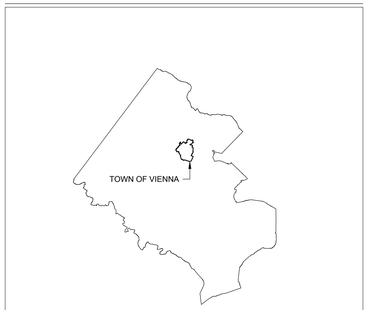
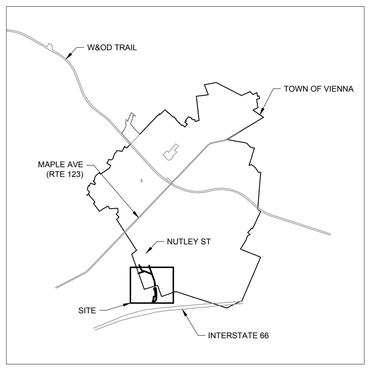
TOWN OF
VIENNA

HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE

VICINITY MAPS



FAIRFAX COUNTY, VIRGINIA
1" = 50,000ft



TOWN OF VIENNA, VIRGINIA
1" = 5,000ft

SITE MAP

SOURCE: VIRGINIA BASE MAP PROGRAM 2017 IMAGERY
LOCATION: INTERSECTION OF VIRGINIA CENTER BLVD AND NUTLEY ST SW
VIENNA, VA 22181
(38.882905, -77.268386)

250 0 250 500 FT

SHEET INDEX

SHEET NUMBER	SHEET TITLE
01	COVER SHEET
02	GENERAL NOTES
03	EXISTING CONDITIONS PLAN
04	OVERALL SITE PLAN
05	SITE PLAN NORTH
06	SITE PLAN SOUTH
STREAM RESTORATION STRUCTURE DETAILS	
07	TYPICAL SECTIONS
08	CONSTRUCTED RIFFLE DETAIL
09	ROCK CASCADE DETAIL
10	ROCK CROSS VANE DETAIL
11	ROCK VANE DETAILS
12	LOG VANE DETAILS
13	ROCK REVETMENT DETAILS
14	TOE WOOD DETAIL
15	PLUNGE POOL DETAILS
16	IMBRICATED WALL DETAILS
17	STORM SEWER OUTFALL DETAILS
18	ROCK CHANNEL TRIBUTARIES DETAIL

NOT FOR CONSTRUCTION

TOWN OF VIENNA since 1890

NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.

CLIENT: TOWN OF VIENNA
127 CENTER STREET SOUTH
VIENNA, VA 22180

ENGINEER:
Wood Environment & Infrastructure Solutions
4795 Meadow Wood Lane, Suite 310 East
Chantilly, VA 20151-1678
Tel. (703) 488-3700
www.woodplc.com

DRAWN BY: AA / MJH
CHECKED BY: MJH
APPROVED BY: MTB
SCALE: 1" = 250'

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

SHEET TITLE: COVER SHEET

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 01 OF 18

STORM TABLE

EX 3629 — TOP=332.94
INV=328.31 (18" RCP FRM UNK)
INV=328.20 (18" RCP TO #1151)

EX 1151 — TOP=332.51
INV=327.97 (FRM #3629)
INV=325.82 (FRM UNK)
INV=321.18 (TO UNK)

EX 1335 — TOP=331.26
INV=326.52 (FRM UNK S)
INV=323.26 (FRM #1396)
INV=321.72 (TO POND)

EX 1396 — TOP=331.90
INV=324.05 (FRM #1419)
INV=323.95 (TO #1335)

EX 1419 — TOP=331.46
INV=325.09 (FRM UNK)
INV=324.74 (TO #1396)

EX 1062 — TOP=330.82
INV=325.65 (15" RCP TO STREAM)

EX 3620 — TOP=331.54
INV=325.15 (36" RCP STREAM)

EX 3614 — TOP=331.99
(SEALED NO ACCESS)

EX 3435 — TOP=332.33
INV=324.67 (FRM #3614)
INV=324.63 (TO STREAM)

EX 3605 — TOP=335.59
INV=328.12 (18" RCP FRM UNK)
INV=328.04 (18" RCP TO #3529)

EX 3529 — TOP=335.59
INV=330.42 (18" RCP FRM #3605)
INV=330.29 (TO STREAM)

EX 3637 — TOP=340.38
INV=336.46 (18" RCP FRM UNK)
INV=336.40 (18" RCP TO #2602)

EX 2602 — TOP=340.19
INV=334.78 (18" RCP FRM #3637)
INV=334.99 (15" RCP TO STREAM)

EX 3657 — TOP=344.77
INV=339.31 (TO HEADWALL)

EX 3664 — TOP=339.54
INV=330.12 (TO HEADWALL)

EX 1485 — INV=318.26

EX 1486 — INV=319.02

EX 1487 — INV=317.91

EX 1488 — INV=318.07

EX 1591 — INV=319.11

EX 1603 — INV=319.24

EX 1601 — INV=320.00

EX 1600 — INV=319.95

EX 1828 — INV=325.56

EX 1913 — INV=320.92

EX 1698 — INV=328.35

EX 1773 — INV=324.37

EX 3650 — TOP=345.18
INV=340.26

EX 1389 — INV=335.86

EX 2142 — INV=329.93

EX 3092 — INV=332.03

EX 3164 — INV=332.40

EX 3165 — INV=332.40

EX 3166 — INV=332.40

EX 3167 — INV=332.40

EX 3108 — INV=331.27

EX 3107 — INV=331.30

EX 3106 — INV=331.28

EX 3109 — INV=331.30

EX 2304 — TOP=342.70

EX 2885 — INV=338.98

EX 2884 — INV=332.52

EX 2883 — INV=332.55

EX 2286 — INV=331.89

EX 2284 — INV=331.85

EX 3072 — INV=332.11

SANITARY TABLE

EX 3730 — TOP=342.50
(SEALED, NO ACCESS)

EX 2048 — TOP=333.52
INV=327.99 (FRM #3230)
INV=327.93 (TO #1880)

EX 1880 — TOP=332.42
INV=326.86 (FRM #2048)
INV=326.54 (TO #1824)

EX 1824 — TOP=332.07
INV=325.80 (FRM #1880)
INV=325.77 (TO #1502)

EX 1502 — TOP=327.82
INV=321.76 (FRM #1824)
INV=321.63 (FRM #3619)
INV=321.70 (TO #1495)

EX 1495 — TOP=327.17
INV=322.30 (FRM #1502)
INV=322.39 (TO UNK)

EX 3619 — TOP=331.60
(SEALED, NO ACCESS)

EX 3618 — TOP=332.81
INV=319.04 (FRM UNK)
INV=317.21 (FRM UNK)
INV=317.10 (TO UNK)

EX 1501 — TOP=327.06
INV=312.53 (FRM UNK)
INV=311.36 (FRM #1875)
INV=310.81 (TO UNK)

EX 1875 — TOP=329.68
INV=317.67 (FRM #3029)
INV=317.22 (TO #1501)

EX 3029 — TOP=332.54
INV=317.98 (FRM #3299)
INV=318.07 (TO #1875)

EX 3298 — TOP=334.04
INV=318.97 (FRM UNK)
INV=318.41 (TO #3029)

EX 3000 — TOP=337.89
INV=319.91 (FRM #3120)
INV=319.96 (TO UNK)

EX 3120 — TOP=339.12
INV=320.53 (FRM UNK)
INV=320.23 (TO #3000)

EX 3119 — TOP=336.80
INV=328.23 (FRM UNK)
INV=328.23 (TO #3001)

EX 3001 — TOP=338.10
INV=327.30 (FRM #3119)
INV=327.48 (TO #2363)

EX 2363 — TOP=335.33
INV=326.95 (FRM #3001)
INV=326.80 (TO #2340)

EX 2340 — TOP=335.35
INV=324.04 (FRM #2363)
INV=323.84 (TO UNK)

EX 3002 — TOP=338.32
INV=329.53 (FRM UNK W)
INV=329.96 (FRM UNK N)
INV=329.51 (TO #2362)

EX 2362 — TOP=335.66
INV=329.00 (FRM #3002)
INV=328.95 (TO #3646)

EX 3646 — TOP=333.38
INV=328.13 (FRM #2362)
INV=327.89 (TO UNK)

EXISTING CONDITIONS LEGEND

- HVAC UNIT
- CABLE PEDESTAL
- FIRE HYDRANT
- GAS VALVE
- GUY WIRE
- LAMP POST
- SIGN
- STORM MANHOLE
- SEWER MANHOLE
- TRAFFIC POLE
- UTILITY PEDESTAL
- UTILITY POLE
- VAULT
- WATER VALVE
- WETLAND FLAG
- U.G. ELECTRIC LINE
- FENCE
- GUARDRAIL
- U.G. GAS LINE
- OVERHEAD UTILITY LINE
- U.G. SANITARY LINE
- U.G. TELEPHONE LINE
- U.G. WATER LINE
- RIP-RAP

SURVEY NOTES (FROM BOWMAN)

1. THE SURVEYED PROPERTIES DELINEATED HEREON ARE LOCATED ON FAIRFAX COUNTY TAX ASSESSMENT MAP NO. 0482-22-A.
2. THE SURVEYED PROPERTIES ARE NOW IN THE NAME OF TOWNES OF MOOREFIELD AND RECORDED IN DEED BOOK 4259 PAGE 155 AMONG THE LAND RECORDS OF FAIRFAX COUNTY, VIRGINIA.
3. BOUNDARY INFORMATION AND BUILDING FEATURES AS SHOWN HEREON ARE COMPILED FROM EXISTING SHAPE FILES PROVIDED BY THE FAIRFAX COUNTY AND A FIELD SURVEY PERFORMED BY BOWMAN CONSULTING GROUP, LTD. BETWEEN SEPTEMBER 3, 2019 AND SEPTEMBER 20, 2019. NORTH MERIDIAN IS REFERENCED TO VIRGINIA COORDINATE SYSTEM NORTH, NAD 83. VERTICAL DATUM IS NAVD 88.
4. THE SURVEYED PROPERTIES AS SHOWN HEREON ARE SUBJECT TO ALL COVENANTS AND RESTRICTIONS OF RECORD AND THOSE RECORDED HEREWITH. BOWMAN CONSULTING GROUP, LTD. WAS NOT PROVIDED A TITLE COMMITMENT.
5. A PORTION OF THE SURVEYED PROPERTIES SHOWN HEREON LIE IN ZONE "A" (NO BASE FLOOD ELEVATIONS DETERMINED) AND ZONE "X" OTHER AREAS (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP FOR FAIRFAX COUNTY, VIRGINIA, AND INCORPORATED AREAS, PANEL 145 OF 450 AND HAVING A MAP NUMBER 51059C0145E, WITH A MAP REVISED DATE OF SEPTEMBER 17, 2010.
6. THE LOCATION OF ALL VISIBLE STRUCTURES AND OTHER IMPROVEMENTS SITUATED ON THE SURVEYED PROPERTY, WHICH HAVE BEEN CAREFULLY ESTABLISHED BY THE CLASSIFICATION AND SPECIFICATIONS FOR CADASTRAL SURVEYS ARE CORRECTLY SHOWN.
7. THE TOPOGRAPHY DEPICTED HEREON IS BASED UPON A FIELD RUN SURVEY BY THIS FIRM IN SEPTEMBER, 2019 UTILIZING A COMBINATION OF TERRESTRIAL LIDAR AND CONVENTIONAL SURVEY METHODS. THE CONTOUR INTERVAL IS TWO (2) FOOT.

TOWN OF VIENNA GENERAL NOTES

1. A PRE-CONSTRUCTION MEETING MUST BE HELD PRIOR TO THE START OF CONSTRUCTION. CALL 703-255-6384 TO SCHEDULE THE PRE-CONSTRUCTION MEETING.
2. ALL CONSTRUCTION GENERATED DEBRIS MUST BE HAULED AWAY BY THE CONTRACTOR OR OWNER.
3. PRIOR TO THE REMOVAL OF ANY TOWN TREES (TREES WITHIN THE RIGHT OF WAY), THE APPLICANT OR THEIR REPRESENTATIVE SHALL CONTACT THE TOWN OF VIENNA ARBORIST AT 703-255-6360 TO COORDINATE HAVING THE TOWN ARBORIST ONSITE DURING ALL TOWN TREE REMOVAL.
4. TREE PROTECTION FOR ANY TOWN TREE, AS SHOWN ON PLAN, MUST BE INSTALLED PRIOR TO ANY SITE WORK.
5. IT IS UNLAWFUL TO PERFORM ANY CONSTRUCTION ABOVE FOUNDATION CORNERS PRIOR TO APPROVAL OF SETBACKS. WORK COMPLETED IN VIOLATION OF THIS REQUIREMENT IS SUBJECT TO DEMOLITION.
6. ALL DUMPSTERS/PODS ARE TO BE PLACE ON PRIVATE PROPERTY.
7. FRONT ELEVATION CHECKS ARE REQUIRED.
8. WALL CHECK SURVEYS ARE REQUIRED AND MUST BE SUBMITTED PRIOR TO CONSTRUCTION ABOVE FOUNDATION CORNERS.
9. A CERTIFICATE OF OCCUPANCY IS REQUIRED PRIOR TO OCCUPANCY. ALL REQUIRED DOCUMENTATION AND INSPECTIONS MUST BE SUBMITTED/COMPLETED BEFORE THE TOWN OF VIENNA WILL ISSUE A CERTIFICATE OF OCCUPANCY.
10. EXISTING SANITARY SEWER LATERALS ARE TYPICALLY CAPPED AT OR NEAR THE PROPERTY LINE. THE REUSE OF THE PORTION OF THE EXISTING SANITARY SEWER LATERAL BETWEEN THE TOWN OWNED SEWER MAIN AND THE CAPPED END MAY BE ALLOWED PROVIDING THAT A LICENSED PLUMBER CERTIFIES THAT THE EXISTING PIECE OF PIPE IS GRADED PROPERLY AND IN LIKE NEW CONDITION. THE REUSE OF A PORTION OF THE EXISTING LATERAL DOES NOT IMPLY THAT THE TOWN IN WARRANTING THE CONDITION IN ANY WAY.

