

June 30, 2023

Project Portal Cover Page

To:	USEPA
Cc:	NCG
From:	David Haury, Anchor QEA, LLC
Re:	East Branch Early Action Supplemental CSTAG Submittal Document

Caroline – The NCG has prepared the attached supplemental submittal document in support of CSTAG’s review of the proposed East Branch Early Action. We are also looking forward to making a presentation to USEPA Region 2, CSTAG, and other stakeholders on July 12, 2023.

DRAFT



June 2023
Newtown Creek Remedial Investigation/Feasibility Study



East Branch Early Action CSTAG Submittal

Prepared for the Newtown Creek Group

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ABBREVIATIONS

Background Memorandum	<i>Consideration of Background and Reference Area Information for the Study Area at the Newtown Creek Superfund Site</i>
C19-C36	C19-C36 aliphatic hydrocarbons
CAG	Community Advisory Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFT	chemical fate and transport
CM	creek mile
COC	contaminant of concern
CSM	conceptual site model
CSO	combined sewer overflow
CSTAG	Contaminated Sediments Technical Advisory Group
Cu	copper
D/F TEQ	total dioxin/furan toxic equivalence quotient (mammal)
EA	Early Action
FFS	Focused Feasibility Study
Framework Memorandum	<i>Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach</i>
FS	Feasibility Study
ISS	in situ stabilization/solidification
LiDAR	Light Detection and Ranging
LTCP	Long-Term Control Plan
LTE	long-term equilibrium
LTE Report	<i>Interim Estimates of Post-Remedy Surface Sediment Concentrations</i>
mg/kg	milligram per kilogram
MLLW	mean lower low water
MS4	municipal separate storm sewer system
NAPL	nonaqueous phase liquid
NCG	Newtown Creek Group
NCP	National Contingency Plan
ng/kg	nanogram per kilogram
NYCDEP	New York City Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
OU	operable unit
Overview Memorandum	<i>East Branch Early Action Overview</i>
Pb	lead

PMP	post-remedy monitoring plan
PRG	preliminary remediation goal
RAL	remedial action level
RAO	remedial action objective
RG	remediation goal
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
Site	Newtown Creek Superfund Site
SWAC	surface-weighted average concentration
TBD	to be decided
TPAH (34)	total polycyclic aromatic hydrocarbon (34)
TCB	total polychlorinated biphenyl
USEPA	U.S. Environmental Protection Agency
WWTP	wastewater treatment plant

1 Introduction

The Newtown Creek Group (NCG) appreciates the opportunity to participate in the Contaminated Sediments Technical Advisory Group's (CSTAG's) review of a proposed Early Action (EA) in East Branch of the Newtown Creek Superfund Site (the Site). The NCG is completing a draft East Branch EA Focused Feasibility Study (FFS) scheduled to be submitted to the U.S. Environmental Protection Agency (USEPA) at the end of July 2023, which will evaluate a number of proposed remedial alternatives in East Branch.

In late 2021, USEPA Region 2 asked the NCG to consider implementing an EA in a portion of the upper part of the Newtown Creek Study Area. USEPA Region 2 indicated that it had briefed CSTAG on the idea of an EA in this portion of the Study Area and had received a favorable response. The NCG worked with USEPA Region 2 to identify a suitable location for an EA. East Branch was selected because the conditions in East Branch include all the major components of the conceptual site model (CSM) for the Study Area, making it an ideal location for evaluating remedial options and remedy effectiveness for the rest of the creek. As summarized in USEPA Region 2's *East Branch Early Action Overview* memorandum (Overview Memorandum; USEPA 2023a), an EA is consistent with an adaptive management approach to contaminated sediment sites and would provide the following benefits:

- Expedite the overall site response
- Immediately reduce risks to human health and the environment within the East Branch EA area and within the Newtown Creek Study Area as a whole
- Provide an opportunity to gain direct remedial experience in the creek and inform future efforts
- Use post-EA monitoring data to inform future remedial efforts in other parts of the Study Area, update the Study Area CSM, and better understand the impacts of ongoing sources to the East Branch EA area

This submittal serves as a preview of the East Branch EA FFS and outlines the following points:

- The Newtown Creek Remedial Investigation (RI) process has been finalized. USEPA Region 2 approved the *Remedial Investigation Report* (Anchor QEA 2023a) in April 2023. The RI process has resulted in a comprehensive understanding of the nature and extent of contamination in the creek, ongoing sources, fate and transport processes, and risk to human health and the environment. All of this work has been completed in East Branch and throughout the rest of the Study Area.¹ As a result, there is a comprehensive dataset as well as other information available to design and implement a successful and sustainable EA in East Branch.
- An EA in East Branch is consistent with USEPA's principles for managing contaminated sediment site risks (USEPA 2002, 2005, 2017a), CSTAG's 2015 recommendations for the Newtown Creek Study Area (CSTAG 2015), Superfund Task Force recommendations

¹ The defined Study Area of the Site includes the main channel of Newtown Creek and its five tributaries (Whale Creek, Dutch Kills, East Branch, English Kills, and Maspeth Creek).

(USEPA 2017b), USEPA Region 2's *Consideration of Background and Reference Area Information for the Study Area at the Newtown Creek Superfund Site* memorandum (Background Memorandum; USEPA 2019), and USEPA's guidance on adaptive management approaches at contaminated sediment Superfund sites (USEPA 2022).

- USEPA Region 2's draft final memorandum, *Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach* (Framework Memorandum; USEPA 2023b) is currently being revised. When finalized, the EA in East Branch will also be consistent with this framework.
- The NCG is committed to working with USEPA Region 2 to implement a post-EA monitoring program to evaluate remedy performance and effectiveness, as well as the influence of ongoing external inputs on long-term equilibrium (LTE) surface sediment contaminant of concern (COC) concentrations that represent background conditions in the creek. It is important to understand the effects of ongoing external inputs to the system and understand changes in these inputs, as evidenced by the required actions on combined sewer overflow (CSO) and other stormwater outfalls as part of OU2² and future CSO control work in East Branch as part of the Long-Term Control Plan (LTCP) for Newtown Creek. Most importantly, the monitoring program must be designed to differentiate remedy performance from background.

An EA in East Branch will accelerate cleanup on this reach of the creek by up to 10 years or more compared to the OU1 remedy. In addition, the NCG is confident that the EA for East Branch will be a final remedy, will not require any additional active remediation in the future, and will demonstrate and evaluate the ability of dredge-and-cap technologies to reduce risks to human health and the environment in the long term. It will also control CSM-related issues, such as nonaqueous phase liquid (NAPL), ebullition, and groundwater discharge, and consider the sustainability of a remedial action, given the influence of ongoing sources to East Branch on surface sediment COC concentrations. There will be challenges as well, such as the following: 1) coordinating remedial activities in East Branch within approximately the same time frame as the planned replacement of the Grand Street bridge; and 2) confirming that there are not any potentially important but yet uncharacterized sources of COCs to East Branch that will need to be considered during remedial design.

The draft East Branch EA FFS is the product of 20 months of collaboration between the NCG and USEPA. This East Branch EA FFS process is far enough along that we believe it is both feasible and prudent to accelerate the remediation of East Branch. As summarized in this submittal and described in detail in the forthcoming East Branch EA FFS and NCG's upcoming presentation at the July 12, 2023, meeting, the NCG believes that a successful EA, incorporating limited dredging followed by capping throughout East Branch, can be designed and implemented within East Branch in an expedited manner that would meet the Comprehensive Environmental Response, Compensation, and Liability

² Operable unit (OU) 2 refers to the current and future discharge of OU1 COCs from CSOs to the Study Area.

Act (CERCLA) criteria for evaluating remedial alternatives; further the principles enumerated in CSTAG's most recent charter; and make sense for Newtown Creek and its stakeholders.

