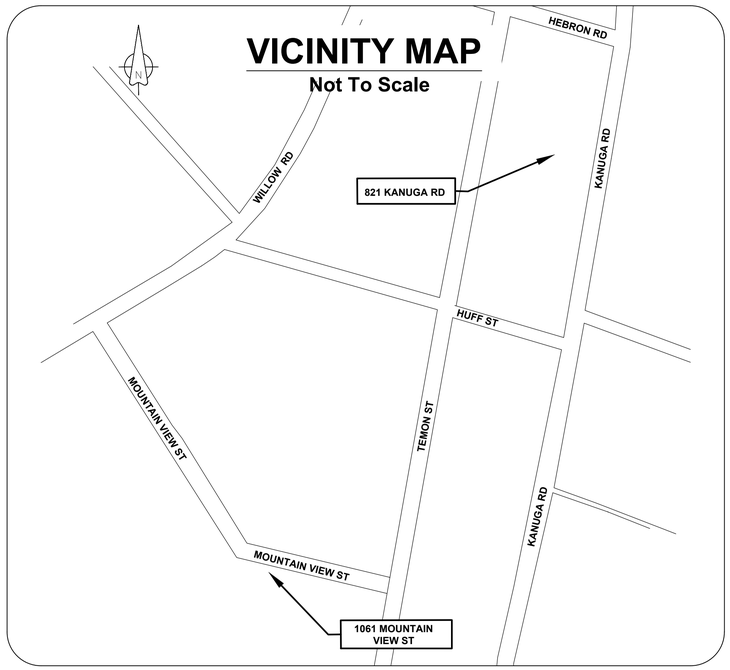
2026 STORMWATER IMPROVEMENTS

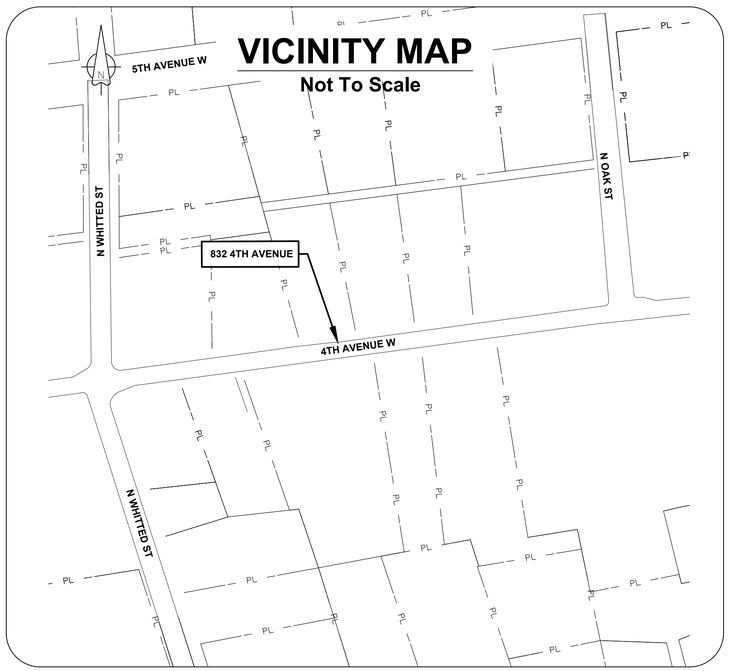
CITY OF HENDERSONVILLE, NC

305 WILLIAMS STREET
HENDERSONVILLE, NC 28792
PROJECT 25107

MOUNTAIN VIEW ST - KANUGA RD - 4TH AVE

TYPE OF WORK:
STORMWATER IMPROVEMENTS





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NO.	DATE	DESCRIPTION	BY
1.	11.21.25	ISSUED FOR BID	RLS

STORMWATER CONSTRUCTION

TITLE SHEET

NORTH CAROLINA PROFESSIONAL SEAL 054479 ENGINEER RICHARD SHOOK
RLS 11/21/25

JMB	RLS	BS	2025.11.21
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Project No.: **25107**
Revision: **00**
Sheet: 01 of 06
Drawing No.
C-1

GENERAL NOTES

GENERAL ITEMS

1. If any conflict arises between these general notes and any other notes found in the plans the City of Hendersonville Engineering Department has the authority to review and approve legitimate conflicting project specific notes if needed.

2. All construction, testing, and materials shall be in accordance with the City's current standard details and specifications. Prior to any construction, the Contractor shall be familiar with the Contract Documents and Specifications, the Plans (including all notes), the City of Hendersonville's Specifications, and any other applicable standards or specifications relevant to the proper completion of the work specified. Failure on the part of the Contractor to be familiar with all Standards and Specifications pertaining to this work shall in no way relieve the Contractor of responsibility for performing the work in accordance with all such applicable Standards and Specifications.

3. Prior to construction, Contractor shall have in their possession all necessary permits, plans, licenses, etc. Contractor shall have at least one set of approved Engineering Plans and Specifications on-site at all times.

4. Owner shall be responsible for obtaining all offsite easements prior to commencement of offsite and relevant on-site construction activities. It shall be the responsibility of the Contractor, prior to the initiation of construction on easements through private property, to inform the property owner of this intent to begin construction. Before beginning construction in areas of public dedication, the Contractor shall inform the agency having jurisdiction in the area forty-eight (48) hours prior to initiation of the work.

5. All work shall conform to the City of Hendersonville's current version of design manuals, technical specifications, standard details, and/or approved materials lists. In the event an item is not covered in the plans or the above referenced documents, the most current North Carolina Department of Environmental Quality (NCDEQ) or North Carolina Department of Transportation (NCDOT) standards and specifications shall apply with concurring notification to the City of Hendersonville Engineering Department and Engineer of Record. The Engineering Department shall have the final decision on all construction materials, methods, and procedures.

6. Construction inspection may be performed by representatives of the Owner, Engineer, City, and reviewing authorities / agencies. Unrestricted access shall be provided to them at all times. Contractor is responsible for understanding and scheduling required inspections. Testing samples shall be collected and processed by certified technicians.

7. All Contractors must confine their activities to the work area. No encroachments onto developed or undeveloped areas will be allowed. Any damage resulting therefrom shall be Contractor's responsibility to repair or restore. If the Contractor desires to utilize adjacent lot(s) for any purpose, the Contractor shall provide the City advance written permission from the property owner(s). The project shall not be finalized until the Contractor provides a written letter from the property owner(s) stating that the property owner is satisfied with the said repairs or restorations. All disturbances caused by the Contractor that is superfluous to the project shall be returned to pre-project conditions and shall comply with all erosion control requirements.

8. It will be the responsibility of each Contractor to protect all existing public and private utilities throughout the construction of this project. Contractor shall contact the appropriate utility companies to identify utility locations prior to commencement of construction and shall maintain up-to-date utility locates throughout the duration of construction. Contractor shall assume full liability and responsibility to those utility companies for any damages caused by the Contractor to utility facilities. If the Contractor damages any City property (water mains, fire hydrants, structures, etc.), they will be assessed applicable charges. Contractor may be required to expose these facilities at no cost to the City.

NC 811	811 or (800) 632-4949
Enbridge (Gas)	(828) 670-3513
Duke Energy	(800) 769-3766
AT & T	(800) 778-9140
Hendersonville Water & Sewer	(828) 697-3073
Altice USA	(800) 778-9140

9. Continuous access for mail service, solid waste collection, emergency services (fire, police, EMS), school bus service, and local residents/businesses shall be maintained during construction. Where temporary closures are unavoidable, the Contractor shall coordinate in advance with the City Engineer and all affected service providers to minimize disruptions.

10. The Contractor shall maintain, and keep in good repair, all the areas covered by the Plans and Specifications during the full duration of the Project.

11. Working Time is defined as the time during the day, except holidays in which the Contractor shall be permitted to work. Unless otherwise approved, normal work hours will be 7:00 a.m. to 5:00 p.m. Monday through Friday. The Contractor will not be allowed to work on weekends or City of Hendersonville holidays unless an exception is given by the City, and it is the Contractor's responsibility to verify the City's holiday schedule. The consequences of work being performed without the benefit of inspection on Saturdays, Sundays, or holidays may be the removal of all work performed without the appropriate inspection, as determined by the Hendersonville Engineering Construction Inspector.

12. No material which has been used by the Contractor for any temporary purposes whatsoever is to be incorporated in the permanent work without written consent of the City of Hendersonville Engineering Department and/or the Engineer of Record.

13. Where the words "equivalent", "proper", or "equal to" are used, they shall be understood to mean that the item referred to shall be proper, the equivalent of, or equal to some other item, in the opinion or judgment of the Engineer of Record and the City. Where the term "or equal," or "or approved equal" is not used in the specifications, this does not necessarily exclude alternative items, materials, or equipment which may accomplish the intended purpose. Where materials or equipment are specified by a trade or brand name, it is not the intention of the City to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality or performance, and to establish an equal basis for the evaluation of bids. No substitutions will be permitted until the Contractor has received written permission of the City of Hendersonville Engineering Department and/or the Engineer of Record to make a substitution for the material that has been specified.

14. The Contractor shall be responsible for the repair or replacement of any existing items damaged by the Contractor during construction. These may include but are not limited to landscaping, irrigation, mailboxes, fences, driveways, street pavement, sidewalks, hike / bike trails, public utilities, franchise utilities, structures, buildings, etc. Any such existing items which are removed or damaged shall be put back to better or previous condition at no cost to the City.

15. The Contractor shall coordinate construction activities with the City of Hendersonville Engineering Department. In the event other contractors are doing work in the same area simultaneously with this project, the Contractor shall coordinate his proposed construction with other contractors. Any work performed within NCDOT right-of-way shall comply with applicable NCDOT standards and the Contractor shall be responsible for obtaining the required permits to perform said work.

16. Contractor shall inform Owner, residences, and/or businesses forty-eight (48) hours prior to any interruption of sewer and/or water service or impactsto existing access. Contractor shall schedule the construction activities to minimize any inconvenience to the residents and businesses. Interruptions to existing services may be required to be performed during off times and shall be coordinated with the affected agencies. Any planned interruptions of sewer and/or water services must have prior written approval of the Engineering Department.

17. All shop drawings, traffic control plans, working drawings or other documents which require review by the City, shall be submitted by the Contractor sufficiently in advance of scheduled construction to allow no less than 10 business days for review and response by the City.

18. All Contractors and Subcontractors shall conduct work in accordance with safe work practices and all applicable federal, state, and local safety and health regulations, including the Occupational Safety and Health Administration (OSHA) standards (29 CFR Part 1926 - Safety and Health Regulations for Construction). Compliance with OSHA regulations is the sole responsibility of the Contractor. Failure to comply shall be grounds for immediate suspension of work until corrective measures are implemented to the satisfaction of the Owner.

19. It is the Contractor's responsibility to maintain a neat and accurate record of construction for the Record Drawings that will be submitted to City. Prior to final acceptance, the Contractor's redlines shall be provided to the Engineer of Record for incorporation into the Record Drawings. Record Drawings including redline updates shall be provided to the Hendersonville Engineering Construction Inspector at least one day prior to the scheduled final walkthrough inspection.

EROSION CONTROL & VEGETATION

1. The Contractor shall comply with the City of Hendersonville Stormwater Ordinance, the Henderson County Erosion and Sediment Control Program (as delegated by NCDEQ), the North Carolina Department of Environmental Quality (NCDEQ) NPDES General Permit for Construction Stormwater (NCG01), and all other applicable State and Local regulations.

2. The Contractor shall employ measures as necessary to prevent dirt, mud, and debris from being tracked off site. Any dirt, mud, and debris tracked offsite shall be cleaned up by the Contractor immediately to ensure safe environment within and adjacent to the site.

3. The site shall be reviewed by the Contractor or his representative weekly, and after any major storm. Adjustments/repairs to the erosion control measures will be made as needed. The Contractor shall notify Hendersonville Construction Inspectors of adjustments/repairs such that the adjustments/repairs may be inspected and approved by the Erosion Control Inspectors in coordination with the Stormwater Director.

4. Unless otherwise approved by the Engineering Department, perennial vegetation shall be fully established in all disturbed areas (both on-site and off-site) and all temporary erosion and sediment control measures shall be removed (both on-site and off-site) prior to final acceptance and issuance of a Certificate of Occupancy

5. All excavated earth in excess of that required for backfilling, and all concrete removed, shall be disposed of in a satisfactory manner. The Contractor shall provide documentation to the City in writing of the final destination of this material. The documentation shall include permission from the property owner and verification from the floodplain manager in the jurisdiction that the disposal area is outside the FEMA 100-year floodplain.

6. Concrete truck and equipment washout shall be performed only in approved, designated containment areas. Contractors and Subcontractors shall prevent the discharge of wash water, slurry, or residues to the storm drainage system, surface waters, or surrounding property. Washout materials shall be removed and disposed of in compliance with NCDEQ and NPDES requirements. Failure to comply may result in suspension of work until corrective measures are implemented to the satisfaction of the Owner.

TREE PRESERVATION

1. Prior to construction, the Contractor shall construct and maintain a protective fence at the drip line of all protected existing trees, unless noted otherwise on the construction drawings. Any damage to the existing trees caused by construction shall be replaced to the satisfaction of the Owner and/or the City of Hendersonville at the Contractor's expense.

2. All protective measures shall be in place prior to commencement of any site or grading work and remain in place until all exterior work has been completed.

3. The following activities shall be prohibited within the limits of the primary root zone: material storage, equipment cleaning/liquid disposal, and construction equipment/vehicular traffic. No signs or wires shall be attached to trees.

4. Unless specifically allowed, no grade changes shall be allowed within the limits of the primary root zone of any protected tree unless the Engineering Department approves adequate construction methods.

5.No trimming of trees may occur within the Tree Preservation fencing limits without prior consent of the Engineering Department..

PEDESTRIAN ACCESSIBILITY

1. Contractor shall maintain all existing pedestrian routes and access within and adjacent to the site throughout the duration of construction. A temporary pedestrian route shall be provided when any existing sidewalk is closed due to construction activity. Any signage required for the designation of a temporary pedestrian route shall be included on the approved Traffic Control Plan.

2. All newly constructed sidewalks, curb ramps, and crosswalks installed within the City of Hendersonville public right-of-way, easements, or on City property shall be considered pedestrian access routes and shall conform to the most current (Draft or Adopted) Public Right-of-Way Accessibility Guidelines (PROWAG) created by the United States Access Board. The City of Hendersonville Engineering Department shall be the sole authority in determining whether the constructed facilities comply with PROWAG. Any work determined by the Engineering Department to be non-compliant shall be removed and replaced by the Contractor, at the Contractor's sole expense, until full compliance is achieved.

TRAFFIC CONTROL

1. All existing traffic control devices and infrastructure shall remain in place, operational, and unobstructed at all times throughout the duration of construction unless otherwise approved by the Engineering Department. The Contractor shall be responsible for maintaining all traffic control devices whether or not work is active. Any deficiencies shall be corrected by the Contractor immediately regardless of time of day.

2. All traffic control devices shall conform to the latest edition of the Federal Manual on Uniform Traffic Control Devices (MUTCD), as adopted by the North Carolina Department of Transportation (NCDOT), and shall meet current crashworthiness standards (MASH, or NCHRP 350 where still applicable). Devices shall utilize a minimum of Type III high-intensity retroreflective sheeting, or Type IV reboundable high-intensity retroreflective sheeting where flexibility is required.

3. Construction activities which impact existing traffic and/or access to properties shall not begin until a site-specific traffic control plan is approved by the City of Hendersonville. Traffic control plans may be required on other roadways as determined by the Engineering Department or their designee. All traffic control plans must be prepared by an individual certified in their preparation and must be submitted for review a minimum of seven (7) working weekdays prior to the anticipated implementation. Any deviation from an approved Traffic Control Plan must be reviewed by the Engineering Department or their designee.

4. Lane closures will not be permitted on arterial roadways before 9:00 am or after 4:00 p.m. Violations may result in suspension of all work at the job site for a minimum of forty-eight (48) hours. The Engineering Department reserves the right to deny, restrict, or revoke permission for closures.

5. Lane closures will not be permitted on streets in the vicinity of private and/or public schools during posted school zone hours. Lane closures in the vicinity of schools without designated school zones shall be coordinated with the school.

6. All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time at the end of the workday, temporary traffic control devices that are no longer appropriate shall be removed, covered or turned away from traffic.

7. Existing permanent signs removed by the Contractor for construction purposes other than stop, yield, and street name signs shall be returned to the City of Hendersonville. All stop, yield, and street name signs removed shall be temporarily erected in the appropriate locations and in accordance with the MUTCD until permanent signing can be installed. Any temporary stop or yield sign locations to be left in place overnight requires prior approval from the Engineering Department.

8. Any permanent signs or existing pavement markings that conflict with the approved traffic control plan shall be covered, obliterated, or removed as directed by the Engineering Department.

9. Contractor shall notify the City of Hendersonville Public Works at (828) 697-3084 and Project Manager at least twenty-four (24) hours in advance of any work to be performed on a roadway or driveway within 500 feet of an existing traffic signal. Temporary traffic control devices within vehicle detection zones shall not be installed or removed without consent from the Engineering Department.

10. Access must be maintained to all drives and side streets or as indicated in the Traffic Control Plan.

THE CITY OF HENDERSONVILLE, NC 1847

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STORMWATER CONSTRUCTION

GENERAL NOTES

NORTH CAROLINA PROFESSIONAL SEAL 054479 ENGINEER RICHARD SHOOK

JMB	RLS	BS	2025.11.21
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Project No.: **25107**

Revision: **00**

Sheet: 02 of **06**

Drawing No.

C-2

GENERAL NOTES

STORM SEWER

1. The Contractor shall construct and maintain all trenching, shoring, and excavation operations in full compliance with applicable Occupational Safety and Health Administration (OSHA) requirements (29 CFR Part 1926 Subpart P - Excavations). The Contractor is solely responsible for providing, installing, and maintaining protective systems necessary to ensure the safety of workers and the public.

2. Prior to final acceptance, the Contractor shall perform a video inspection of all storm sewers and provide a copy of the inspection to the Hendersonville Engineering Construction Inspector. All storm sewers shall be cleared of any sediment and debris.

3. Any deficiencies identified in the final video inspection shall be corrected at the Contractor's expense.

4. When there is less than two foot clearance between a water/sewer line and a storm sewer, the Contractor shall install concrete encasement around the sanitary sewer or water lines at the storm sewer crossing. The encasement shall be a minimum of 10 L.F. and 6-inch thick centered at the crossing.

5. Manhole lids on storm sewer inlets and junction boxes shall be centered over the outgoing storm lateral.

6. All bends and wyes for pipes less than 42-inch diameter must be factory manufactured bends and wyes.

7. The contractor shall install City of Hendersonville standard storm sewer disc markers on all new inlets.

8. The contractor shall install City of Hendersonville standard storm sewer manhole lids on inlets, manholes, junction boxes, etc.

9. All storm sewer pipe shall be installed on stable, uniform bedding in accordance with manufacturer recommendations and NCDOT Standard Specifications. Bedding and backfill shall be placed in maximum 8-inch lifts and compacted to 95% of maximum dry density (per AASHTO T-99) unless otherwise specified.

10. All utility crossings shall be carefully excavated and hand-dug as necessary to avoid damage to existing facilities.

11. All precast manholes, catch basins, and junction boxes shall conform to ASTM C478 and City of Hendersonville standard details.

12. Frames and grates shall be installed flush with finished pavement or sidewalk grade, and set to proper slope to avoid ponding.

13. Storm sewer pipe materials shall conform to current NCDOT Standard Specifications (RCP - ASTM C76, HDPE - ASTM F2648). Pipe material substitutions must be approved by the City Engineer.

14. HDPE Pipe shall have a smooth interior and annular exterior corrugations. HDPE pipe shall meet ASTM F2648 and have a Manning's "n" value for use in design of 0.012.

15. HDPE pipe shall be joined using a bell & spigot joint meeting ASTM F2648. The joint shall be watertight according to the requirement of ASTM D3212. Gaskets shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly. 12 - through 60-inch diameters shall have an exterior bell wrap installed by the manufacturer.

16. Fittings shall conform to ASTM F2306. Bell and spigot connections shall utilize a welded bell and valley or saddle gasket meeting the watertight joint performance requirements of ASTM F2306.

17. To assure watertightness, field performance verification may be accomplished by testing in accordance with ASTM F2487. Appropriate safety precautions must be used when field-testing any pipe material. Contact the manufacturer for recommended leakage rates.

18. Material for pipe production shall be an engineered compound of virgin and recycled high-density polyethylene conforming with the minimum requirements of cell classification 424420C (ESCR Test Condition B) for 4- through 10-inch diameters, and 435420C (ESCR Test Condition B) for 12- through 60-inch diameters, as defined and described in the latest version of ASTM D3350, except that carbon black contentshould not exceed 4%. The design engineer shall verify compatibility with overall system including structural,hydraulic, material, and installation requirements for a given application.

19. Installation shall be in accordance with ASTM D2321 with the exception that minimum cover in trafficked areas for 4- through 48-inch diameters shall be one foot and for 60-inch diameter the minimum cover shall be 2 ft. in single run applications. Backfill for minimum cover situations shall consist of Class 1 (compacted) or Class 2 (minimum 95% SPD) material.

20. HDPE connections to manholes shall be watertight according to ASTM F2510/F 2510M, "Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Corrugated High Density Polyethyline Drainage Pipes." Fitting dimensions should be supplied to the manufacturer to insure the proper fitting size and manhole boot connector are supplied.

21. When installing an HDPE manhole adapter on the upstream end of a manhole, the fitting may be over inserted into the structure temporarily while the adjoining pipe is laid. The spigot piece is then pushed back through the structure and connected to the bell end when pushing the joint together. Alternately, when using the adapter fitting in the downstream end of the structure, before pushing the bell and spigot together from inside the structure, it is necessary to provide blocking at the structure to prevent the fitting from moving in the structure.

22. The Contractor shall restore all disturbed areas, including pavement, curb, sidewalk, and landscaping, to original or better condition. All pavement replacement shall conform to City of Hendersonville paving standards.

23. Erosion control measures (silt fence, inlet protection, sediment traps, etc.) shall be installed and maintained during construction in accordance with the approved Erosion and Sediment Control Plan and NCDEQ requirements.

24. All work shall conform to City of Hendersonville standards, NCDOT Standard Specifications, and applicable NCDEQ regulations. Any work determined by the City Engineer to be deficient or non-compliant shall be removed and replaced by the Contractor at no additional cost to the City.

PAVING

1. All mix designs shall be signed and sealed by a Professional Engineer and submitted to the Hendersonville Engineering Construction Inspector a minimum of two weeks before a scheduled pour. Mix designs are subject to approval by the Engineering Department.

2. The Contractor shall give the Hendersonville Engineering Construction Inspector a minimum of 24 hour notice of his intention to construct Portland cement concrete pavement, structural concrete, or hot mix asphalt to assure the adequate quality control of construction materials and workmanship.