TOWN OF VIENNA LAND DISTURBING GENERAL NOTES

1. THE LAND DISTURBING PERMIT MUST BE KEPT ON THE WORK SITE AND SHOWN WHEN REQUESTED.
2. A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IN CONFORMANCE WITH 9VAC25-870-54 AND TOWN CODE SECTION 23-13 MUST BE MAINTAINED AT A CENTRAL LOCATION ON THE SITE. IF AN ON-SITE LOCATION IS UNAVAILABLE, NOTICE OF THE SWPPP'S LOCATION MUST BE POSTED NEAR THE MAIN ENTRANCE OF THE CONSTRUCTION SITE. THE SWPPP SHALL BE MADE AVAILABLE FOR PUBLIC REVIEW IN ACCORDANCE WITH THE GENERAL PERMIT EITHER ELECTRONICALLY OR IN HARD COPY.
3. THE TOWN OF VIENNA DEPARTMENT OF PUBLIC WORKS MUST BE NOTIFIED BY TELEPHONE (703-255-6380) WHEN WORK IS TO COMMENCE AND WHEN THE PROJECT IS COMPLETED. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR AGREES TO CONTACT AND MEET WITH THE DEPARTMENT TO IDENTIFY SIGNIFICANT STORMWATER CONTROL INSTALLATION POINTS WHERE THE CONTRACTOR MUST CONTACT THE TOWN FOR INSPECTION EITHER DURING OR IMMEDIATELY AFTER INSTALLATION. THE DEPARTMENT SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF THESE INSTALLATION POINTS.
4. NO LAND DISTURBING ACTIVITY SHALL COMMENCE UNTIL ALL EROSION AND SEDIMENT CONTROL ARE IN PLACE AS SPECIFIED IN THE EROSION AND SEDIMENT CONTROL PLAN AND A PRE-CONSTRUCTION MEETING WITH TOWN STAFF IS HELD.
5. THE CONTRACTOR AGREES TO BE RESPONSIBLE FOR ANY AND ALL DAMAGES TO ANY OTHER INSTALLATION, ALREADY IN PLACE, AS A RESULT OF WORK COVERED BY THIS PERMIT.
6. THE TOWN RESERVES THE RIGHT TO ORDER A DEVELOPER OR CONTRACTOR TO CEASE AND DESIST ALL WORK ACTIVITY IN THE EVENT THAT THE DEVELOPER OR CONTRACTOR IS UNABLE TO MEET THE REQUIREMENTS OF THE STORMWATER MANAGEMENT PLAN, EROSION AND SEDIMENT CONTROL PLAN, OR THE SWPPP. THIS INCLUDES KEEPING ALL STREETS AND RIGHTS-OF-WAY FREE OF MUD AND DIRT.
7. THE APPLICANT AGREES TO MAINTAIN THE WORK IN THE MANNER APPROVED UPON ITS COMPLETION.
8. A PERMIT MAY BE DENIED ANY APPLICANT, AND ALL PERMIT ISSUED BY THE TOWN MAY BE REVOKED, WHENEVER, IN THE OPINION OF THE DIRECTOR OF PUBLIC WORKS, THE SAFETY, USE OR MAINTENANCE OF THE PROPERTY SO REQUIRES. PERFORMANCE BONDS REQUIRED UNDER SECTION 23-7 AND SECTION 23-23 OF THE TOWN CODE WILL STAND FORFEITED AND WORK SHALL NOT BE RECOMMENCED UNTIL A REPLACEMENT BOND IS POSTED.
9. PERFORMANCE BONDS SHALL BE CONDITIONED TO CONFORM ANY WORK TO APPROVED STANDARDS, SPECIFICATIONS, AND CRITERIA AS SET OUT IN THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND STORMWATER MANAGEMENT PLAN.
10. UPON COMPLETION OF ADEQUATE STABILIZATION OF AN APPROVED EROSION AND SEDIMENT CONTROL PLAN, THE CONTRACTOR SHALL NOTIFY THE DIRECTOR OF PUBLIC WORKS OF SUCH COMPLETION. FOLLOWING INSPECTION OF THE WORK AND PLANTING AND A DETERMINATION THAT THEY ARE IN COMPLIANCE WITH THE APPROVED PLAN, THE DIRECTOR OF PUBLIC WORKS SHALL ISSUE A LETTER OR PRELIMINARY ACCEPTANCE. THE CONTRACTOR SHALL GUARANTEE ALL EROSION AND SEDIMENT CONTROL WORK FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE PRELIMINARY ACCEPTANCE, OR FOR A PERIOD OF ONE YEAR FROM ANY REPAIR OR REPLANTING ORDERED BY THE DIRECTOR OF PUBLIC WORKS, OR UNTIL SUCH TIME THAT ALL CONTROL STRUCTURES AND A MINIMUM OF 90% OF ALL PLANTINGS HAVE SURVIVED FOR A YEAR WITHOUT NEED FOR FURTHER REPLANTING AND REPAIR. FINAL ACCEPTANCE SHALL OCCUR WHEN PRELIMINARY ACCEPTANCE HAS REMAINED UNREVOKED FOR A PERIOD OF ONE YEAR, OR WHEN ALL CONTROL STRUCTURES AND A MINIMUM OF 90% OF ALL PLANTS HAVE SURVIVED FOR A PERIOD OF ONE YEAR WITHOUT NEED FOR FURTHER REPLANTING OR REPAIR.
11. THE STORMWATER MANAGEMENT PERFORMANCE BOND WILL BE RELEASED UPON ALL STORMWATER MANAGEMENT FACILITIES IN THE STORMWATER MANAGEMENT PLAN PASSING FINAL CONSTRUCTION INSPECTION BY THE DIRECTOR OF PUBLIC WORKS OR HIS DESIGNEE. A CONSTRUCTION RECORD DRAWING FOR PERMANENT STORMWATER MANAGEMENT FACILITIES MUST BE SUBMITTED TO THE DIRECTOR PRIOR TO BOND RELEASE IN ACCORDANCE WITH TOWN CODE SECTION 23-14D.
12. THE MAINTENANCE AGREEMENT REQUIRED IN TOWN CODE SECTION 23-18 MUST BE RECORDED IN THE FAIRFAX COUNTY LAND RECORDS PRIOR TO TERMINATION OF THE GENERAL PERMIT.

NOT FOR CONSTRUCTION

TOWN OF VIENNA since 1890

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127 CENTER STREET SOUTH
VIENNA, VA 22180

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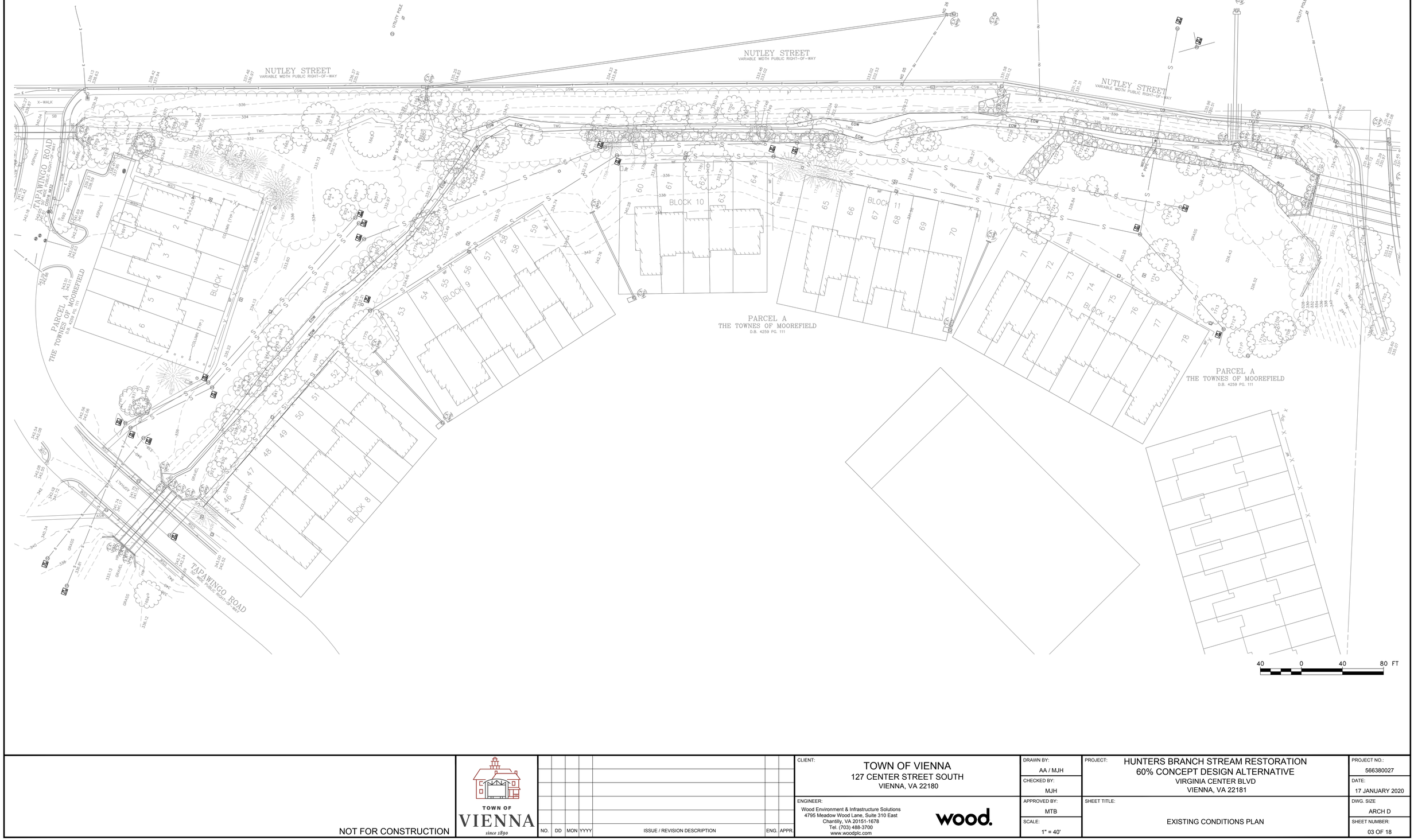
CHECKED BY: MJH
APPROVED BY: MTB
SCALE: NOT TO SCALE

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

SHEET TITLE: GENERAL NOTES

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 02 OF 18



PLOTTED BY:HEPP, MICHAEL SHEET SET:Hunters Branch LAYOUT:03 EXISTING CONDITIONS PLAN January 17, 2020 01:05:29pm P:\CAD_PROJECTS\VIENNA\HUNTERS BRANCH\CIV\03 EXISTING CONDITIONS PLAN.DWG

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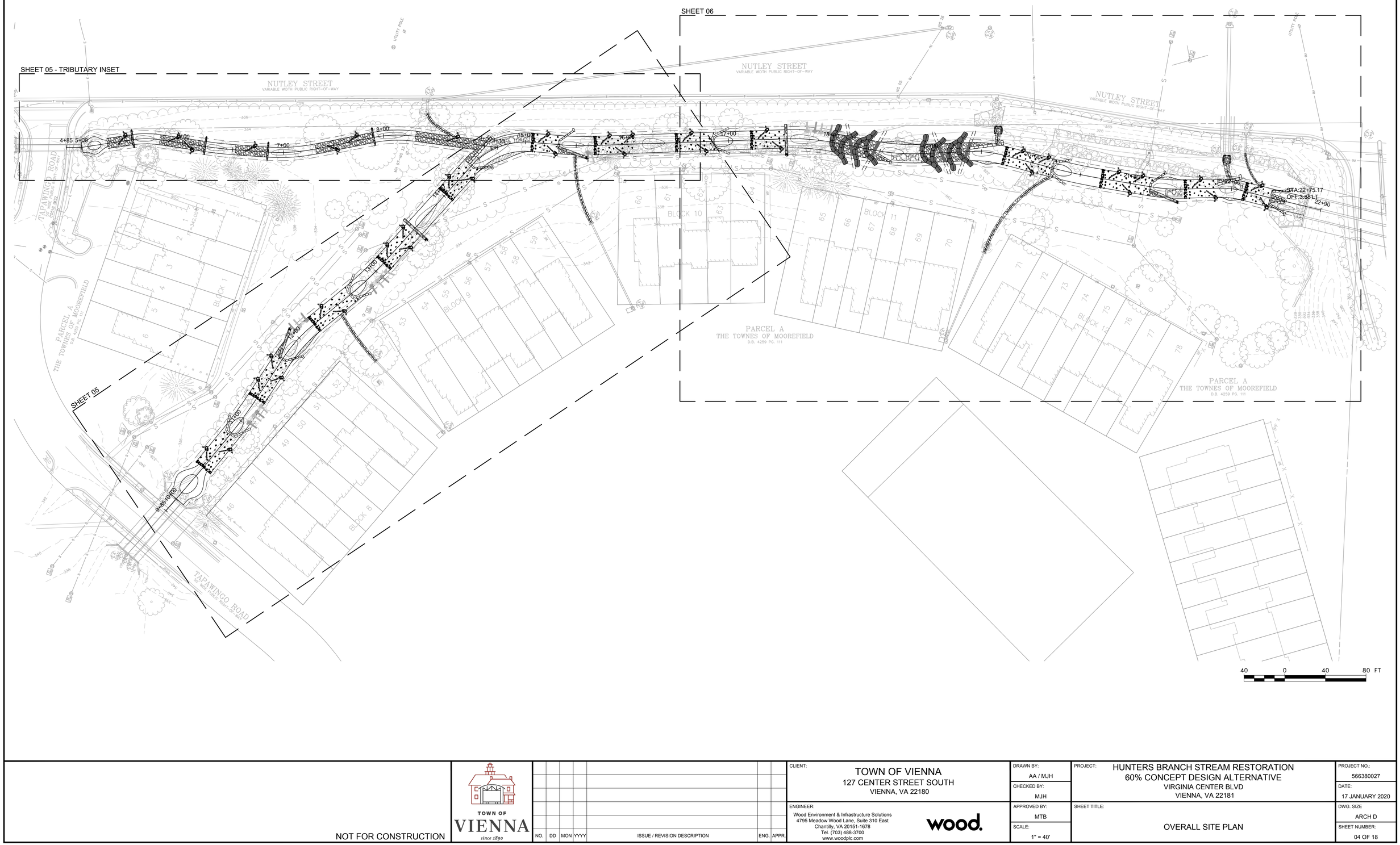
SHEET TITLE: EXISTING CONDITIONS PLAN

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 03 OF 18



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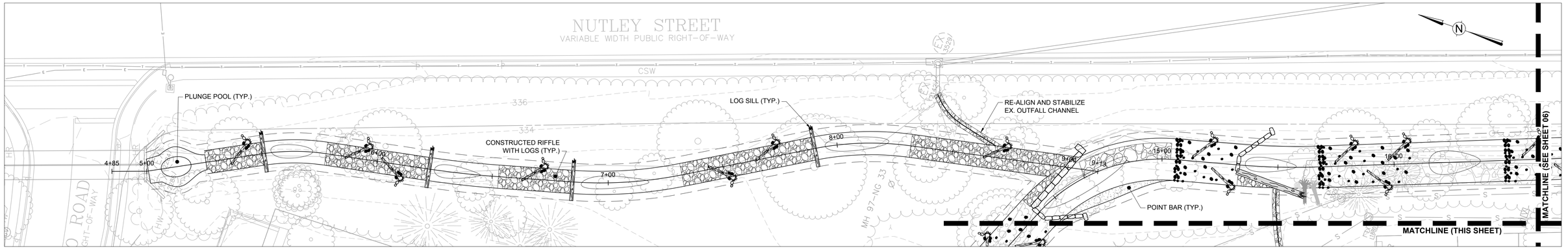
SHEET TITLE: OVERALL SITE PLAN

PROJECT NO.:	566380027
DATE:	17 JANUARY 2020
DWG. SIZE	ARCH D
SHEET NUMBER:	04 OF 18

PLOTTED BY:HEPP, MICHAEL SHEET SET:Hunters Branch LAYOUT:04 OVERALL SITE PLAN January 17, 2020 01:05:34pm \\CHY-FS1\PROJECTS\CAD_PROJECTS\VIENNA\HUNTERS BRANCH\CIV\04 SITE PLAN SOUTH.DWG



HUNTERS BRANCH TRIBUTARY 5+00 - 9+13

SOURCE: JENNINGS ENVIRONMENTAL

HUNTERS BRANCH 10+00 - 16+62

LEGEND

- EXISTING CONTOUR
- VEGETATED BENCH
- LOG VANE
- ROCK VANE
- ROCK CROSS VANE
- CASCADE WITH BOULDER STEPS AND LOGS
- CONSTRUCTED RIFFLE WITH LOGS
- LATERAL SCOUR POOL WITH POINT BAR
- TRIBUTARY SUBSTRATE
- ROCK TOE REVETMENT
- TOE WOOD

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SHEET TITLE: SITE PLAN NORTH

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SHEET NUMBER:	05 OF 18

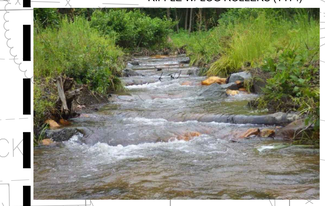
NUTLEY STREET
VARIABLE WIDTH PUBLIC RIGHT-OF-WAY

NUTLEY STREET
VARIABLE WIDTH PUBLIC RIGHT-OF-WAY

DIRECT EX. OUTFALL OVER ROCK VANE

ROCK CASCADE (TYP.)

