

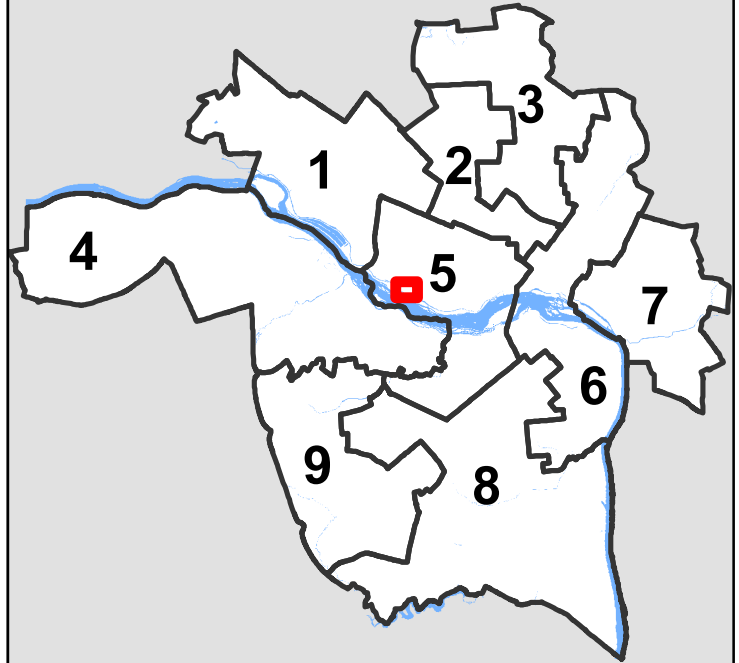
City of Richmond Department of Planning & Development Review

Location, Character, and Extent

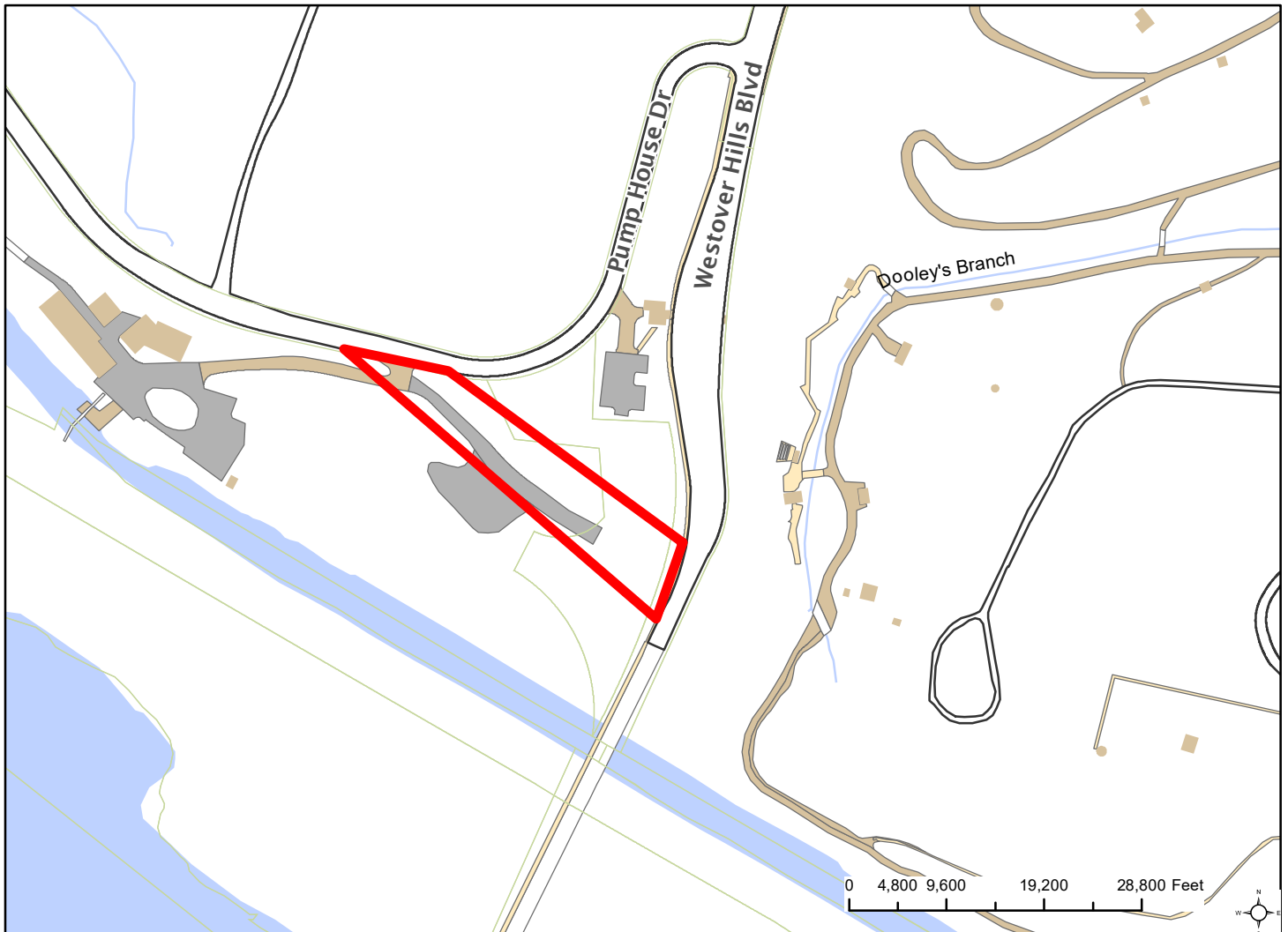
LOCATION:
1704 Pump House Dr. (Pump House Parking Lot)

