CONSTRUCTION PLANS

FOR

SIGNAL HILL

HENDERSONVILLE, NORTH CAROLINA

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5	ROAD PLAN & PROFILE 11+00 - 21+93
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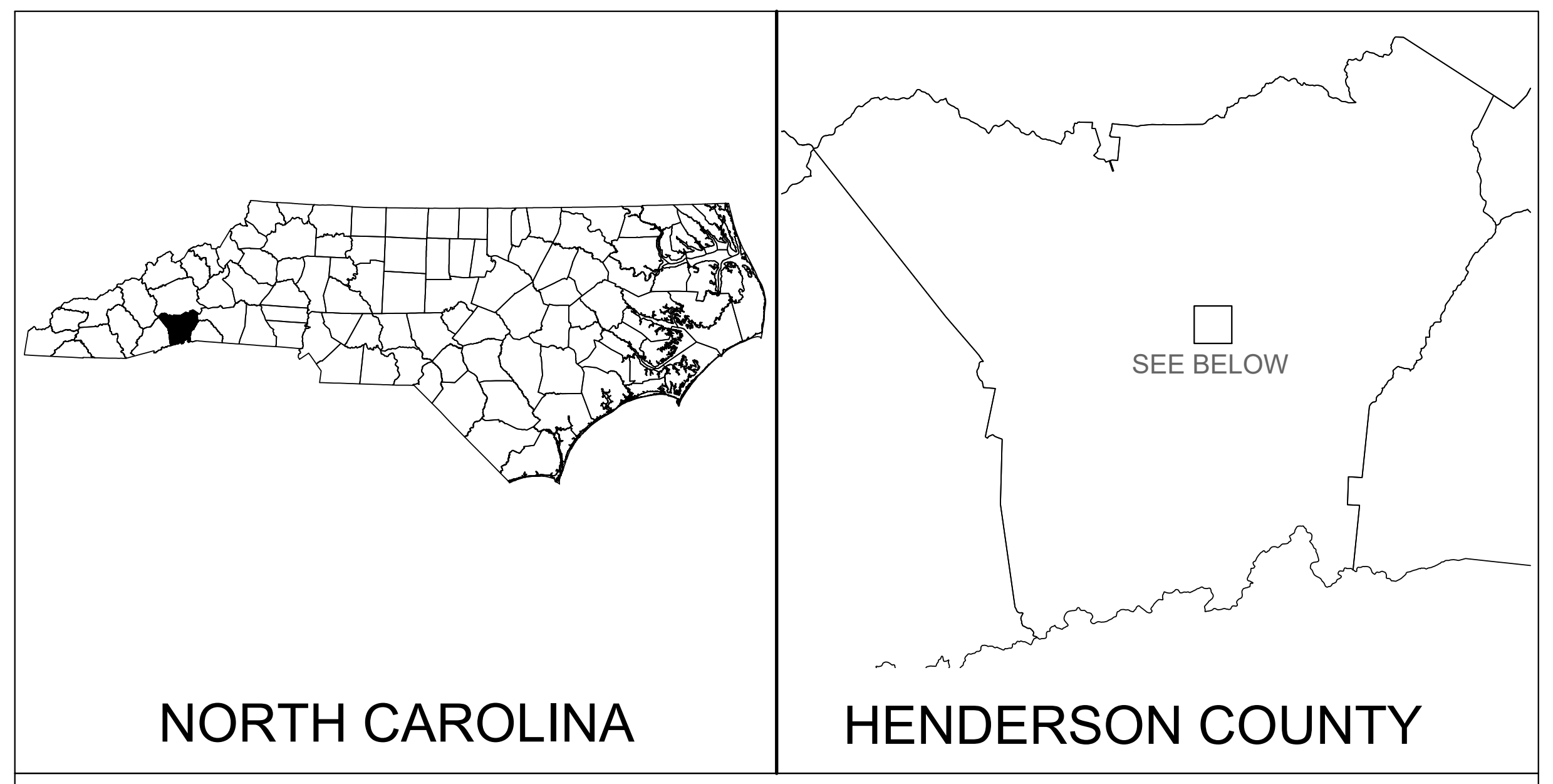
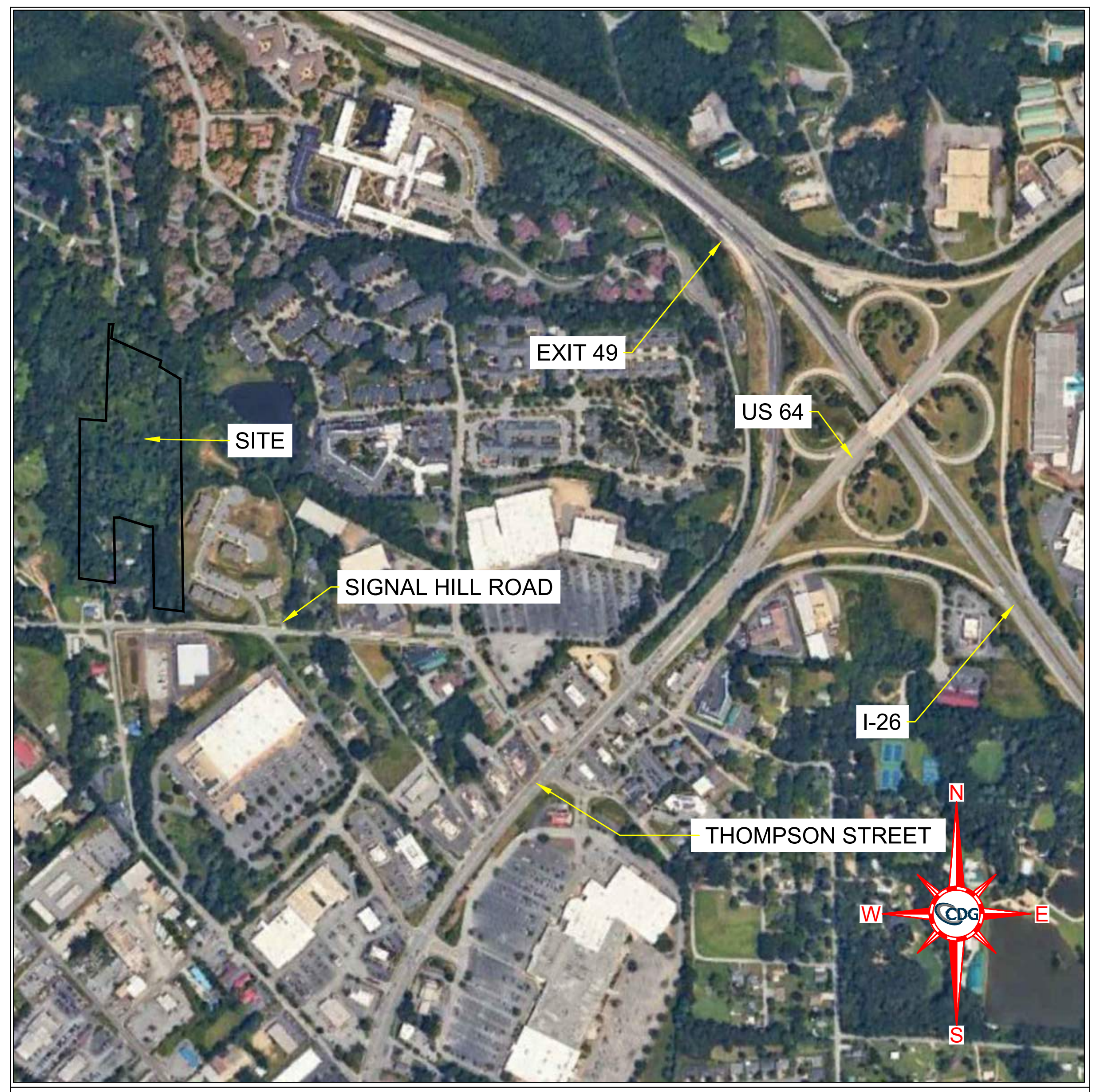
31	MISCELLANEOUS DETAILS
32	PRE DEVELOPMENT DRAINAGE AREA MAP
33	POST DEVELOPMENT DRAINAGE AREA MAP



VICINITY MAP SCALE: N.T.S.



VICINITY MAP SCALE: N.T.S.

DEVELOPMENT DATA		
SUBDIVISION CONFIGURATION		
ZONING:	R-15 / R-20	
PARCEL ID NUMBER:	9579065791 9579068507 9579068308 9579068117 9579067975 9579076259	
TYPE OF DEVELOPMENT:	RESIDENTIAL	
DISTURBED AREA:	DA	
TOTAL SITE AREA (Ac.)	13.01	
NO. OF LOTS:	50	
GROSS DENSITY (UNITS/Ac.):		
BUILDING SETBACKS:	FRONT:	30'
	SIDE:	10'
	REAR:	15'
MIMIMUM LOT SIZE:	15,000 / 20,000	
MIMIMUM LOT WIDTH:	85 / 100	
RIGHT-OF-WAY WIDTH	45' MIN.	
UTILITY PROVIDERS		
WATER PROVIDER:		
HENDERSONVILLE WATER & SEWER		
10 6th AVENUE EAST		
HENDERSONVILLE, NC 28792		
828.697.3052		
SEWER PROVIDER:		
HENDERSONVILLE WATER & SEWER		
160 6TH AVENUE EAST		
HENDERSONVILLE, NC 28792		
828.697.3052		
TELEPHONE AND CABLE PROVIDER:		
SPECTRUM		
352 AIRPORT ROAD SUITE 70		
ARDEN, NC 28704		
866.874.2389		
POWER PROVIDER:		
DUKE ENERGY		
957 SPARTANBURG HWY		
HENDERSONVILLE, NC 28792		
828-698-2034		

CONTACT INFORMATION

OWNER/DEVELOPER

FIRST VICTORY
542 S .CALDWELL ST.
BREVARD, NC 28712
828.884.7934

SURVEYOR

COLE SURVEYING AND DESIGN
549 ELK PARK DRIVE; SUITE 707
ASHEVILLE, NC 28804
828.251.7025

ENGINEER

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
(704) 394-6913

CLIENT CONTACT

TRAVIS FOWLER
828.884.7934

FIRST VICTORY
542 S .CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS
3	02/18/2025	ADDRESS CITY & COUNTY COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
SEAL 030895
05/15/2025

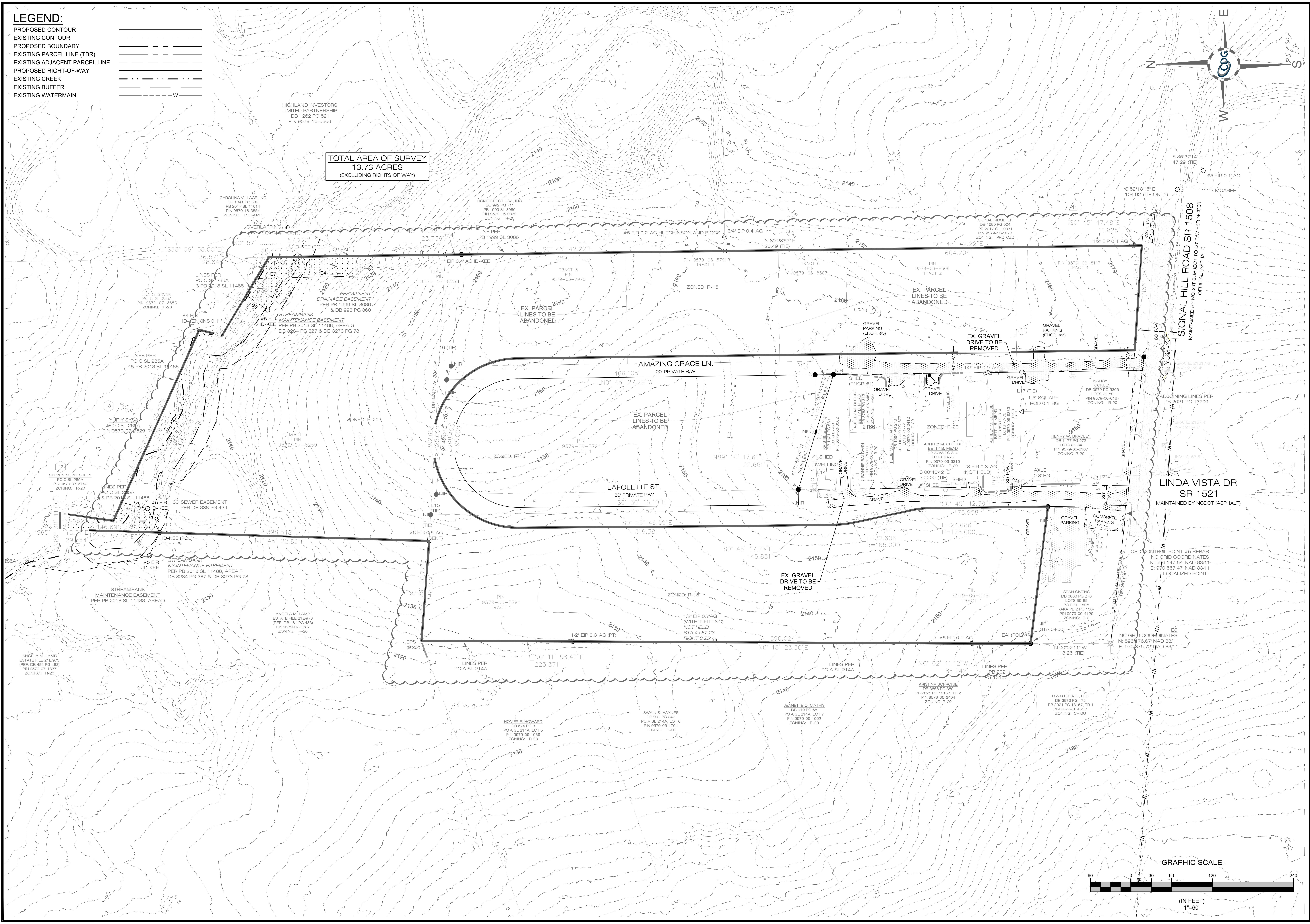
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: 1
SHEET TITLE: COVER

Y:\Shared\2_ENG\R656605823\5_DESIGN\DWG\SHEETS\COVER.dwg, 5/15/2025 4:33 PM, Toby Harris



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FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:

TOBIN M. HARRIS
030895

05/15/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

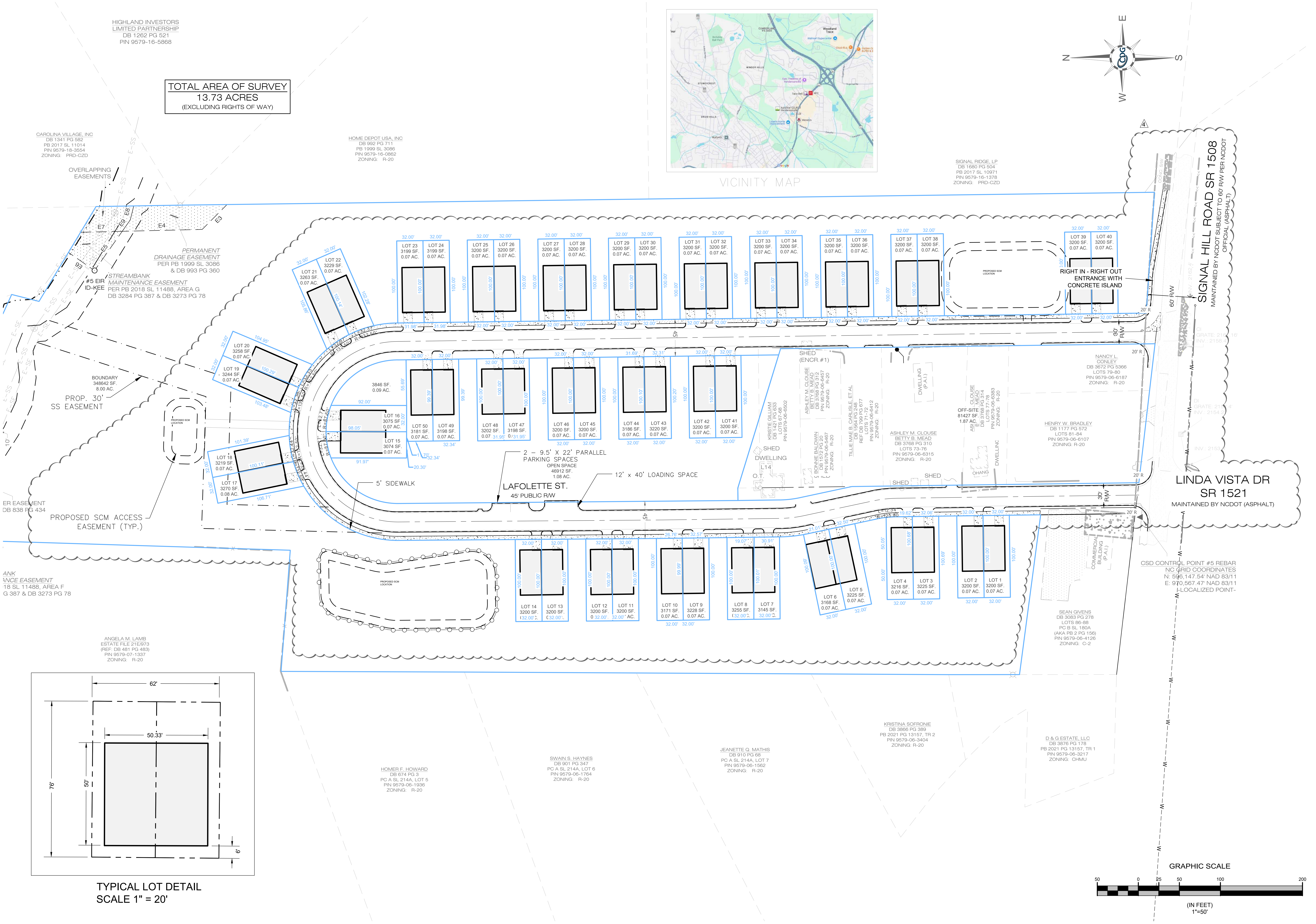
THREE NOTCH GROUP

4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
EXISTING CONDITIONS PLAN

DRAWING NO:
2


TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)
VICINITY MAP
HIGHLAND INVESTORS LIMITED PARTNERSHIP DB 1262 PG 521 PIN 9579-16-5868
CAROLINA VILLAGE, INC DB 1341 PG 582 PB 2017 SL 11014 PIN 9579-18-3554 ZONING: PRD-CZD
HOME DEPOT USA, INC DB 992 PG 711 PB 1999 SL 3086 PIN 9579-16-0862 ZONING: R-20
SIGNAL RIDGE, LP DB 1680 PG 504 PB 2017 SL 10971 PIN 9579-16-1378 ZONING: PRD-CZD
OVERLAPPING EASEMENTS
PERMANENT DRAINAGE EASEMENT PER PB 1999 SL 3086 & DB 993 PG 360
STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA G DB 3284 PG 387 & DB 3273 PG 78
#5 EIR ID-KEE
BOUNDARY 348642 SF. 8.00 AC.
PROP. 30' SS EASEMENT
PROPOSED SCM ACCESS EASEMENT (TYP.)
PROPOSED SCM LOCATION
SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)
60' R/W
RIGHT IN - RIGHT OUT ENTRANCE WITH CONCRETE ISLAND
LINDA VISTA DR SR 1521
MAINTAINED BY NCDOT (ASPHALT)
LAFOLETTE ST.
45' PUBLIC R/W
2 - 9.5' X 22' PARALLEL PARKING SPACES
OPEN SPACE 46912 SF. 1.08 AC.
12' x 40' LOADING SPACE
5' SIDEWALK
3846 SF. 0.09 AC.
LOT 1 3200 SF. 0.07 AC.
LOT 2 3200 SF. 0.07 AC.
LOT 3 3225 SF. 0.07 AC.
LOT 4 3216 SF. 0.07 AC.
LOT 5 3225 SF. 0.07 AC.
LOT 6 3168 SF. 0.07 AC.
LOT 7 3145 SF.
LOT 8 3255 SF.
LOT 9 3228 SF. 0.07 AC.
LOT 10 3171 SF. 0.07 AC.
LOT 11 3200 SF.
LOT 12 3200 SF.
LOT 13 3200 SF.
LOT 14 3200 SF.
LOT 15 3074 SF. 0.07 AC.
LOT 16 3075 SF. 0.07 AC.
LOT 17 3270 SF. 0.08 AC.
LOT 18 3219 SF. 0.07 AC.
LOT 19 3244 SF. 0.07 AC.
LOT 20 3258 SF. 0.07 AC.
LOT 21 3263 SF. 0.07 AC.
LOT 22 3229 SF. 0.07 AC.
LOT 23 3199 SF. 0.07 AC.
LOT 24 3199 SF. 0.07 AC.
LOT 25 3200 SF. 0.07 AC.
LOT 26 3200 SF. 0.07 AC.
LOT 27 3200 SF. 0.07 AC.
LOT 28 3200 SF. 0.07 AC.
LOT 29 3200 SF. 0.07 AC.
LOT 30 3200 SF. 0.07 AC.
LOT 31 3200 SF. 0.07 AC.
LOT 32 3200 SF. 0.07 AC.
LOT 33 3200 SF. 0.07 AC.
LOT 34 3200 SF. 0.07 AC.
LOT 35 3200 SF. 0.07 AC.
LOT 36 3200 SF. 0.07 AC.
LOT 37 3200 SF. 0.07 AC.
LOT 38 3200 SF. 0.07 AC.
LOT 39 3200 SF. 0.07 AC.
LOT 40 3200 SF. 0.07 AC.
LOT 41 3200 SF. 0.07 AC.
LOT 42 3200 SF. 0.07 AC.
LOT 43 3220 SF. 0.07 AC.
LOT 44 3186 SF. 0.07 AC.
LOT 45 3200 SF. 0.07 AC.
LOT 46 3200 SF. 0.07 AC.
LOT 47 3198 SF.
LOT 48 3202 SF. 0.07
LOT 49 3198 SF. 0.07 AC.
LOT 50 3181 SF. 0.07 AC.
SHED (ENCR.#1)
KRISTIE GILLIAM DB 1414 PG 633 LOTS 67-68 PIN 9579-06-6502
ASHLEY M. CLOUSE BETTY B. MEAD DB 3768 PG 312 PIN 9579-06-6457 ZONING: R-20
BONNIE BALDWIN DB 1572 PG 20 PIN 9579-06-5487 ZONING: R-20
TILLIE MAE B. CARLISLE, ET AL DB 1564 PG 248 REF DB 1799 PG 677 LOTS 71-72 PIN 9579-06-6412 ZONING: R-20
DWELLING (P.A.I.)
ASHLEY M. CLOUSE BETTY B. MEAD DB 3768 PG 310 LOTS 73-76 PIN 9579-06-6315 ZONING: R-20
OFF-SITE 81427 SF. 1.87 AC.
CLOUSE DB 3768 PG 314 LOTS 77-78 PIN 9579-06-6383 ZONING: R-20
NANCY L. CONLEY DB 3672 PG 5366 LOTS 79-80 PIN 9579-06-6187 ZONING: R-20
HENRY W. BRADLEY DB 1177 PG 572 LOTS 81-84 PIN 9579-06-6107 ZONING: R-20
SHED
DWELLING
SHED
CSD CONTROL POINT #5 REBAR NC GRID COORDINATES N: 596,147.54' NAD 83/11 E: 970,567.47' NAD 83/11 -LOCALIZED POINT-
COMMERCIAL BUILDING (P.A.I.)
SEAN GIVENS DB 3083 PG 278 LOTS 86-88 PC B SL 180A (AKA PB 2 PG 156) PIN 9579-06-4126 ZONING: C-2
ER EASEMENT DB 838 PG 434
ANK ANCE EASEMENT 18 SL 11488, AREA F G 387 & DB 3273 PG 78
ANGELA M. LAMB ESTATE FILE 21E/973 (REF. DB 481 PG 483) PIN 9579-07-1337 ZONING: R-20
HOMER F. HOWARD DB 674 PG 3 PC A SL 214A, LOT 5 PIN 9579-06-1936 ZONING: R-20
SWAIN S. HAYNES DB 901 PG 347 PC A SL 214A, LOT 6 PIN 9579-06-1764 ZONING: R-20
JEANETTE Q. MATHIS DB 910 PG 68 PC A SL 214A, LOT 7 PIN 9579-06-1562 ZONING: R-20
KRISTINA SOFRONIE DB 3866 PG 389 PB 2021 PG 13157, TR 2 PIN 9579-06-3404 ZONING: R-20
D & G ESTATE, LLC DB 3876 PG 178 PB 2021 PG 13157, TR 1 PIN 9579-06-3217 ZONING: OHMU
62'
50.33'
76'
50'
6'
TYPICAL LOT DETAIL
SCALE 1" = 20'
GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'
N
S
E
W

Y:\Shared\2_ENG\656605823\5_DESIGN\DWG\SHEETS\SITE.dwg, 5/15/2025 4:34 PM, Toby Harris

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:
030895
TOBIN M. HARRIS
05/15/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
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CHARLOTTE, NC 28208
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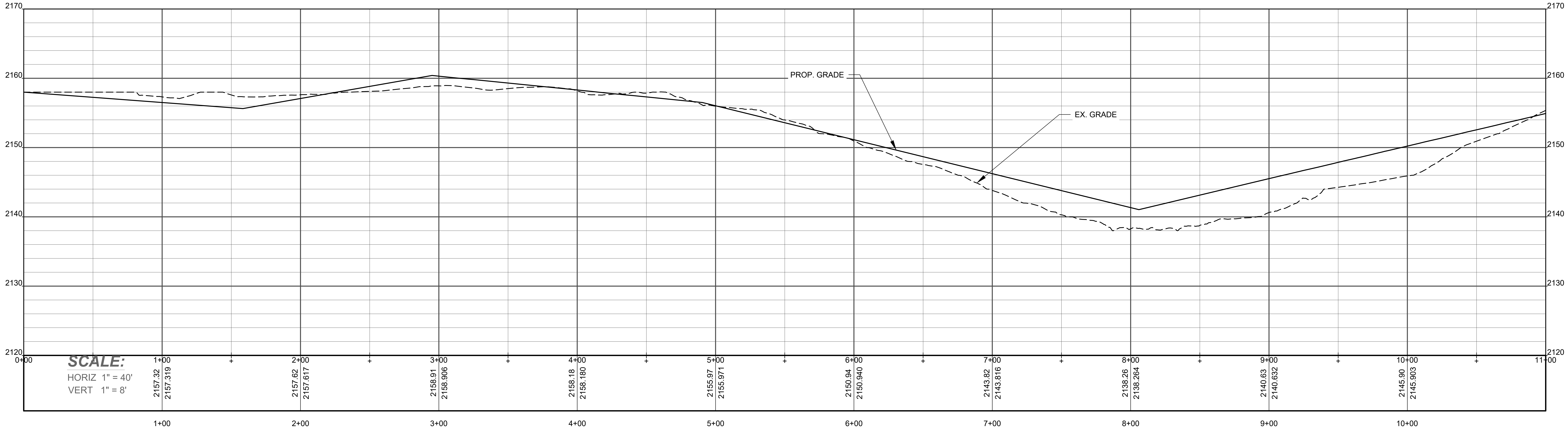
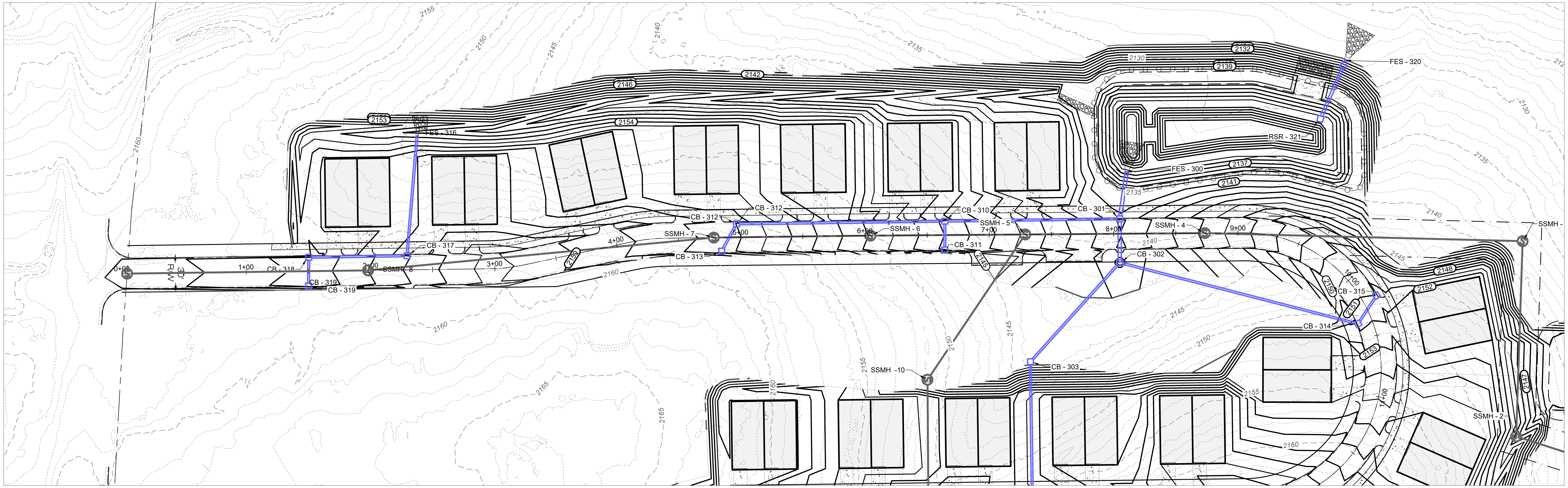
License No. C-4973

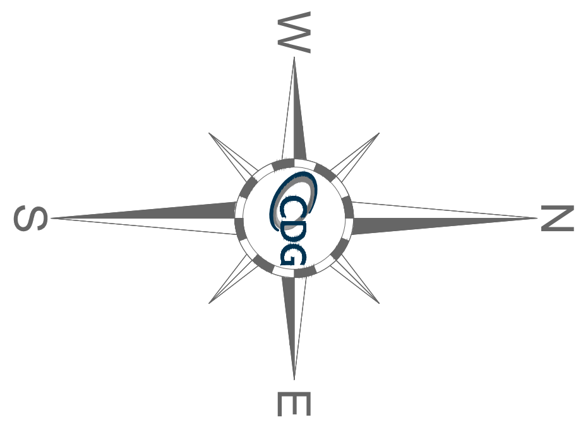
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SITE PLAN

DRAWING NO: 3







GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1"=40'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
030895
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
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SCALE:	AS SHOWN

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SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
ROAD PLAN & PROFILE
0+00 - 11+00

DRAWING NO:
4

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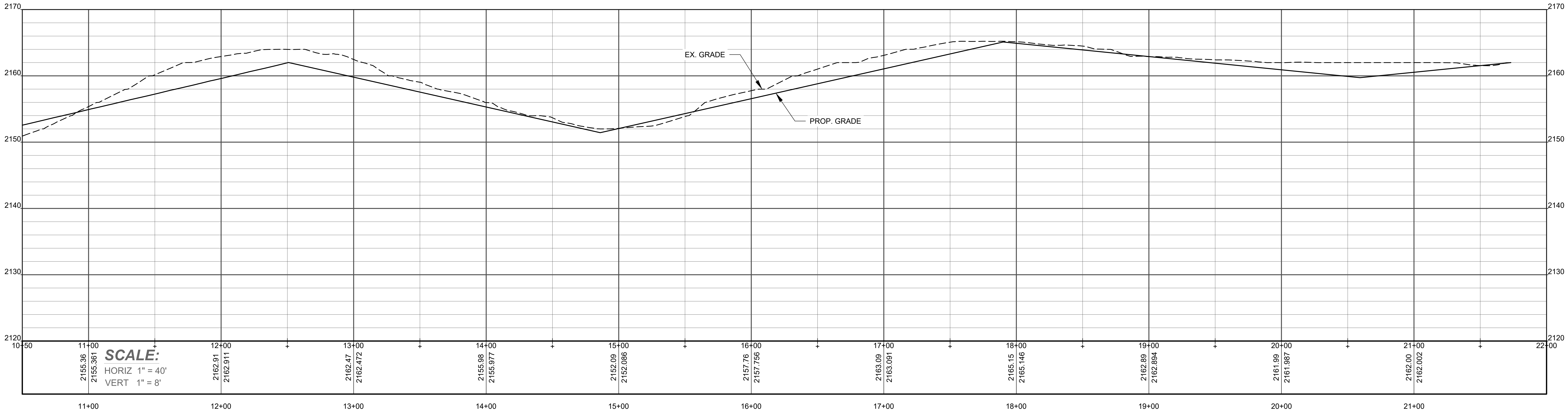

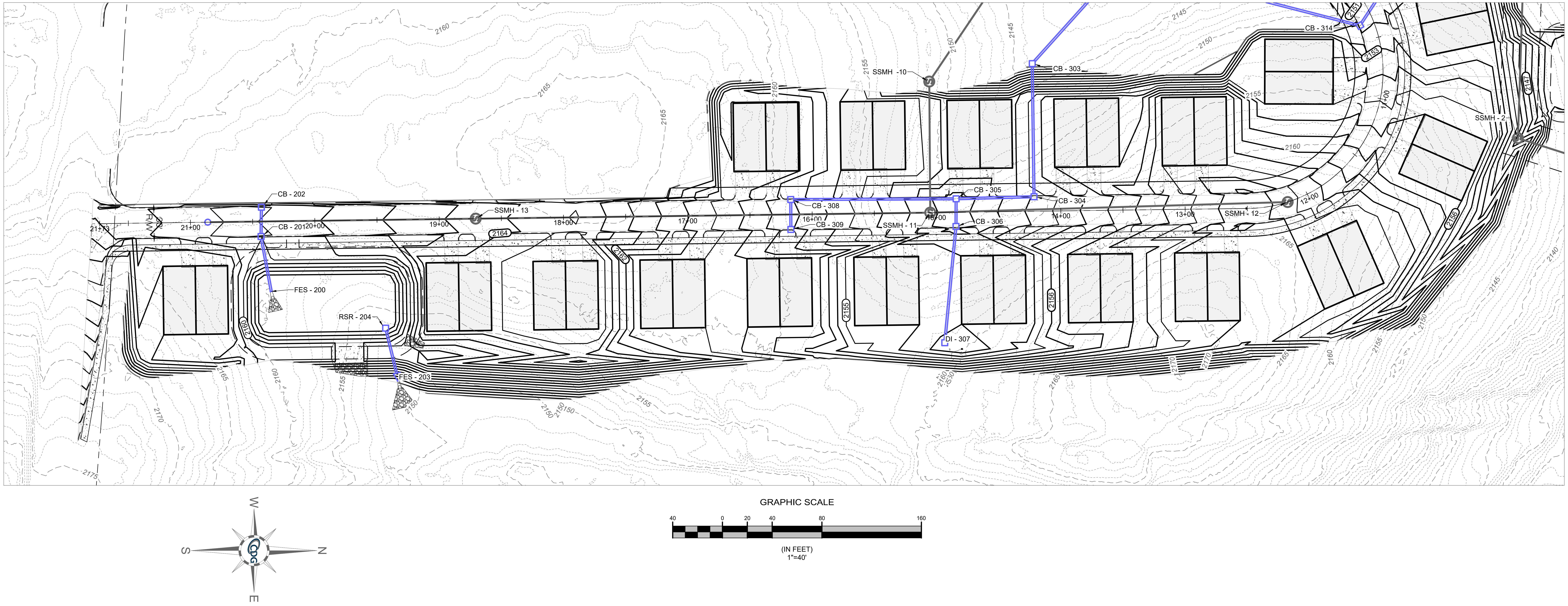

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:

TOBIN M. HARRIS
SEAL 030895
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
ROAD PLAN & PROFILE
11+00 - 21+93

DRAWING NO:
5

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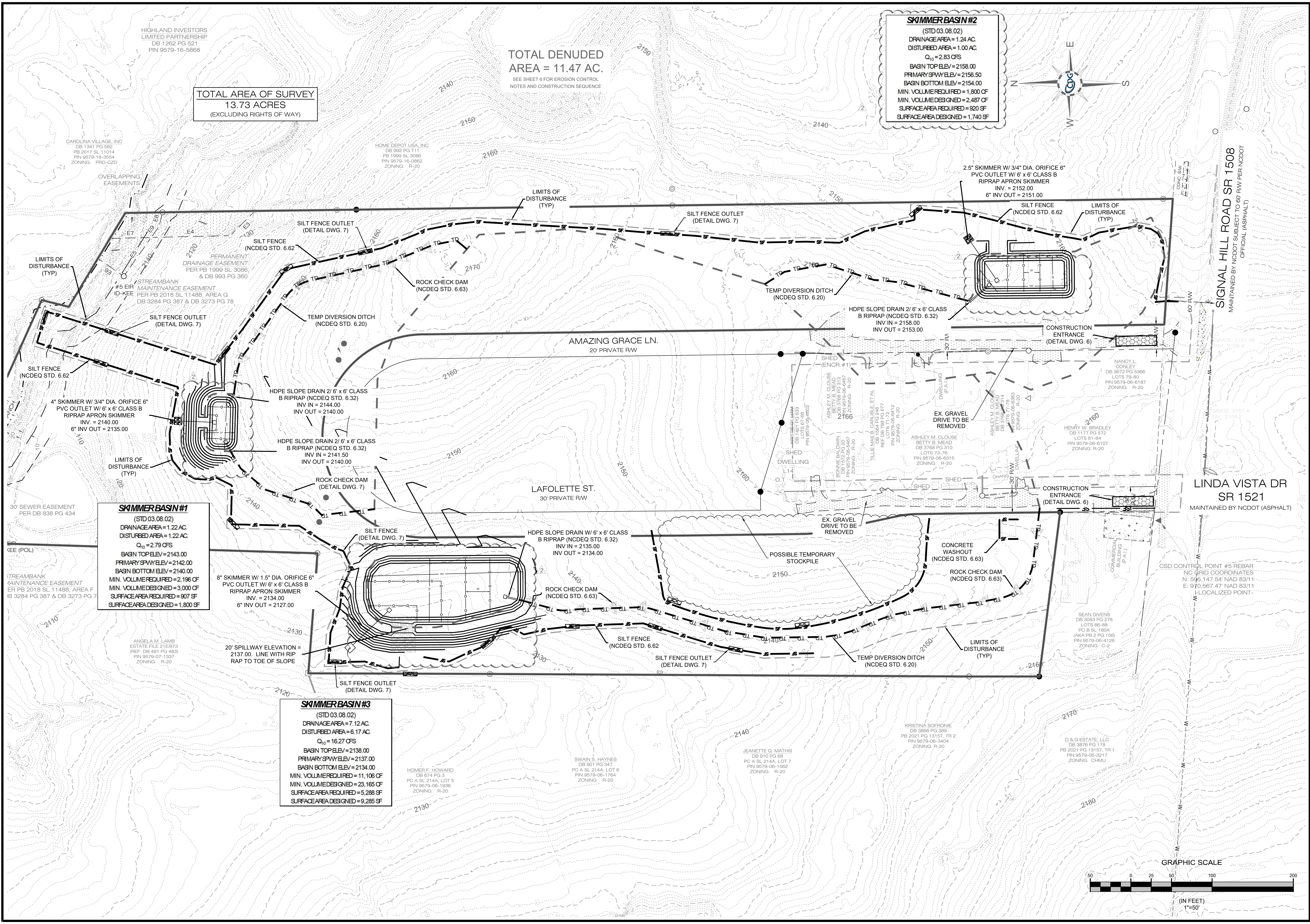

TOTAL DENUDED AREA = 11.47 AC.
SEE SHEET 6 FOR EROSION CONTROL NOTES AND CONSTRUCTION SEQUENCE
TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)
HIGHLAND INVESTORS LIMITED PARTNERSHIP DB 1262 PG 521 PIN 9579-16-5868
CAROLINA VILLAGE, INC DB 1341 PG 582 PB 2017 SL 11014 PIN 9579-18-3554 ZONING: PRD-CZD
HOME DEPOT USA, INC DB 992 PG 711 PB 1999 SL 3086 PIN 9579-16-0862 ZONING: R-20
OVERLAPPING EASEMENTS
PERMANENT DRAINAGE EASEMENT PER PB 1999 SL 3086, & DB 993 PG 360
STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA G DB 3284 PG 387 & DB 3273 PG 78
#5 EIR ID-KEE
LIMITS OF DISTURBANCE (TYP)
SILT FENCE (NCDEQ STD. 6.62)
SILT FENCE OUTLET (DETAIL DWG. 7)
ROCK CHECK DAM (NCDEQ STD. 6.63)
TEMP DIVERSION DITCH (NCDEQ STD. 6.20)
4" SKIMMER W/ 3/4" DIA. ORIFICE 6" PVC OUTLET W/ 6' x 6' CLASS B RIPRAP APRON SKIMMER INV. = 2140.00 6" INV OUT = 2135.00
HDPE SLOPE DRAIN 2/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32) INV IN = 2144.00 INV OUT = 2140.00
HDPE SLOPE DRAIN 2/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32) INV IN = 2141.50 INV OUT = 2140.00
ROCK CHECK DAM (DETAIL DWG. 7)
30' SEWER EASEMENT PER DB 838 PG 434
STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA F DB 3284 PG 387 & DB 3273 PG 7
SILT FENCE (DETAIL DWG. 7)
8" SKIMMER W/ 1.5" DIA. ORIFICE 6" PVC OUTLET W/ 6' x 6' CLASS B RIPRAP APRON SKIMMER INV. = 2134.00 6" INV OUT = 2127.00
HDPE SLOPE DRAIN W/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32) INV IN = 2135.00 INV OUT = 2134.00
20' SPILLWAY ELEVATION = 2137.00. LINE WITH RIP RAP TO TOE OF SLOPE
ANGELA M. LAMB ESTATE FILE 21E/973 (REF: DB 481 PG 483) PIN 9579-07-1337 ZONING: R-20
AMAZING GRACE LN. 20' PRIVATE R/W
LAFOLETTE ST. 30' PRIVATE R/W
2.5" SKIMMER W/ 3/4" DIA. ORIFICE 6" PVC OUTLET W/ 6' x 6' CLASS B RIPRAP APRON SKIMMER INV. = 2152.00 6" INV OUT = 2151.00
HDPE SLOPE DRAIN 2/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32) INV IN = 2158.00 INV OUT = 2153.00
CONSTRUCTION ENTRANCE (DETAIL DWG. 6)
EX. GRAVEL DRIVE TO BE REMOVED
POSSIBLE TEMPORARY STOCKPILE
CONCRETE WASHOUT (NCDEQ STD. 6.63)
SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)
LINDA VISTA DR SR 1521
MAINTAINED BY NCDOT (ASPHALT)
NANCY L. CONLEY DB 3672 PG 5366 LOTS 79-80 PIN 9579-06-6187 ZONING: R-20
HENRY W. BRADLEY DB 1177 PG 673 LOTS 81-84 PIN 9579-06-6107 ZONING: R-20
ASHLEY M. CLOUSE BETTY B. MEAD DB 3768 PG 310 LOTS 73-76 PIN 9579-06-6315 ZONING: R-20
SHED
DWELLING
CSD CONTROL POINT #5 REBAR NC GRID COORDINATES N: 596,147.54' NAD 83/11 E: 970,567.47' NAD 83/11 -LOCALIZED POINT-
SEAN GIVENS DB 3083 PG 278 LOTS 86-88 PC B SL 180A (AKA PB 2 PG 156) PIN 9579-06-4126 ZONING: C-2
COMMERCIAL BUILDING (P.A.I.)
KRISTINA SOFRONIE DB 3866 PG 389 PB 2021 PG 13157, TR 2 PIN 9579-06-3404 ZONING: R-20
D & G ESTATE, LLC DB 3876 PG 178 PB 2021 PG 13157, TR 1 PIN 9579-06-3217 ZONING: CHMU
JEANETTE Q. MATHIS DB 910 PG 68 PC A SL 214A, LOT 7 PIN 9579-06-1562 ZONING: R-20
SWAIN S. HAYNES DB 901 PG 347 PC A SL 214A, LOT 6 PIN 9579-06-1764 ZONING: R-20
HOMER F. HOWARD DB 674 PG 3 PC A SL 214A, LOT 5 PIN 9579-06-1936 ZONING: R-20
N
E
S
W
GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

SKIMMER BASIN #2
(STD 03.08.02)
DRAINAGE AREA = 1.24 AC.
DISTURBED AREA = 1.00 AC.
Q_{10} = 2.83 CFS
BASIN TOP ELEV = 2158.00
PRIMARY SPWY ELEV = 2156.50
BASIN BOTTOM ELEV = 2154.00
MIN. VOLUME REQUIRED = 1,800 CF
MIN. VOLUME DESIGNED = 2,487 CF
SURFACE AREA REQUIRED = 920 SF
SURFACE AREA DESIGNED = 1,740 SF

SKIMMER BASIN #1
(STD 03.08.02)
DRAINAGE AREA = 1.22 AC.
DISTURBED AREA = 1.22 AC.
Q_{10} = 2.79 CFS
BASIN TOP ELEV = 2143.00
PRIMARY SPWY ELEV = 2142.00
BASIN BOTTOM ELEV = 2140.00
MIN. VOLUME REQUIRED = 2,196 CF
MIN. VOLUME DESIGNED = 3,000 CF
SURFACE AREA REQUIRED = 907 SF
SURFACE AREA DESIGNED = 1,800 SF

SKIMMER BASIN #3
(STD 03.08.02)
DRAINAGE AREA = 7.12 AC.
DISTURBED AREA = 6.17 AC.
Q_{10} = 16.27 CFS
BASIN TOP ELEV = 2138.00
PRIMARY SPWY ELEV = 2137.00
BASIN BOTTOM ELEV = 2134.00
MIN. VOLUME REQUIRED = 11,106 CF
MIN. VOLUME DESIGNED = 23,165 CF
SURFACE AREA REQUIRED = 5,288 SF
SURFACE AREA DESIGNED = 9,285 SF

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
SEAL 030895
01/31/2025

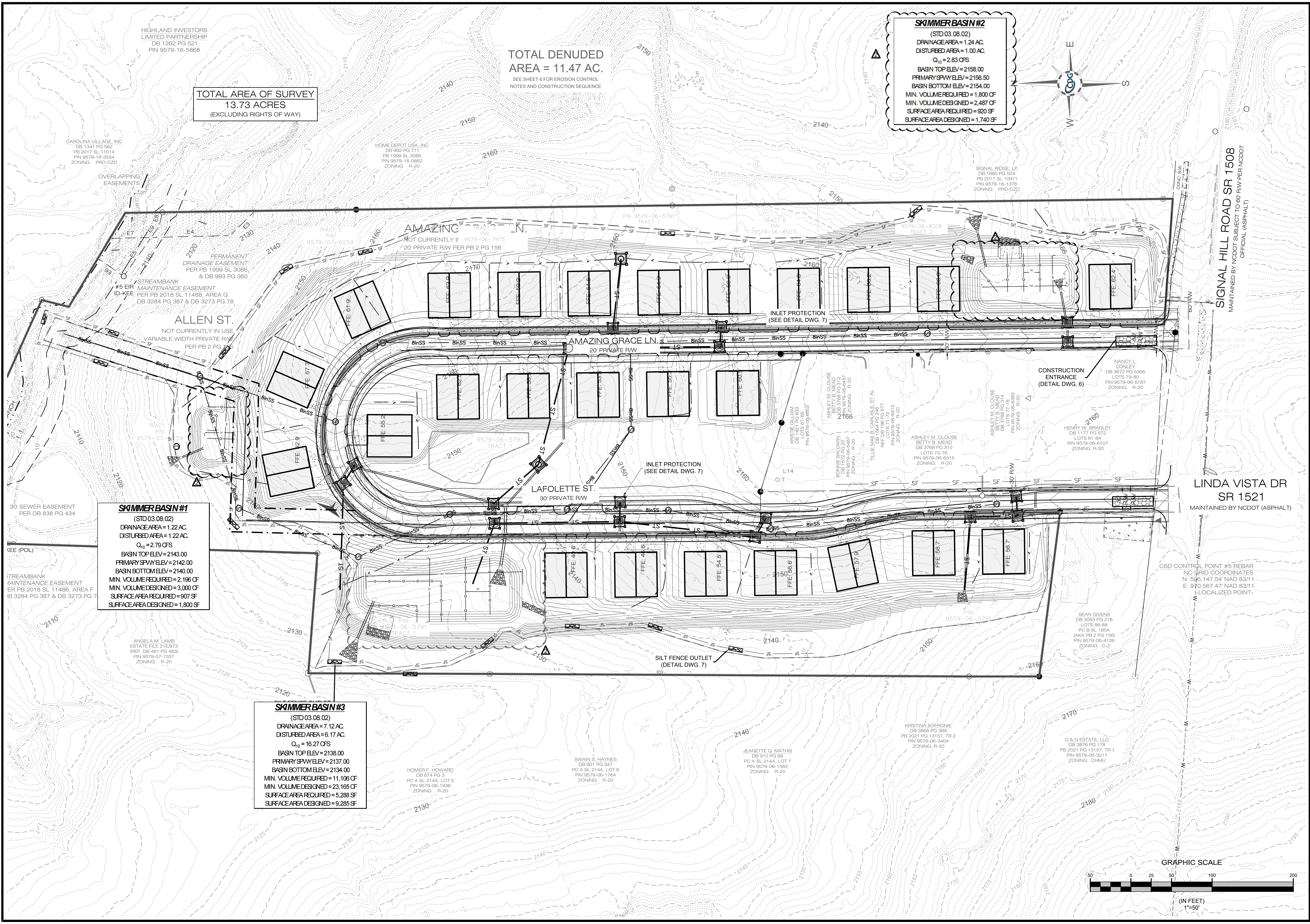
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
EROSION CONTROL
PH 1 PLAN

DRAWING NO:
6



SKIMMER BASIN #2

(STD 03.08.02)
DRAINAGE AREA = 1.24 AC.
DISTURBED AREA = 1.00 AC.
Q_{10} = 2.83 CFS
BASIN TOP ELEV = 2158.00
PRIMARY SPWY ELEV = 2156.50
BASIN BOTTOM ELEV = 2154.00
MIN. VOLUME REQUIRED = 1,800 CF
MIN. VOLUME DESIGNED = 2,487 CF
SURFACE AREA REQUIRED = 920 SF
SURFACE AREA DESIGNED = 1,740 SF

SKIMMER BASIN #1

(STD 03.08.02)
DRAINAGE AREA = 1.22 AC.
DISTURBED AREA = 1.22 AC.
Q_{10} = 2.79 CFS
BASIN TOP ELEV = 2143.00
PRIMARY SPWY ELEV = 2142.00
BASIN BOTTOM ELEV = 2140.00
MIN. VOLUME REQUIRED = 2,196 CF
MIN. VOLUME DESIGNED = 3,000 CF
SURFACE AREA REQUIRED = 907 SF
SURFACE AREA DESIGNED = 1,800 SF

SKIMMER BASIN #3

(STD 03.08.02)
DRAINAGE AREA = 7.12 AC.
DISTURBED AREA = 6.17 AC.
Q_{10} = 16.27 CFS
BASIN TOP ELEV = 2138.00
PRIMARY SPWY ELEV = 2137.00
BASIN BOTTOM ELEV = 2134.00
MIN. VOLUME REQUIRED = 11,106 CF
MIN. VOLUME DESIGNED = 23,165 CF
SURFACE AREA REQUIRED = 5,288 SF
SURFACE AREA DESIGNED = 9,285 SF

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
030895
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH
GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
EROSION CONTROL
PH 2 PLAN

DRAWING NO:
7

2

CONSTRUCTION SEQUENCE:

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT EROSION IS MINIMIZED AND THAT COMPLIANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, REGULATIONS, AND ORDINANCES IS MAINTAINED THROUGHOUT EXECUTION OF THIS PROJECT.

1. OBTAIN A LAND DISTURBING PERMIT. SCHEDULE A PRE-CONSTRUCTION MEETING.
2. CLEAR FOR AND INSTALL GRAVEL CONSTRUCTION ENTRANCES. CLEAR FOR AND INSTALL ONSITE PERIMETER SILT FENCE AS SHOWN ON THE APPROVED PLANS. ONCE IN PLACE, CONTRACTOR MAY THEN CLEAR FOR AND INSTALL SEDIMENT BASINS, FOLLOWED BY ANY TEMPORARY DIVERSIONS AS SHOWN ON THE APPROVED PLANS. PERMANENT BASIN / POND OUTFALL STRUCTURES AND PIPING WILL REQUIRE INSTALLATION DURING PHASE 1 EROSION CONTROL. ALL SEDIMENT BASINS AND TRAPS MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL UPGRADIENT AREAS ARE STABILIZED.
3. ONCE EROSION CONTROL MEASURES HAVE BEEN APPROVED BY INSPECTOR, COMPLETE DEMOLITION OF ALL FEATURES ON SITE NOT ALREADY NECESSARY TO BE REMOVED FOR BASIN INSTALLATION.
4. EXCAVATION MAY BEGIN AT THIS TIME. ANY FILL OPERATIONS MUST BEGIN AT THE REAR / UPSTREAM SIDE OF THE SITE AND WORK THEIR WAY FORWARD / DOWNSTREAM. THIS WILL ENSURE POSITIVE DRAINAGE OF THE SITE TOWARDS THE SEDIMENT BASINS THROUGHOUT THE MASS GRADING PORTION OF CONSTRUCTION. CONTRACTOR TO ENSURE NO SUMPS ARE CREATED IN GRADED AREAS UNTIL STORM INLETS CAN BE PROVIDED FOR THOSE SUMPS.
5. BEGIN INSTALLATION OF STORM DRAIN, SEWER AND WATER UTILITIES. STORM DRAIN INSTALLATION MUST START AT MOST DOWN STREAM STRUCTURE AND MOVE UPSTREAM. AS INLETS ARE INSTALLED, PROVIDE INLET PROTECTION IMMEDIATELY. AFTER INLETS ARE INSTALLED, CURBING MAY BE INSTALLED WHERE NECESSARY AND WHEN EVER A TEMPORARY DITCH IS TO BE FILLED IN / RELOCATED, CONTRACTOR MUST CONTACT AN EROSION CONTROL INSPECTOR BEFORE AND AFTER THE RELOCATION HAS TAKEN PLACE WITH 48 HOURS NOTICE BEING GIVEN PRIOR TO RELOCATION. AS AREAS ARE BROUGHT UP TO GRADE, TEMPORARILY OR PERMANENTLY STABILIZE PER TIME FRAMES LISTED ON THIS SHEET.
   NOTE: ALL SEDIMENT BASINS AND TRAPS MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL UPGRADIENT AREAS HAVE BEEN STABILIZED AND THE STORM DRAIN SYSTEM IS IN PLACE, DIVERTING DRAINAGE FROM THESE TEMPORARY TRAPS / BASINS TO THE PERMANENT BASINS. A NC DEMLR REPRESENTATIVE MUST APPROVE THE REMOVAL OF ANY SEDIMENT BASIN OR TRAP PRIOR TO IT TAKING PLACE.
6. PROVIDE PAVEMENT IN ROADWAY AND PARKING AREAS IN ORDER TO PERMANENTLY STABILIZE THESE AREAS. IF ALL BUILDING PERMITS HAVE BEEN ACQUIRED, CONSTRUCTION MAY ALSO BEGIN ON BUILDINGS AND RETAINING WALLS AT THIS TIME.
   NOTE: THE CONTRACTOR SHALL ENSURE THAT THE EROSION CONTROL DEVICES REMAIN UNDISTURBED DURING CONSTRUCTION OF THE BUILDING PADS AND ASSOCIATED PARKING/DRIVE AREAS ADJACENT TO THESE DEVICES UNTIL THE CONTRIBUTING UPSTREAM AREAS HAVE BEEN STABILIZED AND APPROVED.
7. ONCE SITE IS APPROVED BY INSPECTOR, SILT FENCING AND CONSTRUCTION ENTRANCE MAY BE REMOVED. SEDIMENT BASINS MAY BE CONVERTED TO THEIR FINAL WET POND CONDITIONS. PERMANENTLY STABILIZE ANY REMAINING AREAS WITH SOD, SEED AND MULCH, OR PAVING AS NECESSARY.

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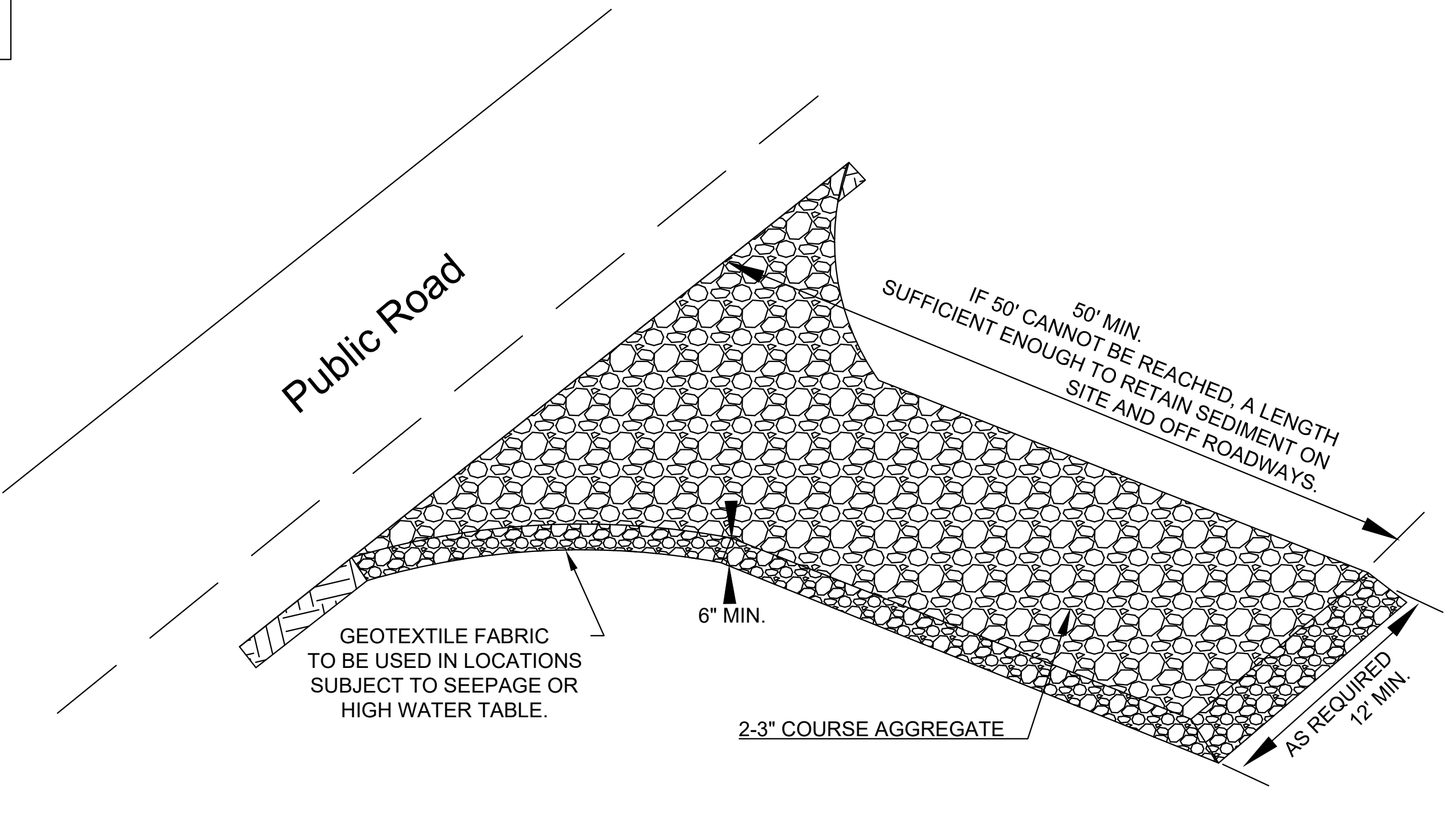
Public Road
50' MIN.
IF 50' CANNOT BE REACHED, A LENGTH SUFFICIENT ENOUGH TO RETAIN SEDIMENT ON SITE AND OFF ROADWAYS.
GEOTEXTILE FABRIC TO BE USED IN LOCATIONS SUBJECT TO SEEPAGE OR HIGH WATER TABLE.
6" MIN.
2-3" COURSE AGGREGATE
AS REQUIRED
12' MIN.

Construction:
1. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade it.
2. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
3. Provide drainage to carry water to a sediment trap or other suitable outlet.
4. Use geotextile fabrics in order to improve stability of the foundation in locations subject to seepage or high water table.

Maintenance:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make any required repairs immediately.
2. Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone.
3. Sediment on roadways is to be removed immediately by broom and shovel, either by manual or mechanical means, and not to be washed off where it has the potential to enter a stream, drainage way or storm drain system.

DEQ NORTH CAROLINA Department of Environmental Quality

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

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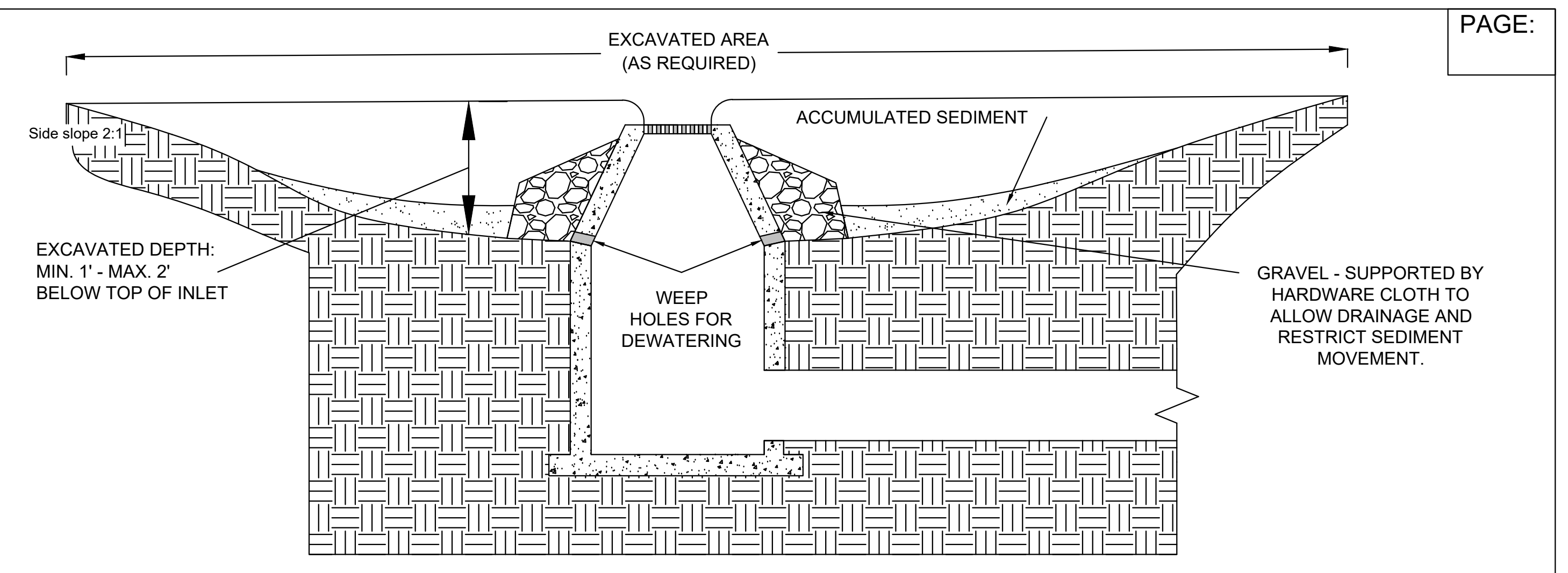
EXCAVATED AREA (AS REQUIRED)
Side slope 2:1
ACCUMULATED SEDIMENT
EXCAVATED DEPTH: MIN. 1' - MAX. 2' BELOW TOP OF INLET
WEEP HOLES FOR DEWATERING
GRAVEL - SUPPORTED BY HARDWARE CLOTH TO ALLOW DRAINAGE AND RESTRICT SEDIMENT MOVEMENT.

Notes:
1. Clear the area of all debris that might hinder excavation and disposal of spoil.
2. Grade the approach to the inlet uniformly.
3. Protect weep holes by gravel.
4. When the contributing drainage area has been permanently stabilized, seal weep holes, fill the basin with stable soil to final grading elevations, compact it properly and stabilize.

Maintenance:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater.
2. Clean, and properly maintain the excavated basin after every storm until the contributing drainage area has been permanently stabilized.
3. remove sediment when the volume of the basin has been reduced by one-half.
4. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize appropriately.

DEQ NORTH CAROLINA Department of Environmental Quality

EXCAVATED DROP INLET PROTECTION (TEMPORARY)

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

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TEMPORARY SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding Dates
Mountains—Above 2500 feet: Feb. 15 - May 15
Below 2500 feet: Feb. 1- May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR SUMMER

Seeding Mixture

Species	Rate (lb/acre)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding Dates
Mountains — May 15 - Aug. 15
Piedmont — May 1 - Aug. 15
Coastal Plain — Apr. 15 - Aug. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR FALL

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120

Seeding Dates
Mountains — Aug. 15 - Dec. 15
Coastal Plain and Piedmont — Aug. 15 - Dec. 31

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1-$1\frac{1}{2}$ tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700 - 1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. The finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

DEQ NORTH CAROLINA Department of Environmental Quality

TEMPORARY SEEDING

Effective Date: 9/1/2023
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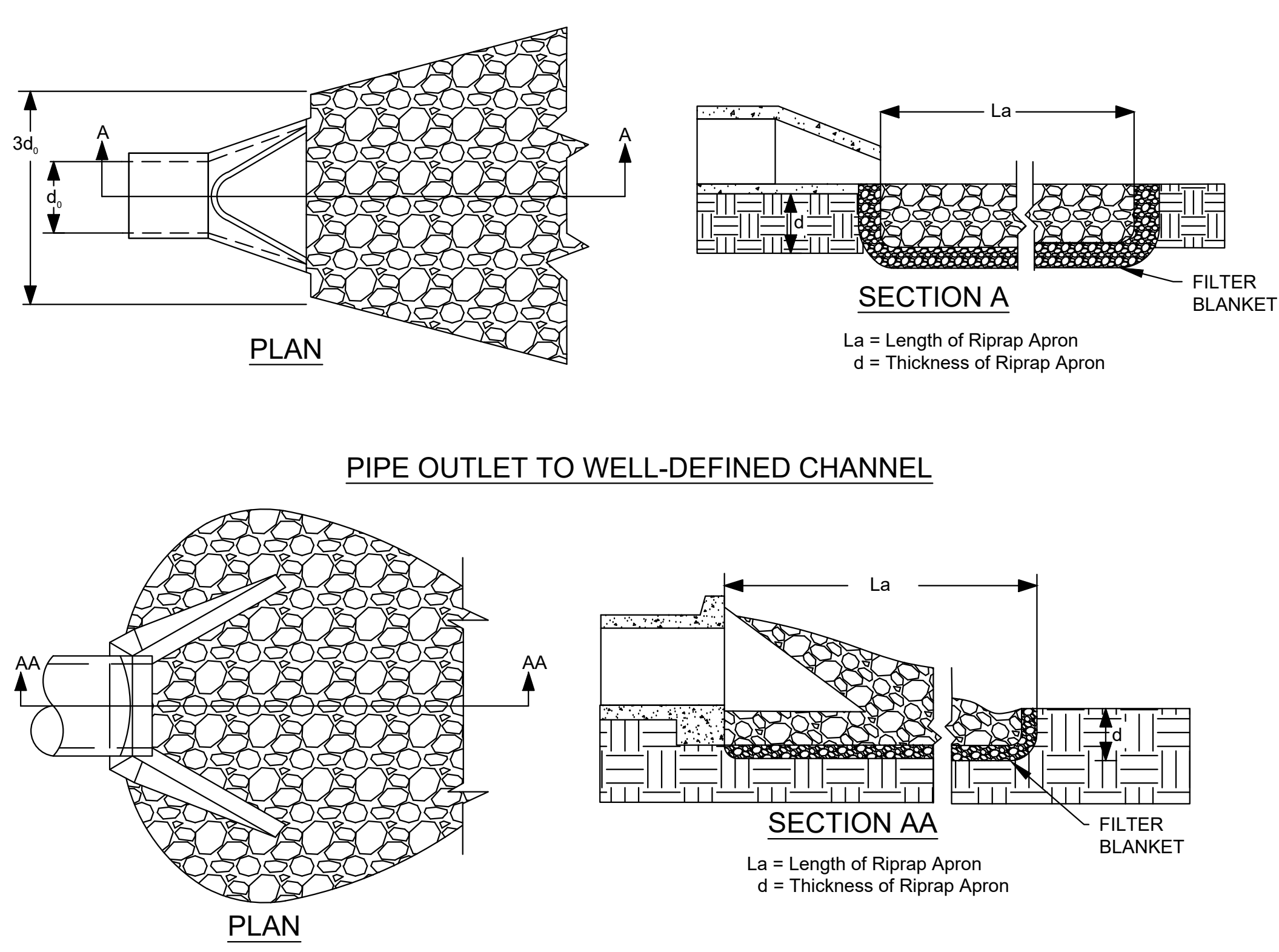
PIPE OUTLET TO FLAT AREA NO WELL-DEFINED CHANNEL
$3d_0$
d_0
A
A
PLAN
La
d
SECTION A
FILTER BLANKET
La = Length of Riprap Apron
d = Thickness of Riprap Apron
PIPE OUTLET TO WELL-DEFINED CHANNEL
AA
AA
PLAN
La
d
SECTION AA
FILTER BLANKET
La = Length of Riprap Apron
d = Thickness of Riprap Apron

NOTES:
1. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.
2. The riprap and gravel filter must conform to the specified grading limits shown on the plans.
3. Filter cloth, when used, must meet design requirements, and be properly protected from punching or tearing during installation. Repair any damage by removing the riprap and placing another piece over the damaged area. If the damage is extensive, replace the entire filter cloth.
4. All connecting joints should overlap so the top layer is above the downstream layer a minimum of 1 foot.
5. The minimum thickness of the riprap should be 1.5 times the maximum stone diameter but not less than 6".
6. Riprap may be field stone or rough quarry stone. It should be hard, angular highly weather-resistant and well graded.
7. Construct the apron on zero grade with no overfill at the end. Make the top of the riprap at the downstream end level with the receiving area or slightly below it.
8. Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed, place in the upper section of the apron.