2 Overview

East Branch Overview and Data Summary

The East Branch tributary of Newtown Creek is located in Kings County and Queens County, New York City, New York. Newtown Creek is a tidally influenced tributary to the Lower East River and forms a partial border between the boroughs of Queens and Brooklyn. The defined Newtown Creek Study Area includes the main channel of Newtown Creek and its five tributaries, including East Branch, as described in a 2011 Administrative Order on Consent between USEPA, NCG, and the New York City Department of Environmental Protection (NYCDEP) (CERCLA Docket No. CERCLA-02-2011-2011). The main channel of Newtown Creek begins at the confluence with the East River and extends inland approximately 3.8 miles to the head of English Kills, with the mouth of East Branch starting at creek mile (CM) 2.8. The downstream extent of East Branch begins just upstream of the Turning Basin and continues for approximately 0.16 mile before branching into two lobes. The western lobe, designated the East Branch terminus, extends up to the CSOs located near Metropolitan Avenue, and the eastern lobe, designated as the Western Beef Slip (see Figure 2-1). USEPA has designated the entire Study Area as Operable Unit 1 (OU1).

The Remedial Investigation/Feasibility Study (RI/FS) has included several phases of field investigations and associated evaluations, including the site history; current uses and creek configuration; completion of baseline human health and ecological risk assessments; a comprehensive sampling of sources; and information derived from modeling of hydrodynamics, sediment transport, as well as chemical fate and transport (CFT) conducted to date. The East Branch EA FFS will evaluate remedial alternatives to address areas of East Branch where concentrations of COCs in sediments exceed cleanup criteria set forth for the Newtown Creek Study Area.

As summarized in Table 2-1, more than 550 samples and more than 110,000 individual analytical measurements from more than 150 locations were collected within East Branch during the RI and Feasibility Study (FS). This effort included data and evaluations specifically recommended by CSTAG in 2015 (CSTAG 2015), including evaluation of point sources, groundwater, erosional shorelines, NAPL, ebullition, and fish and shellfish tissue data. The comprehensive dataset generated by the NCG's data collection efforts, under oversight from USEPA Region 2, has led to a detailed understanding of site conditions for this complex system that is heavily influenced by the dynamics of a unique industrial, urban environment with contributions of contaminants and stressors from various sources.

Table 2-1
Comprehensive Data Collected by the NCG to Evaluate the East Branch CSM and Potential Significance of Sources Under Oversight by USEPA

Program	Data Type Collected
Physical Surveys and Studies	Hydrographic surveys, currents, surface water elevations, shoreline surveys, LiDAR and high-resolution aerial imagery, thermal infrared imagery, Sedflume (erosion potential), groundwater seepage measurements, field ebullition survey
Sediment Sampling and Studies	Surface sediment (0–6 inches); subsurface sediment; native material; NAPL extent and mobility; in-creek sediment traps; geochronology; geotechnical; waste characterization
Water Sampling	General chemistry, water quality
Porewater Sampling	Surface sediment general chemistry and quality, subsurface sediment (mid-point) general chemistry and quality
Groundwater Sampling	General chemistry and quality in native deposits
Point Source Sampling	General chemistry and quality of stormwater discharges, combined sewer outfalls, Newtown Creek WWTP overflow, effluent from groundwater remediation and dewatering systems, Newtown Creek WWTP influent
Ecological Studies	Habitat surveys, wildlife surveys, caged bivalve sampling, benthic toxicity testing, community surveys and bioaccumulation testing, and fish and crab surveys and sampling
Air Quality Sampling	Ambient air sampling within and outside the Study Area
Gas Ebullition	Surveys of bubbles and sheen blossoms, pilot study and FS program for quantitative gas and NAPL/contaminant measurements using equipment custom designed for the Newtown Creek project

East Branch Conceptual Site Model

According to USEPA contaminated sediment guidance (USEPA 2005) and New York State Department of Environmental Conservation (NYSDEC) contaminated site investigation and remediation guidance (NYSDEC 2010), a CSM generally represents the environmental system and the physical, chemical, and biological processes that determine the transport of contaminants from sources to receptors. The East Branch CSM (Figure 2-2) provides the current understanding of processes affecting East Branch and forms the foundation for the development and evaluation of remedial alternatives presented in Section 5 of the draft East Branch EA FFS. Although the NCG has used the comprehensive RI/FS dataset to develop a detailed and scientifically sound CSM for the East Branch, it may be updated periodically throughout the East Branch EA FFS and OU1 RI/FS process as new information becomes available.

The land use history and urban landscape in which East Branch exists also shapes the CSM and informs the nature and extent of contamination and potentially significant sources, exposure

pathways, and receptors. The elements of the East Branch CSM that are most important in the development and selection of remedial alternatives are as follows:

- Environmental setting considerations
 - The surface area is 11.2 acres.
 - The average soft sediment thickness is 13 feet.
 - There is a federally authorized navigation channel in most of the reach, though current ship and barge traffic is very limited. As a result, the U.S. Army Corps of Engineers has determined that the channel can be deauthorized.
 - There are two CSO discharges at the head of East Branch, two municipal separate storm sewer system (MS4) outfalls, and approximately 35 stormwater outfalls within East Branch. The largest CSO (NCB-083) is a Tier 1 CSO (the largest CSO classification tier in New York City) and currently discharges approximately 490 million gallons per year of untreated combined sewer effluent.
 - An aeration piping system is present on the sediment bed.
 - Approximately one-half of the shoreline structures along the East Branch shoreline are in fair to good condition.
 - The Grand Street Bridge crosses the middle of East Branch and is scheduled to be replaced. Current timing of the bridge replacement is not known with certainty, but bridge replacement activities may overlap with remedial activities in East Branch.
 - There is potential for habitat restoration.
- Nature and extent of contamination
 - COCs were detected throughout the surface and subsurface sediment. Risk-based preliminary remediation goals (PRGs) are applied to surface sediments where exposure occurs.
 - COC concentrations in the sediment generally increase with depth.
 - COCs were detected in native material, and concentrations were generally at least an order of magnitude lower than COC concentrations in the sediment.
 - COCs were detected in other media: surface water, porewater, and groundwater.
 - Sheens were observed intermittently throughout East Branch in surface and subsurface sediment and at one location in native material. NAPL blebs were occasionally observed in subsurface sediment but not in surface sediment or native material.
 - NAPL was immobile at all locations tested.
- Contaminant sources, fate, and transport
 - Depositing solids originate primarily from CSO and stormwater outfalls, with some influence from solids that originated in the East River. Solids loadings from CSOs and stormwater outfalls are the dominant sources of solids to East Branch compared to the East River, and loadings from these sources will continue in the future, particularly for

CSOs because reductions in discharge volumes under the LTCP will not be realized until after 2040.

- East Branch is net depositional.
- Ongoing external inputs could result in recontamination above risk-based remediation goals (RGs) for certain COCs.
- Groundwater seepage rates into the creek range from 0.30 to 1.0 centimeter per day.
- There is relatively small contribution to COC loads from sources other than point sources, tidal exchange, and groundwater (e.g., ebullition and atmospheric deposition).

3 Summary of Remedial Alternatives for East Branch

Remedial Action Objectives

Remedial action objectives (RAOs) provide a general description of what a cleanup is expected to accomplish and help focus remedial alternatives development and evaluation (USEPA 2005).

USEPA-proposed RAOs for the East Branch EA are included in the Overview Memorandum, as follows:

- **“RAO 1: Exposure-Based RAOs**
 - *Reduce human exposure to fish and crab ingestion risks above protective levels by reducing the concentrations of COCs in contaminated surface sediment in the East Branch to protective PRGs/RGs*
 - *Reduce ecological exposure to site COCs in contaminated surface sediment in the East Branch to protective PRGs/RGs*
- **RAO 2: Source Control RAOs**
 - *Reduce migration of site-related NAPL and other sources within the East Branch portion of the Study Area to surface sediment and surface water to levels that are protective for human health and ecological exposure”*
(USEPA 2023a)

Preliminary Remediation Goals

Development of RGs for a site should include consideration of ecological and human health risks from site-related contamination, as well as site-specific background conditions (i.e., ongoing external inputs) that will not be controlled by the remedy. For purposes of evaluating the effectiveness of remedial alternatives in reducing risks to human health and the environment for the OU1 FS, USEPA developed risk-based PRGs (Anchor QEA 2021a). These risk-based PRGs are also applicable to East Branch, as discussed in the Overview Memorandum (USEPA 2023a). PRGs will eventually be developed into final, contaminant-specific RGs (either risk-based or background-based) as part of the Record of Decision, both for OU1 and the EA.

