and encasing the plastic.
12. Cathodic Protection of Isolated Steel components in Plastic piping systems – Provide one of the following:
    a. A small galvanic anode directly connected to the steel component.
    b. Each steel component may be connected to a locator wire which is also connected to one or more galvanic anodes. To facilitate monitoring, the locator wire may be terminated at one or more service risers.
    c. Use of certain metal fittings in plastic pipelines without coating, cathodic protection, and monitoring when adequate external corrosion control is provided by alloy.
    d. Type 316 stainless steel or equally corrosion resistant component.
13. Valve enclosures - Where curb boxes or other enclosures are used, they shall not be supported by the plastic pipe and shall not in any way impose secondary stresses.
14. Testing (Steel and Plastic)
    a. Mains shall be pressure tested at a minimum of 100 psi, for a minimum time of 4 hours. Service lines shall be pressure tested at a minimum of 50 psi, for a minimum time of 4 hours.

APPENDIX A ABBREVIATIONS & DEFINITIONS

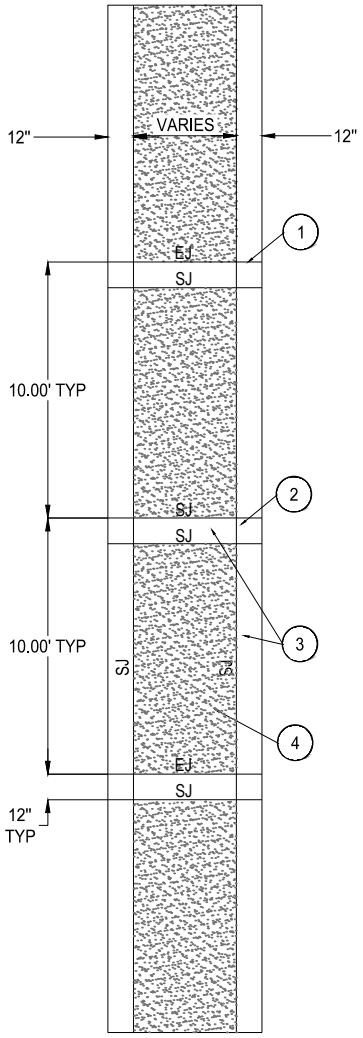
ACI	American Concrete Institute
ADA	Americans with Disabilities Act Accessibility Guidelines
AESS	Architecturally Exposed Structural Steel
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BHMA	Builders Hardware Manufacturers Association
BSC	Biological Safety Cabinets

CAL OSHA	California Division of Occupational Safety and Health
CBC	California Building Code
CCCPD	Chancellors Committee on Campus Planning and Design
CCR	California Code of Regulations
CSI	Construction Specifications Institute
DPP	Detailed Project Program
DSA	Division of the State Architect
EDP	EXECUTIVE DESIGN PROFESSIONAL: The Design Professional contracted by the University to prepare Construction Documents for a particular project. In this document, the term “Executive Design Professional” may refer to an architect, landscape architect, planner, interior designer, or an engineer of record.
EH&S	Environmental Health & Safety
EIR	Environmental Impact Report
ENR	Engineering News Record
ER	Entrance Facility Room
ESR	Evaluation Service Report – developed by ICC – product approval for adherence to code standards
FD&C	Facilities Design and Construction
FRP	Fiberglass reinforced polyester
FSC	Forest Stewardship Council
GA	Gypsum Association
GFCI	Ground Fault Circuit Interrupter
HDPE	High Density Polyethylene
ICC	International Code Council
ICC-ES	ICC Evaluation Service
LRDP	Long Range Development Plan for UC Davis Health
NFPA	National Fire Protection Association
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NOA	Naturally Occurring Asbestos
OSHPD	Office of Statewide Health Planning and Development

PCB's	Polychlorinated biphenyls – manmade chemicals banned by the USEPA in 1979 widely used in electrical equipment like capacitators and transformers
PETG	Polyethylene terephthalate glycol
PO&M	Plant Operations & Maintenance
PPG	Project Planning Guide
PSI	Pounds per Square Inch
SDI	Steel Door Institute
SFM	State Fire Marshal
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSMA	Steel Stud Manufacturers Association
UBC	Uniform Building Code
SDI	Steel Door Institute
TS	Telecommunications Spaces
TR	Entrance Facility Room
UNIVERSITY REPRESENTATIVE	The person designated by UC Davis Health to represent the University to the Contractor, Design Professionals, and/or Project Engineers.
UPC	Uniform Plumbing Code
VOC	Volatile Organic Compound - organic chemicals that have a high vapor pressure at ordinary room temperature.

APPENDIX B CIVIL DETAILS

1. Refer to the attachment for typical Civil details.



NOTES

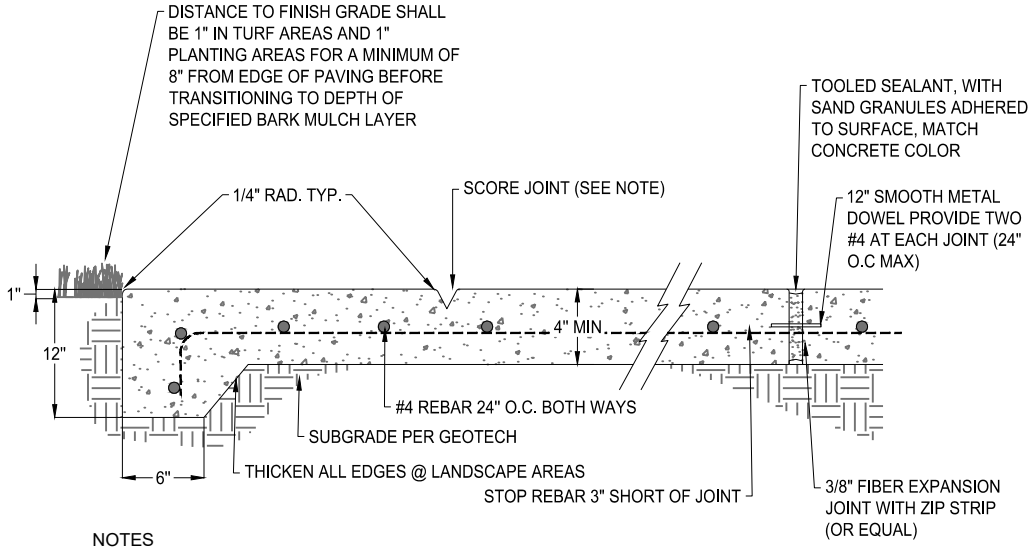
1. 3/8" FIBER EXPANSION JOINT (EJ) WITH ZIP-STRIP TOP AND FINISHED WITH JOINT SEALANT, WITH SAND GRANULES ADHERED TO SURFACE.
2. SCORE JOINT (SJ) SHALL BE 1/4 DEPTH OF TOTAL CONCRETE THICKNESS.
3. MEDIUM BROOM FINISH.
4. EXPOSED AGGREGATE- MIX DESIGN TO INCLUDE CACHE CREEK AGGREGATE.

GENERAL NOTES

1. MINOR PEDESTRIAN WALKS ARE SIMILAR FOR SJ AND EJ SPACING. SJ SPACING SHALL BE LONGITUDINAL SJ AND EXPOSED AGRREGATE FINISH.
2. MINOR PEDESTRIAN WALKWAY FINISH SHALL BE MEDIUM BROOM FINISH SWEPT PERPENDICULAR TO DIRECTION OF PATH.
3. COMPRESSIVE STRENGHT - 3000 PSI MIN.
4. 1% MIN. AND 1.5% MAX. CROSS SLOPE.
5. WALKWAY SHALL NOT EXCEED 5% LONGITUDINAL SLOPE WITHOUT COMPLYING WITH THE CBC PROVISIONS FOR PEDESTRIANS RAMPS.

CAMPUS STANDARD SIDEWALK DETAIL

NTS



NOTES

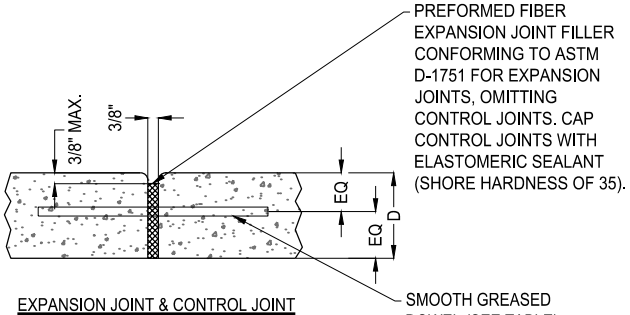
1. COMPRESSIVE STRENGTH - MIN. 3,000 PSI.
2. FINISH TO BE MED. BROOM FINISH UNLESS OTHERWISE NOTED ON DRAWIGS.
3. MIN. CROSS SLOPE ON ALL CONCRETE SURFCES TO BE 1% MAXIMUM SLOPE 1.5% UNLESS NOTED OTHERWISE.
4. SCORE JOINTS TO BE 1/4 DEPTH OF TOTAL CONCRETE THICKNESS. SEE PLAN FOR SCOPE JOINT AND EXPANSION JOINT SPACING.

CONCRETE PAVING SECTION

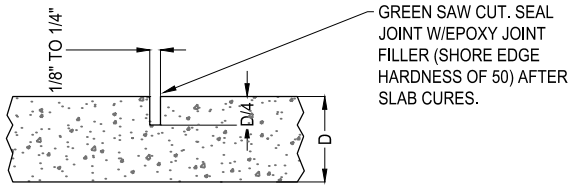
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DOWEL SIZE & SPACING			
SLAB DEPTH	DIAMETER	LENGTH	SPACING
4"	5/8"	12"	24" O.C.
6"	3/4"	18"	18" O.C.
8"	1"	24"	18" O.C.
10"	1"	24"	12" O.C.

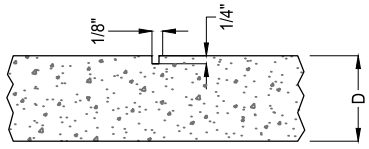
SLAB THICKNESS	WPJ SPACING (EACH WAY)	CONTROL JOINT SPACING
4"	8' O.C. MAX.	32' O.C. MAX.
6"	12' O.C. MAX.	36' O.C. MAX.
8"	16' O.C. MAX.	40' O.C. MAX.
10"	N/A	40' O.C. MAX.



EXPANSION JOINT & CONTROL JOINT



WEAKENED PLANE JOINT

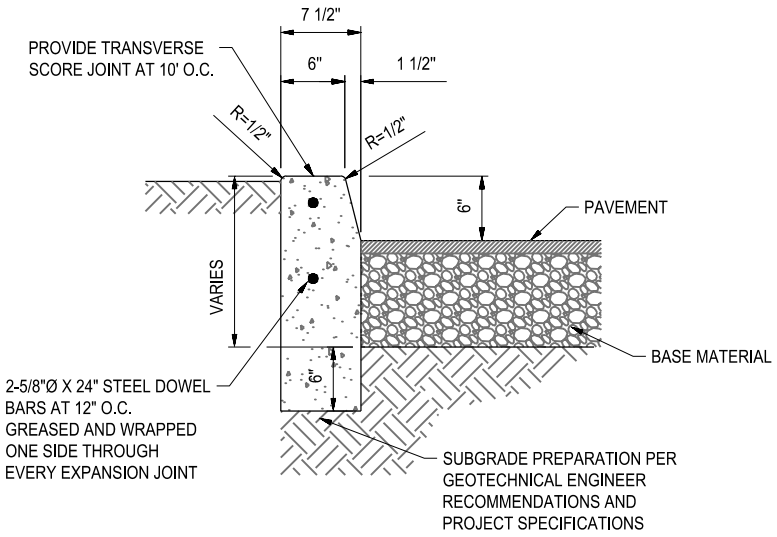


NOTE:
SCORE JOINT SPACING SHALL BE PLACED 5'-0" O.C. UNLESS OTHERWISE NOTED ON PLANS

SCORE LINE

TYPICAL CONCRETE JOINT DETAILS

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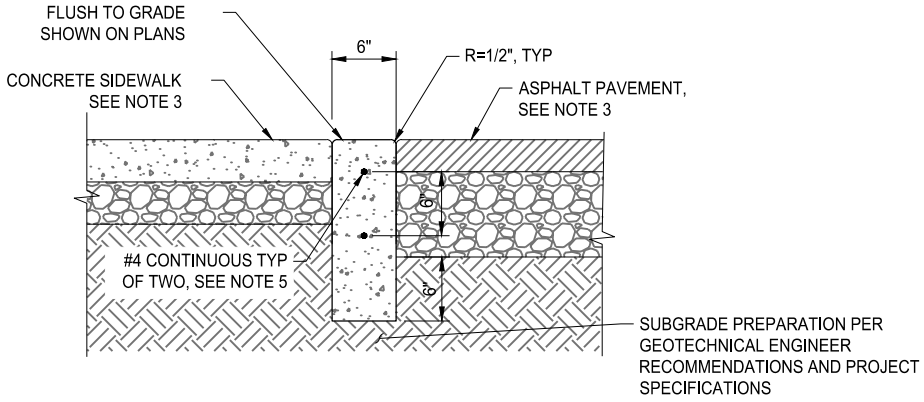


VERTICAL CURB

NTS

C-04

JUNE 2025

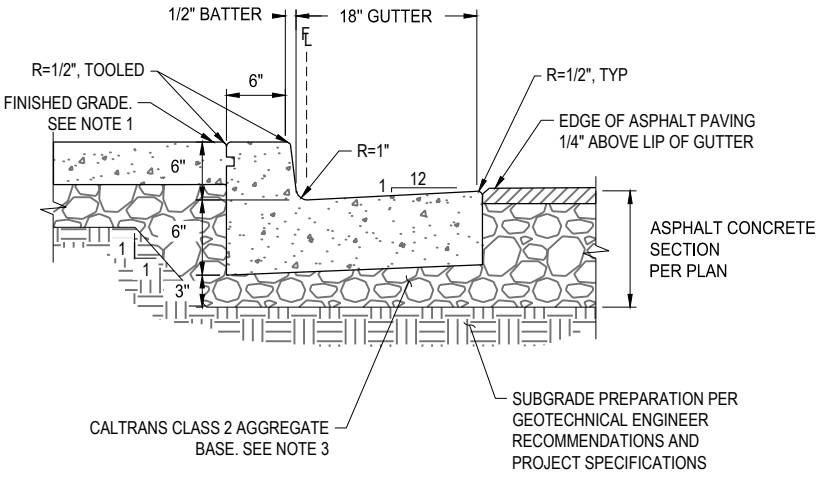


NOTES

1. CONCRETE MIX PER SPECIFICATIONS.
2. PLACE 1/2" THICK EXPANSION JOINTS FULL WIDTH 20' OC MAX SPACING. CONTROL JOINTS SHALL BE PROVIDED BETWEEN EXPANSION JOINTS AT 10' MAX SPACING.
3. SEE ASPHALT CONCRETE PAVEMENT, CONCRETE PAVEMENT, AND CONCRETE SIDEWALK DETAILS FOR ADJACENT PAVEMENT SECTIONS.
4. [ALTERNATE REINFORCEMENT: USE FIBER MATRIX ADD MIXTURE PER SPECIFICATION XX XX XX].

FLUSH CURB

NTS

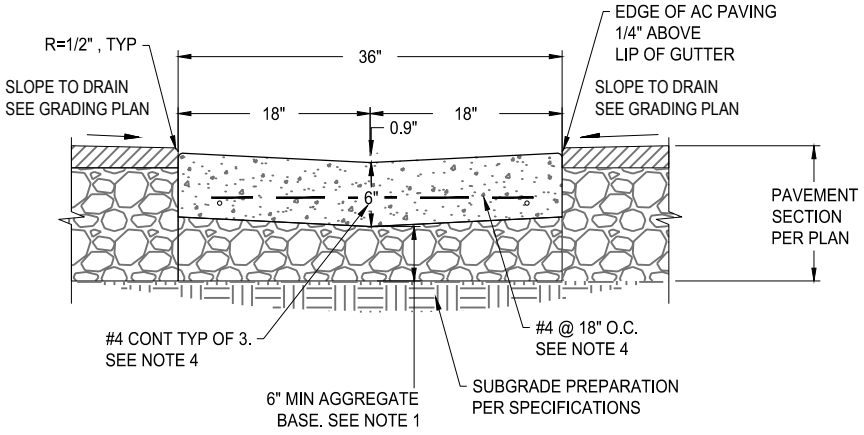


NOTES

1. WHERE CURB ABUTS PROPOSED SIDEWALK, FORM 1" X 2" KEY IN BACK OF CURB TO CONNECT WITH PROPOSED SIDEWALK.
2. DO NOT POUR SIDEWALK MONOLITHICALLY UNLESS OTHERWISE NOTED.
3. PROVIDE A 3" LAYER OF CLASS 2 AGGREGATE BASE OR SUBBASE UNDER CURB UNLESS OTHERWISE NOTED.
4. CONCRETE MIX PER SPECIFICATIONS.

CURB AND GUTTER

NTS



NOTES

1. PLACE AGGREGATE BASE IN MAXIMUM 6 INCH THICK UNCOMPACTED LIFTS. COMPACT EACH LIFT TO 95% RELATIVE COMPACTION.

2. DISCONTINUE THE GUTTER LONGITUDINAL REBAR 3" EACH SIDE OF ALL CONTROL AND EXPANSION JOINTS AND INSTALL DOWELS PER PLAN.

3. INSTALL TRANSVERSE EXPANSION JOINTS AT MAXIMUM 30 FEET O.C. CONSTRUCT CRACK CONTROL JOINTS AT MAXIMUM 10 FEET O.C. CRACK CONTROL JOINTS SHALL BE 1/8 INCH WIDE, AND TOOLED OR SAW CUT TO A MINIMUM DEPTH EQUAL TO 1/4 OF THE TOTAL SLAB DEPTH.

