

N69118.AR.001502
ST JULIENS CREEK
5090.3a

PROPOSED PLAN FOR SITE 5 BURNING GROUNDS EPA DESIGNATION OPERABLE UNIT
5 (OU 5) AND BLOWS CREEK ST JULIENS CREEK ANNEX VA
11/1/2015
NAVFAC MID ATLANTIC

Proposed Plan

Site 5 – Burning Grounds (EPA Designation OU-5) and Blows Creek
 St. Juliens Creek Annex
 Chesapeake, Virginia
 November 2015

1. Introduction

This **Proposed Plan**¹ is being submitted for public review and comment. This Proposed Plan presents information that supports the conclusion that **no further action (NFA)** is necessary to address soil, sediment, groundwater, and surface water for **Environmental Restoration Program (ERP) Site 5** and Blows Creek, at St. Juliens Creek Annex (SJCA), Chesapeake, Virginia.

This Proposed Plan is issued jointly by the United States Navy (Navy), the lead agency for environmental restoration activities at SJCA, and the **United States Environmental Protection Agency (EPA)** Region 3, the lead regulatory agency. The Navy and the EPA, in consultation with the **Virginia Department of Environmental Quality (VDEQ)**, will select the final remedy for this site after reviewing and considering all information submitted during the 45-day **public comment period**. The Navy and EPA, in consultation with the VDEQ, may modify this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on this Proposed Plan.

The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Sections 113 (k)(2)(B), 117(a), 120(f), and 121 (f)(1)(G) of the **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)**, also known as Superfund), as amended; under Sections 300.430(f)(2) and 300.430(f)(3) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**; and in accordance with the **Federal Facility Agreement**, outlining the process by which the ERP is to be implemented at SJCA. This Proposed Plan summarizes information that can be found in greater detail in the reports of investigations that have been conducted at Site 5 and within the portion of the Blows Creek watershed that lies within the boundary of SJCA. These reports are contained in the **Administrative Record (AR)** file for SJCA and are summarized in Table 1 and Table 2.

Mark Your Calendar for the Public Comment Period



November 15–
December 30, 2015

Submit Written Comments

The Navy will accept written comments on this Proposed Plan during the public comment period. To submit comments or obtain further information, please refer to the names and contact information included at the end of Section 7. A blank sheet has been added at the end of the document for written comments.

Attend the Public Meeting



December 3, 2015,
5–6 p.m.

Major Hillard Library –
Chesapeake
824 Old George Washington
Highway N
Chesapeake, Virginia 23323

The Navy will hold a public meeting to explain the Proposed Plan. Verbal and written comments will be accepted at this meeting.

Location of the Administrative Record File



<http://go.usa.gov/Dyn4>

¹ A glossary of key terms is provided in Section 8. These terms are identified in bold print the first time they appear in this plan.

Table 1 – Site 5 Studies, Investigations, and Activities Summary

Study/Investigation/Activity*	AR Document Number	Investigation Activities
Initial Assessment Study (IAS) (Naval Engineering Environmental Support Activity, 1981)	000091	Archival records were collected and evaluated and an inspection of the site was performed. The evaluation indicated that waste ordnance disposal and equipment decontamination operations, where equipment was filled with straw and oil and ignited, were performed at the burning grounds. The visual examination of the site revealed ordnance residue, such as old cartridge ends and spacers, as well as non-ordnance residue, such as broken glass.
Phase II RCRA Facility Assessment (RFA) (A.T. Kearney, Inc. and K.W. Brown and Associates, Inc., 1989)	000090	Site 5 was initially identified for further investigation during the Phase II RFA, when a faint hydrocarbon odor was noted at the site. The RFA recommended additional investigation because of the high potential for a release to soil and groundwater from the historical activities at the site and the shallow depth of groundwater, a moderate to high potential for a release to surface water due to the close proximity of Blows Creek, and a moderate to high potential for release of subsurface gas based on the waste disposal activities.
Aerial Photographic Site Analysis (EPA, 1995)	N/A	Eight aerial photographs dated between 1937 and 1995 were used to conduct a historical aerial photograph review to assess conditions and changes at Site 5. The historical aerial review identified ground scarring, stained soils, disturbed ground, small trenches, historical excavation activities, outside storage of construction materials, containers, and potential debris.
Relative Risk Ranking (RRR) System Data Collection Report (CH2M HILL, 1996)	000095	Surface soil and groundwater samples were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), inorganics, total phosphorus, and explosives. Pesticides, PCBs, and SVOCs were detected.
Remedial Investigation (RI)/Human Health Risk Assessment (HHRA)/ Ecological Risk Assessment (ERA) Report for Sites 3, 4, 5, and 6 (CH2M HILL, 2003)	000170 (Text) 000171 (Appendices)	<p>From 1997 to 2003, a Remedial Investigation (RI) was conducted for ERP Sites 3, 4, 5, and 6. The RI field activities conducted for Site 5 included geophysical investigations, monitoring well installation, water-level monitoring, waste delineation, and the collection and analysis of surface and subsurface soil, groundwater, drainage sediment, and drainage surface water samples. Analytical data were compared to screening criteria and SJCA background levels. Based on the waste delineation activities, the RI concluded that the extent of waste was greater than previously identified and the Site 5 boundary was expanded to include the extent of the waste encountered.</p> <p>A Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (ERA) were conducted, which concluded that potential unacceptable risks to human and ecological receptors were present at Site 5 from exposure to chemicals in soil and upland drainage ditch sediment. Because surface water is transient at the site and the drainage ditches provided minimal ecological habitat, no significant risks to human health and the environment were identified for surface water. No human health risks were identified from exposure to shallow aquifer groundwater; however, only the construction worker scenario was evaluated and there were isolated detections of metals at concentrations above maximum contaminant levels (MCLs). Although unacceptable risks to human health from exposure to metals in the deep aquifer groundwater were identified, they were eliminated from further evaluation by the partnering team based on consideration of a varying combination of factors, including the sporadic frequency of detections, metals concentrations below background concentrations, and metals concentrations below the MCLs.</p> <p>The RI recommended additional soil and groundwater sampling to further define the nature and extent of contamination within Site 5 and additional investigation of sediment in Blows Creek to evaluate the potential for adverse effects to aquatic life (see Table 2, Blows Creek section).</p>

* The documents listed are available in the AR and provide detailed information used to support remedy selection at Site 5.

Table 1 – Site 5 Studies, Investigations, and Activities Summary, cont.

Study/Investigation/Activity*	AR Document Number	Investigation Activities
Expanded RI/HHRA/ERA for Site 5 (CH2M HILL, 2006)	000522	Fieldwork for an Expanded RI (ERI) was conducted in December 2003 and included the collection and analysis of surface soil samples to fill spatial data gaps, better evaluate areas posing potential unacceptable human health and/or ecological risks, and evaluate potential remedial alternatives. Additionally, groundwater samples were collected from existing monitoring wells to verify screening criteria and background exceedances identified during the RI. Analytical data were compared to screening criteria and SJCA background levels. The HHRA was also revised to include residential scenarios for groundwater, and evaluate the historical RI data and the additional groundwater samples. Potential unacceptable risks were identified for potable use of shallow groundwater associated with metals; however, based on the variability of the groundwater data previously collected, the SJCA Partnering Team, consisting of representatives from the Navy, EPA, and VDEQ, agreed to collect two additional rounds of groundwater data.
Addendum to the Expanded RI/HHRA/ERA for Site 5 (CH2M HILL, 2007)	000592	Two additional rounds of groundwater data were collected and evaluated in June and October 2006. Analytical data were compared to screening criteria and SJCA background levels. Potential unacceptable risks were identified for potable use of shallow groundwater associated with metals. However, no further action was deemed necessary to address shallow aquifer groundwater as a result of consideration of a combination of factors, including the planned removal of the waste/burnt soil area, historical placement of dredge fill in the area, lack of a discernible plume, acceptable/minimal hazards/risks, metals concentrations inconsistently above MCLs/action levels, and metals concentrations below background concentrations.
Engineering Evaluation/Cost Analysis (EE/CA) and Action Memorandum (AM) for Site 5 Waste/Burnt Soil Area and Impacted Surface Soil and Sediment Areas (CH2M HILL, 2007)	000568	<p>In February 2007, an Engineering Evaluation and Cost Analysis (EE/CA) was prepared to evaluate NTCRA alternatives to mitigate potential unacceptable human health and ecological risks in the waste/burnt soil area and impacted surface soil and drainage sediment. The recommended alternative was Excavation and Restoration/Wetland Creation. This alternative included excavation of waste/burnt soil and impacted surface soil and drainage sediment, disposal of excavated material, limited grading and backfill, and restoration as a mixed wetland/upland habitat. In addition, cleanup goals for soil and sediment were established to be protective of human receptors for all scenarios evaluated (Table 3, Cleanup Goal column).</p> <p>A public notice was issued in <i>The Virginian-Pilot</i> on January 19, 2007, and the EE/CA was made available to the public from January 19 to February 18, 2007. No comments were received and an Action Memorandum was signed by the Navy on March 20, 2007, to implement the recommended alternative presented in the EE/CA.</p>
Change in Scope of the Response and Ceiling Increase Action Memorandum for Site 5 Waste/Burnt Soil Area and Impacted Surface Soil and Sediment Areas (CH2M HILL, 2010)	001122	In order to allow for a more flexible future land use, a supplemental Action Memorandum was prepared that documented the changes to the initial recommended alternative from the EE/CA. The new site restoration plan included additional backfill within the excavated areas to achieve pre-removal-action grade and restoration with the same vegetation present prior to the NTCRA. A public notice was issued in <i>The Virginian-Pilot</i> on June 2, 2010, to inform the public of the change in scope. No feedback was provided by the public, and the Navy signed the Supplemental Action Memorandum on November 29, 2010.

