

Site Plans

Issued for: **Final Design**

Date Issued: June 25, 2019

Latest Issue: June 25, 2019

VHB Plans

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C-0	Cover Sheet	6/25/19
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C-2	Stream Geometry Plan	6/25/19
C-3	Sequence of Construction	6/25/19
C-4	Construction Details	6/25/19
C-5	Construction Details	6/25/19
C-6	Stream Typical Sections	6/25/19
C-7	Plan & Profile Sta 24+11 to Sta 18+50	6/25/19
C-8	Plan & Profile Sta 18+50 to Sta 13+00	6/25/19
C-9	Plan & Profile Sta 13+00 to Sta 10+70	6/25/19
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C-17	Cross Section Calculation Summary	6/25/19
C-18	Cross Section Calculation Summary	6/25/19
SV-1	Existing Conditions Plan	6/25/19
SV-2	Existing Conditions Plan	6/25/19
D-1	Design Narrative	6/25/19
D-2	Design Narrative	6/25/19

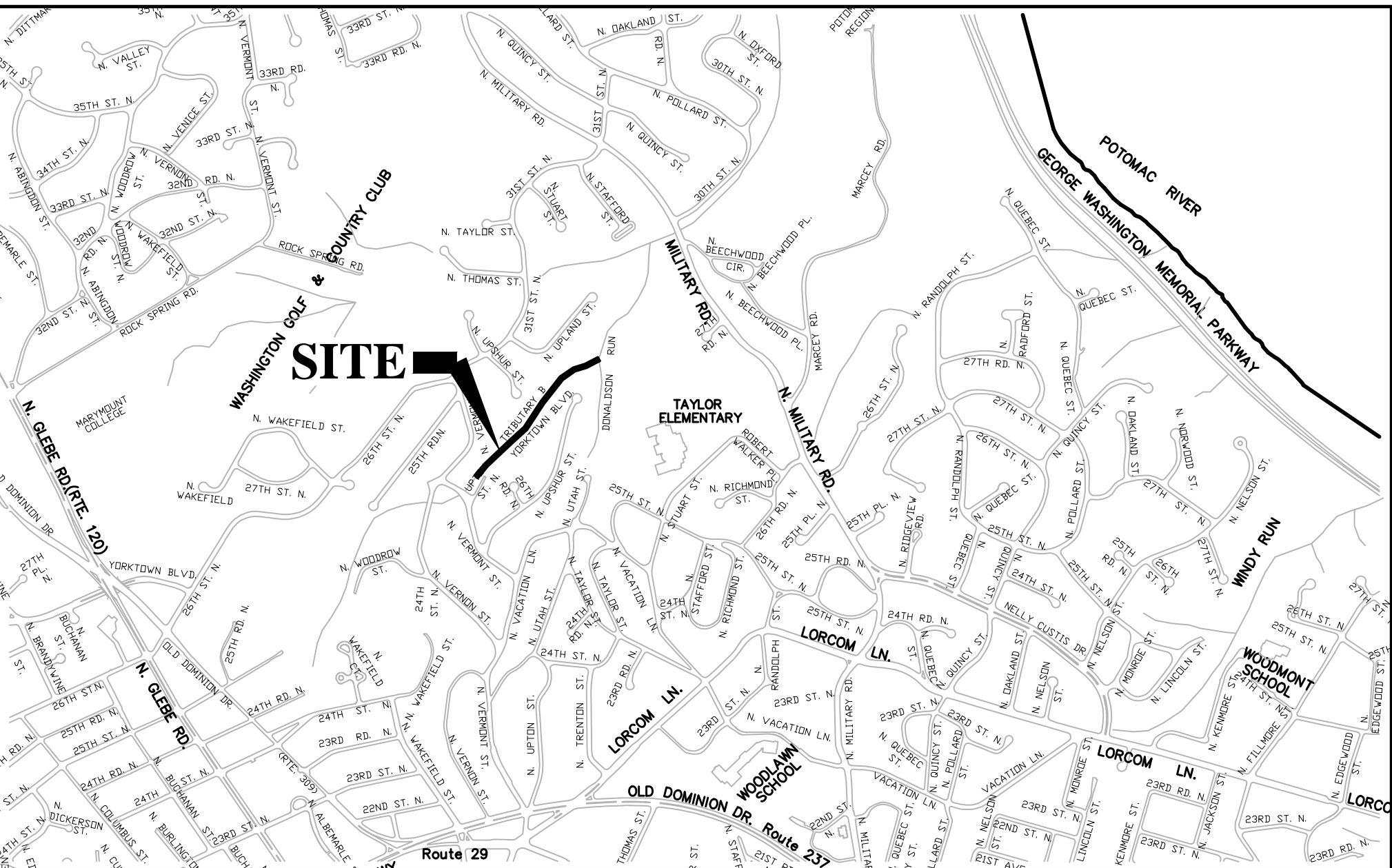
County Plans

No.	Drawing Title	Latest Issue
ESC-1	Erosion and Sediment Control Plan	6/25/19
ESC-2	Erosion and Sediment Control Plan	6/25/19
ESC-3	Erosion and Sediment Control Details	6/25/19
ESC-4	Erosion and Sediment Control Notes	6/25/19
SD-1 thru 3	Stormwater Plan and Profile	6/25/19
SD-4	Stormwater Details	6/25/19
SD-5	Stormwater Drainage Area Map	6/25/19
SD-6	Stormwater Computations	6/25/19
SD-7 thru 9	Stormwater Pollution Prevention Plan	6/25/19
SD-10	Overall Drainage Area Map	6/25/19
SD-11	Water Quality Impact Assessment Plan	6/25/19
L-1 thru 2	Existing Tree Inventory	6/25/19
L-3 thru 4	Tree Removal Plan	6/25/19
L-5 thru 6	Tree Replacement Plan	6/25/19
L-7 thru 8	Stream Planting Plan	6/25/19
L-9	Planting Notes and Details	6/25/19
MOT-1	Maintenance of Traffic Plan	6/25/19

Donaldson Run Tributary B Stream Restoration Project

Arlington County, Virginia

Department of Environmental Services



Site Location Map



Floodplain:

The Property Shown Is Within A Floodplain Zone A2 & B As Designated By and Shown On FEMA Flood Insurance Rate Map, Community Panel No. 5155200036C & 5155200038C

Applicant/Prepared for:

Arlington County
Department of Environmental Services
2100 Clarendon Boulevard, Suite 710
Arlington, VA 22201
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(703) Fax 228-7134
Contact: Jason Papacosma

Wetland Notes:

Waters of the U.S. within the Project Limits are confined to the channel of Donaldson Run Tributary B as indicated on Sheets SV-1 and SV-2.

Stormwater Management

SWM #14-1702



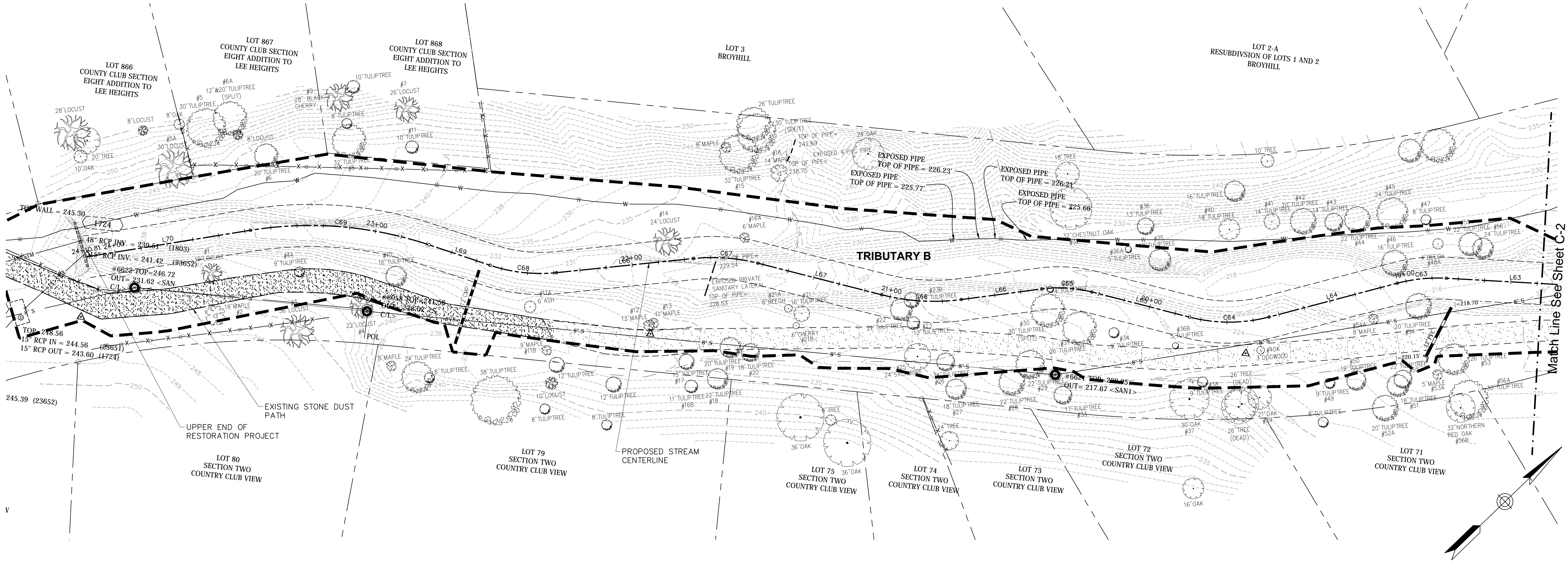
Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

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757 220 0500 · 757 220 8544



C-0





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Legend	
	PROPERTY LINE
	BASELINE
	MATCHLINE
	EXISTING STORM SEWER
	WATER LINE
	SEWER LINE
	LIMIT OF DISTURBANCE



PROPOSED STREAM ALIGNMENT

Number	Delta	Radius	Length	Bearing	Ch. Dist.	Start Northing	Start Easting	End Northing	End Easting
L50			14.73'	N19°38'58"E		7016944.04	11876939.99	7016957.91	11876944.94
C49	24° 13' 01"	50.00'	21.13'	N31°45'26"E	20.98'	7016926.21	11876928.95	7016944.04	11876939.99
L51			27.42'	N43°51'59"E		7016906.43	11876909.94	7016926.21	11876928.95
C50	51° 12' 31"	20.00'	17.88'	N69°28'14"E	17.29'	7016900.37	11876893.75	7016906.43	11876909.94
L52			11.11'	S84°55'30"E		7016901.36	11876882.68	7016900.37	11876893.75
C51	67° 18' 39"	35.00'	41.12'	N61°25'10"E	38.79'	7016882.80	11876848.62	7016901.36	11876882.68
L53			15.21'	N27°45'51"E		7016869.34	11876841.53	7016882.80	11876848.62
C52	99° 33' 19"	38.00'	66.03'	N77°32'31"E	58.03'	7016856.82	11876784.87	7016869.34	11876841.53
L54			24.72'	S52°40'50"E		7016871.81	11876765.21	7016856.82	11876784.87
C53	93° 04' 19"	60.00'	97.46'	N80°47'01"E	87.10'	7016857.86	11876679.24	7016871.81	11876765.21
L55			57.24'	N34°14'51"E		7016810.55	11876647.03	7016857.86	11876679.24
C54	25° 30' 58"	50.00'	22.27'	N47°00'20"E	22.08'	7016795.49	11876630.87	7016810.55	11876647.03
L56			39.59'	S59°45'49"E		7016775.55	11876596.67	7016795.49	11876630.87
C55	7° 28' 25"	100.00'	13.04'	N56°01'37"E	13.03'	7016768.27	11876585.86	7016775.55	11876596.67
C56	34° 05' 26"	40.00'	23.80'	N35°14'41"E	23.45'	7016739.07	11876559.34	7016758.22	11876572.87
L57			34.44'	N18°11'58"E		7016706.35	11876548.58	7016739.07	11876559.34
C57	24° 21' 15"	50.00'	21.25'	N30°22'36"E	21.09'	7016688.16	11876537.92	7016706.35	11876548.58
L58			30.68'	N42°33'13"E		7016665.55	11876517.17	7016688.16	11876537.92
C58	27° 53' 14"	59.69'	29.05'	N28°36'36"E	28.77'	7016640.30	11876503.39	7016665.55	11876517.17
L59			24.77'	N14°39'59"E		7016616.34	11876497.12	7016640.30	11876503.39

Number	Delta	Radius	Length	Bearing	Ch. Dist.	Start Northing	Start Easting	End Northing	End Easting
C59	34° 42' 43"	59.82'	36.24'	N32°01'20"E	35.69'	7016586.08	11876478.20	7016616.34	11876497.12
L60			5.20'	N49°22'42"E		7016582.70	11876474.25	7016586.08	11876478.20
C60	11° 17' 54"	50.00'	9.86'	N43°43'45"E	9.84'	7016575.58	11876467.45	7016582.70	11876474.25
L61			31.75'	N38°04'48"E		7016550.60	11876447.87	7016575.58	11876467.45
C61	16° 58' 35"	50.00'	14.81'	N29°35'30"E	14.76'	7016537.76	11876440.58	7016550.60	11876447.87
L62			55.77'	N21°06'13"E		7016485.73	11876420.50	7016537.76	11876440.58
C62	26° 03' 11"	70.00'	31.83'	N34°07'48"E	31.56'	7016459.61	11876402.79	7016485.73	11876420.50
L63			52.35'	N47°09'23"E		7016424.01	11876364.41	7016459.61	11876402.79
C63	17° 57' 45"	60.00'	18.81'	N38°10'31"E	18.73'	7016409.28	11876352.83	7016424.01	11876364.41
L64			50.39'	N29°11'38"E		7016365.29	11876328.25	7016409.28	11876352.83
C64	29° 10' 57"	60.00'	30.56'	N43°47'07"E	30.23'	7016343.46	11876307.33	7016365.29	11876328.25
L65			38.43'	N58°22'35"E		7016323.31	11876274.61	7016343.46	11876307.33
C65	21° 57' 04"	50.00'	19.16'	N47°24'03"E	19.04'	7016310.43	11876260.59	7016323.31	11876274.61
L66			30.87'	N36°25'31"E		7016285.59	11876242.26	7016310.43	11876260.59
C66	21° 48' 09"	80.00'	30.44'	N47°19'36"E	30.26'	7016265.08	11876220.02	7016285.59	11876242.26
L67			48.66'	N58°13'40"E		7016239.46	11876178.65	7016265.08	11876220.02
C67	20° 11' 02"	70.00'	24.66'	N48°08'09"E	24.53'	7016223.08	11876160.38	7016239.46	11876178.65
L68			52.43'	N38°02'38"E		7016181.79	11876128.07	7016223.08	11876160.38
C68	24° 25' 15"	60.00'	25.57'	N50°15'16"E	25.38'	7016165.57	11876108.55	7016181.79	11876128.07
L69			24.46'	N62°27'53"E		7016154.26	11876086.86	7016165.57	11876108.55

Number	Delta	Radius	Length	Bearing	Ch. Dist.	Start Northing	Start Easting	End Northing	End Easting
C69	27° 43' 28"	142.24'	68.83'	N48°36'09"E	68.16'	7016109.18	11876035.73	7016154.26	11876086.86
L70			62.99'	N34°44'25"E		7016057.42	11875999.84	7016109.18	11876035.73
L71			16.42'	N52°17'24"E		7016758.22	11876572.87	7016768.27	11876585.86

Donaldson Run
Tributary B
Stream Restoration
Country Club View
Arlington, Virginia

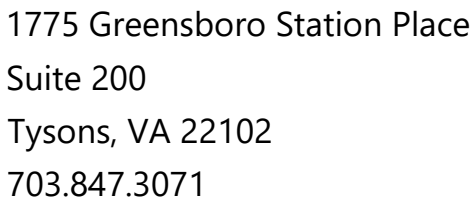
No.	Revision	Date	App'd.

Designed by IFS	Checked by JRL
Issued for Final Design	Date June 25, 2019

Drawing Title
Stream Geometry Plan

Drawing Number

C-1



PROPERTY LINE
BASELINE
MATCHLINE
EXISTING STORM SEWER
WATER LINE
SEWER LINE
LIMIT OF DISTURBANCE



No.	Revision	Date	Appvd.
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Designed by	Checked by
IFS	JRL
Issued for	Date
Final Design	June 25, 2019

Drawing Number

Sheet 3 of 23

Project Number
32923.00



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DONALDSON RUN TRIBUTARY B STREAM RESTORATION PROJECT

1. THE PROJECT CONSISTS OF RESTORING A PORTION OF DONALDSON RUN TRIBUTARY A STREAM CORRIDOR BEGINNING AT THE CULVERT OUTFALL LOCATED AT NORTH UPTON STREET AND ENDING AT THE CONFLUENCE WITH DONALDSON RUN TRIBUTARY A, APPROXIMATELY 1,100 LINEAR FEET UPSTREAM OF MILITARY ROAD. THE EXISTING CHANNEL LENGTH IS APPROXIMATELY 1,404 LINEAR FEET, WHEREAS THE PROPOSED CHANNEL LENGTH IS APPROXIMATELY 1,331 LINEAR FEET. RESTORATION ACTIVITIES SHALL INCLUDE:
 - GRADING THE STREAM VALLEY THROUGH A CONTROLLED CUT AND FILL OPERATION TO IMPROVE CHANNEL FORM (PATTERN, DIMENSION, PROFILE)
 - INSTALLING NATURAL ROCK STRUCTURES TO PROVIDE FOR GRADE CONTROL, ENHANCED AQUATIC HABITAT FEATURES, AND INFRASTRUCTURE PROTECTION
 - STABILIZING THE PEDESTRIAN PATHWAY THAT RUNS ALONG THE STREAM REACH THROUGH GRADING AND INSTALLATION OF NEW DRAINAGE STRUCTURES
 - INSTALLATION OF A NEW UPSTREAM CULVERT AT NORTH UPTON STREET FOR IMPROVED STORMWATER CONVEYANCE
 - INSTALLATION OF NEW STORMWATER CULVERTS ALONG THE STEEP LEFT BANK TO REDUCE EROSION ALONG THE VALLEY WALLS, AND
 - PLANTING DISTURBED AREAS WITH A VARIETY OF NATIVE TREES, SHRUBS, AND HERBACEOUS MATERIALS TO PROMOTE LONG-TERM MORPHOLOGICAL STABILITY, INCREASE HABITAT DIVERSITY, AND ENHANCE VISUAL VALUE THROUGHOUT THE STREAM CORRIDOR.
2. THE TOTAL DISTURBED AREA WILL BE APPROXIMATELY 2.14 ACRES INCLUDING THE STREAM CHANNEL.
3. THE PROJECT IS LOCATED ON COUNTY AND PRIVATELY OWNED PROPERTY WITHIN A DEEP, FORESTED STREAM VALLEY, BORDERED BY RESIDENTIAL PROPERTIES. A SANITARY SEWER LINE RUNS PARALLEL TO THE STREAM ALONG THE RIGHT BANK. THE SANITARY SEWER CROSSES THE STREAM AT STREAM STATION 13+35 AND 17+25.
4. CONSTRUCTION ACTIVITIES SHALL NOT ADVERSELY IMPACT AREAS OUTSIDE THE PROJECT AREA. OFF SITE DISPOSAL OF SURPLUS OR UNSUITABLE EXCAVATED MATERIAL SHALL BE CONDUCTED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL ORDINANCES.
5. SOILS CONSIST PREDOMINANTLY OF GLENELG-MANOR AND GLENELG-URBAN LAND COMPLEX. THESE SOILS HAVE A LOAMY TEXTURE, MODERATE PERMEABILITY RATE, AND SEVERE EROSION POTENTIAL. THE HYDROLOGIC SOIL GROUPING CLASSIFICATION IS B.

SEQUENCE OF CONSTRUCTION

PRE-CONSTRUCTION:

1. STAKEOUT THE LIMITS OF DISTURBANCE (LOD) AND THE PROPOSED STREAM ALIGNMENT BASED ON THE GEOMETRY PLAN SHEET STREAM ALIGNMENT. AT CURVES, PC AND PT POINTS SHALL BE STAKED AS WELL CENTER OF CURVE WITH CORRESPONDING RADIUS OF CURVATURE LISTED. VERTICAL CONTROL SHALL BE CLEARLY MARKED.
2. IDENTIFY AND ESTABLISH STABILIZED CONSTRUCTION ACCESS, STAGING AND STOCKPILE AREAS, EROSION EROSION AND SEDIMENT CONTROL PRACTICES. NOTE THAT AS CONSTRUCTION TRAFFIC WILL ENTER THE SITE FROM THE ONE CONSTRUCTION ENTRANCE SHOWN ON THE PLANS LOCATED AT N VERMONT STREET.
3. IN COOPERATION WITH ARLINGTON COUNTY'S ARBORIST AND ENGINEER, IDENTIFY TREES TO BE PROTECTED WITHIN THE LOD AND INSTALL TREE PROTECTION AS DIRECTED AND SPECIFIED IN THE SPECIAL PROVISIONS. ADJUST GRADING LIMITS AND ELEVATIONS WHERE PRACTICABLE IN ORDER TO SALVAGE EXISTING TREES IDENTIFIED FOR PROTECTION. THE ENGINEER WILL DETERMINE THE FEASIBILITY OF ADJUSTING CUT AND FILL LIMITS FOR PURPOSES OF SAVING EXISTING TREES.
4. ROOT PRUNING SHALL TAKE PLACE PRIOR TO ANY CLEARING AND GRADING AND SHALL BE CONDUCTED WITH THE SUPERVISION OF A CERTIFIED ARBORIST PER ARLINGTON COUNTY SPECIFICATIONS.
5. MOBILIZE EQUIPMENT AND MATERIALS TO THE SITE.
6. INSTALL PERIMETER EROSION AND SEDIMENT CONTROL DEVICES AS INDICATED ON THE PLANS.
7. REQUEST FOR A PRE-CONSTRUCTION MEETING WITH ARLINGTON COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.
8. STREAM CONSTRUCTION SHALL PROCEED FROM UPSTREAM TO DOWNSTREAM AS CURRENT BANK EROSION IS MOST SEVERE IN THE UPSTREAM REACHES.
9. STORMWATER PIPE CONSTRUCTION AS DETAILED IN SHEETS SD-1 THROUGH SD-4 SHALL VARY IN TIMING WITH THE STREAM CONSTRUCTION. THE FOLLOWING DETAIL RECOMMENDATIONS FOR EACH STORMWATER PIPE:
 - 9.1. 48" AND 18" HDPE CONSTRUCTION SHALL BE COMPLETED PRIOR TO STREAM RESTORATION TO REDUCE THE POTENTIAL FOR SEDIMENT TRANSPORT AND DEPOSITION INTO THE RESTORED STREAM REACH.
 - 9.2. 15" HDPE CONSTRUCTION ON THE WEST SIDE (LEFT BANK) OF THE STREAM REACH SHALL BE CONSTRUCTED PRIOR TO AND/OR CONCURRENT WITH THE STREAM CONSTRUCTION.
 - 9.3. 12" AND 8" HDPE CONSTRUCTION ON THE EAST SIDE (RIGHT BANK) OF THE STREAM REACH SHALL BE CONSTRUCTED CONCURRENT WITH STREAM CONSTRUCTION TO FACILITATE CONSTRUCTION AND TIE-IN WITH THE STREAM CHANNEL DIMENSIONS, MATERIALS AND STRUCTURES.
10. STREAM CONSTRUCTION SHALL BE COMPLETED IN THE FOLLOWING PHASES:

- | | | | | | | |
|----------|----------|--------|---------|-------|----|-------|
| PHASE 1: | PROPOSED | STREAM | STATION | 20+90 | TO | 24+11 |
| PHASE 2: | PROPOSED | STREAM | STATION | 18+30 | TO | 20+90 |
| PHASE 3: | PROPOSED | STREAM | STATION | 14+80 | TO | 18+30 |
| PHASE 4: | PROPOSED | STREAM | STATION | 10+70 | TO | 14+80 |

PHASE 1 SEQUENCING:

1. INSTALL DIESEL-POWERED PUMP AROUND DIVERSION AS NEEDED FOR DAILY WORK. RECOMMENDED PUMP AROUND LOCATIONS ARE SHOWN ON THE PLANS (ESC-1) AND MAY VARY WITHIN THE PHASED CONSTRUCTION ZONE AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL OPERATE AND MAINTAIN THE PUMP-AROUND SYSTEM TWENTY FOUR HOURS A DAY. UNLESS ALL DISTURBED AREAS WITHIN THE PUMP-AROUND WORK AREA CAN BE STABILIZED BY THE END OF THE WORK DAY OR UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. CLEAR AND GRUB AS NECESSARY TO INSTALL THE PROPOSED CONTOURS AND ROCK STRUCTURES. IN GENERAL, RESTORATION ACTIVITIES SHALL BE PERFORMED IN INCREMENTS NOT TO EXCEED A LINEAR DISTANCE THAT THE CONTRACTOR CAN COMPLETE BY THE END OF EACH WORK DAY. SUBSEQUENTLY, THE WORK INCLUDES GRADING AND STABILIZATION AS INDICATED ON THE CONSTRUCTION PLANS. CLEARING AND GRUBBING MAY PROCEED AHEAD OF CUT AND FILL OPERATIONS PROVIDED SILT FENCE IS INSTALLED ALONG THE TOP OF STREAMBANKS TO MINIMIZE SILTATION.
3. STRIP AND STOCKPILE THE TOP 9 INCHES OF SOIL MATERIAL FROM THE GRADING LIMITS AND PLACE SILT FENCE AROUND THE STOCKPILES.
4. CUT AND FILL IN ACCORDANCE WITH THE TYPICAL CROSS SECTIONS, GRADING PLAN, AND CROSS SECTIONS TAKEN FROM GRADING PLAN.
5. 8" AND 12" HDPE CONSTRUCTION ON THE EAST SIDE (RIGHT BANK) SHALL BE CONSTRUCTED CONCURRENT WITH STREAM CONSTRUCTION SO THAT THE OUTFALL WILL TIE-IN WITH THE STREAM CHANNEL AND MATERIALS.
6. INSTALL ROCK STRUCTURES IN ACCORDANCE WITH THE GRADING PLAN AND CONSTRUCTION DETAILS SHEETS.
7. PLACE 18 INCHES OF IMPORTED COBBLE-GRAVEL-SAND MATERIAL TO CONSTRUCT THE STREAMBED.
8. TIE ANY EXISTING DRAINAGE FEATURES TO THE PROPOSED CHANNEL AS DIRECTED BY THE ENGINEER.
9. PLACE A MINIMUM OF 6 INCHES OF TOPSOIL TO ACHIEVE FINAL GRADES IN ALL RE-GRADED AREAS WITH THE EXCEPTION OF THE ROCK LINED CHANNEL.
10. PREPARE SEED BED IN ALL DISTURBED AREAS AND SOW WITH FLOODPLAIN AND UPLAND SEED MIX AS SPECIFIED.
11. INSTALL EROSION CONTROL MATTING ON FLOODPLAIN AREA AS INDICATED IN THE TYPICAL CROSS SECTIONS.
12. INSTALL WOODY PLANT MATERIALS AS INDICATED ON THE PLANTING SUMMARY AND DETAILS CONSTRUCTION PLAN SHEET. TIMING OF WOODY PLANTING MAY VARY DEPENDING ON TIME OF YEAR, AND SHALL BE APPROVED BY ARLINGTON COUNTY.
13. SEED AND MULCH ALL DISTURBED AREAS BEFORE PROCEEDING TO NEXT PHASE.
14. ONCE DISTURBED AREAS AND EXPOSED SLOPES ARE STABILIZED, REMOVE PUMP-AROUND SYSTEM.
15. UPON APPROVAL FROM ARLINGTON COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR, REMOVE STOCKPILE AREAS AND EROSION AND SEDIMENT CONTROL PRACTICES.

PHASE 2 SEQUENCING:

1. INSTALL DIESEL-POWERED PUMP AROUND DIVERSION AS NEEDED FOR DAILY WORK. RECOMMENDED PUMP AROUND LOCATIONS ARE SHOWN AND MAY VARY WITHIN THE PHASED CONSTRUCTION ZONE AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL OPERATE AND MAINTAIN THE PUMP-AROUND SYSTEM TWENTY FOUR HOURS A DAY UNLESS ALL DISTURBED AREAS WITHIN THE PUMP-AROUND WORK AREA CAN BE STABILIZED BY THE END OF THE WORK DAY OR UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. CLEAR AND GRUB AS NECESSARY TO INSTALL THE PROPOSED CONTOURS AND ROCK STRUCTURES. IN GENERAL, RESTORATION ACTIVITIES SHALL BE PERFORMED IN INCREMENTS NOT TO EXCEED A LINEAR DISTANCE THAT THE CONTRACTOR CAN COMPLETE BY THE END OF EACH WORK DAY. SPECIFICALLY, THAT WORK INCLUDES GRADING AND STABILIZATION AS INDICATED ON THE CONSTRUCTION PLANS. CLEARING AND GRUBBING MAY PROCEED AHEAD OF CUT AND FILL OPERATIONS PROVIDED SILT FENCE IS INSTALLED ALONG THE TOP OF STREAMBANKS TO MINIMIZE SILTATION.
3. STRIP AND STOCKPILE THE TOP 9 INCHES OF SOIL MATERIAL FROM THE GRADING LIMITS AND PLACE SILT FENCE AROUND THE STOCKPILES.
4. CUT AND FILL IN ACCORDANCE WITH THE TYPICAL CROSS SECTIONS, GRADING PLAN, AND CROSS SECTIONS TAKEN FROM GRADING PLAN.
5. 8" HDPE CONSTRUCTION ON THE EAST SIDE (RIGHT BANK) SHALL BE CONSTRUCTED CONCURRENT WITH STREAM CONSTRUCTION SO THAT THE OUTFALL WILL TIE-IN WITH THE STREAM CHANNEL AND MATERIALS.
6. INSTALL ROCK STRUCTURES IN ACCORDANCE WITH THE GRADING PLAN AND CONSTRUCTION DETAILS SHEETS.
7. PLACE 18 INCHES OF IMPORTED COBBLE-GRAVEL-SAND MATERIAL TO CONSTRUCT THE STREAMBED.
8. TIE ANY EXISTING DRAINAGE FEATURES TO THE PROPOSED CHANNEL AS DIRECTED BY THE ENGINEER.
9. PLACE A MINIMUM OF 6 INCHES OF TOPSOIL TO ACHIEVE FINAL GRADES IN ALL RE-GRADED AREAS WITH THE EXCEPTION OF THE ROCK LINED CHANNEL.
10. PREPARE SEED BED IN ALL DISTURBED AREAS AND SOW WITH FLOODPLAIN AND UPLAND SEED MIX AS SPECIFIED.
11. INSTALL EROSION CONTROL MATTING ON FLOODPLAIN AREA AS INDICATED IN THE TYPICAL CROSS SECTIONS.
12. INSTALL WOODY PLANT MATERIALS AS INDICATED ON THE PLANTING SUMMARY AND DETAILS CONSTRUCTION PLAN SHEET. TIMING OF WOODY PLANTING MAY VARY DEPENDING ON TIME OF YEAR, AND SHALL BE APPROVED BY ARLINGTON COUNTY.
13. SEED AND MULCH ALL DISTURBED AREAS BEFORE PROCEEDING TO NEXT PHASE.
14. ONCE DISTURBED AREAS AND EXPOSED SLOPES ARE STABILIZED, REMOVE PUMP-AROUND SYSTEM. INSTALL DIESEL-POWERED PUMP AROUND DIVERSION AS NEEDED FOR DAILY WORK. RECOMMENDED PUMP AROUND LOCATIONS ARE SHOWN AND MAY VARY WITHIN THE PHASED CONSTRUCTION ZONE AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL OPERATE AND MAINTAIN THE PUMP-AROUND SYSTEM TWENTY FOUR HOURS A DAY UNLESS ALL DISTURBED AREAS WITHIN THE PUMP-AROUND WORK AREA CAN BE STABILIZED BY THE END OF THE WORK DAY OR UNLESS OTHERWISE APPROVED BY THE ENGINEER.
15. UPON APPROVAL FROM ARLINGTON COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR, REMOVE STOCKPILE AREAS AND EROSION AND SEDIMENT CONTROL PRACTICES.

PHASE 3 SEQUENCING:

1. INSTALL DIESEL-POWERED PUMP AROUND DIVERSION AS NEEDED FOR DAILY WORK. RECOMMENDED PUMP AROUND LOCATIONS ARE SHOWN AND MAY VARY WITHIN THE PHASED CONSTRUCTION ZONE AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL OPERATE AND MAINTAIN THE PUMP-AROUND SYSTEM TWENTY FOUR HOURS A DAY UNLESS ALL DISTURBED AREAS WITHIN THE PUMP-AROUND WORK AREA CAN BE STABILIZED BY THE END OF THE WORK DAY OR UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. CLEAR AND GRUB AS NECESSARY TO INSTALL THE PROPOSED CONTOURS AND ROCK STRUCTURES. IN GENERAL, RESTORATION ACTIVITIES SHALL BE PERFORMED IN INCREMENTS NOT TO EXCEED A LINEAR DISTANCE THAT THE CONTRACTOR CAN COMPLETE BY THE END OF EACH WORK DAY. SPECIFICALLY, THAT WORK INCLUDES GRADING AND STABILIZATION AS INDICATED ON THE CONSTRUCTION PLANS. CLEARING AND GRUBBING MAY PROCEED AHEAD OF CUT AND FILL OPERATIONS PROVIDED SILT FENCE IS INSTALLED ALONG THE TOP OF STREAMBANKS TO MINIMIZE SILTATION.
3. STRIP AND STOCKPILE THE TOP 9 INCHES OF SOIL MATERIAL FROM THE GRADING LIMITS AND PLACE SILT FENCE AROUND THE STOCKPILES.
4. 15" HDPE CONSTRUCTION ON THE WEST SIDE (LEFT BANK) OF THE STREAM REACH SHALL BE CONSTRUCTED PRIOR TO AND/OR CONCURRENT WITH THE STREAM CONSTRUCTION. CONSTRUCTION TO BE COMPLETED WITHIN ONE DAY OR EROSION CONTROL MATTING TO BE USED TO KEEP DISTURBED AREA STABILIZED UP SLOPE OF RECEIVING STREAM.
5. 12" HDPE CONSTRUCTION ON THE EAST SIDE (RIGHT BANK) SHALL BE CONSTRUCTED CONCURRENT WITH STREAM CONSTRUCTION SO THAT THE OUTFALL WILL TIE-IN WITH THE STREAM CHANNEL AND MATERIALS.
6. CUT AND FILL IN ACCORDANCE WITH THE TYPICAL CROSS SECTIONS, GRADING PLAN, AND CROSS SECTIONS TAKEN FROM GRADING PLAN.
7. INSTALL ROCK STRUCTURES IN ACCORDANCE WITH THE GRADING PLAN AND CONSTRUCTION DETAILS SHEETS.
8. PLACE 18 INCHES OF IMPORTED COBBLE-GRAVEL-SAND MATERIAL TO CONSTRUCT THE STREAMBED.
9. TIE ANY EXISTING DRAINAGE FEATURES TO THE PROPOSED CHANNEL AS DIRECTED BY THE ENGINEER.
10. PLACE A MINIMUM OF 6 INCHES OF TOPSOIL TO ACHIEVE FINAL GRADES IN ALL RE-GRADED AREAS WITH THE EXCEPTION OF THE ROCK LINED CHANNEL.
11. PREPARE SEED BED IN ALL DISTURBED AREAS AND SOW WITH FLOODPLAIN AND UPLAND SEED MIX AS SPECIFIED.
12. INSTALL EROSION CONTROL MATTING ON FLOODPLAIN AREA AS INDICATED IN THE TYPICAL CROSS SECTIONS.
13. INSTALL WOODY PLANT MATERIALS AS INDICATED ON THE PLANTING SUMMARY AND DETAILS CONSTRUCTION PLAN SHEET. TIMING OF WOODY PLANTING MAY VARY DEPENDING ON TIME OF YEAR, AND SHALL BE APPROVED BY ARLINGTON COUNTY.
14. SEED AND MULCH ALL DISTURBED AREAS BEFORE PROCEEDING TO NEXT PHASE.
15. ONCE DISTURBED AREAS AND EXPOSED SLOPES ARE STABILIZED, REMOVE PUMP-AROUND SYSTEM.
16. UPON APPROVAL FROM ARLINGTON COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR, REMOVE STOCKPILE AREAS AND EROSION AND SEDIMENT CONTROL PRACTICES.

PHASE 4 SEQUENCING:

3. INSTALL DIESEL-POWERED PUMP AROUND DIVERSION AS NEEDED FOR DAILY WORK. RECOMMENDED PUMP AROUND LOCATIONS ARE SHOWN AND MAY VARY WITHIN THE PHASED CONSTRUCTION ZONE AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL OPERATE AND MAINTAIN THE PUMP-AROUND SYSTEM TWENTY FOUR HOURS A DAY UNLESS ALL DISTURBED AREAS WITHIN THE PUMP-AROUND WORK AREA CAN BE STABILIZED BY THE END OF THE WORK DAY OR UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. CLEAR AND GRUB AS NECESSARY TO INSTALL THE PROPOSED CONTOURS AND ROCK STRUCTURES. IN GENERAL, RESTORATION ACTIVITIES SHALL BE PERFORMED IN INCREMENTS NOT TO EXCEED A LINEAR DISTANCE THAT THE CONTRACTOR CAN COMPLETE BY THE END OF EACH WORK DAY. SPECIFICALLY, THAT WORK INCLUDES GRADING AND STABILIZATION AS INDICATED ON THE CONSTRUCTION PLANS. CLEARING AND GRUBBING MAY PROCEED AHEAD OF CUT AND FILL OPERATIONS PROVIDED SILT FENCE IS INSTALLED ALONG THE TOP OF STREAMBANKS TO MINIMIZE SILTATION.
3. STRIP AND STOCKPILE THE TOP 9 INCHES OF SOIL MATERIAL FROM THE GRADING LIMITS AND PLACE SILT FENCE AROUND THE STOCKPILES.
4. 15" HDPE CONSTRUCTION ON THE WEST SIDE (LEFT BANK) OF THE STREAM REACH SHALL BE CONSTRUCTED PRIOR TO AND/OR CONCURRENT WITH THE STREAM CONSTRUCTION. CONSTRUCTION TO BE COMPLETED WITHIN ONE DAY OR EROSION CONTROL MATTING TO BE USED TO KEEP DISTURBED AREA STABILIZED UP SLOPE OF RECEIVING STREAM.
5. CUT AND FILL IN ACCORDANCE WITH THE TYPICAL CROSS SECTIONS, GRADING PLAN, AND CROSS SECTIONS TAKEN FROM GRADING PLAN.
6. INSTALL ROCK STRUCTURES IN ACCORDANCE WITH THE GRADING PLAN AND CONSTRUCTION DETAILS SHEETS.
7. PLACE 18 INCHES OF IMPORTED COBBLE-GRAVEL-SAND MATERIAL TO CONSTRUCT THE STREAMBED.
8. TIE ANY EXISTING DRAINAGE FEATURES TO THE PROPOSED CHANNEL AS DIRECTED BY THE ENGINEER.
9. PLACE A MINIMUM OF 6 INCHES OF TOPSOIL TO ACHIEVE FINAL GRADES IN ALL RE-GRADED AREAS WITH THE EXCEPTION OF THE ROCK LINED CHANNEL.
10. PREPARE SEED BED IN ALL DISTURBED AREAS AND SOW WITH FLOODPLAIN AND UPLAND SEED MIX AS SPECIFIED.
11. INSTALL EROSION CONTROL MATTING ON FLOODPLAIN AREA AS INDICATED IN THE TYPICAL CROSS SECTIONS.
12. INSTALL WOODY PLANT MATERIALS AS INDICATED ON THE PLANTING SUMMARY AND DETAILS CONSTRUCTION PLAN SHEET. TIMING OF WOODY PLANTING MAY VARY DEPENDING ON TIME OF YEAR, AND SHALL BE APPROVED BY ARLINGTON COUNTY.
13. SEED AND MULCH ALL DISTURBED AREAS BEFORE PROCEEDING TO NEXT PHASE.
14. ONCE DISTURBED AREAS AND EXPOSED SLOPES ARE STABILIZED, REMOVE PUMP-AROUND SYSTEM.

15. UPON APPROVAL FROM ARLINGTON COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR, REMOVE STOCKPILE AREAS AND EROSION AND SEDIMENT CONTROL PRACTICES.

POST-CONSTRUCTION:

1. REQUEST APPROVAL FROM ARLINGTON COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR PRIOR TO REMOVAL OF SEDIMENT CONTROL MEASURES.
2. UPON APPROVAL FROM AUTHORIZING AGENCY, REMOVE ALL EROSION AND SEDIMENT CONTROL MEASURES, AND STABILIZE ALL AREAS DISTURBED BY EROSION AND SEDIMENT CONTROL MEASURES.
3. ENSURE THAT THE SITE IS FREE OF TRASH, DEBRIS, AND ANY LEFTOVER CONSTRUCTION MATERIALS PRIOR TO DEMOBILIZATION.
4. DEMOBILIZE ALL EQUIPMENT FROM THE SITE.
5. SEED, MULCH AND STABILIZE STAGING AREAS, STOCKPILE AREAS, AND CONSTRUCTION ENTRANCES WITH SEED MIX AS SPECIFIED IN PLANS.

MISCELLANEOUS

2. ALL CONSTRUCTION WORK FOR THIS PROJECT SHALL CONFORM TO THE ARLINGTON COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS MANUAL (LATEST EDITION) AND ANY SPECIAL PROVISIONS, AND SPECIAL DETAILS FOR SHEETS STORM SEWER, AND UTILITY CONSTRUCTION AS PROVIDED ON THE PLANS OR IN THE BID PROPOSAL. ARLINGTON COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE AVAILABLE AT THE FOLLOWING LINK:
[HTTPS://BUILDING.ARLINGTONVA.US/RESOURCES/DESIGN-STANDARDS-GUIDELINES](https://building.arlingtonva.us/resources/design-standards-guidelines)
3. ALL EXISTING CONDITIONS INCLUDING STREAM ALIGNMENT, UTILITY LOCATIONS, PROPERTY BOUNDARIES, AND 1-FOOT CONTOURS ARE BASED UPON ARLINGTON COUNTY'S 2003 PLANIMETRIC GIS DATABASE AND A DETAILED FIELD SURVEY PERFORMED BY VHB, INC. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS AND DETERMINING THE EXTENT TO WHICH EXISTING CONDITIONS MAY AFFECT CONSTRUCTION OPERATIONS.
4. THE LIMITS OF DISTURBANCE (LOD) AS INDICATED ON THE GRADING PLANS WERE ESTABLISHED TO GIVE THE CONTRACTOR AMPLE ROOM FOR CONDUCTING CONSTRUCTION OPERATIONS. CONSTRUCTION TRAFFIC INSIDE THE LOD, HOWEVER, SHALL BE CONFINED TO THAT NECESSARY FOR CARRYING OUT RESTORATION OPERATIONS WHILE PROTECTING HIGH VALUE TREES FROM DAMAGE. AFTER THE CONTRACTOR HAS MARKED THE LOD AS PART OF HIS/HER CONSTRUCTION LAYOUT SURVEY, ARLINGTON COUNTY WILL IDENTIFY SPECIFIC TREES TO BE PROTECTED DURING CONSTRUCTION. THE CONTRACTOR SHALL THEN MARK TREES TO BE PROTECTED WITH TREE PROTECTION (TP) FENCING AS SPECIFIED IN THE SPECIAL PROVISIONS AND SHOWN ON SHEETS L-3 AND L-4 PRIOR TO CONDUCTING ANY WORK INSIDE THE LOD.
5. THE CONTRACTOR SHALL CONTACT "MISS UTILITY" AT 1-800-257-7777 FOR MARKING THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES (I.E. WATER, SEWER, GAS, TELEPHONE, ELECTRIC, AND CABLE TV) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION OR CONSTRUCTION. THE CONTRACTOR SHALL ALSO IDENTIFY AND PROTECT ALL OTHER UTILITIES LINES FOUND IN THE WORK SITE AREA BELONGING TO OTHER OWNERS THAT ARE NOT MEMBERS OF "MISS UTILITY". THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING UTILITIES AND THE RELATED STRUCTURES. ALL EXISTING UTILITY SYSTEMS SHALL BE PROTECTED TO PREVENT DAMAGE DURING THE CONTRACTOR'S OPERATIONS. ANY SYSTEM DAMAGED SHALL BE PROMPTLY REPAIRED AT NO COST TO THE OWNER.
6. SURPLUS EXCAVATED MATERIAL THAT IS NOT NEEDED TO CONSTRUCT THE PROPOSED CHANNEL ALIGNMENT WILL BE REMOVED FROM THE SITE AT NO ADDITIONAL COST TO THE COUNTY. ALL EXPENSE ASSOCIATED WITH REMOVAL, TRANSPORT, AND DISPOSAL OF SURPLUS MATERIAL SHALL BE INCLUDED IN THE BID PRICE FOR EXCAVATION.
7. REMOVAL AND DISPOSAL COSTS FOR ANY EXISTING CONCRETE RUBBLE, OR OTHER MISCELLANEOUS ITEMS NOT SUITABLE FOR CONSTRUCTING THE PROPOSED CHANNEL AND FLOODPLAIN ARE TO BE INCLUDED IN THE UNIT PRICE BID FOR EXCAVATION.
8. ONLY THE FOLLOWING NON-STORMWATER DISCHARGES ARE AUTHORIZED BY ARLINGTON COUNTY'S MS4 PERMIT, UNLESS THE STATE WATER CONTROL BOARD, THE VIRGINIA SOIL AND WATER CONSERVATION BOARD (BOARD), OR ARLINGTON COUNTY DETERMINES THE DISCHARGE TO BE A SIGNIFICANT SOURCE OF POLLUTANTS TO SURFACE WATERS: WATER LINE FLUSHING; LANDSCAPE IRRIGATION; DIVERTED STREAM FLOWS; RISING GROUND WATERS; UNCONTAMINATED GROUND WATER INFILTRATION (AS DEFINED AT 40 CFR 35.2005/2020); UNCONTAMINATED PUMPED GROUND WATER; DISCHARGES FROM POTABLE WATER SOURCES; FOUNDATION DRAINS; AIR CONDENSING CONDENSATION; IRRIGATION WATER; SPRINGS; WATER FROM CRAWL SPACE PUMPS; FOOTING DRAINS; LAWN WATERING; INDIVIDUAL RESIDENTIAL CAR WASHING; FLOWS FROM RIPARIAN HABITATS AND WETLANDS; DECHLORINATED SWIMMING POOL DISCHARGES; DISCHARGES OR FLOWS FROM FIRE FIGHTING; AND, OTHER ACTIVITIES GENERATING DISCHARGES IDENTIFIED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY AS NOT REQUIRING VPDES AUTHORIZATION. APPROPRIATE CONTROLS MUST BE IMPLEMENTED TO PREVENT ANY NON-STORMWATER DISCHARGES NOT INCLUDED ON THE ABOVE LIST (E.G., CONCRETE WASH WATER, PAINT WASH WATER, VEHICLE WASH WATER, DETERGENT WASH WATER, ETC.) FROM BEING DISCHARGED INTO ARLINGTON COUNTY'S MS4 SYSTEM, WHICH INCLUDES THE CURB AND GUTTER SYSTEM, AS WELL AS CATCH BASINS AND OTHER STORM DRAIN INLETS, OR STREAM NETWORK. PER CHAPTER 26 OF THE ARLINGTON COUNTY CODE, IT SHALL BE UNLAWFUL FOR ANY PERSON TO DISCHARGE DIRECTLY OR INDIRECTLY INTO THE STORM SEWER SYSTEM OR STATE WATERS, ANY SUBSTANCE LIKELY, IN THE OPINION OF THE COUNTY MANAGER, TO HAVE AN ADVERSE EFFECT ON THE STORM SEWER SYSTEM OR STATE WATERS.

Donaldson Run Tributary B Stream Restoration

Country Club View
Arlington, Virginia

[illegible]

Sequence of Construction

STREAMBED MATERIAL SIZING

SHIELD'S EQUATION			
$t_0 = \text{shear stress} = \gamma RS$			
γ	SPECIFIC WEIGHT OF WATER	62.4	LB/FT ³
A_{bkf}	BANKFULL AREA	18	FT ²
WP	WETTED PERIMETER	16.50	FT
R	HYDRAULIC RADIDS (A_{bkf}/WP)	1.09	FT
S	MAXIMUM RIFFLE SLOPE	0.035	FT/FT
t_0	BOUNDARY SHEAR STRESS	2.38	LB/FT ²
$D_{50} = 3.07 \times t_0^{1.042}$			
D_{50}	STABLE MEAN DIAMETER BED MATERIAL	7.6	IN
D50	PROPOSED BED MATERIAL	8-10	IN
$D_{MAX} = 152.02 \times t_0^{0.7355}$			
D_{MAX}	PREDICTED LARGEST MOVABLE PARTICLE	287.9	in
		11.3	IN
D64	PROPOSED BED MATERIAL	14-16	IN

STREAMBED MATERIAL

THE BOULDER-COBBLE-GRAVEL-SAND MATERIAL SPECIFIED BELOW MUST BE APPROVED BY THE ENGINEER AT THE CONTRACTOR'S PROPOSED SOURCE PRIOR TO BEING PLACED IN THE STREAM CHANNEL.

Cumulative Percent of particles finer than indicated particle size	PARTICLE SIZE (inches)	PARTICLE TYPE
D10	< 0.04in	sand
D16	1.0-2.0in	gravel
D35	3.0-4.0in	cobble
D50	8.0-10.0in	cobble
D84	14.0-16.0in	boulder

DESCRIPTION	SIZE	BUCKETS	PERCENT
ROCK/BOULDER	WELL GRADED 12-16"	0.5	7 - 12%
ROCK/COBBLE	WELL GRADED 8 - 12"	2	35 - 40%
BANK RUN GRAVEL	0.08 - 2.5"	2	35 - 40%
COURSE SAND	0.04 - 0.08" (1 - 2 MM)	0.75	12 - 17%

ALL IMPORTED BEDDING MATERIAL SHALL CONSIST OF FIELD STONE OR NATURAL RIVER ROCK SIMILAR IN COLOR AND APPEARANCE TO IN-SITU MATERIALS. CRUSHED STONE SHALL NOT BE PERMITTED. BANK RUN GRAVEL MAY INCLUDE UP TO 5% CLAY, SILT, AND/OR SAND, AND UP TO 25% COBBLE AND SHALL HAVE NATURAL COLOR (BROWN, TAN, YELLOW, OR WHITE) SAND SHALL BE WELL MIXED AND PREDOMINANTLY 1.0 TO 2.0 MILLIMETERS IN SIZE AND HAVE NATURAL COLOR (BROWN, TAN, YELLOW, OR WHITE) THE GRADATION OF IMPORTED MATERIALS SHALL FALL WITHIN THE ENVELOPE AS INDICATED IN THE TABLE ABOVE. COBBLE-GRAVEL VOID RATIO IS ESTIMATED AT 20%. THEREFORE, 20% BY VOLUME OF CL MATERIAL SHALL BE ADDED TO THE COBBLE-GRAVEL-SAND MATERIAL PRIOR TO PLACEMENT IN THE DESIGNATED AREAS. SEE CONSTRUCTION SPECIFICATIONS FOR DETAILS RELATIVE TO MIXING, PLACING, AND COMPACTING STREAMBED MATERIAL.

Streambed Material

Source: VHB N.T.S.

STRUCTURAL FLOODPLAIN MATERIAL

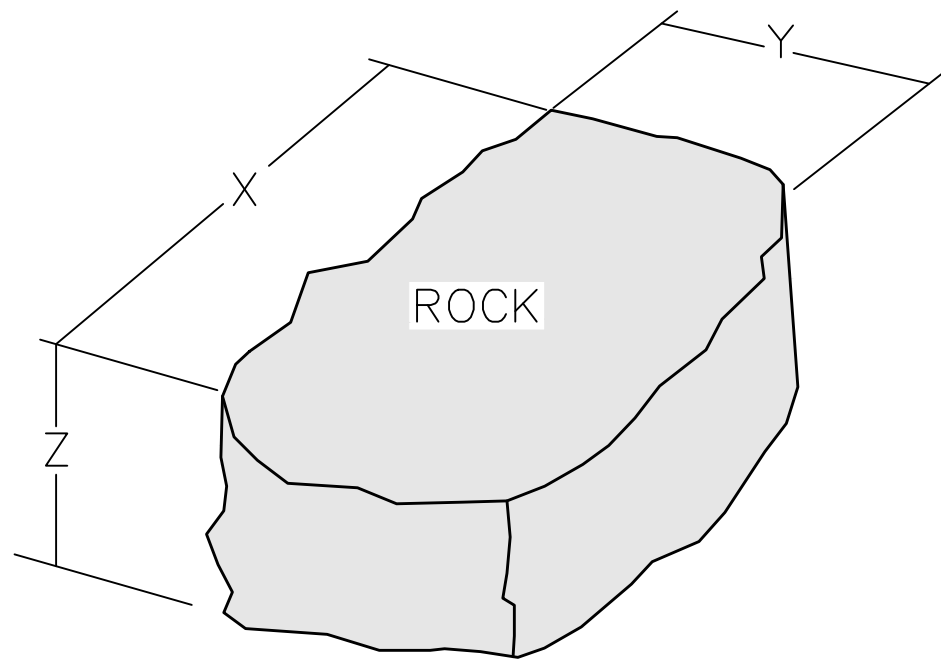
THE MATERIAL SPECIFIED BELOW MUST BE APPROVED BY THE ENGINEER AT THE CONTRACTOR'S PROPOSED SOURCE PRIOR TO BEING PLACED IN THE FLOODPLAIN AT THE EXPOSED WATERLINE SECTION.

DESCRIPTION	SIZE	BUCKETS	PERCENT
ROCK/COBBLE	CLASS I RIPRAP (8 - 12" DIA)	2	45 - 55%
BANK RUN GRAVEL	0.08 - 2.5"	1	20 - 30%
COURSE SAND	0.04 - 0.08" (1 - 2 MM)	0.5	12 - 17%
TOPSOIL	LOAM OR SILT LOAD WITH 3-5% ORGANIC CONTENT	0.5	12 - 17%

ROCK SHALL CONSIST OF CRUSHED DIABASE STONE OR RIVER WASHED COBBLE WITH THE SPECIFIED DIMENSION. BANK RUN GRAVEL MAY INCLUDE UP TO 5% CLAY, SILT, AND/OR SAND, AND UP TO 25% COBBLE AND SHALL HAVE NATURAL COLOR (BROWN, TAN, YELLOW, OR WHITE) SAND SHALL BE WELL MIXED AND PREDOMINANTLY 1.0 TO 2.0 MILLIMETERS IN SIZE AND HAVE NATURAL COLOR (BROWN, TAN, YELLOW, OR WHITE) TOPSOIL SHALL BE 50% SIFTED, UNWASHED COURSE SAND (FINES ALLOWED), 24% COMPOSTED LEAF/BARK MULCH, 25% MINERAL SILT OR FINDER MATERIAL.

Structural Floodplain Mix (Sta 20+40 to 20+90)

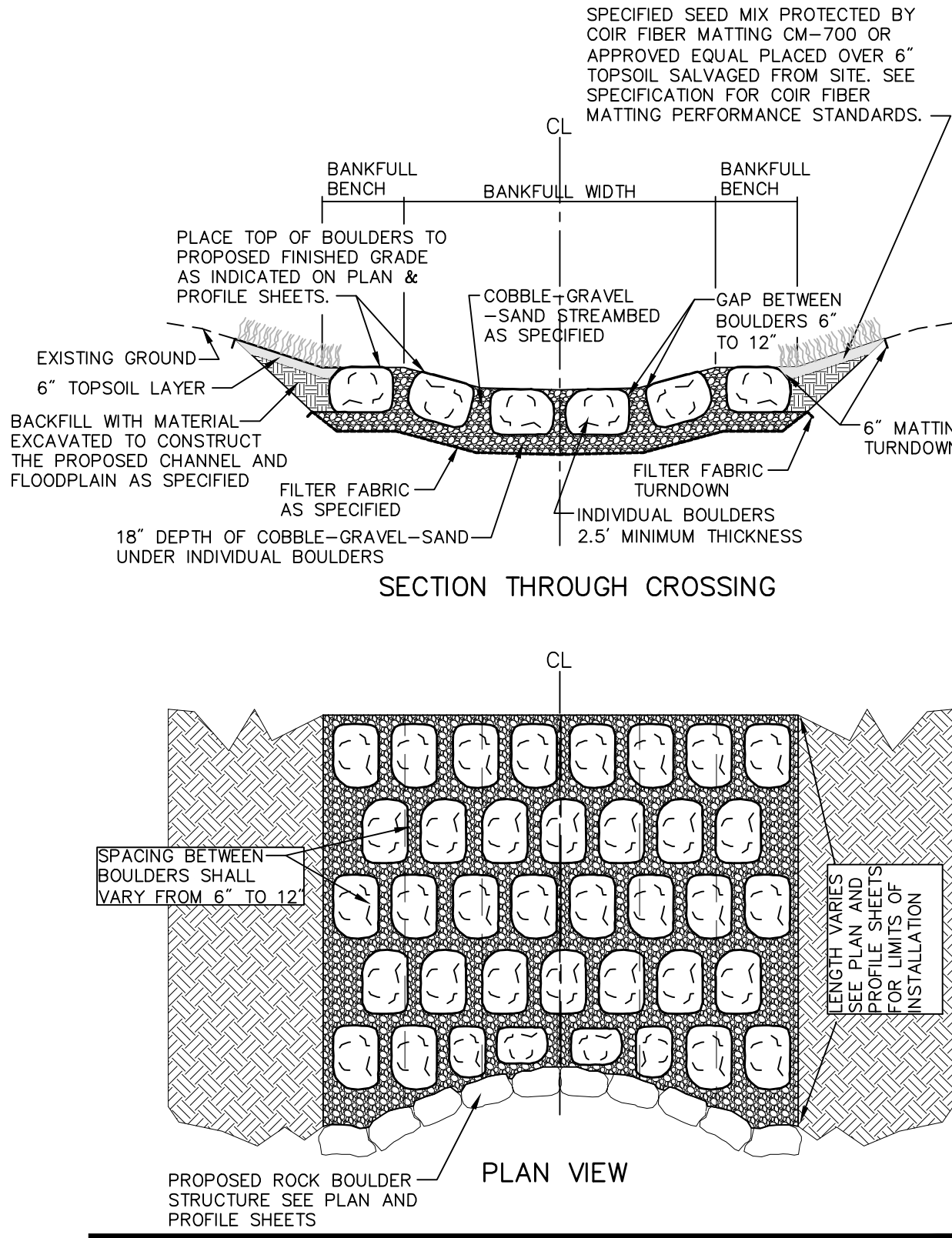
Source: VHB N.T.S.



STRUCTURE TYPE	DIMENSION		
	X	Y	Z
STEP-RUN / STEP-POOL	3' - 6'	2.5' - 4'	1.5' - 2.5'
BOULDER CROSSING			
WATER MAIN ACCESS	4' - 7'	3.5' - 5'	2.5' - 3'
PLUNGE-POOL	3' - 6'	2.5' - 4'	1.5' - 2.5'
STACKED STONE WALL	3' - 6'	2.5' - 4'	1.5' - 2.5'

Rock Axis Detail

Source: VHB N.T.S.



Boulder Crossing for Water Main Access

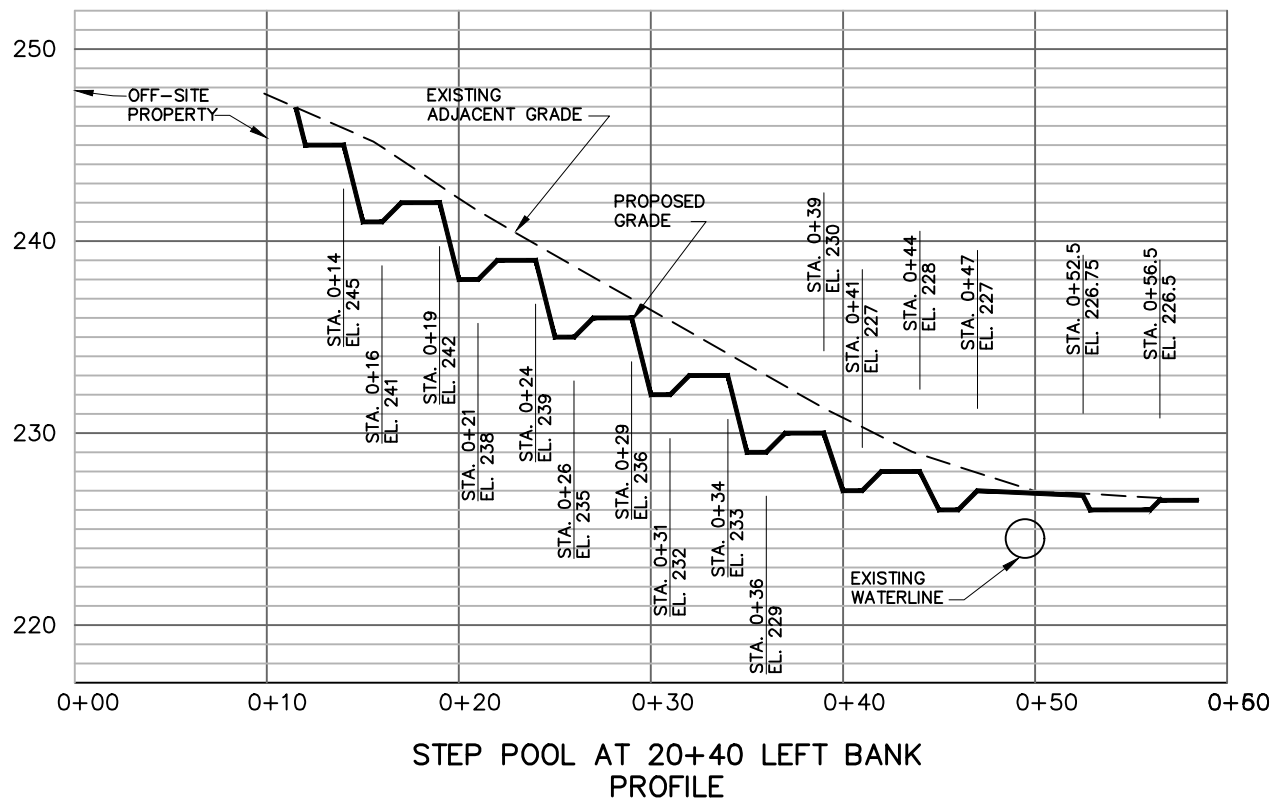
Source: VHB N.T.S.

Step Run Structure Table							
Structure	Point	Station	Offset	Elevation	Northing	Easting	
SR1	A	22+62.8	0.00	233.00	7016161.56	11876100.93	
SR1	B	22+58.8	-8.00	234.50	7016170.68	11876101.07	
SR1	C	22+58.8	8.00	234.50	7016156.50	11876108.52	
SR2	A	22+08.5	0.00	231.44	7016197.95	11876140.71	
SR2	B	22+05.0	-8.00	232.97	7016205.63	11876136.57	
SR2	C	22+05.4	8.00	232.98	7016195.49	11876148.94	
SR3	A	21+23.5	0.00	228.64	7016254.39	11876202.76	
SR3	B	21+19.5	-8.00	230.18	7016263.28	11876201.92	
SR3	C	21+19.7	8.00	230.19	7016249.61	11876210.24	
SR4	A	21+08.5	0.00	227.85	7016262.29	11876215.51	
SR4	B	21+04.6	-8.00	229.37	7016271.35	11876214.67	
SR4	C	21+04.6	8.00	229.37	7016257.67	11876223.36	
SR5	A	20+58.2	0.00	225.86	7016297.55	11876251.09	
SR5	B	20+53.9	-8.00	227.37	7016305.76	11876247.21	
SR5	C	20+54.3	8.00	227.41	7016295.87	11876259.79	
SR6	A	20+48.1	0.00	225.25	7016305.65	11876257.07	
SR6	B	20+44.5	-8.00	226.83	7016313.28	11876252.76	
SR6	C	20+44.6	8.00	226.83	7016303.74	11876265.60	
SR7	A	20+03.2	0.00	223.51	7016333.68	11876291.44	
SR7	B	19+99.6	-8.00	225.06	7016342.41	11876290.37	
SR7	C	19+99.9	8.00	225.08	7016332.86	11876298.48	
SR8	A	19+92.4	0.00	222.89	7016339.34	11876300.63	
SR8	B	19+89.8	-8.00	224.68	7016347.56	11876298.72	
SR8	C	19+89.0	8.00	224.72	7016334.31	11876307.73	
SR9	A	19+38.4	0.00	221.01	7016378.93	11876335.87	
SR9	B	19+34.5	-8.00	222.55	7016386.25	11876330.79	
SR9	C	19+35.2	8.00	222.58	7016377.84	11876344.43	
SR10	A	18+98.3	0.00	219.36	7016413.78	11876355.61	
SR10	B	18+95.0	-8.00	220.90	7016421.29	11876351.17	
SR10	C	18+93.9	8.00	220.83	7016412.38	11876364.50	
SR11	A	18+88.3	0.00	218.76	7016421.57	11876361.93	
SR11	B	18+84.8	-8.00	220.30	7016429.91	11876359.00	
SR11	C	18+84.5	8.00	220.28	7016418.36	11876370.08	
SR12	A	18+48.5	0.00	217.46	7016448.69	11876391.03	
SR12	B	18+45.0	-8.00	219.02	7016456.96	11876388.17	
SR12	C	18+44.9	8.00	219.02	7016445.29	11876399.12	
SR13	A	18+33.7	0.00	216.86	7016458.77	11876401.90	
SR13	B	18+29.5	-8.00	218.43	7016467.28	11876399.22	
SR13	C	18+29.8	8.00	218.44	7016455.80	11876410.37	
SR14	A	17+78.5	0.00	215.16	7016506.37	11876428.46	
SR14	B	17+75.0	-8.00	216.65	7016512.54	11876422.27	
SR14	C	17+75.0	8.00	216.65	7016506.71	11876437.17	
SR15	A	17+68.5	0.00	214.56	7016515.70	11876432.06	
SR15	B	17+64.8	-8.00	216.07	7016522.07	11876425.95	
SR15	C	17+65.0	8.00	216.09	7016516.04	11876440.77	
SR16	A	17+15.0	0.00	212.78	7016562.26	11876457.01	
SR16	B	17+11.3	-8.00	214.31	7016569.91	11876453.20	
SR16	C	17+12.3	8.00	214.36	7016560.05	11876465.58	
SR17	A	16+93.5	0.00	211.90	7016579.03	11876470.41	
SR17	B	16+90.9	-8.00	213.44	7016587.15	11876467.20	
SR17	C	16+89.7	8.00	213.49	7016575.83	11876478.53	
SR18	A	16+41.9	0.00	210.27	7016621.44	11876497.87	
SR18	B	16+37.7	-8.00	211.81	7016626.07	11876490.27	
SR18	C	16+38.9	8.00	211.86	7016623.81	11876506.15	
SR19	A	15+94.7	0.00	208.66	7016664.25	11876515.97	
SR19	B	15+91.3	-8.00	210.31	7016672.18	11876512.39	
SR19	C	15+91.0	8.00	210.30	7016661.57	11876524.37	
SR20	A	15+75.3	0.00	207.97	7016678.55	11876529.09	
SR20	B	15+71.9	-8.00	209.55	7016686.50	11876525.53	
SR20	C	15+71.3	8.00	209.53	7016676.10	11876537.71	
SR21	A	15+15.0	0.00	205.96	7016730.96	11876556.85	
SR21	B	15+11.4	-8.00	207.49	7016736.84	11876550.33	
SR21	C	15+11.3	8.00	207.49	7016732.08	11876565.60	
SR22	A	14+65.5	0.00	204.17	7016768.79	11876586.54	
SR22	B	14+61.4	-8.00	205.68	7016777.75	11876585.27	
SR22	C	14+61.2	8.00	205.67	7016764.70	11876594.52	
SR23	A	14+14.5	0.00	202.05	7016795.09	11876630.20	
SR23	B	14+11.4	-8.00	203.74	7016803.38	11876628.45	
SR23	C	14+11.1	8.00	203.73	7016790.14	11876637.43	
SR24	A	13+60.0	0.00	200.76	7016836.51	11876664.71	
SR24	B	13+56.0	-8.00	202.34	7016845.12	11876660.89	
SR24	C	13+56.0	8.00	202.34	7016836.12	11876674.12	
SR25	A	13+30.0	0.00	199.46	7016861.23	11876681.71	
SR25	B	13+27.3	-8.00	201.02	7016868.59	11876677.41	
SR25	C	13+25.5	8.00	200.93	7016859.27	11876690.54	
SR26	A	12+25.3	0.00	195.87	7016864.86	11876774.33	
SR26	B	12+21.5	-8.00	197.42	7016868.94	11876782.18	
SR26	C	12+21.5	8.00	197.42	7016856.22	11876772.47	
SR27	A	12+05.2	0.00	195.06	7016853.19	11876790.64	
SR27	B	12+01.4	-8.00	196.62	7016859.11	11876796.96	
SR27	C	12+01.3	8.00	196.61	7016844.14	11876791.31	
SR28	A	11+30.4	0.00	192.17	7016883.10	11876848.78	
SR28	B	11+26.8	-8.00	193.73	7016890.68	11876844.03	
SR28	C	11+25.8	8.00	193.69	7016882.30	11876857.70	
SR29	A	11+15.3	0.00	191.57	7016894.46	11876858.54	
SR29	B	11+10.6	-8.00	193.09	7016904.00	11876858.55	
SR29	C	11+10.0	8.00	193.06	7016890.27	11876866.79	

Step Pool Structure Table						
Structure	Point	Station	Offset	Elevation	Northing	Easting
SP1	A	2238.1	0.00	232.16	7016175.20	11876122.07
SP1	B	2234.1	4.32	232.61	7016175.14	11876128.08
SP1	C	2234.5	-5.03	232.83	7016181.19	11876126.94
SP1	D	2227.1	-8.00	233.66	7016188.36	11876123.05
SP1	E	2222.9	8.00	233.52	7016181.84	11876138.26
SP2	A	2199	0.00	231.02	7016205.61	11876146.70
SP2	B	2195.3	4.66	231.50	7016205.65	11876152.65
SP2	C	2195.2	-4.90	231.51	7016211.56	11876145.14
SP2	D	2186.8	-8.00	232.23	7016220.15	11876147.93
SP2	E	2186.8	8.00	232.23	7016210.27	11876160.51
SP3	A	21+65	0.00	230.00	7016231.53	11876168.19
SP3	B	21+62.2	3.95	230.59	7016230.58	11876172.92
SP3	C	21+61	-5.41	230.44	7016238.31	11876167.51
SP3	D	21+49.9	-8.00	231.25	7016247.30	11876176.44
SP3	E	21+56.4	8.00	231.50	7016230.96	11876180.27
SP4	A	2092.6	0.00	226.61	7016271.41	11876228.84
SP4	B	20+89.7	3.73	227.03	7016270.51	11876233.52
SP4	C	20+89.8	-5.01	227.48	7016276.95	11876227.61
SP4	D	20+83.9	-8.00	228.44	7016282.86	11876229.48
SP4	E	20+77.6	8.00	228.24	7016276.85	11876245.57
SP5	A	20+38.5	0.00	224.63	7016313.28	11876262.87
SP5	B	20+36.0	5.12	225.27	7016311.63	11876268.26
SP5	C	20+34.8	-4.07	225.05	7016318.86	11876262.48
SP5	D	20+23.6	-8.00	226.03	7016329.77	11876269.85
SP5	E	20+28.0	8.00	226.12	7016314.11	11876275.33
SP6	A	19+78.5	0.00	222.10	7016346.90	11876312.33
SP6	B	19+74.8	4.78	222.49	7016345.64	11876318.34
SP6	C	19+74.9	-4.87	222.74	7016352.87	11876311.95
SP6	D	19+67.0	-8.00	223.57	7016360.01	11876314.73
SP6	E	19+61.3	8.00	223.46	7016354.42	11876330.76
SP7	A	19+22.8	0.00	219.93	7016392.49	11876343.45
SP7	B	19+19.9	4.41	220.56	7016392.94	11876348.75
SP7	C	19+18.1	-5.19	220.68	7016398.29	11876340.74
SP7	D	19+12.5	-8.00	221.52	7016405.44	11876341.92
SP7	E	19+12.6	8.00	221.52	7016397.57	11876355.45
SP8	A	18+78.5	0.00	218.16	7016428.29	11876369.03
SP8	B	18+75.5	4.32	218.72	7016427.14	11876374.14
SP8	C	18+74.7	-4.89	218.59	7016434.46	11876368.49
SP8	D	18+62.6	-8.00	219.44	7016444.94	11876375.22
SP8	E	18+68.2	8.00	219.59	7016429.40	11876381.99
SP9	A	18+07.9	0.00	215.77	7016479.08	11876417.52
SP9	B	18+03.2	4.48	216.31	7016481.54	11876423.63
SP9	C	18+03.6	-4.83	216.36	7016484.90	11876414.94
SP9	D	17+94.7	-8.00	217.21	7016494.14	11876415.17
SP9	E	17+93.6	8.00	217.16	7016489.38	11876430.48
SP10	A	17+57.8	0.00	213.97	7016528.04	11876436.84
SP10	B	17+55.0	4.75	214.49	7016528.88	11876442.26
SP10	C	17+54.4	-4.09	214.30	7016532.67	11876434.24
SP10	D	17+44.1	-8.00	215.18	7016546.66	11876435.63
SP10	E	17+47.2	8.00	215.29	7016535.00	11876448.10
SP11	A	16+67.9	0.00	210.76	7016597.39	11876488.60
SP11	B	16+64.9	4.21	211.18	7016597.75	11876493.85
SP11	C	16+64.8	-4.51	211.55	7016602.34	11876494.84
SP11	D	16+59.2	-8.00	212.45	7016608.38	11876485.74
SP11	E	16+53.1	8.00	212.25	7016607.88	11876502.82

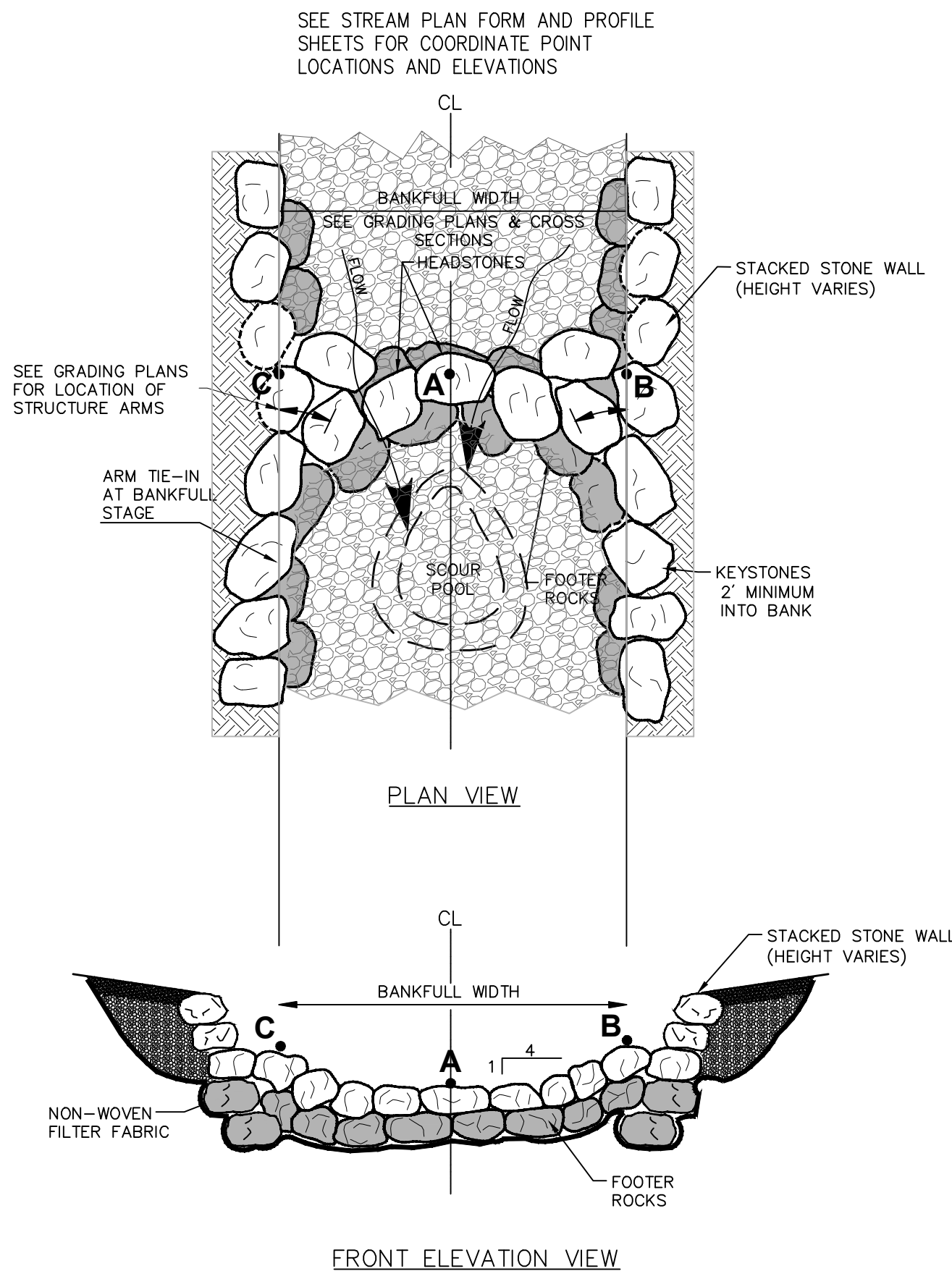


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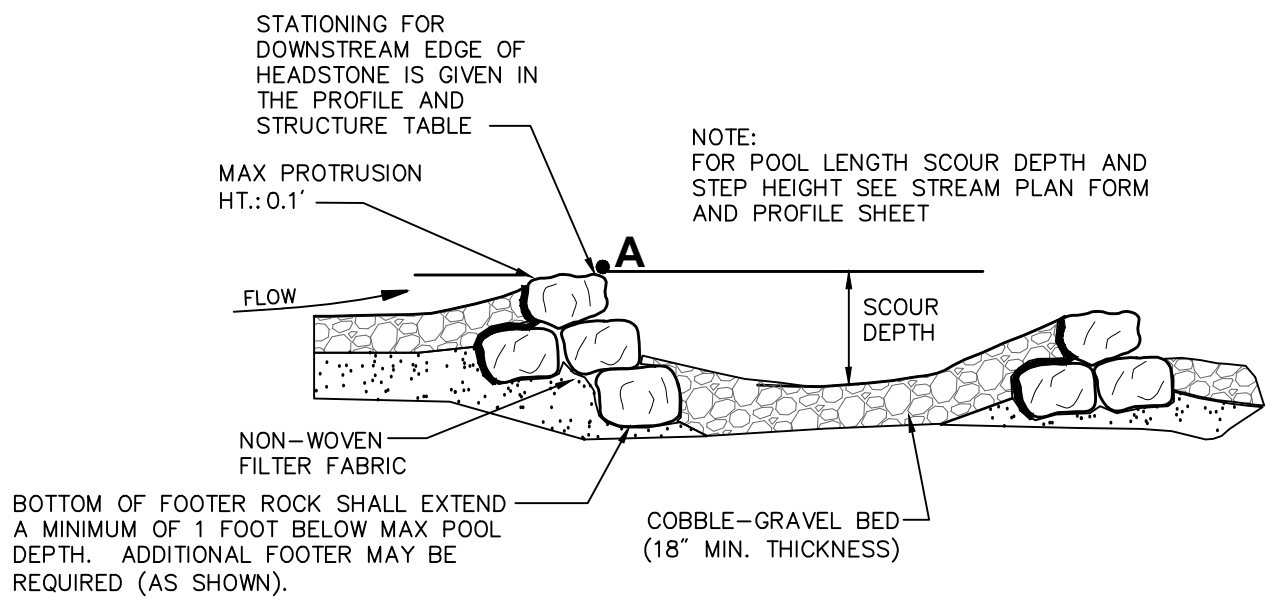


NOTES FOR UPLAND STEP POOL SYSTEMS LOCATED:

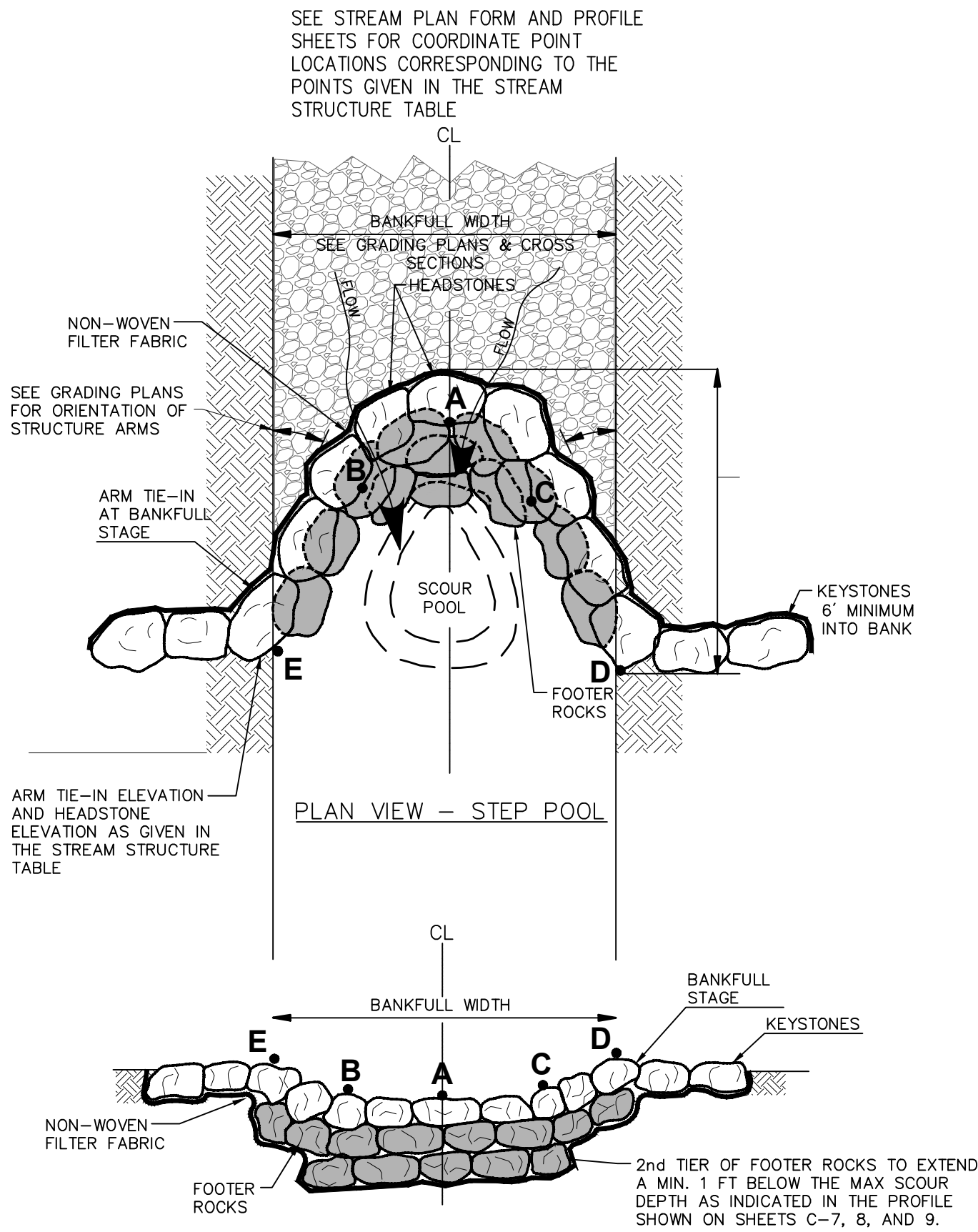
- AT 15+60 (LEFT BANK)
 - AT 20+40 (LEFT BANK)
 - AT 21+35 (LEFT BANK)
- A. DESIGN SHALL FOLLOW THE DETAILS BELOW FOR THE PLUNGE POOL STRUCTURE WITHOUT THE ADDITIONAL STACKED STONE WALL.
- B. STEP POOL ROCK SIZING SHALL REFER TO THE ROCK AXIS DETAIL ON SHEET C-4 FOR STEP-RUN/STEP POOL.
- C. STEP POOLS AT 15+60 AND 21+35 SHALL USE THE COBBLE/GRAVEL BED DETAILED BELOW FOR PLUNGE POOL STRUCTURES.
- D. STEP POOLS AT 20+40 SHALL REPLACE THE COBBLE/GRAVEL BED WITH AN INTERLOCKED BED OF BOULDER ROCK OF SAME SIZE AS THE STEP-RUN/STEP POOL ROCK SIZING SPECIFIED ON C-4.