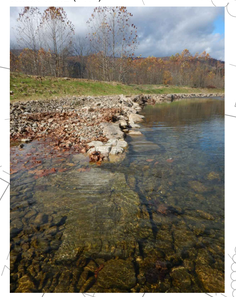
RIFFLE W/ LOG ROLLERS (TYP.)



REGRADE AND STABILIZE BANKS WITH VEGETATION

RE-ALIGN AND STABILIZE EX. SWALE

ROCK VANE (TYP.)



PROTECT EX. SEWER LINE

DIRECT EX. OUTFALL OVER ROCK VANE

ROCK W-WEIR

STA:22+75.17
OFF:3.88'LT

TIE TO ELEVATION OF EX. DOWNSTREAM POND TO PREVENT BACKWATER

MATCHLINE (SEE SHEET 05)

PARCEL A
THE TOWNES OF MOOREFIELD

PARCEL A
THE TOWNES OF MOOREFIELD
D.B. 4259 PG. 111

LEGEND

- EXISTING CONTOUR
- VEGETATED BENCH
- LOG VANE
- ROCK VANE
- ROCK CROSS VANE
- CASCADE WITH BOULDER STEPS AND LOGS
- CONSTRUCTED RIFFLE WITH LOGS
- LATERAL SCOUR POOL WITH POINT BAR
- TRIBUTARY SUBSTRATE
- ROCK TOE REVETMENT
- TOE WOOD

HUNTERS BRANCH 16+62 - 22+75

20 0 20 40 FT

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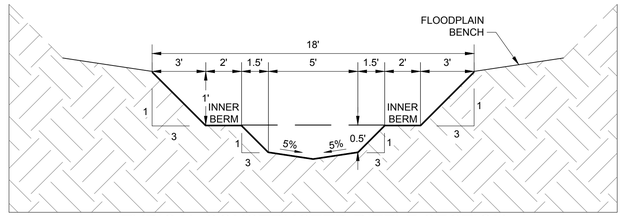
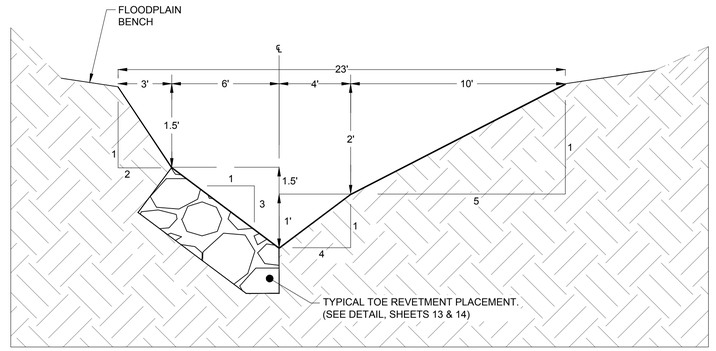
VIRGINIA CENTER BLVD
VIENNA, VA 22181

SHEET TITLE: SITE PLAN SOUTH

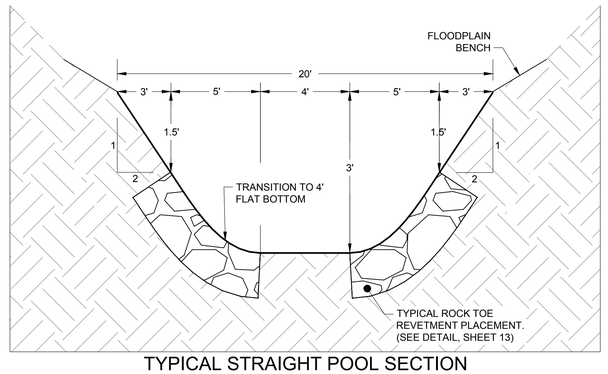
PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 06 OF 18



TYPICAL CONSTRUCTED RIFFLE SECTION



TYPICAL POOL IN BEND SECTION



TYPICAL STRAIGHT POOL SECTION

NOTE:
THESE ARE TYPICAL SECTIONS, THERE IS VARIABILITY OF THE CHANNEL THROUGHOUT THE PROFILE LENGTH RESULTING FROM TRANSITIONS AND THE TOP OF BANK WHICH IS A CONTINUALLY SLOPING SURFACE.

NOT FOR CONSTRUCTION

TOWN OF VIENNA since 1890

NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.

CLIENT: TOWN OF VIENNA
127 CENTER STREET SOUTH
VIENNA, VA 22180

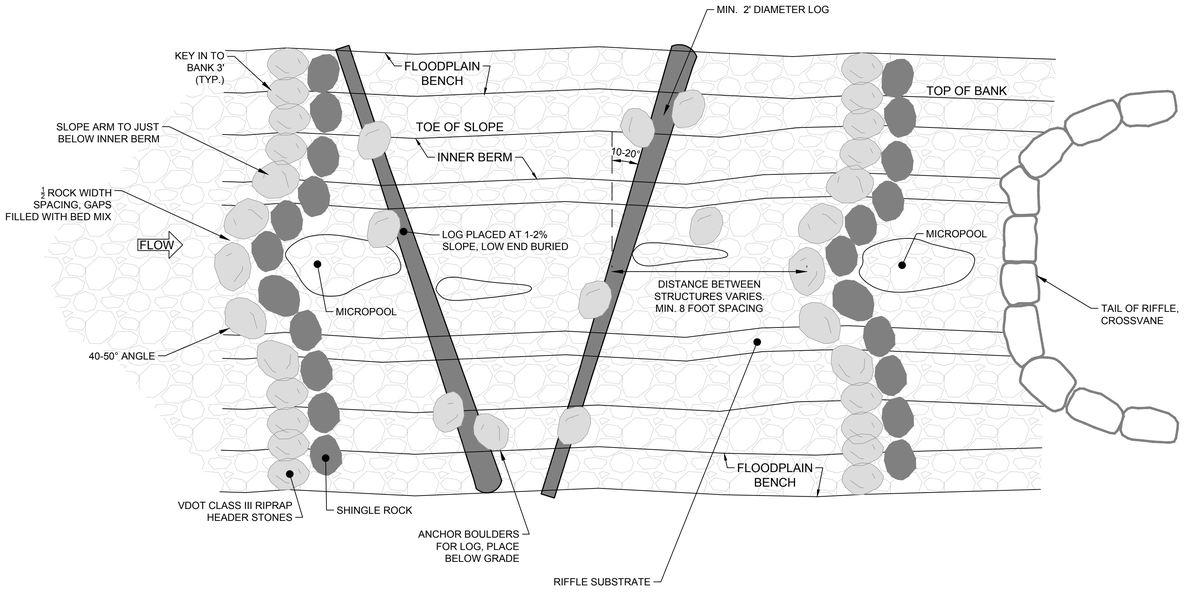
ENGINEER:
Wood Environment & Infrastructure Solutions
4795 Meadow Wood Lane, Suite 310 East
Chantilly, VA 20151-1678
Tel. (703) 488-3700
www.woodplc.com

DRAWN BY: AA / MJH
CHECKED BY: MJH
APPROVED BY: MTB
SCALE: NOT TO SCALE

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

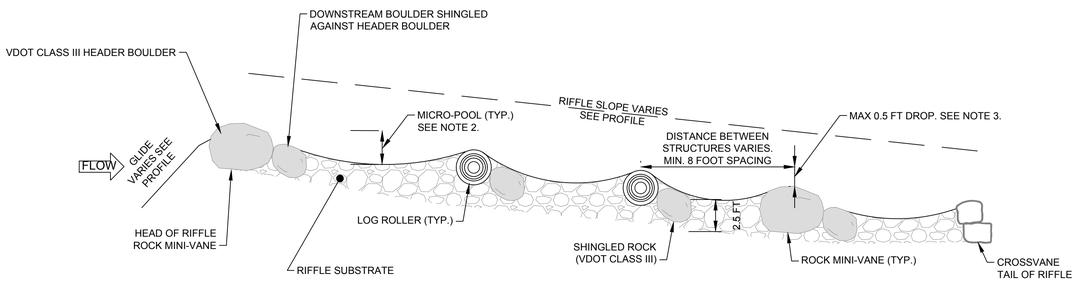
SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS
TYPICAL SECTIONS

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 07 OF 18



CONSTRUCTED RIFFLE WITH LOGS
PLAN

NOT TO SCALE



CONSTRUCTED RIFFLE WITH LOGS
PROFILE

NOT TO SCALE

CONSTRUCTED RIFFLE WITH LOGS
NOTES

CONSTRUCTED RIFFLE MATERIAL DIMENSIONS

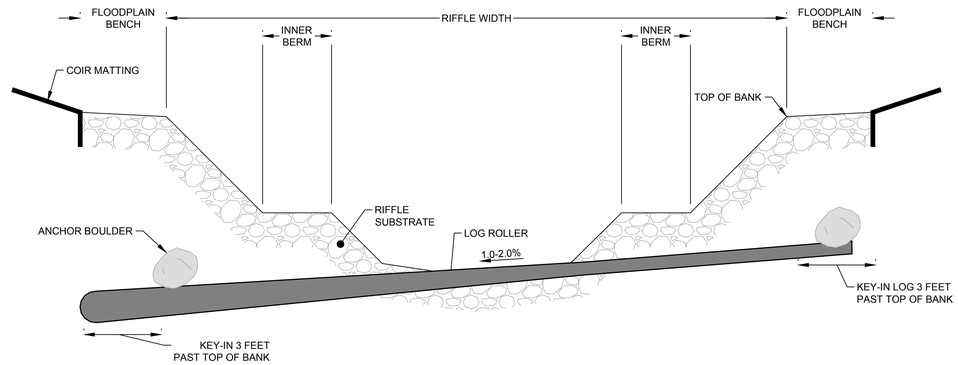
STRUCTURE SIZE TABLE	
ROCK STRUCTURES	VDOT CLASS III RIPRAP
LOGS	MIN DIAMETER = 2' LENGTH = 24'±
CHANNEL BED MATERIAL SPECS	
RIFFLE SUBSTRATE	GABION STONE VDOT CLASS I VDOT CLASS II SUPPLEMENTAL EXISTING BED MATERIAL EXISTING STREAM BED MATERIAL (COBBLE-GRAVEL-SAND) SHALL BE USED TO TOP DRESS AND FILL THE MATRIX OF THE LARGER BED MATERIAL AT THE DIRECTION OF THE FIELD ENGINEER. SELECT GRAVEL MATERIAL CAN BE HARVESTED FROM SPOIL PILES ON-SITE, BUT SHOULD HAVE A GRADATION WHICH IS APPROVED BY THE ON-SITE ENGINEER.

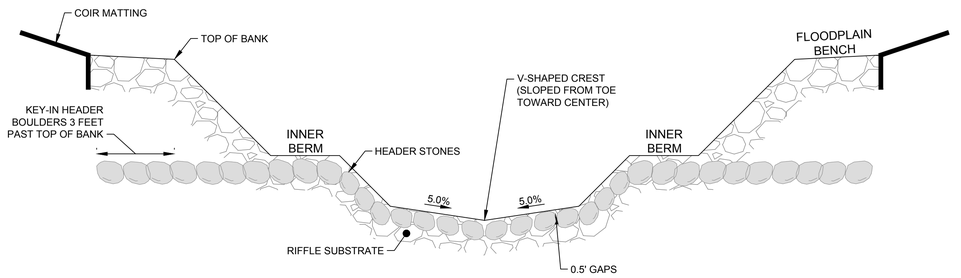
NOTES:

ASSUMED ROCK DENSITY 165 LB/FT^3

BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT THE FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM. STRUCTURE DIMENSIONS SHALL BE +/- 0.5'.

1. TYPICAL CONSTRUCTION SEQUENCE FOR THE CONSTRUCTED RIFFLES WITH LOGS IS AS FOLLOWS:
   A. BANK CLEARING AND SURVEY STAKING THE STRUCTURES ALONG THE RIFFLE.
   B. DIG A TRENCH (2.5 FT) FOR THE RIFFLE.
   C. PLACE VDOT CLASS III ROCKS FOR THE MINI-VANES, SHINGLED WITH SLIGHTLY SMALLER CLASS III ROCK. MINI-VANES WILL BE THE HEAD OR RIFFLE AND THE LAST STRUCTURE IN THE RIFFLE. LOGS ARE TO BE PLACED AS INTERMEDIATE STRUCTURES BUT ARE NOT TO BE PLACED AT THE HEAD OF RIFFLE OR LAST STRUCTURE.
   D. PLACE ROCK AND LOG STRUCTURES ENSURING KEY-IN PAST THE TOP OF BANK.
   E. FILL THE REST OF THE RIFFLE BETWEEN THE STRUCTURES USING RIFFLE SUBSTRATE MATERIAL. THE RIFFLE SUBSTRATE MATERIAL SHALL BE PLACED AT A UNIFORM 2.5 FT THICKNESS SUCH THAT, IN CROSS SECTION, ITS LOWEST ELEVATION OCCURS AT THE CENTER OF THE CHANNEL PER THE CROSS-SECTION DETAIL.
   F. RIFFLE SUBSTRATE MATERIAL SHALL EXTEND A MINIMUM OF 3 FT UPSTREAM OF THE P.T.
2. IF SPACING BETWEEN SILLS/MINI-VANES IS LESS THAN ½ RIFFLE WIDTH NO MICRO-POOLS ARE REQUIRED. WHERE SPACING IS GREATER THAN ½ RIFFLE WIDTH, MICRO-POOLS ARE REQUIRED.
3. MAXIMUM DROP BETWEEN STRUCTURES IS TO BE SIX (6) INCHES. GENERALLY THERE WILL BE 4 STRUCTURES PER RIFFLE. HOWEVER, SOME RIFFLES MAY REQUIRE ADDITIONAL STRUCTURES TO KEEP DROPS LESS THAN OR EQUAL TO 6 INCHES.