* The documents listed are available in the AR and provide detailed information used to support remedy selection at Site 5.

Table 1 – Site 5 Studies, Investigations, and Activities Summary, cont.

Study/Investigation/Activity*	AR Document Number	Investigation Activities
<p>NTCRA and Construction Completion Report (CCR) for Site 5 (AGVIQ-CH2M HILL, 2012)</p>	<p>001316 - 001318</p>	<p>NTCRA activities began in January 2008 and were completed in July 2012. In September 2012, a Construction Completion Report (CCR) was prepared to document the completion of the NTCRA, which consisted of excavation and offsite disposal of waste/burnt soil and impacted soil and sediment with contaminant of concern (COC) concentrations exceeding the cleanup goals.</p> <p>The limits of excavation varied across the site based on the type of media (soil, sediment, groundwater, or surface water) and whether or not the NTCRA was driven by human health or ecological risks. The horizontal and vertical extents of excavation in the waste/burnt soil area were determined based on visual inspection during the NTCRA and/or confirmation sampling. The human health risk-based areas were excavated to a depth of 1 foot, followed by confirmation sampling. Confirmation samples were collected to confirm the excavations were adequate and that the cleanup goals were met. In accordance with the confirmation sampling work plan (CH2M HILL, 2007c), the confirmation sample analytical results were compared to the cleanup goals established in the EE/CA. When the maximum concentration detected at a particular location exceeded a cleanup goal, the 95 percent upper confidence limit (UCL) of the mean for all of the samples was calculated, and if the 95 percent UCL of the mean was below the cleanup goal, no additional removal was required and no additional samples were collected. All of the cleanup goals were met during the Site 5 NTCRA (Table 3).</p> <p>The ecological risk-based areas were excavated to a depth of 1 foot and did not require confirmation sampling because the site-wide average concentrations of the COCs remaining in place in surface soil and sediment following implementation of the NTCRA reduced the potential risks to an acceptable level, as documented in the EE/CA and Action Memorandum.</p> <p>A total of 32,960 tons of waste and contaminated soil and sediment was disposed. The site was restored with clean fill and graded to provide positive stormwater drainage and prevent ponding. Topsoil was placed and then seeded in disturbed grass areas, and wetland vegetation was replanted in the pre-existing wetland area, to return Site 5 to the same hydrologic, topographic, and vegetative conditions as were present prior to the NTCRA.</p>

* The documents listed are available in the AR and provide detailed information used to support remedy selection at Site 5.

Table 1 – Site 5 Studies, Investigations, and Activities Summary, cont.

Study/Investigation/Activity*	AR Document Number	Investigation Activities
Site 5 Supplemental RI Report (CH2M HILL, 2015)	001452	<p>Following completion of the NTCRA, a NFA Proposed Plan was drafted in 2012 and submitted to EPA and VDEQ for review. During the review, concerns were raised about potential hazards from exposure to cobalt in shallow aquifer groundwater if used as a potable water supply because a more conservative provisional toxicity value for cobalt had been adopted by EPA since the risk assessment documented in the Addendum to the ERI had been performed (CH2M HILL, 2007); therefore, using the current toxicity value, the hazard associated with cobalt would be higher. Based on these concerns, it was deemed necessary to collect additional groundwater samples and re-evaluate the cause for and risk associated with select metals in the shallow aquifer groundwater.</p> <p>In 2014, a Supplemental RI was conducted to determine whether the current concentrations of metals in the shallow aquifer groundwater pose unacceptable risk, and if so, whether they are the result of a CERCLA site release that requires remedial action. The Supplemental RI field activities included water-level monitoring, groundwater sampling, and surface water monitoring for pH. Groundwater analytical data were compared to screening criteria and SJCA background levels.</p> <p>The HHRA identified potentially unacceptable risks to human health associated with hypothetical future resident use of the shallow aquifer groundwater as a potable water supply from exposure to aluminum, arsenic, beryllium, hexavalent chromium, cobalt, iron, and manganese. However, no further action was deemed necessary to address shallow aquifer groundwater as a result of a combination of factors, including the completed removal of the waste/burnt soil area, historical placement of dredge fill in the area, relatively low pH in rainfall, data evaluation indicating the CERCLA site release (waste disposal and burning) has not significantly impacted the shallow aquifer groundwater, metals concentrations being the result of naturally occurring site conditions and/or non-CERCLA site related historical activities, and acceptable/minimal hazards/risks.</p>

* The documents listed are available in the AR and provide detailed information used to support remedy selection at Site 5.

Table 2 – Blows Creek and Blows Creek Watershed Sites Studies, Investigations, and Activities Summary

Study/Investigation/ Activity*	AR Document Number	Investigation Activities
Site 1 and AOCs 1, 8, and 12 (Upland Areas within the Blows Creek Watershed)		
Site Screening Assessment (SSA) (CH2M HILL, 2002)	000156	During the Site Screening Assessment (SSA) field investigation, surface water and sediment samples were collected and analyzed from Site 1, and surface and subsurface soil samples were collected and analyzed and geophysical surveys were conducted at AOCs 1, 8 and 12. Based on the results, further investigation was recommended for Site 1 because the extent of waste at the site was unknown, and for AOC 1 because of elevated compounds detected in surface soil. AOCs 8 and 12 were determined to require NFA, based on review of aerial photographs, site visits, and evaluation of the data collected, which all determined that AOCs 8 and 12 do not pose an unacceptable risk to human health or the environment.
SSA Report Addendum: Site 1 – Waste Disposal Area A (CH2M HILL, 2002)	000183	Site 1 was initially investigated in the SSA report for SJCA. Based on the recommendation of the SSA report, additional fieldwork to investigate potential contamination at Site 1 was conducted. In September 2002, three test pits were excavated within the site boundary, and no significant debris was encountered in any of the test pits. Therefore, consensus was reached that NFA was required.
Site Investigation Report, Sites 8, 19, 21 and AOC 1 (CH2M HILL, 2004)	000220	AOC 1 was initially investigated in the SSA report for SJCA. Based on the recommendation of the SSA report, further investigation was conducted at AOC 1. Soil samples were collected from within AOC 1, and a human health risk screening of the data determined that no unacceptable risk to humans was present as a result of exposure to constituents at AOC 1. In addition, an ecological risk screening determined that there was minimal ecological habitat for potential receptors. The site investigation report concluded that NFA was required for AOC 1.
Site 3 (Upland Area within the Blows Creek Watershed)		
NTCRA and Site 3 Confirmation Closeout Report (CH2M HILL, 2004)	000224	NTCRA activities within Site 3 were conducted in two phases. Phase I was conducted by the Navy's Remedial Action Construction (RAC) contractor, OHM/Shaw, from August 2002 through September 2002. During Phase I approximately 3,300 cubic yards of waste and soil were removed from the northern portion of Site 3. The Phase II removal action was conducted by AGVIQ-CH2M HILL Joint Venture I (JV I) from October 2003 through March 2004. Approximately 9,497 cubic yards of waste, soil, and upland drainage ditch sediment/soil were removed during the Phase II removal. Pre-excavation confirmation samples were collected and showed that all potential risk to human and ecological receptors had been mitigated by the removal action.
ROD, Site 3: Waste Disposal Area C (NAVFAC, 2006)	000523	The selected remedy documented in the ROD for Site 3 was NFA. The NTCRAs eliminated potentially unacceptable risks associated with waste, soil, and upland drainage ditch sediment/soil.
Site 4 (Upland Area within the Blows Creek Watershed)		
Record of Decision (ROD), Site 4: Landfill D (NAVFAC, 2004)	000258	Unacceptable risk to human and ecological receptors was present from exposure to waste and COCs (inorganics and polycyclic aromatic hydrocarbons [PAHs]) in soil within Site 4 and mercury in the eastern drainage ditch of Site 4. The selected remedy documented in the ROD was soil cover, removal of wetland debris, removal of the eastern drainage ditch sediment, and Land Use Controls (LUCs) .