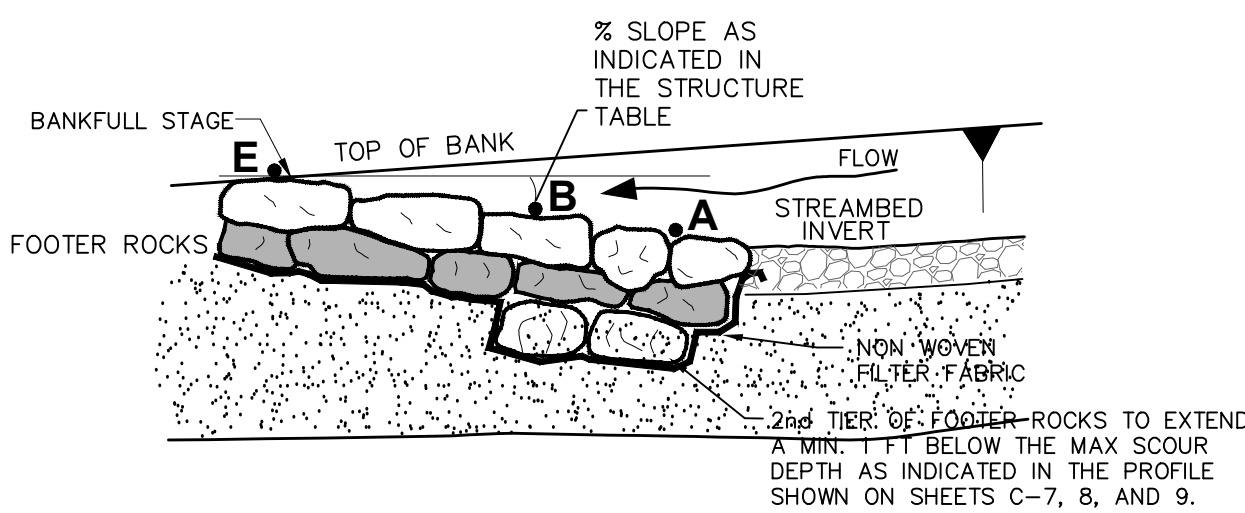
A= POINT ON CENTER DOWNSTREAM EDGE OF HEAD STONE
BANKFULL DEPTH = 2'
B= POINT ON THE CENTER DOWNSTREAM EDGE OF BANKFULL TIE-IN
C= POINT ON THE CENTER DOWNSTREAM EDGE OF BANKFULL TIE-IN



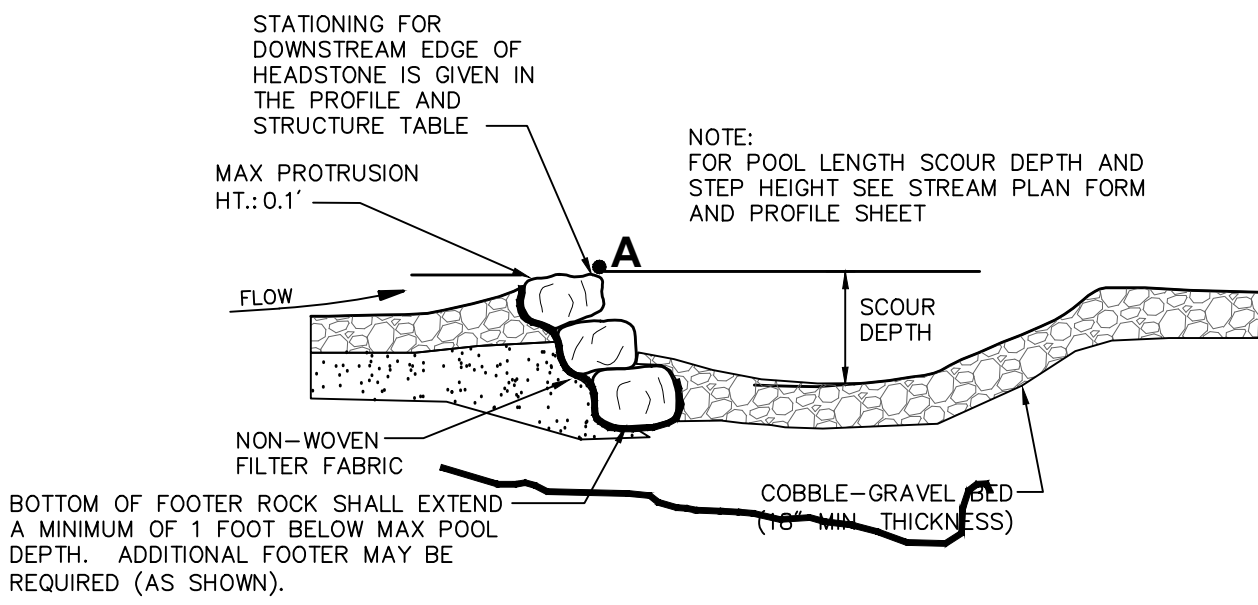
PROFILE THROUGH 1/4 OF STRUCTURE



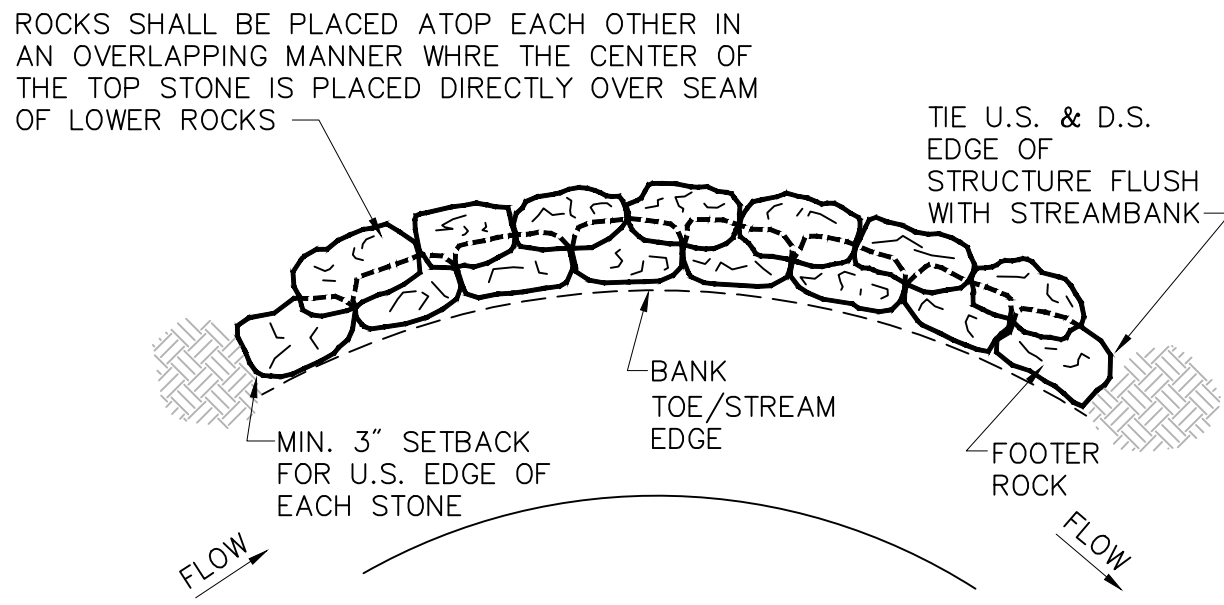
A= POINT ON CENTER DOWNSTREAM EDGE OF HEAD STONE
B= POINT ON THE CENTER STREAM SIDE EDGE
C= POINT ON THE CENTER STREAM SIDE EDGE
D= POINT ON THE CENTER DOWNSTREAM EDGE OF BANKFULL TIE-IN
E= POINT ON THE CENTER DOWNSTREAM EDGE OF BANKFULL TIE-IN



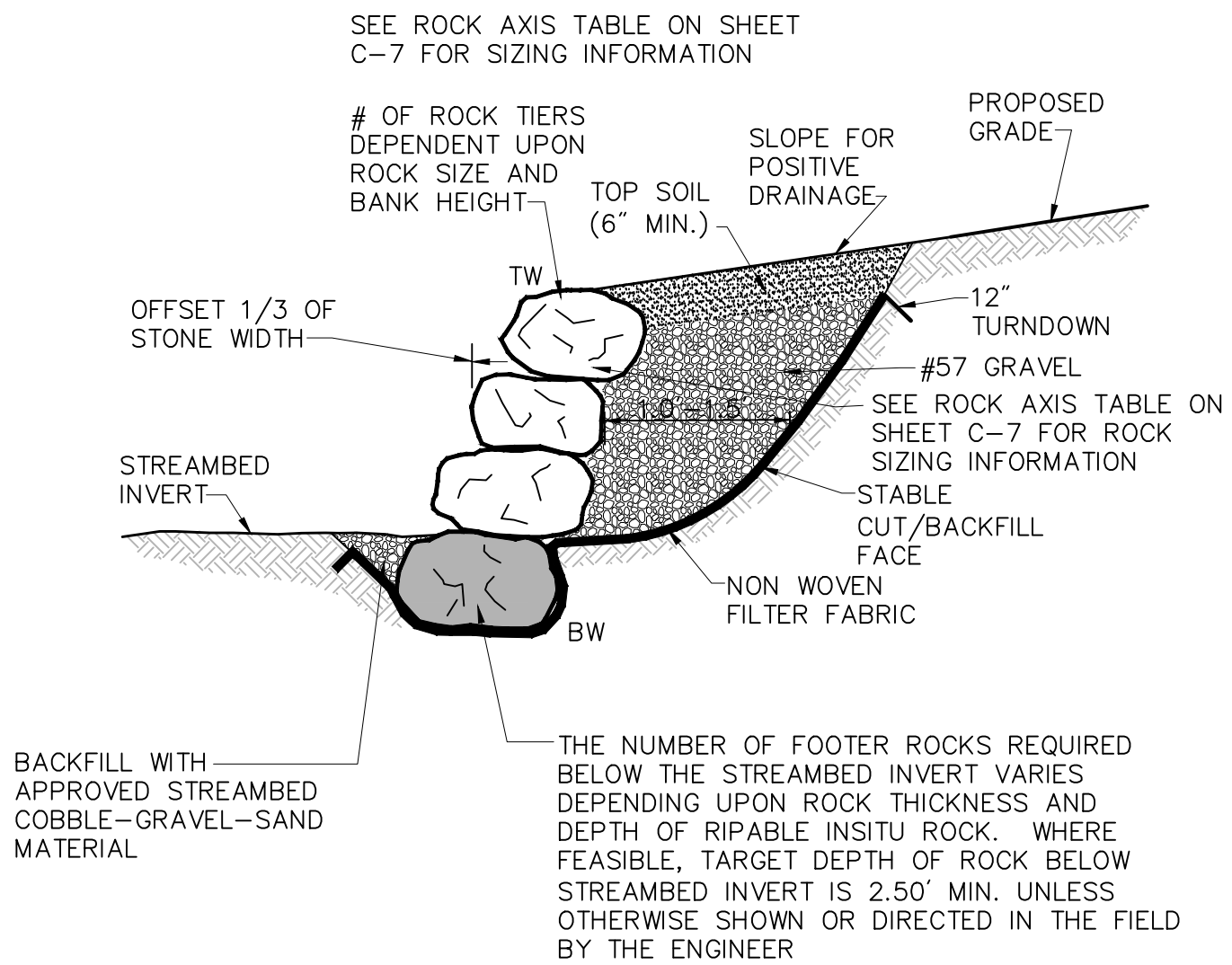
PROFILE OF VANE ARM



PROFILE THROUGH 1/4 OF STRUCTURE



PLAN VIEW

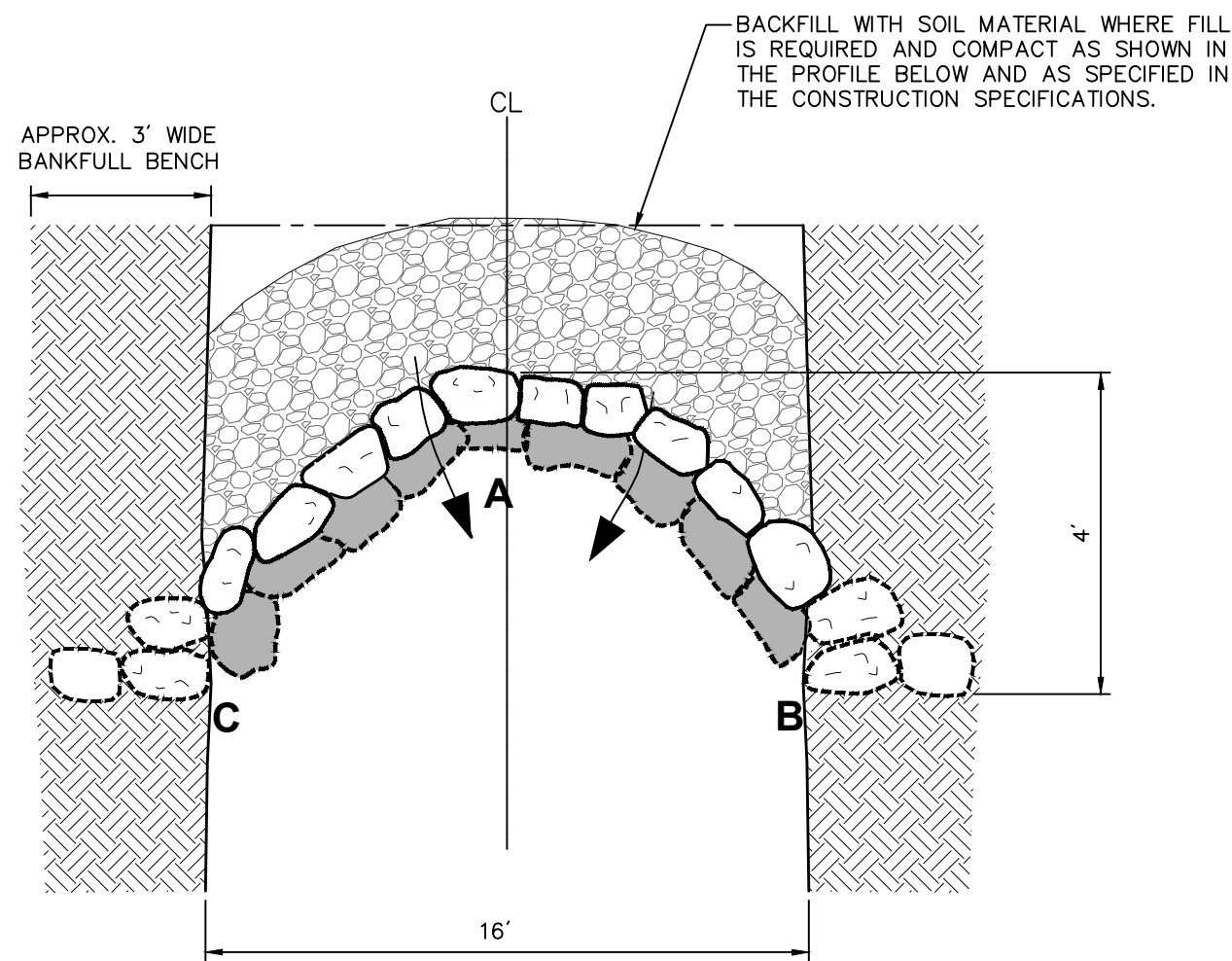


SECTION VIEW

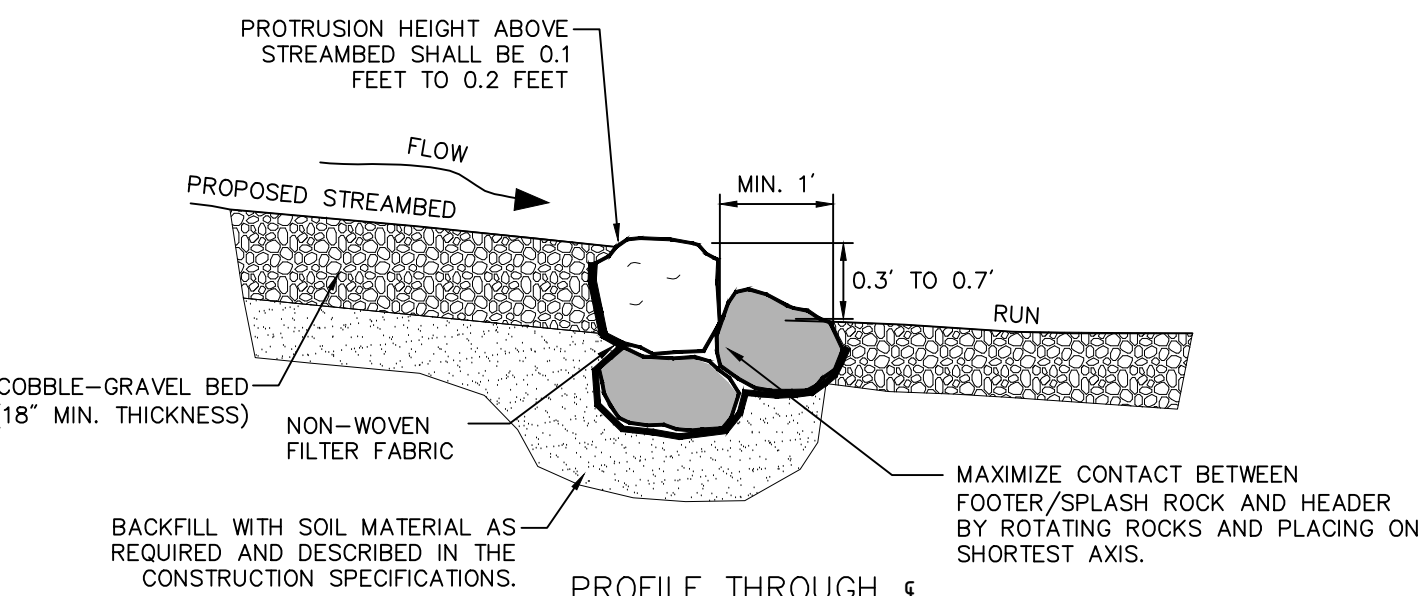
Stacked Stone Wall

Source: VHB

N.T.S.



PLAN VIEW



PROFILE THROUGH 1/4 OF STRUCTURE

Donaldson Run Tributary B Stream Restoration Country Club View Arlington, Virginia

No.	Revision	Date	Appd.

Designed by	Checked by
IFS	JRL
Issued for	Date
Final Design	June 29, 2020

Construction Details

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32923.00

Plunge-Pool Structure Detail (PP)

N.T.S.

Source: VHB

1/19

VHB-1

Step-Pool Structure Detail (SP)

N.T.S.

Source: VHB

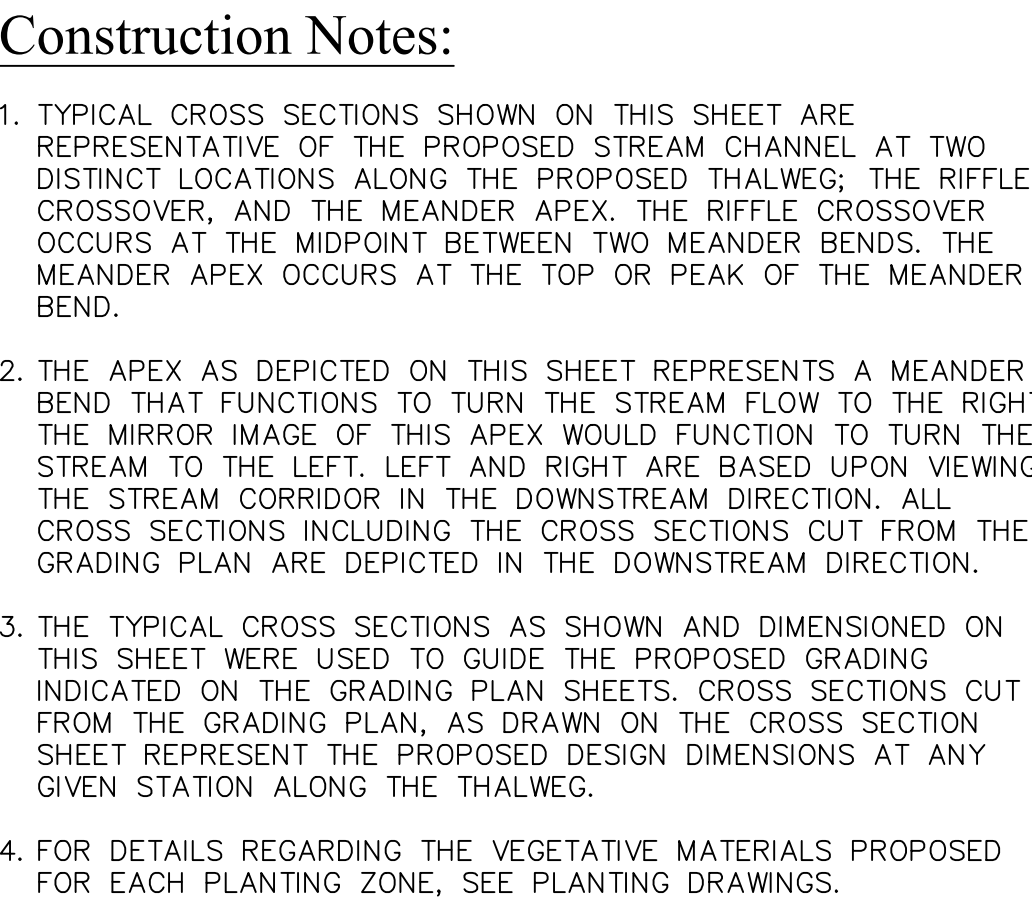
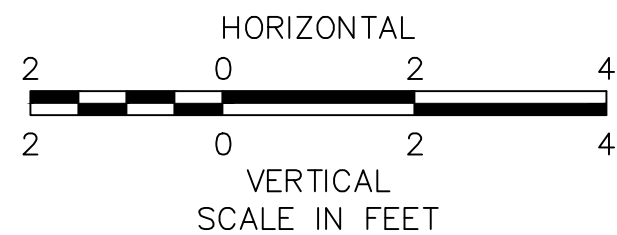
11/12

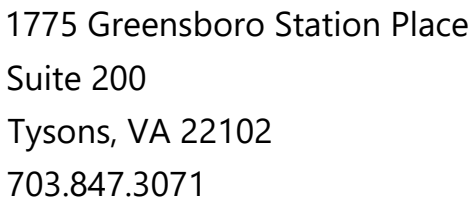
VHB-1

Step-Run Structure Detail (SR)

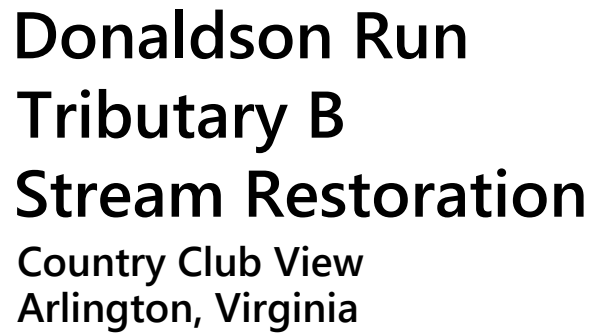
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Source: VHB



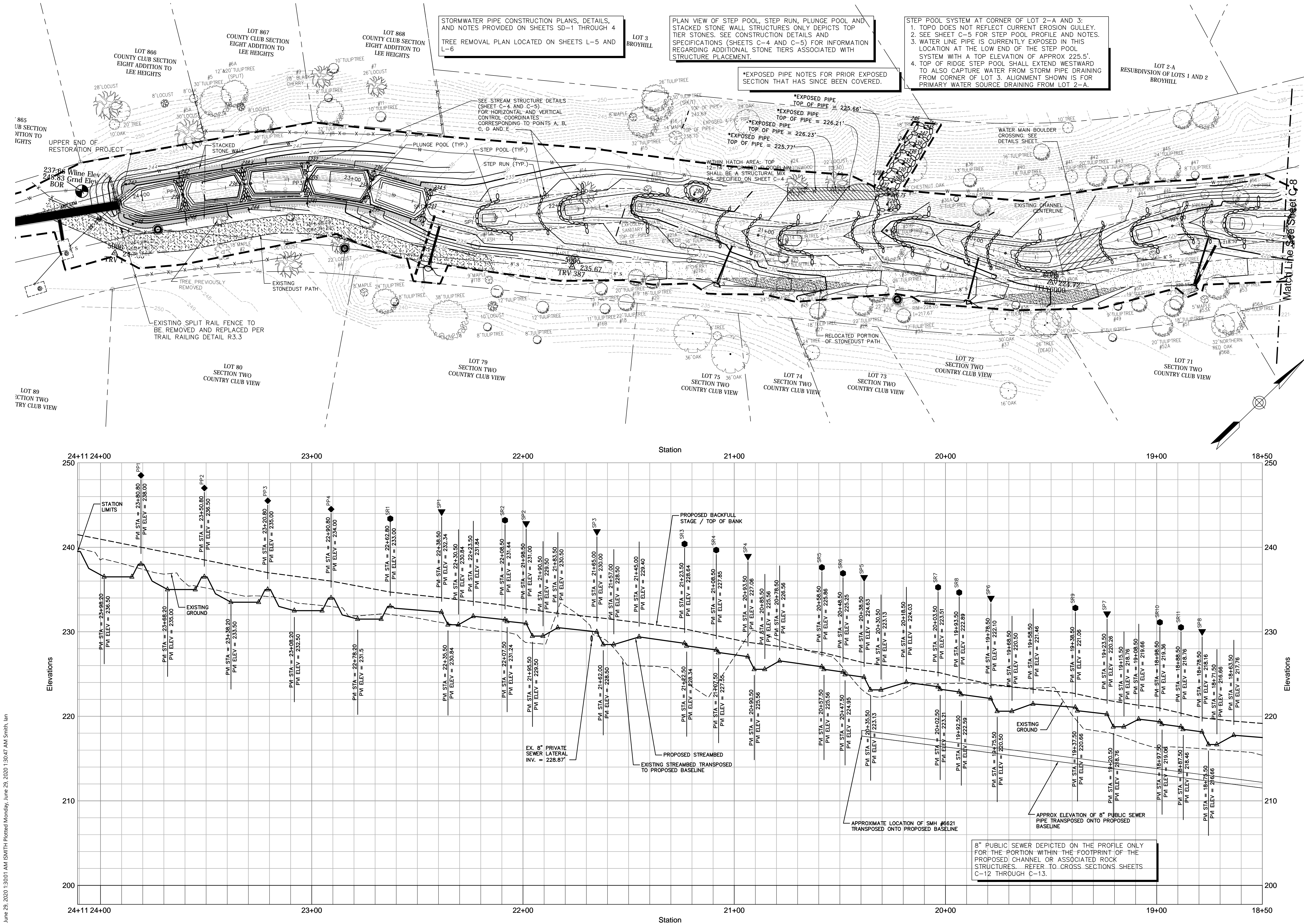


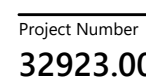
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	BASELINE
	MATCHLINE

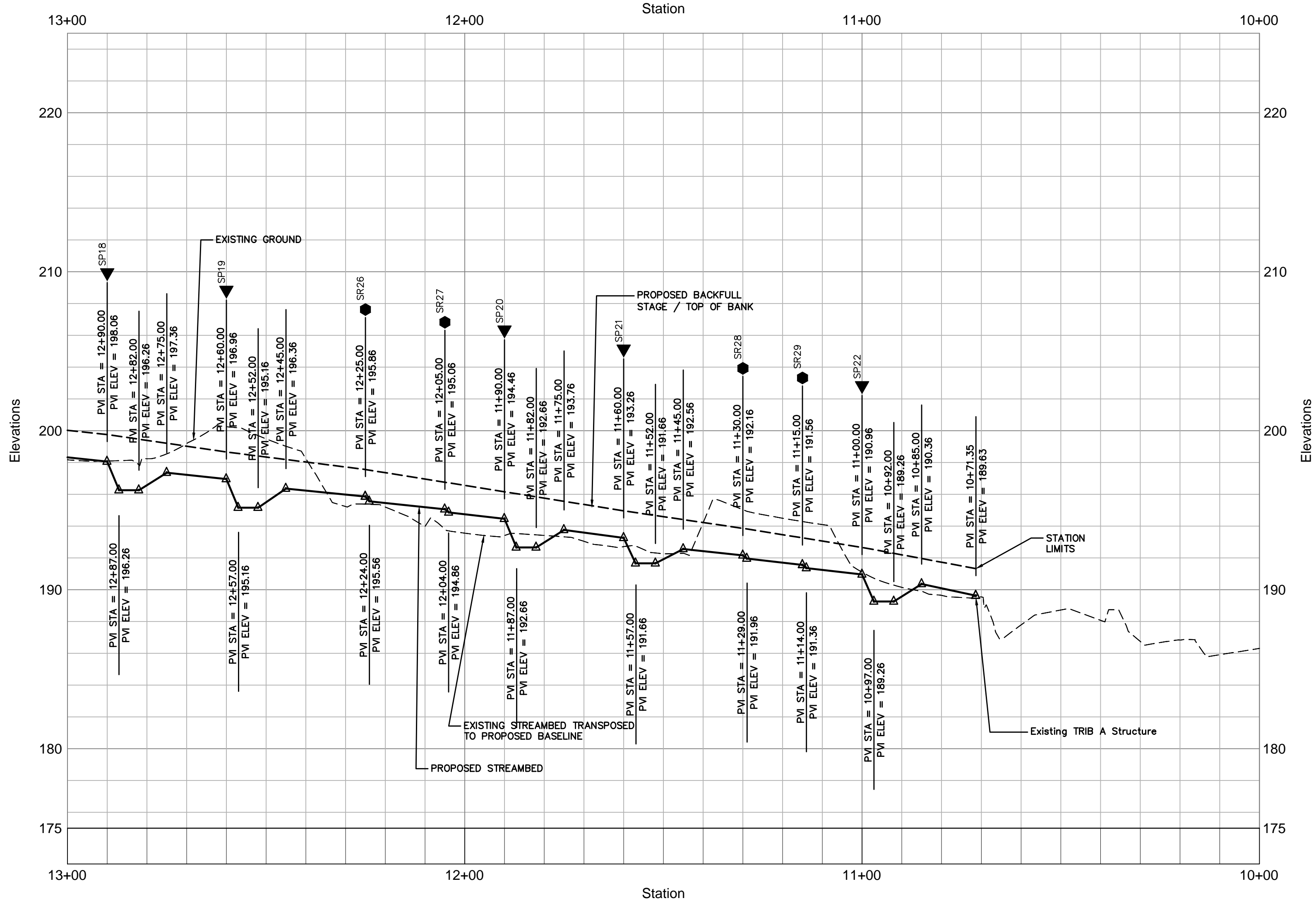
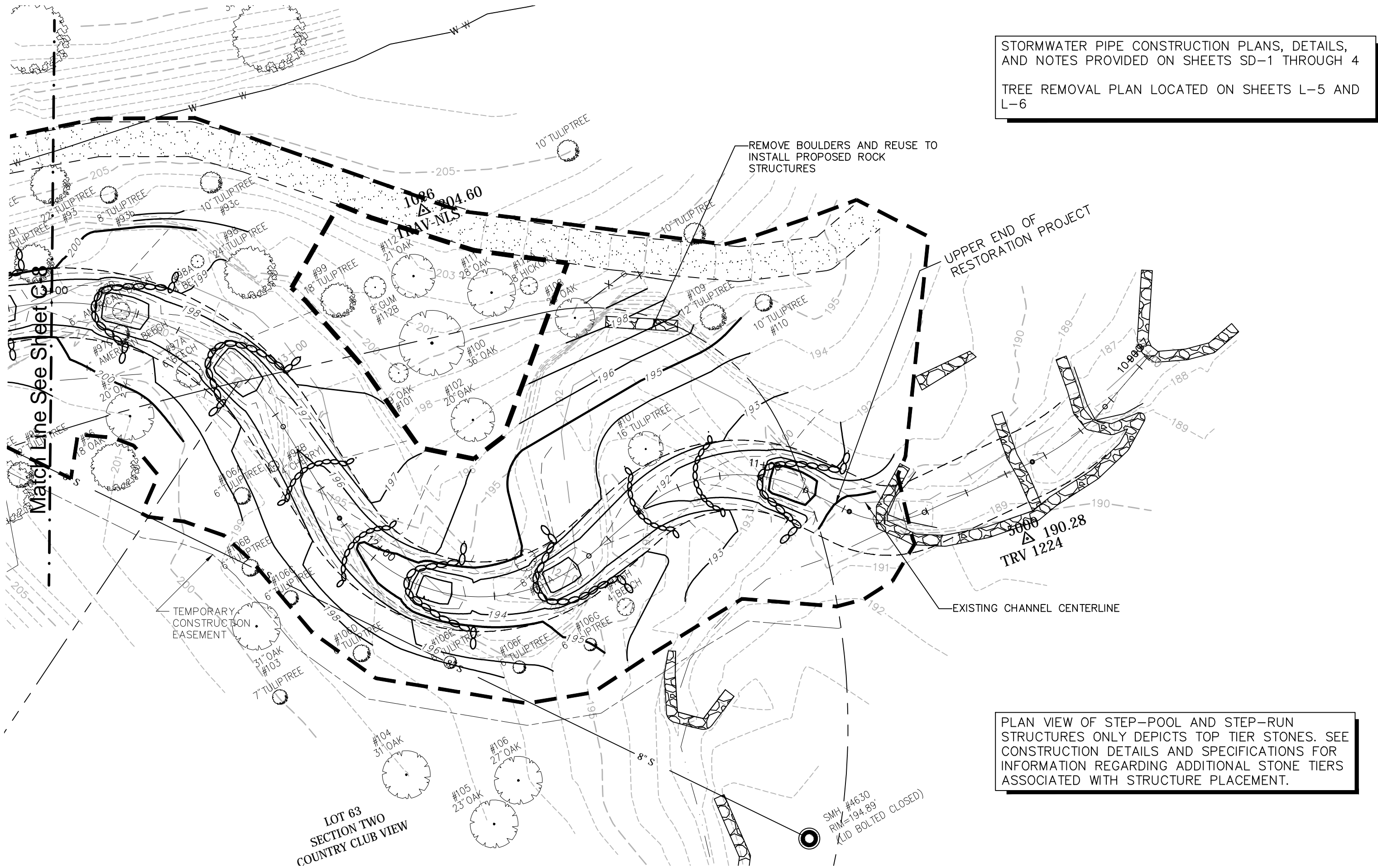
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Drawing Number

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32923.00

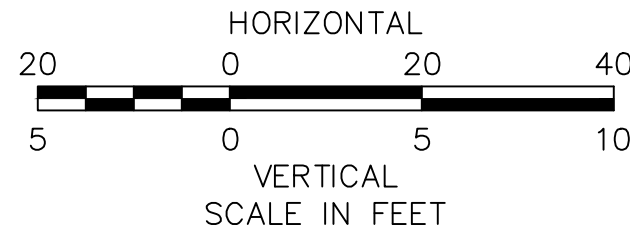
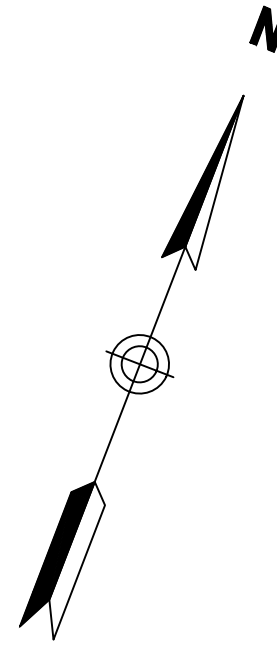




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Legend

- PROPERTY LINE
- BASELINE
- MATCHLINE
- EXISTING STORM SEWER
- WATER LINE
- SEWER LINE
- LIMIT OF DISTURBANCE
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- PROPOSED 0.5' CONTOUR
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- STEP POOL (SP)
- STEP RUN (SR)



Donaldson Run Tributary B Stream Restoration Country Club View Arlington, Virginia

No.	Revision	Date	Appvd.

Designed by IFS	Checked by JRL
Issued for Final Design	Date June 29, 2020

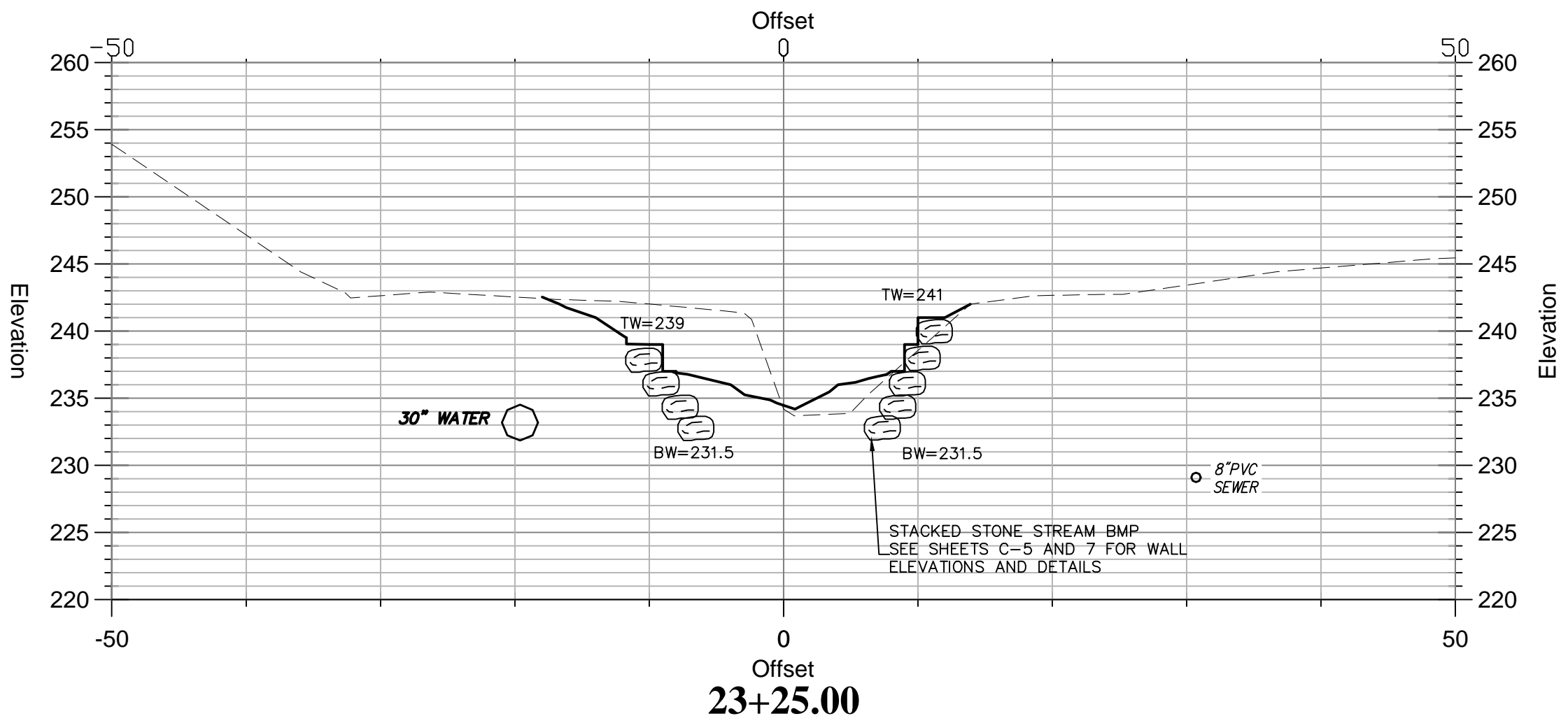
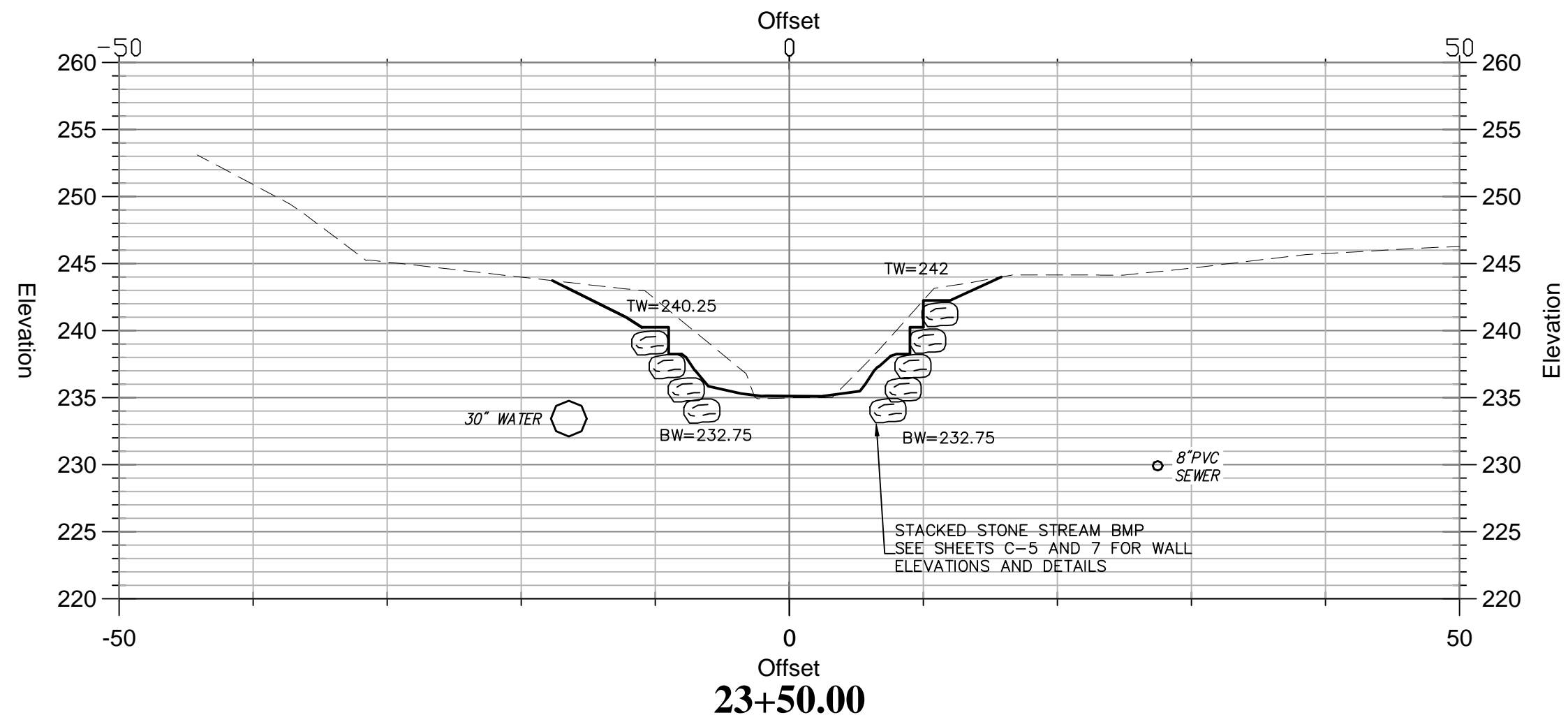
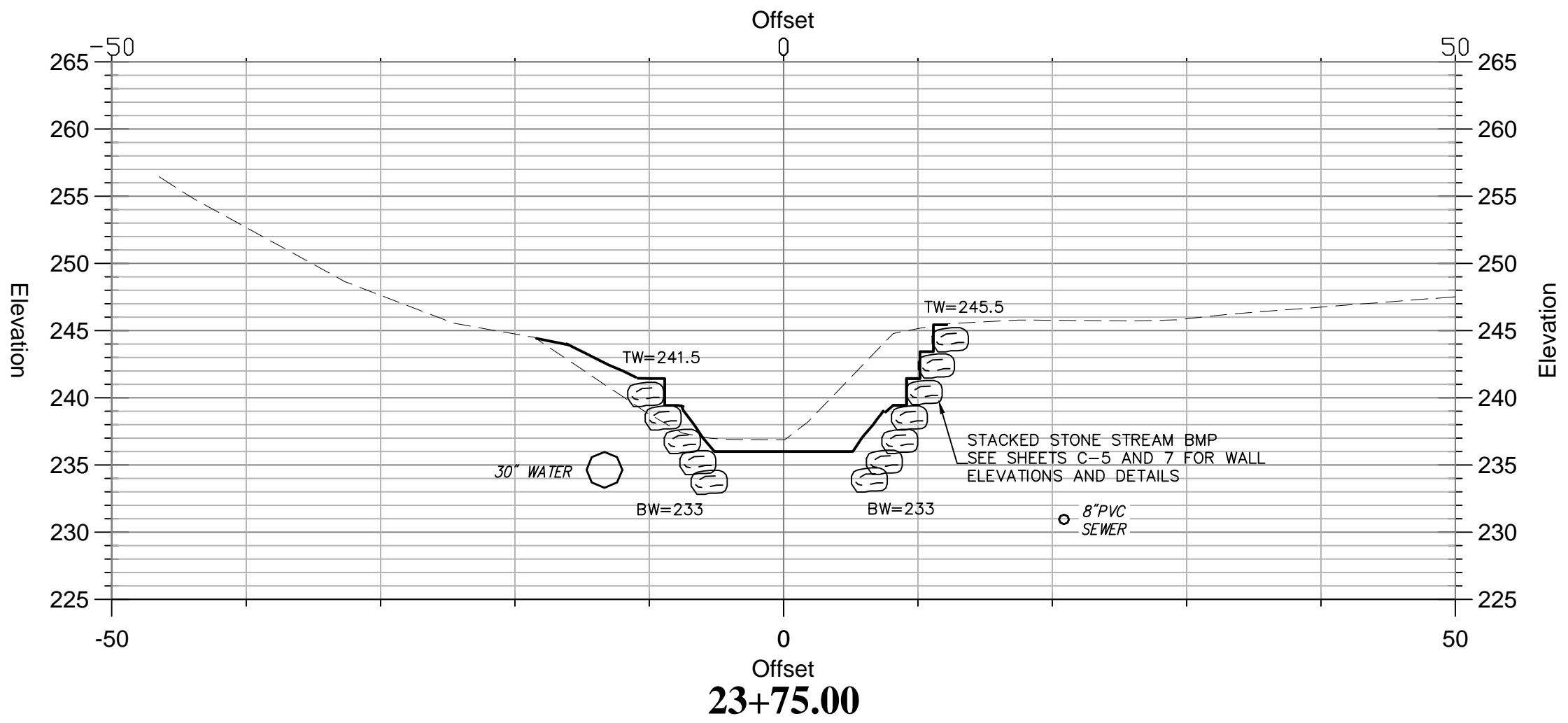
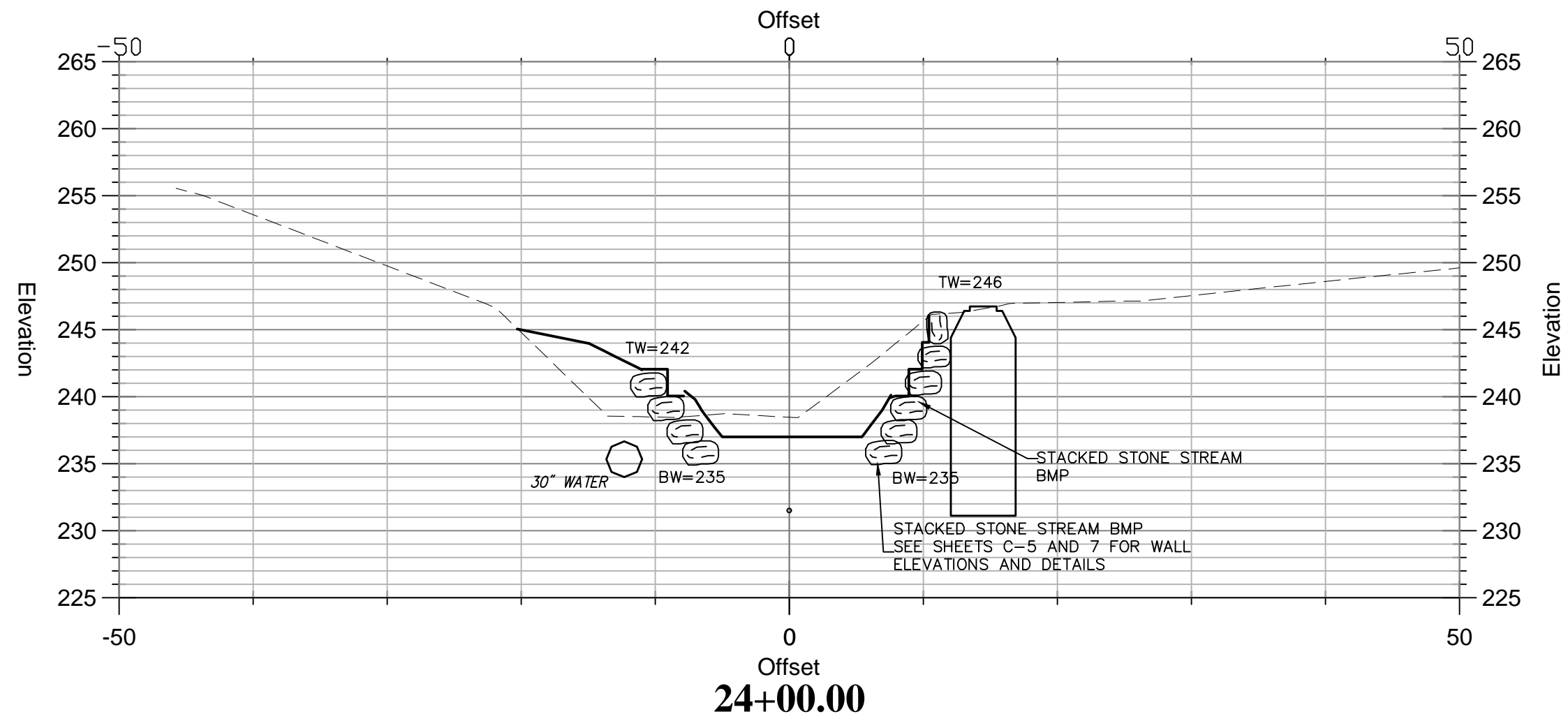
Plan and Profile Sta 13+00 to 10+70

Drawing Number

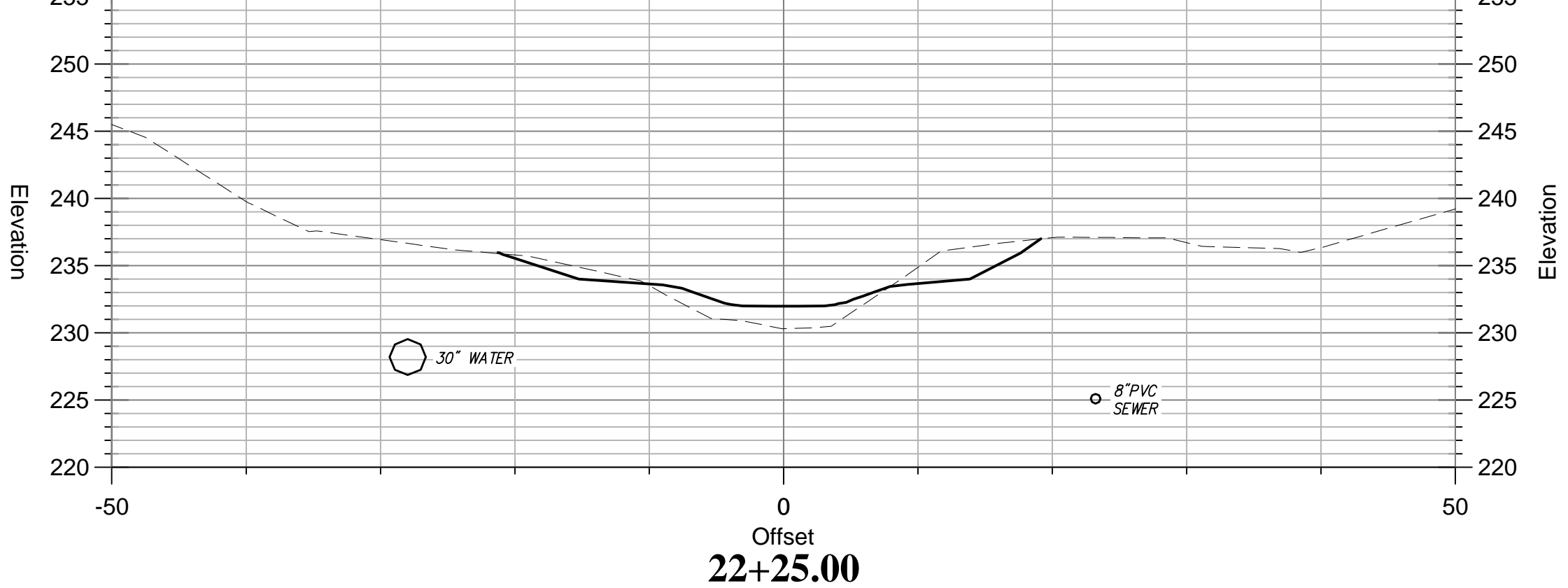
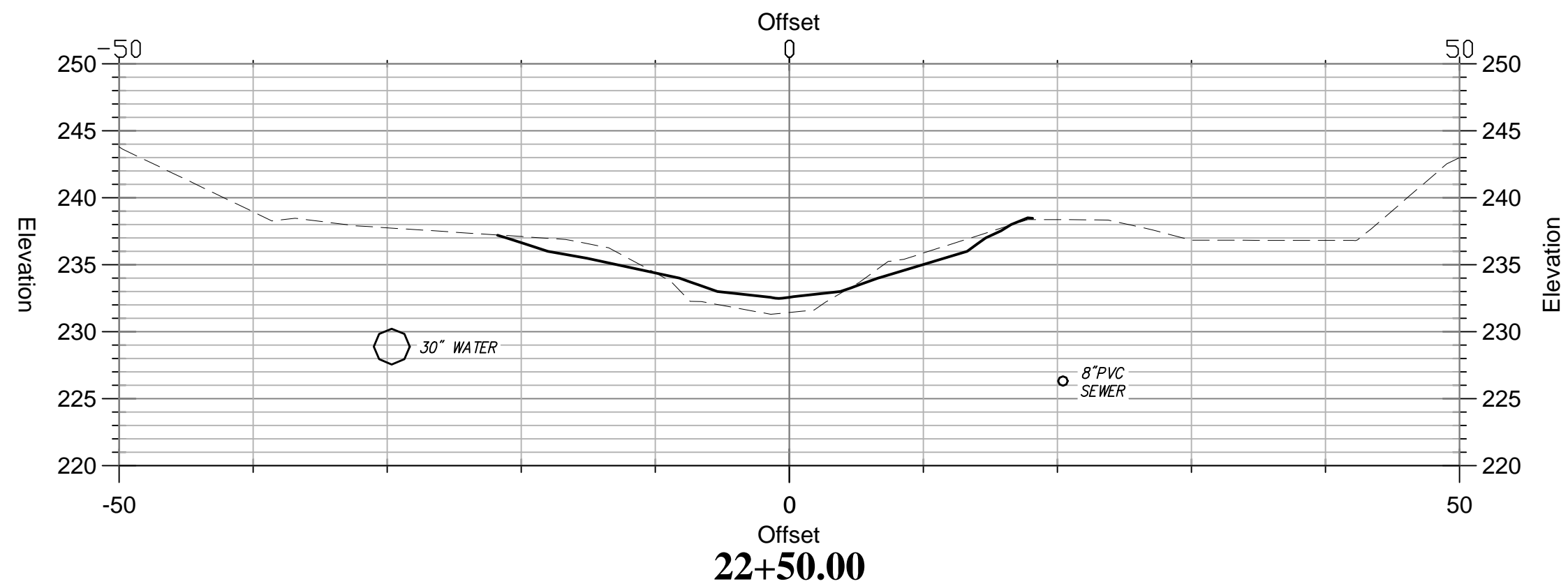
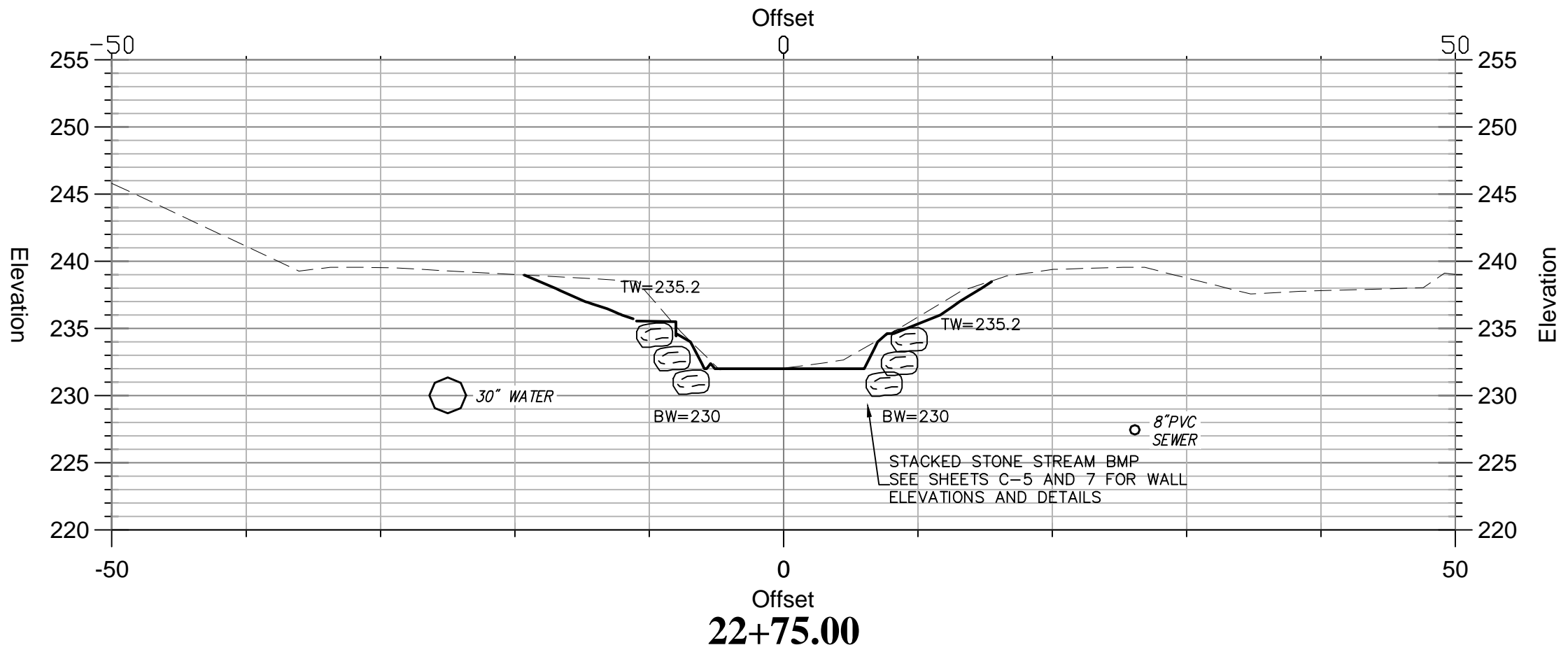
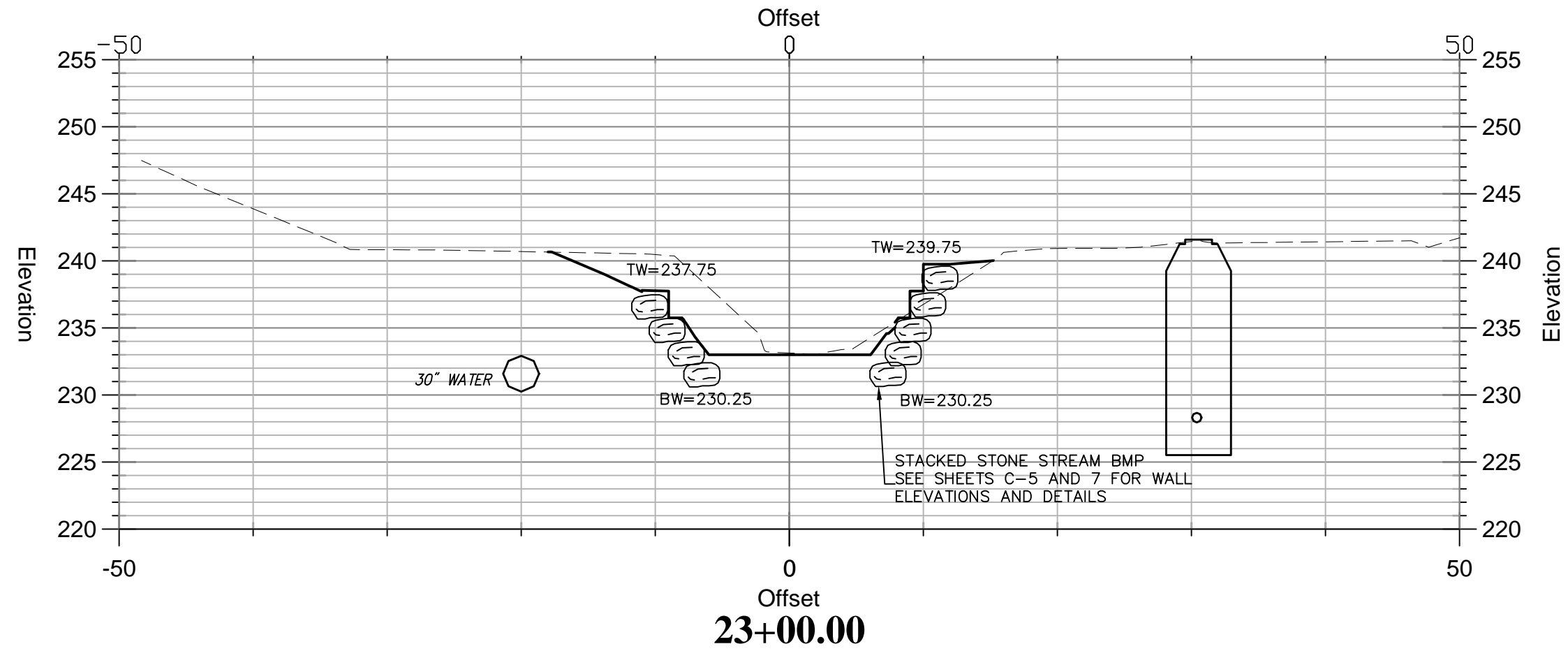
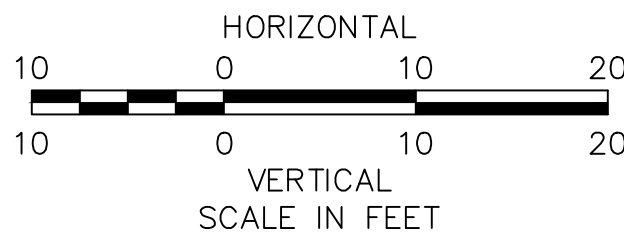
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Project Number
32923.00



NOTE:
LOCATION OF WATERMAIN IS APPROXIMATE
AND EXACT LOCATION MUST BE DETERMINED
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Donaldson Run Tributary B Stream Restoration Country Club View Arlington, Virginia

No.	Revision	Date	Appd.

Designed by IFS	Checked by JRL
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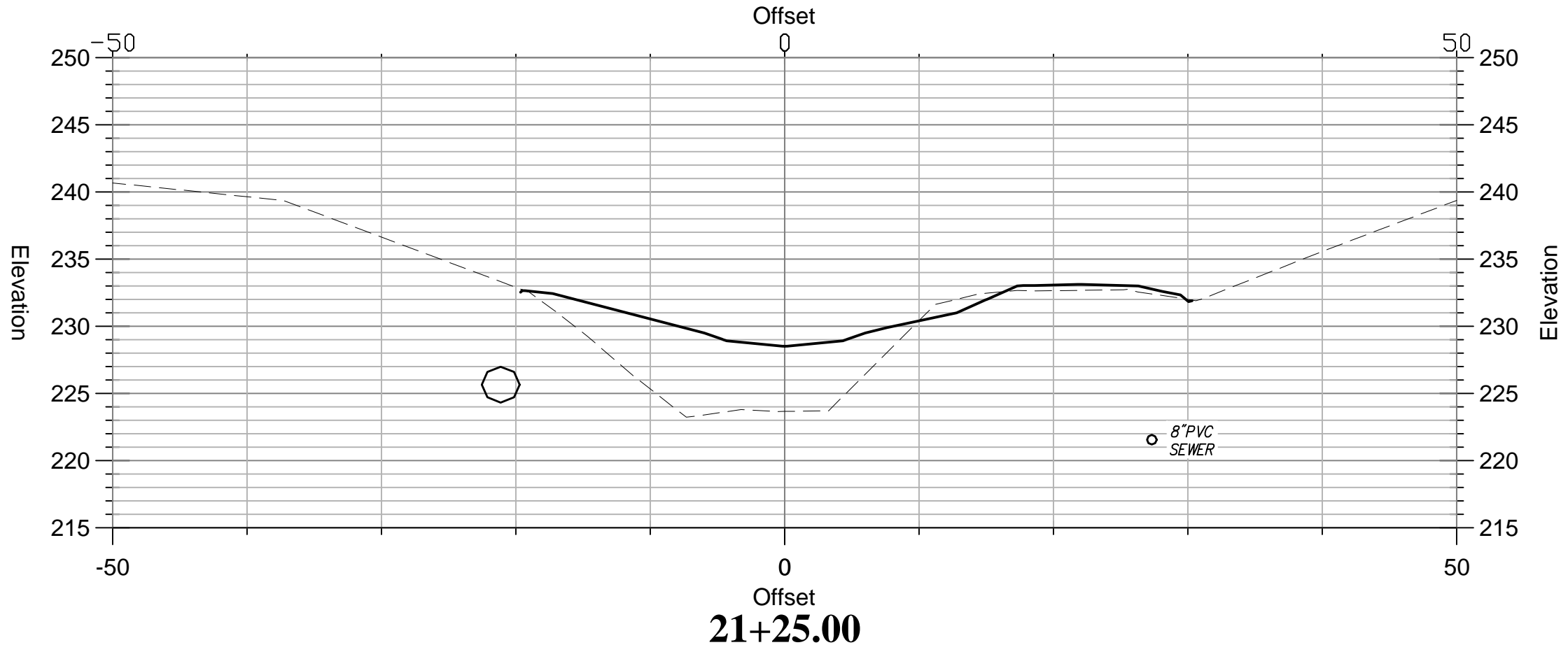
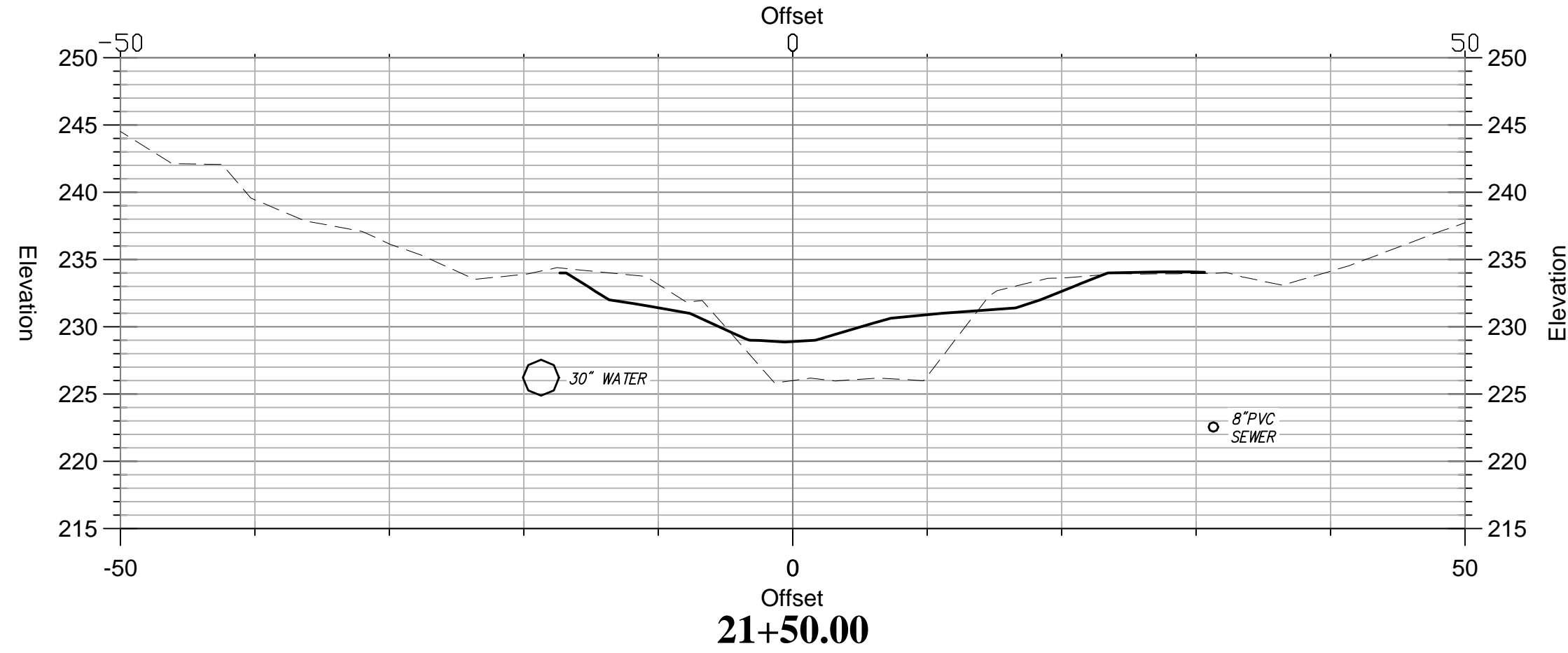
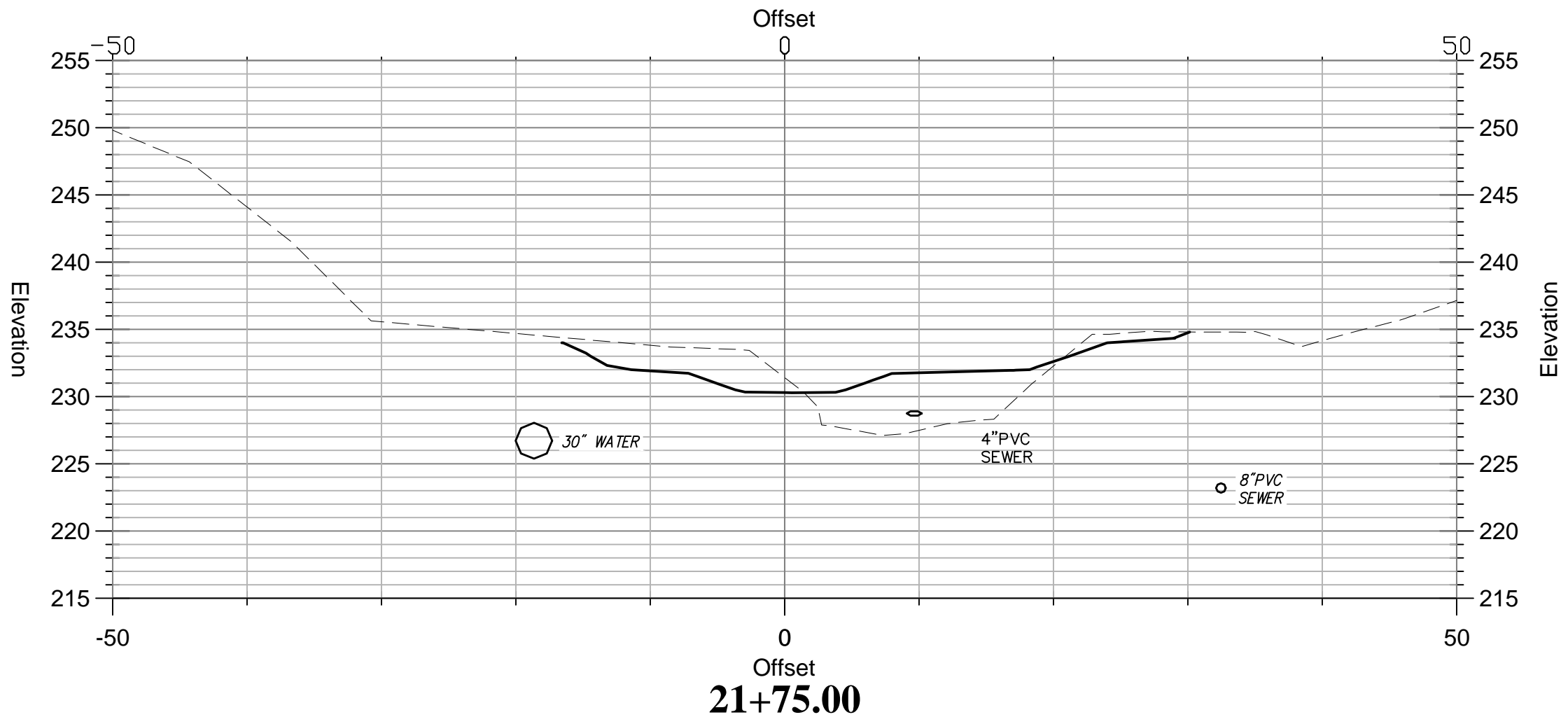
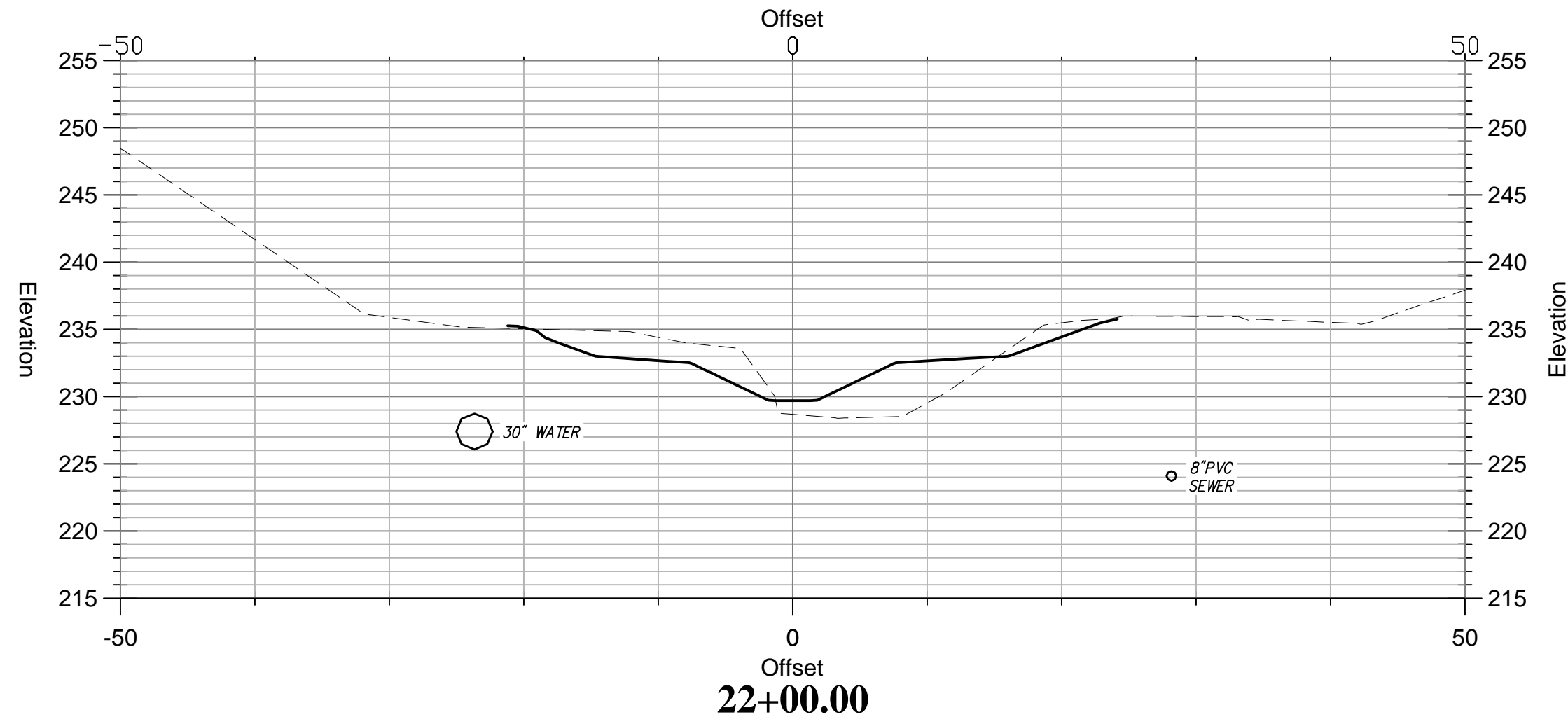
Drawing Title
**Cross Sections
From Grading Plan**

Drawing Number

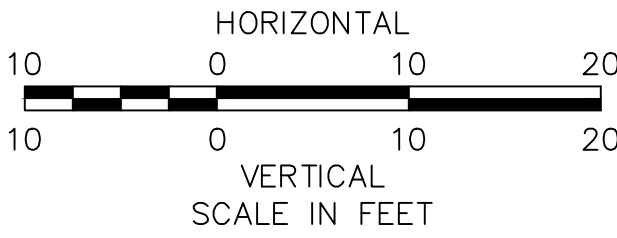
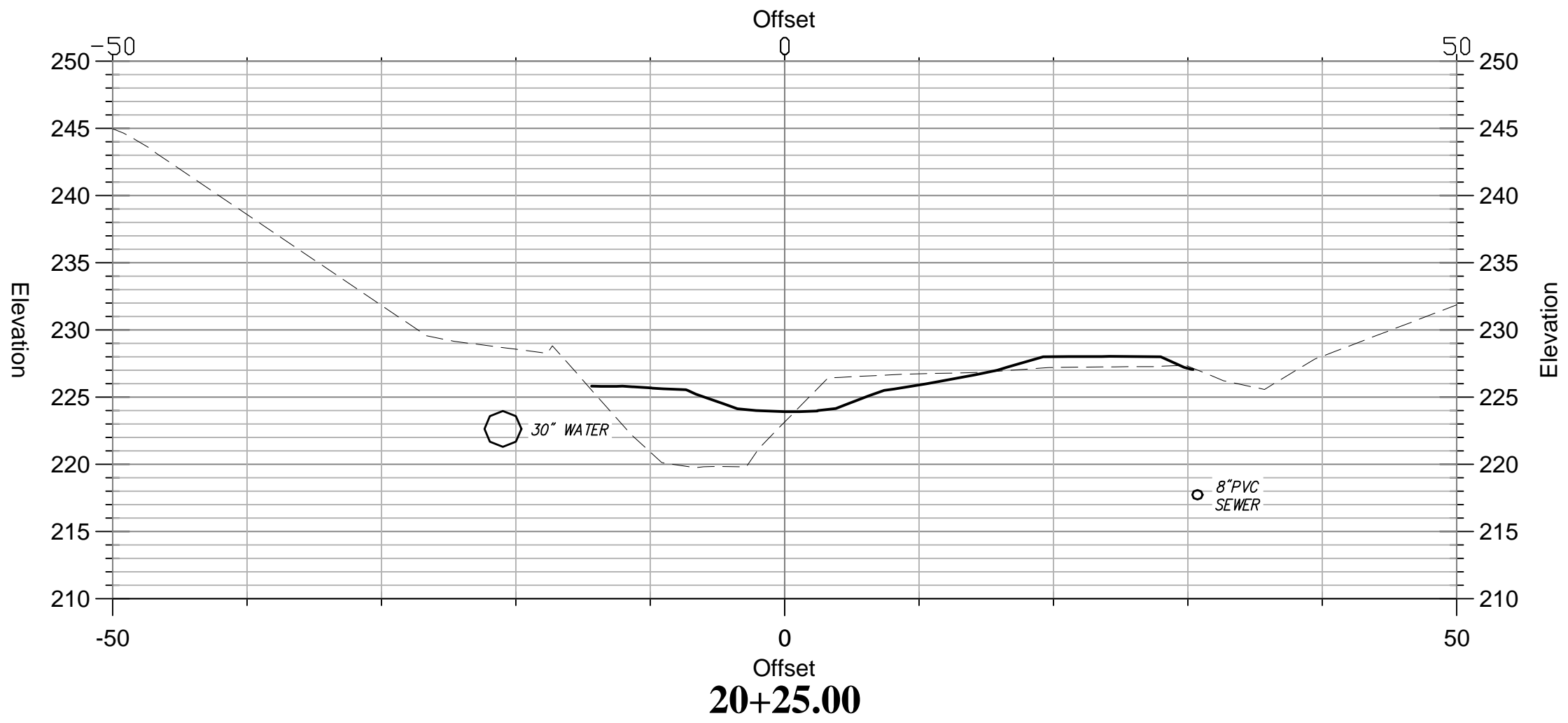
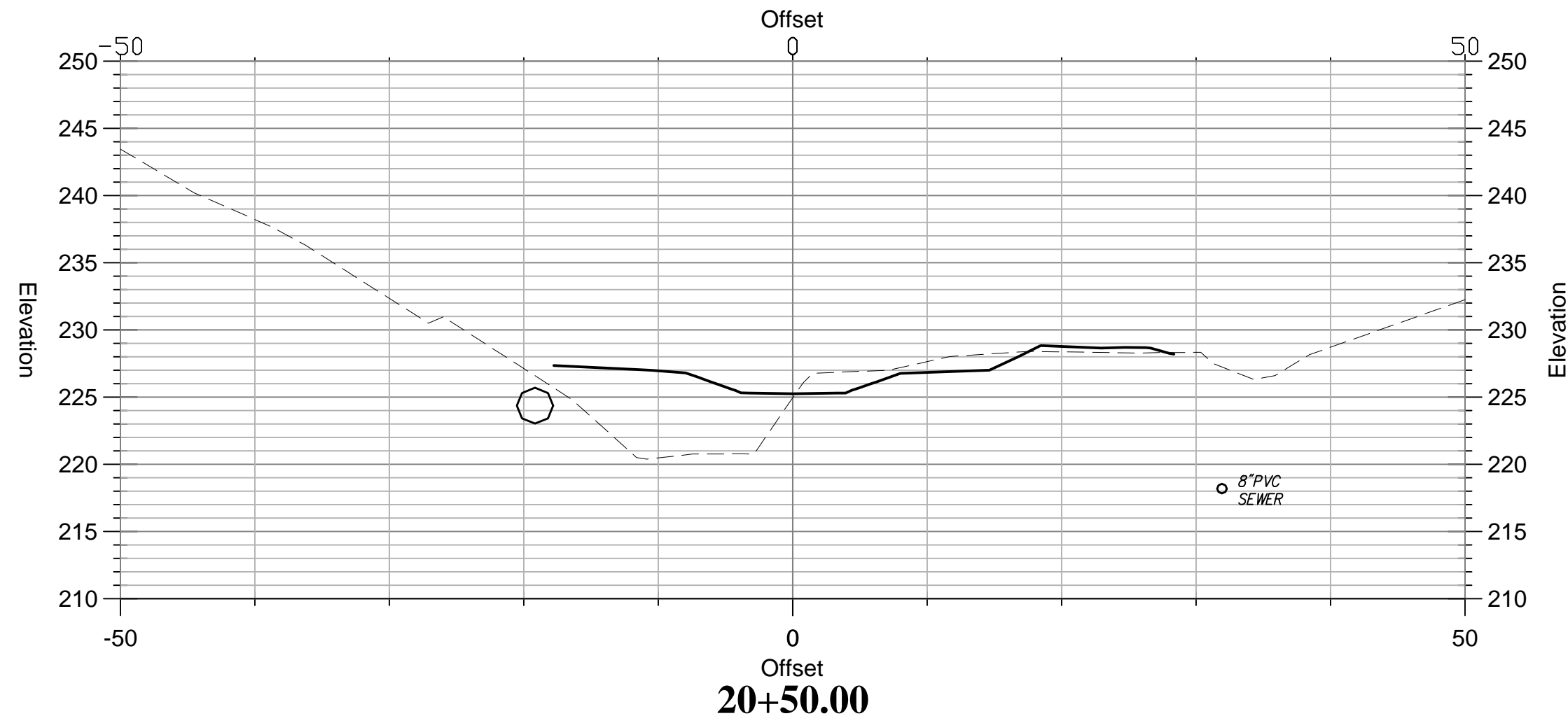
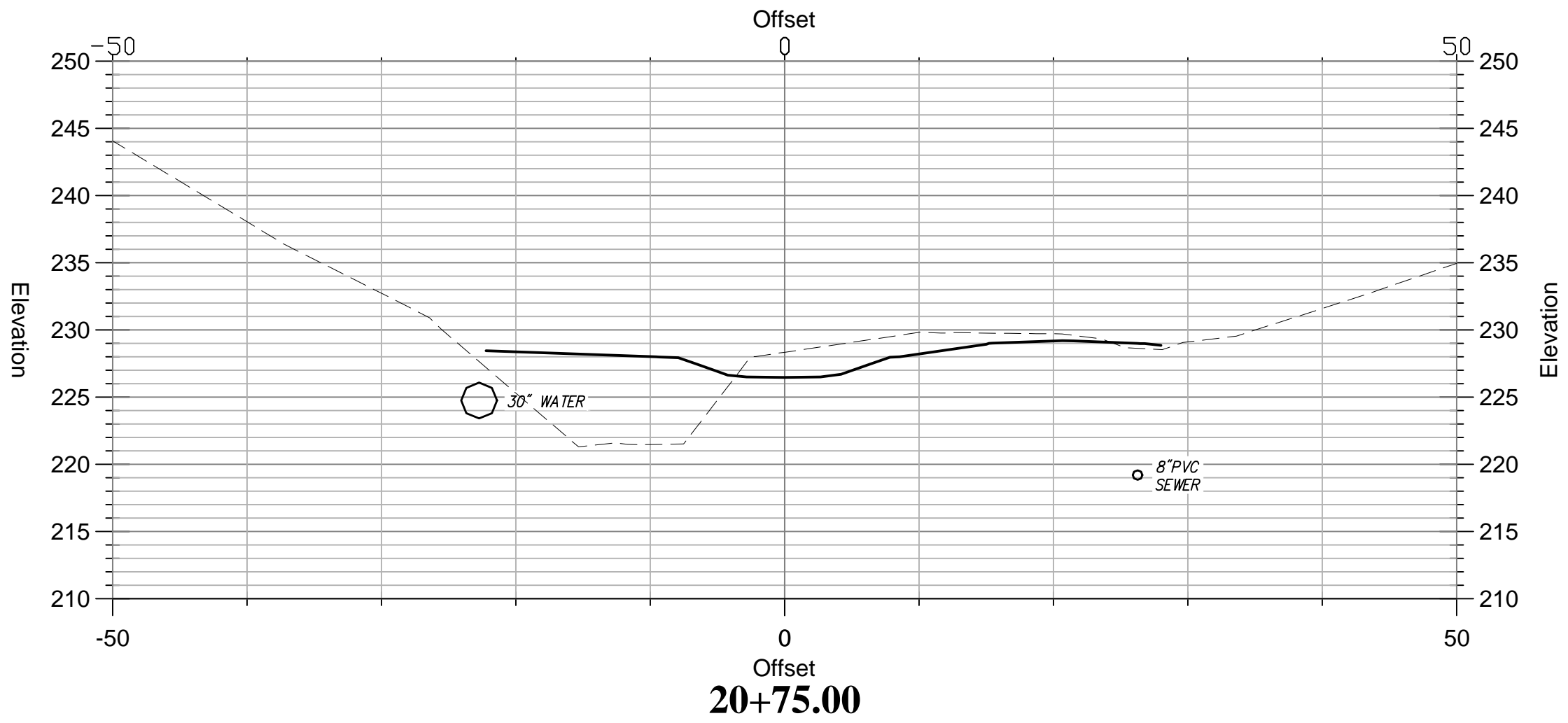
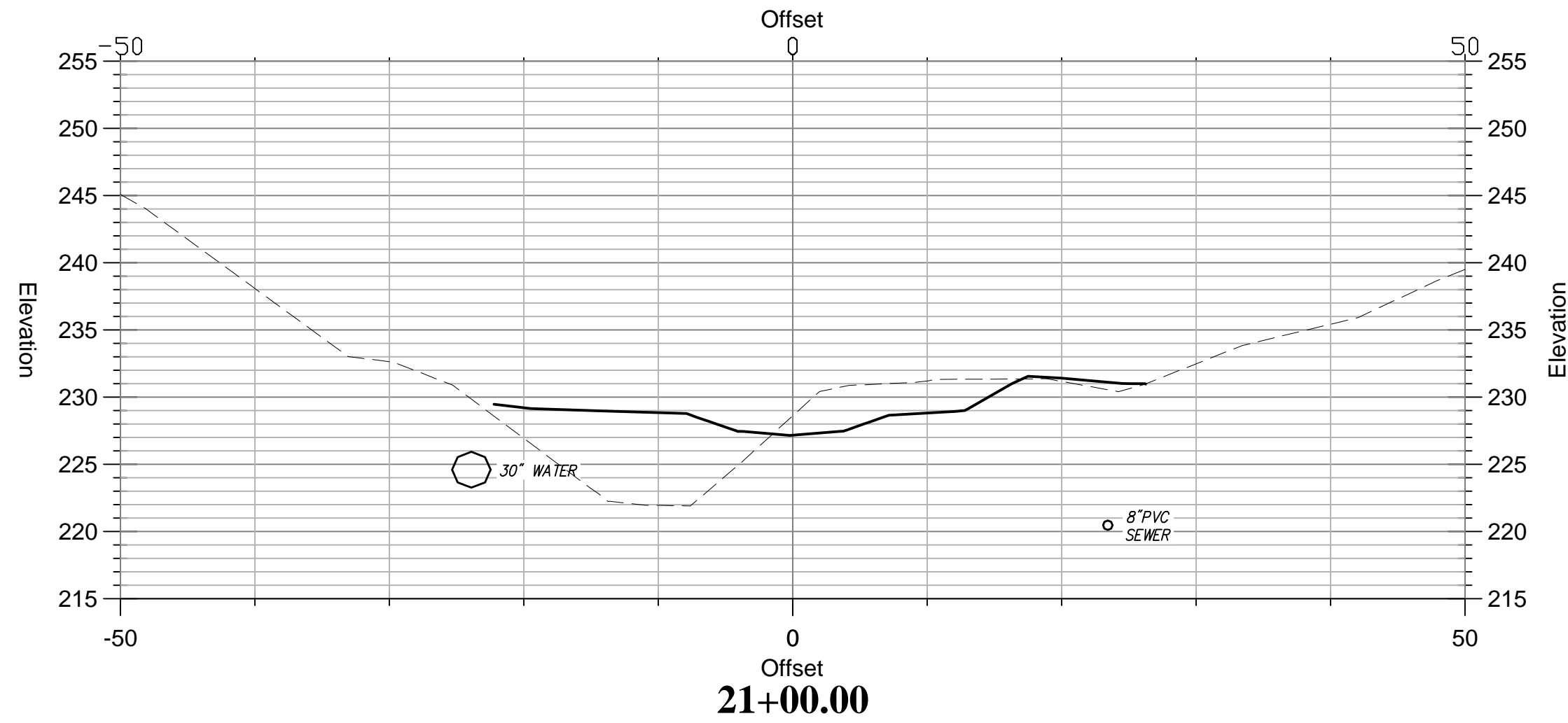
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Project Number
32923.00



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Donaldson Run
Tributary B
Stream Restoration
Country Club View
Arlington, Virginia

No.	Revision	Date	Appd.