The NCP and USEPA guidance require consideration of overall protection of human health and the environment, technical practicability, and the potential for recontamination in remedy selection, and USEPA guidance states that the RAOs and cleanup levels need to be achievable (40 Code of Federal Regulations [CFR] 300.430[f][1][i][B]) (USEPA 2002, 2005). In this context, background conditions are an important consideration because *“the CERCLA program, generally, does not clean up to concentrations below natural or anthropogenic background levels”* (USEPA 2002).

Risk-Based PRGs for East Branch

As discussed in the Overview Memorandum (USEPA 2023a), risk-based PRGs were developed based on the results of the human health and ecological risk assessments. The risk-based PRGs for the COCs identified in the risk assessments are summarized in Table 3-1. The risk-based PRGs are sediment-based because reducing surface sediment COC concentrations would reduce risks to ecological receptors that come into contact with contaminated surface sediments and would reduce risks to human and ecological receptors that consume contaminated fish and crab tissue by reducing the degree to which sediment-based bioaccumulative COCs enter the food chain and accumulate in upper trophic level receptors.

PRGs for the site are evaluated either on a surface-weighted average concentration (SWAC) basis or a point-by-point basis depending upon the nature of exposure.

Table 3-1
Summary of Risk-Based PRGs

COC	Risk-Based PRG	Applicable Spatial Scale	Basis
TPCB	0.3 mg/kg	Study Area-wide SWAC	Human health risk: crab consumption
D/F TEQ	18 ng/kg	Study Area-wide SWAC	Human health risk: crab consumption
Cu	490 mg/kg	Not to exceed	Ecological risk: dietary intake for mummichog
TPAH (34)	100 mg/kg	Not to exceed	Ecological risk: benthic invertebrate toxicity
C19-C36	200 mg/kg	Not to exceed	Ecological risk: benthic invertebrate toxicity
Pb	340 mg/kg	SWAC in Study Area intertidal areas only	Ecological risk: dietary intake for spotted sandpiper

Site-Specific Background Considerations for East Branch

The Framework Memorandum (USEPA 2023b) states, *“There are many external ongoing sources of contamination to the Creek, including MS4s, WWTP effluent, permitted and non-permitted discharges, overland flow, groundwater, seeps and the East River that may be outside the scope of OU1 of the site.”* Therefore, consistent with the NCP and USEPA guidance, in cases where risk-based PRGs may not be achievable due to the influence of site-specific background conditions, appropriate background concentrations should be determined for use in the remedial decision-making process. USEPA (2023b) goes on to state the following:

"There are many ongoing sources to the Creek that are not part of the Study Area and some of these may impact the protectiveness of the remedy. EPA will continue to work with the State of New York to identify and address any such ongoing sources [...] As part of an adaptive management approach, identification of upland sources that may affect the protectiveness of the remedy may occur at multiple stages, including during remedy implementation or during post-remedy operation, maintenance and monitoring."

To provide an initial evaluation of the contribution of these ongoing external inputs of COCs to the Study Area and to estimate the expected LTE COC concentrations in surface sediments post-remedy due to these ongoing external inputs, a spreadsheet model was developed by the NCG (see *Interim Estimates of Post-Remedy Surface Sediment Concentrations* [LTE Report; Anchor QEA 2021b]). Predictions from that model are made on a reach-specific basis and include a base value established using central tendency metrics (e.g., arithmetic average) for COC concentrations or loads associated with each source type, along with upper- and lower-bound values to characterize an uncertainty range. USEPA has adopted the LTE modeling framework and is modifying it to conduct probabilistic simulations to develop updated ranges of LTE values concurrent with other revisions to the LTE model being made to address USEPA comments on the LTE Report. For the purposes of this East Branch EA FFS, the ranges from the LTE Report (i.e., based on upper- and lower-bound values) are being used to represent East Branch LTE values. It is recognized that these ranges will be refined in the future based on updated probabilistic modeling performed by USEPA, other revisions to the model framework and by incorporating new data on COC concentrations or loads from the East River, lateral groundwater discharge, and outfalls sampled as part of OU2 sampling programs.

The preliminary estimates of LTE concentrations for East Branch and the Study Area are presented in Table 3-2. The LTE model predictions are based on the assumption of post-remedy conditions in the entire Newtown Creek Study Area. As such, the LTE ranges may be slightly higher for an EA in East Branch because other reaches of Newtown Creek that have not been remediated may result in some additional loading of COCs to East Branch.

For purposes of this East Branch EA FFS, the NCG believes these values define site-specific background surface sediment COC concentrations in East Branch. As discussed in the Framework Memorandum (USEPA 2023b), these LTE estimates are preliminarily defined as the initial interim performance measures for East Branch, although this terminology may change as the Framework Memorandum is finalized by USEPA. These initial LTE values are compared to the risk-based PRGs to evaluate whether the risk-based PRGs are expected to be met for the long term regardless of the remedy selected.

Table 3-2
Estimated LTE Concentrations in East Branch Relative to Risk-Based PRGs

COC	Risk-Based PRG	Estimated LTE Range^{1,2}
TPCB	0.3 mg/kg (Study Area-wide SWAC)	East Branch LTE range: 0.30–0.64 mg/kg Study Area-wide SWAC: 0.21–0.54 mg/kg
D/F TEQ ³	18 ng/kg (Study Area-wide SWAC)	East Branch LTE range: 52–98 ng/kg Study Area-wide SWAC: 30–71 ng/kg
Cu	490 mg/kg (not to exceed)	East Branch LTE range: 140–330 mg/kg
TPAH (34)	100 mg/kg (not to exceed)	East Branch LTE Range: 38–61 mg/kg
C19-C36 ³	200 mg/kg (not to exceed)	East Branch LTE range: 1,700–2,600 mg/kg
Pb ⁴	340 mg/kg (Study Area-wide SWAC in intertidal areas only)	The LTE spreadsheet model was not developed for Pb due to the limited spatial extent of the intertidal areas.

Notes:

LTE values are **bolded** for COCs for which the risk-based PRG may not be met in the long term due to ongoing external inputs.

1. LTE values are presented as a range based on the upper- and lower-bound uncertainty values for the LTE concentration (Anchor QEA 2021b). Preliminary estimates of LTE concentrations were developed on a reach-average basis and were not developed to be able to make predictions on an individual point-by-point basis. The range of reach-average LTE estimates in East Branch is provided for each COC. For the risk-based PRGs that are evaluated on a Study Area-wide SWAC basis, the LTE values expressed as a Study Area-wide SWAC are also provided.
2. USEPA is using the LTE model framework to develop updated LTE ranges using a probabilistic approach. In general, the LTE values presented in this table, which are based on the LTE Report (Anchor QEA 2021b), are similar to preliminary LTE ranges predicted by USEPA's probabilistic analysis (e.g., consistent with values from frequency distributions that correspond to percentiles such as the 10th to 90th percentile).
3. It should be noted that LTE estimates for D/F TEQ and C19-C36 are more uncertain due to data limitations. There are sampling programs that are being designed that will help address these limitations—specifically, CSO, shallow lateral groundwater, East River particulate matter, and CM 0–2 surface sediment sampling.
4. Ecological receptor exposure to Pb is limited to incidental ingestion of intertidal sediment by spotted sandpipers (Anchor QEA 2018). The LTE evaluation was performed at the scale of an entire reach and, as such, is unable to be used to perform calculations at the smaller scale of an intertidal zone; therefore, Pb will not be included in LTE evaluations.