* The documents listed are available in the AR and provide detailed information used to support remedy selection at Blows Creek.

Table 2 – Blows Creek and Blows Creek Watershed Sites Studies, Investigations, and Activities Summary, cont.

Study/Investigation/Activity*	AR Document Number	Investigation Activities
Remedial Action (RA) and Construction Closeout Report, Site 4: Landfill D Soil Cover (Design/Build) (JV I, 2005)	000470	The Remedial Design (RD) for Site 4 was completed in November 2004. The Remedial Action (RA) was conducted from March 2005 to October 2005. Surface debris was removed from the wetland area adjacent to Blows Creek, a minimum 2-foot soil cover was installed, and 1 foot of sediment from the floor and sidewalls of the eastern drainage ditch was removed in order to meet the cleanup goals established for mercury.
Remedial Action Completion Report (RACR), Site 4: Landfill D (NAVFAC, 2006)	000572	The Remedial Action Completion Report (RACR) documents completion of the RA and demonstrates the achievement of the Remedial Action Objectives.
Site 6 (Upland Area within the Blows Creek Watershed)		
NTCRA and Site 6 Closeout Report and Site 3 Removal Summary (CH2M HILL, 2002)	000175	The NTCRA for Site 6 was implemented in 2002 to remove approximately 180 cubic yards of soil and concrete from within Site 6. All surface soil and all remnants of the concrete caged unit and associated subsurface soil were removed. Following the removal, groundwater and subsurface soil confirmation sampling was conducted and confirmed that the removal of the surface soil eliminated any potential risks posed to human or ecological receptors at Site 6. The excavation was backfilled with clean fill.
ROD, Site 6: Small Arms Unit (NAVFAC, 2003)	000189	The selected remedy documented in the ROD for Site 6 is NFA. The NTCRA removed all soil posing potentially unacceptable risk to human and ecological receptors.
Site 19 (Upland Area within the Blows Creek Watershed)		
NTCRA and Construction Closeout Report, Site 19-Removal Action (JV I, 2006)	000527	The NTCRA for Site 19 consisted of excavation of impacted soil within Site 19 and backfilling with clean soil. The NTCRA activities were completed in May 2006 and approximately 500 tons of soil were removed and disposed offsite. Excavation areas were delineated based on pre-removal confirmation samples.
Closeout Report for Site 19 (CH2M HILL, 2006)	000557	Following the NTCRA, NFA is necessary. Site 19 poses no unacceptable risk to human health or the environment and no restrictions on land use are necessary.
Blows Creek		
Baseline Ecological Risk Assessment (BERA), Blows Creek Watershed (CH2M HILL, 2006)	000562	Based on the recommendations of the RI/HHRA/ERA Report for Sites 3, 4, 5, and 6, a Baseline Ecological Risk Assessment (BERA) was conducted for Blows Creek to identify potential risks associated with possible historical contributions to Blows Creek from upland Navy ERP Sites, including Sites 3, 4, 5, 6, and 19. The investigation activities included collection and analysis of sediment and fish tissue samples. Results indicated that concentrations of mercury in Blows Creek did not pose any potential risk to ecological receptors, and the majority of chemicals identified as posing a potential risk in Blows Creek did not exceed the 95 percent upper tolerance limits (UTLs) for St. Juliens Creek sediment or dredge fill soil at most locations. The BERA noted that Site 4 soil and sediment were previously identified as a potential source of contamination to Blows Creek; however, the remedial action conducted at Site 4 in 2006 removed contaminated soil and sediment. Therefore, Site 4 no longer represents a potential source of hazardous substances to Blows Creek. The BERA concluded that Blows Creek does not pose an unacceptable risk to benthic-dwelling organisms based on the low frequency and magnitude of these exceedances and the fact that bioassay results did not show a clear relationship between chemical concentration and bioassay organism response, which suggests that the bioassay organisms are not being impacted by the presence of chemicals in sediment.

* The documents listed are available in the AR and provide detailed information used to support remedy selection at Blows Creek.

2. Site Background

SJCA covers approximately 490 acres and is situated at the confluence of St. Juliens Creek and the Southern Branch of the Elizabeth River in the city of Chesapeake, Virginia (Figure 1). Most of the surrounding area is developed and includes residences, schools, recreational areas, and shipping facilities for several large industries.

2.1 Site Description and Background

Site 5

Site 5, Burning Grounds [formerly Solid Waste Management Unit (SWMU) 8], encompasses an area of approximately 23 acres in the northeastern portion of SJCA (Figure 2). Operations began at the Burning Grounds in the 1930s when waste ordnance materials were disposed by open burning on three main pads. Additional debris, such as large steel plates and metal from buildings, were also disposed at the site. In mid-1977, the site was used for facility-wide ordnance equipment and material decontamination, which included filling equipment with oil and straw and burning it. After the decontamination process, the ground was reportedly covered with oil and straw, burned, disced, and burned again; samples were then collected to certify decontamination. Historical aerial photographs indicated that prior to its use as a burning ground and disposal area, Site 5 and much of the adjacent area had been used for placement of dredge spoil material that reportedly originated from Blows Creek and the Southern Branch of the Elizabeth River. Site 6 is located within the east-central portion of Site 5 (Figure 2). Site 6 is a former ERP Site that was closed under a NFA Record of Decision (ROD) in September 2003 after a Non-Time Critical Removal Action (NTCRA) was completed.

Blows Creek

Blows Creek is a tidally-influenced brackish water tributary to the Southern Branch of the Elizabeth River that runs through the center of SJCA; it is considered a sub-watershed to the

Southern Branch of the Elizabeth River. Several ERP sites at SJCA, in addition to Site 5, are located within the Blows Creek watershed, and were identified as potential historical sources of contaminants, including Sites 1, 3, 4, 6, and 19 and Areas of Concern (AOCs) 1, 8, and 12 (Figure 2). Therefore, Blows Creek was investigated, both independently and along with the ERP sites.

2.2 Summary of Investigations and Actions

This section summarizes the investigations conducted to assess the nature and extent of possible soil, sediment, groundwater, and surface water contamination at Site 5 and Blows Creek. Both Site 5 and Blows Creek have been characterized as part of several investigations and actions since 1981. Detailed information from investigations conducted at Site 5, Blows Creek, and other sites within the Blows Creek watershed is available in the AR for SJCA. Investigations relevant to Site 5 are presented in Table 1. Investigations conducted within the Blows Creek watershed and actions taken at the sites within the Blows Creek watershed, excluding Site 5, are presented in Table 2. While the watershed sites are not included in the scope of this Proposed Plan, the background information is provided to support the Blows Creek decision-making processes because the sites were previously identified as potential sources of contamination to Blows Creek.

3. Site Characteristics

Site 5

Site 5 consists of mixed land cover including a forested area in the southern portion, wetlands in the central and southern portions, and open fields. The southern wetland area extends beyond the border of Site 5 to Blows Creek (Figure 3). The wetland area within Site 5 is predominantly supported by surface water runoff and does not typically maintain standing water except during and after storm events. The topography is generally level and slopes gently towards Blows Creek,

