



Appendix D: Requirements for Formal Grading, Erosion Control, and Stormwater Plans

Formal site plans as required the Unified Development Ordinance, shall be submitted for review and approval on 24" X 36" sheets and use an engineering scale between 1"=10' to 1"=50'. All plans must be based on the NAD 83 and NAVD 88 datum and shall include:

If project disturbs more than 1 acre or results in impervious area greater than 50% of the entire site acreage, and the project results in an increase in impervious area of 5,000 square feet or greater, the project shall meet the requirements of subsections 7-12-2(f) of the City of Asheville UDO. All erosion and sediment control shall be based upon the latest revision of the "Erosion and Sediment Control Planning and Design Manual" by NCDENR.

All Grading, Erosion Control, and Stormwater Plans Shall Include a "Development Data Block" the Following Information:

Requirement
Name of property owner(s).
Name, address, and phone number of contact person.
PIN number(s) of property being developed.
Size of property in acres.
Amount of disturbed area in acres.
A table indicating the amounts of pre- and post-development pervious/impervious areas in acres, and the percentage of total parcel for pre- and post-development impervious areas.
Cut and fill volumes and indicate if waste or borrow areas are proposed.
Soil types.
Zoning district.
Approval block (3" x 5" white space) near the lower right corner of the front sheet.

All Grading / Erosion Control and Stormwater Plans Shall Include the Following:

Requirement
North arrow.
A 4"x 4" vicinity map at a maximum scale of 1"=1000'.
A graphic scale for the plan (engineering scale not greater than 50-scale).
Show all existing property boundaries with dimensions.
PIN number(s) of adjacent properties.
Show <u>existing</u> and <u>proposed</u> topographical contours (2 ft. increments or less).
Elevation labels shall be provided for contours at 20 ft intervals.
(Contour information shall be developed from actual field topographic survey, and must be tied to N.C. Grid and NAVD 1988. A copy of the sealed topographic survey will be required).
Show and label all <u>existing</u> and <u>proposed</u> retaining walls with top/bottom of wall elevations and reference appropriate detail(s).
Show and label all water courses and water bodies within aquatic buffers, along with their associated buffers.
If existing trees are to be removed from aquatic buffers, show and label location.
Show and label all <u>existing</u> and <u>proposed</u> structures and improved areas.
Show finished floor elevations for all buildings.



All Grading, Erosion Control, and Stormwater Plans Shall Include a “Development Data Block” the Following Information (continued):

Requirement
Show and label all flood fringe and floodway zones per 2010 FIRM panels.
Provide FEMA Elevation Certificates for any proposed structures, or any structures that have been substantially damaged or will be substantially improved, that are within the 100-year floodplain.
Show and label all <u>existing</u> and <u>proposed</u> utilities.
Show, label and dimension <u>existing</u> and <u>proposed</u> easements .
Show and label name and width of all adjacent streets.
Show and dimension all rights-of-way

All Grading and Erosion Control Plans Shall Include the Following:

Requirement
Show and label all proposed silt fence(s) and reference appropriate detail(s).
Show and label proposed temporary diversion ditches: <ul style="list-style-type: none"> • All ditch sections shall be labeled with a ditch ID. • Indicate the % slope of all ditch sections. • Provide ditch cross-sections, indicating ditch depth, top and bottom widths and side slopes. • Indicate type and installation requirements for in ditch erosion protection, such as riprap, geo-blankets, etc.
Show and label proposed temporary sediment basins. <ul style="list-style-type: none"> • Dimension basins. • Indicate basin volume. • Depict grading for basin by showing basin contours. • Reference appropriate standard detail. • Provide a maintenance schedule on the plans.
Show all inlet protection measures and reference appropriate detail(s).
Show, label and dimension all proposed construction entrances and reference appropriate detail(s).
Show any other sediment control devices not listed above and reference appropriate detail(s).
For all slopes 4:1 or greater, show the method of stabilization, such as hydro-seeding, geo-blankets, etc.
Provide a construction sequence for the erosion control measures.
Provide all pertinent grading and erosion control notes and details.
If sediment basins are proposed: volume, area, inflow and out flow calculations shall be submitted. <i>Calculations shall bear design professional seal and signature.</i>
Show and label all <u>existing</u> and <u>proposed</u> storm drainage structures: <ul style="list-style-type: none"> • The type of structure shall be indicated. • All structures shall be labeled with a structure ID. • Invert elevations shall be indicated for all pipes in the structure. • The elevation of the top of the structure shall be indicated. • The appropriate standard detail shall be referenced.
Show and label all <u>existing</u> and <u>proposed</u> storm drainage pipes: <ul style="list-style-type: none"> • The material type of pipe shall be indicated. • All pipes shall be labeled with a pipe ID. • The length, size and slope of all pipes shall be indicated. • The appropriate standard installation detail shall be referenced.



All Grading and Erosion Control Plans Shall Include the Following (continued):

Requirement
Show and label all <u>existing</u> and <u>proposed</u> permanent storm conveyance ditches: <ul style="list-style-type: none"> • All ditch sections shall be labeled with a ditch ID. • Indicate the % slope of all ditch sections. • Provide ditch cross-sections, indicating ditch depth, top and bottom widths and side slopes. • Indicate type and installation requirements for in ditch erosion protection, such as riprap, geo-blankets, etc.
Provide profiles for storm drainage system which shall include the following: <ul style="list-style-type: none"> • Storm drainage structures and pipes with all information as indicated above. • All crossings with other existing and proposed underground utilities with separation distances indicated. • Existing and proposed grades.
Show and label all storm drainage dispersion devices.
Provide headwalls or end sections at all pipe outlets and reference appropriate detail(s).
Provide all referenced details on the plans.

Additional items required for Grading / Erosion Control plan submittals:

Requirement
The Financially Responsible Person section of the grading application shall be completed and signed before the application will be accepted and processed.
For all projects that disturb over 5 acres, a security for re-vegetation in the amount of \$3,500.00 per disturbed acre or part thereof is required prior to approval of the grading permit.
For projects with twenty-five thousand square feet of disturbance or greater, a contract is required between the financially responsible person and a licensed professional for erosion and sediment control compliance inspections. The executed and notarized Certificate of Inspection Agreement shall be submitted prior to approval of the grading permit.
For pipes and ditches: provide capacity and velocity calculations. <i>Calculations shall bear design professional seal and signature.</i>
For outlets: provide calculations for dispersion devices and reference the appropriate detail(s). <i>Calculations shall bear design professional seal and signature.</i>
For inlets on public streets: provide stormwater spread calculations. <i>Calculations shall bear design professional seal and signature.</i>
Copy of the property deed(s).
If the property owner resides outside the state of North Carolina, an in state agent must sign the application and provide a notarized letter of authorization from the owner.

All Stormwater plans shall include the following:

Requirement
Show and label all <u>existing</u> and <u>proposed</u> detention/retention basins, underground storage systems and all other BMPs. <ul style="list-style-type: none"> • All basins shall be labeled with a basin ID. • Dimension basins. • Indicate basin volume. • For above ground basins, show grading for basin by showing basin contours. • Provide specific basin cross-sections and information, which indicates all pertinent design information.
Show and label all <u>existing</u> and <u>proposed</u> stormwater control structures: <ul style="list-style-type: none"> • All structures shall be labeled with a structure ID. • Provide a specific control structure detail with dimensions, which indicates all pertinent design information. • Provide a 6-foot chain link fence and access gate for all above ground basins that do not meet safety requirements. • Provide all pertinent stormwater notes and details.



Additional items required for Stormwater plan submittals:

Requirement
Stormwater quantity control systems shall limit the 2-year and 10-year developed peak discharge rates to pre-developed peak discharge rates using the 24-hour SCS Type II design storm and pass the 50-year, 24-hr event storm.
Stormwater quality control systems shall control and treat the runoff leaving the site from the first inch of rain (determined using Simple Method). The volume of runoff shall be detained between 48 and 120 hours. Also, all structural stormwater treatment systems shall be designed to have a minimum of 85% average annual removal for Total Suspended Solids.
For basins and control structures: pre and post development runoff, storage volume, inflow and out flow calculations shall be submitted. Also, provide a maintenance schedule with the calculations. <i>Calculations shall bare design professional seal and signature.</i>
Development or redevelopment required to comply with the provisions for post-construction stormwater control, a contract is required between the person financially responsible and a licensed professional for post construction stormwater control compliance checks.
Note: A pre-construction meeting will be required for all projects with storm drainage systems or stormwater management systems. Cut sheets for all structures must be submitted prior to the pre-construction meeting.



Appendix E: Storm Drainage and Stormwater As-built Specification

Per the final release requirements outlined in the Code of Ordinances; All stormwater management BMPs, facilities and related improvements, and all storm drainage structures and conveyances shall be field surveyed and represented on an as-built record drawing per the following specifications;

- 1 copy of a digital electronic file of the as-built record drawing shall be delivered on CD-ROM in
- AutoCAD .dwg format (Version 14 or newer).
- 2 hardcopies of each as-built record drawing sheet are required upon delivery.
- All digital as-built record drawing entities shall be referenced using the North Carolina State Plane Coordinate System, U.S. Survey Feet as Units of Measure (grid coordinates, carried to two or more decimal places), NAVD 88' Vertical Datum, NAD 83' Horizontal Datum (epoch specified). This spatial reference shall be clearly noted on the drawing. All drawing entities shall be referenced to a monument grid tie associated with at least one storm drainage structure located on the subject property. The relative horizontal and vertical accuracy of field surveyed data should be equal to or less than 0.10 feet.
- The as-built record drawing shall include a North arrow indicating Grid North.
- The as-built record drawing shall include the City of Asheville issued permit number related to the storm drainage and/or stormwater project.
- The as-built record drawing shall include a vicinity map depicting the general location of the site.
- The general feature type, northing, easting, and top elevation of all storm drainage structures, stormwater BMPs, facilities, and related improvements shall be clearly labeled on the drawing, adjacent to the feature to which they correspond OR the labels may be configured using a cross-referenced table system that utilizes unique identifiers.
- All pipes and like conveyances shall be represented on the drawing and associated with text or labels indicating slope, distance, diameter (or dimensions), material type, inverts (in & out), and dissipation pad sizes. Text and labels should be clearly legible and placed next to the features to which they correspond OR they may be configured using a cross-referenced labeling and table system that utilizes unique identifiers.
- All above-ground detention or retention facilities, BMPs, or similar facilities shall be represented on the drawing using 1' contours enclosed by outer breakline(s). Labels or text indicating the maximum storage volume (for a 50-year storm event) and associated elevation should be placed inside the feature or adjacent to the feature with which it corresponds. Perimeter fencing associated with storage facilities must be represented on the drawing per as-built conditions. A field surveyed as-built detail of any outlet control structures or associated features must be included.
- All accessible structures and conveyances associated with underground storage systems shall be represented within the drawing. Labels or text indicating the maximum storage volume (for a 50-year storm event) and associated elevation should be placed inside the feature or adjacent to the feature with which it corresponds. A field surveyed as-built detail of any outlet control structures or associated features must be included.
- The outline of the 100-Year (1% annual chance) floodplain boundary and any associated floodway or non-encroachment areas shall be represented on the drawing per the approved site plans



- The as-built record drawing shall include the boundary of the subject property by courses and distances with references.
- Storm drainage structures and conveyances, and stormwater BMPs, facilities, and related features shall be included in one or more separate CAD drawing layers, where the keyword “Stormwater” shall be included in the title or name for all such layers.
- Impervious features and facilities, including but not limited to; driveways, parking areas, walkways, building footprints & utility pads shall be represented on the drawing per the approved site plans. These features shall be included in one or more separate CAD drawing layers, where the keyword “Impervious” shall be included in the title or name for all such layers.
- The as-built record drawing shall be certified, signed, dated, and sealed by a registered design professional certified to sign and seal such documents. The text “As-Built Record Drawing” shall be clearly marked on each page.



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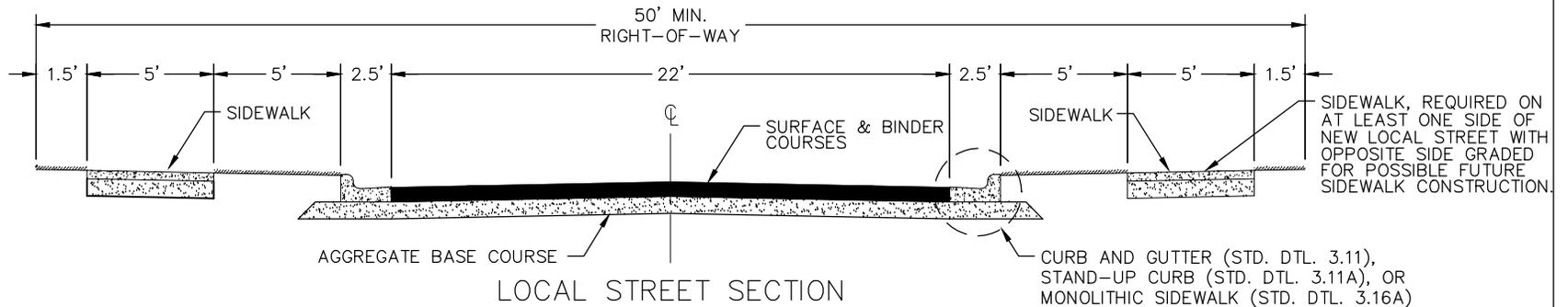
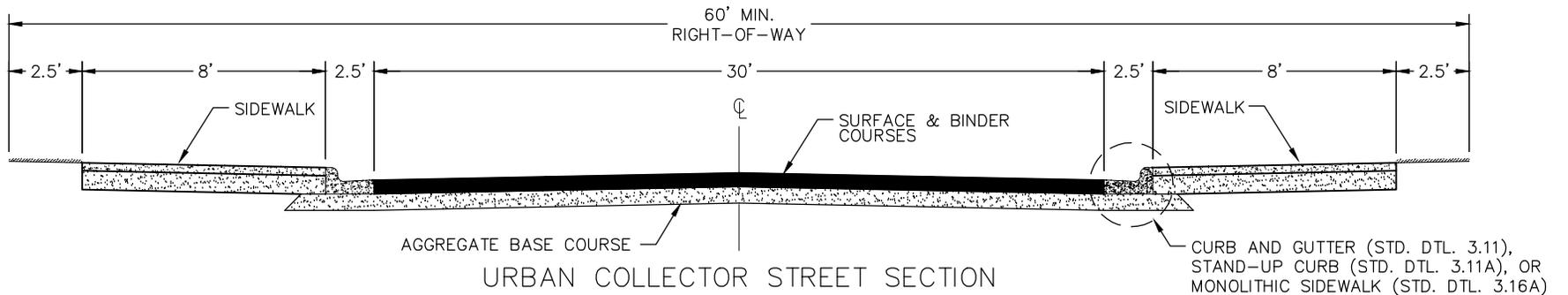
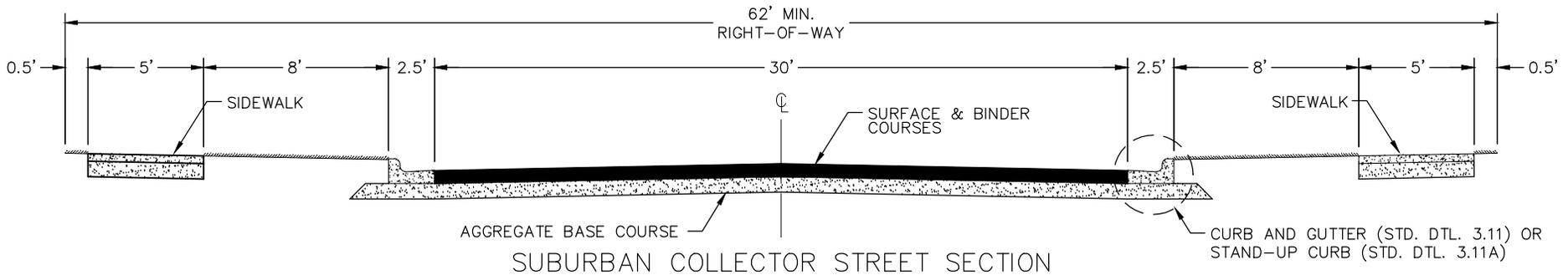
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PAVEMENT DESIGN

SURFACE COURSE = 2" OF SF 9.5A, S 9.5B, OR S 9.5C

BINDER COURSE = 5" OF I 19.0B OR B 25.0B OR THE APPLICATION OF BOTH BINDER COURSES (I 19.0B ON TOP OF B 25.0B) ONLY 4" OF BINDER COURSE WHEN STAND-UP CURB IS INSTALLED.

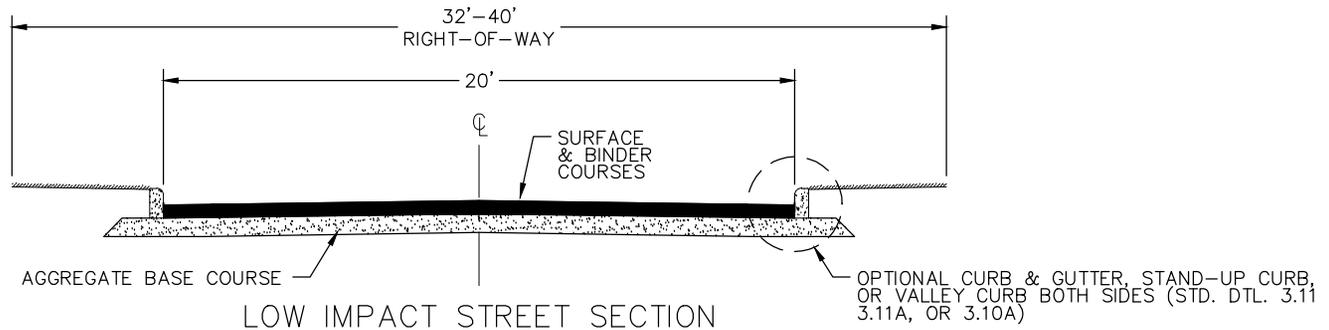
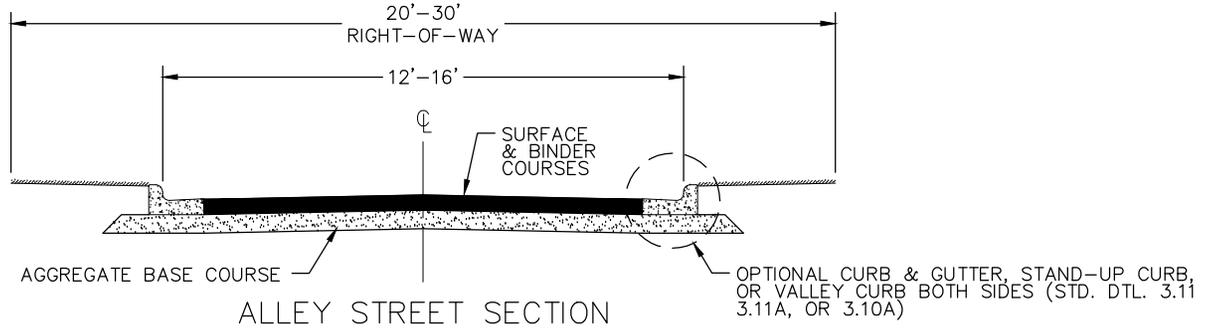
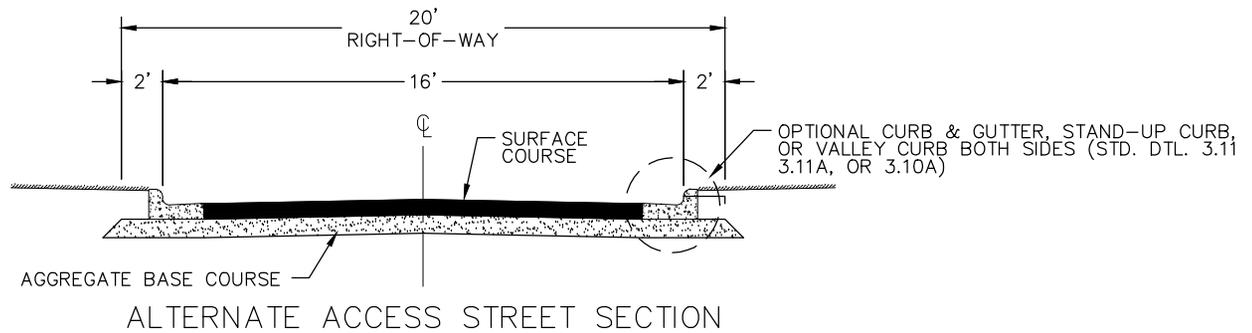
AGGREGATE BASE COURSE = 8" OF A.B.C.



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STANDARD STREET SECTIONS (SUBURBAN COLLECTOR, URBAN COLLECTOR & LOCAL)

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.01



PAVEMENT DESIGN

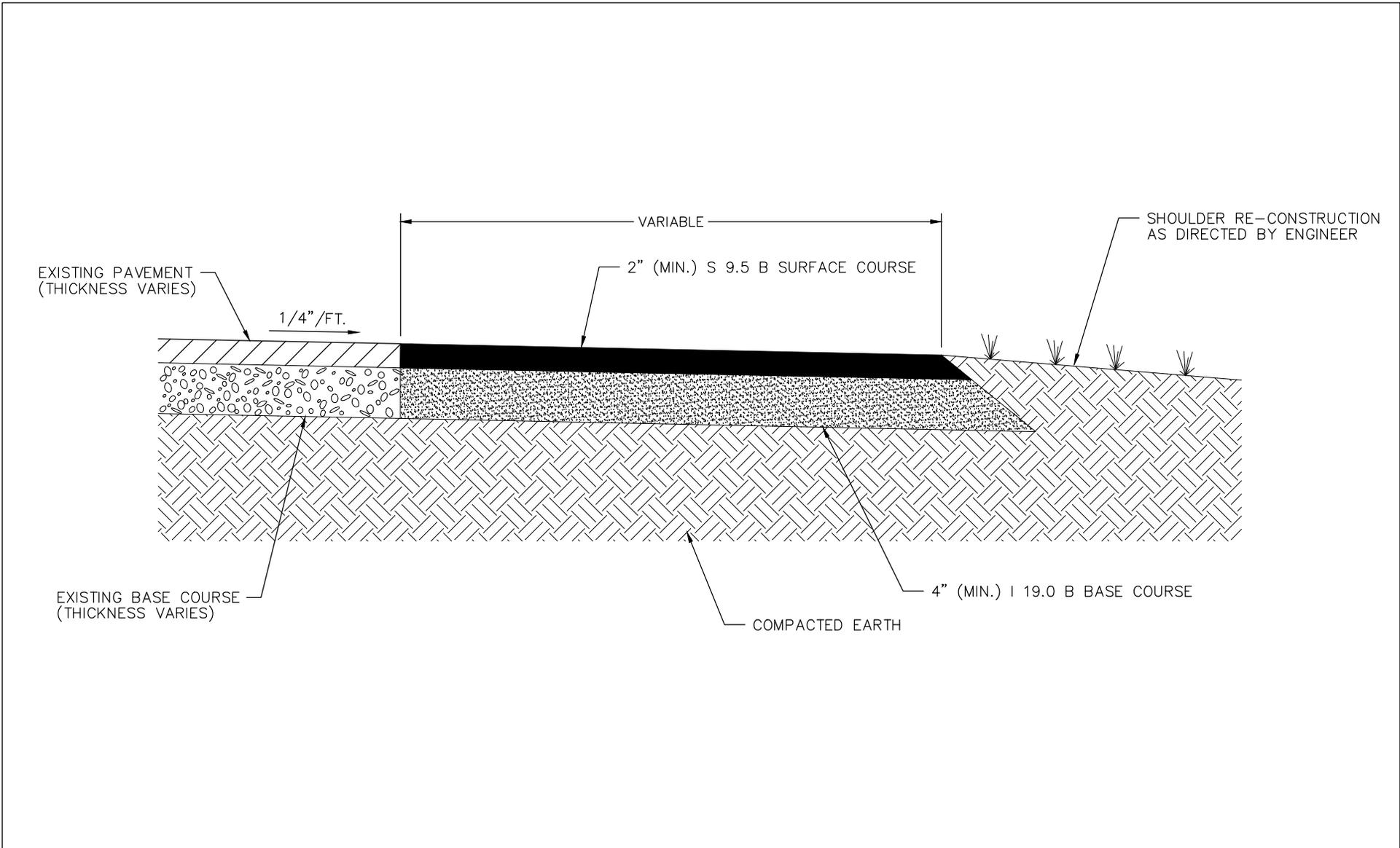
SURFACE COURSE = 2" OF SF 9.5A, S 9.5B, OR S 9.5C

BINDER COURSE = 5" OF I 19.0B OR B 25.0B OR THE APPLICATION OF BOTH BINDERS COURSES (I 19.0B ON TOP OF B 25.0B) ONLY 4" OF BINDER COURSE WHEN STAND-UP CURB IS INSTALLED.

AGGREGATE BASE COURSE = 8" OF A.B.C.

**STANDARD STREET SECTIONS
(ALTERNATE ACCESS, ALLEY & LOW IMPACT)**

REVISIONS	
DATE	DESCRIPTION

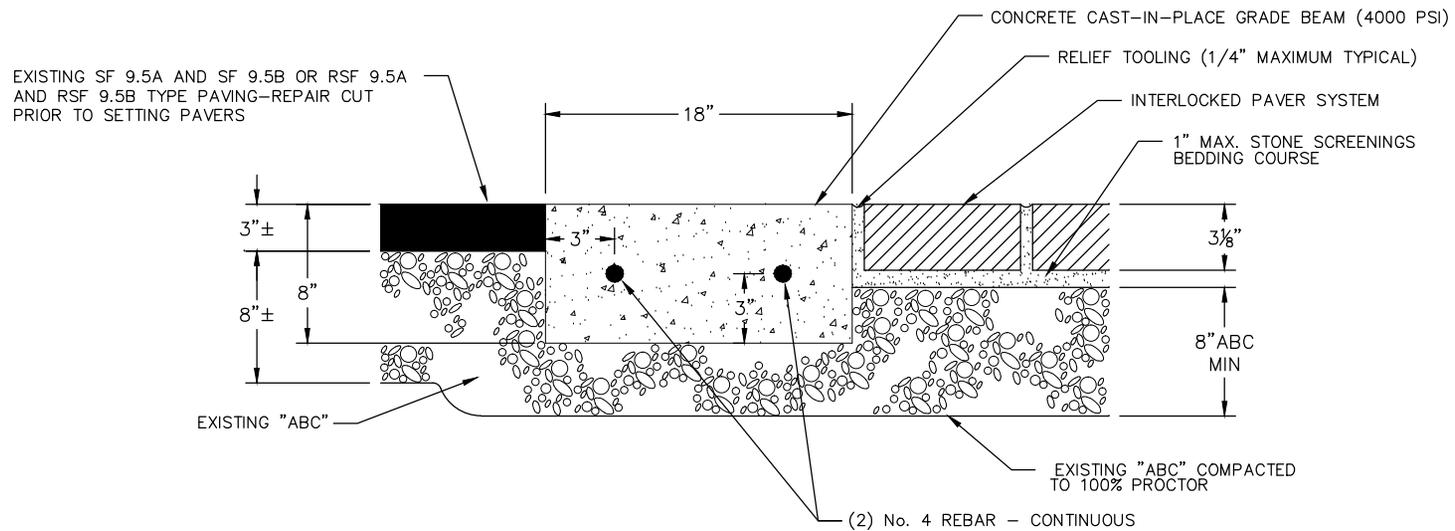


ROADWAY WIDENING

REVISIONS	
DATE	DESCRIPTION

NOTE:

1. EXISTING "ABC" IN ROADWAY MAY BE USED AS BASE COURSE AFTER COMPACTING TO ACHIEVE 100% PROCTOR. LOCALIZED UNDERCUTTING AND REPAIR SHALL BE REQUIRED WHERE PROOFROLLING RESULTS IN PUMPING OR AS DIRECTED BY THE INSPECTOR. TESTING OF SUBGRADE/"CABC" COMPACTION SHALL BE REQUIRED.
2. EXISTING ROADWAY PAVING SHALL BE SAW-CUT TO RECEIVE PLACEMENT OF GRADE BEAMS. A THREE-DAY CURING PERIOD SHALL BE REQUIRED FOR GRADE BEAMS PRIOR TO REMOVAL OF REMAINING BITUMINOUS PAVING. BASE BELOW GRADE BEAMS SHALL BE COMPACTED TO 100% PROCTOR.
3. BRICK PAVED STREETS SHALL NOT BE MAINTAINED BY THE CITY OF ASHEVILLE.

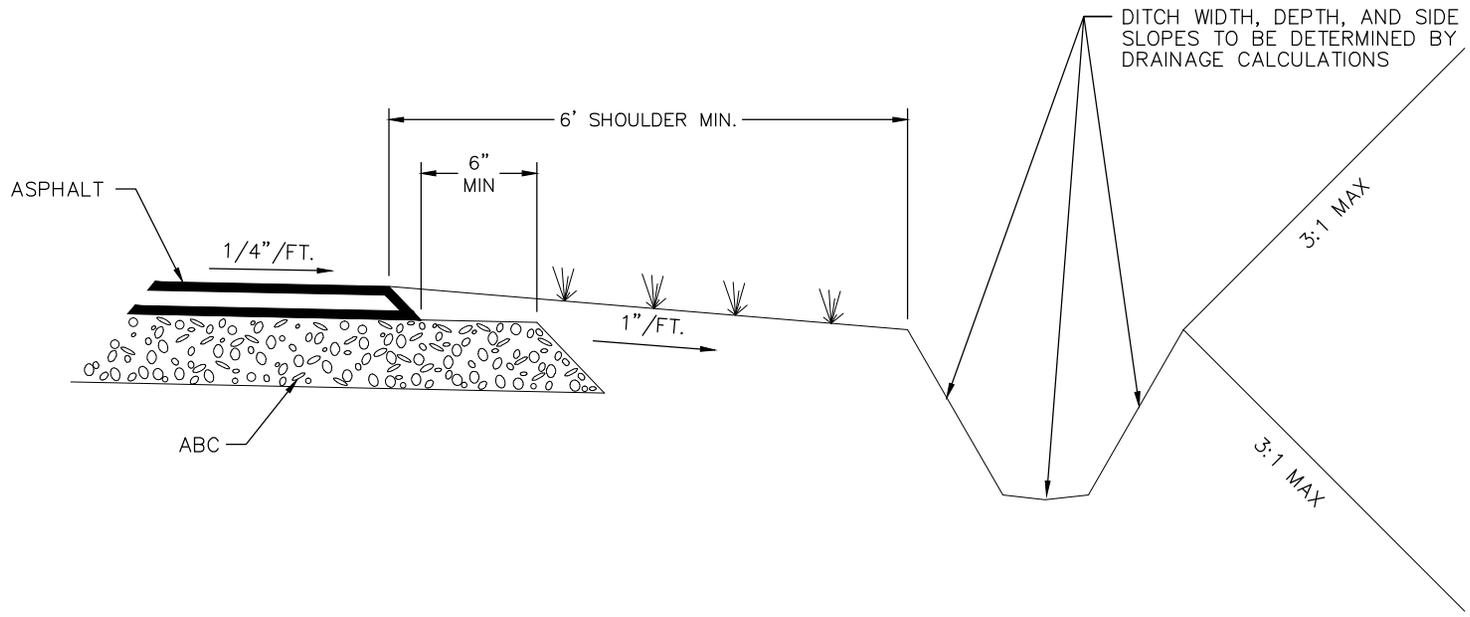


SECTIONAL VIEW



**INTERLOCKED CONCRETE PAVER
STREET SECTION**

REVISIONS	
DATE	DESCRIPTION



- THIS SECTION MAY ONLY BE USED WHEN ALL OF THE FOLLOWING CONDITIONS ARE MET:
1. STREET VERTICAL GRADE SHALL NOT EXCEED 5% AT ANY POINT.
 2. SWALE SYSTEM DESIGNED TO CARRY AT LEAST THE 10 YEAR STORM.
 3. VELOCITY WITHIN THE SWALE SHALL BE NON-EROSIVE.
 4. DETAILED DRAINAGE CALCULATIONS REQUIRED.

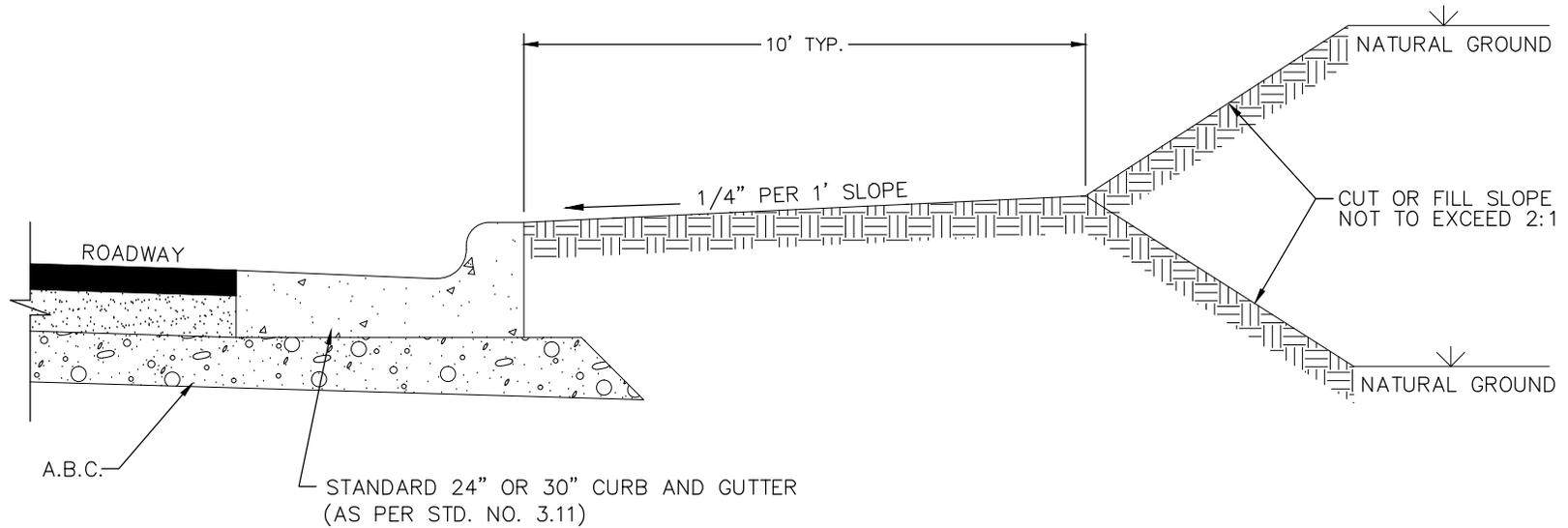


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STANDARD SECTION WITHOUT CURB & GUTTER

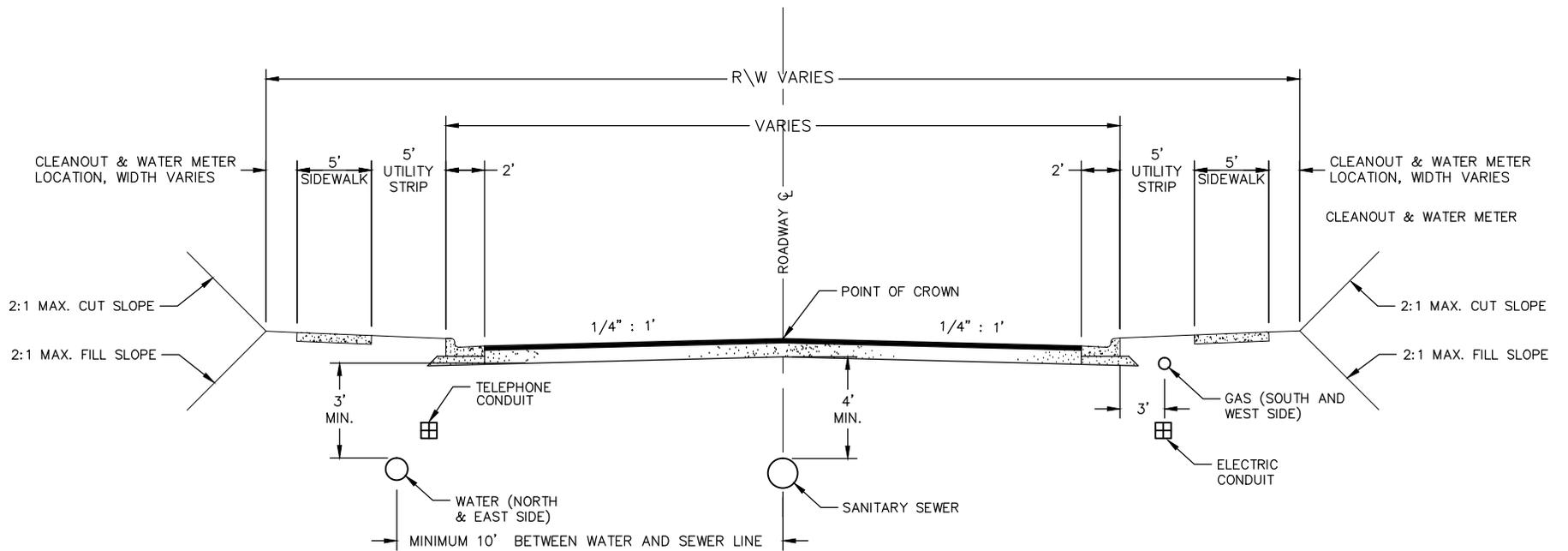
REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.05



**STANDARD SHOULDER SECTION
 WITHOUT SIDEWALK**

REVISIONS	
DATE	DESCRIPTION



CROSS SECTION
N.T.S.

NOTE:

- THERE SHALL BE AN 18" VERTICAL SEPARATION BETWEEN WATER AND SEWER LINES
- WATER AND/OR SANITARY SEWER LINES SHALL BE A MINIMUM OF TWO (2) FEET FROM THE EDGE OF THE CURB AND GUTTER
- WATERLINE TRUST BLOCK MUST BE CONSTRUCTED TO THE MINIMUM DIMENSIONS AS PER CITY OF ASHEVILLE'S WATER RESOURCES SPECIFICATION MANUAL STANDARD DETAIL "THRUST BLOCK FOR TEES & RESTRAINING REQUIREMENTS FOR OTHER FITTINGS"



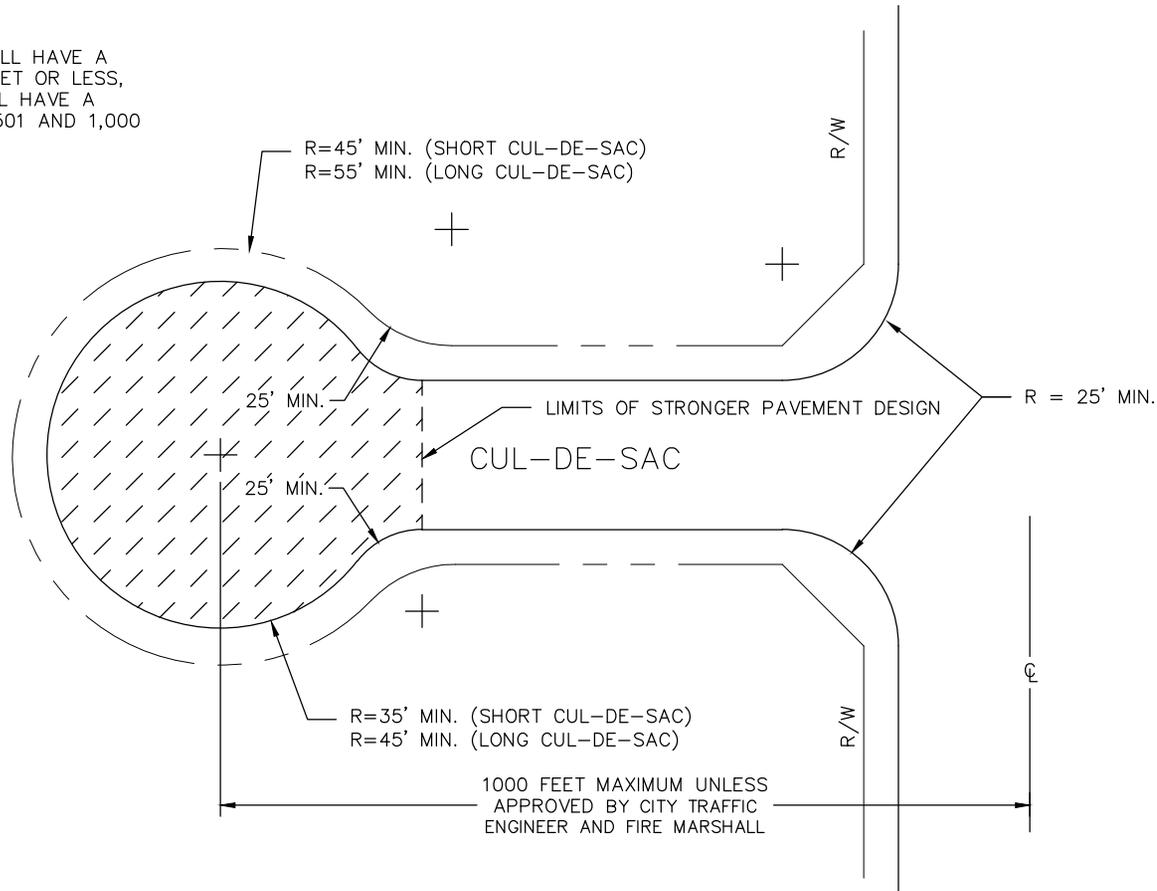
REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.07

NOTE

SMALLER RADIUS MAY BE APPROVED BY TRAFFIC ENGINEER

CUL-DE-SAC LENGTHS

A SHORT CUL-DE-SAC WILL HAVE A TOTAL LENGTH OF 500 FEET OR LESS, A LONG CUL-DE-SAC WILL HAVE A TOTAL LENGTH BETWEEN 501 AND 1,000 FEET.



CUL-DE-SAC STRONGER PAVEMENT DESIGN

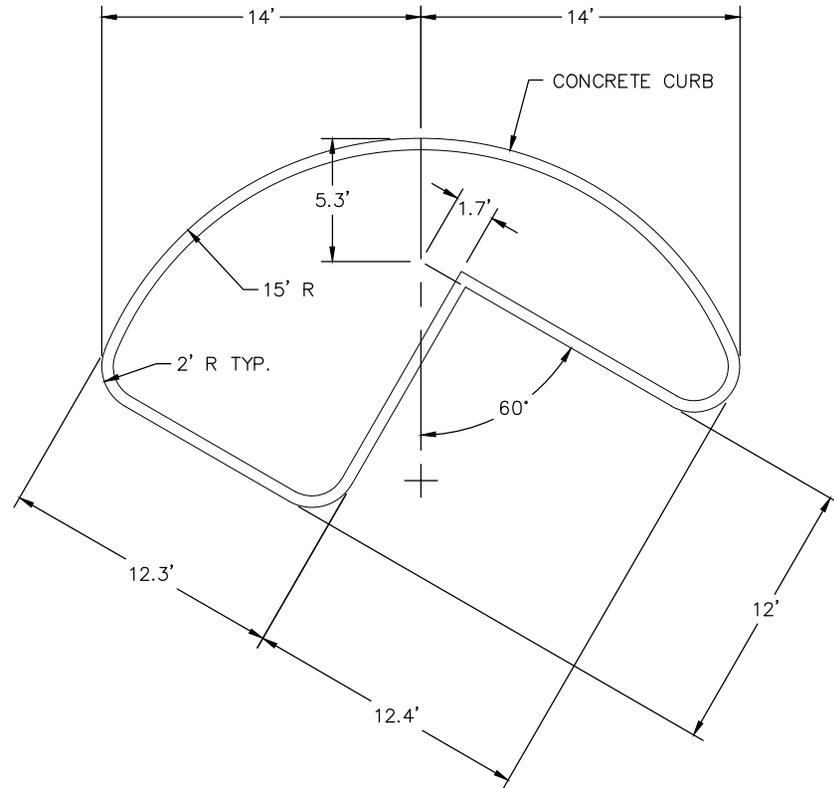
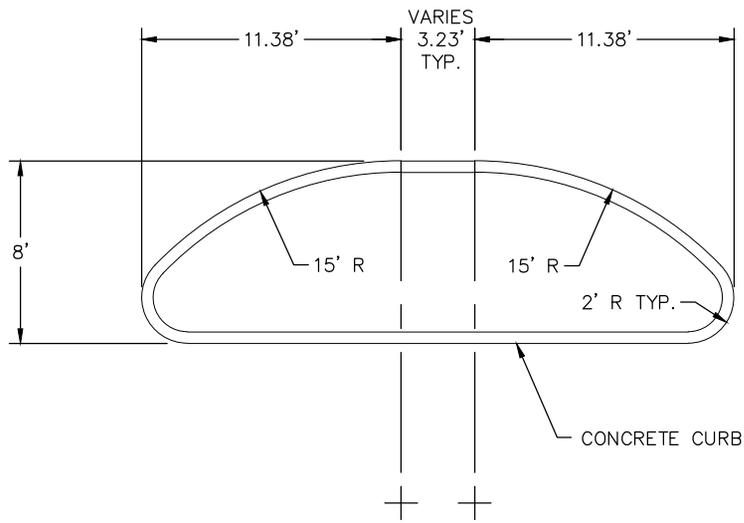
SURFACE COURSE = 2" OF SF 9.5A AND SF 9.5B OR RSF 9.5A AND RSF 9.5B
 BINDER COURSE = 2" OF I 19.0B and B 25.0B
 BASE COURSE = 8" OF A.B.C.



