



## REGION 2

NEW YORK, N.Y. 10007

November 3, 2023

### MEMORANDUM

**SUBJECT:** EPA Region 2 Responses to Contaminated Sediments Technical Advisory Group Recommendations – CSTAG Recommendations on Proposed Early Action, East Branch Newtown Creek, Newtown Creek Superfund Site, New York, New York. Milestone 3.

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**TO:** Karl Gustavson, Chair  
Contaminated Sediments Technical Advisory Group.  
Office of Superfund Remediation and Technology Innovation

This document provides EPA Region 2's responses to the recommendations provided in the memorandum, "CSTAG Recommendations on Proposed Early Action, East Branch Newtown Creek, Newtown Creek Superfund site, New York, New York. Milestone 3" dated September 26, 2023. The September 26, 2023, memorandum provides the Contaminated Sediments Technical Advisory Group's (CSTAG) recommendations regarding a proposed early action (EA) for the East Branch (EB) portion of Newtown Creek, as presented by Region 2 in a Site Information Package (SIP) submitted to CSTAG in July 2023.

### Brief Description of the Site

Newtown Creek is 3.8 miles long and includes five short tributaries, including the East Branch. It forms part of the boundary between Brooklyn and Queens in New York City. Newtown Creek

was listed on the National Priorities List in September 2010 and has been divided into three operable units (OUs):

- OU1 includes the entire Study Area, as defined in a 2011 Administrative Settlement Agreement and Order on Consent (CERCLA Docket No. CERCLA 02-2011-2011) (2011 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 AOC requires the Respondents to perform a Remedial Investigation (RI) and Feasibility Study (FS) for the Site under EPA oversight. Anchor QEA, consultant for the NCG, is currently completing the multi-year, phased RI/FS.
- 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 focused feasibility study (FFS) for OU2 was conducted by NYC, with EPA oversight, and the FFS report was completed in November 2019. Following completion of the city's FFS, EPA proposed in November 2019 and finalized in April 2021 a decision that no further action is needed at this time under the Superfund program to address the volume of CSO discharges to Newtown Creek. The plan for post-ROD monitoring, to be conducted by NYC with oversight by EPA, is currently being finalized.
- OU3 refers to the evaluation of a potential interim, early action for the lower portion of Newtown Creek from creek mile 0 to creek mile 2 (CM 0-2) of 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.

The EB EA is being evaluated as an interim remedy for a portion of the OU1 Study Area of the site. The Region has developed a site-specific framework to provide a means to assess the long-term effectiveness of any OU1 remedy, or remedies, selected for the site, including both the performance of the remedy itself within the Study Area and the impact on the protectiveness of the remedy from ongoing sources of contamination. After review by CSTAG, on March 9, 2023 an initial version of the "Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach" for the Newtown Creek Superfund site (referred to herein as the Framework) was provided to the NCG, the New York State Department of Environmental Conservation (NYSDEC), the NYC Department of Environmental Protection (NYCDEP), the National Oceanic and Atmospheric Administration, and the Fish and Wildlife Service for consideration. Based on feedback received, a revised version of the Framework

dated June 29, 2023 was provided to CSTAG as part of its review of the EB EA. Attached is an updated revision of the Framework which incorporates the additional feedback received from CSTAG during the EB EA review process.

Region 2 greatly appreciates CSTAG's thorough review and thoughtful recommendations related to the proposed EB EA for OU1. Region 2's specific responses to CSTAG's September 26, 2023 recommendations are provided below. The Region will consider CSTAG's recommendations throughout the process of finalizing the EB EA FFS, selecting and implementing an EA if the decision is made to proceed with an EA, and, as appropriate, through the selection and implementation of remedies for other portions of the site.

Each of the September 26, 2023 CSTAG recommendations is presented below, followed by Region 2's response. The Framework described above is central to many of the responses.