3. Test cylinder: minimum 5 needed for breaks: one at day 7, three at day 28 and 1 hold.

4. No vehicles are permitted on reinforcing steel at any time.

5. Full panel replacement required (where cut) or as required by the Engineering Department.

6. Restore permanent type pavements, alley pavement, sidewalks, driveways, curbs, gutters, and surface structures removed or disturbed during or as a result of construction operations to a condition which is equal in appearance and quality to the condition that existed before the work began. The surface of all improvements shall match the appearance of the existing surface.

7. The subgrade for street and driveway pavement shall be prepared by excavating and filling the area as required, to bring the grade to the elevations as shown on the Drawings. All areas that are intended to be paved shall be proof rolled once the subgrade has been prepared and compacted. Hendersonville Engineering Construction Inspector must be present to observe proof rolling.

8. All concrete paving, including sidewalks and hike & bike trails, shall have a minimum compressive strength of 4000 psi, unless a higher compressive strength is specified.

9. All fill shall be compacted to 95% Standard Proctor Density in a maximum of 6-inch lifts or per the approved Geotechnical Engineers Report.

10. The subgrade shall extend a minimum of 12-inches beyond the back of curb to the minimum depths specified in the Hendersonville Engineering Design Manual or greater depths as recommended in the site specific geotechnical report. The Contractor shall obtain a site-specific lime series and add sufficient lime accordingly to achieve a Plasticity Index not to exceed 12.

TESTING AND QUALITY CONTROL

1. The Owner will employ the services of an engineering testing laboratory to make certain inspections and to sample and test the materials to be used in the Work on all projects. The Owner shall furnish, at his own expense, all necessary specimens for testing of the materials and when requested, shall furnish a complete written statement of the origin, composition, and/or manufacturer of any or all materials that are to be used in the Work. All materials not conforming to the requirements of the Specifications will be rejected.

2. During the construction, the engineering testing laboratory will perform services related to checking the quality of the Work being performed by the Contractor to determine if the improvements are being constructed in accordance with the Plans and Specifications. This quality control service does not relieve the Contractor of its responsibility with regard to constructing the work in accordance with the contract.

3. The Contractor must ensure the testing laboratory representative has arrived onsite prior to beginning any Work requiring sampling and testing. The testing laboratory representative shall be equipped with the appropriate testing equipment, properly maintained, and calibrated as verified by the Contractor. In the event the scope and schedule of the work warrants, the laboratory shall provide sufficient additional representatives. The testing laboratory shall issue all reports to the designated distribution list in a timely fashion. All test results that do not comply with project Specifications shall be clearly indicated.

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NORTH CAROLINA PROFESSIONAL SEAL 054479 ENGINEER RICHARD SHOOK

11/21/25

JMB	RLS	BS	2025.11.21
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

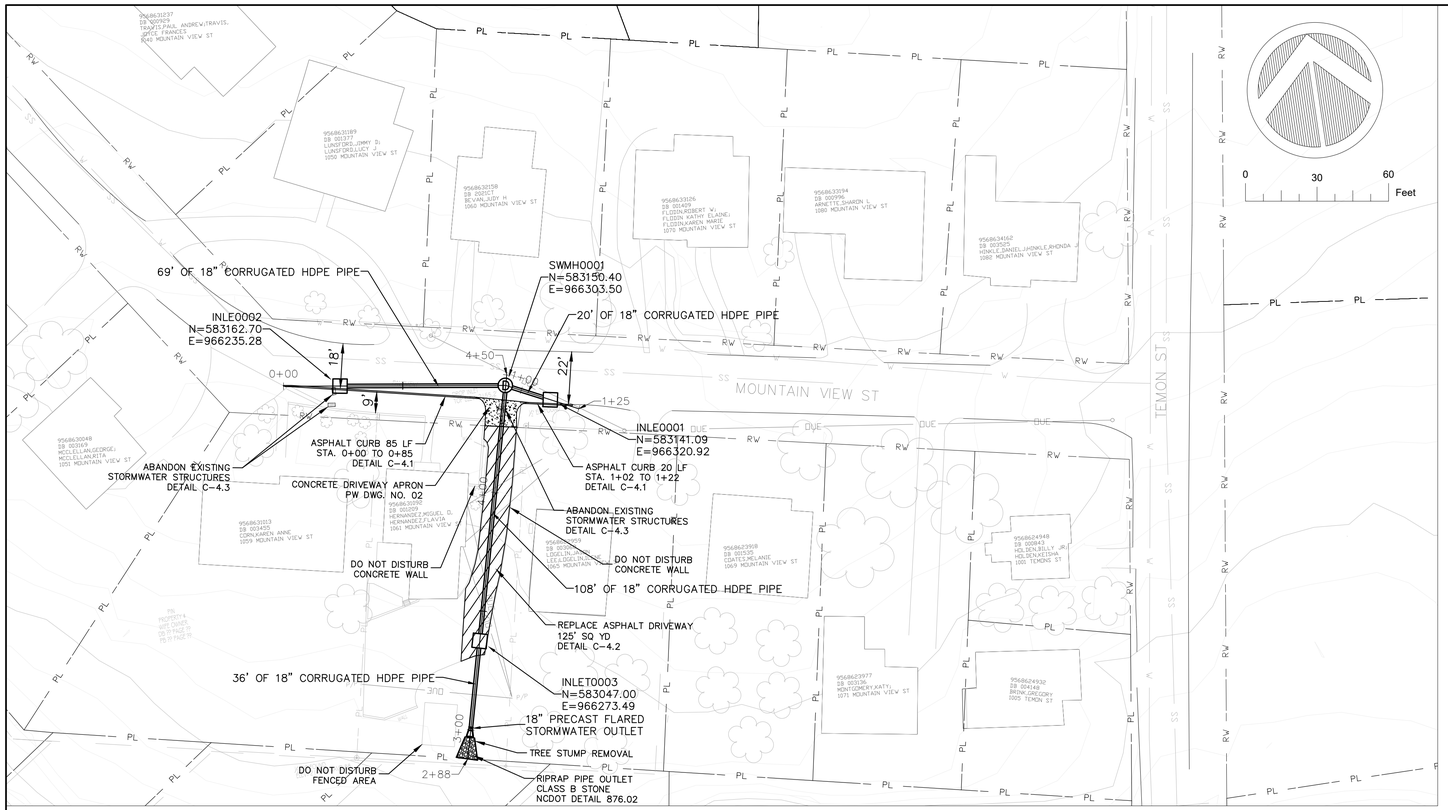
Project No.: **25107**

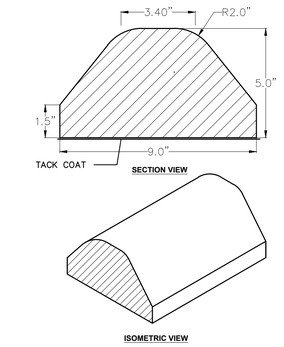
Revision: **00**

Sheet: 03 of **06**

Drawing No.

C-3

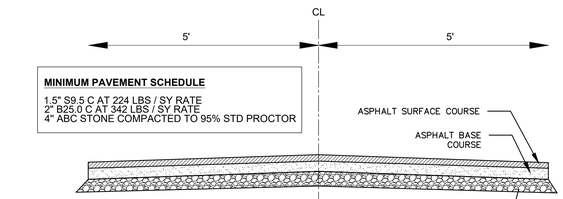




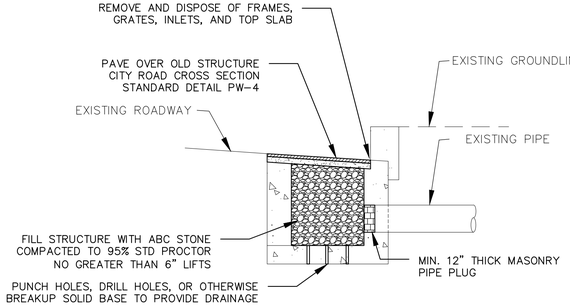
NOTES:

1. CLEAN EXISTING PAVEMENT REMOVING DEBRIS, DIRT, DUST, AND LOOSE AGGREGATE.
2. ASPHALT MIX DESIGN FOR ASPHALT CURB SHALL BE HMA CLASS 3/8" - 1/2" (AGGREGATE RATIOS AS PER CLASS B MODIFIED), ASPHALT BINDER GRADE PG 64-22 (OR SIMILAR), MIX AT 307 - 317 DEGREES FAHRENHEIT. ALLOW MIX TO COOL TO 287 - 295 DEGREES FAHRENHEIT BEFORE USING TO MINIMIZE SLUMP.
3. TACK COAT PLACED WITH SYNTHETIC BROOM SHALL BE PLACED END TO END AND SIDE TO SIDE SUCH THAT WHEN CURB IS PLACED A SMALL AMOUNT OF BONDING AGENT CAN BE SEEN ON BOTH SIDES OF THE CURB.
4. ALL OUTSIDE CORNERS AND RADII, UP TO 12 FOOT RADII, SHALL HAVE A "BULLNOSE" (ADDED CONCRETE TO REINFORCE CURBING). BULLNOSE SHALL BE FLUSH WITH THE TOP OF THE CURB AND EXTEND THE ENTIRE RADIUS. IN THE CASE OF OUTSIDE CORNERS (FACING PARKING AREA), BULLNOSE SHALL EXTEND NO LESS THAN 12 INCHES BACK FROM THE CORNER OF THE CURB. ALL SHALL BE BEVELED AT 45 DEGREES TO LESSEN IMPACT DAMAGE. NO STEEL SHALL BE ALLOWED UNLESS MANDATED BY ARCHITECT, ENGINEER OR MUNICIPAL AGENCY.

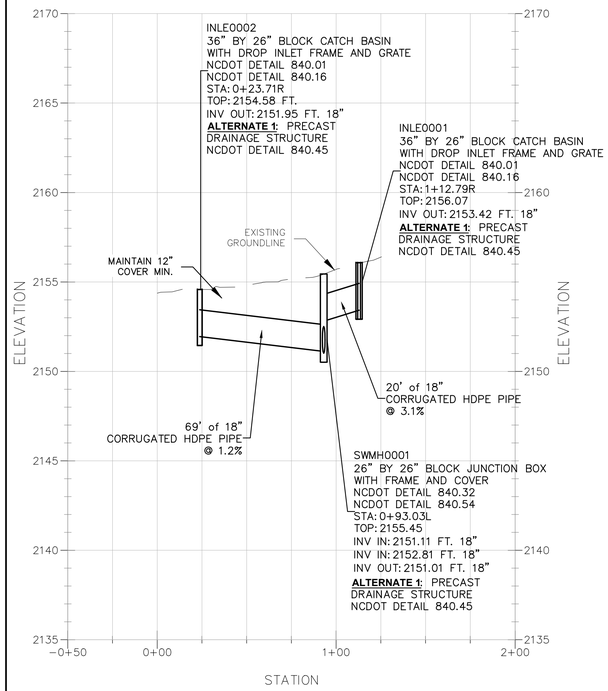
ASPHALT CURB
DETAIL C-4.1

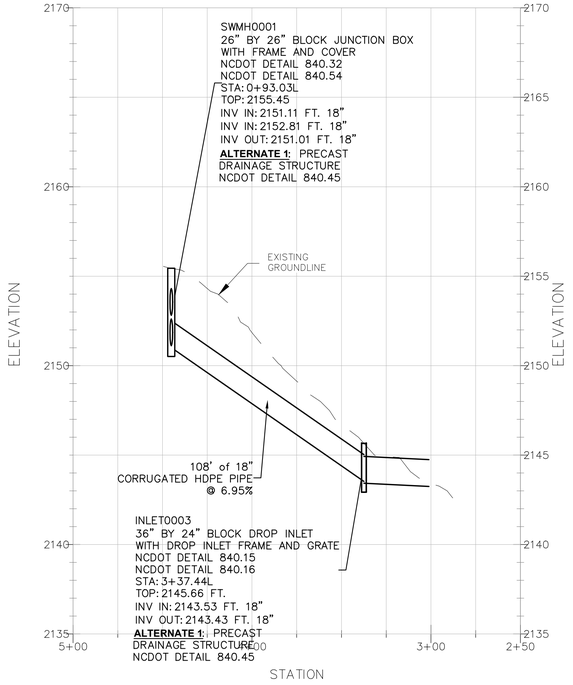


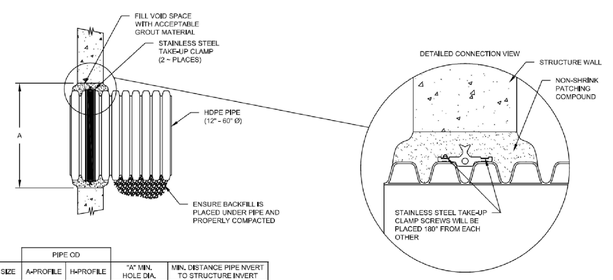
ASPHALT DRIVEWAY
DETAIL C-4.2



ABANDON STORMWATER
STRUCTURE
DETAIL C-4.3







PIPE SIZE	PIPE OD A-PROFILE	PIPE OD H-PROFILE	"A" MIN. HOLE DIA.	MIN. DISTANCE PIPE INVERT TO STRUCTURE INVERT
12" (300mm)	14.5" (368.3mm)	N/A	19.5" (495.3mm)	3.7" (94.0mm)
15" (375mm)	17.8" (447.0mm)	N/A	23.00" (584.2mm)	4.0" (101.6mm)
18" (450mm)	21.2" (536.5mm)	N/A	26.50" (673.1mm)	4.2" (106.7mm)
24" (600mm)	27.8" (706.1mm)	N/A	33.25" (844.5mm)	4.5 (114.3mm)
30" (750mm)	35.1" (891.2mm)	N/A	40.50" (1028.7mm)	5.2" (132.1mm)
36" (900mm)	41.1" (1043.9mm)	41.1" (1043.9mm)	47.00" (1193.8mm)	5.5" (139.7mm)
42" (1050mm)	47.7" (1211.6mm)	48.2" (1219.2mm)	53.00" (1346.2mm)	5.7" (144.8mm)
48" (1200mm)	53.8" (1301.4mm)	54.0" (1371.6mm)	59.00" (1496.6mm)	5.7" (144.8mm)
60" (1500mm)	66.3" (1684.0mm)	67.3" (1709.4mm)	72.00" (1828.8mm)	6.4" (162.6mm)

NOTES:
PERFORMANCE HIGHLY DEPENDENT ON INSTALLATION. CONTRACTOR MUST ENSURE MANHOLE GASKET IS UNIFORMLY SEATED AROUND STRUCTURE ADAPTER. EXTRA PRECAUTIONS MUST BE TAKEN TO PREVENT DIFFERENTIAL SETTLEMENT BETWEEN THE PIPE AND MANHOLE.

CONNECTION TO MANHOLE
(GROUTED WATERTIGHT)
DETAIL C-4.4

CITY OF HENDERSONVILLE, NC
"The City of Four Seasons"
City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
(828) 697-3066 (fax)
www.cityofhendersonville.org

NO.	DATE	DESCRIPTION	RLS
1.	11.21.25	ISSUED FOR BID	

STORMWATER CONSTRUCTION

1061 MOUNTAIN VIEW PLAN, PROFILE & DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 054479 ENGINEER RICHARD SHOCK

JMB	RLS	BS	2025.11.21
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

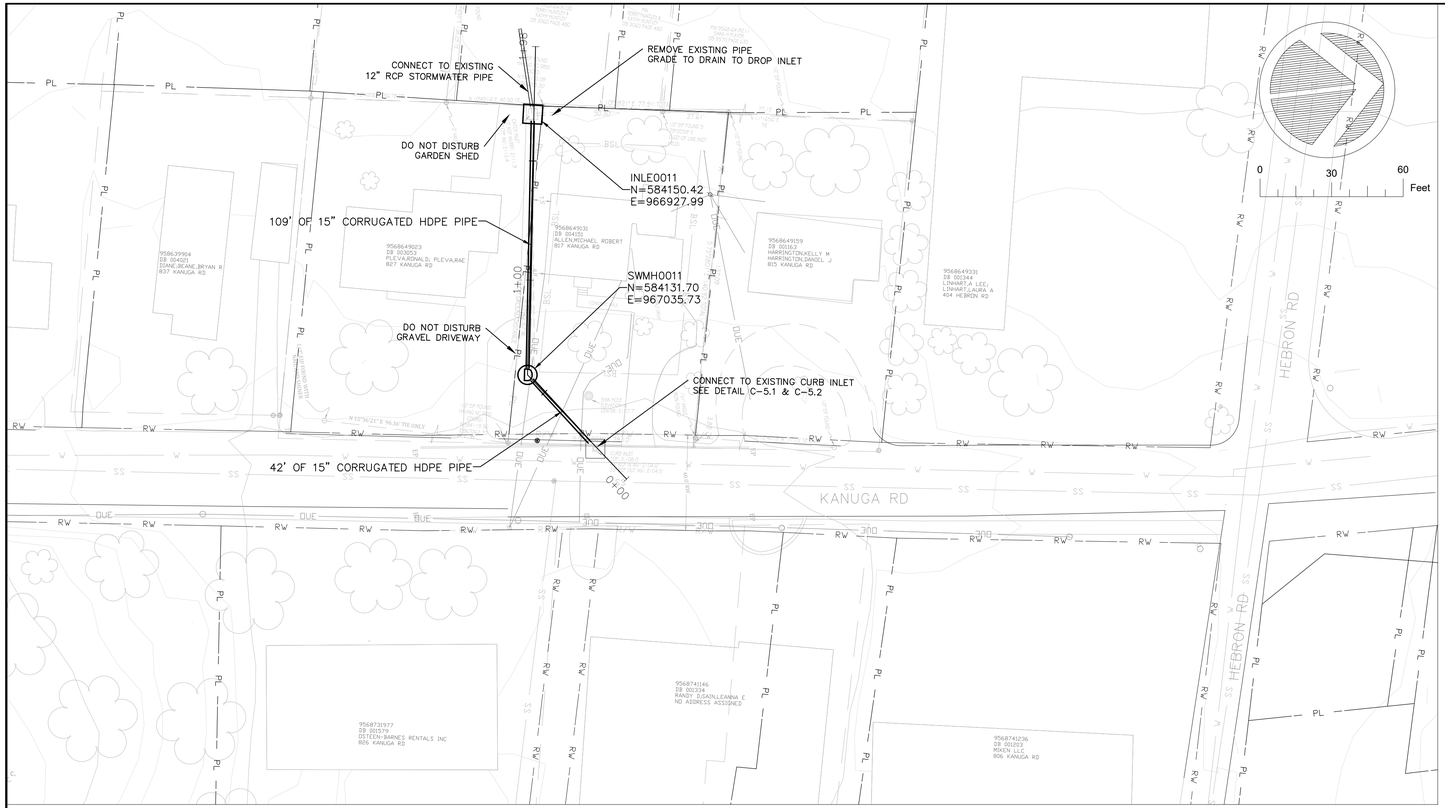
Project No.: **25107**

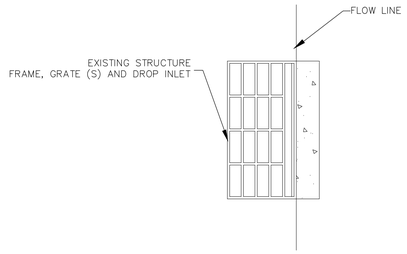
Revision: **00**

Sheet: 04 of 06

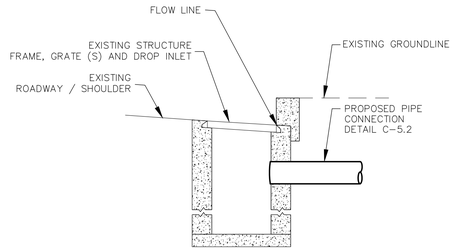
Drawing No.

C-4





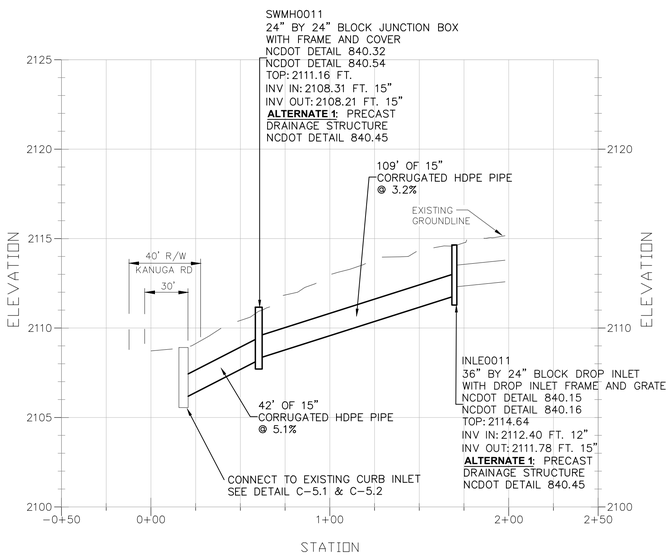
PLAN

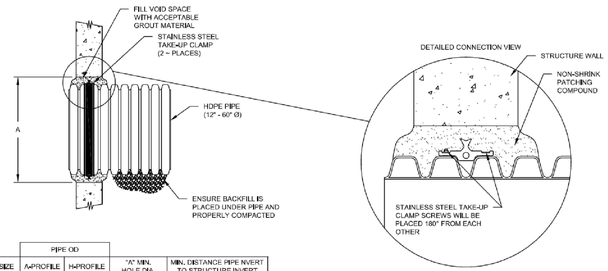


SECTION

EXISTING STRUCTURE CONNECTION

DETAIL C-5.1





PIPE SIZE	PIPE OD A-PROFILE	PIPE OD H-PROFILE	"A" MIN. HOLE DIA.	MIN. DISTANCE PIPE INVERT TO STRUCTURE INVERT
12" (300mm)	14.5" (368.3mm)	N/A	19.5" (495.3mm)	3.7" (94.0mm)
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42" (1050mm)	47.7" (1211.6mm)	48.0" (1219.2mm)	53.00" (1346.2mm)	5.7" (144.8mm)
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NOTES:
PERFORMANCE HIGHLY DEPENDENT ON INSTALLATION. CONTRACTOR MUST ENSURE MANHOLE GASKET IS UNIFORMLY SEATED AROUND STRUCTURE ADAPTER. EXTRA PRECAUTIONS MUST BE TAKEN TO PREVENT DIFFERENTIAL SETTLEMENT BETWEEN THE PIPE AND MANHOLE.

