UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
NEW YORK, N.Y. 10007

May 24, 2024

MEMORANDUM

SUBJECT: EPA Region 2 Reponses to Contaminated Sediments Technical Advisory Group (CSTAG) Recommendations on Proposed Early Action, East Branch Newtown Creek, Newtown Creek Superfund Site, New York, New York. Milestone 4.

FROM: Angela Carpenter, Chief
Special Projects Branch, EPA Region 2
Superfund and Emergency Management Division

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 (EB) Newtown Creek, Newtown Creek Superfund site, New York, New York. Milestone 4" dated April 9, 2024. The April 9, 2024, 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 in February 2024 by Region 2 in a Site Information Package (SIP) submitted to CSTAG in February 2024.

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, was finalized by EPA in April 2024.

- 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 OU1 Study Area is defined, generally, as the Creek itself up to the mean highwater line. Internal sources of contamination include, for example, ebullition and sediment resuspension. External sources of contamination include, for example, permitted and non-permitted discharges, overland flow and contamination from upland properties. The term internal/external interface sources of contamination has been developed to capture the gray area between these types of sources. For example, contamination may be entering the Creek below the mean high-water line through seeps but the source of the contamination is from the surrounding upland area. Similarly, shoreline bank erosion and lateral groundwater flow may also fall into this category. Its usage is described more fully in the response to Recommendation 4 below.

The Region has also 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 (NOAA), and the Fish and Wildlife Service (FWS) for consideration. Based on feedback received, a revised version of the Framework dated November 3, 2023, was provided to CSTAG as part of its review of the EB EA for Milestone Meeting No. 4.

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 April 9, 2024, 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, and, as appropriate, through the selection and implementation of remedies for other portions of the site.

Each of the April 9, 2024, CSTAG recommendations is summarized below, followed by Region 2's response. The Framework described above is central to many of the responses.

Recommendations

1. Rationale for Preferred Alternative

CSTAG recommends strengthening the technical justifications for supporting alternative EB-D over EB-B. For example, it was unclear whether alternative EB-B will be less resilient to sea level rise (as suggested in the rationale) or if the increased mudline elevation will result in increased localized erosion and possible overbank flooding during significant storm surge and high rainfall events that result in CSO discharges. The Region should describe how the preferred alternative was evaluated for resiliency to the effects of climate change and sea level rise.

Response: The Region recognizes the importance of implementing an alternative that is resilient to the effects of climate change and sea level rise and has identified Alternative EB-D – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth with Localized Deeper Dredging – as its preferred alternative for the East Branch interim remedial action. The Region

has concluded that Alternative EB-D can be designed in such a manner that it is resilient to the effects of climate change and sea level risk. In addition, the Region has concluded that Alternative EB-D would perform favorably in comparison to the other active alternatives evaluated, including Alternative EB-B.

Alternative EB-B would raise the average elevation of the sediment bed thus making it less resilient than the other active alternatives to the effects of climate change such as erosional impacts resulting from more frequent and higher intensity rainfall and higher intensity outfall and overland flows. As is noted by CSTAG, the increased mudline elevation would likely result in increased localized erosion and possible overbank flooding during significant storm surge and high rainfall events that result in CSO discharges. Both Alternatives EB-C and EB-D would maintain existing water depths and therefore maintain the current hydraulics of the system.

The design of the remedy selected for the EB EA will include resiliency measures related to climate change and will specifically consider the intensity, frequency, or duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.

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

2. Technology Application in the Preferred Alternative

CSTAG recommends that the Region provide additional detail in alternative EB-D on where "[d]eeper dredging and/or the use of targeted in-situ stabilization (ISS)" will be applied and how the selection among those two approaches will be determined.

CSTAG also recommends that prior to the remedial design, the Region consider developing a decision tree that provides criteria or lines of evidence for requiring deeper dredging or treatment via ISS to mitigate subsurface sources of toxic materials to the post remediation surface sediments. This decision process would be informed by the PDI and lateral

groundwater/seeps investigation. This process would inform decision making for additional source controls or optimization within the study area and would allow the Region to learn means and methods for addressing NAPL while developing remedies for the remaining portions of Newtown Creek.