MAINTENANCE:
1. Inspect outlet structures at least weekly and after each rainfall of 1.0 inch or greater.
2. Check outlets for erosion around or below riprap and for if stones have been dislodged. Make repairs immediately to prevent further damage.

DEQ NORTH CAROLINA Department of Environmental Quality

OUTLET STABILIZATION STRUCTURE

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

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NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

SEEDING MIXTURE

Species	Rate
Centipede	5 lbs/acre
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Coastal or Eastern Piedmont for Centipede- Sept. 1 - May 1
Coastal and Piedmont for Indian Woodoats and Virginia Wild Rye- Feb 15 - April 1
Mountains for Indian Woodoats and Virginia Wild Rye- March 1 - May 15

Maintenance:
Significant maintenance may be required to obtain desired cover.

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR SUMMER

SEEDING MIXTURE

Species	Rate
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Mountains - July 15- Aug 15
Piedmont - Aug 15 - Oct 15

Maintenance:
Indian Woodoats and Virginia Wild Rye are both sun and shade tolerant.

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR FALL

SEEDING MIXTURE

Species	Rate
Hard Fescue	15 lbs/acre
Switchgrass	2.5-3.5 lbs/acre*
Indian Grass	5-7 lbs/acre*
Big Bluestem	5-7 lbs/acre*
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Mountains - Hard Fescue- Aug 1 - June 1
Mountains- Switchgrass, Indian Grass, Big Bluestem- Dec 1 - April 15
Piedmont and Coastal- Switchgrass, Indian Grass, Big Bluestem- Dec 1 - April 1
Coastal- Indian Woodoats and Virginia Wild Rye- Sept 1 - Nov 1

Maintenance:
Hard Fescue is not recommended for slopes > 5%. Prefers shade.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1 to $1\frac{1}{2}$ tons/acre on coarse0textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700-1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. the finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. all ridges and depressions shall be removed and filled to provide the approved surface drainage . Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

NOTES:
1. Permanent seeding, sodding or other means of stabilization are required when all construction work is completed according to the NPDES timeframes table.
2. A North Carolina Department of Agriculture soils test (or equal) is highly recommended to be obtained for all areas to be seeded, sprigged, sodded or planted.
3. Use a seeding mix that will produce fast0growing nurse crops and includes non-invasive species that will eventually provide a permanent groundcover. Soil blankets may be used in lieu of nurse crops. Mat, tack or crimp mulch, as needed to stabilize seeded areas until root establishment. Mulch must cover at leaser 80% of the soil surface.
4. Ground cover shall be maintained until permanent vegetation is established and stable against accelerated erosion.

DEQ NORTH CAROLINA Department of Environmental Quality

PERMANENT SEEDING

Effective Date: 9/1/2023
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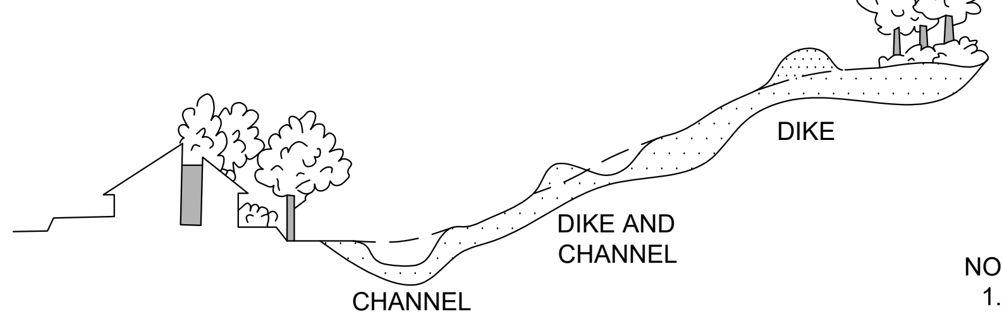
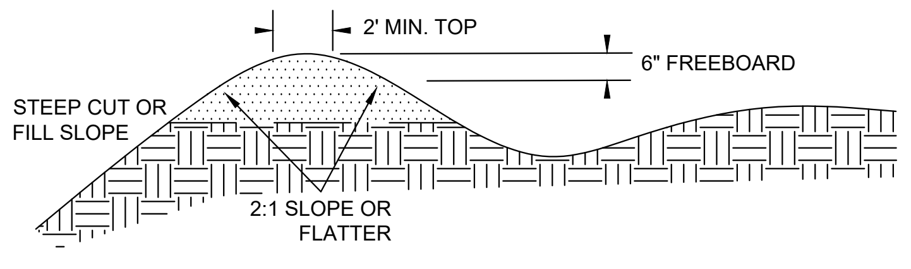
USE OF DIVERSIONS TO PROTECT CUT OR FILL SLOPES, PROTECT STRUCTURES OR OFF-SITE PROPERTY, OR BREAK LONG SLOPES.



CROSS-SECTION FOR PERMANENT DIVERSION LOCATED ABOVE A SLOPE.



Minimum Design Storm for Degrees of Hazard

Level of Protection	Area to Be Protected	Minimum Design Storm
Low	All erosion control facilities. Open areas, parking lots, minor recreation areas.	10 year
Medium	Recreation development, low-capacity roads and minor structures.	25 year, 24 hour 50 year, 24 hour
High	Major structures, homes, main school buildings, high-capacity roads.	100 year, 24 hour

NOTES:
1. Permanent Diversions can be installed as temporary diversions until the site is stabilized and then completed as a permanent measure, or they can be installed in final form during the initial construction operation, so long as they function properly and meet all temporary measure standards.
2. Remove and properly dispose of all trees, brush, stumps, or other objectionable material. Fill and compact all ditches, swales, or gullies that will be crossed to natural ground level or above.
3. Just before placement of fill, the base of the ridge should be disked by machinery.
4. Excavate, shape, and stabilize the diversion to line, grade, and cross section, as required in the design plan.
5. Compact the ridge to prevent unequal settlement, and to provide stability against seepage.
6. Stabilized the diversion with Permanent vegetation after installation.

MAINTENANCE:
1. Inspect permanent diversions at least weekly and after each rainfall of 1.0 inch or greater.
2. Immediately remove any obstructions from the flow area, and repair the diversion ridge.
3. Check outlets, and make timely repairs as needed.
4. Maintain the vegetation in a vigorous, healthy condition at all times.

DEQ NORTH CAROLINA Department of Environmental Quality

PERMANENT DIVERSIONS

Effective Date: 9/1/2023
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Mulching Materials and Application Rates

Material Organic Mulches	Rate Per Acre	Quality	Notes
Straw	1-2 tons	Dry, unchopped, unweathered; avoid weeds.	Should come from wheat or oats; spread by hand or machine; must be tacked down.
Wood Chips	5-6 tons	Air dry	Treat with 12 lbs nitrogen/ton. Apply with mulch blower, chip handle, or by hand. Not for use in fine turf.
Wood Fiber	0.5-1 tons		Also referred to as wood cellulose. May be hydroseeded. Do not use in hot, dry weather.
Bark	35 cubic yards	Air dry, shredded or hammer-milled, or chips.	Apply with mulch blower, chip handler, or by hand. Do not use asphalt tack.
Corn Stalks	4-6 tons	Cut or shredded in 4-6 inch lengths.	Apply with mulch blower or by hand. Not for use in fine turf.
Sericea Lespedeza seed-bearing stems	1-3 tons	Green or dry; should contain mature seed.	
Nets and Mats*			
Jute net	Cover area	Heavy, uniform; woven of single jute yarn.	Withstands waterflow. Best when used with organic mulch
Fiberglass net	Cover area		Withstands waterflow. Best when used with organic mulch
Excelsior (wood fiber net)	Cover area		Withstands waterflow.
Fiberglass roving	0.5-1 tons	Continuous fibers of drawn glass bound together with a non-toxic agent.	Apply with a compressed air ejector. Tack with emulsified asphalt at a rate of 25-35 gal/1,000 sq. ft.
Chemical Stabilizers**			
Aquatain Aerospray Curasol AK Pertroset SB Terra Tack Crust 500 Genaqua 743 M-145	Follow Manufacturer's specifications		Not beneficial to plant growth

*Refer to Practice No. 6.30, Grass Lined Channels in the NC DEQ E&SC Planning and Design Manual
**Use of trade names does not imply endorsement of product.

NOTES:
1. Select material based on site and practice requirements, availability of material, labor and equipment.
2. Before mulching, complete grading, install sediment control practices, and prepare the seedbed. Apply seed before mulching **except** when seed is applied as part of a hydroseeder slurry containing wood fiber mulch or a hydroseeder slurry is applied over straw.

APPLICATION OF ORGANIC MULCH
1. Spread mulch uniformly by hand, or with a mulch blower.
2. When spreading straw mulch by hand, divide the area to be mulched into sections of approximately 1,000 ft^2, and place 70-90 lb. of straw(1 1/2 to 2 bales) in each section to facilitate uniform distribution.
3. After Spreading, no more than 25% of the ground surface should be visible.
4. In hydroseeding operations a green dye, added to the slurry, assures a uniform application.

ANCHORING ORGANIC MULCH
1. Straw mulch must be anchored immediately after spreading.
2. A tractor-drawn implement designed to punch mulch into the soil or a mulch anchoring tool provides maximum erosion control with straw. A regular farm disk, weighted and set nearly straight, may substitute, but will not do a job comparable to the mulch anchoring tool. The disk should not be sharp enough to cut the straw. These methods are limited to slopes no steeper than 3:1, where equipment can operate safely.
3. Application of liquid mulch binders and tackifiers should be heaviest at the edges of areas and at crests of ridges and banks, to resist winds. Binder should be applied uniformly to the rest of the area. Binders may be applied after mulch is spread, or may be sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is the most effective method.
4. Emulsified asphalt should be applied at 0.10 gallons per square yard (10 gal/1,000 ft^2). Heavier applications cause straw to "perch" over rills. Use Rapid setting (RS or CRS) designated asphalt in traffic areas to prevent uncured asphalt from being picked up on shoes and causing damage to rugs, clothes, etc.
5. Synthetic binders may be used as recommended by the manufacturer.
6. Lightweight plastic, cotton, jute, wire or paper nets may be stapled over the mulch according to the manufacturer's recommendations.
7. For small areas where other methods cannot be used, peg and twine anchoring can be used. Drive 8-10 inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes can be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine two or more times around each peg.
8. Rye Grain may be used to anchor mulch in fall plantings, and German Millet in spring. Broadcast at 15 lb/acre before applying mulch.

CHEMICAL MULCHES
1. May be effective for soil stabilization if used between May 1 and June 15, or Sept. 15 and Oct. 15, provided that they are used on slopes **no steeper** than 4:1, and that proper seedbed preparation has been accomplished, including surface roughening where required.
2. Chemical mulches cannot be used to bind other mulches, or with wood fiber in a hydroseeded slurry at any time. Follow the manufacturer's recommendations for application.

FIBERGLASS ROVING
1. Spread roving uniformly over the area at a rate of 0.25 to 0.35 lb/yd^2. Anchor with asphalt immediately after application, at a rate of 0.25-0.35 gal/yd^2
2. As a channel lining, and at other sites of concentrated flow, the roving mat must be further anchored to prevent undermining.
3. It may be secured with stakes placed at intervals no greater than 10 feet along the drainageway, and randomly throughout its width, but not more than 10 feet apart.
4. As an option to staking, the roving can be buried to a depth of 5 inches at the upgrade end and at intervals of 50 feet along the length of the channel.

NETS AND MATS
1. Nests alone generally provide little moisture conservation benefits and only limited erosion protection. Therefore, typically use in conjunction with an organic mulch such as straw.
2. Except when wood fiber slurry is used, netting should always be installed **over** the mulch. Wood fiber may be sprayed on top of an installed net.
3. Mats, including "excelsior" (wood fiber) blankets, are considered protective mulches and may be used alone.
4. Place the matting in firm contact with the soil, and staple securely.

DEQ NORTH CAROLINA Department of Environmental Quality

MULCHING

Effective Date: 9/1/2023
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FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

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ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS
Toby M. Harris
01/31/2025

PROJECT #	656605823
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Phone: 704-394-6913
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SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: 8

SHEET TITLE: ESC DETAILS-1

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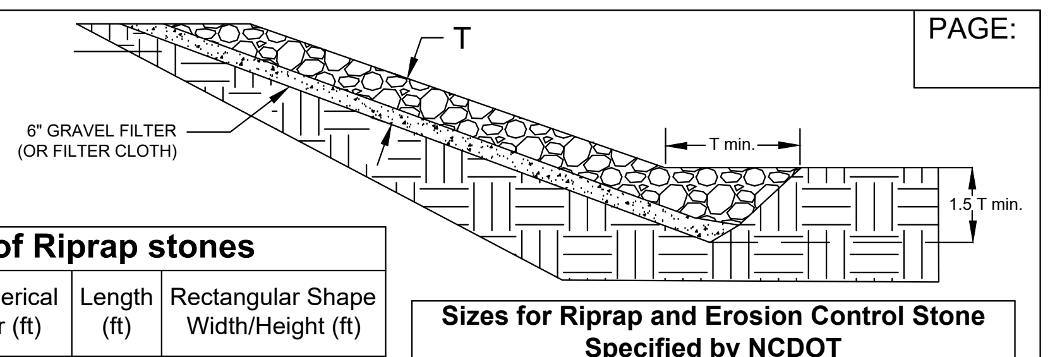

Subgrade Preparation:
1. Prepare the subgrade for riprap and filter to the required lines and grades shown on the plans.
2. Compact any fill required in the subgrade to a density approximating that of the surrounding undisturbed material or overfill depressions with riprap.
3. Remove brush, trees, stumps, and other objectionable material.

Sand and Gravel Filter Blanket:
1. Place the filter blanket immediately after the ground foundation is prepared.
2. When using gravel, spread filter stone in a uniform layer to the specified depth.
3. When more than one layer of filter material is used, spread the layers with minimal mixing.

Synthetic Filter Fabric:
1. Place the cloth filter directly on the prepared foundation.
2. Overlap the edges by at least 12 inches, and space anchor pins every 3 feet along the overlap.
3. Bury the upstream end of the cloth a minimum of 12 inches below ground and bury the lower end of the cloth or over lap with the next section as required.
4. If damage occurs while placing riprap, remove the riprap, and repair the sheet by adding another layer of filter material with a minimum overlap of 12 inches around the damaged area. If damage is extensive, remove and replace the entire sheet.
5. If placing large stones or machine placing is difficult, a 4 inch layer of fine gravel or sand may be needed to protect the filter cloth.

Maintenance:
In general, once a riprap installation has been properly designed and installed it requires very little maintenance. Riprap should be inspected periodically for scour or dislodged stones. Control of weed and brush growth may be needed in some locations.

Size of Riprap stones

Weight (lb)	Mean Spherical Diameter (ft)	Length (ft)	Rectangular Shape Width/Height (ft)
50	0.8	1.4	0.5
100	1.1	1.8	0.6
150	1.3	2.0	0.7
300	1.6	2.6	0.9
500	1.9	3.0	1.0
1000	2.2	3.7	1.3
1500	2.6	4.7	1.5
2000	2.8	5.4	1.8
4000	3.6	6.0	2.0
6000	4.0	6.9	2.3
8000	4.5	7.6	2.5
20,000	6.1	10.0	3.3

Sizes for Riprap and Erosion Control Stone Specified by NCDOT

Riprap		Erosion Control	
Class 1	Class 2	Class A	Class B
5-200 lb	25-250 lb	2"-6"	5"-15"
30% shall weigh a minimum of 60 lbs each	60% shall weigh a minimum of 100 lbs each		
No more than 10% shall weigh less than 15 lbs each	No more than 5% shall weigh less than 50 lbs each	10% tolerance top and bottom sizes	
		Equally distributed, no gradation specified	Equally distributed, no gradation specified

Riprap should be a well-graded mixture with 50% by weight larger than the specified design size.
Diameter of the largest stone size in the mix should be 1.5 times the d_{50} size with smaller sizes grading down to 1 inch.

Stone Placement:
1. Placement of riprap should follow immediately after placement of the filter.
2. Place so that riprap forms a dense, well-graded mass of stone with a minimum of voids.
3. Place to its full thickness in one operation.
4. Do not place by dumping through chutes or other methods that cause segregation of stone sizes.
5. Take care not to dislodge underlying base or filter when placing stone.
6. The toe of the riprap slope should be keyed to a stable foundation at its base.
7. The toe should be excavated to a depth about 1.5 times the design thickness of the riprap and extend horizontally from the slope, as shown above.
8. Hand placing may be necessary to achieve the proper distribution of stone sizes to produce a relatively smooth, uniform surface.

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RIP RAP

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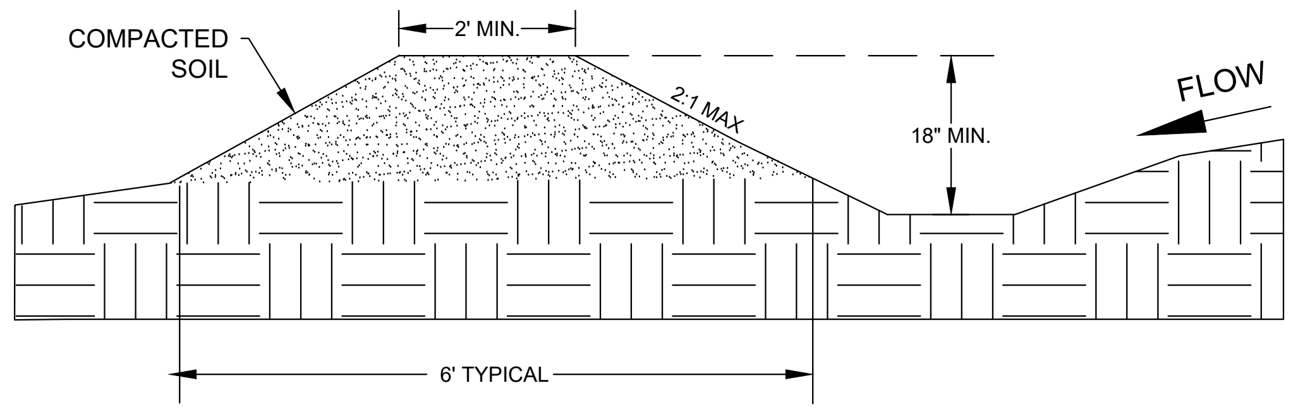
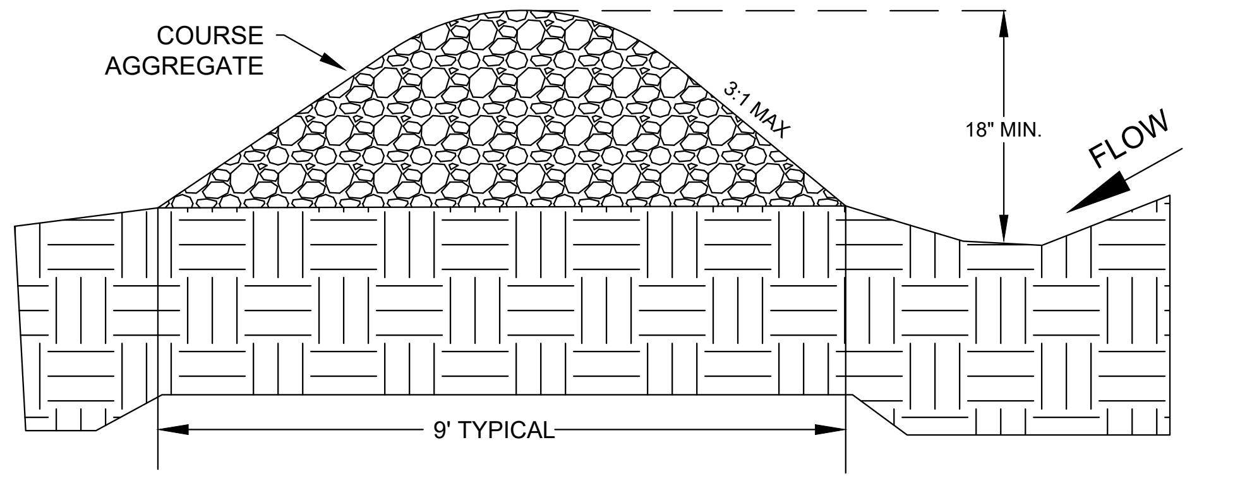
TEMPORARY EARTHEN DIVERSION DIKE



TEMPORARY GRAVEL DIVERSION DIKE FOR VEHICLE CROSSING



NOTES:
1. Remove and properly dispose of all tree, brush, stumps, and other objectionable material.
2. Temporary diversions are to only be used for drainage areas of 5 acres or less.
3. Ridges will have a 2 feet minimum top width, 2:1 or flatter side slopes and a minimum of 0.3 feet freeboard.
4. Channels will have a parabolic, trapezoidal, or V shape with side slopes of 2:1 or flatter.
5. Any point where vehicles will be crossing should have 3:1 or flatter side slopes.
6. Ensure the top of the dike is not lower at any point than the design elevation plus the specified settlement.
7. Provide sufficient room around diversions to permit machine re-grading and cleanout.
8. Vegetate the ridge immediately after construction unless it will remain in place less than 30 working days.

MAINTENANCE:
1. Inspect all measures at least weekly and after every rainfall of 1.0 inch or greater.
2. Make all repairs immediately.
3. Immediately remove any sediment from the flow area and repair the diversion ridge.
4. Check outlets and make timely repairs as needed.

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TEMPORARY DIVERSIONS

Effective Date: 9/1/2023
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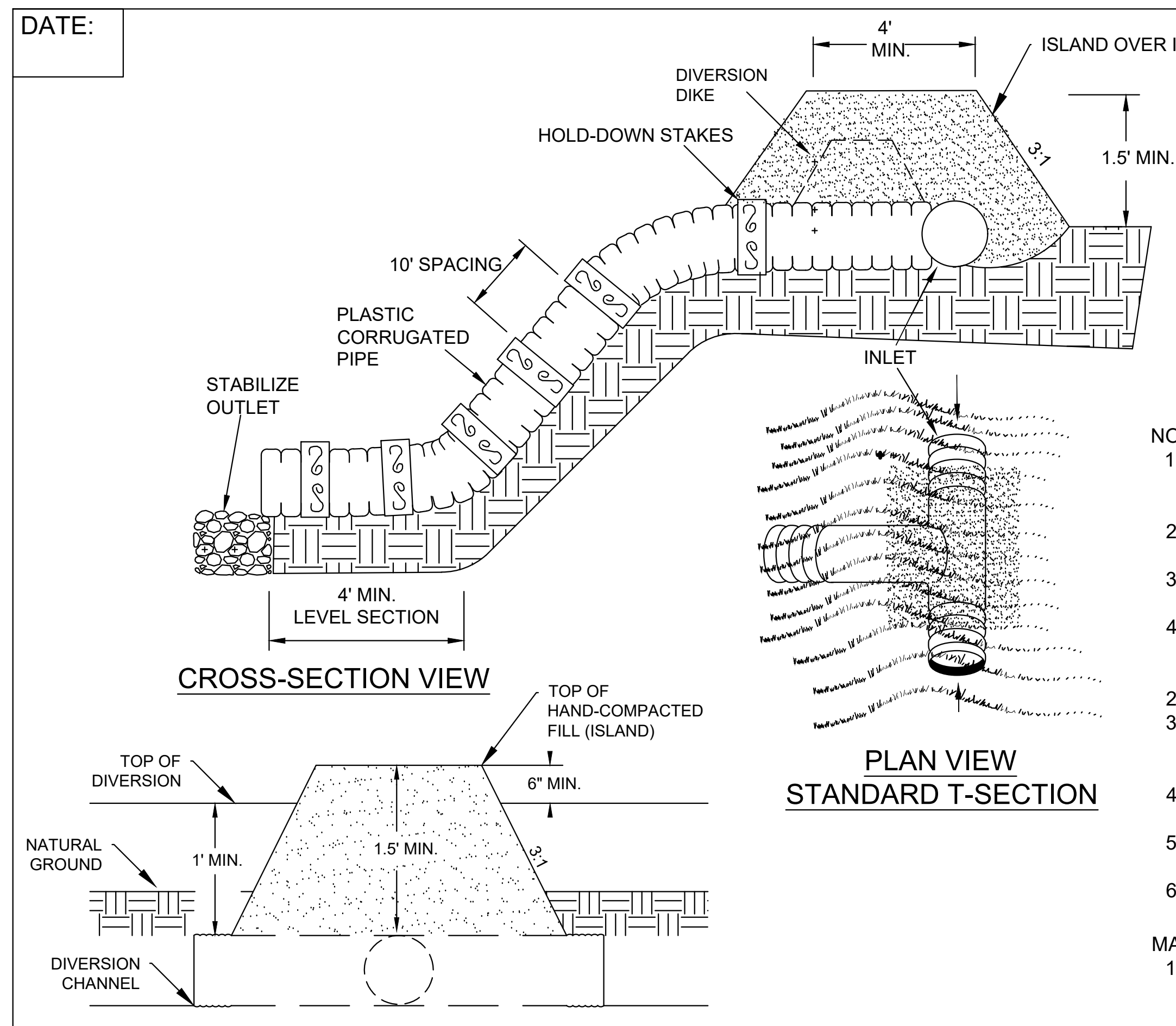

Size of Slope Drain

Max. Drainage Area per Pipe (Acres)	Pipe Diameter (Inches)
0.50	12
0.75	15
1.00	18
>1.00*	as designed
* Inlet design becomes more complex beyond this size.	

NOTES:
1. Place slope drains on undisturbed soil or well compacted fill at locations and elevations shown on the plan.
2. Slightly slope the section of pipe under the dike toward its outlet.
3. Hand tamp the soil under and around the entrance section in lifts not to exceed 6 inches.
4. Fill over the drain at the top of the slope to a minimum of 1.5 feet depth, 4 feet top width and 3:1 side slopes.
2. Ensure all slope drain connections are watertight.
3. Compact fill material and securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet apart.
4. Extend the drain beyond the toe of the slope, and adequately protect the outlet from erosion.
5. Make the compacted, settled dike ridge no less than 1 foot above the top of the pipe at every point.
6. Immediately stabilize all disturbed areas following construction.

MAINTENANCE:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater; repair immediately.

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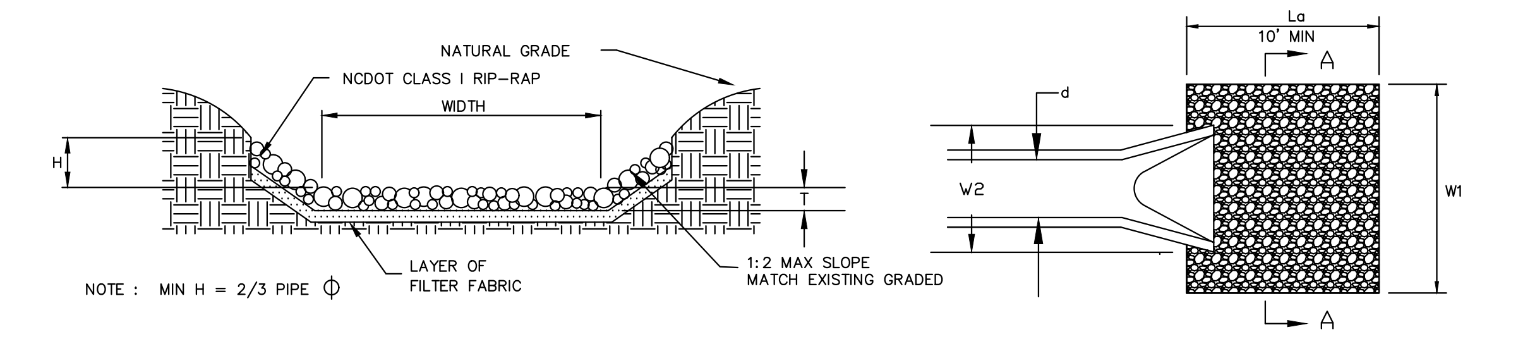
TEMPORARY SLOPE DRAINS

Effective Date:
9/1/2023



CONSTRUCTION SPECIFICATIONS :

A. BOTTOM GRADE SHALL BE 0.0 %.
B. SIDE SLOPES 2:1 OR FLATTER.
C. SIDEWALLS SHALL EXTEND UP AS SHOWN ON THE PLANS BUT NOT LESS THAN TWO-THIRDS THE PIPE DIAMETER.
D. THERE SHALL BE NO OVERFALL FROM THE END OF THE APRON TO THE SURFACE OF THE RECEIVING CHANNEL. THE AREA TO BE PAVED OR RIP-RAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE SAME GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL. THE APRON SHALL HAVE A CUTOFF TO TOE WALL AT THE DOWNSTREAM END.
E. APRON DIMENSIONS AND RIP-RAP SIZE OR CONCRETE THICKNESS MUST BE AS SHOWN ON THE PLANS.
F. THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL AT THE OUTLET PIPE, WHICHEVER IS GREATER, OR 3 TIMES THE DIAMETER.
G. THE PLACING OF FILL, EITHER LOOSE OR COMPACTED IN THE RECEIVING CHANNEL SHALL NOT BE ALLOWED.
H. NO BENDS OR CURVES IN THE HORIZONAL ALIGNMENT OF THE APRON WILL BE PERMITTED.
I. FILTER FABRIC TO BE MIRAFI 500 OR APPROVED EQUAL
J. THICKNESS OF RIP-RAP TO BE 1' OR AS NOTED BY THE ENGINEER.

USE USDA NOMOGRAPH FROM NC SEDIMENT AND EROSION CONTROL MANUAL FOR DESIGN DATA

OUTLET	Q(CFS)	V(FPS)	La	W1	W2	*T	H
FES-200	10.5	5.9	16'	17.5'	4.5'	14"	20"
FES-204	23.7	13.4	16'	17.5'	4.5'	14"	20""
FES-300	41.1	8.4	8'	10.5'	7.5'	14"	20"
FES-316	7.8	4.4	14'	15.5'	4.5'	14"	20"
FES-320	40.1	12.8	12'	14'	6'	14"	20"
FES-322	14.4	8.2	12'	13.5'	6'	14"	20"

* d50 (see fig 8.06 a&b "NC SEDIMENT AND EROSION CONTROL MANUAL"
dmax = 1.5 x d50
T = 1.5 X dmax.
La = LENGTH OF RIP RAP APRON. 4xd
W1 = END OF APRON. 3xd
W2 = END OF FLARED SECTION

RIP-RAP APRON
FOR FLARED END SECTION

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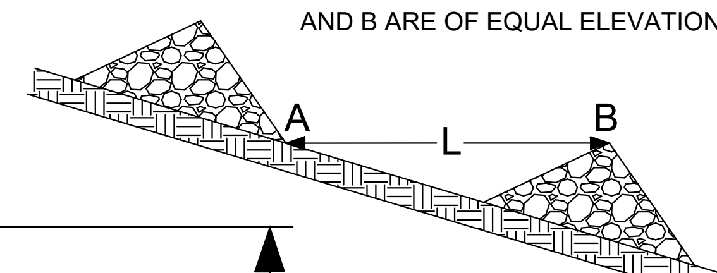
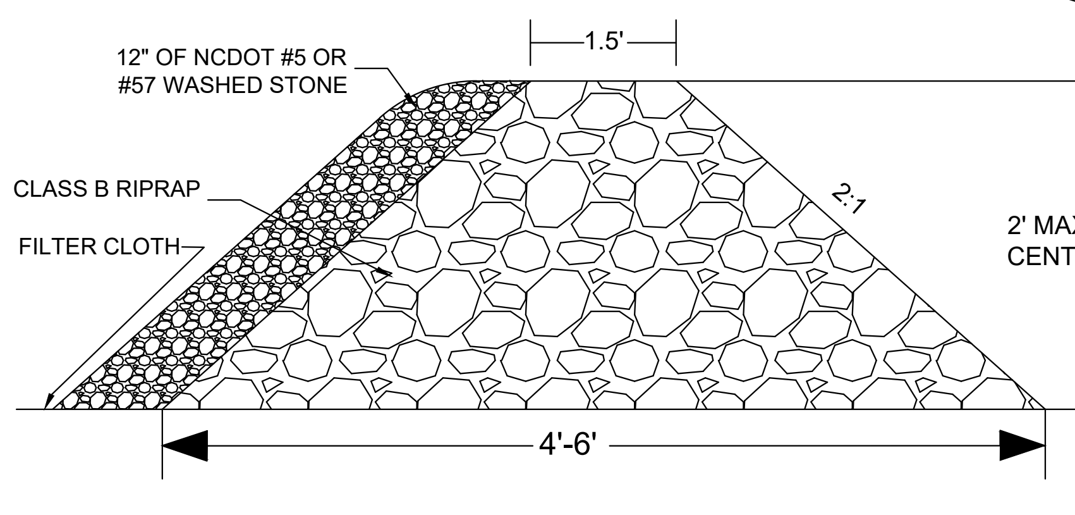
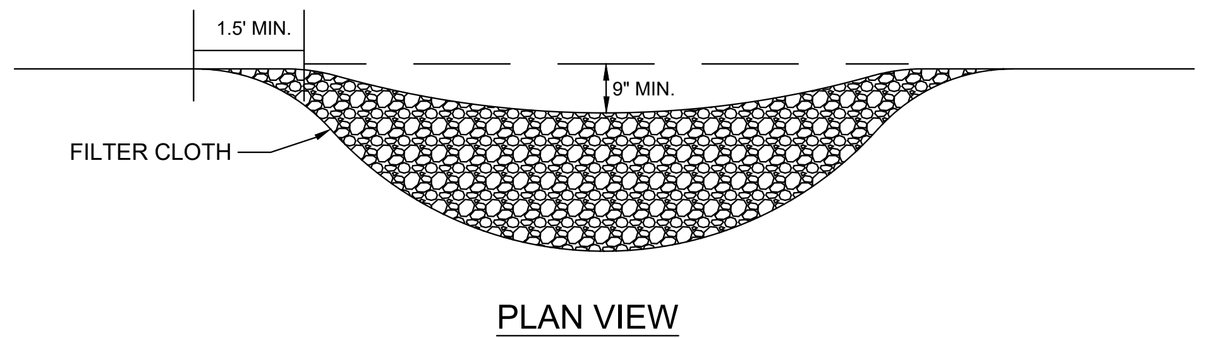


L= THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION



CROSS-SECTION VIEW



PLAN VIEW

NOTES:
1. Place stone on a filter fabric foundation.
2. The center stone section must be at least 9 inches below natural ground level where the dam abuts the channel banks.
3. Extend stone at least 1.5 feet beyond the ditch bank to keep water from cutting around the ends of the check dam.
4. Set spacing between dams to assure that the elevation at the top of the lower dam is the same as the toe elevation of the upper dam.
5. Protect the channel after the lowest check dam from heavy flow that could cause erosion.
6. Make sure the channel reach above the most upstream dam is stable.
7. Ensure that other areas of the channel, such as culvert entrances below the check dams, are not subject to damage or blockage from displaced stones.
8. Riprap and filter fabric should be keyed in to prevent under cutting.
9. Ends of check dams may need to be turned uphill to prevent bypass and better conform to site conditions.
10. Do not place check dams in intermittent or perennial streams.

MAINTENANCE:
1. Inspect check dams and channels at least weekly and after each rainfall of 1.0 inch or greater. Clean out sediment, straw, limbs or other debris that could clog the channel when needed.
2. Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel.
3. Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to the dams as needed to maintain design height and cross section.

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CHECK DAM

Effective Date: 9/1/2023
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Temporary Seeding Recommendations

Common Name	Scientific Name	Rate per Acre	Optimal Planting Date
Rye Grain	Secale Cereale	30 lbs	Aug. 15 - May 15
Wheat	Triticum Aestivum	30 lbs	Aug. 15 - May 15
German Millet	Setaria Italica	10 lbs	May 15 - Aug. 15
Browntop Millet	Urochloa Ramosa	10 lbs	May 15 - Aug. 15

Temporary Seeding Recommendations:
- Temporary annual seed selection should be based on season of project installation.
- A single species selection for temporary cover is acceptable.
- In some cases where seasons overlap, a mixture of two or more temporary species may be necessary; however, application rates should not exceed the total recommended rate per acre.
- Temporary seed should be mixed and applied simultaneously with the permanent seed mix if optimal planting dates allow.

Permanent Seeding Recommendations:
Optimal Planting: Mar. 1 - May 15, July 15 - Aug. 15

Common Name	Scientific Name	Type*	% of Mix	Soil Drainage Adaptation	Shade Tolerance	Height
Indian Woodoats	Chasmanthium latifolium	Cold Season	1-10%	Well-drained to Droughty	Moderate	4
Virginia Wildrye	Elymus virginicus	Cold Season	5-25%	Well-drained to Droughty	Moderate	3
Eastern Bottle-brush Grass	Elymus hystrix	Cold Season	5-10%	Well-drained to Droughty	Moderate	3
Winter Bentgrass	Argostis hyemalis	Cold Season	10-20%	Well-drained	Moderate	3
Rough Bentgrass	Agrostis scabra	Cold Season	10-20%	Poorly-drained	Poor	2.5

Permanent Seeding Recommendations:
Optimal Planting: Dec. 15 - May 15, Aug. 15 - May 15

Common Name	Scientific Name	Type*	% of Mix	Soil Drainage Adaptation	Shade Tolerance	Height
Soft Rush	Juncus effusus	Wetland	1-10%	Poorly-drained	Poor	4
Shallow Sedge	Carex lurida	Wetland	1-10%	Poorly-drained	Poor	3
Fox Sedge	Carex vulpinoidea	Wetland	1-10%	Poorly-drained	Poor	3
Leathery Rush	Junucus coriaceus	Wetland	2-5%	Poorly-drained	Poor	2

Permanent Seeding Recommendations:
Optimal Planting Dec. 1 - Apr. 15

Common Name	Scientific Name	Cultivars	Type*	% of Mix	Soil Drainage Adaptation	Shade Tolerance	Height
Switchgrass	Panicum virgatum	Cave-in-rock -- well drained Blackwell -- well drained Shelter -- well drained Kanlow -- poorly drained Carthage -- well drained	Warm Season	10-15%	Cultivar Dependent	Poor	6
Indiangrass	Sorghastrum nutans	Rumsey, Osage, Cheyenne	Warm Season	10-30%	Well-drained to Droughty	Poor	6
Deertongue	Dichanthelium clandestinum	Tioga	Warm Season	5-25%	Poorly-drained to Droughty	Moderate	6
Big Bluestem	Andropogon gerardii	Roundtree, Kaw, Earl	Warm Season	10-30%	Well-drained to Droughty	Poor	6
Little Bluestem	Schizachyrium scoparium	Aldous, Cimarron	Warm Season	10-30%	Well-drained to Droughty	Poor	4
Sweet Woodreed	Cinna arundinacea		Warm Season	1-10%	Poorly-drained to Well-drained	Moderate	5
Rice Cutgrass	Leersia oryzoides		Warm Season	5-25%	Poorly-drained	Poor	5
Redtop Panic Grass	Panicum rigidulum		Warm Season	10-20%	Well-drained	Poor	3.5
Eastern Gammagrass	Tripsacum dactyloides		Warm Season	10-20%	Well-drained to Poorly-drained	Poor	4.5
Purple Top	Tridens flavus		Warm Season	5-10%	Well-drained to Droughty	Poor	2.5

- No specific seeding rate is given in order to allow for custom seed mixes based on site characteristics and season. However, permanent seed inclusion in the mix should total 15 pounds of pure live seed (PLS) per acre drilled or 15-20 pounds PLS per acre broadcast applied.
- At least 4 species should be selected for the mixture, including one species from each type(warm and cold season and wetland); selection of more than four species is recommended for increasing chances of successful vegetation establishment.
- If other species such as wildflowers are added to the mix, they should not be counted in the minimum seeding rate for grasses.

Permanent Seeding:
- Soil analysis should be performed to determine nutrient and lime needs of each site.
- Riparian buffers regulated for nutrient management may be limited to a single application of fertilizer.
- Apply seed uniformly with a cyclone seeder, drop-type spreader, drill or hydroseeder on a firm, friable seedbed.
- When using a drill, equipment should be calibrated in the field for the desired seeding rate.
- Mulch all plantings immediately after seeding (see 6.14, Mulching).If planting on stream banks steeper than 10% or areas subject to flooding, a biodegradable RECP (6.17, Rolled Erosion Control Products) is recommended to hold seed and soil in place.

Maintenance:
- Many of the recommended permanent grass species may require two years of establishment, depending on site conditions.
- Inspect seeded areas for failure and make necessary repairs, soil amendments, and reseedings.
- If weedy exotic species have overtaken the area after the first growing season, the invading species must be eradicated to allow native species to grow.
- Monitor the site until long term stability has been established.

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RIPARIAN AREA SEEDING (MOUNTAIN REGION)

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

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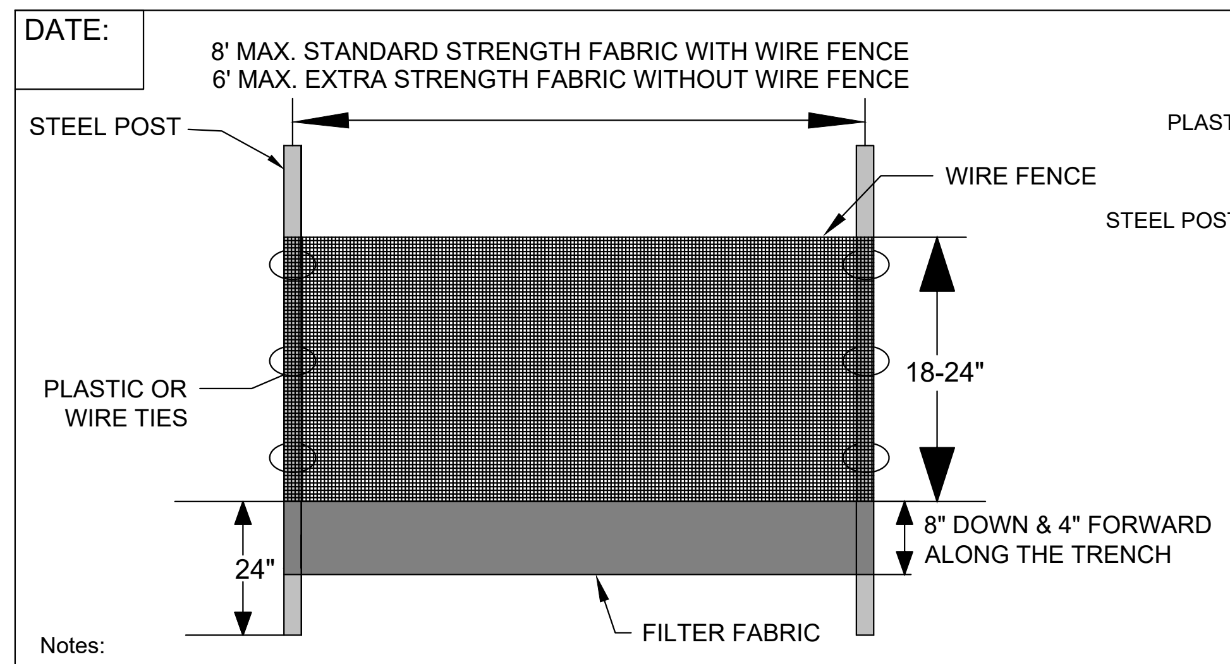
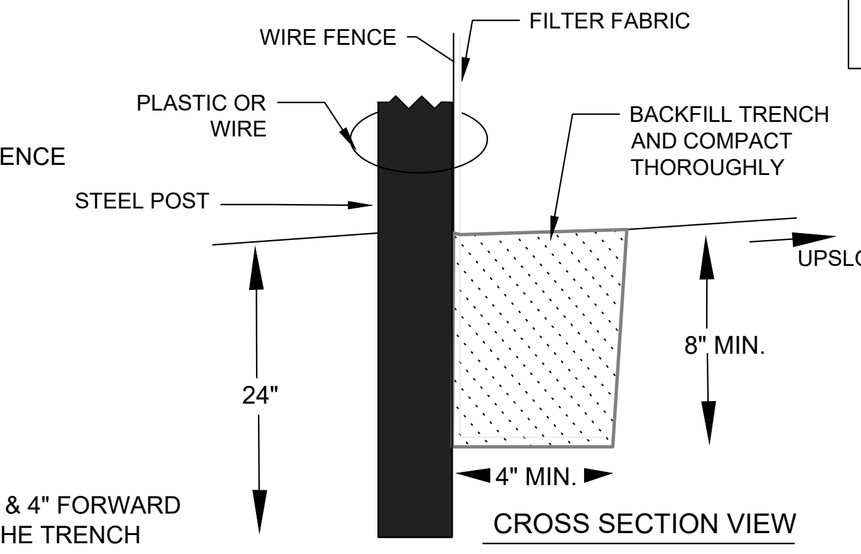

8' MAX. STANDARD STRENGTH FABRIC WITH WIRE FENCE
6' MAX. EXTRA STRENGTH FABRIC WITHOUT WIRE FENCE
STEEL POST
WIRE FENCE
PLASTIC OR WIRE TIES
18-24"
8" DOWN & 4" FORWARD ALONG THE TRENCH
24"
FILTER FABRIC



CROSS SECTION VIEW

Notes:
1. Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.
2. Ensure that the height of the sediment fence does not exceed 24 inches above the ground. (Higher fences may impound volumes of water sufficient to cause failure of the structure)
3. Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.
4. Support standard strength filter fabric by wire mesh fastened securely to the upslope side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have a minimum 50 pound tensile strength.
5. When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Supports should be driven securely into the ground a minimum of 24 inches. Wire mesh should be a minimum 14-gauge with 6 inch mesh spacing.
6. Extra strength filter fabric with 6 foot post spacing does not require a wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have a minimum of 50 pound tensile strength.
7. Excavate the trench approximately 4 inches wide and 8 inches deep along the proposed line of the posts and upslope from the barrier.
8. Place 12 inches of fabric along the bottom and side of the trench.
9. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.
10. Do not attach filter fabric to existing trees.
11. Do not place across ditches, streams, or any other areas of concentrated flow.

Max. Slope Length and Slope for Which Sediment Fence is Applicable

Slope	Slope Length (ft)	Max. Area (ft^2)
<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

Maintenance:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make any required repairs immediately.
2. Should the fabric of a sediment fence collapse, tear, decompose, or become ineffective, replace it promptly.
3. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and reduce pressure on the fence. Take care to avoid undermining the fence during cleanouts.
4. Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

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SEDIMENT FENCE

Effective Date: 9/1/2023
In accordance with the 2013
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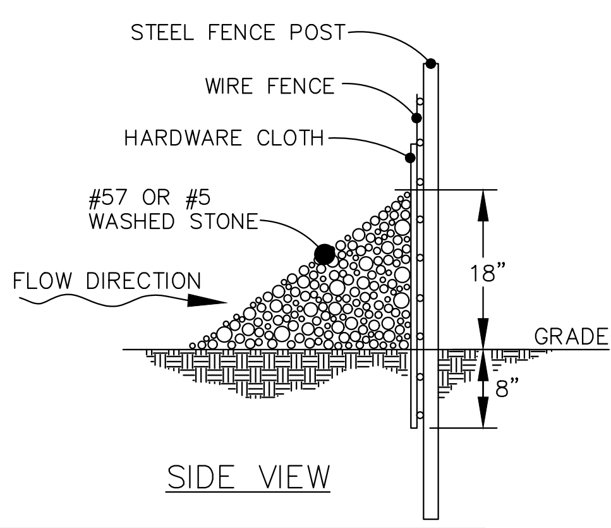
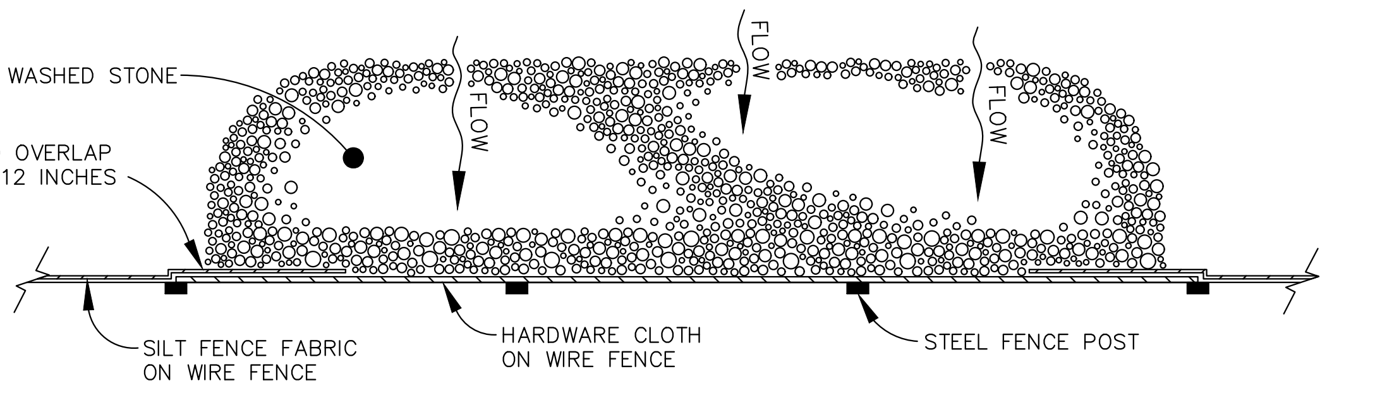
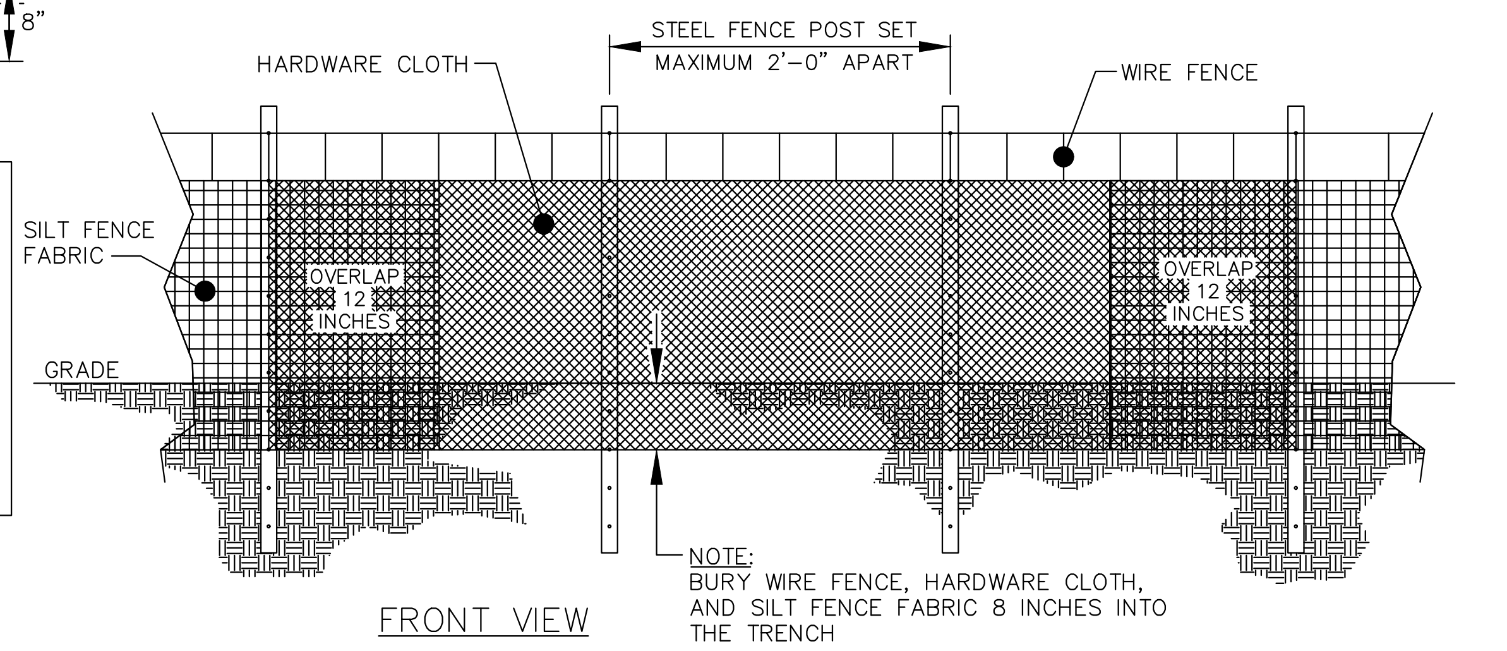


SIDE VIEW



PLAN VIEW

NOTE:
USE SILT FENCE OUTLETS ONLY WHEN DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE AND THERE IS A LOW AREA. USE AS A REPAIR OF SILT FENCE FAILURES.

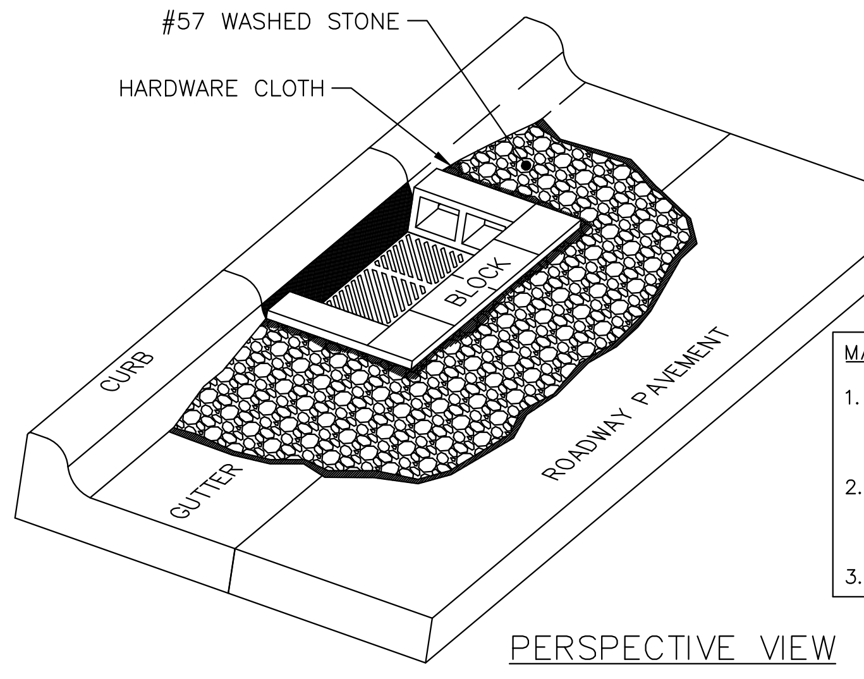


FRONT VIEW

NOTE:
BURY WIRE FENCE, HARDWARE CLOTH, AND SILT FENCE FABRIC 8 INCHES INTO THE TRENCH

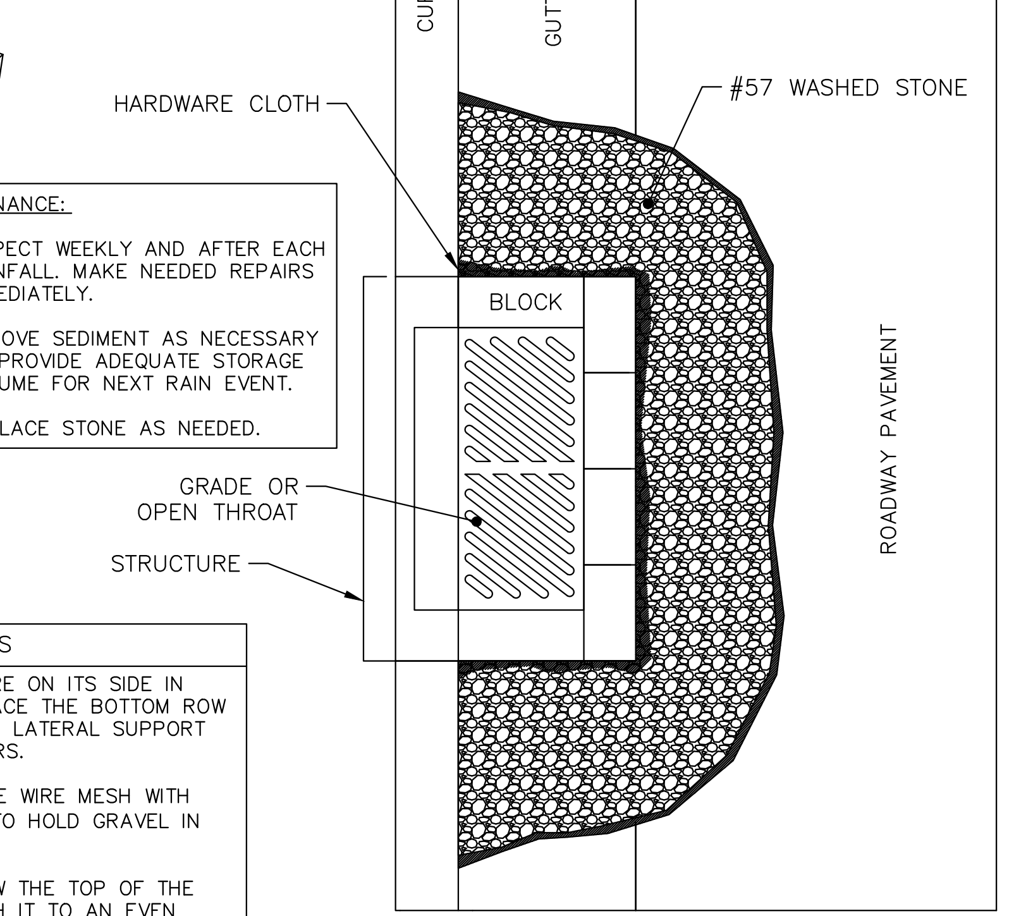
MAINTENANCE:
1. INSPECT WEEKLY AND AFTER EACH RAINFALL EVENT.
2. CLEAR THE WIRE OF ANY DEBRIS OR OTHER OBJECTS TO PROVIDE ADEQUATE FLOW FOR SUBSEQUENT RAINS.
3. TAKE CARE NOT TO DAMAGE OR UNDERCUT THE WIRE AND SILT FENCE FABRIC DURING SEDIMENT REMOVAL.
4. REFRESH AND REPLACE STONE AS NEEDED.

STANDARD SILT FENCE OUTLET



PERSPECTIVE VIEW

MAINTENANCE:
1. INSPECT WEEKLY AND AFTER EACH RAINFALL. MAKE NEEDED REPAIRS IMMEDIATELY.
2. REMOVE SEDIMENT AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR NEXT RAIN EVENT.
3. REPLACE STONE AS NEEDED.



PLAN VIEW

CONSTRUCTION SPECIFICATIONS
1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE IN THE BOTTOM ROW TO ALLOW POOL DRAINAGE. PLACE THE BOTTOM ROW OF BLOCKS AGAINST THE EDGE OF THE CURB FOR LATERAL SUPPORT AND TO AVOID WASHOUTS WHEN OVERFLOW OCCURS.
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 #57 WASHED STONE PLACED 2 INCHES BELOW THE TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER AND SMOOTH IT TO AN EVEN GRADE.
4. APPROVED EQUIVALENTS ACCEPTED.

STANDARD BLOCK & GRAVEL PROTECTION

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
030895
TOBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

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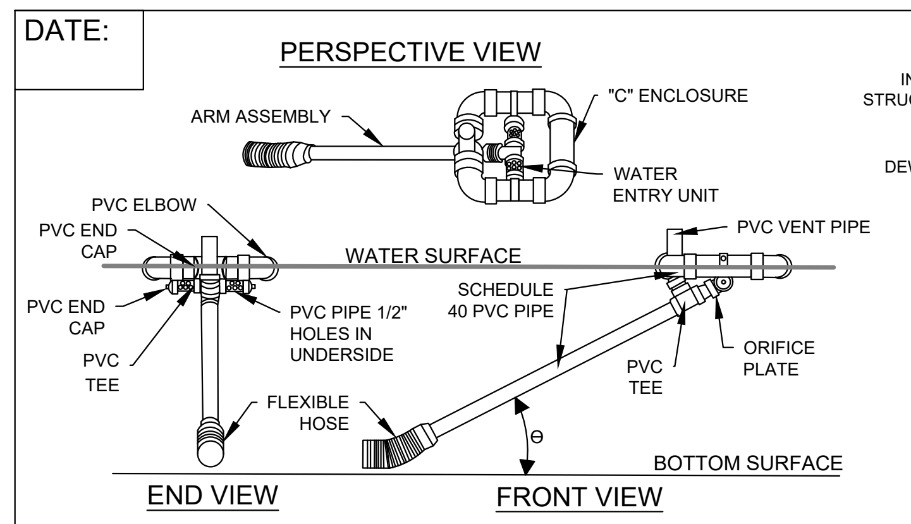
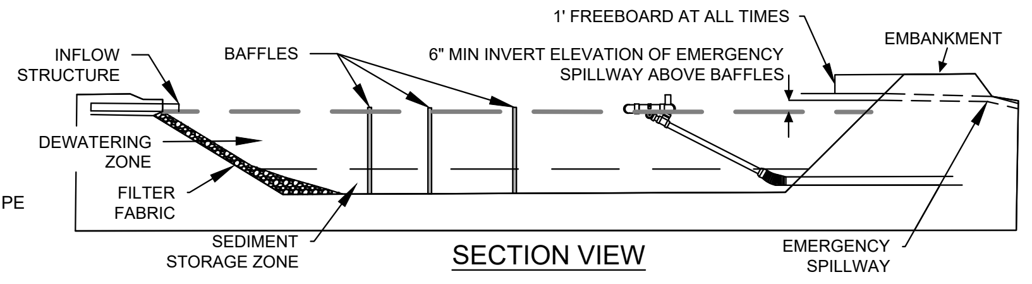
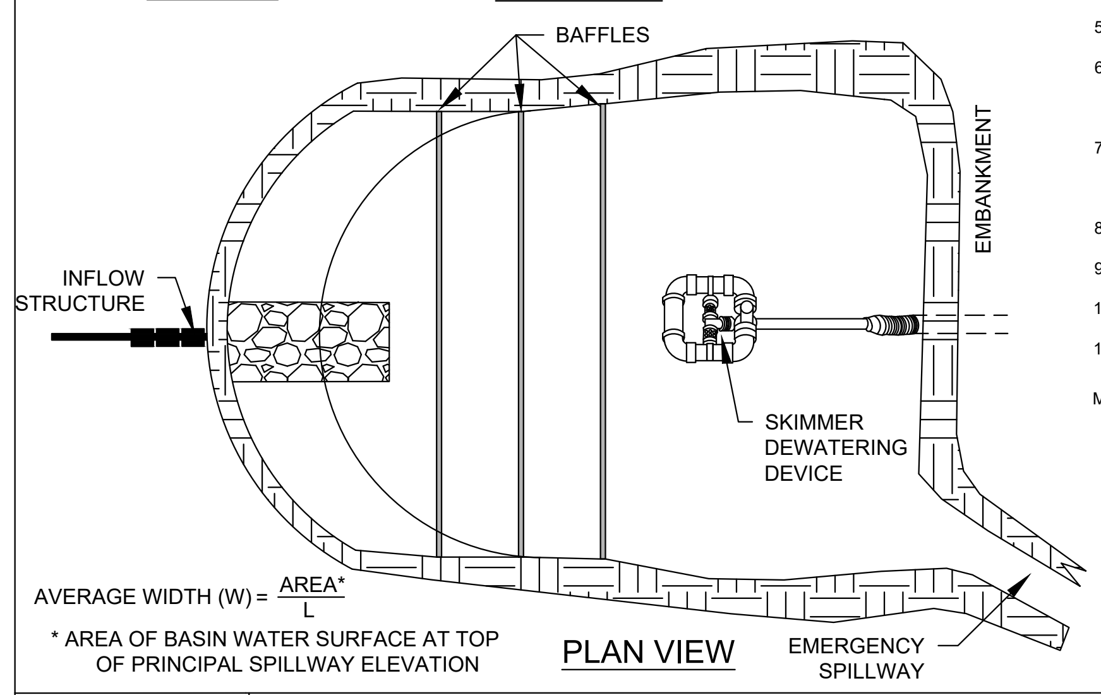






AVERAGE WIDTH (W) = $\frac{\text{AREA}^*}{L}$

* AREA OF BASIN WATER SURFACE AT TOP OF PRINCIPAL SPILLWAY ELEVATION

NOTES:

1. Clear, grub and strip the area under the embankment of all vegetation and root mat. Remove all surface soil containing high amounts of organic matter and stockpile or dispose of it properly. Haul all objectionable material to the designated disposal area. Place temporary sediment control measures below basin as needed.
2. Place the fill in lifts not to exceed 9 inches, and machine compact it. Over fill the embankment 6 inches to allow for settlement.
3. Place the barrel on a firm, smooth foundation of impervious soil. Do not use pervious material such as sand, gravel, or crushed stone as backfill around the pipe. Place the fill around the pipe spillway in 4-inch layers and compact it under and around the pipe to at least the same density as the adjacent embankment.
4. Place a minimum depth of 2 feet compacted backfill over the pipe spillway before crossing with construction equipment.
5. Ensure that the flow length to basin width ratio is at least 2:1 to improve trapping efficiency. Length is measured at the elevation of the principal spillway.
6. Assemble the skimmer following manufacturers instructions or as designed and lay on the bottom of the basin with the flexible joint at the inlet of the barrel pipe. Attach the flexible joint to the barrel pipe and position the skimmer over the excavated pit or support. Be sure to attach a rope and anchor it to the side of the basin.This will be used to pull the skimmer to the side for maintenance.
7. Install the spillway in undisturbed soil to the greatest extent possible. The spillway should be lined with laminated plastic or impermeable geotextile fabric. The fabric must be wide and long enough to cover the bottom and sides and extend onto the top of the dam for anchoring in a trench. The edges may be secured with 8-inch staples or pins.
8. Filter fabric must be long enough to extend down the slope and exit onto stable ground. The width of the fabric must be one piece, not joined or spliced; otherwise water can get under the fabric.
9. The upper section(s) should overlap the lower section(s) so that water cannot flow under the fabric. Secure the upper edge and sides of the fabric in a trench with staples or pins.
10. Discharge water into the basin in a manner to prevent erosion. Use temporary slope drains or diversions with outlet protection to divert sediment-laden water to the upper end of the pool area to improve basin trap efficiency.
11. Stabilize the emergency spillway embankment and all other disturbed areas above the crest of the principal spillway immediately after construction.

MAINTENANCE:

1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make necessary repairs immediately.
2. Remove sediment and restore the basin to its original dimensions when sediment accumulates to one-half the height of the first baffle. Pull the skimmer to one side so that the sediment underneath can be excavated. Excavate the sediment from the entire basin, not just around the skimmer or within the first cell.
3. Make sure any vegetation growing in the bottom of the basin does not hold down the skimmer.
4. Repair baffles if they are damaged. Re-anchor the baffles if water is flowing underneath or around them.
5. Ensure the skimmer is not clogged with trash or debris.
6. If the skimmer arm or barrel pipe is clogged, remove orifice and clear debris with a plumber's snake or by flushing with clean water. Be sure to replace the orifice before repositioning the skimmer.
7. Check fabric lined spillway for damage and make any required repairs with fabric that spans the full width of the spillway. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement.