## **Recommendations**

### **1. Early actions and site strategy**

EPA is proposing an early action in the 11-acre East Branch (EB) tributary of the Newtown Creek Superfund site. The EB is near the head of Newtown Creek and off the main flow path which lessens potential recontamination from adjacent sediments (although sediments can transport up into EB during high tide). Like much of Newtown Creek, the EB is complicated by the presence of an authorized navigation channel, stormwater and CSO outfalls, other ongoing sources, infrastructure maintenance (e.g., bridge replacement), presence of nonaqueous phase liquids (NAPL), and bulkheaded shoreline in disrepair. The Region proposes conducting remedial action in this tributary while the OU1 sitewide feasibility study is being completed. The provided rationale includes expediting cleanup, significant contaminant mass and exposure reduction in the early action area, and gaining experience and knowledge to inform the conceptual site model (CSM) and future work in the Creek. The Region's early action framework includes pre- and post-action monitoring to identify underestimated or missed sources and to identify and address short and long-term performance issues. The process provides reasonable assurance that site characterization or remedy performance shortcomings will be understood and addressed.

The Region, CSTAG, and site stakeholders have long advocated for early efforts to expedite cleanup and efficiently reduce risk. CSTAG agrees that EB is a good opportunity for early action and particularly to develop experience managing challenges in place throughout Newtown Creek. Getting to early and efficient cleanup in the EB will be difficult due to site characteristics, but also the administrative challenges inherent to balancing multiple stakeholder perspectives

and developing multi-party agreements under Superfund. CSTAG is optimistic that EPA and stakeholders can align within this relatively small area of the larger site to achieve “early” action and provide an example of how to use early actions to expedite sitewide cleanup.

**Response:** Region 2 appreciates CSTAG’s support in moving forward with the proposed early action. The Region is looking forward to working through the challenges presented by this early action, collaborating with stakeholders, and conducting and achieving a cleanup in this portion of Newtown Creek.

## **2. Shoreline NAPL Seeps**

CSTAG supports the Region’s efforts to continue to evaluate ongoing sources and to consider whether EB upland properties have actionable shoreline NAPL seeps. CSTAG recommends that the Region work with the NYSDEC to clarify how they intend to share responsibility for evaluating and remediating these potential sources of COCs.

CSTAG recommends that the Region clarify the remedial design decision process for assessing whether additional source control or protections, such as sealed bulkheads, will be needed for in-water work. Early action alternatives could include a common element that assumes an evaluation of shoreline NAPL seeps at priority upland properties and costing assumptions that some amount of sealed bulkhead will be required. This collaborative process for identifying and evaluating shoreline seeps may not be as critical in the EB, but it will likely become more important elsewhere in Newtown Creek.

**Response:** Region 2 appreciates CSTAG’s recommendations on this issue and agrees with the proposed solutions. Additional evaluation of shoreline seeps during the design of whatever remedy is selected will be clearly included in the Proposed Plan and Record of Decision (ROD) as a common element for all active alternatives considered. The Region will also be asking the NCG to include cost assumptions for the inclusion of some amount of sealed bulkhead in the FFS report, with the acknowledgement that this amount must be refined based on the results of a pre-design investigation and may be higher or lower than anticipated. Similarly, the Region will also be asking the NCG to include the use of In-Situ Stabilization (ISS) to address issues associated with NAPL as a common element of all active alternatives considered, with some cost assumptions built in for this possibility as well.

During the design of the remedy, it is anticipated that the pre-design investigation will work to identify any seeps that are present in the EB portion of the site and to estimate their contaminant loads. This information will be evaluated to determine whether the contaminant loads have the potential to impact the protectiveness of the remedy, and, if so, source control and/or remedy protection measures will be included in the design of the remedy.

