



**US Army Corps
of Engineers®**
New York District

NEW YORK AND NEW JERSEY HARBOR DEEPENING CHANNEL IMPROVEMENTS

NAVIGATION STUDY

FINAL INTEGRATED FEASIBILITY REPORT & ENVIRONMENTAL ASSESSMENT

APPENDIX A6: Hazardous, Toxic and Radioactive Waste (HTRW)

Table of Contents

1.0	Introduction.....	4
1.1.	Study Area	4
1.2.	Regulatory Framework	4
2.0	Regional Description	5
2.1.	Topography and Geology Summary	5
2.2.	Hydrogeology and Surface Water Summary	6
2.3.	Sediment Quality Summary	6
2.4.	Study Area Alternatives Summary	9
2.5.	HTRW Sites within the Study Area.....	10
2.5.1.	National Priority List Superfund Sites:.....	10
2.5.2.	Diamond Alkali Superfund Site.....	12
2.5.3.	State Listed Contaminated Sites (NJDEP).....	15
2.5.4.	State Listed Contaminated Sites (NYSDEC).....	19
2.5.5.	Previous Harbor Deepening Project (HDP) Summary	24
3.0	Findings and Conclusion.....	24
4.0	Acronyms.....	25
5.0	Resources and Sources.....	27

Figures

Figure 1	Topographic Maps
Figure 2	Recommended Plan
Figure 3	NPL Superfund Sites in the Vicinity
Figure 4	Diamond Alkali Superfund Site Location
Figure 5	Diamond Alkali Superfund Site, Newark Bay Operable Unit Boundaries
Figure 6	NJDEP Known Contaminated Sites in the Vicinity
Figure 7	NJDEP Chromate Contaminated Sites adjacent to the Kill Van Kull Channel
Figure 8	NYSDEC Known Contaminated Sites in the Vicinity
Figure 9	Archer-Daniels Midland Company Site Location
Figure 10	NYSDECinfo Locator Environmental Cleanup Remediation Sites adjacent to the Kill Van Kull Channel

Tables

Table 1a	Sediment Concentration Ranges by Waterway
Table 1b	Surface Sediment Concentration Ranges in Newark Bay
Table 2	NPL Superfund Sites in the Vicinity
Table 3	Updated Estimated Schedule for the Diamond Alkali Superfund Site, Newark Bay Operable Unit

1.0 Introduction

The United States Army Corps of Engineers (USACE) New York District (herein “District”) has prepared an integrated Feasibility Report (FR) and Environmental Assessment (EA) for the New York New Jersey Harbor Deepening Channel Improvements (NYNJHDCI) Study, in partnership with the Port Authority of New York and New Jersey (PANYNJ). This Hazardous, Toxic and Radioactive Waste (HTRW) report was prepared to review the Study Area to determine if the NYNJHDCI project is co-located within federal or state listed contaminated sites.

1.1. Study Area

The NYNJHDCI project Study Area is located within the NY Metropolitan Area, focused on the New York and New Jersey Harbors. The Port of New York and New Jersey (herein “Port”) is the largest port on the East Coast, serving a local population of over 27 million people (PANYNJ 2019). The Port is comprised of both public and private terminals and is capable of handling a variety of cargo including, but not limited to, containers, roll on-roll off automobiles, liquid and dry bulk, breakbulk, and specialized cargo.

The existing federal navigation channels were previously designed for the *Regina Maersk* vessel, constructed under the 50-foot Harbor Deepening Project (HDP). Presently, the Port receives cargo on vessels that are larger in width, depth, and length. The current channels are unable to support the increased vessel size, resulting in a greater risk of grounding, collision, marine casualty, and operational limitations within the harbor. The NYNJHDCI Study focuses on improving the channels to support the current and projected future vessel usage.

1.2. Regulatory Framework

This HTRW report was prepared in accordance with the USACE Engineering Regulation (ER) 1165-2-132 and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 42 United States Code 9601 et seq. HTRW is defined by ER 1165-2-132 as:

“Except for dredged material and sediments beneath navigable waters proposed for dredging... HTRW includes any material listed as a “hazardous substance” under [CERCLA]... Dredged material and sediments beneath navigable waters proposed for dredging qualify as HTRW only if they are within the boundaries of a site designated by the EPA or a state for a response action (either a removal action or a remedial action) under CERCLA, or if they are part of a National Priority List (NPL) site under CERCLA.”

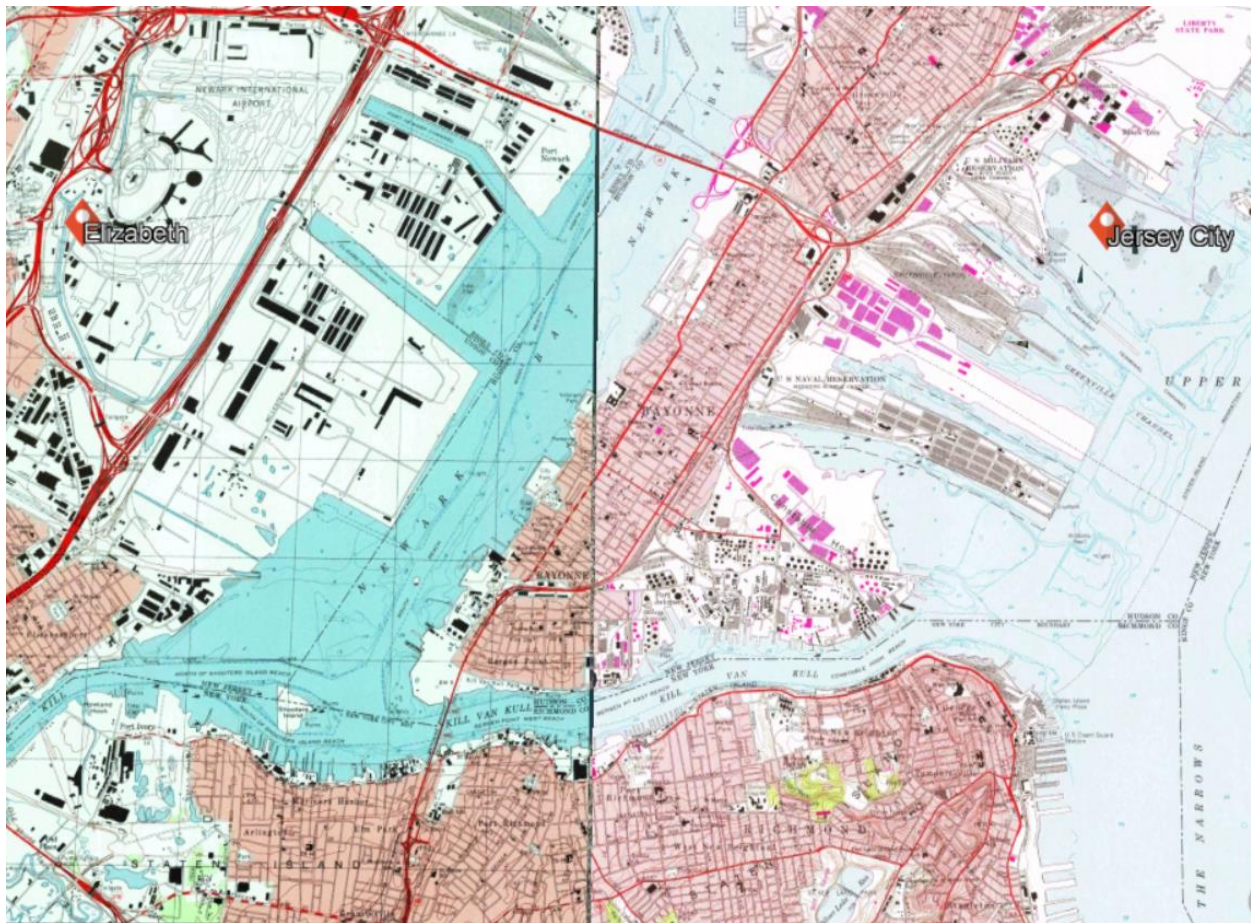
This report was prepared by performing the following:

- Review existing and readily available federal and state records of contaminated sites within the Study Area;
- Identify contaminated sites that are co-located within the navigation channels proposed to be improved; and,
- Determine if co-located contaminated sites may affect or be affected by the project.

2.0 Regional Description

2.1. Topography and Geology Summary

The topography and geology of the land surrounding the Study Area consists of mostly flat and heavily urbanized terrain, ranging from approximately five feet above mean sea level (AMSL) to approximately 200 ft AMSL in the vicinity. Topographic gradients generally slope towards, or have drainage to, surface water areas that are dominantly present throughout the area.



Source: USGS, 1995 Elizabeth Quadrangle (left) and 1967 Jersey City Quadrangle (right).

Figure 1: Topographic Maps

Many of the channels in the NY Metropolitan area are underlain by bedrock or glacial sediments with relatively recent black silt or sand waves of coarse sand and fine gravel. Outside the channels, Holocene estuarine sediments overlay Pleistocene glacial sediments. Triassic-Jurassic sandstones and shales are intruded by the Palisades diabase sill and associated basalt sills in the western Kill Van Kull and Newark Bay. Pleistocene glacial sediments mostly overlie the bedrock in the surrounding area; however, bedrock is locally found exposed or overlain by Holocene sediments. The sediments consist of glacial moraine till deposits, glacial lake deposits of finely laminated to varved clayey silts and outwash sands. Holocene sediments in Newark Bay include fossil oyster

reef on diabase, finely laminated tidal deposits overlaying the Pleistocene glacial sediments and varved silty clays, peat, organic silts, and gray silts (Beda et al undated and Monteverde et al 2015). For additional details and source information regarding the topography and geology of the Study Area, refer to the FR/EA for which this document is an appendix to.

2.2. Hydrogeology and Surface Water Summary

Topographic gradients typically dictate the surficial and shallow groundwater flow, where hydrogeologic gradients usually follow, under normal circumstances, towards the nearest major water body (i.e., Atlantic Ocean). Groundwater in the vicinity of the Study Area is anticipated to flow from higher elevations in the west and north to lower elevations in the east and south, however, groundwater flow patterns can vary based on site specific topographic and geologic conditions.