Response: The Region appreciates CSTAG's support on the Region's approach to making location-specific design determinations to achieve and attain the RAOs for this interim remedy. The Region will determine where deeper dredging and/or targeted ISS will be applied based on the following information: potential for upward NAPL migration from the deeper soft and/or native sediment, potential for human and/or ecological exposure to PTW, depth of sediment to uncontaminated material, and/or relatively high COC concentrations in sediment (i.e., "hot spots"). ISS specifically will be considered where needed to reduce migration, and/or for treating NAPL or PTW, and for shoreline stabilization.

Early in the design process, the Region will develop a decision tree that provides criteria or lines of evidence for requiring deeper dredging or treatment via ISS to mitigate subsurface sources of toxic materials to the post remediation surface sediments. The PDI will then help inform any refinements of the decision tree that may be needed prior to collecting additional data and/or completing the design.

In addition to consideration of mitigating potential subsurface impacts to the post-remediation surface sediment concentrations, the design process will also consider lateral and within-creek impacts to the protectiveness of the remedy, including from sediment resuspension, ebullition, groundwater, seeps, bank erosion, and other sources of contamination such as overland flow, CSOs and other permitted discharges and contaminated upland properties. Data from all of the sources and more will be collected and/or gathered (if collected under different regulatory programs) as part of the PDI process and incorporated into the design of the remedy. These data will then be used to determine, for example, if sealed bulkheads are needed anywhere as a temporary measure until the related upland source can be addressed, and/or if additional shoreline stabilization measures are needed.

3. Additional Considerations for Developing an Adaptive Site Management Approach (ASM)

CSTAG recommends that in the ASM strategy, the Region should include a discussion of evaluation and decision timepoints to document when data will be evaluated, and when the evaluated data will be used to make decisions on remedy adaptation. The appropriate timing for this decision will be an important but challenging determination, and should consider the

action timing, expected trends in contaminated media, measured results, and stakeholder expectations.

CSTAG also recommends that baseline monitoring to support the ASM strategy occurs before the early action is implemented. The Region should provide sufficient detail in the ASM strategy to develop the baseline monitoring program to understand how the early action RAOs support the site-wide RAOs and how progress towards those site-wide RAOs will be monitored. These aspects of the ASM strategy are particularly important for designing the baseline monitoring program that supports both this initial early action and the site-wide, long-term monitoring. Additional recommendations on the baseline sampling are provided in recommendation 6.

Response: The Region appreciates this comment and agrees that development of a post-implementation evaluation plan with decision points is a critical aspect of the ASM strategy that is being developed for the Site. In addition, the Region agrees that conducting a baseline monitoring program prior to implementation of the early action is also a critical aspect of this action. At this time, the Region proposes using the following approach, which can be refined over time as conditions warrant.

The long-term cleanup goals for the remedy selected for the East Branch portion of OU1 will be the risk-based PRGs that were developed during the OU1 RI/FS process. Immediately after implementation of the remedy, COC concentrations in the surface sediment should be clean (meaning non-detect or well below any regulatory standards for non-metals and at or below concentrations generally consistent with naturally occurring levels for metals). Over time, however, the surface sediment concentrations of COCs will likely increase due to the presence of ongoing sources of contamination. The long-term equilibrium (LTE) model was developed to estimate what the new equilibrium concentrations in the surface sediment could be after remediation based on previous data collected from the ongoing sources. Based on the current outputs of the LTE model, as shown in Figure 1 (attached), copper and total polycyclic aromatic hydrocarbons (TPAH) from ongoing sources have less potential to cause surface sediment PRG exceedances post-remedy than dioxins/furans and C19-C36 aliphatic hydrocarbons. Total polychlorinated biphenyls (TPCBs) fall somewhere in the middle. Note that new data obtained during the pre-design investigation (PDI) and the baseline monitoring program will be used to update the LTE model and the revised outputs of the model will be used to support the initial post-implementation evaluation plan.

The Region suggests that the evaluation process be conducted as follows. The updated outputs of the LTE model will be used in the development of Interim Evaluation Measures (IEMs) for the action. The output of EPA's LTE model is a cumulative distribution function (CDF) for each COC

on a reach-specific basis (in this case, the East Branch). The CDF plot shows the percent likelihood that any future equilibrium concentration is equal to or below a single specific concentration. The IEMs will initially be set to the 50th percentile concentration prediction from the LTE model for each COC (or the risk-based PRG if that is higher than the prediction from the LTE model). The 50th percentile of the CDF is being proposed as the appropriate evaluation measure to account for the inherent uncertainty associated with any modeling and the uncertainty around the ongoing sources of contamination.