CONNECTION TO MANHOLE (GROUTED WATERTIGHT)

DETAIL C-5.2

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CITY OF HENDERSONVILLE, NC

"The City of Four Seasons"

City of Hendersonville Engineering Department
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(828) 697-3066 (fax)
www.cityofhendersonville.org

NO.	DATE	DESCRIPTION	BY
1.	11.21.25	ISSUED FOR BID	RLS

STORMWATER CONSTRUCTION

821 KANUGA RD PLAN, PROFILE & DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 054479 ENGINEER RICHARD SHOOK

JMB	RLS	BS	2025.11.21
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

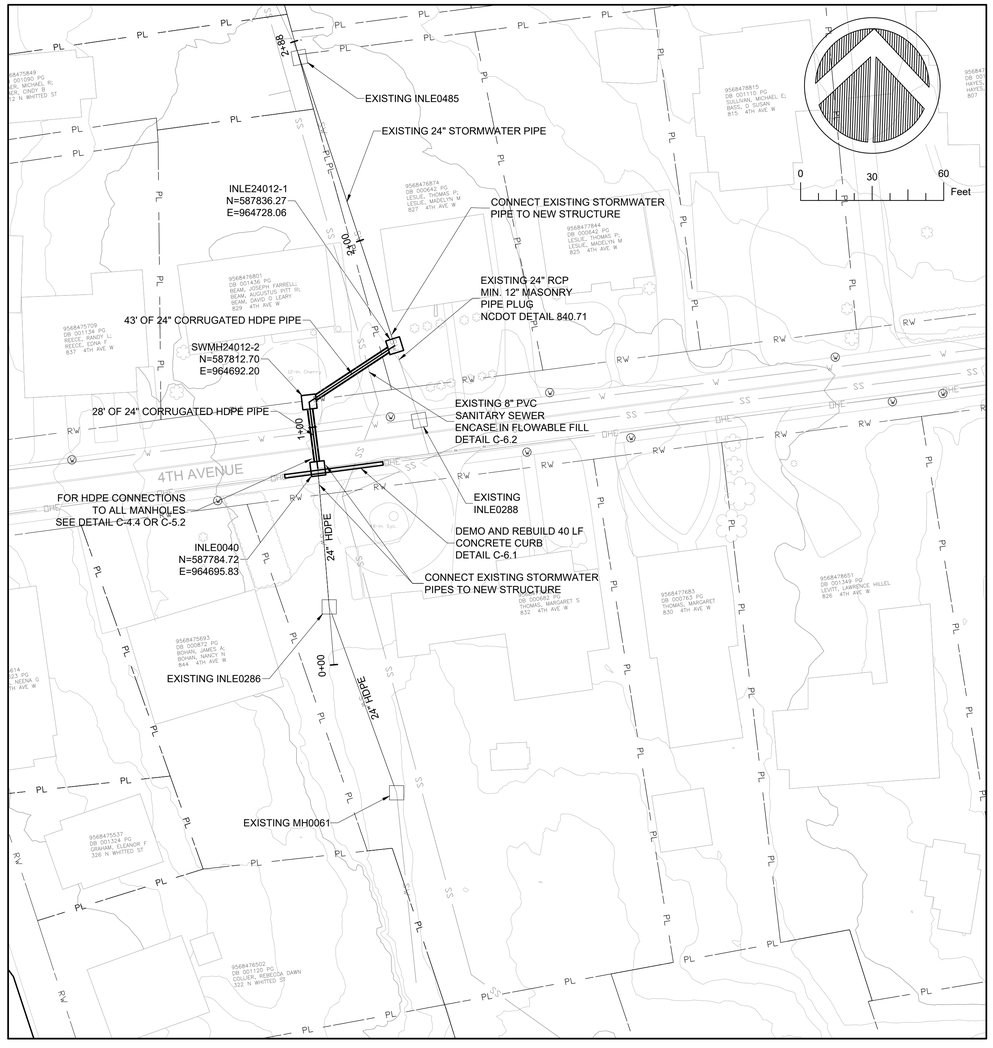
Project No.: **25107**

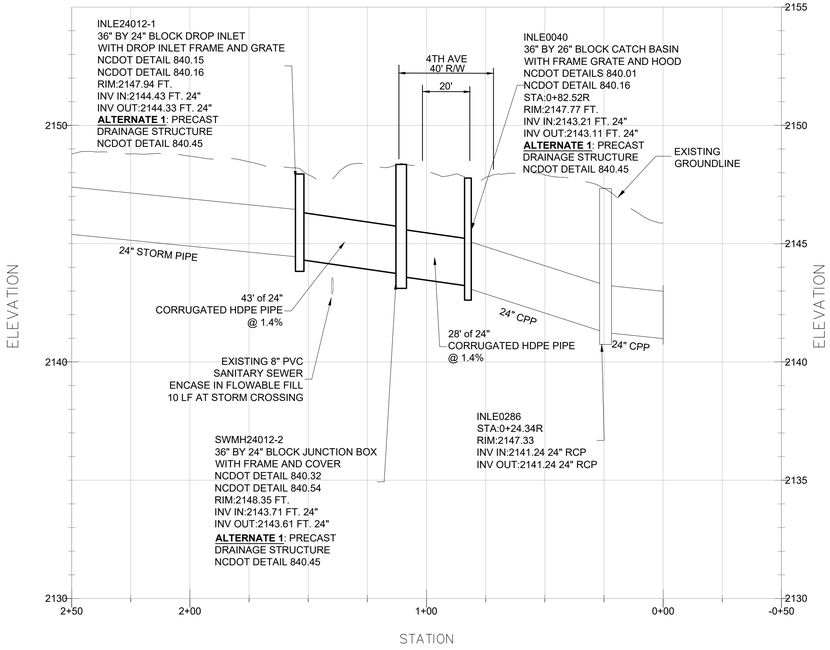
Revision: **00**

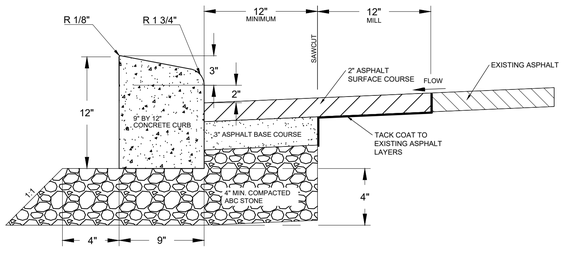
Sheet: 05 of **06**

Drawing No.

C-5



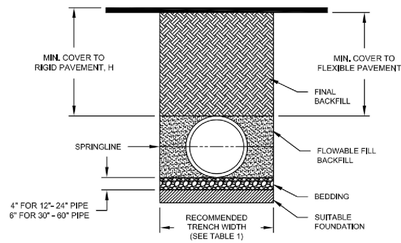




NOTES:

1. PROPOSED CONCRETE CURB SHALL BE CONSTRUCTED ON SUFFICIENTLY COMPACTED SUBGRADE AS SPECIFIED. AT A MINIMUM A 4" LAYER OF COMPACTED ABC STONE SHALL BE PLACED AS A LEVELING BASE FOR THE CURB.
2. WHERE THICKER SECTIONS OF EXISTING CONCRETE CURB HAVE BEEN REMOVED THE CONTRACTOR SHALL USE COMPACTED ABC STONE TO CREATE A LEVEL SUBGRADE. COSTS ASSOCIATED WITH THIS WORK SHALL BE INCLUDED IN THE PRICE OF CURB CONSTRUCTION.
3. SAWCUT AND REMOVE EXISTING PAVEMENT A MINIMUM OF 12" FROM EDGE OR AS DIRECTED BY THE ENGINEER.
4. MILL EXISTING PAVEMENT A MINIMUM OF 1 1/2" DEEP AND 1' FROM SAW CUT.
5. WEDGE NEW SURFACE OVER EXISTING SURFACE.
6. PLACE CONTRACTION JOINTS IN CURB AT 10' INTERVALS WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS.
7. LONGITUDINAL JOINTS SHALL BE PLACED BETWEEN CURB AND GUTTER AND ANY EXISTING OR NEW ASPHALT ROAD SURFACE.
8. TRANSVERSE EXPANSION JOINTS SHALL BE PLACED AT 90' INTERVALS.
9. A 1/2" ISOLATION JOINT WILL BE REQUIRED WHERE THE CURB AND GUTTER JOINS ANY RIGID STRUCTURE INCLUDING SIDEWALK.
10. FILL ALL JOINTS WITH APPROVED JOINT FILLER AND SEAL ALL JOINTS WITH APPROVED JOINT SEALER THAT CONFORMS TO ASTM C920.

CURB REPLACEMENT
DETAIL C-6.1



NOTES:

1. FLOWABLE FILL SHOULD BE DESIGNED TO PROVIDE ADEQUATE STRENGTH TO CARRY ALL LIVE AND DEAD LOADING BUT ALLOW FOR ANY FUTURE EXCAVATION. TYPICAL 28 DAY COMPRESSIVE STRENGTHS RANGE BETWEEN 50 AND 100 PSI. MIX SHOULD BE OF A CONSISTENCY THAT COMPLETELY FILLS SPACE BETWEEN PIPE AND TRENCH WALLS.
2. IF TRENCH IS EXCAVATED IN ROCK OR HIGH-BEARING STRENGTH SOILS, TRENCH WIDTHS FOR 24" - 60" DIA. MAY BE REDUCED, FROM VALUES IN TABLE 1, TO THE PIPE OD PLUS 12".
3. FLOWABLE FILL SHOULD NOT BE PLACED WHEN TEMPERATURES ARE BELOW 40°F, AGAINST FROZEN TRENCH MATERIAL OR WHEN APPRECIABLE PRECIPITATION IS FORECASTED DURING PLACEMENT.
4. PRECAUTIONS SHALL BE TAKEN TO PREVENT FLOTATION. ANCHORING SYSTEM AND/OR INCREMENTAL LIFTS SHOULD BE UTILIZED TO ENSURE PIPE REMAINS ON GRADE. REFER TO TECHNICAL NOTE 5.02, FLOWABLE FILL FOR THERMOPLASTIC PIPE, FOR EXAMPLES OF ANCHOR TYPES AND INCREMENTAL LIFT RECOMMENDATIONS.
5. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
6. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 12"-24" DIAMETER PIPE (300mm-600mm); 6" (150mm) FOR 30"-60" (750mm-1500mm) DIAMETER PIPE. THE MIDDLE 1/3 BENEATH THE PIPE INVERT SHALL BE LOOSELY PLACED.
7. FINAL BACKFILL: FINAL BACKFILL SHALL NOT BE PLACED UNTIL A PENETROMETER READING OF AT LEAST 500 PSI PER ASTM C403 IS MEASURED, THE CRITERIA OF ASTM D 6024 ARE MET, OR OTHER MEANS APPROVED BY THE ENGINEER TO DETERMINE SUITABILITY FOR LOAD APPLICATION ARE SATISFIED.
8. MINIMUM COVER: MINIMUM COVER, H, IS 12" (300mm) UP TO 48" (1200mm) DIAMETER PIPE AND 24" (600mm) OF COVER FOR 60" (1500mm) DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. SHALLOWER COVER MAY BE POSSIBLE AND IS CONTINGENT UPON THE MIX BEING DESIGNED TO CARRY THE ANTICIPATED VEHICULAR LOADS, INCLUDING IMPACTING FORCES.

TABLE 1, RECOMMENDED TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
12" (300mm)	22" (559mm)
15" (375mm)	27" (686mm)
18" (450mm)	33" (838mm)
21" (525mm)	37" (940mm)
24" (600mm)	42" (1067mm)
30" (750mm)	51" (1295mm)
36" (900mm)	59" (1499mm)
42" (1050mm)	66" (1676mm)
48" (1200mm)	74" (1880mm)
54" (1350mm)	82" (2083mm)
60" (1500mm)	90" (2286mm)

CURB REPLACEMENT
DETAIL C-6.2

THE CITY OF HENDERSONVILLE NC 1847

CITY OF HENDERSONVILLE, NC
"The City of Four Seasons"

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
(828) 697-3066 (fax)
www.cityofhendersonville.org

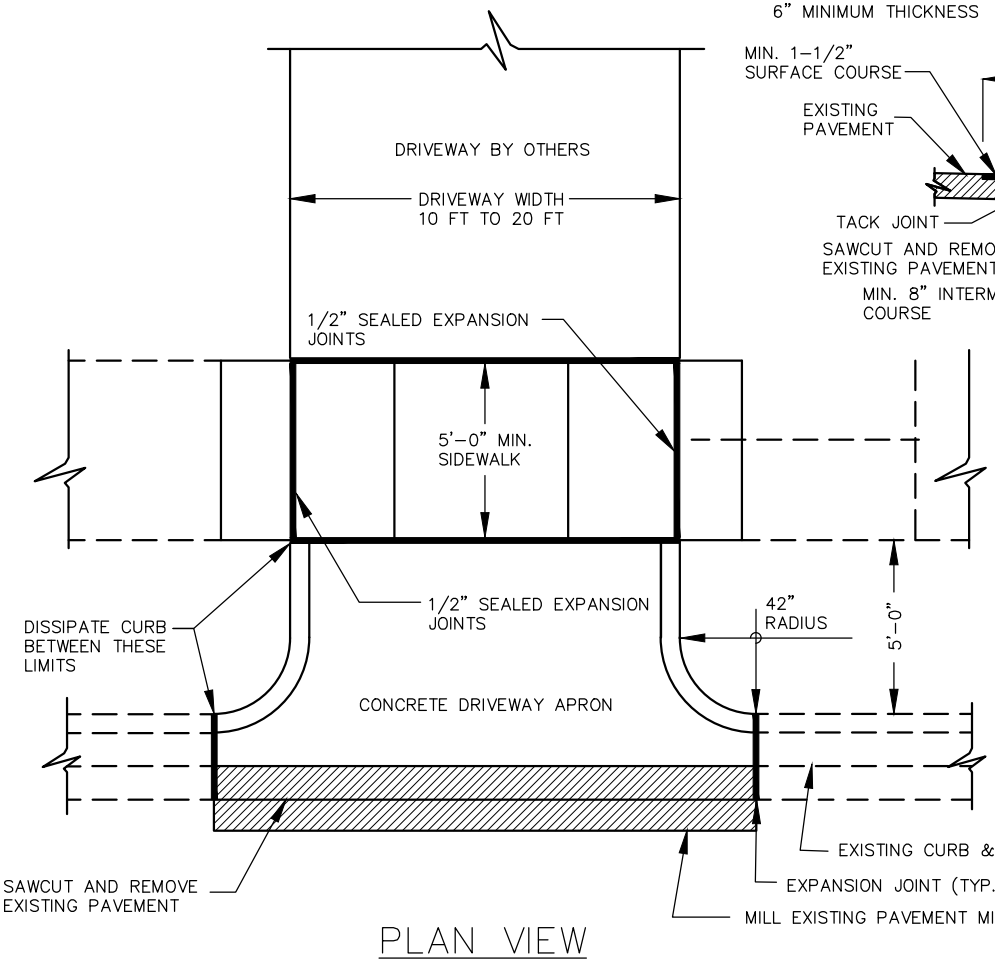
NO.	DATE	DESCRIPTION	BY
1.	11.21.25	ISSUED FOR BID	RLS

STORMWATER CONSTRUCTION
832 4TH AVE
PLAN, PROFILE & DETAILS

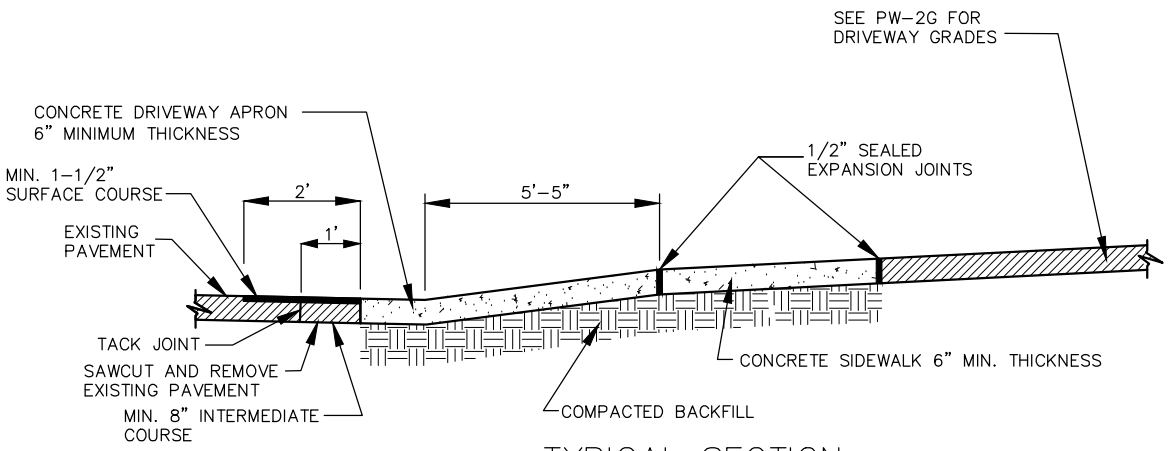
NORTH CAROLINA PROFESSIONAL SEAL 054479 ENGINEER RICHARD SHOOK

JMB	RLS	BS	2025.11.21
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Project No.: 25107
Revision: 00
Sheet: 06 of 06
Drawing No.
C-6



PLAN VIEW



TYPICAL SECTION

NOTES:

1. CURB SHALL BE TAPERED TO FINISH FLUSH WITH SIDEWALK.
2. BEGINNING RADIUS SHALL NOT ENCROACH ON ADJACENT PROPERTIES BASED ON A PROJECTION OF THE PROPERTY LINE FROM THE RIGHT OF WAY TO THE CURB LINE.
3. SIDEWALK SECTION SHALL BE REQUIRED ALONG ALL STREETS.
4. THE CITY IS NOT RESPONSIBLE FOR VEHICLES THAT DRAG DUE TO GRADE OF DRIVEWAY. THE DRIVEWAY IS PRIVATELY MAINTAINED.
5. ALL CONCRETE SHALL BE 4,000 PSI.
6. ALL EXPANSION JOINTS TO BE SEALED WITH POLYMER SEALANT MEETING ASTM C920.
7. THE WIDTH OF DRIVEWAYS MEASURED PARALLEL TO THE EDGE OF THE TRAVEL WAY AND FROM THE EDGE OF PAVEMENT TO EDGE OF PAVEMENT AT THE NARROWEST WIDTH, SHALL BE WITHIN THE SPECIFIED MINIMUM AND MAXIMUM LIMITS.
8. A DRIVEWAY THE ONE-WAY OPERATION SHALL HAVE A MINIMUM 10 FOOT AND A MAXIMUM 20 FOOT WIDTH.

DATE: 09/25/2025

SCALE: NOT TO SCALE PW DWG. NO. 02

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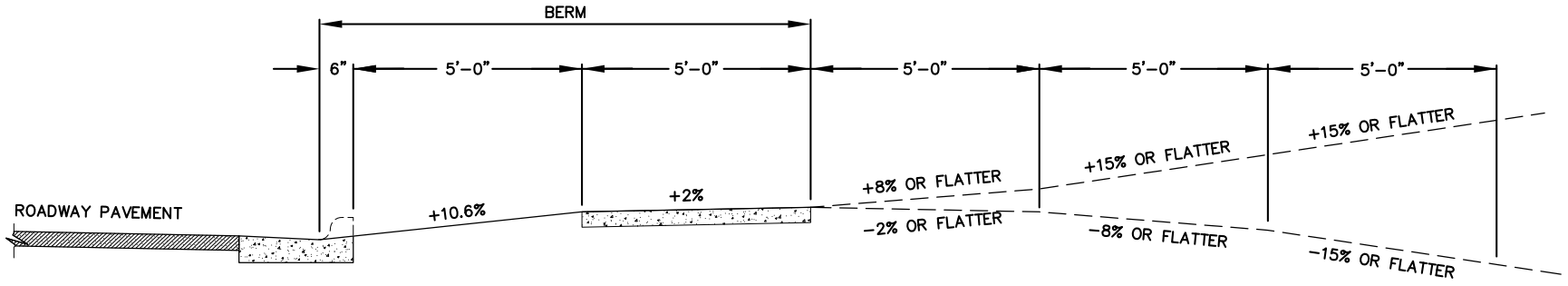
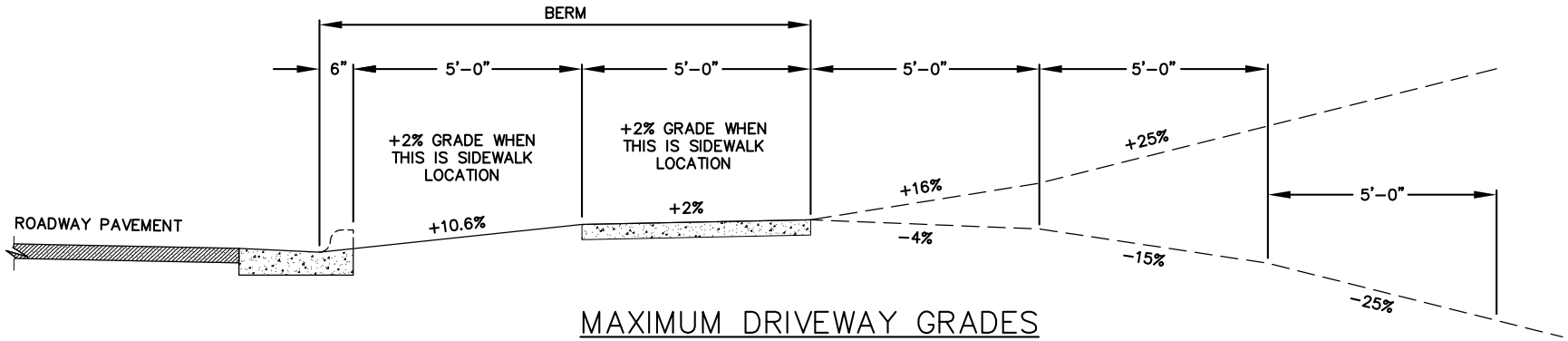
DRIVEWAY APRON