USEPA expects the loadings from these ongoing external sources to decrease over time due to *“improved BMPs in general, ongoing cleanup actions and additional regulatory control”* (USEPA 2023b). Given this, USEPA lays out an approach in which the long-term PRGs are equal to the risk-based PRGs, and *“interim performance measures”* would be developed for remedy selection and design. Per USEPA (2023b), *“interim performance measures”* are to be developed using empirical data as well as the LTE and CFT models.

The NCG and NYCDEP believe that *“interim performance measures”* is a misnomer, because it incorrectly implies that it can be used to evaluate remedy effectiveness. It runs the risk of confusing remedy performance with the issue of ongoing inputs to the creek (i.e., background). As set forth in the Framework Memorandum (USEPA 2023b), interim performance measures are a measure of the

effect of ongoing inputs on future sediment contaminant levels in the creek (commonly understood, and generally understood in EPA guidance, as “background”). Although USEPA guidance makes clear that “background” should be taken into account in setting action levels and cleanup goals, the impacts of ongoing releases of CERCLA contaminants into the creek are not directly relevant to the evaluation of remedy effectiveness but more to the sustainability of the remedy. Instead, post-remedy monitoring of remedy effectiveness will focus on evaluating whether historical contamination in the sediments below the remedial cap is not breaching the remedial cap and contributing to the contamination accumulating in the sediments settling onto the cap. An effective and protective remedy will be implemented in East Branch that will create a clean sediment surface and prevent any migration of COCs from contaminated sediment that remains below the cap. The challenge in East Branch (and the rest of the creek) is not in reaching risk-based levels of COCs in surface sediments immediately post-remedy but in sustaining these levels in the face of ongoing external inputs of COCs to the surface sediments post-remedy over the longer term.

Overall, comparison of the preliminary estimates of LTE concentrations with the risk-based PRGs indicates that some risk-based PRGs (specifically dioxin/furan toxic equivalence quotient [mammal] [D/F TEQ] and C19-C36 aliphatic hydrocarbons [C19-C36] and possibly total polychlorinated biphenyl [TPCB]) may not be met in surface sediments in the long term, regardless of the remedy selected, due to ongoing external inputs to the Study Area from sources such as CSOs, MS4s, and the East River. Long-term monitoring would be performed after remedy implementation, which would help determine if additional source control measures for ongoing external inputs are needed in order to meet the risk-based PRG.

Areas to Be Considered for Remediation

To evaluate remedial alternatives, remedial action levels (RALs) were developed that define or delineate areas to be targeted for remediation, such that if all exceedances of RALs for an individual COC are remediated, the risk-based PRG for that COC would be met at time zero at the relevant spatial scale (see Table 3-3). The RALs can be considered a not-to-exceed sediment COC concentration for a given sample point. Each RAL was developed on an individual COC basis. For risk-based PRGs that are expressed on a not-to-exceed basis (i.e., copper [Cu], total polycyclic aromatic hydrocarbon [34] [TPAH (34)], and C19-C36), by definition, the RAL to meet the risk-based PRG at time zero is equal to that risk-based PRG. For risk-based PRGs that are SWAC-based (i.e., TPCB, D/F TEQ, and lead [Pb]), the RAL is a higher concentration than the risk-based PRG, such that remediation of all concentrations above the RAL would result in a SWAC over the entire Study Area equal to the risk-based PRG at time zero. The expected RALs for TPCB, D/F TEQ, and Pb to meet their respective risk-based PRG on a Study Area-wide basis are presented in Table 3-3. These RALs are consistent with those presented in the OU1 *Alternatives Memorandum* (Anchor QEA 2022a).

**Table 3-3
Summary of Risk-Based PRGs and RALs**

COC	Risk-Based PRG	RAL to Meet Risk-Based PRG at Time Zero
TPCB	0.3 mg/kg (Study Area-wide SWAC)	1.2 mg/kg
D/F TEQ	18 ng/kg (Study Area-wide SWAC)	86 ng/kg
Cu	490 mg/kg (not to exceed)	490 mg/kg
TPAH (34)	100 mg/kg (not to exceed)	100 mg/kg
C19-C36	200 mg/kg (not to exceed)	200 mg/kg
Pb	340 mg/kg (SWAC in intertidal areas only)	950 mg/kg (in intertidal areas only)

The surface sediment COC concentrations were used as the metric to delineate the lateral extent of remediation in East Branch. This analysis indicates that almost the entire spatial extent of surface sediment exceeds the risk-based PRGs for one or more of these COCs and often by more than tenfold. The areas with no risk-based PRG or expected RAL exceedances of any of these COCs in East Branch are relatively small and isolated. Therefore, due to constructability reasons, these areas would be remediated in the active remediation alternatives. Sediment-based remediation of the areas exceeding the not-to-exceed risk-based PRGs would also contribute to the reduction of concentrations of those COCs with PRGs evaluated on a Study Area-wide SWAC basis.

Remedial Alternatives for East Branch Early Action

Consistent with USEPA's guidance on conducting an RI/FS (USEPA 1988), a range of remedial alternatives was developed by combining retained General Response Actions, technologies, and process options into alternatives that would address unacceptable risk in East Branch.

The following five active alternatives were developed, along with a no action alternative for a total of six:

- **Alternative EB-A:** No Action
- **Alternative EB-B:** Dredge to -3 Feet Mean Lower Low Water (MLLW) to Allow Placement of a 3 Foot-Thick Cap Below 0 Foot MLLW
- **Alternative EB-C:** Dredge 3 Feet and Place 3-Foot-Thick Cap
- **Alternative EB-D:** Dredge 3 Feet and Place 3-Foot-Thick Cap with Localized Dredge All

- **Alternative EB-E:** Dredge All Within Navigation Channel, Cap Outside
- **Alternative EB-F:** Dredge All

The term “Dredge All” refers to removal of all soft sediment. The area where surface sediment concentrations exceed risk-based PRGs for one or more COCs covers nearly the entire surface area of sediment in East Branch; therefore, for constructability reasons, the entire spatial extent of East Branch would be addressed by the active remedial alternatives. This means that the footprints associated with Alternatives EB-B, EB-C, EB-D, EB-E, and EB-F are identical, covering approximately 11 acres (see Figures 3-1 through 3-6). A summary of each remedial alternative is included in Table 3-4 and summarized in the following subsections.

Table 3-4
Summary of Remedial Alternatives

Alternative	Description	Quantities				
		Dredge Volume ¹ (cubic yards)	Dredge and Backfill Area (acres)	Cap-Only Area (acres)	Dredge and Amended Cap Area (acres)	ISS Area ² (acres)
EB-A	No Action	0	0	0	0	0
EB-B	Dredge to -3 Feet MLLW to allow placement of a 3-Foot-Thick Cap Below 0 Foot MLLW	31,000	0	8.5	2.7	0.8
EB-C	Dredge 3 Feet and Place 3-Foot-Thick Cap	92,200	0	0	11.2	0.4
EB-D	Dredge 3 Feet and Place 3-Foot-Thick Cap with Localized Dredge All	107,600	1.9	0	9.3	0.4
EB-E	Dredge All Within Navigation Channel, Cap Outside	232,800	3.3	0	7.9	0.7
EB-F	Dredge All	253,500	4.4	0	6.9	0.2

Notes:

1. Dredge volume is for sediment removal only (i.e., does not include debris). Volumes include overdredge allowance and constructability considerations specific to each alternative.
2. ISS area includes dredging and amended capping.

- **Alternative EB-A: No Action:** Under this alternative, no active remediation would be conducted. Additionally, it is assumed that no monitoring would be conducted. Therefore, the existing conditions in East Branch would not change, with the exception of those changes that

result from ongoing natural recovery processes and changes in surface sediment concentrations as they equilibrate with ongoing external inputs over the long term (i.e., LTE).