A tiered evaluation program will be developed and refined over time. The initial tier will include the regular post-implementation sampling plan that will be developed during the design of the remedy, that will be refined over time, and that is described in more detail in the response to Recommendation 4, below. For the second tier, increased monitoring of all potential sources of contamination would be required when a surface sediment concentration in the remedy footprint reaches between 75% and 90% of the current IEM for any particular COC, depending on the COC and the likelihood (as predicted by the LTE model) that it will exceed the IEM over time.

This monitoring program will allow EPA to identify the specific ongoing sources that may cause IEM exceedances before IEM exceedances actually occur. In addition, by helping identify the location and magnitude of unacceptable sources, it will enable EPA to develop an appropriate course of action to ideally prevent IEM exceedances from ever occurring and, therefore, minimizing the amount of additional post-implementation in-creek work that may be required. The IEMs will be refined over time as new empirical data is obtained and updated LTE model projections are evaluated. Over time, as additional external source control measures are taken, the expectation is that all IEMs will be consistent with the risk-based PRGs, at which point the remedy would be protective and the ongoing monitoring would be conducted to assure it remains so.

Regarding NAPL and sheens specifically, if NAPL from ongoing sources, including upland seeps, is found to be impacting the protectiveness of the implemented remedy, it will need to be addressed through either state and/or federal enforcement authorities (to be determined on a case-by-case basis). In addition, sheens could potentially be indicative of the in-Creek remedy not functioning as intended and/or of an external source of contamination. As such, any sheen observed in the future would need to be further investigated, including through sampling and analysis. Depending on the results, additional remedial efforts could be required, again through either state and/or federal enforcement authorities (to be determined on a case-by-case basis).

In addition, the Region will conduct an extensive baseline monitoring effort prior to remedy implementation to, at a minimum, identify existing environmental parameters, COC concentrations, and sediment surface elevations throughout the East Branch. The baseline monitoring data quality objectives, media of interest, and spatial extent will be established during the design phase.

4. East Branch Interim Action Monitoring

CSTAG recommends that the Region consider whether it would be useful to differentiate between performance and RAO monitoring within the long-term monitoring objectives. Performance monitoring provides data to evaluate whether the constructed remedies (e.g., caps, ISS) are performing as designed whereas RAO monitoring is designed to evaluate whether conditions are trending towards or achieving RAOs. By developing sampling and evaluation approaches specific to these different objectives, the results can be more readily used to distinguish any performance issues associated with the constructed portion of the remedy from ongoing sources contributing to any lack of remedy performance.

CSTAG also recommends that in addition to the media of interest listed in the consultation memo, the Region may find it useful to add the following:

- Dissolved phase surface water COC concentrations using passive samplers to complement the pore water and surface water particulate sampling already planned. These data could be used to support differentiation of external inputs from performance of the constructed remedy in addition to detecting trends in surface water conditions before construction, during construction, and post construction.
- Bank inspections for erosion and possibly soil sampling if surface sediment conditions are not meeting expected remedy performance.
- Combined sewer overflow/municipal separate storm sewer system/stormwater and direct drainage, in the event these data are not already collected by others.

Finally, CSTAG recommends that the Region include the key aspects of the long-term monitoring program identified in the Tier 2 consultation memo (and above) in the proposed plan and ROD to set expectations for robust monitoring.

Response: The Region appreciates CSTAG's recommendations regarding both the dual goals of the evaluation monitoring program and the additional parameters to be included.

The Region is designing the long-term evaluation monitoring program so that it can be used to assess both the performance of the remedy itself within the East Branch and the impact on the protectiveness of the remedy from ongoing sources over time. The monitoring plan will be designed to detect both bottom-up concerns with the remedy (for example, from underlying NAPL or groundwater facilitated transport) as well as top-down concerns (for example, from the effects of climate change and scouring, and from the effects of ongoing sources of contamination from upland properties). The iterative approach, which is consistent with the Framework that has been developed for this Site, is as follows:

- Set long-term PRGs for the East Branch portion of OU1 equal to the risk-based human health and ecological concentrations.
- Determine interim evaluation measures (IEMs) using empirical data, as well as the predictive LTE model developed for the Site. The IEMs will be used for remedy design, implementation, and post-implementation monitoring, and will be adjusted periodically using empirical data to account for current conditions.
- Develop a long-term monitoring program that includes sampling of at least surface sediment, subsurface sediment, porewater, both suspended sediment and dissolved phase concentrations in surface water (with collection of dissolved phase surface water COC concentrations using passive samplers), and ongoing external sources of contamination (including, at a minimum, CSOs, MS4s, stormwater and overland flow, as needed if not being monitored under OU2). The monitoring program will also include regular bank inspections for erosion, with sampling as needed, and for the presence of seeps, with opportunistic sampling as possible. The purpose of this long-term monitoring program is to assess overall remedy effectiveness, including both the performance of the remedy itself within the East Branch portion of the OU1 Study Area and the impact on the protectiveness of the remedy from ongoing sources over time.
- If surface sediment concentrations do not meet the IEMs and do not continue trending towards the long-term remediation goals, determine if this is due to the performance of the in-Creek remedy itself or if additional external or internal/external interface source control measures are needed, either through federal and/or State of New York enforcement authorities, as appropriate.

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

state and/or federal (Superfund and/or non-Superfund) enforcement authority, to be determined on a case-by-case basis. For example, it may be determined that a sealed bulkhead should be put in place (through federal Superfund authority) as a temporary measure to address seeps while cleanup of the related upland source of contamination is evaluated and implemented (through state authority). The Region is using the term internal/external interface sources of contamination to more readily discuss the situation described in this example where the source of the contamination is from the surrounding upland area, but the impact is to the Creek itself.

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

5. SWAC Based Comparison to the IEMs and Compliance with the Risk-Based PRGs

CSTAG recommends that methods to evaluate compliance with SWAC-based PRGs be clearly defined in the FFS and interim ROD. For example, will compliance be defined as the 95% upper confidence level on the mean if less than the PRG, as recommended in US EPA 1989, or as a statistical comparison of the mean to the PRG, following the statistical recommendations in US EPA 2006? The Region should also consider specifying that monitoring and compliance data will be collected using spatially unbiased study designs.

Response: The Region appreciates CSTAG's support on the application of the IEMs and PRGs.

As described in the Region's response to Recommendation 3, above, the IEM for each COC will be set at the 50th percentile of the expected new equilibrium concentrations, as predicted by the LTE model, or the risk based PRG if this concentration is equal to or higher than the expected equilibrium concentration.

Regarding compliance with SWAC-based PRGs, the statistical methods to be used to evaluate compliance are still being discussed, and the Region is considering both of the approaches referenced above. The evaluation will be done on a reach-wide SWAC basis (or an intertidal area SWAC basis for lead) for the SWAC-based PRGs, and compliance will be defined as either the 95% upper confidence level on the mean, as recommended in US EPA 1989, or as a statistical comparison of the mean to the PRG, following the statistical recommendations in US EPA 2006. The Region's evaluation of NTE-based IEMs would be on a point-by-point basis.

Additional details will be provided to CSTAG once they are developed, and the Region welcomes any additional feedback CSTAG may want to provide.

Regarding development of the monitoring and compliance sampling program, the long-term evaluation monitoring sampling locations will be determined using an unbiased approach. To the extent practicable, the locations will be equally spaced and include both vertical and horizontal delineation. At a minimum, the following will be included in the long-term effectiveness monitoring sampling extent:

- Vertical: From water column directly above sediment/remedy surface (~0-6") to just below deepest portion of remedy (~0-12" into un-remediated material) to determine potential "contaminant source zone" concentrations
- Horizontal: Across entire East Branch, into immediately adjacent un-remediated portion of OU1 to determine potential "contaminant source zone" concentrations
- Opportunistic seep sampling, if any observed
- Temporal: once immediately post-remedy construction then on regular to be determined intervals

If exceedance of 75% to 90% of the IEM, depending on the COC, does occur, then the Tier 2 sampling approach, as described in the response to Recommendation 3 above, will have sufficient spatial density to discern the location of any unacceptable sources.

