

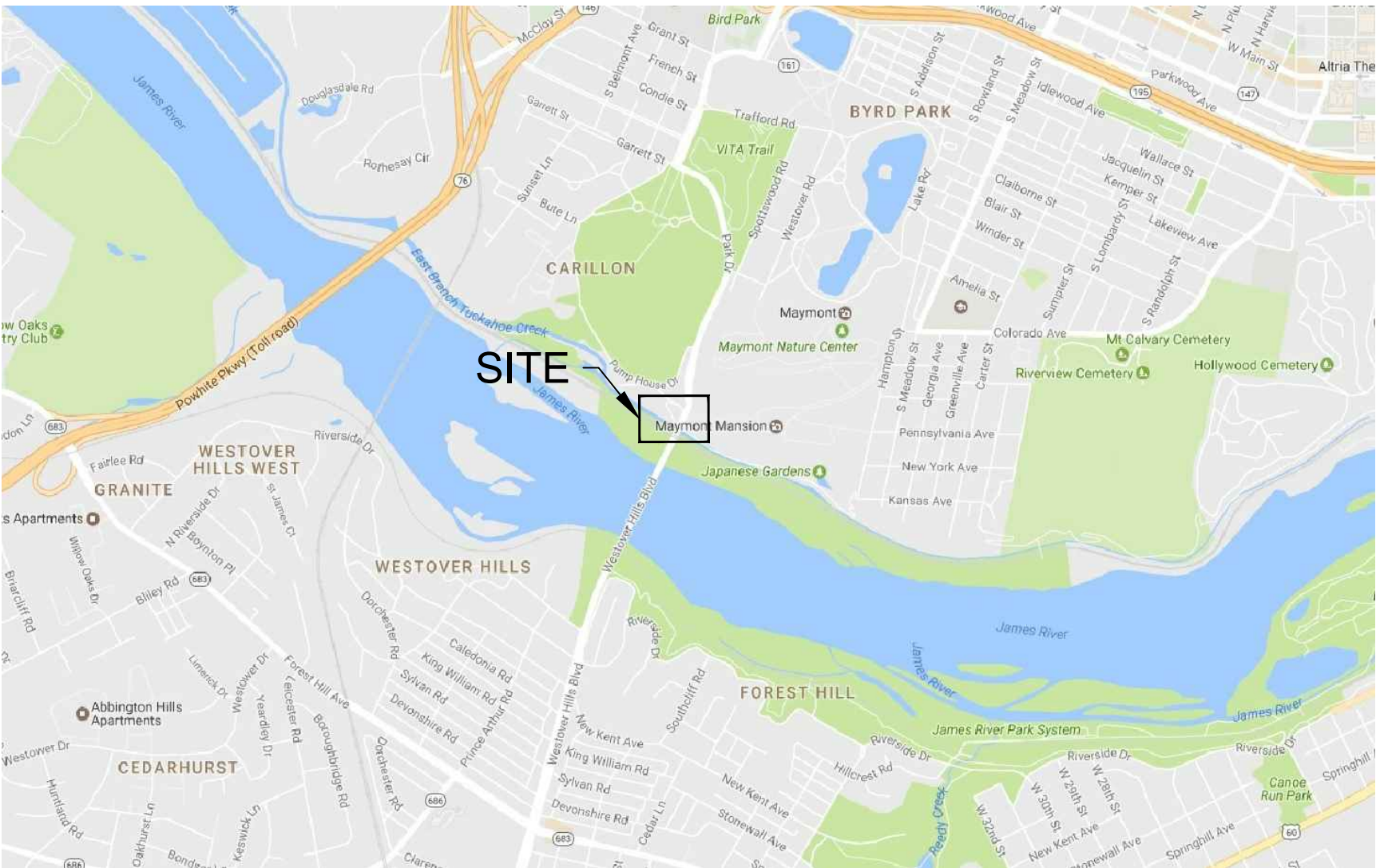
CITY OF RICHMOND, VIRGINIA
DEPARTMENT OF PARKS, RECREATION
AND COMMUNITY FACILITIES



PUMP HOUSE PARKING LOT TRAIL

INDEX OF SHEETS

Table with 2 columns: SHEET TITLE and SHEET NO.
Rows include: COVER SHEET (C0.0), EXISTING CONDITIONS AND DEMOLITION PLAN (C1.0), LAYOUT AND GRADING PLAN (C2.0), SITE NOTES AND DETAILS (C3.0), STORMWATER NOTES AND DETAILS (C3.1), STORMWATER MAPS AND CALCULATIONS (C4.0), SWALE CROSS-SECTIONS AND CALCULATIONS (C4.1), SWALE CROSS-SECTIONS AND CALCULATIONS (C4.2), PHASE I EROSION & SEDIMENT CONTROL PLAN (C5.0), PHASE II EROSION & SEDIMENT CONTROL PLAN (C5.1), EROSION & SEDIMENT CONTROL NOTES & DETAILS (C5.2)



VICINITY MAP

1"=2000'

OCTOBER 25, 2019

STORMWATER DRAINAGE QUANTITIES:

Table with 2 columns: Item and Quantity.
Rows: 12" DRAIN BASIN (1 EA), 12" HDPE PIPE (30 LF), 6" PERFORATED UNDERDRAIN (90 LF), 6" CLEANOUT (4 EA), DRAINAGE SWALE (390 LF)

EROSION & SEDIMENT CONTROL QUANTITIES:

Table with 2 columns: Item and Quantity.
Rows: LAND DISTURBANCE (0.52 AC), SILT FENCE (300 LF), SAFETY FENCE (200 LF), INLET PROTECTION (2 EA), DIVERSION (450 LF)

PERMITS REQUIRED:

- RICHMOND STORMWATER MANAGEMENT PERMIT

REVISIONS

Table with 3 columns: NO., DATE, COMMENTS. (Empty rows for revisions)

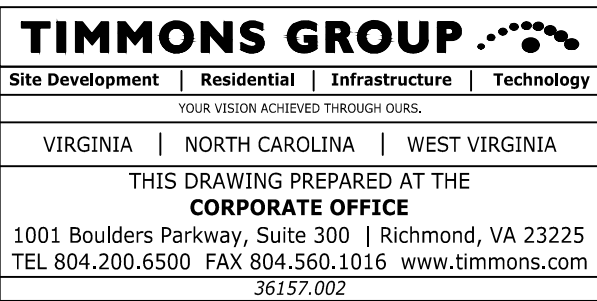
OWNER
RICHMOND METROPOLITAN AUTHORITY
901 E. BYRD STREET
RICHMOND, VA 23219
TELEPHONE: (804) 523-3320
CONTACT: THERESA SIMMONS
EMAIL: THERESA.SIMMONS@RMATAONLINE.ORG

OWNER
CITY OF RICHMOND DPU
600 E. BROAD STREET, ROOM 831
RICHMOND, VA 23219
TELEPHONE: (804) 646-6964
CONTACT: JONET PREVOST-WHITE
EMAIL: JONET.PREVOST-WHITE@RICHMONDGOV.COM

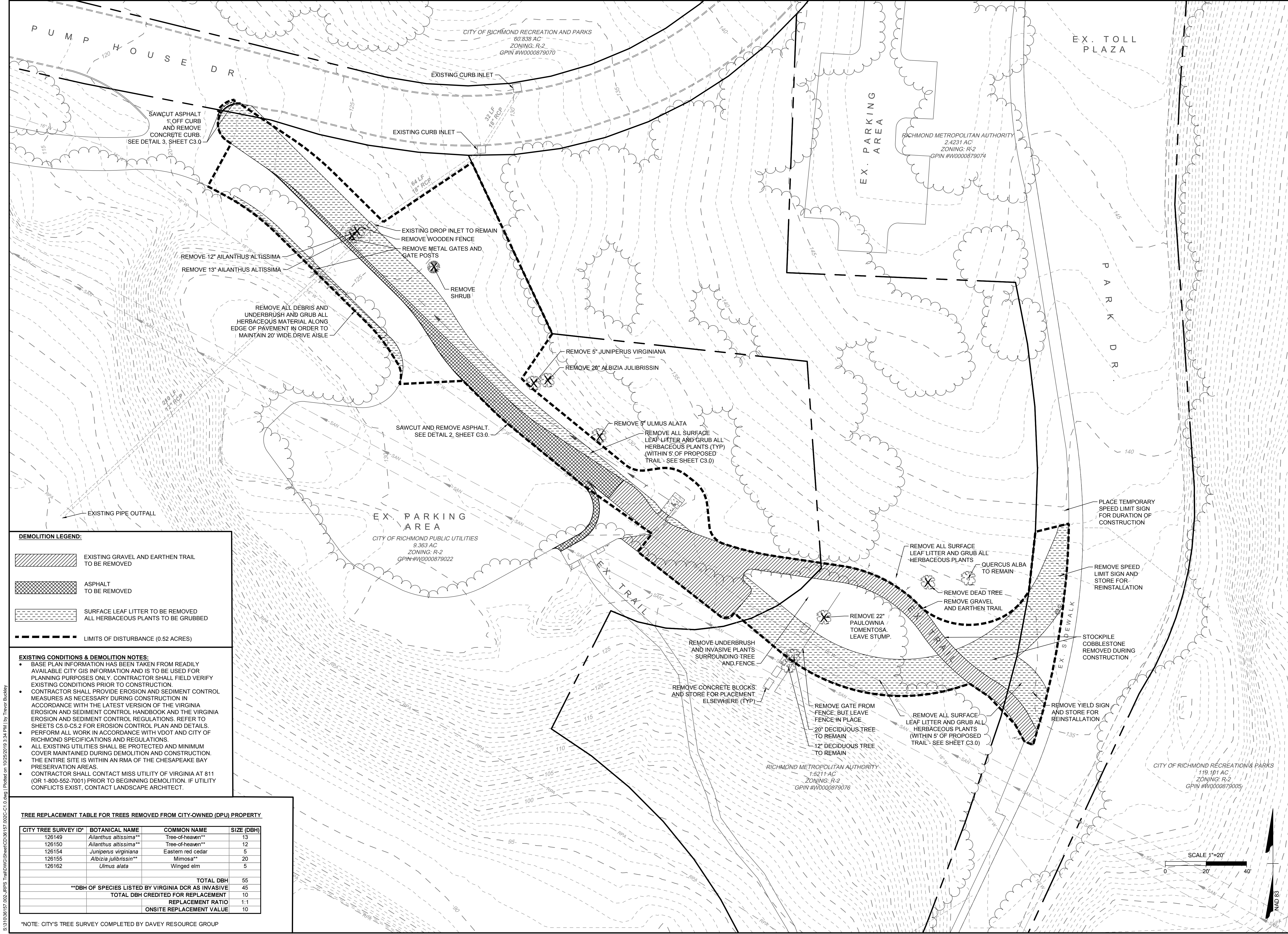
DEVELOPER
CITY OF RICHMOND DPRCF
4201 RIVERSIDE DRIVE
RICHMOND, VA 23225
TELEPHONE: (804) 201-5914
CONTACT: MICHAEL BURTON
EMAIL: MICHAEL.BURTON@RICHMONDGOV.COM

CIVIL ENGINEER
TIMMONS GROUP
1001 BOULDERS PARKWAY, SUITE 300
RICHMOND, VA 23225
TELEPHONE: (804) 200-6495
CONTACT: LEE ANN GUDORP, P.E.
EMAIL: LEEANN.GUDORP@TIMMONS.COM

LANDSCAPE ARCHITECT
TIMMONS GROUP
1001 BOULDERS PARKWAY, SUITE 300
RICHMOND, VA 23225
TELEPHONE: (804) 200-6424
CONTACT: SCOTT WILEY, PLA
EMAIL: SCOTT.WILEY@TIMMONS.COM



S:\31036157-002-JRPS Trail\DWG\Sheet\CD\36157-002C-C1.dwg [Printed on 10/25/2019 3:34 PM] by Trevor Buckley



CHECK SET
NOT FOR
CONSTRUCTION

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6300 FAX 804.580.1016 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

DATE

10/25/2019

DRAWN BY
T. BUCKLEY

DESIGNED BY
S. W./T. B.

CHECKED BY
S. WILEY

SCALE
1"=20'

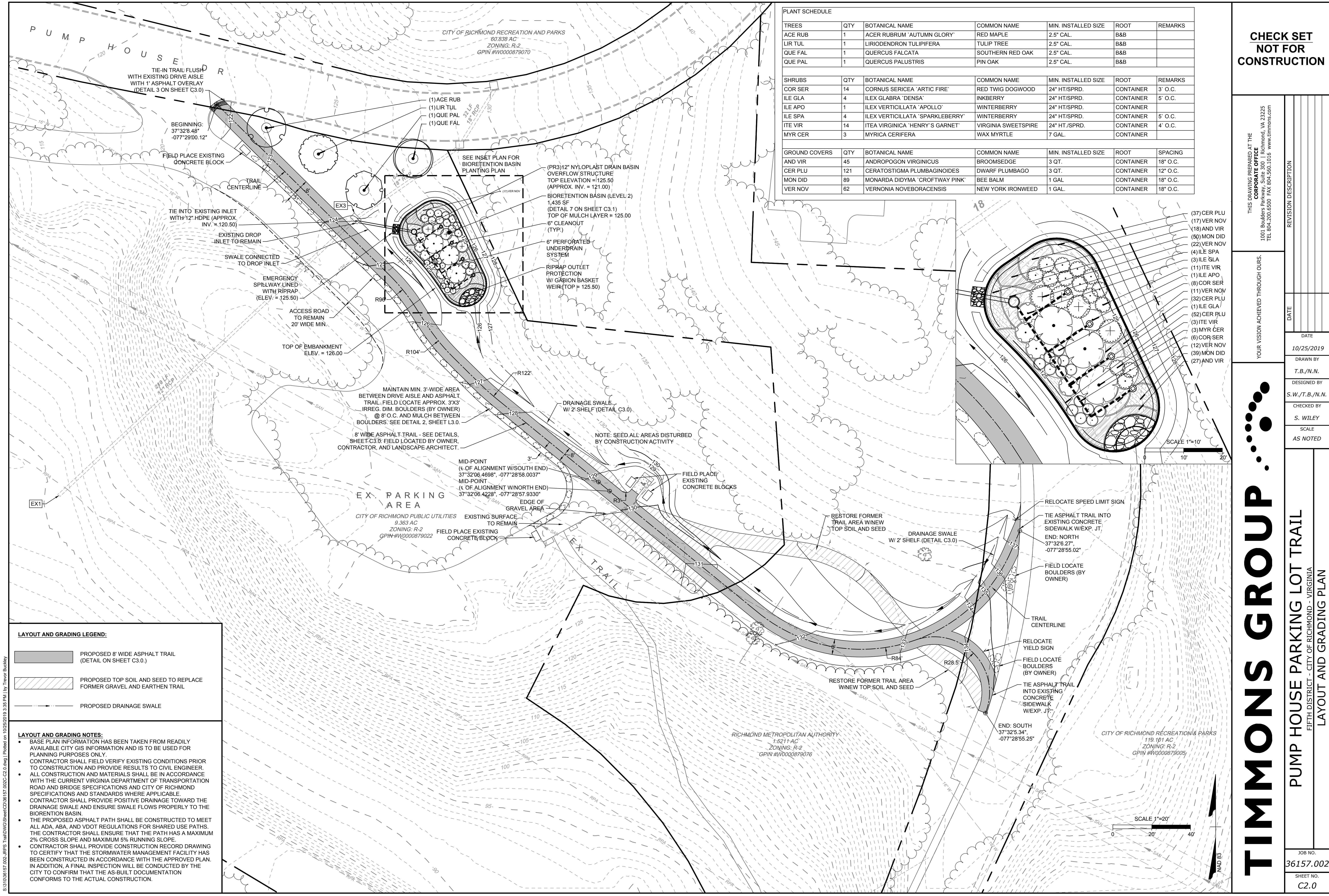
PUMP HOUSE PARKING LOT TRAIL
FIFTH DISTRICT - CITY OF RICHMOND - VIRGINIA
EXISTING CONDITIONS AND DEMOLITION PLAN

JOB NO.
36157.002

SHEET NO.
C1.0

TIMMONS GROUP

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.



