Final Five-Year Review Report
for
Former David Taylor Research Center

Former Naval Surface Warfare Center
Carderock Division
Annapolis Detachment
Annapolis, Maryland

Naval Facilities Engineering Command
Washington

Contract Number N40080-16-D-0322

Contract Task Order 009

May 2020

FINAL FIVE-YEAR REVIEW REPORT

for

FORMER DAVID TAYLOR RESEARCH CENTER

FORMER NAVAL SURFACE WARFARE CENTER CARDEROCK DIVISION ANNAPOLIS DETACHMENT ANNAPOLIS, MARYLAND

Submitted to:

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AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
AST	Above Ground Storage Tank
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CVOC	Chlorinated Volatile Organic Compounds
COPC	Chemical of Potential Concern
DTRC	David Taylor Research Center
EBS	Environmental Baseline Survey
ERA	Ecological Risk Assessment
ESL	Ecological Screening Levels
FEMA	Federal Emergency Management Agency
FFF	Former Fuel Farm
FOST	Findings of Suitability to Transfer
HHRA	Human Health Risk Assessment
IC	Institutional Control
LLC	Limited Liability Corporation
MCL	Maximum Contaminant Limit
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
MDE	Maryland Department of the Environment
NSWC	Naval Surface Warfare Center
O&M	Operation and Maintenance
OSA	Open Storage Area
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene
PFAS	Per- and polyfluoroalkyl substances
PRAP	Proposed Remedial Action Plan
PRG	Preliminary Remediation Goal
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SERA	Screening Level Ecological Risk Assessment
SI	Site Investigation
SMDP	Scientific Management Decision Point
SVOC	Semivolatile Organic Compound
TBC	To Be Considered

TCE	Trichloroethylene
Tetra Tech	Tetra Tech, Inc.
USEPA	U.S. Environmental Protection Agency
VI	Vapor Intrusion
VOC	Volatile Organic Compound

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Former Naval Surface Warfare Center - Carderock Division, Annapolis Detachment (David Taylor Research Center)		
EPA ID: MD6170024685		
Region: 3	**State:** MD	**City/County:** Annapolis, Anne Arundel County

SITE STATUS	
NPL Status: Non-NPL	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: Other Federal Agency **If "Other Federal Agency" was selected above, enter Agency name:** Department of the Navy
Author name (Federal or State Project Manager): Mr. David Steckler, Remedial Project Manager
Author affiliation: Naval Facilities Engineering Command Washington
Review period: February 2015 – February 2020
Date of site inspection: September 11, 2019
Type of review: Statutory
Review number: 4
Triggering action date: February 12, 2015
Due date *(five years after triggering action date)*: February 12, 2020

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None of the environmental Areas of Concern (AOCs) at the former David Taylor Research Center have protectiveness issues or recommendations:
• AOC 1: Building 44 – Former Sandblasting Pad • AOC 2: Building 119 • AOC 3: Former Fuel Farm • AOC 4: Fuel Tank Farm • AOC 5: Building 120 Machine Shop • AOC 6: Open Storage Area • Building 34 – Flammable Storage Area

Protectiveness Statement(s)

The protectiveness statements for the AOCs are summarized below.

1.AOC 1: Building 44 – Former Sandblasting Pad	*Protectiveness Determination:* • Protective	*Due Date:* NA
Protectiveness Statement: • The remedy at AOC 1 is protective of human health and the environment.		

2. AOC 2: Building 119 – Former Welding /Fabrication Shop	*Protectiveness Determination:* • Protective	*Due Date:* NA
Protectiveness Statement: • The remedy at AOC 2/Building 119 is protective of human health and the environment.		

3. AOC 3: Former Fuel Farm	*Protectiveness Determination:* • Protective	*Due Date:* NA
Protectiveness Statement: • The remedy at AOC 3 is protective of human health and the environment.		

4. AOC 4: Fuel Tank Farm	*Protectiveness Determination:* • Protective	*Due Date:* NA
Protectiveness Statement: • The remedy at AOC 4 is protective of human health and the environment.		

5. AOC 5: Building 120 Machine Shop	*Protectiveness Determination:* • Protective	*Due Date:* NA
Protectiveness Statement: • The remedy at AOC 5 is protective of human health and the environment.		

6. AOC 6: Open Storage Area	*Protectiveness Determination:* • Protective	*Due Date:* NA
Protectiveness Statement: • The remedy at AOC 6 is protective of human health and the environment.		

7. Building 34 – Flammable Storage Area	*Protectiveness Determination:* • Protective	*Due Date:* NA
Protectiveness Statement: • The remedy at Building 34 is protective of human health and the environment.		

Sitewide Protectiveness Statement
The remedies at David Taylor Research Center are protective of human health and the environment, under current land use activities. The remedies or institutional controls implemented for these areas are functioning as intended, and human and ecological risks are currently under control and are anticipated to be under control in the future. However, because contaminants remain in environmental media at some sites at levels that do not allow for unrestricted use/unlimited exposure, the facility does not meet the requirements for Site-Wide Ready for Anticipated Use.

Signature of U.S. Department of the Navy and Date:
Willington Lin **U.S. Navy** **BRAC Environmental Coordinator,** **NAVFAC BRAC Program Mgmt. Office**  19 May 2020 **Date**

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EXECUTIVE SUMMARY

The final remedy for the Naval Surface Warfare Center (NSWC) – Carderock Division, Annapolis Detachment (David Taylor Research Center) located in Annapolis, Maryland included institutional controls in the form of deed restrictions. These restrictions applied to the future use of the site (no residential use), the prohibition of child day care centers, and the prohibition of shallow groundwater use. The site was transferred to Anne Arundel County on October 29, 2002. The County immediately sold the property to Annapolis Partners Limited Liability Corporation (LLC) on the same day. A Record of Decision (ROD) was produced and signed on March 6, 2001. This is the fourth Five-Year Review performed for the sites at David Taylor Research Center. The trigger for this Five-Year Review was the signing of the previous Five-Year Review Report on February 12, 2015.

The assessment of this Five-Year Review found that the remedy is operating in accordance with the requirements of the ROD. The remedy is functioning as designed and is protective of human health and the environment. The current reuse of the property (light industrial activities) is compliant with the institutional controls.

The site inspection, document review, and site interviews have not identified any information that would call into question the protectiveness of the remedy. As long as institutional controls through deed restrictions are maintained and followed for the Areas of Concern (AOC) reviewed herein, risk levels to potential receptors should remain within acceptable levels.

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1.0 INTRODUCTION

This document presents the results of the Fourth Five-Year Review, undertaken to determine whether the final remedy at the former David Taylor Research Center (DTRC) – Carderock Division, Annapolis Detachment, Annapolis, Maryland is protective of human health and the environment. The methods, findings, and conclusions of these evaluations required every five years are documented in Five-Year Review reports.

The Navy prepared this Five-Year Review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The United States Environmental Protection Agency (USEPA) clarified this requirement further in the NCP; 40 Code of Federal Regulations (CFR) §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action.*

On behalf of Naval Facilities Engineering Command (NAVFAC) Washington, Helios Resources Ltd. and Tetra Tech, Inc. (Tetra Tech) conducted this Five-Year Review in response to Task Order 009 under Contract Number N40080-16-D-0322. Representatives of NAVFAC Washington and Tetra Tech conducted a site inspection on September 11, 2019. This Five-Year Review was conducted in accordance with USEPA guidance (USEPA, 2001) and Navy policy (Department of the Navy, 2001c).

This is the fourth Five-Year Review for the former NSWC Annapolis. The triggering action for this statutory review was the signing of the Third Five-Year Review Report on February 12, 2015. The Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. A summary of the previous Five-Year Review Reports completed for the former DTRC is provided below:

- First Five-Year Review Report: Completed by JM Waller Associates on behalf of NAVFAC Washington in December 2004 (Navy signature on May 24, 2005). The report cited the site-wide deed restrictions prohibiting residential land use and shallow groundwater use. The report also listed five Areas of Concern (AOCs) noted for site- specific prohibition of outdoor child daycare facilities. The report concluded that the remedy was functioning as intended by the Record of Decision (ROD), and that no issues were identified related to site operations or implementation of aid remedy. The report also concluded that the remedy was protective of human health and the environment.

- Second Five-Year Review Report: Completed by Agviq-CH2M Hill on behalf of NAVFAC Washington in May 2009 (Navy Signature on March 4, 2010). The report cited that the remedy of institutional controls (ICs) for the former DTRC is protective of human health and the environment.

- Third Five-Year Review Report: Completed by H & S Environmental Inc. on behalf of NAVFAC Washington in January 2015 (Navy Signature on February 12, 2015). The report concluded that the remedy of ICs for the former DTRC is protective of human health and the environment.

2.0 SITE CHRONOLOGY

The former DTRC was originally the U.S. Naval Engineering Experiment Station. Initial construction began in 1903 and was completed in 1908. The Station rapidly expanded, including the addition of fill material (dredge spoils) from the Severn River to increase the land area of the site. The name of the site was changed to the Marine Engineering Laboratory in 1963. In 1967, the Marine Engineering Laboratory was combined with the David Taylor Model Basin to form the Naval Ship Research and Development Center, which later became the David Taylor Research Center. In 1992, the David Taylor Research Center merged with Naval Ship Systems Engineering Station (NAVSSES) of Philadelphia and the site was designated part of the Naval Surface Warfare Center. The primary operations at the site were research and development regarding machinery, metals and alloys, corrosion, welding and fabrication, fuels and lubricants, and coatings to improve the design, shipboard operations, and performance of ships, submarines, and other Navy machinery and equipment. In 1995, the site was scheduled for closure under the Base Realignment and Closure (BRAC) IV.

Various site investigations were performed and decision documents produced during the late 1990s. In 1996, an Environmental Baseline Survey (EBS) Phase I was initiated to document the environmental condition of the facility prior to property transfer. Under the facility EBS program, areas and sites identified with documented releases or other environmental concerns were deferred to the appropriate environmental cleanup or compliance program for further characterization and/or mitigation, depending on the nature of the concern. The EBS Phase I identified nine areas of concern (AOCs) for additional evaluation as identified below:

- Building 3 (Research and Development)
- Building 34 (Research, Training, and Development)
- Building 127 (Electrical System Library)
- Building 132 (Water Supply Pump House)
- Building 184 (Pesticide Mixing Area)
- Open Storage Area, also referred to as AOC 6
- Fuel Tank Farm, also referred to as AOC 4
- Former Fuel Farm, also referred to as AOC 3
- Worthington Basin

In February 1997, an EBS Phase I AOC Evaluation Report classified these nine AOCs into three recommendation categories as identified below:

- EBS Phase II Investigation (three AOCs) – Open Storage Area, Former Fuel Farm, and Fuel Tank Farm

- General Housekeeping (three AOCs) - Building 3, Building 34, and Building 127

- No Further Action (three AOCs) - Building 132, Building 184, and the Worthington Basin

The EBS Phase II Investigation began with an AOC Screening process which confirmed the results of the EBS Phase I AOC Evaluation Report, recommended to proceed with the investigation of three AOCs. Additional state and federal regulatory concerns were addressed in a BRAC review of closure plans and subsequently, four additional AOCs were identified for evaluation by the EBS Phase II Investigation consisting of two previously identified AOCs (Building 127 and Building 184) and two additional identified AOCs (Building 44 – Former

Sandblasting Pad and Building 119 – Welding/Fabrication Shop).