CONSTRUCTED RIFFLE WITH LOGS
CROSS SECTIONS

NOT TO SCALE

NOT FOR CONSTRUCTION

TOWN OF VIENNA since 1890

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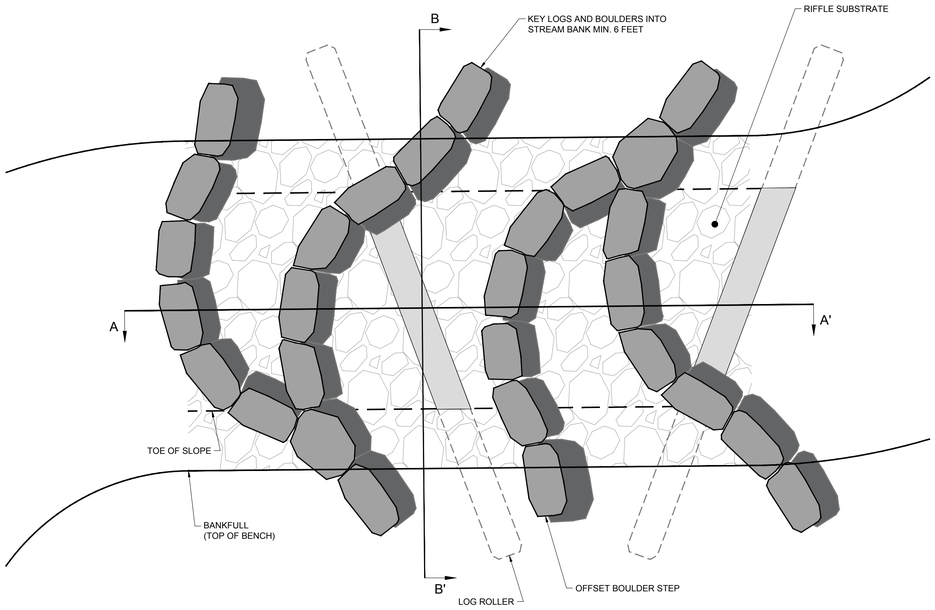
SCALE:	NOT TO SCALE

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS
CONSTRUCTED RIFFLE DETAIL

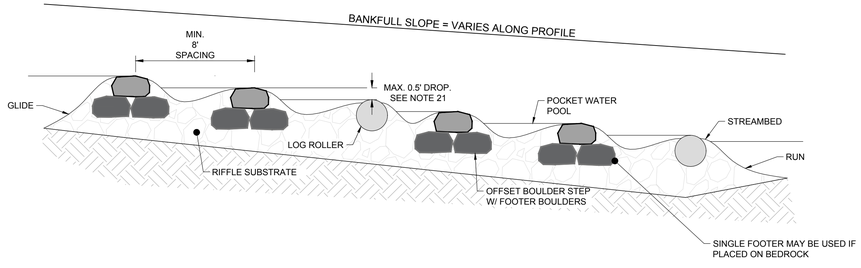
PROJECT NO.:	566380027
DATE:	17 JANUARY 2020
DWG. SIZE	ARCH D
SHEET NUMBER:	08 OF 18

PLOTTED BY:HEPP, MICHAEL SHEET SET:Hunters Branch LAYOUT:08 CONSTRUCTED RIFFLE DETAIL January 17, 2020 01:06:01pm \\CHY-FS1\CAD_PROJECTS\VIENNA\HUNTERS BRANCH\CIV\08 CONSTRUCTED RIFFLE DETAIL.DWG



CASCADE WITH BOULDER STEPS AND LOGS
PLAN

NOT TO SCALE



CASCADE WITH BOULDER STEPS AND LOGS
PROFILE A - A'

NOT TO SCALE

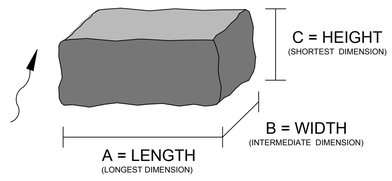
CASCADE WITH BOULDER STEPS AND LOGS
NOTES

1. THE CASCADE STRUCTURE WITH OFFSET BOULDER STEPS AND LOG ROLLERS IS A STREAM AND RIVER RESTORATION DESIGN FEATURE THAT INCORPORATES COARSE SUBSTRATE MATERIAL, BOULDERS AND LARGE WOOD (LOGS) IN THE CHANNEL BOTTOM THAT WILL NOT BE MOBILIZED UNDER DEFINED FLOW CONDITIONS. REPLACING (OR ADDING TO) THE NATIVE CHANNEL BED MATERIAL WITH LARGER DIAMETER ROCK AND LARGE WOOD CREATES A RIFFLE THAT FUNCTIONS AS A RIGID GRADE CONTROL AND HABITAT FEATURE. LARGER ROCK MATERIAL AND WOOD ENHANCES FLOW DIVERSITY AND TURBULENCE UNDER BASE FLOW CONDITIONS, WHICH PROMOTES AQUATIC HABITAT, NUTRIENT PROCESSING, AND RE-AERATION OF STREAM FLOW BENEFITING WATER QUALITY. THE D100 PARTICLES OF THE CONSTRUCTED CASCADE SHOULD BE DESIGNED TO RESIST t100-YR WHILE ALLOWING SMALLER SUBSTRATE PARTICLES TO BE MOBILIZED AND REPLACED BY UPSTREAM SEDIMENT SUPPLY. THIS STRUCTURE MAY BE USED AS RIFFLE WITH STEEPER SLOPES AS GRADE CONTROL.
2. ALL SELECT CASCADE MATERIAL SHALL BE QUARRIED STONE UNLESS NATIVE MATERIAL OF SIMILAR SIZE IS AVAILABLE ONSITE AND MEETS THE CONSTRUCTED CASCADE SIZE SPECIFICATIONS. THE ENGINEER MUST APPROVE THE USE OF ALL ONSITE NATIVE MATERIAL.
3. THE GRAVEL AND COBBLE SUBSTRATE USED FOR THIS DESIGN FEATURE SHOULD BE PREFERENTIALLY HARVESTED FROM THE EXISITING CHANNEL AND OTHER DESIGNATED MINING AREAS ONSITE.
4. SORTING AND SIEVING OF THE HARVESTED RIFFLE SUBSTRATE IS INCIDENTAL TO THE CONSTRUCTION OF THIS STRUCTURE.
5. LOGS SHALL HAVE MINIMUM DIAMETER OF 2'. LOGS SHALL HAVE A MINIMUM LENGTH OF 30± FEET.
6. ALL LOGS SHALL BE RELATIVELY STRAIGHT AND LIMBS AND BRANCHES SHALL BE TRIMMED FLUSH.
7. FOR INSTALLATION, THE CONTRACTOR SHALL OVER EXCAVATE THE LENGTH OF THE CASCADE, INSTALL 700 GRAM COIR FIBER EROSION CONTROL MATTING, KEY MATTING INTO THE CASCADE TRENCH AND BACKFILL WITH THE SPECIFIED SELECT CASCADE SUBSTRATE MATERIAL TO THE ELEVATIONS SHOWN ON THE PROPOSED PROFILE.
8. CONSTRUCTED CASCADE MATERIAL SHALL EXTEND A MINIMUM OF 3 FEET UPSTREAM OF THE P.T. INTO THE GLIDE.
9. P.T. AND P.C. STATIONS AND ELEVATIONS ARE INCLUDED IN THE PROPOSED PLAN AND PROFILE SHEETS. SET RIFFLE INVERTS AT ELEVATION SHOWN ON THE PLAN AND PROFILE SHEETS. NO ELEVATIONS OF THE CONSTRUCTED RIFFLE WITH LOG ROLLERS MAY VARY FROM THE PLAN SHEETS WITHOUT DIRECTION FROM THE ENGINEER.
10. THE VERTICAL SLOPE OF EACH LOG AND BOULDER ARM SHALL NOT EXCEED 2% UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE SLOPES WILL BE DICTATED BY THE WIDTH TO DEPTH RATIO OF THE REACH, TYPICAL RIFFLE INNER BERM CHANNEL, AND THE VERTICAL DROP OVER THE LOG AND LOG DIAMETER.
11. SELECT CASCADE MATERIAL (CASCADE SUBSTRATE) SHALL BE USED AS BACKFILL MATERIAL AROUND THE STRUCTURE.
12. SECURE ALL GEOTEXTILE FABRIC ON TOP OF FOOTER LOGS USING 3 INCH 10D GALVANIZED COMMON NAIL ON 12 INCH SPACING ALONG LOG. NAIL NON-WOVEN GEOTEXTILE TO EDGE OF HEADER LOG AND BACKFILL.
13. SELECT CASCADE MATERIAL DEPTH SHALL BE AT LEAST 2.5 FEET.
14. SELECT CASCADE MATERIAL WILL BE PLACED AT A UNIFORM THICKNESS.
15. THE SELECT CASCADE MATERIAL WILL BE PLACED SUCH THAT, IN CROSS-SECTION, ITS LOWEST ELEVATION OCCURS IN THE CENTER OF THE CHANNEL AS PER THE DETAIL.
16. SELECT CASCADE MATERIAL SHALL BE COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
17. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
18. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
19. BOULDER DIMENSIONS SHALL BE +/- 0.5'.
20. IF BEDROCK IS PRESENT DIRECTLY BELOW SURFACE BOULDER, FOOTING MAY NOT BE NECESSARY. HOWEVER, BASED ON THE DEPTH OF BEDROCK, ADDITIONAL FOOTER BOULDERS MAY BE REQUIRED IN ORDER TO SEAT FOOTERS ON BEDROCK. CHIP BEDROCK 0.5' FOR PLACEMENT AND SEAT FOOTER BOULDERS IN BEDROCK AT THE DIRECTION OF THE FIELD ENGINEER. IF BEDROCK IN NOT ENCOUNTERED, ADDITIONAL FOOTER BOULDERS MAY BE REQUIRED. IN THIS CASE THE ADDITIONAL TIER OF FOOTER BOULDERS SHALL EXTEND BELOW THE MAX SCOUR DEPTH (CHANNEL INVERT).
21. MAXIMUM DROP BETWEEN STRUCTURES IS TO BE SIX (6) INCHES. GENERALLY THERE WILL BE 4 ROCK STRUCTURES PER RIFFLE. HOWEVER, SOME RIFFLES MAY REQUIRE ADDITIONAL STRUCTURES TO KEEP DROPS LESS THAN OR EQUAL TO 6 INCHES.

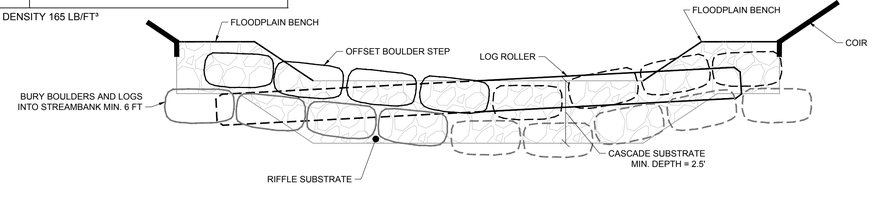
CASCADE MATERIAL DIMENSIONS

STRUCTURE SIZE TABLE		A	B	C
ROCK	OFFSET BOULDER STEP	4'	3'	2'
	FOOTER BOULDER	4'	3'	2'
LOGS	MIN DIAMETER = 2' MIN LENGTH = 30'			
CHANNEL BED MATERIAL SPECS				
RIFFLE SUBSTRATE	GABION STONE VDOT CLASS 1 VDOT CLASS II SUPPLEMENTAL EXISTING BED MATERIAL EXISTING STREAM BED MATERIAL (COBBLE-GRAVEL-SAND) SHALL BE USED TO TOP DRESS AND FILL THE MATRIX OF THE LARGER BED MATERIAL AT THE DIRECTION OF THE FIELD ENGINEER. SELECT GRAVEL MATERIAL CAN BE HARVESTED FROM SPOIL PILES ON-SITE, BUT SHOULD HAVE A GRADATION WHICH IS APPROVED BY THE ON-SITE ENGINEER.			

ASSUMED ROCK DENSITY 165 LB/FT³



NOTE:
BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT FUTURE SETTLEMENT IS KEPT TO A MINIMUM. MINIMUM STRUCTURE DIMENSIONS SHALL BE +/- 0.5'.BEFORE PLACEMENT OF BACKFILL, CHANNEL SHALL BE EXCAVATED TO A STABLE SUBGRADE (APPROVED BY TOWN OF VIENNA ON-SITE ENGINEER). FOOTER BOULDERS MUST HAVE ATLEAST ONE CONTACT POINT WITH HEADER BOULDERS, AND MAY BE MORE ROUNDED THAN HEADER. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONE DEPENDING UPON HEADER BOULDER SIZE AND DEPTH TO STABLE SUBGRADE.



