Superfund Program
Proposed Plan

U.S. Environmental Protection Agency
Region 2

Newtown Creek Superfund Site
East Branch Early Action
New York City, New York

August 2024

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives that the United States Environmental Protection Agency (EPA) considered to address a portion of Operable Unit 1 (OU1) of the Newtown Creek Superfund site (Site) located in Queens and Brooklyn, New York. The OU1 Study Area is defined, generally, as the water and sediment of Newtown Creek and its tributaries up to and including the landward edge of the shoreline[1], and this Proposed Plan relates specifically to the East Branch portion of the Study Area. This Proposed Plan also identifies EPA's preferred alternative for the East Branch portion of the OU1 Study Area and provides the rationale for this preference.

The overall Site is being addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as the Superfund Law), as amended. A comprehensive remedial investigation and feasibility study (RI/FS) for all of OU1 of the Site is currently ongoing. EPA has determined that there is enough information available for the East Branch portion of OU1 to select an interim, early action remedy for this portion of the Site while the full OU1 RI/FS continues. For administrative purposes, this interim, early action is referred to as Operable Unit 4 (OU4). For clarity throughout the rest of this Proposed Plan, OU4 will be referred to as the "East Branch portion of OU1."

EPA's preferred alternative for the East Branch portion of OU1 calls for the following: dredging to allow placement of a multi-layered amended armored cap to maintain the existing water depth; localized deeper dredging where needed based on the remaining depth to uncontaminated material, comparatively higher concentrations of contaminants in remaining sediment, the potential for exposure to principal threat waste, and the potential for upward migration of non-aqueous phase liquids (NAPL); the use of in-situ stabilization, if and where needed, to further address contaminant migration from beneath the capped areas; backfill, as needed, in areas that are dredged deeper to maintain

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:
August 28, 2024 to September 27, 2024
EPA will accept written comments on the Proposed Plan during the public comment period. Written comments should be addressed to:

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
Email: kwan.caroline@epa.gov

Written comments must be postmarked no later than September 27, 2024. To request an extension, send a request in writing to Caroline Kwan by 5:00 pm on September 27, 2024.

PUBLIC MEETING:
EPA will hold a hybrid public meeting to explain the Proposed Plan and all of the alternatives presented in the Focused Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held in person at the location below or join virtually using https://usepa.zoomgov.com/meeting/register/vJItd-6spzoiGSfaTmPGUoT_YeJV1kdDPXY

September 18, 2024
6:30pm to 8:30pm
The Chatroom at Elsewhere
599 Johnson Avenue
Brooklyn, New York 11237

In addition, documents from the administrative record are available on-line at:
https://www.epa.gov/superfund/newtown-creek

[1] The full definition of the Study Area can be found in, https://semspub.epa.gov/src/document/02/109610 (see Section IV, Paragraph 13v).

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existing water depth; the use of sealed bulkheads, if and where needed, as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented; shoreline stabilization measures, as needed; offsite disposition of dredged sediment; institutional controls; and a highly robust pre- and post-implementation monitoring plan to demonstrate the ongoing performance and protectiveness of the remedy. Any upland source control measures that are determined to be needed to support the long-term protectiveness of the remedy will be implemented under state and/or federal enforcement authorities, as to be determined on a case-by-case basis.

This Proposed Plan was developed by EPA, the lead agency, in consultation with the New York State Department of Environmental Conservation (NYSDEC), the support agency. EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of CERCLA, as amended, and Section 300.430(f) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Release of this Proposed Plan initiates a 30-day public comment period. EPA, in consultation with NYSDEC, will select a remedy for the East Branch portion of OU1 after reviewing and considering all information submitted during the public comment period. EPA, in consultation with NYSDEC, may modify the preferred alternative or select another alternative presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

This Proposed Plan summarizes information that can be found in greater detail in the focused feasibility study (FFS) report prepared for the East Branch portion of OU1, which can be found in the administrative record for this remedial decision. The dates for the public comment period, the public meeting described below, and the location of the administrative record can be found in the “Mark Your Calendars” text box on Page 1 and in the “For Further Information” text box on Page 26. EPA and NYSDEC encourage the public to review these documents to gain a more comprehensive understanding of activities for the Site.

COMMUNITY ROLE IN SELECTION PROCESS

This Proposed Plan is being issued to inform the public of EPA’s preferred alternative to address the East Branch portion of the OU1 Study Area and to solicit public comments pertaining to all the remedial alternatives evaluated, including the preferred alternative. Changes to the preferred alternative, or a change to another alternative, may be made if public comments or additional data indicate that such a change would result in a more appropriate remedial action. The final decision regarding a selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comments on all the alternatives considered in the Proposed Plan because EPA may select a remedy other than the preferred alternative.

This Proposed Plan has been made available to the public for a public comment period that concludes on September 27, 2024.

A public meeting will be held during the public comment period to present the conclusions of the FFS, to elaborate further on the reasons for proposing the preferred alternative, and to receive public comments. The public meeting will include a presentation by EPA of the preferred alternative and other cleanup options.

This Proposed Plan and all associated outreach materials are being released in Chinese, Polish and Spanish in addition to English, and live interpretation services will be available at the public meeting.

Comments received at the public meeting, as well as written comments received during the public comment period, will be documented in a Responsiveness Summary section of a Record of Decision (ROD), along with EPA’s responses. A ROD is a document that memorializes the selection of a remedy and the basis for the selection.

SCOPE AND ROLE OF ACTION

As with many Superfund sites, the contamination at this Site is complex, and the cleanup is being managed through several operable units, or OUs.

OU1 includes the entire Study Area, as generally described above and as fully defined in a 2011 administrative order on consent (AOC) between EPA and six Respondents, including the City of New York (NYC) and a group of five private parties known as the Newtown Creek Group (NCG). The NCG includes Phelps Dodge Refining Corporation, Texaco, Inc., BP Products North America Inc., the Brooklyn Union Gas Company D/B/A National Grid NY, and ExxonMobil Oil Corporation. The 2011 AOC requires the Respondents to perform a Remedial Investigation (RI) and Feasibility Study (FS) for OU1 under EPA oversight. That RI/FS is currently ongoing.

OU2 relates to current and reasonably anticipated future releases of CERCLA hazardous substances from combined sewer overflow (CSO) discharges to the Study Area, as described in a 2018 AOC between EPA and NYC (CERCLA Docket No. CERCLA-02-2018-2020). A ROD was signed in April 2021 which selected a remedy of no further action at this time under the Superfund program to address the volume of CSO discharges to Newtown Creek, where no further action in this case assumes that the Newtown Creek CSO Long-Term Control Plan that the New York City Department of Environmental Protection (NYCDEP) is under order by NYSDEC to implement is, in fact, implemented as required by the schedule developed pursuant to the NYSDEC order. The ROD requires a post-ROD monitoring program to assure the assumptions made in reaching this conclusion remain appropriate. The monitoring plan was finalized in April 2024 pursuant to a 2022 AOC between EPA and NYC (CERCLA Docket No. CERCLA-02-2022-2003).

OU3 refers to the evaluation of a potential interim, early action for the lower two miles of the Creek in the Study Area, as described in a 2019 AOC between EPA and the NCG (CERCLA Docket No. CERCLA-02-2019-2011). The NCG conducted an FFS under the AOC to see if an interim, early action remedy for OU3 was scientifically and technically appropriate and to develop and evaluate a focused range of cleanup action alternatives for OU3. After EPA's technical review and consultation with stakeholders, EPA determined that the selection of a remedy for this portion of the Creek should be deferred pending completion of the OU1 studies.

This Proposed Plan identifies an interim remedy for the East Branch portion of the OU1 Study Area (see Figure 1, all figures are at the end of this Proposed Plan). The East Branch is one of the five tributaries to Newtown Creek. It is a dead-end tributary to the upper main stem of the Creek, located between the creek head at the intersection of Metropolitan and Onderdonk Avenues and approximately Creek Mile 2.8 where it converges with English Kills. The downstream extent of the East Branch begins just upstream of the Turning Basin and continues upstream for approximately 0.16 miles before branching off into two lobes. The western lobe extends up to the CSOs located near Metropolitan Avenue, and the eastern lobe is referred to as the Western Beef Slip (see Figure 2). The RI/FS for the entire OU1 Study Area is still ongoing. As such, any remedy selected for the East Branch portion of OU1 is considered interim at this time while EPA’s overall conceptual site model (CSM) of the Site is being further refined.

As an interim remedy, the selected remedy for the East Branch portion of OU1 will be reviewed on an ongoing basis to assure the assumptions made in reaching this conclusion remain appropriate. That said, EPA fully anticipates that the remedy selected for the East Branch portion of OU1 will be consistent with the eventual final remedy selected for OU1. EPA further anticipates that the East Branch portion of OU1 remedy, and the associated operation and maintenance activities, will be subsumed by the eventual final OU1 remedy. Early actions in other portions of the Creek may also be considered in the future.

OVERALL SITE DESCRIPTION

The Site is located in Kings County and Queens County, New York City, New York. The Site includes Newtown Creek and its five tributaries, including Whale Creek, Dutch Kills, East Branch, English Kills and Maspeth Creek.

The Site is located within the Newtown Creek Significant Maritime and Industrial Area (SMIA), one of six designated SMIAs in New York City. The Newtown Creek SMIA, at over 780 acres, is the largest SMIA in New York City, and includes portions of the Greenpoint, Williamsburg, Long Island City, and Maspeth industrial areas.

Newtown Creek and its tributaries comprise an estuarine water body that is generally oriented in an east-west direction, although the easternmost section of

Newtown Creek and several of the tributaries are oriented north-south. The water in Newtown Creek is currently classified by the NYSDEC as Class SD, saline surface water with a protected use of fish survival only, though it does not presently meet parameters for that protected use.

The Creek itself is used for both commercial/industrial and recreational purposes and it is surrounded by a mix of residential, commercial, and industrial uses.

The total human population within a one-mile radius of the Site is estimated to be approximately 380,000. EPA's environmental justice screening tool was recently used to generate a report for the area. The report found that people of color make up more than half of the community and approximately 47% of the population consists of non-English speakers. Potential environmental justice concerns within the community include particulate matter, ozone, diesel particulate matter, air toxics cancer risk, air toxics respiratory hazard index, toxic releases to air, traffic proximity, lead paint, Superfund proximity, hazardous waste proximity, underground storage tanks, and wastewater discharge. These environmental indicators are above 50 percent of the national percentile at the Site.

The findings of the report confirm that the outreach efforts EPA has been making are reasonable and appropriate. Regular community engagement at the Site has been ongoing for more than 10 years. Outreach has been conducted through social media, public meetings, and by attending Community Advisory Group meetings, and Site-related information has been provided in multiple languages including English, Polish, Spanish, and Chinese. This ensures the factors above are taken into account for effective and appropriate outreach.

SITE BACKGROUND

Historically, Newtown Creek drained the uplands of western Long Island and flowed through wetlands and marshes. In the mid-1800s, the area next to the 3.8-mile-long Creek was one of the busiest industrial areas in New York City. Industrial facilities were located along its banks, including more than 50 oil refineries, petrochemical plants, fertilizer and glue factories, sawmills, and lumber and coal yards. Newtown Creek was crowded with commercial vessels, including large ships bringing in raw materials and fuel and taking out finished products including petroleum products, chemicals, and metals. In addition to the industrial pollution that resulted from all of this activity, New York City began dumping raw sewage directly into the water in 1856. During World War II, the Creek was one of the busiest ports in the nation. Currently, factories, warehouses, public utilities, and municipal facilities operate along the Creek. Various contaminated facilities upland of the Creek have been, and some continue to be, sources of the contamination at Newtown Creek.

This industrial development resulted in a major reworking of the Creek banks and channel for drainage and navigation purposes. The channelizing and deepening of Newtown Creek and its tributaries were largely completed by the 1930s, defining its current configuration. This historical development has resulted in changes in the nature of Newtown Creek and its tributaries' natural drainage condition from one with tributary flow, to one that is governed largely by engineered and institutional systems.

In the early 1990s, New York State declared that Newtown Creek was not meeting water quality standards under the Clean Water Act. Since then, several state- and city-sponsored cleanups of properties in the Newtown Creek area have taken place, and many such cleanups are ongoing. A major upgrade of the Newtown Creek Wastewater Treatment Plant was completed in 2012.

The Site was added in 2010 to the EPA National Priorities List pursuant to CERCLA.

Enforcement History

As noted previously, six responsible parties have entered into a 2011 AOC to conduct the OU1 RI/FS, and monitoring related to OU2 is being conducted per the terms of a 2022 AOC with NYC only.

Additional potentially responsible parties have been notified of their potential liability since the original 2011 AOC was signed. The role and contribution of these additional parties to each OU at the Site is yet to be determined, although it is anticipated that the additional PRPs will be asked to take part in the remedial design and/or remedial action activities associated with the Site, including the East Branch portion of OU1. Efforts to identify additional potentially responsible parties continues.

OVERALL SITE CHARACTERISTICS

The Site has been extensively studied through the OU1 RI/FS process.

OU1 Study Area Investigation

Field work for the OU1 RI/FS began in February 2012 and is still ongoing. The RI/FS work has included sampling of surface water, surface sediment, subsurface sediment, groundwater, air, NAPL, ebullition, seeps, shoreline soil, point and non-point discharges, and biota, as well as physical and ecological surveys, multiple bathymetry surveys, and toxicity testing.