- **Alternative EB-B: Dredge to -3 Feet MLLW to Allow Placement of a 3 Foot-Thick Cap Below 0 Foot MLLW:** This alternative consists of dredging sediments where necessary to allow for placement of an amended cap to be installed entirely at (or below) an elevation of 0 foot MLLW across the entire footprint of East Branch. For this alternative, there would be more cap material placed than sediment removed via dredging (i.e., dredging would occur in only approximately 25% of East Branch); therefore, this alternative would result in a mudline elevation that is shallower on average than the current mudline.
- **Alternative EB-C: Dredge 3 Feet and Place 3-Foot-Thick Cap:** This alternative consists of dredging sediments prior to the installation of an amended cap across the entire footprint of East Branch. The depth of dredging is the same as the cap thickness, and current mudline elevations would be maintained following remedy implementation to the extent practicable.
- **Alternative EB-D: Dredge 3 Feet and Place 3-Foot-Thick Cap with Localized Dredge All:** This alternative, is the same as Alternative EB-C, (i.e., dredging to allow placement on an amended cap), but in select areas with limited sediment thickness, sediment would be removed down to native material based on the cost-effectiveness of dredging versus capping. A Pre-Design Investigation would be implemented during the remedial design phase to further delineate the native surface elevations, and construction verification methods would be developed to verify that dredging to the native material interface is achieved. Under this alternative, there would be more sediment removed via dredging than cap material placed; therefore, this alternative would result in a mudline elevation that is deeper on average than the current mudline.
- **Alternative EB-E: Dredge All Within Navigation Channel, Cap Outside:** Under this alternative, sediment in the federally authorized navigation channel would be removed down to an elevation necessary to accommodate placement of an amended cap below the current authorized navigation channel depth plus a buffer, or to native material, whichever is shallower. Areas that are dredged to native material would be covered with a clean sand backfill layer to manage post-dredge residuals, or with an amended cap, if necessary, in areas of relatively high groundwater dissolved phase COC concentrations. In the remaining areas of East Branch, a combination of dredging and/or capping with an amended cap would be performed. This alternative would result in a mudline elevation that is deeper than the current mudline.
- **Alternative EB-F: Dredge All:** This alternative consists of dredging down to native material in the entire East Branch footprint, followed by the placement of a clean sand backfill layer to manage post-dredge residuals or an amended cap, if necessary, in areas of relatively high groundwater dissolved phase COC concentrations. This alternative would result in a mudline elevation that is deeper than the current mudline.

4 The East Branch Early Action Is Consistent with the NCP; USEPA Guidance; CSTAG's 2015 Recommendations; and USEPA Region 2's Background Memorandum, Framework Memorandum, and Overview Memorandum

As described in Section 1, the NCG believes the EA in East Branch is consistent with USEPA Region 2's objectives for the EA, as described in the Overview Memorandum (USEPA 2023a) and the Framework Memorandum (USEPA 2023b), while also recognizing that ongoing external inputs to East Branch represent background conditions that must be evaluated as part of post-remedy monitoring, consistent with the two aforementioned documents and USEPA's Background Memorandum (USEPA 2019). The EA in East Branch is also consistent with USEPA guidance: *"The primary goals of an early action are to achieve prompt risk reduction and increase the efficiency of the overall site response"* (USEPA 1992). The USEPA Superfund Task Force also recommends the use of EAs to improve and accelerate the Superfund cleanup process, and USEPA guidance on EAs encourages the consideration of EA as part of the overall site strategy (USEPA 2017b, 2019). An EA within East Branch would be expected to immediately reduce risks to human health and the environment within the East Branch EA area (and within the Newtown Creek Study Area as a whole). An EA is anticipated to expedite the overall site response by implementing a remedial action in a portion of the Study Area sooner than would occur for the full OU1 remedial action. In addition, consistent with USEPA's adaptive management guidance for managing contaminated sediment sites, implementing an EA would provide valuable information to allow a fuller evaluation of the implementability and effectiveness of remedial technologies that could be applicable to the entire Study Area. Lastly, post-construction monitoring data of an EA would provide information to update the Study Area CSM, particularly regarding the future impacts of ongoing sources to the East Branch EA area. The EA remedy evaluation and selection process for East Branch will inform the OU1 site-wide FS, which will include consideration of the holistic set of remedial alternatives for Newtown Creek.

In 2015, CSTAG provided a set of recommendations for the Newtown Creek Study Area, based on information available at that time (CSTAG 2015). These recommendations, in part, included additional data collection and studies that would better inform future management decisions at the Site. These recommendations have been implemented by the NCG, under USEPA oversight, and significant additional work has been completed, as summarized below. The NCG believes that the comprehensive RI/FS process that began in 2011 and continues today has resulted in a well-defined CSM.

Data collection efforts completed since the beginning of 2015, consistent with CSTAG's 2015 recommendations, include the following:

- Additional sediment sampling and studies, including surface sediment, subsurface sediment, native material, NAPL, in-creek sediment traps, and geotechnical and waste characterization

- Surface water sampling within Newtown Creek and the East River
- External ongoing input sampling, including point sources, overland flow, groundwater, and potentially erodible shorelines
- Evaluation of in-creek processes, including NAPL mobility, gas ebullition, and sediment resuspension from propeller wash
- A second round of fish and crab tissue sampling in 2018 to supplement the first round of sampling conducted in 2014

In addition, as described in the following subsections, the NCG believes that an EA in East Branch will meet all of the requirements for remedial actions in the NCP and is consistent with the USEPA Principles (2002, 2005, 2017a), CSTAG's recommendations (2015), and Superfund Task Force recommendations that are particularly important and relevant for an EA in East Branch (USEPA 2017b). Finally, the NCG is committed to collecting the necessary post-EA remedy completion data as part of a comprehensive Performance Monitoring Program (PMP) to evaluate the effectiveness and sustainability of the EA and to confirm the CSM for East Branch.

Key USEPA Principles and CSTAG Recommendations for East Branch

The relevant guidelines and recommendations embodied in the USEPA Principles (2002, 2005, 2017a), CSTAG's recommendations (2015), and Superfund Task Force recommendations (USEPA 2017b) can be summarized as follows in the context of an EA in East Branch.

Develop a Conceptual Site Model and Control Sources Early

Consistent with USEPA Principle Nos. 1 (Control Sources Early) and 4 (Develop and Refine a Conceptual Site Model that Considers Sediment Stability) (USEPA 2002) and CSTAG's recommendations (2015), the NCG, in cooperation with USEPA, implemented an extensive series of studies to evaluate ongoing sources and estimate contaminant loading to Newtown Creek. These studies included a comprehensive evaluation of potential sources to East Branch and the Study Area as a whole and support an accelerated remedial action in this part of the system, even while the Study Area-wide (OU1) FS continues. In addition, NYSDEC has implemented additional investigations of uncharacterized sources (e.g., shoreline seeps), and they have indicated that the results will be used to address upland properties of concern.

As detailed in Sections 2 and 5 of the draft East Branch EA FFS, the NCG believes that these potential ongoing external inputs will not adversely affect EA remedy performance in East Branch. Ongoing inputs are independent of remedy performance. Although contamination will occur in the sediments that accumulate on the top of a remediated surface (i.e., cap), that is a separate issue from cap or remedy performance, which will focus on whether the cap prevents upward migration of contaminants from sediments below the cap. Ultimately, the long-term measure of success for

East Branch is that surface sediment COC concentrations meet the higher of the risk-based goals or the LTE surface sediment COC concentrations that reflect the influence of ongoing external COC sources.

Define Background

USEPA Principle No. 6 (2002) recommends evaluating the assumptions and uncertainties associated with site characterization data and site models. CSTAG's recommendations highlighted the need to evaluate whether current RI data and modeling were *"sufficient to support a background determination, and if it is not sufficient, determine what additional actions are necessary to define background"* (CSTAG 2015).

USEPA's Background Memorandum recognizes that *"among the expectations of the OU1 RI/FS will be to sort through the various inputs to Newtown Creek and to identify which need to be addressed by CERCLA, which are covered by other environmental statutes and are anticipated to be addressed through other authority, and which constitute true background conditions for the waterbody"* (USEPA 2019).

