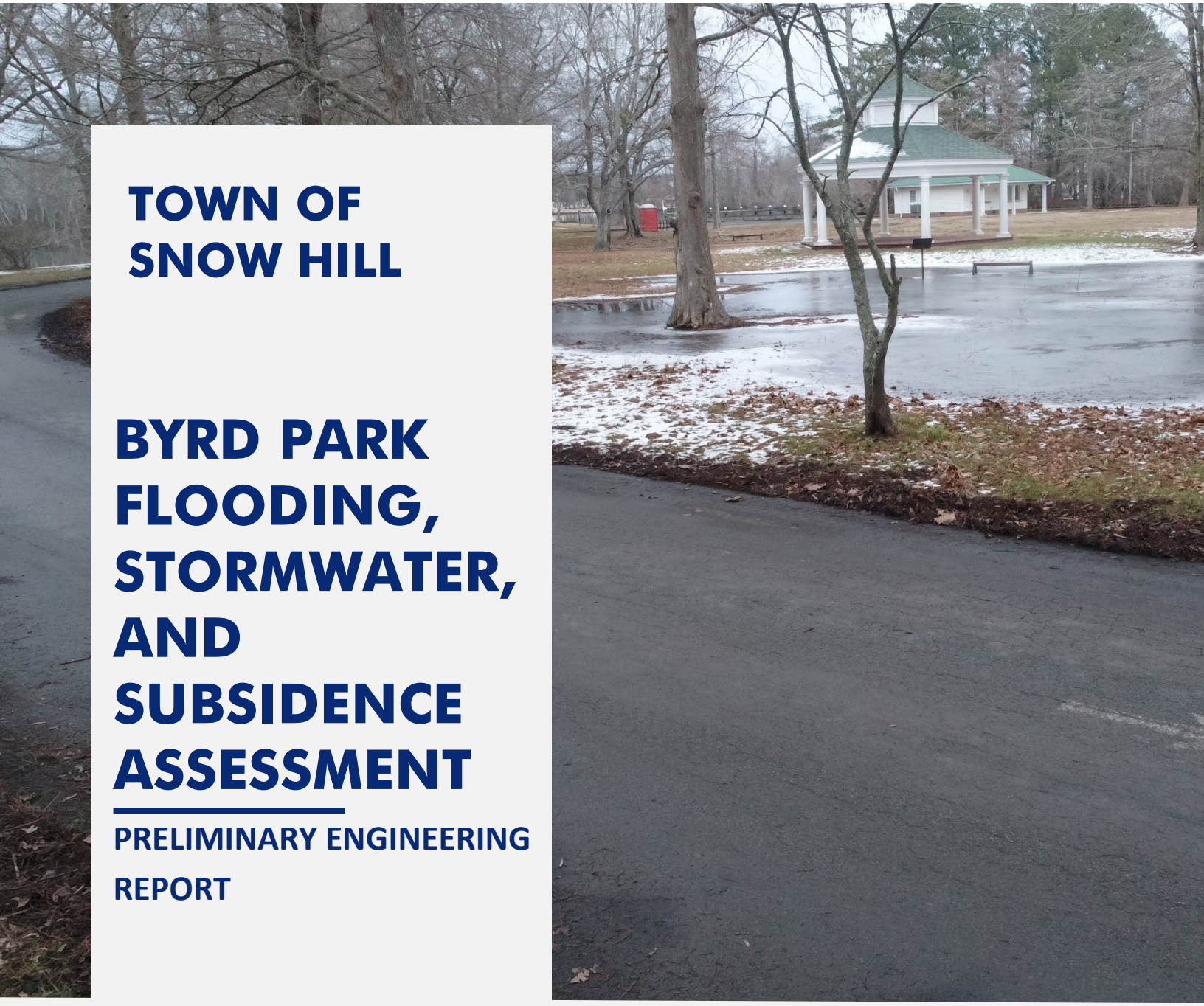

TOWN OF SNOW HILL

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

PRELIMINARY ENGINEERING REPORT

SEPT. 2022

DBF #0118A001.A01

Prepared By:

DAVIS BOWEN & FRIEDEL, INC.

MARYLAND DEPARTMENT OF NATURAL RESOURCES

❑ 601 E. MAIN STREET, SUITE 100, SALISBURY, MD 21804-5021 • 410.543.9091
❑ 1 PARK AVENUE, MILFORD, DE 19963 • 302.424.1441
❑ 106 N. WASHINGTON STREET, SUITE 103, EASTON, MD 21601• 410.770.4744
www.dbfinc.com

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

TOWN OF SNOW HILL, WORCESTER COUNTY, MD

DBF #0118A001

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BYRD PARK FLOODING STORMWATER, AND SUBSIDENCE STUDY

I. PRELIMINARY ENGINEERING REPORT

This Byrd Park Flooding Evaluation has been prepared by Davis, Bowen & Friedel, Inc. (DBF) for the Town of Snow Hill (Town) located on the Pocomoke River in Worcester County, Maryland. The Town of Snow Hill has experienced increased flooding at the Byrd Park over the past couple of decades. The Town desires to regain and improve the functionality of the park and enhance the natural appeal of the park as a destination for locals and visitors. Current flooding patterns have resulted in significant areas of the park being unusable to the public and difficult to maintain.

In an effort to use this study to obtain funding, the report generally follows, although not strictly, the Interagency Memorandum for the recommended best practices for the development of Preliminary Engineering Reports dated January 16, 2013 as developed by US Department of Agriculture Rural Development, US Environmental Protection Agency, US Department of Housing and Urban Development, and the US Department of Health and Human Services.

II. PROJECT PLANNING

This report will review the available options to improve the park's drainage conditions, reduce the areas that experience flooding, and the frequency of flooding within Byrd Park. Currently the Town has witnessed flooding throughout the park and has experienced standing water remain for several days after significant storm events.

A. Location

The project is located in the Town of Snow Hill, Worcester County, Maryland. Byrd Park is located along the Pocomoke River on the west side of Snow Hill. A vicinity map is provided as Exhibit 2.1. A location map is provided as Exhibit 2.2. All exhibits are provided in Appendix A.

B. Environmental Resources Present

This project site is in an environmentally sensitive area. The project is located within the Resource Conservation Area (RCA) of the critical area. The entire project area is located within zone AE (7ft) on the FEMA floodplain maps. The project area contains Department of Natural Resources (DNR) identified riverine and palustrine wetlands.

There are no known protected lands located in the vicinity of the project. There are no known National Register of Historic Places located in the vicinity of the project. There are no known Maryland Historic Trust (MHT) preservation easements located in the vicinity of the project.

Environmental mapping including Critical Area, Floodplain, and Wetlands, is provided as Appendix B.

The following section provides a brief discussion of each of the environmental resources and their effect on the project:

- Critical Area: Critical area permitting, and mitigation requirements will depend on the proposed improvements. Most improvements are within the Critical Area Boundaries, but most do not increase impervious area within the park.
- Floodplains: Proposed improvements will take into consideration the park location in the 100-year flood plain.
- Wetlands: Proposed improvements will minimize impacts to wetlands.

C. Community Engagement

The Town of Snow Hill has undertaken the project to improve the experience of residents using the park. Community input will be obtained at multiple stages during the project planning process, at milestones as determined by the Town.

III. EXISTING FACILITIES

Byrd Park is approximately 17.3 acres, most of which is maintained grass fields. The park contains 2 boat ramps, approximately 2,500 LF of pavement and gravel roads, 2 basketball courts, a playground, and several large structures. There are a series of existing drainage features on the site, The park is split by a large drainage canal that drains to the Pocomoke River, this canal is tidal. The area of the park to the southwest of the canal has a series of manmade drainage ditches and culverts. The area to the northeast of the canal has several existing stormwater features. There is a grass field located to the southwest of the park that is Town property, and within the scope of this study. It does not contain any drainage facilities and is regularly inundated with ponding water. Exhibit 3.1 shows the existing drainage area map. The park is maintained by the Town of Snow Hill's Department of Public Works. The major existing park facilities are shown on the map provided in Exhibit 3.2.

A. Location Map

Vicinity and Location maps are included as Exhibits 2.1 and 2.2.

B. History

The Byrd Park was part of the Pocomoke River marshland before being filled with sediment acquired from channel maintenance of the Pocomoke River in the 1930s. The park was founded during the 1930s. There has been speculation that the park was used as a dump and burn site at some point. Based on soil and groundwater samples taken on the site there is substantial evidence that this likely occurred. The park has not been used as dump or burn site for many decades.

The Maryland Department of the Environment has completed phase 1 & 2 Brownfields reports in April 2004, and May 2005 respectively. The fact sheet for these is included in Appendix D.

Ground water test results were found to be outside of State drinking water limits, as such it cannot be used for that purpose. However, the test results were within state limits to be around and only requires remediation if used for consumption. The samples were taken from the superficial aquifer, the town water supply wells are not within this aquifer but it is recommended that further studies take place to monitor a potential leaking aquifers. The subsurface geotechnical report is included in Appendix E.

C. Condition of Existing Facilities

The park experiences regular flooding during storm events. The flooding results in standing water in remaining for several days throughout the park. The two boat ramps are located at either end of the park riverfront. Each boat ramp has been found to flood during storm surges. Each boat ramp than traps water behind it leading to longer lasting flooding. The stretch of grass located behind the bulkhead along northeast edge of the

park appears to flood frequently. This may be due to water penetrating the bulkhead or water being trapped behind the bulkhead during flooding events. Flooding has been noted along the edges of roads within the park at several locations. The multiple grass fields and the playground area on the southwest of the park have been found to pond water at varying levels of severity. The more severely affected areas having 6" or more of ponding remaining for a week or longer.

The existing stormwater feature located in the northwest portion of the site appears to have a clogged drainpipe and seems to infiltrate at an inadequate rate. The main drainage feature of the park is a small canal running north-south splitting the park. This feature has several ditches and swales branching off throughout the western portion of the park. These features are affected by tidal influence. The two pavilions located on the western portion of the site drain to these ditches. The existing storm culvert and catch basin located south of the playground area was found to be clogged and filled with dirt and debris.

There is an existing boardwalk located along the northwest portion of the park. The older sections of this boardwalk are aged and warped to varying degrees and should be considered for replacement to provide ADA accessibility.

Topographic survey and geotechnical investigations were performed for the entire park, please refer to Exhibit 3.3, Existing Ponding Exhibit, showing areas with low elevations and areas of flooding. Also please refer to Exhibit 3.4, Subgrade Exploration Exhibit, showing areas where trash/refuse were encountered from when the park was used as a dump facility.

It was questioned whether some of the flooding occurring in the park was due to ground subsidence experiences as a result of the park being used as a dump site in the past. It is likely that some natural material compaction and subsidence has occurred due to the park's historical usage. However, we could not locate historical topographical data precise enough to perform a useful comparison. Based on data available, a comparison was made between the park topography in 2014 and 2022. During this 8-year period no substantial land subsidence was observed. Despite the parks past use as a dump/burn spot, it is not anticipated that additional significant land subsidence will occur in the future. This data does not disprove any land subsidence that may have occurred prior to 2014. However, it does indicate that the land has been stable for the past 8-year period. Should the Town ever decide to make roadway or structural improvements over the historical dump area shown on Exhibit 3.4, the structural capacity of the existing soils would have to be considered and tested to determine any required remediation/stabilization.

IV. NEED FOR PROJECT

This park was historically utilized by many residents on a regular basis. The Town currently owns and maintains a significant amount of infrastructure in the park, including community gathering locations, playground equipment, sports and recreational facilities, and river access points within the park. Due to the flooding and drainage failures that have worsened over the years, the park usage has decreased significantly. Improving the drainage of the park will help increase park usage and improve the quality of life for residents of the Town. Exhibit 4.1 contains two aerial images of the park in January 2022, please note the extensive water coverage throughout the park. Exhibit 4.2 contains two images of flooding taken at the park in January 2022. Both exhibits can be found in Appendix A.

V. ALTERNATIVES CONSIDERED

The following section will review the alternatives considered to alleviate the current flooding issues.

1. Alternative #1 – Maintenance of Existing Stormwater Management Facilities and Installation of Check Valves.

A. Description

There are several existing stormwater management features onsite that are clogged and failing to drain. This alternative recommends the cleaning of the drainpipes and catch basins as well as the installation of check valves on the 5 discharge pipes located throughout the park, 3 discharging to the river and 2 discharging to the canal. This will help reduce the influence of tidal waters and the rate of debris collecting within the pipes. However, this will only help reduce the flooding where the existing stormwater facilities exist. There are some sections on the west side of the park that will be largely unaffected by this alternative.

B. Map

Exhibit 5.1.1 highlights the locations of the existing stormwater/storm drain facilities and their outfall pipes.

C. Environmental Impact

This alternative will improve drainage of the park to some extent, however, it will not eliminate the flooding issues. Environmental Impacts of implementing this alternative will be negligible since the storm drainage facilities are already in-place. The total impervious area will remain the unchanged.

D. Sustainability Considerations

i. Water and Energy Efficiency

This alternative does not change any water or energy efficiency.

ii. Green Infrastructure

This alternative does not introduce any additional green infrastructure to the park.

iii. Climate-related Considerations

The threat of sea level rise and an increase frequency of storm surges could result more intense flooding at Byrd Park. While this alternative will improve the drainage situation for the existing conditions, it does not provide significant resiliency to potential future conditions.

iv. Other

There are no other sustainability considerations for this alternative.

E. Cost Estimates

The cost estimate is provided in Appendix C. A summary is provided below.

Table 5.1 – Alternative 1 Cost Estimate Summary

Parameter	Cost
Construction Costs	$15,015.00
Non-Construction Costs	$2,730.00
Annual Operations & Maintenance Costs	$1500.00

F. Design Criteria

This alternative does not include any design criteria beyond minor site plan preparation to show the scope of work and provide minimum acceptance criteria.

G. Land Requirements

This alternative does not require any additional land.

H. Potential Construction Problems

This alternative does not have any anticipated potential construction problems.

2. Alternative #2 – Re-grading Low Areas

A. Description

This alternative would consist of re-grading the low-lying areas within the park that have been found to pond water. This includes the regrading/raising of some sections of the existing roads in the park, which would consist of milling and overlaying of pavement to eliminate the ponding witnessed on the roads under current conditions.

B. Map

Exhibit 5.2.1 contains a map showing low elevation areas and areas of known ponding.

C. Environmental Impact

This alternative will improve drainage area and decrease flooding but does not impact the surrounding environment. The type and amount of impervious cover will not change due to the land regrading or paving of the existing roads.

D. Sustainability Considerations

i. Water and Energy Efficiency

This alternative does not change any water or energy efficiency.

ii. Green Infrastructure

This alternative does not introduce any additional green infrastructure to the park.

iii. Climate-related Considerations

This alternative does not include any additional climate related considerations. This alternative would result in less flooding and could be considered as an improvement to park resiliency from an accessibility standpoint but does not provide a significant increase to future sea level rise impacts.

i. Other

There are no other sustainability considerations for this alternative.

E. Cost Estimates

The cost estimate is provided in Appendix C. A summary is provided below.

Table 5.2.1 – Alternative 2 Cost Estimate Summary

Parameter	Cost
Construction Costs	$38,390.00
Non-Construction Costs	$6,980.00
Annual Operations & Maintenance Costs	$1,000.00

F. Design Criteria

This alternative does not include any significant design criteria beyond minor site plan preparation to show the scope of work and provide minimum acceptance criteria.

G. Land Requirements

This alternative does not have any known additional land requirements.

H. Potential Construction Problems

This alternative does not have any anticipated potential construction problems.

3. Alternative #3 – Construction of Stormwater Features (Bioswales, Vegetative Buffers, and Rain Barrels)

A. Description

This alternative assesses the implementation of stormwater management (SWM) Environmental Site Design (ESD) and Best Management Practices (BMPs) to improve storm water drainage from quantity and quality standpoints. The Town could perform improvements to the existing drainage swales located on the western side of the park, at the existing pavilions, creation of vegetative buffers along the shorelines, and introduction of rain barrels.

Improvements to drainage bioswales would include minor re-grading of the existing swales to allow the planting of native species of plants that can survive being flooded for periods of time. This alteration would also require a change in maintenance, specifically these swales should no longer be mowed and instead be allowed to grow throughout the year. This should improve the capacity of the existing drainage features and help dry the surrounding areas.

Vegetative buffers would include the planting of native species that thrive in muddier soils. These plantings would take place along the eastern bulkhead and other areas that remain wet days after a storm event. These areas should no longer be mowed and allowed to grow year-round. The introduction of these buffers would help dry out surrounding areas.

Rain barrels offer a low-cost method to provide minor stormwater storage capacity for the existing pavilions, this would help reduce the amount of water ponding around these facilities. The captured water could then be repurposed for landscaping irrigation, or simply released after the storm has passed.

The Town has prior commitments from the recently completed Proposed Extension of Boardwalk project in Sturgis Park. To fulfill critical area mitigation requirements, the Town must plant the equivalent of approximately 3200 square feet (sf) of planting mitigation, the design intent for that project was to have a portion or all plantings be located at Byrd Park. It is recommended that during the creation of bioswales or vegetative buffers, the Town considers using plants that meet Critical Area planting mitigation standards to meet the requirements.

B. Map

Exhibit 5.3.2 contains a map showing proposed locations of vegetative swales, vegetative buffers, and rain barrels.

C. Environmental Impact

This alternative improves the existing ditches soil cover which ranges from bare soil to maintained grass, and the increase in native plants will have positive environmental impacts to the surrounding areas. Native shoreline plants tend to improve infiltration, offer increased pollutant filtering, and are more attractive to local pollinators (birds, bees, butterflies, etc.).

D. Sustainability Considerations

i. Water and Energy Efficiency

This alternative does not significantly change water or energy efficiency, but rain barrels can improve water usage efficiency for landscaping irrigation purposes.

ii. Green Infrastructure

This alternative will result in the improvement of existing drainage ditches with green infrastructure devices, and the introduction of rain barrels and vegetative buffers.

iii. Climate-related Considerations

This alternative does not include any additional climate related considerations. This alternative would result in less flooding and could be considered as an improvement to park resiliency from an accessibility standpoint but does not provide a significant increase to future sea level rise impacts.

iv. Other

There are no other sustainability considerations for this alternative. However, implementation of bioswales, shoreline buffers, and rain barrels could be utilized by local schools as an educational awareness and training tool for learning about environmentally friendly "green" infrastructure and their positive impacts on the environment.

E. Cost Estimates

The cost estimate is provided in Appendix C. A summary is provided below.

Table 5.3.1 – Alternative 3 Cost Estimate Summary

Parameter	Cost
Construction Costs	$30,145.50
Non-Construction Costs	$5,401.00
Annual Operations & Maintenance Costs	$1,000.00

F. Design Criteria

This alternative does not include any design criteria beyond minor site plan preparation to show the scope of work and provide minimum acceptance criteria.

G. Land Requirements

This alternative will require some areas of the park currently not being used due to being wet and muddy to be converted to planted areas. The tradeoff being that surrounding areas should dry become dryer.

H. Potential Construction Problems

This alternative does not have any anticipated potential construction problems.

4. Alternative #4 – Canal Dam & Inline Check Valves

A. Description

This alternative assesses the option of installing a concrete wall with multiple pipe penetrations underneath the existing vehicle bridge crossing the canal. The pipe penetrations would have inline check valves installed to allow flow out of the park during low tide and keep the river from entering the canal during high tide and storm surges. An overflow weir, beneath the height of the bridge will likely be required to allow extreme storm events to drain from the park. A trash rack is recommended to be included to reduce the maintenance required.

B. Map and Schematic

Exhibit 5.4.1 contains a map showing the proposed location of the canal dam.

C. Environmental Impact

This alternative will reduce the amount of standing water within the canal and dry adjacent areas. It will not affect sections of the park that do not drain to the canal.

D. Sustainability Considerations

i. Water and Energy Efficiency

This alternative does not change any water or energy efficiency.

ii. Green Infrastructure

This alternative does not include any green infrastructure.

iii. Climate-related Considerations

This alternative does not include any significant, long-term climate-related considerations, but would assist with maintaining normal water level in the canal during high tide and storm surges.

iv. Other

There are no other sustainability considerations for this alternative

E. Cost Estimates

The cost estimate is provided in Appendix C. A summary is provided below.

Table 5.4.1 – Alternative 4 Cost Estimate Summary

Parameter	Cost
Construction Costs	$144,375.00
Non-Construction Costs	$26,250.00
Annual Operations & Maintenance Costs	$1,000.00

**This cost estimate does not include any modifications to the existing vehicular bridge although none are anticipated.*

F. Design Criteria

Design criteria would include hydraulic analysis of the proposed dam to determine proper elevations, hydraulic capacity of the pipes, and structural integrity of the overall device. Site plans and details would be prepared by a professional engineering firm to show the scope of work and provide minimum construction and acceptance criteria.

G. Land Requirements

This alternative does not have any known land requirements.