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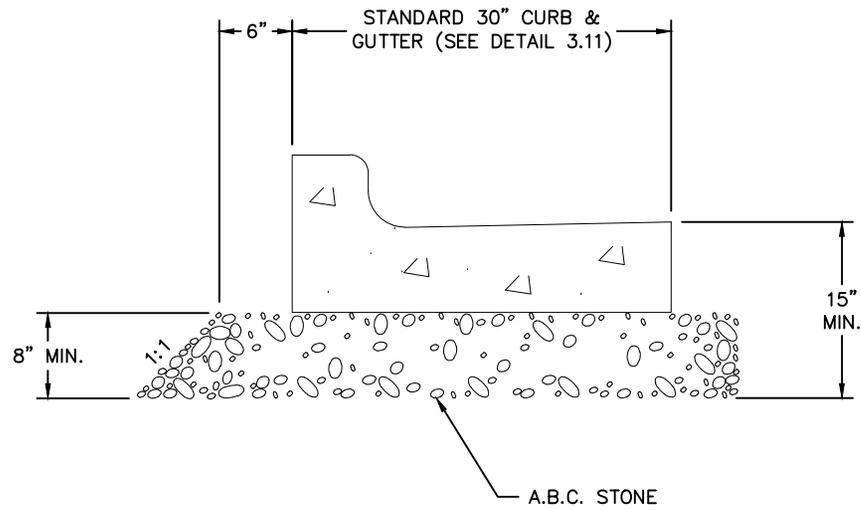
CUL-DE-SAC DIMENSIONS

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.08



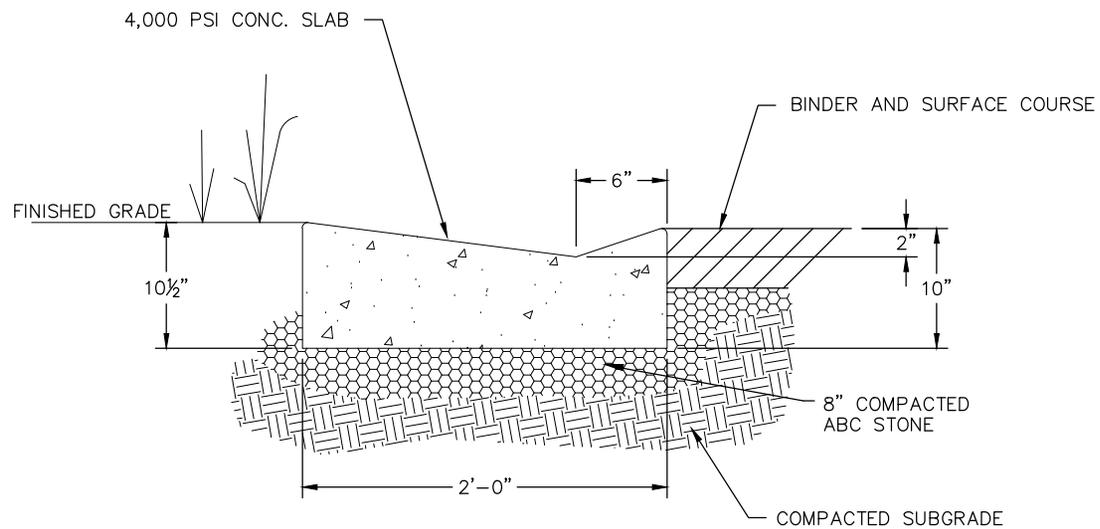
TYPICAL END ISLANDS FOR PARKING LOTS

REVISIONS	
DATE	DESCRIPTION



**A.B.C. UNDER 2'-6"
CURB & GUTTER**

REVISIONS	
DATE	DESCRIPTION



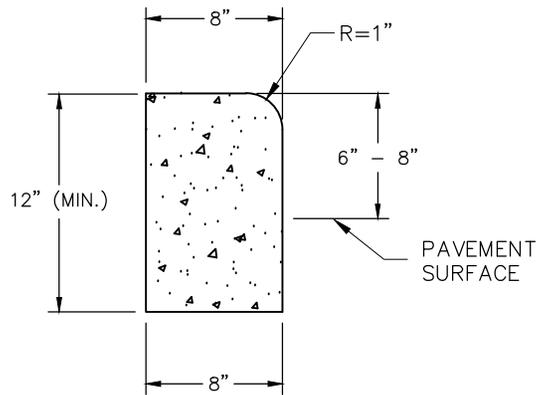
NOTE:
 VALLEY CURB IS ONLY ALLOWED WHEN STREET GRADES DO NOT EXCEED
 5% AND WHEN CONSISTENT WITH EXISTING CURBING IN THE AREA.



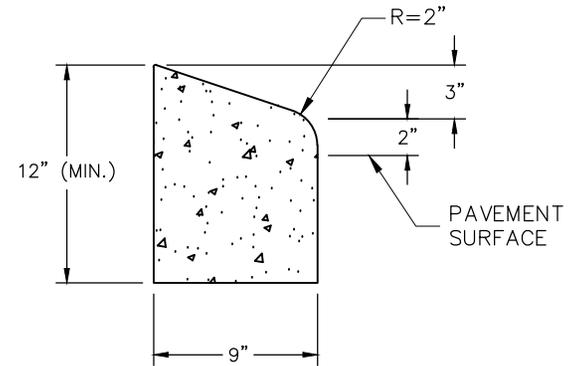
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VALLEY CURB DETAIL

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.10A

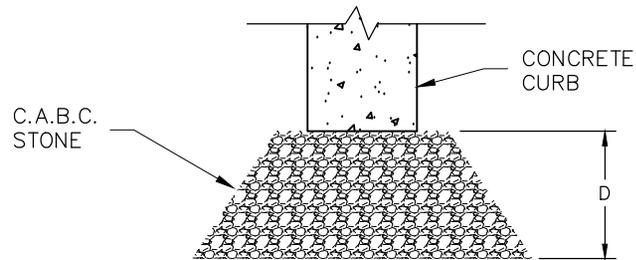


STANDARD STAND-UP CURB
(NON TRAFFIC BEARING)



ONLY TO BE USED ADJACENT TO TRAFFIC ISLANDS AND MOUNTABLE APRONS

MOUNTABLE CURB
(TRAFFIC BEARING)



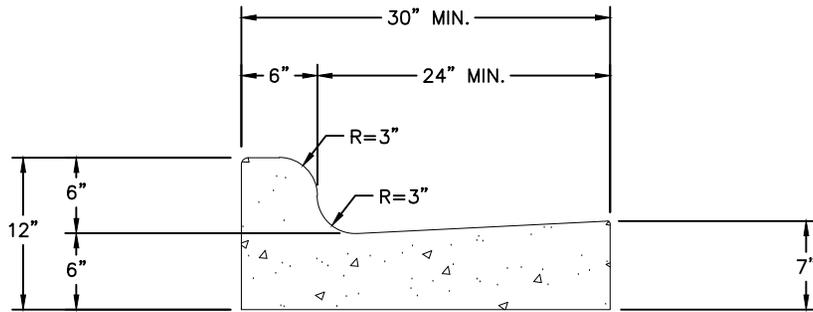
D = 6" MIN. FOR NON TRAFFIC BEARING
OR 8" MIN FOR TRAFFIC BEARING

C.A.B.C. STONE UNDER CURB

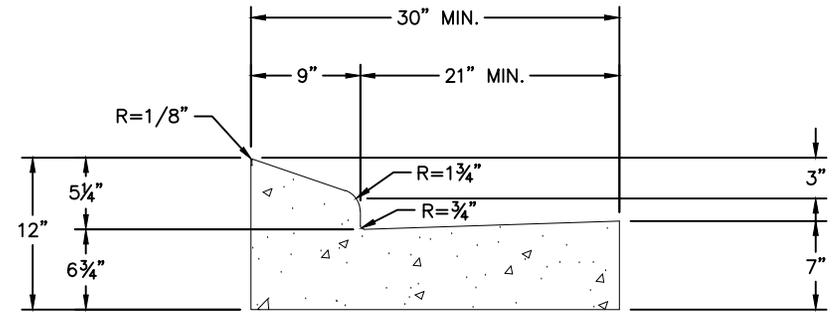


**STANDARD STAND-UP &
MOUNTABLE CURB**

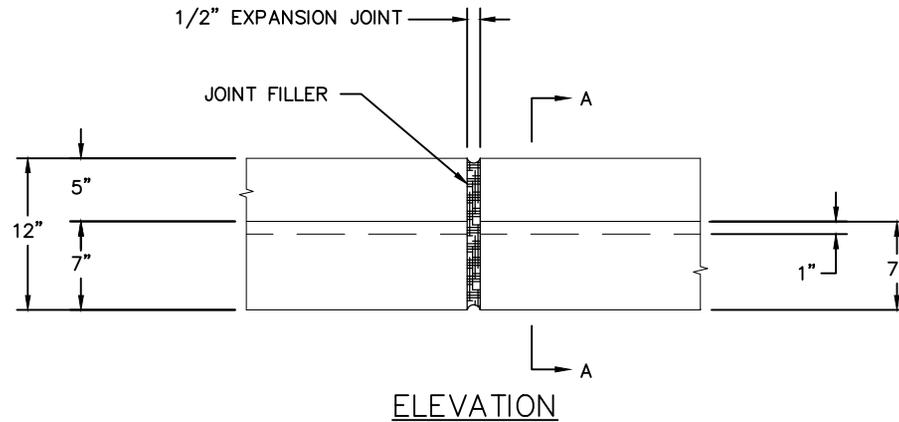
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DATE	DESCRIPTION



CURB & GUTTER
SECTION AA



CURB & GUTTER
SECTION AA



ELEVATION

NOTES:

1. CONCRETE SHALL BE 4,000 P.S.I.
2. A 1/2 INCH EXPANSION JOINT FILLED WITH JOINT FILLER SHALL BE PLACED NO FARTHER THAN 50 FEET APART OR AT ALL RIGID OBJECTS.
3. JOINT MATERIALS SHALL BE ACCORDANCE WITH THE JOINT MATERIALS SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.
4. A NON SEALED 3/4 INCH DEEP TOOL JOINT SHALL BE PLACED EVERY 10 FEET.

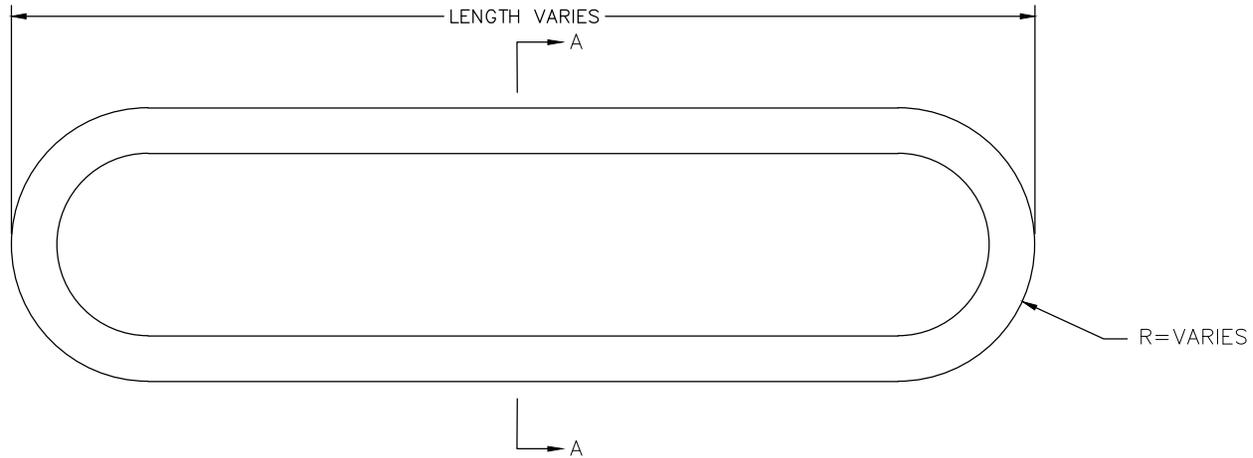


City of Asheville, NC
Standard Specifications
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**STANDARD CONCRETE
CURB AND GUTTER**

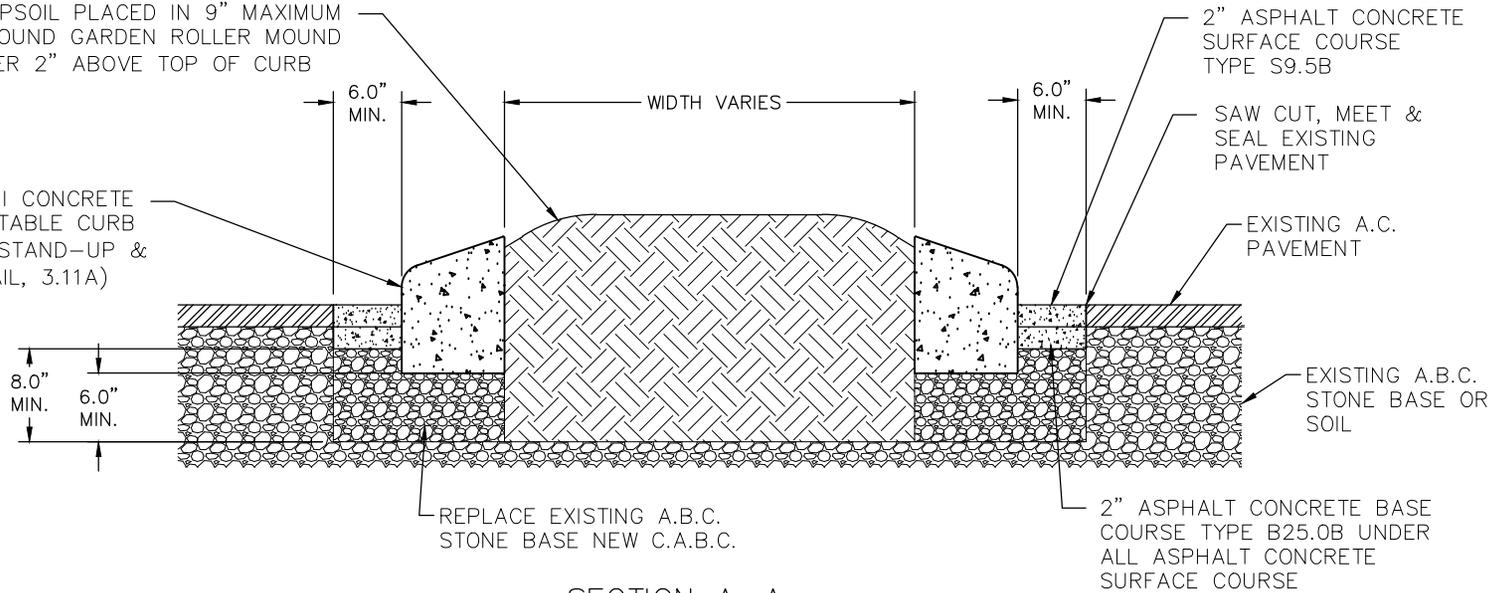
REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.11



BACKFILL WITH TOPSOIL PLACED IN 9" MAXIMUM LIFTS WITH 200 POUND GARDEN ROLLER MOUND TOPSOIL AT CENTER 2" ABOVE TOP OF CURB

12"X9" 4000 P.S.I CONCRETE STANDARD MOUNTABLE CURB (SEE STANDARD STAND-UP & MOUNTABLE DETAIL, 3.11A)



SECTION A-A

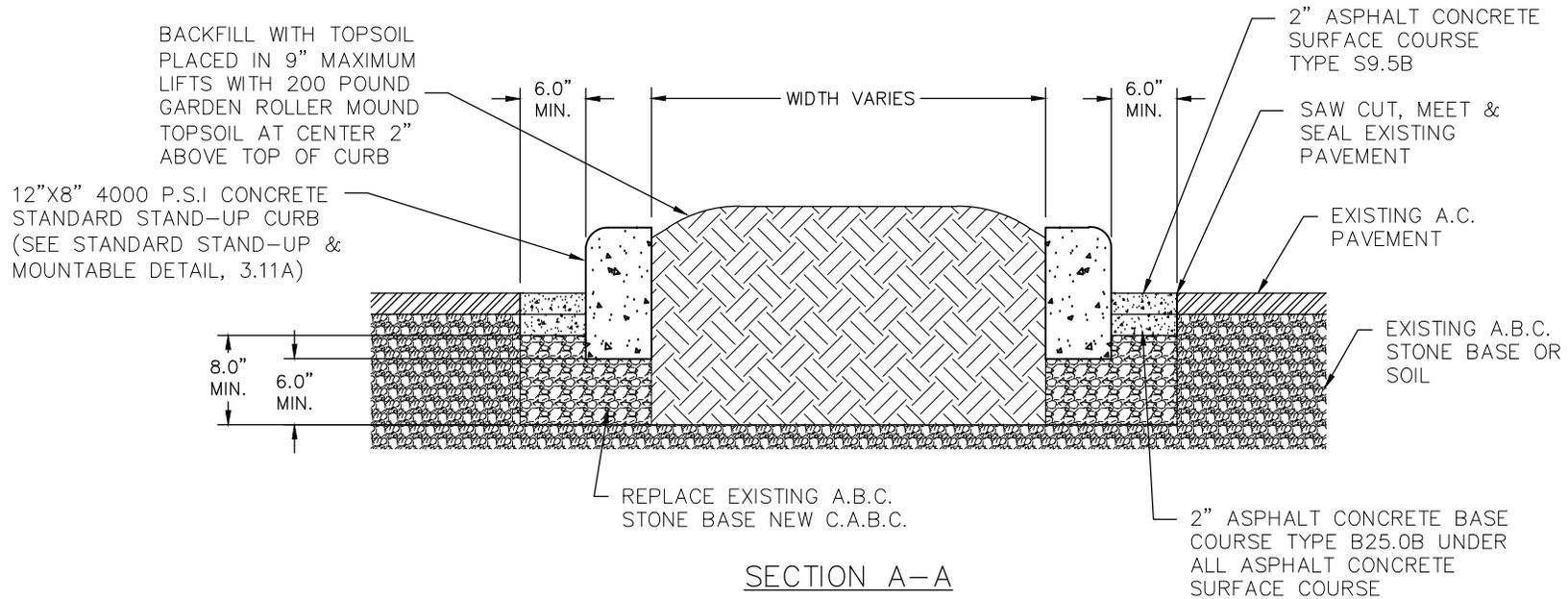
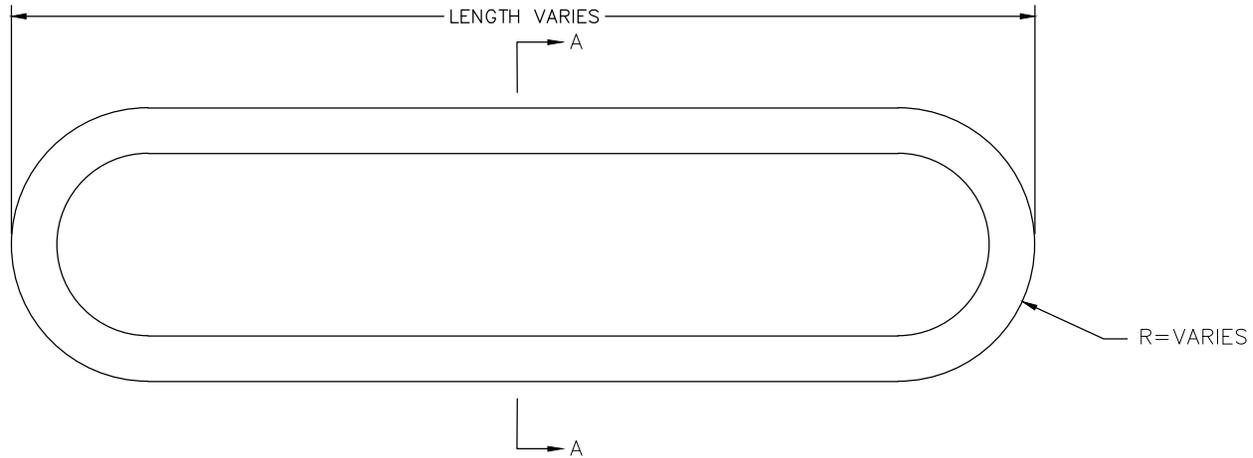


City of Asheville, NC
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MEDIAN ISLAND w/STANDARD MOUNTABLE CURB

REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.11B

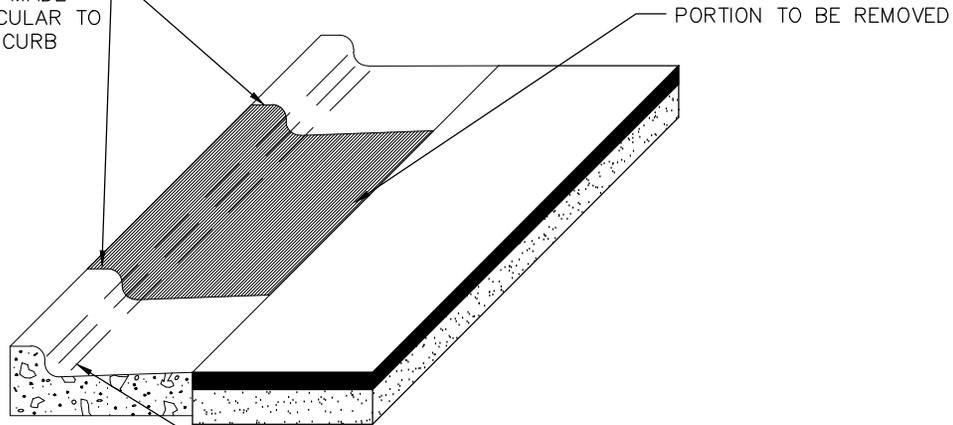


City of Asheville, NC
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 and Details Manual

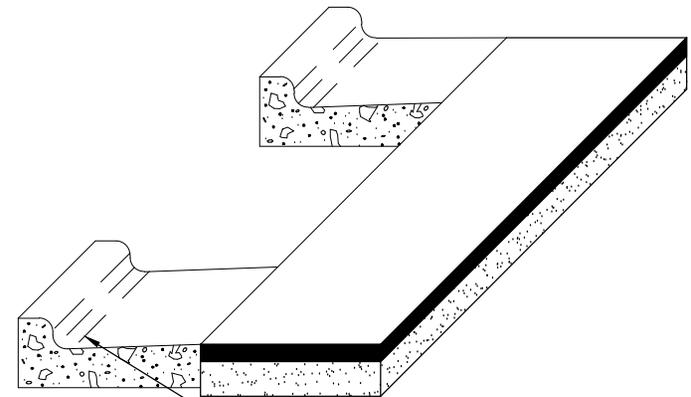
**MEDIAN ISLAND w/STANDARD
 STAND-UP CURB**

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.11C

A 2" DEEP CUT SHALL BE MADE PERPENDICULAR TO BACK OF CURB



STEP ONE



STEP TWO

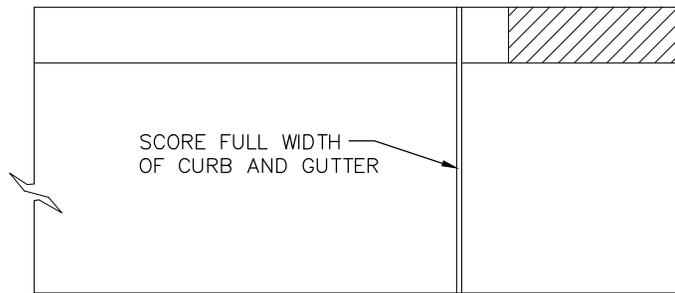
NOTE:

CURB AND GUTTER SECTION SHALL BE REMOVED IN ACCORDANCE WITH DRIVEWAY WIDTH APPROVED BY THE CITY OF ASHEVILLE.

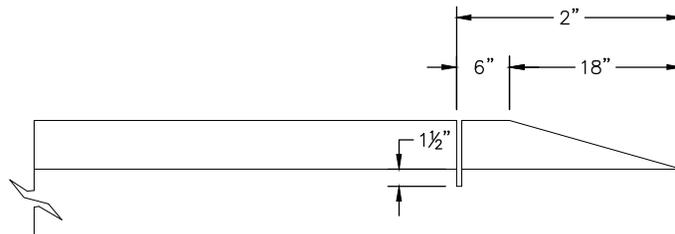
IF PERPENDICULAR CUT IS WITHIN 12" FROM A JOINT, THEN THE PARALLEL CUT SHALL BE MADE TO THAT JOINT.



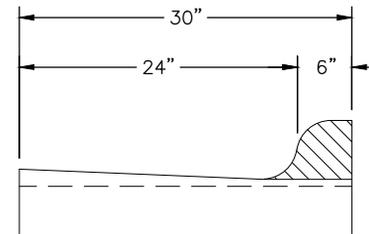
REVISIONS	
DATE	DESCRIPTION



PLAN



FRONT

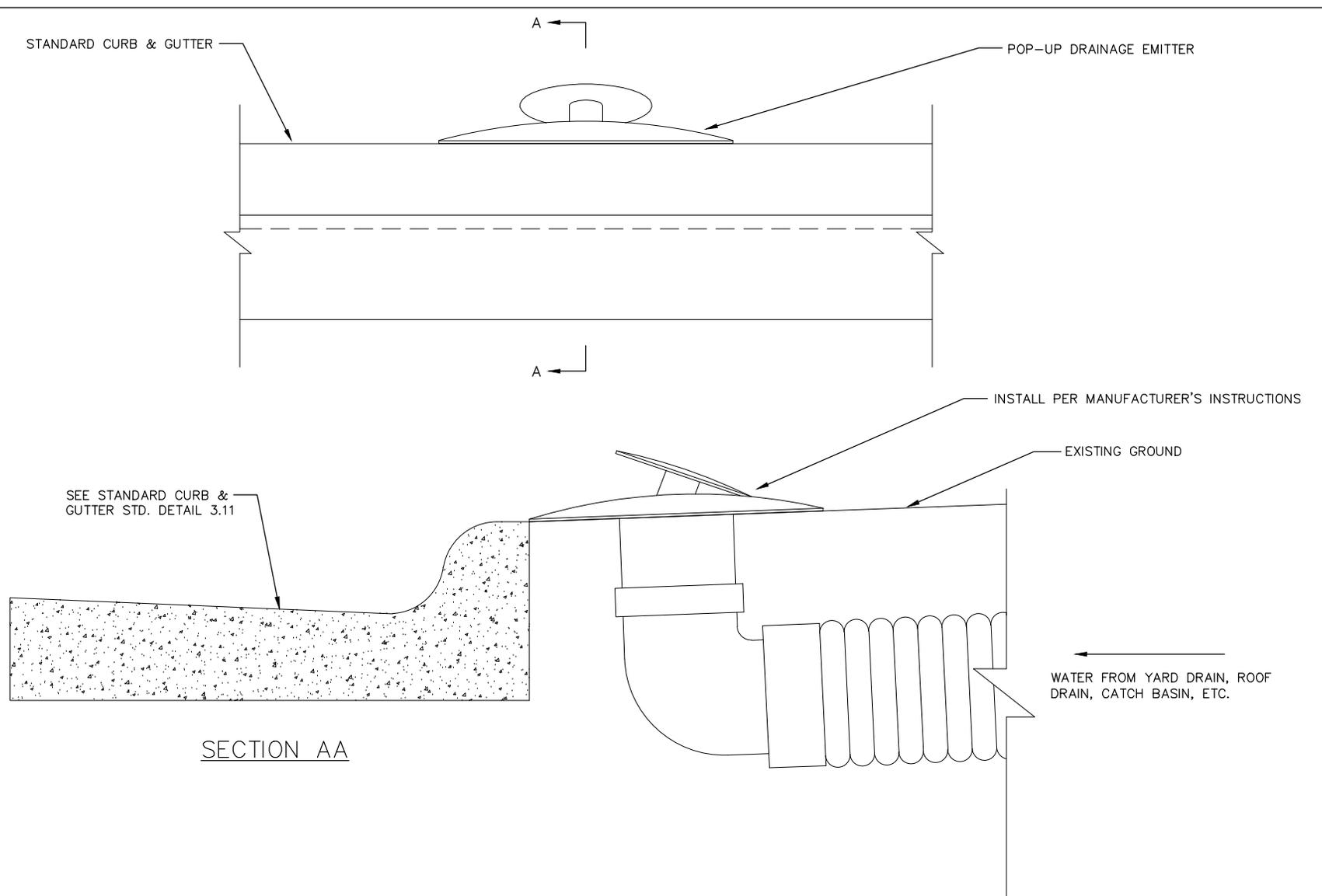


END



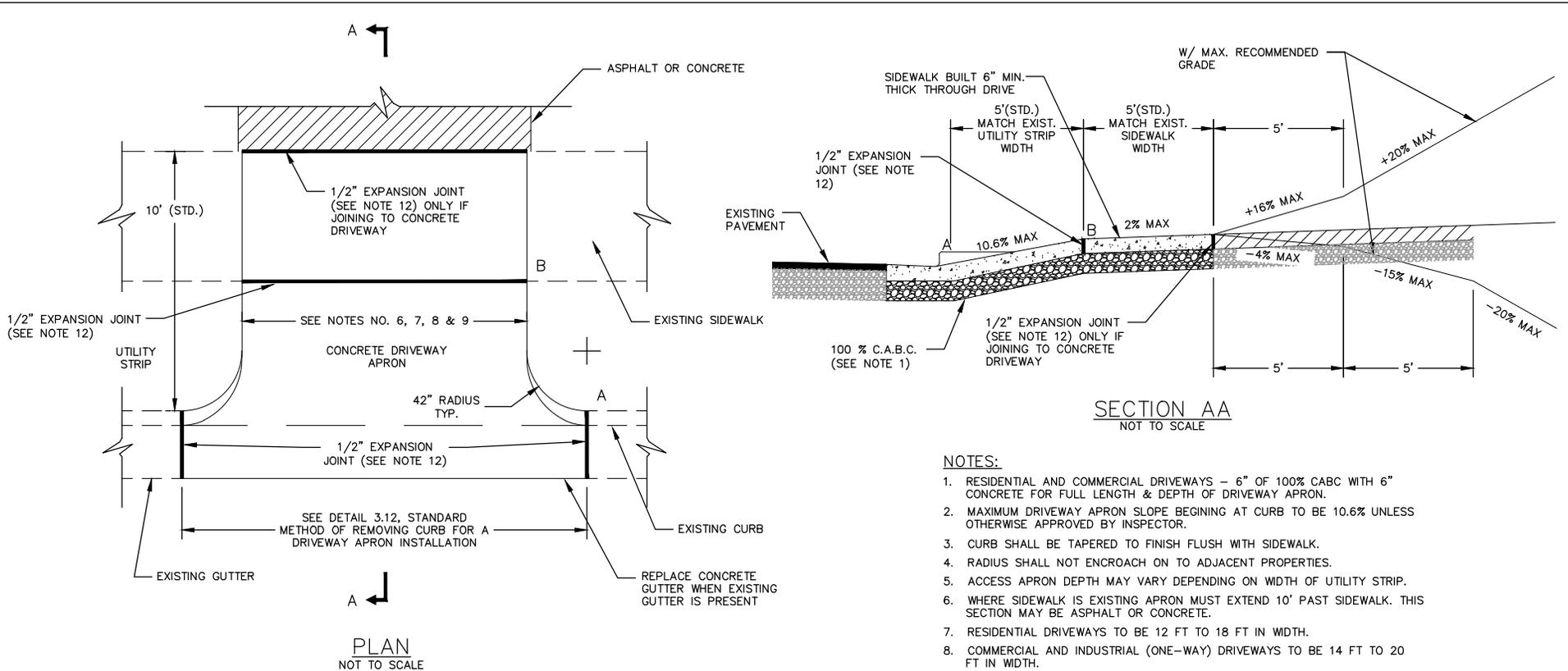
**STANDARD METHOD OF ENDING
CURB AND GUTTER**

REVISIONS	
DATE	DESCRIPTION



POP-UP DRAINAGE EMITTER

REVISIONS	
DATE	DESCRIPTION



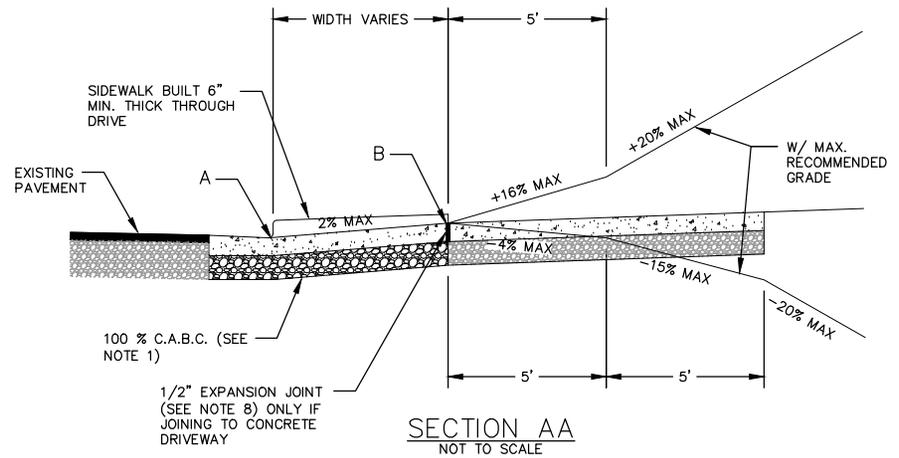
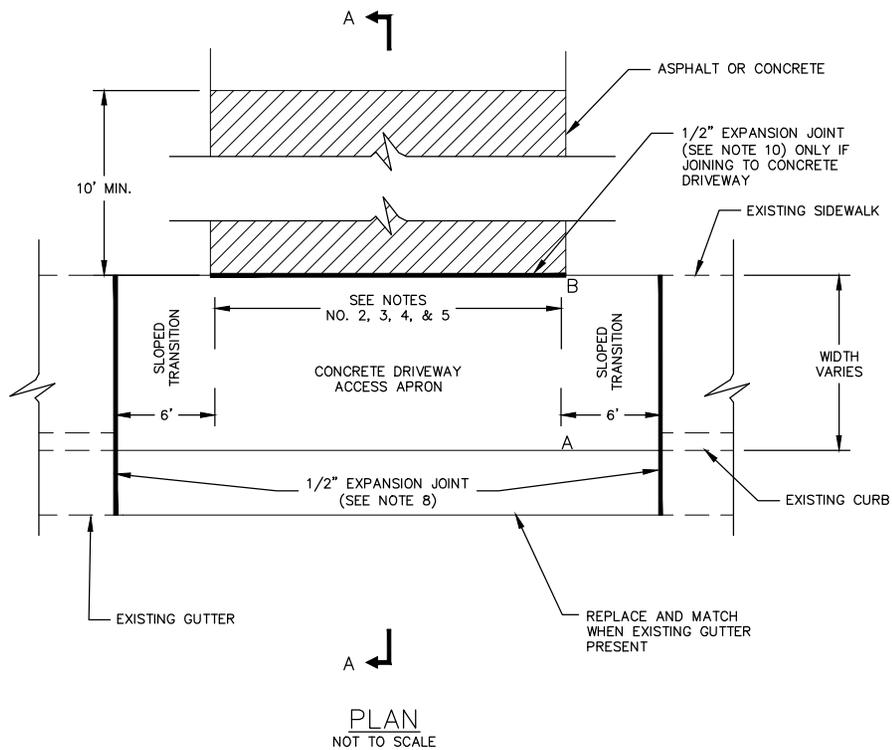
NOTES:

1. RESIDENTIAL AND COMMERCIAL DRIVEWAYS - 6" OF 100% C.A.B.C. WITH 6" CONCRETE FOR FULL LENGTH & DEPTH OF DRIVEWAY APRON.
2. MAXIMUM DRIVEWAY APRON SLOPE BEGINNING AT CURB TO BE 10.6% UNLESS OTHERWISE APPROVED BY INSPECTOR.
3. CURB SHALL BE TAPERED TO FINISH FLUSH WITH SIDEWALK.
4. RADIUS SHALL NOT ENCR OACH ON TO ADJACENT PROPERTIES.
5. ACCESS APRON DEPTH MAY VARY DEPENDING ON WIDTH OF UTILITY STRIP.
6. WHERE SIDEWALK IS EXISTING APRON MUST EXTEND 10' PAST SIDEWALK. THIS SECTION MAY BE ASPHALT OR CONCRETE.
7. RESIDENTIAL DRIVEWAYS TO BE 12 FT TO 18 FT IN WIDTH.
8. COMMERCIAL AND INDUSTRIAL (ONE-WAY) DRIVEWAYS TO BE 14 FT TO 20 FT IN WIDTH.
9. COMMERCIAL AND INDUSTRIAL (TWO-WAY) DRIVEWAYS TO BE 24 FT TO 36 FT IN WIDTH.
10. ALL CONCRETE SHALL BE A MINIMUM OF 4000 P.S.I.
11. ELEV. "B" MINUS ELEV. "A" MUST NOT BE THAN LESS 1 INCH.
12. 1/2 INCH EXPANSION JOINTS TO BE FILLED WITH JOINT FILLER AND SEALER PLACED BETWEEN ALL RIGID OBJECTS AS SHOWN EXTENDING TO THE FULL DEPTH OF THE CONCRETE WITH THE TOP OF THE FILLER 1/2 INCH BELOW THE FINISHED SURFACE. JOINT FILLER MATERIALS SHALL BE IN ACCORDANCE WITH THE "JOINT MATERIALS" SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.



**STANDARD DRIVEWAY APRON
WITH SIDEWALK & UTILITY STRIP**

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.15

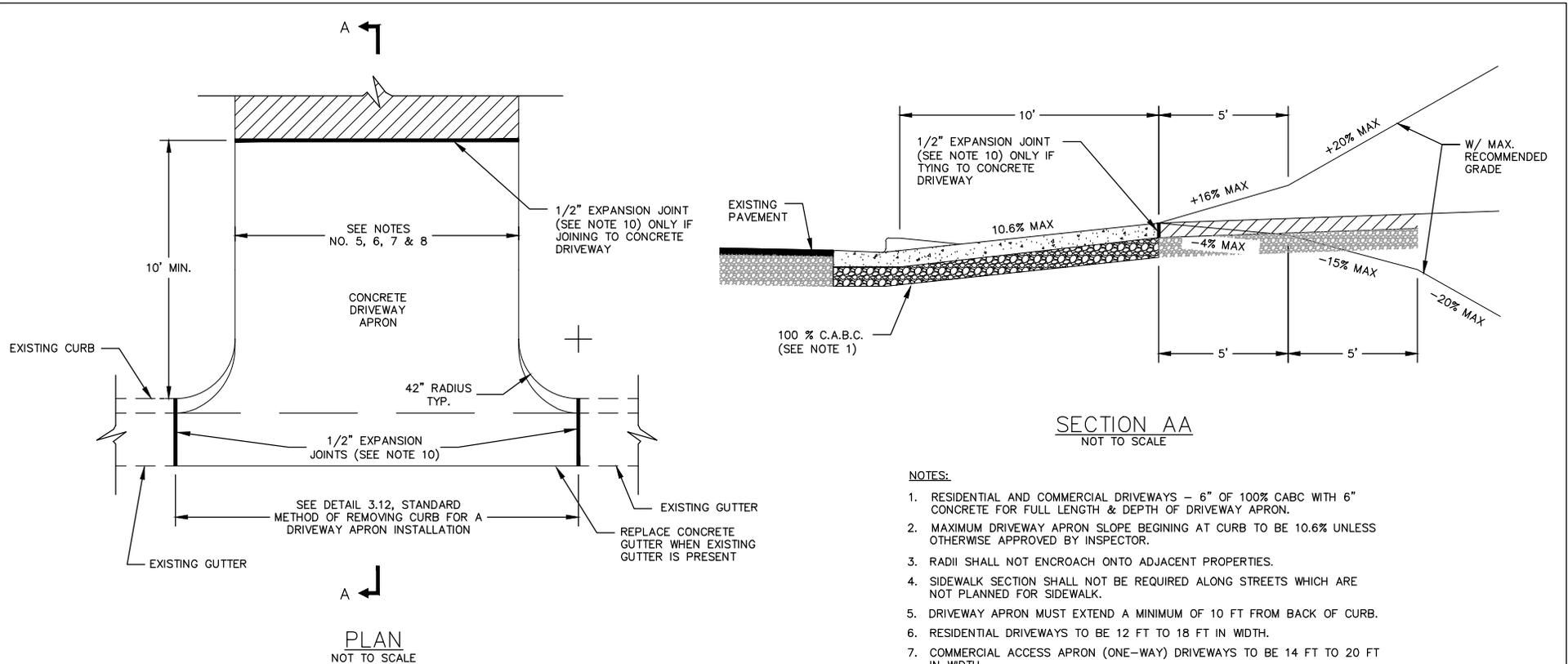


NOTES:

1. RESIDENTIAL AND COMMERCIAL DRIVEWAYS – 6" OF 100% CABC WITH 6" CONCRETE FOR FULL LENGTH & DEPTH OF DRIVEWAY APRON.
2. WHERE SIDEWALK IS OR TO BE INSTALLED, DRIVEWAY APRON MUST EXTEND A MINIMUM OF 10' PAST SIDEWALK. THIS SECTION MAY BE CONCRETE OF ASPHALT.
3. RESIDENTIAL DRIVEWAYS TO BE 12' TO 18' IN WIDTH.
4. COMMERCIAL ACCESS APRON (ONE-WAY) DRIVEWAYS TO BE 14 FT TO 20 FT IN WIDTH.
5. COMMERCIAL ACCESS APRON (TWO-WAY) DRIVEWAYS TO BE 24 FT TO 36 FT IN WIDTH.
6. ALL CONCRETE SHALL BE A MINIMUM OF 4000 P.S.I.
7. ELEV. "B" MINUS ELEV. "A" EQUALS 1 INCH.
8. ½ INCH EXPANSION JOINTS TO BE FILLED WITH JOINT FILLER AND SEALER PLACED BETWEEN ALL RIGID OBJECTS AS SHOWN EXTENDING TO THE FULL DEPTH OF THE CONCRETE WITH THE TOP OF THE FILLER ½ INCH BELOW THE FINISHED SURFACE. JOINT FILLER MATERIALS SHALL BE IN ACCORDANCE WITH THE 'JOINT MATERIALS' SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.



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		3.15A

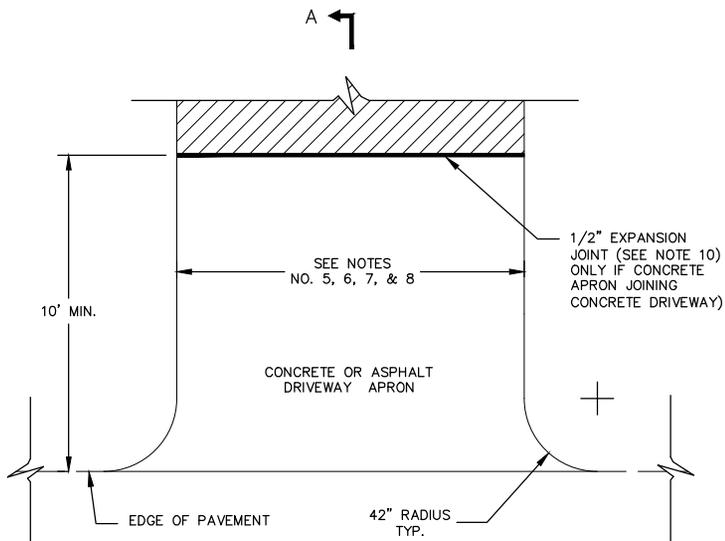


SECTION AA
NOT TO SCALE

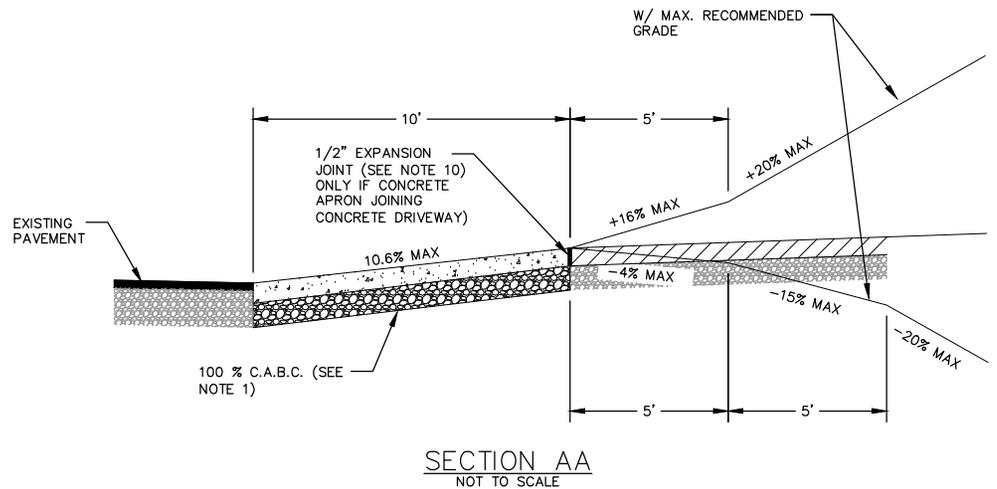
- NOTES:
1. RESIDENTIAL AND COMMERCIAL DRIVEWAYS – 6" OF 100% CABC WITH 6" CONCRETE FOR FULL LENGTH & DEPTH OF DRIVEWAY APRON.
 2. MAXIMUM DRIVEWAY APRON SLOPE BEGINING AT CURB TO BE 10.6% UNLESS OTHERWISE APPROVED BY INSPECTOR.
 3. RADII SHALL NOT ENCR OACH ONTO ADJACENT PROPERTIES.
 4. SIDEWALK SECTION SHALL NOT BE REQUIRED ALONG STREETS WHICH ARE NOT PLANNED FOR SIDEWALK.
 5. DRIVEWAY APRON MUST EXTEND A MINIMUM OF 10 FT FROM BACK OF CURB.
 6. RESIDENTIAL DRIVEWAYS TO BE 12 FT TO 18 FT IN WIDTH.
 7. COMMERCIAL ACCESS APRON (ONE-WAY) DRIVEWAYS TO BE 14 FT TO 20 FT IN WIDTH.
 8. COMMERCIAL ACCESS APRON (TWO-WAY) DRIVEWAYS TO BE 24 FT TO 36 FT IN WIDTH.
 9. ALL CONCRETE SHALL BE A MINIMUM OF 4000 P.S.I.
 10. INCH EXPANSION JOINTS TO BE FILLED WITH JOINT FILLER AND SEALER PLACED BETWEEN ALL RIGID OBJECTS AS SHOWN EXTENDING TO THE FULL DEPTH OF THE CONCRETE WITH THE TOP OF THE FILLER 1/2 INCH BELOW THE FINISHED SURFACE. JOINT FILLER MATERIALS SHALL BE IN ACCORDANCE WITH THE "JOINT MATERIALS" SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.