There are many ongoing, external sources of contamination to the Study Area. These include municipal separate storm sewer system outfalls (MS4s), the Newtown Creek wastewater treatment plant (WWTP) treated effluent outfall, permitted industrial discharges, other permitted/non-permitted discharges, overland flow/direct drainage, other non-point sources, the tidal effects of the East River, atmospheric deposition, shoreline seeps/groundwater discharge from upland properties, and shoreline bank erosion, as well as CSO discharges.

Some of these sources may be considered both internal and external to the Study Area. For example, contamination may be entering the Creek below the mean high-water line through seeps, but the source of the contamination may be from the surrounding upland area. The other ongoing sources that fall into this category include lateral groundwater and shoreline bank erosion. These types of sources are referred to as "internal/external interface sources" herein. As is explained later in this Proposed Plan, this distinction is important to the development of the remedy for the East Branch portion of OU1.

Representative samples from all of the ongoing sources were collected as part of the OU1 RI/FS process.

Investigation activities related to the OU1 Study Area are ongoing. EPA is currently concluding a study to characterize lateral groundwater discharge along the shoreline of the Creek to refine the groundwater contaminant loading estimates to the Creek, and additional sediment and water quality samples are also currently being collected from the Creek and from the East River to supplement previously collected data. Additional data from ongoing point sources and the East River will also be obtained as part of the OU2 post-ROD monitoring program. These data will be considered, as appropriate, in the design for the East Branch portion of OU1 remedy.

OU1 Study Area General Findings

A draft RI Report was initially submitted to EPA by the Respondents to the 2011 AOC in November 2016. Revised versions responding to EPA comments were submitted in April 2019, June 2020, October 2021, December 2022, and January 2023. The final RI Report was approved by EPA in April 2023. A Baseline Human Health Risk Assessment (BHHRA) was approved by EPA in June 2017, and a Baseline Ecological Risk Assessment (BERA) was approved by EPA in November 2018. The draft FS Report for the entire OU1 Study Area is currently being prepared.

As part of the OU1 RI/FS, a complex set of interrelated models has been developed. Hydrodynamic and sediment transport models (which include groundwater and point source sub-models) were submitted with the RI Report and have been reviewed (both internally and through the peer review process), refined, and finalized. EPA has also developed a long-term equilibrium (LTE) model to assess the impact of ongoing sources of contamination on the OU1 Study Area (including the East Branch). The LTE model is currently going through review by technical experts outside of the project team. This model and its use in the remedial process is described more fully in later sections of this document. A contaminant fate and transport model had also been under development. However, EPA determined that the hydrodynamic and sediment transport models provide a detailed understanding of site characteristics and potential physical transport mechanisms impacting the Site, and those models, in conjunction with the LTE model, can be used in the evaluation of remedial alternatives for OU1. As such, completion of the contaminant fate and transport model was discontinued. Based on data collected as part of the OU1 RI/FS field program and current modeling, development of the CSM for the OU1 Study Area is well advanced. Additionally, the lateral groundwater discharge study data and additional sediment and surface water data will help further refine the OU1 CSM, as will the design and implementation of a remedy for the East Branch portion of OU1.

Elevated concentrations of contamination were found throughout the OU1 Study Area. Much of this contamination is due to historic inputs of contamination to the Creek, and contamination is found, in particular, in the surface and subsurface sediment of the Creek and in the underlying native material. In-Creek processes may lead to the spread of this contamination within the Study Area. These processes include gas ebullition (bubbling)-facilitated contaminant/NAPL transport, sediment resuspension, NAPL dissolution and migration, and vertical groundwater discharge.

In addition, ongoing sources of contamination will continue to add contamination to the Study Area. While EPA anticipates the amount of contamination entering the Creek from ongoing sources will decrease over time due to various factors, including cleanup of upland properties, greater regulatory control, and improved practices for managing waste and stormwater, all ongoing external sources of contamination cannot be completely eliminated.

Current and Reasonably Anticipated Future Site Uses

Navigation

Newtown Creek is currently an active navigable waterway with a federally authorized channel and is expected to continue to be an industrial waterway in the future. Based upon recent analysis from the U.S Army Corps of Engineers, the currently authorized navigational depths for portions of the Creek can be reduced in extent and depth and still meet the expected future industrial uses, and other portions can be deauthorized for navigation purposes.

Recreation, Fishing, and Crabbing

Newtown Creek is currently used for recreational purposes such as boating. Recreational uses are expected to continue and likely expand as cleanup of the waterway enhances the opportunities for use. The Creek is also currently used by some people for fishing and crabbing. The New York State Department of Health has developed fish consumption advisories identifying consumption limits for fish and crabs in Newtown Creek (and other waterways within New York City), and, in consultation with the community, EPA has placed signs at known fishing/crabbing locations along the Creek advising anglers of the Superfund site designation and the State fish consumption advisories. However, the Creek is still used for fishing and crabbing, and some people continue to consume what they catch. This is expected to continue.

Upland Uses

Uses of the areas surrounding the Creek are highly varied, and they include industrial/commercial properties, residential properties, limited recreational access areas, and abandoned properties. In addition, many upland properties adjacent to the Creek are contaminated from past industrial uses and are being addressed through State and non-Superfund federal cleanup actions.

EPA expects that when development/reuse of land adjacent to the Creek occurs, it will result in a broader range of land use, generally leading to increased human presence at the Creek. While the mix of industrial, commercial, and residential properties may remain similar over time, the exact use of particular lots may change, and there is a strong desire from the community to create more recreational options and soft shorelines.

Ecological Uses

Newtown Creek includes urban ecosystems that provide ecological benefits to environmental flora and fauna. EPA expects that general trends already underway in the Creek toward healthier and more diverse ecosystems will continue and will be supported by actions taken by EPA to address the Newtown Creek Site, along with other actions (*e.g.*, improved watershed management practices and greater regulatory control). EPA also expects that several locations along the waterway may be changed from bulkheads to soft shorelines that would enhance ecosystem diversity.

EAST BRANCH EARLY ACTION OVERVIEW

General Overview of the East Branch

The East Branch is a dead-end tributary to Newtown Creek with a surface area of approximately 11 acres. It is approximately 0.5 miles in length. The geographic extent is described more fully in the Scope and Role of this Action section of this Proposed Plan.

The East Branch was created in 1884 by cutting into the previously marshy edges of the waterway to increase distribution of building materials to supply the residential population near this area of the Creek. Similar to other portions of OU1, the East Branch is a highly engineered water body that was almost completely bulkheaded by the early 1900s. Approximately 80 percent of the shoreline within the East Branch currently contains bulkheads, with nearly all of the remaining shorelines containing riprap or other armoring. The bulkheads vary in their condition, and some require significant maintenance (See Figure 3). Based on the 2022 bathymetric survey, the average bathymetric elevation in East Branch is -11 feet North American Vertical Datum of 1988 (NAVD88), with a minimum elevation of approximately -24 feet NAVD88 (See Figure 4). Water depths extend to a maximum of approximately 21 feet below mean lower low water (MLLW); MLLW is +2.61 feet above NAVD88. Tidal ranges are approximately up to 5 feet, and there are portions of the East Branch sediment that are exposed during low tide. The average width of the East Branch is approximately 214 feet in the downstream portion and western lobe and 111 feet in the narrower Western Beef slip.

A federally authorized navigation channel is currently present in a majority of the East Branch. A recent study by the U.S. Army Corps of Engineers did not identify any commercial users of the East Branch that would require a navigation channel. The 2024 Water Resources Development Act (WRDA) bill includes a plan to deauthorize the East Branch navigation channel, and EPA expects that WRDA will be passed prior to EPA's remedy decision on this proposed plan.

Important infrastructure located in the East Branch includes the Grand Street swing bridge, an aeration system operated and maintained by NYC to improve dissolved oxygen levels, submerged electrical cable crossings below the Grand Street bridge, stormwater outfalls including two CSOs, two MS4 outfalls, and approximately 35 stormwater outfalls. A project to replace the Grand Street bridge is currently being developed by NYC; EPA is actively coordinating with NYC on this activity (see Figure 5).

Basis for East Branch Interim Early Action

EPA is using an adaptive management approach for OU1 of the Site consistent with EPA's Adaptive Management Framework, which is described as "a formalized process to manage risks from contaminated sediment sites where iterations of remediation, monitoring, and progress evaluations are guided by a formalized adaptive management plan that establishes the goals of the project, sets expectations, uses monitoring data to evaluate progress towards those expectations, and adapts the remedy as necessary based on those evaluations" (OLEM Directive No. 9200.1-166). EPA has developed a Site-specific memorandum titled, "Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach" that is included in the administrative record for this Proposed Plan (EPA, November 2023, referred to herein as the "Framework"). This Framework is an initial step towards describing the adaptive management approach that will be utilized at this Site, and the East Branch interim early action is consistent with this Framework.

Broadly, EPA is proposing to conduct an interim early action in the East Branch portion of the OU1 Study Area so that remedial action can occur in this tributary while the full OU1 FS is being completed. It would be beneficial to move forward with conducting an interim early action in the East Branch for the following primary reasons:

- It will expedite the overall Site response by implementing remedial measures in one of the most upstream portions of the OU1 Study Area.
- It will result in immediate risk reduction and contaminant mass removal in this portion of the OU1 Study Area (and, to a lesser extent, within the OU1 Study Area as a whole).

- It will provide an opportunity to gain direct remedial experience working in the Creek, which would help all parties involved gain experience with the logistics of conducting remedial work in the remainder of the Site and help inform future efforts.

- Lessons learned from conducting the action (and associated pre-design investigation, remedial construction, and pre- and post-implementation monitoring) will help inform the conduct of potential future early actions on other portions of the Creek, as well as the overall OU1 FS alternatives development, evaluation, and remedy selection as well as the eventual implementation of the OU1 remedy.

- It will provide an opportunity to validate and update the broader CSM that is being refined for the full OU1 Study Area. The early action will include a robust post-implementation evaluation monitoring program, and if the monitoring shows that the assumptions used to develop the East Branch CSM are not accurate, the CSM will then be updated accordingly.

It is EPA's expectation at this time that the post-implementation monitoring conducted as part of this early action would continue until such a time as the interim Early Action remedy is subsumed into a final remedy for the Site.

Characteristics of the East Branch

The sediment bed throughout the East Branch is a cohesive (muddy) bed, with varying amounts of fine (clay or silt-sized) particles and coarse (sand-sized) material, with an average sediment thickness of 13 feet, and with significantly greater sediment thicknesses in the western lobe of between 16 and 26 feet (see Figure 6). The sediment bed is underlain by native materials, which consist of glacial (Upper Glacial Aquifer) and post-glacial (historical marsh, lacustrine, and fluvial creek deposits) deposits.

The natural hydrodynamics of the East Branch (similar to other areas of Newtown Creek) are dominated by twice-daily tidal flows from the East River and by storm-driven freshwater inputs from over 35 individual point source discharges (direct discharges from individual sites, highway drains, MS4 discharges, CSOs and overland flow) creating a dynamic local environment that exhibits a unique combination of solids loads and depositional characteristics. Freshwater also enters the East Branch from groundwater discharge, which occurs vertically at the base of the East Branch through the sediment bed and laterally through vertical permeable shorelines to the surface water (*i.e.*, lateral discharge). EPA is currently investigating the groundwater entering the East Branch laterally from upland properties as part of the lateral groundwater discharge investigation, and information from this study will be incorporated into the design of the remedy for the East Branch.

During dry weather, salinity values in the East Branch range from approximately 12 to 24 practical salinity units and are slightly lower than those of the main stem and the East River. However, during wet weather, salinity values are more variable and are generally less than salinity values measured during dry weather.

Potential climate change impacts to the East Branch include high vulnerability to sea level rise, extreme winds, extreme heat, and air quality risks. The average daily maximum temperature is expected to increase to around 72°F and total precipitation is expected to increase 5 to 8 inches if global emissions of heat-trapping gases continue increasing through the year 2100. Annual counts of intense rainstorms — those that drop two or more inches in one day – are projected to increase by 1%. Historically, Kings County averaged one intense rainstorm per year. The design of the remedial action will consider resiliency measures related to these anticipated hazards and will specifically consider the intensity, frequency, and duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.

Nature and Extent of Contamination in the East Branch

The following discussion of the nature and extent of contamination in the East Branch is focused on the list of Contaminants of Concern (COCs) that has been developed for the overall OU1 Study Area. Based on the results of the human and ecological risk assessments that were conducted for the entire OU1 Study Area, the COCs include total polycyclic aromatic hydrocarbons (TPAH(34)), C19- C36 aliphatic hydrocarbons, total polychlorinated biphenyls (TPCBs), total dioxins/furans (measured as toxicity equivalence quotients, or TEQs, and represented below by 2,3,7,8-TCDD), copper, and lead. More information about the development of the list of COCs and risk-based preliminary remediation goals (PRGs) is presented in the Summary of Site Risks and Remedial Action Objectives sections below. The CSM for the East Branch is presented in Figure 7. Appendix A of the East Branch FFS report, which is included in the administrative record for this remedial decision, includes several figures showing the nature and extent of contamination in the East Branch portion of the OU1 Study Area.