The Study Area consists of several bays, rivers, and channels. Surface waters within the Study Area primarily include the Passaic and Hackensack Rivers, Newark Bay, Kill Van Kull, Hudson River and Upper Bay. The Passaic and Hackensack Rivers flow south and converge in Newark Bay, where surface water continues to drain south, eventually into Raritan Bay. The Hudson River generally flows south, where it converges with the East River in the Upper Bay but is tidally influenced with dual flow directions, extending north as far as Troy, New York (NYSDEC 2021a). The Kill Van Kull is a tidal strait that connects the Upper Bay with Newark Bay flowing from east to west. All surface water in the area ultimately drains into the Atlantic Ocean to the east.

The region has a dynamic hydrology due to the variation in tidal velocity, amount of freshwater flow, and bathymetry among the connecting bays. These waterways exist within a heavily industrialized and developed corridor and contain deepwater navigation channels that allow transport of cargo into and out of the Ports of New York and New Jersey (USACE 1999). For additional detail and source information regarding the hydrogeology and surface waters of the Study Area, refer to the FR/EA for which this document is an appendix to.

2.3. Sediment Quality Summary

Sediment quality has been assessed extensively over the past several decades for contaminant concentrations related to the surrounding, and upgradient, highly urban and industrial operations historically prevalent throughout the Study Area. Several recent studies and data sources, including those studies with sampling results presented in **Table 1a and 1b**, have demonstrated that while contaminants of varying concentrations remain present, the overall harbor has trended cleaner in the past few decades and is expected to continue trending cleaner as a result of, to name a few examples, natural attenuation recovery processes, historical and recent deepening and maintenance dredging of navigation channels, and following a CERCLA remedial action associated with the Diamond Alkali Superfund Site (NBSA 2019, Lodge et al 2015, and USFWS et al 2020). Some model simulations have also indicated that sediment contaminant levels will continue to decrease over time even if current contaminant loads in Newark Bay were to remain constant (Lodge et al 2015).

Waterway	Chemical	Units	Number of Samples	Range of Concentrations	
				Minimum Detect	Maximum Detect
Passaic River – Lower 17.4 to 8.3 miles	TCDD	ppt	297	0.02	51,100
Passaic River – Lower 8.3 miles			478	0.02	34,100
Hackensack River			84	0.18	2,990
Newark Bay			179	0.95	592
Arthur Kill			73	0.30	347
Kill Van Kull			3	5.79	20.2
Passaic River – Lower 17.4 to 8.3 miles	Mercury	ppm	273	0.02	22.2
Passaic River – Lower 8.3 miles			465	0.04	24.3
Hackensack River			429	0.01	21,382.50
Newark Bay			199	0.05	1,320
Arthur Kill			230	0.02	2,300
Kill Van Kull			3	0.77	7.70
Passaic River – Lower 17.4 to 8.3 miles	Total DDT	ppb	291	0.07	1,371.10
Passaic River – Lower 8.3 miles			277	0.21	4,002
Hackensack River			2	13.80	15.30
Newark Bay			95	1.62	558.14
Arthur Kill			17	11.70	3,740
Kill Van Kull			3	15.60	464
Passaic River – Lower 17.4 to 8.3 miles	Total PAH	ppb	348	147.72	622,768
Passaic River – Lower 8.3 miles			520	277.40	2,523,200
Hackensack River			291	262.50	51,620,000
Newark Bay			191	118.10	478,440

Arthur Kill			193	81.95	189,514
Kill Van Kull			3	6,780	20,730
Passaic River – Lower 17.4 to 8.3 miles	Total PCB	ppb	296	1.25	30,782.26
Passaic River – Lower 8.3 miles			482	0.82	28,578.83
Hackensack River			320	0.18	2,000,000
Newark Bay			150	4.53	10,400
Arthur Kill			193	9	5,500
Kill Van Kull			3	442.09	538.85

Source: USFWS et al 2020, Exhibit 2-1, Concentrations of Select Hazardous Substances Measured in Sediments of the Lower Passaic River/Newark Bay Study Area, 1990-2016 (portion of recreated).

Table 1a – Sediment Concentration Ranges by Waterway

Chemical	Units	Number of Samples	Median	Range of Concentrations	
				Minimum Detect	Maximum Detect
2,3,7,8-TCDD	ppt	254	42.8	0.12	1,710
Arsenic	ppm	254	13.3	1.18	115
Barium	ppm	254	117	5.5	1,260
Cadmium	ppm	254	0.91	0.0592	24.6
Chromium	ppm	254	95.8	3.95	777
Copper	ppm	254	100	1.5	924
Lead	ppm	254	111	2.18	2,190
Mercury	ppm	254	1.48	0.0051	22.1
Nickel	ppm	254	37.9	3.83	282
Silver	ppm	254	1.46	0.0448	12
Zinc	ppm	254	220	8.18	6,810
Bis(2-Ethylhexyl)phthalate	ppb	254	340	96	38,000
Total Petroleum Hydrocarbon	ppm	254	190	6.5	2,900
Total DDT (4,4)	ppb	254	26	0.093	1,800

Total Aroclor PCBs (sum of 9 Aroclors)	ppb	254	140	6.4	2,500
Total PCB Congeners (209)	ppt	254	277,254	2,480	5,030,000
Total Alpha + Gamma Chlordane	ppb	254	4.3	0.039	32

Source: NBSA 2019, Table 6-1, Phase III Stratified Mean Surface Sediment Concentrations in the NBSA (portion of recreated).

Table 1b – Surface Sediment Concentration Ranges in Newark Bay

However, it is not anticipated that sediment load concentrations will remain constant based on efforts underway and planned for the connecting waterways and Newark Bay, including the USEPA’s remedial investigation and action of the Lower 8.3 miles of the Passaic River planned to reduce or eliminate risk to human health and the environment related to the Diamond Alkali Superfund Site (herein “Diamond Alkali”) (USFWS et al 2020). While Table 1a and 1b present the general sediment sampling results throughout the study area water ways and Newark Bay, it should be noted that sampling locations were specific to the remedial investigation of Diamond Alkali. Material generated from the existing navigation channels during the HDP was tested and found at concentrations suitable for placement at HARS or beneficial use placement as grading/closure materials, for marsh restorations, and artificial reef development (NBSA 2019).

2.4. Study Area Alternatives Summary

Navigation channel improvement alternatives that were considered in this FR/EA include incremental deepening from 2 feet (ft) to 7 ft for larger vessels to achieve safer vessel access into Port Jersey-Port Authority Marine Terminal (PJPAMT) and to Elizabeth-Port Authority Marine Terminal (EPAMT). Alternatives reviewed include six incremental deepening variations to PJPAMT and six incremental deepening variations to EPAMT in addition to a No Action Alternative for each port, discussed in more detail in the FR/EA.

The Recommended Plan referenced herein and discussed in more detail in the FR/EA, includes the deepening of Ambrose Channel, Anchorage Channel, Kill Van Kull, Newark Bay Channel, South Elizabeth Channel, Elizabeth Channel and Port Jersey Channel by 5 feet (ft).