The EBS Phase II Investigation was initiated in 1997 with preparation of EBS Phase II Work Plans. EBS Phase II field investigations were conducted in June and July 1998. The objective of the EBS Phase II Investigation was to collect and evaluate soil analytical data to facilitate property transfer and to close out areas of concern (AOC) as applicable. Based on the analytical results of soil samples collected from each AOC, human and ecological risk evaluations, and subsequent regulatory evaluations, three AOCs were targeted for further evaluation under the Navy's Installation Restoration Program. EBS Phase II AOCs identified for further assessment were:

- Building 119
- Former Fuel Farm
- Open Storage Area

The other four AOCs (Fuel Tank Farm, Building 127, Building 184, and Building 44) required no further action.

In 1999, a Site Investigation (SI) Work Plan was prepared in accordance with the EBS Phase II recommendations for continued investigation of COPCs. The SI was intended to build upon the information developed during the EBS Phase II Investigation to further characterize the AOCs for the presence or absence of contaminants. The work included the identification and quantification of contaminant concentrations, extent of, or potential for migration from suspected sites, and possible effects on human health and the environment based on further screening against the established human and ecological screening criteria. The study consisted of field investigations including monitoring well installation; collection of groundwater, sediment, and soil samples; analysis of samples; and preparation of contaminant profiles. The SI Work Plan also included AOC-specific sampling designs for three additional AOCs added after the EBS Phase II field investigations were completed (Building 120 [Machine Shop, also referred to as AOC 5], Building 34, and the Worthington/Dungan Basins). Therefore, the following AOCs were identified in the SI completed in 2000 with the following recommended actions:

- Building 119 – No further action
- Former Fuel Farm – No further action
- Building 120 – No further action
- Open Storage Area – Scientific Management Decision Point (SMDP) recommended due to potential ecological risk COPCs. The SMDP is defined as a point during the ecological risk assessment (ERA) process when the risk manager evaluates the existing risk information and considers risk management decision options.
- Building 34 (Flammable Storage Area) – No further action.
- Worthington and Dungan Basins - SMDP recommended due to potential ecological risk COPCs. Note that these basins are not considered part of Federal property due to their location in the Severn River and hence these areas were not transferred during the property transfers discussed below, nor were deed restrictions applied to these areas.

The results of the SI were incorporated into the Proposed Remedial Action Plan (PRAP), which was released for public comment in late 2000. The results of the public meeting, including written and verbal comments, were incorporated into the ROD which was issued in March 2001

(Department of the Navy, 2001b). When the ROD was proposed, two remedial alternatives were developed: (1) No Action; and (2) ICs. The selected remedy was Alternative 2, ICs to be protective of human health and of the environment.

The ROD officially stipulated the remedial approach to be ICs. Under this remedy, deed restrictions were implemented to restrict: (1) site-wide residential land use; (2) outdoor child daycare at specific AOCs; and (3) site-wide shallow groundwater use. However, the ROD explains in Section 9.1 (Selected Remedy) that, "*The deed restrictions [for the property] will be detailed in the Finding of Suitability to Transfer, FOST.*" No remedial design or active remedial action was performed at the former DTRC.

On May 24, 2001, the FOST was finalized with USEPA concurrence on November 6, 2001 to transfer the property to the Land Re-Use Authority of Anne Arundel County. On October 29, 2002, the subject property was formally transferred to Anne Arundel County who immediately sold the property to Annapolis Partners LLC, for industrial redevelopment.

According to the FOST, the ICs that are currently in place are to restrict: (1) residential land use facility-wide; (2) AOC-specific outdoor child daycare at six AOCs; and (3) shallow groundwater use only at Building 119. These ICs are the deed restrictions defined in the transfer deed for the facility. The six AOCs identified for ICs (no residential or outdoor child daycare use; no groundwater use at Building 119) consist of:

- Building 44
- Building 119
- Former Fuel Farm
- Building 120
- Fuel Tank Farm
- Open Storage Area

In addition, five other AOCs were identified within the FOST for no further action consisting of Building 3, Building 18, Buildings 125 and 184, Building 34, and Building 127.

A copy of the deed was obtained from the Public Land Records Department of the Anne Arundel County Courthouse on July 9, 2009. Upon inspection of the deed, there are two separate documents detailing the two property transfers, the first transfer from the United States Government to Anne Arundel County and the second transfer from the county to Annapolis Partners, LLC. The deed restrictions are specifically outlined in the first transfer deed and reaffirmed in the second transfer deed.

The review period for the First Five-Year Review Report began in March 2001 and was completed in May 2005. The date of the Site Inspection was March 10, 2004. The report was completed and officially signed May 24, 2005. The review period for the Second Five-Year Review Report was from March 2005 to March 2010. The date of the Site Inspection was June 25, 2009. The review period for the Third Five-Year Review Report is from March 2010 to March 2015. The date of the site inspection was September 23, 2014. The report was completed and signed on February 12, 2015. The review period for this Fourth Five-Year Review Report is from February 2015 to February 2020. The date of the site inspection was September 11, 2019. Table 2-1 summarizes the site chronology.

TABLE 2-1

CHRONOLOGY OF SITE EVENTS
FORMER NSWC ANNAPOLIS
ANNAPOLIS, MARYLAND

Event	Date
Site Activity Begins at US National Engineering Experimental Station	1903
Name Changed to Marine Engineering Laboratory	1963
Marine Engineering Laboratory Combined with David Taylor Model Basin to form the Naval Ship Research and Development Center	1967
Site Designated Part of Naval Surface Warfare Center	1992
Site scheduled to be closed under BRAC IV	1995
Environmental Baseline Survey – Phase I	1996
Environmental Baseline Survey – Phase II	1997
Site Investigation	1999
Proposed Plan released to the public; start of public comment period	2000
Record of Decision (ROD)	2001
Finding of Suitability for Transfer	2001
Property transferred to Anne Arundel County	2002
Property transferred to Annapolis Partners LLC	2002
First Five-Year Review Report Signed	2005
Second Five-Year Review Report Signed	2010
Third Five-Year Review Report Signed	2015
Vapor Intrusion evaluation Building 119 - sampling conducted	2018
Fourth Five Year Review Report Signed	2020

3.0 BACKGROUND

3.1 PHYSICAL CHARACTERISTICS

The former DTRC Annapolis facility is located on the Broadneck Peninsula in Anne Arundel County, Maryland. **Figure 3-1** is a site location map. **Figure 3-2** is a site layout map which includes the AOC locations. The site is approximately two miles northeast of the city of Annapolis and occupies approximately forty-four acres. It consists of seventy-eight buildings and sixteen functional areas and utility units (e.g., wells, sewer pumps, and outdoor electrical substations). To the north is the U.S. Naval Station–Annapolis and to the south is the Severn River.

The topography is rolling, with elevations decreasing with proximity to the Severn River. Maximum relief is approximately sixty feet, although much of the developed portion of the installation is flat lying and adjacent to the Severn River. Areas of the site adjacent to the Severn River, both east and west of the Worthington and Dungan Basins, are reclaimed land areas— areas that were filled starting in the mid-1930s and ending in the early 1950s. The Federal Emergency Management Agency (FEMA) has identified Zone B flood plains at the site. Zone B flood plains are defined by FEMA as areas between the limits of the 100-year and 500-year flood; certain areas subject to 100-year flooding with average depths less than one foot or where contributing drainage areas are less than one square mile; or areas protected by levees from the base flood.

The site is located in the Monmouth-Collington soil association consisting of nearly level to moderately steep, well-drained sandy and loamy soil types. The predominant soil units present at the NSWC Annapolis are the Monmouth fine sandy loam to the north, Keyport silt loam to the east, the Sassafras loam in the central portion and cut and fill to the west and south.

The facility lies within the Atlantic Coastal Plain Physiographic Province and is underlain by interbedded clay, silt, and sand. Geologic mapping efforts for the Broadneck Peninsula, performed by the Maryland Geological Survey in 1976, indicate the western half of the NSWC Annapolis is underlain by the sand of the Aquia Formation. The eastern portion of the site is underlain by the Talbot Formation, a poorly sorted sand, silt, and clay matrix. Low-lying areas in the southern portion of the facility and adjacent to the Severn River consist of artificial fill (i.e., dredge material) used for land reclamation. Maryland Geological Survey estimates the depth of the surficial units at approximately fifty feet. The Monmouth Formation, a sandy clay layer approximately 100 feet thick, lies below the surficial units and represents a major aquiclude that separates groundwater in the shallow zone from groundwater in confined aquifers below. Depth to groundwater in the surficial unit beneath the facility varies ranging from depths greater than forty feet in topographically higher locations to depths as shallow as two feet in the southern portion of the site near the Severn River. The shallow groundwater flow gradient across the site trends in a southeasterly direction toward the Severn River.

3.2 LAND AND RESOURCE USE

The facility is currently a light industrial area comprised of warehouse and office building space. Seven tenants use the office/warehouses. Adjacent land use at the NSA is mixed and includes both residential, recreational, and light industrial use. The nearest residences (Navy housing on the adjacent NSA facility) are immediately adjacent to the DTRC.

There are no permanent water bodies on the site. Surface water runoff from the facility is directed toward the storm water drainage system with discharge to either the Worthington or Dungan Basins along the Severn River or the Severn River directly.

3.3 BASIS FOR REMEDIAL ACTION

The need for a remedial action at the former DTRC facility was based on the history of site activities and the resulting multimedia contamination, nature and extent of the multimedia contamination, a human health and ecological risk assessment, and the comparison of contaminants of concern to calculated, or literature, preliminary remediation goals. A summary of the six AOCs identified as subject to ICs, according to the FOST, are presented below. A summary of one additional area not subject to ICs, Building 34, is also included because it was identified as an AOC in the ROD, and was subject to remedial action (sealing the floor). For each AOC or building, the contamination history, results of investigation(s), and risk assessment results are summarized below.

3.3.1 AOC Summary Discussion

AOC 1: Building 44 – Former Sandblasting Pad

Building 44 is located in the western quadrant of the property on the north side of the main parking lot across from Building 119. The AOC consists of an 18 foot by 20 foot concrete pad. It is bordered by a small strip of uncovered soil on the east side, asphalt pavement on the south side, a block building (Building 44) on the west, and backed by a block retaining wall. It is known to have been the site of a concrete pad for sandblasting operations. **Figure 3-3** shows a map of this AOC.