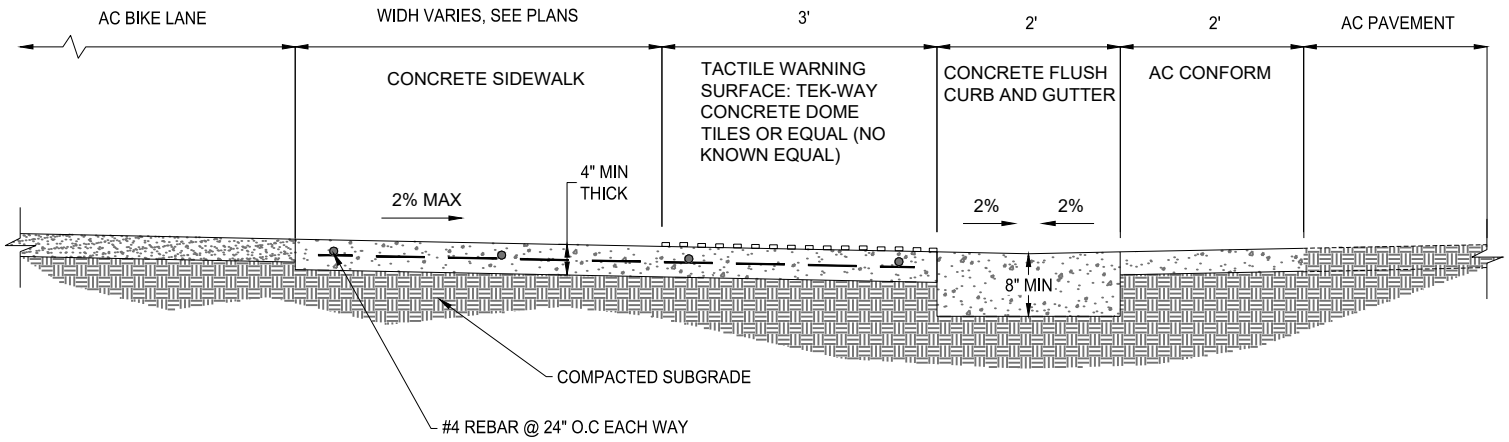
4. ALTERNATE REINFORCEMENT: USE FIBER MATRIX ADD MIXTURE PER PLANS.