DESIRABLE DRIVEWAY GRADES



MAXIMUM DRIVEWAY GRADES

DATE: 05/19/2023

SCALE: NOT TO SCALE PW DWG. NO. 02G

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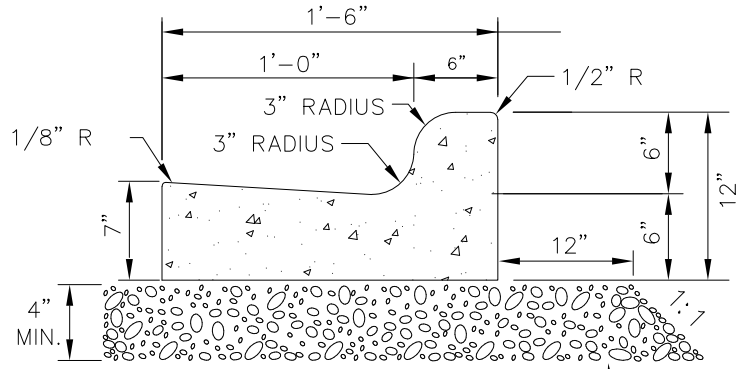
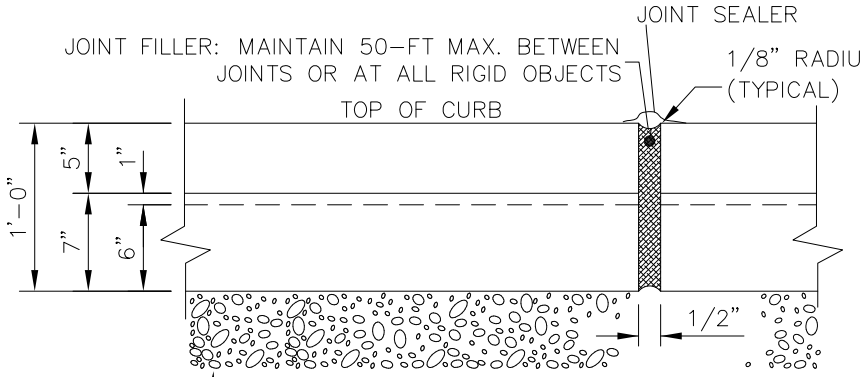
DRIVEWAY APRON TYPE I & II GRADES



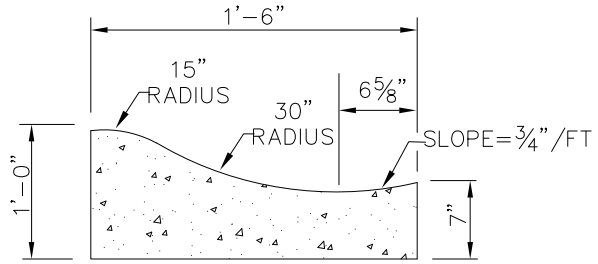
STANDARD 18" CURB & GUTTER
SIDE VIEW

AGGREGATE BASE COURSE (A.B.C.)
UNDER THE CURB & GUTTER
TYPICAL ALL C&G TYPES

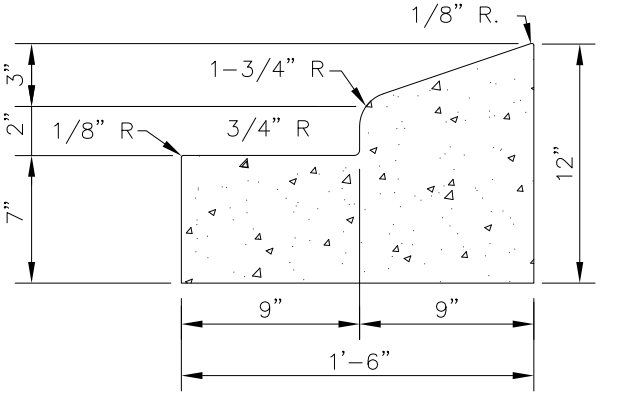


FRONT VIEW
TRANSVERSE EXPANSION JOINT

ALTERNATE CURB TYPES – MUST BE APPROVED BEFORE USE



ROLLED CURB
SIDE VIEW



MEDIAN CURB & GUTTER
SIDE VIEW

NOTES:

1. CONCRETE SHALL BE 4,000 P.S.I.
2. CONTRACTION JOINTS SHALL BE SPACED AT 10 FOOT INTERVALS. (A 15 FOOT SPACING WILL BE ALLOWED WHEN A MACHINE IS USED)
3. FINISH ALL CONCRETE WITH CURING COMPOUND.
4. REFER TO **NCDOT** DET. 846.01 FOR CURB & GUTTER SUPERELEVATION RATES.
5. ALL EXPANSION JOINTS WILL BE SEALED WITH JOINT SEALER.

DATE: 05/19/2023

SCALE: NOT TO SCALE PW DWG. NO. 03

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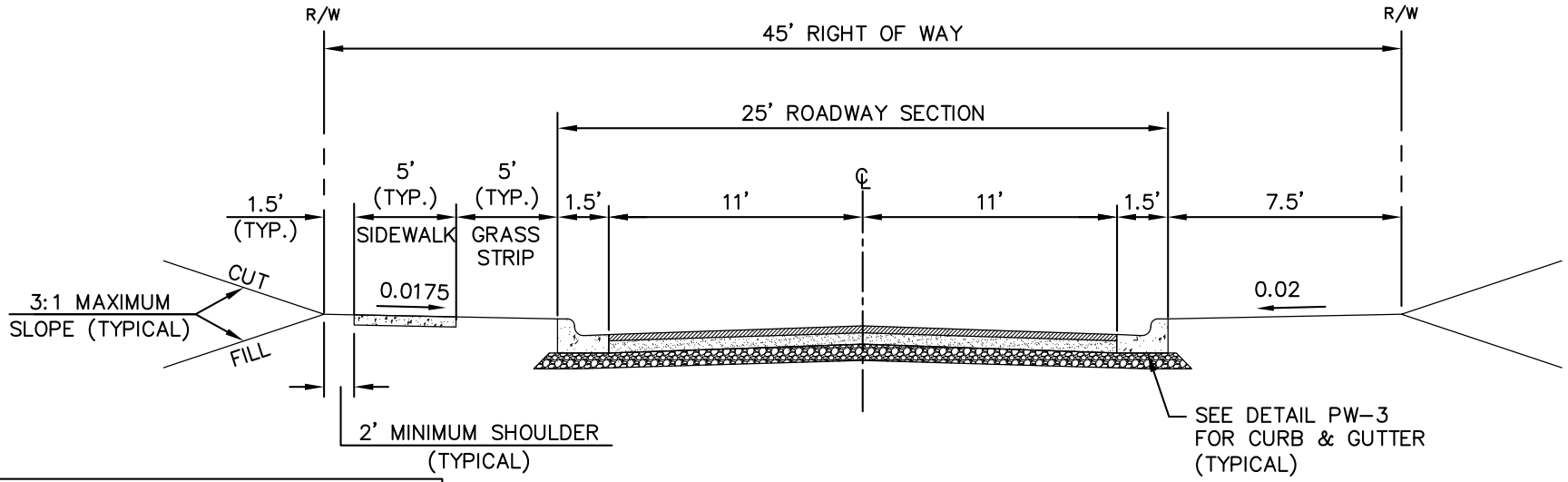
CONCRETE CURB AND GUTTER TYPES



MINIMUM PAVEMENT SCHEDULE

2" S9.5 C AT RATE OF 224 LBS/SY
3" B25.0 C AT RATE OF 342 LBS/SY
6" A.B.C.

45' RIGHT OF WAY
26' ROADWAY SECTION

SECTION VIEW

NOTES:

1. NORMAL CROWN OF 0.02' PER FOOT UNLESS OTHERWISE REQUIRED TO HAVE SUPERELEVATION.
2. PAVEMENT DESIGN SHALL BE REQUIRED AND APPROVED BY **NCDOT** (FOR NCDOT ROADS) AND/OR CITY OF HENDERSONVILLE PRIOR TO PLACEMENT OF ANY BASE MATERIAL.
3. PAVEMENT DESIGN SHALL BE AS SHOWN OR AS DESIGNED BY GEOTECHNICAL ENGINEER, WHICHEVER IS GREATER.
4. TACK COAT SHALL BE APPLIED BENEATH EACH LAYER OF ASPHALT MIX TO BE PLACED AT A RATE OF 0.04 GAL/SY
5. GRASS UTILITY STRIP REQUIRED UNLESS APPROVED BY PUBLIC WORKS DIRECTOR.
6. FINAL SURFACE COURSE TO BE APPLIED UPON CITY OF HENDERSONVILLE APPROVAL.

DATE: 05/19/2023

SCALE: NOT TO SCALE PW DWG. NO. 04

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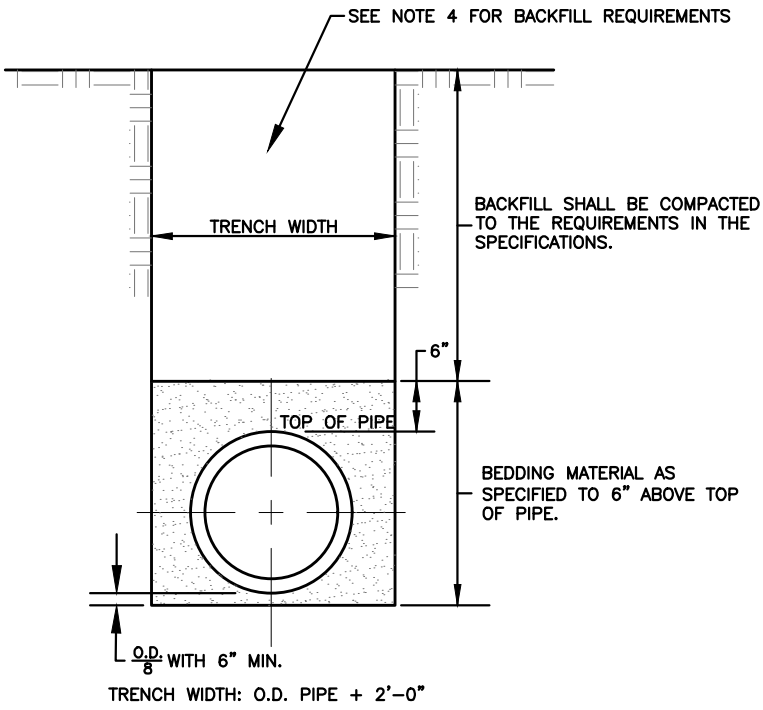
STANDARD LOCAL STREET



NOTES:

1. BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS 'B' BEDDING FOR RIGID PIPING.
2. IN ROCK OR WET SOIL, PIPE MUST BE BEDDED IN AT LEAST 6" OF #57 WASHED STONE.
3. FORCE MAIN BEDDING SHALL BE SELECT NATURAL SAND WELL COMPACTED IN 6" LIFTS.
4. TRENCHES EXCAVATED OUTSIDE EXISTING ROAD AND RAILWAY RIGHTS-OF-WAY SHALL BE BE BACKFILLED WITH COMMON BACKFILL MATERIAL CONSISTING OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS AND TAMPED THOROUGHLY. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM, APPROXIMATELY HORIZONTAL LAYERS. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS. ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF AT LEAST 85% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR) OR AS APPROVED BY THE ENGINEER. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.
5. WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DEWATERING, DRYING, PROTECTION, AND STORAGE OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL, HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS ML, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 85% STANDARD PROCTOR.
6. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

-

DATE: 10/19/2023	SS-D DWG. NO. 1
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
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Hendersonville, NC 28792
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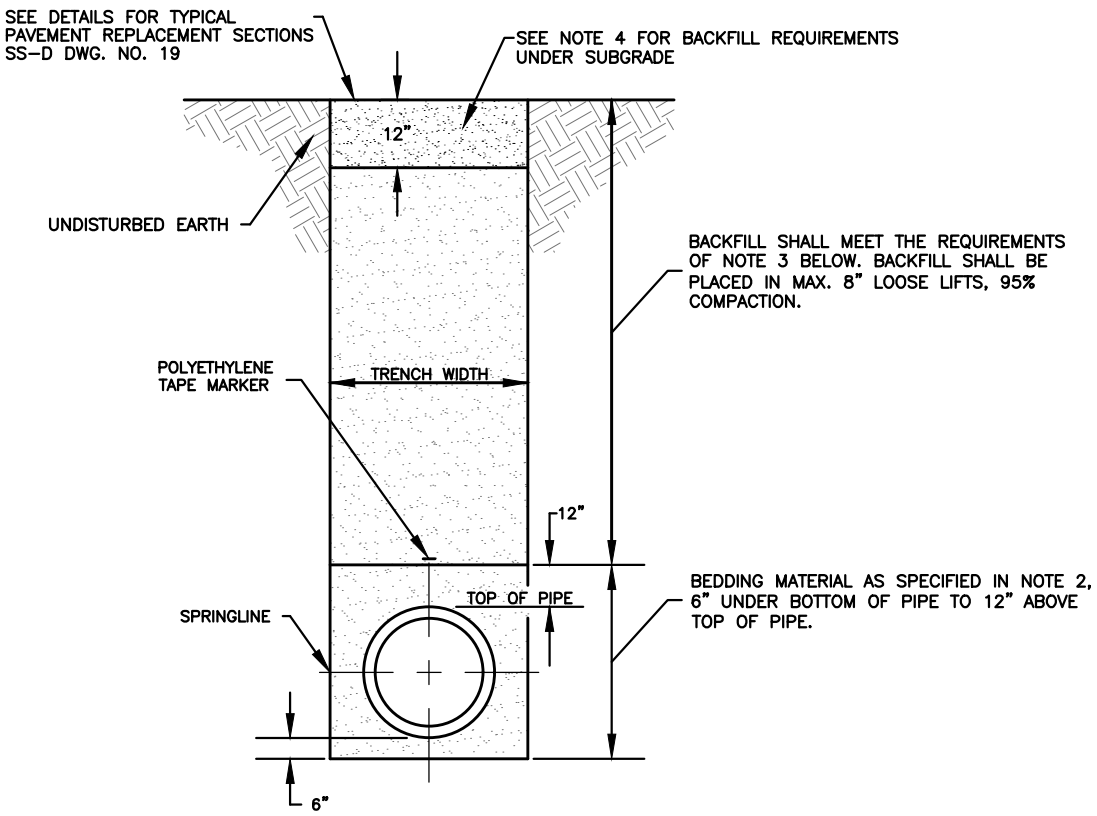
GRAVITY SEWER

TRENCH CONSTRUCTION

OUTSIDE PAVEMENT



TRENCH WIDTH: OUTSIDE DIAMETER OF PIPE + 2'-0"

NOTES:

1. THIS TRENCH BACKFILL DETAIL APPLIES TO AREAS UNDER PAVEMENT. CURB AND GUTTER, AND SIDEWALK.
2. BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS B BEDDING FOR RIGID PIPING.
3. COMMON BACKFILL MATERIAL SHALL CONSIST OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM, APPROXIMATELY HORIZONTAL LAYERS NOT EXCEEDING EIGHT (8) INCHES IN DEPTH FOR THE FULL WIDTH. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS AND CAPABLE OF BEING COMPACTED TO 95% STANDARD PROCTOR. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.

   WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DEWATERING, DRYING, PROTECTION, AND STORAGE OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL, HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS ML, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 95% STANDARD PROCTOR.
4. THE TOP 12 INCHES OF FINAL BACKFILL FOR ROAD OR STREET SUBGRADE SHALL BE COMPACTED TO 98% STANDARD PROCTOR.
5. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

-

DATE: 10/19/2023 SS-D DWG. NO. 2

SCALE: NOT TO SCALE

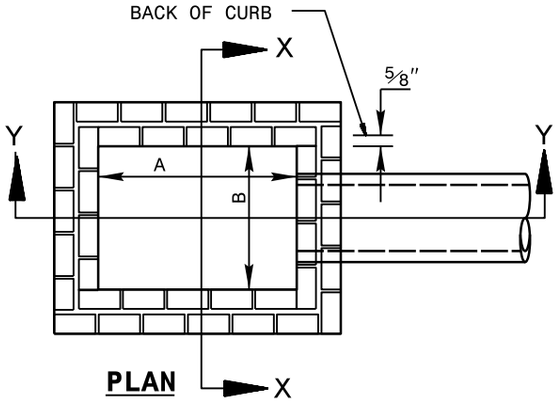
City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)

www.cityofhendersonville.org

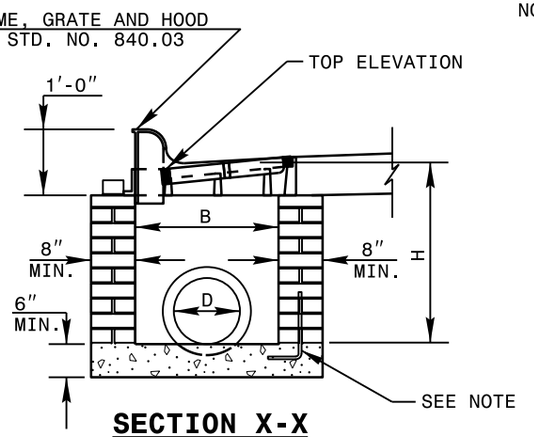
GRAVITY SEWER

TRENCH CONSTRUCTION

UNDER PAVEMENT

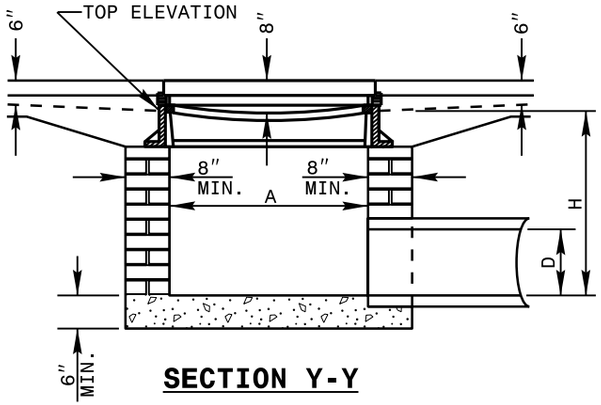


PLAN

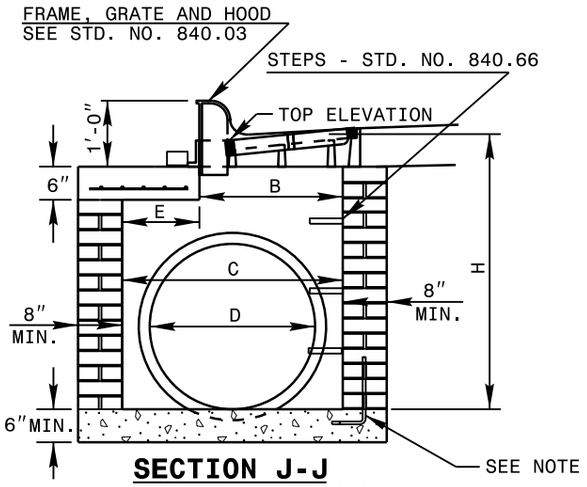


SECTION X-X

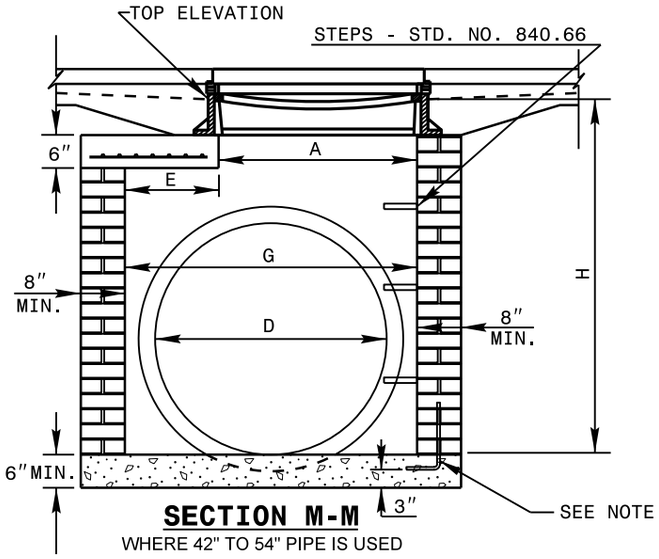
NOTES:
MORTAR JOINTS ½" +/- ⅛" THICK.
USE CLASS "B" CONCRETE THROUGHOUT.
USE FORMS FOR CONSTRUCTION OF THE BOTTOM SLAB.
DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.
USE #4 BAR DOWELS AT 12" CENTERS FOR ALL PIPE SIZES.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.
USE BRICK OR CONCRETE BLOCK WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
FOR 8'-0" IN HEIGHT OR LESS, USE 8" WALL. OVER 8'-0" IN HEIGHT, USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL FOR THE REMAINING 6'-0". QUANTITES TO BE ADJUSTED ACCORDINGLY.
MAXIMUN DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12'-0". STD. NO. 840.45 CONTROLS MAXIMUM DEPTH OF PRECAST BOX IF USED.
CONSTRUCT WITH PIPE CROWNS MATCHING.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.