Surface and subsurface soil was evaluated for potential releases of specific Target Analyte List (TAL) metals and cyanide from its previous use as a sandblasting pad. Six TAL metals (arsenic, aluminum, antimony, copper, selenium, and zinc) were identified as COPCs in the surface soil based on human health (industrial exposure) and ecological risk screening. Arsenic was the only constituent detected above industrial Risk-Based Concentrations (RBCs).

The human health risk assessment completed for Building 44 indicated that both carcinogenic risks and non-carcinogenic effects were acceptable under an industrial land use scenario. The results of the ecological risk assessment and subsequent discussions with the BRAC Cleanup Team (BCT) indicated that this area does not represent a viable habitat for ecological receptors due to the small size of the soil strip in the AOC. Therefore, since the potential area of exposure is limited, there is not a significant ecological receptor population.

It should be noted that the ROD does not mention the Building 44 AOC; however, Building 44 was identified in the FOST as an AOC requiring further action in the form of ICs and in the deed with site-specific deed restrictions prohibiting outdoor child daycare. Building 44 was evaluated in the previous Five-Year Review Report.

Building 44 Summary of Human and Ecological Risks

Based upon the industrial exposure assumptions, the Building 44 AOC poses no unacceptable human health risks. The Building 44 AOC poses no unacceptable ecological risks.

AOC 2: Building 119 – Welding/Fabrication Shop

Building 119 is located in the southwest quadrant of the property (see **Figure 3-2**). It was originally built in 1952 to contain the special fuels that were used for propulsion tests conducted in Building 120. The “special fuels” that were stored there were jet fuel and other lighter-than-diesel fuels. At the time of the facility closure in 1999, the building was used as a fabrication and welding shop.

Building 119 was first identified as a potential environmental concern when soil sampling was conducted by the USEPA in 1992 to assess structural conditions related to a potential site for a proposed USEPA Environmental Science Center. Volatile Organic Compounds (VOCs) trichloroethylene (TCE) and perchloroethylene (PCE), which are common degreasing compounds, were detected in soils. VOCs in soils at Building 119 were further evaluated during the Phase II EBS investigation. This investigation confirmed the presence of TCE and PCE in soils but concentrations were low and no sample results exceeded the most current industrial soil RBC screening levels. Consequently, there were no COPCs identified for the Building 119 site. No ecological risk screening was conducted at Building 119 since incomplete exposure pathways existed due to paving.

An SI was conducted at Building 119 to determine if the shallow groundwater table was impacted due to vertical migration of VOCs from soils. Shallow groundwater and subsurface soil samples at Building 119 were collected during the SI. **Figure 3-4** presents the site layout and the SI and EBS sampling locations at Building 119. One metal, arsenic, was found above the most current industrial soil screening levels in subsurface soil. The arsenic concentrations were, however, within the naturally-occurring background range established during the Phase II EBS. VOC contaminants were found in the shallow groundwater samples collected from the two wells. Groundwater concentrations were compared to the most current USEPA Region III tap water RBCs and Federal Maximum Contaminant Levels (MCLs). Drinking water criteria were selected for comparison standards in the absence of industrial criteria. Four VOCs were found at concentrations in excess of Federal MCLs.

VOC impacts to groundwater at Building 119 are likely due to the mobility of the contaminants identified, and the shallow depth to groundwater (approximately five to seven feet). However, no source and no identifiable groundwater plume were identified. The groundwater involved represents an unnatural zone entrapped in fill material as opposed to a natural geologic formation. This entrapped fill material is also too shallow and limited in extent for suitability as a supply source for water. This groundwater is not a potential drinking water resource and remediation for that purpose is not necessary. The former DTRC is connected to the public drinking water supply for Anne Arundel County and both county and State regulations prohibit the drilling of supply wells in areas served by public water systems. Hence, groundwater uses are neither planned nor permitted and there are no complete pathways to human receptors. A surface water sample was collected on April 16, 2000 from the Severn River in a location directly adjacent to Building 119. No VOCs were detected in the sample. Consequently, the Building 119 AOC is expected to have no adverse effect on ecological receptors.

Building 119 Summary of Human and Ecological Risks

Based upon the industrial exposure assumptions and use of public water supplies, the Building 119 AOC poses no unacceptable human health risks. The VI assessment completed in 2018 identified the potential for unacceptable risk to a hypothetical future resident (note: this scenario is currently disallowed under the existing ICs) and hypothetical future full-time indoor worker. Should land-use in the immediate vicinity of the detected VOCs change, the Navy will take steps to ensure future users are protected from site contaminants.

AOC 3: Former Fuel Farm

This AOC, designated as the Former Fuel Farm (FFF), is located north and adjacent to Worthington Basin (**Figure 3-2**). It is an area encompassing Building 177, two gas turbine generator trailers, an electrical substation, various access drives and parking areas, and

miscellaneous small structures. This area is comprised of various surfaces including asphalt, concrete, grass, dirt, and gravel. This AOC was the location of a former fuel farm that housed eight large above-ground storage tanks (ASTs), constructed between 1934 and 1945, and razed between 1952 and 1958. The ASTs contained heating fuel and diesel fuel and, although there were no documented releases from the FFF, the site was identified as an AOC due to the potential for spills and/or leaks during the time that it was active. **Figure 3-5** is a site layout map.

The potential impact of petroleum storage and transfer activities at the FFF ASTs was initially assessed by a soil boring/sampling investigation in the EBS Phase II study. Four polycyclic aromatic hydrocarbons (PAHs) were identified as contaminants in the surface and subsurface soil at the FFF. The maximum concentration of benzo[a]pyrene slightly exceeded the most current industrial soil screening criterion in soil samples collected from one soil boring. However no cancer risks for benzo[a]pyrene exceeded the USEPA's identified acceptable range for either of the two human exposure groups evaluated (maintenance and construction workers).

Three other PAHs were identified because they exceeded their respective ecological screening criteria for surface soil. Ecological risks at the FFF were evaluated for acenaphthene, fluoranthene, and pyrene. Maximum concentrations of these compounds only marginally exceeded the ecological risk screening numbers. Therefore, it was recommended that these compounds be addressed as part of an SMDP. An SMDP for the FFF was discussed at a BCT meeting held by the Navy, USEPA, and Maryland Department of the Environment (MDE) on April 17, 1999. At that meeting it was agreed that ecological risks from potential exposure to contaminants at the FFF were not sufficient to warrant additional action. The three PAH contaminants only marginally exceeded risk-based screening criteria, the exceedances were localized (i.e., identified in the same surface soil sample), and the contaminants were below a paved surface. PAH constituents in the remaining seven FFF samples were reported in concentrations well below the ecological screening levels. The BCT concluded that continued ecological risk characterization at the FFF would not be required.

Evidence of weathered petroleum noted in several FFF soil borings, and concerns for the shallow groundwater environment resulted in the FFF being investigated further under the SI. Five monitoring wells were installed at the FFF. The sampling and monitoring well locations are shown in **Figure 3-5**. No sample results exceeded the most current industrial soil or tap water RBCs. The SI concluded with recommendation for no further action for the FFF.

Summary of Human and Ecological Risks

Based upon the industrial exposure assumptions, the FFF AOC poses no unacceptable human health risks. The FFF AOC poses no unacceptable ecological risks.

AOC 4: Fuel Tank Farm

The Fuel Tank Farm (FTF) AOC is located in the northwest quadrant (see **Figure 3-2**), occupying approximately 22,000 square feet, and consists of a series of fifteen ASTs that contained various amounts and grades of heating and motor fuel in the past. The FTF currently has one active AST (AST-147) used as a reserve energy source for the steam plant. The rest of the ASTs are either inactive or have been disconnected and removed. **Figure 3-6** shows the layout of the site.

According to the FOST, the FTF was officially transferred to the U.S. Naval Academy in January of 1999, but the operational responsibility still remained with the former DTRC. In June 1999, all but three ASTs were removed from the FTF. Although inactive, AST-27 and AST-28 remained on site. The only remaining active AST on the tank farm was AST-147, but it is unclear if it is still

currently active. In 2000, the Naval Academy designated the Fuel Tank Farm as excess and thus, was scheduled to be included in the transfer deed. The tank farm was officially transferred to Anne Arundel County as part of an Ancillary Parcel, and immediately sold to Annapolis Partners, LLC with the rest of the main property.

As of the Phase II EBS Report in 2000, the remaining ASTs contained only No. 2 fuel oil. There are two separate bermed areas within the fenced fuel farm. The tank farm was constructed during the mid-1950s after the Former Fuel Farm was closed. It is separated into two areas, the old and the new. The north portion was newly bermed (i.e., lined and gravel covered) as of 1997 during the Phase I EBS evaluation. The old area in the southern portion is gravel covered with no known liner. The lower portion of fuel farm was identified as the AOC. It is listed as an AOC because of historical spills. The tanks located in the southern portion are inactive and have been cleaned and disconnected. The area beneath AST Nos. 27, 28, 29, 147, and 148 was underlain by an impermeable layer in 1994. AST Nos. 27, 28, 147, and 148 were active during the Phase I EBS in December 1996 and remained active until June 1999. At the time that the FOST was signed in 2001, AST No. 147 was the only active tank on the fuel farm and met all requirements for ASTs. This 99,960-gallon tank contains No. 2 fuel oil for use by the boilers in the steam plant.

In 1992, petroleum-impacted soil was removed to assess the presence of petroleum hydrocarbons as part of a soil boring investigation. The soil boring report indicated that elevated levels of VOCs existed in two borings along the southern and southeastern borders of the tank farm. It was noted that the petroleum-impacted soil was underlain by relatively non-impacted soil indicating that underlying groundwater was not likely affected. The report concluded that the findings indicated an historical petroleum release. The southern portion of the tank farm was kept as an AOC to verify that the prior soil removal was complete and that no COPCs remained in the soil. See **Figure 3-6** for soil boring locations.

In 2000 under the Phase II EBS, twenty-seven subsurface soil samples were collected from twelve soil borings and analyzed for lead, TPH, PAHs, and BTEX. The analytical results were screened against human health risk-based screening levels. No human health COPCs were identified based on screening against industrial RBCs. A human health toxicological evaluation was conducted and human health risks were calculated to be below levels of concern.

As described above, a soil-removal action was carried out on the FTF site in 1992. In the Phase II EBS investigation, only subsurface soil samples were taken to evaluate the removal action. Since only subsurface soil samples were collected at the site, ecological risk screening was deemed unnecessary and therefore no ecological risk screening was performed.

It should be noted that the ROD did not mention the FTF AOC possibly because it was due to be transferred to NSA at about the same time as the document was signed. The FTF was then included in the transfer deed to Anne Arundel County and then to Annapolis Partners, LLC as an “Ancillary Parcel”. It was reported in the FOST as an AOC requiring further action in the form of ICs and in the deed with site-specific deed restrictions prohibiting outdoor child daycare.