CASCADE WITH BOULDER STEPS AND LOGS
CROSS SECTION B - B'

NOT TO SCALE

NOT FOR CONSTRUCTION

TOWN OF VIENNA since 1890

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60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS
ROCK CASCADE DETAIL

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
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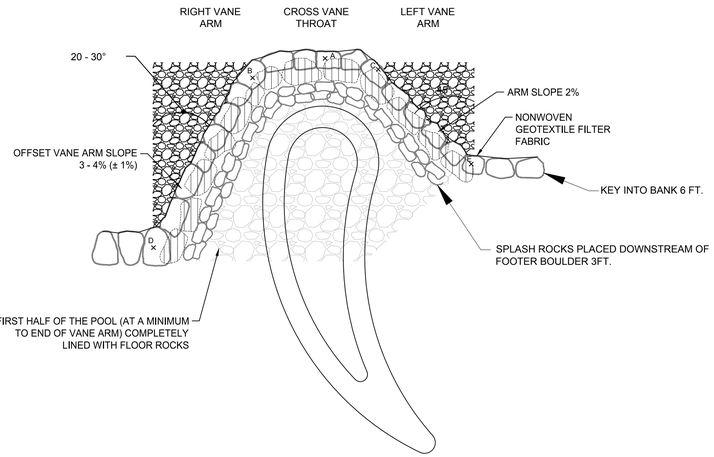
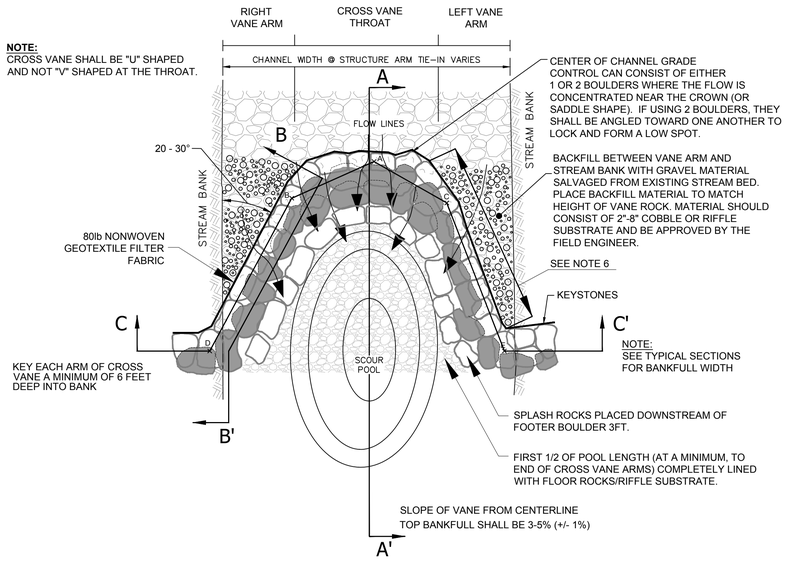


OFFSET CROSS VANE



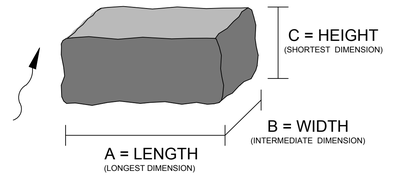
CROSS VANE

ROCK CROSS VANE
PLAN

NOT TO SCALE

ROCK CROSS VANE
NOTES

1. ALL STONES ARE TO BE STRUCTURE STONE. STRUCTURE STONE IS DEFINED AS BLOCK LIKE, CUBICAL, OR STRAIGHT EDGED BOULDERS.
2. GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, PLUGGING WITH STRUCTURE STONE CLASS A AND NO.57 OR CHINKING STONE, AS APPROVED BY THE TOWN OF VIENNA, AND LINING WITH FILTER FABRIC.
3. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE TOWN OF VIENNA'S FIELD ENGINEER OR QUALIFIED REPRESENTATIVE.
4. CONTRACTOR WILL BE REQUIRED TO FIT BOULDERS TIGHTLY.
5. FOOTER BOULDERS AND VANE BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.
6. THE SLOPE OF THE VANE ARM FROM CENTERLINE ELEVATION TO THE TIE-IN AT THE BANK SHALL BE 2-5%.
7. THERE SHALL BE NO DROP GREATER THAN 1.0 FOOT. VERTICAL TOLERANCE SHALL BE 0.1' FOR CROSS VANE STRUCTURES.
8. THE ELEVATION OF EACH GRADE CONTROL STRUCTURE SHOULD BE EQUAL TO OR GREATER THAN THE ELEVATION OF THE TOP OF THE FOOTER BOULDER DIRECTLY UPSTREAM.
9. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF STRUCTURE.
10. ½ THE POOL LENGTH OR POOL LENGTH TO THE END OF THE CROSS VANE ARMS (WHICHEVER IS GREATER) IS TO BE LINED WITH FLOOR ROCKS. SPLASH ROCKS SHALL EXTEND A MINIMUM LENGTH OF 3 FEET DOWNSTREAM OF THE FOOTER BOULDERS AND BE PLACED TO PROVIDE A ROUGH SURFACE SUCH THAT ROCK EDGES PROTRUDE 0.3 TO 0.5 FT ABOVE THE BED SURFACE.
11. IF BEDROCK IS PRESENT DIRECTLY BELOW SURFACE BOULDER, FOOTING MAY NOT BE NECESSARY. HOWEVER, BASED ON THE DEPTH TO BEDROCK, ADDITIONAL FOOTER BOULDERS MAY BE REQUIRED IN ORDER TO SEAT FOOTERS ON BEDROCK. CHIP BEDROCK 0.5' FOR PLACEMENT AND SEAT FOOTER BOULDERS IN BEDROCK AT THE DIRECTION OF THE FIELD ENGINEER. IF BEDROCK IS NOT ENCOUNTERED, ADDITIONAL FOOTER BOULDERS MAY BE REQUIRED. IN THIS CASE THE ADDITIONAL TIER OF FOOTER BOULDERS SHALL EXTEND BELOW THE MAX SCOUR DEPTH (CHANNEL INVERT) OF THE POOL.
12. AS THE TAIL OF RIFFLE APPROACHES THE PROPOSED CROSS VANES, THE CONTRACTOR SHALL CONSTRUCT THE INNER BERM FEATURE SUCH THAT IT GRADUALLY REDUCES AND FANS OUT/TAPERS INTO THE BACKSIDE OF THE VANE ARM AND DOES NOT IMPEDE OR BLOCK THE FLOW OF WATER THROUGH THE THROAT OF THE CROSS VANE.



NOTE:
BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT THE FUTURE SETTLEMENT IS KEPT TO A MINIMUM. BEFORE PLACEMENT OF BACKFILL, CHANNEL SHALL BE EXCAVATED TO A STABLE SUBGRADE (APPROVED BY TOWN OF VIENNA ON-SITE ENGINEER). FOOTER BOULDERS MUST HAVE AT LEAST ONE CONTACT POINT WITH HEADER BOULDERS, AND MAY BE MORE ROUNDED THAN HEADER. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONE DEPENDING UPON HEADER BOULDER SIZE AND DEPTH TO STABLE SUBGRADE. MINIMUM STRUCTURE DIMENSIONS SHALL BE +/- 0.5'.

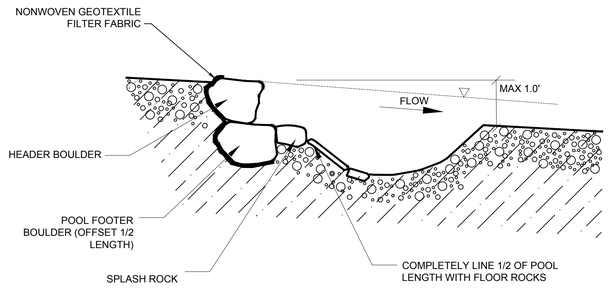
CROSS VANE MATERIAL DIMENSIONS

STRUCTURE SIZE TABLE		A	B	C
CROSS VANE STRUCTURES	HEADER BOULDER/ VANE ARMS	4'	3'	2'
	FOOTER BOULDER	4'	3'	2'
	SPLASH ROCKS	3'	2'	2'
	FLOOR ROCKS	RIFFLE SUBSTRATE MIX		

NOTES:
ASSUMED ROCK DENSITY 165 LB/FT³

STRUCTURE STONE IS TO BE OF IGNEOUS OR METAMORPHIC ORIGIN, UNLESS APPROVED BY THE TOWN OF VIENNA'S FIELD ENGINEER OR QUALIFIED REPRESENTATIVE.

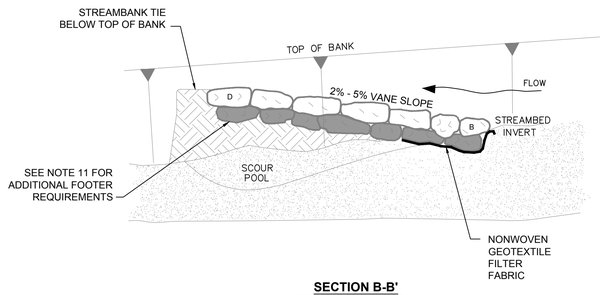
FOOTER STONES SHALL HAVE A MINIMUM OF ONE (1) CONTACT POINT WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN HEADER STONES. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.



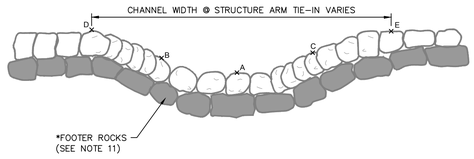
PROFILE THROUGH CENTER OF CROSS VANE

ROCK CROSS VANE
PROFILE A - A'

NOT TO SCALE



SECTION B-B'
PROFILE OF VANE ARM



SECTION C-C'
CROSS SECTION THROUGH CENTER OF CROSS VANE

ROCK CROSS VANE
CROSS SECTION B - B' AND C - C'

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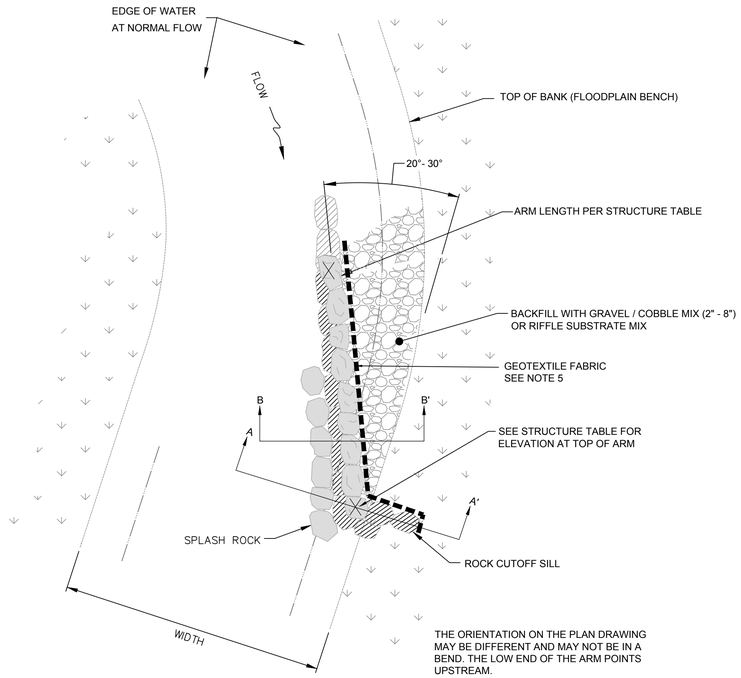
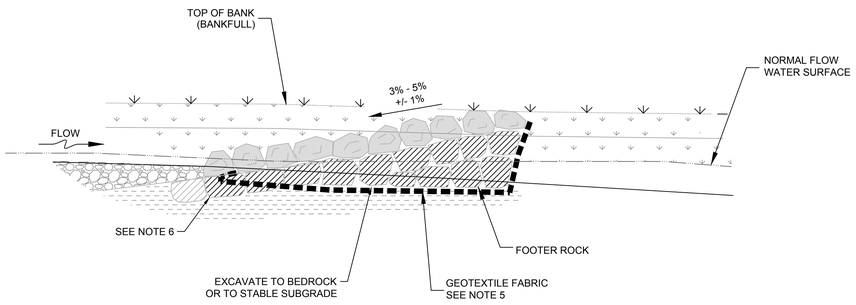
DWG. SIZE: ARCH D
SHEET NUMBER: 10 OF 18



ROCK VANE
PLAN

NOT TO SCALE



ROCK VANE
PROFILE A - A'

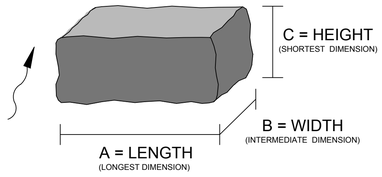
NOT TO SCALE

ROCK VANE
NOTES

1. PROVIDE A RANGE OF ROCK SIZES FOR FLEXIBILITY TO MEET DESIGN GRADES & LINES. AT LEAST 80% OF THE ROCK SHALL MEET OR EXCEED THE AVERAGE SIZE ROCK REQUIREMENTS; UP TO 15% OF ROCK MAY BE IN THE MINIMUM TO AVERAGE SIZE CATEGORY; AND 5% MAY BE SMALLER FRAGMENTS FOR CHINKING USE.
2. SMALLER HEIGHT ROCKS ARE REQUIRED TO TAPER STRUCTURES AT APEX ON BEDROCK. FOOTER ROCKS SHALL MEET STRUCTURE ROCK REQUIREMENTS.
3. FOR MAIN STRUCTURE ROCK, SILL, AND FOOTER ROCK, THE ROCK SOURCE SHALL BE FROM AN ACCEPTABLE WVDOH QUARRY OR FROM ENGINEER APPROVED SOURCE.
4. ON-SITE COBBLE AND BOULDERS MAY BE USED TO FILL VOIDS AND FOR SPLASH ROCKS, BUT NOT FOR USE AS ANY MAIN STRUCTURE ROCK, UNLESS APPROVED BY ON-SITE ENGINEER.
5. USE NON-WOVEN GEOTEXTILE FABRIC AS DESCRIBED IN THE SPECIFICATIONS. PLACE GEOTEXTILE BEHIND THE ARM (UPSTREAM SIDE), DRAPED FROM TOP OF ROCK STRUCTURE TO BOTTOM OF FOOTER ROCK AND EXTEND A MINIMUM OF HALF THE TRENCH BOTTOM WIDTH. TRIM EXCESS OR VISIBLE FABRIC. EXTEND GEOTEXTILE ALONG HALF OF THE SILL LENGTH.
6. ON BEDROCK STREAM BEDS , EXCAVATE POOL BEFORE INSTALLING STRUCTURE. EXCAVATION AND BACKFILL WORK RELATED TO THIS
7. IF BEDROCK IS PRESENT DIRECTLY BELOW SURFACE BOULDER, FOOTING MAY NOT BE NECESSARY. HOWEVER, BASED ON THE DEPTH TO BEDROCK, ADDITIONAL FOOTER BOULDERS MAY BE REQUIRED IN ORDER TO SEAT FOOTERS ON BEDROCK. CHIP BEDROCK 0.5' FOR PLACEMENT AND SEAT FOOTER BOULDERS IN BEDROCK AT THE DIRECTION OF THE FIELD ENGINEER. IF BEDROCK IS NOT ENCOUNTERED, ADDITIONAL FOOTER BOULDERS MAY BE REQUIRED. IN THIS CASE THE ADDITIONAL TIER OF FOOTER BOULDERS SHALL EXTEND BELOW THE MAX SCOUR DEPTH (CHANNEL INVERT).

ROCK VANE MATERIAL DIMENSIONS

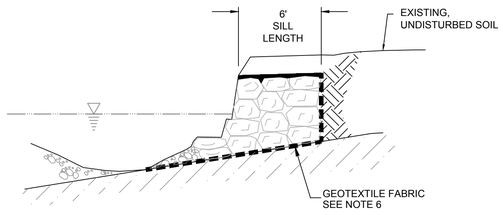
STRUCTURE SIZE TABLE		A	B	C
STRUCTURES	HEADER ROCKS	4'	3'	2'
	FOOTER ROCKS	4'	3'	2'

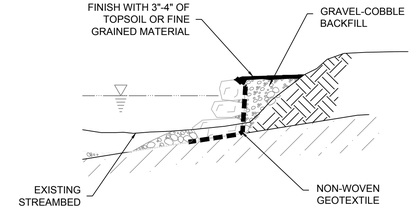


NOTES:
ASSUMED ROCK DENSITY 165 LB/FT³

FOOTER STONES SHALL HAVE A MINIMUM OF ONE (1) CONTACT POINT WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN HEADER STONES. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.