PLANT SCHEDULE						
TREES	QTY	BOTANICAL NAME	COMMON NAME	MIN. INSTALLED SIZE	ROOT	REMARKS
ACE RUB	1	ACER RUBRUM 'AUTUMN GLORY'	RED MAPLE	2.5" CAL.	B&B	
LIR TUL	1	LIRIODENDRON TULIPIFERA	TULIP TREE	2.5" CAL.	B&B	
QUE FAL	1	QUERCUS FALCATA	SOUTHERN RED OAK	2.5" CAL.	B&B	
QUE PAL	1	QUERCUS PALUSTRIS	PIN OAK	2.5" CAL.	B&B	
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	MIN. INSTALLED SIZE	ROOT	REMARKS
COR SER	14	CORNUS SERICEA 'ARTIC FIRE'	RED TWIG DOGWOOD	24" HT/SPRD.	CONTAINER	3' O.C.
ILE GLA	4	ILEX GLABRA 'DENSE'	INKBERRY	24" HT/SPRD.	CONTAINER	5' O.C.
ILE APO	1	ILEX VERTICILLATA 'APOLLO'	WINTERBERRY	24" HT/SPRD.	CONTAINER	
ILE SPA	4	ILEX VERTICILLATA 'SPARKLEBERRY'	WINTERBERRY	24" HT/SPRD.	CONTAINER	5' O.C.
ITE VIR	14	ITEA VIRGINICA 'HENRY'S GARNET'	VIRGINIA SWEETSPIRE	24" HT/SPRD.	CONTAINER	4' O.C.
MYR CER	3	MYRICA CERIFERA	WAX MYRTLE	7 GAL.	CONTAINER	
GROUND COVERS	QTY	BOTANICAL NAME	COMMON NAME	MIN. INSTALLED SIZE	ROOT	SPACING
AND VIR	45	ANDROPOGON VIRGINICUS	BROOMEDGE	3 QT.	CONTAINER	18" O.C.
CER PLU	121	CERATOSTIGMA PLUMBAGINOIDES	DWARF PLUMBAGO	3 QT.	CONTAINER	12" O.C.
MON DID	89	MONARDA DIDYMA 'CROFTWAY PINK'	BEE BALM	1 GAL.	CONTAINER	18" O.C.
VER NOV	62	VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	1 GAL.	CONTAINER	18" O.C.

CHECK SET
NOT FOR
CONSTRUCTION

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.586.1016 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

DATE
10/25/2019
DRAWN BY
T.B./N.N.
DESIGNED BY
S.W./T.B./N.N.
CHECKED BY
S. WILEY
SCALE
AS NOTED

TIMMONS GROUP

PUMP HOUSE PARKING LOT TRAIL
FIFTH DISTRICT - CITY OF RICHMOND - VIRGINIA
LAYOUT AND GRADING PLAN

JOB NO.
36157.002
SHEET NO.
C2.0

LAYOUT AND GRADING LEGEND:

PROPOSED 8' WIDE ASPHALT TRAIL
(DETAIL ON SHEET C3.0.)

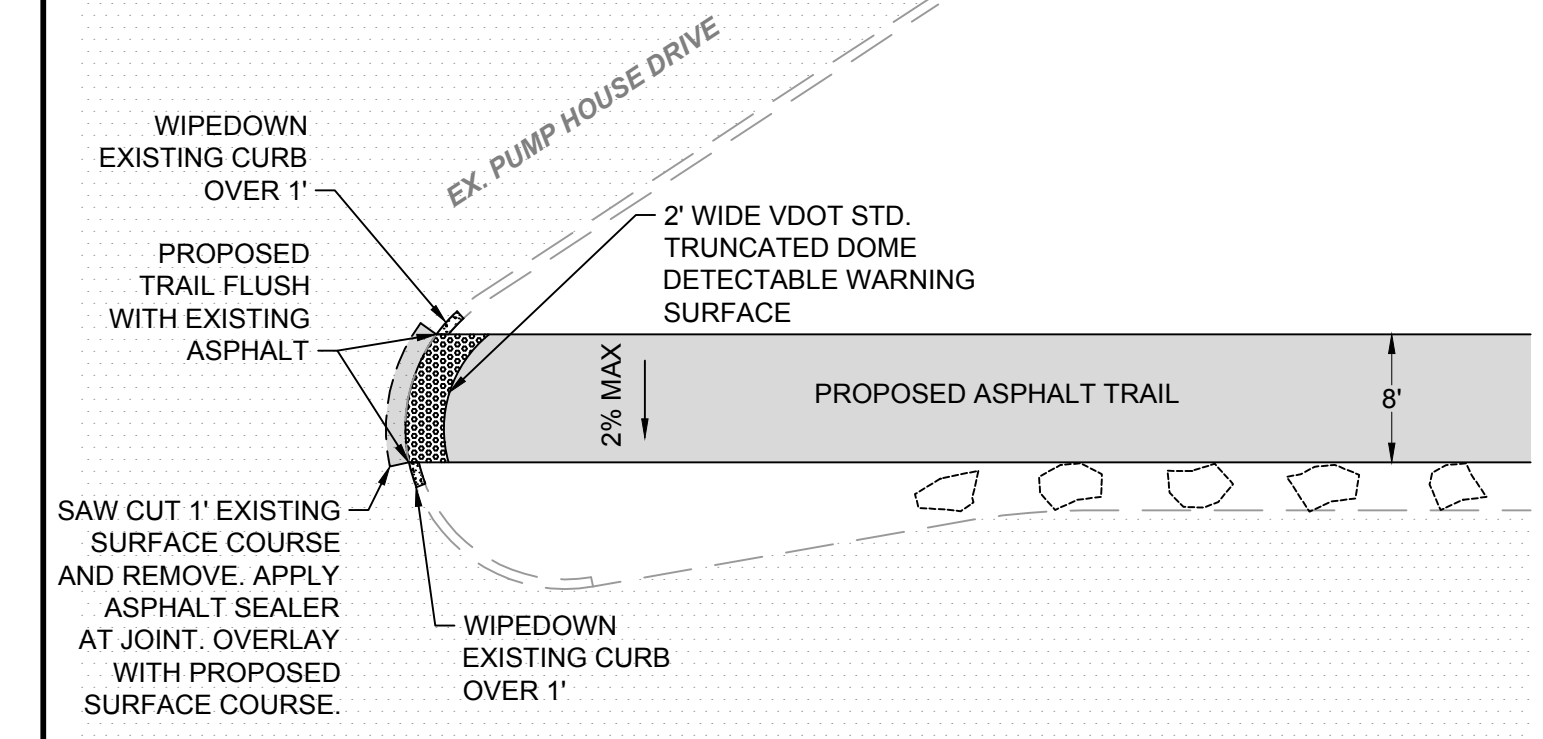
PROPOSED TOP SOIL AND SEED TO REPLACE
FORMER GRAVEL AND EARTHEN TRAIL

PROPOSED DRAINAGE SWALE

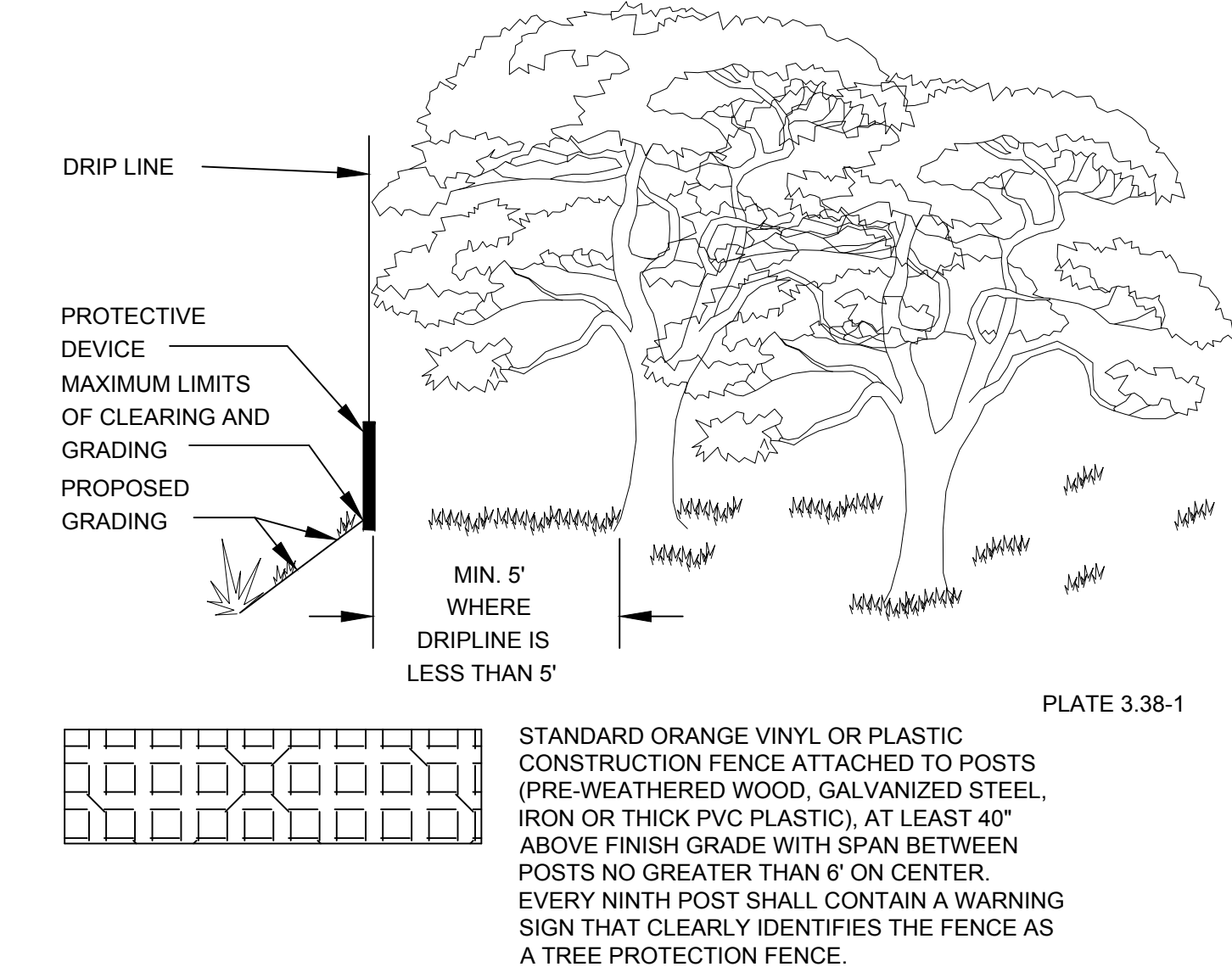
LAYOUT AND GRADING NOTES:

- BASE PLAN INFORMATION HAS BEEN TAKEN FROM READILY AVAILABLE CITY GIS INFORMATION AND IS TO BE USED FOR PLANNING PURPOSES ONLY.
- CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND PROVIDE RESULTS TO CIVIL ENGINEER.
- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS AND CITY OF RICHMOND SPECIFICATIONS AND STANDARDS WHERE APPLICABLE.
- CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE TOWARD THE DRAINAGE SWALE AND ENSURE SWALE FLOWS PROPERLY TO THE BIORETENTION BASIN.
- THE PROPOSED ASPHALT PATH SHALL BE CONSTRUCTED TO MEET ALL ADA, ABA, AND VDOT REGULATIONS FOR SHARED USE PATHS. THE CONTRACTOR SHALL ENSURE THAT THE PATH HAS A MAXIMUM 2% CROSS SLOPE AND MAXIMUM 5% RUNNING SLOPE.
- CONTRACTOR SHALL PROVIDE CONSTRUCTION RECORD DRAWING TO CERTIFY THAT THE STORMWATER MANAGEMENT FACILITY HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLAN. IN ADDITION, A FINAL INSPECTION WILL BE CONDUCTED BY THE CITY TO CONFIRM THAT THE AS-BUILT DOCUMENTATION CONFORMS TO THE ACTUAL CONSTRUCTION.