NORTH CAROLINA
Department of Environmental Quality

SKIMMER SEDIMENT BASIN

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

DATE:

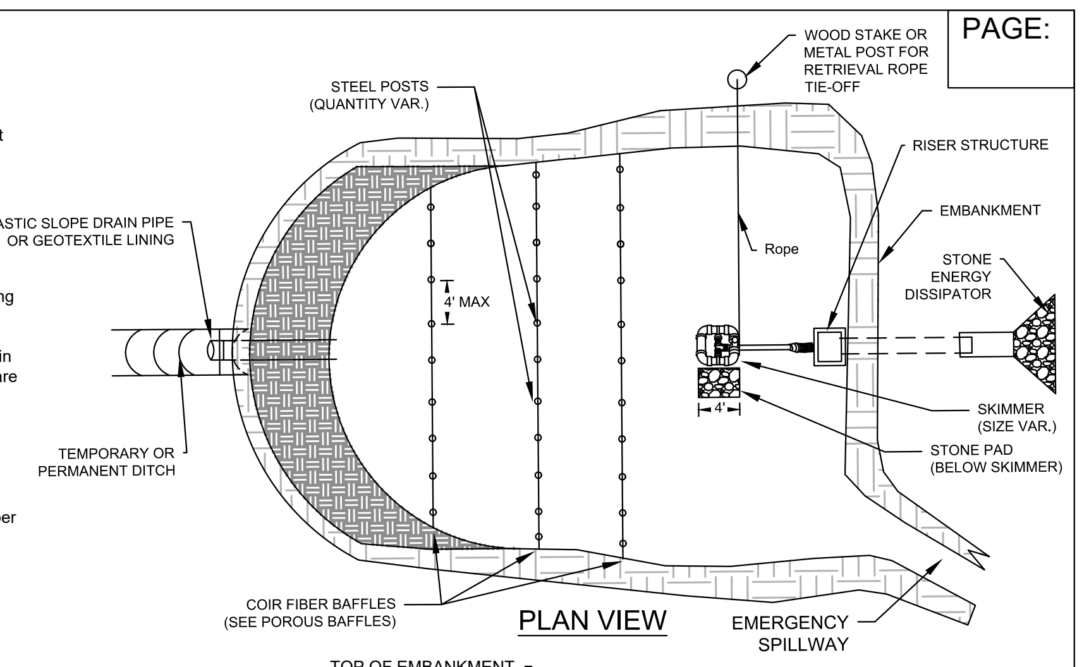
PAGE:

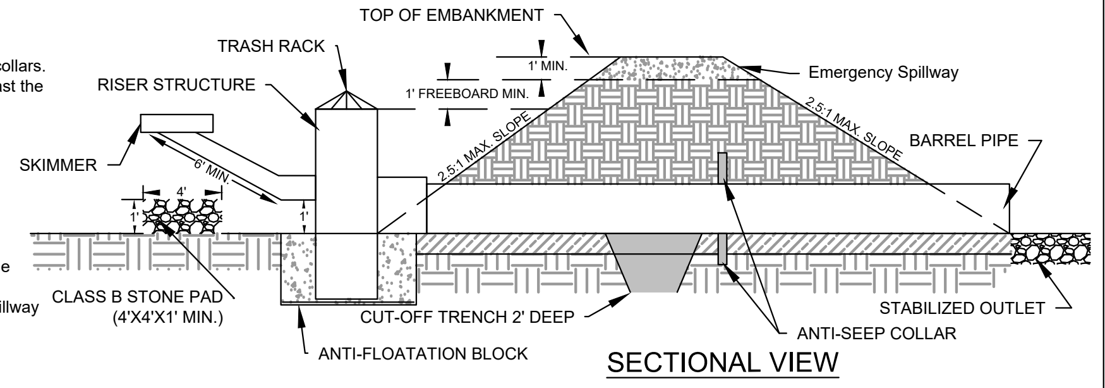
NOTES:

1. Install temporary sediment basins to the approved design. If the basin will eventually be converted to a permanent SCM device, the basin must function as a temporary sediment basin and meet the following parameters until completion of the project:
    - Maximum Drainage Area: 100 acres
    - Minimum Sediment Storage Volume: 1800 cubic feet per acre of disturbed area
    - Minimum Surface Area: 435 square feet per cfs of Q_{10} peak inflow
    - Minimum dewatering time: 48 hours
2. Clear, grub, and strip topsoil from areas under the embankment to remove trees, vegetation, roots, and other objectionable material. Delay clearing the pool area until the dam is complete. Stockpile all topsoil or soil containing organic matter for use on the outer shell of the embankment to facilitate vegetative establishment.
3. Place temporary sediment control measures below the basin and stockpile as needed.
4. Excavate a cut-off trench along the center line of the earth fill embankment. Cut trench to stable soil material, but in no case make it less than 2 feet deep with maximum side slopes no steeper than 1:1. Compaction requirements are the same as those for the embankment.
5. Extend the cut-off trench into both abutments to at least the elevation of the riser crest.
6. Keep the trench dry during backfilling and compaction operations.
7. Fill material should be clean mineral soil, free of roots, woody vegetation, rocks, and other objectionable material. Areas of approved fill should be shown on the plans.
8. Scarify areas on which fill is to be placed prior to placing. Ensure that fill material contains sufficient moisture so it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction.
9. Place fill material in 6 to 8 inch continuous layers over the entire length of fill area and compact.
10. Construct the embankment to an elevation 10% higher than the design height to allow for settling.
11. Securely attach the riser to the barrel or barrel stub to make a watertight structural connection. All connections should be made using approved watertight assemblies.
12. If no riser structure is to be used, couple the skimmer arm directly into the embankment 1 foot from the bottom of the basin.
13. The arm pipe connecting the skimmer to the riser shall have a minimum length of 6 feet.
14. Place barrel and riser on a firm, smooth foundation of impervious soil.
15. Do not use pervious material such as sand, gravel, or crushed stone as backfill around the pipe or anti-seep collars.
16. Place fill material around the pipe spillway in 4-inch layers, and compact it under and around the pipe to at least the same density as the adjacent embankment.
17. Place a minimum depth of 2 feet of compacted backfill over the pipe spillway before crossing it with any construction equipment.
18. Anchor riser in place by concrete or other satisfactory means to prevent floatation.
19. In no case should the pipe conduit be installed by cutting a trench through the dam after the embankment is complete.
20. Install the emergency spillway in undisturbed soil.
21. Discharge water into the basin in a manner to prevent erosion.
22. Construct basin so that the disturbed area is minimized, divert surface water from bare areas and complete the embankment before the area is cleared.
23. Stabilize the emergency spillway embankment and all other disturbed area above the crest of the principal spillway immediately after construction.
24. Seed and place matting for erosion control on interior and exterior side slopes.
25. Install Porous Baffles as specified on following sheets.

MAINTENANCE:

1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make any repairs immediately.
2. Remove sediment and restore basin to its original dimensions when it accumulates to one-half the design depth.
3. Place removed sediment in an area with sediment control measures to ensure no loss of sediment off-site.
4. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement.
5. Remove all trash and other debris form the riser and pool area.


WOOD STAKE OR METAL POST FOR RETRIEVAL ROPE TIE-OFF
STEEL POSTS (QUANTITY VAR.)
RISER STRUCTURE
EMBANKMENT
PLASTIC SLOPE DRAIN PIPE OR GEOTEXTILE LINING
Rope
STONE ENERGY DISSIPATOR
4' MAX
4'
SKIMMER (SIZE VAR.)
STONE PAD (BELOW SKIMMER)
TEMPORARY OR PERMANENT DITCH
COIR FIBER BAFFLES (SEE POROUS BAFFLES)
PLAN VIEW
EMERGENCY SPILLWAY



Acceptable Dimensions for Basin Embankment

Fill Height	Minimum Top Width
Less than 10.0 ft	8.0 ft
10.0 ft to 15.0 ft	10.0 ft

NORTH CAROLINA
Department of Environmental Quality

SEDIMENT BASIN

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

DATE:

PAGE:

SPACING GUIDE FOR SLOPE BREAKS		
	SLOPE	SPACING (FT)
Steep Slopes	2:1	20
	3:1	35
	4:1	45
Long Slopes	15-25%	50
	10-15%	80
	6-10%	125
	3-6%	200
	<3%	300

Use slope breaks, such as diversions, wattles, or benches, as appropriate, to reduce the length of cut-and-fill slope to limit sheet and rill erosion and prevent gullying.

MAINTENANCE:

1. Periodically check all graded areas and the supporting erosion and sedimentation control practices, especially after heavy rainfalls.
2. Promptly remove all sediment from diversions and other water-disposal practices.
3. If washouts or breaks occur, repair immediately.
4. Prompt maintenance of small eroded areas before they become significant gullies is an essential part of an effective erosion and sedimentation control plan.

NOTES:

1. Construct and maintain all erosion and sediment control practices and measures in accordance with the approved sedimentation control plan and construction schedule.
2. Remove good topsoil from areas to be graded and filled, and preserve it for use in finishing the grading of all critical areas.
3. Scarify areas to be topsoiled to a minimum depth of 2 inches before placing topsoil.
4. Clear and grub areas to be filled by removing trees, vegetation, roots, or other objectionable material that would affect the planned stability of the fill.
5. Ensure that fill material is free of brush, rubbish, rocks, logs, stumps, building debris, and other materials inappropriate for constructing stable fills.
6. Place all fill in layers not to exceed 9 inches in thickness, and compact the layers as required to reduce erosion, slippage, settlement, or other related problems.
7. Do not incorporate frozen, soft, mucky, or highly compressible materials into fill slopes.
8. Do not place fill on a frozen foundation, due to possible subsidence and slippage.
9. Keep diversions and other water conveyance measures free of sediment during all phases of development.
10. Handle seeps or springs encountered during construction in accordance with approved methods (subsurface drain).
11. Permanently stabilize all graded areas immediately after final grading is completed on each area in the grading plan. Apply temporary stabilization measures on all graded areas when work is to be interrupted or delayed for 30 days or longer.
12. Show topsoil, stockpiles, borrow areas, and spoil areas on the plans, and make sure they are adequately protected from erosion. Include final stabilization of these areas in the plan.

NORTH CAROLINA
Department of Environmental Quality

LAND GRADING

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

DATE:

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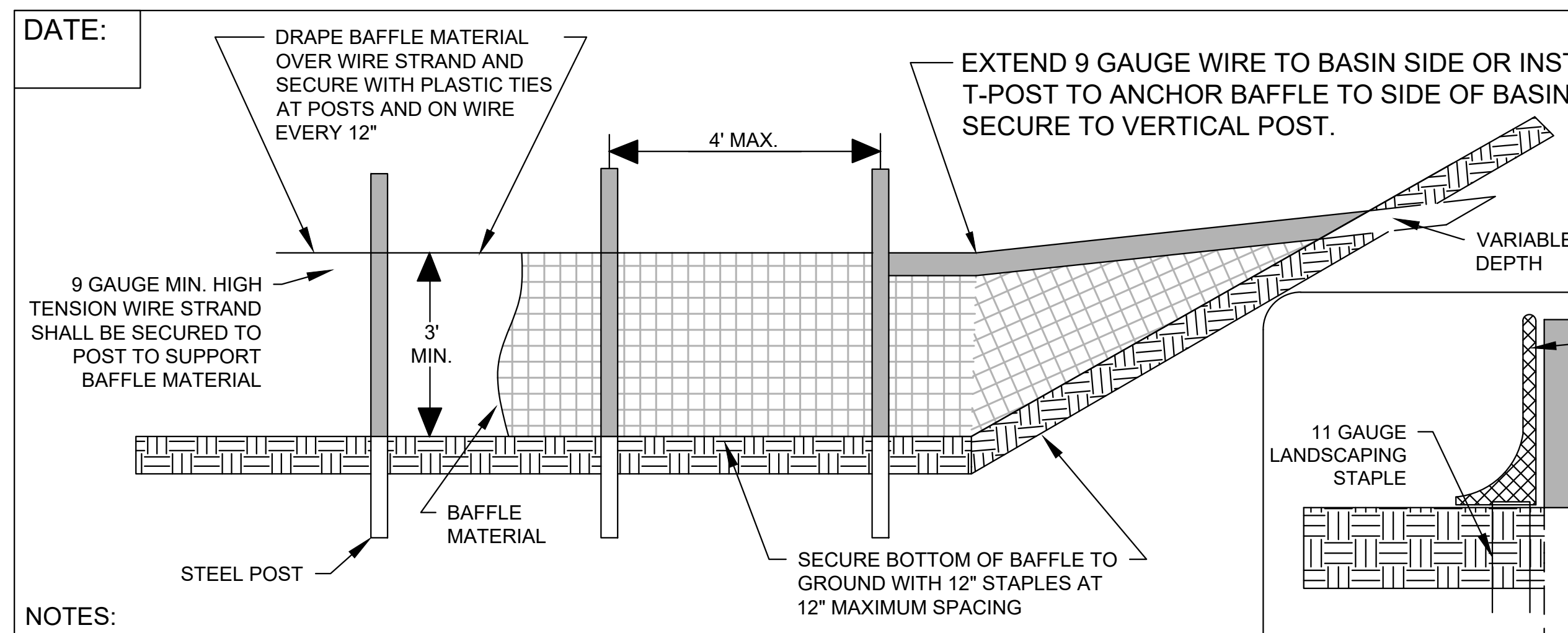
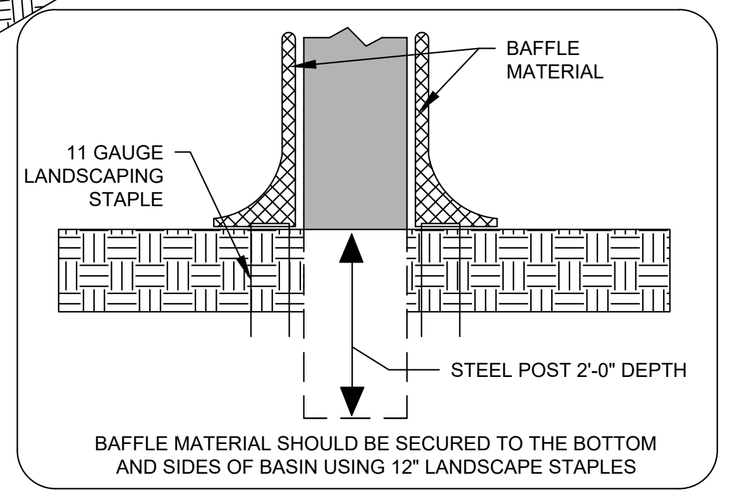

DRAPE BAFFLE MATERIAL OVER WIRE STRAND AND SECURE WITH PLASTIC TIES AT POSTS AND ON WIRE EVERY 12"
EXTEND 9 GAUGE WIRE TO BASIN SIDE OR INSTALL T-POST TO ANCHOR BAFFLE TO SIDE OF BASIN AND SECURE TO VERTICAL POST.
4' MAX.
VARIABLE DEPTH
9 GAUGE MIN. HIGH TENSION WIRE STRAND SHALL BE SECURED TO POST TO SUPPORT BAFFLE MATERIAL
3' MIN.
BAFFLE MATERIAL
STEEL POST
SECURE BOTTOM OF BAFFLE TO GROUND WITH 12" STAPLES AT 12" MAXIMUM SPACING



BAFFLE MATERIAL SHOULD BE SECURED TO THE BOTTOM AND SIDES OF BASIN USING 12" LANDSCAPE STAPLES

NOTES:

1. Use matting made of 100% coconut fiber(coir) twine woven into high strength matrix.
2. Staples should be made of 0.125 inch diameter, new steel wire formed into a 'U' shape not less than 12 inches in length with a throat of 1 inch in width. The staples anchor the porous baffles into the sides and bottom of the basin.
3. Grade the basin so that the bottom is level front to back and side to side.
4. Install the coir fiber baffles immediately upon excavation of the basins.
5. Install posts across the width of the sediment trap.
6. Steel posts should be driven to a depth of 24 inches and spaced in a maximum of 4 feet apart. The top of the fabric should be a minimum of 6 inches higher than the invert of the spillway. Tops of the baffles should be a minimum of 2 inches lower than the top of the earthen embankment.
7. Install 3 coir fiber baffles in basins at drainage outlets with a spacing of 1/4 the basin length. 2 coir fiber baffles can be installed in the basins less than 20 feet in length with a spacing of 1/3 the basin length.
8. Attach a 9-gauge high tension wire strand to the steel posts at a height of 6 inches above the spillway elevation with plastic ties or wire fasteners to prevent sagging. If the temporary sediment basin will be converted to a permanent stormwater basin of a greater depth, the baffle height should be based on the pool depth during use as a temporary sediment basin.

MAINTENANCE:

1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater and repair immediately.
2. Maintain access to baffles. If the fabric collapses, tears, decomposes, or becomes ineffective, replace immediately.
3. Remove sediment deposits when it reaches half full. Replace if baffle fabric is damaged during clean-out operations. Sediment depth should never exceed half the designed storage depth.

NORTH CAROLINA
Department of Environmental Quality

POROUS BAFFLES

Effective Date: 9/1/2023
In accordance with the 2013
Design Manual Updates

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
SEAL 030895
TOBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: 10
SHEET TITLE: ESC DETAILS-3

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GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes

Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10 feet or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers. • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

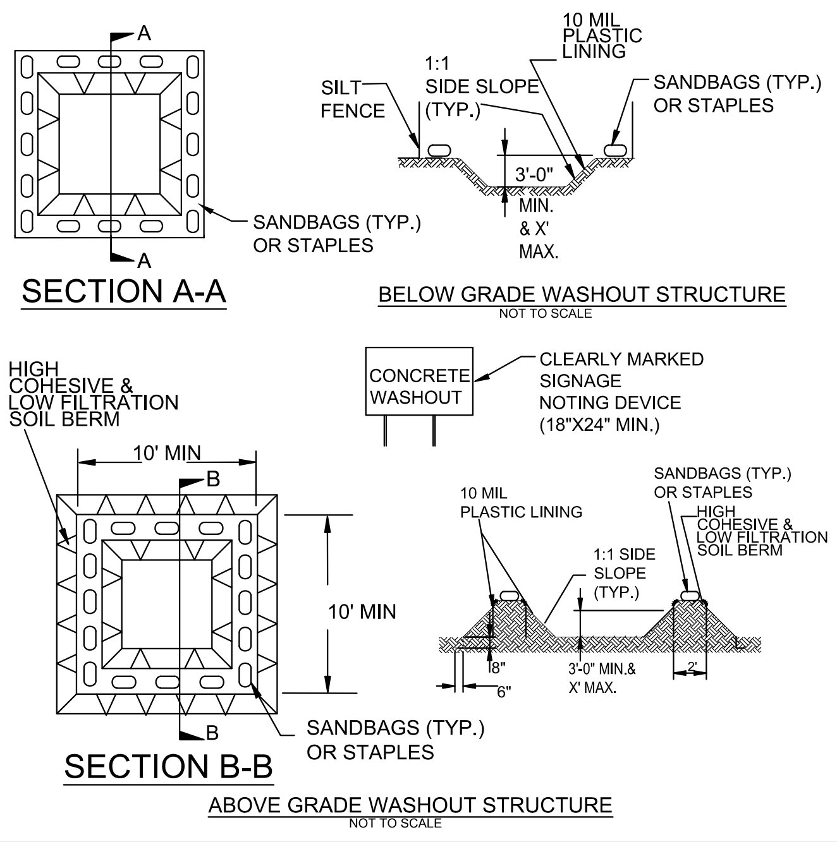
EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER


A
A
SILT FENCE
1:1 SIDE SLOPE (TYP.)
10 MIL PLASTIC LINING
SANDBAGS (TYP.) OR STAPLES
3'-0" MIN. & X' MAX.
SANDBAGS (TYP.) OR STAPLES
SECTION A-A
BELOW GRADE WASHOUT STRUCTURE
NOT TO SCALE
CONCRETE WASHOUT
CLEARLY MARKED SIGNAGE NOTING DEVICE (18"X24" MIN.)
HIGH COHESIVE & LOW FILTRATION SOIL BERM
10' MIN
B
10' MIN
B
10 MIL PLASTIC LINING
SANDBAGS (TYP.) OR STAPLES
HIGH COHESIVE & LOW FILTRATION SOIL BERM
1:1 SIDE SLOPE (TYP.)
8"
6"
3'-0" MIN.& X' MAX.
2'
SANDBAGS (TYP.) OR STAPLES
SECTION B-B
ABOVE GRADE WASHOUT STRUCTURE
NOT TO SCALE

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY.
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

EFFECTIVE DATE: 11/12/2020

NCG-01 GROUND COVER & MATERIALS HANDLING

PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

(a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,
(b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit,
(c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems
(d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item (c) above,
(e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
(f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend on holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "Zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours.	1. Identification of the measures inspected 2. Date and Time of the inspection 3. Name of the person performing the inspection 4. Indication of whether the measures were operating properly 5. Description of maintenance needs for the measure 6. Description, Evidence, and date of corrective actions taken
(3) Stormwater discharge outfalls(SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours.	1. Identification of the discharge outfalls inspected 2. Date and Time of the inspection 3. Name of the person performing the inspection 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration 5. Indication of visible sediment leaving the site 6. Description, Evidence, and date corrective actions taken
(4) Perimeter of Site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours.	If visible Sedimentation is found outside site limits, then record of the following shall be made: 1) Actions taken to clean up or stabilize sediment that has left the site limits 2) Description, Evidence and date of corrective actions taken 3) An explanation as to the actions taken to control future releases
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours.	If the stream or wetland has increased visible sedimentation or has visible increased turbidity from the construction activity, then a record of the following shall be made: 1) Description, Evidence and date of corrective actions taken 2)Records of required reports to the appropriate Division Regional Office per Part III, Section C, Item(2)(a) of this permit
(6) Ground Stabilization Measures	After each phase of grading.	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Document Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This General Permit as well as the Certificate of Coverage, after it is received.

(b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.
(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.
(d) Anticipated bypasses and unanticipated bypasses.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframe (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• Within 24 hours, an oral or electronic notification. • Within 7 Calendar Days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related caused, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per item 1(b)-(c) above	• Within 24 Hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• *A report at least ten days before the date of the bypass, if possible.* The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• Within 24 Hours, an oral or electronic notification • Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40 CFR 122.41(l)(7)]	• Within 24 Hours, an oral or electronic notification • Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

EFFECTIVE DATE: 11/12/2020

NCG01- SELF INSPECTION

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: 11
SHEET TITLE: NCG01-1

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

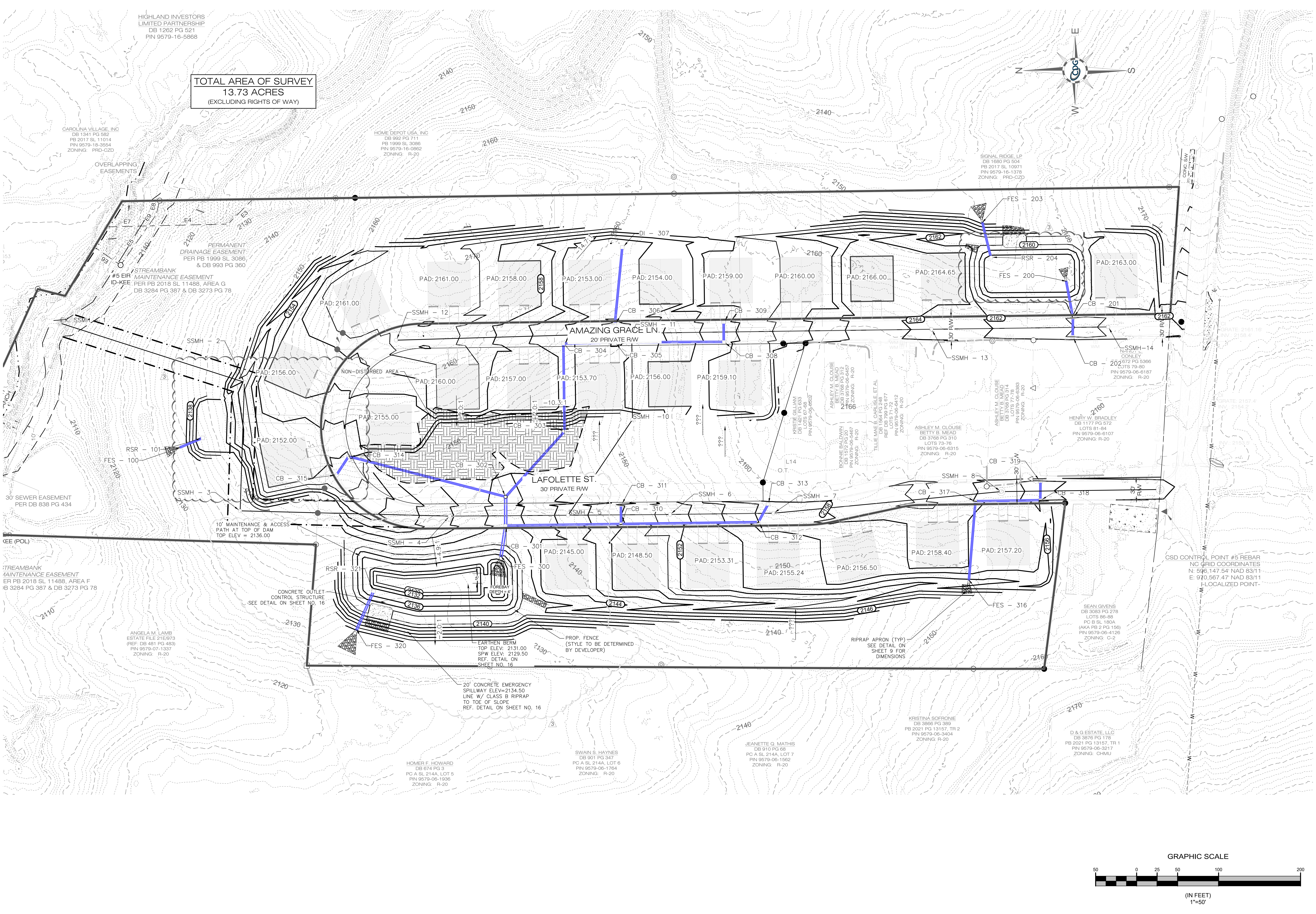
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

ENGINEER'S SEAL:
TOBIN M. HARRIS
SEAL 030895
05/15/2025

REVISIONS

REV.	DATE	COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS

FIRST VICTORY
542 S .CALDWELL ST.
BREVARD
828.884.7934


TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)
HIGHLAND INVESTORS LIMITED PARTNERSHIP DB 1262 PG 521 PIN 9579-16-5868
CAROLINA VILLAGE, INC DB 1341 PG 582 PB 2017 SL 11014 PIN 9579-18-3554 ZONING: PRD-CZD
HOME DEPOT USA, INC DB 992 PG 711 PB 1999 SL 3086 PIN 9579-16-0862 ZONING: R-20
SIGNAL RIDGE, LP DB 1680 PG 504 PB 2017 SL 10971 PIN 9579-16-1378 ZONING: PRD-CZD
OVERLAPPING EASEMENTS
PERMANENT DRAINAGE EASEMENT PER PB 1999 SL 3086, & DB 993 PG 360
STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA G DB 3284 PG 387 & DB 3273 PG 78
#5 EIR ID-KEE
30' SEWER EASEMENT PER DB 838 PG 434
STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA F DB 3284 PG 387 & DB 3273 PG 78
AMAZING GRACE LN.
20' PRIVATE R/W
LAFOLETTE ST.
30' PRIVATE R/W
NON-DISTURBED AREA
PAD: 2161.00
PAD: 2158.00
PAD: 2153.00
PAD: 2154.00
PAD: 2159.00
PAD: 2160.00
PAD: 2166.00
PAD: 2164.65
PAD: 2163.00
PAD: 2156.00
PAD: 2160.00
PAD: 2157.00
PAD: 2153.70
PAD: 2156.00
PAD: 2159.10
PAD: 2155.00
PAD: 2152.00
PAD: 2145.00
PAD: 2148.50
PAD: 2153.31
PAD: 2155.24
PAD: 2156.50
PAD: 2158.40
PAD: 2157.20
DI - 307
FES - 203
RSR - 204
FES - 200
CB - 201
CB - 202
SSMH - 14
SSMH - 13
SSMH - 12
SSMH - 11
SSMH - 10
SSMH - 1
SSMH - 2
SSMH - 3
SSMH - 4
SSMH - 5
SSMH - 6
SSMH - 7
SSMH - 8
CB - 306
CB - 309
CB - 304
CB - 305
CB - 308
CB - 303
CB - 314
CB - 302
CB - 315
CB - 311
CB - 313
CB - 310
CB - 312
CB - 317
CB - 318
CB - 319
CB - 301
FES - 300
FES - 316
FES - 320
RSR - 321
RSR - 101
FES - 100
FOREBAY DEPTH = 4'
10' MAINTENANCE & ACCESS PATH AT TOP OF DAM TOP ELEV = 2136.00
CONCRETE OUTLET CONTROL STRUCTURE SEE DETAIL ON SHEET NO. 16
EARTHEN BERM TOP ELEV: 2131.00 SPW ELEV: 2129.50 REF. DETAIL ON SHEET NO. 16
PROP. FENCE (STYLE TO BE DETERMINED BY DEVELOPER)
20' CONCRETE EMERGENCY SPILLWAY ELEV=2134.50 LINE W/ CLASS B RIPRAP TO TOE OF SLOPE REF. DETAIL ON SHEET NO. 16
RIPRAP APRON (TYP) SEE DETAIL ON SHEET 9 FOR DIMENSIONS
CSD CONTROL POINT #5 REBAR NC GRID COORDINATES N: 596,147.54' NAD 83/11 E: 970,567.47' NAD 83/11 -LOCALIZED POINT-
ANGELA M. LAMB ESTATE FILE 21E/973 (REF: DB 481 PG 483) PIN 9579-07-1337 ZONING: R-20
HOMER F. HOWARD DB 674 PG 3 PC A SL 214A, LOT 5 PIN 9579-06-1936 ZONING: R-20
SWAIN S. HAYNES DB 901 PG 347 PC A SL 214A, LOT 6 PIN 9579-06-1764 ZONING: R-20
JEANETTE Q. MATHIS DB 910 PG 68 PC A SL 214A, LOT 7 PIN 9579-06-1562 ZONING: R-20
KRISTINA SOFRONIE DB 3866 PG 389 PB 2021 PG 13157, TR 2 PIN 9579-06-3404 ZONING: R-20
D & G ESTATE, LLC DB 3876 PG 178 PB 2021 PG 13157, TR 1 PIN 9579-06-3217 ZONING: CHMU
SEAN GIVENS DB 3083 PG 278 LOTS 86-88 PC B SL 180A (AKA PB 2 PG 156) PIN 9579-06-4126 ZONING: C-2
HENRY W. BRADLEY DB 1177 PG 572 LOTS 81-84 PIN 9579-06-6107 ZONING: R-20
ASHLEY M. CLOUSE BETTY B. MEAD DB 3768 PG 310 LOTS 73-76 PIN 9579-06-6315 ZONING: R-20
2150
2140
2160
2170
2130
2120
2110
2162
2164
2144
2146
2136
2132
2138
2152
2158
GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS
3	02/18/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:

TOBIN M. HARRIS
SEAL 030895
Toby M Harris
02/18/2025

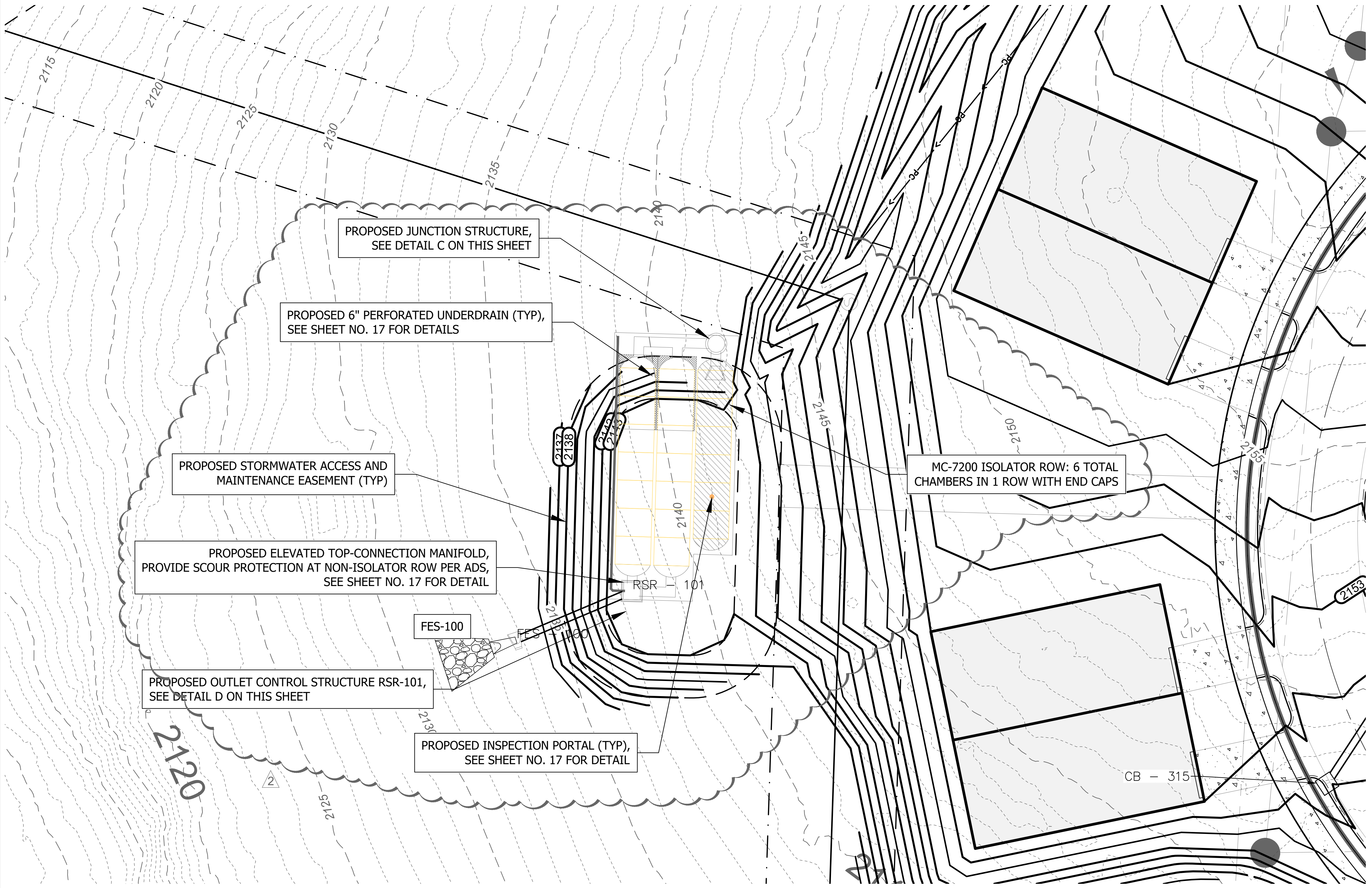
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

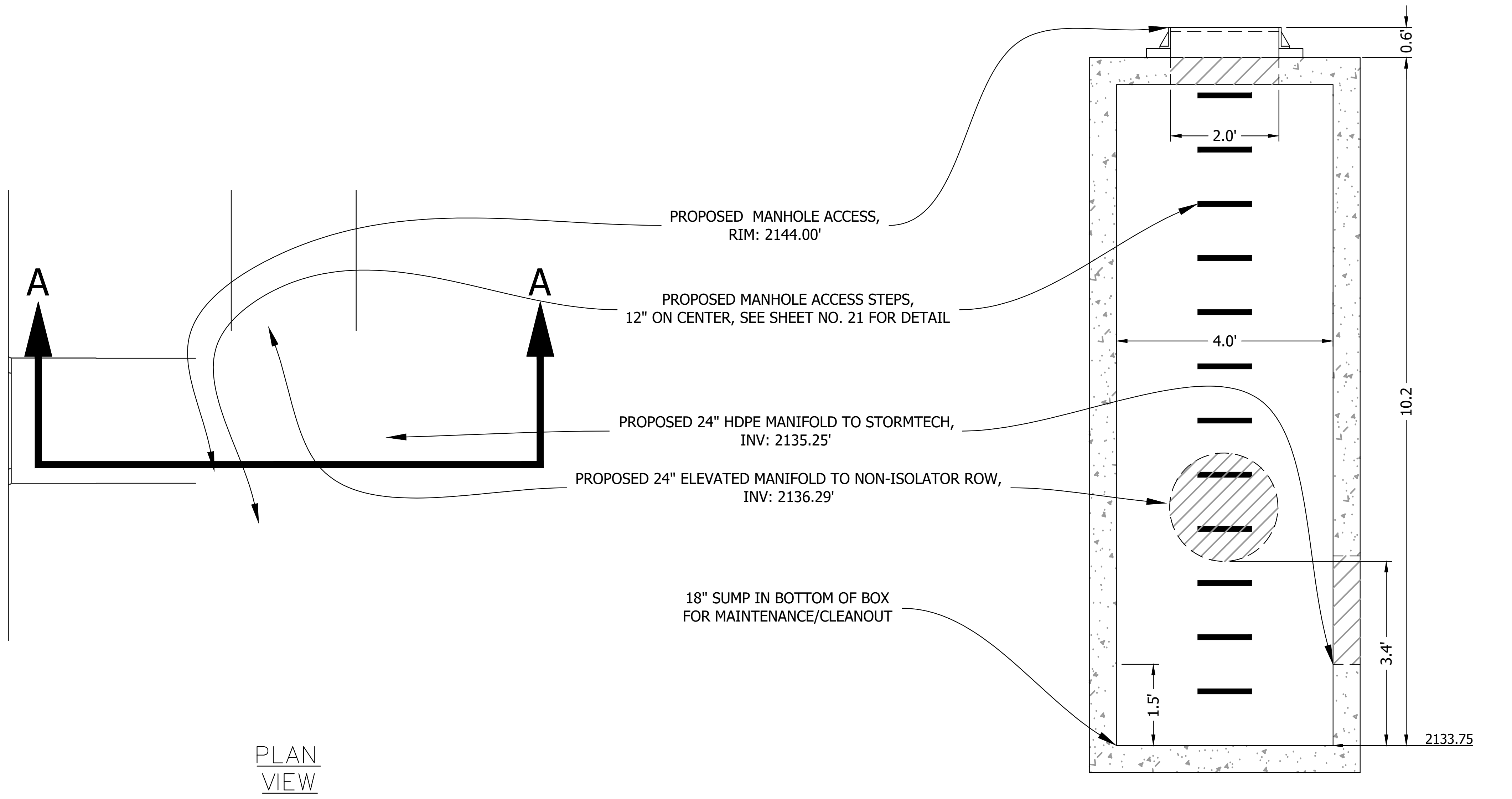
SHEET TITLE:
GRADING & STORMWATER PLAN

DRAWING NO:
13


PROPOSED JUNCTION STRUCTURE, SEE DETAIL C ON THIS SHEET
PROPOSED 6" PERFORATED UNDERDRAIN (TYP), SEE SHEET NO. 17 FOR DETAILS
PROPOSED STORMWATER ACCESS AND MAINTENANCE EASEMENT (TYP)
PROPOSED ELEVATED TOP-CONNECTION MANIFOLD, PROVIDE SCOUR PROTECTION AT NON-ISOLATOR ROW PER ADS, SEE SHEET NO. 17 FOR DETAIL
FES-100
PROPOSED OUTLET CONTROL STRUCTURE RSR-101, SEE DETAIL D ON THIS SHEET
PROPOSED INSPECTION PORTAL (TYP), SEE SHEET NO. 17 FOR DETAIL
MC-7200 ISOLATOR ROW: 6 TOTAL CHAMBERS IN 1 ROW WITH END CAPS
RSR - 101
CB - 315
2115
2120
2125
2130
2135
2140
2145
2150
2160
2120

A STORMWATER SCM SYSTEM B4 - PLAN VIEW

SCALE= 1"=20'


A
A
PLAN VIEW
PROPOSED MANHOLE ACCESS, RIM: 2144.00'
PROPOSED MANHOLE ACCESS STEPS, 12" ON CENTER, SEE SHEET NO. 21 FOR DETAIL
PROPOSED 24" HDPE MANIFOLD TO STORMTECH, INV: 2135.25'
PROPOSED 24" ELEVATED MANIFOLD TO NON-ISOLATOR ROW, INV: 2136.29'
18" SUMP IN BOTTOM OF BOX FOR MAINTENANCE/CLEANOUT
0.6'
2.0'
4.0'
10.2
3.4'
1.5'
2133.75

SECTION A—A

C ST-81: JUNCTION MANHOLE TO ISOLATOR ROW

SCALE= 1" : 2'

STORMWATER WETLAND PLANT RECOMMENDATIONS (FROM NC DEQ MANUAL)

BOTANICAL NAME	COMMON NAME
ASCLEPIAS INCARNATA	SWAMP MILKWEED
CAREX TENERA	QUILL SEDGE
CHELONE GLABRA	WHITE TURTLEHEAD
EUPATORIADELPHUS DUBIUS	DWARF JOE PYE WEED
EUPATORIADELPHUS FISTULOSUS	JOE PYE WEED
EUPATORIADELPHUS MACULATUS	SPOTTED TRUMPETWEED
HIBISCUS COCCINEUS	SCARLET ROSE MALLOW
HIBISCUS LAEVIS	HALBERDLEAF ROSE MALLOW
KOSTELETZKYA VIRGINICA	SEASHORE MALLOW
LOBELIA CARDINALIS	CARDINAL FLOWER
LOBELIA ELONGATA	LONGLEAF LOBELIA
LOBELIA SIPHILITICA	GREAT BLUE LOBELIA
RHYNCHOSPORA COLORATA	STARRUSH WHITETOP
SACCHARUM BALDWINII	NARROW PLUMEGRASS

SCM-1	
WATER QUALITY VOL. (CF)	362
SCM TYPE)	STORMTECH MC-7200
TOTAL STORAGE (CF)	2135.00
BOTTOM OF STORAGE (')	2135.25
BOTTOM OF STORMTECH (')	2136.00
TOP OF STORMTECH (')	2141.00
TOP OF STORAGE (')	2142.00
MIN. FINISHED GRADE	2143.00
MAX FINISHED GRADE	2148.00
WQ ORIFICE SIZE (")	0.5
ELEVATED MANHOLE ELEV. (')	2144.00
FIRST OVERFLOW INV. (')	2135.00
SECOND OVERFLOW INV. (')	2135.00
THIRD OVERFLOW INV. (')	2135.00
WQV STAGE (UNROUTED)(')	2135.00
WQV STAGE (ROUTED)(')	2135.00
2-YR STAGE (')	2137.26
10-YR STAGE (')	2138.28
25-YR STAGE (')	2139.16
50-YR STAGE (')	2139.98

100.0” Wide + 9.0” Spacing = 109.0” C—C Row Spacing

7 Chambers/Row x 6.59’ Long +2.73’ Cap Length x 2 = 51.61’ Row Length +12.0” End Stone x 2 = 53.61’ Base Length

3 Rows x 100.0” Wide + 9.0” Spacing x 2 + 12.0” Side Stone x 2 = 28.50’ Base Width

12.0” Stone Base + 60.0” Chamber Height + 12.0” Stone Cover = 7.00’ Field Height

21 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 3 Rows = 3,930.4 cf Chamber Storage

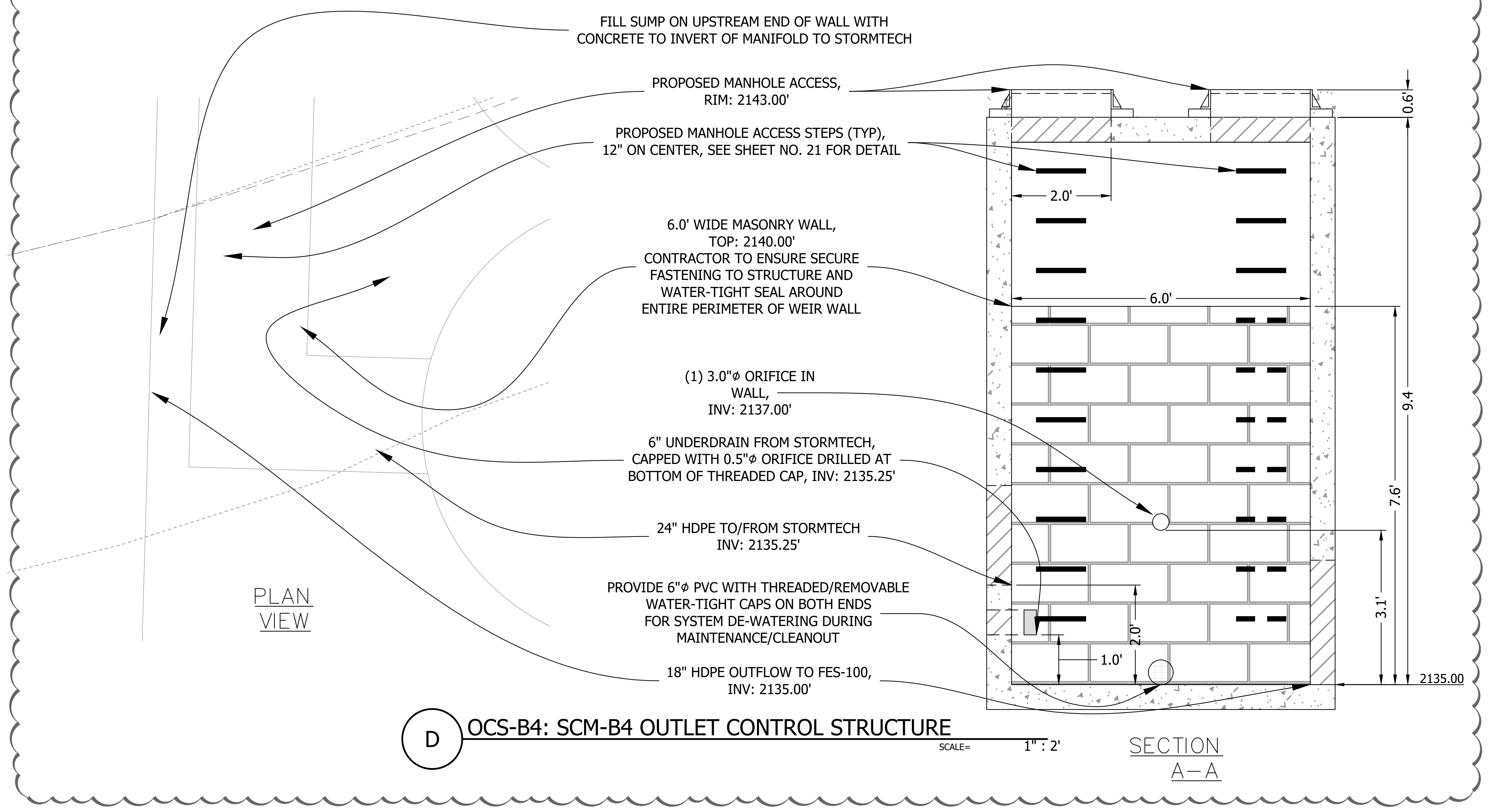
10,694.9 cf Field — 3,930.4 cf Chambers = 6,764.5 cf Stone x 40.0% Voids = 2,705.8 cf Stone Storage

Chamber Storage + Stone Storage = 6,636.2 cf = 0.152 af
Overall Storage Efficiency = 62.1%
Overall System Size = 53.61’ x 28.50’ x 7.00’

21 Chambers
396.1 cy Field
250.5 cy Stone

B SCM-B2: STORMTECH MC-7200 SYSTEM SUMMARY

SCALE= NTS


PLAN VIEW
FILL SUMP ON UPSTREAM END OF WALL WITH CONCRETE TO INVERT OF MANIFOLD TO STORMTECH
PROPOSED MANHOLE ACCESS, RIM: 2143.00'
PROPOSED MANHOLE ACCESS STEPS (TYP), 12" ON CENTER, SEE SHEET NO. 21 FOR DETAIL
6.0' WIDE MASONRY WALL, TOP: 2140.00' CONTRACTOR TO ENSURE SECURE FASTENING TO STRUCTURE AND WATER-TIGHT SEAL AROUND ENTIRE PERIMETER OF WEIR WALL
(1) 3.0"φ ORIFICE IN WALL, INV: 2137.00'
6" UNDERDRAIN FROM STORMTECH, CAPPED WITH 0.5"φ ORIFICE DRILLED AT BOTTOM OF THREADED CAP, INV: 2135.25'
24" HDPE TO/FROM STORMTECH INV: 2135.25'
PROVIDE 6"φ PVC WITH THREADED/REMOVABLE WATER-TIGHT CAPS ON BOTH ENDS FOR SYSTEM DE-WATERING DURING MAINTENANCE/CLEANOUT
18" HDPE OUTFLOW TO FES-100, INV: 2135.00'
0.6'
2.0'
6.0'
9.4
7.6'
3.1'
2.0'
1.0'
2135.00

SECTION A—A

D OCS-B4: SCM-B4 OUTLET CONTROL STRUCTURE

SCALE= 1" : 2'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
SEAL 030895
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	1" = 50'

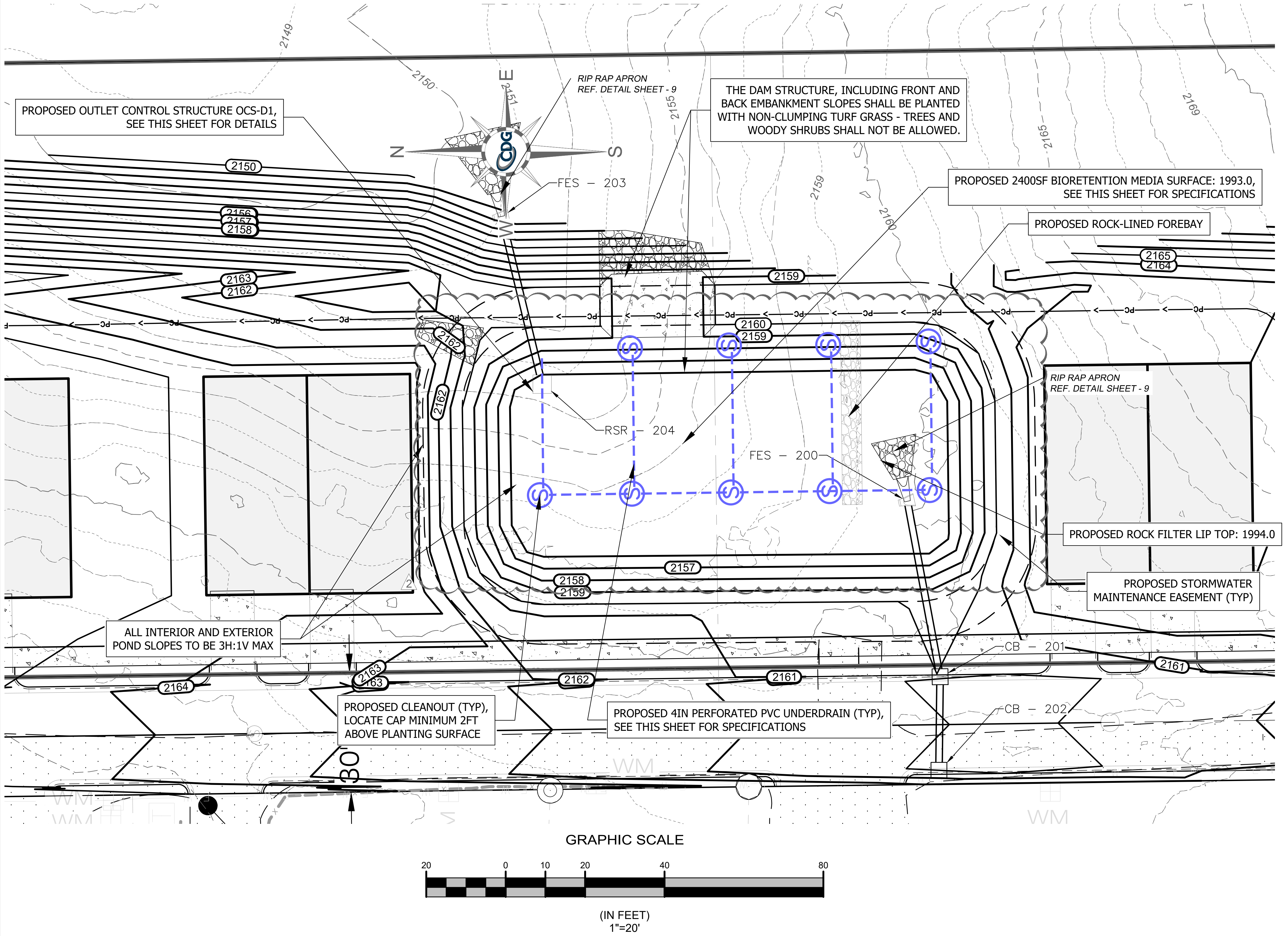
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SCM DETAIL 1

DRAWING NO: 14

Y:\Shared\2_ENG\656605823_DESIGN\DWG\SHEETS\SCM DETAILS.dwg, 5/15/2025 4:37 PM, Toby Harris


PROPOSED OUTLET CONTROL STRUCTURE OCS-D1,
SEE THIS SHEET FOR DETAILS
RIP RAP APRON
REF. DETAIL SHEET - 9
THE DAM STRUCTURE, INCLUDING FRONT AND BACK EMBANKMENT SLOPES SHALL BE PLANTED WITH NON-CLUMPING TURF GRASS - TREES AND WOODY SHRUBS SHALL NOT BE ALLOWED.
PROPOSED 2400SF BIORETENTION MEDIA SURFACE: 1993.0,
SEE THIS SHEET FOR SPECIFICATIONS
PROPOSED ROCK-LINED FOREBAY
FES - 203
FES - 200
RSR - 204
RIP RAP APRON
REF. DETAIL SHEET - 9
PROPOSED ROCK FILTER LIP TOP: 1994.0
PROPOSED STORMWATER MAINTENANCE EASEMENT (TYP)
ALL INTERIOR AND EXTERIOR POND SLOPES TO BE 3H:1V MAX
PROPOSED CLEANOUT (TYP), LOCATE CAP MINIMUM 2FT ABOVE PLANTING SURFACE
PROPOSED 4IN PERFORATED PVC UNDERDRAIN (TYP), SEE THIS SHEET FOR SPECIFICATIONS
CB - 201
CB - 202
N
S
E
W
2149
2150
2151
2155
2156
2157
2158
2159
2160
2161
2162
2163
2164
2165
2169
WM
GRAPHIC SCALE
20
0
10
20
40
80
(IN FEET)
1"=20'

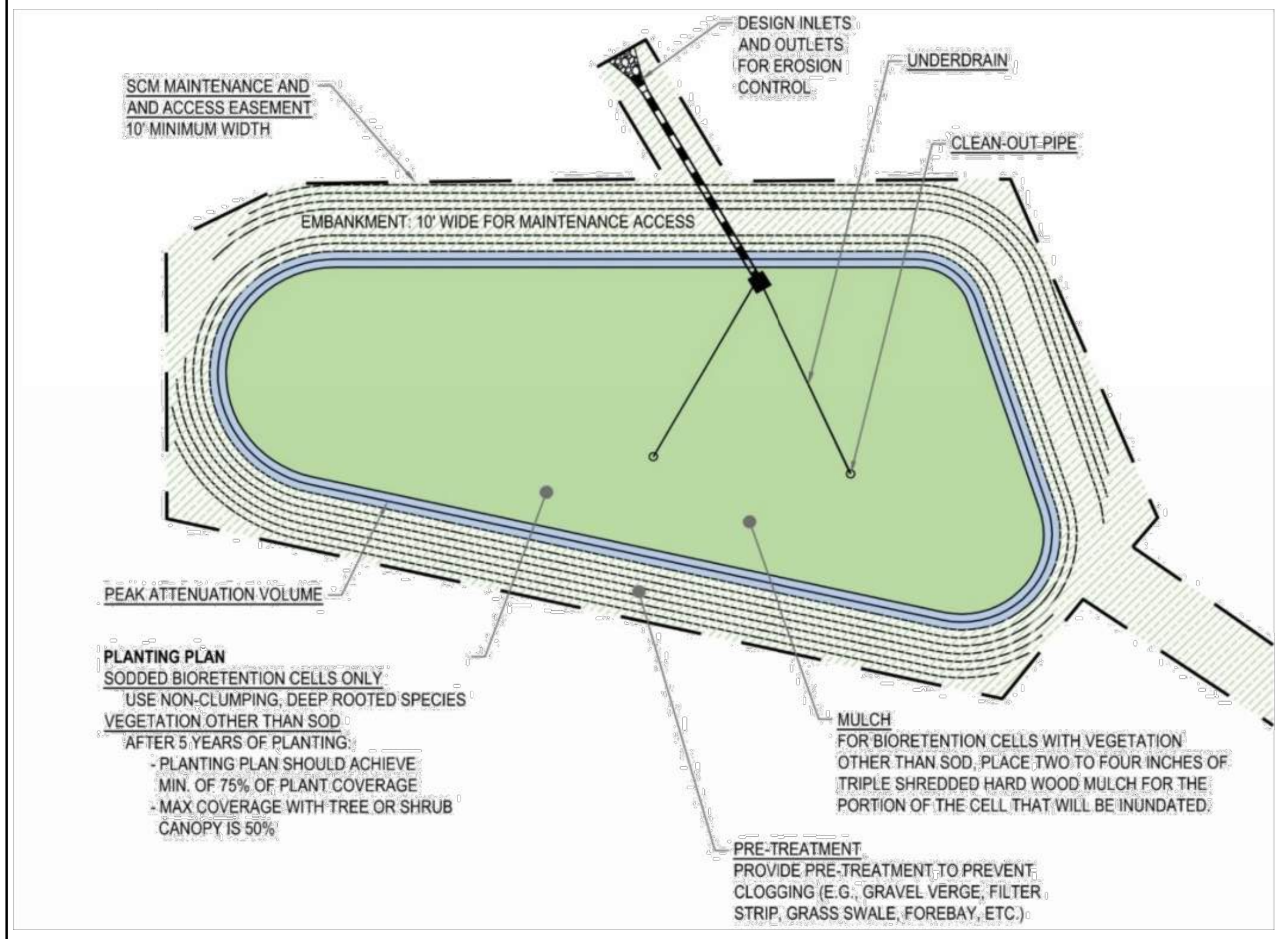


Figure 1: Bioretention Example: Plan View

PLANTING PLAN
SODDED BIORETENTION CELLS ONLY
USE NON-CLUMPING, DEEP ROOTED SPECIES
VEGETATION OTHER THAN SOD
AFTER 5 YEARS OF PLANTING:
- PLANTING PLAN SHOULD ACHIEVE MIN. OF 75% OF PLANT COVERAGE
- MAX COVERAGE WITH TREE OR SHRUB CANOPY IS 50%

MULCH
FOR BIORETENTION CELLS WITH VEGETATION OTHER THAN SOD, PLACE TWO TO FOUR INCHES OF TRIPLE SHREDDED HARD WOOD MULCH FOR THE PORTION OF THE CELL THAT WILL BE INUNDATED.

PRE-TREATMENT
PROVIDE PRE-TREATMENT TO PREVENT CLOGGING (E.G., GRAVEL VERGE, FILTER STRIP, GRASS SWALE, FOREBAY, ETC.)

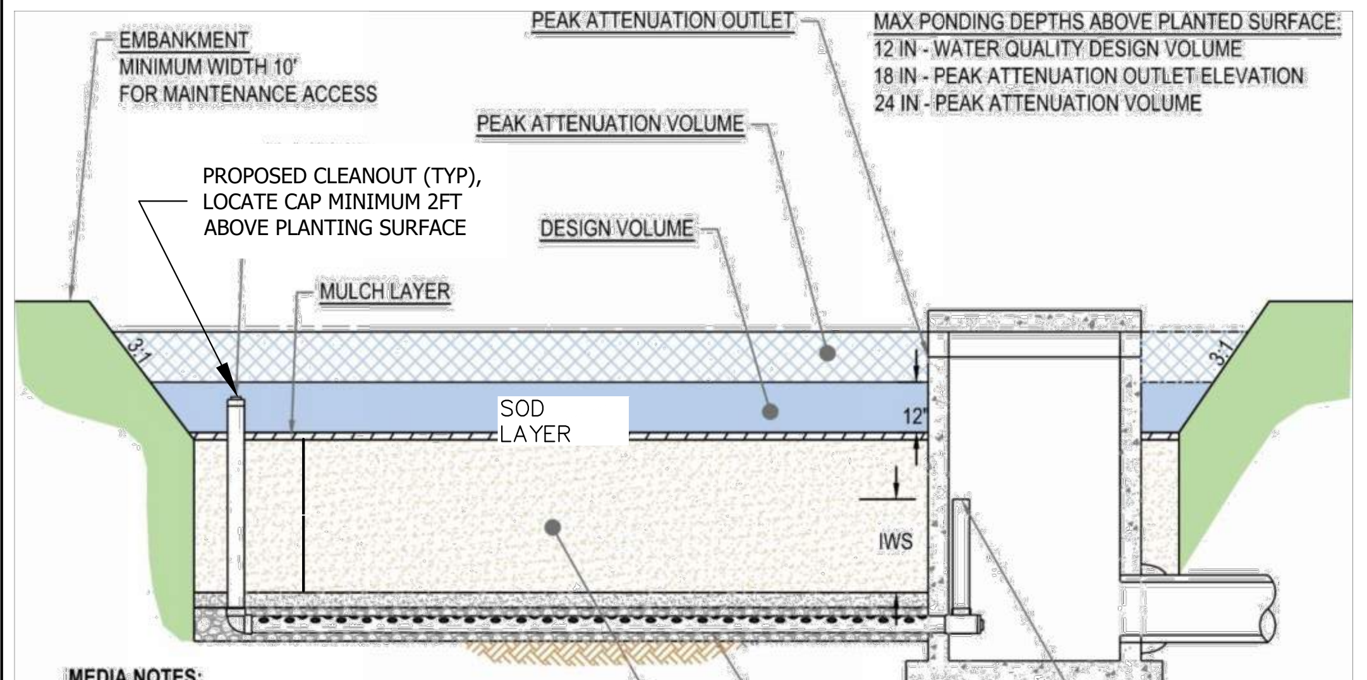


Figure 2: Bioretention Example: Cross-Section

MAX PONDING DEPTHS ABOVE PLANTED SURFACE:
12 IN - WATER QUALITY DESIGN VOLUME
18 IN - PEAK ATTENUATION OUTLET ELEVATION
24 IN - PEAK ATTENUATION VOLUME

MEDIA NOTES:

MEDIA MIX
THE MEDIA SHOULD BE COMPOSED OF A HOMOGENOUS MIX OF THE FOLLOWING:
a. 75 - 85% MEDIUM TO COARSE WASHED SAND
b. 8 - 10% FINES (SILT AND CLAY); AND
c. 5 - 10% ORGANIC MATTER (SUCH AS PINE BARK FINES)

MINIMUM MEDIA DEPTH
ALL CELLS WITH TREES AND SHRUBS: 36 INCHES
CELLS WITHOUT TREES AND SHRUBS:
WITH NO IWS: 24 INCHES
WITH IWS: 30 INCHES

MEDIA P-INDEX
LESS THAN 30 IN NSW WATERS
LESS THAN 50 ELSEWHERE

MEDIA MAINTENANCE
MAINTAIN MEDIA SUCH THAT INFILTRATION RATE IS AT LEAST 1 IN/R

NO MECHANICAL COMPACTION
DO NOT MECHANICALLY COMPACT THE MEDIA. WATER OR WALK ON IT AS IT IS PLACED.

SHWT MUST BE > 2 FT BELOW THE LOWEST POINT OF THE BIORETENTION CELL

B BIORETENTION DETAILS

SCALE= NTS

MEDIUM TO COARSE WASHED SAND SHALL BE ASTM C33, AASHTO M 6/M 80, ASTM C330, AASHTO M195, OR EQUIVALENT

THE ENTIRE SURFACE OF THE CELL WILL BE VEGETATED. SOD SHOULD BE INSTALLED WHEN GRASS IS USED FOR BIORETENTION CELLS AS SEEDING IS TYPICALLY NOT A VIABLE OPTION.