Designed by IFS	Checked by JRL
Issued for Final Design	Date June 25, 2019

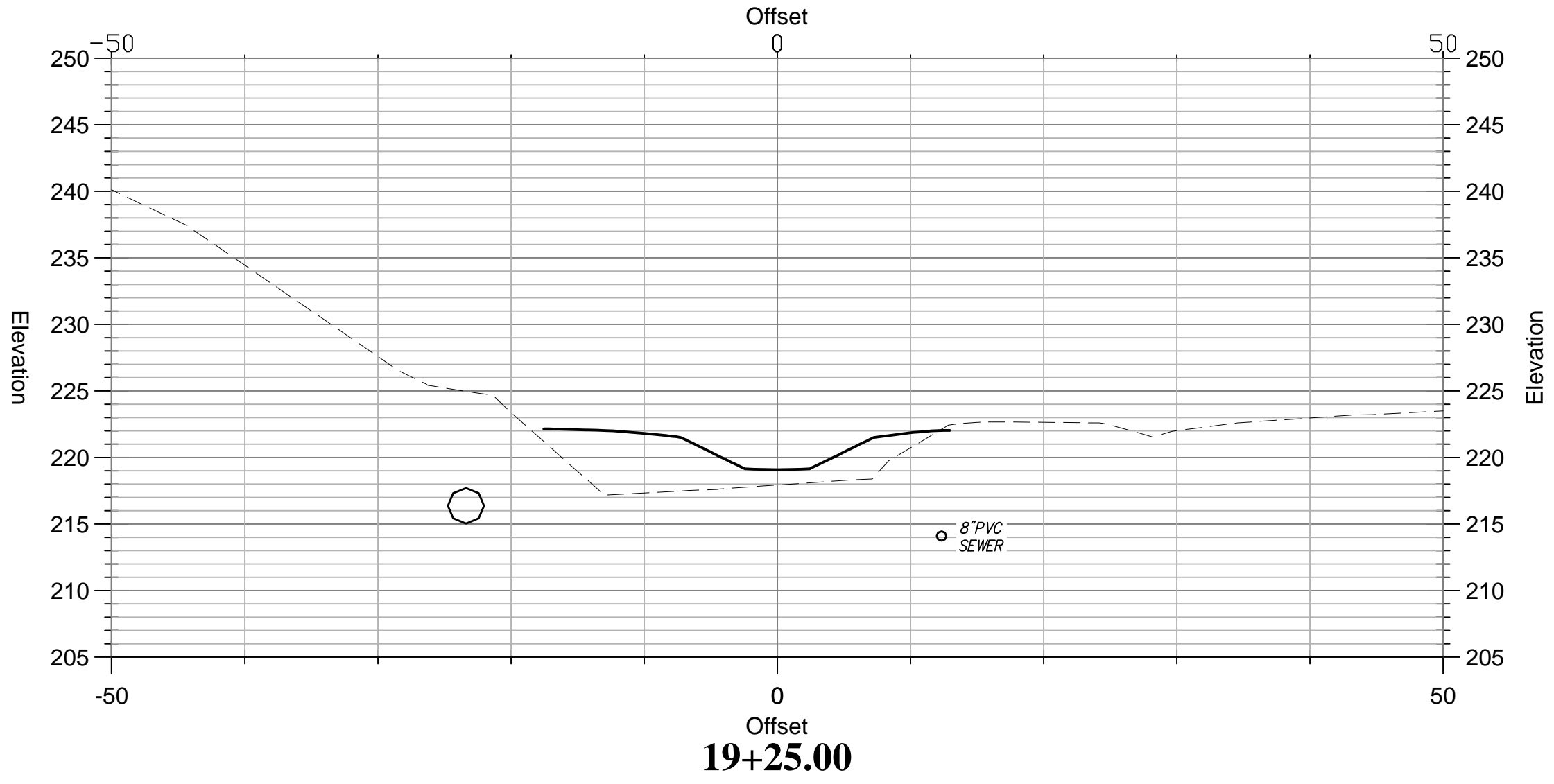
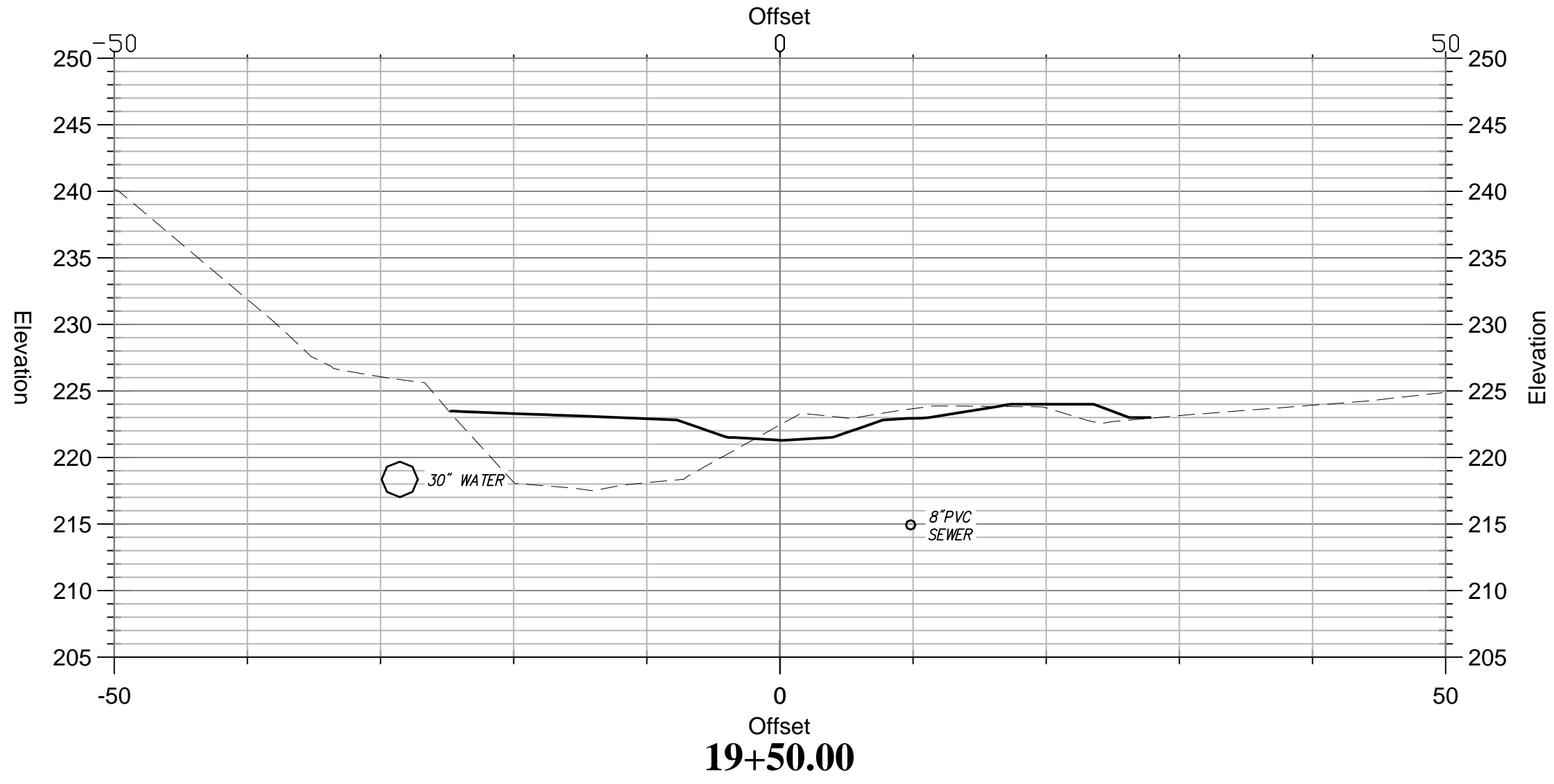
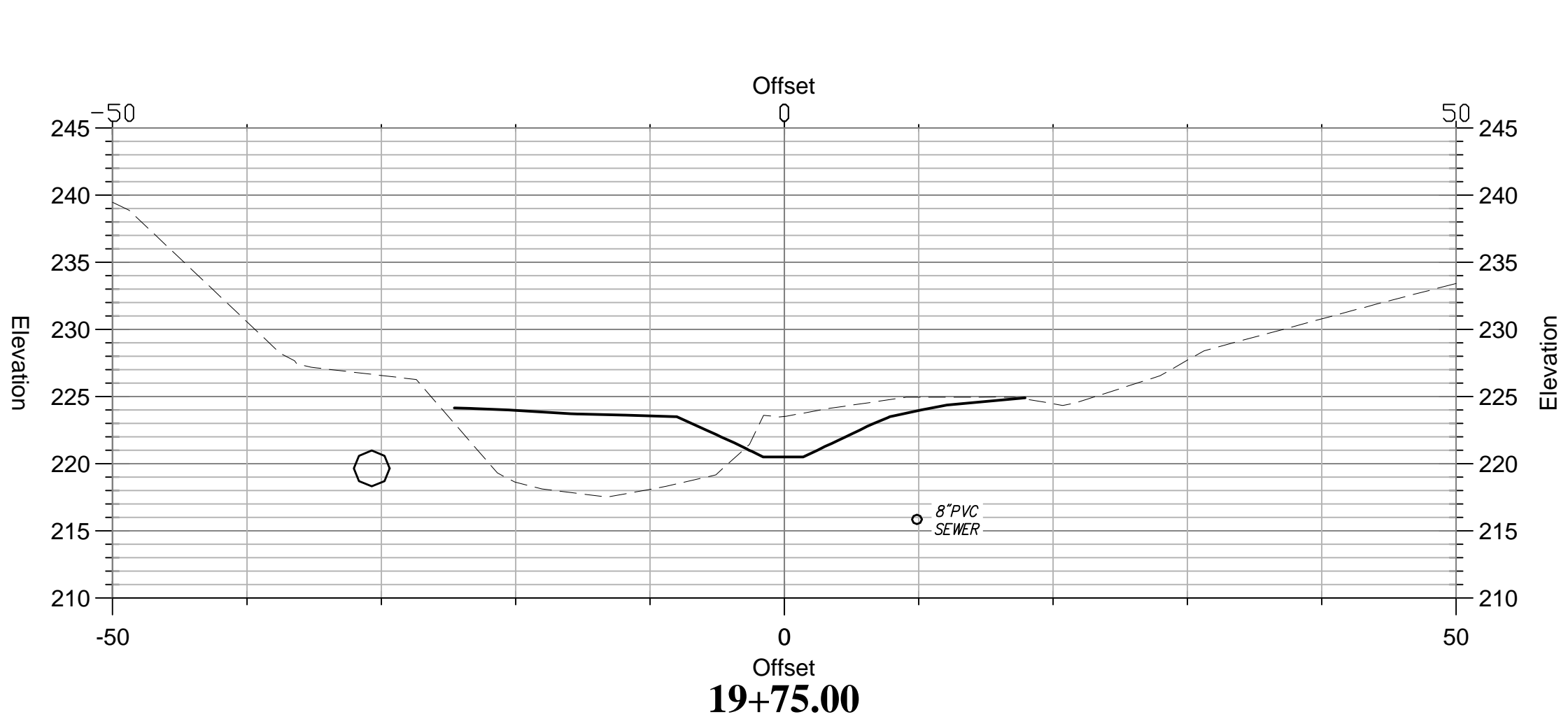
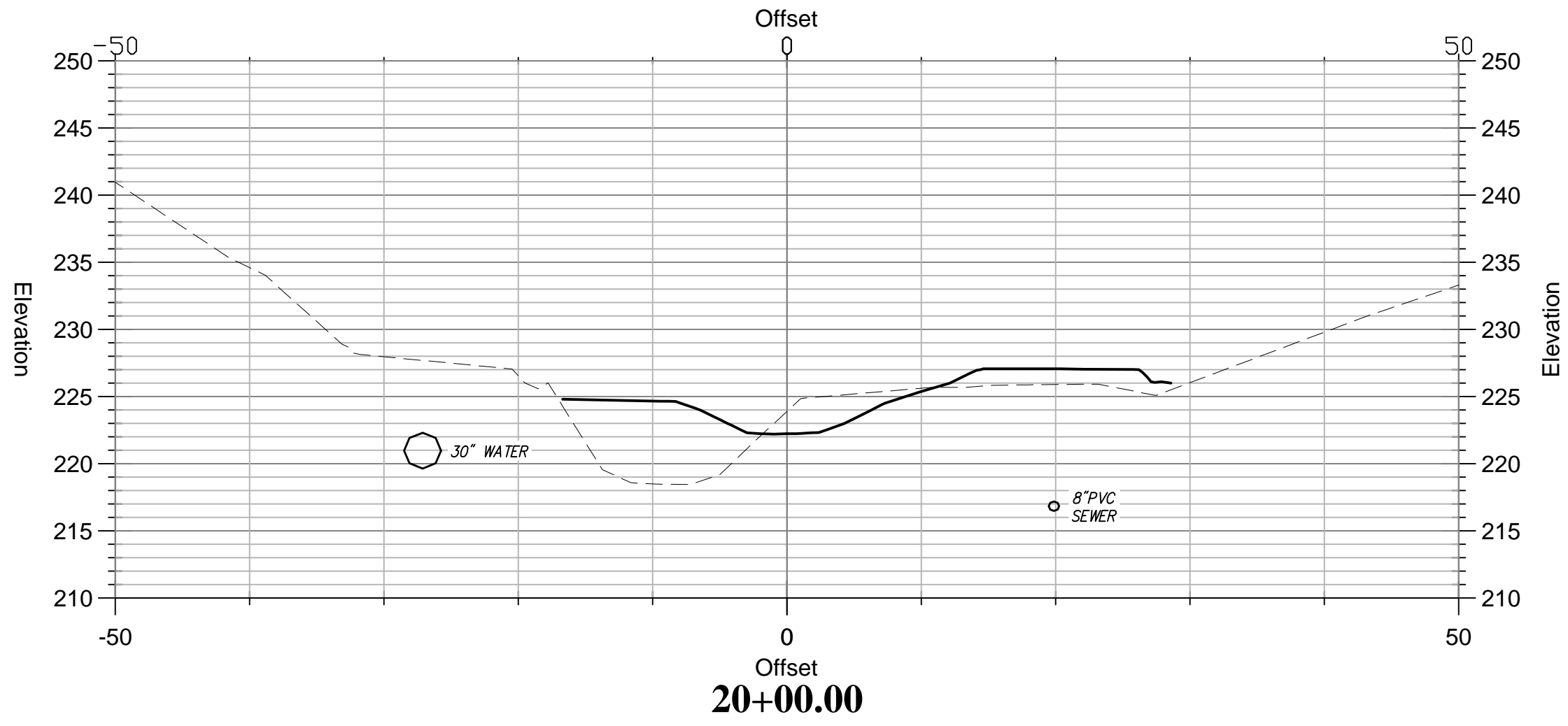
Drawing Title
Cross Sections
From Grading Plan

Drawing Number

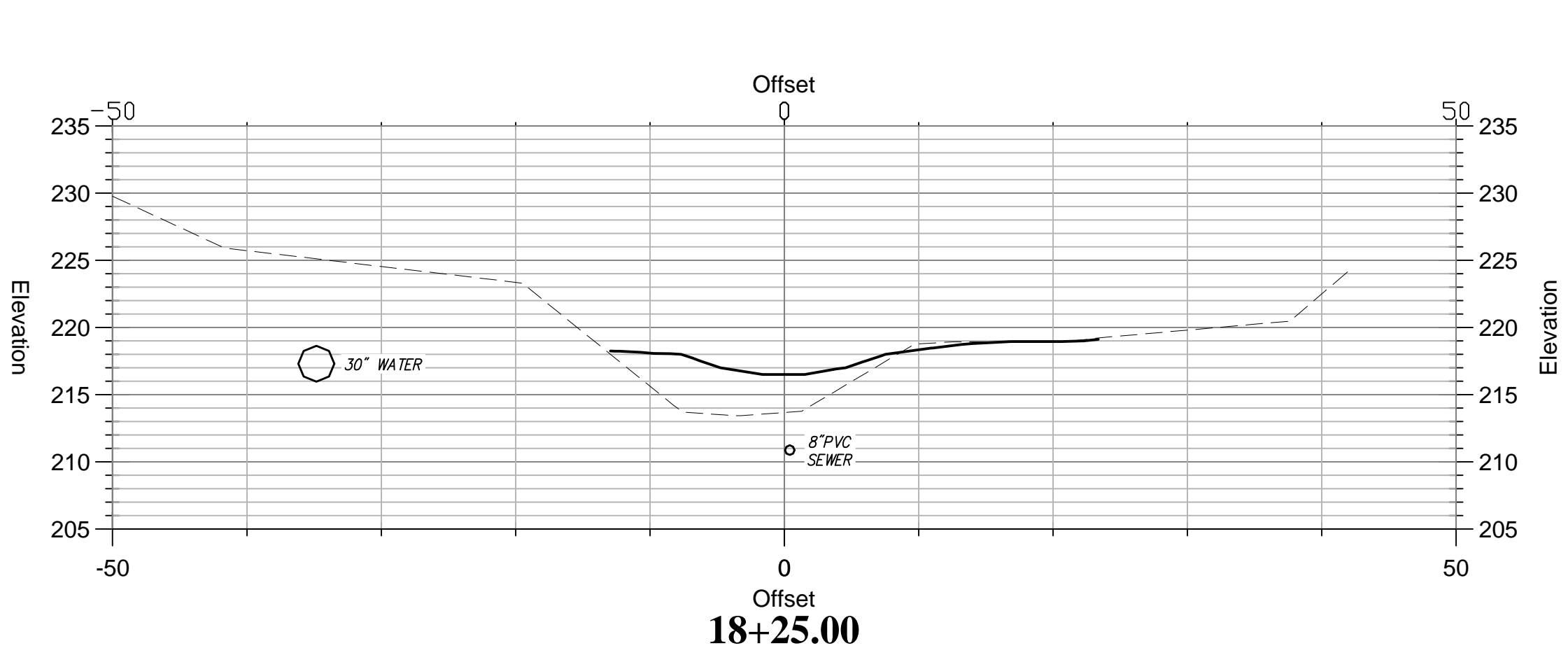
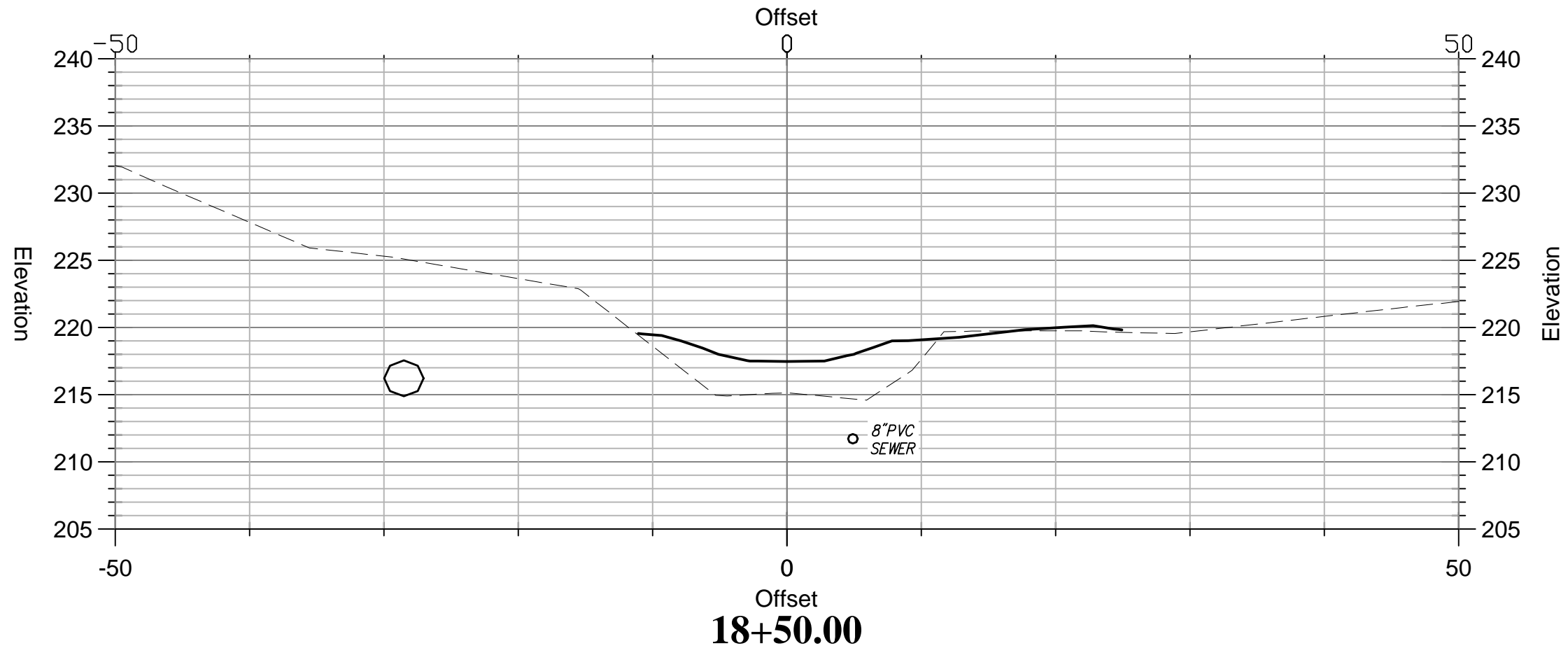
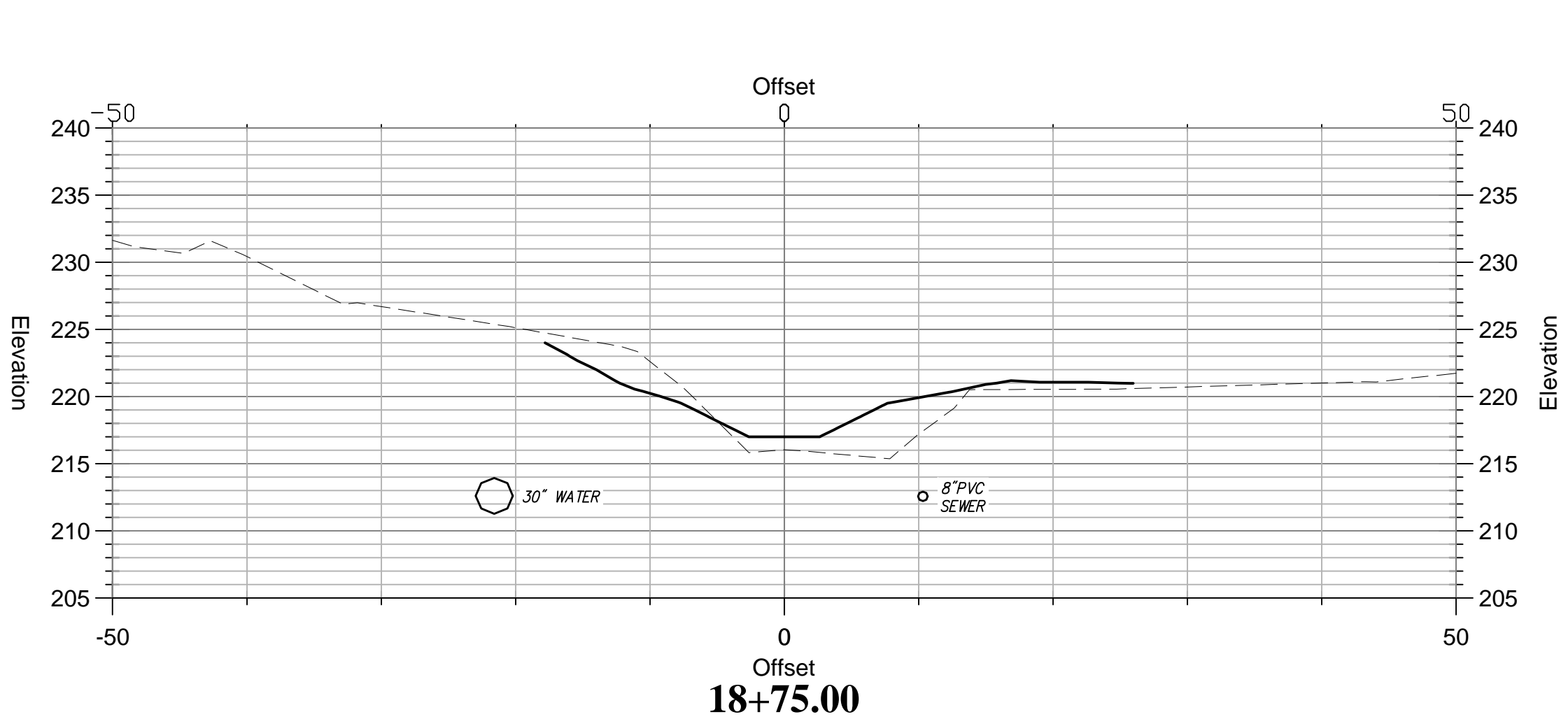
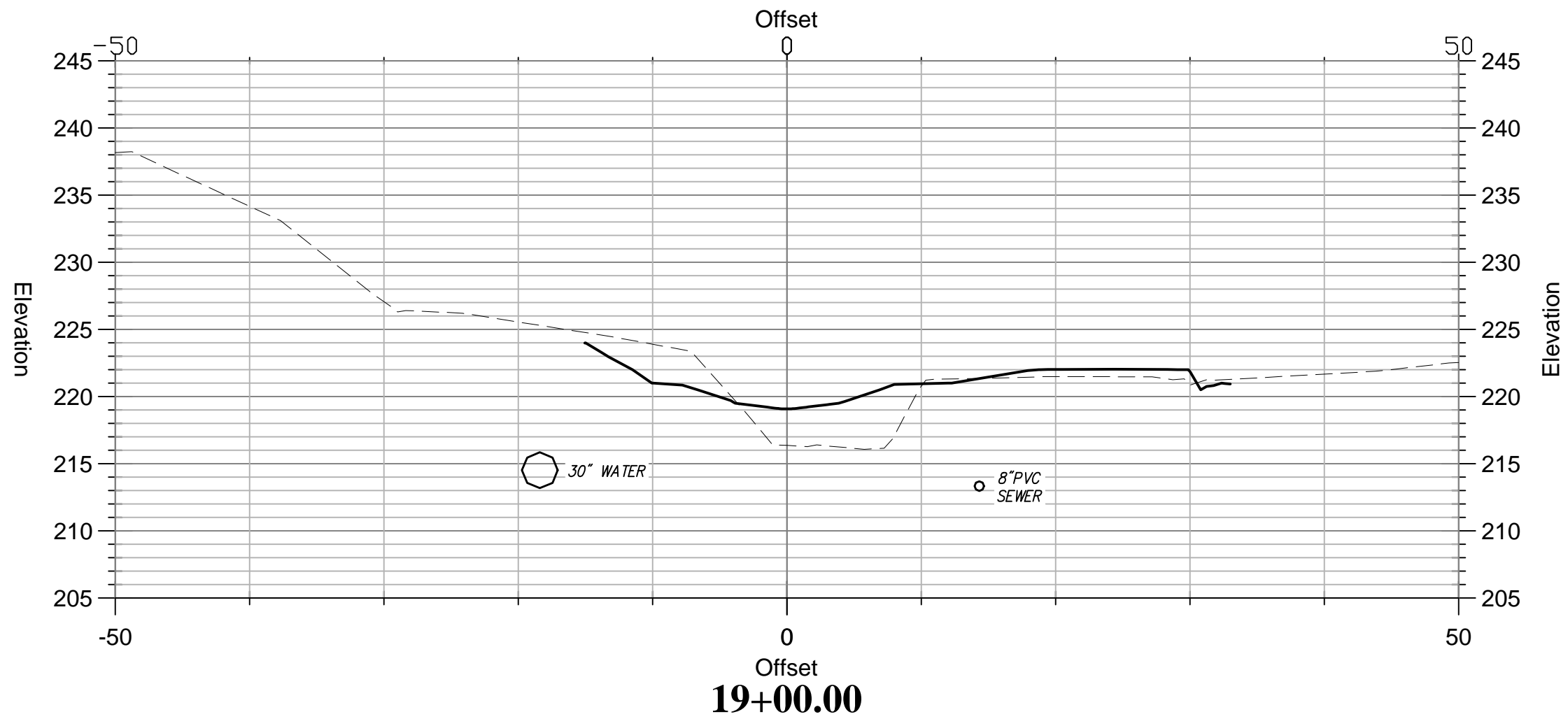
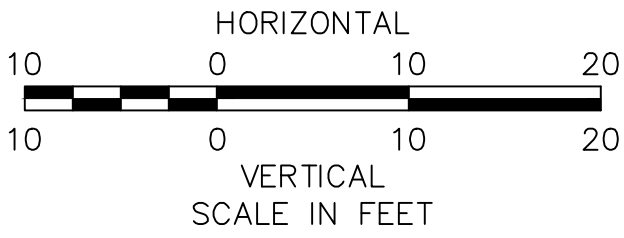
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Project Number
32923.00



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Donaldson Run Tributary B Stream Restoration Country Club View Arlington, Virginia

No.	Revision	Date	Appvd.

Designed by	Checked by
IFS	JRL
Issued for	Date
Final Design	June 25, 2019

Drawing Title

Cross Sections From Grading Plan

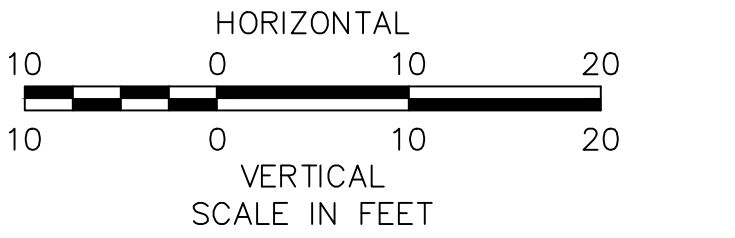
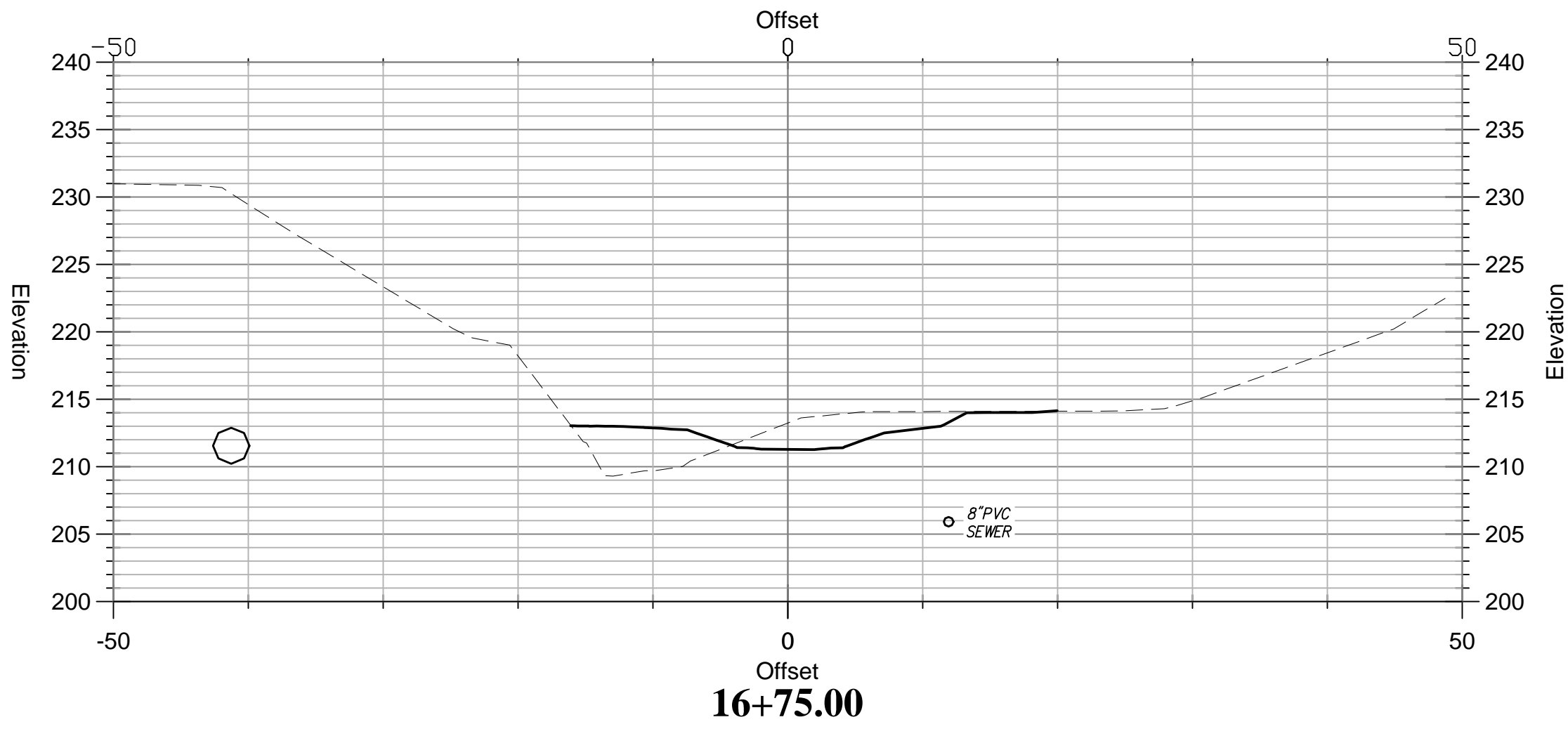
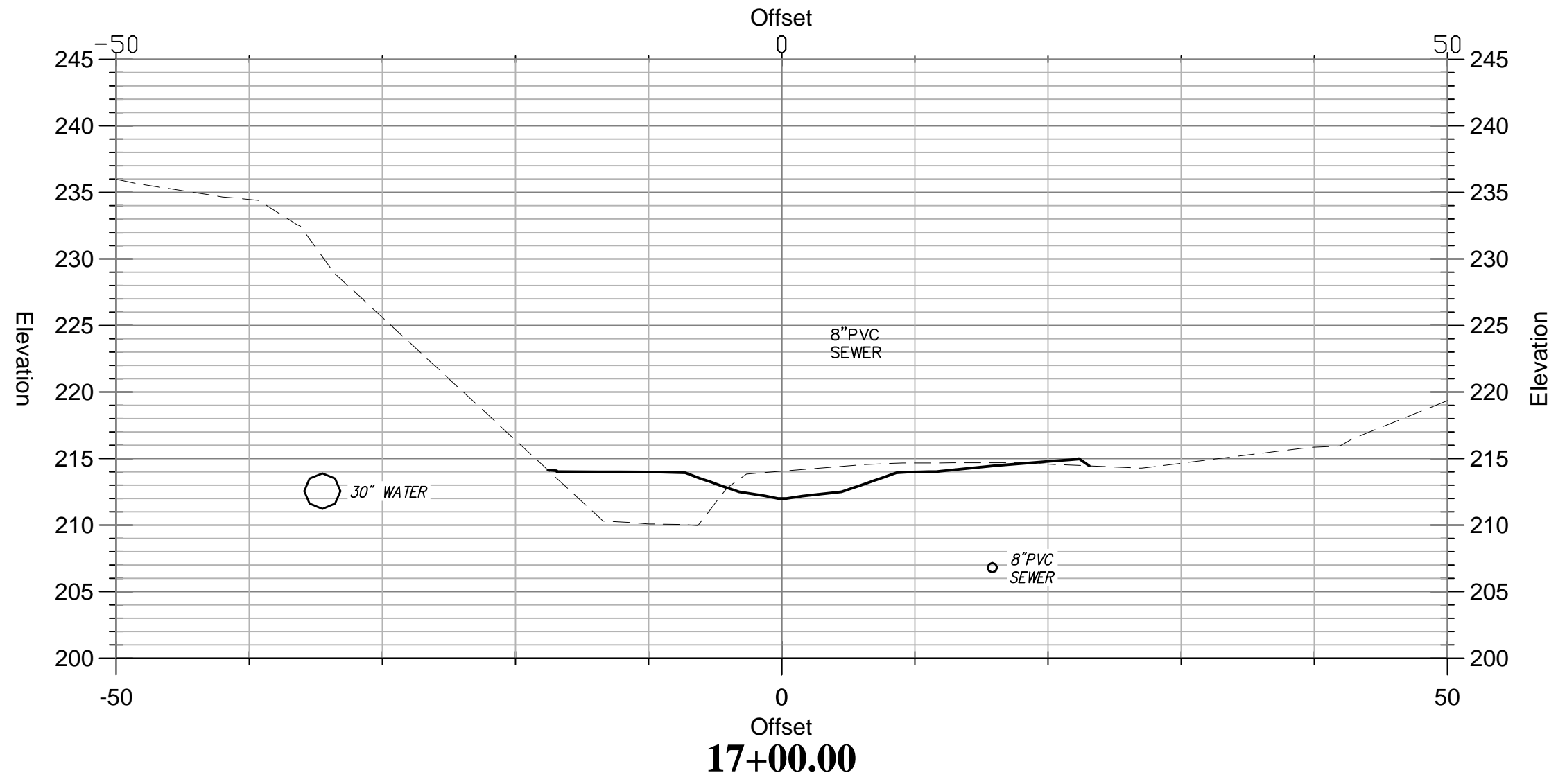
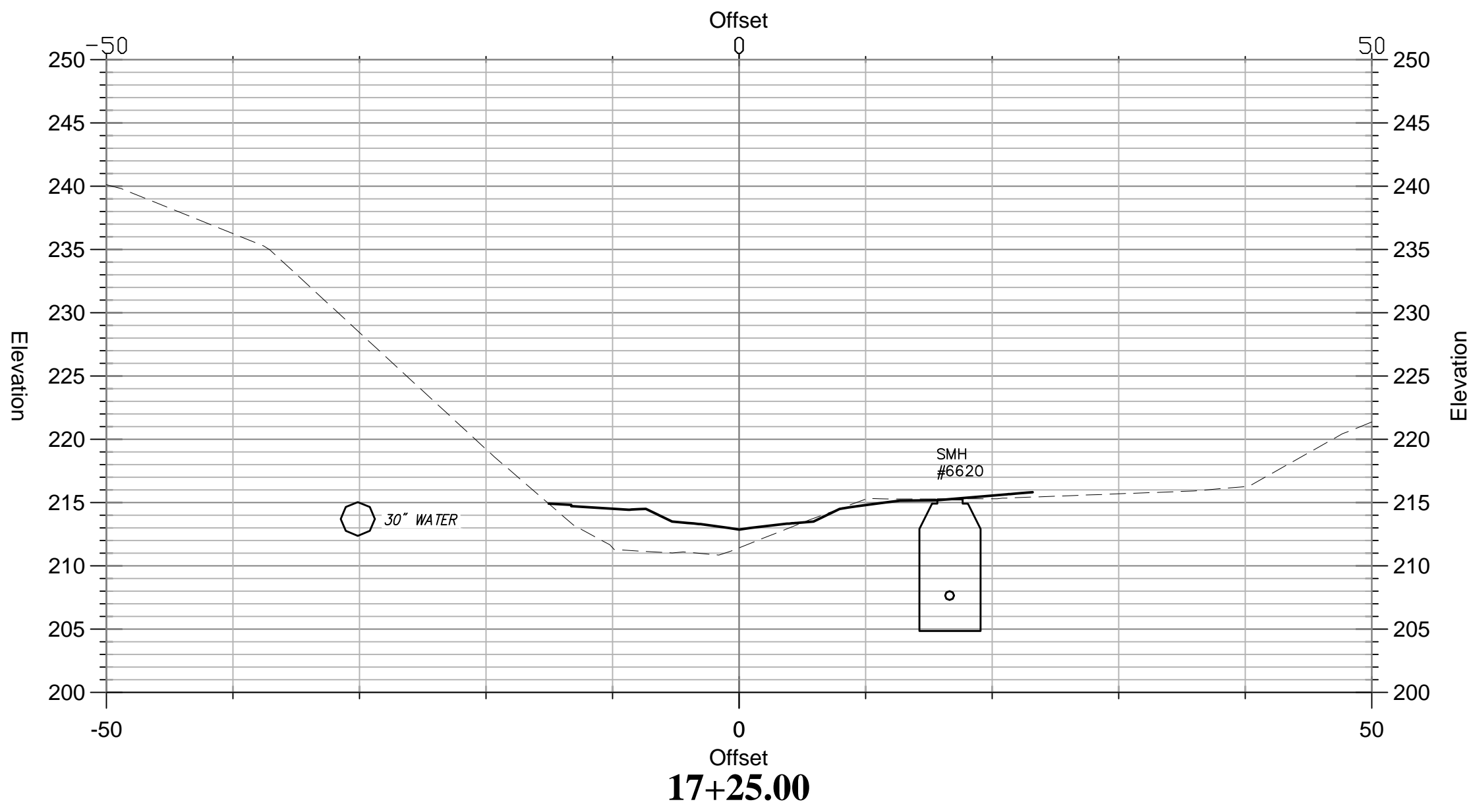
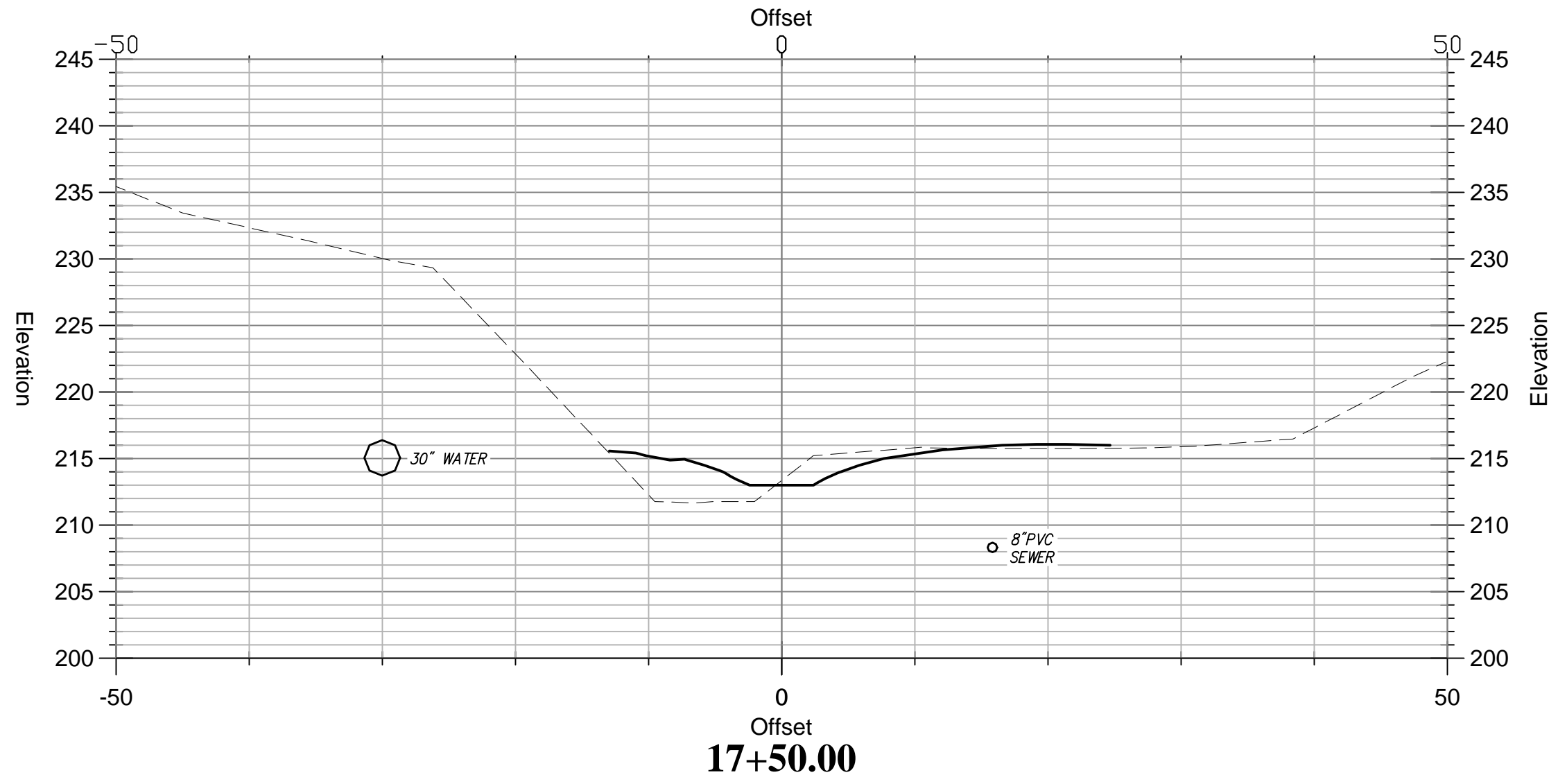
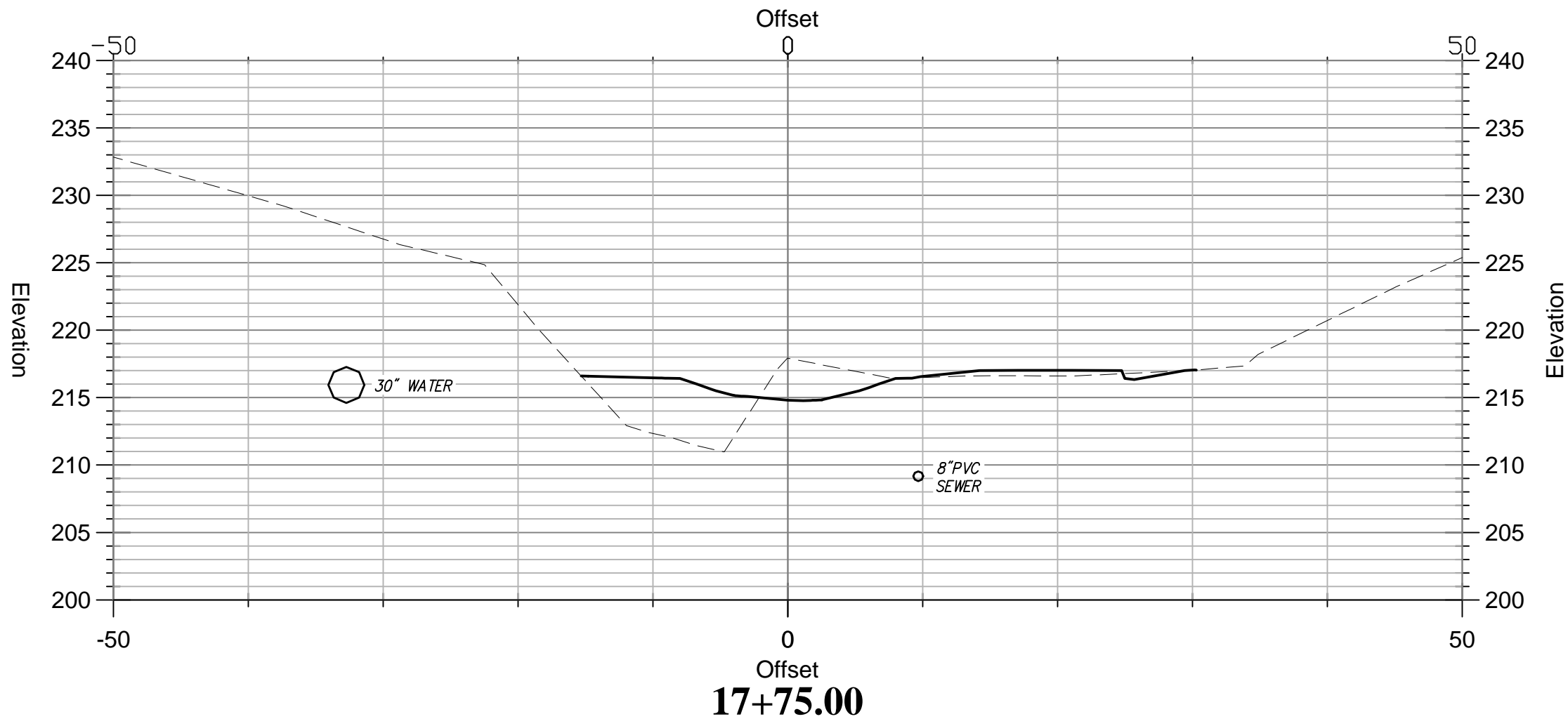
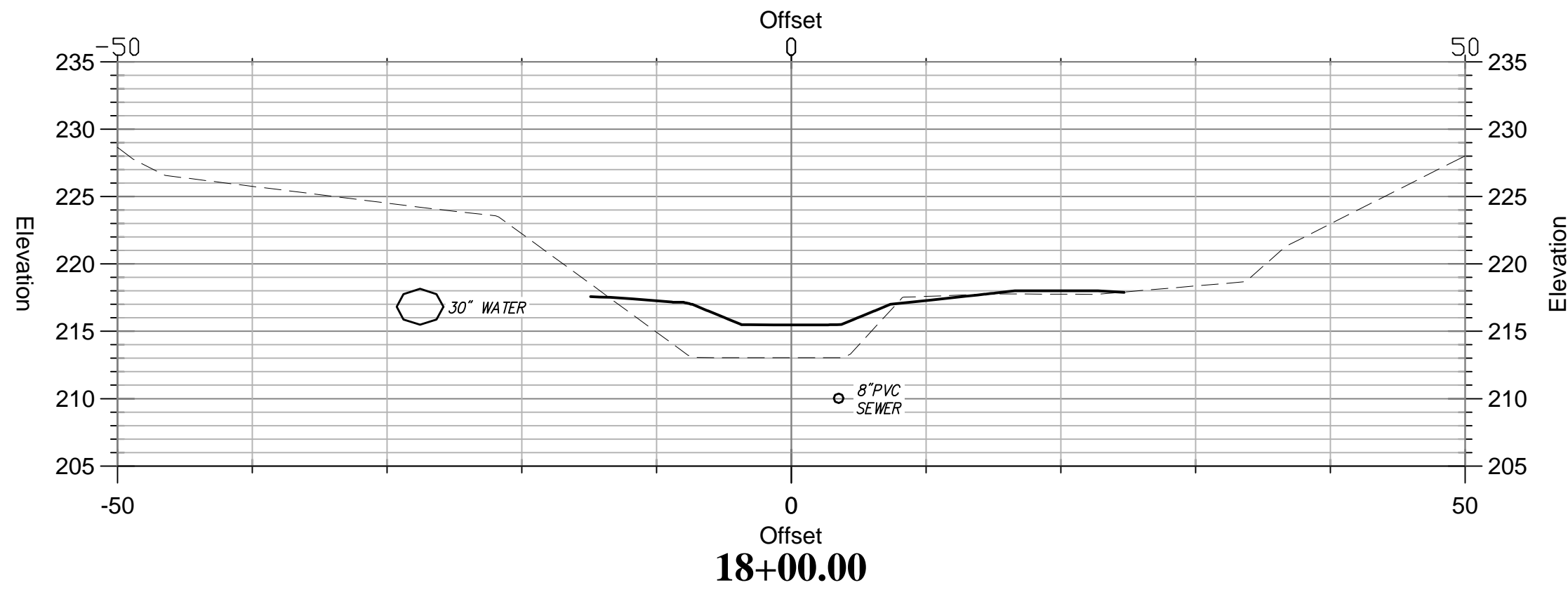
Drawing Number

C-12

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Project Number
32923.00

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Donaldson Run Tributary B Stream Restoration Country Club View Arlington, Virginia

No.	Revision	Date	Appvd.

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IFS	JRL
Issued for	Date
Final Design	June 25, 2019

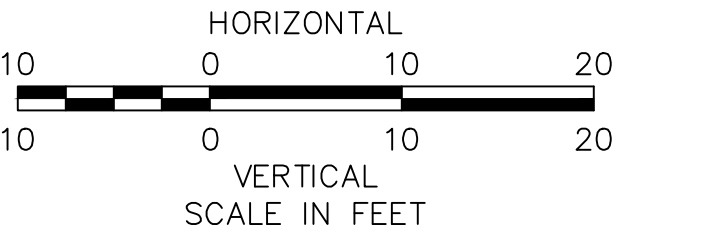
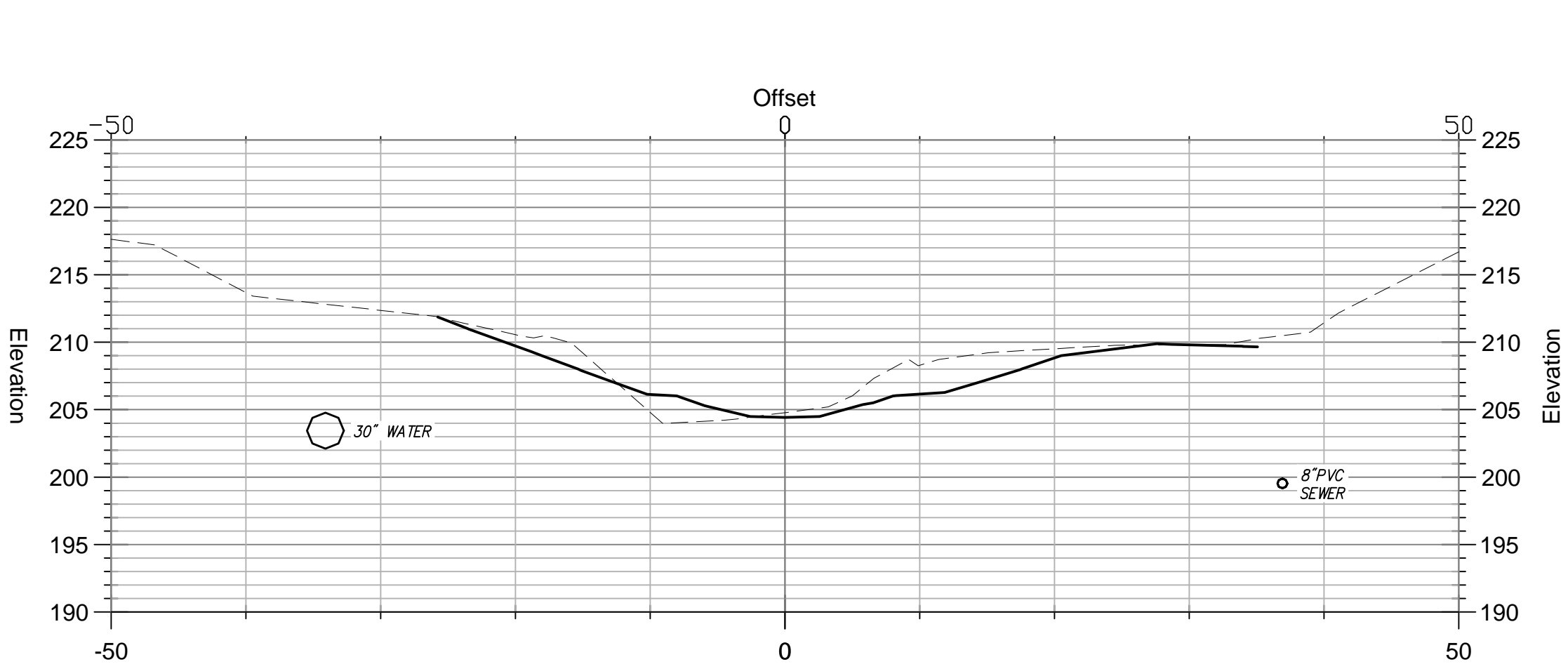
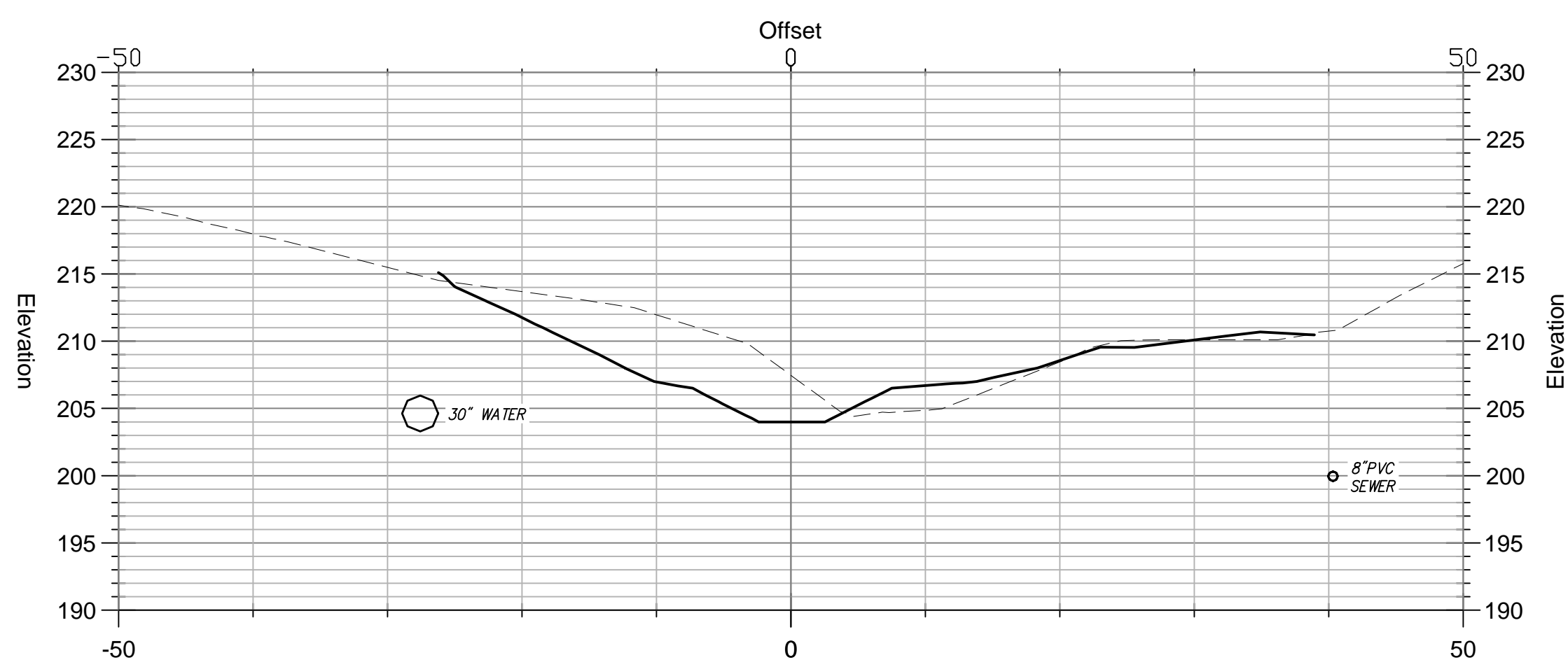
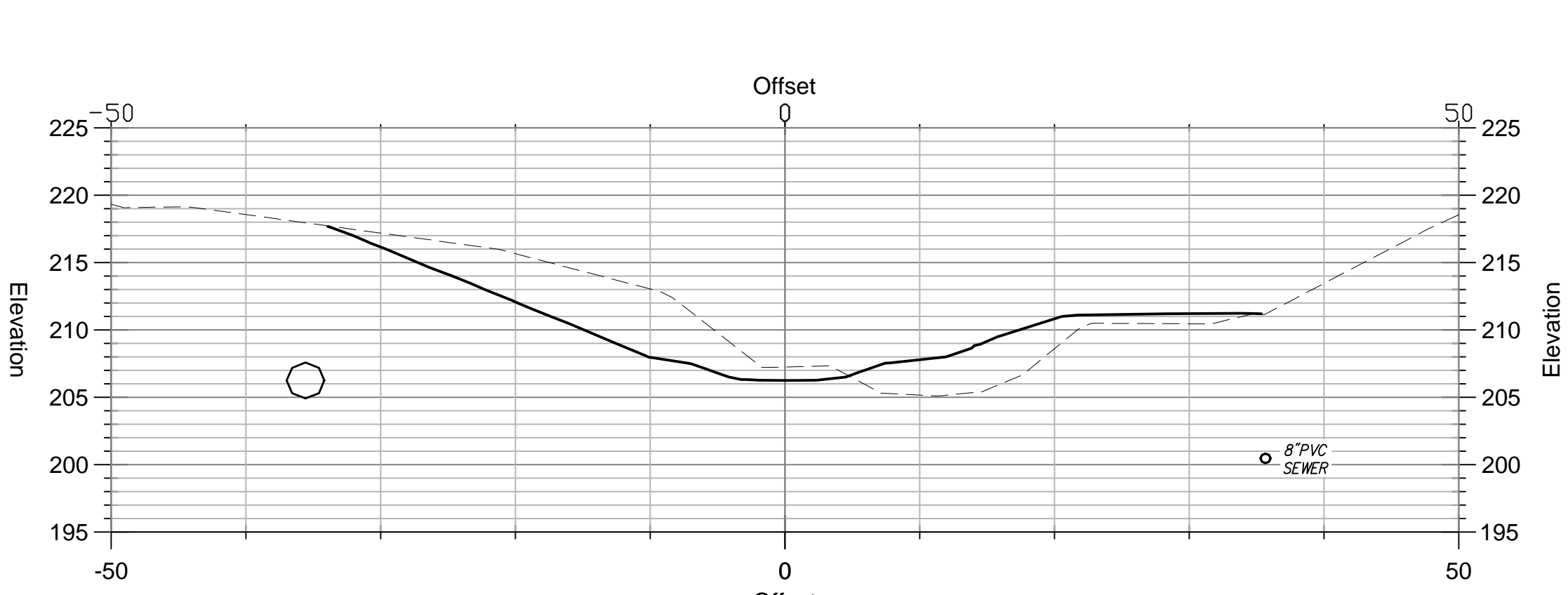
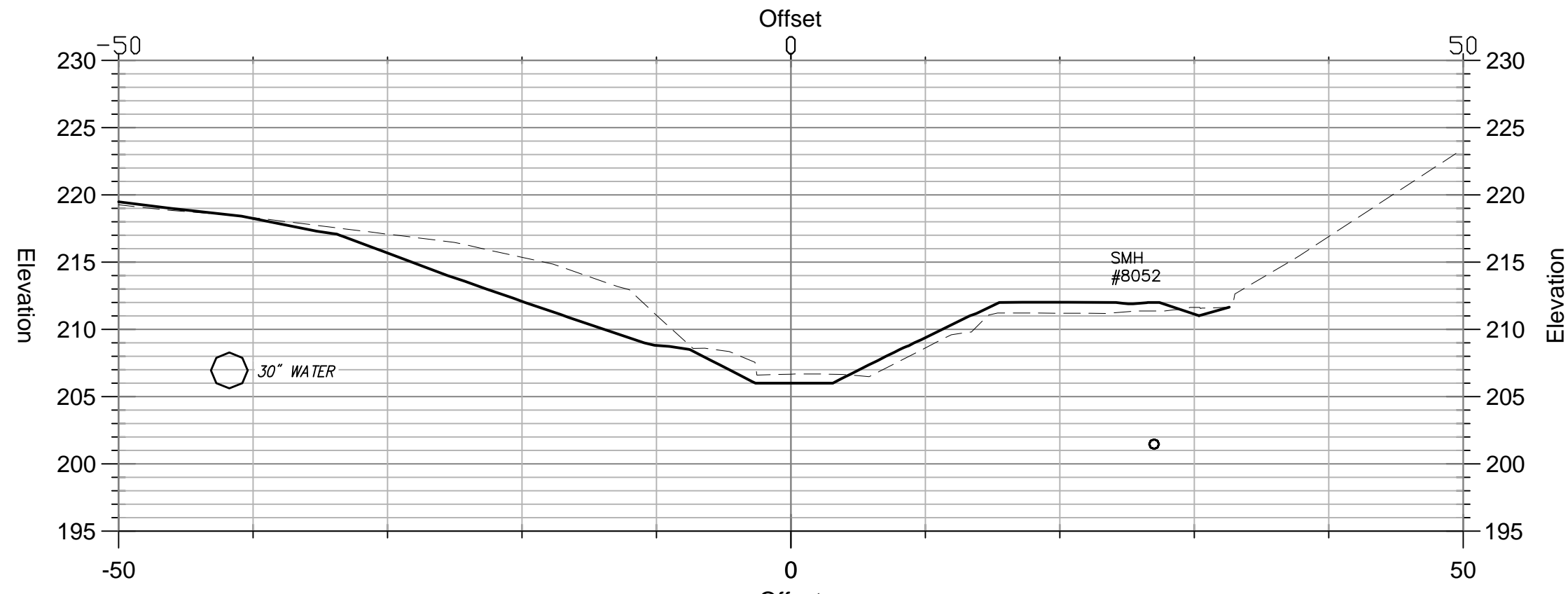
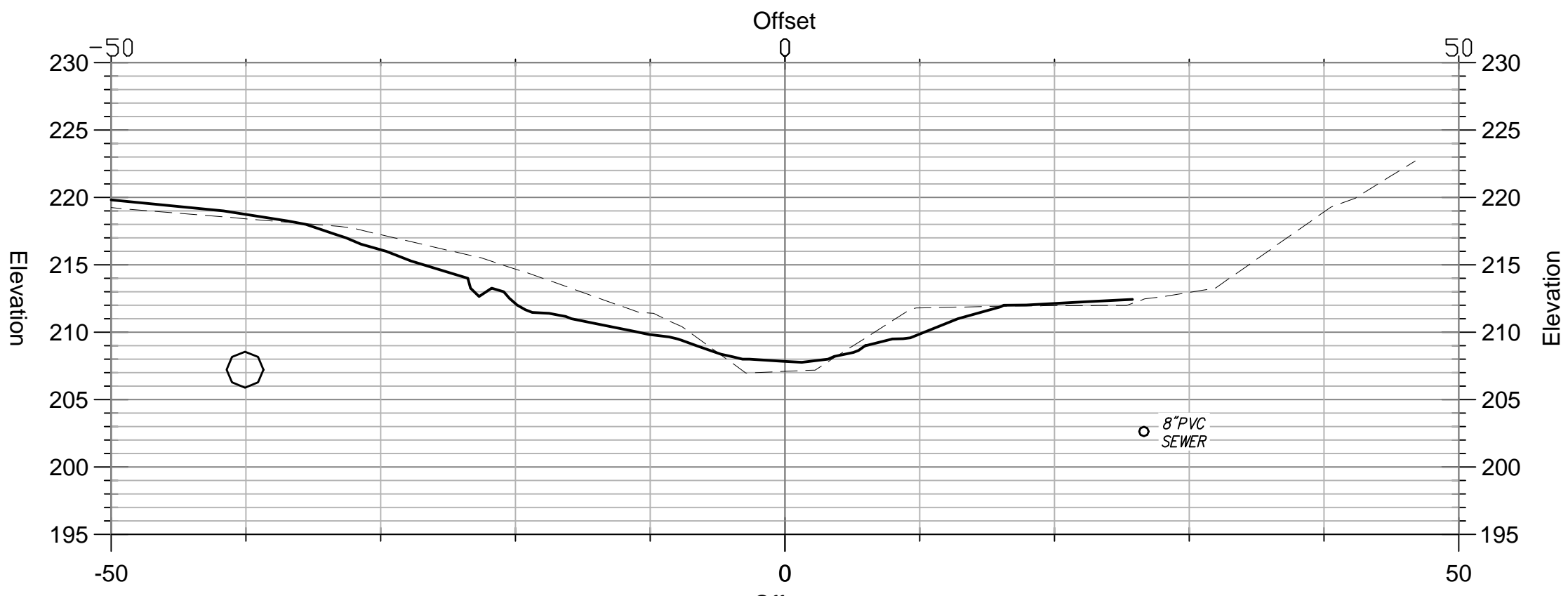
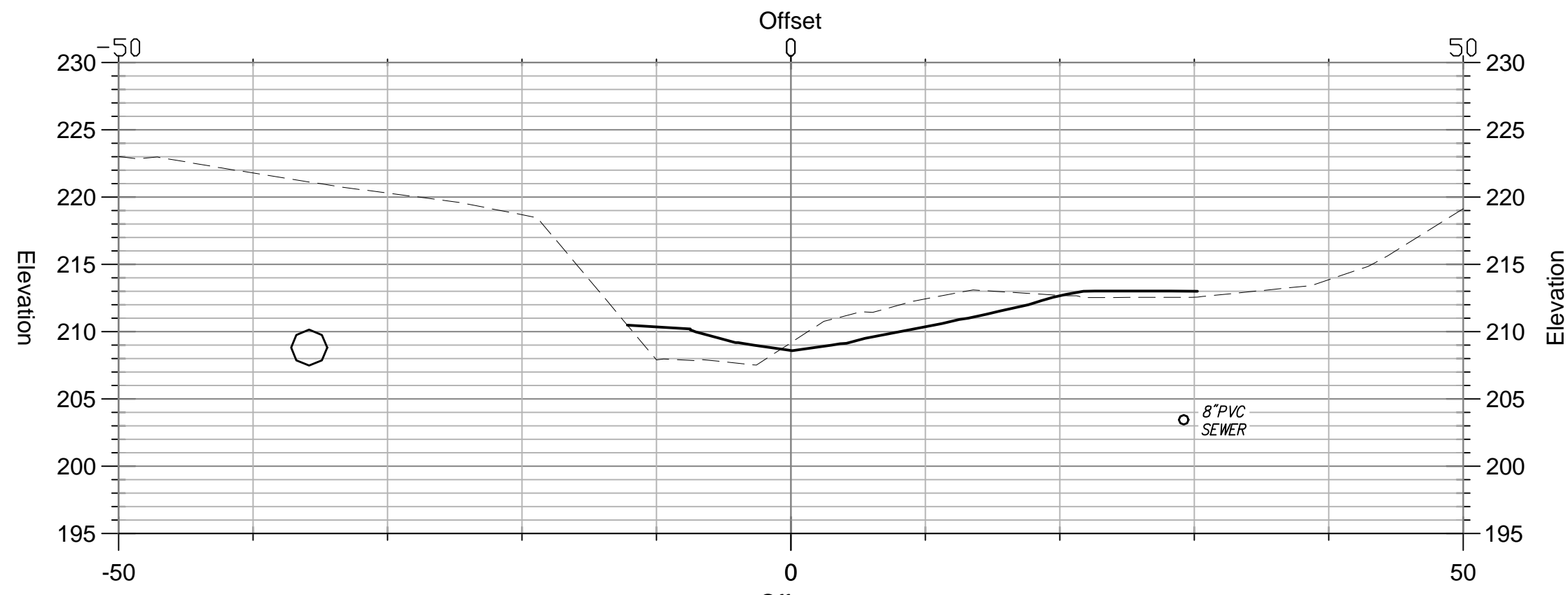
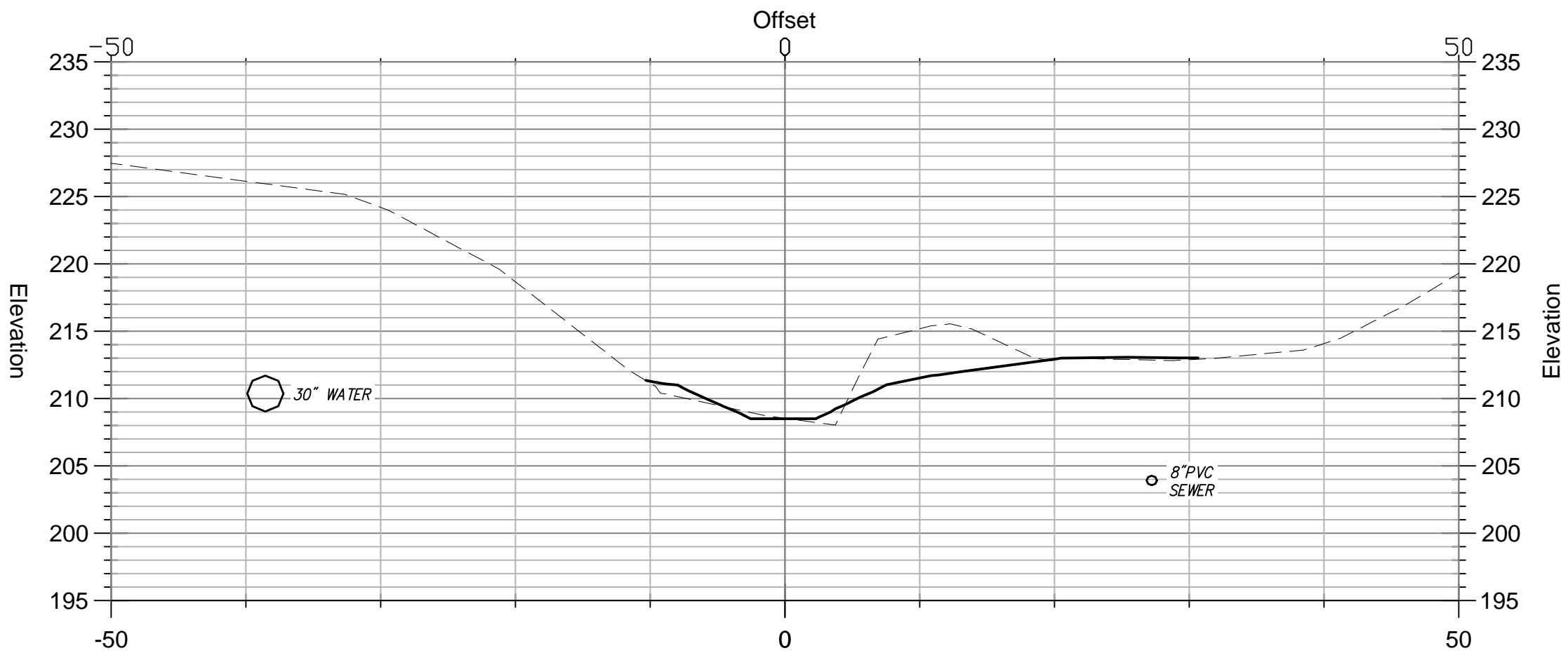
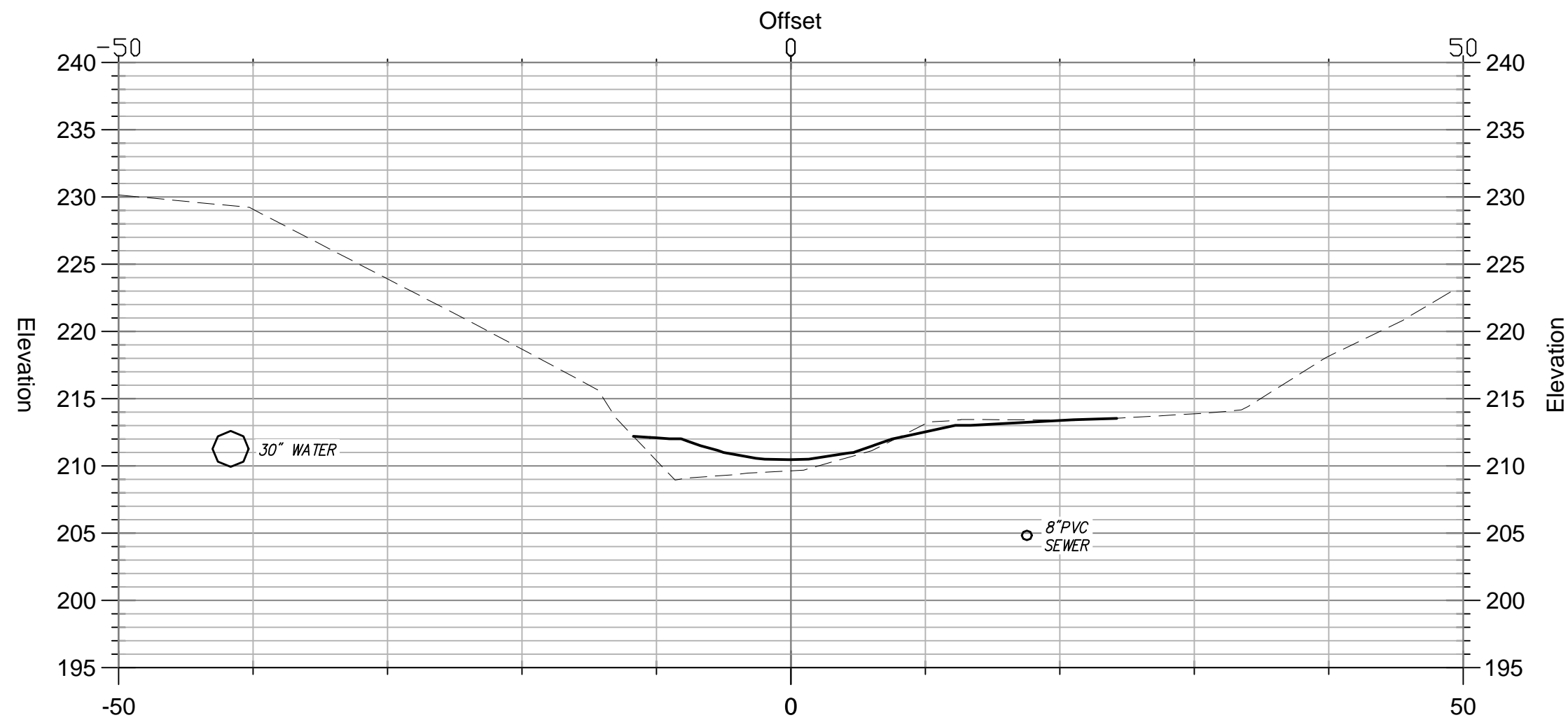
Cross Sections From Grading Plan

Drawing Number

C-13

Sheet 14 of 23

Project Number
32923.00



**Donaldson Run
Tributary B
Stream Restoration**
Country Club View
Arlington, Virginia

No.	Revision	Date	Appvd.