H. Potential Construction Problems

This alternative would require the check valves to be adequately sized to allow flow out of the canal during storm events. An overflow weir will need to be at the appropriate elevation to reduce the chance of any flooding.

5. Alternative #5 –Elevate Bulkheads & Raise Elevations Within the Park

A. Description

This alternative assesses the option of increasing the height of the bulkheads, and raising the park elevations. Based on available information from FEMA, the park is in a flood zone AE with an elevation of 7.2-7.3. The average elevation of the park bulkheads is 1.80, elevations throughout the park varies from 2.25 to 1.50. Based on this information it would not be feasible to raise the bulkhead and park elevations high enough to eliminate all flooding. However, raising the elevations would improve the flooding situation.

B. Map

Exhibit 5.5.1 contains a map denoting the existing bulkhead elevations.

C. Environmental Impact

This alternative will have a neutral impact on the surrounding environment. By raising the elevation of the park there will be an increase in stormwater runoff to adjacent sites. Depending on the permit process for such a project, additional stormwater management devices may be required to mitigate this.

D. Sustainability Considerations

i. Water and Energy Efficiency

This alternative does not change any water or energy efficiency.

ii. Green Infrastructure

A project of this magnitude would allow for potential design and implementation of various green infrastructure types, including permeable paving, rain gardens, bioswales, shoreline protection buffers, etc.

iii. Climate-related Considerations

This alternative would significantly improve the climate-related resiliency of the park.

iv. Other

There are no other sustainability considerations for this alternative

E. Cost Estimates

The cost estimate is provided in Appendix C. A summary is provided below.

Table 5.5.1 – Alternative 5 Cost Estimate Summary

Parameter	Cost
Construction Costs	$2,660,625.00
Non-Construction Costs	$491,250.00
Annual Operations & Maintenance Costs	$10,000.00

**Due to the nature of this alternative, the current construction material and labor market fluidity, and the multitude of potential unknown construction problems involved, this cost estimate may be inaccurate by 25 - 50%*

F. Design Criteria

This alternative will require major site plan preparation for design, permitting and construction, and require extensive permitting of various design criteria and environmental impacts to wetlands, waterways, floodplain, Critical Area, etc.

G. Land Requirements

This alternative does not have any known land requirements.

H. Potential Construction Problems

There are several existing structures within the park including several pavilions, a gazebo, a building, basketball courts, and a playground. It would take a significant amount of time and cost to raise or replace these. The existing bulkhead has two boat ramps which will have to be reconstructed as well.

VI. SELECTION OF AN ALTERNATIVE

a. Life Cycle Cost Analysis

Present worth cost analysis for the alternatives was completed using the following technique.

$$PW = PW_{construction\ costs} + PW_{non-construction\ costs} + PW_{O\&M} - PW_{Salvage}$$

$$PW_{O\&M} = A_{O\&M}\left(\frac{(1+i)^n - 1}{i(1+i)^n}\right)$$

$$PW_{Salvage} = \frac{F_{Salvage}}{(1+i)^n}$$

a. $PW = present\ worth$
$A = annuity$
$F = future\ value$
$i = the$ real $federal\ discount\ rate$ (-0.3%)
$n = the\ term\ of\ analysis$ $(30\ years)$

The present worth of the alternatives is summarized in the table below.

Table 6.1: Present Worth Analysis

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Present Worth of Construction Costs ($PW_{Construction\ Costs}$)	$15,015.00	$38,390.00	$30,146.00	$144,375.00	$2,660,625.00
Present Worth of Non-Construction Costs ($PW_{Non-construction\ costs}$)	$2,730.00	$6,980.00	$5,481.00	$26,250.00	$491,250.00
Annuity of O&M ($A_{O\&M}$)	$1,500.00	$1,000.00	$1,000.00	$1,000.00	$10,000.00
Present Worth of O&M ($PW_{O\&M}$)	$0	$0	$0	$0	$0
Future Value of Salvage ($F_{Salvage}$)	$0	$0	$0	$0	$0
Present Worth of Salvage ($PW_{Salvage}$)	$0	$0	$0	$0	$0
Total Present Worth (PW)	**$64,906.15**	**$76,810.77**	**$67,067.77**	**$202,065.77**	**$3,466,282.68**

Based on the above present worth analysis, Alternatives 1 through 4 would be the recommended options. It should be noted that no single alternative will eliminate the flooding within the park completely. We recommend stating with option 1 and continuing through Alternative 4 as funding will allow. Additional action should be taken if flooding/drainage issues persist.

b. Non-Monetary Factors

Non-monetary factors such as improving the diversity of the park's vegetation with native plantings, as well as how effective the alternative is estimated to be at reducing flooding across the park were considered.

VII. PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

A. Preliminary Project Design

The recommended course of action is to proceed with Alternative 1 initially. Alternative 1 is primarily maintenance and improving the existing facilities. However, this alternative alone will not resolve the flooding problems across the park. After the completion of Alternative 1 it is recommended that the Town analyze the situation and continue to Alternative 2 if desired. Alternative 2 will include re-grading the existing low spots within the park to avoid ponding.

If flooding still occurs than the issue is does not stem from poor grading, but instead a lack of stormwater management/drainage capabilities. Alternatives 3 and 4 each include stormwater management or stormwater drainage facilities that would increase the resilience of the parks facilities to mitigate flooding. Alternative 3 is significantly cheaper, as it includes low-tech methods of altering existing ditches and wet areas with the trade off being these areas will permanently be vegetation, thus reducing the total 'free space' of the park. Alternative 4 includes the installation of a hard structure under an existing vehicular bridge and is more expensive but will significantly reduce the effect of tidal water within the park canal area.

B. Project Schedule

It is recommended that the town pursue funding for improvements to the park and dependent on the amount of funding available, proceed sequentially with as many alternatives as desired. This will result in a long project schedule as the new drainage situation will need to be assessed after the completion of each alternative. It is anticipated that Alternatives 1 and 2 could be designed, permitted, bid and constructed in 12 – 18 months, once funding is acquired.

C. Permit Requirements

The projects will require numerous permits at the local, County, State, and Federal levels, including but not limited to various agencies within the Maryland Department of the Environment (MDE) including the Wetlands and Waterways, Floodplain Management, Worcester County Soil Conservation District, and the Critical Area Commission. Upon acquisition of all permits, the project will receive final approval from the Town of Snow Hill and all funding agencies prior to bidding and construction.

D. Sustainability Considerations

i. Water and Energy Efficiency

Energy efficiency will not be affected by this project.

ii. Green Infrastructure

Alternative 3 includes the creation of green infrastructure within the park via bioswales, and vegetative buffer areas.

iii. Other

No other known considerations were noted.

E. Annual Operating Budget

i. Income

This park is owned and operated by the Town of Snow Hill. It is maintained by the Public Works Department.

ii. Annual O&M Costs

Any additional operation and maintenance costs created by this project will be manageable and budgeted by the Town.

iii. Debt Repayments

Debt repayments will be based on the amount of funding the Town receives and chooses to utilize. This will be dependent on the number of alternatives chosen for implementation.

iv. Reserves

Debt Service Reserve

To be determined based on funding options available.

Short-Lived Asset Reserve

Short lived assets for the project would include replacement of check valves.

Table 7.2: Short-Lived Assets

Description	Qty.	Unit Price	Total Cost	Replacement Period (Years)	Annual Cost
Check Valves	5	$350	$1,750	10	$175
Total Annual Reserve Amount					**$175.00**

v. Short-Lived Assets

The short-lived assets for the recommended alternatives would primarily consists of check valves. These costs are projected to add up to $175 annually.

VIII. CONCLUSIONS AND RECOMMENDATIONS

Based on consideration of the alternatives listed above, this report recommends starting with Alternative 1, repairing and improving the existing stormwater management facilities. It can not be stated that this alternative alone will fix the flooding issues currently experienced at the park. It is recommended that the Town analyze the situation after completing alternative 1, and if desired to continue with alternative 2, then alternative 3, and finally Alternative 4. Alternative 5 is not recommended due to the immeense costs of raising the existing bulkheads, as well as the potential construction problems faced by raising the existing buildings and structures.

APPENDIX A – EXHIBITS

DAVIS, BOWEN & FRIEDEL, INC. ARCHITECTS ENGINEERS SURVEYORS

SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

EXHIBIT 2.1 - VICINITY MAP

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=5 MILES	0118A001.A01

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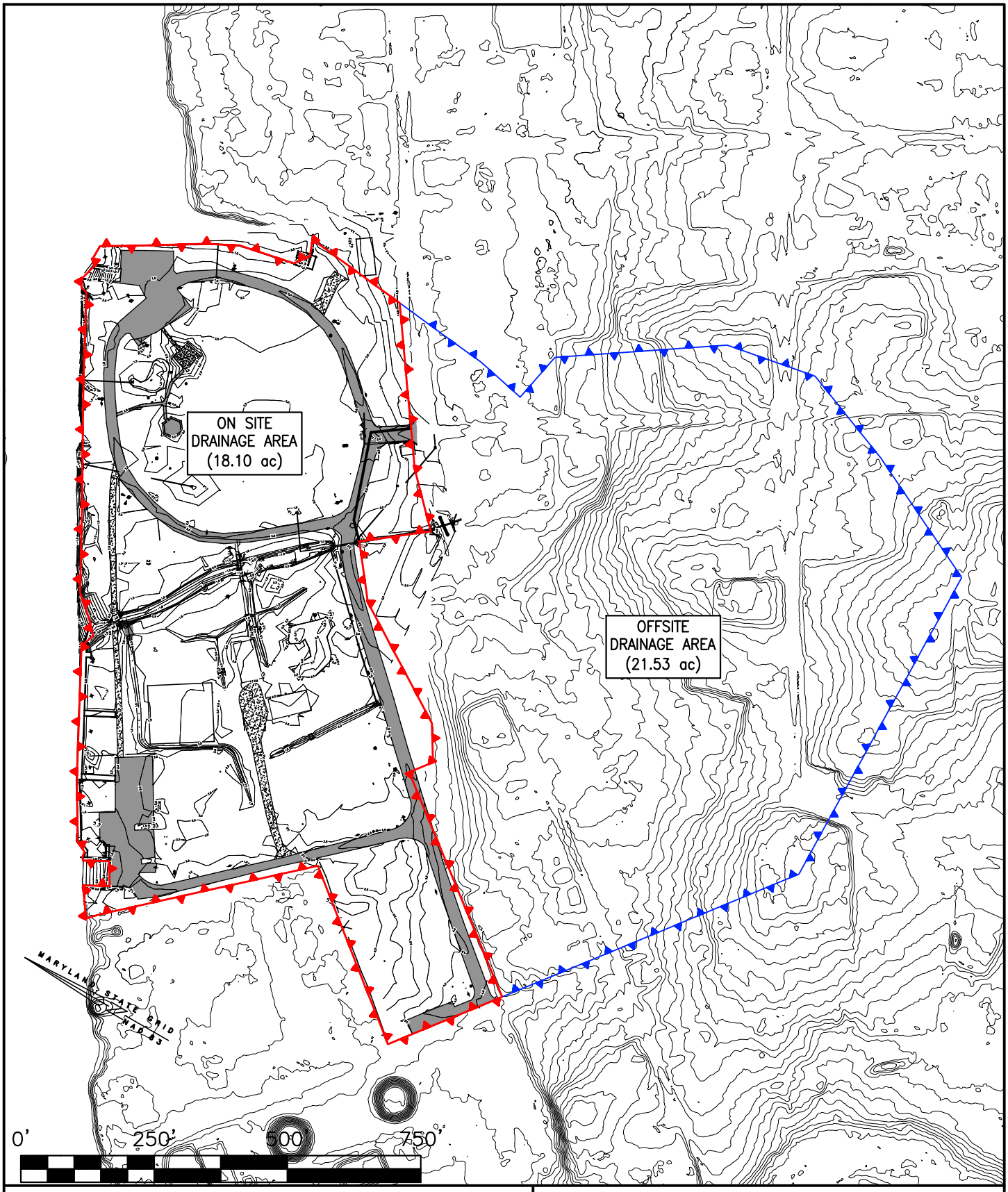
SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

EXHIBIT 2.2 - LOCATION MAP

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=2000'	0118A001.A01



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MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

EXHIBIT 3.1 - DRAINAGE AREA MAP

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=250'	0118A001.A01

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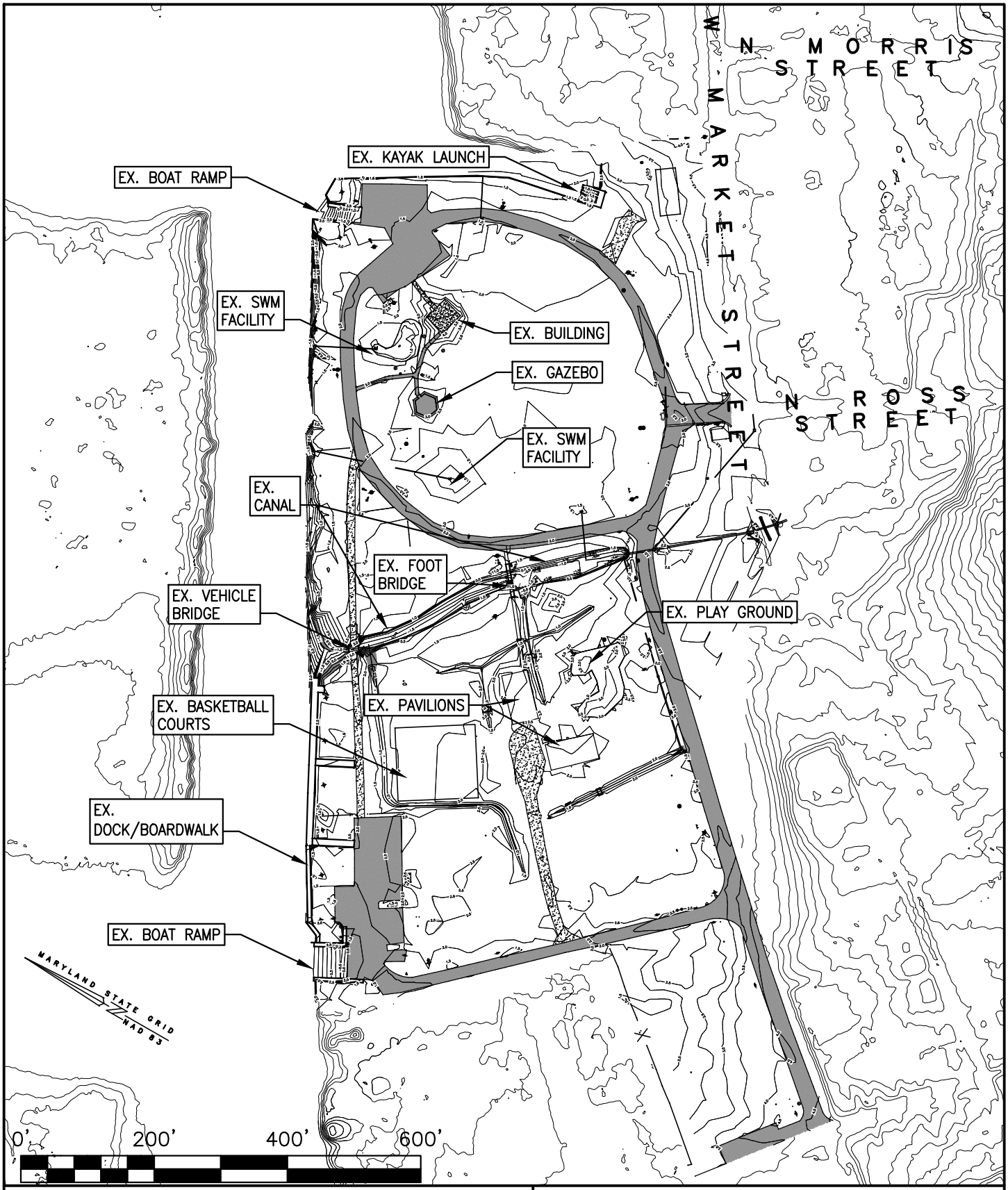

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MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

EXHIBIT 3.2 - EX. FACILITIES

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=200'	0118A001.A01

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B-1
INV: 1.79 10' DEEP BORE
GROUND WATER INV: -3.01

B-2
INV: 1.73 6' DEEP BORE
GROUND WATER INV: -0.27

B-3
INV: 2.01 10' DEEP BORE
GROUND WATER INV: -0.99

WESTERN BOAT RAMP

EASTERN BOAT RAMP

INV: -1.44
8" PVC

INV: -0.21
6" PVC

CATCH BASIN
RIM: 1.03
SUMP: -0.97

INV: -1.28

CATCH BASIN
RIM: 0.76
SUMP: -0.89

CATCH BASIN
RIM: 0.71
SUMP: -1.28

KAYAK AND CANOE LAUNCH

B-12
INV: 2.37 6' DEEP BORE
GROUND WATER INV: -0.63

CATCH BASIN
RIM: 1.34
INV A: -0.06 8" CLAY

INV: -0.46
8" CLAY

B-5
INV: 2.17 6' DEEP BORE
GROUND WATER INV: -2.33

INV: -0.44
12" RCP/CMP

SMH
RIM: 2.50

CATCH BASIN 7
RIM: 1.56
INV A: -0.27 12" METAL

INV: -1.21
24" RCP/CMP

CATCH BASIN 6
RIM: 2.61
INV A: -0.84 24" CMP
INV B: -0.37 24" CMP
INV C: -0.09 8" METAL

(FORMER POULTRY
PROCESSING PLANT)

B-11
INV: 1.81 10' DEEP BORE
GROUND WATER INV: 0.31

B-10
INV: 2.59 10' DEEP BORE
GROUND WATER INV: 0.59

B-4 (APPROX.)
INV: 2.30 10' DEEP
GROUND WATER INV: -1.70

CATCH BASIN 5
RIM: 3.56
INV A: -0.37 24" RCP
INV B: -0.26 24" CMP

INV: -0.44
12" RCP/CMP

CATCH BASIN 8
RIM: 3.25
INV A: 1.59 8" METAL
INV B: 1.62 6" METAL

INV: 0.27
12" CMP

B-8
INV: 2.49 10' DEEP
GROUND WATER INV: -1.51

CATCH BASIN
RIM: 3.69
INV A: -0.01 24" RCP
INV B: -0.10 6" METAL
INV C: -0.31 24" CMP

CATCH BASIN
RIM: 3.75
INV A: 2.13 12" CMP

B-6
INV: 2.21 6' DEEP
GROUND WATER INV: -1.79

B-7
INV: 2.21 4' DEEP
GROUND WATER INV: -0.29

B-9
INV: 4.29 6' DEEP
GROUND WATER INV: 0.29

CYPRESS LANE

DAYTON AVENUE

W MARKET STREET

W MARKET STREET

NAD 83
MARYLAND STATE GRID

LEGEND

- LOW ELEVATION ZONES IDENTIFIED BY TOPOGRAPHIC SURVEY
- PONDING ZONES IDENTIFIED IN THE FIELD
- SATURATED SOIL CONDITIONS
- PROPERTY LINE, RIGHT-OF-WAY LINE OR LOT LINE
- SETBACK LINE
- CENTERLINE OF ROAD
- EASEMENTS
- FENCE
- CONTOUR
- WATER BODY EDGE OF WATER LINE
- STORMDRAIN, MANHOLE, AND INLET
- EXISTING TREE
- ROAD SIGN, MAIL BOX
- UTILITY POLE WITH GUY WIRES

NOTE:
1. FIELD INVESTIGATION TOOK PLACE ON APRIL 22, 2022, 3 DAYS AFTER THE SIGNIFICANT RAIN EVENT(1.24 INCH OF RAINFALL) ON APRIL 19, 2022, AND DURING A SITE VISIT WITH TOWN AND DNR PERSONEL ON JUNE 7, 2022.
2. AREAS IDENTIFIED AS LOW ELEVATION ZONES BY THE TOPOGRAPHY WERE IDENTIFIED AS SOFT GROUND DURING FIELD INVESTIGATION.
3. PONDING DEPTHS WITNESSED VARIED UP TO 6" DEEP IN SOME PLACES.