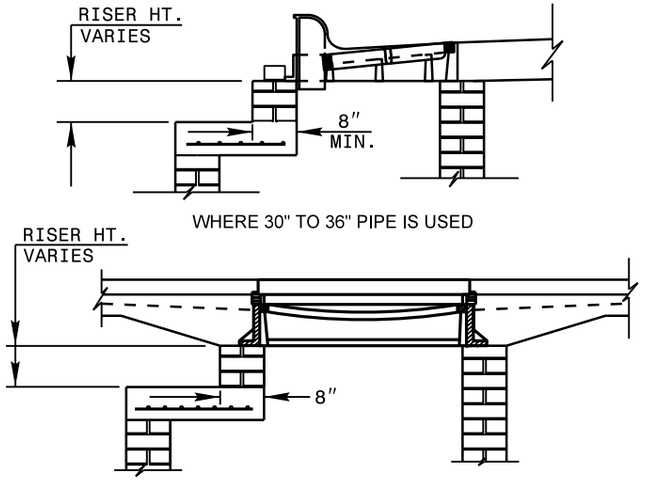
SECTION Y-Y



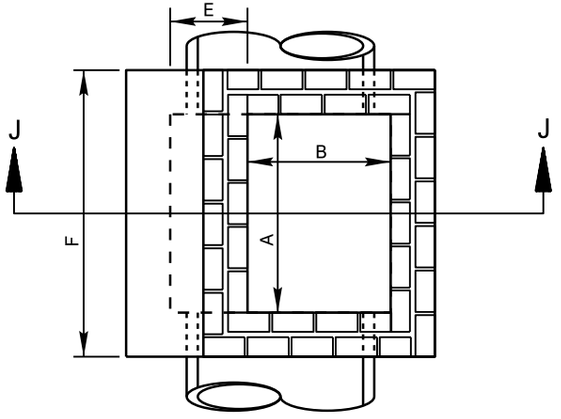
SECTION J-J
WHERE 30" TO 36" PIPE IS USED



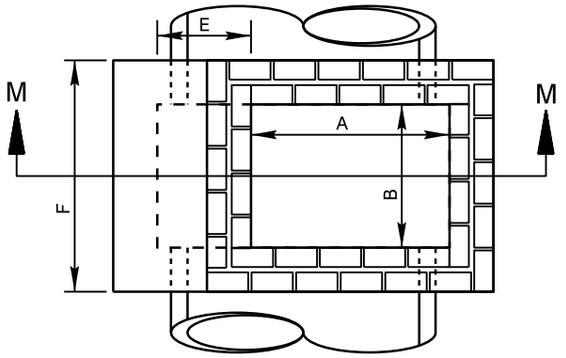
SECTION M-M
WHERE 42" TO 54" PIPE IS USED



DETAIL SHOWING METHOD OF RISER CONSTRUCTION



PLAN



PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

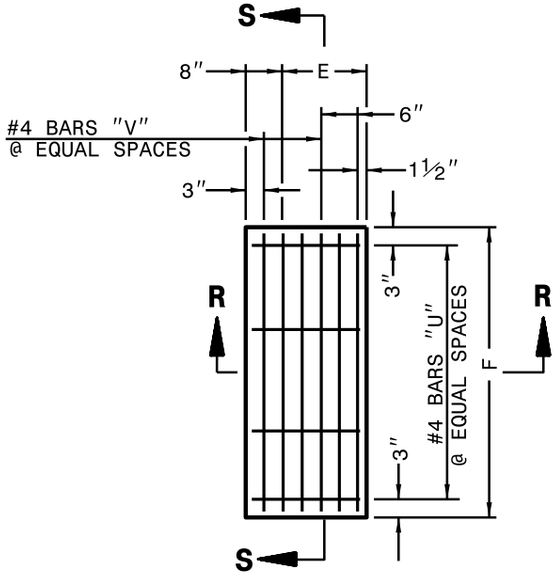
ROADWAY STANDARD DRAWING FOR

BRICK CATCH BASIN

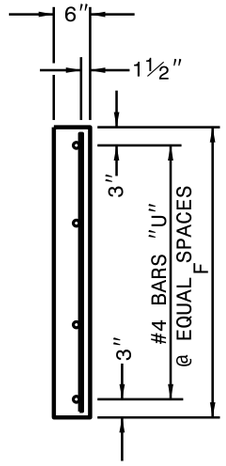
12" THRU 54" PIPE

SHEET 1 OF 2

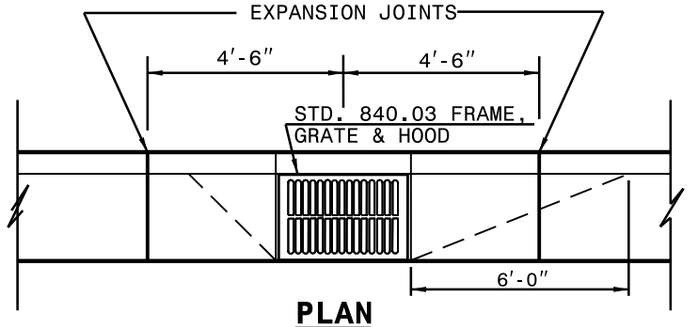
840.01



PLAN OF TOP SLAB

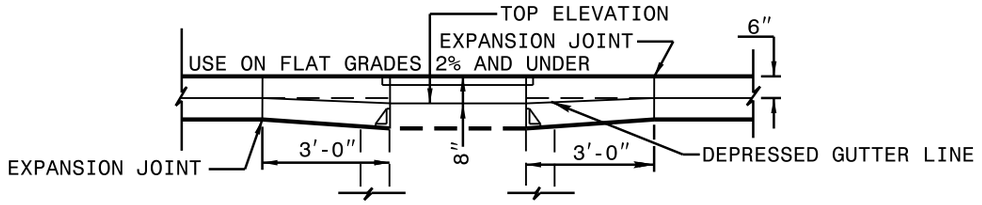


SECTION S-S



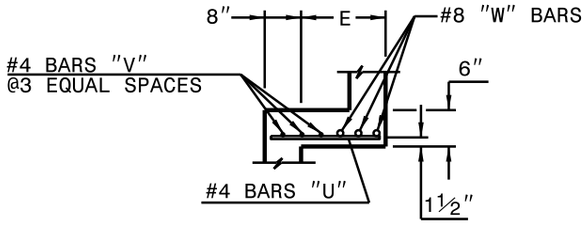
PLAN

CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES

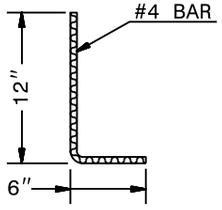


ELEVATION

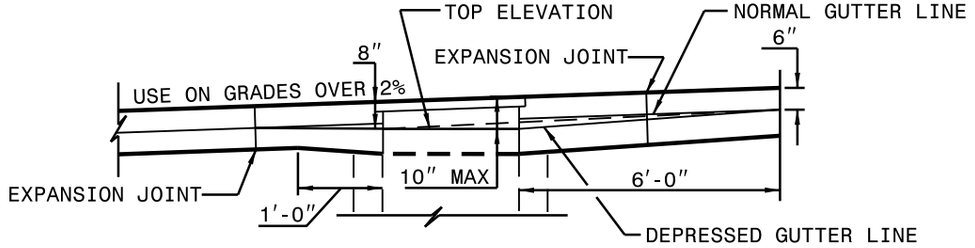
NORMAL CURB AND GUTTER ON LIGHT GRADES



SECTION R-R



DOWEL



ELEVATION

NORMAL CURB AND GUTTER ON STEEP GRADES

MINIMUM DIMENSIONS AND QUANTITIES FOR BRICK CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER)*

DIMENSIONS OF BOX AND PIPE						TOP SLAB DIMENSIONS		BARS-U		BARS-V		BARS-W		TOTAL LBS.	CU.YDS. CONC. IN BOX			BRICK MASONRY		DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT			NO.	LENGTH	NO.	LENGTH	NO.	LENGTH		TOP SLAB	BOTTOM SLAB	TOTAL CONC.	BRICK MSNR. IN WALLS	TOTAL BRICK AND CONCRETE	C.M.	R.C.
D	A	B	C	G	H	E	F														
12"	3'-0"	2'-2"	--	--	2'-9"	--	--	--	--	--	--	--	--	--	--	0.281	0.281	0.883	1.164	0.020	0.042
15"	3'-0"	2'-2"			3'-0"											0.281	0.281	0.963	1.244	0.031	0.047
18"	3'-0"	2'-2"			3'-3"											0.281	0.281	1.043	1.324	0.044	0.065
24"	3'-0"	2'-2"			3'-9"											0.281	0.281	1.204	1.485	0.078	0.121
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-2"	4'-4"	4	1'-6"	3	4'-1"	3	4'-1"	45	0.147	0.374	0.521	1.606	2.217	0.122	0.184
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-4"	4	2'-0"	4	4'-1"	3	4'-1"	49	0.187	0.415	0.602	1.914	2.516	0.176	0.261
42"	3'-0"	2'-2"		4'-5"	5'-3"	1'-5"	3'-6"	4	1'-9"	3	3'-3"	3	3'-3"	38	0.135	0.373	0.508	2.152	2.660	0.240	0.371
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-6"	4	2'-6"	4	3'-3"	3	3'-3"	41	0.173	0.410	0.583	2.415	2.998	0.313	0.477
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-6"	4	3'-0"	6	3'-3"	3	3'-3"	47	0.211	0.448	0.659	2.806	3.465	0.396	0.595

* RISER HAS .321 CUBIC YARDS OF BRICK MASONRY PER FOOT HEIGHT

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR

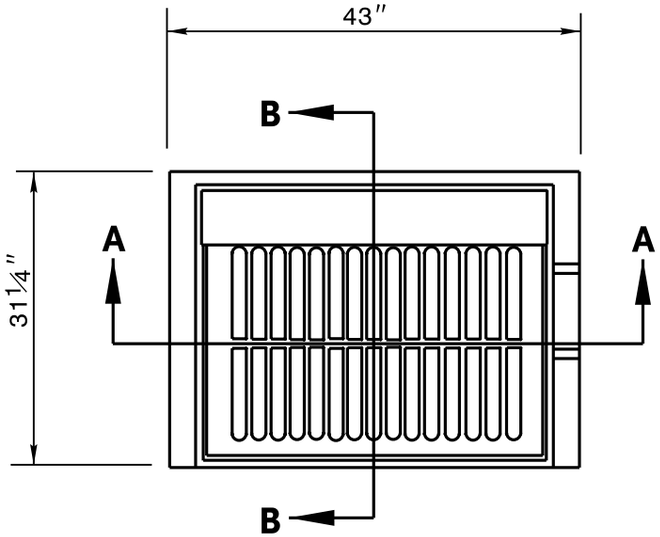
BRICK CATCH BASIN

12" THRU 54" PIPE

SHEET 2 OF 2

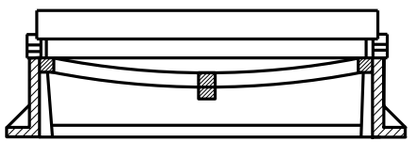
840.01

NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.

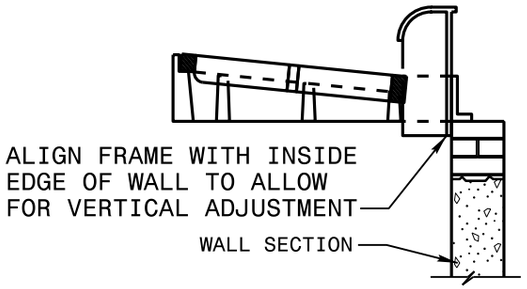


PLAN

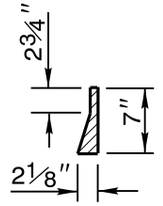
FRAME,GRATE, & HOOD ASS'Y



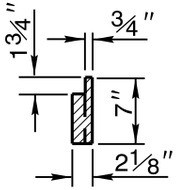
SECTION - AA



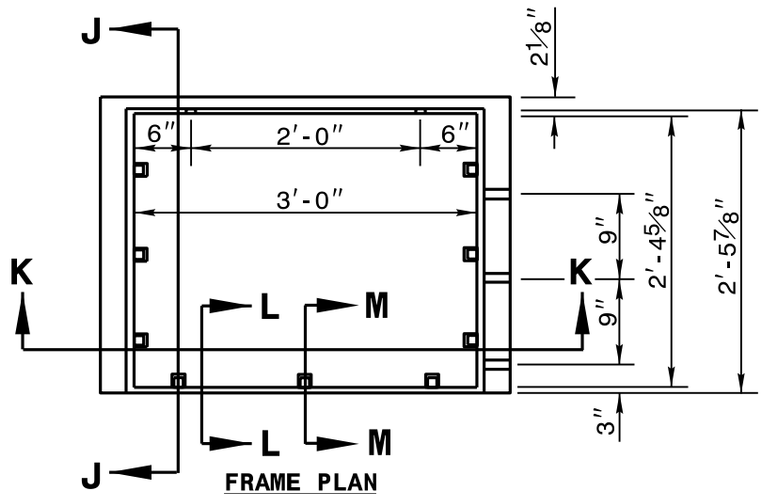
SECTION - BB



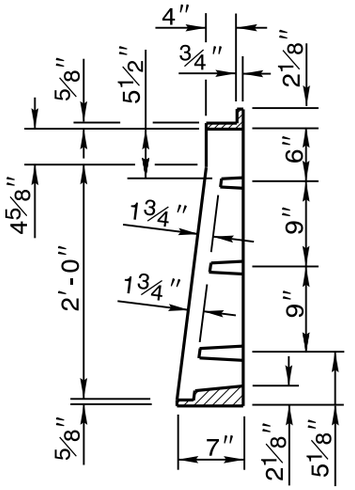
SECTION - LL



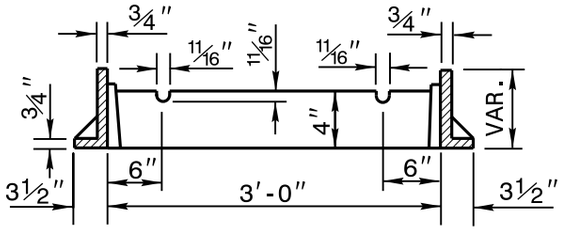
SECTION - MM



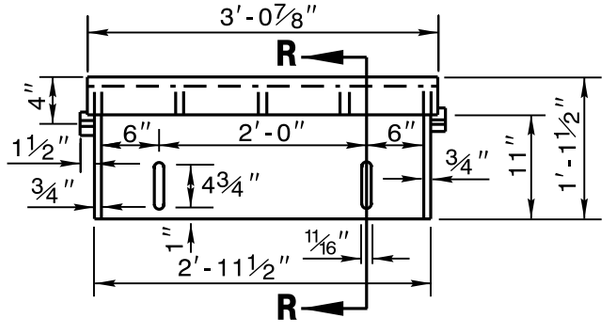
FRAME PLAN



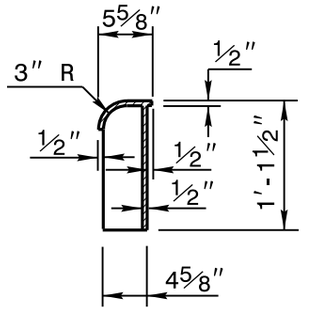
SECTION - JJ



SECTION - KK



HOOD ELEVATION



SECTION - RR

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR

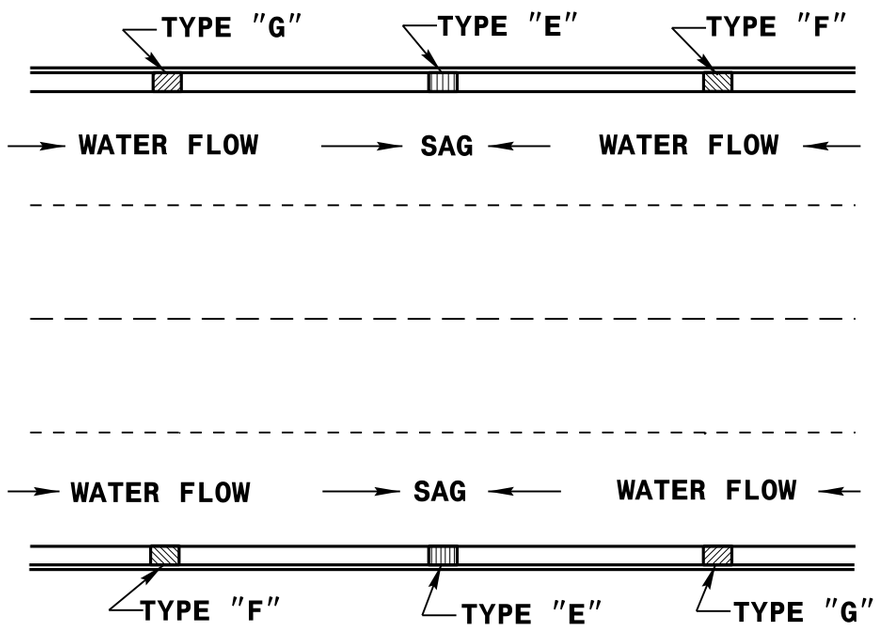
FRAME, GRATES, AND HOOD

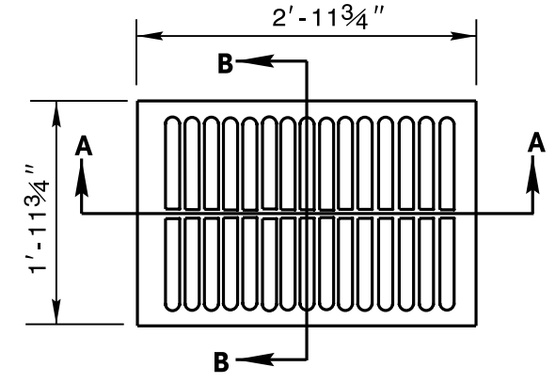
FOR USE ON STANDARD CATCH BASIN

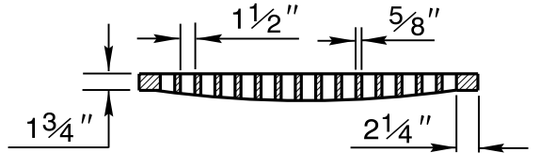
SHEET 1 OF 2

840.03

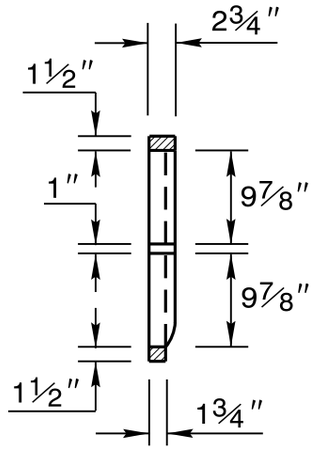
DETAIL SHOWING TYPES OF GRATES
USE ACCORDING TO WATER FLOW.





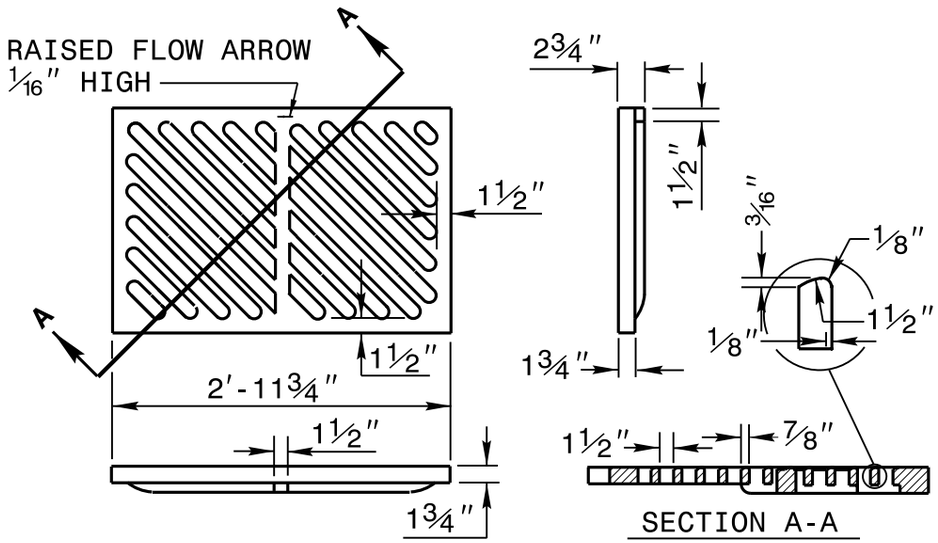


SECTION A-A



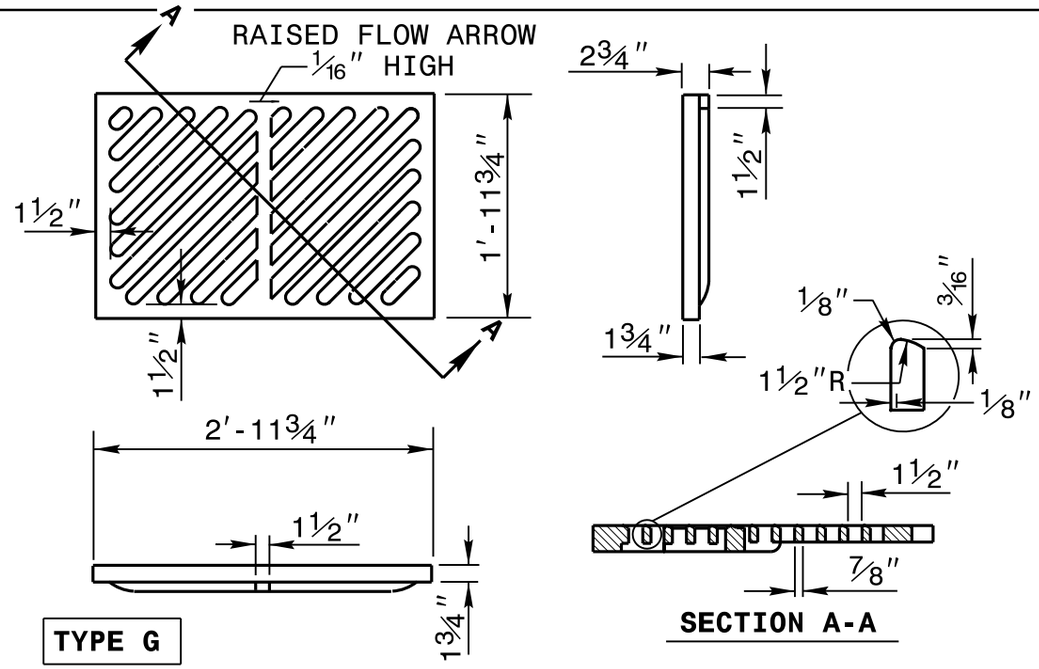
SECTION B-B

TYPE - E



SECTION A-A

TYPE - F



TYPE G

SECTION A-A

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

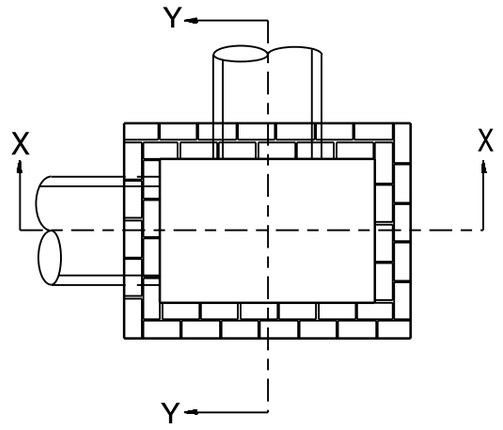
ROADWAY STANDARD DRAWING FOR

FRAME, GRATES, AND HOOD

FOR USE ON STANDARD CATCH BASIN

SHEET 2 OF 2

840.03



PLAN

WITH COPING REMOVED

GENERAL NOTES:

MORTAR JOINTS ½″ +/- ⅛″ THICK.

USE CLASS "B" CONCRETE THROUGHOUT.

USE FORMS FOR CONSTRUCTION OF THE BOTTOM SLAB.

USE #4 BAR DOWELS AT 12″ CENTERS.

DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.

PROVIDE ALL CATCH BASINS OVER 3′-6″ IN DEPTH WITH STEPS 12″ ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

USE BRICK OR CONCRETE BLOCK WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

FOR 8′-0″ IN HEIGHT OR LESS, USE 8″ WALL. OVER 8′-0″ IN HEIGHT, USE 12″ WALL TO 6′-0″ FROM TOP OF WALL AND 8″ WALL FOR THE REMAINING 6′-0″. QUANTITES TO BE ADJUSTED ACCORDINGLY.

MAX.DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12′-0″. STD. DWG. 840.45 OR 840.46 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.

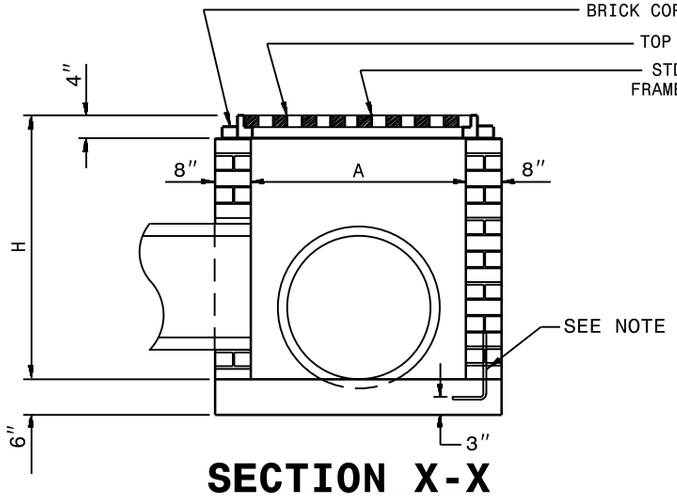
CONSTRUCT WITH PIPE CROWNS MATCHING.

SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.

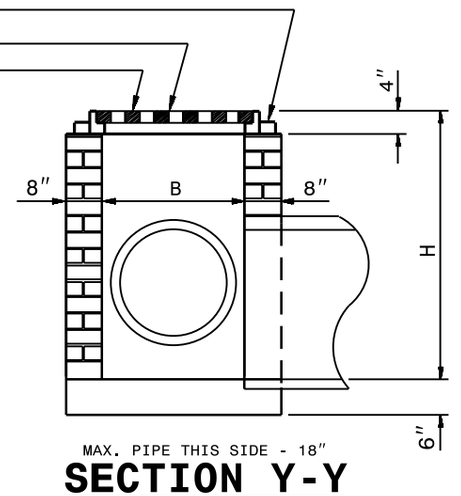
DO NOT USE BRICK MASONRY DROP INLET IN LOCATIONS SUBJECT TO TRAFFIC.

CHAMFER ALL EXPOSED CORNERS 1″.

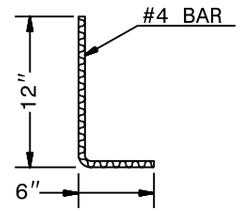
DRAWING NOT TO SCALE.



SECTION X-X



SECTION Y-Y



DOWEL

DIMENSIONS AND QUANTITIES FOR DROP INLET(BASED ON MIN. HEIGHT, H)

DIMENSIONS OF BOX & PIPE				CUBIC YARDS CONCRETE	CUBIC YARDS BRICK MASONRY		DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	MIN. HEIGHT					
D	A	B	H	BOTTOM SLAB	WALL PER FOOT HT.	TOTAL BRICK MASONRY FOR MIN. HEIGHT, H	C.S.	R.C.
12″	3′-0″	2′-0″	2′-0″	0.268	0.313	0.522	0.020	0.032
15″			2′-3″	0.268	0.313	0.600	0.031	0.047
18″			2′-6″	0.268	0.313	0.678	0.044	0.065
24″			3′-0″	0.268	0.313	0.835	0.078	0.113
30″	3′-0″	2′-0″	3′-6″	0.268	0.313	0.991	0.122	0.170

STATE OF NORTH CAROLINA
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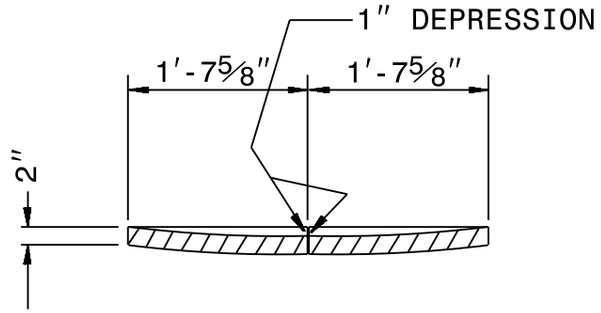
ROADWAY STANDARD DRAWING FOR

BRICK DROP INLET

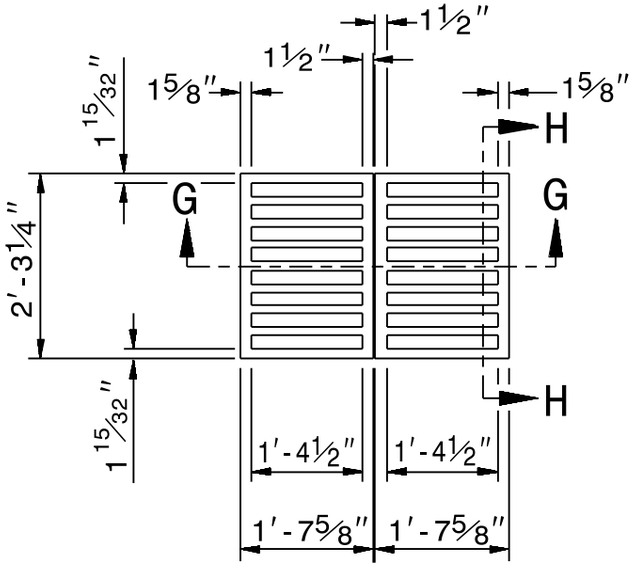
12″ THRU 30″ PIPE

SHEET 1 OF 1

840.15

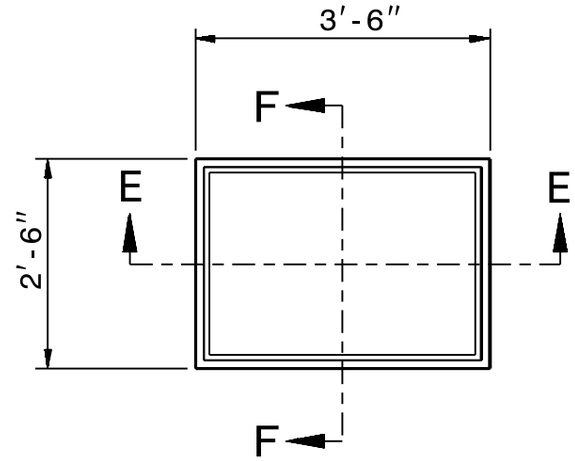


SECTION G-G



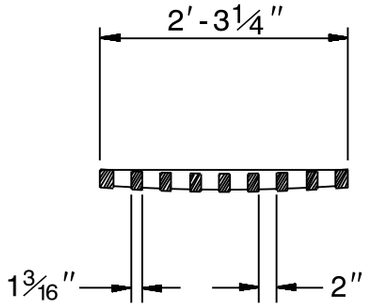
PLAN OF GRATING

CAST IRON

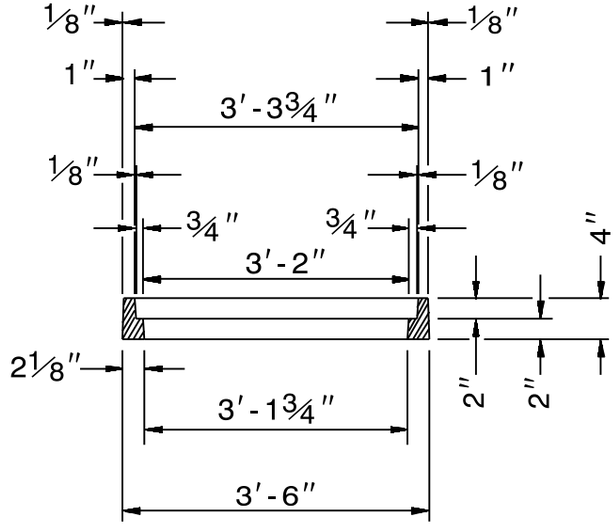


PLAN OF FRAME

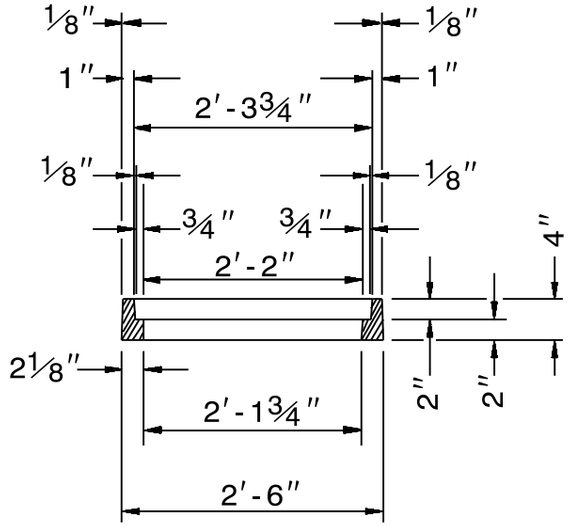
CAST IRON



SECTION H-H



SECTION E-E



SECTION F-F

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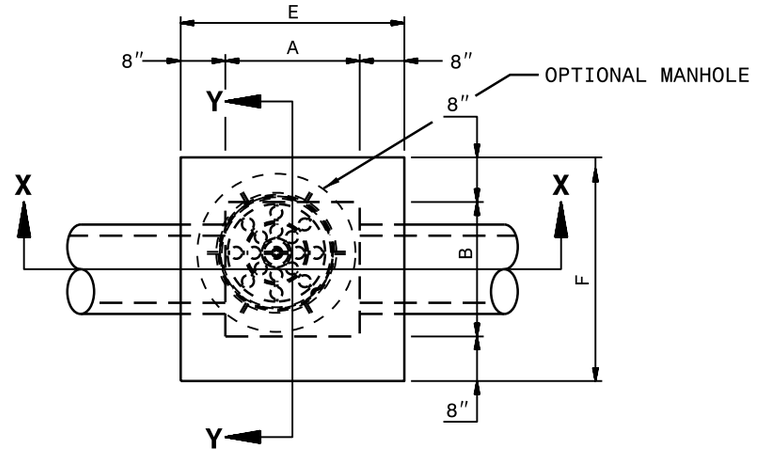
ROADWAY STANDARD DRAWING FOR

DROP INLET FRAME AND GRATES

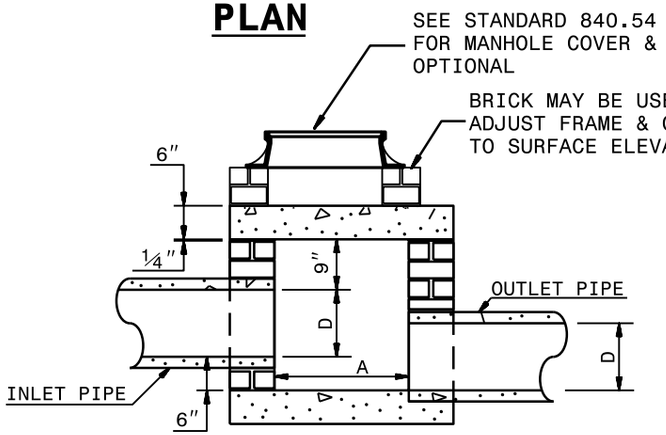
FOR USE WITH STD. DWG.S 840.14 AND 840.15

SHEET 1 OF 1

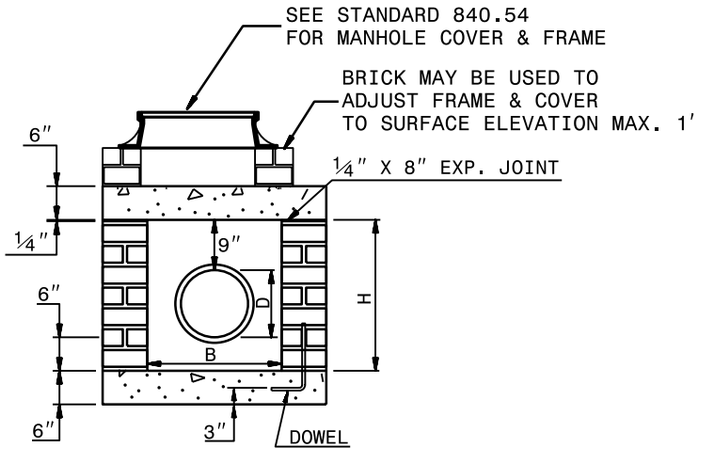
840.16



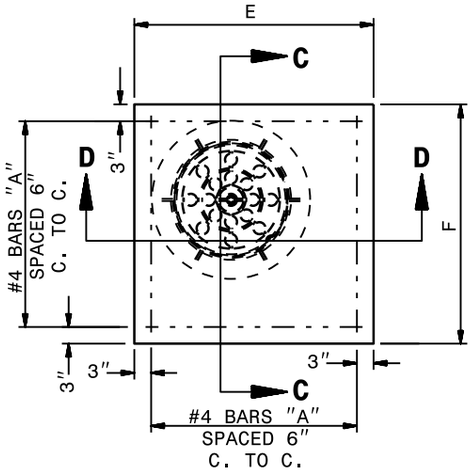
PLAN

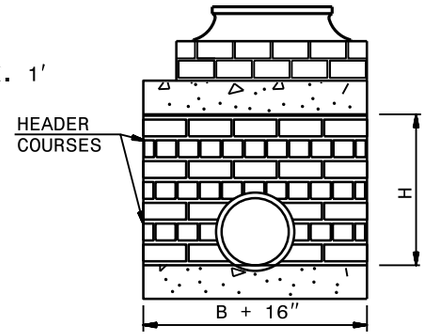


SECTION X-X



SECTION Y-Y





OUTLET ELEVATION

GENERAL NOTES:

CHAMFER ALL EXPOSED CORNERS 1″.

USE CLASS "B" CONCRETE THROUGHOUT.

USE #4 BAR DOWELS AT 12″ CENTERS.

MORTAR JOINTS ½″ ± ⅛″ THICK.

CONCAVE TOO ALL EXPOSED JOINTS.

USE FORMS TO CONSTRUCT THE BOTTOM SLAB.

JUMBO BRICK WILL BE PERMITTED. CONCRETE BRICK OR 4″ SOLID CONCRETE BLOCKS MAY BE USED IN LIEU OF CLAY BRICK.

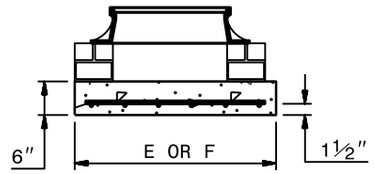
FOR 8′-0″ IN HEIGHT OR LESS, USE 8″ WALL. OVER 8′-0″ IN HEIGHT, USE 12″ WALL TO 6′-0″ FROM TOP OF WALL, AND 8″ WALL FOR THE REMAINING 6′-0″. ADJUST DIMENSIONS AND QUANTITIES ACCORDINGLY.

IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD NO. 840.00.

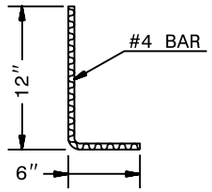
PROVIDE ALL JUNCTION BOXES OVER 3′-6″ IN DEPTH WITH STEPS 12″ ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.

ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB, ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)

MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12′-0″. STANDARD DRAWING 840.45 OR 840.46 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.



SECTION C-C OR D-D



DOWEL

DIMENSIONS AND QUANTITIES FOR BRICK JUNCTION BOXES

DIMENSIONS OF BOX AND PIPE				REINFORCEMENT BARS		TOP SLAB DIMENSIONS		CUBIC YARDS			DEDUCTIONS FOR ONE PIPE CU.YDS.	
PIPE	SPAN	WIDTH	HEIGHT					CONC.	BRICK MASONRY			
D	A	B	H	NO.	LENGTH	E	F	TOP & BOTTOM CU. YD.	MIN. HEIGHT CU. YD.	WALL PER FT. HT. CU. YD.	C.S.	R.C.
12″	2′-0″	2′-0″	2′-3″	12	3′-1″	3′-4″	3′-4″	0.412	0.591	0.263	0.020	0.032
15″	2′-0″	2′-0″	2′-6″	12	3′-1″	3′-4″	3′-4″	0.412	0.657	0.263	0.031	0.047
18″	2′-4″	2′-4″	2′-9″	14	3′-5″	3′-8″	3′-8″	0.498	0.814	0.296	0.044	0.065
24″	3′-0″	3′-0″	3′-3″	16	4′-1″	4′-4″	4′-4″	0.695	1.176	0.362	0.078	0.113
30″	3′-4″	3′-4″	3′-9″	16	4′-5″	4′-8″	4′-8″	0.807	1.481	0.395	0.122	0.170
36″	4′-0″	4′-0″	4′-3″	20	5′-1″	5′-4″	5′-4″	1.053	1.959	0.461	0.176	0.238
42″	4′-8″	4′-8″	4′-9″	22	5′-9″	6′-0″	6′-0″	1.333	2.503	0.527	0.240	0.323
48″	5′-4″	5′-4″	5′-3″	26	6′-5″	6′-8″	6′-8″	1.646	2.940	0.560	0.313	0.422
54″	5′-10″	5′-10″	5′-9″	28	6′-11″	7′-2″	7′-2″	1.902	3.502	0.609	0.396	0.535
60″	6′-6″	6′-6″	6′-3″	30	7′-7″	7′-10″	7′-10″	2.272	4.113	0.658	0.489	0.660
66″	7′-1″	7′-1″	6′-9″	32	8′-2″	8′-5″	8′-5″	2.624	4.778	0.708	0.591	0.798

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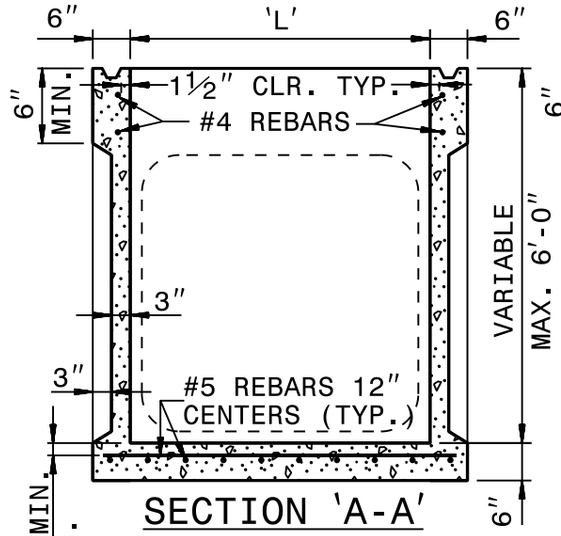
ROADWAY STANDARD DRAWING FOR

BRICK JUNCTION BOX

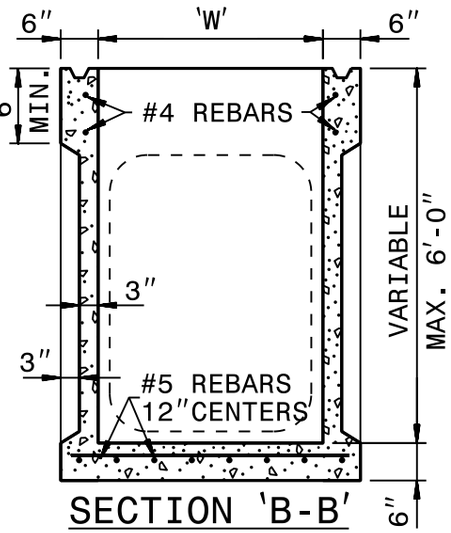
12″ THRU 66″ PIPE

SHEET 1 OF 1

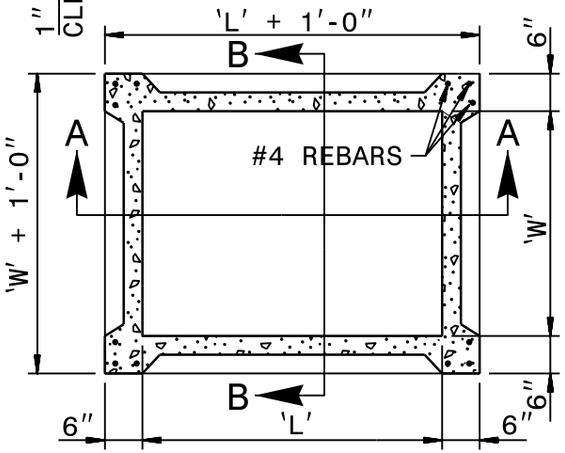
840.32



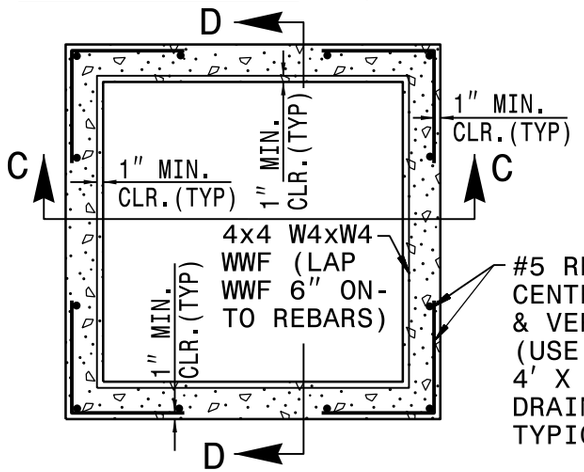
SECTION 'A-A'



SECTION 'B-B'



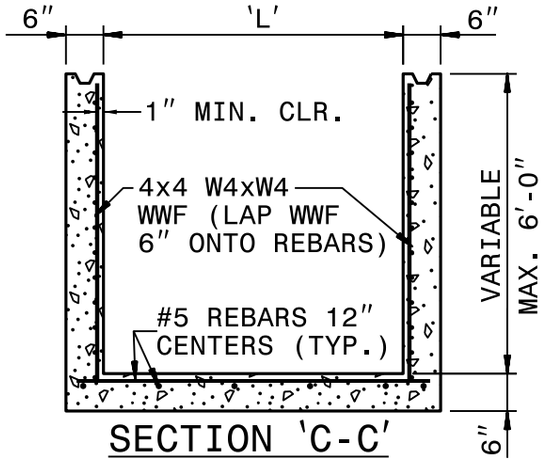
WAFFLE WALL PLAN VIEW



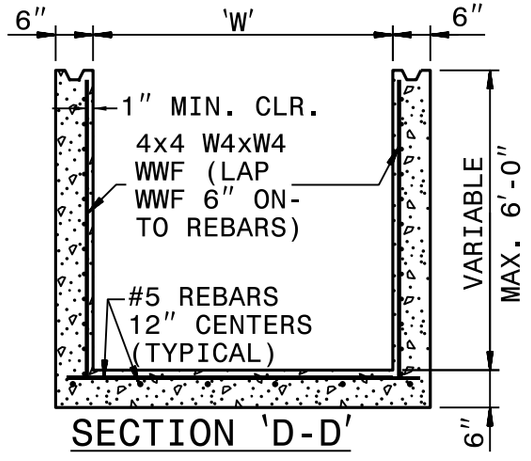
SOLID WALL PLAN VIEW

#5 REBARS @ 12″ CENTERS (HORIZ. & VERT.) (USE WITH 4′ X 4′ & LARGER DRAINAGE STRUCTURES TYPICAL)

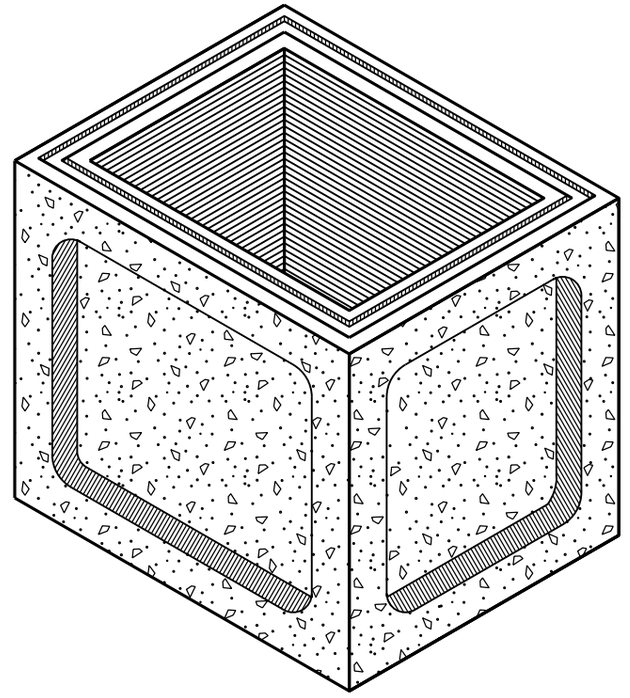
THE PATTERN OF THE KNOCK-OUT PANELS ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.