In addition, while ideally all significant upland impacts (including those through seeps) would be discovered during the design process, and acknowledging that many such impacts have already been identified and addressed (or are being addressed) through NYSDEC enforcement authority, the Framework that the Region has developed for this site provides a methodology for both determining if upland impacts are more significant than initially anticipated and for addressing any such upland impacts if they are found. The Framework requires cooperation and coordination with NYSDEC and the Region will continue to collaborate with its state partner to clarify how this cooperation and coordination will work. For example, regular monthly coordination meetings between EPA and NYSDEC have been being held since at least August 2022 and additional meetings are arranged on an as needed basis. This level of engagement will continue and, as necessary, increase throughout the remedy selection, design, implementation and post-implementation process.

### 3. Remedial action objectives refinement

The current draft language of the RAOs for the EB EA is as follows:

#### Exposure-based RAOs

- Reduce human exposure to fish and crab ingestion risks above protective levels by reducing the concentrations of (Contaminants of Concern) COCs in contaminated sediment in the East Branch to protective Preliminary Remediation Goals (PRGs)/Remediation Goals (RGs).
- Reduce ecological exposure to site COCs in sediment in the East Branch by reducing the concentrations of COCs in contaminated sediment to protective PRGs/RGs.

#### Source Control RAOs

- Reduce migration of site-related Non-aqueous Phase Liquid (NAPL) and other sources within the East Branch to sediment and surface water above levels that are protective for human health and ecological exposure.

CSTAG recommends the Region consider:

a. replacing the phrase “the concentrations of COCs in contaminated sediment” with “the exposure of biota to sediment COCs” in the first exposure-based proposed RAO.

**Response:** The development of clear and concise RAOs that capture the objectives of the cleanup is often challenging and the Region appreciates CSTAG’s continued input on this topic. To summarize the situation more fully, the Baseline Human Health Risk Assessment for OU1 concluded that unacceptable risks to human health from the Superfund COCs are associated

with ingestion of fish and crabs from the Creek. COC concentrations in fish and crab are elevated primarily due to their exposure to elevated COC concentrations in sediment and/or in smaller species, including benthic macroinvertebrates, that feed directly from the sediment. Therefore, by reducing the exposure of all ecological receptors to contamination in sediment, the concentrations of COCs in fish and crab that humans are likely to ingest will decrease. The risk-based PRGs for sediment were developed with this scenario in mind. Therefore, both the RAO and the performance metrics for determining remedy effectiveness would be associated with sediment concentrations.

With this in mind, the Region suggests using the following slightly modified RAO:

- 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 levels.

The language after the listing of RAOs in the documents would then clarify that this would be achieved by reducing concentrations of COCs in accessible sediment to concentrations below risk-based PRGs. For Newtown Creek, the bioavailable zone has been determined to be 6 inches. Therefore, accessible sediment would be the sediment in the top 6 inches of the Creek (also considered surface sediment for this site).

b. rewording the proposed source control RAO to make clearer the definition of “site-related” and the intent of the remedial action.

**Response:** Again, developing clear and concise language for RAOs is challenging. EPA appreciates CSTAG’s input on the source control RAO for this action and agrees the definition of “site-related” is not entirely clear. The intent of the action is to implement a protective remedy for the EB portion of the Study Area, even though it will be considered interim. As is noted in the Framework, 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. Therefore, consistent with the Framework, the long-term post-implementation monitoring program for the action must evaluate both the performance of the remedy itself within the Study Area and the impact on the protectiveness of the remedy from ongoing sources outside of the Study Area; this will require ongoing and effective coordination with NYSDEC in the long term (as described in the response to Recommendation 2).

In order to more clearly capture this complex situation, the Region proposes the following revised source control RAO for the EB EA (with the revised language in italics):

- Reduce migration of *COCs related to Non-aqueous Phase Liquid (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 language after the RAO would then clarify that how, and through what entity, to address contamination from upland sources that impacts the protectiveness of the remedy would be determined on a case-by-case basis, in consultation with NYSDEC.