5. CONCRETE MIX PER SPECIFICATIONS.

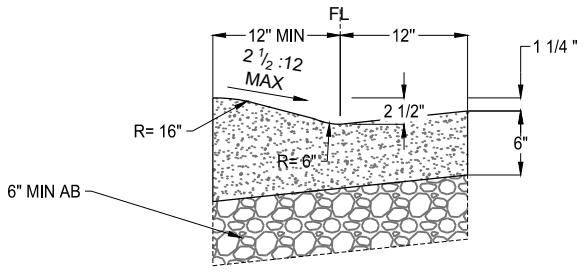
VALLEY GUTTER

NTS

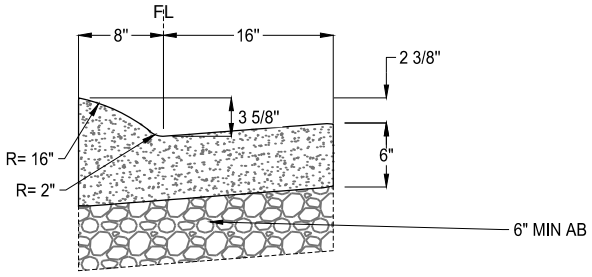
JUNE 2025



BIKE CROSSING @ STREET WITH WALKWAY & TRUNCATED DOMES



BICYCLE CURB RAMP & GUTTER



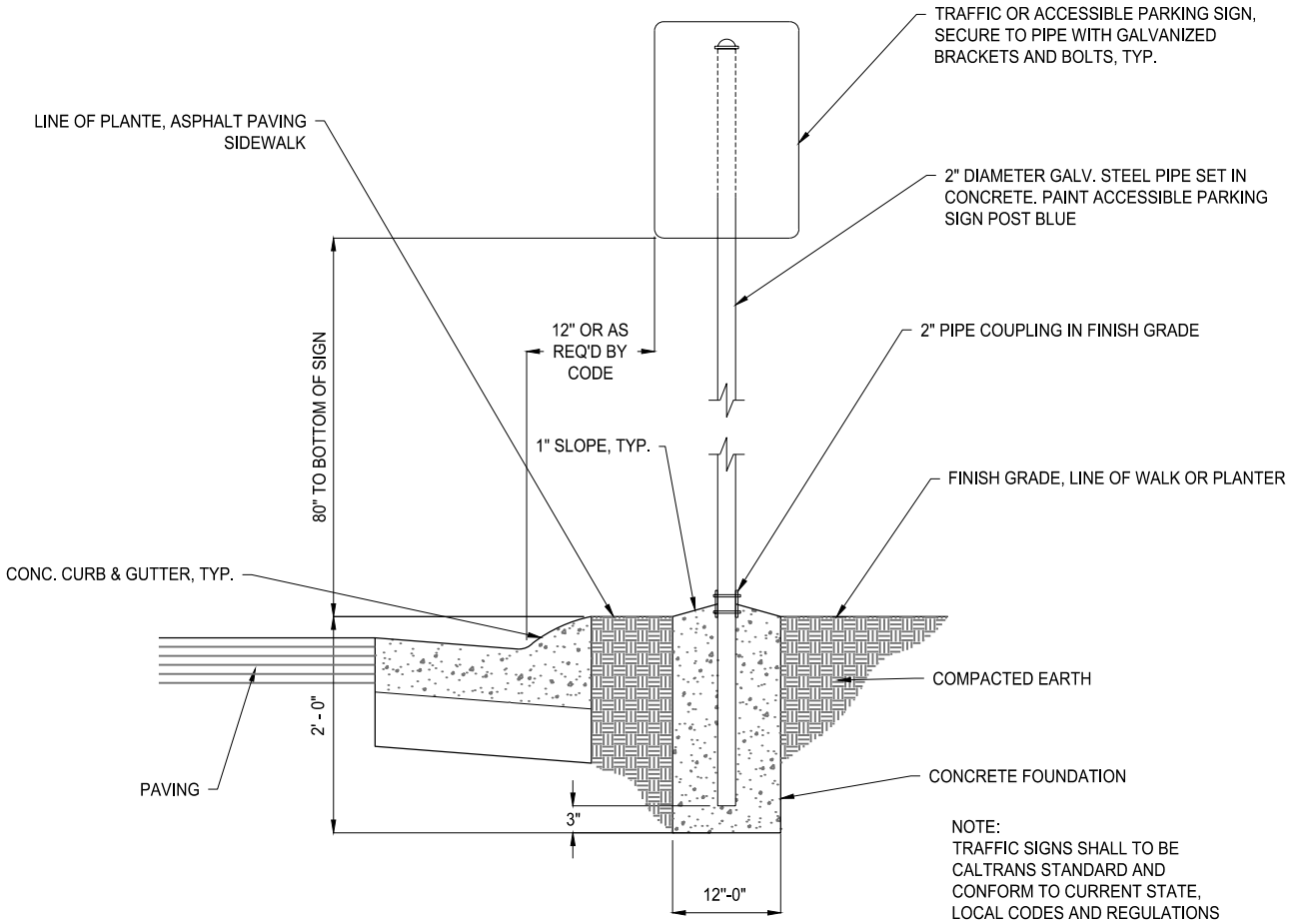
ROLLED CURB RAMP & GUTTER

BICYCLE RAMPS AT STREETS AND WALKS

NTS

C-08

JUNE 2025

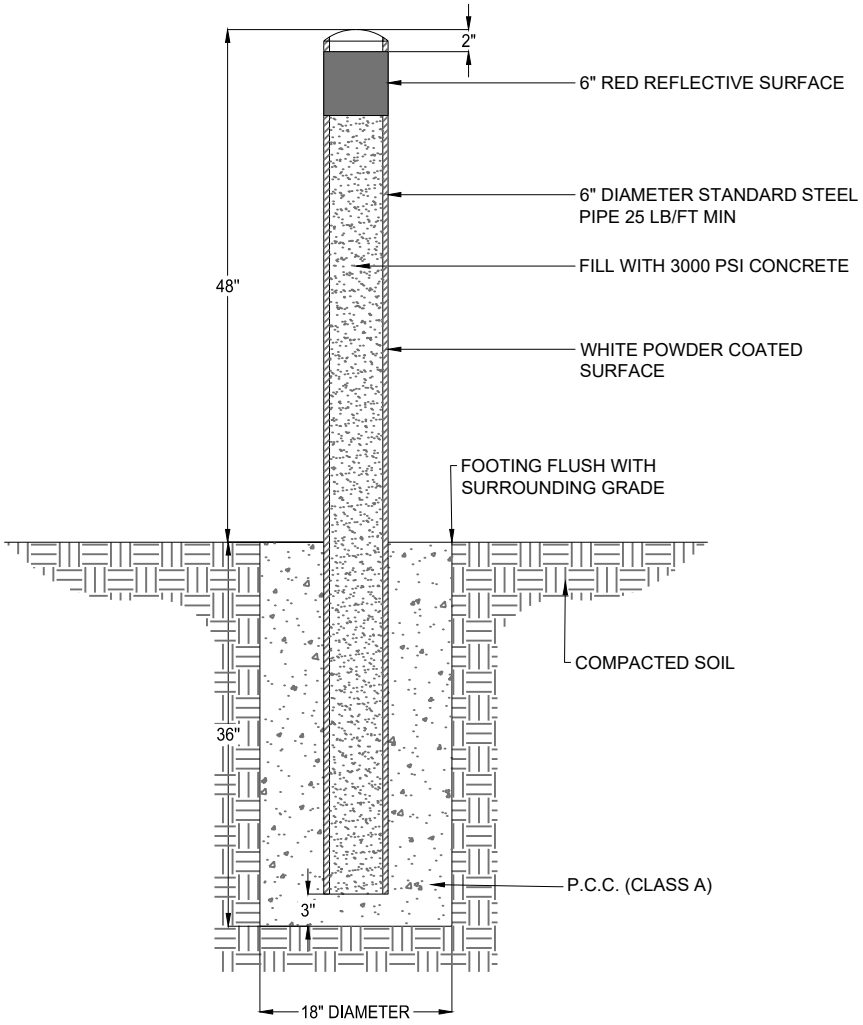


TRAFFIC SIGN POST

NTS

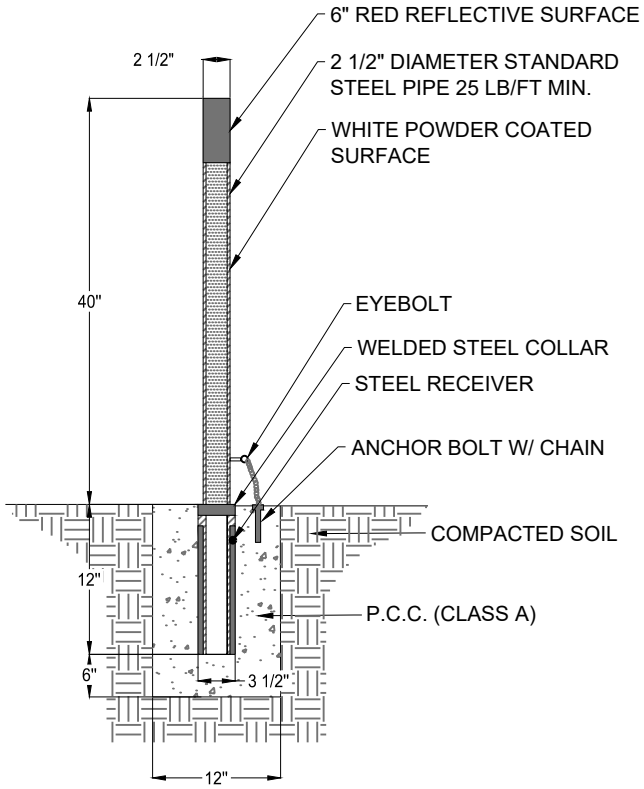
C-09

JUNE 2025



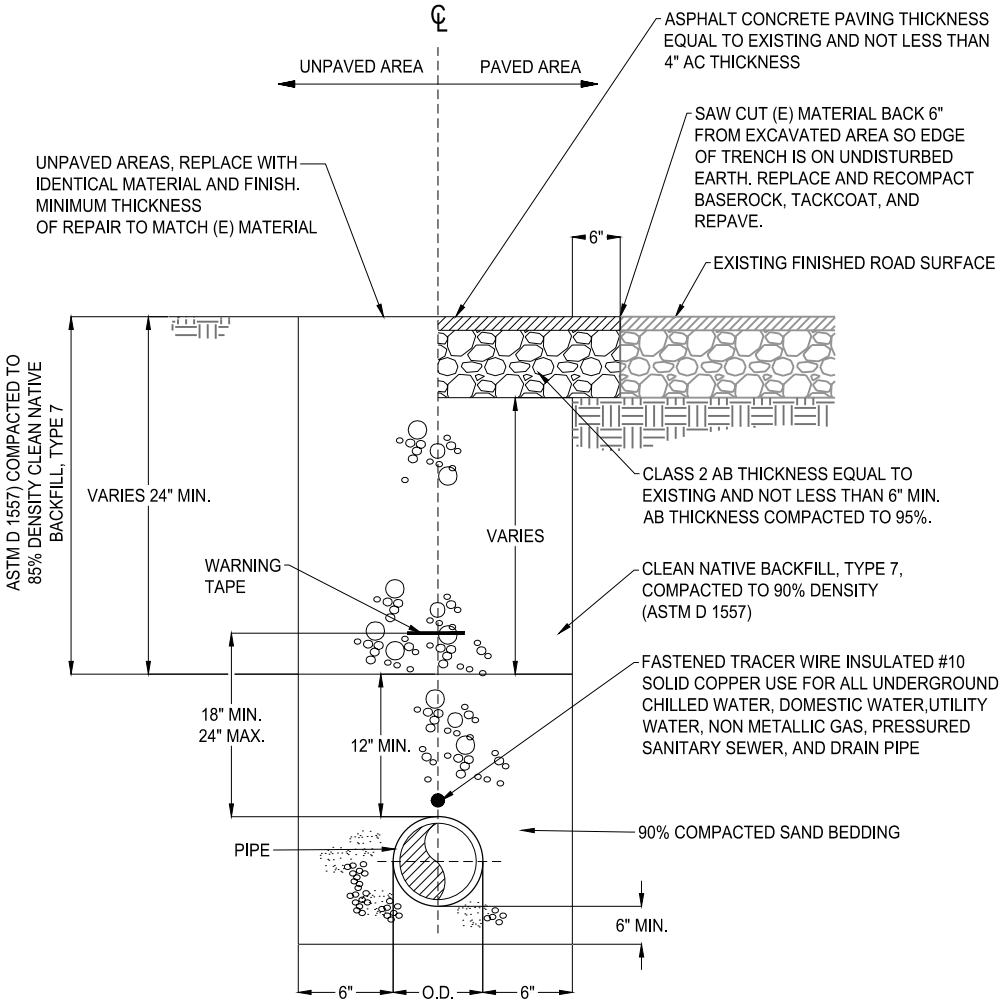
PERMANENT METAL BOLLARD

NTS



REMOVABLE STEEL BOLLARD

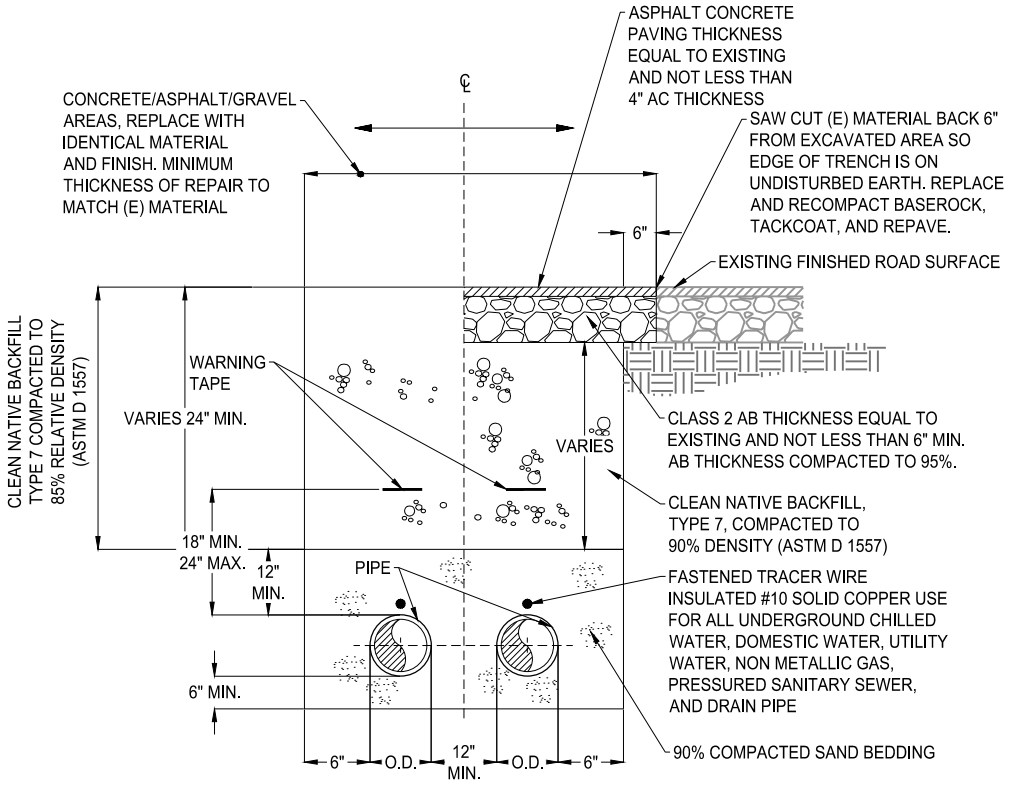
NTS



TRENCH SINGLE UTILITY

NTS

JUNE 2025



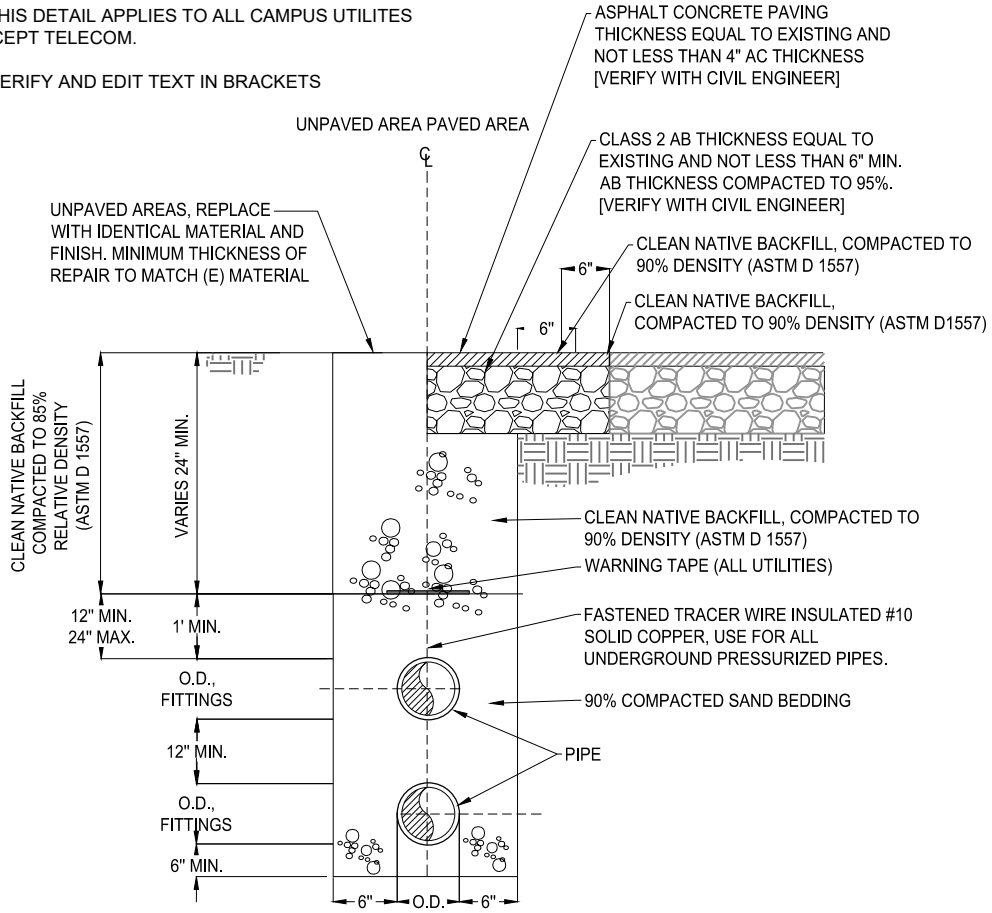
TRENCH DOUBLE UTILITY HORIZONTAL

NTS

NOTES TO DESIGN PROFESSIONAL:

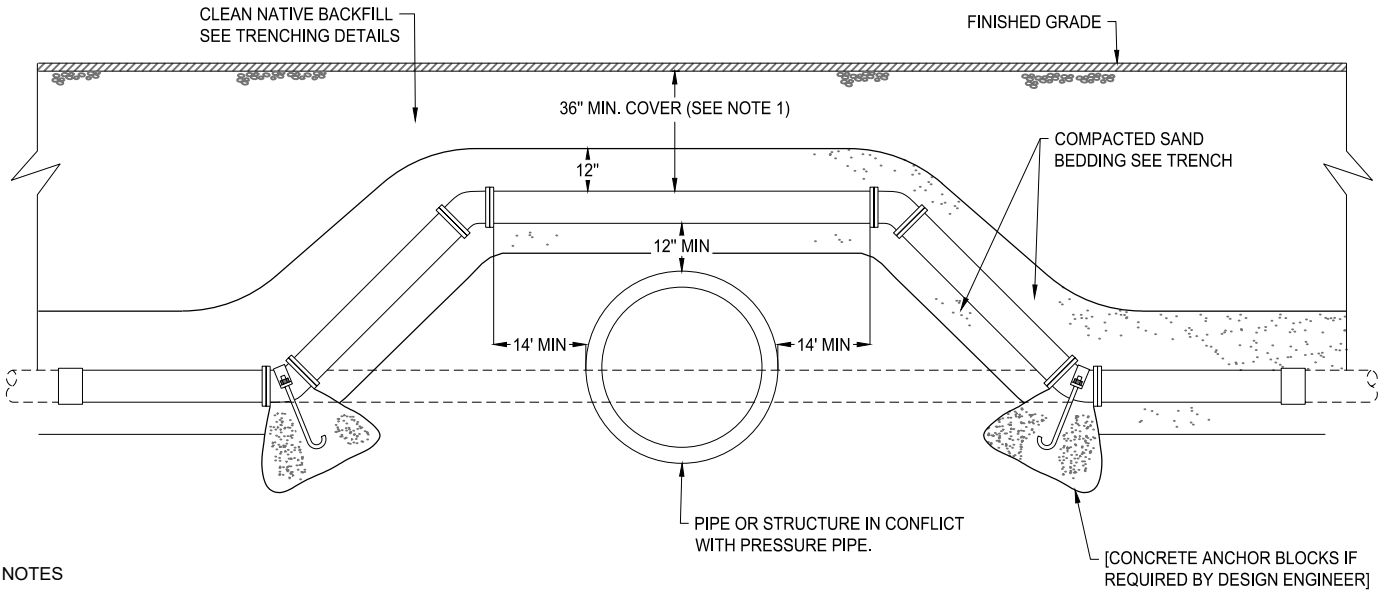
1. THIS DETAIL APPLIES TO ALL CAMPUS UTILITES EXCEPT TELECOM.

2. VERIFY AND EDIT TEXT IN BRACKETS



TRENCH DOUBLE UTILITY VERTICAL

NTS



NOTES

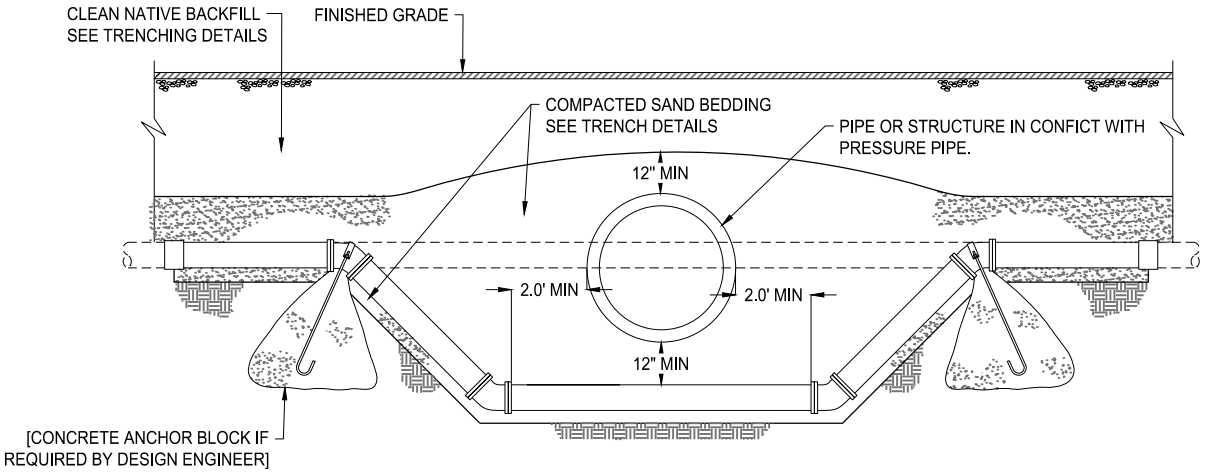
1. IF COVER IS LESS THAN 36" ALL PIPE AND FITTINGS SHALL BE DUCTILE IRON AND SHALL BE WRAPPED WITH POLYETHYLENE.
2. USE MECHANICAL JOINT OR FLANGED FITTINGS WITH RESTRAINED JOINTS MAY BE USED.
3. ALL BENDS SHALL BE 45° OR 22-1/2" FITTINGS - NO 90° BENDS ALLOWED.
4. SEE UTILITY TRENCHING DETAILS FOR TYPICAL TRENCH SECTIONS.
5. IF EITHER PIPE IS DOMESTIC WATER REFER TO THE MOST RECENT VERSION OF THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES GUIDANCE "CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES.

NOTES TO DESIGN PROFESSIONAL:

1. OVER CROSSING TO BE USED ONLY WITH APRROVAL OF UNIVERSITY REPRESENTATIVE.
2. VERIFY AND EDIT TEXT IN BRACKETS [ ].

PRESSURE PIPE OVER STRUCTURE

NTS



NOTES

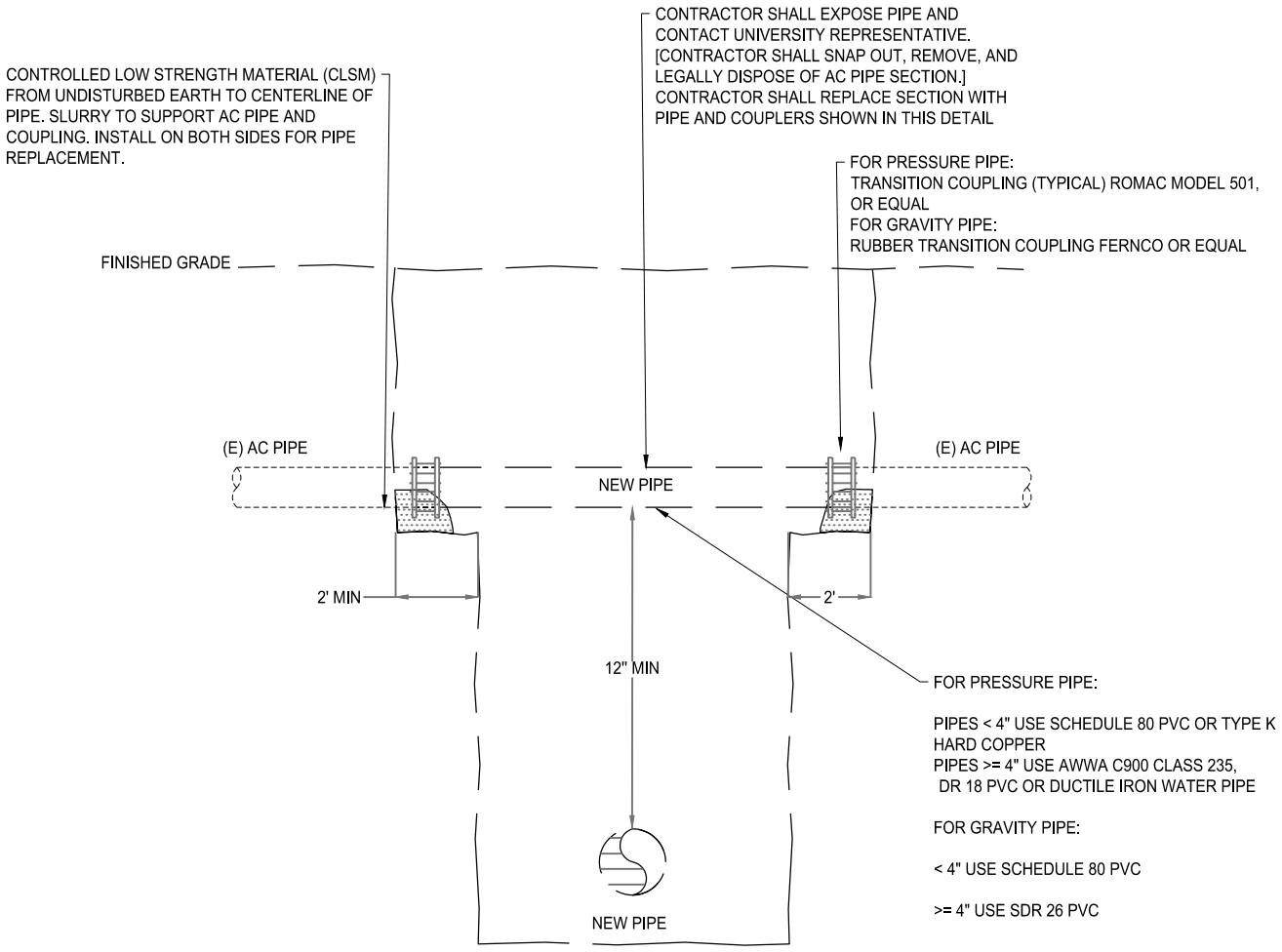
1. USE MECHANICAL JOINT OR FLANGED FITTINGS WITH RESTRAINED JOINTS.
2. ALL BENDS SHALL BE 45° OR 22-1/2" FITTINGS - NO 90° BENDS ALLOWED.
3. SEE UTILITY TRENCHING DETAILS FOR TYPICAL TRENCH SECTIONS.
4. IF EITHER PIPE IS DOMESTIC WATER REFER TO THE MOST RECENT VERSION OF THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES GUIDANCE "CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES.

NOTES TO DESIGN PROFESSIONAL:

1. VERIFY AND EDIT TEXT IN BRACKETS [ ].

PRESSURE PIPE LOWERING

NTS



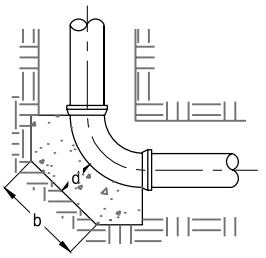
NOTES TO DESIGN PROFFESSIONAL:

1. REFER TO DETAIL C-X FOR TRENCHING AND BACKFILL
2. VERIFY AND EDIT TEXT IN BRACKETS [].

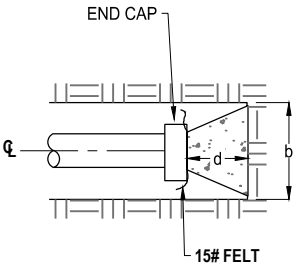
ASBESTOS CEMENT PIPE UNDERCROSSING

NTS

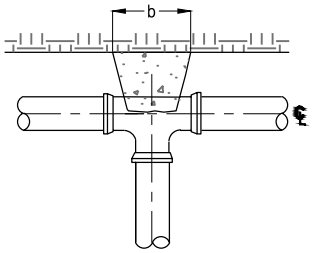
JUNE 2025



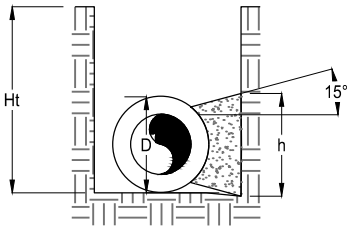
BEND PLAN VIEW



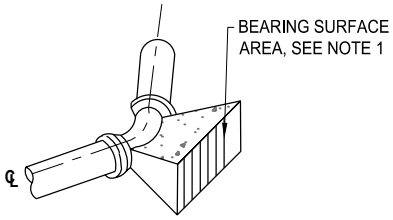
PLUG/END CAP PLAN VIEW



TEE PLAN VIEW



SECTION THROUGH THRUST BLOCK



TYPICAL BEARING SURFACE

MINIMUM BEARING SURFACE THRUST BLOCK AREA (SQ. FT.) PER 100 PSI TEST PRESSURE					
PIPE SIZE	SOIL BEARING CAPACITY (PSF)	TEE/END CAP	90° BEND	45° BEND	22-1 1/2° BEND
6"	1000	4	6	3	2
	2000	2	3	2	1
8"	1000	7	10	5	3
	2000	4	5	3	2
12"	1000	16	22	12	6
	2000	8	11	6	3
*MULTIPLY NO. IN TABLE BY TEST PRESSURE & DIVIDE BY 100					

NOTES

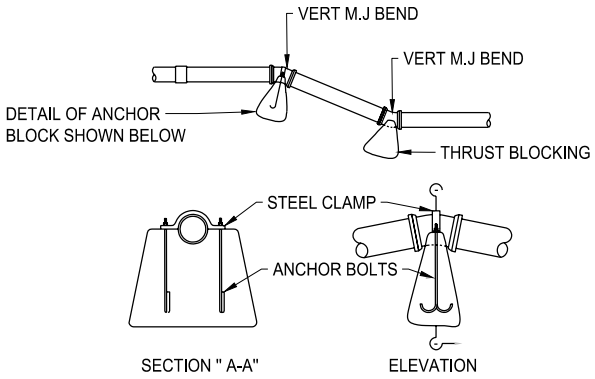
1. BEARING SURFACE SHALL BE PLACED ON UNDISTURBED SOIL WHERE POSSIBLE; OTHERWISE, FILL BETWEEN THE BEARING SURFACE AND THE UNDISTURBED SOIL MUST BE COMPACTED TO 90% RELATIVE COMPACTION.
2. BLOCK HEIGHT (h): D ≤ h ≤ 1/2 Ht AND SHOULD BE 1-2 TIMES b.
3. UNLESS OTHERWISE INDICATED ON DRAWINGS, THRUST BLOCKS SHALL ONLY BE USED IF CONNECTING TO EXISTING UNRESTRAINED PIPE OR FITTINGS.
4. SAFE BEARING LOAD OF SOIL FOR HORIZONTAL THRUST SHALL NOT BE EXCEEDED.
5. CONCRETE BLOCKING, CAST-IN-PLACE, TO EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL AND ENTIRE BEARING AREA MUST BE AGAINST UNDISTURBED SOIL.
6. IN USING THRUST BLOCKING TABLE BELOW, ASSUMED 2000 P.S.F. BEARING CAPACITY UNLESS OTHERWISE SHOWN ON DRAWINGS.
7. FOR PLUGGED LEG(S) OF TEE OR CROSS, USE HARNESS TYPE BLOCKING AND CONCRETE BLOCKING INDICATED BELOW.
8. THRUST BLOCKS SHALL BE FORMED ON THE SIDES TO ESTABLISH A DEFINITE SHAPE AND LIMIT ON HEIGHT AND WIDTH SUBJECT TO APPROVAL BY THE UNIVERSITY'S REPRESENTATIVE BEFORE ORDERING CONCRETE. FORMS SHALL BE REMOVED BEFORE BACKFILLING.
9. PROVISIONS SHALL BE MADE TO INSURE THAT PIPE JOINTS, FITTINGS AND VALVES ARE NOT COVERRED UNNECESSARILY.