Tank Farm Summary of Human and Ecological Risks

Based upon the industrial exposure assumptions, the Fuel Tank Farm AOC poses no unacceptable human health risks. The Tank Farm AOC poses no unacceptable ecological risks.

AOC 5: Building 120 – Machine Shop

Building 120 is located along the Severn River along the western boundary of the Worthington

Basin (**Figure 3-2**). It was used historically as a propulsion-testing laboratory; however, at the time of the site closure, the building was used as a machine shop. In 1998 the Navy identified staining of the concrete floor in several locations, as well as potential migration pathways (i.e., former utility conduits) to exposed soil in sub-grade areas below the concrete floor. The floor of the building is constructed of a concrete slab that is elevated about four feet above the ground surface. Surface soil and standing water samples were collected from the crawl space below the concrete slab during the SI. The standing water in that area is from the condensate dripping from steam pipes. See **Figure 3-7** for the sampling locations for Building 120.

In surface soils, no organic compounds were identified as human health COPCs but two metals (arsenic and lead) had concentrations in excess of the most current industrial soil screening levels. However, the maximum concentration for arsenic was found to be within the range of naturally-occurring background concentrations. The maximum lead exceedances, although greater than the industrial soil screening level, were not considered to be a significant concern since the lead concentrations were below levels that would prompt USEPA recommendations for response actions for lead-paint-contaminated bare soil based on adult exposure and no reasonably foreseeable complete pathway exists. In addition, the number of lead exceedances was limited (i.e., only two of ten samples exceeded the screening criterion of 400 mg/kg) and the potential for human exposure in the crawl space below Building 120 was low. Ecological risks at Building 120 were not evaluated since there was no ecological exposure route to the subfloor area.

Individual VOCs, Semi-volatile organic compounds (SVOCs), PAHs, and metals were identified as COPCs based on the results of water samples collected from the standing water below the concrete floor of Building 120. COPC identification was based on comparisons to conservative RBCs representing drinking water (tap water) exposure scenarios since there were no industrial water RBCs. Although the use of the tap water standards provided a measure to evaluate the standing water quality results, it did not provide a fair representation of potential risks since it is reasonable to assume that the standing water below Building 120 is not a source of drinking water. Therefore, no action was necessary for the standing water.

Building 120 Summary of Human and Ecological Risks

Based upon the industrial exposure assumptions, the Building 120 AOC poses no unacceptable human health risks. The Building 120 AOC poses no unacceptable ecological risks.

AOC 6: Open Storage Area

The Open Storage Area (OSA) is located in the northwest quadrant (**Figure 3-2**). The AOC is approximately 22,000 square feet and consists of soil, gravel, and sparse grass and weeds, split by three asphalt driveways. Prior to the 1950s, the area was used as a parking lot. Subsequent to that, the area was used for outdoor storage of materials and equipment up until base closure in December 1999. **Figure 3-8** is a site layout map.

The Phase I EBS first noted leaking machinery and stained pavement. The potential environmental impact of the storage-related activities was first assessed during the Phase II EBS by a surface and subsurface soil investigation. The EBS Phase II investigation sample results revealed low levels of VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), and metals in surface soil at the OSA. Although the sample results showed some of the same chemicals in subsurface soil, the concentrations decreased rapidly with depth.

PCBs (specifically Aroclor 1260) were detected in most of the surface soil samples. Aroclor 1260 concentrations exceeded the most current industrial soil screening level and it was identified as a

potential human health contaminant. Several metals, including lead, zinc, cadmium, mercury, nickel, and selenium, were also identified as potential human health contaminants since they were also found above industrial soil screening levels. Cancer and non- cancer risks were evaluated for construction and maintenance workers. The results of the human health toxicological evaluation revealed no unacceptable risk levels.

The ecological risk assessment in the EBS focused on the reported concentrations of aluminum, mercury, and Aroclor 1260, three of twenty-four COPCs identified, as these compounds were determined to the likely risk drivers for potential ecological exposure. The EBS Phase II discussion of ecological risk at the OSA concluded with recommendations for an SMDP assessment for the potential ecological contaminants identified. At a BCT meeting on April 17, 1999, the Navy, USEPA, and MDE discussed an SMDP assessment for the OSA and agreed that soil concentrations of aluminum, mercury, and PCBs were elevated substantially above the ecological screening values. The BCT agreed that additional ecological site characterization be conducted at the OSA. These evaluations were conducted during the SI.

Figure 3-8 depicts the site layout and sampling locations conducted during the SI. The results of the SI sampling revealed ecological screening criteria exceedances for ten metals. Generally, the elevated metals were reported from samples reasonably distributed across the site. Seven pesticides and three PCBs were also identified as ecological contaminants in surface soil collected during the SI. In general, most of the pesticides were found at one location and in low concentrations. Exceedances for the PCB Aroclor 1260, however, were reported in several SI samples and were well distributed throughout the unpaved areas of the OSA. Additional ecological risk evaluations at the OSA were conducted to refine the initial screening level work completed. A Tier 1 Ecological Screening Risk Assessment and Tier 2 Step 3a Refinement of Conservative Exposure Assumptions were conducted to enable an ecological risk management decision by the BCT. A summary of the results indicated that the OSA 1.3-acre site consists of approximately seventy-percent gravel, rocks, and asphalt, and thirty percent disturbed vegetation. Thus, the area for exposure of ecological receptors is about 0.4 acre. The BCT determined that such a small area cannot expose populations of ecological receptors to significant risk. Although some individuals of plant species and soil invertebrates will be exposed, any potential deleterious effect would not be manifested at the population or community level.

OSA Summary of Human and Ecological Risks

Based upon the industrial exposure assumptions, the OSA AOC poses no unacceptable human health risks. The OSA AOC poses no unacceptable ecological risks.

Building 34 – Flammable Storage Area

The Building 34 area was included in the previous Five-Year Review Report because it was specified as an AOC in the ROD, and contamination was left in place within the sealed concrete floor. However, unlike the six AOCs listed above, ICs were not applied to Building 34 per the FOST. Building 34 is located in the southern portion of the northeast quadrant on Greenlee Road (**Figure 3-2**). The concrete building was historically used as part of a sewage treatment system. It was later converted to its existing condition and used as a storage area for flammable substances (i.e., oils, solvents, flammables, as well as acids). **Figure 3-9** is a site layout map.

Oil staining on the floor of the building resulted in investigation as part of the Phase II EBS. Evidence of leaks and spills was documented through visual reconnaissance but the concrete slab floor was found to be in good condition and there were no floor drains or sumps that could act as conduits for contaminants to migrate away from the building. Consequently, Building 34

was recommended for “general housekeeping”. The Navy Environmental Detachment, Charleston, accomplished “housekeeping” on March 12-13, 1999 by conducting a thorough pressure- washing of the floor and lower walls. Staining remained on the concrete floor after the cleaning effort and analysis of concrete chip samples revealed the presence of organic constituents. Because the housekeeping was not successful in removing all contamination from the floor, USEPA and MDE recommended that the floor be sealed to prevent any contaminants from escaping into the environment. According to the FOST, this sealing was accomplished in December 1999 by applying a four-inch layer of reinforced concrete over an impervious membrane.

During the SI, subsurface soil borings were completed downgradient of Building 34 to verify no contaminants had migrated to the surrounding environment. Subsurface soil sampling locations are presented in **Figure 3-9**. The Building 34 subsurface soil sample results revealed no human risks based on concentrations below industrial RBCs. Due to the proposed reuse of the property as an industrial park with a need for child daycare facilities, these results were later re-screened against residential RBCs and no human health COPCs were identified. The area downgradient of Building 34 is covered with asphalt paving. As such, no ecological exposure pathway was available and the Building 34 site does not pose unacceptable risks to ecological receptors.

After the floor was sealed in 1999, the FOST identified that no remedial actions were required. The FOST states that, *“In support of the proposed reuse of the property as a high-tech industrial park with a need for child day care facilities, these results [of the 1999 Site Inspection] were later re-screened against residential RBCs with no human health COPCs identified.”* Therefore, Building 34 was not included in the list of AOCs designated for site-specific ICs restricting outdoor child daycare in the deed.

Building 34 Summary of Human and Ecological Risks

Based upon the industrial exposure assumptions, the Building 34 AOC poses no unacceptable human health risks. The Building 34 AOC poses no unacceptable ecological risks.

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DRAWN BY: J. ENGLISH	DATE: 08/11/14
CHECKED BY: A. McGIVNEY	DATE: 10/30/19
REVISED BY: P. O'BRIEN	DATE: 10/30/19
SCALE: AS NOTED	

SITE LOCATION MAP
FORMER DAVID TAYLOR
RESEARCH CENTER
ANNAPOLIS, MARYLAND

CONTRACT NUMBER: 16-D-0322	TO NUMBER: 009
APPROVED BY: ___	DATE: ___
APPROVED BY: ___	DATE: ___
FIGURE NO.: FIGURE 3-1	REV: 1

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DRAWN BY: J. ENGLISH	DATE: 08/12/14	SITE LAYOUT MAP FORMER DAVID TAYLOR RESEARCH CENTER ANNAPOLIS, MARYLAND	CONTRACT NUMBER: 16-D-0322 / TO NUMBER: 009
CHECKED BY: A. McGIVNEY	DATE: 11/01/19		APPROVED BY: ___ / DATE: ___
REVISED BY: P. O'BRIEN	DATE: 11/01/19		APPROVED BY: ___ / DATE: ___
SCALE: AS NOTED			FIGURE NO.: FIGURE 3-2 / REV: 1

PGH P:\GIS\ANNAPOLIS_NS\MAPDOCS\MXD\BLDG44_AOC_REV1.MXD 10/30/19 PFO

DRAWN BY: J. ENGLISH	DATE: 08/14/14
CHECKED BY: A. McGIVNEY	DATE: 10/15/14
REVISED BY: P. O'BRIEN	DATE: 10/30/19
SCALE: AS NOTED	

AOC 1 (BUILDING 44) - SITE LAYOUT
FORMER DAVID TAYLOR
RESEARCH CENTER
ANNAPOLIS, MARYLAND

CONTRACT NUMBER: 16-D-0322	TO NUMBER: 009
APPROVED BY: ___	DATE: ___
APPROVED BY: ___	DATE: ___
FIGURE NO.: FIGURE 3-3	REV: 1

PGH P:\GIS\ANNAPOLIS_NS\MAPDOCS\MXD\BLDG119_AOC_REV1.MXD 11/18/19 PFO

DRAWN BY: J. ENGLISH	DATE: 08/11/14
CHECKED BY: A. McGIVNEY	DATE: 11/18/19
REVISED BY: P. O'BRIEN	DATE: 11/18/19
SCALE: AS NOTED	