STANDARD DRIVEWAY ACCESS APRON WITH CURB & GUTTER & WITHOUT SIDEWALK

REVISIONS	
DATE	DESCRIPTION



PLAN
NOT TO SCALE



SECTION AA
NOT TO SCALE

NOTES:

1. RESIDENTIAL AND COMMERCIAL DRIVEWAYS – 6" OF 100% CABC WITH 6" CONCRETE FOR FULL LENGTH & DEPTH OF DRIVEWAY APRON.
2. MAXIMUM DRIVEWAY APRON SLOPE BEGINNING AT EDGE OF PAVEMENT TO BE 10.6% UNLESS OTHERWISE APPROVED BY INSPECTOR.
3. RADII SHALL NOT ENCROACH ONTO ADJACENT PROPERTIES.
4. SIDEWALK SECTION SHALL NOT BE REQUIRED ALONG STREETS WHICH ARE NOT PLANNED FOR SIDEWALK.
5. DRIVEWAY APRON MUST EXTEND A MINIMUM OF 10 FT FROM EDGE OF PAVEMENT.
6. RESIDENTIAL DRIVEWAYS TO BE 12 FT TO 18 FT IN WIDTH.
7. COMMERCIAL ACCESS APRON (ONE-WAY) DRIVEWAYS TO BE 14 FT TO 20 FT IN WIDTH.
8. COMMERCIAL ACCESS APRON (TWO-WAY) DRIVEWAYS TO BE 24 FT TO 36 FT IN WIDTH.
9. ALL CONCRETE SHALL BE A MINIMUM OF 4000 P.S.I.
10. INCH EXPANSION JOINTS TO BE FILLED WITH JOINT FILLER AND SEALER PLACED BETWEEN ALL RIGID OBJECTS AS SHOWN EXTENDING TO THE FULL DEPTH OF THE CONCRETE WITH THE TOP OF THE FILLER 1/2 INCH BELOW THE FINISHED SURFACE. JOINT FILLER MATERIALS SHALL BE IN ACCORDANCE WITH THE "JOINT MATERIALS" SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.

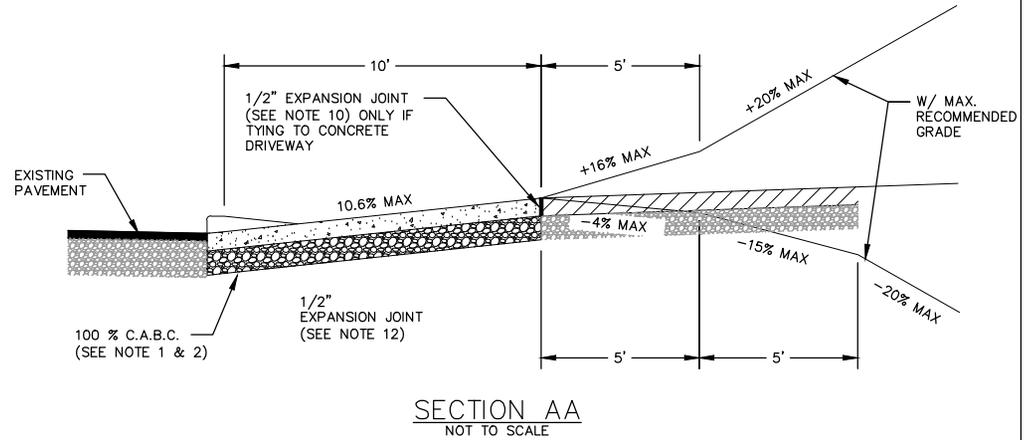
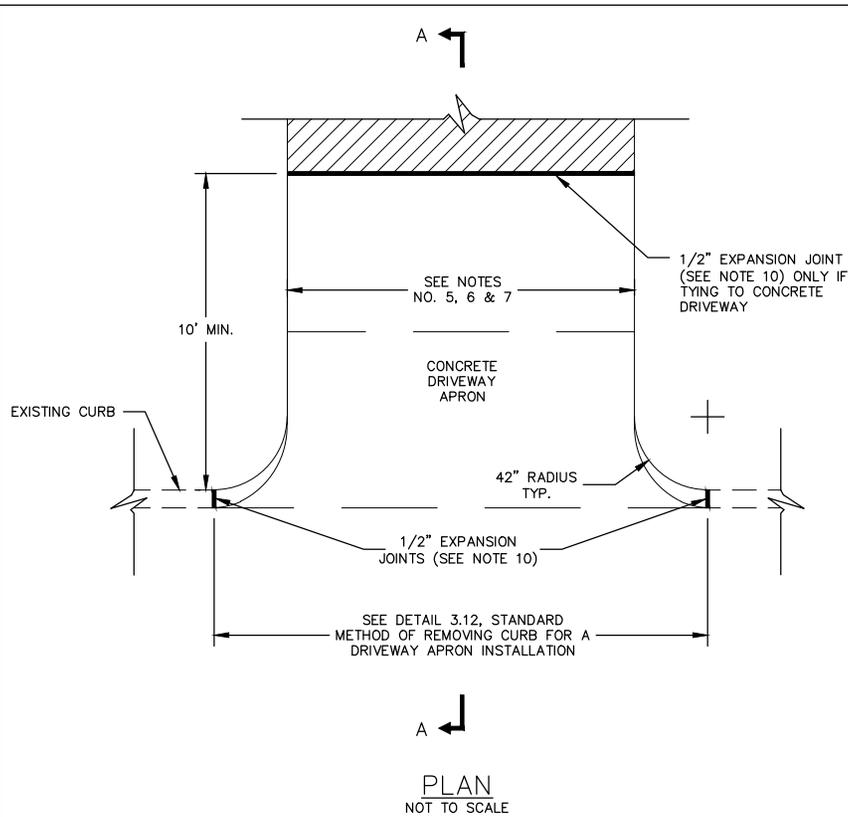


City of Asheville, NC
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**STANDARD DRIVEWAY ACCESS APRON
WITHOUT CURB & WITHOUT SIDEWALK**

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DATE	DESCRIPTION

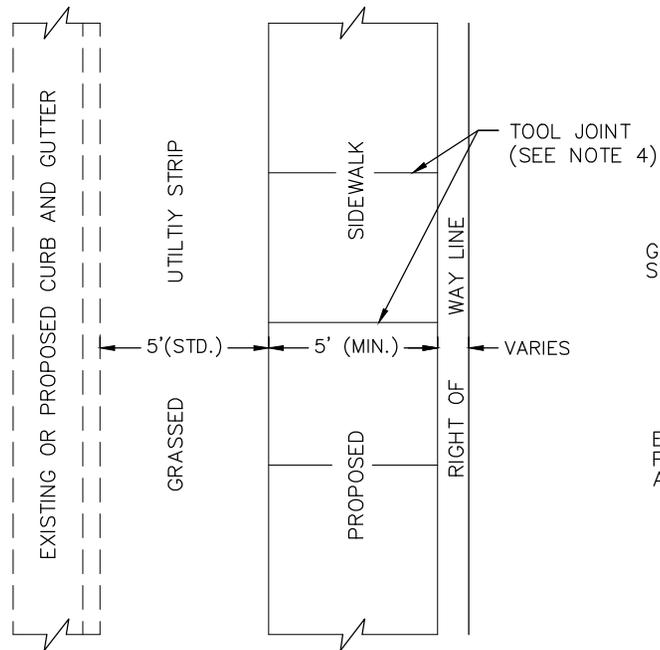
STD. NO.
3.15C



- NOTES:**
1. RESIDENTIAL AND COMMERCIAL DRIVEWAYS – 6" OF 100% CABG WITH 6" CONCRETE FOR FULL LENGTH & DEPTH OF DRIVEWAY APRON.
 2. MAXIMUM DRIVEWAY APRON SLOPE BEGINING AT CURB TO BE 10.6% UNLESS OTHERWISE APPROVED BY INSPECTOR.
 3. RADII SHALL NOT ENCROACH ONTO ADJACENT PROPERTIES.
 4. SIDEWALK SECTION SHALL NOT BE REQUIRED ALONG STREETS WHICH ARE NOT PLANNED FOR SIDEWALK.
 5. DRIVEWAY APRON MUST EXTEND A MINIMUM OF 10 FT FROM BACK OF CURB.
 6. RESIDENTIAL DRIVEWAYS TO BE 12 FT TO 18 FT IN WIDTH.
 7. COMMERCIAL ACCESS APRON (ONE-WAY) DRIVEWAYS TO BE 14 FT TO 20 FT IN WIDTH.
 8. COMMERCIAL ACCESS APRON (TWO-WAY) DRIVEWAYS TO BE 24 FT TO 36 FT IN WIDTH.
 9. ALL CONCRETE SHALL BE A MINIMUM OF 4000 P.S.I.
 10. INCH EXPANSION JOINTS TO BE FILLED WITH JOINT FILLER AND SEALER PLACED BETWEEN ALL RIGID OBJECTS AS SHOWN EXTENDING TO THE FULL DEPTH OF THE CONCRETE WITH THE TOP OF THE FILLER 1/2 INCH BELOW THE FINISHED SURFACE. JOINT FILLER MATERIALS SHALL BE IN ACCORDANCE WITH THE "JOINT MATERIALS" SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.

**STANDARD DRIVEWAY ACCESS APRON WITH
 STAND UP CURB & WITHOUT SIDEWALK**

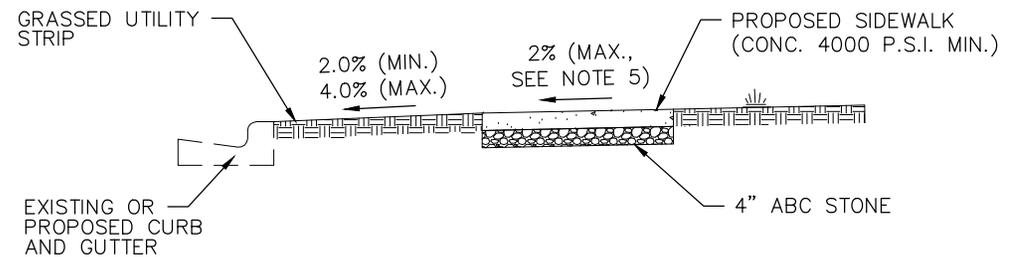
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	DESCRIPTION	
		3.15D



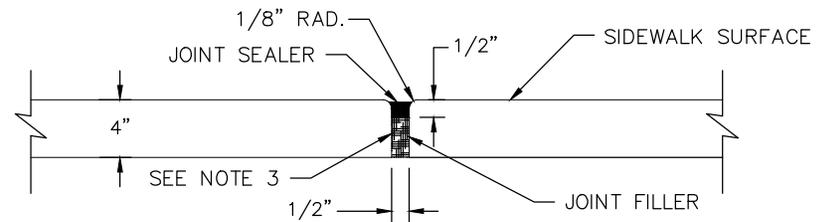
PLAN VIEW

NOTES:

1. TRANSVERSE EXPANSION JOINTS TO BE A MAXIMUM OF 50 FEET.
2. ALL CONCRETE TO BE FINISHED WITH CURING COMPOUND.
3. EXPANSION JOINT MATERIALS SHALL BE IN ACCORDANCE WITH THE "JOINT MATERIALS" SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.
4. TOOL JOINTS SHALL BE SPACED TO MATCH THE WIDTH OF THE SIDEWALK BUT BE NO LESS THAN FIVE (5) FEET APART. TOOL JOINTS SHALL BE 3/4 INCH DEEP AND MUST NOT BE SEALED.
5. THE DOWN DIRECTION OF THE 2% (MAX.) CROSS SLOPE OF THE PROPOSED SIDEWALK IS TYPICAL AS SHOWN FOR DRAINAGE TOWARD ROADWAY. ACTUAL DOWN DIRECTION TO BE DETERMINED BY PROJECT'S EXISTING AND/OR PROPOSED TOPOGRAPHY.



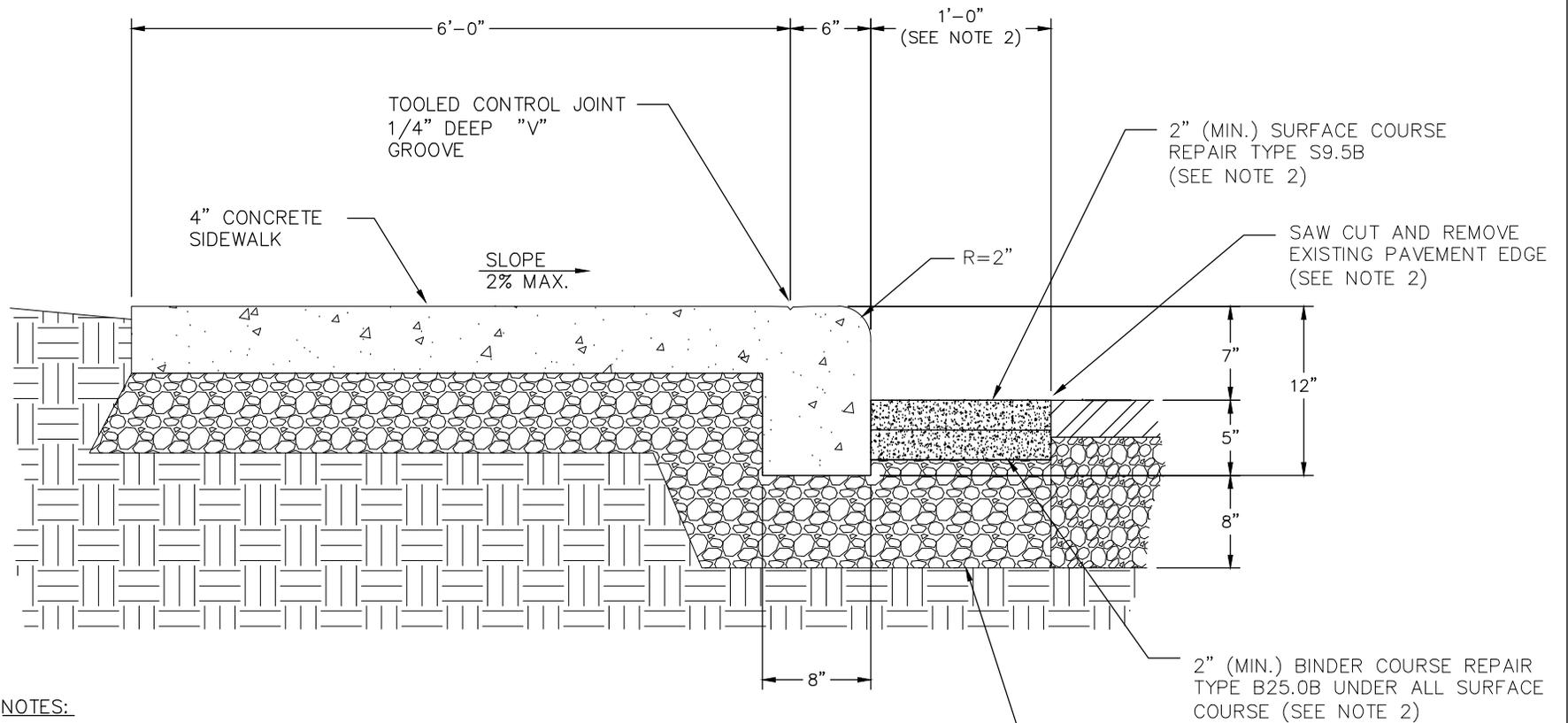
TYPICAL SECTION



TRANSVERSE EXPANSION JOINT



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	DESCRIPTION	
		3.16



NOTES:

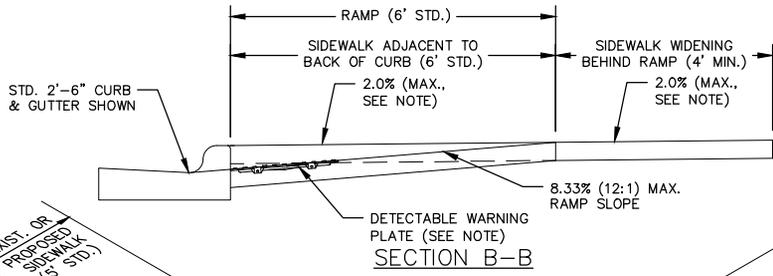
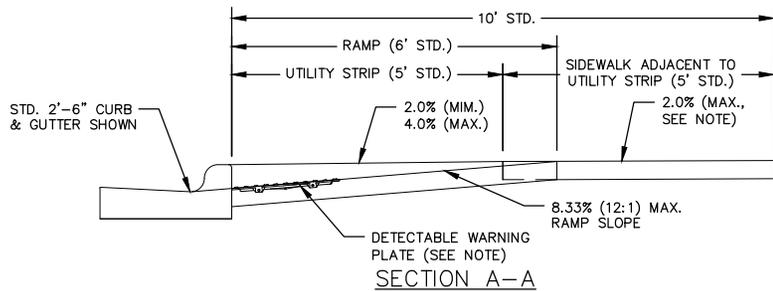
1. THE CITY TRAFFIC ENGINEER TO APPROVE THE USE OF MONOLITHIC CURB SIDEWALK.
2. THE 1'-0" SAW CUT, REMOVAL, AND THE REPAIR OF ABC STONE, BINDER, SURFACE COURSE FROM FACE OF CURB IS ONLY FOR THE INSTALLATION OF THE MONOLITHIC CURB & SIDEWALK ADJACENT TO AN EXISTING STREET.



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MONOLITHIC CURB & SIDEWALK

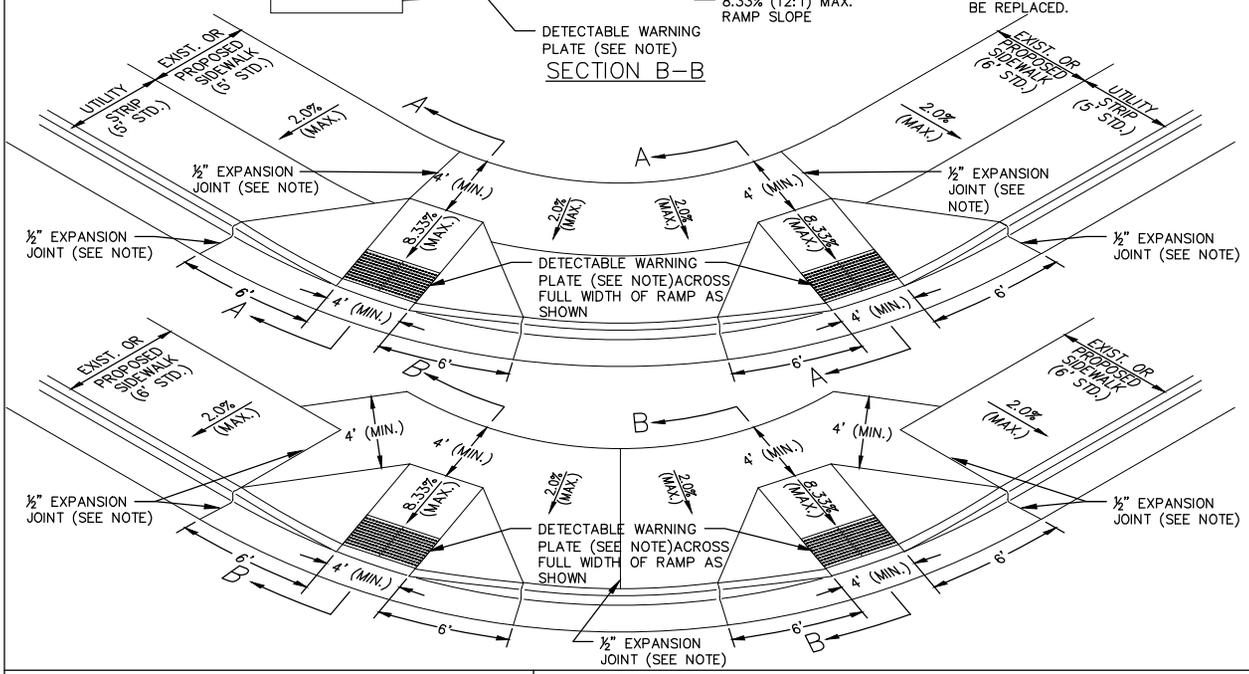
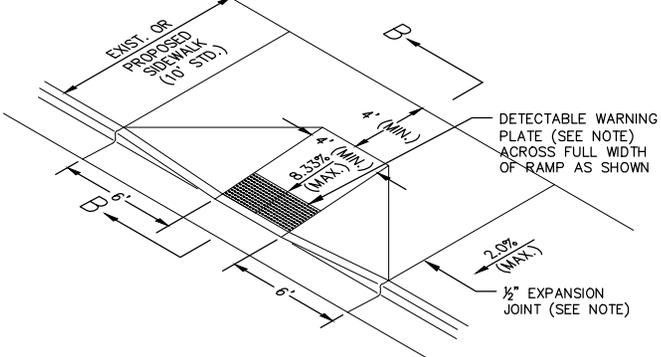
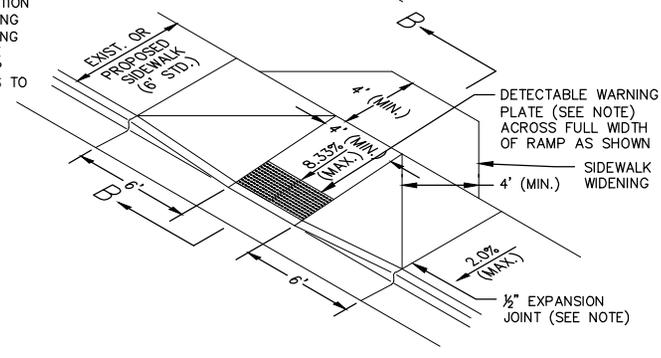
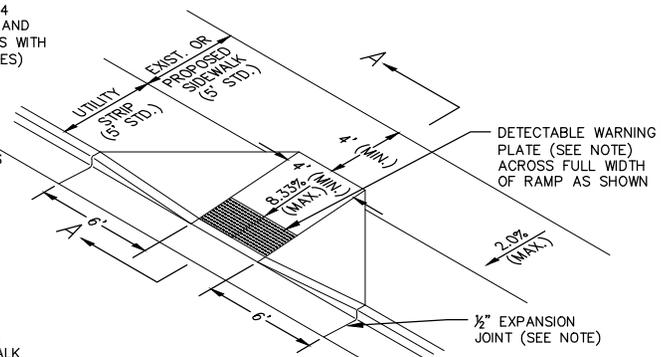
REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.16A



DETECTABLE WARNING PLATE:
 USE NEENAH FOUNDRY COMPANY R-4984
 DETECTABLE WARNING PLATE OR EQUAL AND
 MUST COMPLY WITH ADAAG (AMERICANS WITH
 DISABILITIES ACT ACCESSIBILITY GUIDELINES)
 AND ARCHITECTURAL BARRIER ACT 1968
 GUIDELINES.

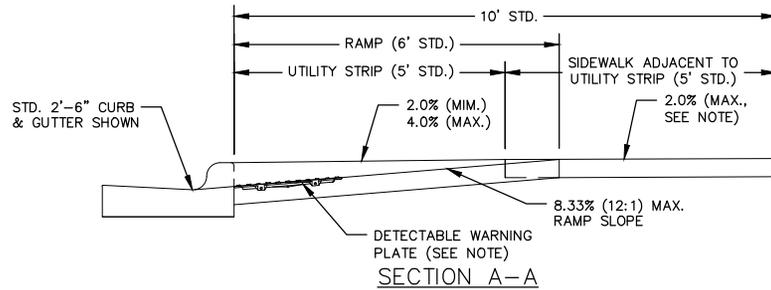
EXPANSION JOINT:
 1/2 INCH EXPANSION JOINTS TO BE
 FILLED WITH JOINT FILLER AND SEALER
 PLACED BETWEEN ALL RIGID OBJECTS AS
 SHOWN EXTENDING TO THE FULL DEPTH
 OF THE CONCRETE WITH THE TOP OF
 THE FILLER 1/2 INCH BELOW THE FINISHED
 SURFACE. JOINT FILLER MATERIALS
 SHALL BE IN ACCORDANCE WITH THE
 "JOINT MATERIALS" SECTION OF THE
 MOST CURRENT NCDOT STANDARD
 SPECIFICATIONS FOR ROAD STRUCTURES
 MANUAL.

2% (MAX.) SIDEWALK CROSS SLOPE:
 THE DOWN DIRECTION OF THE 2% (MAX.)
 CROSS SLOPE OF THE PROPOSED SIDEWALK
 IS TYPICAL AS SHOWN FOR DRAINAGE
 TOWARD ROADWAY. ACTUAL DOWN DIRECTION
 TO BE DETERMINED BY PROJECT'S EXISTING
 AND/OR PROPOSED TOPOGRAPHY. EXISTING
 SIDEWALK TO REMAIN AS IS UNLESS THE
 INSTALLATION OF THE WHEELCHAIR RAMP
 REQUIRES ADJACENT SIDEWALK SECTIONS TO
 BE REPLACED.

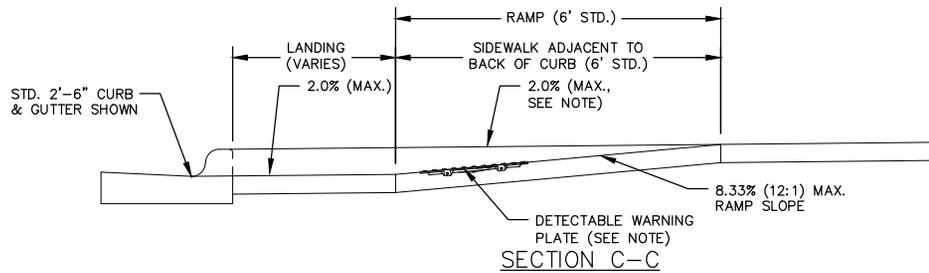


STANDARD WHEELCHAIR RAMP

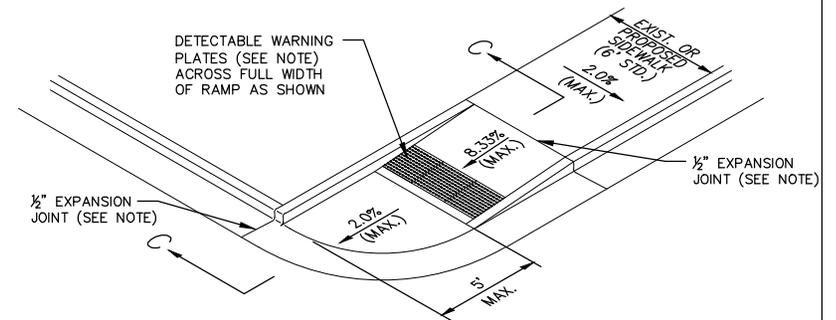
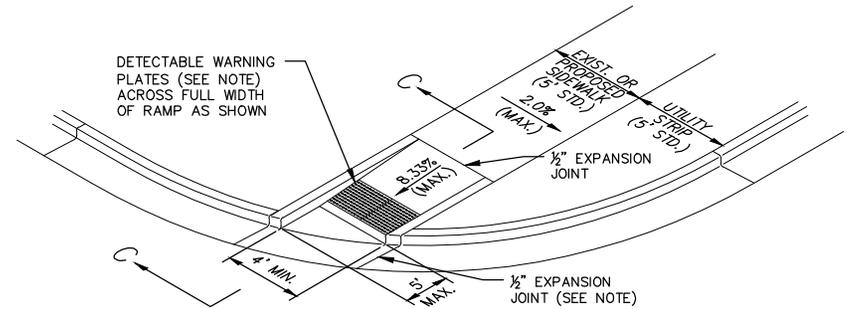
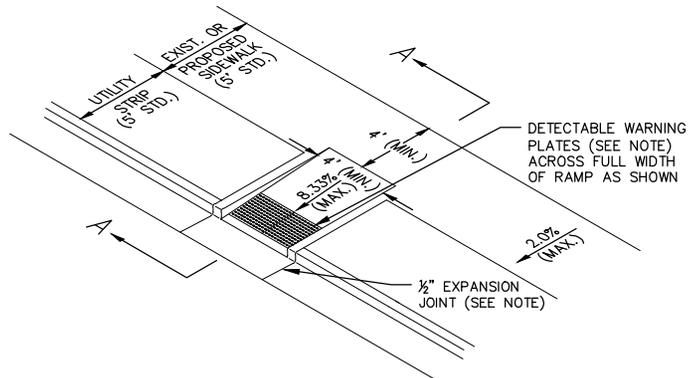
REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.17



SECTION A-A



SECTION C-C



DETECTABLE WARNING PLATE:

USE NEENAH FOUNDRY COMPANY R-4984 DETECTABLE WARNING PLATE OR EQUAL AND MUST COMPLY WITH ADAAG (AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES) AND ARCHITECTURAL BARRIER ACT 1968 GUIDELINES.

EXPANSION JOINT:

1/2 INCH EXPANSION JOINTS TO BE FILLED WITH JOINT FILLER AND SEALER PLACED BETWEEN ALL RIGID OBJECTS AS SHOWN EXTENDING TO THE FULL DEPTH OF THE CONCRETE WITH THE TOP OF THE FILLER 1/2 INCH BELOW THE FINISHED SURFACE. JOINT FILLER MATERIALS SHALL BE IN ACCORDANCE WITH THE "JOINT MATERIALS" SECTION OF THE MOST CURRENT NCDOT STANDARD SPECIFICATIONS FOR ROAD STRUCTURES MANUAL.

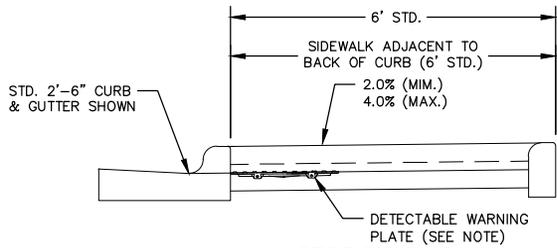
2% (MAX.) SIDEWALK CROSS SLOPE:

THE DOWN DIRECTION OF THE 2% (MAX.) CROSS SLOPE OF THE PROPOSED SIDEWALK IS TYPICAL AS SHOWN FOR DRAINAGE TOWARD ROADWAY. ACTUAL DOWN DIRECTION TO BE DETERMINED BY PROJECT'S EXISTING AND/OR PROPOSED TOPOGRAPHY. EXISTING SIDEWALK TO REMAIN AS IS UNLESS THE INSTALLATION OF THE WHEELCHAIR RAMP REQUIRES ADJACENT SIDEWALK SECTIONS TO BE REPLACED.

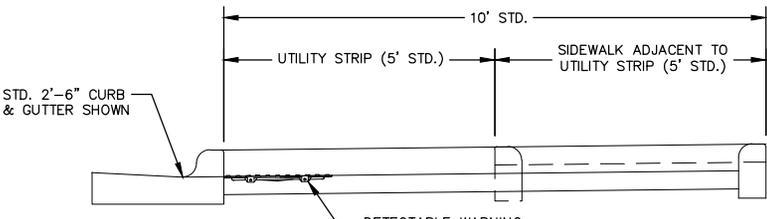


STANDARD WHEELCHAIR RAMP

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.17A



SECTION D-D

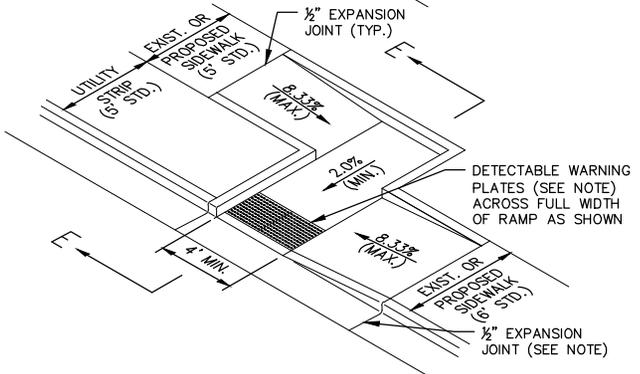
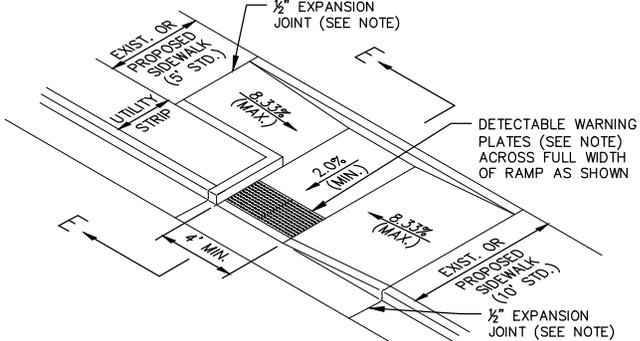
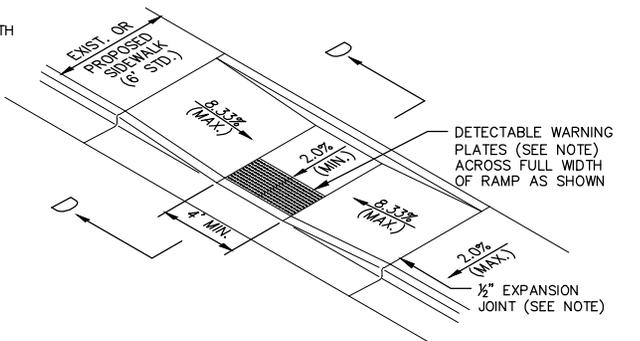
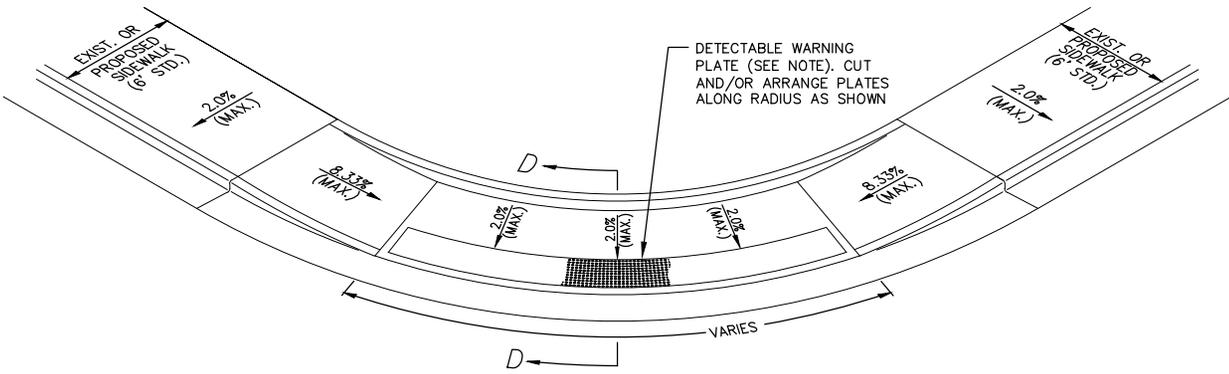


SECTION E-E

DETECTABLE WARNING PLATE:
 USE NEENAH FOUNDRY COMPANY R-4984
 DETECTABLE WARNING PLATE OR EQUAL AND
 MUST COMPLY WITH ADAAG (AMERICANS WITH
 DISABILITIES ACT ACCESSIBILITY GUIDELINES)
 AND ARCHITECTURAL BARRIER ACT 1968
 GUIDELINES.

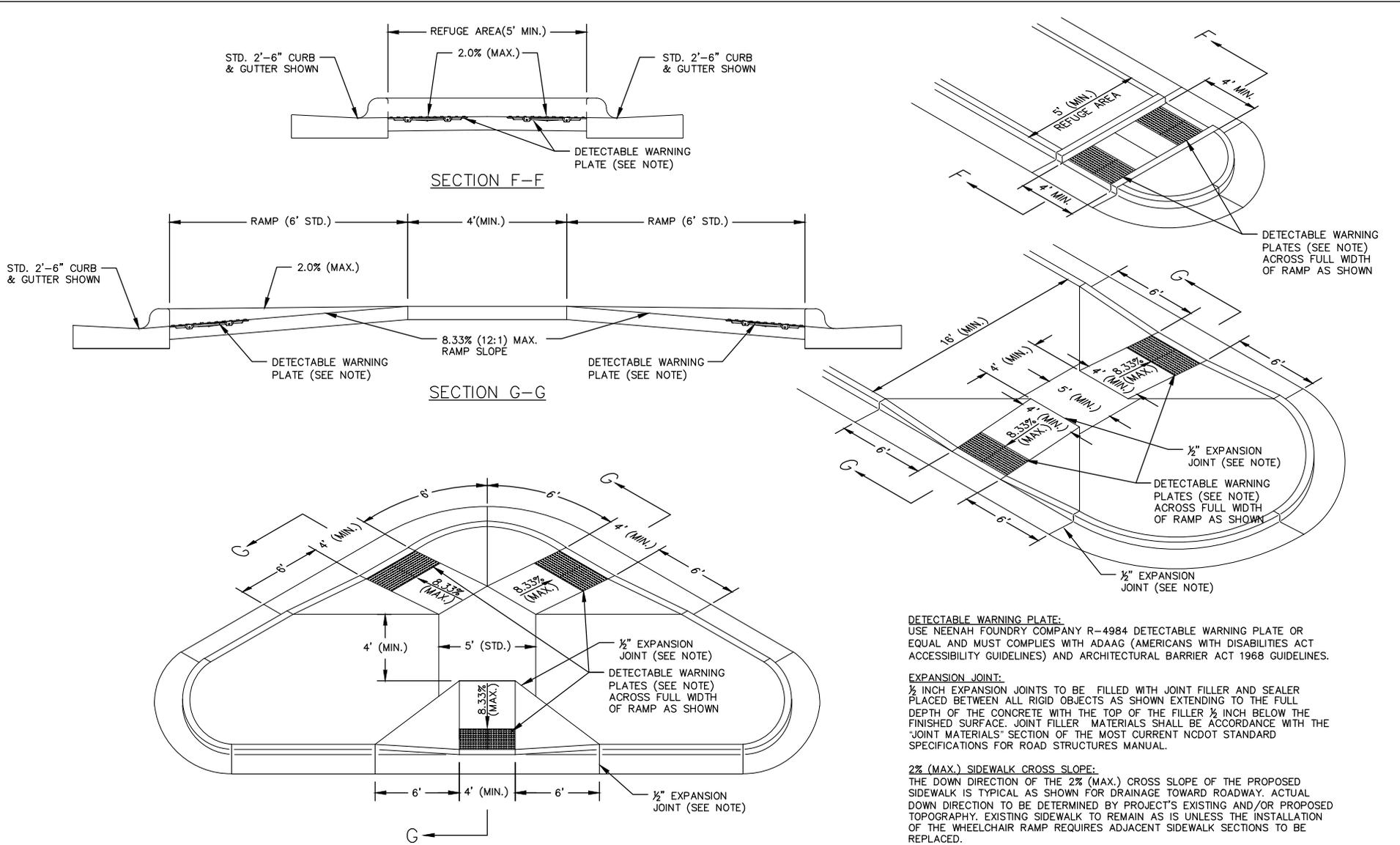
EXPANSION JOINT:
 1/2 INCH EXPANSION JOINTS TO BE
 FILLED WITH JOINT FILLER AND SEALER
 PLACED BETWEEN ALL RIGID OBJECTS AS
 SHOWN EXTENDING TO THE FULL DEPTH
 OF THE CONCRETE WITH THE TOP OF
 THE FILLER 1/2 INCH BELOW THE FINISHED
 SURFACE. JOINT FILLER MATERIALS
 SHALL BE ACCORDANCE WITH THE 'JOINT
 MATERIALS' SECTION OF THE MOST
 CURRENT NCDOT STANDARD
 SPECIFICATIONS FOR ROAD STRUCTURES
 MANUAL.

2% (MAX.) SIDEWALK CROSS SLOPE:
 THE DOWN DIRECTION OF THE 2% (MAX.)
 CROSS SLOPE OF THE PROPOSED SIDEWALK
 IS TYPICAL AS SHOWN FOR DRAINAGE
 TOWARD ROADWAY. ACTUAL DOWN DIRECTION
 TO BE DETERMINED BY PROJECT'S EXISTING
 AND/OR PROPOSED TOPOGRAPHY. EXISTING
 SIDEWALK TO REMAIN AS IS UNLESS THE
 INSTALLATION OF THE WHEELCHAIR RAMP
 REQUIRES ADJACENT SIDEWALK SECTIONS
 TO BE REPLACED.



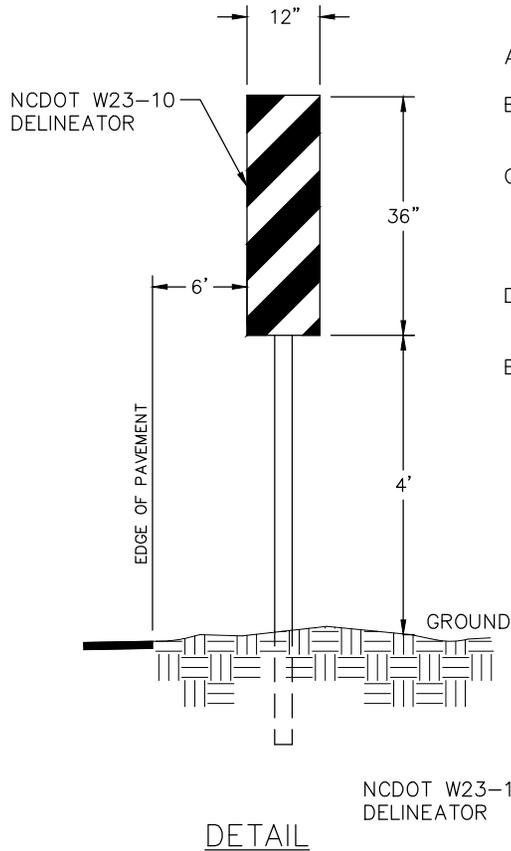
STANDARD WHEELCHAIR RAMP

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.17B



STANDARD WHEELCHAIR RAMP

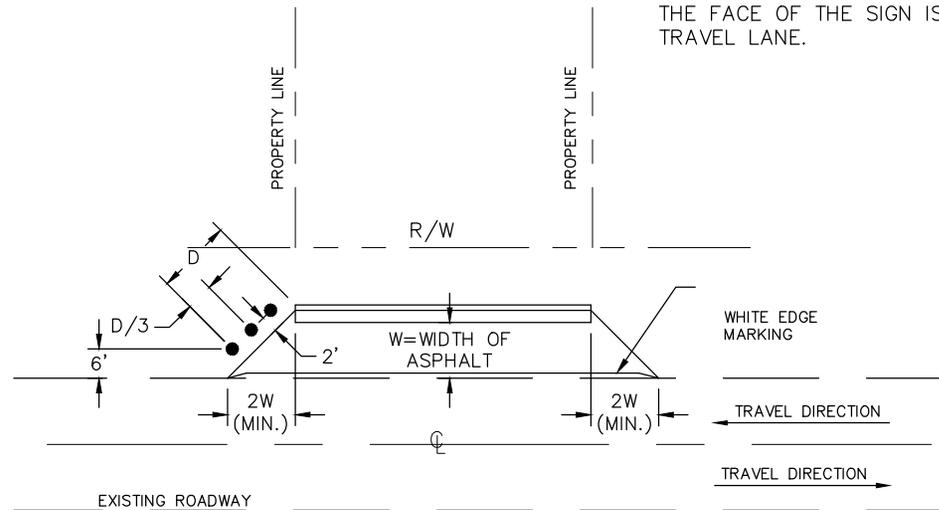
REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.17C



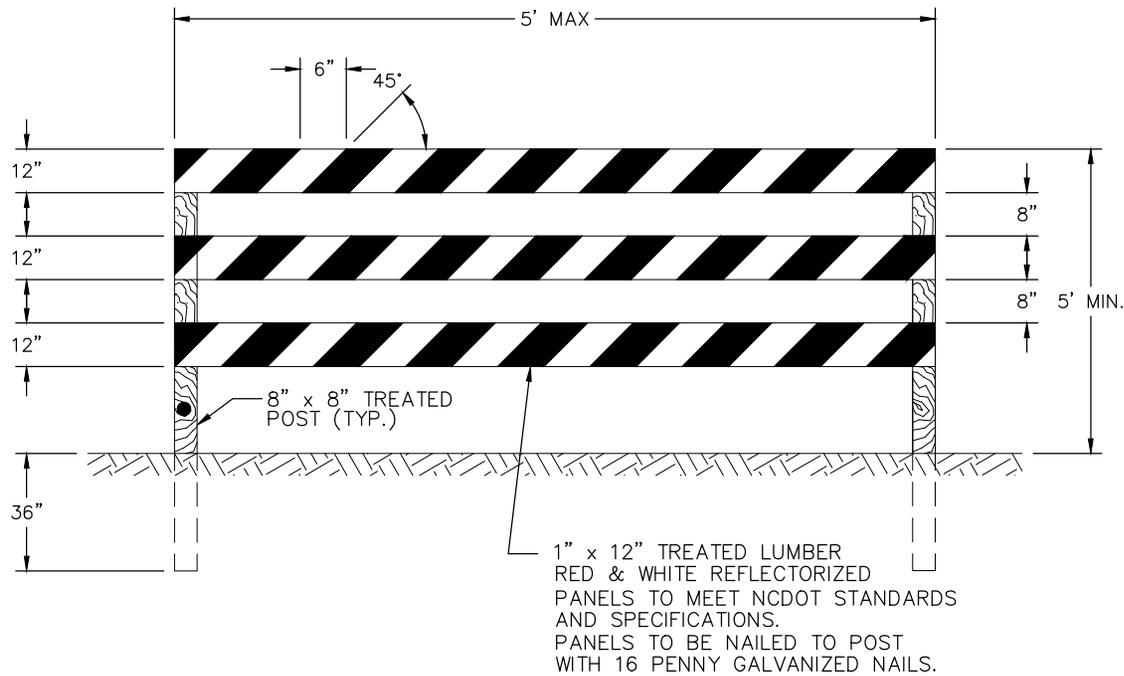
- A. BOTTOM EDGE OF DELINEATOR 4' ABOVE ROADWAY.
- B. THE DELINEATOR STRIPES SHALL SLOPE UPWARD AND OUTWARD FROM TRAFFIC.
- C. DELINEATORS TO BE SPACED ON CENTERS AT 1/3 OF THE DISTANCE D SHOWN BELOW FOR NEW ASPHALT WIDTHS < 15_FT. OR AT 1/4 OF D FOR NEW ASPHALT WIDTHS > 15 FT.
- D. DELINEATORS SHALL BE MOUNTED ON BREAKAWAY POSTS.
- E. DELINEATORS SHALL BE REFLECTORIZED.

