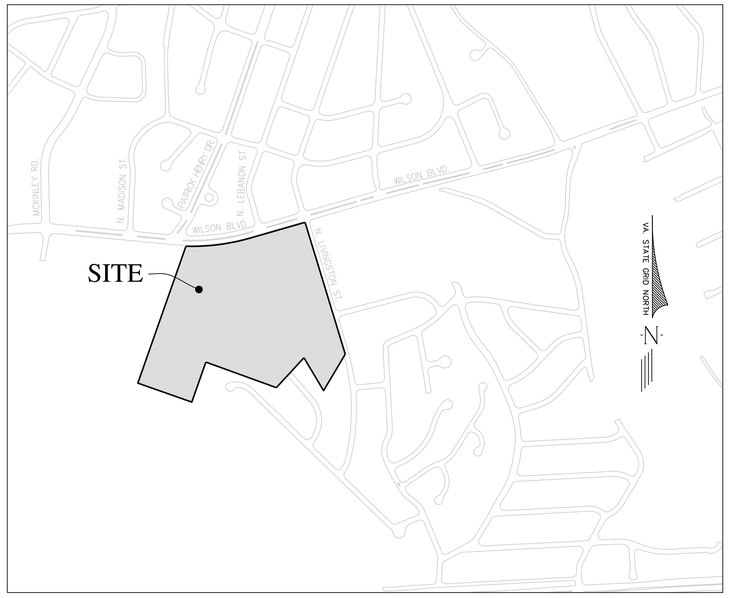
CIVIL ENGINEERING PLAN
UPTON HILL REGIONAL PARK
PARK IMPROVEMENTS
ARLINGTON COUNTY, VA
SWM PROJECT #: SWM 18-0119

GENERAL NOTES

1. THE ARLINGTON COUNTY REAL PROPERTY CODE (RPC) FOR THE SUBJECT SITE IS: RPC 12042103. THE PARCEL IS ZONED S-3A/R-6 WITH A TOTAL PROPERTY AREA OF 1,020,006 S.F./23.42 A.C. THE PROJECT IS BEING DEVELOPED PER THE S-3A/R-6 ZONING REQUIREMENTS.
2. THE ARLINGTON COUNTY ADDRESS FOR THE SITE IS 6060 WILSON BLVD, ARLINGTON, VA 22205.
3. THE PURPOSE OF THIS PLAN IS TO PROPOSE A NEW PARKING LOT AND OTHER MINOR IMPROVEMENTS TO THE PROPERTY.
4. ELEVATIONS ARE BASED ON ARLINGTON COUNTY DATUM.
5. THE SITE SHOWN HEREON IS REFERENCED TO THE VIRGINIA COORDINATE SYSTEM OF 1983 AS COMPUTED FROM A FIELD RUN BOUNDARY AND HORIZONTAL CONTROL SURVEY.
5. THE SITE SHOWN HEREON IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 AS COMPUTED FROM A FIELD VERTICAL CONTROL SURVEY.
6. BOUNDARY AND TOPOGRAPHY PER SURVEY BY URBAN ENGINEERING & ASSOCIATES, INC. NOVEMBER, 2017.
7. STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES (BMP) WILL BE PROVIDED ONSITE WITH THE USE OF POROUS ASPHALT AND BIO-RETENTION.
8. ALL STORM DRAINAGE FACILITIES CONSTRUCTED WITH THIS PROJECT SHALL MEET OR EXCEED ARLINGTON COUNTY STANDARDS AND SPECIFICATIONS.
9. ALL STORM DRAINAGE AREAS DEFINED HEREON AS SHEETFLOW SATISFY THE SHEETFLOW PROVISIONS OF 9VAC25-870-66 AND SHALL HAVE HAVE NO ADVERSE IMPACT TO ADJACENT PROPERTIES.
10. THERE ARE NO FLOODPLAIN AREAS PRESENT ONSITE.
11. ALL WATER SERVICE CONNECTIONS MUST HAVE A MINIMUM COVER OF 4.0' UNLESS CONSTRUCTED AT A UTILITY CROSSING.
12. ALL BASE AND SUB-BASE MATERIAL SHALL BE COMPACTED TO NINETY EIGHT PERCENT (98 THEORETICAL DENSITY WHEN TESTED IN ACCORDANCE WITH AASHTO METHOD T-99 (SEE VDOT 1994 ROAD AND BRIDGE SPECIFICATIONS, SECTION 304 AND 305).
13. THE APPROVAL OF THESE PLANS SHALL IN NO WAY RELIEVE THE DEVELOPER OR HIS AGENTS OF ANY LEGAL RESPONSIBILITY WHICH MAY BE REQUIRED BY THE CODE OF VIRGINIA OR ANY OTHER ORDINANCE ENACTED BY ARLINGTON COUNTY.
14. LIGHTING AND UNDERGROUND UTILITIES AND STRUCTURES ARE TO BE LOCATED AWAY FROM LANDSCAPING TO THE EXTENT NECESSARY TO MINIMIZE ANY IMPACT ON THE ROOT SYSTEMS OF THE PROPOSED LANDSCAPING.
15. FOR LOCATION OF EXISTING UTILITIES, DESCRIPTIONS, SEE EXISTING CONDITIONS PLAN ON SHEET C.06.
16. THE LOCATIONS OF EXISTING NON SURVEYABLE UTILITIES ON THESE DRAWINGS ARE GENERALLY APPROXIMATE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES WITHIN THE AREA OF CONSTRUCTION PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL CONTACT MISS UTILITY AT 1-800-257-7777, UTILITY COMPANY REPRESENTATIVES, PERFORM TEST PITS, REVIEW CURRENT TEST PIT DATA, AND WHATEVER OTHER OPERATIONS AVAILABLE TO INSURE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES IN THE AREA OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY URBAN LTD. OF ANY POTENTIAL CONFLICTS PRIOR TO COMMENCING CONSTRUCTION.
17. 14. THE CONTRACTOR SHALL CAREFULLY EXAMINE THE SITE AND MAKE ALL INSPECTIONS NECESSARY IN ORDER TO DETERMINE THE FULL EXTENT OF THE WORK REQUIRED TO MAKE THE COMPLETED WORK CONFORM TO THE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE NATURE AND LOCATION OF THE WORK, CONDITIONS, THE CONFORMATION AND CONDITION OF THE EXISTING GROUND SURFACE AND THE CHARACTER OF EQUIPMENT AND FACILITIES NEEDED PRIOR TO AND DURING PROSECUTION OF THE WORK. THE DEVELOPER OR THE CONTRACTOR SHALL SATISFY HIMSELF AS THE THE CHARACTER, QUALITY AND THE QUANTITY OF SURFACE AND SUBSURFACE MATERIALS OR OBSTACLES TO BE ENCOUNTERED. ANY INACCURACIES OR DISCREPANCIES BETWEEN THE DRAWINGS AND BROUGHT OT THE OWNER'S ATTENTION IN ORDER TO CLARIFY THE EXACT NATURE OF THE WORK TO BE PERFORMED PRIOR TO COMMENCEMENT OF ANY WORK.
18. ALL UNDERGROUND UTILITIES WITHIN STREET RIGHT-OF-WAY OR EASEMENTS SHALL BE INSTALLED TO ARLINGTON COUNTY STANDARDS PRIOR TO THE INSTALLATION OF ANY SUBBASE MATERIAL OR RESTORATION OF PAVEMENT.
19. NO EXISTING SANITARY SEWER, WATERMAIN, STORM DRAIN OR FIRE HYDRANT SHALL BE TAKEN OUT OF SERVICE OR MADE INACCESSIBLE WITHOUT APPROVAL BY THE DEPARTMENT OF PUBLIC WORKS.
20. ALL CURB AND GUTTER, PAVEMENT, AND SIDEWALK CONSTRUCTION WITHIN STREET RIGHT-OF-WAY OR EASEMENT LINES SHALL BE PROPERLY COORDINATED WITH THE ARLINGTON COUNTY DEPARTMENT OF PUBLIC WORKS AND SHALL BE IN CONFORMANCE WITH THESE PLANS.
21. ALL GAS LINE CONSTRUCTION TO BE BY THE WASHINGTON GAS COMPANY; THE CONTRACTOR SHALL COORDINATE HIS OPERATIONS WITH WASHINGTON GAS COMPANY.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE LIMITS OF THIS PROJECT; THESE UTILITIES SHALL BE CAPPED AT THE CURB LINE AND REMOVED WITHIN THE SITE BY (OR WITH THE APPROVAL OF) EACH UTILITY COMPANY AND/OR BY ARLINGTON COUNTY.
23. THE DEVELOPER OR CONTRACTOR SHALL OBTAIN PERMITS FROM THE INSPECTION SERVICES DIVISION FOR THE CONSTRUCTION OF ALL PRIVATE SIDEWALKS, DRIVEWAYS, PARKING AREAS AND OTHER ONSITE FACILITIES.
24. THE DEVELOPER OR CONTRACTOR SHALL FURNISH EMERGENCY TELEPHONE NUMBER TO THE CONSTRUCTION MANAGEMENT SECTION, ENGINEERING DIVISION, DPW.
25. PARKING ON-SITE OR ON A SUITABLE OFF-SITE LOCATION SHALL BE PROVIDED FOR ALL CONSTRUCTION WORKERS WITHOUT CHARGE TO THE WORKERS.
26. THE SITE HAS NO EXISTING BUS STOPS.
27. CONTRACTOR/ESTIMATOR SHOULD CONSIDER FIELD CONDITIONS AND CONSTRUCTION REQUIREMENTS NECESSARY TO FULLY COMPLETE THE PROPOSED IMPROVEMENTS OF THIS SITE PLAN WHILE PLANNING/SCHEDULING/ESTIMATING.
28. ALL FINISHED GRADING, SEEDING, SODDING OR PAVING SHALL BE DONE IN SUCH A MANNER TO PRECLUDE THE PONDING OF WATER ON THE SITE.
29. ALL WALKS, CURB-CUTS, RAMPS, DRIVEWAYS, ETC. ARE TO CONFORM AND BE INSTALLED TO ADA REQUIREMENTS AND IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ANY VARIATION FROM THIS IS TO BE REVIEWED AD APPROVED BY THE CIVIL ENGINEER, LANDSCAPE ARCHITECT AND OWNER.
30. ANY SPEED HUMPS, ROAD PAINTING, STREET SIGNS, OR SIMILAR ITEMS THAT REQUIRE REMOVAL FOR WORK WITHIN THE RIGHT OF WAY SHALL BE REPLACED IN KIND UPON COMPLETION OF THE WORK REQUIRING THE REMOVAL OF SUCH ITEM.
31. ANY OPEN CUT IN THE ROAD WAY WILL REQUIRE A PATCH TO EXTEND AT LEAST TO THE MIDDLE OF THE ROAD PER COUNTY REQUIREMENTS.
32. FIELD VERIFIED RPA WAS PROVIDED BY TNT ENVIRONMENTAL, DATED JUNE 11TH, 2018.



VICINITY MAP
SCALE : 1"=500'

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APPLICANT/ DEVELOPER
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FAIRFAX STATION, VA 22039
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(703) 642-2306
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No.	DATE	DESCRIPTION

REVISIONS

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CLAYTON C. TOCK
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

COVER SHEET
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: AS NOTED		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
09-28-18	–		
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
		SHEET C.01 OF 45	SP-12928

Urban, Ltd. – I:\JOBS\UPTON HILL PARK\SP\12928-01-COVER.dwg [COVER] August 16, 2019 – 11:00am jpiteri

VDOT GENERAL NOTES

1. THESE PLANS WERE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF (SELECT ONE):

   ☒ VDOT SUBDIVISION STREET REQUIREMENTS (SSR 24VAC-30-91 EFFECTIVE JANUARY 1, 2005 AND VDOT ROAD DESIGN MANUAL APPENDIX B)

   ☐ VDOT SECONDARY STREET ACCEPTANCE REQUIREMENTS (SSAR 24VAC-30-92 EFFECTIVE MARCH 9, 2009 AND VDOT ROAD DESIGN MANUAL APPENDIX B1). SCHEMATIC STREET LAYOUT AND COMPUTATIONS OF CONNECTIVITY INDEX ARE PROVIDED WITH THESE PLANS PER 24VAC30-92-60.

   ☐ VDOT SECONDARY STREET ACCEPTANCE REQUIREMENTS (SSAR 24VAC-30-92 EFFECTIVE DECEMBER 31, 2011 AND VDOT ROAD DESIGN MANUAL APPENDIX B1). SCHEMATIC STREET LAYOUT WITH PHASING DIAGRAM FOR STREET ACCEPTANCE ARE PROVIDED WITH THESE PLANS PER 24VAC30-92-60.

2. METHODS AND MATERIALS USED SHALL CONFORM TO CURRENT COUNTY/TOWN AND VDOT STANDARDS AND SPECIFICATIONS.

3. ALL UTILITIES, INCLUDING ALL POLES, ARE TO BE RELOCATED AT THE DEVELOPER'S EXPENSE, PRIOR TO CONSTRUCTION.

4. OPEN CUTTING OF PAVED OR SURFACE TREATED ROADS IS NOT PERMITTED. ALL UTILITIES WHICH WILL BE PLACED UNDER EXISTING STREETS ARE TO BE BORED OR JACKED. ANY EXCEPTIONS, DUE TO EXTENUATING CIRCUMSTANCES, ARE TO BE ADDRESSED AT THE PERMIT STAGE.

5. ANY TYPE OF REVERSE CURB (SPILL CURB, CG-6R, ETC.) AND TRANSITION TO THESE CURBS SHALL NOT BE USED WITH THE PUBLIC RIGHT OF WAY.

6. THE DEVELOPER IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING ROADS AND UTILITIES WHICH OCCUR AS A RESULT OF PROJECT CONSTRUCTION WITHIN OR CONTIGUOUS TO EXISTING RIGHT OF WAY.

7. A SMOOTH GRADE SHALL BE MAINTAINED FROM THE CENTERLINE OF THE EXISTING ROAD TO THE PROPOSED EDGE OF PAVEMENT TO PRECLUDE THE FORMING OF FALSE GUTTERS AND/OR THE PONDING OF ANY WATER IN THE ROADWAY.

8. STANDARD GUARDRAILS AND/OR HANDRAILS SHALL BE INSTALLED AT HAZARDOUS LOCATIONS AS DESIGNATED DURING FIELD REVIEW BY THE COUNTY/TOWN INSPECTOR OR VDOT.

9. THE DEVELOPER IS RESPONSIBLE FOR ALL TRAFFIC CONTROL. THE DEVELOPER SHALL SUBMIT A SIGNING, STRIPING AND/OR SIGNALIZATION PLAN TO THE VDOT LAND DEVELOPMENT SECTION A MINIMUM OF THIRTY DAYS PRIOR TO PERMIT APPLICATION. THE DEVELOPER SHALL NOT COMMENCE CONSTRUCTION OF ANY PAVEMENT COURSE WITHOUT AN APPROVED STRIPING PLAN.

10. PAVEMENT DESIGN IS BASED ON AN ASSUMED CBR VALUE OF 10 (USE CBR VALUE OF 4 IN LOUDOUN CO). SOIL TESTS OF SUBGRADE MUST BE SUBMITTED FOR ACTUAL DETERMINATION OF REQUIRED THICKNESS OF THE PAVEMENT INCLUDING LAYERS OF ASPHALT AND SUBBASE PRIOR TO SUBBASE PLACEMENT.
11. A 4 (MIN.) LAYER OF STONE IS REQUIRED BENEATH CURB AND GUTTER (MAY BE SHOWN ON TYPICAL SECTION IN LIEU OF A NOTE).

12. ALL UNTREATED AGGREGATE USED IN BASE OR SUBBASE COURSES SHALL BE 21B, EXCEPT ON ROADS WITH ADT OF 1000 VPD OR LESS, WHERE 21A AGGREGATE MAY BE USED. WHEN 21B AGGREGATE IS USED, UD-4 UNDERDRAINS MUST BE PROVIDED

13. ADDITIONAL DITCH LININGS OR SILTATION AND EROSION CONTROL MEASURES SHALL BE PROVIDED, AT THE DEVELOPER'S EXPENSE, AS DETERMINED NECESSARY BY VDOT AND/OR THE COUNTY/TOWN DURING FIELD REVIEW. ALL COSTS SHALL BE ASSUMED BY THE DEVELOPER.

14. THE ENTIRE SURFACE OF THE ROADWAY (OLD AND NEW PORTIONS) SHALL BE OVERLAID AND RE-STRIPED AS REQUIRED BY VDOT PERSONNEL. OVERLAY OF EXISTING PAVEMENT SHALL BE MINIMUM OF 1.25 DEPTH; ANY COSTS ASSOCIATED WITH PAVEMENT OVERLAY, OR THE MILLING OF EXISTING PAVEMENT TO OBTAIN REQUIRED DEPTH, SHALL BE ASSUMED BY THE DEVELOPER.

15. DEVELOPER IS RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF ANY TRAFFIC SIGNAL INSTALLATION OR MODIFICATION WHICH WILL BE NECESSARY AS A RESULT OF DEVELOPMENT OF THIS SITE.

16. ALL RIGHT OF WAY DEDICATED TO PUBLIC USE SHALL BE CLEAR AND UNENCUMBERED.

17. THE COUNTY/TOWN SHALL OBTAIN A PERMIT FOR ALL SIDEWALKS WITHIN THE RIGHT OF WAY THAT DO NOT QUALIFY FOR VDOT MAINTENANCE.

18. TRAFFIC CONTROL DEVICES OR ADVISORY SIGNS, SUCH AS MULTIWAY STOPS, SPEED LIMITS, WATCH FOR CHILDREN, PEDESTRIAN TRAFFIC ETC., SHALL NOT BE INSTALLED UNLESS SPECIFICALLY SHOWN ON THESE PLANS OR A VDOT APPROVED PLAN REVISION. SPEED STUDY CERTIFIED BY PROFESSIONAL ENGINEER SHOULD BE SUBMITTED FOR VDOT APPROVAL PRIOR TO THE STREET ACCEPTANCE FOR ANY ROAD TO BE POSTED OTHER THAN THE STATUTORY SPEED LIMIT. SHOULD UNAPPROVED SIGNS BE NOTED AT THE TIME OF VDOT INSPECTION, THE ROAD ACCEPTANCE PROCESS SHALL BE TERMINATED IMMEDIATELY AND NOT RECOMMENCED UNTIL A DETERMINATION IS MADE REGARDING THE APPROVAL OF ANY ADDITIONAL SIGNS. IMMEDIATE REMOVAL OF SUCH SIGNS SHALL NOT NEGATE THE NEED FOR THE SUBMISSION OF A REVISION.

19. LANDSCAPING AND IRRIGATION SYSTEMS SHALL NOT BE INSTALLED WITHIN THE PUBLIC RIGHT OF WAY EXCEPT AS SHOWN ON THESE PLANS OR A VDOT APPROVED REVISION.

20. BEGINNING JULY 1, 2009 ALL LAND USE PERMIT APPLICATIONS ARE REQUIRED TO PROVIDE AT LEAST ONE (1) PERSON WHO, AT MINIMUM, IS VERIFIED BY VDOT IN BASIC WORK ZONE TRAFFIC CONTROL FOR ALL PERMITTED ACTIVITIES WITHIN STATE MAINTAINED RIGHT OF WAY WHICH INVOLVES INSTALLING, MAINTAINING, OR REMOVING WORK ZONE TRAFFIC CONTROL DEVICES. THIS PERSON SHALL BE RESPONSIBLE FOR THE PLACEMENT, MAINTENANCE AND REMOVAL OF ALL WORK ZONE TRAFFIC CONTROL DEVICES.

ARLINGTON COUNTY NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT ARLINGTON COUNTY DES STANDARDS AND SPECIFICATIONS.

2. THE DEVELOPER OR CONTRACTOR SHALL REMOVE AND REPLACE, TO THE CURRENT ARLINGTON COUNTY DES STANDARDS AND SPECIFICATIONS, ANY EXISTING ENTRANCES, CURB AND GUTTER OR SIDEWALK ALONG THE FRONTAGE OF THIS SITE IN POOR CONDITION, OR DAMAGED DURING CONSTRUCTION.

3. THE DEVELOPER OR CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND CLOSING, TO ARLINGTON COUNTY STANDARDS, ANY EXISTING ENTRANCES NOT BEING USED IN CONJUNCTION WITH THIS DEVELOPMENT.

4. THE DEVELOPER OR CONTRACTOR SHALL OBTAIN ARLINGTON COUNTY PERMITS FOR ALL WORK WITHIN THE RIGHT OF WAY ALONG THE FRONTAGE OF THIS SITE.

5. THERE MAY BE UNDERGROUND CONDUIT, CABLES AND TRAFFIC DETECTION DEVICES IN THIS AREA; THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY TRAFFIC CONTROLS THAT ARE DISTURBED DURING CONSTRUCTION. NOTIFY THE TRANSPORTATION ENGINEERING & OPERATIONS BUREAU AT (703)-228-3575, 24 HOURS PRIOR TO STARTING WORK.

6. THE DEVELOPER OR CONTRACTOR SHALL NOT DISTURB OR REMOVE ANY TRAFFIC CONTROL SIGNS, PARKING METERS OR ANY OTHER TRAFFIC CONTROL DEVICE WITHOUT PRIOR PERMISSION FROM THE TRANSPORTATION ENGINEERING & OPERATIONS BUREAU. CONTRACT TRANSPORTATION ENGINEERING AT (703)-228-575.

7. THE DEVELOPER OR CONTRACTOR SHALL OBTAIN A PERMIT FROM THE TRANSPORTATION ENGINEERING & OPERATIONS BUREAU, PRIOR TO PLACING ANY OBSTRUCTION WITHIN THE PUBLIC RIGHT OF WAY, OR ON SIDEWALKS ALONG THE FRONTAGE OF THIS DEVELOPMENT.

8. ALL SANITARY SEWER CLEAN-OUTS LOCATED WITHIN THE TRAVEL WAY OR PARKING LOTS OF THIS DEVELOPMENT SHALL BE CAST IRON.

9. THE CONTRACTOR SHALL CONSTRUCT ALL HANDICAP RAMPS TO THE CURRENT VDOT STANDARDS. USE 2'X2' TRUNCATED DOME PANELS.

10. THE DEVELOPER OR CONTRACTOR SHALL OBTAIN PERMITS FROM THE INSPECTION SERVICES DIVISION PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION OF ON-SITE FACILITIES. FOR INFORMATION AND PERMIT REQUIREMENTS, CALL (703)-228-3800.

11. THE PLANTING OF STREET TREES FOR THIS DEVELOPMENT SHALL BE COORDINATED WITH AND APPROVED BY THE DEPARTMENT OF PARKS, RECREATION AND COMMUNITY RESOURCES (DPRCR). THIS COORDINATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, DEVELOPER OR THEIR ENGINEER. THE DEVELOPER OR CONTRACTOR SHALL CONTACT PRCR AT (703)-288-6557, 72 HOURS IN ADVANCE TO SCHEDULE INSPECTION OF EXCAVATION, PLANT MATERIAL AND INSTALLATION. ALSO, PRIOR TO REMOVING OR DISTURBING ANY EXISTING COUNTY TREES, CONTACT PRCR FOR INFORMATION AND APPROVAL.

UTILITY MARKING REQUIREMENTS

THE DEVELOPER OR CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 48 HOURS PRIOR TO THE START OF ANY EXCAVATION OR CONSTRUCTION FOR THE MARKINGS OF UNDERGROUND UTILITIES.

STREET LIGHTING INFORMATION

DENOTES PROPOSED ARLINGTON COUNTY STANDARD STREET LIGHT LOCATION. THE DEVELOPER OR CONTRACTOR SHALL CONTACT THE TRANSPORTATION ENGINEERING & OPERATIONS BUREAU AT (703) 228-3575 FOR LIGHTING REQUIREMENTS, SPECIFICATIONS AND COORDINATION INFORMATION. THE CAPITAL COST OF THE LIGHTING INSTALLATION SHALL BE PAID BY THE DEVELOPER OR CONTRACTOR.

DENOTES 2-INCH RIGID STEEL CONDUIT, INSTALLED 24-INCHES DEEP AND NOT MORE THAN 6-INCHES FROM THE BACK OF CURB. THIS CONDUIT SHALL BE FURNISHED BY THE DEVELOPER OR CONTRACTOR AND CONTAIN A NYLON CORD OR PULL WIRE WITH 500 LBS. MINIMUM STRESS PULL. CONTACT THE TRANSPORTATION ENGINEERING & OPERATIONS BUREAU AT (703) 228-3575 FOR CONDUIT SPECIFICATIONS, AND INSTALLATION REQUIREMENTS.

TEST PIT NOTE

IN ORDER TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF A GIVEN UTILITY AND TO ASSIST THE CONTRACTOR AND/OR OWNER IN DETERMINING AREAS OF SPECIAL CONCERN, URBAN ENGINEERING & ASSOC., INC. HAS INDICATED HEREON CERTAIN LOCATIONS WHERE TEST PITS SHOULD BE EXCAVATED PRIOR TO COMMENCING CONSTRUCTION. THESE INDICATIONS ARE NOT INTENDED TO BE ALL INCLUSIVE AND WILL NOT RELIEVE THE CONTRACTOR AND/OR OWNER OF THE RESPONSIBILITY OF DIGGING ADDITIONAL TEST PITS, AS MIGHT BE REQUIRED BY ACTUAL SITE CONDITIONS. ANY DISCREPANCIES FOUND BETWEEN ACTUAL AND ASSUMED CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF URBAN ENGINEERING & ASSOC., INC. BY CALLING 703-642-8080.

SITE DATA

1.) SITE AREA = 1,020,006 SF (23.41 AC)

2.) USE
EXISTING USE = PARK
PROPOSED USE = PARK

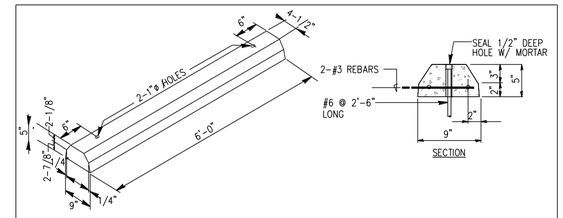
3.) LOT REQUIREMENTS
MINIMUM AREA = 6,000 SF
PROPOSED LOT AREA = 1,020,006 SF (23.41 AC)

4.) PARKING
REQUIRED = N/A
PROPOSED = 218 SPACES

5.) HANDICAPPED PARKING
REQUIRED = N/A
PROPOSED = 11 HANDICAPPED SPACES

LEGEND:

	EXISTING OVERHEAD WIRE		EXISTING STORM DRAIN STRUCTURE
G	EXISTING GAS LINE		PROPOSED STORM DRAIN STRUCTURE
G	PROPOSED GAS LINE	00	EXISTING CONTOUR (1')
GV	EXISTING GAS VALVE	00	PROPOSED CONTOUR (1')
GV	PROPOSED GAS VALVE	00	EXISTING CONTOUR (5')
WM	EXISTING WATER METER	00	PROPOSED CONTOUR (5')
WM	PROPOSED WATER METER		EXISTING SANITARY SEWER
WV	EXISTING WATER VALVE		PROPOSED SANITARY SEWER
WV	PROPOSED WATER VALVE	W	EXISTING WATER LINE
		W	PROPOSED WATER LINE
T.B.R.	TO BE REMOVED		EXISTING TREE LINE
S, C, HC	STANDARD, COMPACT, AND HANDICAP PARKING SPACE DESIGNATOR		EXISTING PROPERTY LINE
			PROPOSED PROPERTY LINE
V	VISITOR PARKING SPACE		EXISTING PROPERTY LINE PIPES
FF	FINISHED FLOOR		PROPOSED PROPERTY LINE PIPES
PROP.	PROPOSED		EX. FIRE HYDRANT
EX.	EXISTING		PROP. FIRE HYDRANT
SF	SQUARE FEET		PROPOSED LIMITS OF CLEARING & GRADING
GSF	GROSS SQUARE FEET		EXISTING CURB & GUTTER
NSF	NET SQUARE FEET	C-2	PROPOSED CURB & GUTTER
	PROPOSED ENTRANCE/EXIT TO BUILDING	C-2R	REVERSE FLOW CURB & GUTTER
	TRAFFIC SIGN		EXISTING POWER POLE
	STREET SIGN		TEST PIT REQUIRED
+25.6	EXISTING SPOT ELEVATION		
+25 60	PROP. SPOT ELEVATION		PROPOSED CSRP-1
	EXISTING FENCE		BENCHMARK
	EXISTING LIGHTING		EXISTING TREE
	PROPOSED LIGHTING		PROPOSED TREE
VPD	PROJECTED TRAFFIC COUNT (BASED ON 6TH ED. OF ITE TRIP GENERATION BOOK)		



PRECAST CONCRETE ☐ HEEL STOP
NOT TO SCALE

No.	DATE	DESCRIPTION

REVISIONS

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PROFESSIONAL ENGINEER

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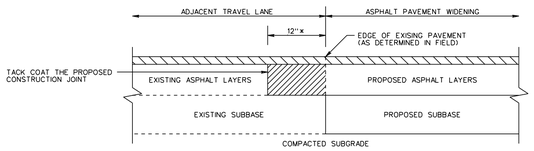
ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

GENERAL NOTES & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: AS NOTED	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.02 OF 45	SP-12928

Urban, Ltd. – J:_JOBS\UPTON HILL PARK\SP\12928-02-GNOTES.dwg [GeneralNotes] August 16, 2019 – 11:00am rjofori

WP-2



CONSTRUCTION JOINT DETAIL

REMOVE EXISTING ASPHALT LAYERS TO EXISTING SUBBASE AND REPLACE WITH PROPOSED ASPHALT WIDENING LAYERS

PROPOSED MINIMUM 1½ INCH THICK ASPHALT SURFACE COURSE (SEE NOTE 5)

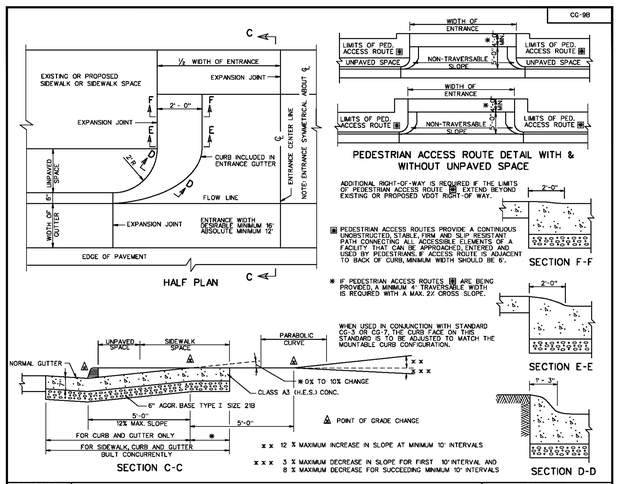
x MINIMUM 12 INCHES, OR GREATER AS NECESSARY TO ABUT THE FULL THICKNESS OF EXISTING ASPHALT LAYERS AS DETERMINED BY CORES (SEE NOTE 3)

NOTES:

1. ASPHALT PAVEMENT WIDENING SHALL HAVE A PAVEMENT DESIGN IN ACCORDANCE WITH CURRENT VDOT PROCEDURES AND BE APPROVED BY THE ENGINEER.
2. THE PAVEMENT DESIGN FOR ASPHALT PAVEMENT WIDENING SHALL MEET OR EXCEED THE DEPTHS AND TYPES OF THE LAYERS OF EXISTING PAVEMENT. SUBSURFACE DRAINAGE OF THE EXISTING AND PROPOSED PAVEMENT SHALL BE ADDRESSED IN THE PAVEMENT DESIGN.
3. A MINIMUM OF THREE CORES SHALL BE TAKEN ALONG THE CENTER OF THE ADJACENT TRAVEL LANE TO DETERMINE THE TYPE AND THICKNESS OF EXISTING PAVEMENT LAYERS. THESE CORES SHALL BE SPACED NO MORE THAN 500 FEET APART.
4. THE ADJACENT TRAVEL LANE SHALL BE MILLED A MINIMUM DEPTH OF 1½ INCHES AND REPLACED WITH AN ASPHALT SURFACE COURSE TO MATCH THE PROPOSED PAVEMENT WIDENING SURFACE COURSE, UNLESS WAIVED BY THE ENGINEER.
5. THE ENGINEER MAY REQUIRE THE MILLING DEPTH OF THE EXISTING PAVEMENT TO BE ADJUSTED TO ACHIEVE AN ACCEPTABLE PAVEMENT CROSS-SLOPE AND EFFECTIVE SURFACE DRAINAGE.
6. EXISTING PAVEMENT MARKINGS AND MARKERS WITHIN THE PROJECT LIMITS SHALL BE RESTORED SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. FINAL TRANSVERSE PAVEMENT TIE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 315.05(c) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TIE-IN LOCATIONS SHALL BE TESTED USING A 10 FOOT STRAIGHTEDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 315.07(a) OF THE SPECIFICATIONS.

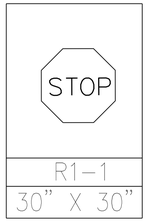
VDOT ROAD AND BRIDGE STANDARDS		ASPHALT PAVEMENT WIDENING FOR WIDENING SUBJECT TO TRAFFIC VIRGINIA DEPARTMENT OF TRANSPORTATION	SPECIFICATION REFERENCE
SHEET 1 OF 1	REVISION DATE		315
303.02			

CG-9B



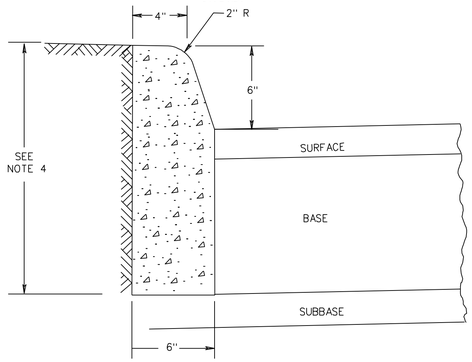
SPECIFICATION REFERENCE	STANDARD ENTRANCE GUTTER	VDOT ROAD AND BRIDGE STANDARDS
502	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE 07/15 — SHEET 1 OF 1 — 203.02

STOP SIGN DETAIL



DETAIL TYPICAL CG-2

N.T.S.



NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. CURB HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB.
4. THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (15" DEPTH) OR INCREASED AS MUCH AS 3" (21" DEPTH) IN ORDER THAT THE BOTTOM OF CURB WILL COINCIDE WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE THE DEPTH IS TO BE 18" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.
5. CG-2 IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-6 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.
6. THE CONTRACTOR MAY UTILIZE ROLLED ASPHALT CURB IN LIEU OF CONCRETE CURB AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLING ASPHALT CURB IN LIEU OF THE CONCRETE CURB.
7. ALL SPOT ELEVATIONS SHOWN IN THE VICINITY OF NEW CURB ON SHEET C.10-C.11, ARE EDGE OF PAVEMENT (EP) ELEVATIONS UNLESS OTHERWISE INDICATED.

SOILS LEGEND

SCALE=1"=200'

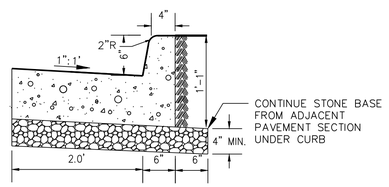
NUMBER	NAME	SOIL GROUP	CLASS	K FACTOR
6B	GLENELG LOAM, (3-8%)	B	N/A	0.32
6D	HATBORO LOAM, (0-2%)	B	N/A	0.32
4B	URBAN LAND-SASSAFRAS-NEABSCO COMPLEX	D	N/A	N/A
10D	URBAN LAND-GLENELG COMPLEX, (15-25%)	B	N/A	N/A
12	URBAN LAND-UDORTHENTS COMPLEX, (2-15%)	D	N/A	N/A
38D	FAIRFAX LOAM(15-25%)	B	I	0.28
38E	FAIRFAX LOAM(25-45%)	B	I	0.28
95	URBAN LAND	D	IVB	N/A
101	URBAN LAND -WHEATON COMPLEX	D	IVB	0.32

SOIL LINES

SITE AREA

CURB & GUTTER (CG-6)

NOT TO SCALE



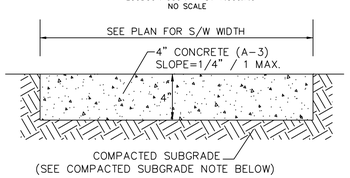
NOTES:

1. THIS ITEM MAY BE PRECASE OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST
3. COMBINATION CURB AND GUTTER HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS RADIAL COMBINATION CURB AND GUTTER.
4. FOR USE WITH STABILIZED OPEN-GRADED DRAINAGE LAYER, THE BOTTOM OF THE CURB AND GUTTER SHALL BE CONSTRUCTED PARALLEL TO THE SLOPE OF ALL SUBBASE COURSES AND TO THE DEPTH OF THE PAVEMENT
5. THIS CURB MAY BE USED WHERE DESIGN SPEED IS 40MPH OR LESS ON RURAL HIGHWAYS AND 45MPH OR LESS IN DEVELOPED URBAN & SUBURBAN AREAS. IF THESE DESIGN SPEEDS ARE EXCEEDED STANDARD CG-7 IS REQUIRED.

DETAIL TYPICAL CONC. SIDEWALK

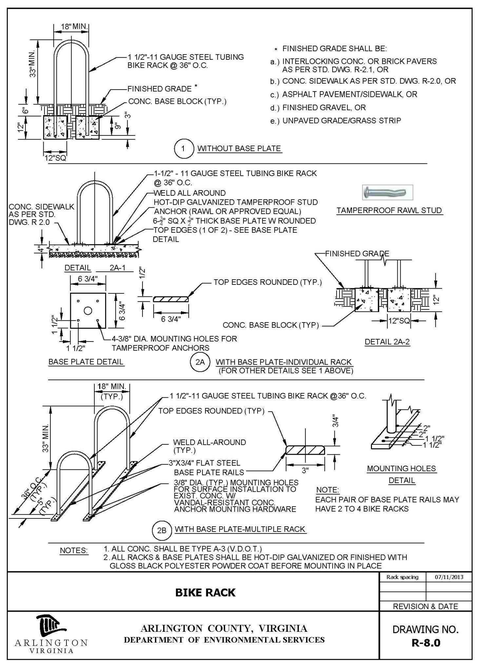
LOUDOUN COUNTY FSM 4.500.4.a

NO SCALE



COMPACTED SUBGRADE NOTE:

THE TOP 12" OF SUBGRADE TO BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY PER STANDARD PROCTOR TEST WITHIN ±2% OPTIMUM MOISTURE.



BIKE RACK	Rack spacing 07/11/2013
	REVISION & DATE
ARLINGTON COUNTY, VIRGINIA DEPARTMENT OF ENVIRONMENTAL SERVICES	DRAWING NO. R-8.0

No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA — CLAYTON C. TOCK — Lic. No. 036790 — 07/30/19 — PROFESSIONAL ENGINEER

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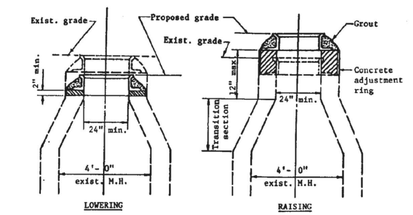
ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
GENERAL NOTES & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

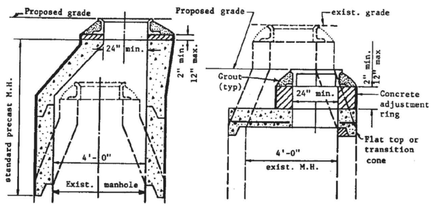
SCALE: AS NOTED	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.03 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP12928-02-CIVIL\ES.dwg [GeneralDetails] August 16, 2019 – 11:00am rpiteri



TYPE-A ADJUSTMENT (FRAME & COVER ONLY)

Raise or lower frame and cover such that height of 2' neck section, excluding frame and cover, does not exceed 12" maximum or 2" minimum. If range is exceeded, use Type-B or Type-C adjustment.



TYPE-B ADJUSTMENT (RAISE M.H.)

Remove existing transition section and construct new manhole as required.

TYPE-C ADJUSTMENT (LOWER M.H.)

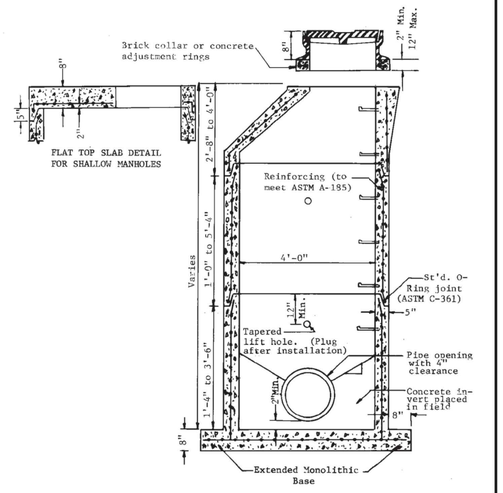
Remove existing transition section and manhole to 2' min. below proposed grade and construct new manhole as required.

MANHOLES
ADJUSTMENTS TO NEW GRADES

REVISION & DATE

ARLINGTON VIRGINIA — ARLINGTON COUNTY, VIRGINIA, DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO. **S-2.5**



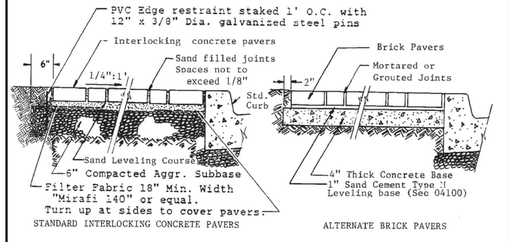
NOTES:
1. Manhole shall meet all requirement of ASTM C-478.
2. Riser and/or eccentric cone section may be replaced with alternate "Flat Top Slab" for use in shallow manholes.
3. Other combinations of riser and taper sections may be used as approved by the Engineer, to achieve required height.
4. Tongue and groove joint sealer may be used in lieu of "O-Ring joint."
5. For additional notes, see Drawing D-3.0.

STORM SEWER PRECAST MANHOLE, PH-1
FOR PIPE SIZES 15" THROUGH 36"

REVISION & DATE

ARLINGTON VIRGINIA — ARLINGTON COUNTY, VIRGINIA, DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO. **D-3.1**



STANDARD INTERLOCKING CONCRETE PAVERS

ALTERNATE BRICK PAVERS

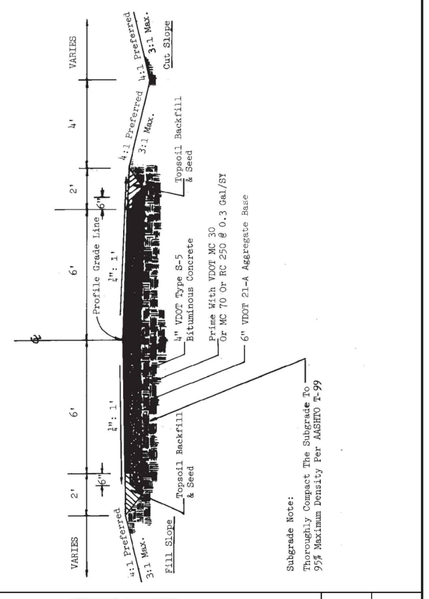
NOTES
1. Refer to Section 2611 and Section 2612 for specifications for Interlocking Concrete Pavers and Brick Pavers and other related materials shown on sidewalk applications.
2. All brick shall meet ASTM Specification C-902-78.
3. For driveway application see Drawing R-2.4 and related specs.

INTERLOCKING CONCRETE AND BRICK PAVERS
FOR SIDEWALK APPLICATION

REVISION & DATE

ARLINGTON VIRGINIA — ARLINGTON COUNTY, VIRGINIA, DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO. **R-2.1**



TYPICAL SECTION
HIKING - BIKING - JOGGING TRAIL

REVISION & DATE

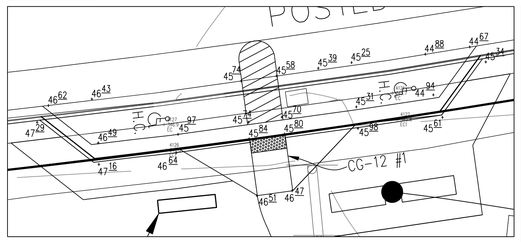
ARLINGTON VIRGINIA — ARLINGTON COUNTY, VIRGINIA, DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO. **R-6.1**

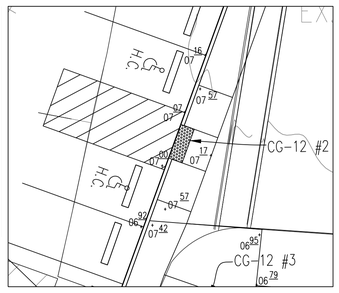
CG-12 COMPUTATIONS

SCALE: 1" = 10'

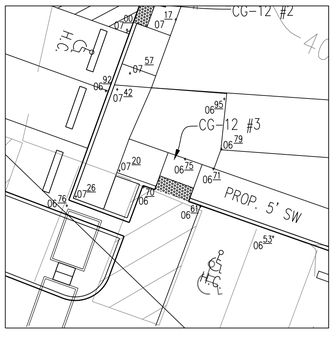
CG-12 #1



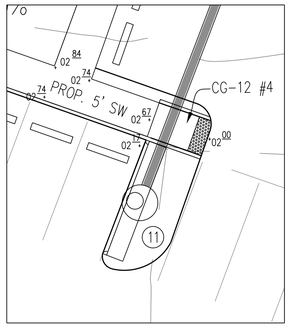
CG-12 #2

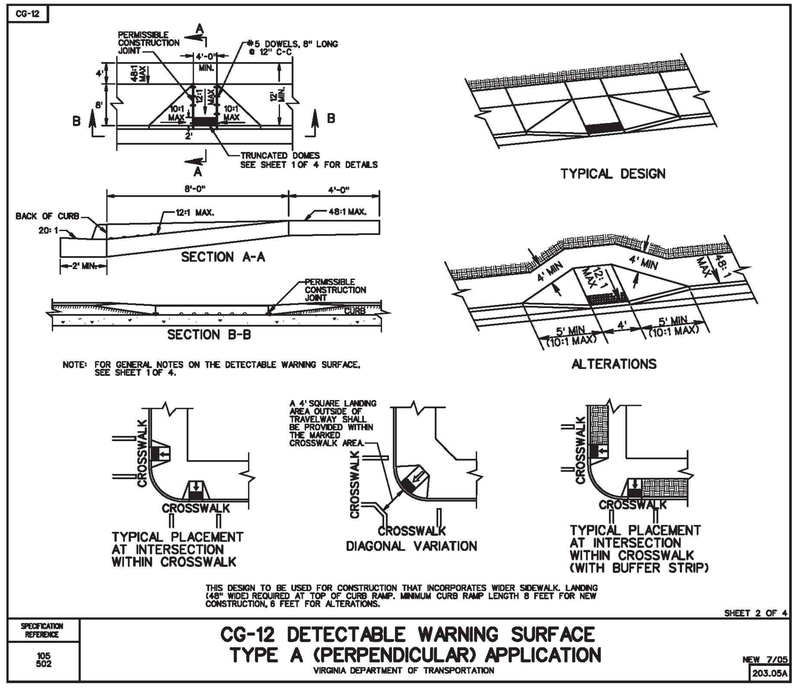


CG-12 #3



CG-12 #4





No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA — CLAYTON C. TOCK — Lic. No. 036790 — 01/30/19 — PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

GENERAL NOTES & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

ALE: AS NOTED	DESIGNED	CHECKED
BMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
PPROVED DATE HIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER

SHEET C.03AOF 45 — SP-12928

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The proposed shelter, shade structure, bike rack and park signs are not part of this project and shall not be included in the bid.

The Proposed Ropes Course, Proposed Ticket Booth, Proposed Canopy, Proposed Wood Deck and Proposed Catwalk and Stairs Leading to the Wood Deck are not part of this project.

SHEETS C.06,C.08,C.10

SHEETS C.07,C.09,C.11

THIS SHEET IS FOR OVERVIEW PURPOSES ONLY.

VA STATE GRID NORTH

No.	DATE	DESCRIPTION
		REVISIONS

CLAYTON C. TOCK
Lic. No. 036790
07/30/19
COMMONWEALTH OF VIRGINIA
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

OVERVIEW

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=60'		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
09-28-18	–		
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
			SHEET C.04 OF 45 — SP-12928

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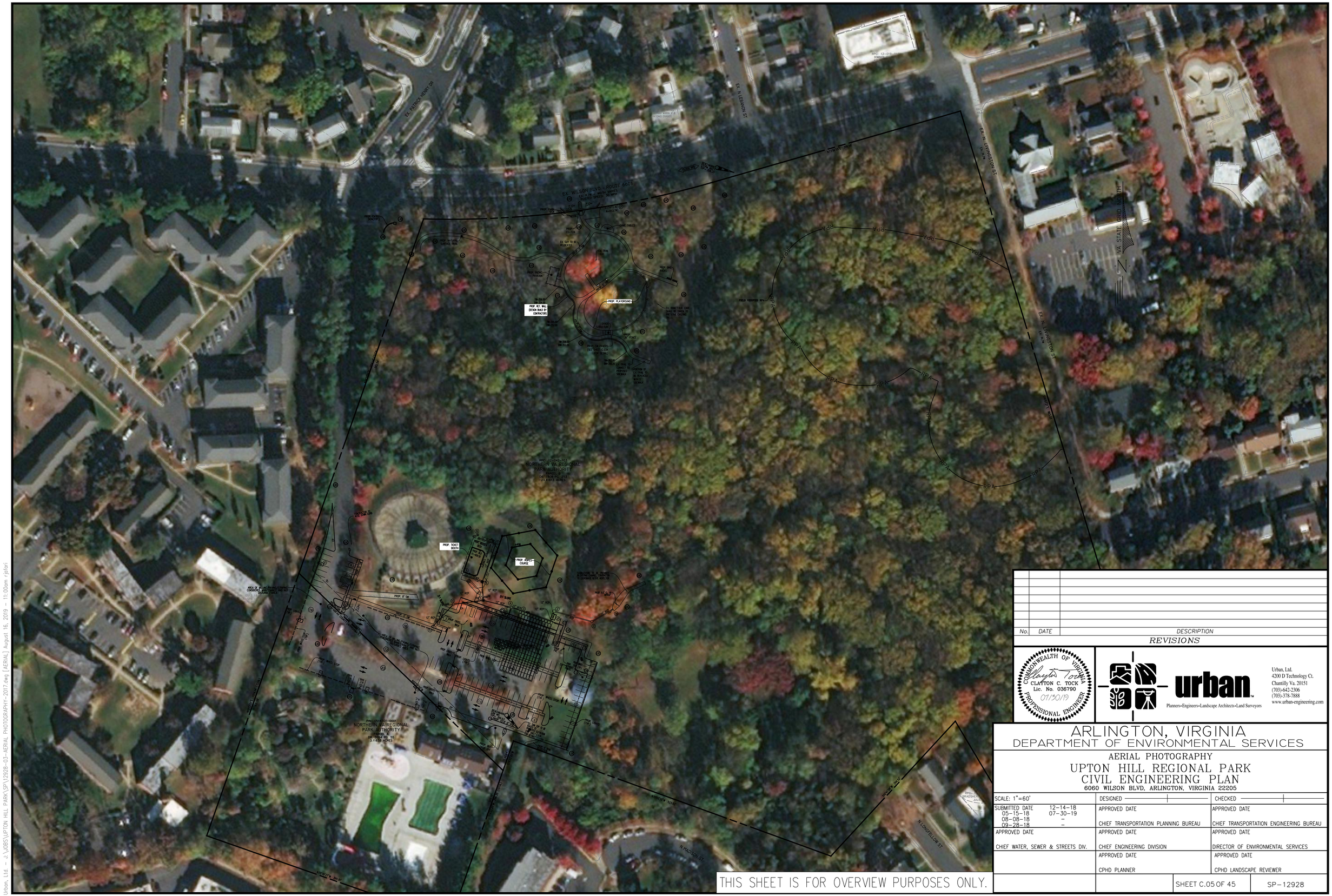

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No.	DATE	DESCRIPTION

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CLAYTON C. TOCK
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

AERIAL PHOTOGRAPHY

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=60'		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
09-28-18	–		
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
			SHEET C.05 OF 45 — SP-12928

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No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EXISTING CONDITIONS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 05-15-18, 08-08-18, 09-28-18, 12-14-18, 07-30-19, -, -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.06 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-06-EX CONDITIONS.dwg [EX CONDITIONS] August 16, 2019 – 11:01am rjafari

MATCHLINE
SEE SHEET C.06

N 7003437
E 11869559

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

VA STATE GRID NORTH
N 7003435
E 11868824

N 7003275.08
E 11868854.31

PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

PIN: 0514-01-0001
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

N 7002956
E 11868810

N 7002969.14
E 11869170.69

RPC: 12-042-106
SAINT ALBAN'S HOUSING
HARTLAND BANK
DB. 3860 PG. 1232

EX. ASPHALT
EX. BATTING CAGE
EX. TIMBERS
EX. CHAIN LINK FENCE
EX. SHED
EX. BENCH (TYP.)
EX. 8" CHAIN LINK
EX. MEMORIAL STONE
EX. 8" PVC PIPE
EX. EXERCISE AREA (T.B.R.)
EX. WOOD CHIP TRAIL
"YELLOW TRAIL"
EX. ASPHALT PARKING AREA
EX. 4' CHAIN LINK
EX. MINI GOLF
EX. 8' METAL FENCE
EX. WATER PARK / EX. WOOD DECK
EX. BUILDING
EX. PIPE TO BE ABANDONED
EX. CONCRETE PAD
EX. GAZEBO (T.B.R.)
EX. SPLIT RAIL (T.B.R.)
EX. 4' OLD CONC FENCE
EX. 8" SANITARY SEWER
EX. 6" PVC SANITARY SEWER
EX. 16' CHAIN LINK WITH BARBED WIRE
CONCRETE SIDEWALK
CURB
CONC
WALK
OHU
ARLINGTON COUNTY/FAIRFAX COUNTY (APPROXIMATE)

N19°22'01"E 1014.14' (TOTAL)
431.59'
N45°57'40"W 440.11'
S19°22'20"W 48.64'
247.71'
296.35' (TOTAL)
BENCHMARK SAN MH TOP= 399.63

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
01/30/19
PROFESSIONAL ENGINEER

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DEPARTMENT OF ENVIRONMENTAL SERVICES

EXISTING CONDITIONS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.07 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP12928-06-EX CONDITIONS.dwg [EX CONDITIONS (2)] August 16, 2019 – 11:01am rjrbri

EX. PATRICK HENRY DR

VA STATE GRID NORTH

N 7003982
E 11869741

RPC: 12-018-001
AGER LUCAS &
AGER LISA

RPC: 12-018-024
DE LA VIA MARCELINO
DE LA VIA JULIETA ET AL

RPC: 12-018-023
TONAKARN EAK & ORAPAN

RPC: 12-018-022
HORNE HEATHER

RPC: 12-018-021
DE OVANDO MARIA V &
ANTONIO OVANDO

RPC: 12-018-020
FERRANDO WILLIAM ANTHONY
ET AL

URCIA ANDRES C TR
URCIA ROWENA M TR

EX. N LEBANON ST

EX. 8" SANITARY SEWER

EX. CG

EX. 15" RCP

EX. 12" RCP

EX. 21" RCP

EX. SW

EX. MEDIAN

EX. WILSON BLVD - ROUTE 6608
EX. R/W - WIDTH VARIES
POSTED SPEED: 30 MPH

15,000 VPD

BENCHMARK
STORM MH ST
TOP= 339.20

N 7003881.48
E 11869495.85

N 7003896
E 11869741

N73°56'55"E 399.58'

CONTRACTOR TO MATCH EXISTING CURB & GUTTER

CG-6B

R=1472.40'
A=453.74'

EX. ASPHALT PATH

EX. ASPHALT (T.B.R.)

EX. SWING SET

EX. ASPHALT

N 7003824.66
E 11869047.49

PROP. ENTRY SIGN(TYP.)

RPC: 12-042-066
COMMONWEALTH
OF VIRGINIA

EX. WOOD STEPS

EX. BUS SHELTER

PROP. PARK SIGN

PROP. CG-12A #1

POTENTIAL BIKE SHARE STATION

GAME TABLES

PROP. NATURAL SURFACE TRAIL

EX. GUY TO BE RELOCATED

PROP. 5' SW

EX. TRAIL T.B.R.

EX. SPLIT RAIL (T.B.R.)

EX. TIMBERS (T.B.R.)

EX. CINDER BLOCK FACILITIES TO REMAIN

PROP. BIKE RACKS

EX. UTILITY POLE

PROP. PICNIC PAVILION

EX. PLAYGROUND AREA (T.B.R.)

TW=356.00
BW=354.00
PROP. RET. WALL
(DESIGN BUILD BY
CONTRACTOR)

EX. MEMORIAL STONE

TW=355.00
BW=352.00

PROP. PLAYGROUND

EX. TRAIL T.B.R./ CARE SHALL BE TAKEN TO PRESERVE EXISTING TREES

SHADE STRUCTURE

PROP. 36" FENCE

POST

"RED TRAIL"
EX. WOOD CHIP TRAIL

TW=358.00
BW=353.00

PROP. SW PAVERS
(SEE SHEET C.03A
FOR DETAIL)

TW=352.00
BW=350.20

EX. TRAIL TO CONNECT TO PROPOSED SIDEWALK

PORTION OF EX. TRAIL TO BE REPLACED WITH 5' SIDEWALK

EX. WOOD CHIP TRAIL

EX. ASPHALT

RPA

The proposed shelter, shade structure, bike rack and park signs are not part of this project and shall not be included in the bid.

FIELD VERIFIED RPA

RPC: 12-042-061
NORTHERN VA REGIONAL
PARK AUTHORITY

N10°22'01"E 1014.4' (TOTAL)
582.54'

N 7003547
E 11869046

MATCHLINE
SEE SHEET C.09

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT AND UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

urban
Planners•Engineers•Landscape Architects•Land Surveyors

Urban, Ltd.
4200 D Technology Ct.
Chantilly Va. 20151
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(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

GEOMETRY PLAN

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP12928-08-GEOMETRY.dwg [GEOMETRY] October 01, 2019 – 5:49pm jdelapiro

MATCHLINE
SEE SHEET C.08

N 7003437
E 11869559

VA STATE GRID NORTH
N 7003435
E 11868824

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

The Proposed Ropes Course, Proposed Ticket Booth, Proposed Canopy, Proposed Wood Deck and Proposed Catwalk and Stairs Leading to the Wood Deck are not part of this project.

PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

PIN: 0514-01-0001
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

RPC: 12-042-106
SAINT ALBANS HOUSING
HARTLAND BANK
DB. 3860 PG. 1232

N 7002956
E 11868810

N 7003275.08
E 11868854.31

N 7002969.14
E 11869170.69

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
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ARLINGTON, VIRGINIA
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GEOMETRY PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

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	SHEET C.09 OF 45	SP-12928

Urban, Ltd. – I:\JOBS\UPTON HILL PARK\SP\12928_08-GEOMETRY.dwg [GEOMETRY (2)] October 01, 2019 – 5:49pm jdelapiana

EX. WILSON BLVD - ROUTE 6608
EX. R/W - WIDTH VARIES
POSTED SPEED: 30 MPH

EX. PATRICK HENRY DR

EX. N LEBANON ST

VA STATE GRID NORTH

N 7003982
11869174

RPC: 12-018-001
AGER LUCAS &
AGER LISA

RPC: 12-018-024
DE LA VIA MARCELINO
DE LA VIA JULIETA ET AL

RPC: 12-018-023
TONAKARN EAK & ORAPAN

RPC: 12-018-022
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DE OVANDO MARIA V &
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RPC: 12-018-020
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URCIA ANDRES C TR
URCIA ROWENA M TR

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STORM MH ST
TOP= 339.20

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CONTRACTOR TO MATCH EXISTING CURB & GUTTER

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EX. MEDIAN

EX. ASPHALT PATH

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EX. ASPHALT

EX. 15" RCP

EX. 21" RCP

EX. 12" RCP

EX. 8" SANITARY SEWER

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(DESIGN BUILD BY
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TW=355.00
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(SEE SHEET C.03A
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PORTION OF EX. TRAIL TO BE REPLACED WITH 5' SIDEWALK

RPC: 12-042-061
NORTHERN VA REGIONAL
PARK AUTHORITY

N 7003547
E 11869046

MATCHLINE
SEE SHEET C.11

RPA

FIELD VERIFIED RPA

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No.	DATE	DESCRIPTION

REVISIONS

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07/30/19
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

GRADING PLAN

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.10 OF 45	SP-12928

Urban, Ltd. — J:\JOBS\UPTON HILL PARK\SP\12928-08-GRADING.dwg [GRADING] October 01, 2019 - 5:55pm jdelajara

MATCHLINE
SEE SHEET C.10

N 7003437
E 11869559

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

VA STATE GRID NORTH
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N 7003275.08
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PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

PIN: 0514-01-0001
NORTHERN VA REGIONAL
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PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

N 7002956
E 11868810

N 7002969.14
E 11869170.69

RPC: 12-042-106
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HARTLAND BANK
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No.	DATE	DESCRIPTION
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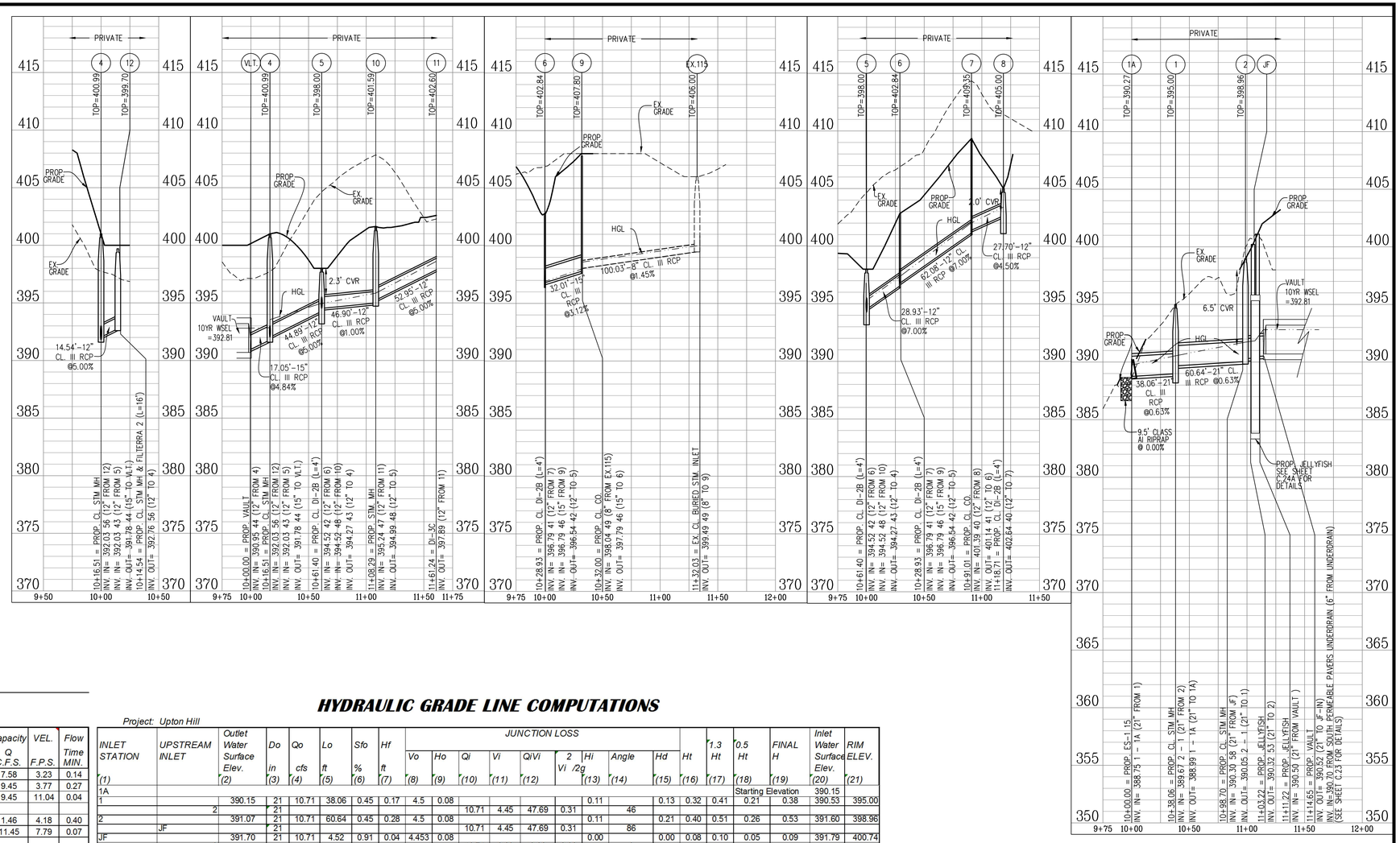
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.11 OF 45 SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-08-GRADING.dwg [GRADING (2)] October 01, 2019 – 5:49pm jdelpino



STORM SEWER DESIGN COMPUTATIONS

Project: Upton Hill

From Point	To Point	Drainage Area	C Factor	C x A Increment	C x A Cumm.	Inlet Time Min.	Rain Fall In/Hr	Runoff Q C.F.S.	Invert Elevation Upper End	Invert Elevation Lower End	Length FT.	Slope %	Dia. IN.	Capacity Q C.F.S.	VEL. F.P.S.	Flow Time MIN.
8	7	0.03	0.45	0.01	0.01	5.00	6.79	0.09	402.64	401.39	27.70	4.50%	12	7.58	3.23	0.14
7	6	0.00	0.00	0.00	0.01	5.00	6.79	0.09	401.14	396.79	62.08	7.00%	12	9.45	3.77	0.27
6	5	0.09	0.63	0.06	0.50	5.00	6.79	3.38	396.54	394.52	28.93	7.00%	12	9.45	11.04	0.04
*																
EX.115	9	0.57	0.75	0.43	0.43	5.00	6.79	2.90	399.49	398.04	100.03	1.45%	8	1.46	4.18	0.40
9	6	0.00	0.00	0.00	0.43	5.00	6.79	2.90	397.79	396.79	32.01	3.12%	15	11.45	7.79	0.07
*																
11	10	0.51	0.74	0.38	0.38	5.00	6.79	2.56	397.89	395.24	52.95	5.00%	12	7.99	9.05	0.10
10	5	0.00	0.00	0.00	0.38	5.00	6.79	2.56	394.99	394.52	46.90	1.00%	12	3.58	4.96	0.16
5	4	0.11	0.34	0.04	0.91	5.00	6.79	6.20	394.27	392.03	44.89	5.00%	12	7.99	11.23	0.07
4	VLT.	0.00	0.00	0.00	1.58	5.00	6.79	10.71	391.78	390.95	17.05	4.84%	15	14.25	12.75	0.02
*																
12	4	0.82	0.81	0.66	0.66	5.00	6.79	4.51	392.76	392.03	14.54	5.00%	12	7.99	10.47	0.02
*																
VLT.O	JF-IN	0.00	0.00	0.00	0.00	5.00	6.79	10.71	390.52	390.50	3.43	0.50%	21	11.24	5.32	0.01
*																
JF	2	0.00	0.00	0.00	0.00	5.00	6.79	10.71	390.32	390.30	4.52	0.50%	21	11.21	5.31	0.01
2	1	0.00	0.00	0.00	0.00	5.00	6.79	10.71	390.05	389.67	60.64	0.63%	21	12.58	5.87	0.17
1	1A	0.00	0.00	0.00	0.00	5.00	6.79	10.71	388.99	388.75	38.06	0.63%	21	12.62	5.89	0.11
*																

HYDRAULIC GRADE LINE COMPUTATIONS

Project: Upton Hill

INLET STATION	UPSTREAM INLET	Outlet Water Surface Elev.	Do	Qo	Lo	Sfo	Hf	JUNCTION LOSS Vo	Ho	Qi	Vi	QiVi	2 Vi /2g	Hi	Angle	Hd	Ht	1.3 Ht	0.5 Ht	FINAL H	Inlet Water Surface Elev.	RIM ELEV.
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
1A																			Starting Elevation		390.15	
1		390.15	21	10.71	38.06	0.45	0.17	4.5	0.08					0.11		0.13	0.32	0.41	0.21	0.38	390.53	395.00
	2		21							10.71	4.45	47.69	0.31		46							
2		391.07	21	10.71	60.64	0.45	0.28	4.5	0.08					0.11		0.21	0.40	0.51	0.26	0.53	391.60	398.96
	JF		21							10.71	4.45	47.69	0.31		86							
JF		391.70	21	10.71	4.52	0.91	0.04	4.453	0.08					0.00		0.00	0.08	0.10	0.05	0.09	391.79	400.74
	0									10.71	0.00	0.00	0.00		0							
VLT.																			Starting Elevation		392.81	
4		392.81	15	10.71	17.05	0.56	0.10	8.7	0.30					0.34		0.36	0.99	1.29	0.64	0.74	393.55	400.99
	5		12							6.20	7.89	48.88	0.97	0.34	5	0.03						
	12		12							4.51	5.74	25.90	0.51	0.18	90	0.36						
12		393.55	12	4.51	14.54	0.32	0.05	5.742	0.13					0.00		0.00	0.13	0.17	0.08	0.13	393.68	399.70
	0									4.51	0.00	0.00	0.00		0							
5		393.55	12	6.20	44.89	0.60	0.27	7.9	0.24					0.10		0.18	0.52	0.68	0.34	0.61	394.16	398.00
	6		12							3.38	4.30	14.54	0.29	0.10	73	0.18						
	10		12							2.56	3.26	8.36	0.17	0.06	21	0.03						
10		395.32	12	2.56	46.90	0.51	0.24	3.3	0.04					0.06		0.09	0.19	0.25	0.12	0.37	395.69	401.59
	11		12							2.56	3.26	8.36	0.17		62							
11		396.04	12	2.56	52.95	0.10	0.05	3.263	0.04					0.00		0.00	0.04	0.05	0.03	0.08	396.12	402.60
	0									2.56	0.00	0.00	0.00		0							
6		395.32	12	3.38	28.93	0.13	0.04	4.3	0.07					0.03		0.05	0.15	0.20	0.10	0.14	395.46	402.84
	7		12							0.09	0.12	0.01	0.00	0.00	23	0.00						
	9		15							2.90	2.37	6.87	0.09	0.03	67	0.05						
7		397.79	12	0.09	62.08	0.00	0.00	0.1	0.00					0.00		0.00	0.00	0.00	0.00	0.00	397.80	409.35
	8		12							0.09	0.12	0.01	0.00		90							
8		402.19	12	0.09	27.70	0.00	0.00	0.117	0.00					0.00		0.00	0.00	0.00	0.00	0.00	402.19	405.00
	0									0.09	0.00	0.00	0.00		0							
9		397.79	15	2.90	32.01	0.20	0.06	2.4	0.02					0.38		0.20	0.60	0.78	0.39	0.46	398.25	407.80
	EX.115		8							2.90	8.32	24.14	1.07		22							
	9	397.79	15	2.90	32.01	0.06	0.02	2.365	0.02					0.00		0.00	0.02	0.03	0.01	0.03	397.83	407.80
	0									2.90	0.00	0.00	0.00		0							
EX.115		398.58	8	2.90	100.03	3.96	3.96	8.316	0.27					0.00		0.00	0.27	0.35	0.17	4.13	402.71	406.00
	0									2.90	0.00	0.00	0.00		0							

STORM SEWER INLET COMPUTATIONS

INLET NUMBER	INLET TYPE	INLET LENGTH	TOTAL DEPTH (FT)	DRAINAGE AREA	C	C x A	C x A W	INTENSITY	Q INCR	Q CARRY OVER	Q TOTAL	S GUTTER	Sx CROSS SLOPE	T SPREAD	W	W/T	Sw	Sw/Sx	Eo	a	S'w	Se	Lt	P EFFECTIVE LENGTH	L/Lt	d	E	h	Q INT	d/H	Qb CARRY OVER	T SPREAD AT SAG	REMARKS
5	DI-2B	4	10+00	0.11	0.34	0.04	0.04	6.86	0.26	0.00	0.26													4		0.08							
6	DI-2B	4	10+00	0.09	0.63	0.06	0.06	6.86	0.39	0.00	0.39													4		0.10							
8	DI-2B	4	10+00	0.03	0.45	0.01	0.01	6.86	0.09	0.00	0.09													4		0.04							
11	DI-3C	10.0	4.7	0.51	0.74	0.38	0.38	5.01	1.89	0.00	1.89	0.0271	0.0870	3.04	2.00	0.66	0.085	0.98	0.94	1.95	0.08	0.16	9.78		1.02		1.00		1.89		0.00		
12	DI-30	16.0	6.9	0.82	0.81	0.66	0.66	5.01	3.33	0.00	3.33	0.0329	0.0200	8.40	2.00	0.24	0.085	4.25	0.67	3.56	0.15	0.12	15.91		1.01		1.00		3.33		0.00		

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

urban
Planners•Engineers•Landscape Architects•Land Surveyors

Urban, Ltd.
4200 D Technology Ct.
Chantilly Va. 20151
(703)-642-2306
(703)-378-7888
www.urban-engineering.com

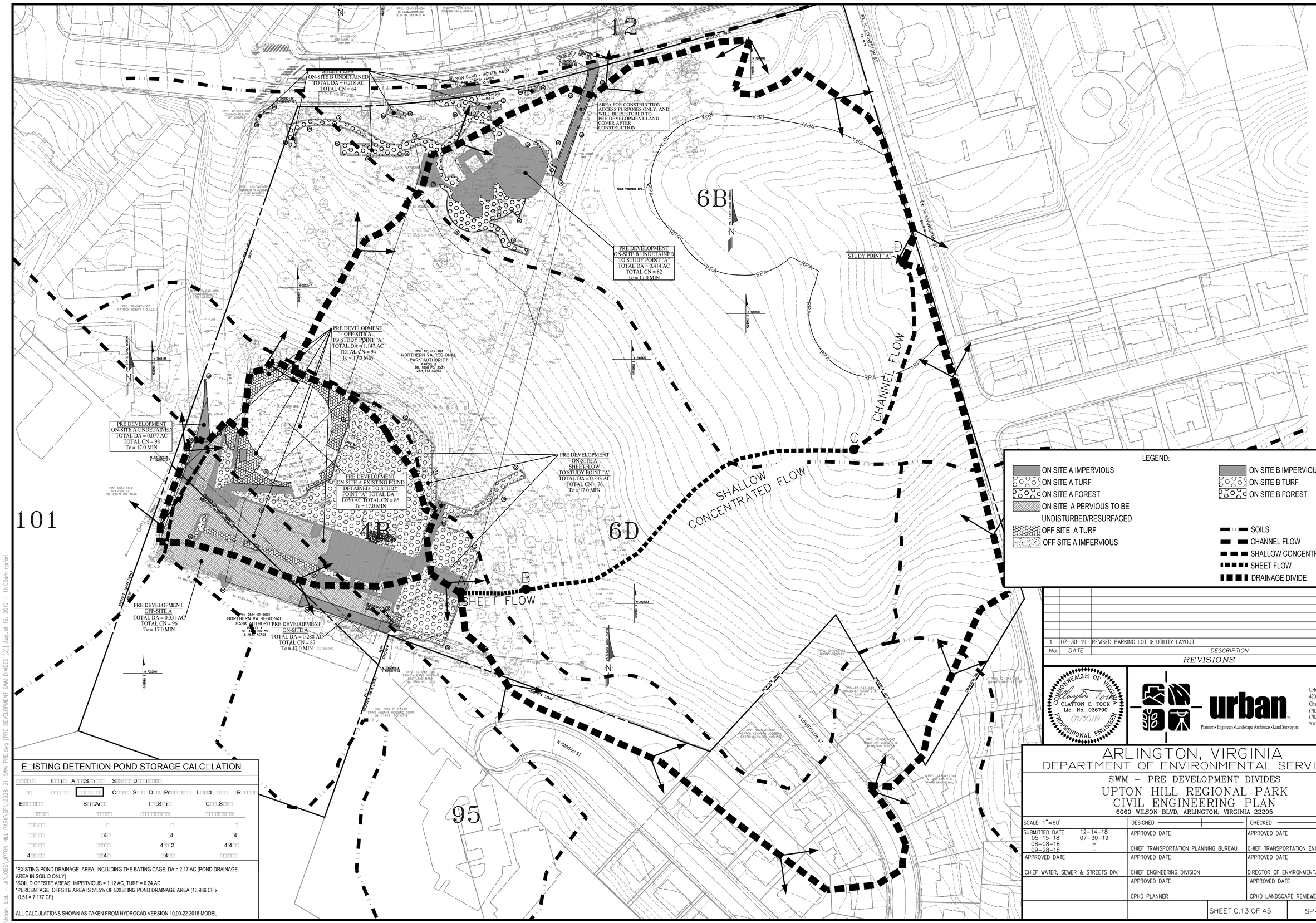
ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

STORM PROFILES & COMPUTATIONS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

SCALE: 1"=50'(H); 1"=5'(V)	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 - 09-28-18 -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER

SHEET C.12 OF 45 | SP-12928

Urban, Ltd. - J:\JOBS\UPTON HILL PARK\SP\12928-18- STORM PROFILES.dwg [Layout1] October 01, 2019 - 5:50pm jdelapiro



EXISTING DETENTION POND STORAGE CALCULATION

	Elevation	Area (SF)	Storage (CF)	Cumulative Storage (CF)
		4	4	4
			4 2	4 4
	4	4	4	

*EXISTING POND DRAINAGE AREA, INCLUDING THE BATING CAGE, DA = 2.17 AC (POND DRAINAGE AREA IN SOIL D ONLY)
*SOIL D OFFSITE AREAS: IMPERVIOUS = 1.12 AC, TURF = 0.24 AC.
*PERCENTAGE OFFSITE AREA IS 51.5% OF EXISTING POND DRAINAGE AREA (13,936 CF x 0.51 = 7,177 CF)

ALL CALCULATIONS SHOWN AS TAKEN FROM HYDROCAD VERSION 10.00-22 2018 MODEL

No.	DATE	DESCRIPTION
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

SWM – PRE DEVELOPMENT DIVIDES

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=60'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.13 OF 45	SP-12928

Urban, Ltd. – I:\JOBS\UPTON HILL PARK\SP\12928-21-SWM PRE.dwg [PRE DEVELOPMENT SWM DIVIDES (2)] August 16, 2019 – 11:02am rjefari

SITE DRAINAGE SHED PREDE□ELOPMENT CALC□LATION SITE B □NORTH□

O□□□□ A □□d□□□□□d □S□□□□F□□□

Area (ac)	CN	Description
0.110	98	Paved parking, HSG D
0.194	80	>75% Grass cover, Good, HSG D
0.304	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

O□□□□ A □□d□□□□□d □S□□□□F□□□

Area (ac)	CN	Description
0.262	98	Paved parking, HSG D
0.262		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

O□□□□ A □□d□□□□□d

C□r□□ N□□ □□r C□□□□□□□□□□

Area (ac)	CN	Description
0.097	61	>75% Grass cover, Good, HSG B
0.181	80	>75% Grass cover, Good, HSG D
0.005	98	Paved parking, HSG B
0.043	98	Paved parking, HSG D
0.326	77	Weighted Average

T□□ □ □C□□□□□r□□□□ C□□□□□□□□□□

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

□ □□□r F□□□ C□□□□□□□□□□

Runoff = 0.50 cfs @ 11.96 hrs, Volume= 1,020 cf, Depth= 0.86"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr Storm Rainfall=2.69"

Runoff = 1.00 cfs @ 11.95 hrs, Volume= 2,339 cf, Depth= 2.46"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr Storm Rainfall=2.69"

Runoff = 0.80 cfs @ 11.96 hrs, Volume= 1,624 cf, Depth= 1.47"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr Storm Rainfall=2.69"

2 □□□r F□□□ C□□□□□□□□□□

Runoff = 0.59 cfs @ 11.96 hrs, Volume= 1,392 cf, Depth= 1.16"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 yr Storm Rainfall=3.15"

Runoff = 1.18 cfs @ 11.95 hrs, Volume= 2,775 cf, Depth= 2.92"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 yr Storm Rainfall=3.15"

Runoff = 1.01 cfs @ 11.96 hrs, Volume= 2,064 cf, Depth= 1.87"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 yr Storm Rainfall=3.15"

□□ □□□r F□□□ C□□□□□□□□□□

Runoff = 1.46 cfs @ 11.96 hrs, Volume= 2,946 cf, Depth= 2.49"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr Storm Rainfall=4.84"

Runoff = 1.82 cfs @ 11.95 hrs, Volume= 4,378 cf, Depth= 4.60"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr Storm Rainfall=4.84"

Runoff = 1.79 cfs @ 11.95 hrs, Volume= 3,771 cf, Depth= 3.42"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr Storm Rainfall=4.84"

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Area (ac)	CN	Description
0.739	80	>75% Grass cover, Good, HSG D
0.225	98	Paved parking, HSG D
0.025	77	Woods, Good, HSG D
0.989	84	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry,**

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Runoff = 1.51 cfs @ 12.10 hrs, Volume= 4,542 cf, Depth= 1.27"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr Storm Rainfall=2.69"

2 □□□r F□□□ C□□□□□□□□□□

Runoff = 1.96 cfs @ 12.10 hrs, Volume= 5,890 cf, Depth= 1.64"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 yr Storm Rainfall=3.15"

□□ □□□r F□□□ C□□□□□□□□□□

Runoff = 3.71 cfs @ 12.09 hrs, Volume= 11,217 cf, Depth= 3.12"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr Storm Rainfall=4.84"

O□□□□ A D□□□□□d

Area (ac)	CN	Description
0.190	80	>75% Grass cover, Good, HSG D
0.981	98	Paved parking, HSG D
1.171	95	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.1208	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
5.6	574	0.1170	1.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	322	0.0527	6.13	248.88	**Channel Flow,** Area= 40.6 sf Perim= 81.4' r= 0.50' n= 0.035 Earth, dense weeds
17.0	996	Total			

□ □□□r F□□□ C□□□□□□□□□□

Runoff = 2.90 cfs @ 12.09 hrs, Volume= 9,128 cf, Depth= 2.15"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr Storm Rainfall=2.69"

2 □□□r F□□□ C□□□□□□□□□□

Runoff = 3.47 cfs @ 12.09 hrs, Volume= 11,035 cf, Depth= 2.60"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 yr Storm Rainfall=3.15"

□□ □□□r F□□□ C□□□□□□□□□□

Runoff = 5.54 cfs @ 12.08 hrs, Volume= 18,113 cf, Depth= 4.26"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr Storm Rainfall=4.84"

□ □□□r T□□□F□□□ C□□□□□□□□□□

Inflow Area = 132,945 sf, 53.28% Impervious, Inflow Depth = 1.68" for 1 yr Storm event
Inflow = 5.51 cfs @ 12.01 hrs, Volume= 18,654 cf
Primary = 5.51 cfs @ 12.01 hrs, Volume= 18,654 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

2 □□□r T□□□F□□□ C□□□□□□□□□□

Inflow Area = 132,945 sf, 53.28% Impervious, Inflow Depth = 2.09" for 2 yr Storm event
Inflow = 6.84 cfs @ 12.01 hrs, Volume= 23,156 cf
Primary = 6.84 cfs @ 12.01 hrs, Volume= 23,156 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

□□ □□□r T□□□F□□□ C□□□□□□□□□□

Inflow Area = 132,945 sf, 53.28% Impervious, Inflow Depth = 3.65" for 10 yr Storm event
Inflow = 11.85 cfs @ 12.01 hrs, Volume= 40,424 cf
Primary = 11.85 cfs @ 12.01 hrs, Volume= 40,424 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

SITE DRAINAGE SHED PREDE□ELOPMENT CALC□LATION SITE B □NORTH□

O□□□□ B □□d□□□□□d □S□□□□F□□□

C□r□□ N□□ □□r C□□□□□□□□□□

Area (ac)	CN	Description
0.012	61	>75% Grass cover, Good, HSG B
0.042	98	Paved parking, HSG B
0.164	55	Woods, Good, HSG B
0.218	64	Weighted Average

T□□ □ □C□□□□□r□□□□ C□□□□□□□□□□

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

□ □□□r F□□□ C□□□□□□□□□□

Runoff = 0.10 cfs @ 11.99 hrs, Volume= 270 cf, Depth= 0.34"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr Storm Rainfall=2.69"

2 □□□r F□□□ C□□□□□□□□□□

Runoff = 0.18 cfs @ 11.98 hrs, Volume= 424 cf, Depth= 0.54"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 yr Storm Rainfall=3.15"

□□ □□□r F□□□ C□□□□□□□□□□

Runoff = 0.57 cfs @ 11.97 hrs, Volume= 1,169 cf, Depth= 1.48"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr Storm Rainfall=4.84"

O□□□□ B □d□□□□□d

Area (ac)	CN	Description
0.011	61	>75% Grass cover, Good, HSG B
0.255	98	Paved parking, HSG B
0.148	55	Woods, Good, HSG B
0.414	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry,**

□ □□□r F□□□ C□□□□□□□□□□

Runoff = 0.56 cfs @ 12.10 hrs, Volume= 1,713 cf, Depth= 1.14"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 yr Storm Rainfall=2.69"

2 □□□r F□□□ C□□□□□□□□□□

Runoff = 0.75 cfs @ 12.10 hrs, Volume= 2,251 cf, Depth= 1.50"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 yr Storm Rainfall=3.15"

□□ □□□r F□□□ C□□□□□□□□□□

Runoff = 1.46 cfs @ 12.09 hrs, Volume= 4,413 cf, Depth= 2.94"
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 yr Storm Rainfall=4.84"

□ □□□r T□□□F□□□ C□□□□□□□□□□

Summary for Link 16L: NORTH DRAINAGE AREA

Inflow Area = 27,530 sf, 46.99% Impervious, Inflow Depth = 0.86" for 1 yr Storm event
Inflow = 0.60 cfs @ 12.08 hrs, Volume= 1,982 cf
Primary = 0.60 cfs @ 12.08 hrs, Volume= 1,982 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

2 □□□r T□□□F□□□ C□□□□□□□□□□

Summary for Link 16L: NORTH DRAINAGE AREA

Inflow Area = 27,530 sf, 46.99% Impervious, Inflow Depth = 1.17" for 2 yr Storm event
Inflow = 0.81 cfs @ 12.07 hrs, Volume= 2,675 cf
Primary = 0.81 cfs @ 12.07 hrs, Volume= 2,675 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

□□ □□□r T□□□F□□□ C□□□□□□□□□□

Summary for Link 16L: NORTH DRAINAGE AREA

Inflow Area = 27,530 sf, 46.99% Impervious, Inflow Depth = 2.43" for 10 yr Storm event
Inflow = 1.69 cfs @ 12.03 hrs, Volume= 5,582 cf
Primary = 1.69 cfs @ 12.03 hrs, Volume= 5,582 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

No.	DATE	DESCRIPTION

REVISIONS

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	SHEET C.13AOF 45	SP-12928

Urban, Ltd. – J:_JOBS\UPTON HILL PARK\SP\12928-21-SWM PRE.dwg [C.13A] August 16, 2019 – 11:02am rjafari

POST□DE□ELOPMENT STORAGE □OL□ME DETAILS

□OL□ME	STORAGE RE□□IRED	STORAGE DESCRIPTION	REFERENCE
□□	□□□□ □□	SO□TH SITE STORAGE RE□□IRED	SEE C.□□
□2	N□A	NORTH SITE STORAGE □NOT RE□□IRED□	SEE C.□□
□□	□□□□ □□	SO□TH SITE OFFSITE AREA	SEE C.□□
TOTAL	□□□□2 □□	STORAGE RE□□IRED □TO BE PRO□IDED AT SO□TH SITE	

□OL□ME	STORAGE RE□□IRED	STORAGE PRO□IDED	STORAGE DESCRIPTION	REFERENCE
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		2□□□ □□□	PERMEABLE PA□ERS B STORAGE PRO□IDED	SEE C.□□F □STORAGE □ □□□FT□
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SEE SHEETS #### & ####
FOR ADDITIONAL LAND
COVER INFORMATION

LEGEND:
- ON SITE
- SOILS
- CHANNEL FLOW
- SHALLOW CONCENTRATION FLOW
- SHEET FLOW
- DRAINAGE DIVIDE

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
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SWM - POST DEVELOPMENT DIVIDES
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SUBMITTED DATE 05-15-18, 08-08-18, 09-28-18, 12-14-18, 07-30-19	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	SHEET C.14 OF 45	SP-12928

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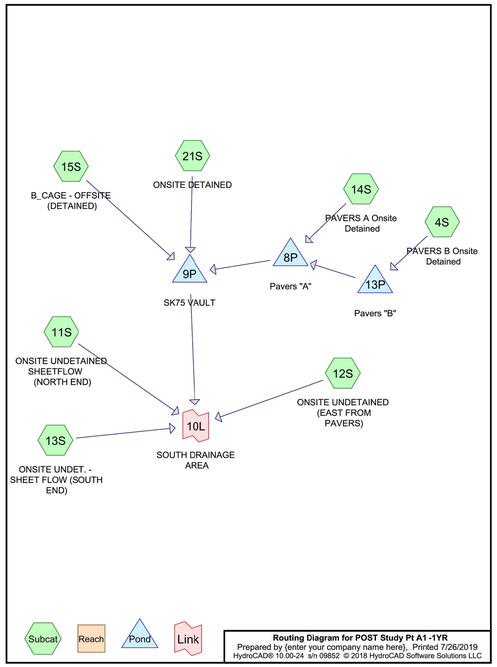
SOUTH DRAINAGE AREA



Routing Diagram for POST Study Pt A1 -1YR
Prepared by {enter your company name here}, Printed 7/26/2019
HydroCAD® 10.00-24 s/n 09852 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
0	**0**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

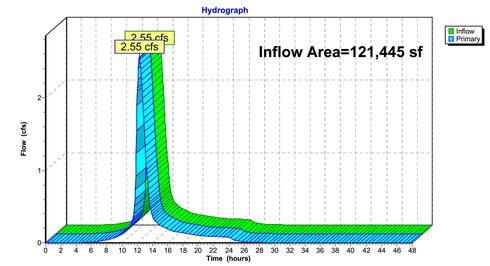
Link 10L: SOUTH DRAINAGE AREA Inflow=2.55 cfs 19,440 cf
Primary=2.55 cfs 19,440 cf

Summary for Link 10L: SOUTH DRAINAGE AREA

Inflow Area = 121,445 sf, 70.44% Impervious, Inflow Depth = 1.92" for 1 yr Storm event
Inflow = 2.55 cfs @ 12.27 hrs, Volume= 19,440 cf
Primary = 2.55 cfs @ 12.27 hrs, Volume= 19,440 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 10L: SOUTH DRAINAGE AREA



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

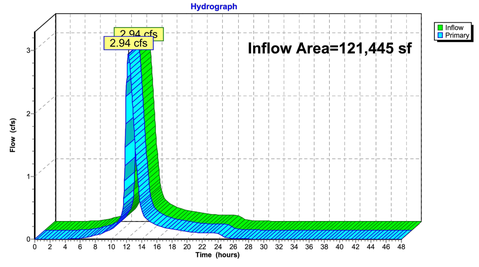
Link 10L: SOUTH DRAINAGE AREA Inflow=2.94 cfs 23,756 cf
Primary=2.94 cfs 23,756 cf

Summary for Link 10L: SOUTH DRAINAGE AREA

Inflow Area = 121,445 sf, 70.44% Impervious, Inflow Depth = 2.35" for 2 yr Storm event
Inflow = 2.94 cfs @ 12.27 hrs, Volume= 23,756 cf
Primary = 2.94 cfs @ 12.27 hrs, Volume= 23,756 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 10L: SOUTH DRAINAGE AREA



No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.15 OF 45 / SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [SDA 1] August 16, 2019 – 11:02am rpferi

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

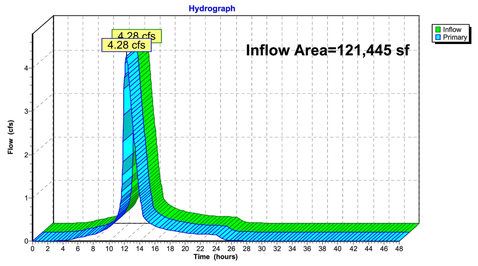
Link 10L: SOUTH DRAINAGE AREA Inflow=4.28 cfs 40,023 cf
Primary=4.28 cfs 40,023 cf

Summary for Link 10L: SOUTH DRAINAGE AREA

Inflow Area = 121,445 sf, 70.44% Impervious, Inflow Depth = 3.95" for 10 yr Storm event
Inflow = 4.28 cfs @ 12.26 hrs, Volume= 40,023 cf
Primary = 4.28 cfs @ 12.26 hrs, Volume= 40,023 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 10L: SOUTH DRAINAGE AREA



No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

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UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 - 09-28-18 -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.15A OF 45	SP-12928

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No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

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SWM - POST DEVELOPMENT

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 - 09-28-18 -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.16 OF 45	SP-12928

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No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

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SWM - POST DEVELOPMENT

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 - 09-28-18 -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.16A OF 45	SP-12928

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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
0	**0**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 8P: Pavers "A" Peak Elev=396.51' Storage=155 cf Inflow=0.29 cfs 1,884 cf
Outflow=0.25 cfs 1,884 cf

Summary for Pond 8P: Pavers "A"

[79] Warning: Submerged Pond 13P Primary device # 1 INLET by 0.01'

Inflow Area = 9,932 sf, 89.91% Impervious, Inflow Depth = 2.28" for 1 yr Storm event
Inflow = 0.29 cfs @ 12.17 hrs, Volume= 1,884 cf
Outflow = 0.25 cfs @ 12.40 hrs, Volume= 1,884 cf, Atten= 14%, Lag= 13.7 min
Primary = 0.25 cfs @ 12.40 hrs, Volume= 1,884 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 396.51' @ 12.40 hrs Surf.Area= 765 sf Storage= 155 cf

Plug-Flow detention time= 18.7 min calculated for 1,884 cf (100% of inflow)
Center-of-Mass det. time= 18.7 min (858.9 - 840.2)

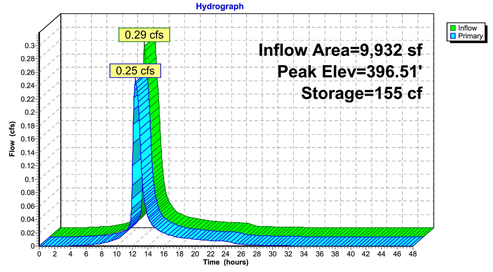
Volume	Invert	Avail.Storage	Storage Description
#1	396.00'	1,071 cf	**Pavers (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.00	765	0.0	0	0
399.50	765	40.0	1,071	1,071

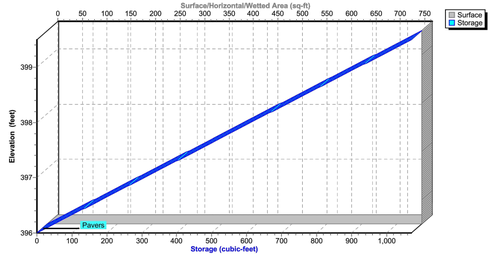
Device	Routing	Invert	Outlet Devices
#1	Primary	396.00'	**6.0" Round 6" PVC** L= 63.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.00' / 390.70' S= 0.0837 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.00'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.25 cfs @ 12.40 hrs HW=396.51' (Free Discharge)
└**1=6" PVC** (Passes 0.25 cfs of 0.48 cfs potential flow)
└**2=4" Orifice/Grate** (Orifice Controls 0.25 cfs @ 2.81 fps)

Pond 8P: Pavers "A"



Pond 8P: Pavers "A"



Hydrograph for Pond 8P: Pavers "A"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.00	0.00
1.00	0.00	0	396.00	0.00
2.00	0.00	0	396.00	0.00
3.00	0.00	1	396.00	0.00
4.00	0.00	1	396.00	0.00
5.00	0.00	3	396.01	0.00
6.00	0.00	5	396.02	0.00
7.00	0.00	8	396.03	0.00
8.00	0.01	12	396.04	0.00
9.00	0.01	16	396.05	0.01
10.00	0.01	20	396.07	0.01
11.00	0.02	27	396.09	0.02
12.00	**0.20**	**77**	**396.25**	**0.12**
13.00	**0.11**	**90**	**396.29**	**0.15**
14.00	0.04	43	396.14	0.04
15.00	0.02	32	396.10	0.03
16.00	0.02	27	396.09	0.02
17.00	0.01	24	396.08	0.02
18.00	0.01	22	396.07	0.01
19.00	0.01	21	396.07	0.01
20.00	0.01	19	396.06	0.01
21.00	0.01	18	396.06	0.01
22.00	0.01	17	396.05	0.01
23.00	0.01	16	396.05	0.01
24.00	0.01	16	396.05	0.01
25.00	0.00	13	396.04	0.00
26.00	0.00	9	396.03	0.00
27.00	0.00	7	396.02	0.00
28.00	0.00	6	396.02	0.00
29.00	0.00	4	396.01	0.00
30.00	0.00	3	396.01	0.00
31.00	0.00	3	396.01	0.00
32.00	0.00	2	396.01	0.00
33.00	0.00	1	396.00	0.00
34.00	0.00	1	396.00	0.00
35.00	0.00	1	396.00	0.00
36.00	0.00	1	396.00	0.00
37.00	0.00	1	396.00	0.00
38.00	0.00	0	396.00	0.00
39.00	0.00	0	396.00	0.00
40.00	0.00	0	396.00	0.00
41.00	0.00	0	396.00	0.00
42.00	0.00	0	396.00	0.00
43.00	0.00	0	396.00	0.00
44.00	0.00	0	396.00	0.00
45.00	0.00	0	396.00	0.00
46.00	0.00	0	396.00	0.00
47.00	0.00	0	396.00	0.00
48.00	0.00	0	396.00	0.00

Stage-Area-Storage for Pond 8P: Pavers "A"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.00	**765**	0	398.65	765	811
396.05	765	15	398.70	765	826
396.10	765	31	398.75	765	842
396.15	765	46	398.80	765	857
396.20	765	61	398.85	765	872
396.25	765	77	398.90	765	887
396.30	765	92	398.95	765	903
396.35	765	107	399.00	765	918
396.40	765	122	399.05	765	933
396.45	765	138	399.10	765	949
396.50	765	153	399.15	765	964
396.55	765	168	399.20	765	979
396.60	765	184	399.25	765	995
396.65	765	199	399.30	765	1,010
396.70	765	214	399.35	765	1,025
396.75	765	230	399.40	765	1,040
396.80	765	245	399.45	765	1,056
396.85	765	260	399.50	765	**1,071**
396.90	765	275			
396.95	765	291			
397.00	765	306			
397.05	765	321			
397.10	765	337			
397.15	765	352			
397.20	765	367			
397.25	765	383			
397.30	765	398			
397.35	765	413			
397.40	765	428			
397.45	765	444			
397.50	765	459			
397.55	765	474			
397.60	765	490			
397.65	765	505			
397.70	765	520			
397.75	765	536			
397.80	765	551			
397.85	765	566			
397.90	765	581			
397.95	765	597			
398.00	765	612			
398.05	765	627			
398.10	765	643			
398.15	765	658			
398.20	765	673			
398.25	765	689			
398.30	765	704			
398.35	765	719			
398.40	765	734			
398.45	765	750			
398.50	765	765			
398.55	765	780			
398.60	765	796			

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 8P: Pavers "A" Peak Elev=396.60' Storage=184 cf Inflow=0.33 cfs 2,259 cf
Outflow=0.28 cfs 2,259 cf

No.	DATE	DESCRIPTION

REVISIONS

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CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	SHEET C.16	8OF 45 SP-12928

Urban, Ltd – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [PAVERS A-1] August 16, 2019 – 11:03am rjahri

Summary for Pond 8P: Pavers "A"

[79] Warning: Submerged Pond 13P Primary device # 1 INLET by 0.10'

Inflow Area = 9,932 sf, 89.91% Impervious, Inflow Depth = 2.73" for 2 yr Storm event
Inflow = 0.33 cfs @ 12.17 hrs, Volume= 2,259 cf
Outflow = 0.28 cfs @ 12.42 hrs, Volume= 2,259 cf, Atten= 15%, Lag= 15.2 min
Primary = 0.28 cfs @ 12.42 hrs, Volume= 2,259 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 396.60' @ 12.42 hrs Surf.Area= 765 sf Storage= 184 cf

Plug-Flow detention time= 17.8 min calculated for 2,259 cf (100% of inflow)
Center-of-Mass det. time= 17.8 min (850.7 - 832.9)

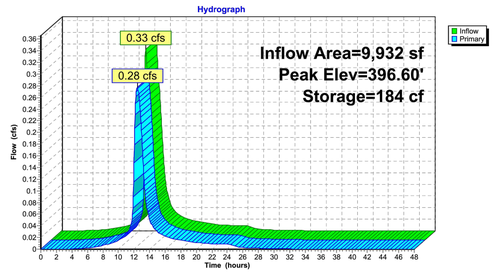
Volume	Invert	Avail.Storage	Storage Description
#1	396.00'	1,071 cf	**Pavers (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.00	765	0.0	0	0
399.50	765	40.0	1,071	1,071

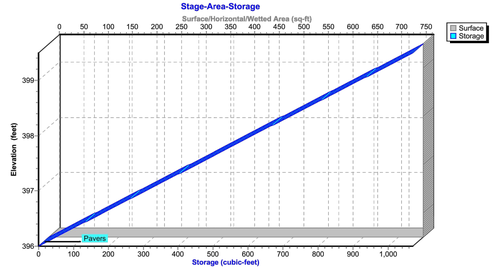
Device	Routing	Invert	Outlet Devices
#1	Primary	396.00'	**6.0" Round 6" PVC** L= 63.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.00' / 390.70' S= 0.0837 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.00'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.28 cfs @ 12.42 hrs HW=396.60' (Free Discharge)
└**1=6" PVC** (Passes 0.28 cfs of 0.56 cfs potential flow)
└**2=4" Orifice/Grate** (Orifice Controls 0.28 cfs @ 3.17 fps)

Pond 8P: Pavers "A"



Pond 8P: Pavers "A"



Hydrograph for Pond 8P: Pavers "A"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.00	0.00
1.00	0.00	0	396.00	0.00
2.00	0.00	0	396.00	0.00
3.00	0.00	1	396.00	0.00
4.00	0.00	2	396.01	0.00
5.00	0.00	4	396.01	0.00
6.00	0.00	7	396.02	0.00
7.00	0.00	11	396.04	0.00
8.00	0.01	15	396.05	0.01
9.00	0.01	19	396.06	0.01
10.00	0.02	24	396.08	0.02
11.00	0.03	31	396.10	0.02
12.00	**0.24**	**89**	**396.29**	**0.15**
13.00	**0.15**	**115**	**396.38**	**0.19**
14.00	0.05	47	396.15	0.05
15.00	0.03	35	396.11	0.03
16.00	0.02	29	396.10	0.02
17.00	0.02	26	396.08	0.02
18.00	0.01	24	396.08	0.02
19.00	0.01	22	396.07	0.01
20.00	0.01	21	396.07	0.01
21.00	0.01	19	396.06	0.01
22.00	0.01	18	396.06	0.01
23.00	0.01	18	396.06	0.01
24.00	0.01	17	396.06	0.01
25.00	0.00	13	396.04	0.01
26.00	0.00	10	396.03	0.00
27.00	0.00	8	396.03	0.00
28.00	0.00	6	396.02	0.00
29.00	0.00	5	396.01	0.00
30.00	0.00	3	396.01	0.00
31.00	0.00	3	396.01	0.00
32.00	0.00	2	396.01	0.00
33.00	0.00	2	396.01	0.00
34.00	0.00	1	396.00	0.00
35.00	0.00	1	396.00	0.00
36.00	0.00	1	396.00	0.00
37.00	0.00	1	396.00	0.00
38.00	0.00	0	396.00	0.00
39.00	0.00	0	396.00	0.00
40.00	0.00	0	396.00	0.00
41.00	0.00	0	396.00	0.00
42.00	0.00	0	396.00	0.00
43.00	0.00	0	396.00	0.00
44.00	0.00	0	396.00	0.00
45.00	0.00	0	396.00	0.00
46.00	0.00	0	396.00	0.00
47.00	0.00	0	396.00	0.00
48.00	0.00	0	396.00	0.00

Stage-Area-Storage for Pond 8P: Pavers "A"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.00	**765**	0	398.65	765	811
396.05	765	15	398.70	765	826
396.10	765	31	398.75	765	842
396.15	765	46	398.80	765	857
396.20	765	61	398.85	765	872
396.25	765	77	398.90	765	887
396.30	765	92	398.95	765	903
396.35	765	107	399.00	765	918
396.40	765	122	399.05	765	933
396.45	765	138	399.10	765	949
396.50	765	153	399.15	765	964
396.55	765	168	399.20	765	979
396.60	765	184	399.25	765	995
396.65	765	199	399.30	765	1,010
396.70	765	214	399.35	765	1,025
396.75	765	230	399.40	765	1,040
396.80	765	245	399.45	765	1,056
396.85	765	260	399.50	765	**1,071**
396.90	765	275			
396.95	765	291			
397.00	765	306			
397.05	765	321			
397.10	765	337			
397.15	765	352			
397.20	765	367			
397.25	765	383			
397.30	765	398			
397.35	765	413			
397.40	765	428			
397.45	765	444			
397.50	765	459			
397.55	765	474			
397.60	765	490			
397.65	765	505			
397.70	765	520			
397.75	765	536			
397.80	765	551			
397.85	765	566			
397.90	765	581			
397.95	765	597			
398.00	765	612			
398.05	765	627			
398.10	765	643			
398.15	765	658			
398.20	765	673			
398.25	765	689			
398.30	765	704			
398.35	765	719			
398.40	765	734			
398.45	765	750			
398.50	765	765			
398.55	765	780			
398.60	765	796			

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 8P: Pavers "A" Peak Elev=396.96' Storage=293 cf Inflow=0.46 cfs 3,646 cf
Outflow=0.37 cfs 3,645 cf

Summary for Pond 8P: Pavers "A"

[79] Warning: Submerged Pond 13P Primary device # 1 INLET by 0.46'

Inflow Area = 9,932 sf, 89.91% Impervious, Inflow Depth = 4.40" for 10 yr Storm event
Inflow = 0.46 cfs @ 12.16 hrs, Volume= 3,646 cf
Outflow = 0.37 cfs @ 12.49 hrs, Volume= 3,645 cf, Atten= 19%, Lag= 20.2 min
Primary = 0.37 cfs @ 12.49 hrs, Volume= 3,645 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 396.96' @ 12.49 hrs Surf.Area= 765 sf Storage= 293 cf

Plug-Flow detention time= 16.2 min calculated for 3,642 cf (100% of inflow)
Center-of-Mass det. time= 16.2 min (832.4 - 816.2)

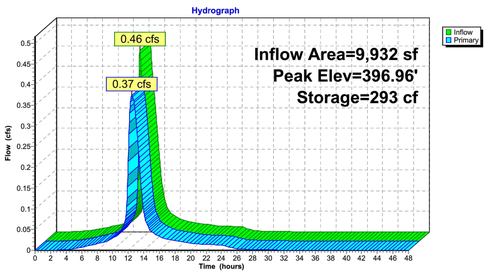
Volume	Invert	Avail.Storage	Storage Description
#1	396.00'	1,071 cf	**Pavers (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.00	765	0.0	0	0
399.50	765	40.0	1,071	1,071

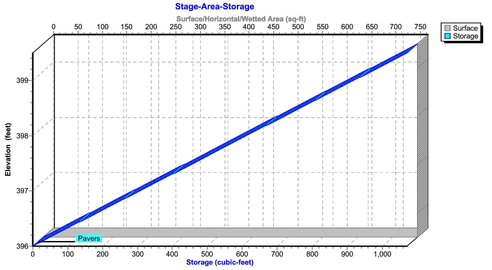
Device	Routing	Invert	Outlet Devices
#1	Primary	396.00'	**6.0" Round 6" PVC** L= 63.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.00' / 390.70' S= 0.0837 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.00'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.37 cfs @ 12.49 hrs HW=396.96' (Free Discharge)
└**1=6" PVC** (Passes 0.37 cfs of 0.80 cfs potential flow)
└**2=4" Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.28 fps)

Pond 8P: Pavers "A"



Pond 8P: Pavers "A"



No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.16C OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [PAVERS A-2] August 16, 2019 – 11:03am rjohn

Hydrograph for Pond 8P: Pavers "A"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.00	0.00
1.00	0.00	0	396.00	0.00
2.00	0.00	1	396.00	0.00
3.00	0.00	3	396.01	0.00
4.00	0.00	6	396.02	0.00
5.00	0.01	11	396.04	0.00
6.00	0.01	16	396.05	0.01
7.00	0.01	21	396.07	0.01
8.00	0.02	24	396.08	0.02
9.00	0.02	28	396.09	0.02
10.00	0.03	34	396.11	0.03
11.00	0.05	43	396.14	0.05
12.00	**0.35**	**130**	**396.43**	**0.21**
13.00	**0.26**	**223**	**396.73**	**0.32**
14.00	0.08	65	396.21	0.09
15.00	0.04	43	396.14	0.05
16.00	0.03	37	396.12	0.03
17.00	0.03	32	396.11	0.03
18.00	0.02	30	396.10	0.02
19.00	0.02	28	396.09	0.02
20.00	0.02	26	396.08	0.02
21.00	0.02	24	396.08	0.02
22.00	0.01	23	396.08	0.01
23.00	0.01	23	396.07	0.01
24.00	0.01	22	396.07	0.01
25.00	0.01	16	396.05	0.01
26.00	0.00	11	396.04	0.00
27.00	0.00	9	396.03	0.00
28.00	0.00	7	396.02	0.00
29.00	0.00	5	396.02	0.00
30.00	0.00	4	396.01	0.00
31.00	0.00	3	396.01	0.00
32.00	0.00	2	396.01	0.00
33.00	0.00	2	396.01	0.00
34.00	0.00	1	396.00	0.00
35.00	0.00	1	396.00	0.00
36.00	0.00	1	396.00	0.00
37.00	0.00	1	396.00	0.00
38.00	0.00	1	396.00	0.00
39.00	0.00	0	396.00	0.00
40.00	0.00	0	396.00	0.00
41.00	0.00	0	396.00	0.00
42.00	0.00	0	396.00	0.00
43.00	0.00	0	396.00	0.00
44.00	0.00	0	396.00	0.00
45.00	0.00	0	396.00	0.00
46.00	0.00	0	396.00	0.00
47.00	0.00	0	396.00	0.00
48.00	0.00	0	396.00	0.00

Stage-Area-Storage for Pond 8P: Pavers "A"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.00	**765**	0
396.05	765	15
396.10	765	31
396.15	765	46
396.20	765	61
396.25	765	77
396.30	765	92
396.35	765	107
396.40	765	122
396.45	765	138
396.50	765	153
396.55	765	168
396.60	765	184
396.65	765	199
396.70	765	214
396.75	765	230
396.80	765	245
396.85	765	260
396.90	765	275
396.95	765	291
397.00	765	306
397.05	765	321
397.10	765	337
397.15	765	352
397.20	765	367
397.25	765	383
397.30	765	398
397.35	765	413
397.40	765	428
397.45	765	444
397.50	765	459
397.55	765	474
397.60	765	490
397.65	765	505
397.70	765	520
397.75	765	536
397.80	765	551
397.85	765	566
397.90	765	581
397.95	765	597
398.00	765	612
398.05	765	627
398.10	765	643
398.15	765	658
398.20	765	673
398.25	765	689
398.30	765	704
398.35	765	719
398.40	765	734
398.45	765	750
398.50	765	765
398.55	765	780
398.60	765	796

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
398.65	765	811
398.70	765	826
398.75	765	842
398.80	765	857
398.85	765	872
398.90	765	887
398.95	765	903
399.00	765	918
399.05	765	933
399.10	765	949
399.15	765	964
399.20	765	979
399.25	765	995
399.30	765	1,010
399.35	765	1,025
399.40	765	1,040
399.45	765	1,056
399.50	765	**1,071**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 8P: Pavers "A" Peak Elev=397.35' Storage=413 cf Inflow=0.59 cfs 5,129 cf
Outflow=0.46 cfs 5,129 cf

Summary for Pond 8P: Pavers "A"

[79] Warning: Submerged Pond 13P Primary device # 1 INLET by 0.85'

Inflow Area = 9,932 sf, 89.91% Impervious, Inflow Depth = 6.20" for 50 yr Storm event
Inflow = 0.59 cfs @ 12.15 hrs, Volume= 5,129 cf
Outflow = 0.46 cfs @ 12.56 hrs, Volume= 5,129 cf, Atten= 22%, Lag= 24.7 min
Primary = 0.46 cfs @ 12.56 hrs, Volume= 5,129 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 397.35' @ 12.56 hrs Surf.Area= 765 sf Storage= 413 cf

Plug-Flow detention time= 15.6 min calculated for 5,123 cf (100% of inflow)
Center-of-Mass det. time= 15.7 min (822.7 - 807.0)

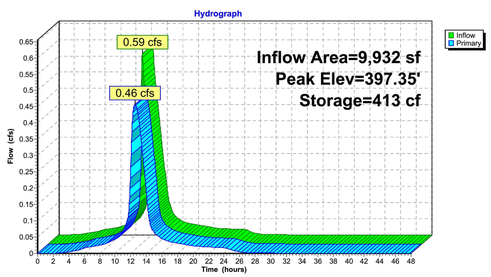
Volume	Invert	Avail.Storage	Storage Description
#1	396.00'	1,071 cf	**Pavers (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.00	765	0.0	0	0
399.50	765	40.0	1,071	1,071

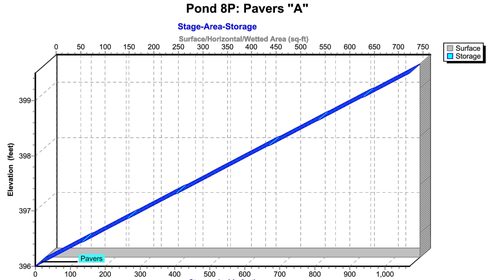
Device	Routing	Invert	Outlet Devices
#1	Primary	396.00'	**6.0" Round 6" PVC** L= 63.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.00' / 390.70' S= 0.0837 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.00'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.46 cfs @ 12.56 hrs HW=397.35' (Free Discharge)
└**1=6" PVC** (Passes 0.46 cfs of 0.99 cfs potential flow)
└**2=4" Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.24 fps)

Pond 8P: Pavers "A"



Pond 8P: Pavers "A"



Hydrograph for Pond 8P: Pavers "A"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.00	0.00
1.00	0.00	0	396.00	0.00
2.00	0.00	2	396.01	0.00
3.00	0.00	6	396.02	0.00
4.00	0.01	12	396.04	0.00
5.00	0.01	18	396.06	0.01
6.00	0.02	24	396.08	0.02
7.00	0.02	28	396.09	0.02
8.00	0.03	31	396.10	0.02
9.00	0.03	36	396.12	0.03
10.00	0.04	42	396.14	0.04
11.00	0.07	54	396.18	0.07
12.00	**0.46**	**173**	**396.56**	**0.27**
13.00	**0.35**	**352**	**397.15**	**0.42**
14.00	0.14	110	396.36	0.19
15.00	0.06	52	396.17	0.06
16.00	0.04	43	396.14	0.05
17.00	0.04	38	396.12	0.04
18.00	0.03	35	396.12	0.03
19.00	0.03	33	396.11	0.03
20.00	0.02	30	396.10	0.02
21.00	0.02	28	396.09	0.02
22.00	0.02	27	396.09	0.02
23.00	0.02	26	396.09	0.02
24.00	0.02	26	396.08	0.02
25.00	0.01	18	396.06	0.01
26.00	0.00	12	396.04	0.00
27.00	0.00	9	396.03	0.00
28.00	0.00	7	396.02	0.00
29.00	0.00	5	396.02	0.00
30.00	0.00	4	396.01	0.00
31.00	0.00	3	396.01	0.00
32.00	0.00	2	396.01	0.00
33.00	0.00	2	396.01	0.00
34.00	0.00	1	396.00	0.00
35.00	0.00	1	396.00	0.00
36.00	0.00	1	396.00	0.00
37.00	0.00	1	396.00	0.00
38.00	0.00	1	396.00	0.00
39.00	0.00	0	396.00	0.00
40.00	0.00	0	396.00	0.00
41.00	0.00	0	396.00	0.00
42.00	0.00	0	396.00	0.00
43.00	0.00	0	396.00	0.00
44.00	0.00	0	396.00	0.00
45.00	0.00	0	396.00	0.00
46.00	0.00	0	396.00	0.00
47.00	0.00	0	396.00	0.00
48.00	0.00	0	396.00	0.00

Stage-Area-Storage for Pond 8P: Pavers "A"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.00	**765**	0
396.05	765	15
396.10	765	31
396.15	765	46
396.20	765	61
396.25	765	77
396.30	765	92
396.35	765	107
396.40	765	122
396.45	765	138
396.50	765	153
396.55	765	168
396.60	765	184
396.65	765	199
396.70	765	214
396.75	765	230
396.80	765	245
396.85	765	260
396.90	765	275
396.95	765	291
397.00	765	306
397.05	765	321
397.10	765	337
397.15	765	352
397.20	765	367
397.25	765	383
397.30	765	398
397.35	765	413
397.40	765	428
397.45	765	444
397.50	765	459
397.55	765	474
397.60	765	490
397.65	765	505
397.70	765	520
397.75	765	536
397.80	765	551
397.85	765	566
397.90	765	581
397.95	765	597
398.00	765	612
398.05	765	627
398.10	765	643
398.15	765	658
398.20	765	673
398.25	765	689
398.30	765	704
398.35	765	719
398.40	765	734
398.45	765	750
398.50	765	765
398.55	765	780
398.60	765	796

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
398.65	765	811
398.70	765	826
398.75	765	842
398.80	765	857
398.85	765	872
398.90	765	887
398.95	765	903
399.00	765	918
399.05	765	933
399.10	765	949
399.15	765	964
399.20	765	979
399.25	765	995
399.30	765	1,010
399.35	765	1,025
399.40	765	1,040
399.45	765	1,056
399.50	765	**1,071**

No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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DEPARTMENT OF ENVIRONMENTAL SERVICES
SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.16D OF 45	SP-12928

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 8P: Pavers "A" Peak Elev=397.59' Storage=486 cf Inflow=0.65 cfs 6,004 cf
Outflow=0.50 cfs 6,004 cf

Summary for Pond 8P: Pavers "A"

[79] Warning: Submerged Pond 13P Primary device # 1 INLET by 1.09'

Inflow Area = 9,932 sf, 89.91% Impervious, Inflow Depth = 7.25" for 100 yr Storm event
Inflow = 0.65 cfs @ 12.14 hrs, Volume= 6,004 cf
Outflow = 0.50 cfs @ 12.59 hrs, Volume= 6,004 cf, Atten= 23%, Lag= 27.0 min
Primary = 0.50 cfs @ 12.59 hrs, Volume= 6,004 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 397.59' @ 12.59 hrs Surf.Area= 765 sf Storage= 486 cf

Plug-Flow detention time= 15.6 min calculated for 5,997 cf (100% of inflow)
Center-of-Mass det. time= 15.6 min (819.2 - 803.6)

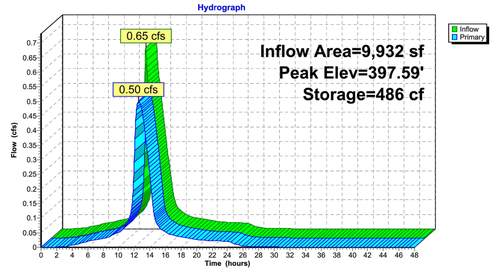
Volume	Invert	Avail.Storage	Storage Description
#1	396.00'	1,071 cf	**Pavers (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.00	765	0.0	0	0
399.50	765	40.0	1,071	1,071

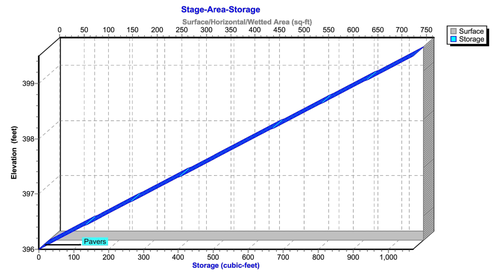
Device	Routing	Invert	Outlet Devices
#1	Primary	396.00'	**6.0" Round 6" PVC** L= 63.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.00' / 390.70' S= 0.0837 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.00'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.50 cfs @ 12.59 hrs HW=397.59' (Free Discharge)
↳**1=6" PVC** (Passes 0.50 cfs of 1.09 cfs potential flow)
↳**2=4" Orifice/Grate** (Orifice Controls 0.50 cfs @ 5.74 fps)

Pond 8P: Pavers "A"



Pond 8P: Pavers "A"



Hydrograph for Pond 8P: Pavers "A"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.00	0.00
1.00	0.00	0	396.00	0.00
2.00	0.00	3	396.01	0.00
3.00	0.00	8	396.03	0.00
4.00	0.01	16	396.05	0.01
5.00	0.02	23	396.07	0.01
6.00	0.02	28	396.09	0.02
7.00	0.03	32	396.10	0.03
8.00	0.03	35	396.11	0.03
9.00	0.04	40	396.13	0.04
10.00	0.05	46	396.15	0.05
11.00	0.09	60	396.19	0.08
12.00	**0.51**	**198**	**396.65**	**0.29**
13.00	**0.40**	**430**	**397.41**	**0.47**
14.00	0.19	157	396.51	0.25
15.00	0.07	59	396.19	0.08
16.00	0.05	47	396.15	0.05
17.00	0.04	41	396.13	0.04
18.00	0.04	38	396.12	0.04
19.00	0.03	35	396.12	0.03
20.00	0.03	33	396.11	0.03
21.00	0.02	30	396.10	0.02
22.00	0.02	29	396.10	0.02
23.00	0.02	29	396.09	0.02
24.00	0.02	28	396.09	0.02
25.00	0.01	19	396.06	0.01
26.00	0.00	13	396.04	0.00
27.00	0.00	10	396.03	0.00
28.00	0.00	7	396.02	0.00
29.00	0.00	6	396.02	0.00
30.00	0.00	4	396.01	0.00
31.00	0.00	3	396.01	0.00
32.00	0.00	3	396.01	0.00
33.00	0.00	2	396.01	0.00
34.00	0.00	1	396.00	0.00
35.00	0.00	1	396.00	0.00
36.00	0.00	1	396.00	0.00
37.00	0.00	1	396.00	0.00
38.00	0.00	1	396.00	0.00
39.00	0.00	0	396.00	0.00
40.00	0.00	0	396.00	0.00
41.00	0.00	0	396.00	0.00
42.00	0.00	0	396.00	0.00
43.00	0.00	0	396.00	0.00
44.00	0.00	0	396.00	0.00
45.00	0.00	0	396.00	0.00
46.00	0.00	0	396.00	0.00
47.00	0.00	0	396.00	0.00
48.00	0.00	0	396.00	0.00

Stage-Area-Storage for Pond 8P: Pavers "A"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.00	**765**	0	398.65	765	811
396.05	765	15	398.70	765	826
396.10	765	31	398.75	765	842
396.15	765	46	398.80	765	857
396.20	765	61	398.85	765	872
396.25	765	77	398.90	765	887
396.30	765	92	398.95	765	903
396.35	765	107	399.00	765	918
396.40	765	122	399.05	765	933
396.45	765	138	399.10	765	949
396.50	765	153	399.15	765	964
396.55	765	168	399.20	765	979
396.60	765	184	399.25	765	995
396.65	765	199	399.30	765	1,010
396.70	765	214	399.35	765	1,025
396.75	765	230	399.40	765	1,040
396.80	765	245	399.45	765	1,056
396.85	765	260	399.50	765	**1,071**
396.90	765	275			
396.95	765	291			
397.00	765	306			
397.05	765	321			
397.10	765	337			
397.15	765	352			
397.20	765	367			
397.25	765	383			
397.30	765	398			
397.35	765	413			
397.40	765	428			
397.45	765	444			
397.50	765	459			
397.55	765	474			
397.60	765	490			
397.65	765	505			
397.70	765	520			
397.75	765	536			
397.80	765	551			
397.85	765	566			
397.90	765	581			
397.95	765	597			
398.00	765	612			
398.05	765	627			
398.10	765	643			
398.15	765	658			
398.20	765	673			
398.25	765	689			
398.30	765	704			
398.35	765	719			
398.40	765	734			
398.45	765	750			
398.50	765	765			
398.55	765	780			
398.60	765	796			

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.16E OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [PAVERS A-4] August 16, 2019 – 11:03am rjafari

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
0	**0**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 13P: Pavers "B" Peak Elev=396.97' Storage=487 cf Inflow=0.50 cfs 1,607 cf
Outflow=0.23 cfs 1,607 cf

Summary for Pond 13P: Pavers "B"

Inflow Area = 8,581 sf, 88.32% Impervious, Inflow Depth = 2.25" for 1 yr Storm event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 1,607 cf
Outflow = 0.23 cfs @ 12.29 hrs, Volume= 1,607 cf, Atten= 54%, Lag= 12.0 min
Primary = 0.23 cfs @ 12.29 hrs, Volume= 1,607 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 396.97' @ 12.29 hrs Surf.Area= 2,601 sf Storage= 487 cf

Plug-Flow detention time= 67.2 min calculated for 1,607 cf (100% of inflow)
Center-of-Mass det. time= 67.0 min (852.9 - 785.9)

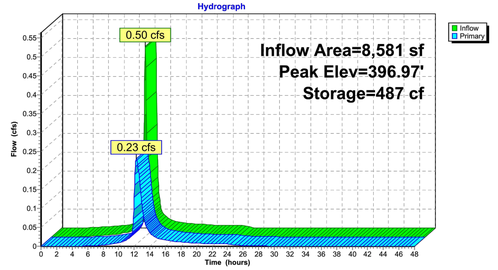
Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	3,121 cf	**Pavers (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.50	2,601	0.0	0	0
399.50	2,601	40.0	3,121	3,121