NOTES TO DESIGN PROFESSIONAL:

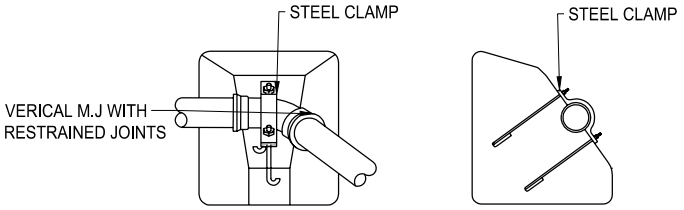
1. VERIFY AND EDIT TEXT IN BRACKETS [].
2. FOR PIPES LARGER THAN 12" IN DIAMETER, THE DESIGN ENGINEER MUST SUBMIT CALCULATIONS TO SIZE CONCRETE THRUST BLOCKS PER NFPA.
3. THE DESIGN ENGINEER SHALL SPECIFY THRUST BLOCKING REQUIREMENTS FOR ALL OTHER SOIL BEARING CONDITIONS

THRUST BLOCK HORIZONTAL

NTS



TYPICAL CONCRETE ANCHOR BLOCK FOR VERTICAL BEND



TYPICAL CONCRETE ANCHOR BLOCK FOR COMBINATION
HORIZONTAL - VERTICAL BEND

NOTES:

1. GRAVITY BLOCKS MUST BE SIZED TO RESIST THRUST IN THE VERTICAL DIRECTION.ONLY THE WEIGHT OF THE BLOCK WILL BE USED TO RESIST VERTICAL THRUST

2. [THRUST BLOCKS SHALL ONLY BE USED IF CONNECTING TO EXISTING UNRESTRAINED PIPE OR FITTINGS AND BE EXPLICITLY SHOWN ON THE DRAWINGS.]

3. PROVISIONS SHALL BE MADE TO INSURE THAT PIPE JOINTS, FITTINGS, AND VALVES ARE NOT COVERED BY THE CONCRETE THRUST BLOCK.

3. CONCRETE ANCHOR BLOCKS SHALL BE INSTALLED BY THE CONTRACTOR TO WITHSTAND A THRUST PRODUCED BY THE TEST PRESSURE PLUS 50 PSI. MINIMUM DIMENSIONS FOR ANCHOR BOLTS AND CLAMPS ARE LISTED IN THE TABLE BELOW.

4. USE ONLY MECHANICAL JOINT RESTRAINED FITTINGS

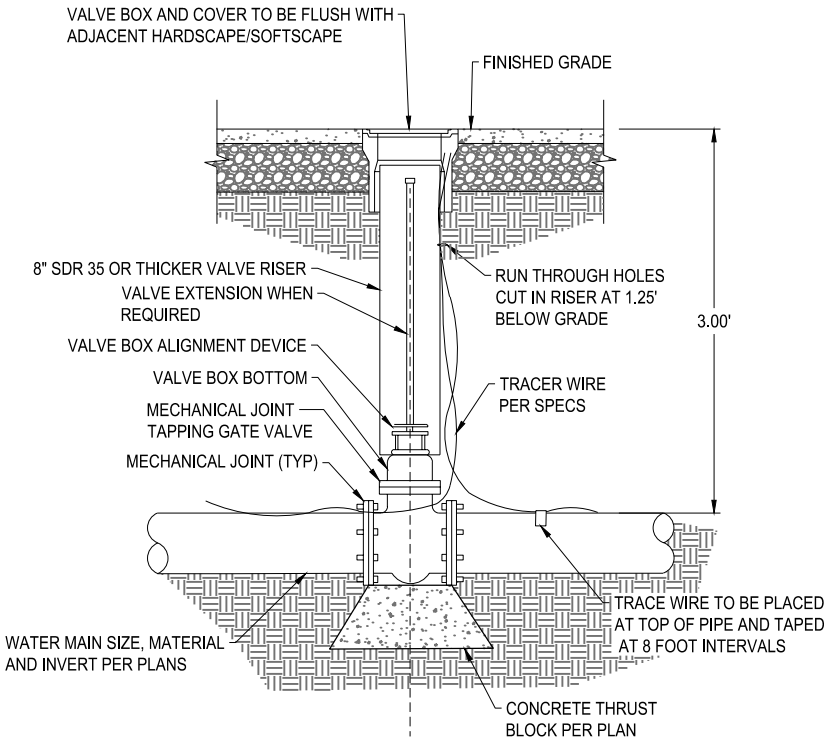
PIPE SIZE	ANCHOR BOLTS	STEEL CLAMPS
4"	5/8"	3" x 1/4"
6"	5/8"	3" x 1/4"
8"	3/4"	3" x 1/4" x 1/4"
12"	1-1 /8"	4" x 1/2"

NOTES TO DESIGN PROFFESSIONAL:

1. VERIFY AND EDIT TEXT IN BRACKETS [].

2. FOR PIPES GREATER THAN 12". DESIGN ENGINEER MUST SUBMIT CALCULATIONS TO SIZE ANCHOR BOLTS AND CLAMPS

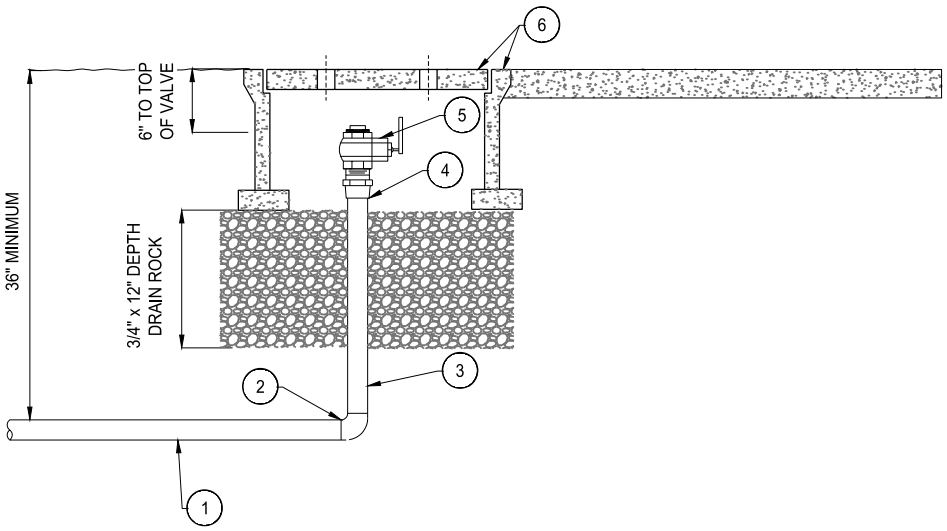
NOTES
1) GPS COORDINATES FOR ALL INSTALLED VALVES ARE TO BE PROVIDED TO PO&M FOR DOCUMENTING.



GATE VALVE

NTS

JUNE 2025



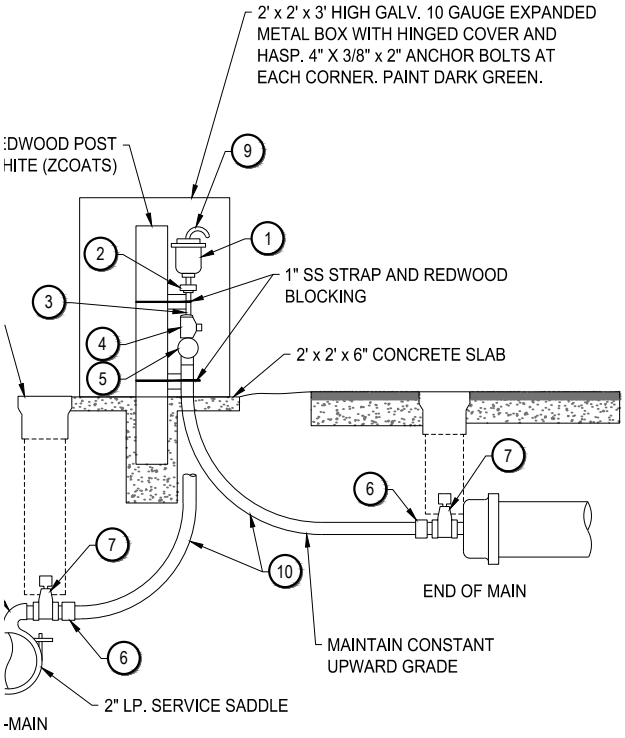
NOTES:

1. 2" TYPE K COPPER TUBING.
2. SILLFOSS ALL PIPE JOINTS.
3. WRAP PIPE WITH 40 MIL TOTAL PVC PROTECTION TAPE.
4. SOFT SOLDER MALE ADAPTER.
5. FULL PORT BRONZE BALL VALVE & PLUG. FORD MULLER OR EQUAL.
6. METER BOX AND LID.

NON-TRAFFIC AREAS USE CHRISTY B12 BOX WITH B12G LID. TRAFFIC AREAS USE CHRISTY B1017 BOX WITH B1017-JH COVER.

2-INCH BLOW-OFF VALVE

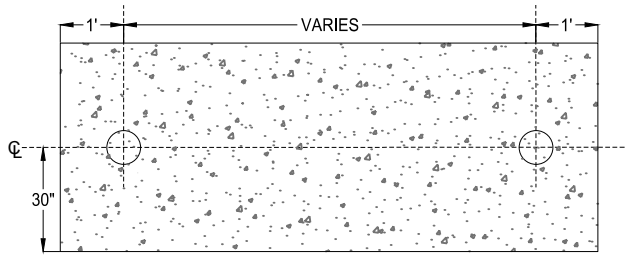
NTS



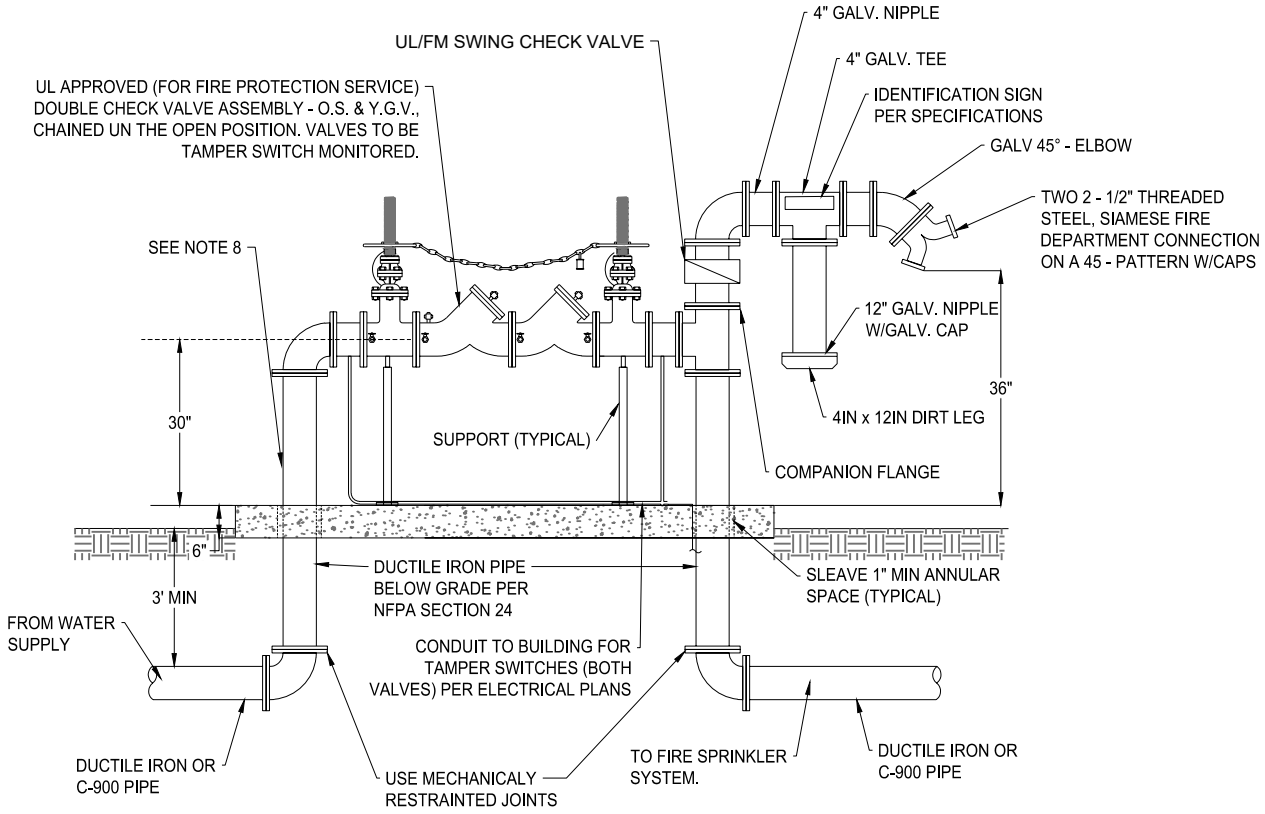
ITEM	DESCRIPTION
1.	1" APCO #743C AIR RELEASE
2.	1" GALV. UNION
3.	2"x1" BRASS BUSHING
4.	2" BRASS TEE W/ 2" PLUG
5.	2" P.J. CORPORATION STOP
6.	2" P.J. x I.P. ADAPTEC
7.	2" GATE VALVE
8.	2"x90 DEG. STREET ELBOW
9.	1"x90 DEG. STREET ELBOW
10.	2" SERVICE PIPE

AIR RELEASE VALVE

NTS



TOP VIEW OF SLAB

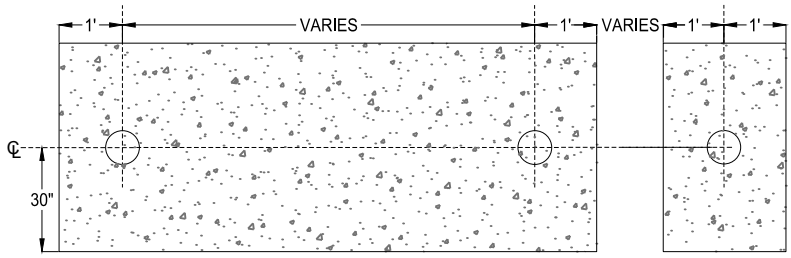


NOTE:

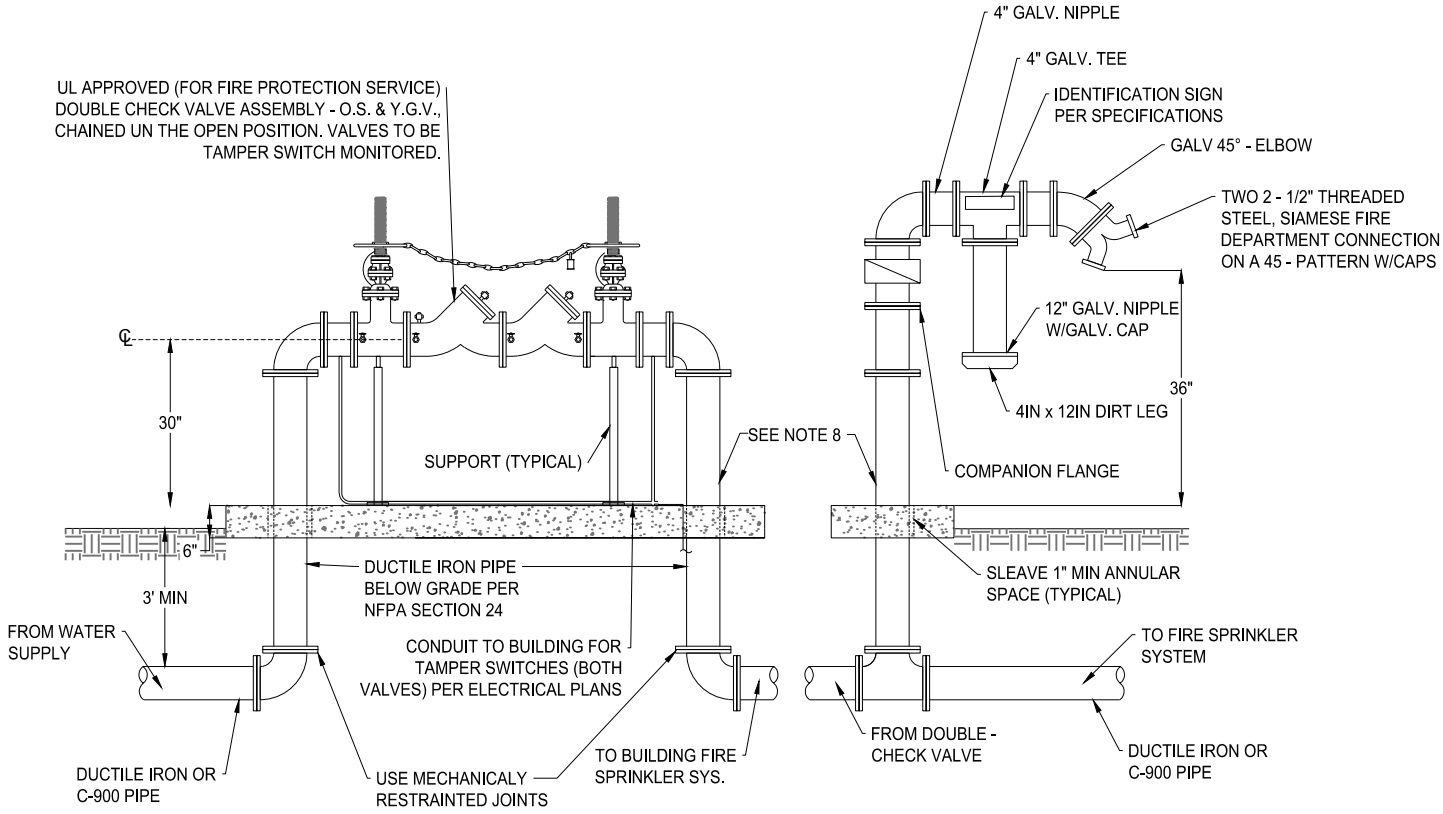
1. SIGNAGE PER CAMPUS STANDARD IDETIFY BUILDING BY NAME OR PICTOGRAM AS REQUIRED BY FIRE DEPARTMENT.
2. ALL STEEL PIPE SHALL BE AS PER AWWA C-200 WITH 1/4" WALL AND COATED AND LINED BY FUSION BONDED EPOXY AS PER AWWA C-213, 20 MILS MIN.
3. ALL STEEL FLANGES SHALL BE CLASS D AS PER AWWA C-207.
4. ALL DUCTILE IRON FITTINGS SHALL MEET AWWA C-10 & C-153, CLASS 150, RATED FOR 350 PSI. THE INTERIOR SHALL BE MORTAR LINED AS PER AWWA C-104 AND BELOW GROUND EXTERIOR SHALL HAVE A COAL TAR COATING AS PER AWWA C-203.
5. ALL NUTS AND BOLTS BELOW GROUND SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MIN. IN BOTH CASES.
6. BOTH GATE VALVES SHALL BE SUPERVISED BY THE FIRE ALARM SYSTEM.
7. CONTRACTOR SHALL PROVIDE CHAIN FOR LOCKING WHEELS TOGETHER (UNIVERSITY TO PROVIDE LOCK)
8. CONTRACTOR SHALL PROVIDE REMOVABLE INSULATION BLANKET.

