DOCKET ITEM #7
Resource Protection Area Exception Request
520 Cameron Station Blvd. - Armistead Boothe Park

CONSENT AGENDA ITEM
If no one asks to speak about this case prior to the hearing, it will be approved without discussion as part of the Consent Agenda.

Application	**General Data**	
Public Hearing and consideration of a request for an exception, pursuant to Zoning Ordinance Section 13-119, to allow a new encroachment of 0.36 acres impervious area in the form of synthetic turf surface in a Resource Protection Area (RPA) associated with the improvement of a municipal park.	**Planning Commission Hearing:**	June 24, 2021
	City Council Hearing:	N/A
Address: 520 Cameron Station Boulevard	**Zone:**	CDD #9/Coordinated Development District #9
Applicant: City of Alexandria - Department of Recreation, Parks and Cultural Activities	**Small Area Plan:**	Eisenhower West

Staff Recommendation: APPROVAL

Staff Reviewers:
Melanie Mason, Principal Planner, T&ES, melanie.mason@alexandriava.gov
Abigail Harwell, Urban Planner, P&Z, abigail.harwell@alexandriava.gov

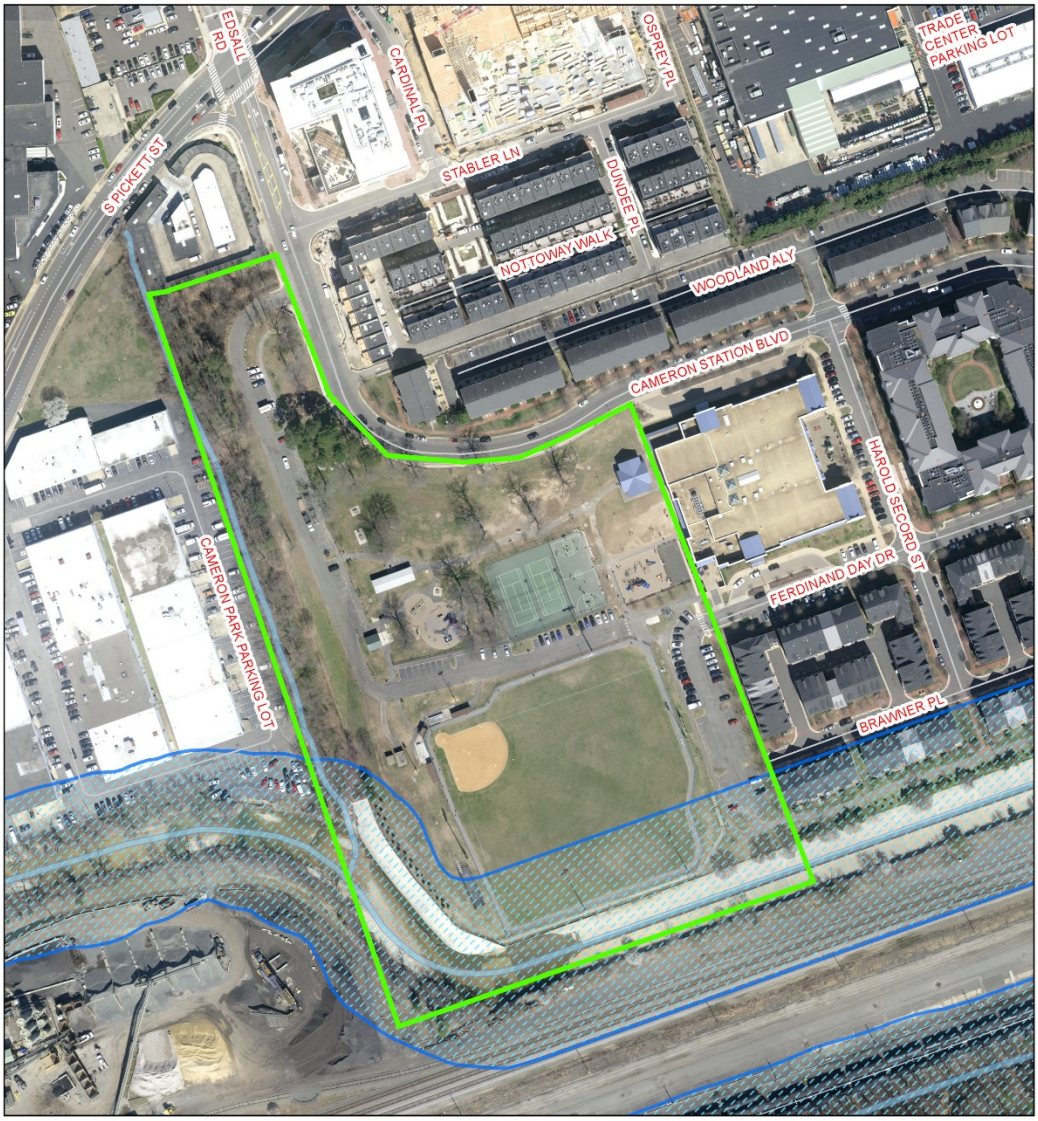
Park and Recreation Commission Recommendation: APPROVAL

At the April 26, 2021 Park and Recreation Commission meeting, the members of the Commission voted 6-0 to support the staff recommendation to approve the exception request at 520 Cameron Station Boulevard.

Environmental Policy Commission Recommendation: APPROVAL

At the May 17, 2021 Environmental Policy Commission (EPC) meeting, the members of the Commission voted 12-0 to support the staff recommendation to approve the exception request at 520 Cameron Station Boulevard.

Site Map



Armistead Boothe Park

N
W E
S

0 145 290 580 Feet

Parcel
Stream
Street Centerline
Resource Protection Area

I. SUMMARY

A. Recommendation

Staff recommends ***APPROVAL*** of the City of Alexandria Department of Recreation, Parks and Cultural Activities (RPCA-applicant) request for an exception to the requirements of Article XIII of the Alexandria Zoning Ordinance for a new encroachment of 0.36 acres of new impervious surface (synthetic turf) in a Resource Protection Area (RPA) associated with GRD2021-00036, the redevelopment of Armistead Boothe Park. The proposed park improvements provided in the request for exception satisfy the criteria in the Zoning Ordinance to grant the exception as discussed below.

B. General Description

The Armistead Boothe Park project is located at 520 Cameron Station Boulevard. The property is located within the Eisenhower West Small Area Plan and zoned Coordinated Development District #9 (CDD #9). The proposed plan consists of reconfiguration and conversion of the existing diamond turf field into a synthetic turf field, the overlay of a rectangular field on the reconfigured site, and additional park amenities associated with the redevelopment of the field (the "site"). The Final 1 Grading Plan showing the proposed encroachment and a Water Quality Impact Assessment (WQIA) have been formally submitted to the City for review.

Adjacent to the field on the western and southern portions of the site is Backlick Run, a perennial stream. The portion of the stream adjacent to the western side of the site contains a natural stream bottom and concrete reinforced wall on the stream side and bank. Adjacent to the southern portion of the site, Backlick Run is channelized and wholly contained within a walled concrete channel. The full 100 feet of the RPA extends on both the western and southern sides of the site. Due to the concrete walled channels, the RPA on this site is graded such that any runoff flowing through the RPA is directed away from Backlick Run and ultimately flows through the storm sewer system into Ben Brenman Pond.

The applicant is requesting an exception to the following section of the Zoning Ordinance:

- 13-107 - Development, redevelopment, and uses permitted in RPAs.

II. BACKGROUND

A. Procedural Background

RPA Definition

RPAs are required under the Virginia Administrative Code Chapter 9VAC25-830: Chesapeake Bay Preservation Area Designation and Management Regulations and the Chesapeake Bay Preservation Act as incorporated into Article XIII of the City's Zoning Ordinance, the Environmental Management Ordinance (EMO).

Per Section 13-105, RPAs consist of sensitive land that has either an intrinsic water quality value due to the ecological and biological processes such land performs or that is sensitive to uses or activities such that the use results in significant degradation to the quality of state waters. In their natural condition, these lands provide for the removal, reduction, or assimilation of nonpoint source pollution entering the bay and its tributaries. An area of land that includes any one of the following land types shall be considered to be within the RPA:

(1) Tidal wetlands;
(2) Tidal shores;
(3) Nontidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow;
(4) Water bodies with perennial flow.
(5) A buffer area of 100 feet (measured from top of bank) located adjacent to and landward of the components listed above and along both sides of any water body with perennial flow, to include the environmental feature, constitutes the RPA.

Per Section 13-119(G), a request for an exception to the RPA provisions of the EMO must be first heard by the Environmental Policy Commission (EPC) who must recommend support, denial or modification of the exception. The exception must then be heard by the Planning Commission, who will make the final determination. At the May 17, 2021 EPC meeting, the members of the Commission voted 12-0 to support the staff recommendation to approve the exception request.

In this case, the RPA feature is attributed to Backlick Run, a perennial stream located on the western and southern sides of the site.

Allowable Redevelopment within the RPA

Per Section 13-107(C)(2), redevelopment may be allowed provided that the following criteria are met:

(1) There is no increase in impervious surface cover;
(2) There is no further encroachment within the RPA; and
(3) The proposed redevelopment is consistent with the city master plan.

Exception Criteria to be Considered

To grant an exception to the RPA provisions, Section 13-119(B)[1] of the EMO, the reviewing body must find that the applicant has proven each of the following criteria by a preponderance of the evidence:

(1) Granting the exception will not confer upon the applicant any special privileges that are denied to other property owners in the CBPA [Chesapeake Bay Preservation Area] overlay district;
(2) The exception is not based upon conditions or circumstances that are self-created or self-imposed, nor does the exception arise from conditions or circumstances either permitted or noncomplying that are related to adjacent parcels;
(3) The exception is the minimum necessary to afford relief;

[1] The provisions of the EMO are based upon the regulations found in 9VAC25-830-150 of the Virginia Administrative Code.

(4) The exception will be consistent with the purpose and intent of the overlay district, and not injurious to water quality, the neighborhood or otherwise detrimental to the public welfare;
(5) Reasonable and appropriate conditions are imposed, as warranted, to prevent the allowed activity from causing degradation of water quality.

Economic hardship alone is not sufficient reason to grant an exception per Section 13-119(C).

B. Site Context

The disturbed area associated with the project site is 3.85 acres and is located at 520 Cameron Station Boulevard. Backlick Run, a perennial stream, is located to the west and south of the property. On the western bank, the stream is bound by Armistead Boothe Park and Virginia Paving. On the southern bank, the stream is bound by Armistead Boothe Park and the Norfolk Southern Transloading Facility. On each side of this stream there is a 100' RPA buffer measured from the top of bank. The existing site consists of a diamond turf field and other park amenities. The area of total RPA on the site is approximately 1.53 acres and currently consists of 0.18 acres of impervious area and 1.35 acres of managed turf. The existing impervious area in the RPA consists of fencing, sheds, a concrete drainage channel and pathways.

C. Exception Description

The applicant has requested an exception to Section 13-107 of the Alexandria Zoning Ordinance to allow a new encroachment in the RPA.

The proposed disturbance in the RPA would consist of the conversion of the existing natural turf field to synthetic turf, reconfiguration of the field, new lighting, and new fencing. The Virginia Department of Environmental Quality (VDEQ) considers synthetic turf impervious for stormwater management purposes, therefore the new synthetic turf within the RPA is considered a new encroachment. The existing 0.18 acres of encroachments in the RPA, including a batting cage, concrete channel, and sheds, are to be removed with this plan. The plan also proposes the conversion of 0.76 acres of managed turf within the RPA to forested area.

The proposed new encroachment would therefore consist of 0.36 acres new impervious surface (synthetic turf) in the landward 50-100 feet of the RPA. The existing 0.18 acres of encroachments located within the stream-facing 50 feet of the RPA would be removed.

III. STAFF ANALYSIS

A. Compliance with Environmental Management Ordinance

The requested exception meets the criteria outlined in the EMO, and therefore meets the requirements for approval.

Exception Criteria (1). The exception must be the minimum necessary to afford relief.

According to state guidance on exceptions, when considering the minimum necessary to afford relief, the size of the structure, the types of proposed structures, and the placement of the structures in relation to the size, layout and location of the lot or parcel must be considered. If alternative location, sizing, or orientation options to avoid the need for an exception are available, then the finding of "minimum necessary to afford relief" has not been met.

The applicant reviewed multiple layouts with staff to achieve the programmatic requirements for the site. Based upon site constraints, no layout could fully move the location of the field outside of the RPA. The applicant was, however, able to relocate the field further landward, remove existing encroachments from the first 0–50-foot section of the RPA located next to the stream, and add new encroachments only within the 50-100 -foot landward section of the RPA.

This demonstrates that the requirement for the "minimum necessary to afford relief" has been met.

Exception Criteria (2). The exception must not be based upon conditions or circumstances that are self-created or self-imposed, nor can the exception arise from conditions or circumstances either permitted or noncomplying that are related to adjacent parcels.

The existing property is a turf diamond ball field. This project involves the conversion of the existing land cover to synthetic turf and reconfiguration of the field. The applicant has demonstrated that to maintain the existing use and programmatic needs of the City, an encroachment is required within the 50–100-foot landward section of the RPA.

Exception Criteria (3). Granting the exception must not confer upon the applicant any special privileges that are denied to other property owners in the CBPA overlay district.

This criterion is intended to ensure that an exception request does not give the applicant something that has been denied to others in similar situations. No other request has been submitted for conversion of natural turf to synthetic turf. While VDEQ considers synthetic turf as impervious for stormwater management purposes, the surface does not generate the same type and volume of runoff as a traditional impervious surface. In this case, the synthetic turf has been designed as a stormwater Best Management Practice (BMP) that treats stormwater runoff. In addition, the stream channel bed and banks in the impacted RPA area are lined with concrete and the site topography is unique. In their natural form, RPAs are graded such that runoff flows over land through an RPA buffer area to slow and treat runoff prior to it entering a natural waterway. However, on this site, the existing condition and the proposed grading directs all runoff from the site landward and away from the stream.

Exception Criteria (4). The exception must be consistent with the purpose and intent of the overlay district, and not injurious to water quality, the neighborhood or otherwise detrimental to the public welfare.

This exception is consistent with the intent of the CPBA overlay district defined in Section 13-105. Per Section 13-101 of the Zoning Ordinance, the purpose of the overlay district is to safeguard the waters of the Commonwealth from pollution and to prevent any increase in pollution of state waters. The RPA on this site is graded inland and away from the stream preventing any runoff from the RPA from directly entering Backlick Run. The encroachment itself, the synthetic turf field, will be designed as a level 2 permeable pavement BMP which acts to slow and treat runoff before it enters the storm sewer system. After leaving the field, runoff from the site is then directed into an underground storm sewer system that flows into Ben Brenman Pond, which is a level 2 water quality BMP prior to discharge further downstream into Backlick Run. Runoff from storms flowing into these two BMPs provides an improvement to water quality, rather than a detriment.

In addition, the conversion of the field from natural to synthetic turf removes the need for any fertilizer and herbicide use to maintain the turf. The use of such chemicals in close proximity to a waterway is not ideal to protect water quality.

Exception Criteria (5). Reasonable and appropriate conditions are imposed, as warranted, to prevent the allowed activity from causing degradation of water quality.

This criterion is intended to ensure that conditions are imposed to, among other things, protect water quality and the functionality of an RPA as if it were undisturbed. The applicant has submitted a full mitigation plan for the encroachment.

Mitigation
The encroachment itself, the synthetic turf field, will function as a water quality BMP. Runoff from the new encroachment will be treated onsite and any flow leaving the site will be treated in a level 2 water quality pond before being discharged further downstream into Backlick Run. The applicant has proposed removal of 0.18 acres of encroachments within the first 50 feet of the RPA therefore removing all impervious area in the more critical 0–50-foot stream facing portion of the RPA buffer.

The applicant is also proposing to reforest 0.76 acres of managed turf and impervious area within the RPA with locally native trees and shrubs, therefore restoring the first 50 feet of the RPA to a natural state.

In addition, the conversion of the field to synthetic turf will eliminate the use of herbicides and pesticides on site, which can contribute to a degradation of water quality.

IV. CONCLUSION

In summary, in order to grant an exception, the request must meet all five exception criteria. When evaluating this request against the required exception criteria in the EMO, the application meets the criteria by a preponderance of the evidence as required under the Zoning Ordinance in order to be granted. Therefore, this exception should be approved.

V. STAFF RECOMMENDATIONS

Staff recommends **approval** of the exception request.

VI. ATTACHMENTS

Attachment 1: Exception Request Letter
Attachment 2: Water Quality Impact Assessment

April 7, 2021

Yon Lambert, Director
Department of Transportation and Environmental Services
301 King Street, Suite 4100
Alexandria, Virginia 22314

Via E-mail: yon.lambert@alexandriava.gov

RE: Armistead L. Boothe Park – Field Conversion Design

Dear Mr. Lambert:

On behalf of City of Alexandria Department of Recreation, Parks and Cultural Activities (client) I am submitting this hearing request for approval of an encroachment into the Resource Protection Area (RPA) along Backlick Run for the proposed development (site) at Armistead L. Boothe Park located at 520 Cameron Station Boulevard. The client requests this exception to Zoning Ordinance Section 13-107(C)(2) as permitted by Zoning Ordinance Section 13-107(E)(1) and 13-119. The site improvements will increase the net impervious area within the RPA but will also feature new forested area. The project will remove 0.18 impervious acres consisting of a concrete drainage channel, sheds and associated paths and a compacted gravel batting cage. The post-developed 0.36 acres of impervious in the RPA is comprised of the proposed synthetic turf athletic field which will function as a level 2 permeable pavement facility.

I. Project Background

The client seeks to redevelop the existing natural turf athletic field at the site to a multi-use synthetic turf field which will also function as a Level 2 permeable pavement stormwater management facility. Upgraded site lighting, new fencing, equipment buildings, batting cages, dugouts, warm up areas and spectator seating will be provided. New ADA-compliant access from the parking lot to the renovated facilities will also be provided. A reforested buffer will be provided to the maximum extent practicable along the western and southern portion of the site adjacent to Backlick Run. The project will also feature a modified parking lot turn-around for improved vehicular circulation, improved pedestrian connectivity at the northwest, northeast and southeast corners of the site including a mulch nature trail through the proposed forested area within the RPA.

II. Existing RPA Conditions

There is 0.18 acres of impervious area and 1.35 acres of managed turf within the RPA. There is currently no forested area. The site generally slopes from the northwest to the southeast at less than 2 percent. There is a concrete channel that runs along the south side of the site adjacent to the Backlick Run concrete bank that intercepts sheet flow from the site and turns north to direct the runoff to existing inlet structure #10. There is a concrete retaining wall at the top of the Backlick Run concrete bank to the south. The area from this retaining wall sheet flows north into the concrete channel on site.

The western side of the site is also bordered by Backlick Run where a concrete bank is present. An area less than 0.01 acres within the limits of disturbance features maximum 3:1 slopes with runoff draining away from the top of concrete bank east into the site. Runoff from this area is collected in existing inlet structure #6.

A. Morton Thomas and Associates, Inc. performed a tree survey on January 15, 2021. Of the vegetation surveyed, 60 of the trees and the one shrub are located in the RPA. The existing trees and shrubs consist of a mix of native hardwood typically found in the mid-Atlantic region (i.e., oak, gum, buckeye, ash, pine, sycamore, locust, cypress and cherry) as well as non-native/invasive species (i.e., privet, London plane tree, red mulberry, Norway spruce, pear and silk tree). The majority of the trees are located along the park's western and southern boundaries bordering Backlick Run. The trees do not constitute a forest as they do not provide closed canopy and do not meet the minimum forest width criteria.

III. Proposed RPA Development & Mitigation

The proposed work within the RPA will be removal of 0.18 acres impervious consisting of existing fencing, a concrete drainage channel, sheds and impervious paths to them and a compacted gravel batting cage, plus 0.36 acres of new impervious area consisting of the level 2 permeable pavement BMP. The net new imperious area of 0.18 acres is the encroachment area. Additionally, 0.76 acres of new forested area is proposed within the RPA. A mulch nature trail through the RPA new forested area is also proposed to provide pedestrian connectivity at the northwest and southeast corners of the site. The Table below summarizes the land cover conversions both on-site and within the RPA.

Table 1 – Land Cover Conversion Summary

	Site Analysis			RPA Analysis		
Land Cover Type	**Existing**	**Post-Developed**	**Area Change (+/- AC)**	**Existing**	**Post-Developed**	**Area Change (+/- AC)**
Forested	0.00	0.76	+0.76	0.00	0.76	+0.76
Managed Turf	3.50	0.43	-3.07	1.35	0.41	-0.94
Impervious	0.35	2.66	+2.31	0.18	0.36	+0.18

Per Zoning Ordinance Section 13-107(C)(2), the following 3 criteria for redevelopment must be met:

a) There is no increase in impervious surface cover;
b) There is no further encroachment within the RPA; and
c) The proposed redevelopment is consistent with the city master plan.

The following are point-by-point responses to each of the above criteria.

a) The existing RPA impervious area to be removed currently provides no water quality benefit. While the net encroachment area of impervious area will increase by 0.18 acres, it is to install a level 2 permeable pavement facility. In this case the water quality benefit outweighs the additional impervious area since the increase is in order to provide a BMP facility.
b) While the net increase of 0.18 acres of impervious is an encroachment, the physical setback of impervious area from Backlick Run will increase. The existing concrete drainage channel to be removed is 3 feet from the concrete bank of Backlick Run

along the southern side of the site, while the new BMP will be 50 feet from the from the concrete bank. This provides 47 more feet of separation between Backlick Run and impervious land cover on the southern side. Along the western side of the site the existing batting cage is approximately 38 feet from the RPA and the storage sheds are approximately 45 feet from the RPA. In the post-developed condition, a full 100' forested buffer will be provided with the exception of the southwest corner of the site where the RPA and Backlick Run bends. Here the proposed permeable pavement BMP will begin to encroach into the RPA.

c) A virtual community meeting was held on February 25, 2021 to solicit public feedback. The public expressed a strong desire to have a synthetic turf field for increased playability and new supporting infrastructure including warmup areas, dugouts and batting cages. This redevelopment is consistent with the City's Master Plan – Eisenhower West Small Area Plan.

Per Zoning Ordinance Section 13-107(E)(1), when the application of the buffer area would result in the loss of a buildable area on a lot or parcel recorded prior to October 1, 1989, encroachments into the buffer area may be approved by the director of T&ES in accordance with the following criteria:

a) Encroachments into the buffer area shall be the minimum necessary to achieve a reasonable buildable area for a principal structure and necessary utilities;
b) Where practicable, a vegetated area that will maximize water quality protection, mitigate the effects of the buffer encroachment, and is equal to the area of encroachment into the buffer area shall be established elsewhere on the lot; and
c) The encroachment may not extend into the seaward 50 feet of the buffer area.