Surface sediment (sediment within the top 6 inches of the sediment column): In surface sediment, there is no clear spatial distribution pattern associated with measurements of TPAH(34), C19-C36 aliphatic hydrocarbons, and lead concentrations in the East Branch. However, concentrations of TPCBs, 2,3,7,8-TCDD, and copper in surface sediment decline from the East Branch's confluence with the main stem of the Creek moving upstream to the head of the tributary (western lobe). Generally, COC concentrations in surface sediment in the East Branch are similar to or lower than COC concentrations in other areas of Newtown Creek. All COCs were detected in surface sediment at concentrations greater than their respective risk-based PRG.

Subsurface sediment (sediment below the top 6 inches of the sediment column to the native material interface): COC concentrations in subsurface sediment in the East Branch are higher than surface sediment concentrations in nearly all cases. There is no clear spatial distribution pattern associated with measurements of TPCBs and lead concentrations in subsurface sediment in the East Branch. Generally, TPAH(34) and copper concentrations are elevated at the confluence with the main stem and in Western Beef Slip and decrease upstream toward the head of the tributary (western lobe). On the other hand, concentrations of C19–C36 aliphatic hydrocarbons and 2,3,7,8-TCDD are higher at the head of tributary (western lobe). Generally, COC concentrations in subsurface sediment in the East Branch are similar to or lower than COC concentrations in other areas of Newtown Creek. All COCs were detected in subsurface sediment at concentrations greater than their respective risk-based PRG.

Native Material (glacial and post-glacial deposits present below the sediment): TPAH(34), C19-C36 aliphatic hydrocarbons, and lead concentrations in native material are generally two to three orders of magnitude less than those in subsurface sediment. TPCBs and copper concentrations are generally one to two orders of magnitude less than those in subsurface sediment. 2,3,7,8-TCDD was detected in one sample in the native material. Other than one sample with a C19-C36 aliphatic hydrocarbons concentration greater than the risk-based PRG, all other COC concentrations detected in native material were less than their respective risk-based PRG.

Porewater: Shallow porewater samples (0 to 12 inches below sediment surface) were analyzed for all Site COCs except for C19–C36 aliphatic hydrocarbons and 2,3,7,8-TCDD, because these were not initially identified as potential COCs for the Site. There is no clear spatial distribution pattern associated with measurements of TPAH(34) and lead concentrations in shallow porewater in the East Branch. Concentrations of TPCBs and copper in shallow porewater are higher near the East Branch's confluence with the main stem of the Creek than at the locations closer to its head (western lobe). TPCB concentrations in porewater from 1 to 2 feet below sediment surface (collected during the FS) in the eastern lobe are higher than in shallow porewater at the confluence with the main stem.

Only one mid-depth porewater sample was collected in the East Branch, from a depth interval of 1.5 to 3.5 feet. Mid-depth porewater samples are porewater samples collected from mid-depth within the subsurface sediment, at the approximate midpoint between the mudline and underlying native material. Since only one sample was collected, no spatial pattern could be determined. However, in the mid-depth porewater sample, TPCBs and copper concentrations were greater than, TPAH(34) concentrations were similar to, and lead concentrations were less than, concentrations detected in shallow porewater samples collected at this one location.

Groundwater: Groundwater samples, collected from monitoring wells within the Creek, were analyzed for all Site COCs except for 2,3,7,8-TCDD. Dissolved lead was only detected in one groundwater sample; as such, no spatial pattern could be determined. There is no clear spatial distribution pattern associated with measurements of TPAH(34), C19–C36 aliphatic hydrocarbons, and dissolved copper in groundwater below the East Branch. The lowest concentrations of TPCBs in groundwater were observed at the head of the tributary (western lobe). The lateral groundwater study described above will provide additional information on groundwater impacts to the Creek.

NAPL and sheen in sediment: Laboratory analysis of NAPL from the OU1 Study Area shows that it generally consists of TPAH(34) and TPCBs. Observations of NAPL blebs in sediment were located sporadically throughout the East Branch area and are not clustered at a particular location. Similarly, visual observations of surface and subsurface sediment samples identified sheen intermittently throughout the East Branch, and visual observations of sediment samples collected in the eastern lobe (also referred to as the Western Beef slip) identified sheen in every sample collected (note that sheen is the appearance of iridescence on the surface of sediment or water and can be due to biological degradation of organic material or other processes; it is not necessarily indicative of the presence of Site COCs). NAPL blebs were also observed in the shake tests of two subsurface sediment cores collected in the eastern lobe. Mobile NAPL, defined as non-residual NAPL that can move through advection and as measured through laboratory testing, was not identified in the East Branch. However, the mobility of NAPL in untested areas of the East Branch is unknown, and changes to in-situ conditions and/or anthropogenic disturbances could potentially mobilize NAPL.

Gas ebullition: Gas ebullition originates primarily in surface and shallow subsurface sediment when water/sediment temperatures are generally higher and water depths are shallower (near the hours of low tides) and organic content in sediments is high enough to support the bacterial production of methane gas. When gas ebullition occurs in the presence of sheen-bearing material (NAPL or other organic materials), or below these materials, those constituents may be transported with gas bubbles to the water column, creating sheens that develop and/or expand. Gas ebullition-facilitated sheens were observed during surveys within the East Branch, indicating that gas ebullition-facilitated transport of NAPL is an on-going process. Gas ebullition can also transport contaminants from the sediment bed to the water column.

Particulate phase concentrations in surface water: In Newtown Creek overall, spatial patterns in particulate phase TPAH(34), TPCB, copper, and lead concentrations in surface water show similar patterns to those in whole water (particulate, plus dissolved phase) samples, specifically that concentrations tend to increase with increasing distance upstream in the main stem of the Creek. Particulate phase TPAH(34) and TPCB concentrations also tend to be higher in the more upstream tributaries, like the East Branch. These patterns tend to be more prevalent during wet weather conditions.

Summary: In summary, COC concentrations in the sediment generally increase with depth, whereas COC concentrations in native material are generally one or more orders of magnitude lower than COC concentrations in the surface and subsurface sediment. Areas of sediment where COC concentrations do not increase with depth (*e.g.*, near CSO discharge locations at the head of the western lobe) have likely been affected by resuspension, redeposition, and mixing.

COCs are detected and elevated in media other than sediments, including surface water, porewater and groundwater. Sheens have been observed intermittently throughout surface and subsurface sediment; NAPL blebs have been occasionally observed in subsurface sediment. Sheens have been observed in surface water due to ebullition. NAPL has been observed to be immobile (under conservative laboratory test conditions) at two locations tested in the East Branch, but existing immobile NAPL may be mobilized during implementation of the remedy, and mobile NAPL may be identified during the pre-design investigation that will be conducted.

Ongoing Sources of Contamination to the East Branch

There are many ongoing sources of contamination to the East Branch portion of OU1, both internal to the OU1 Study Area and external to the Creek.

Internal ongoing sources of contamination to the East Branch include sediment resuspension from within the

OU1 Study Area, movement of sediment and surface water through tidal flow, and ebullition-facilitated transport.

External sources of contamination to the East Branch include CSOs, MS4s, permitted and non-permitted discharges, overland flow, vertical groundwater flow and atmospheric deposition. There are also many ongoing sources of contamination to the East Branch that lie at the interface of the Study Area and the uplands and may be considered both internal and external sources of contamination. These include sources such as lateral groundwater flow, seeps from contaminated upland properties, and bank erosion, and as mentioned previously, they are referred to herein as internal/external interface sources.

Overall, the East Branch is net depositional, though there are locally erosional areas. The relative impact of the ongoing sources varies throughout the East Branch. Depositing solids and COC loads originate primarily from point sources (*i.e.*, CSO and stormwater outfalls). East River solids comprise approximately 30 percent of the deposited sediment and COC load in the East Branch. Findings of the OU1 RI/FS show that the contribution to COC loads from the other ongoing sources is less significant in the East Branch portion of OU1 than in other portions of OU1, though this finding will continue to be evaluated on an ongoing basis during and after implementation of a remedy for the East Branch.

EPA has developed the LTE model mentioned previously to assess the impact of ongoing sources of contamination on the OU1 Study Area (including the East Branch). The LTE model estimates the concentration of COCs in surface sediment that would occur from the external ongoing sources of contamination assuming that the concentration of COCs in sediment were zero to start. In other words, it measures the amount of recontamination that would be expected to occur from ongoing external sources after a remedy is implemented. The LTE model was developed using data from the OU1 RI/FS and will be updated over time using data obtained through the ongoing OU1 RI/FS, OU2 post-ROD monitoring program, and pre- and post-implementation monitoring conducted as part of the East Branch remedy. The output of EPA's LTE model is a cumulative distribution function for each COC which shows the percentage of likelihood that a concentration is equal to or below the concentration indicated.

East Branch Focused Feasibility Study (FFS)

Information gained through the full OU1 RI/FS was used to conduct a FFS. The FFS develops and evaluates remedial alternatives for the East Branch portion of the OU1 Study Area. A draft FFS was submitted to EPA in July 2023, and a draft final version was submitted in August 2024 shortly before the release of this Proposed Plan. The latter version is available for review and comment as part of the Administrative Record for this action. The FFS will be finalized once all comments on this Proposed Plan are received and considered.

SUMMARY OF SITE RISKS

OU1 Risk Assessments

As part of the OU1 RI/FS process, baseline human health and ecological risk assessments were conducted, and the reports have been approved by EPA. Superfund risk assessments identify unacceptable risks to public health or welfare and the environment from actual or threatened releases of hazardous substances from a Superfund site into the environment. The identification of unacceptable risks forms the basis for developing and selecting cleanup options for a site.

Human Health Risk Assessment

The Baseline Human Health Risk Assessment (BHHRA) for OU1 was approved in June 2017. The risk of a reasonably maximally exposed (RME) individual developing cancer or noncancer health effects as a result of exposure to CERCLA hazardous substances through ingestion of fish or crab exceeds the acceptable risk range identified in the NCP. The BHHRA evaluated a wide variety of possible exposure pathways, including recreational boaters, swimmers, shoreline recreators/waders, dockside and landside workers, as well as risks to residents and workers due to flooding events.

Unacceptable risks were associated with exposure to total non-dioxin-like PCB congeners, total PCB congeners, and total dioxins/furans through ingestion of fish and crab in the Creek. Specifically, fish and crab consumption risks and HIs for the RME scenarios exceed CERCLA-acceptable risk levels of an excess cancer risk of 10^{-6} to 10^{-4} and a noncancer goal of protection of an HI of 1 for adult, adolescent and child anglers and crabbers.

For all other receptors and pathways, the cancer risks from exposure to CERCLA hazardous substances were found to be below or within EPA's acceptable risk range. The only other receptor found to have unacceptable risks was the general construction worker. While cancer risks for this receptor were found to be within the acceptable risk range, noncancer hazards exceeded the hazard threshold of an HI of 1.

Ecological Risk Assessment

The Baseline Ecological Risk Assessment (BERA) for OU1 was approved in September 2018. Overall, the results of the BERA indicate that Study Area sediment, particularly in the Turning Basin and most of the tributaries, is toxic to benthic invertebrates and presents exposure risks for bivalves, blue crabs, fish and birds. The primary contaminants leading to unacceptable risk were hydrocarbons (including PAHs), PCBs, and copper, with additional risk from dioxins/furans and lead.

Conclusion

Sediment is the primary media of concern for all CERCLA elevated risks at the East Branch portion of OU1.

Based on the results of the remedial investigation and the risk assessments, EPA has determined that the preferred alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) describe what the proposed site cleanup is expected to accomplish. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels (*e.g.*,

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these releases under current- and anticipated future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario that portrays the highest level of human exposure that could reasonably be expected to occur is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at a site and are referred to as chemicals of concern, or COCs, in the final remedial decision document or Record of Decision.

PRGs). The following RAOs have been established for the East Branch portion of the OU1 Study Area:

Exposure-based RAOs

- Reduce potential current and future human exposure to COCs from ingestion of fish and crab by preventing biota exposure to sediments in the East Branch with COC concentrations above protective PRGs/Remediation Goals (RGs).
- Reduce ecological exposure to Site COCs in sediment by reducing the concentrations of COCs in contaminated sediment in the East Branch to protective PRGs/RGs.

Source Control RAO

- Reduce migration of COCs related to NAPL and its constituents, and other sources of COCs within the East Branch, to surface sediment and surface water to levels that are protective for human health and ecological exposure.

The exposure-based RAOs would be achieved by reducing concentrations of COCs in surface sediment to concentrations below the RGs that are selected. For Newtown Creek, it was estimated that the top 6 inches of the sediment is the biologically active zone. This depth is the current definition for surface sediment associated with the source control RAO.

It is expected that these interim RAOs will be consistent with the RAOs selected for the OU1 Study Area. The interim remedy selected for the East Branch will include a robust pre- and post-implementation monitoring program to assure that both the exposure-based and source control RAOs are being met on an ongoing basis over time, and until such a time as the long-term monitoring of this action is subsumed into a final OU1 Study Area remedy monitoring program. The long-term monitoring approach for the East Branch is described more fully below in the Overview of Remedy Approach section of this Proposed Plan. In particular, the long-term monitoring approach description explains how the source control RAO will be met over time.

WHAT IS A "PRINCIPAL THREAT?"