As discussed in detail in Section 3, initial estimates of LTE values are a representation of site-specific background concentrations in East Branch and also represent an estimate of what surface sediment COC concentrations will equilibrate to post-remedy. These LTE values also provide an initial baseline for comparison of post-remedy monitoring data to assess whether post-remedy conditions are approaching these estimates and, if not, why not. In the Framework Memorandum, USEPA (2023b) has tentatively defined these initial LTE estimates as initial interim performance measures for East Branch (and also the Study Area as a whole). As discussed in Section 3 under the subsection Preliminary Remediation Goals, the NCG believes that "interim performance measures" is a misnomer that runs the risk of confusing remedy performance with the broader issues regarding ongoing inputs to the creek (i.e., background).

Define Project-Specific Management Approaches and Implement in an Iterative Fashion

Consistent with USEPA Principle No. 7 (Select Site-Specific, Project-Specific, and Sediment-Specific Risk Management Approaches That Will Achieve Risk-Based Goals; USEPA 2002) and CSTAG's recommendations (2015) to divide the Site into OUs, the NCG and USEPA have worked collaboratively to define East Branch as a candidate for an EA because it would be expected to immediately reduce risks to human health and the environment within the East Branch EA area (and within the Newtown Creek Study Area as a whole). Completing an EA in this area will provide valuable information on the effectiveness of remedial technologies that may be applicable to the

entire Study Area. Applying lessons learned from a remedy completed in East Branch to other areas of the creek is also consistent with USEPA's guidance on adaptive management (USEPA 2022).

In addition, an EA in East Branch is consistent with USEPA Principle No. 5, which states, in part, that *"an iterative approach is defined broadly to include approaches which incorporate testing of hypotheses and conclusions and foster re-evaluation of site assumptions as new information is gathered"* (USEPA 2002). This is also supported by other USEPA guidance, which states, *"Where sufficient data supporting early action are in the site record, regions are encouraged to consider taking early actions to control these current or potential future exposures and risks in these areas"* (USEPA 2017a).

These data will also be used to confirm the elements of the East Branch CSM, discussed in detail in Section 2 of the draft East Branch EA FFS, which are important determinants of a successful and sustainable remedy in this portion of the Site.

Monitor Remedy Effectiveness

USEPA Principle No. 11 recommends monitoring during and after sediment remediation to assess and document remedy effectiveness. The degree to which the EA meets the RAOs for East Branch and helps to achieve anticipated Site-wide RAOs will be evaluated by the degree to which the remedy performs as designed. In addition to confirming the performance of the EA, one of the other major benefits of a PMP is the opportunity to collect data to further evaluate the impact of ongoing external inputs on LTE surface sediment COC concentrations in East Branch. Data collected as part of the East Branch PMP could help inform remedial decisions for OU1. In addition, data collected as part of the PMP also will be used to confirm the important elements of the East Branch CSM, as discussed in Section 2 of the East Branch EA FFS.

Elements of the PMP may include the following:

- **Data Collection Throughout East Branch:** Baseline measurement of surface sediment COC concentrations immediately post-remedy and change in surface sediment concentrations over time
- **Physical and Chemical Cap Performance Monitoring:** Includes evaluation of erosion protection layer and porewater COC measurements in the cap surface
- **Contingency Monitoring Component:** Opportunity for revisions and/or additional elements to monitoring program based on a collaborative review of initial results with USEPA and other stakeholders

Implementing the East Branch PMP provides numerous benefits, including the following:

- Confirms elements of the East Branch CSM
- Provides empirical understanding of how ongoing sources and sediment deposition affect LTE surface sediment COC concentrations

- Provides empirical data to compare to long-term trends in surface sediment COC concentrations anticipated from modeling predictions
- Provides empirical data about effectiveness of dredging and cover of a unique substrate material that will provide learning opportunities for the OU1 remedy

Coordinate with Other Stakeholders and Involve the Community Early and Often

Consistent with USEPA Principle No. 3 (Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees; USEPA 2002) and CSTAG's recommendations (2015), the NCG and USEPA have coordinated with NYCDEP and NYSDEC throughout the East Branch EA process, including a number of technical meetings with NYCDEP staff. In addition, NYCDEP and NYSDEC have reviewed and commented on the East Branch EA FFS alternatives memorandum (Anchor QEA 2023b) and annotated outline (Anchor QEA 2022b).

Consistent with USEPA Principle No. 2 (Involve the Community Early and Often; USEPA 2002) and CSTAG's recommendations (2015), the NCG has continued to take a proactive approach in supporting USEPA in meaningful engagement with community stakeholders in the Superfund process to better understand their vision for Newtown Creek. These efforts have included the following:

- Ongoing coordination with USEPA, including ongoing briefings to the Community Advisory Group (CAG) on the East Branch EA process
- Promoting an open dialogue with community members by hosting and participating in educational events, boat tours, and meetings
- Engaging with the local business community
- Consistent with the *Newtown Creek Vision Plan 2018* (Riverkeeper and Newtown Creek Alliance 2018), discussion with the Newtown Creek Alliance, Riverkeeper, and CAG the potential for a post-EA restoration project in the Western Beef slip

The proposed EA for East Branch has the potential to alleviate the local business and community members' concerns about a protracted cleanup and uncertainty about the future of Newtown Creek, as well as the potential economic benefit of getting a meaningful portion of the creek remediated within an expedited time frame, in an area of the creek that the community would like better access to (Riverkeeper and Newtown Creek Alliance 2018).

5 Newtown Creek Group Recommendation

The following list provides a summary of a comparative analysis of the remedial alternatives evaluated to be included in the East Branch EA FFS and supports the NCG's recommendation for Alternative EB-B:

- The five active alternatives perform similarly in terms of overall protection of human health and the environment and long-term effectiveness and permanence.
- The five alternatives would reduce toxicity, mobility, or volume through treatment over the entire footprint of East Branch, with Alternative EB-B providing the most in situ treatment.
- Alternative EB-B would perform best with respect to short-term impacts and implementability; other alternatives that involve significant amounts of shoreline/bulkhead improvements to facilitate remediation are expected to significantly extend the remedial design and implementation phases, thereby frustrating a key USEPA motivation for the EA.
- The NCP deems a remedy cost-effective if its costs are proportional to its overall effectiveness (40 CFR 300.430[f][1][ii][D]) Alternative EB-B would be completed sooner and provide the most in situ treatment (i.e., amended capping and in situ stabilization/solidification [ISS]) while providing overall protection of human health and the environment and long-term effectiveness; on this basis, it is the most cost-effective alternative.
- Overall, of the five active alternatives, Alternative EB-B meets the threshold criteria and would provide the most in situ treatment (with amended capping over the entire footprint of East Branch as well as ISS in portions of East Branch) while also providing ex situ treatment of sediment that is removed by dredging. Additionally, because Alternative EB-B could be implemented in a shorter period of time (two construction seasons as opposed to four construction seasons for Alternatives EB-C and EB-D, six construction seasons for Alternative EB-E, and seven or more construction seasons for Alternative EB-F), it would be easier to implement than the other active remedial alternatives and would have fewer short-term impacts (e.g., fewer truck trips) without compromising long-term effectiveness. Finally, Alternative EB-B sets the stage sooner and better positions East Branch for significant post-remedy restoration projects and other community benefit projects.