COUNCIL DISTRICT: 5

PROPOSAL: Review of trail improvements linking Pump House Park, Byrd Park, and the North Bank Trail



*For questions, please contact Josh Son
at 646-3741 or joshua.son@richmondgov.com*





Application for URBAN DESIGN COMMITTEE Review

Department of Planning and Development Review
Planning & Preservation Division
900 E. Broad Street, Room 510
Richmond, Virginia 23219
(804) 646-6335

<http://www.richmondgov.com/CommitteeUrbanDesign>

Application Type

- Addition/Alteration to Existing Structure
 New Construction
 Streetscape
 Site Amenity

- Encroachment
 Master Plan
 Sign
 Other

Review Type

- Conceptual
 Final

Project Name: _____

Project Address: _____

Brief Project Description (this is not a replacement for the required detailed narrative) : _____

Applicant Information

(on all applications other than encroachments, a City agency representative must be the applicant)

Name: _____ Email: _____

City Agency: _____ Phone: _____

Address: _____

Main Contact (if different from Applicant): _____

Company: _____ Phone: _____

Email: _____

Submittal Deadlines

All applications and support materials must be filed no later than 21 days prior to the scheduled meeting of the Urban Design Committee (UDC). Please see the schedule on page 3 as actual deadlines are adjusted due to City holidays. **Late or incomplete submissions will be deferred to the next meeting.**

Filing

Applications can be mailed or delivered to the attention of "Urban Design Committee" at the address listed at the top of this page. **It is important that the applicant discuss the proposal with appropriate City agencies, Zoning Administration staff, and area civic associations and residents prior to filing the application with the UDC.**

UDC Background

The UDC is a ten member committee created by City Council in 1968 whose purpose is to advise the City Planning Commission on the design of projects on City property or right-of-way. The UDC provides advice of an aesthetic nature in connection with the performance of the duties of the Commission under Sections 17.05, 17.06 and 17.07 of the City Charter. The UDC also advises the Department of Public Works in regards to private encroachments in the public right-of-way.

Pump House Parking Lot Trail – Project Narrative

Purpose and Description of the Project

The Department of Parks, Recreation, and Community Facilities (DPRCF) plans to construct a 530-foot long eight-foot wide asphalt trail to connect existing trail networks between Pump House Drive and Park Drive at the north end of the Boulevard Bridge. Currently, pedestrians and cyclists use a footpath that exists on the site to move between the parking lot and Park Drive. This trail will be dimensioned for two-way traffic flow and will serve both cyclists and pedestrians accessing the Pump House Park, Byrd Park, and the North Bank Trail. The trail will also be designed to Virginia Department of Transportation (VDOT) “shared used path” standards and to Architectural Barriers Act (ABA) Accessibility Standards for trails to provide an accessible pathway. (The more northern of the two spurs connecting to the sidewalk along Pump House Drive is not graded to accessible standards.)

The trail connector will be bordered by locally-sourced granite boulders (some already stockpiled at the site) to form a traffic barrier through the Pump House Parking Lot, and it will be furnished with repurposed concrete blocks (from the site). The stormwater management plan includes a swale that roughly parallels the length of the trail and will conduit water to a bioretention basin (level 2) adjacent to the trail at its western end. This stormwater best management practice (BMP) will be planted and will be visible from Pump House Drive. Existing signs will be resituated with the new design; additional trail-related signage will be added by DPRCF as needed using their standard signage program.

The trail crosses property owned by the Department of Public Utilities (DPU) that is currently used for the parking lot and trailhead for the North Bank Trail, as well as property owned by the Richmond Metropolitan Transportation Authority (RMTA) along Park Drive south of the toll plaza. The project has been permitted with RMTA.

Project Background

James River Park System (JRPS) staff with DPRCF engaged Timmons Group for technical services to design this trail connector improvement. These services began with a review of two schematic design alternatives for the site that HKS Architects produced in Fall 2016. Timmons Group generated preliminary cost estimates for both alternatives to assist DPRCF in the budget and planning process. Subsequently, DPRCF contracted with Timmons Group in Winter 2017 to refine one of the schematic alternatives into a final design viable for implementation.

The services for producing a final design included the creation of a base map (in lieu of a field survey) and construction documentation suitable for bidding. The base map comprised aerial imagery, City of Richmond GIS data, and field observations collected from a site visit, all compiled into AutoCAD for construction documentation. The construction documents consisted of existing site conditions, a demolition plan, the trail design and layout, grading and drainage measures, and construction notes and details. Timmons Group met with JRPS staff on site to review the construction plans and make notes for revising the construction plan set. Initial construction documentation was completed in Spring 2017. Subsequently, DPRCF applied for a Recreational Trails Program (RTP) grant through the Virginia Department of Conservation and Recreation (DCR) (see Project Budget and Funding Sources). As a part of that grant application, Timmons Group generated a revised cost estimate for the project and a new

proposal for additional planning, design, and construction documentation work needed to guide the project through the review and permitting processes required by the City and DCR (as stipulated by the terms of the grant program).

Timmons Group updated the construction document set in Fall 2017 to include a stormwater management plan that meets local and state requirements; this is the plan set included in this UDC submission. This project is being submitted to UDC for review and approval by the Planning Commission prior to submitting to the DPU for the permitting process pertaining to land disturbance, stormwater management, and protection of the Chesapeake Bay watershed.

Project Budget and Funding Sources

The project budget is \$124,634.40, which includes the following:

- Environmental and cultural resource studies needed for National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance (given the federal funding)
- Submission of an application and design exhibits to the City's Urban Design Committee (UDC) and the Planning Commission and assistance with the approval process of these two bodies
- Submission of applications and design drawings to the City's Department of Public Utilities (DPU) and assistance with the permitting process
- Construction administration of the project
- Construction of an eight-foot wide asphalt trail, bioretention facility, and associated landscaping and site amenities.