#### **4. Interim Evaluation Measures**

CSTAG recommends ongoing consultations with stakeholders to distinguish between the proposed risk-based remediation goals and the interim evaluation measures. The interim evaluation measures should be more thoroughly described, including their purpose, how and where they will be applied, the process for updating these measures, and specificity regarding their use in site monitoring and adaptive site management, particularly determining whether and where additional source control is warranted. In the same vein, the Region should also describe when and at what spatial scale the risk-based remediation goals will be applied to evaluate remedy effectiveness.

**Response:** The Region plans to engage in additional discussions with stakeholders to clarify how the interim evaluation measures will be used to evaluate whether COC concentrations are trending towards the proposed risk-based remediation goals. The measures themselves will be more thoroughly described, including their purpose, how and where they will be applied, the process for updating the measures, and specificity regarding their use in site monitoring and adaptive site management, particularly determining whether and where additional source control is warranted.

The updated Framework attached to this response provides some of the additional detail requested, and the rest will be developed through the FFS development process as well as during the design of the selected remedy. The spatial scale that the risk-based remediation goals will be applied to will be more thoroughly described in the FFS but, in general, will be reach-based, not Study Area based.

Very broadly, the measures will be developed based on empirical data and through the use of the long-term equilibrium model developed specifically for this purpose. The model and its outputs will be refined over time through the collection of additional empirical data on an ongoing basis before, during and after implementation of the remedy. The interim evaluation measures (IEMs) will be used in conjunction with a robust post-implementation sampling program designed to determine if any portions of the East Branch Study Area are becoming

recontaminated to concentrations above what would be expected based on the IEMs. Additional details on this approach will be provided in the Adaptive Site Management (ASM) strategy that is being developed for this site, and as further described in the response to Recommendation 7.

By not including NAPL seeps in the determination of IEMs, EPA is being conservative in its approach. The Framework has been carefully developed to provide a means to achieve a protective remedy without the establishment of background conditions, and in fact has coined the term “Interim Evaluation Measures” for this specific site. The IEMs are based on ongoing inputs to the site from outside of the Creek. These could be considered background, but the Region is instead using the IEM term to make clear that there is an expectation that current loading to the Creek can and should decrease over time, and that EPA Superfund will help effectuate this decrease to the extent possible. The IEMs will be used to determine what concentrations in the surface sediment of the Creek should look like based on known current loading to the system. Not including NAPL seeps in the IEMs will help the Region identify any potentially significant ongoing sources of contamination through the robust post-implementation sampling that will be conducted. In other words, if the IEMs are exceeded at any location, then that indicates an unknown source may be causing the exceedance, and that previously unknown source can then be addressed, as appropriate, through either Federal Superfund or NYSDEC action.

If concentrations greater than the LTE ranges are observed in an area of post-remedy surface sediments, then further investigation into the potential for a shoreline NAPL seep source(s) (or other ongoing sources) in the vicinity of elevated surface sediment concentrations would be performed.

## **5. Alternatives**

CSTAG recommends the Region develop the FFS and Record of Decision (ROD) language to maximize flexibility in the face of implementation challenges and new findings such as the need for variation in cap design, bulkhead replacement or other source control/remedy protection measures, additional dredging, in-situ treatment, or in-situ stabilization.

### **Response:**

Region 2 fully agrees with this comment and intends to develop ROD language that offers both maximum flexibility to design the remedy appropriately based on the ongoing groundwater sampling effort and the results of the predesign investigation activities, while also providing clear metrics and measures that must be achieved so that the goals of the remedy are achieved. Whatever alternative is ultimately selected will need to allow for the incorporation of dredging, capping, isolation and treatment components. As mentioned in the recommendation,



this will need to include the ability to vary cap design, to use bulkhead replacement or other source control/remedy protection measures, additional dredging, in-situ treatment, and/or in-situ stabilization.