0 50 100 150

EXISTING PONDING SITE PLAN
1"=50'

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed Professional Engineer under the laws of the State of MD License No.42581, Expiration Date:08-13-22

DAVIS, BOWEN & FRIEDEL, INC.
ARCHITECTS ENGINEERS SURVEYORS
SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

EXISTING PONDING EXHIBIT

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

TOWN OF SNOW HILL
SNOW HILL, WORCESTER COUNTY, MD

Revisions:

Date: MAY 2022
Scale: 1":50'
Dwn.By: NSB
Proj.No.: 0118A001.016
Dwg.No.:

EX 3.3

L:\0118A Snow Hill\0118A001 On-Call\118A001.016 - Byrd Park Flooding Eval\Design\Print Sheet & Exhibits\EXHIBITS.dwg Sep 30, 2022 - 10:51am, (BRAN)

B-1
INV: 1.79 10' DEEP BORE
GROUND WATER INV: -3.01
STATIC WATER INV: 0.29
TRASH ENCOUNTERED
INV: -0.21(3FT)

B-2
INV: 1.73 6' DEEP BORE
GROUND WATER INV: -0.27
TRASH ENCOUNTERED
INV: -0.27(1FT)
WOOD DEBRIS
INV: -1.27(2FT)

B-3
INV: 2.01 10' DEEP BORE
GROUND WATER INV: -0.99
STATIC WATER INV: -0.37
NO TRASH ENCOUNTERED
TRACE CLAY 1.73 TO -2.27 (4FT)

B-12
INV: 2.37 6' DEEP BORE
GROUND WATER INV: -0.63
POSSIBLE CLAY LAYER AT
INV: 0.37 TO -0.63 (1FT)
NO TRASH ENCOUNTERED

B-11
INV: 1.81 10' DEEP BORE
GROUND WATER INV: 0.31
STATIC WATER INV: 0.71
TRACE GRAVEL FILL AND CLAY ENCOUNTERED
IMMEDIATELY 1.81 TO 0.31 (1.5FT)
TRACE CLAY, GRAVEL, ORGANIC SILT/TRASH FILL
AT INV: 0.31 TO -1.69 (2FT)
TRACE CLAY, GRAVEL, ORGANIC SILT/TRASH, AND
GLASS DEBRIS AT INV: -1.69 TO -3.19 (1.5FT)

(FORMER POULTRY
PROCESSING PLANT)

B-10
INV: 2.59 10' DEEP BORE
GROUND WATER INV: 0.59
TRACE GRAVEL FILL ENCOUNTERED IMMEDIATELY
2.59 TO -1.41 (4FT)
TRACE DEBRIS, GLASS, WOOD FILL AT INV:
-1.41 (1FT)
MOSTLY SAND W/ TRACE WOOD DEBRIS
POSSIBLE CLAY LAYER AT INV: -2.83

B-8
INV: 2.49 10' DEEP
GROUND WATER INV: -1.51
STATIC WATER INV: -0.66
LITTLE SILT FILL ENCOUNTERED
INV: 2.49 TO -1.51 (4FT)
TRACE WOOD DEBRIS ENCOUNTERED
INV: -1.51 TO -2.51 (1FT)
CONSTRUCTION DEBRIS(WOOD) ENCOUNTERED
INV: -2.51 TO -3.51 (1FT)
GROUNDWATER CONTAMINANT FOUND, 1
COMPONENT ABOVE REPORTING LIMIT

B-6
INV: 2.21 6' DEEP
GROUND WATER INV: -1.79
TRACE TO LITTLE FILL
INV: 0.21 TO -0.79 (1FT)
TRACE TRASH FILL
INV: -0.79 TO -3.79 (3FT)

B-7
INV: 2.21 4' DEEP
GROUND WATER INV: -0.29
CRUSHED ASPHALT AND SILT ORGANIC/TRASH
FILL ENCOUNTERED IMMEDIATELY AND STAYED
FOR DURATION OF BORE (4FT)

B-4 (APPROX.)
INV: 2.30 10' DEEP
GROUND WATER INV: -1.70
STATIC WATER INV: 0.90
NO TRASH ENCOUNTERED
TRACE TO LITTLE AMOUNTS OF CLAY
2.30 TO -5.70 (8FT)
GROUNDWATER CONTAMINANTS FOUND, 5
COMPONENTS ABOVE REPORTING LIMIT

B-5
INV: 2.17 6' DEEP BORE
GROUND WATER INV: -2.33
NO TRASH ENCOUNTERED
MOSTLY SAND W/ TRACE WOOD
DEBRIS INV: -1.83 (0.5FT)
POSSIBLE CLAY LAYER AT INV:
-2.83

B-9
INV: 4.29 6' DEEP
GROUND WATER INV: 0.29
NO TRASH ENCOUNTERED
MOSTLY SAND, SILT, TRACE GRAVEL

CYPRESS LANE

DAYTON AVENUE

W. MARKET STREET

W. MARKET STREET

NAD 83 MARYLAND STATE GRID

LEGEND

- PROPERTY LINE, RIGHT-OF-WAY LINE OR LOT LINE
- SETBACK LINE
- CENTERLINE OF ROAD
- EASEMENTS
- FENCE
- CONTOUR
- WATER BODY EDGE OF WATER LINE
- STORMDRAIN, MANHOLE, AND INLET
- APPROX. TRASH ZONE
- ROAD SIGN, MAIL BOX
- UTILITY POLE WITH GUY WIRES
- EXISTING TREE

NOTE:
1. TRASH ZONE DEPICTED IS A ROUGH ESTIMATE BASED ON SOIL BORING FINDINGS. EXACT TRASH BOUNDARY LIMITS ARE NOT KNOWN.

0 50 100 150

EXISTING TRASH ZONES SITE PLAN
1"=50'

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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed Professional Engineer under the laws of the State of MD License No.42581, Expiration Date:08-13-22.

DAVIS, BOWEN & FRIEDEL, INC.
ARCHITECTS ENGINEERS SURVEYORS
SALISBURY, MARYLAND (410) 543-9091
BALTIMORE, MARYLAND (410) 837-3701
EASTON, MARYLAND (410) 770-4744

SUBGRADE EXPLORATION EXHIBIT

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

TOWN OF SNOW HILL
SNOW HILL, WORCESTER COUNTY, MD

Revisions:

Date:	MAY 2022
Scale:	1":50'
Dwn.By:	NSB
Proj.No.:	0118A001.016
Dwg.No.:	EX 3.4

IMAGE 1: AERIAL IMAGERY OF PARK IN JANUARY 2022

IMAGE 2: AERIAL IMAGERY OF PARK IN JANUARY 2022

DAVIS, BOWEN & FRIEDEL, INC. ARCHITECTS ENGINEERS SURVEYORS

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MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

EXHIBIT 4.1 - AERIAL IMAGERY

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	NOT TO SCALE	0118A001.A01

IMAGE 3: DOCUMENTED PONDING/FLOODING IN JANUARY 2022

IMAGE 4: DOCUMENTED PONDING/FLOODING IN JANUARY 2022

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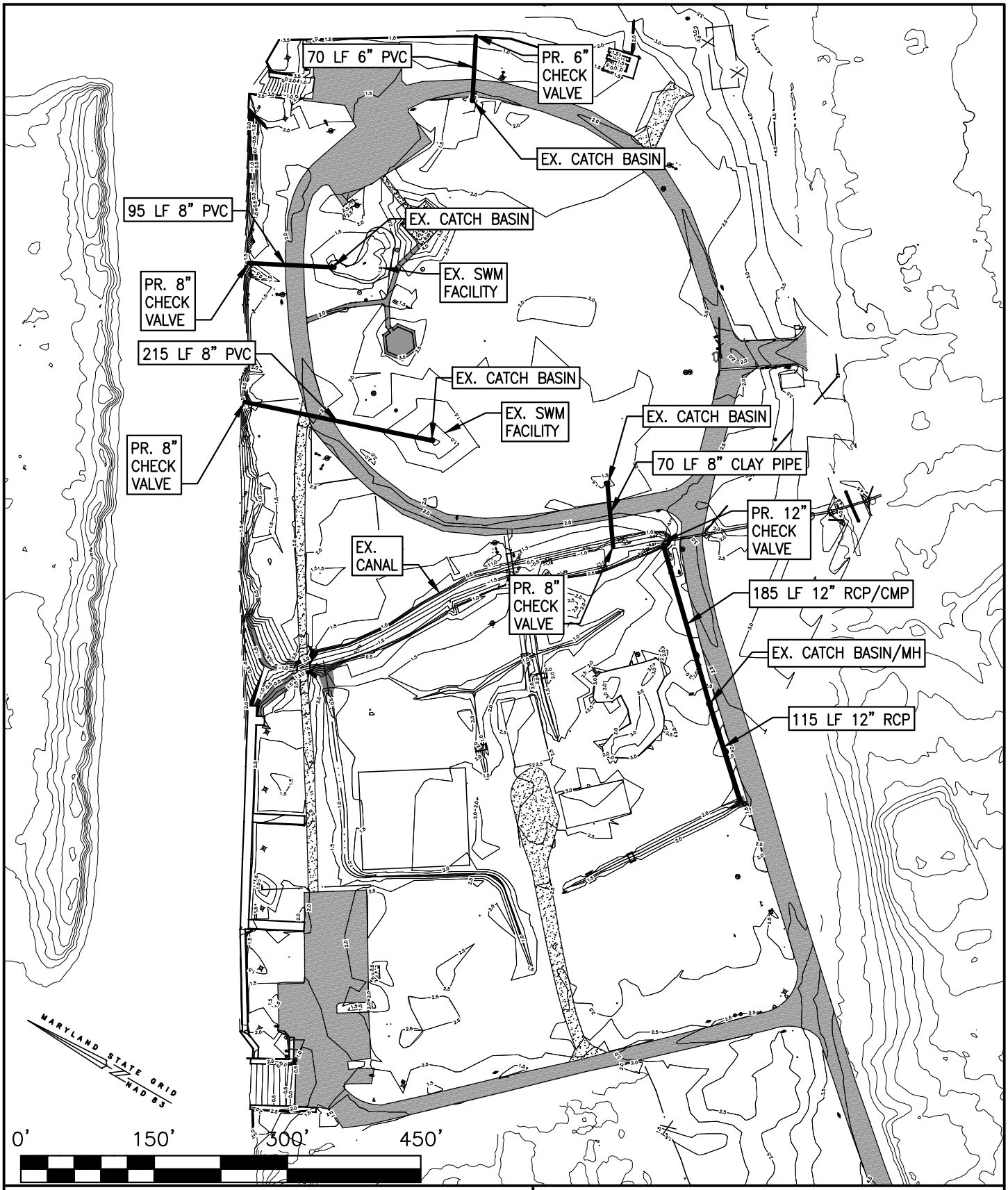
SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

EXHIBIT 4.2 - FLOODING PHOTOS

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	NOT TO SCALE	0118A001.A01



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EASTON, MARYLAND (410) 770-4744

EXHIBIT 5.1 - ALT #1

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=150'	0118A001.A01

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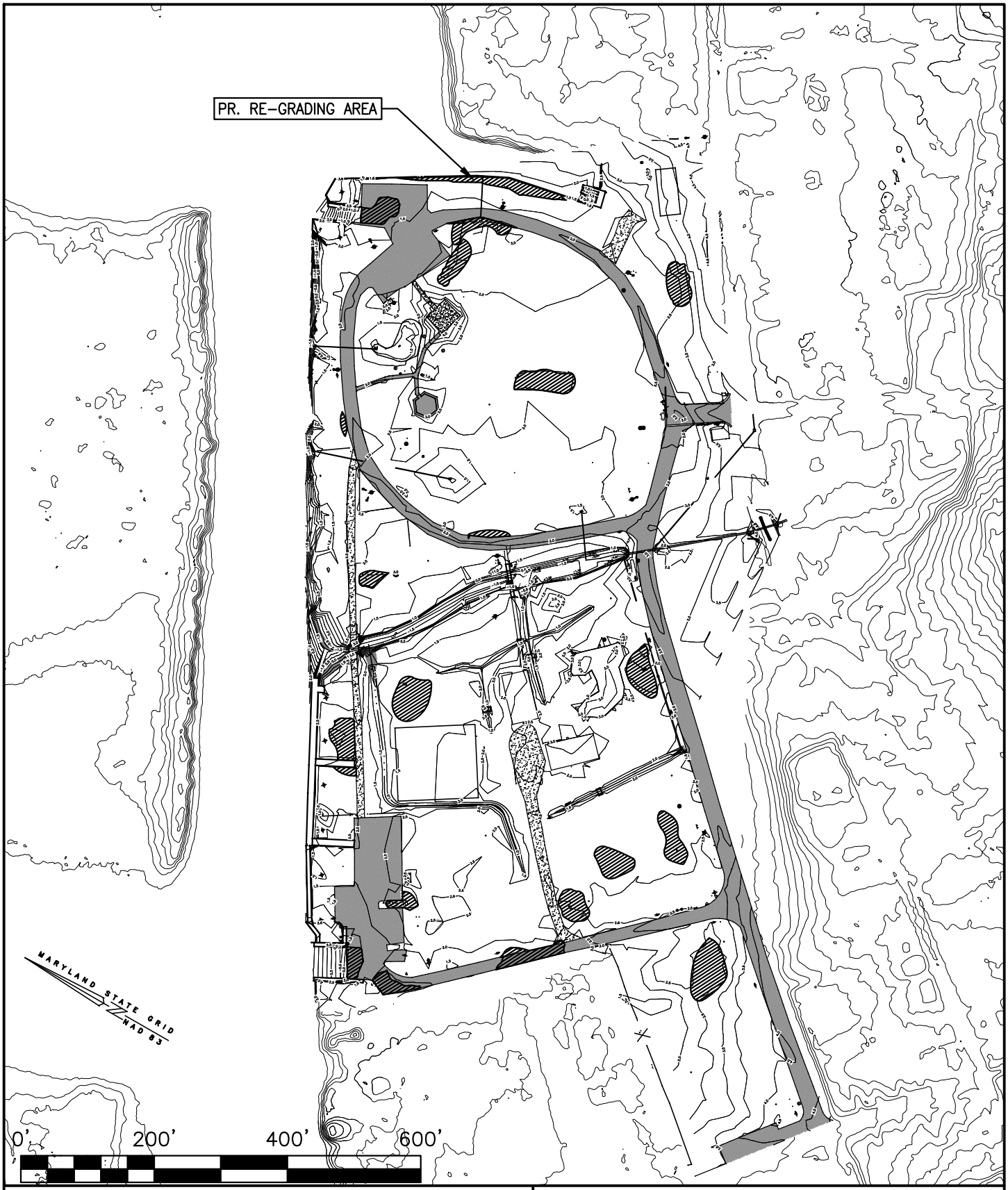

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SALISBURY, MARYLAND (410) 543-9091
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EXHIBIT 5.2 - ALT #2

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=200'	0118A001.A01

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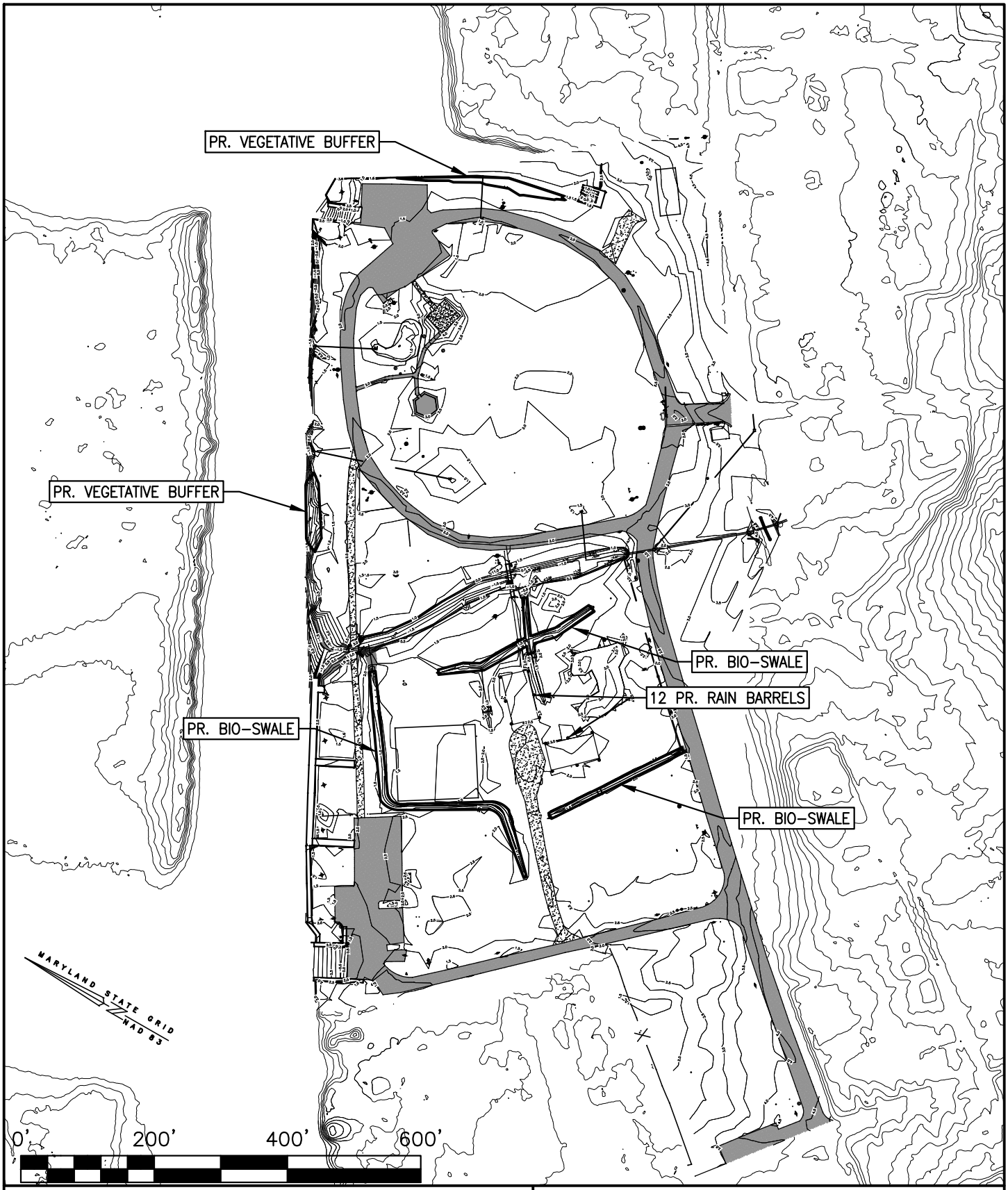

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EASTON, MARYLAND (410) 770-4744

EXHIBIT 5.3 - ALT #3

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=200'	0118A001.A01

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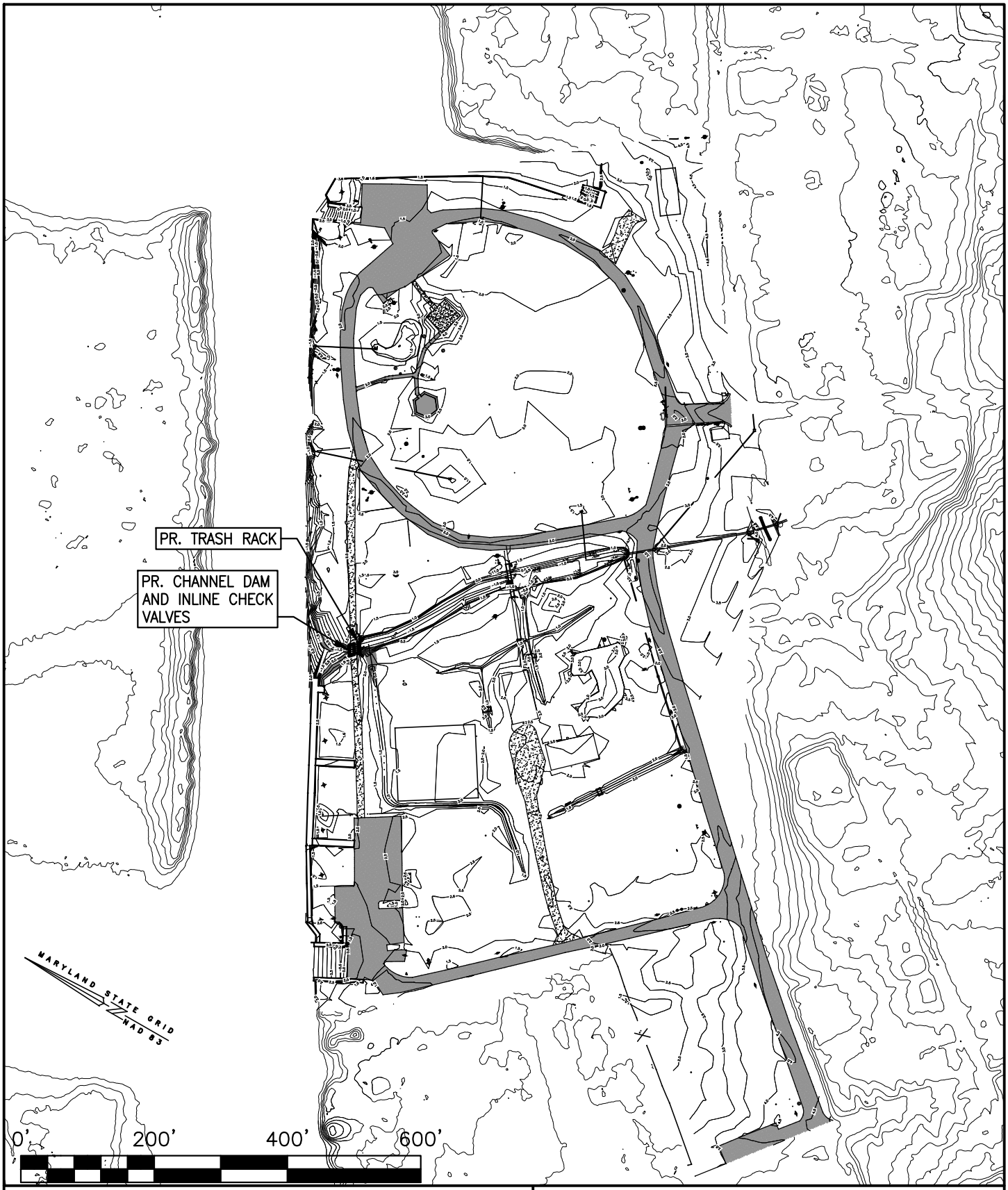