NOTES:

1. TAPER ON BOTH ENDS OF ROADWAY WIDENING SHALL BE A MINIMUM 2:1. THE CITY OF ASHEVILLE AND/OR NCDOT RESERVE THE RIGHT TO REQUIRE A LONGER TAPER IF DEEMED NECESSARY FOR THE SAFETY OF THE PUBLIC.
2. A SOLID WHITE EDGE MARKING SHALL BE EXTENDED ALONG WIDENING AT EXISTING PAVEMENT.
3. DELINEATORS SHALL ONLY BE REQUIRED AT TAPER FROM CURB TO EXISTING PAVEMENT IN DIRECTION OF TRAVEL.
4. DELINEATORS SHALL BE ORIENTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.



REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.18



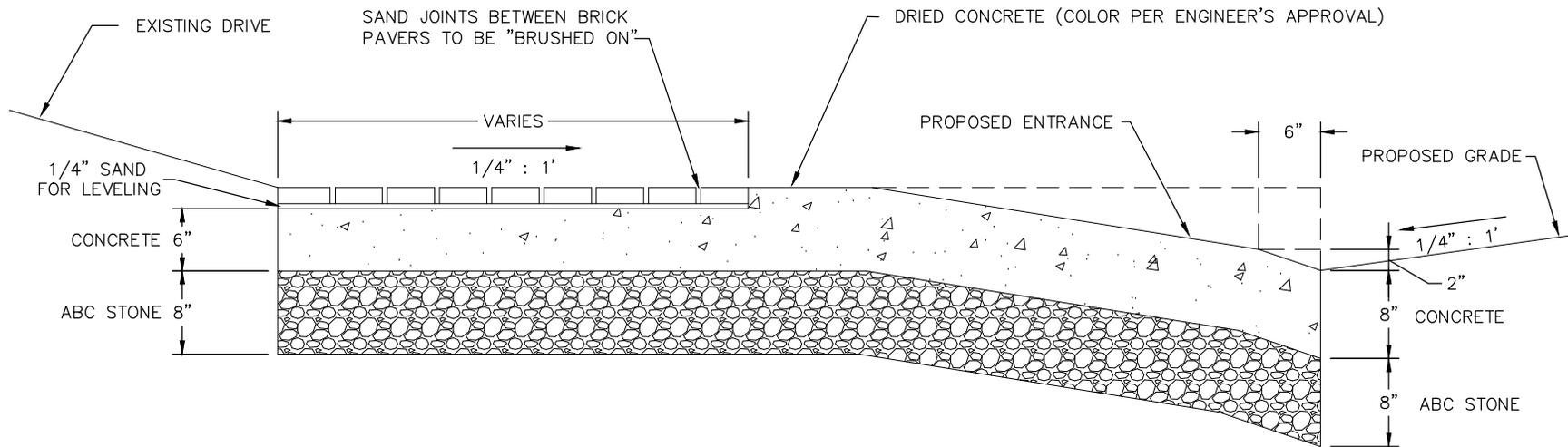
NOTES:

1. BARRICADE TO BE ERECTED ACROSS ENTIRE ROADWAY INCLUDING CURB & GUTTER.
2. ADVANCE WARNING SIGN W14-1 (DEAD END) SHALL BE PLACED JUST AFTER LAST INTERSECTING STREET.



**TEMPORARY BARRICADE FOR
DEAD END ROADS**

REVISIONS	
DATE	DESCRIPTION



NOT TO SCALE



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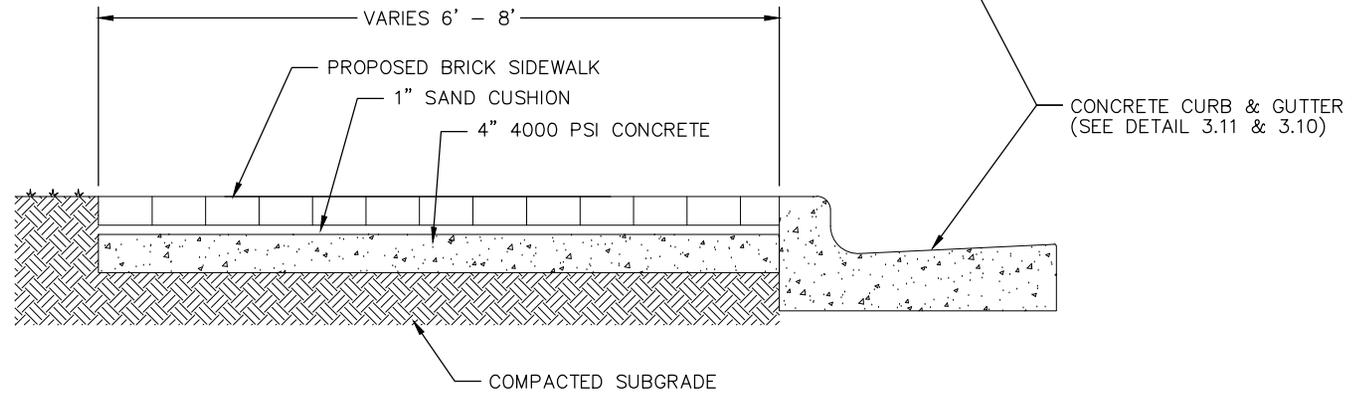
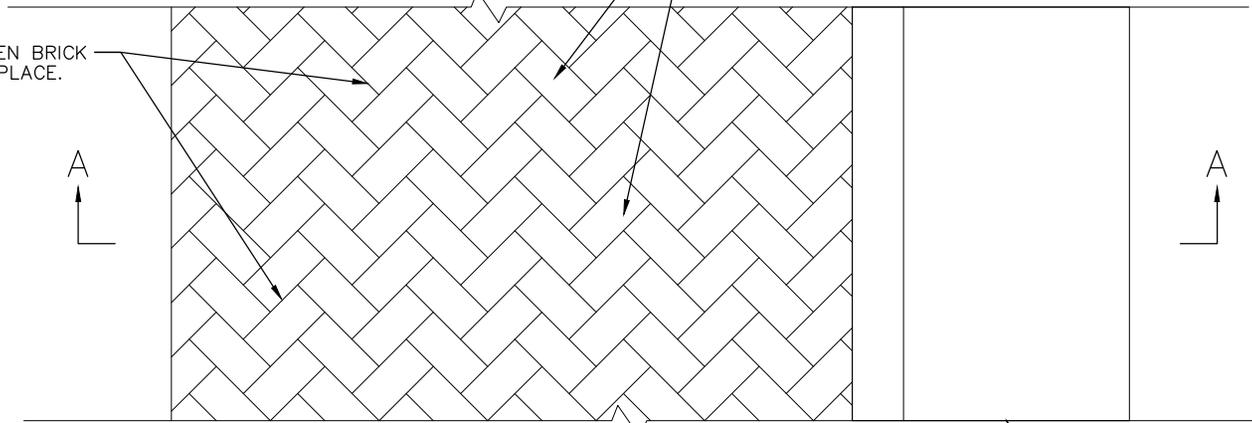
BRICK SIDEWALK AT DRIVEWAY ENTRANCES

REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.20

SAND JOINTS BETWEEN BRICK TO BE BRUSHED IN PLACE.

USE MODULAR BRICK PAVERS WITH A HERRINGBONE PATTERN WHEN INSTALLING BRICK SIDEWALKS. IN THE BILTMORE VILLAGE HISTORIC DISTRICT, USE MODULAR BRICK PAVERS, OF A MATCHING COLOR, UTILIZING A RUNNING BOND PATTERN. SAND JOINTS BETWEEN BRICK TO BE BRUSHED IN PLACE.



SECTION AA

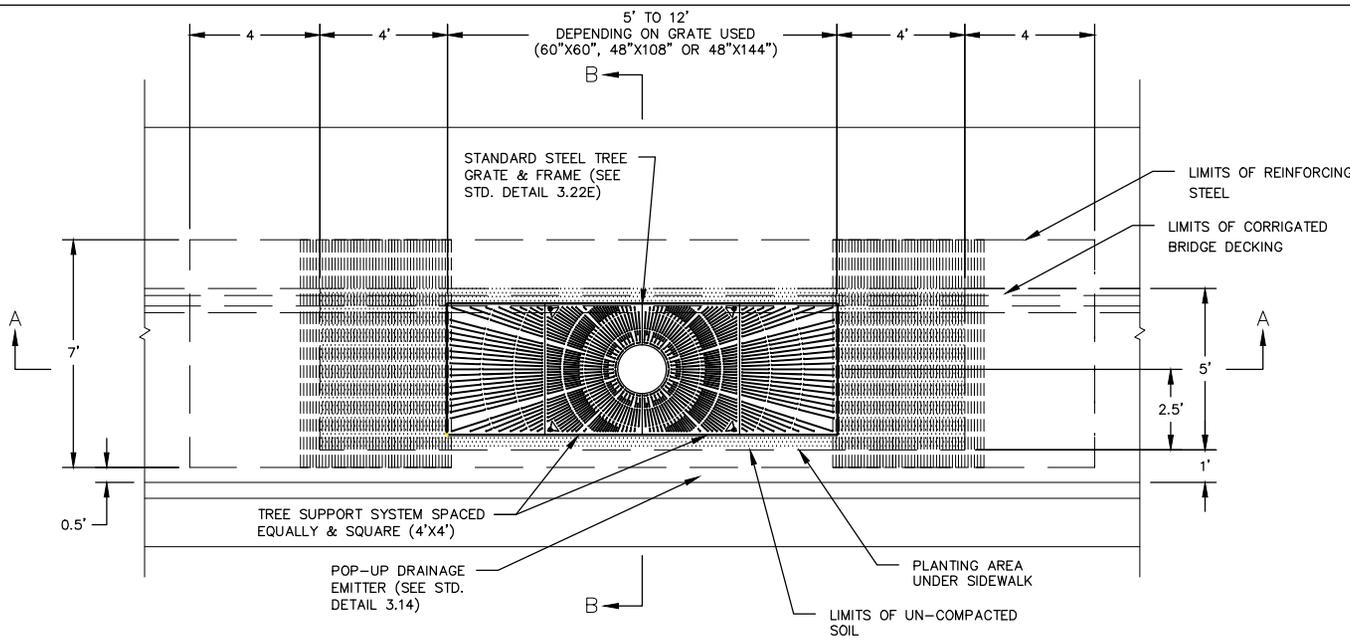


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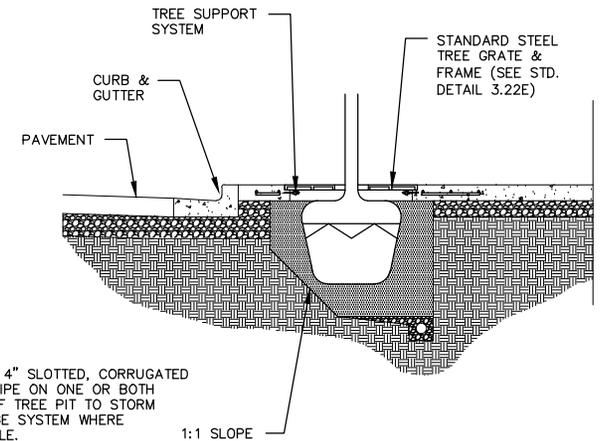
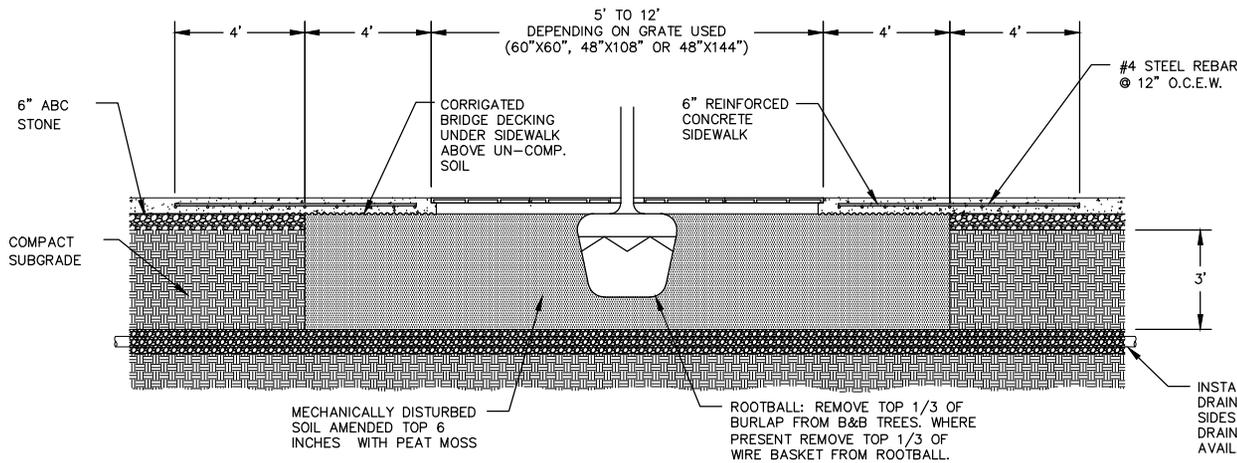
NEW BRICK SIDEWALK

REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.21



NOTES:
 TO REPAIR A CUT IN THIS AREA, SAW CUT A VERTICAL STRAIGHT CUT AND REMOVE CONCRETE STEEL, DRILL IN TO VERTICAL CONCRETE FACE AND DOWEL STEEL INTO EXISTING SIDEWALK SIX INCHES AND SECURE WITH APPROVED EPOXY. SPLICE STEEL IN NEW CUT A MINIMUM OF FOUR INCHES AND REPLACE REMAINING STEEL AS SHOWN.



SECTION A-A

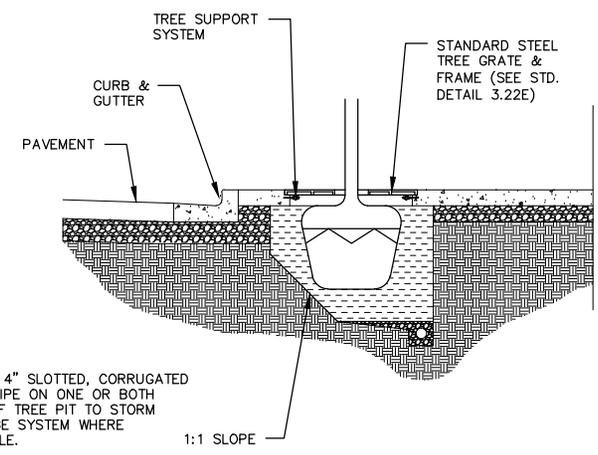
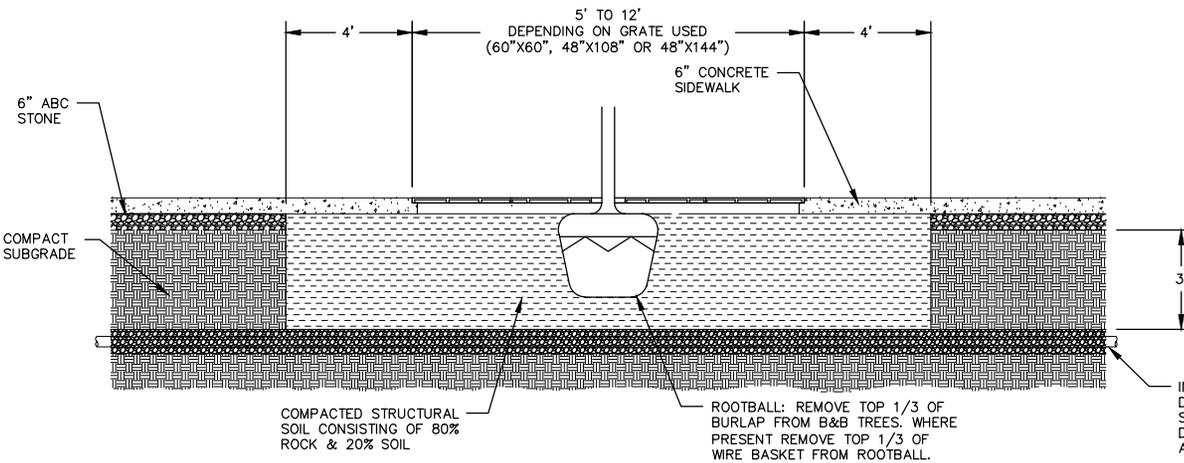
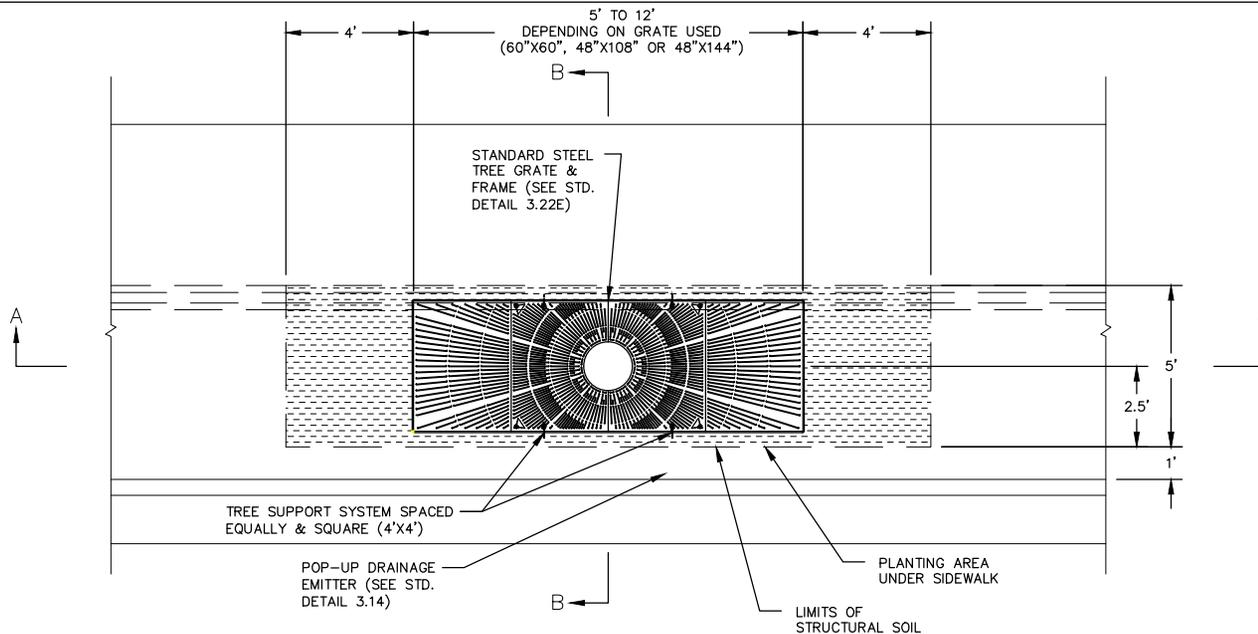
SECTION B-B



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**SIDEWALK TREE PIT,
 REINFORCED CONCRETE SIDEWALK**

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.22

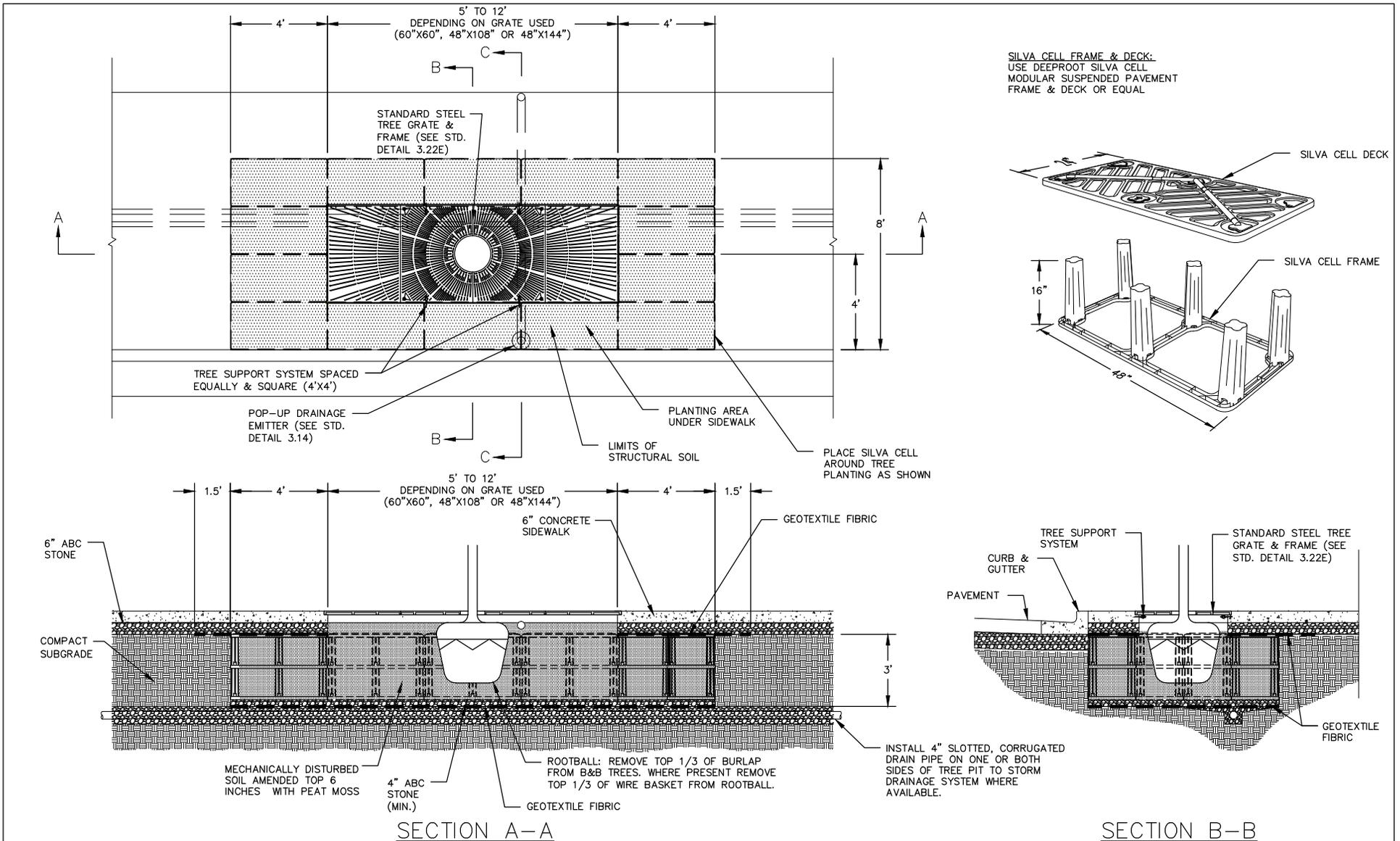


SECTION A-A

SECTION B-B

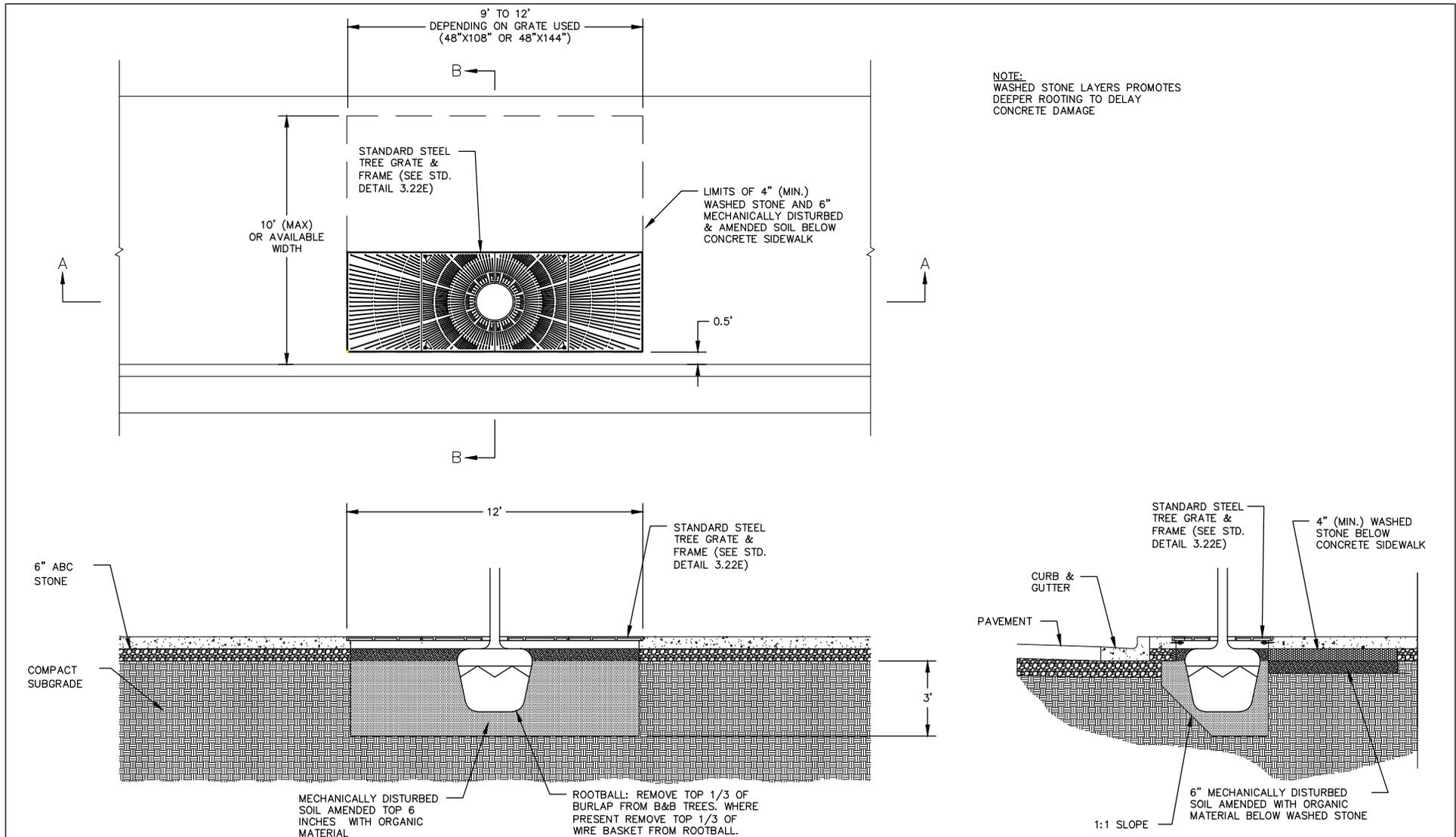
**SIDEWALK TREE PIT,
STRUCTURAL SOIL**

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.22A



SIDEWALK TREE PIT, SILVA CELL

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.22B



NOTE:
WASHED STONE LAYERS PROMOTES
DEEPER ROOTING TO DELAY
CONCRETE DAMAGE

SECTION A-A

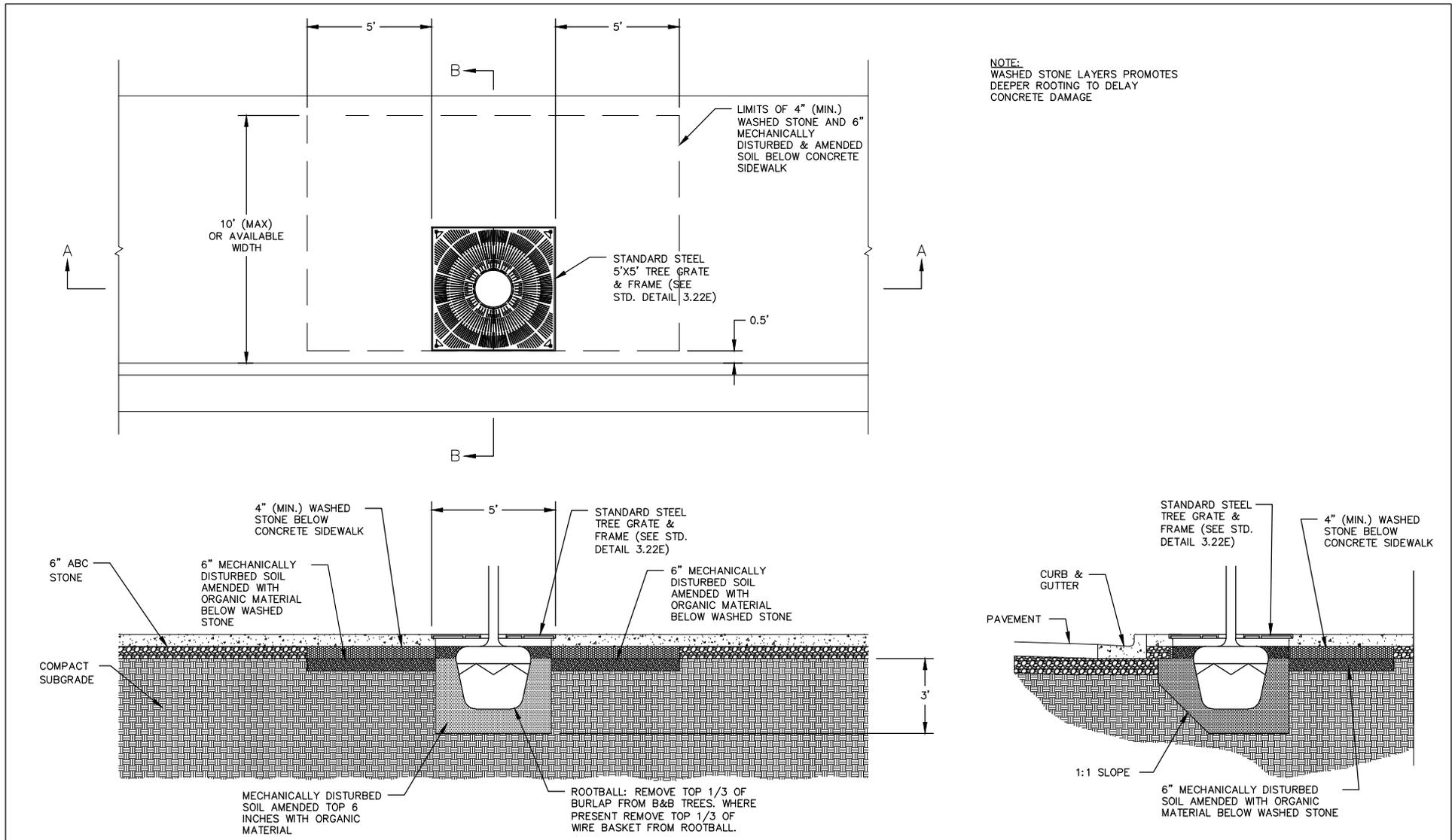
SECTION B-B



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**SIDEWALK TREE PIT, LARGE TREE
GRATE WITH WASHED STONE BORDER**

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.22C



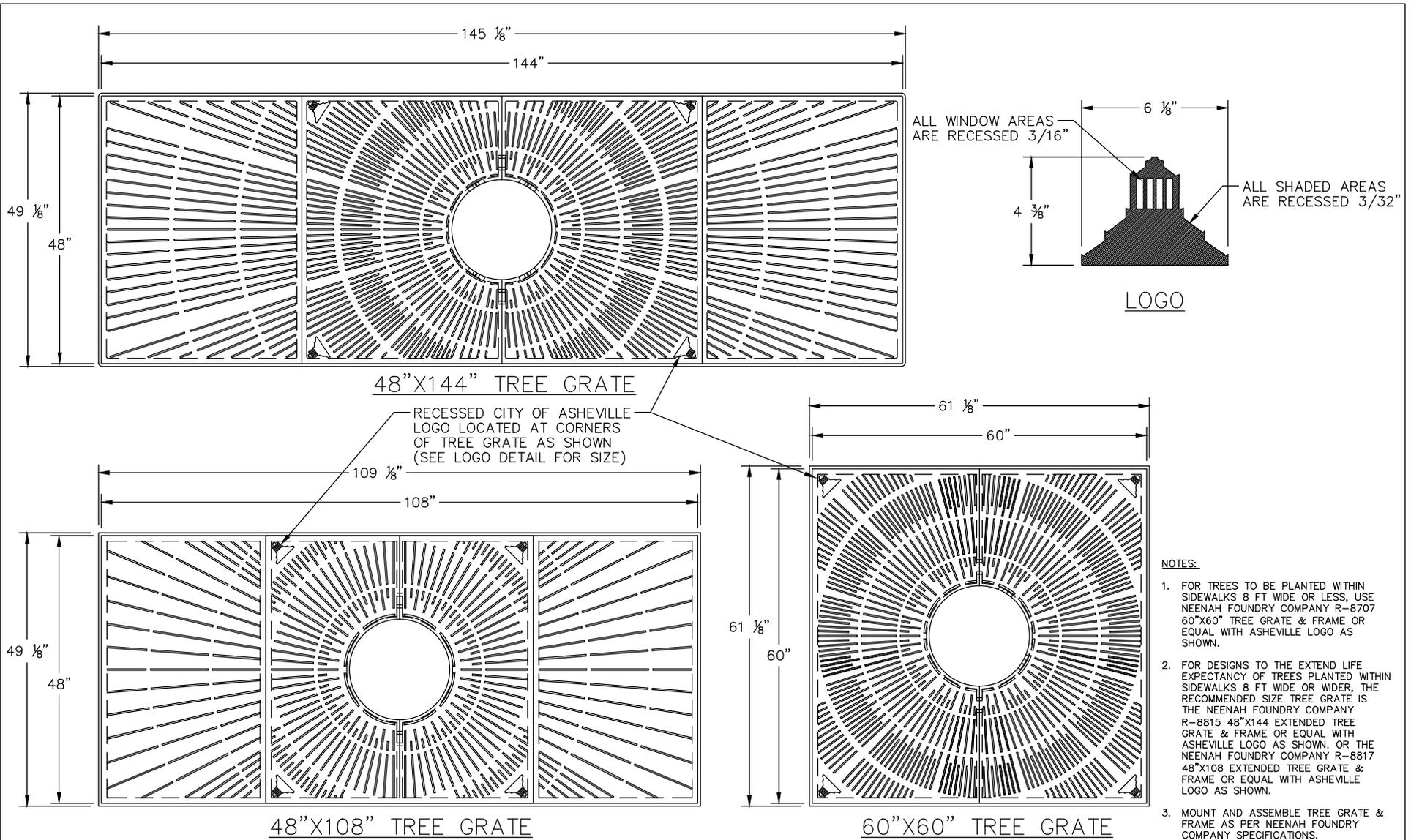
SECTION A-A

SECTION B-B



**SIDEWALK TREE PIT, STANDARD TREE
GRATE WITH WASHED STONE BORDER**

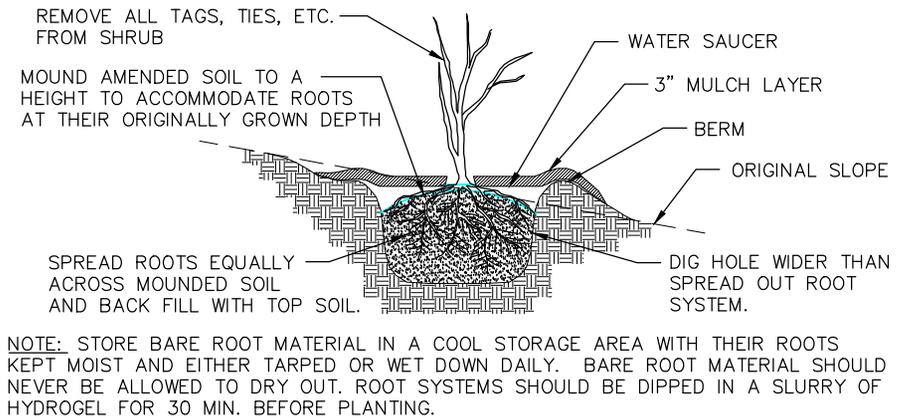
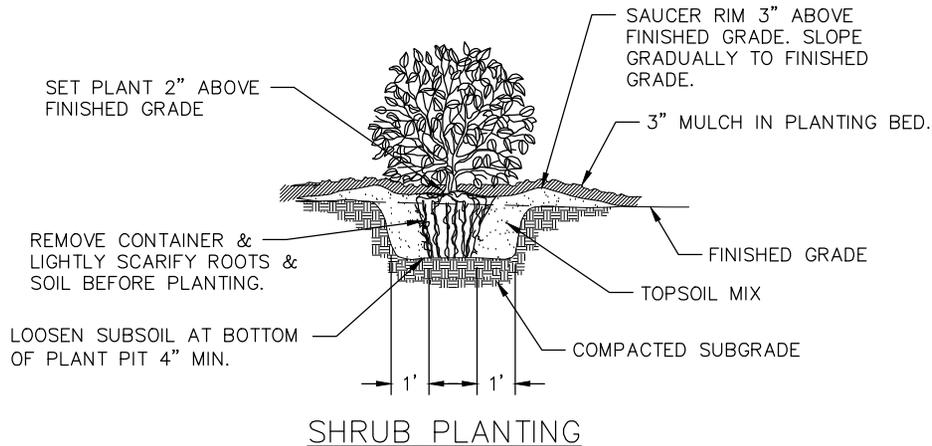
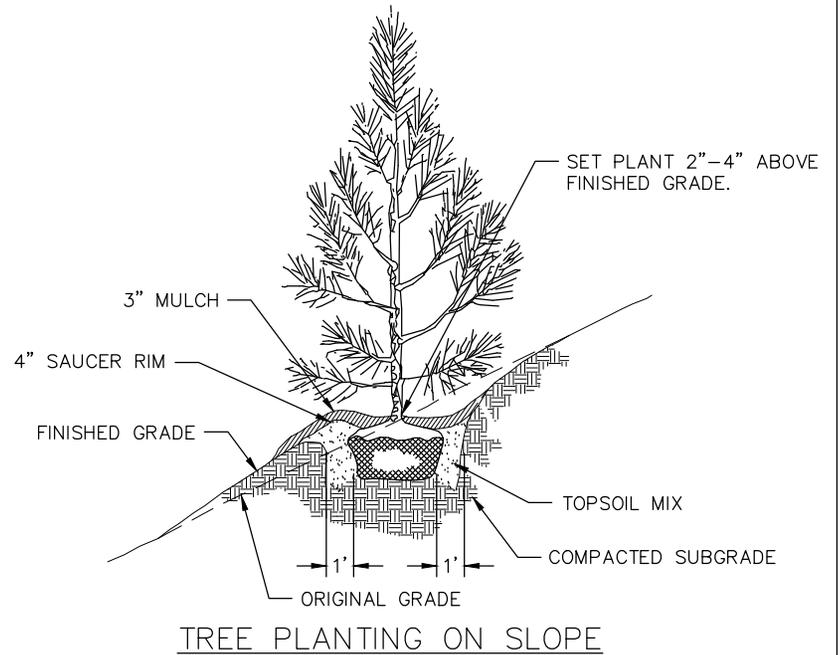
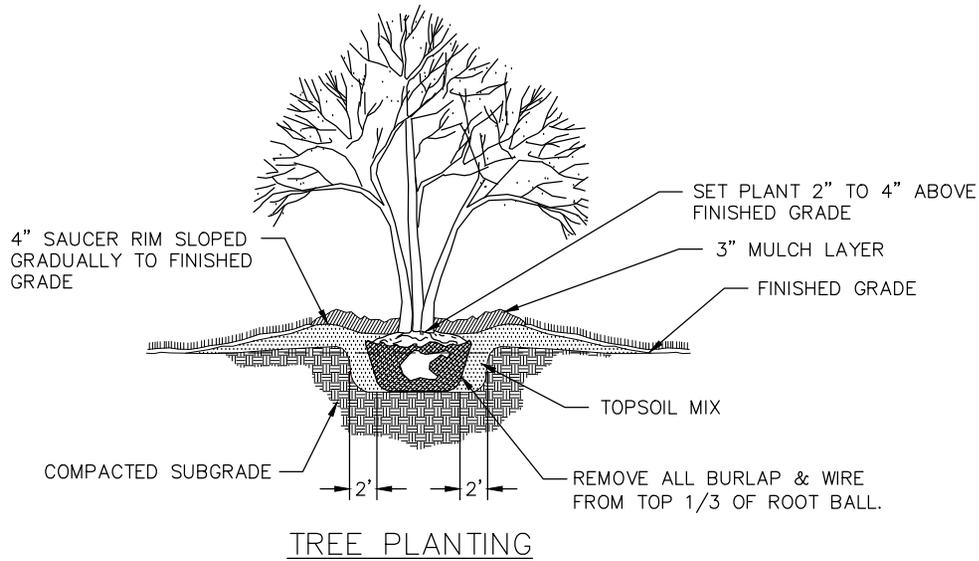
REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.22D



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SIDEWALK TREE GRATE & FRAME

DATE	REVISIONS	STD. NO.
	DESCRIPTION	
		3.22E

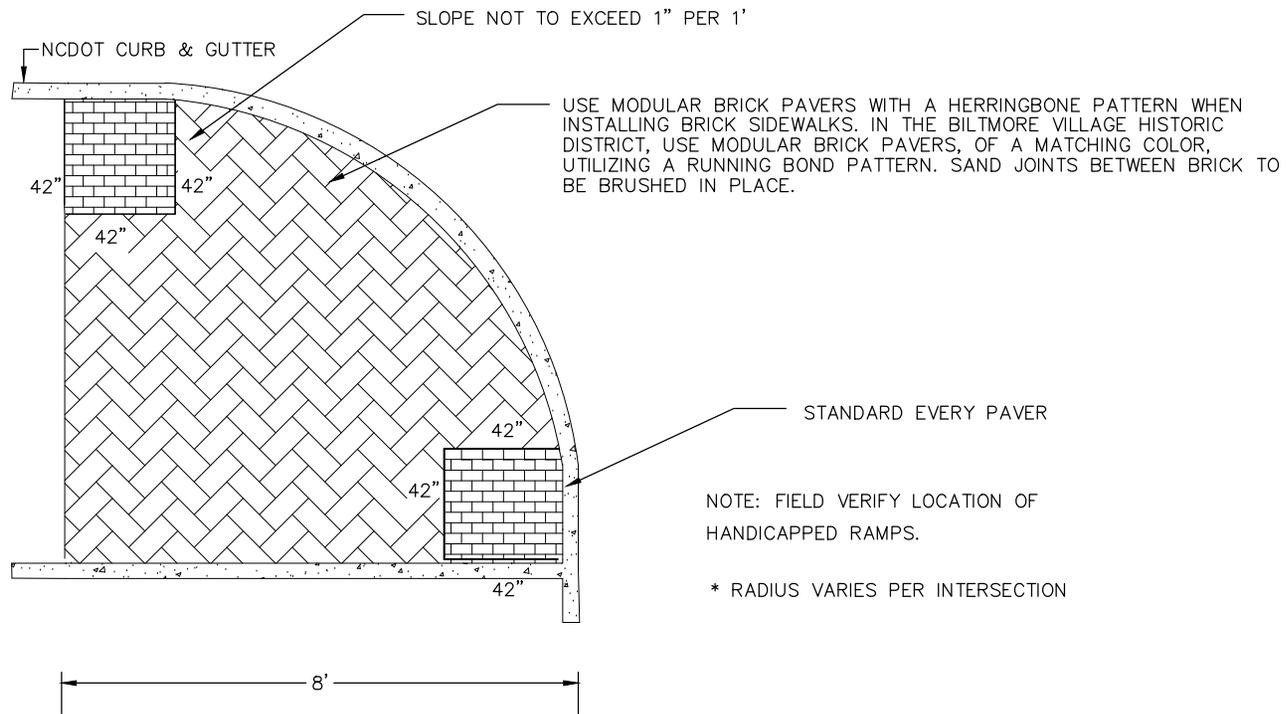


NOTE: STORE BARE ROOT MATERIAL IN A COOL STORAGE AREA WITH THEIR ROOTS KEPT MOIST AND EITHER TARPED OR WET DOWN DAILY. BARE ROOT MATERIAL SHOULD NEVER BE ALLOWED TO DRY OUT. ROOT SYSTEMS SHOULD BE DIPPED IN A SLURRY OF HYDROGEL FOR 30 MIN. BEFORE PLANTING.