NOTE:
BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT THE FUTURE SETTLEMENT IS KEPT TO A MINIMUM. BEFORE PLACEMENT OF BACKFILL, CHANNEL SHALL BE EXCAVATED TO A STABLE SUBGRADE (APPROVED BY TOWN OF VIENNA ON-SITE ENGINEER). FOOTER BOULDERS MUST HAVE AT LEAST ONE CONTACT POINT WITH HEADER BOULDERS, AND MAY BE MORE ROUNDED THAN HEADER. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONE DEPENDING UPON HEADER BOULDER SIZE AND DEPTH TO STABLE SUBGRADE. MINIMUM STRUCTURE DIMENSIONS SHALL BE +/- 0.5'.





ROCK VANE
CROSS SECTION B - B'

NOT TO SCALE

NOT FOR CONSTRUCTION

TOWN OF VIENNA since 1890

NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.

CLIENT: TOWN OF VIENNA
127 CENTER STREET SOUTH
VIENNA, VA 22180

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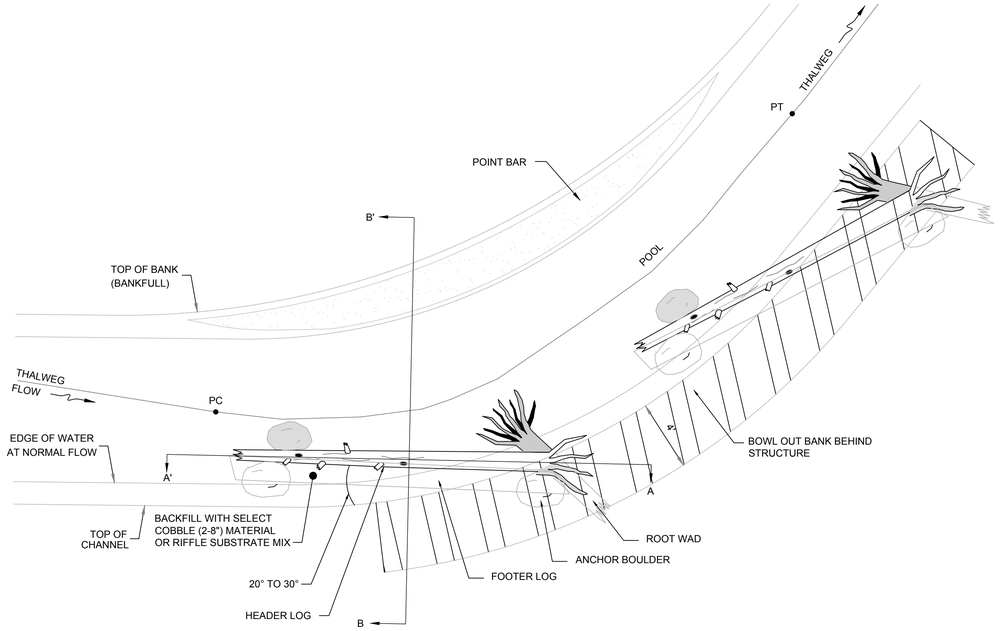
DRAWN BY: AA / MJH
CHECKED BY: MJH
APPROVED BY: MTB
SCALE: NOT TO SCALE

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS
ROCK VANE DETAILS

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 11 OF 18

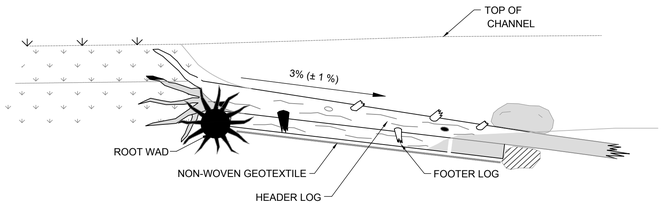


LOG VANE
NOTES

1. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE $\frac{1}{4}$ DIAMETER FROM THE TOP OF THE LOG. THE NAILS SHALL BE ON 12IN CENTERS. FILTER FABRIC SHALL BE BURIED IN THE BOTTOM OF THE CHANNEL AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
2. A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE ANCHOR BOULDERS ARE BURIED BENEATH THE BED SURFACE ELEVATION.
3. A HYDRAULIC EXCAVATOR WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB SHALL BE USED TO PLACE BOULDERS AND LOGS WITH THE SUPERVISION OF THE ENGINEER
4. HEADER AND FOOTER LOGS SHALL BE A MINIMUM OF 18-24 IN. IN DIAMETER WITH A LENGTH OF 30 FT. THE HEADER LOG SHALL BE SET IN PLACE FIRST WITH THE FOOTER LOG UNDERNEATH AND BEHIND THE HEADER LOG PRIOR TO BACKFILLING THE TRENCH
5. 1/3 OF THE WAY ACROSS THE CHANNEL FROM THE OUTSIDE BANK THE HEADER ROCK SHALL BE PLACED AT 2 IN. ABOVE THE CHANNEL INVERT ELEVATION
6. EXCAVATE POOL TO A MINIMUM DEPTH OF 3 FEET BELOW EXISTING STREAMBED. IF BEDROCK IS ENCOUNTERED BEFORE REACHING THE MINIMUM DEPTH, THE EXCAVATION MAY STOP AT BEDROCK. EXCAVATED MATERIAL MAY BE USED FOR BACKFILLING ALONG THE LOG VANE.
7. SEED, MULCH, AND RESTORE DISTURBED AREAS TO PRE-EXISTING CONDITIONS OR BETTER. PROVIDE PLANTINGS AS REQUIRED BY PLANTING PLAN, IF PROVIDED.
8. ANY SOIL DISTURBED DURING THE PLACEMENT OF LOG VANES, SHALL BE SEEDED USING TEMPORARY AND PERMANENT SEEDING METHODS.
9. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE VANE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
10. THE GAP BETWEEN THE HEADER AND FOOTER LOG SHALL BE CHINKED BY HAND WITH GRAVEL COBBLE AND WOODY DEBRIS FROM THE UPSTREAM DIRECTION.
11. THE HORIZONTAL ANGLE OF THE HEADER LOG OF THE VANE AND THE BANK SHALL BE BETWEEN 20-30 DEGREES
12. SELECT GRAVE MATERIAL CAN BE HARVESTED FROM SPOIL PILES ON SITE BUT SHOULD HAVE A GRADATION APPROVED BY THE FIELD ENGINEER.
13. THE ROOTWAD SHALL BE A MINIMUM OF 6.5 FT IN LENGTH, WITH A ROOT FAN WITH A DIAMETER OF AT LEAST 3 FT. AND A DIAMETER OF 18IN - 24"IN.
14. STRUCTURE INVERT ELEVATION SHALL BE THE SAME ELEVATION AS THE RIFFLE IMMEDIATELY DOWNSTREAM OF THE STRUCTURE IN THE PLAN VIEW.

LOG VANE
PLAN

NOT TO SCALE

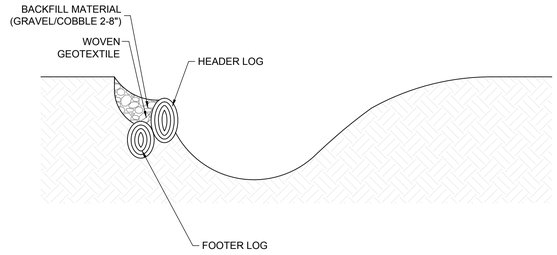


LOG VANE DIMENSIONS

STRUCTURE SIZE TABLE		A	B	C
ROCK	HEADER BOULDER/ VANE ARMS	4'	3'	2'
	FOOTER BOULDER	4'	3'	2'
LOGS	MIN DIAMETER = 2' MIN LENGTH = 23'			

NOTES:
ASSUMED ROCK DENSITY 165 LB/FT³

FOOTER STONES SHALL HAVE A MINIMUM OF ONE (1) CONTACT POINT WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN HEADER STONES. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.



NOTE:
FOOTER STONES SHALL HAVE A MINIMUM OF ONE (1) CONTACT POINT WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN HEADER STONES. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.

LOG VANE
PROFILE A - A'

NOT TO SCALE

LOG VANE
CROSS SECTION B - B'

NOT TO SCALE

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TOWN OF VIENNA since 1890

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wood.

DRAWN BY: AA / MJH
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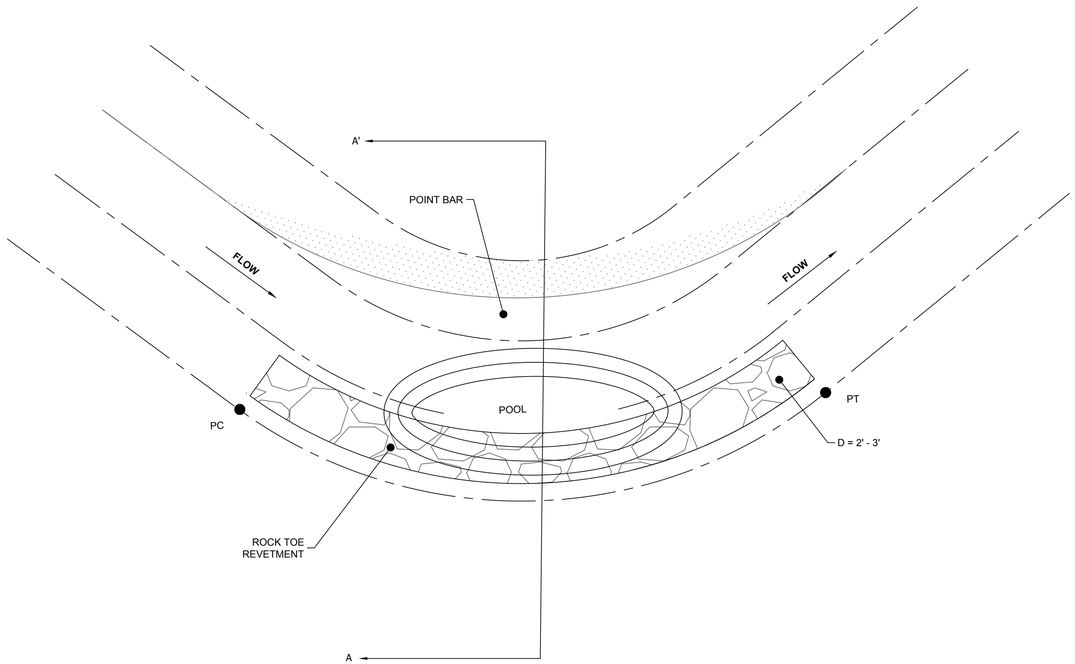
APPROVED BY: MTB
SCALE: NOT TO SCALE

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

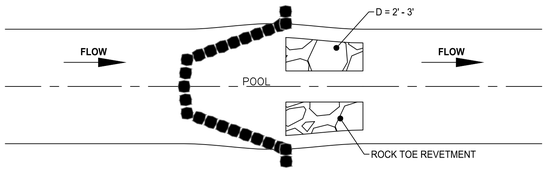
SHEET TITLE:
STREAM RESTORATION STRUCTURE DETAILS
LOG VANE DETAILS

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 12 OF 18



ROCK REVETMENT
PLAN - POOL IN BEND

NOT TO SCALE



ROCK REVETMENT
PLAN - STRAIGHT POOL

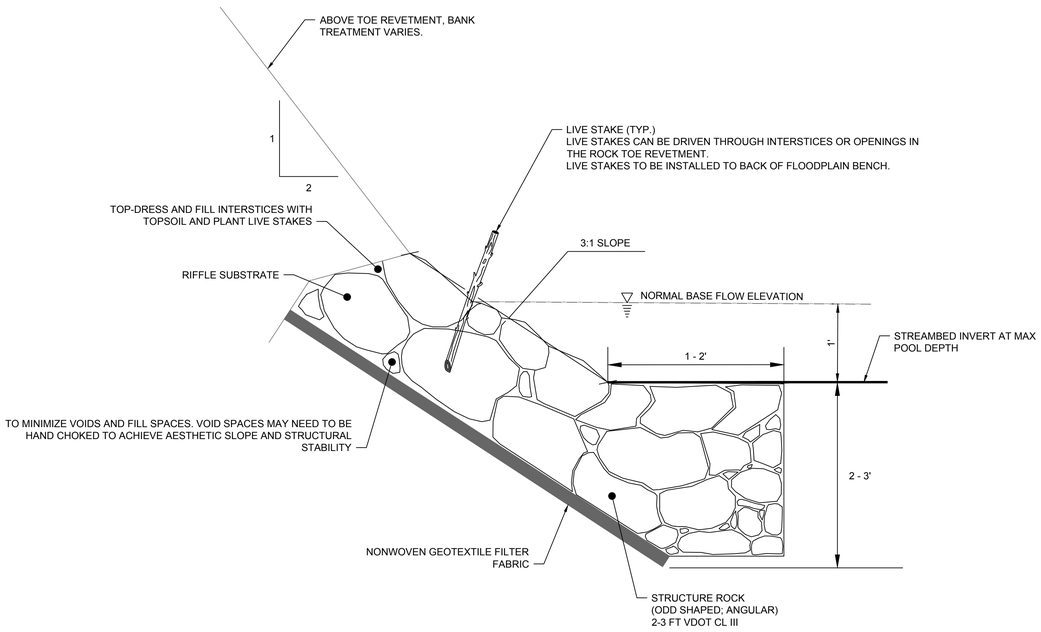
NOT TO SCALE

ROCK REVETMENT
NOTES

1. ALL STRUCTURE ROCK TOE SHALL BE VDOT CLASS III RIPRAP (LARGE ANGULAR ODD SHAPED) OR APPROVED BY THE ENGINEER BEFORE INSTALLATION.
2. ROCK TOE SHALL BE PLACED SUCH THAT MATERIALS LOCK TOGETHER.
3. SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
4. ASSUMED ROCK DENSITY = 165 LB/FT3.
5. IF BEDROCK IS ENCOUNTERED, SEAT FOOTER REVETMENT IN BEDROCK AT DIRECTION OF THE FIELD ENGINEER.
6. ROCK TOE REVETMENT TO BEGIN AT CROSS VANE ARM AND END AT PT (HEAD OF RIFFLE)
7. CONTRACTOR TO DIG 1" PILOT HOLES FOR PLACEMENT OF LIVE STAKES IN ROCK TOE REVETMENT.
8. CONTRACTOR TO INSTALL ROCK TOE REVETMENT TO A DEPTH 2-3' BELOW MAXIMUM POOL DEPTH INVERT THE ENTIRE LENGTH OF THE ROCK TOE REVETMENT.
9. IN STRAIGHT POOLS, ROCK TOES IS TO BE INSTALLED ALONG BOTH THE RIGHT AND LEFT BANKS. ROCK TOE INSTALLATION ALONG THE RIGHT BANK IS TO BE MIRROR IMAGE OF THE DETAIL SHOWN BELOW.

