

Executive Summary

New York City (the City) is uniquely positioned in the investigation and remediation of the Newtown Creek (the Creek) Superfund Site (the Site or Study Area), acting as a stakeholder representing the interests of the local public and identified as a Potentially Responsible Party (PRP) by the US Environmental Protection Agency (USEPA). From this standpoint the City generally supports the Early Action (EA) in the East Branch (EB) as a potential opportunity for an expedited and effective clean up, but has several concerns regarding various elements of the proposed EB EA. The City's concerns center on the Remedial Action Objectives (RAOs) for EB, as well as the rest of the Creek (designated Operable Unit 1 [OU1]), and the cleanup goals set for EB and OU1. It is important to address these concerns to 1) avoid potential failure of the EA via recontamination of the remediated area and 2) to be consistent with USEPA guidance for Superfund cleanups. The concerns include:

- 1)** The RAOs of the EA and OU1 do not include control of Non-Aqueous Phase Liquid (NAPL) seeping from upland sites, therefore, the RAOs of the EA and OU1 are not comprehensive. NAPL seeps are prevalent in OU1 and have been well documented by multiple parties. NAPL seeping from upland sites adjacent to the EA and in OU1 contains Contaminants of Potential Concern (COPCs) at similar concentrations to NAPL that migrates through the sediment bed within the Site. NAPL seeping from upland sites will cause recontamination of the remediated area if not controlled and exposes ecological receptors to very high concentrations of COPCs. For this reason, the RAOs for the EA and OU1 should include control of potentially significant upland sites.
- 2)** USEPA guidance and precedence considers anthropogenic background as well as risk-based Preliminary Remediation Goals (PRGs) for any action, however, the EA seems to refer to anthropogenic background as Interim Performance Measures (IPM). The EA seems to set the long-term goal to reduce sediment concentrations below the anthropogenic background in order to meet risk-based PRGs, while not recognizing that the anthropogenic background is at or below the risk-based PRGs for all measured COPCs except dioxin/furans, where it is at comparable levels. Furthermore, an undue emphasis is placed on potentially attempting to reduce anthropogenic background by controlling urban runoff to the Site. The City strongly opposes the use of IPM to target point sources to the Creek in an effort to reduce the anthropogenic background, which is marginally above the risk-based levels. This is especially relevant as NAPL, a principal threat waste at most sites, continues to enter the study area from uncontrolled upland sites.
- 3)** The objectives and purpose of the EA assume that the CSM of the EB is the same as the remainder of OU1 and that the EA can inform or validate the CSM for the remainder of OU1. This is fundamentally incorrect as the EB is distinct from the many other portions of the Creek. In addition to this, the schedules for the EB Focused Feasibility Study (FFS) and OU1 Feasibility Study (FS) are too close in time for the actions or lessons learned from EB FFS to be applicable to OU1 in any meaningful way.
- 4)** The CSM for the EB is incomplete, potentially important sources are left uncharacterized. This includes NAPL and contaminated groundwater arriving through the intertidal zone and NAPL transported into EB from other areas of the Site during flood tides. These data gaps occur throughout the Site and are not unique to EB.

- 5) The alternatives proposed for EA do not consider bulkhead stability. Many shorelines in the EB are unstable, so shoreline stability needs to be considered.
- 6) The proposed performance monitoring to evaluate interim remedy success for the EA must consider that the EB is connected to the rest of the Creek and will experience contaminant exchange with unremediated parts of the Creek and associated sources due to tidal exchange. The performance monitoring and the pre-design investigation must include systematic surveys to document NAPL seeping from upland properties and take steps to control them. Additional steps also must be taken to understand the impact of exchange with other parts of the Creek.
- 7) The methods used to characterize NAPL mobility do not sufficiently characterize in-situ conditions. A close examination of the methods used shows that the methods were meant for coarse-grained materials and not soft fine-grained sediment. The method limits NAPL migration by compressing the sample and reducing conductivity, and the presence of sheen in the final steps of the testing was not counted as indicative of the presence of NAPL. Mobility of NAPL has significant potential impacts on the viability of the EA and the alternatives that should be considered.