TREE & SHRUB PLANTING DETAIL

DATE	REVISIONS	STD. NO.
	DESCRIPTION	
		3.22F



NOT TO SCALE

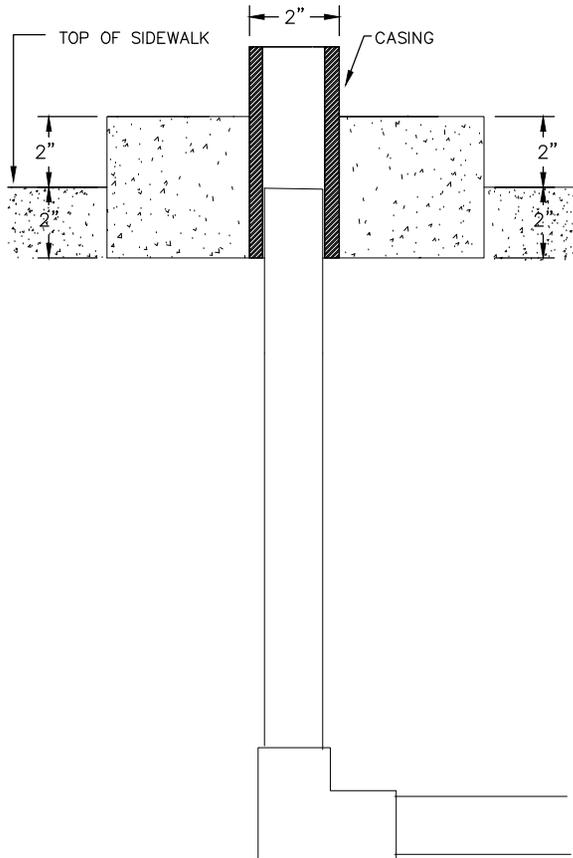


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RADIUS CONCRETE KEYSTONE

REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.23



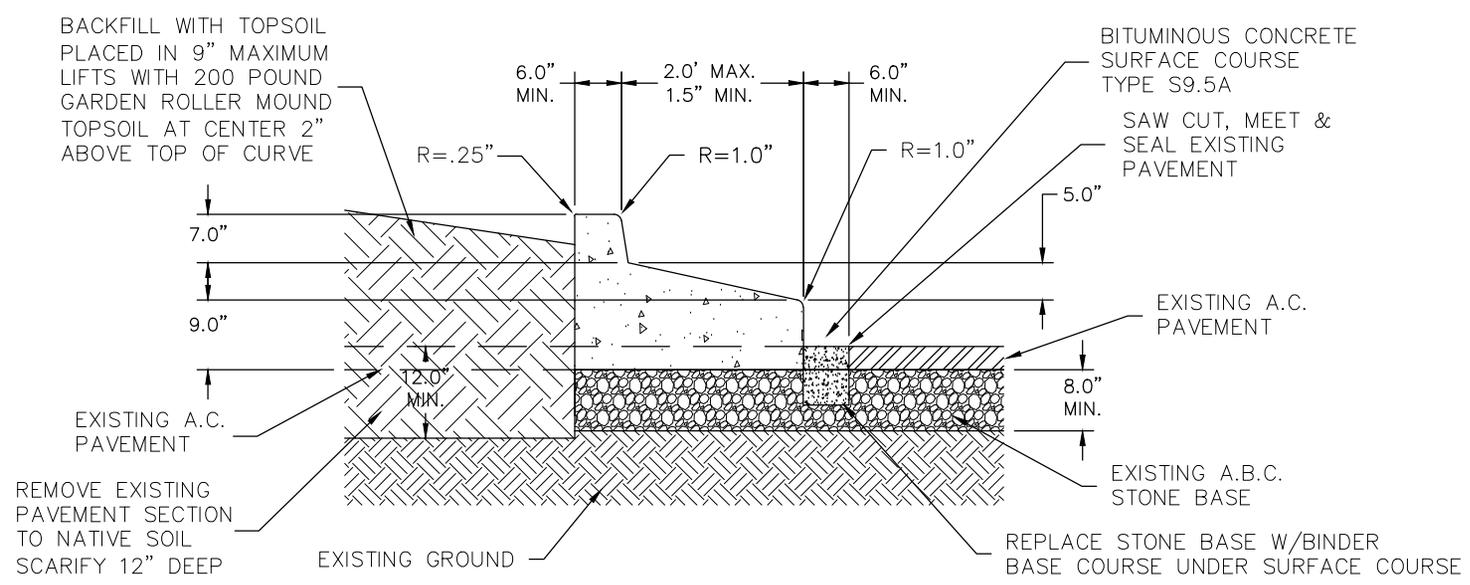
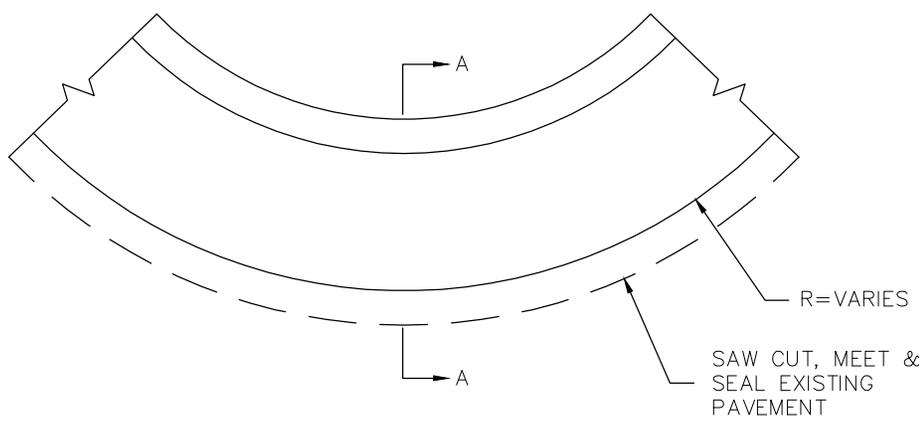
NOT TO SCALE

- * 2" P.V.C. CONDUIT (24" DEEP) RUN
- * ENTIRE LENGTH OF NEW SIDEWALK TO UNDERGROUND SERVICE.
- * FIELD VERIFY LOCATION OF BASES



LAMP POST BASE

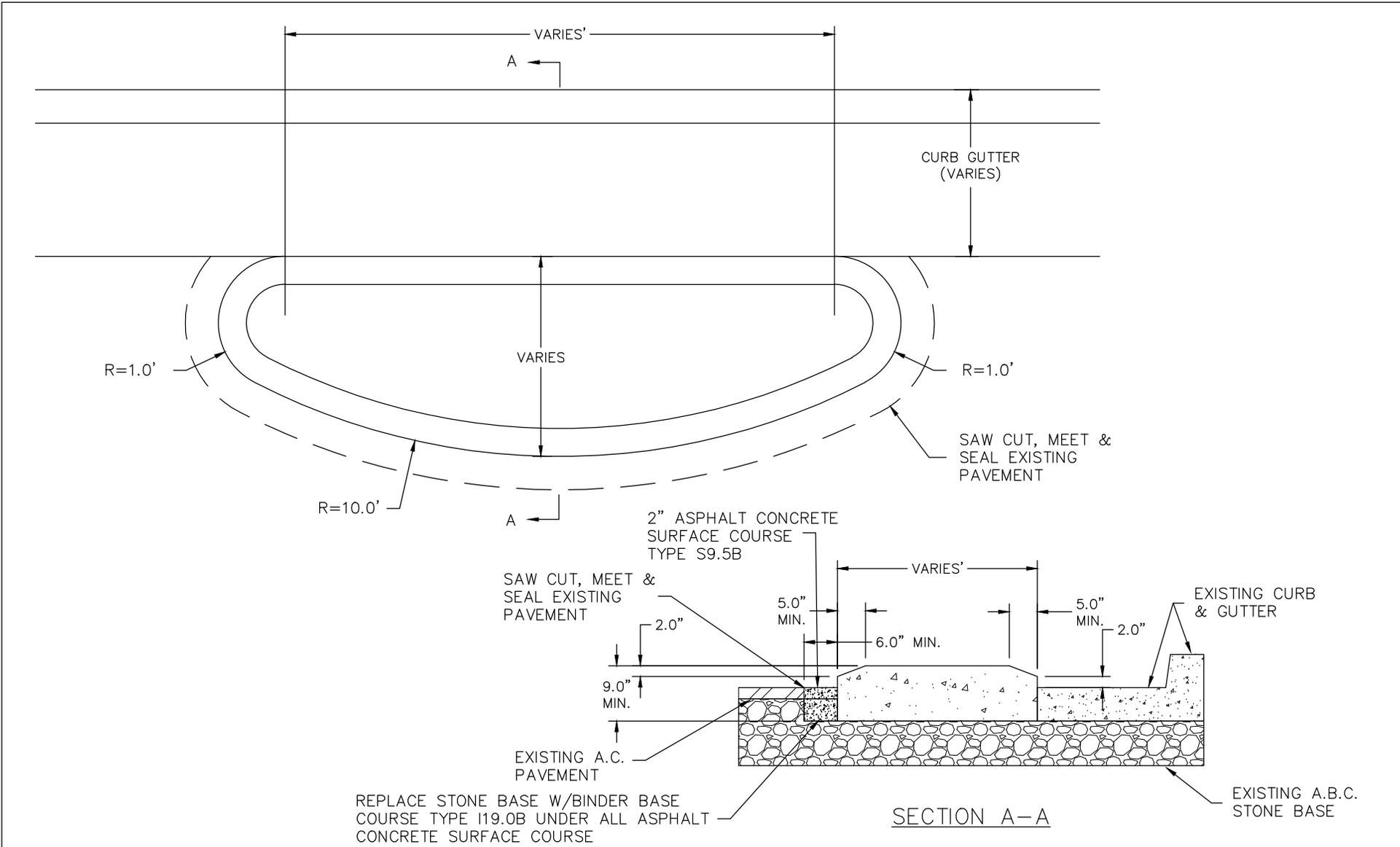
REVISIONS	
DATE	DESCRIPTION



SECTION A-A

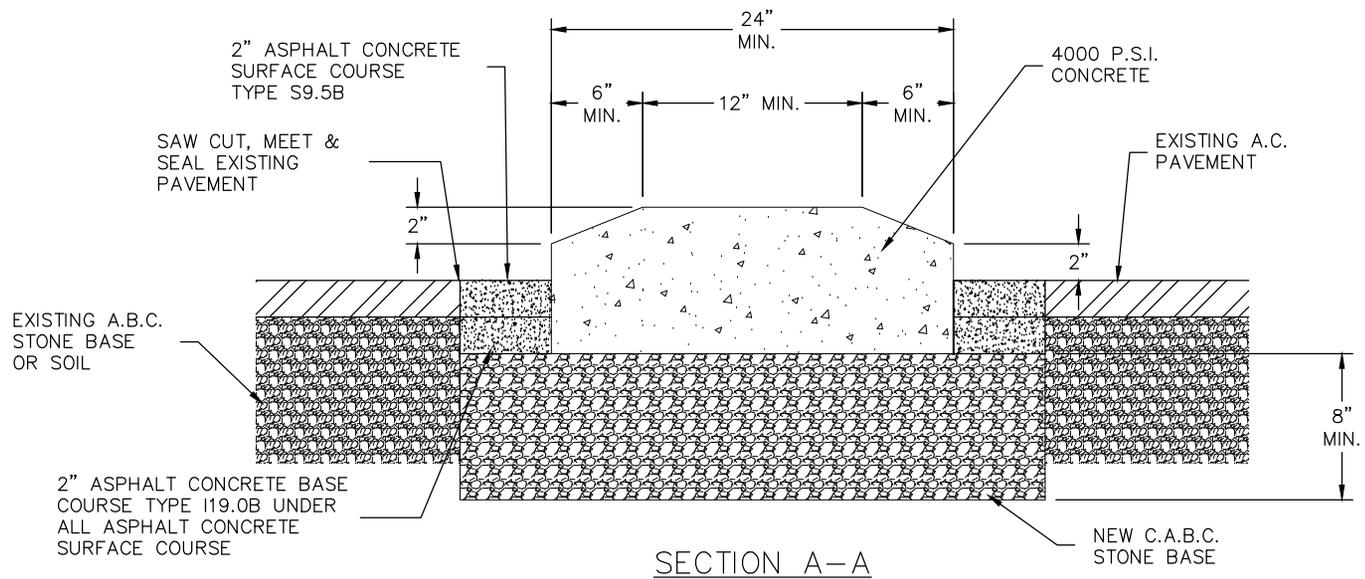
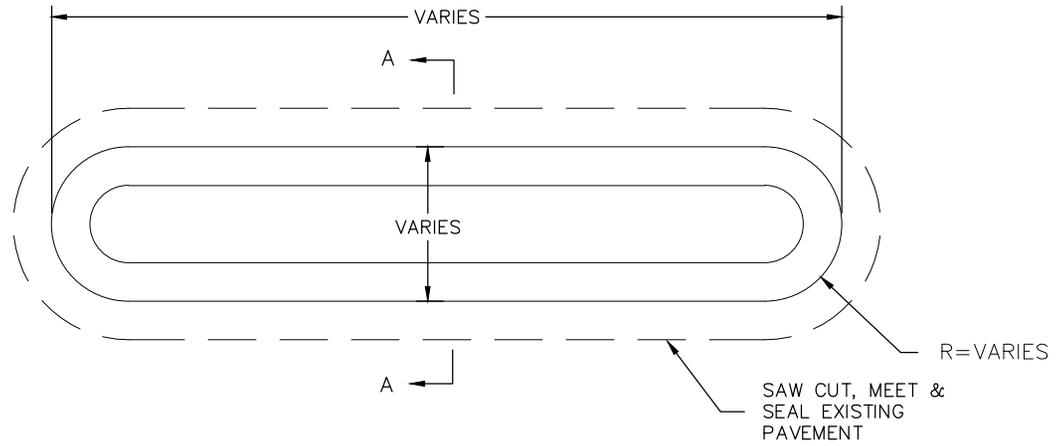
CONCRETE CIRCLE

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.25



MOUNTABLE CONCRETE ISLAND

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.26

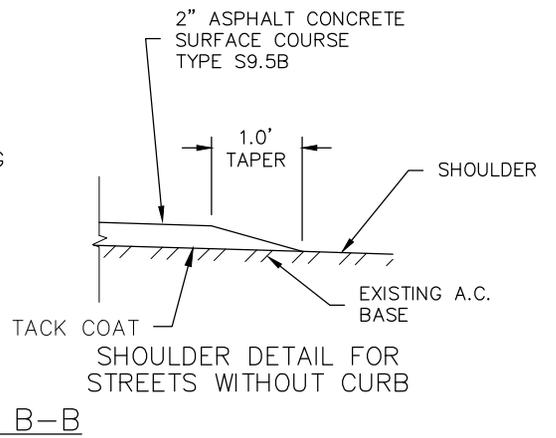
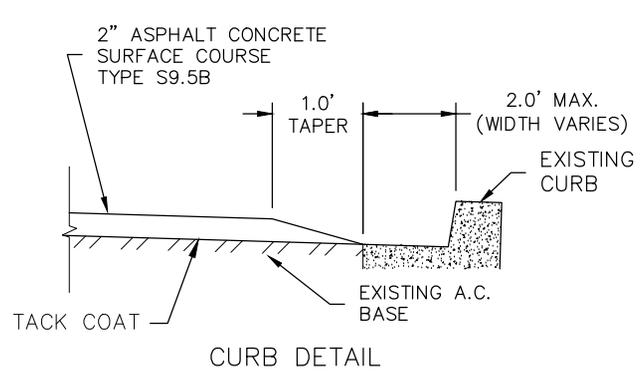
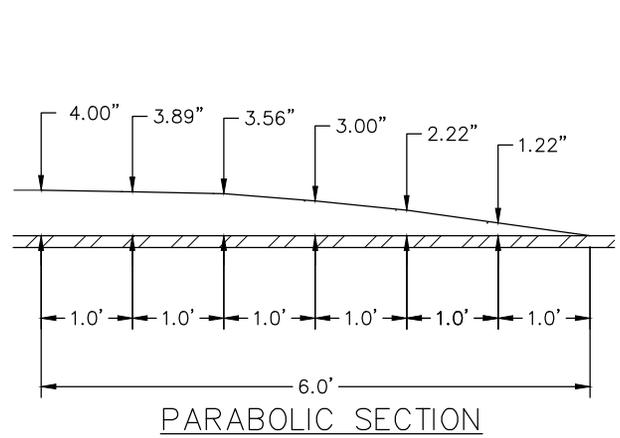
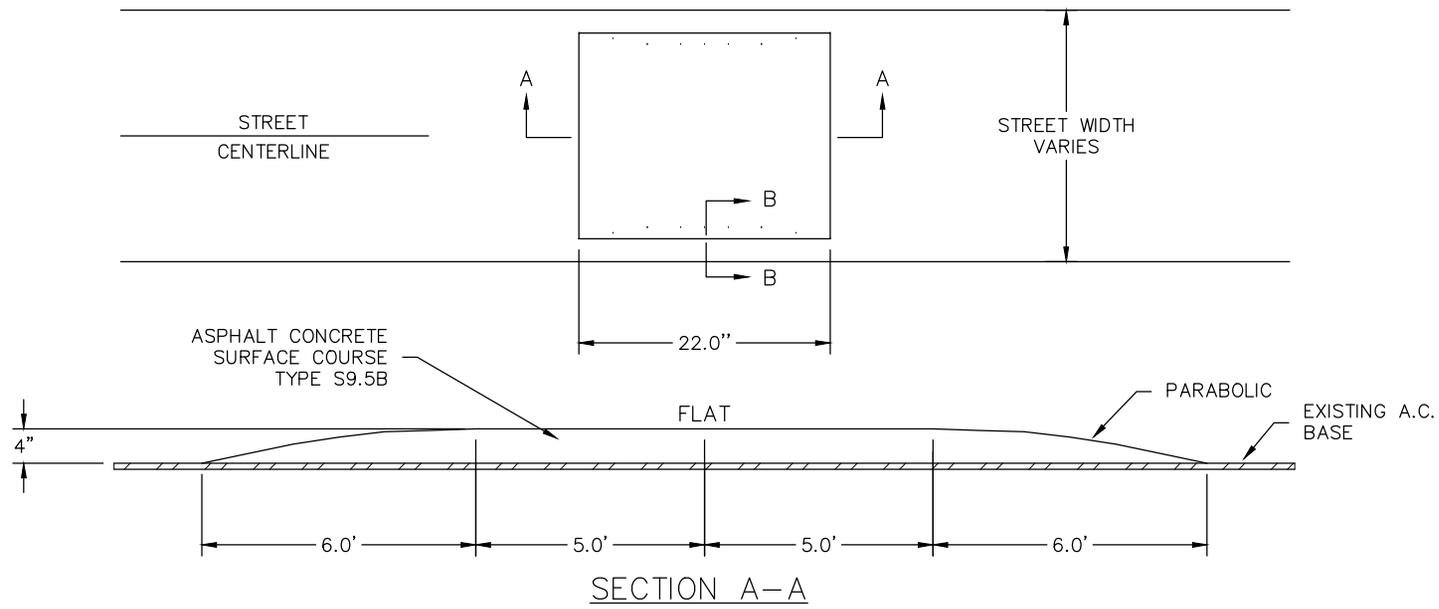


SECTION A-A



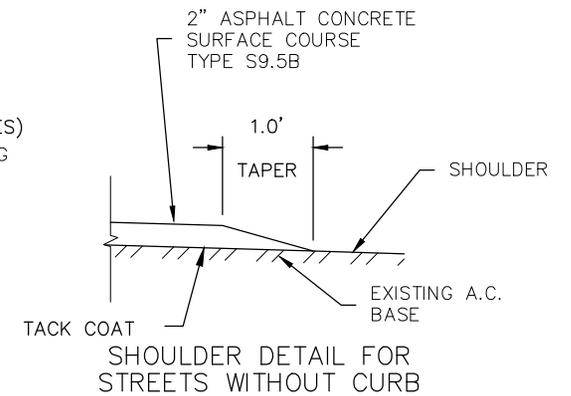
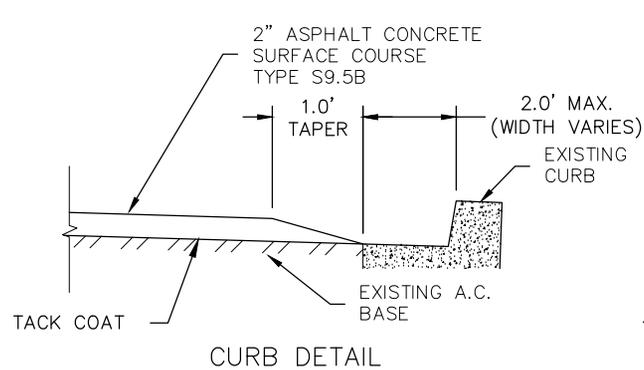
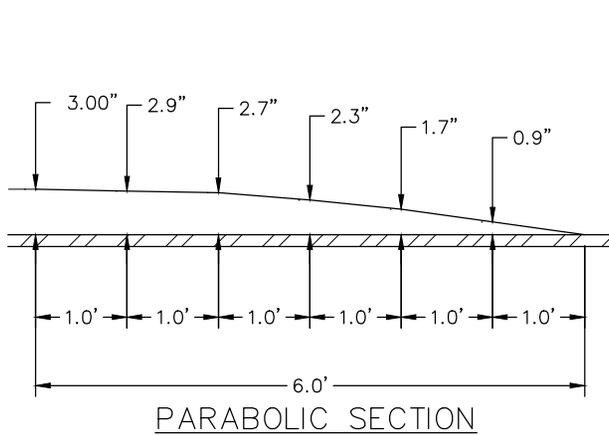
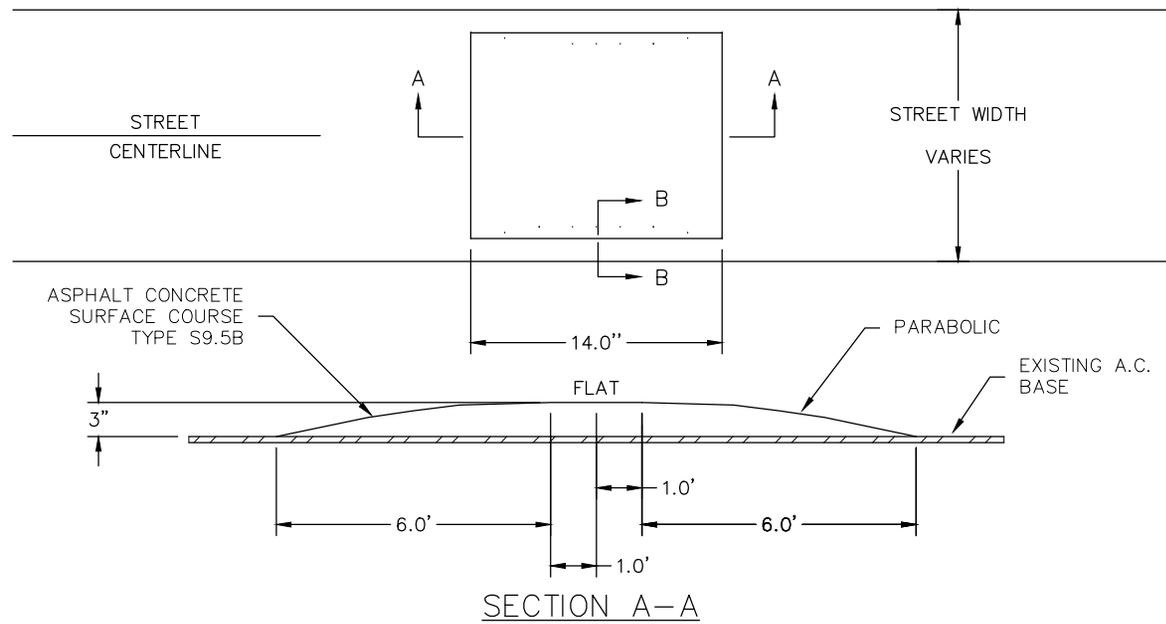
MOUNTABLE CONCRETE TRAFFIC SEPARATOR ISLAND

REVISIONS	
DATE	DESCRIPTION



**22' COLLECTOR STREET
SPEED HUMP**

REVISIONS	
DATE	DESCRIPTION



SECTION B-B

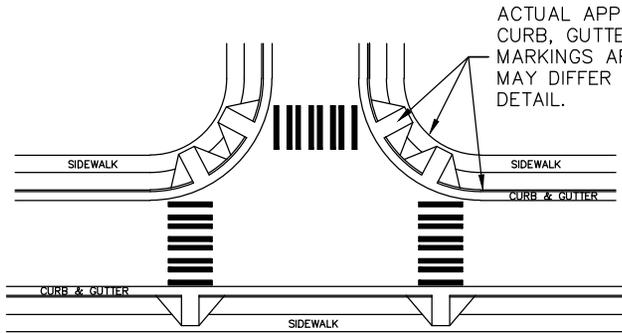


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14' COLLECTOR STREET SPEED HUMP

REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.29

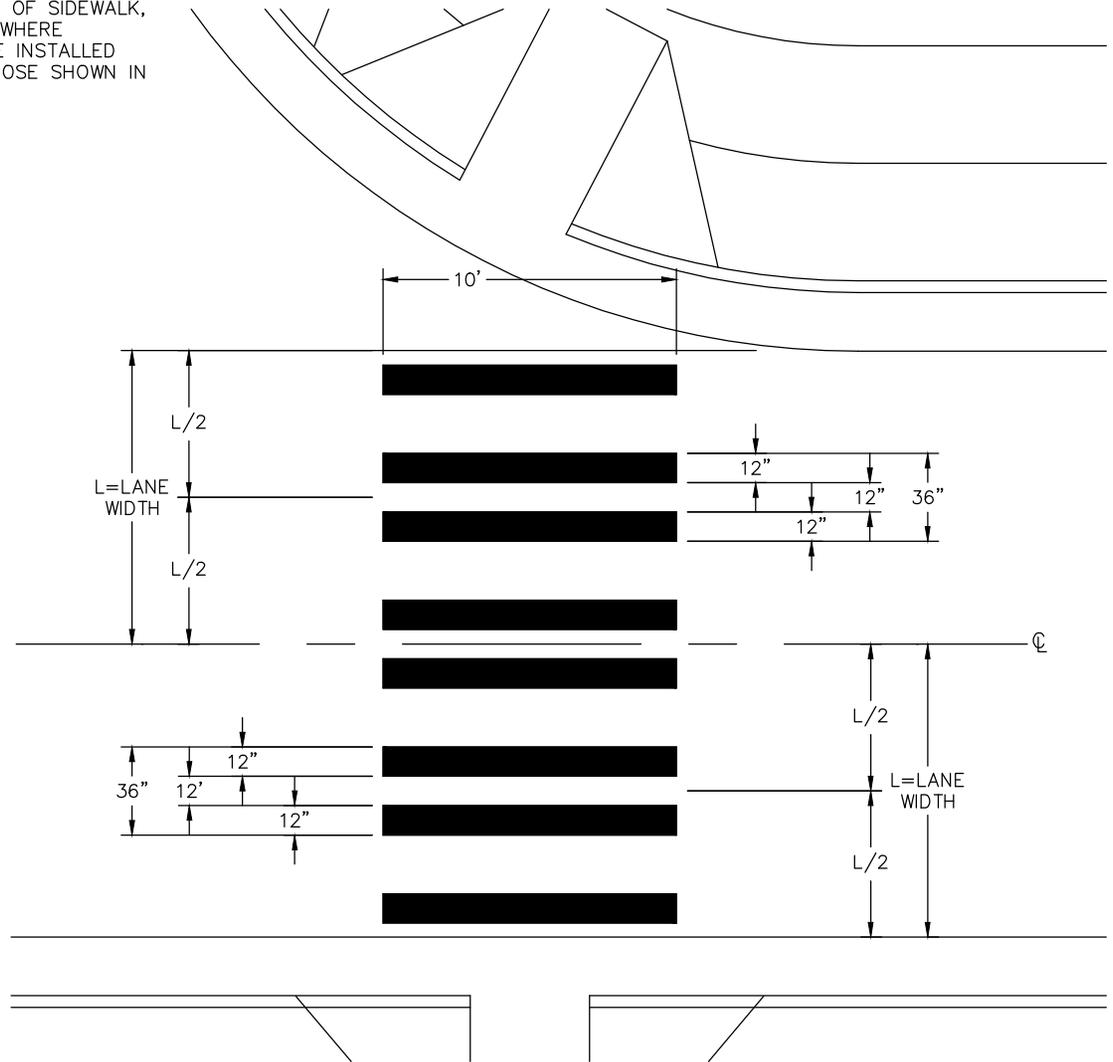


ACTUAL APPEARANCE OF SIDEWALK, CURB, GUTTER, ETC. WHERE MARKINGS ARE TO BE INSTALLED MAY DIFFER FROM THOSE SHOWN IN DETAIL.

DETAIL SHOWING TYPICAL LOCATION OF HIGH VISIBILITY CROSS WALK MARKINGS

NOTES:

1. WHERE ON STREET PARKING EXIST, INSTALL FIRST TRANSVERSE 7 TO 8 FEET FROM THE CURB.
2. WHERE PARKING EXIST ON ONLY ONE SIDE OF THE ROAD AND THE CENTERLINE IS NOT MARKED, ASSUME THAT THE ROAD "CENTERLINE" IS AT THE MIDDLE OF WIDTH REMAINING AFTER ASSUMING 7' FOR PARKING
3. WHERE TRAFFIC LANE LINES ARE NOT USED, AND PARKING CANNOT BE USED TO DEFINE LANES, USE A LANE WIDTH OF 10 FEET BEGINNING AT THE MARKED OR UNMARKED CENTERLINE OF THE ROADWAY. WHERE PARKING EXIST ON ONLY ONE SIDE OF THE ROAD AND THE CENTERLINE IS NOT MARKED, ASSUME THAT THE ROAD "CENTERLINE" IS AT THE MIDDLE OF WIDTH REMAINING AFTER ASSUMING 7' FOR PARKING



PLAN VIEW

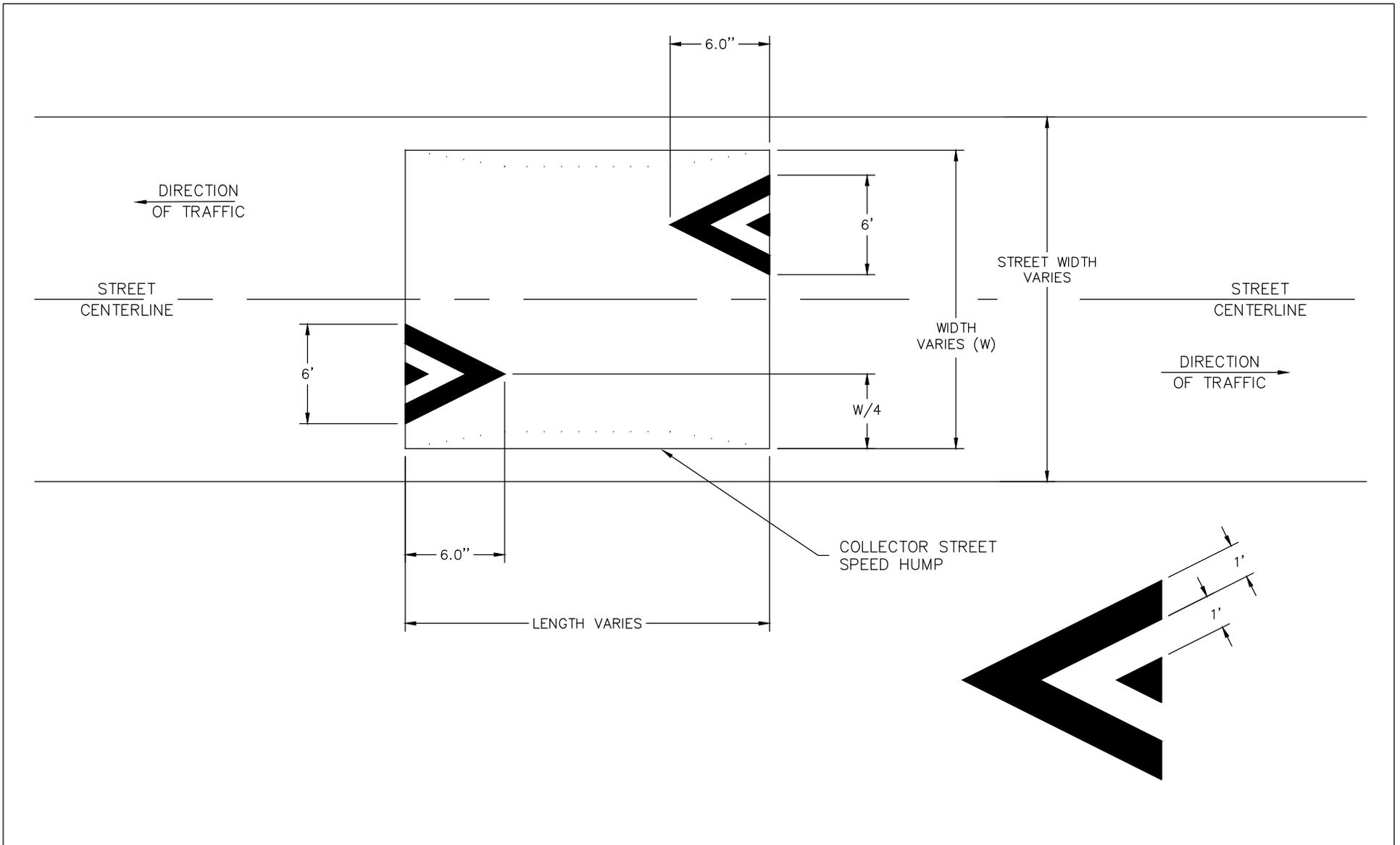


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HIGH VISABILTY CROSS WALK

REVISIONS	
DATE	DESCRIPTION

STD. NO.
3.30

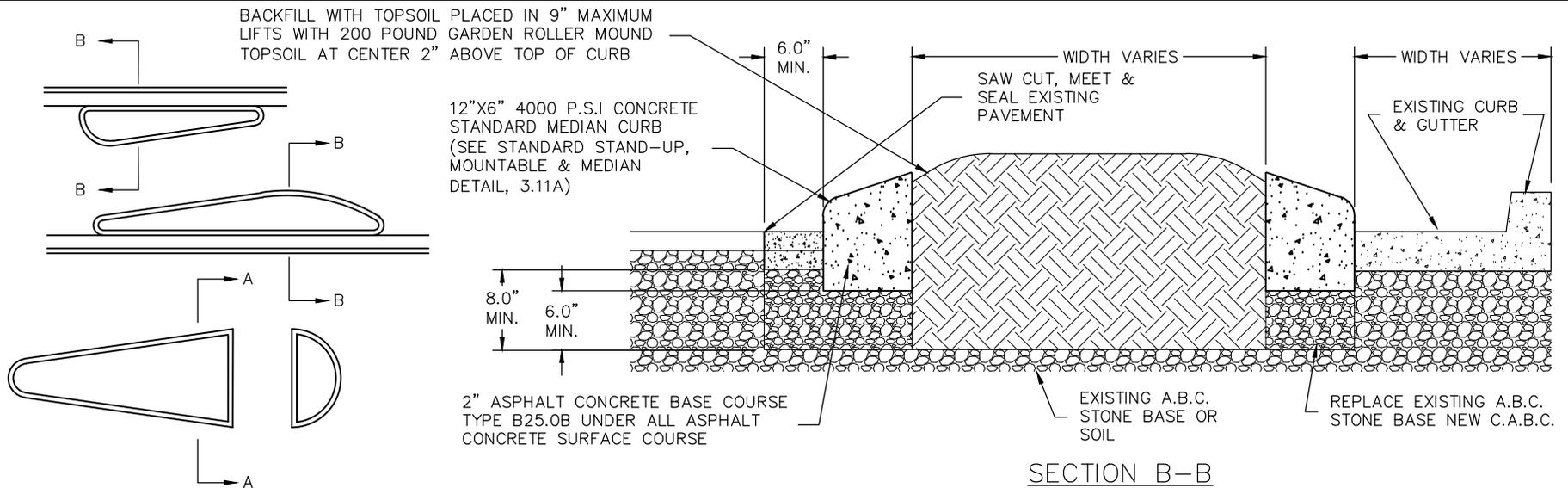


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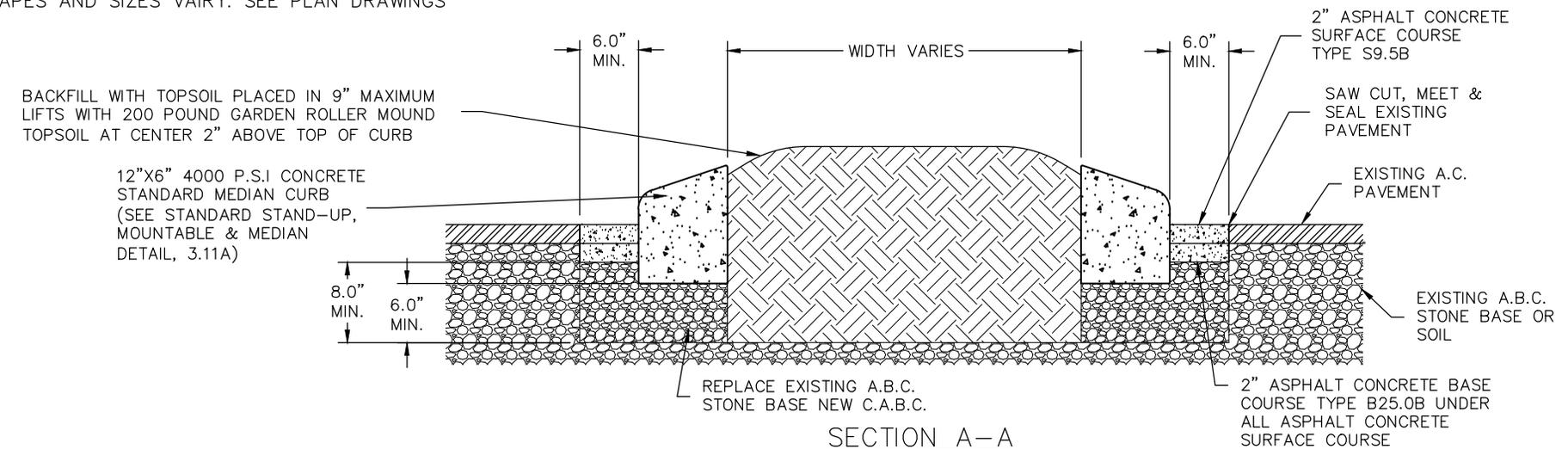
COLLECTOR STREET SPEED HUMP MARKINGS

DATE	REVISIONS
	DESCRIPTION

STD. NO.
3.31

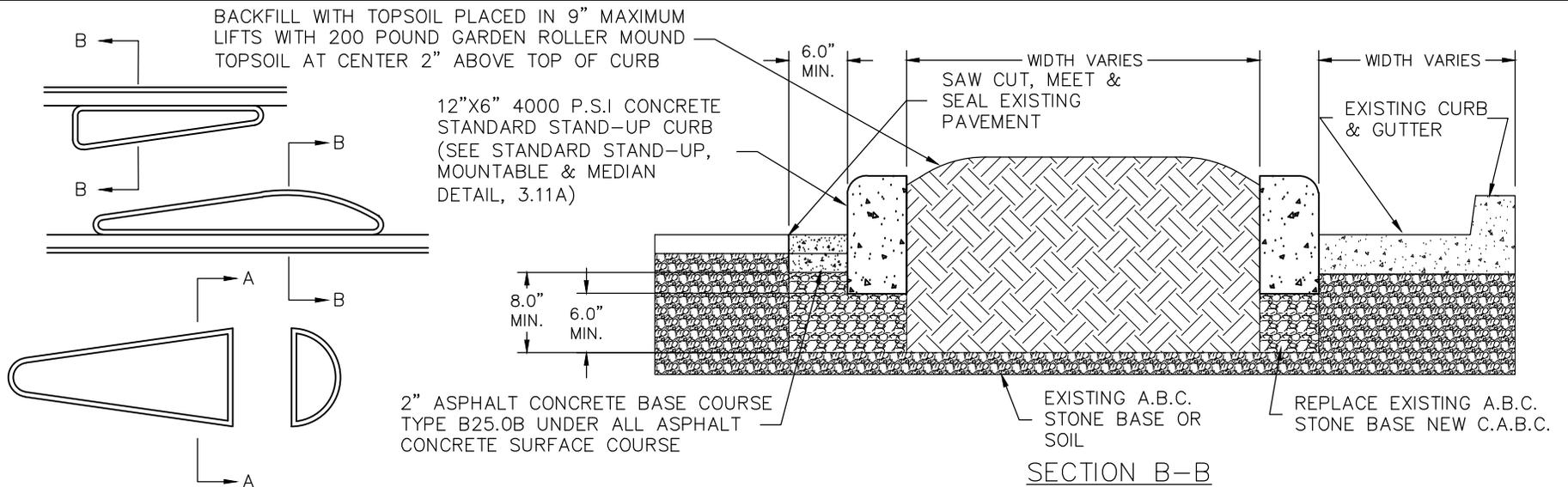


LATERAL SHIFT ISLANDS
SHAPES AND SIZES VARY. SEE PLAN DRAWINGS

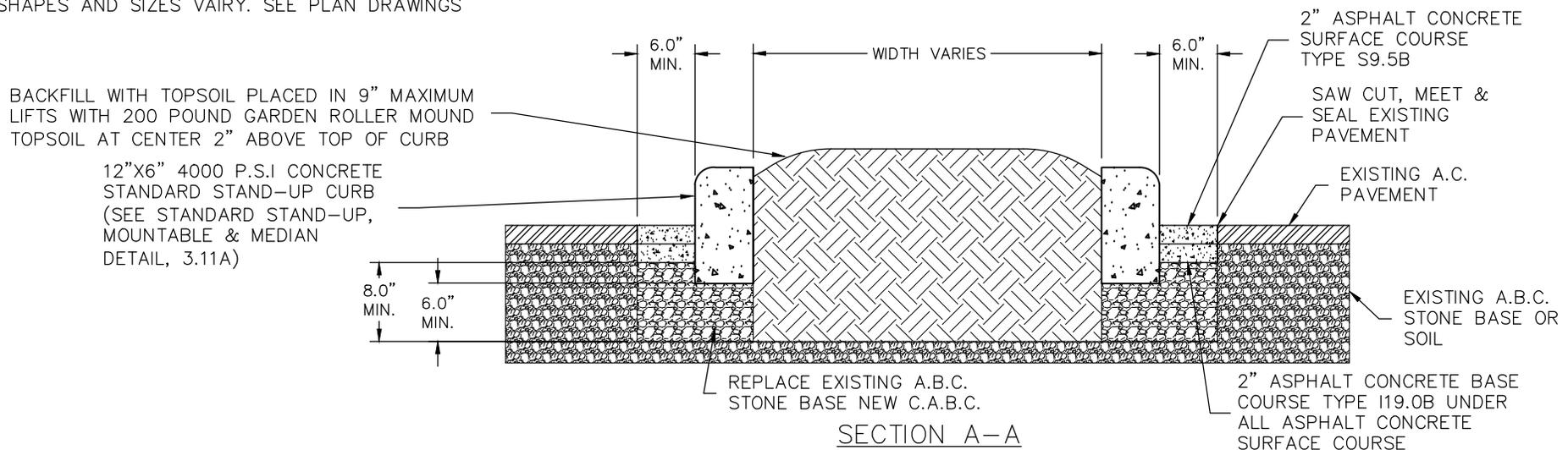


LATERAL SHIFT ISLAND
w/STANDARD MOUNTABLE CURB

DATE	REVISIONS	STD. NO.
	DESCRIPTION	
		3.32

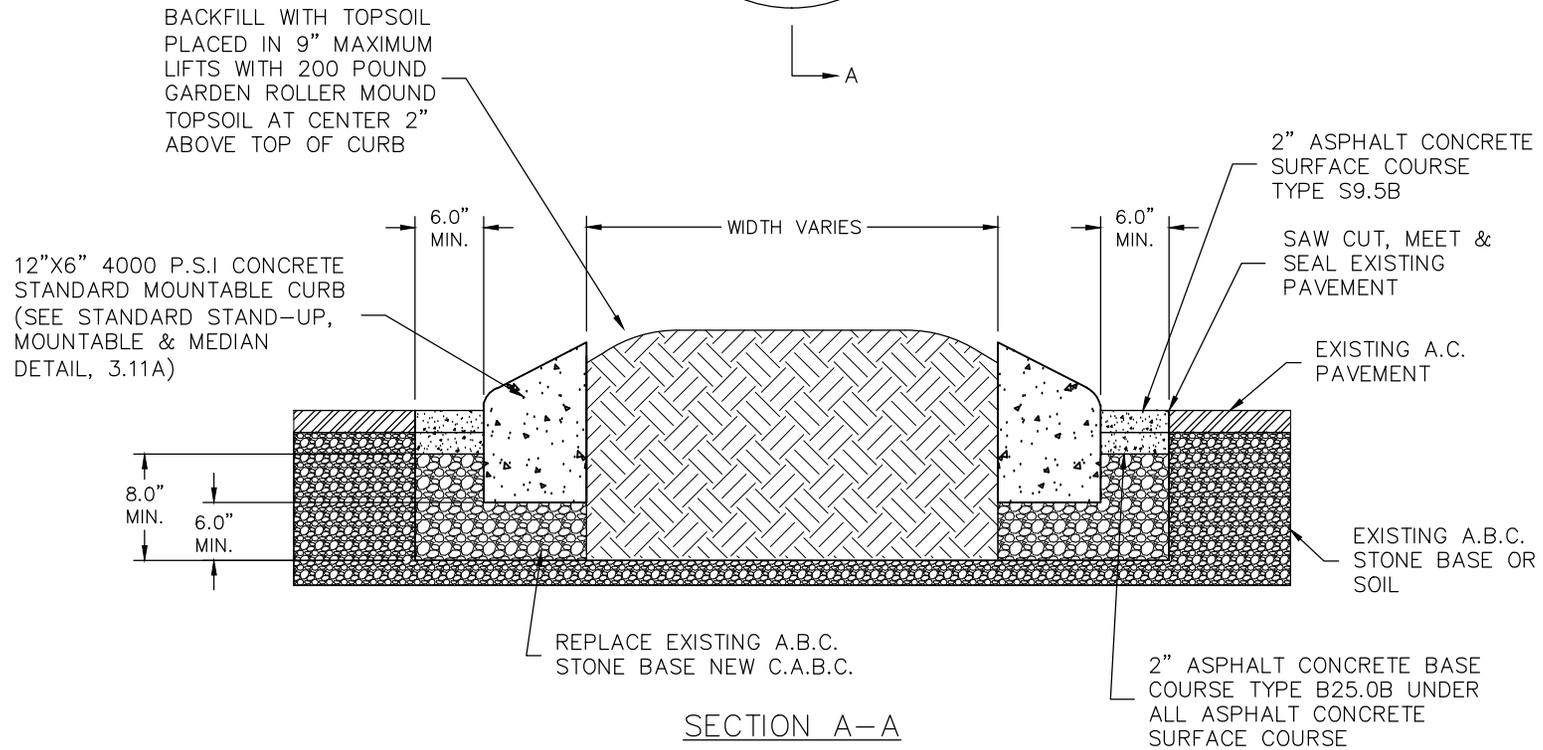
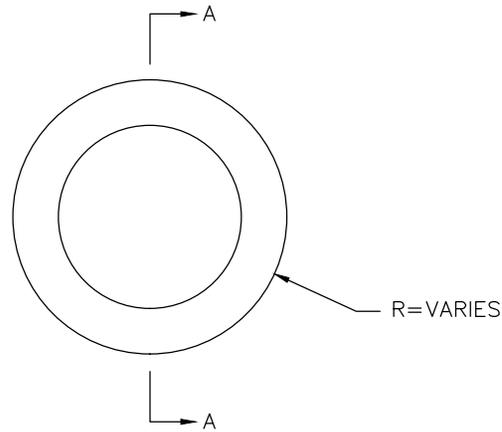