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered a source material; however, non-aqueous phase liquids in groundwater may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. A decision whether and how to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Preliminary Remediation Goals

Based on the findings of the BHHRA and the BERA for the full OU1 Study Area, six COCs have been identified for OU1 of the Site and risk-based PRGs have been developed for each of the COCs. Table 1 at the end of this document lists the COCs, the risk-based PRGs, and the basis for selecting each of the PRGs. They were developed in consultation with EPA's Office of Research and Development and were selected based on the most sensitive exposure pathway, whether it be due to human health or ecological risk. These COCs and PRGs will be used for the East Branch portion of the OU1 Study Area as well (once a remedy is selected, the PRGs become the RGs for the action).

EPA is proposing that the long-term cleanup goals for the East Branch Early Action be set to the risk-based PRGs. EPA can select PRGs consistent with background conditions if risk-based remediation goals are lower than background concentrations. However, since the Creek is a dead-end water body without a natural up-river source of water and there are many ongoing sources of contamination to the Creek, the determination of background at this Site is not clear cut. Furthermore, while ongoing sources of contamination will continue post-remedy, there is an expectation that the overall external (including internal/external interface) loading to the Creek will decrease over time because of improved best management practices, ongoing cleanup actions (such as at upland sites), and additional regulatory control (including the long-term control plan both for Newtown Creek and for the East River overall). Since EPA anticipates that the risk-based PRGs are attainable in the long-term, background-based PRGs or action levels are not necessary for this action.

The process that will be used to assure the RAOs are being met over time is described in the Summary of Remedial Alternatives section below.

PRINCIPAL THREAT WASTE

Principal threat wastes (PTW) are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (*e.g.*, solvents) or materials having high concentrations of toxic compounds. A detailed explanation of principle threat wastes can be found in the information box, "What is a Principal Threat?" on the preceding page.

For this action, two types of PTW are potentially present. These include:

- Contaminated sediment with PCB concentrations above 500 parts per million (ppm).
- NAPL in subsurface sediment or upland soil that has the potential to migrate to surface sediment and surface water.

Based on the findings of the RI/FS, there is no known PTW in the East Branch. However, additional sampling will be conducted to support the design of the remedy that is selected for the East Branch portion of the OU1 Study Area and, if PTW is encountered, it will be treated as described below.

OVERVIEW OF REMEDY APPROACH

The general intent of the action for the East Branch portion of OU1 is to remove contaminated sediment to a depth that will result in immediate risk reduction and contaminant mass removal in this portion of the Creek (and, to a lesser extent, within the Study Area as a whole) and to assure the risk reductions are maintained in the long-term.

As previously discussed, there are many ongoing sources of contamination to the East Branch portion of OU1. These sources are internal to the Creek, external to the Creek and at the internal/external interface between the Creek itself and the surrounding upland areas, and any of these ongoing sources of contamination could impact the protectiveness of the remedy.

While the CSM for the East Branch portion of OU1 is well developed at this point, there is uncertainty around the impact of these ongoing sources to the protectiveness of any remedy selected. It would take considerable additional time (on the order of years) to significantly reduce this uncertainty and given the Creek's location in a densely populated urban environment, there will always be a relatively large degree of uncertainty associated with the potential impact of ongoing contamination on any implemented remedy. As such, rather than delay taking any in-Creek remedial action until the uncertainty is reduced, EPA developed the Site-specific Framework, mentioned previously, for OU1 to allow remedial work to proceed sooner rather than later. The Framework provides both an approach for evaluating the long-term effectiveness of remedies implemented for the Site, as well as a roadmap for addressing any impacts to the protectiveness that are discovered. It includes an iterative approach to post-remedy monitoring and evaluation to assure that risk-based remediation goals are achieved in the long term. This iterative approach, as applied specifically to the East Branch portion of OU1, is described as follows:

- Set long-term PRGs for the East Branch portion of OU1 equal to the risk-based human health and ecological concentrations.
- Determine interim evaluation measures (IEMs) using empirical data, as well as the predictive

LTE model developed for the Site. The IEMs will be used for remedy design, implementation, and post-implementation monitoring and will be adjusted periodically using empirical data to account for current conditions.

- Develop a long-term monitoring program that includes sampling of at least surface sediment, subsurface sediment, porewater, both suspended sediment and dissolved phase concentrations in surface water, and ongoing external sources of contamination (including, at a minimum, CSOs, MS4s, stormwater and overland flow, as needed if not being monitored under OU2). The monitoring program will also include regular visual and/or fluorescence technology inspections for NAPL, with chemical analysis to confirm the composition of NAPL identified, regular bank inspections for erosion, with sampling as needed, and regular inspections for the presence of seeps, with opportunistic sampling as possible. The purpose of this long-term monitoring program is to assess overall remedy effectiveness, including both the performance of the remedy itself within the East Branch portion of the OU1Study Area and the impact on the protectiveness of the remedy from ongoing sources over time.
- If surface sediment concentrations do not meet the IEMs and do not continue trending towards the long-term remediation goals, determine if this is due to the performance of the in-Creek remedy itself or if additional external or internal/external interface source control measures are needed, either through voluntary actions or through federal and/or State of New York enforcement authorities, as appropriate.

The appropriate source control measures would be determined on a location-specific basis. The appropriate entity to control the source would be determined on a situation-specific basis. For example, if the need for source control is determined to be related to an issue with the in-Creek remedy, then the additional source control measures would be taken through federal Superfund enforcement authority. However, if the need for source control is related to a seep from a contaminated upland property, then the source control action would be taken through state and/or federal (Superfund and/or non-Superfund) enforcement authority, to be determined on a case-by-case basis.

It is EPA's expectation that the alternative selected for the East Branch would successfully address internal sources of contamination. The approach described above provides a means to confirm this is true and to assure the RAOs for the action are met in the long-term by ensuring impacts from all potential sources are understood and addressed, as needed and under the appropriate enforcement authority.

Data-Based Rationale for Remedy Approach

Figure 8 was developed through the use of the LTE model using existing data collected as part of the OU1 RI/FS process. It shows the expected range of long-term equilibrium concentrations for all of the COCs except lead based on existing data (lead is only a concern in the intertidal areas and is not included in the LTE model). This information will be updated based on sampling conducted during investigations to support the design of the remedy and on an ongoing basis after implementation of the remedy, but the existing data shows that risk-based PRGs do appear to be achievable at this time for copper (PRG 490 ppm) and TPAH(34) (PRG 100 ppm), may be achievable with little or no additional source control work for PCBs (PRG 0.30 ppm), and will likely take time and additional source control work to achieve for dioxins/furans (PRG 18 ppt) and C19-C36 (PRG 200 ppm).

Figure 8 also shows that CSOs currently provide a significant contribution to the long-term equilibrium concentration for most of the COCs, including dioxins/furans TEQ and C19-C36. The volume of CSO discharges to the Creek will decrease by approximately 65% once the long-term control plan NYCDEP is under order by NYSDEC to implement by 2042 is fully implemented. As such, it is known that significant source control will happen in the not-too-distant future. In addition, as is described more fully below, the active remedial alternatives will help reduce other contributors to the long-term equilibrium concentrations, including lateral groundwater/seeps, bank erosion, and porewater advection on a temporary basis, until appropriate source control measures can be taken under either state and/or federal enforcement authorities.

This analysis illustrates that, based on EPA's current understanding, the RAOs that have been established for the East Branch portion of OU1 are achievable in the long-term. The model will be used to determine the IEMs.

Monitoring and Evaluation Approach

Immediately after implementation of the remedy selected for the East Branch portion of OU1, COC concentrations in the surface sediment should be clean (meaning non-detect or well below any regulatory standards for non-metals and at or below concentrations consistent with naturally occurring levels for metals). Over time, however, the surface sediment concentrations of COCs are anticipated to increase due to the presence of ongoing sources of contamination. The LTE model was developed to estimate what the new equilibrium concentrations in the surface sediment will be based on data collected from the ongoing sources. Based on the current outputs of the LTE model, copper and TPAH from ongoing sources have less potential to cause PRG exceedances post-remedy than dioxins/furans and C19-C36. TPCBs fall somewhere in the middle.

IEMs will be developed through the use of the LTE model and will be set to the 50th percentile concentration prediction from the LTE model for each COC. A tiered monitoring program will be developed and refined over time. The initial tier will include a regular, post-implementation sampling plan that will be developed during the remedial design. The second tier would require increased monitoring of all potential sources of contamination if the surface sediment concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC.

This monitoring program will allow EPA to identify the specific, ongoing sources that may cause IEM exceedances before IEM exceedances actually occur and will enable EPA to develop an appropriate course of action to ideally prevent IEM exceedances from ever occurring. The IEMs will be refined over time as new empirical data is obtained, and the IEM for any particular COC could be consistent with the risk-based PRG. Over time, as additional external and internal/external interface source control measures are taken, the expectation is that all IEMs will be consistent with the risk-based PRGs, at which point the remedy would be protective and the ongoing monitoring would be conducted to assure it remains so.

Regarding NAPL and sheens specifically, if NAPL from ongoing sources, including upland seeps, is found to be impacting the protectiveness of the implemented remedy, it will need to be addressed through either state and/or federal enforcement authorities (to be determined on a case-by-case basis).

In addition, sheens could potentially be indicative of Site-related contamination at elevated concentrations that would impact the effectiveness of the implemented remedy. As such, any sheen observed in the future would need to be further investigated, including through sampling and analysis. Depending on the results, additional remedial efforts could be required, again through either state and/or federal enforcement authorities (to be determined on a case-by-case basis).

SUMMARY OF REMEDIAL ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, comply with applicable or relevant and appropriate requirements (ARARs), and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) of CERCLA also establishes a preference for remedial actions that employ, as a principal element, treatment to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4). In addition, interim actions must also protect human health and the environment from the threats they are addressing, be cost effective, and consistent with the final remedy.

The remedial alternatives evaluated for the East Branch portion of OU1 (except for the no action alternative) focus on the removal of contaminated sediments and capping. Five active remedial alternatives were developed. Brief descriptions of the remedial alternatives considered to address the East Branch portion of the OU1 Study Area are provided below.

More detail can be found in the FFS report prepared for the East Branch.

Common Elements of Each Active Alternative

Common elements of each of the active alternatives will include the following:

- Pre-design investigation - A robust pre-design investigation (PDI) will be conducted. The PDI will include, at a minimum, data collection to refine the footprints and depths of various remedy components and fill data gaps and would include: additional delineation of NAPL, potential PTW and potential Toxic Substances Control Act (TSCA) regulated material (like high concentrations of TPCBs); further delineation of the COCs; additional surveys, including for the presence of NAPL and seeps; and additional geotechnical investigations to support design of the remedy. If needed, treatability studies will be conducted to obtain any additional required information to inform the design of the early action remedy. Data from the PDI will also be used to refine the outputs of the LTE model that will be used to develop the initial IEMs that will be refined over time.
- Dredging - Each of the active remedial alternatives includes various amounts of dredging that will reduce the volume of contaminated sediment remaining in the East Branch. Because of the presence of debris in the East Branch, it is assumed that mechanical rather than hydraulic dredging will be used.
- Capping – Each active alternative includes placement of amended caps in areas that vary by alternative. An amended cap consists of addition of specialized or manufactured materials intermixed with typical cap aggregate materials at specified amounts. The objectives of the cap in each area are to provide (i) physical isolation of COCs in the sediment from the benthic environment; (ii) erosion protection to maintain cap stability against forces resulting from open water flows, propwash, vessel wakes, and other forces; and/or (iii) chemical isolation to sequester COCs and, where containment is possible, NAPL, that could be transported from the contaminated sediment below the cap via dissolved phase advection, diffusion, and/or gas-ebullition facilitated transport.
- In situ stabilization and solidification (ISS), where needed to reduce migration, and/or for treating NAPL or PTW. While existing data does not indicate this option will be necessary, for costing purposes the FFS assumes that ISS to treat NAPL and/or PTW will be needed to address 0.6 acres of the East Branch, which equates to 5.5 percent of the total surface area of the East Branch.
- Sealed bulkheads - if and where needed to reduce migration, sealed bulkheads may be used as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented. Again, while the need for sealed bulkheads is not currently indicated by the existing data, for cost estimating purposes the FFS assumes that 20 percent of the length of bulkheads required for each alternative will need to be sealed, and it is further noted in the FFS that sealed bulkheads may be required in areas that do not otherwise require bulkheads for stabilization purposes.
- Stabilization measures - Each remedial alternative includes stabilization measures that may be applicable depending on the location-specific conditions. These stabilization measures may include the use of ISS for bank stabilization or adjacent to sensitive structures, placing limits on the means and methods of dredging (*e.g.*, prescribing slot dredging in some areas), and temporary or permanent structural support (*i.e.*, repair or replacement of a bulkhead).
- Dredged Material Management and Disposition – Each alternative assumes dredged material will be barged to an offsite processing facility where it would be treated through stabilization/solidification with amendment as necessary to reduce the moisture content of the material and meet transport and disposal requirements. Dredged material would then be transported by truck and disposed of in an

- offsite permitted Subtitle C, Subtitle D, and/or TSCA waste landfill, depending on the waste profile for a given dredged material management area. The potential for offsite beneficial reuse of some portion of the dredged material will also be considered, as appropriate. Debris would also need to be disposed of and/or beneficially reused, as appropriate.
- Institutional controls - institutional controls may be required to protect the constructed components of the alternative, as needed. Fish consumption advisories currently in place through the State are assumed to remain in place.
- Evaluation monitoring – as described in the Overview of Remedy Approach section of this Proposed Plan, a robust evaluation monitoring program will include baseline monitoring, construction-phase monitoring, and long-term monitoring to assess both the performance of the remedy itself and the impact on the protectiveness of the remedy from ongoing sources post-implementation.