NAVFAC

BUILDING 119 AOC - SITE LAYOUT
FORMER DAVID TAYLOR RESEARCH CENTER
ANNAPOLIS, MARYLAND

CONTRACT NUMBER: 16-D-0322	TO NUMBER: 009
APPROVED BY: ___	DATE: ___
APPROVED BY: ___	DATE: ___
FIGURE NO.: FIGURE 3-4	REV: 1

PGH P:\GIS\ANNAPOLIS_NS\MAPDOCS\MXD\FORMER_FUEL_FARM_AOC_REV1.MXD 11/18/19 PFO

DRAWN BY J. ENGLISH	DATE 08/11/14	FORMER FUEL FARM AOC - SITE LAYOUT FORMER DAVID TAYLOR RESEARCH CENTER ANNAPOLIS, MARYLAND	CONTRACT NUMBER 16-D-0322 / TO NUMBER 009
CHECKED BY A. McGIVNEY	DATE 11/18/19		APPROVED BY ___ / DATE ___
REVISED BY P. O'BRIEN	DATE 11/18/19		APPROVED BY ___ / DATE ___
SCALE AS NOTED			FIGURE NO. FIGURE 3-5 / REV 1

PGH P:\GIS\ANNAPOLIS_NS\MAPDOCS\MXD\FUEL_TANK_FARM_AOC_REV1.MXD 10/30/19 PFO

DRAWN BY K. MOORE	DATE 10/15/14	FUEL TANK FARM AOC FORMER DAVID TAYLOR RESEARCH CENTER ANNAPOLIS, MARYLAND	CONTRACT NUMBER 16-D-0322 / TO NUMBER 009
CHECKED BY A. McGIVNEY	DATE 10/15/14		APPROVED BY ___ DATE ___
REVISED BY P. O'BRIEN	DATE 10/30/19		APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. FIGURE 3-6 / REV 1

PGH P:\GIS\ANNAPOLIS_NS\MAPDOCS\MXD\BLDG120_AOC_REV1.MXD 11/18/19 PFO

DRAWN BY J. ENGLISH	DATE 08/11/14	BUILDING 120 AOC - SITE LAYOUT FORMER DAVID TAYLOR RESEARCH CENTER ANNAPOLIS, MARYLAND	CONTRACT NUMBER 16-D-0322 / TO NUMBER 009
CHECKED BY A. McGIVNEY	DATE 11/18/19		APPROVED BY ___ DATE ___
REVISED BY P. O'BRIEN	DATE 11/18/19		APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. FIGURE 3-7 / REV 1

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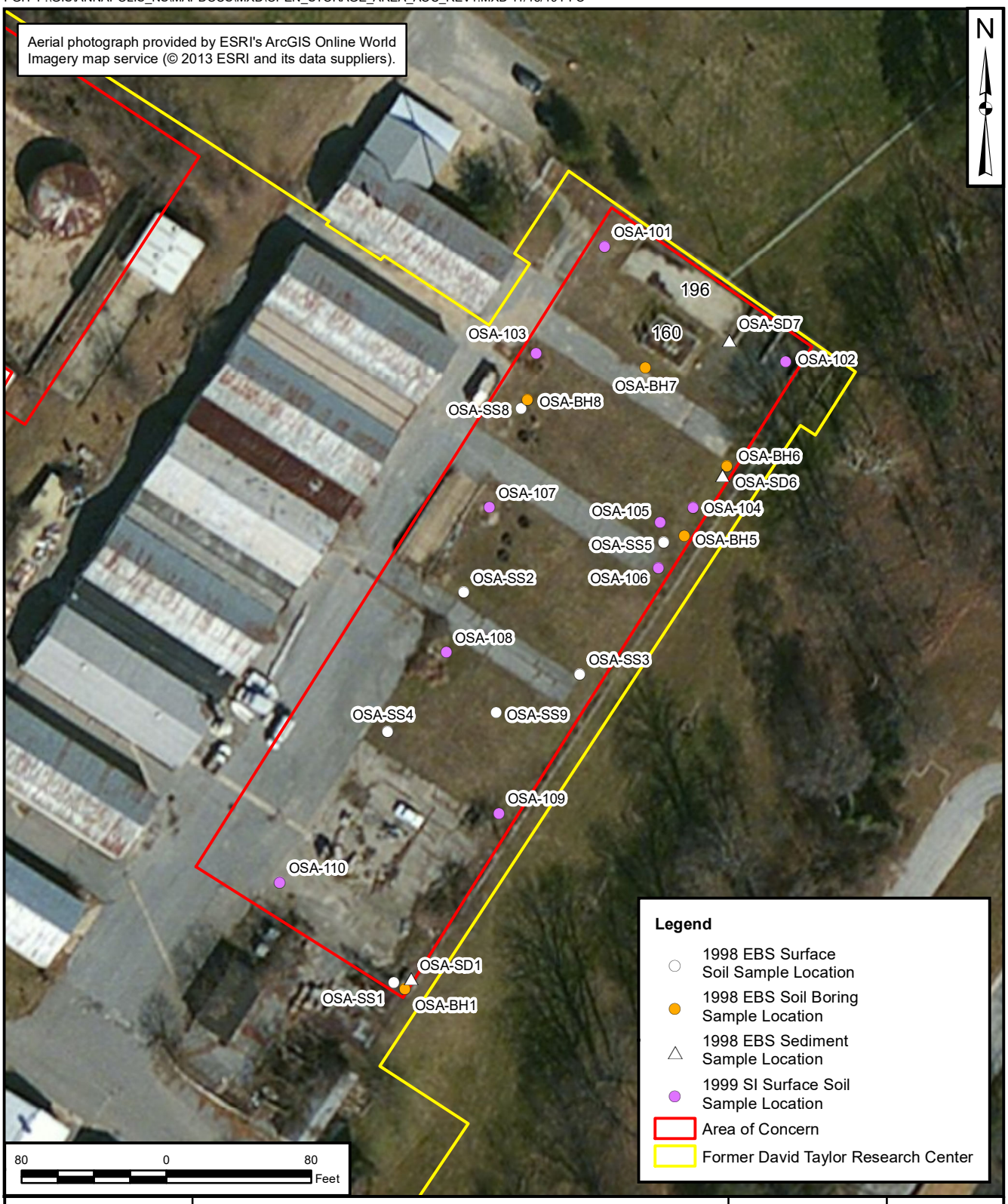

DRAWN BY J. ENGLISH	DATE 08/11/14	OPEN STORAGE AREA AOC - SITE LAYOUT FORMER DAVID TAYLOR RESEARCH CENTER ANNAPOLIS, MARYLAND	CONTRACT NUMBER 16-D-0322 / TO NUMBER 009
CHECKED BY A. McGIVNEY	DATE 11/18/19		APPROVED BY ___ DATE ___
REVISED BY P. O'BRIEN	DATE 11/18/19		APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. FIGURE 3-8 / REV 1

PGH P:\GIS\ANNAPOLIS_NS\MAPDOCS\MXD\BLDG34_AOC_REV1.MXD 11/18/19 PFO

DRAWN BY: J. ENGLISH	DATE: 08/11/14	BUILDING 34 - SITE LAYOUT FORMER DAVID TAYLOR RESEARCH CENTER ANNAPOLIS, MARYLAND	CONTRACT NUMBER: 16-D-0322 / TO NUMBER: 009
CHECKED BY: A. McGIVNEY	DATE: 11/18/19		APPROVED BY: ___ / DATE: ___
REVISED BY: P. O'BRIEN	DATE: 11/18/19		APPROVED BY: ___ / DATE: ___
SCALE: AS NOTED			FIGURE NO.: FIGURE 3-9 / REV: 1

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4.0 REMEDIAL ACTION

4.1 REMEDY SELECTION

The results of the human health and ecological risk assessments completed for the former DTRC revealed no unacceptable levels of risk based on the identified routes of exposure. The human health risk assessments were based on Anne Arundel County's planned industrial reuse of the facility. Conservative industrial human exposure assumptions were developed and evaluated. Reuse scenarios with greater potential exposure and potentially greater human health risks, (i.e., residential reuse) were not evaluated since industrial reuse has been identified as the sole reuse option.

A detailed analysis of the possible remedial alternatives for the site was included in the SI report. The detailed analysis was conducted in accordance with the USEPA document entitled *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA and the NCP.*

The formal selected remedy for the site involved the implementation of ICs. These ICs include base-wide deed restrictions prohibiting permanent residential land use. A restriction against outdoor daycare facilities at the AOCs was included along with a restriction against shallow groundwater use at Building 119.

The selected remedy of ICs at the former DTRC is presented in the ROD (March 2001) with specific details regarding the deed restrictions identified in the FOST (November 2001).

- The ROD states that, *"Base-wide ICs will include restricting the site to industrial use and a prohibition on the use of ground water. A site-specific IC will include a restriction on outdoor day-care activities at each of the five AOCs. The ICs will be provided in the transfer deeds."*

- The ROD states in Section 9.1 that *"The deed restrictions will be detailed in the FOST."* The FOST defines the AOC-specific application of the ICs. For example the FOST includes an AOC-specific deed restriction preventing use of groundwater at the Building 119 AOC, rather than the base-wide groundwater use restriction first identified in the ROD.

- The FOST states *"The CERCLA remedial response documented in [the ROD] shall establish deed restrictions to run in perpetuity, which shall prohibit use of this shallow sub-surface water."* The entire base is supplied with municipal water and County and State regulations prohibit the installation of a water supply well in an area served by a public water system. Therefore, this matter does not affect the protectiveness of the remedy, since no drinking water supply wells will be installed on the facility.

The ICs described in the FOST were added to the property transfer deed, which was executed in 2002. The property was then immediately transferred again to the private land

developer Annapolis Partners, LLC. The ICs were verified in the latest deed. Copies of the deeds are on file at the Anne Arundel County Courthouse at the Department of Public Land Records. Therefore, the following covenants and restrictions from the first deed that transferred the property from the U.S. Government to Anne Arundel County are still in place:

- Covenant and Restriction Regarding Outdoor Child Daycare: Prohibition from using these specified AOCs for outdoor child daycare purposes.
  - AOC 1 – Building 44 – Former Sandblast Pad
  - AOC 2 – Building 119 – Welding/Fabrication Shop
  - AOC 3 – Former Fuel Farm
  - AOC 4 – Tank Farm
  - AOC 5 – Building 120 – Machine Shop
  - AOC 6 – Open Storage Area
- Covenant and Restriction Regarding Use of Ground Water: Prohibition from using shallow groundwater for drinking or any other purpose in AOC 2 [Building 119].
- Covenant and Restriction Regarding Permanent Residential Use: Prohibition from using DTRC for permanent residential purposes.