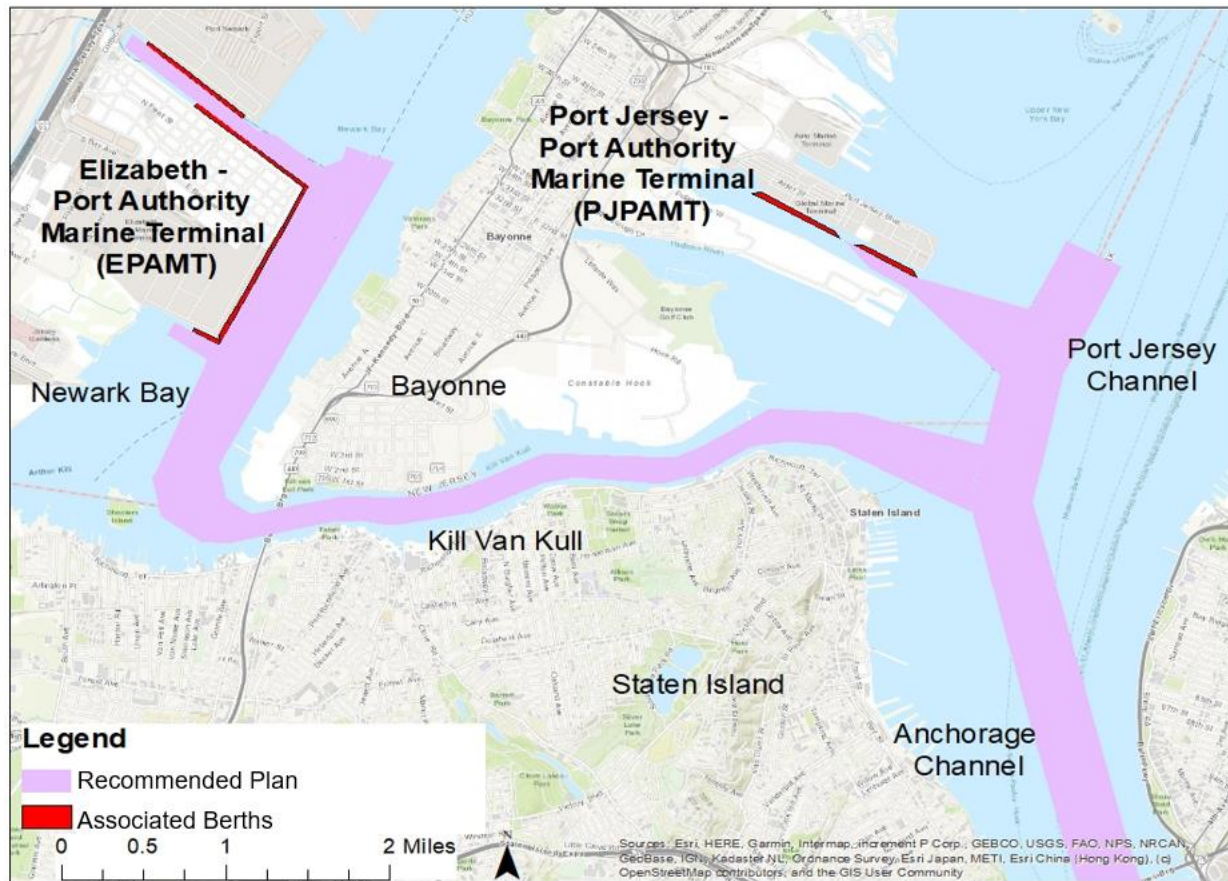


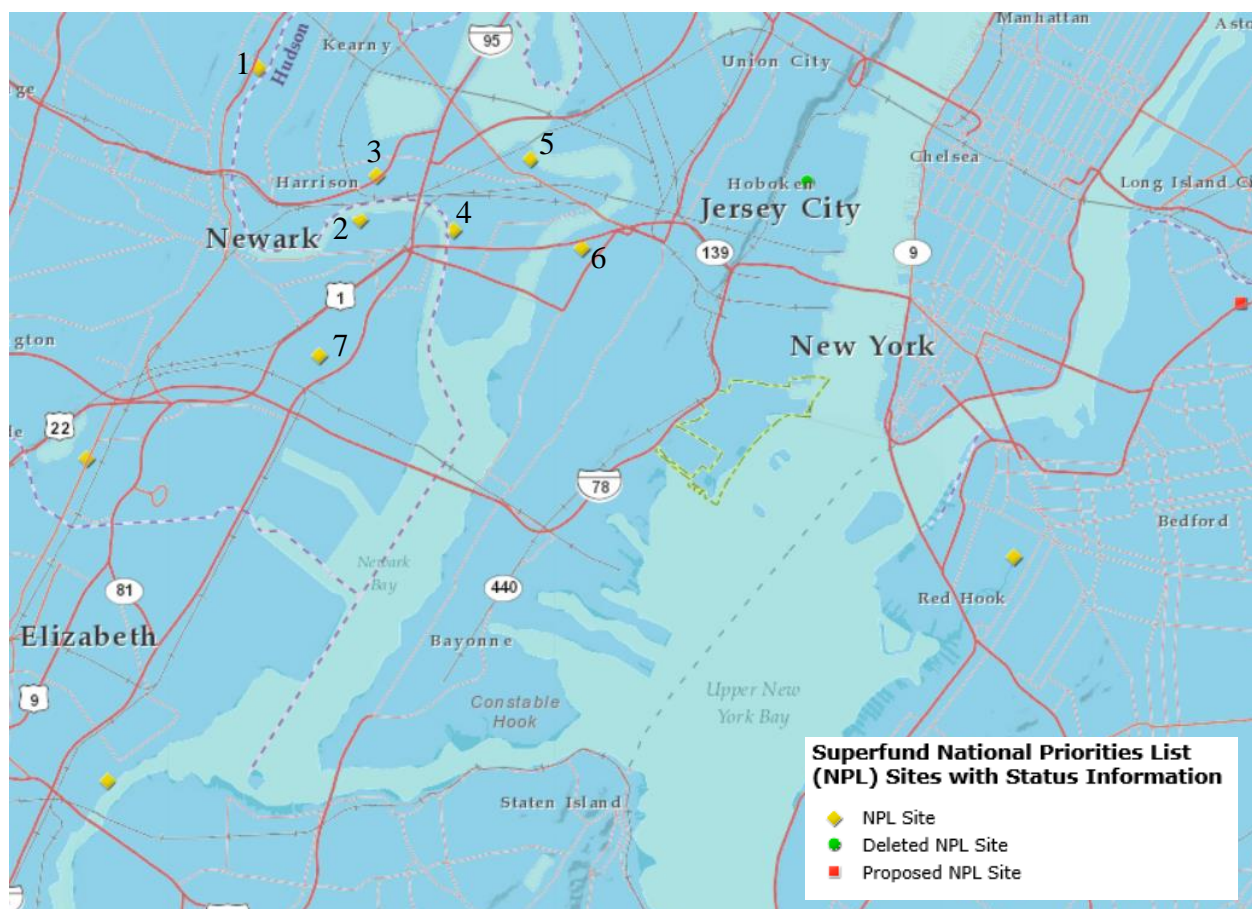
Figure 2: Recommended Plan – Inner Harbor

2.5. HTRW Sites within the Study Area

Several federal and state listed contaminated sites are in the nearby vicinity of the NYNJHDCI project are on land, outside of the project boundary, with the exception of a portion of a National Priority List (NPL) Superfund Site/Listed State of New Jersey site discussed in more detail in **Section 2.5.1 and 2.5.2**. The following sections contain a summary of the federal and state listed HTRW sites located in the vicinity of the Study Area.

2.5.1. National Priority List Superfund Sites:

CERCLA was established by Congress in 1980, giving USEPA the funds and authority to remediate contaminated sites where there is no identifiable responsible party. The purpose of CERCLA, also referred to as Superfund, is to protect human health and the environment, have identified responsible parties pay for remediation, involve communities in the process, and return contaminated sites to productive uses (USEPA 2020a). There are six NPL Superfund Sites located upgradient of the NYNJHDCI project with potential, or known, impacts to surface waters. Below, **Figure 3** presents the location of nearby NPL Superfund Sites and **Table 2** provides a summary of nearby upgradient NPL Superfund Sites identified in the figure (USEPA 2021a):



Source: USEPA 2021a

Figure 3: NPL Superfund Sites in the Vicinity

FIGURE ID NO.	NPL SITE NAME	SITE ID	MEDIA IMPACTED	CONTAMINANTS OF CONCERN
1	Riverside Industrial Park	NJSFN0204232	Soil, ground water, surface water (Passaic River)	VOCs, SVOCs, PCBs, metals; Benzene, mercury, chromium, arsenic, 2,4-dimethylphenol
2	Diamond Alkali	NJD980528996	Soil, ground water, surface water (Passaic River)	2,4,5-trichlorophenol, dioxin (TCDD), metals, pesticides
3	Diamond Head Oil Refinery	NJD092226000	Soil, ground water, wetland sediment	VOCs, SVOCs, pesticides, PCBs, metals
4	Syncon Resins	NJD064263817	Soil, ground water	Benzene, PCBs, toluene.

5	Standard Chlorine	NJD002175057	Soil, ground water, surface water (Hackensack River)	VOCs, SVOCs, PCBs: dioxins, dichlorobenzenes, 1,2,4-trichlorobenzene, naphthalene, benzene, chlorobenzene
6	PJP Landfill	NJD980505648	Soil, ground water	VOCs
7	Pierson's Creek	NJD002144517	Wetland sediment, surface water (Pierson's Creek into Newark Bay)	VOCs, PAHs, PCBs, pesticides, metals: mercury, arsenic cadmium, chromium, lead, nickel

Note: **Bolded Red** text indicates NPL Site that is co-located, or partially co-located in the NYNJHDCI Project Area.

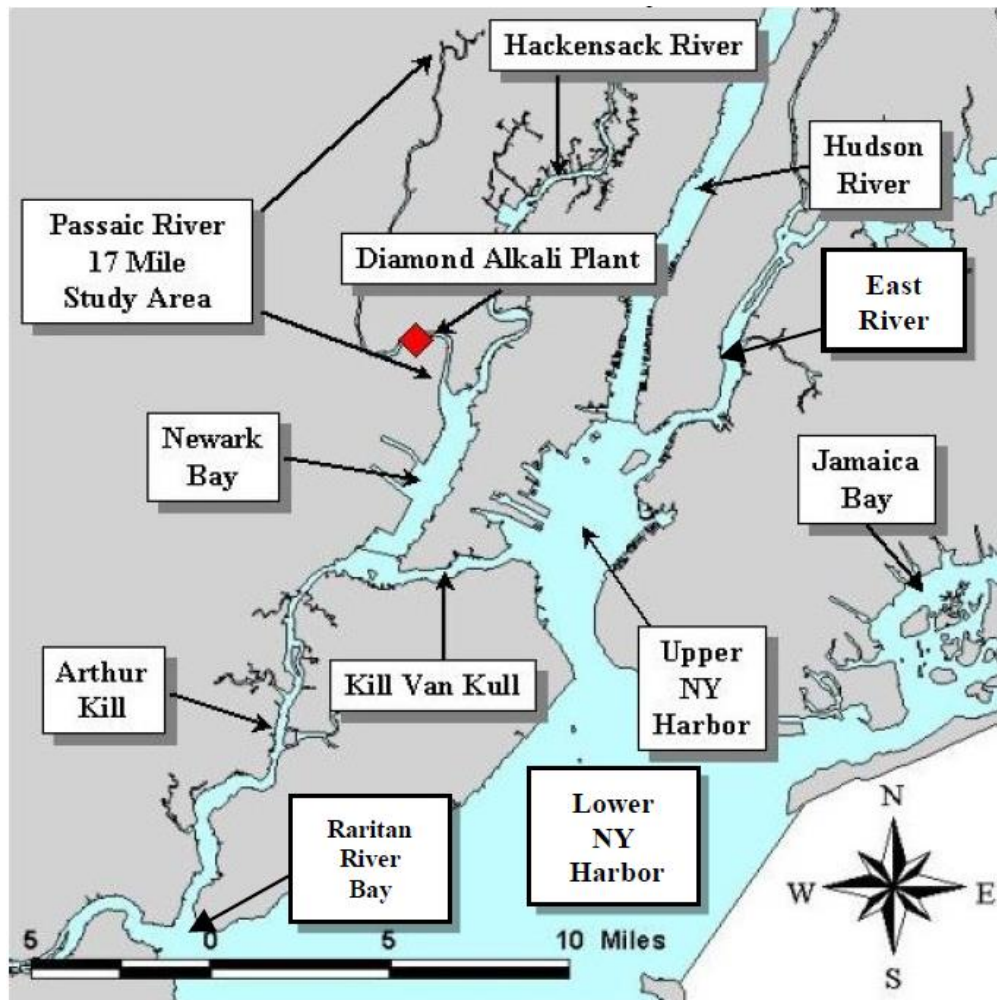
Source: USEPA 2020b

Table 2: NPL Superfund Sites in the Vicinity

Of these seven nearby NPL Superfund Sites, none are co-located within the NYNJHDCI project area with the exception of a portion of the Diamond Alkali Superfund Site (herein “Diamond Alkali”) study area that is under investigation in and around Newark Bay. No other existing, former, or proposed NPL sites were identified in the vicinity of the NYNJHDCI project with the potential to affect, or be affected by, the NYNJHDCI project.