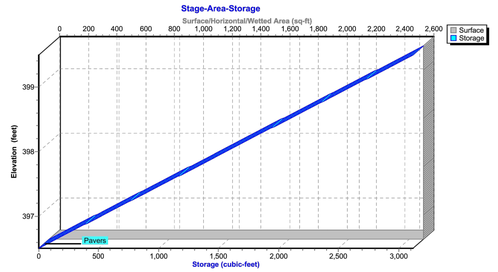
Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**6.0" Round 6" PVC** L= 52.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.10' S= 0.0076 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.50'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.23 cfs @ 12.29 hrs HW=396.97' (Free Discharge)
↳**1=6" PVC** (Passes 0.23 cfs of 0.44 cfs potential flow)
↳**2=4" Orifice/Grate** (Orifice Controls 0.23 cfs @ 2.64 fps)

Pond 13P: Pavers "B"



Pond 13P: Pavers "B"



Hydrograph for Pond 13P: Pavers "B"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.50	0.00
1.00	0.00	0	396.50	0.00
2.00	0.00	0	396.50	0.00
3.00	0.00	0	396.50	0.00
4.00	0.00	2	396.50	0.00
5.00	0.00	7	396.51	0.00
6.00	0.00	15	396.51	0.00
7.00	0.01	26	396.52	0.00
8.00	0.01	37	396.54	0.00
9.00	0.01	49	396.55	0.01
10.00	0.01	64	396.56	0.01
11.00	0.03	87	396.58	0.02
12.00	**0.41**	**273**	**396.76**	**0.13**
13.00	**0.04**	**244**	**396.73**	**0.11**
14.00	0.02	130	396.62	0.04
15.00	0.02	98	396.59	0.02
16.00	0.01	85	396.58	0.02
17.00	0.01	75	396.57	0.01
18.00	0.01	69	396.57	0.01
19.00	0.01	64	396.56	0.01
20.00	0.01	60	396.56	0.01
21.00	0.01	56	396.55	0.01
22.00	0.01	53	396.55	0.01
23.00	0.01	51	396.55	0.01
24.00	0.01	50	396.55	0.01
25.00	0.00	37	396.54	0.00
26.00	0.00	28	396.53	0.00
27.00	0.00	21	396.52	0.00
28.00	0.00	16	396.52	0.00
29.00	0.00	13	396.51	0.00
30.00	0.00	10	396.51	0.00
31.00	0.00	7	396.51	0.00
32.00	0.00	6	396.51	0.00
33.00	0.00	4	396.50	0.00
34.00	0.00	3	396.50	0.00
35.00	0.00	3	396.50	0.00
36.00	0.00	2	396.50	0.00
37.00	0.00	2	396.50	0.00
38.00	0.00	1	396.50	0.00
39.00	0.00	1	396.50	0.00
40.00	0.00	1	396.50	0.00
41.00	0.00	1	396.50	0.00
42.00	0.00	0	396.50	0.00
43.00	0.00	0	396.50	0.00
44.00	0.00	0	396.50	0.00
45.00	0.00	0	396.50	0.00
46.00	0.00	0	396.50	0.00
47.00	0.00	0	396.50	0.00
48.00	0.00	0	396.50	0.00

Stage-Area-Storage for Pond 13P: Pavers "B"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.50	**2,601**	0	399.15	2,601	2,757
396.55	2,601	52	399.20	2,601	2,809
396.60	2,601	104	399.25	2,601	2,861
396.65	2,601	156	399.30	2,601	2,913
396.70	2,601	208	399.35	2,601	2,965
396.75	2,601	260	399.40	2,601	3,017
396.80	2,601	312	399.45	2,601	3,069
396.85	2,601	364	399.50	2,601	**3,121**
396.90	2,601	416			
396.95	2,601	468			
397.00	2,601	520			
397.05	2,601	572			
397.10	2,601	624			
397.15	2,601	676			
397.20	2,601	728			
397.25	2,601	780			
397.30	2,601	832			
397.35	2,601	884			
397.40	2,601	936			
397.45	2,601	988			
397.50	2,601	1,040			
397.55	2,601	1,092			
397.60	2,601	1,144			
397.65	2,601	1,196			
397.70	2,601	1,248			
397.75	2,601	1,301			
397.80	2,601	1,353			
397.85	2,601	1,405			
397.90	2,601	1,457			
397.95	2,601	1,509			
398.00	2,601	1,561			
398.05	2,601	1,613			
398.10	2,601	1,665			
398.15	2,601	1,717			
398.20	2,601	1,769			
398.25	2,601	1,821			
398.30	2,601	1,873			
398.35	2,601	1,925			
398.40	2,601	1,977			
398.45	2,601	2,029			
398.50	2,601	2,081			
398.55	2,601	2,133			
398.60	2,601	2,185			
398.65	2,601	2,237			
398.70	2,601	2,289			
398.75	2,601	2,341			
398.80	2,601	2,393			
398.85	2,601	2,445			
398.90	2,601	2,497			
398.95	2,601	2,549			
399.00	2,601	2,601			
399.05	2,601	2,653			
399.10	2,601	2,705			

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 13P: Pavers "B" Peak Elev=397.06' Storage=580 cf Inflow=0.60 cfs 1,931 cf
Outflow=0.26 cfs 1,931 cf

Summary for Pond 13P: Pavers "B"

Inflow Area = 8,581 sf, 88.32% Impervious, Inflow Depth = 2.70" for 2 yr Storm event
Inflow = 0.60 cfs @ 12.08 hrs, Volume= 1,931 cf
Outflow = 0.26 cfs @ 12.29 hrs, Volume= 1,931 cf, Atten= 56%, Lag= 12.6 min
Primary = 0.26 cfs @ 12.29 hrs, Volume= 1,931 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 397.06' @ 12.29 hrs Surf.Area= 2,601 sf Storage= 580 cf

Plug-Flow detention time= 63.7 min calculated for 1,931 cf (100% of inflow)
Center-of-Mass det. time= 63.6 min (844.8 - 781.2)

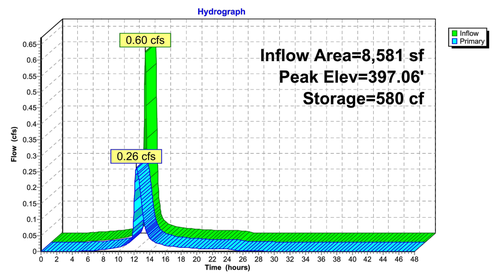
Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	3,121 cf	**Pavers (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.50	2,601	0.0	0	0
399.50	2,601	40.0	3,121	3,121

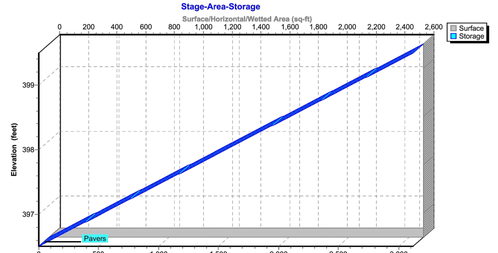
Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**6.0" Round 6" PVC** L= 52.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.10' S= 0.0076 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.50'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.26 cfs @ 12.29 hrs HW=397.06' (Free Discharge)
↳**1=6" PVC** (Passes 0.26 cfs of 0.52 cfs potential flow)
↳**2=4" Orifice/Grate** (Orifice Controls 0.26 cfs @ 3.01 fps)

Pond 13P: Pavers "B"



Pond 13P: Pavers "B"



No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK V
Lic. No. 036790
07/30/19
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SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.16F OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [PAVERS B-1] August 16, 2019 – 11:03am rjahari

Hydrograph for Pond 13P: Pavers "B"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.50	0.00
1.00	0.00	0	396.50	0.00
2.00	0.00	0	396.50	0.00
3.00	0.00	0	396.50	0.00
4.00	0.00	4	396.50	0.00
5.00	0.00	12	396.51	0.00
6.00	0.01	23	396.52	0.00
7.00	0.01	36	396.53	0.00
8.00	0.01	47	396.55	0.01
9.00	0.01	60	396.56	0.01
10.00	0.02	75	396.57	0.01
11.00	0.03	99	396.60	0.02
12.00	**0.49**	**316**	**396.80**	**0.16**
13.00	**0.05**	**291**	**396.78**	**0.14**
14.00	0.03	142	396.64	0.04
15.00	0.02	106	396.60	0.03
16.00	0.02	92	396.59	0.02
17.00	0.01	81	396.58	0.02
18.00	0.01	75	396.57	0.01
19.00	0.01	70	396.57	0.01
20.00	0.01	65	396.56	0.01
21.00	0.01	61	396.56	0.01
22.00	0.01	58	396.56	0.01
23.00	0.01	57	396.55	0.01
24.00	0.01	55	396.55	0.01
25.00	0.00	40	396.54	0.00
26.00	0.00	29	396.53	0.00
27.00	0.00	23	396.52	0.00
28.00	0.00	17	396.52	0.00
29.00	0.00	13	396.51	0.00
30.00	0.00	10	396.51	0.00
31.00	0.00	8	396.51	0.00
32.00	0.00	6	396.51	0.00
33.00	0.00	5	396.50	0.00
34.00	0.00	4	396.50	0.00
35.00	0.00	3	396.50	0.00
36.00	0.00	2	396.50	0.00
37.00	0.00	2	396.50	0.00
38.00	0.00	1	396.50	0.00
39.00	0.00	1	396.50	0.00
40.00	0.00	1	396.50	0.00
41.00	0.00	1	396.50	0.00
42.00	0.00	0	396.50	0.00
43.00	0.00	0	396.50	0.00
44.00	0.00	0	396.50	0.00
45.00	0.00	0	396.50	0.00
46.00	0.00	0	396.50	0.00
47.00	0.00	0	396.50	0.00
48.00	0.00	0	396.50	0.00

Stage-Area-Storage for Pond 13P: Pavers "B"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.50	**2,601**	0	399.15	2,601	2,757
396.55	2,601	52	399.20	2,601	2,809
396.60	2,601	104	399.25	2,601	2,861
396.65	2,601	156	399.30	2,601	2,913
396.70	2,601	208	399.35	2,601	2,965
396.75	2,601	260	399.40	2,601	3,017
396.80	2,601	312	399.45	2,601	3,069
396.85	2,601	364	399.50	2,601	**3,121**
396.90	2,601	416			
396.95	2,601	468			
397.00	2,601	520			
397.05	2,601	572			
397.10	2,601	624			
397.15	2,601	676			
397.20	2,601	728			
397.25	2,601	780			
397.30	2,601	832			
397.35	2,601	884			
397.40	2,601	936			
397.45	2,601	988			
397.50	2,601	1,040			
397.55	2,601	1,092			
397.60	2,601	1,144			
397.65	2,601	1,196			
397.70	2,601	1,248			
397.75	2,601	1,301			
397.80	2,601	1,353			
397.85	2,601	1,405			
397.90	2,601	1,457			
397.95	2,601	1,509			
398.00	2,601	1,561			
398.05	2,601	1,613			
398.10	2,601	1,665			
398.15	2,601	1,717			
398.20	2,601	1,769			
398.25	2,601	1,821			
398.30	2,601	1,873			
398.35	2,601	1,925			
398.40	2,601	1,977			
398.45	2,601	2,029			
398.50	2,601	2,081			
398.55	2,601	2,133			
398.60	2,601	2,185			
398.65	2,601	2,237			
398.70	2,601	2,289			
398.75	2,601	2,341			
398.80	2,601	2,393			
398.85	2,601	2,445			
398.90	2,601	2,497			
398.95	2,601	2,549			
399.00	2,601	2,601			
399.05	2,601	2,653			
399.10	2,601	2,705			

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 13P: Pavers "B" Peak Elev=397.40' Storage=938 cf Inflow=0.94 cfs 3,128 cf
Outflow=0.36 cfs 3,127 cf

Summary for Pond 13P: Pavers "B"

Inflow Area = 8,581 sf, 88.32% Impervious, Inflow Depth = 4.37" for 10 yr Storm event
Inflow = 0.94 cfs @ 12.08 hrs, Volume= 3,128 cf
Outflow = 0.36 cfs @ 12.32 hrs, Volume= 3,127 cf, Atten= 62%, Lag= 14.1 min
Primary = 0.36 cfs @ 12.32 hrs, Volume= 3,127 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 397.40' @ 12.32 hrs Surf.Area= 2,601 sf Storage= 938 cf

Plug-Flow detention time= 57.0 min calculated for 3,127 cf (100% of inflow)
Center-of-Mass det. time= 56.7 min (826.4 - 769.6)

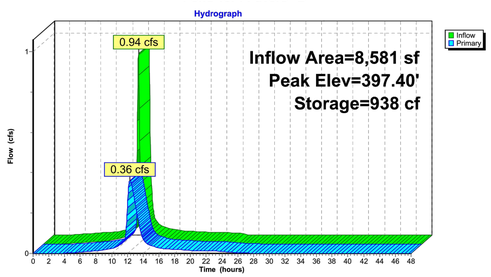
Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	3,121 cf	**Pavers (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
396.50	2,601	0.0	0	0
399.50	2,601	40.0	3,121	3,121

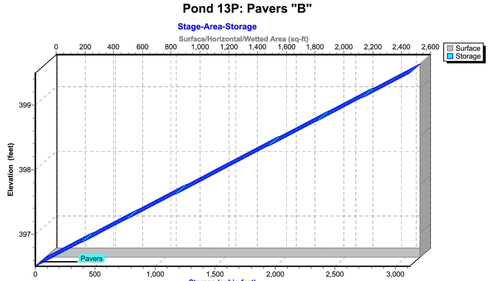
Device	Routing	Invert	Outlet Devices
#1	Primary	396.50'	**6.0" Round 6" PVC** L= 52.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 396.50' / 396.10' S= 0.0076 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	396.50'	**4.0" Vert. 4" Orifice/Grate** C= 0.600

Primary OutFlow Max=0.36 cfs @ 12.32 hrs HW=397.40' (Free Discharge)
↳**1=6" PVC** (Passes 0.36 cfs of 0.71 cfs potential flow)
↳**2=4" Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.12 fps)

Pond 13P: Pavers "B"



Pond 13P: Pavers "B"



Hydrograph for Pond 13P: Pavers "B"

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	396.50	0.00
1.00	0.00	0	396.50	0.00
2.00	0.00	0	396.50	0.00
3.00	0.00	6	396.51	0.00
4.00	0.01	19	396.52	0.00
5.00	0.01	36	396.53	0.00
6.00	0.01	52	396.55	0.01
7.00	0.01	66	396.56	0.01
8.00	0.02	76	396.57	0.01
9.00	0.02	90	396.59	0.02
10.00	0.03	106	396.60	0.03
11.00	0.05	138	396.63	0.04
12.00	**0.78**	**472**	**396.95**	**0.23**
13.00	**0.07**	**525**	**397.00**	**0.24**
14.00	0.04	191	396.68	0.07
15.00	0.03	133	396.63	0.04
16.00	0.02	114	396.61	0.03
17.00	0.02	101	396.60	0.02
18.00	0.02	94	396.59	0.02
19.00	0.02	87	396.58	0.02
20.00	0.01	80	396.58	0.01
21.00	0.01	75	396.57	0.01
22.00	0.01	72	396.57	0.01
23.00	0.01	70	396.57	0.01
24.00	0.01	69	396.57	0.01
25.00	0.00	48	396.55	0.01
26.00	0.00	33	396.53	0.00
27.00	0.00	25	396.52	0.00
28.00	0.00	19	396.52	0.00
29.00	0.00	15	396.51	0.00
30.00	0.00	11	396.51	0.00
31.00	0.00	9	396.51	0.00
32.00	0.00	7	396.51	0.00
33.00	0.00	5	396.50	0.00
34.00	0.00	4	396.50	0.00
35.00	0.00	3	396.50	0.00
36.00	0.00	2	396.50	0.00
37.00	0.00	2	396.50	0.00
38.00	0.00	1	396.50	0.00
39.00	0.00	1	396.50	0.00
40.00	0.00	1	396.50	0.00
41.00	0.00	1	396.50	0.00
42.00	0.00	0	396.50	0.00
43.00	0.00	0	396.50	0.00
44.00	0.00	0	396.50	0.00
45.00	0.00	0	396.50	0.00
46.00	0.00	0	396.50	0.00
47.00	0.00	0	396.50	0.00
48.00	0.00	0	396.50	0.00

Stage-Area-Storage for Pond 13P: Pavers "B"

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
396.50	**2,601**	0	399.15	2,601	2,757
396.55	2,601	52	399.20	2,601	2,809
396.60	2,601	104	399.25	2,601	2,861
396.65	2,601	156	399.30	2,601	2,913
396.70	2,601	208	399.35	2,601	2,965
396.75	2,601	260	399.40	2,601	3,017
396.80	2,601	312	399.45	2,601	3,069
396.85	2,601	364	399.50	2,601	**3,121**
396.90	2,601	416			
396.95	2,601	468			
397.00	2,601	520			
397.05	2,601	572			
397.10	2,601	624			
397.15	2,601	676			
397.20	2,601	728			
397.25	2,601	780			
397.30	2,601	832			
397.35	2,601	884			
397.40	2,601	936			
397.45	2,601	988			
397.50	2,601	1,040			
397.55	2,601	1,092			
397.60	2,601	1,144			
397.65	2,601	1,196			
397.70	2,601	1,248			
397.75	2,601	1,301			
397.80	2,601	1,353			
397.85	2,601	1,405			
397.90	2,601	1,457			
397.95	2,601	1,509			
398.00	2,601	1,561			
398.05	2,601	1,613			
398.10	2,601	1,665			
398.15	2,601	1,717			
398.20	2,601	1,769			
398.25	2,601	1,821			
398.30	2,601	1,873			
398.35	2,601	1,925			
398.40	2,601	1,977			
398.45	2,601	2,029			
398.50	2,601	2,081			
398.55	2,601	2,133			
398.60	2,601	2,185			
398.65	2,601	2,237			
398.70	2,601	2,289			
398.75	2,601	2,341			
398.80	2,601	2,393			
398.85	2,601	2,445			
398.90	2,601	2,497			
398.95	2,601	2,549			
399.00	2,601	2,601			
399.05	2,601	2,653			
399.10	2,601	2,705			

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.16G OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [PAVERS B-2] August 16, 2019 – 11:03am rjafari

SWM VAULT

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
0	0	TOTAL AREA

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 9P: SK75 VAULT Peak Elev=391.45' Storage=4,258 cf Inflow=5.20 cfs 17,379 cf
Outflow=2.40 cfs 17,377 cf

Summary for Pond 9P: SK75 VAULT

Inflow Area = 103,542 sf, 75.26% Impervious, Inflow Depth = 2.01" for 1 yr Storm event
Inflow = 5.20 cfs @ 12.09 hrs, Volume= 17,379 cf
Outflow = 2.40 cfs @ 12.30 hrs, Volume= 17,377 cf, Atten= 54%, Lag= 12.9 min
Primary = 2.40 cfs @ 12.30 hrs, Volume= 17,377 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 391.45' @ 12.30 hrs Surf.Area= 5,192 sf Storage= 4,258 cf

Plug-Flow detention time= 37.1 min calculated for 17,377 cf (100% of inflow)
Center-of-Mass det. time= 37.0 min (844.4 - 807.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	390.20'	4,547 cf	**53.75'W x 96.59'L x 3.50'H Field A** 18,171 cf Overall - 6,805 cf Embedded = 11,366 cf x 40.0% Voids
#2A	390.70'	6,805 cf	**Lane StormKeeper SK75** x 143 Inside #1 Effective Size= 44.7"W x 30.0"H => 6.61 sf x 7.08'L = 46.8 cf Overall Size= 51.0"W x 30.0"H x 7.30'L with 0.22' Overlap 143 Chambers in 11 Rows Cap Storage= +5.2 cf x 2 x 11 rows = 115.3 cf
		11,351 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	390.10'	**15.0" Round 15" Culvert** L= 73.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 390.10' / 389.67' S= 0.0059 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	390.20'	**10.0" Vert. 10" Orifice/Grate** C= 0.600

Primary OutFlow Max=2.40 cfs @ 12.30 hrs HW=391.45' (Free Discharge)
↳**1=15" Culvert** (Passes 2.40 cfs of 4.63 cfs potential flow)
↳**2=10" Orifice/Grate** (Orifice Controls 2.40 cfs @ 4.40 fps)

Pond 9P: SK75 VAULT - Chamber Wizard Field A

Chamber Model = Lane StormKeeper SK75 (Lane StormKeeper)
Effective Size= 44.7"W x 30.0"H => 6.61 sf x 7.08'L = 46.8 cf
Overall Size= 51.0"W x 30.0"H x 7.30'L with 0.22' Overlap
Cap Storage= +5.2 cf x 2 x 11 rows = 115.3 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

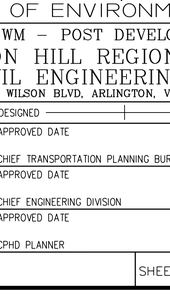
13 Chambers/Row x 7.08' Long +1.81' Cap Length x 2 = 95.59' Row Length +6.0" End Stone x 2 = 96.59' Base Length
11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

143 Chambers x 46.8 cf + 5.2 cf Cap Volume x 2 x 11 Rows = 6,804.9 cf Chamber Storage

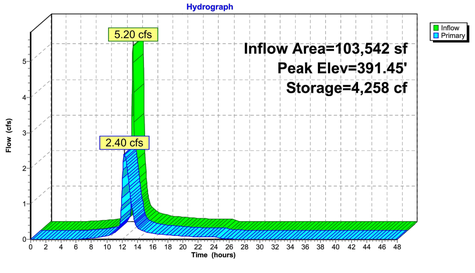
18,171.3 cf Field - 6,804.9 cf Chambers = 11,366.4 cf Stone x 40.0% Voids = 4,546.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,351.5 cf = 0.261 af
Overall Storage Efficiency = 62.5%
Overall System Size = 96.59' x 53.75' x 3.50'

143 Chambers
673.0 cy Field
421.0 cy Stone



Pond 9P: SK75 VAULT



Hydrograph for Pond 9P: SK75 VAULT

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	390.20	0.00
1.00	0.00	0	390.20	0.00
2.00	0.00	0	390.20	0.00
3.00	0.00	0	390.20	0.00
4.00	0.00	3	390.20	0.00
5.00	0.01	23	390.21	0.00
6.00	0.02	63	390.23	0.00
7.00	0.03	122	390.26	0.02
8.00	0.05	185	390.29	0.03
9.00	0.08	253	390.32	0.06
10.00	0.12	330	390.36	0.10
11.00	0.24	462	390.42	0.19
12.00	**4.18**	**1,977**	**390.92**	**1.43**
13.00	**0.52**	**1,896**	**390.90**	**1.38**
14.00	0.27	634	390.51	0.34
15.00	0.20	499	390.44	0.22
16.00	0.15	438	390.41	0.17
17.00	0.13	393	390.39	0.14
18.00	0.12	368	390.38	0.12
19.00	0.10	344	390.37	0.11
20.00	0.09	318	390.35	0.09
21.00	0.08	298	390.34	0.08
22.00	0.07	290	390.34	0.08
23.00	0.07	283	390.34	0.07
24.00	0.07	277	390.33	0.07
25.00	0.00	172	390.28	0.03
26.00	0.00	114	390.25	0.01
27.00	0.00	85	390.24	0.01
28.00	0.00	70	390.23	0.00
29.00	0.00	58	390.23	0.00
30.00	0.00	49	390.22	0.00
31.00	0.00	40	390.22	0.00
32.00	0.00	33	390.22	0.00
33.00	0.00	27	390.21	0.00
34.00	0.00	22	390.21	0.00
35.00	0.00	18	390.21	0.00
36.00	0.00	15	390.21	0.00
37.00	0.00	12	390.21	0.00
38.00	0.00	10	390.20	0.00
39.00	0.00	8	390.20	0.00
40.00	0.00	6	390.20	0.00
41.00	0.00	5	390.20	0.00
42.00	0.00	4	390.20	0.00
43.00	0.00	3	390.20	0.00
44.00	0.00	3	390.20	0.00
45.00	0.00	2	390.20	0.00
46.00	0.00	2	390.20	0.00
47.00	0.00	1	390.20	0.00
48.00	0.00	1	390.20	0.00

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 9P: SK75 VAULT Peak Elev=391.71' Storage=5,302 cf Inflow=6.28 cfs 21,177 cf
Outflow=2.74 cfs 21,176 cf

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.16H OF 45 — SP-12928

Urban, Ltd. – J:_JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [VAULT-1] August 16, 2019 – 11:03am rpferi

VAULT (CONTINUED)

Summary for Pond 9P: SK75 VAULT

Inflow Area = 103,542 sf, 75.26% Impervious, Inflow Depth = 2.45" for 2 yr Storm event
Inflow = 6.28 cfs @ 12.09 hrs, Volume= 21,177 cf
Outflow = 2.74 cfs @ 12.31 hrs, Volume= 21,176 cf, Atten= 56%, Lag= 13.5 min
Primary = 2.74 cfs @ 12.31 hrs, Volume= 21,176 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 391.71' @ 12.31 hrs Surf.Area= 5,192 sf Storage= 5,302 cf

Plug-Flow detention time= 36.2 min calculated for 21,176 cf (100% of inflow)
Center-of-Mass det. time= 36.1 min (837.8 - 801.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	390.20'	4,547 cf	**53.75'W x 96.59'L x 3.50'H Field A** 18,171 cf Overall - 6,805 cf Embedded = 11,366 cf x 40.0% Voids
#2A	390.70'	6,805 cf	**Lane StormKeeper SK75** x 143 Inside #1 Effective Size= 44.7"W x 30.0"H => 6.61 sf x 7.08'L = 46.8 cf Overall Size= 51.0"W x 30.0"H x 7.30'L with 0.22' Overlap 143 Chambers in 11 Rows Cap Storage= +5.2 cf x 2 x 11 rows = 115.3 cf
		11,351 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	390.10'	**15.0" Round 15" Culvert** L= 73.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 390.10' / 389.67' S= 0.0059 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	390.20'	**10.0" Vert. 10" Orifice/Grate** C= 0.600

Primary OutFlow Max=2.74 cfs @ 12.31 hrs HW=391.70' (Free Discharge)
↑**1=15" Culvert** (Passes 2.74 cfs of 5.35 cfs potential flow)
↑**2=10" Orifice/Grate** (Orifice Controls 2.74 cfs @ 5.02 fps)

Pond 9P: SK75 VAULT - Chamber Wizard Field A

Chamber Model = Lane StormKeeper SK75 (Lane StormKeeper)
Effective Size= 44.7"W x 30.0"H => 6.61 sf x 7.08'L = 46.8 cf
Overall Size= 51.0"W x 30.0"H x 7.30'L with 0.22' Overlap
Cap Storage= +5.2 cf x 2 x 11 rows = 115.3 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

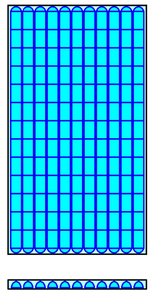
13 Chambers/Row x 7.08' Long +1.81' Cap Length x 2 = 95.59' Row Length +6.0" End Stone x 2 = 96.59' Base Length
11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

143 Chambers x 46.8 cf + 5.2 cf Cap Volume x 2 x 11 Rows = 6,804.9 cf Chamber Storage

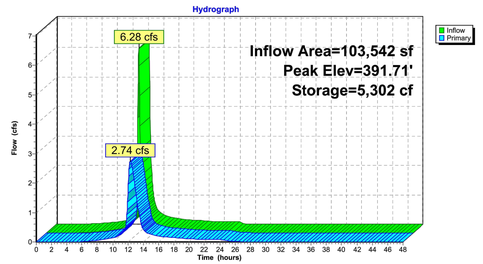
18,171.3 cf Field - 6,804.9 cf Chambers = 11,366.4 cf Stone x 40.0% Voids = 4,546.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,351.5 cf = 0.261 af
Overall Storage Efficiency = 62.5%
Overall System Size = 96.59' x 53.75' x 3.50'

143 Chambers
673.0 cy Field
421.0 cy Stone



Pond 9P: SK75 VAULT



Hydrograph for Pond 9P: SK75 VAULT

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	390.20	0.00
1.00	0.00	0	390.20	0.00
2.00	0.00	0	390.20	0.00
3.00	0.00	0	390.20	0.00
4.00	0.01	11	390.21	0.00
5.00	0.02	45	390.22	0.00
6.00	0.03	105	390.25	0.01
7.00	0.05	177	390.29	0.03
8.00	0.07	240	390.32	0.05
9.00	0.11	309	390.35	0.09
10.00	0.16	388	390.39	0.14
11.00	0.31	535	390.46	0.25
12.00	**5.09**	**2,402**	**391.01**	**1.66**
13.00	**0.64**	**2,577**	**391.05**	**1.74**
14.00	0.32	714	390.54	0.42
15.00	0.23	544	390.46	0.26
16.00	0.18	478	390.43	0.20
17.00	0.15	430	390.41	0.16
18.00	0.14	401	390.39	0.14
19.00	0.12	374	390.38	0.13
20.00	0.10	346	390.37	0.11
21.00	0.09	324	390.36	0.10
22.00	0.09	315	390.35	0.09
23.00	0.09	308	390.35	0.09
24.00	0.08	301	390.35	0.08
25.00	0.00	182	390.29	0.03
26.00	0.00	118	390.26	0.01
27.00	0.00	88	390.24	0.01
28.00	0.00	71	390.23	0.00
29.00	0.00	60	390.23	0.00
30.00	0.00	50	390.22	0.00
31.00	0.00	41	390.22	0.00
32.00	0.00	34	390.22	0.00
33.00	0.00	28	390.21	0.00
34.00	0.00	23	390.21	0.00
35.00	0.00	19	390.21	0.00
36.00	0.00	15	390.21	0.00
37.00	0.00	13	390.21	0.00
38.00	0.00	10	390.20	0.00
39.00	0.00	8	390.20	0.00
40.00	0.00	7	390.20	0.00
41.00	0.00	5	390.20	0.00
42.00	0.00	4	390.20	0.00
43.00	0.00	3	390.20	0.00
44.00	0.00	3	390.20	0.00
45.00	0.00	2	390.20	0.00
46.00	0.00	2	390.20	0.00
47.00	0.00	1	390.20	0.00
48.00	0.00	1	390.20	0.00

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 9P: SK75 VAULT Peak Elev=392.81' Storage=9,351 cf Inflow=10.21 cfs 35,377 cf
Outflow=3.89 cfs 35,375 cf

Summary for Pond 9P: SK75 VAULT

Inflow Area = 103,542 sf, 75.26% Impervious, Inflow Depth = 4.10" for 10 yr Storm event
Inflow = 10.21 cfs @ 12.09 hrs, Volume= 35,377 cf
Outflow = 3.89 cfs @ 12.34 hrs, Volume= 35,375 cf, Atten= 62%, Lag= 15.2 min
Primary = 3.89 cfs @ 12.34 hrs, Volume= 35,375 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 392.81' @ 12.34 hrs Surf.Area= 5,192 sf Storage= 9,351 cf

Plug-Flow detention time= 35.4 min calculated for 35,375 cf (100% of inflow)
Center-of-Mass det. time= 35.3 min (822.9 - 787.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	390.20'	4,547 cf	**53.75'W x 96.59'L x 3.50'H Field A** 18,171 cf Overall - 6,805 cf Embedded = 11,366 cf x 40.0% Voids
#2A	390.70'	6,805 cf	**Lane StormKeeper SK75** x 143 Inside #1 Effective Size= 44.7"W x 30.0"H => 6.61 sf x 7.08'L = 46.8 cf Overall Size= 51.0"W x 30.0"H x 7.30'L with 0.22' Overlap 143 Chambers in 11 Rows Cap Storage= +5.2 cf x 2 x 11 rows = 115.3 cf
		11,351 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	390.10'	**15.0" Round 15" Culvert** L= 73.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 390.10' / 389.67' S= 0.0059 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	390.20'	**10.0" Vert. 10" Orifice/Grate** C= 0.600

Primary OutFlow Max=3.89 cfs @ 12.34 hrs HW=392.81' (Free Discharge)
↑**1=15" Culvert** (Passes 3.89 cfs of 7.87 cfs potential flow)
↑**2=10" Orifice/Grate** (Orifice Controls 3.89 cfs @ 7.13 fps)

Pond 9P: SK75 VAULT - Chamber Wizard Field A

Chamber Model = Lane StormKeeper SK75 (Lane StormKeeper)
Effective Size= 44.7"W x 30.0"H => 6.61 sf x 7.08'L = 46.8 cf
Overall Size= 51.0"W x 30.0"H x 7.30'L with 0.22' Overlap
Cap Storage= +5.2 cf x 2 x 11 rows = 115.3 cf

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

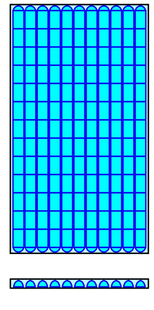
13 Chambers/Row x 7.08' Long +1.81' Cap Length x 2 = 95.59' Row Length +6.0" End Stone x 2 = 96.59' Base Length
11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

143 Chambers x 46.8 cf + 5.2 cf Cap Volume x 2 x 11 Rows = 6,804.9 cf Chamber Storage

18,171.3 cf Field - 6,804.9 cf Chambers = 11,366.4 cf Stone x 40.0% Voids = 4,546.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,351.5 cf = 0.261 af
Overall Storage Efficiency = 62.5%
Overall System Size = 96.59' x 53.75' x 3.50'

143 Chambers
673.0 cy Field
421.0 cy Stone



No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

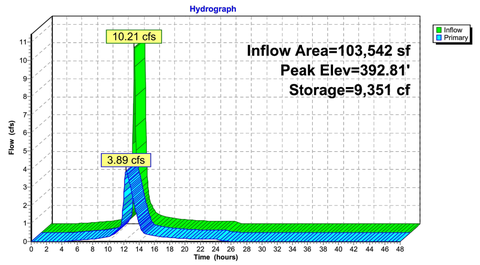
SWM – POST DEVELOPMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.16 OF 45 SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM POST.dwg [VAULT-2] August 16, 2019 – 11:03am rjafari

VAULT (CONTINUED)

Pond 9P: SK75 VAULT



Hydrograph for Pond 9P: SK75 VAULT

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	390.20	0.00
1.00	0.00	0	390.20	0.00
2.00	0.00	0	390.20	0.00
3.00	0.01	17	390.21	0.00
4.00	0.03	79	390.24	0.01
5.00	0.06	175	390.28	0.03
6.00	0.09	265	390.33	0.07
7.00	0.12	334	390.36	0.10
8.00	0.15	390	390.39	0.14
9.00	0.23	471	390.43	0.20
10.00	0.31	565	390.47	0.27
11.00	0.57	765	390.57	0.48
12.00	**8.38**	**4,060**	**391.40**	**2.33**
13.00	**1.06**	**5,580**	**391.78**	**2.83**
14.00	0.50	1,358	390.77	1.03
15.00	0.37	695	390.53	0.40
16.00	0.29	602	390.49	0.31
17.00	0.24	541	390.46	0.25
18.00	0.21	506	390.44	0.22
19.00	0.19	471	390.43	0.20
20.00	0.16	435	390.41	0.17
21.00	0.14	408	390.40	0.15
22.00	0.14	397	390.39	0.14
23.00	0.13	388	390.39	0.14
24.00	0.13	380	390.38	0.13
25.00	0.01	211	390.30	0.04
26.00	0.00	131	390.26	0.02
27.00	0.00	95	390.25	0.01
28.00	0.00	76	390.24	0.01
29.00	0.00	64	390.23	0.00
30.00	0.00	53	390.23	0.00
31.00	0.00	45	390.22	0.00
32.00	0.00	37	390.22	0.00
33.00	0.00	31	390.21	0.00
34.00	0.00	25	390.21	0.00
35.00	0.00	21	390.21	0.00
36.00	0.00	17	390.21	0.00
37.00	0.00	14	390.21	0.00
38.00	0.00	11	390.21	0.00
39.00	0.00	9	390.20	0.00
40.00	0.00	7	390.20	0.00
41.00	0.00	6	390.20	0.00
42.00	0.00	5	390.20	0.00
43.00	0.00	4	390.20	0.00
44.00	0.00	3	390.20	0.00
45.00	0.00	2	390.20	0.00
46.00	0.00	2	390.20	0.00
47.00	0.00	2	390.20	0.00
48.00	0.00	1	390.20	0.00

T[illegible] C[illegible]r[illegible] C[illegible]

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.1208	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.15"
5.6	574	0.1170	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	322	0.0527	6.13	248.88	Channel Flow, Area= 40.6 sf Perim= 81.4' r= 0.50' n= 0.035 Earth, dense weeds
17.0	996	Total			

No.	DATE	DESCRIPTION
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REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

SWM – POST DEVELOPMENT

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

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		SHEET C.16J OF 45 — SP-12928

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VAULT (CONTINUED)

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No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
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SWM - POST DEVELOPMENT

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

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	SHEET C.16K OF 45	SP-12928

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SWM WATER QUANTITY ENERGY BALANCE WORKSHEET

SOUTH SITE AREA (acre)	1.64			
	1-year		10-year	
	PRE	POST (adjusted)	PRE	POST (adjusted)
P	2.69	2.69	4.84	4.84
CN	91	88	91	88
S=1000/CN-10	0.99	1.36	0.99	1.36
0.2S	0.20	0.27	0.20	0.27
RV=[P-0.2S]^2/(P-0.2S)+S	1.78	1.55	3.83	3.52

QPost Development <= I.F.* (Qpre-development* RVpre-development)/RVDeveloped)

I.F	0.8			
CHANNEL PROTECTION (2-YEAR)			**FLOOD CONTROL (10-YEAR)**	
Qpre-development	5.97	From TR55	Qpre-development	10.39
QPost Development	6.95	From TR55	QPost Development	11.51
RVPost Development (with runoff reduction)	2.18	From RRM	RVPost Development (with runoff reduction)	3.81
Qallowable	3.91		Qallowable	10.44
Qallowable/QPost Development	0.56		Qallowable/QPost Development	0.91
Vs/Vr	0.3	Fig 11.7 of DEQ Manual	Vs/Vr	0.3
Vs	0.65		Vs	1.14
Storage required (cf)	3893		Storage required (cf)	6805

NORTH SITE AREA (acre)	0.63			
	1-year		10-year	
	PRE	POST (adjusted)	PRE	POST (adjusted)
P	2.69	2.69	4.84	4.84
CN	75	69	75	69
S=1000/CN-10	3.33	4.49	3.33	4.49
0.2S	0.67	0.90	0.67	0.90
RV=(P-0.2S)^2/(P-0.2S)+S	0.76	0.51	2.32	1.84

QPost Development <= I.F.* (Qpre-development* RVpre-development)/RVDeveloped)

I.F	0.8		
CHANNEL PROTECTION (2-YEAR)		**FLOOD CONTROL (10-YEAR)**	
Qpre-development	0.81	Qpre-development	1.69
QPost Development	0.5	QPost Development	1.34
RVPost Development (with runoff reduction)	0.51	RVPost Development (with runoff reduction)	1.84
Qallowable	0.97	Qallowable	2.13
Qallowable/QPost Development	1.94	Qallowable/QPost Development	1.59
Vs/Vr	0.12	Vs/Vr	0.12
Vs	0.06	Vs	0.22
Storage required (cf)	140	Storage required (cf)	505

*Since Qpost < Qallowable for both channel protection and flood control, no storage is required for the north area. See C.14

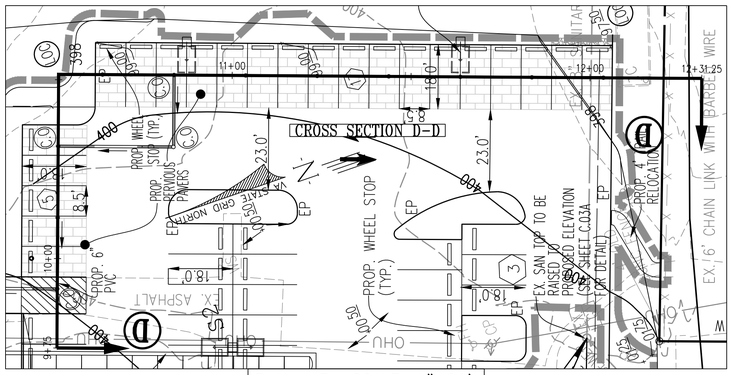
*THE POST DEVELOPMENT RUNOFF FOR THE 1 YEAR FROM THE ON-SITE AREA SHALL BE LESS THAN THE PRE-DEVELOPED PER THE STATE ENERGY BALANCE EQUATION STATED BELOW:

Qdev ≤ I.F. * (Qpre * RVpre)/RVdev
WHERE I.F.(IMPROVEMENT FACTOR) IS 0.8 FOR SITES MORE THAN 1.0 ACRES

THE COMPUTATIONS FOR THE 1 YEAR ALLOWABLE RATE IS PROVIDED AT RIGHT:

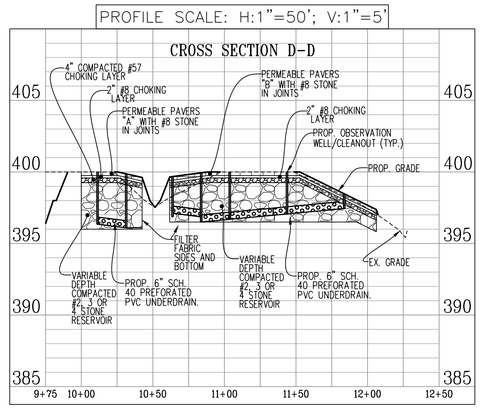
1 YEAR SWM RUNOFF COMPUTATIONS
Rv pre = 14,758 CU.FT
Q pre = 4.79 CFS
Rv dev = 17869 CU.FT

Qdev on-site ≤ I.F. * (Qpre * RVpre)/RVdev
Qdev on-site ≤ 0.8 * (4.79 * 14,758)/17,869
2.48 CFS ≤ 3.16 CFS



PLAN VIEW SCALE: 1"=20'

PROFILE SCALE: H:1"=50'; V:1"=5'



POLLUTION PREVENTION

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

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

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

MAINTENANCE STATEMENT

ALL PROPOSED STORMWATER MANAGEMENT FACILITIES SHALL BE PRIVATELY OWNED AND MAINTAINED, SHALL BE DISCLOSED AS PART OF THE CHAIN OF TITLE TO ALL FUTURE OWNERS RESPONSIBLE FOR MAINTENANCE OF THE FACILITIES, AND PRIVATE MAINTENANCE RESPONSIBILITIES SHALL BE ESTABLISHED IN THE REQUIRED DEED OF DEDICATION PRIOR TO PLAN APPROVAL.

CONSTRUCTION INSPECTION

INSPECTIONS ARE NEEDED DURING CONSTRUCTION TO ENSURE THAT FACILITIES ARE BUILT IN ACCORDANCE WITH THE APPROVED PLANS AND DESIGN SPECIFICATIONS. THE DEVELOPER/OWNER SHALL PROVIDE FOR PERIODIC INSPECTIONS OF THE FACILITY DURING CONSTRUCTION. DETAILED INSPECTION CHECKLISTS SHALL BE USED THAT INCLUDE SIGN-OFFS BY A LICENSED LAND SURVEYOR OR PROFESSIONAL ENGINEER REGISTERED IN VIRGINIA AT CRITICAL STAGES OF CONSTRUCTION, TO ENSURE THAT THE CONTRACTOR'S INTERPRETATION OF THE PLAN IS CONSISTENT WITH THE DESIGNER'S INTENT. THE ACTUAL INSPECTIONS MAY BE PERFORMED BY AN INDIVIDUAL UNDER THE DIRECT SUPERVISION OF THE LICENSED PROFESSIONAL.

AS-BUILT CERTIFICATION

AFTER THE FACILITY HAS BEEN CONSTRUCTED, THE DEVELOPER SHALL HAVE AN AS-BUILT CERTIFICATION CONDUCTED BY A LICENSED LAND SURVEYOR OR PROFESSIONAL ENGINEER REGISTERED IN VIRGINIA AND SUBMITTED TO THE COUNTY ALONG WITH THE AS-BUILT CHECKLIST AND AS-BUILT PLAN. THE AS-BUILT CERTIFICATION VERIFIES THAT THE FACILITY WAS INSTALLED AS DESIGNED AND APPROVED.
THE FOLLOWING COMPONENTS SHALL BE ADDRESSED IN THE AS-BUILT CERTIFICATION:

a. THE FILTER IS IN CONFORMANCE WITH THE SPECIFICATION AND IS INSTALLED TO THE CORRECT DEPTH (IF APPLICABLE).
b. ELEVATIONS (e.g., THE INVERT OF THE UNDERDRAIN, INVERTS FOR THE INFLOW AND OUTFLOW POINTS, etc.) AND THE SURFACE SLOPE ARE PER THE PLAN (IF APPLICABLE).
c. PRETREATMENT STRUCTURES (IF APPLICABLE) ARE PROPERLY INSTALLED AND WORKING EFFECTIVELY.
d. OBSERVATION WELLS ARE INSTALLED AND WORKING EFFECTIVELY (IF APPLICABLE).
e. ANY MATERIAL DELIVERY TICKETS AND CERTIFICATIONS FROM THE MATERIAL SUPPLIERS AND RESULTS OF THE TESTS AND INSPECTIONS (IF APPLICABLE).
f. INFILTRATION BASED FACILITIES SHALL BE INSPECTED AT THE OBSERVATION WELL 24 HOURS FOLLOWING A STORM EVENT IN EXCESS OF 0.5 INCHES OF RAINFALL OR ARTIFICIAL FLOODING TO DETERMINE THAT THE FACILITY IS DRAINING PROPERLY. REPORT OF FIELD PERFORMANCE TEST RESULTS AHLL BE INCLUDED ALONG WITH THE AS-BUILT SUBMISSION PACKAGE.
g. PLANTING IS INSTALLED PER PLAN (IF APPLICABLE).
h. BASED ON THE TYPE OF THE FACILITY, DIGITAL PHOTOGRAPHS DOCUMENTING CONSTRUCTION AND SHOWING THE SITE BEFORE BEGINNING CONSTRUCTION, THE EXCAVATION'S WALLS AND BOTTOM BEFORE ANY BACKFILL, PLACEMENT OF EACH MATERIAL LAYER SHOWING THE FINAL TOP SURFACE OF EACH LAYER, PLACEMENT OF THE UNDERDRAIN SYSTEM, OBSERVATION WELLS, AND, OUTLET WORKS (IF APPLICABALE).
i. GPS COORDINATES FOR EACH FACILITY.

STORMWATER MANAGEMENT NARRATIVE

THE SUBJECT SITE IS LOCATED WITHIN THE FOUR MILE RUN WATERSHED. THE TOTAL DISTURBED AREA IS 2.28 AC THE TOTAL SITE AREA IS 26.53 AC. 0.09 AC OF THE PREVIOUSLY LISTED DISTURBED AREA IS FOR CONSTRUCTION ACCESS PURPOSES ONLY, AND SHALL BE RESTORED TO PREDEVELOPMENT CONDITIONS FOLLOWING CONSTRUCTION. THUS, IT IS NOT INCLUDED IN THE SWM ANALYSIS. A STORM WATER MANAGEMENT (SWM) ANALYSIS COMPARING THE EXISTING 1, 2, AND 10 YEAR RUNOFS TO THE PROPOSED 1, 2, AND 10 YEAR RUNOFFS HAS BEEN PERFORMED FOR THE SUBJECT SITE. THE EXISTING IMPERVIOUS AREA IS 0.78 ACRES. THE PROPOSED REDEVELOPMENT OF THE SUBJECT SITES INCREASES THE TOTAL IMPERVIOUSNESS OF THE SITE TO 1.17 ACRES.

ONE DOWNSTREAM STUDY POINT WAS ESTABLISHED AT THE SITE OUTFALL TO ENSURE OUTFALL ADEQUACY. SEE THE PRE DEVELOPMENT DIVIDES AND CALCULATIONS ON SHEET C.13 FOR THE LOCATION OF STUDY POINT "A" AND THE ASSOCIATED DRAINAGE SHEDS, SEE SHEET C.14 FOR THE POST DEVELOPMENT DIVIDES AND CALCULATIONS. THE DRAINAGE AREAS FOR THE SITES B (NORTH), AND A (SOUTH) ARE ANALYZED INDIVIDUALLY AND THE ENERGY BALANCE EQUATION IS PRESENTED BELOW. POST DEVELOPMENT CONDITIONS ON SITE A AND SITE B SATISFY THE ENERGY BALANCE EQUATION.

THE ALLOWABLE RUNOFFS FROM THE SITE FOR STUDY POINT "A" FOR THE 1-YR, 2-YR, AND 10-YR STORM ARE 4.79 CFF, 5.97 CFS, AND 10.39 CFS, RESPECTFULLY. THE PROPOSED RUNOFFS FROM THE SITE FOR STUDY POINT "A" FOR THE 1-YR, 2-YR, AND 10-YR STORM ARE 2.48 CFS, 2.85 CFS, AND 4.14 CFS, RESPECTFULLY.

A DETAILED OUTFALL ADEQUACY ANALYSIS HAS BEEN PROVIDED ON SHEET C.26

SITE B

FLOW SUMMARY		PRE-DEVELOPMENT			POST-DEVELOPMENT SUMMARY			Q ALLOW*
NODE ID	RETURN EVENT	Q PEAK hrs	Q PEAK cfs	Rv cu.ft.	Q PEAK hrs	Q PEAK cfs	Rv cu.ft.	CFS
ONSITE B - UNDETAINED SHEET FLOW (WEST SIDE)	1	11.99	0.10	270	11.97	0.23	499	
	2	11.98	0.18	424	11.97	0.34	711	
	10	11.97	0.57	1,169	11.96	0.82	1,642	
ONSITE B - UNDETAINED (EAST SIDE)	1	12.10	0.56	1,713	12.13	0.18	714	
	2	12.10	0.75	2,251	12.12	0.31	1,063	
	10	12.09	1.46	4,413	12.10	0.86	2,661	
NORTH DRAINAGE AREA	1	12.08	0.60	1,982	12.00	0.31	1,213	0.65
	2	12.07	0.81	2,675	12.00	0.50	1,774	N/A
	10	12.03	1.69	5,582	12.00	1.34	4,304	1.68

SITE A

FLOW SUMMARY		PRE-DEVELOPMENT			POST-DEVELOPMENT SUMMARY			Q ALLOW*
NODE ID	RETURN EVENT	Q PEAK hrs	Q PEAK cfs	Rv cu.ft.	Q PEAK hrs	Q PEAK cfs	Rv cu.ft.	CFS
ONSITE A - UNDETAINED SHEET FLOW (SOUTH SIDE)	1	11.96	0.76	1,538	11.95	0.69	1,571	
	2	11.96	0.96	1,956	11.95	0.82	1,875	
	10	11.95	1.70	3,572	11.95	1.27	2,997	
OFFSITE A - UNDETAINED SHEET FLOW (SOUTH SIDE)	1	11.95	1.22	2,700	11.95	1.76	3,916	
	2	11.95	1.44	3,244	11.95	2.09	4,704	
	10	11.95	2.27	5,255	11.95	3.29	7,620	
ONSITE A - UNDETAINED (NE SIDE)	1	12.11	0.31	982	12.12	0.11	407	
	2	12.10	0.44	1,351	12.11	0.18	592	
	10	12.10	0.97	2,906	12.10	0.46	1,421	
ONSITE A - DETAINED		12.10	1.74	5,236				
		12.09	2.23	6,699				
		12.09	4.07	12,406				
OFFSITE A - DETAINED (NW SIDE)		12.09	2.75	8,541				
		12.09	3.31	10,390				
		12.08	5.35	17,280				
BMP/ VAULT	1				12.30	2.40	17,377	
	2				12.31	2.74	21,176	
	10				12.34	3.89	35,375	
PERVIOUS PAVER A OUTFLOW	1				12.40	0.25	1,884	
	2				12.42	0.28	2,259	
	10				12.49	0.37	3,645	
PERVIOUS PAVER B OUTFLOW	1				12.29	0.23	1,607	
	2				12.29	0.26	1,931	
	10				12.32	0.36	3,127	
SOUTH DRAINAGE AREA	1	12.09	4.79	14,758	12.28	2.48	17,869	3.16
	2	12.09	5.97	18,439	12.28	2.85	21,881	5.96
	10	12.09	10.39	32,592	12.27	4.14	37,026	10.38

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

urban
Planners•Engineers•Landscape Architects•Land Surveyors
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

SWM COMPUTATIONS & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER

SHEET C.17 OF 45 | SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP12928-21-SWM.dwg [COMPS-DETS-PROF] August 16, 2019 - 11:04am rjafari

DEPARTMENT OF ENVIRONMENTAL SERVICES
Office of Sustainability and Environmental Management

2100 Clarendon Boulevard, Suite 705, Arlington, VA 22201
TEL 703-228-4488 FAX 703-228-7134 TTY 703-228-4611 www.arlingtonva.us

Instructions for completing and submitting the:

Stormwater Facility
Maintenance and Monitoring Agreement

1. When applying for a Land Disturbance Activity (LDA) Permit, complete fields that are in all caps on the first (1) page of the Stormwater Facility Maintenance and Monitoring Agreement (Agreement) and do one of the following for preliminary review:

   a. upload as a part of your ePlan review if applying electronically, or
   b. email StormwaterReview@arlingtonva.us if applying by paper.

   If any corrections are needed, you will be notified within 3-4 business days by email.

   The signatures of all property owners will be required for the final Agreement submitted in Step 2. A blank agreement with multiple signature blocks can be requested to the above email address.

2. When the *draft Agreement has been approved and a SWM# assigned*, type the SWM# as well as Building Permit# and LDA# on the form and submit the signed, notarized, single-sided original of the Agreement to the counter at 2100 Clarendon Blvd., Suite 800.

3. Agreement will be routed internally for the County's signature. This step typically takes 3-4 business days.

4. When the Agreement has been executed by the County, you will be notified that you can pick up the Agreement from Suite 800.

5. Pick up the agreement and have it recorded at the Courthouse (1425 N Courthouse Rd., Suite 6200). Recording hours are 8 a.m. to 3:30 p.m., Monday – Friday. Court Land Records only accepts cash or check. They will provide you with a receipt.

6. Return a copy of receipt to Suite 800.

Prior to the issuance of CO and closure of the LDA:
The applicant must submit for review a certification by an Engineer, Land Surveyor, or Landscape Architect that the Stormwater Management Facilities (SWMFs) have been constructed and installed as designed, including photographs, elevations and receipts as outlined in the Construction Inspection Checklist. After submittal, up to 5 business days will be needed to review the package for completeness and to determine if the certification is acceptable. The applicant will be notified of acceptance/rejection via email. Each subsequent submittal will take up to 2 business days to review. If documentation is incomplete and/or the SWMF was not constructed properly, re-construction may be required. Acceptance of the certification will be noted in the comments on the CO and LDA permit. PLEASE ALLOW SUFFICIENT TIME IN YOUR CONSTRUCTION AND/OR FINANCING SCHEDULE FOR THIS REVIEW AND APPROVAL PROCESS.

This document can be found at: **http://topics.arlingtonva.us/building/stormwater-management-ordinance/**
or by searching "Stormwater Management Ordinance Appendix A" on www.arlingtonva.us

Updated 5/16

ARLINGTON COUNTY, VIRGINIA
STORMWATER FACILITY
MAINTENANCE AND MONITORING AGREEMENT

THIS AGREEMENT ("Agreement"), made and entered into this ____day of _____ , 20___ , by and between -NAME OF PROPERTY OWNER-, (hereinafter the "Landowner"), and The County Board of Arlington County, Virginia, a body corporate and politic (the "County"); , (hereinafter the "Landowner"), and The County Board of Arlington County, Virginia, a body corporate and politic (the "County");

WITNESSETH:

WHEREAS, the Landowner is the owner of certain real property located and situated in Arlington County, Virginia by virtue of a Deed recorded in Deed Book -BOOK-, Page -PAGE- or Instrument Number -INSTRUMENT NUMBER- (the "Property"), in the Land Records of Arlington County, Virginia (the "Land Records"); and

WHEREAS, the Property is identified in the records of the Arlington County Department of Real Estate Assessments by Real Property Code (RPC) number(s) -RPC NUMBERS-; and

WHEREAS, the Landowner or its representative has submitted to the County, for review and approval, building and development plans for the Property entitled -NAME OF GRADING PLAN-, addressed as -ADDRESS OF PROJECT-, identified by Building Permit number(s) -BUILDING PERMIT NUMBER-, Land Disturbance Permit (LDA) number -LAND DISTURBANCE PERMIT NUMBER-; and identified by Stormwater Management (SWM) number -SWM NUMBER- (the "Plans"), which, in their final approved form as determined by the County's records, are expressly made a part hereof and are incorporated by reference herein; and

WHEREAS, the Plans depict the proposed construction of certain required facilities that provide for the control of stormwater quality and/or quantity within the confines of the Property; and

WHEREAS, Chapter 60 (Stormwater Management Ordinance) and Chapter 61 (Chesapeake Bay Preservation Ordinance) of the Arlington County Code (collectively the "Code") require that on-site stormwater management facilities, as shown on the Plans, be constructed and adequately maintained by the Landowner, its successors and assigns; and

WHEREAS, the Landowner desires to comply with the Code, construct the aforesaid stormwater management facilities ("Facilities") as shown on the Plans, and enter into the following agreement all as hereinafter set forth.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the Landowner and the County enter into this agreement subject to the following terms and conditions:

1. The Facilities on the Property shall be constructed by the Landowner, its successors and assigns, in accordance with the approved Plans.

2. The Landowner, its successors and assigns, shall perform the maintenance schedule for the Facilities as outlined and specified on the approved Plans and shall maintain the Facilities in good working order to ensure the approved design functions.

3. The Landowner, successors and assigns, shall be responsible for the inspection and maintenance of the Facilities, according to the inspection qualifications, frequency, maintenance and reporting requirements noted on the Plans and/or specified in the Code. The purpose of the inspection shall be to ensure the safe and proper function of the Facilities. The inspection shall include but not be limited to the inspection of berms, vegetation, filtration media, inlet and outlet structures, pond areas, access, and any other related appurtenances. Deficiencies shall be noted in the inspection report. If deficiencies are noted, they shall be promptly corrected by the Landowner, or its successors and assigns, and a certification reflecting such corrections shall be submitted to the County indicating the safe and proper function of the Facilities.

4. Should the Landowner, its successors and assigns, fail to complete the inspection required by paragraph 3 above, the Landowner, its successors and assigns hereby grant permission to the County, its authorized agents and employees, to enter upon the Property and to inspect the Facilities whenever the County deems necessary, and such inspection shall be performed at the Landowner, its successors and assigns expense. Whenever reasonably possible, the County shall attempt to notify the Landowner, its successors and assigns, prior to entering the Property. The purpose of inspection shall be to verify the safe and proper function of the Facilities, investigate reported deficiencies, and/or to respond to citizen complaints. The County shall provide to the Landowner, or its successors and assigns, copies of the inspection results and of any directive from the County outlining any necessary repairs or maintenance required to the Facilities, including a date by which such necessary repairs or maintenance shall be completed.

5. In the event the Landowner, its successors and assigns, fail to complete the necessary repairs or maintenance within thirty (30) days following the date required or in cases involving flooding, on or before the date required, the County shall have the right to enter the Property and take any and all steps necessary to bring the operation and function of the Facilities into compliance with all applicable codes and design standards, and to charge the costs of any repairs or maintenance and related administrative functions to the Landowner, its successors and assigns. This provision shall not be construed to allow the County to erect any structure of a permanent nature on the Property that is not associated with the proper function and operation of the Facilities. It is expressly understood and agreed that the County shall be under no obligation to maintain or repair the said Facilities, and in no event shall this Agreement be construed to impose any such obligation on the County.

6. In the event the County, pursuant to this Agreement, performs work of any nature, or expends any funds in the performance of said work for labor, use of equipment, supplies, materials and the like on account of the Landowner's or its successors' and assigns' failure to perform such work, the Landowner, its successors and assigns, shall reimburse the County, upon demand, within 30 days of receipt thereof for all costs incurred by the County hereunder. If not paid within such 30-day period, the County shall post a lien against the Property in the amount of such costs, plus interest at the Judgment

Rate, and may enforce it in the same manner as a lien for Real Property taxes may be enforced. The County may also proceed to collect amounts due in any manner not prohibited by law.

7. The Landowner, its successors and assigns, shall indemnify and hold harmless the County, its agents and employees for any and all damages, accidents, casualties, occurrences or claims which might arise or be asserted against the County resulting from any repairs, construction, or corrective actions required to be performed by the County to bring the Facilities into compliance with all applicable codes and design standards due to Landowner's, its successors' and assigns', failure to comply with this Agreement.

8. The Landowner, its successors and assigns, shall indemnify and hold harmless the County, its agents and employees for any and all damages, accidents, casualties, occurrences or claims which might arise or be asserted against the County resulting from any construction or maintenance of the Facilities by the Landowner, its successors and assigns.

9. In the event a claim based upon the indemnities of paragraphs 7 or 8 is asserted against the County, its agents or employees, the County shall promptly notify the Landowners, their successors and assigns, who shall defend, at their own expense, any suit based on such claim. If, as a result of a claim, any judgment against the County, its agents or employees is allowed, the Landowner, its successors and assigns shall incur all costs and expenses associated therewith.

10. The Landowner, its successors and assigns, hereby grant permission unto the County, its authorized agents and employees to enter and access the Property, upon prior written notification from the County, to install, operate, and maintain at the County's sole expense equipment desired to monitor the stormwater flow characteristics, including pollutant content of the influent and effluent, at intermediate points on the Property, and within the Facility. No entry or access to the Property by the County pursuant to this paragraph will unreasonably interfere with the Landowner's, its successors' and assigns' use or operation of the Property.

11. The Landowner, its successors and assigns, hereby grant permission unto the County, its authorized agents, employees, and official guests to enter and access the Property, upon written request by the County, but at the convenience of Landowner, its successors and assigns, in order to conduct educational tours of the Facilities. The County agrees that it shall hold Landowner harmless for any and all damages, accidents, casualties, occurrences or claim which might arise or be asserted against the Landowner occurring as a result of such tours to the extent that such claims arise from the negligence of the County. The purpose of such tours shall be to expand the base of knowledge in the stormwater management field amongst public and private sector planners, engineers, scientists and other interested parties.

12. This Agreement shall be recorded among the Land Records, shall constitute a covenant running with the title of the Property or equitable servitude, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and other successors in interest. Proof of recordation of this agreement shall be provided to the Arlington County Department of Environmental Services by the Landowner, its successors and assigns prior to the issuance by the County of the Building Permit for the Property.