Designed by IFS	Checked by JRL
Issued for Final Design	Date June 25, 2019

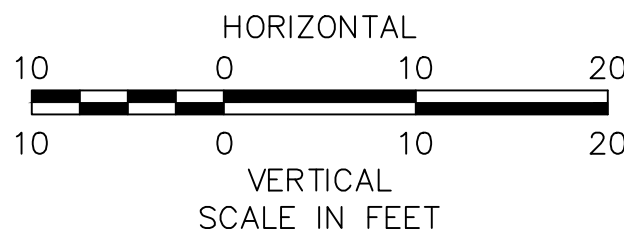
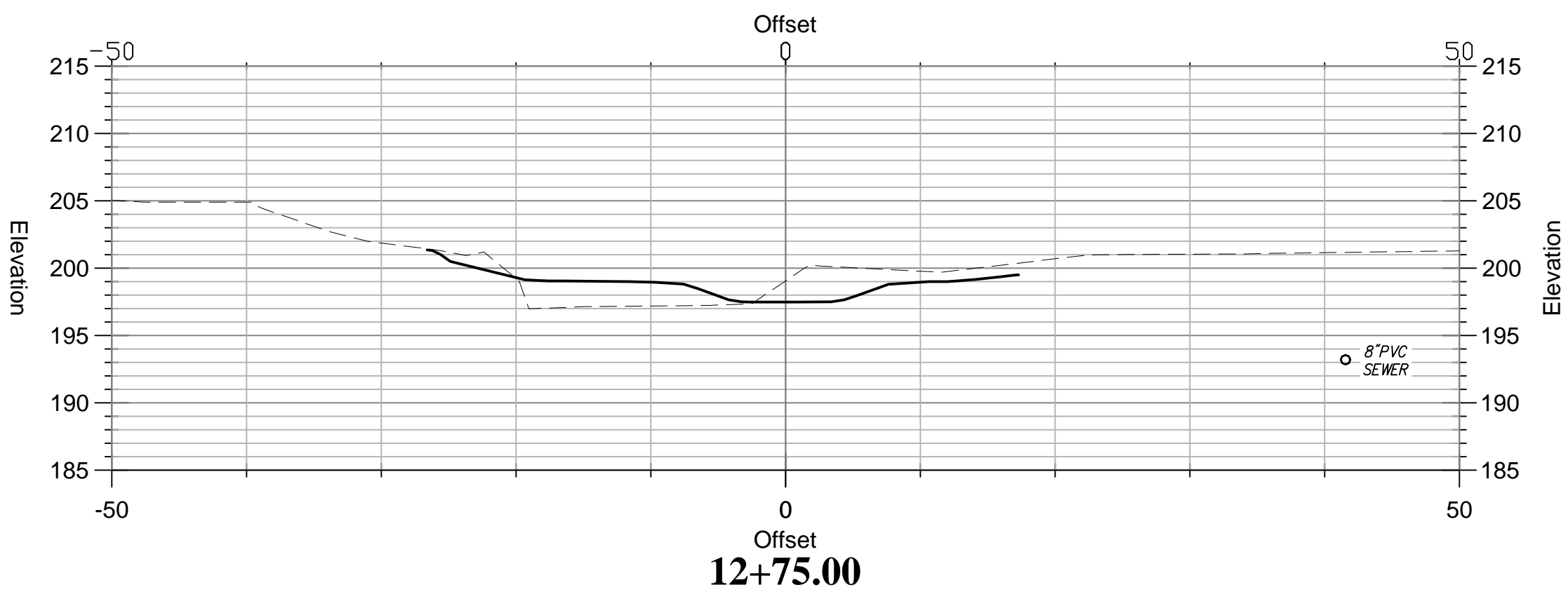
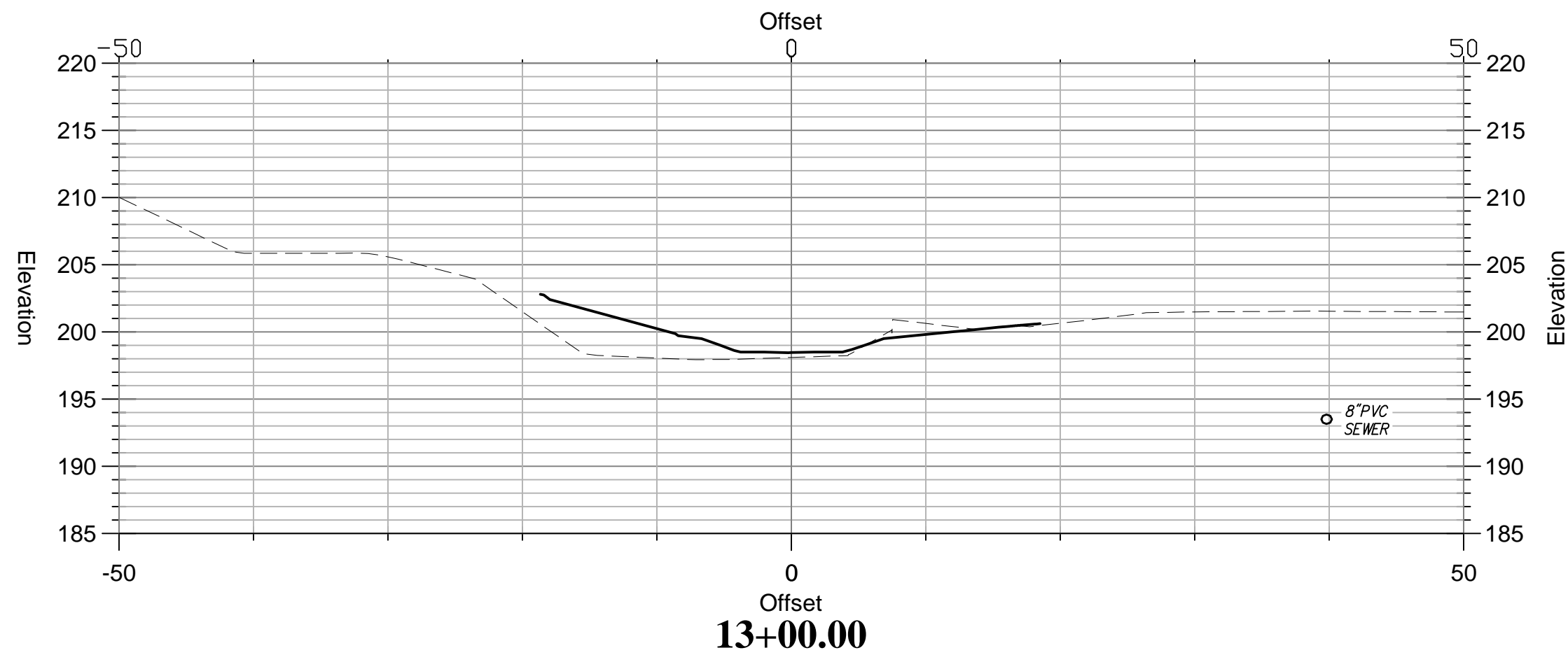
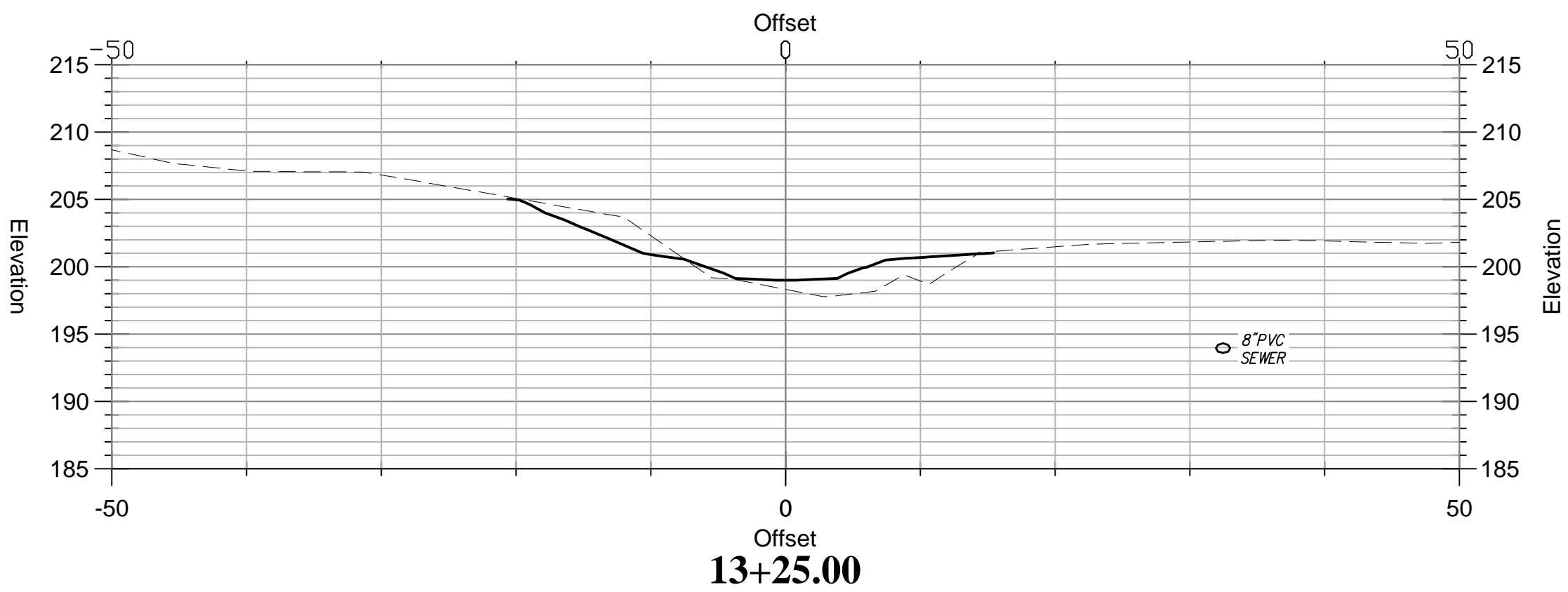
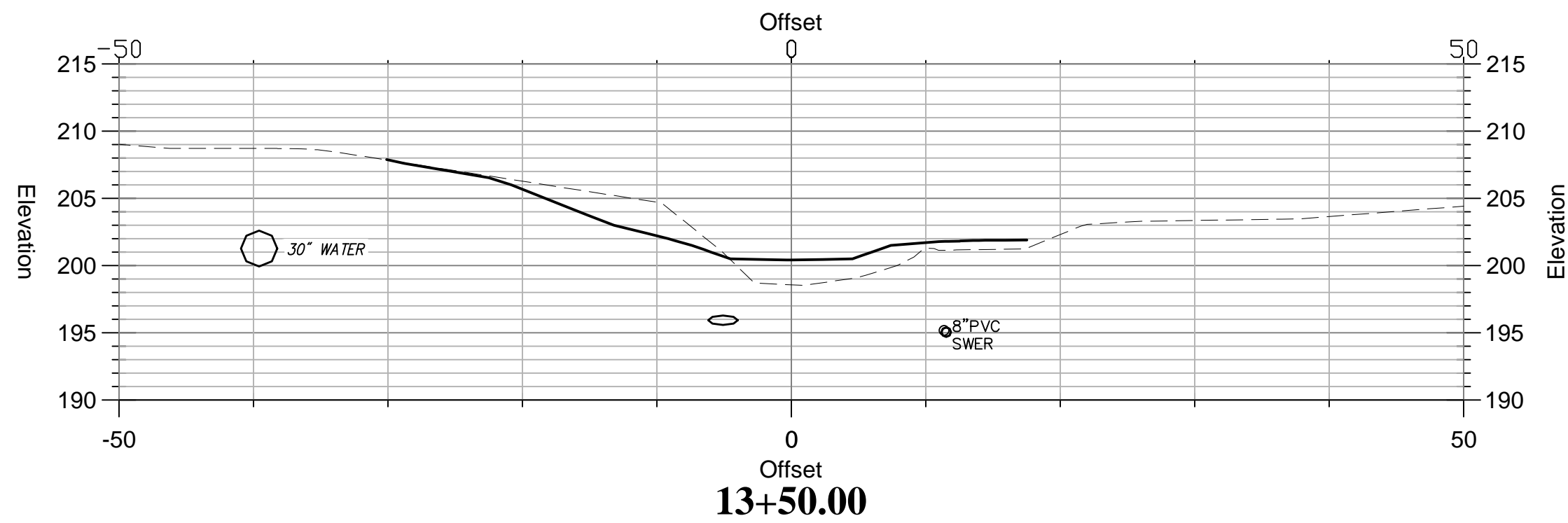
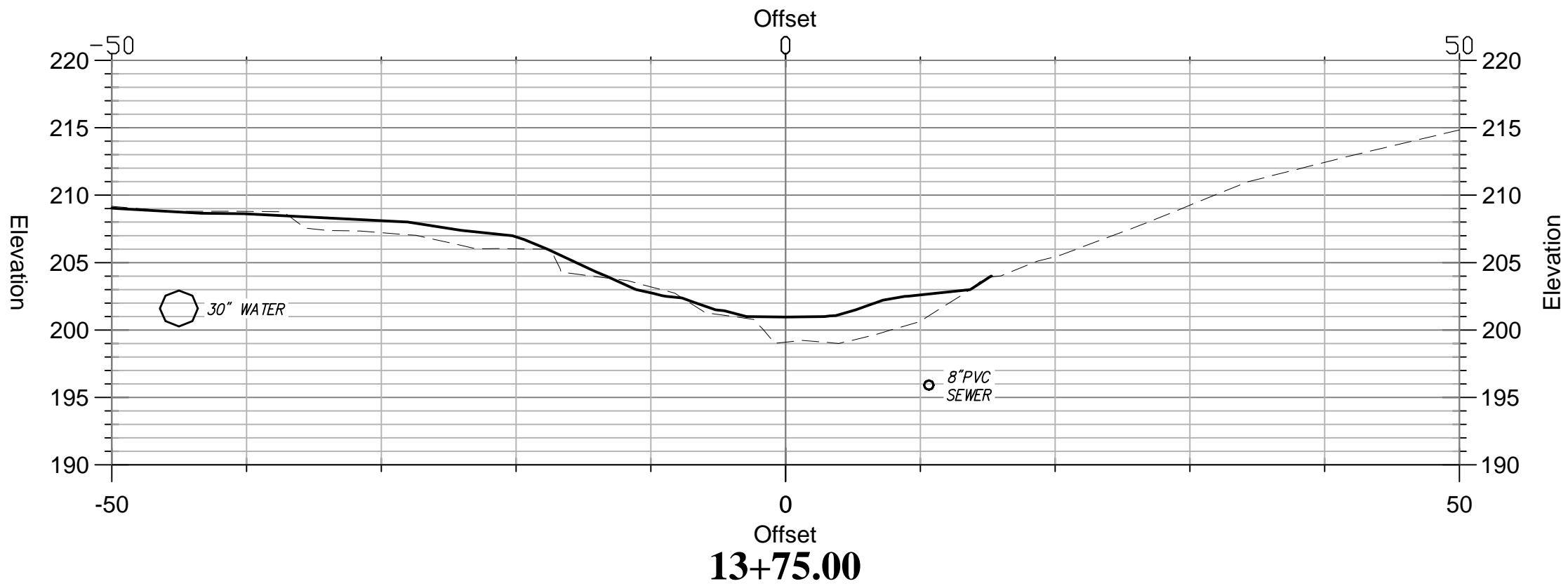
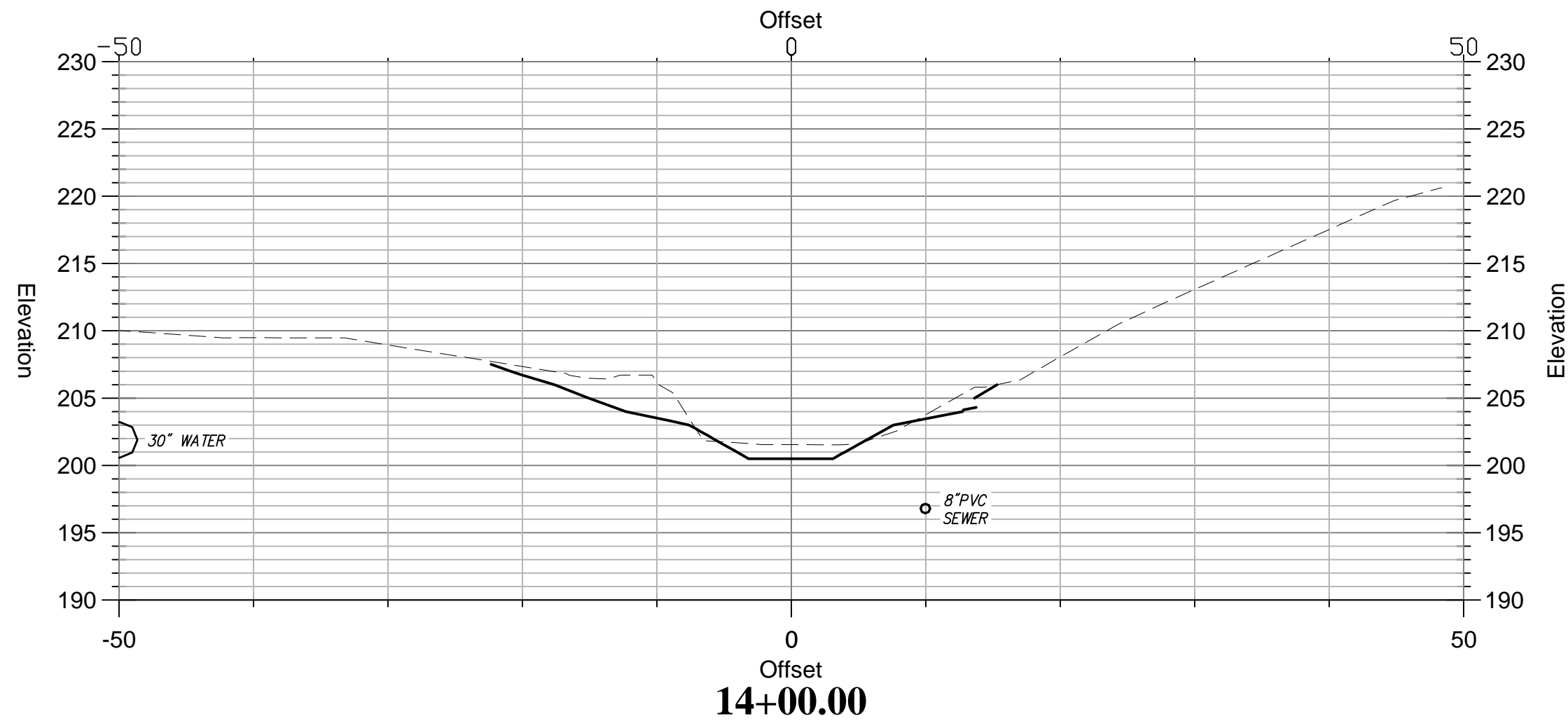
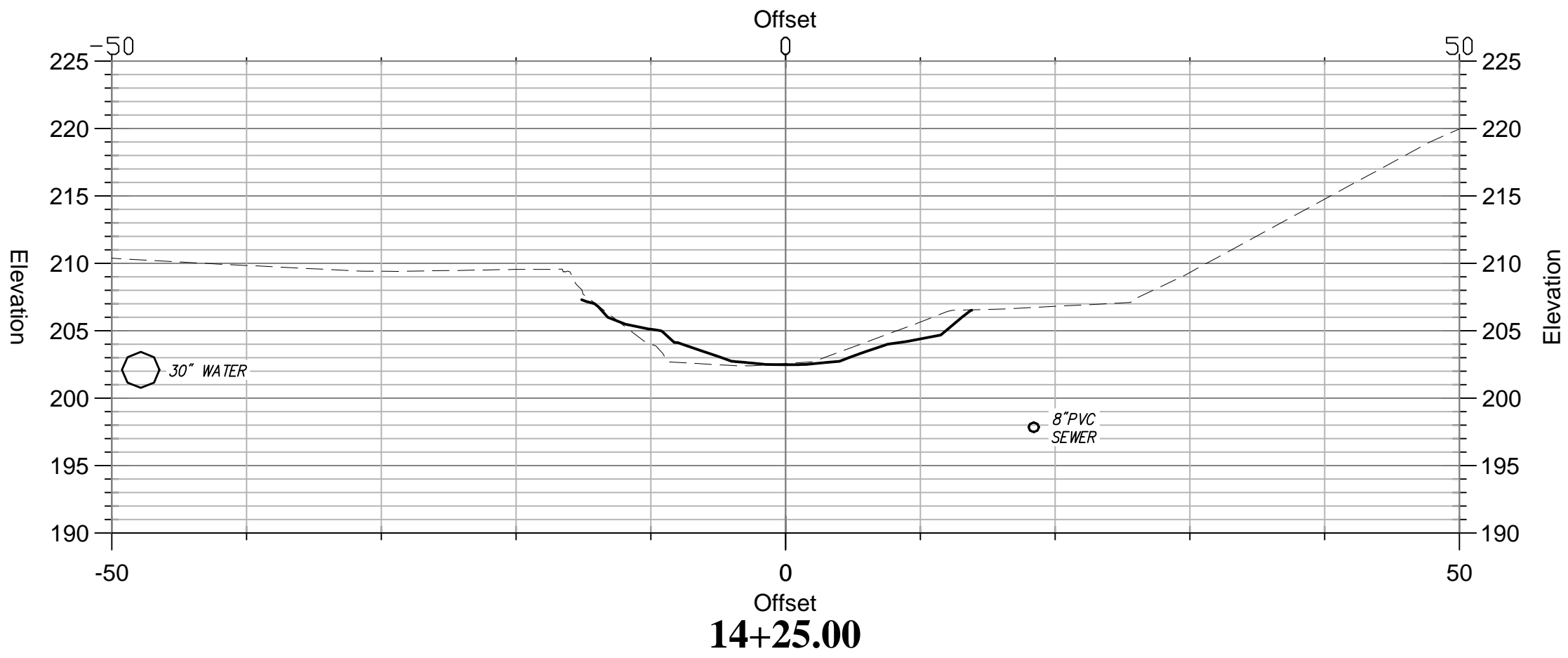
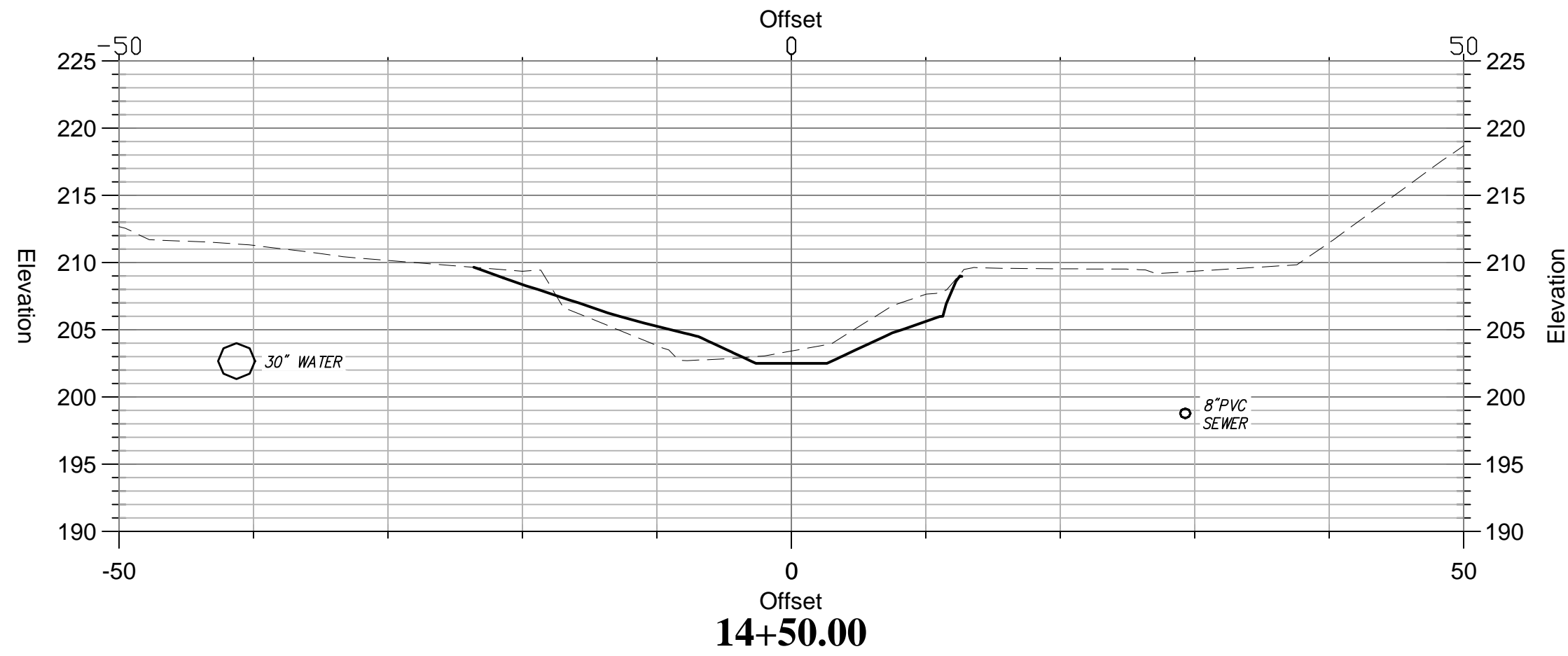
**Cross Sections
From Grading Plan**

Drawing Number

C-14

Sheet 15 of 23

Project Number
32923.00



Donaldson Run
Tributary B
Stream Restoration
Country Club View
Arlington, Virginia

No.	Revision	Date	Appvd.

Designed by	Checked by
IFS	JRL
Issued for	Date
Final Design	June 25, 2019

Drawing Title

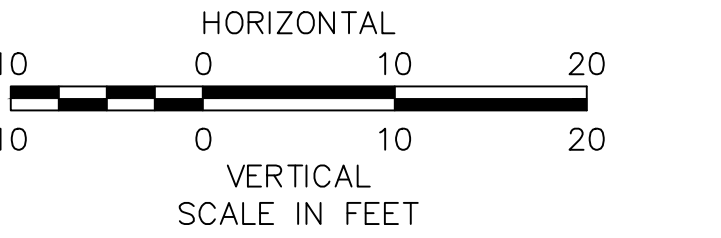
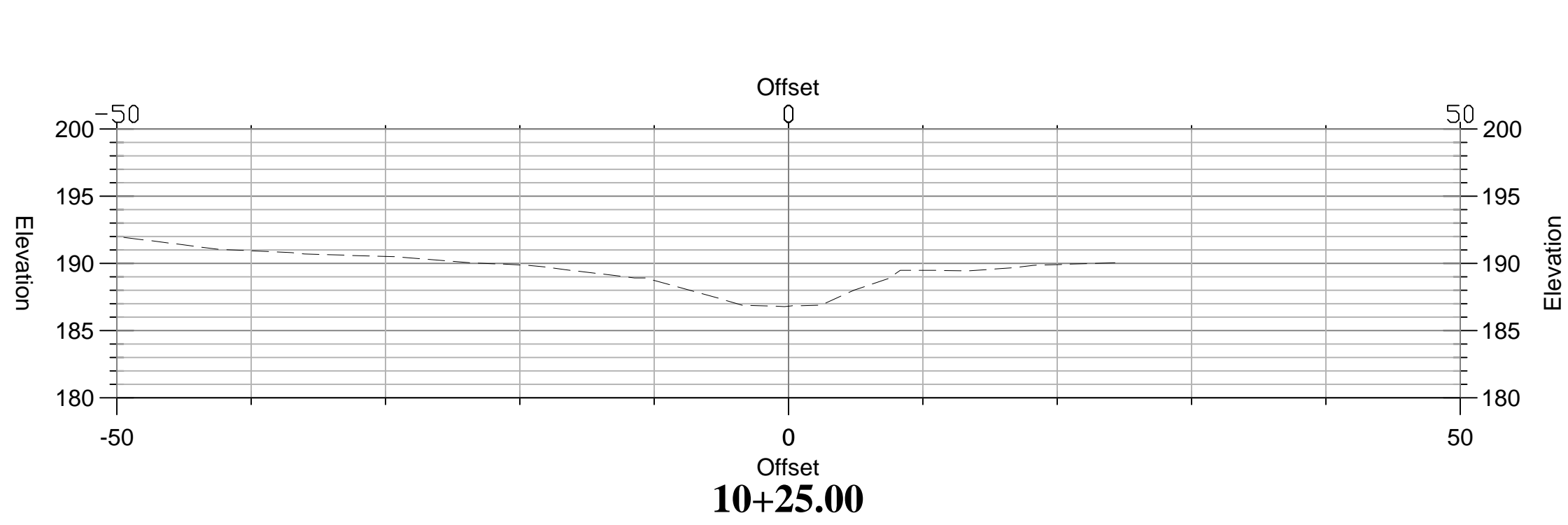
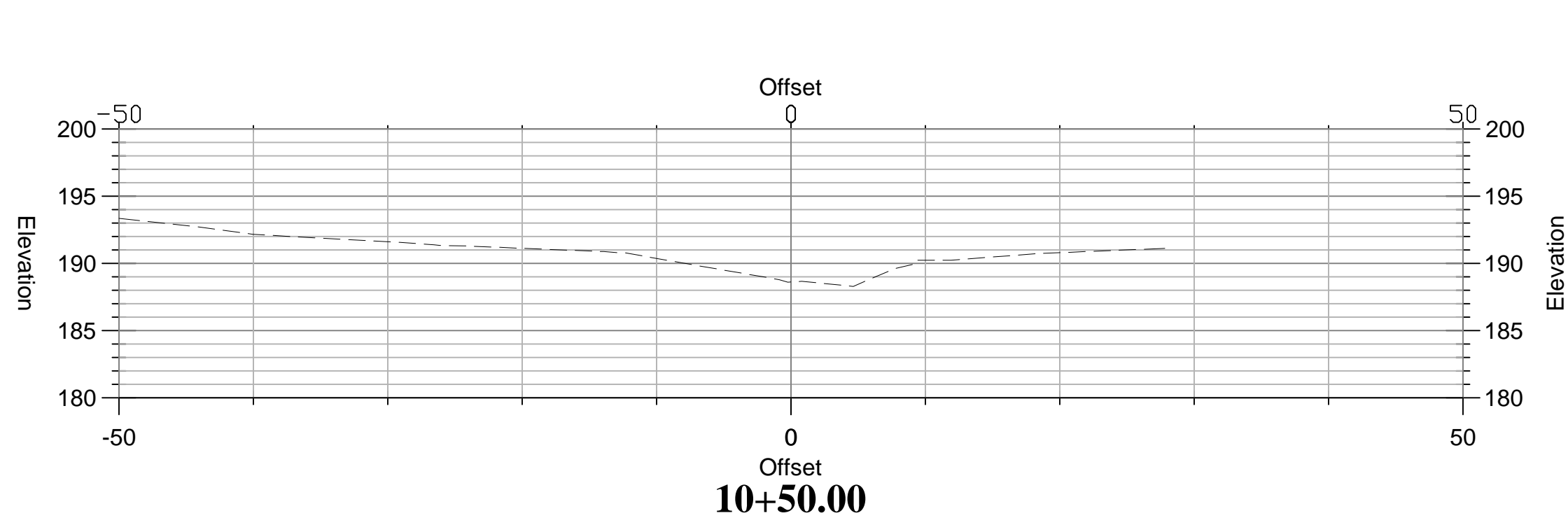
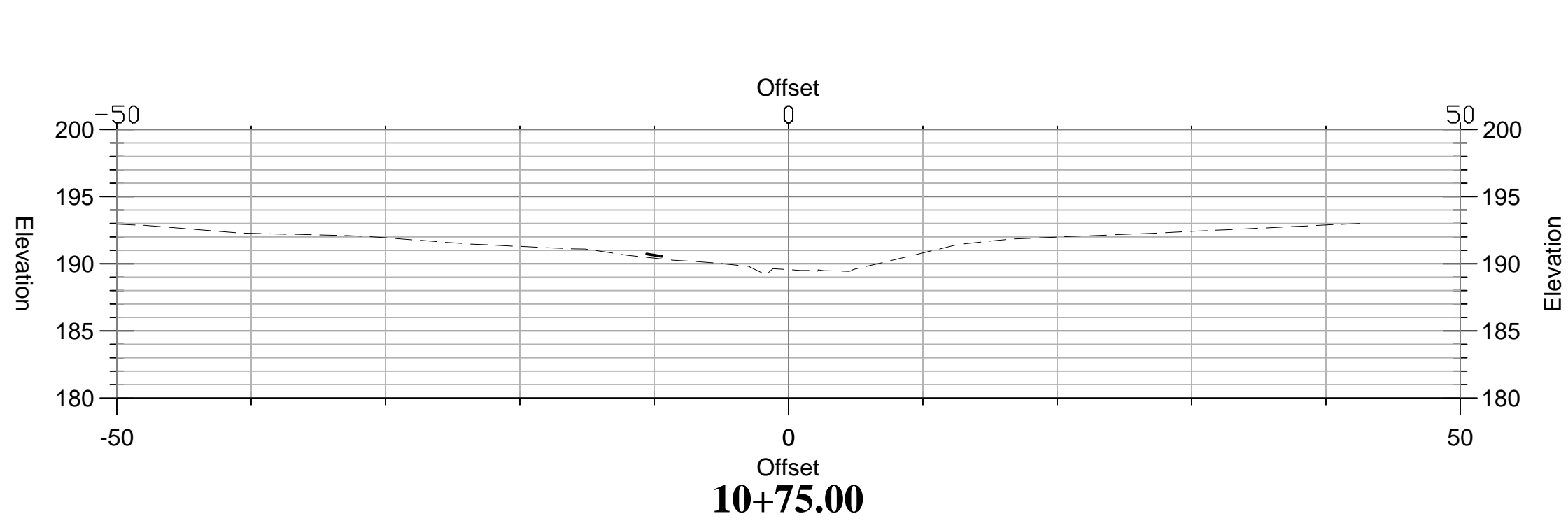
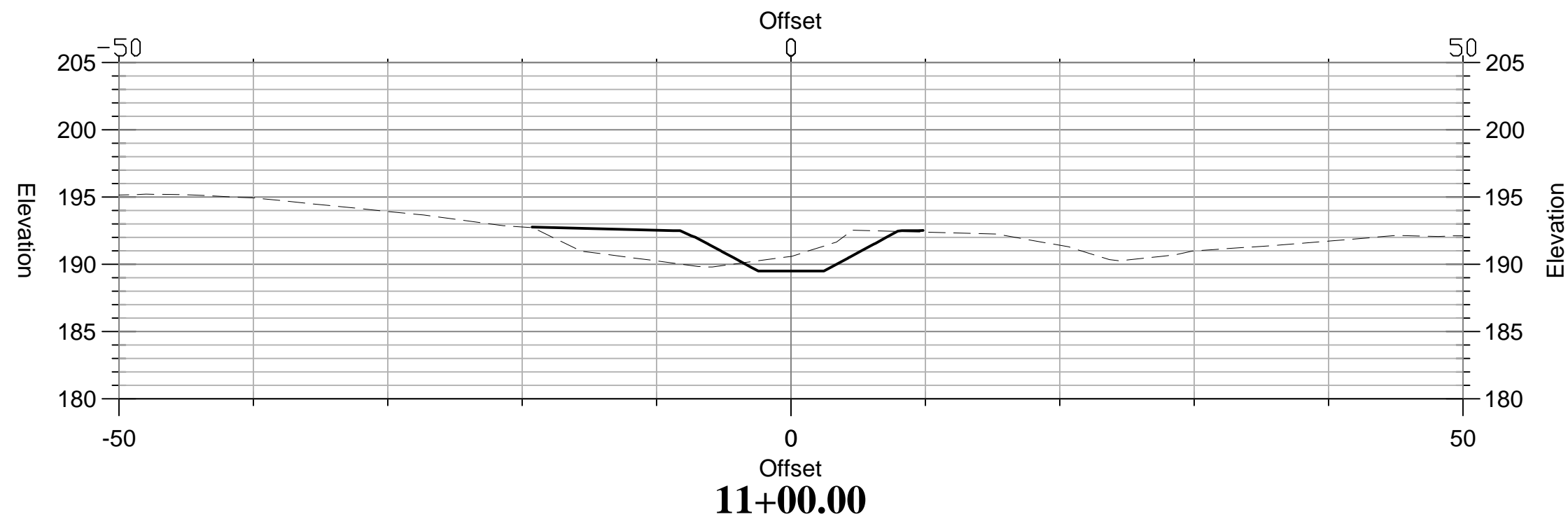
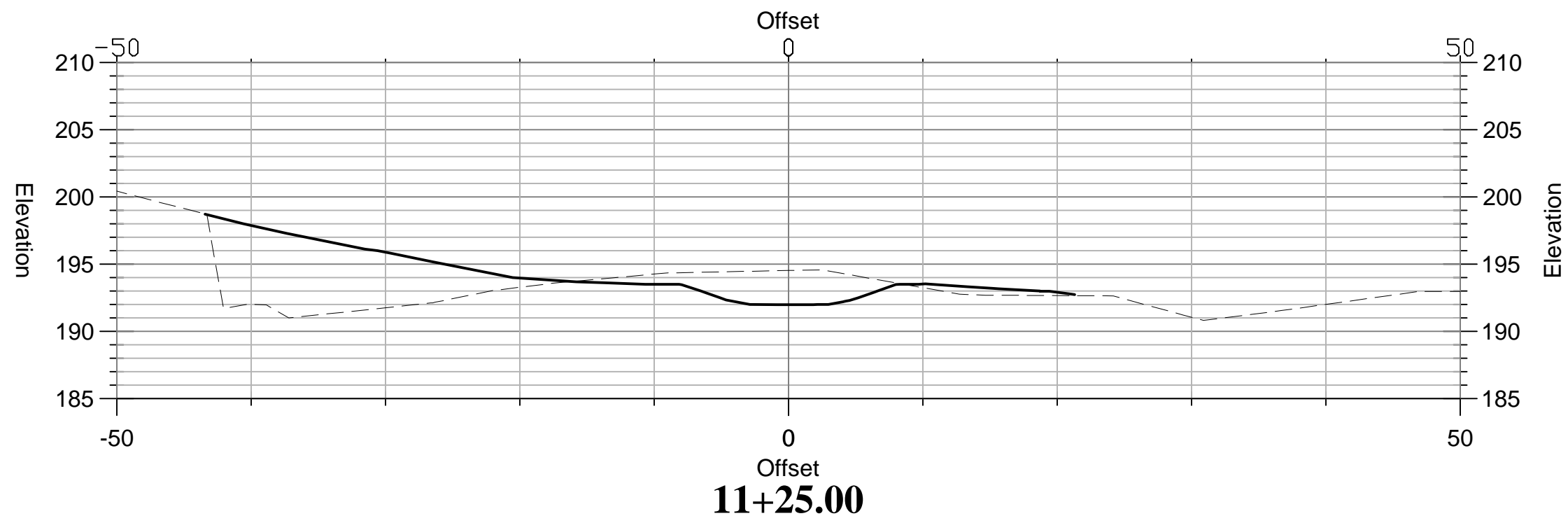
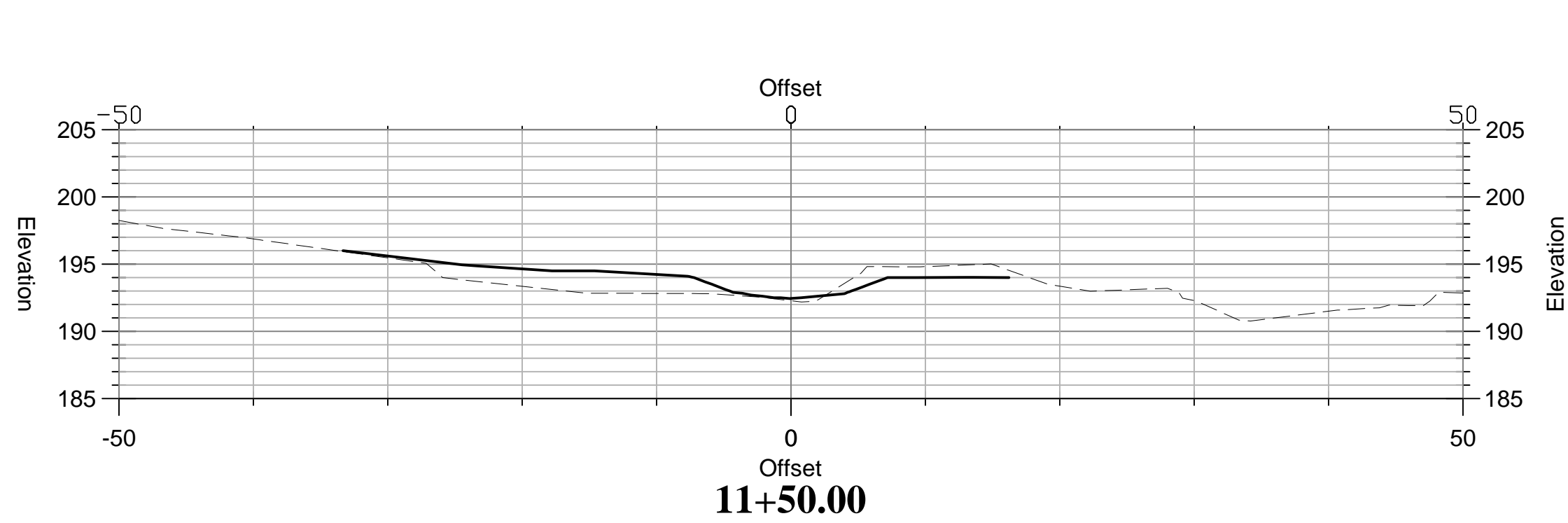
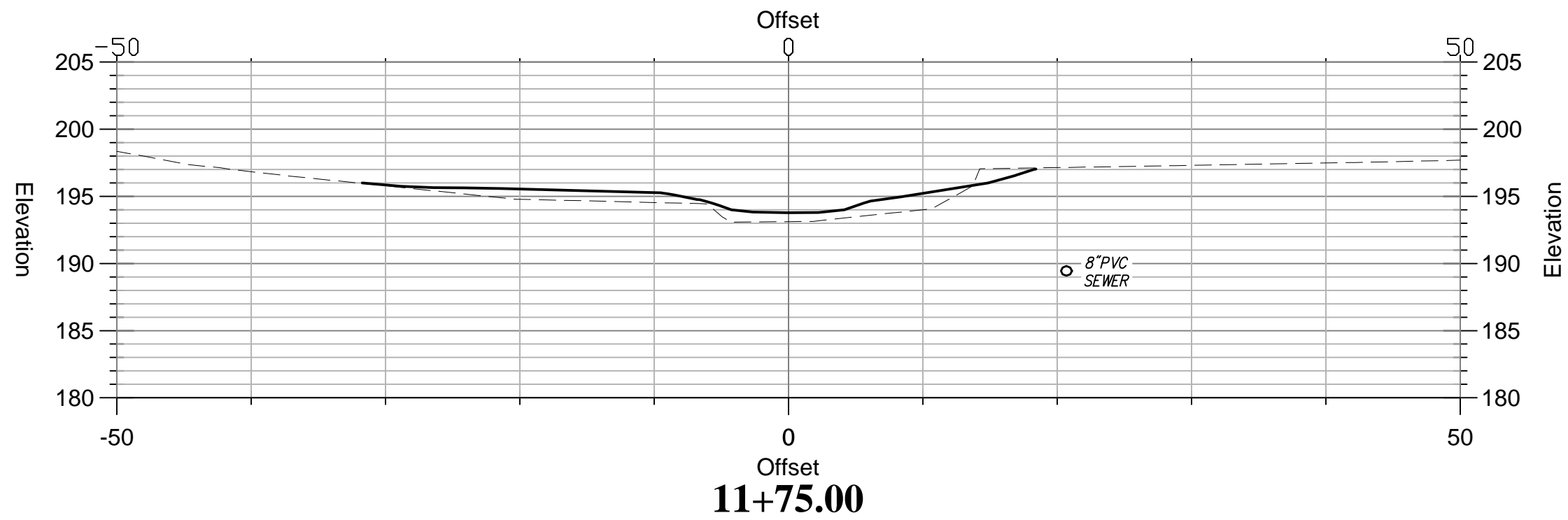
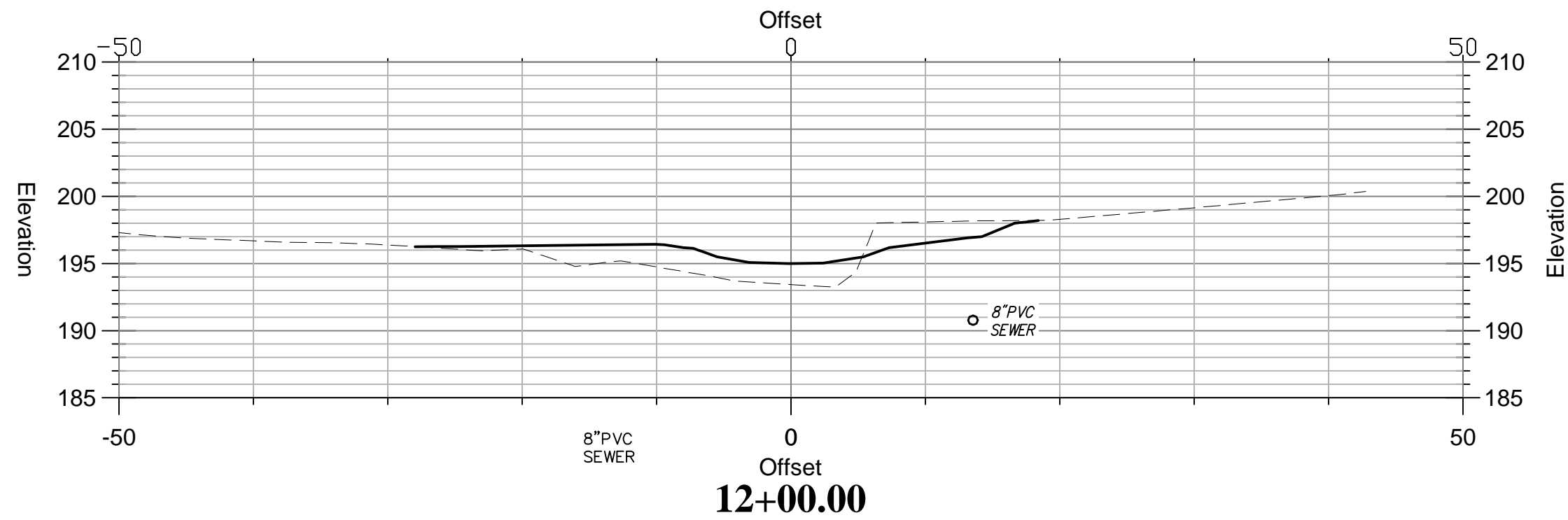
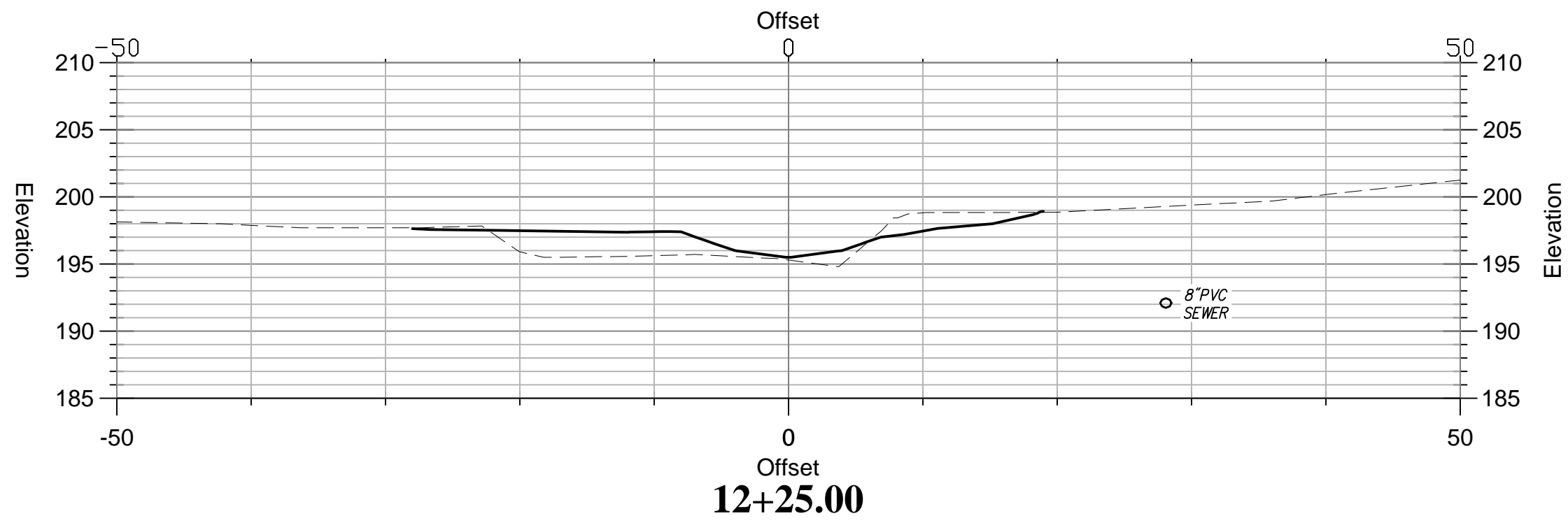
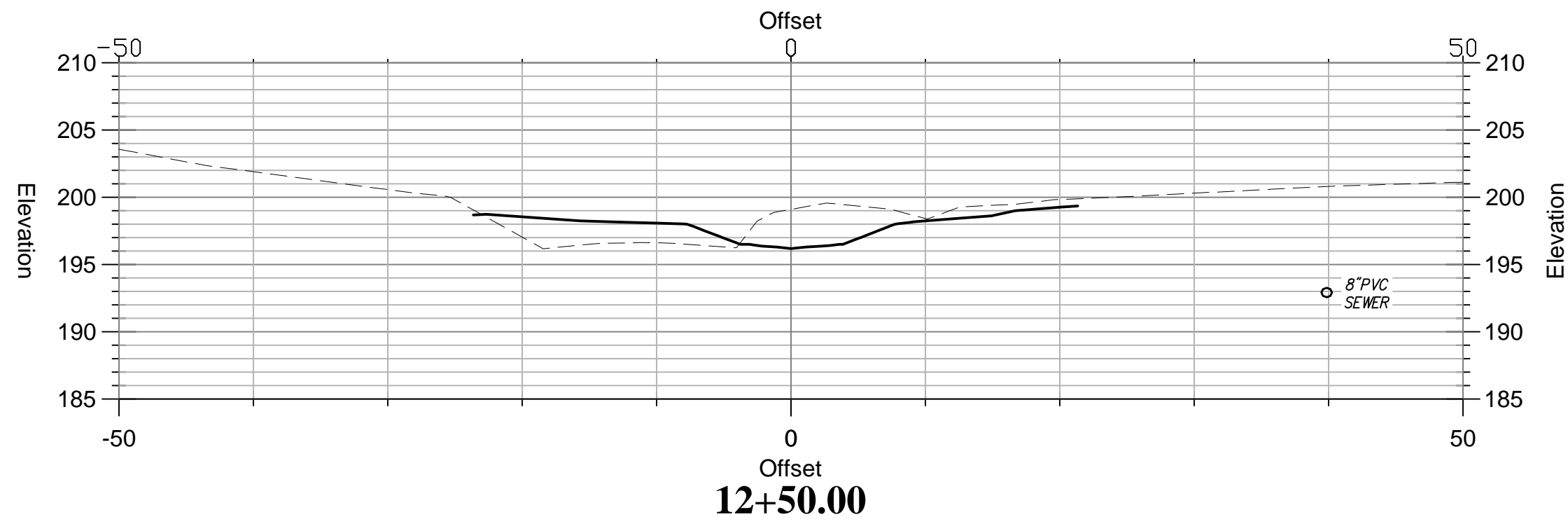
Cross Sections
From Grading Plan

Drawing Number

C-15

Sheet 16 of 23

Project Number
32923.00



Donaldson Run
Tributary B
Stream Restoration
Country Club View
Arlington, Virginia

No.	Revision	Date	Appvd.

Designed by	Checked by
IFS	JRL
Issued for	Date
Final Design	June 25, 2019

Cross Sections
From Grading Plan

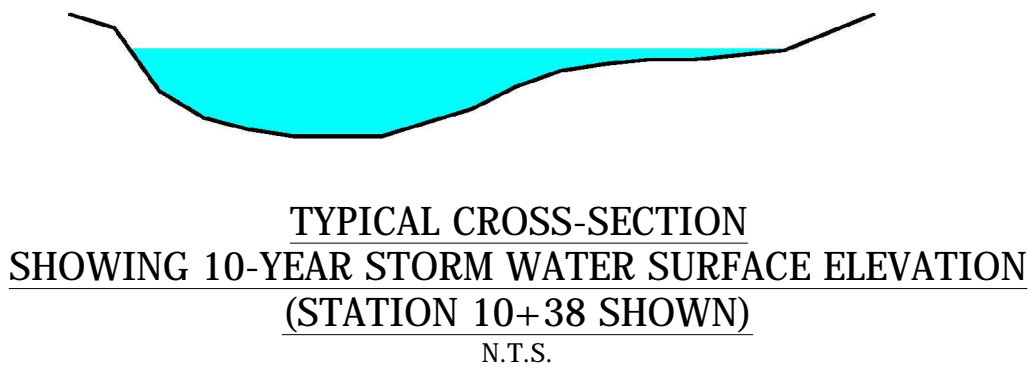
Drawing Number

C-16

Sheet 17 of 23

Project Number
32923.00

SEE SHEETS C-1 AND C-2 FOR
PROPOSED STREAM STATIONING



SHEAR NARRATIVE

IN ORDER TO SPECIFY MATERIAL SIZE, MANY CONSIDERATIONS MUST BE CONSIDERED, INCLUDING SHEAR STRESS AND SLOPE. HEC-RAS MODELING OF THE TRIBUTARY B DESIGN SHOWS THAT THE MATERIAL SIZE FOR THE D84 (15 INCHES) IS SUFFICIENT FOR THE 2-YEAR AND 10-YEAR STORMS. IN GENERAL THE SHEAR STRESS FOR THE 2-YEAR STORM IS AT OR BELOW 2 LB/SF, AND FOR THE 10-YEAR STORM IT IS GENERALLY BETWEEN 2.5 AND 3 LB/SF. THE TABLES ON THIS AND THE FOLLOWING SHEET SHOW THE HEC-RAS MODELING WITH TWO DIFFERENT DESIGN METHODS USED TO CALCULATE MATERIAL SIZE, LABELED LEO AND COLORADO. THE LEO DESIGN CALCULATIONS SHOW D84 VALUES GENERALLY BETWEEN 5 TO 7 INCHES AND THE COLORADO DESIGN CALCULATIONS SHOW D84 VALUES A LITTLE LARGER IN THE 8 TO 12 INCH RANGE. THE SPECIFIED DESIGN D84 OF 15 INCHES IS SUFFICIENT TO HANDLE THE PREDICTED SHEAR STRESS GENERATED BY THE 2-YEAR STORM FLOW ON THE RESTORED STREAM CHANNEL AS IT IS GENERALLY LARGER THAN SPECIFIED BY BOTH DESIGN METHODS FOR THE 2-YEAR FLOW. SIMILARLY FOR THE 10-YEAR STORM FLOW THE LEO DESIGN GENERALLY SPECIFIES SMALLER D84 VALUES BETWEEN 8 AND 11 INCHES, WHILE THE COLORADO DESIGN SPECIFIED SLIGHTLY LARGER VALUES OF 8 TO 14 INCHES. THE DESIGN D84 OF 15 INCHES IS STILL GENERALLY SUFFICIENT EVEN AT THE HIGHER SHEAR STRESS GENERATED BY THE 10-YEAR STORM.

CROSS SECTION SUMMARY TABLE																	
River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)	Shear LOB (lb/sq ft)	Shear ROB (lb/sq ft)	Power Chan (lb/ft s)	d84 colorado (in)	d84 leo (in)
23+80	2 year	150	238	240.4	240.4	241.08	0.021337	6.65	22.86	17.4	0.99	1.81	0.12	0.4	12.02	9.26	5.70
23+80	10 year	321	238	241.31	241.31	242.4	0.017845	8.49	39.06	18.31	0.99	2.49	0.33	0.78	21.16	11.71	7.94
23+68	2 year	150	235	239.56		239.7	0.001725	2.94	51.12	18.06	0.29	0.28	0.01	0.01	0.83	2.35	0.81
23+68	10 year	321	235	240.71		241.03	0.002756	4.56	72.48	19.21	0.39	0.62	0.12	0.12	2.81	4.21	1.87
23+50	2 year	150	236.5	238.91	238.91	239.57	0.020708	6.57	23.38	18.41	0.98	1.76	0.4	0.4	11.59	9.07	5.53
23+50	10 year	321	236.5	239.79	239.79	240.85	0.017774	8.41	39.98	19.29	0.98	2.46	0.77	0.77	20.67	11.60	7.84
23+38	2 year	150	233.5	237.94		238.28	0.005739	4.64	32.34	11.89	0.5	0.76			3.52	4.89	2.31
23+38	10 year	321	233.5	238.94	238.28	239.62	0.009448	6.61	49.5	17.94	0.67	1.46	0.33	0.12	9.64	7.91	4.55
23+21	2 year	150	235	237.41	237.41	238.07	0.020708	6.57	23.38	18.41	0.98	1.76	0.4	0.4	11.59	9.07	5.53
23+21	10 year	321	235	238.29	238.29	239.35	0.017774	8.41	39.98	19.29	0.98	2.46	0.77	0.77	20.67	11.60	7.84
23+08	2 year	150	232.5	237.08		237.17	0.000965	2.49	61.94	19.08	0.23	0.19	0.04	0.04	0.48	1.76	0.54
23+08	10 year	321	232.5	238.25		238.49	0.001703	3.98	85.36	21.75	0.32	0.45	0.1	0.09	1.77	3.33	1.34
22+91	2 year	150	234	236.41	236.41	237.07	0.020602	6.56	23.44	18.54	0.98	1.76	0.4	0.4	11.52	9.07	5.53
22+91	10 year	321	234	237.29	237.29	238.34	0.017434	8.36	40.36	19.72	0.97	2.42	0.79	0.79	20.22	11.46	7.71
22+78	2 year	150	231.5	235.68		235.84	0.002153	3.23	47.52	18.68	0.34	0.35	0.06	0.06	1.11	2.77	1.03
22+78	10 year	321	231.5	236.82		237.17	0.003113	4.85	69.38	19.82	0.43	0.7	0.17	0.17	3.38	4.60	2.12
22+63	2 year	150	233	235.02	235.02	235.71	0.021111	6.67	22.79	17.55	0.99	1.81	0.19	0.32	12.06	9.26	5.70
22+63	10 year	321	233	235.92	235.92	237	0.017566	8.46	39.71	20.19	0.98	2.47	0.43	0.71	20.89	11.64	7.88
22+40	2 year	150	232.34	234.33	234.33	234.81	0.02396	5.83	30.12	33.37	0.85	2.14	0.57	0.58	12.46	10.47	6.78
22+40	10 year	321	232.34	234.98	234.98	235.7	0.023728	7.43	52.93	36.04	0.9	3.07	1.4	1.31	22.79	13.66	9.88
22+34	2 year	150	230.84	234.33		234.55	0.005785	3.8	44.25	33.89	0.43	0.79	0.14	0.09	2.98	5.03	2.40
22+34	10 year	321	230.84	235.08		235.49	0.0085	5.52	70.48	36.94	0.55	1.52	0.54	0.45	8.37	8.14	4.75
22+25	2 year	150	231.84	233.92	233.92	234.43	0.023464	5.86	29.19	32.74	0.84	2.14	0.43	0.47	12.55	10.47	6.78
22+25	10 year	321	231.84	234.6	234.6	235.34	0.023403	7.49	52.25	35.67	0.89	3.09	1.27	1.24	23.15	13.72	9.95
22+10	2 year	150	231.44	233.46	233.46	233.96	0.023437	5.86	29.33	32.59	0.84	2.14	0.44	0.52	12.54	10.47	6.78
22+10	10 year	321	231.44	234.15	234.15	234.88	0.022773	7.43	52.83	35.93	0.89	3.03	1.26	1.25	22.52	13.53	9.74
22+00	2 year	150	231	233.03	233.03	233.52	0.022734	5.8	29.86	33.79	0.83	2.09	0.42	0.5	12.13	10.29	6.62
22+00	10 year	321	231	233.7	233.7	234.42	0.022504	7.38	53.7	37.29	0.88	2.99	1.22	1.23	22.06	13.39	9.61
21+94	2 year	150	229.5	233.04		233.26	0.005921	3.83	43.35	35.78	0.44	0.8	0.08	0.12	3.08	5.08	2.43
21+94	10 year	321	229.5	233.73		234.17	0.009195	5.66	69.3	39.44	0.57	1.61	0.48	0.51	9.1	8.50	5.04
21+85	2 year	150	230.5	232.6	232.6	233.13	0.024002	5.97	27.87	32.74	0.85	2.21	0.33	0.3	13.19	10.72	7.01
21+85	10 year	321	230.5	233.33	233.33	234.02	0.021138	7.27	55.18	40	0.85	2.88	1.12	0.96	20.94	13.03	9.24
21+65	2 year	150	230	232.03	232.03	232.53	0.02294	5.83	29.72	34.75	0.84	2.11	0.38	0.46	12.3	10.37	6.68
21+65	10 year	321	230	232.7	232.7	233.4	0.022525	7.36	54.37	38.94	0.88	2.98	1.14	1.23	21.96	13.36	9.58
21+55	2 year	150	228.5	231.89		231.97	0.001711	2.47	74.8	36.9	0.25	0.3	0.13	0.14	0.75	2.47	0.88
21+55	10 year	321	228.5	232.7		232.88	0.002953	3.81	106.31	40.77	0.35	0.67	0.33	0.33	2.54	4.46	2.02
21+40	2 year	150	229.4	231.39	231.39	231.87	0.023353	5.78	30.7	34.85	0.84	2.09	0.55	0.55	12.08	10.29	6.62
21+40	10 year	321	229.4	232.03	232.03	232.73	0.023434	7.37	53.95	37.6	0.89	3.02	1.36	1.32	22.23	13.49	9.71
21+20	2 year	150	228.64	230.67	230.67	231.18	0.02354	5.89	28.97	32.17	0.85	2.16	0.4	0.53	12.69	10.55	6.85
21+20	10 year	321	228.64	231.36	231.36	232.1	0.022877	7.47	52.01	34.45	0.89	3.06	1.26	1.3	22.86	13.62	9.84
21+08	2 year	150	227.85	229.83	229.83	230.43	0.028265	6.3	25.55	25.87	0.92	2.5	0.42	0.42	15.76	11.74	7.97
21+08	10 year	321	227.85	230.64	230.64	231.43	0.022398	7.56	50.28	32.09	0.89	3.1	1.25	1.09	23.44	13.76	9.98
20+95	2 year	150	227.06	229.03	229.03	229.5	0.024033	5.79	30.75	35.06	0.85	2.11	0.66	0.35	12.25	10.37	6.68
20+95	10 year	321	227.06	229.67	229.67	230.35	0.023542	7.32	54.45	38.39	0.89	2.99	1.5	1	21.86	13.39	9.61
20+89	2 year	150	225.56	229.03		229.26	0.006221	3.91	41.68	30.81	0.45	0.84	0.09	0.14	3.26	5.26	2.56
20+89	10 year	321	225.56	229.56		230.13	0.012365	6.31	60.96	39.49	0.66	2.04	0.44	0.6	12.87	10.11	6.45
20+80	2 year	150	226.56	228.67	228.67	229.14	0.021566	5.69	31.04	38.17	0.81	2	0.38	0.43	11.39	9.96	6.32
20+80	10 year	321	226.56	229.3	229.3	229.97	0.022259	7.26	55.66	41.75	0.87	2.91	1.21	0.93	21.15	13.13	9.34
20+60	2 year	150	225.86	227.83	227.83	228.28	0.02325	5.7	31.78	37.65	0.84	2.05	0.66	0.38	11.69	10.15	6.49
20+60	10 year	321	225.86	228.46	228.46	229.09	0.022329	7.12	58.04	45.78	0.87	2.83	1.44	0.8	20.13	12.86	9.07
20+50	2 year	150	225.25	227.24	227.24	227.75	0.025087	5.97	31.97	38.65	0.87	2.24	0.57	0.59	13.34	10.83	7.11
20+50	10 year	321	225.25	227.94	227.94	228.69	0.024233	7.62	60.98	44.21	0.91	3.19	1.5	1.22	24.33	14.05	10.28
20+40	2 year	150	224.63	226.62	226.62	227.17	0.050694	6.07	28.29	31.04	0.88	4.53	0.77	1.07	27.55	18.18	14.82
20+40	10 year	321	224.63	227.48	227.38	228.13	0.03676	7.04	59.48	39.68	0.81	5.22	1.95	2.08	36.73	20.18	17.17
20+34	2 year	150	223.13	226.72		226.92	0.010352	3.68	47.15	35.68	0.42	1.44	0.27	0.25	5.29	7.83	4.49
20+34	10 year	321	223.13	227.55		227.92	0.014117	5.23	79.3	41.65	0.51	2.63	0.98	0.82	13.76	12.19	8.41
20+20	2 year	150	224.03	226.13	226.1	226.63	0.044367	5.8	30.33	35.2	0.83	4.1	0.75	0.89	23.76	16.90	13.35
20+20	10 year	321	224.03	227.16	226.86	227.64	0.02552	6.2	73.02	54.72	0.68	3.94	1.81	1.14	24.45	16.41	12.81
20+05	2 year	150	223.51	225.47	225.47	226.08	0.029011	6.35	26.5	28.31	0.93	2.54	0.42	0.57	16.14	11.88	8.11
20+05	10 year	321	223.51	226.14	226.14	227.17	0.031552	8.54	49.52	38.9	1.04	4.06	1.43	1.26	34.65	16.77	13.22
19+95	2 year	150	222.89	224.88	224.88	225.44	0.026746	6.16	28.56	31.67	0.9	2.38	0.52				

SEE SHEETS C-1 AND C-2 FOR
PROPOSED STREAM STATIONING

CROSS SECTION SUMMARY TABLE

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)	Shear LOB (lb/sq ft)	Shear ROB (lb/sq ft)	Power Chan (lb/ft s)	d84 colorado (in)	d84 leo (in)
17+95	2 year	150	215.46	217.72	217.49	218.15	0.016784	5.35	33.29	37.87	0.73	1.71	0.49	0.23	9.17	8.88	5.37
17+95	10 year	321	215.46	218.36	218.36	219.13	0.02169	7.52	60.13	46.36	0.87	3.05	1.29	0.93	22.9	13.59	9.81
17+80	2 year	150	215.36	217.36	217.36	217.85	0.023955	5.86	33.88	44.31	0.85	2.15	0.61	0.52	12.59	10.51	6.82
17+80	10 year	321	215.36	218.03	218.03	218.71	0.022758	7.35	66.26	49.51	0.88	2.98	1.38	1.31	21.92	13.36	9.58
17+70	2 year	150	214.76	216.77	216.77	217.28	0.024253	5.92	32.41	42.77	0.86	2.19	0.62	0.43	12.98	10.65	6.95
17+70	10 year	321	214.76	217.48	217.48	218.15	0.02186	7.3	66.73	50.7	0.87	2.92	1.39	1.17	21.34	13.16	9.38
17+55	2 year	150	214.17	216.18	216.18	216.72	0.024827	6.01	30.3	39.6	0.87	2.26	0.59	0.34	13.57	10.90	7.18
17+55	10 year	321	214.17	216.95	216.95	217.63	0.021012	7.29	66.06	50.93	0.86	2.89	1.35	1.03	21.04	13.06	9.28
17+47	2 year	150	212.67	216.01		216.22	0.005261	3.74	47.48	42.84	0.42	0.75	0.19	0.08	2.81	4.84	2.27
17+47	10 year	321	212.67	216.83		217.22	0.007264	5.34	87.2	51.86	0.52	1.39	0.56	0.41	7.4	7.63	4.33
17+30	2 year	150	213.46	215.46	215.38	216.02	0.025861	6.1	28.55	30.19	0.89	2.33	0.68	0.48	14.21	11.15	7.41
17+30	10 year	321	213.46	216.27	216.27	216.98	0.021123	7.37	64.68	51.95	0.86	2.94	1.37	0.94	21.68	13.23	9.44
17+15	2 year	150	212.98	215.01	215.01	215.61	0.028073	6.27	27.08	31.82	0.92	2.48	0.47	0.36	15.54	11.67	7.91
17+15	10 year	321	212.98	215.86	215.86	216.59	0.021295	7.41	63.69	52.98	0.86	2.97	1.33	0.82	22	13.33	9.54
16+94	2 year	150	212.1	214.24	214.05	0.01968	5.65	29.9	28.74	0.78	1.94	0.39	0.38	10.96	9.74	6.12	
16+94	10 year	321	212.1	215.01	215.01	215.76	0.020196	7.42	60.82	49.81	0.85	2.93	1.23	0.66	21.75	13.20	9.41
16+85	2 year	150	211.86	213.79	213.79	214.37	0.02764	6.23	27.72	29.29	0.91	2.44	0.56	0.59	15.21	11.53	7.78
16+85	10 year	321	211.86	214.68	214.68	215.44	0.020768	7.43	60.93	49.93	0.86	2.96	1.42	0.62	22.03	13.30	9.51
16+70	2 year	150	211.26	213.22	213.22	213.81	0.02836	6.27	27.48	27.79	0.92	2.48	0.65	0.67	15.59	11.67	7.91
16+70	10 year	321	211.26	213.95	213.95	214.92	0.028569	8.29	48.46	29.55	0.99	3.78	1.78	1.56	31.31	15.92	12.27
16+64	2 year	150	209.56	213.2		213.4	0.004845	3.62	46.42	27.07	0.4	0.7	0.16	0.16	2.53	4.60	2.12
16+64	10 year	321	209.56	214.2		214.6	0.006627	5.28	77.25	42.69	0.5	1.34	0.55	0.21	7.06	7.42	4.16
16+55	2 year	150	210.56	212.96		213.32	0.012664	4.9	35.07	25.58	0.64	1.4	0.47	0.44	6.86	7.67	4.36
16+55	10 year	321	210.56	213.83	213.43	214.49	0.014563	6.8	60.04	37.1	0.73	2.38	1.13	0.5	16.16	11.33	7.58
16+43	2 year	150	210.46	212.67	212.41	213.08	0.032035	5.29	31.2	23.63	0.72	3.29	1.09	1.06	17.4	14.37	10.62
16+43	10 year	321	210.46	213.34	213.21	214.19	0.043519	7.72	49.15	38.79	0.89	6.25	2.55	1.07	48.22	23.04	20.72
16+30	2 year	150	209.96	211.92	211.92	212.52	0.056845	6.33	25.82	24.74	0.93	4.97	1.32	1.09	31.45	19.46	16.32
16+30	10 year	321	209.96	212.79	212.76	213.61	0.044479	7.68	50.86	32.9	0.89	6.24	2.5	2.15	47.99	23.01	20.68
16+24	2 year	150	208.26	212.03		212.21	0.007957	3.42	48.37	27.43	0.37	1.21	0.29	0.24	4.13	6.89	3.74
16+24	10 year	321	208.26	213		213.34	0.011064	4.97	79.91	45.48	0.46	2.29	0.76	0.46	11.38	11.01	7.28
16+15	2 year	150	209.26	211.79		212.09	0.019382	4.52	37.55	27.08	0.57	2.29	0.75	0.64	10.35	11.01	7.28
16+15	10 year	321	209.26	212.68		213.19	0.02152	6.12	64.68	33.86	0.64	3.7	1.47	1.35	22.66	15.67	12.00
15+95	2 year	150	208.96	211.03	210.92	211.52	0.042006	5.73	29.32	25.8	0.81	3.96	1.28	1.08	22.71	16.47	12.88
15+95	10 year	321	208.96	211.88	211.71	212.61	0.037787	7.27	53.14	30.33	0.83	5.52	2.57	2.13	40.16	21.03	18.20
15+75	2 year	150	208.16	210.39	210.11	210.78	0.030065	5.17	32.4	24.83	0.7	3.13	1.05	1.03	16.17	13.85	10.08
15+75	10 year	321	208.16	211.16	210.92	211.88	0.035349	7.18	52.69	28.22	0.81	5.33	2.27	2.23	38.25	20.49	17.55
15+50	2 year	150	207.26	209.23	209.23	209.79	0.053112	6.15	27.52	27.62	0.9	4.68	1.23	1.27	28.78	18.62	15.33
15+50	10 year	321	207.26	209.98	209.98	210.82	0.049805	7.87	49.33	30.79	0.94	6.65	2.99	2.75	52.36	24.11	22.10
15+44	2 year	150	205.56	209.18		209.37	0.009257	3.57	47.14	28.82	0.4	1.34	0.31	0.3	4.77	7.42	4.16
15+44	10 year	321	205.56	210.08		210.46	0.012978	5.19	74.72	32.48	0.49	2.54	0.99	0.88	13.19	11.88	8.11
15+35	2 year	150	206.46	208.97		209.25	0.018683	4.41	39.93	29.85	0.56	2.19	0.77	0.7	9.65	10.65	6.95
15+35	10 year	321	206.46	209.83		210.3	0.020666	5.93	67.5	34.11	0.63	3.5	1.68	1.41	20.75	15.04	11.32
15+15	2 year	150	206.16	208.22	208.13	208.69	0.041436	5.67	30.56	29.42	0.81	3.89	1.19	1.06	22.06	16.25	12.64
15+15	10 year	321	206.16	208.94	208.88	209.69	0.043114	7.47	53.49	34.36	0.88	5.94	2.74	2.24	44.35	22.19	19.65
15+00	2 year	150	205.46	207.43	207.43	207.99	0.052745	6.13	27.78	28.46	0.9	4.65	1.26	1.18	28.51	18.53	15.23
15+00	10 year	321	205.46	208.18	208.18	209	0.048683	7.78	50.9	33.39	0.93	6.51	2.86	2.6	50.66	23.74	21.62
14+94	2 year	150	203.76	207.37		207.57	0.009363	3.58	47.04	29.44	0.4	1.35	0.31	0.29	4.83	7.46	4.20
14+94	10 year	321	203.76	208.22		208.61	0.013803	5.28	74.16	34.6	0.51	2.66	0.97	0.9	14.05	12.29	8.51
14+85	2 year	150	204.66	207.16		207.44	0.019021	4.44	39.78	30.18	0.56	2.22	0.77	0.71	9.83	10.76	7.05
14+85	10 year	321	204.66	207.92		208.44	0.023965	6.22	64.46	34.54	0.67	3.9	1.79	1.6	24.26	16.29	12.68
14+65	2 year	150	204.36	206.33	206.33	206.84	0.048694	5.91	27.75	27.96	0.87	4.31	1.16	1.11	25.44	17.53	14.07
14+65	10 year	321	204.36	207.02	207.02	207.77	0.045581	7.4	48.1	31.34	0.89	5.94	2.68	2.28	43.97	22.19	19.65
14+55	2 year	150	203.86	205.83	205.83	206.34	0.049083	5.93	27.59	27.5	0.87	4.33	1.16	1.17	25.69	17.59	14.13
14+55	10 year	321	203.86	206.6	206.52	207.29	0.039807	7.09	49.96	30.64	0.84	5.38	2.47	2.21	38.17	20.63	17.72
14+49	2 year	150	202.16	205.77		205.95	0.00896	3.5	46.35	27.56	0.39	1.29	0.3	0.3	4.52	7.22	4.00
14+49	10 year	321	202.16	206.75		207.07	0.010599	4.75	74.96	30.78	0.45	2.12	0.84	0.76	10.58	10.40	6.72
14+40	2 year	150	203.06	205.58		205.84	0.016866	4.21	38.76	26.71	0.53	1.99	0.71	0.69	8.39	9.93	6.29
14+40	10 year	321	203.06	206.54		206.94	0.01604	5.37	65.55	29.11	0.55	2.83	1.35	1.21	15.17	12.86	9.07
14+25	2 year	150	202.86	204.82	204.81	205.39	0.054264	6.19	25.6	22.54	0.91	4.74	1.29	1.29	29.36	18.80	15.53
14+25	10 year	321	202.86	205.57	205.57	206.49	0.052064	8.02	42.82	23.55	0.96	6.92	2.8	2.92	55.53	24.83	23.04
14+15	2 year	150	202.36	204.57	204.32	204.94	0.028706	5.02	32	24.36	0.68	2.96	1.01	1.03	14.85	13.30	9.51
14+15	10 year	321	202.36	205.31	205.06	205.97	0.032973	6.85	50.8	26.76	0.78	4.88	2.11	2.15	33.41	19.20	16.01
14+00	2 year	150	201.86	203.82	203.82	204.36	0.051442	6.04	26.72	25.45	0.89	4.51	1.2	1.26	27.27	18.12	14.75
14+00	10 year	321	201.86	204.53	204.53	205.36	0.048799	7.68	45.58	27.84	0.92	6.39	2.68	2.8	49.09	23.42	21.20
13+94	2 year	150	199.86	203.83		203.99	0.006936	3.23	50.02	27.06	0.34	1.07	0.23	0.24	3.46	6.29	3.29
13+94	10 year	321	199.86	204.76		205.06	0.009707	4.64	76.41	29.89	0.43	2.01	0.71	0.74	9.31	10.00	6.35
13+85	2 year	150	201.16	203.6		203.88	0.019628	4.41	37.21	27.65	0.57	2.21	0.74	0.76	9.77	10.72	7.01
13+85	10 year	321	201.16	204.51		204.93	0.018358	5.56	63.41	30.04	0.59	3.08	1.42</				

Design Narrative

BACKGROUND INFORMATION AND ANALYSIS
STREAM NAME: DONALDSON RUN TRIBUTARY B
STREAM LENGTH: 1,400 LINEAR FEET
STREAM LOCATION: STREAM RESTORATION REACH IS LOCATED WITHIN ZACHARY TAYLOR PARK FROM THE DISCHARGE POINT OF THE CULVERT UNDER NORTH VERMONT STREET TO ITS CONFLUENCE WITH DONALDSON RUN (PARCEL ID: 05-001-020)
WATERSHED AREA: 99.2 ACRES

A ROSSEN LEVEL I GEOMORPHIC CHARACTERIZATION AND STREAM CLASSIFICATION WAS PERFORMED ALONG THE SUBJECT REACH. THE MAJORITY OF THE STREAM WAS CLASSIFIED AS A ROSSEN TYPE B/C STREAM, WHICH IS AN ENTRENCHED, NARROW, AND DEEP, STEP/POOL CHANNEL WITH LOW SINUOSITY. THE CHANNEL EXHIBITS INSTABILITY WITH A HIGH POTENTIAL FOR VERY HIGH BANK EROSION RATES AND HIGH SEDIMENT SUPPLY TO DOWNSTREAM RECEIVING WATERS.

- THE POTENTIAL FOR RESTORATION IS HIGH. THE GOALS OF RESTORING/STABILIZING/ENHANCING THE DEGRADED STREAM CHANNEL BED AND BANK ARE THE FOLLOWING:
- PROVIDE AQUATIC BENEFITS AND HABITAT
 - PROVIDE GRADE CONTROL AND ENERGY DISSIPATION
 - IMPROVE WATER QUALITY AND AESTHETICS
 - PREVENT FURTHER EROSION
 - PROTECT ADJACENT INFRASTRUCTURE
 - PROVIDE AN AMENITY WITHIN AN ACTIVE PARK SETTING

LAND USE
THE MAJORITY OF THE DRAINAGE AREA IS DEVELOPED AND PREDOMINANTLY RESIDENTIAL SINGLE-FAMILY HOMES. WHILE THE DRAINAGE AREA, MUCH LIKE THE ENTIRE COUNTY IS AT BUILD-OUT CONDITIONS, THE COUNTY IS SEEING THE GREATEST INCREASES IN IMPERVIOUS COVER COMING FROM THE SINGLE-FAMILY SECTOR, WHERE OLDER SINGLE-FAMILY UNITS ARE BEING ENLARGED OR COMPLETELY REPLACED WITH A LARGER IMPERVIOUS FOOTPRINT. COUNTY GIS ANALYSIS SHOWS AN ANNUAL INCREASE IN IMPERVIOUS AREA OF APPROXIMATELY 0.3% PER YEAR BETWEEN 2009 AND 2016. FOR PURPOSES OF THIS RESTORATION PLAN, THE HYDROLOGIC ANALYSIS OF THE DRAINAGE AREA HAS AN IMPERVIOUS COVER OF 26.25%. ADDITIONAL SENSITIVITY ANALYSES WERE RUN TO EVALUATE THE MAGNITUDE OF THE INCREASE IN FLOW RATES ENTERING THE STREAM SYSTEM IF THE IMPERVIOUS AREA WITHIN THE DRAINAGE AREA INCREASED BY 5%, 10% AND 20%. THE RESULTING INCREASE IN FLOW RATES WERE NOMINAL AND THE PROPOSED STREAM DESIGN HAS THE CAPACITY AND STRUCTURE TO CONVEY THE INCREASED FLOWS AND RESULTING INCREASE IN SHEAR STRESS WITH A SIGNIFICANT MARGIN OF SAFETY.

	Imp %	Q1 (CFS)	Q1.5 (CFS)	Q2 (CFS)	Q10 (CFS)	Q100 (CFS)
ORIGINAL	26.25%	71.62	89.00	106.01	227.55	510.04
5% INCREASE	27.56%	73.37	90.81	107.33	230.20	513.06
10% INCREASE	28.88%	75.13	92.63	108.72	232.90	516.07
20% INCREASE	31.50%	78.69	96.31	112.79	238.26	521.98

DESIGN METHODOLOGY
THE METHODOLOGY USED IS NATURAL CHANNEL DESIGN (NCD). THE GOAL OF THIS METHODOLOGY IS TO RESTORE STREAM CHANNELS SO THAT THEY MAY FUNCTION IN A STATE OF DYNAMIC EQUILIBRIUM. THIS METHODOLOGY EMPLOYS THE USE OF EXISTING CONDITION STREAM STABILITY ASSESSMENT, REFERENCE REACH DATA COLLECTION AND ANALYSIS, AND ASSOCIATED HYDROLOGIC AND HYDRAULIC MODELING PROCESSES. NCD TAKES INTO CONSIDERATION THE STABLE FORM/STREAM TYPE FOR A GIVEN VALLEY TYPE WITH A SPECIFIED INPUT OF WATER AND SEDIMENT FROM THE WATERSHED. NCD REQUIRES EXTENSIVE EVALUATION OF THE EXISTING CHANNEL AND WATERSHED TO DETERMINE THE CAUSES/SOURCES OF INSTABILITY. IT ALSO REQUIRES AN EVALUATION OF THE ON-SITE CONSTRAINTS AND WHETHER THE OPTIMUM STREAM TYPE IS ACHIEVABLE. DEPENDING ON THE SITE CONSTRAINTS, DIFFERENT PRIORITY LEVELS OF RESTORATION ARE POSSIBLE FOR INCISED CHANNELS, RANGING FROM PRIORITY 1 TO 4.

PRIORITY LEVEL 1 RESULTS IN THE CHANNEL BEING RECONNECTED TO THE HISTORICAL FLOODPLAIN SO THAT THE CHANNEL MAY ACCESS THIS AREA DURING BANKFULL AND GREATER FLOW EVENTS.

PRIORITY 2 AND 3 ATTEMPT TO RESTORE THE CHANNEL AT ITS EXISTING BED ELEVATION, WHILE LEVEL 2 HAS A MORE DISTINCT FLOODPLAIN AND THUS CREATES A MEANDERING CHANNEL, WHEREAS LEVEL 3 HAS A NARROW FLOODPLAIN, IS LESS SINUOUS AND MORE OF A STEP-POOL SYSTEM.

PRIORITY LEVEL 4 IS NOT REALLY RESTORATION AS MUCH AS STABILIZATION IN-PLACE IN AN ATTEMPT TO DECREASE BANK EROSION AND LOCAL INSTABILITY.

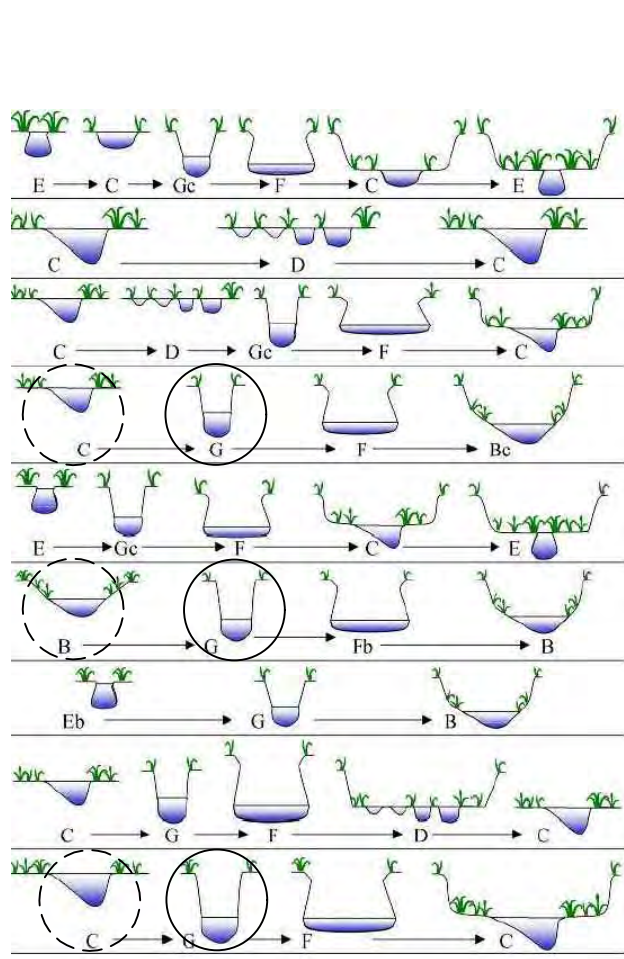
THIS PROJECT PROPOSES PRIORITY LEVEL 1 RESTORATION WHEREIN THE CHANNEL IS TO BE RAISED AND

RECONNECTED TO THE HISTORICAL FLOODPLAIN. DUE TO THE CURRENT LANDSCAPE POSITION OF THE CHANNEL, RESTORATION AT THE EXISTING BED ELEVATION WOULD LEAVE LIMITED ROOM FOR CREATION OF A FLOODPLAIN AND WOULD REQUIRE STEEP GRADES OR WALLS TO TIE-INTO EXISTING VALLEY SLOPES. BY RAISING THE CHANNEL THE DESIGN PROVIDES ROOM TO CREATE A NARROW FLOODPLAIN AND NATURAL MEANDER PATTERN WHILE LIMITING THE IMPACTS TO THE ADJACENT SLOPES AND INFRASTRUCTURE.

RESTORATION PROJECTS THAT UTILIZE NCD METHODOLOGY TYPICALLY EMPLOY IN-STREAM STRUCTURES MADE OF ROCK OR WOOD TO ACHIEVE A VARIETY OF GOALS. THESE GOALS MAY INCLUDE: ENHANCED IN-STREAM HABITAT, BANK PROTECTION, FLOW DIVERSITY, AND GRADE-CONTROL. DONALDSON RUN TRIBUTARY B RESTORATION PROPOSES THE USE OF ROCK DUE TO THE HIGH ENERGY OF FLOW THROUGH THE SYSTEM. THE ROCK STRUCTURES WILL PROVIDE GRADE CONTROL, ENERGY DISSIPATION AND A RIFLE-POOL SEQUENCE FOR VARIATION IN FLOW DEPTHS AND HABITAT.

DESIGN PROCESS

EXISTING CONDITION SURVEY OF THE REACH TO BE RESTORED INCLUDED A LONGITUDINAL PROFILE, CROSS SECTIONS, PEBBLE COUNTS, PAVEMENT/SUB-PAVEMENT SAMPLING. ALSO, THE EXISTING VEGETATION WAS INVENTORIED AND ADJACENT WETLAND AREAS WERE DELINEATED. ANALYSIS OF THE STREAM MORPHOLOGY DATA PROVIDED VHB WITH THE INFORMATION REQUIRED TO CLASSIFY THE STREAM CHANNEL UTILIZING THE ROSSEN CLASSIFICATION SYSTEM, ASSESS ITS PHASE IN THE EVOLUTIONARY SEQUENCE OF CHANNEL MORPHOLOGY, AND DETERMINE THE STABLE STREAM TYPE FOR THE RESTORATION DESIGN.



GIVEN THE CONFINED AND STEEP VALLEY THAT DONALDSON RUN TRIBUTARY B FLOWS THROUGH, THE EXISTING G TYPE CHANNEL (SHOWN WITH A SOLID OUTLINE ORLE) IF LEFT ALONE PER THE EVOLUTIONARY SEQUENCES SHOWN TO THE LEFT, WILL PROGRESS NEXT TO AN F TYPE CHANNEL BEFORE EITHER STABILIZING AS A C OR B TYPE CHANNEL IN A DEEPER VALLEY SETTING. THIS IS NOT A DESIRABLE SCENARIO GIVEN THE STEEP VALLEY WALLS AND ADJACENT INFRASTRUCTURE AND RESIDENTIAL PROPERTIES. STABILIZING THE CHANNEL IN PLACE AND IMPROVING UPON PROTECTION FOR THE INFRASTRUCTURE IS CRITICAL TO LONG-TERM STABILITY AND THUS THE PRIMARY GOAL OF THIS RESTORATION.

THE PROPOSED CHANNEL TYPE IS A COMBINATION OF B AT THE UPPER END AND C (SHOWN IN A DASHED CIRCLE)TOWARD THE LOWER HALF, WITH THE BED RAISED TO RECONNECT WITH ITS PRIOR FLOODPLAIN.

CHANNEL SIZING

WITHIN THE EXISTING CONDITIONS SURVEY, FOUR SECTIONS (SHOWN ON SHEET D-2) WERE IDENTIFIED AS DISPLAYING BANKFULL CONDITIONS. STATIC COMPUTATIONS WERE RUN AT THOSE THREE SECTIONS TO DETERMINE THE BANKFULL DISCHARGE. DISCHARGE VALUES RANGED FROM 78 CUBIC FEET PER SECOND (CFS) TO 105.3 CFS WITH THE AVERAGE AT 101 CFS, WHICH WAS SET AS THE DESIGN FLOW. WITH THE TARGET STREAM TYPE BEING B4 / C4, THE MANNING'S "N" AND WIDTH/DEPTH RATIOS WERE EVALUATED TO ACHIEVE A DYNAMIC / SELF-MAINTAINING FORM.

DUE TO THE URBAN SETTING A STORMWATER RUNOFF REGIME WAS TAKEN INTO CONSIDERATION, ACCOMMODATING THE FLASHY, CLEAR WATER NATURE OF THE CONTRIBUTING RUNOFF EVENTS. AN ADDITIONAL CONSIDERATION RELATED TO URBAN WATERSHEDS IS THE FREQUENCY OF THE STORM FLOW EVENTS. WHILE RURAL WATERSHEDS TEND TO EXPERIENCE A FLOW AT THE BANKFULL ELEVATION OR GREATER EVERY 1.3 TO 2 YEARS, URBAN STREAMS MAY HAVE A BANKFULL EVENT MULTIPLE OCCASIONS WITHIN A GIVEN YEAR. FOR PURPOSES OF THIS DESIGN IT WAS ANTICIPATED THAT THE DESIGN BANKFULL DISCHARGE BE EQUIVALENT TO THE 1-YEAR STORM. THE URBAN NATURE OF THE PROJECT REACH WATERSHED CREATES SOME LIMITATIONS ON THE RESTORATION DESIGN. THESE POTENTIAL LIMITATIONS INCLUDE: NECESSITY TO IMPORT SOME COARSE GRAINED BED MATERIAL DUE TO THE LACK OF ADEQUATE SEDIMENT RECHARGE AND TRANSPORT, AND INCREASED NEED TO INCLUDE GRADE CONTROL STRUCTURE WITHIN THE CHANNEL TO ACCOMMODATE THE HIGH SHEARING FORCES RESULTING FROM THE FREQUENT RUNOFF/STORM EVENTS WITHIN THE NARROW VALLEY SETTING.

HYDROLOGIC AND HYDRAULIC MODELING

HYDROLOGIC ANALYSIS

HYDRO-CAD WAS USED TO MODEL THE WATERSHED AND ANTICIPATED FLOWS INTO THE STREAM CHANNEL. THE WATERSHED IS DEPICTED ON THE FOLLOWING PLAN SHEET. THE WATERSHED WAS DIVIDED INTO THREE SUB-SHEDS AND DETERMINED THE DISCHARGES IN THE FOLLOWING TABLE. THE OUTPUT OF DISCHARGES RANGED FROM 71.62 CFS FOR THE 1-YEAR EVENT TO 106 CFS FOR THE 2-YEAR EVENT, THIS PROVIDED A FACTOR OF CONFIDENCE THAT THE MODEL WAS WITHIN THE RANGE OF ANTICIPATED FLOWS, GIVEN THAT THE BANKFULL EVENT (101 CFS) SHOULD OCCUR WITHIN THE FREQUENCY OF 1-2 YEARS. THE 71.62 CFS MODELED AS THE 1-YEAR STORM WAS ASSUMED AS THE BANKFULL EVENT AND TO BE CONSERVATIVE IN THE HYDRAULIC MODELING TO BE 101 CFS. AS A RESULT ALL OF THE MODELED DISCHARGES WERE INCREASED BY THE SAME FACTOR OF 1.41(101/71.62 = 1.41). THIS INCREASE PROVIDES A FACTOR OF SAFETY IN ESTIMATING THE CAPACITY AND SUBSTRATE SIZING WHEN CONSIDERING THE FLASHY URBAN NATURE OF THE WATERSHED, THE PRIOR DISCUSSION ON ANTICIPATED INCREASES IN IMPERVIOUS AREAS WITHIN THE WATERSHED, AND THE PROTECTION OF ADJACENT INFRASTRUCTURE WITHIN THE CONFINED STEEP VALLEY.

	Q1 (CFS)	Q1.5 (CFS)	Q2 (CFS)	Q10 (CFS)	Q100 (CFS)
H-C DISCHARGE	71.62	89.00	106.01	227.55	510.04
FACTOR OF SAFETY	1.41	1.41	1.41	1.41	1.41
HEC-RAS DISCHARGE	101	126	150	321	720

HYDRAULIC ANALYSIS

STATIC COMPUTATIONS WERE INITIALLY USED TO EVALUATE A RANGE OF CRITICAL SHEER STRESSES THAT WOULD MOBILIZE PARTICLES WITHIN THE CHANNEL. THE INITIAL STEP TOOK INTO CONSIDERATION THE FACTORS AFFECTING THE MOVEMENT OF PARTICLES, INCLUDING I) SHAPE AND DENSITY OF PARTICLES, II) STREAM GEOMETRY, III) SUBPAVEMENT MATERIAL SIZE AND CHARACTER, IV) INTERLOCKING OR EMBEDDEDNESS OF PARTICLES, AND V) FLOW CHARACTERISTICS. FURTHER IMPACTING THE CRITICAL SHEER STRESS IS THE PROTRUSION HEIGHT OF STEP STRUCTURES. TO ANALYZE BOTH THE EFFECT OF THE CHANNEL DIMENSIONS, PATTERN AND PROFILE AND THE EFFECT OF THE PROPOSED STEP STRUCTURES OF LARGE EMBEDDED ROCK AND ULTIMATELY THE STABILITY OF THE PROPOSED CHANNEL FOR THE FULL RANGE OF DESIGN FLOWS, A HEC-RAS HYDRAULIC MODEL WAS DEVELOPED.

THE MODEL (SUMMARY OUTPUT PROVIDED ON SHEETS C-16 AND 17) PREDICTS THAT A MATERIAL SIZE FOR THE D84 (15 INCHES) IS SUFFICIENT FOR THE 2-YEAR AND 10-YEAR STORMS. IN GENERAL THE SHEAR STRESS FOR THE 2-YEAR STORM IS AT OR BELOW 2 LB/SF, AND FOR THE 10-YEAR STORM IT IS GENERALLY BETWEEN 2.5 AND 3 LB/SF. THE SUMMARY TABLES ON SHEETS C-16 AND 17 SHOW THE HEC-RAS MODELING WITH TWO DIFFERENT DESIGN METHODS USED TO CALCULATE MATERIAL SIZE, LABELED LEO AND COLORADO. THE LEO DESIGN CALCULATIONS SHOW D84 VALUES GENERALLY BETWEEN 5 TO 7 INCHES AND THE COLORADO DESIGN CALCULATIONS SHOW D84 VALUES A LITTLE LARGER IN THE 8 TO 12 INCH RANGE. THE SPECIFIED DESIGN D84 OF 15 INCHES IS SUFFICIENT TO HANDLE THE PREDICTED SHEAR STRESS GENERATED BY THE 2-YEAR STORM FLOW ON THE RESTORED STREAM CHANNEL AS IT IS GENERALLY LARGER THAN SPECIFIED BY BOTH DESIGN METHODS FOR THE 2-YEAR FLOW. SIMILARLY FOR THE 10-YEAR STORM FLOW THE LEO DESIGN GENERALLY SPECIFIES SMALLER D84 VALUES BETWEEN 8 AND 11 INCHES, WHILE THE COLORADO DESIGN SPECIFIED SLIGHTLY LARGER VALUES OF 8 TO 14 INCHES. THE DESIGN D84 OF 15 INCHES IS STILL GENERALLY SUFFICIENT EVEN AT THE HIGHER SHEAR STRESS GENERATED BY THE 10-YEAR STORM.

CHANNEL SUBSTRATE AND SEDIMENT TRANSPORT

IN A STABLE STREAM SYSTEM IN A MORE RURAL SETTING WHERE THERE IS ADEQUATE SUPPLY OF SEDIMENT MOVING THROUGH THE SYSTEM (LARGER PARTICLES IN UPPER STEEP REACHES TO SMALLER PARTICLES IN COASTAL FLAT REACHES), THE RESTORED REACH MUST BE DESIGNED TO PROPERLY TRANSPORT THIS MATERIAL. IN AN URBAN STREAM HOWEVER, MUCH OF THE SUPPLIED SEDIMENT RESULTS FROM THE ERODING STREAMBANKS AND/OR INCISING CHANNEL BED BOTH UPSTREAM AND WITHIN THE PROJECT REACH. THE STABILIZATION OF THE BED AND BANKS THROUGH THE RESTORATION REACH WILL GREATLY REDUCE THE MATERIAL AVAILABLE FOR TRANSPORT. THIS REDUCTION IN AVAILABLE BEDLOAD COULD RESULT IN INCISION OF THE RESTORED CHANNEL IF THE BED MATERIAL IS SMALL ENOUGH TO BE TRANSPORTED. MOBILIZATION OF THE BED MATERIAL HAS TO BE MINIMIZED TO MAINTAIN THE DESIGN BED ELEVATION AND OVERALL CHANNEL STABILITY. THUS, THE DESIGN PROPOSES THE USE OF BED MATERIAL OF A SPECIFIC SIZE TO REDUCE MOBILITY BUT ALSO OF A SPECIFIC RANGE TO PROVIDE A MORE NATURAL AESTHETIC AND TO CREATE A GRADATION THAT FILLS VOIDS AND BETTER LOCKS IN (REINFORCES) THE BED MATERIAL.