2.5.2. Diamond Alkali Superfund Site

The main plant of Diamond Alkali was located at 80 Lister Avenue in Newark, New Jersey approximately five miles upgradient from Newark Bay along the western shore of the Passaic River (**Figure 3 and 4**). The Diamond Alkali plant historically is known for the manufacturing of agricultural chemicals and herbicides utilized in the production of “Agent Orange”. Agent Orange was primarily utilized in the 1950s and 1960s during the Vietnam War. A bi-product of Agent Orange manufacturing, 2,3,7,8-Tetrachlorodibenzo-p-dioxin (herein “TCDD”), polluted the surface and subsurface of the plant grounds in addition to the Passaic River which drains south into Newark Bay. Although production of Agent Orange ceased in the 1970s, adverse effects of manufacturing processes are still present to this day. Due to the known pollution concerns, the New Jersey Department of Environmental Protection (NJDEP) prohibits the consumption of fish or shellfish from the Lower Passaic River and Newark Bay (USEPA 2020c). Below, **Figure 4** presents the location of the Diamond Alkali plant in relation to the surrounding vicinity and proximity to surrounding surface water features:



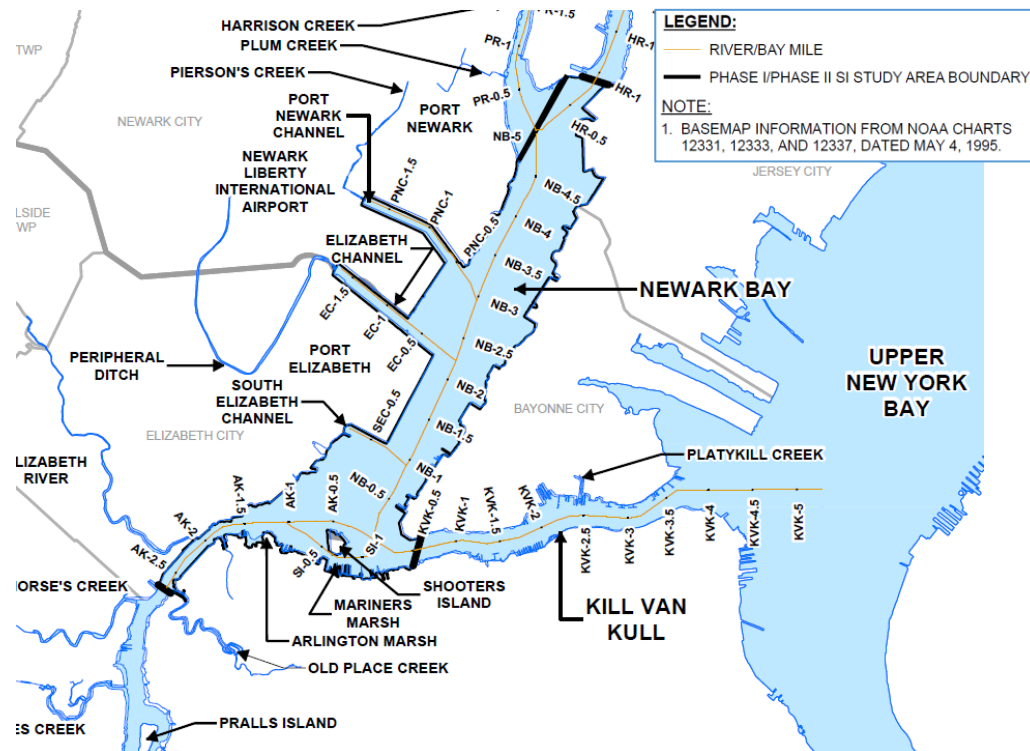
Source: USFWS et al 2020

Figure 4: Diamond Alkali Superfund Site Location

In 1984 the USEPA added the Diamond Alkali plant as a NPL Superfund Site after the State of New Jersey and USEPA performed environmental sampling at the facility and in the Passaic River, revealing high levels of TCDD (USFWS et al 2020). In 1994, a six-mile stretch of the Passaic River was added to the remediation investigation requirements of the site, and in 2003 expanded the remedial investigation to a 17-mile stretch of the Passaic River. One year later, in 2004, Newark Bay, Arthur Kill and Kill Van Kull channels and portions of the Hackensack River were added to the investigation efforts (referred to herein as the “Newark Bay Study Area” or “Newark Bay Operable Unit (OU)”). The Newark Bay Study Area is bound by the Lower Passaic River Restoration Project downstream boundary, the Contrail Bridge at the Hackensack River, the Bayonne Bridge, and the Goethals Bridge (Tierra 2007).

The USEPA managed an interim remedial action at the Diamond Alkali site in 2001, which included the installation of a flood wall, subsurface slurry walls, and groundwater collection and treatment system, and capping to prevent future exposure to contaminated soil and releases to the Passaic River. In 2012, contaminated sediment on the east back of the Passaic River near

Lyndhurst, New Jersey was dredged for removal and subsequently capped. In 2016 the USEPA signed a Record of Decision for the Lower 8.3 miles of the Passaic River which includes bank to bank dredging to a depth of 2.5 feet, engineering and institutional controls, and long-term monitoring (USFWS et al 2020).



Source: Tierra 2007

Figure 5: Diamond Alkali Superfund Site, Newark Bay Operable Unit Boundaries

Currently, remedial investigation and reporting of the Newark Bay OU is still in progress. In 2007, Tierra Solutions, Inc. prepared a Phase II Remedial Investigation Work Plan for the Newark Bay Study Area, which detailed sampling goals to determine the horizontal and vertical extent and concentration levels of Diamond Alkali contaminants of concern, including, but not limited to, polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, polychlorinated biphenyls, polyaromatic hydrocarbons, pesticides, and metals (Tierra 2007). In 2017 a Phase III Sediment Investigation Field Report was prepared to document the sediment sampling activities performed at 231 sampling locations in Newark Bay. Phase III data will be forthcoming in a Remedial Investigation Report; however, Phase III data has been incorporated into the Newark Bay Study Area Conceptual Site Model revised in January 2019 (NBSA 2019). Additional Diamond Alkali study information and plans are located on the Newark Bay Study website: www.ournewarkbay.org (NBSW 2020).

In January 2020 the Final Natural Resource Damage Assessment (NRDA) Plan for the Diamond Alkali was released by the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA), detailing the assessment of accumulated damages caused by the Diamond Alkali on the natural resources located within the Passaic River

and Newark Bay, including the Arthur Kill, Kill Van Kull, and portions of the Hackensack River. The purpose of the NRDA Plan is to document the exposure of natural resources to hazardous substance releases and identifies the anticipated procedures for evaluating the injuries caused by exposure. This report details the hazardous substance exposure to natural resources (i.e., fish, shellfish, birds) and outlines recommendations and a proposed pathway forward (USFWS et al 2020).

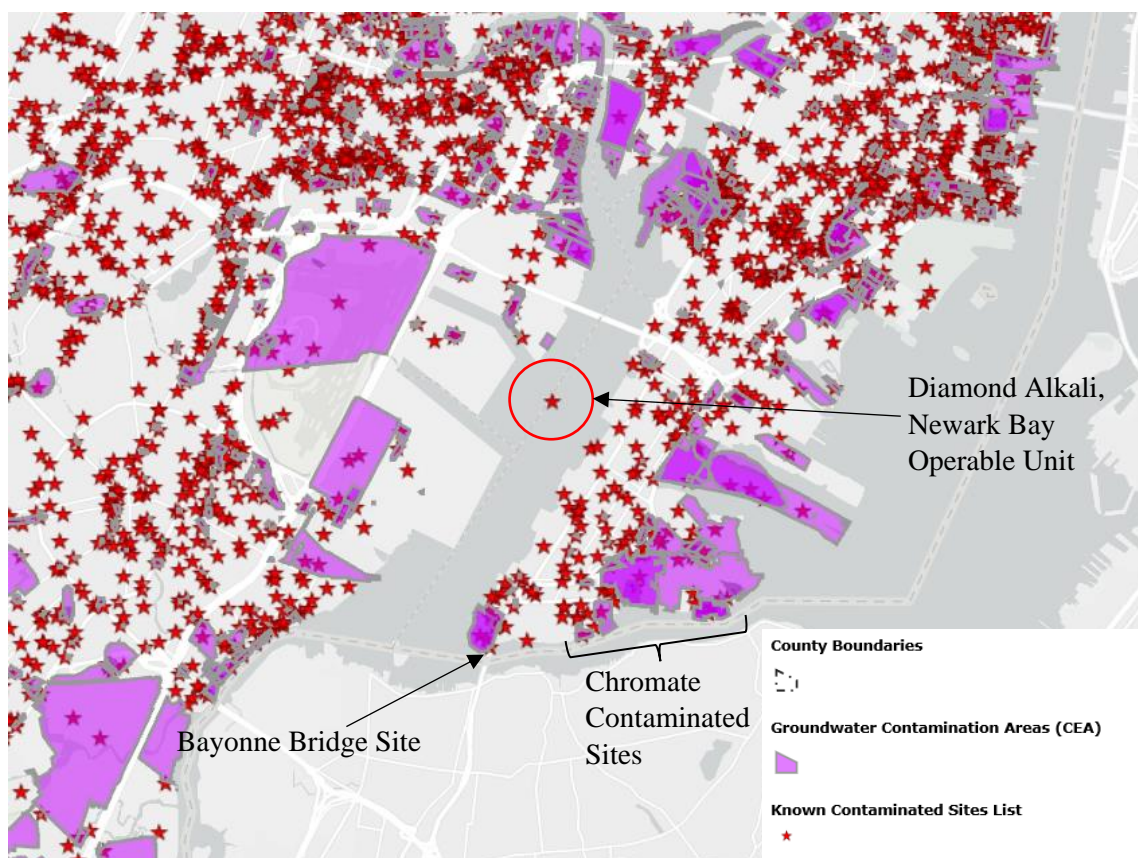
The District and the USEPA have been meeting on a bimonthly basis to coordinate the NYNJHDCI study and the ongoing remedial investigation and remedial action efforts within the Newark Bay Study Area. In April 2022, the USEPA provided the District with the following updated estimated schedule for the Diamond Alkali, Newark Bay OU (**Table 3**). Schedule dates have been updated since the release of the Draft Integrated Feasibility Report and Environmental Assessment, which originally presented a Record of Decision anticipated for this study by November 2022 (USEPA 2020c). In Spring 2022, the USEPA completed modeling baseline future projection scenarios incorporating the NYNJHDCI Recommended Plan projections. Schedules are subject to change and the following estimated schedule has been provided for general informational purposes at this present time. Note, the USEPA’s online cleanup schedule has not yet been updated with newly estimated dates (USEPA 2021b). The District will continue to coordinate with the USEPA on the Newark Bay Study Area cleanup schedule and the NYNJHDCI schedule as both studies advance in the future.