WITNESS the following signatures and seals:

_____
(Landowner)

-PRINTED NAME-
Print or Type Name

-TITLE-
Title

Certificate of Acknowledgment:

City/County of_____ Commonwealth of Virginia

The foregoing instrument was acknowledged before me this ___ day of _____, 20__

by _____ **(Name of person seeking acknowledgment)**

_____
Notary Public's signature

Notary registration number:_____

My commission expires: _____

THE COUNTY BOARD OF
ARLINGTON COUNTY, VIRGINIA

BY: _____

Qianqian Li
Name

Department of Environmental Services
Virginia Stormwater Management
Program (VSMP) Administrative Officer
Title

Certificate of Acknowledgment:

City/County of_____ Commonwealth of Virginia

The foregoing instrument was acknowledged before me this ___ day of _____, 20__

by _____ **(Name of person seeking acknowledgment)**

_____
Notary Public's signature

Notary registration number:_____

My commission expires: _____

Registration Statement
General VPDES Permit for Discharges of Stormwater from Construction Activities (VAR10)

(Please Type or Print All Information)

1. **Construction Activity Operator:** *(General permit coverage will be issued to this operator. The Certification in Item #12 must be signed by the appropriate person associated with this operator.)*
   Name: Northern VA Regional Park Authority
   Contact: Brian Nolan
   Mailing Address: 5400 Ox Rd.
   City: Fairfax Station State: VA Zip: 22039 Phone: 703-352-5900
   Email address (if available): bnolan@nvrpa.org
   Indicate if DEQ may transmit general permit correspondence electronically: Yes ☒ No ☐
2. **Existing General Permit Registration Number (for renewals only):**
3. **Name and Location of the Construction Activity:**
   Name: Upton Hill Regional Park
   Address (if available): 6060 Wilson Blvd.
   City: Arlington State: VA Zip: 22205
   County (if not located within a City): Arlington County
   Latitude (decimal degrees): 38.871966 Longitude (decimal degrees): -77.142024
   Name and Location of all Off-site Support Activities to be covered under the general permit:
   Name: N/A
   Address (if available):
   City: State: Zip:
   County (if not located within a City):
   Latitude (decimal degrees): Longitude (decimal degrees):
4. **Status of the Construction Activity (check only one):** Federal ☐ State ☐ Public ☒ Private ☐
5. **Nature of the Construction Activity (e.g., commercial, industrial, residential, agricultural, oil and gas, etc.):**
   Park Improvements
   Name of the Receiving Water(s) and Hydrologic Unit Code (HUC) - Link to HUC6 Map
   Name: Potomac River-Fourmile Run Name:
   HUC: PL25 HUC:
7. **If the discharge is through a Municipal Separate Storm Sewer System (MS4), the name of the MS4 operator:**
8. **Estimated Project Start and Completion Date:**
   Start Date (mm/dd/yyyy): 12/2 Completion Date (mm/dd/yyyy): 12/2
9. **Total Land Area of Development (to the nearest one-hundredth acre):** 23.40
   Estimated Area to be Disturbed (to the nearest one-hundredth acre): 2.80
10. **Is the area to be disturbed part of a larger common plan of development or sale?** Yes ☐ No ☒
11. **A stormwater pollution prevention plan (SWPPP) must be prepared in accordance with the requirements of the General VPDES Permit for Discharges of Stormwater from Construction Activities prior to submitting this Registration Statement. By signing this Registration Statement the operator is certifying that the SWPPP has been prepared.**
12. **Certification:** "I certify under penalty of law that I have read and understand this Registration Statement and that this document and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."
    Printed Name: Brian Nolan Title: Dir. of Planning and Development
    Signature: Date: 9/1/18
    (Please sign in INK. This Certification must be signed by the appropriate person associated with the operator identified in Item #1.)

No.	DATE	DESCRIPTION

REVISIONS

CLAYTON C. TOCK
Lic. No. 036790
01/30/19
COMMONWEALTH OF VIRGINIA
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
SWM COMPUTATIONS & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.17A OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-21-SWM.dwg [CORRESPONDENCE (2)] August 16, 2019 – 11:04am rjahari

STORMWATER POLLUTION PREVENTION PLAN (SWPPP) COVER PAGE

For Construction Activities At:

Upton Hill Regional Park
6060 Arlington Blvd
Arlington, VA, 22203

Latitude: 38. 8721 N (decimal degrees)

Longitude: -77 .1414 W (decimal degrees)

Construction Activity Operator:
NORTHERN VIRGINIA REGIONAL PARK AUTHORITY
5400 OX RD.
FAIRFAX STATION, VA 22039
(703) 359-4921
CONTACT: BRIAN NOLAN
EMAIL: BNOLAN@NVRPA.COM

SWPPP Preparation Date:

July, 7th, 2018

CERTIFICATION

"I certify under penalty of law that I have read and understand this document and that this document and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Operator Name: _____

Title: _____

Signature: _____

Date: _____

1.0 SWPPP Documents Located Onsite & Available for Review

SWPPP Document Type	Located Onsite & Available for Review?	
Registration Statement	☒ Yes	☐ NA
Notice of Coverage Letter	☒ Yes	☐ NA
Construction General Permit	☒ Yes	☐ NA
Pollution Prevention Plan	☒ Yes	☐ NA
Erosion & Sediment Control Plan (or agreement in lieu of)	☒ Yes	☐ NA
Stormwater Management Plan	☒ Yes	☐ NA

2.0 Authorized Non-Stormwater Discharges

Type of Authorized Non-Stormwater Discharge	Likely Present at Your Project Site?	
External buildings wash down	☒ Yes	☐ No
Uncontaminated foundation or footing drains	☐ Yes	☒ No
Uncontaminated excavation dewatering	☐ Yes	☒ No
Landscape irrigation	☒ Yes	☐ No
Others [describe]	☐ Yes	☒ No

3.0 Pollution Prevention Awareness

Employees will be given a "walk through" of the site identifying areas of possible pollution and will be shown Erosion and Sediment Controls and Pollution Prevention Practices (identified in Sections 4.0 and 5.0 of this SWPPP) that are applicable to their assigned job duties. A refresher meeting and "walk through" will be conducted on an as needed basis.

4.0 Erosion & Sediment Controls

Select all that apply	Erosion & Sediment Control	Estimated Installation Date	Estimated Removal Date	Responsible Party
☒	Construction Entrance (Std. & Spec. 3.02)	Insert Date	Insert Date	Construction Activity Operator (See Cover Page of this SWPPP)
☒	Silt Fence (Std. & Spec. 3.05)	Insert Date	Insert Date	
☒	Culvert Inlet Protection (Std. & Spec. 3.08)	Insert Date	Insert Date	
☒	Outlet Protection (Std. & Spec. 3.18)	Insert Date	NA	
☐	Temporary Seeding (Std. & Spec. 3.31)	As required by 3.31	NA	
☐	Permanent Seeding (Std. & Spec. 3.32)	Insert Date	NA	
☐	Sodding (Std. & Spec. 3.33)	Insert Date	NA	
☐	Mulching (Std. & Spec. 3.35)	Insert Date	NA	
☒	Safety Fence (Std. & Spec 3.01)	Insert Date	Insert Date	

5.0 Potential Sources of Pollution & Pollution Prevention Practices

Pollutant-Generating Activity	Likely Present at your Project Site?	Sediment	Nutrients	Heavy Metals	pH (acids and bases)	Pesticides & Herbicides	Oil & Grease	Bacteria & Viruses	Trash, Debris, Solids	Other Toxic Chemicals	Pollution Prevention Practice	Responsible Party
		Pollutants										
Clearing, grading, excavating, and un-stabilized areas	☒ Yes ☐ No	X							X		(1)	Construction Activity Operator (See Cover Page of this SWPPP)
Paving operations	☒ Yes ☐ No	X					X		X		(2)	
Concrete washout and cement waste	☒ Yes ☐ No			X	X				X		(3)	
Structure construction, stucco, painting, and cleaning	☒ Yes ☐ No			X	X				X	X	(4)	
Dewatering operations	☒ Yes ☐ No	X	X						X		(5)	
Material delivery and storage	☒ Yes ☐ No	X	X	X	X		X		X	X	(6)	
Material use during building process	☒ Yes ☐ No		X	X	X		X		X	X	(7)	
Solid waste disposal	☒ Yes ☐ No								X	X	(8)	
Sanitary waste	☒ Yes ☐ No		X		X			X			(9)	
Landscaping operations	☒ Yes ☐ No	X	X			X			X	X	(10)	
Others [describe]	☐ Yes ☒ No	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]	(11)	

Pollution Prevention Practices:

(1) **Clearing, grading, excavating and un-stabilized areas** – Utilize erosion and sediment controls to prevent sediment laden or turbid runoff from leaving the construction site. Dispose of clearing debris at acceptable disposal sites. Apply permanent or temporary stabilization, sodding and/or mulching to denuded areas in accordance with the erosion and sediment control specifications and the general VPDES permit for discharges of stormwater from construction activities.

(2) **Paving operations** – Cover storm drain inlets during paving operations and utilize pollution prevention materials such as drip pans and absorbent/oil dry for all paving machines to limit leaks and spills of paving materials and fluids.

(3) **Concrete washout and cement waste** – Direct concrete wash water into a leak-proof container or leak-proof settling basin that is designed so that no overflows can occur due to inadequate sizing or precipitation. Hardened concrete wastes shall be removed and disposed of in a manner consistent with the handling of other construction wastes.

(4) **Structure construction, stucco, painting and cleaning** – Enclose, cover or berm building material storage areas if susceptible to contaminated stormwater runoff. Conduct painting operations consistent with local air quality and OSHA regulations. Mix paint indoors, in a containment area or in a flat unpaved area. Prevent the discharge of soaps, solvents, detergents and wash water from construction materials, including the clean-up of stucco paint, form release oils and curing compounds.

(5) **Dewatering operations** – Construction site dewatering from building footings or other sources may not be discharged without treatment. Sediment laden or turbid water shall be filtered, settled or similarly treated prior to discharge.

(6) **Material delivery and storage** – Designate areas of the construction site for material delivery and storage. Place near construction entrances, away from waterways, and avoid transport near drainage paths or waterways.

(7) **Material use during building process** – Use materials only where and when needed to complete the construction activity. Follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability and mixing of chemicals.

(8) **Solid waste disposal** – Designate a waste collection area on the construction site that does not receive a substantial amount of runoff from upland areas and does not drain directly to a waterway. Ensure that containers have lids so they can be covered before periods of rain, and keep containers in a covered area whenever possible. Schedule waste collection to prevent the containers from overfilling.

(9) **Sanitary waste** – Prevent the discharge of sanitary waste by providing convenient and well-maintained portable sanitary facilities. Locate sanitary facilities in a convenient location away from waterways.

(10) **Landscaping operations** – Maintain as much existing vegetation as practicable. Apply permanent or temporary stabilization, sodding and/or mulching to denuded areas in accordance with the erosion and sediment control specifications and the general VPDES permit for discharges of stormwater from construction activities. Apply nutrients in accordance with manufacturer's recommendations and not during rainfall events.

(11) **Others** – If applicable, describe your Pollution Prevention Practice.

6.0 Stormwater Management Controls

Select all that apply	Stormwater Management Control	Estimated Installation Date	Responsible Party
☐	Post-development Stormwater Management Controls provided by a Larger Common Plan of Development or Sale	NA	Common Plan Construction Activity Operator
☐	Rooftop Disconnection	Insert Date	Construction Activity Operator (See Cover Page of this SWPPP)
☐	Sheet flow to Vegetated Filter (1 or 2)	Insert Date	
☐	Grass Channel	Insert Date	
☐	Rainwater Harvesting	Insert Date	
☒	Permeable Pavement (1 or 2)	Insert Date	

Select all that apply	Stormwater Management Control	Estimated Installation Date	Responsible Party
☐	Infiltration (1 or 2)	Insert Date	Construction Activity Operator (See Cover Page of this SWPPP)
☒	Bioretention (1 or 2)	Insert Date	
☐	Others [describe]	Insert Date	
☐	Exempted	NA	NA

7.0 Spill Prevention & Response

Most spills can be cleaned up following manufacturer specifications. Absorbent/oil dry, sealable containers, plastic bags, and shovels/brooms are suggested minimum spill response items that should be available at this location.

1st Priority: Protect all people
2nd Priority: Protect equipment and property
3rd Priority: Protect the environment

1. Check for hazards (flammable material, noxious fumes, cause of spill) – if flammable liquid, turn off engines and nearby electrical equipment. If serious hazards are present leave the area and call 911. LARGE SPILLS ARE LIKELY TO PRESENT A HAZARD.
2. Make Sure the spill area is safe to enter and that it does not pose an immediate threat to health or safety of any person.
3. Stop the spill source.
4. Call co-workers and supervisor for assistance and to make them aware of the spill and potential dangers.
5. If possible, stop spill from entering drains (use absorbent or other material as necessary).
6. Stop spill from spreading (use absorbent or other material)
7. If spilled material has entered a storm sewer; contact locality's storm water department.
8. Clean up spilled material according to manufacturer specifications, for liquid spills use absorbent materials and do not flush area with water.
9. Properly dispose of cleaning materials and used absorbent material according to manufacturer specifications.

Emergency Contacts:

Normal Working Hours

DEQ Northern Regional Office	703-583-3800

Nights, Holidays & Weekends

VA Dept. of Emergency Management 24 Hour Reporting Service	804-674-2400

Local Contacts

Arlington County Fire & Police	703-558-2222
DES Water, Sewer, Streets 24-Hour Emergency	703-228-6555
Washington Gas Emergency	703-750-1400

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
SWM COMPUTATIONS & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A		DESIGNED	CHECKED
SUBMITTED DATE 05-15-18 08-08-18 09-28-18	12-14-18 07-30-19 – –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.		APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.17B OF 45	SP-12928

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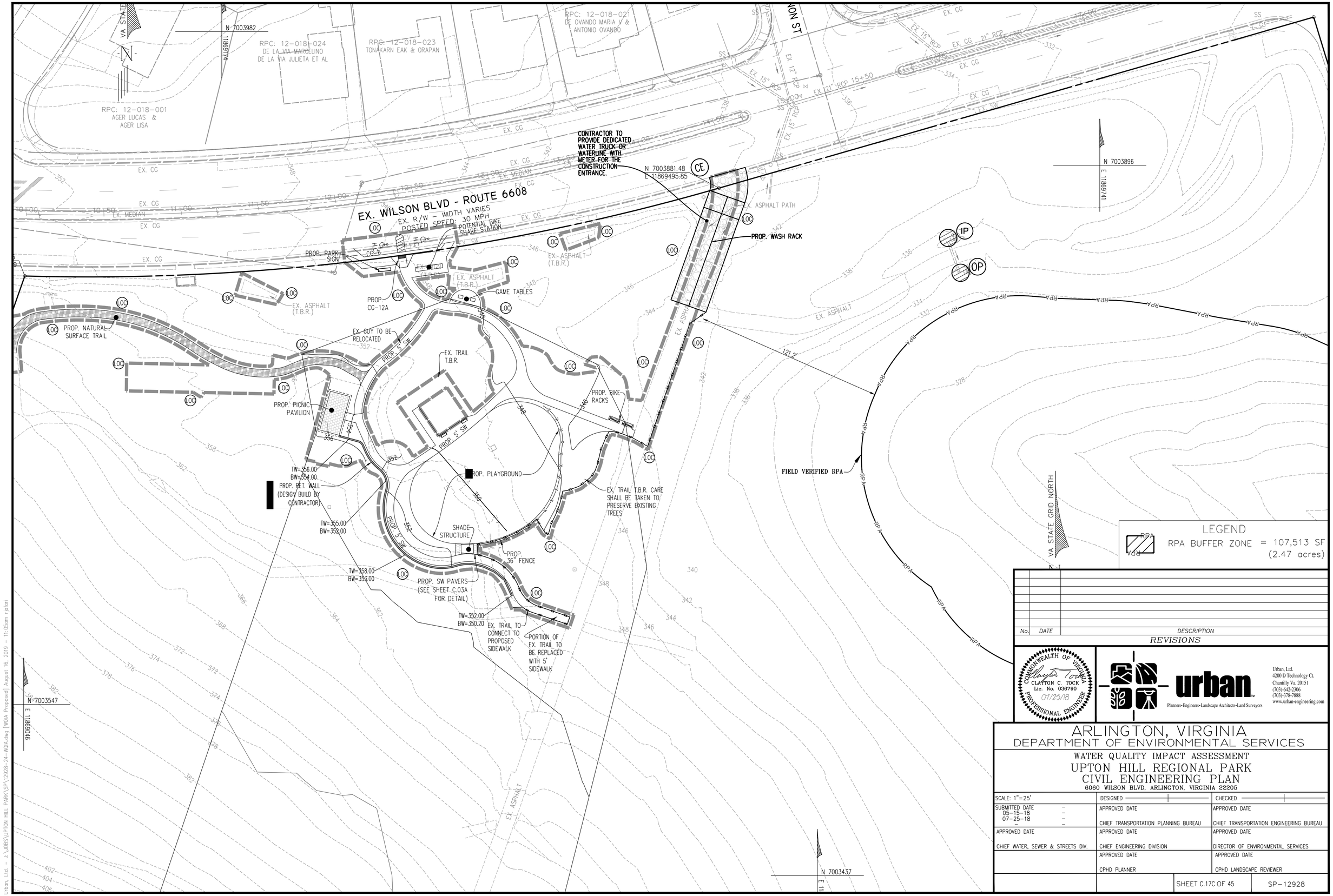

No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

WATER QUALITY IMPACT ASSESSMENT

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 05-15-18 07-25-18	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.17C OF 45 — SP-12928

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Appendix C. Water Quality Impact Assessment Data Sheet

Project Address: 6060 Wilson Blvd., Arlington, VA 22205	Date: September 21st, 2018
Applicant Name/Affiliation: Northern Virginia Regional Park Authority	Applicant Contact Information (phone and email): 703-359-49212 bnolan@nvrpa.com
Owner/Client Name: Northern Virginia Regional Park Authority	Owner/Client Contact Information (phone and email): 703-359-49212 bnolan@nvrpa.com

Section 1: Type of activity proposed

Activity type (check all that apply):

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

Section 2: Key details of the proposed activity

Complete all that apply		Explanation
Total area of disturbance on parcel (sf)	134,600 SF	Includes building footprint plus a 10 foot buffer. Also includes all soil disturbance, ingress/egress areas, stockpiling areas, etc.
Area of disturbance within RPA (sf)	0 SF	Includes removal of trees ≥ 3" in diameter
Area of disturbance on slopes greater than or equal to 15 percent located adjacent to landward RPA boundary (sf)	0 SF	Does not apply to RPA parcels along Chain Bridge Road (15 percent and greater slopes are included as part of RPA)

Complete all fields		Existing condition	Proposed condition	Explanation
RPA encroachment (ft)	Left third of parcel or site	330 ft	330 ft	The **distance** (in feet) from the existing or proposed structure to the designated RPA feature (edge of stream or open channel, wetland, etc.). Encroachments of zero (0) indicate the project will impact the stream or other RPA feature.
	Middle third of parcel or site	150 ft	150 ft	
	Right third of parcel or site	30 ft	30 ft	
Total development footprint in RPA (sf)		0 SF	0 SF	The existing footprint includes the **area** of any existing structures, patios, decks, walkways, etc. Proposed footprint is the anticipated post-project area of all structures, additions, decks, walkways, regraded area behind a retaining wall, etc.
Impervious footprint in RPA (sf)		0 SF	0 SF	Total **area** of impervious surfaces within the RPA (rooftops, pavement, etc.)

(OVER)

STAFF USE ONLY

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

Major WQIA required? ☐ Yes ☐ No

Date WQIA/Exception request information complete:

Date Chesapeake Bay Preservation Ordinance and E/S ordinance (if applicable) approvals issued in Permits Plus:

Section 3: Plan and Narrative

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

- The RPA on the property is 107,513 SF or 2.47 acres. There is 0 SF of the RPA located within the job site, and there will be 0 SF of the RPA disturbed. See Existing Conditions sheet C.06 and WQIA sheet C.17C

- Root pruning will be implemented along the edge of the job site. Tree protection and super silt fence is proposed along the limits of clearing as well. These activities are outside the RPA. See Tree Preservation Plan sheet C.37

- Tree and vegetation planting are proposed on the job site, outside of the RPA. See Landscape Plan sheet C.40.

- A bioretention and pervious pavers have been proposed to detain the post development flow. See Grading Plan sheet C.10 and WQIA sheet C.17C.

-The disturbed area in the northern site upstream of the RPA is proposed to flow off of the site in the form of sheet flow. Additionally, the portion of the northern job site closest to the RPA contains no proposed improvements, it is for construction access only, and will be restored to pre-development conditions after construction.

- Erosion and sediment control is proposed through the use of silt fencing around the job site. Inlet protection is also proposed. See WQIA sheet C.17C and Erosion and Sediment Control Phase I & II sheets C.27-C.30.

Additional Water Quality Impact Assessment Information

The information supplied on this form satisfies the minimum requirements for a Minor Water Quality Impact Assessment. For projects that disturb over 2500 square feet, elements of a Major Water Quality Impact Assessment may also be required, depending on the nature and extent of the proposed RPA encroachment, as outlined in Section 61-12 of the ordinance.

No.	DATE	DESCRIPTION

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COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
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07/25/18
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

WATER QUALITY IMPACT ASSESSMENT
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

SCALE:	DESIGNED	CHECKED
SUBMITTED DATE – 05-15-18 – 07-25-18 – –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.17D OF 45	SP-12928

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EX. PATRICK HENRY DR

VA STATE GRID NORTH

N 7003982

E 11869174

RPC: 12-018-001
AGER LUCAS &
AGER LISA

RPC: 12-018-024
DE LA VIA MARCELINO
DE LA VIA JULIETA ET AL

RPC: 12-018-023
TONAKARN EAK & ORAPAN

RPC: 12-018-022
HORNE HEATHER

RPC: 12-018-021
DE OVANDO MARIA V &
ANTONIO OVANDO

RPC: 12-018-020
FERRANDO WILLIAM ANTHONY
ET AL

URCIA ANDRES C TR
URCIA ROWENA M TR

EX. N LEBANON ST

EX. WILSON BLVD - ROUTE 6608
EX. R/W - WIDTH VARIES
POSTED SPEED: 35 MPH

15,000 VPD

N 7003881.48
E 11869495.85

N 7003896
E 11869741

N73°56'55"E 399.58'

EX. 8" SANITARY SEWER

EX. CG

EX. MEDIAN

EX. ASPHALT PATH

EX. ASPHALT (T.B.R.)

EX. WINDOW GATE

POTENTIAL BIKE SHARE STATION

PROP. PARK SIGN

R=1472.40'
A=453.74'

GAME TABLES

PROP. CG-12A

N 7003824.66
E 11869047.49

PROP. ENTRY SIGN (TYP.)

RPC: 12-042-066
COMMONWEALTH
OF VIRGINIA

EX. WOOD STEPS

EX. BUS SHELTER

PROP. NATURAL SURFACE TRAIL

EX. GUY TO BE RELOCATED

PROP. 5' SW

EX. TRAIL T.B.R.

PROP. BIKE RACKS

EX. WOOD CHIP TRAIL

PROP. PICNIC PAVILION

EX. PLAYGROUND AREA (T.B.R.)

EX. CINDER BLOCK FACILITIES TO REMAIN

RPC: 12-042-061
NORTHERN VA REGIONAL
PARK AUTHORITY

TW=356.00
BW=354.00
PROP. RET. WALL
(DESIGN BUILD BY
CONTRACTOR)

EX. MEMORIAL STONE

TW=355.00
BW=352.00

PROP. PLAYGROUND

EX. PLAYGROUND AREA (T.B.R.)

EX. SHADE STRUCTURE

EX. TRAIL T.B.R. CARE SHALL BE TAKEN TO PRESERVE EXISTING TREES

PROP. 36" FENCE

"RED TRAIL"
EX. WOOD CHIP TRAIL

TW=358.00
BW=353.00

PROP. SW PAVERS
(SEE SHEET C.03A
FOR DETAIL)

TW=352.00
BW=350.20

EX. TRAIL TO CONNECT TO PROPOSED SIDEWALK

PORTION OF EX. TRAIL TO BE REPLACED WITH 5' SIDEWALK

N70°27'01"E 1014.14' (TOTAL)
582.54'

N 7003547
E 11869046

AREA FOR CONSTRUCTION ACCESS PURPOSES ONLY, AND WILL BE RESTORED TO PRE-DEVELOPMENT LAND COVER AFTER CONSTRUCTION.

RPA

FIELD VERIFIED RPA

LEGEND

ONSITE PROP. IMPERVIOUS AREA TO BE DISTURBED	= 0.14 AC
ONSITE PROP. MANAGED TURF AREA TO BE DISTURBED	= 0.47 AC
SOILS	
DRAINAGE DIVIDES	

MATCHLINE
SEE SHEET ####

No.	DATE	DESCRIPTION

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CLAYTON C. TOCK
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07/30/19
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

BMP DESIGN & DETAILS

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–		
09-28-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
		SHEET C.18 OF 45	SP-12928

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No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

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CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 05-15-18, 08-08-18, 09-28-18, 12-14-18, 07-30-19	APPROVED DATE / CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE / CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE / CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE / CHIEF ENGINEERING DIVISION	APPROVED DATE / DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE / CPHD PLANNER	APPROVED DATE / CPHD LANDSCAPE REVIEWER
	SHEET C.19 OF 45	SP-12928

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Project Name: **Upton Hill Park**
Date: **7/30/2019**
Linear Development Project? No

data input cells
constant values
calculation cells
final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area *(acres)* → 2.28

Maximum reduction required:	*20%*
The site's net increase in impervious cover (acres) is:	*0.39*
Post-Development TP Load Reduction for Site (lb/yr):	*1.28*

Check:
BMP Design Specifications List: 2011 Stds & Specs
Linear project? No
Land cover areas entered correctly? ✔
Total disturbed area entered? ✔

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested		0.31			0.31
Managed Turf (acres) -- disturbed, graded for yards or other turf to be		0.14		1.05	1.19
Impervious Cover (acres)		0.30		0.48	0.78
					2.28

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be		0.60		0.51	1.11
Impervious Cover (acres)		0.15		1.02	1.17
Area Check	OK.	OK.	OK.	OK.	2.28

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

LAND COVER SUMMARY -- PRE-REDEVELOPMENT

Land Cover Summary-Pre

Pre-ReDevelopment	Listed	Adjusted[1]
Forest/Open Space Cover (acres)	0.31	0.46
Weighted Rv(forest)	0.03	0.03
% Forest	14%	24%
Managed Turf Cover (acres)	1.19	0.65
Weighted Rv(turf)	0.24	0.24
% Managed Turf	52%	34%
Impervious Cover (acres)	0.78	0.78
Rv(impervious)	0.95	0.95
% Impervious	34%	41%
Total Site Area (acres)	**2.28**	**1.89**
Site Rv	**0.46**	**0.48**

Treatment Volume and Nutrient Load

Pre-ReDevelopment Treatment Volume (acre-ft)	0.0867	0.0759
Pre-ReDevelopment Treatment Volume (cubic feet)	3,778	3,304
Pre-ReDevelopment TP Load (lb/yr)	**2.37**	**2.08**
Pre-ReDevelopment TP load per acre (lb/acre/yr)	1.04	1.10
Baseline TP Load (lb/yr) (**0.41 lbs/acre/yr** applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		*0.77*

[1] Adjusted Land Cover Summary:
Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column I shows load reduction requriement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary-Post (Final)

Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	1.11
Weighted Rv (turf)	0.22
% Managed Turf	49%
Impervious Cover (acres)	1.17
Rv(impervious)	0.95
% Impervious	51%
Final Site Area (acres)	**2.28**
Final Post Dev Site Rv	**0.60**

Land Cover Summary-Post

Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	1.11
Weighted Rv (turf)	0.22
% Managed Turf	59%
ReDev. Impervious Cover (acres)	0.78
Rv(impervious)	0.95
% Impervious	41%
Total ReDev. Site Area (acres)	**1.89**
ReDev Site Rv	**0.52**

Land Cover Summary-Post

Post-Development New Impervious	
New Impervious Cover (acres)	0.39
Rv(impervious)	0.95

Treatment Volume and Nutrient Load

Final Post-Development Treatment Volume (acre-ft)	0.1133	**Post-ReDevelopment Treatment Volume (acre-ft)**	0.0824	**Post-Development Treatment Volume (acre-ft)**	0.0309
Final Post-Development Treatment Volume (cubic feet)	4,933	**Post-ReDevelopment Treatment Volume (cubic feet)**	3,588	**Post-Development Treatment Volume (cubic feet)**	1,345
Final Post-Development TP Load (lb/yr)	**3.10**	**Post-ReDevelopment Load (TP) (lb/yr)***	**2.25**	**Post-Development TP Load (lb/yr)**	**0.85**
Final Post-Development TP Load per acre (lb/acre/yr)	1.36	Post-ReDevelopment TP load per acre (lb/acre/yr)	1.19		
		Max. Reduction Required (Below Pre-ReDevelopment Load)	**20%**		
		TP Load Reduction Required for Redeveloped Area (lb/yr)	**0.59**	**TP Load Reduction Required for New Impervious Area (lb/yr)**	**0.69**

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	**1.28**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	16.98	Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	22.17

Site Results (Water Quality Compliance)

Area Checks	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	AREA CHECK
FOREST/OPEN SPACE (ac)	0.00	0.00	0.00	0.00	0.00	OK.
IMPERVIOUS COVER (ac)	0.85	0.00	0.00	0.00	0.00	OK.
IMPERVIOUS COVER TREATED (ac)	0.85	0.00	0.00	0.00	0.00	OK.
MANAGED TURF AREA (ac)	0.39	0.00	0.00	0.00	0.00	OK.
MANAGED TURF AREA TREATED (ac)	0.01	0.00	0.00	0.00	0.00	OK.
AREA CHECK	OK.	OK.	OK.	OK.	OK.	

Site Treatment Volume (ft^3) 4,933

Runoff Reduction Volume and TP By Drainage Area

	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	TOTAL
RUNOFF REDUCTION VOLUME ACHIEVED (ft^3)	573	0	0	0	0	573
TP LOAD AVAILABLE FOR REMOVAL (lb/yr)	2.06	0.00	0.00	0.00	0.00	2.06
TP LOAD REDUCTION ACHIEVED (lb/yr)	1.39	0.00	0.00	0.00	0.00	1.39
TP LOAD REMAINING (lb/yr)	0.67	0.00	0.00	0.00	0.00	0.67
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	2.79	0.00	0.00	0.00	0.00	2.79

Total Phosphorus

FINAL POST-DEVELOPMENT TP LOAD (lb/yr)	3.10
TP LOAD REDUCTION REQUIRED (lb/yr)	1.28
TP LOAD REDUCTION ACHIEVED (lb/yr)	1.39
TP LOAD REMAINING (lb/yr):	1.71
REMAINING TP LOAD REDUCTION REQUIRED (lb/yr):	0.00 **

** TARGET TP REDUCTION EXCEEDED BY 0.11 LB/YEAR **

Total Nitrogen (For Information Purposes)

POST-DEVELOPMENT LOAD (lb/yr)	22.17
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	2.79
REMAINING POST-DEVELOPMENT NITROGEN LOAD (lb/yr)	19.38

BEST MANAGEMENT PRACTICES NARRATIVE

THE SUBJECT SITE IS LOCATED ON PARCEL 12042103. THE ENTIRE SITE IS LOCATED WITHIN THE FOUR MILE RUN WATERSHED. THE TOTAL DISTURBED AREA IS 2.33 AC AND THE TOTAL SITE AREA IS 26.53 AC. 0.05 AC OF THE PREVIOUSLY LISTED DISTURBED AREA IS FOR CONSTRUCTION ACCESS PURPOSES ONLY, AND SHALL BE RESTORED TO PREDEVELOPMENT CONDITIONS FOLLOWING CONSTRUCTION. THUS, IT IS NOT INCLUDED IN THE BMP ANALYSIS. THE SUBJECT SITE WAS ZONED S-3A/R-6 PER ARLINGTON COUNTY ZONING ORDINANCE. WORK PROPOSED WITH THIS DEVELOPMENT PLAN PERTAINS TO THE CONSTRUCTION OF A PARKING LOT AND ASSOCIATED INFRASTRUCTURE.

DUE TO INCREASE IN IMPERVIOUS AREA, BMP'S ARE REQUIRED FOR THIS SITE TO MEET TOTAL PHOSPHORUS REMOVAL RATE PER THE VIRGINIA RUNOFF REDUCTION METHOD REDEVELOPMENT WORKSHEET. COMPLIANCE SHALL BE MET WITH THE USE OF LEVEL 1 BIORETENTION AND PERMEABLE PAVEMENT.

THE TARGET REDUCTION WAS MET WITH A 0.11 LB/YR EXCEEDANCE. SEE THIS SHEET FOR COMPUTATIONS.

REQUIRED REDUCTION IN PHOSPHORUS LOADS: PER VRRM REDEVELOPMENT COMPLIANCE SPREADSHEET

PRE REDEVELOPMENT IMPERVIOUS AREA = 0.78 AC.
PRE REDEVELOPMENT LOAD (TP) = 2.37 LB/YR

POST REDEVELOPMENT IMPERVIOUS AREA = 1.17 AC.
POST REDEVELOPMENT LOAD (TP) = 3.10 LB/YR

BMP/SWM FACILITIES GEOGRAPHIC COORDINATES	JELLYFISH	PERMEABLE PAVERS
DECIMAL DEGREES LATITUDE	38.871278N	38.872662N
DECIMAL DEGREES LONGITUDE	-77.143012W	-77.142363W

ALL BMP'S SHALL BE PRIVATELY MAINTAINED

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

BMP DESIGN & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.20 OF 45	SP-12928

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Drainage Area A

Drainage Area A Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals	Land Cover Rv
Forest/Open Space (acres)				0.00	0.00	0.00
Managed Turf (acres)				0.39	0.39	0.25
Impervious Cover (acres)				0.85	0.85	0.95
				Total	1.24	

Total Phosphorus Available for Removal in D.A. A (lb/yr)	2.06
Post Development Treatment Volume in D.A. A (ft^3)	3,285

PERMEABLE PAVEMENT A AND B

Stormwater Best Management Practices (RR = Runoff Reduction) --Select from dropdown lists-

Practice	Runoff Reduction Credit (%)	Managed Turf Credit Area (acres)	Impervious Cover Credit Area (acres)	Volume from Upstream Practice (ft^3)	Runoff Reduction (ft^3)	Remaining Runoff Volume (ft^3)	Total BMP Treatment Volume (ft^3)	Phosphorus Removal Efficiency (%)	Phosphorus Load from Upstream Practices (lb)	Untreated Phosphorus Load to Practice (lb)	Phosphorus Removed By Practice (lb)	Remaining Phosphorus Load (lb)	Downstream Practice to be Employed
3. Permeable Pavement (RR)													
3.a. Permeable Pavement #1 (Spec #7)	45	0.01		0	4	5	9	25	0.00	0.01	0.00	0.00	None
3.b. Permeable Pavement #2 (Spec #7)	75		0.22		569	190	759	25		0.48	0.39	0.09	14.a. MTD - Hydrodynamic

JELLYFISH UNIT

14. Manufactured Treatment Devices (no RR)													
14.a. Manufactured Treatment Device-Hydrodynamic	0			2,362	0	2,362	2,362	50	0.91	0.00	0.45	0.45	None

SEDIMENT STRIP

14. Manufactured Treatment Devices (no RR)													
14.c. Manufactured Treatment Device-Generic	0		0.63	0	0	2,173	2,173	40	0.00	1.36	0.55	0.82	14.a. MTD - Hydrodynamic

TOTAL IMPERVIOUS COVER TREATED (ac)	0.85	AREA CHECK: OK.
TOTAL MANAGED TURF AREA TREATED (ac)	0.01	AREA CHECK: OK.
TOTAL PHOSPHORUS REMOVAL REQUIRED ON SITE (lb/yr)	1.28	
TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. A (lb/yr)	2.06	
TOTAL PHOSPHORUS REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	1.00	
TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.39	
TOTAL PHOSPHORUS LOAD REDUCTION ACHIEVED IN D.A. A (lb/yr)	1.39	
TOTAL PHOSPHORUS REMAINING AFTER APPLYING BMP LOAD REDUCTIONS IN D.A. A (lb/yr)	0.67	

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

NITROGEN REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	2.79
NITROGEN REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00
TOTAL NITROGEN REMOVED IN D.A. A (lb/yr)	2.79

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		APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.21 OF 45	SP-12928

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PERMEABLE PAVER CONSTRUCTION SEQUENCE

THE FOLLOWING IS A TYPICAL CONSTRUCTION SEQUENCE TO PROPERLY INSTALL PERMEABLE PAVEMENT, WHICH MAY NEED TO BE MODIFIED TO DEPENDING ON WHETHER POROUS ASPHALT (PA), PERVIOUS CONCRETE (PC) OR INTERLOCKING PAVER (IP) DESIGNS ARE EMPLOYED.

STEP 1. CONSTRUCTION OF THE PERMEABLE PAVEMENT SHALL ONLY BEGIN AFTER THE ENTIRE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED. THE PROPOSED SITE SHOULD BE CHECKED FOR EXISTING UTILITIES PRIOR TO ANY EXCAVATION. DO NOT INSTALL THE SYSTEM IN RAIN OR SNOW, AND DO NOT INSTALL FROZEN AGGREGATE MATERIALS.

STEP 2. AS NOTED ABOVE, TEMPORARY EROSION AND SEDIMENT (E&S) CONTROLS ARE NEEDED DURING INSTALLATION TO DIVERT STORMWATER AWAY FROM THE PERMEABLE PAVEMENT AREA UNTIL IT IS COMPLETED. SPECIAL PROTECTION MEASURES SUCH AS EROSION CONTROL FABRICS MAY BE NEEDED TO PROTECT VULNERABLE SIDE SLOPES FROM EROSION DURING THE EXCAVATION PROCESS. THE PROPOSED PERMEABLE PAVEMENT AREA MUST BE KEPT FREE FROM SEDIMENT DURING THE ENTIRE CONSTRUCTION PROCESS. CONSTRUCTION MATERIALS THAT ARE CONTAMINATED BY SEDIMENTS MUST BE REMOVED AND REPLACED WITH CLEAN MATERIALS.

STEP 3. WHERE POSSIBLE, EXCAVATORS OR BACKHOES SHOULD WORK FROM THE SIDES TO EXCAVATE THE RESERVOIR LAYER TO ITS APPROPRIATE DESIGN DEPTH AND DIMENSIONS. FOR MICRO-SCALE AND SMALL-SCALE PAVEMENT APPLICATIONS, EXCAVATING EQUIPMENT SHOULD HAVE ARMS WITH ADEQUATE EXTENSION SO THEY DO NOT HAVE TO WORK INSIDE THE FOOTPRINT OF THE PERMEABLE PAVEMENT AREA (TO AVOID COMPACTION). CONTRACTORS CAN UTILIZE A CELL CONSTRUCTION APPROACH, WHEREBY THE PROPOSED PERMEABLE PAVEMENT AREA IS SPLIT INTO 500 TO 1000 SQ. FT. TEMPORARY CELLS WITH A 10 TO 15 FOOT EARTH BRIDGE IN BETWEEN, SO THAT CELLS CAN BE EXCAVATED FROM THE SIDE. EXCAVATED MATERIAL SHOULD BE PLACED AWAY FROM THE OPEN EXCAVATION SO AS TO NOT JEOPARDIZE THE STABILITY OF THE SIDE WALLS.

STEP 4. THE NATIVE SOILS ALONG THE BOTTOM AND SIDES OF THE PERMEABLE PAVEMENT SYSTEM SHOULD BE SCARIFIED OR TILLED TO A DEPTH OF 3 TO 4 INCHES PRIOR TO THE PLACEMENT OF THE FILTER LAYER OR FILTER FABRIC. IN LARGE SCALE PAVING APPLICATIONS WITH WEAK SOILS, THE SOIL SUBGRADE MAY NEED TO BE COMPACTED TO 95% OF THE STANDARD PROCTOR DENSITY TO ACHIEVE THE DESIRED LOAD-BEARING CAPACITY. (NOTE: THIS EFFECTIVELY ELIMINATES THE INFILTRATION FUNCTION OF THE INSTALLATION, AND IT MUST BE ADDRESSED DURING HYDROLOGIC DESIGN.)

STEP 5. THE FILTER LAYER SHOULD BE INSTALLED ON THE BOTTOM OF THE RESERVOIR LAYER, AND WHERE WARRANTED, FILTER FABRIC CAN BE PLACED ON THE SIDES.

STEP 6. PROVIDE A MINIMUM OF 2 INCHES OF AGGREGATE ABOVE AND BELOW THE UNDERDRAINS. THE UNDERDRAINS SHOULD SLOPE DOWN TOWARDS THE OUTLET AT A GRADE OF 0.5% OR STEEPER. THE UP-GRADIENT END OF UNDERDRAINS IN THE RESERVOIR LAYER SHOULD BE CAPPED. WHERE AN UNDERDRAIN PIPE IS CONNECTED TO A STRUCTURE, THERE SHALL BE NO PERFORATIONS WITHIN 1 FOOT OF THE STRUCTURE. ENSURE THAT THERE ARE NO PERFORATIONS IN CLEAN-OUTS AND OBSERVATION WELLS WITHIN 1 FOOT OF THE SURFACE.

STEP 7. SPREAD 6-INCH LIFTS OF THE APPROPRIATE CLEAN, WASHED STONE AGGREGATE. PLACE AT LEAST 4 INCHES OF ADDITIONAL AGGREGATE ABOVE THE UNDERDRAIN, AND THEN COMPACT IT USING A VIBRATORY ROLLER IN STATIC MODE UNTIL THERE IS NO VISIBLE MOVEMENT OF THE AGGREGATE. DO NOT CRUSH THE AGGREGATE WITH THE ROLLER.

STEP 8. INSTALL OVERDRAIN IF REQUIRED AND CONNECT INTO OUTLET CONVEYANCE SYSTEM.

STEP 9. INSTALL THE DESIRED DEPTH OF THE BEDDING LAYER, DEPENDING ON THE TYPE OF PAVEMENT, AS FOLLOWS:
PERVIOUS CONCRETE: NO BEDDING LAYER IS USED.
POROUS ASPHALT: THE BEDDING LAYER FOR POROUS ASPHALT PAVEMENT CONSISTS OF 1 TO 2 INCHES OF CLEAN, WASHED ASTM D 448 NO.57 STONE. THE FILTER COURSE MUST BE LEVELED AND PRESSED (CHOKED) INTO THE RESERVOIR BASE WITH AT LEAST FOUR (4) PASSES OF A 10-TON STEEL DRUM STATIC ROLLER.
INTERLOCKING PAVERS: THE BEDDING LAYER FOR OPEN-JOINTED PAVEMENT BLOCKS SHOULD CONSIST OF 2 INCHES OF WASHED ASTM D 448 NO.8 STONE.

STEP 10. PAVING MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER OR INDUSTRY SPECIFICATIONS FOR THE PARTICULAR TYPE OF PAVEMENT.

INSTALLATION OF POROUS ASPHALT. THE FOLLOWING HAS BEEN EXCERPTED FROM VARIOUS DOCUMENTS, MOST NOTABLY JACKSON (2007).

1. INSTALL POROUS ASPHALT PAVEMENT SIMILARLY TO REGULAR ASPHALT PAVEMENT. THE PAVEMENT SHOULD BE LAID IN A SINGLE LIFT OVER THE FILTER COURSE. THE LAYING TEMPERATURE SHOULD BE BETWEEN 2300F AND 2600F, WITH A MINIMUM AIR TEMPERATURE OF 500F, TO ENSURE THAT THE SURFACE DOES NOT STIFFEN BEFORE COMPACTION.
2. COMPLETE COMPACTION OF THE SURFACE COURSE WHEN THE SURFACE IS COOL ENOUGH TO RESIST A 10-TON ROLLER. ONE OR TWO PASSES OF THE ROLLER ARE REQUIRED FOR PROPER COMPACTION. MORE ROLLING COULD CAUSE A REDUCTION IN THE POROSITY OF THE PAVEMENT.
3. THE MIXING PLANT MUST PROVIDE CERTIFICATION OF THE AGGREGATE MIX, ABRASION LOSS FACTOR, AND ASPHALT CONTENT IN THE MIX. TEST THE ASPHALT MIX FOR ITS RESISTANCE TO STRIPPING BY WATER USING ASTM 1664. IF THE ESTIMATED COATING AREA IS NOT ABOVE 95%, ADDITIONAL ANTI-STRIPPING AGENTS MUST BE ADDED TO THE MIX.
4. TRANSPORT THE MIX TO THE SITE IN A CLEAN VEHICLE WITH SMOOTH DUMP BEDS SPRAYED WITH A NON-PETROLEUM RELEASE AGENT. THE MIX SHALL BE COVERED DURING TRANSPORTATION TO CONTROL COOLING.
5. TEST THE FULL PERMEABILITY OF THE PAVEMENT SURFACE BY APPLICATION OF CLEAN WATER AT A RATE OF AT LEAST FIVE GALLONS PER MINUTE OVER THE ENTIRE SURFACE. ALL WATER MUST INFILTRATE DIRECTLY, WITHOUT PUDDLE FORMATION OR SURFACE RUNOFF.
6. INSPECT THE FACILITY 18 TO 30 HOURS AFTER A SIGNIFICANT RAINFALL (GREATER THAN 1/2 INCH) OR ARTIFICIAL FLOODING, TO DETERMINE THAT THE FACILITY IS DRAINING PROPERLY.

MAINTENANCE AGREEMENTS

THE VIRGINIA STORMWATER MANAGEMENT REGULATIONS (4 VAC 50-60) SPECIFY THE CIRCUMSTANCES UNDER WHICH A MAINTENANCE AGREEMENT MUST BE EXECUTED BETWEEN THE OWNER AND THE VSMP AUTHORITY, AND SETS FORTH INSPECTION REQUIREMENTS, COMPLIANCE PROCEDURES IF MAINTENANCE IS NEGLECTED, NOTIFICATION OF THE LOCAL PROGRAM UPON TRANSFER OF OWNERSHIP, AND RIGHT-OF-ENTRY FOR LOCAL PROGRAM PERSONNEL.

1. ALL PERMEABLE PAVEMENT INSTALLATIONS MUST BE COVERED BY A LONG TERM MAINTENANCE AGREEMENT AND DRAINAGE EASEMENT CONSISTENT WITH THE PROVISIONS OF THE VSMP REGULATIONS TO ALLOW INSPECTION AND MAINTENANCE.
2. THE MAINTENANCE AGREEMENTS SHOULD NOTE WHICH CONVENTIONAL PARKING LOT MAINTENANCE TASKS MUST BE AVOIDED (E.G., SANDING, RE-SEALING, RE-SURFACING, POWER-WASHING). SIGNS SHOULD BE POSTED ON LARGER PARKING LOTS TO INDICATE THEIR STORMWATER FUNCTION AND SPECIAL MAINTENANCE REQUIREMENTS. WHEN MICRO-SCALE OR SMALL-SCALE PERMEABLE PAVEMENT ARE INSTALLED ON PRIVATE RESIDENTIAL LOTS, HOMEOWNERS SHOULD BE PROVIDED A SIMPLE DOCUMENT THAT EXPLAINS THE PURPOSE OF THE PERMEABLE PAVEMENT AND OUTLINES (1) THE ROUTINE MAINTENANCE NEEDS, (2) THE LONG-TERM MAINTENANCE PLAN, AND (3) THE BASIC PARAMETERS OF THE DEED RESTRICTION, DRAINAGE EASEMENT OR OTHER MECHANISM ENFORCEABLE BY THE VSMP AUTHORITY TO HELP ENSURE THAT THE PERMEABLE PAVEMENT SYSTEM IS MAINTAINED AND FUNCTIONING.
3. THE MECHANISM SHOULD, IF POSSIBLE, GRANT AUTHORITY FOR THE VSMP AUTHORITY TO ACCESS THE PROPERTY FOR INSPECTION OR CORRECTIVE ACTION.

MAINTENANCE TASKS

IT IS DIFFICULT TO PRESCRIBE THE SPECIFIC TYPES OR FREQUENCY OF MAINTENANCE TASKS THAT ARE NEEDED TO MAINTAIN THE HYDROLOGIC FUNCTION OF PERMEABLE PAVEMENT SYSTEMS OVER TIME. MOST INSTALLATIONS WORK REASONABLY WELL YEAR AFTER YEAR WITH LITTLE OR NO MAINTENANCE, WHEREAS SOME HAVE PROBLEMS RIGHT FROM THE START.

THE FOLLOWING TASKS MUST BE AVOIDED ON ALL PERMEABLE PAVEMENTS:

1. SANDING
2. RE-SEALING
3. RE-SURFACING
4. POWER WASHING
5. STORAGE OF SNOW PILES CONTAINING SAND
6. STORAGE OF MULCH OR SOIL MATERIALS
7. CONSTRUCTION STAGING ON UNPROTECTED PAVEMENT

A PREVENTATIVE MAINTENANCE TASK FOR LARGE-SCALE APPLICATIONS INVOLVES REGENERATIVE AIR VACUUM SWEEPING ON A FREQUENCY CONSISTENT WITH THE USE AND LOADINGS ENCOUNTERED IN THE PARKING LOT. MANY CONSIDER AN ANNUAL, DRY-WEATHER SWEEPING IN THE SPRING MONTHS TO BE IMPORTANT. THE CONTRACT FOR SWEEPING SHOULD SPECIFY THAT A VACUUM SWEEPER BE USED THAT DOES NOT USE WATER SPRAY, SINCE SPRAYING MAY LEAD TO SUBSURFACE CLOGGING. VACUUM SETTINGS FOR LARGE-SCALE INTERLOCKING PAVER APPLICATIONS SHOULD BE CALIBRATED SO THEY DO NOT PICK UP THE STONES BETWEEN PAVEMENT BLOCKS.

MAINTENANCE INSPECTIONS

IT IS HIGHLY RECOMMENDED THAT A SPRING MAINTENANCE INSPECTION AND CLEANUP BE CONDUCTED AT EACH PERMEABLE PAVEMENT SITE, PARTICULARLY AT LARGE-SCALE APPLICATIONS.

MAINTENANCE OF PERMEABLE PAVEMENT IS DRIVEN BY ANNUAL INSPECTIONS THAT EVALUATE THE CONDITION AND PERFORMANCE OF THE PRACTICE. ANY PERMEABLE PAVEMENT INSTALLATION WITH EXTERNAL DRAINAGE AREA (RUN-ON) SHOULD BE INSPECTED MORE FREQUENTLY DURING THE FIRST YEAR (FOUR SEASONS) TO ENSURE THAT THERE ARE NO UNEXPECTED CONTRIBUTING LOADS OF SEDIMENT OR PAVEMENT PARTICULATES FROM THE CONTRIBUTING AREA. IF SO, EXTENSIVE INVESTIGATION SHOULD ASSESS WAYS TO LIMIT THE CONTRIBUTIONS, OR THE MAINTENANCE SCHEDULE SHOULD BE ADJUSTED TO ENSURE THE PAVEMENT DOES NOT BECOME CLOGGED.

THE FOLLOWING ARE SUGGESTED ROUTINE ANNUAL MAINTENANCE INSPECTION POINTS FOR PERMEABLE PAVEMENTS:

1. THE DRAWDOWN RATE SHOULD BE MEASURED AT THE OBSERVATION WELL FOR THREE (3) DAYS FOLLOWING A STORM EVENT IN EXCESS OF 1/2 INCH IN DEPTH. IF STANDING WATER IS STILL OBSERVED IN THE WELL AFTER THREE DAYS, THIS IS A CLEAR SIGN THAT CLOGGING IS A PROBLEM.
2. INSPECT THE SURFACE OF THE PERMEABLE PAVEMENT FOR EVIDENCE OF SEDIMENT DEPOSITION, ORGANIC DEBRIS, STAINING OR PONDING THAT MAY INDICATE SURFACE CLOGGING. IF ANY SIGNS OF CLOGGING ARE NOTED, SCHEDULE A VACUUM SWEEPER (NO BROOMS OR WATER SPRAY) TO REMOVE DEPOSITED MATERIAL. THEN, TEST SECTIONS BY POURING WATER FROM A FIVE GALLON BUCKET TO ENSURE THEY WORK.
3. INSPECT THE STRUCTURAL INTEGRITY OF THE PAVEMENT SURFACE, LOOKING FOR SIGNS OF SURFACE DETERIORATION, SUCH AS SLUMPING, CRACKING, SPALLING OR BROKEN PAVERS. REPLACE OR REPAIR AFFECTED AREAS, AS NECESSARY.
4. CHECK INLETS, PRETREATMENT CELLS AND ANY FLOW DIVERSION STRUCTURES FOR SEDIMENT BUILDUP AND STRUCTURAL DAMAGE. NOTE IF ANY SEDIMENT NEEDS TO BE REMOVED.
5. INSPECT THE CONDITION OF THE OBSERVATION WELL AND MAKE SURE IT IS STILL CAPPED.
6. GENERALLY INSPECT ANY CONTRIBUTING DRAINAGE AREA FOR ANY CONTROLLABLE SOURCES OF SEDIMENT OR EROSION.

AN EXAMPLE MAINTENANCE INSPECTION CHECKLIST FOR PERMEABLE PAVEMENT CAN BE ACCESSED IN APPENDIX C OF CHAPTER 9 OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK (2010). BASED ON INSPECTION RESULTS, SPECIFIC MAINTENANCE TASKS WILL BE TRIGGERED AND SCHEDULED TO KEEP THE FACILITY IN OPERATING CONDITION.

PERMEABLE PAVERS "A"

PERMEABLE PAVEMENT		Input	Critera
Level 1			
Tv = [(Rv)(A)]/12-The volume reduced by an upstream BMP	Tv =	105.9597	
Soil infiltration: less than 0.5 in/hr	rate =	0	OK
Underdrain required			Yes
CDA:	ratio =	0.75	
The permeable pavement area plus upgradient parking, as long as the ratio of external contributing area to permeable pavement does not exceed 2.5:1.	AREA (ft²)=	1341.648	OK
PHYSICAL FEASIBILITY			
External drainage area: Less than 2.5x surface area of permeable pavement			
Pavement slope (longtitudinal):			
Bottom of slope should be 0%, or 1% with underdrain or overdrain.	slope =	1.00%	OK
Hydraulic Head:			
Minimum of 2 feet of head	feet =	2	OK
Underdrain should have minum 0.5% slope	slope =	0.50%	OK
Minimum depth to water table: Vertical distance of at least 2 feet	feet =	2	OK
Setbacks:			
Horizontal distance from water supply well (at least 100 ft)	feet =	N/A	OK
Horizontal distance from septic system (at least 50 ft)	feet =	N/A	OK
Distance of down-gradient from dry/wet utility lines (at least 5 ft)	feet =	5	OK
Setbacks based on design scale			
Down-greadient from building 5	feet =	10	OK
Up-gradient from building 25	feet =	50	OK
DESIGN CRITERIA			
(Equation 7.1) $d_{stone}=[(P \times A1 \times Rv1)+(P+Ap)]/(\eta r \times Ap)$			
dstone = Depth of the stone reservoir layer (ft.)	feet =	**2.83**	
P = The rainfall depth (in feet) for the Treatment Volume (Level 1 = 1 inch (0.08 ft); Level 2 = 1.1 inch (0.09 ft)), or other design storm	feet =	0.08	
AI = Contributing impervious drainage area, (ft2)	ft^2 =	1341.648	
RvI = Volumetric runoff coefficient		0.95	
AP = Area of permeable pavement (ft2)	ft^2 =	765	
ηr = Porosity of reservoir layer (0.4)	ratio =	0.4	

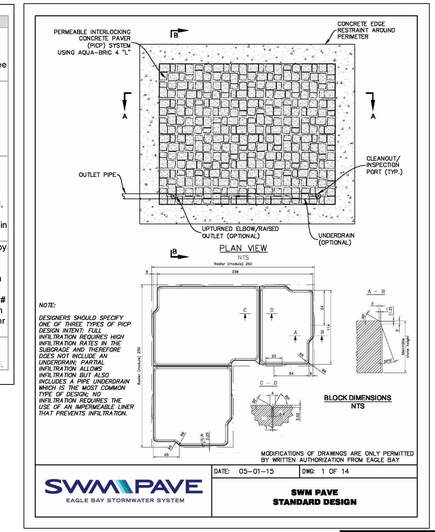
PERMEABLE PAVERS "B"

PERMEABLE PAVEMENT		Input	Critera
Level 1			
Tv = [(Rv)(A)]/12-The volume reduced by an upstream BMP	Tv =	622.4724	
Soil infiltration: less than 0.5 in/hr	rate =	0	OK
Underdrain required			Yes
CDA:	ratio =	2.31	
The permeable pavement area plus upgradient parking, as long as the ratio of external contributing area to permeable pavement does not exceed 2.5:1.	AREA (ft²)=	8607.456	OK
PHYSICAL FEASIBILITY			
External drainage area: Less than 2.5x surface area of permeable pavement			
Pavement slope (longtitudinal):			
Bottom of slope should be 0%, or 1% with underdrain or overdrain.	slope =	1.00%	OK
Hydraulic Head:			
Minimum of 2 feet of head	feet =	2	OK
Underdrain should have minum 0.5% slope	slope =	0.50%	OK
Minimum depth to water table: Vertical distance of at least 2 feet	feet =	2	OK
Setbacks:			
Horizontal distance from water supply well (at least 100 ft)	feet =	N/A	OK
Horizontal distance from septic system (at least 50 ft)	feet =	N/A	OK
Distance of down-gradient from dry/wet utility lines (at least 5 ft)	feet =	5	OK
Setbacks based on design scale			
Down-greadient from building 10	feet =	10	OK
Up-gradient from building 50	feet =	50	OK
DESIGN CRITERIA			
(Equation 7.1) $d_{stone}=[(P \times A1 \times Rv1)+(P+Ap)]/(\eta r \times Ap)$			
dstone = Depth of the stone reservoir layer (ft.)	feet =	**3.08**	
P = The rainfall depth (in feet) for the Treatment Volume (Level 1 = 1 inch (0.08 ft); Level 2 = 1.1 inch (0.09 ft)), or other design storm	feet =	0.08	
AI = Contributing impervious drainage area, (ft2)	ft^2 =	8607.456	
RvI = Volumetric runoff coefficient		0.87	
AP = Area of permeable pavement (ft2)	ft^2 =	2601	
ηr = Porosity of reservoir layer (0.4)	ratio =	0.4	

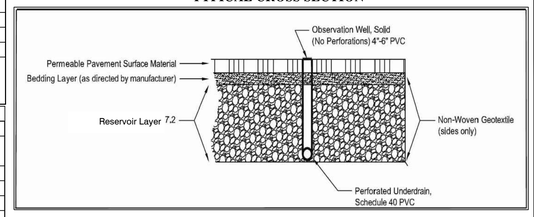
Material Specifications for Underneath the Permeable Pavements

Material	Specification	Notes
Bedding Layer	PC: None PICP: 2 in. depth of No. 8 stone above 4 inches of No. 57	ASTM D448 size No. 8 stone (e.g. 3/8 to 3/16 inch in size). ASTM D448 size No. 57 stone (e.g. 1 1/2 to 1/2 inch in size) .Should be washed, clean and free of all fines.
Reservoir Layer	PC: No. 57 stone PICP: No. 2 or 3 stone	PC: ASTM D448 size No. 57 stone (e.g. 1 1/2 to 1/2 inch in size) PICP: No. 2 Stone (e.g. 3 inch to 3/4 inch in size) or No. 3 Stone. Depth is based on the pavement structural and hydraulic requirements. Should be washed, clean and free of all fines.
Underdrain	Use 4 to 6 inch diameter perforated PVC (AASHTO M 252) pipe, with 3/8-inch perforations at 6 inches on center; each underdrain installed at a minimum 0.5% slope located 20 feet or less from the next pipe (or equivalent corrugated HDPE may be used for non-vehicular applications). Perforated pipe installed for the full length of the permeable pavement cell, and non-perforated pipe, as needed, is used to connect with the storm drain system. T's and Y's installed as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with caps.	
Filter Layer	The underlying native soils should be separated from the stone reservoir by a 2 to 4 inch layer of choker stone (e.g. No. 8) covered by a 6 to 8 inch layer of coarse sand (e.g. ASTM C 33, gradation) or use an appropriate filter fabric for the particular application based on AASHTO M288-06. At a minimum the fabric shall have a Flow Rate greater than 125 gpm/sq. ft. (ASTM D4491), and an Apparent Opening Size (AOS) equivalent to a US # 70 or # 80 sieve (ASTM D4751). The geotextile AOS selection is based on the percent passing the No. 200 sieve in "A" Soil subgrade, using FHWA or AASHTO selection criteria.	
Observation Well	Use a perforated 4 to 6 inch vertical PVC pipe (AASHTO M 252) with a cap, installed flush with the surface. Applications in vehicular areas shall have a metal cap. All applications shall have an observation well installed.	

*PC: Permeable Concrete, PICP: Permeable Interlocking Concrete Pavers



LEVEL 1 PERMEABLE PAVEMENT TYPICAL CROSS SECTION



Permeable Pavement Maintenance Schedule

Maintenance Activity	Schedule
• Check observation wells 3 days after a storm event in excess of 1/2 inch in depth. Standing water observed in the well after three days is a clear indication of clogging • Inspect the surface of the permeable pavement for evidence of sediment deposition, organic debris, staining or ponding that may indicate surface clogging. If any signs of clogging are noted, schedule a vacuum sweeper (no brooms or water spray) to remove deposited material. • Inspect the structural integrity of the pavement surface, looking for signs of surface deterioration, such as slumping, cracking, spalling or broken pavers. Replace or repair affected areas, as necessary. • Check inlets, pretreatment cells and any flow diversion structures for sediment buildup and structural damage. Note if any sediment needs to be removed. • Inspect the condition of the observation well and make sure it is still capped. • Generally inspect any contributing drainage area for any controllable sources of sediment or erosion.	Annually
• Inspected and certified by a professional licensed in the State of Virginia	Once every 5 years

ALL BMP'S SHALL BE PRIVATELY MAINTAINED

Construction Inspection Checklist: Permeable Pavement

ARLINGTON VIRGINIA

Address/ Location: _____ Building Permit #: _____

LDA Permit #: _____ SWM#: _____

Contractor: _____ Telephone: _____

Certifying Professional*: _____ Telephone: _____

Date Started: _____ Final Inspection Date: _____

*Certifying professional must be a licensed Professional Engineer (PE), Landscape Architect (LA), or Land Surveyor (LS).

The following checklist provides a basic outline of the anticipated items for the construction inspection of permeable pavement. This checklist does not necessarily differentiate between the types of pavement materials and the different construction requirements. Inspectors should review the plans carefully, and adjust these items and the timing of inspection verification as needed to ensure the intent of the design is met. The standard for design of this practice is based on Virginia Stormwater BMP Clearinghouse and Arlington County Stormwater Guidance Manual.

All items should be crossed off when completed. Items labeled "Certification of..." must be crossed off, dated and initialed by the certifying inspector.

PRE-CONSTRUCTION MEETING	DATE
☐ Walk through site with builder/contractor/subcontractor to review the SWPPP (erosion and sediment control plan, the stormwater management plan, and the Pollution Prevention plan)	
☐ Determine when permeable pavement is built in project construction sequence; before or after building construction and determine measures for protection and surface cleaning.	
☐ Identify the tentative schedule for construction, verify the certification of the installer (ICPI for permeable interlocking pavers or NRMCA for pervious concrete) and requirements and schedule for interim inspections.	
☐ Storage locations for aggregate material have been identified (hard surface or on geotextile).	
☐ Pre-construction meeting with the contractor designated to install the permeable pavement, County DES inspector, and person completing this checklist has been conducted.	

SEDIMENT MANAGEMENT	DATE
☐ Access routes for delivery and construction vehicles identified.	
☐ Vehicle tire/track washing station location/maintenance (if specified in the erosion and sediment control plan/SWPPP).	
☐ Contributing drainage areas are stabilized and are not eroding.	

EXCAVATION	DATE
☐ Excavated area marked with paint and/or stakes.	
☐ Excavation size and location conforms to plan.	
☐ Runoff is diverted around the excavation area to a stabilized conveyance.	
☐ If excavation is used as a sediment trap: verify that the bottom elevation of the proposed stone reservoir is lower than the bottom elevation of the existing trap.	