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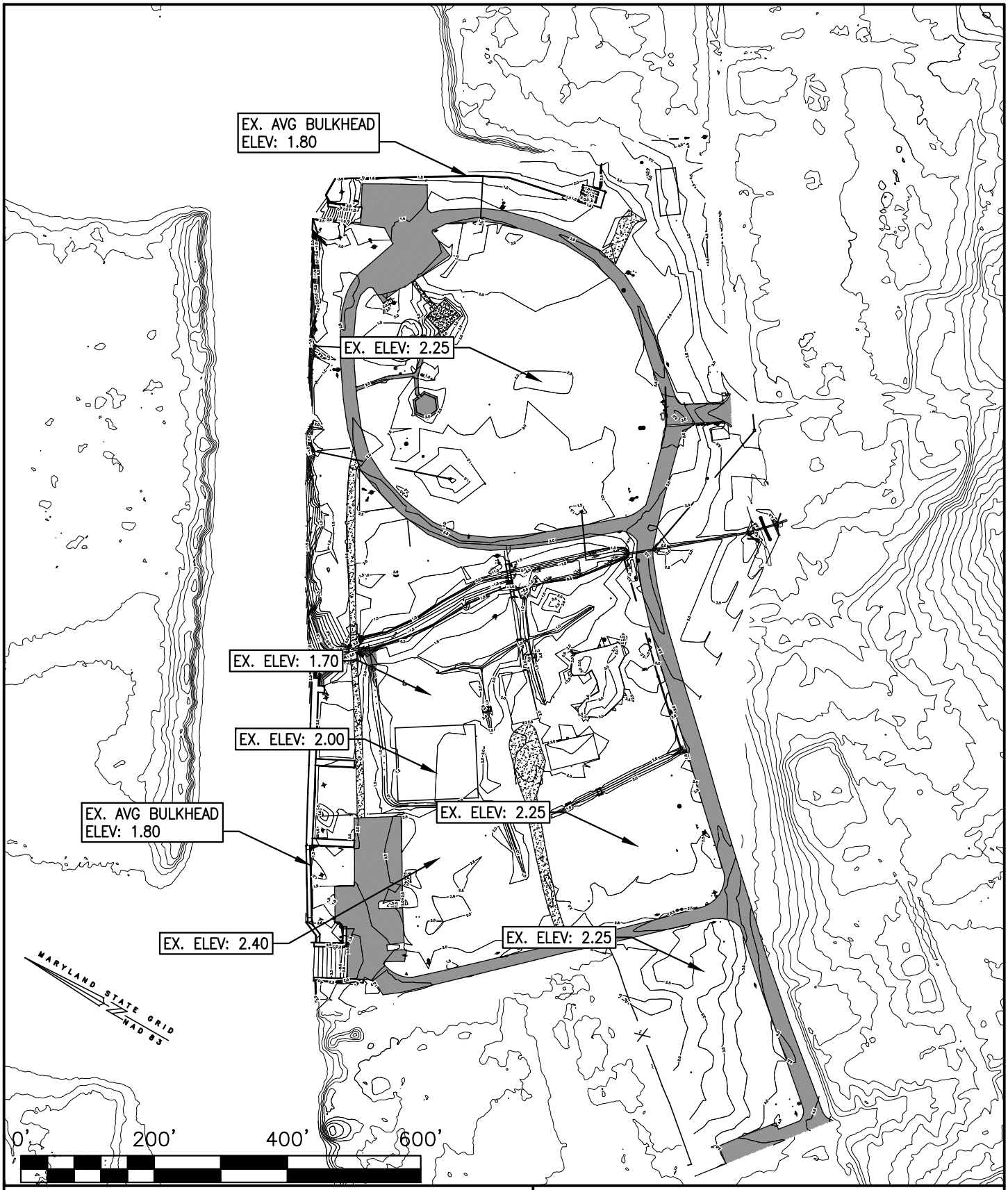
EXHIBIT 5.4 - ALT #4

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=200'	0118A001.A01



DAVIS, BOWEN & FRIEDEL, INC. ARCHITECTS ENGINEERS SURVEYORS

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MILFORD, DELAWARE (302) 424-1441
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EXHIBIT 5.5 - ALT #5

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=200'	0118A001.A01

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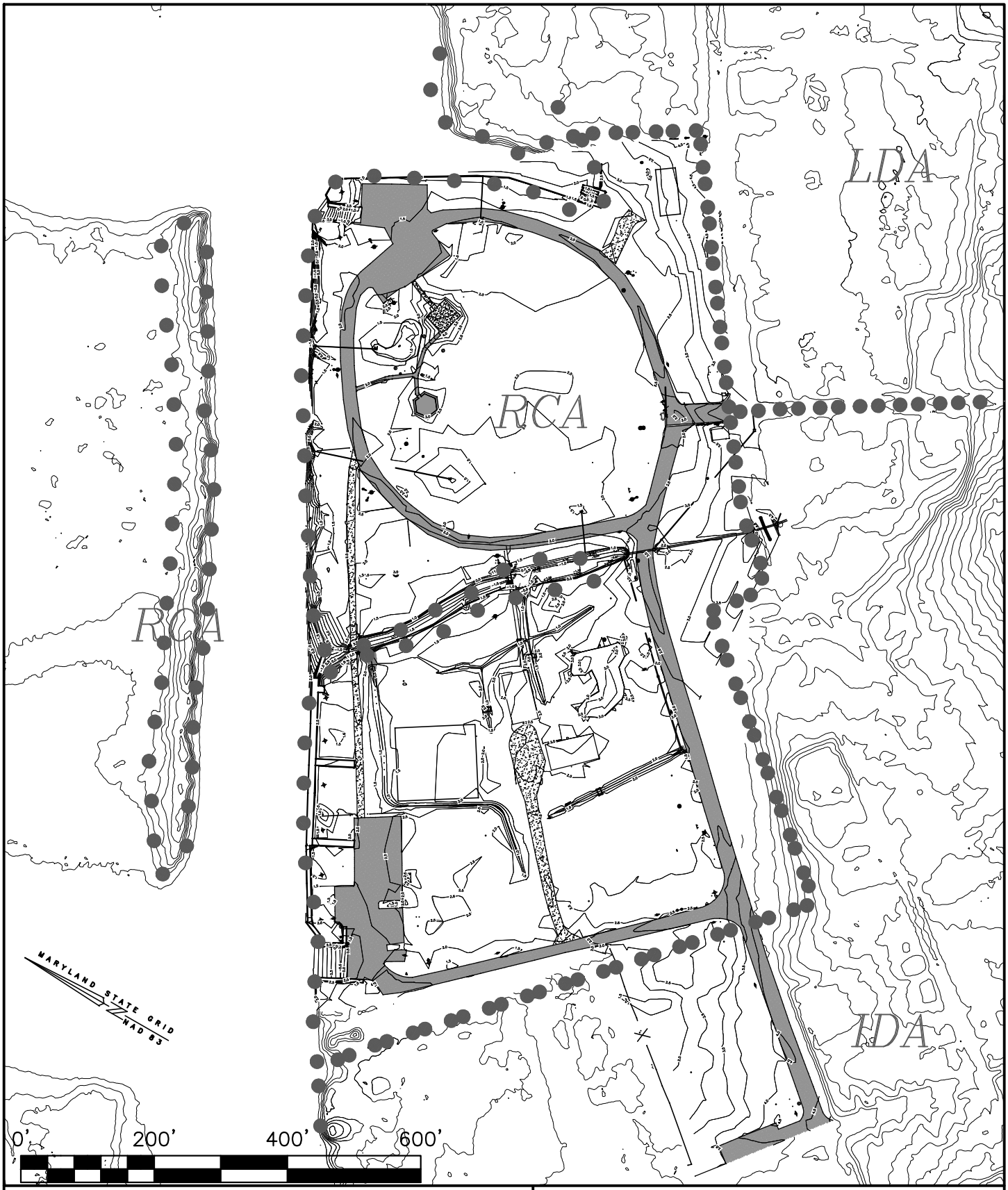
APPENDIX B – ENVIRONMENTAL MAPPING



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EASTON, MARYLAND (410) 770-4744

APPENDIX B-CRITICAL AREA MAP

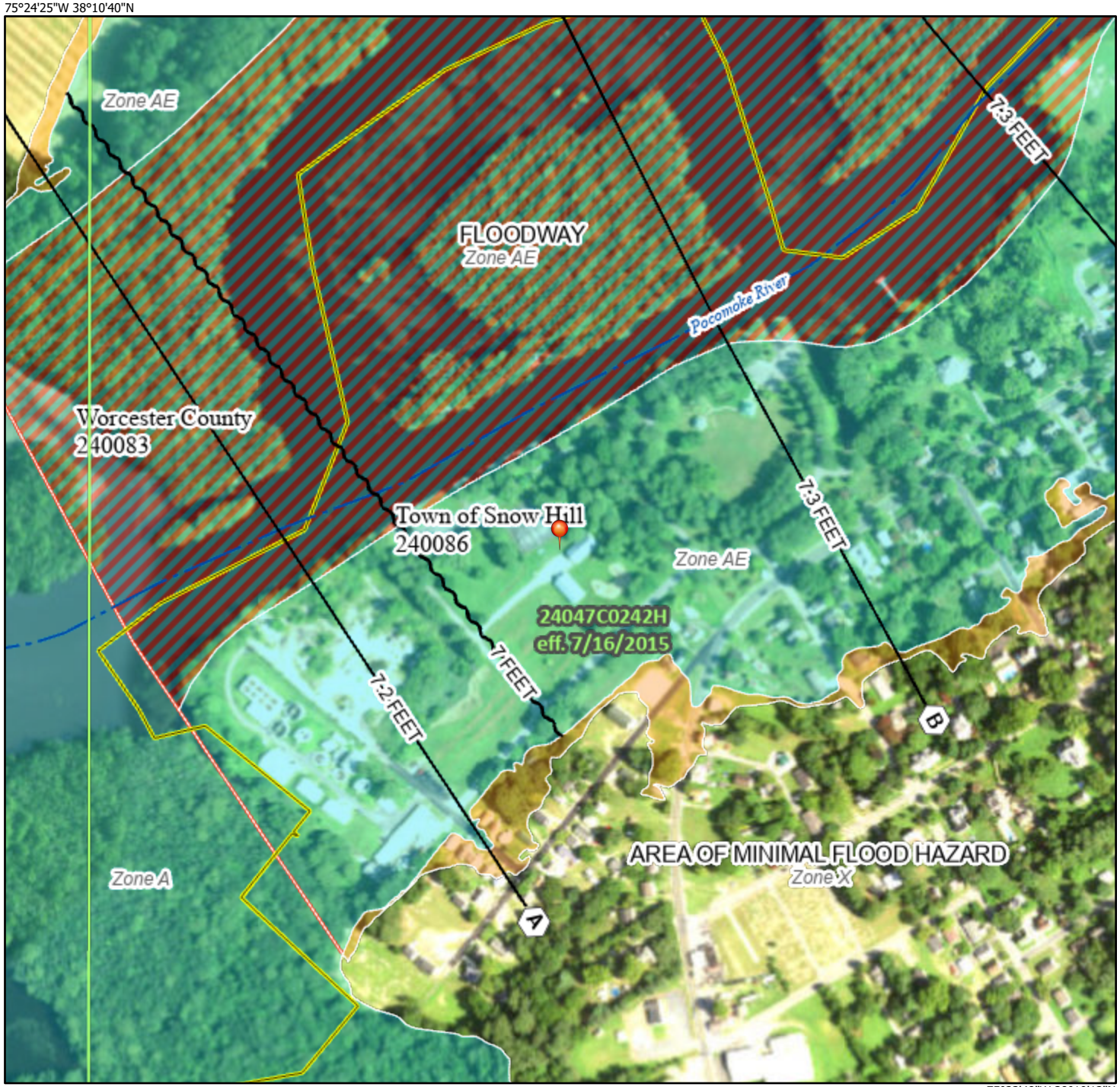
BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=200'	0118A001.A01

National Flood Hazard Layer FIRMette

FEMA

75°24'25"W 38°10'40"N



75°23'48"W 38°10'12"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

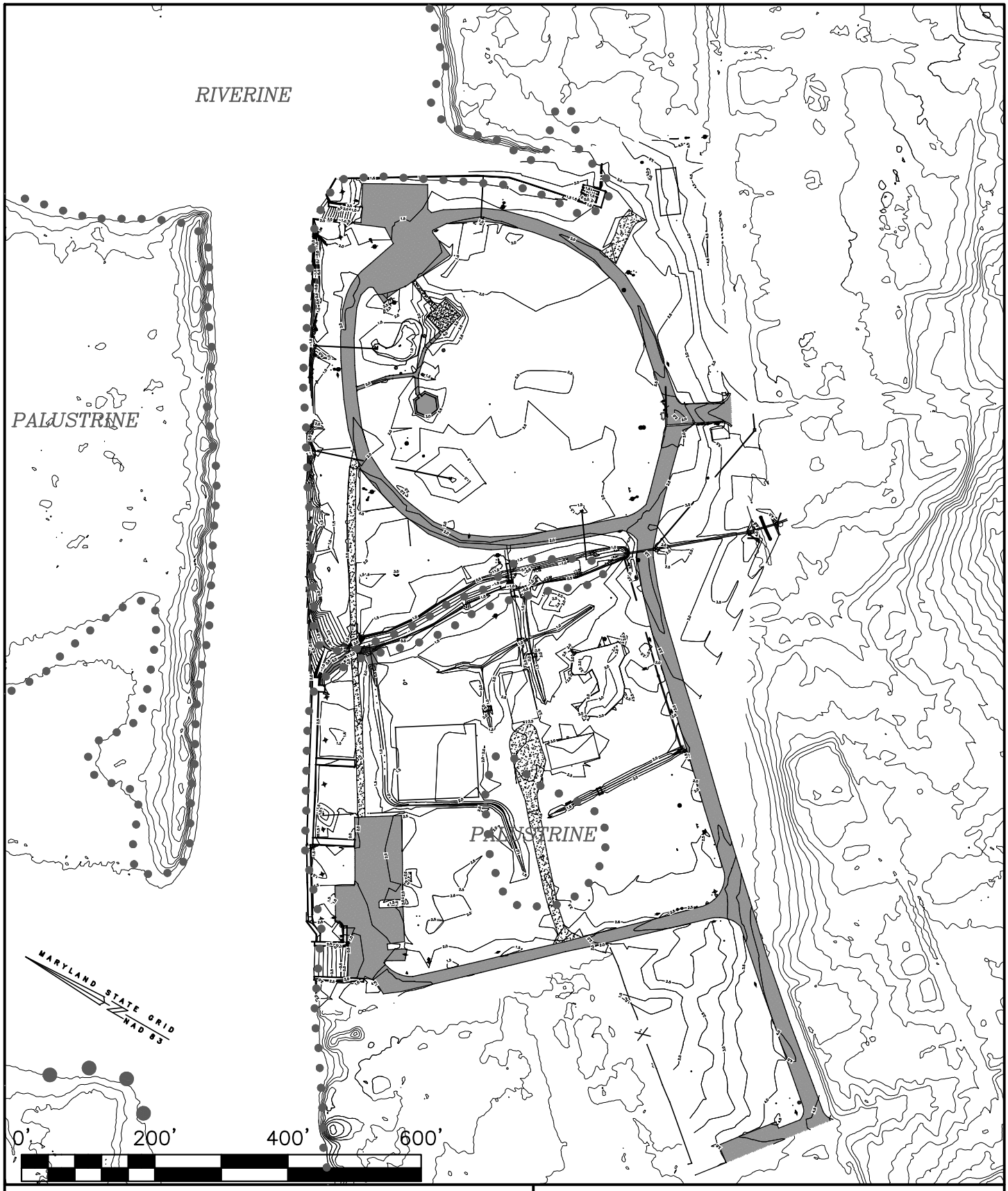
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/8/2022 at 9:07 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



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DAVIS, BOWEN & FRIEDEL, INC. ARCHITECTS ENGINEERS SURVEYORS

SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

APPENDIX B-WETLAND MAPPING

BYRD PARK FLOODING, STORMWATER, AND SUBSIDENCE ASSESSMENT

Date:	Scale:	Proj.No.:
SEPT 2022	1"=200'	0118A001.A01

APPENDIX C – PRELIMINARY PROJECT COST ESTIMATES

Byrd Park Flooding Stormwater, and Subsidence Assessment
Budgetary Cost Estimate (Alternative #1)
DBF# 0118A001.016
September 2022

Maintenance of Existing Stormwater Management Facilities and Installation of Check Valves.

Item	Units	Quantity	Unit Price	Totals
Ex. Inlet Structures and Stormdrain Cleaning	LF	700	$15.00	$10,500.00
Furnish and Install Proposed Check Valves	EA	5	$500.00	$2,500.00
			Mobilization @ 5%	$650.00
			Construction Sub-Total	$13,650.00
			Contingency @ 10%	$1,365.00
			Surveying, Engineering & Permitting @ 10%	$1,365.00
			Construction Admin. & Inspection @ 10%	$1,365.00
			TOTAL	**$17,745.00**

Byrd Park Flooding Stormwater, and Subsidence Assessment
Budgetary Cost Estimate (Alternative #2)
DBF# 0118A001.016
September 2022

Re-grading Low Areas

Item	Units	Quantity	Unit Price	Totals
Pavement Overlay Operations	SY	600	$30.00	$18,000.00
Re-Grading Low-Lying Areas	SY	3200	$5.00	$16,000.00
			Mobilization @ 5%	$900.00
			Construction Sub-Total	$34,900.00
			Contingency @ 10%	$3,490.00
			Surveying, Engineering & Permitting @ 10%	$3,490.00
			Construction Admin. & Inspection @ 10%	$3,490.00
			TOTAL	**$45,370.00**

Byrd Park Flooding Stormwater, and Subsidence Assessment
Budgetary Cost Estimate (Alternative #3)
DBF# 0118A001.016
September 2022

Construction of Stormwater Features (Bioswales, Vegetative Buffers, and Rain Barrels)

Item	Units	Quantity	Unit Price	Totals
Vegetative Swales	LF	1300	$12.00	$15,600.00
Rain Barrels	EA	12	$500.00	$6,000.00
Vegetative Buffers	SY	300	$15.00	$4,500.00
			Mobilization @ 5%	$1,305.00
			Construction Sub-Total	$27,405.00
			Contingency @ 10%	$2,740.50
			Surveying, Engineering & Permitting @ 10%	$2,740.50
			Construction Admin. & Inspection @ 10%	$2,740.50
			TOTAL	**$35,626.50**

Byrd Park Flooding Stormwater, and Subsidence Assessment
Budgetary Cost Estimate (Alternative #4)
DBF# 0118A001.016
September 2022

Channel Dam & Inline Check Valves

Item	Units	Quantity	Unit Price	Totals
Check Dam Structure & Trash Rack	LS	1	$125,000.00	$125,000.00
			Mobilization @ 5%	$6,250.00
			Construction Sub-Total	$131,250.00
			Contingency & Legal @ 10%	$13,125.00
			Surveying, Engineering & Permitting @ 10%	$13,125.00
			Construction Admin. & Inspection @ 10%	$13,125.00
			TOTAL	**$170,625.00**

Byrd Park Flooding Stormwater, and Subsidence Assessment
Budgetary Cost Estimate (Alternative #5)
DBF# 0118A001.016
September 2022

Elevate Bulkheads & Raise Elevatios Within the Park

Item	Units	Quantity	Unit Price	Totals
Raising Bulkhead	LF	700	$1,250.00	$875,000.00
Raising Park Elevations	LS	1	$1,500,000.00	$1,500,000.00
			Mobilization @ 5%	$43,750.00
			Construction Sub-Total	$2,418,750.00
			Contingency & Legal @ 10%	$241,875.00
			Surveying, Engineering & Permitting @ 10%	$241,875.00
			Construction Admin. & Inspection @ 10%	$241,875.00
			Bond Closing	$7,500.00
			TOTAL	**$3,151,875.00**

APPENDIX D –MDE BROWNFIELDS FACT SHEET

Department of the Environment

Facts About...