Table 3 – Site 5 Cleanup Goals and Confirmation Sample Results Summary

COC	Cleanup Goal (mg/kg)	Maximum Detection of COC following completion of NTCRA (mg/kg)	95% UCL of the Mean Concentration detected following completion of NTCRA (mg/kg)
Arsenic	22	40.5	13.7
Copper	3,043	240	Not calculated
Lead	400	412	89.7

mg/kg = milligrams per kilogram

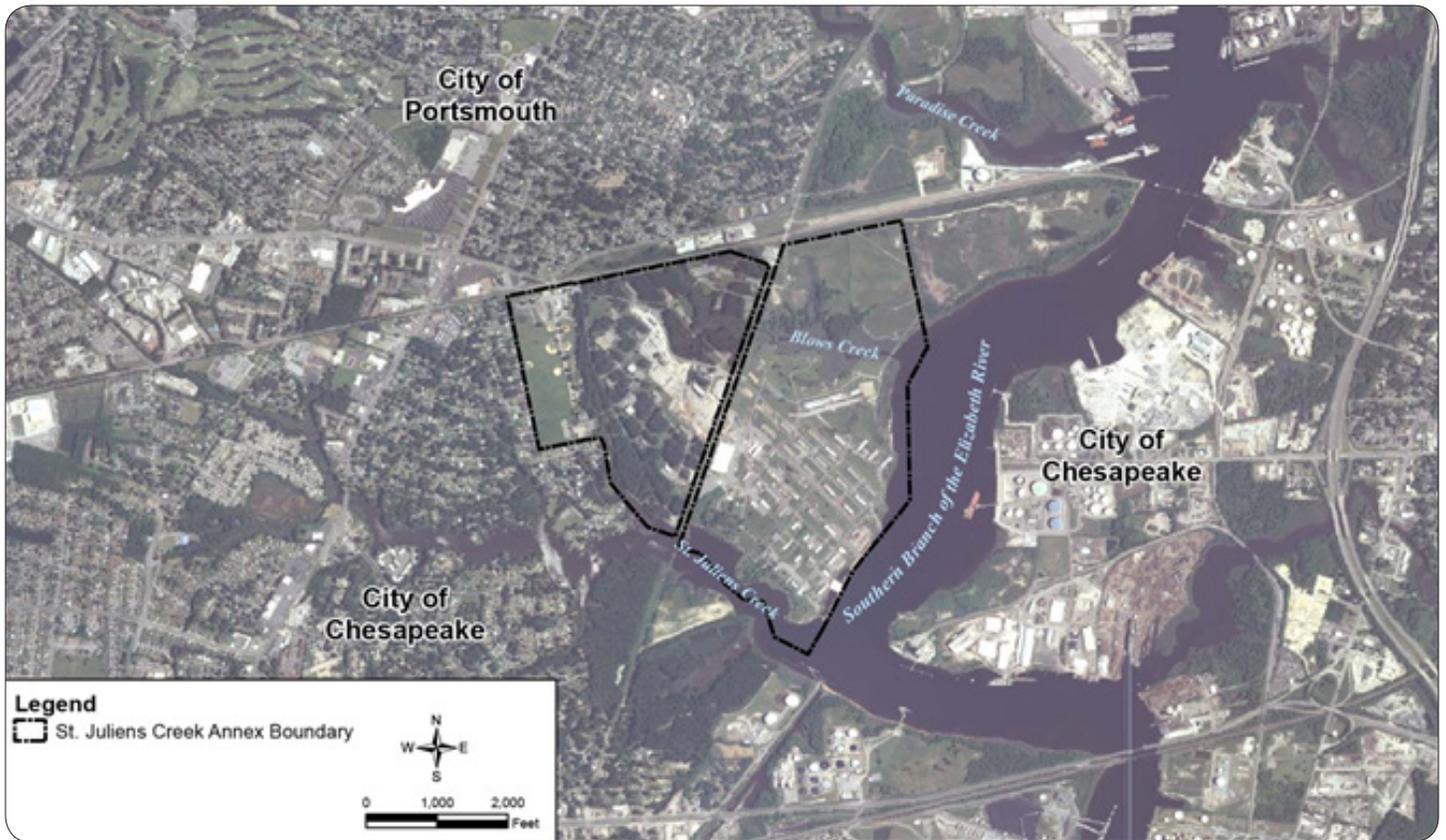


Figure 1 – SJCA Location

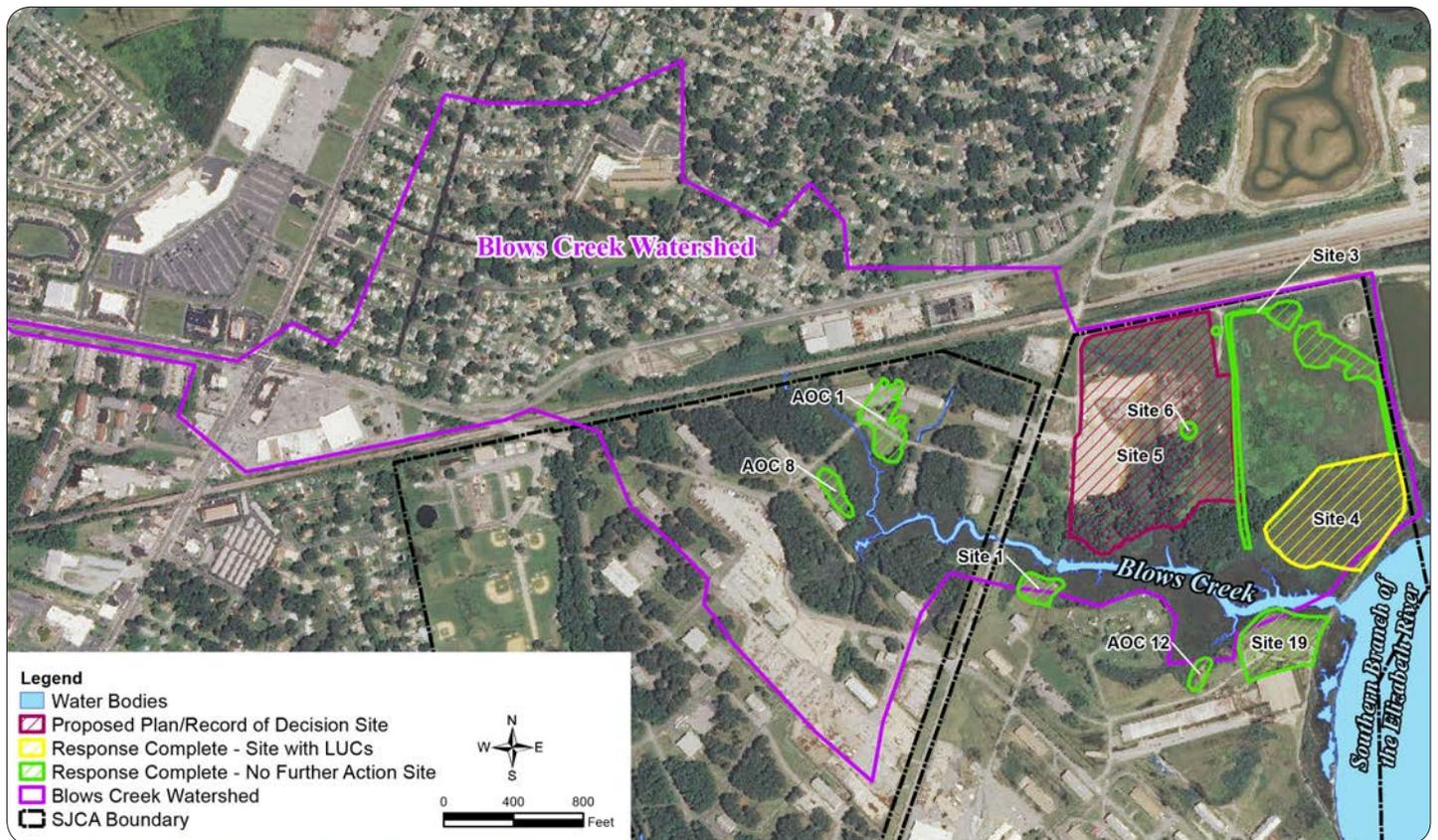


Figure 2 – Site Locations

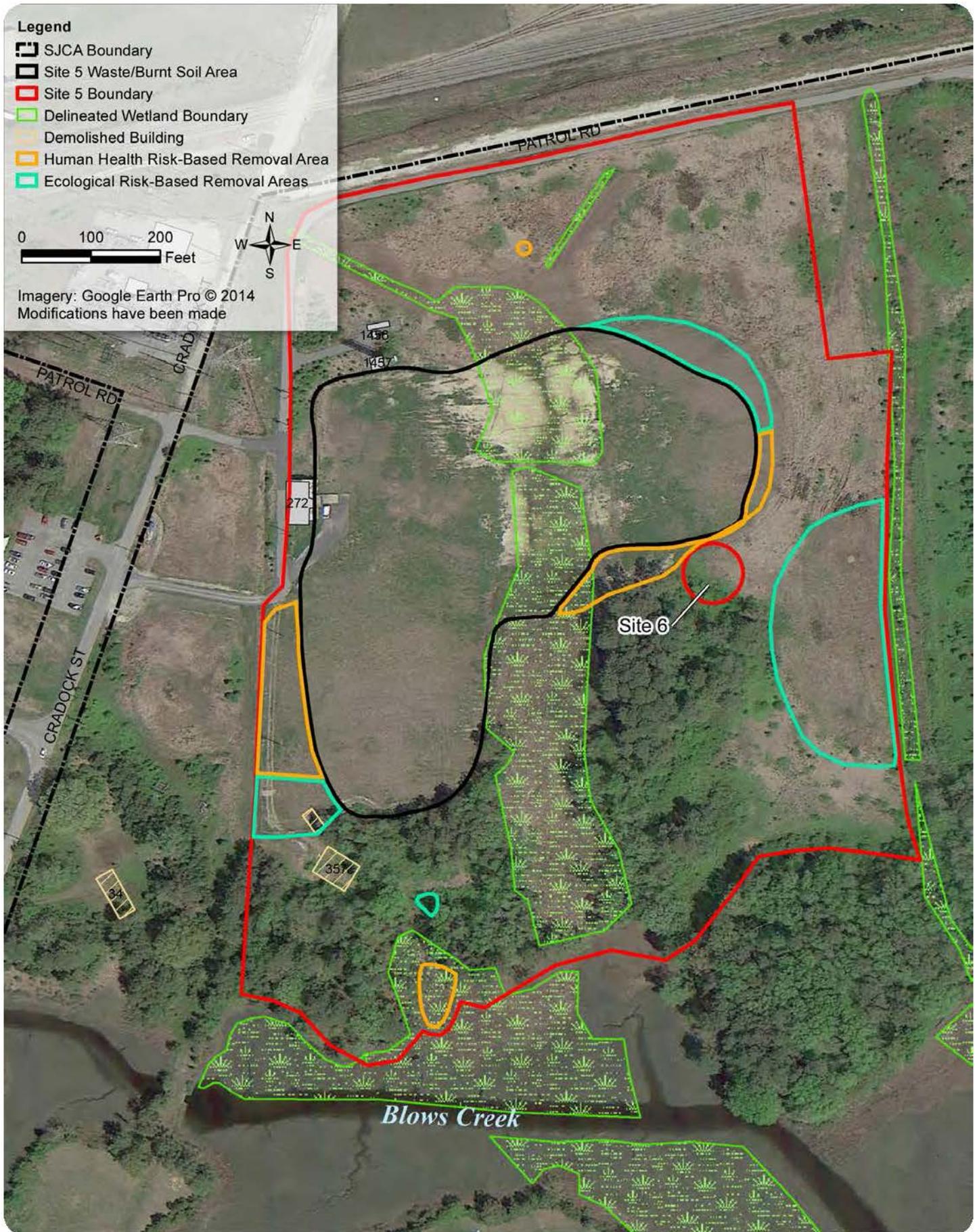


Figure 3 – Site 5 Removal Areas

with elevations ranging from 8 feet above mean sea level (amsl) in the northern portion of the site to 0 feet amsl in the southern portion of the site at Blows Creek. Precipitation averages 43 inches annually and is slightly higher from June to August because of the prevalence of thunderstorms. The average pH of rain in Virginia is 4.3 (extremely acidic), which is about 10 times more acidic than natural precipitation; however, the pH can vary from week to week (and rainstorm to rainstorm) from 3.5 to 5.0.² Surface water at Site 5 drains either naturally via overland flow or through unlined man-made drainage ditches to Blows Creek. Vegetated drainage ditches (1 to 3 feet deep) reduce runoff onto the site from adjacent areas.

Site 5 is located in the **dredge fill** and **Munden-Tetotum** soil types.³ The Navy, EPA, and VDEQ agreed to evaluate all of Site 5 soil as dredge fill soil.⁴ The dredge fill reportedly originated from the Southern Branch of the Elizabeth River and Blows Creek. There are sporadic areas of low pH in the groundwater and soil at Site 5, which is consistent with pH levels facility-wide. The majority of the low pH levels within SJCA are located in the dredge fill and Munden-Tetotum soil types.

The groundwater within the unconfined Columbia aquifer occurs at relatively shallow depths (less than 1 foot to approximately 6 feet below the ground surface) and discharges locally to surface water nearby. The Yorktown aquifer is also present at Site 5 and within the Blows Creek watershed. The Columbia and Yorktown aquifers are not used as a potable water source regionally or at SJCA. Potable water at SJCA is supplied by the City of Chesapeake's distribution system. A more detailed description of the groundwater aquifers and potable water supply at SJCA and nearby locales is provided in the RI/HHRA/ERA Report.⁵ Groundwater in the vicinity of and at SJCA is not used as a source of domestic water supply. The closest well is approximately 1 mile upgradient of SJCA and is used for industrial activities. No surrounding surface water bodies serve as a water supply.

2 Virginia Department of Conservation & Recreation. 2014. *Virginia's Natural Resources Education Guide*, Chapter 2, Virginia's Air Resources. <http://www.deq.virginia.gov/Portals/0/DEQ/ConnectWithDEQ/EnvironmentallInformation/VirginiaNaturally/Guide/chapter2.pdf>. Accessed November 6, 2015.

3 CH2M HILL. 2001. *Final Background Investigation Report, SJCA, Chesapeake, Virginia*. October.

4 CH2M HILL. 2006. *Final ERI/HHRA/ERA for Site 5, SJCA, Chesapeake, Virginia*. June.

5 CH2M HILL. 2003. *Final RI/HHRA/ERA for Sites 3, 4, 5, and 6, SJCA, Chesapeake, Virginia*. March.

Blows Creek