INITIAL OBSERVATIONS SHOWED A BED MATERIAL IN THE EXISTING CHANNEL OF APPROXIMATELY 100MM(D84). KNOWING THAT THE CHANNEL IS ACTIVELY ERODING A LARGER DIAMETER BED MATERIAL WOULD BE REQUIRED. THE DESIGN STATIC ASSESSMENT USED THE EXISTING CHANNEL AND LARGEST D84 TO DETERMINE THE EXPECTED BANKFULL DISCHARGE. MODELING THE FINAL DESIGN DIMENSIONS INCLUDED THE USE OF SHIELDS EQUATION TO ESTIMATE SHEAR STRESS AND A RESULTING MINIMUM PARTICLE SIZE OF 7.6 INCHES (D50) TO RESIST TRANSPORT. FINALLY, MODELING OF THE SYSTEM IN HEC-RAS WAS USED TO VERIFY AN APPROPRIATE SIZE OF 14-16 INCHES (D84) TO RESIST TRANSPORT. BASED ON THE ANALYSIS THE PROPOSED BED MATERIAL IS AS FOLLOWS:

Cumulative Percent of particles finer than indicated particle size	PARTICLE SIZE (inches)	PARTICLE TYPE
D10	< 0.04m	sand
D16	1.0-2.0m	gravel
D35	3.0-4.0m	cobble
D50	8.0-10.0m	cobble
D84	14.0-16.0m	boulder

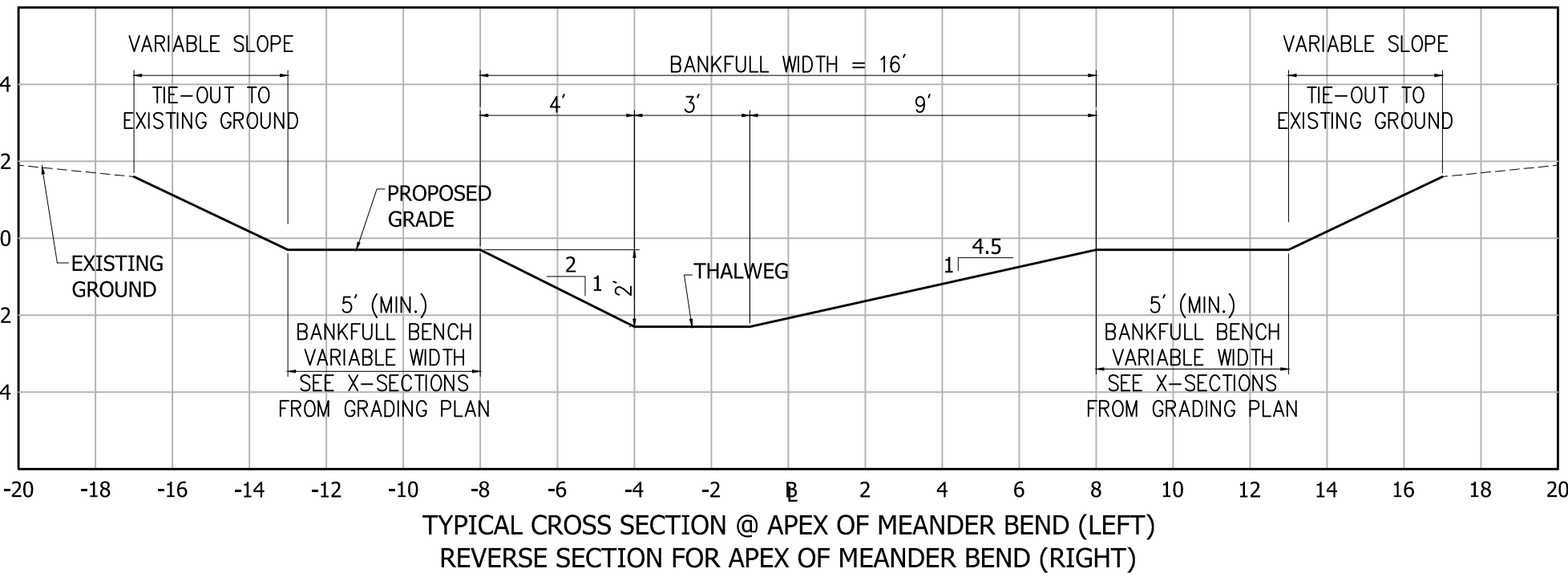
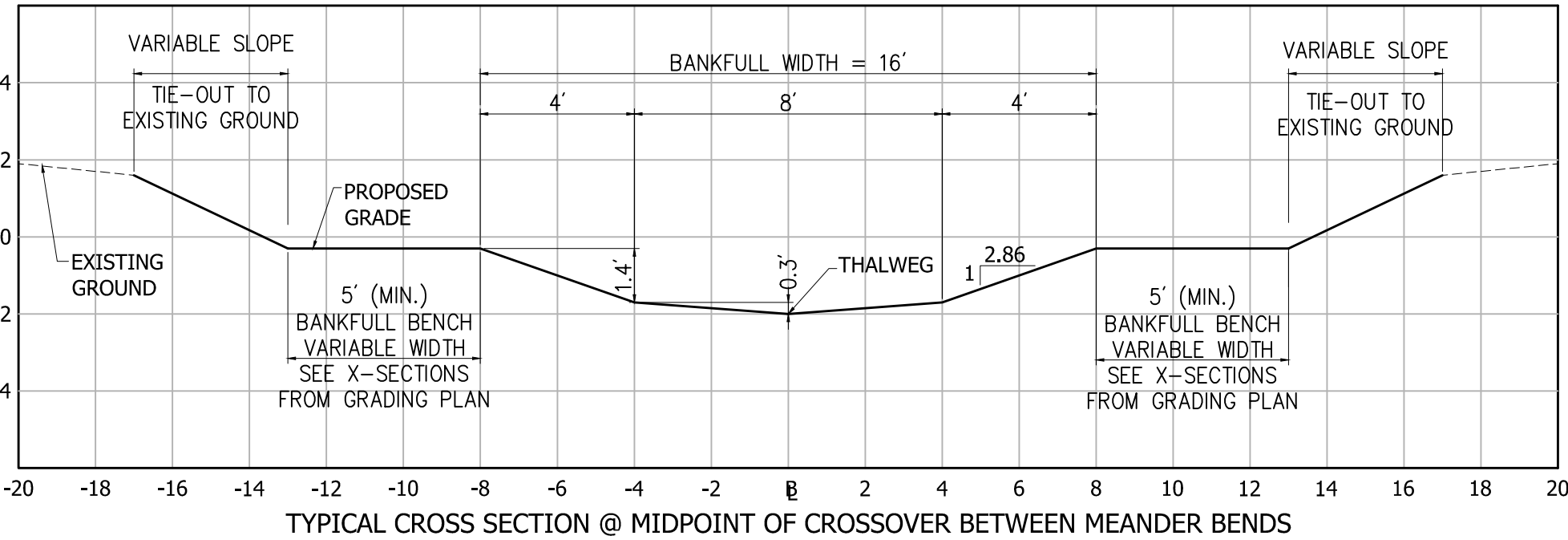
REGULATORY COMPLIANCE

THE NCD METHODOLOGY IS PREFERRED BY THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ) AND THE US ARMY CORPS OF ENGINEERS (USACE) FOR STREAM RESTORATION PROJECTS. THE 2005 STATE LEGISLATURE REVISED STATE LAW TO STIPULATE THAT ANY STREAM RESTORATION PROJECT THAT IS DESIGNED IN ACCORDANCE WITH NCD PRINCIPLES IS EXEMPT FROM THE REQUIREMENTS OF MS 19 (CODE OF VIRGINIA, 10.1-560 AND 10.1-561) AS WELL AS ANY RELATED LOCAL REQUIREMENTS. ADDITIONALLY, ON APRIL 7, 2017, DEQ PUBLISHED ITS FINAL SECTION 401 WATER QUALITY CERTIFICATION CONDITIONS FOR THE USACE'S NATIONWIDE PERMIT (NWP) #27 (STREAM AND WETLAND RESTORATION ACTIVITIES) REQUIRING THAT NATURAL STREAM DESIGN BE USED FOR STREAM RESTORATION. THEREFORE THE FLOW RATES USED FOR THIS PROJECT WERE DEVELOPED USING NCD PRINCIPLES AND SUBSEQUENTLY CORROBORATED THROUGH APPLICATION OF HYDROLOGIC/HYDRAULIC MODELING EFFORTS.

CONCLUSION

THE DONALDSON RUN TRIBUTARY B STREAM RESTORATION SITE WILL BE RESTORED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. NATURAL CHANNEL DESIGN PRINCIPLES AND METHODOLOGY HAVE BEEN EMPLOYED IN THE DESIGN OF THIS PROJECT AS DETAILED IN THIS PLAN SET. THROUGH ANALYSIS OF THE PROJECT REACH, APPROPRIATE REFERENCE SECTIONS, AND HYDROLOGIC AND HYDRAULIC MODELING RESULTS, THE PROJECT DESIGN IS APPROPRIATE FOR THIS ACTIVELY ERODING CHANNEL IN AN URBAN STEEP VALLEY SETTING WITH CRITICAL INFRASTRUCTURE IN THE IMMEDIATE SURROUNDINGS.

FINAL DESIGN DIMENSIONS



Donaldson Run
Tributary B
Stream Restoration
Country Club View
Arlington, Virginia

No.	Revision	Date	Appd.

Designed by IFS	Checked by JRL
Issued for Final Design	Date June 25, 2019

Design Narrative

Drawing Number

D-1

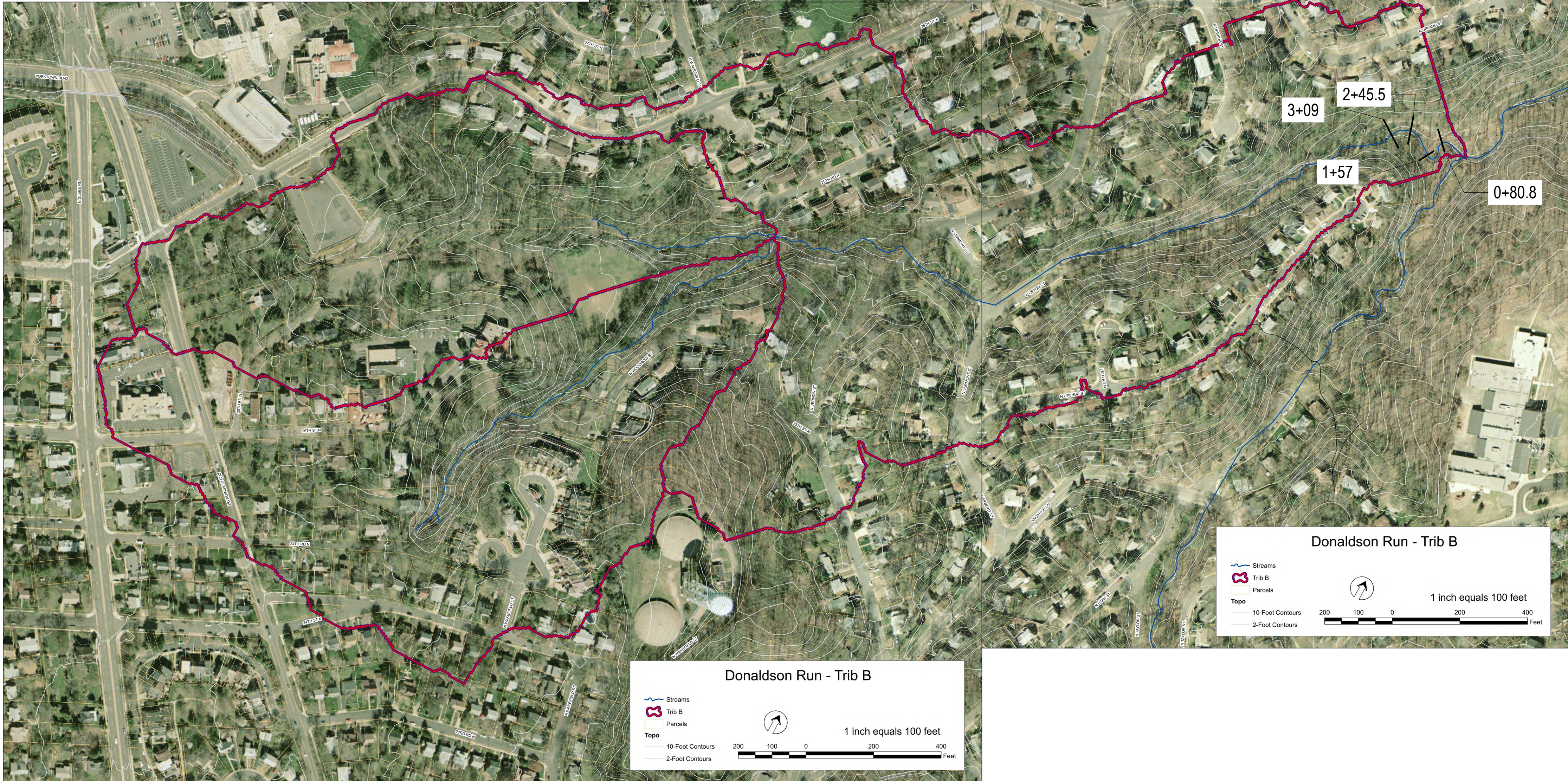


1775 Greensboro Station Place
Suite 200
Tysons, VA 22102
703.847.3071

DRAINAGE AREA MAP

SUMMARY OF LAND USE CONDITIONS

AREA (ACRES)	CN	DESCRIPTION
1.040	61	> 75% GRASS COVER, GOOD, HSG B
44.800	74	> 75% GRASS COVER, GOOD, HSG C
26.048	98	PAVED PARKING AND ROOFS
5.840	55	WOODS, GOOD, HSG B
21.500	70	WOODS, GOOD, HSG C



EXISTING REFERENCE SECTIONS

Worksheet 5-2. Computations of velocity and bankfull discharge using various methods (Rosgen and Silvey, 2005).

Bankfull VELOCITY / DISCHARGE Estimates									
Site	Donaldson Run - Tributary B			Location		0+80.8			
Date	3/1/09	Stream Type	B4 (± WD)	Valley Type	II				
Observers	CRS			HUC					
INPUT VARIABLES					OUTPUT VARIABLES				
Bankfull Cross-section AREA	17.0	A_{bf} (sqft)	Bankfull Mean DEPTH	1.14	D_{bf} (ft)				
Bankfull WIDTH	14.9	W_{bf} (ft)	Wetted PERIMETER	15.74	W_{wet} (ft)				
D84 @ Riffle	104.7	Dia. (mm)	D84 mm / 304.8 =	0.34	D84 (ft)				
Bankfull SLOPE	0.0298	S (ft/ft)	Hydraulic RADIUS	1.0800	R (ft)				
Gravitational Acceleration	32.2	g (ft/sec ²)	Relative Roughness	3.14	n (ft/sec)				
Drainage AREA	0.14	DA (sqmi)	Shear Velocity	1.0187	u^* (ft/sec)				
ESTIMATION METHODS					Bankfull VELOCITY	Bankfull DISCHARGE			
1. Friction Factor/ Relative Roughness	$u = [2.83 + 5.66 \log(R / D84)] u^*$				5.7	ft/ Sec	97.4	CFS	
2. Roughness Coefficient a) Manning's "n" from Friction factor / relative roughness (Figs. 5-6, 5-7) $n = 1.4895 R^{0.148} S^{0.78}$	$n = 0.0033$				6.2	ft/ Sec	105.2	CFS	
b) Manning's "n" from Jarrett (USGS) $n = 0.395 R^{0.148} S^{0.78}$					-	ft/ Sec	-	CFS	
c) Manning's "n" from Stream Type $n = 1.4895 R^{0.148} S^{0.78}$	$n = 0.0040$ (USGS, no veg.)				4.6	ft/ Sec	81.8	CFS	
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)					5.8/6.2	ft/ Sec	98.2/105.4	CFS	
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)					6.5	ft/ Sec	110.3	CFS	
* "best" prof. judgement = 0.0415									
4. Continuity Equations	a) USGS Gage: Return Period for Bankfull Discharge (Y+Q) =					ft/ Sec		CFS	
4. Continuity Equations	b) Regional Curves $u = Q/A$					ft/ Sec		CFS	
Options for using the D84 term in the relative roughness relation (R/D84), when using estimation method 1:									
Option 1:	For sand-bed channels, measure the "pretension height" (h_p) of sand dunes above channel bed elevations. Substitute an average sand dune pretension height (h_p in feet) for the D84 term in estimation method 1.								
Option 2:	For bedrock-dominated channels, measure several "pretension heights" (h_p) of bedrock dunes above channel bed elevations. Substitute an average bedrock pretension height (h_p in feet) for the D84 term in estimation method 1.								
Option 3:	For bedrock-dominated channels, measure several "pretension heights" (h_p) of rock separations steps/joints upflashed surfaces above channel bed elevations. Substitute an average bedrock pretension height (h_p in feet) for the D84 term in estimation method 1.								

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WARSSS page 5-21

Worksheet 5-2. Computations of velocity and bankfull discharge using various methods (Rosgen and Silvey, 2005).

Bankfull VELOCITY / DISCHARGE Estimates									
Site	Donaldson Run - Tributary B			Location		1+57			
Date	3/1/09	Stream Type	B4	Valley Type	II				
Observers	CRS			HUC					
INPUT VARIABLES					OUTPUT VARIABLES				
Bankfull Cross-section AREA	16.4	A_{bf} (sqft)	Bankfull Mean DEPTH	1.11	D_{bf} (ft)				
Bankfull WIDTH	14.8	W_{bf} (ft)	Wetted PERIMETER	15.91	W_{wet} (ft)				
D84 @ Riffle	116.5	Dia. (mm)	D84 mm / 304.8 =	0.38	D84 (ft)				
Bankfull SLOPE	0.0260	S (ft/ft)	Hydraulic RADIUS	1.0300	R (ft)				
Gravitational Acceleration	32.2	g (ft/Sec ²)	Relative Roughness	2.83	n (ft/Sec)				
Drainage AREA	0.14	DA (sqmi)	Shear Velocity	0.9501	u^* (ft/Sec)				
ESTIMATION METHODS					Bankfull VELOCITY	Bankfull DISCHARGE			
1. Friction Factor/Relative Roughness	$u = [2.83 + 5.66 \log(R / D84)] u^*$				4.8	ft/Sec	80.3	CFS	
2. Roughness Coefficient: a) Manning's 'n' from friction factor / relative roughness (Figs. 5-6, 5-7) = $1.4895 R^{0.148} S^{0.78}$	$n = 0.4055$				5.4	ft/Sec	87.9	CFS	
2. Roughness Coefficient: b) Manning's 'n' from Jarrett (USGS) = $n = 1.4895 R^{0.148} S^{0.78}$	$n = 0.395 R^{0.148} S^{0.78}$				-	ft/Sec	-	CFS	
Note: The equation is for riprap-covered, steep, impact, high-velocity, roughness, urban, bedrock-dominated stream channels.									
2. Roughness Coefficient: c) Manning's 'n' from Stream Type = $n = 1.4895 R^{0.148} S^{0.78}$	$n = 0.40-0.50$ (no. veg.)				4.4	ft/Sec	71.3	CFS	
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)					4.9/5.7	ft/Sec	86.8/93.2	CFS	
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)					5.9	ft/Sec	96.2	CFS	
"C" best perf. judgement = 0.0415									
4. Continuity Equations: a) USGS Gage: Return Period for Bankfull Discharge (Y+Q) =	$u = Q/A$					ft/Sec		CFS	
4. Continuity Equations: b) Regional Curves: $u = Q/A$						ft/Sec		CFS	
Options for using the D84 term in the relative roughness relation (R/D84), when using estimation method 1:									
Option 1: For sand-bed channels, measure the "pretension height" (h_p) of sand dunes above channel bed elevations. Substitute an average sand dune pretension height (h_p in feet) for the D84 term in estimation method 1.									
Option 2: For bedrock-dominated channels, measure several "pretension heights" (h_p) of bedrock dunes above channel bed elevations. Substitute an average bedrock pretension height (h_p in feet) for the D84 term in estimation method 1.									
Option 3: For bedrock-dominated channels, measure several "pretension heights" (h_p) of rock separations steps/joints upflashed surfaces above channel bed elevations. Substitute an average bedrock pretension height (h_p in feet) for the D84 term in estimation method 1.									

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WARSSS page 5-21

Worksheet 5-2. Computations of velocity and bankfull discharge using various methods (Rosgen and Silvey, 2005).

Bankfull VELOCITY / DISCHARGE Estimates									
Site	Donaldson Run - Tributary B			Location		2+45.5			
Date	3/1/09	Stream Type	B4 (W/D)	Valley Type	II				
Observers	CRS			HUC					
INPUT VARIABLES					OUTPUT VARIABLES				
Bankfull Cross-section AREA	17.5	A_{bf} (sqft)	Bankfull Mean DEPTH	1.39	D_{bf} (ft)				
Bankfull WIDTH	12.5	W_{bf} (ft)	Wetted PERIMETER	13.64	W_{wet} (ft)				
D84 @ Riffle	97.6	Dia. (mm)	D84 mm / 304.8 =	0.32	D84 (ft)				
Bankfull SLOPE	0.0239	S (ft/ft)	Hydraulic RADIUS	1.2800	R (ft)				
Gravitational Acceleration	32.2	g (ft/Sec ²)	Relative Roughness	4.00	n (ft/Sec)				
Drainage AREA	0.14	DA (sqmi)	Shear Velocity	0.9921	u^* (ft/Sec)				
			$u^* = \frac{1}{1.49S}$						
ESTIMATION METHODS					Bankfull VELOCITY		Bankfull DISCHARGE		
1. Friction Factor/Relative Roughness	$u = [2.83 + 5.66 \log(R / D84)] u^*$				6.2	ft / Sec	108.5	CFS	
2. Roughness Coefficient	a) Manning's "n" from friction factor / relative roughness (Figs. 5-6, 5-7) $n = 1.4895 R^{0.148} S^{0.78}$				6.7	ft / Sec	116.4	CFS	
2. Roughness Coefficient	b) Manning's "n" from Jarrett (USGS) $n = 0.395 R^{0.148} S^{0.78}$				-	ft / Sec	-	CFS	
Note: The equation is for application involving open, steeped high bedrock roughness, unlike bedrock-dominated stream sections. In the stream type chart, B4 (W/D) is marked with a red "X".									
2. Roughness Coefficient	c) Manning's "n" from Stream Type $n = 1.4895 R^{0.148} S^{0.78}$				4.9	ft / Sec	84.9	CFS	
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)	a) Manning's "n" from Stream Type $n = 1.4895 R^{0.148} S^{0.78}$				6.2/6.7	ft / Sec	109.2/116.4	CFS	
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)	b) Manning's "n" from Stream Type $n = 1.4895 R^{0.148} S^{0.78}$				6.5	ft / Sec	114.5	CFS	
"best" prof. judgment $n = 0.0415$									
4. Continuity Equations	a) USGS Gage: Return Period for Bankfull Discharge (Y+Q) =					ft / Sec		CFS	
4. Continuity Equations	b) Regional Curves $u = Q/A$					ft / Sec		CFS	
Options for using the D84 term in the relative roughness relation (R/D84), when using estimation method 1:									
Option 1: For sand-bed channels, measure the "pretension height" (h_p) of sand dunes above channel bed elevations. Substitute an average sand dune pretension height (h_p in feet) for the D84 term in estimation method 1.									
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Option 3: For bedrock-dominated channels, measure several "pretension heights" (h_p) of rock separations steps/joints upflashed surfaces above channel bed elevations. Substitute an average bedrock pretension height (h_p in feet) for the D84 term in estimation method 1.									

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WARSSS page 5-21

Worksheet 5-2. Computations of velocity and bankfull discharge using various methods (Rosgen and Silvey, 2005).

Bankfull VELOCITY / DISCHARGE Estimates									
Site	Donaldson Run - Tributary B			Location		3+09			
Date	3/1/09	Stream Type	B4 (W/D)	Valley Type	II				
Observers	CRS			HUC					
INPUT VARIABLES					OUTPUT VARIABLES				
Bankfull Cross-section AREA	15.7	A_{bf} (sqft)	Bankfull Mean DEPTH	1.21	D_{bf} (ft)				
Bankfull WIDTH	13.0	W_{bf} (ft)	Wetted PERIMETER	13.87	W_{wet} (ft)				
D84 @ Riffle	-	Dia. (mm)	D84 mm / 304.8 =	-	D84 (ft)				
Bankfull SLOPE	0.0270	S (ft/ft)	Hydraulic RADIUS	1.1300	R (ft)				
Gravitational Acceleration	32.2	g (ft/Sec ²)	Relative Roughness	0.9903	n (ft/Sec)				
Drainage AREA	0.14	DA (sqmi)	Shear Velocity	0.9903	u^* (ft/Sec)				
ESTIMATION METHODS					Bankfull VELOCITY	Bankfull DISCHARGE			
1. Friction Factor/Relative Roughness	$u = [2.83 + 5.66 \log(R / D84)] u^*$				ft/Sec	CFS			
2. Roughness Coefficient	a) Manning's "n" from friction factor / relative roughness (Figs. 5-6, 5-7) $n = 1.4895 R^{0.148} S^{0.78}$				ft/Sec	CFS			
2. Roughness Coefficient	b) Manning's "n" from Jarrett (USGS) $n = 0.395 R^{0.148} S^{0.78}$				-	ft/Sec	-	CFS	
2. Roughness Coefficient	c) Manning's "n" from Stream Type $n = 1.4895 R^{0.148} S^{0.78}$				4.7	ft/Sec	74.1 CFS		
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)	a) Manning's "n" from Stream Type $n = 1.4895 R^{0.148} S^{0.78}$					ft/Sec	CFS		
3. Other Methods, in Hydraulic Geometry (Hs, Darcy-Weisbach, Chzy C, etc.)	b) Manning's "n" from Stream Type $n = 1.4895 R^{0.148} S^{0.78}$				6.4	ft/Sec	100.0 CFS		
4. Continuity Equations	a) USGS Gage: Return Period for Bankfull Discharge (Y+Q) =					ft/Sec	CFS		
4. Continuity Equations	b) Regional Curves $u = Q/A$					ft/Sec	CFS		
Options for using the D84 term in the relative roughness relation (R/D84), when using estimation method 1:									
Option 1: For sand-bed channels, measure the "pretension height" (h_p) of sand dunes above channel bed elevations. Substitute an average sand dune pretension height (h_p in feet) for the D84 term in estimation method 1.									
Option 2: For bedrock-dominated channels, measure several "pretension heights" (h_p) of bedrock dunes above channel bed elevations. Substitute an average bedrock pretension height (h_p in feet) for the D84 term in estimation method 1.									
Option 3: For bedrock-dominated channels, measure several "pretension heights" (h_p) of rock separations steps/joints upflashed surfaces above channel bed elevations. Substitute an average bedrock pretension height (h_p in feet) for the D84 term in estimation method 1.									

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WARSSS page 5-21

Donaldson Run Tributary B Stream Restoration Country Club View Arlington, Virginia

No. Revision Date Appd.



1775 Greensboro Station Place
Suite 200
Tysons, VA 22102
703.847.3071

Legend

---	PROPERTY LINE
---	BASELINE
---	MATCHLINE
---	EXISTING STORM SEWER
---	WATER LINE
---	SEWER LINE
---	WATER LINE BORING. ELEV IS OF TOP OF PIPE, UNLESS OTHERWISE NOTED

Match Line See Below



Donaldson Run Tributary B Stream Restoration Country Club View Arlington, Virginia

No.	Revision	Date	Appr.

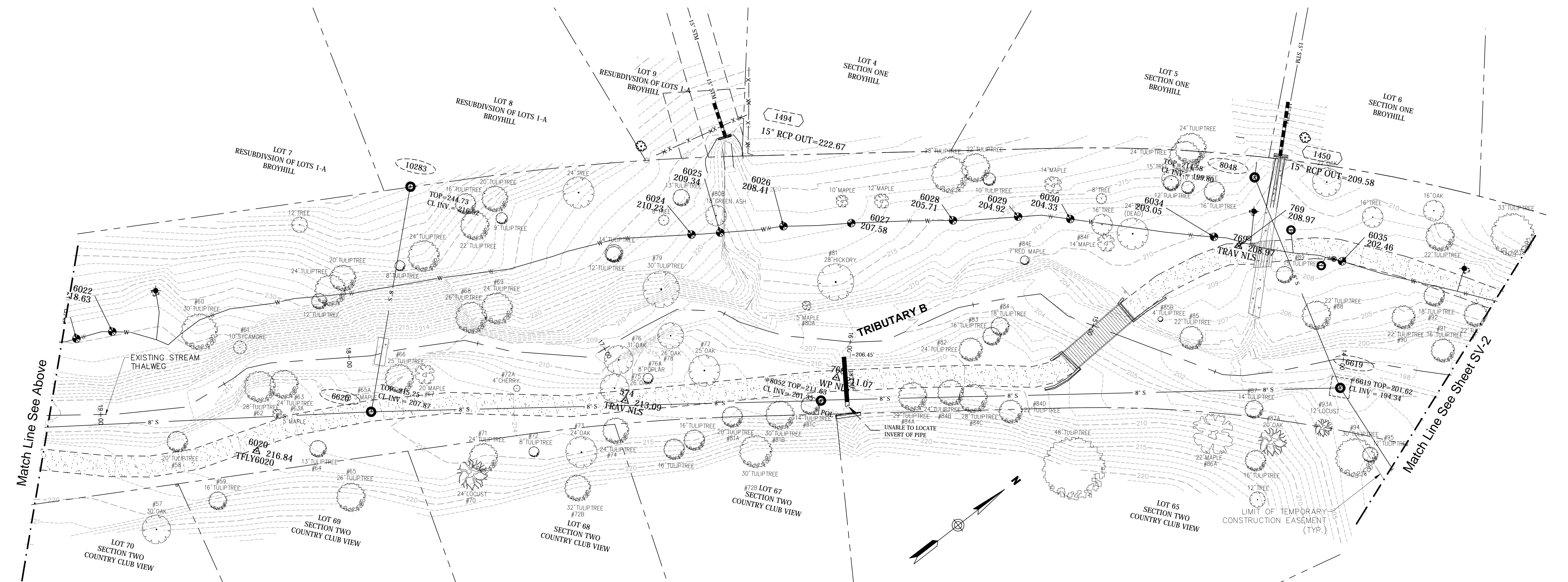
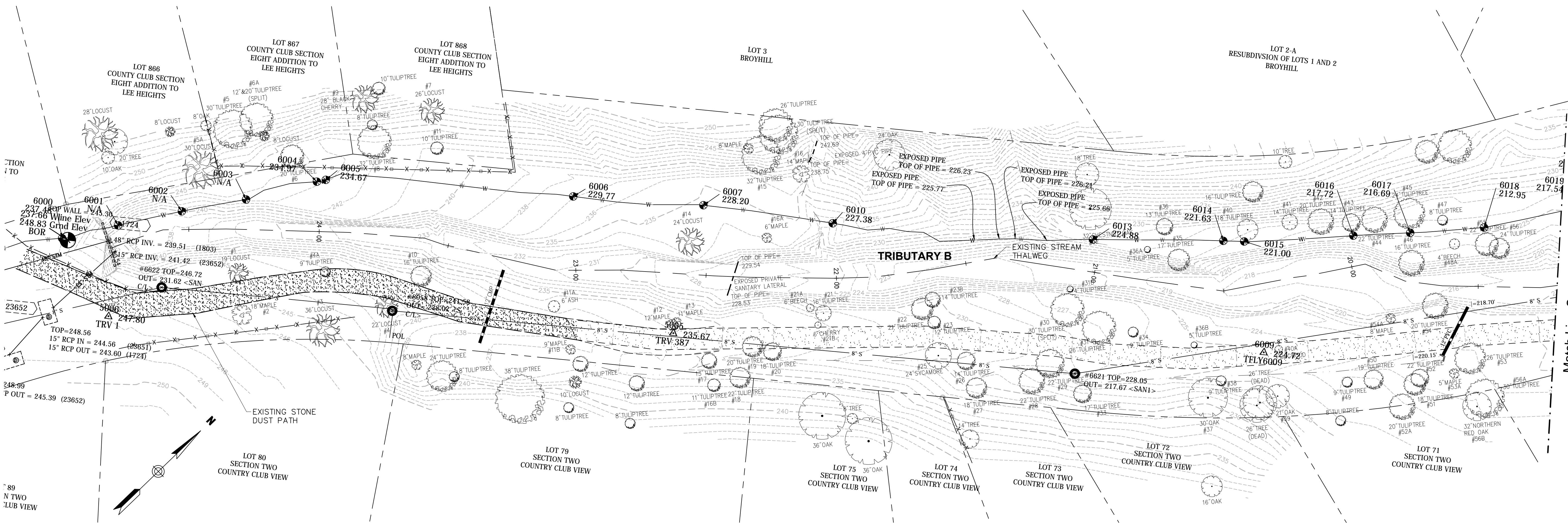
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Issued for Final Design	Date June 25, 2019

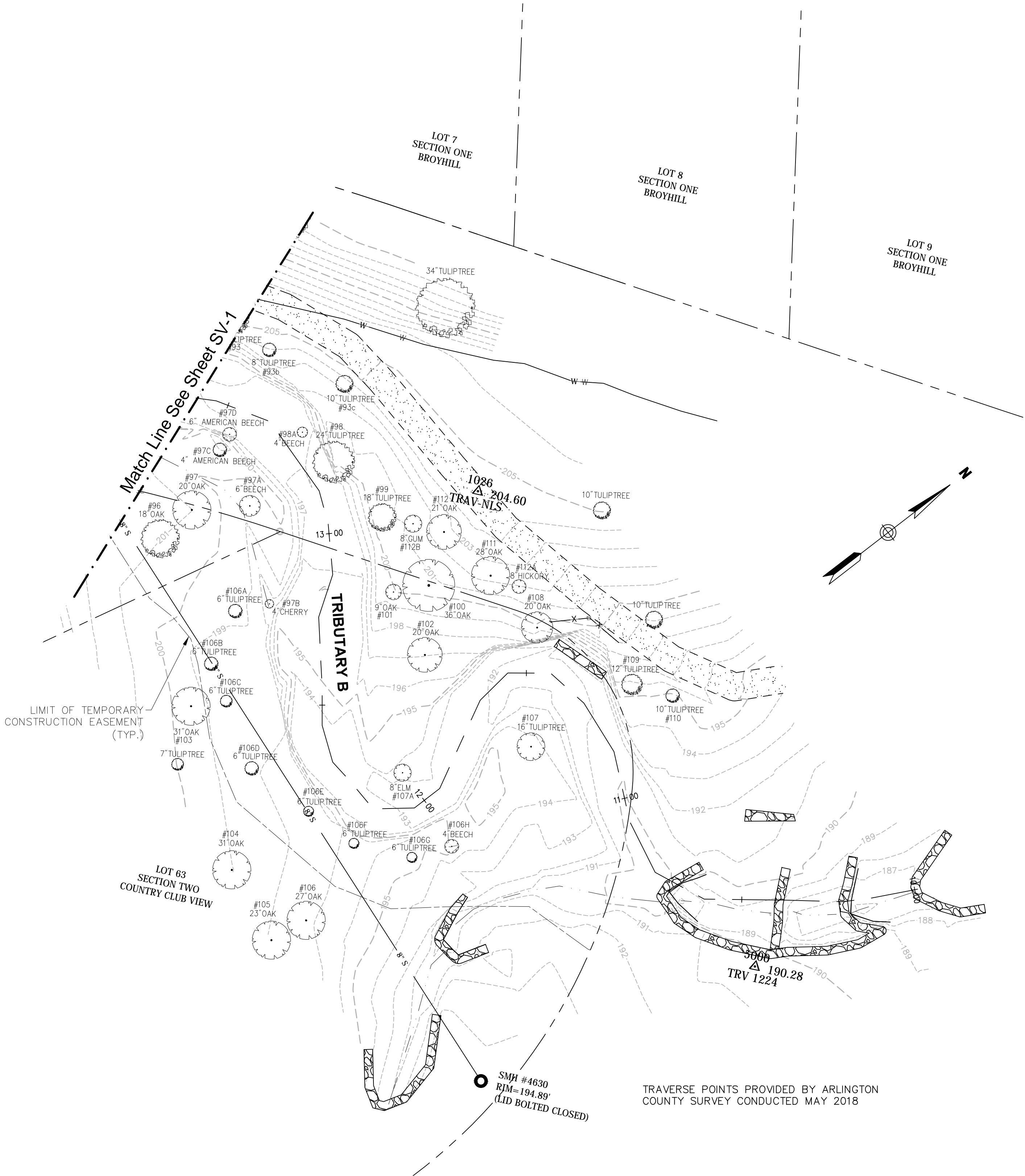
Existing Conditions Plan

SV-1

Sheet 20 of 23

Project Number
32923.00





Legend	
	PROPERTY LINE
	BASELINE
	MATCHLINE
	48" STM
	W
	8" S
	BOR# ELEV.
	WATER LINE BORING. ELEV IS OF TOP OF PIPE, UNLESS OTHERWISE NOTED



Donaldson Run
Tributary B
Stream Restoration
Country Club View
Arlington, Virginia

No.	Revision	Date	Appvd.

Designed by	Checked by
IFS	JRL
Issued for	Date
Final Design	June 25, 2019

Drawing Title

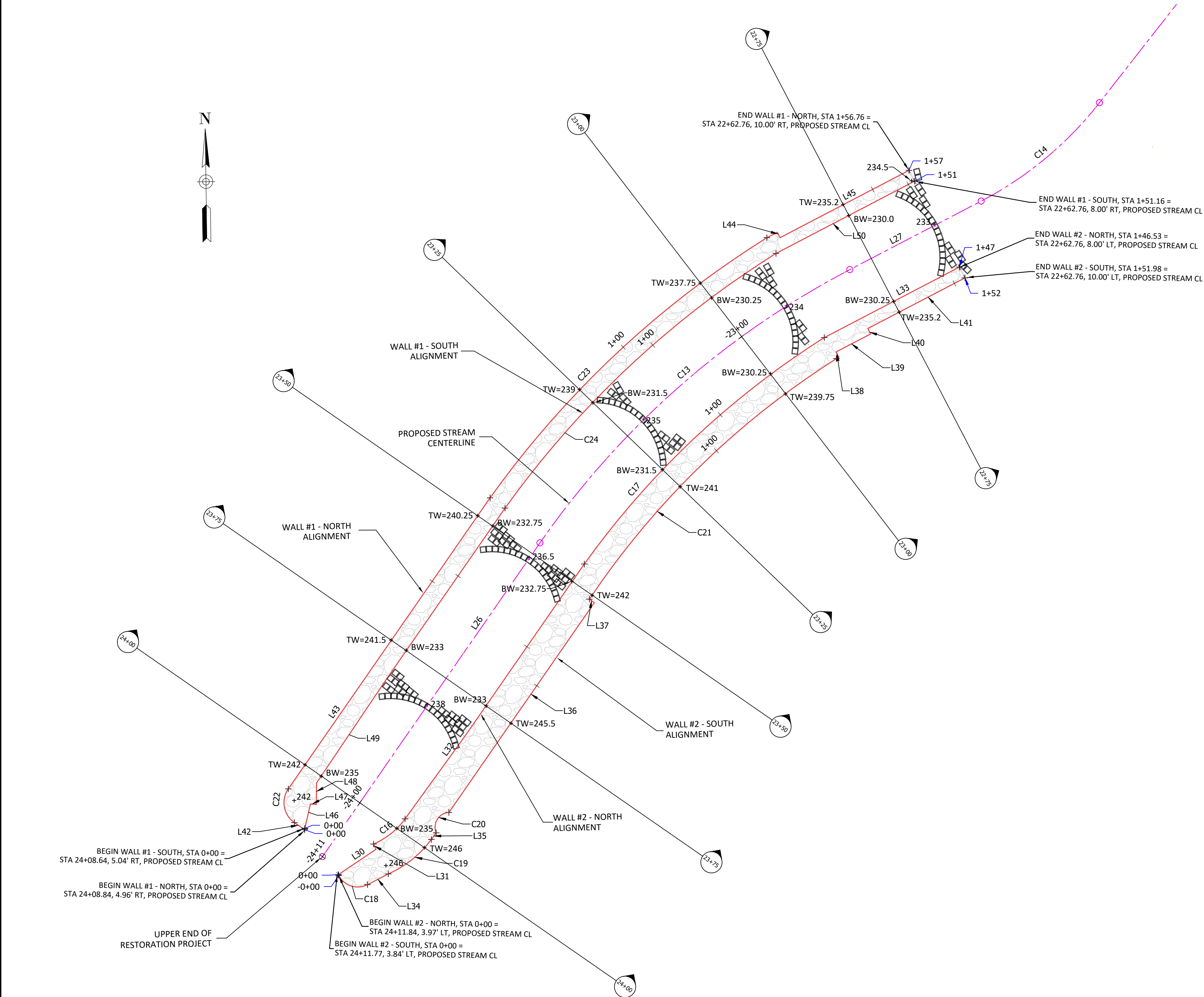
Existing Conditions Plan

Drawing Number

SV-2

Sheet 21 of 23

Project Number
32923.00



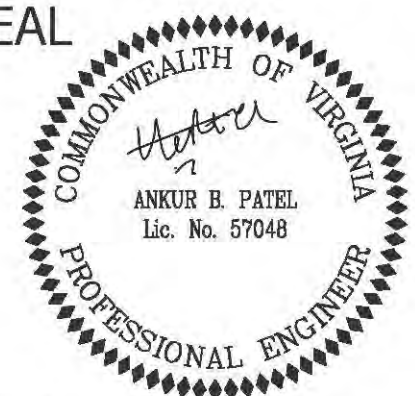
- NOTES:
- CROSS SECTIONS OF STREAM SHOWING VERTICAL INFORMATION FOR WALL CAN BE FOUND ON SHEET C-10.
 - REFER TO SHEETS C-5 AND C-7 FOR STACKED STONE WALL DETAIL AND PLAN AND PROFILE VIEW.

WALL #1 - NORTH							
Number	Length	Radius	Line/Chord Direction	CHORD LENGTH	DELTA	START STA OR PC	END STA OR PT
L42	2.043		N55° 17' 01.81"W			0+00.00	0+02.04
C22	6.284	3.999	N10° 15' 55.73"W	5.66	90° 02' 12"	0+02.04	0+08.33
L43	58.447		N34° 44' 26.29"E			0+08.33	0+66.77
C23	63.079	160.992	N46° 47' 32.25"E	62.68	22° 26' 57"	0+66.77	1+29.85
L44	1.000		S27° 32' 06.98"E			1+31.77	1+32.77
L45	23.990		N62° 27' 53.02"E			1+32.77	1+56.76

WALL #1 - SOUTH							
Number	Length	Radius	Line/Chord Direction	CHORD LENGTH	DELTA	START STA OR PC	END STA OR PT
L46	4.144		N12° 49' 31.75"E			0+00.00	0+04.14
L47	0.958		S85° 17' 01.81"E			0+04.14	0+05.10
L48	3.552		N01° 00' 13.26"E			0+05.10	0+08.65
L49	20.547		N33° 58' 53.95"E			0+08.65	0+29.20
C24	61.744	158.000	N46° 46' 45.88"E	61.35	22° 23' 25"	0+63.62	1+25.37
L50	25.793		N62° 27' 53.02"E			1+25.37	1+51.16

WALL #2 - NORTH							
Number	Length	Radius	Line/Chord Direction	CHORD LENGTH	DELTA	START STA OR PC	END STA OR PT
L30	7.499		N56° 07' 03.09"E			0+00.00	0+07.50
L31	0.958		N25° 17' 01.81"W			0+07.50	0+08.46
C16	6.736	12.401	N51° 25' 59.93"E	6.65	31° 07' 20"	0+08.46	0+15.19
L32	17.131		N35° 52' 20.04"E			0+15.19	0+32.33
C17	54.766	142.000	N46° 40' 45.71"E	54.43	22° 05' 52"	0+66.62	1+21.38
L33	25.149		N62° 27' 53.03"E			1+21.38	1+46.53

WALL #2 - SOUTH							
Number	Length	Radius	Line/Chord Direction	CHORD LENGTH	DELTA	START STA OR PC	END STA OR PT
C18	5.525	3.540	S72° 23' 53.95"E	4.98	89° 26' 10"	-0+00.00	0+05.53
L34	3.869		N62° 53' 01.08"E			0+05.53	0+09.39
C19	9.191	17.345	N51° 16' 48.58"E	9.08	30° 21' 34"	0+09.39	0+18.58
L35	1.364		N36° 06' 01.33"E			0+18.58	0+19.95
C20	4.614	2.458	N32° 04' 44.49"E	3.97	107° 34' 12"	0+19.95	0+24.56
L36	42.118		N34° 44' 26.29"E			0+24.56	0+66.68
L37	1.001		N55° 15' 33.71"W			0+66.68	0+67.68
C21	57.296	138.000	N45° 45' 56.52"E	56.89	23° 47' 19"	0+67.68	1+24.98
L38	1.000		N28° 35' 37.74"W			1+25.46	1+26.46
L39	6.442		N62° 27' 53.02"E			1+26.46	1+32.90
L40	1.000		N27° 32' 06.98"W			1+32.90	1+33.90
L41	18.080		N62° 27' 53.02"E			1+33.90	1+51.98



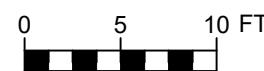
Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
Glenn 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Dennis M. Leach 9/10/20
TRANSPORTATION DIRECTOR
Christin Pelicore 9/10/20
PROJECT MANAGER

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
S32D GEOMETRIC CONTROL PLAN.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

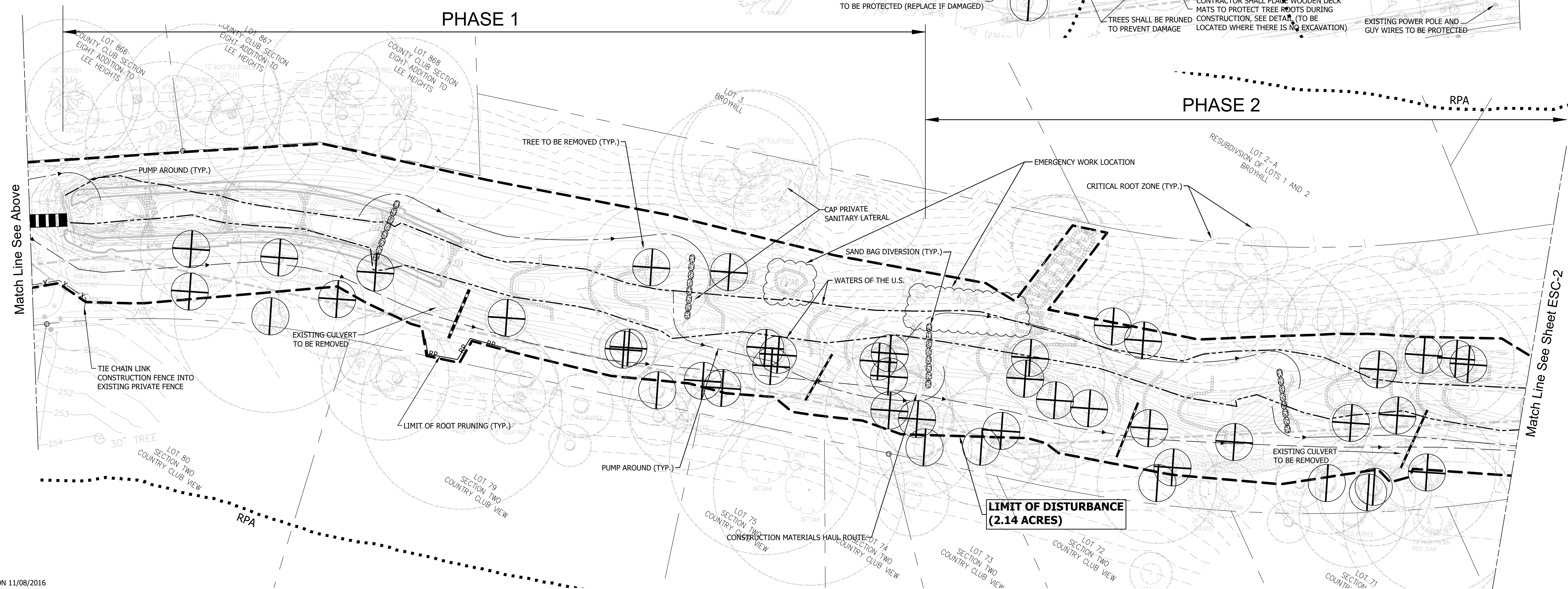
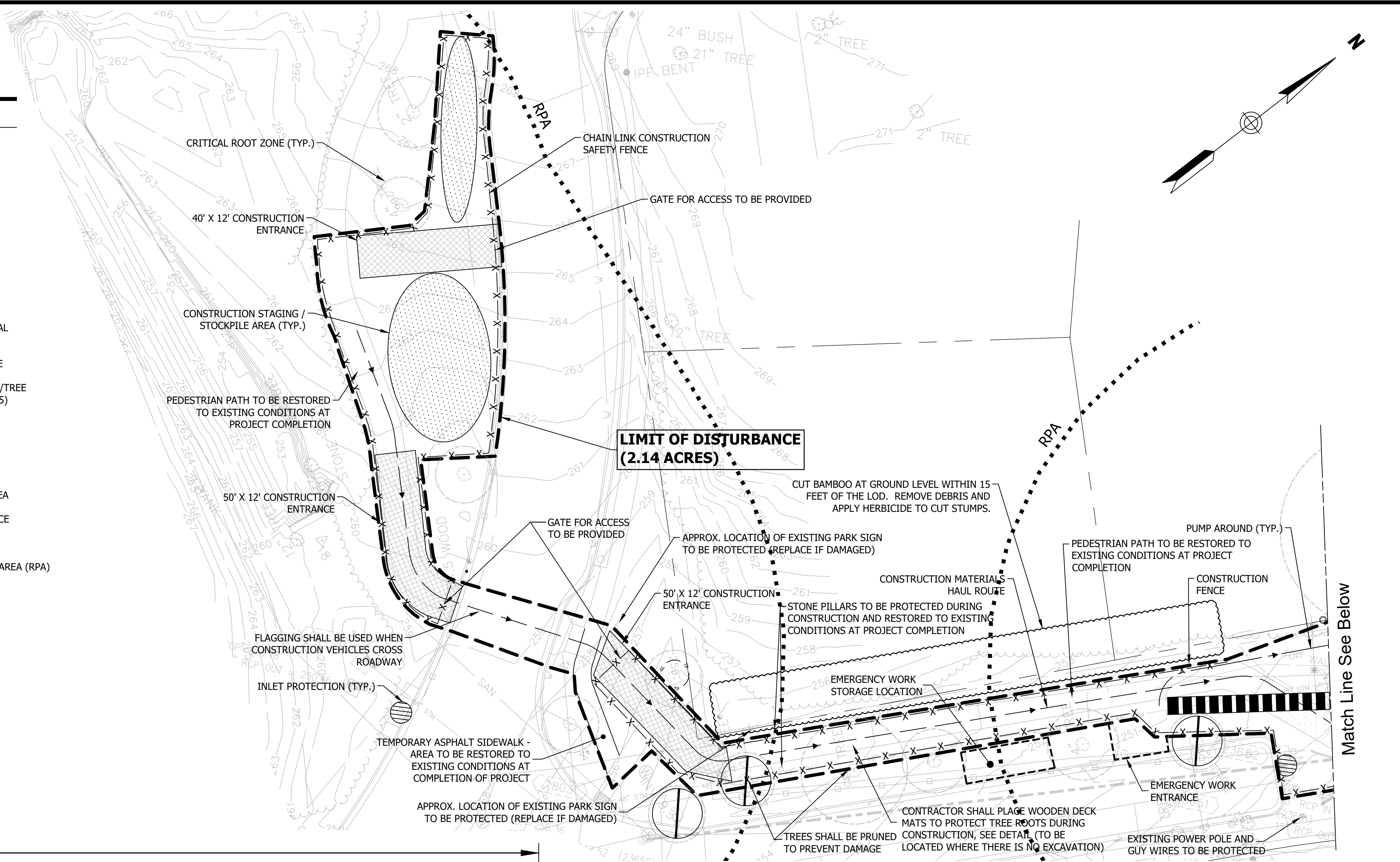
PLOTTED: JULY 10 2020
PLOTTED BY: JCANDLER

SCALE: 1" = 10'



- NOTES:
1. THE LIMITS OF DISTURBANCE (LOD) AS INDICATED ON THESE PLANS WERE ESTABLISHED TO GIVE THE CONTRACTOR AMPLE ROOM FOR CONDUCTING CONSTRUCTION OPERATIONS. NO TREES SHALL BE REMOVED UNTIL AFTER THE CONTRACTOR HAS MARKED THE LOD AS PART OF HIS/HER CONSTRUCTION LAYOUT SURVEY. THE PROJECT OFFICER / DESIGNER OR URBAN FORESTER WILL IDENTIFY SPECIFIC SPECIMEN TREES TO BE PROTECTED DURING CONSTRUCTION. THE CONTRACTOR SHALL THEN MARK TREES TO BE PROTECTED WITH TREE PROTECTION (TP) FENCING AS SPECIFIED IN THE SPECIAL PROVISIONS.
 2. THE LOD SHALL BE SURVEYED AND CLEARLY DEMARCATED BY THE CONTRACTOR AND APPROVED BY THE PROJECT OFFICER PRIOR TO ANY CONSTRUCTION ACTIVITIES.
 3. SILT FENCE SHALL BE PROVIDED AROUND ALL STOCKPILES LOCATED ADJACENT TO THE STREAM.
 4. ORANGE SAFETY FENCE SHALL BE INSTALLED ALONG THE ENTIRE LOD, IN AREAS WHERE THERE IS NOT CHAIN LINK SAFETY FENCE OR TREE PROTECTION FENCE PROPOSED.
 5. TREE PROTECTION FENCE SHALL BE INSTALLED ALONG THE LIMITS OF ALL PROPOSED ROOT PRUNING.
 6. THE LOD IS SHOWN ON MULTIPLE PLAN SHEETS. THE LIMITS AS SHOWN ON THIS PLAN SHALL GOVERN THE CONTRACTOR'S FIELD LAYOUT.
 7. THE SANITARY SEWER LINES THAT CROSS AND RUN PARALLEL WITH THE PROJECT STREAM CORRIDOR SHALL BE PROTECTED FROM DAMAGE DURING ALL CONSTRUCTION OPERATIONS.
 8. IF REPAIR OR REPLACEMENT OF ANY ASPECT OF THE SANITARY SEWER SYSTEM BECOMES NECESSARY DUE TO DAMAGE RESULTING FROM THE CONTRACTOR'S CONSTRUCTION OPERATION, ALL WORK SHALL CONFORM TO ARLINGTON COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND BE PERFORMED AT THE CONTRACTOR'S EXPENSE.
 9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY CONTROLLING AND DIVERTING SEWAGE RELATED TO ANY NECESSARY REPLACEMENT OR REPAIR WORK. THE CONTRACTOR SHALL ALSO MAKE ADEQUATE PROVISIONS TO PROTECT DONALDSON RUN FROM ANY ACCIDENTAL RELEASES OF SEWAGE.
 10. ALL SANITARY SEWER WORK SHALL CONFORM TO ARLINGTON COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS.

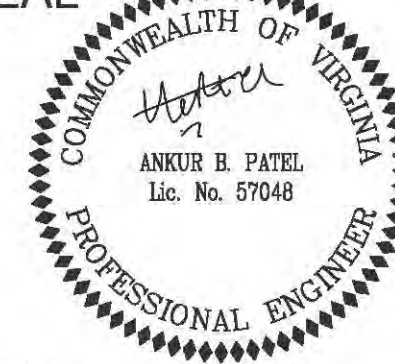
Legend	
	MATCH LINE
	LIMIT OF DISTURBANCE
	CONSTRUCTION FENCE
	HAUL ROUTE
	CRITICAL ROOT ZONE
	TREE TO BE REMOVED
	POTENTIAL TREE REMOVAL (SAVE IF POSSIBLE)
	TREE PROTECTION FENCE
	LIMIT OF ROOT PRUNING/TREE PROTECTION (SEE NOTE 5)
	PUMP AROUND
	SAND BAG DIVERSION
	INLET PROTECTION
	MATERIALS STORAGE AREA
	CONSTRUCTION ENTRANCE
	WATERS OF THE U.S.
	RESOURCE PROTECTION AREA (RPA)



DEPARTMENT OF
ENVIRONMENTAL SERVICES
FACILITIES & ENGINEERING DIVISION
ENGINEERING BUREAU
2100 CLARENDON BOULEVARD, SUITE 813
ARLINGTON, VA 22201
PHONE: 703.228.3629
FAX: 703.228.3606

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SEAL



08/28/20

APPROVALS DATE

Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
Christie 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Dennis M. Leach 9/10/20
TRANSPORTATION DIRECTOR
Christin Policover 9/10/20
PROJECT MANAGER

REVISIONS DATE

EROSION AND SEDIMENT
CONTROL PLAN

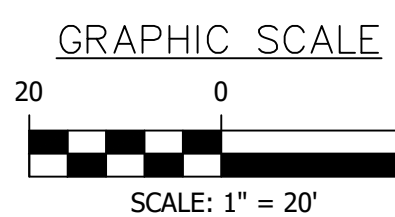
DONALDSON RUN
TRIBUTARY B
S32D

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

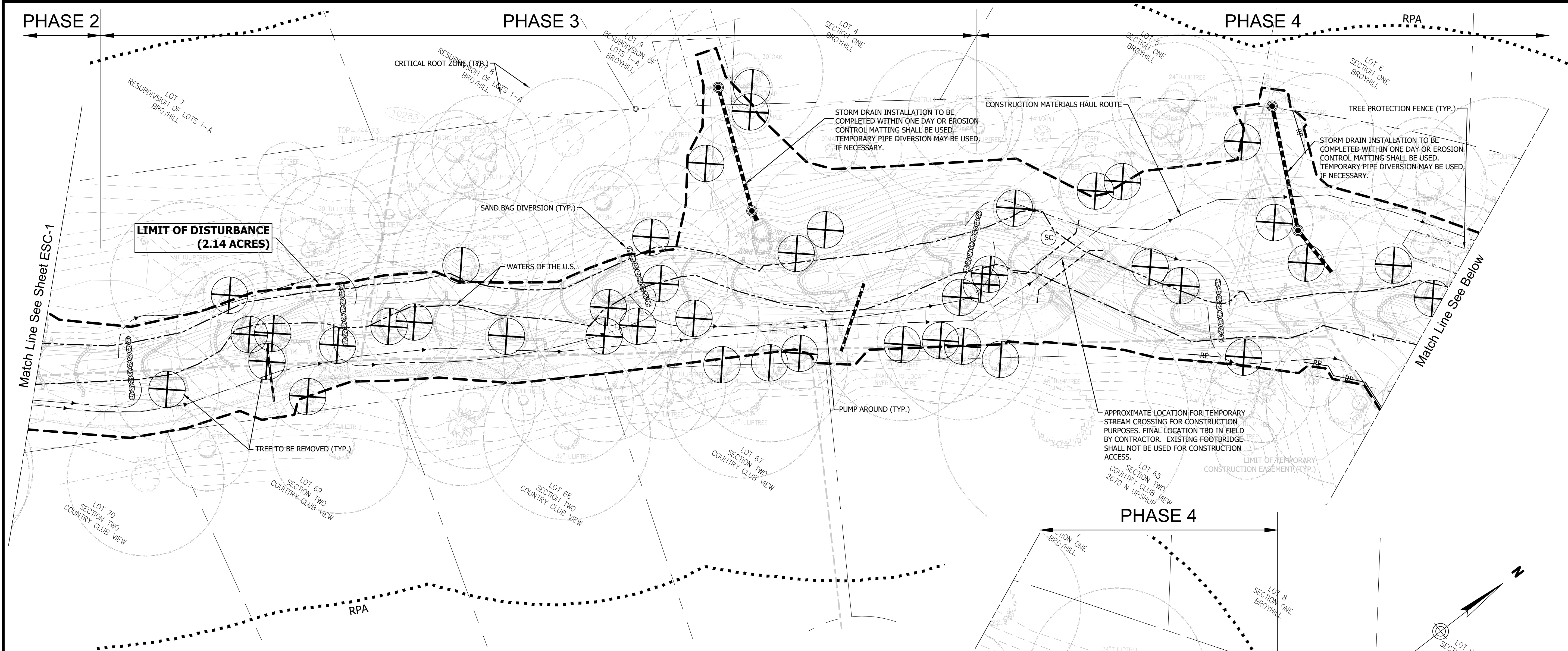
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PLOTTED: SEPTEMBER 10 2020
PLOTTED BY: JCANDLER

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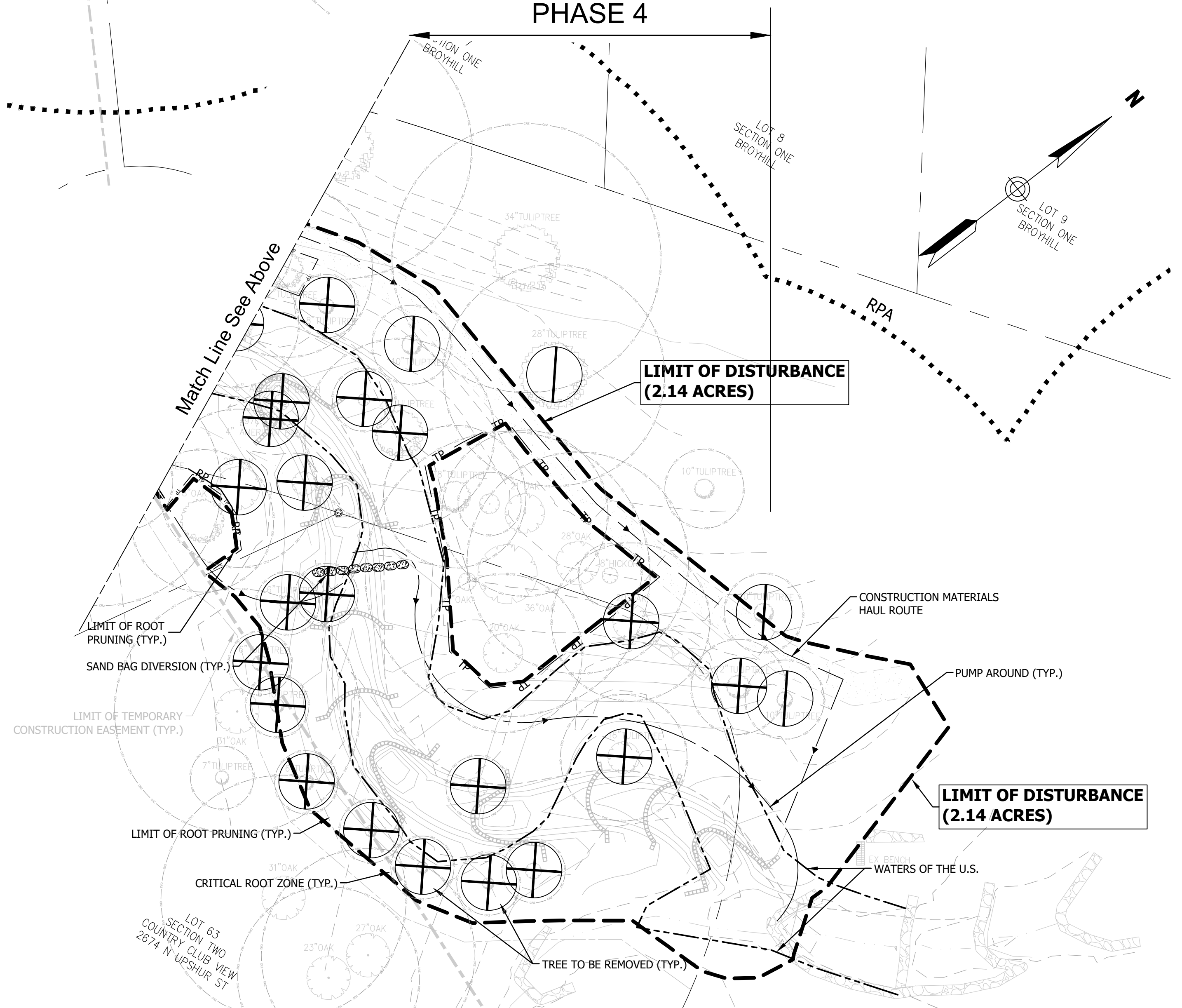


SHEET ESC-1



- NOTES:
1. THE LIMITS OF DISTURBANCE (LOD) AS INDICATED ON THESE PLANS WERE ESTABLISHED TO GIVE THE CONTRACTOR AMPLE ROOM FOR CONDUCTING CONSTRUCTION OPERATIONS. NO TREES SHALL BE REMOVED UNTIL AFTER THE CONTRACTOR HAS MARKED THE LOD AS PART OF HIS/HER CONSTRUCTION LAYOUT SURVEY. THE PROJECT OFFICER / DESIGNER OR URBAN FORESTER WILL IDENTIFY SPECIFIC SPECIMEN TREES TO BE PROTECTED DURING CONSTRUCTION. THE CONTRACTOR SHALL THEN MARK TREES TO BE PROTECTED WITH TREE PROTECTION (TP) FENCING AS SPECIFIED IN THE SPECIAL PROVISIONS.
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 10. ALL SANITARY SEWER WORK SHALL CONFORM TO ARLINGTON COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS.

Legend	
	MATCH LINE
	LIMIT OF DISTURBANCE
	HAUL ROUTE
	CRITICAL ROOT ZONE
	TREE TO BE REMOVED
	POTENTIAL TREE REMOVAL (SAVE IF POSSIBLE)
	TREE PROTECTION FENCE
	LIMIT OF ROOT PRUNING/TREE PROTECTION FENCE (SEE NOTE 5)
	PUMP AROUND
	SAND BAG DIVERSION
	WATERS OF THE U.S.
	RESOURCE PROTECTION AREA
	TEMPORARY STREAM CROSSING



ARLINGTON VIRGINIA

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SEAL

08/28/20
APPROVALS DATE
Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER
Ramal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
Dennis W. Leach 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Christin Jolicœur 9/10/20
TRANSPORTATION DIRECTOR
PROJECT MANAGER

REVISIONS	DATE

EROSION AND SEDIMENT CONTROL PLAN

DONALDSON RUN TRIBUTARY B S32D

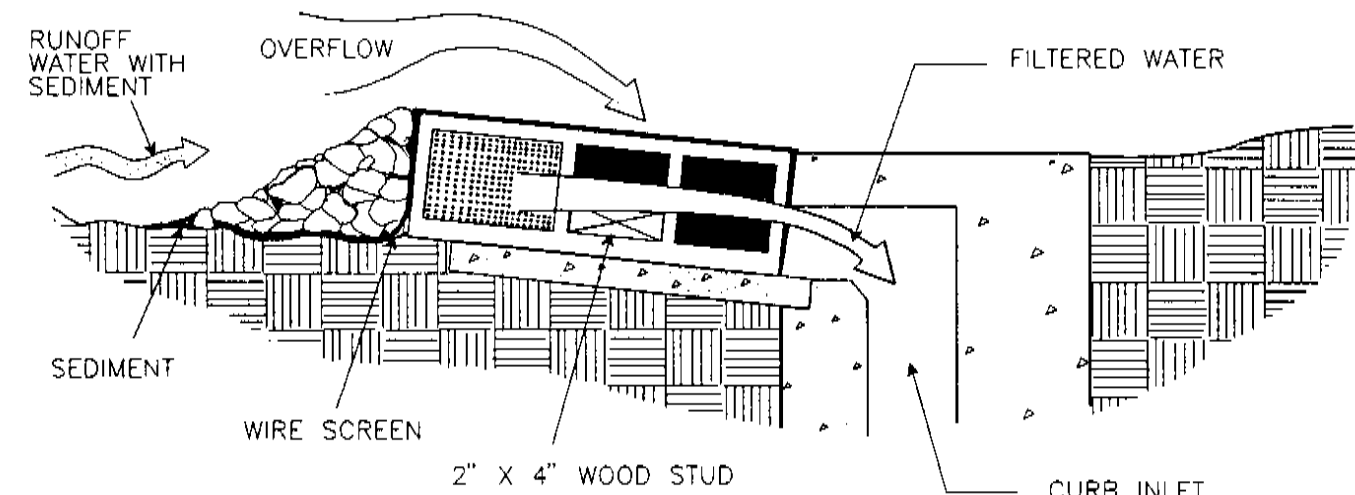
DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

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PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

PLOTTED: SEPTEMBER 10 2020
PLOTTED BY: JCANDLER

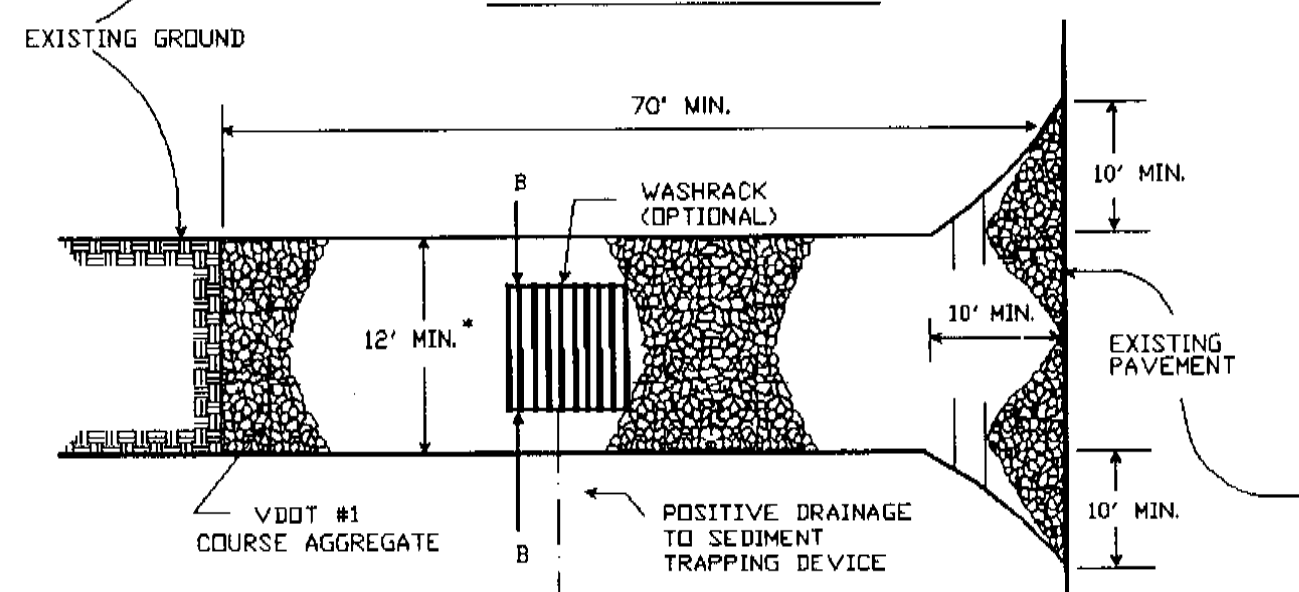
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SCALE: 1" = 20'

SHEET ESC-2

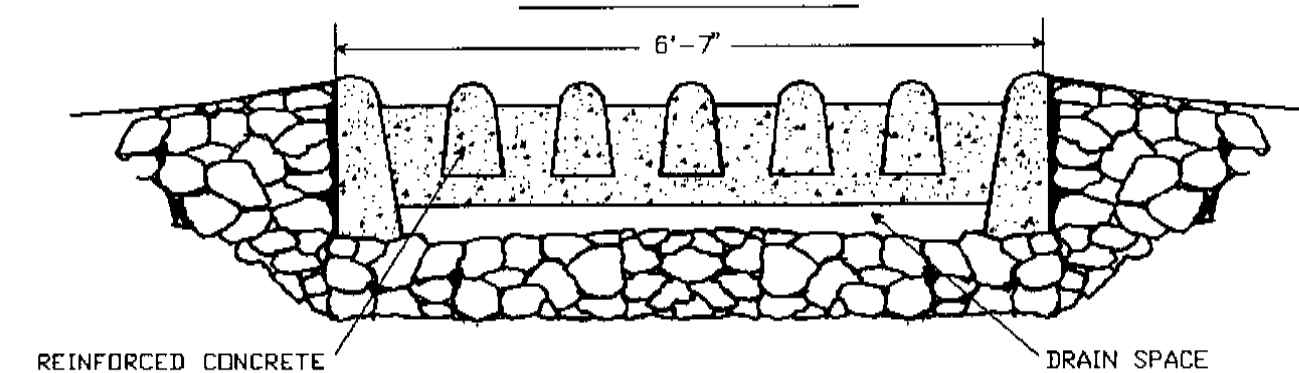


THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE

BLOCK AND GRAVEL INLET PROTECTION



PLAN VIEW



The diagram illustrates a tree protection zone (TPZ) for a tree. A sign on the left specifies the area and provides contact information for reporting violations. A protective structure, made of chain-link fabric and pipe, encircles the tree. The structure is 10 feet in diameter and 2 feet high. A typical sign is shown on the structure, indicating the TPZ and the tree's location. The structure is anchored to the ground with tension bars at the ends. The sign also indicates the minimum height of the structure (6 feet) and the minimum depth of the anchoring (2 feet).

NO ENTRY
TREE PRESERVATION AREA
CALL: 703-228-6567
TO REPORT VIOLATIONS
PROHIBIDO ENTRAR
ZONA DE PROTECCION DEL ARBOL
LLAMAR AL TEL. 703-228-6567
PARA REPORTAR VIOLACIONES

SIGN ENLARGEMENT
12"
2" = 1'-0"

2" CHAIN-LINK FABRIC
PIPE 2" O.D.
GALVANIZED STEEL

TYPICAL SIGNAGE
30" O.C.
(SEE ENLARGEMENT)

TENSION BAR AT ENDS

10'-0" MAX.

6'-0" MIN.

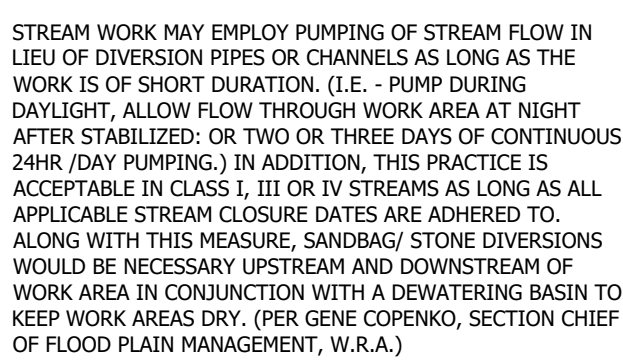
2'-0" MIN. DEPTH

NOTES:

1. TREE PROTECTION (ENF TPF) SHALL BE INSTALLED PRIOR TO ANY SITE WORK, CLEARING OR DEMOLITION.
2. TPF SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
3. REMOVE TPF ONLY WITH APPROVAL FROM ARLINGTON COUNTY URBAN FORESTER AFTER ALL SITE WORK HAS BEEN COMPLETED.
4. SIGN MATERIAL TO BE WEATHER RESISTANT.

ROOT PRUNING

N.T.S.



PLAN VIEW

PUMP DISCHARGE HOSE

STRAP

FILTER BAG

MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALS

12 IN MIN.

ELEVATION

STRAP

FILTER BAG

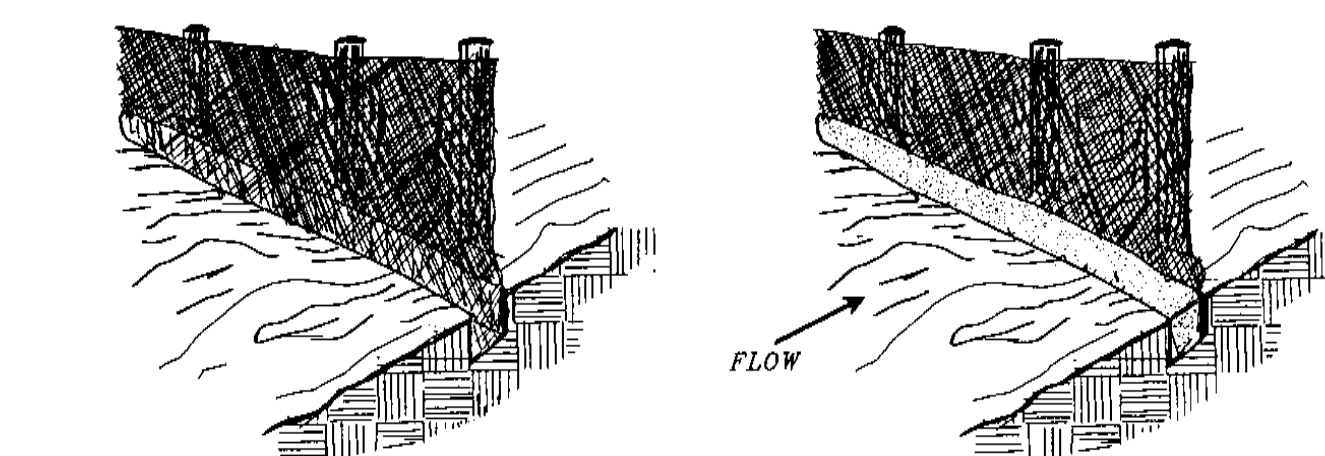
SLOPE 5% MAX

12 IN MIN

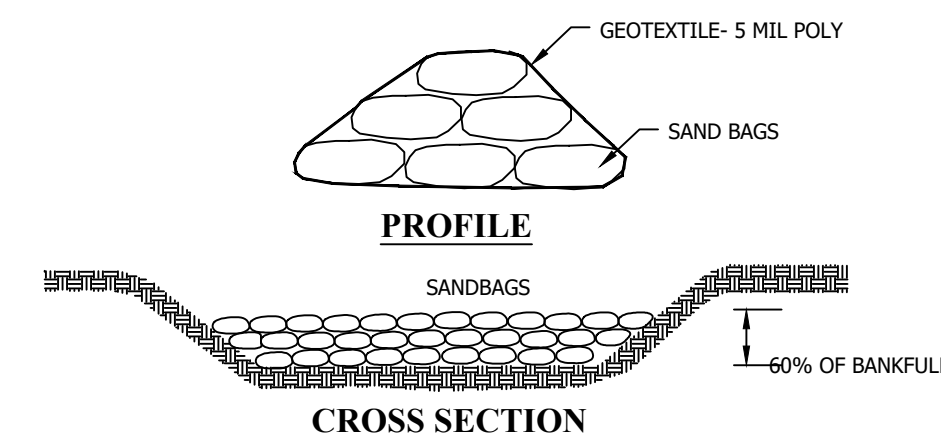
1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., WULFH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OF 25 MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARY) FOR THE FOLLOWING:

GRAB TENSILE	250 LB	ASTM D-4632
PUNCTURE	150 LB	ASTM D-4633
FLOW RATE	70 GAL/MIN/FT ²	ASTM D-4491
PERMITTIVITY (SEC ⁻¹)	1.2 SEC ⁻¹	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-4751
SEAM STRENGTH	90%	ASTM D-4632
6. REPLACE FILTER BAG IF BAG CLOGS OR HAS TEARS, RIPS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

1. SET THE STAKES.
2. EXCAVATE A 4" X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.
3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.
4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)
SILT FENCE
N.T.S.



**ACCESS ROAD
DECK MAT**

NOTES:

1. MAT SHALL BE "DECK MAT" BY CAROLINA MAT INCORPORATED OR APPROVED EQUAL.
2. MATS SHALL BE INSTALLED SUCH THAT THE SURFACE TIMBER RUNS PARALLEL WITH THE VEHICLE TREAD, SUBSEQUENT MATS SHALL BE INSTALLED SUCH THAT THEY BUTT UP AGAINST EACH OTHER.
3. TO PROTECT CRITICAL ROOT ZONES, 4" MULCH SHALL BE PLACED BENEATH MATS FOR ACCESS PATHS.

**PLAN VIEW
NOT TO SCALE**

**SECTION A-A'
NOT TO SCALE**

The diagram illustrates the installation of a Deck Mat for an access road. The plan view shows a rectangular mat with a central area of woven filter fabric (12'0" wide) and two side areas of 2'0" wide. The mat is composed of 2"x8" surface timber running parallel to the vehicle tread, with 2"x8" runner timber supporting it. The mat is bolted to the ground. The section A-A' shows the mat's profile, including the woven filter fabric, 2"x8" surface timber, 2"x8" runner timber, 4" mulch layer, and the sub-surface. The mat is installed against a tree trunk, with a 2'0" gap between the mat and the tree. The mat is labeled "ABUTTING DECK MAT" and "LOD-TREE PROTECTION FENCE".

<i>Amy Pflaum</i>	8/31/2020
QUALITY CONTROL ENGINEER	
<i>Kamal Taktak</i>	9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR	
<i>Shayla</i>	09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF	
<i>Dennis W. Leach</i>	9/10/20
TRANSPORTATION DIRECTOR	
<i>Christin Jolicœur</i>	9/10/20
PROJECT MANAGER	

EROSION AND SEDIMENT CONTROL DETAILS

DONALDSON RUN
TRIBUTARY B

SCALE:

ESC-3

DONALDSON RUN TRIBUTARY B

PRE-STORM EROSION & SEDIMENTATION CHECKLIST:

PER EROSION AND SEDIMENT CONTROL GENERAL NOTE 6, THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ANY ADDITIONAL EROSION AND SEDIMENT CONTROL (ESC) MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE COUNTY. THESE SUPPLEMENTARY PRACTICES ARE IN ADDITION TO THOSE SHOWN IN AN ESC PLAN. ESC PRACTICES SHALL BE MODIFIED AS NEEDED TO ENSURE ONLY CLEAR WATER IS DISCHARGED FROM THE SITE.

THE FOLLOWING ACTIONS SHALL BE TAKEN PRIOR TO STORM EVENTS WITH PREDICTED HEAVY AND/OR LARGE VOLUME RAINFALL TO PREVENT SEDIMENT DISCHARGES FROM A CONSTRUCTION SITE. A TYPICAL SUMMER THUNDERSTORM IS AN EXAMPLE OF A STORM EVENT WITH PREDICTED HEAVY AND/OR LARGE VOLUME RAINFALL.

A. PERIMETER CONTROLS

1. SILT FENCE SHALL BE CHECKED FOR UNDERMINING, HOLES, OR DETERIORATION OF THE FABRIC. FENCING SHALL BE REPLACED IMMEDIATELY IF THE FABRIC IS DAMAGED OR WON. SILT FENCE MUST BE TRENCHED INTO THE GROUND PER STATE SPECIFICATIONS (STD & SPEC 3.09).

2. WOODEN STAKES OR STEEL POSTS SHALL BE PROPERLY SECURED UPRIGHT INTO THE GROUND. DAMAGED POSTS OR STAKES MUST BE REPLACED.

3. SEDIMENT THAT HAS ACCUMULATED AGAINST THE SILT FENCE SHOULD BE REMOVED. ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE LEVEL REACHES ONE-HALF THE HEIGHT OF THE FENCING.

4. HAY BALES OR A STONE BERM SHOULD BE SPACED ACROSS THE CONSTRUCTION ENTRANCE TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION SITE.

B. EXPOSED SLOPES AND SOIL

1. EXPOSED SLOPES NOT AT THE FINAL STABILIZATION PHASE SHALL BE COVERED WITH TARPS, PLASTIC SHEETING, OR EROSION CONTROL MATTING. COVERING MATERIAL SHALL BE PROPERLY SECURED/ANCHORED.

2. CONTROLS SHALL BE INSTALLED TO PREVENT CONCENTRATED FLOW DOWN AN EXPOSED SLOPE. BERMS OR DIVERSION DIKES SHALL BE INSTALLED AT THE TOP OF CUT/EXPOSED SLOPES TO DIRECT STORM FLOW AROUND THE DISTURBED AREA.

3. EXPOSED SLOPES AT THE FINAL STABILIZATION PHASE SHALL BE STABILIZED USING SLOPE STABILIZATION PRACTICES SUCH AS SOIL STABILIZATION BLANKETS OR MATTING AS SPECIFIED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH) STD & SPEC 3.36. BLANKETS OR MATS MUST BE PROPERLY SECURED AND ANCHORED TO THE SLOPE USING STAPLES, PINS, OR STAKES.

4. SEEDED AREAS SHALL BE CHECKED AND RESEEDED AS NECESSARY TO COVER EXPOSED SOIL. RECENTLY SEEDED AREAS SHALL BE PROTECTED BY STRAW OR SOIL STABILIZATION BLANKETS TO PREVENT SEEDING FROM BEING WASHED AWAY.

C. STOCKPILES

1. STOCKPILED SOIL AND OTHER LOOSE MATERIALS THAT CAN BE WASHED AWAY SHALL BE COVERED WITH A TARP, PLASTIC SHEETING, OR OTHER STABILIZATION MATTING. THE COVER MUST BE PROPERLY SECURED/ANCHORED DOWN TO PREVENT IT FROM BEING BLOWN OFF AND EXPOSING MATERIALS TO RAIN. CONTROLS SUCH AS HAY BALES OR BOOMS SHOULD BE PLACED ALONG THE PERIMETER OF THE STOCKPILE (DOWNHILL SIDE).

D. INLET PROTECTION

2. INLET PROTECTION CONTROLS SHALL BE INSPECTED TO ENSURE THEY ARE FUNCTIONING PROPERLY AND FLOODING WILL NOT OCCUR. CLOGGED OR DAMAGED CONTROLS MUST BE REPLACED IMMEDIATELY. ENSURE CONTROLS ALLOW FOR OVERFLOW/BYPASS OF STORMWATER RUNOFF DURING SIGNIFICANT STORM EVENTS.

IN ADDITION TO THESE PRE-STORM ACTIONS, ALL EROSION AND SEDIMENT CONTROL (ESC) MEASURES MUST BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL.

LAND CONSERVATION NOTES – GENERAL

1. NO DISTURBED AREA WILL REMAIN DENUDED FOR MORE THAN 7 CALENDAR DAYS UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR OR HIS AGENT.

2. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING. FIRST AREAS TO BE CLEARED ARE TO BE THOSE REQUIRED FOR THE PERIMETER CONTROLS.

3. ALL STORM AND SANITARY SEWER LINES NOT IN STREETS ARE TO BE MULCHED AND SEEDED WITHIN 5 DAYS AFTER BACKFILL. NO MORE THAN 500 FEET ARE TO BE OPEN AT ANY ONE TIME.

4. ELECTRIC POWER, TELEPHONE AND GAS SUPPLY TRENCHES ARE TO BE COMPACTED, SEEDED AND MULCHED WITHIN 5 DAYS AFTER BACKFILL.

5. ALL TEMPORARY EARTH BERMS, DIVERSIONS AND SEDIMENT CONTROL DAMS ARE TO BE MULCHED AND SEEDED FOR TEMPORARY VEGETATIVE COVER IMMEDIATELY AFTER GRADING. STRAW OR HAY MULCH IS REQUIRED. THE SAME APPLIES TO ALL SOIL STOCKPILES.

6. DURING CONSTRUCTION, ALL STORM SEWER INLETS WILL BE PROTECTED BY INLET PROTECTION.

12/23/2015
date

Qianqin Li, P.E.
ESC Program Administrator
Department of Environmental Services
2100 Clarendon Boulevard, Suite 813
Arlington, Virginia 22201

Re: Erosion and Sediment Control Permit Application for:

Donaldson Run Tributary B Stream Restoration

street address
Upton St. N

lot, block, section subdivision
LDA XXX

permit number

Dear Mrs. Li:

I hereby certify that I accept the responsibilities of Responsible Land Disturber for the above referenced project. I understand that these responsibilities include:

1. Reviewing the erosion and sedimentation (E&S) plan for the project.

2. Walking the site prior to construction to identify critical areas.

3. Conducting a pre-construction briefing with earth moving and site contractors to present the E&S plan and highlight the presence of critical areas, the limits of clearing and the required E&S controls and tree protection measures to be installed. Call 703-228-0760 to schedule pre-construction meeting.

4. Regularly inspecting the site during construction to ensure that all E&S controls are functioning and are adequate to address erosion and sedimentation. Inspect the site 48 hours after a runoff-generating storm, and provide a copy of the inspection findings to the county.

5. Reporting to the owner the presence inadequate or non functioning E&S controls when they are observed.

6. Ensuring that temporary soil stabilization is applied within 7 days to areas denuded that will remain undisturbed for longer than 14-days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

7. Calling (703) 228-0760 at least 80 hours before demolishing any structure.

I may be reached at (703) 228 - 3663 with questions about this plan or my execution of the duties of Responsible Land Disturber.

telephone number

Sincerely,

signed

name printed

professional registration (type and number)

GENERAL EROSION AND SEDIMENT CONTROL NOTES

1. UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS.

2. THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.

3. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.

4. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.

5. PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN THE AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION AND SEDIMENT CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.

6. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.

7. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.

8. DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

9. THE CONTRACTOR SHALL INSPECT ALL EROSION AND SEDIMENT CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

10. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED.

PROJECT DESCRIPTION:

THERE WAS EMERGENCY WORK PERFORMED NEAR THE STREAM TO REPAIR THE LACK OF COVER OVER THE 30" WATERMAIN NEAR THE STREAM (SEE SHT ESC-1) COMPLETED IN EARLY SEPTEMBER 2020. THE EMERGENCY WORK WAS STREAMBANK STABILIZATION TO THE EXISTING CONDITIONS. THE DONALDSON RUN TRIBUTARY B STREAM RESTORATION PROJECT CONSISTS OF REALIGNING AND RE-GRADING APPROXIMATELY 1,420 LINEAR FEET OF THE STREAM BED. TO RESTORE THE STREAM CORRIDOR TO ITS NATURAL FUNCTIONING STATE, PROTECT THE NEARBY RESIDENCES, AND PREVENT THE STREAM BANKS FROM FURTHER DETERIORATION, THE PROJECT WILL INCORPORATE CONSTRUCTION OF CROSS-VANES, STEP POOLS AND PLUNGE POOLS. IMPROVEMENTS WILL BE MADE TO THREE STORM SEWER OUTFALLS IN ORDER TO MINIMIZE EROSION OF THE STREAM BANK.

EXISTING SITE CONDITIONS:

TRIBUTARY B IS AN EXISTING STREAM CORRIDOR THAT IS EXPERIENCING EROSION AND OTHER FORMS OF DETERIORATION. TRIBUTARY B BEGINS AT THE 42-INCH CULVERT OUTFALL NEAR THE END OF UPTON ST. N AND ENDS AT THE CONFLUENCE WITH TRIBUTARY A. A STONE DUST PEDESTRIAN WALKWAY MEANDERS ADJACENT TO THE STREAM.