Byrd Park (Brownfields Site)

Site Location

Byrd Park is located along the Pocomoke River in the northwestern corner of Snow Hill,Worcester County, Maryland . The Park is 15-acres in size and lies approximately five feet above the Pocomoke River. Surface features include two playgrounds, one basketball court, a boat ramp, fishing and picnic areas, flat open grasslands, two open-air pavilions, and two small buildings for concessions and restrooms. Residential neighborhoods to the east and south, industrial properties to the west, and the Pocomoke River to the north surround Byrd Park.

Site History

Prior to the 1930s Byrd Park was part of the Pocomoke River marshland. In the 1930s, sediments derived from channel maintenance of the Pocomoke River were placed in this area as fill creating the land that became the Park.

According to representatives of the Town of Snow Hill, dumping and burning allegedly occurred within the footprint of Byrd Park from the 1920s into the 1940s. However, these representatives did not know the nature and extent of the materials that were allegedly disposed there. There is no State or regulatory file history regarding this alleged former dump.

Environmental Investigations and Actions

Based on a request from the Town of Snow Hill, the Maryland Department of the Environment (MDE) personnel toured the Park on April 1, 2004. A Phase I Brownfields report was completed on July 11, 2004. Although evidence of the dump/burn area was not identified, MDE recommended sampling to further investigate the alleged disposal area to justify the ongoing recreational use of the property. On July 6, 2004 MDE collected soil and groundwater samples at the Park. The results were presented in the Phase II Brownfields report completed on May 17, 2005. Analytical results from the soil and groundwater samples confirmed evidence of past disposal practices at the location. The results revealed the presence of some semi-volatile organic compounds, all below Maryland State concentration standards.

Current Status

Results from the analytical assessment support the continued use of Byrd Park for recreational activities.

Planned or Potential Future Action

There are no planned future remedial actions for this site.

Facility Contacts

Kim Lemaster	Maryland Department of the Environment Federal Superfund Division	410-537-3440

Last Update: November 21, 2006

APPENDIX E – GEOTECHNICAL REPORT

JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

March 31, 2022

Joshua Taylor
Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Salisbury, Maryland 21804

Re: Report of Limited Subsurface Evaluation and
Geotechnical Consulting Services
Byrd Park Project
Snow Hill, Maryland
Project No.: JDH-10/22/122

Dear Mr. Taylor:

John D. Hynes & Associates, Inc. has completed the limited subsurface exploration and geotechnical consulting services at the above referenced property located on Ball Park Road in Snow Hill, Maryland. The services were performed in general accordance with our contract dated December 15, 2020. We understand that the purpose of the work was to identify shallow soil types, identify the presence of landfill debris, observe the location of groundwater, and to evaluate groundwater quality at the site.

Hynes & Associates drilled 12 soil borings and collected soil samples for logging the soil profiles. In addition, Hynes & Associates installed six temporary monitoring wells and collected six groundwater samples for laboratory testing.

Hynes & Associates appreciates the opportunity to be of service to you. If you have any questions regarding this report or if we may be of further assistance, please contact our office.

Respectfully,
JOHN D. HYNES & ASSOCIATES, INC.

Richard D. Rhoads
Project Geologist

Kelly Childs
FOR: John D. Hynes
President

RDR: JDH/kc

32185 Beaver Run Drive • Salisbury, Maryland 21804 • 410-546-6462 • Fax 410-548-5346
Email: jdh@jdhynesinc.com

REPORT OF
LIMITED SUBSURFACE EVALUATION
AND
GEOTECHNICAL CONSULTING SERVICES

BYRD PARK PROJECT
SNOW HILL, MARYLAND

PREPARED FOR
DAVIS, BOWEN & FRIEDEL, INC.

MARCH 31, 2022
PROJECT NO.: JDH-10/22/122

32185 Beaver Run Drive • Salisbury, Maryland 21804 • 410-546-6462 • Fax 410-548-5346
Email: jdh@jdhynesinc.com

HYNES

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GROUNDWATER SAMPLING AND TESTING 2
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PURPOSE AND SCOPE

The subsurface exploration study was performed to evaluate the subsurface conditions with respect to the following:

1. Soil and groundwater conditions at the boring locations selected by Davis, Bowen & Friedel, Inc.;
2. Evaluate for the presence of buried fill associated with a historic landfill at the project site; and
3. Test groundwater for the presence of semi-volatile organics (SVOC) at 6 locations.

The boring logs present the estimated (visual) soil classifications in accordance with the USCS soil classification system. Refer to the boring log sheets in the Appendix for the subsurface conditions at each boring location.

EXISTING SITE CONDITIONS

As shown on the Project Location Map (Drawing JDH-10/22/122-A) in the Appendix, the project is located on the north side of Ball Park Drive in Snow Hill, Maryland. At the time of our exploration work, the majority of the project site was in a grass covered recreational park. The project is located in a predominantly residential area. Topographically, the project site is relatively flat, but slopes gently down to the adjoining Pocomoke River to the northwest.

PROJECT CHARACTERISTICS

The proposed project involves a flood evaluation of the existing park. The work completed by Hynes & Associates was one of the components of the flood evaluation.

FIELD EXPLORATION AND STUDY

In order to determine the nature of the subsurface conditions at the site, 12 test borings designated as B-1 through B-12, were drilled at the approximate locations shown on our Boring Location Plan (Drawing No.: JDH-10/22/122-B) in the Appendix. The borings were drilled to depths of 5 to 10 feet below existing grade using a hand auger (shallow borings) and a track-mounted 7822 Geoprobe drill rig. Temporary monitoring pipes were constructed at 6 boring locations to facilitate the collection of water quality samples.

A brief description of our field procedures is included in the Appendix. The results of all boring and sampling operations are shown on the boring logs.

Samples of the subsurface soils were examined by our engineering staff and were visually classified in accordance with the Unified Soil Classification System (USCS). The estimated USCS descriptions and symbols appear on the description column of the boring logs, and a key to the system's nomenclature is provided in the Appendix of this report. Also included are reference sheets which define the USCS terms and symbols used on the boring logs.

We note that the test boring records represent our interpretation of the field data based on visual examination. Indicated interfaces between materials may be gradual.

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SUBSURFACE CONDITIONS

Referring to the boring logs, at the ground surface we encountered between 6 to 12 inches of organic bearing soil at the boring locations. Approximately 36 inches of organic soil was encountered at location B-5. Other thicknesses of organic bearing soils, or other materials may be encountered at other locations on site.

Below the organic bearing soil horizon, the soils layers were visually classified in accordance with the USCS classification system. We encountered layers of SAND (SP), low silt SAND (SP-SM), Silty SAND (SM), SAND and SILT (SM-ML), Clayey SILT (ML), organic SILT (OL), and PEAT (Pt) in the test borings. Where encountered, the PEAT was typically observed at the bottom of the soil borings.

We, also, encountered 3 to 6 feet of fill material at 7 of the boring locations (B-1, B-2, B-6, B-7, B-8, B-10, and B-11). The fill included up to 5 ft. of soil overlying 1 to 4 feet thick layers of household trash (glass and plastic) and construction debris (rock, brick and concrete). The boring locations where fill was encountered may be within the former landfill that was previously located at the project site. Refer to the Boring Location sketch: Drawing JDH-10/22/122-B in the Appendix.

Groundwater was encountered at depths ranging from approximately 1.5 to 4.8 feet during drilling operations. Groundwater elevations may vary at other times during the year depending upon the amount of local precipitation and the extent of local surface development. Groundwater levels will change in response to tidal fluctuations.

GROUNDWATER SAMPLING AND TESTING

To evaluate groundwater, Hynes & Associates installed temporary monitoring wells at 6 boring locations to facilitate the collection of groundwater samples. In accordance with our discussions with the Worcester County Health Department, well permits were not required for the temporary wells. The wells were installed to depths of approximately 6 feet. The temporary monitoring pipes were constructed using 1-inch diameter PVC screen (5 feet) and solid casing. Well locations were selected by Davis, Bowen & Friedel, Inc. The temporary wells were installed at boring locations B-1, B-3, B-4, B-8, B-10 and B-11. See the *Boring Location Sketch: Drawing JDH-10/22/122-B* in the Appendix for the approximate locations of the temporary monitoring wells.

One groundwater sample was collected from each temporary well. The water samples were designated B-1, B-3, B-4, B-8, B-10 and B-11. The water samples were collected using low flow sampling techniques. Prior to collecting the water samples, approximately 10 well volumes (0.5 gallons) of water was purged from each well. The purge water was discharged to the ground surface. The 6 water samples were tested for semi-volatile organic compounds (SVOCs) using EPA Method 8270 at the Phase Separation Science laboratory. After collecting the water sample, the temporary wells were abandoned in accordance with State of Maryland requirements.

Results of the testing indicated that 12 chemical compounds were detected in sample B-4 and one chemical compound was detected in sample B-8. SVOC chemical compounds were not detected in the other 4 water samples that were tested. A summary of the laboratory test results is presented in the *Laboratory Data – Groundwater* Table included in the Appendix.

Of the 13 different chemical compounds that were detected in the 2 water samples, 5 compounds detected in sample B-4 are higher than Maryland Department of the Environment (MDE) Cleanup Guidelines for potable water. The 5 compounds were Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)flouranthene, Bibenz(a,h)anthracene and Indeno(1,2,3-c,d) Pyrene. None of the other compounds identified in the water samples were higher than the MDE

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Guidelines for potable water. Laboratory results and corresponding MDE Guidelines are summarized in the Table in the Appendix. The laboratory report of analysis is, also, included in the Appendix.

We note that MDE publishes Cleanup Guidelines for potable (drinking water) groundwater. The shallow groundwater at the site is not used for drinking water. Clean-up guidelines for non-potable groundwater are not published by MDE. It is the opinion of Hynes & Associates that the laboratory results be forwarded to MDE for review.

REMARKS

This report has been prepared solely and exclusively for Davis, Bowen & Friedel, Inc. to provide guidance to design professionals for the Byrd Park project located in Snow Hill, Maryland. It has not been developed to meet the needs of others, and application of this report for other than its intended purpose could result in substantial difficulties. The Consulting Engineer cannot be held accountable for any problems which occur due to the application of this report to other than its intended purpose. This report in its entirety should be attached to the project specifications.

These analyses are, of necessity, based on the concepts made available to us at the time of the writing of this report, and on-site conditions, surface and subsurface that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the areal extent of the site and to depth, are representative of conditions across the site.

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted engineering principles and practices.

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Email: jdh@jdhynesinc.com

APPENDIX

1. Investigative Procedures
2. Project Location Map
3. Boring Location Plan
4. Boring Logs
5. Laboratory Data-Groundwater Table
6. Laboratory Report of Analysis
7. Unified Soil Classification Sheet
8. Field Classification Sheet
9. Important Information Sheet

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HYNES

INVESTIGATIVE PROCEDURES

HAND AUGER SOIL TEST BORINGS

Test borings were conducted using a hand auger. The auger is manually advanced by rotating the shaft of the auger. The auger is withdrawn at short intervals for inspection of soils collected in the auger head. Soil samples are taken when soil conditions are noted to change. The soil descriptions for each boring are presented on the boring logs in the Appendix.

SOIL TEST BORINGS

Soil drilling and sampling operations were performed in accordance with ASTM Specification D-1586. The borings were advanced by mechanically turning continuous hollow stem auger flights into the ground. At regular intervals, samples were obtained with a standard 1.4 inch I.D., 2.0 inch O.D. splitspoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is the "Standard Penetration Resistance". The penetration resistance, when properly evaluated, is an index to the soil's strength, density and behavior under applied loads. The soil descriptions and penetration resistances for each boring are presented on the Test Boring Records in the Appendix.

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our investigation, jar samples obtained during drilling operations are examined in our laboratory and visually classified by the geotechnical engineer in accordance with ASTM Specification D-2488. The soils are classified according to the USDA or Unified Classification System (ASTM D-2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior.

SIEVE ANALYSIS TEST

Gradational analysis tests were performed to determine the particle size and distribution of the samples tested. The grain size distribution of soils coarser than a No. 200 sieve is determined by passing the sample through a standard set of nested sieves. The percentage of materials passing the No. 200 sieve is determined by washing the material over a No. 200 sieve. These tests are in accordance with ASTM D-421, D-422 and D-1140. The results are presented in the Appendix to our report.

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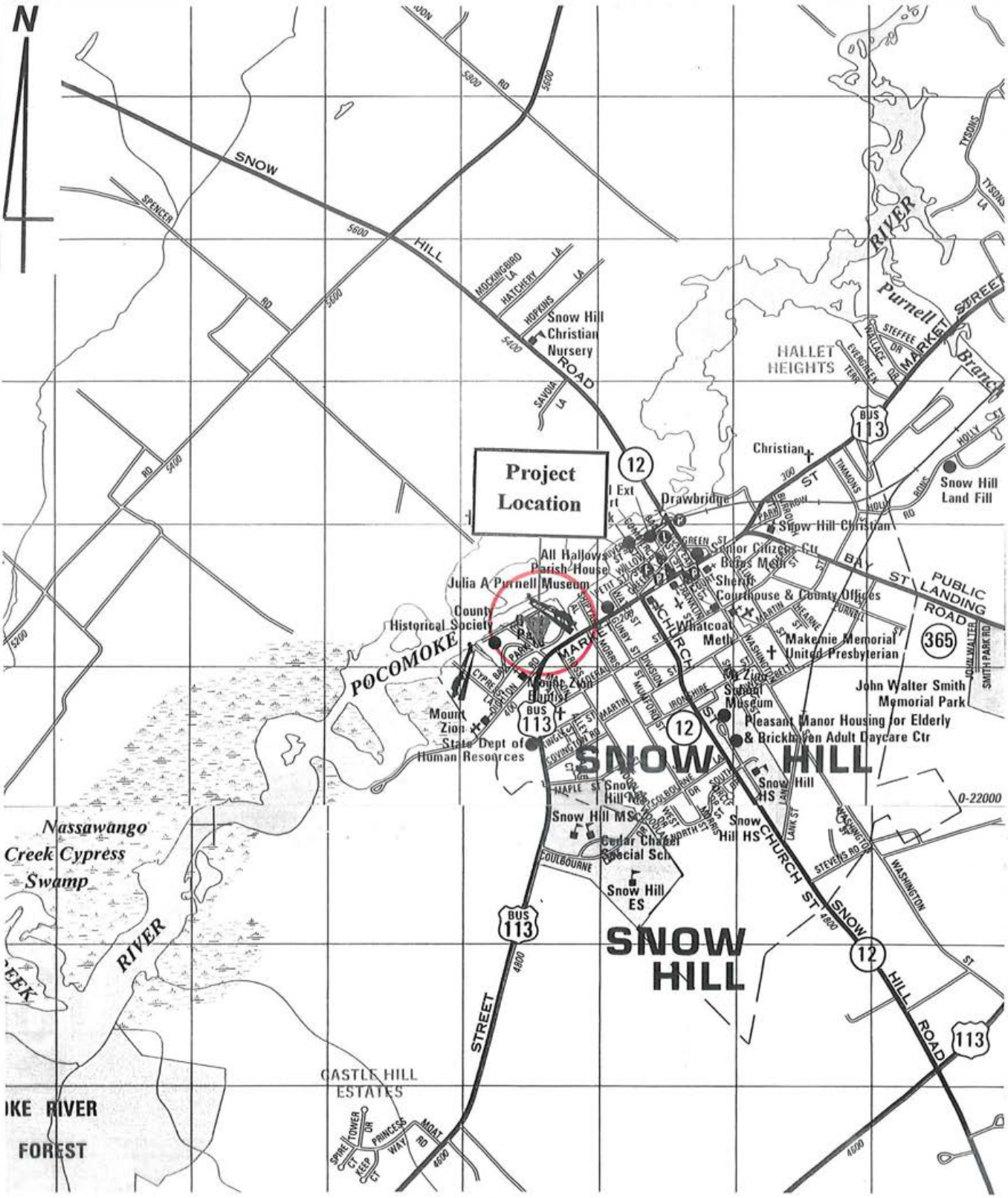

HYNES **JOHN D. HYNES & ASSOCIATES, INC.**
32185 Beaver Run Drive • Salisbury, Maryland 21804
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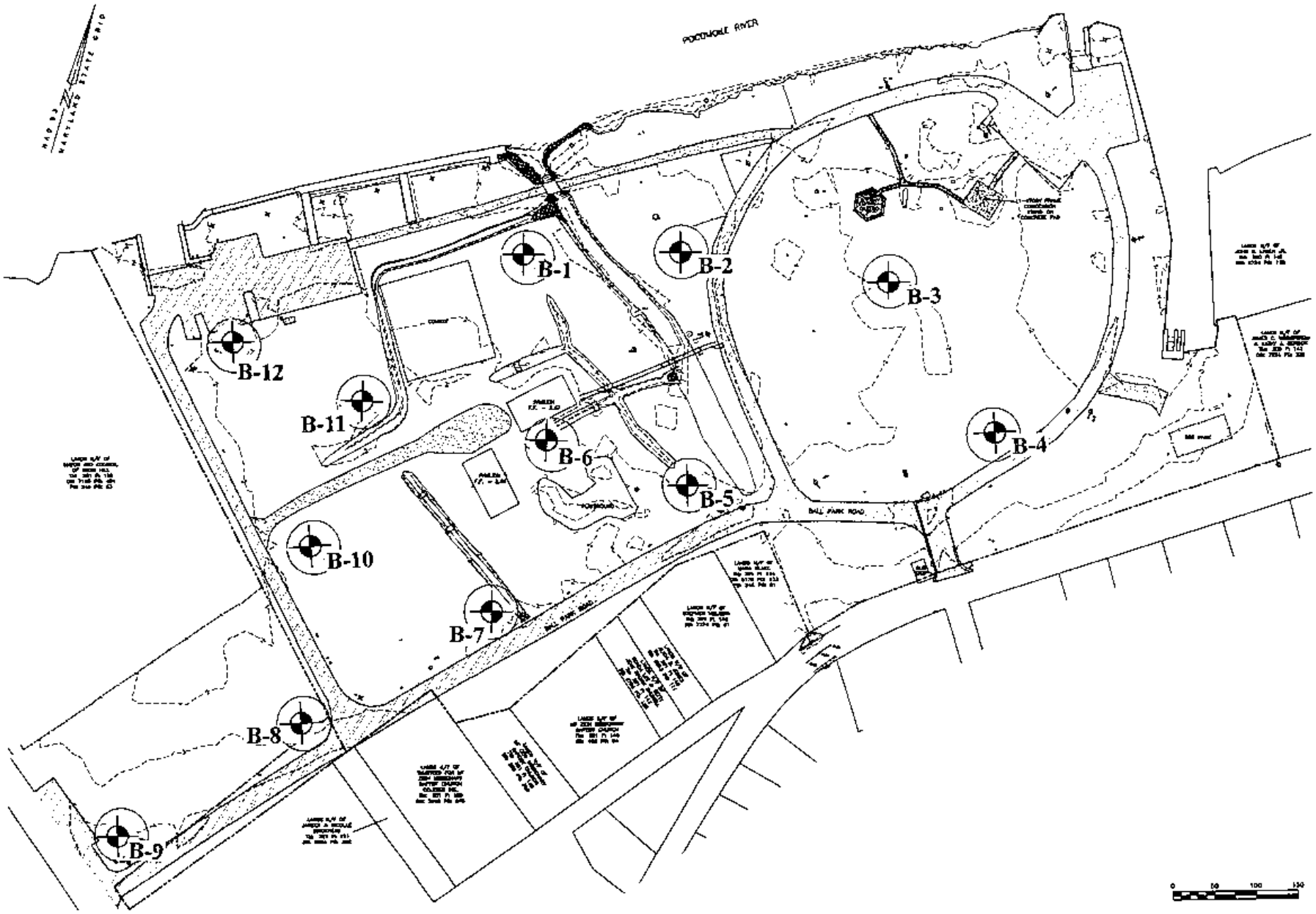
	Date: March 9, 2022
	Scale = 1" = 2000 feet
	Drawn: ADC Maps
Project Location Map Byrd Park Snow Hill, Maryland	**DWG. No.** **JDH-10/22/122-A**



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Boring Location Plan
Byrd Park
Snow Hill, Maryland

Date: March 9, 2022
Scale: As Shown
Drawn: DBE
DWG. No. JDH-10/22/122-B

HYNES & ASSOCIATES

LOG OF BORING B-1

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 7822 DT) (DP)
Total Depth: : 10 feet