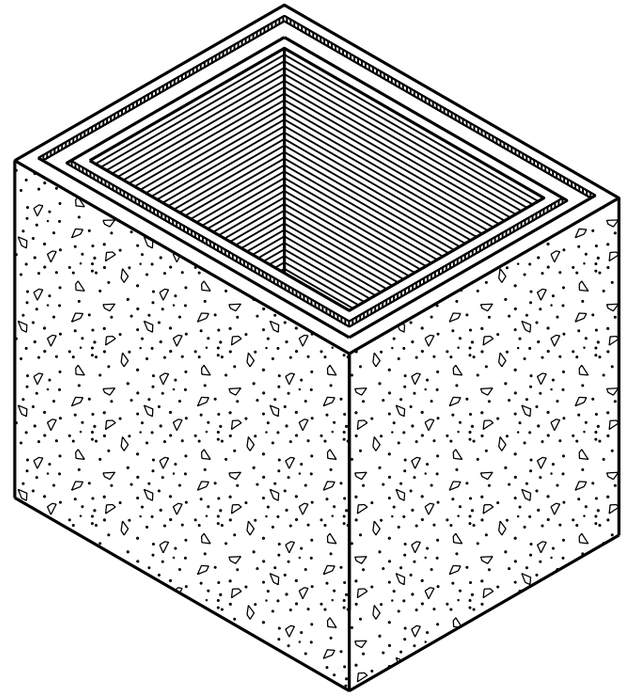
SECTION 'C-C'



SECTION 'D-D'



WAFFLE WALL ISOMETRIC VIEW



SOLID WALL ISOMETRIC VIEW

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ROADWAY STANDARD DRAWING FOR

PRECAST DRAINAGE STRUCTURE

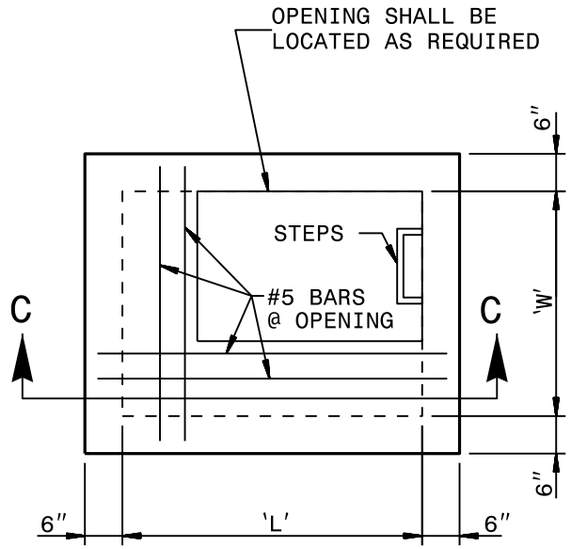
(SOLID AND WAFFLE WALL)

SHEET 1 OF 2

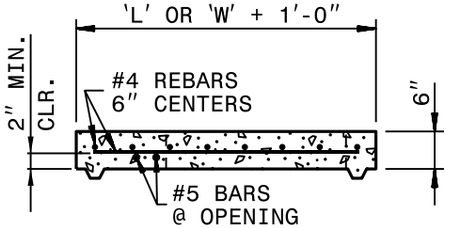
840.45

GENERAL NOTES:

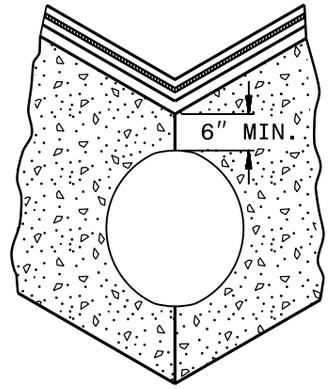
* THIS PRECAST BOX MAY BE USED FOR THE FOLLOWING STANDARDS: 840.01, 840.02, 840.04, 840.05, 840.13, 840.14, 840.15, 840.17, 840.18, 840.19, 840.26, 840.27, 840.28, 840.31, 840.32 AND 840.41.
* INSTALL PRECAST DRAINAGE STRUCTURES AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 840.
* DO NOT PLACE PRECAST DRAINAGE STRUCTURES UNDER TRAFFIC OR WHERE TRAFFIC WILL BE DETOURED.
* USE 4000 PSI CONCRETE.
* PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A1064.
* LIMIT MAXIMUM DEPTH TO TOP OF BOTTOM SLAB FOR WAFFLE WALL STRUCTURE TO 10′-0″; LIMIT SOLID WALL STRUCTURE TO 15′-0″.
* PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
* CUT OR FORM OPENINGS FOR PIPE TO PROVIDE REQUIRED SIZE AND LOCATION. ORIENT WAFFLE WALL STRUCTURES SO THAT PIPES ENTER THROUGH THE KNOCKOUT/WAFFLE PANELS ONLY. PIPES MAY ENTER THROUGH THE CORNERS OF SOLID WALL BOXES IF A MINIMUM OF 6″ OF WALL IS PROVIDED ABOVE THE HOLE.
* ALL ELEMENTS PRECAST TO MEET ASTM C913.
* FRAME AND GRATE HEIGHT MAY BE ADJUSTED WITH CONCRETE OR BRICK IN ACCORDANCE WITH STANDARD 840.25.
* PROVIDE PRECAST STRUCTURES OVER 3′-6″ IN DEPTH WITH STEPS AS DIRECTED BY THE ENGINEER.
* WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
* SEAL JOINTS WITH A FLEXIBLE BUTYL RUBBER BASE CONFORMING TO FEDERAL SPECIFICATION SS-S-21A, AASHTO M-198, TYPE B - BUTYL RUBBER.
* LIMIT MAXIMUM STRUCTURE SIZE TO INSIDE CLEAR DIMENSIONS OF 5′-0″ X 5′-0″.
* THE OUTSIDE PIPE DIAMETER PLUS 2″ OR THE OPENING REQUIRED FOR FRAME AND GRATE IS THE MINIMUM STRUCTURE SIZE WHICHEVER IS GREATER.
* USE MANHOLE FRAME AND COVER AS INDICATED ON THE PLANS. REINFORCE OPENING AS SHOWN ON THIS SHEET.



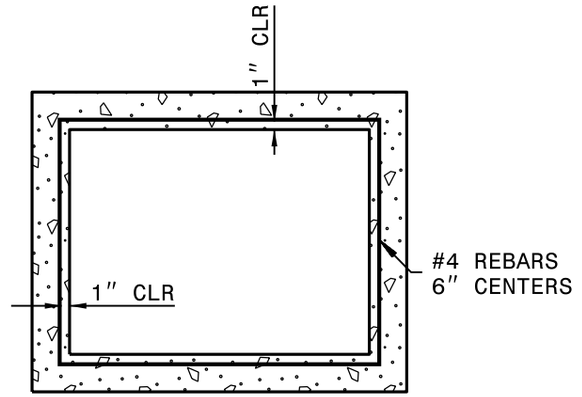
PLAN TOP SLAB



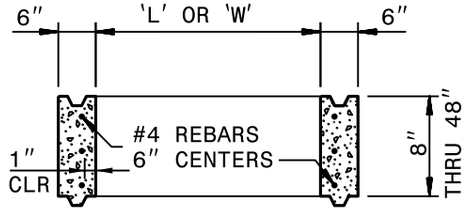
SECTION 'C-C'



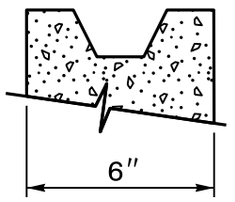
CORNER CUT DETAIL (SOLID WALL BOX)



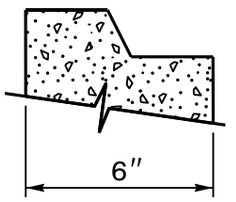
PRECAST RISER PLAN



PRECAST RISER DETAIL



SECTION VIEW



SECTION VIEW

OPTIONAL JOINT DETAILS

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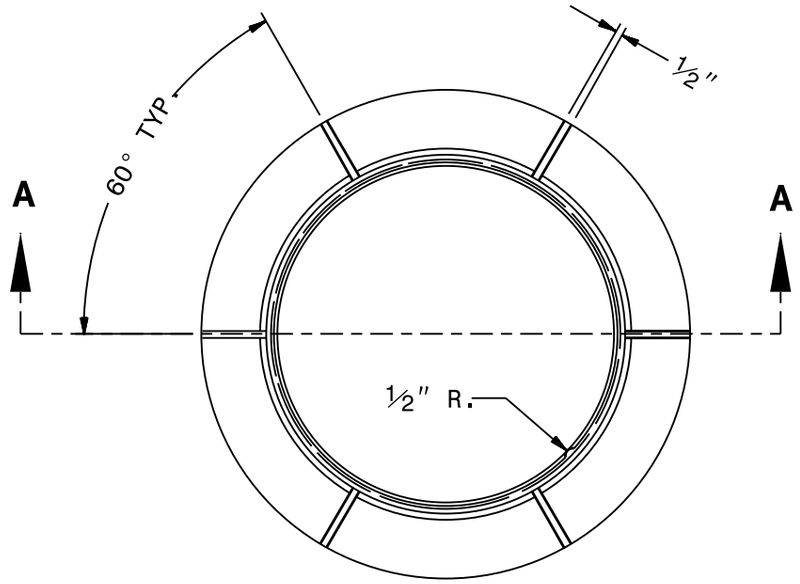
ROADWAY STANDARD DRAWING FOR

PRECAST DRAINAGE STRUCTURE

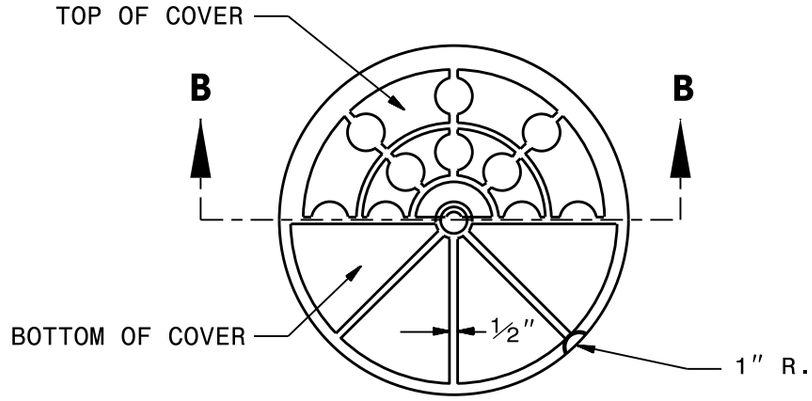
(GENERAL NOTES AND DETAILS)

840.45

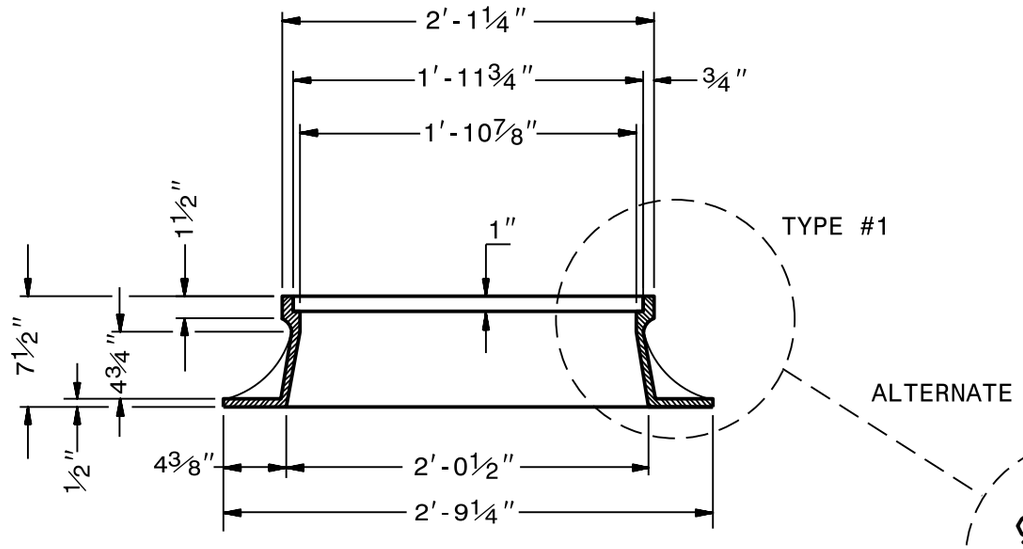
SOLID COVER SHOWN PERFORATED. PERFORATED AVAILABLE IF SPECIFIED.
STATE USE OF SYSTEM ON COVER
(I.E.: SEWER, STORM DRAIN, ELECTRICAL)



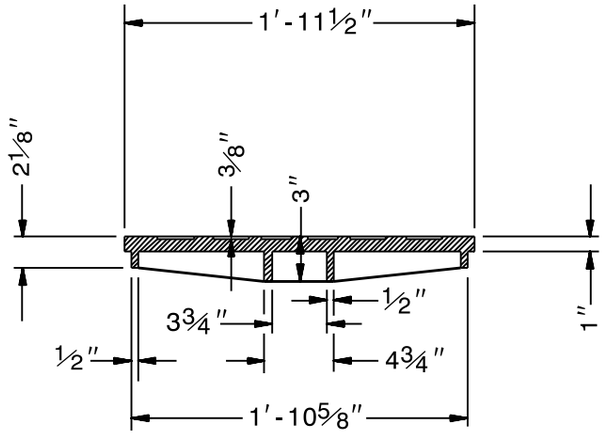
PLAN OF FRAME



PLAN OF COVER



SECTION A-A



SECTION B-B

MINIMUM WEIGHTS - LBS.
FRAME - 180
COVER - 120
TOTAL - 300

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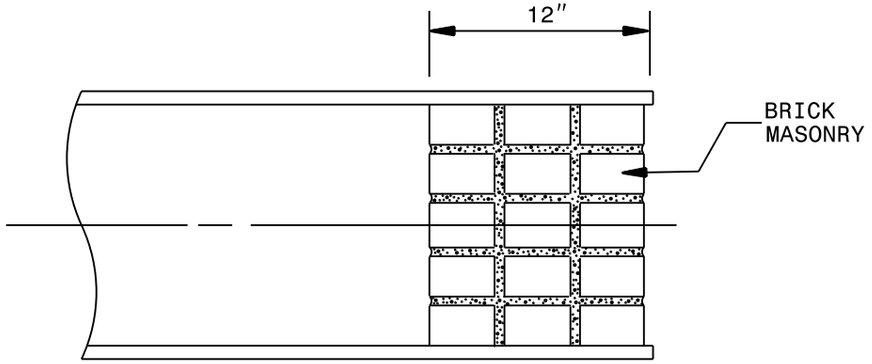
ROADWAY STANDARD DRAWING FOR

MANHOLE FRAME AND COVER

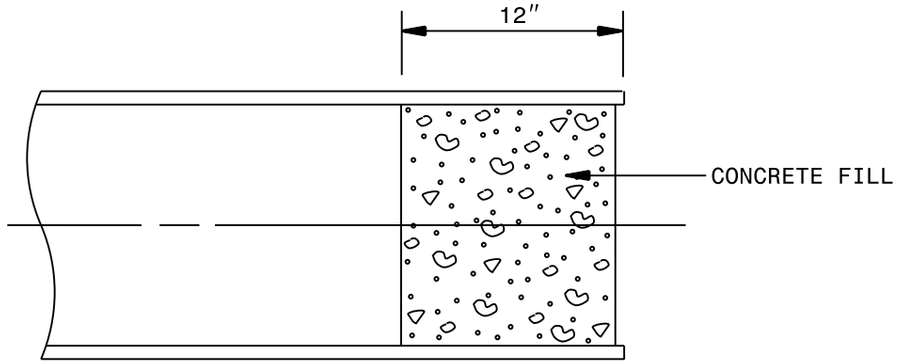
SHEET 1 OF 1

840.54



SECTION OF MASONRY

PIPE PLUG



SECTION OF CONCRETE

PIPE PLUG

QUANTITIES	
PIPE SIZE	CUBIC YARDS
12″	0.029
15″	0.045
18″	0.065
24″	0.116
30″	0.182
36″	0.262
42″	0.356
48″	0.465
54″	0.589
60″	0.727
66″	0.880

NOTE:

EITHER BRICK MASONRY OR CONCRETE MAY BE USED.

CONCRETE BRICK MAY BE USED IN LIEU OF CLAY BRICK. JUMBO BRICK WILL BE PERMITTED.

NOTE:

USE PAY LIMITS (C.Y.) FOR PIPE PLUGS 12″ IN THICKNESS ONLY.

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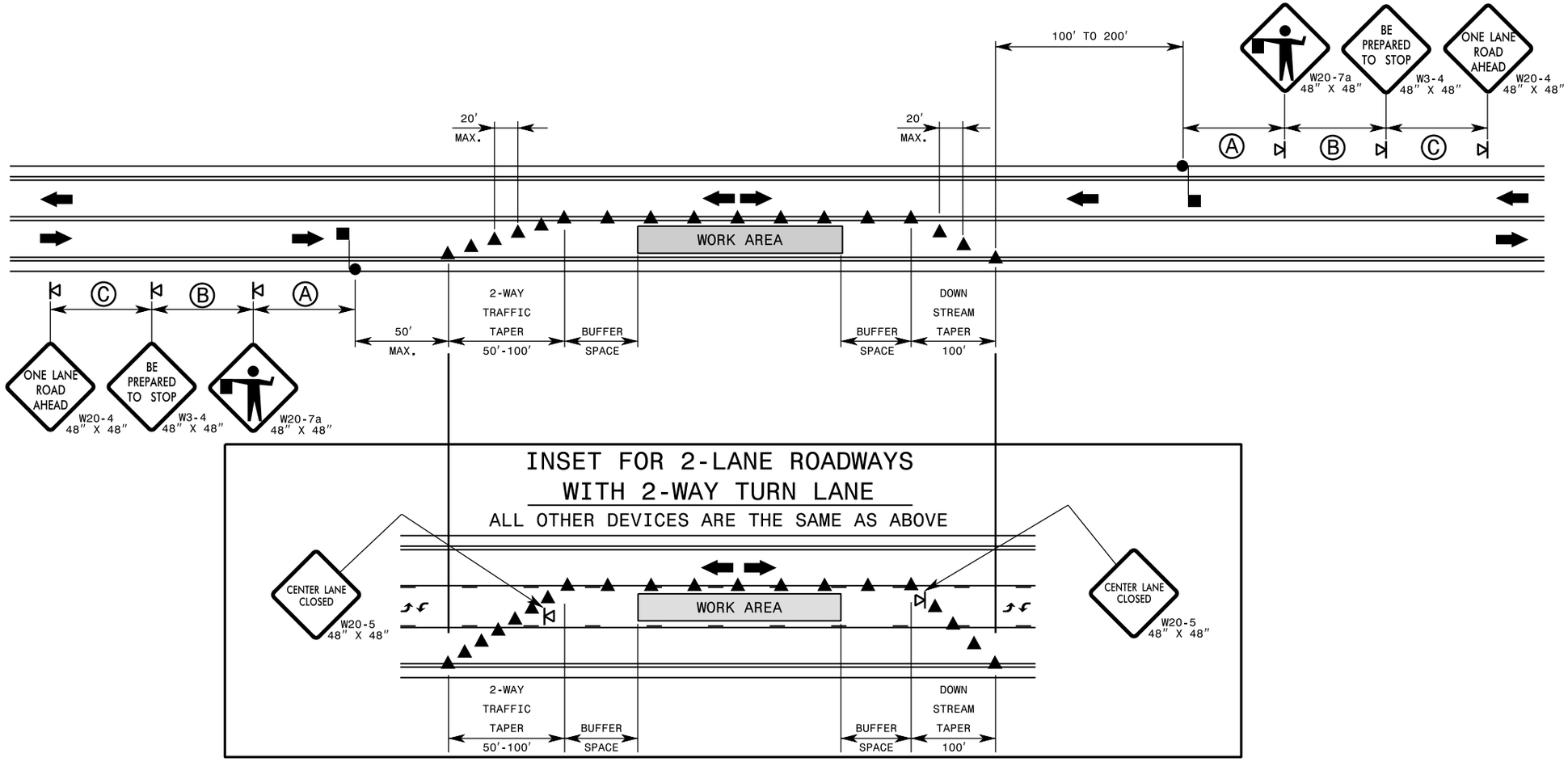
ROADWAY STANDARD DRAWING FOR

CONCRETE AND BRICK PIPE PLUG

SHEET 1 OF 1

840.71



GENERAL NOTES FOR FLAGGING OPERATIONS

1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.

3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

4- FOR POSTED SPEED LIMITS BELOW 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 20 FEET IN THE TAPERS AND THE SHIFTS AND 40 FEET IN THE TANGENTS. FOR POSTED SPEED LIMITS GREATER THAN OR EQUAL TO 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 40 FEET IN THE TAPERS AND THE SHIFTS AND 80 FEET IN THE TANGENTS.

5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO RSD. 1101.11, SHEET 2).

6- DO NOT STOP ALL DIRECTIONS OF TRAFFIC FOR MORE THAN 5 MINUTES AT A TIME.

7- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.

8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7A) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.

9- REFER TO THE CURRENT MUTCD FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.

10- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

11- IF VEHICLE QUEUES WILL REACH WITHIN 100′ OF EITHER SIDE OF ACTIVE RAILROAD TRACKS, PROVIDE A UNIFORMED LAW ENFORCEMENT OFFICER OR FLAGGER TO PREVENT VEHICLES FROM STOPPING WITHIN THE GRADE CROSSING. PROVIDE OFFICER OR FLAGGER EVEN IF AUTOMATIC WARNING MEASURES ALREADY EXIST.

12- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

GENERAL NOTES FOR PILOT CAR OPERATIONS

1- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.

2- IF ROADWAY WIDTH IS LESS THAN 22 FEET (EOP TO EOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA, AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.

3- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.

4- MOUNT SIGN G20-4 "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.

5- UNLESS APPROVED BY THE ENGINEER, DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE, MEASURED FROM THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.

6- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.

LEGEND

- FLAGGER
- CONE
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
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RALEIGH, N.C.