The following are point-by-point responses to each of the above criteria.

a) The proposed athletic field redevelopment provides the minimum amount of new impervious cover within the RPA while still meeting the programming needs of the various park users and conforms to the City's master plan. See Appendix A for various design layouts that had been considered.
b) Reforestation using native species will be provided within the RPA. The reforestation area includes stratified layers of native species – not only canopy trees but also understory trees, shrubs and perennials. The proposed planting in the RPA includes 59 trees and 110 shrubs and reflects the multiple layers of a healthy forest. Collectively, all proposed planting contributes to a much-improved RPA buffer and overall site that provides erosion/runoff control, native habitat and air quality improvements.
c) The proposed design will not encroach into the seaward 50 feet of the buffer area. This minimum 50-foot buffer is maintained along the southern side of the site and increases to a full 100-foot buffer as the site wraps around to the western edge.

Per Zoning Ordinance Section 13-119(B), the director of T&ES shall review the request for an exception and the water quality impact assessment and may grant the exception with such conditions and safeguards as deemed necessary to further the purpose and intent of this Article XIII if the director of T&ES finds that the applicant has demonstrated by a preponderance of the evidence that:

(1) Granting the exception will not confer upon the applicant any special privileges that are denied to other property owners in the CBPA overlay district;

- AMT Response: Granting this exception will not confer upon the applicant any special privileges that are denied to other property owners in the CBPA overlay district.

(2) The exception is not based upon conditions or circumstances that are self-created or self-imposed, nor does the exception arise from conditions or circumstances either permitted or noncomplying that are related to adjacent parcels;

- AMT Response: The exception is not based upon self-created or self-imposed conditions nor are the conditions related to adjacent parcels. A full 100-foot buffer and zero net encroachment is not feasible at this site to provide the required athletic footprint necessary to function as intended in the City Master Plan. Eleven different concept layouts were studied and the selected design provides the minimum amount of encroachment into the RPA while still providing a functional athletic facility. See Appendix A for several of the field layouts that were studied during the programming and concept stage of the design process.

  Ultimately Layout 2B was determined to be the layout that provided the minimum RPA encroachment while balancing playability, constructability, and level of play. In order to fit 2B within the parameters of the site, home plate was shifted approximately 27' to the north. This allowed for a right field corner fence approximately 283' away from home plate that was also >50' away from the concrete Backlick Run channel. This 283' distance is suitable for adult male slow pitch softball (as well as younger levels of play). If the right field fence was set outside the 100' buffer, the foul pole distance would have been reduced to 233', which is suitable for neither adult male nor adult female slow pitch softball and is approximately 70' shorter than the existing right field foul pole. Keeping the right field foul pole outside the 100' buffer would have resulted in a significant reduction in playability to the detriment of park users.

  In addition to shifting to the north, home plate was also shifted about 13' to the east. This pulled the proposed right field baseball fence, dugouts, and warmup spaces out of the 100' RPA buffer to the maximum extent practicable.

  The capital investment required of a synthetic turf field necessitates a multi-purpose use. Striping (in the baseball/softball outfield) for soccer, rugby, football, lacrosse, and field hockey were all considered. The minimum dimensions for rugby, football, lacrosse and field hockey all would have encroached into the RPA on the west side (left foul line) of the synthetic turf field. Therefore, a 165'x300' soccer field was instead selected as it reduced RPA encroachment relative to the other sports while still offering the site multiple uses for a variety of ages and skill levels.

(3) The exception is the minimum necessary to afford relief;

- AMT Response: As described above for item #2, A series of layouts were studied and the selected design provides the minimum amount of encroachment into the RPA while still providing a functional athletic facility. Per Zoning Ordinance Section 13-107(E)(1)(c), the proposed layout will maintain a minimum 50-foot seaward buffer area.

(4) The exception will be consistent with the purpose and intent of the overlay district, and not injurious to water quality, the neighborhood or otherwise detrimental to the public welfare;

- AMT Response: The post-developed condition will be consistent with the intent of the overlay district, not injurious to water quality, the neighborhood or otherwise detrimental to the public welfare. Existing impervious area will be replaced by a BMP that will provide a water quality benefit. The proposed reforestation vegetation will enhance the character of the RPA buffer and contribute to the reduction in phosphorus load.

(5) Reasonable and appropriate conditions are imposed, as warranted, to prevent the allowed activity from causing degradation of water quality.

- AMT Response: The existing banks of Backlick Run adjacent to the site are concrete and the site topography is such that runoff drains away from the top of bank on both the western and southern borders back into the site. Any potential water degradation from construction activities will be further mitigated through super silt fence, silt fence, inlet protection controls and a construction entrance with wash rack. Further, the sequence of construction is such that grading activitis and removal of the concrete drainage channel will occur after the new athletic field and upstream areas have been stabilized to further protect the RPA during construction activities.

Through a combination of the above mitigation measures, the proposed on-site level 2 permeable pavement facility will provide 4.10 lb/yr of phosphorus removal which exceeds the site requirement of 4.00 lb/yr of phosphorus removal. The on-site facility will be in series with the downstream Ben Brenman level 2 wet pond which will provide an additional 1.42 lb/yr of phosphorus removal for a total of 5.52 lb/yr of phosphorus removal. The excess 1.52 lb/yr of phosphorus removal will be banked by the City in order to provide water quality credit to projects that won't be able to achieve the minimum water quality requirement and bolster the City's ability to meet the current Chesapeake Bay TMDL goals.

For these reasons, we respectfully request an exception to Zoning Ordinance Section 13-107(C)(2) for the proposed improvements within the RPA.

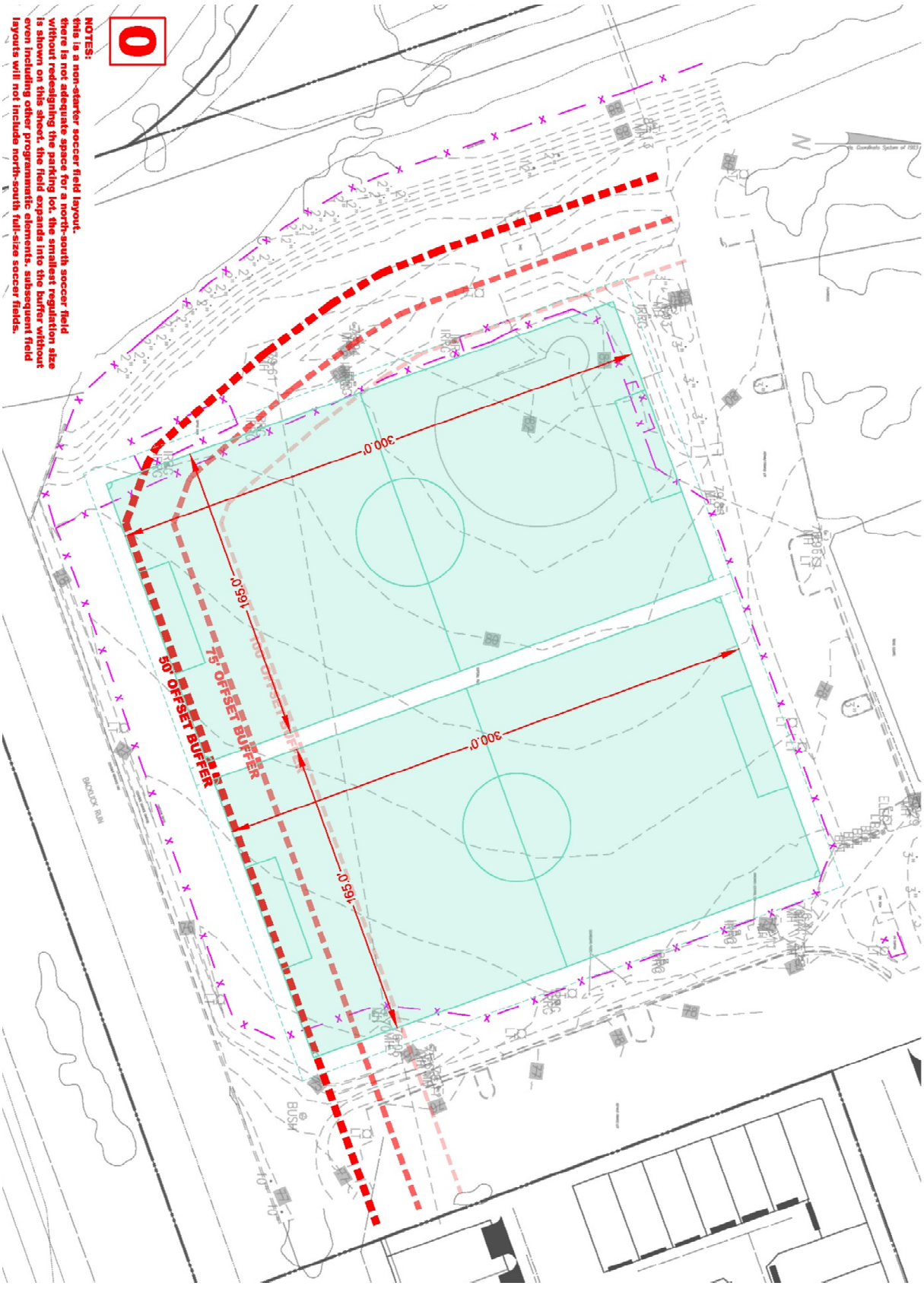
Sincerely,

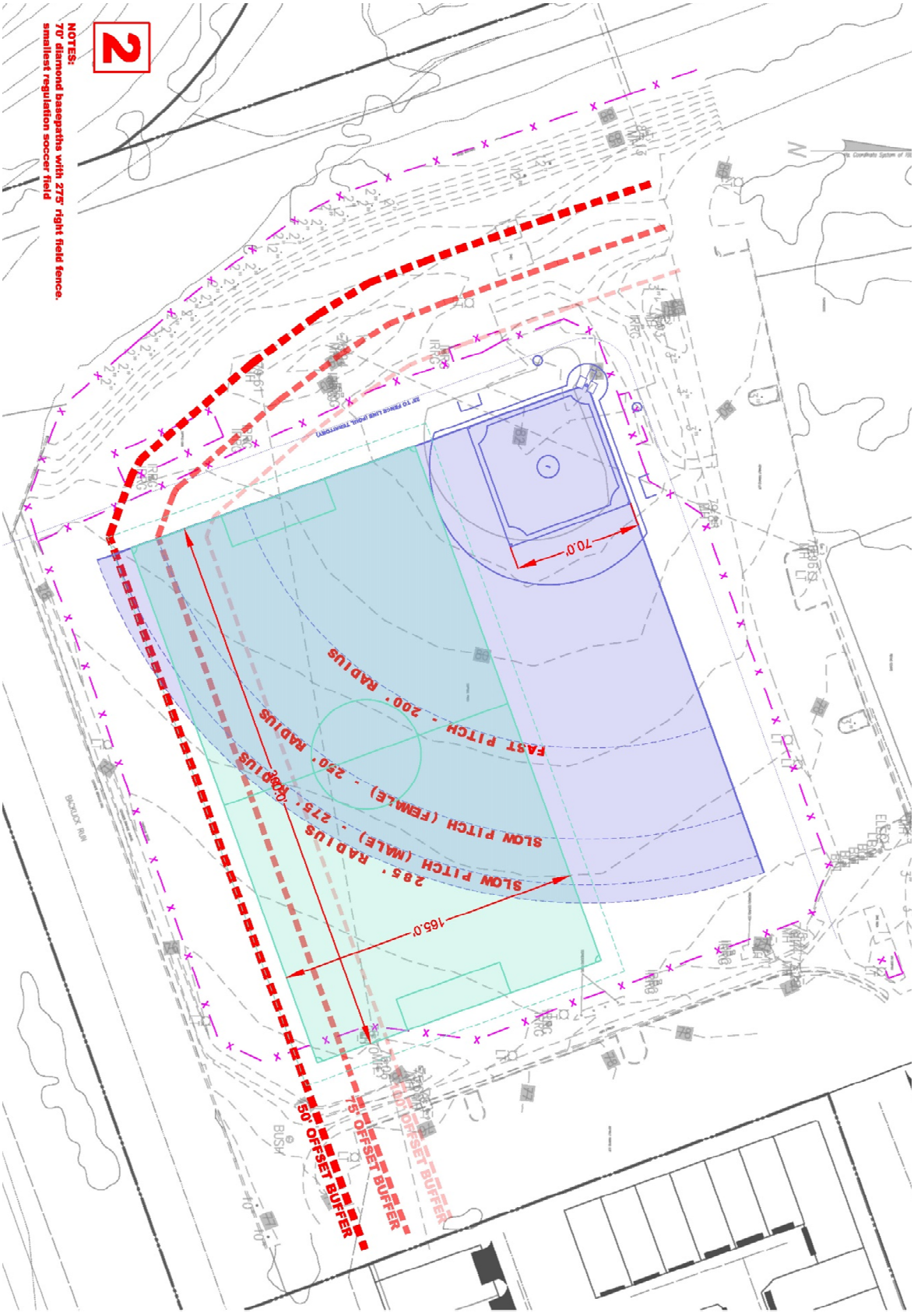
A. Morton Thomas and Associates, Inc.

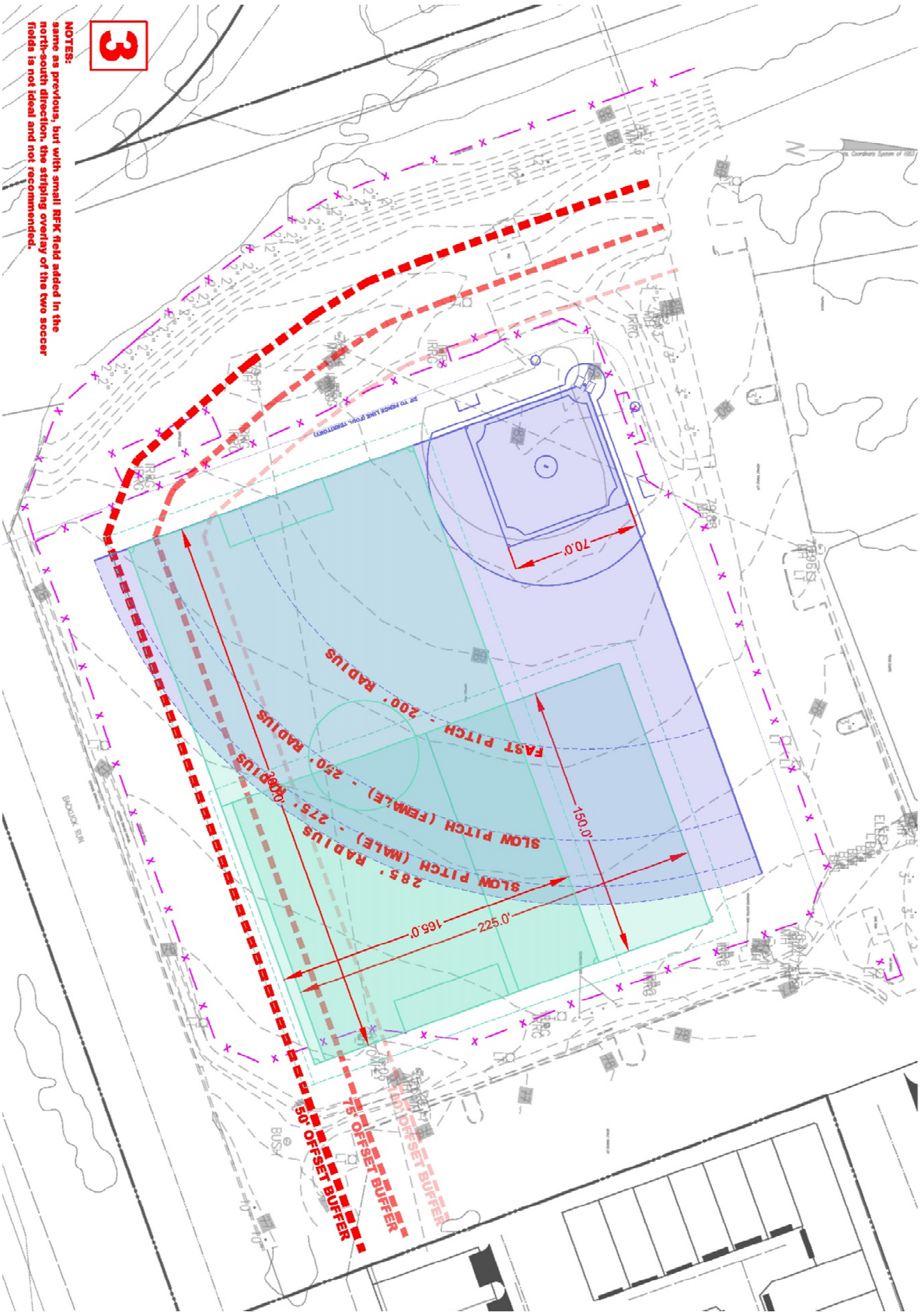
Chelsea Bishop, P.E.
Senior Project Manager

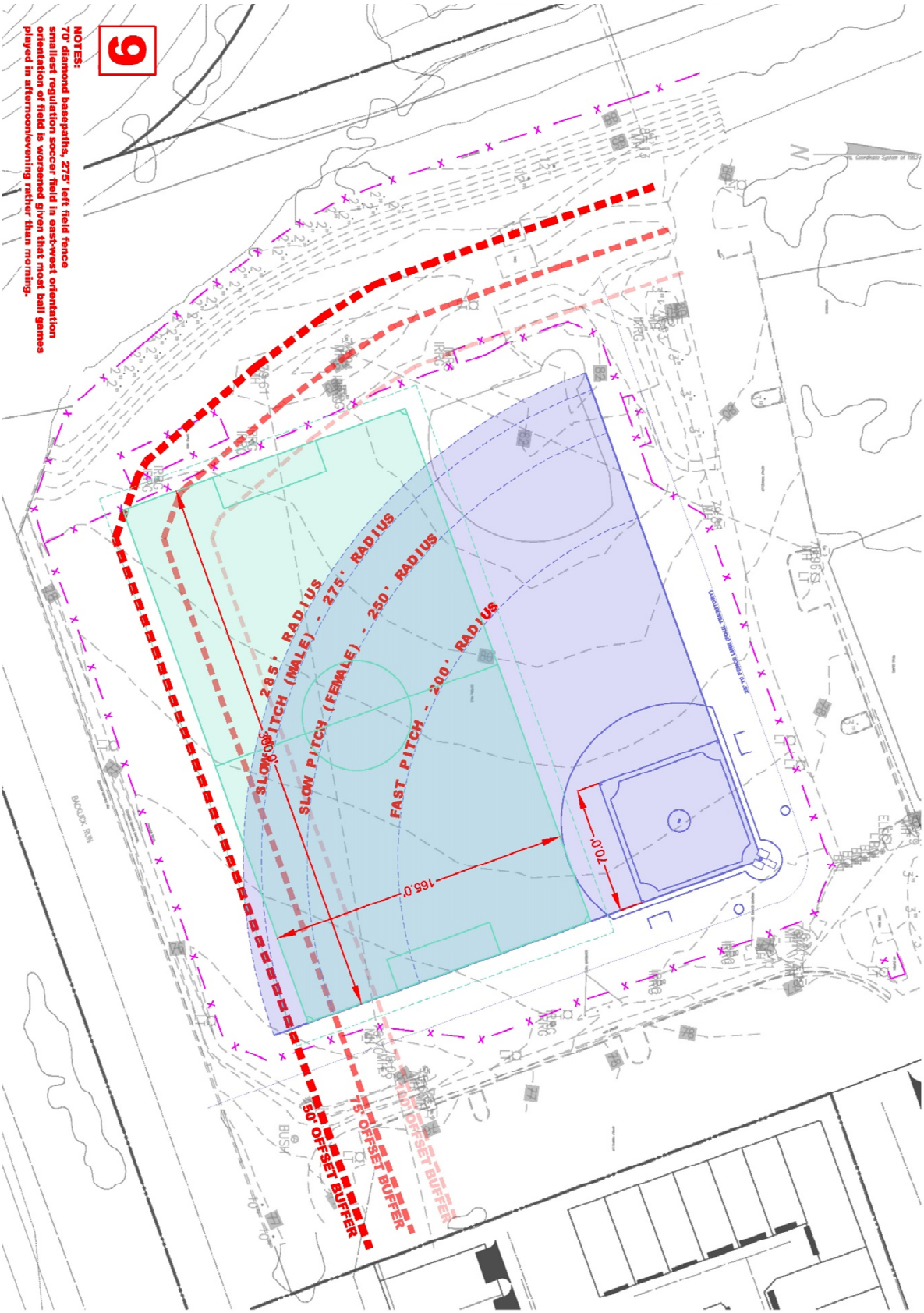
APPENDICES

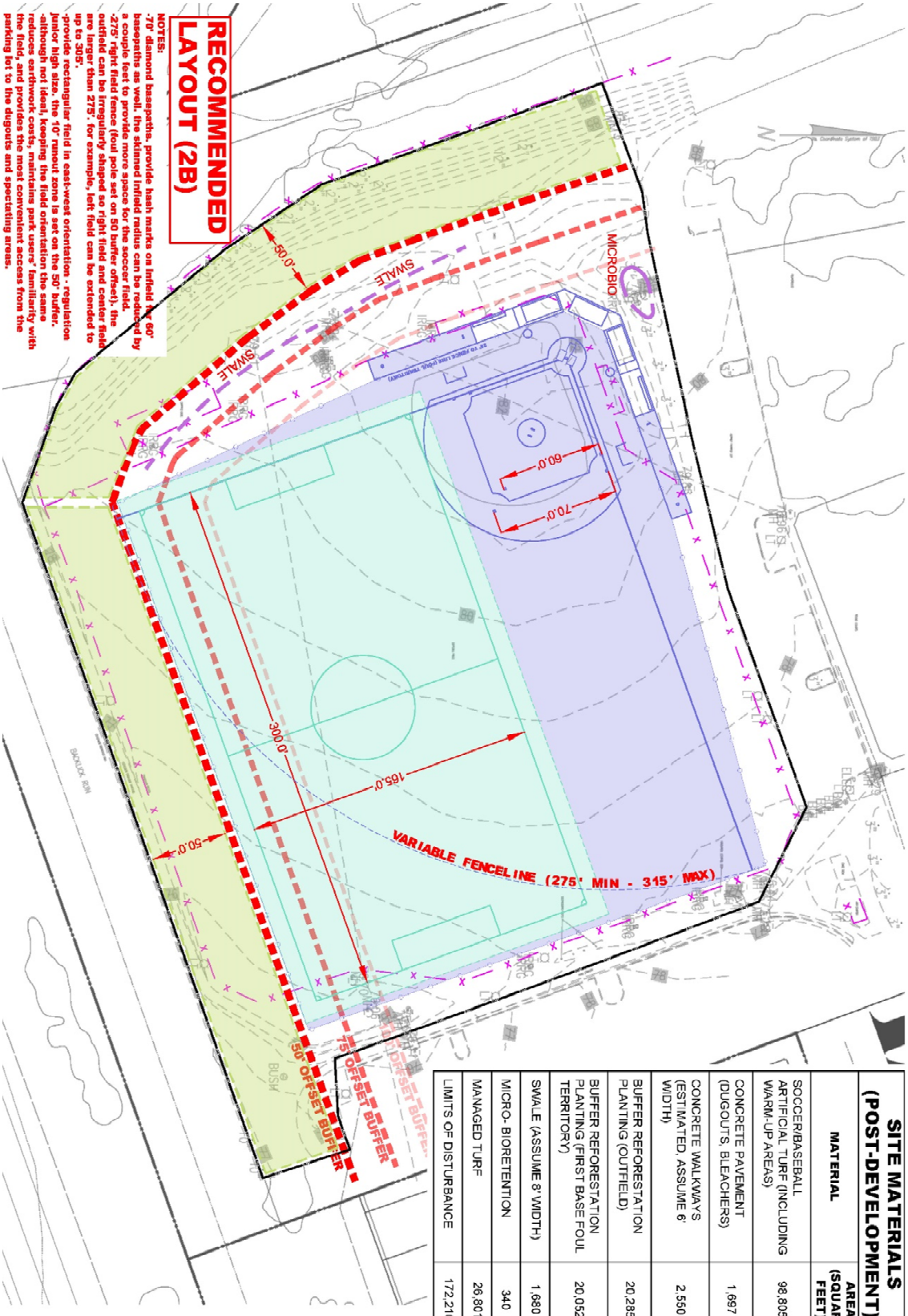
APPENDIX A: SITE LAYOUT STUDIES


0
NOTES:
this is a non-starter soccer field layout.
there is not adequate space for a north-south soccer field
without redesigning the parking lot. the smallest regulation size
is shown on this sheet. the field expands into the buffer without
even including other programmatic elements. subsequent field
layouts will not include north-south full-size soccer fields.
300.0'
165.0'
75' OFFSET BUFFER
50' OFFSET BUFFER
300.0'
165.0'
BACKLICK RUN
BUSH