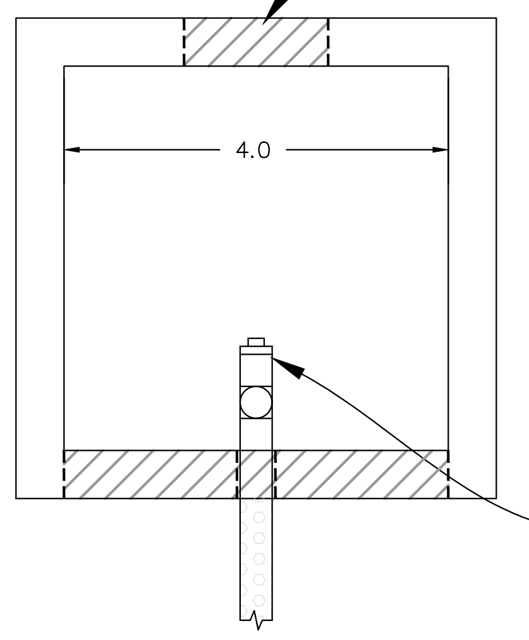
2

STORMWATER WETLAND PLANT RECOMMENDATIONS
(FROM NC DEQ MANUAL)

BOTANICAL NAME	*COMMON NAME*
ASCLEPIAS INCARNATA	*SWAMP MILKWEED*
CAREX TENERA	*QUILL SEDGE*
CHELONE GLABRA	*WHITE TURTLEHEAD*
EUPATORIADELPHUS DUBIUS	*DWARF JOE PYE WEED*
EUPATORIADELPHUS FISTULOSUS	*JOE PYE WEED*
EUPATORIADELPHUS MACULATUS	*SPOTTED TRUMPETWEED*
HIBISCUS COCCINEUS	*SCARLET ROSE MALLOW*
HIBISCUS LAEVIS	*HALBERDLEAF ROSE MALLOW*
KOSTELETZKYA VIRGINICA	*SEASHORE MALLOW*
LOBELIA CARDINALIS	*CARDINAL FLOWER*
LOBELIA ELONGATA	*LONGLEAF LOBELIA*
LOBELIA SIPHILITICA	*GREAT BLUE LOBELIA*
RHYNCHOSPORA COLORATA	*STARRUSH WHITETOP*
SACCHARUM BALDWINII	*NARROW PLUMEGRASS*

UNDERDRAIN NOTES:

1) ALL PIPING IN THE UNDERDRAIN SYSTEM SHOULD HAVE A MINIMUM SLOPE OF 0.5% AND SHOULD BE CONSTRUCTED OF SCHEDULE 40 OR SDR-35 SMOOTH WALL PVC PIPE
2) A MINIMUM OF 4 ROWS OF PERFORATIONS SHOULD BE PROVIDED AROUND THE DIAMETER OF THE PIPE. THE PERFORATIONS SHOULD BE PLACED 6IN ON CENTER WITHIN EACH ROW FOR THE ENTIRE LENGTH OF THE DRAINAGE LATERAL. PERFORATIONS SHOULD BE 3/8IN DIAMETER.
3) UNDERDRAIN PIPES SHOULD HAVE A MINIMUM OF 3IN OF WASHED #57 STONE ABOVE AND ON EACH SIDE OF THE PIPE (NOT REQUIRED BELOW THE PIPE). ABOVE THE STONE, EITHER FILTER FABRIC OR 2IN OF CHOKING STONE SHOULD BE INSTALLED TO PROTECT THE UNDERDRAIN FROM BLOCKAGE (FILTER FABRIC SHOULD BE AVOIDED IF THERE IS ANY QUESTION ABOUT THE FUTURE STABILITY OF THE DRAINAGE AREA). ABOVE THE FILTERING DEVICE, A MINIMUM OF 2IN OF WASHED SAND SHOULD BE INSTALLED. CHOKING STONE (#8 OR #89) IN LIEU OF FILTER FABRIC IS RECOMMENDED IF THERE IS POTENTIAL FOR HIGHER SEDIMENT LOADS THAT WOULD LEAD TO CLOGGING. PIPE SOCKS ARE ALSO NOT RECOMMENDED



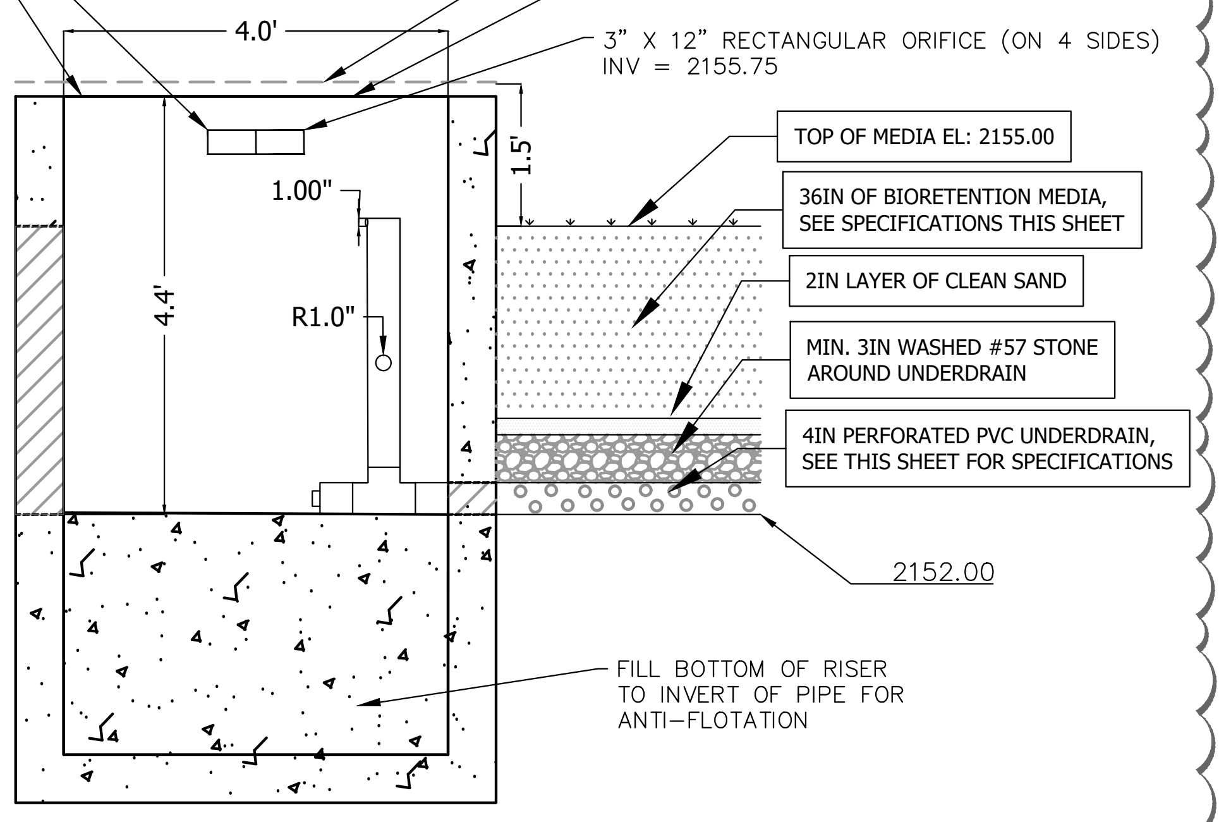
18IN HDPE OUTFLOW TO FES-204, INV: 2152.00

4IN PVC UNDERDRAIN FROM BIORETENTION, INV: 2152.00
TRANSITION TO NON-PERFORATED PVC AT OUTSIDE OF STRUCTURE WITH WATER-TIGHT SEAL, PROVIDE 4X4X4 TEE WITH UPTURNED ELBOW, AND THREADED/REMOVABLE CAP DOWNSTREAM OF TEE. THE 4IN VERTICAL STEM SHALL BE OPEN AT THE TOP, INV: 2155.00 WITH A 2INØ ORIFICE DRILLED INTO THE PIPE, INV: 2153.50

C OUTLET CONTROL STRUCTURE OCS-F2 - PLAN VIEW

SCALE= 1":2'

ALL WEIRS & ORIFICES SHALL HAVE TRASH RACK W/ 4" OPENINGS BTWN BARS, RUST RESISTANT MATERIAL


TOP OF DAM
ELEV = 2158.00 WIDTH = 20'
EMERGENCY SPILLWAY ELEV = 2156.50
TOP OF RISER ELEV = 2156.35
3" X 12" RECTANGULAR ORIFICE (ON 4 SIDES)
INV = 2155.75
4.0'
1.5'
4.4'
1.00"
R1.0"
TOP OF MEDIA EL: 2155.00
36IN OF BIORETENTION MEDIA, SEE SPECIFICATIONS THIS SHEET
2IN LAYER OF CLEAN SAND
MIN. 3IN WASHED #57 STONE AROUND UNDERDRAIN
4IN PERFORATED PVC UNDERDRAIN, SEE THIS SHEET FOR SPECIFICATIONS
2152.00
FILL BOTTOM OF RISER TO INVERT OF PIPE FOR ANTI-FLOTATION

D OUTLET CONTROL STRUCTURE OCS-F2 - PROFILE VIEW

SCALE= 1":2'

2

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
SEAL 030895
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	1" = 50'

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
SCM DETAIL 2

DRAWING NO:
15

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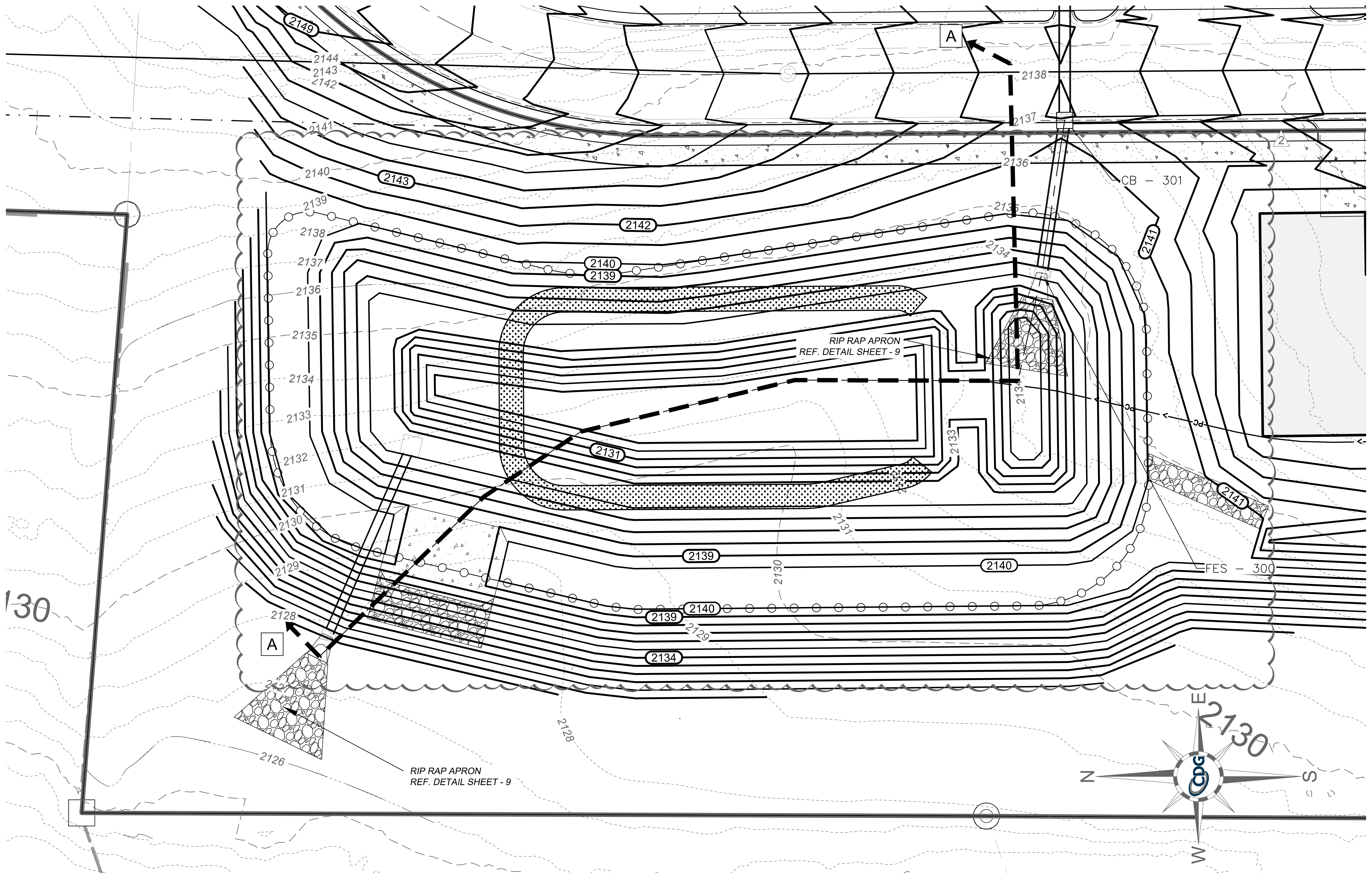
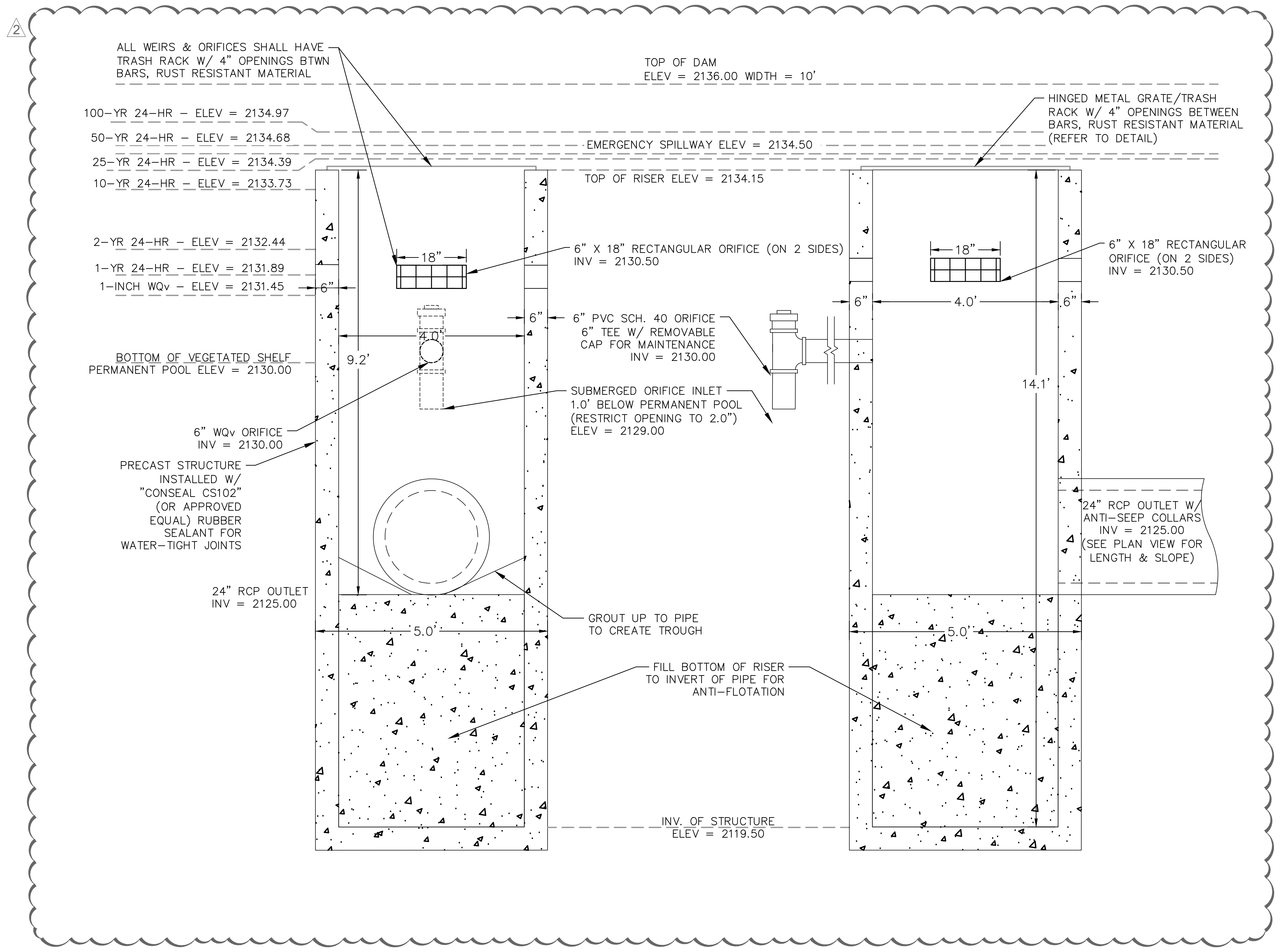


WET POND 3 PLAN VIEW

SCALE : 1" = 20'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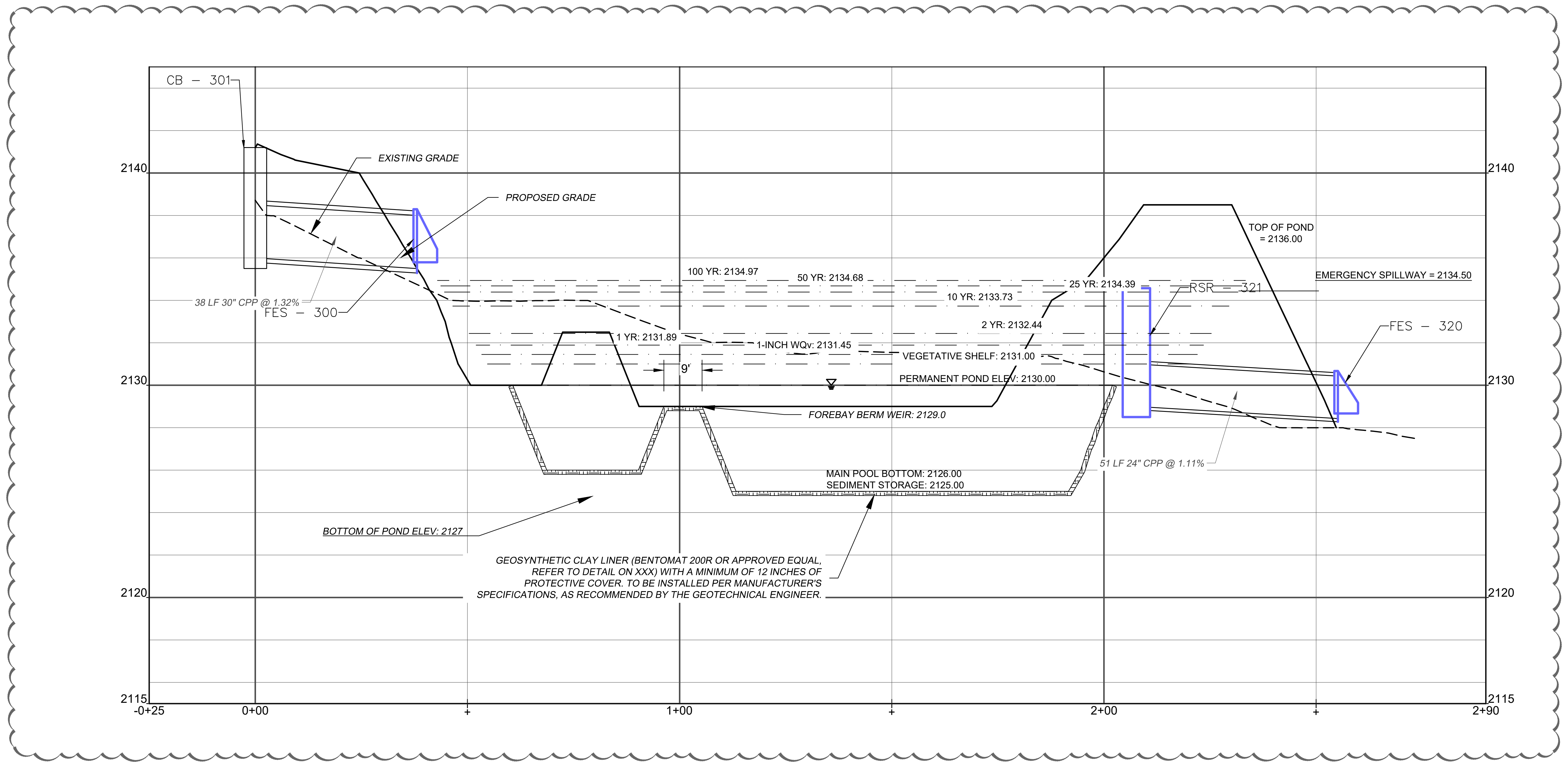
ALL WEIRS & ORIFICES SHALL HAVE TRASH RACK W/ 4" OPENINGS BTWN BARS, RUST RESISTANT MATERIAL
TOP OF DAM ELEV = 2136.00 WIDTH = 10'
100–YR 24–HR – ELEV = 2134.97
50–YR 24–HR – ELEV = 2134.68
25–YR 24–HR – ELEV = 2134.39
10–YR 24–HR – ELEV = 2133.73
EMERGENCY SPILLWAY ELEV = 2134.50
TOP OF RISER ELEV = 2134.15
HINGED METAL GRATE/TRASH RACK W/ 4" OPENINGS BETWEEN BARS, RUST RESISTANT MATERIAL (REFER TO DETAIL)
2–YR 24–HR – ELEV = 2132.44
1–YR 24–HR – ELEV = 2131.89
1–INCH WQv – ELEV = 2131.45
18"
6" X 18" RECTANGULAR ORIFICE (ON 2 SIDES) INV = 2130.50
6"
4.0'
6" PVC SCH. 40 ORIFICE 6" TEE W/ REMOVABLE CAP FOR MAINTENANCE INV = 2130.00
BOTTOM OF VEGETATED SHELF PERMANENT POOL ELEV = 2130.00
9.2'
14.1'
SUBMERGED ORIFICE INLET 1.0' BELOW PERMANENT POOL (RESTRICT OPENING TO 2.0") ELEV = 2129.00
6" WQv ORIFICE INV = 2130.00
PRECAST STRUCTURE INSTALLED W/ "CONSEAL CS102" (OR APPROVED EQUAL) RUBBER SEALANT FOR WATER–TIGHT JOINTS
24" RCP OUTLET W/ ANTI–SEEP COLLARS INV = 2125.00 (SEE PLAN VIEW FOR LENGTH & SLOPE)
24" RCP OUTLET INV = 2125.00
GROUT UP TO PIPE TO CREATE TROUGH
5.0'
FILL BOTTOM OF RISER TO INVERT OF PIPE FOR ANTI–FLOTATION
INV. OF STRUCTURE ELEV = 2119.50

WET POND 3 OUTLET STRUCTURE DETAIL

1" = 2'


2
CB – 301
EXISTING GRADE
PROPOSED GRADE
38 LF 30" CPP @ 1.32%
FES – 300
100 YR: 2134.97
50 YR: 2134.68
25 YR: 2134.39
10 YR: 2133.73
2 YR: 2132.44
1 YR: 2131.89
1-INCH WQv: 2131.45
VEGETATIVE SHELF: 2131.00
PERMANENT POND ELEV: 2130.00
9'
FOREBAY BERM WEIR: 2129.0
TOP OF POND = 2136.00
EMERGENCY SPILLWAY = 2134.50
RSR – 321
FES – 320
51 LF 24" CPP @ 1.11%
MAIN POOL BOTTOM: 2126.00
SEDIMENT STORAGE: 2125.00
BOTTOM OF POND ELEV: 2127
GEOSYNTHETIC CLAY LINER (BENTOMAT 200R OR APPROVED EQUAL, REFER TO DETAIL ON XXX) WITH A MINIMUM OF 12 INCHES OF PROTECTIVE COVER. TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS, AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
2140
2130
2120
2115
-0+25
0+00
1+00
2+00
2+90

WET POND 3 SECTION VIEW A–A

HORIZONTAL SCALE : 1" = 20'
VERTICAL SCALE : 1" = 2'

▨ VEGETATED SHELF
0"-18" ABOVE NORMAL P0OL
PLANT REQ. 50 PLANTS/200 S.F.

INTERIOR SLOPES ABOVE THE VEGETATED SHELF AND EXTERIOR EMBANKMENT SLOPES SHALL BE VEGETATED WITH NON-CLUMPING TURF GRASS. TREES & WOODY SHRUBS SHALL NOT BE ALLOWED.

MINIMUM PLANTING REQUIREMENTS (PER NCDEQ BMP MANUAL)
50 PLANTS PER 200 SF OF VEGETATED SHELF REQUIRED

AREA OF VEGETATED (LITTORAL) SHELF:	*1,450 SF*
MINIMUM NUMBER OF PLANTS:	*363 PLANTS*

USE THREE SPECIES EACH OF SHALLOW LAND HERBACEOUS PLANTS:
3-4 OF EA. SPECIES

PLANTS SHOULD BE SPACED APPROXIMATELY 24" - 36" ON CENTER AND SHOULD YIELD COVER IN APPROXIMATELY 1 - 2 YEARS.

STORMWATER WETLAND PLANT RECOMMENDATIONS
(FROM NC DEQ MANUAL)

BOTANICAL NAME	*COMMON NAME*
ASCLEPIAS INCARNATA	*SWAMP MILKWEED*
CAREX TENERA	*QUILL SEDGE*
CHELONE GLABRA	*WHITE TURTLEHEAD*
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EUPATORIADELPHUS FISTULOSUS	*JOE PYE WEED*
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LOBELIA SIPHILITICA	*GREAT BLUE LOBELIA*
RHYNCHOSPORA COLORATA	*STARRUSH WHITETOP*
SACCHARUM BALDWINII	*NARROW PLUMEGRASS*

NOTE: DURING EROSION CONTROL PHASES, THE 6" WATER QUALITY ORIFICE SHALL BE USED TO CONNECT THE SKIMMER TO THE OUTLET STRUCTURE. ALL OTHER WEIRS & ORIFICES, INCLUDING THE TOP GRATE, SHALL BE TEMPORARILY BLOCKED IN ORDER TO FORCE WATER FROM THE SEDIMENT BASIN THROUGH THE SKIMMER. THE EMERGENCY SPILLWAY IN THE DAM SHALL REMAIN ACTIVE THROUGH ALL STAGES OF EROSION CONTROL. ONCE EROSION CONTROL MEASURES ARE REMOVED, THE SEDIMENT BASIN SHALL BE CONVERTED TO A PERMANENT WET DETENTION POND. THE SKIMMER SHAL BE DISCONNECTED, THE WATER QUALITY DEVICE SHALL BE INSTALLED & WEIRS SHALL BE UNCOVERED. REFER TO DETAIL SHEET FOR EROSION CONTROL DETAILS REGARDING THE SKIMMER.

WET DETENTION POND DESIGN CRITERIA
DRAINAGE AREA = 8.79 AC
IMPERVIOUS AREA = 2.18 AC (24.80%)
WATER QUALITY VOLUME = 11,245 CF

TOP OF DAM ELEV = 2136.00
TOP OF VEGETATED SHELF = 2131.00
PERMANENT POOL ELEVATION = 2130.00
BOTTOM OF FOREBAY = 2126.00
BOTTOM OF MAIN POOL = 2125.00

MAIN POOL VOLUME = 17,819 CF
FOREBAY VOLUME = 3,207 CF (18.0%)

GRAPHIC SCALE

(IN FEET)
1"=50'

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	*01/31/2025*	*ADDRESS CITY & COUNTY COMMENTS*

ENGINEER'S SEAL:
SEAL 030895
TOBIN M. HARRIS
Toby M Harris
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
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APPROVED:	TMH
SCALE:	1" = 50'

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
SCM DETAIL 3

DRAWING NO:
16

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

SIGNAL HILL
HENDERSONVILLE, NC, USA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-7200.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

1. STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-7200 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

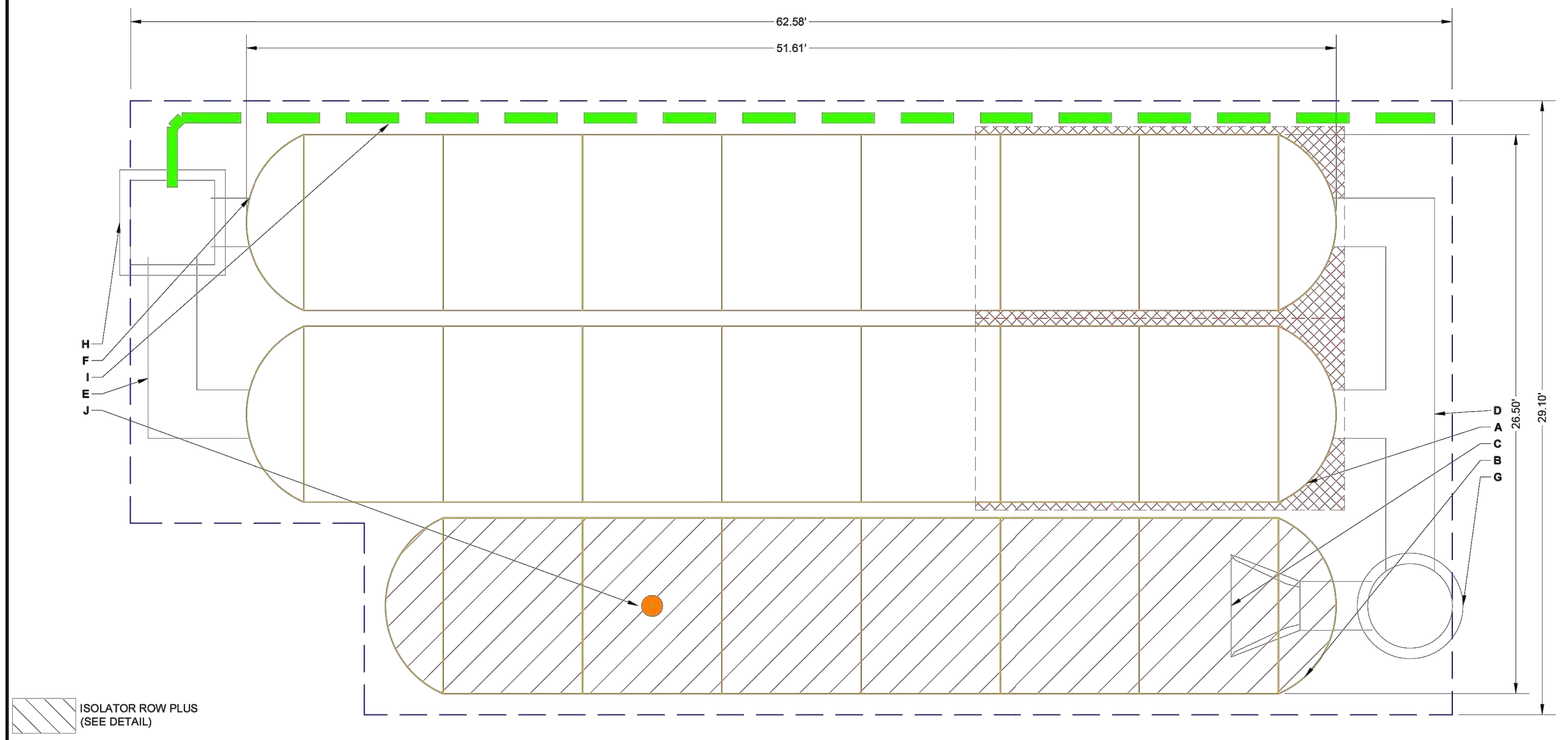
©2025 ADS, INC.

PROPOSED LAYOUT: BED 4	
20	STORMTECH MC-7200 CHAMBERS
6	STORMTECH MC-7200 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
6899	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
1721	SYSTEM AREA (SF)
183.4	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	2148.00
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	2143.50
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	2143.00
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	2143.00
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	2143.00
TOP OF STONE:	2142.00
TOP OF MC-7200 CHAMBER:	2141.00
24" x 24" TOP MANIFOLD INVERT:	2137.92
24" x 24" BOTTOM MANIFOLD INVERT:	2136.19
24" ISOLATOR ROW PLUS INVERT:	2136.19
24" BOTTOM CONNECTION INVERT:	2136.19
BOTTOM OF MC-7200 CHAMBER:	2136.00
UNDERDRAIN INVERT:	2135.25
BOTTOM OF STONE:	2135.25

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" TOP PARTIAL CUT END CAP, PART#: MC7200IEPP24T / TYP OF ALL 24" TOP CONNECTIONS	23.05"	
PREFABRICATED END CAP	B	24" BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	C	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MCFLAMP		
MANIFOLD	D	24" x 24" TOP MANIFOLD, ADS N-12	23.05"	
MANIFOLD	E	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
PIPE CONNECTION	F	24" BOTTOM CONNECTION	2.26"	
CONCRETE STRUCTURE	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		9.5 CFS IN
CONCRETE STRUCTURE	H	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		14.0 CFS OUT
UNDERDRAIN	I	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
INSPECTION PORT	J	10" SEE DETAIL		



▧ ISOLATOR ROW PLUS (SEE DETAIL)

▦ PLACE MINIMUM 17.50' OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

— — BED LIMITS

NOTES
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

SIGNAL HILL
HENDERSONVILLE, NC, USA
DATE: 01/30/2025 DRAWN: KH
PROJECT #: CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
1-800-821-6710 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473
0 5 10

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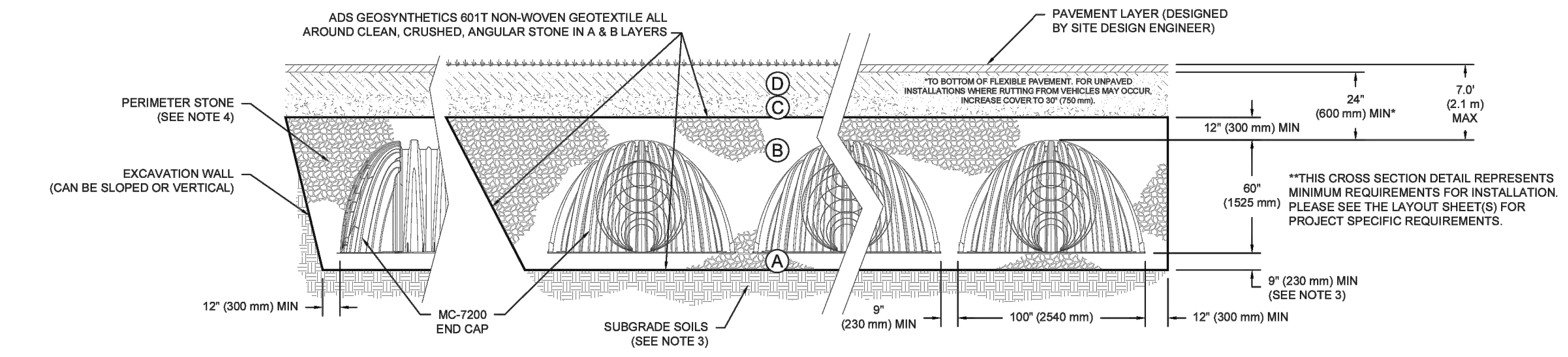
SHEET
2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



ADS GEOSYNTHETICS 601T NON-WOVEN GEOTEXTILE ALL AROUND CLEAN, CRUSHED, ANGULAR STONE IN A & B LAYERS
PAVEMENT LAYER (DESIGNED BY SITE DESIGN ENGINEER)
PERIMETER STONE (SEE NOTE 4)
EXCAVATION WALL (CAN BE SLOPED OR VERTICAL)
D
C
B
A
*TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).
24" (600 mm) MIN*
7.0' (2.1 m) MAX
12" (300 mm) MIN
60" (1525 mm)
9" (230 mm) MIN (SEE NOTE 3)
12" (300 mm) MIN
MC-7200 END CAP
SUBGRADE SOILS (SEE NOTE 3)
9" (230 mm) MIN
100" (2540 mm)
12" (300 mm) MIN

**THIS CROSS SECTION DETAIL REPRESENTS MINIMUM REQUIREMENTS FOR INSTALLATION. PLEASE SEE THE LAYOUT SHEET(S) FOR PROJECT SPECIFIC REQUIREMENTS.

NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

SIGNAL HILL
HENDERSONVILLE, NC, USA
DATE: 01/30/2025 DRAWN: KH
PROJECT #: CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
1-800-821-6710 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

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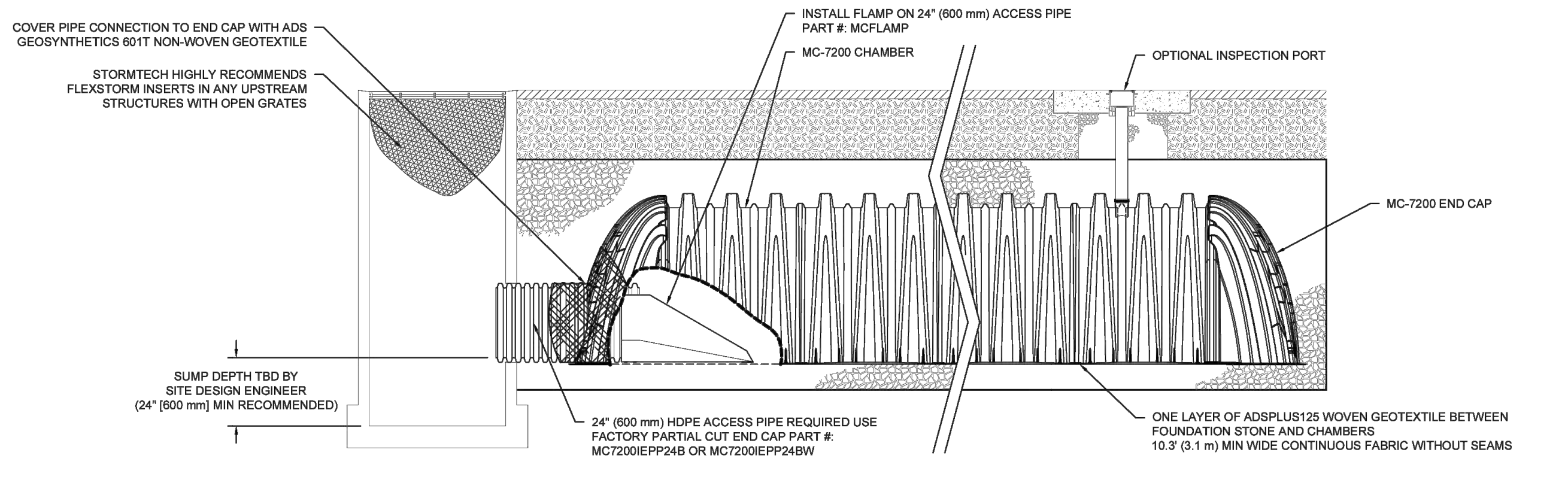
SHEET
4 OF 6



COVER PIPE CONNECTION TO END CAP WITH ADS GEOSYNTHETICS 601T NON-WOVEN GEOTEXTILE
STORMTECH HIGHLY RECOMMENDS FLEXSTORM INSERTS IN ANY UPSTREAM STRUCTURES WITH OPEN GRATES
INSTALL FLAMP ON 24" (600 mm) ACCESS PIPE PART #: MCFLAMP
MC-7200 CHAMBER
OPTIONAL INSPECTION PORT
MC-7200 END CAP
SUMP DEPTH TBD BY SITE DESIGN ENGINEER (24" [600 mm] MIN RECOMMENDED)
24" (600 mm) HDPE ACCESS PIPE REQUIRED USE FACTORY PARTIAL CUT END CAP PART #: MC7200IEPP24B OR MC7200IEPP24BW
ONE LAYER OF ADSPLUS125 WOVEN GEOTEXTILE BETWEEN FOUNDATION STONE AND CHAMBERS 10.3' (3.1 m) MIN WIDE CONTINUOUS FABRIC WITHOUT SEAMS

MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

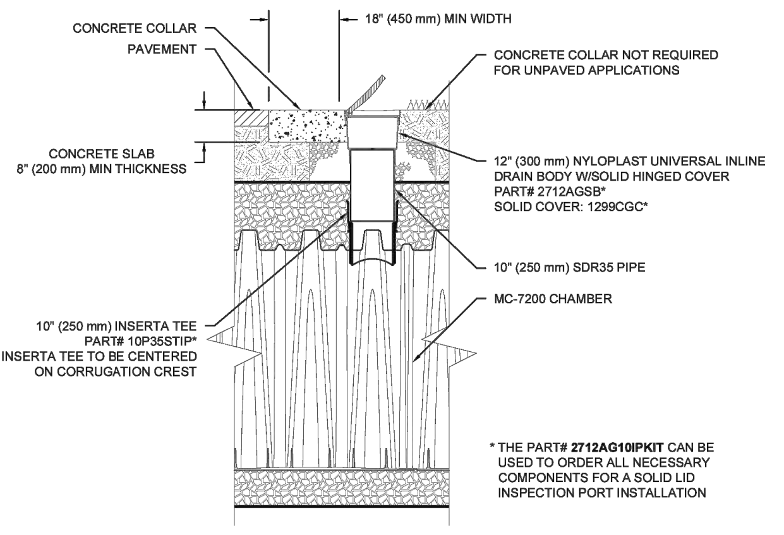
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



CONCRETE COLLAR
PAVEMENT
18" (450 mm) MIN WIDTH
CONCRETE COLLAR NOT REQUIRED FOR UNPAVED APPLICATIONS
CONCRETE SLAB 8" (200 mm) MIN THICKNESS
12" (300 mm) NYLOPLAST UNIVERSAL INLINE DRAIN BODY W/SOLID HINGED COVER PART# 2712AGSB* SOLID COVER: 1299CGC*
10" (250 mm) SDR35 PIPE
MC-7200 CHAMBER
10" (250 mm) INSERTA TEE PART# 10P35STIP* INSERTA TEE TO BE CENTERED ON CORRUGATION CREST

* THE PART# **2712AG10IPKIT** CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

MC-7200 10" (250 mm) INSPECTION PORT DETAIL
NTS

SIGNAL HILL
HENDERSONVILLE, NC, USA
DATE: 01/30/2025 DRAWN: KH
PROJECT #: CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

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SHEET
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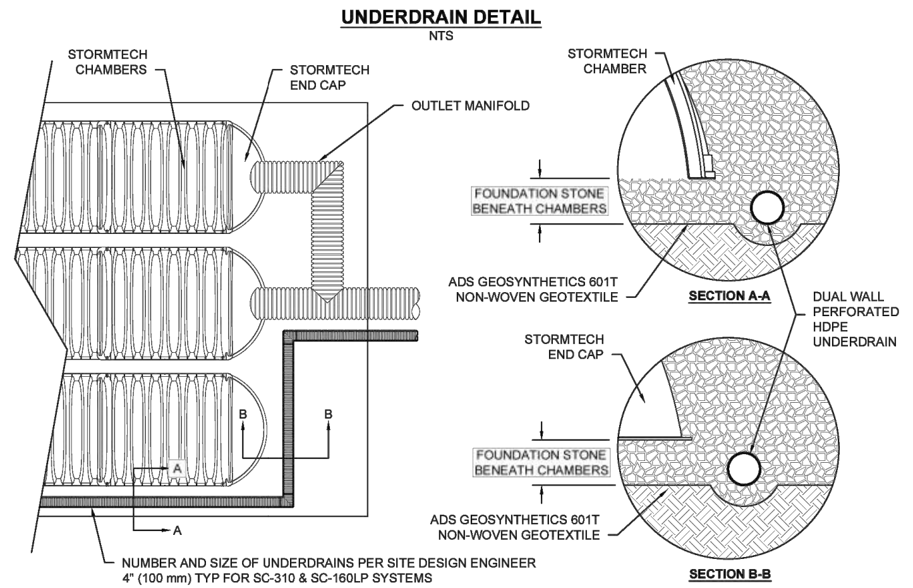
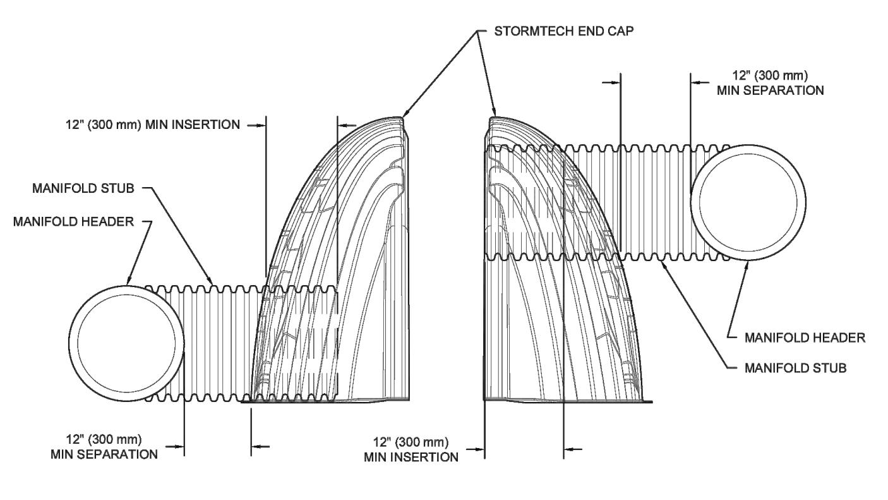
UNDERDRAIN DETAIL
NTS



STORMTECH CHAMBERS
STORMTECH END CAP
OUTLET MANIFOLD
STORMTECH CHAMBER
FOUNDATION STONE BENEATH CHAMBERS
ADS GEOSYNTHETICS 601T NON-WOVEN GEOTEXTILE
SECTION A-A
DUAL WALL PERFORATED HDPE UNDERDRAIN
STORMTECH END CAP
FOUNDATION STONE BENEATH CHAMBERS
ADS GEOSYNTHETICS 601T NON-WOVEN GEOTEXTILE
SECTION B-B
B
B
A
A
NUMBER AND SIZE OF UNDERDRAINS PER SITE DESIGN ENGINEER 4" (100 mm) TYP FOR SC-310 & SC-160LP SYSTEMS 6" (150 mm) TYP FOR SC-800, DC-780, MC-3500, MC-4500 & MC-7200 SYSTEMS

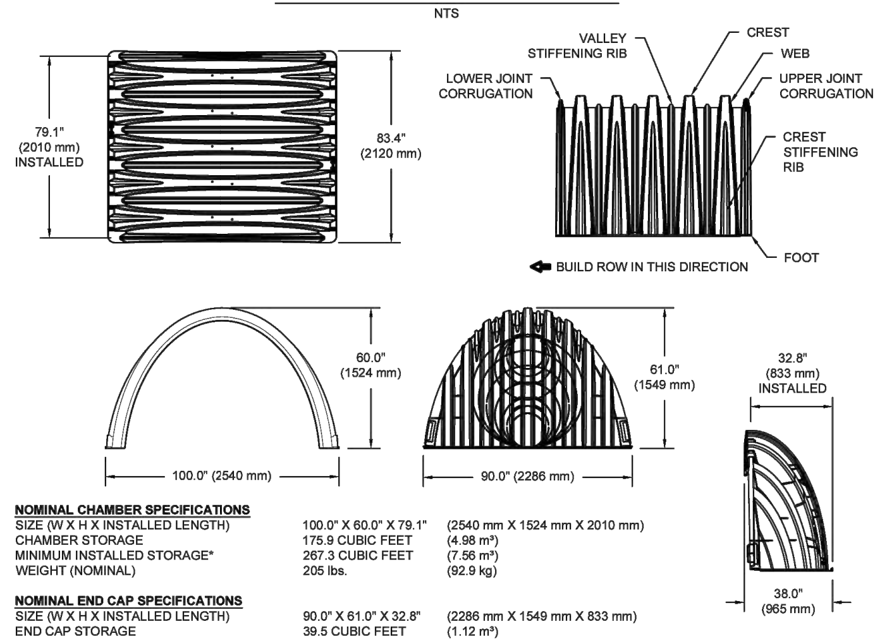
MC-SERIES END CAP INSERTION DETAIL
NTS



STORMTECH END CAP
12" (300 mm) MIN INSERTION
12" (300 mm) MIN SEPARATION
MANIFOLD STUB
MANIFOLD HEADER
12" (300 mm) MIN SEPARATION
12" (300 mm) MIN INSERTION
MANIFOLD HEADER
MANIFOLD STUB

NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-7200 TECHNICAL SPECIFICATION
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

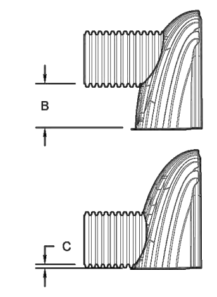
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B		---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B		---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B		---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B		---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B		---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW			
MC7200IEPP18B		---	1.97" (50 mm)
MC7200IEPP18BW			
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW			
MC7200IEPP24B		---	2.26" (57 mm)
MC7200IEPP24BW			
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

SIGNAL HILL
HENDERSONVILLE, NC, USA
DATE: 01/30/2025 DRAWN: KH
PROJECT #: CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

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SHEET
6 OF 6

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
SEAL 032895
TOBIN M. HARRIS
01/31/2025

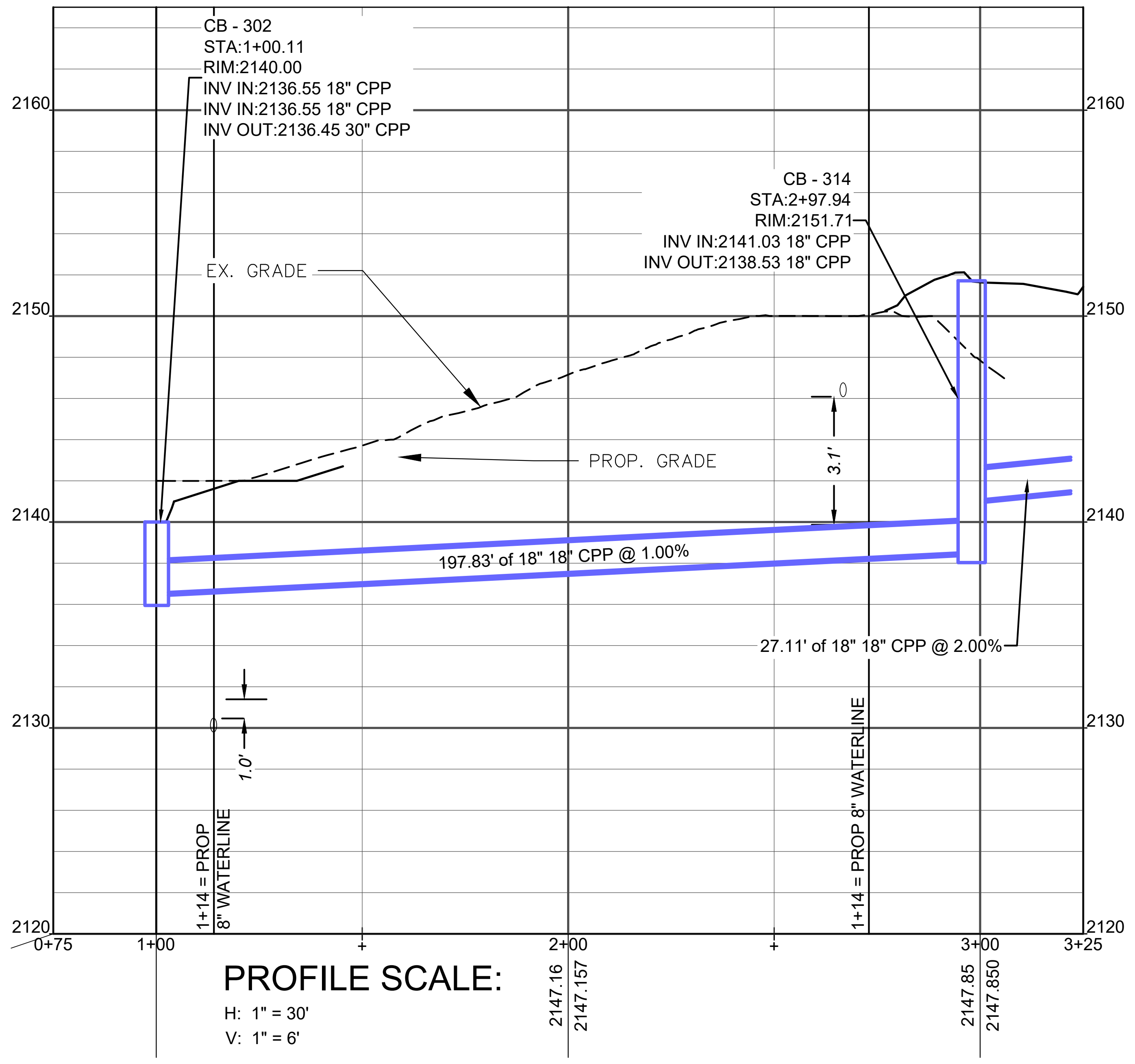
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

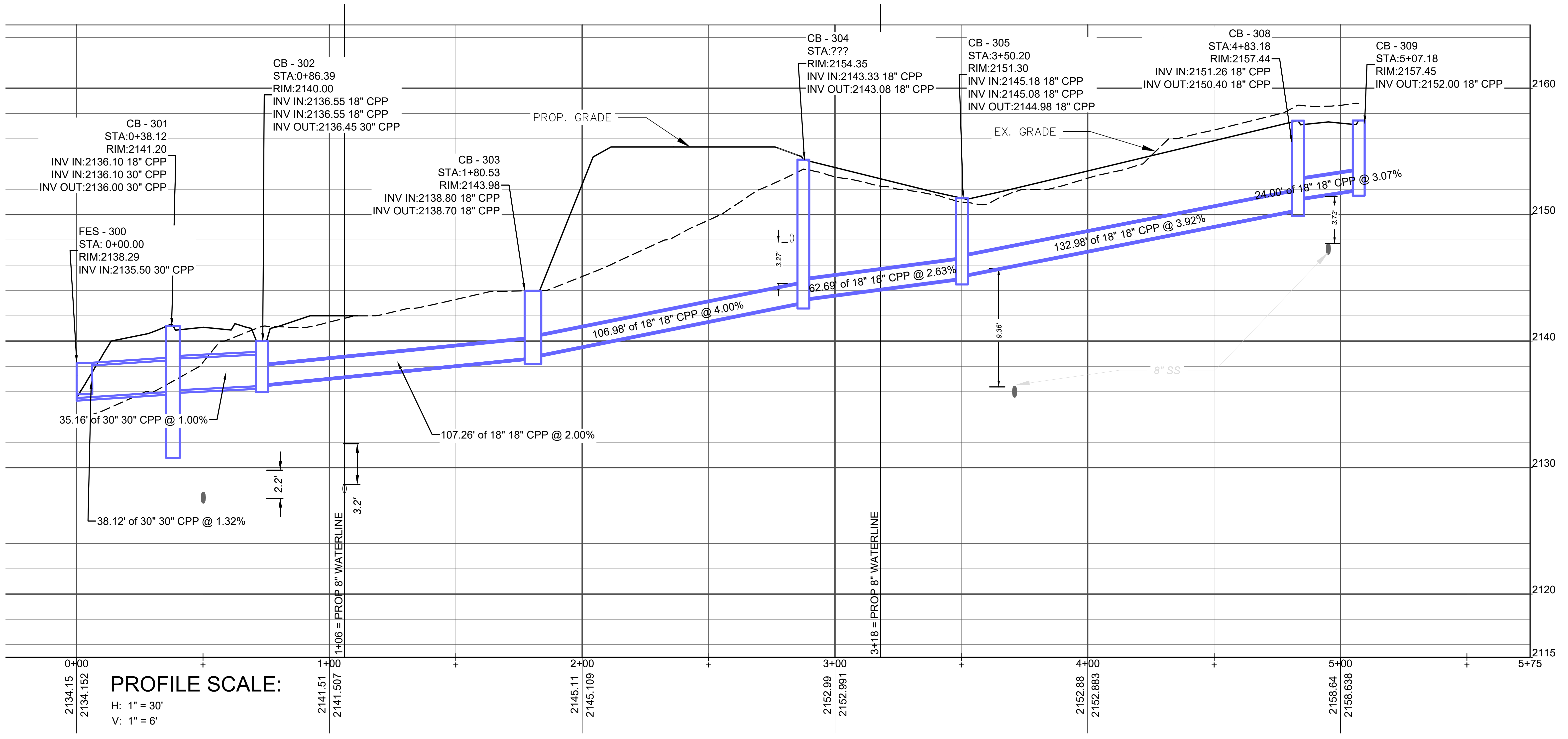
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

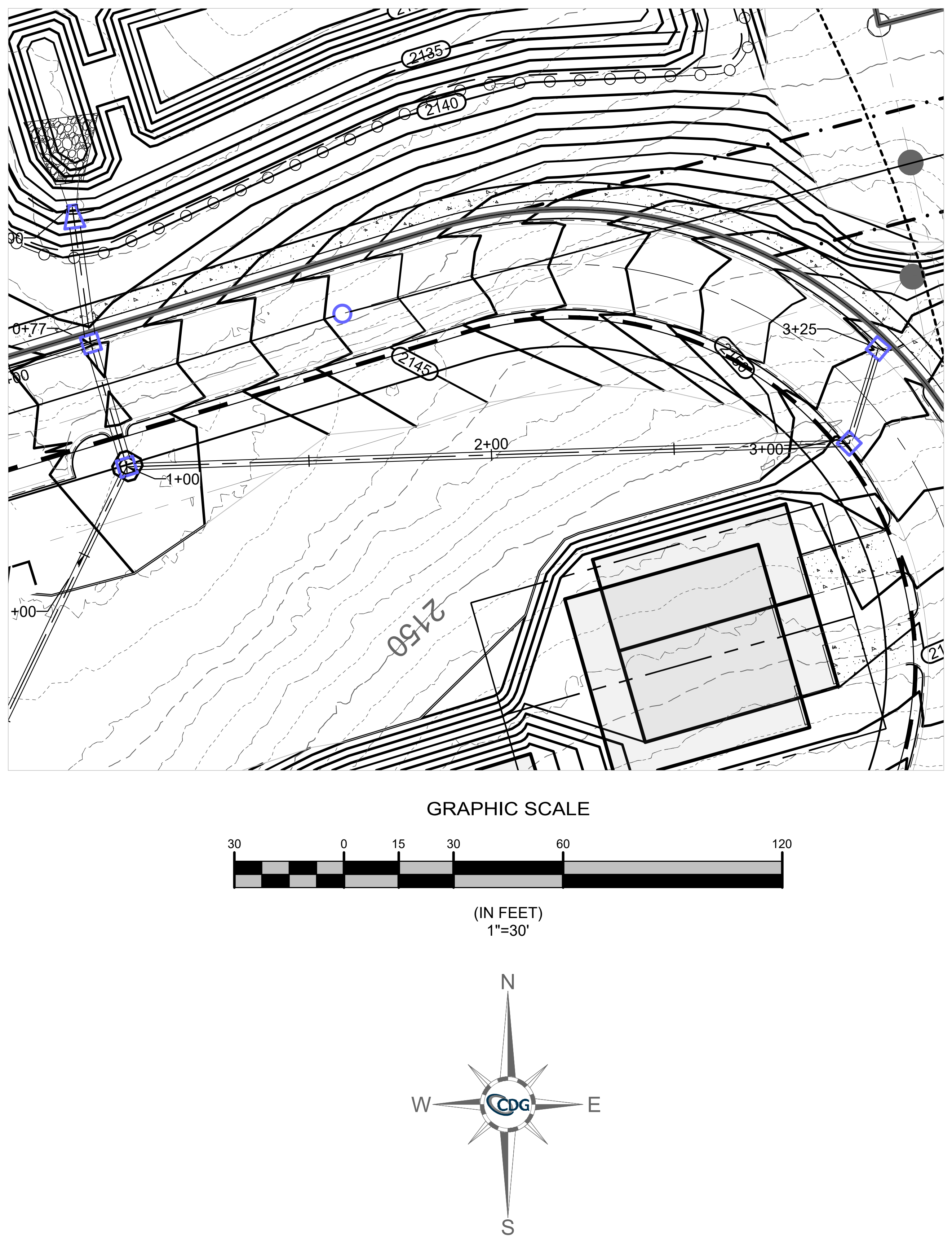
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

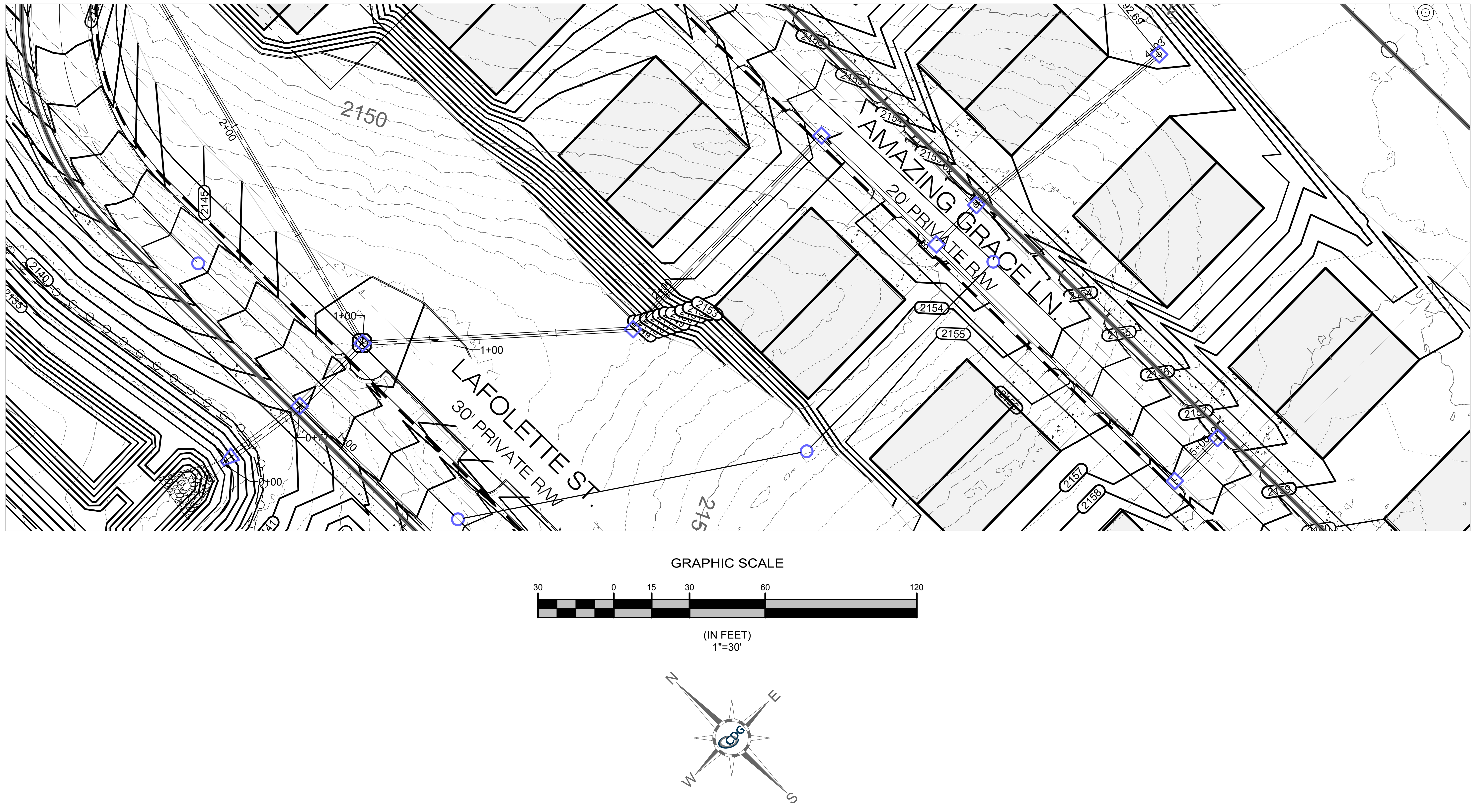
DRAWING NO: 17
SHEET TITLE: ADS DETAILS

Y:\Shared\2_ENG\R\656605823\5_DESIGN\DWG\SHEETS\SCM DETAILS.dwg, 5/15/2025 4:38 PM, Toby Harris









FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
030895
TOBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

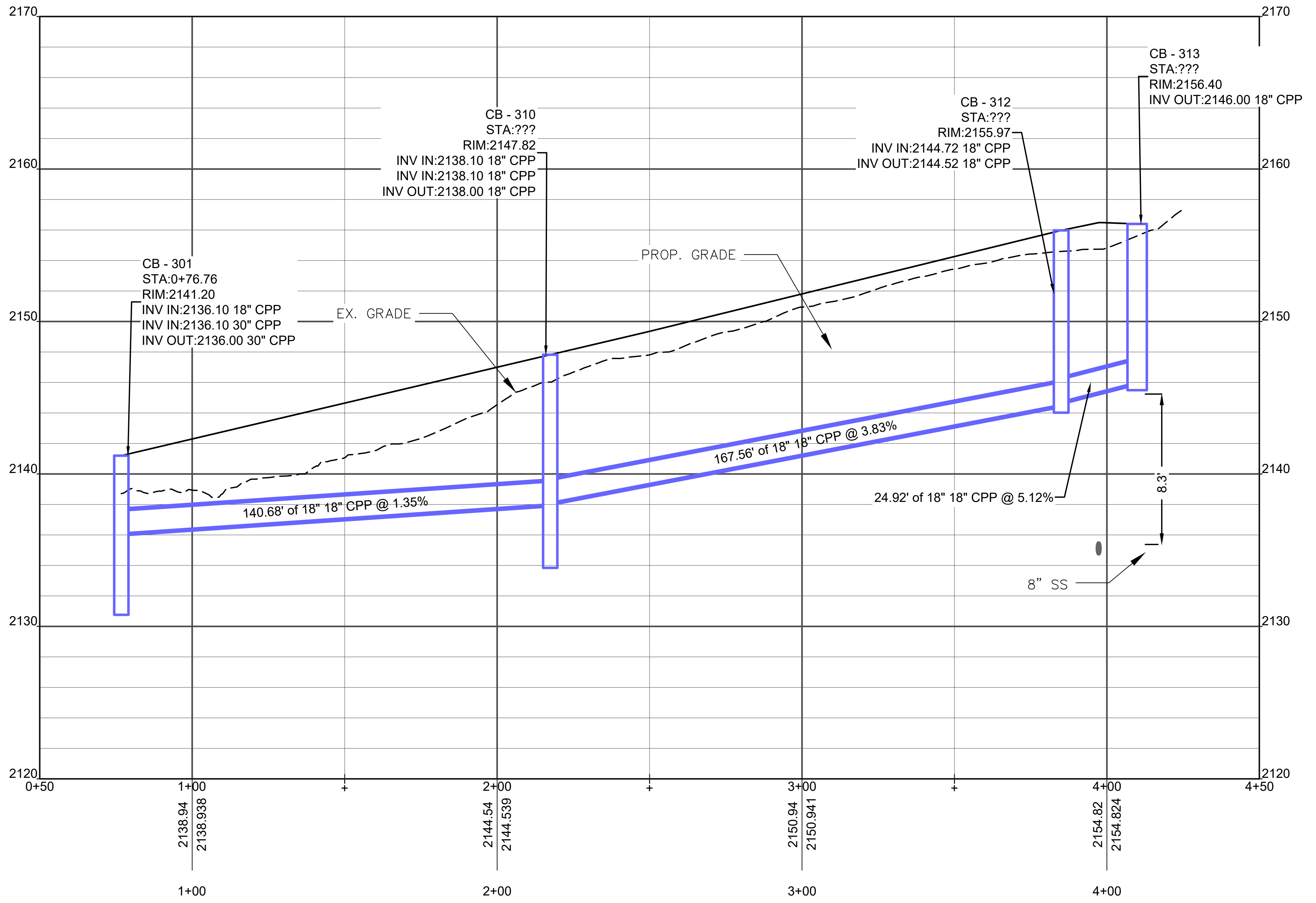
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
STORM PLAN & PROFILE - 1

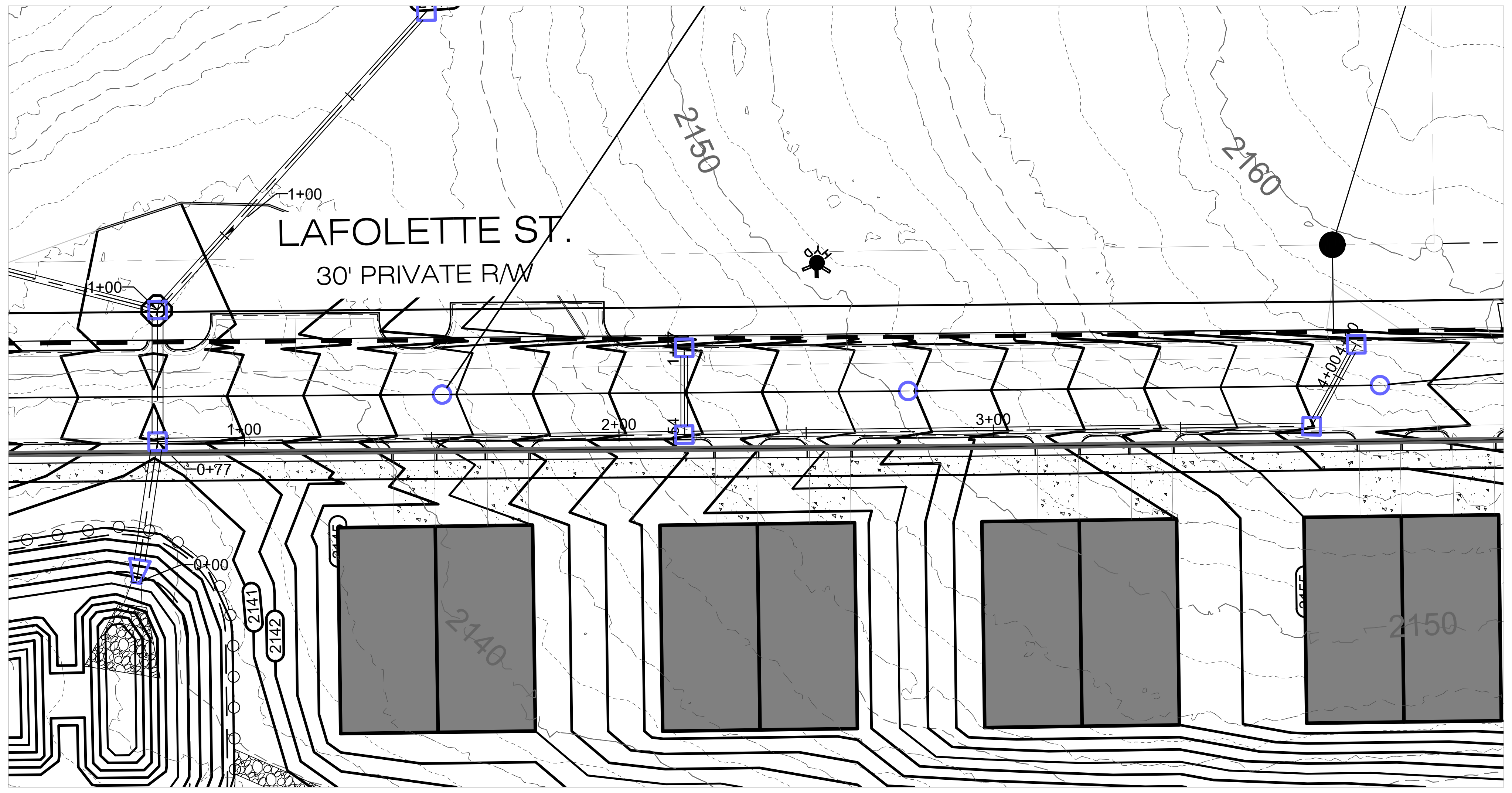
DRAWING NO:
18

Y:\Shared\2_ENG\R656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE STM.dwg, 5/15/2025 4:39 PM, Toby Harris



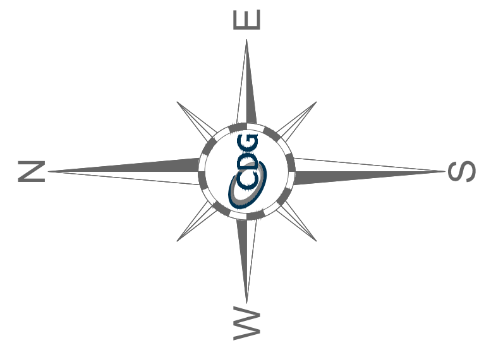
PROFILE SCALE:

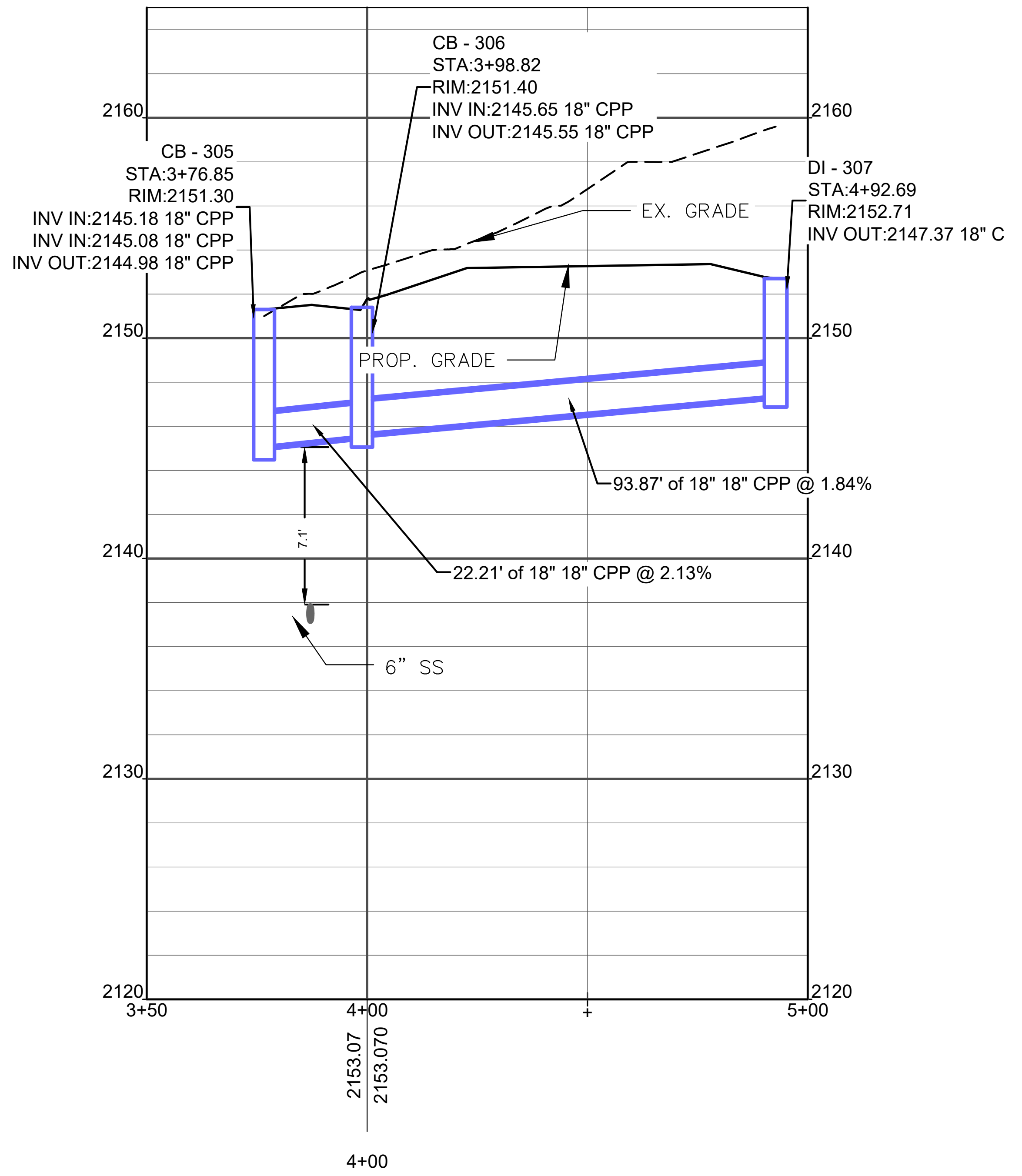
H: 1" = 30'
V: 1" = 6'