DOUBLE CHECK VALVE ASSEMBLY

NTS



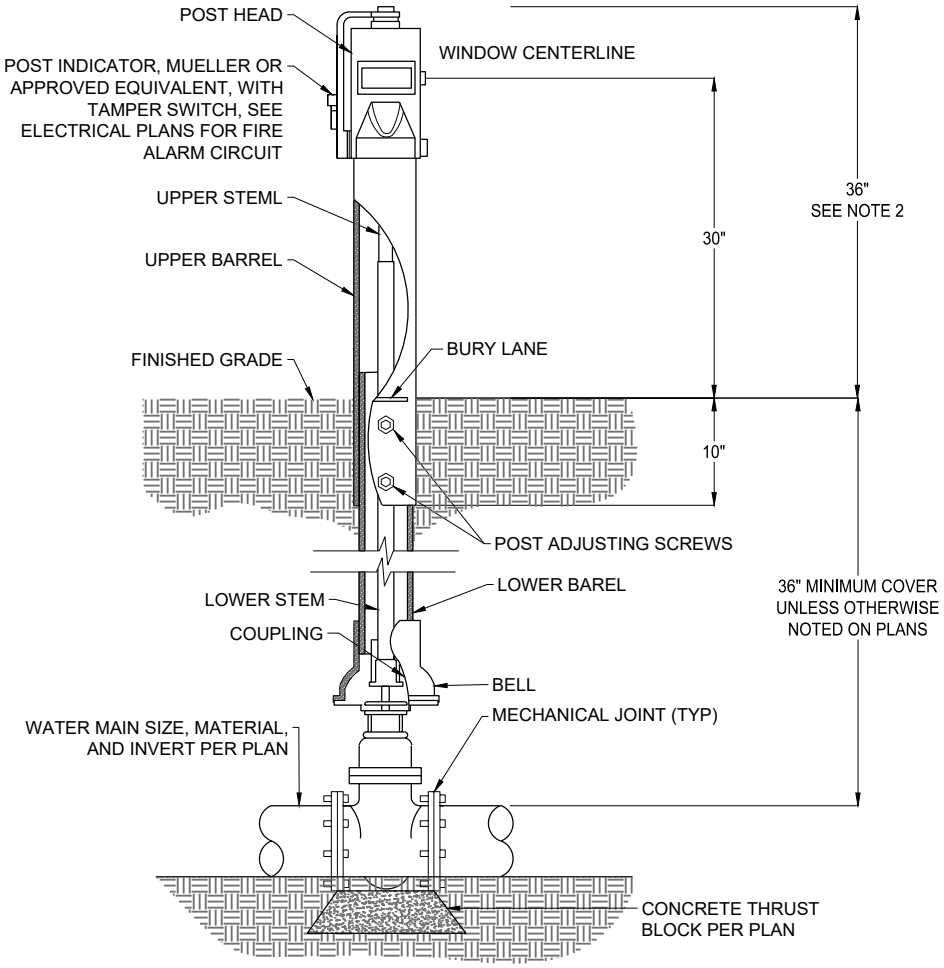
TOP VIEW OF SLAB



NOTE:

1. SIGNAGE PER CAMPUS STANDARD IDETIFY BUILDING BY NAME OR PICTOGRAM AS REQUIRED BY FIRE DEPARTMENT.
2. ALL STEEL PIPE SHALL BE AS PER AWWA C-200 WITH 1/4" WALL AND COATED AND LINED BY FUSION BONDED EPOXY AS PER AWWA C-213, 20 MILS MIN.
3. ALL STEEL FLANGES SHALL BE CLASS D AS PER AWWA C-207.
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6. BOTH GATE VALVES SHALL BE SUPERVISED BY THE FIRE ALARM SYSTEM.
7. CONTRACTOR SHALL PROVIDE CHAIN FOR LOCKING WHEELS TOGETHER (UNIVERSITY TO PROVIDE LOCK)
8. CONTRACTOR SHALL PROVIDE REMOVABLE INSULATION BLANKET.

DOUBLE CHECK VALVE ASSEMBLY & FIRE WATER SERVICE (SEPARATE) NTS



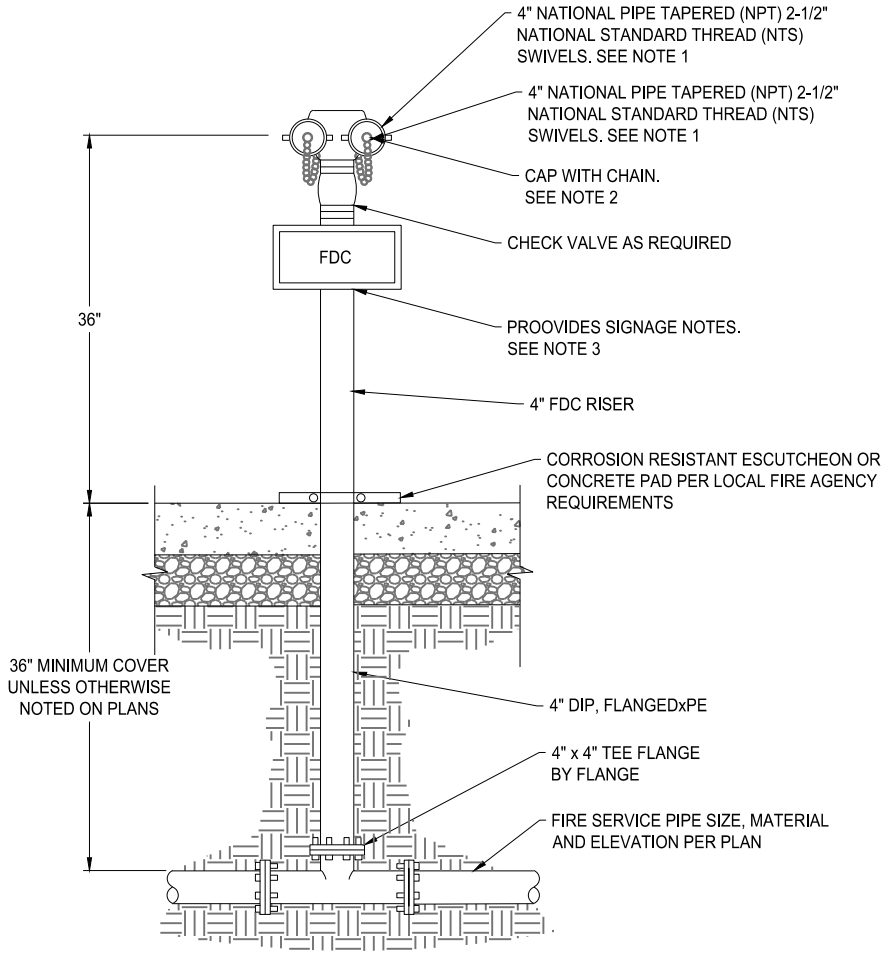
NOTES

1. THE POST INDICATOR VALVE ASSEMBLY MUST BE UL LISTED AND FM APPROVED PER LOCAL FIRE AGENCY REQUIREMENTS.

2. POST INDICATOR VALVES MUST BE SET SO THAT THE TOP OF THE POST IS 36 INCHES ABOVE THE FINISH GRADE OR AS REQUIRED BY LOCAL FIRE AGENCY REQUIREMENTS

POST INDICATOR VALVE INSTALLATION

NTS



NOTES:

1. THE FIRE DEPARTMENT CONNECTION SHALL USE A NATIONAL HOSE INTERNAL THREADED SWIVEL FITTING(S) WITH A NATIONAL HOSE STANDARD THREAD(S).

2. CAPS SHALL BE SUITABLE FOR THE PRESSURE OF THE FIRE SYSTEM, LOCKABLE AND ARRANGED FOR EASY REMOVAL BY FIRE DEPARTMENT.

3. EACH FIRE DEPARTMENT CONNECTION SHALL BE DESIGNATED WITH A SIGN AS FOLLOWS:
   A. SIGN SHALL HAVE RAISED OR ENGRAVED LETTERS AT LEAST 1 INCH IN HEIGHT ON A PLATE OR FELTING.

   B. SIGN SHALL INDICATE THE TYPE OF SYSTEM FOR WHICH THE CONNECTION IS INTENDED AND INCLUDE THE BUILDING ADDRESS AND/OR SECTION OF BUILDING FOR WHICH IT IS SERVING.

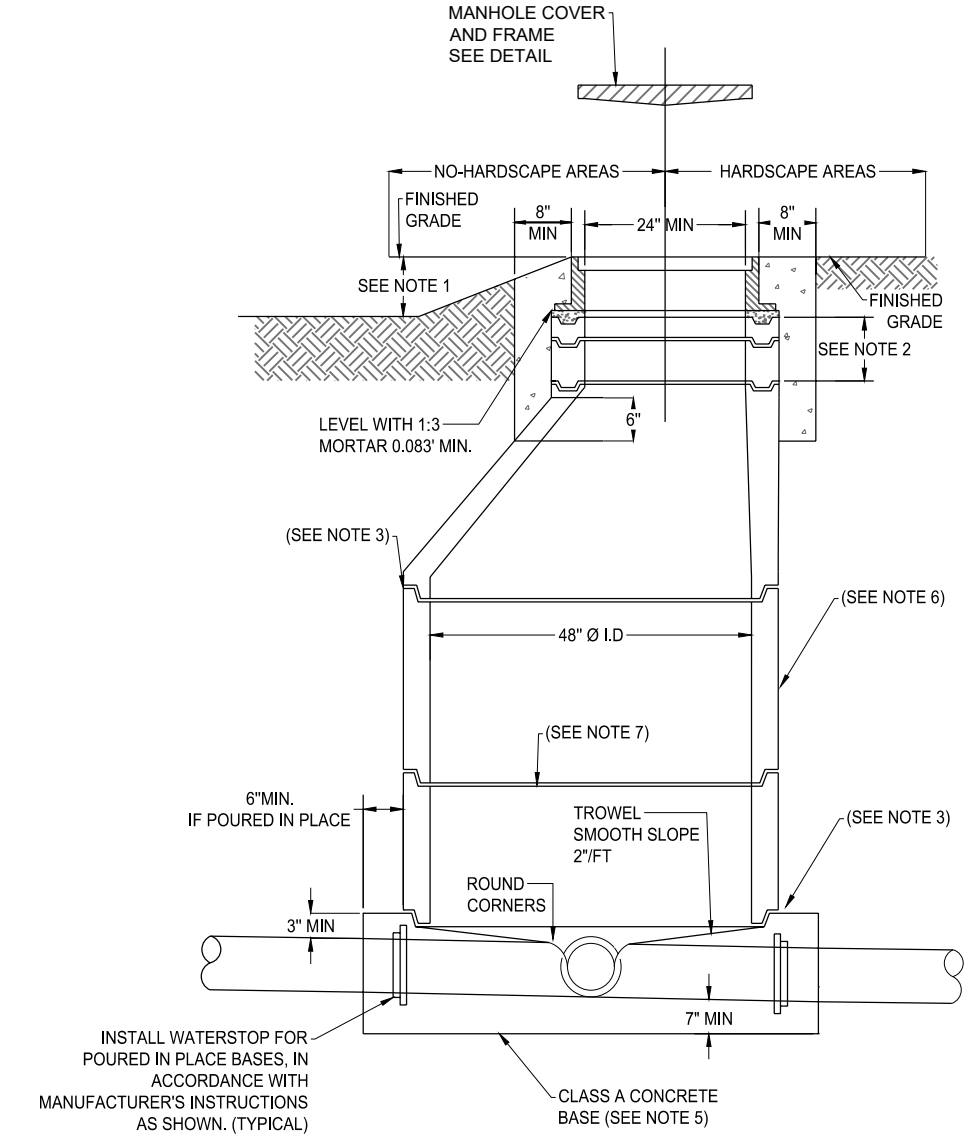
   C. THE SIGN SHALL INDICATE THE REQUIRED DESIGN PRESSURE WHEN THE SYSTEM DEMAND EXCEEDS 150 PSI

4. FDC SHALL BE INSTALLED A MINIMUN 36" FROM FACE OF CURB OR PROTECTED BY BOLLARDS.

5. A CLEAR WORKING SPACE OF 36" SHALL BE PROVIDED ON ALL SIDES OD FDC.

FIRE DEPARTMENT CONNECTION (FDC)

NTS



NOTE

1. WHEN MANHOLES ARE INSTALLED IN UNIMPROVED AREAS, THE TOP OF THE COVER SHALL BE A MIN. OF 6" ABOVE GRADE (1.5" IN DG AREAS). SLOPE @1:2 TO MATCH FINISH GRADE.

2. MIN. OF ONE 3" GRADE ADJUSTMENT RING. MAX. HEIGHT OF GRADE ADJUSTMENT RINGS = 20". ALTERNATELY, CONTRACTOR MAY CAST GRADE ADJUSTMENT RINGS IN PLACE.

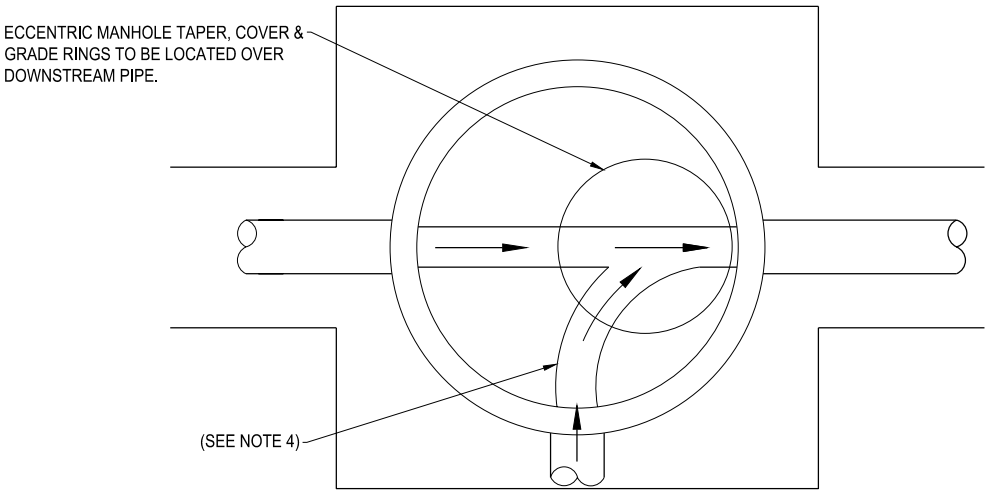
3. SET ALL BARREL SECTIONS & TAPER SECTIONS IN PLASTIC GASKET, RAM-NEK OR EQUAL TYPICAL JOINT USE (1)3/4"x2-1/2" RAM-NEK SEAL, OR EQUAL 6" WIDE GROUT BAND ON INSIDE & OUTSIDE.

4. AFTER LOWER RING SECTION IS SET, CUT OUT TOP HALF OF PIPE FLUSH WITH INSIDE FACE OF M.H. WALL AND CONSTRUCT SHELF & U-SHAPED CHANNEL. MAKE ELEVATION CHANGES GRADUALLY AND DIRECTIONAL CHANGES WITH SMOOTH CURVES. SLOPE AND SIZE OF CHANNELS SHALL MATCH UPSTREAM AND DOWNSTREAM PIPES. MANHOLE CHANNELS WITH A HORIZONTAL CHANGE IN DIRECTION OF 30° OR MORE SHALL HAVE A MIN. DROP OF 0.1' ACROSS THE MANHOLE OR SHALL MATCH THE SLOPE OF THE PIPE. WHICHEVER IS GREATER.