2
NOTES:
70' diamond baseparths with 275' right field fence.
smallest regulation soccer field
70.0'
FAST PITCH - 200' RADIUS
SLOW PITCH (FEMALE) - 250' RADIUS
SLOW PITCH (MALE) - 275' RADIUS
285' RADIUS
165.0'
50' OFFSET BUFFER
75' OFFSET BUFFER
100' OFFSET BUFFER


3
NOTES:
same as previous, but with small RFK field added in the north-south direction, the striping overlay of the two soccer fields is not ideal and not recommended.
70.0'
FAST PITCH - 200' RADIUS
SLOW PITCH (FEMALE) - 250' RADIUS
SLOW PITCH (MALE) - 275' RADIUS
285' RADIUS
150.0'
165.0'
225.0'
50' OFFSET BUFFER
75' OFFSET BUFFER
100' OFFSET BUFFER


6
NOTES:
70' diamond basepaths, 275' left field fence
smallest regulation soccer field in east-west orientation
orientation of field is worsened given that most ball games
played in afternoon/evening rather than morning.
SLOW PITCH (MALE) - 275' RADIUS
SLOW PITCH (FEMALE) - 250' RADIUS
FAST PITCH - 200' RADIUS
285'
300'
166.0'
70.0'
50' OFFSET BUFFER
75' OFFSET BUFFER
BACKOX RUN



SITE MATERIALS (POST-DEVELOPMENT)

MATERIAL	AREA (SQUARE FEET)
SOCCER/BASEBALL ARTIFICIAL TURF (INCLUDING WARM-UP AREAS)	98,805
CONCRETE PAVEMENT (DUGOUTS, BLEACHERS)	1,697
CONCRETE WALKWAYS (ESTIMATED, ASSUME 6' WIDTH)	2,550
BUFFER REFORESTATION PLANTING (OUTFIELD)	20,285
BUFFER REFORESTATION PLANTING (FIRST BASE FOUL TERRITORY)	20,052
SWALE (ASSUME 8' WIDTH)	1,680
MICRO- BIORETENTION	340
MANAGED TURF	26,801
LIMITS OF DISTURBANCE	172,210

ARMISTEAD L. BOOTHE PARK FIELD CONVERSION DESIGN

AMT Project No. 20-0229.001

WATER QUALITY IMPACT ASSESSMENT

APPLICANT

City of Alexandria Department of Recreation, Parks and Cultural Activities
1108 Jefferson Street
Alexandria, VA 22314

SUBMITTED TO

City of Alexandria Planning Commission
301 King Street, Council Chambers, 2nd Floor
Alexandria, VA 22314

PREPARED BY

A. Morton Thomas and Associates, Inc.
800 King Farm Boulevard, 4th Floor
Rockville, MD 20850
301.881.2545
amtengineering.com

APRIL 7, 2021

This WQIA is based on the Armistead L. Boothe Park Field Conversion Design Construction Drawings. This signature and seal certifies that the information contained herein is accurate to the best of my knowledge.

License No. 50030
Expiration Date: 06/30/2022

Seal / Signature

Signed: John Farrell – Virginia Certified Environmental Planner # 025223

Dated: April 7, 2021

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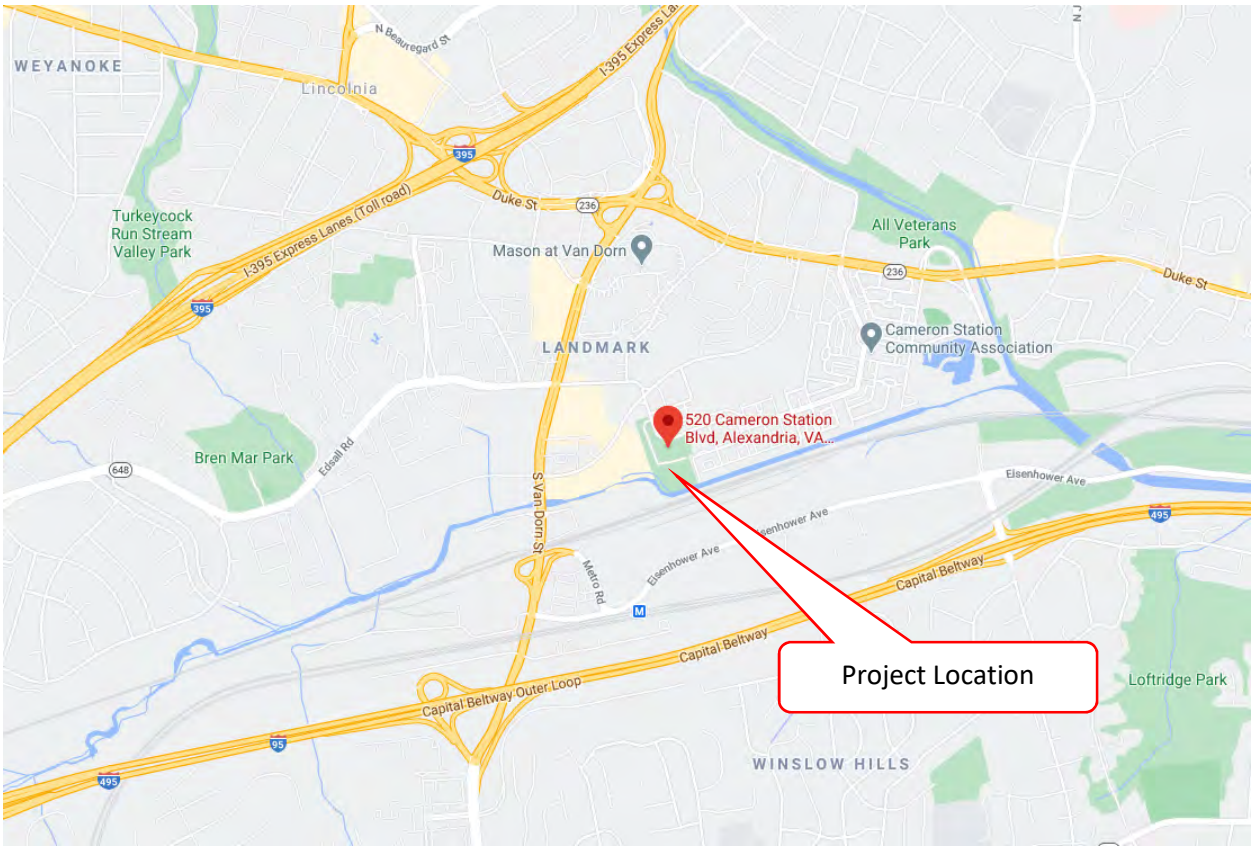
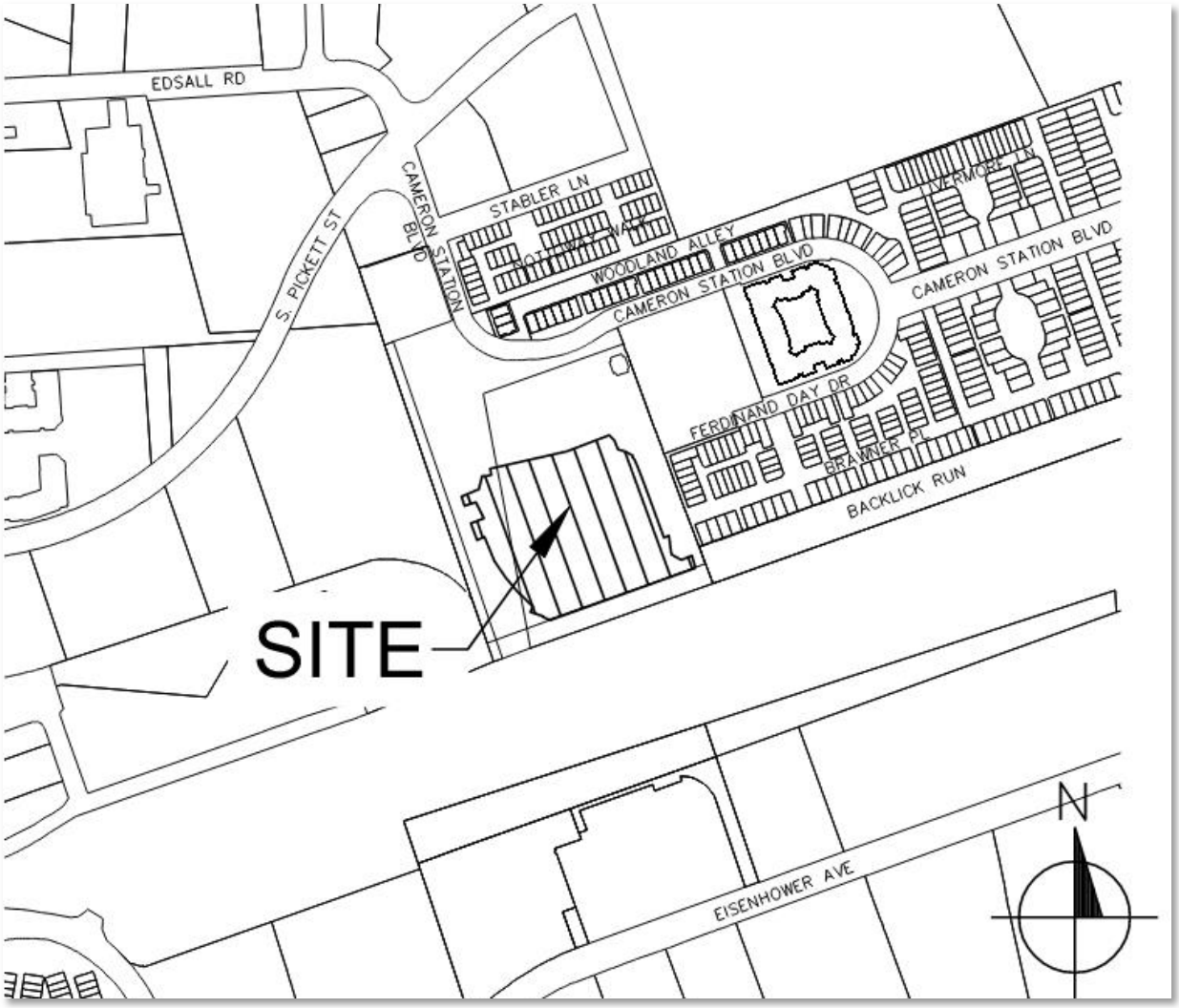
LOCATION MAP



VICINITY MAP



1. INTRODUCTION

This Water Quality Impact Assessment (WQIA) has been prepared for the redevelopment of a 4.03-acre project site area (site) within the 11.57-acre Armistead L. Boothe Park located at 520 Cameron Station Boulevard. The site is bordered by Backlick Run to the south and west, Ferdinand Day Drive to the east and park parking and playground to the north. The property is owned by City of Alexandria (City) and consists of an existing natural turf field. The project is being developed by City Department of Recreation, Parks and Cultural Activities to replace the existing field with a synthetic turf multi-use sports field and provide supporting infrastructure and site upgrades.

There will be more than 5,000 square feet of disturbance within the RPA, therefore this is a water quality major impact assessment as required per City Code Section 13-117. This WQIA will identify the location, nature and impacts of this proposed redevelopment and mitigation measures including BMPs and vegetation.

The proposed site use will not be changing and there was previous RPA disturbance with previous park development. This project will disturb 1.53 acres within the RPA. Currently there is 0.18 acres of impervious area within the RPA and in the post-developed condition there will be 0.36 acres of impervious area, including a portion of the proposed synthetic turf field which will be used as a permeable pavement level 2 BMP facility. Additionally, 0.76 acres will be converted from managed turf land cover to reforested area within the RPA directly adjacent to Backlick Run. Refer to Tables 1 and 6 for a summary of land cover within the RPA in the existing and post-developed conditions.

2. EXISTING CONDITIONS

The Armistead L. Boothe Park features a natural turf diamond ball field that serves multiple athletic sports. Supporting features include batting cages, spectator seating, lights, equipment buildings and pedestrian access to the parking lot to the north. Backlick Run stream borders the site to the west and south. The site generally drains from the northwest to the southeast and is located in the floodplain and partially within the resource protection area (RPA).

2.1. ENVIRONMENTAL SITE ASSESSMENT

A Phase 1 Environmental Site Assessment (ESA) has not been completed for this site. However, a Limited Site Investigation was completed to identify any potential soil contaminants within the proposed BMP footprint. Two boring locations identified contaminated soils. These areas will either need to have soil remediated or an impermeable liner will be installed in the vicinity of these areas to provide a barrier between the stormwater and contaminated soils. Refer to Appendix A for the Limited Site Investigation report prepared by Terracon Consultants, Inc., dated February 1, 2021.

A site-specific RPA delineation was completed per City Code Section 13-112. There are slopes in excess of 15% along a portion of the site to the west adjacent to Backlick Run where the grade slopes east into the project site area. The following features or characteristics are not present at the site:

- Intermittent streams
- Highly erodible soils
- Springs or seeps

- Wetlands

2.2. LAND COVER

Table 1 below provides a summary of existing land cover types within the site and within the RPA.

Table 1 - Existing Land Cover Summary		
Land Cover Type	Existing Area within Site (Acres)	Existing Area within RPA (Acres)
Forested	0.00	0.00
Managed Turf	3.50	1.35
Impervious	0.35	0.18
Total	**3.85**	**1.53**

2.3. TOPOGRAPHY

The site generally slopes from the northwest to the southeast at less than 2 percent. There is a concrete channel that runs along the south side of the site adjacent to the Backlick Run concrete bank that intercepts sheet flow from the site and turns north to direct the runoff to existing inlet structure #10. There is a concrete retaining wall at the top of the Backlick Run concrete bank to the south. The area from this retaining wall sheet flows north into the concrete channel on site.

The western side of the site is also bordered by Backlick Run where a concrete bank is present. An area less than 0.01 acres within the limits of disturbance features maximum 3:1 slopes with runoff draining away from the top of concrete bank east into the site. Runoff from this area is collected in existing inlet structure #6.

The asphalt parking area and adjacent portion of the athletic field along the left base line sheet flows to the northeast into existing inlet structures #3 and #2.

2.4. HYDROLOGY

The site is bordered to the west and south by Backlick Run which is the what the RPA limit is based from. Backlick Run features concrete channels adjacent to this site with a concrete retaining wall along the south edge of the site. The limits of the concrete channel and retaining wall sets the drainage divide, with runoff flowing away from the concrete border back into the site. The site only contains one drainage area for stormwater management analysis. Each of the on-site inlets converges at existing inlet structure #2 on the northeast corner of the site. A 30” RCP outlets from existing inlet structure #2 to the north and ultimately follows the MS4 to the Ben Brenman Park wet pond. For the purposes of the VRRM spreadsheet it is assumed the site has hydrologic soil type D with an existing CN of 82. No portion of the site area drains directly into the adjacent Backlick Run.

2.5. POLLUTANT LOADS

Based on the Virginia Runoff Reduction Method (VRMM) redevelopment spreadsheet the existing pollutant load from the site is 2.75 lb/yr of phosphorus. It is assumed the site has hydrologic soil type D.

2.6. BMPS

There are no existing BMP facilities located within the site. However, drainage from the Park is collected into the MS4 and discharges into the Ben Brenman Level 2 Wet Pond which serves 290 acres of City of Alexandria runoff including this existing site.

2.7. SOILS & GEOLOGY

The NRCS web soil survey shows Grist Mill sandy loam (40), 0-25% slopes within the project site which is hydrologic soil group C. For the purposes of stormwater management calculations hydrologic soil group D is used per the direction of City staff. This site's geology is within the Potomac Formation of Cretaceous period. The existing soils on-site consist of approximately 2-4 feet of fill materials over a combination of lean clay with gravel, sandy silt with gravel, silty sand with gravel and sandy lean clay. Refer to Appendix B for the complete Geotechnical Engineering Report prepared by Terracon Consultants, Inc., dated January 29, 2021.

2.8. VEGETATION

A. Morton Thomas and Associates, Inc. performed a tree survey on January 15, 2021. Trees with a diameter at breast height (DBH) of 1" and greater were located, inventoried and assessed for species, size, and condition. A condition rating was determined by using the Council of Tree and Landscape Appraisers (CTLA) method – including a scoring point system for roots, trunk, scaffold branches, small branches/twigs and foliage/buds. Collectively, the scores for the individual components of the trees are aggregated to a total condition score out of a total maximum score of 100. A total of 74 trees and one shrub were located on site. Of the vegetation surveyed, 60 of the trees and the one shrub are located in the RPA. (14 trees are not in the RPA.)

The existing trees and shrubs consist of a mix of native hardwood typically found in the mid-Atlantic region (i.e., oak, gum, buckeye, ash, pine, sycamore, locust, cypress and cherry) as well as non-native/invasive species (i.e., privet, London plane, red mulberry, Norway spruce, pear and silk tree). Standing dead trees were not surveyed. Species present are summarized in Table 2 (below) – indicating that more than 50% of the trees surveyed are mulberry or Norway spruce. Of the 74 trees, two are 30" or more – T4 (a 37" pin oak) and T7 (a 30" sweet gum). Seventy-three percent of the trees surveyed are <6" DBH (see Table 3 below).

Table 2 - Existing Tree Species

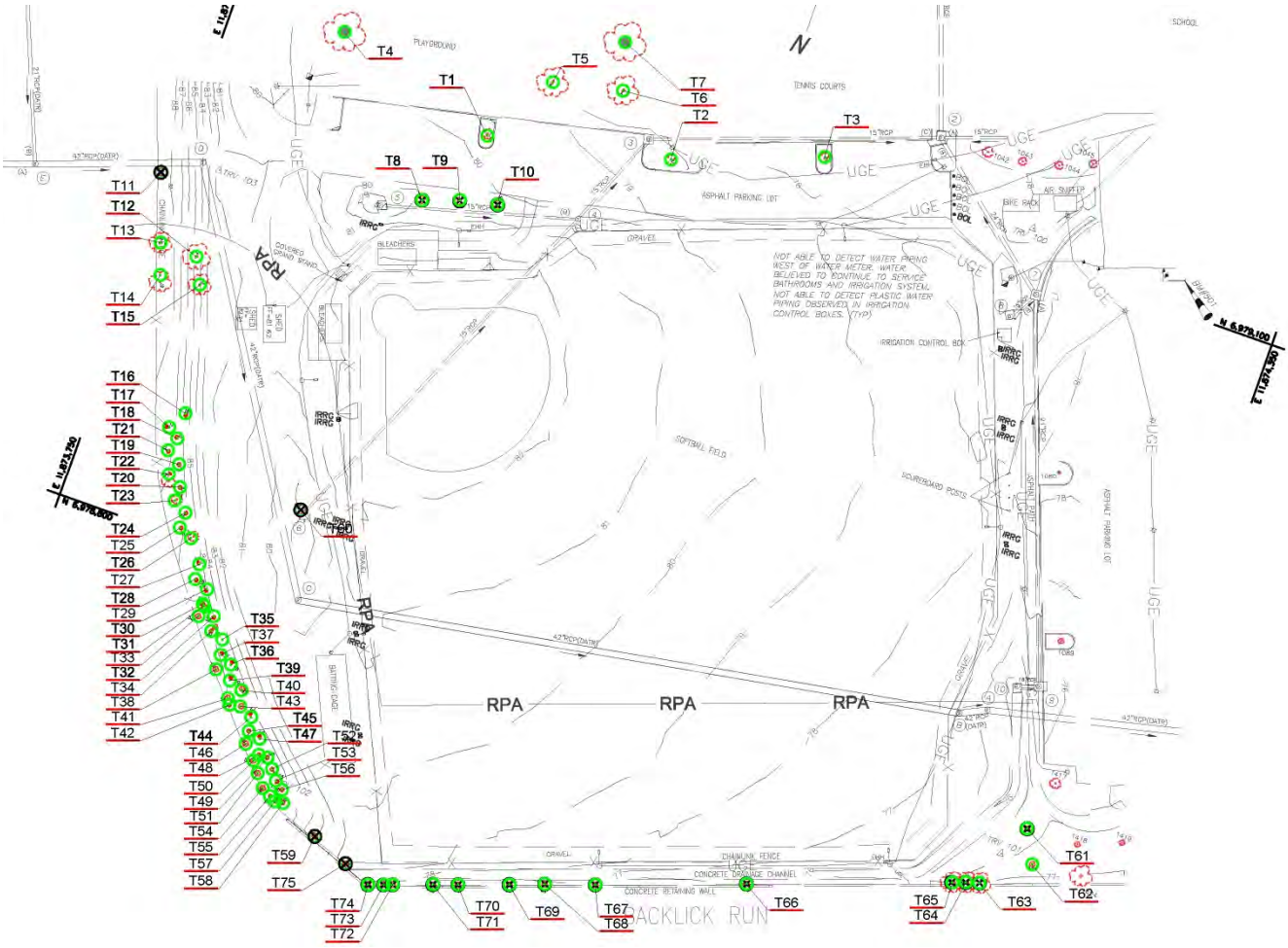
Species	Quantity	Percentage
London Plane	6	8.1%
Oak	3	4.1%
Gum	1	1.4%
Buckeye	2	2.7%
Ash	1	1.4%
Mulberry	12	16.2%
Pine	3	4.1%
Spruce	27	36.5%
Locust	7	9.5%

Sycamore	6	8.1%
Pear	1	1.4%
Cypress	1	1.4%
Cherry	3	4.1%
Silk Tree	1	1.4%
Total	**74**	**100%**

Table 3 – Tree DBH Size Range

DBH Size Range	Quantity	Percentage
0 - 2.9"	36	48.6%
3.0 - 5.9"	18	24.3%
6.0 - 17.9"	14	18.9%
18.0 - 29.9"	4	5.4%
>30.0"	2	2.7%
Total	**74**	**100%**

The majority of the trees are located along the park's western and southern boundaries bordering Backlick Run. The trees do not constitute a forest as they do not provide closed canopy and do not meet the minimum forest width criteria. See the map below for locations of the trees. The tree table and locations are also shown on LF-01 and LF-02.