Permeable Pavement | January 2017

☐ Subgrade surface is free of rocks and roots, and large voids. Any voids should be refilled with the base aggregate to create a level surface for the placement of aggregates and underdrain (if required).	
☐ For Level 2 permeable pavement, ensure the bottom of the excavation is scarified prior to placement of stone.	
☐ No groundwater seepage or standing water is present. Any standing water is dewatered to an acceptable dewatering device.	
☐ The excavation has achieved the proper elevations and grade (0% slope) as noted on the approved plans.	
☐ **Certification of Excavation Inspection:** Inspector certifies the successful completion of the excavation steps listed above. Photos required include excavated subgrade prior to covering with fabric and stone, and include measurement from subgrade to reference point (i.e., top of edge restraint, top of apron, top of garage entrance, top of flow barriers and flow barrier excavation cuts, etc.).	

FILTER LAYER, UNDERDRAIN, STONE RESERVOIR, AND BEDDING LAYER PLACEMENT	DATE
☐ All aggregates, including, as required, the filter layer (choker stone & sand or geotextile), the reservoir layer, and bedding layer conform to specifications as certified by quarry.	
☐ Underdrain size and perforations meet the specifications (if applicable).	
☐ Placement of filter layer and initial layer of reservoir layer aggregates (approximately 2 inches) spread (not dumped) to avoid aggregate segregation.	
☐ Placement of underdrain, observation wells, and underdrain fittings in accordance with the approved plans.	
☐ Concrete curbs or plastic/metal edge restraints are installed.	
☐ Sides of excavation covered with geotextile, prior to placing stone reservoir aggregate; no tears or holes, or excessive wrinkles are present.	
☐ Flow barriers are properly installed (if applicable).	
☐ Stone reservoir layer and bedding layer is properly installed.	
☐ **Certification of Filter Layer, Underdrain, Stone Reservoir and Bedding Layer Inspection:** Inspector certifies the successful completion of the filter layer, underdrain, stone reservoir and bedding layer placement steps listed above. Photos and material delivery tickets for these items are attached. Photos required include: ○ Non-woven geotextile fabric installed on bottom and sides of excavated subgrade; ○ Perforated observation well prior to installation of stone; ○ Perforated underdrain (if applicable) and connection to storm sewer or dry well; ○ Depth of #2 or #3 stone installed (if applicable); ○ Edge restraints; ○ Depth of #57 stone installed; ○ Depth of #8 stone installed. Photos required of flow barrier (if applicable): ○ 12" height of berm; ○ 12" height of cut for flow barrier; ○ Impermeable liner; ○ Distance between flow barriers. Material delivery tickets required include: ○ Choker stone & sand or geotextile installed at subbase; ○ Geotextile installed along sides; ○ Geotextile used as the impermeable barrier on gravel flow berms (if applicable); ○ #2 or #3 stone (if applicable), #57 stone, #8 stone.	

Permeable Pavement | January 2017

PERMEABLE PAVERS OR PERVIOUS CONCRETE INSTALLATION	DATE
☐ Permeable paver surface is installed.	
☐ If pavers are used, the joints are full of #8 or #9 stone.	
☐ **Certification of Pavement Installation:** Contractor and/or manufacturer certifies that permeable pavement has been placed in accordance with manufacturers specifications (ICPI Tech Spec #18 for interlocking concrete pavers or ACI#522.1-13 for pervious concrete). Photos required include: ○ Overall of completed installation; ○ Observation well with proper cap installed. Material delivery tickets required for the pavers or concrete installed.	
☐ The permeable pavement is protected until the remainder of the site is stabilized.	

COMMENTS (CLARIFICATION, DEVIATIONS, ETC.)	DATE

All items checked above have been inspected by me (or by an individual under my responsible charge) and have been completed to my satisfaction and meet the approved plans (or deviations are noted here).

Signature: _____ Date: _____

Certifying Professional's License Number (or Seal): _____

Installer / Contractor's Certification (Required)

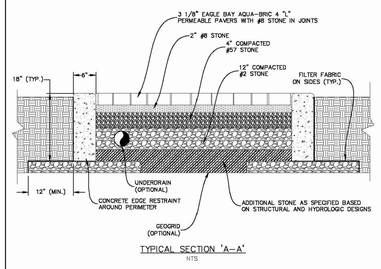
☐ **Permeable Interlocking Pavers:** Attach copy of ICPI Certification

☐ **Pervious Concrete:** NRMCA Certification* Number: _____

*NRMCA Certification must be either Installer or Craftsman certification.

Permeable Pavement | January 2017

*SEE DESIGN DETAILS FOR ACTUAL DEPTHS



TYPICAL SECTION 'A-A'
NTS

*OR APPROVED EQUAL

MODIFICATIONS OF DRAWINGS ARE ONLY PERMITTED BY WRITTEN AUTHORIZATION FROM EAGLE BAY
DATE: 05-01-15
DWG 2 OF 14
SWM PAVE
EAGLE BAY STORMWATER SYSTEM
SWM PAVE AQUA-BRIC TYPE 4 "L" PERMEABLE PAVERS
STANDARD DESIGN PROFILE

No.	DATE	DESCRIPTION

REVISIONS

CLAYTON C. TOCK
Lic. No. 036790
07/30/19
COMMONWEALTH OF VIRGINIA
PROFESSIONAL ENGINEER

urban
Planners•Engineers•Landscape Architects•Land Surveyors

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Chantilly Va. 20151
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(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

BMP - DESIGN & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A		DESIGNED	CHECKED
SUBMITTED DATE 05-15-18 08-08-18 09-28-18	12-14-18 07-30-19 - -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.		APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
			SHEET C.22 OF 45 — SP-12928

Urban, Ltd. - J:_JOBS\UPTON HILL PARK\SP\12928-22-BMP.dwg [Paver DETAILS 1] August 16, 2019 - 11:06am rjafari

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No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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DEPARTMENT OF ENVIRONMENTAL SERVICES

BMP - DESIGN & DETAILS

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CIVIL ENGINEERING PLAN

6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 - 09-28-18 -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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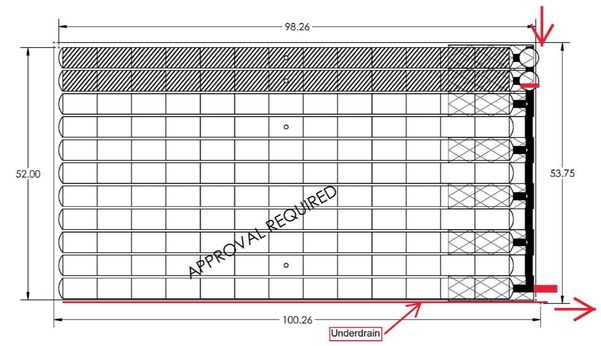
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.23 OF 45	SP-12928

Urban, Ltd. - J:\JOBS\UPTON HILL PARK\SP\12928-23-BMP.dwg [bio DETAILS 2] August 16, 2019 - 11:06am rjafari



NOTE: ALL FITTING DIMENSIONS ARE FOR REFERENCE ONLY. ROWS MARKED WITH ▨ INDICATE SEDIMENT STRIPS.
Structures to be designed by others.

See page 3 for quantity information and BOM

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File Name:	sk180 elbow	LANE ENTERPRISES,INC.
Page Number:	1 OF 1	SK75 System Created for Upton Park 4
Date Drawn:	7/30/19	
Drawn By:	KBMax	

Quantities Page

Excavation Information:
Excavation Volume: 657.97 cy
Stone Volume: 775.1 tons (Uses 140 lbs per c.f.)
Sq. ft of system: 5395.76 sf
Perimeter: 300.03 ft

Fabric Information:
Fabric Needed (woven): 399.15 sy (includes 15% waste factor)
Fabric Needed (non-woven): 1512.14 sy (includes 15% waste factor)

System Volume and Elevations:
System Volume: 11598.48cf
Maximum Allowable Grade:401.18
Minimum Allowable Grade (Unpaved with Traffic):395.18
Minimum Allowable Grade (Unpaved no Traffic):394.68
Minimum Allowable Grade (Base of Flexible Pavement):394.68
Minimum Allowable Grade (Top of Rigid Pavement):395.18
Top of Stone:393.68
Bottom of Chamber:390.7
Bottom of Stone:390.2

APPROVAL REQUIRED

PART NUMBER	QTY.
SK75 End Cap	22
6" Inspection Port	4
Total SK75 Chambers	143
Chambers with Sediment Strip	26
Scour Protection	7
SK75 15" Triple Tee	1
15"	4
SK75 15" Single Tee	3
SK75 15" Elbow	1
round structure	2

NOTE: ALL FITTING DIMENSIONS ARE FOR REFERENCE ONLY.

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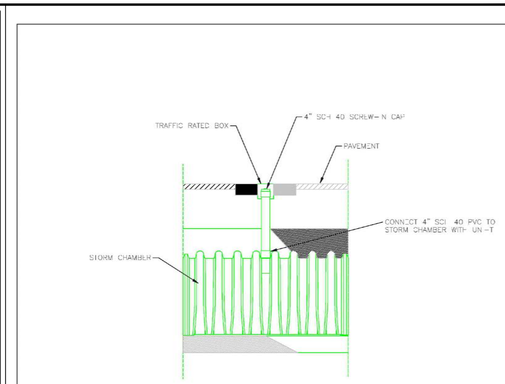
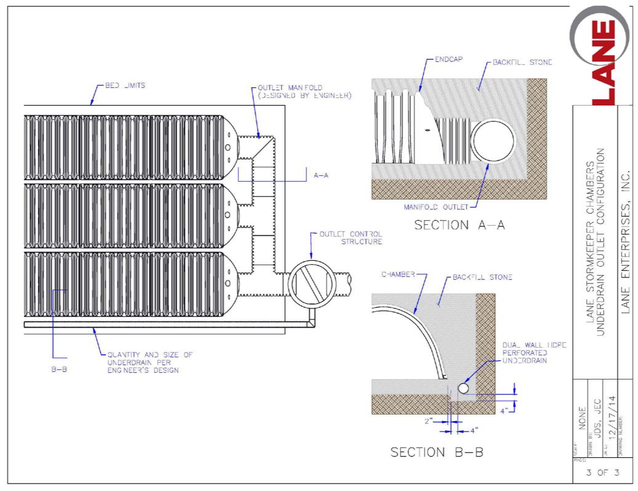
File Name:	sk180 elbow	LANE ENTERPRISES,INC.
Page Number:	1 OF 1	Quantity Information SK75 System Created for Upton Park 4
Date Drawn:	7/30/19	
Drawn By:	KBMax	



INSPECTION PORT/ CLEANOUT OUT OF STORM CHAMBER TOP DETAIL

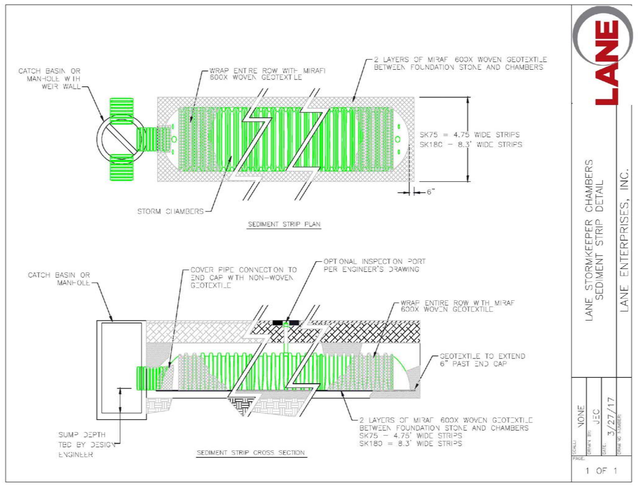
LANE STORMKEEPER CHAMBERS
INSPECTION PORT/ CLEANOUT DETAIL
LANE ENTERPRISES, INC.

SCALE: NONE | Design By: JEC | Drawn By: | Date: | Checked By:
PAGE: 1 OF 1



LANE STORMKEEPER CHAMBERS
UNDERDRAIN OUTLET CONFIGURATION
LANE ENTERPRISES, INC.

SCALE: NONE | Design By: JDS, JEC | Drawn By: | Date: 12/17/14 | Checked By:
PAGE: 3 OF 3



LANE STORMKEEPER CHAMBERS
SEDIMENT STRIP DETAIL
LANE ENTERPRISES, INC.

SCALE: NONE | Design By: JEC | Drawn By: | Date: 3/27/17 | Checked By:
PAGE: 1 OF 1

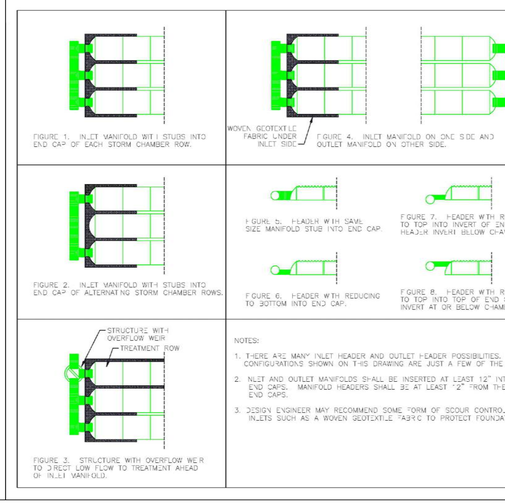


FIGURE 1. INLET MANIFOLD WITH STUBS INTO END CAP OF EACH STORM CHAMBER ROW.

FIGURE 2. INLET MANIFOLD WITH STUBS INTO END CAP OF ALTERNATING STORM CHAMBER ROWS.

FIGURE 3. STRUCTURE WITH OVERFLOW WEIR TO DIRECT LOW FLOW TO TREATMENT AHEAD OF INLET MANIFOLD.

FIGURE 4. INLET MANIFOLD ON ONE SIDE AND OUTLET MANIFOLD ON OTHER SIDE.

FIGURE 5. HEADER WITH SAME SIZE MANIFOLD STUB INTO END CAP.

FIGURE 6. HEADER WITH REDUCING TO BOTTOM INTO END CAP.

FIGURE 7. HEADER WITH REDUCING STUB TO TOP INTO INVERT OF END CAP WITH HEADER INVERT BELOW CHAMBER INVERT.

FIGURE 8. HEADER WITH REDUCING STUB TO TOP INTO TOP OF END CAP WITH HEADER INVERT AT OR BELOW CHAMBER INVERT.

NOTES:
1. THERE ARE MANY INLET HEADER AND OUTLET HEADER POSSIBILITIES. THE CONFIGURATIONS SHOWN ON THIS DRAWING ARE JUST A FEW OF THE OPTIONS.
2. INLET AND OUTLET MANIFOLDS SHALL BE INSERTED AT LEAST 12" INTO CHAMBER END CAPS. MANIFOLD HEADERS SHALL BE AT LEAST 2" FROM THE BASE OF THE END CAPS.
3. DESIGN ENGINEER MAY RECOMMEND SOME FORM OF SCOUR CONTROL MEASURE AT INLETS SUCH AS A WOVEN GEOTEXTILE FABRIC TO PROTECT FOUNDATION STONE.

LANE STORMKEEPER SK180 CHAMBER
HEADER CONFIGURATIONS
LANE ENTERPRISES, INC.

SCALE: NONE | Design By: JEC | Drawn By: | Date: 12/17/14 | Checked By:
PAGE: 1 OF 1

ALL BMP'S SHALL BE PRIVATELY MAINTAINED

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

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CLAYTON C. TOCK
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SCALE: N/A		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
09-28-18	–		
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
		SHEET C.24 OF 45	SP-12928

Upton Hill Regional Park 7-30-2019

Calculating Treatment Volume Peak Discharge

Introduction

The water quality treatment volume (*Tv*) is defined as the amount of runoff from a contributing drainage area generated by the rainfall from the 90th percentile storm event, which has been established as the 1-inch storm for Virginia. In order to properly size water quality best management practices (BMPs), the water quality treatment volume must be calculated using the Virginia Runoff Reduction Method (VRRM). This treatment volume can then be converted into peak discharge (q_{pTv}) in order to ensure non-erosive conditions and BMP flow capacity. The peak discharge is further needed for the design and sizing of pretreatment cells, level spreaders, by-pass diversion structures, overflow riser structures, grass swales, water quality swale geometry, and manufactured treatment devices (MTDs).

The Virginia Department of Environmental Quality (DEQ) has reviewed several methods for calculating peak discharge. **The Modified Curve Number Method is DEQ's preferred way to calculate the peak discharge for the water quality treatment volume associated with the BMP drainage area**. The method is based on the Small Storm Hydrology Method (Pitt, 1999) and Natural Resources Conservation Service (NRCS) Graphical Peak Discharge Method in *Technical Release 55* (TR-55; USDA, 1986).

The equation used for the Modified Curve Number Method is provided in DEQ's Draft 2013 Virginia Stormwater Management Handbook (Second Edition) and is provided below.

Equation 11.12 in DEQ, 2013 (Modified NRCS TR-55 Eq. 4-1)

$$q_{pTv} = q_u \times A \times Q_a$$

Where:
q_{pTv} = treatment volume peak discharge (cfs)
q_u = unit peak discharge (cfs/mi²/in)
A = BMP drainage area (mi²)
Q_a = runoff volume (watershed inches = *T_{VBMP}/BMP drainage area*)

Modified Curve Number Method

Follow the steps below to use the Modified Curve Number Method to compute the peak discharge of the BMP's treatment volume (q_{pTv}).

Step 1: Calculate the BMP treatment volume (T_{VBMP}) using the VRRM (version 3.0).
The VRRM spreadsheets for new development and redevelopment are available on the VRRM page of the Virginia Stormwater BMP Clearinghouse website (www.swbmp.vwrrc.vt.edu). The T_{VBMP} is expressed in the VRRM spreadsheets in cubic feet (ft³). The T_{VBMP} is used to compute the runoff volume (Q_a).

Note: When using a treatment train, the designer should consult the VRRM spreadsheet to determine the total treatment volume from both the immediate contributing drainage area and any additional volume remaining from the upstream BMP.

T_{VBMP} = 2517 cf

Step 2: Calculate the modified curve number (*CN*) for the BMP contributing drainage area.
The *CN* is needed to compute the initial abstraction (I_a), which is used to determine the unit peak discharge (q_u) **(Step 4)**.

The following equation is derived from the NRCS Curve Number Method, which is described in detail in Chapter 2 (Estimating Runoff) of TR-55 (USDA, 1986):

Equation: Derivation of NRCS Curve Number and Runoff Equation

$$CN = \frac{1000}{[10 + 5P + 10Q_a - 10(Q_a^2 + 1.25Q_aP)^{0.5}]}$$ = 97

Where:
CN = modified curve number
P = rainfall (inches), equal to 1.0 inch in Virginia
Q_a = runoff volume (watershed inches), equal to *T_{VBMP} ÷ BMP drainage area*
Qa = 2517 cf / (1.01 ac * 43,560 sf/ac) * 12 in/ft = 0.693 in

Note: When using a hydrologic/hydraulic model for sizing a runoff reduction BMP or calculating q_{pTv}, designers must use this modified curve number for the drainage area to generate runoff equal to the T_{VBMP}.

Step 3: Compute the time of concentration (T_c) for the site or drainage area.
T_c influences the shape and peak of the runoff hydrograph. Chapter 3 of TR-55 (Time of Concentration and Travel Time; USDA, 1986) provides detailed procedures for computing the T_c.
Assumed Tc = 0.1 hour

Step 4: Determine the unit peak discharge (q_u).
The unit peak discharge (q_u) is described in Chapter 4 of TR-55 (Graphical Peak Discharge Method; USDA, 1986).
q_u = 1000 cfs/mi²/in

Note: The Virginia Stormwater Management Program (VSMP) regulations require that designers use updated rainfall data based upon the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 publication for stormwater management computations and modeling.

Note: Exhibit 4-II in TR-55 reports q_u in units of csm/in, which equals cubic feet per second (cfs) per square mile (mi²) of drainage area per inch of runoff (cfs/mi²/in).

Step 5: Calculate the water quality treatment volume's peak discharge (q_{pTv}).
The q_{pTv} is computed using equation 11.12 in DEQ's Draft 2013 Virginia Stormwater Management Handbook and is shown in the Introduction section of this document. The equation is a modified version of equation 4-1 in TR-55 (Chapter 4: Graphical Peak Discharge Method; USDA, 1986).

q_{pTv} = 1.11 cfs

Required # of Chambers = 1.11 cfs / 0.15 cfs/SK75 Chamber* = 8 each SK 75 Chambers

* from Sediment Strip sizing document

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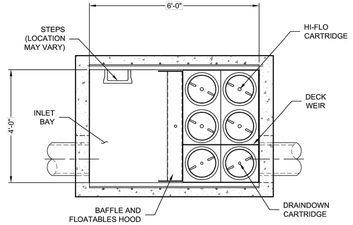
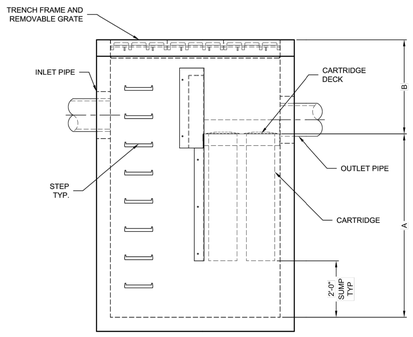


PLAN VIEW
(TOP SLAB NOT SHOWN FOR CLARITY)



ELEVATION VIEW

Jellyfish® Filter

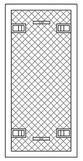
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING: U.S. PATENT NO. 8,287,726; 8,221,618; US 8,123,935; OTHER INTERNATIONAL PATENTS PENDING

JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD SURFACE INLET STYLE WITH TRENCH GRATE AND COVER IS SHOWN. ALTERNATE CURB INLET OR PIPE INLET OPTIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.

CARTRIDGE SELECTION

CARTRIDGE LENGTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"	5'-4"	4'-3"	3'-3"
FLOW RATE HIGH-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089	0.133 / 0.067	0.089 / 0.045	0.049 / 0.025
MAX. TREATMENT (CFS)	0.89	0.67	0.45	0.25
OUTLET INVERT TO RIM (MIN) (B)	3'-4"	3'-4"	3'-4"	3'-4"



24"
TRENCH COVER
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID					JF
WATER QUALITY FLOW RATE (cfs)					0.45
PEAK FLOW RATE (cfs)					3.45
RETURN PERIOD OF PEAK FLOW (yrs)					10
# OF CARTRIDGES REQUIRED (H/F / DD)					3/1
CARTRIDGE LENGTH					54
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	390.50	RCP	21	*	*
INLET #2		*	*	*	*
OUTLET	390.32	RCP	21	*	*
SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.					
RIM ELEVATION					400.00
ANTI-FLOTATION BALLAST		WIDTH		HEIGHT	
		N/A		N/A	
NOTES/SPECIAL REQUIREMENTS:					
* PER ENGINEER OF RECORD					

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDEDTO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE (WHERE APPLICABLE) AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

JELLYFISH JFSI0406
STANDARD DETAIL
SURFACE INLET CONFIGURATION

CONTECH ENGINEERED SOLUTIONS

Project Name:	Upton Hill		
Site Designation:	JF	**Date:**	9/5/19
County or Independent City:	Arlingotn	**Design Engineer:**	JLW
State:	VA		

Mass Loading Calculations:

Peak Design Flow (cfs)	3.45
Water Quality Flow (cfs)	0.46
Annual Rainfall (inches)	43
Total Drainage Area, A (ac)	1.33
Post Development Impervious Area, A_i (ac)	0.96
Pervious Area, A_p (ac)	0.37
Impervious Runoff Coefficient, Rv	0.95
Pervious Runoff Coefficient, Rv	0.25
% Impervious	72%
Runoff Coefficient, Rc	0.76
TSS Removal By Pretreatment	41%
Agency Required TSS % Removal	80%
Required TSS Removal Efficiency of Filter	66%
Percent Runoff Capture	90%
Mean Annual Runoff, V_t (ft^3)	141,113
Event Mean Concentration of Pollutant, EMC (mg/L)	60
Annual Mass Load, M_{total} (lbs)	528.25

Flow Based Filter Sizing:

Mass to be Captured by System (lbs)	206.02
Filter Type	Jellyfish
Structure Type	Vault
Cartridge Length	54"
Allowable Load Per Hi-Flo Cartridge (lbs)	125
Allowable Load Per Draindown Cartridge (lbs)	63
# Hi-Flo Cartridges Required	3
# Draindown Cartridges Required	1
Recommended Model	4'x6' Vault
TSS Treatment Capacity (lbs)	438.00
Maximum Water Quality Flow	0.62 cfs

JELLYFISH - MAINTENANCE SHEDULE

1.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

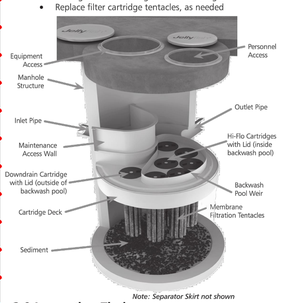
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed



Note: Separator Skirt not shown

2.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent*.

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

3.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

3.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.

Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment (≥ 1/16") accumulated on the deck surface should be removed.

3.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

4.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. ***Caution: Dropping objects onto the cartridge deck may cause damage.***
3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

5.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. ***Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs.***
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

5.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.

Cartridge Removal & Lifting Device

2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.
3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. ***Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane.***
4. Collected rinse water is typically removed by vacuum hose.
5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

5.3 Sediment and Flotables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.

Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.
4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.

Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

5.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. ***Caution: Do not force the cartridge downward; damage may occur.***
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

5.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

5.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

ALL BMP'S SHALL BE PRIVATELY MAINTAINED

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
Clayton Tock
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

urban™
Planners•Engineers•Landscape Architects•Land Surveyors

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4200 D Technology Ct.
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(703)-642-2306
(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

BMP DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
09-28-18	–		
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
		SHEET C.24AOF 45	SP-12928

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No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

BMP DETAILS

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.24 BOF 45	SP-12928

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POINT OF CONFLUENCE
OUTFALL #1
TOTAL DA AT POINT A
=88.70 AC

STUDY POINT "A"
TOTAL DA = 26.61 AC
CN=67

STUDY POINT "A1"
TOTAL DA = 2.44 AC
CN=93

ADDITIONAL OFFSITE DA
FOR X-SECTION =2.94 AC
CN=80

CHANNEL FLOW

SHALLOW CONCENTRATED FLOW

SHEET FLOW

LIMIT OF ANALYSIS
(MAJOR FLOODPLAIN)

LEGEND

DRAINAGE DIVIDES

No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

OUTFALL ANALYSIS

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

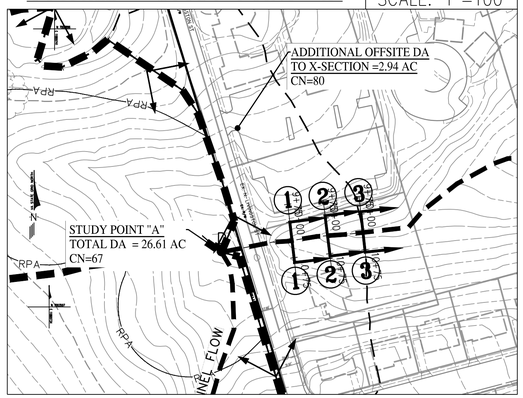
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=100'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.25 OF 45 — SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-23-OUTFALL.dwg [OUTFALL MAP] August 16, 2019 – 11:07am rpitari

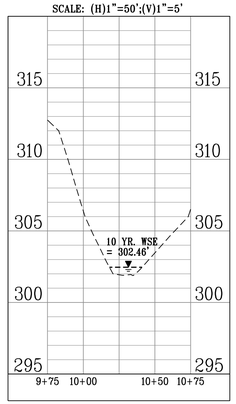
OUTFALL – STUDY POINT "A"

SCALE: 1"=100'



CROSS SECTION 1-1

SCALE: (H)1"=50';(V)1"=5'



POST DEVELOPMENT CONDITIONS:

CROSS SECTION 1-1

DA = 3.43 (ONSITE) + 26.12 (OFFSITE) = 29.55 AC.
CN = VARIES (SEE SHEET C.25)
P2 = 3.15 IN
P10 = 4.84 IN
Tc = 17.0 (SEE THIS SHEET)

Q2(TOTAL) = 16.74 CFS (SEE THIS SHEET)
Q10(TOTAL) = 48.65 CFS (SEE THIS SHEET)

CHANNEL SLOPE = 3.91%

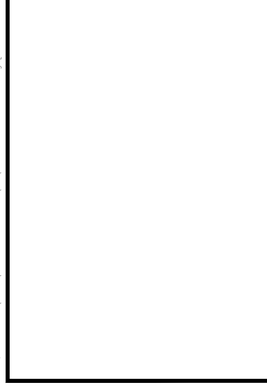
n' = 0.035 DENSE WEEDS (EARTH, WINDING AND SLUGGISH APPENDIX 7D-1 VDOT DRAINAGE MANUAL)

V2= 3.38 FPS
D10= 0.59 FT.

V2allow= 4.0 FPS (A-1-B MIXTURES PER TABLE 7D-2, VDOT DRAINAGE MANUAL)

CROSS SECTION 2-2

SCALE: (H)1"=50';(V)1"=5'



POST DEVELOPMENT CONDITIONS:

CROSS SECTION 2-2

DA = 3.43 (ONSITE) + 26.12 (OFFSITE) = 29.55 AC.
CN = VARIES (SEE SHEET C.25)
P2 = 3.15 IN
P10 = 4.84 IN
Tc = 17.0 (SEE THIS SHEET)

Q2(TOTAL) = 16.74 CFS (SEE THIS SHEET)
Q10(TOTAL) = 48.65 CFS (SEE THIS SHEET)

CHANNEL SLOPE = 3.91%

n' = 0.035 DENSE WEEDS (EARTH, WINDING AND SLUGGISH APPENDIX 7D-1 VDOT DRAINAGE MANUAL)

V2= 3.43 FPS
D10= 0.69 FT.

V2allow= 4.0 FPS (A-1-B MIXTURES PER TABLE 7D-2, VDOT DRAINAGE MANUAL)

CROSS SECTION 3-3

SCALE: (H)1"=50';(V)1"=5'

POST DEVELOPMENT CONDITIONS:

CROSS SECTION 3-3

DA = 3.43 (ONSITE) + 26.12 (OFFSITE) = 29.55 AC.
CN = VARIES (SEE SHEET C.25)
P2 = 3.15 IN
P10 = 4.84 IN
Tc = 17.0 (SEE THIS SHEET)

Q2(TOTAL) = 16.74 CFS (SEE THIS SHEET)
Q10(TOTAL) = 48.65 CFS (SEE THIS SHEET)

CHANNEL SLOPE = 3.91%

n' = 0.035 DENSE WEEDS (EARTH, WINDING AND SLUGGISH APPENDIX 7D-1 VDOT DRAINAGE MANUAL)

V2= 3.58 FPS
D10= 0.62 FT.

V2allow= 4.0 FPS (A-1-B MIXTURES PER TABLE 7D-2, VDOT DRAINAGE MANUAL)

OVERALL OUTFALL NARRATIVE: STUDY POINT "A" (CHANNEL AND FLOOD PROTECTION)

STUDY POINT A CONSISTS OF THE TWO ONSITE AREAS WITH A TOTAL DRAINAGE AREA OF 3.43 ACRES AND AND OFFSITE AREA OF 23.18 ACRES. CURRENTLY, STUDY POINT "A" DOES NOT EXPERIENCE LOCALIZED FLOODING OR EROSION.

CROSS-SECTION 1-1, 2-2, 3-3

THE AREA TO CROSS-SECTIONS 1, 2, AND 3 CONSISTS OF 3.43 ACRES OF ONSITE AREA AND 26.12 ACRES OF OFFSITE AREA WITH A COMBINED DRAINAGE AREA OF 29.55 ACRES AND A COMBINED CURVE NUMBER OF 68. OUTFALL AREA IS COLLECTED BY AN OPEN CHANNEL SYSTEM TO EAST OF THE SUBJECT SITE, BEGINNING JUST WEST OF N. LIVINGSTON ST. AND CONTINUING IN AN EASTERLY DIRECTION TOWARD FOUR MILE RUN, DISCHARGING INTO A 100 YEAR MAPPED FLOODPLAIN.

AS SHOWN ON THIS SHEET, THE 10 YEAR STORM IS FULLY CONVEYED WITHIN EACH CHANNEL CROSS SECTION AS THE 10-YEAR FLOW HAS BEEN GREATLY REDUCED DUE TO THE EXPANDED CHAMBER SYSTEM. FURTHER, THE 2 YEAR STORM DOES NOT CAUSE ENOUGH EROSIVE VELOCITIES WHICH EXCEEDS THE ALLOWABLE PERMISSIBLE VELOCITY FOR EACH CHANNEL. THEREFORE IT IS THE OPINION OF URBAN-LTD THAT AN ADEQUATE OUTFALL EXISTS AND NO FURTHER ANALYSIS IS REQUIRED.

URBAN LTD.
CLAYTON C. TOCK, P.E., PRINCIPAL DATE 07/30/19

POST□DE□ELOPMENT O□TFLO□ S□MMARIES

SEE SHEET C.□□□C.□□G
FOR BIORETENTION AND PA□ERS 2□R AND □□□R O□TFLO□ S

2-year Cross-Section Total Summary

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10-year Cross-Section Total Summary

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DRAINAGE SHED TO POINT "A"

Post Development OFFSITE UNDETAINED AREA Runoff Calculations - Point "A"

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DRAINAGE SHED TO CROSS□SECTIONS

Post Development OFFSITE UNDETAINED AREA Runoff Calculations - X-S

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SEE SHEET □□□□□□□□□

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

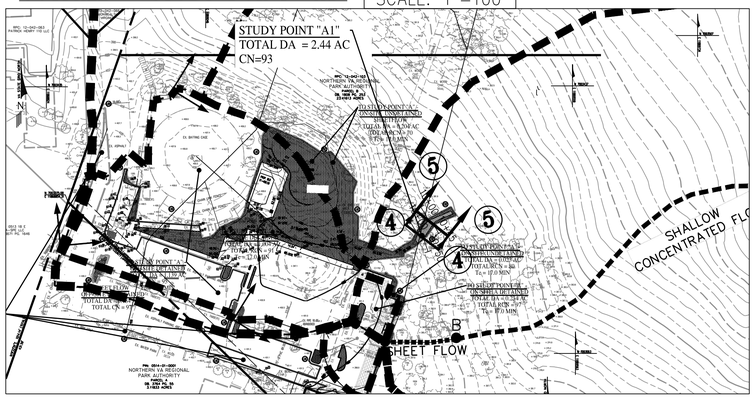
OUTFALL ANALYSIS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=30'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.26 OF 45	SP-12928

Urban, Ltd – J:\JOBS\UPTON HILL PARK\SP\12928-23-OUTFALL.dwg [OUT ANLYS TO STUDY PT. A] August 16, 2019 – 11:07am rjebri

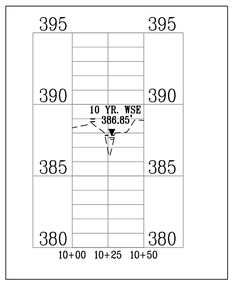
OUTFALL – STUDY POINT "A1"

SCALE: 1"=100'



CROSS SECTION 4–4

SCALE: (H)1"=50';(V)1"=5'



POST DEVELOPMENT CONDITIONS:

CROSS SECTION 4–4

DA = 1.26 (ONSITE) + 1.18 (OFFSITE) = 2.44 AC.
CN = VARIES (SEE SHEET C.25)
P2 = 3.15 IN
P10 = 4.84 IN
Tc = 17.0 (SEE THIS SHEET)

Q2(TOTAL) = 1.90 CFS (SEE THIS SHEET)
Q10(TOTAL) = 3.46 CFS (SEE THIS SHEET)

CHANNEL
SLOPE = 10.72%

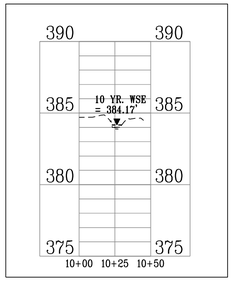
n' = 0.035 STONY BOTTOM AND WEEDY SIDES (EARTH, WINDING AND SLUGGISH APPENDIX 7D–1 VDOT DRAINAGE MANUAL)

V2= 4.68 FPS
D10= 0.49 FT.

REFER TO EROSION AND SEDIMENT CONTROL SHEET C.30 FOR TREATMENT OF EXISTING CHANNEL AT STUDY POINT A1.

CROSS SECTION 5–5

SCALE: (H)1"=50';(V)1"=5'



POST DEVELOPMENT CONDITIONS:

CROSS SECTION 4–4

DA = 1.26 (ONSITE) + 1.18 (OFFSITE) = 2.44 AC.
CN = VARIES (SEE SHEET C.25)
P2 = 3.15 IN
P10 = 4.84 IN
Tc = 17.0 (SEE THIS SHEET)

Q2(TOTAL) = 1.90 CFS (SEE THIS SHEET)
Q10(TOTAL) = 3.46 CFS (SEE THIS SHEET)

CHANNEL
SLOPE = 10.72%

n' = 0.035 STONY BOTTOM AND WEEDY SIDES (EARTH, WINDING AND SLUGGISH APPENDIX 7D–1 VDOT DRAINAGE MANUAL)

V2= 3.03 FPS
D10= 0.18 FT.

REFER TO EROSION AND SEDIMENT CONTROL SHEET C.30 FOR TREATMENT OF CHANNEL AT STUDY POINT A1.

OUTFALL NARRATIVE: STUDY POINT "A1" (CHANNEL AND FLOOD PROTECTION)

STUDY POINT A1 CONSISTS OF THE PARKING, BATTING CAGE, BIORETENTION, AND PAVER AREAS WITH A TOTAL DRAINAGE AREA OF 2.44 ACRES INCLUDING AN OFFSITE DETAINED AREA OF 1.18 ACRES. CURRENTLY, STUDY POINT "A1" IS WITHIN A ROCKY LINED CHANNEL, BUT EROSION IS PRESENT (REFER TO EROSION & SEDIMENT CONTROL PHASE II SHEET C.30).

CROSS-SECTION 4-4, AND 5-5

THE AREA TO CROSS–SECTIONS 4 AND 5 CONSISTS OF 1.26 ACRES OF ONSITE AREA AND 1.18 ACRES OF OFFSITE AREA WITH A COMBINED DRAINAGE AREA OF 2.44 ACRES AND A COMBINED CURVE NUMBER OF 97. THE EXISTING POND PROVIDES TREATMENT FOR THE EXISTING PARKING LOT AND BATTING CAGE AS WELL AS OTHER PORTIONS OF LAWN WITHIN THE DRAININAGE ARE. THE VOLUME TO TREAT THE OFFSITE AREAS IS CALCULATED ON SHEET C.13.

THE PROPOSED BIO–RETENTION FACILITY AND ARCH–SYSTEM VAULT WILL TAKE THE PLACE OF THE EXISTING POND VOLUME FOR THE OFF–SITE AREAS AND THE ON–SITE DEVELOPED AREAS. SEE SHEET C.14 FOR VOLUME CALCULATIONS. THE PROPOSED VAULT WAS ORIGINALLY SIZED IN ACCORDANCE WITH THE ARLINGTON COUNTY ENERGY BALANCE WORKSHEET TO ACCOUNT FOR ONSITE AREAS WITHIN THE DRAINAGE AREAS WITH A 20% IMPROVEMENT FACTOR ALONG WITH THE VOLUME REQUIRED FOR OFF–SITE TREATMENT IN THE EXISTING POND. THE BIO–RETENTION FACILITY AS–DESIGNED OFFERS SOME RUNOFF REDUCTION CREDIT AND, AS ROUTED, LENGTHENS THE TOTAL DETENTION TIME. ALL ROUTING DIAGRAMS ARE PROVIDED FOR THE BIO–RETENTION ON SHEETS C.16 TO C.16A, AND VAULT ON SHEETS C.16H TO C.16K.

THE STORAGE VOLUME REQUIRED IN THE FACILITIES WAS COMPUTED BASED ON THE ARLINGTON COUNTY ENERGY BALANCE WORKSHEET SHOWN ON SHEET C.17. AS SHOWN ON SHEET C.14, THE VOLUME PROVIDED IN THE SYSTEM AS DESIGNED IS 17,682 C.F. TO ACCOUNT FOR THE WATER QUALITY VOLUME AS WELL AS THE WATER QUANTITY VOLUME. THE TOTAL BMP TREATMENT VOLUME IS 5,639 C.F. AND THE REMAINDER OF THE VOLUME IN THE SYSTEM IS PROVIDED TO MITIGATE WATER QUANTITY AND ENERGY BALANCE REQUIREMENTS. THE STORAGE PROVIDED (12,043 C.F.) IS LARGER THAN THE STORAGE REQUIRED FROM THE ENERGY BALANCE WORKSHEET (11,915 C.F.).

AS SHOWN ON THIS SHEET, SECTIONS WERE TAKEN AT THE END OF THE DESIGNED OUTLET PROTECTION AND 50' DOWNSTREAM ALONG THE SAME CHANNEL. WITHIN THE NEXT 50' DOWNSTREAM FROM THIS LAST CHANNEL THE DISCERNABLE CHANNEL IS NO LONGER PRESENT IN THE FIELD. AS SHOWN IN THE SECTIONS, THE 10–YEAR STORM IS FULLY CONVEYED WITHIN THE CHANNEL SECTIONS AND THE 2–YEAR VELOCITY IS WITHIN THE REQUIRED TOLERANCE FOR A RIP–RAP LINED CHANNEL. IT IS THEREFORE THE OPINION OF URBAN–LTD THAT AN ADEQUATE OUTFALL EXISTS AND NO FURTHER ANALYSIS IS REQUIRED.

URBAN LTD.
CLAYTON C. TOCK, P.E., PRINCIPAL DATE 07/30/19

Clayton Tock

POST□DE□ELOPMENT O□TFLO□ S□MMARIES

SEE SHEET C.□□C.□□□
FOR BIORETENTION□PA□ERS□FILTERRA□AND STORAGE 2□R AND
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2-year Cross-Section Total Summary

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10-year Cross-Section Total Summary

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No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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OUTFALL ANALYSIS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=30'	DESIGNED	CHECKED
SUBMITTED DATE 12–14–18 05–15–18 07–30–19 08–08–18 – 09–28–18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.26AOF 45 SP–12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-23-OUTFALL.dwg [OUT ANLYS TO STUDY PT A1] August 16, 2019 – 11:07am rjafari

EX. PATRICK HENRY DR

VA STATE GRID NORTH

N 7003982

E 11869174

RPC: 12-018-024
DE LA VIA MARCELINO
DE LA VIA JULIETA ET AL

RPC: 12-018-023
TONAKARN EAK & ORAPAN

RPC: 12-018-022
HORNE HEATHER

RPC: 12-018-020
FERNANDO WILLIAM ANTHONY
ET AL

RPC: 12-018-021
DE OVANDO MARIA V &
ANTONIO OVANDO

URCIA ANDRES C TR
URCIA ROWENA M TR

EX. N LEBANON ST

RPC: 12-018-001
AGER LUCAS &
AGER LISA

EX. WILSON BLVD - ROUTE 6608
EX. R/W WIDTH VARIES
POSTED SPEED: 30 MPH

N73°56'55"E 399.58'

CONTRACTOR TO PROVIDE DEDICATED WATER TRUCK OR WATERLINE WITH METER FOR THE CONSTRUCTION ENTRANCE.

15,000 GPD

N 7003881.48
E 11869395.85

BENCHMARK
TOP OF UNIFORM
ELEV. 335.20

N 7003824.66
E 11869047.49

N 7003896
E 11869741

DA=1.83AC
C=0.60
TO STR EX. 104

DA=0.39AC
C=0.60
TO STR

DA=0.06AC
C=0.60
TO 362' OF SSF

DA=0.39AC
C=0.30
TO 216'
OF SSF

DA=0.56AC
C=0.45
TO 803'
OF SSF

DA=1.24AC
C=0.30
TO TSD

RPC: 12-042-066
COMMONWEALTH
OF VIRGINIA

RPC: 12-042-061
NORTHERN VA REGIONAL
PARK AUTHORITY

EX. WOOD STEPS

EX. DOG SHELTER

EX. TIMBERS

EX. CINDER BLOCK FACILITIES (TO BE REMOVED)

EX. MEMORIAL STONE

EX. PLAYGROUND AREA (T.B.R.)

EX. ASPHALT (T.B.R.)

EX. SIGN

EX. WOOD CHIP TRAIL

"RED TRAIL"

EX. UTILITY POLE

EX. 8" SANITARY SEWER

EX. CG

EX. 15" RCP

EX. 21" RCP 15+50

EX. 12" RCP 11+50

EX. 12" RCP 12+00

TO EX. MEDIAN

R=1472.40'
A=453.74'

N 7003547
E 11869046

N10°20'10"E 1014.41' (TOTAL)

352.94'

FIELD VERIFIED RPA

THIS SHEET FOR E&S PURPOSES ONLY. SEE SHEET #C.32 FOR LEGENDS.

MATCHLINE
SEE SHEET C.28

No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

urban
Planners•Engineers•Landscape Architects•Land Surveyors

Urban, Ltd.
4200 D Technology Ct.
Chantilly Va. 20151
(703)-642-2306
(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EROSION & SEDIMENT CONTROL – PHASE I

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"= 25'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.27 OF 45	SP-12928

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MATCHLINE
SEE SHEET C.27

N 7003437
E 11869559

VA STATE GRID NORTH

N 7003435
E 11868824

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

N 7003275.08
E 11868854.31

DA=0.06AC
C=0.60
TO 93' OF SSF

DA=0.25AC
C=0.60
TO 493'
OF SSF

DA=2.40AC
C=0.60
TO EX. POND

DA=0.09AC
C=0.60
TO 72'
OF SSF

DA=0.08AC
C=0.60
TO 137'
OF SSF

DA=0.20AC
C=0.60
TO 82' OF SSF

EX. BATTING CAGE
EX. ASPHALT
EX. TIMBERS
EX. CHAIN LINK FENCE
EX. BENCH (TYP.)
EX. 8" PVC PIPE
EX. MEMORIAL STONE
EX. 8' CHAIN LINK
EX. ASPHALT PARKING AREA
EX. MINI GOLF
EX. WATER PARK / EX. WOOD DECK
EX. BUILDING
EX. EXTERCISE AREA (T.B.R.)
EX. 6" PVC PIPE
EX. CONCRETE PAD
GAZEBO (T.B.R.)
EX. SPLIT RAIL FENCE (T.B.R.)
EX. 8" SANITARY SEWER
EX. 6' CHAIN LINK WITH BARBED WIRE
EX. WOOD CHIP TRAIL
YELLOW TRAIL
EX. ASPHALT
OHU
STEPS
CONCRETE WALK
CONC.
CONCRETE SIDEWALK
CURB & GUTTER
EX. PIPE TO BE ABANDONED
PROP. RIP-RAP
PROP. WASH RACK
CONTRACTOR TO PROVIDE DEDICATED WATER TRUCK OR WATER HOSE FOR THE CONSTRUCTION ENTRANCE
ARLINGTON COUNTY/FAIRFAX COUNTY (APPROXIMATE)
APPROX. LOCATION OF PROPERTY LINE
BENCHMARK SAN MH TOP = 399.63

N19°22'01"E 1014.14' (TOTAL)
431.59'
N45°57'40"W 440.11'
S19°22'20"W 48.64'
247.71'
296.35' (TOTAL)

PIN: 0514-01-0001
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

N 7002956
E 11868810

N 7002969.14
E 11869170.69

RPC: 12-042-106
SAINT/ ALBANS HOUSING
HARTLAND BANK
DB. 3860 PG. 1232

THIS SHEET FOR E&S PURPOSES ONLY. SEE SHEET #C.32 FOR LEGENDS.

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EROSION & SEDIMENT CONTROL - PHASE I
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"= 25'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 - 09-28-18 -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.28 OF 45	SP-12928

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EX. PATRICK HENRY DR

VA STATE GRID NORTH

N 7003982
E 11869174

RPC: 12-018-001
AGER LUCAS &
AGER LISA

RPC: 12-018-024
DE LA VIA MARCELINO
DE LA VIA JULIETA ET AL

RPC: 12-018-023
TONAKARN EAK & ORAPAN

RPC: 12-018-022
HORNE HEATHER

RPC: 12-018-020
FERNANDO WILLIAM ANTHONY
ET AL

RPC: 12-018-021
DE OVANDO MARIA V &
ANTONIO OVANDO

URCIA ANDRES C TR
URCIA ROWENA M TR

EX. N LEBANON ST

EX. 8" SANITARY SEWER

EX. WILSON BLVD - ROUTE 6608
EX. R/W - WIDTH VARIES
POSTED SPEED: 30 MPH
POTENTIAL BIKE SHARE STATION

15,000 VPD

CONTRACTOR TO PROVIDE DEDICATED WATER TRUCK OR WATERLINE WITH METER FOR THE CONSTRUCTION ENTRANCE

N 7003881.48
E 11869495.85

BENCHMARK
ELEVATION
335.20

N73°56'55"E 399.58'

N 7003896
E 11869741

DA=1.83AC
C=0.61
TO STR EX. 104

DA=0.39AC
C=0.60
TO STR

PROP. WASH RACK

EX. SWING GATE TO BE REMOVED AN REPLACED AFTER COMPLETION OF CONSTRUCTION. IF THE GATE IS DAMAGED, IT WILL BE REPLACED AT NO COST TO THE DEVELOPER.

N 7003824.66
E 11869047.49

PROP. ENTRY SIGN(TYP.)

RPC: 12-042-066
COMMONWEALTH
OF VIRGINIA

EX. WOOD STEPS

PROP. NATURAL SURFACE TRAIL

DA=0.39AC
C=0.30
TO 216'
OF SSF

DA=0.06AC
C=0.60
TO 362'
OF SSF

PROP. CG-12A

PROP. PARK SIGN

EX. GUY TO BE RELOCATED

EX. TRAIL T.B.R.

GAME TABLES

EX. ASPHALT T.B.R.

EX. TIMBERS

PROP. PICNIC PAVILION

EX. PLAYGROUND AREA (T.B.R.)

EX. CINDER BLOCK FACILITIES TO BE REMOVED

PROP. 5' SW

PROP. BIKE RACKS

EX. UTILITY POLE

DA=0.56AC
C=0.58
TO 803'
OF SSF

PROP. PLAYGROUND

EX. TRAIL T.B.R. CARE SHALL BE TAKEN TO PRESERVE EXISTING TREES

RPC: 12-042-061
NORTHERN VA REGIONAL
PARK AUTHORITY

TW=356.00
BW=354.00
PROP. RET. WALL
(DESIGN BUILD BY
CONTRACTOR)

EX. MEMORIAL STONE

TW=355.00
BW=352.00

SHADE STRUCTURE

PROP. 36" FENCE

DA=1.24AC
C=0.30
TO TSD

EX. WOOD CHIP TRAIL

TW=358.00
BW=353.00

PROP. SW PAVERS
(SEE SHEET C.03A
FOR DETAIL)

TW=352.00
BW=350.20

EX. TRAIL TO CONNECT TO PROPOSED SIDEWALK

PORTION OF EX. TRAIL TO BE REPLACED WITH 5' SIDEWALK

MODERATE 5044 L.F. (TOTAL)
557 L.F.

N 7003547
E 11869046

EX. WOOD STEPS

EX. ASPHALT

EX. CG

EX. 15" RCP

EX. 21" RCP 15+50

EX. 12" RCP 11+60

EX. 18" RCP 12+00

EX. 15" CG

EX. 21" RCP

EX. 8" SANITARY SEWER

EX. SWING GATE

PROP. WOOD CHIP TRAIL

FIELD VERIFIED RPA

RPA

THIS SHEET FOR E&S PURPOSES ONLY. SEE SHEET #C.32 FOR LEGENDS.

MATCHLINE
SEE SHEET C.30

No.	DATE	DESCRIPTION
		REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

urban
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EROSION & SEDIMENT CONTROL – PHASE II

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.29 OF 45	SP-12928

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THIS SHEET FOR E&S PURPOSES ONLY. SEE SHEET #C.32 FOR LEGENDS.

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EROSION & SEDIMENT CONTROL – PHASE II
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 05-15-18, 08-08-18, 09-28-18, 12-14-18, 07-30-19, –, –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.30 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-27-E&S2.dwg [ES 2 (2)] August 16, 2019 – 11:08am rjafari

VIRGINIA EROSION AND SEDIMENT CONTROL MINIMUM STANDARDS

4VAC50-30-40. MINIMUM STANDARDS

AN EROSION AND SEDIMENT CONTROL PROGRAM ADOPTED BY A DISTRICT OR LOCALITY MUST BE CONSISTENT WITH THE FOLLOWING CRITERIA, TECHINQUES 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 30 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 STOCKPILES 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 UPSTREAM 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 TWENTY-FIVE 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 SLOPES STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

8. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CURT 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 OPERATIONS., 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.

11. 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 REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.

15. THE BED AND BANKS OF A WATER COURSE 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 THESE REGULATIONS.
F. APPLICABLE SAFETY REGULATIONS 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 LARGERLAND-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 LOCAL PROGRAM 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:

A. CONCENTRATED STORMWATER RUNOFF LEAVING A DEVELOPMENT SITES SHALL BE DISCHARGED DIRECTLY INTO AN ADEQUATE NATURAL OR MAN-MADE RECEIVING CHANNEL, PIPE OR STORM SEWER SYSTEMS. FOR THOSE SITES WHERE RUNOFF IS DISCHARGED INTO A PIPE OR SYSTEM, DOWNSTREAM STABILITY ANALYSIS AT THE OUTFALL OF THE PIPE OR PIPE SYSTEM SHALL BE PERFORMED.
B. ADEQUACY OF ALL CHANNELS AND PIPES SHALL BE VERIFIED IN THE FOLLOWING MANNER:
(1). THE APPLICANT SHALL DEMONSTRATE THAT THE TOTAL DRAINAGE AREA TO THE POINT OF ANALYSIS WITHIN THE CHANNEL IS ONE HUNDRED TIMES GREATER THAN THE CONTRIBUTING DRAINAGE AREA OF THE PROJECT IN QUESTION: OR
(2). (A) NATURAL CHANNELS SHALL BE ANALYZED BY THE USE OF A TWO-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP CHANNEL BANKS NOR CAUSE EROSION OF CHANNEL BED OR BANKS; AND
(A) ALL PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS SHALL BE ANALYZED BY THE USE OF A TEN-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP ITS BANKS AND BY THE USE OF A TWO-YEAR STORM TO DEMONSTRATE THAT STROMWATER WILL NOT CAUSE EROSION OF CHANNEL BED OR BANKS; AND
(B)PIPES AND STORM SYSTEMS SHALL BE ANALYZED BY THE USE OF A TEN-YEAR STORM TO VERIFY THAT STORMWATER WILL BE CONTAINED WITHIN THE PIPE OR SYSTEM.
C. IF EXISTING NATURAL RECEIVING CHANNELS OR PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS OR PIPES ARE NOT ADEQUATE, THE APPLICANT SHALL:
(1) IMPROVE THE CHANNEL TO A CONDITION WHERE A TEN-YEAR STORM WILL NOT OVERTOP THE BANKS AND A TWO-YEAR STORM WILL NOT CAUSE EROSION TO THE CHANNEL BED OR BANKS; OR
(2) IMPROVE THE PIPE OR PIPE SYSTEM TO A CONDITION WHERE THE TEN-YEAR STORM IS CONTAINED WITHIN THE APPURTENANCES; OR
(3) DEVELOP A SITE DESIGN THAT WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A TWO-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A NATURAL CHANNEL OR WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A TEN-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A MAN-MADE CHANNEL;
(4) PROVIDE A COMBINATION OF CHANNEL IMPROVEMENT, STORMWATER DETENTION OR OTHER MEASURES WHICH IS SATISFACTORY TO THE PLAN-APPROVING AUTHORITY TO PREVENT DOWNSTREAM EROSION.
D. THE APPLICANT SHALL PROVIDE EVIDENCE OF PERMISSION TO MAKE THE IMPROVEMENTS.
E. ALL HYDROLOGIC ANALYSIS SHALL BE BASED ON THE EXISTING WATERSHED CHARACTERISTICS AND THE ULTIMATE DEVELOPMENT OF THE SUBJECT PROJECT.
F. IF THE APPLICANT CHOOSES AN OPTION THAT INCLUDES STORMWATER DETENTION HE SHALL OBTAIN APPROVAL FROM THE LOCALITY OF A PLAN FOR MAINTENANCE OF THE DETENTION FACILITIES. THE PLAN SHALL SET FORTH THE MAINTENANCE REQUIREMENTS OF THE FACILITY AND THE PERSON RESPONSIBLE FOR PERFORMING THE MAINTENANCE.
G. OUTFALL FROM A DETENTION FACILITY SHALL BE DISCHARGED TO A RECEIVING CHANNEL, AND ENERGY DISSIPATERS 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.
I. 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.
J. IN APPLYING THESE STORMWATER RUNOFF 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 CONDITIONS SHALL BE USED IN ALL ENGINEERING CALCULATIONS.
K. 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.

EROSION AND SILTATION CONTROL NARRATIVE:

PROJECT DESCRIPTION:
THE SUBJECT SITE IS LOCATED AT 6060 WILSON BLVD IN ARLINGTON, VA 20190. THE PROJECT CONSISTS OF THE ADDITION OF A PARKING LOT AND MINOR IMPROVEMENTS. THE TOTAL DISTURBED AREA WILL BE 2.33 ACRES.

EXISTING SITE CONDITIONS:
THE SITE IS A PUBLIC PARK AND PARKING LOTS. THE AREA WITHIN THE PROPOSED DEVELOPMENT IS WOODLAND. THERE ARE NO EXISTING WETLANDS ON SITE. THE EXISTING SLOPE OF THE SITE DOES NOT EXCEED 3:1.

ADJACENT AREAS:
TO THE NORTH OF THE SITE IS WILSON BLVD. TO THE WEST THERE ARE EXISTING RESIDENTIAL APARTMENTS. TO THE SOUTH OF THE SITE IS OCEAN DUNES WATERPARK. TO THE EAST OF THE SITE THERE ARE EXISTING SINGLE FAMILY HOMES.

OFFSITE AREAS:
NO OFF-SITE LAND DISTURBING ACTIVITIES ARE EXPECTED TO OCCUR. ANY OFFSITE BORROW, WASTE OR SURPLUS AREAS WILL REQUIRE A SEPARATE PLAN AND PERMIT APPROVED BY THE RELEVANT LOCAL, STATE AND FEDERAL BODIES.

SOILS:
REFER TO SHEET C.03 FOR MAPPING AND LISTING OF SOIL TYPES ON THE SITE.

CRITICAL AREAS:
NO CRITICAL SLOPES (GREATER THAN 3:1) EXIST ON THIS SITE.

PROPOSED TREE SAVE AREA:
ANY TREE OUTSIDE THE LIMITS OF CLEARING AND GRADING SHALL REMAIN UNDISTURBED UNLESS DIRECTLY INSTRUCTED BY THE COUNTY INSPECTOR.

EROSION CONTROL/GENERAL LAND CONSERVATION NOTES:
NO DISTURBED AREA THAT IS NOT ACTIVELY BEING WORKED SHALL REMAIN DENUDED FOR MORE THAN 7 CALENDAR DAYS. TEMPORARY COVER BY SEEDING OR MULCHING SHALL BE PROVIDED ON ANY AREAS THAT WILL BE EXPOSED FOR A PERIOD GREATER THAN 7 DAYS BEFORE PERMANENT STABILIZATION CAN BE ACHIEVED. PERMANENT COVER SHOULD BE PROVIDED, BY MEANS OF PLACEMENT OF NEW CONCRETE OR ASPHALT SURFACE, AS SOON AS POSSIBLE IN THE AREA SUBJECT TO DISTURBANCE.

SEDIMENT CONTROL:
MINIMIZATION AND CONTROL OF SEDIMENT SHALL BE ACCOMPLISHED THROUGH RAPID STABILIZATION OF THE DISTURBED AREA AND THE INSTALLATION OF MECHANICAL DEVICES, INCLUDING INLET PROTECTION, AND A TEMPORARY AREA FOR THE WASHING OF CONSTRUCTION VEHICLES PRIOR TO THEIR LEAVING THE SITE, IF NECESSARY. BECAUSE OF THE NATURE OF THE PROPOSED CONSTRUCTION, OCCURRENCES OF CONTSTRUCTION VEHICLES WORKING WITHIN OR PASSING THROUGH DENUDED SOIL AREAS SHOULD BE EXTREMELY LIMITED, SINCE COMPLETION OF MUCH OF THE CONSTRUCTION SHOULD BE POSSIBLE WITH THE VEHICLES BEING SITUATED ON THE EXISTING ADJOINING PAVED AREAS OR ON NEWLY PLACED GRAVEL BASE MATERIAL.

PHASE 1:
1. INSTALL INLET PROTECTION FOR ALL EXISTING INLETS AS SHOWN ON THE PHASE I DRAWINGS.
2. CLEAR AND GRUB ALONG THE PERIMETER OF LIMITS OF CLEARING AND GRADING. INSTALL PERIMETER CONTROLS IN THE FORM OF SILT FENCE DIRECTLY AFTER PAVEMENT DEMOLITION IS COMPLETE. ADDITIONAL SILT FENCE HAS BEEN PROPOSED ALONG THE PERIMETER OF THE SITE TO ENSURE THAT NO SEDIMENT LEAVES THE SITE AND TO MINIMIZE PEDESTRIAN TRAFFIC THROUGH THE SITE. THIS SILT FENCE MAY BE MODIFIED AT THE DIRECTION OF THE INSPECTOR AS CONSTRUCTION PROGRESSES.
3. ONCE THE ABOVE STEPS HAVE BEEN COMPLETED, THE COUNTY PROJECT E&S INSPECTOR MUST BE CONTACTED TO INSPECT THE SITE. NO FURTHER CONSTRUCTION ACTIVITY SHALL COMMENCE UNTIL THE COUNTY INSPECTOR HAS PERFORMED THE SITE INSPECTION.

PHASE 2:
1. ONCE ALL E&S CONTROLS HAVE BEEN INSTALLED AND APPROVED BY THE COUNTY INSPECTOR, THE CONTRACTOR SHALL PROCEED TO CLEAR AND GRADE THE REMAINDER OF THE SITE.
2. ALL SILT FENCES AND SUPER SILT FENCES WILL REMAIN WHERE SHOWN ON THE PHASE II PLAN.
3. AS THE PROJECT PROGRESSES, THE CONTRACTOR SHALL TRANSITION THE VARIOUS SECTORS OF THE SITE TO PHASE 2 OF THE EROSION AND SEDIMENT CONTROL PROGRAM. ANY TIME A PORTION OF THE E&S PROGRAM IS PLANNED TO BE REMOVED, THE CONTRACTOR MUST CONTACT THE COUNTY E&S INSPECTOR PRIOR TO REMOVAL.
4. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO MINIMIZE DISTURBANCE OF TRAFFIC AND PEDESTRIAN TRAVEL NEAR THE SITE.
5. AFTER CONSTRUCTION OPERATIONS HAVE ENDED AND ALL DISTURBED AREAS HAVE BEEN STABILIZED WITH VEGETATION, THE EROSION AND SEDIMENT CONTROL MEASURES MAY BE REMOVED UPON THE APPROVAL OF THE COUNTY E&S INSPECTOR.