Given the industrial nature of the East Branch, each of the active remedial alternatives would also need to address infrastructure in and around the East Branch, including the Grand Street Bridge and the aeration system. Debris removal will also be a required component of each alternative prior to any dredging occurring.

For each of the active alternatives, the exposure-based RAOs would be achieved immediately following completion of construction because a clean cap would be placed over the entire surface of the East Branch, thus reducing surface sediment concentrations to "clean" at time zero (as described in the previous section of this Proposed Plan). Concentrations of COCs in the surface sediment are anticipated to increase over time as a result of the influence of ongoing external and internal/external interface sources of contamination until a new equilibrium surface concentration is reached. It is then expected that surface sediment concentrations should start decreasing over time as the loading of ongoing sources of contamination to the East Branch decreases. The IEM for each COC will be set at the 50^{th} percentile of the expected new equilibrium concentrations, as predicted by the LTE model, or the risk-based PRG if this concentration is equal to or higher than the expected equilibrium concentration. The post-implementation monitoring program (described under "Monitoring and Evaluation Approach") will be used to determine if the source-control RAOs are being met. Increased monitoring of all potential sources of contamination would be conducted when the surface sediment concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC. As described previously, additional source control actions will then be taken on an as-needed basis under state and/or federal enforcement authority, to be determined on a case-by-case basis.

The construction time provided below for each alternative does not include the time required to design the remedy, to negotiate the implementation performance of the remedy with any potentially responsible parties, or to procure necessary contracts. It also does not include any additional source control actions that may be needed over time. For costing purposes, the evaluation monitoring is assumed to continue for a period of 10 years (as captured in the Total Operation & Maintenance (O&M) dollar figure), after which it is assumed the O&M will be subsumed by the final OU1 remedy. In addition, since contamination would remain in the Creek above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional response actions may be implemented.

Finally, each of the alternatives developed for this action is focused on addressing the East Branch portion of the OU1 Study Area and, to some extent, the interface between the Study Area and the upland properties (for example, seeps and shoreline erosion). The evaluation monitoring program will help determine if there are impacts to the protectiveness of the alternative from ongoing sources.

Alternative EB-A - No Action

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be initiated to remediate contaminated sediment that poses unacceptable risks to human health and the environment.

Total Capital Cost:	*$0*
Total O&M:	*$0*
Total Cost:	*$0*
Present Worth Cost:	*$0*
Construction Time:	*0 years*

Alternative EB-B – Dredge to Allow Placement of Cap at or Below 0 foot MLLW

Alternative EB-B consists of dredging of sediments where necessary to allow for placement of an armored and amended cap to be installed entirely at (or below) an elevation of 0 foot MLLW.

For this alternative, there would be more cap material placed than sediment removed via dredging; therefore, this alternative would result in a mudline elevation in East Branch that is shallower on average than the current mudline and would reduce water depths in the East Branch following remedy implementation.

Based on the assumptions used in the FFS, Alternative EB-B is expected to take 13 months to construct (over two construction seasons) and includes the following:

- Removal of approximately 34,000 cubic yards (CY) of debris and sediment (32,300 cy of sediment and 1,700 cy of debris; 24 scow trips for sediment and debris) over 3.5 acres;
- Capping with 79,400 cy of material (40 scow trips), over 11.2 acres (including post-ISS cap);
- ISS of 26,000 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 60 linear feet (LF) of shoreline; and
- Shoreline stabilization along 1,850 LF, or 36 percent, of the shoreline through the use of ISS, bulkheads and/or slot dredging.

Capital Cost:	*$ 141.4 million*
Total O&M Cost:	*$ 33.4 million*
Total Cost:	*$ 174.8 million*
Present Worth Cost:	*$ 152.0 million*
Construction Time Frame:	*2 years*

Alternative EB-C – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth

Alternative EB-C consists of dredging sediment to a minimum depth (assumed to be 3 feet on average) across the entire footprint of the East Branch to allow for placement of an armored and amended cap to maintain the existing water depth.
Based on the assumptions used in the FFS, Alternative EB-C is expected to take 22 months to construct (over three construction seasons) and includes the following:

- Removal of approximately 97,200 CY of debris and sediment (92,300 cy of sediment and 4,900 cy of debris; 63 scow trips for sediment and debris) over 11.2 acres;
- Capping with 77,000 cy of material (39 scow trips), over 11.2 acres (including post-ISS cap);
- ISS of 9,900 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 180 LF of shoreline; and
- Shoreline stabilization along 3,850 LF, or 76 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

Capital Cost:	*$ 236.8 million*
Total O&M Cost:	*$ 33.3 million*
Total Cost:	*$ 270.1 million*
Present Worth Cost:	*$ 235.2 million*
Construction Time Frame:	*3 years*

Alternative EB-D – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth with Localized Deeper Dredging

Alternative EB-D is similar to EB-C and consists of dredging an estimated 3 feet of sediments across the entire footprint of the East Branch to allow for placement of a 3-foot armored and amended cap to maintain existing water depth. In addition, this alternative includes the option for deeper dredging of sediments in select areas based on the following considerations:

- Potential for NAPL migration from the deeper soft and/or native material
- Potential for exposure to principal threat waste
- Depth to native material

- Comparatively higher COC concentrations in remaining sediment

Based on the assumptions used in the FFS, Alternative EB-D is expected to take 22 months to construct (over three construction seasons) and includes the following:

- Removal of approximately 106,300 CY of debris and sediment (101,000 cy of sediment and 5,300 cy of debris; 69 scow trips for sediment and debris) over 11.2 acres;
- Capping with 69,600 cy of material (35 scow trips), over 10.0 acres (including post-ISS cap);
- Backfilling with 14,400 CY of sand (8 scow trips), as needed to maintain existing water depth where deeper dredging is conducted;
- ISS of 9,900 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 180 LF of shoreline; and
- Shoreline stabilization along 3,850 LF, or 76 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

Capital Cost:	*$ 245.9 million*
Total O&M Cost:	*$ 33.3 million*
Total Cost:	*$ 279.2 million*
Present Worth Cost:	*$ 243.5million*
Construction Time Frame:	*3 years*

Alternative EB-E – Dredge All Within Navigation Channel, and Cap Outside Channel

Alternative EB-E consists of dredging the federally authorized navigation channel to a depth necessary to accommodate a cap below the current authorized depth plus a buffer (the depth of which is to be determined in consultation with the U.S. Army Corps of Engineers), or to native material, whichever is shallower. Areas dredged to native material would include backfill, if necessary. The remedy also includes dredging and/or capping with an armored and amended cap outside of the navigation channel, including in the Western Beef Slip, which is outside of the navigation channel, or in areas determined to have a relatively high flux of COCs from groundwater. The alternative also includes backfill, as needed, and would result in deeper water depths on average.

This alternative was included in the FFS because, at the time of preparation, deauthorization of the federally authorized navigation channel in the East Branch was uncertain.

Based on the assumptions used in the FFS, Alternative EB-E is expected to take 37 months to construct (over five construction seasons) and includes the following:

- Removal of approximately 246,100 CY of debris and sediment (233,800 cy of sediment and 12,300 cy of debris; 157 scow trips for sediment and debris) over 10.6 acres;
- Capping with 42,700 cy of material (22 scow trips), over 8.1 acres (including post-ISS cap);
- Backfilling with 7,200 CY of sand (4 scow trips);
- ISS of 17,300 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 490 LF of shoreline; and
- Shoreline stabilization along 4,250 LF, or 84 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

Capital Cost:	*$ 467.4 million*
Total O&M Cost:	*$ 32.4 million*
Total Cost:	*$ 499.8 million*
Present Worth Cost:	*$ 418.7 million*
Construction Time Frame:	*5 years*

Alternative EB-F – Dredge All

Alternative EB-F would consist of dredging down to uncontaminated material across the entire footprint of the East Branch and backfill and would result in deeper water depths on average. Even though this alternative includes dredging of all contaminated sediment, armored/amended caps would be placed over areas determined to have a relatively high flux of COCs from groundwater.

Based on the assumptions used in the FFS, Alternative EB-F is expected to take 46 months to construct (over seven construction seasons) and includes the following:

- Removal of approximately 268,100 CY of debris and sediment (254,700 cy of sediment and 13,400 cy of debris; 171 scow trips for sediment and debris) over 11.2 acres;

- Capping with 31,500 cy of material (16 scow trips), over 6.8 acres (including post-ISS cap);
- Backfilling with 10,100 CY of sand (6 scow trips);
- ISS would not be needed for NAPL treatment since this alternative would dredge all contaminated sediments;
- Sealed bulkheads along 850 LF of shoreline; and
- Shoreline stabilization along 4,500 LF, or 88 percent, of the shoreline through the use of ISS or bulkheads.

Capital Cost:	*$ 578.0 million*
Total O&M Cost:	*$ 32.1 million*
Total Cost:	*$ 610.1 million*
Present Worth Cost:	*$ 492.7 million*
Construction Time Frame:	*7 years*

EVALUATION OF ALTERNATIVES
Nine Criteria Evaluation

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy (see table below, Evaluation Criteria for Superfund Remedial Alternatives). This section of the Proposed Plan describes the relative performance of each alternative against the nine criteria, noting how each compares to the other options under consideration. A detailed analysis of the alternatives can be found in the East Branch Early Action FFS Report.

1. Overall Protection of Human Health and the Environment

Alternative EB-A (No Action) would not be protective of human health and the environment because it would not reduce the potential exposure of human and ecological receptors to COCs in sediment. As it would not meet this threshold criterion, Alternative EB-A was not evaluated against the other NCP criteria.

The remaining alternatives would meet the threshold criteria of overall protection of human health and the environment. Exposure to contaminated sediment and migration of contaminants through sediment would be addressed through an appropriately designed combination of dredging, capping, ISS, sealed bulkheads, and treatment. Each alternative also assumes bank-to-bank remediation will be conducted, so that a clean surface would be present immediately after dredging and capping were completed.

At this time, deauthorization of the federally authorized navigation channel in the East Branch of Newtown Creek is included in the 2024 WRDA bill and is expected to be approved prior to issuance of the remedy decision on this proposed plan. As such, Alternative

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

EB-E is not considered further in the nine criteria evaluation. The evaluation of Alternative EB-E would be very similar to that for Alternative EB-F.

2. Compliance with Applicable or Relevant and Appropriate Requirements

Under CERCLA, remedial actions must comply with all federal and state environmental requirements, standards, criteria, and limitations, unless such ARARs are waived under certain specific conditions. Because the remedy for the East Branch portion of OU1 is considered an interim early action, identification of ARARs is not necessary at this time. It is nonetheless expected that each of the active alternatives could be designed in such a way that it attains location- and action-specific ARARs. Chemical-specific ARARs would be addressed by the eventual, final remedy selected for OU1.

There are no chemical-specific ARARs for sediments. Alternatives EB-B, EB-C, EB-D, EB-E, and EB-F would satisfy location-specific ARARs (key potential location-specific ARARs include the Endangered Species Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, Protection of Wetlands regulations, and Floodplain Management regulations) and action-specific ARARs (key potential action-specific ARARs include the requirements of the Clean Water Act that would apply to dredging and capping, the RCRA requirements that would apply to management of dredged materials, and the Clean Air Act).

Alternatives EB-B, EB-C, EB-D, EB-E, and EB-F would be anticipated to comply with location- and action-specific ARARs through appropriate engineering design and agency review processes. Confirmation of ARAR compliance is typically demonstrated during remedial design and through the remedial action work plan (*e.g.*, environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and best management practices [BMPs]) as well as monitoring during the construction period.

3. Long-Term Effectiveness and Permanence

Each of the remaining alternatives would be effective in the long term through the use of appropriate remedial technologies, including dredging, ISS, and the installation of amended caps and/or backfill layers, as well as the use of sealed bulkheads, where needed, as a temporary measure until a long-term solution can be implemented. Long-term effectiveness would be maintained through the ongoing conduct of a robust post-implementation monitoring plan designed to detect both bottom-up concerns with the remedy (for example, from underlying NAPL or groundwater facilitated transport) as well as top-down concerns (for example, from the effects of climate change and scouring, and from the effects of ongoing sources of contamination from upland properties). If an impact on the protectiveness of the remedy is found, then the appropriate entity to address that impact will be determined on a case-by-case basis.

Alternative EB-B would raise the average elevation of the sediment bed thus potentially making it less resilient than the other active alternatives to the effects of climate change such as erosional impacts resulting from more frequent and higher intensity rainfall and higher intensity outfall and overland flows both currently and in the future. As such, the long-term effectiveness and permanence of Alternative EB-B is less than the other alternatives. Alternatives EB-C and EB-D would maintain existing water depths and therefore maintain the current hydraulics of the system. Alternatives EB-F would increase the average water depths in the East Branch, thus potentially making it more resilient to climate change though also altering the hydrodynamics of the system. Alternative EB-D would remove and/or use ISS to treat remaining waste below the estimated 3-foot dredge limit, thus likely making it more effective in the long-term at preventing exposure to or migration of contamination from below the capped area to the surface than Alternative EB-C. It would also require less O&M than Alternative EB-C since it would be less reliant on capping in the long term to maintain long-term effectiveness and permanence. Alternative EB-F would be effective in the long term since all contaminated material would be dredged to uncontaminated material.