In accordance with Section 121 of CERCLA, a ROD was issued for the former DTRC facility in March 2001, which called for the deed restrictions outlined in the FOST (November 2001). These restrictions were recorded into the property transfer deeds. The remedial action is to be reviewed at least once every five years to re-evaluate facility conditions, confirm the presence of ICs, and determine the need for further remedial action to protect human health.

4.2 SYSTEM OPERATION/OPERATION AND MAINTENANCE

There are no active remedial systems in operation at the NSWC Annapolis. The remedy is ICs. There have been no operation and maintenance costs incurred to date.

5.0 PROGRESS SINCE THE LAST REVIEW

This is the Fourth Five-Year Review Report for the former DTRC. There have been no significant changes in property use since the previous Five-Year Review. There has been no recent investigation sampling or additional data collected at DTRC, with one exception. Since the last Five-Year Review, additional investigation at one AOC (Building 119) was completed.

During the EBS – Phase II (EA, 2000a) and the Site Investigation (SI) (EA, 2000b) for DTRC, elevated concentrations of specific CVOCs were found in soil gas, soil and shallow groundwater (approximately 6 feet bgs) at the Building 119 AOC. As noted within the Building 119 AOC Summary section of the United States Environmental protection Agency (USEPA) Record of Decision (ROD) for the site (USEPA, 2001), "No source [of the CVOCs] was identified and no identifiable groundwater plume exists. The groundwater involved represents an unnatural zone entrapped in fill material as opposed to a natural geologic formation. It is also too shallow and limited in extent to serve as a supply source for water. The Facility was recently connected to public drinking water supply for Anne Arundel County and both county and state regulations prohibit the drilling of supply wells in areas served by public water systems."

Therefore, at the time of the 2000 SI and 2001 ROD, it was concluded that the Building 119 AOC posed no unacceptable human health risks. It was noted, however, in the third Five-Year Review that the VI pathway for CVOCs at Building 119 had not been quantitatively evaluated in previous investigative work (H&S and Tt, 2015).

Due to the finding of the third Five-Year review and results from the prior sampling/investigations, a vapor intrusion (VI) evaluation and human health risk assessment (HHRA) was conducted for selected chlorinated volatile organic compounds (CVOCs) at the Building 119 Area of Concern (AOC) in January 2018. The results of the 2018 VI evaluation are summarized in Section 6.4.

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6.0 FIVE YEAR REVIEW PROCESS

6.1 ADMINISTRATIVE COMPONENTS

The USEPA and MDE were notified of the initiation of the Five-Year Review in August 2019. The NSWC Annapolis Five-Year Review team was led by Mr. David Steckler, the Remedial Project Manager (RPM) for the Navy. Ms. Linda Gustafson, the MDE RPM, participated in the review.

Tetra Tech prepared the review document under contract to the navy. The following are components of the Five-Year Review:

- Community involvement
- Document review
- Data review
- Site inspection
- Five-Year Review report development and review

6.2 COMMUNITY INVOLVEMENT

A public notice was published in *The Baltimore Sun* newspaper on August 14, 2019 and the *Bowie Blade News* newspaper on August 15, 2019 that a Five-Year Review was being conducted for NSWC Annapolis.

Upon completion of the Five-Year Review, notices will be sent to the same local newspapers indicating that the results of the review are available to the public at the location identified below:

U.S. Naval Academy
Environmental Division
Attn: Ms. Wendy Martinko
Halligan Hall (Building 181)
181 Wainwright Road
Annapolis, MD 21402
Phone: 410-293-1024
Wendy.martinko@navy.mil

6.3 DOCUMENT REVIEW

The Five-Year Review included a review of relevant documents. The documents reviewed included the following:

- EA Engineering, Science, and Technology, Inc., 1996. *Environmental Baseline Survey, Naval Surface Warfare Center, Carderock Division-Annapolis Detachment.* Final prepared for Department of the Navy Engineering Field Activity Chesapeake. December.

- EA Engineering, Science, and Technology, Inc., 2000a. *Environmental Baseline Survey, Phase II Report of Results, Naval Surface Warfare Center, Carderock*

Division– Annapolis Detachment, Annapolis, Maryland. Final prepared for Department of the Navy Engineering Field Activity Chesapeake. June.

- EA Engineering, Science, and Technology, Inc., 2000b. *Site Investigation Naval Surface Warfare Center, Carderock Division–Annapolis Detachment, Annapolis, Maryland.* Final prepared for Department of the Navy Engineering Field Activity Chesapeake. June.

- Department of the Navy, Engineering Field Activity Chesapeake, 2001a. Finding of Suitability to Transfer (FOST) – Former Naval Surface Warfare Center (NSWC) – Carderock Division, Annapolis Detachment, Annapolis, Maryland. May.

- Department of the Navy, Engineering Field Activity Chesapeake, 2001b. Record of Decision – Former Naval Surface Warfare Center (NSWC) – Carderock Division, Annapolis Detachment, Annapolis, Maryland. March.

- Department of the Navy, Naval Facilities Engineering Command Washington, 2004. *Final Five-Year Review Report for Naval Surface Warfare Center (NSWC) – Carderock Division, Annapolis Detachment, Annapolis, Maryland*. December.

- Department of the Navy, Naval Facilities Engineering Command Washington, 2010. *Final Five-Year Review Report for Naval Surface Warfare Center (NSWC) – Carderock Division, Annapolis Detachment, Annapolis, Maryland*. May.
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- Department of the Navy, Naval Facilities Engineering Command Washington, 2015. *Final Five-Year Review Report for Naval Surface Warfare Center (NSWC) – Carderock Division, Annapolis Detachment, Annapolis, Maryland*. January.

6.4 DATA REVIEW

The remedy for NSWC Annapolis involves only deed restrictions on property use. No documentation was found to indicate the intended current and future use (i.e., commercial/industrial use) plans for usage and development have changed. As noted previously, the ICs currently in-place on the property prevent residential use of the property.

Past environmental reports were reviewed to identify operational history or data suggesting further evaluation of emerging contaminants is warranted for the AOCs transferred. The USEPA defines an emerging contaminant as a chemical or material characterized by a perceived, potential, or real threat to human health or the environment or by a lack of published health standards (USEPA, 2013). A contaminant also may be "emerging" because of the discovery of a new source or a new pathway to humans.. Per- and polyfluoroalkyl substances (PFAS), the class of chemicals in aqueous film-forming foam (AFFF), are considered emerging contaminants and their potential health risks are being examined by the United Stated Environmental Protection Agency (USEPA).

As a voluntary and proactive measure to confirm the presence or absence of PFAS at the former DTRC, on 19 July 2017, the Navy collected groundwater samples from four direct-push locations that correspond to the locations of former monitoring wells. The results indicated the PFAS were present in groundwater but at concentrations beneath the published USEPA Lifetime Health Advisory Level. Details of the sampling and results were provided to the property owners in a letter report dated 19 September 2017. That letter report was also provided to the MDE.

A soil vapor assessment was completed at the Building 119 AOC in 1998 as part of the EBS Phase II investigation. Elevated levels of chlorinated VOCs (e.g., greater than 100 parts per million by volume) were detected in 8 of 19 soil vapor samples. However, due to the small area of impacts, and the unoccupied structure representing an incomplete exposure pathway, no further action was required concerning VI at that time.

In January of 2018, a vapor intrusion (VI) evaluation and human health risk assessment (HHRA) was conducted for select volatile organic compounds (VOCs) at the Building 119 Area of Concern (AOC) at the Former David Taylor Research Center site, Annapolis, Maryland. The potential for the presence of the following CVOC chemicals of potential concern (COPCs) in soil gas and groundwater at the Building 119 AOC was evaluated:

- 1,1,1-Trichloroethane (1,1,1-TCA)
- 1,1-Dichloroethane (1,1-DCA)
- 1,1-Dichloroethylene (1,1-DCE)
- Chloroethane
- cis-1,2-Dichloroethene (cis-1,2-DCE)
- Tetrachloroethylene (PCE)
- trans-1,2-Dichloroethene (trans-1,2-DCE)
- Trichloroethylene (TCE)
- Vinyl Chloride

Results from soil gas and groundwater sampling were then used to prepare a VI HHRA as an addendum to the Final HHRA prepared for groundwater from the site (EA, 2000).

The VI assessment objective was to quantify potential VI risk under both a future hypothetical resident and commercial indoor worker exposure scenario. From analyzing both groundwater and soil gas data, the assessment concluded that there was the potential for unacceptable risk to a hypothetical future resident and hypothetical future full-time indoor worker. A conservative estimate of VI risk relative to the current building use was depicted in these future exposure scenarios. During this assessment, Building 119 was infrequently occupied and the future hypothetical commercial indoor worker scenario assumes frequent, long-duration occupancy (i.e., 8 hours/day, 250 days/year). In estimating indoor air concentrations, the USEPA's Johnson and Ettinger (J&E) VI modeling tends to be conservative, whereas actual indoor air data would provide a more accurate representation of the VI risk.

In summary, the following conclusions were reported for the 2018 VI assessment. The modeled indoor air from both groundwater and soil gas data exceeded target risk levels for the hypothetical resident. The primary risk driver in groundwater and soil gas was TCE for both cancer risk and non-cancer hazard. Vinyl chloride in groundwater exceeded target risk levels for carcinogenic effects only. Also, the modeled indoor air from both groundwater and soil gas data have exceeded target risk levels for the indoor worker. The only risk driver in groundwater and soil gas is TCE for both cancer risk and non-cancer hazard.

Institutional controls restrict future residential use of the site. Building 119 is currently not occupied. Should land use in the area of Building 119 change in the future (e.g., new construction, or tenants occupying Building 119), the results of the VI assessment should be taken into account to ensure that future users are protected from site contaminants.

6.5 SITE INSPECTION

An inspection of the site was conducted on September 11, 2019 by representatives of the Helios/Tetra Tech team and the Navy, with access facilitated by the current owner. The purpose of the inspection was to assess the protectiveness of the remedy and to document that the ICs applied to the site are currently in place and effective. Appendix A is the site inspection report.

The property is currently home to seven tenants. The Joint Spectrum Center, a Department of Defense entity, is the largest tenant. The remaining tenants are generally light industrial. Naval housing developments, part of the Naval Station, are adjacent to the property. Access to the subject property is through the housing development – therefore it is restricted and a security pass is required for any visitor.

Visual inspection of the five AOCs detailed in the ROD was conducted. The AOCs and their current usage, if any, are summarized below:

Building 44 – AOC 1, the former Building 44 Sandblasting Pad, is comprised of an abandoned concrete pad near the edge of a steeply sloped, wooded area. Former Building 44 and many of the structures near AOC 1, including Building 184 (a pole building located immediately east of AOC 1), are overgrown with vegetation. AOC 1 appears to be covered with a fallen tree, piles of asphalt millings, broken concrete debris, and a sand pile. Several large trench drains were observed in the paved, unused parking area adjacent to AOC 1.