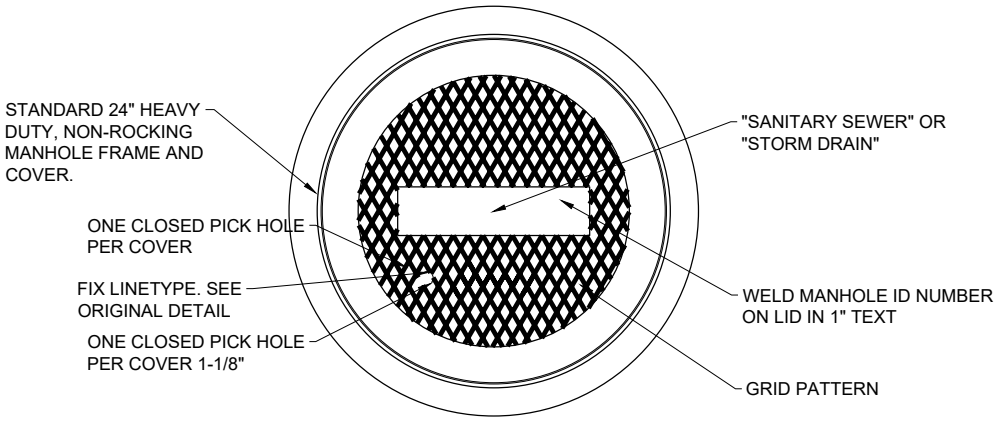
5. POURED-IN-PLACE BASE SHALL BE POURED FULL THICKNESS ON UNDISTURBED SOIL. PRECAST BASE SHALL BE PLACED ON 6" MIN. OF 3/4" DRAIN ROCK INSTALLED AGAINST UNDISTURBED EARTH.

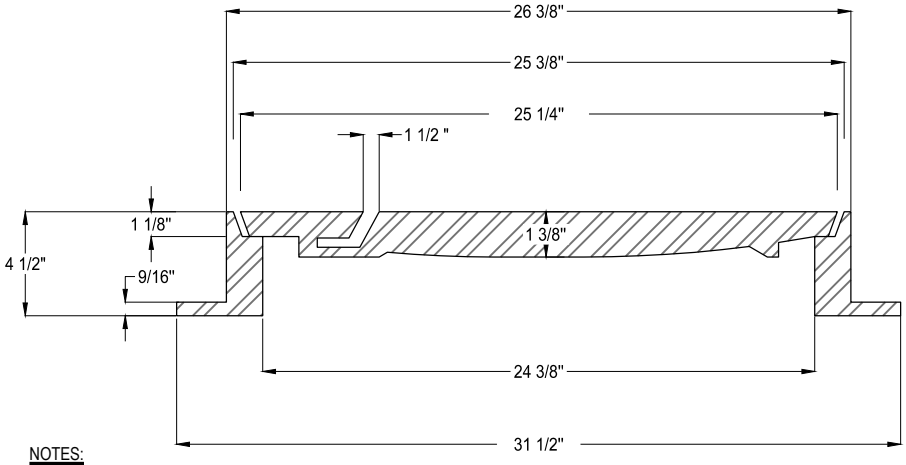
6. STANDARD MANHOLE BARREL SECTION PER ASTM C478.

7. 48"Ø I.D. M.H. TO BE USED FOR ALL MAINS LESS THAN 21"Ø. 60"Ø I.D. M.H. TO BE USED FOR ALL MAINS 21"Ø TO 48"Ø OR WHERE INSIDE DROP FITTINGS ARE USED.



MANHOLE BASE
CHANNELIZATION PLAN AND LOCATION OF
ECCENTRIC MANHOLE COVER





NOTES:

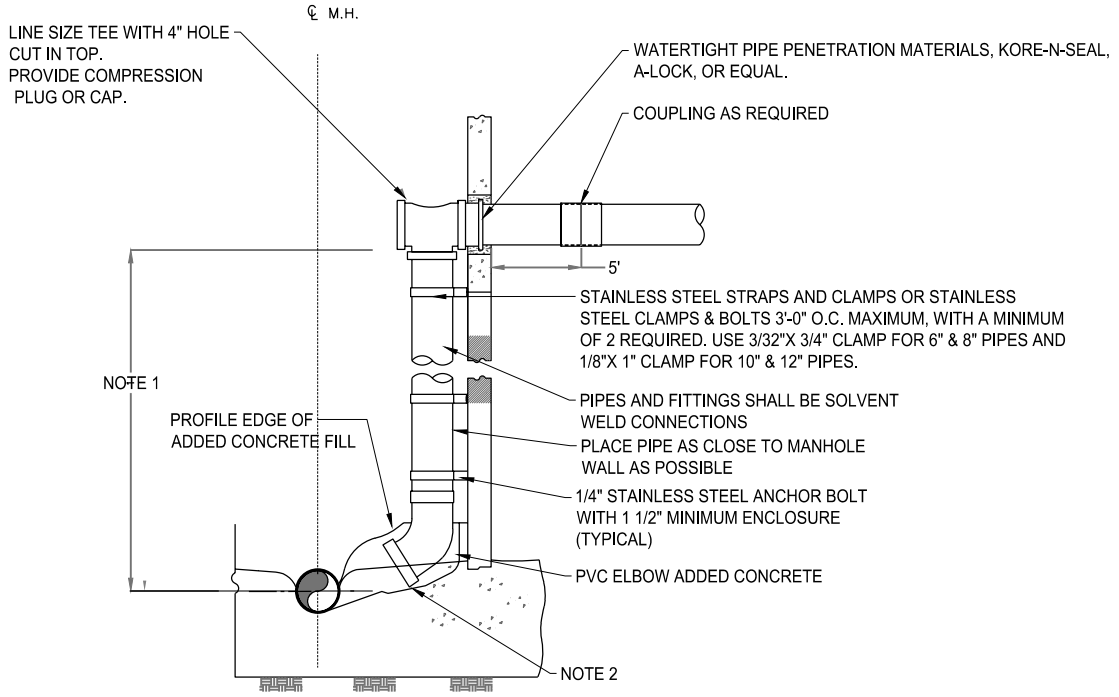
1. SPECIFY SANITARY SEWER OR STORM DRAIN WHEN ORDERING.
2. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO A.S.T.M. DESIGNATION A-48 CLASS 35 B, OR SECTION 55-2.03 AND 75-1.02 OF THE CALTRANS STADARD SPECIFICATIONS
3. MINIMUM WEIGHT COMPONENTS:
   COVER - 130 POUNDS
   FRAME - 135 POUNDS
4. FRAME AND COVER SHALL BE H-20 TRAFFIC RATED.

MANHOLE FRAME & COVER

1. D&L SUPPLY A-1024, SOUTH BAY FOUNDRY SBF 1900 CPH OR EQUAL.

MANHOLE COVER

NTS



NOTES
1. PROVIDE PVC DROP PIPE WHEN THE PIPE INVERT IS MORE THAN 24" ABOVE THE MANHOLE BASE.

2. PROVIDE CHANNEL IN THE MAIN BASE TO DIRECT FLOW TO THE MAIN CHANNEL.

3. MANHOLES CONSTRUCTED USING THIS STANDARD SHOULD BE 60" IN DIAMETER AND INSTALLED IN ACCORDANCE WITH DETAIL [C-#]. USE 72" WHERE THERE ARE TWO DROP CONNECTIONS.

4. ENCLOSE ELBOW IN CONCRETE. FORM SMOOTH CHANNEL WITH A SWIPE TO THE MANHOLE FLOWLINE.

5. INSTALL THE WATERSTOP IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AS SHOWN.

6. PVC PIPE AND FITTINGS SHOULD HAVE THE SAME NOMINAL SIZE AND SDR RATING AS INCOMING PIPES

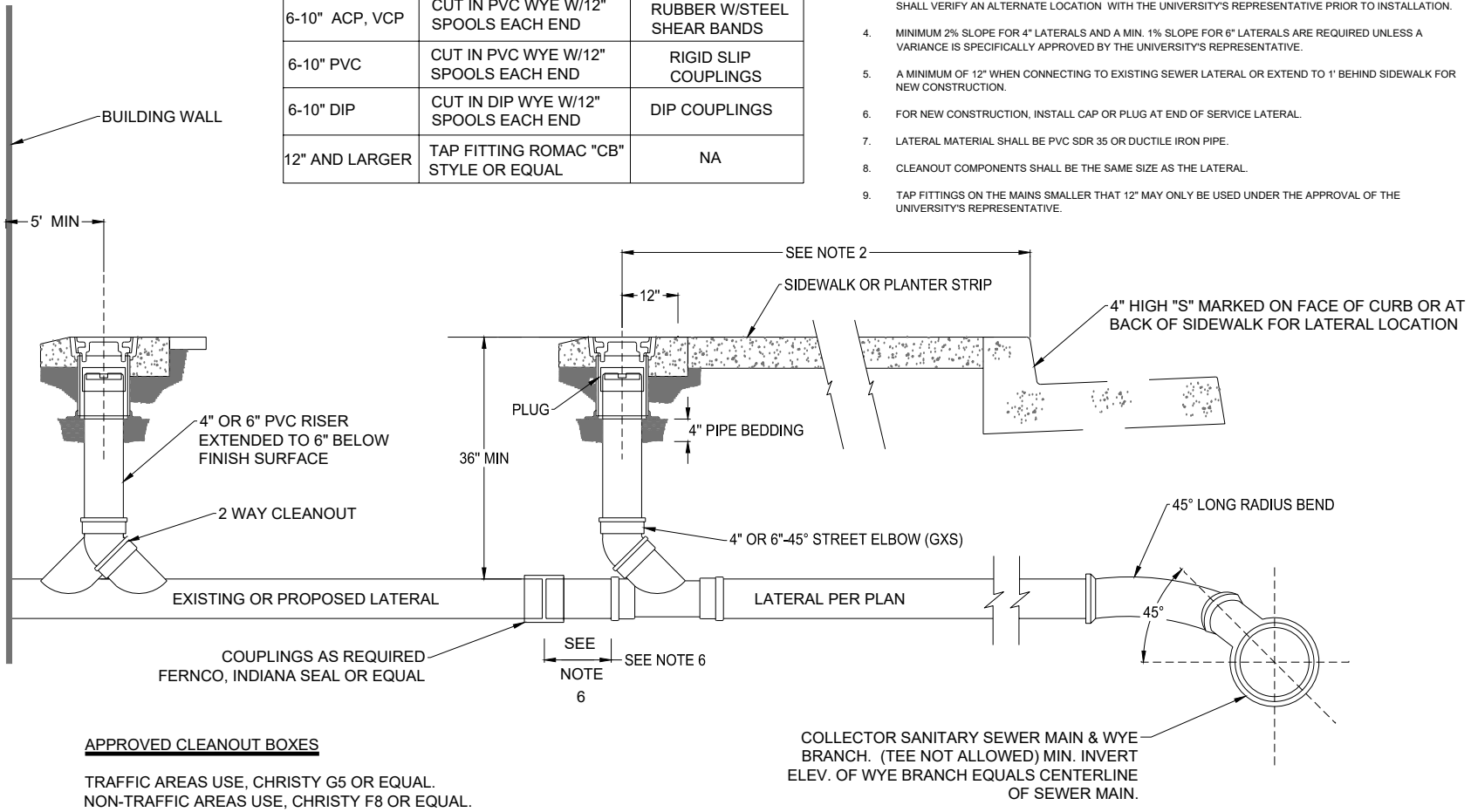
NOTES TO DESIGN PROFESSIONAL:
1. VERIFY AND EDIT TEXT IN BRACKETS [].

LATERAL CONNECTIONS TO EXISTING MAINS:

MAIN SIZE & MATERIAL	CONNECTION TYPE	COUPLINGS
6-10" ACP, VCP	CUT IN PVC WYE W/12" SPOOLS EACH END	RUBBER W/STEEL SHEAR BANDS
6-10" PVC	CUT IN PVC WYE W/12" SPOOLS EACH END	RIGID SLIP COUPLINGS
6-10" DIP	CUT IN DIP WYE W/12" SPOOLS EACH END	DIP COUPLINGS
12" AND LARGER	TAP FITTING ROMAC "CB" STYLE OR EQUAL	NA

NOTES:

1. THE SEWER SERVICE LATERAL SHALL BE OF SUFFICIENT DEPTH TO ADEQUATELY SERVE THE BUILDING SITE, AND IN NO CASE SHALL BE LESS THAN 3 FT. DEEP AT HE CLEANOUT UNLESS OTHERWISE AUTHORIZED BY THE UNIVERSITY'S REPRESENTATIVE.
2. CLEANOUT TO BE INSTALLED 18" FROM FACE TO CURB OR 12" MAXIMUM BEHIND SIDEWALK. WHERE SERVICE IS IN DRIVEWAY, INSTALL CLEANOUT 18" BEHIND APRON.
3. IN CASES WHERE THE CLEANOUT INSTALLATION CONFLICTS WITH EXISTING FACILITIES, THE CONTRACTOR SHALL VERIFY AN ALTERNATE LOCATION WITH THE UNIVERSITY'S REPRESENTATIVE PRIOR TO INSTALLATION.
4. MINIMUM 2% SLOPE FOR 4" LATERALS AND A MIN. 1% SLOPE FOR 6" LATERALS ARE REQUIRED UNLESS A VARIANCE IS SPECIFICALLY APPROVED BY THE UNIVERSITY'S REPRESENTATIVE.
5. A MINIMUM OF 12" WHEN CONNECTING TO EXISTING SEWER LATERAL OR EXTEND TO 1' BEHIND SIDEWALK FOR NEW CONSTRUCTION.
6. FOR NEW CONSTRUCTION, INSTALL CAP OR PLUG AT END OF SERVICE LATERAL.
7. LATERAL MATERIAL SHALL BE PVC SDR 35 OR DUCTILE IRON PIPE.
8. CLEANOUT COMPONENTS SHALL BE THE SAME SIZE AS THE LATERAL.
9. TAP FITTINGS ON THE MAINS SMALLER THAT 12" MAY ONLY BE USED UNDER THE APPROVAL OF THE UNIVERSITY'S REPRESENTATIVE.



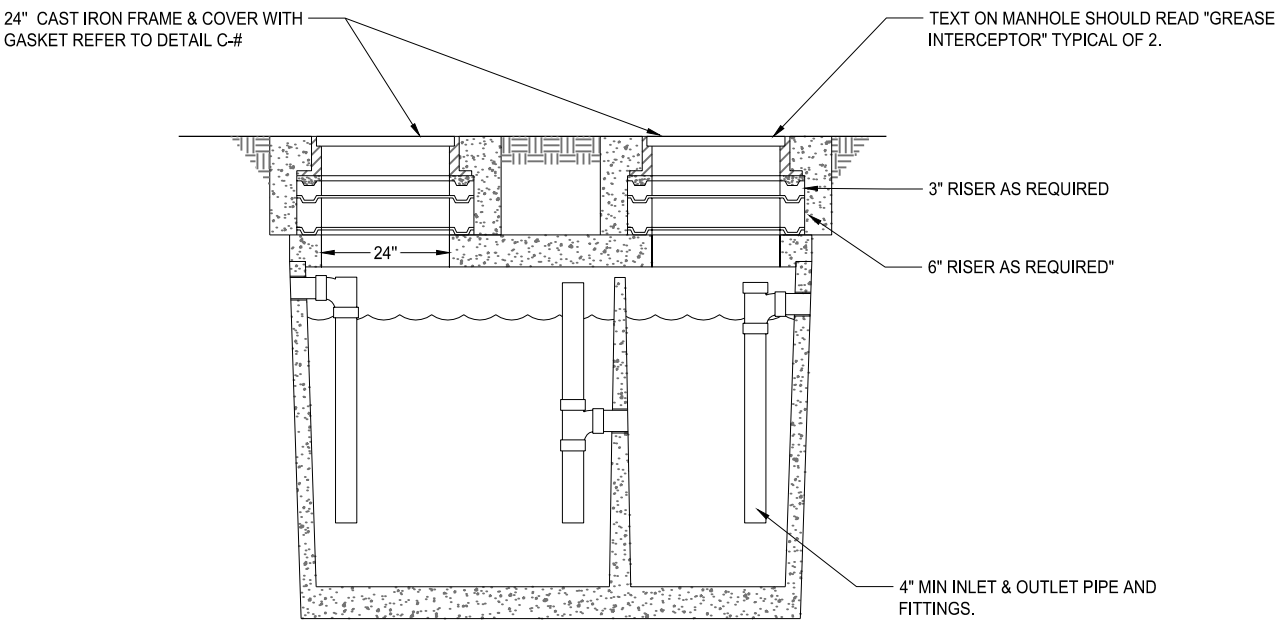
APPROVED CLEANOUT BOXES

TRAFFIC AREAS USE, CHRISTY G5 OR EQUAL.
NON-TRAFFIC AREAS USE, CHRISTY F8 OR EQUAL.
ALL BOXES WITH CAST IRON LID MARKED "SEWER".
PROVIDE COMPRESSION PLUG IN CLEANOUT.