The project is being funded through a Recreational Trails Program (RTP) grant award. The RTP is a federally-funded program 80-20 matching reimbursement program administered by the Virginia Department of Conservation and Recreation (DCR). DPRCF is sourcing the 20% match (20% of the project total budget or \$24,926.80) from the City's Major Parks fund. The remainder of the budget is funded through the grant reward. DPRCF is working closely with DCR staff on the grant reporting requirements to track the project's progress and secure reimbursement.

Construction Program

This is a relatively small-scale and simple construction project and it is estimated that construction will take approximately one month to complete. The estimated construction start date is April 22, 2019 and completion is expected by the beginning of June 2019.

Landscaping Plan and Maintenance Analysis

The landscaping consists of three components:

1. Reseeding disturbed areas including the footprint of the now existing footpath
2. Planting trees to replace non-invasive trees removed on City-owned property (on a one-to-one replacement ratio by diameter at breast height)
3. Plantings in the bioretention basin

Landscape maintenance will primarily belong to the DPU as the property owner and as the agency responsible for mowing and maintaining stormwater BMPs on City-owned properties. Tree care of trees on City-owned property is the responsibility of the Urban Forestry division of the Department of Public Works (DPW).

The maintenance of the bioretention basin should include a minimum of annual maintenance and show adhere to the guidelines in the Virginia Stormwater Management Handbook, including the following:

- “Section 9: Maintenance” of the Virginia DCR Stormwater Design Specification No. 9 for bioretention, available online at https://www.swbmp.vwrrc.vt.edu/wp-content/uploads/BMP_Spec_No_9_BIORETENTION.pdf
- Appendix 9-C.10.0 Bioretention Practices: O&M Checklist, available online https://www.swbmp.vwrrc.vt.edu/wp-content/uploads/36_Chap-9_App-9-C_Example-BMP-Maint-Insp-Checklists.pdf

There is one additional tree that will be removed on this project (the *Paulownia tomentosa*), but it is on RTMA-owned property and is not subject to the City’s tree ordinance.

PUMP HOUSE PARKING LOT TRAIL

URBAN DESIGN COMMITTEE – FINAL REVIEW
JANUARY 2019





Parking lot entrance from Pump House Drive – western end of proposed trail.



View to Pump House Drive from western end of proposed trail.



Planted bioretention basin to be located in this lawn area and will be visible from Pump House Drive.



Drive aisle to parking lot – trail to be located along left side.



View across existing parking lot – trail to run along edge of parking lot at the bottom of the slope seen in the background.



Recently installed water fountain to remain. Similar boulders to be used as a barrier between parking lot and trail



Trail amenities, including kiosk and waste bins, to be relocated.



Granite boulders and concrete slabs on site to be repurposed on site.



Existing footpath to be removed and the area reseeded. Signs to be relocated.



Trail will connect to sidewalk at two points along Park Drive at the Boulevard Bridge – eastern end of proposed trail.



PUMP HOUSE PARKING LOT TRAIL

EXISTING CONDITIONS – DECEMBER 2018



CITY OF RICHMOND, VIRGINIA

DEPARTMENT OF PARKS, RECREATION AND COMMUNITY FACILITIES



PUMP HOUSE PARKING LOT TRAIL

INDEX OF SHEETS

SHEET TITLE

SHEET NO.

- COVER SHEET
- EXISTING CONDITIONS AND DEMOLITION PLAN
- LAYOUT AND GRADING PLAN
- NOTES AND DETAILS
- STORMWATER MAPS AND CALCULATIONS

- C0.0
- C1.0
- C2.0
- C3.0
- C4.0



VICINITY MAP

1"=2000'

December 13, 2018

OWNER
CITY OF RICHMOND PARKS, RECREATION &
COMMUNITY FACILITIES
4201 RIVERSIDE DRIVE
RICHMOND, VA 23225
TELEPHONE: (804) 646-5829
CONTACT: NATHAN BURRELL
EMAIL: NATHAN.BURRELL@RICHMONDGOV.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