MAINTENANCE OF CONTROLS:
ALL MEASURES INSTALLED FOR THE CONTROL OF EROSION AND SEDIMENTATION ARE TO BE INSPECTED DAILY BY THE SUPERINTENDENT, AND ANY DAMAGED STRUCTURAL MEASURES ARE TO BE REPAIRED BY THE END OF THE DAY.

VEGETATIVE PRACTICES:

1. TOPSOILING (STOCKPILING) – 3.30
TOPSOIL WILL BE STRIPPED FROM AREAS TO BE GRADED AND STOCKPILED FOR LATER USE, AS NECESSARY, WITH EXCESS TOPSOIL TO BE REMOVED FROM THE SITE. TEMPORARY STOCKPILE LOCATIONS SHALL BE LOCATED ON SITE AND ARE TO BE STABILIZED WITH TEMPORARY VEGETATION.

2. TEMPORARY SEEDING – 3.31
ALL DENUDED AREAS WHICH WILL BE LEFT DORMANT FOR MORE THAN SEVEN DAYS WILL BE SEEDED WITH FAST-GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING. SELECTION OF THE SEED MIXTURE WILL DEPEND ON THE TIME OF YEAR IT IS APPLIED.

PERMANENT STABILIZATION
ALL AREAS DISTURBED BY CONSTRUCTION WILL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISHED GRADING. SEEDING SHALL BE DONE WITH KENTUCKY 31 TALL FESCUE ACCORDING TO STD. & SPEC. 3.32, PERMANENT SEEDING, OF THE HANDBOOK. EROSION CONTROL BLANKETS WILL BE INSTALLED OVER FILL SLOPES WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDED TO PROTECT THE SLOPES FROM RILL AND GULLY EROSION AND TO ALLOW SEED TO GERMINATE PROPERLY. MULCH (STRAW OR FIBER) WILL BE USED ON RELATIVELY FLAT AREAS. IN ALL SEEDING OPERATIONS, SEED, FERTILIZER, AND LIME WILL BE APPLIED PRIOR TO MULCHING. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE MODIFIED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

STRUCTURAL PRACTICES:
1. SILT FENCE – 3.05
SILT FENCE SEDIMENT BARRIERS WILL BE INSTALLED DOWNSLOPE OF AREAS WITH MINIMAL GRADES TO FILTER SEDIMENT-LADEN RUNOFF.

2. INLET PROTECTION – 3.07
ALL STORM INLETS WITH THE POTENTIAL OF RECEIVING SEDIMENT LADEN RUNOFF SHALL RECEIVE INLET PROTECTION AS SHOWN ON THIS PLAN.

3. TREE PRESERVATION AND PROTECTION – 3.38
PROTECTING EXISTING TREES FROM MECHANICAL AND OTHER INJURY DURING LAND-DISTRIBUTING AND CONSTRUCTION ACTIVITY TO ENSURE THE SURVIVAL OF DESIRABLE TREES WHERE THEY WILL BE EFFECTIVE FOR EROSION AND SEDIMENT CONTROL AND PROVIDE OTHER ENVIRONMENTAL AND AESTHETIC BENEFITS.
4. SAFETY FENCE – 3.01
A PROTECTIVE BARRIER INSTALLED TO PREVENT ACCESS TO AN EROSION CONTROL MEASURE.

GENERAL NOTES:

TEMPORARY SEEDING:
1. SELECTION OF PLANTS SHOULD BE BASED ON THE SPECIFIC SITE AND SEASON AND PER VESCH TABLES 3.31-B&C.
2. LIMING REQUIREMENTS SHOULD BE BASED ON TABLE 3.31-A OF THE VESCH.
3. FERTILIZERS SHALL BE APPLIED AS 600 LBS PER ACRE. FERTILIZER SHALL BE INCORPORATED INTO TOP 2-4" OF SOIL.
4. SEED SHALL BE EVENLY APPLIED AND SMALL GRAINS SHALL BE PLANTED NOT MORE THAN 1½" DEEP.
5. SEEDING MADE IN FALL FOR WINTER COVER AND DURING HOT SUMMER SHALL BE APPLIED IN ACCORDANCE WITH STD. 3.30 OF THE VESCH.

PERMANENT SEEDING (IF REQUIRED):
1. PERMANENT VEGETATION COVER MUST MEET THE REQUIREMENTS OF MINIMUM STANDARDS #3 (MS#3) PER VESCH 3.32.
2. PLANT MATERIAL SELECTION SHOULD BE BASED ON TABLES 3.32-A&B DEPENDING ON CLIMATE, TOPOGRAPHY, SOILS AND SITE CONDITIONS.
3. THE PLANTING SOIL MUST HAVE ENOUGH FINE GRAINED SOIL, SUFFICIENT PORE SPACE, SUFFICIENT DEPTH AND FREE FROM TOXIC OR EXCESSIVE QUANTITIES OF ROOTS AND SHALL BE APPILED IN ACCORDANCE WITH STD. 3.30 OF THE VESCH.

DUST CONTROL:
1. PROVISIONS FOR DUST CONTROL SHALL BE MADE IN ACCORDANCE WITH STD. AND SPEC. 3.39 OF THE VESCH.

UTILITY NOTES:
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 FFROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIEMTN 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 THESE REGULATIONS.
F. APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.

STOCKPILING
THE GRADING/EXCAVATION CONTRACTOR FOR THE SUBJECT SITE IS REQUIRED TO NOTIFY, IN WRITING, THE ASSIGNED SITE INSPECTOR REGARDING ANY EXCESS MATERIAL PROPOSED TO BE HAULED OFFSITE PRIOR TO HAULING. THE NOTIFICATION MUST INDICATE THE QUANTITY OF MATERIAL TO BE MOVED OFFSITE, IDENTIFICATION OF THE RECEIVING SITE WHERE THE EXCESS WILL BE TAKEN, AND ALL INFORMATION NECESSARY TO SHOW THAT SUCH RECEIVING SITE HAS BEEN PROPERLY PERMITTED AND HAS E&S CONTROLS INSTALLED

GENERAL LAND CONSERVATION NOTES:

1. NO DISTURBED AREA WHICH IS NOT ACTIVELY BEING WORKED SHALL REMAIN DENUDED FOR MORE THAN 7 CALENDAR DAYS UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR.
2. ALL E&S CONTROL MEASURES APPROVED WITH THE PHASE 1 E&S CONTROL PLAN SHALL BE PLACED AS THE FIRST STEP IN GRADING.
3. ALL STORM AND SANITARY SEWER LINES NOT IN STREETS SHALL BE SEEDED AND MULCHED WITHIN 7 DAYS AFTER BACKFILL. NO MORE THAN 500 FEET SHALL BE OPEN AT ANY ONE TIME.
4. ELECTRIC POWER, TELEPHONE AND GAS SUPPLY TRENCHES SHALL BE COMPACTED, SEEDED AND MULCHED WITHIN 7 DAYS AFTER BACKFILL.
5. ALL TEMPORARY EARTH BERMS, DIVERSIONS AND SEDIMENT CONTROL DAMS SHALL BE SESEDED AND MULCHED FOR TEMPORARY VEGETATIVE COVER IMMEDIATELY (AS SOON AS POSSIBLE BUT NO LATER THAN 48 HOURS) AFTER COMPLETION OF GRADING. STRAW OR HAY MULCH IS REQUIRED. ALL SOIL STOCKPILES SHALL BE SEEDED AND MULCHED WITHIN 7 DAYS AFTER GRADING.
6. DURING CONSTRUCTION, ALL STORM SEWER INLETS SHALL BE PROTECTED BY SEDIMENT TRAPS, MAINTAINED AND MODIFIED DURING CONSTRUCTION PROGRESS AS REQUIRED.
7. ANY DISTURBED AREA NOT COVERED BY ITEM NUMBER 1 ABOVE AND NOT PAVED, SODDED OR BUILT UPON BY NOVEMBER 1, OR DISTURBED AFTER THAT DATE, SHALL BE MULCHED IMMEDIATELY WITH HAY OR STRAW MULCH AT THE RATE OF 2 TONS/ACRE AND OVER-SEEDED BY APRIL 15.
8. AT THE COMPLETION OF ANY PROJECT CONSTRUCTION AND PRIOR TO BOND RELEASE, ALL TEMPORARY SEDIMENT CONTROLS SHALL BE REMOVED AND ALL DENUDED AREAS SHALL BE STABILIZED.
9. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE MODIFIED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBELM IS CORRECTED.

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
EROSION & SEDIMENT CONTROL – DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.31 OF 45	SP-12928

Urban, Ltd – L:\JOBS\UPTON HILL PARK\SP\12928-28-E&S Details.dwg [E&S DETAILS] August 16, 2019 - 11:09am rjafari

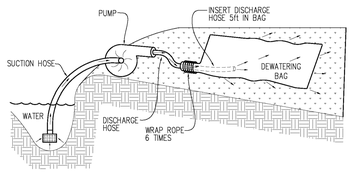
Dewatering Bag Standard Drawing

The purpose of a Dewatering Bag is to collect sediment contained in the discharged water, to prevent the scour and erosion from water exiting a pipe at high velocity, to defuse the water over a wider area to minimize erosion as the water drains away, and to retain all contained within effluent.

A SedCatch® dewatering bag or approved equal should be used anytime water is pumped on the site.

SedCatch® Dewatering Bag *

www.SedCatch.com



Installation and Use:

1. Place SedCatch® Dewatering Bag on the ground or on a trailer over a relatively level, stabilized area.
2. Insert discharge pipe a minimum of 5ft. inside SedCatch® dewatering bag and secure with a rope (included) wrapped 6 times around the snout over a 6 inch width of the bag.
3. Replace SedCatch® Dewatering Bag when half full of sediment or when the sediment has reduced the flow rate of the pump discharge to an impractical amount.

Maintenance and Disposal:

1. Remove and dispose of accumulated sediment away from waterways or environmentally sensitive areas. Slit open Sediment Bag and remove accumulated sediment. Dispose of bag at an appropriate recycling or solid waste facility. OR; as directed by engineer or inspector.

* OR APPROVED EQUAL

CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)

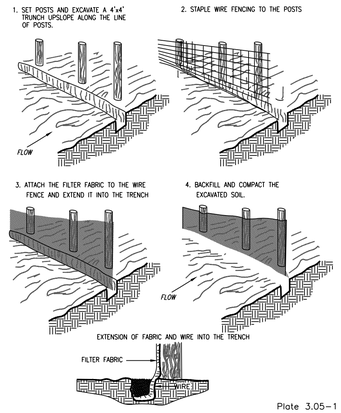
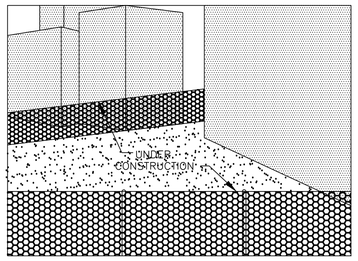
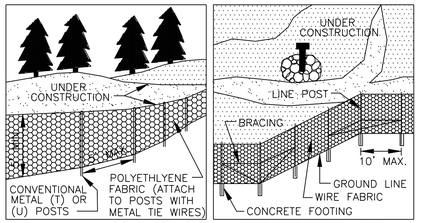


Plate 3.05-1

SAFETY FENCE 3.01-1



PERSPECTIVE VIEW

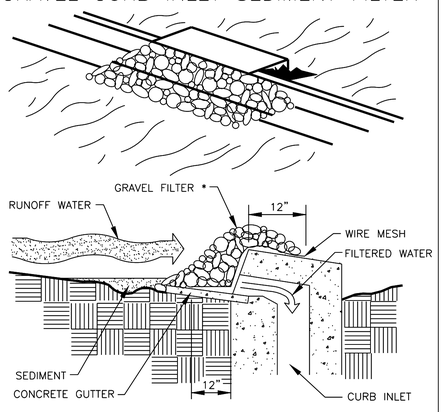


PERSPECTIVE VIEW PLASTIC FENCE

PERSPECTIVE VIEW METAL FENCE

STORM DRAIN INLET PROTECTION 3.07-6

GRAVEL CURB INLET SEDIMENT FILTER



SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE PONDING IN FRONT OF THE STRUCTURE IS NOT LIKELY TO CAUSE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.

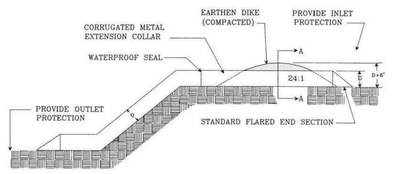
* GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE.

EROSION AND SEDIMENT CONTROL LEGEND

3.01	SAFETY FENCE	SAF
3.02	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
3.05	SILT FENCE	SF
3.07	STORM DRAIN INLET PROTECTION	IP
3.09	TEMPORARY DIVERSION DIKE	DD
	SUPER SILT FENCE	SSF
3.38	TREE PROTECTION	TP
3.18	STORM DRAIN OUTLET PROTECTION	OP
3.20	CHECK DAM	CD

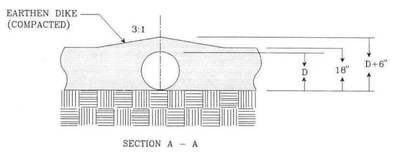
1992 3.15

TEMPORARY SLOPE DRAIN



SECTION VIEW

NOTE: SEDIMENT MAY BE CONTROLLED AT OUTLET IF UPLAND PONDING WILL CREATE PROBLEMS

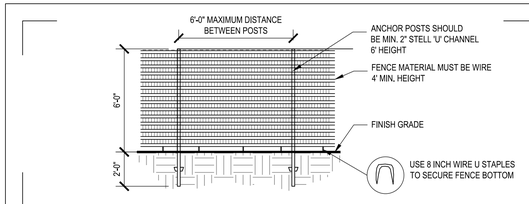


SECTION A – A

Source: Va. DSWC

Plate 3.15-1

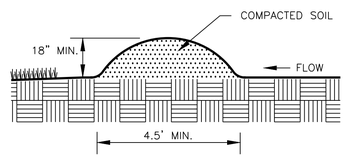
III - 120



TREE PROTECTION FENCE

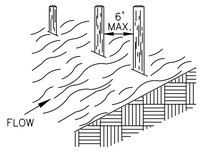
Scale: NTS.

TEMPORARY DIVERSION DIKE 3.09-1

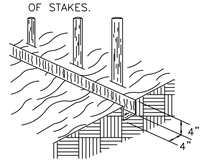


SILT FENCE (WITHOUT WIRE SUPPORT) 3.05-2

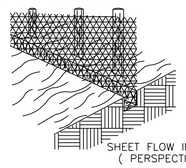
1. SET THE STAKES.



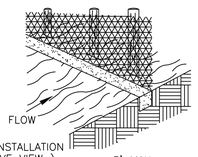
2. EXCAVATE A 4" X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.



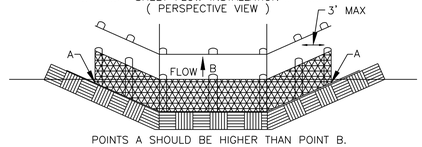
3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.

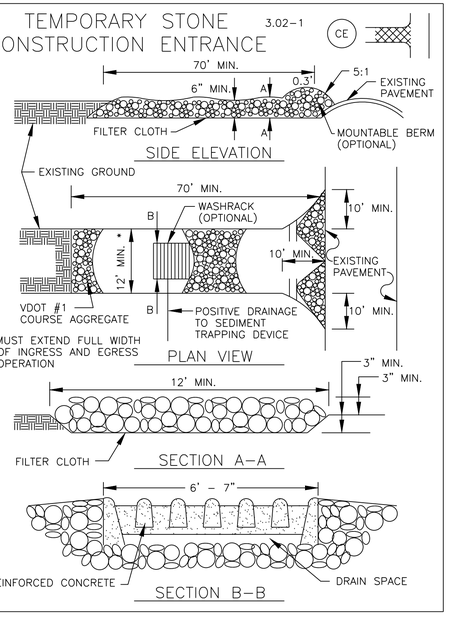


SHEET FLOW INSTALLATION (PERSPECTIVE VIEW)



POINTS A SHOULD BE HIGHER THAN POINT B.
DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

TEMPORARY STONE CONSTRUCTION ENTRANCE 3.02-1



SIDE ELEVATION

* MUST EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION

PLAN VIEW

SECTION A–A

SECTION B–B

No.	DATE	DESCRIPTION

REVISIONS

CLAYTON C. TOCK No. 036790 07/30/19 PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EROSION & SEDIMENT CONTROL – DETAILS
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CIVIL ENGINEERING PLAN
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.32 OF 45 — SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-28-E&S Details.dwg [E&S DETAILS 2] August 16, 2019 – 11:09am rjafari

7/16/18
date

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

Re: Erosion and Sediment Control Permit Application for:

6060 Wilson Blvd, Arlington, VA 222
street address

12-042-103
lot, block, section subdivision

permit number

Dear Mrs. Li:

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

1. Reviewing the erosion and sedimentation (E&S) plan for the project.
2. Walking the site prior to construction to identify critical areas.
3. Conducting a pre-construction briefing with earth moving and site contractors to present the E&S plan and highlight the presence of critical areas, the limits of clearing and the required E&S controls and tree protection measures to be installed. Call 703-228-0760 to schedule pre-construction meeting.
4. Regularily inspecting the site during construction to ensure that all E&S controls are functioning and are adequate to address erosion and sedimentation. Inspect the site 48 hours after a runoff-generating storm, and provide a copy of the inspection findings to the county.
5. Reporting to the owner the presence inadequate or non functioning E&S controls when they are observed.
6. Ensuring that temporary soil stabilization is applied within 7 days to areas denuded that will remain undisturbed for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
7. Calling (703) 228-0760 at least 80 hours before demolishing any structure.

I may be reached at 703-359-4621 with questions about this plan or my execution of the duties of
telephone number
Responsible Land Disturber.

Sincerely,

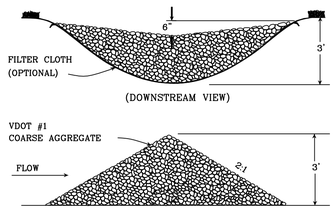
signed

Brian Nolan
name printed

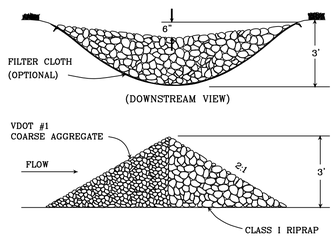
LA# 0406001437
professional registration (type and number)

ROCK CHECK DAM

2 ACRES OR LESS OF DRAINAGE AREA:



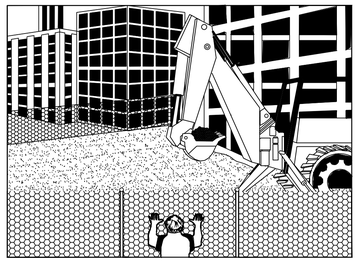
2-10 ACRES OF DRAINAGE AREA:



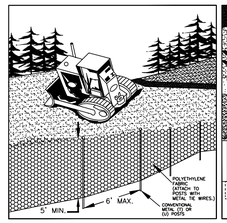
SOURCE: VA. DSWC

PLATE. 3.20-1

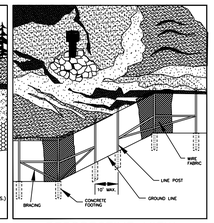
SAFETY FENCE



PERSPECTIVE VIEW



PERSPECTIVE VIEW
PLASTIC FENCE



PERSPECTIVE VIEW
METAL FENCE

SOURCE: CONWED PLASTICS
VDOT ROAD AND BRIDGE STANDARDS
VA. DSWC

PLATE. 3.1-1

SEEDING SPECIFICATION AS SPECIFIED IN DEQ TECHNICIAL BULLETIN NO. 4

1992 3.32

TABLE 3.32-D

SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

	Total Lbs. Per Acre
Minimum Care Lawn	
- Commercial or Residential	
- Kentucky 31 or Turf-Type Tall Fescue	175-200 lbs.
or	
- Common Bermudagrass **	75 lbs.
High-Maintenance Lawn	
- Kentucky 31 or Turf-Type Tall Fescue	200-250 lbs.
or	
- Hybrid Bermudagrass (seed) **	40 lbs. (unhulled)
or	30 lbs. (hulled)
- Hybrid Bermudagrass (by other vegetative establishment method, see Std. & Spec. 3.34)	
General Slope (3:1 or less)	
- Kentucky 31 Fescue	128 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
	150 lbs.
Low Maintenance Slope (Steeper than 3:1)	
- Kentucky 31 Tall Fescue	93-108 lbs.
- Common Bermudagrass **	0-15 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
- Sericea Lespedeza **	20 lbs.
	150 lbs.

* Use seasonal nurse crop in accordance with seeding dates as stated below:
February, March through April ..... Annual Rye
May 1st through August ..... Foxtail Millet
September, October through November 15th ..... Annual Rye
November 16th through January ..... Winter Rye

** May through October, use hulled seed. All other seeding periods, use unhulled seed. Weeping Lovegrass may be added to any slope or low-maintenance mix during warmer seeding periods; add 10-20 lbs./acre in mixes.

Areas which fail to establish vegetative cover adequate to prevent rill erosion will be re-seeded as soon as such areas are identified.

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 (Lolium multi-florum) & Cereal (Winter) Rye (Secale cereale)	50 - 100
Feb. 16 - Apr. 30	Annual Ryegrass (Lolium multi-florum)	60 - 100
May 1 - Aug 31	German Millet (Setaria italica)	50

Source: Va. DSWC

12" STANDARD SIGN DIMENSION

18" STANDARD SIGN DIMENSION

NO
ENTRY
TREE
PRESERVATION
AREA
CALL: xxx-xxx-xxx
TO REPORT VIOLATIONS

PROHIBIDO ENTRAR
ZONA DE PROTECTION DEL ARBOL
LLAMAR AL TEL. xxx-xxx-xxxx
PARA REPORTAR INFRACCIONES

TYPICAL SIGNAGE FOR TREE PRESERVATION AREA

TREE PRESERVATION SIGNAGE NOTE:
SIGNS SHALL BE POSTED AT THE LIMITS OF CLEARING AT A MINIMUM OF 50-FOOT INTERVALS ALONG THE TREE PROTECTION FENCING. ALTERNATE SIGNAGE MAY BE USED ONLY AT THE APPROVAL OF THE DIRECTOR.

1992

TABLE 6-1

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 Virginia Regulations 4VAC50-30 Erosion and Sediment Control Regulations.

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.

VI - 15

Pre-Storm Erosion and Sediment Control Checklist

Per Erosion and Sediment Control General Note 6, the Contractor is responsible for the installation and maintenance of any additional erosion and sediment control (ESC) measures necessary to prevent erosion and sedimentation as determined by the County. These supplementary practices are in addition to those shown in an ESC plan. ESC practices shall be modified as needed to ensure only clear water is discharged from the site.

The following actions shall be taken prior to storm events with predicted heavy and/or large volume rainfall to prevent sediment discharges from a construction site. A typical summer thunderstorm is an example of a storm event with predicted heavy and/or large volume rainfall.

Perimeter controls

- ☒ Silt fence shall be checked for undermining, holes, or deterioration of the fabric. Fencing shall be replaced immediately if the fabric is damaged or worn. Silt fence must be trenched into the ground per state specifications (Std & Spec 3.09).
- ☒ Wooden stakes or steel posts shall be properly secured upright into the ground. Damaged posts or stakes must be replaced.
- ☒ Sediment that has accumulated against the silt fence should be removed. Accumulated sediment must be removed when the level reaches one-half the height of the fencing.
- ☒ Hay bales or a stone berm should be placed across the construction entrance to prevent sediment from leaving the construction site.

Exposed slopes and soil

- ☒ Exposed slopes not at the final stabilization phase shall be covered with tarps, plastic sheeting, or erosion control matting. Covering material shall be properly secured/anchored.
- ☒ Controls shall be installed to prevent concentrated flow down an exposed slope. Berms or diversion dikes shall be installed at the top of cut / exposed slopes to direct storm flow around the disturbed area.
- ☒ Exposed slopes at the final stabilization phase shall be stabilized using slope stabilization practices such as soil stabilization blankets or matting as specified in the Virginia Erosion and Sediment Control Handbook (VESCH) Std & Spec 3.36. Blankets or mats must be properly secured and anchored to the slope using staples, pins, or stakes.
- ☒ Seeded areas shall be checked and reseeded as necessary to cover exposed soil. Recently seeded areas shall be protected by straw or soil stabilization blankets to prevent seeding from being washed away.

Stockpiles

- ☒ Stockpiled soil and other loose materials that can be washed away shall be covered with a tarp, plastic sheeting, or other stabilization matting. The cover must be properly secured / anchored down to prevent it from being blown off and exposing materials to rain. Controls such as hay bales or booms should be placed along the perimeter of the stock pile (downhill side).

Inlet protection

- ☒ Inlet protection controls shall be inspected to ensure they are functioning properly and flooding will not occur. Clogged or damaged controls must be replaced immediately. Ensure controls allow for overflow / bypass of stormwater runoff during significant storm events.

In addition to these pre-storm actions, all erosion and sediment control (ESC) measures must be checked daily and after each significant rainfall.

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
No. 036790
07/30/19
PROFESSIONAL ENGINEER

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Chantilly Va. 20151
(703)-642-2306
(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EROSION & SEDIMENT CONTROL - DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	-	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
09-28-18	-		
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
		SHEET C.33 OF 45	SP-12928

Urban, Ltd. - z:\JOBS\UPTON HILL PARK\SP\12928-28-E&S Details.dwg [E&S DETAILS 3] August 16, 2019 - 11:09am rjafari

THIS SHEET INTENTIONALLY LEFT BLANK

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

SIGHT DISTANCE PROFILE

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD. ARLINGTON, VIRGINIA 22205

SCALE: AS SHOWN	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.34 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-31-SIGHT D.dwg [Layout1] August 16, 2019 - 11:09am rpfori

PAVEMENT DETAILS

N.T.S.

LIGHT DUTY PAVING PARKING LOTS

- 1 1/2" BITUM. CONC. SURFACE (VDOT SPEC. SM-9.5A)
- 3" BITUM. CONC. BASE (VDOT SPEC. BM-25.0)
- 6" COMPACTED AGGR. SUBBASE (VDOT SPEC. 209, 21-A GRAD.)
- * COMPACTED SUBGRADE (SEE NOTE THIS SHEET)

HEAVY DUTY PAVING

- 2" BITUM. CONC. SURFACE (VDOT SPEC. SM-9.5A)
- 3" BITUM. CONC. BASE (VDOT SPEC. BM-25.0)
- 8" COMPACTED AGGR. SUBBASE (VDOT SPEC. 209, 21-A GRAD.)
- * COMPACTED SUBGRADE (SEE NOTE THIS SHEET)

MILL AND OVERLAY AREA

SEE WP-2 DETAIL ON SHEET C.03

PERMEABLE PAVERS

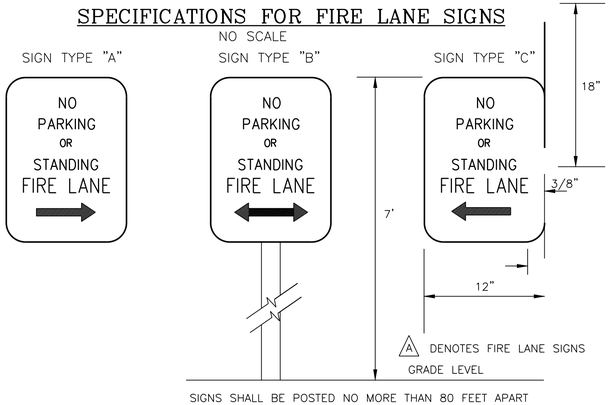
SEE DESIGN & DETAILS ON SHEET C.22

NOTE:

PAVEMENT SECTION IS BASED ON AN ASSUMED CBR VALUE OF 10. ACTUAL CBR VALUES SHALL BE FORWARDED TO URBAN ENGINEERING TO VERIFY THE PROPOSED PAVEMENT SECTION.

SPECIFICATIONS FOR FIRE LANE SIGNS

NO SCALE



SIGNS SHALL BE POSTED NO MORE THAN 80 FEET APART

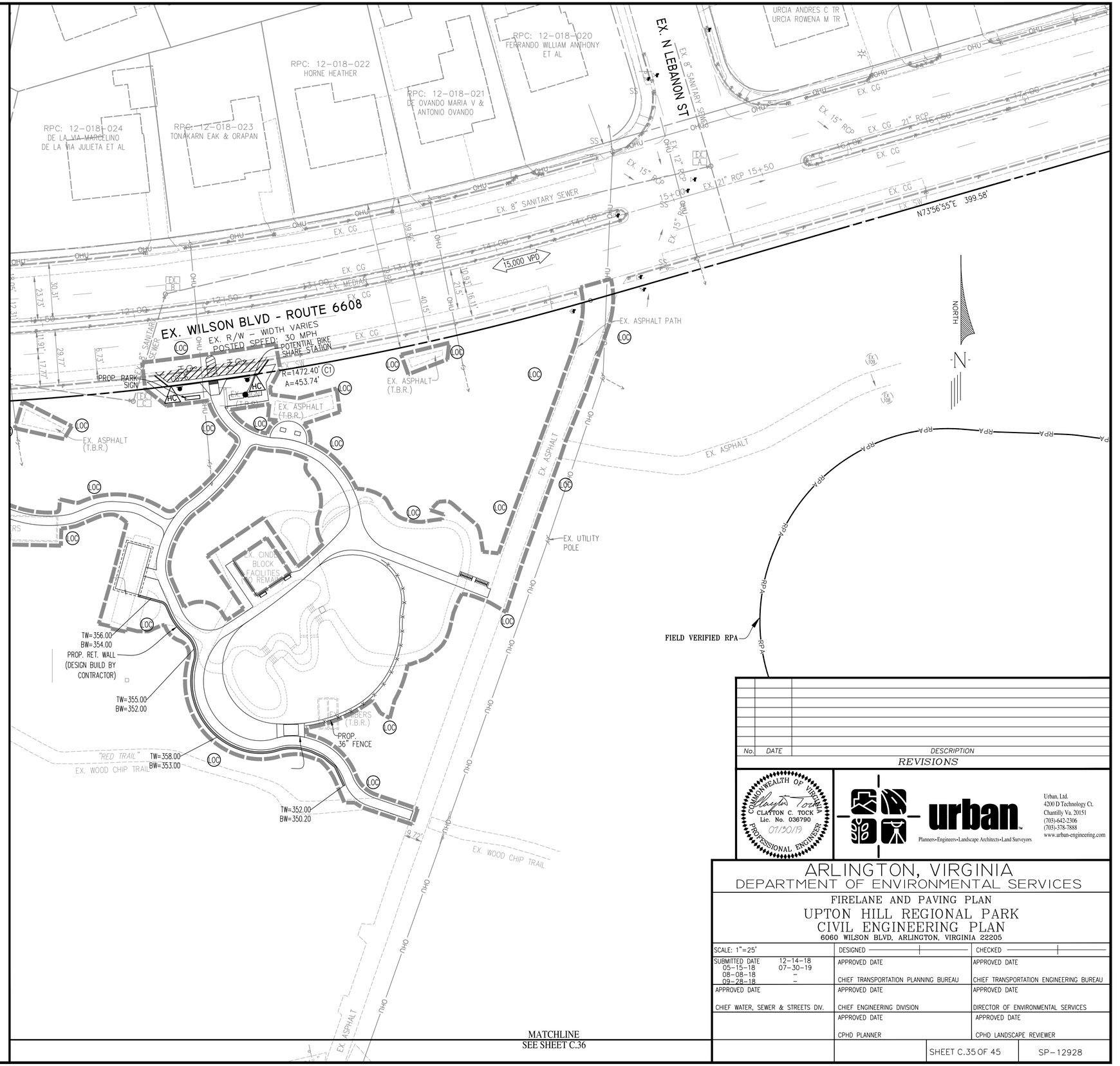
NOTES:

SIGN DIMENSIONS - 12" x 18"
3/8" RED TRIM NEAR OUTSIDE BORDER
LETTERING : RED ON WHITE BACKGROUND
"NO PARKING", "STANDING" - 2"HIGH

"FIRE LANE" - 2 1/2" HIGH
ARROWS - 1" HIGH SOLID LINE
POST (IF USED) - WOOD (4"x4"TREATED)
OR METAL CONSTRUCTION

LEGEND

- C FIRE LANE DESIGNATION SIGN (DETAILS THIS SHEET)
- CONCRETE PAD
- HEAVY DUTY ASPHALT PAVEMENT
- LIGHT DUTY ASPHALT PAVEMENT
- MILL AND OVERLAY AREA



MATCHLINE
SEE SHEET C.36

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

FIRELANE AND PAVING PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 - 09-28-18 -	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.35 OF 45	SP-12928

Urban, Ltd. - J:_JOBS\UPTON HILL PARK\SP\12928_30-FIREPAVE.dwg [FIREPAVE] August 16, 2019 - 11:09am rpfori

MATCHLINE
SEE SHEET C.35

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

PIN: 0514-01-0001
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

RPC: 12-042-106
SAINT ALBANS HOUSING
HARTLAND BANK
DB. 3860 PG. 1232

STEPS
EX. TIMBERS
35.09'
EM
CONTRACTOR TO NOSE DOWN CURB
EX. ASPHALT
EP
PROP. TICKET BOOTH
PROP. WOODEN DECK
PROP. BLD FF=409.50
PROP. CANOPY
PROP. ROPES COURSE
"YELLOW TRAIL"
EX. WOOD CHIP TRAIL
OHU
2.92'
AREA OF MILLING/PAVING/STRIPING CONSIDERED MAINTENANCE AND NOT DISTURBED AREA
PROP. 8' SW
PROP. 5' SW
EX. EDGE OF ASPHALT
ARLINGTON COUNTY (APPROXIMATE)
FAIRFAX COUNTY (APPROXIMATE)
PROP WHEEL STOP (TYP.)
EX. ASPHALT PARKING AREA
PROP. LIGHTS (TYP.)
EX. WOOD DECK
EX. BUILDING
EX. 8" PVC PIPE
PROP. 42.8' 8" PVC
EX. SAN TOP TO BE RAISED TO PROPOSED ELEVATION (SEE SHEET C.03A FOR DETAIL)
CONCRETE SIDEWALK
APPROX. LOCATION OF EX. 6" PVC SANITARY
SANITARY SEWER
EX.
N19°22'01"E 431.59'
10'14.14" (TOTAL)
N45°57'40"W 440.71'
S19°22'20"W 48.64'
247.71'
296.35' (TOTAL)

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

FIRELANE AND PAVING PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18 07-30-19 - -	APPROVED DATE	APPROVED DATE
05-15-18 08-08-18 09-28-18		CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
		SHEET C.36 OF 45	SP-12928

Urban, Ltd. – L:\JOBS\UPTON HILL PARK\SP\12928-30-FIREPAVE.dwg [FIREPAVE2] August 16, 2019 – 11:09am rjvlori

EX. PATRICK HENRY DR

EX. N LEBANON ST

EX. N. LIVINGSTON ST
EX. R/W

EX. WILSON BLVD - ROUTE 6608
EX. R/W – WIDTH VARIES
POSTED SPEED: 30 MPH
POTENTIAL BIKE SHARE STATION

RPC: 12-018-001
AGER LUCAS &
AGER LISA

RPC: 12-018-022
HORNE HEATHER

RPC: 12-018-020
FERRANDO WILLIAM ANTHONY ET AL

RPC: 12-018-021
DE OVANDO MARIA V & ANTONIO OVANDO

RPC: 12-018-024
DE LA VIA MARCELINO
DE LA VIA JULIETA ET AL

RPC: 12-018-023
TONAKARN EAK & ORAPAN

RPC: 12-019-012
DOMINION HILLS LLC
ATTN DAVID B KLIMA

RPC: 12-019-001
URCIA ANDRES C TR
URCIA ROWENA M TR

RPC: 12-041-026
ARLINGTON COMMUNITY CHURCH

RPC: 12-042-066
COMMONWEALTH OF VIRGINIA

RPC: 12-042-061
NORTHERN VA REGIONAL PARK AUTHORITY

RPC: 12-042-103
NORTHERN VA REGIONAL PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

PROP. ENTRY SIGN(TYP.)

PROP. PARK SIGN

EX. WOOD STEPS

EX. TIMBERS (T.B.R.)

EX. WOOD CHIP TRAIL

EX. ASPHALT (T.B.R.)

EX. PLAYGROUND AREA (T.B.R.)

EX. CINDER BLOCK FACILITIES TO REMAIN

EX. MEMORIAL STONE

PROP. 6' FENCE

EX. UTILITY POLE

EX. 8" SANITARY SEWER

EX. CG

EX. MEDIAN

EX. 15" RCP

EX. 21" RCP

EX. 12" CMP

EX. 18" RCP

EX. 24" RCP

OHU

SS

CP

FH

FC

LP

N73°56'55"E 399.58

R=1472.40' (C1)
A=453.74'

FIELD VERIFIED RPA

RPA

NUMEROUS 10"-14" (TOTAL) 580.54'

"RED TRAIL"

"YELLOW TRAIL"

MATCHLINE
SEE SHEET C.38

TREE PRESERVATION LEGEND

000	EXISTING TREE NUMBER
○	CRITICAL ROOT ZONE OF EXISTING TREE TO REMAIN
✕	CRITICAL ROOT ZONE OF EXISTING TREE TO BE REMOVED
—□—	TREE PROTECTION FENCE
—//—	ROOT PRUNING AND TREE PROTECTION FENCE

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
John Lightle
Lic. No. 1957
07/30/19
LANDSCAPE ARCHITECT

urban
Planners•Engineers•Landscape Architects•Land Surveyors
Urban, Ltd.
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Chantilly Va. 20151
(703)-642-2306
(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

TREE PRESERVATION PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=30'		DESIGNED	CHECKED
SUBMITTED DATE	10-11-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–		
09-28-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER

SHEET C.37 OF 45 | SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-07-TREE PRES (LANDSCAPE.dwg [TREE REMOVAL – NORTH] August 16, 2019 – 11:08am rjplpr

MATCHLINE
SEE SHEET C.37

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

EX. BATTING CAGE
EX. ASPHALT
EX. TIMBERS
EX. CHAIN LINK FENCE
EX. SHED
PROP. TICKET BOOTH
PROP. WOODEN DECK
PROP. BLD FF=409.50
PROP. ROPES COURSE
EX. EXERCISE AREA (B.R.)
PROP. BENCH (TYP.)
PROP. 8' SW
CONCRETE WALK
EX. 8' CHAIN LINK
PROP. 5' SW
EX. ASPHALT PARKING AREA
PROP. LIGHTS (TYP.)
PROP. WHEEL STOP
EX. MINI GOLF
EX. WATER PARK / EX. WOOD DECK
EX. BUILDING
EX. SPLIT RAIL FENCE
CONCRETE PAD
EX. GRILL
EX. PICNIC TABLE
EX. WOOD CHIP TRAIL
"YELLOW TRAIL"
EX. PVC PIPE
EX. 8" SANITARY SEWER
EX. 6" CHAIN LINK WITH BARBED WIRE
OHU
EM
STEPS
ARLINGTON COUNTY / FAIRFAX COUNTY (APPROXIMATE)
2:1 SLOPE
3:1 SLOPE
+416
410
400

AREA OF MILLING/PAVING/STRIPING CONSIDERED MAINTENANCE AND NOT DISTURBED AREA
PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

N19°22'01"E 1014.14' (TOTAL)
431.59'

N45°57'40"W
440.11'

TREE PRESERVATION NOTE

TREE PRESERVATION MEASURES SHALL BE IMPLEMENTED AROUND EXISTING TREES 443, 444, 445 AND 446. BEFORE AND DURING CONSTRUCTION, REASONABLE ATTEMPTS SHALL BE TAKEN TO PRESERVE THESE TREES. MONITORING OF THESE TREES BY A CERTIFIED ARBORIST IS RECOMMENDED DURING AND IMMEDIATELY FOLLOWING CONSTRUCTION. NO CREDIT FOR PRESERVATION HAS BEEN TAKEN FOR THESE TREES AND REPLACEMENT TREES ARE PROPOSED WITH THIS APPLICATION.

PIN: 0514-01-0001
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

RPC: 12-042-106
SAINT ALBANS HOUSING
HARTLAND BANK
DB. 3860 PG. 1232

PIN: 0514 01 0333B
SAINT ALBANS HOUSING CORP,
DB. 17445 PG. 0778

S19°22'20"W 48.64'
S19°22'20"W 247.71'
S19°22'20"W 286.35' (TOTAL)
N70°03'10"W 523.62'

N MADISON ST.

TREE PRESERVATION LEGEND

000	EXISTING TREE NUMBER
○	CRITICAL ROOT ZONE OF EXISTING TREE TO REMAIN
✕	CRITICAL ROOT ZONE OF EXISTING TREE TO BE REMOVED
—o—	TREE PROTECTION FENCE
—//—	ROOT PRUNING AND TREE PROTECTION FENCE

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
John Lightle
Lic. No. 1957
07/30/19
LANDSCAPE ARCHITECT

urban
Planners•Engineers•Landscape Architects•Land Surveyors
Urban, Ltd.
4200 D Technology Ct.
Chantilly Va. 20151
(703)-642-2306
(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

TREE PRESERVATION PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=30'		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
09-28-18	–		
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER
		SHEET C.38 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-07-TREE PRES LANDSCAPE.dwg [TREE REMOVAL – SOUTH] August 16, 2019 – 11:10am rpferi

TREE INVENTORY & REPLACEMENT NOTES

1. TREE REPLACEMENT SCORE FORMULA (PER ARLINGTON COUNTY LANDSCAPE STANDARDS PART 4, "REPLACEMENT GUIDELINES", SECTION 5) MULTIPLIES TREE SIZE (DBH), CONDITION RATING, AND SPECIES RATING.

2. CONDITION RATINGS ASSIGNED THROUGH ON-SITE EVALUATION BY URBAN, LTD.'S ISA CERTIFIED ARBORIST, IN ACCORDANCE WITH ISA CONDITION RATING GUIDELINES.

3. SPECIES RATINGS ADAPTED FROM THE "MID-ATLANTIC TREE SPECIES RATING GUIDE" BY MID-ATLANTIC CHAPTER OF INTERNATIONAL SOCIETY OF ARBORICULTURE, 2007 EDITION.

4. EXISTING TREES PROPOSED TO BE PRESERVED SHALL BE REVIEWED IN FIELD AT TIME OF CONSTRUCTION. ANY EXISTING TREES DEEMED "HAZARDOUS" BY ARLINGTON COUNTY URBAN FORESTER OF PROJECT ARBORIST SHALL BE REMOVED AND BE REPLACEMENT TREE(S) SHALL BE INSTALLED ON SITE.

TREE REMOVAL INVENTORY & REPLACEMENT CALCULATIONS

TREE NO.	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS	CONDITION RATING	SPECIES RATING	REPLACEMENT SCORE	QTY. OF TREE REPLACEMENTS
			DBH (in)		(Decimal)	(Decimal)		
117	*Robinia pseudoacacia*	Black Locust	7"	dead	0.0000			0
167	*Robinia pseudoacacia*	Black Locust	7"	dead	0.0000			0
168	*Robinia pseudoacacia*	Black Locust	6"	dead	0.0000			0
169	*Robinia pseudoacacia*	Black Locust	6"	dead	0.0000			0
215	*Cuppressus x leylandii*	Leyland Cypress	5"					1
216	*Cuppressus x leylandii*	Leyland Cypress	6"					1
217	*Cuppressus x leylandii*	Leyland Cypress	5"					1
218	*Cuppressus x leylandii*	Leyland Cypress	6"					1
219	*Cuppressus x leylandii*	Leyland Cypress	5"					1
220	*Cuppressus x leylandii*	Leyland Cypress	6"					1
221	*Cuppressus x leylandii*	Leyland Cypress	7"					1
222	*Cuppressus x leylandii*	Leyland Cypress	6"					1
223	*Cuppressus x leylandii*	Leyland Cypress	6"					1
224	*Cuppressus x leylandii*	Leyland Cypress	7"					1
225	*Cuppressus x leylandii*	Leyland Cypress	8"					1
226	*Cuppressus x leylandii*	Leyland Cypress	7"					1
227	*Cuppressus x leylandii*	Leyland Cypress	6"					1
228	*Cuppressus x leylandii*	Leyland Cypress	7"					1
229	*Cuppressus x leylandii*	Leyland Cypress	8"	overhead electric line				1
230	*Cuppressus x leylandii*	Leyland Cypress	7"	overhead electric line				1
231	*Cuppressus x leylandii*	Leyland Cypress	9"	overhead electric line				1
232	*Cuppressus x leylandii*	Leyland Cypress	8"	overhead electric line				1
233	*Cuppressus x leylandii*	Leyland Cypress	8"	overhead electric line				1
441	*Quercus rubra*	N. Red Oak	7"					1
442	*Quercus rubra*	N. Red Oak	6"					1
443	*Quercus rubra*	N. Red Oak	15"		0.5313	0.7500	5.9771	2
444	*Quercus rubra*	N. Red Oak	13"	co-dominant trunk	0.5938	0.7500	5.7896	2
445	*Quercus rubra*	N. Red Oak	11"		0.5625	0.7500	4.6406	1
446	*Quercus rubra*	N. Red Oak	12"		0.5938	0.7500	5.3442	2
447	*Quercus rubra*	N. Red Oak	14"		0.6250	0.7500	6.5625	2
448	*Taxodium distichum*	Bald Cypress	7"					1
449	*Taxodium distichum*	Bald Cypress	12"	co-dominant trunk	0.6250	0.8250	6.1875	2
450	*Taxodium distichum*	Bald Cypress	14"		0.7188	0.8250	8.3021	2
451	*Taxodium distichum*	Bald Cypress	6"					1
875	*Taxodium distichum*	Bald Cypress	10"					1
1286	*Quercus rubra*	N. Red Oak	12"	co-dominant trunk	0.5818	0.7500	5.2362	2
1287	*Quercus rubra*	N. Red Oak	13"	co-dominant trunk	0.4688	0.7500	4.5708	1
1446	*Acer rubrum*	Red Maple	10"					1
1446-A	*Acer rubrum*	Red Maple	12"	root girdling	0.6250	0.7000	5.2500	2
1446-B	*Acer rubrum*	Red Maple	10"	co-dominant trunk				1
1620	*Pyrus calleryana*	Callery Pear	49"	multistem	0.5818	0.5000	14.2541	3
1710	*Robinia pseudoacacia*	Black Locust	14"		0.5000	0.5500	3.8500	1
1711	*Robinia pseudoacacia*	Black Locust	13"		0.5625	0.5500	4.0219	1
1711-A	*Robinia pseudoacacia*	Black Locust	17"	decay, in decline	0.3438	0.5500	3.2145	1
1725	*Ulmus pumila*	Siberian Elm	13"	co-dominant trunk	0.6563	0.3500	2.9862	1
1726	*Ulmus pumila*	Siberian Elm	14"	co-dominant trunk	0.6250	0.3500	3.0625	1
1788	*Robinia pseudoacacia*	Black Locust	25"		0.4688	0.5500	6.4460	2
1789	*Robinia pseudoacacia*	Black Locust	12"	co-dominant trunk	0.4375	0.5500	2.8875	1
1790	*Robinia pseudoacacia*	Black Locust	17"		0.4688	0.5500	4.3833	1
1791	*Robinia pseudoacacia*	Black Locust	14"		0.5313	0.5500	4.0910	1
2217	*Robinia pseudoacacia*	Black Locust	15"	exposed roots, co-dominant trunk split	0.4063	0.5500	3.3520	1
2680-A	*Gleditsia triacanthos*	Honey Locust	26"	in decline	0.4063	0.5500	5.8101	2
2659	*Ulmus pumila*	Siberian Elm	15"	dead	0.0000			0
3090	*Tilia cordata*	Littleleaf Linden	15"		0.6250	0.7250	6.7969	2
3092	*Quercus rubra*	N. Red Oak	15"		0.5313	0.7000	5.5787	2
3097	*Acer rubrum*	Red Maple	13"		0.5938	0.7000	5.4036	2
3098	*Acer saccharum*	Sugar Maple	16"		0.6563	0.7500	7.8756	2
3099	*Acer rubrum*	Red Maple	24"		0.7188	0.7000	12.0758	3
3225	*Robinia pseudoacacia*	Black Locust	13"		0.3750	0.5500	2.6813	1
3225-A	*Magnolia grandiflora*	Southern Magnolia	7"					1
3455	*Quercus rubra*	N. Red Oak	26"	dead, co-dominant trunk	0.0000			0
3477	*Robinia pseudoacacia*	Black Locust	13"	dead	0.0000			0
3479	*Robinia pseudoacacia*	Black Locust	15"	dead	0.0000			0
3516	*Robinia pseudoacacia*	Black Locust	16"	trunk broken off	0.0000			0
						TOTAL QTY. OF REQUIRED TREE REPLACEMENTS		73

TREE PRESERVATION INVENTORY

TREE NO.	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
			DBH (in)	
100	*Robinia pseudoacacia*	Black Locust	10"	trunk broken off
101	*Quercus rubra*	N. Red Oak	4"	
102	*Robinia pseudoacacia*	Black Locust	8"	in decline
103	*Prunus serotina*	Black Cherry	7"	dead
104	*Robinia pseudoacacia*	Black Locust	7"	dead
105	*Robinia pseudoacacia*	Black Locust	9"	
106	*Liriodendron tulipifera*	Tulip Poplar	6"	
107	*Quercus alba*	White Oak	8"	
108	*Acer rubrum*	Red Maple	4"	
109	*Robinia pseudoacacia*	Black Locust	9"	dead
110	*Liriodendron tulipifera*	Tulip Poplar	10"	crooked trunk
111	*Robinia pseudoacacia*	Black Locust	8"	dead
112	*Quercus rubra*	N. Red Oak	8"	crooked trunk
113	*Quercus rubra*	N. Red Oak	5"	
114	*Robinia pseudoacacia*	Black Locust	11"	in decline, leaning
115	*Acer rubrum*	Red Maple	10"	co-dominant trunk
116	*Robinia pseudoacacia*	Black Locust	8"	dead
118	*Robinia pseudoacacia*	Black Locust	7"	in decline, crooked trunk
119	*Carya glabra*	Pignut Hickory	6"	
120	*Robinia pseudoacacia*	Black Locust	8"	decay
121	*Robinia pseudoacacia*	Black Locust	11"	dead, co-dominant trunk
122	*Robinia pseudoacacia*	Black Locust	7"	leaning, dead
123	*Robinia pseudoacacia*	Black Locust	7"	dead
124	*Robinia pseudoacacia*	Black Cherry	6"	witches broom
125	*Robinia pseudoacacia*	Black Locust	7"	dead, leaning
126	*Quercus rubra*	N. Red Oak	10"	
127	*Liriodendron tulipifera*	Tulip Poplar	11"	trunk intertwined w/ 3721
128	*Robinia pseudoacacia*	Black Locust	7"	leaning on 3721, dead
129	*Quercus alba*	White Oak	10"	
130	*Prunus serotina*	Black Cherry	9"	crooked trunk
131	*Carya sp.*	Hickory	10"	trunk broken off
132	*Robinia pseudoacacia*	Black Locust	6"	leaning, dead
133	*unknown*	unknown	6"	in decline
134	*Robinia pseudoacacia*	Black Locust	8"	dead
135	*Acer rubrum*	Red Maple	7"	trunk broken off
136	*Robinia pseudoacacia*	Black Locust	4"	dead
137	*Prunus serotina*	Black cherry	8"	crooked trunk, excessively limbed
138	*Robinia pseudoacacia*	Black Locust	8"	dead
139	*Quercus alba*	White Oak	11"	co-dominant trunk
140	*Quercus montana*	Chestnut Oak	5"	
141	*Quercus montana*	Chestnut Oak	6"	
142	*Quercus montana*	Chestnut Oak	3"	
143	*Sassafras albidum*	Sassafrass	6"	
144	*Robinia pseudoacacia*	Black Locust	7"	dead
145	*Acer rubrum*	Red Maple	5"	
146	*Robinia pseudoacacia*	Black Locust	15"	twin trunk, dead
147	*unknown*	unknown	5"	
148	*Robinia pseudoacacia*	Black Locust	10"	twin trunk, dead
149	*Robinia pseudoacacia*	Black Locust	7"	dead
150	*Acer rubrum*	Red Maple	9"	one sided
151	*Robinia pseudoacacia*	Black Locust	8"	leaning, dead
152	*Prunus serotina*	Black Cherry	6"	leaning
153	*Prunus serotina*	Black Cherry	10"	
154	*Carya glabra*	Pignut Hickory	5"	
155	*Robinia pseudoacacia*	Black Locust	10"	leaning, in decline
156	*Robinia pseudoacacia*	Black Locust	12"	leaning, in decline
157	*Robinia pseudoacacia*	Black Locust	7"	dead
158	*Prunus serotina*	Black Cherry	9"	leaning
159	*Robinia pseudoacacia*	Black Locust	10"	dead
160	*Robinia pseudoacacia*	Black Locust	9"	In decline, decay
161	*Quercus alba*	White Oak	7"	
162	*Quercus alba*	White Oak	4"	
163	*Quercus alba*	White Oak	7"	
164	*Robinia pseudoacacia*	Black Locust	8"	dead
165	*Robinia pseudoacacia*	Black Locust	8"	dead
166	*Robinia pseudoacacia*	Black Locust	7"	dead
170	*Cuppressus x leylandii*	Leyland Cypress	7"	
171	*Cuppressus x leylandii*	Leyland Cypress	8"	
172	*Cuppressus x leylandii*	Leyland Cypress	7"	
173	*Cuppressus x leylandii*	Leyland Cypress	9"	
174	*Cuppressus x leylandii*	Leyland Cypress	8"	
175	*Cuppressus x leylandii*	Leyland Cypress	6"	
176	*Cuppressus x leylandii*	Leyland Cypress	7"	
177	*Cuppressus x leylandii*	Leyland Cypress	6"	
178	*Cuppressus x leylandii*	Leyland Cypress	5"	
179	*Cuppressus x leylandii*	Leyland Cypress	4"	
180	*Cuppressus x leylandii*	Leyland Cypress	6"	
181	*Cuppressus x leylandii*	Leyland Cypress	6"	
182	*Cuppressus x leylandii*	Leyland Cypress	4"	
183	*Cuppressus x leylandii*	Leyland Cypress	6"	
184	*Cuppressus x leylandii*	Leyland Cypress	6"	
185	*Cuppressus x leylandii*	Leyland Cypress	4"	
186	*Cuppressus x leylandii*	Leyland Cypress	6"	
187	*Cuppressus x leylandii*	Leyland Cypress	6"	
188	*Cuppressus x leylandii*	Leyland Cypress	6"	
189	*Cuppressus x leylandii*	Leyland Cypress	6"	
190	*Cuppressus x leylandii*	Leyland Cypress	6"	
191	*Cuppressus x leylandii*	Leyland Cypress	6"	
192	*Cuppressus x leylandii*	Leyland Cypress	6"	
193	*Cuppressus x leylandii*	Leyland Cypress	6"	
194	*Cuppressus x leylandii*	Leyland Cypress	6"	
195	*Cuppressus x leylandii*	Leyland Cypress	4"	
196	*Cuppressus x leylandii*	Leyland Cypress	5"	
197	*Cuppressus x leylandii*	Leyland Cypress	6"	
198	*Cuppressus x leylandii*	Leyland Cypress	6"	
199	*Cuppressus x leylandii*	Leyland Cypress	6"	
200	*Cuppressus x leylandii*	Leyland Cypress	6"	
201	*Cuppressus x leylandii*	Leyland Cypress	5"	
202	*Cuppressus x leylandii*	Leyland Cypress	4"	
203	*Cuppressus x leylandii*	Leyland Cypress	5"	
204	*Cuppressus x leylandii*	Leyland Cypress	7"	
205	*Cuppressus x leylandii*	Leyland Cypress	6"	
206	*Cuppressus x leylandii*	Leyland Cypress	6"	
207	*Cuppressus x leylandii*	Leyland Cypress	6"	
208	*Cuppressus x leylandii*	Leyland Cypress	8"	
209	*Cuppressus x leylandii*	Leyland Cypress	6"	
210	*Cuppressus x leylandii*	Leyland Cypress	7"	
211	*Cuppressus x leylandii*	Leyland Cypress	6"	
212	*Cuppressus x leylandii*	Leyland Cypress	6"	
213	*Cuppressus x leylandii*	Leyland Cypress	4"	
214	*Cuppressus x leylandii*	Leyland Cypress	5"	
439	*Quercus rubra*	N. Red Oak	9"	
440	*Quercus rubra*	N. Red Oak	6"	
443	*Quercus rubra*	N. Red Oak	15"	
444	*Quercus rubra*	N. Red Oak	13"	co-dominant trunk
445	*Quercus rubra*	N. Red Oak	11"	
446	*Quercus rubra*	N. Red Oak	12"	
1074	*Magnolia grandiflora*	Southern Magnolia	18"	co-dominant trunk
1075	*Magnolia grandiflora*	Southern Magnolia	18"	

TREE PRESERVATION INVENTORY

TREE NO.	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
			DBH (in)	
1076	*Magnolia grandiflora*	Southern Magnolia	17"	
1077	*Magnolia grandiflora*	Southern Magnolia	27"	co-dominant trunk
1167	*Pinus strobus*	White Pine	8"	
1178	*Quercus rubra*	N. Red Oak	30"	nearly dead
1230	*Quercus rubra*	N. Red Oak	14"	
1231	*Quercus rubra*	N. Red Oak	17"	
1285	*Quercus rubra*	N. Red Oak	19"	root girdling
1446	*Acer rubrum*	Red Maple	10"	
1578	*Pinus strobus*	White Pine	17"	
1579	*Pinus strobus*	White Pine	12"	
1580	*Pinus strobus*	White Pine	8"	
1580-A	*Pinus strobus*	White Pine	6"	
1581	*Pinus strobus*	White Pine	14"	
1617	*Pinus strobus*	White Pine	11"	
1725-A	*Acer sp.*	Maple	7"	
1726-A	*Quercus montana*	Chestnut Oak	5"	
1792	*Robinia pseudoacacia*	Black Locust	19"	
1793	*Robinia pseudoacacia*	Black Locust	12"	
1793-A	*Quercus alba*	White Oak	8"	
1793-B	*Quercus alba*	White Oak	5"	
1794	*Robinia pseudoacacia*	Black Locust	13"	
1794-A	*Carya cordiformis*	Bitternut Hickory	6"	
1795	*Robinia pseudoacacia*	Black Locust	11"	
1796	*Quercus rubra*	N. Red oak	10"	
1796-A	*Robinia pseudoacacia*	Black Locust	9"	roots/truck growing into 1820-A
1819	*Liriodendron tulipifera*	Tulip Poplar	24"	uprooted
1819-A	*Robinia pseudoacacia*	Black Locust	9"	
1820	*Prunus serotina*	Black Cherry	14"	roots/trunk growing into 1819
1820-A	*Prunus serotina*	Black Cherry	13"	multistem
1821	*Tsuga canadensis*	Eastern Hemlock	47"	one-sided
1881	*Nyssa sylvatica*	Black Gum	18"	one-sided
1882	*Nyssa sylvatica*	Black Gum	17"	trunk split, trunk decay
1959	*Carya cordiformis*	Bitternut Hickory	19"	leaning
2066	*Fraxinus sp.*	Ash	17"	trunk broken off
2069	*Quercus montana*	Chestnut Oak	16"	dead
2070	*Quercus montana*	Chestnut Oak	14"	twisted trunk, roots growing into 2071-A
2071	*Ulmus americana*	American Elm	11"	roots growing into 2074, leaning
2071-A	*Quercus montana*	Chestnut Oak	11"	co-dominant trunk
2072	*Ulmus americana*	American Elm	15"	major decay
2075	*Robinia pseudoacacia*	Black Locust	12"	
2075-A	*Prunus serotina*	Black Cherry	12"	
2164	*Carya cordiformis*	Bitternut Hickory	19"	decay, cavity in trunk
2165	*Carya glabra*	Pignut Hickory	19"	co-dominant trunk
2166	*Carya glabra*	Pignut Hickory	34"	
2167	*Carya glabra*	Pignut Hickory	37"	trunk broken off
2168	*Acer saccharum*	Sugar Maple	23"	large decay cavities
2169	*Acer saccharum*	Sugar Maple	28"	co-dominant trunk, included bark
2192	*Quercus montana*	Chestnut Oak	26"	dead
2193	*Catalpa speciosa*	Northern Catalpa	19"	nearly dead
2193-A	*Catalpa speciosa*	Northern Catalpa	20"	scaffold branch damage
2208	*Acer rubrum*	Red Maple	14"	
2214	*Pinus strobus*	White Pine	11"	
2215	*Robinia pseudoacacia*	Black Locust	12"	exposed roots
2216	*Robinia pseudoacacia*	Black Locust	11"	multistem
2219	*Robinia pseudoacacia*	Black Locust	28"	
2223	*Robinia pseudoacacia*	Black Locust	12"	
2225	*Pinus strobus*	White Pine	13"	
2227	*Robinia pseudoacacia*	Black Locust	12"	
2229	*Pinus strobus*	White Pine	11"	
2231	*Pinus strobus*	White Pine	7"	co-dominant trunk
2452	*Ulmus parvifolia*	Chinese Elm	23"	
2453	*Quercus phellos*	Willow Oak	27"	
2516	*Quercus phellos*	Willow Oak	29"	
2570	*Quercus phellos*	Willow Oak	24"	
2571	*Quercus phellos*	Willow Oak	14"	
2572	*Ulmus pumila*	Siberian Elm	16"	co-dominant trunk
2657	*Ulmus pumila*	Siberian Elm	15"	co-dominant trunk
2658	*Acer saccharum*	Sugar Maple	17"	
2660	*Ulmus pumila*	Siberian Elm	14"	
2746	*Quercus alba*	White Oak	36"	
3089	*Acer saccharum*	Sugar Maple	20"	
3091	*Quercus rubra*	N. Red Oak	14"	
3093	*Quercus montana*	Chestnut Oak	26"	
3094	*Quercus rubra*	N. Red Oak	13"	
3095	*Quercus rubra*	N. Red Oak	14"	
3096	*Liriodendron tulipifera*	Tulip Poplar	13"	
3212	*Carya glabra*	Pignut Hickory	22"	
3212-A	*Sassafras albidum*	Sassafrass	10"	
3213	*Quercus montana*	Chestnut Oak	22"	
3214	*Quercus montana*	Chestnut Oak	29"	
3215	*Quercus montana*	Chestnut Oak	26"	co-dominant trunk, dead
3215-A	*Robinia pseudoacacia*	Black Locust	17"	leaning, dead
3215-B	*unknown*	unknown	12"	decay
3216	*Robinia pseudoacacia*	Black Locust	14"	
3220	*Quercus rubra*	N. Red Oak	23"	
3221	*Quercus alba*	White Oak	13"	
3222	*Quercus rubra*	N. Red Oak	26"	
3223	*Ulmus pumila*	Siberian Elm	25"	co-dominant trunk, ivy
3226	*Ulmus americana*	American Elm	19"	dead
3229	*Robinia pseudoacacia*	Black Locust	15"	co-dominant trunk, ivy, in decline
3230	*Ulmus americana*	American Elm	15"	
3231	*Quercus montana*	Chestnut Oak	12"	
3236	*Robinia pseudoacacia*	Black Locust	10"	
3237	*Robinia pseudoacacia*	Black Locust	10"	

TREE PRESERVATION INVENTORY

TREE NO.	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
			DBH (in)	
3239	*Robinia pseudoacacia*	Black Locust	14"	co-dominant trunk
3418	*Acer rubrum*	Red Maple	20"	
3430	*unknown*	unknown	10"	co-dominant trunk
3454	*Quercus rubra*	N. Red Oak	29"	in decline
3456	*Robinia pseudoacacia*	Black Locust	12"	
3473	*Carya cordiformis*	Bitternut Hickory	12"	catalpa sprouts out of trunk
3478	*Carya cordiformis*	Bitternut Hickory	15"	
3480	*Quercus rubra*	N. Red Oak	11"	leaning
3481	*Robinia pseudoacacia*	Black Locust	12"	co-dominant trunk
3482	*Robinia pseudoacacia*	Black Locust	19"	
3483	*Quercus rubra*	N. Red Oak	18"	
3488	*Quercus alba*	White Oak	36"	
3505	*Robinia pseudoacacia*	Black Locust	14"	leaning
3506	*Robinia pseudoacacia*	Black Locust	13"	
3507	*Robinia pseudoacacia*	Black Locust	13"	multistem
3509	*Robinia pseudoacacia*	Black Locust	35"	
3511	*Acer saccharum*	Sugar Maple	25"	multistem
3513	*Acer rubrum*	Red Maple	31"	
3514	*Robinia pseudoacacia*	Black Locust	14"	
3516-A	*Robinia pseudoacacia*	Black Locust	15"	
3517	*Robinia pseudoacacia*	Black Locust	14"	
3555	*Acer rubrum*	Red Maple	11"	dead
3556	*Robinia pseudoacacia*	Black Locust	13"	
3557	*Quercus rubra*	N. Red Oak	13"	
3597	*Robinia pseudoacacia*	Black Locust	14"	
3599	*Quercus montana*	Chestnut Oak	40"	multistem
3603	*Robinia pseudoacacia*	Black Locust	17"	co-dominant trunk
3604	*Robinia pseudoacacia*	Black Locust	21"	
3605	*Robinia pseudoacacia*	Black Locust	13"	
3619	*Robinia pseudoacacia*	Black Locust	25"	
3621	*Robinia pseudoacacia*	Black Locust	16"	
3622	*Robinia pseudoacacia*	Black Locust	15"	co-dominant trunk, in decline
3623	*Robinia pseudoacacia*	Black Locust	24"	
3624	*Robinia pseudoacacia*	Black Locust	16"	trunk broken off
3625	*Robinia pseudoacacia*	Black Locust	12"	one sided, in between guy wires
3626	*Acer rubrum*	Red Maple	10"	
3628	*Quercus rubra*	N. Red Oak	11"	
3629	*Quercus alba*	White Oak	12"	
3632	*Quercus rubra*	N. Red Oak	11"	in decline
3633	*Robinia pseudoacacia*	Black Locust	10"	in decline
3641	*Robinia pseudoacacia*	Black Locust	12"	
3641-A	*Liriodendron tulipifera*	Tulip Poplar	41"	
3647	*Liriodendron tulipifera*	Tulip Poplar	13"	
3654	*Liriodendron tulipifera*	Tulip Poplar	19"	
3669	*Prunus serotina*	Black Cherry	10"	trunk topped off, twin trunk
3668-A	*Robinia pseudoacacia*	Black Locust	22"	
3676	*Robinia pseudoacacia*	Black Locust	14"	ivy
3703	*Robinia pseudoacacia*	Black Locust	14"	ivy
3704	*Robinia pseudoacacia*	Black Locust	12"	ivy
3705	*Liriodendron tulipifera*	Tulip Poplar	14"	
3709	*Acer saccharinum*	Silver Maple	11"	
3712	*Liriodendron tulipifera*	Tulip Poplar	13"	
3721	*Robinia pseudoacacia*	Black Locust	13"	
3723	*Quercus montana*	Chestnut Oak	12"	trunk broken off
3725	*Prunus serotina*	Black Cherry	13"	
3750	*Liriodendron tulipifera*	Tulip Poplar	16"	
4931	*Robinia pseudoacacia*	Black Locust	13"	
4934	*Liriodendron tulipifera*	Tulip Poplar	14"	dead
4940	*Robinia pseudoacacia*	Black Locust	11"	
4943	*Robinia pseudoacacia*	Black Locust	13"	
4944	*Liriodendron tulipifera*	Tulip Poplar	13"	leaning, decay
4945	*Prunus serotina*	Black Cherry	14"	
4946	*Robinia pseudoacacia*	Black Locust	11"	
4948	*Liriodendron tulipifera*	Tulip Poplar	16"	
4950	*Liriodendron tulipifera*	Tulip Poplar	26"	
4953	*Liriodendron tulipifera*	Tulip Poplar	14"	
4954	*Liriodendron tulipifera*	Tulip Poplar	10"	
4958	*Liriodendron tulipifera*	Tulip Poplar	11"	
4960	*Robinia pseudoacacia*	Black Locust	14"	
4964	*Liriodendron tulipifera*	Tulip Poplar	11"	
4965	*Liriodendron tulipifera*	Tulip Poplar	18"	
4968	*Liriodendron tulipifera*	Tulip Poplar	18"	
4970	*Liriodendron tulipifera*	Tulip Poplar	13"	
4976	*Liriodendron tulipifera*	Tulip Poplar	15"	

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
John Lightle
Lic. No. 1957
07/30/19
LANDSCAPE ARCHITECT

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Chantilly Va. 20151
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

TREE PRESERVATION DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: AS NOTED	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.39 OF 45 — SP-12928

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EX. PATRICK HENRY DR

EX. N LEBANON ST

EX. N. LIVINGSTON ST
EX. R/W

EX. WILSON BLVD - ROUTE 6608
EX. R/W – WIDTH VARIES
POSTED SPEED: 30 MPH
POTENTIAL BIKE SHARE STATION

RPC: 12-018-001
AGER LUCAS &
AGER LISA

RPC: 12-018-022
HORNE HEATHER

RPC: 12-018-020
FERRANDO WILLIAM ANTHONY ET AL

RPC: 12-018-021
DE OVANDO MARIA V & ANTONIO OVANDO

RPC: 12-018-024
DE LA VIA MARCELINO
DE LA VIA JULIETA ET AL

RPC: 12-018-023
TONAKARN EAK & ORAPAN

RPC: 12-019-012
DOMINION HILLS LLC
ATTN DAVID B KLIMA

RPC: 12-019-001
URCIA ANDRES C TR
URCIA ROWENA M TR

RPC: 12-041-026
ARLINGTON COMMUNITY CHURCH

RPC: 12-042-066
COMMONWEALTH OF VIRGINIA

RPC: 12-042-061
NORTHERN VA REGIONAL PARK AUTHORITY

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

N73°56'55"E 399.58

N82°20'10"E 100.14' (TOTAL)
382.54'

R=1472.40'
A=453.74

PROP. ENTRY SIGN(TYP.)