Blows Creek is approximately 3,600 feet long. Aquatic habitats within the Blows Creek watershed are composed of the main body of Blows Creek and the fringing wetland within the area of tidal influence. The headwaters to Blows Creek originate in the Craddock District, which is a mixed residential/light industrial area located to the north/northwest of SJCA. However, the Blows Creek watershed is dominated by military and residential land uses. Military land use is estimated to comprise 60 percent of the total land use in the Blows Creek drainage basin, while residential land use is estimated to comprise 30 percent of total land use. Fringing marsh surrounds most of the Blows Creek watershed that occurs on military property, while residential development dominates the very upper reaches of this watershed. Commercial/ industrial land uses are estimated to comprise only 10 percent of the total land use in the Blows Creek watershed.

More than 90 percent of Blows Creek is located on SJCA property. Blows Creek is a tributary to the Southern Branch of the Elizabeth River. The Southern Branch of the Elizabeth River passes through highly developed areas upstream and adjacent to SJCA, discharges into the James River (about 7 miles to the north), and ultimately discharges to the southern reaches of the Chesapeake Bay.

The topography of the Blows Creek watershed is relatively flat. Much of the soil within the northeastern portion of the basin, including portions of Site 5, is composed of dredge fill materials, which are likely to have originated from the Southern Branch of the Elizabeth River. The areas within the Blows Creek watershed not dominated by residential and industrial development consist of mostly mixed upland forest and open field habitats that support a variety of terrestrial species.⁶ A more detailed description of the terrestrial and aquatic ecosystems present at Site 5 and within the Blows Creek watershed is provided in the BERA.⁷

4. Scope and Role of Response Action

SJCA was placed on the **National Priorities List (NPL)** on July 27, 2000. Fifty-nine potentially contaminated ERP sites, comprising 26 Installation Restoration Program sites, one Munitions Response Program (MRP) site, 13 SWMUs, and 20 AOCs, have been identified. Fifty-three were closed following desktop audits or inspections and required no action, including several Blows Creek watershed sites (AOCs 1, 8,

6 CH2M HILL. 2003. *Final RI/HHRA/ERA for Sites 3, 4, 5, and 6, SJCA, Chesapeake, Virginia*. March.

7 CH2M HILL. 2006. *Final BERA, Blows Creek Watershed, SJCA, Chesapeake, Virginia*. December.

and 12 and Site 1). Site 19 was closed following a removal action; closure was documented through completion of a site closeout report.⁸ Five sites have a Final ROD:

- Site 2: Action ROD for soil cover, sediment excavation, monitored **natural attenuation, enhanced reductive dechlorination (ERD)**, and Land Use Controls (LUCs)
- Site 3: No-action ROD
- Site 4: Action ROD for soil cover and LUCs
- Site 6: No-action ROD
- Site 21: Action ROD for **in situ chemical reduction (ISCR)** and ERD

Details of these sites are included in the **Site Management Plan** for SJCA, which is available in the AR and Information Repository.

The Preferred Alternative presented in this Proposed Plan is intended to be the final remedy for Site 5 and Blows Creek, and does not directly include or affect any other ERP site or operable unit at SJCA.

5. Summary of Site Risks

Detailed results of the HHRA and ERA conducted at Site 5 are presented in the RI/HHRA/ERA Report,⁹ ERI Report,¹⁰ the ERI Addendum for Site 5,¹¹ and/or the Supplemental RI Report.¹² Detailed results of the ERA conducted for Blows Creek are presented in the BERA.¹³ These documents are available in the AR. Additional information regarding human health and ecological risks, as well as how risks are calculated, is included in text boxes later in this section.