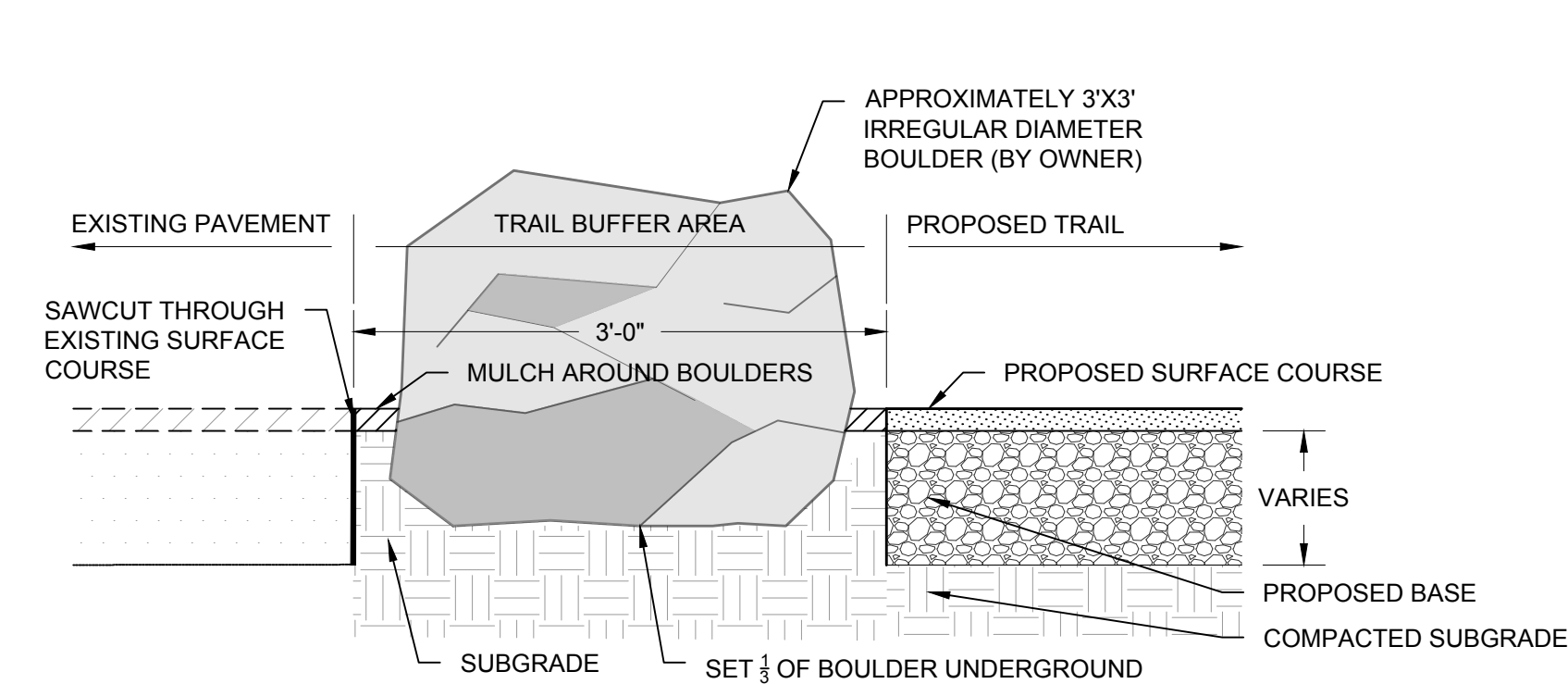
S:\31036157\002_JRPS TrailDWG\Sheet\CD\36157-002C-C3.0.dwg [Plotted on 10/25/2019 3:35 PM] by Trevor Buckley



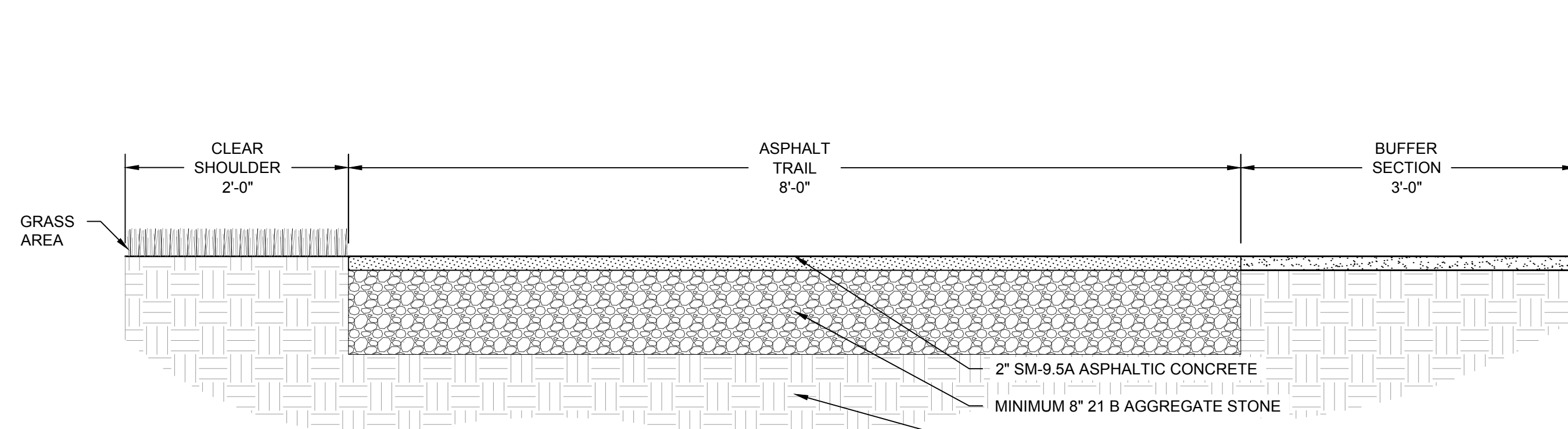
3 PROPOSED TRAIL TIE-IN DETAIL
NOT TO SCALE



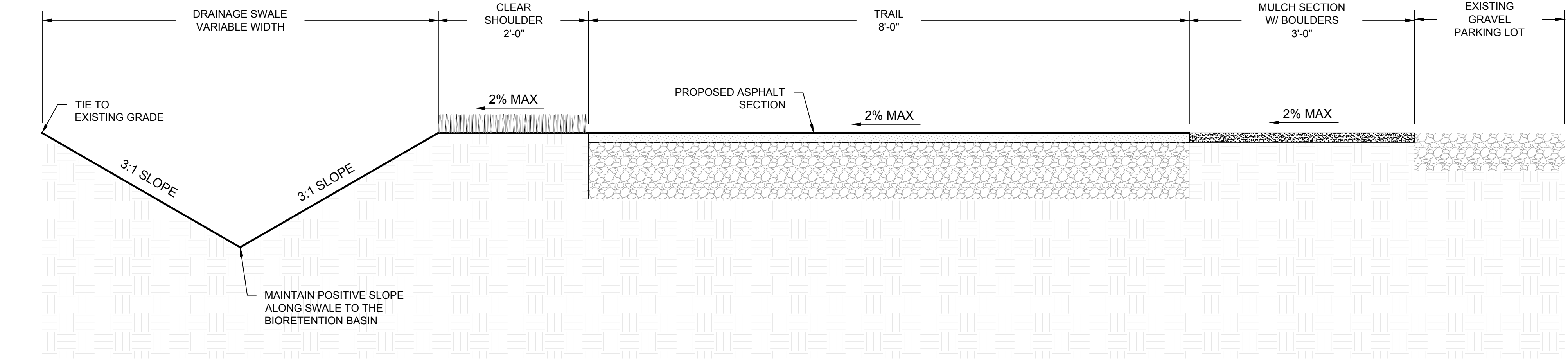
5 TREE PROTECTION AND PRESERVATION
NOT TO SCALE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK



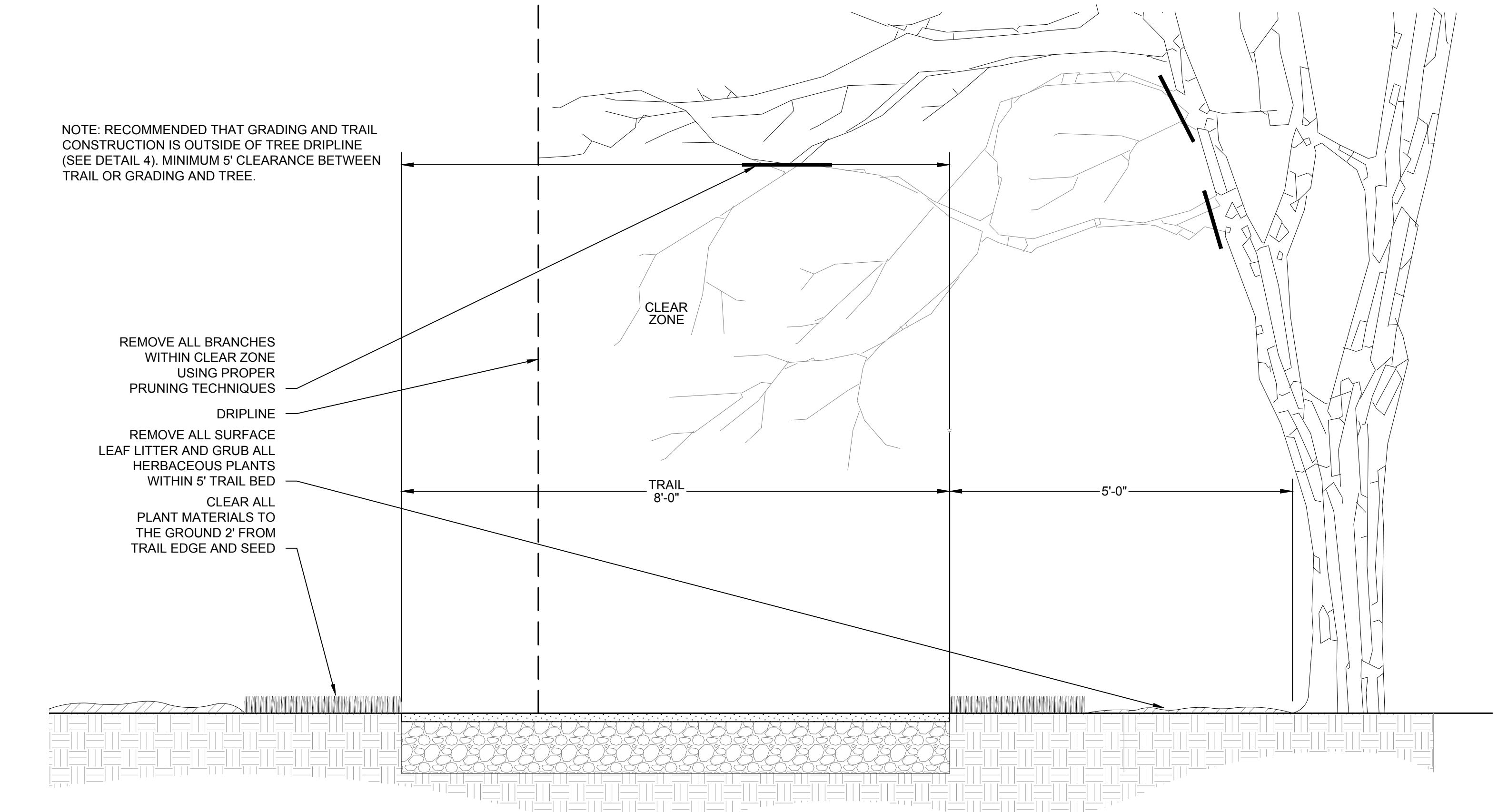
2 PROPOSED TRAIL BUFFER SECTION
1" = 1'-0"



1 LIGHT DUTY ASPHALT PAVEMENT TRAIL SECTION
1" = 1'-0"



4 TYPICAL TRAIL GRADING SECTION
1" = 1'-0"



6 TYPICAL TRAIL CLEARING SECTION
3/4" = 1'-0"

CHECK SET
NOT FOR
CONSTRUCTION

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.0300 FAX 804.580.0106 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