PROP. PARK SIGN

EX. WOOD STEPS

EX. BBQ GRILL & SHELTER

EX. CINDER BLOCK FACILITIES TO BE REMOVED

PROP 36" FENCE

EX. UTILITY POLE

FIELD VERIFIED RPA

"RED TRAIL"
EX. WOOD CHIP TRAIL

"YELLOW TRAIL"
EX. WOOD CHIP TRAIL

EX. WOOD CHIP TRAIL

EX. WOOD CHIP TRAIL

EX. 8" SANITARY SEWER

EX. 15" RCP

EX. 21" RCP

EX. 12" DIP

EX. CG

EX. MEDIAN

OHU

RPA

MATCHLINE
SEE SHEET C.41

LANDSCAPE LEGEND

- PROPOSED SHADE TREE
- EXISTING TREE TO BE PRESERVED
- AREA OF REFORESTATION, SEE REFORESTATION PLAN FOR PLANTING LAYOUT AND SCHEDULE

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
John Lightle
Lic. No. 1957
07/30/19
LANDSCAPE ARCHITECT

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

LANDSCAPE PLAN

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=30'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.40 OF 45	SP-12928

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RPC: 12-042-063
PATRICK HENRY 110 LLC

RPC: 12-042-066
COMMONWEALTH
OF VIRGINIA

MATCHLINE
SEE SHEET C.40

RPC: 12-042-103
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

"YELLOW TRAIL"
EX. WOOD CHIP TRAIL

EX. WOOD CHIP TRAIL

EX. TIMBERS

EM

STEPS

PROP. TICKET BOOTH

PROP. BLD FF=409.50

PROP. ROPES COURSE

+416

EX. CHAIN LINK FENCE

PROP. 8' SW

PROP. 5' SW

AREA OF MILLING/PAVING/STRIPING CONSIDERED MAINTENANCE AND NOT DISTURBED AREA

PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

PROP. LIGHT (TYP.)

ARLINGTON COUNTY (APPROXIMATE)
FAIRFAX COUNTY (APPROXIMATE)

3:1 SLOPE

12" RCP

15" RCP

EX. 8" PVC PIPE

PROP. 6" PVC PIPE

PROP. SWM FACILITY

PROP. WHEEL STOP

PROP. LIGHTS (TYP.)

PROP. BENCHES

PROP. 42.8' 8" PVC @ 2.00%

EX. SAN. MH TO BE RAISED TO PROP. ELEVATION (SEE SHEET C.43A FOR DETAIL)

EX. WOOD DECK

EX. BUILDING

EX. 6' CHAIN LINK WITH BARBED WIRE

EX. 8" SANITARY SEWER

STABILIZATION TO BE PROVIDED IN EXISTING CHANNEL. CONTRACTOR TO COORDINATE W/SITE INSPECTOR

PROP. 9.5' CL A1 RIPRAP

OHU

N19°22'01"E 1014.14' (TOTAL)
431.59'

N43°57'44"W
45.00'

S19°22'30"W
48.64'

S19°22'30"W 296.35' (TOTAL)
247.71'

N70°03'10"W 523.62'

RPC: 12-042-106
SAINT ALBANS HOUSING
HARTLAND BANK
DB. 3860 PG. 1232

PIN: 0514 01 0333B
SAINT ALBANS HOUSING CORP.
DB. 17445 PG. 0778

PIN: 0514-01-0001
NORTHERN VA REGIONAL
PARK AUTHORITY
PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

TREE PLANTING NOTE

TREE PRESERVATION MEASURES SHALL BE IMPLEMENTED AROUND EXISTING TREES 443, 444, 445 AND 446, NO CREDIT FOR PRESERVATION HAS BEEN TAKEN FOR THESE TREES AND REPLACEMENT TREES ARE PROPOSED WITH THIS APPLICATION. IN THE EVENT THAT THE FOUR (4) EXISTING TREES ARE PRESERVED, THE SIX (6) PROPOSED REPLACEMENT TREES SHALL NOT BE REQUIRED.

LANDSCAPE LEGEND

- PROPOSED SHADE TREE
- EXISTING TREE TO BE PRESERVED
- AREA OF REFORESTATION, SEE REFORESTATION PLAN FOR PLANTING LAYOUT AND SCHEDULE

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

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John Lighte
Lic. No. 1957
07/30/19
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

LANDSCAPE PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=30'	DESIGNED	CHECKED
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.41 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-07-TREE PRES LANDSCAPE.dwg [LANDSCAPE PLAN – SOUTH] August 16, 2019 – 11:10am rjeter

PLANTING SPECIFICATIONS

I. SCOPE OF WORK
- A. THIS WORK SHALL CONSIST OF CLEARING AND SOIL PREPERATION, FINISH GRADING, PLANTING AND DRAINAGE, INCLUDING ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND ANY OTHER APPURTENANCES NECESSARY FOR THE COMPLETION OF THIS PROJECT.

II. MATERIALS
- A. GENERALLY
  ALL MATERIALS SHALL BE BEST OF ITS KIND AVAILABLE. SOIL AND PLANTING SHALL NOT BEGIN UNTIL ALL IRRIGATION WORK AROUND PLANTING AREAS IS COMPLETE AND APPROVED.
- B. PLANTS
  ALL PLANTS SHALL BE HEALTHY, OF NORMAL GROWTH, WELL-ROOTED, AND FREE FROM DISEASE AND INSECTS.
- C. TOPSOIL
  ORGANIC TOPSOIL SHALL BE FREE OF DEBRIS, ROCKS LARGER THAN 2", WOOD, ROOTS, VEGITABLE MATTER AND CLAY CLODS.
- D. MULCH
  MULCH SHALL BE DOUBLE-SHREDDED HARDWOOD BARK.

III. FERTILIZER AND CONDITIONERS
- A. ORGANIC FERTILIZER SHALL BE PROCESSED SEWER SLUDGE WITH MINIMUM CONTENT OF 1% NITROGEN AND 2% PHOSPHORIC ACID, EQUIL TO "NITROHUMUS".
- B. ORGANIC FERTILIZER AND SOIL CONDITIONERS SHALL BE "GROW-POWER" OR EQUAL AND ORGANIC BASE MATERIALS COMPRISED OF DECOMPOSED ANIMAL AND VEGETABLE MATTER AND COMPOSTED TO SURPPORT BACTERIAL CULTURES CONTAINING NO POULTRY, ANIMAL OR HUMAN WASTE. GUARANTEED ANALYSIS (5-3-1); NITROGEN 5%, PHOSOHATE 3%, POTASH 1%, 50% HUMIC ACIDS.

IV. GENERAL WORK
- A. LANDSCAPE WORK SHALL BE ACCORDING TO THE WORKMANLIKE STANDARDS ESTABLISHED FOR LANDSCAPE CONSTRUCTION AND PLANTINGS.

V. WEEDING
- A. BEFORE AND DURING PRELIMINARY GRADING AND FINISH GRADING, ALL WEEDS AND GRASSES SHALL BE DUG OUT BT THE ROOTS AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

VI. TOPSOIL
- A. CONTRACTOR SHALL PROVIDE 4" MINIMUM THICK TOPSOIL LAYER IN ALL PLANTING AREAS. TOPSOIL SHALL BE SPREAD OVER A PREPARED SURFACE AS A UNIFORM LAYER TO PRODUCE A 4" COMPACTED THICKNESS. TOPSOIL PRESENT AT THE SITE, IF ANY, MAY BE USED TO SUPPLEMENT TOTAL AMOUNT REQUIRED.

VII. SOIL CONDITIONING
- A. CULTIVATE ALL AREAS SHALL BE PLANTED TO DEPTH OF 6". ALL DEBRIS EXPOSED FROM EXCEVATION AND CULTIVATION SHALL BE DISPOSED OF AT THE CONTRACTOR'S EXPENSE. CONDITIONER SHALL BE SPREAD EVENLY IN ALL PLANTING AREAS AND TILLED IN TWO DIRECTIONS INTO THE TOP 4", WITH THE FOLLOWING PER 1,000 SQUARE FEET.
  - 150 POUNDS "GRO-POWER" OR EQUAL
  - 100 POUNDS ARGRICULTURAL GYPSUM
  - 20 POUNDS NITROFORM (COURSE) 3-O-O BLUE CHIP

VIII. PLANTING
POSITION TREES AND SHRUBS AT THEIR INTENDED LOCATIONS AS PER THE PLANS AND SECURE THE APPROVAL OF THE LANDSCAPE ARCHITECT OR HIS REPRESENTATIVE BEFORE EXCAVATING THE PITS, MAKING NECESSARY ADJUSTMENTS AS DIRECTED.
- A. PLANTING PITS SHALL BE DUG WITH LEVEL BOTTOMS, TWICE THE WIDTH OF THE DIAMETER OF THE ROOT BALL AND DEPTH MATCHING ARLINGTON COUNTY DETAILS R7.2 AND R7.6. EACH PLANT PIT SHALL BE BACKEDFILLED WITH THE FOLLOWING PREPARED SOIL, MIXED THOROUGHLY:
  - 1 PART LEAF MOULD OR COMPOST
  - 1 PART COW MANURE BY VOLUME
  - 3 PARTS TOPSOIL BY VOLUME
  - 21 GRAMS "AGRIFORM" PLANTING TABLETS OR EQUAL
    - 2 TABLETS PER 1 GAL. PLANT
    - 3 TABLETS PER 5 GAL. PLANT
    - 4 TABLETS PER 15 GAL. PLANT
    - FOR LARGER PLANTS, 2 TABLETS PER ½" DIAMETER OF TRUNK CALIPER
- B. PREPARED SOIL SHALL BE TAMPED FIRMLY AT BOTTOM OF PIT. FILL PREPARED SOIL AROUND BALL OF PLANT HALFWAY, INSERT PLANT TABLETS, COMPLETE BACKFILL AND WATER THOROUGHLY.
- C. ALL PLANTS SHALL BE SET SO THAT THEY BEAR THE SAME RELATION TO THE REQUIRED GRADE AS THEY BORE TO THE NATURAL GRADE BEFORE BEING TRANSPLANTED.
- D. IMMEDIATELY AFTER PLANTING, STAKE ALL TREES TO PREVEMT DAMAGE FROM WIND. FEASTEN TREES TO UPPER END OF STATE IN AT LEAST TWO PLACES USING HOSE TYPE TIES.
- E. PREPARE RAISED EARTH BASINS AS WIDE AS PLANTING HOLE OF EACH TREE.
- F. WATER IMMEDIATELY AFTER PLANTING. WATER SHALL BE APPLIED TO EACH TREE AND SHRUB IN SUCH A MANNER AS NOT TO DISTURB BACKFILL AND TO THE EXTENT THAT ALL MATERIALS IN THE PLANTING HOLE ARE THOUGHLY SATURATED.
- G. PRUNE ALL PROPOSED TREES DIRECTLY ADJCENT TO WALKWAYS TO A MINIMUM OF 7'-0" BRANCHING HEIGHT.

IX. GROUND COVER
- A. ALL GROUND COVER AREAS SHALL RECEIVE A ¼" LAYER OF HUMUS HAKED INTO THE TOP 1" OF PREPARED SOIL PRIOR TO PLANTING GROUNG COVER.
- B. SPACING AND VERIETY OF GROUND COVER SHALL BE AS SHOWN ON APPROVED DRAWINGS.
- C. IMMEDIATELY AFTER PLANTING GROUND COVER, CONTRACTOR SHALL THOUGHLY WATER THE GROUND COVER.
- D. ALL GROUND COVER AREAS SHALL BE TREATED WITH A PRE-EMERGENT BEFORE FINAL LANDSCAPE INSPECTION. GROUND COVER AREAS SHALL BE WEEDED PRIOR TO APPLYING PRE-EMERGENT. PRE-EMERGENT SHALL BE APPLIED PER MANUFACTUR'S RECOMMENDATION.

X. FINISH GRADING
- A. ALL AREAS WILL BE RECEIVED BY THE CONTRACTOR AT SUBSTANTIALLY PLUS/MINUS 0.1 FOOT OF FINISH GRADE.
- B. ALL LAWN AND PLANTING AREAS SHALL BE GRADED TO A SMOOTH, EVEN AND UNIFORM PLANE WITH NO ABRUPT CHANGE OF SURFACE, UNLESS OTHERWISE DIRECTED BY LANDSCAPE ARCHITECT OR HIS REPRESENTATIVE. SOIL AREAS ADJCENT TO BUILDINGS SHALL SLOPE AWAY FROM BUILDING.
- C. ALL PLANTING AREAS SHALL BE GRADED AND MAINTAINED TO ALLOW FREE FLOW OF SURFACE WATER.

XI. GUARANTEE
- A. CONTRACTOR SHALL GAURANTEE ALL PLANTS FOR A PERIOD OF TWO YEARS FROM ACCEPTANCE OF JOB.

XII. CLEAN UP
- A. UPON THE COMPLETION OF ALL PLANTING WORK AND BEFORE FINAL ACCEPTANCE, THE CONTRACTOR SHALL REMOVE ALL MATERIAL, EQUIPMENT AND DEBRIS RESULTING FROM HIS WORK. ALL PAVED AREAS SHALL BE BROOM CLEANED AND THE SITE LEFT IN A NEAT AND ACCEPTABLE CONDITION AS APPROVED BY THE OWNER'S AUTHORIZED REPRESENTATIVE.
- B. ALL TREES, SHRUBS OTHER PLANTS AND PLANT BEDS SHALL BE MAINTAINED BY PRUNNING, CULTIVATING AND WEEDING AS REQUIRED FOR HEALTHY GROWTH. THIS WORK SHALL INCLUDE RESTORING PLANTING SAUCERS; TIGHTENING AND REPAIRING STAKES AND GUY SUPPORTS; RSETTING TREES AND SHRUBS TO PROPER GRADES OR VERTICAL POSITION AS REQUIRED; RESTORING OR REPLACING DAMAGED WRAPPINGS; AND SPRAYING WITH HERBICIDE AS REQUIRED TO KEEP TREES AND SHRUBS FREE OF INSECTS AND DISEASE.
- C. LAWNS SHALL ME MAINTAINED BY WEATHERING, FERTILIZING, WEEDING, MOWING, TRIMMING AND OTHER OPERATIONS SUCH AS ROLLING, REGRADING, AND REPLANTING AS REQUIRED TO ESTABLISH A SMOOTH, ACCEPTABLE LAWN FREE OF ERODED OR BARE AREAS.

XIII. MAINTENANCE (ALTERNATE BID)
COST PER MONTH AFTER INITIAL 90-DAY MAINTENANCE PERIOD.

XIV. PLANTING MATERIAL GUARANTEE
- A. PLANTING MATERIAL SHALL BE OF GOOD NURSERY STOCK AND A NURSERY GUARANTEE SHALL BE PROVIDED BY THE GENERAL CONTRACTOR THROUGH THE DEVELOPER FOR TWO YEARS, INCLUDING THE REPLACEMENT AND MAINTENANCE (TO INCLUDE BUT NOT LIMITED TO PRUNING, FEEDING, SPRAYING, MULCHING, WEEDING AND WATERING) OF ALL LANDSCAPE MATERIALS FOLLOWING THE ISSUANCE OF THE MASTER CERTIFICATE OF OCCUPANCY.

XV. URBAN FORESTER NOTIFICATION
- A. THE DEVELOPER AGREES TO NOTIFY THE ARLINGTON COUNTY OF PARKS, RECREATION AND CULTURAL AFFAIRS URBAN FORESTER AT 703-228-6557 AT LEAST 72 HOURS IN ADVANCE OF THE SCHEDULED PLANTING OF ANY TREES IN THE PUBLIC RIGHT OF WAY AND TO BE AVAILABLE AT THE TIME OF PLANTING TO MEET WITH THE STAFF OF THE DPRCR TO INSPECT THE PLANT MATERIAL, TREE PIT, AND THE TECHINIQUE OF PLANTING. SOIL USED IN THE TREE PIT MUST MEET THE SPECIFICATIONS FOR STREET TREE PLANTING "STANDARDS FOR PLANTING AND PRESERVATION OF TREES ON SITE PLAN PROJECTS" AVAILABLE FROM THE URBAN FORESTER.

PLANTING NOTES

1. PLANT MATERIAL SHALL BE FURNISHED AND INSTALLED AS INDICATED, INCLUDING ALL LABOR, MATERIALS, PLANTS, EQUIPMENT, INCIDENTALS, AND CLEAN-UP.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLANTING AT CORRECT GRADES AND ALIGNMENT. LAYOUT TO BE APPROVED BY OWNERS' REPRESENTATIVE PRIOR TO INSTALLATION.
3. PLANTS SHALL BE TYPICAL OF THEIR SPECIES AND VARIETY; HAVE NORMAL GROWTH HABITS, WELL-DEVELOPED DENSELY FOLIATED BRANCHES, AND VIGOROUS ROOT SYSTEMS, AND BE FREE FROM DEFECTS AND INJURIES.
4. CONTRACTORS SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS COSIDERED DETRIMENTIAL TO GROWTH OF PLANT MATERIAL.
5. ALL PLANT MATREIAL SHALL BE GURANTEED BY THE CONTRACTOR TO BE IN GOOD VIGOROUS GROWING CONDITION. PROVISION SHALL BE MADE FOR A GROWTH GUARANTEE OF AT LEAST ONE YEAR FROM THE DATE OF ACCEPTANCE FOR TREES AND SHRUBS. REPLACEMENTS SHALL BE MADE AT THE BEGINNING OF THE FIRST SUCEEDING PLANTING SEASON. ALL REPLACEMENTS SHALL HAVE A GUARENTEE EQUAL TO THAT STATED ABOVE.
6. PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY IF/WHEN PRACTICAL. IN THE EVENT THAT THIS IS NOT POSSIBLE, THE CONTRACTOR SHALL PROTECT STOCK NOT PLANTED. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE-DAY PERIOD AFTER DELIVERY. ANY PLANTS NOT INSTALLED DURING THIS PERIOD SHALL BE REJECTED, UNLESS OWNER AND CONTRACTOR PROVIDE OTHERWISE BY WRITTEN AGREEMENT.
7. QUALITY AND SIZE OF PLANTS, SPREAD OF ROOTS, AND SIZE OF ROOTBALL SHALL BE IN ACCORDANCE WITH THE MOST RECENT VERISION OF ANSI Z60 "AMERICAN STANDARD FOR NURSERY STOCK" PUBLISHED BY THE AMERICAN ASSOCATION OF NURSERYMEN, INC.
8. ALL PLANTS SHALL BE PLANTED IN AMENDED TOP SOIL THAT IS THROUGHLY WATERED AND TAMPED AS BACK-FILLING PROGRESSES. PLANTING MIX TO BE AS SHOWN ON PLANTING DETAILS. LARGE PLANTING AREAS TO INCORPPRATE FERTILIZER AND SOIL CONDITIONERS AS TESTED IN PLANTING SPECIFICATIONS.
9. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS TO DAMAGE THE BARK OR BREAK BRANCHES. PLANTS SHALL BE HANDLED FROM THE BOTTOM OF THE BALL ONLY.
10. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICE. PLANTS SHALL NOT BE INSTALLED IN TOP SOIL THAT IS IN AMUDDY OR FROZEN CONDITION. ALL PLANT MATERIAL SHALL BE SPRAYED WITH "WILT-PRUF" OR EQUAL AS PER MANUFACTURERS INSTRUCTIONS.
11. NO PLANT, EXCEPT GROUNDCOVERS, SHALL BE PLANTED LESS THAN TWO FEET FROM EXISTING STRUCTURES AND SIDEWALKS.
12. SET ALL PLANTS PLUMB AND STRAIGHT. SET AT SUCH LEVEL THAT A NORMAL OR NATURAL RELATIONSHIP TO THE GROUND IF THE PLANT WITH THE GROUND SURFACE WILL BE ESTBLISHED. LOCATE THE PLANT IN THE CENTER OF THE PIT.
13. ALL INJURED ROOTS SHALL BE PRUNED TO MAKE CLEAN ENDSBEFORE PLANTING UTILIZING CLEAN, SHARP TOOLS. IT IS ADVISABLE TO PRUNE APPROXIMATELY 1/3 OF THE GROWTH OF LARGER TREES (2" CALIPER AND GREATER) BY THE REMOVAL OF SURPERFLUOS BRANCHES, THOSE WHICH CROSS, THOSE WHICH RUN PARALLEL, ETC. MAIN LEADER OF TRESS SHALL NOT BE CUT BACK. LONG SIDES BRANCHES SHALL BE SHORTEND.
14. EACH TREE SHRUB SHALL BE PRUNED IN ACCORDANCE WITH STANDARD HORTICULTURAL PRACTICE TO PRESERVE THE NATURAL CHARACTER OF PLANT. PRUNING SHALL BE DONE WITH CLEAN, SHARP TOOLS.
15. TREES SHALL BE SUPPORTED IMMEDIATELY AFTER PLANTING. ALL TREES 6" AND GREATER IN CALIPER SHALL BE GUYDED. SMALLER TREES SHALL BE STAKED. GUYING WIRES AND STAKES SHALL BE INSTALLED AS INDICATED. THE LANDSCAPE CONTRACTOR SHALL REMOVE STAKING, GUYING AND TREE WRAP AT THE END OF ONE YEAR MAINTENANCE AND GUARANTEE PERIOD.
16. ALL PLANTING BEDS SHALL BE MULCHED WITH 3" LAYER OF DOUBLE SHREDDED HARDWOOD BARK MULCH.
17. NEW PLANTING AREAS AND SOD SHALL BE ADEQUATELY IRRIGATED OR WEATHERED TO ESTABLISH THE PROPOSED PLANTS AND LAWN.
18. ALL PLANTS SHOWN ON THE APPROVED LANDSCAPE PLAN SHALL BE INSTALLED, INSPECTED AND APPROVED BT THE LANDSCAPE ARCHITECT OR HIS REPRESENTATIVE. THE LANDSCAPE ARCHITECT SHALL TAKE INTO ACCOUNT SEASONAL COSIDERATIONS IN THIS REGARD. TREES, SHRUBS, VINES AND GROUNDCOVER AS REQUIRED BY OR ASSOCIATED WITH A SUBDIVISION OR SITE PLAN APPROVED BY THE PLANNING AUTHORITIES SHALL BE INSTALLED DURING THE FOLLOWING PLANTING SEASONS:

TYPE	DATES
PLANTS	03/15 TO 12/15
LAWNS	03/15 TO 06/15
	09/15/ TO 12/01

THE FOLLOWING TRE VARITIES SHALL NOT BE PLANTED DURING THE FALL PLANTING SEASON DUE TO THE HAZARDS ASSOCIATED WITH PLANTING THESE TREES IN THIS SEASON:

ACER RUBRUM	POPULUS SPP.
BETULA SPP.	PRUNUS SPP.
CARPINUS SPP.	PYRUS SPP.
CRATECUS SPP.	QUERCUS SPP.
KOELREUTERIA PANICULATA	SALIX SPP.
LIQUIDAMBAR STYRACIFLUA	TILIA TOMENTOSA
LIRIODENDRON TULIPIFERA	ZELKOVA
PLANTANUS ACERIFOLIA	

ANY PLANTING INSTALLED IN CONFLICT WITH THIS REQUIREMENT MUST RECEIVE WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO PLANTING. FALIURE TO COMPLY WITH THESE REQUIREMENTS WILL REQUIRE REMOVAL OF THE PLANTING IN QUESTION. THIS REQUIREMENT DOES NOT APPLY TO SEEDING OR SODDING OR PLANTINGS SPECIFICALLY FOR SOIL STABILIZATION PURPOSES. PLANTINGS ASSOCIATED WITH ANY LOT GIVEN A CERTIFICATE OF OCCUPANCY OUTSIDE THESE PERIODS SHALL BE PROVIDED DURING THE PREVIOUS OR NEXT APPROPREATE SEASON.

19. ALL DISTURBED AREAS SHALL BE TREATED WITH 4" TOP SOIL AND SEEDED IN ACCORDANCE WITH PERMANENT STABILIZATION METHODS INDICATED ON SOIL EROSION AND SEDIMENT CONTROL SHEET.

LANDSCAPE MAINTENANCE MANAGEMENT PROGRAM

I. GENERAL
- A. ALL PLANTING AREAS, INCLUDING LAWNS, BUFFERS, AND PARKING LOTS, SHALL BE PERIODICALLY INSPECTED A MINIMUM OF ONCE PER MONTH, EVERY TWO (2) WEEKS DURING THE GROWING SEASON, OR AFTER EACH MOWING SESSION. A FALL CLEAN-UP SHALL BE PERFORMED EACH YEAR
- B. REMOVE ALL LITTER, DEBRIS AND WEEDS.
- C. MAINTAIN A MINIMUM OF A 2-INCH DEPTH OF ORGANIC HARDWOOD MULCH OR EQUAL IN ALL PLANTING BEDS.

II. IRRIGATION (IF APPLICABLE)
- A. AUTOMATIC SPRINKLERS SHALL BE CLEANED OUT AND TURNED OFF IN THE FALL PRIOR TO THE FIRST FROST, AND TESTED WHEN TURNED ON IN THE SPRING
- B. EVALUATE SUCCESS OF IRRAGATION SYSTEM AND MODIFY AS NECESSARY.
  WATER REQUIREMENTS:
  NEW TRUF: KEEP MOIST UNTIL ALL SEED GERMINARES AMD BECOMES AN ESTABLISHED STAND OF TURF.
  EXISTING TURF: DURING DRY PERIODS, WATER TWICE A WEEK FOR 20 MINUTES AT A TIME, OR SET IRRIGATION FOR COVERAGE OF 1-2 INCHES OF WATER PER WEEK.

III. SEASONAL FLOWERS
- A. ANNUAL FLOWER BEDS SHALL BE PERIODICALLY MULCHED AND THE SOIL AMENDED ANNUALLY. NEW PLANTINGS SHALL BE PROVIDED IN MAY OF EACH YEAR. DURING THE GROWING SEASON, ALL BEDS SHALL RECEIVE PERIODIC INSPECTIONS PER NOTE 1, IRRIGATION AND WEEDING TO MAINTAIN A NEAT APPERANCE.

IV. TURF
- A. LAWN AREAS SHALL NOT EXCEED A HEIGHT OF 4" INCHES. APPROXIMATELY 12-15 MOWINGS PER YEAR WILL BE REQUIRED.
- B. FERTILIZER AND SOIL AMENDMENTS SHOULD BE ADDED A NECESSARY AND/OR ON A SEASONAL BASIS. FERTILIZER IS OPTIMALLY APPLIED TO LAWN AND TURF AREAS THREE TUNES PER SEASON. TIMING, FREQUENCY AND RATE OF APPLICATION SHALL BE ADJUSTED ACCORDING TO WEATHER AND TO HORTICULTURAL AND SOIL TEST CONDITIONS FOR EACH SPECIFIC SITE. FERTILIZER SHALL BE APPLIED BY ACCEPTED METHODS ONLY. SAFTY SHALL BE OF PRIME CONSIDERATION. CARE SHALL BE TAKEN NOT TO APPLY FERTILIZER WHEN THE GROUND IS WET.
- C. SOIL AMENDMENTS SUCH AS LIME, GYPSUM OR PEAT MOSS MAY BE ADDED TO THE SOILS OF LAWNS, TURF OR PLANTING AREAS PERIODICALLY. THE NEED FOR SUCH SOIL AMENDMENTS SHALL BE ANALYZED DURING THE PERIODIC INSPECTIONS AND IN CONJUNCTION WITH SOIL TESTS.
- D. SOIL AMENDMENTS SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS' SPECIFICATIONS OR BASED UPON SOIL TEST RESULTS.
  APPLY A 3-1-2 (21-7-14, 10-4-6, OR 24-4-B) 50% ORGANIC FERTILIZER TWICE A REAR BETWEEN MARCH 15 TO APRIL 15 AND SEPTEMBER 1 TO OCTOBER 1. IF NECESARRY, TWO ADDITIONAL APPLICATIONS MAY BE MADE IN MAY AND NOVEMBER.
  DO NOT APPLY FERTILIZER OR SOIL AMENDMENTS WHILE TURF IS EITHER WET OR UNDER EXTREME STREES, IN WINDY CONDITIONS, OR WHEN CHILDERN ARE PRESENT.

V. PRUNING
- A. REMOVAL OF DEAD, DISEASED, INSECT INFECTED OR WEAK WOOD SHALL TAKE PLACE IN THE DORMANT SEASON OR AFTER FLOWERING. EXCESSIVE SHOOTS AND SUCKERS SHALL BE REMOVED.
- B. SHRUB MATERIAL USED AS A SCREEN SHALL BE PRUNED AS A MASS TO ENCANCE THEIR NATURAL FORM. HEDGES
- C. ROOT PRUNING OF TREES ADJACENT TO CURBS OR SIDEWALKS SHALL OCCURE DURING PERIODIC INSPECTIONS WITH KNOWLEDGE OF MOST RECENT PRUNING. NO MORE THAN 1/3 OF ROOT SYSTEM SHALL BE PRUNDED DURING A YEAR

VI. INSECT AND DISEAES CONTROL
- A. THE CONTROL OF INSECTS AND DISEASE ASSOCIATED WITH ALL PLANTING AREAS SHALL ALWAYS BE A MAINTENANCE PRIORITY. ALL PLANTINGS, INCLUDING EXISITING MATURE TREES, SHALL BE PERIODICALLY INSPECTEDFOR INSECTS OR DISEASE INFESTATION. METHODS UTILIZED TO CONTROL INSECTS OR DISEASE MAY RANGE FROM SPRAYING AND PRUNING TO PLANT REMOVAL. WHATEVER METHOD IS UTILIZED, SAFETY AND CONTROL SHALL BE OF PRIME CONCERN.

VII. RENOVATION
- A. RENOVATION INCLUDES THE RESEEDING OR REPLANTING OF LANDSCAPE AREAS DAMAGED, DESTROYED OR FAILING DUE TO INSECTS, DISEASE, WEATHER OR PHYSICAL DAMAGE.
- B. LAWN-ALL AREAS WHERE SOIL HAS BEEN EXPOSED SHALL BE RENOVATED DURING THE NEXT PLANNING SEASON. PROPER HORTICULTURAL AND SOIL EROSION PREVENTION METHODS SHALL BE UTILIZED. IF SOIL EROSION HAS OCCURRED, THE AREA SHALL BE REPAIRED WITH A SEED MIXTURE COMPATIBLE TO EXISTING PLANTINGS SHALL BE UTILIZED.
- C. PLANTINGS- ALL PLANTINGS WHICH ARE DAMAGED OR DESTROYED SHALL BE REPLACED DURING THE NEXT GROWING SEASON. A FAILING, DAMAGED OR DESTROYED LANDSCAPE SCREEN OR BURREFER MUST BE RENOVATED OR REPLACED WITHIN A REASONABLE PREIOD OF TIME, BUT NOT TO EXCEED THE SUBSEQUENT GROWING SEASON.

VIII. SITE AMENITIES
- A. BENCHES, PATHS, BICYCLE RACKS, TRASH RECEPTACLES AND SIGNS SHALL BE INSPECTED AT LEASTTWICE A YEAR, ONCE IN MARCH AND ONCE IN AUGUST, TO DETERMINE THEIR CONDITION. ANY DAMAGED, WORN OR UNSAFE CONDITIONS SHALL BE RECTIFIED IMMEDIATELY.

IX. PAVED SURFACES
- A. ALL PAVED SURFACES, CONCRETE SIDEWALKS, ASPHALT PAVEMENT AND DECORAVTIE PAVEMENT SHALL BE INSPECTED ON A REGULAR BASIS. ALL SUCH SURFACES SHALL BE INSPECTED AT LEAST ONCE PER MONTH.
- B. TRASH, STAINS AND/OR OBSTRUCTIONS SHALL BE REMOVED IMMEADIATELY. PAVEMENT SHALL BE INSPECTED FOR DAMAGE, CRACKS, AND/OR HOLES, AND RETURNED TO THEIR ORIGINAL CONDITIONS.
- C. SNOW SHALL BE REMOVED DURING AND FOLLOWING EVERY STORM. SIDEWALKS AND PARKING AREAS SHALL BE KEPT CLEAR OF ICE AND SNOW DURING BUSINESS HOURS.

PLANT SCHEDULE

Key	Qty.	Botanical Name	Common Name	Native Species	Size	Type	Remarks
		Shade Trees					
CL	20	Celtis laevigata	Sugar Hackberry	X	2" Cal.	B & B	Uniform branching pattern, No girdling roots
QP	6	Quercus phellos	Willow Oak	X	2" Cal.	B & B	Uniform branching pattern, No girdling roots
UA	3	Ulmus americana 'Valley Forge'	Valley Forge American Elm	X	2" Cal.	B & B	Uniform branching pattern, No girdling roots
	29	**Total Proposed Shade Trees**					

TREE REPLACEMENT COMPUTATIONS

Total Required Tree Replacements	73
Provided Tree Replacements:	
Shade Trees	29
Overstory Trees within Reforestation Area	40
Understory Trees within Reforestation Area (32 Proposed Trees @ 3:1 Ratio)	10
Total Provided Tree Replacements	79

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
John Lightle
Lic. No. 1957
07/30/19
LANDSCAPE ARCHITECT

urban
Planners•Engineers•Landscape Architects•Land Surveyors

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

LANDSCAPE DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.42 OF 45	SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-07-TREE PRES LANDSCAPE.dwg [LANDSCAPE PLAN DETS] August 16, 2019 – 11:10am rjstori

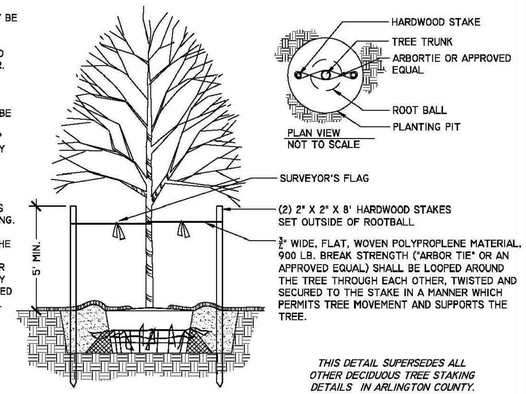
NOTES

1. STAKING AND GUYING MAY ONLY BE IMPLEMENTED WHERE SITE CONDITIONS WARRANT THEIR USE. PLANTED TREES WILL BE ASSESSED INDIVIDUALLY BY PROJECT OFFICER. STAKING AND GUYING WILL BE INSTALLED ONLY IF REQUIRED BY PROJECT OFFICER. CONDITIONS WHERE STAKING AND GUYING MAY BE NECESSARY TO ENSURE STABILITY INCLUDE: WINDY LOCATIONS, STEEP SLOPES, OR WHERE VANDALISM MAY BE A CONCERN.

2. STAKES OR GUYS WILL BE INSTALLED USING ACCEPTED ARBORICULTURE PRACTICES. TREES SHALL STAND PLUMB AFTER STAKING.

3. INSTALLATION WILL INCLUDE THE REMOVAL OF ALL STAKING AND GUYING MATERIAL ONE YEAR AFTER INSTALLATION. ANY HOLES LEFT BY REMOVING STAKING SHALL BE FILLED WITH APPROVED TOPSOIL/BACKFILL MIXTURE.

4. REFER TO DETAILS FOR TREE PLANTING INFORMATION.



THIS DETAIL SUPERSEDES ALL OTHER DECIDUOUS TREE STAKING DETAILS IN ARLINGTON COUNTY.

DECIDUOUS TREE STAKING

NOT TO SCALE

ELEVATION
02930.6 (2013)

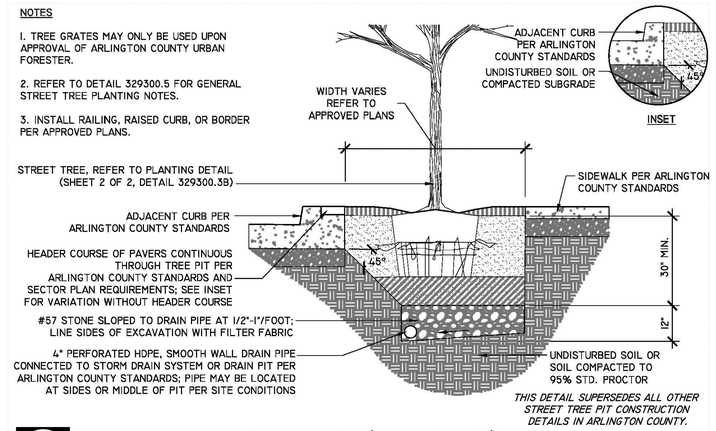
ARLINGTON DPR

NOTES

1. TREE GRATES MAY ONLY BE USED UPON APPROVAL OF ARLINGTON COUNTY URBAN FORESTER.

2. REFER TO DETAIL 329300.5 FOR GENERAL STREET TREE PLANTING NOTES.

3. INSTALL RAILING, RAISED CURB, OR BORDER PER APPROVED PLANS.



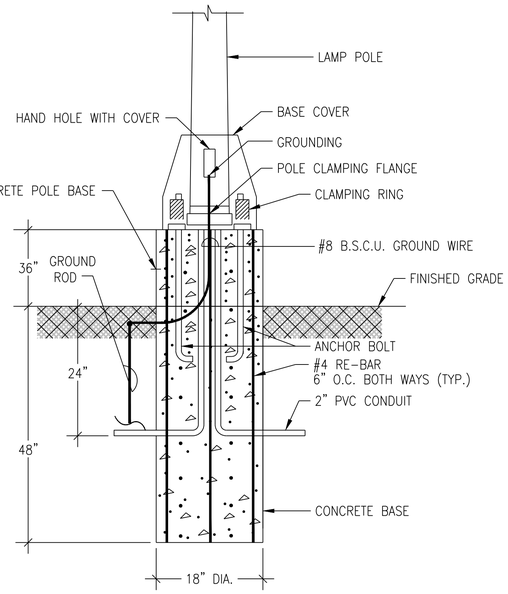
THIS DETAIL SUPERSEDES ALL OTHER STREET TREE PIT CONSTRUCTION DETAILS IN ARLINGTON COUNTY.

STREET TREE PLANTING PIT (SHEET 1 OF 2)

1/2" - 1'-0"

FOR TREE PLANTING PITS IN RIGHT-OF-WAY & ADJACENT TO PAVING
329300.3A (2016) (02930.3A)

ARLINGTON DPR



BASE POLE DETAIL

NOT TO SCALE

NOTES

1. AT PLANTING PRUNE ONLY CROSSING LIMBS, BROKEN OR DEAD BRANCHES, AND ANY BRANCHES THAT POSE A HAZARD TO PEDESTRIANS. DO NOT PRUNE INTO OLD WOOD ON EVERGREENS.

2. CONTRACTOR SHALL MAXIMIZE EXCAVATED AREA FOR TREE PIT WITHOUT ADVERSELY IMPACTING ADJACENT SITE FEATURES.

3. UNLESS OTHERWISE DIRECTED BY PROJECT OFFICER, BACKFILL SOIL MIXTURE WILL BE 3/4 EXISTING SOIL CLEANED OF DEBRIS (GRAVEL, ROCKS, STICKS, TRASH, ETC.) AND MIXED WITH 1/4 ORGANIC MATERIAL(COMPOSTED BARK, LEAF MOLD, OR OTHER PLANT DEBRIS PROCESSED TO A POINT OF DECAY AND APPROVED BY THE PROJECT OFFICER; PEAT MOSS MAY NOT BE USED).

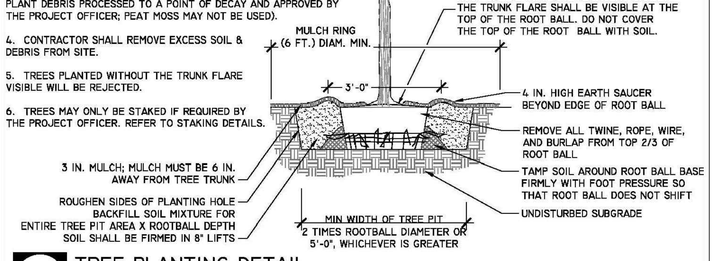
4. CONTRACTOR SHALL REMOVE EXCESS SOIL & DEBRIS FROM SITE.

5. TREES PLANTED WITHOUT THE TRUNK FLARE VISIBLE WILL BE REJECTED.

6. TREES MAY ONLY BE STAKED IF REQUIRED BY THE PROJECT OFFICER. REFER TO STAKING DETAILS.

ALL PLANTS MUST BE WATERED TWICE: ONCE AT INSTALLATION AND AGAIN WITHIN 48-HOURS OF INSTALLATION, PER THE SPECIFICATIONS.

THIS DETAIL SUPERSEDES ALL OTHER TREE PLANTING DETAILS IN ARLINGTON COUNTY.



TREE PLANTING DETAIL

NOT TO SCALE

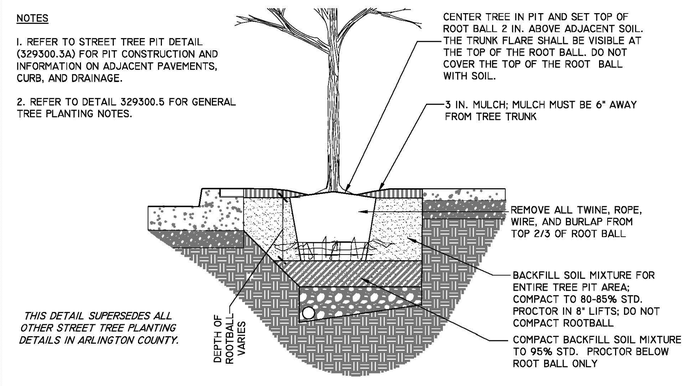
FOR OPEN PLANTING AREAS FREE OF PAVING OR GRATES
02930.1 (2013)

ARLINGTON DPR

NOTES

1. REFER TO STREET TREE PIT DETAIL (329300.3A) FOR PIT CONSTRUCTION AND INFORMATION ON ADJACENT PAVEMENTS, CURB, AND DRAINAGE.

2. REFER TO DETAIL 329300.5 FOR GENERAL TREE PLANTING NOTES.



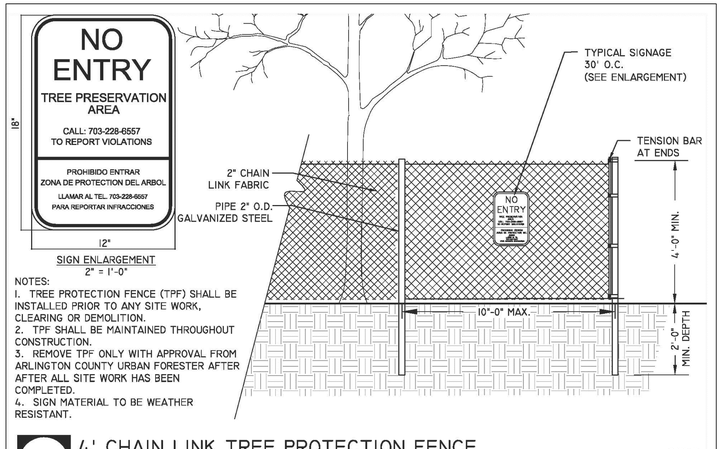
THIS DETAIL SUPERSEDES ALL OTHER STREET TREE PLANTING DETAILS IN ARLINGTON COUNTY.

STREET TREE PLANTING PIT (SHEET 2 OF 2)

1/2" = 1'-0"

FOR TREE PLANTING PITS IN RIGHT-OF-WAY & ADJACENT TO PAVING
329300.3B (2016) (02930.3B)

ARLINGTON DPR



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

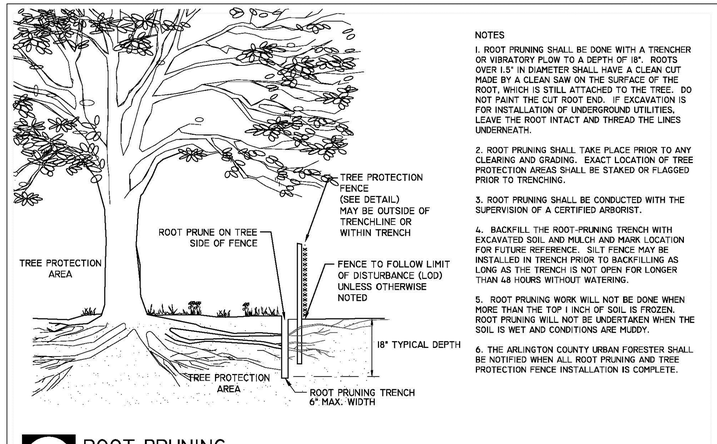
4' CHAIN LINK TREE PROTECTION FENCE

02231.2

ELEVATION

1/2" = 1'-0"

ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF PARKS & RECREATION



NOTES

1. ROOT PRUNING SHALL BE DONE WITH A TRENCHER OR VIBRATORY PLOW TO A DEPTH OF 18". ROOTS OVER 1.5" IN DIAMETER SHALL HAVE A CLEAN CUT MADE BY A CLEAN SAW ON THE SURFACE OF THE ROOT, WHICH IS STILL ATTACHED TO THE TREE. DO NOT PAINT THE CUT ROOT END. IF EXCAVATION IS FOR INSTALLATION OF UNDERGROUND UTILITIES, LEAVE THE ROOT INTACT AND THREAD THE LINES UNDERNEATH.

2. ROOT PRUNING SHALL TAKE PLACE PRIOR TO ANY CLEARING AND GRADING. EXACT LOCATION OF TREE PROTECTION AREAS SHALL BE STAKED OR FLAGGED PRIOR TO TRENCHING.

3. ROOT PRUNING SHALL BE CONDUCTED WITH THE SUPERVISION OF A CERTIFIED ARBORIST.

4. BACKFILL THE ROOT-PRUNING TRENCH WITH EXCAVATED SOIL AND MULCH AND MARK LOCATION FOR FUTURE REFERENCE. SILT FENCE MAY BE INSTALLED IN TRENCH PRIOR TO BACKFILLING AS LONG AS THE TRENCH IS NOT OPEN FOR LONGER THAN 48 HOURS WITHOUT WATERING.

5. ROOT PRUNING WORK WILL NOT BE DONE WHEN MORE THAN THE TOP 1 INCH OF SOIL IS FROZEN. ROOT PRUNING WILL NOT BE UNDERTAKEN WHEN THE SOIL IS WET AND CONDITIONS ARE MUDDY.

6. THE ARLINGTON COUNTY URBAN FORESTER SHALL BE NOTIFIED WHEN ALL ROOT PRUNING AND TREE PROTECTION FENCE INSTALLATION IS COMPLETE.

ROOT PRUNING

02231.5

SECTION

NOT TO SCALE

ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF PARKS & RECREATION

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
John Lightle
Lic. No. 1957
07/30/19
LANDSCAPE ARCHITECT

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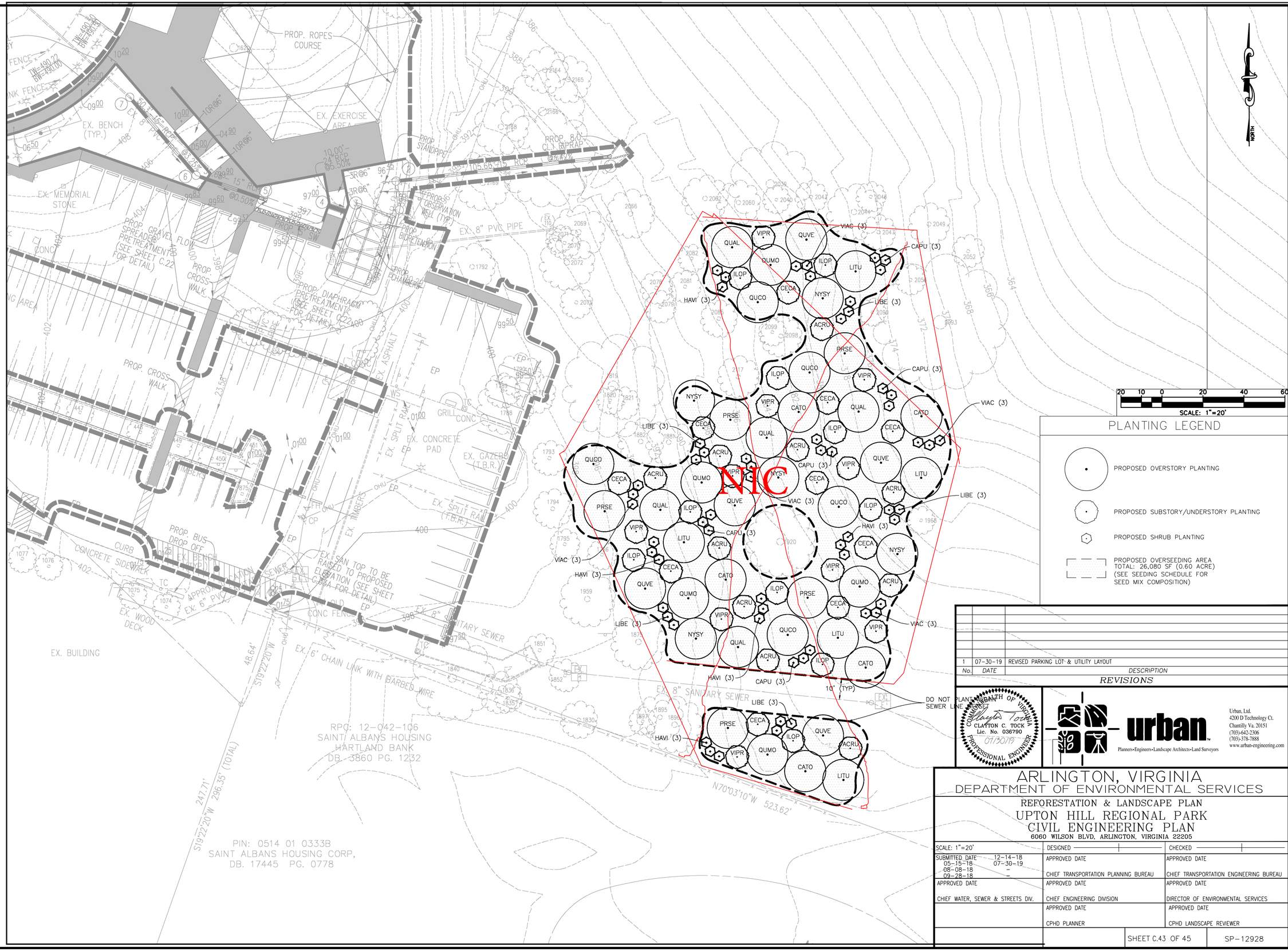
ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

LANDSCAPE DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.42 AOF 45 — SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-07-TREE PRES LANDSCAPE.dwg [LANDSCAPE PLAN DETS (2)] October 02, 2019 – 6:59pm jdelapra



PLANTING LEGEND

- PROPOSED OVERSTORY PLANTING
- PROPOSED SUBSTORY/UNDERSTORY PLANTING
- PROPOSED SHRUB PLANTING
- PROPOSED OVERSEEDING AREA TOTAL: 26,080 SF (0.60 ACRE) (SEE SEEDING SCHEDULE FOR SEED MIX COMPOSITION)

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

REFORESTATION & LANDSCAPE PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=20'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.43 OF 45	SP-12928

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REFORESTATION AREA VEGETATION SCHEDULE

PLANTING SCHEDULE

SPECIES GROUP	SYMBOL	SPECIES	QUANTITY	PLANT SIZE	PLANT SPACING
OVERSTORY LAYER	CATO	CARYA TOMENTOSA (MOCKERNUT HICKORY)	5	2" CALIPER	PER PLAN
	LITU	LIRIODENDRON TULIPIFERA (TULIP POPLAR)	5	2" CALIPER	PER PLAN
	NYSY	NYSSA SYLVATICA (BLACK GUM)	5	2" CALIPER	PER PLAN
	PRSE	PRUNUS SEROTINA (BLACK CHERRY)	5	2" CALIPER	PER PLAN
	QUAL	QUERCUS ALBA (WHITE OAK)	5	2" CALIPER	PER PLAN
	QUCO	QUERCUS COCCINEA (SCARLET OAK)	5	2" CALIPER	PER PLAN
	QUMO	QUERCUS MONTANA (CHESTNUT OAK)	5	2" CALIPER	PER PLAN
	QUVE	QUERCUS VELUTINA (BLACK OAK)	5	2" CALIPER	PER PLAN
		OVERSTORY SUBTOTAL	**40**		
SUBCANOPY/ UNDERSTORY LAYER	ACRU	ACER RUBRUM (RED MAPLE)	8	3 GALLON	PER PLAN
	CECA	CERCIS CANADENSIS (EASTERN REDBUD)	8	3 GALLON	PER PLAN
	ILOP	ILEX OPACA (AMERICAN HOLLY)	8	3 GALLON	PER PLAN
	VIPR	VIBURNUM PRUNIFOLIUM (BLACK-HAW)	8	3 GALLON	PER PLAN
		SUBCANOPY/UNDERSTORY SUBTOTAL	**32**		
SHRUB LAYER	CAPU	CASTANEA PUMILA (AMERICAN CHINQUAPIN)	15	1 GALLON	PER PLAN
	HAVI	HAMAMELIS VIRGINIANA (WITCH HAZEL)	15	1 GALLON	PER PLAN
	LIBE	LINDERA BENZOIN (NORTHERN SPICEBUSH)	15	1 GALLON	PER PLAN
	VIAC	VIBURNUM ACERIFOLIUM (MAPLE-LEAF VIBURNUM)	15	1 GALLON	PER PLAN
		SHRUB SUBTOTAL	**60**		
		REFORESTATION AREA QUANTITY TOTAL	**132**		

REFORESTATION AREA SEEDING SCHEDULE

SEEDING SCHEDULE

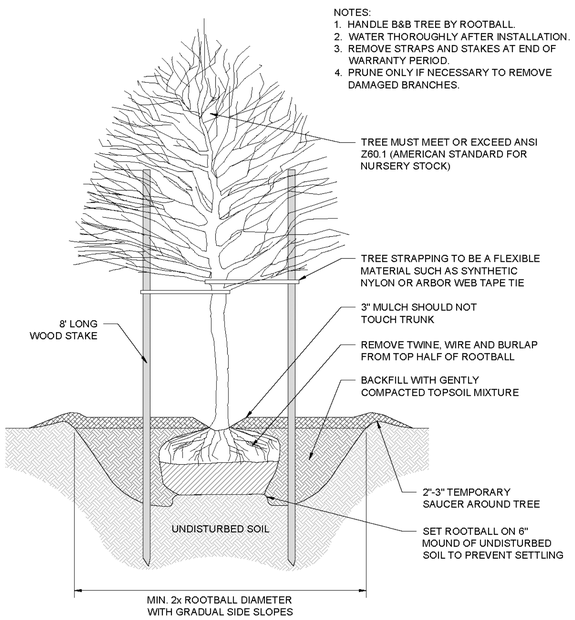
SEEDING ZONE	SPECIES GROUP	SPECIES	SEEDING RATE (LBS/AC)	SEEDING AREA (AC)	QUANTITY (LBS)
REFORESTATION AREA SEED MIX	1	LOLIUM MULTIFLORUM (ANNUAL RYEGRASS)	10.00	0.60	6.00
		SETARIA ITALICA (ITALIAN BRISTLE GRASS)	10.00	0.60	6.00
	2	COREOPSIS LANCEOLATA (LANCE-LEAVED COREOPSIS)	8.00	0.60	4.80
		DICHANTHELIUM CLANDESTINUM (DEER TONGUE GRASS)	8.00	0.60	4.80
		PANICUM VIRGATUM (SWITCHGRASS)	8.00	0.60	4.80
		SORGHASTRUM NUTANS (INDIANGRASS)	8.00	0.60	4.80
		TRIDENS FLAVUS (PURPLETOP)	8.00	0.60	4.80
	3	ASCLEPIAS TUBEROSA (BUTTERFLY MILKWEED)	0.10	0.60	0.06
		APOCYNUM CANNABINUM (INDIANHEMP)	0.10	0.60	0.06
		EUPATORIUM PERFOLIATUM (BONESET)	0.10	0.60	0.06
		EUTHAMIA CAROLINIANA (SLENDER GOLDENTOP)	0.10	0.60	0.06
		ANDROPOGON VIRGINICUS (BROOMSEDGE BLUESTEM)	0.10	0.60	0.06
	4	ASCLEPIAS SYRIACA (COMMON MILKWEED)	0.20	0.60	0.12
		JUNCUS TENUIS (PATH RUSH)	0.20	0.60	0.12
		PENSTEMON DIGITALIS (PENSTEMON)	0.20	0.60	0.12
		VERBESINA ALTERNIFOLIA (WINGSTEM)	0.20	0.60	0.12
	5	HELIOPSIS HELIANTHOIDES (OXEYE SUNFLOWER)	0.20	0.60	0.12
		RUDBECKIA HIRTA (BLACK EYED SUSAN)	0.20	0.60	0.12
		SENNA HEBECARPA (WILD SENNA)	0.20	0.60	0.12
	6	AMELANCHIER CANADENSIS (CANADIAN SERVICEBERRY)	0.50	0.60	0.30
		HAMAMELIS VIRGINIANA (WITCH HAZEL)	0.50	0.60	0.30
		VIBURNUM DENTATUM (SOUTHERN ARROW WOOD)	0.50	0.60	0.30
		VIBURNUM PRUNIFOLIUM (BLACK-HAW)	0.50	0.60	0.30
	7	ACER RUBRUM (RED MAPLE)	0.50	0.60	0.30
		CARPINUS CAROLINIANA (MUSCLEWOOD)	0.50	0.60	0.30
		CERCIS CANADENSIS (EASTERN REDBUD)	0.50	0.60	0.30
		CORNUS FLORIDA (FLOWERING DOGWOOD)	0.50	0.60	0.30
		NYSSA SYLVATICA (BLACK GUM)	0.50	0.60	0.30
		PLATANUS OCCIDENTALIS (AMERICAN SYCAMORE)	0.50	0.60	0.30
		SEEDING TOTALS	66.90	0.60	**40.14**

SEEDING SCHEDULE NOTES:

1. It is expected and preferred that all species in each of the Species Groups are planted. The tolerances listed in this note are intended to incorporate flexibility according to species availability. At a minimum, Contractor to provide at least:
   a) all of Group 1,
   b) 4 of the 5 species in Group 2,
   f) 4 of the 5 species in Group 3,
   d) 3 of the 4 species in Group 4,
   e) 2 of the 3 species in Group 5,
   f) 3 of the 4 species in Group 6,
   g) 5 of the 6 species in Group 8,
2. The planted trees and shrubs shall be randomly spaced and species mixed throughout the planting areas.
3. All seeding rates are expressed in pounds of pure live seed (PLS).