Approximately 19 of the 74 existing trees will be removed (16 of these tree removals are in the RPA). The single shrub (located in the RPA) will also be removed. The total caliper for the trees removed is 101" (90" in the RPA) and the total canopy area removed in is 14,250 square feet (.33 acres), of which 10,500 square feet (0.24 acres) is in the RPA. The trees to be removed in the RPA are primarily red mulberry and black cherry. See Table 4 below for a breakdown of trees to be removed.

Table 4 – Trees to be Removed

Tree #	Scientific Name	Common Name	D.B.H (Inches)	Located within RPA?	Existing Crown Cover (sf)	Existing Crown Cover Removed (sf)
T8	Platanus x acerifolia	London Plane Tree	4.00	no	1250	1250
T9	Platanus x acerifolia	London Plane Tree	4.00	no	1250	1250
T10	Platanus x acerifolia	London Plane Tree	3.00	no	1250	1250
T59	Morus rubra	Red Mulberry	1.00	yes	750	750
T60	Morus rubra	Red Mulberry	7.00	yes	750	750
T61	Pyrus calleryana	Callery Pear	4.00	yes	0	0
T63	Prunus serotina	Black Cherry	22.00	yes	750	750
T64	Prunus serotina	Black Cherry	12.00	yes	750	750
T65	Prunus serotina	Black Cherry	15.00	yes	750	750
T66	Morus rubra	Red Mulberry	3.00	yes	750	750
T67	Morus rubra	Red Mulberry	2.00	yes	750	750
T68	Albizzia julibrissin	Silk Tree	8.00	yes	0	0
T69	Morus rubra	Red Mulberry	1.00	yes	750	750
T70	Morus rubra	Red Mulberry	1.00	yes	750	750
T71	Morus rubra	Red Mulberry	1.00	yes	750	750
T72	Morus rubra	Red Mulberry	1.00	yes	750	750
T73	Morus rubra	Red Mulberry	1.00	yes	750	750
T74	Morus rubra	Red Mulberry	8.00	yes	750	750
T75	Morus rubra	Red Mulberry	3.00	yes	750	750
		Totals	**101.00**	**3 NO**	**14250**	**14250**

		16 YES		

Table 5- Tree Species to be Removed

Species	Quantity	DBH removed	Percentage of Total Trees Removed	Located in RPA	% in RPA
London Plane	3	11.00	15.8%	0	0.0%
Mulberry	11	29.00	57.9%	11	68.8%
Pear	1	4.00	5.3%	1	6.3%
Cherry	3	49.00	15.8%	3	18.8%
Silk Tree	1	8.00	5.3%	1	6.3%
Totals	19	101.00	100.0%	16	100.0%

81.3% of the tree removals in the RPA are non-native/invasives. These tree removals in the RPA are limited to the south side of the park, between the existing concrete channel and the Backlick Run concrete retaining wall. All other trees in the RPA will be preserved so they can continue to provide erosion control, shade, species habitat and other water quality/quantity benefits. The reason for removing these trees in the RPA is to allow for grading of the mulch trail and the swale along the park's southern boundary.

2.9. SANITARY SEWER

There is an existing 42" sanitary sewer main that runs below the existing athletic field from west to east conveying waste from Fairfax County to the Alexandria Renew facility. This site does not convey any sewage to this main in the existing condition.

3. PROPOSED REDEVELOPMENT

The multi-use field will be converted to a synthetic turf field which will also function as a Level 2 permeable pavement stormwater management facility. Upgraded site lighting, new fencing, equipment buildings, batting cages, dugouts, warm up areas and spectator seating will be provided. New ADA-compliant access from the parking lot to the renovated facilities will also be provided. A reforested buffer will be provided to the maximum extent practicable along Backlick Run.

3.1. LAND COVER

The proposed site of 3.85 acres will be comprised of the new synthetic turf athletic field, dugouts, surrounding walkways, spectator seating, equipment storage, batting cages, modified vehicular turn-around for improved circulation, improved pedestrian connectivity at the northwest, northeast and southeast corners of the site including a nature trail through the proposed forested area within the RPA.

Table 6– Post-developed Land Cover Summary			
Land Cover Type	**Area within Site (Acres)**	**Area within RPA (Acres)**	**RPA Area Change Relative to Existing (+/- AC)**
Forested	0.76	0.76	+ 0.76
Managed Turf	0.43	0.41	- 0.94
Impervious	2.66	0.36	+ 0.18
Total	**3.85**	**1.53**	

While there is a 0.18-acre increase in impervious area, the net encroachment, this is comprised of the level 2 permeable pavement BMP. The existing 0.18 acres of impervious cover is comprised of pavement and small buildings which provides no water quality benefit. Those existing hardscape areas are to be removed so the total post-developed 0.36-acres of impervious area within the RPA consists of the BMP and its perimeter curb. Encroachment is discussed in more detail later in Section 4.1.

3.2. TOPOGRAPHY

The site grading patterns will generally remain the same. The site is in the floodplain so the project will not introduce any significant amount of fill that would trigger a floodplain study. The introduction of the synthetic turf field will intercept a large portion of the site that would have previously sheet flowed into the concrete channel. The RPA buffer area south of the synthetic turf field and north of Backlick Run will feature a graded channel to allow runoff to flow from west to east and then north to discharge into existing inlet #10 similar to the existing condition. Minor regrading north of existing inlet structure #6 is proposed to promote better drainage from the asphalt parking lot access.

3.3. HYDROLOGY

The post-developed site will maintain only one drainage area for stormwater management analysis. On-site inlets will continue to converge at existing inlet structure #2 on the northeast corner of the site and join the MS4 to the Ben Brenman Park wet pond. The VRRM calculates reduced CNs of 86 and 88 for the 1-year and 10-year storm events, respectfully. Per City Code Section 13-117(D)(2)(c), the proposed site redevelopment will not:

- Impact wetlands,
- Supply to Waters of the United States (WoUS),
- Disrupt existing hydrology, including wetland and stream circulation patters,
- Import fill materials,
- Include dredge materials,
- Impact shellfish beds, submerged aquatic vegetation or fish spawning areas

3.4. POLLUTANT LOADS

Based on the Virginia Runoff Reduction Method (VRMM) redevelopment spreadsheet the on-site permeable pavement facility will provide 4.10 lb/yr phosphorus removal. This facility is in series with the off-site level 2 wet pond located at Ben Brenman Park. The off-site facility provides an additional 1.42 lb/yr phosphorus removal for a total 5.52 lb/yr phosphorus removal. Refer to sheet C-22 for computations.

3.5. PROPOSED BMPS

This project proposes to use the synthetic turf field as a level 2 permeable pavement facility to address both state stormwater management requirements as well as the City's Green Infrastructure standards. Both the facility footprint and contributing drainage area is 2.33 acres. The facility maintains an average stone reservoir depth of 6 inches. Due to the location within the floodplain, the proposed surface of the field will not raise the current elevation and maintains the general slope pattern from northwest to southeast. As a result, the subgrade includes a series of steps with each section sloping less than 1.0 percent. The subgrade also includes a series of 6" underdrain pipes that are directed to a collector pipe system to the west and south sides of the field to a control structure with STM-1. In order to achieve level 2 design status included with each subgrade step is an impermeable barrier to provide 3" of ponding. The control structure in STM-1 provides a minimum 48-hour drawdown time using a weir plate with low flow orifice. Refer to Sheet C-24 of the construction documents for details and design calculations.

Table 7– BMP/SWM Summary

SWM #	BMP Type	Pervious Area (AC)	Impervious Area (AC)	Phosphorus Removal (lb/yr)
A	Permeable Pavement (L2)	0.00	2.33	4.10
Off-site	Wet Pond (L2)	0.43	0.33	1.42
Total		**0.43**	**2.56**	**5.52**

3.6. SOILS

In order to not fill within the floodplain, the proposed athletic field and surrounding elevations are generally at or below the existing elevations. The area below the proposed synthetic turf field will require removal of existing soils to accommodate the installation of the stone reservoir, surface materials and perimeter curb. According to the Limited Site Investigation (LSI) there is an area of localized soil contamination beneath the proposed permeable pavement facility, located at boring SWM-3 as shown in Appendix A. There are two options to protect the stormwater from interacting with the contaminated soils. The first option is to install an impermeable liner in the vicinity of the contaminated soils. The second option is to remove the contaminated soils and replace with suitable backfill. The construction documents show a minimum 50-foot offset limits of impermeable liner from the known contamination point, SWM-3, which is located in the northwest corner of the proposed permeable pavement footprint.

3.7. VEGETATION

Table 8 - RPA Replacement Tree Planting Schedule					
Existing Trees Removed in the RPA	**Caliper Inches Removed in the RPA (native and non-native/ invasive)**	**Trees Required to Satisfy Replacement Ratio (1 tree planted for every 4 caliper inches removed)**	**Vegetation Type**	**Size**	**Species**
T59	1	1	Canopy Trees	1.5" - 2" Caliper	black gum (*Nyssa sylvatica*); red oak (*Quercus rubra*); red maple (*Acer rubrum*); tulip poplar (*Liriodendron tulipifera*); dogwood (*Cornus florida*)
T60	7	2			
T61	4	1			
T63	22	6			
T64	12	3			
T65	15	4			
T66	3	1			
T67	2	1			
T68	8	2			
T69	1	1			
T70	1	1			
T71	1	1			
T72	1	1			
T73	1	1			
T74	8	2			
T75	3	1			
	Total:	**29**			

The proposed RPA Reforestation tree planting at Boothe Park is developed in consultation with the Stormwater Management Division at Alexandria's Transportation and Environmental Services. The required RPA tree planting is determined by the caliper of each tree removed. Appendix D-5 of the VA Riparian Buffers Modification & Mitigation Guidance Manual stipulates that a 1.5" – 2" tree is required for every 4" of tree DBH removed in the RPA. As mentioned in Section 2.8 of this report, a total of 16 trees within the RPA will be removed. This total includes not only the native tree species to be removed, but also the non-native/invasive trees to be removed.

Based on the replacement ratio, (29) 1.5-2" caliper replacement trees shall be planted in the RPA (both in the western portion next to Backlick Run and in the southern portion next to the concrete run). The table above demonstrates the replacement calculations and the proposed replacement species, in accordance with the Riparian Buffers Modification & Mitigation Guidance Manual. The table is also provided on the planting plan sheet LP1.1.

These replacement trees are planted within the RPA's reforestation area. The reforestation area includes a stratified layers of native species – not only canopy trees (described above) but also understory trees, shrubs and perennials. The proposed planting in the RPA includes 59 trees and 110 shrubs and reflects the multiple layers of a healthy forest. Tree locations consider proper clearance away from the synthetic turf field to reduce the amount of seeds, flowers and leaves that fall into the new field. Additionally, no planting occurs in a 14' wide mulch path area. This 14' wide swath provides

a circuit walking loop around the new ball field. In the future, as part of a separate project, the mulch trail will be converted into a permeable trail and extend the Cameron Station Linear Park.

The rest of the on-site planting is designed in accordance with the City of Alexandria 2019 Landscape Guidelines. This includes ensuring adequate crown coverage provided by proposed canopy trees, understory trees, and shrubs planting, as shown on Sheet LP1.1.

Outside of the RPA reforestation, the site includes a new ball field closely surrounded by existing parking lots to the north and east. The plant-able areas between the field perimeter fencing and parking lots is proposed with low-mow turf grass as a maintenance access buffer is needed around the perimeter of the field. Near the entry plaza (behind home plate), additional perennials and grasses are proposed.

Collectively, all proposed planting contributes to a much-improved RPA buffer and overall site that provides erosion/runoff control, native habitat and air quality improvements.

3.8. SANITARY SEWER

The proposed site will not convey any sewage to the existing 42" sanitary sewer. The proposed synthetic turf field is located directly above the sewer main and there are two existing manhole access that will be within the proposed synthetic turf field footprint. In coordination with Fairfax County Wastewater staff, an impermeable liner will be provided above the sanitary main offset a minimum of 15 feet from the center line for a total 30' width. The standard manhole access lids will be replaced with a synthetic turf covered access frame to maintain access and reduce risk of injury during athletic play. This detail is provided on Sheet C-16 of the Construction Documents.

3.9. EROSION AND SEDIMENT CONTROL

A two-phased erosion and sediment control plan is proposed for this project. All perimeter controls installed in Phase 1 and to remain in Phase 2 unless indicated for adjustment or removal in Phase 2. A stone construction entrance with wash rack will be located in the northwest corner of the site directly off the asphalt access drive. A series of super silt fence south of the proposed synthetic turf field will be installed to filter water prior to entering the concrete channel. Additional super silt fence is proposed along the eastern side of the limits of disturbance. Silt fence will be used adjacent to the parking lot since there is a smaller drainage area to the north. All existing inlet structures will have either standard or curb inlet protection.

3.10. ANTICIPATED PERMITS

- City of Alexandria – Grading Plan Approval
- VPDES Permit
- City of Alexandria – Building Permit*
- City of Alexandria – Hauling Permit*
    - *Permit to be secured by contractor.

3.11. ANTICIPATED CONSTRUCTION SCHEDULE

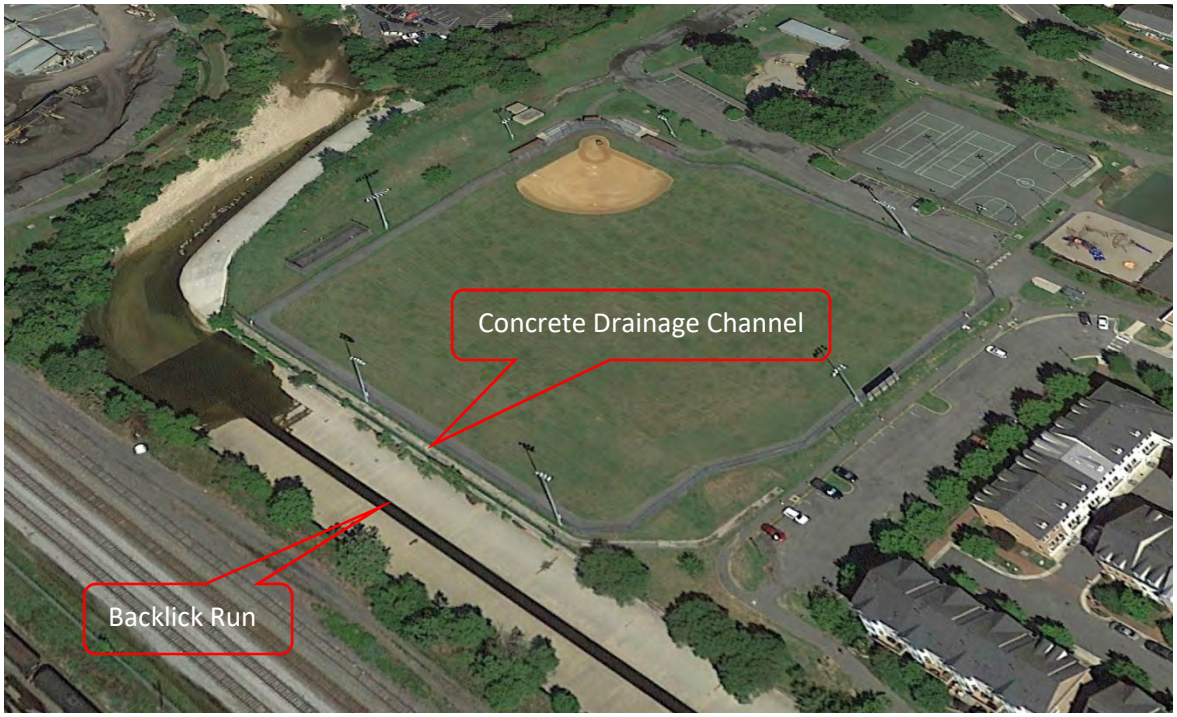
- Summer/Fall 2021: Contractor Bidding

- Fall 2021: Construction Begins
- Spring/Summer 2022: Approximately 6-month Construction Period Concludes

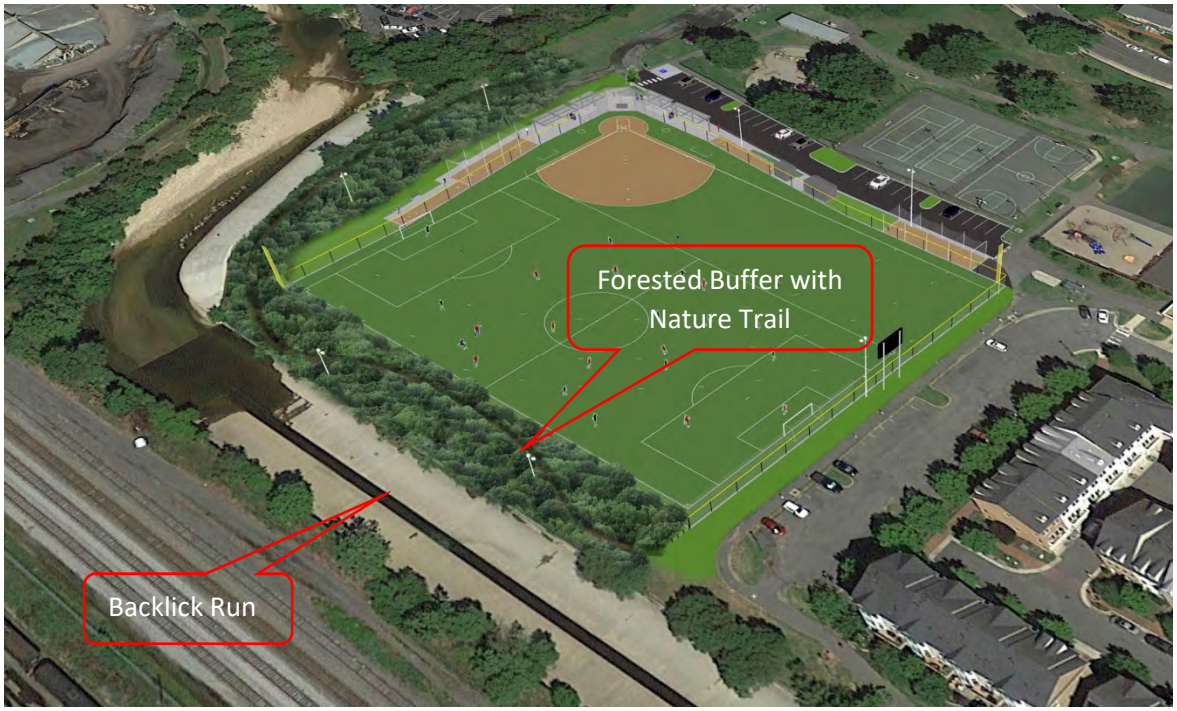
4. DISCUSSION

4.1. RPA ENCROACHMENT

The proposed work within the RPA will be removal of 0.18 acres impervious consisting of existing fencing, a concrete channel, sheds and impervious paths to them and a compacted gravel batting cage, plus 0.36 acres of new impervious area consisting of the permeable pavement BMP and its perimeter curb. The net new imperious area is 0.18 acres, this is the encroachment area. The existing concrete channel to be removed is 3 feet from the concrete bank of Backlick Run, while the new BMP will be 50 feet from the from the concrete bank of Backlick Run. This provides 47 more feet of separation from Backlick Run to impervious land cover. Additionally, although more impervious land cover will exist in the RPA, it is comprised of a level 2 BMP which provides significant water quality benefits compared to the existing hardscape which provides no water quality benefit to the RPA or MS4.



Existing Condition



Post-Development

The remainder of the existing RPA area is 1.35 acres of managed turf. The 100' RPA buffer will largely be maintained along the western side of the project. As the RPA bends with Backlick Run the southwest corner of the synthetic turf field will encroach into the 100' buffer. On the south side of the project a 50' buffer will be maintained. This is necessary so that the programed use of the athletic field can be implemented. As summarized below and described in Section 3.7 there will be a net increase of 0.76 acres of new forested area within the RPA to enhance the buffer.

Table 9 – Land Cover Conversion Summary

Site Analysis				RPA Analysis		
Land Cover Type	**Existing**	**Post-Developed**	**Area Change (+/- AC)**	**Existing**	**Post-Developed**	**Area Change (+/- AC)**
Forested	0.00	0.76	+0.76	0.00	0.76	+0.76
Managed Turf	3.50	0.43	-3.07	1.35	0.41	-0.94
Impervious	0.35	2.66	+2.31	0.18	0.36	+0.18

4.2. **WATER QUALITY**

The site currently is collected in the MS4 and discharges into the downstream Ben Brenman level 2 wet pond. No portion of the existing site drains directly into the adjacent Backlick Run. In the existing condition the pollutant load from the site is 2.75 lb/yr of phosphorus.

In the post-developed condition 4.00 lb/yr of phosphorus removal is required which takes into account the redevelopment of the land including the new forested area within the RPA. The proposed on-site level 2 permeable pavement facility will provide 4.10 lb/yr of phosphorus removal which exceeds the site requirement. The on-site facility will be in series with the downstream Ben Brenman level 2 wet pond which will provide an additional 1.42 lb/yr of phosphorus removal for a

total of 5.52 lb/yr of phosphorus removal. The excess 1.52 lb/yr of phosphorus removal will be banked by the City in order to provide water quality credit to projects that won't be able to achieve the minimum water quality requirement.

A site evaluation did not reveal the presence of wetlands, seeps, or springs on the property. A review of Virginia Department of Wildlife Resources, Virginia Wildlife Information System indicates that no state or federal threatened or endangered species or critical habitat is present on the property.

4.3. ADDITIONAL WATER QUALITY MEASURES

The proposed redevelopment will exceed the water quality requirements for this project as well as provide additional phosphorus removal benefit which can be transferred to other City projects that are unable to meet minimum water quality requirements. As part of the water quality analysis the land cover conversions from existing condition to post-developed are accounted for including the introduction of 0.76 acres of forest area which helps offset the phosphorus removal requirement for the project.

5. CONCLUSION

This redevelopment will not change the site's use but will improve the functionality of the athletic field to support multiple athletic groups and allow for more playable time by virtue of improved drainage. The improved vehicular turn-around at the end of the existing parking lot will promote better vehicular access to the site and surrounding park uses. ADA improvements will be provided for the proposed walkways including a new ramp to connect with ADA parking. The mulch trail through the RPA will provide a connection at the southeast corner to the existing asphalt walkway and existing trail which continues to the east parallel to Backlick Run. The mulch trail reconnects on the northwest corner at the parking lot access to align with the park trail to the north. The plantings within the RPA buffer will enhance the park aesthetic, promote on-site infiltration, reduce runoff, and provide erosion control, all within the Backlick Run RPA.

This project has demonstrated it exceeds City and State stormwater management requirements, has no direct impact to the adjacent water body, will benefit the community and bolster the City's ability to meet the current Chesapeake Bay TMDL goals.

APPENDICES

APPENDIX A: LIMITED SITE INVESTIGATION REPORT

APPENDIX B: GEOTECHNICAL REPORT

APPENDIX A:
LIMITED SITE INVESTIGATION REPORT

Limited Site Investigation

Alexandria Boothe Park Field Replacement

520 Cameron Station Boulevard

Alexandria, Virginia

February 1, 2021

Terracon Project No. JD205244

Prepared for:

A. Morton Thomas & Associates Inc

Chantilly, Virginia

Prepared by:

Terracon Consultants, Inc.