ADJACENT PROPERTIES:

SINGLE-FAMILY RESIDENTIAL PROPERTIES ARE LOCATED ON BOTH SIDES OF THE STREAM.

OFF-SITE AREAS:

THE CONTRACTOR'S STAGING AND STORAGE AREA WILL BE WITHIN THE COUNTY'S PARK LAND LOCATED AT THE INTERSECTION OF UPTON ST. N AND N VERMONT ST. MATERIALS WILL BE TRANSPORTED FROM THIS STAGING AREA TO THE WORK SITE VIA THE EXISTING SIDEWALK ON THE NORTHWEST SIDE OF UPTON ST. N. THIS SIDEWALK WILL REMAIN CLOSED THROUGHOUT THE DURATION OF CONSTRUCTION OF THE PROJECT.

CRITICAL AREAS:

THE PROJECT IS LOCATED WITHIN THE LIMITS OF A RESOURCE PROTECTION AREA AND WATERS OF THE US. STEEP SLOPES EXIST ALONG THE EXISTING STREAM BANK.

EROSION AND SEDIMENT CONTROL MEASURES:

THE EROSION AND SEDIMENT CONTROL MEASURES FOR THIS PROJECT AREA INCLUDE SILT FENCE, TREE PROTECTION FENCING, INLET PROTECTION, A CONSTRUCTION ENTRANCE, AND DEWATERING MEASURES. INLET PROTECTION IS REQUIRED OUTSIDE THE PROJECT LIMITS WHEN/WHERE WATER FROM DISTURBED AREA FLOWS.

PERMANENT STABILIZATION:

ALL OF THE AREAS DISTURBED WITH THIS PLAN WILL BE RETURNED TO A SIMILAR CONDITION TO EXISTING. ALL AREAS WILL BE STABILIZED WITH GRASS OR MULCH.

STORMWATER RUNOFF CONSIDERATIONS:

THE PROJECT WILL NOT ALTER ANY EXISTING DRAINAGE PATTERNS. RUNOFF WILL CONTINUE TO FLOW TO THE STREAM VIA DIRECT RUNOFF AND PIPING FROM EXISTING AND PROPOSED OUTFALLS.

EROSION & SEDIMENT CONTROL PROGRAM:

1. THE EROSION CONTROL PLAN IS INTENDED TO ESTABLISH ENTRANCES AND PERIMETER CONTROL MEASURES WHICH INCLUDES SILT FENCE (SF), INLET PROTECTION (IP), AND OTHER CONTROLS SPECIFIED ON THE PLANS.

2. NO DISTURBED AREA WILL REMAIN DENUDED FOR MORE THAN 7 CALENDAR DAYS UNLESS OTHERWISE AUTHORIZED BY ARLINGTON COUNTY.

3. WHERE CONSISTENT WITH JOB SAFETY REQUIREMENTS, ALL EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES. NO MATERIAL SHALL BE PLACED IN STREAMBEDS. ANY STOCKPILED MATERIAL WHICH WILL REMAIN IN PLACE LONGER THAN 14 DAYS SHALL BE SEEDED AND MULCHED. WHEN SPOIL IS PLACED ON THE DOWNHILL SIDE OF TRENCH, IT SHALL BE BACKSLOPED TO DRAIN TOWARD THE TRENCH. WHEN NECESSARY TO DEWATER THE TRENCH, THE PUMP DISCHARGE HOSE SHALL OUTLET IN A STABILIZED AREA OR A SEDIMENT TRAPPING DEVICE.

4. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING. FIRST AREAS TO BE CLEARED ARE TO BE THOSE REQUIRED FOR THE PERIMETER CONTROLS.

5. ALL TEMPORARY EARTH BERMS, DIVERSIONS AND SEDIMENT CONTROL DAMS ARE TO BE MULCHED AND SEEDED FOR TEMPORARY VEGETATIVE COVER IMMEDIATELY AFTER GRADING. STRAW OR HAY MULCH IS REQUIRED. THE SAME APPLIES TO ALL SOIL STOCKPILES.

6. DURING CONSTRUCTION, ALL STORM SEWER INLETS WILL BE PROTECTED BY INLET PROTECTION.

7. ALL PRACTICES AND CONTROL DEVICES DESCRIBED HEREIN, SHALL CONFORM TO THE CURRENT VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH). IN ADDITION, THE CONTRACTOR SHALL TAKE THE FOLLOWING STEPS TO MINIMIZE THE VOLUME OF SILT:

A. CONTRACTOR SHALL EVALUATE THE SITE TO DETERMINE EXTENSIVE CUT AND FILL AREAS, AND SHALL WORK THOSE AREAS TO MINIMIZE THE EXTENT OF HEAVY EQUIPMENT WORK. CONTRACTOR SHALL STRIVE TO BRING AREAS TO

GRADE (ROUGH OR FINISH) AND TO STABILIZE, BY TEMPORARY OR PERMANENT VEGETATION, THESE DISTURBED AREAS PRIOR TO BEGINNING WORK IN ANOTHER AREA.

B. FILL AREAS SHALL BE COMPACTED COMPLETELY PRIOR TO THE END OF EACH WORK DAY. FILL SLOPE SURFACES SHALL BE LEFT ROUGHENED TO REDUCE SHEET EROSION OF THE SLOPES. CONTRACTOR SHALL RE-DIRECT CONCENTRATED RUNOFF, BY EARTH BERMS OR OTHER DEVICES, AROUND ACTIVELY DISTURBED AREAS TO STABILIZED OUTLETS.

C. CUT SLOPE, AS NECESSARY, SHALL BE PROTECTED FROM CONCENTRATED FLOW BY BERMS ABOVE THE SLOPE AND DIRECTED AROUND THE DISTURBED AREA TO STABILIZED OUTLETS.

EROSION & SEDIMENT CONTROL:

STEP 1:

1. INSTALL THE CONSTRUCTION ENTRANCE WITH WASH RACK AS SHOWN ON THE APPROVED E&S PLAN. MUD AND DEBRIS SHALL BE WASHED FROM ALL CONSTRUCTION VEHICLES AND EQUIPMENT BEFORE LEAVING THE SITE. THE SEDIMENT LADEN WATER WILL BE DIVERTED TO A SEDIMENT CONTROL DEVICE (I.E. SILT FENCE, INLET PROTECTION, ETC.). WATER TANK TRUCKS WILL BE USED IF PUBLIC WATER IS NOT AVAILABLE.

2. INSTALL SILT FENCE ALONG THE PERIMETER OF THE PROJECT AREA AND INSTALL INLET PROTECTION AT ALL EXISTING STORM DRAIN INLETS THAT MAY BE IMPACTED BY RUNOFF FROM THE SITE.

STEP 2:

1. FOLLOWING COMPLETION OF EROSION CONTROL INSTALLATION AS DESCRIBED IN STEP 1 OF THE SEDIMENT CONTROL PROGRAM, AND AFTER APPROVAL BY THE COUNTY INSPECTOR, CLEAR AND GRUB THE REMAINDER OF THE PROJECT AREA AS NECESSARY.

2. IMMEDIATELY FOLLOWING CLEARING OF THE SITE THE STORM SYSTEM SHALL BE INSTALLED TO HANDLE RUNOFF FROM THE SITE. AS EACH STRUCTURE IS INSTALLED, INLET PROTECTION MUST BE PROVIDED.

3. BEGIN GRADING SITE AS REQUIRED AND IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PROGRAM. EMPLOY PUMP-AROUND/DEWATERING OF STREAM CHANNEL AS INDICATED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLANS.

4. ANY EXCESS SOIL MATERIAL SHALL BE DISPOSED OF IN ACCORDANCE WITH VDOT REGULATIONS.

5. AFTER CONSTRUCTION OPERATIONS HAVE ENDED AND ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE MECHANICAL SEDIMENT CONTROLS SHALL BE REMOVED AND THE GROUND SHALL BE PERMANENTLY STABILIZED WITH VEGETATION UPON THE APPROVAL OF THE COUNTY INSPECTOR.

6. THE CONTRACTOR RESERVES THE RIGHT TO DETERMINE SEQUENCING OF CONSTRUCTION; HOWEVER, AT NO TIME SHALL THE SITE BE UNPROTECTED FROM SEDIMENT EROSION.

MAINTENANCE PROGRAM:

THE FOLLOWING IS A PROGRAM OF MAINTENANCE FOR THE MECHANICAL CONTROLS SPECIFIED IN THIS NARRATIVE AND ON THE PLAN:

1. THE SITE SUPERINTENDENT OR HIS/HER REPRESENTATIVE SHALL MAKE A VISUAL INSPECTION OF ALL MECHANICAL CONTROLS AND NEWLY STABILIZED AREA (I.E. SEEDED AND MULCHED AND/OR SODDED AREAS) ON A DAILY BASIS, ESPECIALLY AFTER A HEAVY RAINFALL EVENT TO ENSURE THAT ALL CONTROLS ARE MAINTAINED AND PROPERLY FUNCTIONING. ANY DAMAGED CONTROLS SHALL BE REPAIRED PRIOR TO THE END OF THE WORK DAY INCLUDING RE-SEEDING AND MULCHING OR RE-SODDING IF NECESSARY.

2. ALL SEDIMENT TRAPPING DEVICES SHALL BE CLEARED OUT AT 50% TRAP CAPACITY AND THE SEDIMENT SHALL BE DISPOSED OF BY SPREADING ON THE SITE OR IF NOT SUITABLE FOR FILL, HAULING AWAY AND DEPOSITING AT AN ACCEPTABLE DUMP SITE.

3. THE CONTRACTOR SHALL TAKE SPECIAL CARE TO PREVENT MUD AND/OR OTHER DEBRIS FROM BEING ENTERED ONTO EXISTING SWM/BMP FACILITIES OR DOWNSTREAM WATER WAYS. SHOULD OFF-SITE AREAS BECOME POLLUTED BY CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING THE AFFECTED AREAS TO THE SATISFACTION OF THE INSPECTOR.

4. AT THE COMPLETION OF CONSTRUCTION AND PRIOR TO BOND RELEASE, ALL TEMPORARY SEDIMENT CONTROLS SHALL BE REMOVED AND ANY REMAINING DENUDED AREAS SHALL BE STABILIZED. CERTAIN DEVICES MAY BE REMOVED PRIOR TO CONSTRUCTION COMPLETION BUT ONLY WITH THE APPROVAL OF THE COUNTY INSPECTOR.

5. AFTER CONSTRUCTION OPERATIONS HAVE ENDED, ALL DISTURBED AREAS SHALL BE STABILIZED. UPON APPROVAL OF THE COUNTY INSPECTOR, MECHANICAL SEDIMENT CONTROLS SHALL BE REMOVED AND THE GROUND PERMANENTLY STABILIZED WITH VEGETATION WITHIN 30 DAYS.

CONSTRUCTION ENTRANCE

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR THE WASHING AND REWORKING OF EXISTING STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEANOUT OF ANY STRUCTURES USED TO TRAP SEDIMENT.

2. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.

3. THE USE OF WATER TRUCKS TO REMOVE MATERIALS DROPPED, WASHED, OR TRACKED INTO ROADWAYS WILL NOT BE PERMITTED UNDER ANY CIRCUMSTANCES.

SILT FENCE

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

2. CLOSE ATTENTION SHALL BE PAID TO THE REPAIR OF DAMAGED SILT FENCE RESULTING FROM END RUNS AND UNDERCUTTING.

3. SHOULD THE FABRIC ON A SILT FENCE DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL BE NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.

4. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.

5. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE, PREPARED AND SEEDED.

INLET PROTECTION (ALL TYPES)

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NECESSARY.

2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

TREE PROTECTION

THE COUNTY'S URBAN FORESTER (703-228-1863) SHALL INSPECT ALL TREE PROTECTION 72 HOURS PRIOR TO THE START OF CONSTRUCTION. IN SPITE OF PRECAUTIONS, SOME DAMAGE TO PROTECTED TREES MAY OCCUR. IN SUCH CASES, THE FOLLOWING MAINTENANCE GUIDELINES SHOULD BE FOLLOWED:

1. SOIL AERATION: IF THE SOIL HAS BECOME COMPACTED OVER THE ROOT ZONE OF ANY TREE, THE GROUND SHALL BE AERATED BY PUNCHING HOLES WITH AN IRON BAR. THE BAR SHALL BE DRIVEN 1-FOOT DEEP AND THEN MOVED BACK AND FORTH UNTIL THE SOIL IS LOOSENED. THIS PROCEDURE SHALL BE REPEATED EVERY 18 INCHES UNTIL ALL OF THE COMPACTED SOIL BENEATH THE CROWN OF THE TREE HAS BEEN LOOSENED.

2. REPAIR OF DAMAGE:

A. ANY DAMAGE TO THE CROWN, TRUNK, OR ROOT SYSTEM OF ANY TREE RETAINED ON THE SITE SHALL BE REPAIRED IMMEDIATELY.

B. WHENEVER MAJOR ROOT OR BARK DAMAGE OCCURS, REMOVE SOME FOLIAGE TO REDUCE THE DEMAND FOR WATER AND NUTRIENTS.

C. DAMAGED ROOTS SHALL IMMEDIATELY BE CUT OFF CLEANLY INSIDE THE EXPOSED OR DAMAGED AREA. CUT SURFACES SHALL BE PAINTED WITH APPROVED TREE PAINT, AND MOIST PEAT MOSS, BURLAP, OR TOPSOIL SHALL BE SPREAD OVER THE EXPOSED AREA.

D. TO TREAT BARK DAMAGE, CAREFULLY CUT AWAY ALL LOOSENED BARK BACK INTO THE UNDAIMAGED AREA, TAPER THE CUT AT THE TOP AND BOTTOM, AND PROVIDE DRAINAGE AT THE BASE OF THE WOUND.

E. ALL TREE LIMBS DAMAGED DURING CONSTRUCTION OR REMOVED FOR ANY OTHER REASON SHALL BE CUT OFF ABOVE THE COLLAR AT THE PRECEDING BRANCH JUNCTION.

F. CARE FOR SERIOUS INJURIES SHALL BE PRESCRIBED BY A FORESTER OR A TREE SPECIALIST.

3. FERTILIZATION: BROADLEAF TREES THAT HAVE BEEN STRESSED OR DAMAGED SHALL RECEIVE A HEAVY APPLICATION OF FERTILIZER TO AID THEIR RECOVERY.

A. TREES SHALL BE FERTILIZED IN THE LATE FALL (AFTER OCTOBER 1) OR THE EARLY SPRING (FROM THE TIME FROST IS OUT OF THE GROUND UNTIL MAY 1). FALL APPLICATIONS ARE PREFERRED, AS THE NUTRIENTS WILL BE MADE AVAILABLE OVER A LONGER PERIOD OF TIME.

B. FERTILIZER SHALL BE APPLIED TO THE SOIL OVER THE FEEDER ROOTS. IN NO CASE SHOULD IT BE APPLIED CLOSER THAN 3 FEET TO THE TRUNK. THE ROOT SYSTEM OF CONIFERS EXTENDS SOME DISTANCE BEYOND THE DRIP LINE. INCREASE THE AREA TO BE FERTILIZED BY ONE FOURTH THE AREA OF THE CROWN.

C. FERTILIZER SHALL BE APPLIED USING APPROVED FERTILIZATION METHODS AND EQUIPMENT.

D. FORMULATIONS AND APPLICATION RATES SHALL CONFORM TO THE GUIDELINES GIVEN IN TABLE 3.38-A OF VESCH.

DEWATERING (ALL TYPES)

1. THE FILTERING DEVICES MUST BE INSPECTED FREQUENTLY AND REPAIRED OR REPLACED ONCE THE SEDIMENT BUILD-UP PREVENTS THE STRUCTURE FROM FUNCTIONING AS DESIGNED.

2. THE ACCUMULATED SEDIMENT WHICH IS REMOVED FROM A DEWATERING DEVICE MUST BE SPREAD ON-SITE AND STABILIZED OR DISPOSED OF AT AN APPROVED DISPOSAL SITE AS PER APPROVED PLAN.

PUMP AROUND

1. THE MEASURE SHALL BE INSPECTED AFTER EVERY STORM AND REPAIRS MADE TO THE DIKE/DIVERSION, HOSES, AND OUTFALL, AS NECESSARY. ONCE EVERY TWO WEEKS, WHETHER A STORM EVENT HAS OCCURRED OR NOT, THE MEASURE SHALL BE INSPECTED AND REPAIRS MADE IF NEEDED. DAMAGES CAUSED BY TRAFFIC OR OTHER ACTIVITY MUST BE REPAIRED BEFORE THE END OF EACH WORKING DAY.

TEMPORARY SEEDING:

SEE SHEET III-288 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH) FOR ALLOWABLE PLANTING MATERIAL, SEEDING RATES, AND DATES. THE PLANTING REQUIREMENTS OF THE "SOUTH" SHALL BE FOLLOWED. LIMING SHALL BE BASED ON TABLE 3.31-A OF VESCH. FERTILIZERS SHALL BE APPLIED AS 600 LB/ACRE. THE FERTILIZER SHALL BE INCORPORATED INTO THE TOP 2-4" OF SOIL. SEED SHALL BE EVENLY APPLIED AND SMALL GRAINS SHALL BE PLANTED NO MORE THAN 1.5" DEEP. SEEDING MADE IN FALL FOR WINTER COVER AND DURING HOT SUMMER MONTHS SHALL BE MULCHED.

PERMANENT SEEDING:

PERMANENT SEEDING TO BE PER DEQ TECHNICAL BULLETIN NO. 4, TABLE 3.31-B AND LANDSCAPE PLAN SHEET L-8 FOR SEED MIX.

SODDING:

SODDED AREAS SHALL BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLANS. SOIL TEST SHOULD BE MADE TO DETERMINE THE EXACT REQUIREMENTS FOR LIME AND FERTILIZER. PRIOR TO LAYING SOD, SOIL SURFACE SHALL BE CLEAR OF TRASH, DEBRIS AND LARGE OBJECTS. QUALITY OF SOD SHALL BE STATE CERTIFIED AND ENSURE GENETIC PURITY AND HIGH QUALITY. SOD SHALL NOT BE LAID IN EXCESSIVELY WET OR DRY WEATHER AND BE DELIVERED AND INSTALLED WITHIN 36 HOURS. SOD SHOULD NOT BE LAID ON FROZEN SOIL SURFACE AND SHALL BE INSTALLED PER PAGE III-339 OF VESCH.

DUST CONTROL:

DUST SHALL BE CONTROLLED USING A VARIETY OF METHODS TO INCLUDE VEGETATIVE COVER, MULCH, TILLAGE, IRRIGATION, SPRAY-ON ADHESIVES, STONE, BARRIERS, AND CALCIUM CHLORIDE. THE IMPLEMENTATION OF THE DUST CONTROL METHODS SHALL BE INSTALLED PER SECTION 3.39 OF VESCH.

UTILITY INSTALLATION:

UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:

1. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.

2. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.

3. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.

4. MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION.

5. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE REGULATIONS.

6. APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.

FOR ALL DETAILS AND SPECIFICATIONS, SEE THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK

REVISED ON 11/08/2016

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ARLINGTON
VIRGINIA

DEPARTMENT OF
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FACILITIES & ENGINEERING DIVISION

ENGINEERING BUREAU

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SEAL

COMMONWEALTH OF VIRGINIA

ANKUR B. PATEL

Lic. No. 57048

PROFESSIONAL ENGINEER

08/28/20

APPROVALS

DATE

Amy Pflaum

QUALITY CONTROL ENGINEER

8/31/2020

Kamal Taktak

CONSTRUCTION MANAGEMENT SUPERVISOR

9.2.20

09.10.2020

WATER, SEWER, STREETS BUREAU CHIEF

9/10/20

TRANSPORTATION DIRECTOR

9/10/20

PROJECT MANAGER

REVISIONS

DATE

EROSION AND SEDIMENT
CONTROL NOTES

DONALDSON RUN
TRIBUTARY B

S320

DESIGNED: JCANDLER

DRAWN: JCANDLER

CHECKED: APATEL

MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
S320 ESC NOTES.DWG

PATH: Q:\DATA\S320\DESIGN\DRAWINGS

PLOTTED: SEPTEMBER 10 2020

PLOTTED BY: JCANDLER

SCALE:

GRAPHIC SCALE

20 0 20

SCALE: 1" = 20'

FOR ALL DETAILS AND SPECIFICATIONS, SEE THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK

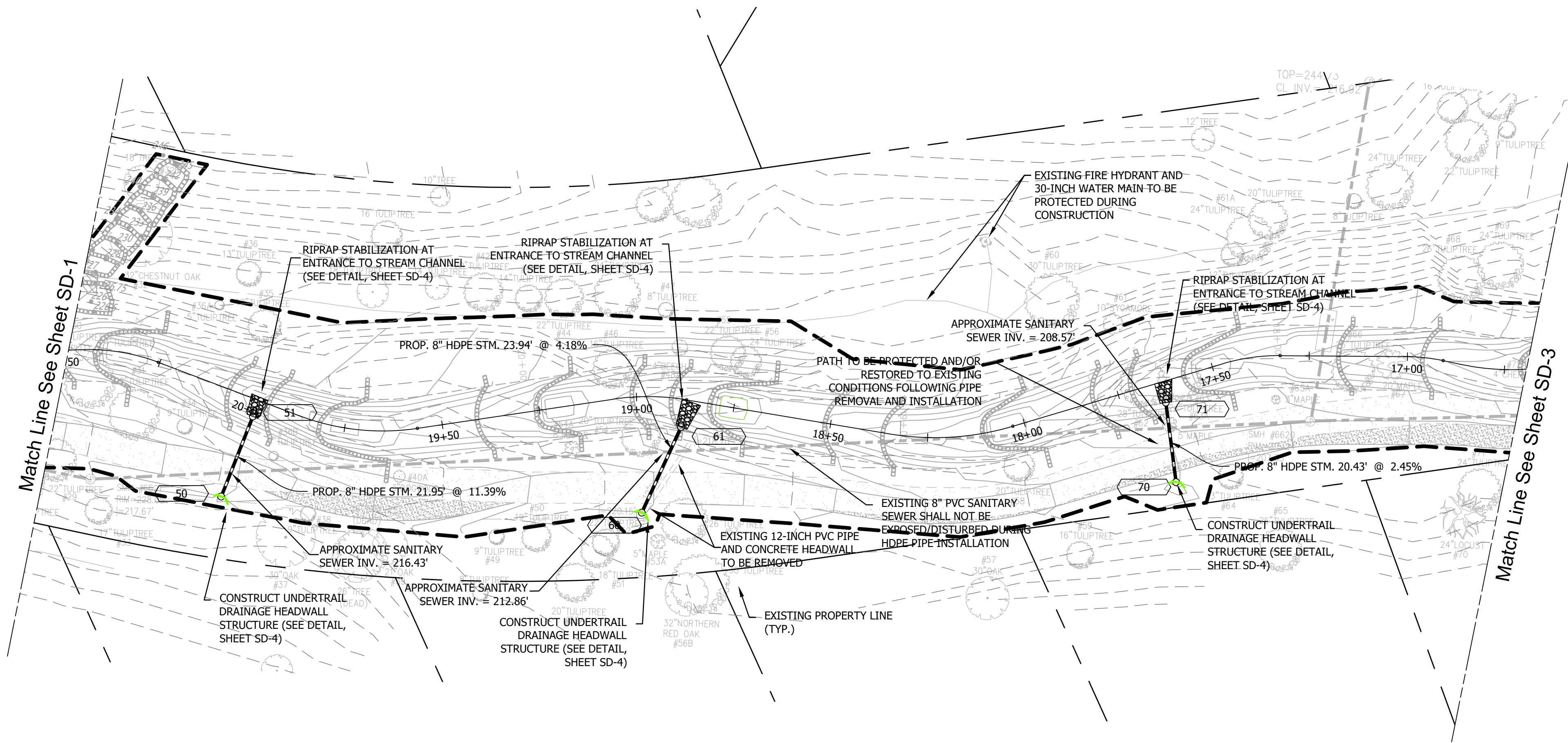
SHEET

ESC-4

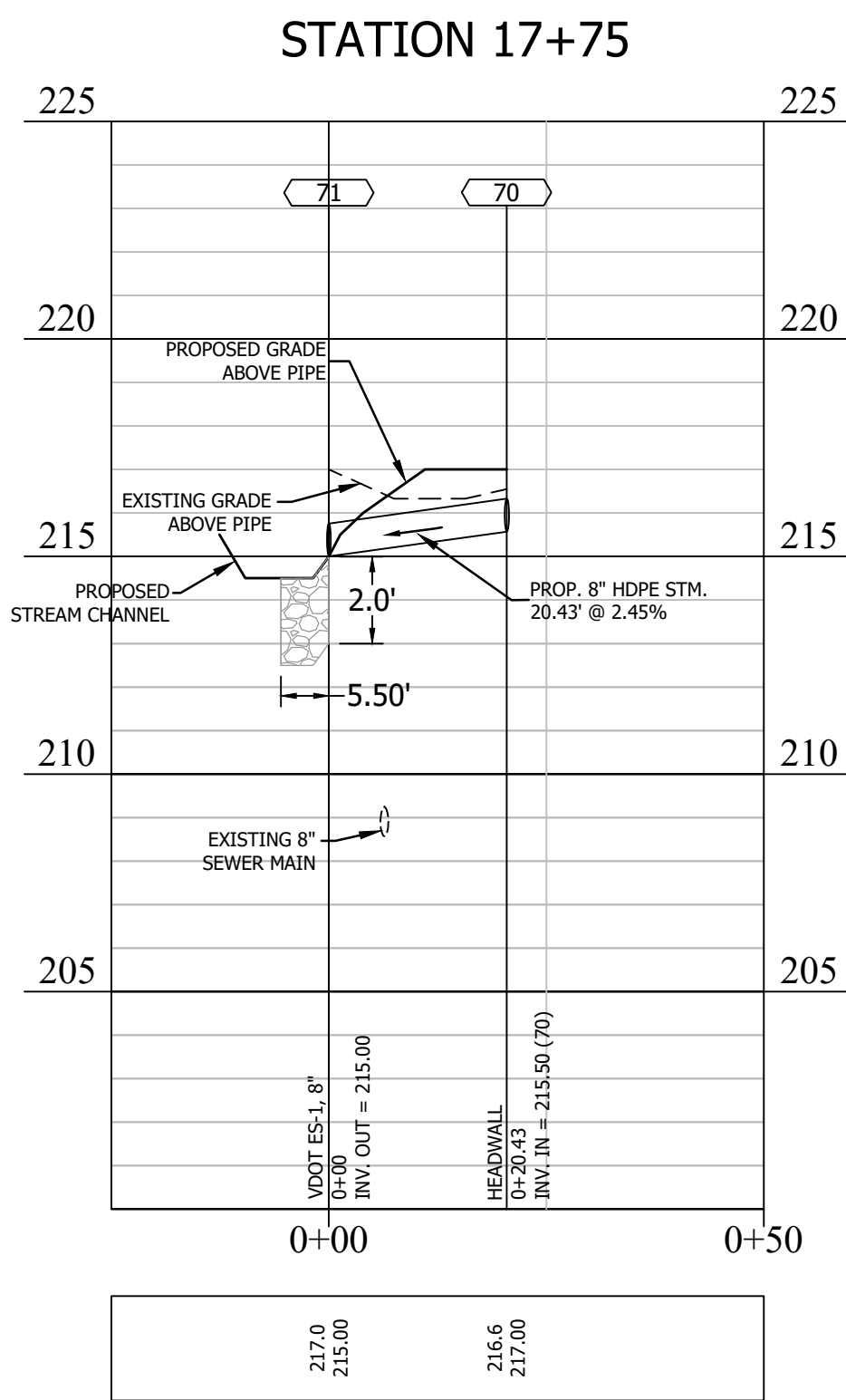
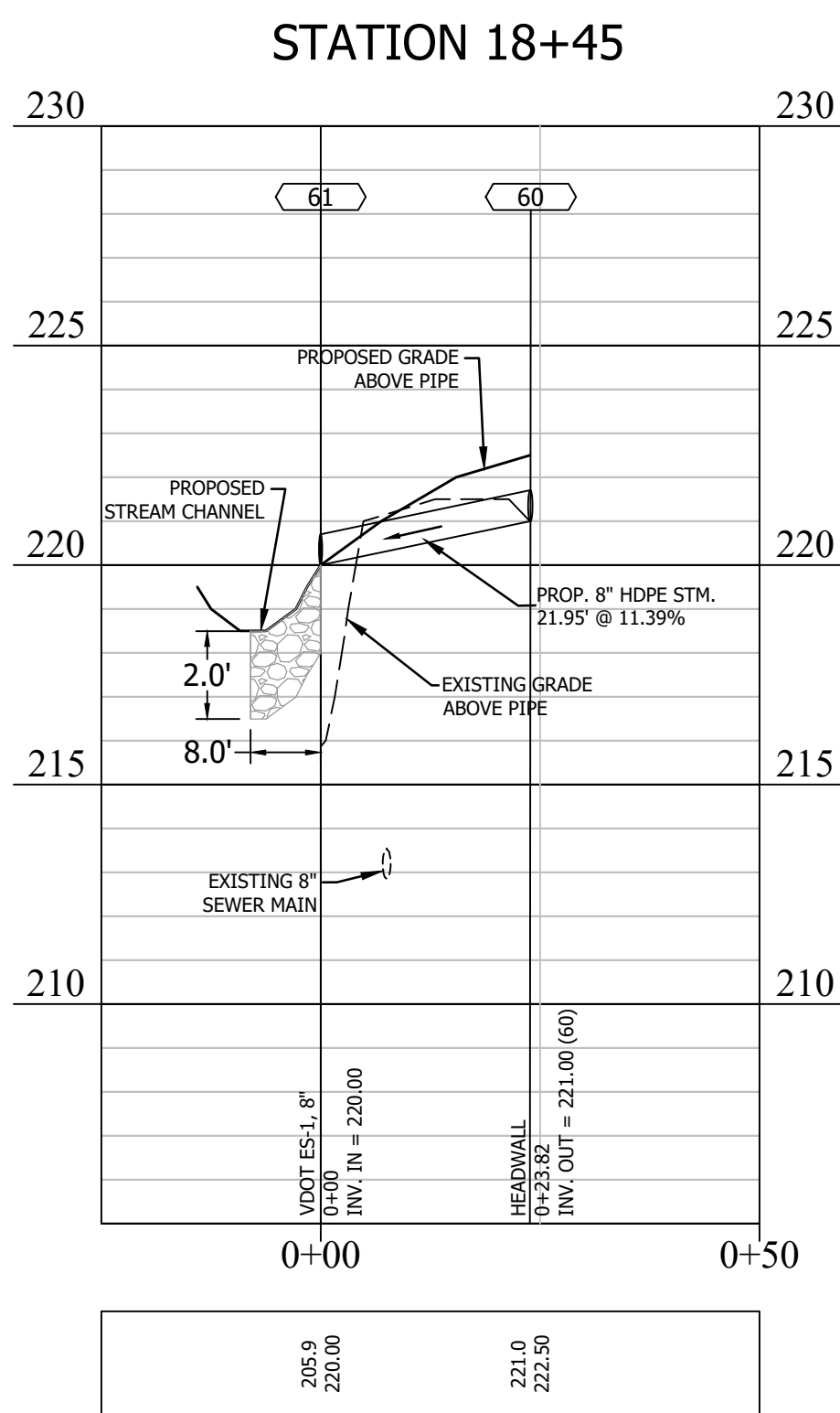
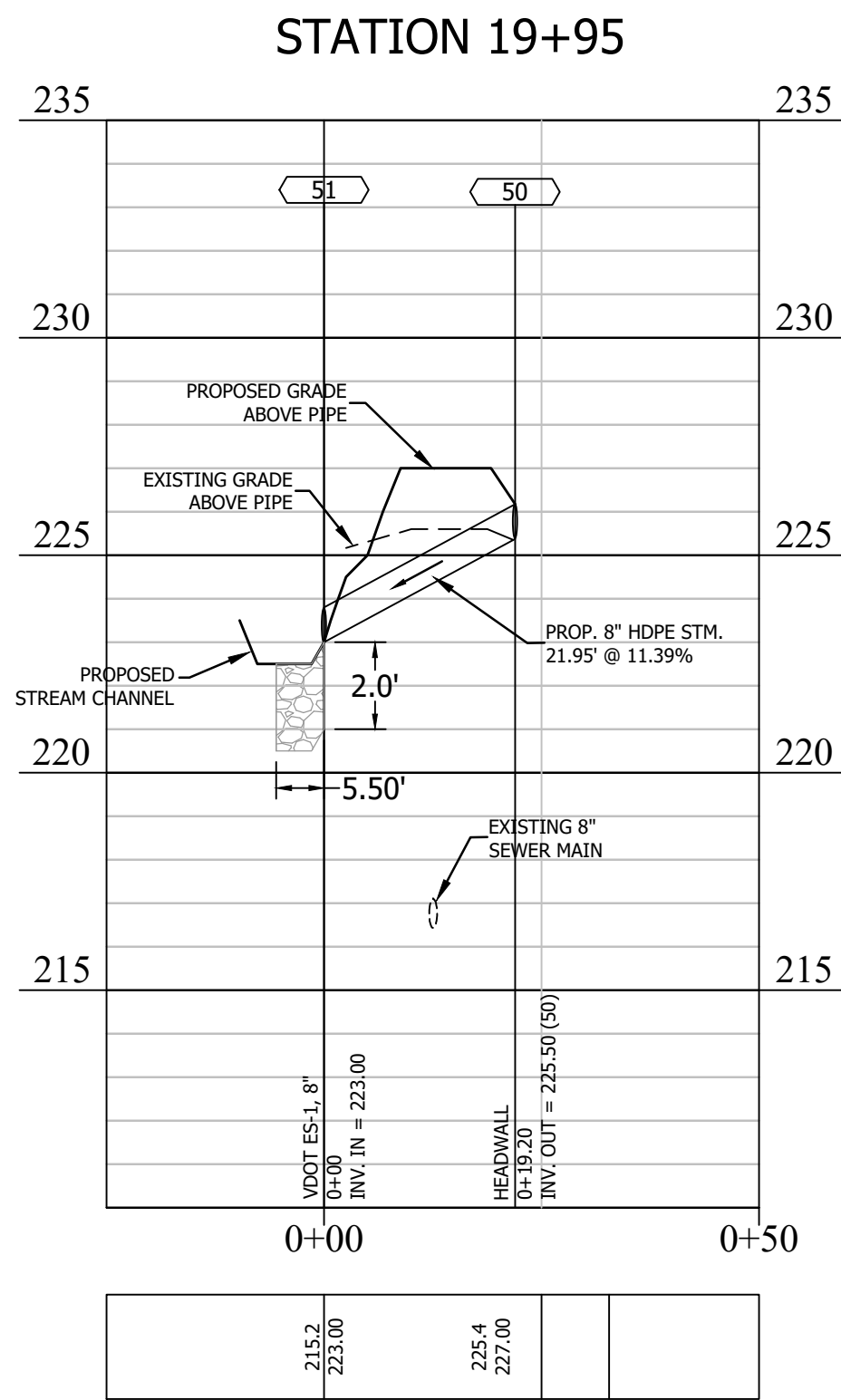
DONALDSON RUN TRIBUTARY B

NOTES:

1. THE EXISTING 12-INCH PVC PIPE AND CONCRETE HEADWALL AT STATION 18+45 SHALL BE EXCAVATED AND REMOVED. NEW BEDDING MATERIALS SHALL BE PLACED AND COMPACTED PRIOR TO INSTALLATION OF NEW HDPE PIPE.



Legend	
	MATCH LINE
	PROPERTY LINE
	EXISTING SANITARY MANHOLE
	EXISTING SANITARY SEWER
	EXISTING STORM INLET
	EXISTING STORM PIPE
	EXISTING STORM HEADWALL
	EXISTING WATER MAIN
	EXISTING WATER MANHOLE
	EXISTING FIRE HYDRANT
	EXISTING WATER VALVE
	PROPOSED STORM PIPE
	PROPOSED STORM MANHOLE
	PROPOSED STORM HEADWALL



08/28/20

APPROVALS DATE

Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
Glenn 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Dennis M. Leach 9/10/20
TRANSPORTATION DIRECTOR
Christin Jolicœur 9/10/20
PROJECT MANAGER

REVISIONS DATE

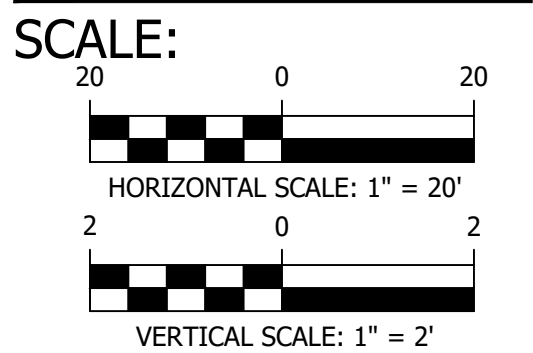
STORMWATER PLAN AND PROFILE

DONALDSON RUN
TRIBUTARY B
S32D

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
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PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

PLOTTED: AUGUST 24 2020
PLOTTED BY: JCANDLER



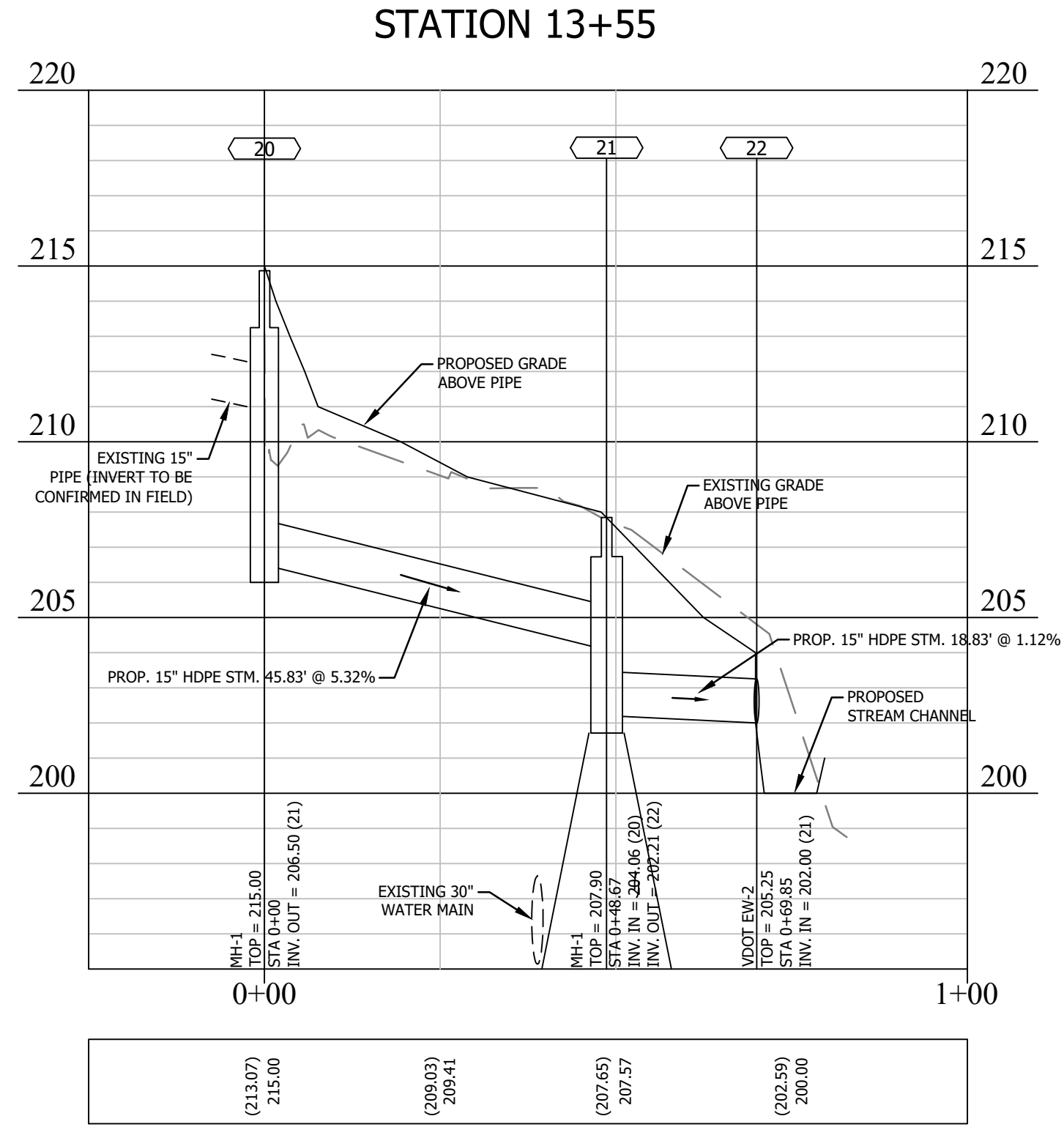
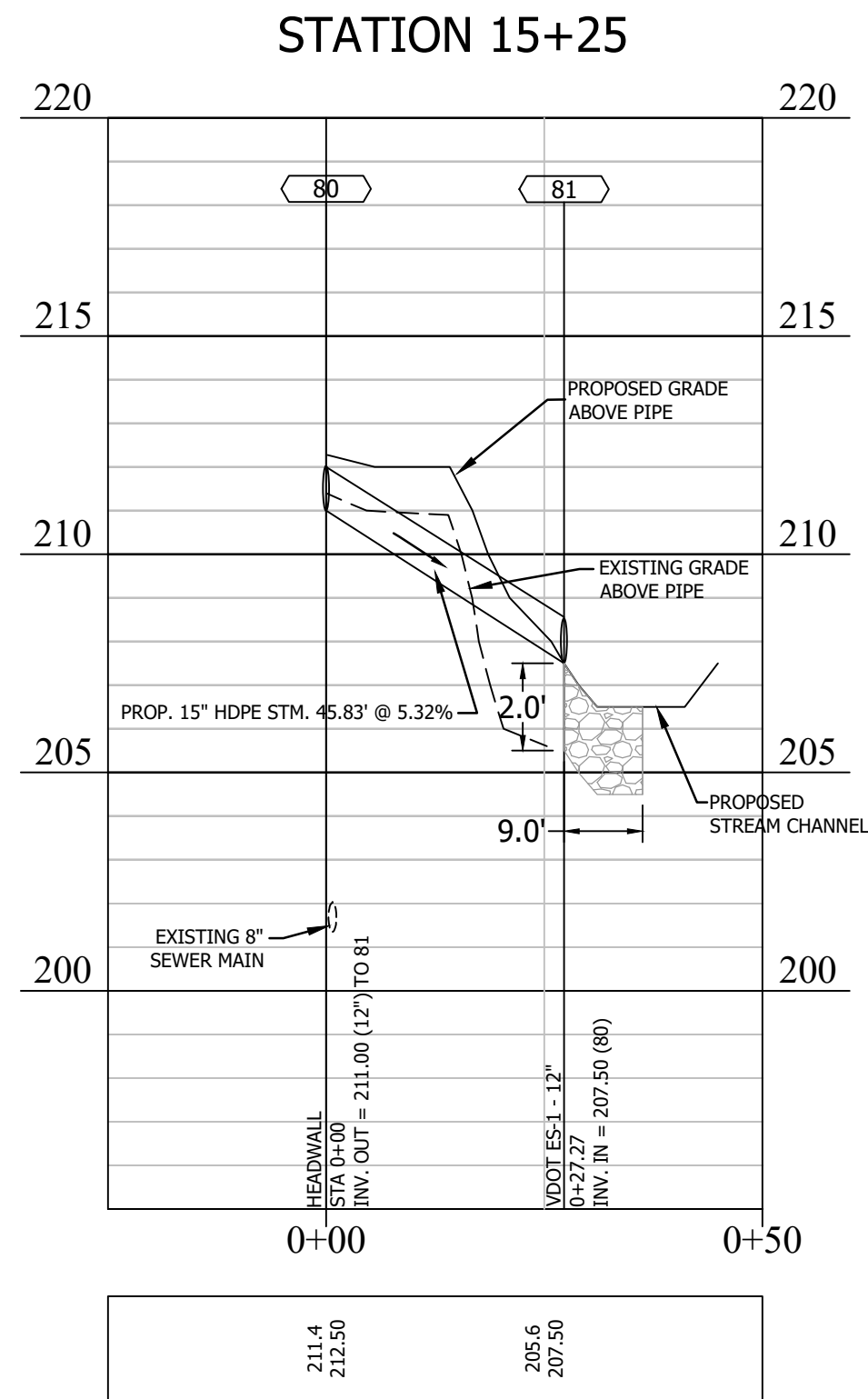
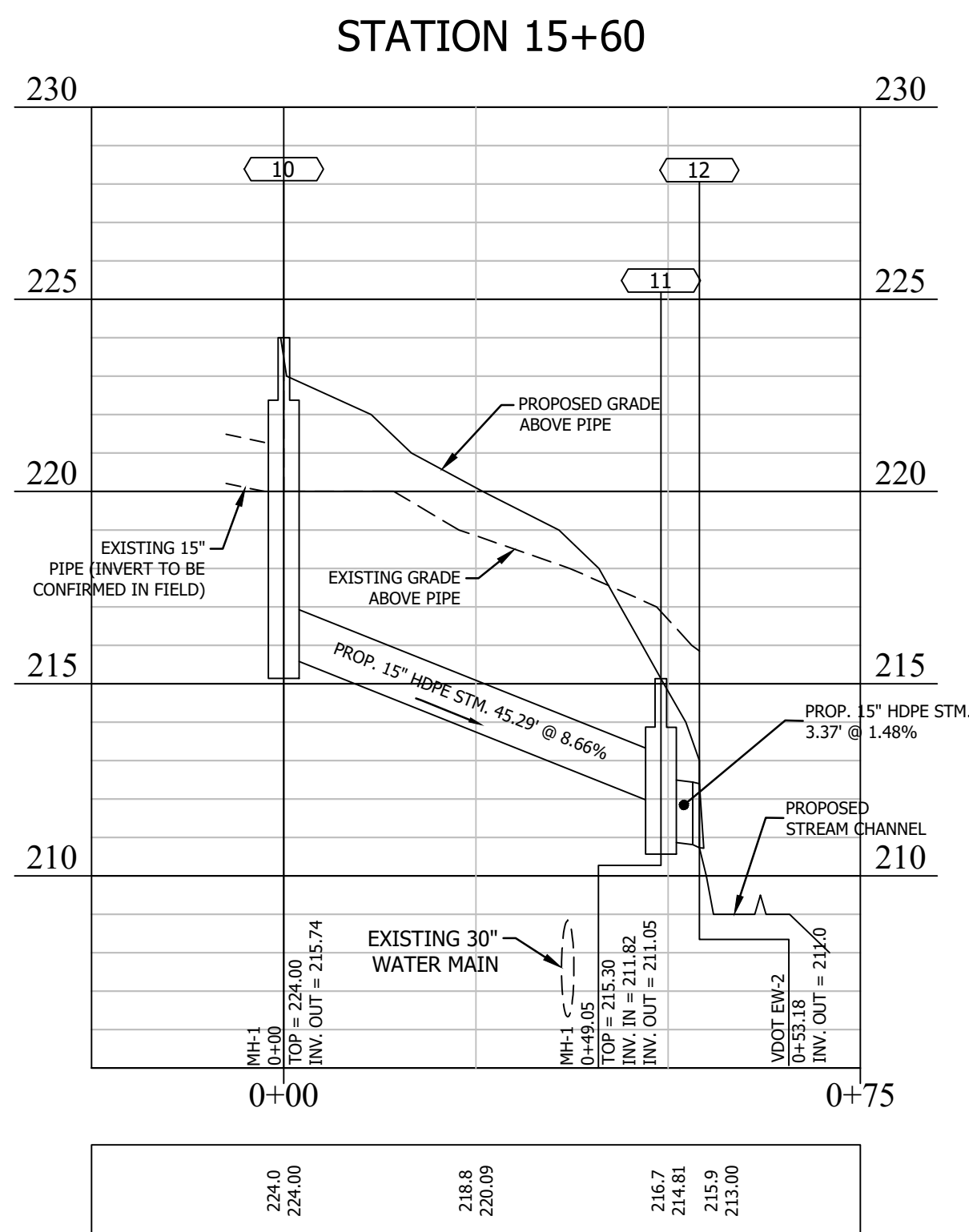
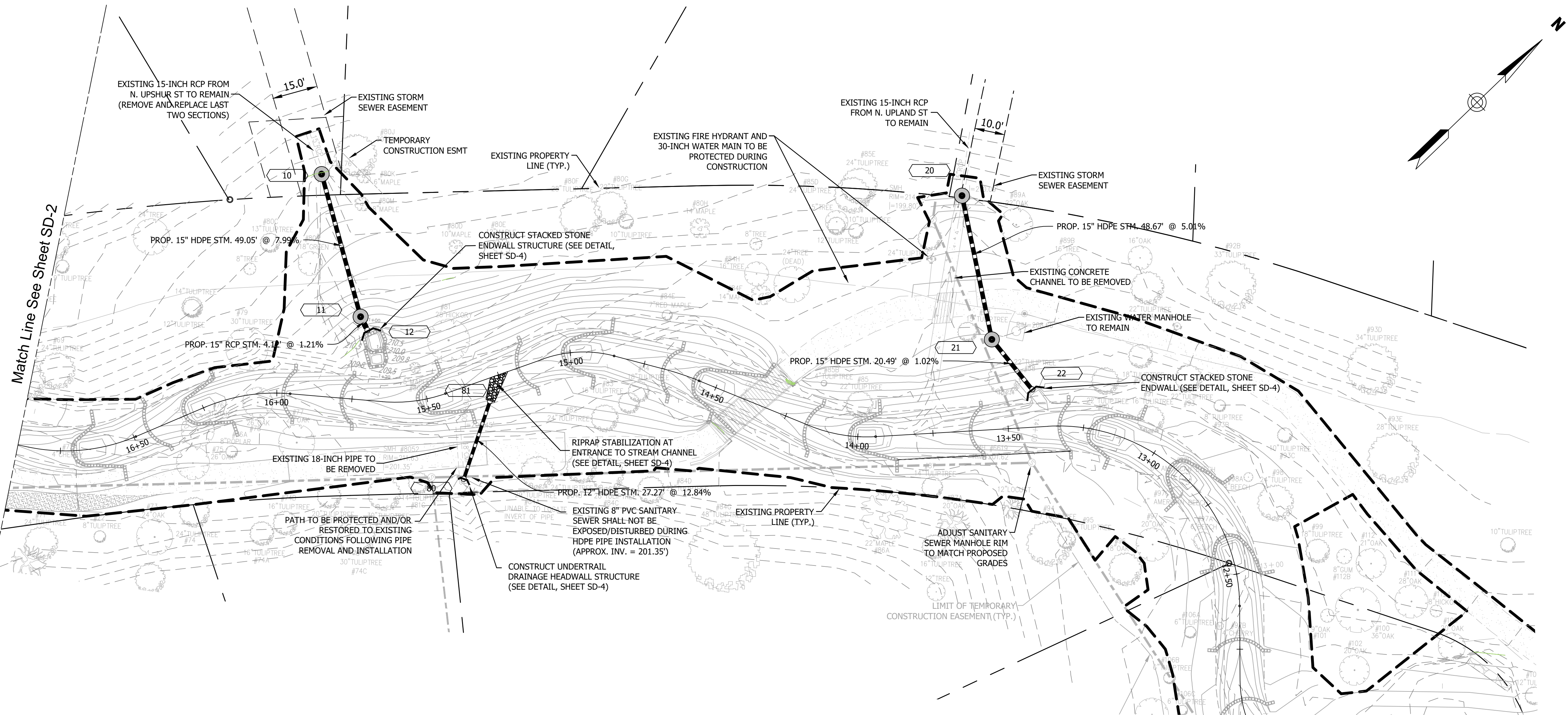
SHEET SD-2

NOTES:

1. THE LAST TWO DOWNSTREAM SECTIONS OF THE 15-INCH PIPE AT STATION 15+60 HAVE SEPARATED. THE SECTIONS, ALONG WITH ANY ASSOCIATED STRUCTURES, SHALL BE EXCAVATED AND REMOVED. THE EXISTING SUBBASE SHALL BE RECOMPACTED, AND TWO NEW SECTIONS OF 15-INCH RCP CLASS III SHALL BE INSTALLED AND BACKFILLED.
2. THE EXISTING 18-INCH CMP AT STATION 15+25 SHALL BE EXCAVATED AND REMOVED. NEW BEDDING MATERIALS SHALL BE PLACED AND COMPACTED PRIOR TO INSTALLATION OF NEW HDPE PIPE.

Legend

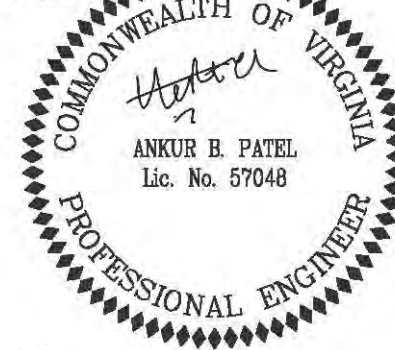
- MATCH LINE
- PROPERTY LINE
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY SEWER
- EXISTING STORM INLET
- EXISTING STORM PIPE
- EXISTING STORM HEADWALL
- EXISTING WATER MAIN
- EXISTING WATER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- PROPOSED STORM PIPE
- PROPOSED STORM MANHOLE
- PROPOSED STORM HEADWALL



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SEAL



08/28/20

APPROVALS DATE

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QUALITY CONTROL ENGINEER

Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR

Cliff 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF

Dennis M. Leach 9/10/20
TRANSPORTATION DIRECTOR

Christin Solicour 9/10/20
PROJECT MANAGER

REVISIONS DATE

STORMWATER PLAN AND PROFILE

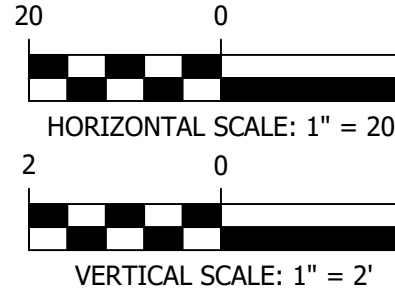
DONALDSON RUN
TRIBUTARY B
S32D

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

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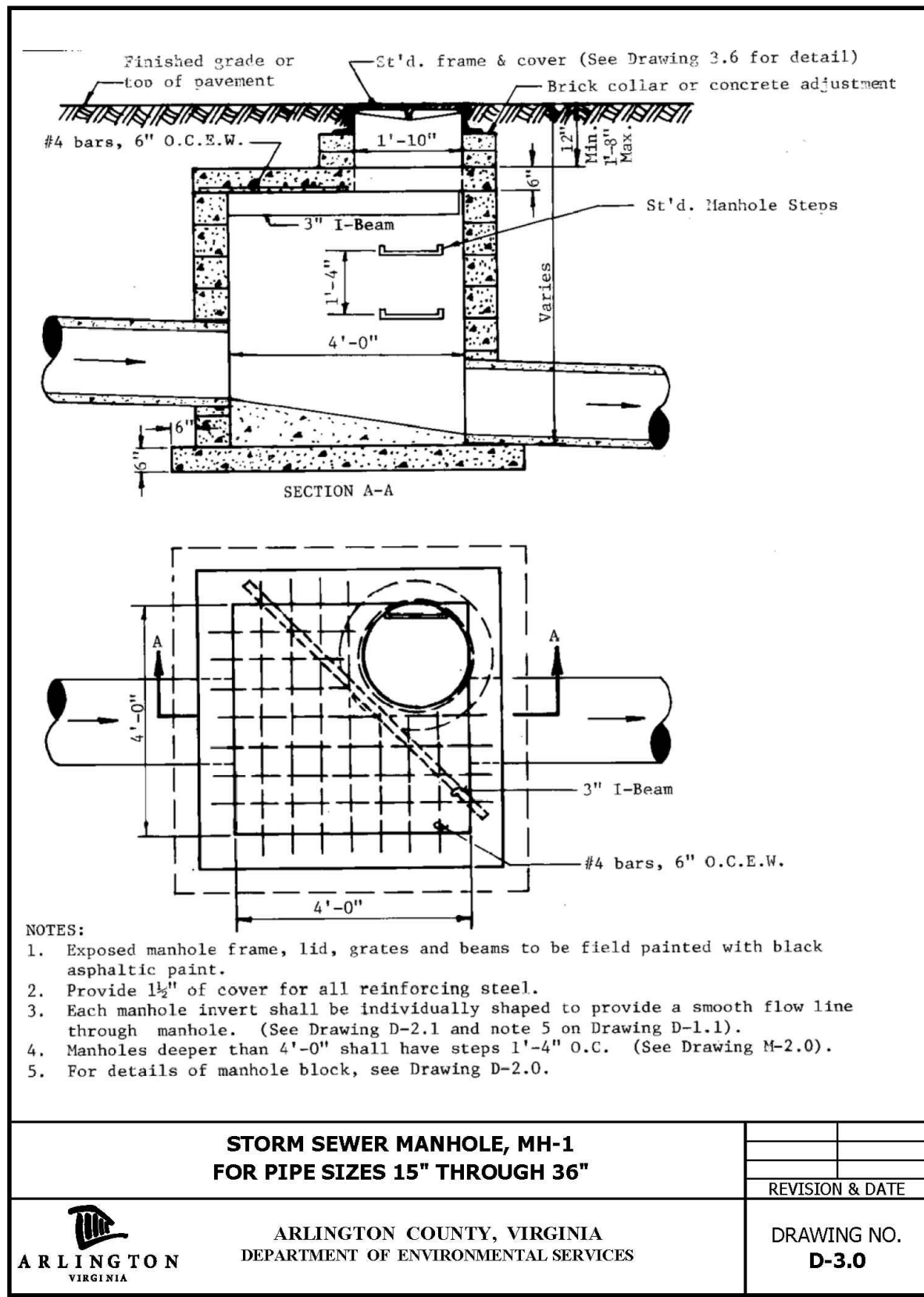
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PLOTTED BY: JCANDLER

SCALE:



SHEET

SD-3



STRUCTURE 10, 11, 20, 21
NTS

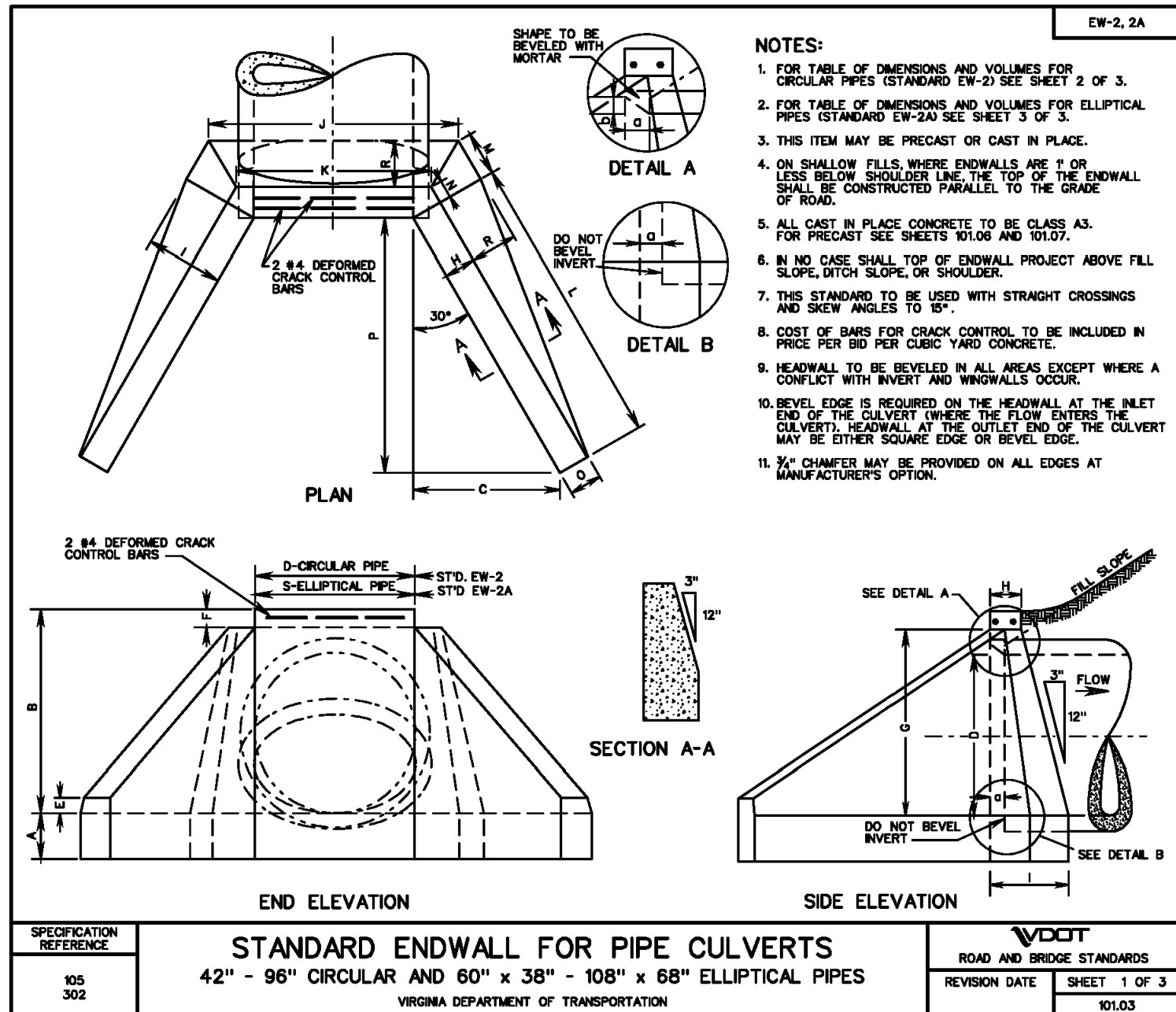
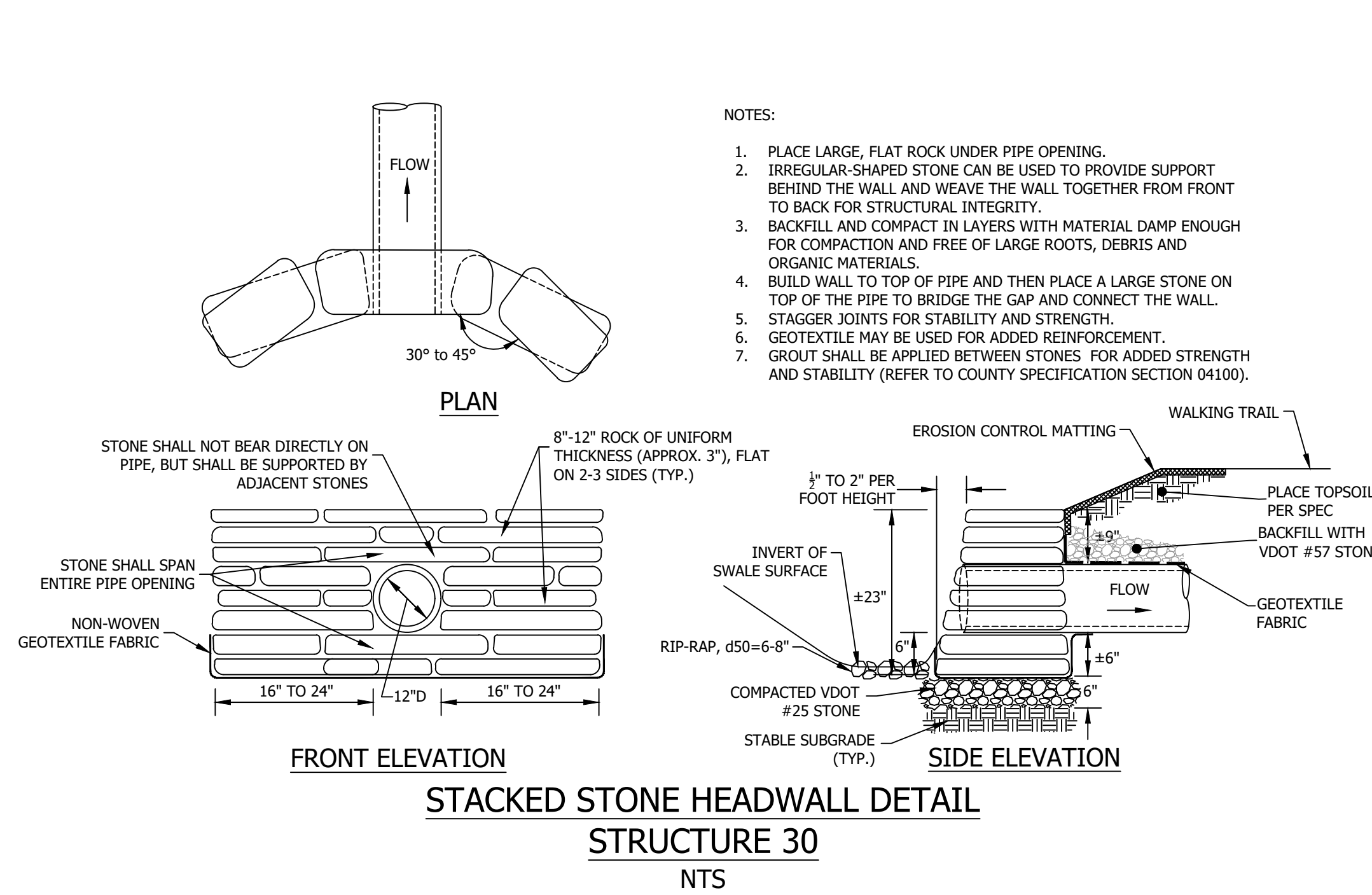
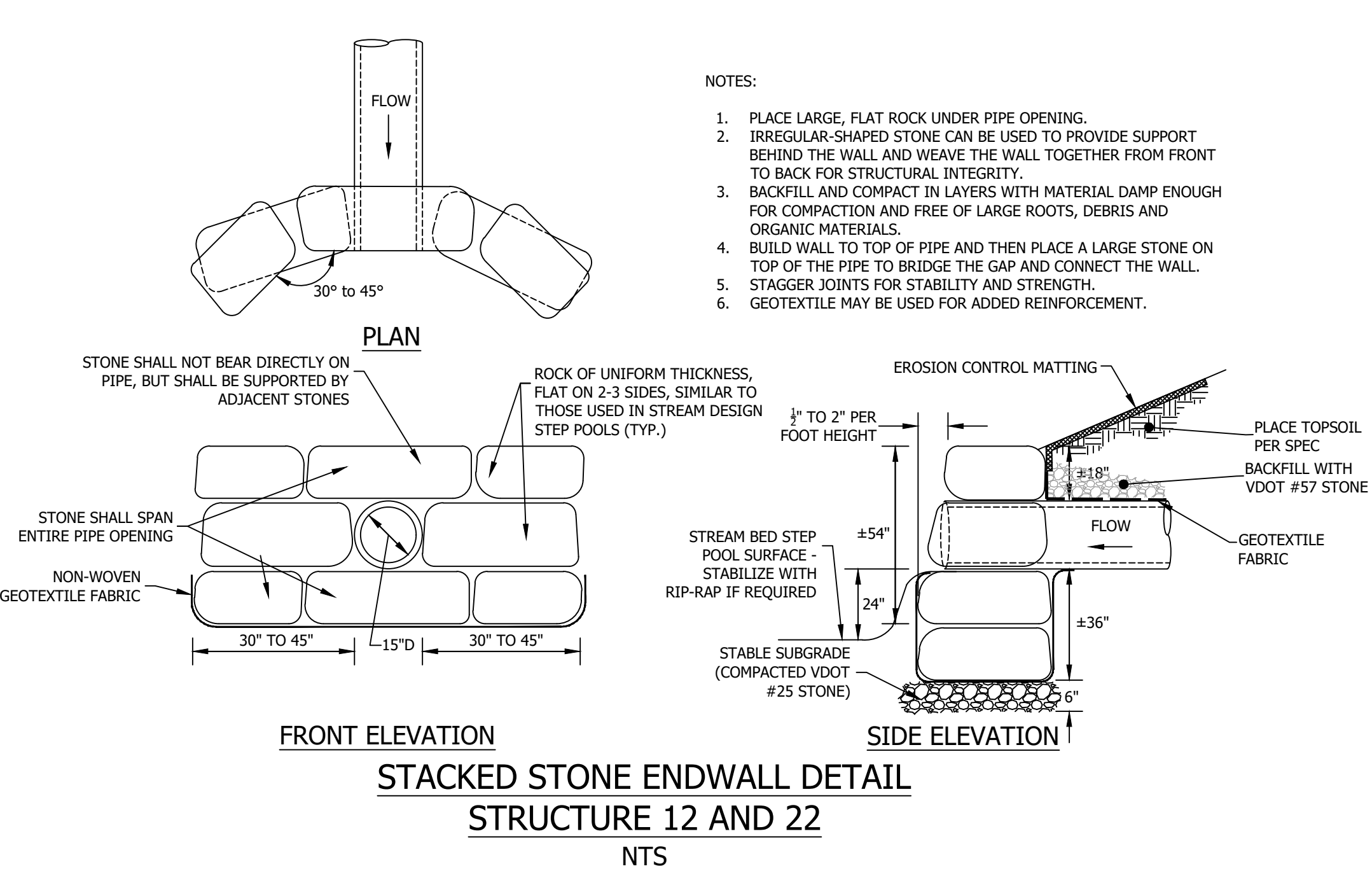


TABLE OF DIMENSIONS AND CONCRETE VOLUMES PER ENDWALL FOR 42" - 96" CIRCULAR PIPE CULVERTS	
DIAMETER OF PIPE CULVERTS	
DIAMETER	CONCRETE VOLUME (CY)
42"	4.373
48"	5.835
54"	7.088
60"	8.778
66"	10.702
72"	12.881
78"	15.303
84"	18.185
90"	21.585
96"	25.507

STRUCTURE 1724
NTS



STRUCTURE 30
NTS

RIPRAP OUTFALL DESIGN FOR CULVERTS PER VDOT EC-1					
STR #	OUTFALL VELOCITY (2YR STORM)	"L"	"W"	"S"	"T"
31	12.41 fps	6.5 ft	1.0 ft	1.0 ft	24"
41	9.94 fps	7.0 ft	1.0 ft	1.0 ft	24"
51	13.13 fps	5.5 ft	1.0 ft	1.0 ft	24"
61	7.02 fps	8.0 ft	1.0 ft	1.0 ft	24"
71	6.13 fps	5.5 ft	1.0 ft	1.0 ft	24"
81	18.04 fps	9.0 ft	1.0 ft	1.25 ft	24"

STRUCTURE 31, 41, 51, 61, 71, 81
NTS

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SEAL
COMMONWEALTH OF VIRGINIA
ANKUR B. PATEL
Lic. No. 57048
PROFESSIONAL ENGINEER

08/28/20
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Dennis M. Leach
TRANSPORTATION DIRECTOR
Christin Jolicœur
PROJECT MANAGER
9/10/20

REVISIONS
DATE

STORMWATER DETAILS

DONALDSON RUN
TRIBUTARY B
S320

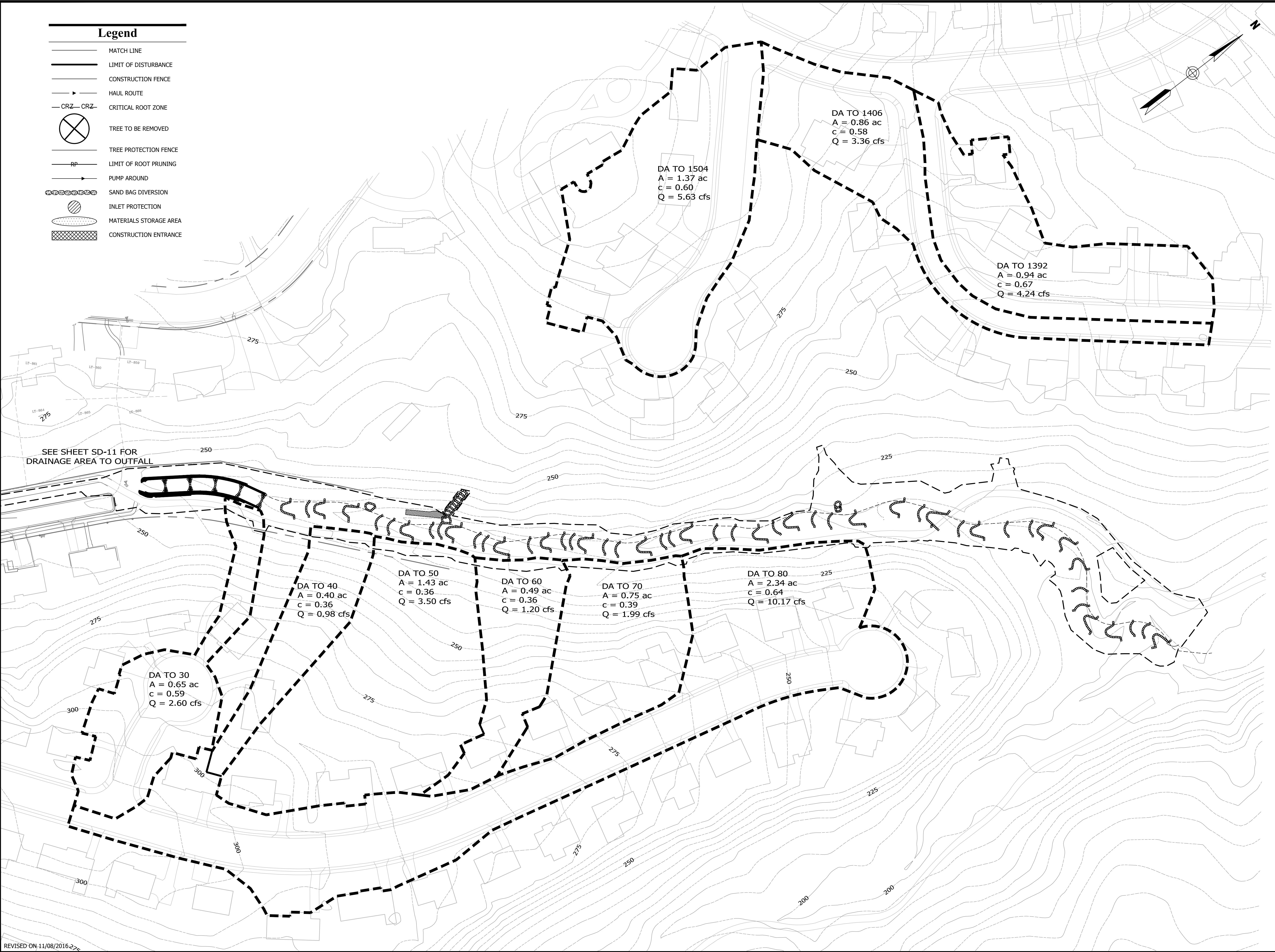
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SHEET SD-4



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SEAL

08/28/20

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<i>Kamal Taktak</i> CONSTRUCTION MANAGEMENT SUPERVISOR	9.2.20
<i>Glenn</i> WATER, SEWER, STREETS BUREAU CHIEF	09.10.2020
<i>Dennis M. Leach</i> TRANSPORTATION DIRECTOR	9/10/20
<i>Christin Jolicœur</i> PROJECT MANAGER	9/10/20

REVISIONS	DATE

STORMWATER DRAINAGE AREA MAP

DONALDSON RUN TRIBUTARY B S32D

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FILENAME: S32D DA PLAN.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

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PLOTTED BY: JCANDLER

SCALE: GRAPHIC SCALE
50 0 50
SCALE: 1" = 50'

SHEET SD-5


STORM SEWER INLET COMPUTATIONS																													
Inlet				Flow							Curb Inlet															Operation			
Number	Type	Length (ft)	Station	Drainage Area (acres)	C	CA	I (in/hr)	Q,Incr (cfs)	Q Carryover (cfs)	QT (cfs)	S Gutter Slope (ft/ft)	Sx Cross Slope (ft/ft)	T (spread)	W (ft)	W / T	Sw (ft/ft)	SW / Sx	EO	Local Depression (in)	a (in)	S'w	Se (ft/ft)	n Value	LT (ft)	L / LT	d (ft)	T Spread at Sag (ft)	E (%)	Q Intercept ed (cfs)
11	MH-1																												
10	MH-1																												
1483	MH-1																												
1496	MH-1																												
1504	CB-2A	8.50		1.37	0.60	0.82	6.79	5.58	0.00	5.58	Sag	0.02	19.94	1.50	0.08	0.08	4.61	0.22	0.00	1.17	0.07	0.03				0.46	19.94	100	5.58
21	MH-1																												
20	MH-1																												
1406	CB-2	8.50		0.86	0.58	0.50	6.79	3.39	0.00	3.39	0.06	0.02	6.68	1.50	0.22	0.08	4.15	0.63	0.00	1.13	0.06	0.06	0.01	31.56	0.27	0.23		48	1.63
1392	CB-2A	8.50		0.94	0.67	0.63	6.79	4.28	0.00	4.28	Sag	0.02	15.01	1.50	0.10	0.08	4.15	0.30	0.00	1.13	0.06	0.04				0.39	15.01	100	4.28
30	Hdwall			0.65	0.59	0.38	6.79	2.60	0.00							100.00	2.60	0.00											
1750	CB-2A	8.50		0.51	0.64	0.33	6.79	2.22	0.00	2.22	Sag	0.03	7.73	1.50	0.19	0.08	3.32	0.53	0.00	1.04	0.06	0.06				0.28	7.73	100	2.22
90	MH-2																												
1803	MH-1																												
23652	CB-2A	16		0.45	0.49	0.22	6.79	1.50	2.27	3.77	Sag	0.03	7.27	1.50	0.21	0.08	3.32	0.56	0.00	1.04	0.06	0.06				0.27	7.27	100	3.77
23651	CB-2	8.50		1.64	0.45	0.74	6.79	5.01	0.00	5.01	0.02	0.03	9.40	1.50	0.16	0.08	3.32	0.45	0.00	1.04	0.06	0.05	0.01	27.07	0.31	0.32		55	2.74
40	Hdwall			0.40	0.36	0.14	6.79	0.98	0.00							100.00	0.98	0.00											
50	Hdwall			1.43	0.36	0.51	6.79	3.50	0.00							100.00	3.50	0.00											
60	Hdwall			0.49	0.36	0.18	6.79	1.20	0.00							100.00	1.20	0.00											
70	Hdwall			0.75	0.39	0.29	6.79	1.99	0.00							100.00	1.99	0.00											
80	Hdwall			2.34	0.64	1.50	6.79	10.17	0.00							100.00	10.17	0.00											

EXISTING 1513 NOT COMPUTED - NO RECORD DATA FOUND AND NO DRAINAGE AREA CHANGE DUE TO THIS DEVELOPMENT.

STORM SEWER DESIGN COMPUTATIONS																					
From Point	To Point	Drainage Area	C Factor	C x A Increment	C x A Cumulative	Inlet Time Min.	Rainfall In/Hr	Runoff Q C.F.S.	Ground Elev. Upper End	Ground Elev. Lower End	Invert Elev. Upper End	Invert Elev. Lower End	HGL Upper End	HGL Lower End	Length Ft.	Slope %	Dia. IN.	Capacity Q C.F.S.	Velocity F.P.S.	Flow Time Min.	
11	12	0.00	0.00	0.00	0.00	5.00	6.79	0.46	215.30	212.52	211.05	211.00	211.68	211.46	5.0	1.00	15	8.39	4.96	0.04	
10	11	0.00	0.00	0.00	0.00	5.00	6.79	0.46	224.00	215.30	215.74	211.82	216.37	212.09	49.1	7.99	15	23.73	8.25	0.41	
1483	10 (Ex. 1494)	0.00	0.00	0.24	0.82	5.00	6.79	5.45	250.77	224.52	245.22	223.00	246.17	223.37	113.6	19.58	15	28.57	0.54	0.43	
1496	1483	0.00	0.00	0.00	0.82	5.00	6.79	5.52	264.72	250.77	257.22	245.72	258.17	246.17	67.6	17.01	15	26.63	10.07	0.25	
1504	1496	1.37	0.60	0.82	0.82	5.00	6.79	5.58	280.96	264.71	271.46	260.22	272.41	260.60	58.8	19.10	15	28.23	11.74	0.22	
21	22	0.00	0.00	0.00	0.00	5.00	6.79	7.58	207.90	203.33	202.21	202.00	203.30	202.93	21.2	0.99	15	8.36	7.19	0.06	
20	21	0.00	0.00	0.00	0.00	5.00	6.79	7.58	215.00	207.90	206.50	204.06	207.59	204.61	48.7	5.01	15	18.80	10.58	0.13	
1406	20 (Ex. 1450)	0.86	0.58	0.50	1.13	5.00	6.79	7.59	242.00	212.52	235.00	211.00	236.10	212.10	156.2	15.37	15	25.32	6.65	0.42	
1392	1406	0.94	0.67	0.63	0.63	5.00	6.79	4.28	242.94	242.00	239.50	237.00	240.37	237.44	40.7	6.14	15	16.00	0.85	0.19	
30	31	0.65	0.59	0.38	0.38	5.00	6.79	2.60	236.00	234.00	237.00	234.00	237.69	232.24	20.5	14.66	12	17.73	11.23	0.03	
1750	30 (Ex. 1698)	0.51	0.64	0.33	0.33	5.00	6.79	2.22	290.00	237.23	285.59	236.00	286.22	236.63	166.7	29.75	12	10.52	4.24	0.98	
91	1724	0.00	0.00	0.00	35.59	5.00	6.79	225.40	249.22	244.32	240.48	239.49	243.85	242.68	29.3	3.40	48	264.20	20.83	0.03	
90	91	0.00	0.00	0.00	34.63	5.00	6.79	219.60	250.44	249.22	241.59	240.48	244.92	243.85	32.6	3.40	48	264.20	17.60	0.03	
1803	90	0.00	0.00	0.00	34.63	5.00	6.79	221.30	256.36	250.44	247.49	241.59	254.44	244.92	173.3	3.40	48	264.20	17.74	0.16	
23652	91	0.45	0.49	0.22	0.96	5.00	6.79	6.48	248.56	249.22	243.60	242.90	244.60	243.85	9.8	7.17	18	28.13	18.75	0.52	
23651	23652	1.64	0.45	0.74	0.74	5.00	6.79	5.01	248.99	248.56	245.39	244.56	245.57	244.66	19.1	4.34	15	13.46	7.71	0.08	
40	41	0.40	0.36	0.14	0.14	5.00	6.79	0.98	231.50	229.50	232.00	229.50	232.47	228.71	20.0	12.50	8	5.55	8.83	0.04	
50	51	1.43	0.36	0.51	0.51	5.00	6.79	3.50	225.00	223.00	225.50	223.00	226.16	224.71	22.0	11.40	8	5.30	11.98	0.03	
60	61	0.49	0.36	0.18	0.18	5.00	6.79	1.20	220.00	220.50	221.00	220.00	221.52	220.71	23.9	4.18	8	3.21	6.33	0.06	
70	71	0.75	0.39	0.29	0.29	5.00	6.79	1.99	215.00	215.00	215.50	215.00	216.13	215.71	20.4	2.45	8	2.46	6.84	0.05	
80	81	2.34	0.64	1.50	1.50	5.00	6.79	10.17	210.50	207.50	211.00	207.50	211.99	208.71	27.3	12.84	12	16	14.88	0.03	

EXISTING 1513-1502 NOT COMPUTED - NO RECORD DATA FOUND AND NO DRAINAGE AREA CHANGE DUE TO THIS DEVELOPMENT.

SITE SUMMARY	
SITE AREA	91,565 SF (2.102 AC)
EXISTING IMPERVIOUS COVER	14,580 SF (0.334 AC)
PROPOSED IMPERVIOUS COVER	14,735 SF (0.338 AC)
IMPERVIOUS INCREASE	155 SF (0.004 AC)

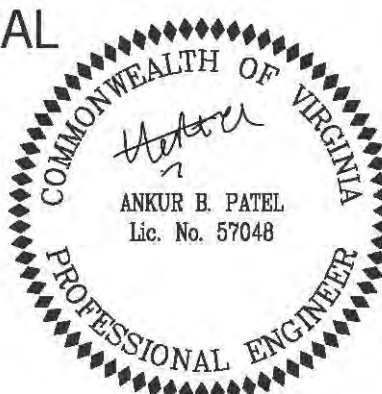


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08/28/20

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Donnie M. Leach 9/10/20
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REVISIONS

DATE

STORMWATER COMPUTATIONS

DONALDSON RUN
TRIBUTARY B
S32D

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
S32D SWPPP.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

PLOTTED: JULY 15 2020
PLOTTED BY: JCANDLER

SCALE: NTS

SHEET

SD-6

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

GENERAL INFORMATION SHEET

THE INFORMATION CONTAINED IN THE SWPPP GENERAL INFORMATION SHEETS IS INTENDED TO COMPLY WITH THE REQUIREMENTS OF THE VSMP GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES (THE VSMP CONSTRUCTION PERMIT) ISSUED JULY 1, 2014 AND VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

SECTION I: GENERAL INFORMATION

1. ACTIVITY DESCRIPTION - THIS PROJECT CONSISTS OF RESTORING A PORTION OF THE DONALDSON RUN TRIBUTARY B STREAM CORRIDOR FROM WITHIN THE VICINITY OF UPTON STREET N. TO THE CONFLUENCE WITH TRIBUTARY A. RESTORATION ACTIVITIES INCLUDE: GRADING THE STREAM VALLEY THROUGH A STRONG CUT AND FILL OPERATION TO IMPROVE CHANNEL FORM; INSTALLING NATURAL ROCK BOULDER STRUCTURES SUCH AS STEP POOLS, STACKED STORM BMPs AND CROSS-VANES TO PROVIDE GRADE CONTROL AND ENHANCED AQUATIC HABITAT FEATURES; REPLACING THREE STORM SEWER OUTFALLS; AND INSTALLING A NEW PEDESTRIAN / LIGHT VEHICLE BRIDGE.

2. THIS LAND DISTURBANCE ACTIVITY SITE IS LOCATED IN ARLINGTON COUNTY AND APPROXIMATELY 2.13 ACRES WILL BE DISTURBED BY EXCAVATION, GRADING OR OTHER CONSTRUCTION ACTIVITIES.

3. THIS PROPOSED ACTIVITY DISTURBS ONE ACRE OR GREATER (2,500 SQUARE FEET OR GREATER IN A DESIGNATED CHESAPEAKE BAY PRESERVATION AREA) AND REQUIRES COVERAGE UNDER THE VSMP GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES (THE VSMP CONSTRUCTION PERMIT) AS ISSUED BY THE DEQ.

4. THE ESC AND SWM PLANS FOR THIS LAND DISTURBANCE ACTIVITY HAVE BEEN DEVELOPED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND ARLINGTON COUNTY STORMWATER MANAGEMENT STANDARDS AND SPECIFICATIONS AS APPROVED BY DEQ.

5. THE CONTRACTOR'S PROJECT SUPERINTENDENT IS DESIGNATED AS THE RLD (UNTIL OTHERWISE IDENTIFIED) FOR THIS LAND DISTURBANCE ACTIVITY.

6. CRITICAL AREAS (E.G., WETLANDS, SURFACE WATER BODIES, ETC.) ADJACENT TO THIS LAND DISTURBANCE ACTIVITY SITE AND NOT OTHERWISE IDENTIFIED IN THE CONSTRUCTION PLAN SET (OR OTHER SUCH DOCUMENTS) ARE AS FOLLOWS:
-JURISDICTIONAL WATERS OF THE U.S., RPA, AND FEMA FLOODPLAIN.

7. STORMWATER RUN-OFF FROM THE DISTURBED AREAS OF THIS LAND DISTURBANCE ACTIVITY WILL FLOW INTO THE FOLLOWING STREAMS: DONALDSON RUN.

8. LOCATIONS WHERE STORMWATER DISCHARGES FROM THIS LAND DISTURBANCE ACTIVITY SITE TO A SURFACE WATER (AS DEFINED IN SECTION 4VAC50-60-10 OF THE VSMP REGULATIONS) ARE IDENTIFIED IN THE CONSTRUCTION PLAN.

SECTION II: EROSION AND SEDIMENT CONTROL

1. THE FOLLOWING VARIANCES TO THE VIRGINIA ESC REGULATIONS HAVE BEEN APPROVED BY THE DEQ FOR THIS LAND DISTURBANCE ACTIVITY: NONE

2. THE INTENDED SEQUENCE AND TIMING OF ACTIVITIES THAT DISTURB SOILS AT THE SITE (E.G., GRUBBING, EXCAVATION, GRADING, UTILITIES AND INFRASTRUCTURE INSTALLATION, ETC.) SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH THE ARLINGTON COUNTY STANDARDS, DOT R&B SPECIFICATIONS, CONTRACT SPECIFICATIONS AND WILL BE INCLUDED WITH THE OTHER SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY.