REVISIONS		
NO.	DATE	COMMENTS

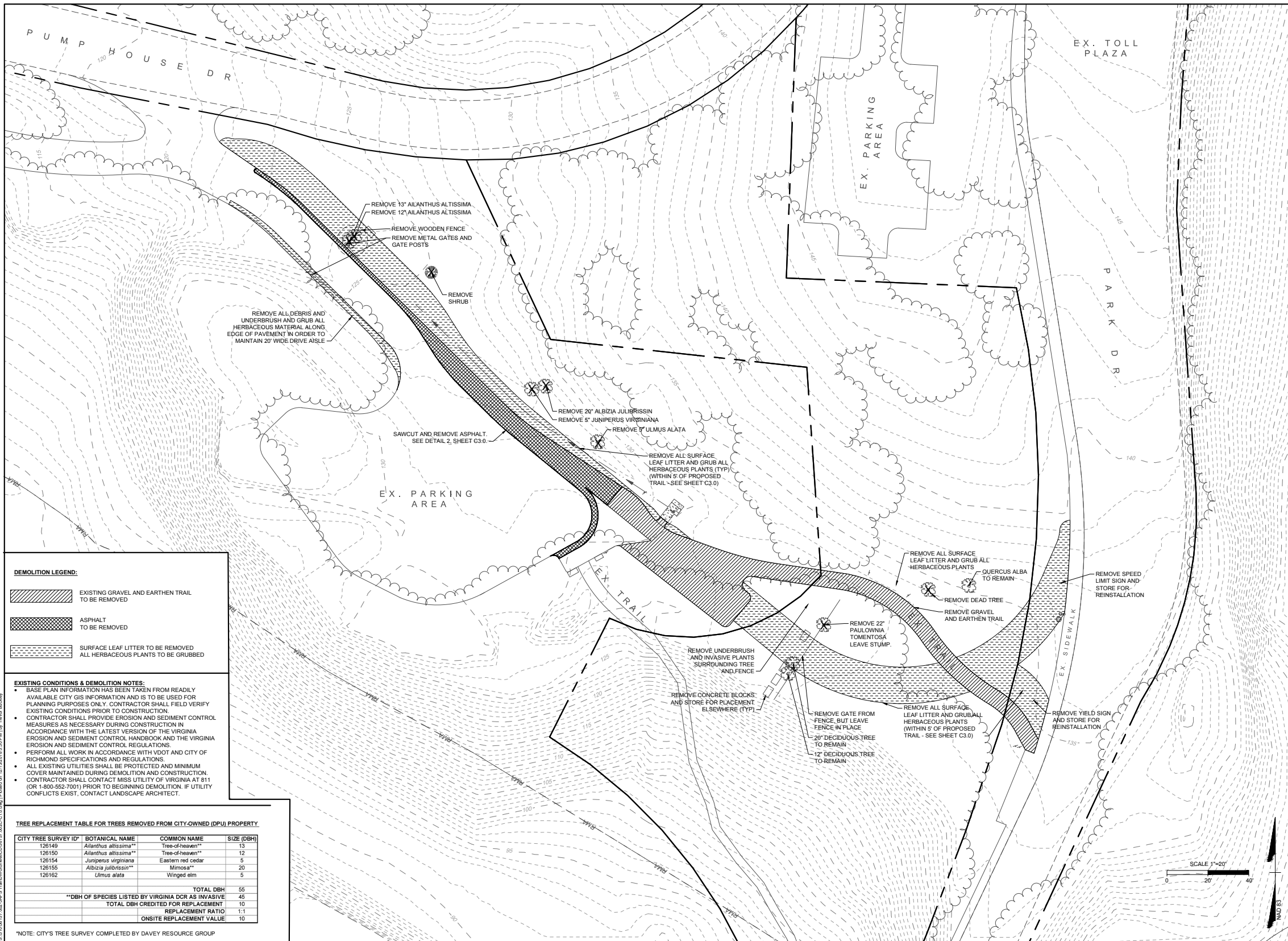


DRAWING NO: 36157.002

PUMP HOUSE PARKING LOT TRAIL

CONSTRUCTION DOCUMENTS – COVER SHEET





DEMOLITION LEGEND:

	EXISTING GRAVEL AND EARTHEN TRAIL TO BE REMOVED
	ASPHALT TO BE REMOVED
	SURFACE LEAF LITTER TO BE REMOVED ALL HERBACEOUS PLANTS TO BE GRUBBED

- EXISTING CONDITIONS & DEMOLITION 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.
 - CONTRACTOR SHALL PROVIDE EROSION AND SEDIMENT CONTROL MEASURES AS NECESSARY DURING CONSTRUCTION IN ACCORDANCE WITH THE LATEST VERSION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS.
 - PERFORM ALL WORK IN ACCORDANCE WITH VDOT AND CITY OF RICHMOND SPECIFICATIONS AND REGULATIONS.
 - ALL EXISTING UTILITIES SHALL BE PROTECTED AND MINIMUM COVER MAINTAINED DURING DEMOLITION AND CONSTRUCTION.
 - CONTRACTOR SHALL CONTACT MISS UTILITY OF VIRGINIA AT 811 (OR 1-800-552-7001) PRIOR TO BEGINNING DEMOLITION. IF UTILITY CONFLICTS EXIST, CONTACT LANDSCAPE ARCHITECT.

TREE REPLACEMENT TABLE FOR TREES REMOVED FROM CITY-OWNED (DPU) PROPERTY

CITY TREE SURVEY ID*	BOTANICAL NAME	COMMON NAME	SIZE (DBH)
126149	<i>Allanthurus altissima</i> **	Tree-of-heaven**	13
126150	<i>Allanthurus altissima</i> **	Tree-of-heaven**	12
126154	<i>Juniperus virginiana</i>	Eastern red cedar	5
126155	<i>Albizia julibrissin</i> **	Mimosa**	20
126162	<i>Ulmus alata</i>	Winged elm	5
			TOTAL DBH
			55
			**DBH OF SPECIES LISTED BY VIRGINIA DCR AS INVASIVE
			45
			TOTAL DBH CREDITED FOR REPLACEMENT
			10
			REPLACEMENT RATIO
			1:1
			ONSITE REPLACEMENT VALUE
			10

*NOTE: CITY'S TREE SURVEY COMPLETED BY DAVEY RESOURCE GROUP

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

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL: 804-200-6500 FAX: 804-356-0116 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