Task	Estimated Completion Schedule
Diamond Alkali, Newark Bay Operable Unit	
Modeling baseline scenarios to include the NYNJHDCI Recommended Plan projections	Spring 2022
Final Remedial Investigation Report	Spring 2022
Final Feasibility Study Report	End of 2023
Record of Decision	End of 2024

Table 3: Updated Estimated Schedule for the Diamond Alkali Superfund Site, Newark Bay Operable Unit

2.5.3. State Listed Contaminated Sites (NJDEP)

There are several known contaminated sites listed by the NJDEP located within the vicinity of the Study Area, presented on **Figure 6** below. Known contaminated sites are defined by the NJDEP as sites where contamination of soil or groundwater has been confirmed (NJDEP 2021a).



Source: NJDEP 2021a

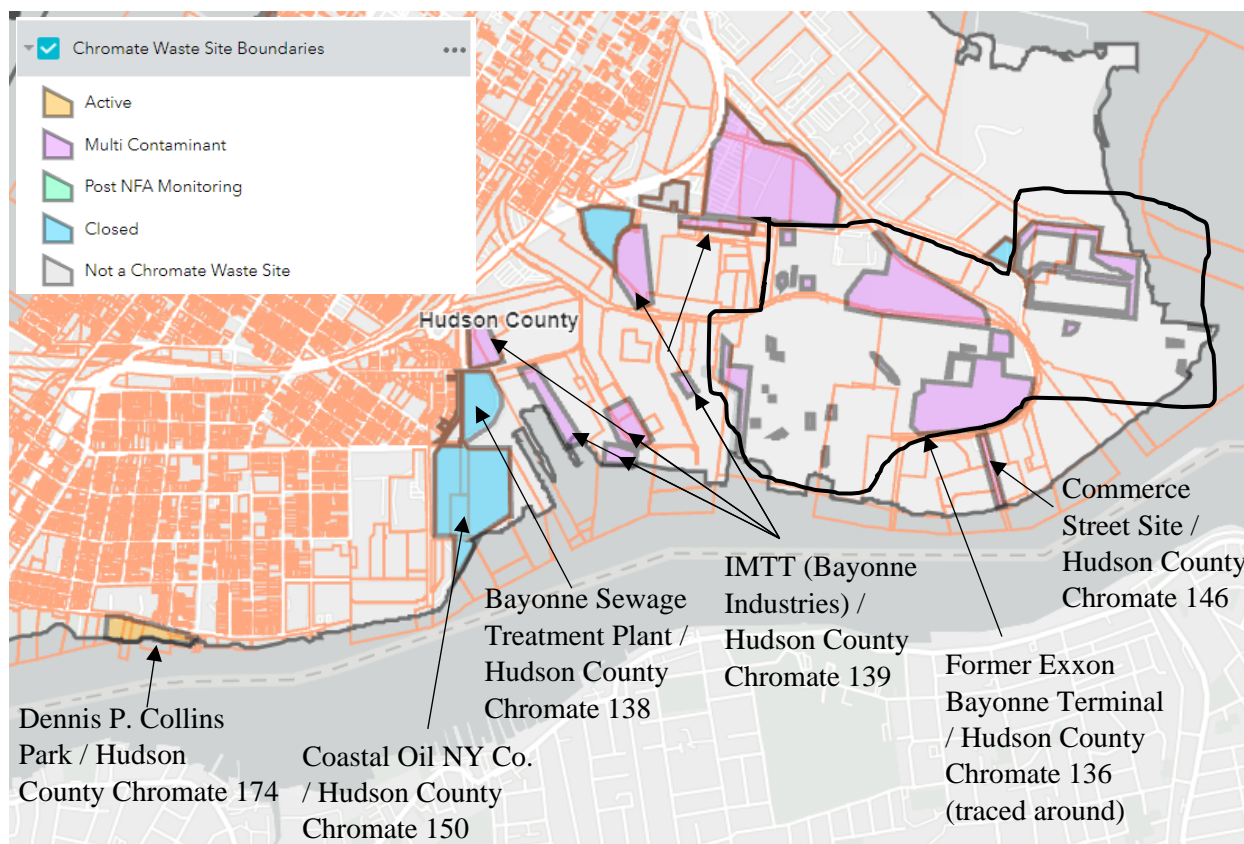
Figure 6: NJDEP Known Contaminated Sites in the Vicinity

The contaminated site identified in Newark Bay, within the NYNJHDCI project area is the Diamond Alkali, Newark Bay OU, discussed in more detail in the previous section. The remainder of these sites are located on land and are not co-located within the project area. Several nearby on land known contaminated sites, including chromate contaminated sites, are located on the south shoreline of Bayonne, New Jersey adjacent to the Kill Van Kull channel, identified as the Bayonne Bridge site (Program Interest (PI) # G000021830), Dennis P. Collins Park (Hudson County Chromate 174, PI # G000011472), Coastal Oil (Hudson County Chromate 150, PI # G000004035), Bayonne Sewage Treatment Plant (Hudson County Chromate 138, PI # G000008754), IMTT, Bayonne Industries (Hudson County Chromate 139, PI# 002552, Site ID 64072), Exxon Bayonne Terminal (Hudson County Chromate 136, Site ID 45533), and the Commerce Street Site (Hudson County Chromate 146, PI # G000008762) shown on **Figure 6 and 7**.

The Bayonne Bridge site is owned by the PANYNJ and is located at 1st Street West and Kennedy Boulevard, and has 26 Case Oversight actions listed on the NJDEP DataMiner database, all of which are closed with the exception of three active actions including two Spill Act Discharges with known groundwater contamination from 1993 and a Spill Act Discharge with groundwater contamination from 2019 (NJDEP 2021b). All three active actions have been placed under a

Classification Exception Area (CEA), restricting groundwater use for potable purposes due to exceedances of historic fill impacted with arsenic (found at 306,000 ug/L) above the State’s primary drinking water standard of 3 ug/L. Remedial investigation and remedial action are currently under the oversight of a Licensed Site Remediation Professional. All remedial action is estimated to have been completed by May 2021. Additional publicly available records identified for the site indicate that a 4,500-gallon waste oil tank (Tank ID: TANK-110491) was removed in 2019 (NJDEP 2021b).

The known chromium contaminated sites are associated with historic fill material originating from three chromite ore-processing plants that operated between 1905 and 1971. The historic fill material generated from these plants was placed in several locations across Hudson County and utilized in the grading and development of over 200 residential, commercial, and industrial sites. Chromium contamination has been investigated under the jurisdiction of the NJDEP and is in the process of cleanup procedures by responsible parties: PPG Industries, Inc., AlliedSignal, Inc., and Maxus Energy Corp (NJDEP 2021c). The chromium cleanup program is referred to as the Hudson County Chromate Project. Six of the many chromium contaminated sites are located in the near vicinity of the project area, along the Kill Van Kull navigation channel (**Figure 7**).



Source: NJDEP 2021a

Figure 7: NJDEP Chromate Contaminated Sites adjacent to the Kill Van Kull Channel

Dennis P. Collins Park is located adjacent to the Bayonne Bridge Site and extends east to Lexington Avenue. Based on available public records, a portion of the Site has been undergoing

a cleanup action for chromium contamination under the name Hudson County Chromate 174 on the south side of 1st Street. According to NJDEP, hexavalent chromium was observed in one sample collected, confirming contamination is limited to one area, however the area of concern is covered with an impermeable liner and asphalt to prevent human exposure (NJDEP 2009). According to the most recent schedule update (July 2021), PPG Industries Inc. completed the installation of two feet of clean soil and replacement of a stone revetment adjacent to the Kill Van Kull. Remaining remedial action tasks include excavation of chromium along the newly replaced revetment that is estimated to be completed in September 2021, and groundwater investigations at the site remain in progress (Riccio 2021).

Coastal Oil NY Co, also referred to as Hudson County Chromate 150, is located adjacent to the Kill Van Kull channel at the foot of 5th Street East and is listed as closed with a No Further Action Letter for unrestricted use on the NJDEP database (NJDEP 2021a) indicating that all remedial investigation and remedial action is completed. It appears the site has both a deed notice in place, to restrict human exposure to contaminants in the subsurface, and a classification exception area to restrict potable groundwater use at the site. No other details were observed on the NJDEP database, however, according to the Hudson County Chromate Update 34, issued in September 2009, fieldwork was completed during Summer of 2002 where hexavalent chromium was found along oil pipeline gallery. During the fieldwork, oil product was discovered and reported to NJDEP's Hotline for case assignment. A final report was prepared in September 2003 and based on the fieldwork performed, no further action was anticipated at this site except for recommendation for a deed notice to be placed on this site (NJDEP 2009).

The Bayonne Sewage Treatment Plant site underwent remedial action under the name Hudson County Chromate 138. Hexavalent chromium was observed in one sample at approximately 10-15 feet bgs, although the exceedance of State criteria was found to be marginal therefore the NJDEP determined no additional remedial investigation or remedial action was necessary (NJDEP 2009). The site is registered as closed by the NJDEP with a No Further Action Letter for unrestricted use (NJDEP 2021a).

IMTT, Bayonne Industries (Hudson County Chromate 139) is located at the foot of East 22nd Street and is listed on the NJDEP database with a status that remedial investigation and remedial action is still in progress for multiple contaminants, in addition to chromium contamination (NJDEP 2021a). According to the Hudson County Chromate Update 34, the NJDEP performed site-wide surface sampling in November 2001, identifying chromium contamination in several locations throughout the site (NJDEP 2009). It appears the site has a classification exception area to restrict potable groundwater use at the site and remains under the oversight of a Licensed Site Remediation Professional (NJDEP 2021a).