The robust post-implementation monitoring plan, plus maintenance of the cap in perpetuity, would be an integral part of each potential alternative to assure it remains effective in the long term, considering both potential internal and external impacts to the remedy.

4. *Reduction of Toxicity, Mobility, or Volume through Treatment*

Each remaining alternative includes a combination of in-situ treatment (through ISS) and ex-situ treatment (of dredged sediment). Alternative EB-F would result in the greatest volume of ex-situ treatment, followed by EB-D, EB-C and EB-B. While the volume of sediment requiring in-situ treatment would be refined using information collected during the PDI and during development of the RD, Alternative EB-D would likely result in the greatest volume of in-situ treatment since Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration.

Both ISS and amended armored capping would be used in all alternatives to address the toxicity and mobility of contamination. While amended capping is not considered treatment, it does provide a means of sequestering the contamination in place so it is not available for exposure to human or ecological receptors, thus reducing the toxic effects. ISS and amended armored capping would also reduce the mobility of contamination remaining in the East Branch after dredging occurs. Reduction of toxicity and mobility (in the sense they were just described) increase from Alternative EB-B to EB-F.

5. *Short-Term Effectiveness*

Impacts to the community for each alternative increase from Alternative EB-B to EB-F. The length of time to implement each alternative increases from 13 months for Alternative EB-B, to 22 months for Alternatives EB-C or EB-D, to 37 months for Alternative EB-E and to 46 months for Alternative EB-F. The longer the timeframe and the greater the quantity of sediment to be addressed, the more significant the short-term impacts to the community would be. These short-term impacts include aesthetic impacts to the waterway, potential for odors and dust, increased noise and decreased access to the Creek. Handling larger quantities of sediment and backfill/capping materials would also have a greater short-term impact on the environment and more opportunities for impacts to worker safety. Short-term impacts would be controlled through the use of construction BMPs, personal protective equipment (PPE), engineering controls, and health and safety plans. On balance, Alternative EB-B would be the most effective in the short term. Alternatives EB-C and EB-D would be more effective in the short term than Alternatives EB-E or EB-F.

6. *Implementability*

It is expected that each of the alternatives would be implementable from a technical standpoint as each alternative employs well-established technologies and approaches. Additionally, services and materials needed to complete each of the active alternatives are readily available. From an administrative standpoint, NYSDEC may have concerns with Alternative EB-B because it would decrease the depth of water and, therefore, could impact water quality and may not comply with their water quality regulations. Specifically, it may affect the ability of the long-term control plan NYCDEP is currently under order by NYSDEC to implement to reach its goals. Alternatives EB-C and EB-D are more readily implementable than Alternative EB-E or EB-F since the depth of dredging would, generally, be less and they would require less structural/engineering support to safely conduct.

There may be location-specific implementability issues associated with the use of ISS where needed to reduce migration of contamination and/or for treating NAPL or PTW. Specifically, successful implementation of ISS near CSO or other large discharges could be problematic if a large storm event were to occur while the stabilizing agent is curing. Mitigation measures to address this concern will be developed during the design of the remedy and implemented if needed.

7. *Cost*

Total present worth costs for Alternatives EB-B, EB-C, EB-D, EB-E and EB-F are summarized below. Present worth is calculated using a discount rate of seven percent. Long term monitoring (LTM) is assumed to be 10 years for each alternative since monitoring would continue until subsumed by the eventual final OU1 remedy.

Alternative EB-B:

- Total Present-Worth Cost $152.0 million
- Implemented within 2 years

- LTM for 0-10 Years at a total cost of $33.4 million

Alternative EB-C:

- Total Present-Worth Cost $235.2 million
- Implemented within 3 years
- LTM for 0-10 Years at a total cost of $33.3 million

Alternative EB-D:

- Total Present-Worth Cost $243.5 million
- Implemented within 3 Years
- LTM for 0-10 Years at a total cost of $33.3 million

Alternative EB-E:

- Total Present-Worth Cost $ 418.7 million
- Implemented within 5 Years
- LTM for 0-10 Years at a total cost of $32.4 million

Alternative EB-F:

- Total Present-Worth Cost $492.7 million
- Implemented within 7 Years
- LTM for 0-10 Years at a total cost of $32.1 million

8. State Acceptance

NYSDEC concurs with EPA's preferred alternative.

9. Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends.

PREFERRED ALTERNATIVE AND BASIS FOR PREFERENCE

EPA's preferred alternative for the East Branch interim remedial action is Alternative EB-D – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth with Localized Deeper Dredging. This alternative includes the following primary components:

- A PDI in the East Branch which would include, at a minimum, the following activities. The PDI will help fill data gaps identified in the FFS report and determine whether PTW is present in the East Branch.
    - Additional sediment COC data collection to refine the remedial footprints and depths of the various remedy components and to delineate potential PTW and TSCA materials;
    - Additional porewater and/or groundwater COC data collection to refine cap designs;
    - Data collection to further delineate NAPL and investigate NAPL mobility;
    - Geotechnical data collection to support dredge design, cap design and shoreline stability evaluations;
    - Investigation (*i.e.*, opportunistic seep sampling) to inform decisions on the need for upland controls (*i.e.*, sealed bulkheads).
- Dredging to a minimum depth to accommodate capping without decreasing water depths. FFS dredge depth estimates range from 36 inches (in deeper water areas) to 53 inches (in shallower water areas) below the current mud line.
- Deeper dredging in areas identified based on the following considerations: potential for NAPL migration from the deeper soft and/or native material; potential for exposure to principal threat waste; depth to native material; and comparatively higher COC concentrations in remaining sediment.
- ISS where needed to reduce migration, and/or for treating NAPL or PTW.
- Capping of all dredged areas. The design of the cap would be determined based on Site conditions, including considerations for areas of relatively high groundwater dissolved phase COCs, NAPL presence, and erosion potential (particularly near CSO discharges). The FFS assumes the placement of a multilayer engineering cap including the following layers: erosion protection, geotechnical filter, dissolved phase chemical isolation, NAPL sorption, and habitat layers. Design of the cap may vary throughout the East Branch depending on location-specific condition and/or constructability considerations.
- Backfill (*e.g.,* a clean sand layer), as needed, to maintain existing water depths.

- Shoreline stabilization, including ISS, slot dredging, or bulkhead replacement, stabilization and/or installation, as needed.
- Sealed bulkheads to address shoreline seeps, as needed based on the results of the PDI and as a temporary measure while the related upland source is addressed through either state or federal enforcement authorities.
- Dewatering and offsite disposition of all dredged sediment and debris.
- Institutional controls, as needed.
- A robust post-implementation evaluation monitoring program to assure the remedy is performing as designed and remains protective over time. The monitoring program would be structured so that any ongoing sources negatively impacting the remedy can be identified and it can be determined if those sources require additional controls, either through state and/or federal enforcement authorities.
- Remediation and monitoring in the East Branch would be a key element and integrated with the OU1 adaptive site management strategy that is being developed.

Preliminary estimates are as follows. All of these estimates will be refined during the PDI:

- 101,000 CYs of sediment will be dredged through this action and 5,300 CY of debris will be removed.
- ISS will be used to address 9,900 CY of sediment in-place over an area of 0.4 acres.
- Deeper dredging to uncontaminated material will occur over 1.2 acres.
- A cap will be placed over the entire area treated through ISS and that an additional 10.0 acres of the East Branch will be covered with an amended cap after dredging, resulting in the need for 69,600 CY of capping material.
- 14,400 CY of backfill material will be needed over 1.2 acres where deeper dredging will occur.
- Shoreline stabilization will be required along 3,850 LF, which equates to approximately 76 percent of the shoreline.
- Sealed bulkheads will be needed over an estimated length of 180 LF.
- It is estimated that the entire action would take 22 months (over 3 construction seasons) to implement.
- The total net-present value cost is expected to be approximately $243.5 million.

Figure 9 illustrates Alternative EB-D.

Any upland source control measures that are determined to be needed to support the long-term protectiveness of the remedy will be implemented under state and/or federal enforcement authorities, as to be determined on a case-by-case basis.

The design of the remedial action will consider resiliency measures related to these anticipated hazards and will specifically consider the intensity, frequency, or duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.

Basis for Remedy Preference

Alternative EB-D is the preferred alternative because it meets the threshold criteria of protecting human health and the environment and complying with ARARs and it provides the best balance of the remaining criteria. It would be more effective in the long-term and provide more reduction in toxicity, mobility or volume through treatment than Alternatives EB-B or EB-C since it would remove more contaminated sediment and would be less reliant on capping to maintain effectiveness. Alternative EB-D would also be more effective in the short-term, more easily implementable and more cost-effective than Alternatives EB-E or EB-F since it will remove less contaminated sediment, thus reducing the opportunities for short-term impacts to the community, to workers and to the environment.

Based on information currently available, EPA believes the preferred alternative meets the threshold criteria and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. EPA expects the preferred alternative to satisfy the following statutory requirements of CERCLA Section 121(b) because (1) it will be protective of human health and the environment, either through this action or through additional actions to be determined as part of the OU1 ROD; (2) it will comply with location and action-specific ARARs; (3) it is cost-effective; and

(4) it utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In addition, CERCLA Section 121 includes a preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances as a principal element.

With respect to the two modifying criteria of the comparative analysis, which are state acceptance and community acceptance, NYSDEC concurs with the preferred alternative and community acceptance will be evaluated upon close of the public comment period.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of a selected remedy.

COMMUNITY PARTICIPATION

EPA encourages the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

Instructions for submitting written comments on the Proposed Plan and the dates for the public comment period, the date, location, and time of the public meeting, and the locations of the Administrative Record files are provided in the text box entitled, "Mark Your Calendar" located on the front page of this Proposed Plan and in the highlight box on this page.

For further information on the Newtown Creek Superfund Site, please contact:

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Remedial Project Manager	Community Involvement Coordinator
(212) 637- 4275	(212) 637-3639
kwan.caroline@epa.gov	loney.natalie@epa.gov

The administrative record file, which contains copies of the Proposed Plan and support documentation, is available at the following location:

EPA Region 2 Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637- 4308
Hours: Monday-Friday, 9 A.M to 5 P.M.

Written comments on this Proposed Plan should be mailed to Mrs. Kwan at the address below or sent via email.

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
Email: kwan.caroline@epa.gov