5.1 Human Health Risk Summary

An HHRA was completed to evaluate potential human health risks from current and future human exposure to soil, groundwater, sediment, and surface water at Site 5. An HHRA was not conducted specifically for Blows Creek media because the results of the investigation of the upland sites within the Blows Creek watershed and conclusion of the BERA eliminated the need. Results of investigations of the upland

sites (AOC 1 and Sites 1, 3, 4, 6, and 19) indicated these sites had not impacted Blows Creek (Table 2). The BERA concluded that there are no unacceptable ecological risks. The ecological risk screening values used in the BERA for the potential site-related contaminants are more conservative (lower) than the human health risk screening values for those contaminants. The results of the BERA, coupled with the upland sites' investigation results, eliminated the need for an HHRA. For more information regarding human health risk and how it is calculated, refer to the text box included in this section titled "What is Human Health Risk and How is it Calculated?".

Soil

No unacceptable risks were identified from exposure to subsurface soil at Site 5. Potential unacceptable risks were identified for surface soil at Site 5 from exposure to metals (arsenic, copper, lead, and iron) under industrial and residential land use scenarios. However, iron was eliminated as a contributor to potential risk in soil because it is an essential nutrient and, even under the most conservative child resident scenario, the exposure levels were below the Recommended Daily Allowance and maximum level of daily intake.

An NTCRA was conducted to mitigate the potential unacceptable human health risks associated with soil at Site 5 within the waste/burnt soil area and human health risk-based removal area (Figure 3). Cleanup goals were determined using risk-based calculations to ensure that site conditions after the NTCRA would not pose an unacceptable risk to human health under any future land-use scenario. Site-specific cleanup goals were met as confirmed by post-removal confirmation samples (Table 3). Therefore, no potential unacceptable risk to human health from exposure to soil at Site 5 remains.

Groundwater

The 2007 shallow groundwater human health risk assessment was updated to reflect the most up-to-date toxicity values within the Supplemental RI Report.¹⁴ Carcinogenic risks and non-carcinogenic hazards exceeding EPA's acceptable risk levels were calculated for a number of metals in shallow groundwater at Site 5 associated with potential future potable use of groundwater. Risks exceeding EPA's acceptable risk levels were associated with potential future exposure to arsenic, cobalt, iron, and manganese. Comparison of metal concentrations at the site to groundwater background values for those metals identified iron and manganese as

8 CH2M HILL. 2006. *Final Closeout Report for Site 19, SJCA, Chesapeake, Virginia*. December.

9 CH2M HILL. 2003. *Final RI/HHRA/ERA for Sites 3, 4, 5, and 6, SJCA, Chesapeake, Virginia*. March.

10 CH2M HILL. 2006. *Final ERI/HHRA/ERA for Site 5, SJCA, Chesapeake, Virginia*. June.

11 CH2M HILL. 2007. *Final Technical Memorandum Addendum to the ERI/HHRA/ERA for Site 5, SJCA, Chesapeake, Virginia*. December.

12 CH2M HILL. 2015. *Final Site 5 Supplemental RI Report, SJCA, Chesapeake, Virginia*. March.

13 CH2M HILL. 2006. *Final BERA, Blows Creek Watershed, SJCA, Chesapeake, Virginia*. December.

14 CH2M HILL. 2015. *Final Site 5 Supplemental RI Report, SJCA, Chesapeake, Virginia*. March.

being associated with groundwater background conditions and eliminated them from further consideration as site-related COCs.

Although total arsenic concentrations were detected above the MCL, the concentrations only slightly exceeded the MCL, are similar in magnitude to the SJCA 95 percent background UTL, and the dissolved arsenic concentrations are below the MCL. Additionally, the highest arsenic concentration was detected in a well which is crossgradient of the area where waste disposal and burning operations occurred, in an area where no other historical contaminant releases are known to have occurred; therefore, the arsenic concentrations are background and not a result of CERCLA site related

operations. Furthermore, although arsenic was identified as a potential risk driver because the reasonable maximum exposure (RME) hazard indexes (HIs) are greater than 1 and the RME excess lifetime cancer risk is greater than 1×10^{-4} , the **central tendency exposure (CTE)** HIs are less than 1, and the CTE excess lifetime cancer risk is less than 1×10^{-4} . Therefore, arsenic can be eliminated from further consideration as a site-related COC.

The highest detected concentrations in groundwater of total cobalt, which is a natural element found in the environment, are similar in magnitude to the SJCA 95 percent background UTL (i.e., concentrations naturally present). Cobalt concentrations in the groundwater within the waste disposal/burning area

What is Human Health Risk and How is it Calculated?

A Human Health Risk Assessment (HHRA) estimates the likelihood of health problems occurring if no cleanup action were taken at a site. This is also referred to as "baseline risk." HHRA's are conducted using a stepped process (as outlined in Navy and EPA HHRA policy and guidance). To estimate baseline risk at a site, the Navy performs the following four-step process:

Step 1: Data Collection and Evaluation

Step 2: Exposure Assessment

Step 3: Toxicity Assessment

Step 4: Risk Characterization

During Data Collection and Evaluation (**Step 1**), the concentrations of chemicals detected at a site are evaluated, including:

- Identifying and evaluating area(s) where site-related chemicals may be found (source areas) and at what concentrations.
- Evaluating potential movement (transport) of chemicals in the environment.
- Comparing site concentrations to risk-based screening levels to determine which chemicals may pose the greatest threat to human health (called "chemicals of potential concern" [COPCs]).
- Background is not considered in the identification of COPCs. Constituents are not excluded from the risk assessment process if they are within the range of background. COPCs that are within the range of background concentrations are discussed during risk management.

In **Step 2**, the Exposure Assessment, potential exposures to the COPCs identified in Step 1 are evaluated. This step includes:

- Identifying possible exposure **media** (for example, soil, air, groundwater, surface water, and/or sediment).
- Evaluating if/how people may be exposed (exposure pathways).
- Evaluating routes of exposure (for example, ingestion).
- Identifying the concentrations of COPCs to which people might be exposed.
- Identifying the potential frequency and length of exposure.
- Calculating a "reasonable maximum exposure" (RME) dose that portrays the highest level of human exposure that could reasonably be expected to occur.

In the Toxicity Assessment (**Step 3**), both cancer and non-cancer toxicity values are identified for oral, dermal, and inhalation exposures to the COPCs. The toxicity values are identified using the hierarchy of toxicity value sources approved by EPA.

Step 4 is Risk Characterization, where the information developed in Steps 1-3 is used to estimate potential risk to people. The following approach is used:

- Two types of risk are considered: cancer risk and non-cancer hazard.
- The likelihood of developing cancer as a result of site exposure is expressed as an upper-bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that might be exposed under the conditions identified in Step 2, one additional case of cancer may occur as a result of site exposure. Unacceptable risk exists when the excess lifetime cancer risk of 1×10^{-4} is exceeded.
- For non-cancer health effects, a "hazard index" (HI) is calculated. The HI represents the ratio between the "reference dose," which is the dose at which no adverse health effects are expected to occur, and the RME dose for a person contacting COPCs at the site. The key concept here is that a "threshold level" (measured as a HI of 1) exists below which no non-cancer health effects are expected to occur. The potential risks from the individual COPCs and exposure pathways are summed and a total site risk is calculated for each receptor. The uncertainties associated with the risk estimates are presented, and their effects on the conclusions of the HHRA are discussed.

were not elevated, and cobalt was not identified as a COC in the soil; therefore, the waste disposal/burning area does not appear to be the source of cobalt in groundwater. The highest detected concentrations of cobalt are located within the area of shallow aquifer groundwater that has low pH; the low pH is attributed to factors such as the relatively low pH in the rainfall, and it is the low pH that is mobilizing naturally-present cobalt. Therefore, cobalt in groundwater is a naturally-occurring substance altered by natural processes (rainfall).

Based on these considerations, the evaluation of the data indicates that the CERCLA site release (waste disposal and burning) has not significantly impacted the shallow aquifer groundwater at Site 5, and that the concentrations of metals in the shallow aquifer groundwater are the result of naturally occurring site conditions (e.g., naturally occurring substances in their unaltered forms, or altered solely through naturally occurring process or phenomenon, in a location where they are naturally found). Therefore, the Navy and EPA, in consultation with VDEQ, agree that CERCLA does not provide the authority to take remedial action pursuant to CERCLA Section 104(a)(3)(A) and no further action is warranted to address these constituents in shallow aquifer groundwater at Site 5.