REVISION DESCRIPTION

DATE	
10/25/2019	

T. BUCKLEY

S. W./T. B.

S. WILEY

SCALE
AS SHOWN

TIMMONS GROUP

PUMP HOUSE PARKING LOT TRAIL
FIFTH DISTRICT - CITY OF RICHMOND - VIRGINIA

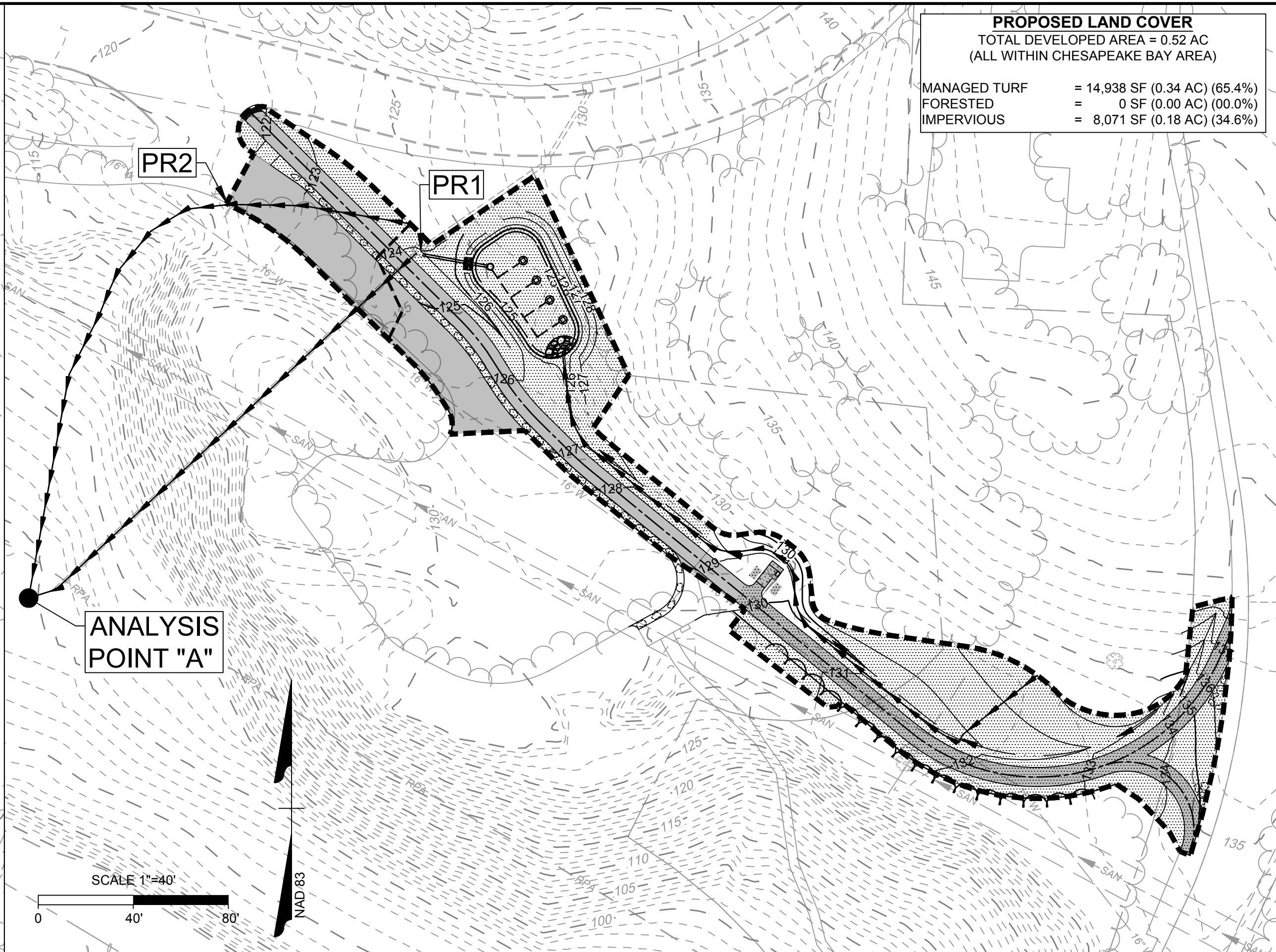
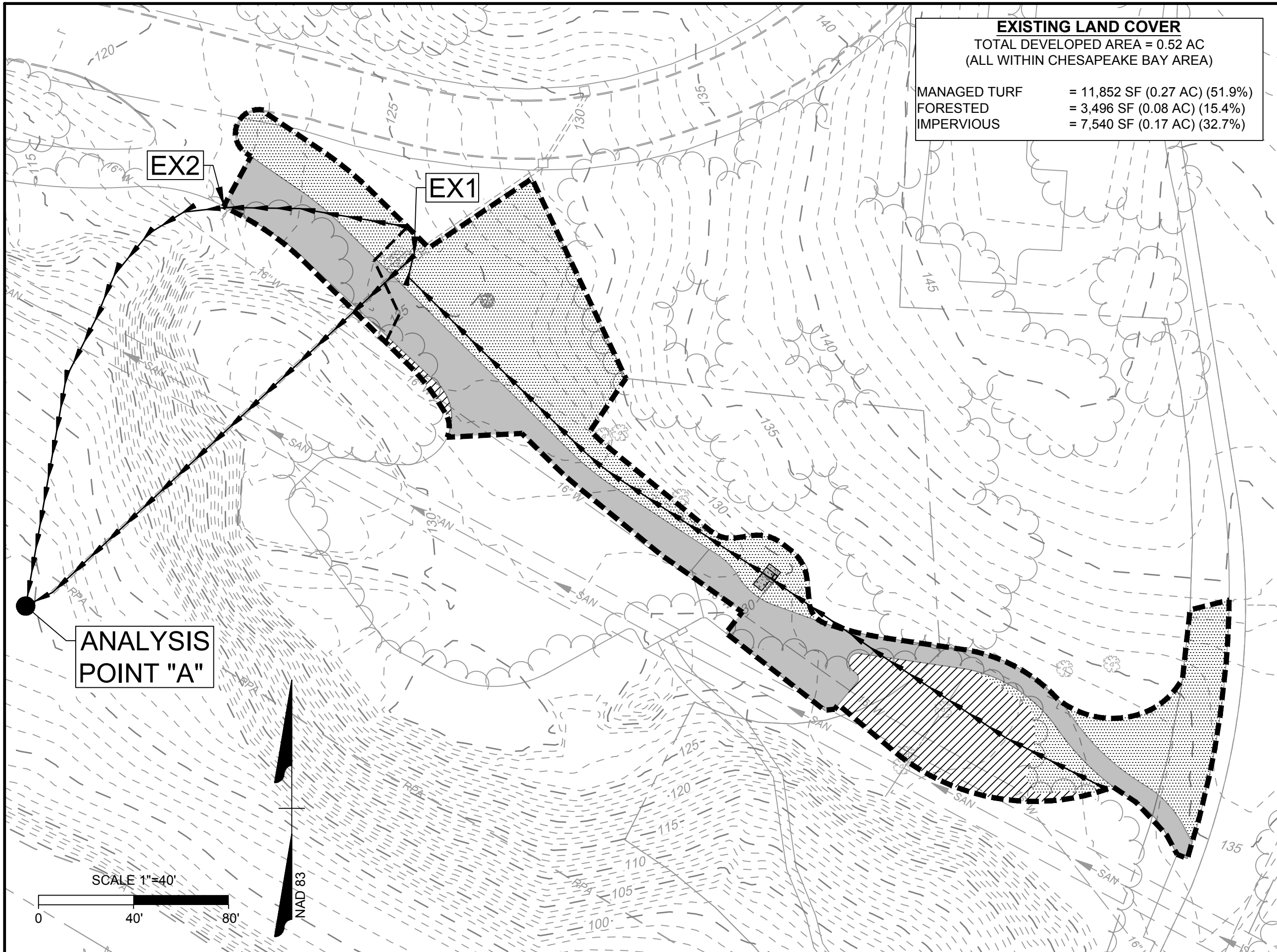
SITE NOTES AND DETAILS

JOB NO.
36157.002

SHEET NO.
C3.0

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.

S:\31036157-002-IRPS Trail\DWGSheet\CD\36157-002C-4.0-STRM.dwg [Plotted on 10/25/2019 3:35 PM] by Trevor Buckley



LAND COVER MAP LEGEND:				
-----	LIMITS OF DISTURBANCE			
- - - - -	DRAINAGE DIVIDE			
----->	FLOW PATH (Tc)			
[Hatched Box]	FORESTED AREA			
[Dotted Box]	LAWN AREA			
[Solid Grey Box]	IMPERVIOUS AREA			

DRAINAGE AREA ID	DESCRIPTION	TOTAL AREA (AC)	CURVE NUMBER, CN	Tc (MIN.)
EX1	EXISTING INLET	0.45 AC	85	11 MIN
EX2	BYPASS (UNDETAINED)	0.07 AC	90	5 MIN
PR1	EXISTING INLET	0.45 AC	85*	9 MIN
PR2	BYPASS (UNDETAINED)	0.07 AC	93	5 MIN

* ADJUSTED CN FROM VRRM SPREADSHEET USED FOR ALL FLOW CALCULATIONS.

BIORETENTION SURFACE AREA REQUIREMENT CALCULATIONS

Tv = 929 CF

STORAGE DEPTH = (3' x 0.25) + (1' x 0.40) + (0.5' x 1.0) = 1.65 FT

REQUIRED SURFACE AREA = Tv * 1.25 / STORAGE DEPTH = 929 CF * 1.25 / 1.65 FT = 704 SF (1,435 SF PROVIDED)

CHECK SET NOT FOR CONSTRUCTION	
THIS DRAWING PREPARED AT THE CORPORATE OFFICE 1001 Builders Parkway, Suite 300 Richmond, VA 23225 TEL 804.200.0500 FAX 804.580.1016 www.timmons.com	REVISION DESCRIPTION
	DATE
YOUR VISION ACHIEVED THROUGH OURS.	DATE
	10/25/2019
	DRAWN BY
	N. NORDBERG
SCALE 1" = 40'	DESIGNED BY
	N. NORDBERG
	CHECKED BY
	L. A. GUDORP

EXISTING LAND COVER MAP

PROPOSED LAND COVER MAP

DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet - Version 3.0	
BMP Design Specifications LAM: 2013 Draft Sub & Specs	
Site Summary	
Project Title: PUMP HOUSE PARKING LOT TRAIL	
Date: 04/08	
Total Rainfall (in):	43
Total Disturbed Area (ac):	0.52
Site Land Cover Summary	
Pre-ReDevelopment Land Cover (acres)	
A Soils	B Soils
C Soils	D Soils
Totals	% of Total
Forest/Open (acres)	0.00
Managed Turf (acres)	0.00
Impervious Cover (acres)	0.00
Post-ReDevelopment Land Cover (acres)	
A Soils	B Soils
C Soils	D Soils
Totals	% of Total
Forest/Open (acres)	0.00
Managed Turf (acres)	0.00
Impervious Cover (acres)	0.00
Site Tv and Land Cover Nutrient Loads	
Final Post-Development (Pre-ReDevelopment & New Impervious)	Post-ReDevelopment (New Impervious)
Post-Development (New Impervious)	Adjusted Pre-ReDevelopment (New Impervious)
Site Tv	0.49
Treatment Volume (ft ³)	929
TP Load (lb/yr)	0.38
Total TP Load Reduction Required (lb/yr)	0.10
Final Post-Development Load (Post-ReDevelopment & New Impervious)	Pre-ReDevelopment
TP Load (lb/yr)	4.18
Site Compliance Summary	
Maximum % Reduction Required Based on Pre-ReDevelopment Load	10%
Total Runoff Volume Reduction (ft ³)	931
Total TP Load Reduction Achieved (lb/yr)	0.42
Total TN Load Reduction Achieved (lb/yr)	3.05
Remaining Post-Development TP Load (lb/yr)	0.17
Remaining TP Load Reduction (lb/yr) Required	0.00 *** TARGET TP REDUCTION EXCEEDED BY 0.31 LB/YEAR ***

Drainage Area A Summary	
Land Cover Summary	
A Soils	B Soils
C Soils	D Soils
Total	% of Total
Forest/Open (acres)	0.00
Managed Turf (acres)	0.00
Impervious Cover (acres)	0.00
BMP Selections	
Practice	Managed Turf Credit Area (acres)
K-6, Bioretention #2 or Micro-Bioretention #2 (See #6)	0.32
Impervious Cover Treated (acres)	0.13
Total Turf Area Treated (acres)	0.32
Total TP Load Reduction Achieved in D.A. (lb/yr)	0.42
Total TN Load Reduction Achieved in D.A. (lb/yr)	3.05

Runoff Volume and CN Calculations	
Target Rainfall Event (in)	1-year storm: 2.75, 2-year storm: 3.37, 10-year storm: 5.05
Drainage Areas	Rv & Cn
CN	85
Rv (ft ³)	931
1-year return period	Rv w/ 85 (acres): 1.35, Rv w/ 85 (acres): 1.03, Rv w/ 85 (acres): 0.79
2-year return period	Rv w/ 85 (acres): 1.52, Rv w/ 85 (acres): 1.19, Rv w/ 85 (acres): 0.90
10-year return period	Rv w/ 85 (acres): 2.14, Rv w/ 85 (acres): 1.69, Rv w/ 85 (acres): 1.25

WATER QUALITY CALCULATIONS

Channel Protection Computations

Analysis Point A

Project Name: Pump House Parking Lot Trail
Timmons Group Project No. 36157.002
Date: 12/14/2018
Calculated By: Nick Nordberg

Pre-Development	
Contributing Drainage Area(s): EX1 & EX2	
Data Input	Descriptions
Total Q _{Pre-Dev} eloped	0.98 CFS
RV _{Pre-Dev} eloped	2,701 CF
Pre-development peak flow for 1-year, 24-hour design storm ^[1]	
Pre-development runoff volume for 1-year, 24-hour design storm ^[1]	
Post-Development	
Contributing Drainage Area(s): PR1 & PR2	
Data Input	Descriptions
Total Q _{Post-Dev} eloped	0.80 CFS
Unadjusted RV _{Post-Dev} eloped	2,134 CF
RV Reduction	* CF
RV _{Post-Dev} eloped	2,134
True post-development runoff volume for 1-year, 24-hour design storm ^[1]	
Improvement Factor	0.9
Per DEQ requirement for projects that disturb less than one (1) acre	

Energy Balance Equation

$$Q_{Post-Developed} \leq I.F. \left(\frac{Q_{Pre-Developed} * RV_{Pre-Developed}}{RV_{Post-Developed}} \right)$$

Actual Q _{Post-Developed}	Max. Permissible Q _{Post-Developed} (from Energy Balance)	Check
0.80 cfs	1.12 cfs	OK

Peak Flow Check

Q _{Post-Developed}	Q _{Pre-Developed}	Check
0.80 cfs	0.98 cfs	OK

* Runoff reduction accounted for in flow values through adjusted curve number

[1] Flow values obtained from PondPak. Calculation packet to be included separately.

WATER QUANTITY CALCULATIONS - CHANNEL PROTECTION

Stormwater Management Facility Data

Stormwater Management Facility Type	Stormwater Management Description	Stormwater Management Facility Structure Number	Location		Acres Treated By Facility			Pollutant Removal, lbs			Runoff captured, acre-feet	HUC (6th order) Of Location Of Facility	Impaired Water Segment To Which Facility Discharges	Ownership Of Facility (Public/Private)
			Latitude	Longitude	Impervious Acres	Pervious Acres	Total Acres	TP	TN	TSS				
Bioretention	Bioretention level 2	n/a	37.535451	-77.482897	0.13	0.32	0.450	0.420	3.050	n/a	0.011	JM86	James River	Public

Flood Protection Computations

Analysis Point A

Project Name: Pump House Parking Lot Trail
Timmons Group Project No. 36157.002
Date: 12/14/2018
Calculated By: Nick Nordberg

Pre-Development	
Contributing Drainage Area(s): EX1 & EX2	
Data Input	Descriptions
2-Year Q _{Pre-Dev} eloped	1.32 CFS
Pre-development peak flow for 2-year, 24-hour design storm ^[1]	
10-Year Q _{Pre-Dev} eloped	2.35 CFS
Pre-development peak flow for 10-year, 24-hour design storm ^[1]	
Post-Development	
Contributing Drainage Area(s): PR1 & PR2	
Data Input	Descriptions
2-Year Q _{Post-Dev} eloped	1.16 CFS
Post-development peak flow for 2-year, 24-hour design storm ^[1]	
10-Year Q _{Post-Dev} eloped	2.27 CFS
Post-development peak flow for 10-year, 24-hour design storm ^[1]	

2-Year Flood Protection Check

$$Q_{Post-Developed} \leq Q_{Pre-Developed}$$

Q _{Post-Developed}	Q _{Pre-Developed}	Check
1.16 cfs	1.32 cfs	OK

10-Year Flood Protection Check

$$Q_{Post-Developed} \leq Q_{Pre-Developed}$$

Q _{Post-Developed}	Q _{Pre-Developed}	Check
2.27 cfs	2.35 cfs	OK

* Runoff reduction accounted for in flow values through adjusted curve number

[1] Flow values obtained from PondPak. Calculation packet to be included separately.

WATER QUANTITY CALCULATIONS - FLOOD PROTECTION

STORMWATER NARRATIVE:

THE PROPOSED SITE IS LOCATED IN THE CITY OF RICHMOND AND CURRENTLY SERVES AS A GRAVEL PARKING LOT SERVING FOR A PUBLIC PARK AND TRAIL SYSTEM. THIS DEVELOPMENT PROPOSES THE CONSTRUCTION OF AN ASPHALT SHARED-USE PATH. THE MAJORITY OF THE EXISTING SITE DRAINS TO AN INLET THAT OUTFALLS WITHIN THE RMA FOR THE JAMES RIVER. THE PROPOSED DEVELOPMENT IS SUBJECT TO THE REQUIREMENTS OF VSMF PART IIB WHICH REQUIRE BOTH STORMWATER QUALITY AND QUANTITY TREATMENT.

STORMWATER QUALITY TREATMENT:

THIS PROJECT PROPOSES 0.52 ACRES OF LAND DISTURBANCE WHICH HAVE BEEN ANALYZED FOR THE PRE AND POST DEVELOPMENT CONDITIONS FOR REDEVELOPMENT PER THE VIRGINIA RUNOFF REDUCTION SPREADSHEET. THIS PROJECT RESULTS IN AN INCREASE OF 0.01 ACRES OF IMPERVIOUS AREA. THE RESULTING TP REMOVAL REQUIRED FOR THE PROPOSED DISTURBANCE IS 0.10 LB/YR.