LATERAL SHIFT ISLANDS
SHAPES AND SIZES VAIRY. SEE PLAN DRAWINGS



LATERAL SHIFT ISLAND w/STANDARD
STAND-UP CURB

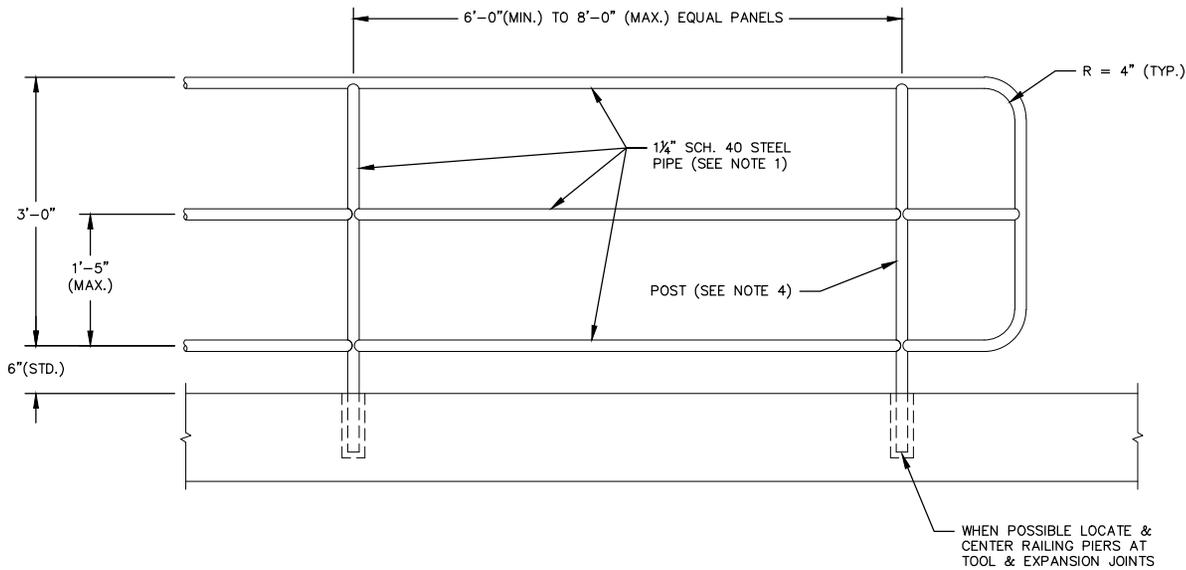
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DATE	DESCRIPTION	
		3.33



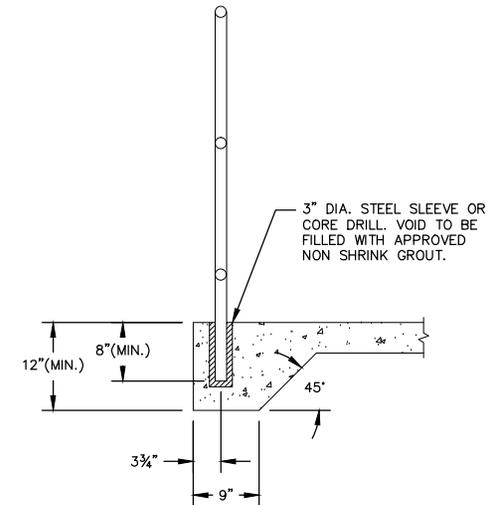
SECTION A-A



REVISIONS	
DATE	DESCRIPTION



PLAN VIEW

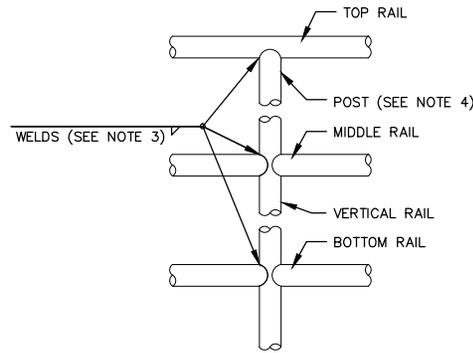


SECTION VIEW

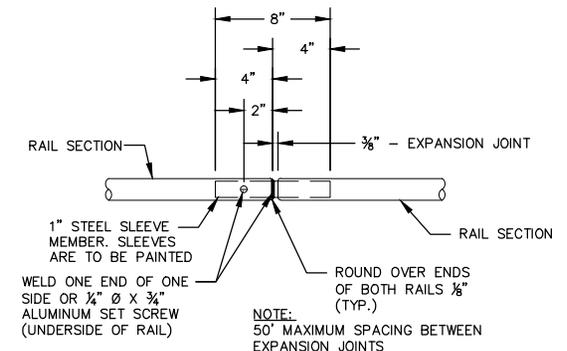
NOTES:

1. CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1 1/4" SCHEDULE 40 PLAIN END STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.
2. CONSTRUCT STEEL PIPE IN ACCORDANCE WITH SECTION 1074 OF THE NCDOT STANDARD SPECIFICATION.
3. WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.
4. ALL POST SECTIONS ARE TO BE CONSTRUCTED PLUMB, NOT PERPENDICULAR TO THE SIDEWALK.
5. USE APPROVED NON-SHRINK GROUT IN ACCORDANCE WITH SECTION 1003 OF THE NCDOT STANDARD SPECIFICATIONS FOR HANDRAIL FOOTINGS.
6. PLACEMENT OF HANDRAIL IN RELATION TO WALL AND SIDEWALK MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.
7. PIPE SURFACE TO BE PREPARED BEFORE PRIMING IN ACCORDANCE WITH THE SOCIETY FOR PROTECTIVE COATING SPECIFICATIONS.
8. PIPE TO BE DELIVERED TO WORK SITE PRIMED PAINTED.
9. PAINT SCHEDULE:

PRIME COAT, SHERWIN WILLIAMS B50NZ0003 - KEM BOND® HIGH SOLIDS ALKYD UNIVERSAL METAL PRIMER RED OXIDE OR EQUAL.
 INTERMEDIATE COAT, SHERWIN WILLIAMS B58T00604 - MACROPOXY® 645 FAST CURE EPOXY A ULTRADEEP/CLEAR TINT BASE OR EQUAL.
 TOP COAT, MIXTURE AS PER MANUFACTURE INSTRUCTIONS OF SHERWIN WILLIAMS B65B00600-ACROLON® 218 HS POLYURETHANE - GLOSS PART A, BLACK AND B65V00600-ALCOLON® 218 HS POLYURETHANE - GLOSS PART B HARDENER OR EQUAL.



RAIL CONNECTION



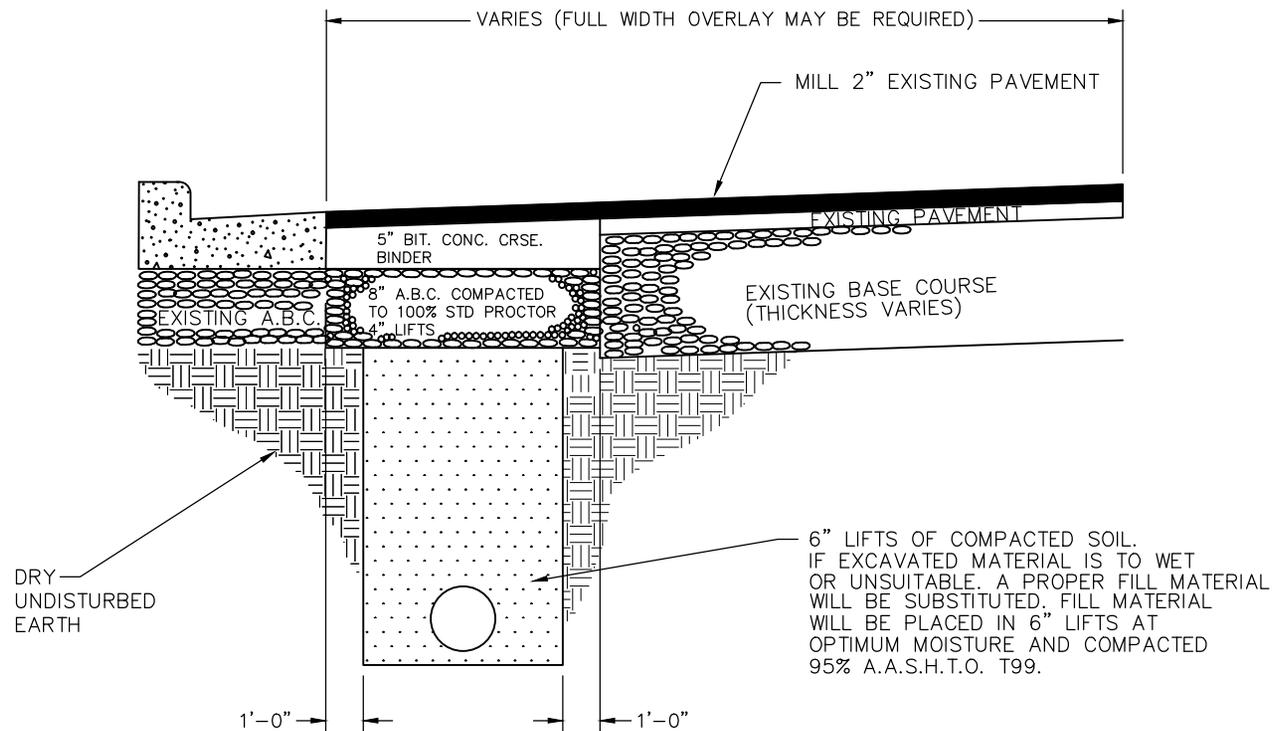
RAILING EXPANSION JOINT



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PEDESTRIAN SAFETY RAILING

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		3.35



NOTE:

1. EDGES TO BE SAWED WITH A CONCRETE SAW TO A NEAT SQUARED EDGE BROOMED CLEAN OF DUST AND DRY BEFORE TACK COAT IS APPLIED.
2. EDGES AND OVERLAY AREAS TO BE TACKED WITH CRS-10R CRD-2.
3. 6" LIFTS OR SUITABLE SOIL OR ABC AT OPTIMUM MOISTURE COMPACTED 100% A.A.S.H.T.O. T99, ALL WET OR UNSUITABLE MATERIAL TO BE REMOVED FROM SITE PRIOR TO BACKFILL.
4. N.C.D.O.T. APPROVED PATCH DETAIL.
5. ALL O.S.H.A. REQUIREMENTS SHALL BE ADHERED TO FOR TRENCHING OPERATIONS.

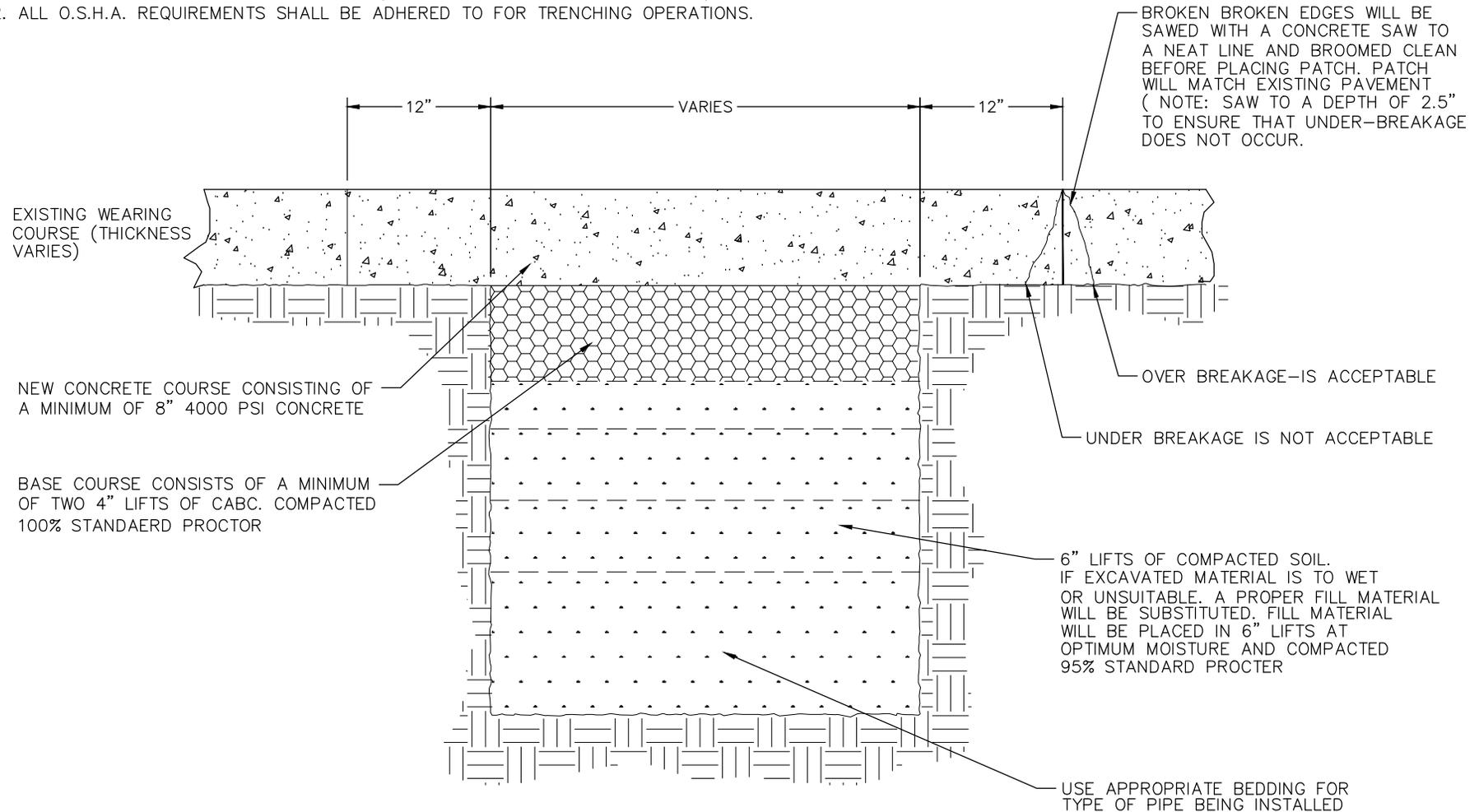


PAVEMENT REMOVAL AND REPLACEMENT

REVISIONS	
DATE	DESCRIPTION

NOTE:

1. IF PATCH EXCEEDS 30' IN LENGTH EXPANSION JOINTS TO MATCH EXISTING OR AT 30' INTERVALS, WHICHEVER IS LESS (JOINT SEALER—N.C.D.O.T. NO. 920.2)
2. ALL O.S.H.A. REQUIREMENTS SHALL BE ADHERED TO FOR TRENCHING OPERATIONS.

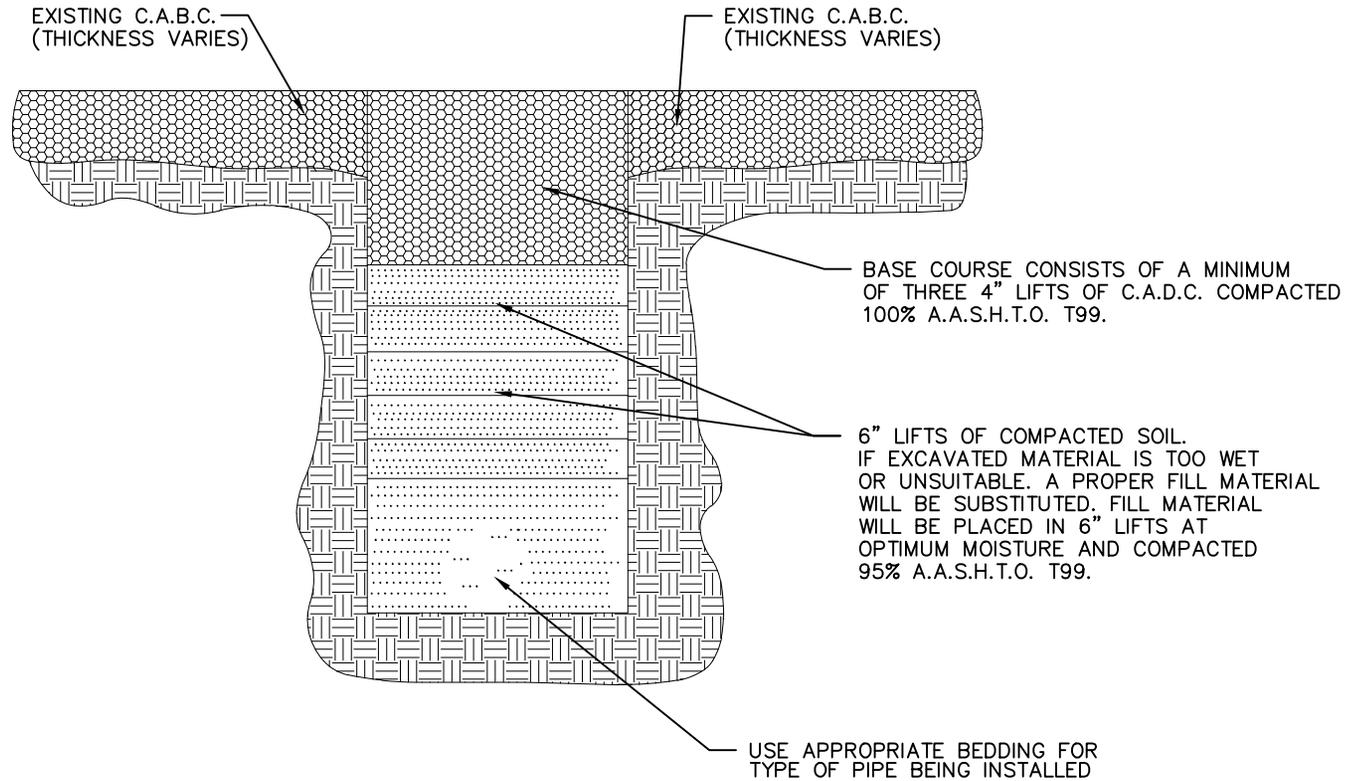


RIGID PAVEMENT REPAIR

REVISIONS	
DATE	DESCRIPTION

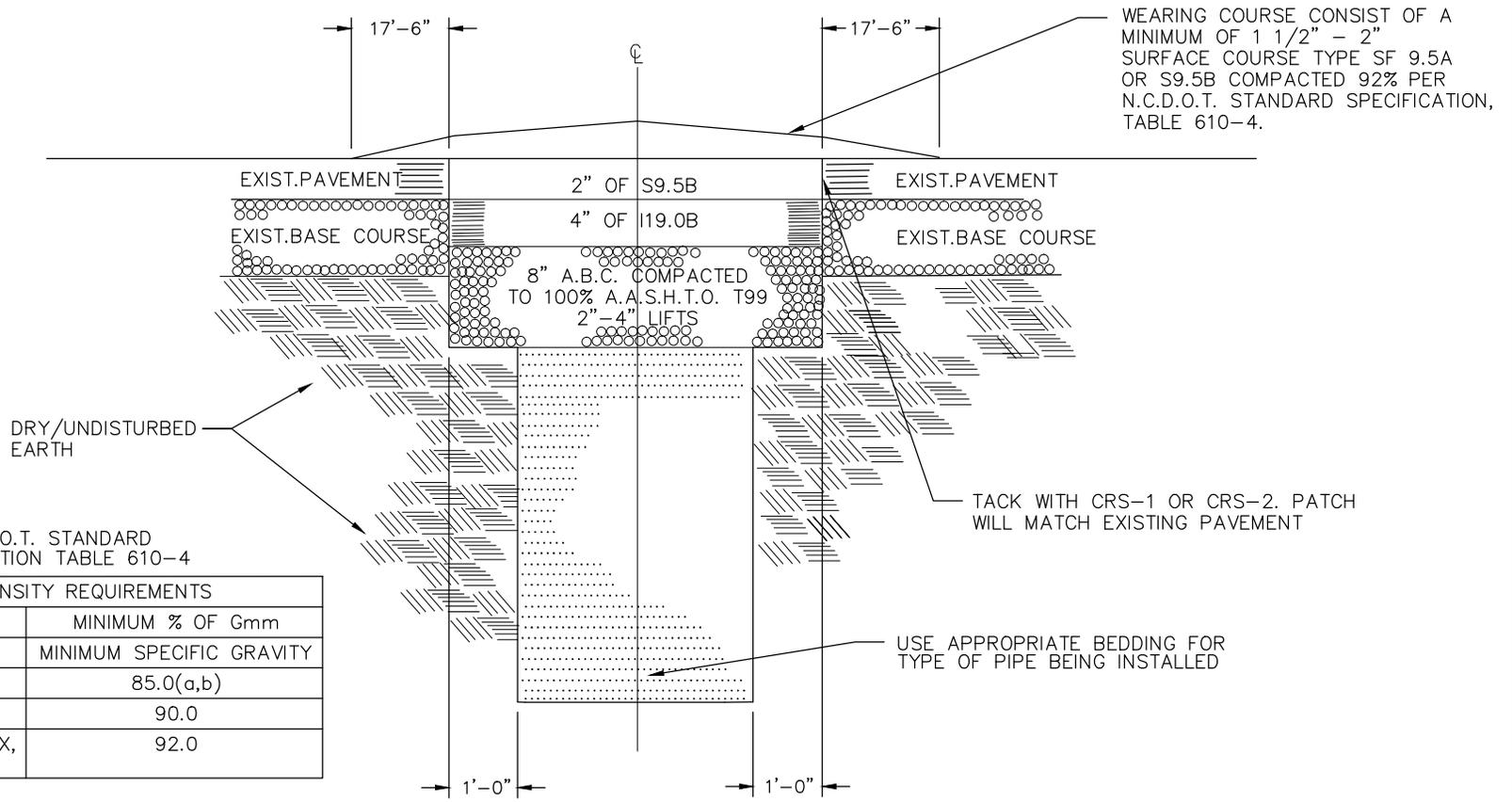
NOTE:

1. USE SUITABLE MATERIAL REMOVED DURING TRENCH EXCAVATION FOR BACKFILL UNLESS DIRECTED OTHERWISE BY ENGINEER.
2. ALL O.S.H.A. REQUIREMENTS SHALL BE ADHERED TO FOR TRENCHING OPERATIONS.



**GRAVEL SURFACE REPAIR
AND BEDDING**

REVISIONS	
DATE	DESCRIPTION



N.C.D.O.T. STANDARD SPECIFICATION TABLE 610-4

MINIMUM DENSITY REQUIREMENTS	
MIX TYPE	MINIMUM % OF Gmm
SUPER PAVE MIXES	
S 4.75A	85.0(a,b)
SF 9.5A	90.0
S 9.5X, S 12.5X, I 19.0X, B 25.0X, B 37.5X	92.0

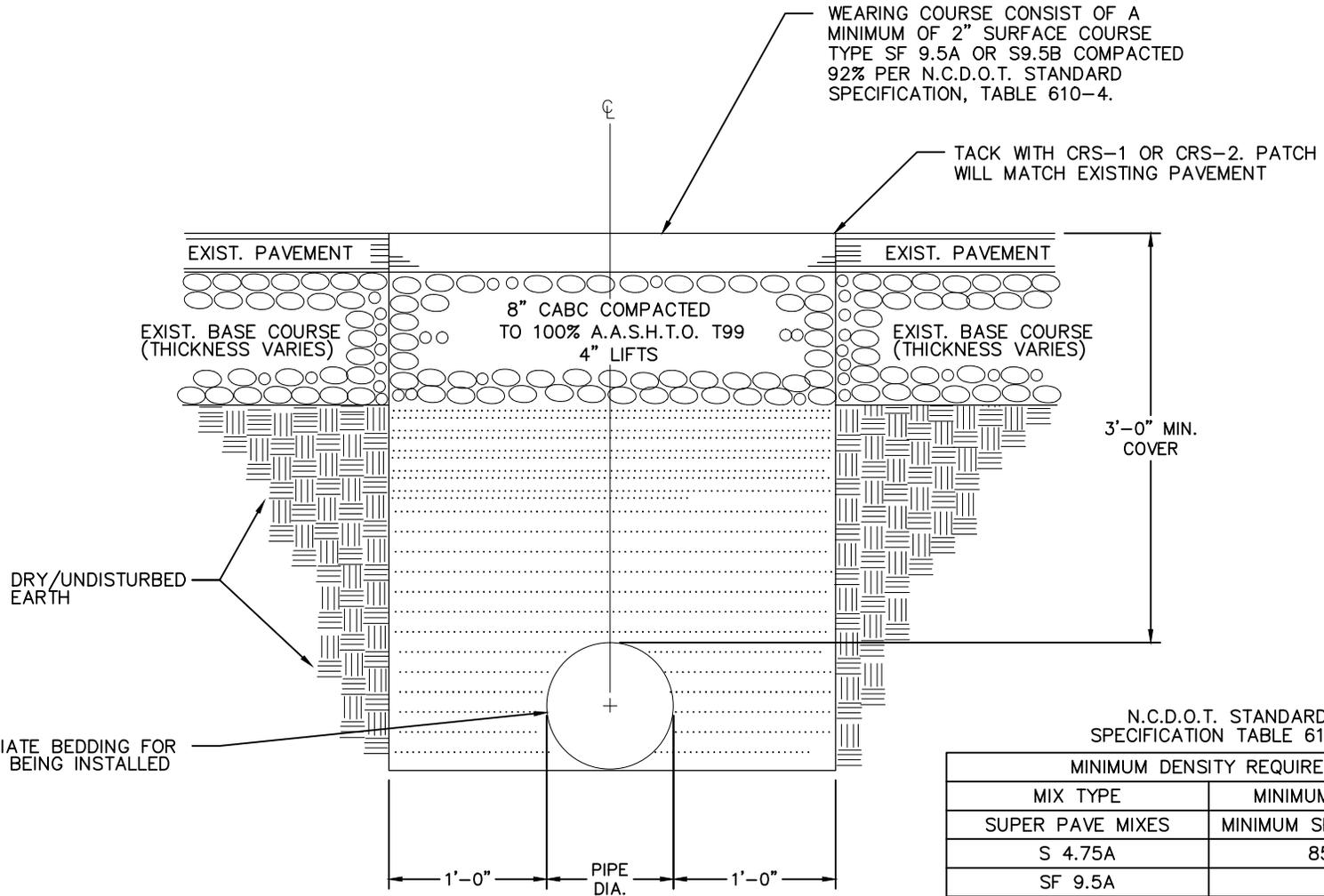
NOTE:

1. EDGES TO BE SAWED WITH A CONCRETE SAW TO A NEAT SQUARED EDGE, DRY BROOMED CLEAN OF DUST BEFORE TACK COAT IS APPLIED.
2. EDGES AND OVERLAY AREAS AND OVERLAY AREAS TO BE TACKED WITH RC OR AE-1 SPECIAL TACK.
3. 6" LIFTS OR SUITABLE SOIL OR ABC AT OPTIMUM MOISTURE COMPACTED 95% STANDARD PROCTOR, ALL WET OR UNSUITABLE MATERIAL TO BE REMOVED FROM SITE PRIOR TO BACKFILL.
4. N.C.D.O.T. APPROVED PATCH DETAIL
5. PATCH MUST BE SQUARE OR RECTANGULAR.
6. ALL O.S.H.A. REQUIREMENTS SHALL BE ADHERED TO FOR TRENCHING OPERATIONS.

REVISIONS	
DATE	DESCRIPTION

NOTE:

1. ALL O.S.H.A. REQUIREMENTS SHALL BE ADHERED TO FOR TRENCHING OPERATIONS.



N.C.D.O.T. STANDARD SPECIFICATION TABLE 610-4

MINIMUM DENSITY REQUIREMENTS	
MIX TYPE	MINIMUM % OF Gmm
SUPER PAVE MIXES	MINIMUM SPECIFIC GRAVITY
S 4.75A	85.0(a,b)
SF 9.5A	90.0
S 9.5X, S 12.5X, I 19.0X, B 25.0X, B 37.5X	92.0

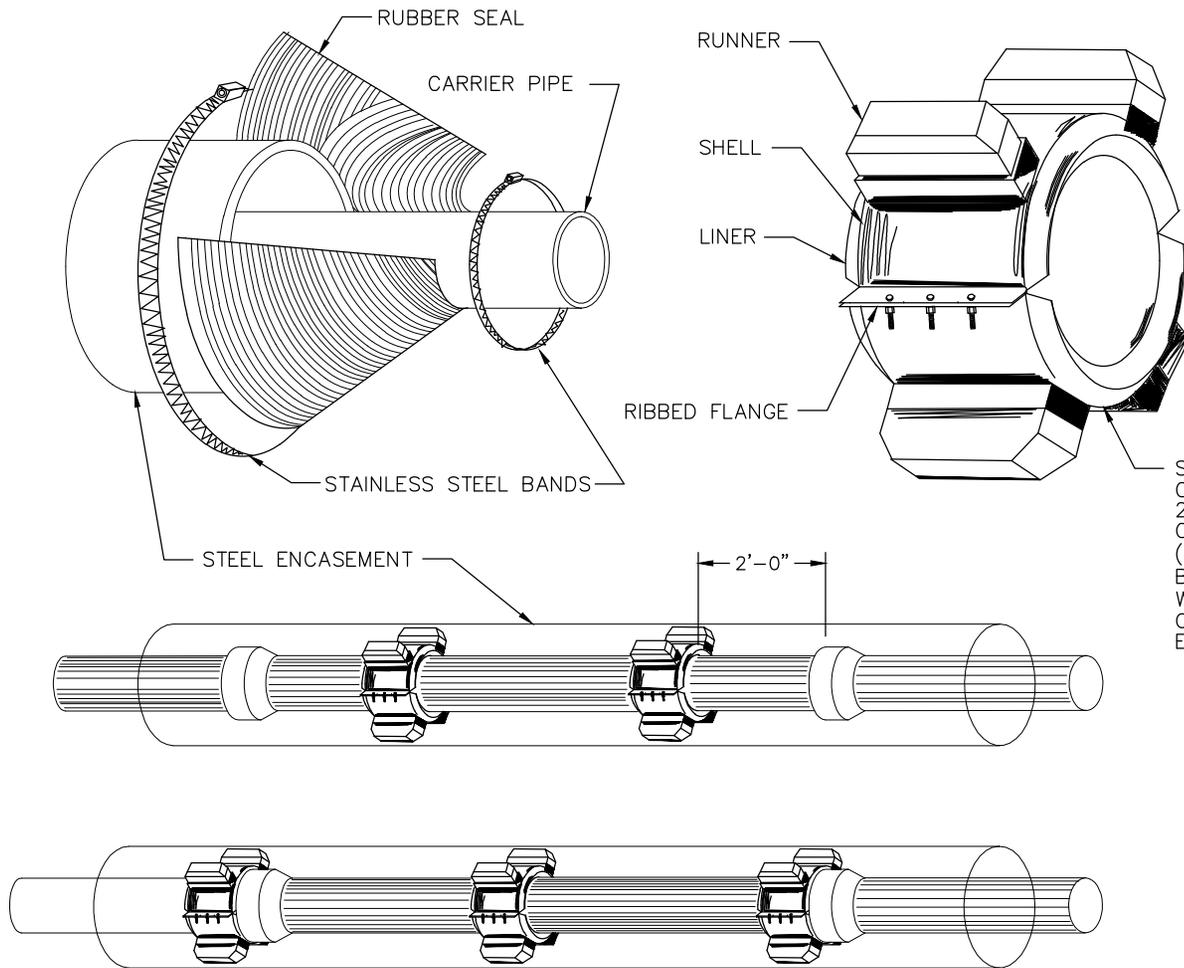


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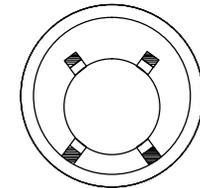
ASPHALT DRIVEWAY PAVEMENT REPLACEMENT

REVISIONS	
DATE	DESCRIPTION

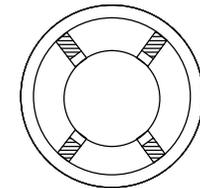
STD. NO.
5.05



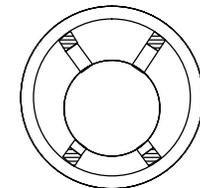
POSITIONING



STANDARD: CARRIER LAYS ON CASING BOTTOM. TOP RUNNERS MAINTAIN SPACING IN THE EVENT OF ROLLOVER.



CENTERED: POSITIONS IN CENTER OF CASING. STABLE WITH MOST ANNULAR SPACE AVAILABLE FOR OTHER USES.



RESTRAINED: KEEPS CARRIER FROM FLOATING OR BUCKING UNDER SUDDEN PRESSURE SURGES.

NOTE: STANDARD POSITIONING TO BE USED UNLESS OTHERWISE NOTED.

NOTE:

1. FOR WATER LINE CARRIER PIPE, JOINTS SHALL BE RESTRAINED AS SPECIFIED IN CITY OF ASHEVILLE WATER RESOURCES STANDARD SPECIFICATIONS AND DETAILS MANUAL.



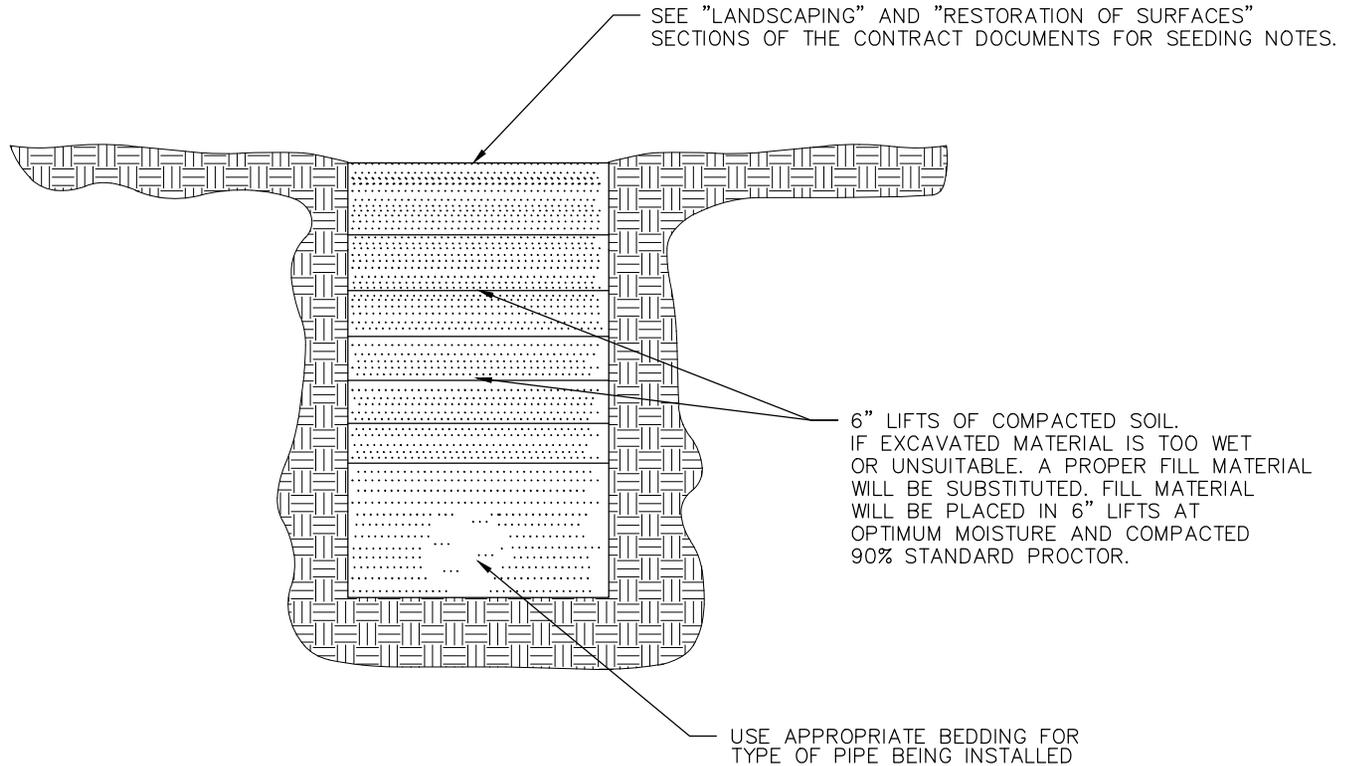
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**CARRIER PIPE IN
STEEL ENCASEMENT**

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		5.06

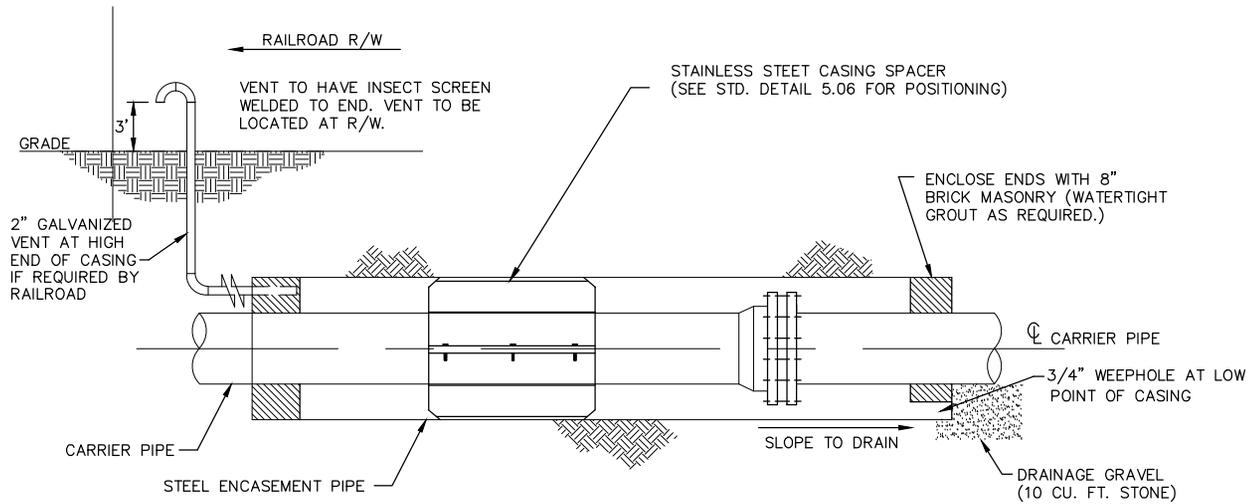
NOTE:

1. USE SUITABLE MATERIAL REMOVED DURING TRENCH EXCAVATION FOR BACKFILL UNLESS DIRECTED OTHERWISE BY ENGINEER.
2. ALL O.S.H.A. REQUIREMENTS SHALL BE ADHERED TO FOR TRENCHING OPERATIONS.



SHOULDER REPAIR

REVISIONS	
DATE	DESCRIPTION



ELEVATION

NOTE:

1. STEEL "SPIDERS" MUST BE USED FOR SUPPORT OF THE CARRIER PIPE WITHIN THE CASING PIPE A MINIMUM OF 2 PER JOINT OF CARRIER PIPE IS REQUIRED..
2. FOR WATER LINE CARRIER PIPE, JOINTS SHALL BE RESTRAINED AS SPECIFIED IN CITY OF ASHEVILLE WATER RESOURCES STANDARD SPECIFICATIONS AND DETAILS MANUAL.



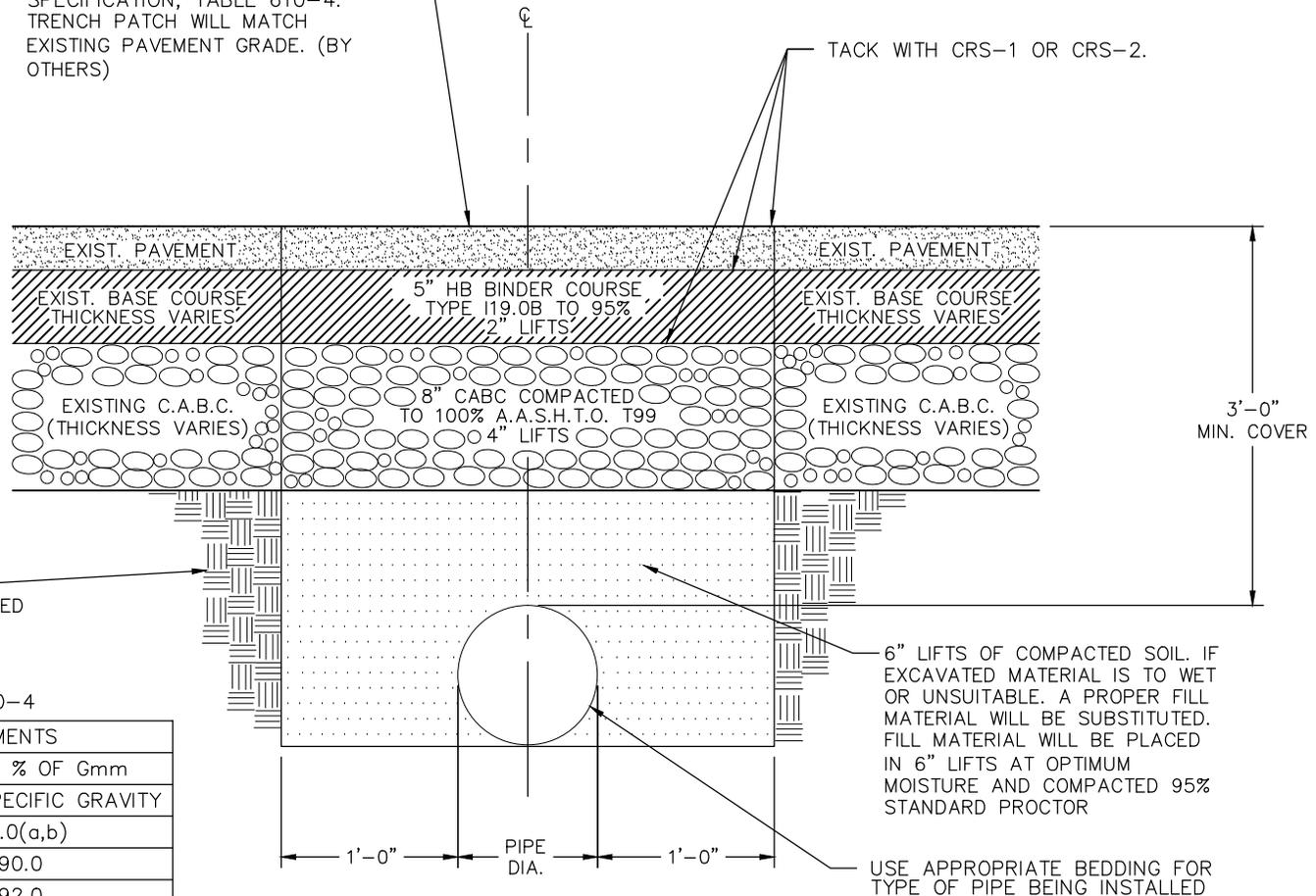
**TYPICAL STEEL ENCASEMENT AND CARRIER
PIPE INSTALLATION UNDER RAILROAD**

REVISIONS	
DATE	DESCRIPTION

WEARING COURSE CONSIST OF A MINIMUM OF 2" SURFACE COURSE TYPE SF 9.5A OR S9.5B COMPACTED 92% PER N.C.D.O.T. STANDARD SPECIFICATION, TABLE 610-4. TRENCH PATCH WILL MATCH EXISTING PAVEMENT GRADE. (BY OTHERS)

NOTE:

1. EDGES TO BE SAWED WITH A CONCRETE SAW TO A NEAT SQUARED EDGE BROOMED CLEAN OF DUST BEFORE TACK COAT IS APPLIED.
2. ALL O.S.H.A. REQUIREMENTS SHALL BE ADHERED TO FOR TRENCHING OPERATIONS.