Ashburn, Virginia

February 1, 2021

A. Morton Thomas & Associates Inc
14555 Avion Parkway Suite 150
Chantilly, Virginia 20151

Attn: Mr. Steven Torgerson
P: (301) 881-2545
E: storgerson@amtengineering.com

Re: Limited Site Investigation
Alexandria Boothe Park Field Replacement
520 Cameron Station Boulevard
Alexandria, Virginia
Terracon Project No. JD205244

Dear Mr. Torgerson:

Terracon Consultants, Inc. (Terracon) is pleased to submit our report of Limited Site Investigation (LSI) activities completed at the site referenced above. The report presents data from recent field activities that included the collection of soil samples for chemical analysis during the geotechnical investigation. Terracon conducted the LSI in general accordance with the Master Services Agreement Task Order dated September 3, 2020.

Terracon appreciates this opportunity to provide environmental services to A. Morton Thomas & Associates Inc. Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
Terracon Consultants, Inc.

Jennifer L. DeLonge
Project Scientist
Jennifer.Delonge@terracon.com

Christopher J. Candela
Environmental Department Manager
Chris.Candela@terracon.com

APPENDICES

1.0 SITE DESCRIPTION

The site is located at 520 Cameron Station Boulevard in Alexandria, Virginia (City of Alexandria Parcel ID # 068.01-02-03). The site is situated on an approximate 504,101 square foot parcel and is developed with a grass baseball field and associated paved surface parking. We understand the site is planned for field improvements including the conversion of the grass baseball field to a synthetic turf field with supporting infrastructure such as netting, dugouts, and a press box. A Topographic Map excerpt showing the site location is included as Exhibit 1, and a Site Diagram with Sampling Locations is included as Exhibit 2 (Appendix A).

2.0 SCOPE OF SERVICES

Please note that Terracon did not conduct a Phase I Environmental Site Assessment (ESA) of the property or receive any previous environmental reports completed at the site, and that the scope of services for this service is based on information provided to us by you. This LSI was not intended to address all potential areas of concern. Based on a request for proposal dated September 30, 2020, Terracon was to provide preliminary screening in order to assess if there are any potentially contaminated soils on the site.

Terracon's LSI scope included the advancement of soil borings in locations associated with the fifteen stormwater management and structural soil borings advanced during the geotechnical investigation. Terracon's LSI was undertaken in accordance with the signed Master Services Agreement Task Order dated September 3, 2020.

2.1 Standard of Care

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time. Terracon makes no warranties, either express or implied, regarding the findings, conclusions, or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report. These LSI services were performed in accordance with the scope of work agreed with you, our client, as reflected in our proposal and were not restricted by ASTM E1903-11.

2.2 Additional Scope Limitations

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, nondetectable, or not present during these services. We cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this LSI. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations, or exploratory services. The data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

2.3 Reliance

This report has been prepared for the exclusive use of A. Morton Thomas & Associates Inc (AMT). Any authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the express written authorization of AMT and Terracon. Any unauthorized distribution or reuse is at AMT's sole risk. Notwithstanding the foregoing, reliance by authorized parties will be subject to the terms, conditions, and limitations stated in the proposal, LSI report, and Terracon's Master Services Agreement and Task Order. The limitation of liability defined in the terms and conditions is the aggregate limit of Terracon's liability to AMT and all relying parties unless otherwise agreed in writing.

3.0 FIELD INVESTIGATION

Terracon conducted the fieldwork under general site safety protocol. Work was performed using Level D work attire. Terracon contacted Miss Utility 811 and requested location of, and markings for, all utilities for which the service was responsible for before commencing intrusive activities at the site. A private utility locator was also subcontracted to locate any private utilities at the site. LSI sampling activities were performed on January 7th and January 8th, 2021.

3.1 Soil Sampling

Terracon advanced a total of fifteen borings (SWM-1 to SWM-12 and B-1 to B-3) at the site, at the locations shown in Exhibit 2 of Appendix A. The borings were advanced to pre-determined termination depths of 6 to 10 feet below ground surface (bgs) per agreement with the client.

The drill rig was utilized to obtain three geotechnical soil samples in the upper 6 feet of the stormwater management borings (SWM-1 to SWM-12) and four geotechnical soil samples in the upper 10 feet of stormwater management/structural borings (B-1 to B-3). Headspace screening was conducted utilizing a calibrated photoionization detector (PID). Soil samples were then collected and submitted for laboratory analysis and were selected based on PID screening results, direct field observations, and professional judgement made by the environmental professional.

Sampling personnel wore disposable nitrile gloves to minimize the potential for sample cross-contamination. Samples were placed in laboratory prepared containers, labeled, and preserved on ice in a cooler, which was secured with custody seals. The samples were submitted to a certified environmental analytical testing laboratory, HP Environmental, in an ice-filled cooler.

Six total composite samples were collected, one per every two stormwater management borings (SWM-1 through SWM-12), for analysis of Total Petroleum Hydrocarbons – Diesel Range Organics (TPH-DRO) and Gasoline Range Organics (TPH-GRO) via USEPA Method 8015C.

A total of six grab samples were collected from the stormwater management borings (SWM-1 through SWM-12, one per every two stormwater management borings) for analysis of Volatile Organic Compounds (VOCs) via USEPA Method 8260. Grab samples were also obtained from stormwater management/structural borings B-1 through B-3 for analysis of TPH-DRO and TPH-GRO via USEPA Method 8015C and VOCs via USEPA Method 8260.

- The following soil samples were collected and submitted to the laboratory for analysis of VOCs:
    - **SWM-2** (2-4')
    - **SWM-3** (2-4')
    - **SWM-6** (4-6')
    - **SWM-8** (4-6')
    - **SWM-9** (4-6')
    - **SWM-11** (4-6')

- **B-1** (5-6.5')
- **B-2** (5-6.5')
- **B-3** (5-6.5')

- The following soil samples were collected and submitted to the laboratory for analysis of TPH-DRO and TPH-GRO:
  - **Comp-1** [SWM-1 (0-6') and SWM-2 (0-6')]
  - **Comp-2** [SWM-3 (0-6') and SWM-4 (0-6')]
  - **Comp-3** [SWM-5 (0-6') and SWM-6 (0-6')]
  - **Comp-4** [SWM-7 (0-6') and SWM-8 (0-6')]
  - **Comp-5** [SWM-9 (0-6') and SWM-10 (0-6')]
  - **Comp-6** [SWM-11 (0-6') and SWM-12 (0-6')]
  - **B-1** (5'-6.5')
  - **B-2** (5'-6.5')
  - **B-3** (5'-6.5')

4.0 RESULTS OF THE FIELD INVESTIGATION

4.1 Geology/Hydrogeology

In general, the LSI encountered topsoil or asphalt and aggregate base overlying gravelly, sandy, silt and clay fill soils; sandy, gravelly, fat/lean clay soils; and silty, gravelly sand and well graded gravel soils extending up to 10 feet bgs. According to the Geologic map of the Annandale quadrangle, Fairfax and Arlington Counties, and Alexandria City, Virginia published in 1986, the site is mapped in the Potomac Formation of the Cretaceous geologic period. Specifically, the site is mapped in fine to coarse-grained, pebbly, quartzo-feldspathic sand interbedded with minor amounts of silt and clay.

Groundwater was not encountered during the field exploration or at the completion of drilling in any of the borings. Furthermore, groundwater was not encountered 24 hours after the completion.

Where more impervious clay soils are encountered, the amount of water seepage into the borings is limited, and it is generally not possible to establish the location of the groundwater table through short term water level observations. Accordingly, the groundwater information presented herein should be used with caution. Also, fluctuations in groundwater levels should be expected with seasons of the year, construction activity, changes to surface grades, precipitation, or other similar factors.

4.2 Field Screening

The field screening results are summarized in the Boring Logs with PID readings in Appendix B. Soils obtained from boring SWM-1 exhibited field screening values ranging between 13 ppm and 20 ppm, between 0 and 25 ppm from boring SWM-2, between 0 and 35 ppm from boring SWM-3

with the highest elevated reading at the 4-6' sampling interval, between 0 and 15 ppm from boring SWM-4, and 30 ppm from boring SWM-11 at the 4-6' sampling interval. All other borings and sampling depths exhibited a PID reading of 0 ppm. Visual and olfactory evidence of suspected impacts to the soil samples in the borings were not observed. Soil samples from each boring were collected.

5.0 ANALYTICAL RESULTS

The table that summarizes the soil results can be found in Appendix C and laboratory results and chains of custody forms are included in Appendix D. The following sections describe the results of the testing.

5.1 Soil Sample Results

A summary of the soil analytical results is summarized in Table 1 of Appendix C. The soil analytical results were compared to the Virginia Department of Environmental Quality's (VDEQ) Voluntary Remediation Program (VRP) Tier II Residential soil screening levels (last updated May 2020), the VRP Tier III Industrial soil screening levels, and the Virginia's Solid Waste Management Regulations (9VAC20-81-660).

VOC analyte naphthalene was detected in SWM-2 (2-4' sampling interval) at 1.0 ug/kg. This is below the VRP Tier II Residential Soil Screening Level of 40.1 ug/kg. The remainder of the VOC results were below the laboratory detection levels.

TPH-GRO was detected above laboratory method detection limits in samples obtained from Comp-1 at 0.5 milligrams per kilogram (mg/kg or ppm), Comp-2 at 1.7 mg/kg, and Comp-6 at 0.4 mg/kg. TPH-DRO was detected above laboratory method detection limits in Comp-1 at 25 mg/kg, Comp-2 at 62 mg/kg, and in B-3 (5'-6.5' sampling interval) at 11 mg/kg. One result, Comp-2 at 62 mg/kg, was found above Virginia's Solid Waste Management Regulations. The remainder of the results for TPH-DRO and TPH-GRO were found below the laboratory detection levels.

6.0 INVESTIGATION DERIVED WASTES

Excess soil sample cuttings were returned to their respective boring of origin where possible. Remaining investigation derived wastes (IDW), such as nitrile sampling gloves were disposed as solid waste based on the field observations at the time of sampling.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the scope of services described in this report and subject to the limitations described herein, Terracon concludes the following regarding the onsite soils:

- All VOC analytes were reported below the laboratory detection levels and/or below the VRP Tier II Residential screening levels in the soil samples tested;
- Comp-2, obtained from borings SWM-3 and SWM-4, exhibited a concentration of TPH-DRO at 62 mg/kg. Please see Virginia's Solid Waste Management Regulations below (Section C); and
- Comp-1 obtained from borings SWM-1 and SWM-2, Comp-2 obtained from borings SWM-3 and SWM-4, Comp-6 obtained from borings SWM-11 and SWM-12, and boring B-3 (5'-6.5' sampling interval) yielded varying concentrations of TPH-DRO and TPH-DRO below 50 mg/kg. While these soils are deemed suitable for fill, it may be necessary to haul them offsite due to the exclusions listed below in Virginia's Solid Waste Management Regulations (Section D).

The following Virginia's Solid Waste Management Regulations (9VAC20-81-660) are as follows pertaining to petroleum impacted soils:

> *If, while hauling out this material, further impacted soils are encountered, the contaminated petroleum soil may be handled or disposed of as follows (in accordance with Virginia Department of Environmental Quality (VDEQ) 9VAC20-81-660):*
>
> *a. Soils exhibiting greater than 100 milligram per kilogram (mg/kg) of TOX may not be disposed until separate approval from the department is granted. This request shall document the cause for the high TOX level.*
> *b. If the concentration of total BTEX is greater than 10 mg/kg or TPH is greater than 500 mg/kg, the soil cannot be disposed of in any landfill unless the facility permit expressly allows such disposal.*
> *c. If the concentration of TPH is greater than 50 mg/kg and less than 500 mg/kg and total BTEX is less than 10 mg/kg, the disposal of the contaminated soil may be approved for permitted landfills equipped with liners and leachate collection systems.*
> *d. Soil containing less than 50 mg/kg TPH and total BTEX less than 10 mg/kg may be used as fill material. This soil, however, may not be disposed of closer than 100 feet of any regularly flowing surface water body or river, 500 feet of any well, spring or other groundwater source of drinking water, and 200 feet from any residence, school, hospital, nursing home, or recreational park area. In addition, if the soil is not to be disposed of on the generator's property, the generator shall notify the property owner that the soil is contaminated and with what it is contaminated.*

Based on the encountered petroleum impacted soils, an Environmental Management Plan for the soils during removal activities should be completed. The Virginia Solid Waste Management Regulations should be followed to include the proper handling of the soils removed. Due to the

shallow depth and strata that the soil was tested at, it is likely that this contaminated material is due to the previously imported fill. However, it is possible that areas of contamination between testing locations and depths may occur and it is also likely that concentration levels of the contaminants will vary from what is detailed herein. Therefore, we recommend planning and budgeting conservatively for handling the subsurface impacts at the subject site.

The remediation of these soils is generally accomplished by excavation and removal of the soils. Confirmation soil testing to confirm the impacted soils have been removed should be expected and budgeted for.

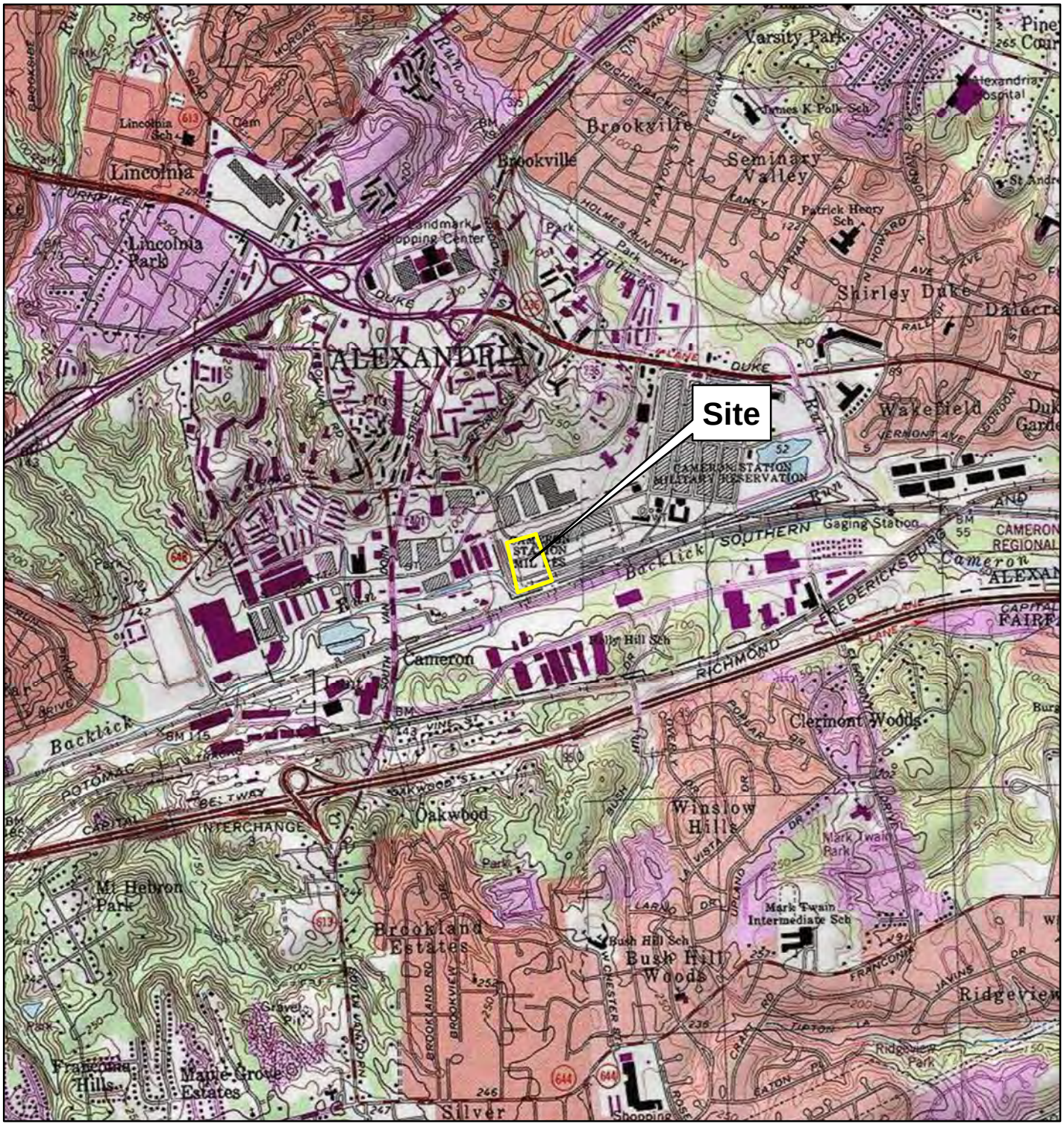
Screening of soils and further sampling during construction excavation activities associated with the site's redevelopment should be completed if petroleum odors are encountered and/or visual indications of contamination are encountered. Confirmatory soil testing to confirm the impacted soils have been removed should be expected and budgeted for. This screening process can be used to better delineate the extent of contamination, and to limit the potential for non-contaminated soils to be removed and disposed of as contaminated soil.

Further investigation may be warranted to delineate the impacted soils obtained from the vicinity of Comp-2 (borings SWM-3 and SWM-4) in order to quantify the volume of soils requiring disposal on the site. These services are not included in the scope of services of this study but can be provided if requested.

APPENDIX A

Exhibit 1 – Topographic Map

Exhibit 2 – Site Diagram with Sampling Locations

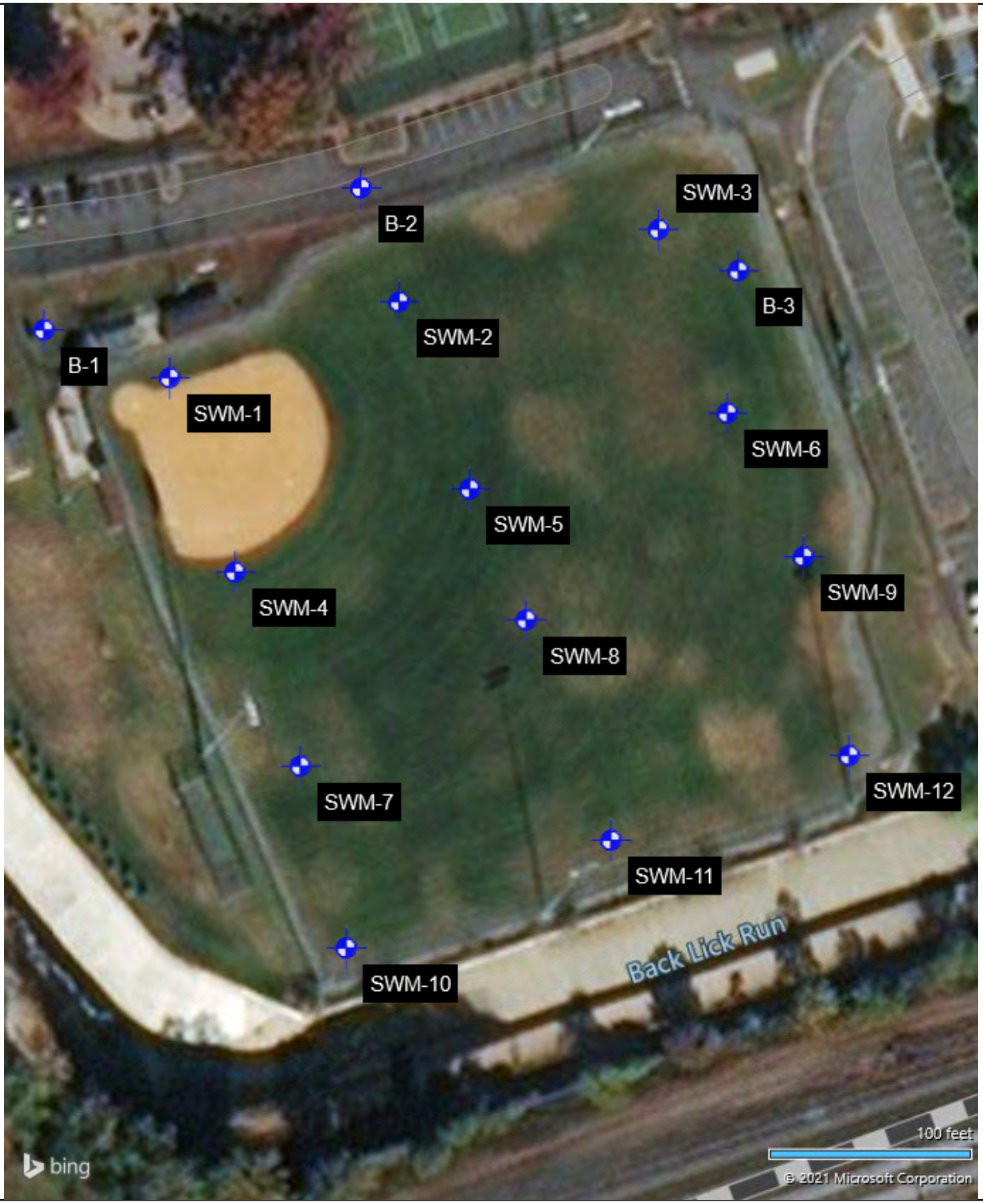


Legend

Site Boundary

PM: JD	Project No. JD205244	Terracon	**Topographic Vicinity Map**
Drawn By: KW	Scale: 1:24,000		**Limited Site Investigation** **Alexandria Boothe Park Field Replacement** **520 Cameron Station Boulevard** **Alexandria, Virginia**
Checked By: JD	File Path:		
Approved By: CC	Date: 1/18/2021	19955 Highland Vista Drive Ashburn, Virginia 20147 Phone: (703) 726-8030 Fax: (703) 726-8032	

EXHIBIT NO. 1



PM: JD	Projectl No. JD205244	Terracon	**Sampling Locations**
Drawn By: KW	Scale:		**Limited Site Investigation** **Alexandria Boothe Park Field Replacement** **520 Cameron Station Boulevard** **Alexandria, Virginia**
Checked By: JD	File Path:		
Approved By: CC	Date: 1/19/2021	19955 Highland Vista Drive Ashburn, Virginia 20147 Phone: (703) 726-8030 Fax: (703) 726-8032	**EXHIBIT NO.** **2**

APPENDIX B

Boring Logs with Photoionization Detector (PID) Readings

BORING LOG NO. B-1

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8046° Longitude: -77.1282°

Approximate Surface Elev.: 79 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.2	79+/-	**TOPSOIL = 2 inches**								
1				**FILL - SANDY SILT WITH GRAVEL (ML)**, fine, red-brown, moist, stiff				1.5	3-4-5-7 N=9	0		
		2.5	76.5+/-									
2				**POTOMAC FORMATION - SANDY LEAN CLAY (CL)**, fine to medium, brown, moist, stiff				1	5-5-6 N=11	0		
				medium stiff	5			1.5	3-4-2 N=6	0	23.5	30-21-9
		8.5	70.5+/-									
3				**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, medium to coarse, light brown and white, moist, medium dense				0.5	3-6-9 N=15	0		
		10.0	69+/-		10							
				Boring Terminated at 10 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling

No water encountered upon completion

Caved: 6 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-08-2021 | Boring Completed: 01-08-2021

Drill Rig: CME 55 | Driller: Josh Cogan

Project No.: JD205244

BORING LOG NO. B-2

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8048° Longitude: -77.1276°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.2	78+/-								
		0.3	78+/-								
		ASPHALT = 2 inches									
		AGGREGATE BASE COURSE = 1 inch									
1		**FILL - SANDY SILT WITH GRAVEL (ML)**, fine to medium, brown-red, moist, medium stiff					1.4	2-3-3-23 N=6	0		
		2.5	75.5+/-								
2		**POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM)**, fine to medium, brown-orange, moist, medium dense					1.5	4-13-9 N=22	0		
				5			1	5-4-10 N=14	0		
		8.5	69.5+/-								
3		**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, very dense, contains cobbles					1.1	8-35-23 N=58	0		
		10.0	68+/-	10							
		Boring Terminated at 10 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite
Surface Capped with Asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling

No water encountered upon completion

Caved: 7 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-08-2021 | Boring Completed: 01-08-2021

Drill Rig: CME 55 | Driller: Josh Cogan

Project No.: JD205244

BORING LOG NO. B-3

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8047° Longitude: -77.1269°

Approximate Surface Elev.: 77 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	76.5+/-								
		TOPSOIL = 4 inches									
1		**FILL - SANDY SILT WITH GRAVEL (ML)**, fine to medium, brown, moist, medium stiff, contains cobbles					1.5	2-3-3 N=6	0		
		2.0	75+/-								
2		**POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM)**, fine to coarse, light brown, moist, loose, contains cobbles					1.5	2-2-3 N=5	0		
		5.0	72+/-	5							
3		**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, medium dense, contains cobbles and quartz fragments					1.3	3-5-17 N=22	0	3.6	NP
							1.5	9-13-8 N=21	0		
		10.0	67+/-	10							
		Boring Terminated at 10 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.1 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021

Drill Rig: CME 55 | Driller: Josh Cogan

Project No.: JD205244

BORING LOG NO. SWM-1

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8045° Longitude: -77.1279°

Approximate Surface Elev.: 82 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	82+/-								
			TOPSOIL = 3 inches								
1			**FILL - SANDY SILT WITH GRAVEL (ML)**, trace cobbles, fine to medium, brown, moist, medium stiff, contains roots				0.8	2-3-3-2 N=6	17		
		2.0	80+/-								
2			**POTOMAC FORMATION - SANDY LEAN CLAY WITH GRAVEL (CL)**, trace cobbles, fine, gray-brown, moist, stiff				1.7	5-5-5-5 N=10	13		
		4.0	78+/-								
3			**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, medium dense, contains cobbles	5			1.3	3-5-24-17 N=29	20		
		6.0	76+/-								
			Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.
Offset SWM-1A approximately 6.0 feet east

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 4 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-2

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8046° Longitude: -77.1275°

Approximate Surface Elev.: 80 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	80+/-								
		TOPSOIL = 3 inches									
1		**FILL - CLAYEY SAND WITH GRAVEL (SC)**, fine to medium, fine, orange-brown, moist, loose, contains cobbles					2	2-2-3-2 N=5	0		
		2.0	78+/-								
2		**POTOMAC FORMATION - SANDY SILT WITH GRAVEL (ML)**, fine, brown, moist, stiff					1.7	3-6-4-6 N=10	25		
				5			0.1	4-4-6-5 N=10	22		
		6.0	74+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
Offset SWM-2A approximately 3.5 feet south

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 3 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-3

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8047° Longitude: -77.1271°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	77.5+/-								
		TOPSOIL = 4 inches									
1		2.0	76+/-				1.7	3-4-4-6 N=8	0		
		FILL - SILTY SAND WITH GRAVEL (SM), fine to medium, light brown, moist, loose									
1		4.0	74+/-				1.5	5-5-4-7 N=9	0		
		FILL - SANDY SILT (ML), fine, brown-gray, moist, stiff									
3		6.0	72+/-	5			2	4-4-4-4 N=8	35		
		POTOMAC FORMATION - SILTY SAND (SM), medium, light gray-brown, moist, loose									
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
SWM-3A offset approximately 4.0 feet south

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 3 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-4

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8043° Longitude: -77.1278°

Approximate Surface Elev.: 81 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	80.5+/-	**TOPSOIL = 4 inches**								
1		2.0	79+/-	**FILL - SILTY SAND WITH GRAVEL (SM)**, trace clay, fine, brown, moist, loose, quartz fragments encountered				1.5	6-4-4-3 N=8	3		
2		4.0	77+/-	**POTOMAC FORMATION - SANDY LEAN CLAY (CL)**, trace cobbles, fine, gray-brown, moist, medium stiff				1.5	5-3-4-6 N=7	15		
		6.0	75+/-	**POTOMAC FORMATION - SANDY SILT (ML)**, fine, gray, moist, medium stiff	5			2	3-4-3-6 N=7	0		
				Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.
Offset SWM-4A approximately 5.0 feet south

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-5

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8044° Longitude: -77.1274°

Approximate Surface Elev.: 80 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.2	80+/-								
1			**TOPSOIL = 2 inches** **FILL - SANDY SILT WITH GRAVEL (ML)**, micaceous, brown, moist, soft, contains cobbles				2	2-2-2-2 N=4	0		
		2.0	78+/-								
2			**POTOMAC FORMATION - SANDY LEAN CLAY WITH GRAVEL (CL)**, micaceous, light brown, moist, stiff, contains cobbles				2	5-4-8-3 N=12	0		
		4.0	76+/-								
			POTOMAC FORMATION - SANDY SILT WITH GRAVEL (ML), dark gray and black, moist, stiff	5			2	3-5-7-4 N=12	0		
		6.0	74+/-								
			Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.
Offset SWM-5A approximately 5.5 feet south

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.9 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-6

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8045° Longitude: -77.1270°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	77.5+/-								
		TOPSOIL = 4 inches									
1		**FILL - SANDY SILT WITH GRAVEL (ML)**, fine, brown, moist, stiff					2	4-4-5-6 N=9	0		
		2.0	76+/-								
3		**POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM)**, fine, light brown, moist, medium dense, quartz fragments					1.7	8-6-10-4 N=16	0		
		gray-brown, loose, without gravel		5			2	4-4-4-5 N=8	0		
		6.0	72+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
SWM-1A offset approximately 5.0 feet east

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-7

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8040° Longitude: -77.1277°

Approximate Surface Elev.: 80 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	80+/-								
		TOPSOIL = 3 inches									
1		**FILL - SANDY SILT WITH GRAVEL (ML)**, fine, brown, moist, stiff					2	3-4-5-4 N=9	0		
		2.0	78+/-								
3		**POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM)**, fine, brown, moist, stiff					2	8-6-4-5 N=10	0		
		medium stiff		5			1.5	2-2-3-5 N=5	0		
		6.0	74+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
Offset SWM-7A approximately 3.0 feet NE

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 6 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-8

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8042° Longitude: -77.1273°

Approximate Surface Elev.: 79 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	78.5+/-								
1			**TOPSOIL = 4 inches** **FILL - SILTY SAND WITH GRAVEL (SM)**, fine to medium, brown, moist, loose, quartz fragments encountered				2	4-3-3-2 N=6	0		
		2.0	77+/-								
2			**POTOMAC FORMATION - SANDY SILT (ML)**, fine, brown, moist, medium stiff				2	3-4-3-3 N=7	0		
				5			2	5-4-4-4 N=8	0		
		6.0	73+/-								
			Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.
Offset SWM-8A approximately 3.5 feet north

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 4.9 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-9

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8043° Longitude: -77.1268°

Approximate Surface Elev.: 77 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	76.5+/-								
		TOPSOIL = 4 inches									
1		2.0	75+/-				2	5-4-7-8 N=11	0		
		FILL - SANDY SILT WITH GRAVEL (ML), dark gray-brown, moist, stiff, contains cobbles									
2		4.0	73+/-				2	6-9-3-4 N=12	0		
		POTOMAC FORMATION - SANDY LEAN CLAY (CL), fine, brown, moist, stiff									
3		6.0	71+/-	5			1.3	2-2-9-4 N=11	0		
		POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM), fine to coarse, light brown, moist, medium dense									
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
SWM-9A offset approximately 3.5 feet west

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-10

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8038° Longitude: -77.1276°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	78+/-								
			TOPSOIL = 3 inches								
1			**FILL - SANDY SILT WITH GRAVEL (ML)**, fine to medium, brown, moist, medium stiff				1.5	2-2-3-2 N=5	0		
		2.0	76+/-								
2			**SANDY LEAN CLAY WITH GRAVEL (CL)**, fine to coarse, light orange-brown, moist, medium stiff				2	2-3-4-2 N=7	0		
				5			0.7	3-4-2-3 N=6	0		
		6.0	72+/-								
			Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.
Offset SWM-10A approximately 3.0 feet northeast

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-11

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8039° Longitude: -77.1272°

Approximate Surface Elev.: 77 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	76.5+/-								
		TOPSOIL = 4 inches									
1		2.0	75+/-				2	3-5-10-9 N=15	0		
		FILL - SANDY SILT WITH GRAVEL (ML), fine to medium, brown, moist, stiff									
							1.7	2-3-5-7 N=8	0		
2											
		stiff									
				5			2	2-3-7-11 N=10	30		
		6.0	71+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
SWM-11A offset approximately 3.5 feet east

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:
Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.6 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

BORING LOG NO. SWM-12

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8040° Longitude: -77.1268°

Approximate Surface Elev.: 76 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	75.5+/-								
1		**TOPSOIL = 4 inches**									
		FILL - CLAYEY SAND WITH GRAVEL (SC), fine to medium, brown, moist, medium dense, contains cobbles					1.7	10-6-4-6 N=10	0		
		2.0	74+/-								
3		**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, medium dense, contains cobbles					1.7	7-6-4-5 N=10	3		
		loose									
				5			1.7	4-3-5-6 N=8	0		
		6.0	70+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
SWM-12A offset approximately 4.5 feet west

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings after delayed water levels were measured.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

Please use for PID readings only, not finalized for geotechnical purposes

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Josh Cogan
Project No.: JD205244

APPENDIX C

Table 1 – Summary of Soil Analytical Results

TABLE 1
Summary of Soil Analytical Results
Alexandria Boothe Park Field Replacement
520 Cameron Station Boulevard
Alexandria, VA
Terracon Project No. JD205364

Sample ID and Depth		Comp-1 (SWM-1 and SWM-2)	Comp-2 (SWM-2 and SWM-3)	Comp-6 (SWM-11 and SWM-12)	SWM-2 (2'-4')	B-3 (5'-6.5')
Collection Date		**1-7-2021**	**1-7-2021**	**1-7-2021**	**1-7-2021**	**1-7-2021**
Parameter[1]	**VRP Tier II Residential Soil Screening Level (ug/kg)**					
Volatile Organic Compounds (8260)						
Naphthalene	40.1	*NT*	*NT*	*NT*	**1.0**	<4.2

Sample ID and Depth		Comp-1 (SWM-1 and SWM-2)	Comp-2 (SWM-2 and SWM-3)	Comp-6 (SWM-11 and SWM-12)	SWM-2 (2'-4')	B-3 (5'-6.5')
Collection Date		**1-7-2021**	**1-7-2021**	**1-7-2021**	**1-7-2021**	**1-7-2021**
Parameter	**VDEQ's Hazardous Waste Management Regulations (9VAC20-81-660) mg/kg**					
Total Petroleum Hydrocarbons – Diesel Range Organics (8015C)						
TPH-DRO	50	**25**	**62**	<10	*NT*	**11**
Total Petroleum Hydrocarbons – Gasoline Range Organics (8015C)						
TPH-GRO	50	**0.5**	**1.7**	**0.4**	*NT*	<0.5

Notes:
[1]Only detected compounds listed
VDEQ= Virginia Department of Environmental Quality
VRP = Virginia Voluntary Remediation Program
Shaded = detected above the regulatory standard
Bolded = detected above laboratory reporting limits, but below regulatory standard
NT = Not tested

APPENDIX D

Analytical Report and Chain of Custody

Certificate of Laboratory Analysis

Terracon
Jennifer Delonge
19955 Highland Vista Dr., Suite 170
Ashburn, VA 20147

Report Number:	**213034**
Date Received:	01/11/21
Date Reported:	01/12/21
Project Location:	Alexandria Boothe Park Renos

Client Sample No:	**Comp-1**	Lab Sample No.:	213034-01
Sample Matrix:	Soil	Collection Date/Time:	01/07/21 10:00
Sample Description:	Jar: SWM-1 & SWM-2		

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	**0.50**	mg/Kg	0.5	1		E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	**25**	mg/Kg	10	1		E	01/12/21	01/12/21	JMP

Certificate of Laboratory Analysis

Terracon
Jennifer Delonge
19955 Highland Vista Dr., Suite 170
Ashburn, VA 20147

Report Number:	**213034**
Date Received:	01/11/21
Date Reported:	01/12/21
Project Location:	Alexandria Boothe Park Renos

Client Sample No:	**Comp-2**	Lab Sample No.:	213034-02
Sample Matrix:	Soil	Collection Date/Time:	01/07/21 09:00
Sample Description:	Jar: SWM-3 & SWM-4		

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	**1.7**	mg/Kg	0.5	1		E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	**62**	mg/Kg	10	1		E	01/12/21	01/12/21	JMP

Certificate of Laboratory Analysis

Terracon
Jennifer Delonge
19955 Highland Vista Dr., Suite 170
Ashburn, VA 20147

Report Number:	**213034**
Date Received:	01/11/21
Date Reported:	01/12/21
Project Location:	Alexandria Boothe Park Renos

Client Sample No:	**Comp-3**	Lab Sample No.:	213034-03
Sample Matrix:	Soil	Collection Date/Time:	01/07/21 11:00
Sample Description:	Jar: SWM-5 & SWM-6		

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	< 0.5	mg/Kg	0.5	1	U	E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	< 10	mg/Kg	10	1	U	E	01/12/21	01/12/21	JMP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **Comp-4**
Sample Matrix: Soil
Sample Description: Jar: SWM-7 & SWM-8

Lab Sample No.: 213034-04
Collection Date/Time: 01/07/21 12:00

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	< 0.5	mg/Kg	0.5	1	U	E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	< 10	mg/Kg	10	1	U	E	01/12/21	01/12/21	JMP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **Comp-5**
Sample Matrix: Soil
Sample Description: Jar: SWM-9 & SWM-10

Lab Sample No.: 213034-05
Collection Date/Time: 01/07/21 13:00

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	< 0.5	mg/Kg	0.5	1	U	E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	< 10	mg/Kg	10	1	U	E	01/12/21	01/12/21	JMP

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Report Number:	**213034**
Date Received:	01/11/21
Date Reported:	01/12/21
Project Location:	Alexandria Boothe Park Renos

Client Sample No:	**Comp-6**	Lab Sample No.:	213034-06
Sample Matrix:	Soil	Collection Date/Time:	01/07/21 14:00
Sample Description:	Jar: SWM-11 & SWM-12		

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	**0.40**	mg/Kg	0.5	1	J	E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	< 10	mg/Kg	10	1	U	E	01/12/21	01/12/21	JMP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **SWM-2 (2-4')**
Sample Matrix: Soil 5.6 gram
Sample Description: Terra Core Kit

Lab Sample No.: 213034-07
Collection Date/Time: 01/07/21 10:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Acetone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Benzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Toluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Styrene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **SWM-2 (2-4')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Naphthalene	**1.0**	ug/Kg	4.5	1	J	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **SWM-3 (2-4')**
Sample Matrix: Soil 6.7 gram
Sample Description: Terra Core Kit

Lab Sample No.: 213034-08
Collection Date/Time: 01/07/21 09:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Acetone	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Benzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Toluene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Styrene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **SWM-3 (2-4')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 3.7	ug/Kg	3.7	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **SWM-6 (4-6')**
Sample Matrix: Soil 6.4 gram
Sample Description: Terra Core Kit

Lab Sample No.: 213034-09
Collection Date/Time: 01/07/21 11:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Acetone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Benzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Toluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Styrene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **SWM-6 (4-6')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **SWM-8 (4-6')**
Sample Matrix: Soil 6.0 gram
Sample Description: Terra Core Kit

Lab Sample No.: 213034-10
Collection Date/Time: 01/07/21 12:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Acetone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Benzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Toluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Styrene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **SWM-8 (4-6')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **SWM-9 (4-6')**
Sample Matrix: Soil 6.4 gram
Sample Description: Terra Core Kit

Lab Sample No.: 213034-11
Collection Date/Time: 01/07/21 13:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Acetone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Benzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Toluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Styrene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **SWM-9 (4-6')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 3.9	ug/Kg	3.9	1	U	A	01/11/21	01/11/21	JP

Certificate of Laboratory Analysis

Terracon
Jennifer Delonge
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Ashburn, VA 20147

Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **SWM-11 (4-6')**
Sample Matrix: Soil 6.3 gram
Sample Description: Terra Core Kit

Lab Sample No.: 213034-12
Collection Date/Time: 01/07/21 14:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Acetone	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Benzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Toluene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Styrene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP

Certificate of Laboratory Analysis

Terracon
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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **SWM-11 (4-6')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 4.0	ug/Kg	4.0	1	U	A	01/11/21	01/11/21	JP

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **B-1 (5-6.5')**
Sample Matrix: Soil 6.0 gram
Sample Description: Jar & Terra Core Kit

Lab Sample No.: 213034-13
Collection Date/Time: 01/08/21 09:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Acetone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Benzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Toluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Styrene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP

Certificate of Laboratory Analysis

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **B-1 (5-6.5')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	< 0.5	mg/Kg	0.5	1	U	E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	< 10	mg/Kg	10	1	U	E	01/12/21	01/12/21	JMP

Certificate of Laboratory Analysis

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Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **B-2 (2.5-4')**
Sample Matrix: Soil 5.5 gram
Sample Description: Jar & Terra Core Kit

Lab Sample No.: 213034-14
Collection Date/Time: 01/08/21 09:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Acetone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Benzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Toluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Styrene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP

Certificate of Laboratory Analysis

Terracon
Jennifer Delonge
19955 Highland Vista Dr., Suite 170
Ashburn, VA 20147

Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **B-2 (2.5-4')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 4.5	ug/Kg	4.5	1	U	A	01/11/21	01/11/21	JP

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	< 0.5	mg/Kg	0.5	1	U	E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	< 10	mg/Kg	10	1	U	E	01/12/21	01/12/21	JMP

Certificate of Laboratory Analysis

Terracon
Jennifer Delonge
19955 Highland Vista Dr., Suite 170
Ashburn, VA 20147

Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Client Sample No: **B-3 (5-6.5')**
Sample Matrix: Soil 5.9 gram
Sample Description: Jar & Terra Core Kit

Lab Sample No.: 213034-15
Collection Date/Time: 01/07/21 15:00

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Vinyl chloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromomethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Trichlorofluoromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Acetone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Methylene chloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Methyl-tert-butyl ether (MTBE)	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
trans-1,2-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Butanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2,2-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
cis-1,2-Dichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromochloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chloroform	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,1-Trichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Carbon tetrachloride	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Benzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Trichloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Dibromomethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromodichloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
cis-1,3-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Methyl-2-pentanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Toluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
trans-1,3-Dichloropropene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,2-Trichloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Hexanone	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Tetrachloroethene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3-Dichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Dibromochloromethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromoethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Chlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,1,2-Tetrachloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Ethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
m,p-Xylene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
o-Xylene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Styrene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromoform	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Isopropylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Bromobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,1,2,2-Tetrachloroethane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP

Certificate of Laboratory Analysis

Terracon
Jennifer Delonge
19955 Highland Vista Dr., Suite 170
Ashburn, VA 20147

Report Number: **213034**
Date Received: 01/11/21
Date Reported: 01/12/21
Project Location: Alexandria Boothe Park Renos

Sample Results Continued ---------- Client Sample No: **B-3 (5-6.5')**

Volatile Organic Compounds Preparation & Analysis Method: EPA 5035 EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
1,2,3-Trichloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
n-Propylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
2-Chlorotoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Chlorotoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3,5-Trimethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
tert-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trimethylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
sec-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,3-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
4-Isopropyltoluene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,4-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
n-Butylbenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2-Dibromo-3-chloropropane	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,4-Trichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Hexachlorobutadiene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
Naphthalene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP
1,2,3-Trichlorobenzene	< 4.2	ug/Kg	4.2	1	U	A	01/11/21	01/11/21	JP

TPH - Gasoline Range Organics Preparation & Analysis Method: EPA 5030 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - GRO	< 0.5	mg/Kg	0.5	1	U	E	01/11/21	01/11/21	JMP

TPH - Diesel Range Organics Preparation & Analysis Method: EPA 3550 EPA 8015

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - DRO	**11**	mg/Kg	10	1		E	01/12/21	01/12/21	JMP

Certificate of Laboratory Analysis

Terracon		Report Number:	**213034**
Jennifer Delonge		Date Received:	01/11/21
19955 Highland Vista Dr., Suite 170		Date Reported:	01/12/21
Ashburn, VA 20147		Project Location:	Alexandria Boothe Park Renos

Qualifier Codes:

U = Analyte was not detected at or above reporting limit
J = Analyte detected below reporting limit (estimated value)

Sample Container Codes:

40 ml VOA Vial (5 ml Sodium Bisulfate)	A & B	Soil
40 ml VOA Vial (5 ml/Methanol):	C	Soil
2 oz Plastic Dry wt Jar	D	Soil
4 oz Glass Jar - Teflon Seal	E	Soil

Notes:

Soil Results are reported on a wet weight basis (as received) unless stated as "dry".
The lab results reflect the measurement of the sample received only and may not be completely representative of the sampled site.
The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.
Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.
The chain-of-custody is a part of the entire analytical report.
Residual sample(s) will be disposed of in three months unless otherwise notified.