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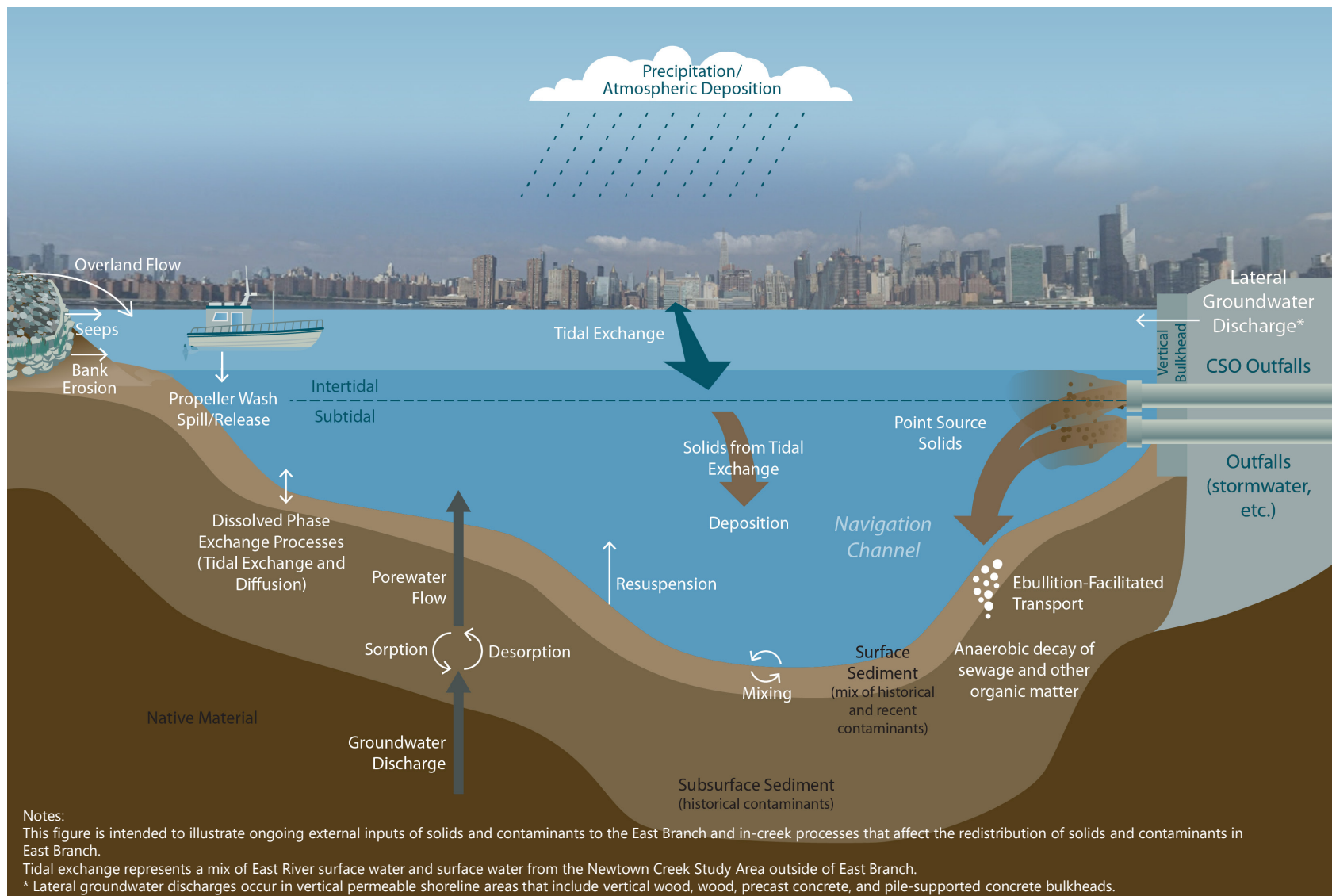
Figures



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Figure 2-1
East Branch Early Action Area
East Branch Early Action CSTAG Submittal
Newtown Creek RI/FS



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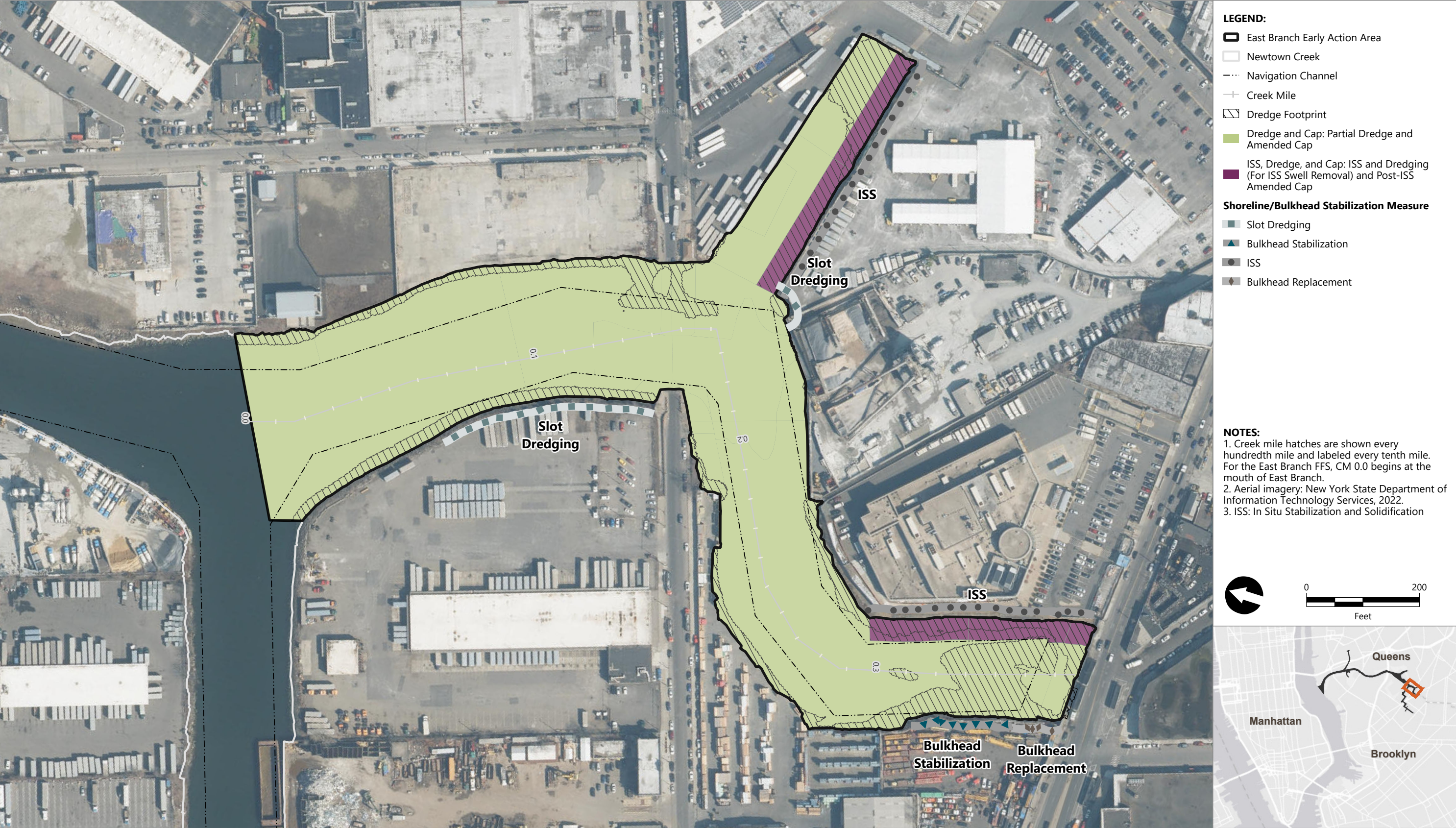
Figure 2-2
East Branch Conceptual Site Model
 East Branch Early Action CSTAG Submittal
 Newtown Creek RI/FS



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Figure 3-1
Alternative EB-A
East Branch Early Action CSTAG Submittal
Newtown Creek RI/FS



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Figure 3-2
Alternative EB-B
East Branch Early Action CSTAG Submittal
Newtown Creek RI/FS