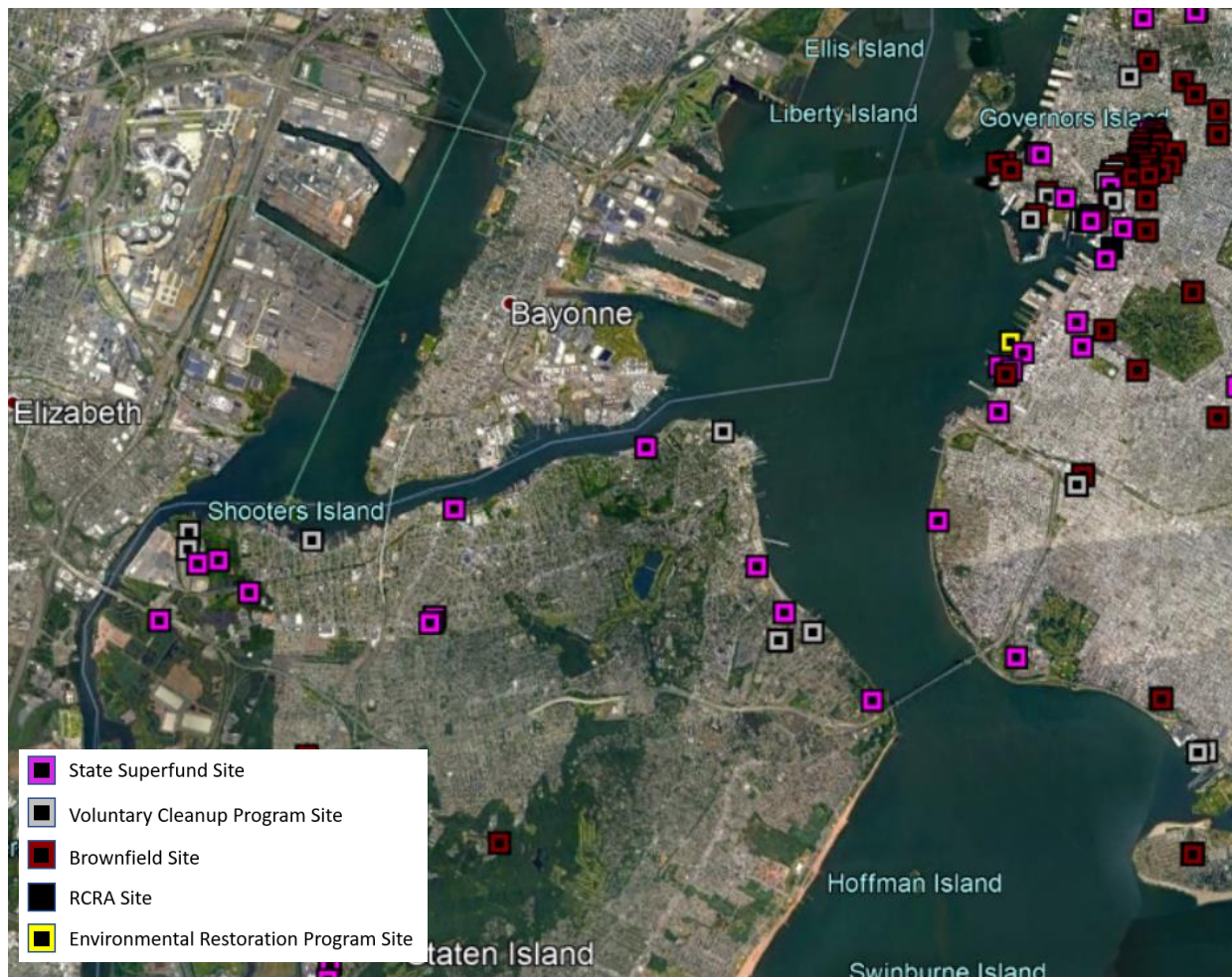
The Commerce Street Site, identified as Hudson County Chromate 146, is located along the roadway of Commerce Street, starting from south of the intersection of Hook Road extending south to where Commerce Street ends adjacent to the Kill Van Kull channel. According to the Hudson County Chromate Update 34, the site is, or has previously been, paved as a temporary engineering control to prevent human exposure at the site while pending remedial investigation and remedial action (NJDEP 2009). The site status is active under the oversight of a Licensed Site

Remediation Professional. According to the NJDEP database, remedial action is scheduled to be completed by December 2024 (NJDEP 2021b).

Additional known contaminated sites located on land along the south shore of Bayonne include: Chevron (PI # 002274), Pirelli Cable Company (PI # G000003880), Bayonne Terminals Incorporated (PI # G000003244), Standard Tank Cleaning Corp (PI # 003518), 5th Street Connection (PI # 735986), 8th Hook Warehouse (PI # 940841), Blue Circle Cement Inc. (PI # 002820), Engel Holding Company (PI # 158730), Amerada Hess Corp (PI # 003919), and Bayonne Energy Center (PI # 025863), all of which are active sites under the oversight of a Licensed Site Remediation Professional. Blue Circle Cement Inc. and Engle Holding Company appear to have active remedial action permits with the NJDEP. Chevron, Pirelli Cable Company, Bayonne Terminals Incorporated, Blue Circle Cement Inc., Engel Holding Company, Amerada Hess Corp, and Bayonne Energy Center appear to have classification exceptions areas beneath all or a portion of each site to restrict potable groundwater use (NJDEP 2021a).

2.5.4. State Listed Contaminated Sites (NYSDEC)

There are several New York State listed known contaminated sites, including State Superfund, voluntary cleanup program, brownfield, resource conservation and recovery act (RCRA), and environmental restoration program sites, located in the vicinity of the project area in Staten Island and Brooklyn, as shown on **Figure 8** (NYSDEC 2020). These sites are located on land and are not co-located within the project area.



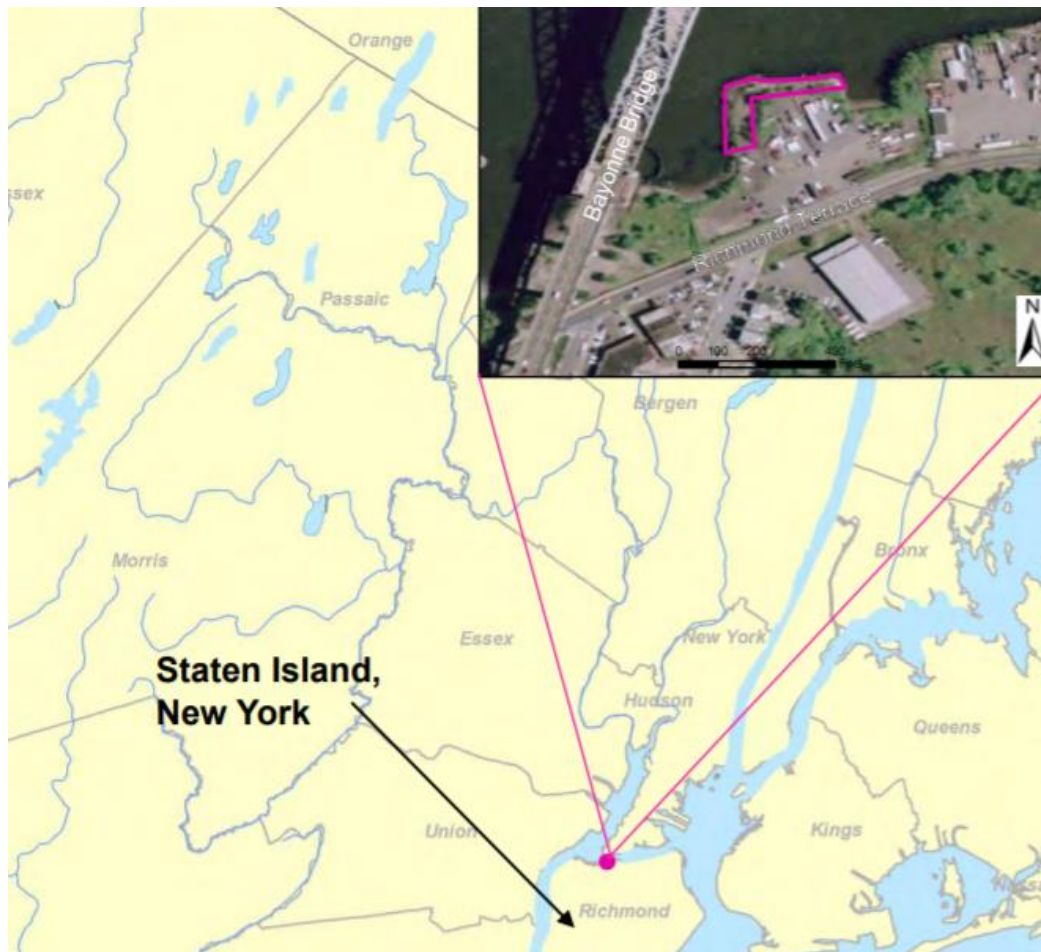
Source: NYSDEC 2020

Figure 8: NYSDEC Known Contaminated Sites in the Vicinity

Several known environmental cleanup remediation sites are located on land immediately adjacent to the Kill Van Kull on the north shore of Staten Island, New York including the Archer-Daniels Midland Company (also referred to as the Staten Island Warehouse, Richmond Terrace Radiological Site, and “cleanup under the Bayonne Bridge”), the Storage Bins (Site ID V00251), Jewett White Lead (Site ID 243035), the Ballpark at St. George Station (Site ID V00228), and Mariners Marsh Park (Site ID 243036) shown on **Figures 9 and 10**.