N.C.D.O.T. STANDARD SPECIFICATION TABLE 610-4

MINIMUM DENSITY REQUIREMENTS	
MIX TYPE	MINIMUM % OF Gmm
SUPER PAVE MIXES	
MINIMUM SPECIFIC GRAVITY	
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SF 9.5A	90.0
S 9.5X, S 12.5X, I 19.0X, B 25.0X, B 37.5X	92.0



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ROAD PAVEMENT REPAIR UTILITY TRENCH WIDTH ONLY

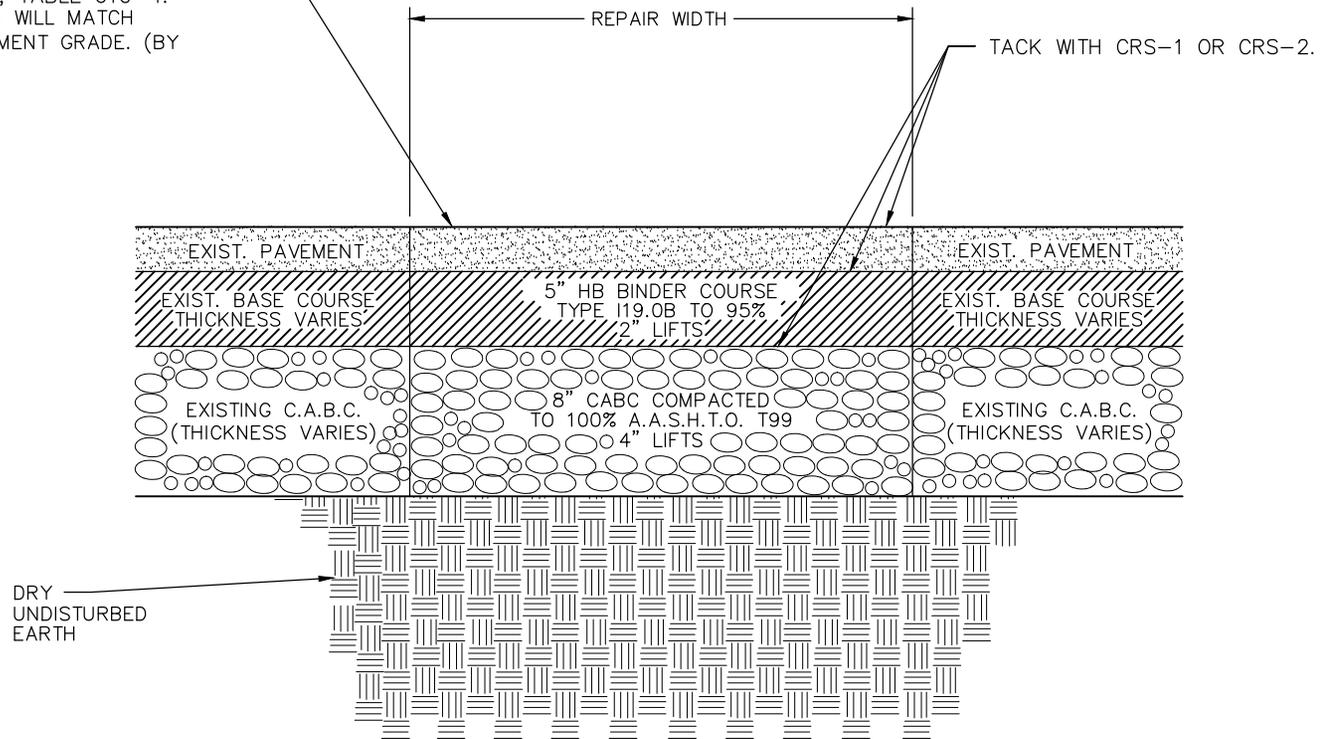
REVISIONS	
DATE	DESCRIPTION

STD. NO.
5.09

NOTE:

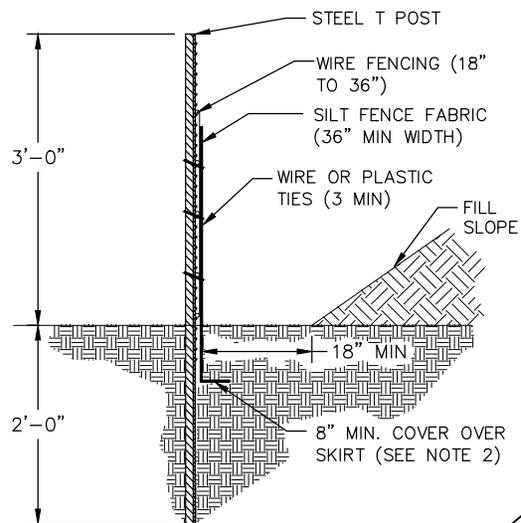
1. EDGES TO BE SAWED WITH A CONCRETE SAW TO A NEAT SQUARED EDGE BROOMED CLEAN OF DUST BEFORE TACK COAT IS APPLIED.

WEARING COURSE CONSIST OF A MINIMUM OF 2" SURFACE COURSE TYPE SF 9.5A OR S9.5B COMPACTED 92% PER N.C.D.O.T. STANDARD SPECIFICATION, TABLE 610-4. TRENCH PATCH WILL MATCH EXISTING PAVEMENT GRADE. (BY OTHERS)

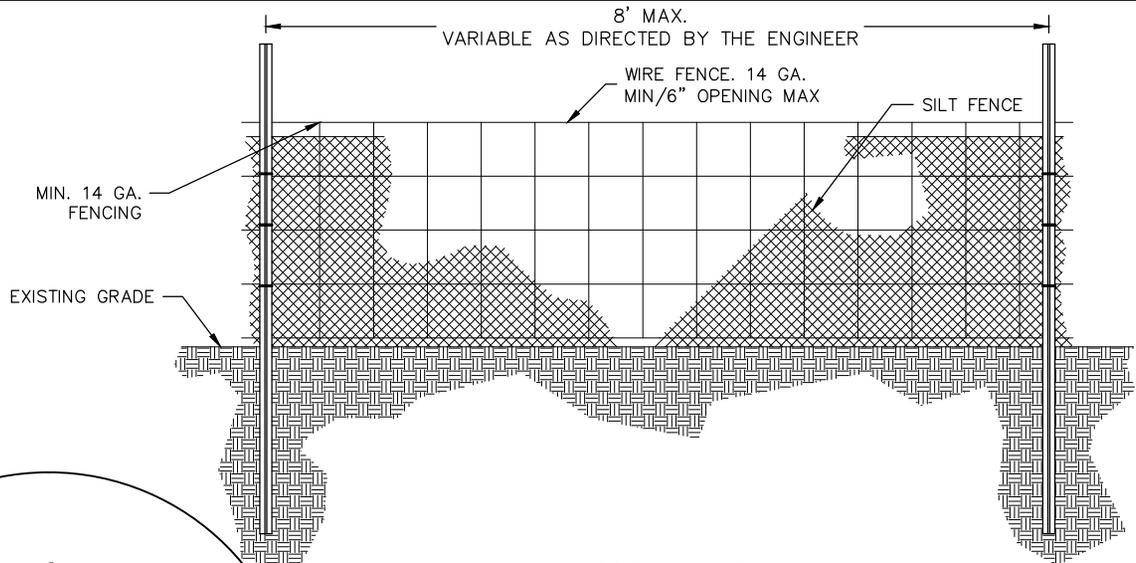


ROAD PAVEMENT REPAIR

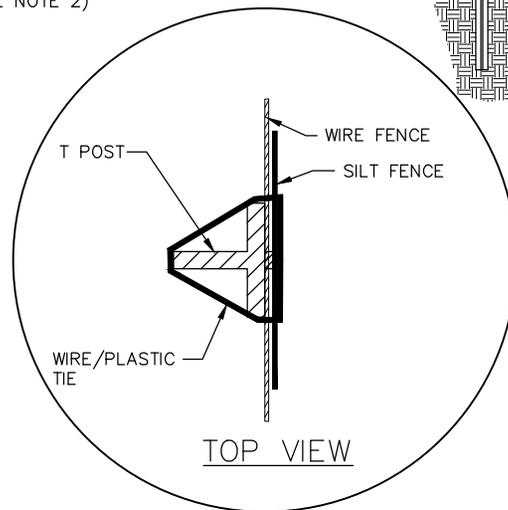
REVISIONS	
DATE	DESCRIPTION



SIDE VIEW



FRONT VIEW



TOP VIEW

NOTES:

1. SILT FENCE MUST BE PLACED 18" (MIN) FROM TOE OF SLOPE. IT CAN NOT BE USED TO HOLD BACK FILL MATERIALS
2. BOTTOM 12 INCHES OF SILT FENCE MUST BE BURIED. PLACE IT IN A TRENCH 8" DEEP AND 4" WIDE
3. USE SILT FENCE ONLY WHEN DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE AND NEVER IN AREAS OF CONCENTRATED FLOW OR IN A STREAM BED.

MAXIMUM SLOPE LENGTH AND SLOPE WHICH SEDIMENT FENCE IS APPLICABLE*

SLOPE	SLOPE LENGTH (FT)	MAXIMUM AREA (SQ FT)
<2%	100	10,000
2 TO 5%	75	7,500
5 TO 10%	50	5,000
10 TO 20%	25	2,500
>20%	15	1,500

* TABLE INFORMATION TAKEN FROM THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL, DETAIL 6.62A.



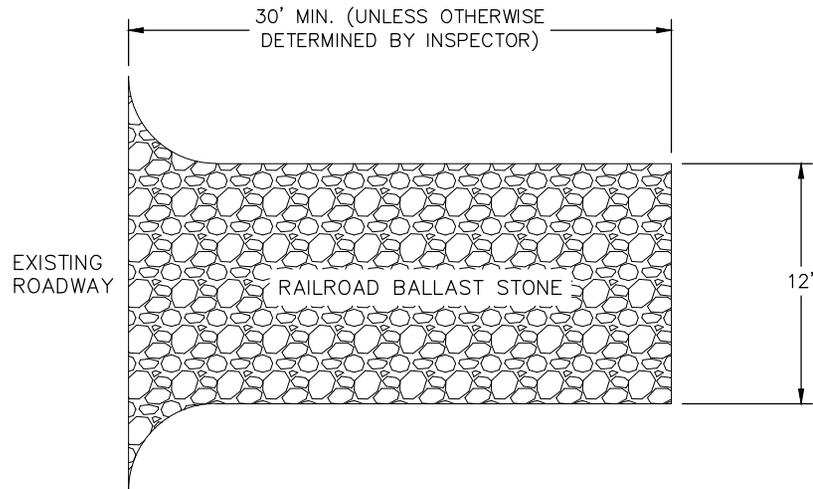
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STANDARD TEMPORARY
SILT FENCE

REVISIONS	
DATE	DESCRIPTION

STD. NO.

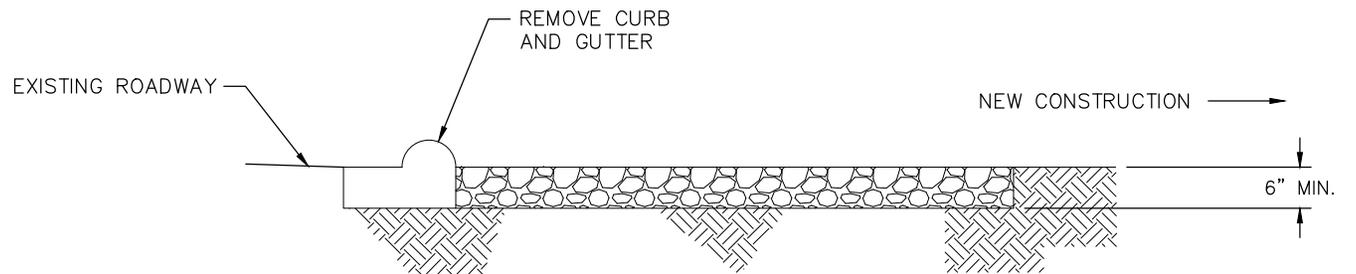
7.01



PLAN

NOTES:

1. THIS ENTRANCE APPLIES ONLY TO ENTRANCES OF INDIVIDUAL SINGLE FAMILY RESIDENTIAL UNITS.
2. REFER TO DWG. STD. No. 3.15--STANDARD DRIVEWAY APRON.
3. REFER TO DWG. STD. No.3.12--STANDARD METHOD OF REMOVING EXISTING CURB.
3. FABRIC MAY BE ADDED UNDER THE STONE WHICH WOULD ADD TOTAL LIFE TO THE CONSTRUCTION ENTRANCE.



CROSS SECTION

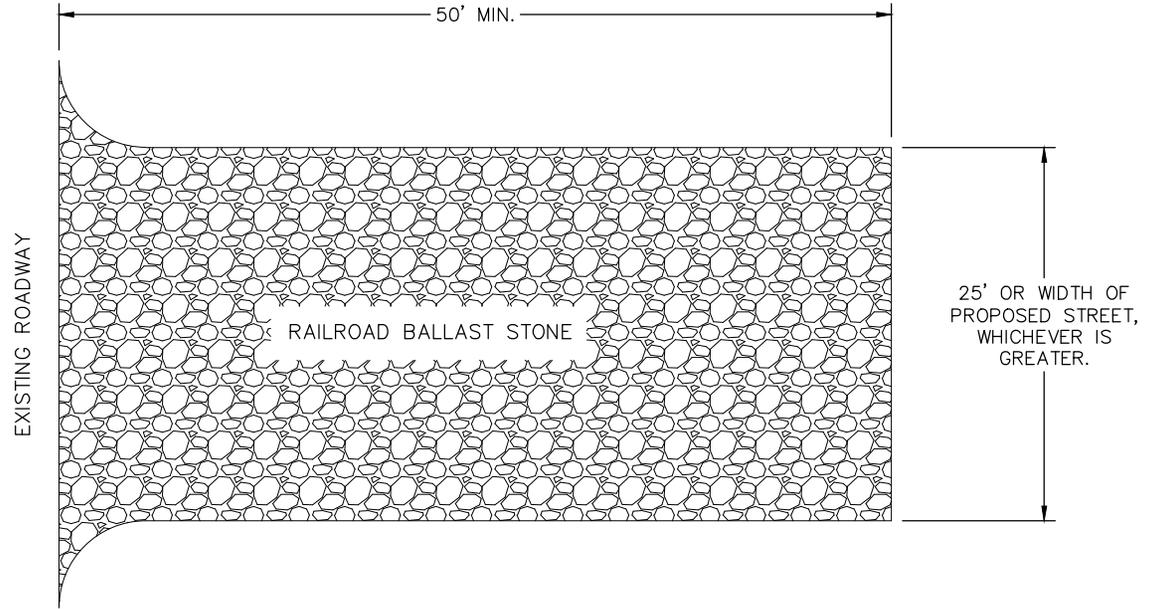


**RESIDENTIAL
CONSTRUCTION ENTRANCE**

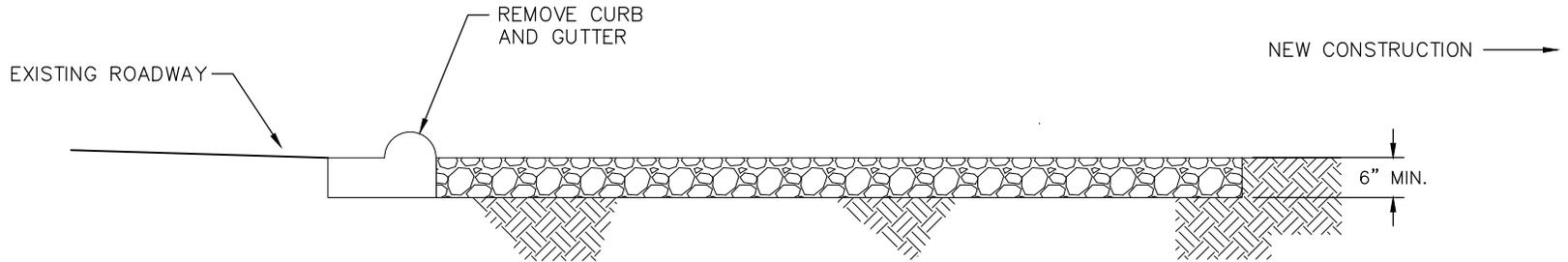
REVISIONS	
DATE	DESCRIPTION

NOTES:

1. THIS ENTRANCE APPLIES ONLY TO ENTRANCES FOR COMMERCIAL SITES.
2. FIRST 5' MUST DRAIN AWAY FROM THE STREET (MIN ¼" PER 1' FALL)
3. FLOW FROM PROJECT SHALL NOT ENTER THE PUBLIC STREET.
4. FABRIC MAY BE ADDED UNDER THE STONE WHICH WOULD ADD TOTAL LIFE TO THE CONSTRUCTION ENTRANCE.



PLAN



CROSS SECTION

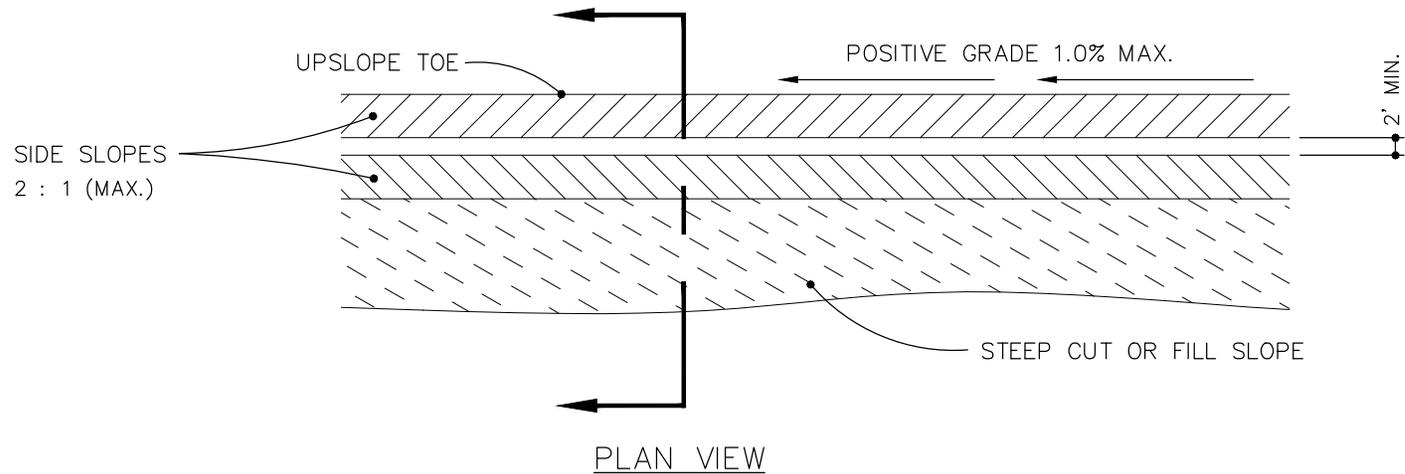
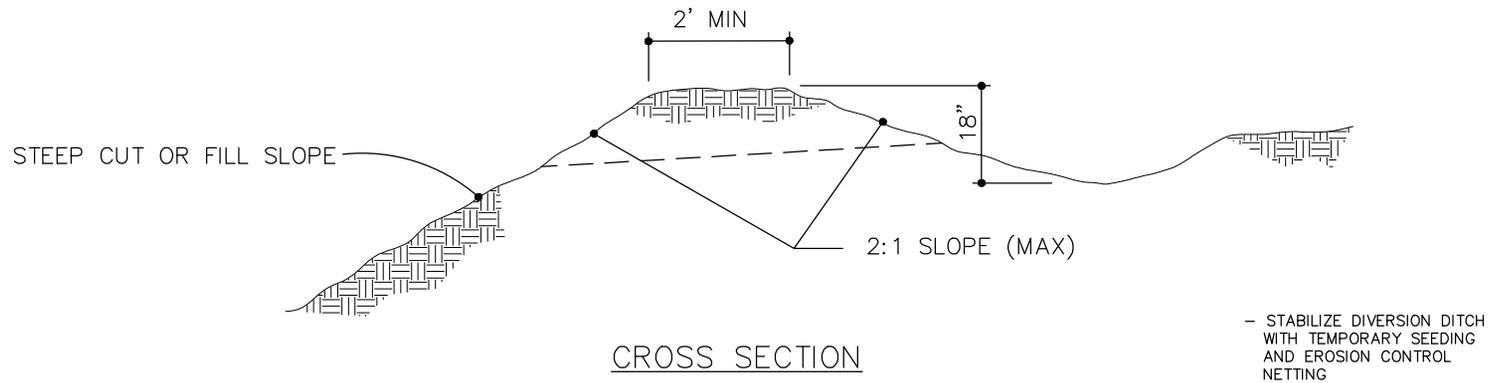


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**COMMERCIAL
 CONSTRUCTION ENTRANCE**

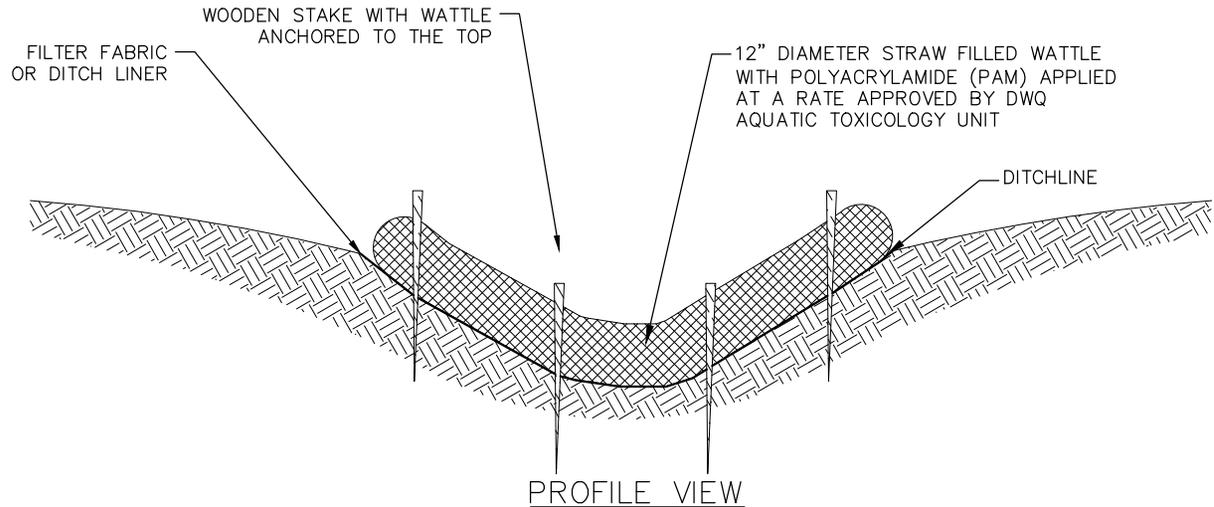
REVISIONS	
DATE	DESCRIPTION

STD. NO.
7.03



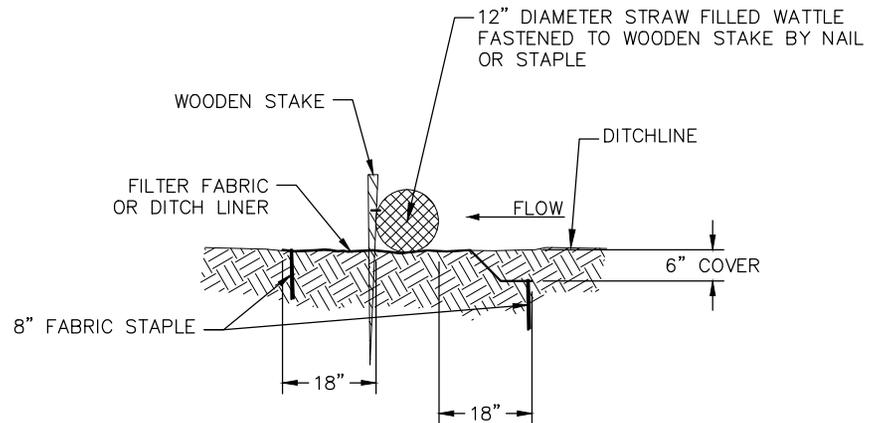
DIVERSION DITCH

REVISIONS	
DATE	



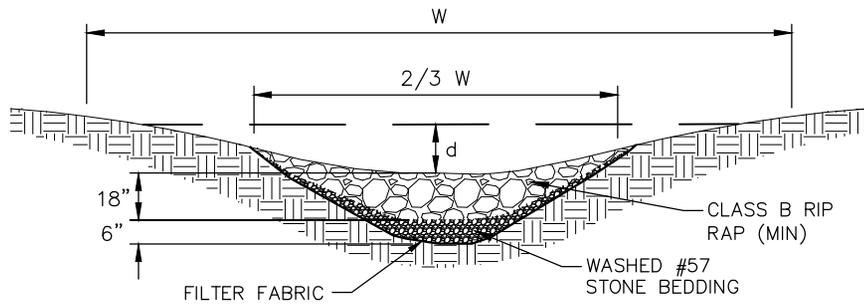
NOTES:

1. WATTLES SHALL BE FILLED WITH STRAW OR OTHER APPROVED MATERIAL
2. POLYACRYLAMIDE (PAM) MAY BE APPLIED AT A RATE APPROVED BY DWQ AQUATIC TOXICOLOGY UNIT.
3. SPACING FOR WATTLES SHALL BE DETERMINED BY THE SITE ENGINEER.
4. WATTLES MAY BE USED FOR PROTECTION OF CATCH BASINS AND DROP INLETS WITH APPROVAL BY THE STORMWATER SERVICES MANAGER OR DESIGNEE.

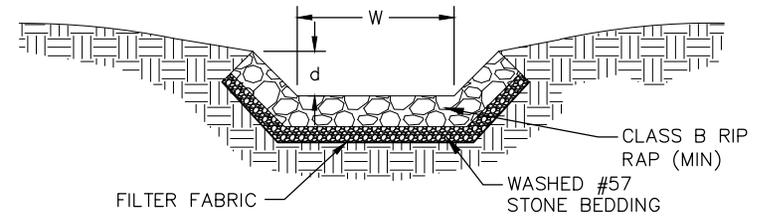


WATTLE DETAIL

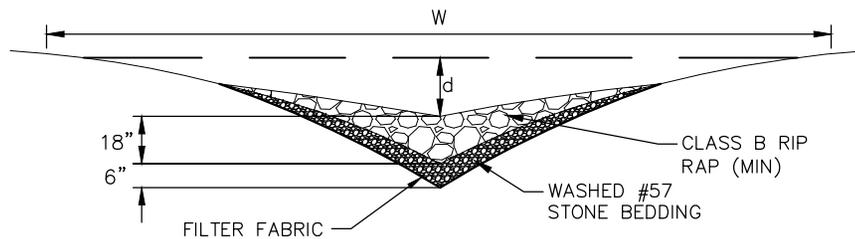
REVISIONS	
DATE	



PARABOLIC-SHAPED WATERWAY WITH STONE CENTER DRAIN



TRAPEZOIDAL



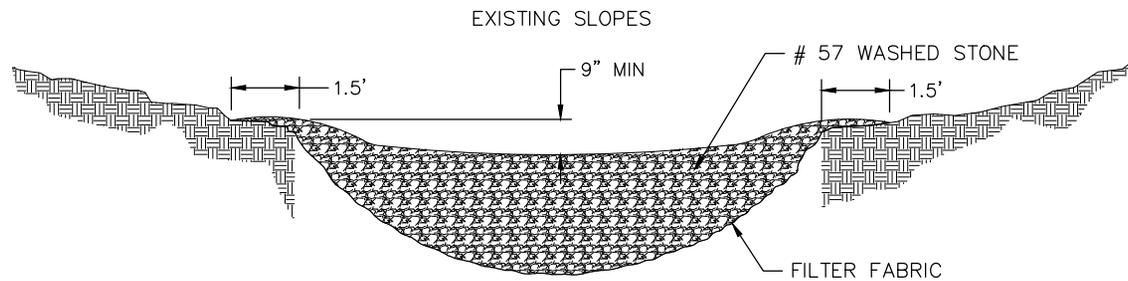
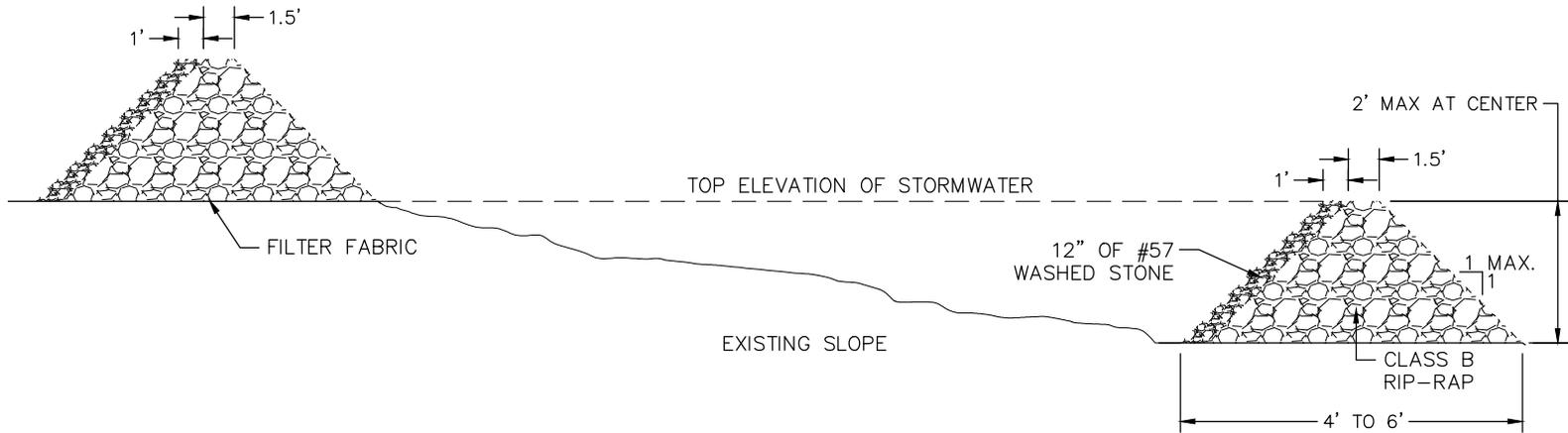
V-SHAPED WATERWAY WITH STONE CENTER DRAIN

NOTE:
 TO BE USED WHERE EXCESSIVE STORMWATER VELOCITIES PROHIBIT VEGETATIVE LININGS. SIZE OF STONE MUST BE DETERMINED BY APPROPRIATE DESIGN PROCEDURE. DIMENSIONS FOR d & W VARIES ACCORDING TO DESIGN. (NC DENR MANUAL, DETAIL 6.62A)



REVISIONS		STD. NO.
DATE	DESCRIPTION	
		7.06

SIDE VIEW



NOTE:
HEIGHT & WIDTH DETERMINED
BY EXISTING TOPOGRAPHY AND
SEDIMENT STORAGE REQUIRED.

FRONT VIEW

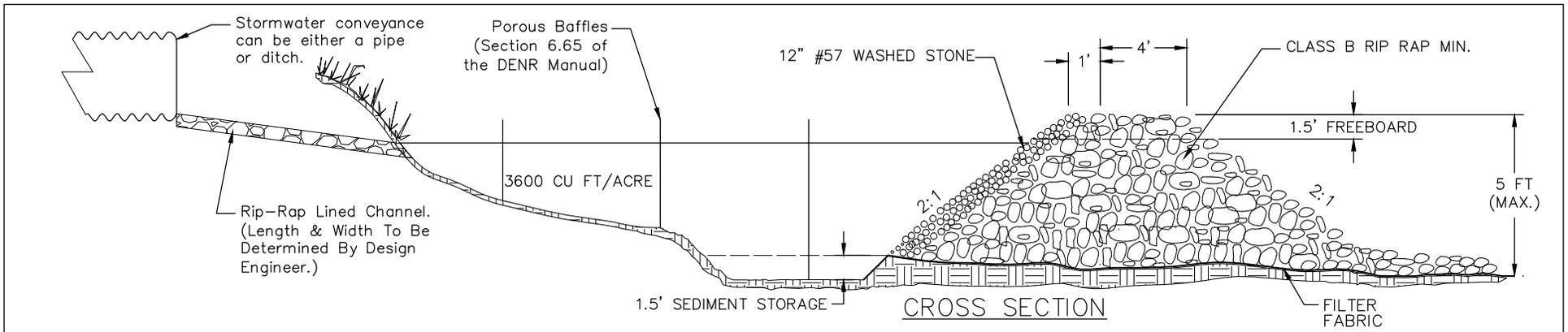


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CHECK DAM

REVISIONS	
DATE	DESCRIPTION

STD. NO.
7.07



NOTES:

1. 5 ACRES MAXIMUM DRAINAGE AREA
2. REFER TO THE LATEST VERSION OF THE NC DENR EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL FOR FURTHER DESIGN CRITERIA.

MAINTENANCE:

1. INSPECT ONCE A WEEK AND AFTER EACH SIGNIFICANT (1/2 INCH OR GREATER) RAINFALL AND MAKE REPAIRS IMMEDIATELY.
2. REMOVE SEDIMENT AND RESTORE THE TRAP TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP.
3. PLACE SEDIMENT IN A DESIGNATED (PERMITTED) DISPOSAL AREA AND REPLACE GRAVEL FACINGS THAT HAVE BEEN IMPAIRED BY SEDIMENT.
4. ANY RIPRAP DISPLACED FROM THE SPILLWAY MUST BE REPLACED IMMEDIATELY.
5. CHECK THE TRAP FOR DAMAGE CAUSED BY EROSION OR PIPING.
6. PERIODICALLY CHECK THE SPILLWAY TO INSURE IT IS MINIMUM 1 1/2 FEET BELOW THE EMBANKMENT.

DESIGN OF SPILLWAY

DRAINAGE AREA (ACRES)	WEIR LENGTH* (FT)
1	4.0
2	6.0
3	8.0
4	10.0
5	12.0

* DIMENSIONS SHOWN ARE MINIMUM



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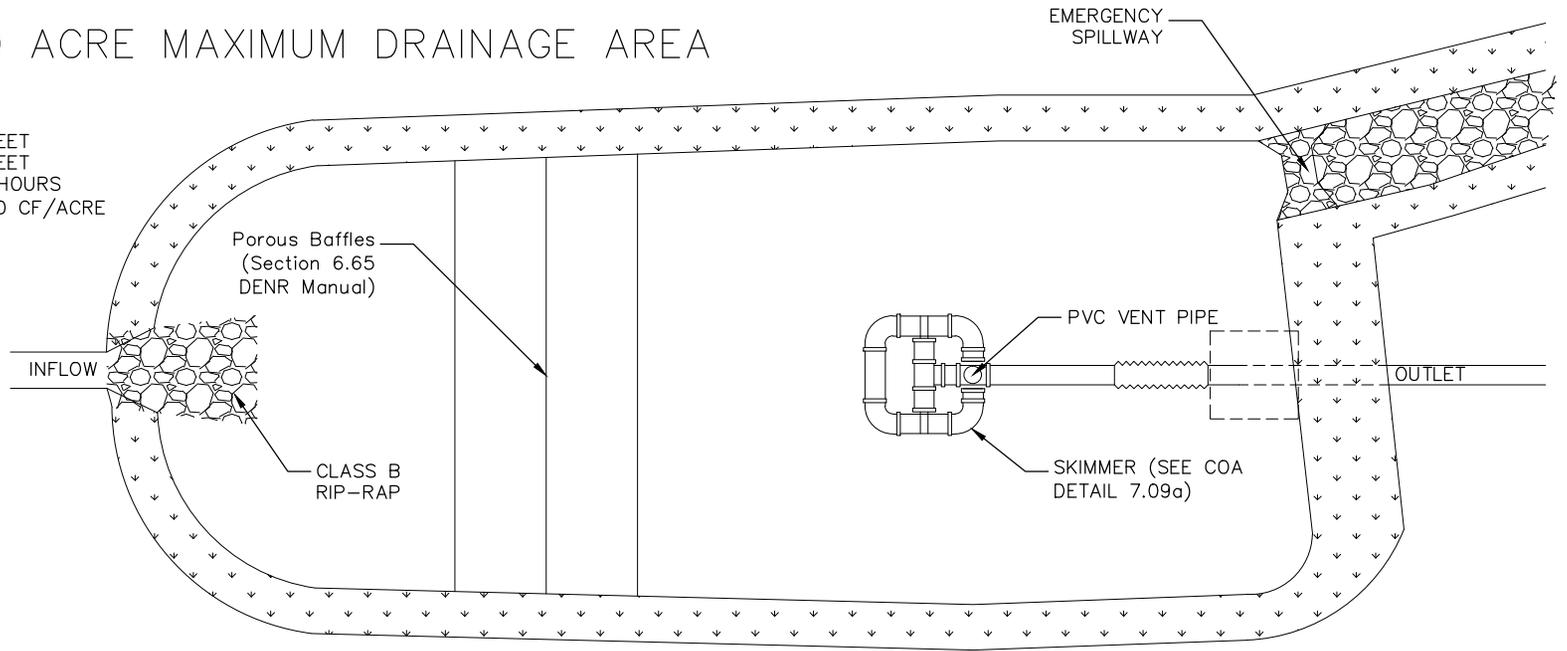
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TEMPORARY SEDIMENT TRAP

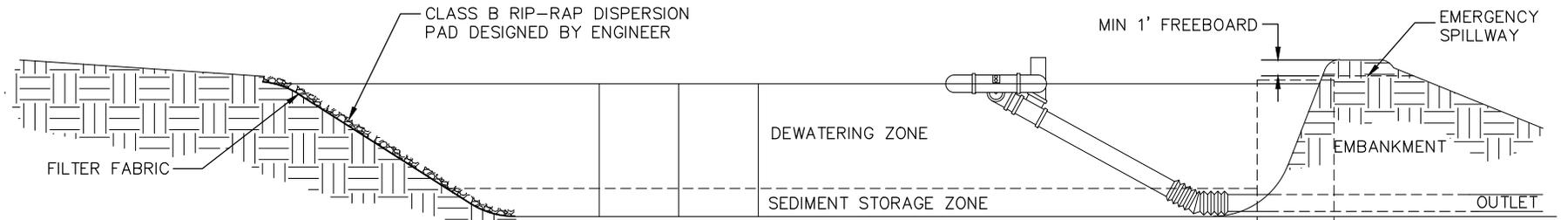
REVISIONS		STD. NO.
DATE	DESCRIPTION	
		7.08

NOTE: FOR 10 ACRE MAXIMUM DRAINAGE AREA

MINIMUM L/W RATIO: 2:1
 MAXIMUM L/W RATIO: 6:1
 MINIMUM DEPTH: 2 FEET
 MAX DAM HEIGHT: 5 FEET
 MIN DEWATERING TIME: 24 HOURS
 STORAGE VOLUME: 1800 CF/ACRE



PLAN VIEW



CROSS-SECTION

SKIMMER MAY ALSO BE USED WITH APPROVED STRUCTURES



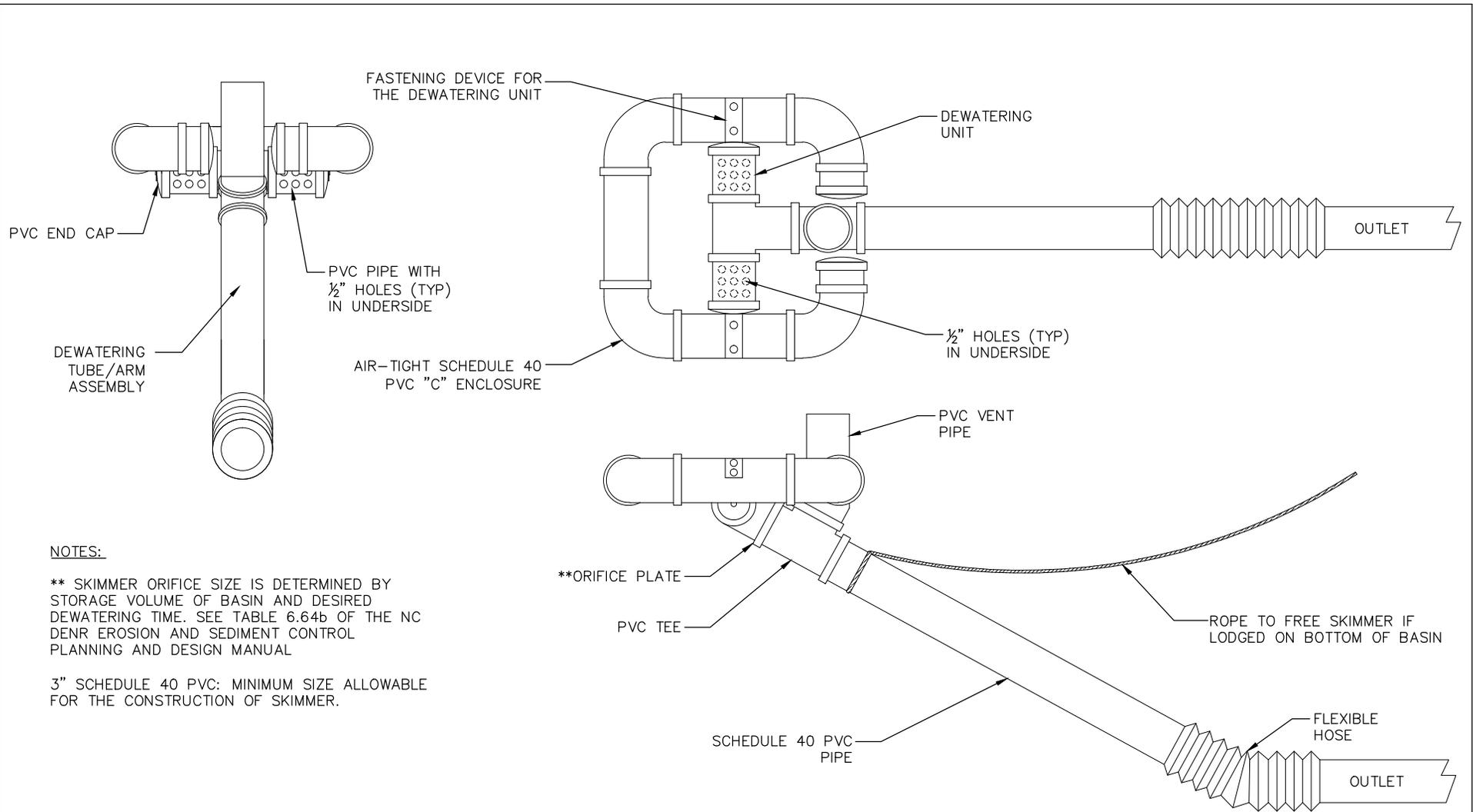
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SKIMMER SEDIMENT BASIN

REVISIONS	
DATE	DESCRIPTION

STD. No.