DATE	REVISION DESCRIPTION
12/13/2018	

JOB NO.
36157.002

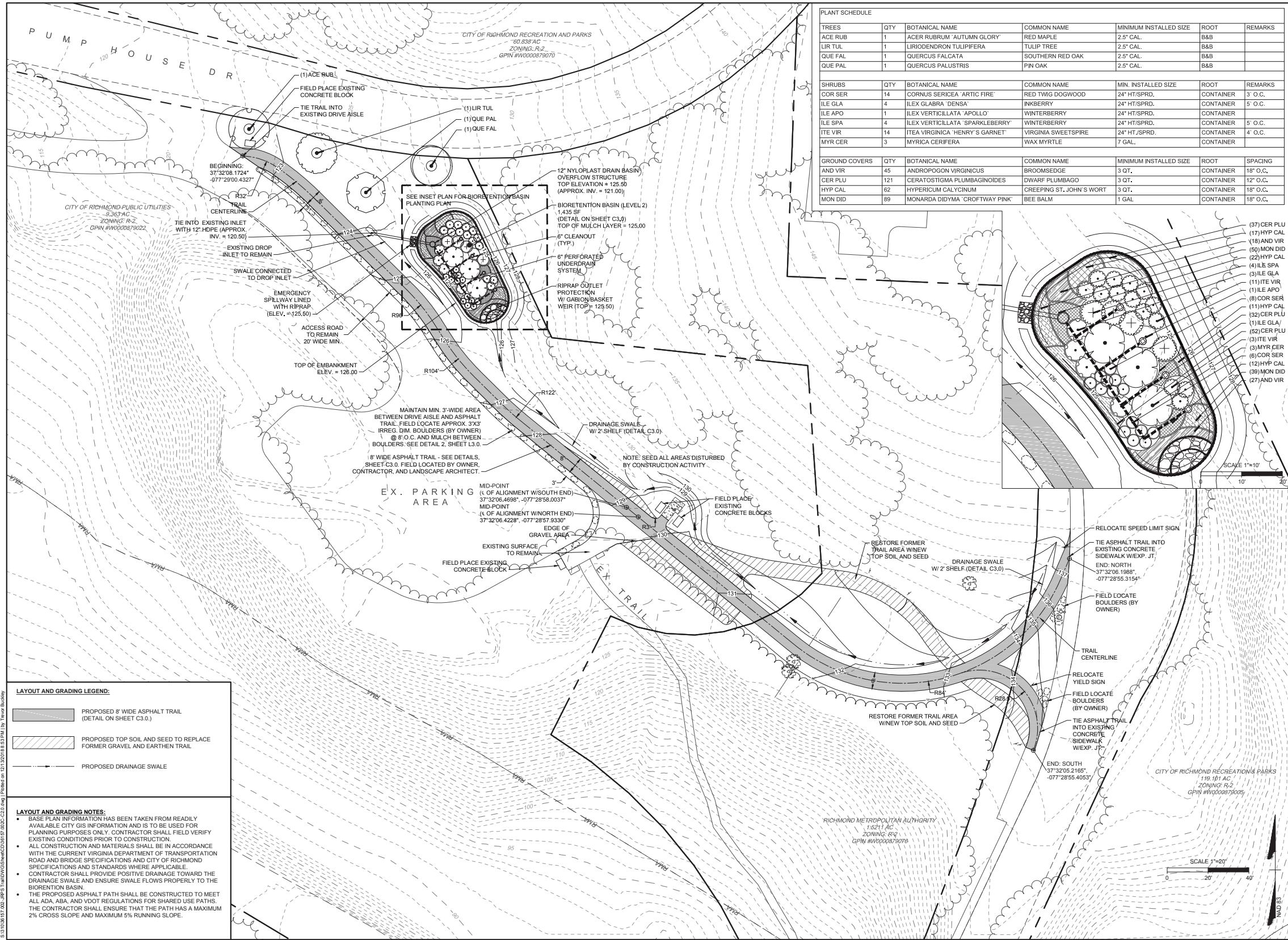
SHEET NO.
C1.0

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHALL BE IN FEET AND INCHES (ROUNDED UP). THIS DRAWING IS THE PROPERTY OF TIMMONS GROUP. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF TIMMONS GROUP.

PUMP HOUSE PARKING LOT TRAIL

CONSTRUCTION DOCUMENTS – EXISTING CONDITIONS AND DEMOLITION PLAN





TREES	QTY	BOTANICAL NAME	COMMON NAME	MINIMUM 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 'DENA'	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	MINIMUM INSTALLED SIZE	ROOT	SPACING
AND VIR	45	ANDROPOGON VIRGINICUS	BROOMSEDGE	3 QT.	CONTAINER	18" O.C.
CER PLU	121	CERATOSTIGMA PLUMBAGINOIDES	DWARF PLUMBAGO	3 QT.	CONTAINER	12" O.C.
HYP CAL	62	HYPERICUM CALYCIUM	CREeping ST. JOHN'S WORT	3 QT.	CONTAINER	18" O.C.
MON DID	89	MONARDA DIDYMA 'CROFTWAY PINK'	BEE BALM	1 GAL.	CONTAINER	18" O.C.

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

DATE: 12/13/2018
DRAWN BY: T.B./N.N.
DESIGNED BY: S.W./T.B./N.N.
CHECKED BY: S. WILEY
SCALE: AS NOTED

YOUR VISION ACHIEVED THROUGH OURS.

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL: 804-200-6500 FAX: 804-960-0106 www.timmons.com

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

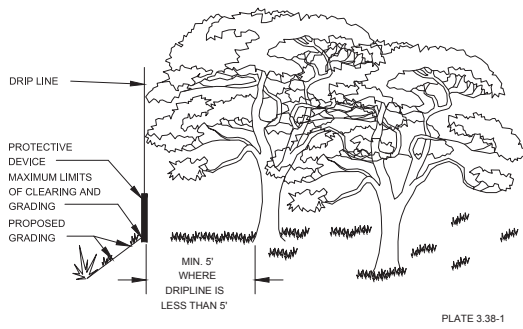
LAYOUT AND GRADING NOTES:

- 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.
- 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.