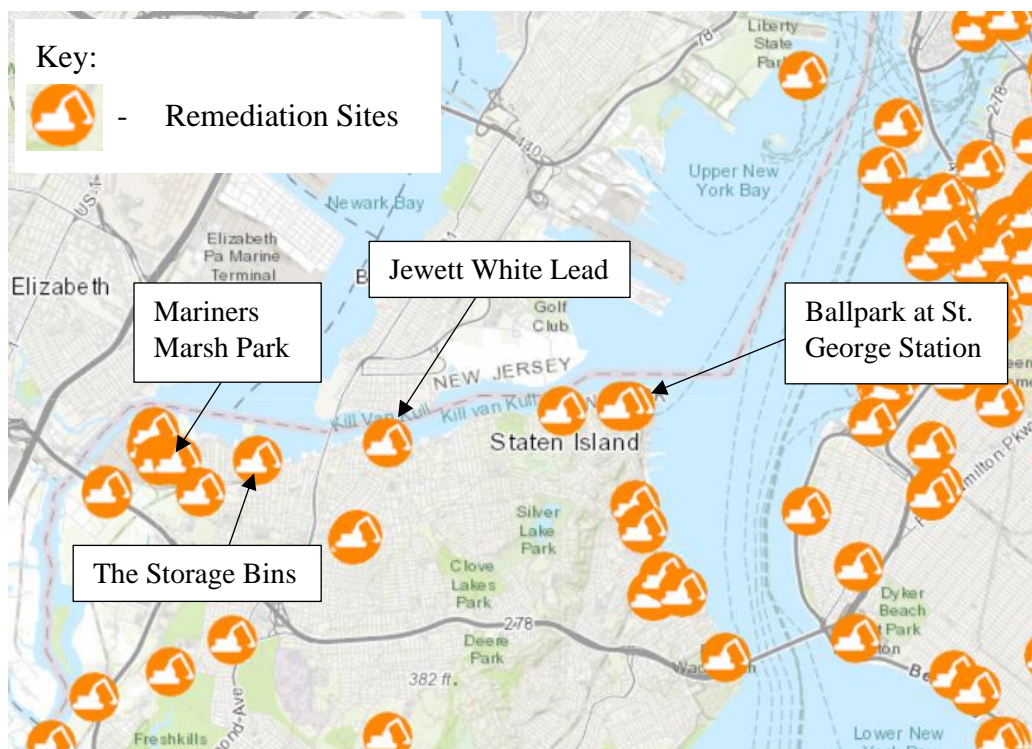
Archer-Daniels Midland Company (also referred to as the Staten Island Warehouse, Richmond Terrace Radiological Site, and “cleanup under the Bayonne Bridge”) is located at 2393 Richmond Terrace and was historically utilized by the African Metals Corporation, a subsidiary of the Union Minière du Haut-Katanga Company to store high-grade Belgian Congo uranium ore between approximately 1939 and 1942. The uranium ore was purchased from the African Metals Corporation by the Manhattan Engineering District (USACE 2012 and USEPA 2021c). In 1980, the Department of Energy (DOE) identified contamination on the northwest corner of the property and later determined the site was eligible for the Formerly Utilized Sites Remedial Action Program

(FUSRAP) in 2009, and subsequently the site was transferred to USACE to manage the remedial investigation and remedial action (USACE 2012 and 2021). Results from a survey performed by the USEPA in February 2008 identified an area of low-level surface radioactive contamination (USACE 2012). Supplemental confirmatory sampling is estimated to occur in Fall 2021. For additional information about the status of this FUSRAP site visit the USACE New York District FUSRAP Fact Sheet for the State Island Warehouse: <https://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/2584232/fact-sheet-staten-island-warehouse/>.



Source: USACE 2017

Figure 9: Archer-Daniels Midland Company Site Location



Source: NYSDEC 2021b

Figure 10: NYSDECinfo Locator Environmental Cleanup Remediation Sites adjacent to the Kill Van Kull Channel

The Storage Bin site is located at 2901 and 2945 Richmond Terrace, adjacent to the Kill Van Kull, and is listed under the Voluntary Cleanup Program. The site was utilized by First Marine Shipyard who operated 13 buildings at the site, which included a mechanical shop, paint storage, plating shop, saw mill, warehouse and offices, as well as concrete mixing and molding facility, dry docks, electrical transformer, etc. Two active spills and seven closed spills were associated with the site in approximately 1990. Almost all building were demolished in 2000 with the exception of the dry docks. (NYSDEC 2021b). The NYSDEC database reports in 2010, the site was divided into two OUs, OU-1 for the upload portion of the site, and OU-2 for the land under the water. OU-1 contaminants of concern include petroleum, SVOCs, PCBs, and metals in soil, groundwater, soil vapor, and sediments associated with ship maintenance and repair, and illegal wetland filling. While contamination is identified beneath the site as confirmed by an investigation performed in 1999 and in 2007, the exact depth and delineation of contaminants is unknown at this time and the Voluntary Cleanup Program was terminated in 2012 due to lack of progress (NYSDEC 2021b).

Jewett White Lead is a New York State Superfund Site and is located at 2000-2012 Richmond Terrace. 2015 Richmond Terrace, across the street, was historically utilized by John Jewett & Sons White Lead Company, who operated a white lead manufacturing facility from approximately 1839 to 1890. National Lead & Oil Company acquired the property in 1890 where they continued to manufacture white lead at 2015 Richmond Terrace, and extended operations across the street to 2000 Richmond Terrace until approximately 1943 (NYSDEC 2021b). The USEPA completed

remedial actions for lead at the 2000-2012 Richmond Terrace property where concentrations of lead were identified up to 150,000 ppm in soil. Concentrations in groundwater were found to not exceed regulatory standards. Surface water samples were collected from perimeter catch basins and from the Kill Van Kull which revealed low levels of lead, indicating that some migration of lead from the site may have occurred (NYSDEC 2021b). While USEPA investigations determined 2015 Richmond Terrace was not eligible for additional remedial actions or given a National Priority List status, USEPA investigations revealed concentrations of lead in excess of the regulatory standards in soil up to 8 feet bgs, in groundwater, and in nearby sediments. According to the NYSDEC database, on-site remedial actions are complete, and measures are in place to control the potential for contact with residual contamination that remains at the site (NYSDEC 2021b).

The Ballpark at St. George Station is a Voluntary Cleanup Program site located between the North Ramp and Jersey Street. Historical operations of the site include a railroad locomotive and railcar servicing and maintenance facility and railcar switchyard from approximately 1883 to 1994 and a parking lot for the Staten Island Ferry after until the side was purchased by the Economic Development Corporation in 1998 to be developed into a minor league baseball stadium and parking facility (NYSDEC 2021b). Investigations conducted at the site revealed PAHs on the eastern portion of the site, and petroleum contamination on the northern and eastern portions of the site. The site was subsequently remediated, with control measures including land use and groundwater use restrictions, vapor mitigation, subsurface barriers, cover system, etc. to reduce the potential of contact with residual contamination remaining at the site (NYSDEC 2021b).

Although situated almost one mile to the southwest of the NYNJHDCI project boundary, the Mariners Marsh site is located at 3418 Richmond Terrace and is identified as a New York State Superfund Site with a history of industrial uses that included a boiler building, rolling mill, blooming mill, shear building, large travelling crane wall, coal tar area, machine shop, blacksmith shop, turning mill, dynamos and engines building, and sherardizing building (NYSDEC 2021b). Prior occupants include Milliken Brothers Structural Iron Works, Rolling Mill, Downey Shipbuilding Yard, American Export Industries, Inc., the City of New York, and most recently the New York City Department of Parks and Recreation. Historical operations include steel manufacturing for buildings and ships and heating operations by coal gasification. After being established as Mariners Marsh Park, the site was developed for recreation with baseball fields and nature hiking trails. A Phase I Environmental Site Assessment, and Phase II Environmental Site Investigation was performed in approximately 2004 and the site subsequently underwent remedial actions in 2012 for contaminants found in soil and groundwater related to the historical coal tar area (NYSDEC 2021b). According to the NYSDEC database the park is closed to the public, and the USEPA's removal action is expected to address exposure and health hazards located at the site (NYSDEC 2021b).

A few additional sites noted in the nearby vicinity of the Kill Van Kull channel include the Coty Warehouse and River North sites (Site ID 243026 and C243045, respectively). Coty Warehouse did not qualify for addition to the Registry of Inactive Hazardous Disposal Sites, which is the NYSDEC's program for identifying, investigating, and remediating sites with high levels of

hazardous waste contamination, therefore the site is listed as no further action at this time (NYSDEC 2021b). The North River site is an active brownfields cleanup site with historic fill material present throughout the site ranging from 5 to 15 feet bgs. According to the NYSDEC database, the brownfields cleanup application is currently under review and the website will be updated when more information is available (NYSDEC 2021b).

2.5.5. Previous Harbor Deepening Project (HDP) Summary

In 1986, Congress authorized USACE to perform several studies to deepen navigation channels within the New York and New Jersey Harbor. In 1999, the District completed an Environmental Impact Statement (EIS) to analyze the impacts of deepening several navigation channels. Three years later, in 2002, the EIS was updated by consolidating several individual harbor deepening projects into one main project, known as the 50-foot Harbor Deepening Project (HDP). Following consolidation, the District prepared a limited reevaluation report, Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) of which was completed in 2004.

After completion of NEPA, the District entered into litigation in 2005 with Natural Resource Defense Council (NRDC), et al as Plaintiffs due to the appearance of a conflict between the EPA's Remedial Investigations Feasibility Study (RI/FS) and the initiation of construction of the 50-foot HDP within the Newark Bay Study Area (USDC 2005). In June 2007, the District agreed to assess the effects of the HDP on the Newark Bay Study Area RI/FS which resulted in a FONSI (USACE 2007). In October 2007, the litigation was resolved with a Stipulation and Order (S&O) that obligated the District to collaborate with USEPA and NJDEP, as necessary, on the advancement of 50-foot HDP regarding ongoing remediation efforts at the Diamond Alkali site within the Newark Bay Study Area. As this is part of standard agency coordination, the District intends to honor the 2007 S&O with the advancement of the NYNJHDCI project, by coordinating the proposed project work with USEPA, as well as implement best management practices, where applicable, in order to not interfere with ongoing investigation and remediation efforts occurring in the Newark Bay (USDC 2007).

3.0 Findings and Conclusion

The Study Area is heavily urban and, as discussed in **Section 2.5**, has many known contaminated sites located in the vicinity, both in New Jersey and New York. These sites are primarily located on land and outside of the NYNJHDCI project boundary except for a portion of one Federal and State (New Jersey) listed Superfund site identified as the Diamond Alkali, Newark Bay OU located in New Jersey. The District will continue to coordinate with the USEPA and NJDEP as necessary in order to not interfere with ongoing investigation and remediation efforts occurring in the Newark Bay Study Area. Sites located in the nearby vicinity of the NYNJHDCI, including those located along the south shore of Bayonne, New Jersey and along the north shore of Staten Island, New York (and in addition to those discussed herein), will be inspected under a pre-construction assessment during the Preconstruction Engineering Design (PED) Phase and monitored during construction. The District will perform an updated HTRW review during PED to determine the status of currently listed known contaminated sites and to identify if any new federal or state listed sites are present prior to the start of work. Known contaminated sites co-located within the project

area will be avoided through coordination efforts (i.e., Diamond Alkali) and the application of any appropriate best management practices will be determined during PED. It is not anticipated that any other federal or state listed contaminated site will affect or be affected by the project.