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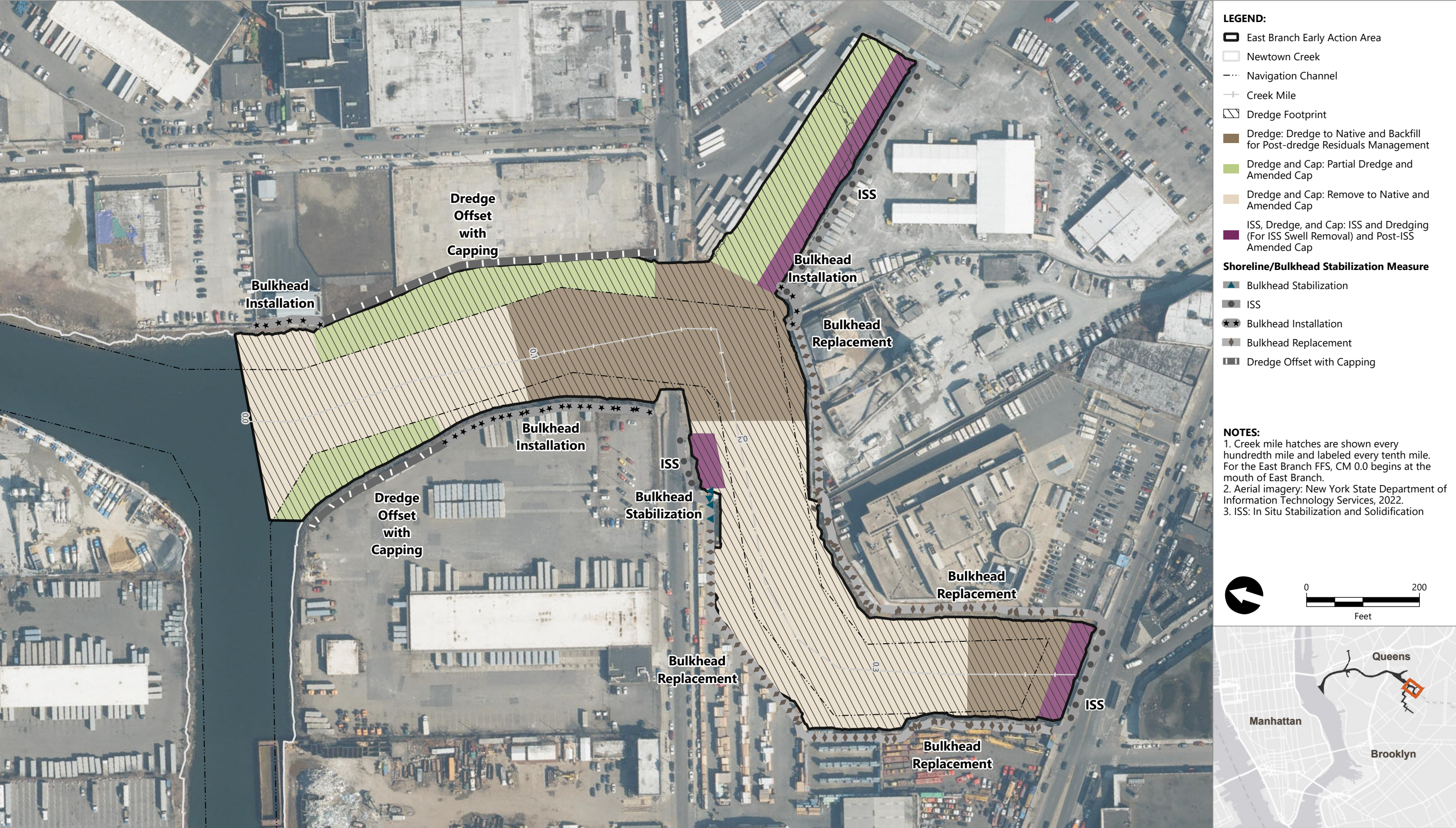
Figure 3-3
Alternative EB-C
East Branch Early Action CSTAG Submittal
Newtown Creek RI/FS



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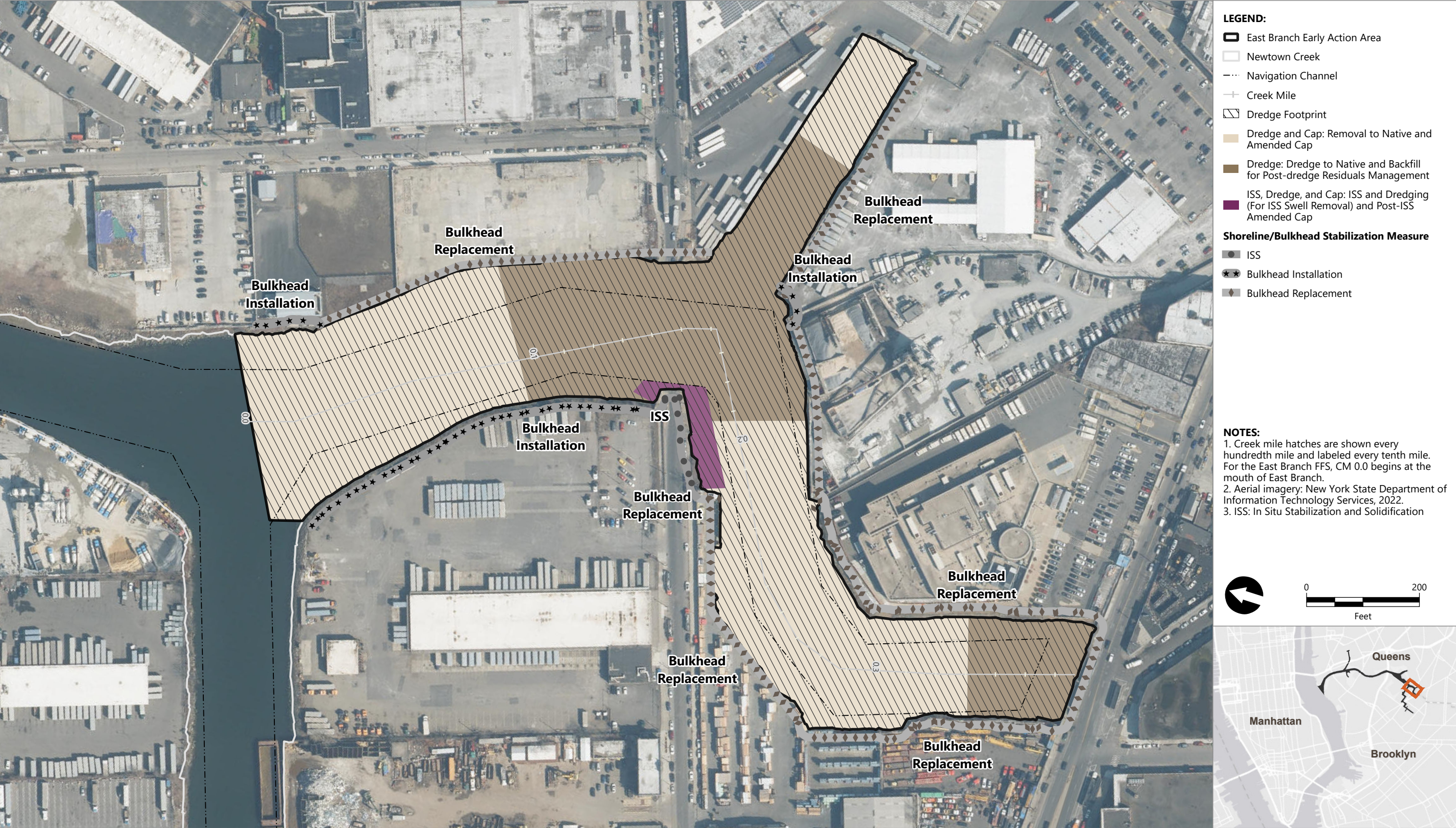
Figure 3-4
Alternative EB-D
East Branch Early Action CSTAG Submittal
Newtown Creek RI/FS



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Figure 3-5
Alternative EB-E
East Branch Early Action CSTAG Submittal
Newtown Creek RI/FS



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Figure 3-6
Alternative EB-F
East Branch Early Action CSTAG Submittal
Newtown Creek RI/FS