THE TOTAL PHOSPHORUS LOAD REDUCTION REQUIRED FOR THE DEVELOPMENT WILL BE MET THROUGH A PROPOSED BIORETENTION FACILITY. THERE WILL BE 0.45 ACRES DRAINING TO THE PROPOSED BMP INCLUDING 0.13 ACRES OF IMPERVIOUS AREA, WHICH RESULTS IN 0.42 LB/YR OF TP REMOVAL, EXCEEDING THE REQUIRED AMOUNT.

STORMWATER QUANTITY TREATMENT:

THE PROPOSED DEVELOPMENT WILL MEET BOTH CHANNEL PROTECTION AND FLOOD PROTECTION REQUIREMENTS AS PART OF IIB OF THE VIRGINIA STORMWATER MANAGEMENT REGULATIONS. ONLY THE DISTURBED AREA WILL BE ANALYZED AS PART OF THIS DEVELOPMENT. THE DISTURBED AREA IS DIVIDED INTO TWO DRAINAGE AREAS: 0.45 ACRES WILL DRAIN TO THE PROPOSED BMP AND OUTFALL TO THE EXISTING STORM SYSTEM, AND 0.07 ACRES WILL BYPASS THE STORM SYSTEM UNDETAINED. BOTH DRAINAGE AREAS WILL CONVERGE DOWNSTREAM AT POINT OF ANALYSIS "A".

CHANNEL PROTECTION:
THE ENERGY BALANCE EQUATION IS USED TO PROVE CHANNEL PROTECTION REQUIREMENTS ARE MET FOR THE 1-YEAR STORM. AN ADJUSTED CURVE NUMBER IS USED TO CALCULATE POST-DEVELOPMENT FLOW RATES DUE TO THE RUNOFF REDUCTION PROVIDED THROUGH THE BIORETENTION BASIN. THE ALLOWABLE FLOW RATE FOR ANALYSIS POINT "A" IS 1.12 CFS AND THE POST-DEVELOPMENT FLOW IS 0.80 CFS.

FLOOD PROTECTION:
THE 10-YEAR FLOW RATE IS USED TO PROVE FLOOD PROTECTION REQUIREMENTS ARE MET. AN ADJUSTED CURVE NUMBER IS USED TO CALCULATE POST-DEVELOPMENT FLOW RATES DUE TO THE RUNOFF REDUCTION PROVIDED THROUGH THE BIORETENTION BASIN. THE ALLOWABLE FLOW RATE FOR ANALYSIS POINT 1 IS 2.35 CFS AND THE POST-DEVELOPMENT FLOW IS 2.27 CFS.

TIMMONS GROUP

PUMP HOUSE PARKING LOT TRAIL
FIFTH DISTRICT - CITY OF RICHMOND - VIRGINIA
STORMWATER MAPS AND CALCULATIONS

JOB NO.
36157.002
SHEET NO.
C4.0

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.

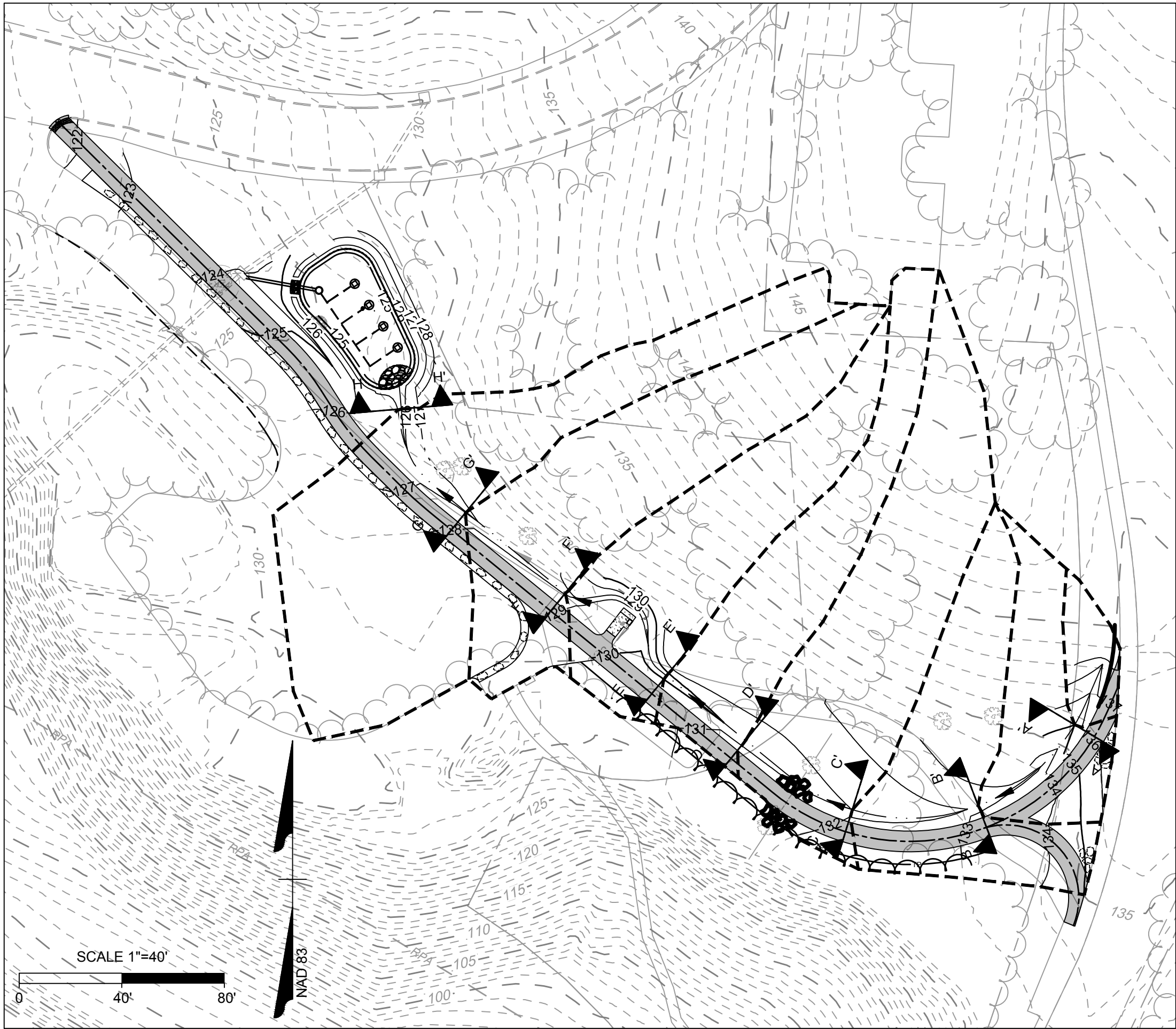
S:\31036157\002-JRPS Trail\DWG\Sheet\CD\36157-002C-4-1-SWAL.dwg [Plotted on 10/25/2019 3:36 PM] by Trevor Buckley

Cross Section for A-A' 2 YR				Cross Section for B-B' 2 YR				Cross Section for C-C' 2 YR																																							
Project Description				Project Description				Project Description																																							
Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula																																					
Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth																																					
Input Data				Input Data				Input Data																																							
Channel Slope		0.07500 ft/ft		Channel Slope		0.07500 ft/ft		Channel Slope		0.02000 ft/ft																																					
Normal Depth		0.07 ft		Normal Depth		0.12 ft		Normal Depth		0.18 ft																																					
Discharge		0.05 ft³/s		Discharge		0.22 ft³/s		Discharge		0.51 ft³/s																																					
Cross Section Image				Cross Section Image				Cross Section Image																																							
Worksheet for A-A' 2 YR				Worksheet for B-B' 2 YR				Worksheet for C-C' 2 YR																																							
Project Description				Project Description				Project Description																																							
Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula																																					
Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth																																					
Input Data				Input Data				Input Data																																							
Channel Slope		0.07500 ft/ft		Channel Slope		0.07500 ft/ft		Channel Slope		0.02000 ft/ft																																					
Discharge		0.05 ft³/s		Discharge		0.22 ft³/s		Discharge		0.51 ft³/s																																					
Section Definitions				Section Definitions				Section Definitions																																							
<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>136.62</td></tr><tr><td>0+07</td><td>136.20</td></tr><tr><td>0+17</td><td>135.99</td></tr><tr><td>0+20</td><td>135.00</td></tr><tr><td>0+30</td><td>135.88</td></tr><tr><td>0+40</td><td>136.27</td></tr></table>				Station (ft)	Elevation (ft)	0+00	136.62	0+07	136.20	0+17	135.99	0+20	135.00	0+30	135.88	0+40	136.27	<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>133.43</td></tr><tr><td>0+17</td><td>133.14</td></tr><tr><td>0+20</td><td>132.15</td></tr><tr><td>0+35</td><td>133.37</td></tr><tr><td>0+40</td><td>133.41</td></tr></table>				Station (ft)	Elevation (ft)	0+00	133.43	0+17	133.14	0+20	132.15	0+35	133.37	0+40	133.41	<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>132.01</td></tr><tr><td>0+17</td><td>132.00</td></tr><tr><td>0+20</td><td>131.01</td></tr><tr><td>0+40</td><td>131.98</td></tr></table>				Station (ft)	Elevation (ft)	0+00	132.01	0+17	132.00	0+20	131.01	0+40	131.98
Station (ft)	Elevation (ft)																																														
0+00	136.62																																														
0+07	136.20																																														
0+17	135.99																																														
0+20	135.00																																														
0+30	135.88																																														
0+40	136.27																																														
Station (ft)	Elevation (ft)																																														
0+00	133.43																																														
0+17	133.14																																														
0+20	132.15																																														
0+35	133.37																																														
0+40	133.41																																														
Station (ft)	Elevation (ft)																																														
0+00	132.01																																														
0+17	132.00																																														
0+20	131.01																																														
0+40	131.98																																														
Roughness Segment Definitions				Roughness Segment Definitions				Roughness Segment Definitions																																							
<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 136.62)</td><td>(0+40, 136.27)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 136.62)	(0+40, 136.27)	0.030	<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 133.43)</td><td>(0+40, 133.41)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 133.43)	(0+40, 133.41)	0.030	<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 132.01)</td><td>(0+40, 131.98)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 132.01)	(0+40, 131.98)	0.030																		
Start Station	Ending Station	Roughness Coefficient																																													
(0+00, 136.62)	(0+40, 136.27)	0.030																																													
Start Station	Ending Station	Roughness Coefficient																																													
(0+00, 133.43)	(0+40, 133.41)	0.030																																													
Start Station	Ending Station	Roughness Coefficient																																													
(0+00, 132.01)	(0+40, 131.98)	0.030																																													
Options				Options				Options																																							
Current roughness weighting Method		Pavlovskii's Method		Current roughness weighting Method		Pavlovskii's Method		Current roughness weighting Method		Pavlovskii's Method																																					
Open Channel Weighting Method		Pavlovskii's Method		Open Channel Weighting Method		Pavlovskii's Method		Open Channel Weighting Method		Pavlovskii's Method																																					
Closed Channel Weighting Method		Pavlovskii's Method		Closed Channel Weighting Method		Pavlovskii's Method		Closed Channel Weighting Method		Pavlovskii's Method																																					
Results				Results				Results																																							
Normal Depth		0.07 ft		Normal Depth		0.12 ft		Normal Depth		0.18 ft																																					
Elevation Range		135.00 to 136.62 ft		Elevation Range		132.15 to 133.43 ft		Elevation Range		131.01 to 132.01 ft																																					
Flow Area		0.03 ft²		Flow Area		0.11 ft²		Flow Area		0.37 ft²																																					
Wetted Perimeter		0.99 ft		Wetted Perimeter		1.84 ft		Wetted Perimeter		4.21 ft																																					
Hydraulic Radius		0.03 ft		Hydraulic Radius		0.06 ft		Hydraulic Radius		0.09 ft																																					
Top Width		0.97 ft		Top Width		1.82 ft		Top Width		4.18 ft																																					
Normal Depth		0.07 ft		Normal Depth		0.12 ft		Normal Depth		0.18 ft																																					
		2-YEAR DEPTH				2-YEAR DEPTH				2-YEAR DEPTH																																					
Critical Depth		0.16 ft		Critical Depth		0.14 ft		Critical Depth		0.10 ft																																					
Critical Slope		0.03057 ft/ft		Critical Slope		0.03057 ft/ft		Critical Slope		0.03057 ft/ft																																					
Worksheet for A-A' 2 YR				Worksheet for B-B' 2 YR				Worksheet for C-C' 2 YR																																							
Results				Results				Results																																							
Critical Depth		0.08 ft		Critical Depth		0.08 ft		Critical Depth		0.08 ft																																					
Critical Slope		0.03917 ft/ft		Critical Slope		0.03247 ft/ft		Critical Slope		0.03247 ft/ft																																					
Velocity		1.46 ft/s		Velocity		2.04 ft/s		Velocity		1.38 ft/s																																					
Velocity Head		0.03 ft		Velocity Head		0.06 ft		Velocity Head		0.03 ft																																					
Specific Energy		0.10 ft		Specific Energy		0.18 ft		Specific Energy		0.21 ft																																					
Froude Number		1.37		Froude Number		1.47		Froude Number		0.82																																					
Flow Type		Supercritical		Flow Type		Supercritical		Flow Type		Subcritical																																					

GRASSED SWALE												
CROSS SECTION	IMPERVIOUS AREA (AC)	TURF AREA (AC)	DRAINAGE AREA (AC)	C-VALUE	CUMULATIVE DRAINAGE AREA (AC)	CUMULATIVE C-VALUE	CHANNEL SLOPE (FT/FT)	Tc (MIN)	2 YEAR STORM		10 YEAR STORM	
									i (IN/HR)	Q ₂ (CFS)	i (IN/HR)	Q ₁₀ (CFS)
A-A'	0.00	0.02	0.02	0.42	0.02	0.42	0.075	5.0	5.3	0.05	7.1	0.07
B-B'	0.01	0.07	0.08	0.43	0.10	0.42	0.075	5.2	5.3	0.22	7.0	0.29
C-C'	0.02	0.11	0.13	0.43	0.23	0.42	0.020	5.6	5.2	0.51	6.9	0.67
D-D'	0.01	0.18	0.19	0.38	0.43	0.40	0.020	5.9	5.1	0.87	6.8	1.16
E-E'	0.01	0.12	0.12	0.38	0.55	0.40	0.020	6.3	5.0	1.09	6.6	1.46
F-F'	0.01	0.14	0.14	0.38	0.69	0.40	0.020	6.6	4.9	1.35	6.5	1.79
G-G'	0.02	0.16	0.18	0.42	0.88	0.40	0.020	7.0	4.8	1.69	6.4	2.25
H-H'	0.15	0.11	0.26	0.66	1.14	0.46	0.020	7.4	4.7	2.48	6.3	3.31