## **6. Monitoring**

a. CSTAG recommends that specifics on the monitoring program be provided within the FFS and ROD. Monitoring is a central component of the remedy and adaptive site management approach, and the Region presents multiple objectives to be achieved by the monitoring program. While it is recognized that details regarding specific sample sizes and locations may not be known at the time of the ROD, the monitoring objectives, parameters, and design to satisfy those objectives should be provided to the extent possible.

b. CSTAG recommends that the Region incorporate porewater sampling to characterize contaminant transport up through the cap; this will help distinguish contaminants associated with the sediment bed from those from other ongoing sources. In-situ passive porewater sampling methods have been shown to be a powerful tool for monitoring migration of hydrophobic organic contaminants through caps at other Superfund sites and could be an important component of cap performance monitoring.

**Response:** The Region agrees with CSTAG's recommendation to develop specifics of the monitoring program for inclusion in the FFS and ROD. Currently, the FFS identifies the potential need to perform baseline monitoring, construction-phase monitoring, and near-term and long-term monitoring. The Region will include a comment on the draft FFS that the FFS be revised to include a discussion of the monitoring objectives and the parameters that would be monitored to evaluate achievement of the objectives, including structuring the monitoring program so that all types of sources potentially impacting remedy performance and/or contributing to recontamination potential are evaluated. Furthermore, the Region will include a comment on the draft FFS that the FFS be revised to identify data gaps that require further investigation during the PDI, and based on information collected during the PDI, additional monitoring objectives may be identified during the design phase of the remedy.

The Region also agrees with CSTAG's recommendation with respect to porewater and will include this as part of the comment on the draft FFS mentioned in the above response regarding the need for the FFS to include specific information of the monitoring program.

## **7. Adaptive site management as a site strategy**

If the Region plans to implement ASM as a cleanup strategy in EB and Newtown Creek, it should develop an ASM plan to formalize the process for early actions to support a final action, in a

manner consistent with EPA's ASM Guidance. In particular, that plan could demonstrate how monitoring will be conducted and how remediation goals will be verified (especially those based on surface-weighted average concentrations [SWACs]) within the early action and site-wide areas.

**Response:** Region 2 acknowledges CSTAG's recommendation and is working to develop an ASM cleanup strategy consistent with the recommendations provided. The Region will share a draft version of the strategy with CSTAG once it is more fully formed. Note that the Framework attached to these responses will be an essential component of the overall ASM strategy.

## **8. Community Engagement**

CSTAG recommends that the Region work with project stakeholders to clarify points of confusion which are distracting from the primary goals of the early action. The Region should clearly explain the bounds of the early action as it pertains to addressing sediment versus potential ongoing sources of contaminants, as well as what will and will not be accomplished by the early action. Doing so can create a shared vision of what successful implementation will look like. For example, if some sediment recontamination is expected, it is important to set expectations so that the project is not wrongly perceived as a failure, and to reinforce that monitoring and evaluation will be ongoing to ensure that EB and sitewide RAOs are achieved. The Region should better explain how the early action will be connected to implementation of the full OU1 remedy (for example, through the development of a site ASM plan) and provide a clearer explanation for the use of IEMs in the early action.

By refocusing on the primary goals of the project and resolving several ongoing sources of confusion, the Region can better inform the community and enable the early action to be viewed as a success.

**Response:** Region 2 recognizes the importance of stakeholder input and will continue to keep project stakeholders informed throughout the early action process. The Region appreciates CSTAG's recommendations and will be sure to focus more attention on the bounds of the EA and discussing with the community what it will and will not achieve. As the early action progresses, the Region will communicate the expectations of the early action, including methods for identifying potential ongoing sources of contamination and addressing recontamination from external sources, and how it will fit in with the larger remediation of the rest of OU1. Successful implementation of the EB EA is a primary goal of all stakeholders.