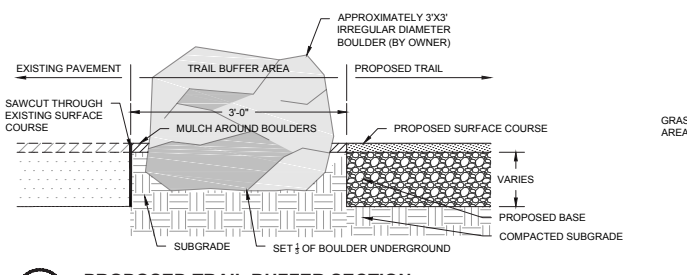
PUMP HOUSE PARKING LOT TRAIL

CONSTRUCTION DOCUMENTS – LAYOUT AND GRADING PLAN

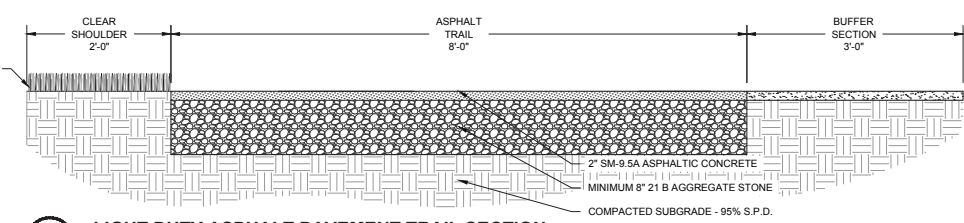




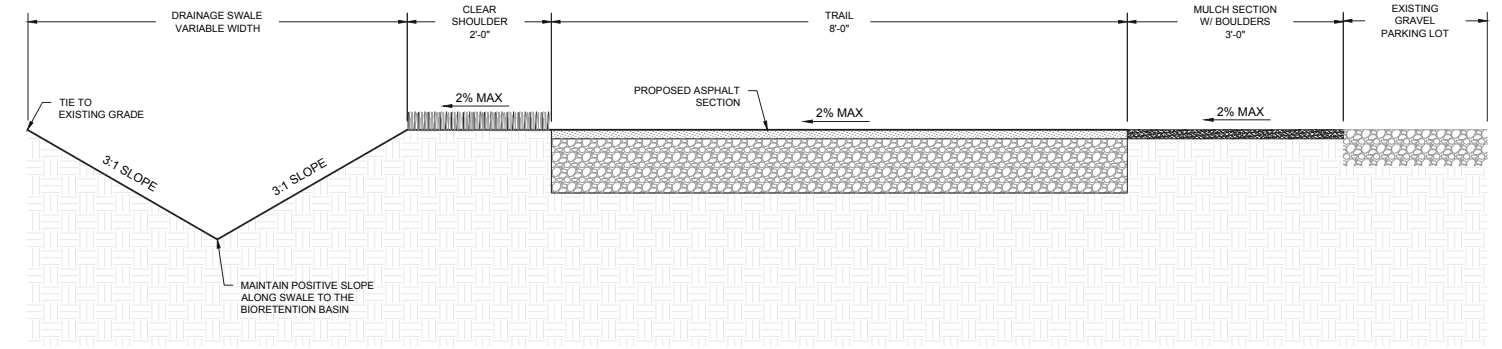
4 TREE PROTECTION AND PRESERVATION
NOT TO SCALE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK



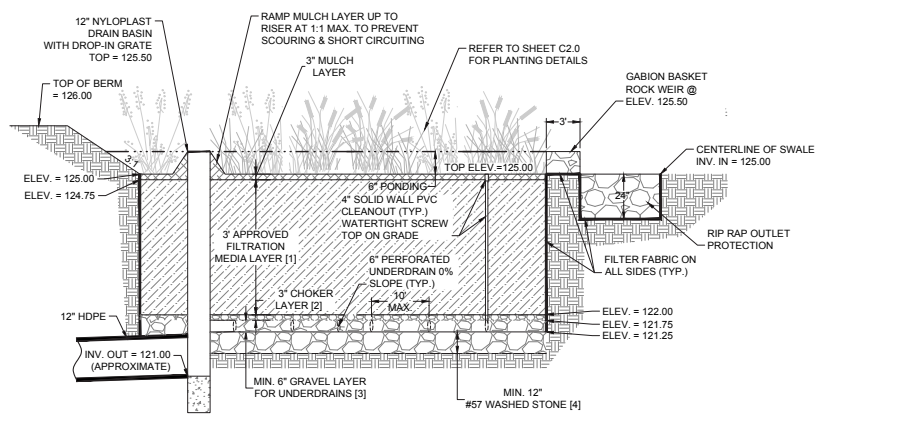
2 PROPOSED TRAIL BUFFER SECTION
1" = 1'-0"