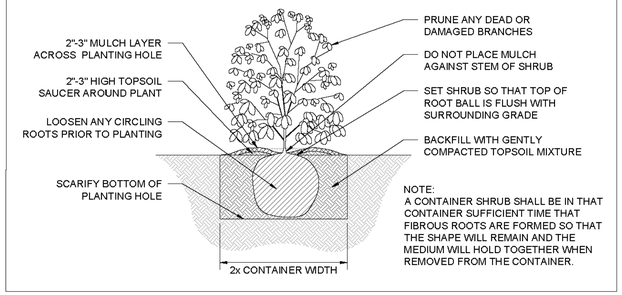
B&B TREE PLANTING DETAIL

NOT TO SCALE



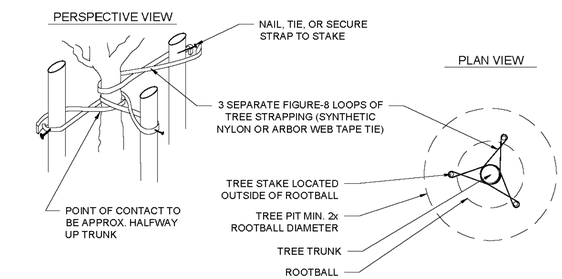
CONTAINER TREE/SHRUB PLANTING DETAIL

NOT TO SCALE



TREE STRAPPING DIAGRAM

NOT TO SCALE



PLANTING SPECIFICATIONS

1. AN□ N□RSER□ S□PPL□ING THE STOC□ SHALL PRO□IDE A C□RRENT N□RSER□ INSPECTION CERTIFICATE FROM THE STATE DEPARTMENT OF AGRIC□LT□RE□OR PRO□IDE AT LEAST THIRT□ DA□S AD□ANCE NOTICE FOR O□NER TO INSPECT THE PLANT SO□RCE AREAS AT O□NER'S DISCRETION. AN□ S□CH INSPECTION IS NOT DEEMED APPRO□AL OF THE PLANT MATERIALS.
2. ALL PLANTS SHALL BE SET STRAIGHT□OR PL□MB.
3. PLANTING HOLES FOR CONTAINER GRO□N PLANTS SHALL BE ONE FOOT □□DEEP PL□S THE CONTAINER DEPTH IN □HICH THE PLANT HAS BEEN GRO□N AND T□O FEET □2□□ IDER THAN CONTAINER.
4. BAC□FILL THE PLANTING HOLES □ITH THE IN□SIT□ SOIL MATERIALS REMO□ED FOR PLANTING AFTER REMO□ING ALL STONES□ROOTS□AND OTHER DEBRIS GREATER THAN □□□2" IN□DIAMETER.
5. FOLLO□ING THE BAC□FILLING□□ ATER TO THE POINT OF SOIL SAT□RATION AND TAMP TO COMPACT THE BAC□FILL MI□T□RE. ADD E□ISTING SOIL TO BRING THE FINAL GRADE IN THE PLANTING HOLE TO THE S□RRO□NDING SOIL S□RFACE. RA□E THE □N□SED E□ISTING SOIL O□TSIDE THE PLANTING HOLES□TA□ING CARE NOT TO MO□ND THE SOIL OR TO SIGNIFICANTL□ ALTER THE E□ISTING GRADES AND THEN PLACE M□LCH□MIN. 2" THIC□□ATOP ENTIRE PLANTING HOLE. THE PLANTING HOLE AREAS M□ST NOT BE DEPRESSED BELO□ THE S□RRO□NDING SOIL S□RFACE ELE□ATIONS. SAID AREAS SHALL BE SLIGHTL□ RAISED □2□"□RELATI□E TO THE SOIL S□RFACE.
6. THE SHR□BS THAT ARE SPECIFIED AS CONTAINER GRO□N SPECIMENS SHALL BE BET□EEN □□" AND □□" IN HEIGHT. THE□ SHALL BE HEALTH□□ □IGORO□S□□ ELL ROOTED AND ESTABLISHED IN THE PLANTING CONTAINER IN □HICH THE□ ARE GRO□ING. A CONTAINER SHR□B SHALL BE IN THAT CONTAINER A S□FFICIENT TIME S□CH THAT FIBRO□S ROOTS ARE FORMED SO THE SHAPE □ILL REMAIN AND THE MEDI□M □ILL HOLD TOGETHER □HEN REMO□ED FROM THE CONTAINER□REFER TO AMERICAN STANDARD FOR N□RSER□ STOC□□
7. DO NOT REMO□E PLANTS FROM CONTAINERS □NTIL IMMEDIATEL□ BEFORE PLANTING. E□AMINE THE ROOTS TO SEE IF THE□ ARE POT BO□ND. CAREF□LL□ SEPARATE AN□ POT BO□ND OR CRAMPED ROOTS AND SPREAD THEM O□T □HEN PLACING THE PLANT SO THAT THE ROOTS CAN GRO□ □ITHO□T F□RTHER CONSTRICTION OF THE ROOT BALL.
8. FERTILI□E EACH PLANT □ITH A 2□GRAM TABLET OF FERTILI□ER. GENERALL□□FOR EACH □2 TO □□ INCHES OF PLANT HEIGHT OR FOR EACH □2" OF TREE DIAMETER AT THE BASE□□SE 2□GRAMS FOR SLO□ GRO□ING PLANTS OR 4□ GRAMS FOR FAST GRO□ING PLANTS OR POOR SOIL SIT□ATIONS. SAID FERTILI□ER TABLETS SHALL BE AGRIFORM 2□□□□□ OR APPRO□ED E□□I□ALENT□APPLIED IN ACCORDANCE □ITH MAN□FACT□RER'S RECOMMENDATIONS.
9. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING NON□S□R□□ING TREES AND SHR□BS D□RING THE CARE AND REPLACEMENT PERIOD □2 MONTHS□□NLESS OTHER□ISE SPECIFIED IN CONTRACT DOC□MENTS□OR □NTIL FINAL ACCEPTANCE□□ HICHE□ER IS THE SHORTEST□AS RE□□IRED B□ THE TERMS OF THE S□R□□AL □ARRANT□ SPECIFIED HEREIN AND□OR IN CONTRACT DOC□MENTS. THE SPECIFICATIONS FOR THE REPLACED PLANTS SHALL BE THOSE PRO□IDED IN THE PLANT LIST.
10. REFER TO APPLICABLE DETAILS □ITHIN THIS PLAN SET FOR ADDITIONAL G□IDANCE ON PLANTING RE□□IREMENTS.

PLANTING SURVIVAL WARRANTY

1. LANDSCAPE CONTRACTOR SHALL G□ARANTEE A MINIM□M S□R□□AL RATE OF EACH □EGETATION SPECIES AFTER □2 MONTHS OF □□□ FOR B□B AND CONTAINER GRO□N STOC□.
2. IF S□R□□AL RATES ARE LESS THAN THE ABO□E □ ARRANT□ RATES□THEN LANDSCAPE CONTRACTOR SHALL REPLACE THE □□ANTIT□ OF DEAD PLANTS □ITHIN THE NE□T PLANTING □INDO□ FOLLO□ING THE END OF THE APPLICABLE □ARRANT□ PERIOD.

SEEDING SPECIFICATIONS

1. SEED SHALL HA□E BEEN COLLECTED THE SAME □EAR OF SEEDING. A SEED GERMINATION AND P□RIT□ RATE OF □□□ IS RE□□IRED. E□IDENCE OF S□CH SHALL BE PRO□IDED TO O□NER PRIOR TO PLANTING.
2. THE LANDSCAPE CONTRACTOR SHALL INSPECT THE AREAS AND CONDITIONS □NDER □HICH THE SEEDING □ OR□ IS TO BE PERFORMED PRIOR TO COMMENCING □ OR□. IF CONDITIONS ARE DETRIMENTAL TO THE PROPER AND TIMEL□ COMPLETION OF THE □ OR□□HE□SHE SHALL NOTIF□ THE O□NER □ERBALL□ AND IN □RITING AND POSTPONE COMMENCING □ OR□ □NTIL THE □NSATISFACTOR□ CONDITIONS HA□E BEEN CORRECTED.
3. CARE SHO□LD BE E□ERCISED TO INS□RE □NIFORM SEED CO□ERAGE IS OBTAINED. SEED SHALL BE APPLIED AT THE RATE SPECIFIED ON THE PLANTING SCHED□LE.
4. THE SPECIFIED SEED SHALL BE O□ERSEEDED IN THE DESIGNATED AREA AS SHO□N ON THE PLANTING PLAN.

PRODUCT HANDLING, STORAGE, AND DELIVERY

1. HANDLE PLANTS AT ALL TIMES SO THAT ROOTS OR BALLS ARE ADE□□ATEL□ PROTECTED FROM BREA□AGE OF BALLS□FROM S□N AND DR□ING □INDS. PLANTS □ITH DRIED O□T TOPS OR ROOTS SHALL BE RE□ECTED.
2. ALL PLANT MATERIALS SHALL BE STORED AND DELI□ERED IN S□CH A FASHION AND FOR TIME INTER□ALS CONSISTENT □ITH SO□ND SIL□IC□LT□RAL PRACTICES.
3. PLANT MATERIAL □ILL BE TRANSPORTED FROM THE N□RSER□ TO THE PLANTING AREAS B□ S□CH MEANS AS TO A□OID □IND DAMAGE□O□ER CRO□DING□OR OTHER MECHANISMS B□ □HICH PH□SICAL DAMAGE MA□ RES□LT TO THE PLANTS.
4. PLANT MATERIAL MA□ BE RANDOML□ INSPECTED B□ THE O□NER □PON ARRI□AL AT EACH PLANTING AREA AND D□RING PLANTING ACTI□ITIES. MATERIAL FO□ND TO BE □NACCEPTABLE □ILL BE RE□ECTED AND THE CONTRACTOR □ILL BE RE□□IRED TO S□PPL□ REPLACEMENT MATERIAL □ITHIN A REASONABLE TIME FRAME □LE. □□□ EE□□ □NACCEPTABLE MATERIAL IS TO BE DEFINED AS THE FOLLO□ING:
   - A□PLANTS □ITH BENT TR□N□S OR M□LTIPLE LEADERS□□NLESS CHARACTERISTIC FOR THE SPECIES□
   - B□PLANTS □ITH DISEASED TR□N□S□STEMS□OR LEA□ES□
   - C□PLANTS □ITH PEST□INFESTED TR□N□S□STEMS□OR LEA□ES□
   - D□PLANTS OF INS□FFICIENT SI□E□LESS THAN A SPECIFIED HEIGHT OR CALIPER□□
   - E□PLANTS OF THE □RONG SPECIES□S□B□SPECIES□
   - F□PLANTS HA□ING ROOT GIRDLING IN THE CONTAINER□

   □NLESS OTHER□ISE APPRO□ED B□ THE O□NER. □□STIFICATION FOR □SE OF TENTATI□EL□ RE□ECTED MATERIAL MA□ BE PRESENTED TO THE O□NER.

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

urban™
Planners•Engineers•Landscape Architects•Land Surveyors

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4200 D Technology Ct.
Chantilly Va. 20151
(703)-642-2306
(703)-378-7888
www.urban-engineering.com

ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

REFORESTATION & LANDSCAPE DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A		DESIGNED	CHECKED
SUBMITTED DATE	12-14-18	APPROVED DATE	APPROVED DATE
05-15-18	07-30-19		
08-08-18	–		
09-28-18	–	CHIEF TRANSPORTATION PLANNING BUREAU	CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE		APPROVED DATE	APPROVED DATE
CHIEF WATER, SEWER & STREETS DIV.		CHIEF ENGINEERING DIVISION	DIRECTOR OF ENVIRONMENTAL SERVICES
		APPROVED DATE	APPROVED DATE
		CPHD PLANNER	CPHD LANDSCAPE REVIEWER

SHEET C.44 OF 45 | SP-12928

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Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description
←→	4	S2	D180	N.A.	0.900	LSI 2/XGBM-5-LED-SS-NW, RTPB5-S11G-18-D180-F-20SRTBC, 20' AFG
→	4	SA	SINGLE	N.A.	0.900	LSI 1/XGBM-3-LED-SS-NW-HSS, RTPB5-S11G-18-S-F-20SRTBC, 20' AFG
→	5	S	SINGLE	N.A.	0.900	LSI 1/XGBM-FT-LED-SS-NW-HSS, RTPB5-S11G-18-S-F-20SRTBC, 20' AFG

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
PAVEMENT	Illuminance	Fc	2.46	8.2	0.5	4.92	16.40

RPC: 12-042-105
NORTHERN VA REGIONAL PARK AUTHORITY
PARCEL B
DB. 1808 PG. 253
23.41613 ACRES

PIN: 0513 18 E
SCA-SPE LLC
DB. 23671 PG. 1646

PIN: 0514-01-0001
NORTHERN VA REGIONAL PARK AUTHORITY
PARCEL A
DB. 3764 PG. 55
3.11833 ACRES

RPC: 12-042-106
SAINT ALBANS HOUSING
HARTLAND BANK
DB. 3860 PG. 1232

VA STATE GRID NORTH
N 7003435
E 11868824
N 7003437
E 11869559
N 7003275.08
E 11868854.31
N 7002956
E 11868810
N 7002969.14
E 11869170.69
N19°22'01"E 1014.14' (TOTAL)
431.59'
S19°22'20"W 48.64'
247.71'
296.35' (TOTAL)
N46°58'40"W 417.17'
35.09'
92'

STEPS
EX. TIMBERS
EX. BATTING CAGE
EX. ASPHALT
CONTRACTOR TO NOSE DOWN CURB
EX. CHAIN LINK FENCE
EX. 4' CHAIN LINK
EX. MINI GOLF
EX. WATER PARK
EX. ASPHALT PARKING AREA
EX. EDGE OF ASPHALT
ARLINGTON COUNTY / FAIRFAX COUNTY (APPROXIMATE)
AREA OF MILLING/PAVING/STRIPING CONSIDERED MAINTENANCE AND NOT DISTURBED AREA
PROP. TICKET BOOTH
PROP. WOODEN DECK
PROP. BLD FF=409.50
PROP. CANOPY
PROP. ROPES COURSE
EX. EXERCISE AREA (B.R.)
PROP. 8' SW
PROP. 5' SW
PROP. 6' SW
PROP. LIGHT (TYP.)
PROP. WHEEL STOP (TYP.)
PROP. WHEEL STOP
PROP. CROSSWALK
EX. MEMORIAL STONE
EX. CONCRETE BENCH
EX. CONCRETE SIDEWALK (TYP.)
EX. 6' CHAIN LINK WITH BARBED WIRE
OHU
EP
CP
TC
HC

No.	DATE	DESCRIPTION
1	07-30-19	REVISED PARKING LOT & UTILITY LAYOUT

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES
LIGHTING PLAN
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: 1"=25'	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.44AOF 45	SP-12928

Urban, Ltd. – I:\JOBS\UPTON HILL PARK\SP\12928-40-LIGHTING PLAN.dwg [LIGHTING PLAN 02] August 16, 2019 – 11:11am rjafari

AirLink™
enabled by Synapse®

Wireless Lighting Controller

The AirLink integrated controller is a California Title 24 compliant lighting controller that provides real-time light monitoring and control with utility-grade power monitoring. It includes a 24V sensor input and power supply to connect up to two (2) sensors into the outdoor AirLink wireless lighting system.

The wireless integrated controller and twist lock controller are compatible with this fixture.

Features

- 2% Utility Grade Power Monitoring
- Up to 80% Savings through smart dimming
- True On/Off functionality via switched relay
- Seamlessly integrates into the outdoor AirLink wireless lighting control solution & Self-healing Mesh Networking
- Relay closes on power loss
- Supports a wide range of LED drivers and fixtures
- Class 1 / Class 2 0-10V Dimming Control
- Direct Connect up to two (2) to 24V Occupancy Sensors and Photocells (consult sales for compatible list)
- Secure, over-the-air upgrades to support future enhancements
- Excellent RF Range — 1,000ft LoS between controllers
- Available in a metal cased version with quick connect terminal blocks
- Lights default to on for safety

Specifications

Regulatory Approvals

- FCC, IC, CE certified
- cULus Listed
- California Title 24 compliant

Power and Performance

- Operating environmental: -40°F to 131°F (-40°C to 55°C)
- Input power: 100–277 VAC +/- 10% (Max 305V)47/64 Hz
- Switched output: Default ON; Zero Cross Switching
- Load rating: 5A @ 100V to 277V (+/- 10%)
- Dimming: 0–10V control; Output: Class 1/2 - 20mA Source Max / 50mA Sink Max
- Power monitoring: Utility grade - 2% accuracy
- Sensors inputs: 0–10V (photocell sensors), 0–24V (all other sensors); Sensor power supply: 24VDC @ 50mA

Other

- Dimensions: 8.2" L x 2.3" W x 1.3" H (209mm L x 59mm W x 33mm H) without antennas
- Radio: SNAP 2.4 GHz; 802.15.4; +20 dBm Transmit Power; -105 dBm Receive Sensitivity
- Warranty: 5 years

Contact LSI Controls

Sales
controls.sales@lsi-industries.com

Support
controls.support@lsi-industries.com
1 (800) 436-7800 (support, option 8)

More information
For more information on AirLink, visit our website at www.lsi-airlink.com/airlink

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LED AREA LIGHTS - (XGBM)

BUG LISTING

XGBM - Type 3

Drive Current	Color Temp.*	Lumens	Watts	LER	BUG Rating
HO	CW	26,754	300	89	B3-U0-G3
	CW-HSS	17,316	288	60	B2-U0-G2
	NW	22,240	289	77	B3-U0-G2
	NW-HSS	13,941	288	48	B2-U0-G2
LW	CW	14,082	140	100	B2-U0-G2
	CW-HSS	9205	137	67	B1-U0-G2
	NW	11_451	137	84	B2-U0-G2
	NW-HSS	7513	136	55	B1-U0-G2
SS	CW	20181	187	108	B3-U0-G3
	CW-HSS	13,034	187	70	B2-U0-G2
	NW	16,394	189	87	B3-U0-G2
	NW-HSS	10,384	189	55	B2-U0-G2

XGBM - Type FT

Drive Current	Color Temp.*	Lumens	Watts	LER	BUG Rating
HO	CW	29,070	301	97	B2-U0-G4
	CW-HSS	20,964	288	73	B1-U0-G4
	NW	23,512	289	81	B2-U0-G4
	NW-HSS	17,191	289	60	B1-U0-G3
LW	CW	15,019	141	107	B1-U0-G3
	CW-HSS	11,519	137	84	B1-U0-G3
	NW	12,217	136	90	B1-U0-G3
	NW-HSS	9365	136	69	B1-U0-G3
SS	CW	20,700	187	111	B2-U0-G3
	CW-HSS	15,273	187	82	B1-U0-G3
	NW	17,230	189	91	B1-U0-G3
	NW-HSS	12,597	189	67	B1-U0-G3

* Color Temperature: NW-4000K, CW-5000K

XGBM - Type 5

Drive Current	Color Temp.*	Lumens	Watts	LER	BUG Rating
HO	CW	25,464	300	85	B4-U0-G2
	NW	20,549	288	71	B4-U0-G2
LW	CW	13,842	140	99	B3-U0-G2
	NW	11,291	136	83	B3-U0-G2
SS	CW	18,044	186	97	B4-U0-G2
	NW	15,173	189	80	B4-U0-G2

XGBM - Type FTA

Drive Current	Color Temp.*	Lumens	Watts	LER	BUG Rating
HO	CW	31,808	301	106	B4-U0-G4
	CW-HSS	20,838	288	72	B3-U0-G3
	NW	25,407	289	88	B3-U0-G3
	NW-HSS	16,855	289	58	B3-U0-G2
LW	CW	16,560	140	118	B3-U0-G2
	CW-HSS	11,440	137	84	B2-U0-G2
	NW	13,473	136	99	B3-U0-G2
	NW-HSS	9277	136	68	B2-U0-G2
SS	CW	23,033	187	123	B3-U0-G3
	CW-HSS	15,213	187	81	B3-U0-G2
	NW	18,752	189	99	B3-U0-G3
	NW-HSS	12,516	189	66	B2-U0-G3

Project Name _____ Fixture Type _____ 10/16/17
Catalog # _____ © 2017 LSI INDUSTRIES INC.

LED AREA LIGHTS - (XGBM)

LUMINAIRE ORDERING INFORMATION

TYPICAL ORDER EXAMPLE: **XGBM 5 LED HO CW UE WHT PCM**

Prefix	Distribution	Light Source	Drive Current	Color Temperature	Input Voltage	Finish	Optional Controls	Optional Sensor/Options
XGBM[1] – LED Greenbriar	FT - Forward Throw FRA - Forward Throw - Automotive 3 - Type III 5 - Type V	LED	LW - Low Watt SS - Super Saver HO - High Output	CW - Cool White (5000K) NW - Neutral White (4000K)	UE - Universal Voltage (120-277) 347-480	BLK - Black BRZ - Bronze GPT - Graphite MSV - Metallic Silver PLP - Platinum Plus SVG - Satin Verde Green WHT - White **Optional Color Decals** 45 – Light Gold 20 – Charcoal Metallic 55 – Black 94 – Blue Metallic 59 – Dark Green 51 – Dark Red 21 – Tomato Red 50 – White 700 – Aztec Silver Metallic	**Wireless Control System[2,3]** (blank) - None POW - Platinum Control System POWH - HostSate!le Platinum Control System GCW - Gold Control System GCWH - HostSate!le Gold Control System DIM - 0-10 volt dimming (required for sate!le fixtures) ALSC - AirLinx Synapse Control System ALSCH - AirLinx Synapse Control System - HostSate!le **Stand-Alone Control** (blank) – None DIM - 0-10 volt dimming[4] (from external signal) BLS – Bi-level Switching[5] (from external signal – required 120-277V controls system voltage)	**Sensor** IMS - Integral Motion Sensor[6] PC120 - 120V Button-Type Photocell PC208 - 208V Button-Type Photocell PC240 - 240V Button-Type Photocell PC277 - 277V Button-Type Photocell PC347 - 347V Button-Type Photocell **Options** BRK - 8" Bracket (S and D180 only) TB - Terminal Block

LUMINAIRE EPA CHART[1] - XGBM

	8" Bracket	12" Bracket
Single	2.3	2.4
D180°	4.7	4.8
D90°	12" Bracket Required	4.7
T90°		7.2
T120°		7.3
Q90°		8.8

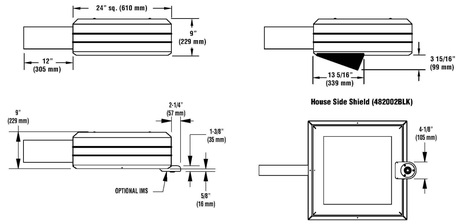
Note: House Side Shield adds to fixture EPA. Consult Factory.

ACCESSORY ORDERING INFORMATION[2] (Accessories are field installed)

Description	Order Number	Description	Order Number
XGBM-HSS: House Side Shield (Black only)	482002 BLK	DPK208, 240 Double Fusing (208V, 240V)	DPK208,240F
RPPP - Round Pole Plate	16291-BLK	DPK480 Double Fusing (480V)	DPK480F
BKS-BO-WM-*, CLR - Wall Mount Plate	1231110 CLR	FK347 Single Fusing (347V)	FK347I
RKA-BO-RA-B-CLR - Radius Arm	16921DQ,R	PMOS1120 - 120V Pole-Mount Occupancy Sensor	518200QLR[8]
BKU-BO-S-19-CLR - Upsweep Bracket for round or square poles	144191CLR	PMOS208/240 - 208, 240V Pole-Mount Occupancy Sensor	534219QLR[8]
FK120 Single Fusing (120V)	FK120F	PMOS277 - 277V Pole-Mount Occupancy Sensor	518029QLR[8]
FK277 Single Fusing (277V)	FK277F	PMOS480 - 480V Pole-Mount Occupancy Sensor	534240QLR[8]

FOOTNOTES:
1- Use with 3' traditional drilling pattern.
2- For wireless controls information and accessories, see Controls section.
3- Requires a SiteManager and override switch. Not compatible with BLS or IMS option.
4- Not compatible with IMS or BLS option.
5- Not compatible with wireless controls system, DIM or IMS option.
6- Not compatible with wireless controls system, DIM or BLS option.
7- House Side Shields add to fixture EPA. Consult factory.
8- Fusing must be located in the hand hole of pole.
9- To be used with any of the PCM/GCM wireless controls systems in the fixture. Consult factory.
10- Photocell must be ordered separately. 7 pin standard. See Accessories.

DIMENSIONS



Project Name _____ Fixture Type _____ 10/16/17
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LED AREA LIGHTS - (XGBM)

Shown with optional decal striping

DOE LIGHTING FACTS

Department of Energy has verified representative product test data and results in accordance with its Lighting Facts Program. Visit www.lightingfacts.com for specific catalog strings.

LIGHT OUTPUT - XGBM

		Lumens (Nominal)				Watts (Nominal)
		Type 3	Type 5	Type FT	Type FTA	
Cool White	LW	14080	13840	15020	16560	140
	SS	20180	18040	20700	23030	187
	HO	26750	25460	29070	31810	300
Neutral White	LW	11450	11290	12220	13470	136
	SS	16390	15170	17230	18750	188
	HO	22240	20550	23510	25410	288

LED Chips are frequently updated therefore values may increase.

This product, or selected versions of this product, meet the standards listed below. Please consult factory for your specific requirements.

RoHS COMPLIANT · FC · CE · cULus wet location · ARRA Funding Compliant · IP67 · DLC

Fixtures comply with ANSI C136.31-2010 American National Standard for Roadway Lighting Equipment - Luminaire Vibration 3G requirements.

US patent D574994 & 7,828,456 and MX patent 29631 and US & Int'l. patents pending

SMARTTEC™ THERMAL CONTROL - LSI drivers feature integral sensor which reduces drive current when ambient temperatures exceed rated temperature.

OCCUPANCY SENSING (IMS) – Optional integral passive infrared motion sensor activates switching of luminaire light levels. High level light is activated and increased to full bright in 1-2 seconds upon detection of motion. Low light level (30% maximum drive current) is activated when target zone is absent of motion activity for ~2 minutes and ramps down (10-15 seconds) to low level to allow eyes time to adjust. Sensor is located on the front of optical assembly and rotates with the optic. Sensor optic has a detection cone of approximately 45°. Examples of detection – occurs 30' out from a 30' mounting height pole; occurs 20' out from a 20' mounting height pole.

ENERGY SAVING CONTROL OPTIONS – DIM – 0-10 volt dimming enabled with controls by others. BLS – Bi-level switching responds to external line voltage signal from separate 120-277V controller or sensor (by others), with low light level decreased to 30% maximum drive current.

LEDS - Select high-brightness LEDs in Cool White (5000K) or Neutral White (4000K) color temperature, 70 CRI.

DISTRIBUTION/PERFORMANCE - Types 3, 5, FT and FTA available - field rotatable reflectors.

HOUSING - Square, die-formed aluminum. Fully enclosed weather-tight housing contains factory prewired drivers and field connections.

TOP-ACCESS COVER - Gasketed, tethered top-access cover provides ease of installation and allows for easy driver access. Four captive stainless-steel fasteners secure the top-access cover to the housing.

OPTICAL UNIT - Clear tempered optical grade flat glass lens sealed to aluminum housing creates an IP67 rated, sealed optical unit (includes pressure stabilizing breather). Optical unit can be easily field rotated in 90o increments. Directional arrow on optics allows alignment without the unit being energized.

MOUNTING - 2-1/2" x 5-3/8" x 12" extruded aluminum arm mounting bracket shipped standard. Use with 5" traditional drilling pattern. Round Pole Plate (RPP2) required for mounting to 3"– 5" round poles. (See Accessory Ordering Information chart.)

ELECTRICAL - Two-stage surge protection (including separate surge protection built into electronic driver) meets IEEE C62.41.2-2002, Location Category C. Available with universal voltage power supply 120-277VAC (UE - 50/60Hz input), and 347-480VAC.

DRIVERS - Available in Low Watt (LW), Super Saver (SS) and High Output (HO) drive currents (Drive currents are factory programmed). Components are fully encased in potting material for moisture resistance. Driver complies with FCC 47 CFR part 15 RFI/EMI standard.

OPERATING TEMPERATURE - -40°C to +50°C (-40°F to +122°F).

FINISH - Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling.

DECAL STRIPING - LSI offers optional color-coordinated decals in 9 standard colors to accent the fixture. Decals are guaranteed for five years against peeling, cracking, or fading.

WARRANTY - LSI LED fixtures carry a limited 5-year warranty.

PHOTOMETRICS - Please visit our web site at www.lsi-industries.com for detailed photometric data.

SHIPPING WEIGHT (IN CARTON) - Fixture - 44.5 lbs (20 kg) Arm - 5 lbs. (2kg) arm

LISTING - UL listed to U.S. and Canadian safety standards. Suitable for wet locations. For a list of the specific products in this series that are DLC listed, please consult the LED Lighting section of our website or the Design Lights website at www.designlights.org.

Project Name _____ Fixture Type _____ 10/16/17
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STEEL ROUND TAPERED POLES

Use ONLY with "Wind Speed Map for ASCE7-05

STEEL ROUND TAPERED POLES - ASCE7-05

POLE	90 MPH	100 MPH	110 MPH	120 MPH	130 MPH	140 MPH	150 MPH	Bolt Circle
20' 11GA	42.2	33.3	26.7	21.7	17.8	14.7	12.2	N
25' 11GA	40.3	31.5	24.9	19.9	16.1	13.0	10.5	N
30' 11GA	39.9	30.7	24.0	18.8	14.8	11.6	9.1	N
35' 11GA	40.9	31.0	23.8	18.3	14.0	10.6	7.8	Q
39' 11GA	34.3	25.3	18.8	13.8	9.9	6.9	4.4	Q
39' 7GA	45.0	34.1	26.0	19.9	15.1	11.3	8.3	S
45' 7GA	50.8	39.8	32.1	26.0	21.4	17.7	14.7	T
50' 7GA	37.0	28.9	22.8	18.1	14.5	11.5	9.3	T

All LSI Industries' poles are guaranteed to meet the EPA requirements listed. LSI Industries is not responsible if a pole order has a lower EPA rating than the indicated wind-loading zone where the pole will be located.
CAUTION: This guarantee does not apply if the pole/bracket/fixture combination is used to support any other items such as flags, pennants, or signs, which would add stress to the pole. LSI Industries cannot accept responsibility for harm or damage caused in these situations.

Use ONLY with "Wind Speed Map for ASCE7-10

STEEL ROUND TAPERED POLES - ASCE7-10

POLE	110 MPH	115 MPH	120 MPH	130 MPH	140 MPH	150 MPH	160 MPH	170 MPH	180 MPH	Bolt Circle
20' 11GA	17.0	15.3	13.9	11.4	9.4	7.9	6.6	5.5	4.6	N
25' 11GA	16.3	14.6	13.0	10.6	8.6	7.0	5.6	4.5	3.6	N
30' 11GA	16.0	14.1	12.5	9.9	7.8	6.2	4.8	3.6	2.6	N
35' 11GA	16.1	14.1	12.3	9.5	7.2	5.4	3.9	2.7	1.6	Q
39' 11GA	13.1	11.7	9.9	7.2	5.0	3.3	1.9	0.7	0.0	Q
39' 7GA	17.5	14.9	13.3	10.2	7.5	5.5	3.8	2.3	1.3	S
45' 7GA	19.9	18.1	16.3	13.4	11.0	9.2	7.6	6.4	5.3	T
50' 7GA	15.1	13.5	12.0	9.5	7.7	6.2	4.9	3.9	3.0	T

All LSI Industries' poles are guaranteed to meet the EPA requirements listed. LSI Industries is not responsible if a pole order has a lower EPA rating than the indicated wind-loading zone where the pole will be located.
CAUTION: This guarantee does not apply if the pole/bracket/fixture combination is used to support any other items such as flags, pennants, or signs, which would add stress to the pole. LSI Industries cannot accept responsibility for harm or damage caused in these situations.

Project Name _____ Fixture Type _____ 11/27/17
Catalog # _____ © 2017 LSI INDUSTRIES INC.

STEEL ROUND TAPERED POLES

POLE ORDERING INFORMATION

TYPICAL ORDER EXAMPLE: **RTPB5 S11G 35 S PLP DGP**

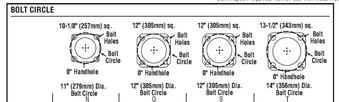
Pole Series	Material	Height[1]	Mounting Configuration	Pole Finish	Options
Round Tapered Pole for Bolt-On Mount 2-Bolt Pattern RTPBS – 5" Traditional drilling pattern	S11G – 11 Ga. Steel S07G – 07 Ga. Steel	20' 25' 30' 35' 39' 45' 50'	S – Single/Parallel D180° – Double D90° – Double DN90° – Double T90° – Triple TN120° – Triple Q90° – Quad	BRZ – Bronze BLK – Black PLP – Platinum Plus WHT – White SVG – Satin Verde Green GPT - Graphite MSV - Metallic Silver	GA – Galvanized Anchor Bolts SF – Single Flood [2] DF – Double Flood [2] DGP – DuraGrip® Plus LAB – Less Anchor Bolts OSXX - Pole preparation for PMOS Occupancy Sensor[3]
Round Tapered Pole for Tenon Mount RTPN	**Consult Pole Selection Chart on opposite page**	N – Tenon Mount (Standard tenon size is 2-3/8" O.D.)		**Standard SF and DF pole preparations are located 3/4 of the height of the pole from the base, except on 20' poles. Maximum height for SF and DF pole preparations on 20' poles is 13' from the base.**	

ACCESSORY ORDERING INFORMATION (Accessories are field installed)

Description	Order Number	Description	Order Number
20 SRTBC Square Base Cover	158388CLR	ER2 – Weatherproof RTP Duplex Receptacle	122566QLR
25 SRTBC Square Base Cover	158390QLR	GFI – Ground Fault RTP Circuit Interrupter	122568QLR
30 SRTBC Square Base Cover	158392CLR	MHD – Mounting Hole Weatherproof Decal	340120
35 SRTBC Square Base Cover	158554QLR	PMOS120 - 120V Occupancy Sensor	518030QLR[4]
39 SRTBC Square Base Cover	158397QLR	PMOS208/240 - 208, 240V Occupancy Sensor	534239QLR[4]
45 SRTBC Square Base Cover	158571QLR	PMOS277 - 277V Occupancy Sensor	518029QLR[4]
50 SRTBC Square Base Cover	158578QLR	PMOS480 - 480V Occupancy Sensor	534240QLR[4]

FOOTNOTES:
1- Pole heights will have +/- 1/2" tolerance.
2- See Flood Lighting Brackets Section for choice of FBO brackets.
3 - Order PMOS separately. Change "XX" to indicate height and side of pole location for pole preparation. EX: OS18A indicates preparation is to be 18ft. up from pole base on side A. Optimal distance from ground to sensor is 20ft.
4 – OSXX option required. Not for use with Metal Halide fixtures.

BOLT CIRCLE



	11" (279mm) Dia. Bolt Cycle	12" (305mm) Dia. Bolt Circle	12" (305mm) Dia. Bolt Circle	14" (356mm) Dia. Bolt Circle
	Q	Q	S	S
Bolt Circle	Slotted 11" (279mm)	Slotted 12" (305mm)	Slotted 12" (305mm)	Slotted 14" (356mm)
Anchor Bolt Size	1" x 36" (25mm x 914mm)	1" x 36" (25mm x 914mm)	1-1/4" x 42" (32mm x 1067mm)	1-1/4" x 42" (32mm x 1067mm)
Anchor Bolt Projection	4" (102mm)	4" (102mm)	5" (127mm)	5" (127mm)
Base Plate Dimensions	10-1/8" sq. x 1" thk. (257mm x 25mm)	12" sq. x 1" thk. (305mm x 25mm)	12" sq. x 1-1/4" thk. (305mm x 32mm)	13-1/2" sq. x 1-1/4" thk. (343mm x 32mm)

Note: Base plate illustrations may change without notice. Do not use for setting anchor bolts. Consult factory for the base plate templates.

Project Name _____ Fixture Type _____ 11/27/17
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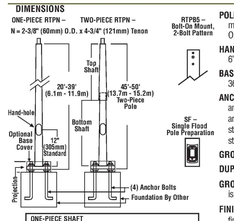
STEEL ROUND TAPERED POLES

DIMENSIONS



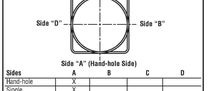
ONE-PIECE SHAFT

Height	Pole Bottom	Pole Top
20' (6.1m)	5.80" (147mm) O.D.	3.0" (76mm) O.D.
25' (7.1m)	6.62" (168mm) O.D.	3.12" (79mm) O.D.
30' (9.1m)	7.50" (191mm) O.D.	3.30" (84mm) O.D.
35' (10.7m)	8.50" (216mm) O.D.	3.60" (91mm) O.D.
39' (11.9m)	9.00" (229mm) O.D.	3.54" (90mm) O.D.

TWO-PIECE SHAFT

Height	Top Shaft Bottom	Top Shaft Length	Bottom Shaft Top	Bottom Shaft Bottom	Bottom Shaft Length
45' (13.7m)	3.95" O.D. (100mm)	6.89" O.D. (175mm)	21'-0" (6.4m)	6.42" O.D. (163mm)	10.00" O.D. (254mm)	25'-6" (7.8m)
50' (15.2m)	3.25" O.D. (83mm)	6.89" O.D. (175mm)	26'-0" (7.9m)	6.42" O.D. (163mm)	10.00" O.D. (254mm)	25'-6" (7.8m)

DRILLING LOCATIONS



Sides	A	B	C	D
Hand-hole	X			
Single	X			
D180°		X		X
D90°	X			X
T90°	X	X		X
TN120°*	X			
Q90°	X	X	X	X
Single FBO	X			
Double FBO		X		X

*Other two locations will be 120° to the left and right of Side A.

Note: Standard SF and DF pole preparations are located 3/4 of the height of the pole from the base, except on 20' poles. Maximum height for SF and DF pole preparations on 20' poles is 13' from the base.

SHIPPING WEIGHTS - Round Steel Tapered Poles

20' (6.1m) S11 Ga. is approximately	153 lbs. (69kg)
25' (7.6m) S11 Ga. is approximately	196 lbs. (89kg)
30' (9.1m) S11 Ga. is approximately	247 lbs. (112kg)
35' (10.7m) S11 Ga. is approximately	318 lbs. (145kg)
39' (11.9m) S11 Ga. is approximately	368 lbs. (167kg)
39' (11.9m) S07 Ga. is approximately	329 lbs. (243kg)
45' (13.7m) S07 Ga. is approximately	622 lbs. (282kg)
50' (15.2m) S07 Ga. is approximately	646 lbs. (293kg)
Anchor Bolts (1" x 36")(25mm x 914mm)	30 lbs. (14kg)/set
Anchor Bolts (1-1/4" x 42")(32mm x 1066mm)	63 lbs. (29kg)/set

POLE SHAFT - Pole shaft is electro-welded ASTM-A595 Grade A steel tubing with a minimum yield strength of 55,000 psi. On Tenon Mount steel poles, tenon is 2-3/8" O.D. high-strength pipe. Tenon is 4-3/4" in length.

HAND-HOLE - Standard hand-hole location is 12" above pole base. Hand-hole size is 4" x 6" and reinforced.

BASE - Pole base is ASTM-A36 hot-rolled steel plate with a minimum yield strength of 36,000 psi. Two-piece square base cover is optional.

ANCHOR BOLTS - Steel Round Tapered poles of 11 gauge material are furnished with anchor bolts featuring zinc-plated double nuts and washers. Galvanized anchor bolts are optional. Poles of 7 gauge material are furnished with galvanized anchor bolts as a standard. Anchor bolts conform to ASTM F 1554-07a Grade 55 with a minimum yield strength of 55,000 psi.

GROUND LUG - Ground lug is standard.

DUPLEX RECEPTACLE - Weatherproof duplex receptacle is optional.

GROUND FAULT CIRCUIT INTERRUPTER - Self-testing ground fault circuit interrupter is optional.

FINISHES - Each pole is finished with DuraGrip®, LSI's baked-on polyester-powder finishing process which electrostatically applies and fuses a polyester powder to the pole. Provides an extremely smooth and uniform finish to withstand extreme weather changes without cracking or peeling, and features a five-year limited warranty. Optional DuraGrip® Plus features the added protection of a 3.0 to 5.0 mil thickness of polyester-powder finish plus an inner coating, as well as a seven-year limited warranty.

DETERMINING THE LUMINAIRE/POLE COMBINATION FOR YOUR APPLICATION:

- Select luminaire from luminaire ordering information
- Select bracket configuration if required
- Determine EPA value from luminaire/bracket EPA chart
- Select pole height
- Select MPH to match wind speed in the application area (See windspeed maps).
- Confirm pole EPA equal to or exceeding value from note above
- Consult factory for special wind load requirements and banner brackets

CLASSIFIED UL · ARRA Funding Compliant

Project Name _____ Fixture Type _____ 11/27/17
Catalog # _____ © 2017 LSI INDUSTRIES INC.

NOTE:

FOR LIGHTING POLE BASE DETAIL SEE SHEET C.42A

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA · CLAYTON C. TOCK · Lic. No. 036790 · 07/30/19 · PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

LIGHTING NOTES & DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
		SHEET C.44B OF 45 — SP-12928

Urban, Ltd. – J:\JOBS\UPTON HILL PARK\SP\12928-40-LIGHTING PLAN.dwg [NOTES & DETAILS] October 02, 2019 - 7:00am pfeltz.pro

GEODESIGN & ENGINEERING, INC.
KNOWLEDGE IS OUR FOUNDATION

August 1, 2018

Northern Virginia Regional Park Authority
5400 Ox Road
Fairfax Station, Virginia 22039

Attention: Mr. Brian Nolan, Special Projects Manager

Reference: Subsurface Exploration and Groundwater Observations
Upton Hill Regional Park
6060 Wilson Boulevard
Arlington, Virginia
GDE Project No.: 18023-P

Dear Mr. Nolan:

Geo Design & Engineering, Inc. (GDE) has completed the subsurface exploration and groundwater observations at the above referenced project. Our work was performed in accordance with GDE Proposal No. 18023-P, dated July 19, 2018. Below is a brief report of our findings

I. Subsurface Exploration

As stated in GDE proposal, GDE performed five (5) test borings with hand augers to minimum depths that are at least 2 feet below the bottom of the proposal facilities, as identified by the project Civil Engineer, Urban, LTD (Urban). The borings were performed for planned bio-retention facilities and porous pavers areas at Upton Hill Regional Park. The boring locations were identified on grading plans provided by Urban, and the elevations at the test boring locations were also provided by Urban.

Based on the above, the borings were supposed to be augered to the following depths:

Boring B-1: 7 feet below existing surface grade
Boring B-2: 18 feet below existing surface grade
Boring B-3: 11 feet below existing surface grade
Boring B-4: 6 feet below existing surface grade
Boring B-5: 5 feet below existing surface grade

All the borings were augered to the planned depths with the exception of Boring B-2. This boring was supposed to be augered to 18 feet below the existing surface grades. However, it was extremely hard and GDE staff engineers encountered auger refusal at 8.5 feet. Upon further discussions with the project Civil Engineer, Mr. Josh Reynolds with Urban, Mr. Reynolds informed GDE to abandon any further exploration at boring location B-2 and said it would be abandoned.

II. Subsurface Conditions

GDE engineers observed approximately 2 feet to 2.75 feet of man-made fill at four (4) of the five (5) test boring locations, and 6 inches of topsoil at the fifth boring (B-3). The man-made fill and topsoil were underlain by naturally occurring terrace deposits of primarily of gravel & sand with silt and clay.

The man-made fill was described and classified as brown, dark brown & red brown sandy lean clay, clayey sand, and sandy silt with various percentages of gravel (USCS Classification: CL, SC, & ML). The fill was generally moist

The naturally occurring soils were described and classified as brown, light brown, orange brown, yellowish brown & red brown sandy lean clay, clayey sand, silty sand, clayey to silty sand, all with various percentages of gravel, and sandy gravel (USCS Classification: CL, SC, SM, SC-SM, and GP). The soils were generally moist.

The "Test Boring Location Plan" and boring logs are attached.

III. Groundwater Observations

All the borings were found dry during and at completion of the field operations. In addition, no signs of the presence of groundwater or perched water were observed within the depths explored

Should you have questions concerning this proposal, do not hesitate to contact us. We appreciate the opportunity to provide our services to you.

Very truly yours,
Geo Design & Engineering, Inc.

COMMONWEALTH OF VIRGINIA
MOHAMAD ABU-KASSEM
No. 29483
PROFESSIONAL ENGINEER

Mohamad-Abu-Kassem, P.E., Principal

Attachments: Boring Location Plans
Boring Logs

GEOTECHNICAL • ENVIRONMENTAL • TESTING AND INSPECTION SERVICES • FORENSIC • RETAINING WALL DESIGN • WETLAND AND SEPTIC FIELD STUDIES
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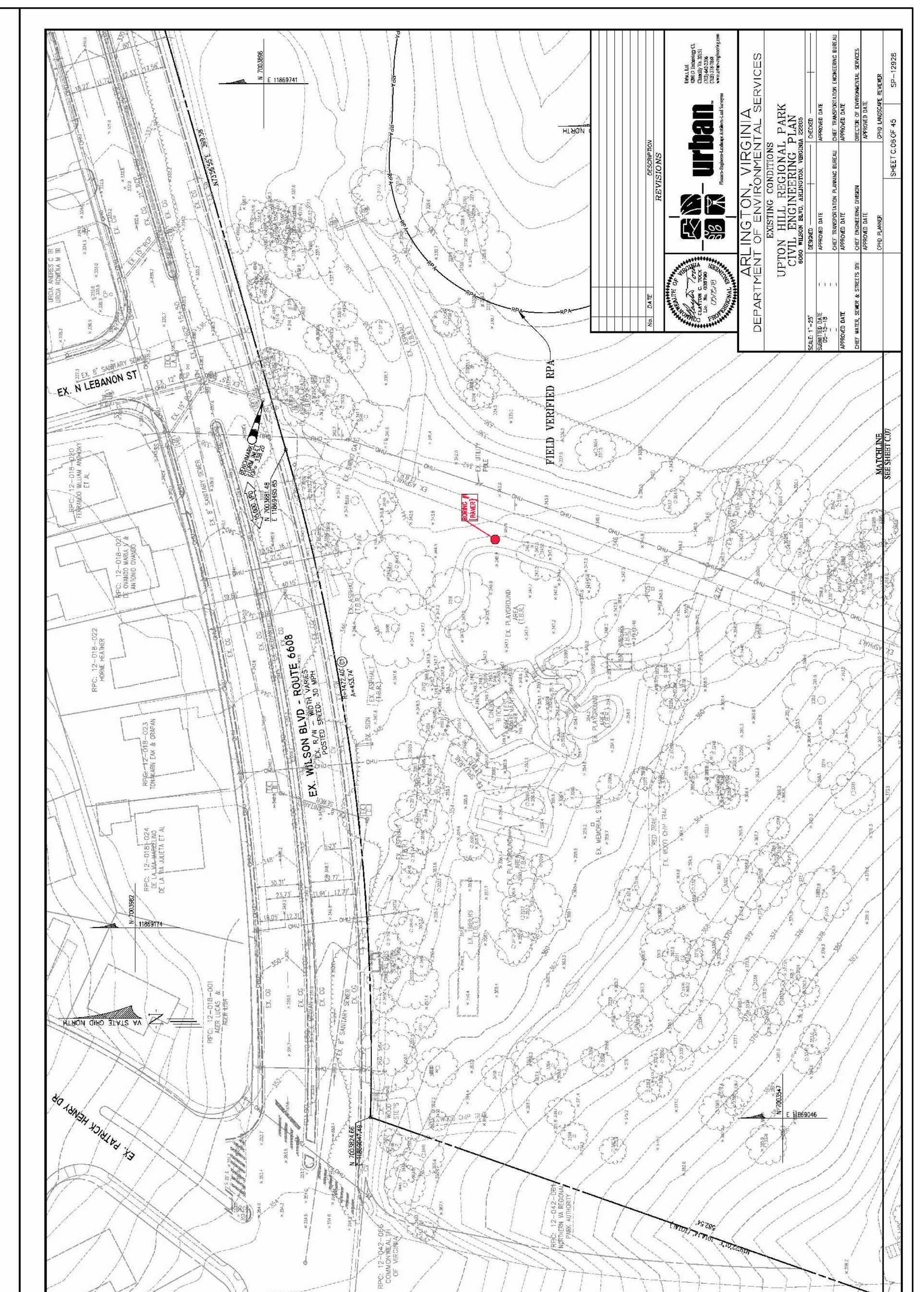

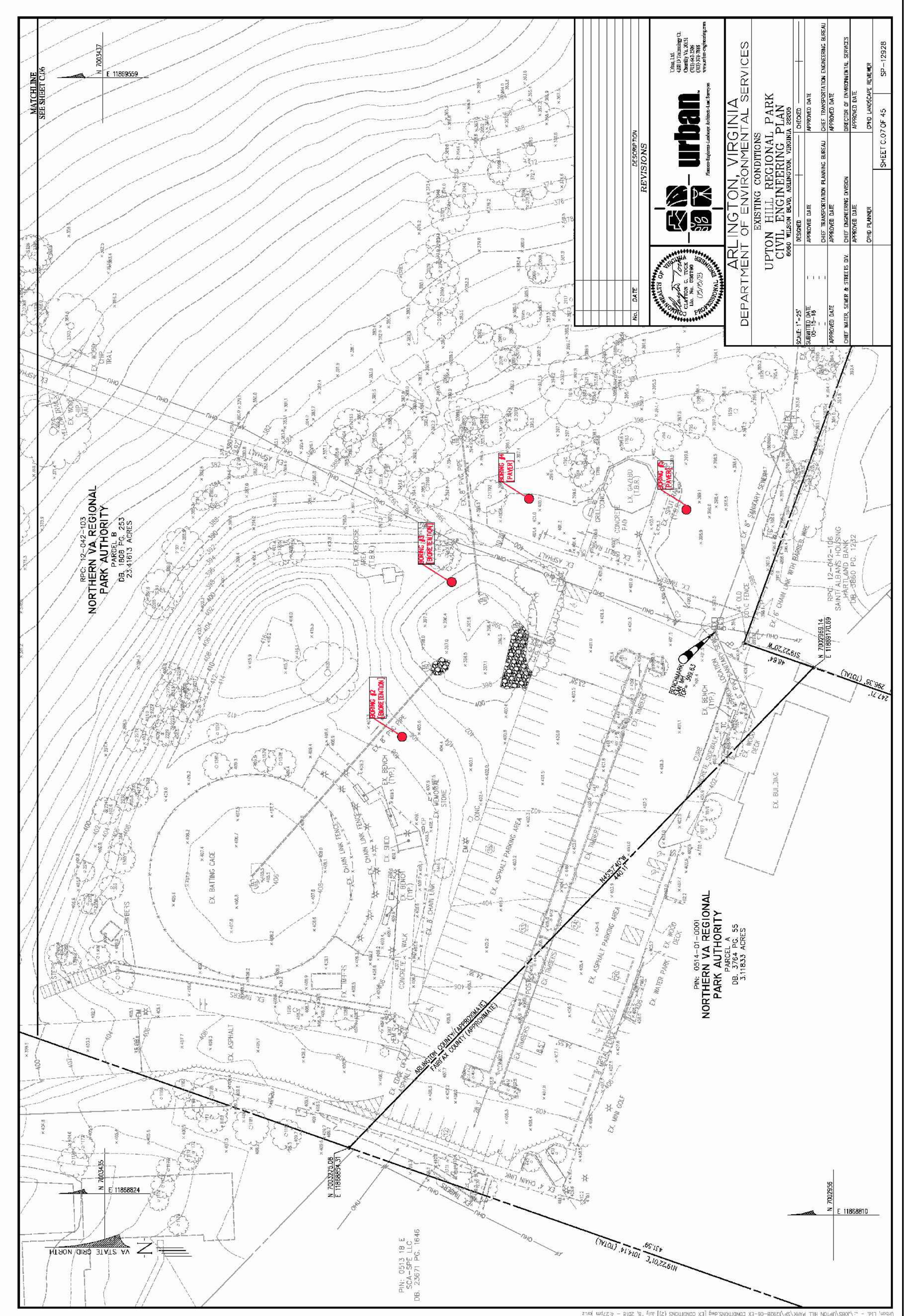

HAND AUGER LOG
HAND AUGER NO.: B-1

PROJECT: Upton Hill Regional Park - Northern Virginia Regional Authority	PROJECT NO.: E18052
CLIENT: Brian Nolan	DATE: 7-28-18
LOCATION: See Test Boring Location Plan	ELEV.: 346.02
EXCAVATION METHOD: Hand Augers	LOGGED BY: A. Estacio
DEPTH TO WATER: Dry	

Elevation/ DEPTH	SOIL SYMBOLS AND SAMPLERS: GRAPHIC	BULK	USCS	DESCRIPTION	DCP blow Count per 1.75" penetration	MOISTURE %
346 — 0			ML	Man-made Fill Dark brown & brown micaceous sandy silt (ML) - moist -Top 4 inches classified as topsoil		
344 — 2			SM	Natural Brown silty sand (SM) with gravel and trace of mica -moist		
342 — 4			ML	Brown & yellow brown sandy silt (ML) with gravel and trace of mica -moist		
340 — 6			CL	Red brown & brown sandy lean clay (CL) with mica -moist		
338 — 8				Boring terminated at 7 feet and backfilled.		
336 — 10						

Notes:

Geo Design & Engineering, Inc.

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

EROSION & SEDIMENT CONTROL – DETAILS
UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN
6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 05-15-18, 08-08-18, 09-28-18, 12-14-18, 07-30-19, –, –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
APPROVED DATE CHIEF WATER, SEWER & STREETS DIV.	APPROVED DATE CHIEF ENGINEERING DIVISION	APPROVED DATE DIRECTOR OF ENVIRONMENTAL SERVICES
	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.44 OF 45	SP-12928

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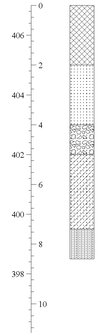
HAND AUGER LOG
HAND AUGER NO.: B-2

PROJECT	PROJECT NO.
Upton Hill Regional Park - Northern Virginia Regional Authority	E18052
CLIENT	DATE
Brian Nolan	7-21-18
LOCATION	ELEV.
See Test Boring Location Plan	407
EXCAVATION METHOD	LOGGED BY:
Hand Augers	A. Estacio
DEPTH TO WATER:	
Dry	



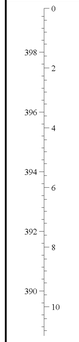
Elevation/ DEPTH	SOIL SYMBOLS AND SAMPLERS GRAPHIC	BULK	USCS	DESCRIPTION	DCP Blow Count per 1.75" penetration	MOISTURE %
			CL-SC	Man-made Fill Brown sandy lean clay to clayey sand (CL-SC) with gravel and trace of mica -moist		
			SC-SM	Natural Red brown clayey sand to silty sand (SC-SM) with gravel -moist		
			SM-GP	Orange brown & yellow brown silty sand with gravel to sandy gravel (SM-GP) -moist		
			SC	Orange brown & brown clayey sand (SC) with gravel -moist		
			SM	Yellow brown silty sand (SM) with gravel -moist		
				Auger refusal. Could not advance. Boring terminated at 8.5 feet and backfilled		

Notes:

Geo Design & Engineering, Inc.

HAND AUGER LOG
HAND AUGER NO.: B-3

PROJECT	PROJECT NO.
Upton Hill Regional Park - Northern Virginia Regional Authority	E18052
CLIENT	DATE
Brian Nolan	7-21-18
LOCATION	ELEV.
See Test Boring Location Plan	399.47
EXCAVATION METHOD	LOGGED BY:
Hand Augers	A. Estacio
DEPTH TO WATER:	
Dry	



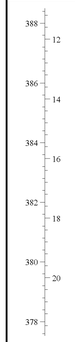
Elevation/ DEPTH	SOIL SYMBOLS AND SAMPLERS GRAPHIC	BULK	USCS	DESCRIPTION	DCP Blow Count per 1.75" penetration	MOISTURE %
				6 inches of topsoil		
			SC	Redbrown & orange brown clayey sand (SC) with gravel -moist		
			SM-GP	Light brown & brown silty sand with gravel to gravel with sand (SM-GP) -moist		
			SM	Brown, yellowish white, & orange brown silty sand (SM) with gravel -moist		

Notes:

Geo Design & Engineering, Inc.

HAND AUGER LOG
HAND AUGER NO.: B-3

PROJECT	PROJECT NO.
Upton Hill Regional Park - Northern Virginia Regional Authority	E18052
CLIENT	DATE
Brian Nolan	7-21-18
LOCATION	ELEV.
See Test Boring Location Plan	399.47
EXCAVATION METHOD	LOGGED BY:
Hand Augers	A. Estacio
DEPTH TO WATER:	
Dry	



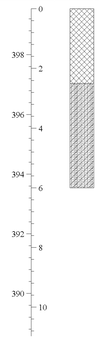
Elevation/ DEPTH	SOIL SYMBOLS AND SAMPLERS GRAPHIC	BULK	USCS	DESCRIPTION	DCP Blow Count per 1.75" penetration	MOISTURE %
				Boring terminated at 11 feet and backfilled		

Notes:

Geo Design & Engineering, Inc.

HAND AUGER LOG
HAND AUGER NO.: B-4

PROJECT	PROJECT NO.
Upton Hill Regional Park - Northern Virginia Regional Authority	E18052
CLIENT	DATE
Brian Nolan	7-21-18
LOCATION	ELEV.
See Test Boring Location Plan	399.54
EXCAVATION METHOD	LOGGED BY:
Hand Augers	A. Estacio
DEPTH TO WATER:	
Dry	



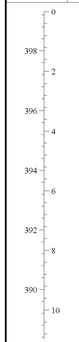
Elevation/ DEPTH	SOIL SYMBOLS AND SAMPLERS GRAPHIC	BULK	USCS	DESCRIPTION	DCP Blow Count per 1.75" penetration	MOISTURE %
			CL-SC	Man-made Fill Brown sandy lean clay to clayey sand (CL-SC) with gravel -moist -Top 4 inches classified as topsoil		
			SC- SM	Natural Orange brown & red brown clayey sand to silty sand (SC-SM) with gravel, little mica-moist		
				Boring terminated at 6 feet and backfilled		

Notes:

Geo Design & Engineering, Inc.

HAND AUGER LOG
HAND AUGER NO.: B-5

PROJECT	PROJECT NO.
Upton Hill Regional Park - Northern Virginia Regional Authority	E18052
CLIENT	DATE
Brian Nolan	7-28-18
LOCATION	ELEV.
See Test Boring Location Plan	399.31
EXCAVATION METHOD	LOGGED BY:
Hand Augers	A. Estacio
DEPTH TO WATER:	
Dry	



Elevation/ DEPTH	SOIL SYMBOLS AND SAMPLERS GRAPHIC	BULK	USCS	DESCRIPTION	DCP Blow Count per 1.75" penetration	MOISTURE %
			CL	Man-made Fill Brown & red brown micaceous fine sandy lean clay (CL) with gravel -moist -Top 3 inches classified as topsoil		
			SC	Natural Orange brown clayey sand (SC) with gravel -moist		
				Boring terminated at 5 feet and backfilled		

Notes:

Geo Design & Engineering, Inc.

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
Clayton Tock
CLAYTON C. TOCK
No. 036790
01/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

GEOTECHNICAL REPORT

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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	APPROVED DATE CPHD PLANNER	APPROVED DATE CPHD LANDSCAPE REVIEWER
	SHEET C.44 OF 45	SP-12928

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COMMONWEALTH of VIRGINIA
DEPARTMENT OF TRANSPORTATION

CHARLES A. KILPATRICK, P.E.
COMMISSIONER

4975 Alliance Drive
Fairfax, VA 22030

March 6, 2018

Mr. Clayton C. Tock, P.E.
Urban, Ltd.
4200 D Technology Court
Chantilly, Virginia 20151

Re: Upton Hill Park
Site Plan #: 12928
Arlington County

Dear Mr. Tock:

VDOT has reviewed the subject site plan received February 2, 2018 and concluded that Wilson Blvd. is not a VDOT maintained roadway in the County of Arlington. Therefore, there are no further objections to the approval of the Upon Hill Park Site Plan. For any question/concerns, please contact me at (703) 691-6733 or David.Jordan@vdot.virginia.gov

Sincerely,

David Jordan
Land Use Engineer

cc: NOVA Fairfax Permits

We Keep Virginia Moving

No.	DATE	DESCRIPTION

REVISIONS

COMMONWEALTH OF VIRGINIA
CLAYTON C. TOCK
Lic. No. 036790
07/30/19
PROFESSIONAL ENGINEER

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ARLINGTON, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

CORRESPONDENCE

UPTON HILL REGIONAL PARK
CIVIL ENGINEERING PLAN

6060 WILSON BLVD, ARLINGTON, VIRGINIA 22205

SCALE: N/A	DESIGNED	CHECKED
SUBMITTED DATE 12-14-18 05-15-18 07-30-19 08-08-18 – 09-28-18 –	APPROVED DATE CHIEF TRANSPORTATION PLANNING BUREAU	APPROVED DATE CHIEF TRANSPORTATION ENGINEERING BUREAU
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