1-24

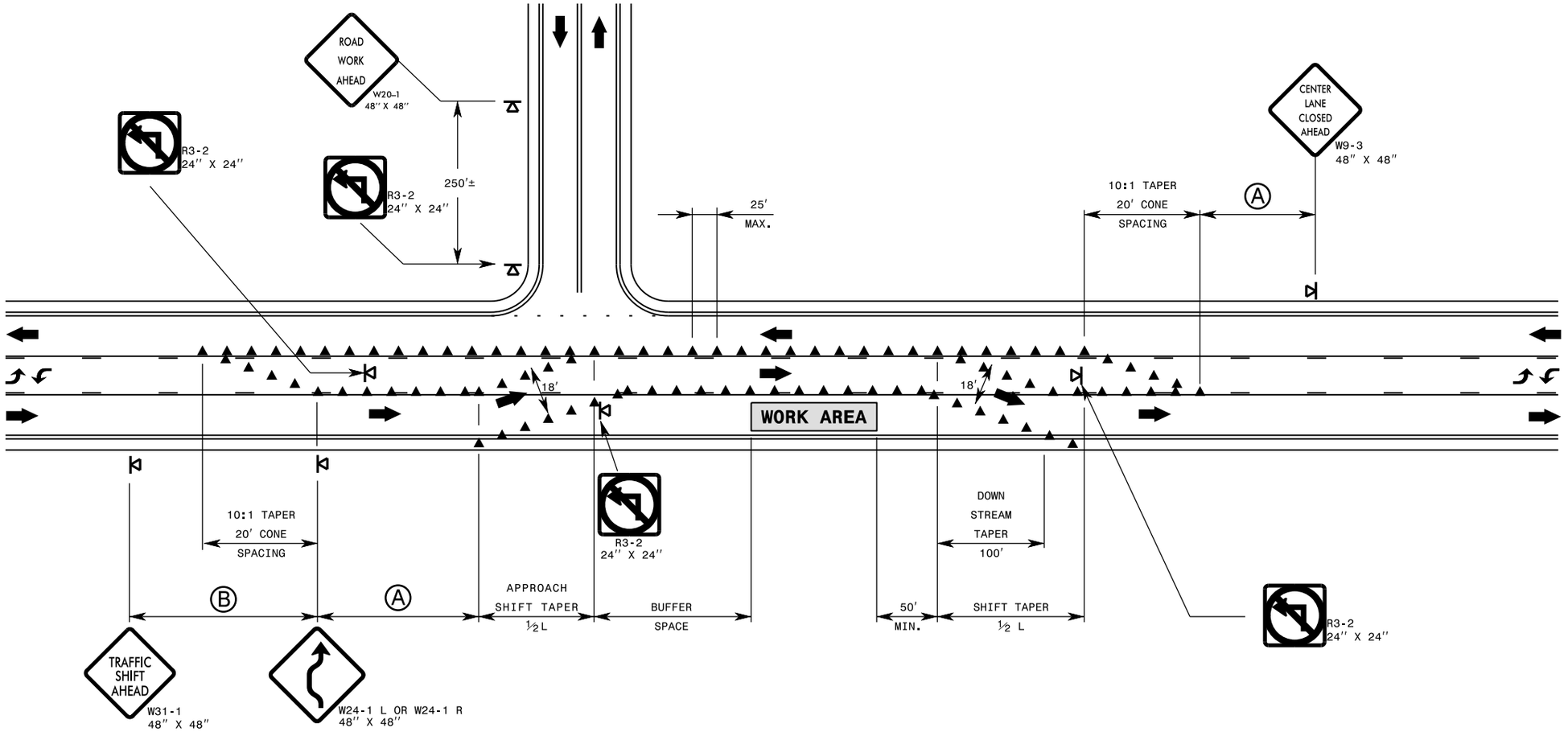
ROADWAY STANDARD DRAWING FOR

TEMPORARY LANE CLOSURES

2-LANE, 2-WAY ROADWAY-1 LANE CLOSED

SHEET 1 OF 19

1101.02



GENERAL NOTES

1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

3- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE BEGINNING OF THE APPROACH SHIFT TAPER (REFER TO RSD. 1101.11, SHEET 2).

4- TMAs ARE REQUIRED WHEN ADEQUATE BUFFER SPACE CANNOT BE ATTAINED. POSITION TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01.

5- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.

6- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

7- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7a) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS, PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.

8- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

- FLAGGER
- CONE
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
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1-24

ROADWAY STANDARD DRAWING FOR

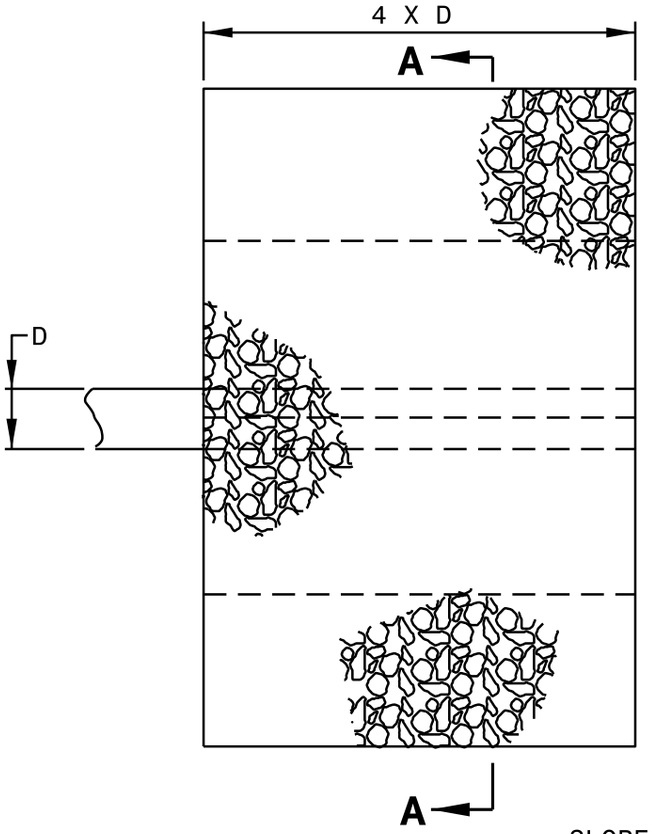
TEMPORARY LANE CLOSURES

2-LANE, 2-WAY ROADWAY WITH 2-WAY TURN LANE
1 THRU LANE CLOSED

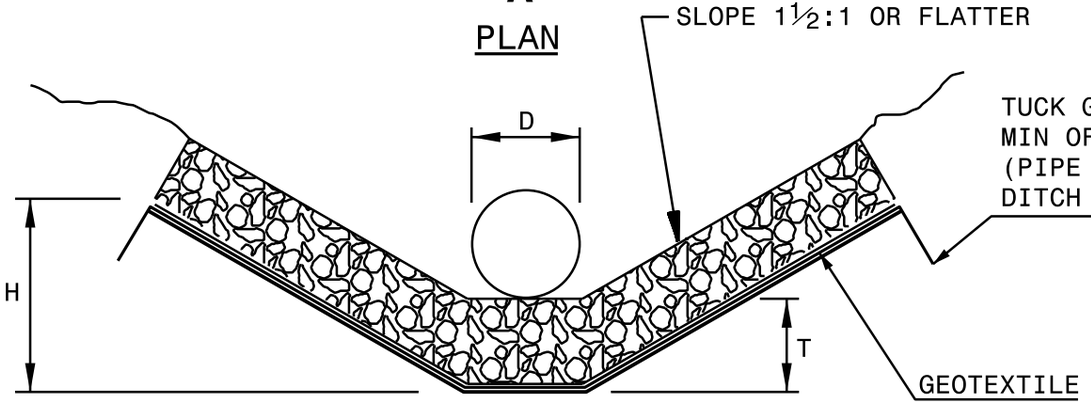
1101.02

D	OUTLET W/DITCH					OUTLET W/O DITCH				
	CLASS 'B' RIP RAP		CLASS I RIP RAP			CLASS 'B' RIP RAP		CLASS I RIP RAP		
	TONS	GEO-TEXTILE (S.Y.)	S.Y.	TONS	GEO-TEXTILE (S.Y.)	TONS	GEO-TEXTILE (S.Y.)	S.Y.	TONS	GEO-TEXTILE (S.Y.)
12″	2	5	5	2	5	1	4	2	1	4
15″	2	7	7	3	7	1	5	3	2	6
18″	3	10	9	4	10	2	7	4	2	8
24″	5	14	15	7	15	3	11	7	4	12
30″	8	21	21	11	22	5	16	11	7	17
36″	11	28	29	15	30	7	22	16	10	23
42″	15	37	39	20	39	10	28	22	13	30
48″	-	-	49	26	50	-	-	28	17	38
54″	-	-	60	33	62	-	-	36	21	47
60″	-	-	73	40	75	-	-	44	26	56
66″	-	-	87	48	89	-	-	54	32	67
72″	-	-	102	57	104	-	-	64	38	78

NOTE:
FOR CALCULATION PURPOSES
CLASS 'B' RIP RAP = 100 LBS./FT^3
CLASS I RIP RAP = 105 LBS./FT^3



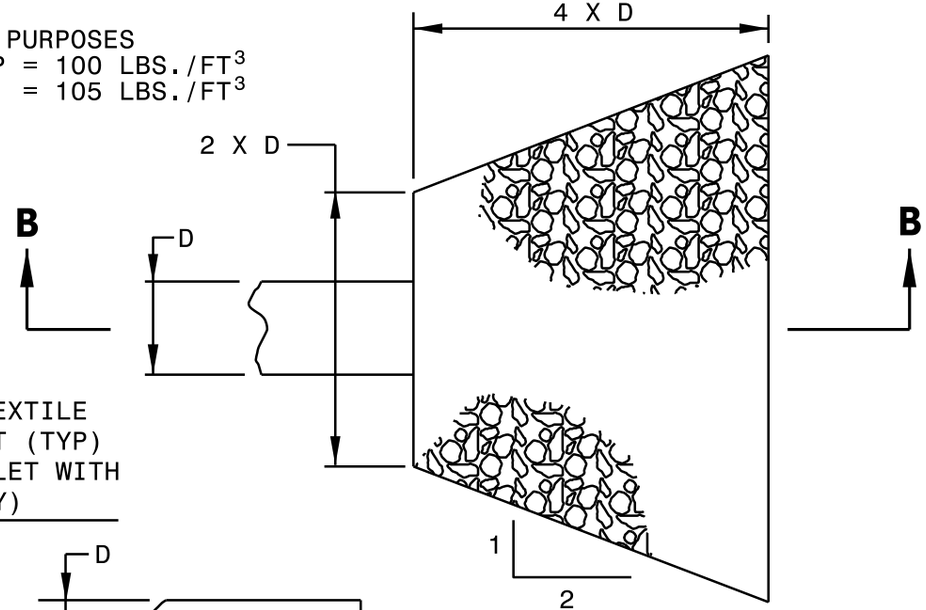
PLAN



SECTION A-A

PIPE OUTLET WITH DITCH

H= RIP RAP TO TOP OF PIPE (MAX. H = D + T)
T= 18″ CLASS I RIP RAP, UNLESS OTHERWISE SHOWN ON PLANS
T= 12″ CLASS 'B' RIP RAP, UNLESS OTHERWISE SHOWN ON PLANS
KEY-IN RIP-RAP



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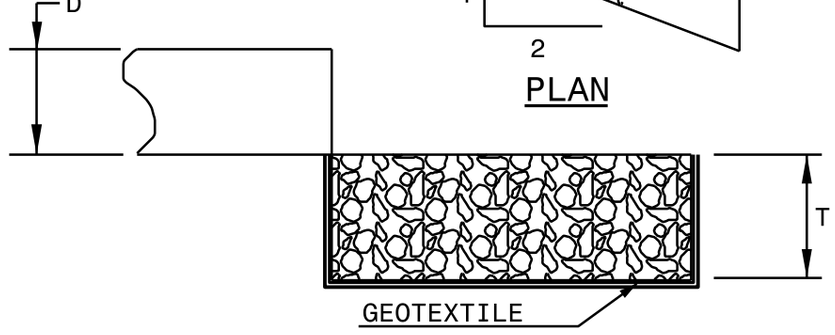

SECTION B-B

PIPE OUTLET WITHOUT DITCH

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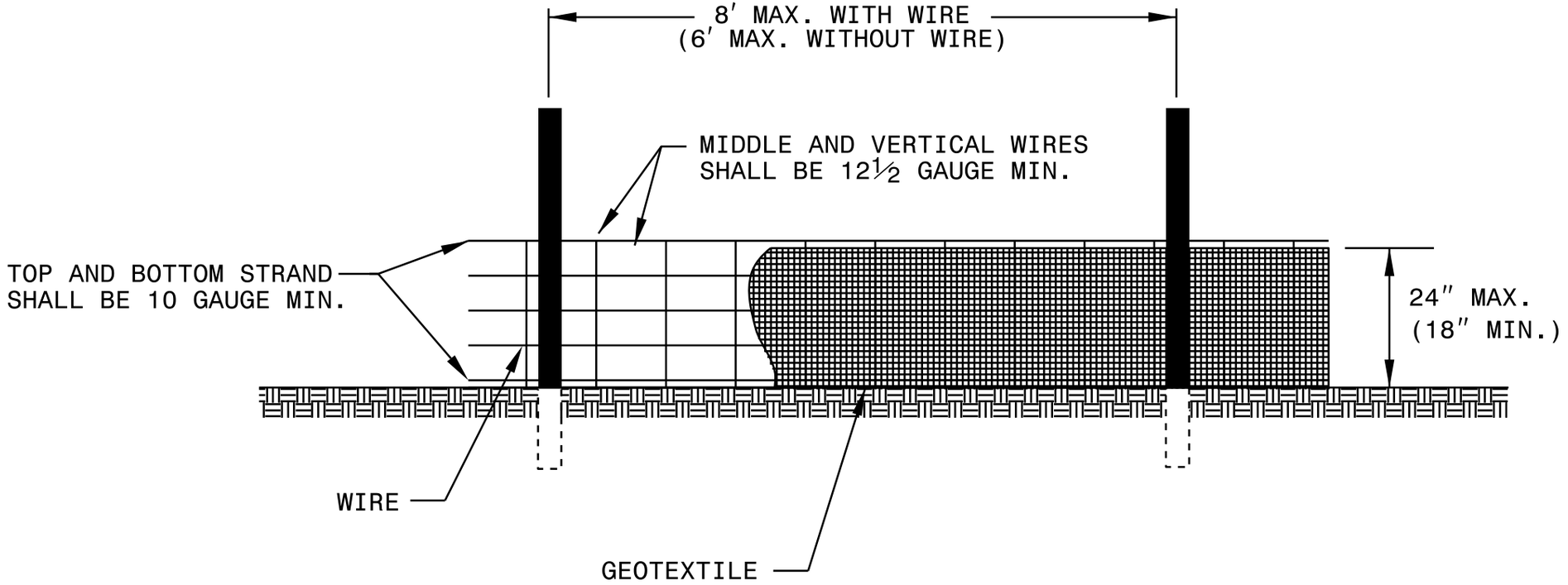
ROADWAY STANDARD DRAWING FOR

GUIDE FOR RIP RAP AT PIPE OUTLETS

SHEET 1 OF 1

876.02



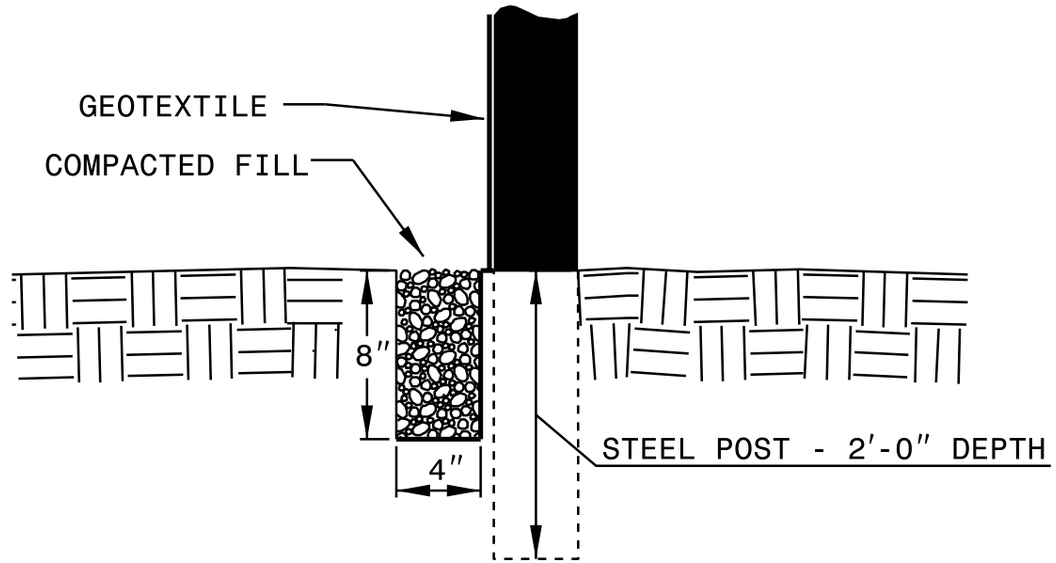
NOTES

USE GEOTEXTILE A MINIMUM OF 36″ IN WIDTH AND FASTEN ADEQUATELY TO THE POSTS AND WIRE AS DIRECTED.

USE WIRE A MINIMUM OF 32″ IN WIDTH AND WITH A MINIMUM OF 5 LINE WIRES WITH 12″ VERTICAL SPACING.

PROVIDE 5′-0″ STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.

FOR MECHANICAL SLICING METHOD INSTALLATION, GEOTEXTILE SHALL BE A MAXIMUM OF 18″ ABOVE GROUND SURFACE.



EXTENSION OF GEOTEXTILE AND WIRE INTO TRENCH

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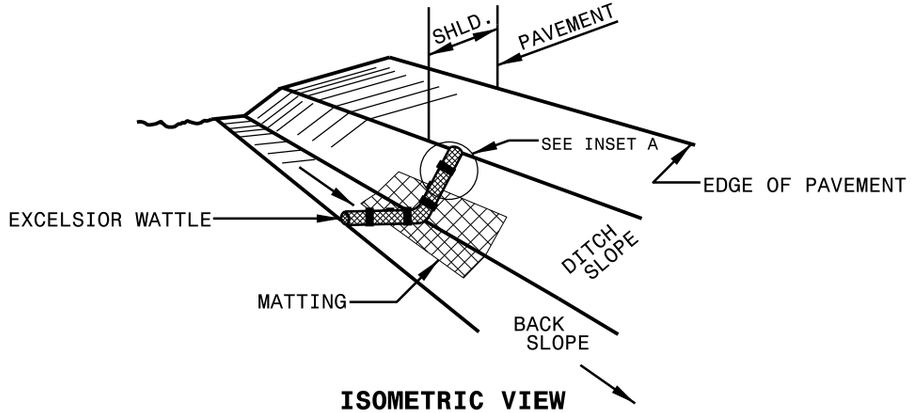
ROADWAY STANDARD DRAWING FOR

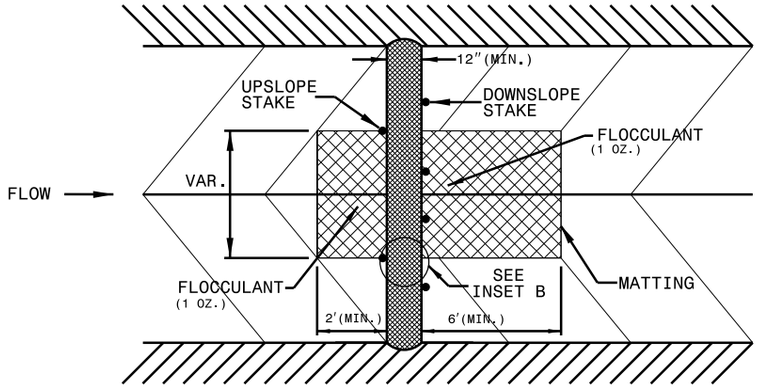
TEMPORARY SILT FENCE

SHEET 1 OF 1

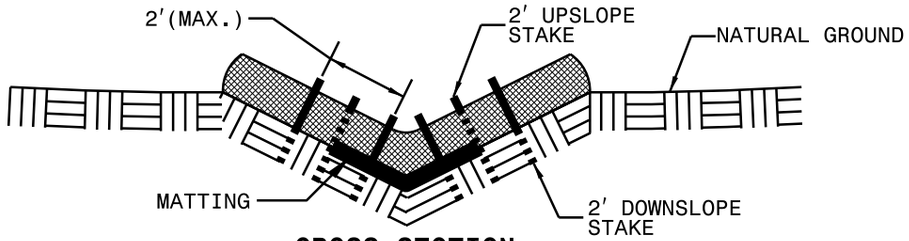
1605.01



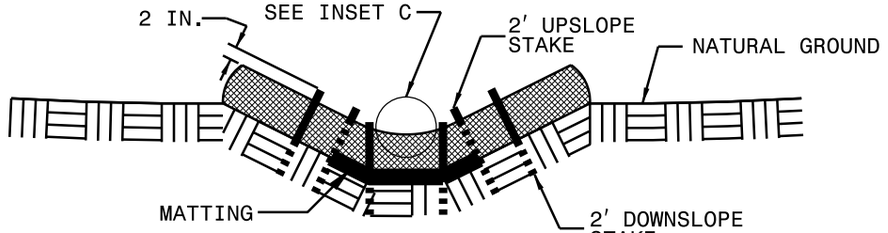
ISOMETRIC VIEW



TOP VIEW



CROSS SECTION 'V' DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

THIS DRAWING APPLIES TO BOTH EXCELSIOR AND COIR FIBER WATTLE CHECKS WITH AND WITHOUT FLOCCULANT.

USE MINIMUM 12 IN. DIAMETER EXCELSIOR OR COIR FIBER WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

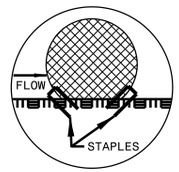
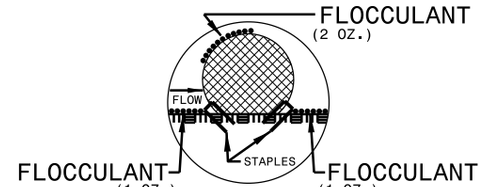
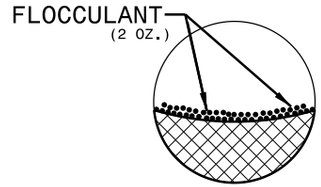
PROVIDE STAPLES MADE OF 11 GAUGE STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 6" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO FLOCCULANT APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED FLOCCULANT OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF FLOCCULANT ON MATTING ON EACH SIDE OF WATTLE. REAPPLY FLOCCULANT AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.

WATTLE CHECK WITHOUT FLOCCULENT	WATTLE CHECK WITH FLOCCULANT
 INSET A  INSET B	 INSET A  INSET B  INSET C

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ROADWAY STANDARD DRAWING FOR

WATTLE CHECK

SHEET 1 OF 1

1636.01