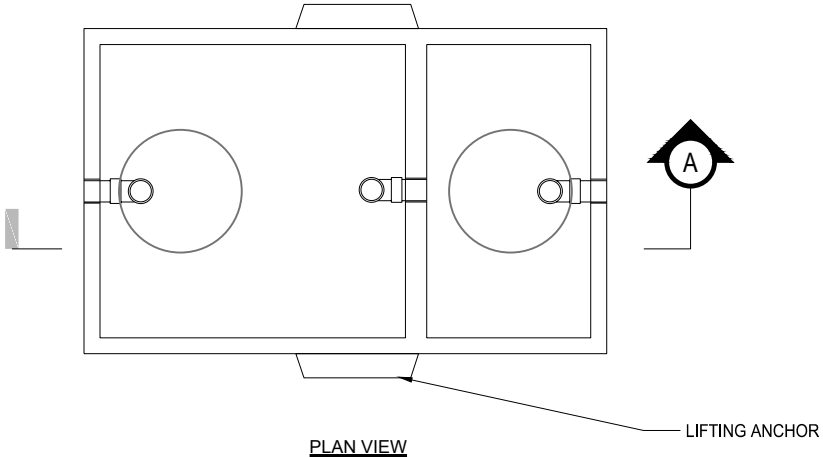
SERVICE LATERAL AND CLEANOUT

NTS

JUNE 2025



SECTION A

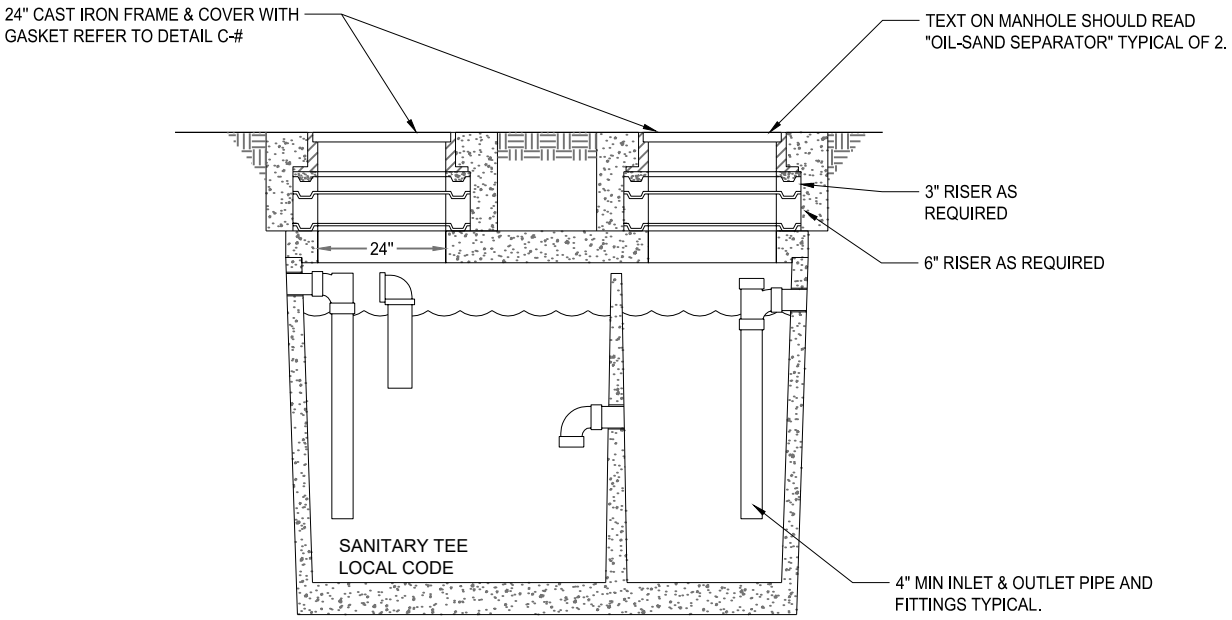


PLAN VIEW
(COVER & RISERS NOT SHOWN)

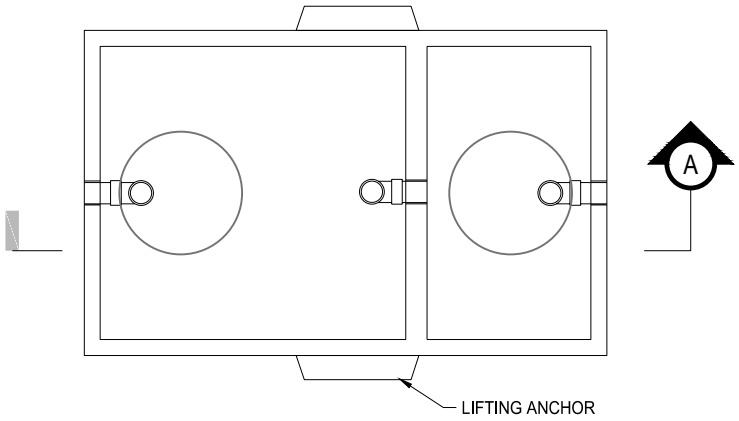
NOTES

1. LIQUID CAPACITY: [AS SPECIFIED BY DESIGN ENGINEER]
2. INLET/OUTLET SIZE: [AS SPECIFIED BY DESIGN ENGINEER]
3. BOX COVER LOAD: H-20 TRAFFIC FROM 1' TO 6' OF SOIL COVER.

NOTES TO DESIGN PROFESSIONAL:
1. VERIFY AND EDIT TEXT IN BRACKETS [ ].



SECTION A



PLAN VIEW
(COVER & RISERS NOT SHOWN)

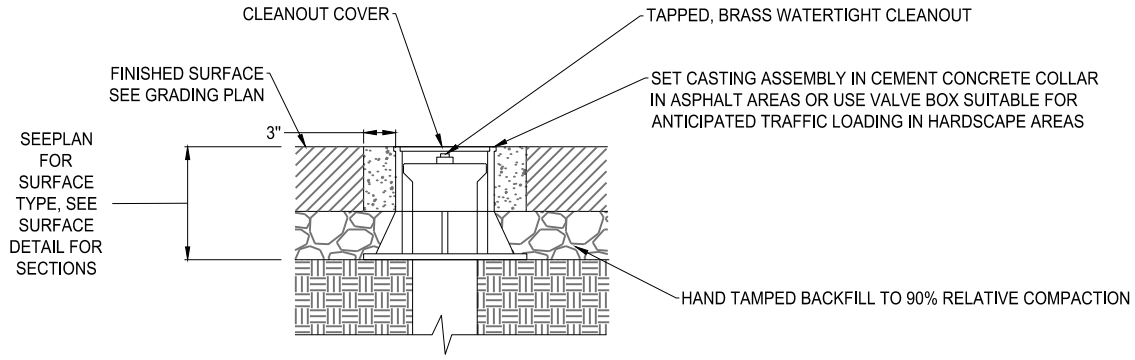
NOTES

1. LIQUID CAPACITY: [AS SPECIFIED BY DESIGN ENGINEER]
2. INLET/OUTLET SIZE: [AS SPECIFIED BY DESIGN ENGINEER]
3. BOX DESIGN LOAD: H-20 TRAFFIC FROM 1' TO 6' OF SOIL COVER.

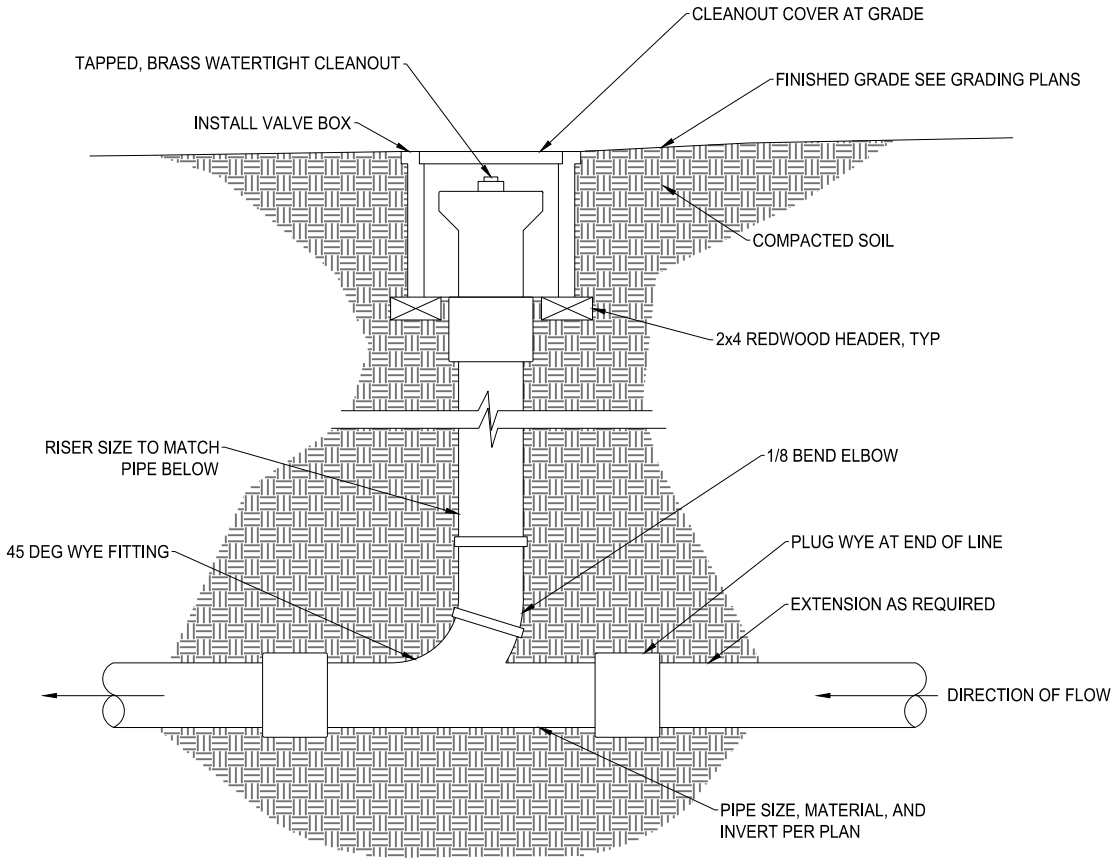
NOTES TO DESIGN PROFESSIONAL:
1. VERIFY AND EDIT TEXT IN BRACKETS [ ].

OIL AND SAND SEPARATOR

NTS



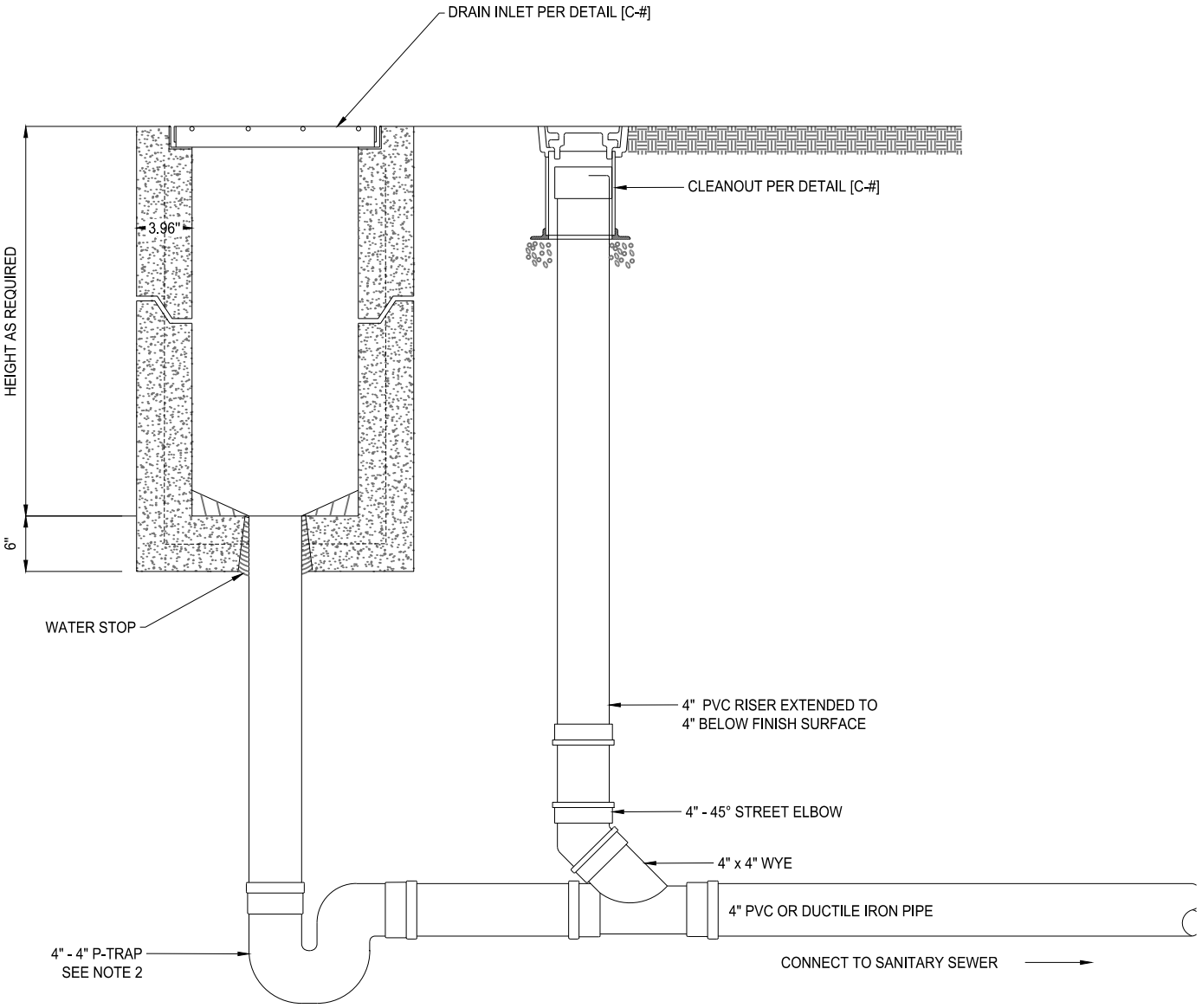
HARDACPE



PLANTING / LAWN

NOTES

1. BRING TO SURFACE WITH TEMPORARY PLUG. AFTER ALL BACKFILL IS COMPLETE AND SUB-GRADE ESTABLISHED IN AREAS TO BE PAVED, THE FINAL RISER PIPE AND BOX SHALL BE INSTALLED AS SHOWN.



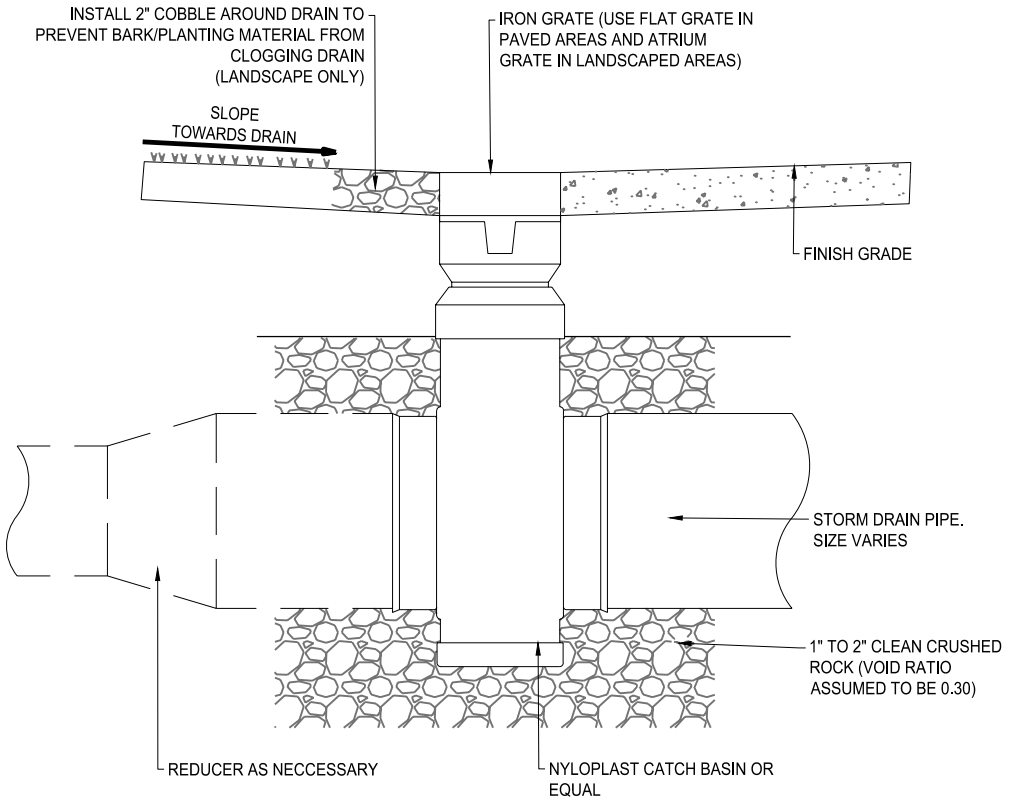
NOTES TO DESIGN PROFESSIONAL:

1. VERIFY AND EDIT TEXT IN BRACKETS [ ].
2. TRAP PRIMER IS TO BE JR SMITH QUAD CLOSE TRAP SEALER OR APPROVED EQUIVALENT.

TRASH ENCLOSURE DRAIN (COVERED ENCLOSURE)