2 YEAR STORM		
B	D	E
57.69	11.5	0.85

10 YEAR STORM		
B	D	E
47.91	9.25	0.72



SWALE CROSS-SECTION DRAINAGE AREA MAP

CHECK SET
NOT FOR
CONSTRUCTION

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.0500 FAX 804.580.0106 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

REVISION DESCRIPTION

DATE

DATE
10/25/2019

DRAWN BY
N. NORDBERG

DESIGNED BY
N. NORDBERG

CHECKED BY
L. A. GUDORP

SCALE
1" = 40'

TIMMONS GROUP

PUMP HOUSE PARKING LOT TRAIL
FIFTH DISTRICT - CITY OF RICHMOND - VIRGINIA
SWALE CROSS-SECTIONS AND CALCULATIONS

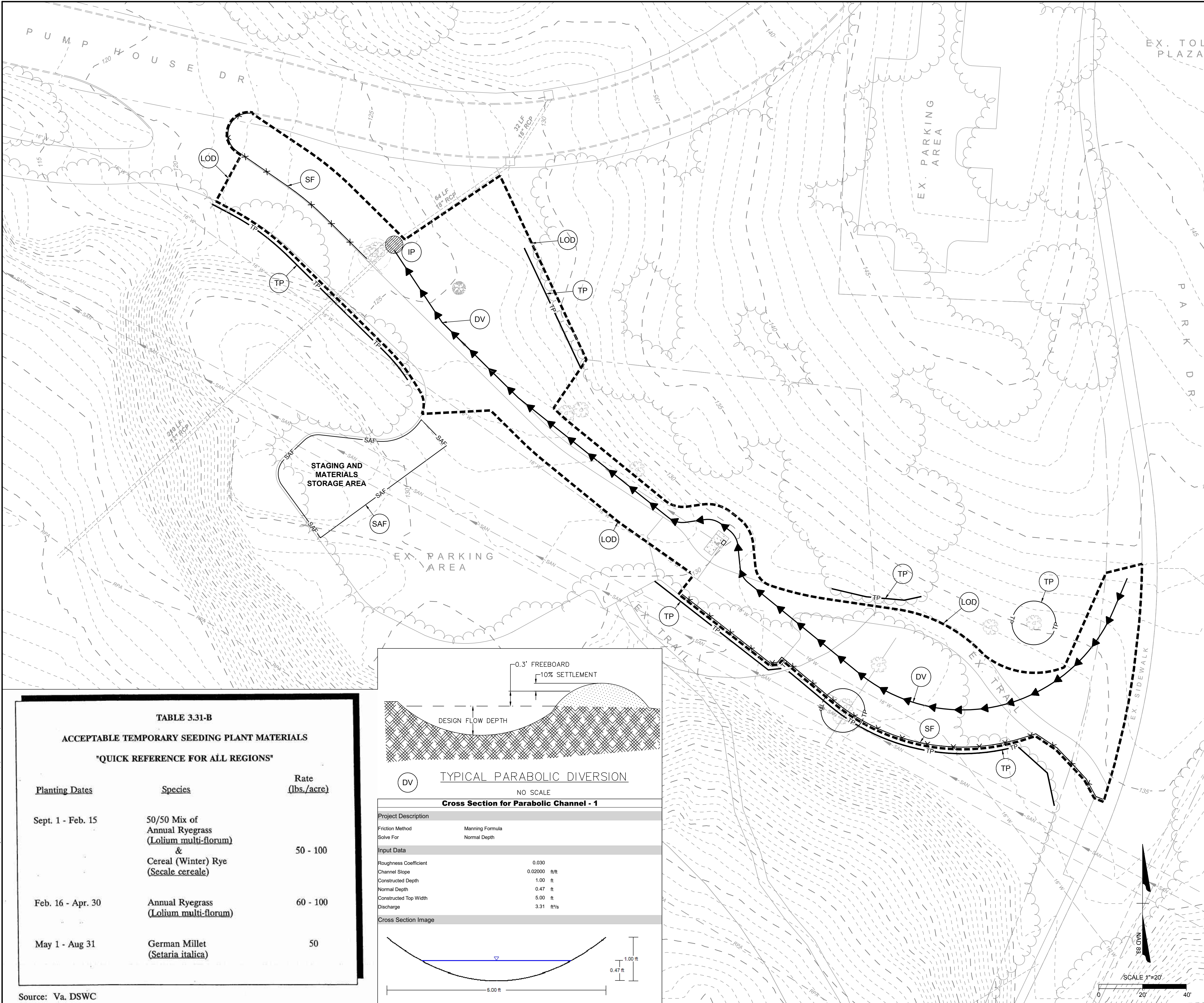
JOB NO.
36157.002
SHEET NO.
C4.1

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.

S:\31036157\002\JRP5 Trail\DWG\Sheet\CD\36157-002C-4.1-SWAL.dwg [Plotted on 10/25/2019 3:36 PM] by Trevor Buckley

Cross Section for D-D' 2 YR				Cross Section for E-E' 2 YR				Cross Section for F-F' 2 YR				Cross Section for G-G' 2 YR				Cross Section for H-H' 2 YR																																																											
Project Description				Project Description				Project Description				Project Description				Project Description																																																											
Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula																																																									
Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth																																																									
Input Data				Input Data				Input Data				Input Data				Input Data																																																											
Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft																																																									
Normal Depth		0.25 ft		Normal Depth		0.42 ft		Normal Depth		0.37 ft		Normal Depth		0.39 ft		Normal Depth		0.46 ft																																																									
Discharge		0.87 ft³/s		Discharge		1.09 ft³/s		Discharge		1.35 ft³/s		Discharge		1.69 ft³/s		Discharge		2.48 ft³/s																																																									
Cross Section Image				Cross Section Image				Cross Section Image				Cross Section Image				Cross Section Image																																																											
Worksheet for D-D' 2 YR				Worksheet for E-E' 2 YR				Worksheet for F-F' 2 YR				Worksheet for G-G' 2 YR				Worksheet for H-H' 2 YR																																																											
Project Description				Project Description				Project Description				Project Description				Project Description																																																											
Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula		Friction Method		Manning Formula																																																									
Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth		Solve For		Normal Depth																																																									
Input Data				Input Data				Input Data				Input Data				Input Data																																																											
Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft		Channel Slope		0.02000 ft/ft																																																									
Discharge		0.87 ft³/s		Discharge		1.09 ft³/s		Discharge		1.35 ft³/s		Discharge		1.69 ft³/s		Discharge		2.48 ft³/s																																																									
Section Definitions				Section Definitions				Section Definitions				Section Definitions				Section Definitions																																																											
<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>131.92</td></tr><tr><td>0+07</td><td>131.35</td></tr><tr><td>0+17</td><td>131.15</td></tr><tr><td>0+20</td><td>130.16</td></tr><tr><td>0+40</td><td>131.73</td></tr></table>				Station (ft)	Elevation (ft)	0+00	131.92	0+07	131.35	0+17	131.15	0+20	130.16	0+40	131.73	<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>130.58</td></tr><tr><td>0+17</td><td>130.42</td></tr><tr><td>0+20</td><td>129.43</td></tr><tr><td>0+25</td><td>131.55</td></tr><tr><td>0+40</td><td>132.05</td></tr></table>				Station (ft)	Elevation (ft)	0+00	130.58	0+17	130.42	0+20	129.43	0+25	131.55	0+40	132.05	<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>129.41</td></tr><tr><td>0+17</td><td>128.81</td></tr><tr><td>0+20</td><td>127.82</td></tr><tr><td>0+40</td><td>131.33</td></tr></table>				Station (ft)	Elevation (ft)	0+00	129.41	0+17	128.81	0+20	127.82	0+40	131.33	<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>128.30</td></tr><tr><td>0+17</td><td>127.88</td></tr><tr><td>0+20</td><td>126.89</td></tr><tr><td>0+40</td><td>130.09</td></tr></table>				Station (ft)	Elevation (ft)	0+00	128.30	0+17	127.88	0+20	126.89	0+40	130.09	<table><tr><th>Station (ft)</th><th>Elevation (ft)</th></tr><tr><td>0+00</td><td>125.99</td></tr><tr><td>0+15</td><td>126.87</td></tr><tr><td>0+20</td><td>125.68</td></tr><tr><td>0+27</td><td>127.09</td></tr><tr><td>0+40</td><td>129.13</td></tr></table>				Station (ft)	Elevation (ft)	0+00	125.99	0+15	126.87	0+20	125.68	0+27	127.09	0+40	129.13
Station (ft)	Elevation (ft)																																																																										
0+00	131.92																																																																										
0+07	131.35																																																																										
0+17	131.15																																																																										
0+20	130.16																																																																										
0+40	131.73																																																																										
Station (ft)	Elevation (ft)																																																																										
0+00	130.58																																																																										
0+17	130.42																																																																										
0+20	129.43																																																																										
0+25	131.55																																																																										
0+40	132.05																																																																										
Station (ft)	Elevation (ft)																																																																										
0+00	129.41																																																																										
0+17	128.81																																																																										
0+20	127.82																																																																										
0+40	131.33																																																																										
Station (ft)	Elevation (ft)																																																																										
0+00	128.30																																																																										
0+17	127.88																																																																										
0+20	126.89																																																																										
0+40	130.09																																																																										
Station (ft)	Elevation (ft)																																																																										
0+00	125.99																																																																										
0+15	126.87																																																																										
0+20	125.68																																																																										
0+27	127.09																																																																										
0+40	129.13																																																																										
Roughness Segment Definitions				Roughness Segment Definitions				Roughness Segment Definitions				Roughness Segment Definitions				Roughness Segment Definitions																																																											
<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 131.92)</td><td>(0+40, 131.73)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 131.92)	(0+40, 131.73)	0.030	<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 130.58)</td><td>(0+40, 132.05)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 130.58)	(0+40, 132.05)	0.030	<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 129.41)</td><td>(0+40, 131.33)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 129.41)	(0+40, 131.33)	0.030	<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 128.30)</td><td>(0+40, 130.09)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 128.30)	(0+40, 130.09)	0.030	<table><tr><th>Start Station</th><th>Ending Station</th><th>Roughness Coefficient</th></tr><tr><td>(0+00, 125.99)</td><td>(0+40, 129.13)</td><td>0.030</td></tr></table>				Start Station	Ending Station	Roughness Coefficient	(0+00, 125.99)	(0+40, 129.13)	0.030																										
Start Station	Ending Station	Roughness Coefficient																																																																									
(0+00, 131.92)	(0+40, 131.73)	0.030																																																																									
Start Station	Ending Station	Roughness Coefficient																																																																									
(0+00, 130.58)	(0+40, 132.05)	0.030																																																																									
Start Station	Ending Station	Roughness Coefficient																																																																									
(0+00, 129.41)	(0+40, 131.33)	0.030																																																																									
Start Station	Ending Station	Roughness Coefficient																																																																									
(0+00, 128.30)	(0+40, 130.09)	0.030																																																																									
Start Station	Ending Station	Roughness Coefficient																																																																									
(0+00, 125.99)	(0+40, 129.13)	0.030																																																																									
Options				Options				Options				Options				Options																																																											
Current roughness weighted Method		Pavlovskii's Method		Current roughness weighted Method		Pavlovskii's Method		Current roughness weighted Method		Pavlovskii's Method		Current roughness weighted Method		Pavlovskii's Method		Current roughness weighted Method		Pavlovskii's Method																																																									
Open Channel Weighting Method		Pavlovskii's Method		Open Channel Weighting Method		Pavlovskii's Method		Open Channel Weighting Method		Pavlovskii's Method		Open Channel Weighting Method		Pavlovskii's Method		Open Channel Weighting Method		Pavlovskii's Method																																																									
Closed Channel Weighting Method		Pavlovskii's Method		Closed Channel Weighting Method		Pavlovskii's Method		Closed Channel Weighting Method		Pavlovskii's Method		Closed Channel Weighting Method		Pavlovskii's Method		Closed Channel Weighting Method		Pavlovskii's Method																																																									
Results				Results				Results				Results				Results																																																											
Normal Depth		0.25 ft		Normal Depth		0.42 ft		Normal Depth		0.37 ft		Normal Depth		0.39 ft		Normal Depth		0.46 ft																																																									
Elevation Range		130.16 to 131.92 ft		Elevation Range		129.43 to 132.05 ft		Elevation Range		127.82 to 131.33 ft		Elevation Range		126.89 to 130.09 ft		Elevation Range		125.68 to 129.13 ft																																																									
Flow Area		0.50 ft²		Flow Area		0.46 ft²		Flow Area		0.60 ft²		Flow Area		0.72 ft²		Flow Area		1.17 ft²																																																									
Wetted Perimeter		4.02 ft		Wetted Perimeter		2.39 ft		Wetted Perimeter		3.33 ft		Wetted Perimeter		3.76 ft		Wetted Perimeter		7.07 ft																																																									
Hydraulic Radius		0.12 ft		Hydraulic Radius		0.19 ft		Hydraulic Radius		0.18 ft		Hydraulic Radius		0.19 ft		Hydraulic Radius		0.17 ft																																																									
Top Width		3.97 ft		Top Width		2.24 ft		Top Width		3.24 ft		Top Width		3.66 ft		Top Width		6.81 ft																																																									
Normal Depth		0.25 ft		Normal Depth		0.42 ft		Normal Depth		0.37 ft		Normal Depth		0.39 ft		Normal Depth		0.46 ft																																																									
Critical Depth		0.24 ft		Critical Depth		0.40 ft		Critical Depth		0.36 ft		Critical Depth		0.38 ft		Normal Depth		0.46 ft																																																									
Critical Slope		0.024 ft/ft		Critical Slope		0.02414 ft/ft		Critical Slope		0.02414 ft/ft		Critical Slope		0.02354 ft/ft		Critical Depth		0.45 ft																																																									
Worksheet for D-D' 2 YR				Worksheet for E-E' 2 YR				Worksheet for F-F' 2 YR				Worksheet for G-G' 2 YR				Worksheet for H-H' 2 YR																																																											
Results				Results				Results				Results				Results																																																											
Critical Slope		0.02712 ft/ft		Critical Slope		0.02448 ft/ft		Velocity		2.24 ft/s		Critical Slope		2.34 ft/s		Critical Slope		0.02500 ft/ft																																																									
Velocity		1.74 ft/s		Velocity		2.35 ft/s		Velocity Head		0.08 ft		Velocity		2.12 ft/s		Velocity		2.12 ft/s																																																									
Velocity Head		0.05 ft		Velocity Head		0.09 ft		Specific Energy		0.45 ft		Velocity Head		0.08 ft		Velocity Head		0.07 ft																																																									
Specific Energy		0.30 ft		Specific Energy		0.50 ft		Specific Energy		0.48 ft		Specific Energy		0.48 ft		Specific Energy		0.53 ft																																																									
Froude Number		0.87		Froude Number		0.91		Froude Number		0.92		Froude Number		0.93		Froude Number		0.90																																																									
Flow Type		Subcritical		Flow Type		Subcritical		Flow Type		Subcritical		Flow Type		Subcritical		Flow Type		Subcritical																																																									

S:\31036157-002-RRPS Trail\DWG\Sheet\CD\36157-002C-5.0-ERO1.dwg | Plotted on 10/25/2019 3:37 PM | by Trevor Buckley



EROSION CONTROL LEGEND:

(SAF)	SAFETY FENCE SAF	*3.01
(SF)	SILT FENCE X X X	*3.05
(IP)	INLET PROTECTION	*3.07
(DV)	DIVERSION	*3.12
(TP)	TREE PROTECTION TP	*3.38
(LOD)	LIMITS OF DISTURBANCE	

* VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER

PHASE I E&S NARRATIVE

1. AN ON-SITE PRE-CONSTRUCTION MEETING IS REQUIRED PRIOR TO THE ISSUANCE OF A LAND DISTURBANCE PERMIT. THE CERTIFIED RESPONSIBLE LAND DISTURBER, RSNMP CONSTRUCTION ACTIVITY OPERATOR, AND THE ENVIRONMENTAL INSPECTOR (OR AUTHORIZED REPRESENTATIVE) MUST ATTEND THE MEETING.