Building 119 – AOC 2, Building 119, is located next to Building 120, and is currently used as a storage annex by Joint Spectrum Center, the tenants of Building 120. No usage or occupants of Building 119 were observed during the site inspection. A number of monitoring well covers were observed on the ground surface around Building 119.

Former Fuel Farm – The area identified as AOC 3, the Former Fuel Farm, currently contains Building 109, Building 177, and a grass-covered area containing an electrical substation and several tractor trailers that contain unused power generation equipment. The buildings appear vacant. The parking lot is used for employees of the Joint Spectrum Center, located across the street. According to the current property owner, the former fuel farm was likely situated primarily in the grassy area, which presently contains some concrete berms and metal anchors.

Fuel Tank Farm – AOC 4, the fuel tank farm, consists of a large gravel-covered area containing several above-ground storage tanks and associated product piping, and some grass-covered areas where tanks have been removed. All of the ASTs at AOC 4 are reportedly inactive/abandoned, with the exception of one 996,000-gallon fuel oil AST that may serve as a backup energy source for the steam plant. (It was unclear based on the site inspection whether any product remains in the AST). The southern portion of the fuel tank farm corresponding to AOC 4 was becoming overgrown with small trees and vegetation.

Building 120 – AOC 5, Building 120 is home to the Joint Spectrum Center, a Department of Defense entity. The building is actively used as an office complex.

Open Storage Area – AOC 6, the Open Storage Area is currently a grassed and asphalt covered area. It appears to be used for staging parked vehicles and trailers by tenants leasing the nearby garage bays from the property owner.

Building 34 – Building 34 appears unused and abandoned. The north side of the building including several metal (possibly fireproof) doors was covered in ivy and poison ivy vines.

Appendix B contains photographs of each AOC discussed above. Based on the site inspection, there are no residential developments or daycare facilities on the site.

In summary, no significant site issues were identified. No documentation for the former DTRC is kept on-site. The Administrative Record including a copy of this Five-Year Review is available at the address listed in Section 6.2.

6.6 PUBLIC RECORDS

Land Records for Ann Arundel County are available digitally for public viewing on the county website, and digital land records set are obtained through the State of Maryland's online land records database, MDLANDREC (www.Mdlandrec.net). The land record volumes (deeds, land use agreements, assignments, etc.) kept by the Clerk of the Circuit Court for Anne Arundel County are maintained and indexed on MDLANDREC.net. A search was performed on MDLANDREC.net for the deeds and associated land use records for the site on November 5, 2019 the availability of these records was confirmed at the Anne Arundel County Clerk of the Circuit Court office in Annapolis, Maryland.

Transfer of the subject parcels (i.e., David Taylor main parcels and ancillary parcels) from the United States of America to Anne Arundel County Maryland (the local redevelopment authority; "LRA") is recorded in Deed Book 12054, pp. 55-189 ("the transfer deeds"), dated October 29, 2002. Sections 7, 8, and 9 of "Notices, Covenants, Conditions, Reservations, and Restrictions" (Book 12054, pp. 61-62) within the transfer deeds include restrictions preventing future use of the property for day care, residential purposes, and future use of groundwater for drinking water purposes. The original deeds for the transferred properties (main parcels and ancillary parcels) also include a "Notice of Environmental Condition" (Book 12054, pp. 57-58) and incorporate by reference the environmental reports related to the site (e.g., the EBS, ROD, FOST, etc.). Exhibit G (Book 12054, pp. 112-129) recorded in the transfer deeds includes a list of hazardous substances which were known to have been stored, used or disposed at the site.

On the same date as the above-referenced deeds, two quitclaim deeds (Book 12054, pp. 477-515, and pp. 516-525) were recorded transferring the subject parcels from the LRA to the developer, Annapolis Partners, LLC. These deeds referenced the preceding deeds, and therefore incorporated the environmental covenants and restrictions by reference. A Redevelopment Agreement was also recorded with these deeds (Book 12054, pp. 311-469) and was reviewed for language related to land use restrictions. Article 4 (Development Performance Standards) includes the prohibition of future use of the property for residential purposes, but does not explicitly mention the prohibition of future day care uses.

It should be noted that the environmental reports, incorporated by reference in the original deeds, are not recorded in the county's land records and are not available at the Clerk of the Circuit Court office. The grantee, Annapolis Partners, LLC acknowledged receipt of these records by its executed acceptance of the deed. Any instrument recorded for future transfer of the property would be required to incorporate or reference the original covenant at a minimum, as well as subsequently identified environmental covenants and restrictions, if any. As per Book 12054, page 057, the environmental reports referenced in the original deeds and related covenants must "run with the land" and must be provided to any subsequent owners, developers, or grantees.

The following ICs are currently being implemented: (1) restriction on residential land use; (2) restriction on AOC-specific outdoor child daycare facilities; and (3) restriction on shallow groundwater use at Building 119.

The Anne Arundel County Department of Public Works indicated that the subject property uses

municipal water. As such, any future request for a permit for water supply well installation at the facility would not be issued. The Anne Arundel County Health Department verified that there are no water supply wells on the former DTRC.

6.7 INTERVIEWS

As part of the Five-Year Review process, interviews were conducted with key personnel, including representatives from the Navy, MDE, and Annapolis Partners (redevelopment authority). Copies of the interviews are contained in Appendix C. Responses in general were favorable and did not call into question the effectiveness of the remedy for the former DTRC.

7.0 TECHNICAL ASSESSMENT

7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

The review of documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions, and the results of the site inspection indicate that the final remedy is functioning as intended by the ROD. The ICs placed on the site, including prohibition of residential development and the establishment of child daycare facilities, along with the prohibition of groundwater usage, are in effect. The effective implementation of these ICs has satisfied the remedial action objectives of the prevention of land use which may permit human exposure greater than associated with industrial use and the use of site groundwater.

A site inspection and records review with several Anne Arundel County departments verified the site has met the remedial action objectives and the ICs have been implemented. Based on conversations with other interested parties, there are no indications of any difficulties with the final remedy.

There were no opportunities to improve the performance and/or to reduce costs due to the fact that no environmental monitoring is currently performed at the former NSWC Annapolis.

7.2 QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEAN-UP LEVELS, AND REMEDIAL ACTION OBJECTIVES (RAOS) USED AT THE TIME OF THE REMEDY SELECTION STILL VALID?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the final remedy. ICs have been effective in maintaining the exposure assumptions on which RAOs were based.

7.2.1 Changes in Standards and To Be Considered (TBCs)

The remedy cited in the ROD was not based on chemical-specific ARARs. When the property was transferred from the Navy, all location and action specific ARARs and TBCs, as cited in the ROD, were satisfied.

7.2.2 Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

DTRC was evaluated in the EBS for potential risks to people who currently use the facility and may use the facility in the future. Exposure to contaminants in surface soil was considered for the human health risk assessment (HHRA). Carcinogenic and non-cancer risks were calculated on the basis of current and future proposed land uses both of which are an industrial land use scenario. Although a public water supply is available, the HHRA included potential risk from exposure to groundwater by hypothetical future residents. Site-specific exposure was considered for maintenance and construction workers and adult and child residents (groundwater use only).

Current toxicity factors were compared to those used in the EBS HHRA in the year 2000. Specifically, USEPA Regional Screening Levels (RSLs), cancer slope factors (CSFs), and reference doses (RfDs) were evaluated. In most cases, the maximum detected concentrations were still less than the Region 3 RSLs. In the second Five-Year Review, two additional COPCs

were identified at two AOCs, the OSA and Building 34. Specifically, vanadium would be retained as a COPC for both the OSA and Building 34 and dieldrin would be retained as a COPC at the OSA. However, in both cases, the maximum detected COPC concentrations marginally exceeded the updated screening levels. This comparison was repeated for the fourth Five-Year Review. Based on comparison of concentrations from the EBS to current (updated in November 2019) RSLs, the risk assessment conclusions would not change for COPCs identified in the HHRA. A tapwater screening level for Perchlorate (PCE) of 14 µg/L was published by USEPA. However, groundwater use for drinking water purposes is prohibited by the ICs applied to AOC 2. The CSFs and RfDs used to develop the cancer and non-cancer risk estimates presented in the EBS have not changed, with the exception of vanadium. Although the RfD has changed from that used during the EBS, risks to humans would be within the acceptable range assuming the restriction preventing residential use of the AOCs remains in effect.

There have been no changes in the exposure assumptions and toxicity data that would significantly alter the conclusions for ecological risk at each AOC. Maximum surface soil concentrations were compared to USEPA Region 3 Biological Technical Assistance Group (BTAG) values and USEPA ecological soil screening levels (ESLs) (which were finalized in November 2003 for select metals and dieldrin). Although some current BTAG values and ESLs were lower than those used in the EBS Screening Level Ecological Risk Assessment (SERA), these changes do not result in a change to the risk conclusions for the AOCs in general. However, additional metals and/or PAHs that were not originally recommended for inclusion in the SMDP would now be included in the SMDP discussions. As noted in the ROD for the NSWC Annapolis, additional investigations at some of the AOCs were conducted as a result of the chemicals already recommended for consideration in the SMDP. No ecological risks were deemed unacceptable at any of the AOCs based on limited or lack of ecological habitat at each AOC. The fact that some toxicity criteria are lower than criteria used in the EBS does not change the final risk conclusions for each of the AOCs because the exposure assumptions have not changed (i.e., complete exposure pathways do not exist due to limited habitat).

In summary, since site usage has not changed, there are no changes in the exposure pathways or receptors. Changes in contaminant toxicity values have been minor and have not impacted the protectiveness of the remedy for NSWC Annapolis.

7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT CALLS INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

The site inspection, document review, and interviews have identified no information that would call into question the current protectiveness of the remedy.

7.4 TECHNICAL ASSESSMENT SUMMARY

According to the data reviewed and the site inspection, the final remedy is functioning as intended by the ROD. As long as the ICs using deed restrictions to prohibit residential use, operation of child day care facilities, or groundwater use remain in-place and are followed, risk levels to humans should remain within acceptable levels under current use.

8.0 ISSUES/RECOMMENDATIONS

8.1 FIVE-YEAR REVIEW ISSUES AND RECOMMENDATIONS

The table below summarizes any issues and related recommendations identified as a result of completing this Five-Year Review.

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
There are no protectiveness issues or recommendations identified for the AOCs at the former DTRC: • AOC 1: Building 44 – Former Sandblasting Pad • AOC 2: Building 119 • AOC 3: Former Fuel Farm • AOC 4: Fuel Tank Farm • AOC 5: Building 120 Machine Shop • AOC 6: Open Storage Area • Building 34: Flammable Storage Area

8.2 OTHER FINDINGS

During the completion of this Five-Year Review, the following finding was identified as items that do not affect current protectiveness. However, there are actions being undertaken to ensure protectiveness is maintained, including CERCLA management activities that are currently underway.