Depth in Feet	Surf. Elev. 1.79	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	1.79	Brown to gray, saturated, fine to medium SAND, with little silt, trace clay, trace gravel (fill)		SM	1	Scale 1" ~ 2.25 feet
1	.79				2	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
2	-.21	Brown to gray, saturated, fine to medium SAND and SILT, with trace clay, trace gravel, trace organic silt (trash, glass, plastic: fill)		SM-ML	3	Groundwater was encountered at 4.8 feet during drilling operations.
3	-1.21					At completion, water was at 1.5 feet.
4	-2.21					Laboratory Test Results
5	-3.21	Dark brown, saturated, Peat		PT	4	Sample No. 2 From 1 to 2 feet
6	-4.21					Sieve Analysis
7	-5.21					Sieve Size — Passing %
8	-6.21					3/8" 100 No. 4 99.3 No. 10 97.6 No. 20 91.5 No. 40 75.6 No. 60 49.3 No. 100 26.7 No. 200 17.8
9	-7.21					Natural Moisture = 20.1%
10	-8.21	Boring terminated at 10 feet.				
11	-9.21					
12	-10.21					
13	-11.21					
14	-12.21					
15						

HYNES & ASSOCIATES

LOG OF BORING B-2

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 5 feet

Depth in Feet	Surf. Elev. 1.73	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	1.73	Brown to gray, wet, fine to medium SAND, with little silt (fill)		SM	1	Scale 1" ~ 2.25 feet Approximately 12 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 2 feet during augering operations.
1	.73					
		Gray, wet, fine to medium SAND, with trace silt (fill)		SP		
2	-.27	Black, wet to saturated, fine to medium SAND, with little silt (trash, plastic, wood: fill)		SM	2	
3	-1.27	Dark brown, saturated, Peat (wood debris)		PT	3	
4	-2.27				4	
5	-3.27	Boring terminated at 5 feet.				
6	-4.27					
7	-5.27					
8	-6.27					
9	-7.27					
10	-8.27					
11	-9.27					
12	-10.27					
13	-11.27					
14	-12.27					
15						

HYNES & ASSOCIATES

LOG OF BORING B-3

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 7822 DT) (DP)
Total Depth: : 10 feet

Depth in Feet	Surf. Elev. 1.73	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	1.73	Brown to gray, wet to saturated, fine to medium SAND, with some silt, trace clay		SM	1	Scale 1" ~ 2.25 feet Approximately 6 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 3 feet during drilling operations. At completion, water was at 2.1 feet.
1	.73				2	
2	-.27					
3	-1.27	Brown to gray, saturated, fine to medium SAND, with some silt, trace clay		SM	3	Laboratory Test Results Sample No. 3 From 3 to 4 feet Sieve Analysis Sieve Size — Passing % No. 4 — 100 No. 10 — 99.8 No. 20 — 96.0 No. 40 — 80.4 No. 60 — 54.6 No. 100 — 33.6 No. 200 — 26.2 Natural Moisture = 11.3%
4	-2.27	Gray, saturated, fine to medium SAND, with trace silt		SP	4	
5	-3.27					
6	-4.27					
7	-5.27					
8	-6.27					
9	-7.27	Dark brown, saturated, Peat		PT	5	
10	-8.27	Boring terminated at 10 feet.				
11	-9.27					
12	-10.27					
13	-11.27					
14	-12.27					
15						

HYNES & ASSOCIATES

LOG OF BORING B-4

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 7822 DT) (OP)
Total Depth: : 10 feet

Depth in Feet	Surf. Elev. 0	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	0	Brown to gray, saturated, fine to medium SAND, with little to some silt, trace to little clay, trace organics		SM	1	Scale 1" ~ 2.25 feet
1	-1					Approximately 6 inches of organic bearing soil was encountered at the ground surface.
2	-2				2	Groundwater was encountered at 4 feet during drilling operations.
3	-3					At completion, water was at 1.4 feet.
4	-4	Gray, saturated, fine to medium SAND, with trace silt, trace clay		SP	3	Laboratory Test Results Sample No. 3 From 4 to 5 feet Sieve Analysis
5	-5					
6	-6				4	Sieve Size / Passing % 3/4" 100 1/2" 98.1 3/8" 97.8 No. 4 84.0 No. 10 90.3 No. 20 85.0 No. 40 67.7 No. 60 37.3 No. 100 12.3 No. 200 6.4
7	-7					
8	-8					
9	-9	Dark brown, saturated, Peat		PT	5	Natural Moisture = 45.9%
10	-10	Boring terminated at 10 feet.				
11	-11					
12	-12					
13	-13					
14	-14					
15						

HYNES & ASSOCIATES

LOG OF BORING B-5

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 2.17	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	2.17	Dark brown, wet, organic SILT, with some fine to medium sand (trace wood debris)		OL	1	Scale 1" ~ 2.25 feet Approximately 36 inches of organic silt was encountered at the ground surface. Groundwater was encountered at 4.5 feet during augering operations.
1	1.17					
2	.17				2	
3	-.83	Gray, wet, fine to coarse SAND, with little silt, trace gravel		SM	3	
4	-1.83	Gray to brown, wet to saturated, fine to medium SAND, with some silt, trace clay (trace wood debris)		SM	4	
5	-2.83	Dark brown, saturated, Peat		PT		
6	-3.83	Dark gray, saturated, fine to medium SAND and clayey, trace organic silt		SM-ML	5	
		Boring terminated at 6 feet.				
7	-4.83					
8	-5.83					
9	-6.83					
10	-7.83					
11	-8.83					
12	-9.83					
13	-10.83					
14	-11.83					
15						

HYNES & ASSOCIATES

LOG OF BORING B-6

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 2.21	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	2.21	Brown, wet, fine to coarse SAND, with trace to little silt, trace gravel (fill)		SP-SM	1	Scale 1" ~ 2.25 feet Approximately 6 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 4 feet during augering operations.
1	1.21					
2	.21	Brown, wet, fine to coarse SAND, with trace to little silt (fill)		SP-SM	2	
3	-.79	Dark brown, saturated, fine to coarse SAND, with little silt, trace organic silt, trace gravel (trash fill)		SM	3	
4	-1.79				4	
5	-2.79				5	
6	-3.79	Boring terminated at 6 feet.				
7	-4.79					
8	-5.79					
9	-6.79					
10	-7.79					
11	-8.79					
12	-9.79					
13	-10.79					
14	-11.79					
15						

HYNES & ASSOCIATES

LOG OF BORING B-7

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 4 feet

Depth in Feet	Surf. Elev. 2.21	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	2.21	Dark brown to black, wet, fine to medium SAND, with trace to little silt (crushed asphalt/trash: fill)		SP-SM	1	Scale 1" ~ 2.25 feet Approximately 12 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 2.5 feet during augering operations.
1	1.21					
2	.21	Dark brown to black, wet, organic SILT, with some fine to medium sand, little silt (trash)		OL	2	
3	-.79				3	
4	-1.79	Boring terminated at 4 feet.				
5	-2.79					
6	-3.79					
7	-4.79					
8	-5.79					
9	-6.79					
10	-7.79					
11	-8.79					
12	-9.79					
13	-10.79					
14	-11.79					
15						

HYNES & ASSOCIATES

LOG OF BORING B-8

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 7822 DT) (DP)
Total Depth: : 10 feet

Depth in Feet	Surf. Elev. 2.49	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	2.49	Brown to gray, wet to saturated, fine to medium SAND, with little silt (fill)		SM	1, 2	Scale 1" ~ 2.25 feet Approximately 12 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 4 feet during augering operations. At completion, water was at 3.15 feet.
1	1.49					
2	.49					
3	-.51					
4	-1.51	Dark gray to dark brown, saturated, fine to coarse SAND and clayey SILT, with trace gravel (trace wood debris: fill)		SM-ML	3	
5	-2.51	Dark brown to black, saturated, PEAT, with wood debris (construction debris: fill)		PT	4	
6	-3.51	Brown, saturated, Peat		PT	5, 6	
7	-4.51					
8	-5.51					
9	-6.51					
10	-7.51	Boring terminated at 10 feet.				
11	-8.51					
12	-9.51					
13	-10.51					
14	-11.51					
15						

HYNES & ASSOCIATES

LOG OF BORING B-9

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 4.29	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	4.29	Brown to gray, wet, fine to medium SAND, with trace to little silt, trace gravel		SP-SM	1	Scale 1" ~ 2.25 feet Approximately 6 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 4 feet during augering operations.
1	3.29					
2	2.29	Brown to gray, wet, fine to medium SAND, with trace to little silt		SP-SM	2	
3	1.29	Brown to gray, wet to saturated, fine to medium SAND, with trace to little silt		SP-SM	3	
4	.29				4	
5	-.71				5	
6	-1.71	Boring terminated at 6 feet.				
7	-2.71					
8	-3.71					
9	-4.71					
10	-5.71					
11	-6.71					
12	-7.71					
13	-8.71					
14	-9.71					
15						

HYNES & ASSOCIATES

LOG OF BORING B-10

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 7822 DT) (DP)
Total Depth: : 10 feet

Depth in Feet	Surf. Elev. 2.59	DESCRIPTION	GRAPHIC	USCS	Sample
0	2.59	Brown to gray, wet to saturated, fine to coarse SAND, with trace silt, trace clay, trace gravel (fill)		SP-SM	1
1	1.59				2
2	.59				
3	-.41				
4	-1.41	Gray, saturated, fine to medium SAND, with trace to little silt, trace gravel (fill)		SP-SM	3
		Gray, saturated, fine to medium SAND, with little to some silt, trace gravel (trace debris, glass, wood: fill)		SM	4
5	-2.41	Brown, saturated, Peat		PT	5
6	-3.41				
7	-4.41				
8	-5.41				
9	-6.41				
10	-7.41	Boring terminated at 10 feet.			
11	-8.41				
12	-9.41				
13	-10.41				
14	-11.41				
15					

REMARKS

Scale 1" ~ 2.25 feet

Approximately 10 inches of organic bearing soil was encountered at the ground surface.

Groundwater was encountered at 2 feet during augering operations.

At completion, water was at 1.45 feet.

Laboratory Test Results

Sample No. 2
From 1 to 3.5 feet

Steve Analysis

Sieve Size	Passing %
3/4"	100
1/2"	92.6
3/8"	92.6
No. 4	91.0
No. 10	89.6
No. 20	82.8
No. 40	64.0
No. 60	38.0
No. 100	17.3
No. 200	10.6

Natural Moisture = 15.8%

HYNES & ASSOCIATES

LOG OF BORING B-11

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 7822 DT) (DP)
Total Depth: : 10 feet

Depth in Feet	Surf. Elev. 1.81	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	1.81	Brown, saturated, fine to medium SAND and SILT, with trace clay, trace gravel (fill)		SM-ML	1	Scale 1" ~ 2.25 feet Approximately 12 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 1.5 feet during drilling operations. At completion, water was at 1.1 feet.
1	.81					
2	-.19	Brown to gray, saturated, fine to medium SAND, with little to some silt, trace clay, trace gray, trace organic silt (fill)		SM	2	
3	-1.19					
4	-2.19	Brown to gray, saturated, fine to medium SAND, with some silt, trace clay, trace gray, trace organic silt, (glass debris: fill)		SM	3	
5	-3.19	Brown, saturated, Peat		PT	4	
6	-4.19					
7	-5.19					
8	-6.19					
9	-7.19					
10	-8.19	Boring terminated at 10 feet.				
11	-9.19					
12	-10.19					
13	-11.19					
14	-12.19					
15						

HYNES & ASSOCIATES

LOG OF BORING B-12

Davis, Bowen & Friedel, Inc.
601 East Main Street, Suite 100
Snow Hill, Maryland 21804

Byrd Park Project

Project No.: JDH-10/22/122

Date Completed: : March 2, 2022
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 2.37	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	2.37	Brown to gray, wet, fine to coarse SAND, with trace to little silt, trace gravel		SP-SM	1	Scale 1" ~ 2.25 feet Approximately 6 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 3 feet during augering operations.
1	1.37					
2	.37	Dark gray, wet, clayey SILT, with little to some fine to medium sand		ML	2	
3	-.63	Gray, wet, fine to medium SAND, with trace silt		SP	3	
4	-1.63	Brown, saturated, Peat		PT	4	
5	-2.63				5	
6	-3.63	Boring terminated at 6 feet.				
7	-4.63					
8	-5.63					
9	-6.63					
10	-7.63					
11	-8.63					
12	-9.63					
13	-10.63					
14	-11.63					
15						

Laboratory Data – Groundwater
Byrd Park Project
Project No. JDH 10/22/122

Analyte	B-1	B-3	B-4	B-8	B-10	B-11	MDE Standard (ug/L)
Acenaphthene	ND	ND	0.53	ND	ND	ND	53
Benzo(a) anthracene	ND	ND	**1.4**	ND	ND	ND	0.03
Benzo(a) pyrene	ND	ND	**2.5**	ND	ND	ND	0.2
Benzo(b) fluoranthene	ND	ND	**1.9**	ND	ND	ND	0.25
Benzo(k) fluoranthene	ND	ND	2.1	ND	ND	ND	2.5
Benzo(g,h,i) perylene	ND	ND	1.4	ND	ND	ND	NA
Chrysene	ND	ND	1.5	ND	ND	ND	25
Dibenz(a,h) Anthracene	ND	ND	**0.51**	ND	ND	ND	0.025
Diethyl Phthalate	ND	ND	ND	1.5	ND	ND	90
Fluoranthene	ND	ND	2.0	ND	ND	ND	80
Indeno(1,2,3-c,d) Pyrene	ND	ND	**1.6**	ND	ND	ND	0.25
Phenanthrene	ND	ND	0.29	ND	ND	ND	12
Pyrene	ND	ND	2.3	ND	ND	ND	12

Test Results Reported in micrograms per liter (ug/L)
ND = Not Detected
NA = Not Available (no standard listed)
*Results reported via method SW-846 8270

Phase Separation Science

6630 Baltimore National Pike
Baltimore, MD 21228
410-747-8770
800-932-9047
www.phasconline.com

Certificate of Analysis

Project Name: Byrd Park
PSS Project No.: 22030402

March 11, 2022

Rich Rhoads
John D. Hynes & Associates
32185 Beaver Run Drive
Salisbury, MD 21801

Reference: PSS Project No: **22030402**
Project Name: Byrd Park
Project Location: Snow Hill, MD
Project ID.: 10-22-122

Dear Rich Rhoads:

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Project number(s) **22030402**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on April 8, 2022, with the exception of air canisters which are cleaned immediately following analysis. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phasconline.com.

Sincerely,

Cathy Thompson
QA Officer

6630 Baltimore National Pike
Baltimore, MD 21228
410-747-8770
800-932-9047
www.phasesonline.com

Explanation of Qualifiers

Project Name: Byrd Park
PSS Project No.: 22030402

Project ID: 10-22-122

The following samples were received under chain of custody by Phase Separation Science (PSS) on 03/04/2022 at 11:00 am

PSS Sample ID	Sample ID	Matrix	Date/Time Collected
22030402-001	B-1	GROUND WATER	03/02/22 16:00
22030402-002	B-3	GROUND WATER	03/02/22 16:00
22030402-003	B-4	GROUND WATER	03/02/22 16:00
22030402-004	B-8	GROUND WATER	03/02/22 16:00
22030402-005	B-10	GROUND WATER	03/02/22 16:00
22030402-006	B-11	GROUND WATER	03/02/22 16:00

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminates, and part 141.3, for the secondary drinking water contaminates.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

B	A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
C	Results Pending Final Confirmation.
E	The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
Fail	The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
J	The target analyte was positively identified below the reporting limit but greater than the MDL.
MDL	This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
ND	Not Detected at or above the reporting limit.
RL	PSS Reporting Limit.
U	Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015

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Certificate of Analysis

Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-1 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-001**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C
Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Acenaphthylene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Acetophenone	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Atrazine	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
Benzo(a)anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Benzo(a)pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Benzo(b)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Benzo(g,h,i)perylene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Benzo(k)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Biphenyl (Diphenyl)	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Butyl benzyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
bis(2-chloroethyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
bis(2-ethylhexyl) phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Di-n-butyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Carbazole	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Caprolactam	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
4-Chloro-3-methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
4-Chloroaniline	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2-Chloronaphthalene	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2-Chlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
4-Chlorophenyl Phenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Chrysene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Dibenz(a,h)Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Dibenzofuran	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
3,3-Dichlorobenzidine	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2,4-Dichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Diethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Dimethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2,4-Dimethylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
4,6-Dinitro-2-methyl phenol	ND	ug/L	5.0		1	03/07/22	03/07/22 13:56	1070
2,4-Dinitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 13:56	1070

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Certificate of Analysis

Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-1 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-001**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s). See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
2,6-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
Fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Fluorene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Hexachlorobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Hexachlorobutadiene	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
Hexachloroethane	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Indeno(1,2,3-c,d)Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Isophorone	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2-Methylnaphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
2-Methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
3&4-Methylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Naphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
2-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
3-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
4-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
Nitrobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2-Nitrophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
4-Nitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 13:56	1070
N-Nitrosodi-n-propyl amine	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Di-n-octyl phthalate	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
Pentachlorophenol	ND	ug/L	2.0		1	03/07/22	03/07/22 13:56	1070
Phenanthrene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 13:56	1070
Pyridine	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2,4,5-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 13:56	1070

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Certificate of Analysis

Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-1 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-001**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

Surrogate(s)	*Recovery*		*Limits*				
2-Fluorobiphenyl	*83*	*%*	*53-103*	*1*	*03/07/22*	*03/07/22 13:56*	*1070*
2-Fluorophenol	*68*	*%*	*56-104*	*1*	*03/07/22*	*03/07/22 13:56*	*1070*
Nitrobenzene-d5	*74*	*%*	*44-103*	*1*	*03/07/22*	*03/07/22 13:56*	*1070*
Phenol-d6	*78*	*%*	*47-108*	*1*	*03/07/22*	*03/07/22 13:56*	*1070*
Terphenyl-D14	*102*	*%*	*69-111*	*1*	*03/07/22*	*03/07/22 13:56*	*1070*
2,4,6-Tribromophenol	*88*	*%*	*42-118*	*1*	*03/07/22*	*03/07/22 13:56*	*1070*

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Certificate of Analysis

Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-3 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-002**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Acenaphthylene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Acetophenone	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Atrazine	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
Benzo(a)anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Benzo(a)pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Benzo(b)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Benzo(g,h,i)perylene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Benzo(k)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Biphenyl (Diphenyl)	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Butyl benzyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
bis(2-chloroethyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
bis(2-ethylhexyl) phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Di-n-butyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Carbazole	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Caprolactam	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
4-Chloro-3-methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
4-Chloroaniline	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2-Chloronaphthalene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2-Chlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
4-Chlorophenyl Phenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Chrysene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Dibenz(a,h)Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Dibenzofuran	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
3,3-Dichlorobenzidine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2,4-Dichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Diethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Dimethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2,4-Dimethylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
4,6-Dinitro-2-methyl phenol	ND	ug/L	5.0		1	03/07/22	03/07/22 14:24	1070
2,4-Dinitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 14:24	1070

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Project Name: Byrd Park
PSS Project No: 22030402

Sample ID: B-3 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-002**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
2,6-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
Fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Fluorene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Hexachlorobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Hexachlorobutadiene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
Hexachloroethane	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Indeno(1,2,3-c,d)Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Isophorone	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2-Methylnaphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
2-Methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
3&4-Methylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Naphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
2-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
3-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
4-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
Nitrobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2-Nitrophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
4-Nitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 14:24	1070
N-Nitrosodi-n-propyl amine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Di-n-octyl phthalate	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
Pentachlorophenol	ND	ug/L	2.0		1	03/07/22	03/07/22 14:24	1070
Phenanthrene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:24	1070
Pyridine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2,4,5-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:24	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-3 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-002**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s) See Batch 192086 on Case Narrative.