ATTACHMENT

1. Draft Final Framework for the Operable Unit One Remedial Objective and Preliminary Remediation Goal Approach, Newtown Creek Superfund Site, New York, New York (revision dated November 3, 2023)

**REVISED DRAFT FINAL MEMORANDUM**  
**Framework for the Operable Unit One**  
**Remedial Action Objective and Preliminary Remediation Goal**  
**Approach**  
**Newtown Creek Superfund Site, New York, New York**

**Development of Remedial Action Objectives**

EPA is employing an adaptive management approach for Newtown Creek Operable Unit 1 (OU1) where interim remedial actions may be focused on specific areas within OU1. These interim or early actions would also have associated remedial action objectives (RAOs), termed interim RAOs, to evaluate the effectiveness of the selected remedies and the adaptive management strategy. Additionally, interim RAOs are expected to support the overall RAOs for OU1 in its entirety as part of a final remedy. This document will discuss the overall RAOs for OU1 and subsequent documents associated with interim or early actions will address related interim RAOs.

The Framework described herein is site-specific, should not be generalized, and may not be applicable to other sites. It is 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). This Framework was developed to provide a means to evaluate the long-term effectiveness of the OU1 remedy, which could potentially be impacted (i) by the performance of the Superfund remedy itself and/or (ii) by the impact of ongoing sources outside of the Superfund process on the protectiveness of the remedy. This Framework provides a path forward for evaluating and, if necessary, addressing both of these scenarios.

RAOs are meant to clearly lay out the goals of a remedial action, based upon the known site conditions and the conceptual site model. Therefore, before presenting the RAOs and the rest of the Framework, it is important to provide some context for the site so that the RAOs may be better understood. The relevant known site conditions for this site include the current and potential future uses for both the Creek and the upland areas, the risks posed by the site to human health and the environment, and the known and potential ongoing sources of contamination to the site. These conditions are laid out below.

- **Current and Potential 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.

### 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 EPA has placed signs at known fishing/crabbing locations along the Creek advising anglers of the Superfund site 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

Areas surrounding the Creek are highly varied, including:

- Industrial/commercial properties
- Residential properties
- Limited recreational access areas
- Abandoned properties

Communities surrounding the Creek are in flux. 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.

In addition, many upland properties adjacent to the creek are contaminated from past industrial uses and are being addressed through State cleanup actions.

## Ecological Uses

Newtown Creek includes urban ecosystems that provide ecological benefits to environmental receptors. 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 expects that several locations along the waterway may be changed from bulkheads to “soft shorelines” that would enhance ecosystem diversity.

- **Risk Assessment**

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. Based on the findings of the human health and ecological risk assessments conducted for the Newtown Creek site, a response action is necessary for the sediments at the Site at this time.

## Human Health Risk

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 Baseline Human Health Risk Assessment (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 nondioxin-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

From the ecological perspective, elevated risks from CERCLA hazardous substances are associated primarily with hydrocarbons (including Total PAHs), PCBs, and copper, and they are elevated for benthic macroinvertebrates, bivalves, blue crab, fish and birds.

Sediment is the primary medium of concern for all CERCLA elevated risks.

## Other Sources of Contamination

While not addressed under CERCLA, elevated levels of pathogens and other non-CERCLA substances are present in Newtown Creek that pose potential exposure risks to recreational users of the waterway and pose other adverse ecological consequences. A significant source of these elevated levels of non-CERCLA substances is CSO discharges into the Creek. As per the requirements of the Clean Water Act, New York City Department of Environmental Protection (NYCDEP) is under order of New York State Department of Environmental Conservation (NYSDEC) to implement the CSO Long Term Control Plan (LTCP) for Newtown Creek, approved by NYSDEC in 2018. The LTCP includes a number of components to reduce CSO discharges to Newtown Creek, including construction of a storage tunnel, that will reduce the volume of CSO discharges to Newtown Creek to achieve waterbody-specific water quality standards consistent with the Federal CSO Control Policy and related guidance by approximately 62.5% from LTCP baseline conditions.