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



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

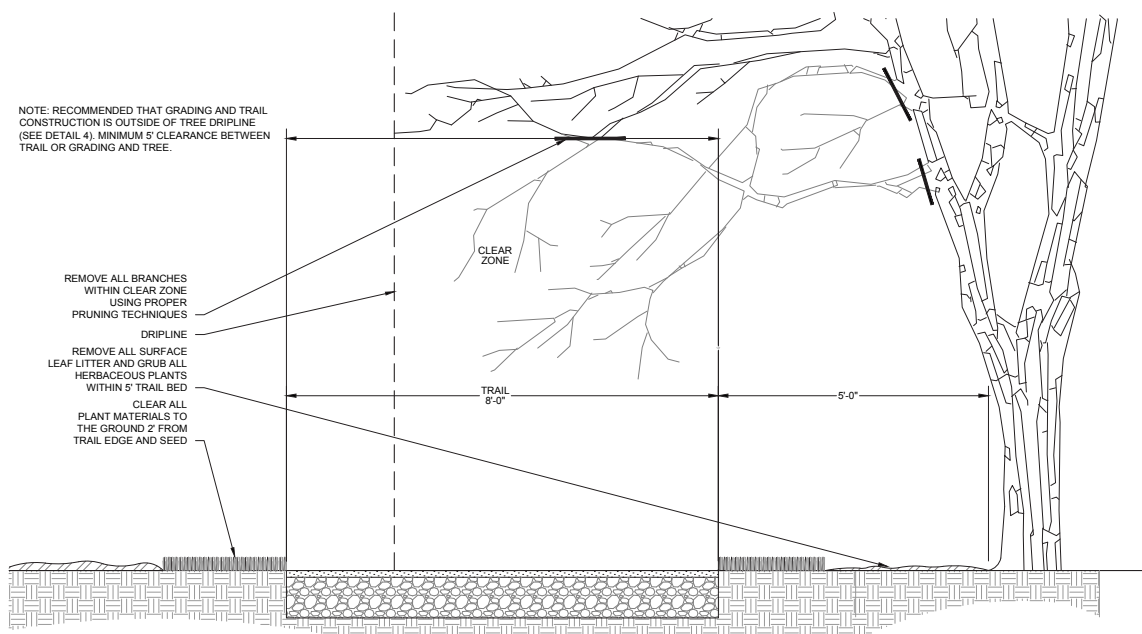


NOTE: ALL ELEVATIONS ARE APPROXIMATE BASED ON GIS INFORMATION AND ARE SUBJECT TO CHANGE DUE TO FIELD CONDITIONS.

[1] 36" BIOFILTER MEDIA MIX (MUST HAVE PHOSPHOROUS INDEX, P-INDEX BETWEEN 10 - 30, OR BETWEEN 7 MG/KG & 21 MG/KG OF P)
 [2] 3" WASHED #8 STONE BRIDGE LAYER
 [3] 6" #57 WASHED STONE
 [4] 12" MIN. #57 WASHED STONE BELOW UNDERDRAIN INVERT. INCREASE STONE DEPTH AS NEEDED TO MAKE CONTACT W/ UNCOMPACTED NATIVE SOILS (APPROX. 1-2 FT.)

- NOTES:**
- BUILD AND VEGETATE BIORETENTION BASIN AS EARLY AS POSSIBLE TO ESTABLISH PLANTINGS BEFORE DIRECTING STORMWATER RUNOFF TO IT OR DIVERT STORMWATER AROUND FACILITY. PREFERABLY, THIS PERIOD WOULD LAST A MINIMUM OF 3 MONTHS.
 - INFILTRATION AREAS (THE AREA OF THE RAIN GARDEN AS DEFINED BY THE TOP ELEVATION OF THE FACILITY) SHALL BE FENCED OFF FROM THE FIRST DAY OF EARTH MOVING UNTIL PROJECT COMPLETION TO PREVENT COMPACTION OF THE SUBGRADE, DIRT TRACKING ONTO ANY LAYER OF THE FACILITY, AND STOCKPILING OF CONSTRUCTION MATERIALS THAT MAY CLOG THE SURFACE.
 - DURING EXCAVATION OF NATIVE SOILS TO THE BOTTOM OF THE FACILITY, RAINFALL MAY CAUSE FINES TO CLOG THE SURFACE OF THE FACILITY. IF THIS OCCURS DURING CONSTRUCTION, HAND RAKE THE SURFACE TO A DEPTH OF 3" TO RESTORE INFILTRATION CAPACITY.
 - NOTIFY LANDSCAPE ARCHITECT IN ADVANCE OF CONSTRUCTING THIS FACILITY SO CONSTRUCTION OBSERVATION MAY BE PERFORMED TO IDENTIFY VARIATIONS IN THE FIELD THAT MAY AFFECT DESIGN AND VERIFY PROPER CONSTRUCTION.

6 BIORETENTION BASIN
NOT TO SCALE



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

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL: 804-200-6500 FAX: 804-960-0116 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