GRADUATE SCALE

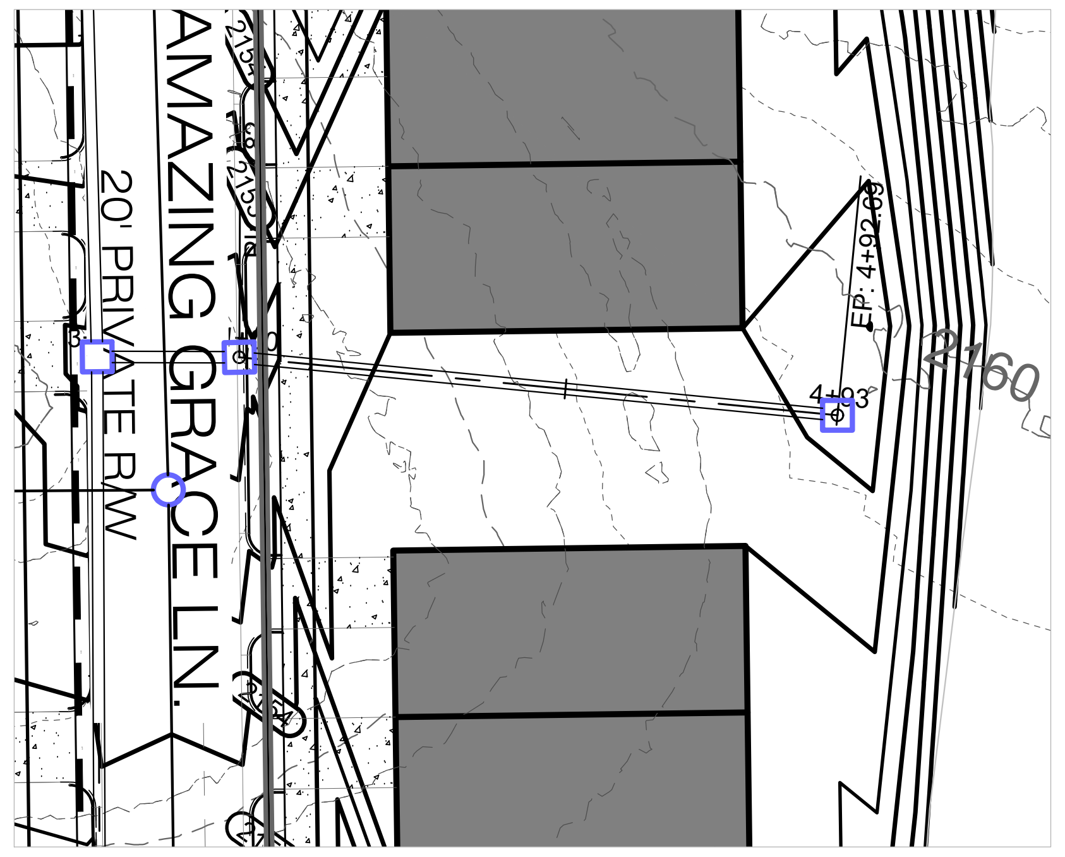
(IN FEET)
1"=30'





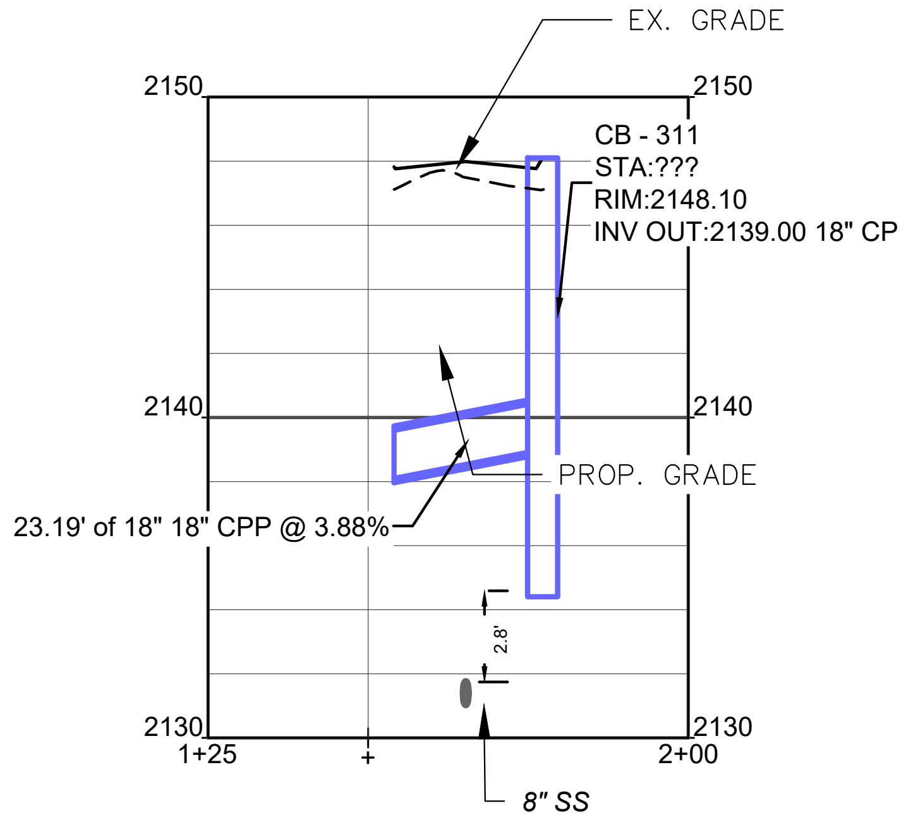
PROFILE SCALE:

H: 1" = 30'
V: 1" = 6'



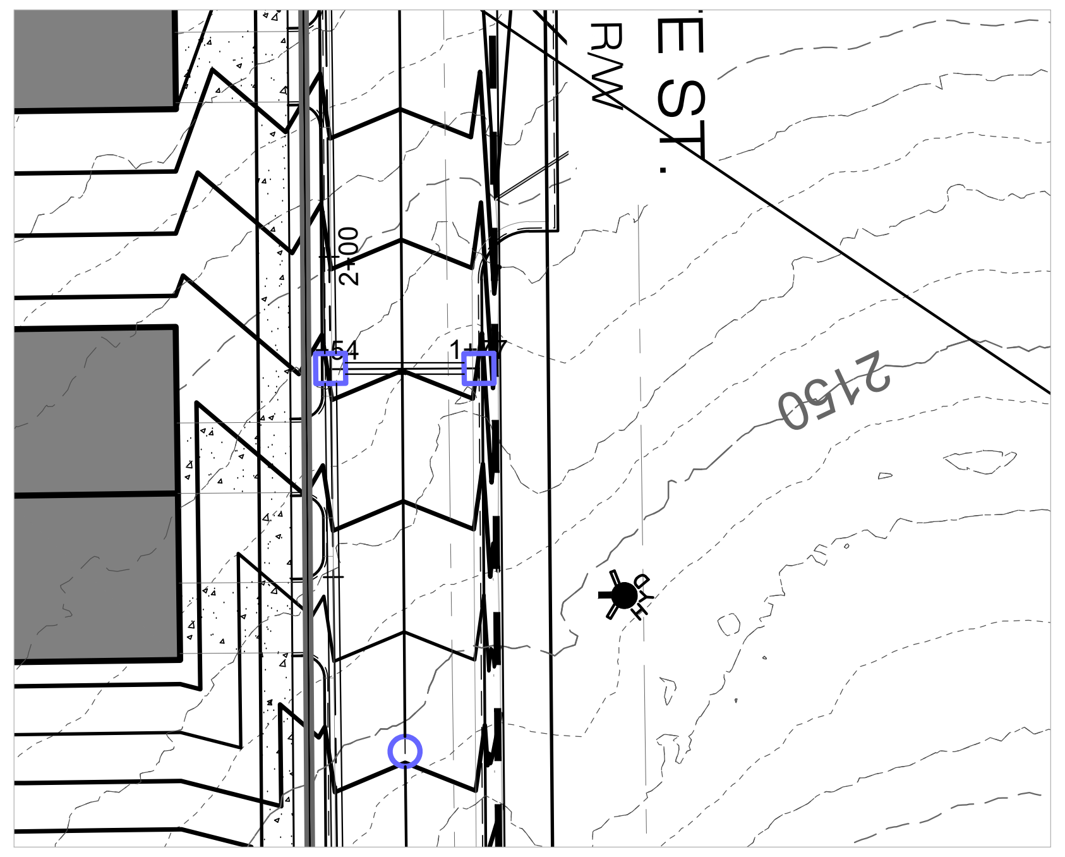
GRAPHIC SCALE

(IN FEET)
1"=30'



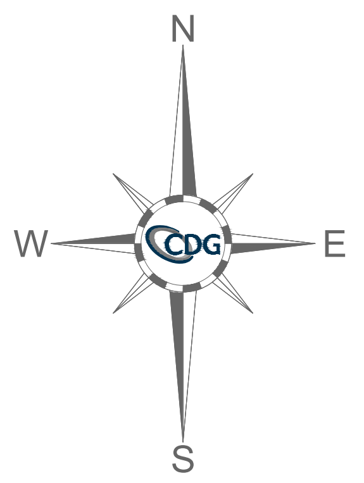
PROFILE SCALE:

H: 1" = 30'
V: 1" = 6'



GRAPHIC SCALE

(IN FEET)
1"=30'



Y:\Shared\2_ENG\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE STM.dwg, 5/15/2024 4:39 PM, Toby Harris

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:

SEAL 030895
TOBIN M. HARRIS
Toby M Harris
09/16/2024

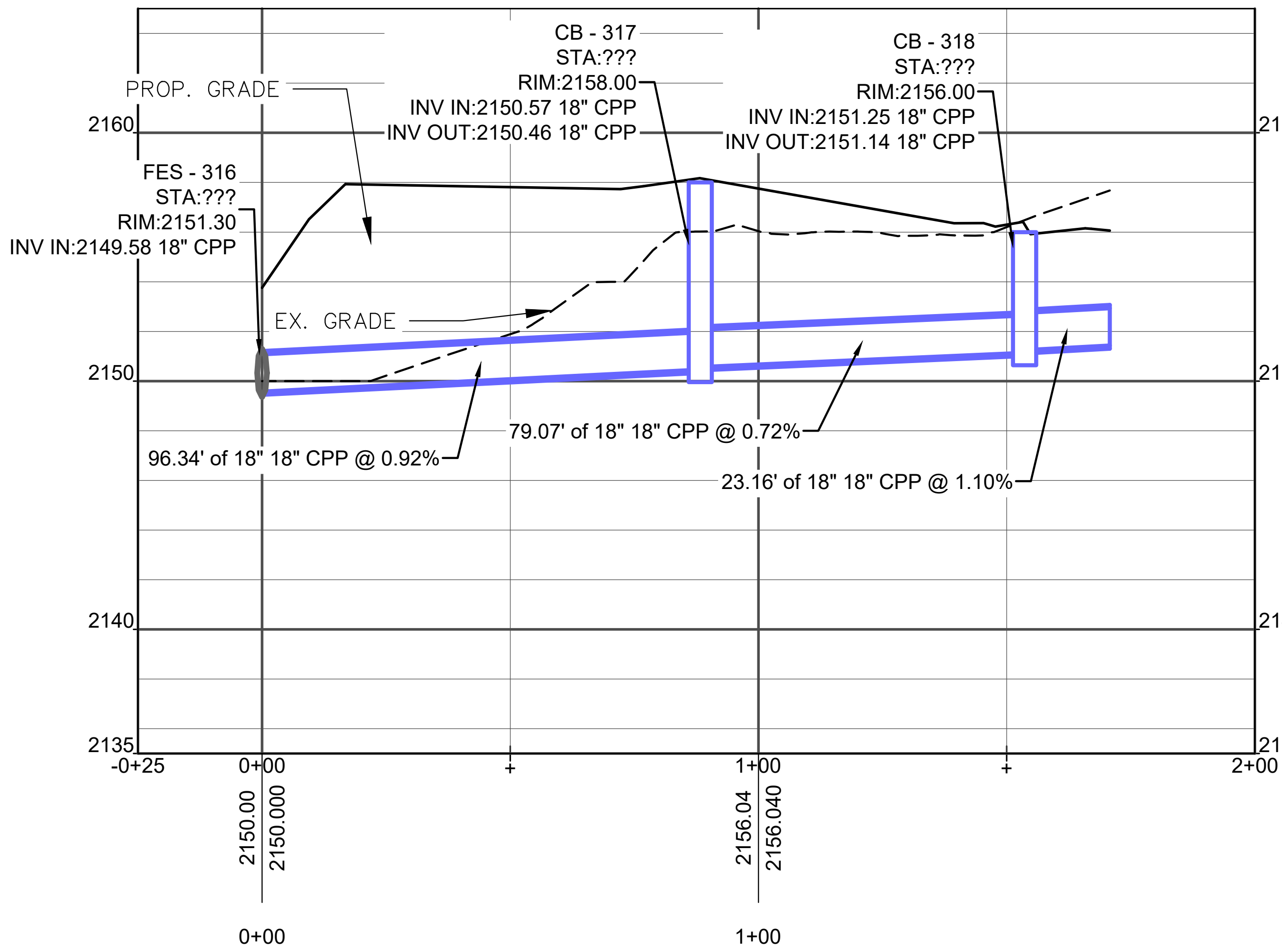
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

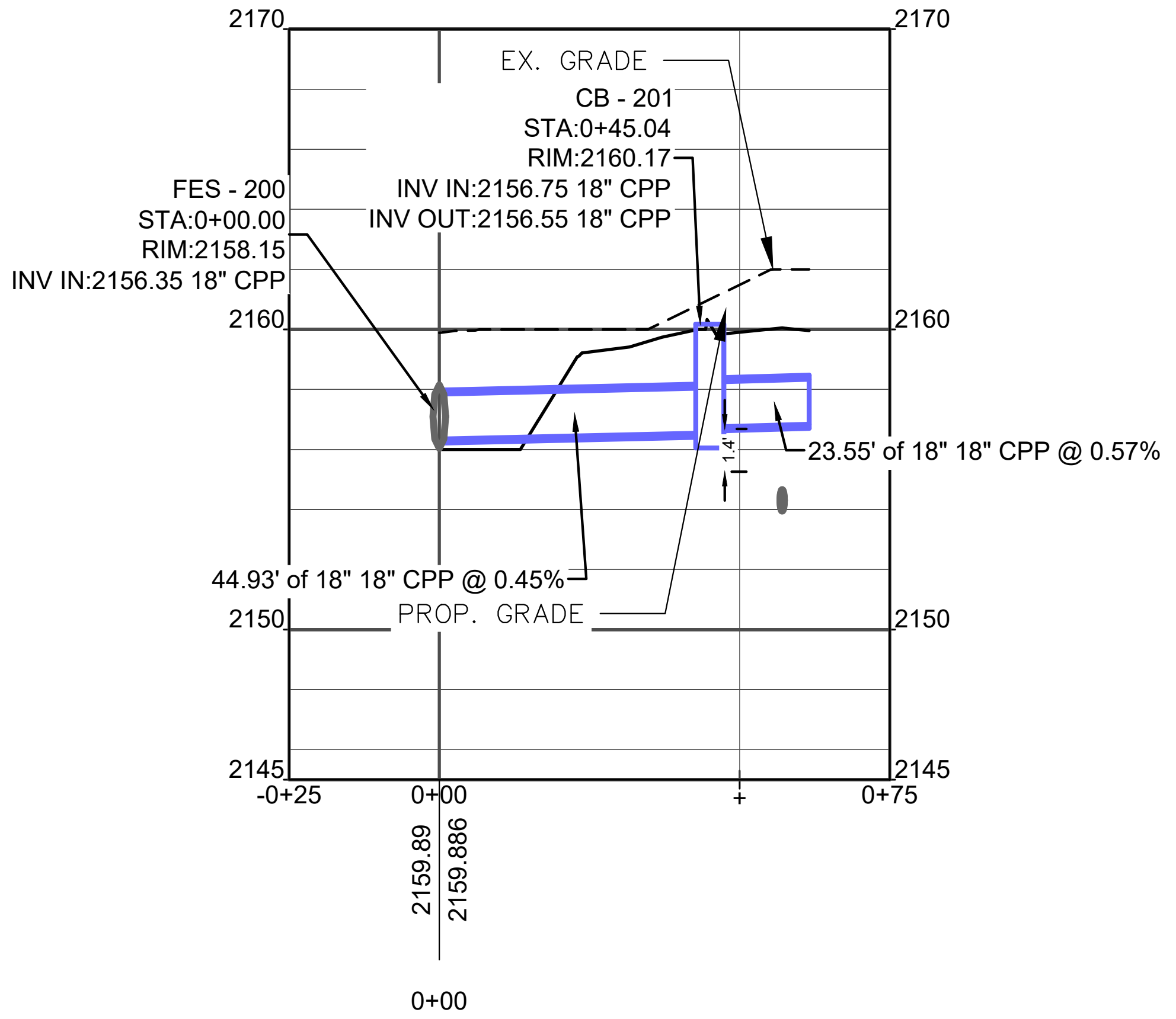
SHEET TITLE:
STORM PLAN & PROFILE - 2

DRAWING NO:
19



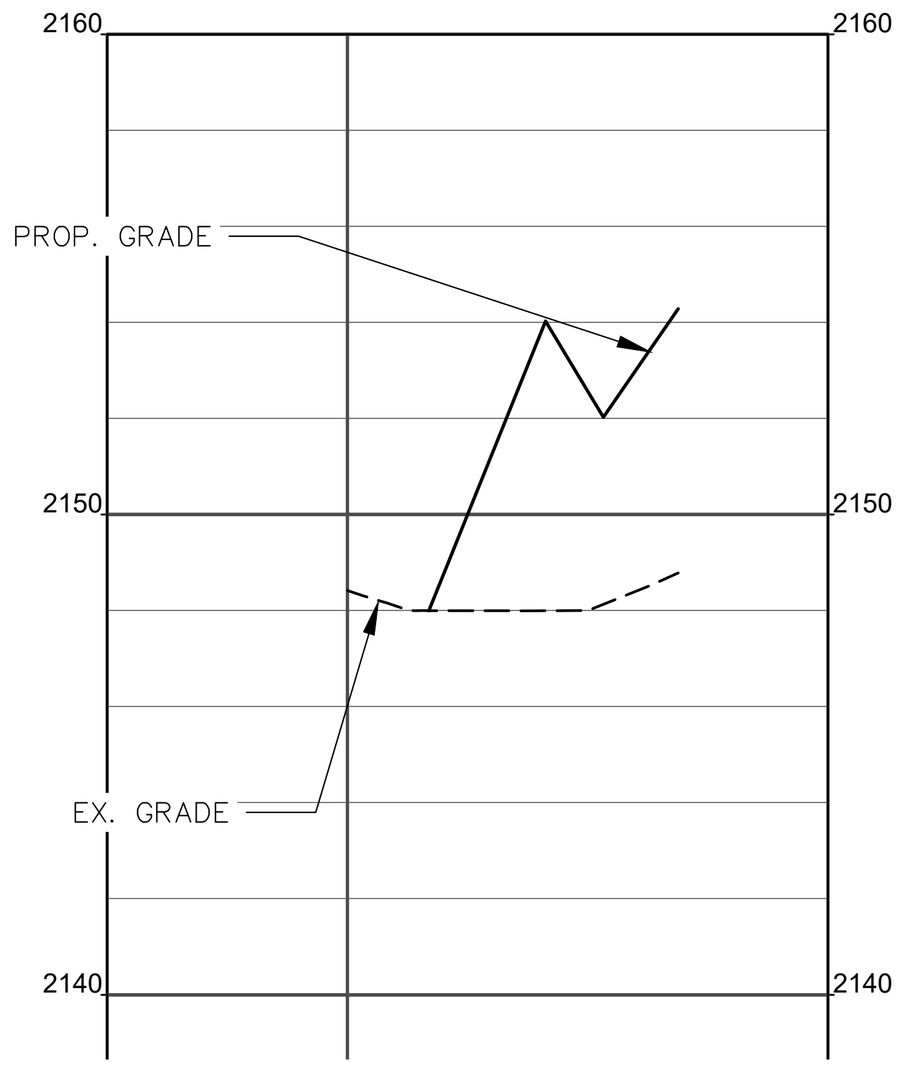
PROFILE SCALE:

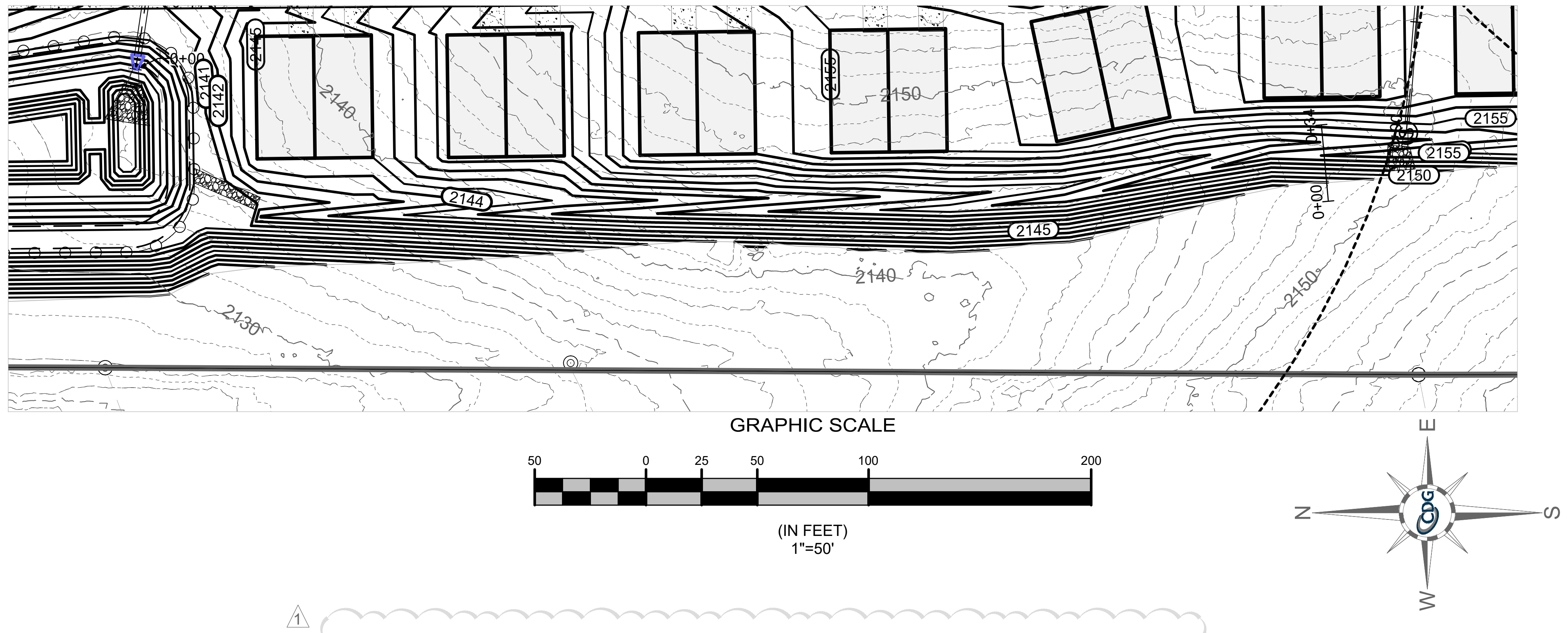
H: 1" = 30'
V: 1" = 6'

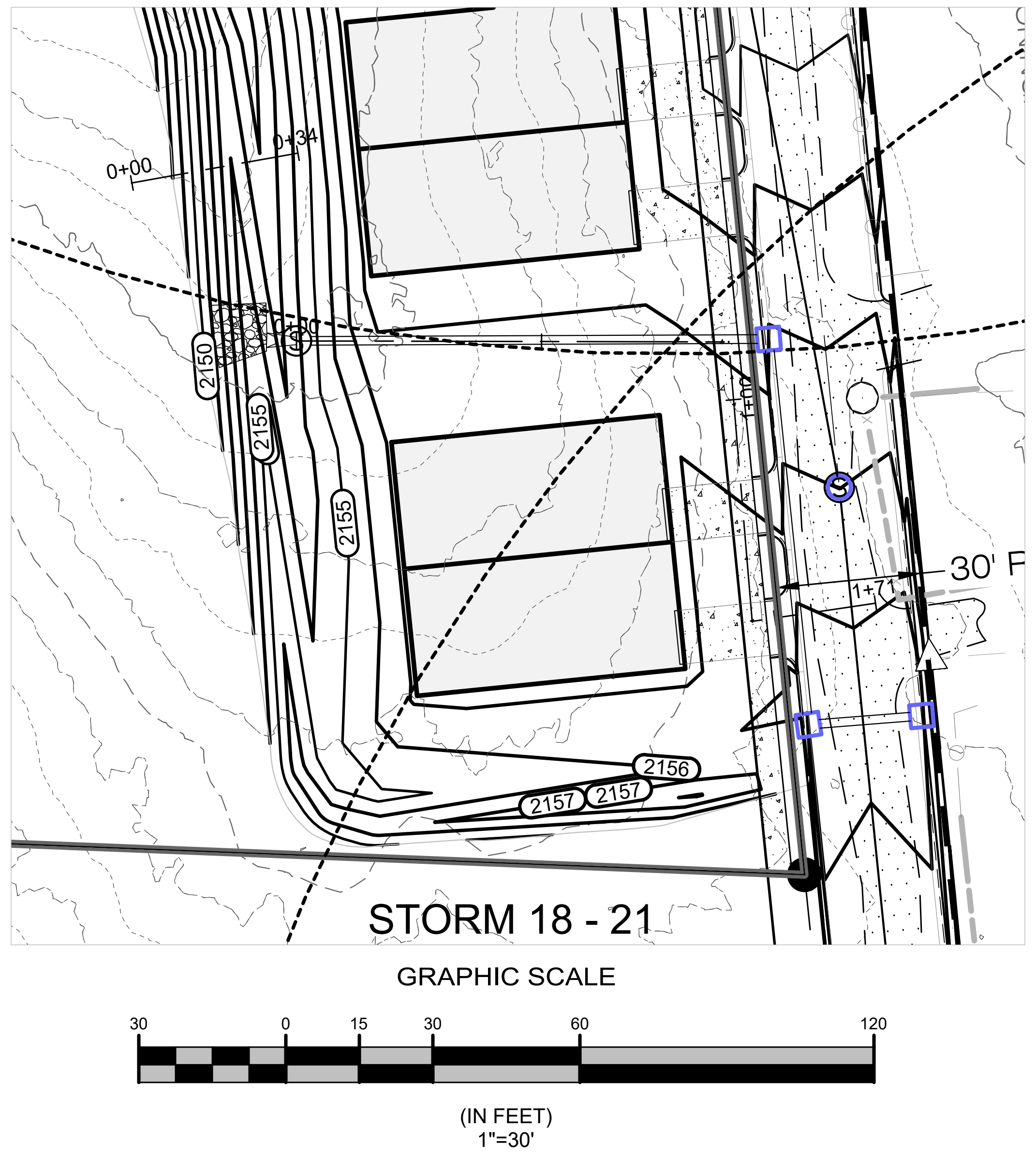


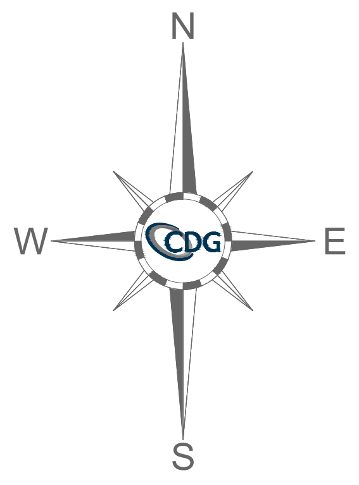
PROFILE SCALE:

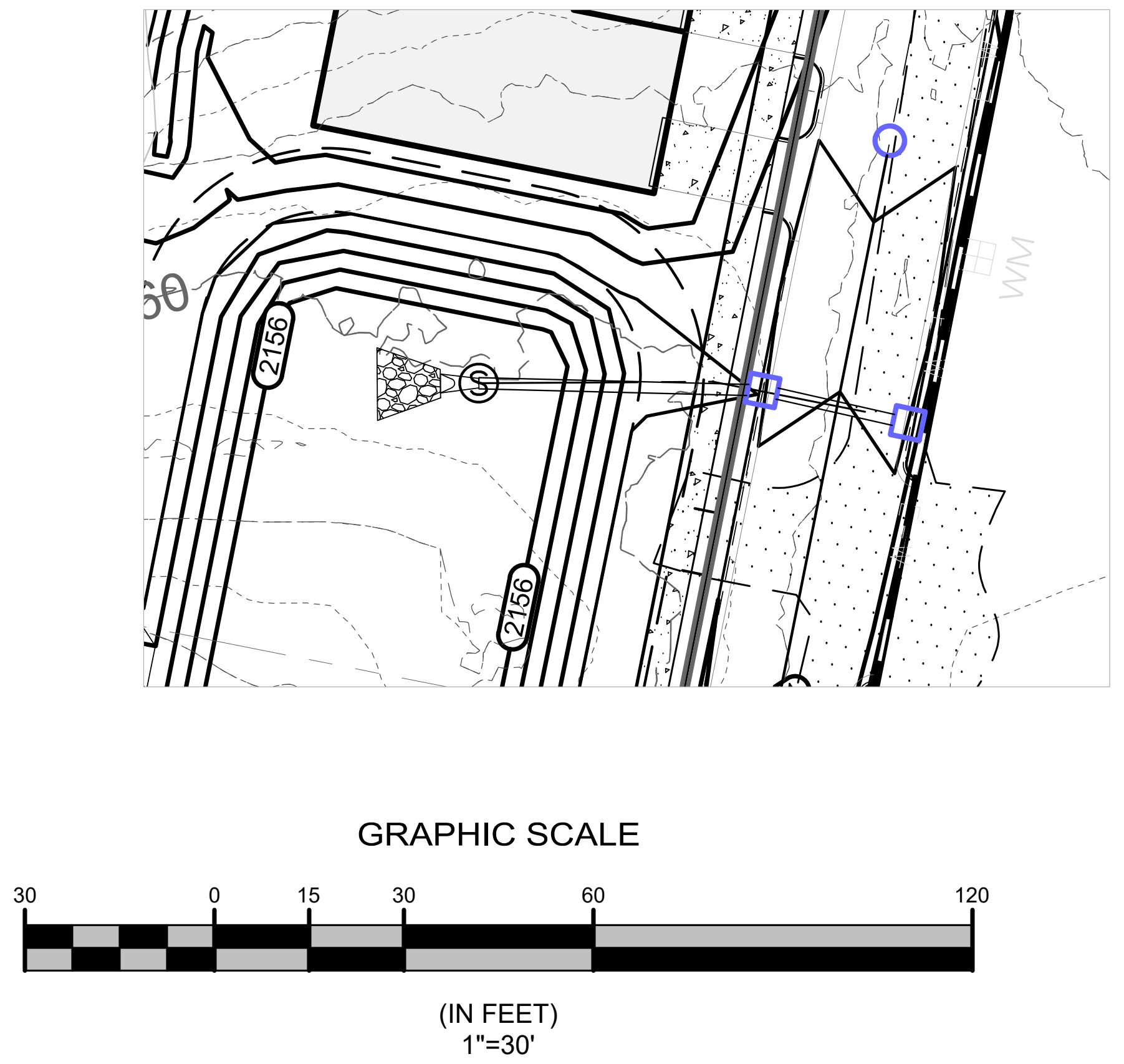
H: 1" = 30'
V: 1" = 6'

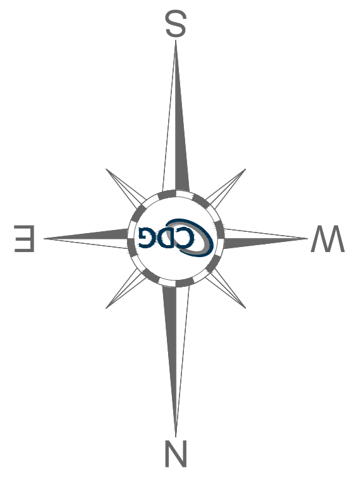












1

STORM CALCULATIONS

100 - NETWORK

Line No.	Line ID	Drng Area (ac)	Line Size (in)	Line Length (ft)	Line Slope (%)	Line Type	Invert Dn (ft)	Invert Up (ft)	Incr Q (cfs)	Vel Dn (ft/s)	Vel Up (ft/s)	HGL Dn (ft)	HGL Up (ft)
1	RSR-101 - FES-100	0.01	18	37.326	0.99	Cir	2134.63	2135.00	0.04	0.04	1.22	2135.41	2135.07

200 - NETWORK

Line No.	Line ID	Drng Area (ac)	Line Size (in)	Line Length (ft)	Line Slope (%)	Line Type	Invert Dn (ft)	Invert Up (ft)	Incr Q (cfs)	Vel Dn (ft/s)	Vel Up (ft/s)	HGL Dn (ft)	HGL Up (ft)
1	CB-201 - FES-200	0.34	18	37.085	0.54	Cir	2156.35	2156.55	1.23	4.13	3.81	2156.92	2157.15
2	CB-202 - CB-201	0.37	18	24.500	0.53	Cir	2156.75	2156.88	1.34	3.44	3.17	2157.16	2157.31
3	RSR-204 - FES-203	0.01	18	41.349	1.21	Cir	2151.50	2152.00	0.04	1.52	1.22	2151.56	2152.07

300 - NETWORK

Line No.	Line ID	Drng Area (ac)	Line Size (in)	Line Length (ft)	Line Slope (%)	Line Type	Invert Dn (ft)	Invert Up (ft)	Incr Q (cfs)	Vel Dn (ft/s)	Vel Up (ft/s)	HGL Dn (ft)	HGL Up (ft)
1	CB-301 - FES-300	0.21	30	62.678	1.00	Cir	2129.00	2129.63	1.06	3.83	3.83	2133.73	2133.84
2	CB-302 - CB-301	0.99	30	23.359	2.01	Cir	2129.73	2130.20	5.02	2.95	2.95	2134.19	2134.21
3	CB-303 - CB-302	0.59	18	94.448	4.83	Cir	2130.73	2135.29	2.99	4.91	6.02	2134.50	2136.43 j
4	CB-304 - CB-303	0.14	18	162.565	3.00	Cir	2137.00	2141.88	0.71	9.96	5.25	2137.59	2142.86
5	CB-305 - CB-304	0.06	18	55.000	3.00	Cir	2143.33	2144.98	0.30	9.72	5.07	2143.89	2145.91
6	CB-308 - CB-305	0.05	18	130.469	4.00	Cir	2145.18	2150.40	0.25	1.02	2.81	2145.91	2150.75 j
7	CB-309 - CB-308	0.13	18	24.532	3.02	Cir	2151.26	2152.00	0.66	5.16	2.61	2151.45	2152.30
8	CB-306 - CB-305	0.32	18	23.671	1.99	Cir	2145.08	2145.55	1.62	5.69	5.03	2145.91	2146.47
9	DI-307 - CB-306	0.84	18	86.197	2.00	Cir	2145.65	2147.37	4.26	4.28	4.51	2146.47	2148.16 j
10	CB-310 - CB-301	0.11	18	154.064	2.00	Cir	2131.26	2134.34	0.56	2.16	4.35	2134.19	2135.09 j
11	CB-312 - CB-310	0.16	18	168.026	6.00	Cir	2134.44	2144.52	0.81	1.55	3.02	2135.09	2144.92 j
12	CB-313 - CB-312	0.08	18	25.529	5.01	Cir	2144.72	2146.00	0.41	2.95	2.29	2144.92	2146.24
13	CB-314 - CB-302	0.20	18	178.583	5.71	Cir	2130.73	2140.93	1.01	1.32	3.72	2134.50	2141.51 j
14	CB-315 - CB-314	0.27	18	27.156	1.99	Cir	2141.03	2141.57	1.37	2.84	3.19	2141.51	2142.01 j
15	CB-311 - CB-310	0.58	18	23.342	2.01	Cir	2134.44	2134.91	2.94	4.03	3.99	2135.09	2135.56
16	CB-317 - FES-316	0.04	18	88.172	0.54	Cir	2148.10	2148.58	0.20	1.45	3.47	2149.10	2149.09 j
17	CB-318 - CB-317	0.21	18	57.179	0.54	Cir	2148.69	2149.00	1.06	3.71	3.39	2149.15	2149.49
18	CB-319 - CB-318	0.14	18	25.421	0.59	Cir	2149.10	2149.25	0.71	1.94	2.66	2149.49	2149.56 j
19	RSR-321 - FES-320	0.01	24	56.616	1.01	Cir	2125.43	2126.00	0.05	0.03	1.29	2126.47	2126.08

Y:\Shared\2_ENG\R\R656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE STM.dwg, 5/15/2025 4:39 PM, Toby Harris

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS

ENGINEER'S SEAL:
030895
TOBIN M. HARRIS
Toby M Harris
09/20/2024

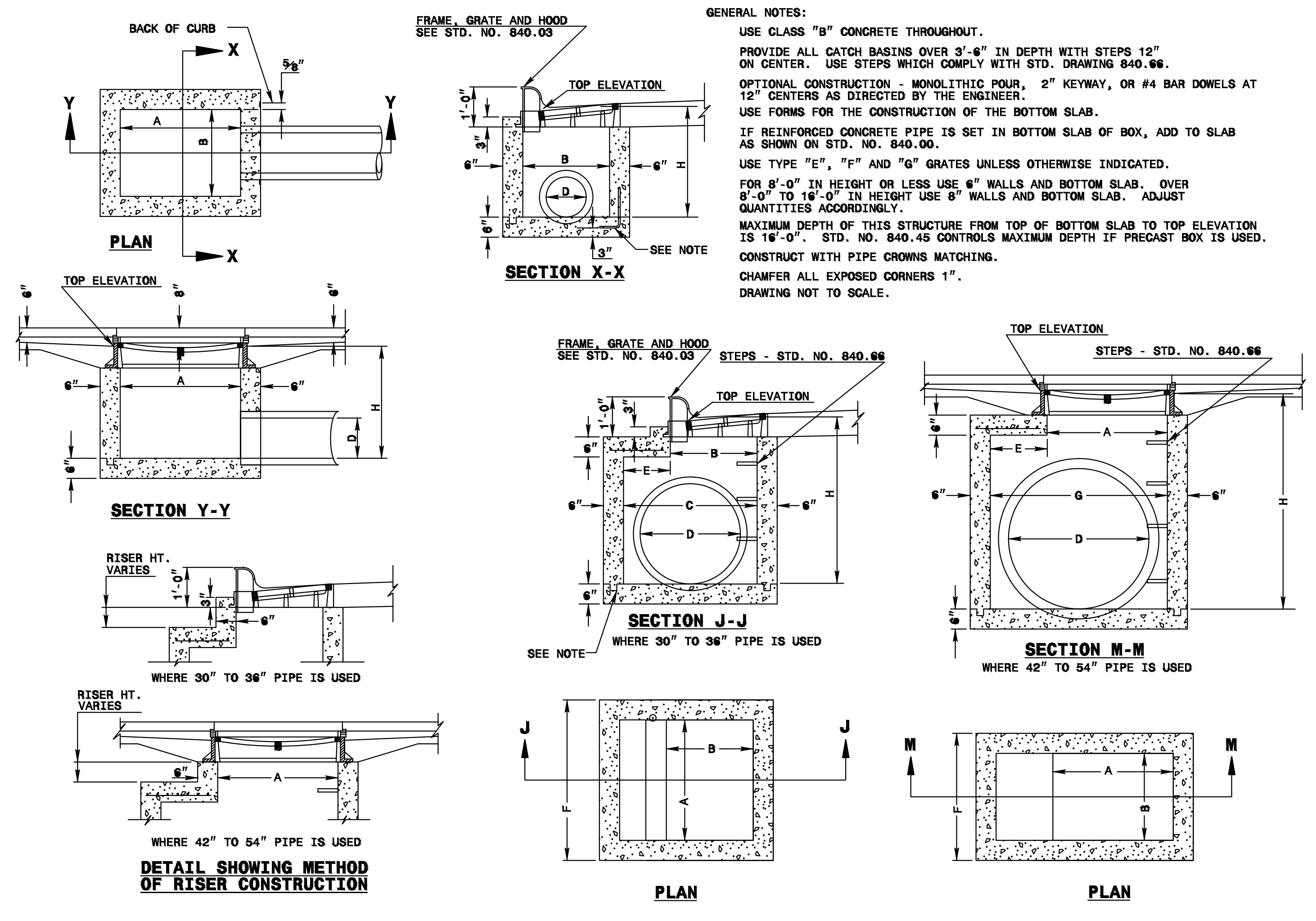
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
STORM PLAN & PROFILE - 3

DRAWING NO:
20


BACK OF CURB
FRAME, GRATE AND HOOD SEE STD. NO. 840.03
TOP ELEVATION
SEE NOTE
SECTION X-X
PLAN
SECTION Y-Y
FRAME, GRATE AND HOOD SEE STD. NO. 840.03
STEPS - STD. NO. 840.66
SECTION J-J
WHERE 30" TO 36" PIPE IS USED
SECTION M-M
WHERE 42" TO 54" PIPE IS USED
RISER HT. VARIES
WHERE 30" TO 36" PIPE IS USED
WHERE 42" TO 54" PIPE IS USED
DETAIL SHOWING METHOD OF RISER CONSTRUCTION
PLAN
PLAN

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

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

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS 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 STD. NO. 840.00.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

MAXIMUM DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 16'-0". STD. NO. 840.45 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

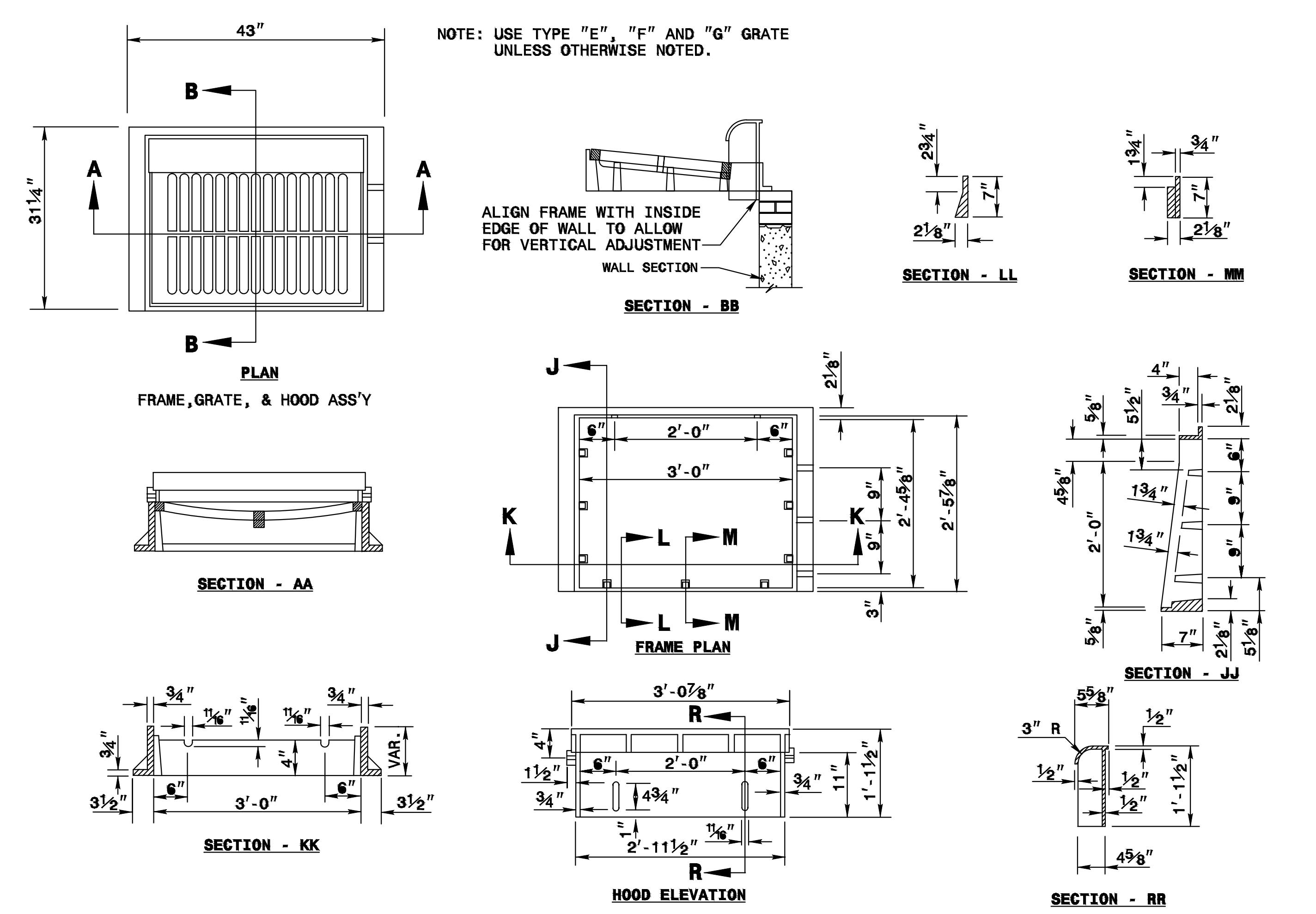
DRAWING NOT TO SCALE.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

SHEET 1 OF 2
840.02

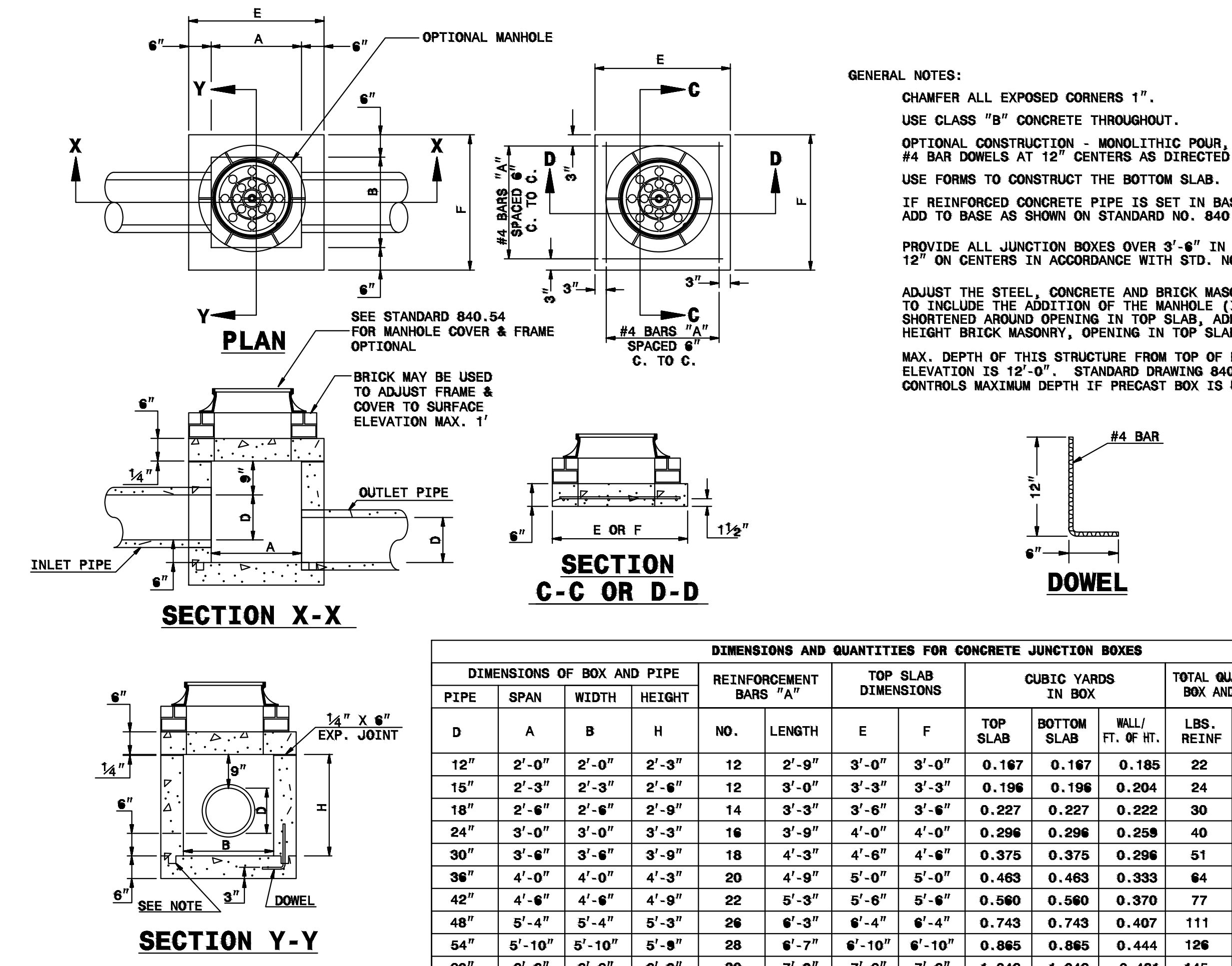
NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.



STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 1 OF 2
840.03



GENERAL NOTES:

CHAMFER ALL EXPOSED CORNERS 1".

USE CLASS "B" CONCRETE THROUGHOUT.

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

USE FORMS TO CONSTRUCT THE BOTTOM SLAB.

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

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

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

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

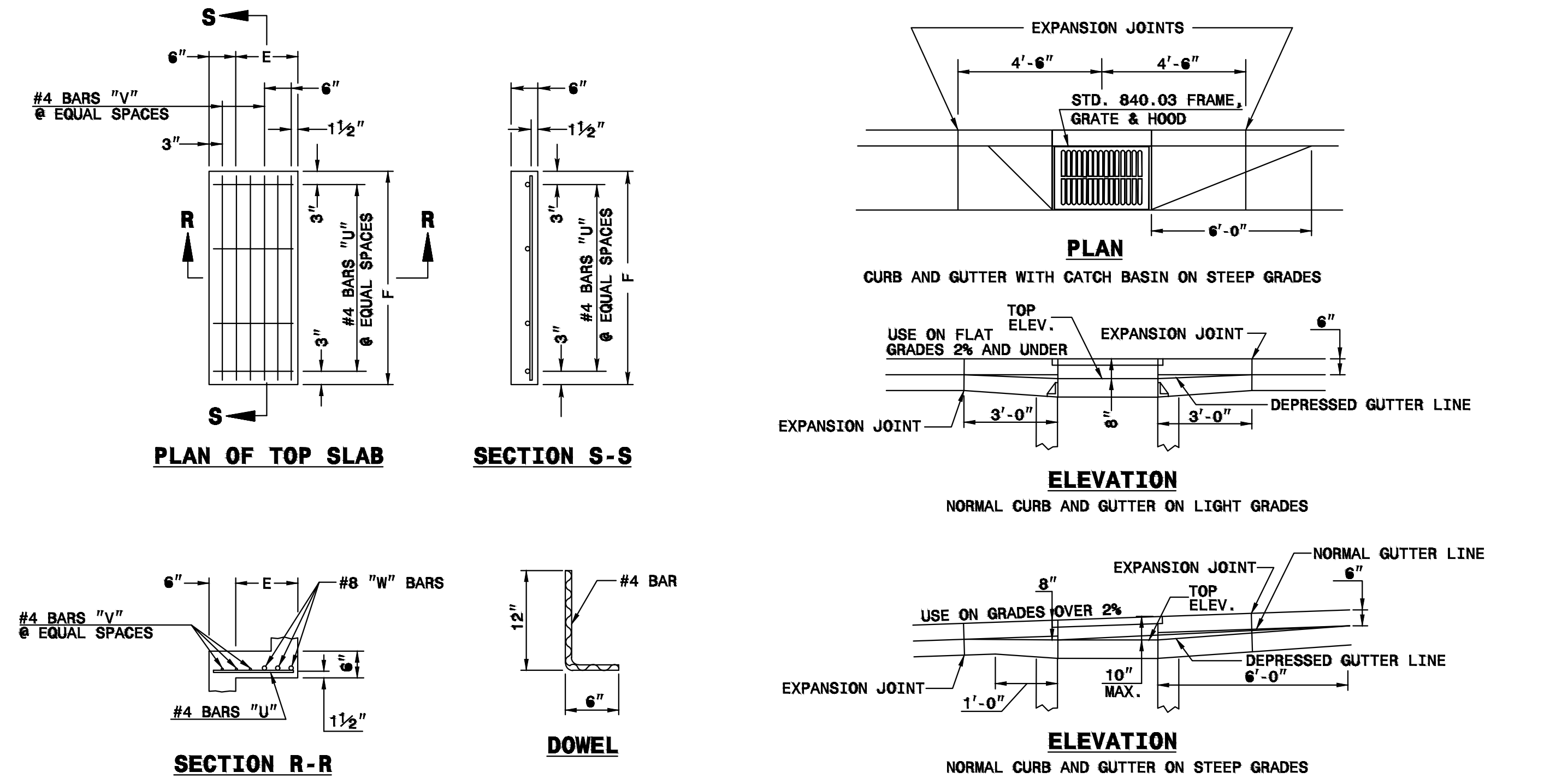
DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES

DIMENSIONS OF BOX AND PIPE				REINFORCEMENT BARS "A"		TOP SLAB DIMENSIONS		CUBIC YARDS IN BOX			TOTAL QUANTITIES BOX AND SLABS		DEDUCTIONS FOR ONE PIPE CU.YDS.	
PIPE	SPAN	WIDTH	HEIGHT											
D	A	B	H	NO.	LENGTH	E	F	TOP SLAB	BOTTOM SLAB	WALL/ FT. OF HT.	LBS. REINF	CU. YDS. MIN. "H"	C.S.	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

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
CONCRETE JUNCTION BOX
12" THRU 66" PIPE

SHEET 1 OF 1
840.31


#4 BARS "V" @ EQUAL SPACES
#4 BARS "U" @ EQUAL SPACES
PLAN OF TOP SLAB
SECTION S-S
EXPANSION JOINTS
STD. 840.03 FRAME, GRATE & HOOD
PLAN
CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES
USE ON FLAT GRADES 2% AND UNDER
EXPANSION JOINT
DEPRESSED GUTTER LINE
ELEVATION
NORMAL CURB AND GUTTER ON LIGHT GRADES
#8 "W" BARS
#4 BAR
#4 BARS "U"
SECTION R-R
DOWEL
NORMAL GUTTER LINE
USE ON GRADES OVER 2%
TOP ELEV.
DEPRESSED GUTTER LINE
10" MAX.
ELEVATION
NORMAL CURB AND GUTTER ON STEEP GRADES

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		TOTAL LBS.	CU.YDS. CONC. IN BOX			DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT										TOP SLAB	BOTTOM SLAB	TOT. CONC. FOR MINIMUM HEIGHT, H		
D	A	B	C	G	H	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH					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	0.112	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

STATE OF
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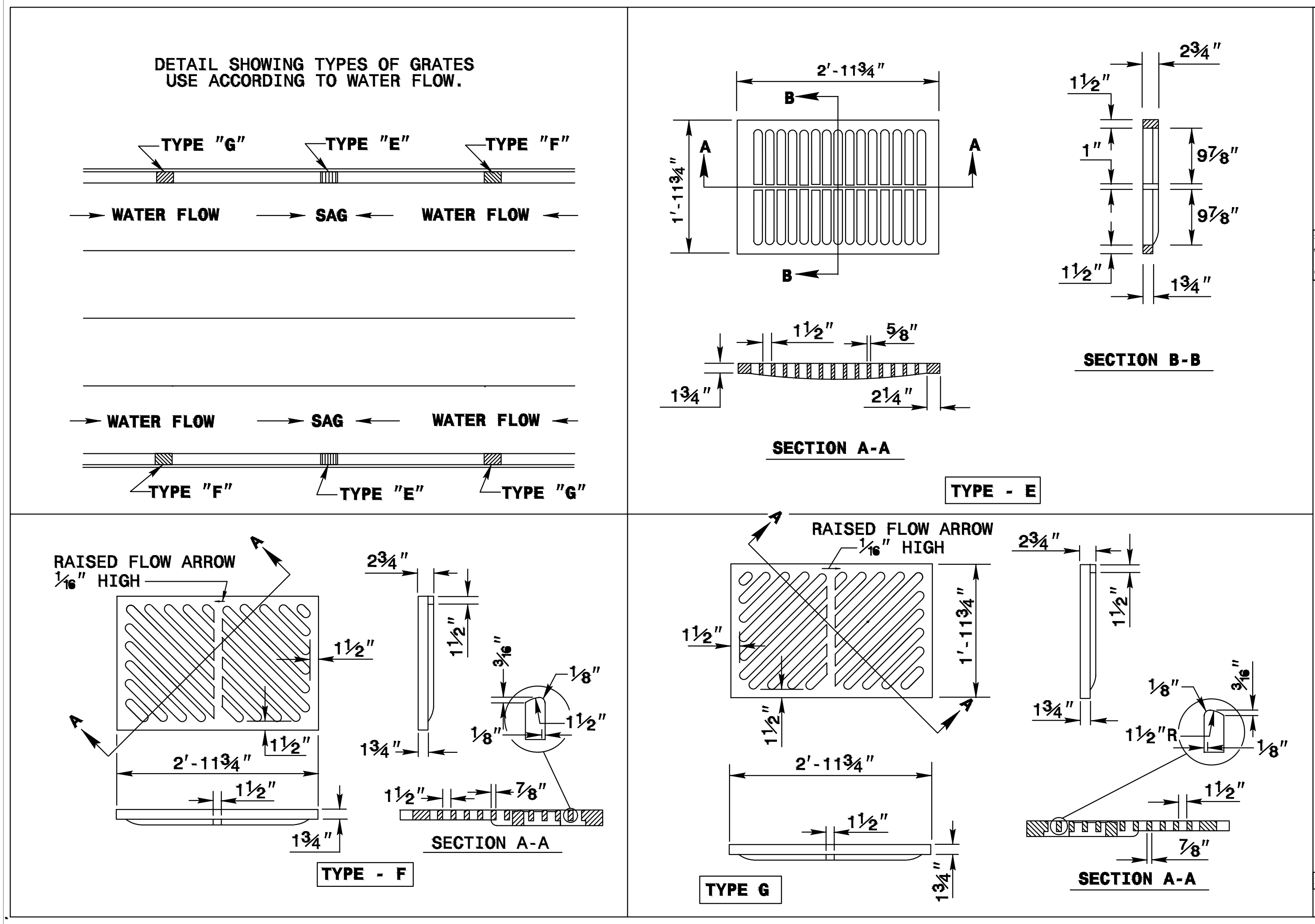
RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

SHEET 2 OF 2
840.02



STATE OF
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RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 2 OF 2
840.03

GENERAL NOTES

USE 4000 PSI MINIMUM COMPRESSIVE STRENGTH CONCRETE.

USE ASTM A615 GRADE 60 REINFORCING STEEL. USE ASTM A1064 WELDED WIRE FABRIC (WWF).

FABRICATE, ASSEMBLE AND DESIGN PRECAST MANHOLE COMPONENTS ACCORDANCE WITH AASHTO M199.

ASSEMBLE RISER AND GRADE RINGS WITH THE STEPS SPACED 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.

THE HEIGHT OF GRADE ADJUSTMENT RINGS PLUS FRAME AND COVER SHALL NOT EXCEED 24".

WHERE THE MANHOLE IS EXPOSED TO ROAD TRAFFIC, CONSTRUCT THE TOP OF THE MANHOLE FLUSH WITH THE GROUND AND A MINIMUM OF 9" ABOVE THE GROUND AT OTHER LOCATIONS.

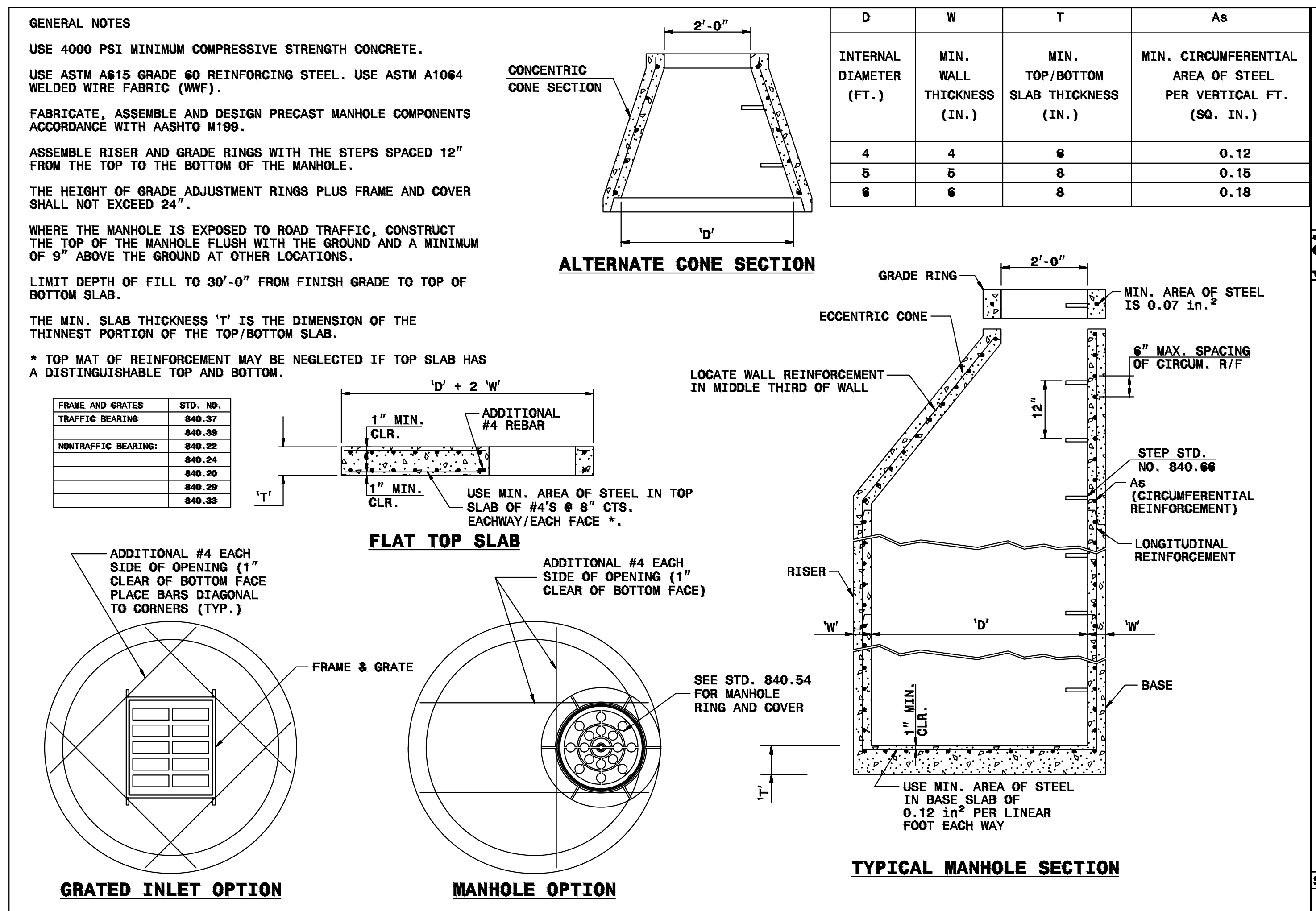
LIMIT DEPTH OF FILL TO 30'-0" FROM FINISH GRADE TO TOP OF BOTTOM SLAB.

THE MIN. SLAB THICKNESS 'T' IS THE DIMENSION OF THE THINNEST PORTION OF THE TOP/BOTTOM SLAB.

* TOP MAT OF REINFORCEMENT MAY BE NEGLECTED IF TOP SLAB HAS A DISTINGUISHABLE TOP AND BOTTOM.

D	W	T	As
INTERNAL DIAMETER (FT.)	MIN. WALL THICKNESS (IN.)	MIN. TOP/BOTTOM SLAB THICKNESS (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

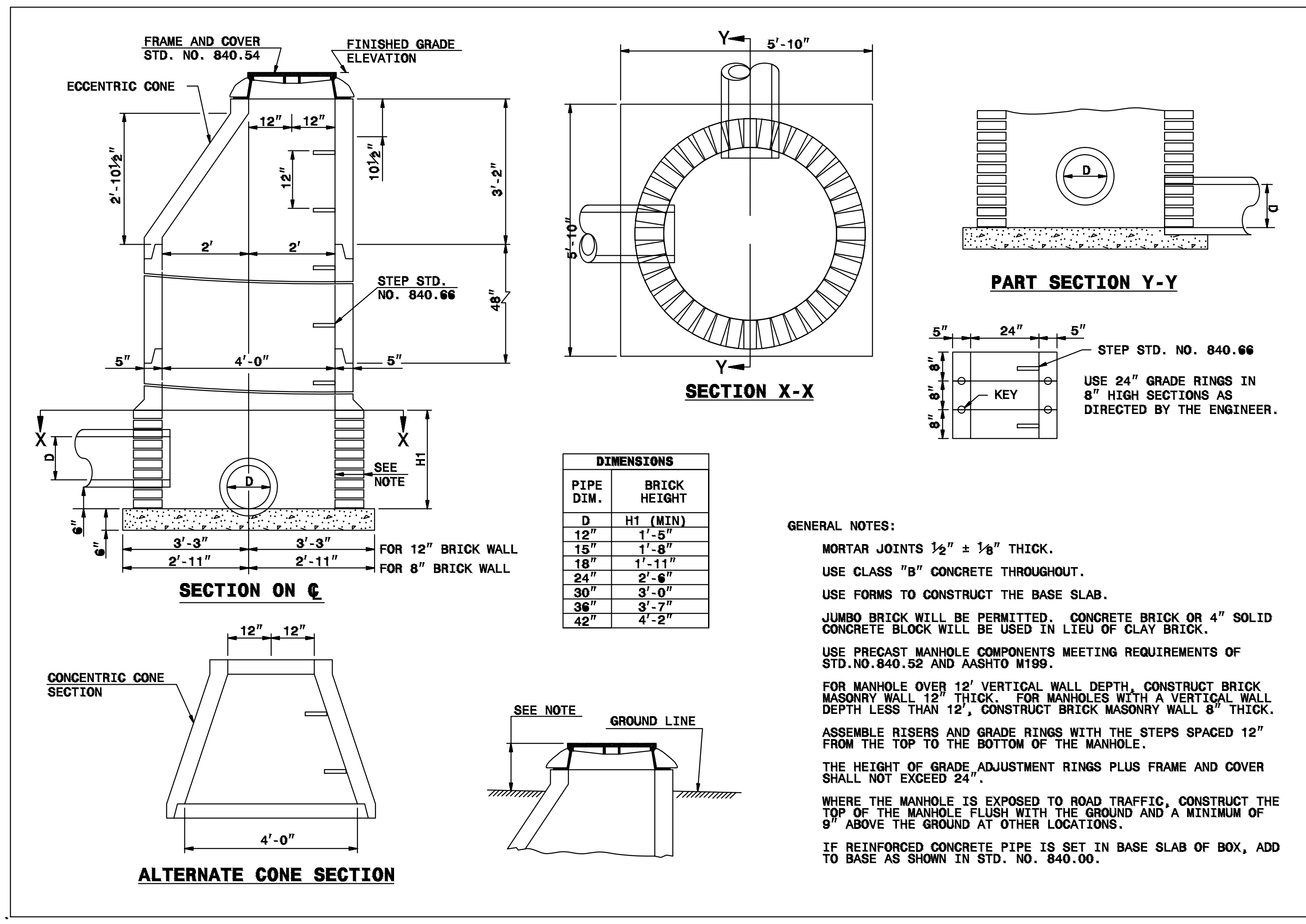
FRAME AND GRATES	STD. NO.
TRAFFIC BEARING	840.37
	840.39
NONTRAFFIC BEARING:	840.22
	840.24
	840.20
	840.29
	840.33


2'-0"
CONCENTRIC CONE SECTION
'D'
ALTERNATE CONE SECTION
GRADE RING
MIN. AREA OF STEEL IS 0.07 in.²
ECCENTRIC CONE
6" MAX. SPACING OF CIRCUM. R/F
LOCATE WALL REINFORCEMENT IN MIDDLE THIRD OF WALL
STEP STD. NO. 840.66
As (CIRCUMFERENTIAL REINFORCEMENT)
LONGITUDINAL REINFORCEMENT
RISER
'W'
'D'
'W'
BASE
USE MIN. AREA OF STEEL IN BASE SLAB OF 0.12 in² PER LINEAR FOOT EACH WAY
TYPICAL MANHOLE SECTION
'D' + 2 'W'
1" MIN. CLR.
ADDITIONAL #4 REBAR
'T'
1" MIN. CLR.
USE MIN. AREA OF STEEL IN TOP SLAB OF #4'S @ 8" CTS. EACHWAY/EACH FACE *.
FLAT TOP SLAB
ADDITIONAL #4 EACH SIDE OF OPENING (1" CLEAR OF BOTTOM FACE PLACE BARS DIAGONAL TO CORNERS (TYP.)
FRAME & GRATE
GRATED INLET OPTION
ADDITIONAL #4 EACH SIDE OF OPENING (1" CLEAR OF BOTTOM FACE)
SEE STD. 840.54 FOR MANHOLE RING AND COVER
MANHOLE OPTION

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
PRECAST MANHOLE 4', 5' AND 6' DIAMETER
12" THRU 48" PIPE

SHEET 1 OF 1
840.52



DIMENSIONS	
PIPE DIM.	BRICK HEIGHT
D	H1 (MIN)
12"	1'-5"
15"	1'-8"
18"	1'-11"
24"	2'-6"
30"	3'-0"
36"	3'-7"
42"	4'-2"

GENERAL NOTES:

MORTAR JOINTS 1/2" ± 1/8" THICK.