The current schedule for the NYNJHDCI project estimates a signed Chief's Report by May 2022, following State and Agency review. The PED phase is not anticipated to begin until after the signing of the Chief's Report with construction estimated to begin in approximately 2025. The Final Remedial Investigation Report for the Diamond Alkali, Newark Bay Operable Unit is currently estimated to be completed in early 2022, with a record of decision estimated by the end of 2024. Schedules are subject to change based on a variety of field and project advancement conditions and therefore, information regarding any future remedial action plans for the responsible parties to remediate the Diamond Alkali Newark Bay Operable Unit will be coordinated with the USEPA and NJDEP as necessary, as well as further future coordination with the USEPA and NJDEP as necessary to ensure complimentary actions commence with the improvement of the Port navigation channels without interfering with remedial action activities.

A Confined Disposal Facility (CDF) is located in Newark Bay between Port Elizabeth channel and Port Newark channel. Now closed and capped, the CDF was designed to store contaminated dredge materials and to prevent pollution of the estuary. The CDF is located outside the proposed dredging areas of the existing navigation channels and will be avoided to ensure no impact to the CDF.

USACE did not encounter hazardous material during the previous harbor deepening projects and while it is not anticipated to be encountered during the work proposed under the NYNJHDCI Study, it is always a possibility in any project. While the project is in a highly urban and historically industrial area with a history of many known contaminated sites located in the vicinity and upgradient, such as the Diamond Alkali site which is known to have contributed to contamination in the Study Area, the overall harbor has been trending cleaner in the past few decades and is expected to continue trending cleaner, especially with the USEPA remedial actions of the Diamond Alkali Lower 8.3 miles of the Passaic River and Newark Bay Study Area, which are anticipated to contribute to future cleaner trends.

In accordance with ER 1165-2-132, dredged materials will be tested under dredged material placement criteria for their suitability for beneficial use in accordance with the appropriate guidelines and criteria including, but not limited to, Section 404 of the Clean Water Act and/or Section 103 of the Marine Protection Research and Sanctuaries Act and supplemented by the Corps of Engineers Management Strategy for Disposal of Dredge Material: Containment Testing and Controls, as well as the protocols listed in Section 6.5 of the FR/EA.

4.0 Acronyms

AMSL	Above Mean Sea Level
Bgs	below ground surface
CDF	Confined Disposal Facility
CEA	Classification Exception Area

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DDT	dichlorodiphenyl-trichloroethane
EA	Environmental Assessment
EIS	Environmental Impact Statement
ER	Engineering Regulation
FONSI	Finding of No Significant Impact
FR	Feasibility Report
FUSRAP	Formerly Utilized Sites Remedial Action Program
HDCI	Harbor Deepening Channel Improvements
HDP	Harbor Deepening Project
HTRW	Hazardous, Toxic and Radioactive Waste
NJDEP	New Jersey Department of Environmental Protection
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priority List
NRDA	Natural Resource Damage Assessment
NRDC	Natural Resource Defense Council
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PANYNJ	Port Authority of New York and New Jersey
PCB	Polychlorinated Biphenyls
PED	Preconstruction, Engineering and Design
ppb	Parts Per Billion (micrograms per kilogram)
ppm	Parts Per Million (milligram per kilogram)
ppt	Parts Per Trillion (nanogram per kilogram)
RCRA	Resource Conservation and Recovery Act
S&O	Stipulation and Order
TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin
USACE	United States Army Corps of Engineers
USC	United States Code
USDC	United States District Court

USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

5.0 Resources and Sources

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) United States Code (USC) 9601 et seq.

Engineering Regulation (ER) 1165-2-132. United States Army Corps of Engineers, *Hazardous, Toxic and Radioactive Waste (HTRW) Guidance for Civil Works Projects*. June 1992.

Beda et al undated. Stephanie Beda, W. Bruce Ward, William Murphy, Robert Fleming, Gary Fleming, Beckett Boyd of Earthworks LLC and Ben A. Baker of the United States Army Corps of Engineers, NY District, *The Quaternary Geology of Newark Bay and Kill Van Kull Channel, New York and New Jersey*. Undated.

Lodge et al 2015. Lodge, J., Landeck Miller, R.E., Suszkowski, D., Litten, S., Douglas, S. 2015. Contaminant Assessment and Reduction Project Summary Report. Hudson River Foundation, New York, NY.

Monteverde et al 2015. Donald H. Monteverde and Greg C. Herman, *Bedrock Geologic Map of the Elizabeth Quadrangle, Essex, Hudson and Union Counties, New Jersey*. 2015.

NBSA 2019. Newark Bay Study Area, Conceptual Site Model, Revision 3. January 2019.

NBSW 2020. Newark Bay Study Website: www.ournewarkbay.org. Accessed: September 2020.

NJDEP 2009. New Jersey Department of Environmental Protection (NJDEP) Site Remediation Program, Chrome Update 34 (September 2009) website: <https://www.nj.gov/dep/srp/siteinfo/chrome/update34.htm>. Accessed: September 2021.

NJDEP 2021a. NJDEP Site Remediation Online Geo-Web Database website: <https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=02251e521d97454aabadfd8cf168e44d>. Accessed: September 2021.

NJDEP 2021b. NJDEP Site Remediation Online DataMiner website: <https://www13.state.nj.us/DataMiner>. Accessed September 2021.

NJDEP 2021c. NJDEP Site Remediation Program, Hudson County Chromate Chemical Production Waste Sites Website: <https://www.nj.gov/dep/srp/siteinfo/chrome/bkgrnd.htm>. Accessed: September 2021.

NYSDEC 2020. New York Department of Environmental Conservation (NYSDEC) Environmental Site Remediation Databases Website: <https://www.dec.ny.gov/cfm/xtapps/derexternal/haz/results.cfm?pageid=3>. Accessed: September 2020.

NYSDEC 2021a. NYSDEC The Hudson River Estuary: A River that Flows Two Ways website: <https://www.dec.ny.gov/lands/4923.html>. Accessed: September 2021.

NYSDEC 2021b. NYSDEC Environmental Site Remediation Databases Website: DECInfo Locator: <https://gisservices.dec.ny.gov/gis/dil/>. Accessed: September 2021.

PANYNJ 2019. The Port Authority of New York and New Jersey, *Port Master Plan 2050*. July 2019.

Riccio 2021. Progress Report (January 30, 2021 through the date of this Report) from Ronald J. Riccio to the Honorable Jeffrey R. Jablonski, A.J.S.C., Superior Court of New Jersey, dated 30 July 2021. Website:
http://www.chromiumcleanup.com/progress_reports/7.30.21%20Progress%20Report%20to%20Judge%20Jablonski.pdf. Accessed: September 2021.

Tierra 2007. Tierra Solutions, Inc. *Final Newark Bay Study Area Remedial Investigation Work Plan, Sediment Sampling and Source Identification Program, Newark Bay, New Jersey Phase II, Revision 2*. October 2007.

USACE 1999. United States Army Corps of Engineers (USACE), *Feasibility Report for New York and New Jersey Harbor Navigation Study, Main Report, Final Environmental Impact Statement (FEIS)*. December 1999.

USACE 2007. USACE, *Final Environmental Assessment, Effects of the NY/NJ Harbor Deepening Project on the Remedial Investigation/Feasibility Study of the Newark Bay Study Area*. June 2007.

USACE 2012. USACE, *Preliminary Assessment, Staten Island Warehouse Formerly Utilized Sites Remedial Action Program (FUSRAP) Site, Richmond Terrace, New York*. January 2012. Website:
https://www.nan.usace.army.mil/Portals/37/docs/civilworks/projects/ny/fusrap/SIW_Pre_Ass_FUSRAP_PA_12_Jan_2012_Combined_no_edits.pdf?ver=Vdex4r4gG8Hx_scgPJuWg%3D%3D. Accessed: September 2021.

USACE 2017. USACE, *Site Inspection Report, Staten Island Warehouse FUSRAP Site, Staten Island, New York*. Revised September 2017. Website:
https://www.nan.usace.army.mil/Portals/37/docs/civilworks/projects/ny/fusrap/SIW_Site_Inspection_reduced_Sep_2017_Final_SIW_SI_compiled.pdf?ver=aW1JpiCqNZeqfFS9PExCuW%3d%3d. Accessed: September 2021.

USACE 2021. USACE Staten Island Warehouse FUSRAP Fact Sheet Website:
<https://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/2584232/fact-sheet-staten-island-warehouse/>. Accessed: September 2021.

USEPA 2020a. United States Environmental Protection Agency website:
<https://www.epa.gov/superfund>. Accessed: September 2020.

USEPA 2020b. USEPA Superfund National Priority List, Where You Live Map, Website:
<https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=33cebcdfdd1b4c3a8b51d416956c41f1>. Accessed: September 2020.

USEPA 2020c. USEPA Superfund Site: Diamond Alkali Co. Newark, New Jersey website:

<https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0200613>. Accessed: September 2020.

USEPA 2021a. USEPA Superfund National Priority List, Where You Live Map, Website: <https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=33cebcdfdd1b4c3a8b51d416956c41f1>. Accessed: September 2021

USEPA 2021b. USEPA Superfund Site: Diamond Alkali Co. Newark, New Jersey website: <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0200613>. Accessed: April 2021.

USEPA 2021c. USEPA technical comments on the New York-New Jersey Harbor Deepening Channel Improvements Navigation Study Draft Integrated Feasibility Report and Environmental Assessment. January 2021.

USDC 2005. United States District Court, Southern District of New York, Opinion and Order, *Natural Resources Defense Council, Inc.; Raritan Baykeeper, Inc.; Andrew Willner; and Greenfaith against the United States Army Corps of Engineers; and COL Richard Polo, Jr.* August 2005.

USDC 2007. United States District Court, Southern District of New York, Stipulation and Order of Settlement and Dismissal, *Natural Resources Defense Council, Inc.; Raritan Baykeeper, Inc.; Andrew Willner; and Greenfaith against the United States Army Corps of Engineers; and COL Aniello L. Tortora.* October 2007.

USFWS et al 2020. United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA), *Final Natural Resource Damage Assessment Plan for the Diamond Alkali Superfund Site.* January 2020.

USGS 1967. United States Geological Survey (USGS) Jersey City Quadrangle 7.5-Minute Series, Topographic Survey. 1967.

USGS 1995. USGS Elizabeth Quadrangle 7.5-Minute Series, Topographic Survey, Elizabeth New Jersey. 1995.