Sediment

Potential unacceptable risks were identified for upland drainage ditch sediment from exposure to metals (arsenic and iron). However, evaluation of the data using sediment screening values was determined to be not representative of existing conditions because the evaluation assumes that the sediment is wet, which results in a higher adherence factor compared to soil. However, the upland drainage ditches are generally dry and the material sampled was not wet. The data were, therefore, re-evaluated using soil screening values, and iron was eliminated as a contributor to potential risk in sediment because no unacceptable risk was identified, leaving only arsenic as a potential risk driver. The NTCRA mitigated the potential unacceptable human health risks associated with arsenic in sediment at Site 5 (Figure 3), and site-specific cleanup goals were met during the NTCRA, as confirmed by post-removal confirmation samples (Table 3). Therefore, no potential unacceptable human health risk from exposure to sediment at Site 5 remains. Because the areas of Site 5 sediment that had posed a potential unacceptable human health risk were fully delineated upgradient of Blows Creek and addressed during the Site 5 NTCRA, no further human health risk assessment of Blows Creek sediment data is warranted.

Surface Water

Human health risk associated with current and future trespasser and future residential exposure scenarios for Site 5 surface water was evaluated and documented within the RI/HHRA/ERA report. No unacceptable human health risks were identified for surface water at Site 5 during any round of risk screening or risk assessment conducted.

5.2 Ecological Risk Summary

An ERA was completed in order to identify potential risk for ecological receptors exposed to soil, surface water, and sediment at Site 5 and for surface water and sediment in Blows Creek. For additional information regarding ecological risk and how it is calculated, refer to the text box in this section titled "What is Ecological Risk and How is it Calculated?".

Soil

Potentially unacceptable risks to ecological receptors were identified for exposure to metals and pesticides in surface soil at Site 5. The NTCRA mitigated the potential unacceptable ecological risks associated with soil by removing contaminated soil from Site 5 to a depth of 1 foot and replacing it with clean fill. This action resulted in the site-wide average concentrations of the chemicals of potential concern (COPCs) remaining in place (in combined surface soil and sediment) being reduced to an acceptable level, as documented in the EE/CA and Action Memorandum. Therefore, no potential unacceptable risk to ecological receptors from exposure to surface soil remains at Site 5.

Sediment

Potentially unacceptable risks to ecological receptors were identified in sediment at Site 5 from exposure to metals and pesticides. These potential risks have been mitigated by the NTCRA (Figure 3), which removed sediment to a depth of 1 foot from locations contributing to the site-wide ecological risk and replaced it with clean fill. This action reduced the site-wide average concentrations of chemicals remaining in place in the combined surface soil and sediment to an acceptable level, as documented in the EE/CA and Action Memorandum. Therefore, no potential unacceptable risk to ecological receptors from exposure to sediment at Site 5 remains.

Sediment data collected in Blows Creek during the BERA were evaluated along with data from background and site-specific (Sites 1, 4, and 5) investigations to evaluate potential risks to benthic-dwelling organisms and avian piscivores.

Semi-volatile organic compounds (SVOCs) (primarily PAHs), pesticides, one type of polychlorinated biphenyl (PCB), and a limited number of metals were detected in Blows Creek sediment at concentrations exceeding ecological screening values, indicating the potential to adversely affect benthic-dwelling organisms. However, the complete risk assessment, presented in the BERA, concluded that there were no unacceptable risks to benthic-dwelling organisms based on the low frequency and magnitude of these exceedances and the fact that bioassay results did not show a clear relationship between chemical concentration and bioassay organism response, which suggests that the bioassay organisms are not being impacted by the presence of chemicals in sediment.

Elevated mercury concentrations detected in the upper reaches of Blows Creek and near the mouth of Blows Creek adjacent to the Site 4 drainage ditch indicated a potential for

adverse effects to avian piscivores (belted kingfisher) during a preliminary screening. However, risks estimated with mercury concentrations measured in actual fish tissue collected from the creek did not indicate the potential for adverse effects to avian piscivores. Therefore, the BERA concluded that there is no unacceptable risk to avian piscivores from the presence of mercury in Blows Creek sediment. Additionally, mercury concentrations detected within Blows Creek sediment were below the 95 percent UTL concentrations detected in both the nearby St. Juliens Creek and the dredge fill soils.

In addition, NTCRAs have been completed at Sites 3, 5, 6, and 19, and an RA has been completed at Site 4 within the Blows Creek watershed. These actions removed contaminated soil and sediment in upland areas that had the potential to act as a future source of contamination to Blows Creek if left in place.

What is Ecological Risk and How is it Calculated?

An ecological risk assessment (ERA) is conceptually similar to a human health risk assessment except that it evaluates the potential risks and impacts to ecological receptors (plants, animals other than humans and domesticated species, habitats [such as wetlands], and communities [groups of interacting plant and animal species]). ERAs are conducted using a tiered, step-wise process (as outlined in Navy and EPA ERA policy and/or guidance) and are punctuated with Scientific Management Decision Points (SMDPs). SMDPs represent points in the ERA process where agreement among stakeholders on conclusions, actions, or methodologies is needed so that the ERA process can continue (or terminate) in a technically defensible manner.

The results of the ERA at a particular SMDP are used to determine how the ERA process should proceed, for example, to the next step in the process or directly to a later step. The process continues until a final decision has been reached (i.e., remedial action if unacceptable risks are identified, or no further action if risks are acceptable). The process can also be repeated if data needs are identified at any step; the needed data are collected and the process starts again at the point appropriate to the type of data collected.

An ERA has three principal components:

1. Problem Formulation establishes the goals, scope, and focus of the ERA and includes:

- Compiling and reviewing existing information on the habitats, plants, and animals that are present on or near the site.
- Identifying and evaluating area(s) where site-related chemicals may be found (source areas) and at what concentrations.
- Evaluating potential movement (transport) of chemicals in the environment.
- Identifying possible exposure media (soil, air, water, sediment).
- Evaluating if/how the plants and animals may be exposed (exposure pathways).
- Evaluating routes of exposure (for example, ingestion).
- Identifying specific receptors (plants and animals) that could be exposed.
- Specifying how the risk will be measured (assessment and measurement endpoints) for all complete exposure pathways.

2. Risk Analysis, which includes:

- Exposure Estimate – An estimate of potential exposures (concentrations of chemicals in applicable media) to plants and animals (receptors). This includes direct exposures of chemicals in site media (such as soil) to lower trophic level receptors (organisms low on the food chain such as plants and insects) and upper trophic level receptors (organisms higher on the food chain such as birds and mammals). This also includes the estimated chemicals dose to upper trophic level receptors via consumption of chemicals accumulated in lower food chain organisms.
- Effects Assessment – The concentrations of chemicals at which an adverse effect may occur.

3. Risk Calculation or Characterization:

- The information developed in the first two steps is used to estimate the potential risk to plants and/or animals by comparing the exposure estimates to the effects threshold.

Also included is an evaluation of the uncertainties (that is, potential degree of error) associated with the predicted risk estimate and their effects on ERA conclusions.

Surface Water

Because surface water is transient at Site 5, and the drainage ditches provide minimal ecological habitat, no unacceptable ecological risks were identified for surface water at Site 5 during any round of risk screening or risk assessment. Therefore, no action is necessary to address ecological risk from surface water at Site 5. In addition, the BERA conducted for Blows Creek concluded that no unacceptable risks were present for Blows Creek surface water, and no action was warranted.

6. Preferred Alternative

Based on the results of the investigations, risk evaluations, and the NTCRA completed at Site 5, no unacceptable site-related risk to human health or the environment remains at Site 5 and Blows Creek. Metals in shallow aquifer groundwater are naturally occurring and a result of natural processes; therefore, CERCLA does not provide authority to take action to reduce metals concentrations in the groundwater. As a result, No Further Action is warranted for all media at Site 5 and Blows Creek.

During the comment period, interested parties may submit written comments to the following address:

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Ms. Karen Doran
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7. Community Participation

The Navy and EPA provide information regarding the environmental cleanups at SJCA to the public through the Restoration Advisory Board, public meetings, the AR for the site, the information repository, and announcements published in *The Virginian-Pilot*. The public comment period for this Proposed Plan runs from November 15 to December 30, 2015, and a public meeting to discuss the Proposed Plan will be held December 3, 2015, from 5 to 6 p.m. Details regarding the public comment period and public meeting are included in the text box in Section 1 entitled "Mark Your Calendar for the Public Comment Period." The Navy will summarize and respond to all comments submitted during the public comment period in a responsiveness summary that will be included in the final decision document, the ROD, which will follow this Proposed Plan. This Proposed Plan and the ROD will become part of the AR file for SJCA.

Public participation is encouraged since the preferred alternative presented in this Proposed Plan may be modified or another alternative selected based on new information and/or public comments received. The public is encouraged to gain a more comprehensive understanding of Site 5, Blows Creek, and the Navy's ERP by attending this and other public meetings advertised in *The Virginian-Pilot* newspaper and by accessing information included in the AR file. Minutes of all public meetings are included in the file.