REVISION DESCRIPTION	DATE
	12/13/2018
DRAWN BY T. BUCKLEY	
DESIGNED BY S. W./T. B.	
CHECKED BY S. WILEY	
SCALE AS SHOWN	

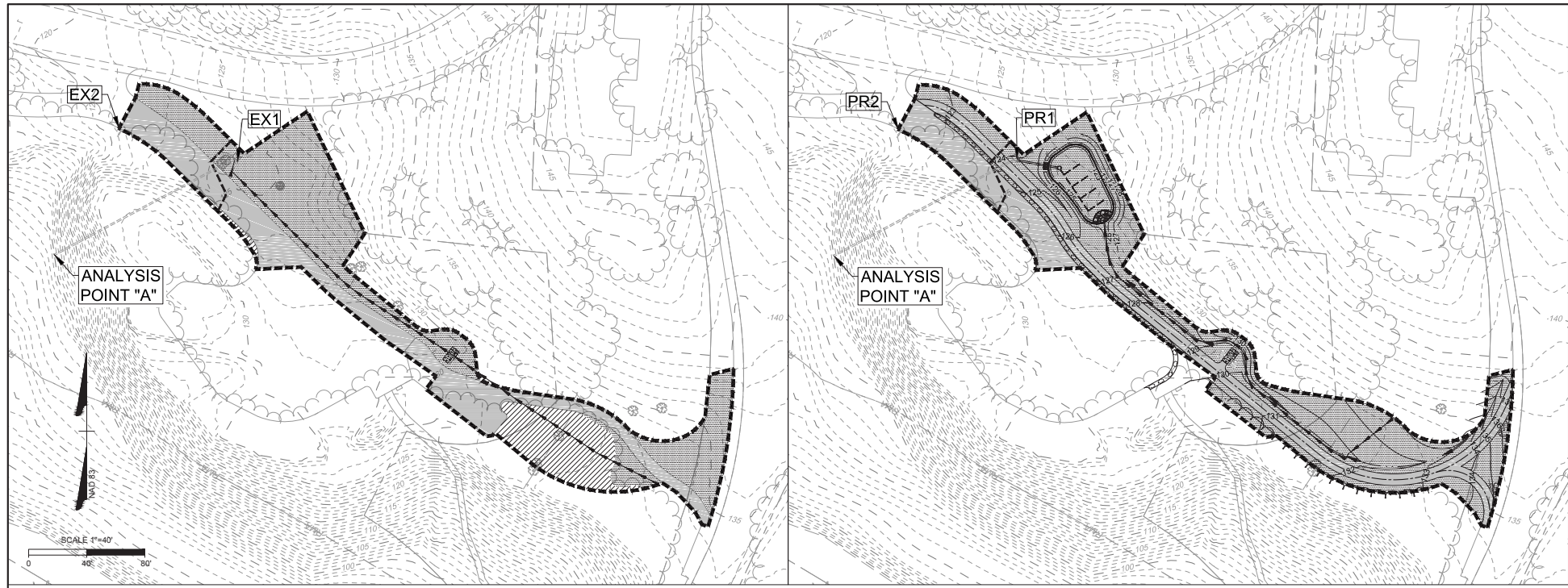
TIMMONS GROUP

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

JOB NO.
36157.002
SHEET NO.
C3.0

THIS DRAWING IS THE PROPERTY OF TIMMONS GROUP. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF TIMMONS GROUP.





LAND COVER MAP LEGEND:

- LIMITS OF DISTURBANCE
- - - DRAINAGE DIVIDE
- - - FLOW PATH (Tc)
- ▨ FORESTED AREA
- ▩ LAWN AREA
- 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 / STORAGE DEPTH = 929 CF / 1.65 FT = 563 SF (1,660 SF PROVIDED)

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
 1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
 TEL: 804-780-0550 FAX: 804-786-1110 | www.timmons.com

DATE	REVISION DESCRIPTION
12/13/2018 <td>YOUR VISION ACHIEVED THROUGH OURS.</td>	YOUR VISION ACHIEVED THROUGH OURS.

DATE: 12/13/2018
 DRAWN BY: T. BUCKLEY
 DESIGNED BY: S.W./T.B.
 CHECKED BY: S. WILEY
 SCALE: 1"=20'

EXISTING LAND COVER MAP

PROPOSED LAND COVER MAP

DEQ Virginia Runoff Reduction Method for Development Compliance Spreadsheet - Version 8.0
 BMP Design Specification List: 2013 South Side & Spots

Site Summary

Project Name: PUMP HOUSE PARKING LOT TRAIL
 Date: 12/14/2018
 Calculated By: Nick Nordberg

Site Land Cover Summary

Pre-Development Land Cover (Acres)	Post-Development Land Cover (Acres)
Forested Area: 0.00	Forested Area: 0.00
Lawn Area: 0.00	Lawn Area: 0.00
Impervious Area: 0.00	Impervious Area: 0.00

Site Runoff and Land Cover Reduction Summary

Runoff Volume (CF)	Runoff Reduction (CF)
Pre-Development: 2,701	Post-Development: 2,134

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} (cfs)	0.88 CFS
RV _{Pre-Dev} (CF)	2,701 CF

Post-Development
Contributing Drainage Area(s): PR1 & PR2

Data Input	Descriptions
Total Q _{Post-Dev} (cfs)	0.80 CFS
Unadjusted RV _{Post-Dev} (CF)	2,134 CF
RV Reduction	567 CF
RV _{Post-Dev} (CF)	2,134 CF

Improvement Factor: 0.9
 Per DEQ requirement for projects that disturb less than one (1) acre

Energy Balance Equation

$$Q_{Post-Developed} \leq 1.1 \cdot \left(\frac{Q_{Pre-Developed} + RV_{Pre-Developed}}{RV_{Post-Developed}} \right)$$

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

Peak Flow Check

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

Q_{Post-Developed}: 0.80 cfs
 Q_{Pre-Developed}: 0.88 cfs
 Check: 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

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} (cfs)	1.32 CFS
10-Year Q _{Pre-Dev} (cfs)	2.35 CFS

Post-Development
Contributing Drainage Area(s): PR1 & PR2

Data Input	Descriptions
2-Year Q _{Post-Dev} (cfs)	1.16 CFS
10-Year Q _{Post-Dev} (cfs)	2.27 CFS

2-Year Flood Protection Check

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

Q_{Post-Developed}: 1.16 cfs
 Q_{Pre-Developed}: 1.32 cfs
 Check: OK

10-Year Flood Protection Check

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

Q_{Post-Developed}: 2.27 cfs
 Q_{Pre-Developed}: 2.35 cfs
 Check: 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 VSMP 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.

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 UN-DETAINED. 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.

Drainage Area A Summary

Land Cover Summary

Land Cover	Area (Ac)	Curve Number
Forested Area	0.00	85
Lawn Area	0.00	90
Impervious Area	0.00	93

BMP Selections

BMP	Area (Ac)	Curve Number
Bioretention Basin	0.52	85

Runoff Volume and CN Calculations

Runoff Volume (CF)	Curve Number
Pre-Development	2,701
Post-Development	2,134

WATER QUALITY CALCULATIONS

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



DECEMBER 13, 2018

PUMP HOUSE PARKING LOT TRAIL

SITE PLAN RENDERING



DESIGN PRECEDENT



BIORETENTION PLANTING PALETTE



SOUTHERN WAX MYRTLE



RED-TWIG DOGWOOD



INKBERRY



WINTERBERRY



SHARED USE PATH / NON-MOTORIZED ASPHALT TRAIL



BROOMSEDGE



DWARF PLUMBAGO



CREeping ST. JOHN'S WORT



BEE BALM



BIORETENTION BASIN

PUMP HOUSE PARKING LOT TRAIL
DESIGN PRECEDENT AND BIORETENTION PLANTING PALETTE