INSTALLATION GUIDELINES:

1. EXCAVATE A TRENCH ALONG THE TOE OF THE STREAMBANK TO 2-3 FT BELOW THE STREAMBED INVERT.
2. PLACE FILTER CLOTH ALONG THE BACKSIDE OF THE TRENCH. PLACE FILTER FABRIC LOOSELY AND EVENLY ON THE PREPARED SLOPE AND SECURED WITH STAKES ON 2 FOOT CENTERS. ADJACENT STRIPS SHOULD OVERLAP 12 INCHES AND BE STAPLED ON 12 INCH CENTERS. THE UPSTREAM OR UPSLOPE FILTER FABRIC SHOULD ALWAYS BE PLACED OVER THE DOWNSTREAM OR DOWNSLOPE FILTER FABRIC. IF THE FILTER FABRIC IS TORN OR DAMAGED, IT SHOULD BE REPAIRED OR REPLACED.
3. PLACE STRUCTURE ROCK STARTING IN THE BOTTOM OF THE TRENCH WORKING UP THE BANK. ROCK MAY HAVE TO BE HAND PLACED IN VOIDS TO ACHIEVE THE DESIRED RESULTS OF LOCKING THE REVETMENT.



ROCK REVETMENT
CROSS SECTION A - A'

NOT TO SCALE

NOT FOR CONSTRUCTION

TOWN OF VIENNA since 1890

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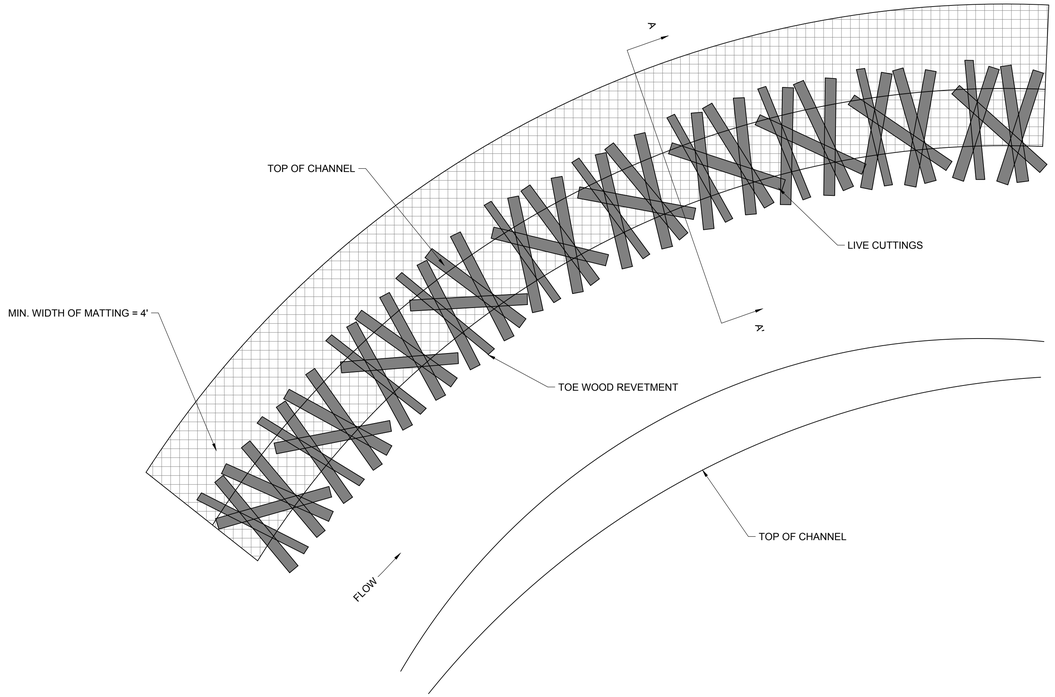
DRAWN BY: AA / MJH
CHECKED BY: MJH
APPROVED BY: MTB
SCALE: NOT TO SCALE

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

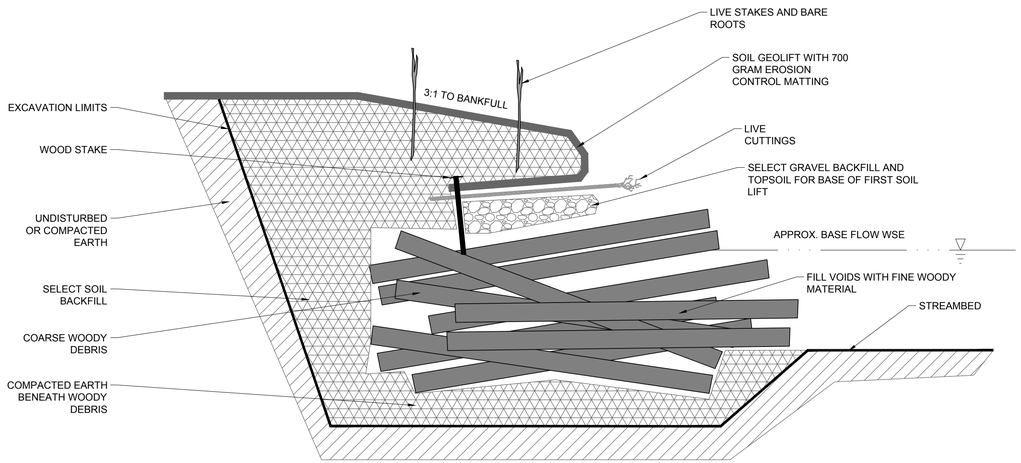
SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS
ROCK REVETMENT DETAILS

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 13 OF 18



TOE WOOD REVETMENT
PLAN

NOT TO SCALE



TOE WOOD REVETMENT
PROFILE - SECTION A - A'

NOT TO SCALE

TOE WOOD REVETMENT
NOTES

1. COARSE, WOODY DEBRIS SHALL CONSIST OF LOGS, ROOTWADS, AND LARGE BRANCHES NOT SUITABLE FOR CONSTRUCTION OF LOG STRUCTURES. ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER. COARSE WOODY DEBRIS SHALL BE CONSTRUCTED WITH THE LARGEST MATERIAL PLACED FIRST. NO LOGS SHALL BE PLACED PARALLEL TO THE FLOW OF WATER, UNLESS DIRECTED BY THE ENGINEER. LOGS SHALL BE PLACED IN A CROSSING PATTERN OR WEAVE SUCH THAT EACH LOG IS ANCHORED BY ANOTHER LOG.
2. SMALL/FINE WOODY DEBRIS SHALL CONSIST OF MEDIUM TO SMALL LIMBS, BRANCHES, BUSHES, AND/OR LOGS. INVASIVE SPECIES SHALL NOT BE USED. SMALL/FINE WOODY DEBRIS SHALL BE PLACED ABOVE THE COARSE WOODY DEBRIS WITH THE LARGEST MATERIAL BEING PLACED FIRST AND THE SMALLEST MATERIAL PLACED LAST.
3. ALL WOODY DEBRIS SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET TO REDUCE THE PRESENCE OF VOIDS IN THE SMALL/FINE WOODY DEBRIS LAYER.
4. GRAVEL LEVELING BASE SHALL BE INSTALLED ABOVE THE HIGHEST ELEVATION OF THE WOODY DEBRIS BEFORE THE SOIL LIFTS ARE STARTED.
5. THE SOIL BACKFILL USED FOR LIFTS AND TOPSOIL USED FOR LAYERING WITH THE LIVE BRANCHES SHALL BE FREE OF ANY LARGE ROOTS OR WOODY DEBRIS AND SHALL GENERALLY BE FREE FROM ANY GRAVEL OR COBBLE MATERIAL.
6. SOIL BACKFILL SHALL BE COMPACTED SUCH THAT FUTURE SETTLING WILL BE KEPT TO A MINIMUM; YET, NOT SUCH THAT THE UNDERLYING BRUSH IS DISPLACED OR DAMAGED. THE TOP OF THE BACKFILL FOR THE FIRST LIFT SHALL BE SLOPED AT APPROXIMATELY 5% AWAY FROM THE STREAM.
7. PLACE A LAYER OF TOPSOIL AND LIVE BRANCHES ON THE GRAVEL LEVELING BASE SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE SOIL LIFT. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES OR APPROVED BY THE ENGINEER.
8. PLACE A LAYER OF 6.5 FEET WIDE 700 GRAM EROSION CONTROL MATTING, OR EQUIVALENT, ON TOP OF THE TOP SOIL AND LIVE BRANCHES SUCH THAT 2.5 FEET OF THE BLANKET WILL BE BURIED BELOW THE NEXT SOIL LIFT. ALLOW THE REMAINING 4.5 FEET OF BLANKET TO HANG OVER THE GRAVEL LEVELING BASE.
9. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 8 INCHES, BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED.
10. TOP DRESS THE SOIL LIFT WITH TOPSOIL FROM THE FACE OF THE SOIL LIFT BACK INTO THE FLOODPLAIN AT LEAST 4 FT.
11. THE EROSION CONTROL FABRIC SHALL BE PULLED AS TIGHT AS POSSIBLE WITHOUT TEARING OR EXCESSIVELY DISTORTING THE FABRIC. SECURE THE EROSION CONTROL AND NON-WOVEN MATTING IN PLACE BY STAKING THE END OF THE EROSION CONTROL FABRIC WITH WOODEN STAKES ON 1.5-FOOT CENTERS.
12. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1-FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE ENGINEER.
13. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
14. COIR LOG TOE PROTECTION MAY BE USED AS ALTERNATIVE BANK REVETMENT WHERE TOE WOOD IS NOT FEASIBLE DUE TO FIELD CONDITIONS.
15. WHERE SHOWN ON THE DRAWINGS, TOE WOOD MAY BE PLACED ON STRAIGHT POOL SECTIONS, AND THE REVETMENT WOULD BE PLACED ON BOTH THE LEFT AND RIGHT BANKS.

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60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
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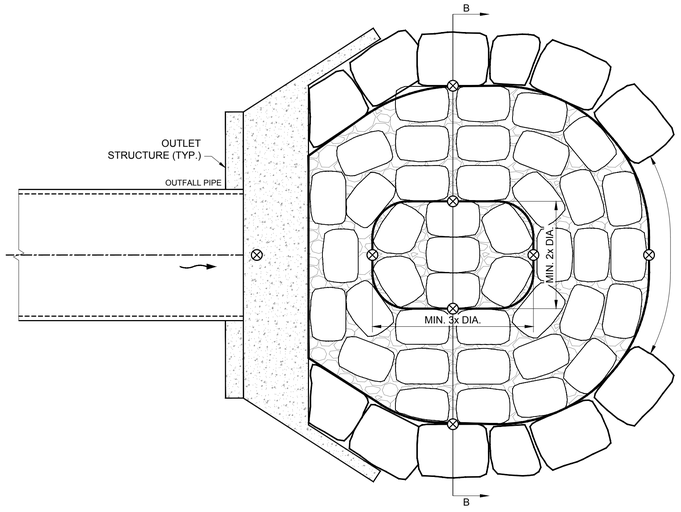
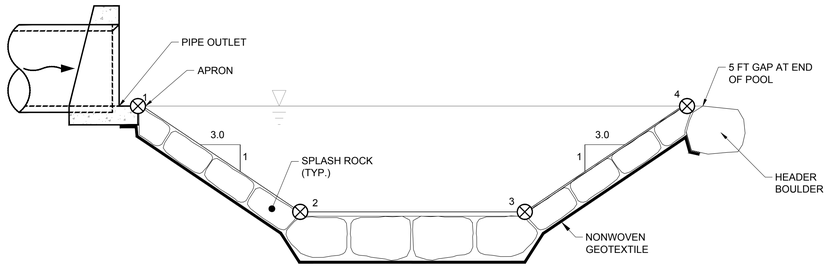
SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS
TOE WOOD DETAIL

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 14 OF 18



PLUNGE POOL
PLAN

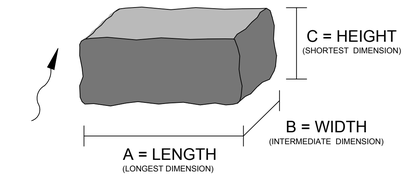


PLUNGE POOL
PROFILE (A - A')

NOT TO SCALE

PLUNGE POOL
NOTES

1. FOR PLUNGE POOL BELOW CULVERT, THERE ARE TO BE NO MAJOR GAPS AND SPLASH ROCKS SHALL TOUCH. INTERSTITIAL SPACE OR SMALLER GAPS SHALL BE FILLED WITH VDOT GABION AND EXISTING STREAM BED MATERIAL.
2. CONSTRUCT A 3 FOOT WIDE BENCH AROUND THE PERIMETER OF THE PLUNGE POOL WITH HEADER BOULDERS.
3. IF AREA UNDER EXISTING CONCRETE APRON HAS BEEN UNDERMINED, CONTRACTOR SHALL PLACE SPLASH ROCKS, VDOT GABION, AND EXISTING STREAM BED MATERIAL TO FILL AREA BEFORE SPLASH ROCKS ARE PLACED SLOPING TOWARDS CENTER OF POOL.
4. DETAIL REPRESENTS GENERAL SCHEMATICS OF THE PLUNGE POOL AND STRUCTURE STONES. DETAILS DO NOT REPRESENT ACTUAL AMOUNTS OF STRUCTURE STONE REQUIRED TO BUILD STRUCTURES.



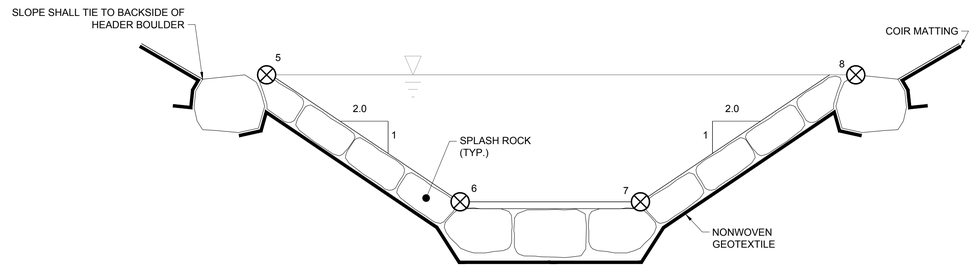
NOTE:
BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT THE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM. MINIMUM STRUCTURE DIMENSIONS SHALL BE +/- 0.5'.

PLUNGE POOL DIMENSIONS

STRUCTURE SIZE TABLE		A	B	C
STRUCTURES	HEADER BOULDER	4'	3'	2'
	SPLASH ROCKS	3'	2'	2'

NOTES:
ASSUMED ROCK DENSITY 165 LB/FT³

FOOTER STONES SHALL HAVE A MINIMUM OF ONE (1) CONTACT POINT WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN HEADER STONES. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.