3. DIRECTIONS OF STORMWATER FLOW AND APPROXIMATE SLOPES ANTICIPATED AFTER MAJOR GRADING ACTIVITIES ARE IDENTIFIED IN THE CONSTRUCTION PLAN SET (OR OTHER SUCH DOCUMENTS) FOR THIS LAND DISTURBANCE ACTIVITY.

4. AREAS OF SOIL DISTURBANCE AND AREAS OF THE SITE WHICH WILL NOT BE DISTURBED ARE IDENTIFIED IN THE CONSTRUCTION PLAN SET (OR OTHER SUCH DOCUMENTS) FOR THIS LAND DISTURBANCE ACTIVITY.

5. LOCATIONS OF MAJOR STRUCTURAL AND NONSTRUCTURAL ESC MEASURES IDENTIFIED IN THE SWPPP, INCLUDING THOSE THAT WILL BE PERMANENT CONTROLS THAT WILL REMAIN AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED, ARE IDENTIFIED IN THE CONSTRUCTION PLAN SET (OR OTHER SUCH DOCUMENTS) FOR THIS LAND DISTURBANCE ACTIVITY.

6. LOCATIONS WHERE STABILIZATION PRACTICES ARE EXPECTED TO OCCUR ARE IDENTIFIED IN THE CONSTRUCTION PLAN.

7. A DESCRIPTION OF INTERIM AND PERMANENT STABILIZATION PRACTICES FOR THE SITE ARE IDENTIFIED IN THE APPLICABLE SECTIONS OF THE DOCUMENTS IDENTIFIED IN NOTE 1 OF SECTION III, THE E & S PLAN AND SHOWN ON THE CONSTRUCTION PLAN.

8. A RECORD OF THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR, WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE, AND WHEN STABILIZATION MEASURES ARE INITIATED WILL BE PROVIDED BY THE CONTRACTOR AND MAINTAINED WITH THE SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY.

9. A DESCRIPTION OF STRUCTURAL PRACTICES TO DIVERT FLOWS FROM EXPOSED SOILS, RETAIN/DETAIN FLOWS OR OTHERWISE LIMIT RUNOFF AND THE DISCHARGE OF POLLUTANTS FROM EXPOSED AREAS OF THE CONSTRUCTION SITE ARE IDENTIFIED IN THE APPLICABLE SECTIONS OF THE DOCUMENTS IDENTIFIED IN NOTE 1 OF SECTION III.

10. A DESCRIPTION AND SCHEDULE OF PROCEDURES TO MAINTAIN VEGETATION, EROSION AND SEDIMENT CONTROL MEASURES AND OTHER PROTECTIVE MEASURES IN GOOD AND EFFECTIVE OPERATING CONDITIONS DURING CONSTRUCTION ARE IDENTIFIED IN THE VA E & S MANUAL.

11. ALL ENGINEERING CALCULATIONS SUPPORTING THE DESIGN OF EROSION AND SEDIMENT CONTROL MEASURES ARE CONTAINED IN THE PROJECT DRAINAGE FILE LOCATED AT ARLINGTON COUNTY AND WILL BE MADE AVAILABLE FOR REVIEW UPON REQUEST DURING NORMAL WORKING BUSINESS HOURS.

12. THE TEMPORARY EROSION AND SILTATION CONTROL ITEMS SHOWN ON THE ESC PLAN FOR THIS LAND DISTURBING ACTIVITY ARE INTENDED TO PROVIDE A GENERAL PLAN FOR CONTROLLING EROSION AND SEDIMENT WITHIN THE PROJECT LIMITS. THE ESC PLAN IS BASED ON FIELD CONDITIONS AT THE TIME OF PLAN DEVELOPMENT AND AN ASSUMED SEQUENCE OF CONSTRUCTION FOR THE PROJECT. THE CONTRACTOR, IN CONJUNCTION WITH ARLINGTON COUNTY, SHALL ADJUST THE LOCATION, QUANTITY AND TYPE OF EROSION AND SEDIMENT CONTROL ITEMS REQUIRED BASED ON THE ACTUAL FIELD CONDITIONS ENCOUNTERED AT THE TIME OF CONSTRUCTION AND THE ACTUAL SCHEDULING AND SEQUENCING OF THE CONSTRUCTION ACTIVITIES. SIGNIFICANT CHANGES TO THE PROPOSED ESC PLAN (E.G., THOSE THAT REQUIRE AN ENGINEERING ANALYSIS) SHALL BE SUBMITTED TO ARLINGTON COUNTY FOR REVIEW AND APPROVAL. ANY CHANGES TO THE PROPOSED ESC PLAN MUST BE NOTED ON THE DESIGNATED RECORD SET OF PLANS WHICH SHALL BE RETAINED ON THE PROJECT SITE AND MADE AVAILABLE UPON REQUEST DURING NORMAL WORKING BUSINESS HOURS.

13. THE AREAS BEYOND THE PROJECT'S CONSTRUCTION AREA ARE TO BE PROTECTED FROM SILTATION. PERIMETER CONTROLS SUCH AS FILTER BARRIER, SILT FENCE, DIVERSION DIKES, TURBIDITY CURTAINS, ETC. SHALL BE INSTALLED PRIOR TO ANY GRUBBING OPERATIONS OR OTHER EARTH MOVING ACTIVITIES.

14. TEMPORARY EARTHEN STRUCTURES SUCH AS DIKES AND BERMS ARE TO BE STABILIZED IMMEDIATELY UPON INSTALLATION. STABILIZATION MAY INCLUDE TEMPORARY OR PERMANENT SEEDING, RIPRAP, AGGREGATE, SOD, MULCHING, AND/OR SOIL STABILIZATION BLANKETS AND MATTING IN CONJUNCTION WITH SEEDING.

15. ALL CHANNEL RELOCATIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE PERMIT REQUIREMENTS AND SHALL BE CONSTRUCTED IN THE DRY WHEREVER POSSIBLE. STABILIZATION OR VEGETATION SHALL BE ESTABLISHED BEFORE FLOW IS REDIRECTED THROUGH THE CONSTRUCTED AREA AS DIRECTED BY THE ENGINEER.

SECTION III: SWPPP

1. ONLY THE FOLLOWING NON-STORMWATER DISCHARGES ARE AUTHORIZED BY ARLINGTON COUNTY'S MS4 PERMIT, UNLESS THE STATE WATER CONTROL BOARD, THE VIRGINIA SOIL AND WATER CONSERVATION BOARD (BOARD), OR ARLINGTON COUNTY DETERMINES THE DISCHARGE TO BE A SIGNIFICANT SOURCE OF POLLUTANTS TO SURFACE WATERS: WATER LINE FLUSHING; LANDSCAPE IRRIGATION; DIVERTED STREAM FLOWS; RISING GROUND WATERS; UNCONTAMINATED GROUND WATER INFILTRATION (AS DEFINED AT 40 CFR 35.2005/20); UNCONTAMINATED PUMPED GROUND WATER; DISCHARGES FROM POTABLE WATER SOURCES; FOUNDATION DRAINS; AIR CONDITIONING CONDENSATION; IRRIGATION WATER; SPRINGS; WATER FROM CRAWL SPACE PUMPS; FOOTING DRAINS; LAWN WATERING; INDIVIDUAL RESIDENTIAL CAR WASHING; FLOWS FROM RIPARIAN HABITATS AND WETLANDS; DECHLORINATED SWIMMING POOL DISCHARGES; DISCHARGES OR FLOWS FROM FIRE FIGHTING; AND, OTHER ACTIVITIES GENERATING DISCHARGES IDENTIFIED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY AS NOT REQUIRING VPDES AUTHORIZATION.

2. APPROPRIATE CONTROLS MUST BE IMPLEMENTED TO PREVENT ANY NON-STORMWATER DISCHARGES NOT INCLUDED ON THE ABOVE LIST (E.G., CONCRETE WASH WATER, PAINT WASH WATER, VEHICLE WASH WATER, DETERGENT WASH WATER, ETC.) FROM BEING DISCHARGED INTO ARLINGTON COUNTY'S MS4 SYSTEM, WHICH INCLUDES THE CURB AND GUTTER SYSTEM, AS WELL AS CATCH BASINS AND OTHER STORM DRAIN INLETS, OR STREAM NETWORK.

3. PER CHAPTER 26 OF THE ARLINGTON COUNTY CODE, IT SHALL BE UNLAWFUL FOR ANY PERSON TO DISCHARGE DIRECTLY OR INDIRECTLY INTO THE STORM SEWER SYSTEM OR STATE WATERS, ANY SUBSTANCE LIKELY, IN THE OPINION OF THE COUNTY MANAGER, TO HAVE AN ADVERSE EFFECT ON THE STORM SEWER SYSTEM OR STATE WATERS.

4. ALL DOCUMENTS RELATED TO THE SWPPP FOR THIS LAND DISTURBANCE ACTIVITY SHALL BE MAINTAINED AT THE ACTIVITY SITE AND SHALL BE READILY AVAILABLE FOR REVIEW UPON REQUEST DURING NORMAL WORKING BUSINESS HOURS. SUCH DOCUMENTS INCLUDE, BUT ARE NOT LIMITED TO, THE CONSTRUCTION PLANS (OR OTHER SUCH DOCUMENTS), THE ESC PLAN, THE POST CONSTRUCTION SWM PLAN (IF APPLICABLE), THE COUNTY STANDARDS AND SPECIFICATIONS # 4, #6, #7, #9 AND #10, SUPPLEMENTAL SPECIFICATIONS, SPECIAL PROVISIONS AND SPECIAL PROVISION COPIED NOTES.

DOCUMENTS RELATED TO STORMWATER POLLUTION PREVENTION WHICH ARE NOT A PART OF THOSE DOCUMENTS REFERENCED ABOVE, SUCH AS COPIES OF THE VSMP CONSTRUCTION PERMIT COVERAGE LETTER (WHEN APPLICABLE) AND THE OCR GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES (WHEN APPLICABLE) AND THOSE REQUIRED TO BE DEVELOPED BY THE CONTRACTOR FOR STORMWATER POLLUTION PREVENTION ASSOCIATED WITH ANY SUPPORT FACILITIES BEING INCLUDED IN THE VSMP CONSTRUCTION PERMIT COVERAGE FOR THIS LAND DISTURBANCE ACTIVITY, ARE TO BE MAINTAINED AT THE ACTIVITY SITE WITH THE OTHER SWPPP DOCUMENTS. WHERE NO FACILITIES ARE AVAILABLE AT THE ACTIVITY SITE TO MAINTAIN THE SWPPP DOCUMENTS, THEY ARE TO BE KEPT BY OR WITH THE DESIGNATED RLD AT LOCATION CONVENIENT TO THE ACTIVITY SITE WHERE THEY WOULD BE MADE AVAILABLE FOR REVIEW UPON REQUEST DURING NORMAL BUSINESS WORKING HOURS.

5. OTHER THAN CONSTRUCTION AT THE ACTIVITY SITE, THERE ARE NO DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY (E.G., FROM DEDICATED ASPHALT PLANTS OR DEDICATED CONCRETE PLANTS) PRODUCED BY THIS LAND DISTURBANCE ACTIVITY OR (WHERE APPLICABLE) INCLUDED IN THE VSMP CONSTRUCTION PERMIT COVERAGE FOR THIS LAND DISTURBANCE ACTIVITY.

6. DOCUMENTS IDENTIFYING THE LOCATIONS OF SUPPORT FACILITIES (E.G., WASTE OR BORROW AREAS, MATERIAL OR EQUIPMENT STORAGE AREAS ETC.) ASSOCIATED WITH OR (WHERE APPLICABLE) INCLUDED IN THE VSMP CONSTRUCTION PERMIT COVERAGE FOR THIS LAND DISTURBANCE ACTIVITY SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH SECTION THE VDOT R&B SPECIFICATIONS AND WILL BE MAINTAINED WITH THE OTHER SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY.

7. A DESCRIPTION OF ALL POLLUTION CONTROL MEASURES THAT WILL BE IMPLEMENTED AS A PART OF THIS CONSTRUCTION ACTIVITY TO CONTROL POLLUTANTS IN STORMWATER DISCHARGES ARE IDENTIFIED AND DESCRIBED IN THE CONTRACTOR SUPPLIED DOCUMENTS, THE CONSTRUCTION PLAN SET (OR OTHER SUCH DOCUMENTS) AND APPLICABLE SECTIONS OF THE VDOT R&B SPECIFICATIONS AND STANDARDS.

8. THE NAME OF THE INDIVIDUAL(S) OR CONTRACTOR(S) RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF THE POLLUTION CONTROL MEASURES SHALL BE SUPPLIED BY THE CONTRACTOR AND MAINTAINED WITH THE OTHER SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY.

9. REQUIREMENTS FOR THE PREVENTION OF THE DISCHARGE OF SOLID MATERIALS, INCLUDING BUILDING MATERIALS, GARBAGE, AND DEBRIS, TO SURFACE WATERS OF THE STATE, EXCEPT AS AUTHORIZED BY A CLEAN WATER ACT 404 PERMIT, ARE CONTAINED IN THE VDOT R&B SPECIFICATIONS.

10. REQUIREMENTS FOR COMPLIANCE WITH APPLICABLE STATE OR LOCAL WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS ARE CONTAINED IN THE VDOT R&B SPECIFICATIONS.

11. A DESCRIPTION OF CONSTRUCTION AND WASTE MATERIALS EXPECTED TO BE STORED ON-SITE, OR AT OFF-SITE SUPPORT FACILITIES INCLUDED IN THE VSMP CONSTRUCTION PERMIT COVERAGE FOR THIS LAND DISTURBANCE ACTIVITY, AND A DESCRIPTION OF CONTROLS TO REDUCE POLLUTANTS FROM THESE MATERIALS, INCLUDING STORAGE PRACTICES TO MINIMIZE EXPOSURE OF THE MATERIALS TO STORMWATER AND PRACTICES FOR SPILL PREVENTION AND RESPONSE, SHALL BE SUPPLIED BY THE CONTRACTOR AND MAINTAINED WITH THE OTHER SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY.

12. FOR ANY SUPPORT AREAS THAT WILL BE INCLUDED IN THE VSMP CONSTRUCTION PERMIT COVERAGE FOR THIS LAND DISTURBANCE ACTIVITY, A DESCRIPTION OF POTENTIAL POLLUTANT SOURCES FROM SUCH AREAS AND A DESCRIPTION OF CONTROLS AND MEASURES THAT WILL BE IMPLEMENTED AT THOSE SITES TO MINIMIZE POLLUTANT DISCHARGES SHALL BE SUPPLIED BY THE CONTRACTOR AND MAINTAINED WITH THE OTHER SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY.

13. THE RLD, OR HIS AUTHORIZED REPRESENTATIVE, CERTIFIES THAT ALL DOCUMENTS IDENTIFIED HEREIN TO BE SUPPLIED BY THE CONTRACTOR WILL BE REVIEWED, APPROVED AND INCLUDED WITH THE OTHER SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY PRIOR TO START OF WORK IN THOSE AREAS IDENTIFIED BY SUCH INFORMATION.

14. THE NAME OF THE INDIVIDUAL(S) RESPONSIBLE FOR THE INSPECTION OF THE EROSION AND SEDIMENT CONTROL MEASURES ON THE LAND DISTURBANCE ACTIVITY IS IDENTIFIED AND WILL BE MAINTAINED WITH THE OTHER SWPPP DOCUMENTS FOR THIS LAND DISTURBANCE ACTIVITY (NOTE: INDIVIDUAL(S) SHALL BE CERTIFIED THROUGH THE DEQ).

15. FOR THOSE LAND DISTURBING ACTIVITIES REQUIRING COVERAGE UNDER THE VSMP GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER FROM CONSTRUCTION ACTIVITIES, THE SWPPP SHALL BE MADE AVAILABLE FOR REVIEW UPON THE REQUEST OF THE DCR, THE EPA, LOCAL GOVERNMENT OFFICIALS OR THE OPERATOR OF A MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) RECEIVING DISCHARGE FROM THE CONSTRUCTION SITE.

16. FOR THOSE LAND DISTURBING ACTIVITIES REQUIRING COVERAGE UNDER THE VSMP GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER FROM CONSTRUCTION ACTIVITIES, THE RLD SHALL POST, OR HAVE POSTED, A COPY OF THE GENERAL PERMIT COVERAGE LETTER, NOTING THE NAME AND CONTACT INFORMATION FOR THE PERSON RESPONSIBLE FOR THE LAND DISTURBING ACTIVITY AND ITS SWPPP, OUTSIDE THE PROJECT'S CONSTRUCTION OFFICE ALONG WITH OTHER FEDERAL AND STATE MANDATED INFORMATION. WHERE THERE IS NO CONSTRUCTION OFFICE (E.G., A MAINTENANCE ACTIVITY), THE PERMIT COVERAGE LETTER IS TO BE MAINTAINED WITH THE OTHER SWPPP DOCUMENTS FOR THE LAND DISTURBING ACTIVITY.

17. FOR THOSE LAND DISTURBING ACTIVITIES REQUIRING COVERAGE UNDER THE VSMP GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER FROM CONSTRUCTION ACTIVITIES ON OR AFTER JULY 1, 2009 THAT HAVE NOT BEEN PREVIOUSLY COVERED BY A VSMP PERMIT, THE SWPPP SHALL BE MADE AVAILABLE FOR REVIEW BY THE PUBLIC UPON REQUEST. SUCH REVIEWS SHALL BE AT A TIME AND PUBLICLY ACCESSIBLE LOCATION CONVENIENT TO ARLINGTON COUNTY AND SHALL BE SCHEDULED DURING NORMAL BUSINESS HOURS AND NO LESS THAN ONCE A MONTH.

18. CHOOSE THE APPROPRIATE NOTE(S) 1 THROUGH 7 THAT ARE APPLICABLE TO THE PROPOSED POST CONSTRUCTION SWM PLAN FOR THIS LAND DISTURBANCE ACTIVITY. DELETE, STRIKETHROUGH OR MARK AS NA THOSE NOT APPLICABLE.)

1. THIS LAND DISTURBANCE ACTIVITY DOES NOT REQUIRE PERMANENT WATER QUALITY SWM FACILITIES BECAUSE THE POST DEVELOPMENT PERCENT IMPERVIOUS OF THE SITE IS LESS THAN 16%.

2. THE FOLLOWING OUTFALLS DO NOT REQUIRE A PERMANENT WATER QUALITY SWM FACILITY BECAUSE THE POST DEVELOPMENT PERCENT IMPERVIOUS OF THE SITE DRAINING TO EACH NOTED OUTFALL IS LESS THAN 16%. (LIST ALL APPLICABLE LOCATIONS):

3. THIS LAND DISTURBING ACTIVITY IS DESIGNATED AS A CATEGORY 2 PROJECT AND COMPLIES WITH POST DEVELOPMENT WATER QUALITY REQUIREMENTS IN ACCORDANCE WITH THE PROVISIONS OF THE VDOT STORMWATER PROGRAM ADVISORY SWPA-12-01.

4. THIS LAND DISTURBING ACTIVITY COMPLIES WITH POST DEVELOPMENT WATER QUALITY REQUIREMENTS IN ACCORDANCE WITH THE PROVISIONS OF THE VDOT STORMWATER PROGRAM ADVISORY SWPA-12-02.

5. AN EXCEPTION FOR (NUMBER) POUNDS OF PHOSPHORUS REMOVAL HAS BEEN GRANTED BY THE DEQ IN ITS LETTER DATED (DATE).

6. THIS LAND DISTURBANCE ACTIVITY IS GRANDFATHERED UNDER THE PART IIC (OLD) TECHNICAL CRITERIA (I.E., PERFORMANCE OR TECHNOLOGY BASED, MS 19, ETC.) IN SECTION 4VAC50- 60-93.1 ET SEQ. OF THE VSMP REGULATION.

7. THIS LAND DISTURBANCE ACTIVITY UTILIZES THE PART IIB (NEW) TECHNICAL CRITERIA (I.E., RUNOFF-REDUCTION METHOD, ENERGY BALANCE EQUATION, ETC.) IN SECTION 4VAC50- 60-93.4 ET SEQ. OF THE VSMP REGULATIONS.

8. THE PERMANENT SWM FACILITIES PROPOSED TO MEET THE WATER QUALITY/QUANTITY REQUIREMENTS FOR THIS LAND DISTURBANCE ACTIVITY ARE LISTED IN SECTION VI.

9. A DESCRIPTION OF ALL POST-CONSTRUCTION STORMWATER MANAGEMENT MEASURES THAT WILL BE INSTALLED DURING THE CONSTRUCTION PROCESS TO CONTROL POLLUTANTS IN STORMWATER DISCHARGES AFTER CONSTRUCTION OPERATIONS HAVE BEEN COMPLETED IS INCLUDED IN THE CONSTRUCTION PLAN SET (OR OTHER SUCH DOCUMENTS) FOR THIS LAND DISTURBANCE ACTIVITY.

10. ALL ENGINEERING CALCULATIONS SUPPORTING THE DESIGN OF THE POST-CONSTRUCTION STORMWATER MANAGEMENT MEASURES, INCLUDING AN EXPLANATION OF THE TECHNICAL BASIS USED TO SELECT THE PRACTICES, ARE CONTAINED IN THE PROJECT DRAINAGE FILE LOCATED AT ARLINGTON COUNTY AND WILL BE MADE AVAILABLE FOR REVIEW UPON REQUEST DURING NORMAL WORKING BUSINESS HOURS.

INFORMATION SHOWN ON THE SWPPP GENERAL INFORMATION SHEETS IS TO BE UPDATED/REVISED BY THE RLD AS NECESSARY IN ORDER TO REFLECT CHANGES THAT MAY OCCUR DURING THE CONSTRUCTION PHASE OF THE LAND DISTURBING ACTIVITY. THE UPDATED/REVISED SHEETS SHALL BE MAINTAINED WITH THE DESIGNATED RECORD SET OF PLANS FOR THE LAND DISTURBANCE ACTIVITY.

* DENOTES INFORMATION THAT IS TO BE PROVIDED/COMPLETED BY THE RLD.
** DENOTES INFORMATION THAT IS TO BE PROVIDED/COMPLETED BY THE CONTRACTOR.

NOTE: EFFECTIVE JULY 1, 2013, RESPONSIBILITY FOR THE VSMP GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES (THE VSMP CONSTRUCTION PERMIT) WAS TRANSFERRED FROM THE OCR TO THE DEQ.

ACRONYMS

DCR - DEPARTMENT OF CONSERVATION AND RECREATION

DEQ - DEPARTMENT OF ENVIRONMENTAL QUALITY

EPA - U.S. ENVIRONMENTAL PROTECTION AGENCY

ESC - EROSION AND SEDIMENT CONTROL

R&B - ROAD AND BRIDGE

RLD - RESPONSIBLE LAND DISTURBER

SWM - STORMWATER MANAGEMENT

SWPPP - STORMWATER POLLUTION PREVENTION PLAN

VDOT - VIRGINIA DEPARTMENT OF TRANSPORTATION

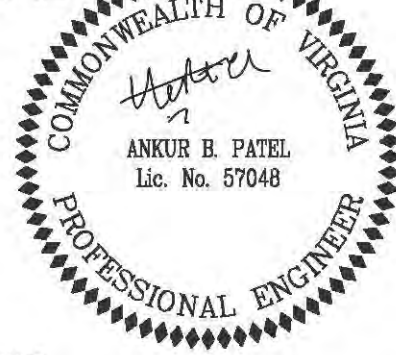
VSMP - VIRGINIA STORMWATER MANAGEMENT PROGRAM



DEPARTMENT OF
ENVIRONMENTAL SERVICES
FACILITIES & ENGINEERING DIVISION
ENGINEERING BUREAU
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SEAL



08/28/20

APPROVALS

DATE

Amy Pfeiffer 8/31/2020
QUALITY CONTROL ENGINEER
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
Glenn 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Dennis M. Leach 9/10/20
TRANSPORTATION DIRECTOR
Christin Jolicœur 9/10/20
PROJECT MANAGER

REVISIONS

DATE

STORMWATER POLLUTION
PREVENTION PLAN

DONALDSON RUN
TRIBUTARY B

S320

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
S320 SWPPP.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

PLOTTED: JULY 15 2020
PLOTTED BY: JCANDLER

SCALE: NTS

SHEET

SD-9

Instructions: Complete this required Front Counter Minimum Acceptance Criteria (MAC) Checklist to ensure the intake of your plan upon submission at 1st submission. If applicable, also complete all attached MAC Checklists for requirements pertaining to the individual review of plan elements.

Project Name: Donaldson Run Tributary B Stream Restoration
Address: Upton St. N
Date: 2/8/18

General Items	yes	n/a	no	sheet
1 Completion of this Front Counter MAC Checklist and all applicable Plan Review MAC Checklists.	X			
2 Submit and sign the MAC Checklist with the civil engineering plan for first submittal only.	X			
3 Include a Cover Sheet with the following information				
a Name of project	X			C-0
b Include the address, if known at the time of submission.	X	X		ALL
c Vicinity Map indicating the North arrow; label all streets	X			C-0
d Name, address, phone number and email of Contractor	X			
e Name, address, phone number and email of Owner	X			C-0
f Name, address, phone number and email of Engineer	X			C-0
g Table of Contents/ Sheet Index	X			C-0
5 Include an Existing Conditions Plan Sheet, Demolition Plan Sheet and Site Plan Sheet	X			SV1-3, C1-2
6 Include the following within the Plan, on applicable Plan Sheets				
a Graphic Scale on ALL plan sheets	X			ALL
b North Arrow on ALL plan sheets	X			ALL
c Current Field Survey Topography (certified)	X			SV1-3
d Site Areas (Post Dedication and Post Vacation)	X			
e Total site area of property in sq ft and acres	X			
f Existing and Proposed Easements on an exhibit	X			EXHIBIT
g Real Property Identification Map Number, RPC Numbers	X			SV1-3
h Legends	X			ALL
8 Engineer's Seal/ Signature - Signed and dated on all sheets	X			ALL

Erosion and Sediment Control Plan	yes	n/a	no	sheet
1 Include the Following on Erosion and Sediment Control Plan Sheets				
a E&S Control Plan and Site Plans	X			ESC1-2
b E&S Control Narrative	X			ESC-4
c E&S Control practices detail drawing (dewatering device, etc.)	X			ESC-3
d E&S Control Plan Legend	X			ESC1-2
e Virginia Erosion and Sediment Control Handbook (VESCH) specification numbers	X			ESC1-4
f Blank Responsible Land Disturber Letter	X			ESC-4

1 of 3

2 General E&S Control Notes and General Land Conservation Notes	X			ESC-4
3 Landscape Conservation Plan with the following clearly indicated				
a Determination of the critical root zone	X			ESC1-2
b Tree protection fencing	X			ESC1-2
c Signage	X	X		
d Critical Root zone mitigation, such as root pruning, padding, or other root protection methods	X			ESC1-2
e Note requiring county arborist inspection before any land disturbance activity	X			ESC-4
f Tree inventory of all trees larger than 3 inches DBH, either on site or with a critical root zone encroaching the limit of disturbance. This list will contain information on species, size, health, whether the tree is protected or not, and other issues, such as location in the RPA, disease concerns, or invasive species presence	X			L1-2
g Tree canopy coverage calculation	X			
h RPA delineation, if applicable	X			SD-11
i For 4.1 site plans and public projects, a calculation of the tree replacement value of removed trees	X			L1-2

Stormwater Management Plan	yes	n/a	no	sheet
1 Include the following on Stormwater Management Plan Sheets				
a Runoff Reduction Spreadsheet	X			
b Design details and reference of stormwater facilities listed in the Runoff Reduction Spreadsheet	X			
c Facility detail, maintenance schedule, material specifications and construction inspection checklist for each stormwater facility proposed	X			
d Stormwater Management Facility and Site Data Spreadsheet	X			
e Drainage area boundary and runoff flow arrows	X			SD-5, 10
f Water Quantity Energy Balance Worksheet	X			
g Waterproofing Note, if applicable	X			
h Meet requirement for sheetflow and statement of no adverse impact to adjacent properties	X			
i Indicate Floodplain boundary and floodplain study OR certification on plan that no floodplain is present	X			SD-11
j Indicate Resource Protection Area (RPA) boundary on plan OR include certified note on plan that no RPA is present. If RPA is present, include Completed Water Quality Impact Assessment (WQIA) form with required elements. Include Completed Exception Request Form on plan (if required), and proposed RPA mitigation	X			SD-11
k Blank Stormwater Facility Maintenance and Monitoring Agreement	X			
l SWMII on the coversheet, once assigned after 1st review			X	

For more information on Runoff Reduction Spreadsheet, Energy Balance Worksheet, WQIA, Exception Request and Stormwater Facility Maintenance and Monitoring Agreement, click here.

Pollution Prevention Plan				
1 Include the following on the Pollution Prevention Plan				
a Standard notes from Stormwater Manual Section 2.4	X			SD7-9
b Authorized Non-Stormwater Discharge (Section 2.0), Potential Sources of Pollution & Pollution Prevention Practices (Section 5.0), and Spill Prevention & Response (Section 7.0) from SWPPP Template (Appendix B) of the Stormwater Manual	X			SD7-9

Registration Statement for project with land disturbance equal to or greater than 1 acre

2 of 3

I certify that the above is true and accurate to the best of my knowledge.

Signature

Date

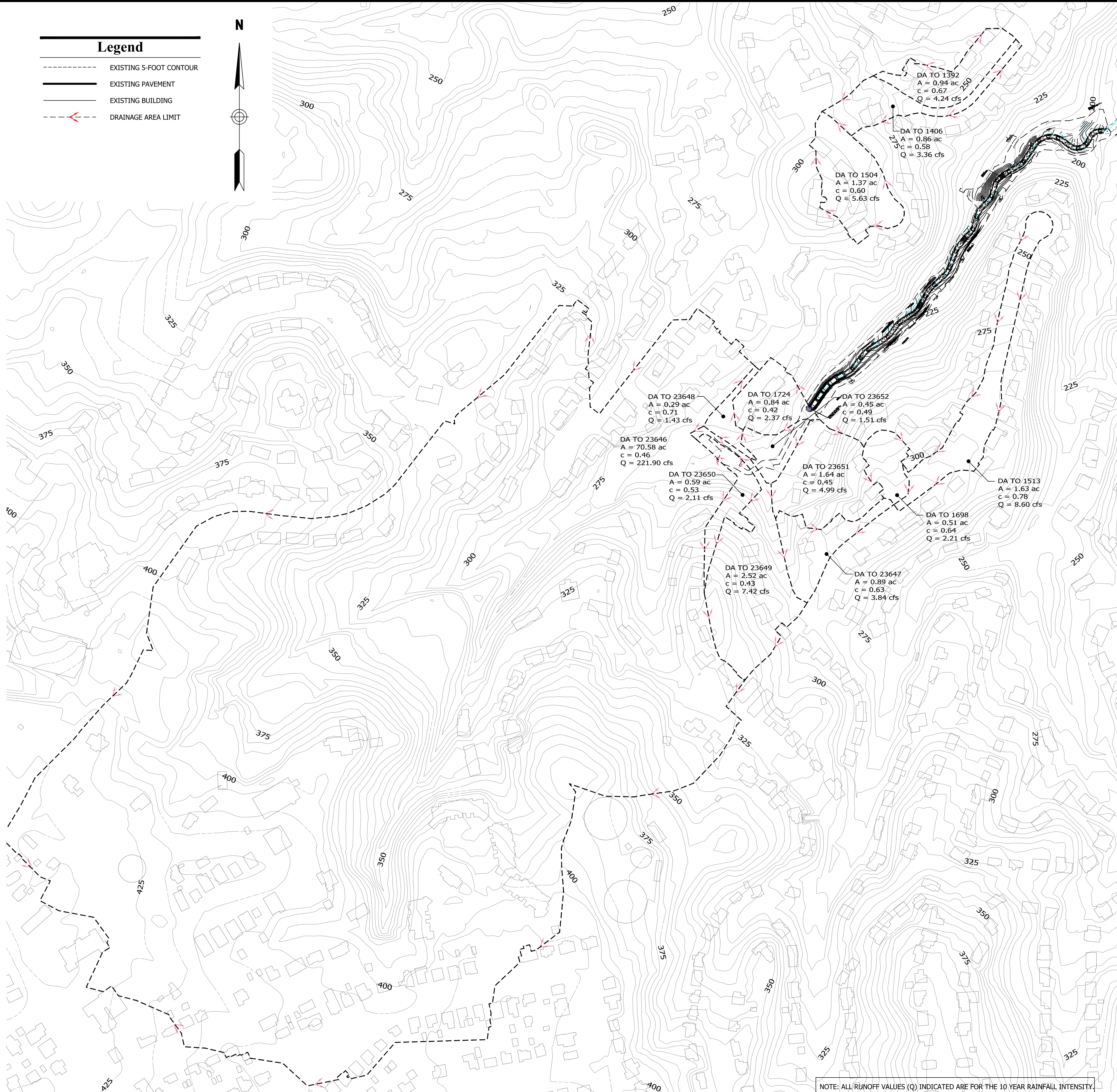
Legend

----- EXISTING 5-FOOT CONTOUR

----- EXISTING PAVEMENT

----- EXISTING BUILDING

---> DRAINAGE AREA LIMIT



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08/28/20
APPROVALS DATE

Amy Pflaum
QUALITY CONTROL ENGINEER 8/31/2020
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Dennis M. Leach 9/10/20
TRANSPORTATION DIRECTOR
Christin Jolicœur 9/10/20
PROJECT MANAGER

REVISIONS DATE

OVERALL DRAINAGE AREA MAP
DONALDSON RUN TRIBUTARY B
S32D

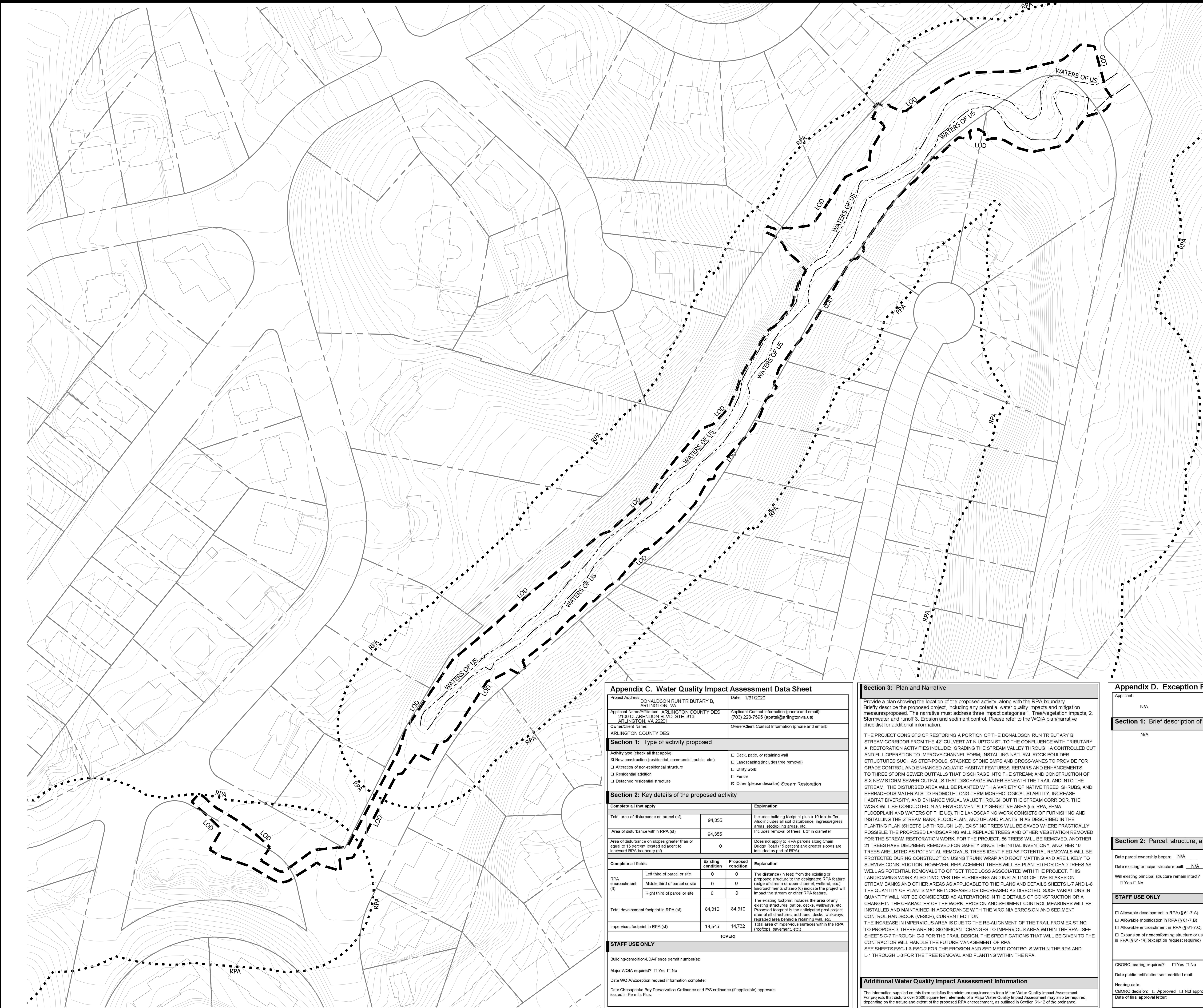
DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
S32D SWPPP.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

PLOTTED: JULY 15 2020
PLOTTED BY: JCANDLER

SCALE:
GRAPHIC SCALE
150 0 150
SCALE: 1" = 150'

SHEET SD-10



Legend

- PROPERTY LINE
- EXISTING 5-FOOT CONTOUR
- LIMIT OF DISTURBANCE (LOD)
- RESOURCE PROTECTION AREA (RPA)
- WATERS OF THE U.S.
- NEW RPA - would need to be confirmed by asbuilt

ARLINGTON VIRGINIA

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SEAL

COMMONWEALTH OF VIRGINIA
ANKUR B. PATEL
Lic. No. 57048
PROFESSIONAL ENGINEER

08/28/20

APPROVALS

Amy Pflaum 8/31/2020
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PROJECT MANAGER

REVISIONS

DATE

REVISIONS	DATE

WATER QUALITY IMPACT ASSESSMENT PLAN

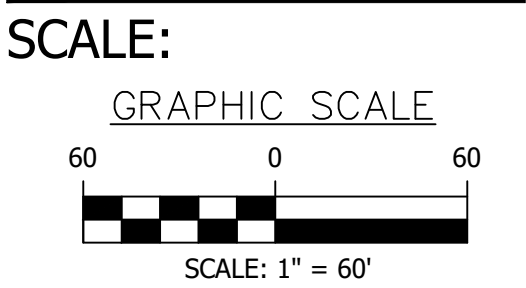
DONALDSON RUN TRIBUTARY B

S320

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
S320 WQIA 2020.DWG
PATH: Q:\DATA\S320\DESIGN\DRAWINGS

PLOTTED: JULY 10 2020
PLOTTED BY: JCANDLER



Appendix C. Water Quality Impact Assessment Data Sheet

Project Address: DONALDSON RUN TRIBUTARY B, ARLINGTON, VA Date: 1/31/2020

Applicant Name/Affiliation: ARLINGTON COUNTY DES 2100 CLARENDON BLVD. STE. 813 ARLINGTON, VA 22201 Applicant Contact Information (phone and email): (703) 228-7595 (apatel@arlingtonva.us)

Owner/Client Name: ARLINGTON COUNTY DES Owner/Client Contact Information (phone and email):

Section 1: Type of activity proposed

Activity type (check all that apply):
☐ New construction (residential, commercial, public, etc.)
☐ Alteration of non-residential structure
☐ Residential addition
☐ Detached residential structure
☐ Deck, patio, or retaining wall
☐ Landscaping (includes tree removal)
☐ Utility work
☐ Fence
☒ Other (please describe): Stream Restoration

Section 2: Key details of the proposed activity

Complete all that apply	Explanation
Total area of disturbance on parcel (sf)	94,355
Area of disturbance within RPA (sf)	94,355
Area of disturbance on slopes greater than or equal to 15 percent located adjacent to landward RPA boundary (sf)	0

Complete all fields	Existing condition	Proposed condition	Explanation
RPA encroachment (ft)	0	0	The distance (in feet) from the existing or proposed structure to the designated RPA feature (edge of stream or open channel, wetland, etc.). Encroachments of zero (0) indicate the project will impact the stream or other RPA feature.
Total development footprint in RPA (sf)	84,310	84,310	The existing footprint includes the area of any existing structures, patios, decks, walkways, etc. Proposed footprint is the anticipated post-project area of all structures, additions, decks, walkways, graded area behind a retaining wall, etc.
Impervious footprint in RPA (sf)	14,545	14,732	Total area of impervious surfaces within the RPA (rooftops, pavement, etc.)

(OVER)

STAFF USE ONLY

Building/demolition/DA/Fence permit number(s):

Major WQIA required? ☐ Yes ☐ No

Date WQIA/Exception request information complete:

Date Chesapeake Bay Preservation Ordinance and EFS ordinance (if applicable) approvals issued in Permits Plus: --

Section 3: Plan and Narrative

Provide a plan showing the location of the proposed activity, along with the RPA boundary. Briefly describe the proposed project, including any potential water quality impacts and mitigation measures proposed. The narrative must address three impact categories: 1. Tree/vegetation impacts, 2. Stormwater and runoff, 3. Erosion and sediment control. Please refer to the WQIA plan/narrative checklist for additional information.

THE PROJECT CONSISTS OF RESTORING A PORTION OF THE DONALDSON RUN TRIBUTARY B STREAM CORRIDOR FROM THE 42' CULVERT AT N UPTON ST. TO THE CONFLUENCE WITH TRIBUTARY A. RESTORATION ACTIVITIES INCLUDE: GRADING THE STREAM VALLEY THROUGH A CONTROLLED CUT AND FILL OPERATION TO IMPROVE CHANNEL FORM, INSTALLING NATURAL ROCK BOULDER STRUCTURES SUCH AS STEP-POOLS, STACKED STONE BMPs AND CROSS-VANES TO PROVIDE GRADE CONTROL AND ENHANCED AQUATIC HABITAT FEATURES, REPAIRS AND ENHANCEMENTS TO THREE STORM SEWER OUTFALLS THAT DISCHARGE INTO THE STREAM, AND CONSTRUCTION OF SIX NEW STORM SEWER OUTFALLS THAT DISCHARGE WATER BENEATH THE TRAIL AND INTO THE STREAM. THE DISTURBED AREA WILL BE PLANTED WITH A VARIETY OF NATIVE TREES, SHRUBS, AND HERBACEOUS MATERIALS TO PROMOTE LONG-TERM MORPHOLOGICAL STABILITY, INCREASE HABITAT DIVERSITY, AND ENHANCE VISUAL VALUE THROUGHOUT THE STREAM CORRIDOR. THE WORK WILL BE CONDUCTED IN AN ENVIRONMENTALLY SENSITIVE AREA (i.e. RPA, FEMA FLOODPLAIN AND WATERS OF THE US). THE LANDSCAPING WORK CONSISTS OF FURNISHING AND INSTALLING THE STREAM BANK, FLOODPLAIN, AND UPLAND PLANTS IN AS DESCRIBED IN THE PLANTING PLAN (SHEETS L-5 THROUGH L-9). EXISTING TREES WILL BE SAVED WHERE PRACTICALLY POSSIBLE. THE PROPOSED LANDSCAPING WILL REPLACE TREES AND OTHER VEGETATION REMOVED FOR THE STREAM RESTORATION WORK. FOR THE PROJECT, 88 TREES WILL BE REMOVED. ANOTHER 21 TREES HAVE BEEN REMOVED FOR SAFETY SINCE THE INITIAL INVENTORY. ANOTHER 16 TREES ARE LISTED AS POTENTIAL REMOVALS. TREES IDENTIFIED AS POTENTIAL REMOVALS WILL BE PROTECTED DURING CONSTRUCTION USING TRUNK WRAP AND ROOT MATTING AND ARE LIKELY TO SURVIVE CONSTRUCTION. HOWEVER, REPLACEMENT TREES WILL BE PLANTED FOR DEAD TREES AS WELL AS POTENTIAL REMOVALS TO OFFSET TREE LOSS ASSOCIATED WITH THE PROJECT. THIS LANDSCAPING WORK ALSO INVOLVES THE FURNISHING AND INSTALLING OF LIVE STAKES ON STREAM BANKS AND OTHER AREAS AS APPLICABLE TO THE PLANS AND DETAILS SHEETS L-7 AND L-8. THE QUANTITY OF PLANTS MAY BE INCREASED OR DECREASED AS DIRECTED. SUCH VARIATIONS IN QUANTITY WILL NOT BE CONSIDERED AS ALTERATIONS IN THE DETAILS OF CONSTRUCTION OR A CHANGE IN THE CHARACTER OF THE WORK. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESH), CURRENT EDITION. THE INCREASE IN IMPERVIOUS AREA IS DUE TO THE RE-ALIGNMENT OF THE TRAIL FROM EXISTING TO PROPOSED. THERE ARE NO SIGNIFICANT CHANGES TO IMPERVIOUS AREA WITHIN THE RPA. - SEE SHEETS C-7 THROUGH C-9 FOR THE TRAIL DESIGN. THE SPECIFICATIONS THAT WILL BE GIVEN TO THE CONTRACTOR WILL HANDLE THE FUTURE MANAGEMENT OF RPA. SEE SHEETS ESC-1 & ESC-2 FOR THE EROSION AND SEDIMENT CONTROLS WITHIN THE RPA AND L-1 THROUGH L-8 FOR THE TREE REMOVAL AND PLANTING WITHIN THE RPA.

Additional Water Quality Impact Assessment Information

The information supplied on this form satisfies the minimum requirements for a Minor Water Quality Impact Assessment. For projects that disturb over 2500 square feet, elements of a Major Water Quality Impact Assessment may also be required, depending on the nature and extent of the proposed RPA encroachment, as outlined in Section 51-12 of the ordinance.

Appendix D. Exception Request Form

Applicant: N/A Project address: N/A

Section 1: Brief description of exception request

N/A

Section 2: Parcel, structure, and ownership information

Date parcel ownership began: N/A Date(s) of construction of any prior work by current owner (alterations, additions, decks, patios, etc.): list individually: 1. Date 2. Type of prior work 3. 4.

Date existing principal structure built: N/A

Will existing principal structure remain intact? ☐ Yes ☐ No

STAFF USE ONLY

☐ Allowable development in RPA (§ 61-7 A)
☐ Allowable modification in RPA (§ 61-7 B)
☐ Allowable encroachment in RPA (§ 61-7 C)
☐ Expansion of nonconforming structure or use in RPA (§ 61-14) (exception request required)

☐ New development in the RPA, redevelopment that increases impervious area in the RPA or encroaches further into the RPA, or any other proposed disturbance of any RPA component (exception request required)
☐ Exempted activity in RPA (§ 61-15)
☐ Proposed development in RMA on 15 percent slopes adjacent to RPA
☐ Other RMA activity: _____

CBORC hearing required? ☐ Yes ☐ No

Date public notification sent certified mail:

Hearing date:

CBORC decision: ☐ Approved ☐ Not approved

Date of final approval letter:

TREE INVENTORY AND PROTECTION LIST										
TREE #	SPECIES	DBH	CONDITION	SPECIES RATING	REPLACEMENT VALUE	REPLACEMENT TREE	COMMENTS	REMOVE TREE	SAVE TREE	CRZ IMPACT
1	BLACK LOCUST	19	50	55	5.2	2	TREE HAS ALREADY BEEN REMOVED	X		58
2	RED MAPLE	18	60	75	8.1	2	ONE-SIDED CROWN	X		36
3	BLACK LOCUST	36	65	55	12.9	3	FILL ON ONE SIDE, TRAIL SHIFT	POTENTIAL		34
4	BLACK LOCUST	22	40	55	4.8	1	CROWN FORM		X	45
4a	TULIPTREE	9				1		X		100
5	TULIPTREE	30	80	75					X	15
5a	BLACK LOCUST	30	50	55			DEAD SMALL LEAD AND BRANCHES		X	41
5b	LOCUST	28							X	3
6	TULIPTREE	20	65	75			DEAD	X		39
6a	TULIPTREE	32	60	75			12 / 20 SPLIT @ 1" HEIGHT		X	1
7	BLACK LOCUST	26	60	55					X	6
8	TULIPTREE	32	70	75					X	33
9	BLACK CHERRY	28	50	75			TWO TRUNKS		X	5
10	TULIPTREE	16	45	75	5.4	2		X		92
11	TULIPTREE	10							X	14
11a	GREEN ASH	6				1		X		100
11b	RED MAPLE	9							X	24
11c	TULIPTREE	38							X	15
11d	TULIPTREE	24							X	51
11e	TULIPTREE	12							X	8
12	RED MAPLE	12	60	75	5.4	2		X		96
13	RED MAPLE	11	65	75	5.4	2		X		99
14	BLACK LOCUST	24	60	55	7.9	2	DEAD	X		97
15	TULIPTREE	32	80	75	19.2	4		X		21
15a	TULIPTREE	30					SPLIT		X	5
15b	OAK	24							X	2
16	RED MAPLE	14	55	75			LEANING		X	8
16a	RED MAPLE	6				1		X		100
16b	TULIPTREE	11							X	0
17	TULIPTREE	13	65	75	6.3	2	CROWN FORM	POTENTIAL		30
18	TULIPTREE	22	70	75					X	22
19	TULIPTREE	20	75	75	11.3	3		X		57
20	TULIPTREE	18	70	75	9.5	2		X		52
21	TULIPTREE	16	60	75	7.2	2		X		99
21a	AMERICAN BEECH	6				1		X		100
21b	BLACK CHERRY	6				1		X		100
21c	OAK	36							X	15
21d	OAK	36							X	5
22	TULIPTREE	21	70	75	11.0	3		X		100
23	TULIPTREE	12	60	75	5.4	2		X		100
23b	TULIPTREE	14	45	75	4.7	1	CROWN MISSING	X		100
25	SYCAMORE	24	70	65	10.9	3	FILL FOR TRAIL SHIFT	X		66
26	TULIPTREE	14	45	75	4.7	1	TRUNK DAMAGE	X		73
27	TULIPTREE	18	65	75					X	31
28	TULIPTREE	22	65	75	10.7	3	DEAD	X		39
29	TULIPTREE	22	75	75	12.4	3	TRAIL SHIFT	X		57
30	TULIPTREE	30	75	75	16.9	4	DEAD	X		94
31	TULIPTREE	26	70	75	13.7	3		X		89
31b	TULIPTREE	4				1		X		100
32	CHESTNUT OAK	32	80	80			DEAD	X		29
33	TULIPTREE	17	75	65					X	19
34	TULIPTREE	9				1	DEAD	X		100
35	TULIPTREE	17	75	80	10.2	3		X		67
36	TULIPTREE	13	75	70				X		17
36a	TULIPTREE	5				1		X		77
36b	TULIPTREE	5						X		100
37	WHITE OAK	30	90	70	18.9	4	TRAIL SHIFT - 5'	POTENTIAL		37
38	TULIPTREE	9				1	TRAIL SHIFT - 4'	X		81
39	WHITE OAK	21	90	65			TRAIL SHIFT - 8'		X	26
40	TULIPTREE	18	75	55			SPLIT BARK, CROWN FORM		X	25
40a	DOGWOOD	3				1	DEAD	X		100
41	TULIPTREE	14	75	65					X	16
42	TULIPTREE	20	75	75					X	30
43	TULIPTREE	14	75	65					X	31
44	TULIPTREE	22	75	50					X	37
45	TULIPTREE	24	75	70					X	35
46	TULIPTREE	16	75	60	7.2	2	STREAM BED UNDERCUT ROOTS	X		97
47	TULIPTREE	8							X	34
48a	AMERICAN BEECH	4				1	TRAIL SHIFT	X		99
49	TULIPTREE	9							X	41
50	TULIPTREE	19	60	80	9.1	2	TRAIL SHIFT, FROST CRACK AT BASE	POTENTIAL		41


Legend

--- MATCH LINE

--- TREE PROTECTION FENCE

TREE INVENTORY AND PROTECTION LIST										
TREE #	SPECIES	DBH	CONDITION	SPECIES RATING	REPLACEMENT VALUE	REPLACEMENT TREE	COMMENTS	REMOVE TREE	SAVE TREE	CRZ IMPACT
51	TULIPTREE	18	60	65	7.0	2		POTENTIAL		26
52	TULIPTREE	22	70	75	11.6	3		POTENTIAL		36
52a	TULIPTREE	20	60	80					X	7
53	TULIPTREE	26	60	70	10.9	3	CROWN FORM	X		49
53a	RED MAPLE	5							X	15
54	TULIPTREE	20	50	75	7.5	2	ROOTS SEVERELY UNDERCUT BY STREAM	X		100
54a	MAPLE	8				1		X		100
55	TULIPTREE	22	60	75	9.9	2		X		73
56	TULIPTREE	24	65	75	11.7	3	DEAD	X		75
56a	TULIPTREE	30	65	75					X	18
98b	NORTHERN RED OAK	32	80	75					X	15
113	EASTERN REDBUD	10	65	70					X	20
114	FLOWERING DOGWOOD	4	70	60					X	25
115	RIVER BIRCH	4	65	70					X	12
116	CRYPTOMERIA	4	60	70					X	23
117	CRYPTOMERIA	4	60	70		1	REPLACE WITH PIN OAK - QUERCUS PALUSTRIS	POTENTIAL		1
118	LONDON PLANETREE	7	55	65			REPLACE WITH RED MAPLE - ACER RUBRUM 'OCTOBER GLORY'	POTENTIAL		60
119	LONDON PLANETREE	15	70	65			PRUNE TO PREVENT DAMAGE		X	45
120	RED MAPLE	9	70	65					X	33
121	RED MAPLE	10	70	65				POTENTIAL		19
122	RED MAPLE	4	70	65		1	REPLACE WITH RED MAPLE - ACER RUBRUM 'OCTOBER GLORY'	X		34
123	CRYPTOMERIA	5	60	70					X	25

POTENTIAL TREE REMOVALS = 17
TOTAL TREES REMOVED = 84
TOTAL TREES PLANTED = 232



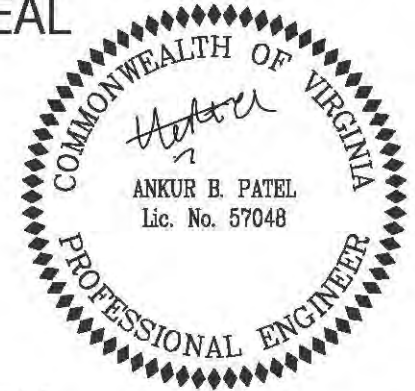
ARLINGTON
VIRGINIA

DEPARTMENT OF
ENVIRONMENTAL SERVICES

FACILITIES & ENGINEERING DIVISION
ENGINEERING BUREAU
2100 CLARENDON BOULEVARD, SUITE 813
ARLINGTON, VA 22201
PHONE: 703.228.3629
FAX: 703.228.3606

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SEAL



08/28/20

APPROVALS

Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER

Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR

Dennis M. Leach 9/10/20
WATER, SEWER, STREETS BUREAU CHIEF

Christin Jolicœur 9/10/20
TRANSPORTATION DIRECTOR

PROJECT MANAGER

REVISIONS

DATE

EXISTING TREE INVENTORY

DONALDSON RUN TRIBUTARY B

S32D


DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME: S32D TREES 2020.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

PLOTTED: SEPTEMBER 10 2020
PLOTTED BY: JCANDLER

SCALE:

GRAPHIC SCALE

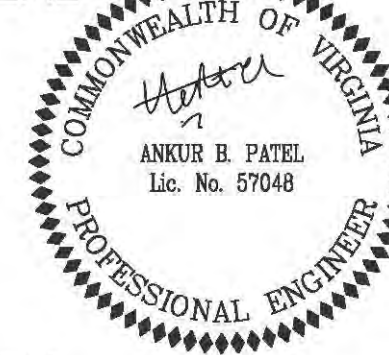


SCALE: 1" = 20'

SHEET

L-1

SEAL



08/28/20

APPROVALS

DATE

Amy Pflaum

QUALITY CONTROL ENGINEER

8/31/2020

Kamal Taktak

9.2.20

CONSTRUCTION MANAGEMENT SUPERVISOR

09.10.2020

WATER, SEWER, STREETS BUREAU CHIEF

Dennis M. Leach

TRANSPORTATION DIRECTOR

Christin Jolicœur

PROJECT MANAGER

REVISIONS

DATE

EXISTING TREE INVENTORY

DONALDSON RUN
TRIBUTARY B

S32D

DESIGNED: JCANDLER

DRAWN: JCANDLER

CHECKED: APATEL

MISS UTILITY TRANSMITTAL #: N/A

FILENAME:

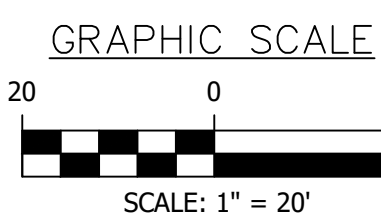
S32D TREES 2020.DWG

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PLOTTED: AUGUST 19 2020

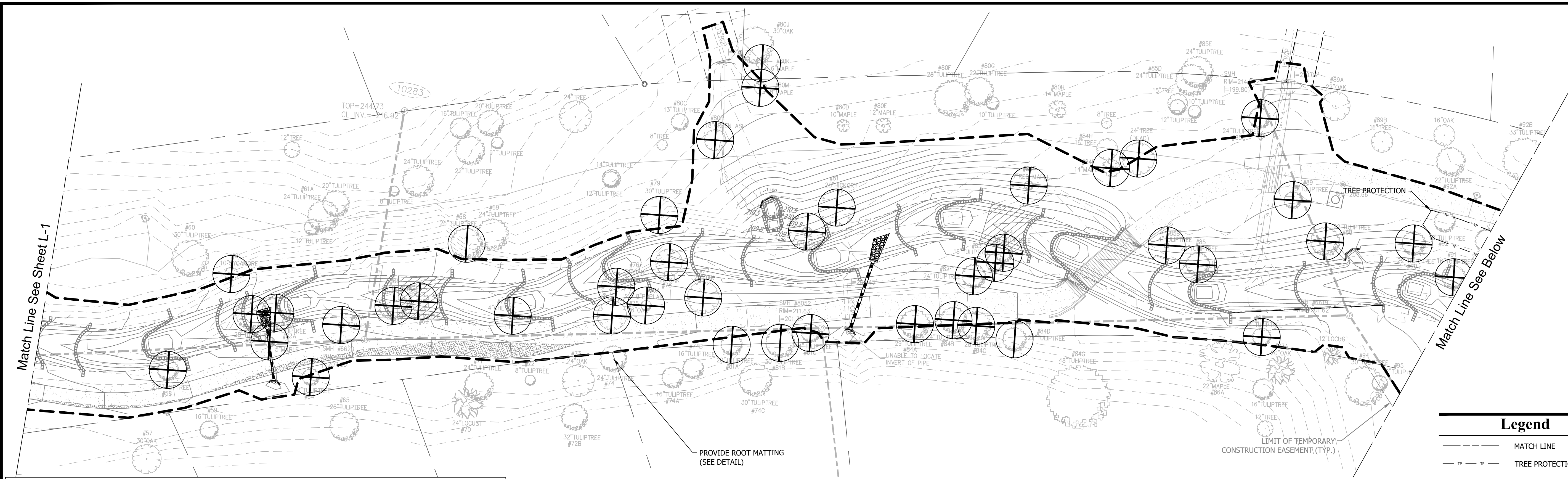
PLOTTED BY: JCANDLER

SCALE:



SHEET

L-2



PROVIDE ROOT MATTING
(SEE DETAIL)

Legend

--- MATCH LINE

--- TREE PROTECTION FENCE

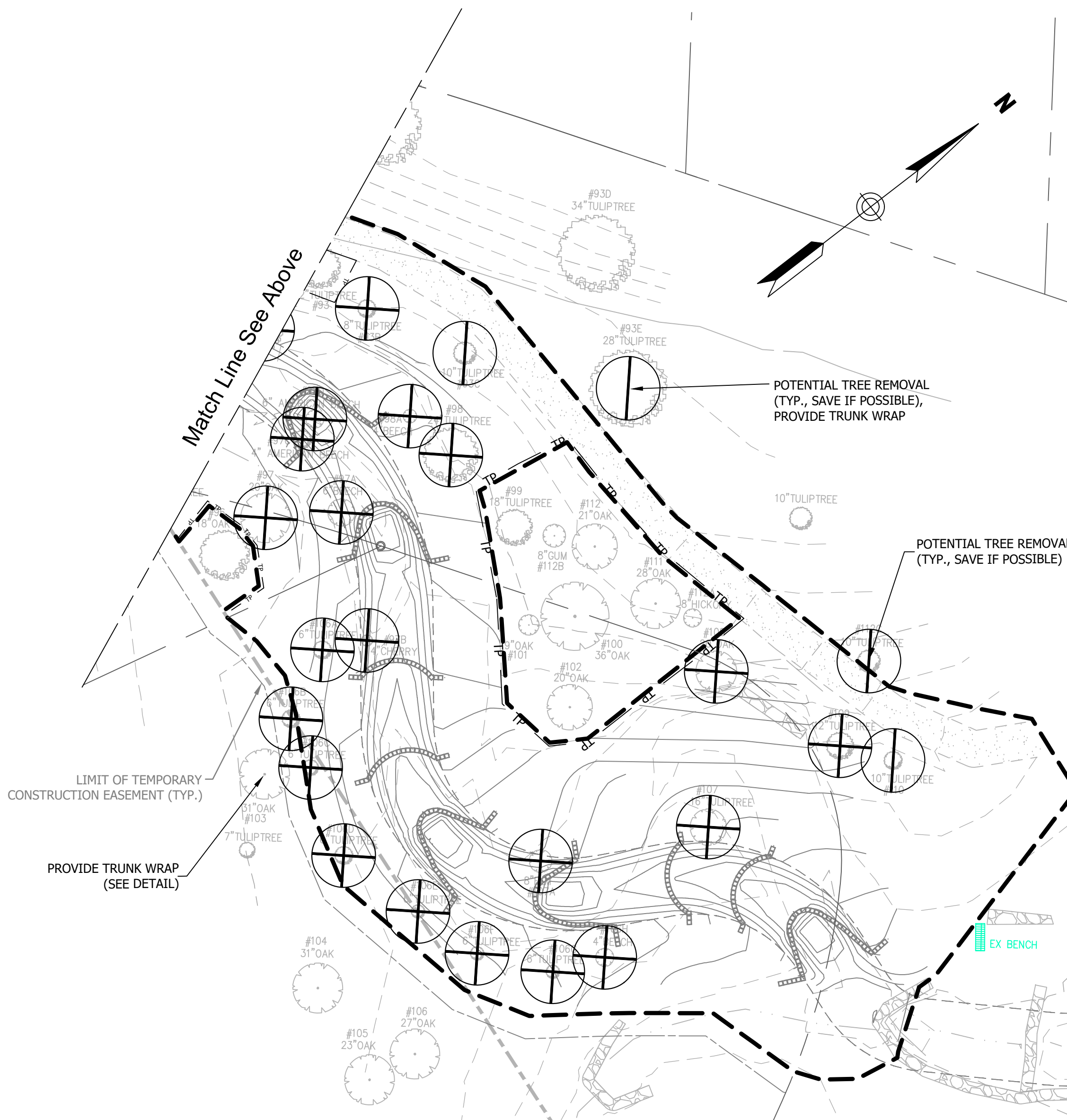
TREE INVENTORY AND PROTECTION LIST

TREE #	SPECIES	DBH	CONDIION	SPECIES RATING	REPLACEMENT VALUE	REPLACEMENT TREE	COMMENTS	REMOVE TREE	SAVE TREE	CRZ IMPACT
57	NORTHERN RED OAK	30	80	80				X	X	15
58	TULIPTREE	20	70	75	10.5	3		X	X	83
59	TULIPTREE	16	50	75			TRAIL SHIFT		X	11
60	TULIPTREE	30	80	75			CRZ?		X	27
61	SYCAMORE	10		65		1		X		42
61a	TULIPTREE	24							X	9
62	TULIPTREE	28	50	75	10.5	3	ROOTS SEVERELY UNDERCUT BY STREAM	X		82
63	TULIPTREE	24	45	75	8.1	2	ROOTS SEVERELY UNDERCUT BY STREAM	X		90
63a	RED MAPLE	5				1		X		100
64	TULIPTREE	13	70	75	6.8	2		X		52
65	TULIPTREE	25	50	75			BROKEN BRANCHES IN CROWN		X	4
65a	NORWAY MAPLE	3				1		X		100
66	TULIPTREE	25	60	75	11.3	3	ROOTS SLIGHTLY UNDERCUT BY STREAM	X		90
67	RED MAPLE	20	50	75	7.5	2	DEAD	X		99
68	TULIPTREE	26	60	75	11.7	3	ON EDGE OF BANK	POTENTIAL		39
69	TULIPTREE	24	55	75				X		27
70	BLACK LOCUST	24	50	55			DEAD	X		9
71	TULIPTREE	24	50	75				X		24
72	TULIPTREE	8						X		2
72a	BLACK CHERRY	4				1		X		100
72b	TULIPTREE	32	60	75					X	9
73	WHITE OAK	24	65	90					X	26
74	TULIPTREE	24	60	75					X	43
74a	TULIPTREE	16							X	6
74b	TULIPTREE	16					DEAD	X		13
74c	TULIPTREE	30							X	16
75	NORTHERN RED OAK	26	60	80	12.5	3	DEAD	X		82
76	NORTHERN RED OAK	31	65	80	16.1	4	DEAD	X		77
76a	TULIPTREE	8				1		X		100
77	WHITE OAK	25	50	90	11.3	3	ROOTS UNDERCUT BY STREAM	X		88
78	WHITE OAK	26	70	90	16.4	4		X		85
79	TULIPTREE	30	75	75	16.9	4	STACKED WALL?	X		53
80a	RED MAPLE	5				1		X		100
80b	GREEN ASH	18	65	80	7.0	2	UNDERCUT	X		73
80c	TULIPTREE	13						X		16
80d	MAPLE	10						X		11
80e	MAPLE	12						X		17
80f	TULIPTREE	28						X		17
80g	TULIPTREE	22						X		6
80h	MAPLE	14						X		1
80i	OAK	30					DEAD, CUT AT 20' AND LEAVE AS SNAG			22
80k	MAPLE	6						POTENTIAL		14
80m	MAPLE	8						X		82
81	HICKORY	28	70	75	14.7	3		X		98
81a	TULIPTREE	20	60	75	9.0	2		POTENTIAL		41
81b	TULIPTREE	30	65	75	14.6	3		POTENTIAL		44
81c	TULIPTREE	14	60	75	6.3	2		X		52
82	TULIPTREE	24	70	75	12.5	3		X		93
83	TULIPTREE	16	60	75	7.2	2		X		100
84	TULIPTREE	18	60	75	8.1	2		X		100
84a	TULIPTREE	29	60	75	13.1	3		X		54
84b	TULIPTREE	24	65	75	11.7	3	DEAD	X		55
84c	TULIPTREE	28	65	75	13.7	3		X		49
84d	TULIPTREE	22	65	75	10.7	3		POTENTIAL		30
84e	RED MAPLE	7	45	75		1		X		100
84f	RED MAPLE	14	45	75		1		X		55
84g	TULIPTREE	48							X	16
84h	TREE	14							X	29
85	TULIPTREE	22	60	75	9.9	2	ROOTS UNDERCUT BY STREAM	X		100
85b	TULIPTREE	4				1		X		100
85c	TULIPTREE	24				3		X		83
85d	TULIPTREE	24					DEAD		X	1
85e	TULIPTREE	24							X	1
86a	RED MAPLE	22	45	75			DEAD		X	25
87	TULIPTREE	14	40	75	4.2	1		X		57
87a	WHITE OAK	20	60	90			ODD CROWN FORM		X	20
88	TULIPTREE	22	70	75	11.6	3		X		100
89	TULIPTREE	15	40	75	4.5	1		X		100
89a	OAK	22							X	34
89b	TREE	16					DEAD		X	10
90	TULIPTREE	22	70	75	11.6	3		X		100
91	TULIPTREE	16	50	75	6.0	2	HALF ROOT SYSTEM UNDERCUT BY STREAM	X		100

REVISED ON 11/08/2016

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DONALDSON RUN TRIBUTARY B



POTENTIAL TREE REMOVAL
(TYP., SAVE IF POSSIBLE),
PROVIDE TRUNK WRAP

POTENTIAL TREE REMOVAL
(TYP., SAVE IF POSSIBLE)

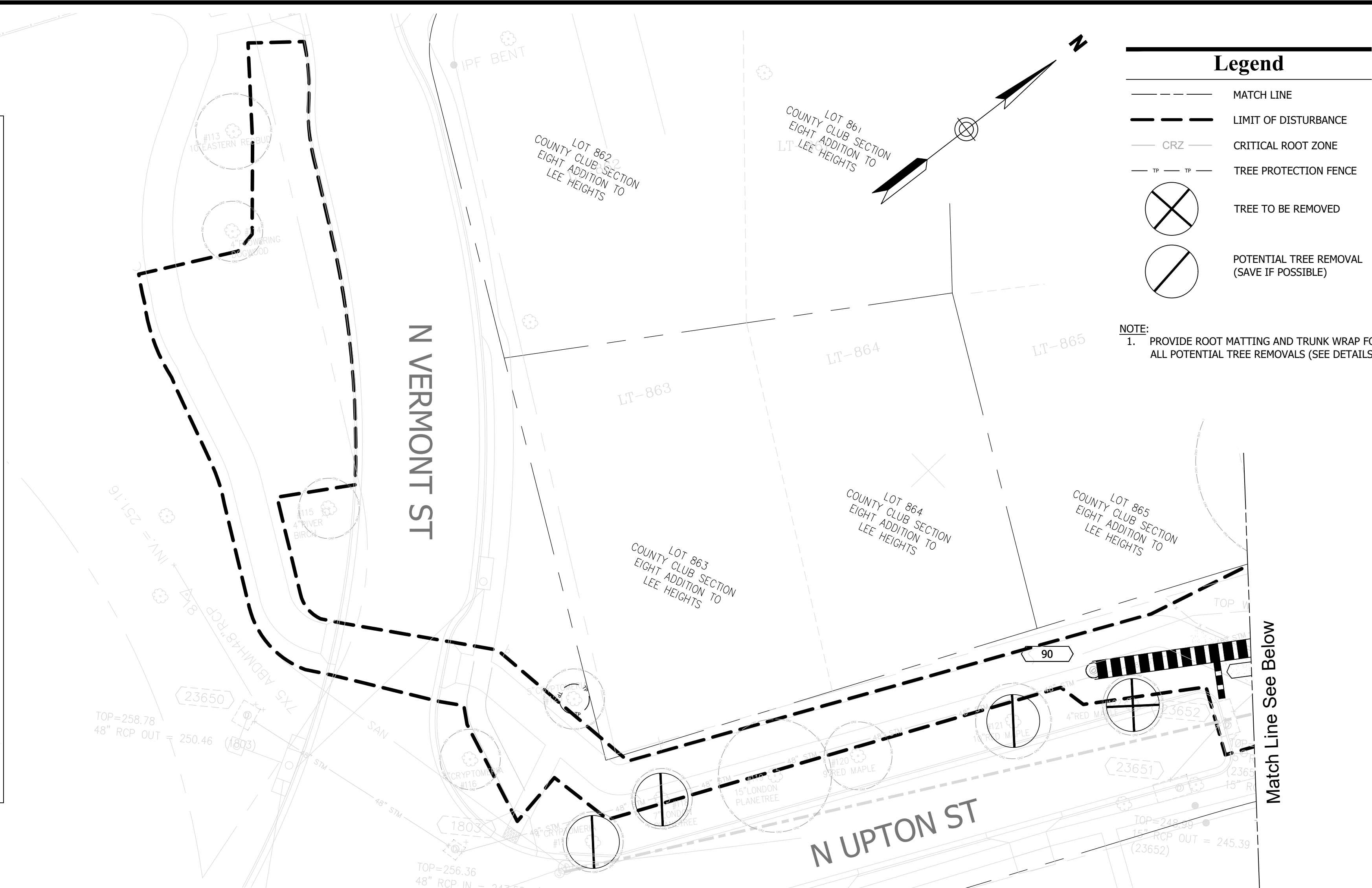
LIMIT OF TEMPORARY
CONSTRUCTION EASEMENT (TYP.)

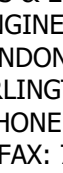
PROVIDE TRUNK WRAP
(SEE DETAIL)

EX BENCH

TREE INVENTORY AND PROTECTION LIST

TREE #	SPECIES	DBH	CONDITION	SPECIES RATING	REPLACEMENT VALUE	REPLACEMENT TREE	COMMENTS	REMOVE TREE	SAVE TREE	CRZ IMPACT
92	TULIPTREE	18	70	75					X	87
92a	TULIPTREE	22							X	19
92b	TULIPTREE	33							X	12
93	TULIPTREE	22	70	75					X	85
93a	BLACK LOCUST	12	65	55		1		X	X	38
93b	TULIPTREE	8				1		X		100
93c	TULIPTREE	10				1		X		9
93d	TULIPTREE	34							X	27
93e	TULIPTREE	28		75			TWO TRUNKS (8" AND 8")	POTENTIAL		9
94	TULIPTREE	30	90	75		5			X	34
95	TULIPTREE	12	55	75					X	31
96	WHITE OAK	18	70	90	11.3	3	FLOODPLAIN GRADING		X	50
97	WHITE OAK	20	65	90	11.7	3	FLOODPLAIN GRADING	X		81
97a	AMERICAN BEECH	6				1		X		100
97b	BLACK CHERRY	4				1	DEAD	X		100
97c	AMERICAN BEECH	4				1		X		100
97d	AMERICAN BEECH	6				1		X		100
98	TULIPTREE	24	50	75	9.0	2	ROOTS SEVERELY UNDERCUT BY STREAM	X		88
98a	AMERICAN BEECH	4				1	ROOTS SEVERELY UNDERCUT BY STREAM	X		100
99	TULIPTREE	18	60	75			FILL		X	41
100	SCARLET OAK	36	70	80	20.2	5			X	68
101	WHITE OAK	9				1			X	100
102	WHITE OAK	22	55	90	10.9	3	LEANING ONTO ANOTHER TREE		X	98
103	WHITE OAK	31	75	90			FLOODPLAIN GRADING?	X		32
104	WHITE OAK	31	80	90			FLOODPLAIN GRADING?	X		10
105	WHITE OAK	23	70	90					X	0
106	WHITE OAK	27	65	90					X	9
106a	TULIPTREE	6				1		X		100
106b	TULIPTREE	6				1	DEAD	X		41
106c	TULIPTREE	6				1	DEAD	X		60
106d	TULIPTREE	6				1		X		70
106e	TULIPTREE	6				1		X		95
106f	TULIPTREE	6				1		X		100
106g	TULIPTREE	6				1		X		100
106h	AMERICAN BEECH	4				1		X		100
107	TULIPTREE	16	60	75	7.2	2		X		100
107a	ELM	8				1	LEANING	X		100
107b	WHITE OAK	20	60	90	10.80	3	CAN STREAM UNDERCUT BE FILLED?	X		78
109	TULIPTREE	12		90		2		X		100
110	TULIPTREE	10				1		POTENTIAL		100
111	WHITE OAK	28	70	90					X	52
112	NORTHERN RED OAK	21	60	80					X	29
112a	HICKORY	8							X	12
112b	BLACK GLIM	8							X	9
112c	TULIPTREE	10				1		POTENTIAL		41



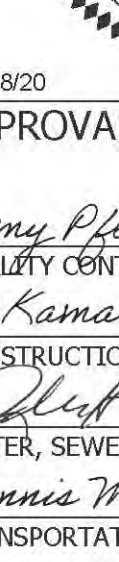


ARLINGTON
VIRGINIA

**DEPARTMENT OF
ENVIRONMENTAL SERVICES**
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SEAL



08/28/20

APPROVALS	DATE
<i>Amy Pflaum</i>	8/31/2020
QUALITY CONTROL ENGINEER	
<i>Kamal Taktak</i>	9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR	
<i>[Signature]</i>	09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF	
<i>Dennis M. Leach</i>	9/10/20
TRANSPORTATION DIRECTOR	
<i>Christin Golicoeur</i>	9/10/20
PROJECT MANAGER	

REVISIONS

DATE

TREE REMOVAL PLAN

**DONALDSON RUN
TRIBUTARY B**

S32D

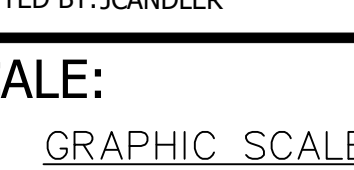
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 DRAWN: JCANDLER
 CHECKED: APATEL
 MISS UTILITY TRANSMITTAL #: N/A

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PLOTTED: SEPTEMBER 10 2020
 PLOTTED BY: JCANDLER

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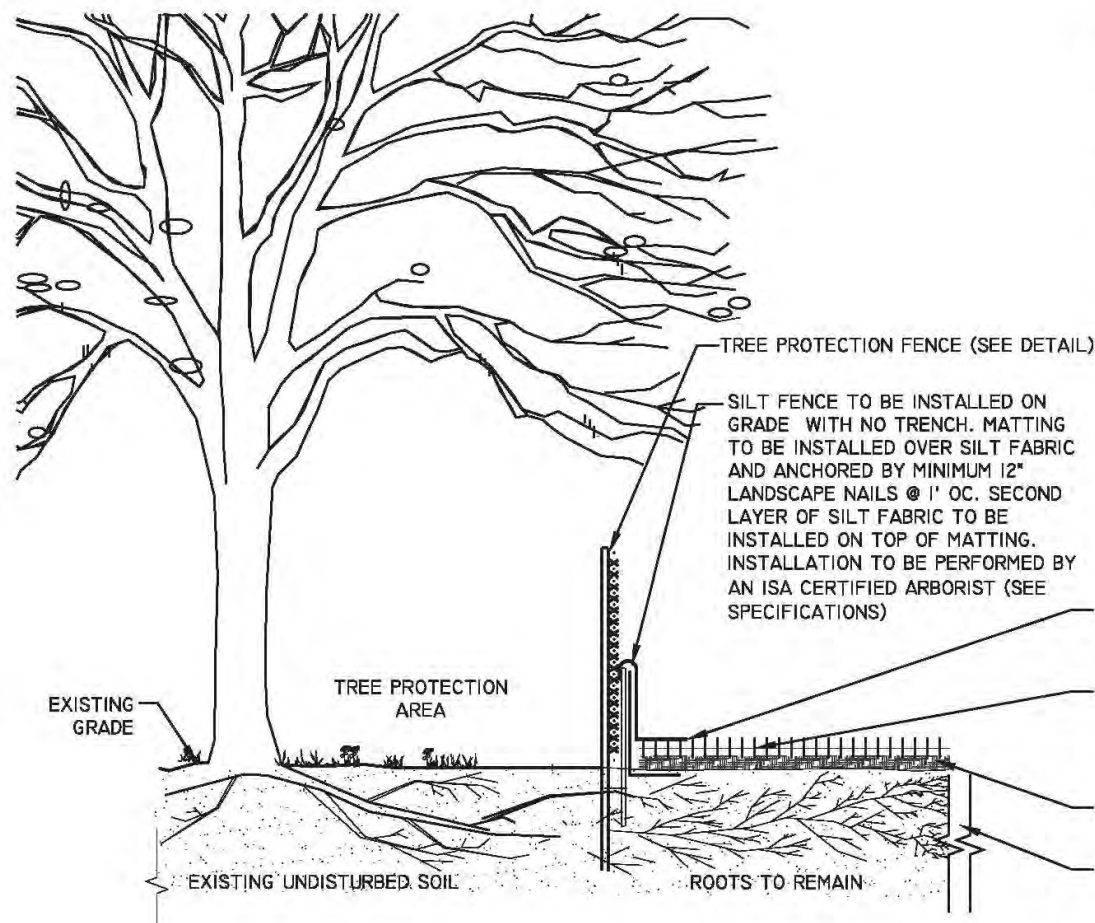
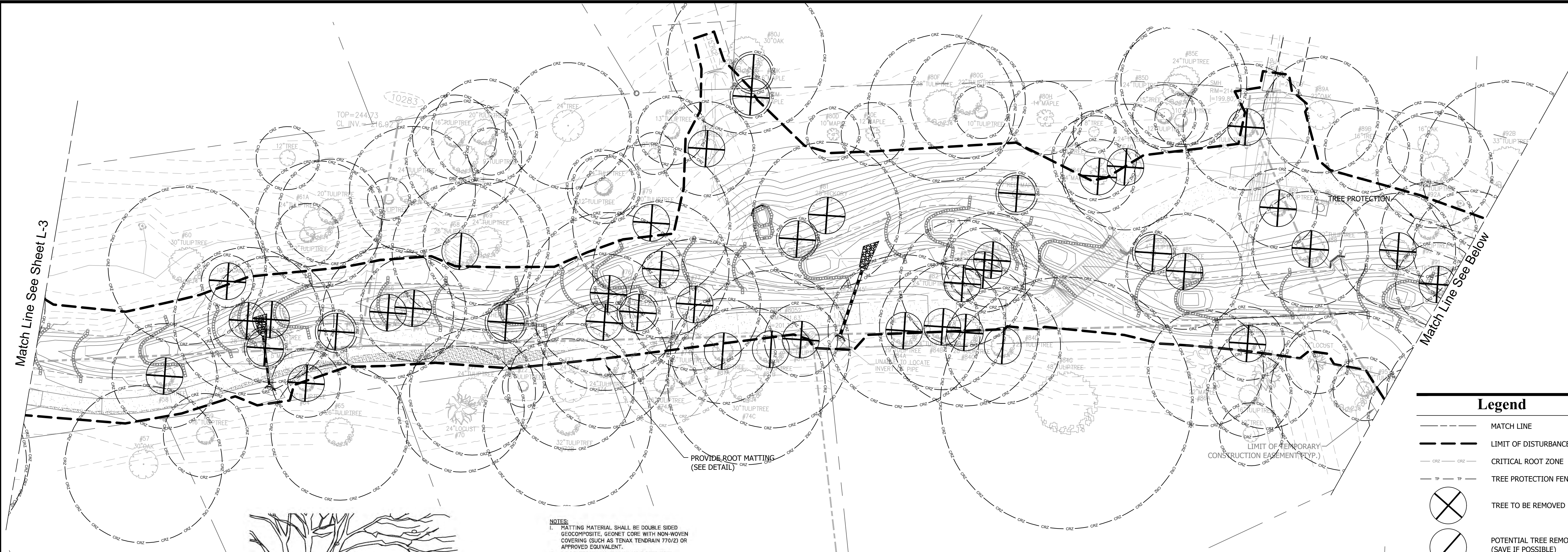
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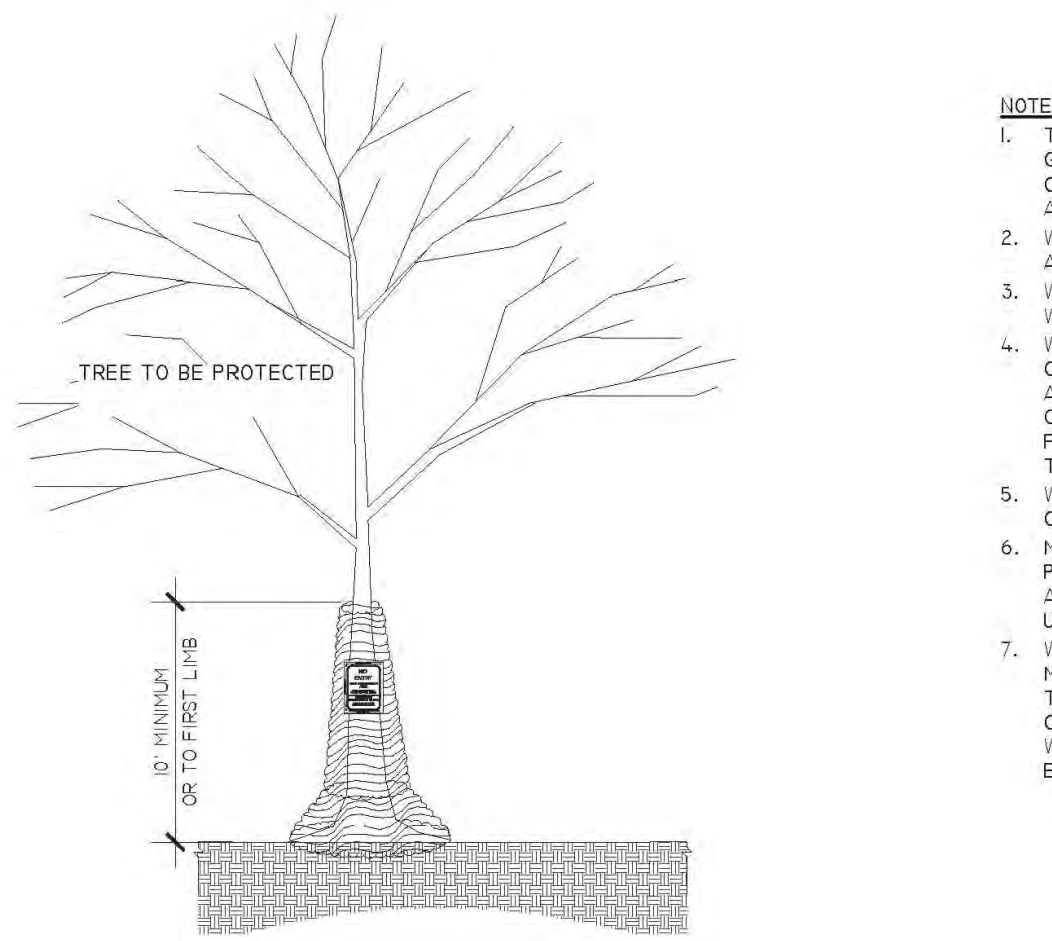
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SHEET

L-3



TEMPORARY ROOT PROTECTION MATTING WITHIN CRZ
311300.7NS
NOT TO SCALE
ARLINGTON VIRGINIA

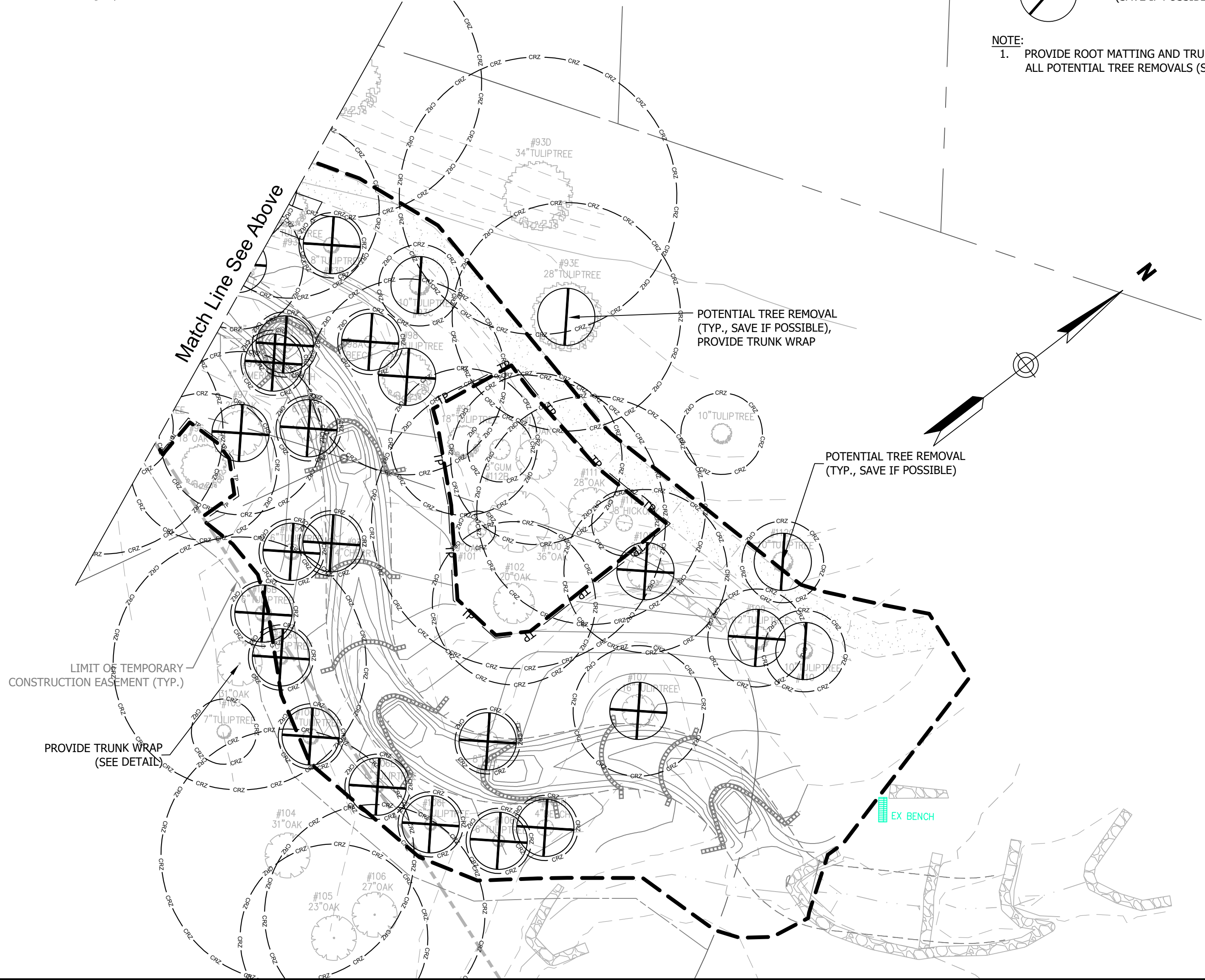


TREE TRUNK AND LIMB PROTECTION WRAP
311300.15NS (2019)
N.T.S.
ARLINGTON VIRGINIA

Legend

- MATCH LINE
- LIMIT OF DISTURBANCE
- CRITICAL ROOT ZONE
- TREE PROTECTION FENCE
- TREE TO BE REMOVED
- POTENTIAL TREE REMOVAL (SAVE IF POSSIBLE)

NOTE:
1. PROVIDE ROOT MATTING AND TRUNK WRAP FOR ALL POTENTIAL TREE REMOVALS (SEE DETAILS).