USE CLASS "B" CONCRETE THROUGHOUT.

USE FORMS TO CONSTRUCT THE BASE SLAB.

JUMBO BRICK WILL BE PERMITTED. CONCRETE BRICK OR 4" SOLID CONCRETE BLOCK WILL BE USED IN LIEU OF CLAY BRICK.

USE PRECAST MANHOLE COMPONENTS MEETING REQUIREMENTS OF STD.NO.840.52 AND AASHTO M199.

FOR MANHOLE OVER 12' VERTICAL WALL DEPTH, CONSTRUCT BRICK MASONRY WALL 12" THICK. FOR MANHOLES WITH A VERTICAL WALL DEPTH LESS THAN 12', CONSTRUCT BRICK MASONRY WALL 8" THICK.

ASSEMBLE RISERS AND GRADE RINGS WITH THE STEPS SPACED 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.

THE HEIGHT OF GRADE ADJUSTMENT RINGS PLUS FRAME AND COVER SHALL NOT EXCEED 24".

WHERE THE MANHOLE IS EXPOSED TO ROAD TRAFFIC, CONSTRUCT THE TOP OF THE MANHOLE FLUSH WITH THE GROUND AND A MINIMUM OF 9" ABOVE THE GROUND AT OTHER LOCATIONS.

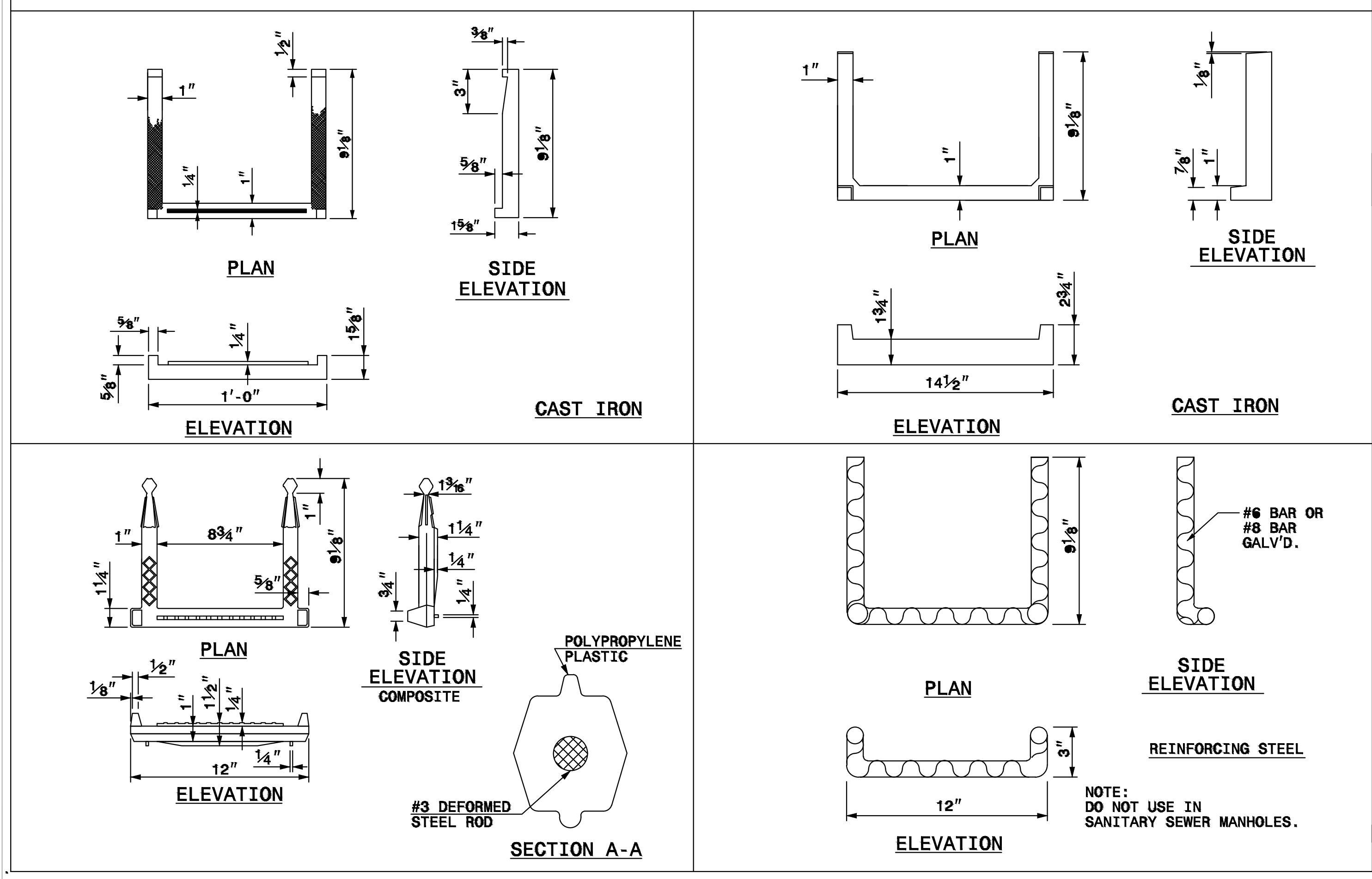
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN IN STD. NO. 840.00.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
PRECAST MANHOLE WITH MASONRY BASE
12" THRU 42" PIPE

SHEET 1 OF 1
840.53

NOTES:
INSTALL ALL STEPS PROTRUDING 4" FROM INSIDE FACE OF STRUCTURE WALL.
STEPS DIFFERING IN DIMENSIONS, CONFIGURATION, OR MATERIALS FROM THOSE SHOWN MAY ALSO BE USED PROVIDED THE CONTRACTOR HAS FURNISHED THE ENGINEER WITH DETAILS OF THE PROPOSED STEPS AND HAS RECEIVED WRITTEN APPROVAL FROM THE ENGINEER FOR THE USE OF SUCH STEPS.



STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1-24

ROADWAY STANDARD DRAWING FOR
DRAINAGE STRUCTURE STEPS

SHEET 1 OF 1
840.66

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
030895
09/16/2024

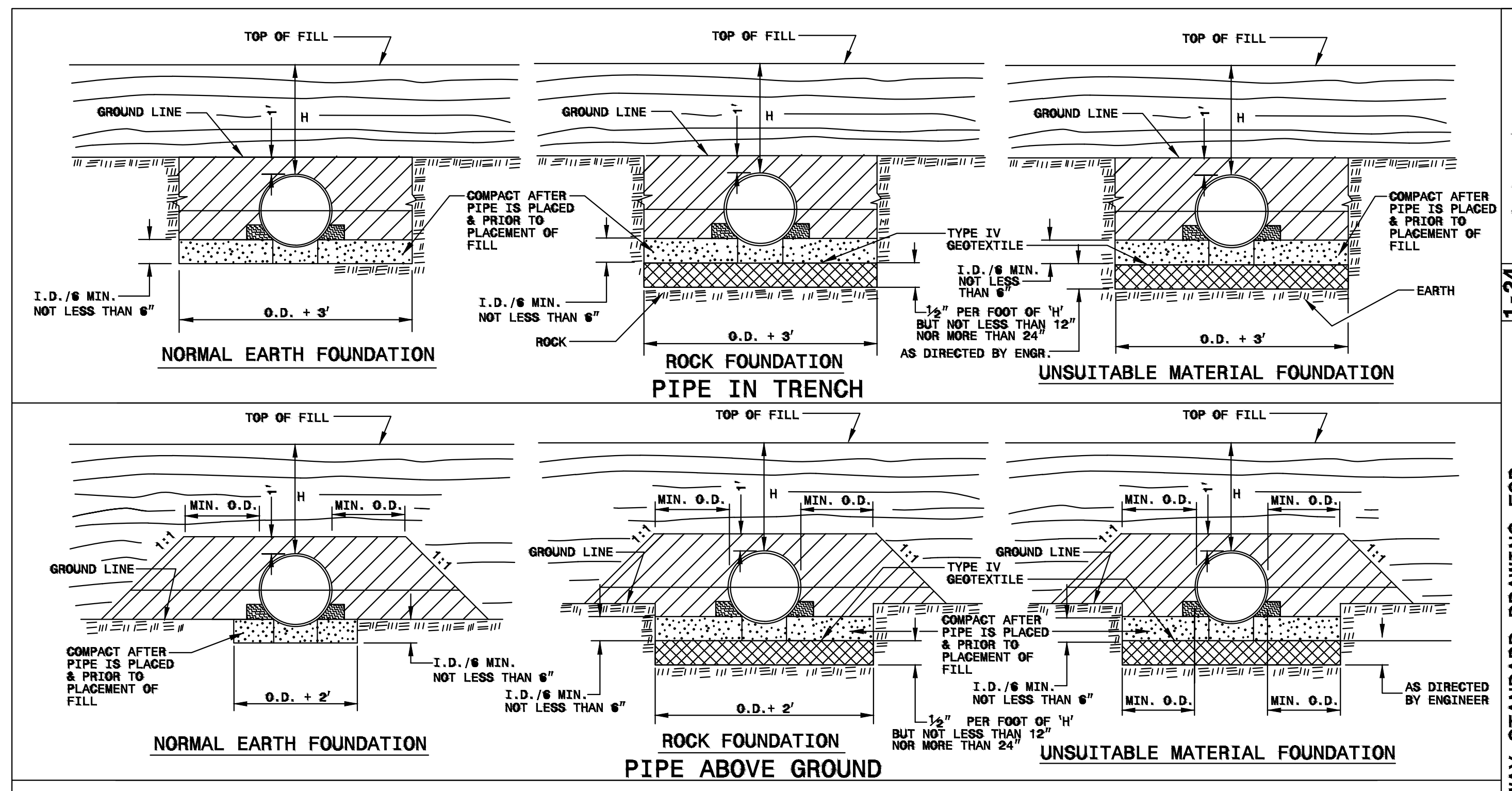
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
STORM DETAILS-1
(SHEET 1 OF 2)

DRAWING NO:
21



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

☰	APPROVED SUITABLE LOCAL MATERIAL.
▦	TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
⛆	LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

—	SPRINGLINE OF PIPE
▨	SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.
☰	UNDISTURBED EARTH MATERIAL
▩	SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

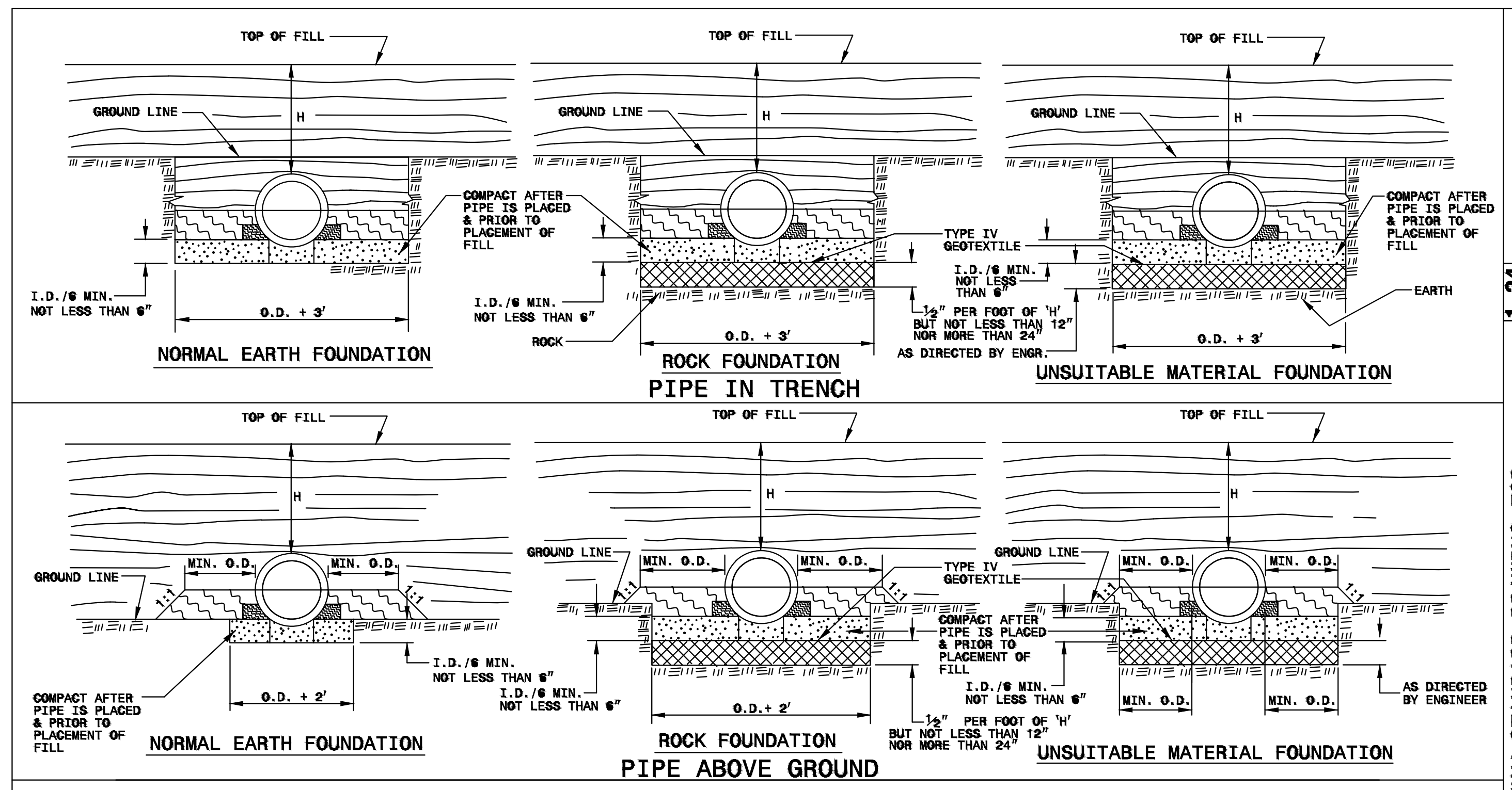
2

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

1-24

ROADWAY STANDARD DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 2
300.01



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

☰	APPROVED SUITABLE LOCAL MATERIAL.
▦	TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
⛆	LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

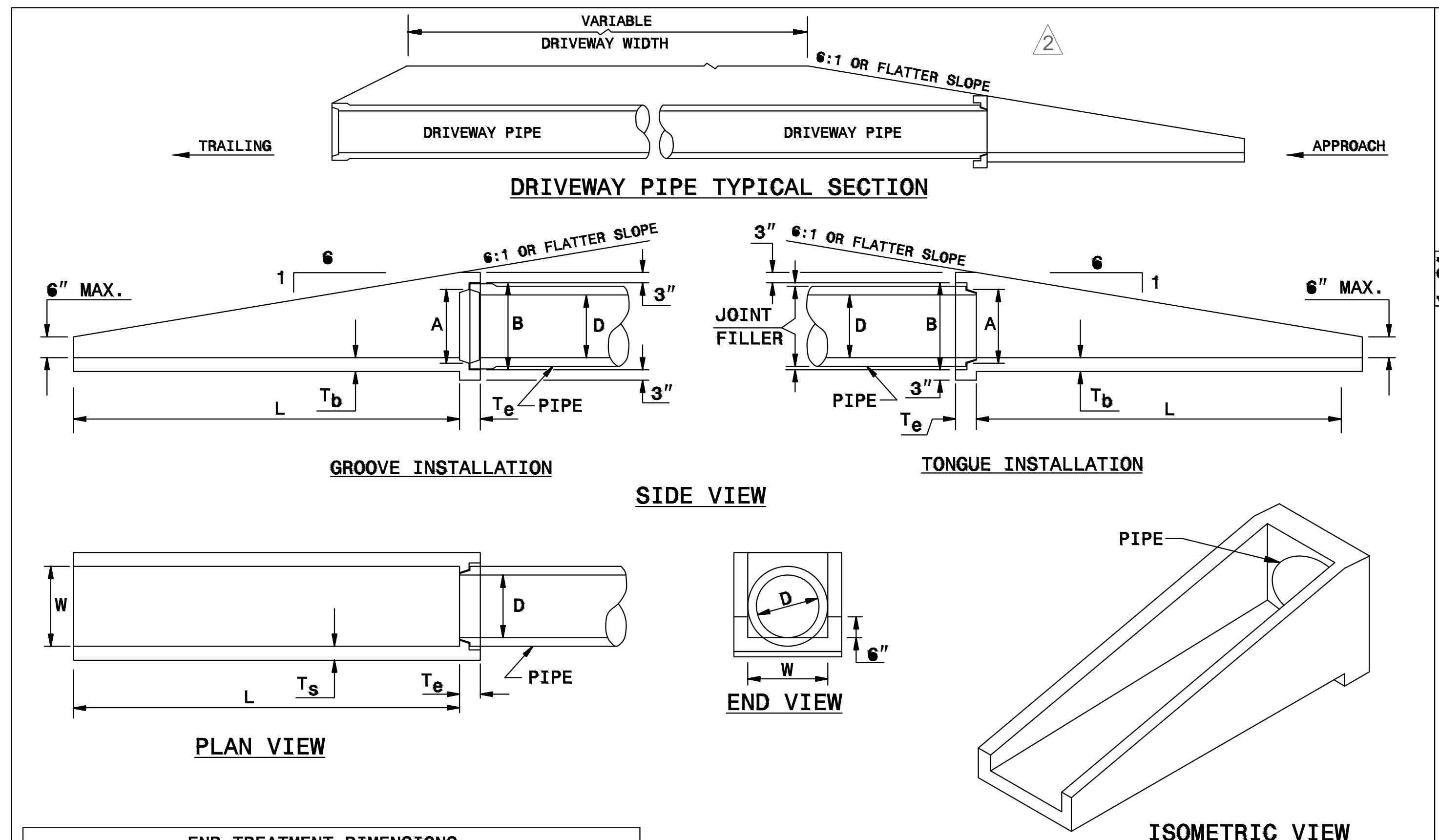
—	SPRINGLINE OF PIPE
▨	SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.
☰	UNDISTURBED EARTH MATERIAL
▩	SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

1-24

ROADWAY STANDARD DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 2
300.01



END TREATMENT DIMENSIONS							
D	L	W	T_s	T_b	T_e	A	B
15"	7'-6"	19"	4"	4"	6"	17¾"	20⅞"
18"	9'-0"	23"	4"	4"	6"	21¼"	25"
24"	12'-6"	30"	4"	4"	6"	27⅞"	32"

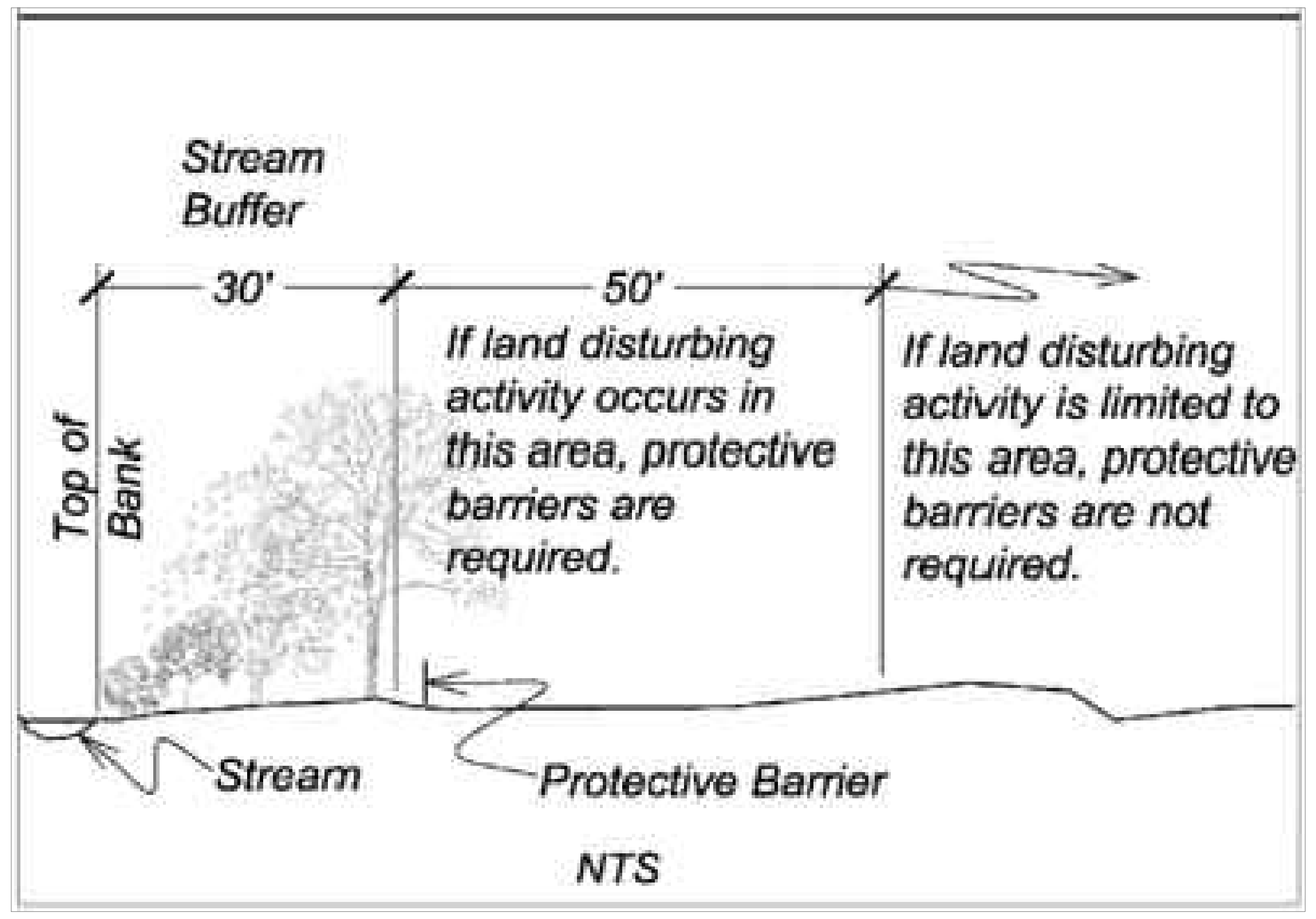
NOTES:
1. CONSTRUCT PIPE END SECTION USING #4 REBAR SPACED 9" EACH WAY AND MEET ALL REQUIREMENTS OF STD. SPEC. 310.
2. CHAMFER ALL EXPOSED CORNERS ¾".

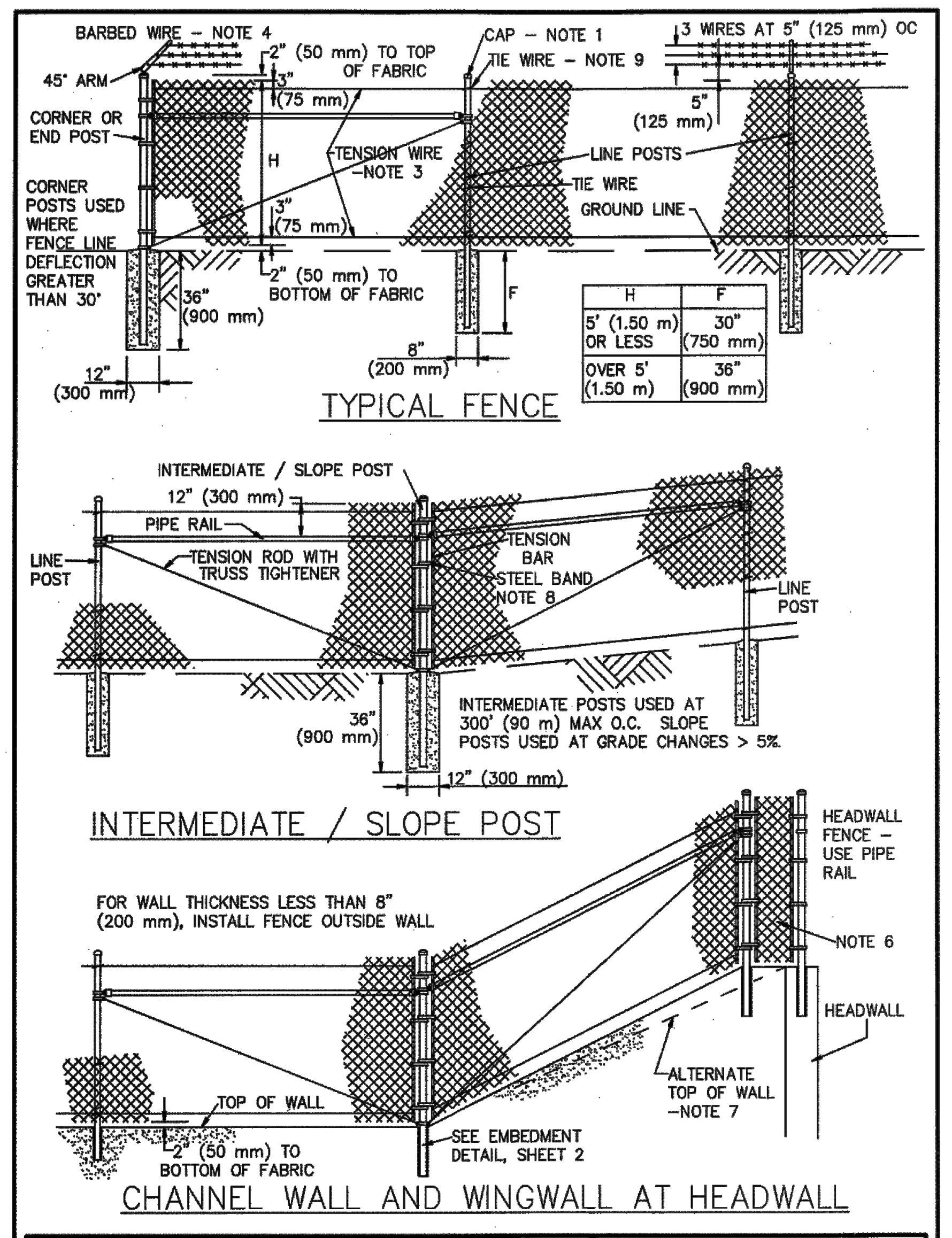
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
PARALLEL PIPE END SECTION
PRECAST CONCRETE SECTION FOR 15" TO 24" PIPE

SHEET 1 OF 1
310.02


Stream Buffer
30'
50'
Top of Bank
If land disturbing activity occurs in this area, protective barriers are required.
If land disturbing activity is limited to this area, protective barriers are not required.
Stream
Protective Barrier
NTS


BARBED WIRE – NOTE 4
45° ARM
2" (50 mm) TO TOP OF FABRIC
CAP – NOTE 1
TIE WIRE – NOTE 9
3 WIRES AT 5" (125 mm) OC
CORNER OR END POST
CORNER POSTS USED WHERE FENCE LINE DEFLECTION GREATER THAN 30°
3" (75 mm)
H
TENSION WIRE –NOTE 3
LINE POSTS
TIE WIRE
GROUND LINE
2" (50 mm) TO BOTTOM OF FABRIC
36" (900 mm)
12" (300 mm)
8" (200 mm)
F
TYPICAL FENCE
INTERMEDIATE / SLOPE POST
12" (300 mm)
PIPE RAIL
TENSION ROD WITH TRUSS TIGHTENER
LINE POST
TENSION BAR
STEEL BAND NOTE 8
INTERMEDIATE POSTS USED AT 300' (90 m) MAX O.C. SLOPE POSTS USED AT GRADE CHANGES > 5%
INTERMEDIATE / SLOPE POST
FOR WALL THICKNESS LESS THAN 8" (200 mm), INSTALL FENCE OUTSIDE WALL
HEADWALL FENCE – USE PIPE RAIL
NOTE 6
HEADWALL
TOP OF WALL
ALTERNATE TOP OF WALL –NOTE 7
2" (50 mm) TO BOTTOM OF FABRIC
SEE EMBEDMENT DETAIL, SHEET 2
CHANNEL WALL AND WINGWALL AT HEADWALL

H	F
5' (1.50 m) OR LESS	30" (750 mm)
OVER 5' (1.50 m)	36" (900 mm)

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

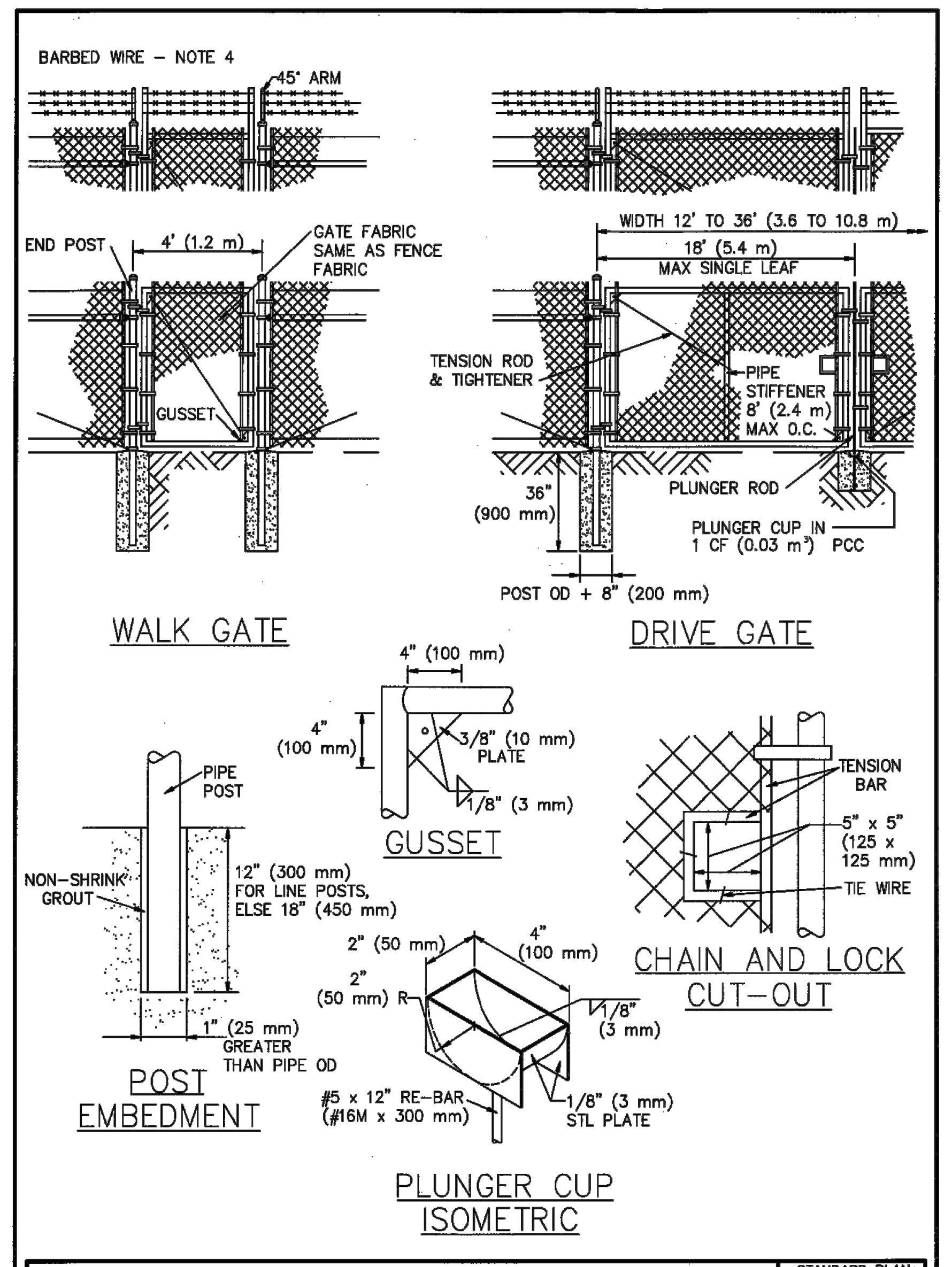
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE 1994 REV. 1998, 2003

CHAIN LINK FENCE AND GATES

STANDARD PLAN 600–3

SHEET 1 OF 3

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

CHAIN LINK FENCE AND GATES

STANDARD PLAN 600–3

SHEET 2 OF 3

NOTES:

1. SECURE DRIVE–FIT GALVANIZED CAP TO POST WITH 1/4" (6 mm) ROUND–HEAD RIVET.
2. H DENOTES FABRIC WIDTH AND NOMINAL FENCE HEIGHT. H = 5' (1.5 m) UNLESS OTHERWISE NOTED.
3. IF FENCE WITH TOP RAIL IS SPECIFIED, DELETE STEEL TENSION WIRE AT TOP, AND PIPE RAILS AT INTERMEDIATE, SLOPE, END AND CORNER POSTS. EXTEND TENSION ROD TO TOP RAIL.
4. BARBED WIRE SHALL BE USED ONLY WHEN SPECIFIED.
5. POST SPACING IS MAXIMUM 10' (3.0 m).
6. FILL CLEAR OPENINGS GREATER THAN 3" (75 mm) WITH FABRIC. FOR OPENINGS LESS THAN 18" (450 mm), TIE FABRIC TO POSTS.
7. USE ONE POST FOR COMBINED SLOPE AND CORNER POST IF TOP OF CHANNEL WALL IS CONSTRUCTED AS SHOWN FOR "ALTERNATE".
8. STEEL BANDS AT TENSION BARS SHALL BE 1/8" x 1" (3 x 25 mm), MINIMUM, SPACED AT MAXIMUM 16" (400 mm).
9. SECURE TENSION WIRES TO EACH LINE POST WITH TIE WIRES.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

CHAIN LINK FENCE AND GATES

STANDARD PLAN 600–3

SHEET 3 OF 3

2

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
SEAL 030895
TOBIN M. HARRIS
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
STORM DETAILS-2
(SHEET 2 OF 2)

DRAWING NO:
22

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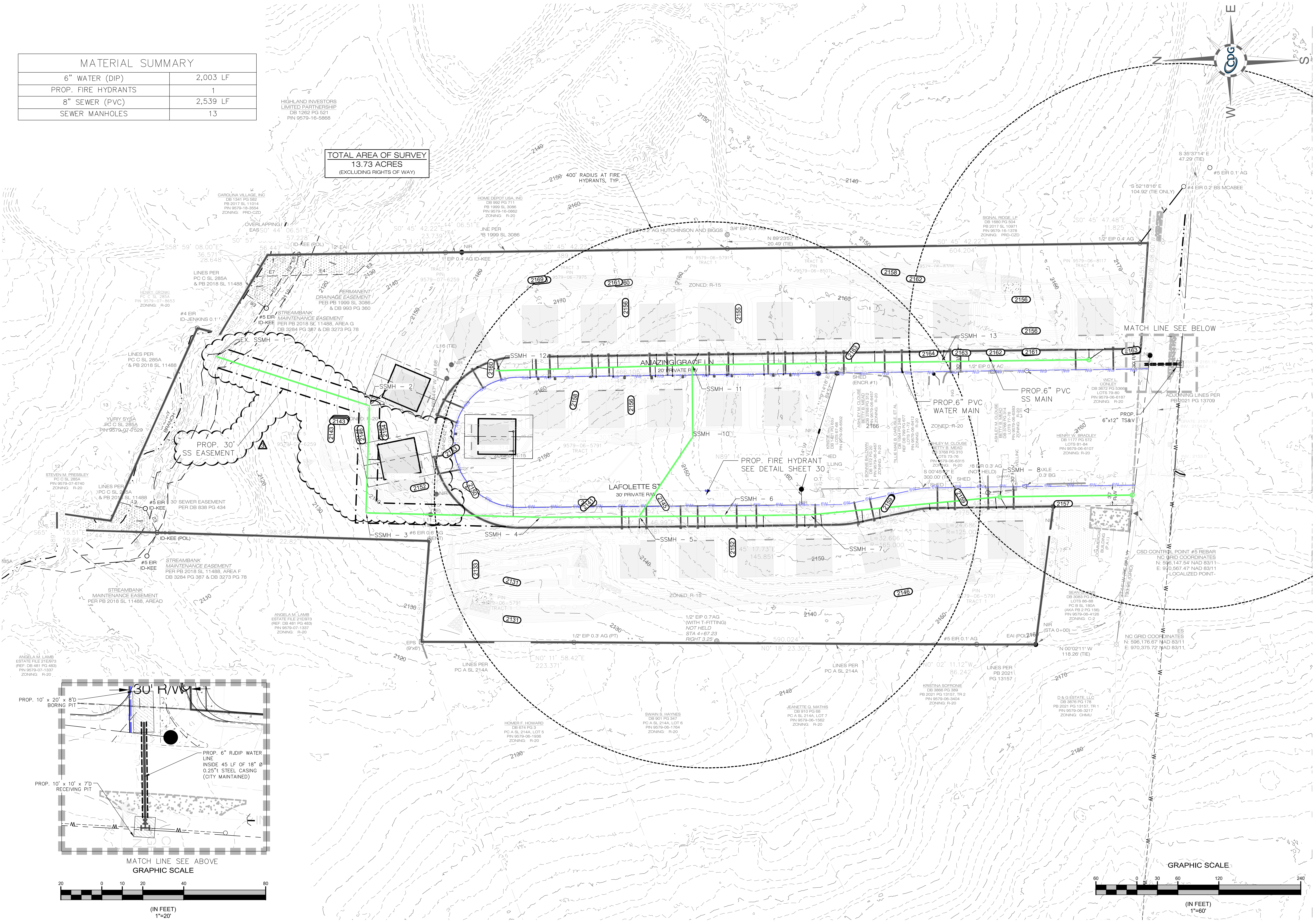
MATERIAL SUMMARY	
6" WATER (DIP)	2,003 LF
PROP. FIRE HYDRANTS	1
8" SEWER (PVC)	2,539 LF
SEWER MANHOLES	13



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FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
3	02/18/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS

02/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

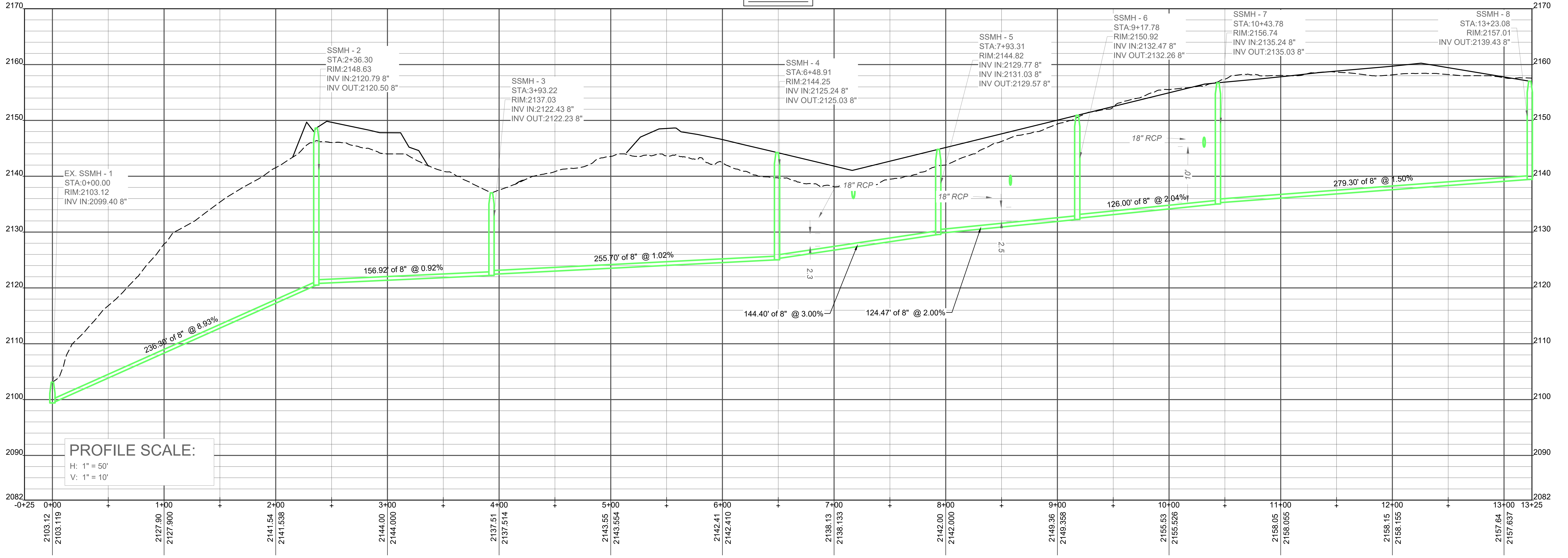
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

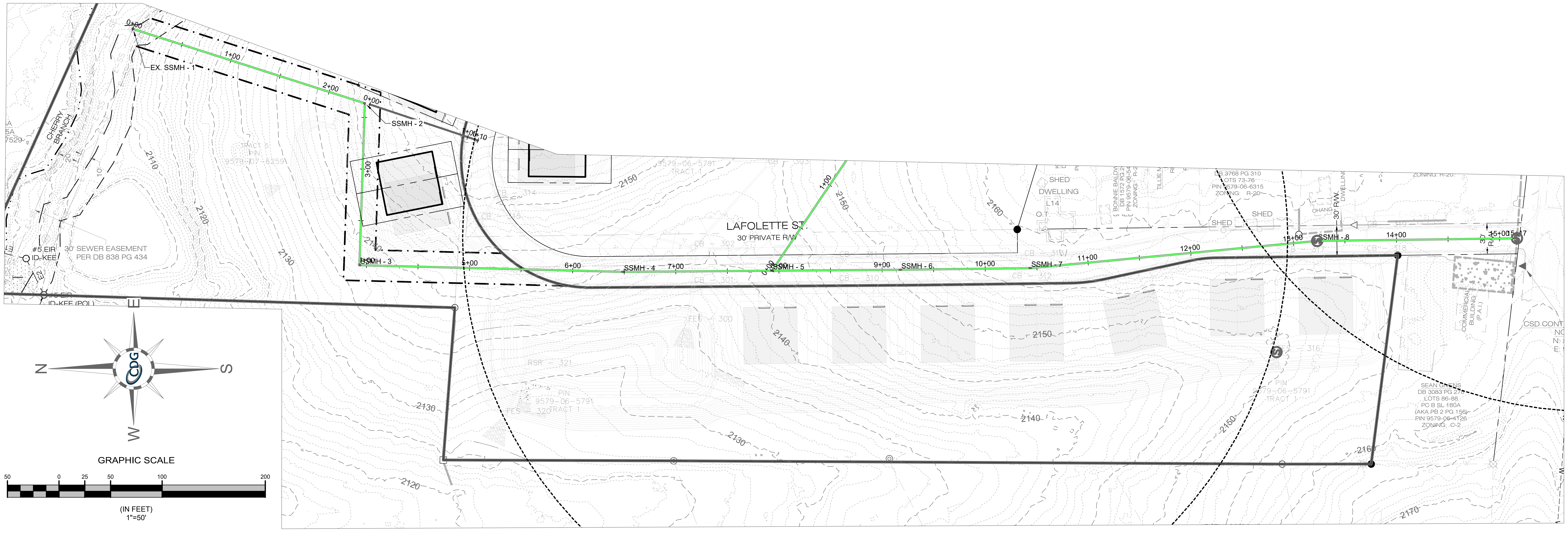
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: UTILITY PLAN

DRAWING NO: 23

SS 1-9





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FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS

09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP

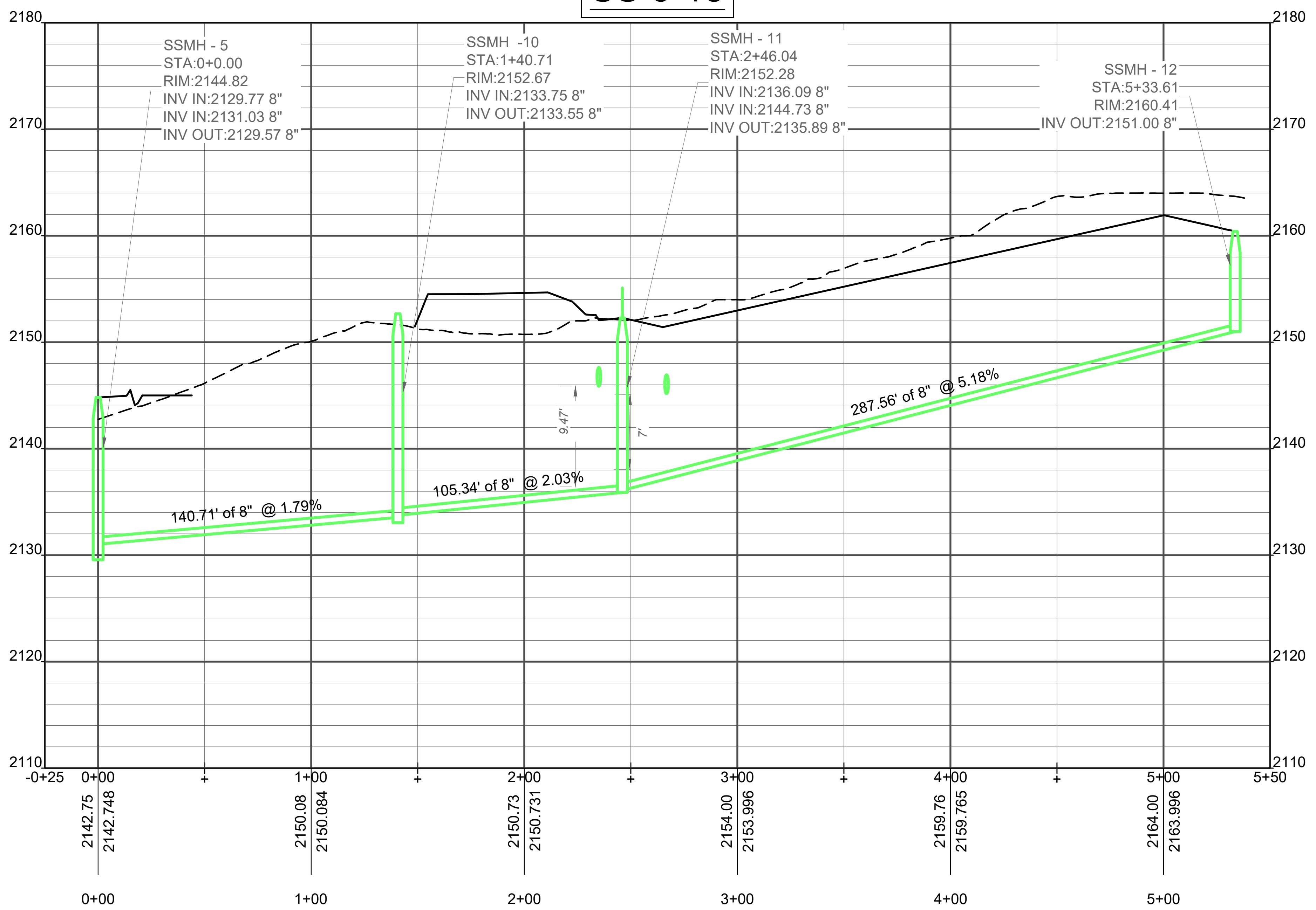
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
SANITARY SEWER PLAN & PROFILE - 1

DRAWING NO:
24

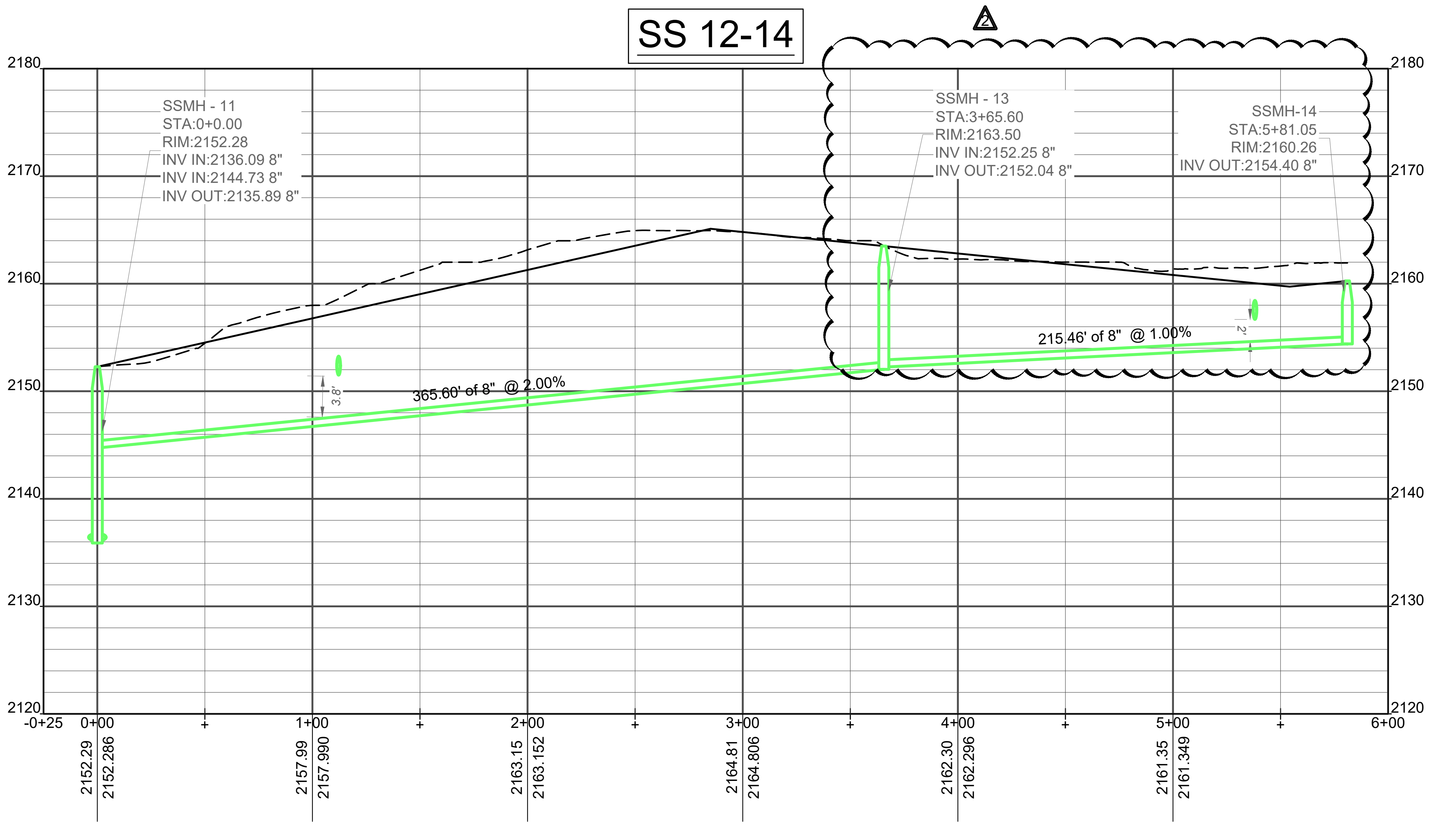
SS 6-13



PROFILE SCALE:

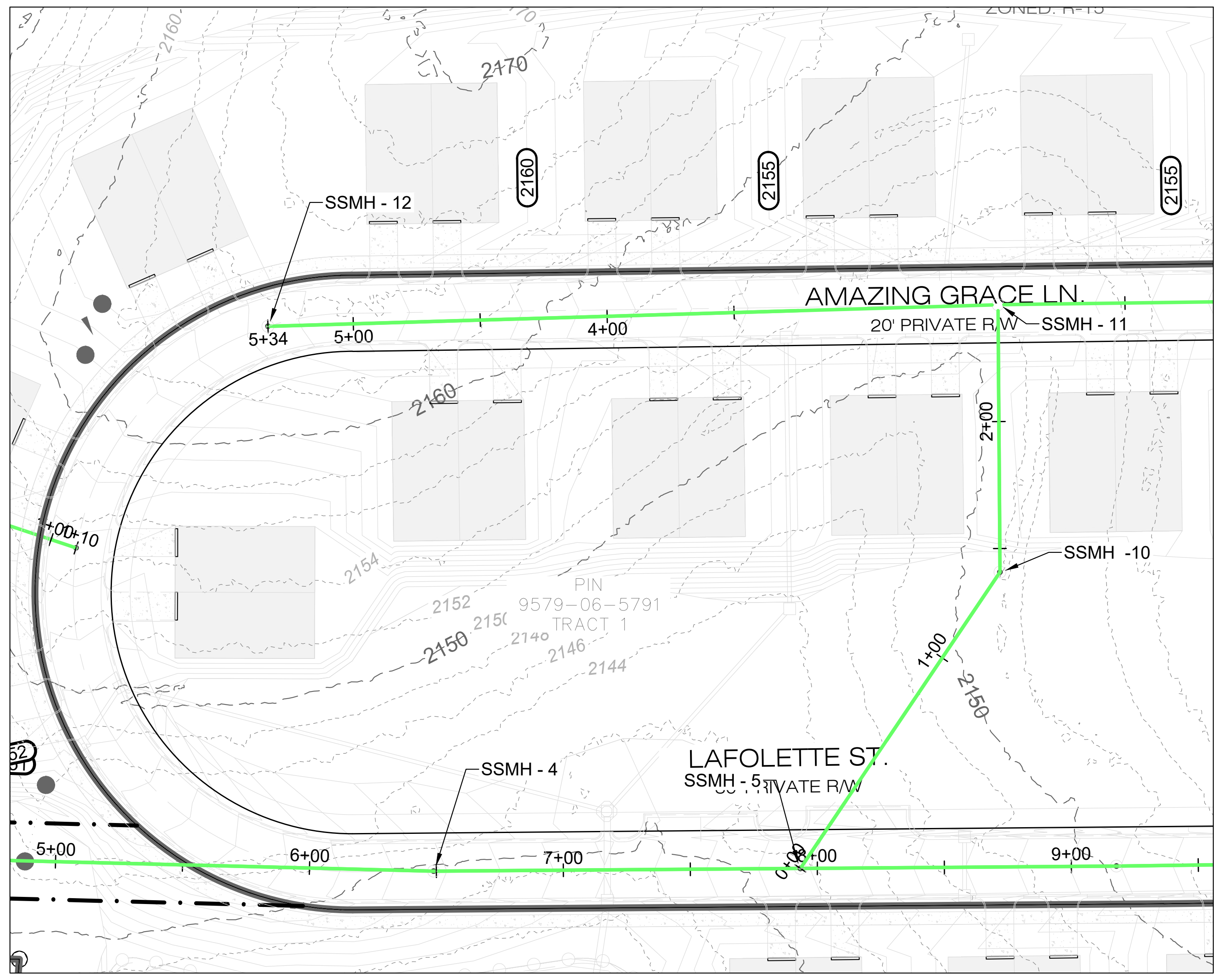
H: 1" = 50'
V: 1" = 10'

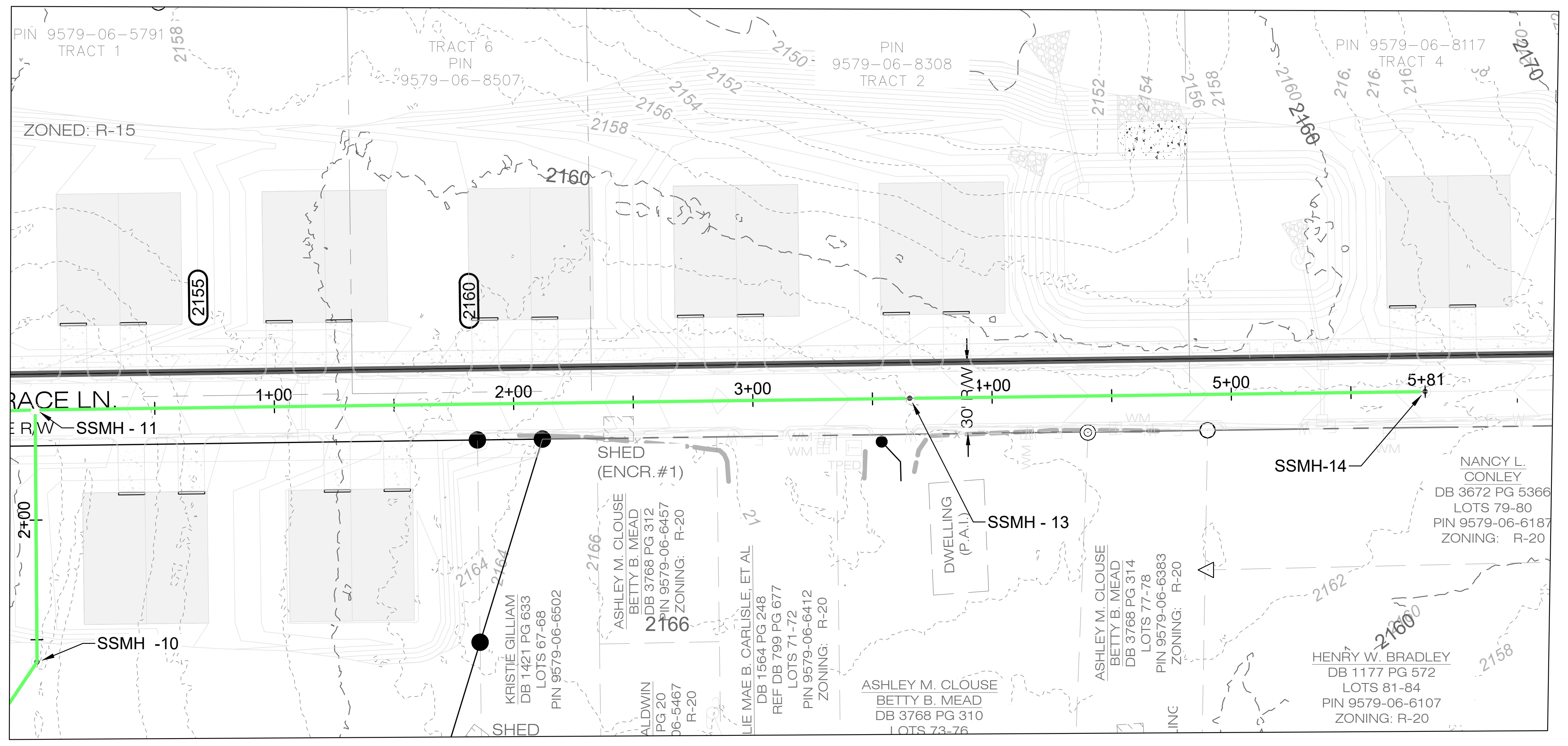
SS 12-14

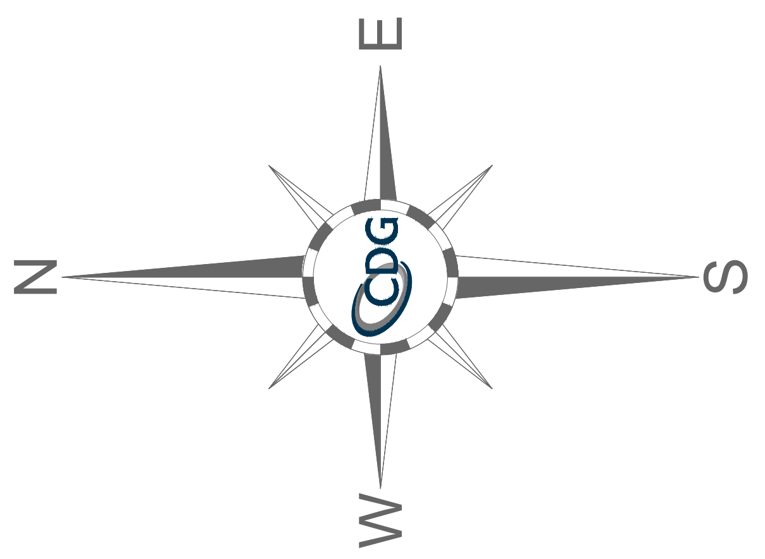


PROFILE SCALE:

H: 1" = 50'
V: 1" = 10'







GRAPHIC SCALE

(IN FEET)
1"=50'

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FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS

01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

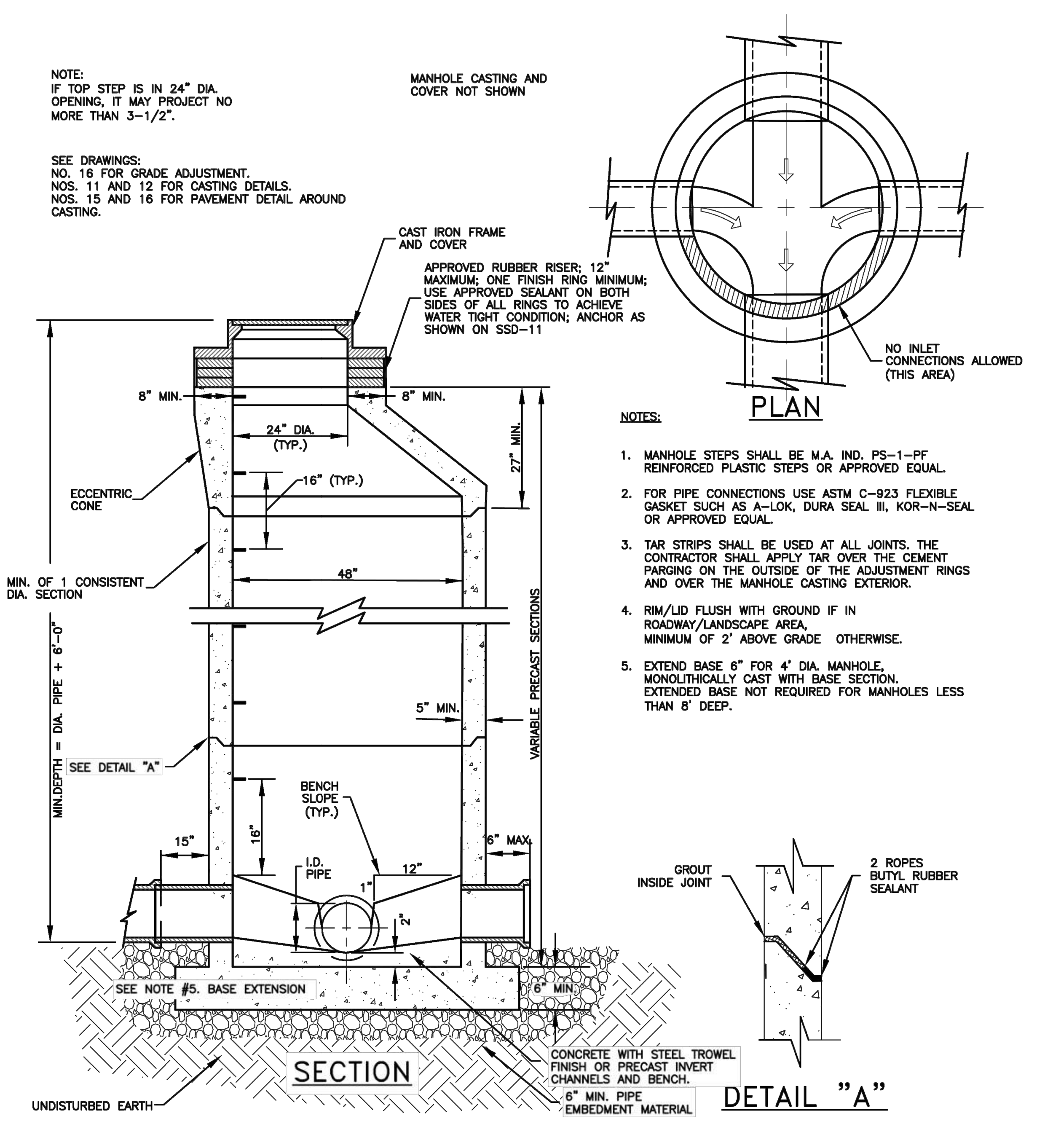
THREE NOTCH GROUP

4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
SANITARY SEWER PLAN & PROFILE - 2

DRAWING NO:
25


MANHOLE CASTING AND COVER NOT SHOWN
CAST IRON FRAME AND COVER
APPROVED RUBBER RISER; 12" MAXIMUM; ONE FINISH RING MINIMUM; USE APPROVED SEALANT ON BOTH SIDES OF ALL RINGS TO ACHIEVE WATER TIGHT CONDITION; ANCHOR AS SHOWN ON SSD-11
8" MIN.
8" MIN.
24" DIA. (TYP.)
27" MIN.
ECCENTRIC CONE
16" (TYP.)
MIN. OF 1 CONSISTENT DIA. SECTION
48"
MIN.DEPTH = DIA. PIPE + 6'-0"
VARIABLE PRECAST SECTIONS
5" MIN.
SEE DETAIL "A"
BENCH SLOPE (TYP.)
16"
15"
6" MAX.
I.D. PIPE
12"
1"
2"
SEE NOTE #5. BASE EXTENSION
6" MIN.
CONCRETE WITH STEEL TROWEL FINISH OR PRECAST INVERT CHANNELS AND BENCH.
6" MIN. PIPE EMBEDMENT MATERIAL
UNDISTURBED EARTH
SECTION
NO INLET CONNECTIONS ALLOWED (THIS AREA)
PLAN
GROUT INSIDE JOINT
2 ROPES BUTYL RUBBER SEALANT
DETAIL "A"

NOTE:
IF TOP STEP IS IN 24" DIA. OPENING, IT MAY PROJECT NO MORE THAN 3-1/2".

SEE DRAWINGS:
NO. 16 FOR GRADE ADJUSTMENT.
NOS. 11 AND 12 FOR CASTING DETAILS.
NOS. 15 AND 16 FOR PAVEMENT DETAIL AROUND CASTING.

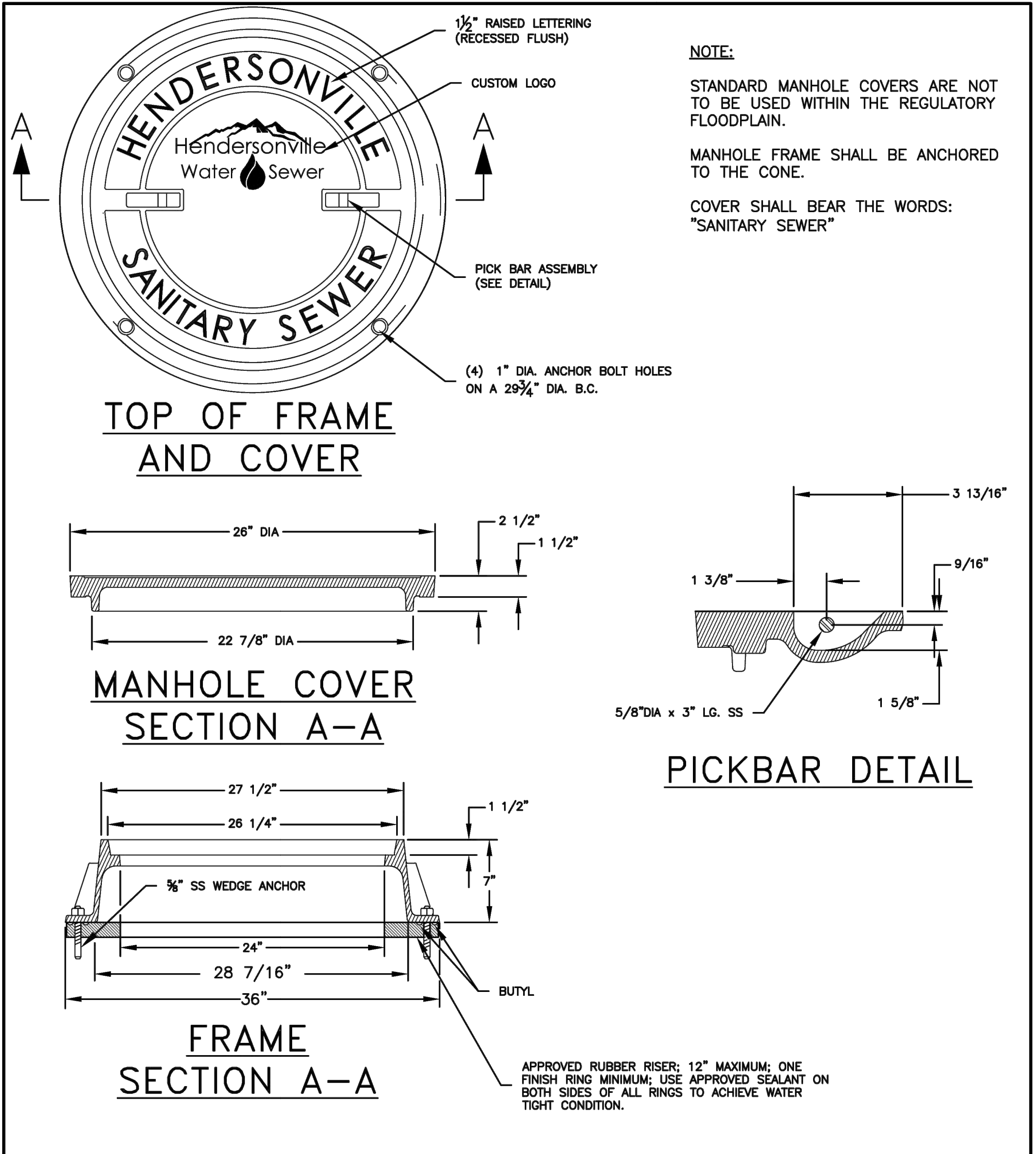
NOTES:

1. MANHOLE STEPS SHALL BE M.A. IND. PS-1-PF REINFORCED PLASTIC STEPS OR APPROVED EQUAL.
2. FOR PIPE CONNECTIONS USE ASTM C-923 FLEXIBLE GASKET SUCH AS A-LOK, DURA SEAL III, KOR-N-SEAL OR APPROVED EQUAL.
3. TAR STRIPS SHALL BE USED AT ALL JOINTS. THE CONTRACTOR SHALL APPLY TAR OVER THE CEMENT PARGING ON THE OUTSIDE OF THE ADJUSTMENT RINGS AND OVER THE MANHOLE CASTING EXTERIOR.
4. RIM/LID FLUSH WITH GROUND IF IN ROADWAY/LANDSCAPE AREA, MINIMUM OF 2' ABOVE GRADE OTHERWISE.
5. EXTEND BASE 6" FOR 4' DIA. MANHOLE, MONOLITHICALLY CAST WITH BASE SECTION. EXTENDED BASE NOT REQUIRED FOR MANHOLES LESS THAN 8' DEEP.