2. INSTALL SAFETY FENCE, SILT FENCE, TREE PROTECTION FENCE, AND INLET PROTECTION AS SHOWN ON PHASE I E&S PLAN, SHEET 05.0. DISTURB/CLEAR AND GRUB ONLY THE PORTIONS OF THE SITE NEEDED TO INSTALL PERIMETER MEASURES IN ACCORDANCE WITH THE REGULATIONS OF THE VESC HANDBOOK.

3. INSTALL DIVERSION.

4. DIVERSION MUST BE SEEDED IMMEDIATELY UPON CONSTRUCTION.

5. ALL EROSION CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VESC HANDBOOK AND VIRGINIA REGULATION 9 VAC 25-840-40.

6. MAINTAIN POSITIVE DRAINAGE TOWARDS DIVERSION AND INLET PROTECTION AT ALL TIMES AND ADJUST MEASURES IF NECESSARY TO INTERCEPT SEDIMENT AND PREVENT EROSION. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEvised SHALL BE MADE IMMEDIATELY.

7. AFTER PERIMETER EROSION CONTROL MEASURES ARE BUILT, AND WITH THE APPROVAL OF THE EROSION CONTROL INSPECTOR, BEGIN DEMOLITION AND SITE WORK PROCEDURES AS INDICATED ON THE PLANS.

8. NO EROSION CONTROL MEASURE SHALL BE REMOVED WITHOUT APPROVAL OF THE ENVIRONMENTAL INSPECTOR.

9. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE INSPECTOR.

LIMITS OF DISTURBANCE = 0.52 ACRES

**CHECK SET
NOT FOR
CONSTRUCTION**

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Builders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.580.0106 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

REVISION DESCRIPTION

DATE	
10/25/2019	

DRAWN BY
N. NORDBERG

DESIGNED BY
N. NORDBERG

CHECKED BY
L.A. GUDORP

SCALE
1" = 20'

TIMMONS GROUP

PUMP HOUSE PARKING LOT TRAIL
FIFTH DISTRICT - CITY OF RICHMOND - VIRGINIA

PHASE I EROSION & SEDIMENT CONTROL PLAN

JOB NO.
36157.002

SHEET NO.
C5.0

limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.

TABLE 3.31-B ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS "QUICK REFERENCE FOR ALL REGIONS"		
Planting Dates	Species	Rate (lbs./acre)
Sept. 1 - Feb. 15	50/50 Mix of Annual Ryegrass (<i>Lolium multi-florum</i>) & Cereal (Winter) Rye (<i>Secale cereale</i>)	50 - 100
Feb. 16 - Apr. 30	Annual Ryegrass (<i>Lolium multi-florum</i>)	60 - 100
May 1 - Aug 31	German Millet (<i>Setaria italica</i>)	50

Source: Va. DSWC

0.3' FREEBOARD
10% SETTLEMENT

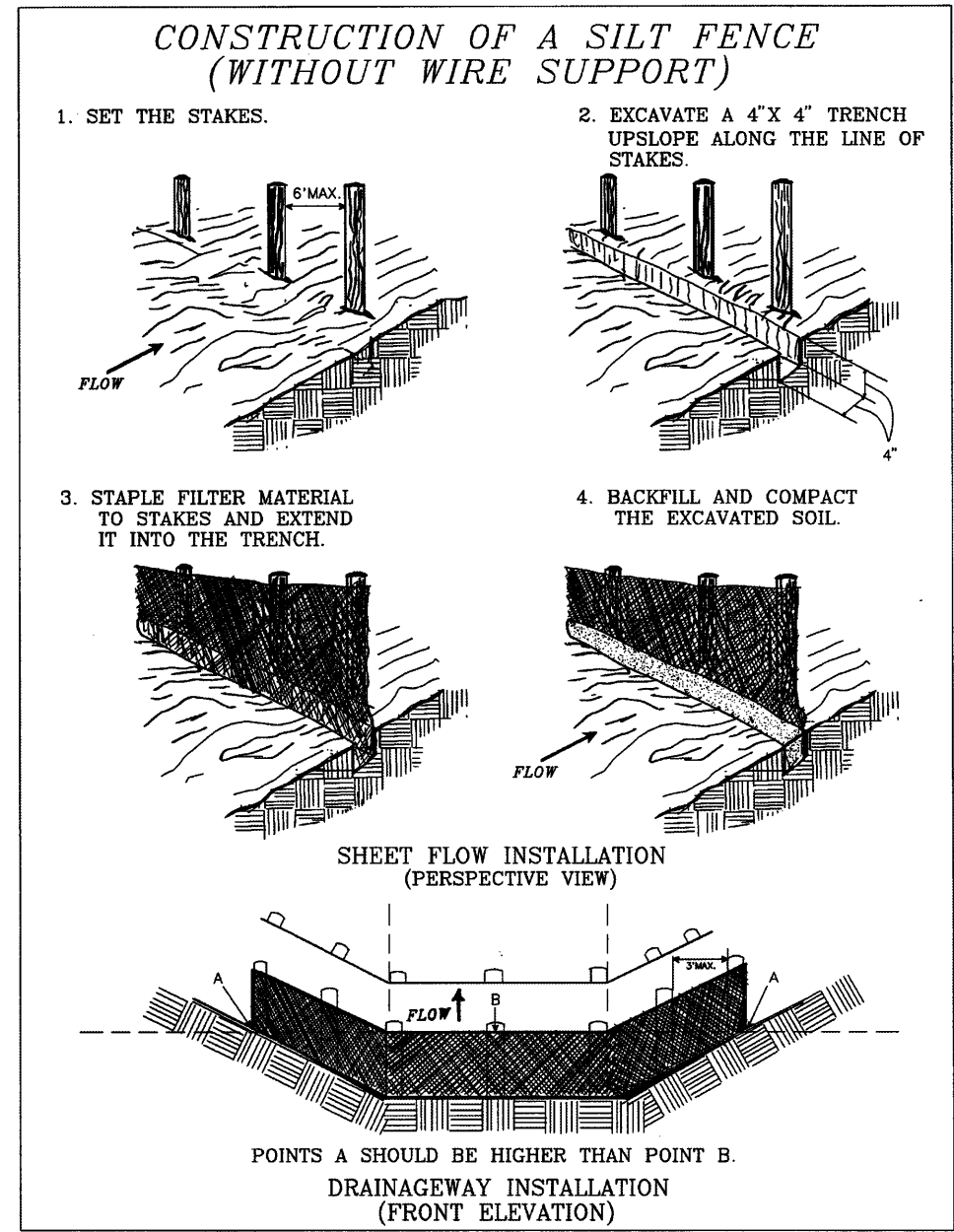
DESIGN FLOW DEPTH

(DV)

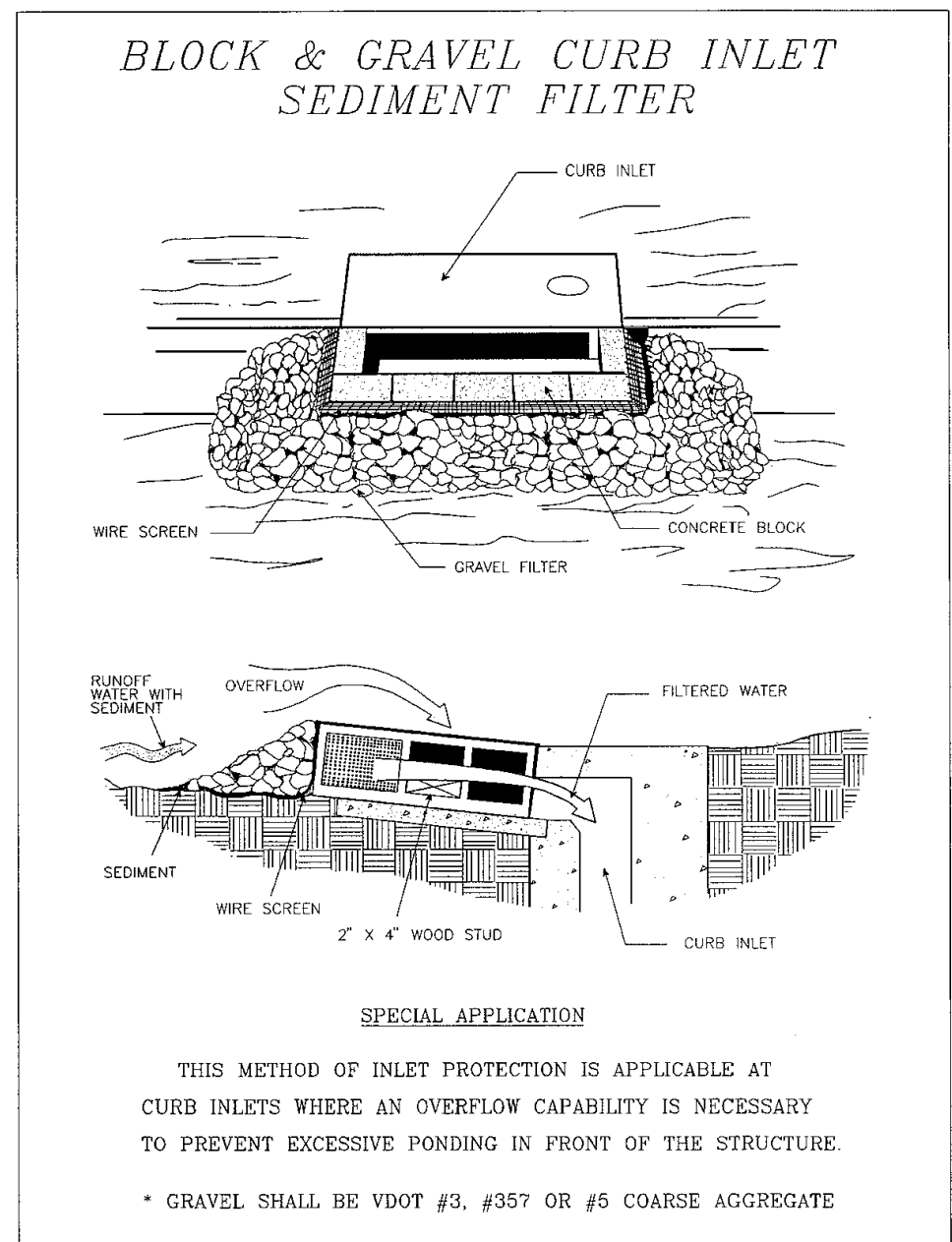
TYPICAL PARABOLIC DIVERSION
NO SCALE

Cross Section for Parabolic Channel - 1

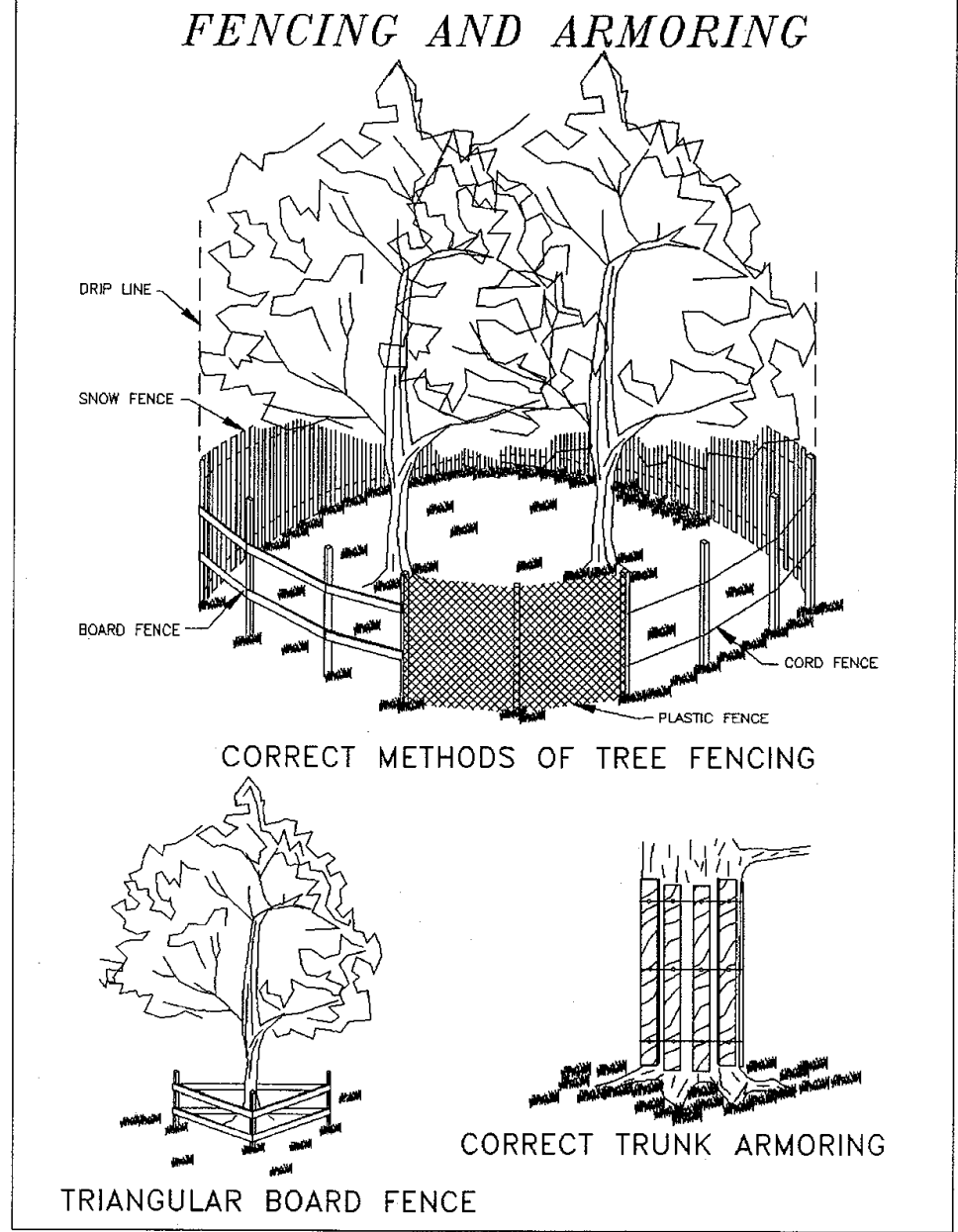
Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.030
Channel Slope	0.02000 ft/ft
Constructed Depth	1.00 ft
Normal Depth	0.47 ft
Constructed Top Width	5.00 ft
Discharge	3.31 ft ³ /s
Cross Section Image	



Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyant Plate 3.05-2



Source: Va. DSWC Plate 3.07-8



Source: Va. DSWC Plate 3.38-2

9VAC25-840-40. Minimum standards. (Effective 11/17/16)

A VESCP must be consistent with the following criteria, techniques and methods:

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
2. During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.
3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.
4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.
5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.
6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.
 - a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.
 - b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.
7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.
8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.
9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.
10. All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.
11. Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.
12. When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.
13. When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.
14. All applicable federal, state and local requirements pertaining to working in or crossing live watercourses shall be met.
15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.
16. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:
 - a. No more than 500 linear feet of trench may be opened at one time.
 - b. Excavated material shall be placed on the uphill side of trenches.
 - c. 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.
 - d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.
 - e. Restabilization shall be accomplished in accordance with this chapter.
 - f. Applicable safety requirements shall be complied with.
17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.
18. 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, unless otherwise authorized by the VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.
19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels.
20. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.
21. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.
22. All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state.
23. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made channels shall satisfy the flow rate capacity and velocity requirements for natural or man-made channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to § 62.1-44.15-54 or § 62.1-44.15-65 of the Act.
24. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15-52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15-24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities (i) are in accordance with provisions for time limits on applicability of approved design criteria in 9VAC25-870-47 or grandfathering in 9VAC25-870-48 of the Virginia Stormwater Management Program (VSMPP) Regulation, in which case the flow rate capacity and velocity requirements of § 62.1-44.15-52 A of the Act shall apply, or (ii) are exempt pursuant to § 62.1-44.15-34 C 7 of the Act.
25. Compliance with the water quantity minimum standards set out in 9VAC25-870-48 of the Virginia Stormwater Management Program (VSMPP) Regulation shall be deemed to satisfy the requirements of this subdivision 19.

Statutory Authority

§ 62.1-44.15-52 of the Code of Virginia.

Historical Notes

Former 4VAC50-30-40, derived from VR825-02-00 § 4; eff. September 13, 1990; amended, Virginia Register Volume 11, Issue 11, eff. March 22, 1995; Volume 29, Issue 4, eff. November 21, 2012; amended and renumbered, Virginia Register Volume 30, Issue 2, eff. October 23, 2013; amended, Virginia Register Volume 31, Issue 24, eff. August 26, 2015; Volume 33, Issue 4, eff. November 17, 2016.

g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.

h. All on-site channels must be verified to be adequate.

Standard E&S Notes

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant (undisturbed) for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
2. Excess excavation disposed of off the site shall be disposed of in accordance with the Virginia Erosion and Sediment Control Handbook.
3. Erosion and Sediment Controls shall be installed in accordance with Virginia Erosion and Sediment Control Handbook and shall be placed prior to or as the first step of the land disturbing activity.
4. Erosion and Sediment Controls shall be maintained so that the sediment carrying runoff from the site will not enter storm drainage facilities.
5. Erosion and Sediment Controls shall be maintained until the disturbed area is stabilized.
6. Properties adjoining the site shall be kept clean of mud or silt carried from the site by vehicular traffic or runoff.
7. The disposal of waste materials removed from erosion and sediment control facilities and the disposal of these facilities shall be in accordance with the Virginia Erosion and Sediment Control Handbook.
8. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.
9. During construction of the project, soil stockpiles shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as soil intentionally transported from the project site.

TABLE 6-1 (Virginia Erosion and Sediment Control Handbook)

GENERAL EROSION AND SEDIMENT CONTROL NOTES

ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and the Virginia Erosion and Sediment Control Regulations 9VAC25-840.

ES-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.

ES-3: All erosion and sediment control measures are to be placed prior to or as the first step in clearing.

ES-4: A copy of the approved erosion and sediment control plan shall be maintained on the site at all times.

ES-5: Prior to commencing land disturbing activities in 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 control plan to the owner for review and approval by the plan approving authority.

ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.

ES-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.

ES-8: During dewatering operations, water will be pumped into an approved filtering device.

ES-9: The contractor shall inspect all erosion 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.

Maintenance Requirements for inclusion in ESC Narrative	
3.01 Safety Fence	1. Safety fence shall be checked regularly for weather-related or other damage. Any necessary repairs must be made immediately.
2.	Care should be taken to secure all access points (gates) at the end of each working day. All locking devices must be repaired or replaced as necessary.
3.05 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.
3.07 Storm Drain Inlet Protection	1. The structure shall be inspected after each rain and repairs made as needed.
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.
3.09 Temporary Diversion Dike	1. The measure shall be inspected after every storm and repairs made to the dike, flow channel, outlet or sediment trapping facility, as necessary.
2.	Once every two weeks, whether a storm event has occurred or not, the measure shall be inspected and repairs made if needed.
3.	Damages caused by construction traffic or other activity must be repaired before the end of each working day.

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION

THE DEVELOPMENT PROPOSES THE CONSTRUCTION OF A 530 LF SHARED-USE ASPHALT TRAIL TO CONNECT PUMP HOUSE DRIVE AND PARK DRIVE. SITE WORK WILL INCLUDE DEMOLITION OF THE EXISTING EARTHEN FOOTPATH AND CLEARING AREA FOR NEW TRAIL. THE 8-FOOT WIDE ASPHALT TRAIL WILL BE CONSTRUCTED ALONG WITH A DRAINAGE SWALE AND BIOTENTION BASIN THAT WILL TREAT STORMWATER AND DISCHARGE TO AN EXISTING STORM STRUCTURE ON-SITE. THERE WILL BE 0.52 AC OF LAND DISTURBANCE WITH THIS PROJECT. THE PROJECT IS ANTICIPATED TO BEGIN IN THE SPRING OF 2019 WITH CONSTRUCTION LASTING APPROXIMATELY ONE MONTH.

EXISTING SITE CONDITIONS

THE SITE IS LOCATED WITHIN THE RMA OF THE CHESAPEAKE BAY PRESERVATION AREA. THE SITE IS CURRENTLY AN ASPHALT/GRAVEL PARKING LOT USED FOR THE PARK TRAIL SYSTEM THAT WILL REMAIN WITH THIS PROJECT. EXISTING LAND COVER CONSISTS OF HIGHLY COMPACTED GRAVEL / ASPHALT PARKING AREA, SHORT GRASS, AND LIGHTLY WOODED AREAS. EXISTING SLOPES IN THE PARKING LOT AREA RANGE FROM 1 TO 5%. EXISTING SLOPES ALONG THE NORTHEAST OF THE SITE RANGE FROM 20 TO 30%. THE EXISTING SITE RUNOFF INCLUDING SOME OFFSITE RUNOFF FROM THE WOODED LOT TO THE NORTHEAST DOWN THE STEEP SLOPES. THE SITE STORMWATER IS CONVEYED BY A SWALE INTO A DROP INLET STRUCTURE WHICH OUTFALLS SOUTHWEST OF THE SITE INTO THE RPA.

ADJACENT SITE

THE PROPERTY IS BORDERED TO THE NORTH BY PUMP HOUSE DRIVE, TO THE EAST BY PARK DRIVE, AND TO THE SOUTH AND WEST BY DENSELY WOODED RPA CONTIGUOUS TO THE JAMES RIVER.

OFF-SITE AREAS

THERE WILL BE MINIMAL WORK WITHIN THE RIGHT-OF-WAY OF PUMP HOUSE DRIVE TO TIE THE PROPOSED TRAIL INTO THE EXISTING CURB RETURN. THERE WILL BE OFFSITE DRAINAGE FROM THE NORTHEAST THAT WILL FLOW THROUGH THE SITE DURING CONSTRUCTION.

SOILS

ACCORDING TO THE MOST RECENT DATA AVAILABLE FOR THE CITY OF RICHMOND FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE, A SINGLE SOIL TYPE IS REPRESENTED ONSITE. THE SOIL FOUND IS LISTED BELOW:

MAY UNIT: 40 - Udothents - Dumps Complex, Pits

CRITICAL AREAS

CRITICAL AREAS INCLUDE EXISTING STEEP SLOPES ALONG THE NORTHEAST OF THE SITE AND PROPOSED DRAINAGE SWALES. ALSO, WORK IN AND AROUND PUBLIC ROADS AND EXISTING PARKING LOT TO REMAIN OPEN DURING CONSTRUCTION.

EROSION AND SEDIMENT CONTROL MEASURES

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. THE MINIMUM STANDARDS OF THE VESCH SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE BY LOCAL AUTHORITIES HAVING JURISDICTION.

1. INLET PROTECTION (VESCH PRACTICE #3.07-8 AND #3.07-2) IS TO BE PLACED AT THE EXISTING INLET AS INDICATED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. INLET PROTECTION IS TO BE PLACED AT THE PROPOSED BIOTENTION OVERFLOW INLET AS INDICATED AT THE TIME THE STRUCTURE IS SET TO RECEIVE RUNOFF.

2. SILT FENCE (VESCH PRACTICE #3.05) WILL BE INSTALLED IN AREAS THAT HAVE POTENTIAL FOR SEDIMENT TO DRAIN OFFSITE.

3. DIVERSION (VESCH PRACTICE #3.12) WILL BE USED TO CONVEY DRAINAGE TO THE EXISTING STORM INLET. THE DIVERSION WILL BE CONVERTED TO THE PERMANENT DRAINAGE SWALE AS DEPICTED ON THE GRADING PLAN.

MANAGEMENT STRATEGIES

1. PROVIDE PERMANENT SEEDING OR OTHER STABILIZATION IMMEDIATELY AFTER GRADING.

2. ISOLATE TRENCHING FOR UTILITIES AND DRAINAGE FROM DOWNSTREAM CONVEYANCES IN ORDER TO MINIMUM PERIMETER CONTROLS.

3. ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE MAINTAINED UNTIL THEY ARE NO LONGER REQUIRED TO COMPLY WITH THE CONTRACT DOCUMENTS OR STATE LAW.

VEGETATION PRACTICES

1. TEMPORARY SEEDING - 3.31

ALL DENUDED AREAS WHICH WILL BE LEFT DORMANT FOR MORE THAN 14 DAYS SHALL BE SEEDED WITH FAST GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING OF THOSE AREAS. SELECTION OF THE SEED MIXTURE SHALL DEPEND ON THE TIME OF YEAR IT IS APPLIED.

2. PERMANENT SEEDING - 3.32

ALL DENUDED AREAS SHALL BE SEEDED WITH PERMANENT VEGETATION FOR FINAL STABILIZATION OF THE PROJECT

3. VEG- 3.37

ALL DENUDED AREAS WHERE VEGETATION OTHER THAN TURF IS PREFERRED SHALL BE STABILIZED BY ESTABLISHING VEGETATIVE COVER WITH TREES, SHRUBS, VINES, OR GRASS COVERS. APPLY AS INDICATED (ALSO REFER TO LANDSCAPE PLAN FOR AREAS WHERE ORNAMENTALS, TREES AND SHRUBS ARE PLANNED.)

PERMANENT STABILIZATION

SEEDING SHALL BE IN ACCORDANCE WITH STD. & SPEC. 3.32, PERMANENT SEEDING. SEED TYPE SHALL BE AS SPECIFIED FOR "MINIMUM CARE LAWNS" AND "GENERAL SLOPES" IN THE HANDBOOK.

1. ANY DISTURBED AREA NOT PAVED, SODDED, OR BUILT UPON, WILL HAVE A VEGETATIVE COVER PRIOR TO FINAL INSPECTION, AND IN THE OPINION OF THE DCR WILL BE MATURE ENOUGH TO CONTROL SOIL EROSION SATISFACTORILY AND SURVIVE SEVER WEATHER CONDITIONS.

2. WINTERIZATION-ANY DISTURBANCE AREA NOT PAVED, SODDED, OR BUILT UPON BY OCTOBER 15TH IS TO BE SEEDED AND MULCHED ON THAT DATE UNLESS WAIVED BY THE DCR.

3. TEMPORARY SEEDING WILL BE APPLIED WITHIN 7 DAYS TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 14 DAYS. FOR TEMPORARY SEEDING USE 50% OF THE RECOMMENDED RATES OF FERTILIZER, LIME AND FULL AMOUNT OF SEED AND MULCH REQUIRED FOR REGULAR SEEDING.

4. ELECTRIC POWER, TELEPHONE, AND GAS SUPPLY TRENCHES ARE TO BE COMPACTED, SEED AND MULCHED WITHIN 7 DAYS AFTER BACKFILL.

5. ALL TEMPORARY EARTH BERMS, DIVERSIONS, AND SILT DAMS ARE TO BE MULCHED AND SEEDED FOR VEGETATIVE COVER IMMEDIATELY AFTER GRADING. STRAW OR HAY MULCH IS REQUIRED. THE SAME APPLIES TO ALL STOCKPILES, ON SITE AS WELL AS SOIL TRANSPORTED FROM THE PROJECT SITE.

CHECK SET
NOT FOR
CONSTRUCTION

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 604.200.6500 FAX 604.560.1016 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

DATE

10/25/2019

DRAWN BY
N. NORDBERG

DESIGNED BY
N. NORDBERG

CHECKED BY
L.A. GUDORP

SCALE
N/A

PUMP HOUSE PARKING LOT TRAIL
FIFTH DISTRICT - CITY OF RICHMOND - VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

JOB NO.
36157.002

SHEET NO.
C5.2

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.