8. Glossary of Terms

This glossary defines in non-technical language the more commonly used environmental terms appearing in this Proposed Plan. The definitions do not constitute the Navy's, EPA's, or VDEQ's official use of terms and phrases for regulatory purposes, and nothing in this glossary should be construed to alter or supplant any other federal or Commonwealth document. Official terminology may be found in the laws and related regulations as published in such sources as the Congressional Record, Federal Register, and elsewhere.

Adherence Factor: The amount of a material (e.g., soil) that adheres to the skin per unit of surface area.

Administrative Record (AR): A compilation of site-related information reviewed or relied upon by the Navy and regulatory agencies to make decisions about the site and its cleanup, which is available for public review.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal or state environmental rules and regulations that are applicable or relevant and appropriate to activities conducted, specific environments, or contaminants found at a CERCLA site.

Assessment and Measurement Endpoint: Measures that focus a risk assessment on particular components of the ecosystem that could be adversely affected by contaminants.

Aquifer: Underground bed of soil or rock from which groundwater can be usefully extracted.

Avian Piscivores: Birds that eat primarily fish, such as kingfishers.

Background: Constituents or locations that are not influenced by the releases from a site, and usually described as either naturally occurring or anthropogenic. Naturally occurring are substances present in the environment that have not been influenced by human activity. Anthropogenic are natural- and human-made substances present in the environment as a result of human activities not specifically related to the CERCLA site release in question.

Baseline Ecological Risk Assessment (BERA): A baseline evaluation of the risk posed to the environment due to contaminated media present; risk identified can be removed through a remedial action.

Benthic-dwelling organism: Organism without a backbone living on the floor of a water body.

Bioassay: A measurement of the effects of one or more chemicals on a living organism.

Brackish Water: Water with salinity intermediate between seawater and freshwater.

Central Tendency Exposure (CTE): The mean concentration of site data, used as an exposure concentration in the risk assessment.

Cleanup Goals: Chemical-specific concentration goals for specific media and land use combinations that serve as a target to use during the development, analysis, and selection of cleanup alternatives. These goals should be protective of human health and the environment and comply with all ARARs for all exposure pathways being addressed.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA): A federal law, commonly referred to as the Superfund Program, passed in 1980 and amended by the Superfund Amendments and Reauthorization Act of 1986. CERCLA provides for cleanup and emergency response in connection with existing inactive hazardous waste disposal sites that endanger public health and safety or the environment.

Contaminant of Concern (COC): A chemical that based upon comparison to regulatory screening criteria has potential to pose unacceptable risks or hazards to receptors at the site.

Disced: To plow soil with agricultural equipment with a number of sharp-edged, concave discs set at an angle. As it moves across the ground, it turns and pulverizes the soil, breaking up clumps.

Dredge Fill: Soil derived from dredging operations consisting of poorly sorted silt and clay with thin lenses of fine sand.

Ecological: Refers to plants and animals in the environment.

Ecological Risk Assessment (ERA): An evaluation of the risk posed to the environment if remedial activities are not performed at the site.

Engineering Evaluation and Cost Analysis (EE/CA): A report that summarizes the comparative evaluation of multiple action plans for a site and presents the chosen method of action.

Enhanced reductive dechlorination (ERD): An anaerobic (without oxygen) process in which an electron donor source is injected into the subsurface to allow chlorine atoms on a chlorinated VOC molecule to be sequentially replaced with hydrogen to break down COCs.

Environmental Restoration Program (ERP): The Navy, as the lead agency, acts in partnership with EPA Region 3 and VDEQ to conduct environmental investigations at the facility through the ERP. The current ERP is consistent with CERCLA and applicable state environmental laws.

Federal Facility Agreement: A written agreement between the Navy, EPA, and VDEQ to identify sites of potential historical contamination and implement corrective actions based on public health and environmental considerations. The Federal Facility Agreement outlines the roles and responsibilities of each party and sets timetables for cleanup actions. Among other requirements, the agreement outlines a process to ensure regulatory authority and oversight.

Geophysical Investigation: The application of a variety of non-intrusive and/or intrusive tools to gather information about the physical properties of the subsurface of a subject property.

Groundwater: Subsurface water that occurs in soil and geologic formations that are fully saturated.

Headwaters: A tributary stream of a river close to or forming part of its source.

Human Health Risk Assessment (HHRA): An evaluation of the risk posed to human health if remedial activities are not implemented.

In Situ Chemical Reduction (ISCR): Use of reducing chemicals (e.g., zero-valent iron) to break down groundwater contaminants into harmless byproducts.

Land Use Controls (LUCs): Physical, legal, or administrative methods that restrict the use of or limit access to property to reduce risks to human health and the environment.

Mean Sea Level: an average level for the surface of one or more of Earth's oceans from which heights such as elevations may be measured.

Munden-Tetotum: moderately well-drained soils that have a subsoil of sandy loam or clayey loam.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): Provides the organizational structure and procedures needed to prepare for and respond to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

National Priorities List (NPL): A list developed by the EPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

Natural Attenuation: Reduction in mass or concentration of a constituent over time or distance from the source due to naturally occurring physical, chemical, and biological processes.

No Further Action (NFA): A determination that site characterization is complete and that, if applicable, removal and/or remedial actions have achieved their objectives, and that no additional investigation or action is required for a site.

Non-Time-Critical Removal Action (NTCRA): A removal action at a site that does not pose an immediate threat to human or ecological health.

Ordnance: Military supplies including weapons, ammunition, combat vehicles, and maintenance tools and equipment.

Potable: Suitable for use as a source of water for human consumption.

Proposed Plan: A document that presents and requests public input regarding a proposed cleanup alternative.

Public Comment Period: The time allowed for the members of an affected community to express views and concerns regarding an action proposed to be taken by the Navy and EPA, such as a rulemaking, permit, or Superfund-remedy selection.

Reasonable Maximum Exposure (RME): The highest level of site chemical concentrations a human can reasonably be expected to be exposed to under different exposure scenarios.

Receptors: Humans, animals, or plants that may be exposed to risks from contaminants related to a given site.

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and public comment on alternative remedies.

Remedial Investigation (RI): A study that supports the selection of a remedy where hazardous substances have been disposed of or released. The RI identifies the nature and extent of contamination at the site.

Sediment: Particulate matter that can be transported by fluid flow and that is found underwater in surface water systems.

Site: The area where a hazardous substance, hazardous waste, hazardous constituent, pollutant, or contaminant from the facility has been deposited, stored, disposed of, or placed; has migrated; or has otherwise come to be located.

Site Management Plan (SMP): An annual report that provides a management tool for NAVFAC, VDEQ, EPA, and consultants for use in planning, scheduling, and setting priorities for environmental remedial response activities to be conducted at a base. The SMP establishes schedules and conceptual approaches for continued CERCLA activities.

SJCA Partnering Team: Group consisting of representatives from the Navy (lead agency), EPA (lead regulatory agency), and VDEQ (support regulatory agency) tasked with reviewing all past work and developing a course of action for all future work requirements at ERP sites in accordance with the Federal Facility Agreement.

Soil: A mixture of organic and inorganic solids, air, water, and biota that exists on the Earth's surface above bedrock, including materials of anthropogenic sources, such as slag and sludge.

Surface Water: All water naturally open to the atmosphere (for example, rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries).

Topography: The arrangement of the natural and artificial physical features of an area.

United States Environmental Protection Agency (EPA): The federal agency responsible for administration and enforcement of CERCLA (and other environmental statutes and regulations), and with final approval authority for the Selected Remedy.

Upper Confidence Limit (UCL): The upper limit of the likely range of the true value for a given set of data.

Upper Tolerance Limit (UTL): A value designed to contain a fraction (such as 95%) of the possible background concentrations, thus providing a reasonable upper limit in what is likely observed in background.

Virginia Department of Environmental Quality (VDEQ): The Commonwealth agency responsible for administration and enforcement of environmental regulations.

Watershed: An area or region drained by a river, river system, or other body of water.

Mark Your Calendar for the Public Comment Period

Public Comment Period

November 15–
December 30, 2015

Submit Written Comments



The Navy will accept written comments on this Proposed Plan during the public comment period. To submit comments or obtain further information, please refer to the names and contact information included at the end of Section 7. A blank sheet has been added at the end of this document to be used for writing comments.

Attend the Public Meeting

December 3, 2015, 5–6 p.m.

Major Hillard Library –
Chesapeake

824 Old George Washington
Highway N

Chesapeake, Virginia 23323



The Navy will hold a public meeting to explain the Proposed Plan. Verbal and written comments will be accepted at this meeting.

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