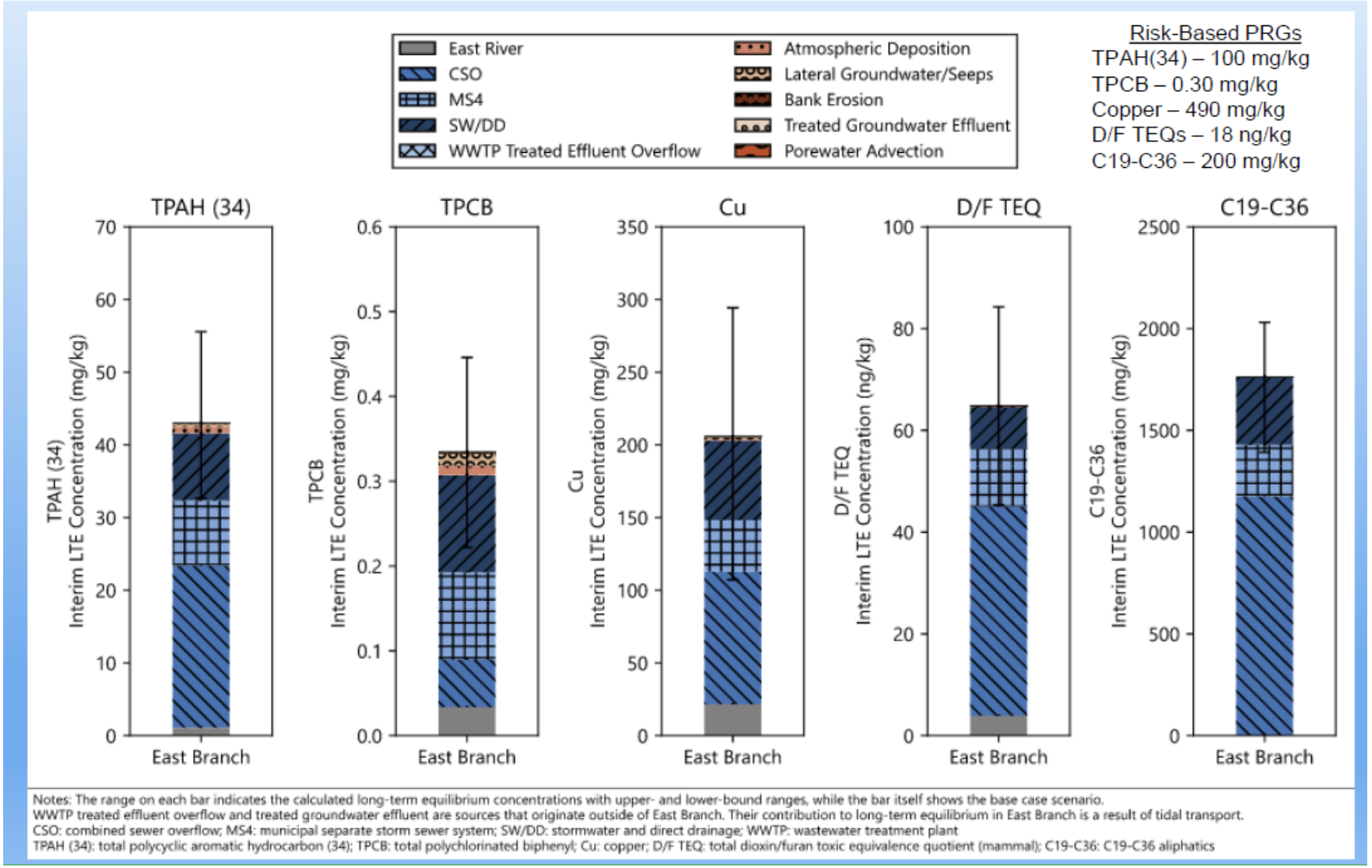
6. Consideration for Baseline and Long-term Sitewide Monitoring

CSTAG recommends that the Region document how fish and crab COC reductions will be monitored and used in the ASM plan and site decision making. Passive samplers may prove a useful surrogate and consistent indicator of East Branch and sitewide COC trends.

Response: The Region appreciates CSTAG's recommendation on this concern. The two exposure-based RAOs for the action are to (i) reduce potential current and future exposure to COCs from ingestion of fish and crab by preventing biota exposure to sediments in the East Branch with COC concentrations above protective PRGs/RGs and (ii) reduce ecological exposure to Site COCs in sediment by reducing the concentrations of COCs in contaminated sediment in the East Branch to protective PRGs/RGs. The EB early action is an interim remedy that will be followed by additional remedial work in the rest of the OU1 Study Area. It will reduce the source of contamination that is available to fish and crabs in Newtown Creek. This is beneficial even if we do not see immediate reductions in fish and crab concentrations from this interim action. A comprehensive baseline monitoring program that includes fish and crabs sampling will be conducted prior to implementing the action. After implementation, passive samplers

deployed in the surface water will generally be used to evaluate concentration trends over time. The long-term fish and crab monitoring program will be re-evaluated as future cleanup decisions are made for the site.

Figure 1 – Current Outputs of Long-Term Equilibrium Model



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