PLUNGE POOL
CROSS SECTION (B - B')

NOT TO SCALE

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TOWN OF VIENNA since 1890

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VIENNA, VA 22180

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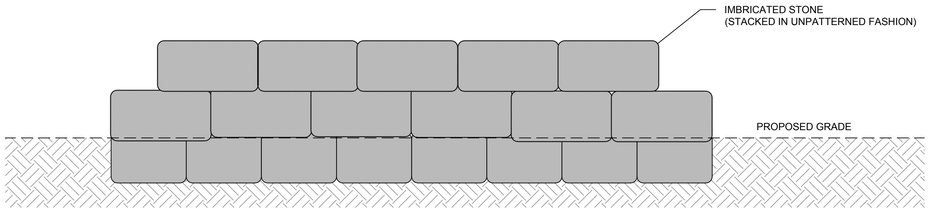
DRAWN BY: AA / MJH
CHECKED BY: MJH
APPROVED BY: MTB
SCALE: NOT TO SCALE

PROJECT: HUNTERS BRANCH STREAM RESTORATION
60% CONCEPT DESIGN ALTERNATIVE
VIRGINIA CENTER BLVD
VIENNA, VA 22181

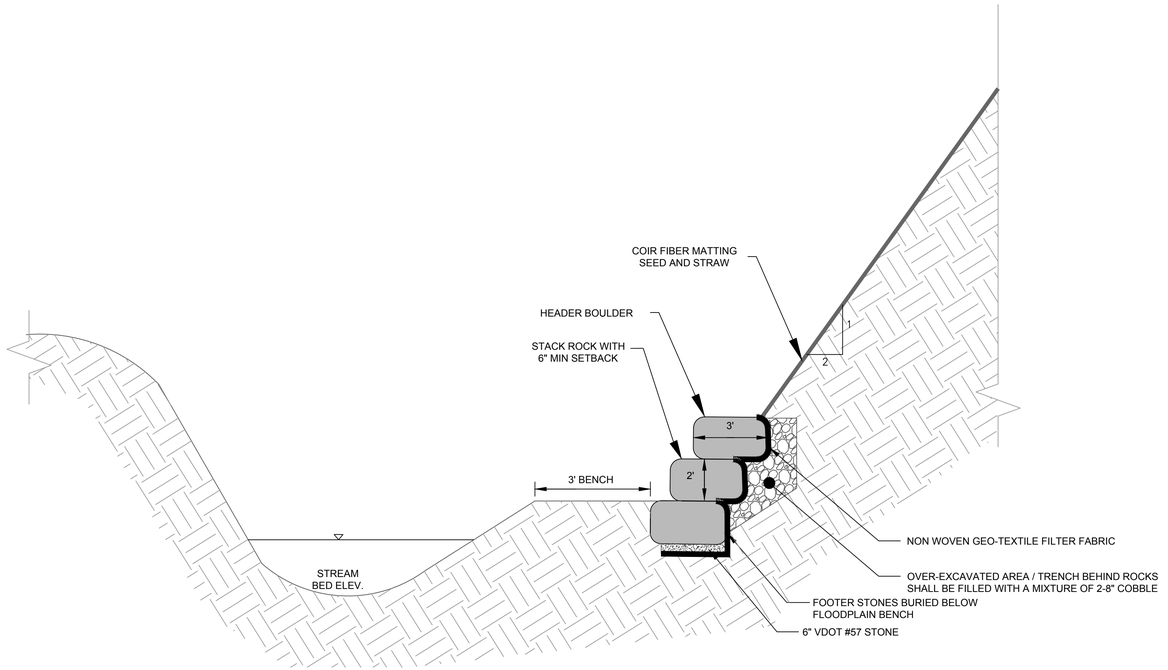
SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS
PLUNGE POOL DETAILS

PROJECT NO.: 566380027
DATE: 17 JANUARY 2020
DWG. SIZE: ARCH D
SHEET NUMBER: 15 OF 18



IMBRICATED STACKED STONE WALL PROFILE

NOT TO SCALE



IMBRICATED STACKED STONE WALL PROFILE (A - A')

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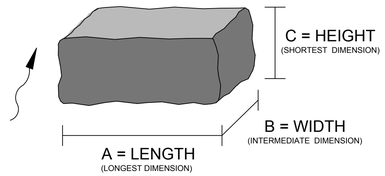
IMBRICATED STACKED STONE WALL NOTES

1. ALL BOULDERS ARE TO BE STRUCTURE STONE. STRUCTURE STONE IS BLOCK LIKE, CUBICAL, OR STRAIGHT EDGED BOULDERS. STRUCTURE STONE SHALL CONSIST OF ANGULAR ROCK, FLAT ON TWO SIDES, CAPABLE OF BEING LAIN IN AN IMBRICATED MANNER. STRUCTURE STONE SIZE SHALL BE AS SPECIFIED IN THE STRUCTURE STONE SIZE TABLE.
2. GAPS BETWEEN STRUCTURE STONE SHALL BE MINIMIZED BY FITTING STRUCTURE STONE TOGETHER AND PLUGGING WITH CHINKING STONE 2-8" COBBLE APPROVED BY THE TOWN OF VIENNA PROJECT MANAGER AND LINKING WITH FILTER FABRIC. GAPS BETWEEN STRUCTURE STONE SHALL BE ELIMINATED BY PLACING THE STONES SO THAT EACH STRUCTURE STONE ABUTS ANOTHER STRUCTURE STONE. ANY VOIDS BETWEEN STRUCTURE STONES SHALL BE FILLED WITH 2-8" COBBLE APPROVED BY THE FIELD ENGINEER.
3. THE CONTRACTOR WILL BE REQUIRED TO FIT STRUCTURE ROCKS TIGHTLY TOGETHER IN ORDER TO MINIMIZE VOID SPACES BETWEEN THE STRUCTURE ROCKS.
4. FILTER FABRIC SHALL BE PLACED ON THE BACKSIDE SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH VOIDS. FILTER FABRIC SHALL BE INSTALLED A MINIMUM OF ONE FOOT UNDERNEATH THE FOOTER STONE AND EXTEND FROM THE BOTTOM OF THE HEADER STONE TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED ALONG THE ENTIRE LENGTH OF THE STRUCTURE.
5. THE TRENCH BEHIND THE TOP OF ROCKS SHALL BE BACKFILLED WITH 2-8" COBBLE.
6. THE IMBRICATED STONE SHALL BE STACKED IN A WALL LIKE FASHION IN UNPATTERNED FASHION, STAGGERING THE JOINTS.
7. THE TOWN OF VIENNA PROJECT MANAGER SHALL INSPECT AND APPROVE BOULDER, COBBLE, AND GRAVEL MATERIAL BEFORE IT IS PLACED.
8. MINI-VANE ARMS CONSTRUCTED IN CASCADE RIFFLES SHALL TIE INTO THE IMBRICATED STACKED STONE WALL.



IMBRICATED STACKED STONE WALL MATERIAL

STRUCTURE SIZE TABLE		A	B	C
STRUCTURES	HEADER BOULDER	4'	3'	2'
STRUCTURES	FOOTER BOULDER	4'	3'	2'

NOTES:
ASSUMED ROCK DENSITY 165 LB/FT³

FOOTER STONES SHALL HAVE A MINIMUM OF ONE (1) CONTACT POINT WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN HEADER STONES. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.

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IMBRICATED WALL DETAILS

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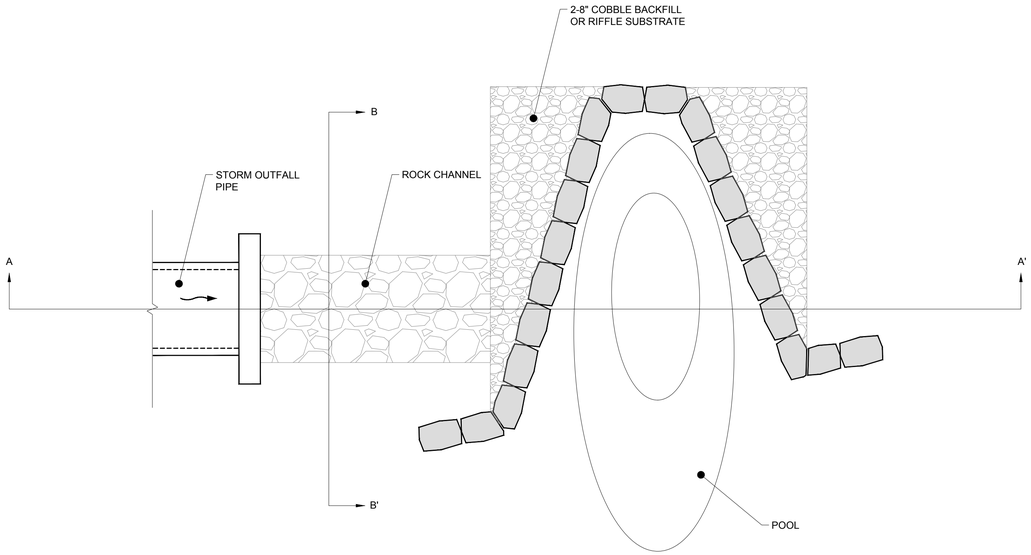

ROCK CHANNEL STORM SEWER OUTFALLS
PLAN

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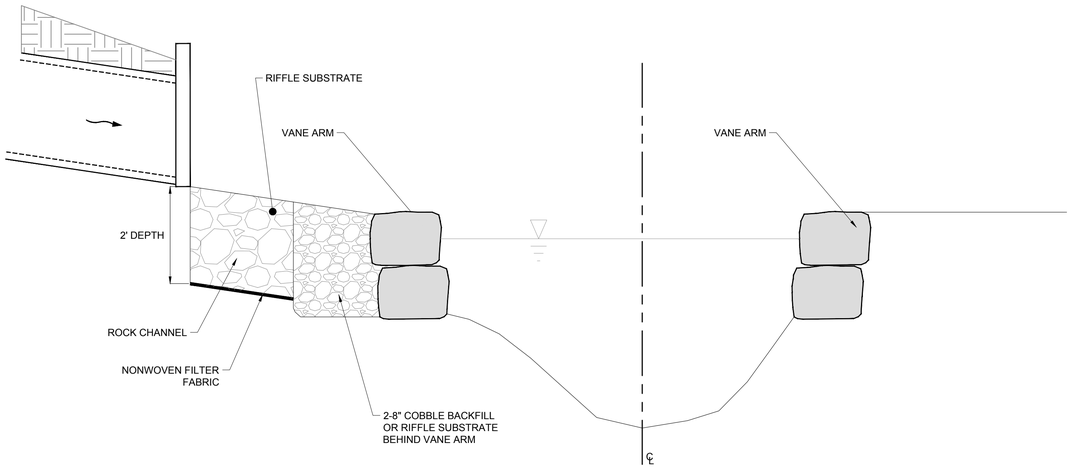
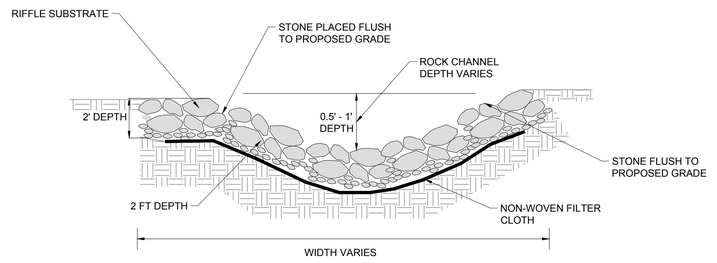


ROCK CHANNEL STORM SEWER OUTFALLS
PROFILE (A - A')

NOT TO SCALE

ROCK CHANNEL STORM SEWER OUTFALLS
NOTES

1. THE ROCK CHANNEL SHALL EXTEND FROM THE STORM SEWER OUTFALL AND CARRIED AND BLENDED INTO THE BACKFILL BETWEEN THE VANE ARM AND STREAM BANK.
2. CONTRACTOR SHALL FORM DEPRESSIONAL SWALE FROM OUTFALL PIPE TO VANE ARM.



ROCK CHANNEL STORM SEWER OUTFALLS
CROSS SECTION (B - B')

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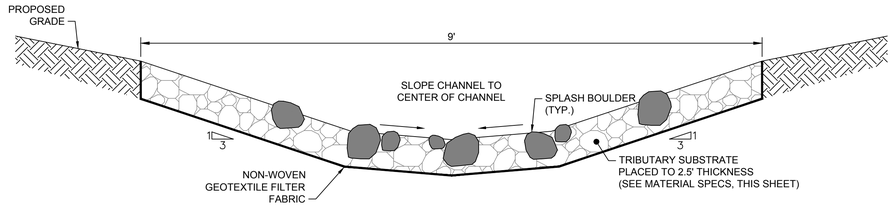

TRIBUTARY CROSS SECTION

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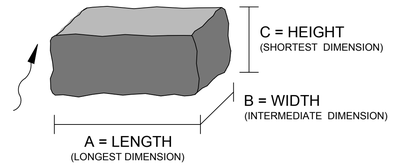
ROCK CHANNEL TRIBUTARIES

NOTES

1. CONTRACTOR SHALL PLACE VDOT CLASS III RIPRAP AND TRIBUTARY SUBSTRATE (A MIXTURE OF VDOT CLASS I RIPRAP, GABION STONE, AND EXISTING STREAM BED MATERIAL) TO FORM THE TYPICAL CHANNEL SECTIONS.
2. CONTRACTOR TO ARRANGE SPLASH BOULDERS ALONG CHANNEL SURFACE TO CREATE UNDULATING AND TURBULENT EFFECTS.
3. SPLASH BOULDERS ARE TO BE PLACED TOWARDS THE CENTER OF THE CHANNEL AND SHOULD PROTRUDE NO MORE THAN SIX (6) INCHES ABOVE THE FINISH SURFACE OF THE BED.
4. CONTRACTOR SHALL ENSURE SECTION IS SLOPED TOWARDS THE CENTER OF CHANNEL.
5. FOR INSTALLATION, CONTRACTOR SHALL OVER EXCAVATE THE LENGTH OF THE TRIBUTARY CHANNELS AND INSTALL 80LB NON WOVEN GEOTEXTILE FILTER FABRIC.



STRUCTURE SIZE TABLE	
SPLASH BOULDERS	VDOT CLASS III RIPRAP
CHANNEL BED MATERIAL SPECS	
TRIBUTARY SUBSTRATE	EQUAL PARTS: VDOT CLASS I RIPRAP VDOT CLASS II RIPRAP GABION STONE SUPPLEMENTED WITH: EXISTING STREAM BED MATERIAL

NOTES:

BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT FUTURE SETTLEMENT IS KEPT TO A MINIMUM.

STRUCTURE DIMENSIONS SHALL BE +/- 0.5'.

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