DATE: 01/26/2024	SS-D DWG. NO. 6
SCALE: NOT TO SCALE	

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

PRECAST MANHOLE


1½" RAISED LETTERING (RECESSED FLUSH)
CUSTOM LOGO
HENDERSONVILLE
Hendersonville Water Sewer
SANITARY SEWER
A
A
PICK BAR ASSEMBLY (SEE DETAIL)
(4) 1" DIA. ANCHOR BOLT HOLES ON A 29¾" DIA. B.C.
TOP OF FRAME AND COVER
26" DIA
2 1/2"
1 1/2"
22 7/8" DIA
MANHOLE COVER SECTION A-A
3 13/16"
9/16"
1 3/8"
1 5/8"
5/8"DIA x 3" LG. SS
PICKBAR DETAIL
27 1/2"
26 1/4"
1 1/2"
7"
⅝" SS WEDGE ANCHOR
24"
28 7/16"
36"
BUTYL
FRAME SECTION A-A
APPROVED RUBBER RISER; 12" MAXIMUM; ONE FINISH RING MINIMUM; USE APPROVED SEALANT ON BOTH SIDES OF ALL RINGS TO ACHIEVE WATER TIGHT CONDITION.

NOTE:

STANDARD MANHOLE COVERS ARE NOT TO BE USED WITHIN THE REGULATORY FLOODPLAIN.

MANHOLE FRAME SHALL BE ANCHORED TO THE CONE.

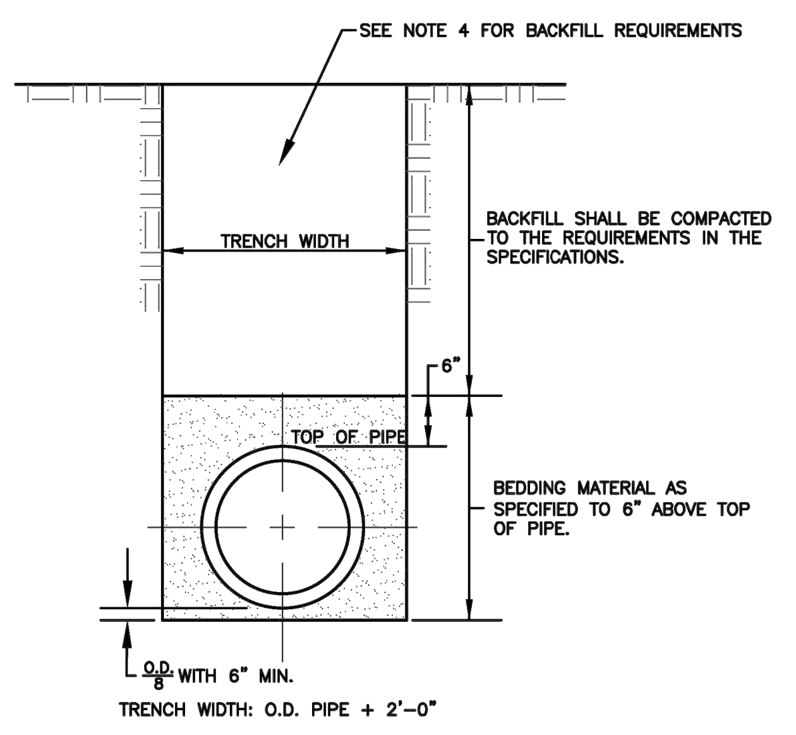
COVER SHALL BEAR THE WORDS: "SANITARY SEWER"

DATE: 01/26/2024	SS-D DWG. NO. 11
SCALE: NOT TO SCALE	

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

STANDARD MANHOLE FRAME AND COVER

H:\DETAILS\-Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, 1/26/2024 11:52:52 AM


SEE NOTE 4 FOR BACKFILL REQUIREMENTS
TRENCH WIDTH
BACKFILL SHALL BE COMPACTED TO THE REQUIREMENTS IN THE SPECIFICATIONS.
6"
TOP OF PIPE
BEDDING MATERIAL AS SPECIFIED TO 6" ABOVE TOP OF PIPE.
O.D./8 WITH 6" MIN.

TRENCH WIDTH: O.D. PIPE + 2'-0"

NOTES:

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

DATE: 10/19/2023	SS-D DWG. NO. 1
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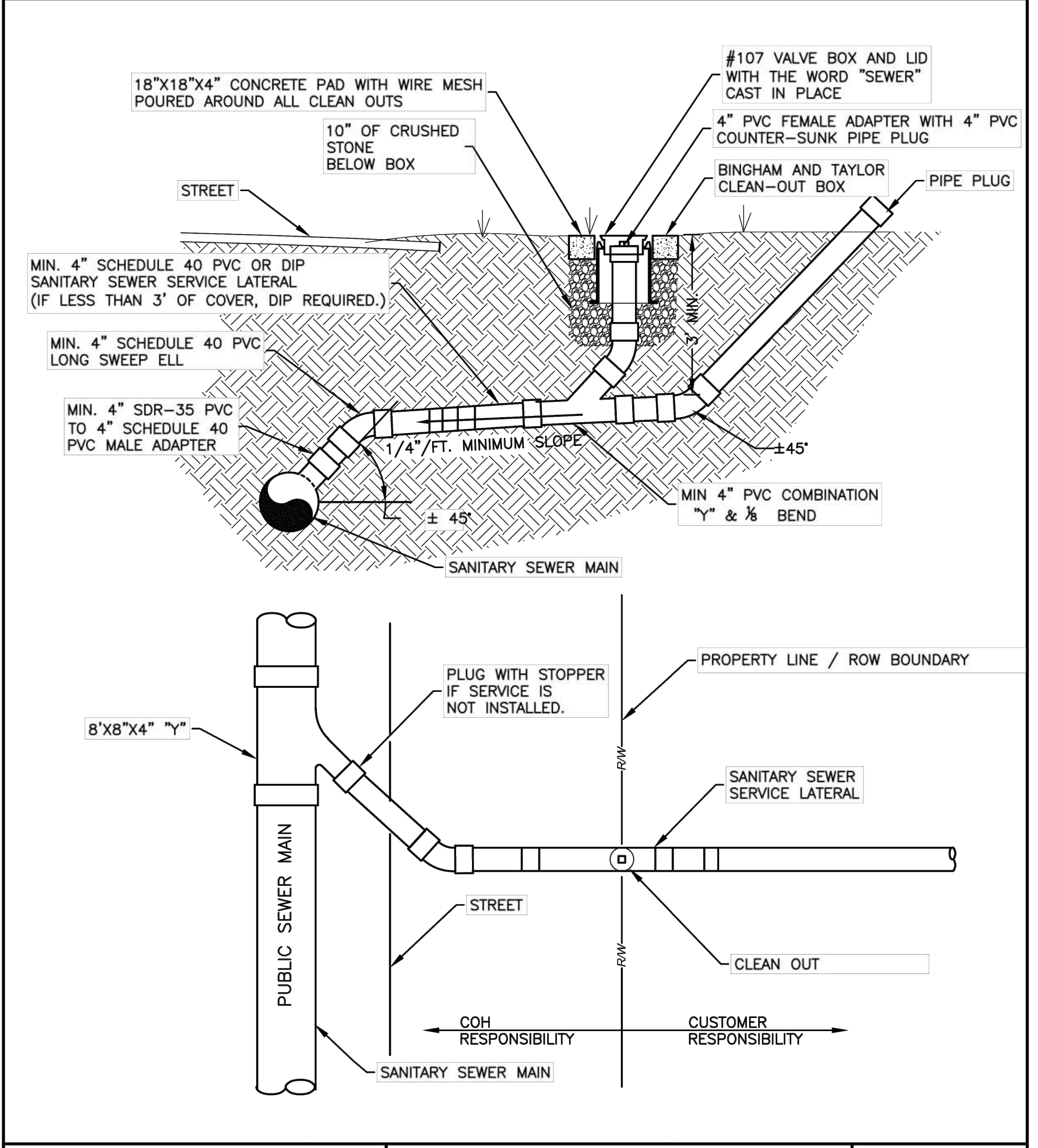
GRAVITY SEWER TRENCH CONSTRUCTION OUTSIDE PAVEMENT


18"X18"X4" CONCRETE PAD WITH WIRE MESH POURED AROUND ALL CLEAN OUTS
#107 VALVE BOX AND LID WITH THE WORD "SEWER" CAST IN PLACE
10" OF CRUSHED STONE BELOW BOX
4" PVC FEMALE ADAPTER WITH 4" PVC COUNTER-SUNK PIPE PLUG
BINGHAM AND TAYLOR CLEAN-OUT BOX
STREET
PIPE PLUG
MIN. 4" SCHEDULE 40 PVC OR DIP SANITARY SEWER SERVICE LATERAL (IF LESS THAN 3' OF COVER, DIP REQUIRED.)
3' MIN.
MIN. 4" SCHEDULE 40 PVC LONG SWEEP ELL
MIN. 4" SDR-35 PVC TO 4" SCHEDULE 40 PVC MALE ADAPTER
1/4"/FT. MINIMUM SLOPE
±45°
MIN 4" PVC COMBINATION "Y" & ⅛ BEND
± 45°
SANITARY SEWER MAIN
PLUG WITH STOPPER IF SERVICE IS NOT INSTALLED.
PROPERTY LINE / ROW BOUNDARY
8'X8"X4" "Y"
R/W
SANITARY SEWER SERVICE LATERAL
PUBLIC SEWER MAIN
STREET
R/W
CLEAN OUT
COH RESPONSIBILITY
CUSTOMER RESPONSIBILITY
SANITARY SEWER MAIN

DATE: 10/19/2023	SS-D DWG. NO. 04
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
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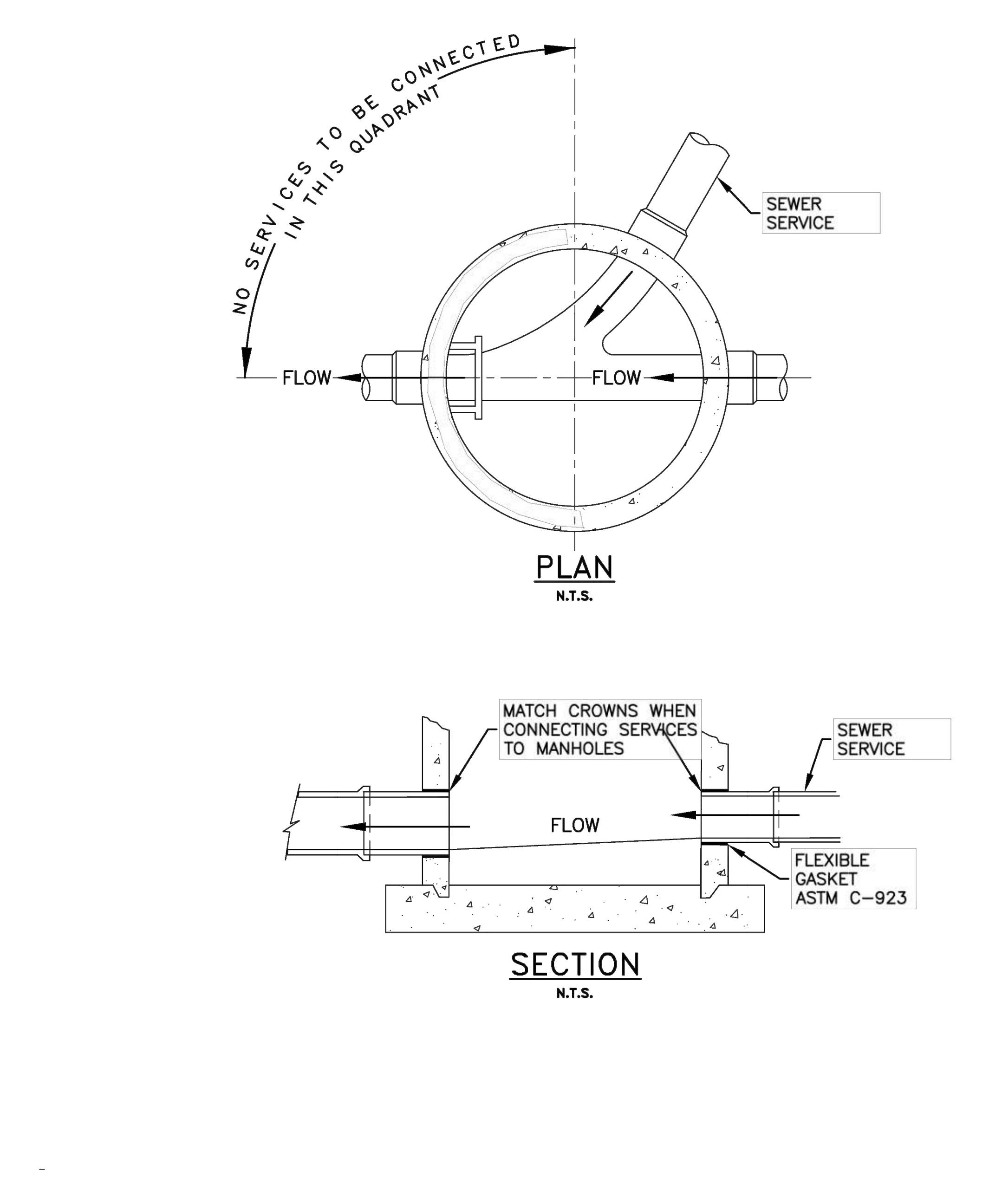
STANDARD SERVICE CONNECTION LATERAL AND CLEANOUT


NO SERVICES TO BE CONNECTED IN THIS QUADRANT
SEWER SERVICE
FLOW
FLOW
PLAN
N.T.S.
MATCH CROWNS WHEN CONNECTING SERVICES TO MANHOLES
SEWER SERVICE
FLOW
FLEXIBLE GASKET ASTM C-923
SECTION
N.T.S.

DATE: 10/19/2023	SS-D DWG. NO. 5
SCALE: NOT TO SCALE	

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

SERVICE CONNECTIONS AT MANHOLES

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TOBIN M. HARRIS
Toby M Harris
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
SANITARY SEWER DETAILS

DRAWING NO:
26

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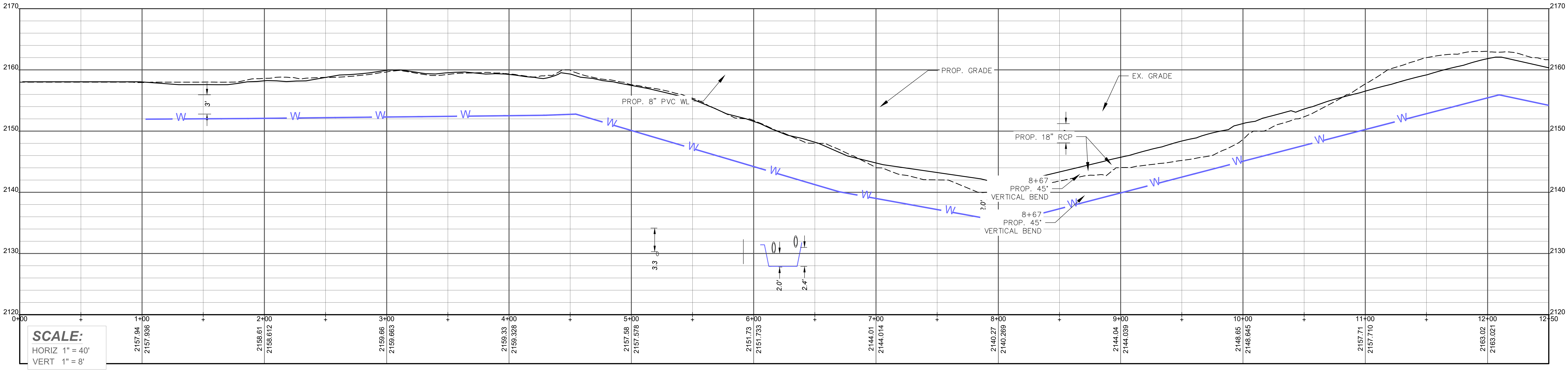
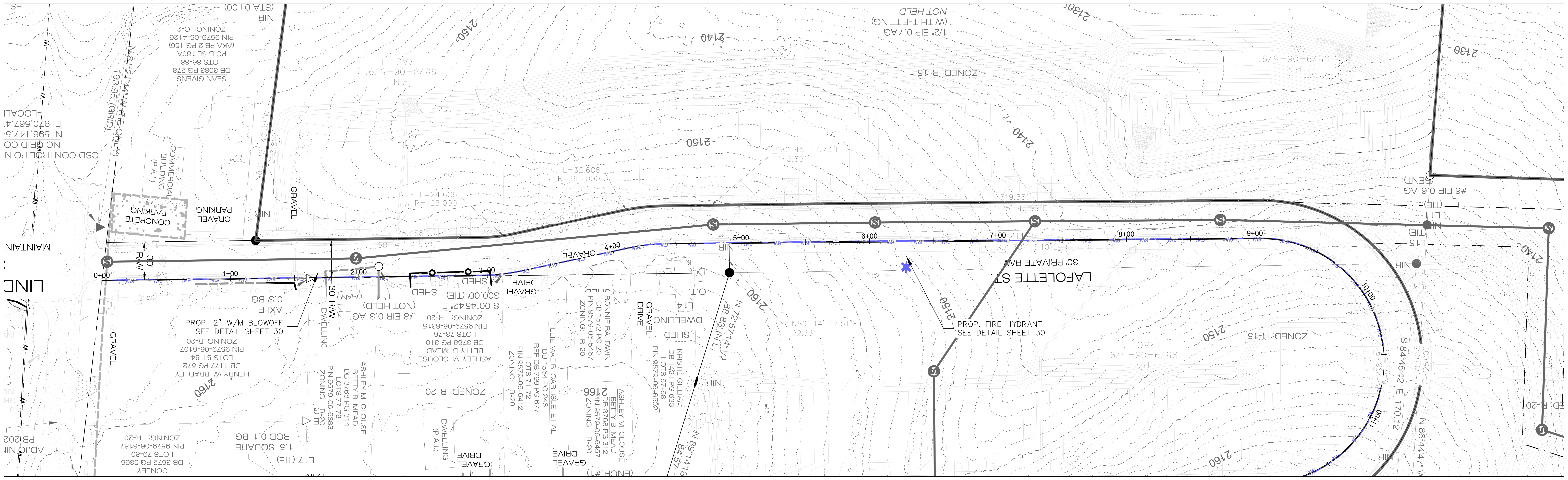
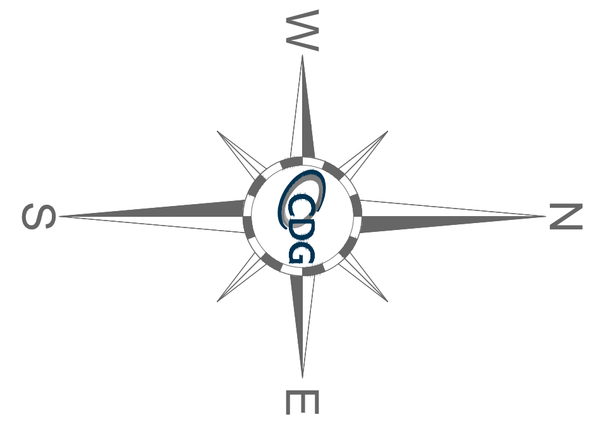


WATERMAIN2

SCALE: 1"=50' (h); 1"=10' (v)





GRAPHIC SCALE

(IN FEET)
1"=40'

Y:\Shared\2_ENG\656605823\5_DESIGN\DWG\SHEETS\WATER PLAN PROFILE.dwg, 5/15/2025 4:45 PM, Toby Harris

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS
Toby M Harris
09/16/2024

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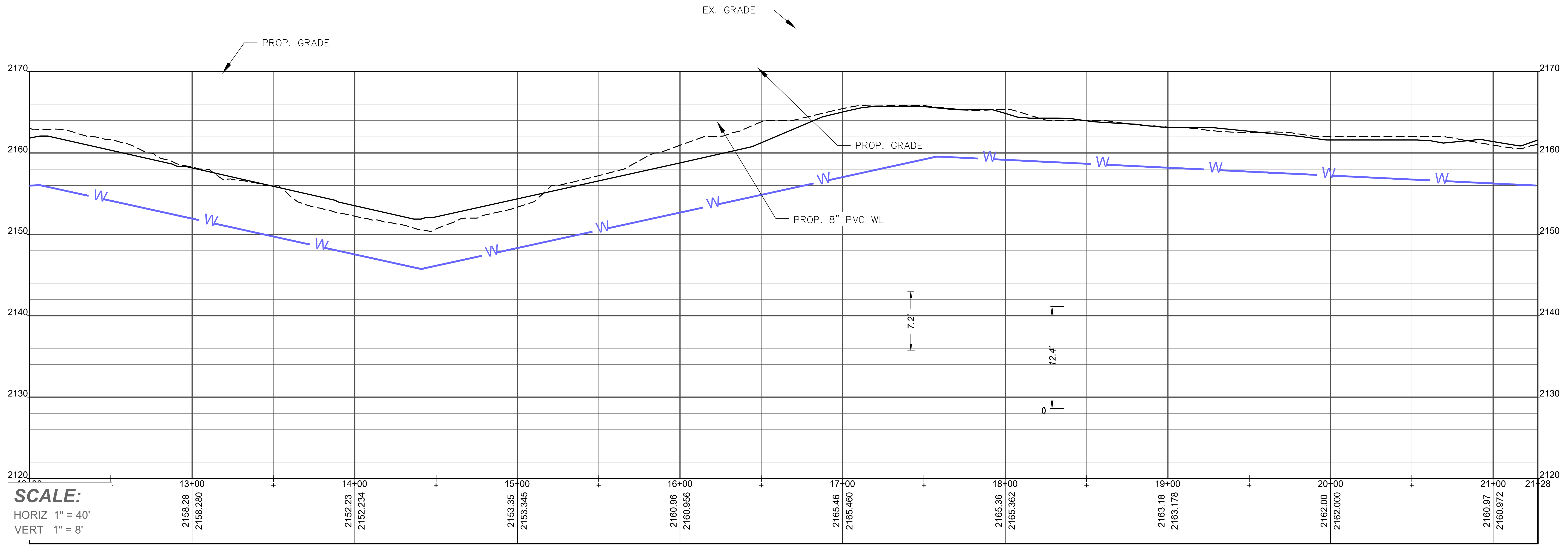
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	########

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

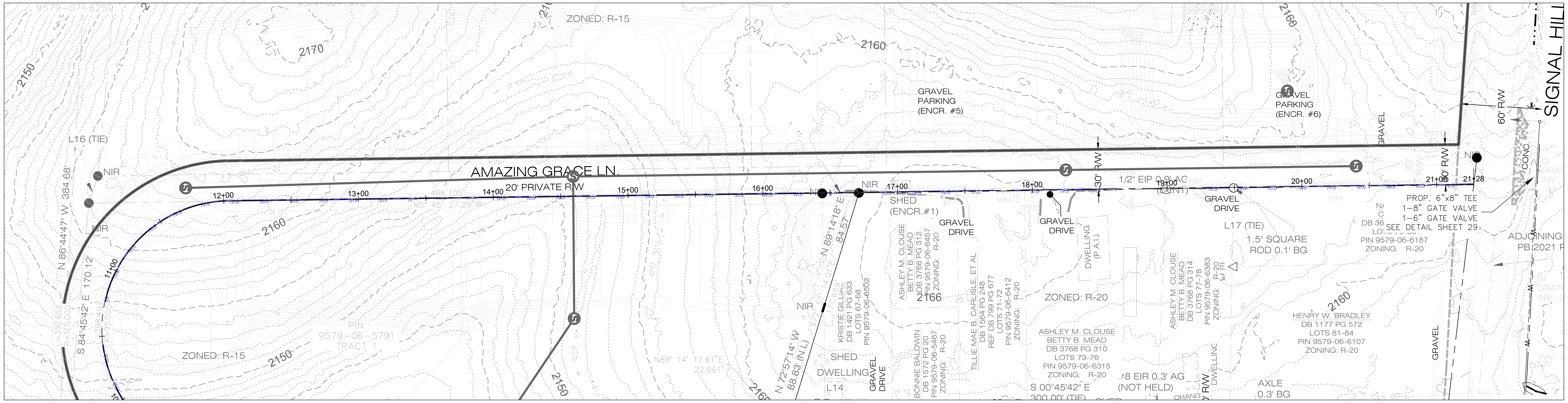
SHEET TITLE:
WATERMAIN PLAN & PROFILE
0+00 - 11+00

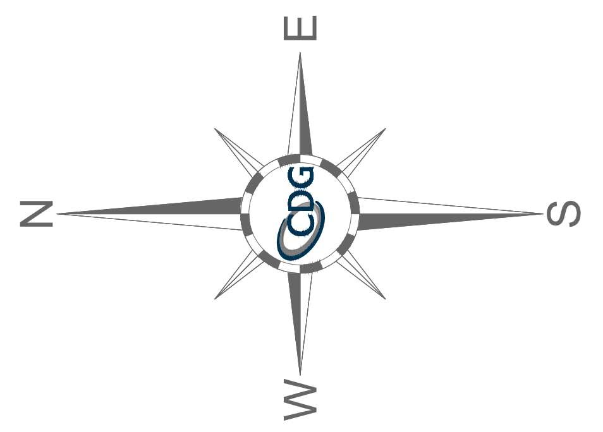
DRAWING NO:
27



SCALE:
HORIZ 1" = 40'
VERT 1" = 8'

WATERMAIN2
SCALE: 1"=50' (h); 1"=10' (v)


9579-07-6259
ZONED: R-15
2170
2160
2150
2160
GRAVEL PARKING (ENCR. #5)
GRAVEL PARKING (ENCR. #6)
L16 (TIE)
NIR
N 86°44'47" W 384.68'
S 84°45'42" E 170.12'
AMAZING GRACE LN.
20' PRIVATE R/W
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00
21+28
11+00
NIR
N 89°14'18" E 84.57'
N 72°57'14" W 88.83' (N/L)
SHED (ENCR.#1)
GRAVEL DRIVE
GRAVEL DRIVE
GRAVEL DRIVE
30' R/W
1/2" EIP 0.9' AG (CONT.)
L17 (TIE)
1.5" SQUARE ROD 0.1' BG
PROP. 6"x8" TEE
1–8" GATE VALVE
1–6" GATE VALVE
SEE DETAIL SHEET 29
PIN 9579-06-6187
ZONING: R-20
ADJOINING PB 2021
60' R/W
SIGNAL HILL
CONC.
GRAVEL
GRAVEL
PIN 9579-06-5791 TRACT 1
ZONED: R-15
N89° 14' 17.61"E 22.661'
KRISTIE GILLIAM DB 1421 PG 633 LOTS 67-68 PIN 9579-06-6502
ASHLEY M. CLOUSE BETTY B. MEAD DB 3768 PG 312 PIN 9579-06-6457 ZONING: R-20
2166
SHED
DWELLING
L14
BONNIE BALDWIN DB 1572 PG 20 PIN 9579-06-5467 ZONING: R-20
TILLIE MAE B. CARLISLE, ET AL DB 1564 PG 248 REF DB 799 PG 677 LOTS 71-72 PIN 9579-06-6412 ZONING: R-20
DWELLING (P.A.I.)
ZONED: R-20
ASHLEY M. CLOUSE BETTY B. MEAD DB 3768 PG 310 LOTS 73-76 PIN 9579-06-6315 ZONING: R-20
ASHLEY M. CLOUSE BETTY B. MEAD DB 3768 PG 314 LOTS 77-78 PIN 9579-06-6383 ZONING: R-20
#8 EIR 0.3' AG (NOT HELD)
S 00°45'42" E 300.00' (TIE)
HENRY W. BRADLEY DB 1177 PG 572 LOTS 81-84 PIN 9579-06-6107 ZONING: R-20
AXLE 0.3' BG
DWELLING



GRAPHIC SCALE

(IN FEET)
1"=40'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
030895
TOBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	#######

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SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
WATERMAIN PLAN & PROFILE
11+00 - 22+00

DRAWING NO:
28

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GENERAL NOTES:

1. WATER CONSTRUCTION ON THIS SITE IS AUTHORIZED BY PERMITS ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY (NCDEQ) AND AUTHORIZED BY THE CITY OF HENDERSONVILLE. THE WORK IS SUBJECT TO INSPECTIONS AT ALL TIMES BY REPRESENTATIVES OF NCDEQ, THE CITY OF HENDERSONVILLE, THE OWNER OR THE ENGINEER. THE PERMITS REQUIRE CERTIFICATION OF COMPLETION OF THE WATER SYSTEMS BY THE ENGINEER AND THE APPLICANT PRIOR TO ISSUANCE OF FINAL OPERATION APPROVAL.
2. MATERIALS AND INSTALLATION FOR WATER CONSTRUCTION SHALL CONFORM TO THE LATEST VERSIONS OF CITY SPECIFICATION AND DETAILS AND AWWA STANDARDS AND REQUIREMENTS.
3. CONTRACTOR SHALL NOTIFY NC811 & APPROPRIATE UTILITIES AGENCIES PRIOR TO PERFORMING ANY WORK.
4. REGULAR WORKING HOURS SHALL BE FROM 7:00 AM TO 5:00 PM MONDAY THROUGH FRIDAY, EXCEPT IN CASES OF EMERGENCY OR OTHERWISE APPROVED IN WRITING BY THE CITY OR AUTHORIZED REPRESENTATIVES. THE CONTRACTOR SHALL ENSURE THE CONSTRUCTION SITE IS SAFE FOR ANY PERSONS WHO MAY BE ON SITE DURING NON-WORKING HOURS.
5. ALL PERSONS SHALL BE COURTEOUS AND RESPECTFUL TO THE PUBLIC. CURSING OUR FOUL LANGUAGE IS NOT PERMITTED AND WILL NOT BE TOLERATED.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TRAFFIC CONTROL ON ALL ROADWAYS DURING THE PROJECT. THE CONTRACTOR SHALL NOTIFY LOCAL EMERGENCY, SCHOOL AND OTHER NECESSARY AUTHORITIES PRIOR TO ANY STREET CLOSING OR TRAFFIC CHANGE.
7. THE CONTRACTOR AT HIS OWN EXPENSE SHALL KEEP THE CONSTRUCTION SITE AND ADJACENT PUBLIC AND PRIVATE ROADWAYS CLEAN DURING THE PROJECT. THE CONTRACTOR IS ALSO RESPONSIBLE FOR CONTROLLING DUST WITHIN THE PROJECT AREA.
8. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION IN ACCORDANCE WITH THE LINES, GRADES AND ELEVATIONS SHOWN ON THE PLANS OR AS GIVEN BY THE ENGINEER IN THE FIELD.
9. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND THE ELEVATION FOR ALL UTILITIES, DRAINAGE AND OTHER UNDERGROUND FACILITIES BOTH EXISTING AND PROPOSED, AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR CONFLICTS PRIOR TO CONSTRUCTION.
10. CONTRACTOR SHALL PROTECT EXISTING UTILITIES DURING CONSTRUCTION. REPAIRS SHALL BE MADE IN ACCORDANCE WITH APPLICABLE STANDARDS OF APPROPRIATE AGENCIES AT THE CONTRACTOR'S EXPENSE.
11. DURING CONSTRUCTION THE CONTRACTOR SHALL MAINTAIN THE OPERATION OF EXISTING UTILITIES WITH THE LEAST AMOUNT OF SERVICE INTERRUPTION POSSIBLE IN COORDINATION WITH THE CITY OF HENDERSONVILLE. CONTINUOUS SERVICE, PUBLIC HEALTH AND SAFETY CONSIDERATIONS SHALL EXCEED ALL OTHERS AND CONTRACTOR'S SCHEDULE, PLANS AND WORK SHALL AT ALL TIMES BE SUBJECT TO ALTERATION AND REVISION IF NECESSARY FOR THESE CONSIDERATIONS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TEMPORARY OR PERMANENT RELOCATION OF STRUCTURES AND UTILITIES, INCLUDING BUT NOT LIMITED TO POLES, SIGNS, FENCES, HYDRANTS, VALVES, PIPING, CONDUITS AND DRAINS THAT INTERFERE WITH THE POSITIONING OF THE WORK AS SHOWN ON THE DRAWINGS.
13. CONTRACTOR SHALL BE REQUIRED TO CONFORM AND COMPLY WITH ALL RESTRICTIONS AND EASEMENT CONDITIONS AND IS RESPONSIBLE FOR ALL RELATED INCIDENTAL COSTS INVOLVED.
14. EXISTING WATER SERVICES SHALL BE REPLACED TO THE EXISTING METER UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY. SPLICING OF THE WATER SERVICE ON THE DOWNSTREAM SIDE OF THE METER IS NOT PERMITTED.
15. ALL DISTURBED AREAS, INCLUDING BUT NOT LIMITED TO ASPHALT, CONCRETE, DRIVEWAYS, ROADS, LANDSCAPING, SHALL BE REPAIRED TO EQUAL OR BETTER CONDITION THAN THE ORIGINAL SITE. GRASS AND LANDSCAPED AREAS FILL MATERIAL MUST BE REPLACED IN TRENCH TO GRADE AS SOON AS WATERLINE CONSTRUCTION ALLOWS. ADEQUATE SEEDING AND STRAW OR MULCH SHALL THEN BE APPLIED TO THE DISTURBED TRENCH AREA. ADDITIONAL FILL AND SITE RESTORATION MAY BE REQUIRED WITHIN THE WARRANTY PERIOD AT THE CITY'S DISCRETION.
16. CONTRACTOR SHALL PROVIDE EROSION CONTROL DEVICES TO CONTROL RUNOFF AS REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR ANY FINES THAT MAY BE LEVIED DUE TO RUNOFF FROM CONSTRUCTION.
17. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW ALL APPLICABLE FEDERAL, STATE AND LOCAL HEALTH AND SAFETY REGULATIONS PERTAINING TO CONSTRUCTION OPERATIONS.
18. ALL WATER MAINS SHALL HAVE 3 FEET MINIMUM COVER.
19. INSTALL FERROUS PIPING FOR BOTH WATER AND SEWER WITHIN 10 FT. OF A CROSSING IF:

19.1. SEWER LINE CROSSES OVER WATER, OR

19.2. VERTICAL CLEARANCE BETWEEN WATER AND SEWER IS LESS THAN 18 INCHES.

19.3. MAINTAIN 10 FEET HORIZONTAL SEPARATION BETWEEN SEWER AND WATER MAINS UNLESS LAID IN SEPARATE TRENCHES WITH THE BOTTOM OF THE WATER LINE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE OR USE FERROUS MATERIAL FOR BOTH WATER AND SEWER.

20. MAINTAIN 18 INCHES VERTICAL SEPARATION BETWEEN STORM DRAIN AND WATER, OR INSTALL FERROUS MATERIAL WATER LINE WITHIN 10 FEET EACH SIDE OF CROSSING.
21. TAPS GREATER THAN ONE-INCH IN DIAMETER IN EXISTING, ACTIVE WATER MAIN ARE TO BE PERFORMED BY THE CITY UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY. TAPS IN NEW CONSTRUCTION ARE TO BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH CITY REQUIREMENTS.
22. ALL WATER METERS WILL BE SET BY CITY STAFF UNLESS THE CONTRACTOR IS GRANTED WRITTEN PERMISSION BY THE CITY.

22.1. THE CONTRACTOR WILL PROVIDE THE CITY NOTICE OF 10 WORKING DAYS MINIMUM PRIOR TO THE DATE OF METER INSTALLATION.

22.2. THE CONTRACTOR WILL PROVIDE A LICENSED PLUMBER DURING THE METER INSTALLATION TO VERIFY LINE SERVICES IN ALL MULTI-METER BOXES.

23. ALL PUBLIC WATER MAIN CONSTRUCTION SHALL BE PERFORMED BY A NORTH CAROLINA LICENSED UTILITY CONTRACTOR.
24. ALL WATER APPURTENANCES ARE TO BE MADE USING LEAD FREE MATERIALS. PIPE, FITTINGS, VALVES, HYDRANTS, PIPE CLAMPS, RESTRAINTS, FLANGES, CASTINGS, REBAR, HATCHES, INLETS, METER BOXES AND ALL OTHER CAST IRON COMPONENTS SHALL BE MANUFACTURED IN THE USA.
25. RESTRAINED JOINTS BY AN APPROVED PIPE MANUFACTURER ARE TO BE USED FOR ALL PUBLIC WATER LINES WHERE THRUST RESTRAINING IS REQUIRED IN ACCORDANCE WITH THE PLANS AND MANUFACTURER'S SPECIFICATION. CONCRETE THRUST BLOCKS ARE PERMITTED ONLY WHERE CONNECTIONS ARE MADE TO EXISTING WATER LINES OR WHERE THE USE OF MECHANICAL RESTRAINT IS NOT FEASIBLE.
26. ALL FIRE HYDRANTS, VAULTS, BACKFLOW PREVENTERS, HOT BOXES AND WATER METERS ARE TO BE INSTALLED ON RELATIVELY FLAT AREAS OUTSIDE OF PAVEMENT.
27. TAMPERING WITH OR ILLEGAL USE OF THE PUBLIC WATER SUPPLY WILL RESULT IN SUSPENSION OF WATER SERVICE, INCLUDING DOMESTIC AND COMMERCIAL, UNTIL FINAL APPROVAL BY THE CITY IS ISSUED. A PERSON FOUND TO BE USING WATER ILLEGALLY SHALL BE SUBJECT TO PENALTIES OR FINES, AS PRESCRIBED AND APPROVED BY CITY COUNCIL.

TESTING & INSPECTION:

1. NOTIFY THE CITY OF HENDERSONVILLE AND ENGINEER AT LEAST 5 WORKING DAYS BEFORE STARTING CONSTRUCTION OF WATER FACILITIES TO SCHEDULE A PRE-CONSTRUCTION CONFERENCE. THE ENGINEER SHALL PERIODICALLY INSPECT THE PROGRESS OF INSTALLATION AT A MINIMUM AND SHALL COMPLETE A FINAL WATER CERTIFICATION.
2. ALL CHANGES TO THE APPROVED CONSTRUCTION PLANS AND SUBMITTALS MUST BE APPROVED IN WRITING BY THE CITY PRIOR TO IMPLEMENTATION IN THE FIELD.
3. THE CONTRACTOR SHALL FURNISH SECURE AND PROVIDE ALL NECESSARY TESTING MATERIALS, EQUIPMENT, LABOR. THE CONTRACTOR SHALL COORDINATE TESTING, FLUSHING, DISINFECTION, AND BACTERIOLOGICAL SAMPLING WITH CITY INSPECTOR.
4. THE ENGINEER OR CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION INSPECTORS 72 HOURS (MINIMUM) PRIOR TO ANY WATER MAIN OR TESTING OPERATIONS. AT A MINIMUM CITY STAFF SHALL BE NOTIFIED PRIOR TO TAPS, TESTING, FLUSHING, DISINFECTION, AND SAMPLING.
5. PRESSURE TEST WATER MAINS TO 200 PSI MIN. FOR A MINIMUM OF TWO HOURS IN ACCORDANCE WITH CITY REQUIREMENTS AND AWWA C600.
6. DISINFECT WATER LINES AND PROVIDE ACCEPTABLE BACTERIOLOGICAL TEST FROM A CERTIFIED TESTING LABORATORY IN ACCORDANCE WITH CITY REQUIREMENTS AND AWWA C651. THE CONTRACTOR MAY ELECT TO USE THE CITY'S CERTIFIED TESTING LABORATORY.
7. PRIVATELY OWNED FIRE SYSTEMS SHALL BE APPROVED BY THE APPROPRIATE LOCAL PERMITTING AUTHORITY. THE CITY ENGINEERING OR WATER AND SEWER DEPARTMENTS ARE NOT RESPONSIBLE FOR ENSURING COMPLIANCE WITH APPROPRIATE FIRE PROTECTION REGULATIONS. THE CITY DOES NOT PROVIDE ANY GUARANTEE OF ITS WATER SYSTEM'S CAPABILITY TO DELIVER WATER FLOW AND RESIDUAL PRESSURE THE FIRE PERMITTING AUTHORITY MAY REQUIRE.
8. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE USC APPROVED AND REVIEWED BY THE CITY'S ENVIRONMENTAL COMPLIANCE COORDINATOR. PROTECTION OF THE PUBLIC WATER DISTRIBUTION SYSTEM SHALL BE ASSURED BY INSPECTION OF THE INSTALLATION AND TESTING OF BACKFLOW PREVENTION DEVICES IN ACCORDANCE WITH APPROPRIATE LOCAL, STATE, AND FEDERAL REGULATIONS.
9. CONSTRUCTION WATER SOURCING MUST BE APPROVED IN WRITING BY THE CITY. CONSTRUCTION WATER CONNECTIONS SHALL BE PAIRED WITH AN IRRIGATION METER AND APPROVED BACKFLOW PREVENTION ASSEMBLY. THIS ASSEMBLY INSTALLATION MUST BE TESTED BY A LICENSED PLUMBER AND TEST RESULTS SUBMITTED TO THE CITY BEFORE USE OF CONSTRUCTION WATER.
10. SECURE FINAL WRITTEN ACCEPTANCE FROM THE CITY OF HENDERSONVILLE PRIOR TO ACTIVATION OF THE SYSTEM. WATER SERVICE WILL NOT BE PROVIDED UNTIL WRITTEN ACCEPTANCE OF THE SYSTEM IS ISSUED BY THE CITY.
11. THE ENGINEER SHALL SUPPLY THE CITY WITH FINAL AS-BUILT DRAWINGS AND COMPLETE ALL PROJECT CLOSE OUT REQUIREMENTS.

DISCLAIMER:

THE STANDARD WATER DETAILS ARE FOR THE SOLE USE OF PROJECTS DIRECTLY FOR, OR THOSE PROJECTS IN WHICH OWNERSHIP WILL BE TRANSFERRED TO THE CITY OF HENDERSONVILLE. THESE TYPICALS ARE INTENDED TO SHOW THE CITY OF HENDERSONVILLE'S EXPECTATIONS FOR THE GENERAL LAYOUT, ARRANGEMENT, AND THE QUALITY OF EQUIPMENT AND MATERIALS FOR WATER DISTRIBUTION SYSTEM ITEMS AND THEIR RELATED APPURTENANCES. IT REMAINS THE SOLE RESPONSIBILITY OF THE ENGINEER IN RESPONSIBLE CHARGE (ERC) OF EACH APPLICATION TO DETERMINE, DESIGN TO, AND CERTIFY TO THE DESIGN PARAMETERS FOR EACH INSTALLATION. THE ERC MUST ALSO ENSURE THE DESIGN COMPLIES WITH THE MINIMUM DESIGN CRITERIA OF NC DIVISION OF ENVIRONMENTAL QUALITY AND ALL LOCAL AND STATE LAWS AND REGULATIONS.

DATE: 05/22/2023 WD DWG. NO. 1

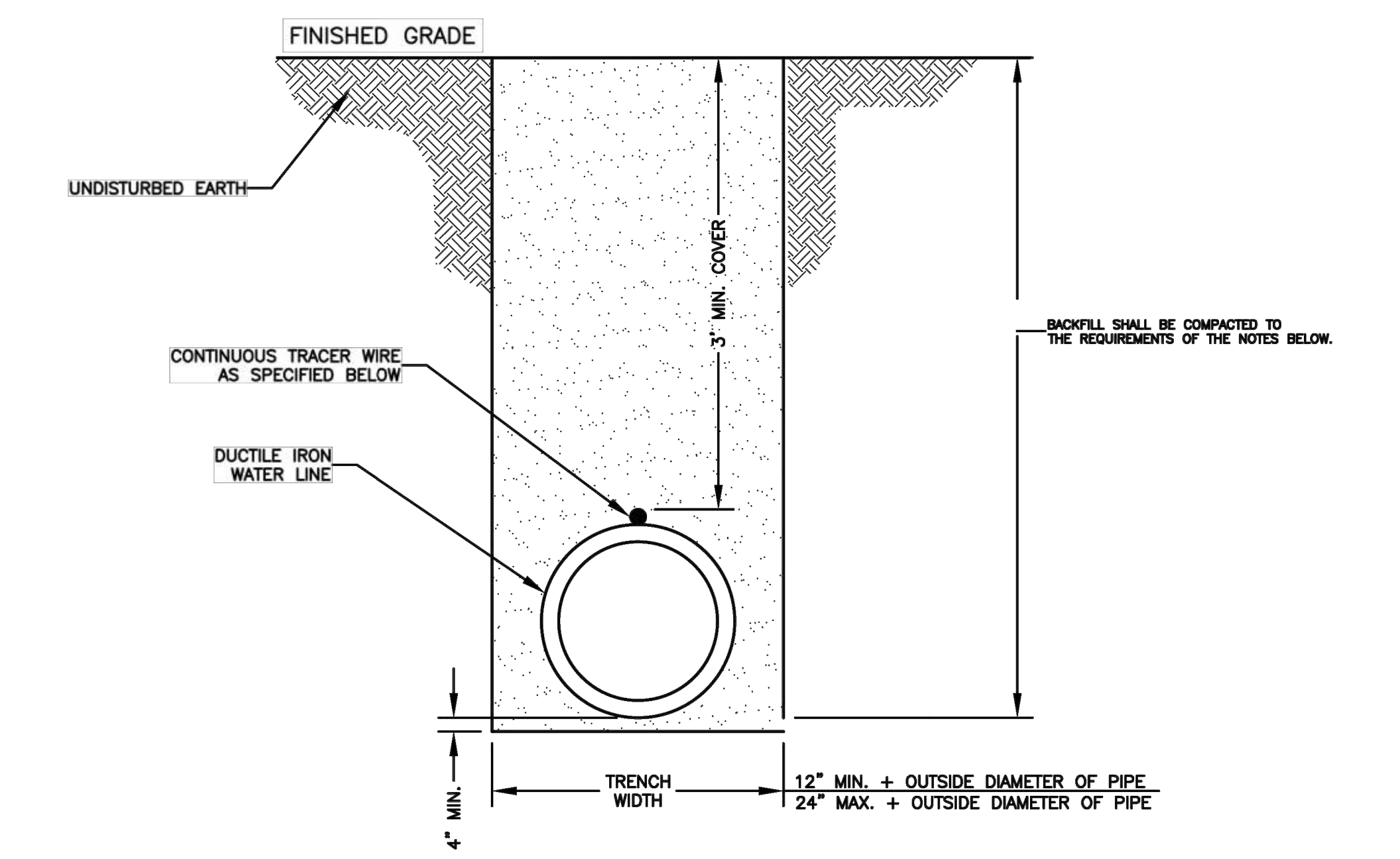
SCALE: NOT TO SCALE

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

www.cityofhendersonville.org

WATER DETAILS
GENERAL NOTES

H:\DETAILS\-Current Standard Details\Water Only\Updated_Water_Details-BulletinsMark-52223.dwg, 5/22/2023 10:22:50 AM


FINISHED GRADE
UNDISTURBED EARTH
3' MIN. COVER
BACKFILL SHALL BE COMPACTED TO THE REQUIREMENTS OF THE NOTES BELOW.
CONTINUOUS TRACER WIRE AS SPECIFIED BELOW
DUCTILE IRON WATER LINE
4" MIN.
TRENCH WIDTH
12" MIN. + OUTSIDE DIAMETER OF PIPE
24" MAX. + OUTSIDE DIAMETER OF PIPE

NOTES:

1. TRENCHES EXCAVATED OUTSIDE EXISTING ROAD AND RAILWAY RIGHTS-OF-WAY SHALL BE BE BACKFILLED WITH COMMON BACKFILL MATERIAL CONSISTING OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS AND TAMPED THOROUGHLY. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM, APPROXIMATELY HORIZONTAL LAYERS. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS. ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF AT LEAST 85% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR) OR AS APPROVED BY THE ENGINEER. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.

   WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DEWATERING, DRYING, PROTECTION, AND STORAGE OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL, HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS ML, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 85% STANDARD PROCTOR.

2. THE WATER LINE SHALL HAVE A MINIMUM OF 3' OF COVER AT FINISHED GRADE.

   TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL. BLUE HDPE JACKET PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR EQUIVALENT APPROVED BY ENGINEER, AND PRODUCED IN THE UNITED STATES OF AMERICA.

   TRACER WIRE SHALL BE EXTENDED ALONG ALL WATER LINES, FITTINGS, VALVES, SERVICES, AND HYDRANTS. LOCATING CLIPS SHALL BE PROVIDED AT ALL VALVES, HYDRANT VALVES AND METER BOXES. THE CONTRACTOR SHALL DUCT TAPE TRACER WIRE ON CROWN OF WATER LINE EVERY FIVE FEET.

DATE: 01/12/2019 WD DWG. NO. 2

SCALE: NOT TO SCALE

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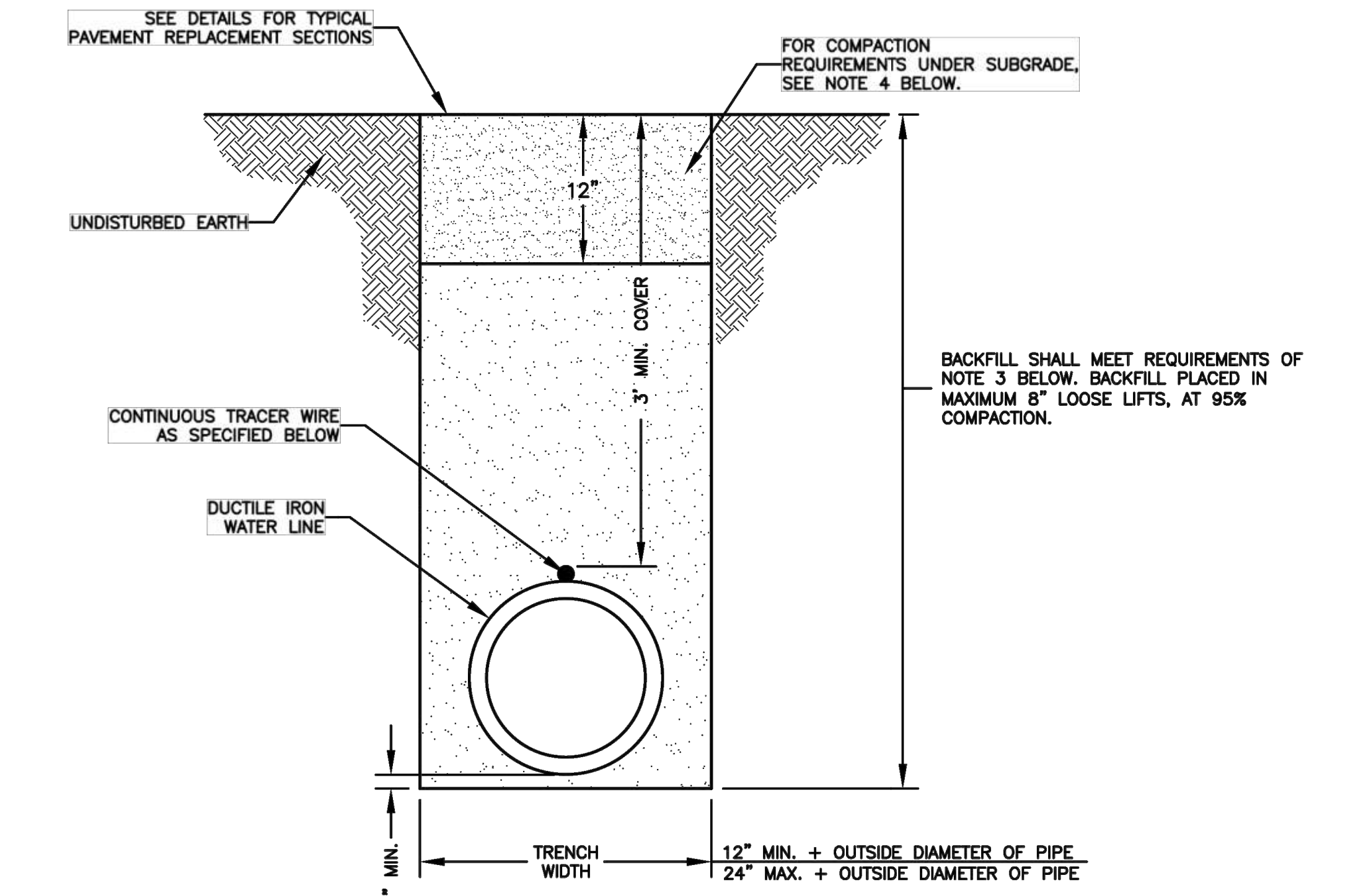
WATER TRENCH CONSTRUCTION
OUTSIDE PAVEMENT

4/30/2019 10:51:55 AM, mpomraning


SEE DETAILS FOR TYPICAL PAVEMENT REPLACEMENT SECTIONS
FOR COMPACTION REQUIREMENTS UNDER SUBGRADE, SEE NOTE 4 BELOW.
12"
UNDISTURBED EARTH
3' MIN. COVER
BACKFILL SHALL MEET REQUIREMENTS OF NOTE 3 BELOW. BACKFILL PLACED IN MAXIMUM 8" LOOSE LIFTS, AT 95% COMPACTION.
CONTINUOUS TRACER WIRE AS SPECIFIED BELOW
DUCTILE IRON WATER LINE
4" MIN.
TRENCH WIDTH
12" MIN. + OUTSIDE DIAMETER OF PIPE
24" MAX. + OUTSIDE DIAMETER OF PIPE

NOTES:

1. THIS TRENCH BACKFILL DETAIL APPLIES TO AREAS UNDER PAVEMENT, CURB, GUTTER, SIDEWALK OR AREAS WHERE THE TRENCH IS WITHIN FIVE (5) FEET OF THE EDGE OF PAVEMENT.
2. COMPACTION OF THE BACKFILL SHALL BE ACHIEVED THROUGH THE USE OF AN APPROVED VIBRATORY PLATE TAMPER OR ROLLER. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.
3. COMPACTION TESTING OF THE BACKFILL SHALL BE PROVIDED, DIRECTED AND COORDINATED BY THE OWNER. INTERVALS OF TESTING SHALL BE AT THE TOTAL DISCRETION OF THE OWNER AND MAY BE CHANGED AT ANY TIME.

   IF A TEST DOES NOT PASS, THE CONTRACTOR SHALL REMOVE THE DEFECTIVE BACKFILL, REDO THE WORK AND THE AREA WILL BE RETESTED. THE CONTRACTOR SHALL BE AWARE OF THE LEVEL OF COMPACTION REQUIRED.

   IF THE WORK IS SUSPECT TO BE DEFECTIVE BY THE OWNER, THE WORK SHALL BE RETESTED.

   THE WATER CONTENT OF THE BACKFILL MATERIAL SHALL ALSO BE TESTED AND RECORDED FOR EACH TEST COMPLETED. THE CONTRACTOR WILL BE ALLOWED TO ADD WATER TO THE BACKFILL MATERIAL IN ORDER TO OBTAIN THE OPTIMUM WATER CONTENT. HOWEVER, THE CONTRACTOR WILL NOT BE ALLOWED TO UTILIZE THE ADDITION OF WATER AS A MEANS OF COMPACTION. FURTHERMORE, SHOULD THE BACKFILL MATERIAL BE FOUND TO HAVE WATER CONTENT RATIOS WHICH IN THE OPINION OF THE ENGINEER OR THE OWNER PREVENTS THE APPROPRIATE COMPACTION OF THE TRENCH, THE CONTRACTOR SHALL REMOVE ALL DEFECTIVE MATERIAL AND UNDERTAKE THE NECESSARY CORRECTIVE WORK.

4. THE TOP TWELVE INCHES OF THE FINAL BACKFILL SHALL BE COMPACTED TO 98% STANDARD PROCTOR,
5. THE WATER LINE SHALL HAVE A MINIMUM OF 3' OF COVER AT FINISHED GRADE.
6. TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL. BLUE HDPE JACKET PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR EQUIVALENT APPROVED BY ENGINEER, AND PRODUCED IN THE UNITED STATES OF AMERICA.

   TRACER WIRE SHALL BE EXTENDED ALONG ALL WATER LINES, FITTINGS, VALVES, SERVICES, AND HYDRANTS. LOCATING CLIPS SHALL BE PROVIDED AT ALL VALVES, HYDRANT VALVES AND METER BOXES. THE CONTRACTOR SHALL DUCT TAPE TRACER WIRE ON CROWN OF WATER LINE EVERY FIVE FEET.

DATE: 06/10/2019 WD DWG. NO. 3

SCALE: NOT TO SCALE

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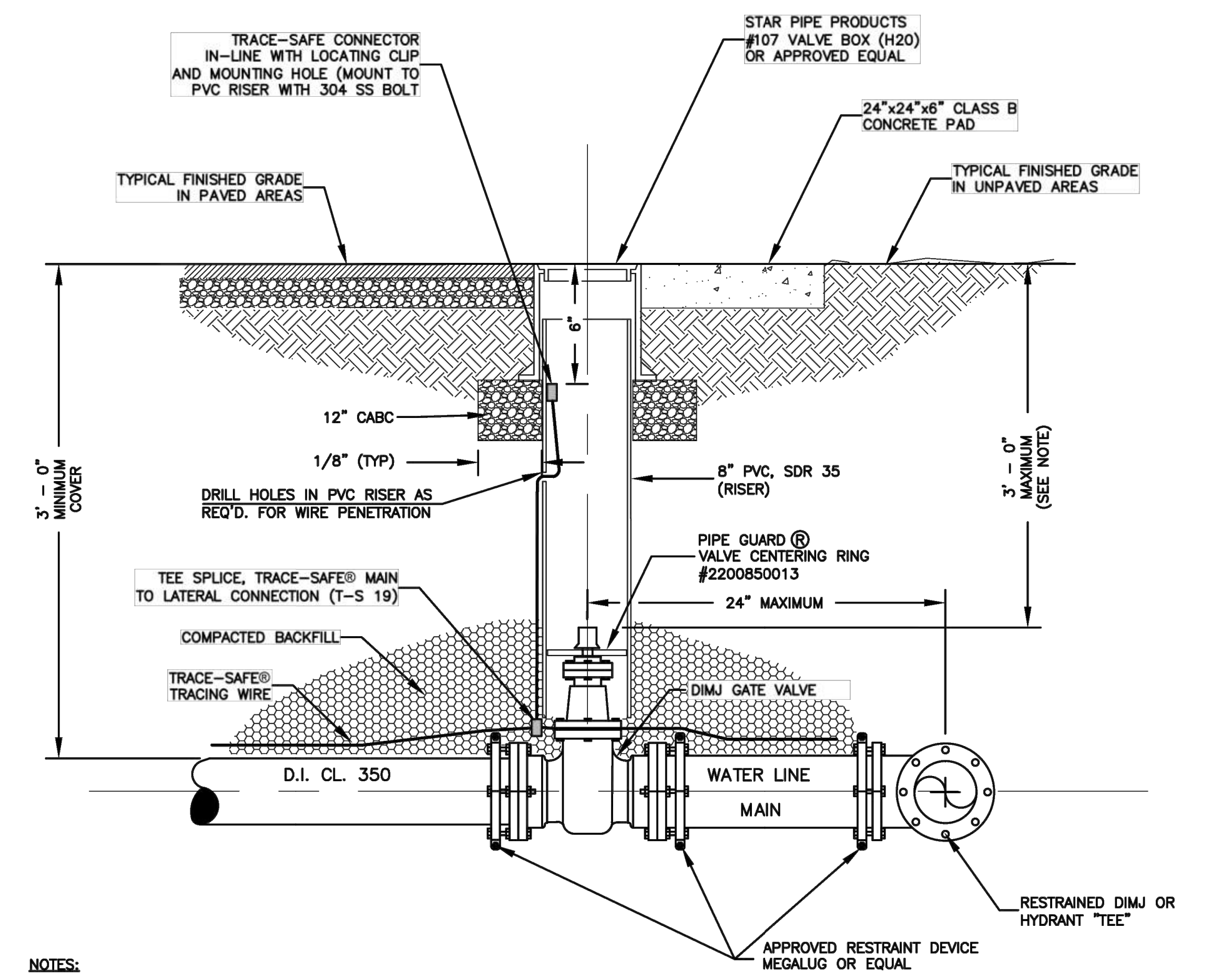
WATER TRENCH CONSTRUCTION
UNDER PAVEMENT


TRACE-SAFE CONNECTOR IN-LINE WITH LOCATING CLIP AND MOUNTING HOLE (MOUNT TO PVC RISER WITH 304 SS BOLT
STAR PIPE PRODUCTS #107 VALVE BOX (H20) OR APPROVED EQUAL
24"x24"x6" CLASS B CONCRETE PAD
TYPICAL FINISHED GRADE IN PAVED AREAS
TYPICAL FINISHED GRADE IN UNPAVED AREAS
6"
12" CABC
1/8" (TYP)
DRILL HOLES IN PVC RISER AS REQ'D. FOR WIRE PENETRATION
8" PVC, SDR 35 (RISER)
3' – 0" MINIMUM COVER
3' – 0" MAXIMUM (SEE NOTE)
PIPE GUARD ® VALVE CENTERING RING #2200850013
TEE SPLICE, TRACE-SAFE® MAIN TO LATERAL CONNECTION (T-S 19)
24" MAXIMUM
COMPACTED BACKFILL
TRACE-SAFE® TRACING WIRE
DIMJ GATE VALVE
D.I. CL. 350
WATER LINE
MAIN
RESTRAINED DIMJ OR HYDRANT "TEE"
APPROVED RESTRAINT DEVICE MEGALUG OR EQUAL

NOTES:

1. TOP OF COVER SHALL BE STAMPED "WATER"
2. VALVE PAD REQUIREMENTS SHALL NOT BE APPLICABLE FOR PAVED SURFACES.
3. PAVEMENT REPAIR SHALL MATCH EXISTING ROAD PAVING SECTION. SEE NCDOT ASPHALT REPAIR DETAIL # 654.01.
4. WHEN OPERATING NUT DEPTH EXCEEDS 3'-0" BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT. TOP OF NUT SHALL BE WITHIN 5" TO 9" OF FINISHED GRADE.
5. TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL. BLUE HDPE JACKET PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR APPROVED EQUIVALENT, AND PRODUCED IN THE UNITED STATES OF AMERICA.

DATE: 10/11/2021 WD DWG. NO. 5

SCALE: NOT TO SCALE

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VALVE INSTALLATION DETAIL

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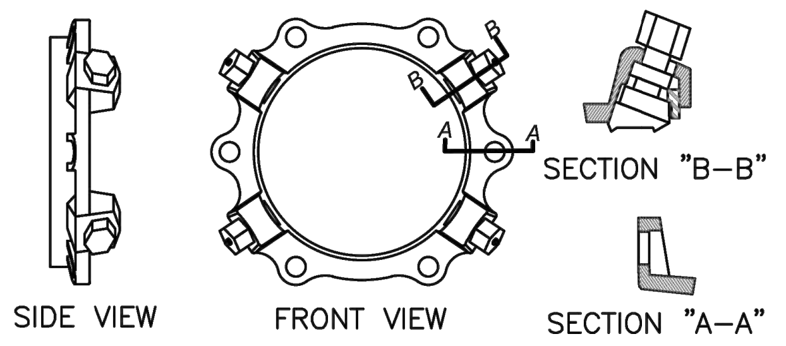
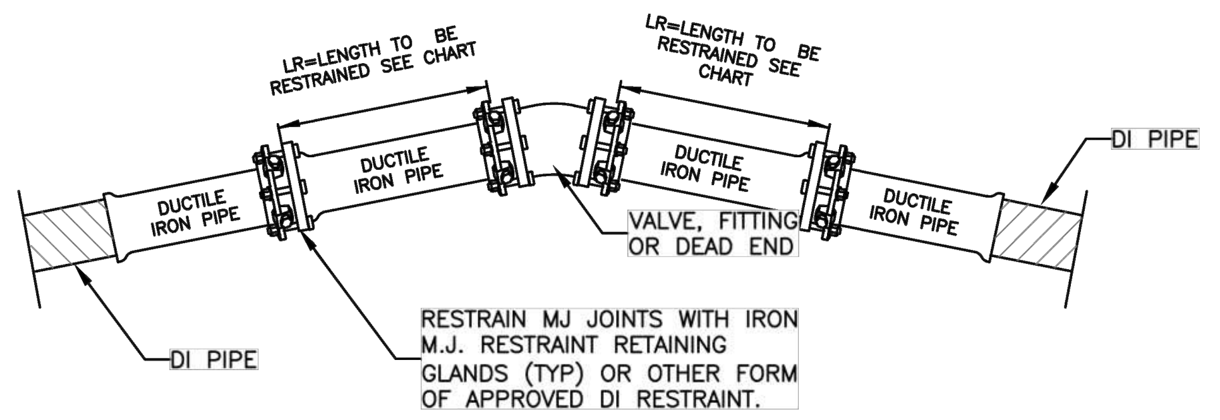


IRON RETAINING GLAND M.J. RESTRAINT			
NOMINAL PIPE SIZE	WEDGES QUANTITY	BOLTS QUANTITY	PRESS RATING
6"	3	6	350
8"	4	6	350
12"	8	8	350
16"	12	12	350

8" SIZE SHOWN 6" & 12" SIMILAR IRON RETAINING GLAND M.J. RESTRAINT

LR (MIN. LENGTH OF RESTRAINT EACH DIRECTION OF THRUST IN LINEAR FEET)
Based on 200 psig pressure, Safety Factor of 2.0:1, BARE DI PIPE AND ML Soil, 3.5' cover
Chart does not apply to pipes wrapped in polyethylene wrap

PIPE SIZE	VALVES DEAD ENDS TEES	90° ELBOWS	45° ELBOW & CROSSES	22–1/2° ELBOWS	REDUCER	
6"	55'	31'	13'	7'	6"X2"	67'
8"	72'	40'	17'	8'	8"X6"	30'
12"	102'	57'	24'	12'	12"X8"	54'
16"	130'	72'	30'	15'	12"X8" 16"X8"	54' 95'


LR=LENGTH TO BE RESTRAINED SEE CHART
LR=LENGTH TO BE RESTRAINED SEE CHART
DUCTILE IRON PIPE
DUCTILE IRON PIPE
DUCTILE IRON PIPE
DUCTILE IRON PIPE
DI PIPE
VALVE, FITTING OR DEAD END
DI PIPE
RESTRAIN MJ JOINTS WITH IRON M.J. RESTRAINT RETAINING GLANDS (TYP) OR OTHER FORM OF APPROVED DI RESTRAINT.