Surrogate(s)	*Recovery*		*Limits*				
2-Fluorobiphenyl	*65*	%	*53-103*	*1*	*03/07/22*	*03/07/22 14:24*	*1070*
2-Fluorophenol	*56*	%	*56-104*	*1*	*03/07/22*	*03/07/22 14:24*	*1070*
Nitrobenzene-d5	*59*	%	*44-103*	*1*	*03/07/22*	*03/07/22 14:24*	*1070*
Phenol-d6	*64*	%	*47-108*	*1*	*03/07/22*	*03/07/22 14:24*	*1070*
Terphenyl-D14	*102*	%	*69-111*	*1*	*03/07/22*	*03/07/22 14:24*	*1070*
2,4,6-Tribromophenol	*87*	%	*42-118*	*1*	*03/07/22*	*03/07/22 14:24*	*1070*

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-4 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-003**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Acenaphthylene	0.53	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Acetophenone	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Atrazine	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
Benzo(a)anthracene	1.4	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Benzo(a)pyrene	2.5	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Benzo(b)fluoranthene	1.9	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Benzo(g,h,i)perylene	1.4	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Benzo(k)fluoranthene	2.1	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Biphenyl (Diphenyl)	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Butyl benzyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
bis(2-chloroethyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
bis(2-ethylhexyl) phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Di-n-butyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Carbazole	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Caprolactam	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
4-Chloro-3-methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
4-Chloroaniline	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2-Chloronaphthalene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2-Chlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
4-Chlorophenyl Phenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Chrysene	1.5	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Dibenz(a,h)Anthracene	0.51	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Dibenzofuran	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
3,3-Dichlorobenzidine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2,4-Dichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Diethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Dimethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2,4-Dimethylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
4,6-Dinitro-2-methyl phenol	ND	ug/L	5.0		1	03/07/22	03/07/22 14:52	1070
2,4-Dinitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 14:52	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-4 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-003**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C
Qualifier(s): See Batch 192086 on Case Narrative

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
2,6-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
Fluoranthene	2.0	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Fluorene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Hexachlorobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Hexachlorobutadiene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
Hexachloroethane	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Indeno(1,2,3-c,d)Pyrene	1.6	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Isophorone	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2-Methylnaphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
2-Methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
3&4-Methylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Naphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
2-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
3-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
4-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
Nitrobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2-Nitrophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
4-Nitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 14:52	1070
N-Nitrosodi-n-propyl amine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Di-n-octyl phthalate	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
Pentachlorophenol	ND	ug/L	2.0		1	03/07/22	03/07/22 14:52	1070
Phenanthrene	0.29	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
Pyrene	2.3	ug/L	0.25		1	03/07/22	03/07/22 14:52	1070
Pyridine	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2,4,5-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 14:52	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-4 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-003**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative

Surrogate(s)	*Recovery*		*Limits*				
2-Fluorobiphenyl	*73*	*%*	*53-103*	*1*	*03/07/22*	*03/07/22 14:52*	*1070*
2-Fluorophenol	*61*	*%*	*56-104*	*1*	*03/07/22*	*03/07/22 14:52*	*1070*
Nitrobenzene-d5	*67*	*%*	*44-103*	*1*	*03/07/22*	*03/07/22 14:52*	*1070*
Phenol-d6	*72*	*%*	*47-108*	*1*	*03/07/22*	*03/07/22 14:52*	*1070*
Terphenyl-D14	*104*	*%*	*69-111*	*1*	*03/07/22*	*03/07/22 14:52*	*1070*
2,4,6-Tribromophenol	*86*	*%*	*42-118*	*1*	*03/07/22*	*03/07/22 14:52*	*1070*

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-8 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-004**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Acenaphthylene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Acetophenone	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Atrazine	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
Benzo(a)anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Benzo(a)pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Benzo(b)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Benzo(g,h,i)perylene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Benzo(k)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Biphenyl (Diphenyl)	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Butyl benzyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
bis(2-chloroethyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
bis(2-ethylhexyl) phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Di-n-butyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Carbazole	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Caprolactam	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
4-Chloro-3-methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
4-Chloroaniline	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2-Chloronaphthalene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2-Chlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
4-Chlorophenyl Phenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Chrysene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Dibenz(a,h)Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Dibenzofuran	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
3,3-Dichlorobenzidine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2,4-Dichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Diethyl phthalate	1.5	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Dimethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2,4-Dimethylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
4,6-Dinitro-2-methyl phenol	ND	ug/L	5.0		1	03/07/22	03/07/22 15:21	1070
2,4-Dinitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 15:21	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-8 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-004**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
2,6-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
Fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Fluorene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Hexachlorobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Hexachlorobutadiene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
Hexachloroethane	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Indeno(1,2,3-c,d)Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Isophorone	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2-Methylnaphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
2-Methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
3&4-Methylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Naphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
2-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
3-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
4-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
Nitrobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2-Nitrophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
4-Nitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 15:21	1070
N-Nitrosodi-n-propyl amine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Di-n-octyl phthalate	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
Pentachlorophenol	ND	ug/L	2.0		1	03/07/22	03/07/22 15:21	1070
Phenanthrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:21	1070
Pyridine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2,4,5-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:21	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-8 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-004**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

Surrogate(s)	*Recovery*		*Limits*				
2-Fluorobiphenyl	*81*	%	*53-103*	*1*	*03/07/22*	*03/07/22 15:21*	*1070*
2-Fluorophenol	*69*	%	*56-104*	*1*	*03/07/22*	*03/07/22 15:21*	*1070*
Nitrobenzene-d5	*75*	%	*44-103*	*1*	*03/07/22*	*03/07/22 15:21*	*1070*
Phenol-d6	*79*	%	*47-108*	*1*	*03/07/22*	*03/07/22 15:21*	*1070*
Terphenyl-D14	*106*	%	*69-111*	*1*	*03/07/22*	*03/07/22 15:21*	*1070*
2,4,6-Tribromophenol	*96*	%	*42-118*	*1*	*03/07/22*	*03/07/22 15:21*	*1070*

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Project Name: Byrd Park
PSS Project No: 22030402

Sample ID: B-10 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-005**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Acenaphthylene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Acetophenone	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Atrazine	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
Benzo(a)anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Benzo(a)pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Benzo(b)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Benzo(g,h,i)perylene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Benzo(k)fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Biphenyl (Diphenyl)	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Butyl benzyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
bis(2-chloroethyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
bis(2-ethylhexyl) phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Di-n-butyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Carbazole	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Caprolactam	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
4-Chloro-3-methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
4-Chloroaniline	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2-Chloronaphthalene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2-Chlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
4-Chlorophenyl Phenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Chrysene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Dibenz(a,h)Anthracene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Dibenzofuran	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
3,3-Dichlorobenzidine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2,4-Dichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Diethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Dimethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2,4-Dimethylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
4,6-Dinitro-2-methyl phenol	ND	ug/L	5.0		1	03/07/22	03/07/22 15:49	1070
2,4-Dinitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 15:49	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-10 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-005**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
2,6-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
Fluoranthene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Fluorene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Hexachlorobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Hexachlorobutadiene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
Hexachloroethane	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Indeno(1,2,3-c,d)Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Isophorone	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2-Methylnaphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
2-Methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
3&4-Methylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Naphthalene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
2-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
3-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
4-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
Nitrobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2-Nitrophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
4-Nitrophenol	ND	ug/L	5.0		1	03/07/22	03/07/22 15:49	1070
N-Nitrosodi-n-propyl amine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Di-n-octyl phthalate	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
Pentachlorophenol	ND	ug/L	2.0		1	03/07/22	03/07/22 15:49	1070
Phenanthrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
Pyrene	ND	ug/L	0.25		1	03/07/22	03/07/22 15:49	1070
Pyridine	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2,4,5-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 15:49	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-10 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-005**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

Surrogate(s)	*Recovery*		*Limits*				
2-Fluorobiphenyl	*80*	*%*	*53-103*	*1*	*03/07/22*	*03/07/22 15:49*	*1070*
2-Fluorophenol	*64*	*%*	*56-104*	*1*	*03/07/22*	*03/07/22 15:49*	*1070*
Nitrobenzene-d5	*70*	*%*	*44-103*	*1*	*03/07/22*	*03/07/22 15:49*	*1070*
Phenol-d6	*76*	*%*	*47-108*	*1*	*03/07/22*	*03/07/22 15:49*	*1070*
Terphenyl-D14	*100*	*%*	*69-111*	*1*	*03/07/22*	*03/07/22 15:49*	*1070*
2,4,6-Tribromophenol	*90*	*%*	*42-118*	*1*	*03/07/22*	*03/07/22 15:49*	*1070*

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-11 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-006**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Acenaphthylene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Acetophenone	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Anthracene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Atrazine	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
Benzo(a)anthracene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Benzo(a)pyrene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Benzo(b)fluoranthene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Benzo(g,h,i)perylene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Benzo(k)fluoranthene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Biphenyl (Diphenyl)	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Butyl benzyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
bis(2-chloroethyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
bis(2-ethylhexyl) phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Di-n-butyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Carbazole	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Caprolactam	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
4-Chloro-3-methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
4-Chloroaniline	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2-Chloronaphthalene	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2-Chlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
4-Chlorophenyl Phenyl ether	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Chrysene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Dibenz(a,h)Anthracene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Dibenzofuran	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
3,3-Dichlorobenzidine	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2,4-Dichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Diethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Dimethyl phthalate	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2,4-Dimethylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
4,6-Dinitro-2-methyl phenol	ND	ug/L	5.1		1	03/07/22	03/07/22 16:18	1070
2,4-Dinitrophenol	ND	ug/L	5.1		1	03/07/22	03/07/22 16:18	1070

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Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-11 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-006**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
2,6-Dinitrotoluene	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
Fluoranthene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Fluorene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Hexachlorobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Hexachlorobutadiene	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
Hexachloroethane	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Indeno(1,2,3-c,d)Pyrene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Isophorone	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2-Methylnaphthalene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
2-Methyl phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
3&4-Methylphenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Naphthalene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
2-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
3-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
4-Nitroaniline	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
Nitrobenzene	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2-Nitrophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
4-Nitrophenol	ND	ug/L	5.1		1	03/07/22	03/07/22 16:18	1070
N-Nitrosodi-n-propyl amine	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Di-n-octyl phthalate	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
Pentachlorophenol	ND	ug/L	2.0		1	03/07/22	03/07/22 16:18	1070
Phenanthrene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Phenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
Pyrene	ND	ug/L	0.26		1	03/07/22	03/07/22 16:18	1070
Pyridine	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2,4,5-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	03/07/22	03/07/22 16:18	1070

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Certificate of Analysis

Project Name: Byrd Park
PSS Project No.: 22030402

Sample ID: B-11 **Date/Time Sampled: 03/02/2022 16:00** **PSS Sample ID: 22030402-006**
Matrix: GROUND WATER **Date/Time Received: 03/04/2022 11:00**

TCL Semivolatile Organic Compounds Analytical Method: SW-846 8270 E Preparation Method: SW3510C

Qualifier(s): See Batch 192086 on Case Narrative.

Surrogate(s)	*Recovery*		*Limits*				
2-Fluorobiphenyl	*74*	*%*	*53-103*	*1*	*03/07/22*	*03/07/22 16:18*	*1070*
2-Fluorophenol	*59*	*%*	*56-104*	*1*	*03/07/22*	*03/07/22 16:18*	*1070*
Nitrobenzene-d5	*63*	*%*	*44-103*	*1*	*03/07/22*	*03/07/22 16:18*	*1070*
Phenol-d6	*72*	*%*	*47-108*	*1*	*03/07/22*	*03/07/22 16:18*	*1070*
Terphenyl-D14	*102*	*%*	*69-111*	*1*	*03/07/22*	*03/07/22 16:18*	*1070*
2,4,6-Tribromophenol	*86*	*%*	*42-118*	*1*	*03/07/22*	*03/07/22 16:18*	*1070*

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Case Narrative

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Project Name: Byrd Park

PSS Project No.: 22030402

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

All sample receipt conditions were acceptable.

Analytical:

TCL Semivolatile Organic Compounds

Batch: 192086

Continuing calibration verification standard (CCV) meets method criteria in that more than 80% of analytes are within acceptance limits, see QC summary.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.

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Lab Chronology

Project Name: Byrd Park
PSS Project No.: 22030402

Method	Client Sample ID	Analysis Type	PSS Sample ID	Mtx	Prep Batch	Analytical Batch	Prepared	Analyzed
SW-846 8270 E	B-1	Initial	22030402-001	W	89834	192086	03/07/2022 10:52	03/07/2022 13:56
	B-3	Initial	22030402-002	W	89834	192086	03/07/2022 10:52	03/07/2022 14:24
	B-4	Initial	22030402-003	W	89834	192086	03/07/2022 10:52	03/07/2022 14:52
	B-8	Initial	22030402-004	W	89834	192086	03/07/2022 10:52	03/07/2022 15:21
	B-10	Initial	22030402-005	W	89834	192086	03/07/2022 10:52	03/07/2022 15:49
	B-11	Initial	22030402-006	W	89834	192086	03/07/2022 10:52	03/07/2022 16:18
	89834-1-BKS	BKS	89834-1-BKS	W	89834	192086	03/07/2022 10:52	03/07/2022 19:37
	89834-1-BLK	BLK	89834-1-BLK	W	89834	192086	03/07/2022 10:52	03/07/2022 12:01
	89834-1-BSD	BSD	89834-1-BSD	W	89834	192086	03/07/2022 10:52	03/07/2022 20:06

Phase Separation Science

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QC Summary

Project Name: Byrd Park
PSS Project No.: 22030402

Analytical Method: SW-846 8270 E Prep Method: SW3510C
Seq Number: 192086 Matrix: Water Date Prep: 03/07/22
MB Sample Id: 89834-1-BLK LCS Sample Id: 89834-1-BKS LCSD Sample Id: 89834-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Flag
Acenaphthene	<0.2500	40.00	35.19	88	37.06	93	68-115	6	20	ug/L	
Acenaphthylene	<0.2500	40.00	35.14	88	37.60	94	63-129	7	20	ug/L	
Acetophenone	<1.000	40.00	36.80	92	35.81	90	67-129	2	20	ug/L	
Anthracene	<0.2500	40.00	35.98	90	36.30	91	72-126	1	20	ug/L	
Atrazine	<2.000	40.00	19.95	50	20.29	51	30-136	2	20	ug/L	
Benzo(a)anthracene	<0.2500	40.00	39.53	99	38.65	97	65-125	2	20	ug/L	
Benzo(a)pyrene	<0.2500	40.00	42.91	107	43.57	109	59-118	2	20	ug/L	
Benzo(b)fluoranthene	<0.2500	40.00	39.02	98	41.05	103	45-133	5	20	ug/L	
Benzo(g,h,i)perylene	<0.2500	40.00	41.55	104	41.25	103	31-153	1	20	ug/L	
Benzo(k)fluoranthene	<0.2500	40.00	41.26	103	41.42	104	42-121	1	20	ug/L	
Biphenyl (Diphenyl)	<1.000	40.00	37.14	93	35.23	88	65-129	6	20	ug/L	
Butyl benzyl phthalate	<1.000	40.00	41.44	104	40.39	101	72-129	3	20	ug/L	
bis(2-chloroethoxy) methane	<1.000	40.00	35.23	88	35.24	88	60-134	0	20	ug/L	
bis(2-chloroethyl) ether	<1.000	40.00	38.12	95	38.47	96	55-128	1	20	ug/L	
bis(2-chloroisopropyl) ether	<1.000	40.00	38.95	97	38.53	96	43-125	1	20	ug/L	
bis(2-ethylhexyl) phthalate	<1.000	40.00	41.36	103	41.15	103	74-127	0	20	ug/L	
4-Bromophenylphenyl ether	<1.000	40.00	38.03	95	37.63	94	65-140	1	20	ug/L	
Di-n-butyl phthalate	<1.000	40.00	38.20	96	37.93	95	73-133	1	20	ug/L	
Carbazole	<1.000	40.00	35.63	89	35.76	89	47-150	0	20	ug/L	
Caprolactam	<2.000	40.00	36.62	92	35.85	90	61-120	2	20	ug/L	
4-Chloro-3-methyl phenol	<1.000	40.00	36.98	92	35.82	90	66-134	2	20	ug/L	
4-Chloroaniline	<1.000	40.00	33.85	85	33.59	84	55-124	1	20	ug/L	
2-Chloronaphthalene	<1.000	40.00	37.36	93	38.67	97	67-125	4	20	ug/L	
2-Chlorophenol	<1.000	40.00	35.85	90	35.59	89	62-129	1	20	ug/L	
4-Chlorophenyl Phenyl ether	<1.000	40.00	37.55	94	40.04	100	63-134	6	20	ug/L	
Chrysene	<0.2500	40.00	37.78	94	37.24	93	72-121	1	20	ug/L	
Dibenz(a,h)Anthracene	<0.2500	40.00	41.56	104	42.30	106	42-138	2	20	ug/L	
Dibenzofuran	<1.000	40.00	35.59	89	39.00	98	69-132	10	20	ug/L	
3,3-Dichlorobenzidine	<1.000	40.00	40.75	102	40.21	101	61-148	1	20	ug/L	
2,4-Dichlorophenol	<1.000	40.00	37.43	94	36.42	91	62-133	3	20	ug/L	
Diethyl phthalate	<1.000	40.00	35.36	88	39.39	98	71-126	11	20	ug/L	
Dimethyl phthalate	<1.000	40.00	34.07	85	37.68	94	66-134	10	20	ug/L	
2,4-Dimethylphenol	<1.000	40.00	38.30	96	38.90	97	65-136	1	20	ug/L	
4,6-Dinitro-2-methyl phenol	<5.000	40.00	38.63	97	39.36	98	47-159	1	20	ug/L	
2,4-Dinitrophenol	<5.000	40.00	35.21	88	36.93	92	29-155	4	20	ug/L	
2,4-Dinitrotoluene	<2.000	40.00	37.60	94	39.75	99	69-132	5	20	ug/L	
2,6-Dinitrotoluene	<2.000	40.00	35.68	89	39.83	100	67-134	12	20	ug/L	
Fluoranthene	<0.2500	40.00	37.79	94	36.71	92	73-130	2	20	ug/L	
Fluorene	<0.2500	40.00	35.96	90	39.18	98	70-121	9	20	ug/L	
Hexachlorobenzene	<1.000	40.00	38.83	97	38.91	97	65-133	0	20	ug/L	
Hexachlorobutadiene	<1.000	40.00	38.22	96	38.91	97	63-125	1	20	ug/L	
Hexachlorocyclopentadiene	<2.000	40.00	42.07	105	45.39	113	39-151	7	20	ug/L	
Hexachloroethane	<1.000	40.00	38.43	96	38.29	96	61-116	0	20	ug/L	
Indeno(1,2,3-c,d)Pyrene	<0.2500	40.00	40.19	100	40.17	100	40-148	0	20	ug/L	
Isophorone	<1.000	40.00	42.86	107	41.32	103	60-125	4	20	ug/L	
2-Methylnaphthalene	<0.2500	40.00	35.37	88	34.74	87	61-128	1	20	ug/L	
2-Methyl phenol	<1.000	40.00	37.53	94	36.70	92	67-125	2	20	ug/L	
3&4-Methylphenol	<1.000	40.00	37.28	93	36.43	91	68-125	2	20	ug/L	
Naphthalene	<0.2500	40.00	34.78	87	33.51	84	64-121	4	20	ug/L	
2-Nitroaniline	<2.000	40.00	36.95	92	39.12	98	59-127	6	20	ug/L	
3-Nitroaniline	<2.000	40.00	37.84	95	38.92	97	55-142	2	20	ug/L	

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QC Summary

Project Name: Byrd Park
PSS Project No.: 22030402

Analytical Method: SW-846 8270 E Prep Method: SW3510C
Seq Number: 192086 Matrix: Water Date Prep: 03/07/22
MB Sample Id: 89834-1-BLK LCS Sample Id: 89834-1-BKS LCSD Sample Id: 89834-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Flag
4-Nitroaniline	<2.000	40.00	38.38	96	41.54	104	49-152	8	20	ug/L	
Nitrobenzene	<1.000	40.00	35.70	89	33.40	84	56-124	6	20	ug/L	
2-Nitrophenol	<1.000	40.00	37.50	94	36.40	91	58-136	3	20	ug/L	
4-Nitrophenol	<5.000	40.00	36.54	91	39.86	100	48-137	9	20	ug/L	
N-Nitrosodi-n-propyl amine	<1.000	40.00	36.12	90	37.16	93	50-130	3	20	ug/L	
N-Nitrosodiphenylamine	<1.000	40.00	35.88	90	36.15	90	56-140	0	20	ug/L	
Di-n-octyl phthalate	<2.000	40.00	42.60	107	40.92	102	51-120	5	20	ug/L	
Pentachlorophenol	<2.000	40.00	37.09	93	36.73	92	59-136	1	20	ug/L	
Phenanthrene	<0.2500	40.00	34.86	87	36.08	90	72-121	3	20	ug/L	
Phenol	<1.000	40.00	35.92	90	36.60	92	63-118	2	20	ug/L	
Pyrene	<0.2500	40.00	38.93	97	38.13	95	72-123	2	20	ug/L	
Pyridine	<1.000	40.00	32.09	80	32.36	81	52-108	1	20	ug/L	
2,4,5-Trichlorophenol	<1.000	40.00	35.41	89	37.27	93	65-132	4	20	ug/L	
2,4,6-Trichlorophenol	<1.000	40.00	34.77	87	37.09	93	64-128	7	20	ug/L	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units
2-Fluorobiphenyl	95		91		94		53-103	%
2-Fluorophenol	90		83		83		56-104	%
Nitrobenzene-d5	93		89		82		44-103	%
Phenol-d6	94		89		89		47-108	%
Terphenyl-D14	97		94		92		69-111	%
2,4,6-Tribromophenol	85		90		95		42-118	%

F = RPD exceeded the laboratory control limits
X = Recovery of MS, MSD or both outside of QC Criteria
H= Recovery of BS,BSD or both exceeded the laboratory control limits
L = Recovery of BS,BSD or both below the laboratory control limits

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QC Summary

Project Name: Byrd Park
PSS Project No.: 22030402

Analytical Method: SW-846 8270 E
Seq Number: 192086 Matrix: Water
CCV Sample Id: CCV-01 Analyzed Date: 03/07/22 11:33