NTS

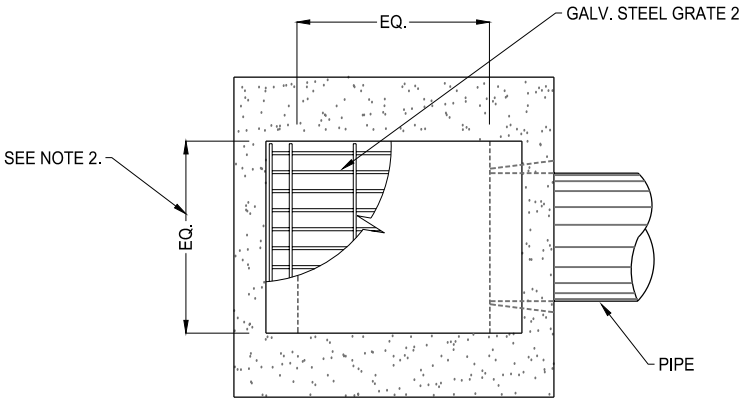
JUNE 2025



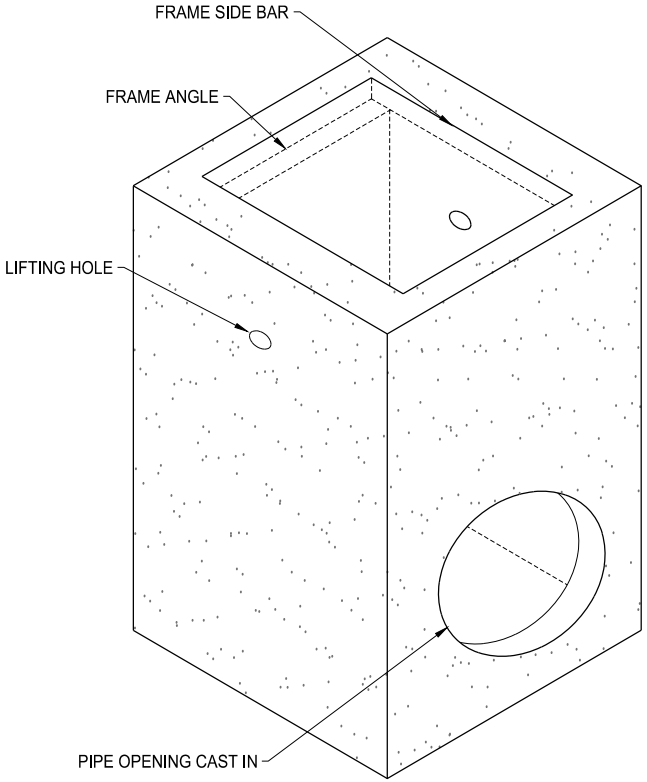
TYPICAL AREA DRAIN INLET

NTS

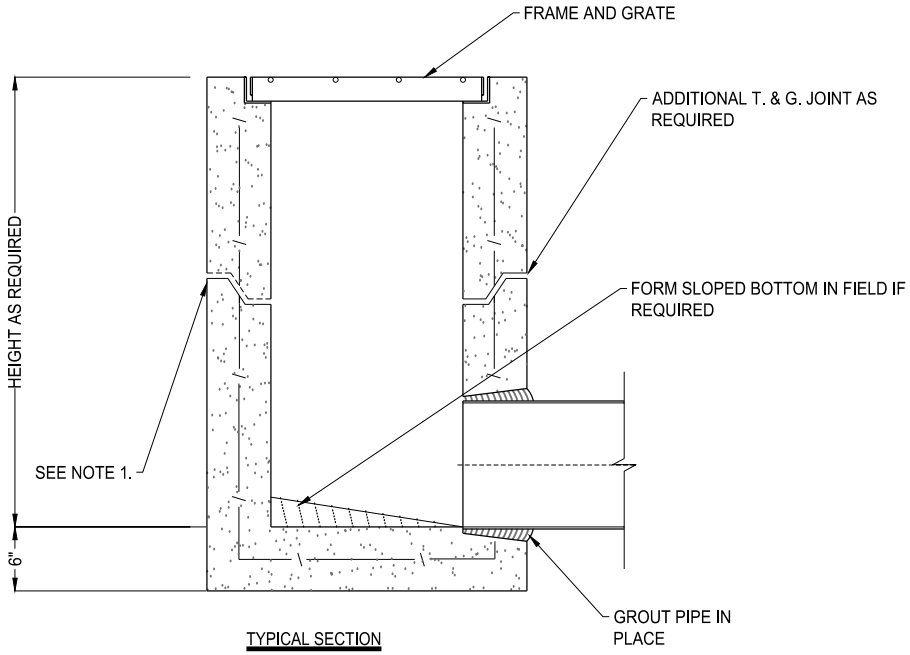
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PLAN



ISOMETRIC



TYPICAL SECTION

TABLE	
BOX SIZE	MAXIMUM DEPTH
12"x12"	2'-0"
18"x18"	2'-6"
24"x24"	3'-0"
30"x30"	3'-6"
36"x36"	4'-0"
FOR BOX SIZE LARGER THAN 36", USE MANHOLE.	

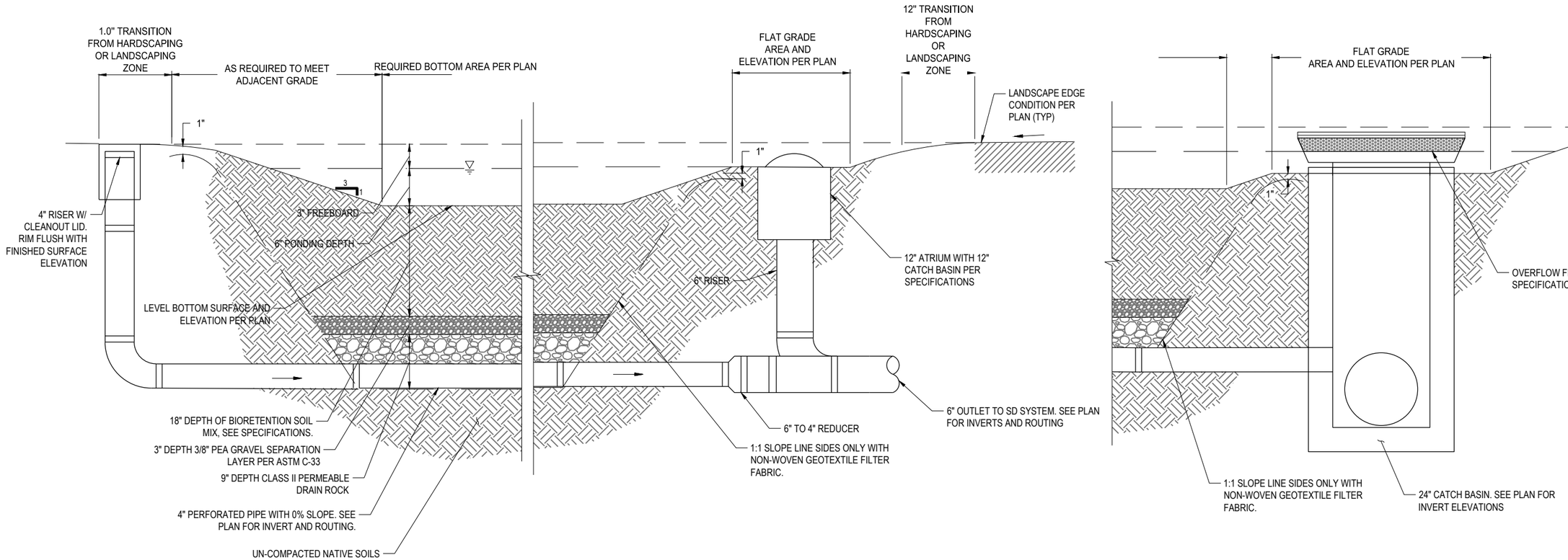
NOTES:

1. SET ALL BOX SECTIONS SECTIONS IN PLASTIC GASKET, RAM-NEK OR EQUAL. TYPICAL JOINT USE (1) 3/4"x 2-1/2" RAM-NEK SEAL OR EQUAL. 6" WIDE GROUT BAND ON OUTSIDE.
2. SEE TABLE FOR BOX SIZE, USING DEPTH OF PIPE(S).

DRAIN INLET

NTS

JUNE 2025

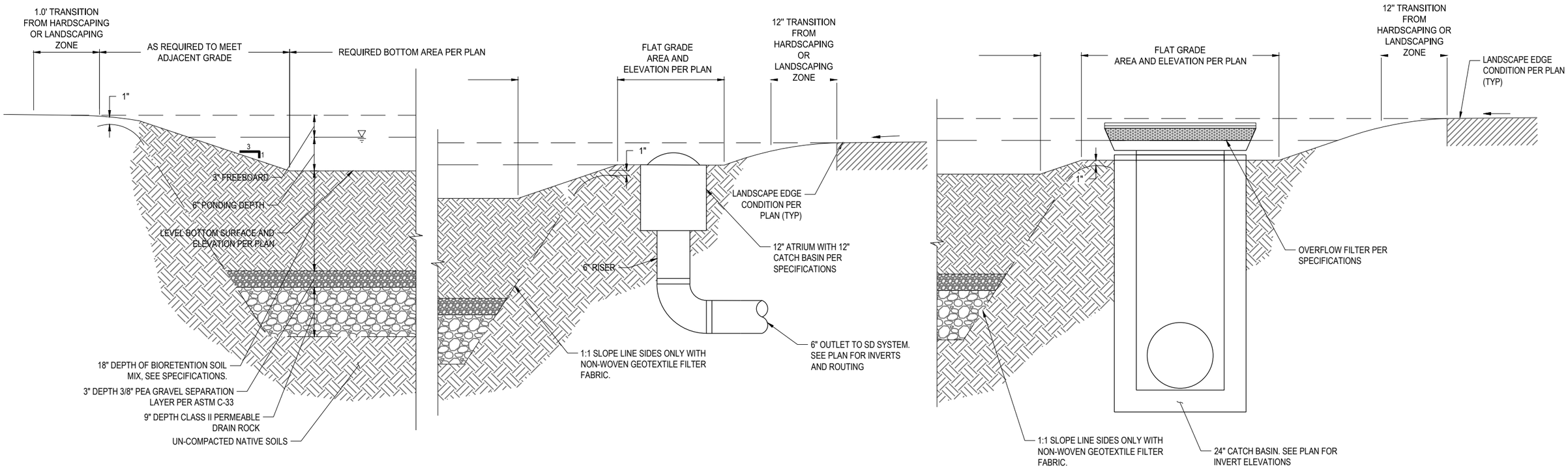


BIORETENTION BASIN (UNDERDRAINED, NO RETENTION)

NTS

C-37 STORM DRAINAGE UTILITIES 33 40 00

JUNE 2025

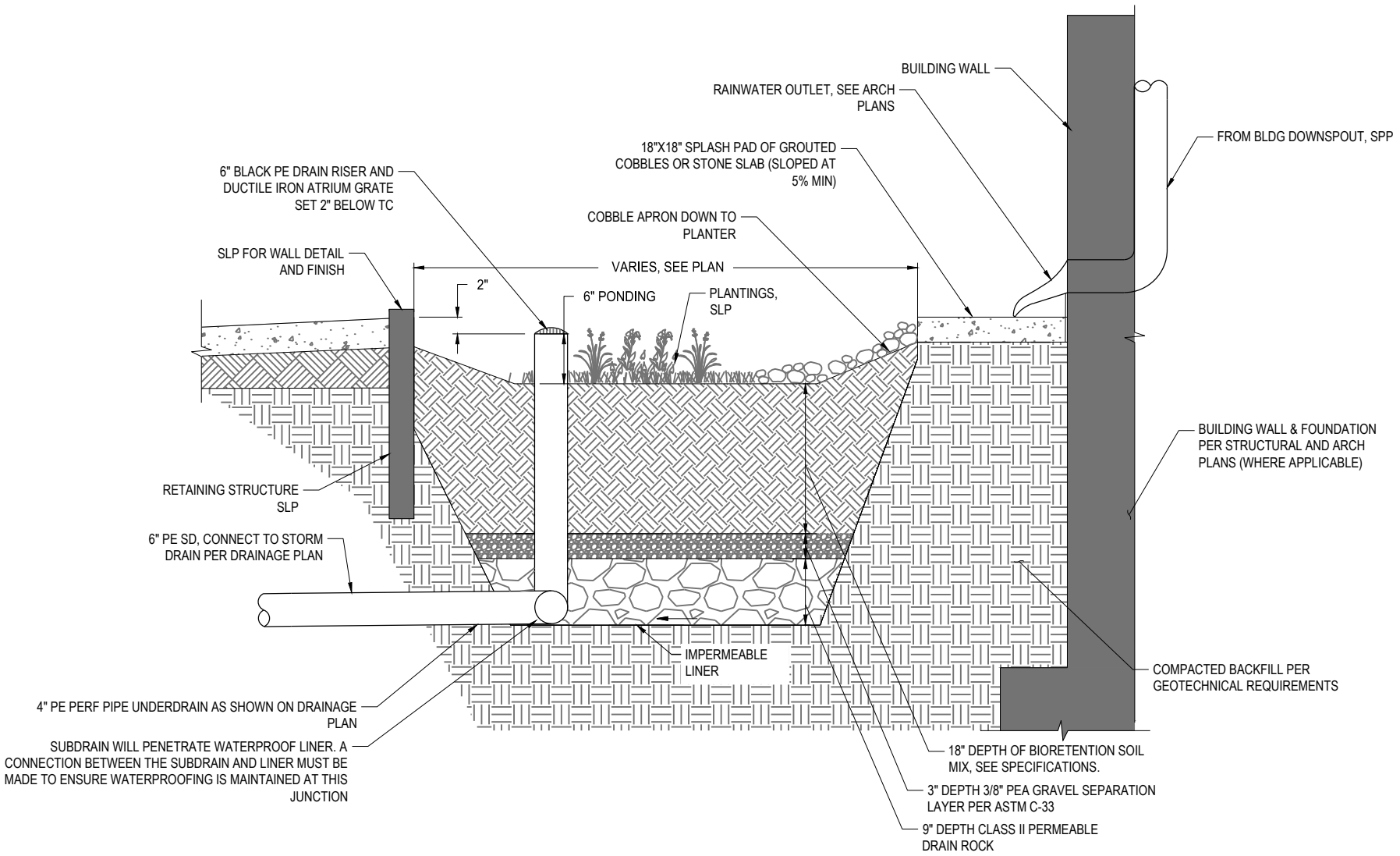


BIORETENTION BASIN
(NO UNDERDRAIN, RETENTION WITHIN BASIN SECTION)

NTS

C-38 STORM DRAINAGE UTILITIES 33 40 00

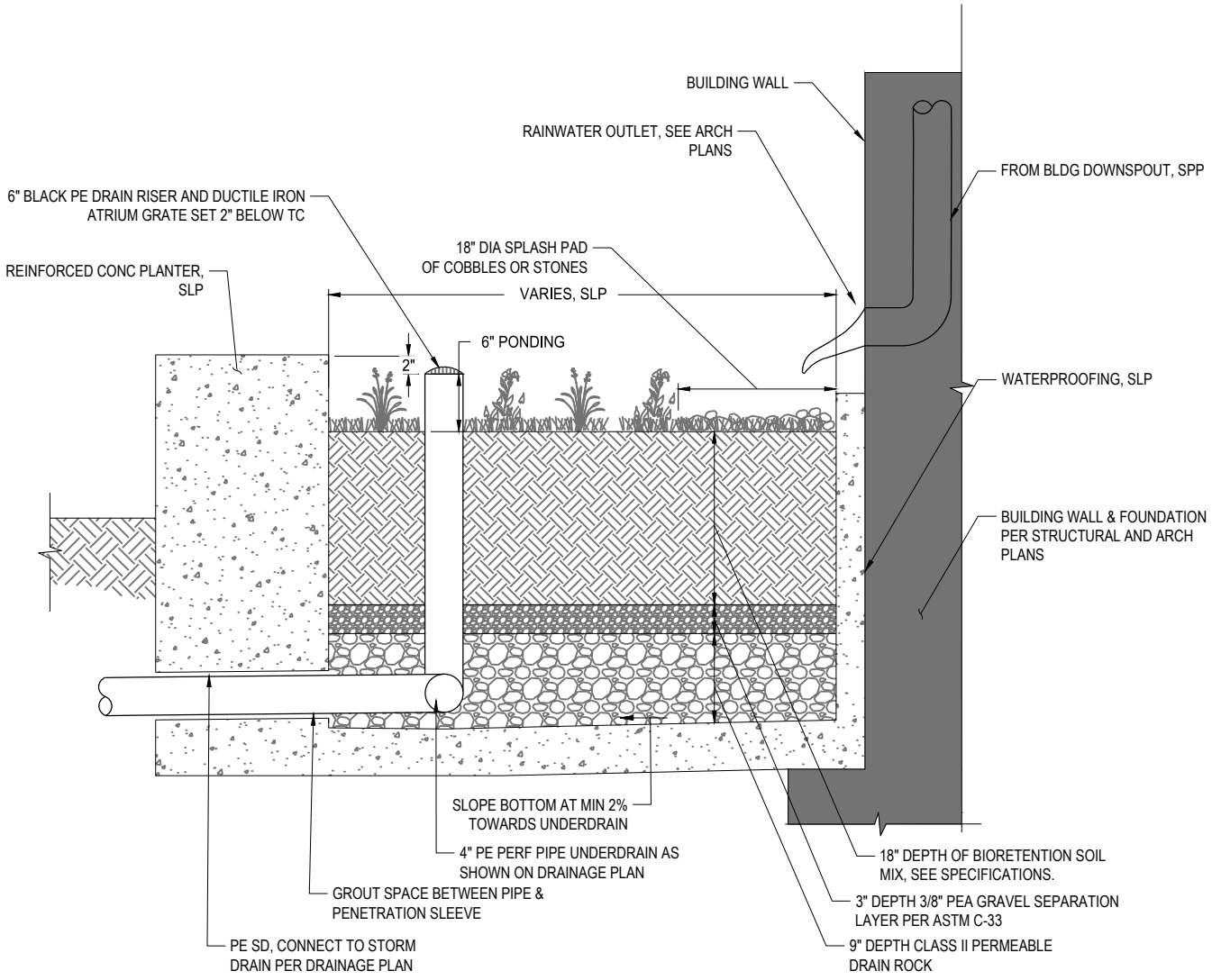
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FLOW THROUGH PLANTER (@ SIDEWALK LEVEL)

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FLOW THROUGH PLANTER (ABOVE SIDEWALK LEVEL)

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