DATE: 05/22/2023 WD DWG. NO. 4-1

SCALE: NOT TO SCALE

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DUCTILE IRON PIPE
RESTRAINT DETAIL

SHEET 1 OF 2

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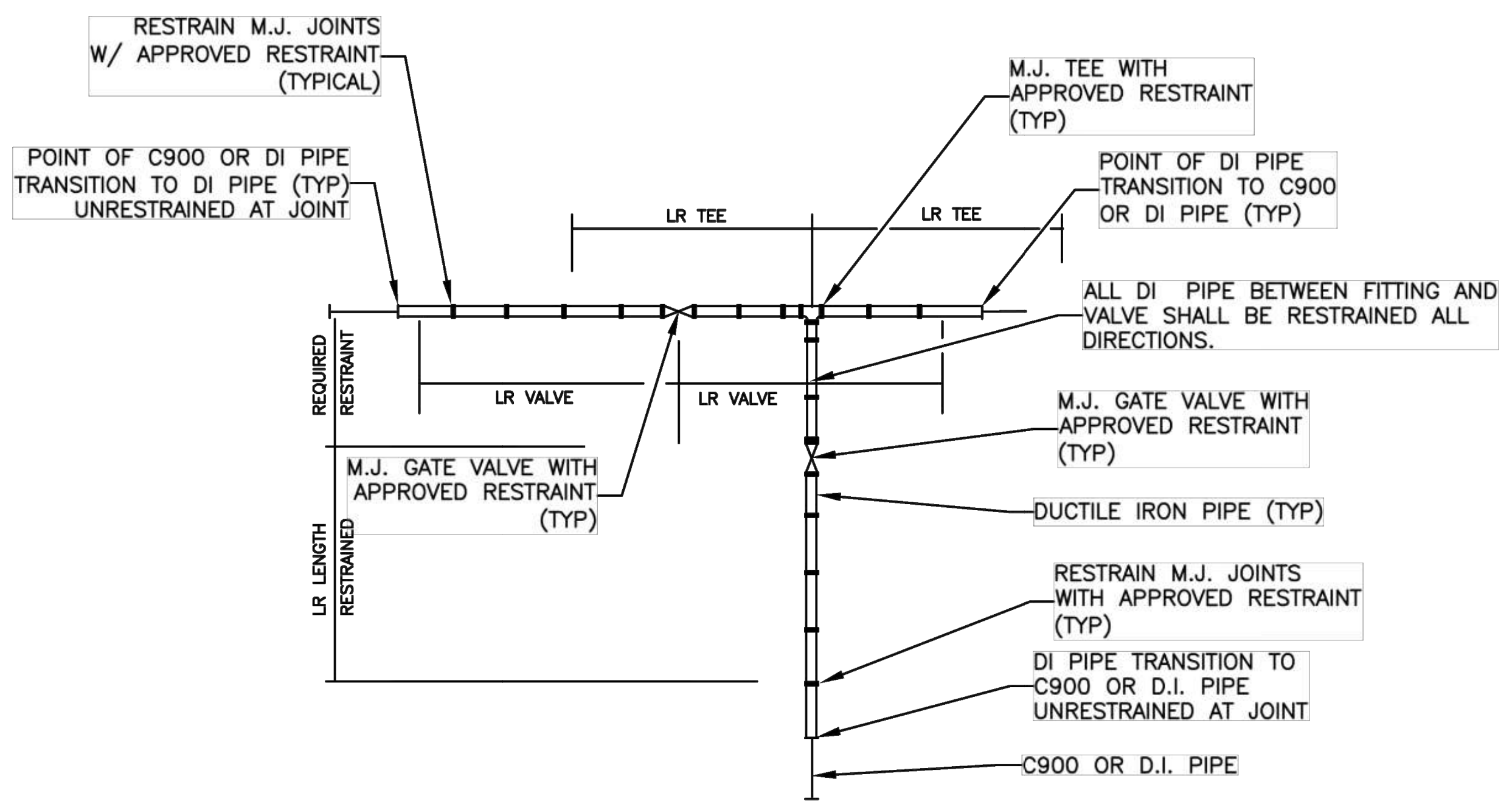
RESTRAIN M.J. JOINTS W/ APPROVED RESTRAINT (TYPICAL)
POINT OF C900 OR DI PIPE TRANSITION TO DI PIPE (TYP) UNRESTRAINED AT JOINT
M.J. TEE WITH APPROVED RESTRAINT (TYP)
POINT OF DI PIPE TRANSITION TO C900 OR DI PIPE (TYP)
LR TEE
LR TEE
ALL DI PIPE BETWEEN FITTING AND VALVE SHALL BE RESTRAINED ALL DIRECTIONS.
REQUIRED RESTRAINT
LR VALVE
LR VALVE
M.J. GATE VALVE WITH APPROVED RESTRAINT (TYP)
M.J. GATE VALVE WITH APPROVED RESTRAINT (TYP)
DUCTILE IRON PIPE (TYP)
LR LENGTH RESTRAINED
RESTRAIN M.J. JOINTS WITH APPROVED RESTRAINT (TYP)
DI PIPE TRANSITION TO C900 OR D.I. PIPE UNRESTRAINED AT JOINT
C900 OR D.I. PIPE

RESTRAINED JOINT DETAIL FOR TYPICAL TEE INTERSECTION
4 WAY INTERSECTION SIMILARLY RESTRAINED

NOTES:

1. THRUST RESTRAINT SHALL BE INSTALLED ON DUCTILE IRON WATER DISTRIBUTION LINES 6" THRU 12" DIAMETER IN THE MANNER SHOWN.
2. IRON RETAINING GLAND M.J. RESTRAINT OR OTHER FORMS OF IRON RESTRAINT SHALL NOT BE USED ON PVC PIPE.
3. PIPE GREATER THAN 12 INCH DIAMETER SHALL REQUIRE RESTRAINED JOINT PIPE FOR THE PROPER LENGTH.
4. COMPACT FITTINGS ARE ACCEPTABLE FOR USE WITH IRON RETAINING GLAND M.J. RESTRAINT AND OTHER FORMS OF DI RESTRAINT.
5. THE MINIMUM LENGTH OF RESTRAINT INDICATED SHALL REQUIRE ALL JOINTS WITHIN THE LR DISTANCE TO BE RESTRAINED.
6. RESTRAINT SYSTEM SHALL BE INSPECTED AND APPROVED PRIOR TO BACKFILLING.
7. RESTRAINT SYSTEMS MAY VARY BASED UPON THE ENGINEERS' DESIGN AS SHOWN ON THE PLAN AND PROFILE SHEETS.
8. GRIPPER RING AND FIELD LOK GASKETS ARE AN ACCEPTABLE METHOD OF RESTRAINT ON DUCTILE IRON PIPE ONLY.
9. TRACER WIRE NOT SHOWN FOR CLARITY. WIRE SHALL BE INSTALLED PER OTHER DETAILS.
10. MECHANICAL JOINTS SHALL BE PRODUCED IN THE UNITED STATES.

DATE: 05/22/2023 WD DWG. NO. 4-2

SCALE: NOT TO SCALE

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DUCTILE IRON PIPE
RESTRAINT DETAIL

SHEET 2 OF 2

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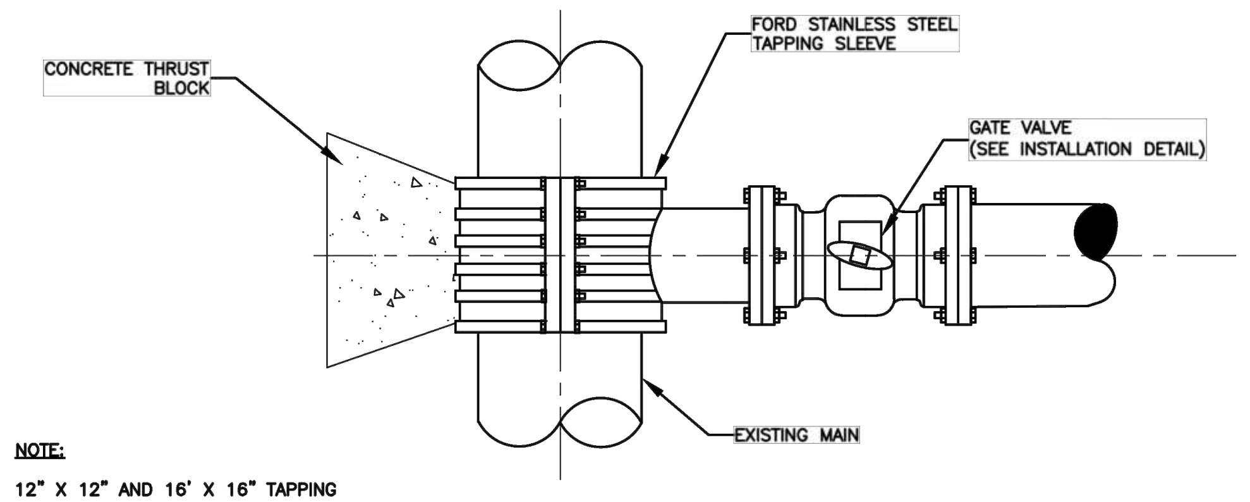
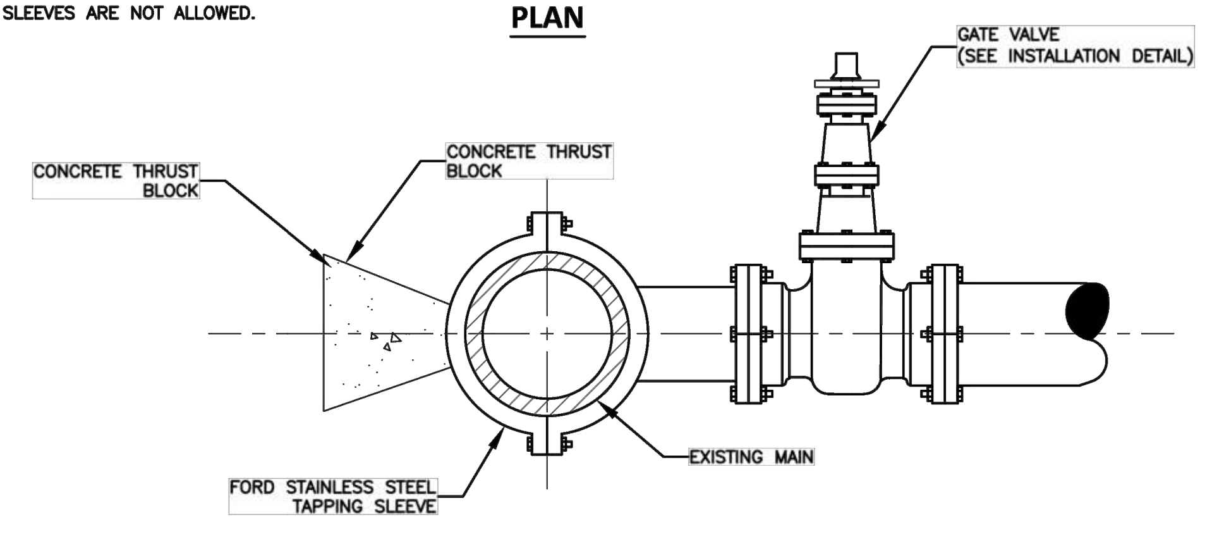

CONCRETE THRUST BLOCK
FORD STAINLESS STEEL TAPPING SLEEVE
GATE VALVE (SEE INSTALLATION DETAIL)
EXISTING MAIN

NOTE:

12" X 12" AND 16' X 16" TAPPING SLEEVES ARE NOT ALLOWED.

PLAN


GATE VALVE (SEE INSTALLATION DETAIL)
CONCRETE THRUST BLOCK
CONCRETE THRUST BLOCK
EXISTING MAIN
FORD STAINLESS STEEL TAPPING SLEEVE

ELEVATION

NOTE:

12" X 12" AND 16' X 16" TAPPING SLEEVES ARE NOT ALLOWED.

TABLE A–1

TBD

NOTE:

1. CONCRETE SHALL BE 3000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS BY THE INSTALLATION OF POLYETHYLENE FILM PLACED BETWEEN THE FITTINGS AND POURED CONCRETE.
3. SEE TABLE A–1 FOR AREA OF CONCRETE REQUIRED FOR MAIN SIZED 6–INCH THROUGH 16–INCH.

DATE: 01/12/2019 WD DWG. NO. 6

SCALE: NOT TO SCALE

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STANDARD TAPPING SLEEVE
AND VALVE ASSEMBLY

4/30/2019 11:02:39 AM, mpomraning

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS

Toby M Harris

09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	########

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
WATERMAIN DETAILS - 1
(SHEET 1 OF 2)

DRAWING NO:
29

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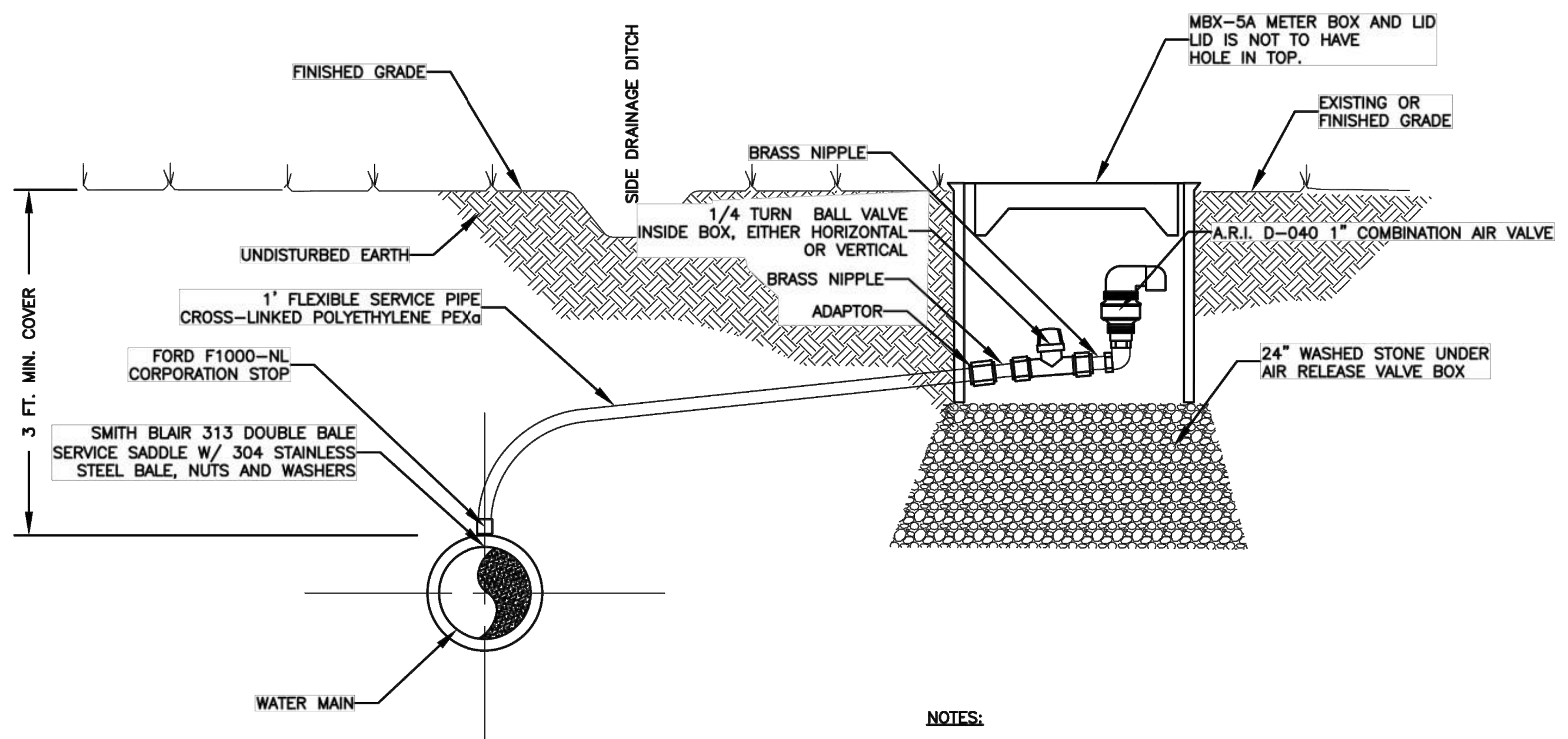

NOTES:

1. PIPE AND FITTINGS SIZE SHALL MATCH THE SIZE OF THE PROPOSED AIR RELEASE VALVE TO BE INSTALLED.
2. TRACER WIRE NOT SHOWN FOR CLARITY. TRACER WIRE SHALL BE CONNECTED TO WATER MAIN TRACER USING CONNECTORS APPROVED BY THE MANUFACTURERS. (SEE VALVE BOX INSTALLATION)
3. ACTUAL LOCATION OF AIR RELEASE VALVE SHALL BE COORDINATED WITH THE CITY AND PROPERTY OWNER.

STANDARD AIR RELEASE VALVE
INSTALLATION DETAIL

WD DWG. NO. 7

DATE: 03/23/2021
SCALE: NOT TO SCALE

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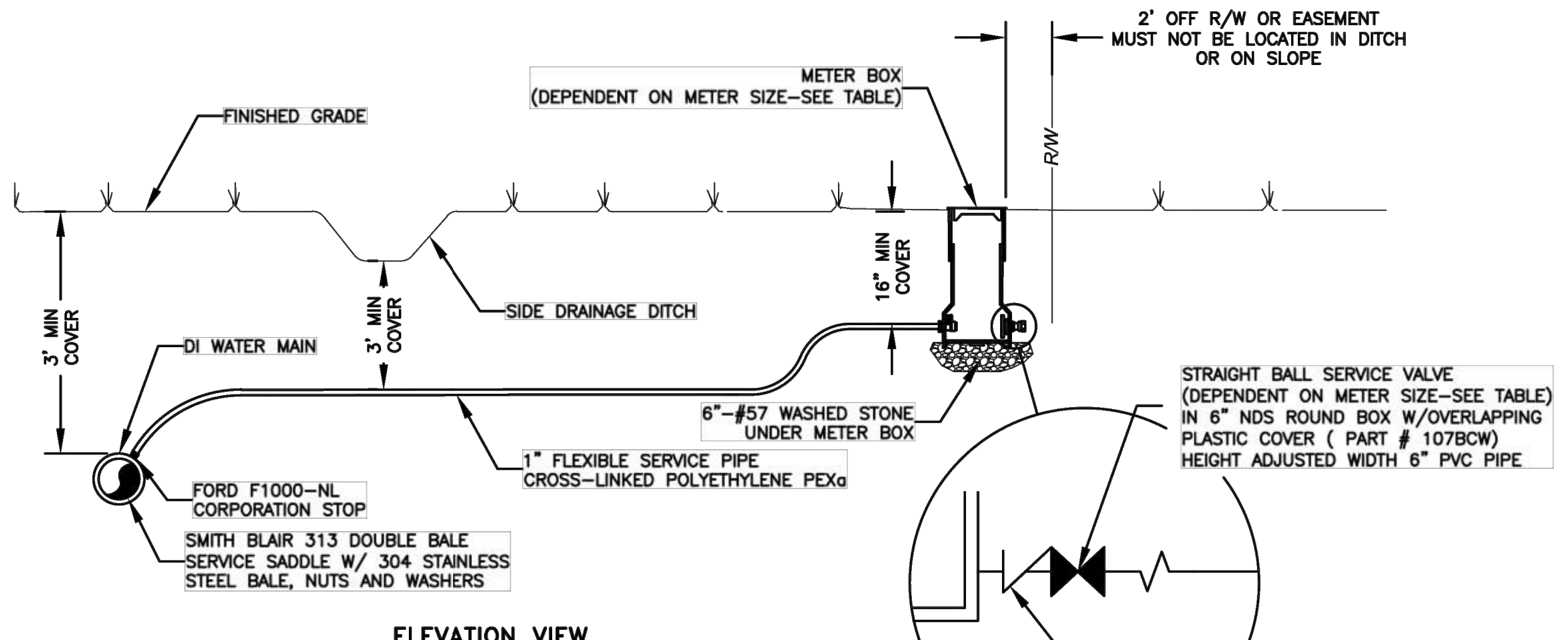
METER SIZE	METER BOX SIZE	METER BOX	LID	STRAIGHT BALL SERVICE VALVE	STRAIGHT DUAL CARTRIDGE CHECK VALVE
3/4" *	3/4"	FORD CB111-233-L-T-NL	FORD YBL-T	FORD B81-233W-NL	HHC81-333-NL
1"	1"	FORD CB111-444-L-T-NL	FORD YBL-T	FORD B81-344W-NL	HHC81-444-NL

* REQUIRES REDUCER L84-34G NL


2' OFF R/W OR EASEMENT
MUST NOT BE LOCATED IN DITCH
OR ON SLOPE
METER BOX
(DEPENDENT ON METER SIZE-SEE TABLE)
FINISHED GRADE
R/W
16" MIN COVER
3' MIN COVER
3' MIN COVER
SIDE DRAINAGE DITCH
DI WATER MAIN
6"-#57 WASHED STONE
UNDER METER BOX
1" FLEXIBLE SERVICE PIPE
CROSS-LINKED POLYETHYLENE PEXa
FORD F1000-NL
CORPORATION STOP
SMITH BLAIR 313 DOUBLE BALE
SERVICE SADDLE W/ 304 STAINLESS
STEEL BALE, NUTS AND WASHERS
STRAIGHT BALL SERVICE VALVE
(DEPENDENT ON METER SIZE-SEE TABLE)
IN 6" NDS ROUND BOX W/OVERLAPPING
PLASTIC COVER (PART # 107BCW)
HEIGHT ADJUSTED WIDTH 6" PVC PIPE
STRAIGHT DUAL CARTRIDGE CHECK VALVE
(DEPENDENT ON METER SIZE-SEE TABLE)

ELEVATION VIEW

NOTES:

1. THE CITY OF HENDERSONVILLE SHALL INSTALL WATER METERS.
2. NO METERS WILL BE INSTALLED NOR WATER SERVICE PROVIDED, UNTIL A WRITTEN FINAL ACCEPTANCE OF THE SYSTEM IS ISSUED BY THE CITY.
3. METER BOX SHALL BE BITUMINOUS COATED, CAST IRON BASE, INNER BARREL, AND OUTER BARREL WITH 1-7/8" TOUCH-READ HOLE IN LID.
4. EXTEND TRACER WIRE FROM MAIN TO METER BOX. WIRE NOT SHOWN FOR CLARITY. TRACER WIRE WILL BE A 19 GAUGE, TIN COATED, COPPER CONDUCTOR WITH POLYETHYLENE INSULATION. CORE MATERIAL COMPRISED OF HIGH-TENACITY, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN 30 MIL. BLUE HDPE JACKET; PROVIDING CORROSION RESISTANCE, FLEXIBILITY, IMPACT STRENGTH AND 1800 LBS. TENSILE STRENGTH. TRACER WIRE WILL NOT CONDUCT AN ELECTRICAL CURRENT WHEN STRUCK BY LIGHTNING AND IS DESIGNED FOR DIRECT BURY AND DIRECTIONAL BORING APPLICATIONS. WHEN SPLICES AND LATERAL CONNECTIONS ARE MADE, ONLY GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH WOVEN POLYESTER FIBER CORE ARE TO BE USED. TRACER WIRE SHALL BE TERMINATED IN METER BOX AT MOUNTED TRACE-SAFE® LOCATING CLIP, MOUNTED A MAXIMUM OF 3" FROM TOP OF BOX WITH 304 SS BOLT. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE® WATER BLOCKING TRACER WIRE AND RELATED CONNECTORS, MANUFACTURED BY NEPTCO, INC., OR EQUIVALENT APPROVED BY ENGINEER, AND PRODUCED IN THE UNITED STATES OF AMERICA.

MINIMUM SERVICE LINE:
1" SERVICE LATERAL INSTALLATION

WD DWG. NO. 8

DATE: 02/10/2021
SCALE: NOT TO SCALE

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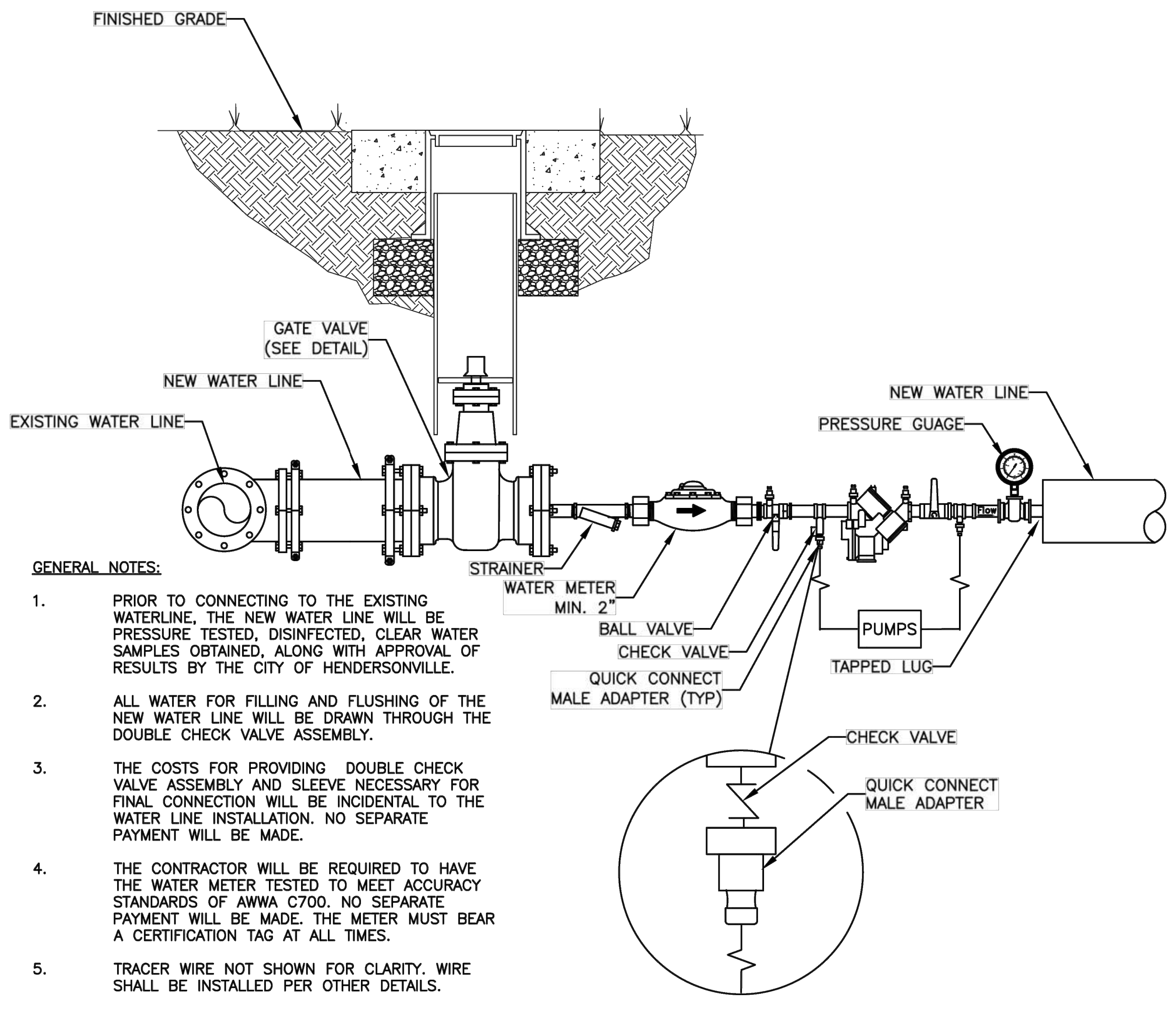


GENERAL NOTES:

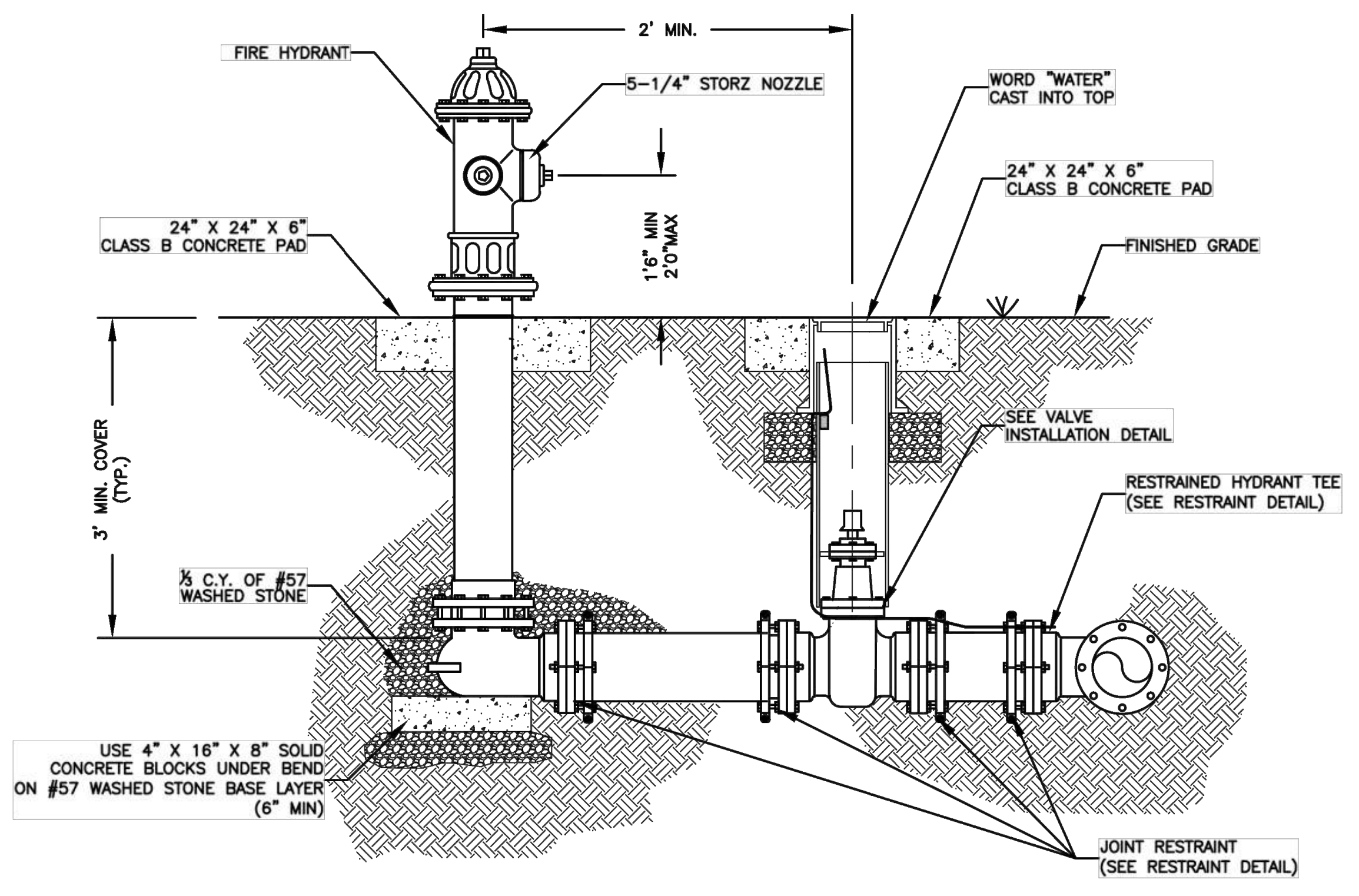
1. PRIOR TO CONNECTING TO THE EXISTING WATERLINE, THE NEW WATER LINE WILL BE PRESSURE TESTED, DISINFECTED, CLEAR WATER SAMPLES OBTAINED, ALONG WITH APPROVAL OF RESULTS BY THE CITY OF HENDERSONVILLE.
2. ALL WATER FOR FILLING AND FLUSHING OF THE NEW WATER LINE WILL BE DRAWN THROUGH THE DOUBLE CHECK VALVE ASSEMBLY.
3. THE COSTS FOR PROVIDING DOUBLE CHECK VALVE ASSEMBLY AND SLEEVE NECESSARY FOR FINAL CONNECTION WILL BE INCIDENTAL TO THE WATER LINE INSTALLATION. NO SEPARATE PAYMENT WILL BE MADE.
4. THE CONTRACTOR WILL BE REQUIRED TO HAVE THE WATER METER TESTED TO MEET ACCURACY STANDARDS OF AWWA C700. NO SEPARATE PAYMENT WILL BE MADE. THE METER MUST BEAR A CERTIFICATION TAG AT ALL TIMES.
5. TRACER WIRE NOT SHOWN FOR CLARITY. WIRE SHALL BE INSTALLED PER OTHER DETAILS.

NEW WATER LINE PRESSURE TEST
BACKFLOW PREVENTION ASSEMBLY

WD DWG. NO. 20

DATE: 02/08/2023
SCALE: NOT TO SCALE

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



NOTES:

1. FIRE HYDRANTS SHALL BE RATED TO A MINIMUM 250 PSI WORKING PRESSURE IN ACCORDACE WITH AWWA C-502 UNLESS SPECIFIED AS 350 PSI BY THE CITY. HYDRANTS SHALL HAVE A 5¼-INCH BARREL AND STORZ CONNECTION.
2. ALL VALVES AND HYDRANTS SHALL HAVE M. J. CONNECTIONS WITH IRON RETAINING GLAND M.J. RESTRAINT.
3. FIRE HYDRANT SHALL BE FACTORY PAINTED YELLOW, WITH FIELD PAINTED TOUCH-UP, BEFORE PROJECT IS ACCEPTED.
4. HYDRANT VALVE SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE MAIN, BUT DO NOT PLACE VALVE IN PROPOSED OR EXISTING CURB AND GUTTER. IF THE STREET IS SOIL AND NO PAVING IS TO BE DONE AT THIS TIME, THE LOCATION OF THE VALVE IS TO BE DETERMINED BY THE ENGINEER.
5. FIRE HYDRANTS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
6. HYDRANT BRANCH SHALL NOT BE BACK FILLED UNTIL INSPECTED AND APPROVED BY THE ENGINEER.
7. GATE VALVE AND BOX SHALL BE IN ACCORDANCE WITH STANDARD DETAIL.
8. HYDRANT EXTENSIONS AND/OR OFFSETS SHALL BE APPROVED BY THE ENGINEER.
9. FIRE HYDRANTS WHICH HAVE BEEN INSTALLED MUST BE TAGGED "OUT OF SERVICE" AND BAGGED, UTILIZING A RED CANVAS BAG WITH WHITE LETTERING, UNTIL SUCH TIME AS THE WATER MAIN TO WHICH CONNECTED IS DISINFECTED AND CONNECTED TO THE ACTIVE WATER SYSTEM.

DATE: 04/24/2019 WD DWG. NO. 12
SCALE: NOT TO SCALE

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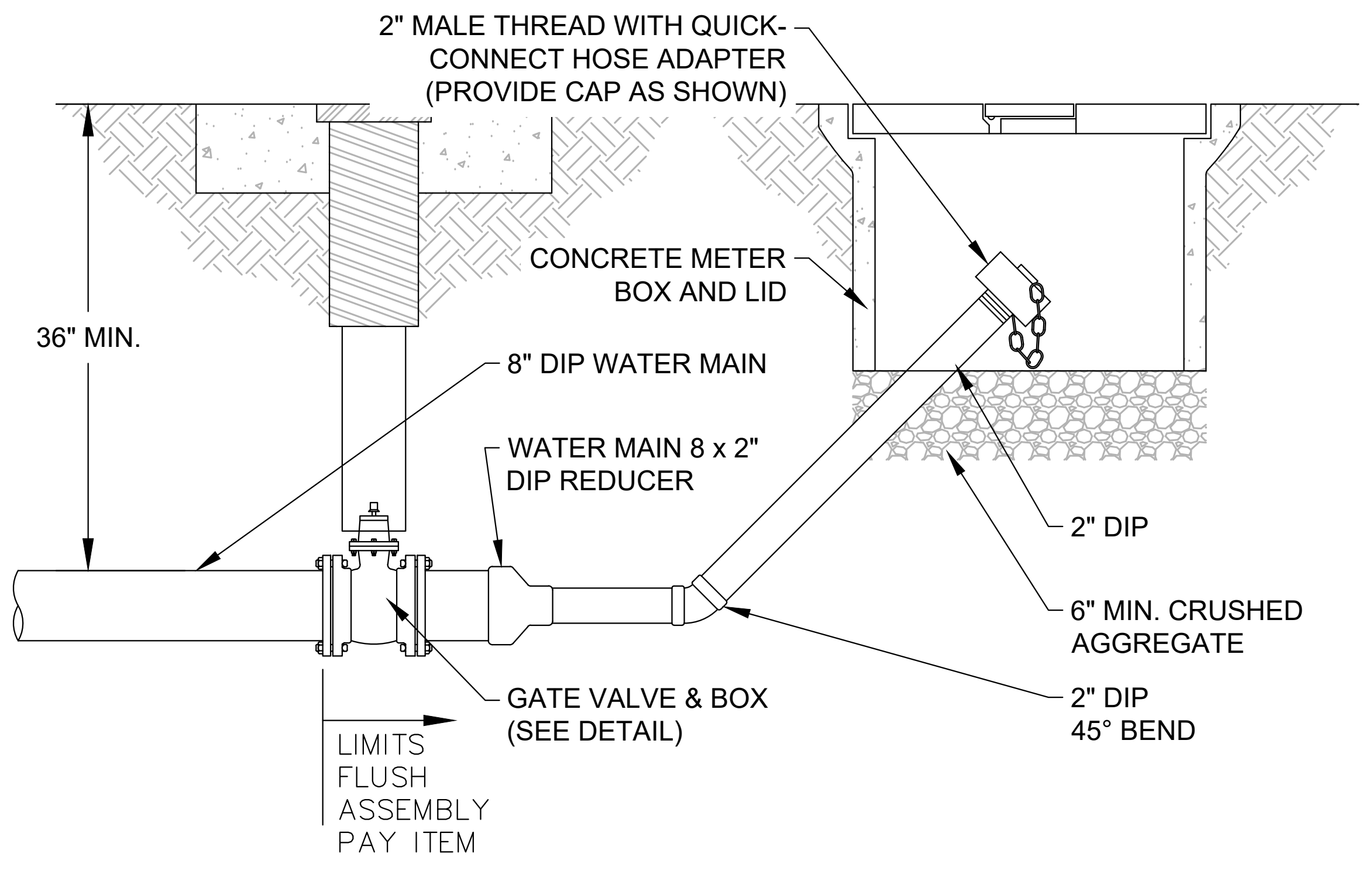
(828) 697-3000 (office)
www.cityofhendersonville.org

FIRE HYDRANT
STANDARD INSTALLATION
DETAIL

4/30/2019 11:16:34 AM, mpomraning



TWO-INCH BLOWOFF ASSEMBLY DETAIL

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS
Toby M Harris
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	########

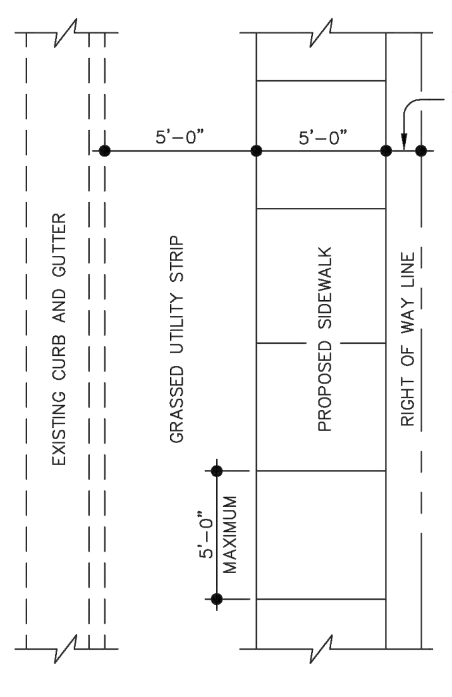
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

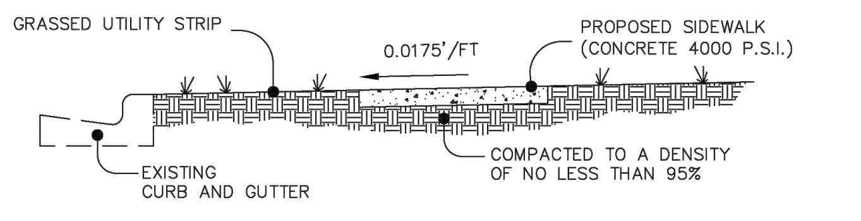
SHEET TITLE:
WATERMAIN DETAILS - 2
(SHEET 2 OF 2)

DRAWING NO:
30

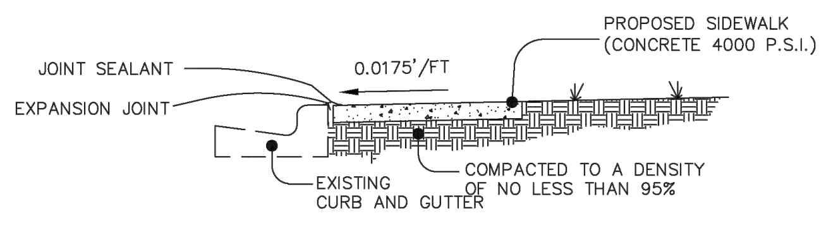
Y:\Shared\2_ENG\R656605823\5_DESIGN\DWG\SHEETS\WATER PLAN PROFILE.dwg, 5/15/2025 4:46 PM, Toby Harris



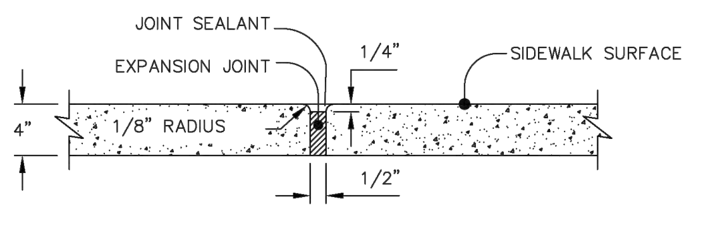
PLAN VIEW


GRASSED UTILITY STRIP
0.0175'/FT
PROPOSED SIDEWALK (CONCRETE 4000 P.S.I.)
EXISTING CURB AND GUTTER
COMPACTED TO A DENSITY OF NO LESS THAN 95%

TYPICAL SECTION


JOINT SEALANT
EXPANSION JOINT
0.0175'/FT
PROPOSED SIDEWALK (CONCRETE 4000 P.S.I.)
EXISTING CURB AND GUTTER
COMPACTED TO A DENSITY OF NO LESS THAN 95%

TYPICAL SECTION NO GRASS STRIP



TRANSVERSE EXPANSION JOINT

NOTES: .

1. TRANSVERSE EXPANSION JOINTS TO BE A MAXIMUM OF 50 FEET.
2. ALL CONCRETE TO BE FINISHED WITH CURING COMPOUND.
3. A 6 INCH DEPTH IS REQUIRED AT LOCATIONS OF DRIVEWAY CROSSINGS, AT STREET INTERSECTIONS (ALONG THE LENGTH OF RADIUS CURB RETURNS), AND IN THE HANDICAP RAMPS.
4. ALL SIDEWALK MUST BE INSPECTED BY CITY INSPECTOR PRIOR TO CONCRETE PLACEMENT.
5. SIDEWALK CROSS SLOPE WILL BE A MAXIMUM OF 0.02'/1' PER ADA REQUIREMENTS.
6. ALL SIDEWALK WILL BE LEFT IN A BROOM FINISH CONDITION.
7. CONTRACTOR MUST REPAIR ALL DAMAGE TO SIDEWALK PRIOR TO TRANSFER OF OWNERSHIP.
8. EXPANSION JOINT MATERIAL TO BE INSTALLED AT ALL LOCATIONS WHERE SIDEWALK ABUTS A RIGID STRUCTURE.
9. ALL EXPANSION JOINTS TO BE SEALED WITH POLYMER SEALANT MEETING ASTM C920

DATE: 05/19/2023
SCALE: NOT TO SCALE WD DWG. NO. 22

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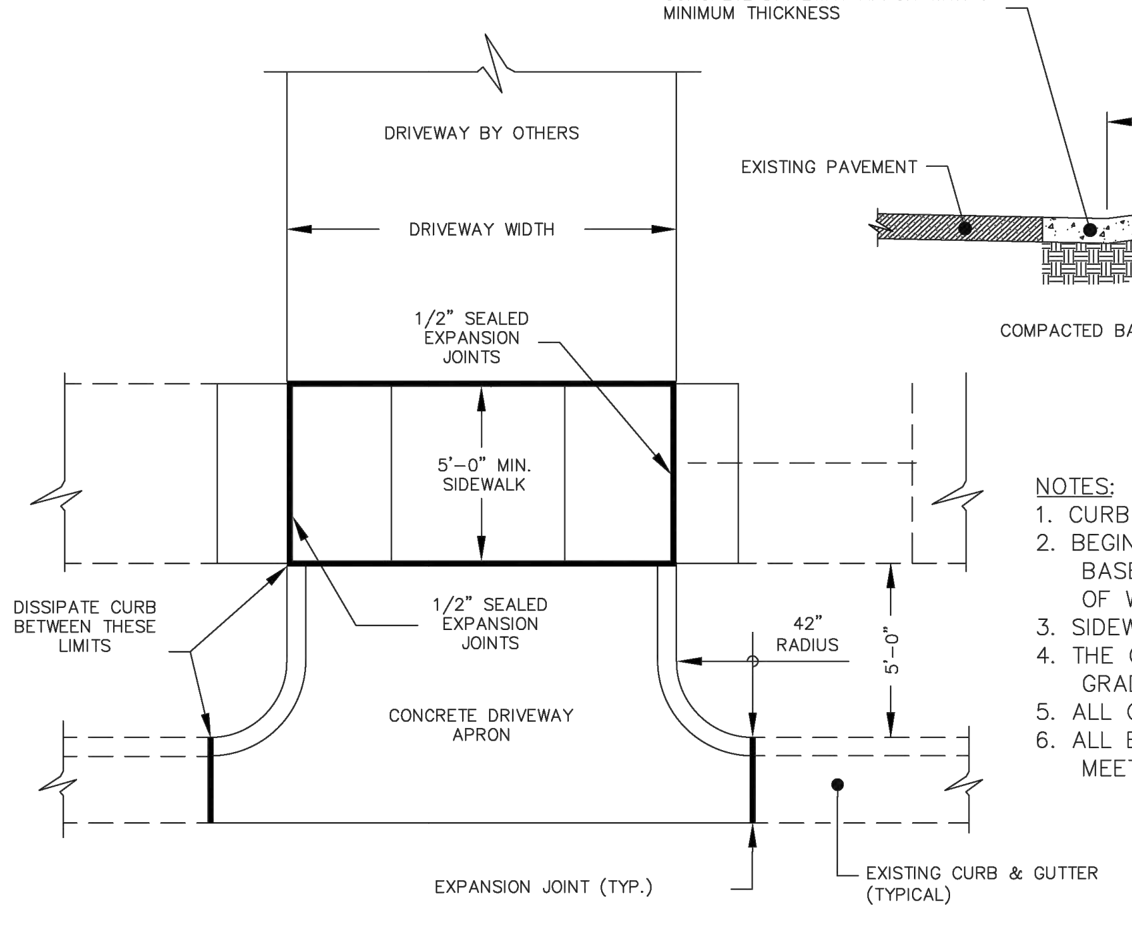
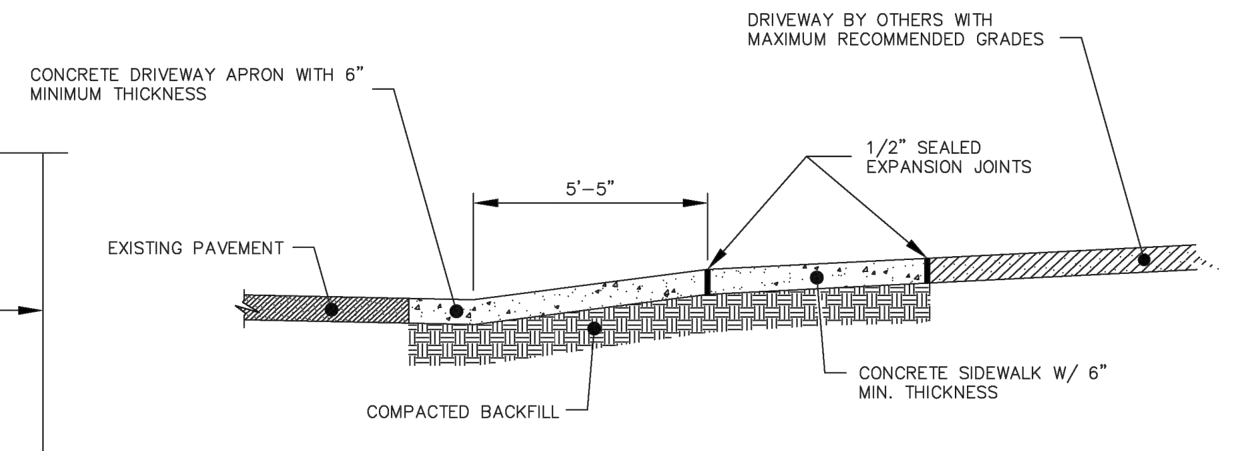
STANDARD CONCRETE SIDEWALK


DRIVEWAY BY OTHERS
DRIVEWAY WIDTH
1/2" SEALED EXPANSION JOINTS
5'-0" MIN. SIDEWALK
DISSIPATE CURB BETWEEN THESE LIMITS
1/2" SEALED EXPANSION JOINTS
42" RADIUS
5'-0"
CONCRETE DRIVEWAY APRON
EXPANSION JOINT (TYP.)
EXISTING CURB & GUTTER (TYPICAL)

PLAN VIEW


DRIVEWAY BY OTHERS WITH MAXIMUM RECOMMENDED GRADES
CONCRETE DRIVEWAY APRON WITH 6" MINIMUM THICKNESS
1/2" SEALED EXPANSION JOINTS
5'-5"
EXISTING PAVEMENT
CONCRETE SIDEWALK W/ 6" MIN. THICKNESS
COMPACTED BACKFILL

TYPICAL SECTION

NOTES:
1. CURB SHALL BE TAPERED TO FINISH FLUSH WITH SIDEWALK.
2. BEGINNING RADIUS SHALL NOT ENCROACH ON ADJACENT PROPERTIES BASED ON A PROJECTION OF THE PROPERTY LINE FROM THE RIGHT OF WAY TO THE CURB LINE.
3. SIDEWALK SECTION SHALL BE REQUIRED ALONG ALL STREETS.
4. THE CITY IS NOT RESPONSIBLE FOR VEHICLES THAT DRAG DUE TO GRADE OF DRIVEWAY. THE DRIVEWAY IS PRIVATELY MAINTAINED.
5. ALL CONCRETE SHALL BE 4,000 PSI.
6. ALL EXPANSION JOINTS TO BE SEALED WITH POLYMER SEALANT MEETING ASTM C920

DATE: 05/19/2023
SCALE: NOT TO SCALE WD DWG. NO. 02

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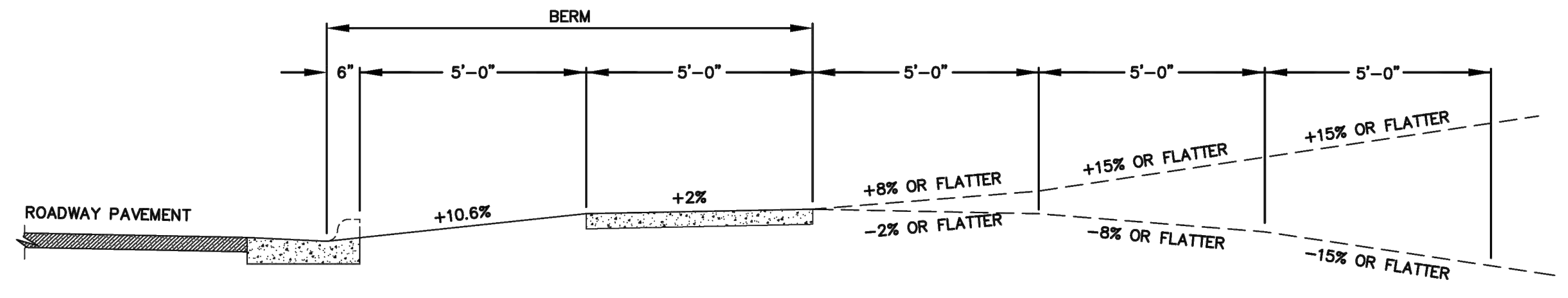
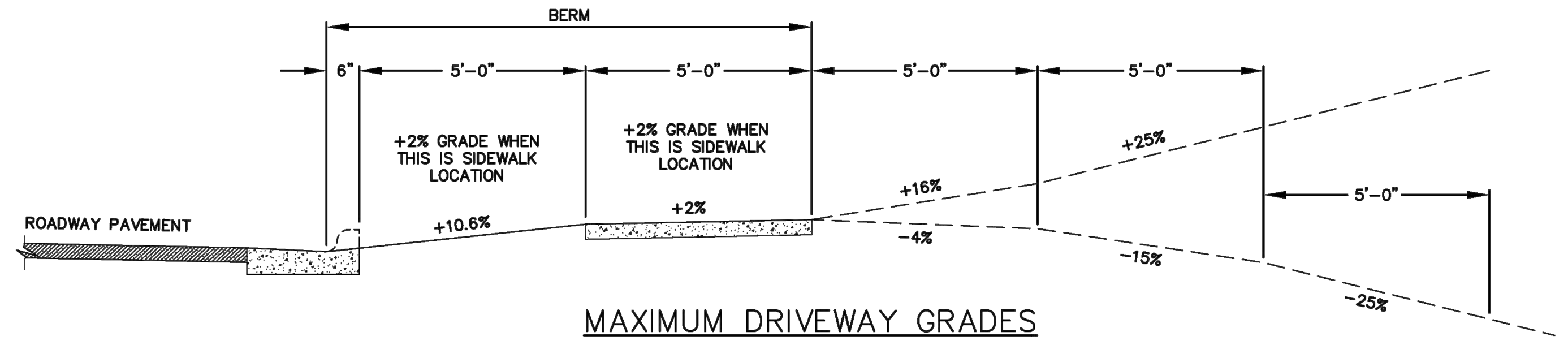
DRIVEWAY APRON TYPE I & II



DESIRABLE DRIVEWAY GRADES


BERM
6"
5'-0"
5'-0"
5'-0"
5'-0"
+2% GRADE WHEN THIS IS SIDEWALK LOCATION
+2% GRADE WHEN THIS IS SIDEWALK LOCATION
ROADWAY PAVEMENT
+10.6%
+2%
+16%
-4%
+25%
-15%
5'-0"
-25%

MAXIMUM DRIVEWAY GRADES

DATE: 05/19/2023
SCALE: NOT TO SCALE WD DWG. NO. 02G

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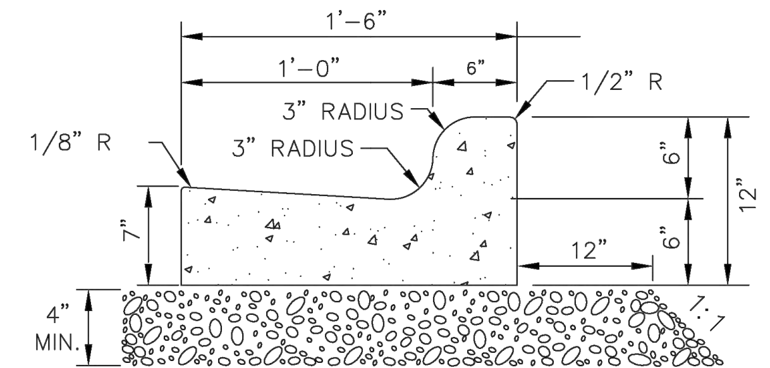
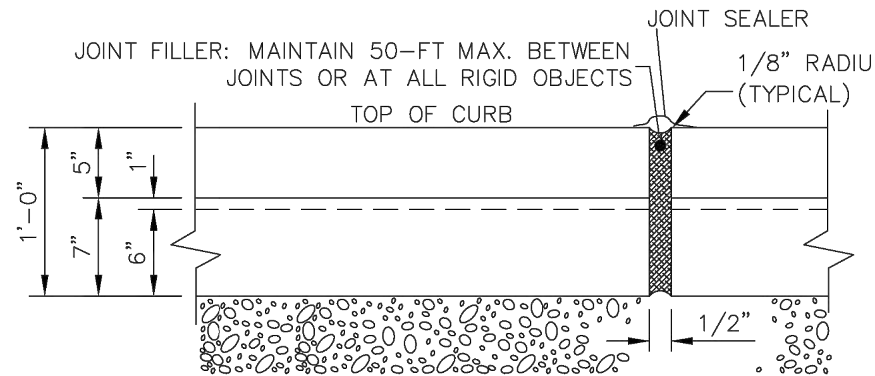
DRIVEWAY APRON TYPE I & II GRADES



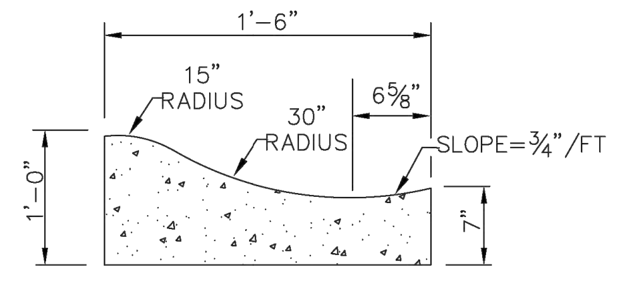
STANDARD 18" CURB & GUTTER
SIDE VIEW

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

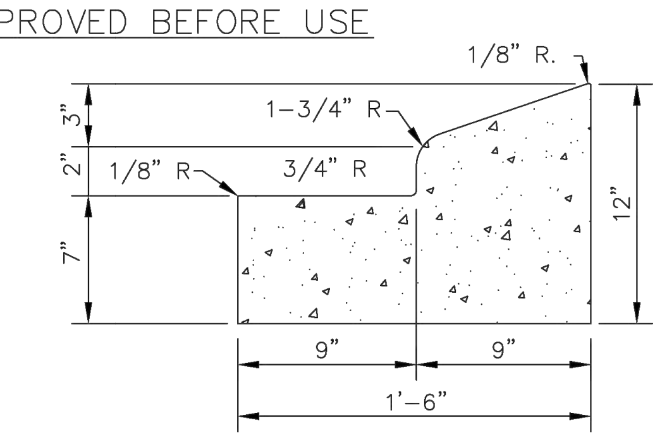

JOINT SEALER
JOINT FILLER: MAINTAIN 50-FT MAX. BETWEEN JOINTS OR AT ALL RIGID OBJECTS
1/8" RADIUS (TYPICAL)
TOP OF CURB
1'-0"
5"
1"
7"
6"
1/2"

FRONT VIEW
TRANSVERSE EXPANSION JOINT

ALTERNATE CURB TYPES – MUST BE APPROVED BEFORE USE



ROLLED CURB
SIDE VIEW



MEDIAN CURB & GUTTER
SIDE VIEW

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

DATE: 05/19/2023
SCALE: NOT TO SCALE WD DWG. NO. 03

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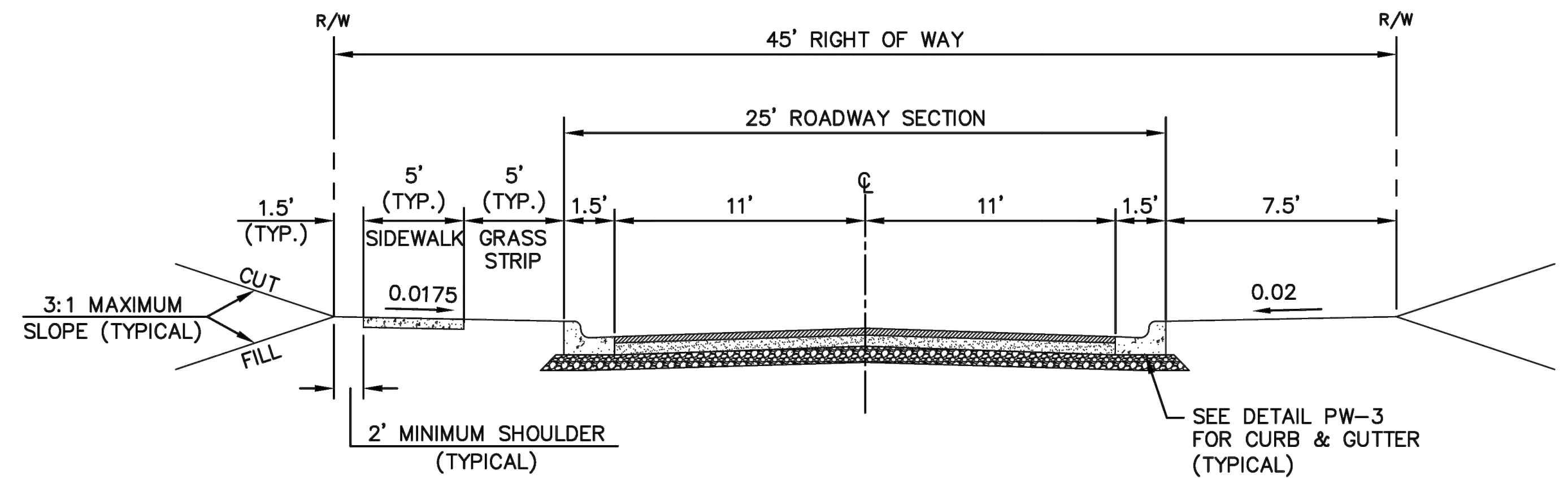
CONCRETE CURB AND GUTTER TYPES



45' RIGHT OF WAY
26' ROADWAY SECTION

SECTION VIEW

MINIMUM PAVEMENT SCHEDULE

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

NOTES:

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

DATE: 05/19/2023
SCALE: NOT TO SCALE WD DWG. NO. 04

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
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STANDARD LOCAL STREET

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
SEAL 030895
Toby M Harris
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

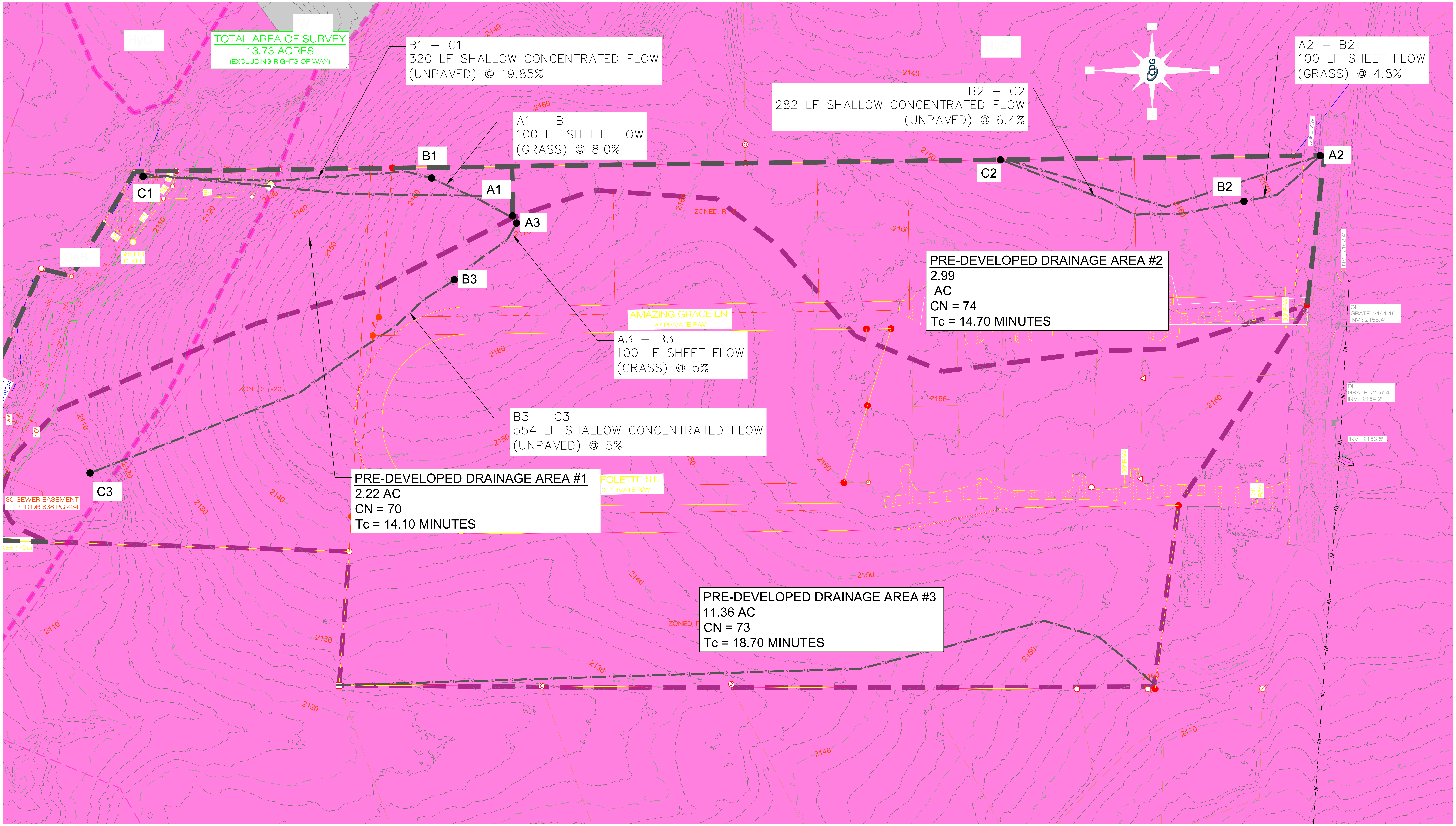
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
MISCELLANEOUS DETAILS

DRAWING NO:
31

Y:\Shared\2_ENG\R656605823\5_DESIGN\DWG\SHEETS\MISC DETAILS.dwg, 5/15/2025 4:46 PM, Toby Harris



B1 – C1
320 LF SHALLOW CONCENTRATED FLOW
(UNPAVED) @ 19.85%

A1 – B1
100 LF SHEET FLOW
(GRASS) @ 8.0%

B2 – C2
282 LF SHALLOW CONCENTRATED FLOW
(UNPAVED) @ 6.4%

A2 – B2
100 LF SHEET FLOW
(GRASS) @ 4.8%

A3 – B3
100 LF SHEET FLOW
(GRASS) @ 5%

B3 – C3
554 LF SHALLOW CONCENTRATED FLOW
(UNPAVED) @ 5%

PRE-DEVELOPED DRAINAGE AREA #1
2.22 AC
CN = 70
Tc = 14.10 MINUTES

PRE-DEVELOPED DRAINAGE AREA #2
2.99
AC
CN = 74
Tc = 14.70 MINUTES

PRE-DEVELOPED DRAINAGE AREA #3
11.36 AC
CN = 73
Tc = 18.70 MINUTES

HYDRAULIC SOIL GROUP

🟪	C (HyC, DeB)
⬜	W

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
TOBIN M. HARRIS
SEAL 030895
09/16/2024

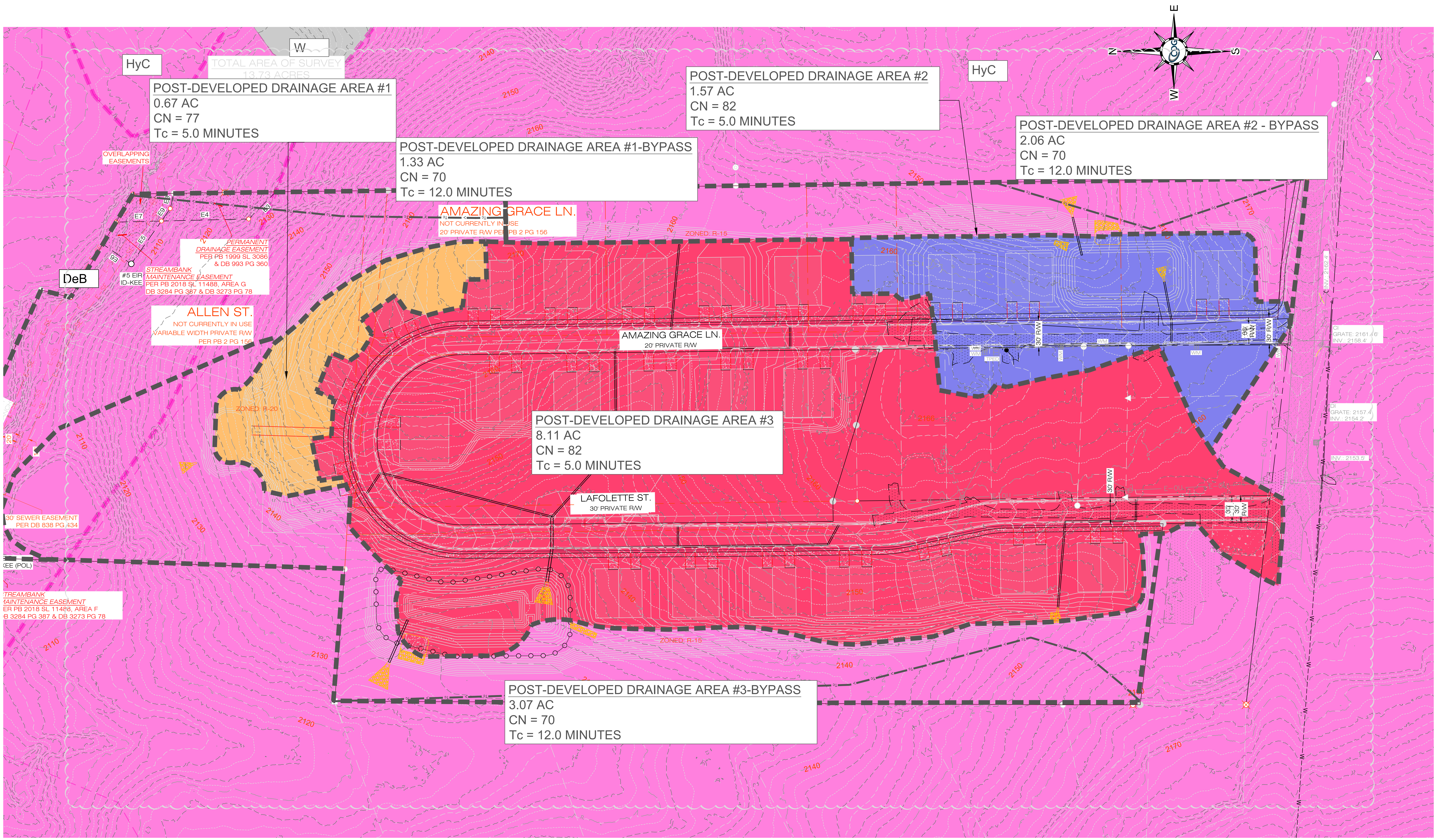
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH
GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
PRE DEVELOPMENT
DRAINAGE AREA MAP

DRAWING NO:
32



HYDRAULIC SOIL GROUP

🟪	C (HyC, DeB)
⬜	W

GRAPHIC SCALE

(IN FEET)

1"=50'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:

TOBIN M. HARRIS 030895

01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP

4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
33 - POST DEVELOPMENT DRAINAGE AREA MAP

DRAWING NO:
33