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Acenaphthene	40000	39120	98	80-120	ug/L	
Acenaphthylene	40000	40060	100	80-120	ug/L	
Acetophenone	40000	41250	103	80-120	ug/L	
Anthracene	40000	40060	100	80-120	ug/L	
Atrazine	40000	39720	99	80-120	ug/L	
Benzo(a)anthracene	40000	39680	99	80-120	ug/L	
Benzo(a)pyrene	40000	45520	114	80-120	ug/L	
Benzo(b)fluoranthene	40000	46000	115	80-120	ug/L	
Benzo(g,h,i)perylene	40000	46630	117	80-120	ug/L	
Benzo(k)fluoranthene	40000	43660	109	80-120	ug/L	
Biphenyl (Diphenyl)	40000	38820	97	80-120	ug/L	
Butyl benzyl phthalate	40000	42560	106	80-120	ug/L	
bis(2-chloroethoxy) methane	40000	40670	102	80-120	ug/L	
bis(2-chloroethyl) ether	40000	41920	105	80-120	ug/L	
bis(2-chloroisopropyl) ether	40000	41320	103	80-120	ug/L	
bis(2-ethylhexyl) phthalate	40000	43750	109	80-120	ug/L	
4-Bromophenylphenyl ether	40000	44430	111	80-120	ug/L	
Di-n-butyl phthalate	40000	41440	104	80-120	ug/L	
Carbazole	40000	38490	96	80-120	ug/L	
Caprolactam	40000	39790	99	80-120	ug/L	
4-Chloro-3-methyl phenol	40000	41810	105	80-120	ug/L	
4-Chloroaniline	40000	38380	96	80-120	ug/L	
2-Chloronaphthalene	40000	37920	95	80-120	ug/L	
2-Chlorophenol	40000	42690	107	80-120	ug/L	
4-Chlorophenyl Phenyl ether	40000	39540	99	80-120	ug/L	
Chrysene	40000	40530	101	80-120	ug/L	
Dibenz(a,h)Anthracene	40000	46800	117	80-120	ug/L	
Dibenzofuran	40000	39800	100	80-120	ug/L	
3,3-Dichlorobenzidine	40000	40400	101	80-120	ug/L	
2,4-Dichlorophenol	40000	43390	108	80-120	ug/L	
Diethyl phthalate	40000	39500	99	80-120	ug/L	
Dimethyl phthalate	40000	40540	101	80-120	ug/L	
2,4-Dimethylphenol	40000	40600	102	80-120	ug/L	
4,6-Dinitro-2-methyl phenol	40000	45530	114	80-120	ug/L	
2,4-Dinitrophenol	40000	43440	109	80-120	ug/L	
2,4-Dinitrotoluene	40000	42850	107	80-120	ug/L	
2,6-Dinitrotoluene	40000	41650	104	80-120	ug/L	
Fluoranthene	40000	40660	102	80-120	ug/L	
Fluorene	40000	37910	95	80-120	ug/L	
Hexachlorobenzene	40000	41240	103	80-120	ug/L	
Hexachlorobutadiene	40000	42250	106	80-120	ug/L	
Hexachlorocyclopentadiene	40000	40720	102	80-120	ug/L	
Hexachloroethane	40000	43050	108	80-120	ug/L	
Indeno(1,2,3-c,d)Pyrene	40000	48450	121	80-120	ug/L	X
Isophorone	40000	38840	97	80-120	ug/L	
2-Methylnaphthalene	40000	39370	98	80-120	ug/L	
2-Methyl phenol	40000	43190	108	80-120	ug/L	
3&4-Methylphenol	40000	42090	105	80-120	ug/L	
Naphthalene	40000	39170	98	80-120	ug/L	
2-Nitroaniline	40000	39250	98	80-120	ug/L	
3-Nitroaniline	40000	39370	98	80-120	ug/L	

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QC Summary

Project Name: Byrd Park
PSS Project No.: 22030402

Analytical Method: SW-846 8270 E

Seq Number: 192086 Matrix: Water

CCV Sample Id: CCV-01 Analyzed Date: 03/07/22 11:33

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
4-Nitroaniline	40000	38840	97	80-120	ug/L	
Nitrobenzene	40000	40450	101	80-120	ug/L	
2-Nitrophenol	40000	45770	114	80-120	ug/L	
4-Nitrophenol	40000	41910	105	80-120	ug/L	
N-Nitrosodi-n-propyl amine	40000	40950	102	80-120	ug/L	
N-Nitrosodiphenylamine	40000	39450	99	80-120	ug/L	
Di-n-octyl phthalate	40000	45400	114	80-120	ug/L	
Pentachlorophenol	40000	44480	111	80-120	ug/L	
Phenanthrene	40000	37850	95	80-120	ug/L	
Phenol	40000	40470	101	80-120	ug/L	
Pyrene	40000	40980	102	80-120	ug/L	
Pyridine	40000	38690	97	80-120	ug/L	
2,4,5-Trichlorophenol	40000	42320	106	80-120	ug/L	
2,4,6-Trichlorophenol	40000	42420	106	80-120	ug/L	

Surrogate	CCV Result	Limits	Units	Flag
2-Fluorobiphenyl	99	80-120	%	
2-Fluorophenol	103	80-120	%	
Nitrobenzene-d5	105	80-120	%	
Phenol-d6	101	80-120	%	
Terphenyl-D14	103	80-120	%	
2,4,6-Tribromophenol	110	80-120	%	

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QC Summary

Project Name: Byrd Park
PSS Project No.: 22030402

Analytical Method: SW-846 8270 E

Seq Number: 192049 Matrix: Solid
Parent Sample Id: ICV-01 ICV Sample Id: ICV-01 Analyzed Date: 03/04/22 16:34

Parameter	Spike Amount	ICV Result	ICV %Rec	Limits	Units	Flag
Acenaphthene	40.00	39.58	99	70-130	mg/kg	
Acenaphthylene	40.00	40.54	101	70-130	mg/kg	
Acetophenone	40.00	41.27	103	70-130	mg/kg	
Anthracene	40.00	40.43	101	70-130	mg/kg	
Atrazine	40.00	41.07	103	70-130	mg/kg	
Benzo(a)anthracene	40.00	40.76	102	70-130	mg/kg	
Benzo(a)pyrene	40.00	46.45	116	70-130	mg/kg	
Benzo(b)fluoranthene	40.00	45.26	113	70-130	mg/kg	
Benzo(g,h,i)perylene	40.00	45.48	114	70-130	mg/kg	
Benzo(k)fluoranthene	40.00	44.52	111	70-130	mg/kg	
Biphenyl (Diphenyl)	40.00	38.80	97	70-130	mg/kg	
Butyl benzyl phthalate	40.00	43.66	109	70-130	mg/kg	
bis(2-chloroethoxy) methane	40.00	40.08	100	70-130	mg/kg	
bis(2-chloroethyl) ether	40.00	41.88	105	70-130	mg/kg	
bis(2-chloroisopropyl) ether	40.00	40.18	100	70-130	mg/kg	
bis(2-ethylhexyl) phthalate	40.00	43.60	109	70-130	mg/kg	
4-Bromophenylphenyl ether	40.00	44.38	111	70-130	mg/kg	
Di-n-butyl phthalate	40.00	42.56	106	70-130	mg/kg	
Carbazole	40.00	37.80	95	70-130	mg/kg	
Caprolactam	40.00	37.96	95	70-130	mg/kg	
4-Chloro-3-methyl phenol	40.00	41.92	105	70-130	mg/kg	
4-Chloroaniline	40.00	38.97	97	70-130	mg/kg	
2-Chloronaphthalene	40.00	39.01	98	70-130	mg/kg	
2-Chlorophenol	40.00	42.09	105	70-130	mg/kg	
4-Chlorophenyl Phenyl ether	40.00	42.27	106	70-130	mg/kg	
Chrysene	40.00	40.63	102	70-130	mg/kg	
Dibenz(a,h)Anthracene	40.00	46.40	116	70-130	mg/kg	
Dibenzofuran	40.00	40.27	101	70-130	mg/kg	
3,3-Dichlorobenzidine	40.00	40.90	102	70-130	mg/kg	
2,4-Dichlorophenol	40.00	43.49	109	70-130	mg/kg	
Diethyl phthalate	40.00	42.64	107	70-130	mg/kg	
Dimethyl phthalate	40.00	41.56	104	70-130	mg/kg	
2,4-Dimethylphenol	40.00	39.12	98	70-130	mg/kg	
4,6-Dinitro-2-methyl phenol	40.00	46.76	117	70-130	mg/kg	
2,4-Dinitrophenol	40.00	44.12	110	70-130	mg/kg	
2,4-Dinitrotoluene	40.00	42.00	105	70-130	mg/kg	
2,6-Dinitrotoluene	40.00	42.89	107	70-130	mg/kg	
Fluoranthene	40.00	41.83	105	70-130	mg/kg	
Fluorene	40.00	39.93	100	70-130	mg/kg	
Hexachlorobenzene	40.00	40.99	102	70-130	mg/kg	
Hexachlorobutadiene	40.00	42.04	105	70-130	mg/kg	
Hexachlorocyclopentadiene	40.00	45.22	113	70-130	mg/kg	
Hexachloroethane	40.00	42.31	106	70-130	mg/kg	
Indeno(1,2,3-c,d)Pyrene	40.00	47.66	119	70-130	mg/kg	
Isophorone	40.00	38.52	96	70-130	mg/kg	
2-Methylnaphthalene	40.00	40.60	102	70-130	mg/kg	
2-Methyl phenol	40.00	42.25	106	70-130	mg/kg	
3&4-Methylphenol	40.00	41.42	104	70-130	mg/kg	
Naphthalene	40.00	38.85	97	70-130	mg/kg	
2-Nitroaniline	40.00	39.98	100	70-130	mg/kg	
3-Nitroaniline	40.00	38.28	96	70-130	mg/kg	

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QC Summary

Project Name: Byrd Park
PSS Project No.: 22030402

Analytical Method: SW-846 8270 E

Seq Number: 192049 Matrix: Solid
Parent Sample Id: ICV-01 ICV Sample Id: ICV-01 Analyzed Date: 03/04/22 16:34

Parameter	Spike Amount	ICV Result	ICV %Rec	Limits	Units	Flag
4-Nitroaniline	40.00	38.94	97	70-130	mg/kg	
Nitrobenzene	40.00	38.96	97	70-130	mg/kg	
2-Nitrophenol	40.00	44.60	112	70-130	mg/kg	
4-Nitrophenol	40.00	42.04	105	70-130	mg/kg	
N-Nitrosodi-n-propyl amine	40.00	39.21	98	70-130	mg/kg	
N-Nitrosodiphenylamine	40.00	41.48	104	70-130	mg/kg	
Di-n-octyl phthalate	40.00	45.71	114	70-130	mg/kg	
Pentachlorophenol	40.00	47.09	118	70-130	mg/kg	
Phenanthrene	40.00	38.43	96	70-130	mg/kg	
Phenol	40.00	39.23	98	70-130	mg/kg	
Pyrene	40.00	40.23	101	70-130	mg/kg	
Pyridine	40.00	37.46	94	70-130	mg/kg	
2,4,5-Trichlorophenol	40.00	42.36	106	70-130	mg/kg	
2,4,6-Trichlorophenol	40.00	44.05	110	70-130	mg/kg	

Surrogate	ICV Result	Limits	Units	Flag
2-Fluorobiphenyl	106	70-130	%	
2-Fluorophenol	103	70-130	%	
Nitrobenzene-d5	103	70-130	%	
Phenol-d6	98	70-130	%	
Terphenyl-D14	104	70-130	%	
2,4,6 Tribromophenol	113	70-130	%	

X = Recovery outside of QC Criteria

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

*CLIENT: Hynes *OFFICE LOC: Salisbury, MD
*PROJECT MGR: Rich Rhoads *PHONE NO.: (410) 548-6462
EMAIL: rrhoads.jdhynes@gmail.com FAX NO: 410 548-5346
*PROJECT NAME: Byrd Park PROJECT NO.: 10-22-12
SITE LOCATION: Snow Hill, MD P.O. NO.: 013726
SAMPLER(S): E. Cross QUOTE NO:

PSS Work Order #: 22030402 PAGE OF

Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil L=Liquid SOL=Solid A=Air WI=Wipe

LAB NO.	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	Preservatives: ICE	REMARKS
1	B-1	3/2	4pm	GW	1	G	SVOC's	X
2	B-3				1			X
3	B-4				1			X
4	B-8				1			X
5	B-10				1			X
6	B-11				1			X

Relinquished By: (1)	Date	Time	Received By:
Evan Cross	3/3/12	3pm	UPS
Relinquished By: (2)	Date	Time	Received By:
1Z 214 38X 01 9814 0860	3/4/12	1100	
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

Requested TAT (One TAT per COC)
X Standard 3-Day 2-Day
Next Day Emergency Other

1 Yes (Cooler Intact)
Yes
UPS

Data Deliverables Required:
COA QC SUMM. CLP LIKE OTHER

Special Instructions:

DW COMPLIANCE: YES
EDD FORMAT TYPE:
STATE RESULTS REPORTED TO: MD DE PA VA WV OTHER

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410-747-8770
800-932-9047
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Sample Receipt Checklist

Project Name: Byrd Park
PSS Project No.: 22030402

Client Name	John D. Hynes & Associates	**Received By**	Marissa Vertucci
Disposal Date	04/08/2022	**Date Received**	03/04/2022 11:00:00 AM
		Delivered By	UPS
		Tracking No	1Z21438X0198140860
		Logged In By	Marissa Vertucci

Shipping Container(s)
No. of Coolers 1

		Ice	Ice Packs Used
Custody Seal(s) Intact?	N/A	Temp (deg C)	5.8
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No
Documentation		Sampler Name	E. Cross
COC agrees with sample labels?	Yes	MD DW Cert. No.	N/A
Chain of Custody	Yes		
Sample Container		Custody Seal(s) Intact?	Not Applicable
Appropriate for Specified Analysis?	Yes	Seal(s) Signed / Dated	Not Applicable
Intact?	Yes		
Labeled and Labels Legible?	Yes		
Holding Time		Total No. of Samples Received	6
All Samples Received Within Holding Time(s)?	Yes	Total No. of Containers Received	6

Preservation

Total Metals	(pH<2)	N/A
Dissolved Metals, filtered within 15 minutes of collection	(pH<2)	N/A
Orthophosphorus, filtered within 15 minutes of collection		N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, DOC (field filtered), COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	N/A
Do VOA vials have zero headspace?		N/A
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A
524 VOC (Rcvd with trip blanks)	(pH<2)	N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By: Date: 03/04/2022
Marissa Vertucci

PM Review and Approval: Date: 03/04/2022
Lynn Jackson

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseseponline.com

e-mail: info@phaseseponline.com

(1) *CLIENT: Hynes *OFFICE LOC.: Salisbury, MD

*PROJECT MGR: Rich Rhoads *PHONE NO.: (410) 546-6462

EMAIL: rrhoads.jdhynes@gmail.com FAX NO.: (410) 548-5346

*PROJECT NAME: Byrd Park PROJECT NO.: 10-22-122

SITE LOCATION: Snow Hill, MD P.O. NO.: 013726

SAMPLER(S): E. Cross DW CERT NO.:

PSS Work Order #: 22030402 PAGE ___ OF ___

Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil L=Liquid SOL=Solid A=Air WI=Wipe

(2)

LAB NO.	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	Preservatives Used: ICE	Analysis/ Method Required (3) * SVOC's	REMARKS
1	B-1	3/2	4pm	GW	1	G	X		
2	B-3	"	"	"	1	"	X		
3	B-4	"	"	"	1	"	X		
4	B-8	"	"	"	1	"	X		
5	B-10	"	"	"	1	"	X		
6	B-11	"	"	"	1	"	X		

(5)

Relinquished By: (1)	Date	Time	Received By:
Evan Cross	3/3/22	3pm	UPS
Relinquished By: (2)	Date	Time	Received By:
1Z 214 38X 01 9814 0860	3/4/22	1100	
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4)

*Requested TAT (One TAT per COC): ☒ 5-Day ☐ 3-Day ☐ 2-Day ☐ Next Day ☐ Emergency ☐ Other

Data Deliverables Required: COA ☐ QC SUMM ☐ CLP LIKE ☐ OTHER ___

# of Coolers: 1

Custody Seal: Yes / Cooler Intact

Ice Present: Y Temp: 5.6-5.8C

ICE PACKS Yes 3/3/22

Shipping Carrier: UPS

Special Instructions:

DW COMPLIANCE? YES ☐ EDD FORMAT TYPE ___

STATE RESULTS REPORTED TO: MD ☐ DE ☐ PA ☐ VA ☐ WV ☐ OTHER ___

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JOHN D. HYNES & ASSOCIATES, INC.

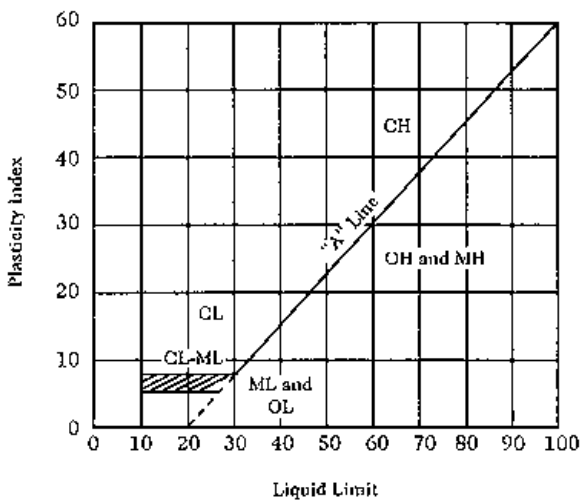
Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			*Group Symbols*	*Typical Names*	*Laboratory Classification Criteria*	
Coarse-grained soils (More than half of material is larger than No 200 sieve size)	Gravels (More than half of coarse fraction is larger than No 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly graded gravels, gravel sand mixtures, little or no fines	Not meeting all graduation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM[a] d / u	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	
	Sands (More than half of coarse fraction is smaller than No 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands,	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all graduation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a] d / u	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols.
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			OL	Organic silts and organic silty clays of low plasticity		
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			CH	Inorganic clays of high plasticity, fat clays		
			OH	Organic clays of medium to high plasticity, organic silts		
	Highly organic soils		Pt	Peat and other highly organic soils		

Determine percentages of sand and gravel from grain-size curve.
Depending on percentage of fines (fraction smaller than No 200 sieve size), coarse grained soils are classified as follows:
Less than 5 percent — GW, GP, SW, SP
More than 12 percent — GM, GC, SM, SC
5 to 12 percent — *Borderline cases requiring dual symbols*

Plasticity Chart



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E-mail - jdhynes@aol.com

HYNES

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

NON-COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

DENSITY

Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

RELATIVE PROPORTIONS

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

PARTICLE SIZE IDENTIFICATION

Boulders	- 8 inch diameter or more
Cobbles	- 3 to 8 inch diameter
Gravel	- Coarse - 1 to 3 inch
	- Medium - 1/2 to 1 inch
	- Fine - 4.75 mm to 1/2 inch
Sand	- Coarse - 2.0 mm to 4.75 mm
	- Medium - 0.425 mm to 2.0 mm
	- Fine - 0.075 mm to 0.425 mm
Silt	- 0.075 mm to 0.002 mm

COHESIVE SOILS
(Clay, Silt and Combinations)

CONSISTENCY

Very Soft	- 3 blows/ft. or less
Soft	- 4 to 5 blows/ft.
Medium Stiff	- 6 to 10 blows/ft.
Stiff	- 11 to 15 blows/ft.
Very Stiff	- 16 to 30 blows/ft.
Hard	- 31 blows/ft. or more

PLASTICITY

Degree of Plasticity	Plasticity Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	over 22

Classification on logs are made by visual inspection of samples unless a sample has been subjected to laboratory classification testing.

Standard Penetration Test - Driving a 2.0" O.D., 1-3/8" I.D., splitspoon sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary to drive the spoon 6 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the test are recorded for each 6 inches of penetration on the drill log (Example - 6/8/9). The standard penetration test value (N - value) can be obtained by adding the last two figures (i.e. 8 + 9 = 17 blows/ft.). (ASTM D-1586)

Strata Changes - In the column "Soil Descriptions," on the drill log, the horizontal lines represent strata changes. A solid line (—) represents an actually observed change, a dashed line (----) represents an estimated change.

Groundwater - Observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc. may cause changes in the water levels indicated on the logs.

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

❑ 601 E. MAIN STREET, SUITE 100, SALISBURY, MD 21804-5021 • 410.543.9091
❑ 1 PARK AVENUE, MILFORD, DE 19963 • 302.424.1441
❑ 106 N. WASHINGTON STREET, SUITE 103, EASTON, MD 21601• 410.770.4744
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