Laboratory Report Approved by:

J Pfaff 01/12/21

Laboratory Director, Chemistry Date

HP ENVIRONMENTAL, INC.
104 Elden St, Herndon, VA 20170 Phone (703) 471-4200 Fax (703) 471-0020

Environmental Sample Chain-of-Custody Record

COC Reference Number: 0001

Client: Terracon		**TURN-AROUND TIME:** Routine [x]					**Tests Requested**								
Address: 19955 Highland Vista Dr, #170 Ashburn, VA 20147		Emergency [ ] Rush (24-48hr) [ ]													
		P.O./Job Number: JD205244													
Contact: Jennifer DeLonge		**SITE:** Alexandria Boothe Park Renos													
e-mail: Jennifer.Delonge@terracon.com															
Phone: 703-726-8030		**Sampled by:** Kelli Williams													
Fax:															
							TPH-GRO EPA 8015	TPH-DRO EPA 8015	VOCs EPA 8260						
	Sample ID	**Sample Date MM/DD/YY**	**Time HH:MM**	**Comp/ Grab**	**Matrix**	**Preserv. pH**	**# Bottles**								**Description/Comments**
1	Comp-1	01/07/21	10:00	C	S		1	✔	✔						Jar- SWM-1 and SWM-2
2	Comp-2	01/07/21	09:00	C	S		1	✔	✔						Jar- SWM-3 and SWM-4
3	Comp-3	01/07/21	11:00	C	S		1	✔	✔						Jar- SWM-5 and SWM-6
4	Comp-4	01/07/21	12:00	C	S		1	✔	✔						Jar- SWM-7 and SWM-8
5	Comp-5	01/07/21	13:00	C	S		1	✔	✔						Jar- SWM-9 & SWM-10
6	Comp-6	01/07/21	14:00	C	S		1	✔	✔						Jar- SWM-11 & SWM-12
7	SWM-2 (2-4')	01/07/21	10:00	G	S		1			✔					Terra Core Kit
8	SWM-3 (2-4')	01/07/21	09:00	G	S		1			✔					Terra Core Kit
9	SWM-6 (4-6')	01/07/21	11:00	G	S		1			✔					Terra Core Kit
10	SWM-8 (4-6')	01/07/21	12:00	G	S		1			✔					Terra Core Kit
11	SWM-9 (4-6')	01/07/21	13:00	G	S		1			✔					Terra Core Kit
12	SWM-11 (4-6')	01/07/21	14:00	G	S		1			✔					Terra Core Kit
13	B-1 (5-6.5')	01/08/21	09:00	G	S		2	✔	✔	✔					Jar & Terra Core Kit
14	B-2 (2.5-4')	01/08/21	09:00	G	S		2	✔	✔	✔					Jar & Terra Core Kit
15	B-3 (5-6.5')	01/07/21	15:00	G	S		2	✔	✔	✔					Jar & Terra Core Kit

Received Condition:	Relinquished By:	Date/Time:	Received By: Date/Time:
Temperature (°C): 8 iced	Kelli Williams	1/11/21 11:25am	
Mode of Shipment: drop	Relinquished By:	Date/Time:	Received By Laboratory: Date/Time:
HPE Report Number: 213034 Lab Use			1.11.21 1125

APPENDIX B:
GEOTECHNICAL REPORT

Geotechnical Engineering Report

Alexandria Boothe Park Field Replacement
Alexandria, Virginia
January 29, 2021
Terracon Project No. JD205244

Prepared for:
A. Morton Thomas & Associates Inc
Chantilly, Virginia

Prepared by:
Terracon Consultants, Inc.
Ashburn, Virginia

January 29, 2021

A. Morton Thomas & Associates Inc
14555 Avion Parkway Suite 150
Chantilly, Virginia 20151

Attn: Mr. Steven Torgerson RLA
P: (301) 881-2545
E: storgerson@amtengineering.com

Re: Geotechnical Engineering Report
Alexandria Boothe Park Field Replacement
520 Cameron Station Boulevard
Alexandria, Virginia
Terracon Project No. JD205244

Dear Mr. Torgerson:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PJD205244 dated September 3, 2020. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork, infiltration and the design and construction of foundations and floor slabs for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Dan Anthony, PE
Senior Staff Engineer

Daniel Gradishar, PE
Principal

REPORT TOPICS

Note: This report was originally delivered in a web-based format. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Alexandria Boothe Park Field Replacement
520 Cameron Station Boulevard
Alexandria, Virginia

Terracon Project No. JD205244
January 29, 2021

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed turf field and field infrastructure to be located at 520 Cameron Station Boulevard in Alexandria, Virginia. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Infiltration analysis
- Foundation design and construction
- Seismic site classification per IBC
- Floor slab design and construction

The geotechnical engineering Scope of Services for this project included the advancement of fifteen (15) test borings to depths ranging from approximately 6 to 10 feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at 520 Cameron Station Boulevard in Alexandria, Virginia. Latitude/Longitude:38.80481, -77.12765 (approximate) See **Site Location**
Existing Improvements	The existing site includes a baseball field, dugouts, fencing, and a paved parking lot.

Item	Description
Existing Topography (from Park Survey)	The elevation (EL.) at the site ranges from EL.75 to EL. 82 feet, sloping downwards towards the south.
Geology	Our experience near the vicinity of the proposed development or geologic maps indicates subsurface conditions consist of soils derived from the Potomac Formation of Cretaceous geologic period. Our exploration corresponds favorably to this geology. Additionally, we encountered fill material associated with previous site development.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	■ Email with project information from Steven Torgerson of AMT on September 1, 2020 ■ "Armistead L. Boothe Park Field Conversion Design" provided by the City of Alexandria ■ "Armistead L. Boothe Park Field Conversion Design RFQ 895" dated 06-1-2020 provided by AMT ■ "Armistead L. Boothe Park Survey" provided by AMT
Project Description	The City of Alexandria is considering the conversion of the existing grass baseball field to a synthetic turf field. Minimal grading is anticipated. Additionally, it is expected that supporting infrastructure such as netting, dugouts, and a press box will be included with the field improvements.
Maximum Loads	Loads were not provided at the time of this writing.

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Fill**	sandy SILT (ML) with variable amounts of gravel, clayey SAND with gravel (SC), brown, moist
2	**Potomac Group – Fine Grained**	sandy LEAN CLAY with gravel (CL), sandy SILT (ML) with variable amounts of gravel, sandy FAT CLAY with gravel (CH), brown and gray, moist
3	**Potomac Group – Coarse Grained**	well graded GRAVEL with silt and sand (GW-SM), silty SAND with gravel (SM), brown and gray, moist

EARTHWORK

Earthwork is anticipated to include clearing and grubbing, excavations, and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Site Preparation

Prior to placing fill, existing vegetation and root mat should be removed. Complete stripping of the topsoil should be performed in the proposed building and parking/driveway areas.

The subgrade should be proofrolled with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck or other method as approved by the Geotechnical Engineer. The proofrolling should be performed under the direction of the Geotechnical Engineer. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed or modified. Excessively wet or dry material should either be removed or moisture conditioned and recompacted.

Existing Fill

As noted in **Geotechnical Characterization**, the borings encountered existing fill to depths ranging from about 2 to 4 feet. The fill appears to have been placed in a controlled manner in most locations based on the N values, but we have no records to indicate the degree of control. Support of footings and floor slabs on or above existing fill soils, is discussed in this report. However, even with the recommended construction procedures, there is inherent risk for the owner that compressible fill or unsuitable material, within or buried by the fill will, not be

discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill, but can be reduced by following the recommendations contained in this report.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 10 feet of structures, pavements or constructed slopes. General fill is material used to achieve grade outside of these areas. Earthen materials used for structural and general fill should meet the following material property requirements:

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive	CL, CL-ML ML, SM, SC	Liquid Limit less than 40 Plasticity index less than 15 Less than 25% retained on No. 200 sieve as permitted by Fairfax County Public Facilities Manual and/or City of Alexandria requirements
Granular	GW, GP, GM, GC, SW, SP, SM, SC	Less than 10% Passing No. 200 sieve

1. Structural and general fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.
2. CH or MH soils should not be used.

Fill Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used	Same as Structural fill
Minimum Compaction Requirements [1, 2, 3]	98% of max. below building foundations and within 1 foot of finished pavement subgrade 95% of max. above foundations, athletic fields, below floor slabs, and more than 1 foot below finished pavement subgrade	90% of max.
Water Content Range [1]	-2% to +2% of optimum	As required to achieve min. compaction requirements

Item	Structural Fill	General Fill

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).
2. High plasticity cohesive fill should not be compacted to more than 100% of standard Proctor maximum dry density if used as general fill (not allowed for structural fill).
3. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254).

Grading and Drainage

All grades must provide effective drainage away from the athletic fields, buildings, or paved areas during and after construction and should be maintained throughout the life of the site improvements. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proofrolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building and athletic field areas and 5,000 square feet in pavement areas. One density and water content test should be performed for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing pressure [1, 2]	2,500 psf
Required Bearing Stratum [3]	Firm natural soils of Model Layers 2 & 3 or new compacted fill
Minimum Foundation Dimensions	Columns: 30 inches Continuous: 18 inches

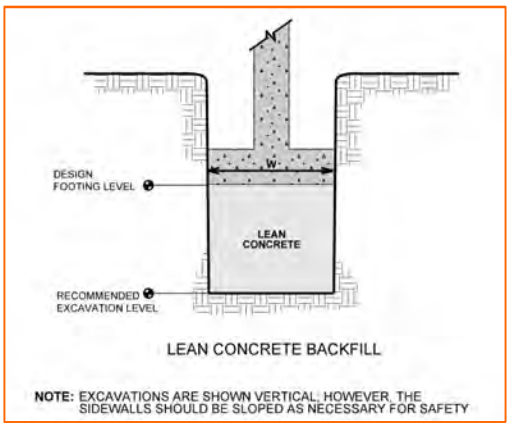
Item	Description
Minimum Embedment below Finished Grade [4]	30 inches
Estimated Total Settlement from Structural Loads [2]	Less than about 1 inch
Estimated Differential Settlement [2, 5]	About 1/2 of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**.
3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork**.
4. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
5. Differential settlements are as measured over a span of 50 feet.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level, new compacted structural fill used, or lean concrete backfill placed in the excavations. This is illustrated on the sketch below.



SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is E**. Subsurface explorations at this site were extended to a maximum depth of 10 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth. Based on our knowledge of geologic conditions and soil conditions of nearby site, improving the **Seismic Site Classification from E to D** is possible using ReMi geophysical testing on-site.

FLOOR SLABS

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support [1]	Minimum 6 inches of free-draining (less than 5% passing the U.S. No. 200 sieve) crushed aggregate compacted to at least 95% of ASTM D 698 [2, 3] At least 18 inches of low plasticity cohesive or granular soils with at least 20% passing the U.S. No. 200 sieve material should be present below floor slabs where lean to fat clay or fat clay soils are present
Estimated Modulus of Subgrade Reaction [2]	80 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. Free-draining granular material should have less than 5% fines (material passing the No. 200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Settlement of floor slabs supported on existing fill materials cannot be accurately predicted, but could be larger than normal and result in some cracking. Mitigation measures, as noted in **Existing Fill** within **Earthwork**, are critical to the performance of floor slabs. In addition to the mitigation measures, the floor slab can be stiffened by adding steel reinforcement, grade beams and/or post-tensioned elements.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

INFILTRATION ANALYSIS

Two methods were used to estimate infiltration capabilities on the subject site: in-situ infiltration testing and published correlations with soil classifications. Details regarding the in-situ infiltration and classification test techniques, the estimated infiltration rates from the individual methods, and

the recommended design infiltration rate for the site soils are presented herein. Classification infiltration rates are empirical values and do not agree with in-situ infiltration testing in the field. Based on local regulatory requirements, the in-situ infiltration rates should be used for design purposes.

Field Infiltration Test Results

In-situ infiltration tests are performed in the field to observe the rate at which water will permeate the soil under saturated conditions. Twelve test borings were drilled in the area of planned infiltration. Test borings were initially drilled to depths of at least 4 feet below the planned infiltration invert elevations, and allowed to remain open for a period of approximately 24 hours to allow any groundwater levels within the boreholes to stabilize. Offset infiltration test holes were drilled at the boring locations to planned infiltration invert elevations. Four-inch diameter PVC casing was set to the bottom of the offset test holes. The purpose of the casing is to prevent caving of test hole sidewalls. After setting the PVC casing, the borehole was filled with water to saturate the bottom subsoils. The following day, the test hole was refilled with water and the water level in each test hole was recorded every hour for a 4-hour period. Using this procedure, the average change in the water level over the 4-hour period is considered the infiltration rate. Based on the results of the in-situ infiltration tests, the infiltration rates that have been calculated and are presented below:

Test Boring No.	Approximate Test Depth (ft)	Field Infiltration Rate (inches/hour)
SWM-1	2	0
SWM-2	2	0
SWM-3	2	0
SWM-4	2	0
SWM-5	2	0
SWM-6	2	0
SWM-7	2	0
SWM-8	2	0.03
SWM-9	2	0
SWM-10	2	0
SWM-11	2	0

Test Boring No.	Approximate Test Depth (ft)	Field Infiltration Rate (inches/hour)
SWM-12	2	0

Classification Test Results

The classification test method is performed with grain-size sieve analyses including hydrometer testing on samples obtained from corresponding proposed infiltration depths, to determine the USDA soil texture classifications. Published correlations between USDA classifications and infiltration rates were used to provide estimated hydraulic conductivity values. Since hydraulic conductivity and infiltration values are essentially equal at no head conditions, using the hydraulic conductivity values to estimate the infiltration rates provides a conservative estimate of infiltration for use in design. Estimated infiltration rates using the USDA soil texture classifications are presented below.

Test Boring No.	Approximate Test Depth (ft)	USDA Soil Texture Classification	Estimated Infiltration Rate (inches/hr)
SWM-1	2-6	Sandy Loam	1.02
SWM-2	0-4	Sandy Loam	1.02
SWM-3	0-2	Sandy Loam	1.02
SWM-3	2-4	Loam	0.52
SWM-4	0-4	Sandy Loam	1.02
SWM-5	0-4	Sandy Loam	1.02
SWM-6	0-4	Sandy Loam	1.02
SWM-7	0-4	Sandy Loam	1.02
SWM-8	0-2	Sandy Loam	1.02
SWM-8	2-4	Loam	0.52
SWM-9	0-4	Sandy Loam	1.02
SWM-10	0-4	Sandy Loam	1.02
SWM-11	0-4	Sandy Loam	1.02
SWM-12	0-4	Sandy Loam	1.02

Recommended Design Infiltration Rate

Based on the results obtained from the calculated field infiltration test, we do not recommend storm water management through infiltration be used at this site.

It should be noted that the recommended design infiltration rate presented herein is intended for use in design. However, during construction, observations of the subgrade conditions should be made to confirm that the subgrade soils are consistent with the soils analyzed in this report.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

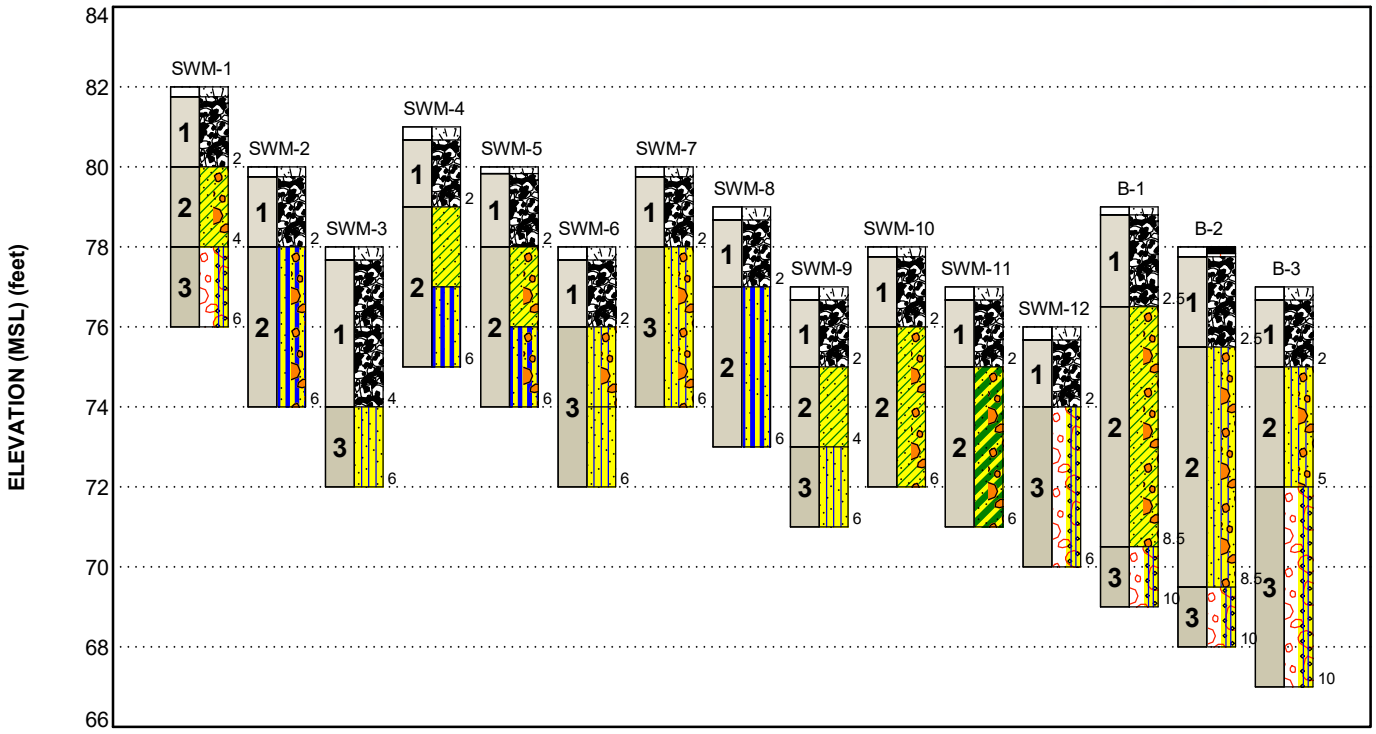
Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

FIGURES

Contents:

GEOMODEL

Alexandria Boothe Park Field Replacement ■ Alexandria, VA
Terracon Project No. JD205244



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fill	SANDY SILT WITH GRAVEL (ML), SANDY SILT (ML), CLAYEY SAND WITH GRAVEL (SC), brown, moist
2	Potomac Formation - Fine Grained	SANDY LEAN CLAY WITH GRAVEL (CL), SANDY SILT (ML), SANDY SILT WITH GRAVEL (ML), SANDY FAT CLAY WITH GRAVEL (CH), brown, gray, moist
3	Potomac Formation - Coarse Grained	WELL GRADED GRAVEL WITH SILT AND SAND (GW-SM), SILTY SAND WITH GRAVEL (SM), brown, gray, moist

LEGEND

- Topsoil
- Fill
- Sandy Lean Clay with Gravel
- Well-graded Gravel with silt and sand
- Sandy Silt with gravel
- Silty Sand
- Sandy Lean Clay
- Sandy Silt
- Sandy Silt with Gravel
- Silty Sand with Gravel
- Sandy Fat Clay with Gravel
- Asphalt
- Aggregate Base Course

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet)	Planned Location
12	6 or auger refusal	Field
3	10 or auger refusal	Infrastructure

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolation from the Grading Plan provided by AMT. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted drill rig using continuous flight augers. Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration or middle 12 inches of 24-inches penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling and also obtained 24-hour groundwater readings for SWM borings. For safety purposes, all borings were backfilled with auger cuttings after their completion. Pavements were patched with cold-mix asphalt and/or pre-mixed concrete, as appropriate.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to

methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- Texture Analysis

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

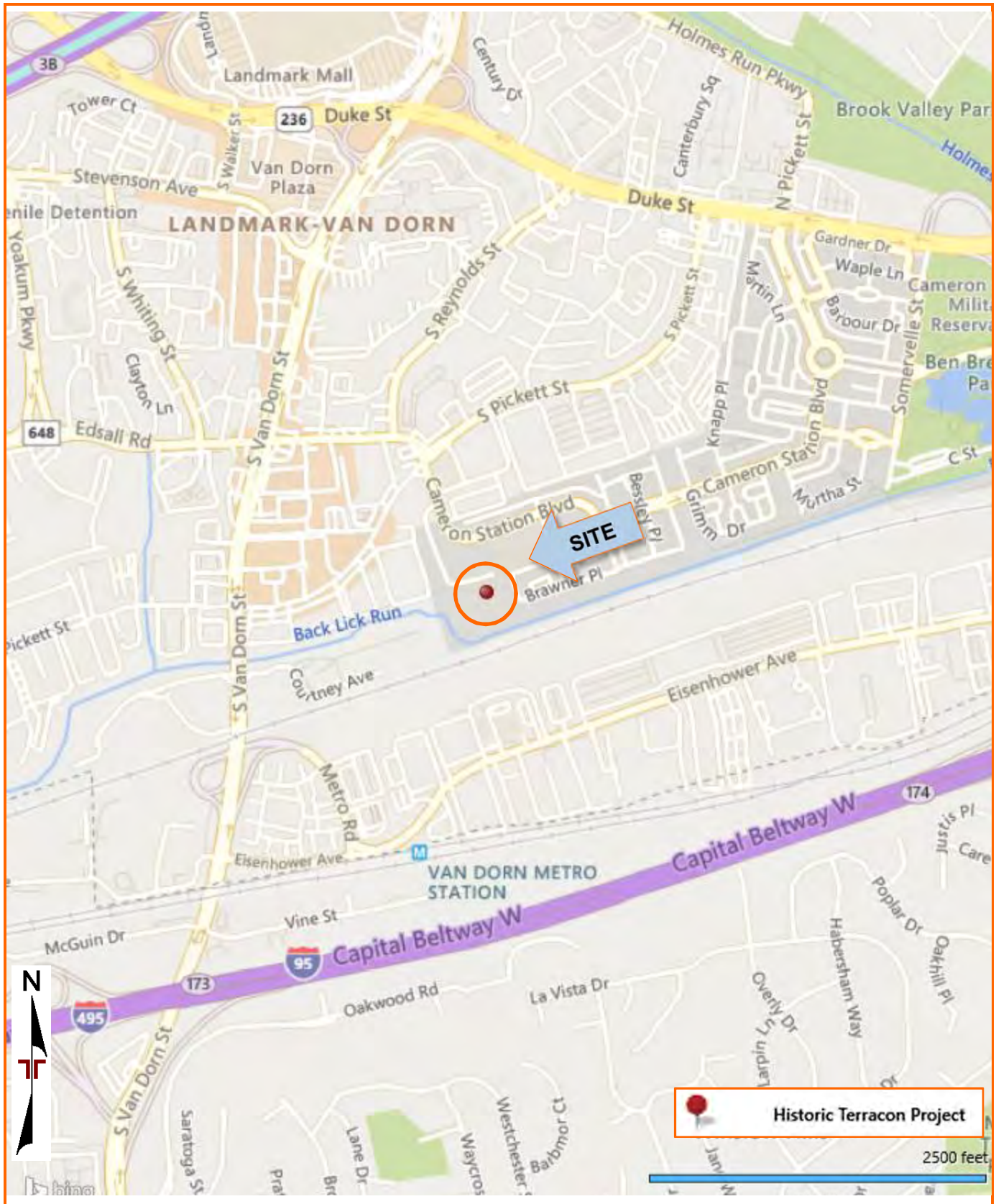


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

Contents:

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8046° Longitude: -77.1282°

Approximate Surface Elev.: 79 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.2	79+/-	**TOPSOIL = 2 inches**								
1				**FILL - SANDY SILT WITH GRAVEL (ML)**, fine, red-brown, moist, stiff				1.5	3-4-5-7 N=9	0		
		2.5	76.5+/-									
2				**POTOMAC FORMATION - SANDY LEAN CLAY (CL)**, fine to medium, brown, moist, stiff				1	5-5-6 N=11	0		
				medium stiff	5			1.5	3-4-2 N=6	0	23.5	30-21-9
		8.5	70.5+/-									
3				**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, medium to coarse, light brown and white, moist, medium dense				0.5	3-6-9 N=15	0		
		10.0	69+/-		10							
				Boring Terminated at 10 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling

No water encountered upon completion

Caved: 6 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-08-2021 | Boring Completed: 01-08-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