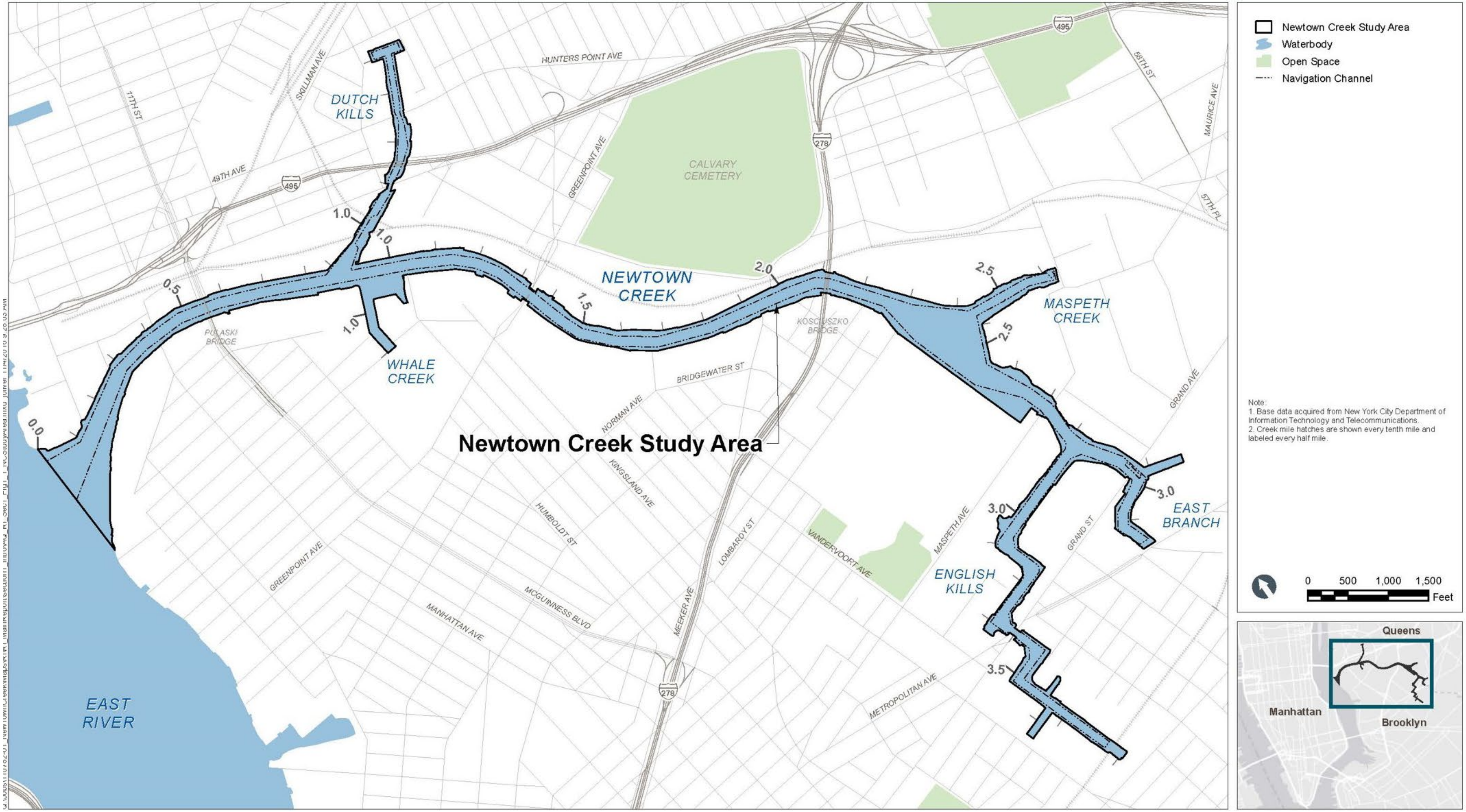


Figure 1 – Newtown Creek Study Area

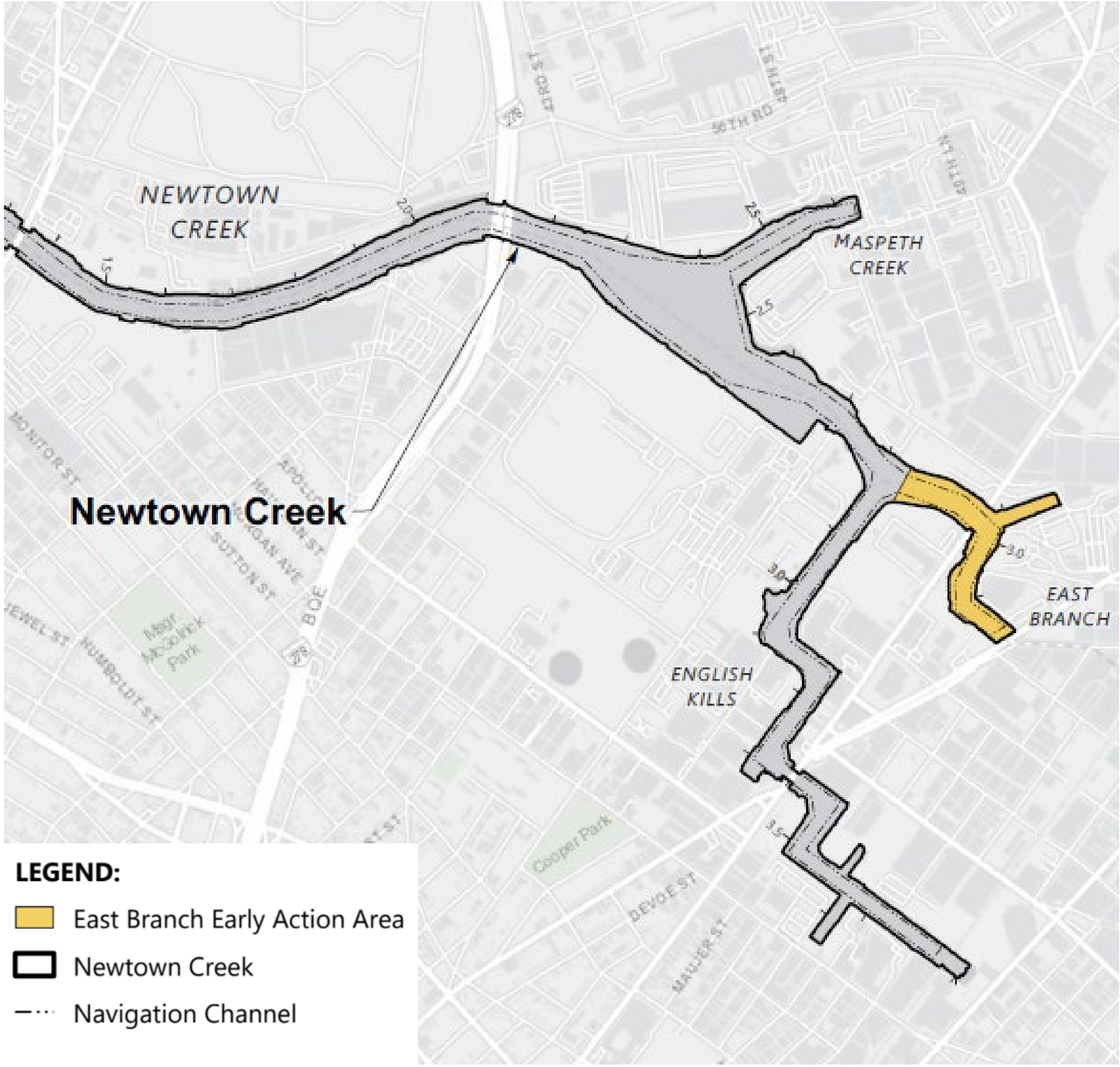


Figure 2 – East Brach Tributary

Figure 3 – Existing Shoreline Conditions East Branch

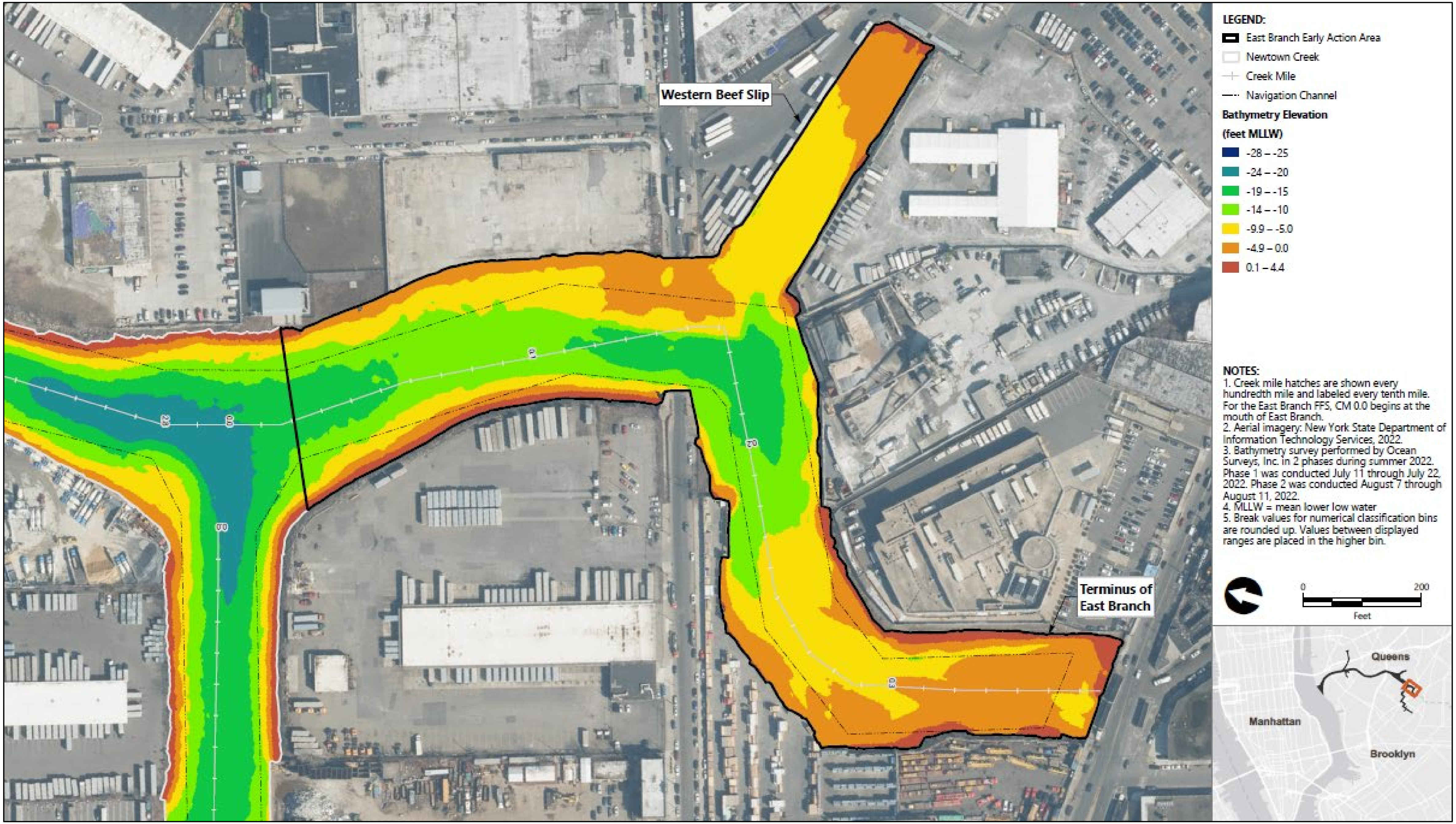


Figure 4 – East Branch Bathymetry

Figure 5 – Point Source Discharge Locations to East Branch

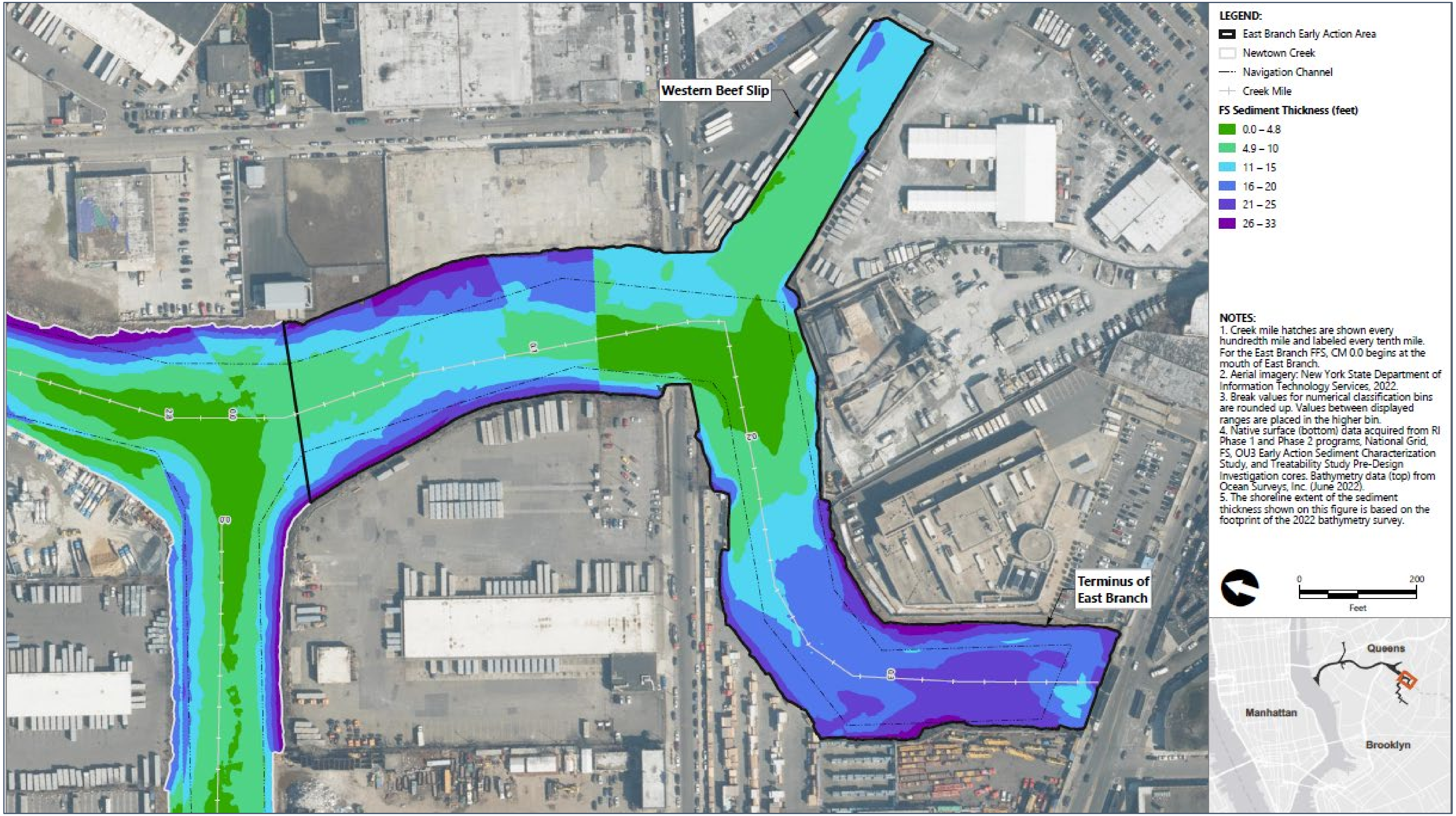


Figure 6 – Sediment Thickness in East Branch

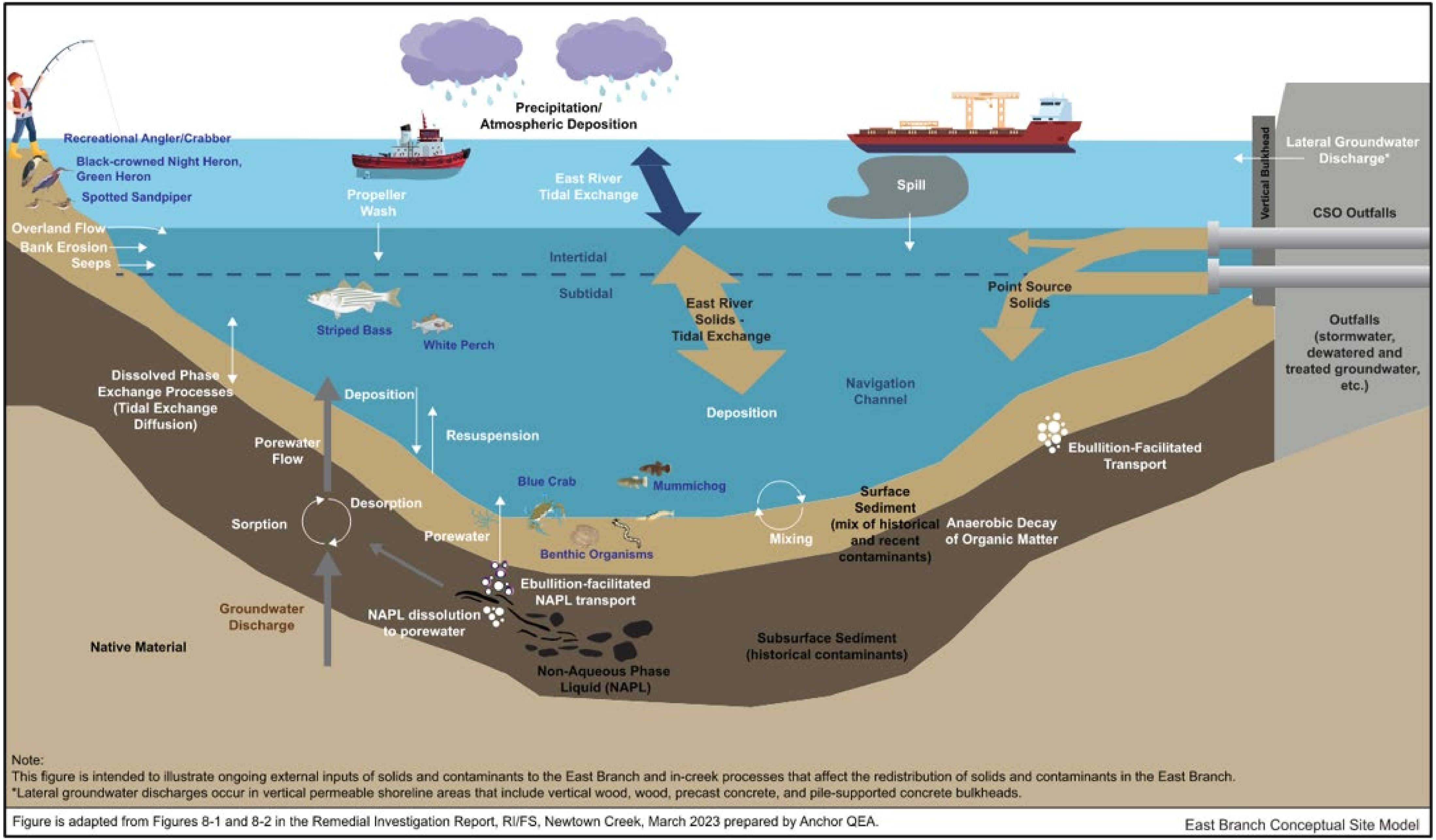
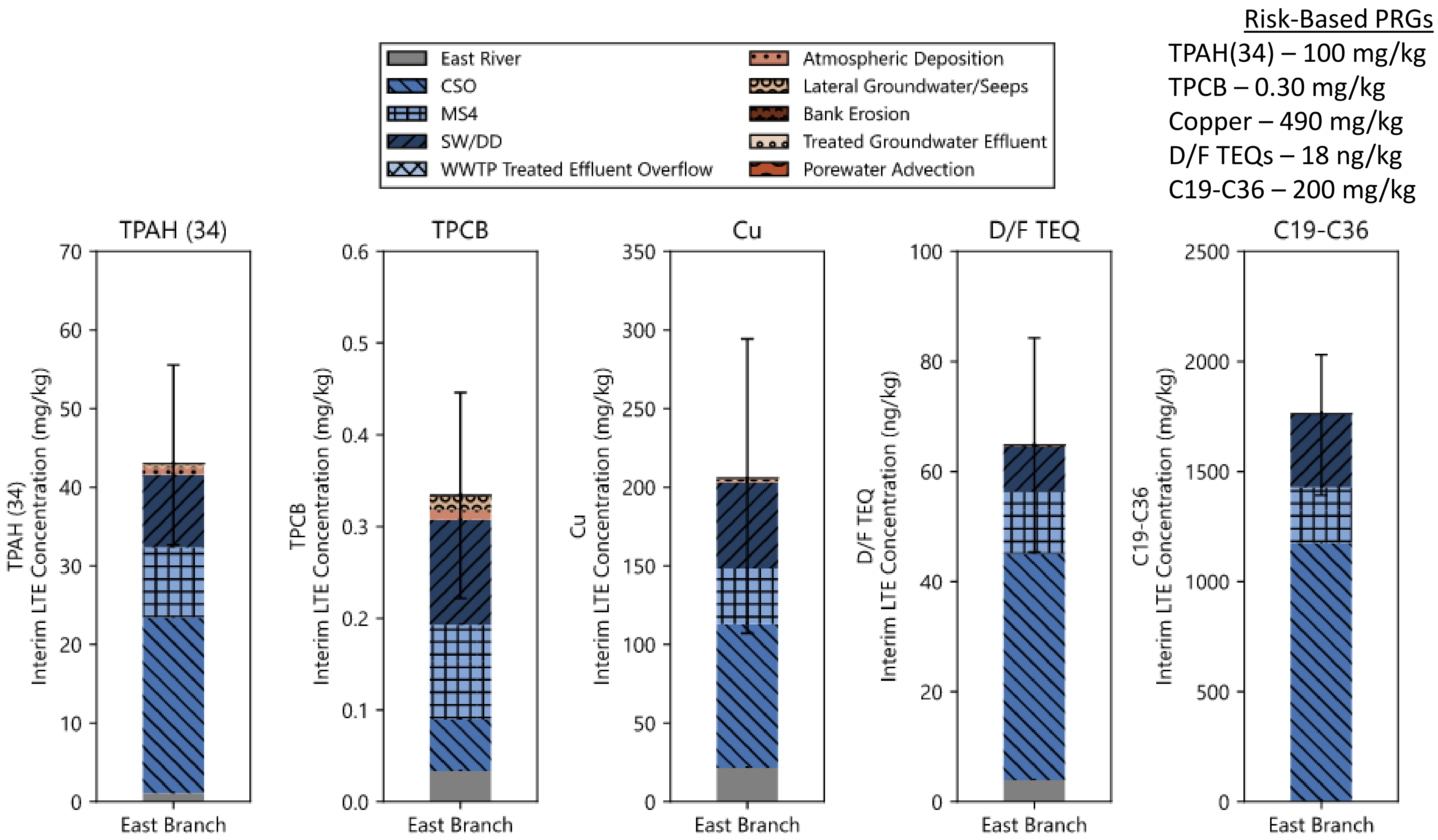


Figure 7 – Conceptual Site Model for East Branch



Notes: The range on each bar indicates the calculated long-term equilibrium concentrations with upper- and lower-bound ranges, while the bar itself shows the base case scenario.
WWTP treated effluent overflow and treated groundwater effluent are sources that originate outside of East Branch. Their contribution to long-term equilibrium in East Branch is a result of tidal transport.
CSO: combined sewer overflow; MS4: municipal separate storm sewer system; SW/DD: stormwater and direct drainage; WWTP: wastewater treatment plant