7.09



NOTES:

** SKIMMER ORIFICE SIZE IS DETERMINED BY STORAGE VOLUME OF BASIN AND DESIRED DEWATERING TIME. SEE TABLE 6.64b OF THE NC DENR EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL

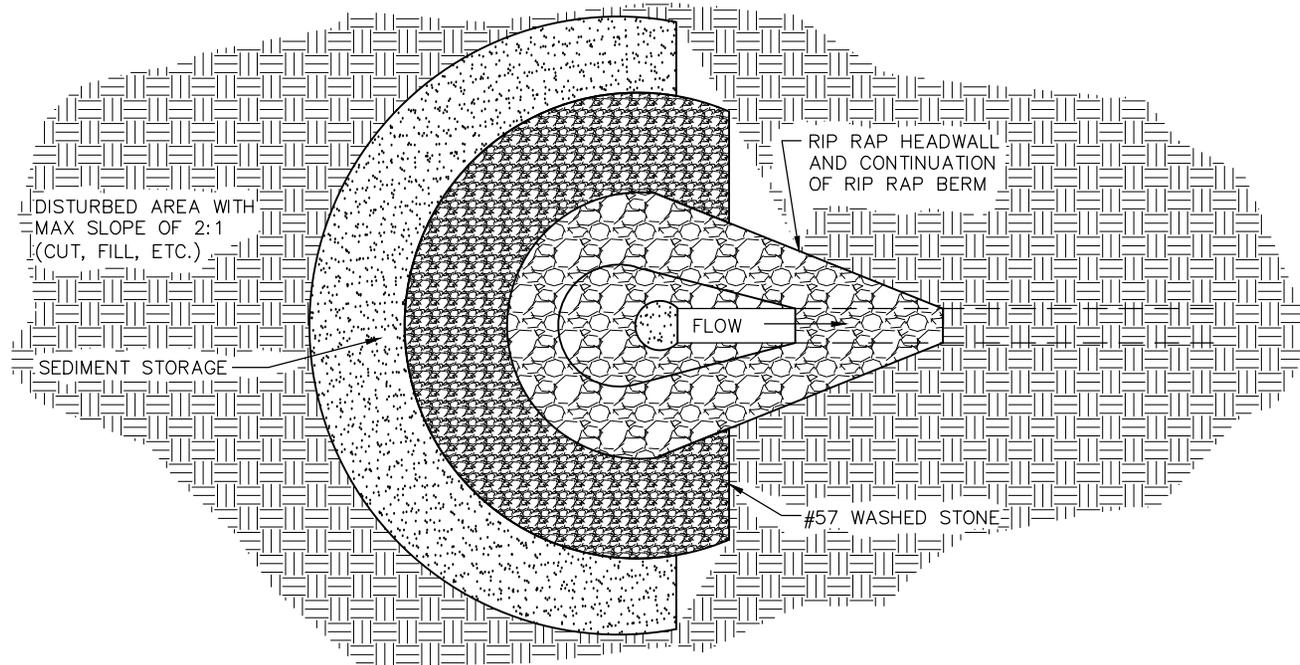
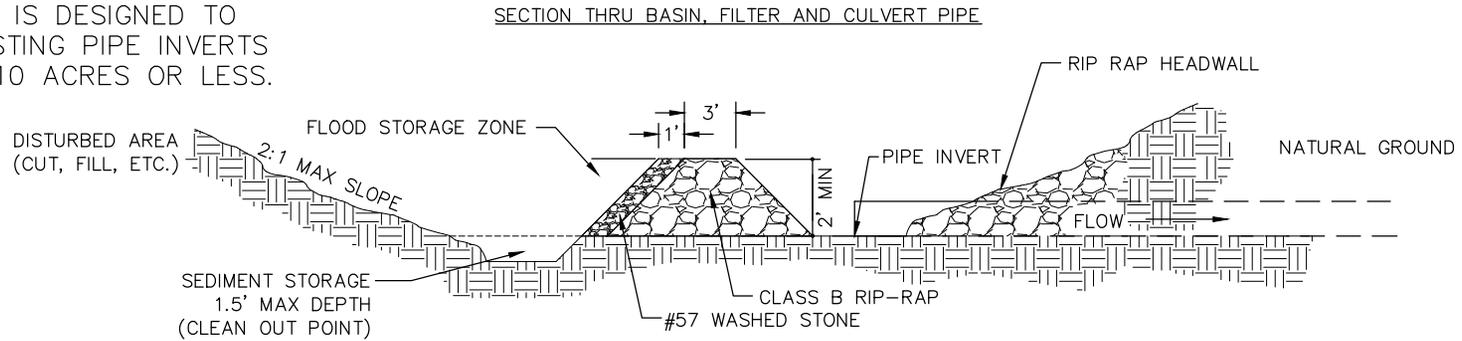
3" SCHEDULE 40 PVC: MINIMUM SIZE ALLOWABLE FOR THE CONSTRUCTION OF SKIMMER.



SKIMMER DETAIL

REVISIONS	
DATE	DESCRIPTION

NOTE:
GRAVEL & RIP RAP FILTER BERM
BASIN DETAIL IS DESIGNED TO
PROTECT EXISTING PIPE INVERTS
THAT DRAIN 10 ACRES OR LESS.



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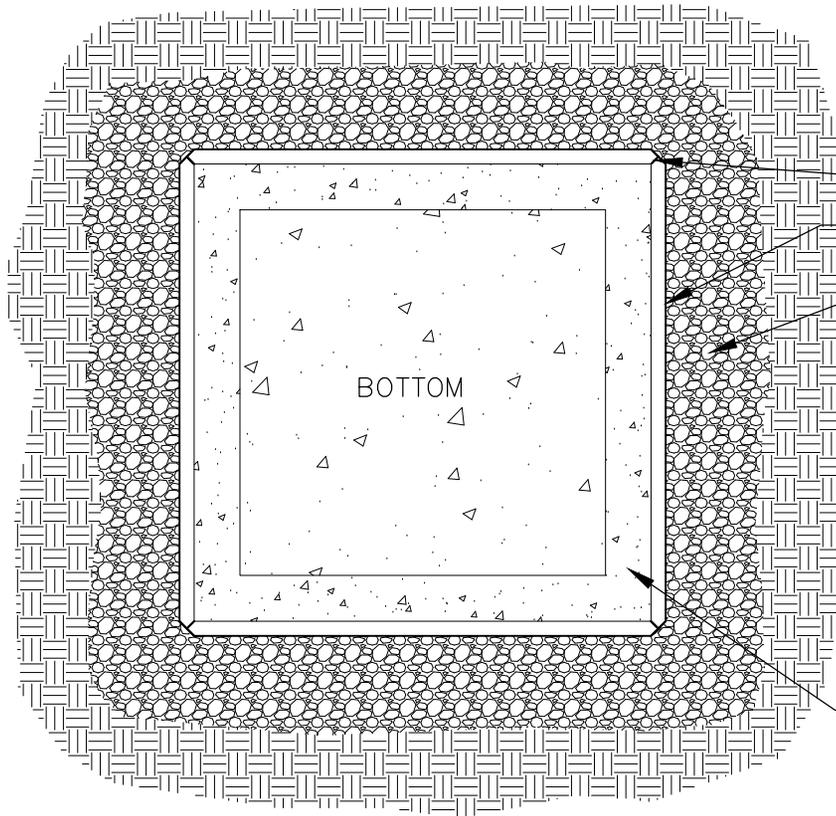
GRAVEL & RIP RAP PIPE INLET PROTECTION

REVISIONS		STD. NO.
DATE	DESCRIPTION	
		7.10

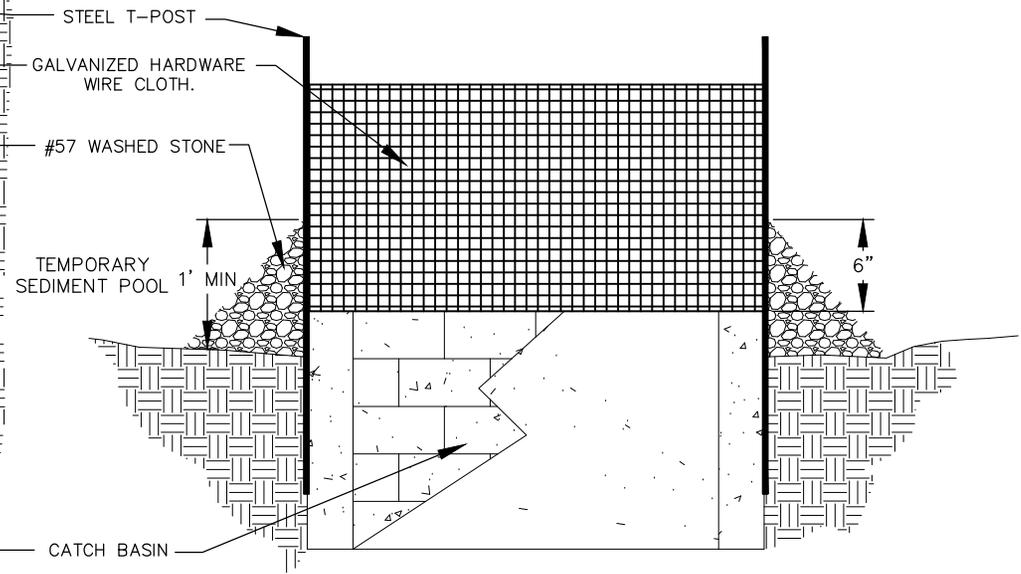
NOTES:

1. SILT FENCE IS NOT ACCEPTABLE IN PLACE OF HARDWARE CLOTH.
2. ONLY STEEL T-POST ARE ACCEPTABLE.
3. #57 WASHED STONE MUST BE A MIN 6" ABOVE THE TOP OF THE CATCH BASIN.
4. TEMPORARY SEDIMENT POOL MUST BE 1' MINIMUM AND 2' MAXIMUM DEPTH

TOP ELEVATION

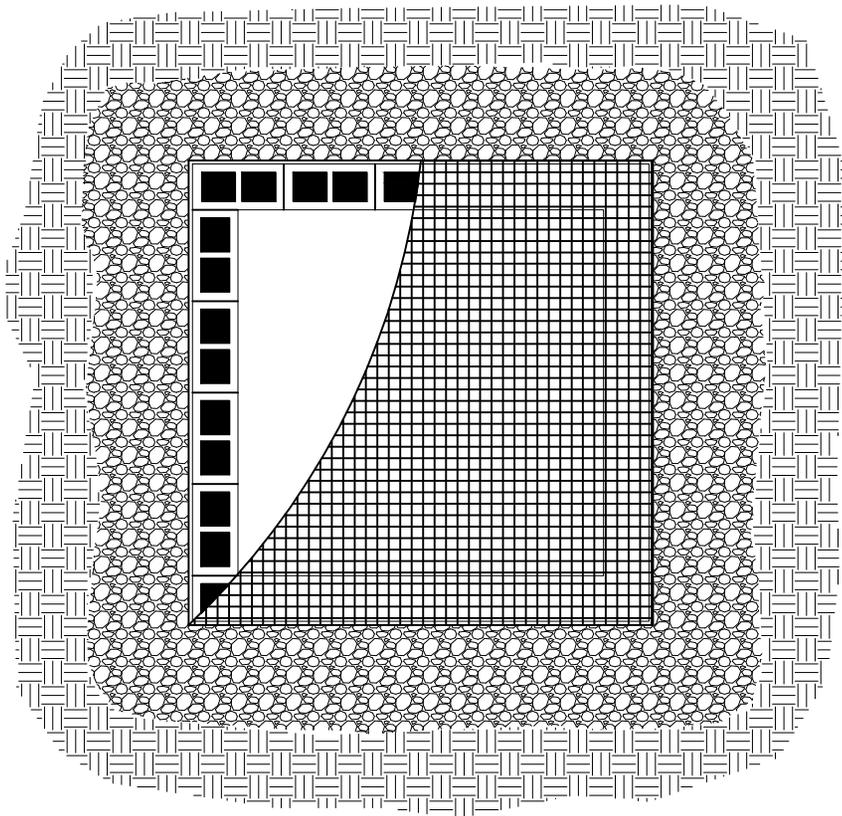


SIDE ELEVATION



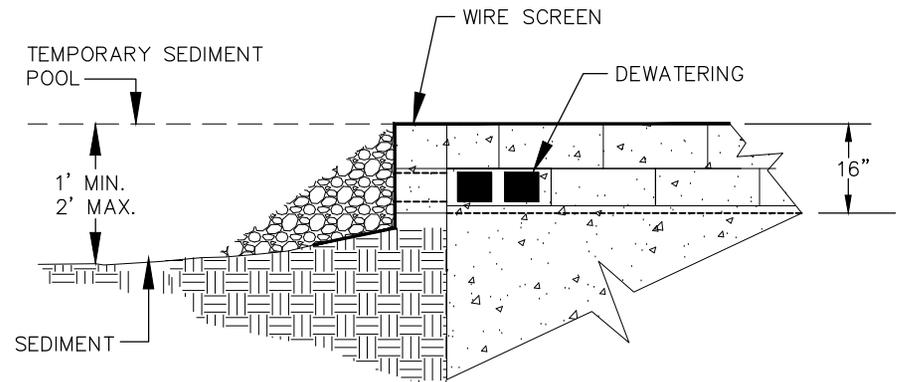
**STANDARD CATCH BASIN
INLET PROTECTION**

DATE	REVISIONS
	DESCRIPTION

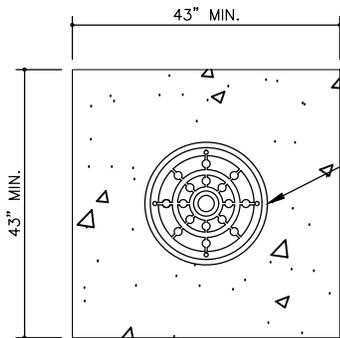


CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE IN THE BOTTOM ROW TO ALLOW POOL DRAINAGE. THE FOUNDATION SHOULD BE EXCAVATED AT LEAST 2 INCHES BELOW THE CREST OF THE STORM DRAIN. PLACE THE BOTTOM ROW OF BLOCKS AGAINST THE EDGE OF THE STORM DRAIN FOR LATERAL SUPPORT AND TO AVOID WASHOUTS WHEN OVERFLOW OCCURS. IF NEEDED, GIVE LATERAL SUPPORT TO SUBSEQUENT ROWS BY PLACING 2 X 4 WOOD STUDS THROUGH BLOCK OPENINGS.
2. CAREFULLY FIT HARDWARE CLOTH OR COMPARABLE WIRE MESH WITH 1/2-INCH OPENINGS OVER ALL BLOCK OPENINGS TO HOLD GRAVEL IN PLACE.
3. USE CLEAN GRAVEL, 3/4- TO 1/2-INCH IN DIAMETER, PLACED 2 INCHES BELOW THE TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER AND SMOOTH IT TO AN EVEN GRADE. DOT #57 WASHED STONE IS RECOMMENDED.

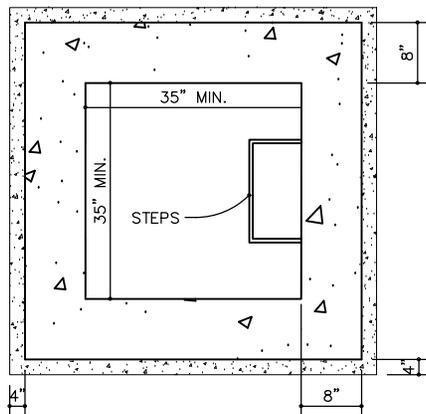


REVISIONS		STD. NO.
DATE	DESCRIPTION	
		7.11A



STD. MANHOLE RING AND COVER (PER NCDOT STANDARD DRAWING 840.54) MAY BE CAST IN SLAB OR SECURED TO TOP

CONCRETE SLAB



PLAN

NOTES:

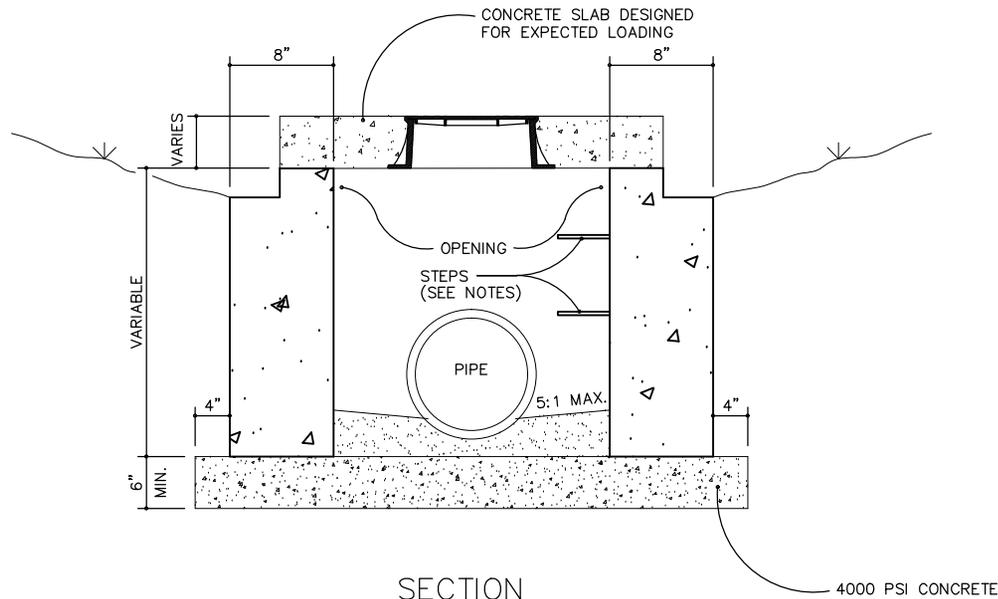
STANDARD STEPS REQUIRED @ 12" O.C. WHERE DEPTH EXCEEDS 4'.

USE MIN. 4000 P.S.I. CONC. MIX.

INSIDE DIMENSION FOR 24" PIPE AND GREATER USE PIPE DIA. PLUS 12".

ALL JUNCTION BOXES SHALL HAVE A PAVED INVERT WITH A MAXIMUM 5:1 SLOPE EXTENDING FROM THE PIPE INVERT TO THE STRUCTURE WALL.

ALL STRUCTURES 4' OR DEEPER SHALL HAVE ACCESS STEPS. STEPS SHALL BE INSTALLED 12" ON CENTER.



SECTION

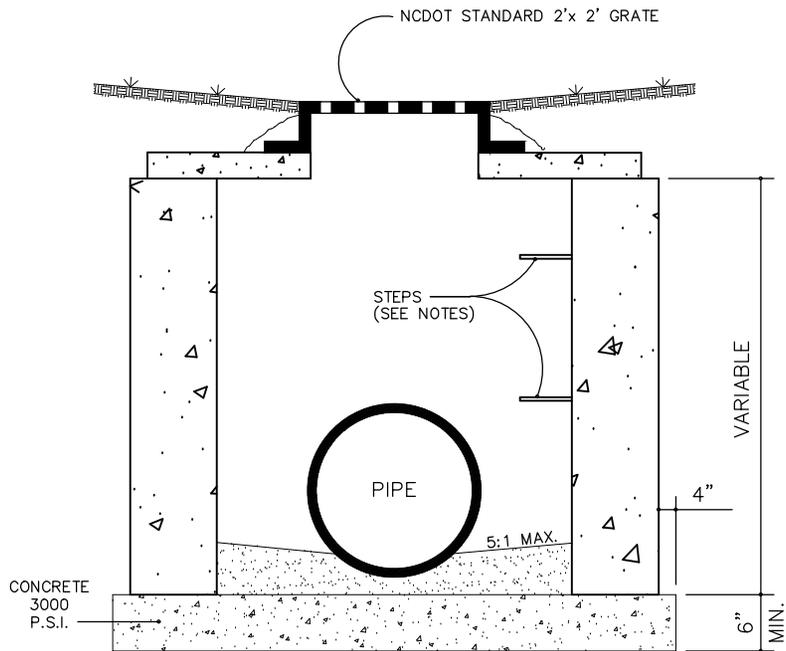


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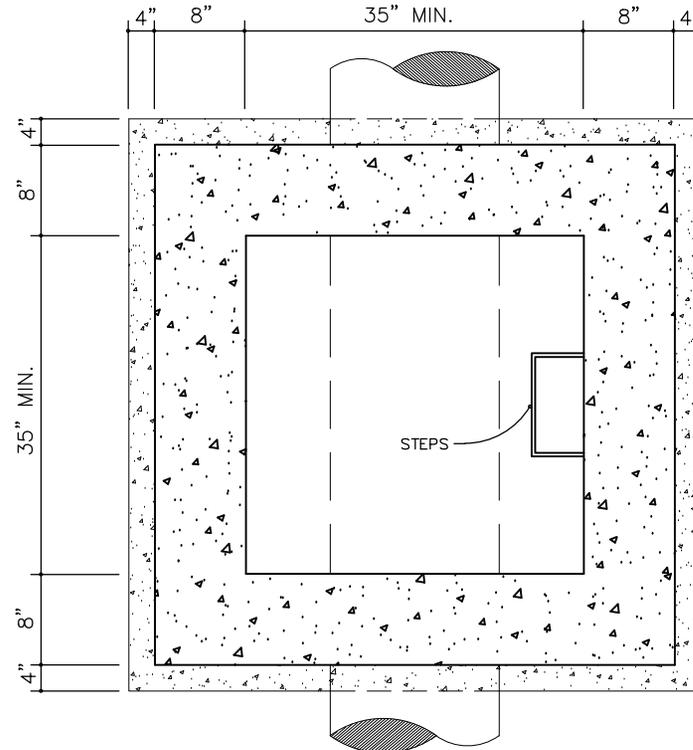
**STANDARD YARD INLET
WITH CONCRETE SLAB**

REVISIONS	
DATE	DESCRIPTION

STD. NO.
8.01



SECTION



PLAN

NOTES:

FOR 24" R.C.P. AND LARGER USE PIPE DIA. PLUS 12" FOR MINIMUM INSIDE DIMENSION.

GRATED INLETS SHALL NOT BE USED WITHIN TRAVEL AREAS.

STANDARD STEPS REQUIRED @ 12" O.C. WHERE DEPTH EXCEEDS 4'.

ALL JUNCTION BOXES SHALL HAVE A PAVED INVERT WITH A MAXIMUM 5:1 SLOPE EXTENDING FROM THE PIPE INVERT TO THE STRUCTURE WALL.

USE MIN. 4000 P.S.I. CONC. MIX.

ALL STRUCTURES 4' OR DEEPER SHALL HAVE ACCESS STEPS. STEPS SHALL BE INSTALLED 12" ON CENTER.



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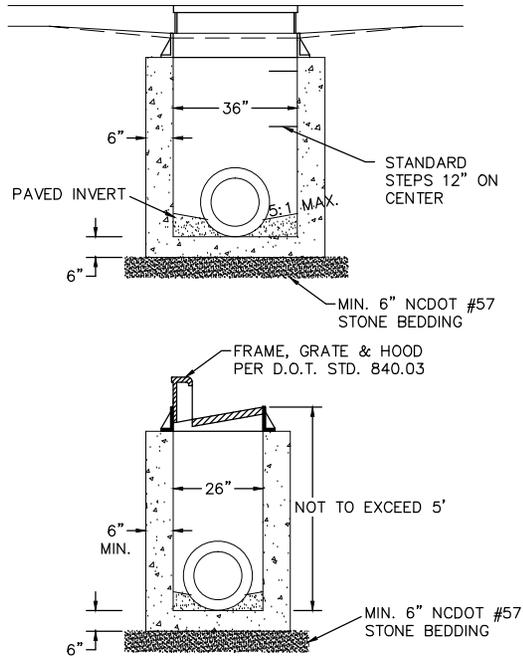
STANDARD YARD INLET WITH GRATE AND FRAME

REVISIONS	
DATE	DESCRIPTION

STD. NO.

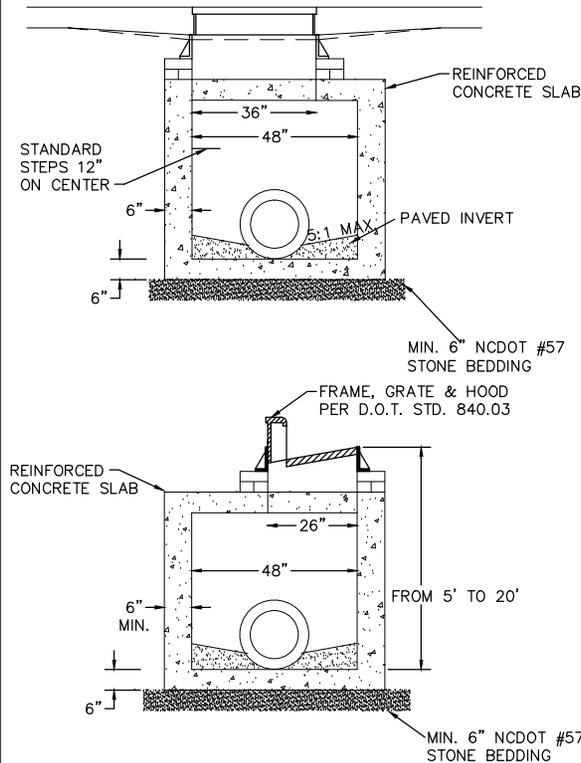
8.02

SHALLOW TYPE
(5 FEET OR LESS IN DEPTH)

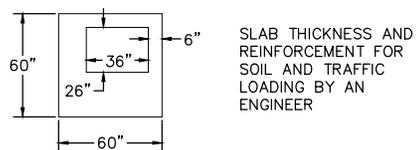


- NOTE:**
1. CONCRETE SHALL BE 4000 PSI MIN. FOR ALL PRECAST CONCRETE CATCH BASINS.
 2. PRECAST CONCRETE STRUCTURES MAY ONLY BE INSTALLED TO DEPTHS CERTIFIED AS ACCEPTABLE BY THE MANUFACTURER.
 3. "WAFFLE" (KNOCK OUT) BOXES ARE ACCEPTABLE FOR SHALLOW TYPE CATCH BASINS WITH MAXIMUM 30 INCH DIA. PIPE ALLOWED.
 4. ALL STRUCTURES 4' OR DEEPER SHALL HAVE ACCESS STEPS. STEPS SHALL BE INSTALLED 12" ON CENTER.
 5. EACH DRAINAGE STRUCTURE SHALL HAVE A PAVED INVERT WITH A MAXIMUM 5:1 SLOPE FROM THE INVERT OF THE PIPE TO THE WALL OF THE STRUCTURE.
 6. APPLY NON-SHRINK AROUND PIPE.
 7. HORIZONTAL, RISER, AND BOXES MUST BE SEALED WITH BUYTL RUBBER JOINTS.

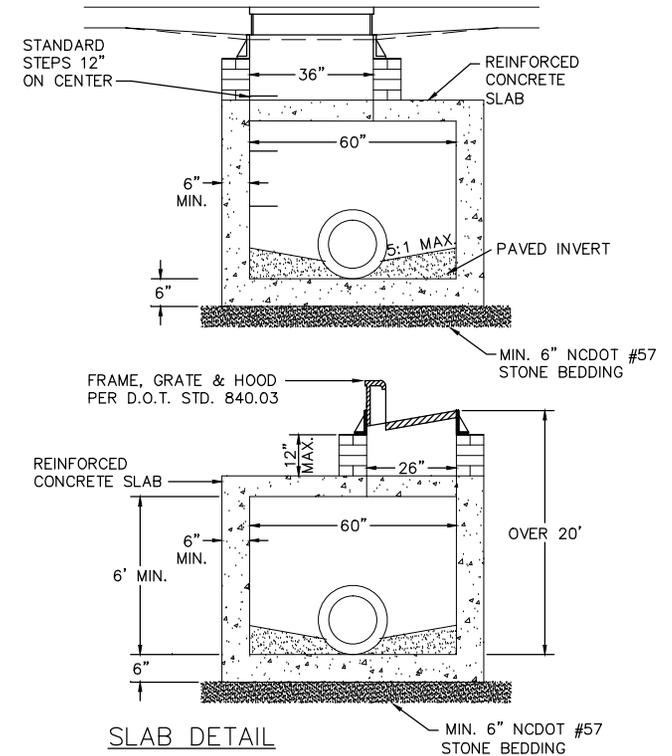
INTERMEDIATE TYPE (4'X4')
(5 FEET TO 20 FEET IN DEPTH)



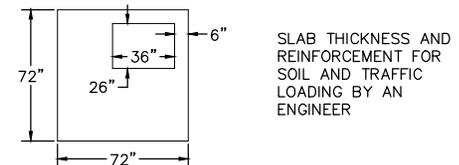
SLAB DETAIL



DEEP TYPE (5'X5')
(OVER 20 FEET IN DEPTH)



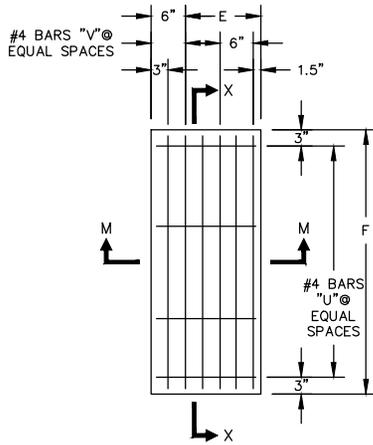
SLAB DETAIL



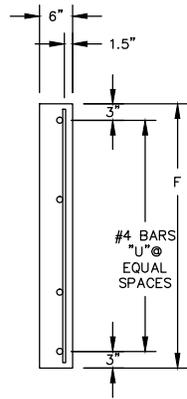
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**PRECAST CONCRETE
CATCH BASIN**

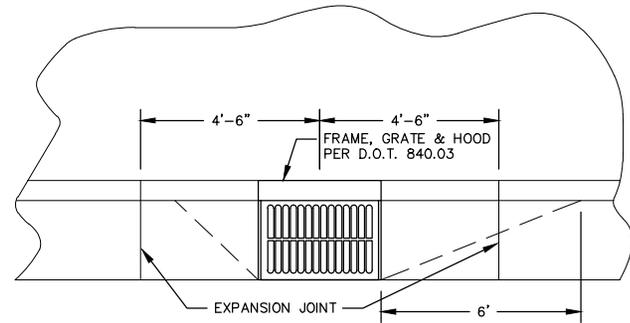
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DATE	DESCRIPTION	
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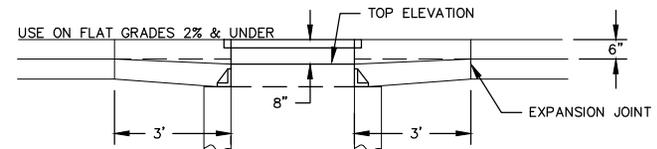
PLAN OF TOP SLAB



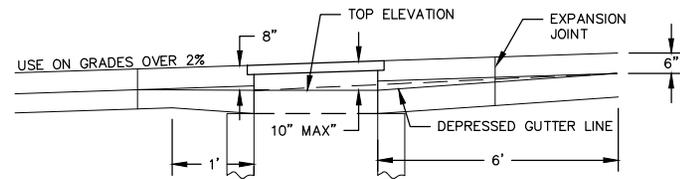
SECTION S-S



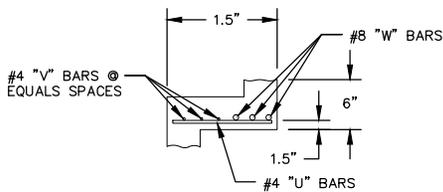
PLAN
CURB & GUTTER WITH CATCH BASIN ON STEEP GRADES



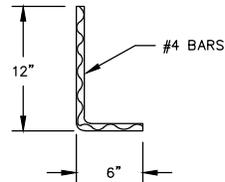
ELEVATION
NORMAL CURB & GUTTER ON LIGHT GRADES



ELEVATION
NORMAL CURB & GUTTER ON STEEP GRADES



SECTION R-R



DOWEL

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H, WITH NO RISER) *																				
DIMENSIONS OF BOX AND PIPE					COVER DIMENSION		BARS-U			BARS-V			BARS-W			CU. YDS. CONC. IN BOX			DEDUCTIONS ONE PIPE	
PIPE D	SPAN A	WIDTH B	WIDTH C	SPAN G	MIN. HEIGHT H	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	TOTAL LBS.	TOP SLAB	BOTTOM SLAB	TOT. CONC. FOR MINIMUM HEIGHT, H	C.M.	R.C.	
12"	3'-0"	2'-2"	---	---	2'-9"	---	---	---	---	---	---	---	---	---	---	0.235	0.772	0.015	0.026	
15"	3'-0"	2'-2"	---	---	3'-0"	---	---	---	---	---	---	---	---	---	---	0.235	0.829	0.023	0.036	
18"	3'-0"	2'-2"	---	---	3'-3"	---	---	---	---	---	---	---	---	---	---	0.235	0.887	0.033	0.049	
24"	3'-0"	2'-2"	---	---	3'-9"	---	---	---	---	---	---	---	---	---	---	0.235	1.001	0.059	0.085	
30"	3'-0"	2'-2"	3'-4"	---	4'-3"	1'-2"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.123	0.321	1.433	0.092	0.127	
36"	3'-0"	2'-2"	3'-10"	---	4'-9"	1'-8"	4'-0"	4	1'-11"	3	3'-9"	3	3'-9"	43	0.161	0.358	1.714	0.132	0.178	
42"	3'-0"	2'-2"	---	4'-5"	5'-3"	1'-5"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.122	0.318	1.738	0.180	0.243	
48"	3'-0"	2'-2"	---	5'-0"	5'-9"	2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.145	0.352	2.052	0.235	0.317	
54"	3'-0"	2'-2"	---	5'-7"	6'-3"	2'-7"	3'-2"	4	2'-10"	5	2'-11"	3	2'-11"	41	0.180	0.386	2.387	0.297	0.401	

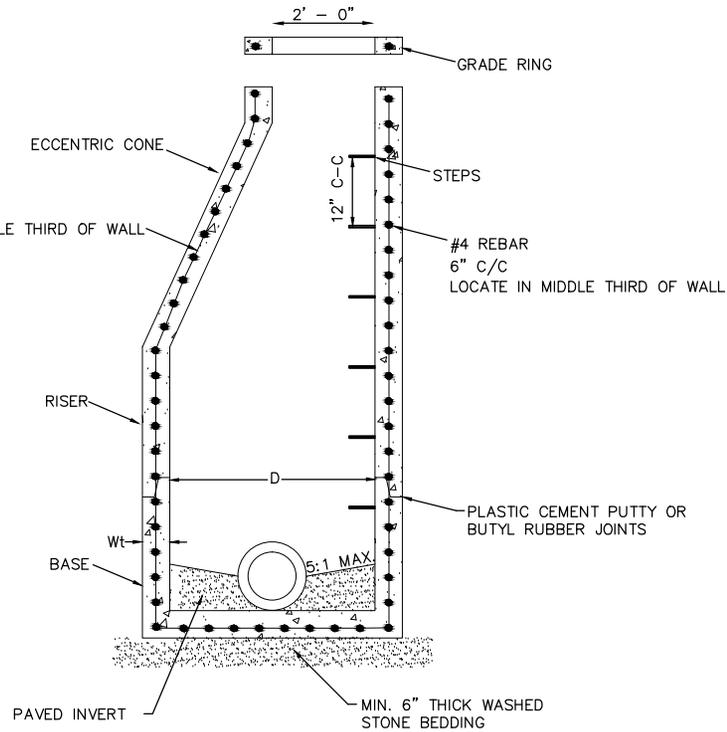
* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT



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PRECAST CONCRETE CATCH BASIN

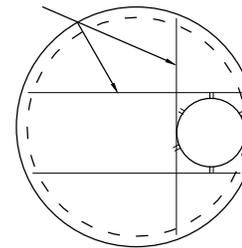
REVISIONS		STD. NO.
DATE	DESCRIPTION	
		8.03A



TYPICAL MANHOLE SECTION

INTERNAL DIAMETER (FT.)	MIN. WALL THICKNESS (Wt) (IN.)	MIN. BOTTOM SLAB THICKNESS (Bt) (IN.)	MIN. CIRCUMFERENTIAL AREA OF STEEL PER VERTICAL FT. (SQ. IN.)
4	4	6	0.12
5	5	8	0.15
6	6	8	0.18

ADDITIONAL #4 EACH SIDE OF OPENING (1" CLEAR OF BOTTOM FACE)



MANHOLE DETAIL

GENERAL NOTES

USE 4,000 psi MINIMUM COMPRESSIVE STRENGTH CONCRETE.

ALL STRUCTURES 4' OR DEEPER SHALL HAVE ACCESS STEPS. STEPS SHALL BE INSTALLED 12" ON CENTER.

BOLT ANCHOR LID RING.

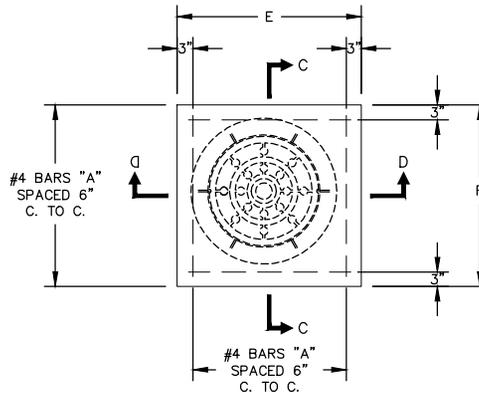
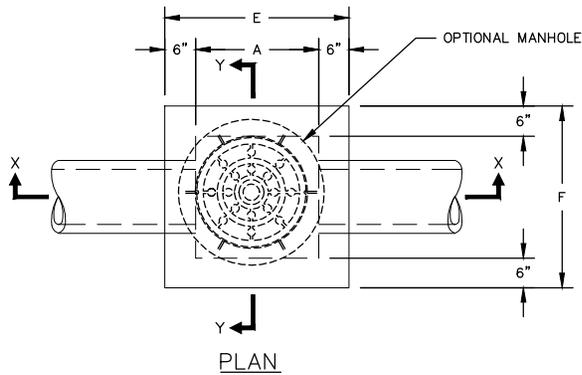


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PRECAST CONCRETE MANHOLE JUNCTION BOX

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GENERAL NOTES:

CHAMFER ALL EXPOSED CORNERS 1"

USE CLASS "B" CONCRETE THROUGHOUT.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTER AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

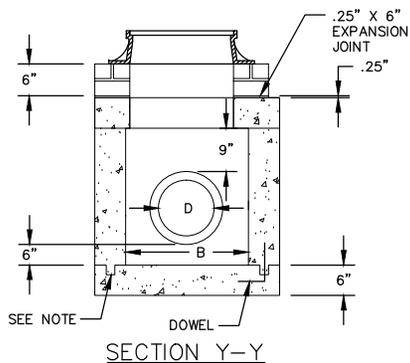
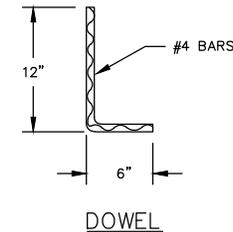
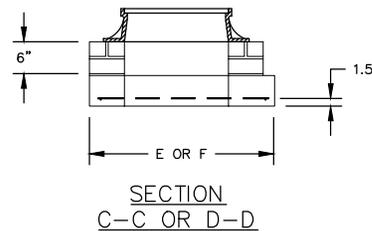
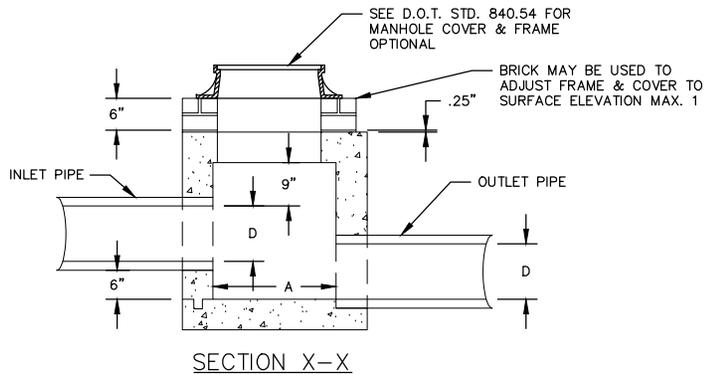
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON D.O.T. STD. NO. 840.00.

PROVIDE ALL CATCH BASINS OVER 4" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH D.O.T. STD. DRAWING 840.66

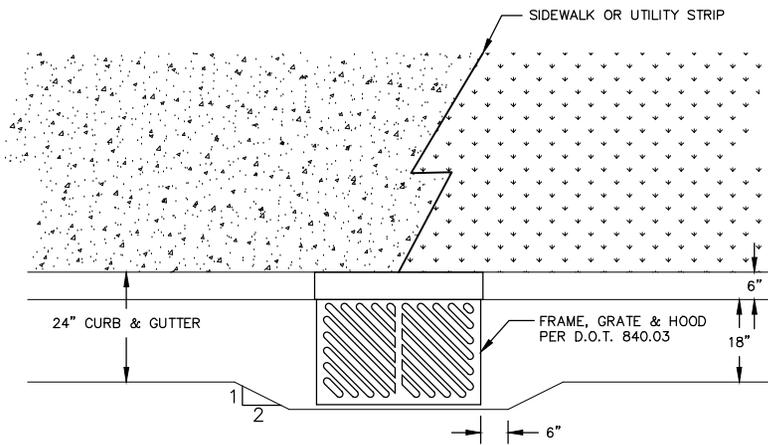
ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB. ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)

MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET

SEAL RISER ALL BOX AND RISER JOINTS WITH PLASTIC CEMENT PUTTY OR BUTYL RUBBER JOINTS.

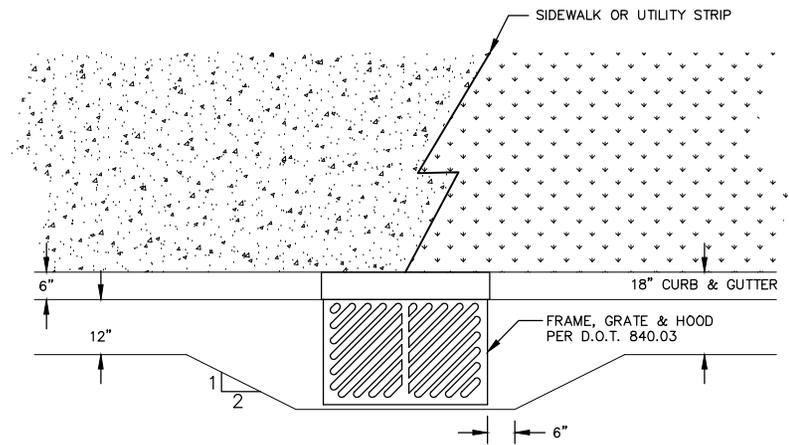


DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES															
DIMENSIONS OF BOX AND PIPE				REINFORCEMENT		TOP SLAB DIMENSION		CU. YDS. IN BOX			TOTAL QUANTITIES BOX AND SLABS		DEDUCTIONS ONE PIPE		
PIPE	SPAN	WIDTH	HEIGHT	BARS "A"	NO.	LENGTH	E	F	TOP SLAB	BOTTOM SLAB	WALL / FT. OF HT.	LBS. REINF.	CU. YDS. MIN. H	C.M.	R.C.
12"	2'-0"	2'-0"	2'-3"	12	2'-9"	3'-0"	3'-0"	0.167	0.167	0.185	22	0.750	0.015	0.024	
15"	2'-3"	2'-3"	2'-6"	12	3'-0"	3'-3"	3'-3"	0.196	0.196	0.204	24	0.902	0.023	0.036	
18"	2'-6"	2'-6"	2'-9"	14	3'-3"	3'-6"	3'-6"	0.227	0.227	0.222	30	1.065	0.033	0.049	
24"	3'-0"	3'-0"	3'-3"	16	3'-9"	4'-0"	4'-0"	0.296	0.296	0.259	40	1.434	0.059	0.085	
30"	3'-6"	3'-6"	3'-9"	18	4'-3"	4'-6"	4'-6"	0.375	0.375	0.296	51	1.860	0.092	0.127	
36"	4'-0"	4'-0"	4'-3"	20	4'-9"	5'-0"	5'-0"	0.463	0.463	0.333	64	2.341	0.132	0.178	
42"	4'-6"	4'-6"	4'-9"	22	5'-3"	5'-6"	5'-6"	0.560	0.560	0.370	77	2.878	0.180	0.243	
48"	5'-4"	5'-4"	5'-3"	26	6'-3"	6'-4"	6'-4"	0.743	0.743	0.407	111	3.623	0.235	0.317	
54"	5'-10"	5'-10"	5'-9"	28	6'-7"	6'-10"	6'-10"	0.865	0.865	0.444	126	4.283	0.297	0.401	
60"	6'-6"	6'-6"	6'-3"	30	7'-3"	7'-6"	7'-6"	1.042	1.042	0.481	145	5.090	0.367	0.495	
66"	7'-1"	7'-1"	6'-9"	32	7'-10"	8'-1"	8'-1"	1.210	1.210	0.518	169	5.917	0.444	0.589	



BIKE LANE

EXISTING PAVEMENT



BIKE LANE

EXISTING PAVEMENT

GENERAL NOTES

1. FRAME, GRATE AND HOOD ASSEMBLY WILL BE DOMESTIC STEEL PRODUCT
2. WHEN WARRANTED GRATES WILL BE TYPE E OR BICYCLE SAFE TYPE F AND TYPE G PER NC DOT STD. DETAIL 840.03 PAGE 2 OF 2.
3. CURB AND GUTTER WILL BE CONSTRUCTED WITH 4000 PSI CONCRETE
4. ANY SUBSTITUTION OF GRATE TYPES OR VARIANCE OF CONSTRUCTION PRACTICES MUST BE APPROVED BY THE STORMWATER SERVICES MANAGER OR APPOINTED DESIGNEE.



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CURB INLETS FOR 18" & 24" CURB & GUTTER

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8.05