- **Ongoing Sources**

As is described in more detail in EPA's October 30, 2019, background/reference memorandum for Newtown Creek, there are many external ongoing sources of contamination to the Creek, including CSOs, Municipal Storm Sewer Systems (MS4s), Wastewater Treatment Plant (WWTP) effluent, permitted and non-permitted discharges, overland flow, groundwater, seeps, bank erosion and the East River.

Each of these ongoing sources provides some level of contaminant loading of hazardous substances, pollutants or contaminants to the Creek. As part of EPA's remedial decision-making, the agency will be making assessments about the potential for any one of these ongoing sources, individually or in combination, to recontaminate the Creek bottom above acceptable levels after completion of the cleanup activities. Because there will continue to be some level of uncertainty about the long-term effects of external sources, as part of an adaptive management strategy, the monitoring of portions of the waterway remediated early in the process (e.g., the East Branch) will provide valuable data on long-term remedy recontamination for subsequent phases of the site cleanup.

Regardless, there is an expectation that, over time, the overall external loading to the creek will decrease due to improved Best Management Practices (BMPs), ongoing cleanup actions (such

as at upland sites) and additional regulatory control (including the LTCP both for Newtown Creek and for the East River overall).

### **Remedial Action Objectives**

Based on the context provided above, the following interim RAOs have been developed for OU1 of the Newtown Creek site. They will likely be the final RAOs for OU1 of the site, but may be revisited when the final Record of Decision (ROD) for OU1 is developed:

#### **Exposure-based RAOs**

- Reduce potential current and future human exposures to Contaminants of Concern (COCs) from ingestion of fish and crab by preventing biota exposure to sediments in the Study Area with COC concentrations above protective Preliminary Remediation Goals (PRGs)/Remediation Goals (RGs).
- Reduce ecological exposure to site COCs in sediment by reducing the concentrations of COCs in contaminated sediment to protective PRGs/RGs.

#### **Source Control RAOs**

- Reduce migration of COCs related to Non-aqueous Phase Liquid (NAPL) and its constituents, and other sources of COCs within the Study Area, 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 accessible sediment to concentrations below the PRGs/RGs that are selected. For Newtown Creek, the bioavailable zone has been determined to be six inches. Therefore, accessible sediment would be the sediment in the top 6 inches of the Creek, and for the source control RAO, surface sediment would be considered the accessible sediment (i.e., the top 6 inches).

As is noted above, 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 NYSDEC to identify and address any such ongoing sources. However, this does not preclude EPA from identifying specific actions, such as the establishment of sealed bulkheads at certain properties or requiring upland response actions to address ongoing sources to the creek, as required components of an EPA remedy decision, if that information is known at the time of remedy selection for in-creek actions. 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 design, during remedy implementation or during post-remedy operation, maintenance and monitoring.

In addition, EPA will continue to evaluate the impact of CSOs on the protectiveness of the remedy and, consistent with the OU2 ROD for the Site, will determine whether additional control actions, either in-creek or at CSO points-of-discharge, are required to meet the remedial action objectives. EPA will work with NYSDEC and NYCDEP to implement any such additional control actions, if necessary.



## Preliminary Remediation Goals

Risk-based PRGs were developed for the six contaminants of concern at the site. They are as follows:

Contaminant of Concern	Risk-Based PRG	Most Sensitive Receptor and Exposure Pathway
TCBs	0.30 mg/kg	Humans via crab consumption
Dioxins/Furans TEQ	18 ng/kg	Humans via crab consumption
Copper	490 mg/kg	Mummichog via dietary intake
Lead	340 mg/kg	Spotted sandpiper via dietary intake
TPAH (34)	100 mg/kg	Benthic macroinvertebrates via sediment toxicity
C19-C36 Aliphatic Hydrocarbons	200 mg/kg	Benthic macroinvertebrates via sediment toxicity
<b>Notes:</b> TPCBs – total polychlorinated biphenyls TEQ – toxic equivalence quotient mg/kg – milligrams per kilogram ng/kg – nanograms per kilogram		