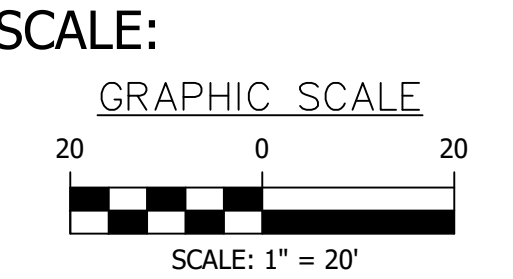
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COMMONWEALTH OF VIRGINIA
ANKUR B. PATEL
Lic. No. 57048
PROFESSIONAL ENGINEER

APPROVALS	DATE
<i>Amy Pflaum</i> QUALITY CONTROL ENGINEER	8/31/2020
<i>Kamal Taktak</i> CONSTRUCTION MANAGEMENT SUPERVISOR	9.2.20
<i>John</i> WATER, SEWER, STREETS BUREAU CHIEF	09.10.2020
<i>Dennis M. Leach</i> TRANSPORTATION DIRECTOR	9/10/20
<i>Christin Policover</i> PROJECT MANAGER	9/10/20

REVISIONS	DATE

TREE REMOVAL PLAN
DONALDSON RUN TRIBUTARY B
S32D

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A
FILENAME: S32D TREES 2020.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS
PLOTTED: AUGUST 19 2020
PLOTTED BY: JCANDLER



LEGEND

UPLAND TREES (1:1)
(PRUNUS SEROTINA, FAGUS GRANDIFOLIA, ULMUS AMERICANA,
NYSSA SYLVATICA, QUERCUS FALCATA, QUERCUS RUBRA,
QUERCUS ALBA, SASSAFRAS ALBIDUM, JUNIPERUS VIRGINIANA,
ILEX OPACA)

STREAMSIDE / FLOODPLAIN TREES (1:1)
(ULMUS AMERICANA, CELTIS OCCIDENTALIS
NYSSA SYLVATICA, PLATANUS OCCIDENTALIS)

STREAMSIDE / FLOODPLAIN TREES (3:1)
(SALIX NIGRA, CARPINUS CAROLINIANA)

STEEP SLOPE TREES (1:1)
(PRUNUS SEROTINA, FAGUS GRANDIFOLIA)

STEEP SLOPE TREES (3:1)
(RHUS CAPALLINUM, RHUS GLABRA)

STEEP SLOPE TREES (SHADE) (3:1)
(MAGNOLIA VIRGINIANA)

SHRUBS (DOES NOT COUNT TOWARDS REPLACEMENT)
(HAMAMELIS VIRGINIANA, ALNUS SERRULATA,
VIBURNUM DENTATUM, SAMBUCUS CANADENSIS, LINDERA
BENZON)

EXISTING TREE TO BE REMOVED

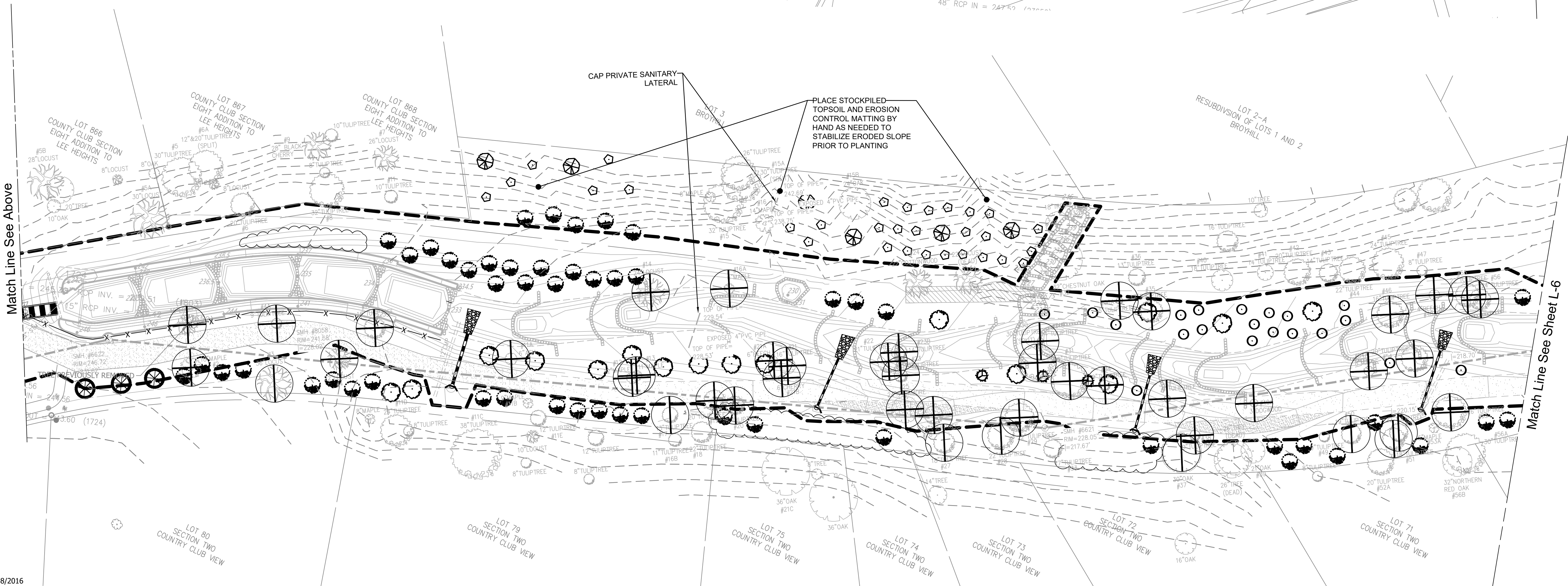
POTENTIAL TREE REMOVAL
(SAVE IF POSSIBLE)

LANDSCAPE-SIZE TREES (3:1)
CORNUS FLORIDA

Legend

MATCH LINE

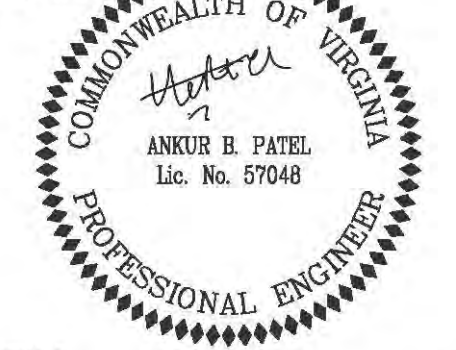
LIMIT OF DISTURBANCE



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SEAL



08/28/20

APPROVALS DATE

Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
Chris 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Donna M. Leach 9/10/20
TRANSPORTATION DIRECTOR
Christin Policoeur 9/10/20
PROJECT MANAGER

REVISIONS DATE

TREE REPLACEMENT PLAN

DONALDSON RUN
TRIBUTARY B

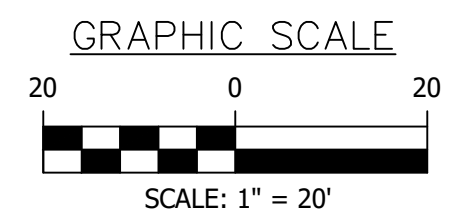
S32D

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

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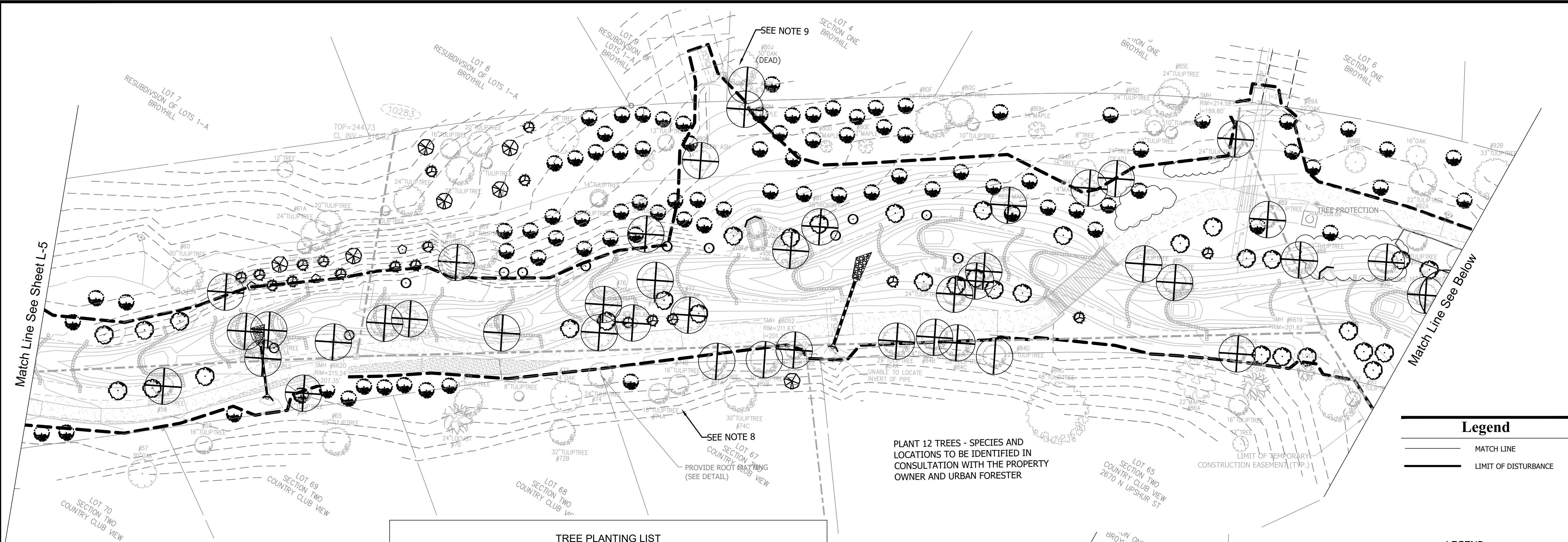
PLOTTED: SEPTEMBER 10 2020
PLOTTED BY: JCANDLER

SCALE:



SHEET

L-5



LEGEND

UPLAND TREES (1:1)
(PRUNUS SEROTINA, FAGUS GRANDIFOLIA, ULMUS AMERICANA, NYSSA SYLVATICA, QUERCUS FALCATA, QUERCUS RUBRA, QUERCUS ALBA, SASSAFRAS ALBIDUM, JUNIPERUS VIRGINIANA, ILEX OPACA)

STREAMSIDE / FLOODPLAIN TREES (1:1)
(ULMUS AMERICANA, CELTIS OCCIDENTALIS, NYSSA SYLVATICA, PLATANUS OCCIDENTALIS)

STREAMSIDE / FLOODPLAIN TREES (3:1)
(SALIX NIGRA, CARPINUS CAROLINIANA)

STEEP SLOPE TREES (1:1)
(PRUNUS SEROTINA, FAGUS GRANDIFOLIA)

STEEP SLOPE TREES (3:1)
(RHUS CAPALLINUM, RHUS GLABRA)

STEEP SLOPE TREES (SHADE) (3:1)
(MAGNOLIA VIRGINIANA)

SHRUBS (DOES NOT COUNT TOWARDS REPLACEMENT)
(HAMAMELIS VIRGINIANA, ALNUS SERRULATA, VIBURNUM DENTATUM, SAMBUCUS CANADENSIS, LINDERA BENZOIN)

EXISTING TREE TO BE REMOVED

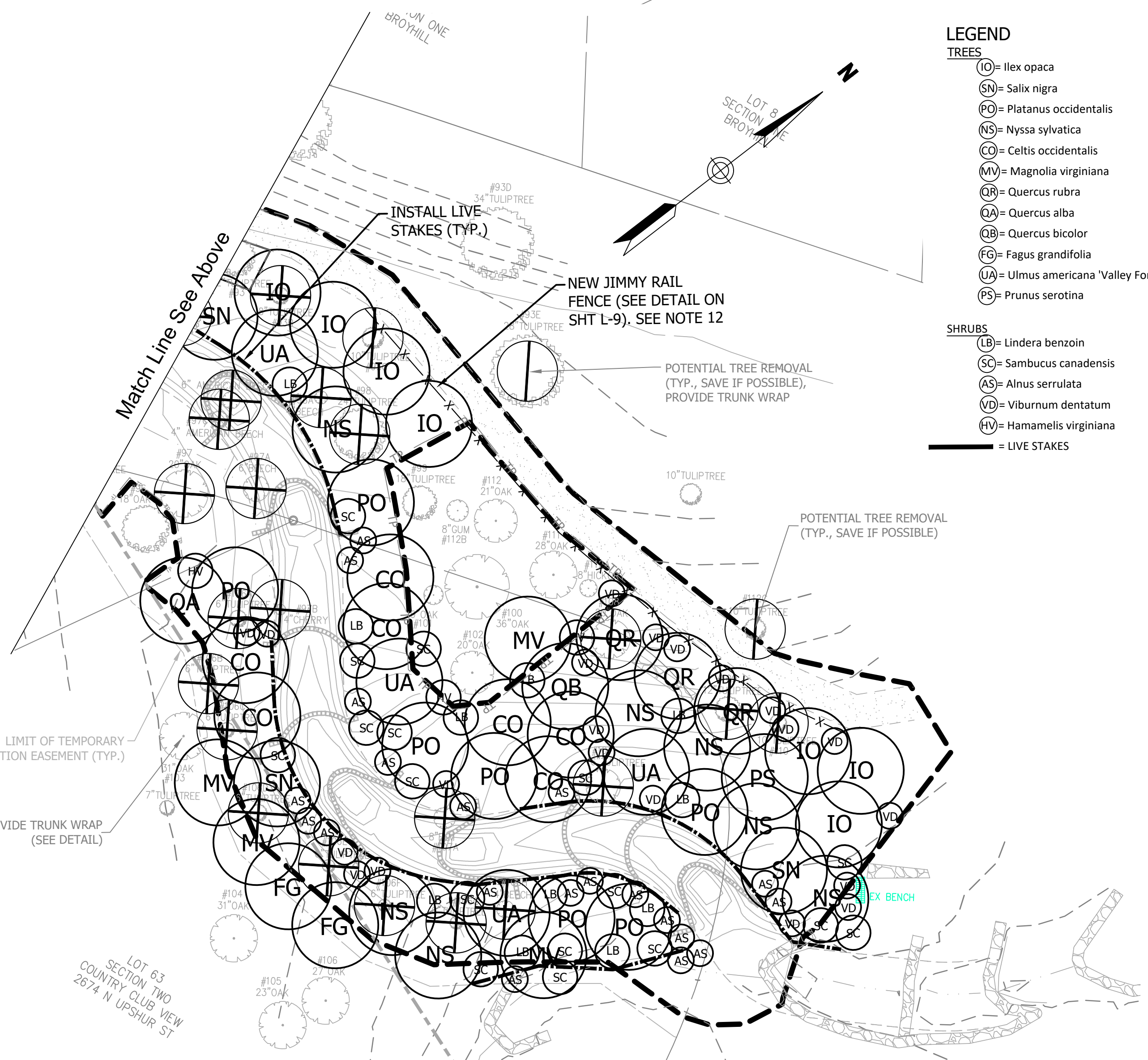
POTENTIAL TREE REMOVAL (SAVE IF POSSIBLE)

LANDSCAPE-SIZE TREES (3:1)
CORNUS FLORIDA

TREE PLANTING LIST							
LOCATION	SPECIES	COMMON NAME	SIZE	NUMBER PROPOSED	REPLACEMENT VALUE	REPLACEMENT COUNT	COMMENTS
LANDSCAPE	CORNUS FLORIDA	FLOWERING DOGWOOD	1.5-2 INCH CALIPER, 6-8 FEET TALL	3	3	1.0	
UPLAND	PRUNUS SEROTINA	BLACK CHERRY	0.75-1 INCH CALIPER, 6-8 FEET TALL	30	1	30.0	
UPLAND	FAGUS GRANDIFOLIA	AMERICAN BEECH	0.75-1 INCH CALIPER, 6-8 FEET TALL	15	1	15.0	
UPLAND	ILEX OPACA	AMERICAN HOLLY	5-6 FEET TALL	7	1	7.0	
UPLAND	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	4-6 FEET TALL	9	3	3.0	
UPLAND	QUERCUS FALCATA	SOUTHERN RED OAK	0.75-1 INCH CALIPER, 6-8 FEET TALL	20	1	20.0	
UPLAND	QUERCUS RUBRA	NORTHERN RED OAK	0.75-1 INCH CALIPER, 6-8 FEET TALL	16	1	16.0	
UPLAND	NYSSA SYLVATICA	BLACK GUM	0.75-1 INCH CALIPER, 6-8 FEET TALL	30	1	30.0	
UPLAND	QUERCUS ALBA	WHITE OAK	0.75-1 INCH CALIPER, 6-8 FEET TALL	16	1	16	
UPLAND	SASSAFRAS ALBIDUM	SASSAFRAS	>0.5 INCH CALIPER, 4-6 FEET TALL	10	3	3.3	
FLOODPLAIN	ULMUS AMERICANA	AMERICAN ELM	0.75-1 INCH CALIPER, 6-8 FEET TALL	15	1	15.0	
FLOODPLAIN	NYSSA SYLVATICA	BLACK GUM	0.75-1 INCH CALIPER, 6-8 FEET TALL	10	1	10.0	
FLOODPLAIN	CARPINUS CAROLINIANA	AMERICAN HORNBEEAM	5-6 FEET TALL	12	3	4.0	
FLOODPLAIN	SALIX NIGRA	BLACK WILLOW	>0.5 INCH CALIPER, 4-6 FEET TALL	24	3	8.0	
FLOODPLAIN	PLATANUS OCCIDENTALIS	SYCAMORE	0.75-1 INCH CALIPER, 6-8 FEET TALL	10	1	10.0	
FLOODPLAIN	CELTIS OCCIDENTALIS	COMMON HACKBERRY	0.75-1 INCH CALIPER, 6-8 FEET TALL	18	1	18.0	
FLOODPLAIN	QUERCUS BICOLOR	SWAMP WHITE OAK	0.75-1 INCH CALIPER, 6-8 FEET TALL	15	1	15.0	
STEEP SLOPES (SUN)	RHUS CAPALLINUM	WINGED SUMAC	3 GALLON	16	3	5.3	Minimum 3' height
STEEP SLOPES (SUN)	RHUS GLABRA	SMOOTH SUMAC	3 GALLON	17	3	5.7	Minimum 3' height
STEEP SLOPES	FAGUS GRANDIFOLIA	AMERICAN BEECH	0.75-1 INCH CALIPER, 6-8 FEET TALL	7	1	7.0	
STEEP SLOPES	PRUNUS SEROTINA	BLACK CHERRY	0.75-1 INCH CALIPER, 6-8 FEET TALL	8	1	8.0	
STEEP SLOPES (SHADE)	MAGNOLIA VIRGINIANA	UMBRELLA TREE	5-6 FEET TALL	26	3	8.7	
SHRUBS	HAMAMELIS VIRGINIANA	WITCHHAZEL	3 GALLON	30	3	10.0	Minimum 3' height
SHRUBS	ALNUS SERRULATA	COMMON ALDER	3 GALLON	40	N/A	0.0	Minimum 3' height
SHRUBS	LINDERA BENZOIN	SPICEBUSH	3 GALLON	32	N/A	0.0	Minimum 3' height
SHRUBS	VIBURNUM DENTATUM	ARROWWOOD	3 GALLON	50	N/A	0.0	Minimum 3' height
SHRUBS	SAMBUCUS CANADENSIS	ELDERBERRY	3 GALLON	36	N/A	0.0	Minimum 3' height
LIVE STAKES	SALIX NIGRA	BLACK WILLOW	3 FEET	200	10	20.0	Minimum 3' height
TOTAL						288.0	

- NOTES:
- WHERE MULTIPLE SPECIES ARE SPECIFIED, TREES SHALL BE PLANTED IN MIXED GROUPS, NOT MONOCULTURES.
 - TREES SHALL BE PLANTED NO CLOSER THEN 5 FEET TO THE EDGE OF THE EXISTING 30-INCH WATER MAIN.
 - TREES SHALL BE PLANTED NO CLOSER THAN 2 FEET FROM THE CENTERLINE OF THE EXISTING SANITARY SEWER LINE.
 - CUT ANY STANDING DEAD TREES ON PUBLIC LAND THAT ARE ADJACENT TO, BUT OUTSIDE THE LOD, TO 20-FT HEIGHT TO CREATE WILDLIFE SNAGS.
 - TREES SHALL BE WATERED AT INSTALLATION AND AT 48 HOURS FOLLOWING PLANTING.
 - STEEP SLOPE AND UPLAND TREES SHALL BE WATERED WEEKLY USING 20 GALLON GATOR BAGS OR AN APPROVED EQUIVALENT DURING PERIODS WITH RAINFALL OF <1 INCH FROM INSTALLATION TO ONE YEAR FOLLOWING PROJECT ACCEPTANCE BETWEEN APRIL 1 AND OCTOBER 1.
 - UPLAND TREES SHALL BE PROTECTED USING BIOBARK BIODEGRADABLE TREE SHELTERS OR AN APPROVED EQUIVALENT (DETAIL SHEET L-9)
 - PLANT 3 ADDITIONAL UPLAND OR STEEP SLOPE TREES. FIELD LOCATE IN CONSULTATION WITH PROPERTY OWNER.
 - CUT THIS EXISTING TREE AT 20' TO CREATE A WILDLIFE SNAG.
 - CONTACT URBAN FORESTER 72 HOURS PRIOR TO PLANTING TO ALLOW FOR INSPECTION OF PLANTING STOCK.
 - ULMUS AMERICANA SHOULD BE DISEASE RESISTANT CULTIVAR (VALLEY FORGE).
 - EXTENT AND PLACEMENT OF FENCE SHOWN IS APPROXIMATE. FIELD LOCATE PER PROJECT OFFICER.

PLANT 12 TREES - SPECIES AND LOCATIONS TO BE IDENTIFIED IN CONSULTATION WITH THE PROPERTY OWNER AND URBAN FORESTER



- LEGEND**
- TREES**
- IO= Ilex opaca
 - SN= Salix nigra
 - PO= Platanus occidentalis
 - NS= Nyssa sylvatica
 - CO= Celtis occidentalis
 - MV= Magnolia virginiana
 - QR= Quercus rubra
 - QA= Quercus alba
 - QB= Quercus bicolor
 - FG= Fagus grandifolia
 - UA= Ulmus americana 'Valley Forge'
 - PS= Prunus serotina
- SHRUBS**
- LB= Linder benzoin
 - SC= Sambucus canadensis
 - AS= Alnus serrulata
 - VD= Viburnum dentatum
 - HV= Hamamelis virginiana
 - = LIVE STAKES



APPROVALS	DATE
<i>Amy Pflaum</i> QUALITY CONTROL ENGINEER	8/31/2020
<i>Kamal Taktak</i> CONSTRUCTION MANAGEMENT SUPERVISOR	9.2.20
<i>Chris</i> WATER, SEWER, STREETS BUREAU CHIEF	09.10.2020
<i>Dennis M. Leach</i> TRANSPORTATION DIRECTOR	9/10/20
<i>Christin Pollicorn</i> PROJECT MANAGER	9/10/20

REVISIONS	DATE

TREE REPLACEMENT PLAN

DONALDSON RUN
TRIBUTARY B

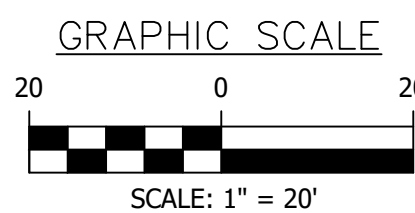
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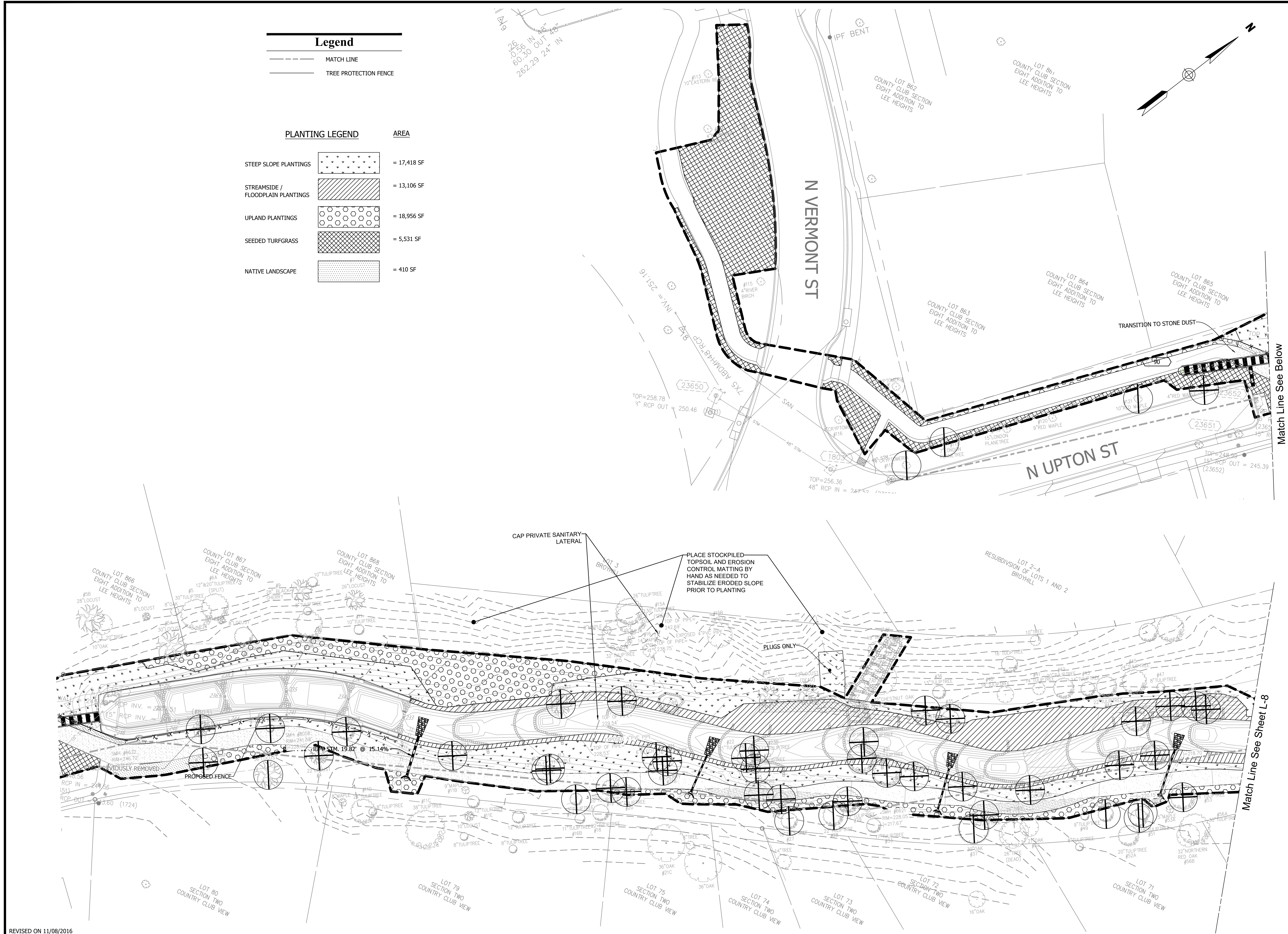
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DRAWN: JCANDLER
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MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
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PATH: Q:\DATA\S320\DESIGN\DRAWINGS

PLOTTED: AUGUST 27 2020
PLOTTED BY: JCANDLER

SCALE:





Legend	
	MATCH LINE
	TREE PROTECTION FENCE

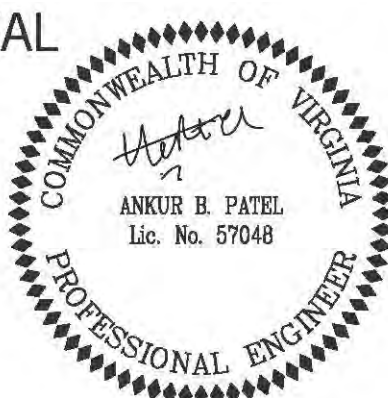
PLANTING LEGEND		AREA
STEEP SLOPE PLANTINGS		= 17,118 SF
STREAMSIDE / FLOODPLAIN PLANTINGS		= 13,106 SF
UPLAND PLANTINGS		= 18,956 SF
SEEDED TURFGRASS		= 5,531 SF
NATIVE LANDSCAPE		= 410 SF



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APPROVALS DATE

Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER

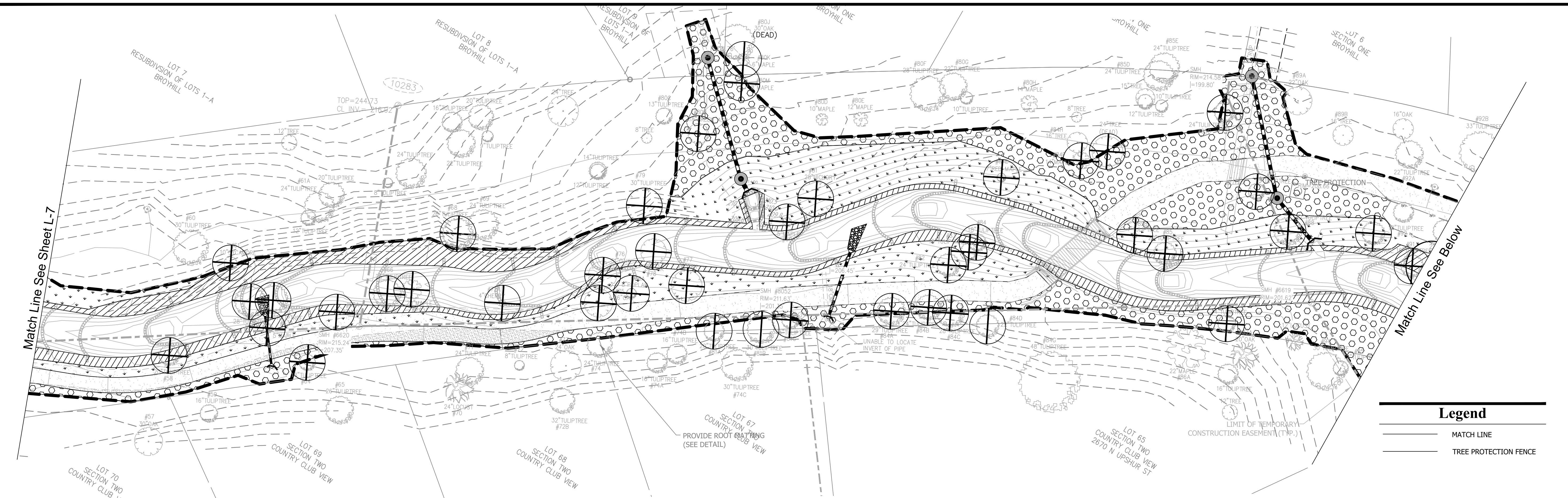
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR

Allyssa 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF

Dennis W. Leach 9/10/20
TRANSPORTATION DIRECTOR

Christin Policover 9/10/20
PROJECT MANAGER

REVISIONS DATE



SEED MIX		
STEEP SLOPE		
SPECIES NAME	COMMON NAME	PLS PERCENT OF SEED MIX
CAREX DIGITALIS	SLENDER WOODLAND SEDGE	10
DICHTANTHELIUM CLANDESTINUM	DEERTONGUE GRASS	20
ELYMUS HYSTRIX	BOTTLEBRUSH GRASS	15
JUNCUS EFFUSUS	SOFT RUSH	10
JUNCUS TENUIS	PATH RUSH	10
ASCLEPAS INCARNATA	SWAMP MILKWEED	15
ANDROPOGON VIRGINICUS	BROOMSEDGE	20
TOTAL		100
STREAMSIDE / FLOODPLAIN		
SPECIES NAME	COMMON NAME	PLS PERCENT OF SEED MIX
DICHTANTHELIUM CLANDESTINUM	DEERTONGUE GRASS	30
JUNCUS EFFUSUS	SOFT RUSH	35
LAPORTEA CANADENSIS	WOOD NETTLE	15
SOLIDAGO RUGOSA	ROUGH GOLDENROD	20
TOTAL		100
UPLAND		
SPECIES NAME	COMMON NAME	PLS PERCENT OF SEED MIX
OXALIS STRICTA	COMMON WOOD SORREL	5
POLYGONATUM BIFLORUM	SOLOMON'S SEAL	5
SOLIDAGO ALTISSIMA	TALL GOLDENROD	10
SOLIDAGO RUGOSA	ROUGH GOLDENROD	10
CAREX DIGITALIS	SLENDER WOODLAND SEDGE	10
DICHTANTHELIUM CLANDESTINUM	DEERTONGUE GRASS	20
ELYMUS HYSTRIX	BOTTLEBRUSH GRASS	10
ASTER DIVARICATUS	WHITE WOOD ASTER	10
ANDROPOGON VIRGINICUS	BROOMSEDGE	20
TOTAL		100
TEMPORARY STABILIZATION		
SPECIES NAME	COMMON NAME	PLS PERCENT OF SEED MIX
LOLIUM MULTIFLORUM	ANNUAL RYEGRASS	100
TURFGRASS		
SPECIES NAME	COMMON NAME	PLS PERCENT OF SEED MIX
FESTUCA ARUNDINACEA	TALL FESCUE	80
POA PRATENSIS	BLUEGRASS	10
LOLIUM PERENNE	PERENNIAL RYEGRASS	10

PLUGS							
UPLAND							
SPECIES NAME	COMMON NAME	SIZE	SPACING	QUANTITY YEAR 1	QUANTITY YEAR 3	QUANTITY YEAR 5	
PARTHENOISSUS QUINQUEFOLIA	VIRGINIA CREEPER	BARE ROOT	10' ON CENTER	375	375	TBD	
POLYSTICHUM ACROSTICHODES	CHRISTMAS FERN	DP	10' ON CENTER	375	375	TBD	
TOTAL				750	750		
STEEP SLOPE							
SPECIES NAME	COMMON NAME	SIZE	SPACING	QUANTITY YEAR 1	QUANTITY YEAR 3	QUANTITY YEAR 5	
ONOCLEA SENSIBILIS	SENSITIVE FERN	DP	5' ON CENTER	250	231	TBD	
OSMUNDA CLAYTONIANA	INTERRRUPED FERN	DP	5' ON CENTER	250	231	TBD	
POLYSTICHUM ACROSTICHODES	CHRISTMAS FERN	DP	5' ON CENTER	250	231	TBD	
TOTAL				750	693		
STREAMSIDE / FLOODPLAIN							
SPECIES NAME	COMMON NAME	SIZE	SPACING	QUANTITY YEAR 1	QUANTITY YEAR 3	QUANTITY YEAR 5	
ONOCLEA SENSIBILIS	SENSITIVE FERN	DP	5' ON CENTER	200	175	TBD	
JUNCUS EFFUSUS	SOFT RUSH	DP	5' ON CENTER	200	175	TBD	
EUPATORIUM PERFOOLIATUM	BONESET	DP	5' ON CENTER	200	175	TBD	
TOTAL				600	525		
LANDSCAPE							
SPECIES NAME	COMMON NAME	SIZE	SPACING	QUANTITY YEAR 1	QUANTITY YEAR 3	QUANTITY YEAR 5	
PARTHENOISSUS QUINQUEFOLIA	VIRGINIA CREEPER	BARE ROOT	5' ON CENTER	15	6	TBD	
SOLIDAGO RUGOSA	ROUGH GOLDENROD	DP	18' ON CENTER	100	61	TBD	
PHLOX DIVARICATA	WOODLAND PHLOX	DP	18' ON CENTER	100	61	TBD	
TOTAL				215	128		

HERBACEOUS PLANTING SCHEDULE						
SPECIES NAME	YEAR 1		YEAR 3		YEAR 5	
	SEED MIX	PLUGS	SEED MIX	PLUGS	SEED MIX	PLUGS
STEEP SLOPE	X	X	X	X	AS NEEDED	AS NEEDED
STREAMSIDE / FLOODPLAIN	X	X	X	X	AS NEEDED	AS NEEDED
UPLAND	X	X	X	X	AS NEEDED	AS NEEDED
LANDSCAPE	NONE	X	NONE	X	NONE	AS NEEDED

- NOTES:
1. STEEP SLOPE, STREAMSIDE/FLOODPLAIN AND UPLAND SEED MIX SHALL BE APPLIED AT A RATE OF 40 LBS/ACRE.
 2. TEMPORARY STABILIZATION SEED MIX SHALL BE APPLIED AT A RATE OF 20 LBS/ACRE.
 3. TURFGRASS SEED MIX SHALL BE APPLIED AT A RATE OF 5 - 8 LBS /1000SF.

PLANTING LEGEND	AREA
STEEP SLOPE PLANTINGS	= 17,061 SF
STREAMSIDE / FLOODPLAIN PLANTINGS	= 13,106 SF
UPLAND PLANTINGS	= 18,956 SF
SEEDED TURFGRASS	= 5,531 SF
NATIVE LANDSCAPE	= 410 SF



ARLINGTON VIRGINIA

DEPARTMENT OF ENVIRONMENTAL SERVICES
FACILITIES & ENGINEERING DIVISION
ENGINEERING BUREAU
2100 CLARENDON BOULEVARD, SUITE 813
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PHONE: 703.228.3629
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SEAL

08/28/20
APPROVALS
DATE

Amy Pflaum 8/31/2020
QUALITY CONTROL ENGINEER
Kamal Taktak 9.2.20
CONSTRUCTION MANAGEMENT SUPERVISOR
Donnie M. Leach 09.10.2020
WATER, SEWER, STREETS BUREAU CHIEF
Christin Polcovich 9/10/20
TRANSPORTATION DIRECTOR
PROJECT MANAGER

REVISIONS
DATE

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

FILENAME:
S32D PLANTINGS 2020.DWG
PATH: Q:\DATA\S32D\DESIGN\DRAWINGS

PLOTTED: JULY 10 2020
PLOTTED BY: JCANDLER

SCALE:
GRAPHIC SCALE
20 0 20
SCALE: 1" = 20'

SHEET L-8

PLANTING NARRATIVE

THE DESIGN INTENT OF THESE PLANTING SHEETS IS TO ESTABLISH STREAMSIDE AND UPLAND VEGETATION AT APPROPRIATE ELEVATIONS TO PROVIDE HABITAT AND SEDIMENT STABILIZATION. THESE COMMUNITIES ARE DESCRIBED AS FOLLOWS. UPLAND AREAS ARE GENERALLY LOCATED UPSLOPE FROM THE STREAM CHANNEL AND ARE NOT INUNDATED BY STREAM FLOW, EVEN UNDER HIGH FLOW CONDITIONS. THE STEEP SLOPE AREAS ARE GNERALLY LOCATED DIRECTLY ADJACENT TO THE STREAM AND CONSIST OF STEEPLY SLOPING HILL SIDE OR STREAM CHANNEL BANK. THESE AREAS ARE VULNERABLE TO EROSION AND CARE SHOULD BE TAKEN TO LIMIT DISTURBANCE DURING PLANTING ACTIVITIES. THE STREAMSIDE AREA IS LOCATED DIRECTLY ADJACENT TO THE STREAM, GENERALLY WITHIN THE CHANNEL OR FLOODPLAIN. THIS AREA MAY BE INUNDATED DURING HIGH FLOW EVENTS. NATIVE LANDSCAPE AREAS ARE LOCATED AT THE PARK ENTRANCE AT THE TRANSITION FROM TURF TO NATURAL AREA.TALL FESCUE SEEDING WILL BE USED IN EXISTING TURFGRASS AREAS ONLY. ANNUAL RYEGRASS SHALL BE PLANTED IN ALL DISTRUBED AREAS AS A TEMPORARY SOIL STABILIZATION TECHNIQUE.

THE PLANTING RESTORATION PLAN HAS A DURATION OF FIVE YEARS, WITH YEAR 1 BEING THE YEAR OF CONSTRUCTION. INVASIVE PLANT CONTROL BEFORE, DURING, AND AFTER CONSTRUCTION IS REQUIRED AS DESCRIBED IN THE SPECIFICATIONS. ALL TREES AND SHRUBS WILL BE PLANTED IN YEAR 1. EACH RESTORATION PLANTING AREA, UPLAND, STEEP SLOPE, NATIVE LANDSCAPE AND STREAMSIDE HAVE DISTINCT SEED MIXES AND PLUG LISTS, AS SHOWN ON THESE SHEETS. IN YEAR 1, EACH AREA WILL BE SEEDED WITH THE SEED MIX AND ANNUAL RYEGRASS AND PLUGS WILL BE PLANTED IN AREAS. THE PLUG QUANTITIES, SPECIES AND INTENDED SPACING ARE SHOWN ON THESE SHEETS. PLUGS SHALL BE PLANTED IN A NATURALISTIC PATTERN. IN YEAR 3, EACH AREA WILL BE SEEDED AGAIN WITH THE SPECIFIC SEED MIX AND THE STEEP SLOPE, UPLAND AND STREAMSIDE AREAS WILL BE PLANTED WITH PLUGS. ADDITIONAL PLUGS WILL BE PLANTED IN THE NATIVE LANDSCAPE AREA AT THE DISCRETION OF THE PROJECT OFFICER. ALL PLANTING LOCATIONS WILL BE REVIEWED BY ARLINGTON COUNTY BEFORE PLANTING SHALL BEGIN. IN YEAR 5, ALL AREAS WILL BE SEEDED IN AREAS OF POOR COVERAGE, AS DETERMINED BY THE PROJECT OFFICER. IN ADDITION, PLUGS WLL BE PLANTED IN ALL AREAS AT THE DISCRETION OF THE PROJECT OFFICER.

PLANTING NOTES

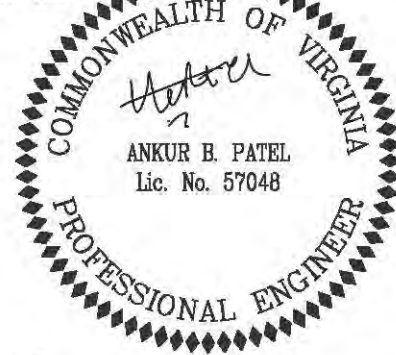
1. NO CULTIVARS OR SUBSTITUTIONS OF SPECIES WILL BE PERMITTED. USE LOCAL ECOTYPES TO THE MAXIMUM EXTENT PRACTICABLE.
2. UPLAND, STREAMSIDE, AND STEEP SLOPE AREAS SHALL BE SEEDED BETWEEN MARCH 1ST AND MAY 31ST, OR OCTOBER 1ST AND NOVEMBER 15TH.
3. SEED SHALL BE APPLIED USING ONE OF THE FOLLOWING METHODS: 1) HYDROSEEDING, OR 2) BROADCASTING THE SEED, THEN SPRAYING A 1/4 TO 1/2 INCH LAYER OF MOIST COMPOST ON TOP.
4. SEED SHOULD BE TRACKED INTO THE SOIL AFTER BROADCASTING.
5. CONTAINER GROWN MATERIAL SHOULD BE PLANTED USING A NATURALIZED PLANTING TECHNIQUE (I.E., AVOID PLANTING IN STRAIGHT LINES OR DISCERNABLE PATTERNS).
6. GENERAL CONTRACTOR OR SUBCONTRACTOR TO THE GENERAL CONTRACTOR SHALL EMPLOY A LICENSED CERTIFIED ARBORIST TO OVERSEE TREE PROTECTION AND TREE PLANTING.
7. PLANTS SHALL BE FURNISHED AND INSTALLED, INCLUDING ALL PLANTS, MATERIALS, AND EQUIPMENT.
8. PLANTS SHALL BE TYPICAL OF THEIR SPECIES AND VARIETY; HAVE NORMAL GROWTH HABITS, WELL-DEVELOPED DENSELY FOLIATED BRANCHES, AND VIGOROUS ROOT SYSTEMS; AND BE FREE FROM DEFECTS AND INJURIES.
9. PLANTS SHALL BE PLANTED ON THE DAY OF DELIVERY IF/WHEN PRACTICAL. IN THE EVENT THAT THIS IS NOT POSSIBLE, THE CONTRACTOR SHALL PROTECT STOCK NOT PLANTED. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE-DAY PERIOD AFTER DELIVERY. ANY PLANTS NOT INSTALLED DURING THIS PERIOD SHALL BE REJECTED, UNLESS OWNER AND CONTRACTOR PROVIDE OTHERWISE BY WRITTEN AGREEMENT.
10. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS TO DAMAGE THE BARK OR BREAK BRANCHES. PLANTS SHALL BE HANDLED FROM THE BOTTOM OF THE ROOT BALL ONLY.
11. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICE. PLANTS SHALL NOT BE INSTALLED IN TOP SOIL THAT IS IN MUDDY OR FROZEN CONDITION. LAWNS, TREES AND SHRUBS SHALL BE INSTALLED BETWEEN MARCH 15TH AND MAY 31st OR BETWEEN SEPTEMBER 15TH AND DECEMBER 1ST. PLUGS SHALL BE INSTALLED BETWEEN MARCH 15TH AND MAY 31st OR BETWEEN SEPTEMBER 15TH AND NOVEMBER 1 ST.
12. NO PLANT, EXCEPT GROUNDCOVERS, SHALL BE PLANTED LESS THAN TWO FEET FROM SIDEWALKS.
13. TREES AND SHRUBS SHALL BE PLANTED IN HOLES TWO TIMES AS WIDE AND TO THE DEPTH OF THE ROOT BALL.
14. PLANTS SHALL BE PLANTED IN IN-SITU SOIL THAT IS THOROUGHLY WATERED.
15. SET ALL PLANTS PLUMB AND STRAIGHT SET AT SUCH LEVEL THAT NORMAL OR NATURAL RELATIONSHIP BETWEEN THE PLANT AND THE GROUND SURFACE WILL BE ESTABLISHED. LOCATE THE PLANT IN THE CENTER OF THE PIT.
16. INJURED ROOTS SHALL BE PRUNED TO CLEAN ENDS BEFORE PLANTING WITH CLEAN, SHARP TOOLS. THE LEADER OF TREES SHALL NOT BE CUT BACK.
17. NEW PLANTING AREAS AND SOD SHALL BE ADEQUATELY IRRIGATED OR WATERED
18. TREES MUST BE INSPECTED AND APPROVED BY A DEPARTMENT OF PARKS & RECREATION, URBAN FORESTER.



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SEAL



08/28/20

APPROVALS	DATE
<i>Amy Pfebaum</i> QUALITY CONTROL ENGINEER	8/31/2020
<i>Kamal Taktak</i> CONSTRUCTION MANAGEMENT SUPERVISOR	9.2.20
<i>Glenn</i> WATER, SEWER, STREETS BUREAU CHIEF	09.10.2020
<i>Dennis M. Leach</i> TRANSPORTATION DIRECTOR	9/10/20
<i>Christin Jolicœur</i> PROJECT MANAGER	9/10/20

REVISIONS	DATE

PLANTING NOTES AND DETAILS

DONALDSON RUN
TRIBUTARY B

S320

DESIGNED: JCANDLER
DRAWN: JCANDLER
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

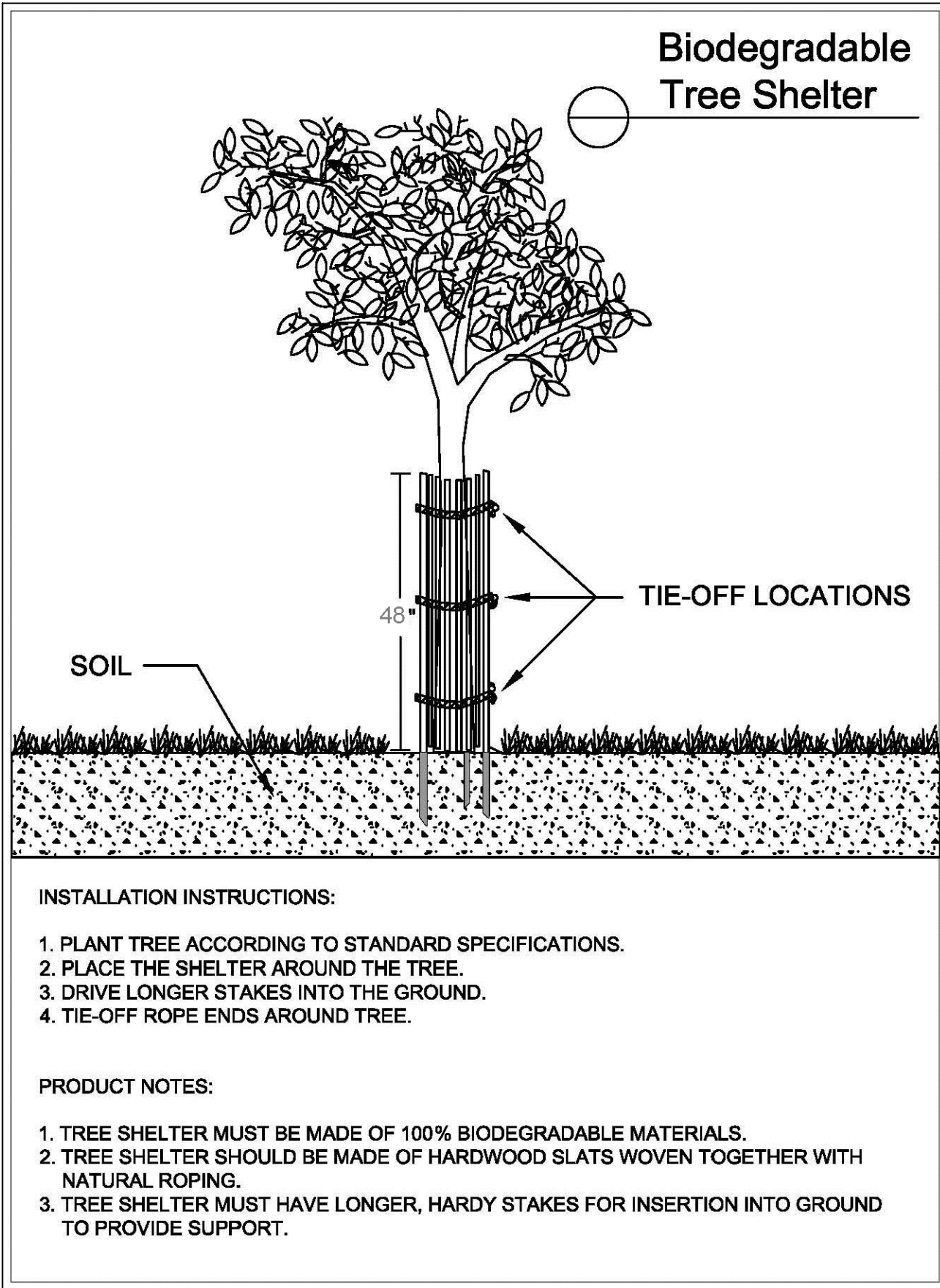
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PLOTTED: JULY 10 2020
PLOTTED BY: JCANDLER

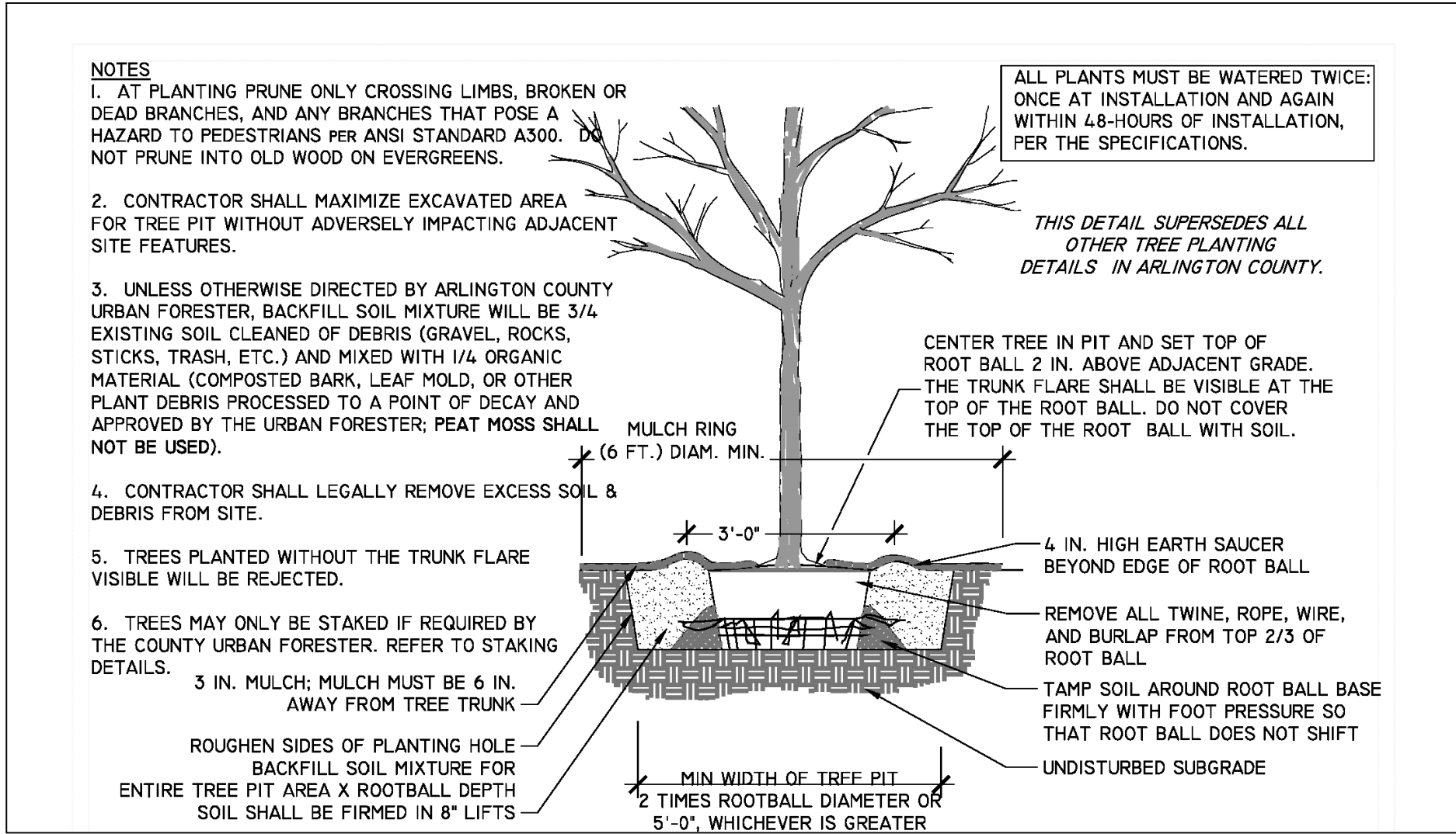
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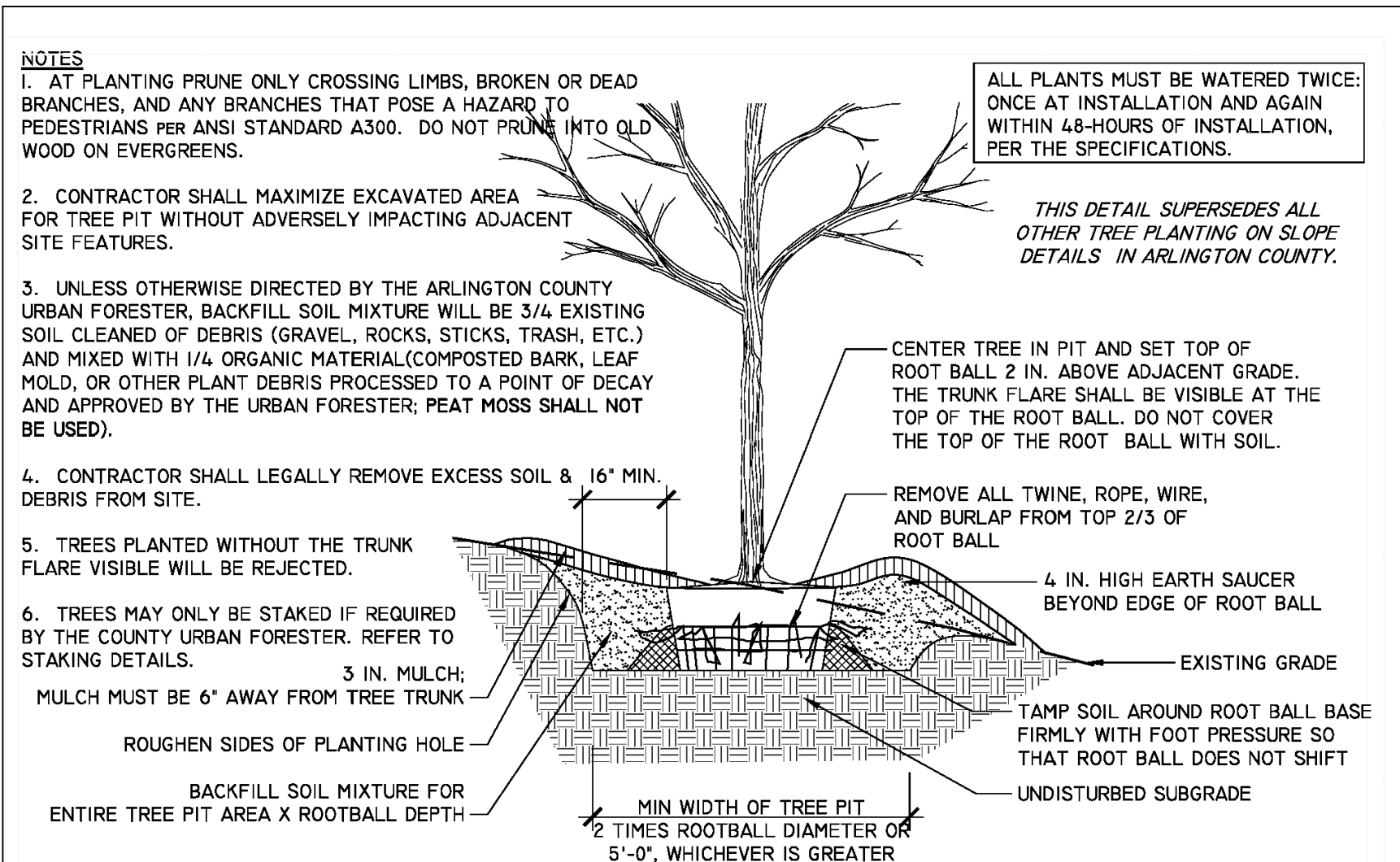
DONALDSON RUN TRIBUTARY B



BIODEGRADABLE TREE SHELTER
N.T.S.

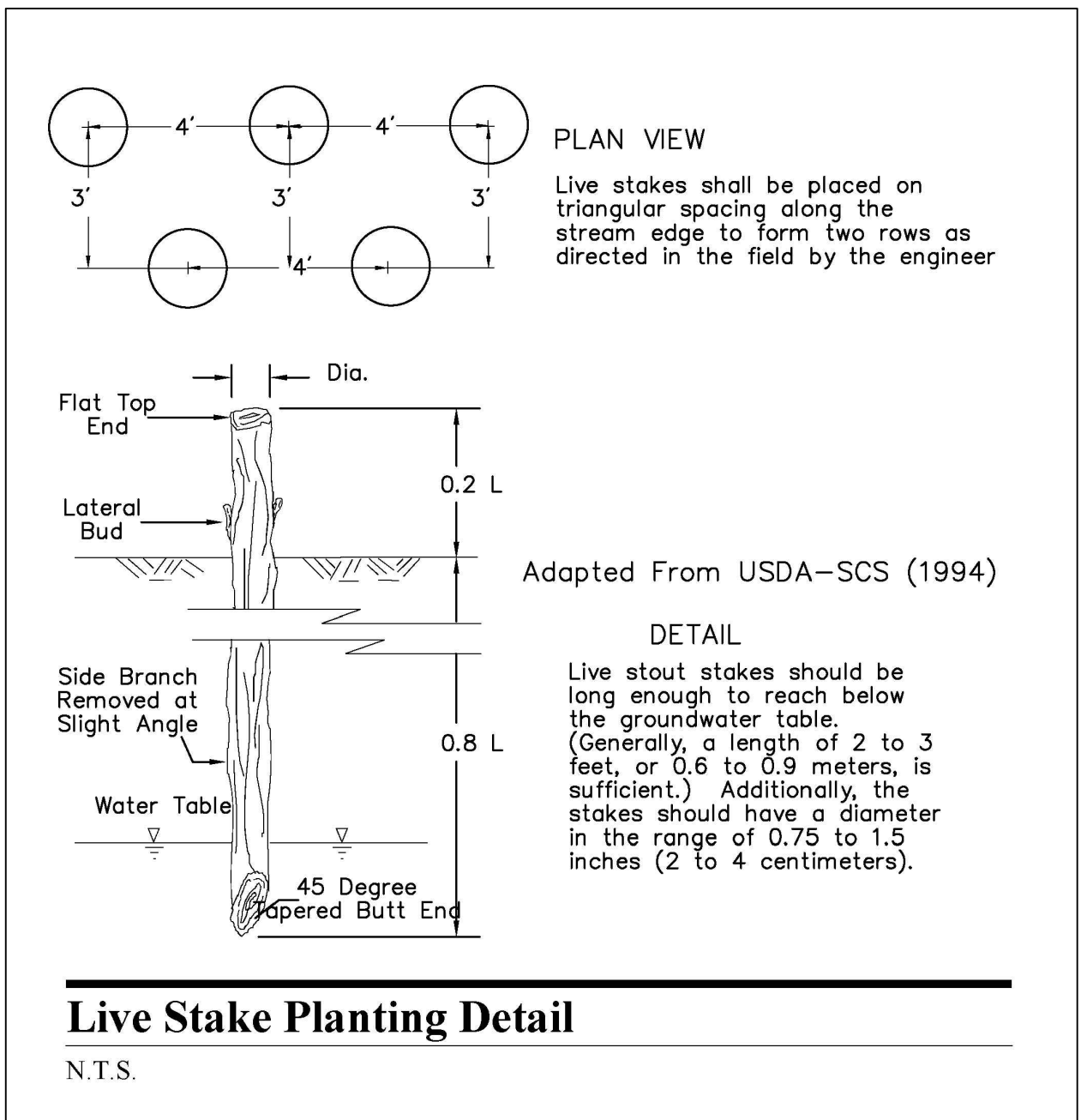
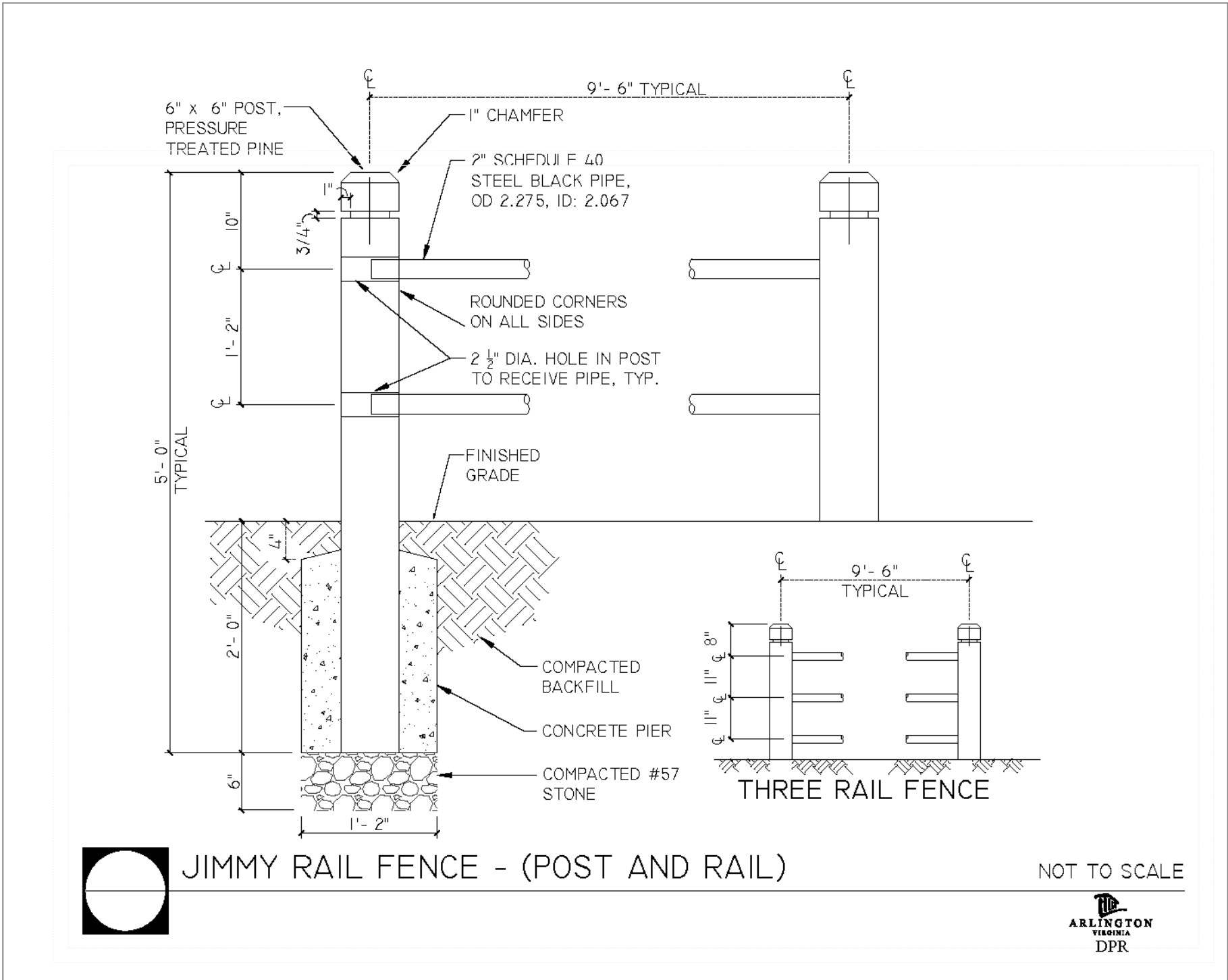
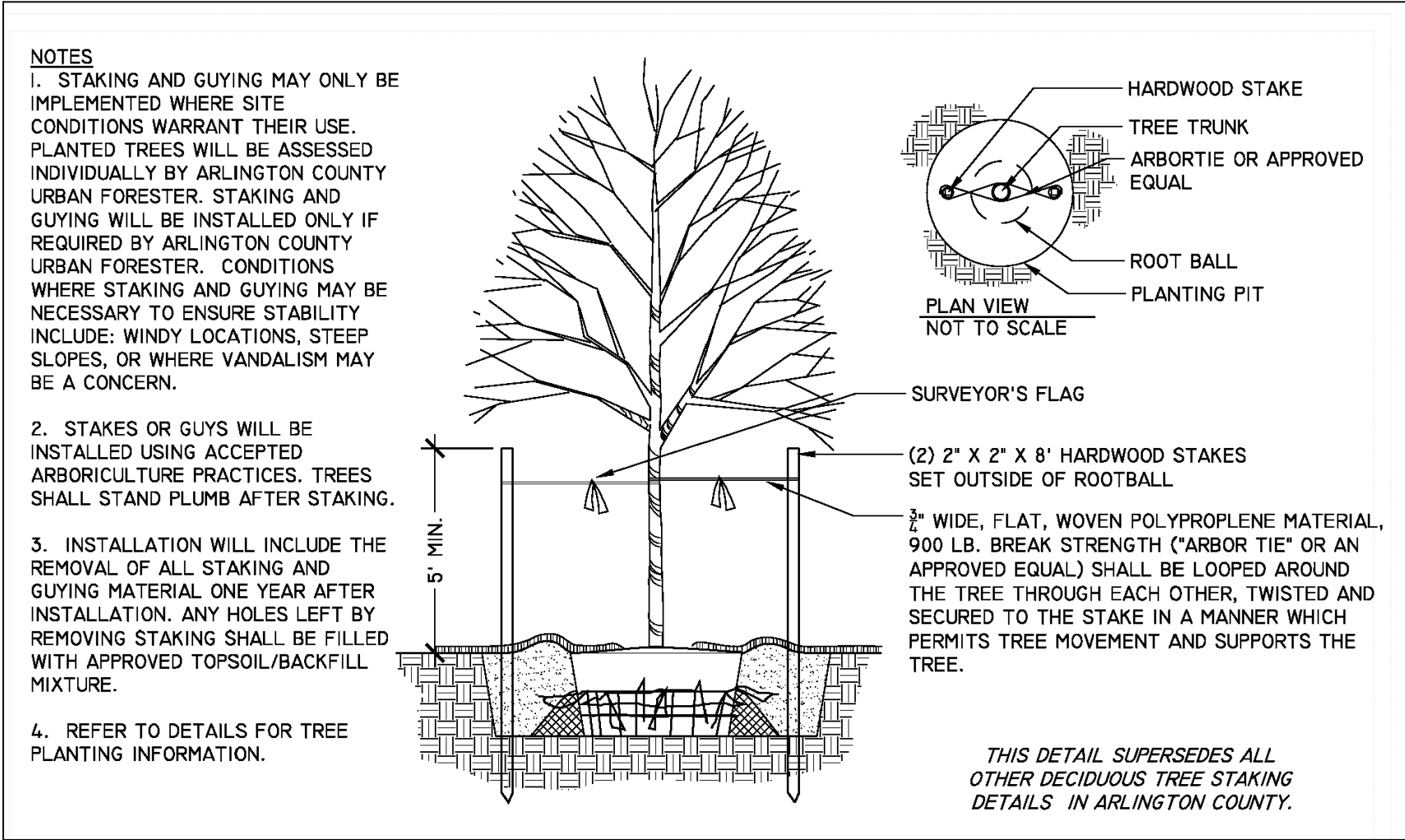


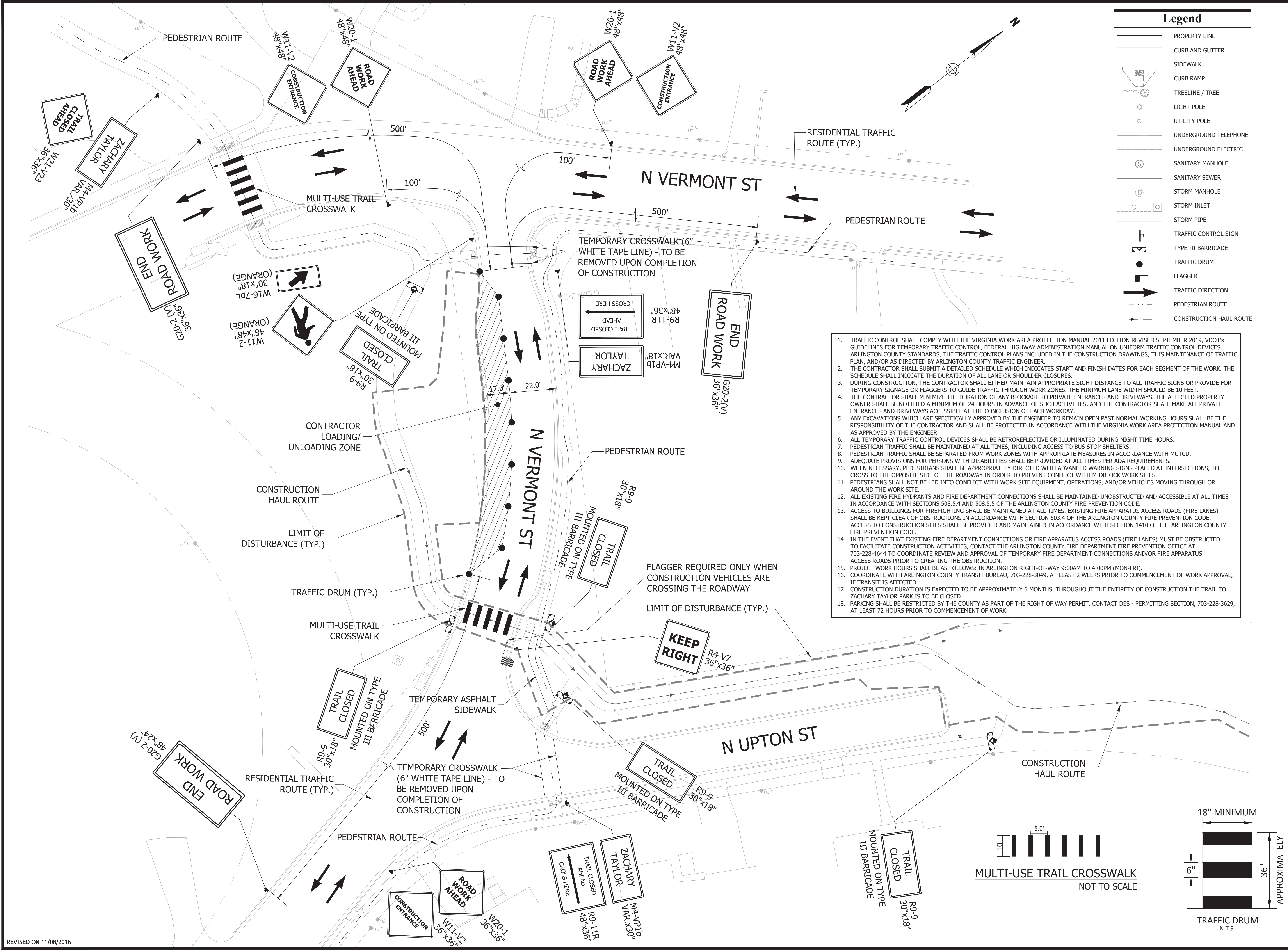
TREE PLANTING
N.T.S.



TREE PLANTING ON SLOPE

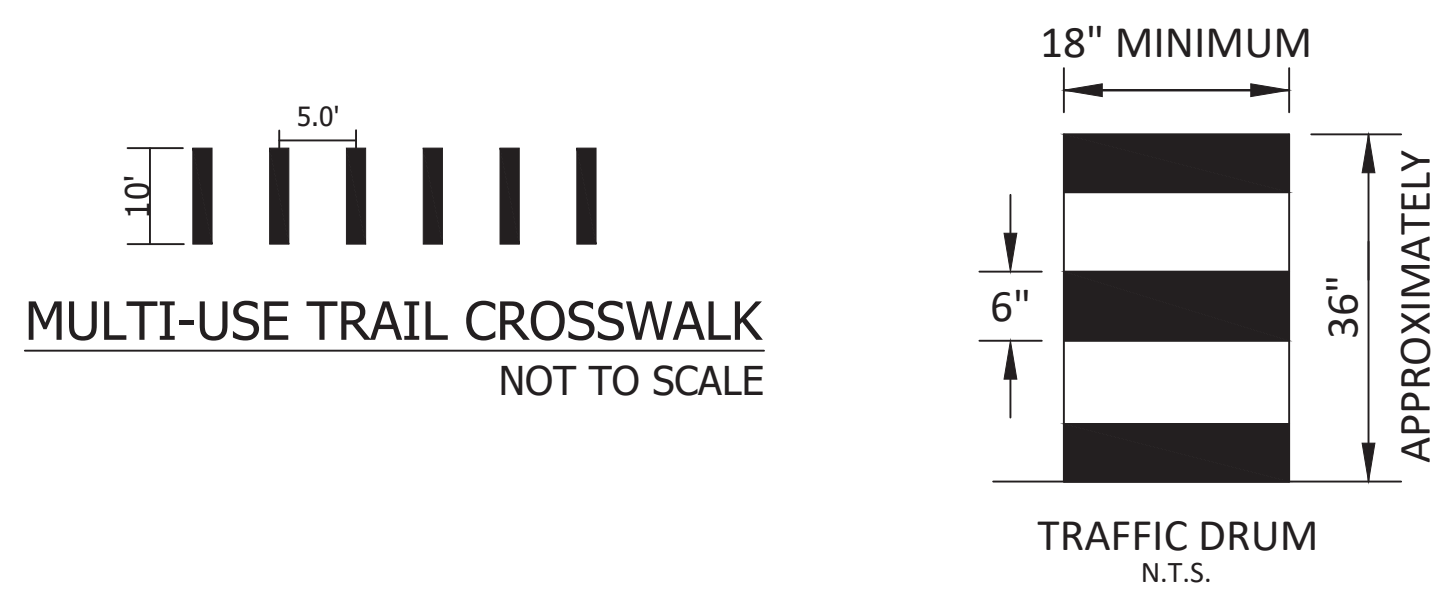
DECIDUOUS TREE STAKING





Legend	
	PROPERTY LINE
	CURB AND GUTTER
	SIDEWALK
	CURB RAMP
	TREELINE / TREE
	LIGHT POLE
	UTILITY POLE
	UNDERGROUND TELEPHONE
	UNDERGROUND ELECTRIC
	SANITARY MANHOLE
	SANITARY SEWER
	STORM MANHOLE
	STORM INLET
	STORM PIPE
	TRAFFIC CONTROL SIGN
	TYPE III BARRICADE
	TRAFFIC DRUM
	FLAGGER
	TRAFFIC DIRECTION
	PEDESTRIAN ROUTE
	CONSTRUCTION HAUL ROUTE

1. TRAFFIC CONTROL SHALL COMPLY WITH THE VIRGINIA WORK AREA PROTECTION MANUAL 2011 EDITION REVISED SEPTEMBER 2019, VDOT'S GUIDELINES FOR TEMPORARY TRAFFIC CONTROL, FEDERAL HIGHWAY ADMINISTRATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, ARLINGTON COUNTY STANDARDS, THE TRAFFIC CONTROL PLANS INCLUDED IN THE CONSTRUCTION DRAWINGS, THIS MAINTENANCE OF TRAFFIC PLAN, AND/OR AS DIRECTED BY ARLINGTON COUNTY TRAFFIC ENGINEER.
2. THE CONTRACTOR SHALL SUBMIT A DETAILED SCHEDULE WHICH INDICATES START AND FINISH DATES FOR EACH SEGMENT OF THE WORK. THE SCHEDULE SHALL INDICATE THE DURATION OF ALL LANE OR SHOULDER CLOSURES.
3. DURING CONSTRUCTION, THE CONTRACTOR SHALL EITHER MAINTAIN APPROPRIATE SIGHT DISTANCE TO ALL TRAFFIC SIGNS OR PROVIDE FOR TEMPORARY SIGNAGE OR FLAGGERS TO GUIDE TRAFFIC THROUGH WORK ZONES. THE MINIMUM LANE WIDTH SHOULD BE 10 FEET.
4. THE CONTRACTOR SHALL MINIMIZE THE DURATION OF ANY BLOCKAGE TO PRIVATE ENTRANCES AND DRIVEWAYS. THE AFFECTED PROPERTY OWNER SHALL BE NOTIFIED A MINIMUM OF 24 HOURS IN ADVANCE OF SUCH ACTIVITIES, AND THE CONTRACTOR SHALL MAKE ALL PRIVATE ENTRANCES AND DRIVEWAYS ACCESSIBLE AT THE CONCLUSION OF EACH WORKDAY.
5. ANY EXCAVATIONS WHICH ARE SPECIFICALLY APPROVED BY THE ENGINEER TO REMAIN OPEN PAST NORMAL WORKING HOURS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE PROTECTED IN ACCORDANCE WITH THE VIRGINIA WORK AREA PROTECTION MANUAL AND AS APPROVED BY THE ENGINEER.
6. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE RETROREFLECTIVE OR ILLUMINATED DURING NIGHT TIME HOURS.
7. PEDESTRIAN TRAFFIC SHALL BE MAINTAINED AT ALL TIMES, INCLUDING ACCESS TO BUS STOP SHELTERS.
8. PEDESTRIAN TRAFFIC SHALL BE SEPARATED FROM WORK ZONES WITH APPROPRIATE MEASURES IN ACCORDANCE WITH MUTCD.
9. ADEQUATE PROVISIONS FOR PERSONS WITH DISABILITIES SHALL BE PROVIDED AT ALL TIMES PER ADA REQUIREMENTS.
10. WHEN NECESSARY, PEDESTRIANS SHALL BE APPROPRIATELY DIRECTED WITH ADVANCED WARNING SIGNS PLACED AT INTERSECTIONS, TO CROSS TO THE OPPOSITE SIDE OF THE ROADWAY IN ORDER TO PREVENT CONFLICT WITH MIDBLOCK WORK SITES.
11. PEDESTRIANS SHALL NOT BE LED INTO CONFLICT WITH WORK SITE EQUIPMENT, OPERATIONS, AND/OR VEHICLES MOVING THROUGH OR AROUND THE WORK SITE.
12. ALL EXISTING FIRE HYDRANTS AND FIRE DEPARTMENT CONNECTIONS SHALL BE MAINTAINED UNOBSTRUCTED AND ACCESSIBLE AT ALL TIMES IN ACCORDANCE WITH SECTIONS 508.5.4 AND 508.5.5 OF THE ARLINGTON COUNTY FIRE PREVENTION CODE.
13. ACCESS TO BUILDINGS FOR FIREFIGHTING SHALL BE MAINTAINED AT ALL TIMES. EXISTING FIRE APPARATUS ACCESS ROADS (FIRE LANES) SHALL BE KEPT CLEAR OF OBSTRUCTIONS IN ACCORDANCE WITH SECTION 503.4 OF THE ARLINGTON COUNTY FIRE PREVENTION CODE. ACCESS TO CONSTRUCTION SITES SHALL BE PROVIDED AND MAINTAINED IN ACCORDANCE WITH SECTION 1410 OF THE ARLINGTON COUNTY FIRE PREVENTION CODE.
14. IN THE EVENT THAT EXISTING FIRE DEPARTMENT CONNECTIONS OR FIRE APPARATUS ACCESS ROADS (FIRE LANES) MUST BE OBSTRUCTED TO FACILITATE CONSTRUCTION ACTIVITIES, CONTACT THE ARLINGTON COUNTY FIRE DEPARTMENT FIRE PREVENTION OFFICE AT 703-228-4644 TO COORDINATE REVIEW AND APPROVAL OF TEMPORARY FIRE DEPARTMENT CONNECTIONS AND/OR FIRE APPARATUS ACCESS ROADS PRIOR TO CREATING THE OBSTRUCTION.
15. PROJECT WORK HOURS SHALL BE AS FOLLOWS: IN ARLINGTON RIGHT-OF-WAY 9:00AM TO 4:00PM (MON-FRI).
16. COORDINATE WITH ARLINGTON COUNTY TRANSIT BUREAU, 703-228-3049, AT LEAST 2 WEEKS PRIOR TO COMMENCEMENT OF WORK APPROVAL, IF TRANSIT IS AFFECTED.
17. CONSTRUCTION DURATION IS EXPECTED TO BE APPROXIMATELY 6 MONTHS. THROUGHOUT THE ENTIRETY OF CONSTRUCTION THE TRAIL TO ZACHARY TAYLOR PARK IS TO BE CLOSED.
18. PARKING SHALL BE RESTRICTED BY THE COUNTY AS PART OF THE RIGHT OF WAY PERMIT. CONTACT DES - PERMITTING SECTION, 703-228-3629, AT LEAST 72 HOURS PRIOR TO COMMENCEMENT OF WORK.



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APPROVALS	DATE
<i>Amy Pflaum</i> QUALITY CONTROL ENGINEER	8/31/2020
<i>Ramall Taktak</i> CONSTRUCTION MANAGEMENT SUPERVISOR	9.2.20
<i>Christin Jolicœur</i> PROJECT MANAGER	09.10.2020

REVISIONS	DATE

MAINTENANCE OF TRAFFIC PLAN

DONALDSON RUN TRIBUTARY B S320

DESIGNED: JTASTAD
DRAWN: JTASTAD
CHECKED: APATEL
MISS UTILITY TRANSMITTAL #: N/A

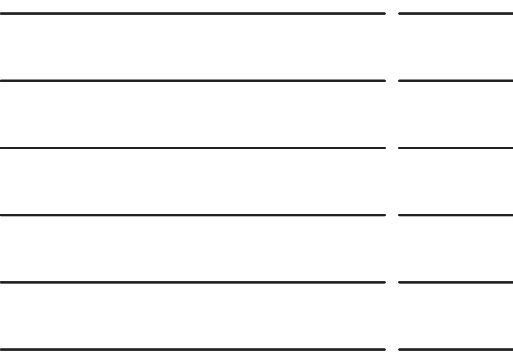
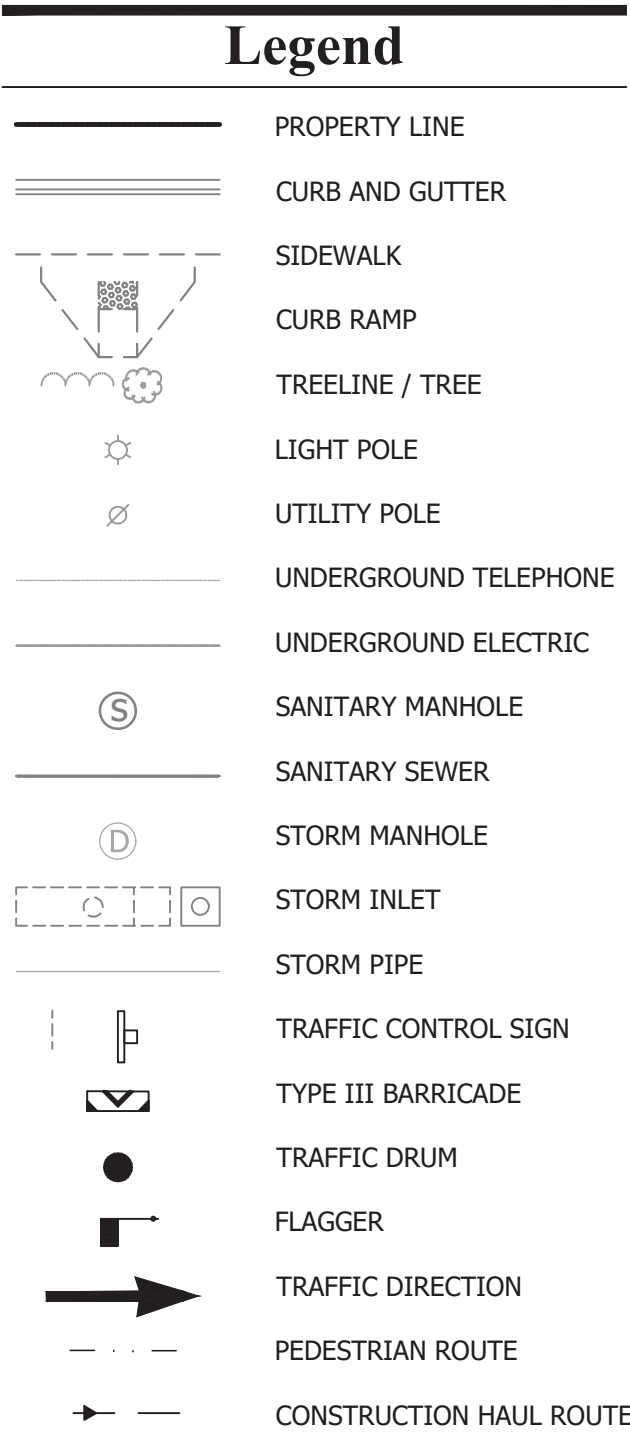
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PLOTTED: APRIL 21 2020
PLOTTED BY: JCANDLER

SCALE: GRAPHIC SCALE
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SCALE: 1" = 20'

SHEET MOT 1 of 2

DONALDSON RUN TRIBUTARY B



**DONALDSON RUN
TRIBUTARY B**

SCALE: 1" = 50'