Other Findings
AOC 2
The potential for future risk due to VI exists at AOC 2. Should the intended future land use change the Navy should work with the current owner of the property to ensure that this risk is mitigated.

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9.0 PROTECTIVENESS STATEMENT

Protectiveness Statement(s)
Protective Remedies: The remedy of ICs for AOCs 1, 2, 3, 4, 5, 6 and Building 34 at the former DTRC is protective of human health and the environment. The final remedy is functioning as intended. The exposure assumptions, toxicity data, clean-up levels, and RAOs used at the time of the final remedy selection are still valid. No other information has come to light that could call into question the protectiveness of the final remedy.

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10.0 NEXT REVIEW

The next Five-Year Review for the former NSWC Annapolis will be completed within five years of the signature date of this report.

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11.0 REFERENCES

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Resolution Consultants. *Final Technical Memorandum –Vapor Intrusion Evaluation and Human Health Risk Assessment at the Former David Taylor Research Center, Annapolis, Maryland.* August 22, 2018.

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APPENDIX A

SITE INSPECTION REPORT

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APPENDIX A
FORMER NSWC ANNAPOLIS
ANNAPOLIS, MARYLAND
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I. SITE INFORMATION	
Site name: **Former NSWC Annapolis**	**Date of inspection:** **September 11, 2019**
Location and Region: **Annapolis, MD**	**EPA ID:** **NA**
Agency, office, or company leading the five-year review: NAVFAC Washington	**Weather/temperature:** **Sunny, 89ºF**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other_____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** NA _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** NA _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Department of the Navy
Contact Dave Steckler RPM 09/11/19 202-365-0241
Name Title Date Phone no.
Problems; suggestions; ☒ Report attached (See Appendix C) No problems noted

Agency MDE
Contact Linda Gustafson RPM Name Title
Date Phone no.
Problems; suggestions; ☒ Report attached (See Appendix C) No problems noted

Agency
Contact
Name Title Date Phone no.
Problems; suggestions; ☒ Report attached

Agency
Contact
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached

4. **Other interviews** (optional) ☒ Report attached. (Appendix C)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒N/A

Remarks

2. **Site-Specific Health and Safety Plan** ☐ Readily available ☐ Up to date ☒N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒N/A
Remarks

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒N/A
Remarks

4. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒N/A
☐ Other permits	☐ Readily available	☐ Up to date	☒N/A

Remarks

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒N/A
Remarks

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A
Remarks

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☒N/A
Remarks

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒N/A
Remarks

9. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up to date	☒N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒N/A

Remarks

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒N/A
Remarks

IV. O&M COSTS ☐ Applicable ☒ N/A

1. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

_____

_

2. O&M Cost Records

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _____

_____

_____

_____

_____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒N/A
Remarks_____

_____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒N/A
Remarks_____

_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☒N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☒N/A

Specific requirements in deed or decision documents have been met ☒Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks _____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒No vandalism evident
Remarks _____

2. **Land use changes on site** ☒
Remarks Industrial land-use consistent with remedy. _____

3. **Land use changes off site** ☒ N/A
Remarks _____

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☒N/A
Remarks _____

B. Other Site Conditions

Remarks

_____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable ☒N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

_____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
Lengths_____ Widths_____Depths_____
Remarks_____

_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

_____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
Areal extent_____ Depth_____
Remarks_____

_____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
Γ Trees/Shrubs (indicate size and locations on a diagram)
Remarks_____

_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks_____

_____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent_____ Height_____
Remarks_____

_____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____

2. Gas Monitoring Probes
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

4. Leachate Extraction Wells
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition Γ Needs Maintenance
Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks_____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks_____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Areal extent_____Depth_____ ☐ N/A
☐ Siltation not evident
Remarks_____

2. **Erosion** Areal extent_____Depth_____
☐ Erosion not evident
Remarks_____

3. **Outlet Works** ☐ Functioning ☐ N/A
Remarks_____

4. **Dam** ☐ Functioning ☐ N/A
Remarks_____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type ofmonitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks_____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks_____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks_____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐Quantity of surface water treated annually_____
   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   ☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks_____

D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation	☐ Applicable	☒ N/A	
1. **Monitoring Wells** (natural attenuation remedy)			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ All required wells located	☐ Needs Maintenance		☐ N/A
Remarks_____			

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any site associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS	
A.	**Implementation of the Remedy**
	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.). Institutional controls prohibiting residential development, operation of child day care facilities, and prohibiting groundwater usage were added to the Deed and no evidence of such activities was noted during conduct of the site inspection.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. NA

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. NA
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. NA

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APPENDIX B

SITE PHOTOGRAPHS,
SEPTEMBER 11, 2019

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Building 119 - Southeast View

Building 119 – Monitoring well northwest of building

Building 120 - South View

Building 120 - East View

Former Fuel Farm – trailer on right in eastern portion of site

Former Fuel Farm - Substation area in back, concrete berms in foreground

Building 34 - North View

Building 34 - East View

Open Storage Area - South View

Open Storage Area – North View

Fuel Tank Farm - Northeast View

Fuel Tank Farm - North View

Former Bldg. 44 – Overgrown and covered with soil/debris

Former Bldg. 44 – fallen tree at right

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APPENDIX C

2019 FIVE-YEAR REVIEW INTERVIEWS

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	Interview Contact	Title	Response Received
1.	David Steckler	NAVFAC Washington RPM	Yes
2.	Linda Gustafson	MDE RPM	Yes
3.	Maurice Tose	Facility Manager for Annapolis Partners	Yes

David Taylor Five-Year Review Interview Information – 1 of 3

Date of Interview	24 September 2019
Interviewee Name	David Steckler
Title	Remedial Project Manager
Organization	Department of the Navy
Address	1314 Harwood Street SE, Washington Navy Yard, DC 20374
Phone	202.365.0241
Email	david.steckler@navy.mil
Person conducting Interview (if applicable)	Via email
Type of Interview Method	Written

Interview Questions

Background Information:

1. What is your overall impression of the project? (General sentiment) Response – Good.
2. What effects have site operations had on the surrounding community?

Response – None.

3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.

Response – No.

4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

Response – No.

5. Do you feel well informed about the site's activities and progress?

Response – Yes.

6. Do you have any comments, suggestions, or recommendations regarding the site's impact on the community?

Response – No.

State and Local Considerations:

7. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, give purpose and results.

Response – No.

8. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

Response – No.

9. Have there been any changes in regulations or clean up levels since implementing the remedy that may affect the site?

Response – Vapor intrusion is now a known risk exposure pathway.

Performance and Operations and Maintenance (O&M) Problems:

10. Is the remedy functioning as expected? How well is the remedy performing?

Response – Yes.

11. Is there a continuous on-site Operations and Maintenance (O&M) presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.

Response – No.

12. Have any problems been encountered which required, or will require, changes to this remedial design or this Record of Decision (ROD)?

Response – Yes. The addition of vapor intrusion mitigation measures, if a building is constructed in the Building 119 area.

13. Do you have any comments, suggestions, or recommendations regarding the project's operations and site management?

Response – No.

David Taylor Five-Year Review Interview Information

Date of Interview	September 25, 2019
Interviewee Name	Linda Gustafson
Title	Remedial Project Manager
Organization	Maryland Department of the Environment
Address	1800 Washington Blvd., Suite 625 Baltimore, Maryland 21230
Phone	410-537-4238
Email	Linda.Gustafson@maryland.gov
Person conducting Interview (if applicable)	
Type of Interview Method	email

Interview Questions

Background Information:

14. What is your overall impression of the project? (General sentiment)

    Response –Investigative work is ongoing at this site.

15. What effects have site operations had on the surrounding community?

    Response – To my knowledge, site operations have not had appreciable effects on the surrounding community.

16. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.

    Response – I am not aware of any community concerns regarding this site as of this time.

17. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

    Response – I have not been made aware of any of the above-mentioned events/incidents at this site.

18. Do you feel well informed about the site's activities and progress?

    Response – My NAVFAC counterpart, David Steckler, provides updates as events occur.

19. Do you have any comments, suggestions, or recommendations regarding the site's impact on the community?

    Response – I have no comments or suggestions at this time.

State and Local Considerations:

20. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, give purpose and results.

Response – The site team meets twice annually, either in person or via telephone conference call, to discuss progress of investigation activities. Occasional visits to the site have taken place as part of project scoping (where to collect samples, etc).

21. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

Response –There have been no complaints, violations or other incidents at this site which have required a response from this office.

22. Have there been any changes in regulations or clean up levels since implementing the remedy that may affect the site?

Response – Yes, new guidance with respect to the issue of vapor intrusion has caused us to revisit the site as there is chlorinated volatile organic compound contamination in the subsurface soil and pore water which could create a vapor intrusion hazard in new construction if preventative steps such as vapor barrier placement are not taken.

Performance and Operations and Maintenance (O&M) Problems:

23. Is the remedy functioning as expected? How well is the remedy performing?

Response – There are no problems that I am aware of.

24. Is there a continuous on-site Operations and Maintenance (O&M) presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.

Response – Frequency, once every 5 years.

25. Have any problems been encountered which required, or will require, changes to this remedial design or this Record of Decision (ROD)?

Response **–** I have no comments or suggestions at this time.

26. Do you have any comments, suggestions, or recommendations regarding the project's operations and site management?

Response – I have no comments or suggestions at this time.

David Taylor Five-Year Review Interview Information

Date of Interview	11/21/2019
Interviewee Name	Maurice B. Tosé
Title	Managing Partner
Organization	Annapolis Partners LLC
Address	1705 Rollins Drive Alexandria, VA 22307
Phone	
Email	tose@annapolispartners.com
Person conducting Interview (if applicable)	Via email
Type of Interview Method	Written

Interview Questions

Background Information:

27. What is your overall impression of the project? (General sentiment) Response – Stable
28. What effects have site operations had on the surrounding community?

Response – None

29. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.

Response – No

30. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

Response – Trespassing (fishing and other), vandalism

31. Do you feel well informed about the site's activities and progress?

Response – Yes

32. Do you have any comments, suggestions, or recommendations regarding the site's impact on the community?

Response – No

State and Local Considerations:

33. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, give purpose and results.

Response – N/A

34. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

Response – N/A

35. Have there been any changes in regulations or clean up levels since implementing the remedy that may affect the site?

Response – N/A

Performance and Operations and Maintenance (O&M) Problems:

36. Is the remedy functioning as expected? How well is the remedy performing?

Response – Yes

37. Is there a continuous on-site Operations and Maintenance (O&M) presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.

Response – Yes. Regular maintenance of facilities and site utilities as necessary.

38. Have any problems been encountered which required, or will require, changes to this remedial design or this Record of Decision (ROD)?

Response – No

39. Do you have any comments, suggestions, or recommendations regarding the project's operations and site management?

Response – No