TPAH (34): total polycyclic aromatic hydrocarbon (34); TPCB: total polychlorinated biphenyl; Cu: copper; D/F TEQ: total dioxin/furan toxic equivalence quotient (mammal); C19-C36: C19-C36 aliphatics

Figure 8 – Preliminary Estimates of Contribution of External Inputs for East Branch*

*Note: this figure will be updated based on data collected during the Preliminary Design Investigation

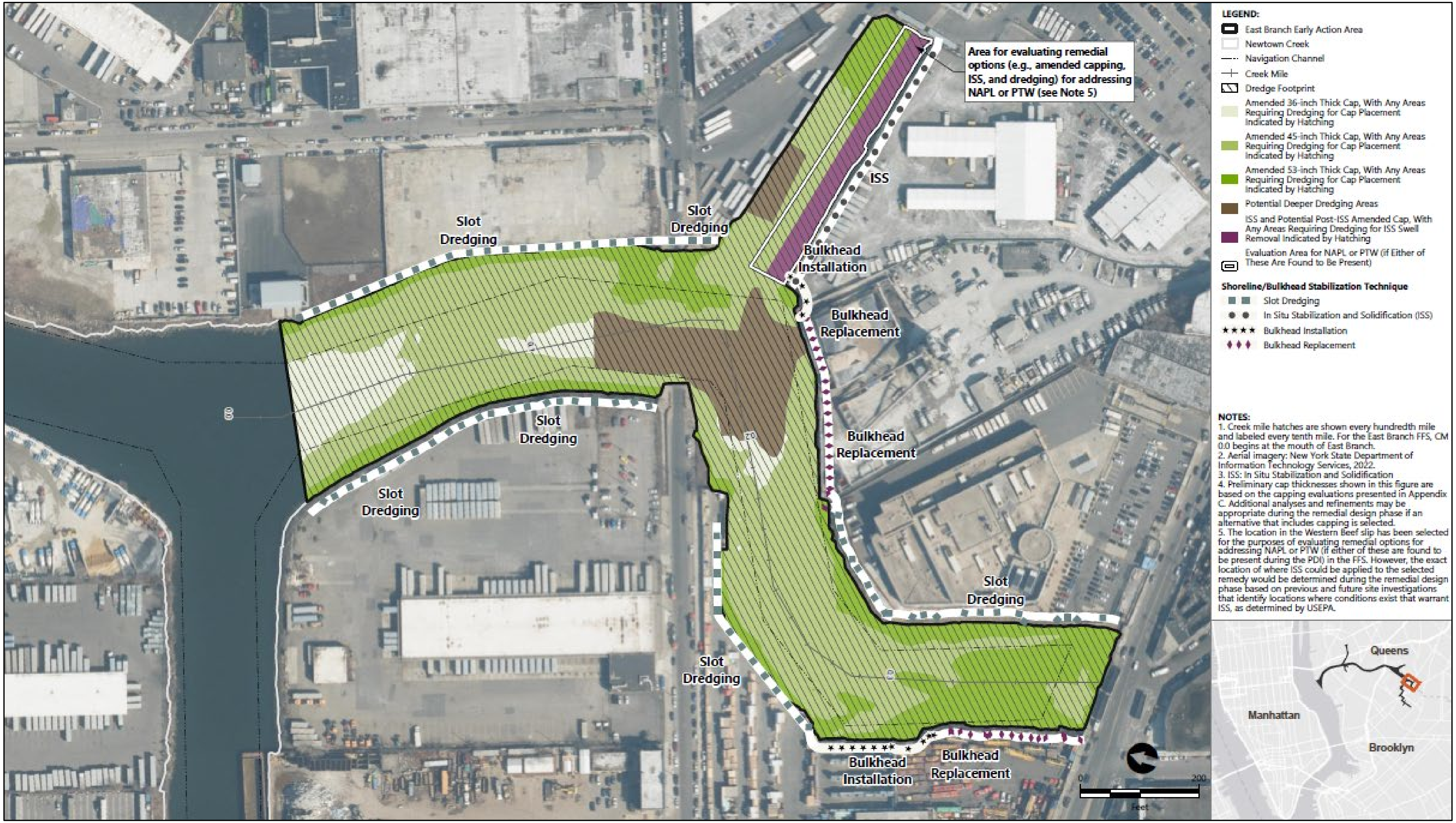


Figure 9 – Alternative EB-D

Table 1 – Newtown Creek Contaminants of Concern (COCs) and Risk-Based Preliminary Remediation Goals (PRGs)

Contaminants of Concern	Risk-Based PRG	Most Sensitive Receptor and Exposure Pathway
TPCBs[1]	0.30 mg/kg	Humans via crab consumption
Dioxins/Furans TEQ[1]	18 ng/kg	Humans via crab consumption
Copper[2]	490 mg/kg	Mummichog via dietary intake
Lead[1]	340 mg/kg	Spotted sandpiper via dietary intake[3]
TPAH(34)[2]	100 mg/kg	Benthic macroinvertebrates via sediment toxicity
C19-C36 Aliphatic Hydrocarbons[2]	200 mg/kg	Benthic macroinvertebrates via sediment toxicity

Notes:
TPCBs – total polychlorinated biphenyls
TEQ – toxic equivalence quotient
mg/kg – milligrams per kilogram
ng/kg – nanograms per kilogram

1. Evaluated on SWAC basis
2. Evaluated on point-by-point basis (not to exceed)
3. Occurs in intertidal mud flats