As is described in more detail in EPA’s October 30, 2019, background/reference memorandum for Newtown Creek, the site’s urban setting presents conditions whereby reaching risk-based remediation goals may be challenging. 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. In addition, several potential sources of contamination to the site, such as non-point source runoff and solids loading from the East River, would not be considered releases of hazardous substances, pollutants or contaminants into the environment, thereby setting them outside the scope of EPA’s authority to respond under CERCLA.

When risk-based PRGs are not achievable, EPA often selects remediation goals consistent with background as the lowest achievable remedial goal. 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, EPA expects that contaminant loading from upland sources will decrease over time. The East River is the only water body directly connected to the Creek (through tidal flow), and, as such, EPA considered using the concentrations of COCs in the East River as background for the Creek. However, this does not seem appropriate, particularly for the portions of the Study Area farthest away from the East River (such as English Kills and the East Branch).

As part of the RI/FS process, EPA has analyzed the range of point source and non-point source inputs of contaminants into Newtown Creek and will continue to collect data from many of

these sources as part of the OU2 monitoring program. There is ample evidence to support a general improvement of surface water and sediment contaminant concentrations within the New York Bight since the 1970s, and the general trend for urban runoff (including point-source and non-point source discharges) suggests lower contaminant loading in the future. EPA expects loading from ongoing sources to decrease over time due to improved BMPs in general, ongoing cleanup actions and additional regulatory control.

Given all of the above, for OU1 of this Site, rather than establishing background conditions, as is often done and as is supported by EPA guidance, EPA expects to follow an iterative approach to post-remedy monitoring with the expectation that improvements in water quality and other factors beyond the scope of CERCLA will allow the risk-based PRGs to be achieved in the future. This iterative approach is described as follows:

- Set long-term PRGs for OU1 consistent with the long-term, risk-based human health and ecological endpoints listed above
- Determine interim evaluation measures using empirical data as well as predictive models developed for the site, which may include both the Long-Term Equilibrium and Contaminant Fate and Transport models. The interim measures will be used for remedy selection, design, implementation, and post-implementation monitoring, and will be adjusted periodically to account for current conditions.
- Develop a long-term monitoring program that includes at least surface sediment and ongoing inputs to assess the overall remedy effectiveness, including both the performance of the remedy itself within the Study Area and the impact on the protectiveness of the remedy from ongoing sources, with the expectation that loading from ongoing sources will decrease over time due to improved BMPs in general, ongoing cleanup actions and additional regulatory control.
- If surface sediment concentrations do not continue trending towards the long-term goals, determine if additional source control measures are needed, either through federal Superfund or State of New York enforcement authorities, as appropriate.

Sources can include both in-creek sources of contamination, such as ebullition and sediment transport, as well as external sources, such as point- and non-point discharges. The monitoring program will be structured so that all types of sources potentially impacting remedy performance and/or contributing to recontamination potential are evaluated. Any source control measures subsequently determined to be necessary would be expected to be location specific. For example, monitoring may show increasing concentrations at a particular Creek Mile and it may be determined that there is an ongoing source near this location that needs further control. The appropriate entity to control the source would be determined on a situation-specific basis.

## **Early Actions and the Adaptive Management Approach**

As is stated in the beginning of this memorandum, EPA expects to select one or more interim or early actions before a final remedy is selected for OU1 of the Newtown Creek site. Any early action taken will have distinct RAOs and interim performance goals that will work towards achieving the overall site RAOs and interim performance measures. A robust post-implementation monitoring plan, similar to that described in the previous section, will also be developed and results from that monitoring plan will be used to help inform future actions at the site. An Adaptive Site Management cleanup strategy for the Site is being developed and it is expected that this framework document will become a key component of that strategy.