BORING LOG NO. B-2

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8048° Longitude: -77.1276°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.2	78+/-								
		0.3	78+/-								
		ASPHALT = 2 inches									
		AGGREGATE BASE COURSE = 1 inch									
1		**FILL - SANDY SILT WITH GRAVEL (ML)**, fine to medium, brown-red, moist, medium stiff					1.4	2-3-3-23 N=6	0		
		2.5	75.5+/-								
2		**POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM)**, fine to medium, brown-orange, moist, medium dense					1.5	4-13-9 N=22	0		
				5			1	5-4-10 N=14	0		
		8.5	69.5+/-								
3		**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, very dense, contains cobbles					1.1	8-35-23 N=58	0		
		10.0	68+/-	10							
		Boring Terminated at 10 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling

No water encountered upon completion

Caved: 7 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-08-2021 | Boring Completed: 01-08-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

BORING LOG NO. B-3

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8047° Longitude: -77.1269°

Approximate Surface Elev.: 77 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	76.5+/-								
1			**TOPSOIL = 4 inches**								
			FILL - SANDY SILT WITH GRAVEL (ML), fine to medium, brown, moist, medium stiff, contains cobbles				1.5	2-3-3 N=6	0		
		2.0	75+/-								
2			**POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM)**, fine to coarse, light brown, moist, loose, contains cobbles				1.5	2-2-3 N=5	0		
		5.0	72+/-	5							
3			**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, medium dense, contains cobbles and quartz fragments				1.3	3-5-17 N=22	0	3.6	NP
							1.5	9-13-8 N=21	0		
		10.0	67+/-	10							
			Boring Terminated at 10 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.1 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Connelly
Project No.: JD205244

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JD205244 ALEXANDRIA BOOTHE_1-18.GPJ TERRACON_DATATEMPLATE.GDT 1/21/21

BORING LOG NO. SWM-1

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8045° Longitude: -77.1279°

Approximate Surface Elev.: 82 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	82+/-								
			TOPSOIL = 3 inches								
1			**FILL - SANDY SILT WITH GRAVEL (ML)**, trace cobbles, fine to medium, brown, moist, medium stiff, contains roots				0.8	2-3-3-2 N=6	17		
		2.0	80+/-								
2			**POTOMAC FORMATION - SANDY LEAN CLAY WITH GRAVEL (CL)**, trace cobbles, fine, gray-brown, moist, stiff				1.7	5-5-5-5 N=10	13		
		4.0	78+/-								
3			**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, medium dense, contains cobbles	5			1.3	3-5-24-17 N=29	20		
		6.0	76+/-								
			Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 4 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Connelly
Project No.: JD205244

BORING LOG NO. SWM-2

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8046° Longitude: -77.1275°

Approximate Surface Elev.: 80 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	80+/-								
		TOPSOIL = 3 inches									
1		**FILL - CLAYEY SAND WITH GRAVEL (SC)**, fine to medium, fine, orange-brown, moist, loose, contains cobbles					2	2-2-3-2 N=5	0		
		2.0	78+/-								
2		**POTOMAC FORMATION - SANDY SILT WITH GRAVEL (ML)**, fine, brown, moist, stiff					1.7	3-6-4-6 N=10	25		
				5			0.1	4-4-6-5 N=10	22		
		6.0	74+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 3 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Connelly
Project No.: JD205244

BORING LOG NO. SWM-3

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8047° Longitude: -77.1271°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	77.5+/-								
		TOPSOIL = 4 inches									
1		2.0	76+/-				1.7	3-4-4-6 N=8	0		
		FILL - SILTY SAND WITH GRAVEL (SM), fine to medium, light brown, moist, loose									
1		4.0	74+/-				1.5	5-5-4-7 N=9	0		
		FILL - SANDY SILT (ML), fine, brown-gray, moist, stiff									
3		6.0	72+/-	5			2	4-4-4-4 N=8	35		
		POTOMAC FORMATION - SILTY SAND (SM), medium, light gray-brown, moist, loose									
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 3 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Connelly
Project No.: JD205244

BORING LOG NO. SWM-4

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8043° Longitude: -77.1278°

Approximate Surface Elev.: 81 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	80.5+/-	**TOPSOIL = 4 inches**								
1		2.0	79+/-	**FILL - SILTY SAND WITH GRAVEL (SM)**, trace clay, fine, brown, moist, loose, contains quartz fragments				1.5	6-4-4-3 N=8	3		
2		4.0	77+/-	**POTOMAC FORMATION - SANDY LEAN CLAY (CL)**, fine, gray-brown, moist, medium stiff, contains cobbles				1.5	5-3-4-6 N=7	15		
		6.0	75+/-	**POTOMAC FORMATION - SANDY SILT (ML)**, fine, gray, moist, medium stiff	5			2	3-4-3-6 N=7	0		
				Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

BORING LOG NO. SWM-5

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8044° Longitude: -77.1274°

Approximate Surface Elev.: 80 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.2	80+/-								
1			**TOPSOIL = 2 inches** **FILL - SANDY SILT WITH GRAVEL (ML)**, micaceous, brown, moist, soft, contains cobbles				2	2-2-2-2 N=4	0		
		2.0	78+/-								
2			**POTOMAC FORMATION - SANDY LEAN CLAY WITH GRAVEL (CL)**, micaceous, light brown, moist, stiff, contains cobbles				2	5-4-8-3 N=12	0		
		4.0	76+/-								
			POTOMAC FORMATION - SANDY SILT WITH GRAVEL (ML), dark gray and black, moist, stiff	5			2	3-5-7-4 N=12	0		
		6.0	74+/-								
			Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.9 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Connelly
Project No.: JD205244

BORING LOG NO. SWM-6

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8045° Longitude: -77.1270°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	77.5+/-								
		TOPSOIL = 4 inches									
1		2.0	76+/-				2	4-4-5-6 N=9	0		
		POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM), fine, light brown, moist, medium dense, quartz fragments					1.7	8-6-10-4 N=16	0		
3		4.0	74+/-								
		POTOMAC FORMATION - SILTY SAND (SM), fine, gray-brown, moist, loose		5			2	4-4-4-5 N=8	0		
		6.0	72+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

BORING LOG NO. SWM-7

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8040° Longitude: -77.1277°

Approximate Surface Elev.: 80 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	80+/-								
		TOPSOIL = 3 inches									
1		**FILL - SANDY SILT WITH GRAVEL (ML)**, fine, brown, moist, stiff					2	3-4-5-4 N=9	0		
		2.0	78+/-								
3		**POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM)**, fine, brown, moist, stiff					2	8-6-4-5 N=10	0		
		medium stiff		5			1.5	2-2-3-5 N=5	0		
		6.0	74+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 6 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

BORING LOG NO. SWM-8

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8042° Longitude: -77.1273°

Approximate Surface Elev.: 79 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	78.5+/-								
		TOPSOIL = 4 inches									
1		**FILL - SILTY SAND WITH GRAVEL (SM)**, fine to medium, brown, moist, loose, quartz fragments encountered					2	4-3-3-2 N=6	0		
		2.0	77+/-								
2		**POTOMAC FORMATION - SANDY SILT (ML)**, fine, brown, moist, medium stiff					2	3-4-3-3 N=7	0		
				5			2	5-4-4-4 N=8	0		
		6.0	73+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 4.9 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Connelly
Project No.: JD205244

BORING LOG NO. SWM-9

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8043° Longitude: -77.1268°

Approximate Surface Elev.: 77 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	76.5+/-								
		TOPSOIL = 4 inches									
1		2.0	75+/-				2	5-4-7-8 N=11	0		
		FILL - SANDY SILT WITH GRAVEL (ML), dark gray-brown, moist, stiff, contains cobbles									
2		4.0	73+/-				2	6-9-3-4 N=12	0		
		POTOMAC FORMATION - SANDY LEAN CLAY (CL), fine, brown, moist, stiff									
3		6.0	71+/-	5			1.3	2-2-9-4 N=11	0		
		POTOMAC FORMATION - SILTY SAND WITH GRAVEL (SM), fine to coarse, light brown, moist, medium dense									
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021
Drill Rig: CME 55 | Driller: Connelly
Project No.: JD205244

BORING LOG NO. SWM-10

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8038° Longitude: -77.1276°

Approximate Surface Elev.: 78 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	78+/-								
		TOPSOIL = 3 inches									
1		**FILL - SANDY SILT WITH GRAVEL (ML)**, fine to medium, brown, moist, medium stiff					1.5	2-2-3-2 N=5	0		
		2.0	76+/-								
2		**SANDY LEAN CLAY WITH GRAVEL (CL)**, fine to coarse, light orange-brown, moist, medium stiff					2	2-3-4-2 N=7	0		
				5			0.7	3-4-2-3 N=6	0		
		6.0	72+/-								
		Boring Terminated at 6 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

BORING LOG NO. SWM-11

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8039° Longitude: -77.1272°

Approximate Surface Elev.: 77 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	76.5+/-	**TOPSOIL = 4 inches**								
1		2.0	75+/-	**FILL - SANDY SILT WITH GRAVEL (ML)**, fine to medium, brown, moist, stiff				2	3-5-10-9 N=15	0		
2				**POTOMAC FORMATION - SANDY FAT CLAY WITH GRAVEL (CH)**, fine to coarse, gray, moist, medium stiff, contains cobbles				1.7	2-3-5-7 N=8	0		
				stiff	5			2	2-3-7-11 N=10	30		
		6.0	71+/-	***Boring Terminated at 6 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5.6 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

BORING LOG NO. SWM-12

PROJECT: Alexandria Boothe Park Field Replacement

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

SITE: 520 Cameron Station Blvd
Alexandria, VA

LOCATION See Exploration Plan

Latitude: 38.8040° Longitude: -77.1268°

Approximate Surface Elev.: 76 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY ()	FIELD TEST RESULTS	PID (ppm)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		0.3	75.5+/-	**TOPSOIL = 4 inches**								
1		2.0	74+/-	**FILL - CLAYEY SAND WITH GRAVEL (SC)**, fine to medium, brown, moist, medium dense, contains cobbles				1.7	10-6-4-6 N=10	0		
3				**POTOMAC FORMATION - WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM)**, fine to coarse, light brown, moist, medium dense, contains cobbles				1.7	7-6-4-5 N=10	3		
3				loose	5			1.7	4-3-5-6 N=8	0		
		6.0	70+/-									
				Boring Terminated at 6 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic Hammer

Advancement Method:
3.25 ID HSA

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No water encountered during drilling
No water encountered upon completion
No water encountered after 24 hrs.
Caved: 5 ft.

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Started: 01-07-2021 | Boring Completed: 01-07-2021

Drill Rig: CME 55 | Driller: Connelly

Project No.: JD205244

SUMMARY OF LABORATORY RESULTS

BORING ID	Depth (Ft.)	Soil Classification USCS & AASHTO	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Fines
B-1	5 - 6.5	SANDY LEAN CLAY(CL) / A-4 (4)	23.5	30	21	9	0.0	37.8	62.2
B-3	5 - 6.5	WELL-GRADED GRAVEL with SILT and SAND(GW-GM) / A-1-a (0)	3.6	NP	NP	NP	59.8	33.3	6.9

PROJECT: Alexandria Boothe Park Field Replacement

SITE: 520 Cameron Station Blvd
Alexandria, VA

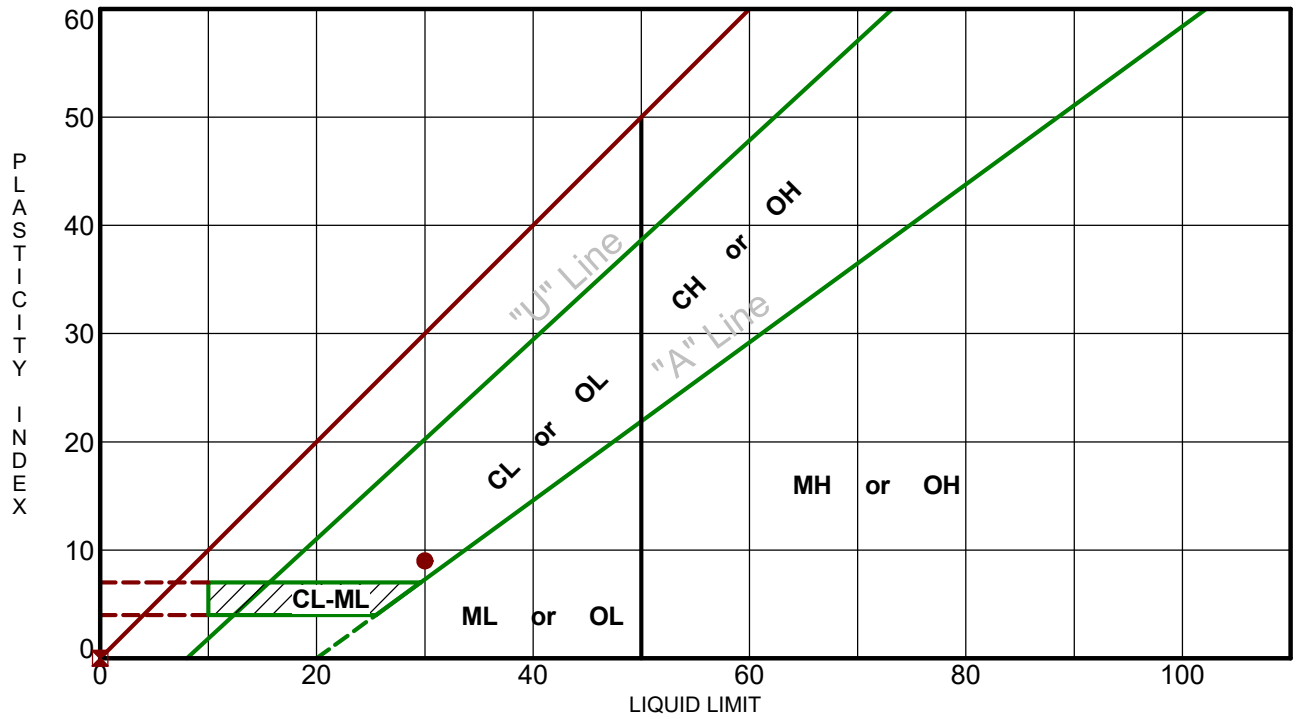
Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA
PH. 703-726-8030 FAX.

PROJECT NUMBER: JD205244

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth	LL	PL	PI	Fines	USCS	Description
●	B-1	5 - 6.5	30	21	9	62.2	CL	SANDY LEAN CLAY
⊠	B-3	5 - 6.5	NP	NP	NP	6.9	GW-GM	WELL-GRADED GRAVEL with SILT and SAND

PROJECT: Alexandria Boothe Park Field Replacement

PROJECT NUMBER: JD205244

SITE: 520 Cameron Station Blvd
Alexandria, VA

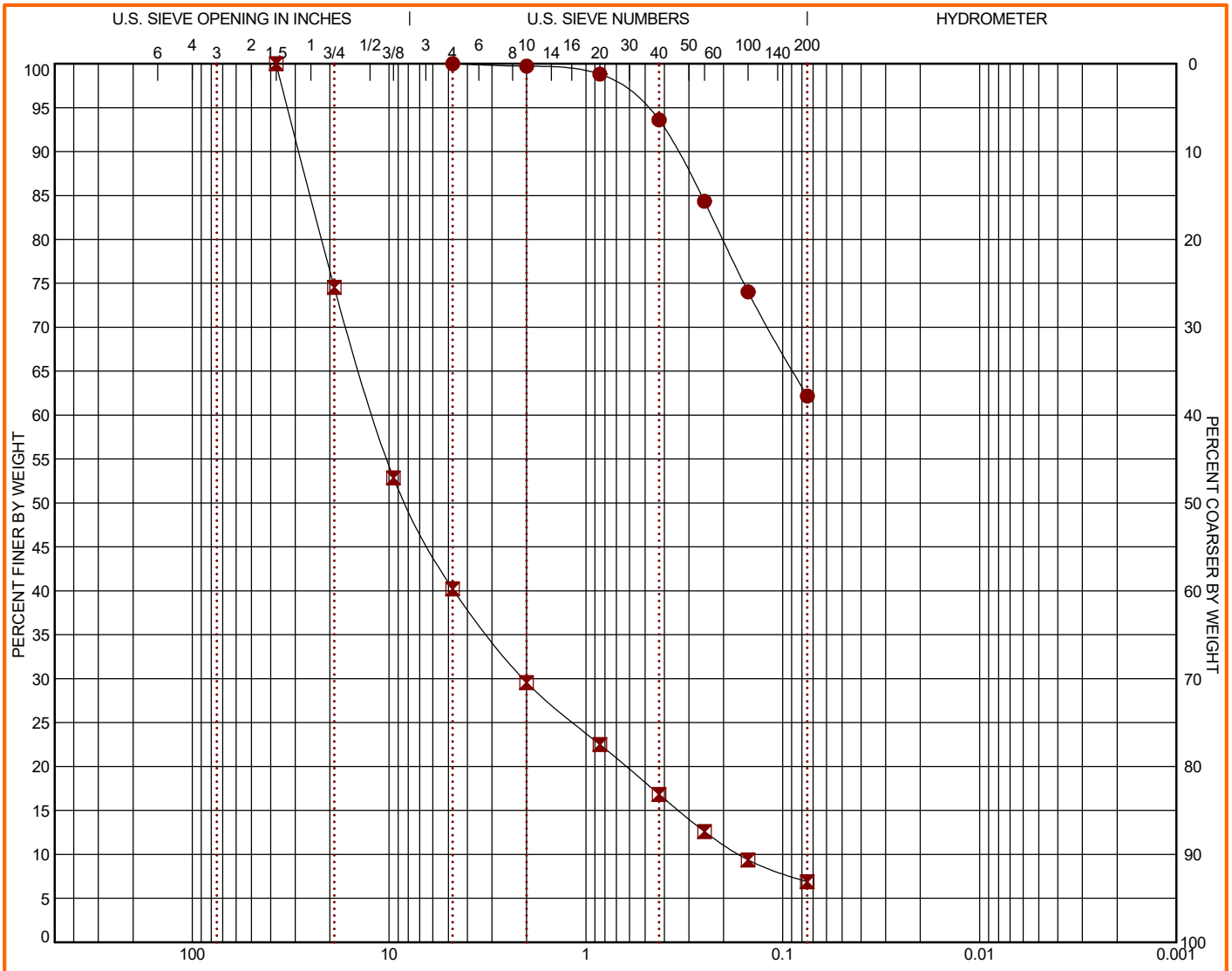
Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

CLIENT: A Morton Thomas & Assoc Inc
Chantilly, VA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JD205244 ALEXANDRIA BOOTHE.GPJ 02195238 US 50 AND CHIPMAN.GPJ 1/14/21

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	B-1	5 - 6.5	0.0	0.0	37.8		62.2		CL
⊠	B-3	5 - 6.5	0.0	59.8	33.3		6.9		GW-GM

GRAIN SIZE	●	⊠
D_{60}		11.935
D_{30}		2.072
D_{10}		0.166

COEFFICIENTS	●	⊠
C_C		2.17
C_U		72.08

●		⊠			
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	1 1/2"	100.0		
#10	99.72	3/4"	74.55		
#20	98.81	3/8"	52.86		
#40	93.6	#4	40.22		
#60	84.34	#10	29.56		
#100	74.03	#20	22.52		
#200	62.17	#40	16.84		
		#60	12.6		
		#100	9.38		
		#200	6.89		

SOIL DESCRIPTION	
●	SANDY LEAN CLAY (CL)
⊠	WELL-GRADED GRAVEL with SILT and SAND (GW-GM)

REMARKS	
●	
⊠	

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GRAIN SIZE: USCS 1 JD205244 ALEXANDRIA BOOTHE.GPJ 02195238 US 50 AND CHIPMAN.GPJ 1/14/21

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

Waypoint ANALYTICAL
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TEXTURE ANALYSIS

Client :
Terracon Consultants
19955 Highland Vista Drive Suite 170
Ashburn , VA 20147

Grower :
Alexandria Boothe Park Field Replacement
JD205244

Farm :

Report No : 21-013-1212
Cust No : 11827
Date Printed : 01/15/2021
Page : 1 of 1

Date Received : 01/13/2021

Lab No	Field ID	Sample Identification	Percent Sand	Percent Silt	Percent Clay	Textural Classification
18875		SWM-1(2-4)	59.5	30.5	9.9	Sandy Loam
18876		SWM-1(4-6)	75.5	16.5	7.9	Sandy Loam
18877		SWM-2(0-2)	63.5	20.5	15.9	Sandy Loam
18878		SWM-2(2-4)	63.5	22.5	13.9	Sandy Loam
18879		SWM-3(0-2)	59.5	24.5	15.9	Sandy Loam
18880		SWM-3(2-4)	43.5	40.5	15.9	Loam
18882		SWM-4(0-2)	55.5	24.5	19.9	Sandy Loam
18883		SWM-4(2-4)	59.5	32.5	7.9	Sandy Loam
18884		SWM-5(0-2)	53.5	30.5	15.9	Sandy Loam
18885		SWM-5(2-4)	57.5	26.5	15.9	Sandy Loam
18886		SWM-6(0-2)	63.5	30.5	5.9	Sandy Loam
18887		SWM-6(2-4)	61.5	28.5	9.9	Sandy Loam
18888		SWM-7(0-2)	59.5	24.5	15.9	Sandy Loam
18889		SWM-7(2-4)	57.5	34.5	7.9	Sandy Loam
18890		SWM-8(0-2)	71.5	18.5	9.9	Sandy Loam
18891		SWM-8(2-4)	39.5	34.5	25.9	Loam
18893		SWM-9(0-2)	71.5	22.5	5.9	Sandy Loam
18894		SWM-9(2-4)	71.5	20.5	7.9	Sandy Loam
18895		SWM-10(0-2)	71.5	18.5	9.9	Sandy Loam
18896		SWM-10(2-4)	79.5	16.5	3.9	Loamy Sand
18897		SWM-11(0-2)	75.5	14.5	9.9	Sandy Loam
18898		SWM-11(2-4)	63.5	26.5	9.9	Sandy Loam
18899		SWM-12(0-2)	59.5	28.5	11.9	Sandy Loam
18900		SWM-12(2-4)	81.5	12.5	5.9	Loamy Sand

Analysis prepared by: Waypoint Analytical Virginia, Inc.

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Alexandria Boothe Park Field Replacement ■ Alexandria, VA

Terracon Project No. JD205244

SAMPLING	WATER LEVEL	FIELD TESTS
Standard Penetration Test	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** **Cave In Encountered** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** Standard Penetration Test Resistance (Blows/Ft.) **(HP)** Hand Penetrometer **(T)** Torvane **(DCP)** Dynamic Cone Penetrometer **UC** Unconfined Compressive Strength **(PID)** Photo-Ionization Detector **(OVA)** Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ³ 4 and 1 £ Cc £ 3 [E]		GW	Well-graded gravel [F]
			Cu < 4 and/or [Cc<1 or Cc>3.0] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ³ 6 and 1 £ Cc £ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above “A”		CL	Lean clay [K, L, M]
			PI < 4 or plots below “A” line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line		CH	Fat clay [K, L, M]
			PI plots below “A” line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ³ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains ³ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains ³ 30% plus No. 200 predominantly sand, add “sandy” to group name.

[M] If soil contains ³ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] PI ³ 4 and plots on or above “A” line.

[O] PI < 4 or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.