Specific comments below follow the USEPA summary document provided to CSTAG:

1) Basis for the EB EA: Several reasons are listed as the basis and supporting reasons for the EB EA. Some of the reasons seem to contradict the USEPA-approved schedule for the Site and the data collection activities proposed for the EB. Specifically, this concern applies to the feasibility or applicability of the following two primary reasons for the EA:

a. Validate and Update CSM for OU1: The Study Area (i.e., OU1) is not a homogenous waterbody with respect to contamination observed in the Creek and sources responsible for contamination. The contamination found in the EB and the sources to EB contamination are not representative of the Study Area/OU1 as a whole. For example, the Turning Basin (TB) area of the Creek has the highest contamination in both surface and subsurface sediments of the Creek for PCBs, PAHs and copper – reflective of the legacy industrial activities along the Creek near that area, such as oil refineries, MGP plants and copper smelters, among others. NAPL impacts (presence of NAPL layers, blebs, sheens) in the sediments of the Creek are significantly higher in the TB than any other part of the Creek. The sources of solids to this portion of the Creek are largely from East River (65%), followed by point sources. The TB is also subject to boat traffic, which is not the case for the EB. The CSM presented in the Remedial Investigation (RI) report for EB is not representative of the CSM for the TB or other areas of the Site. Therefore, any updates to the CSM or validation of the CSM for East Branch would not reflect the validity of the CSM in other parts of the Creek.

In addition, the performance monitoring program evaluates the remedial action on a 5-year schedule. It is unlikely that the schedule and the resulting data can be available in time to provide meaningful information to the CSM for rest of OU1.

b. Applicability of the lessons learned approach for other OU1 areas: The “Basis for the Early Action” section in the EA overview states that the lessons learned from the EB pre-design investigation, remedial action and performance monitoring will *“help inform the conduct of potential future early actions on other portions of the Creek and the OU1 site wide FS alternative development, evaluation and remedy selection”*. However, this is not supported by the OU1 schedule approved by USEPA Region 2 in Spring 2023. As per the OU1 project schedule, the EB EA FFS will be approved by end of February 2024. The FS report for the OU1 is expected to be approved by USEPA in December of 2027 (meaning it will need to be almost fully formed at least a year before, in 2026). Given that the two approvals are three years apart, it is unlikely that the pre-design investigation will be completed for the EA. Therefore, any lessons learned from the EA will not be available to help in determining the remedy selection for OU1. Also, at this time there are no plans for other Early Actions or a need for those, given the schedule for the entire study area.

2) RAOs for the EA not Comprehensive: The source control RAO proposed for the EB and the Study Area is not comprehensive and will prevent achieving the exposure-based remedial action objectives. The purpose of the source control RAO is to “reduce” NAPL migration from sources within the Study Area. This would mean that controlling the ongoing NAPL seeps coming in from upland sites to the Study Area is not an explicit RAO. NAPL is usually designated by USEPA as a principal threat waste and NAPL seeping from upland properties is a common occurrence in the Study Area. The City has documented NAPL seeps from various upland properties in 2016 which have been confirmed by the New York State Department of

Environmental Conservation (NYSDEC) in 2022 and 2023. The community has also documented and sampled NAPL seeps. The RI/FS work does not include sampling data from NAPL seeping into the Creek. Although USEPA has initiated a lateral GW sampling program, this has not included samples of the NAPL seeping from upland properties. The CFT model, to be used for remedy selection, does not include NAPL seeps as a source of contamination to the Creek and cannot assess the current impacts of NAPL on the Creek or the recontamination potential of the ongoing NAPL seeps on the sediment recovery.

Data collected by the City shows that the NAPLs entering the Creek have COPC concentrations that are orders of magnitude higher than the risk-based PRGs. **Figures 1a-c** below show the concentrations of the COPCs in NAPL migrating from upland properties and from sediments of the Creek due to ebullition. As shown in the figures below, the concentrations of COPCs in the NAPLs are very high. On average the TPAH34 concentrations in NAPLs seeping in from upland Sites is about 100,000 mg/kg, average TPCB is approximately 100 mg/kg and average C19-C36 aliphatic petroleum hydrocarbons concentration is approximately 400,000 mg/kg. These concentrations are comparable to the concentrations in NAPLs migrating due to ebullition. Although there is a specific plan to control NAPL migrating through the sediments as part of the source control RAO, NAPL from upland properties is not targeted, despite the elevated concentrations. This is in direct contrast with other Superfund Sites where reducing or eliminating NAPL migration from all sources, including uplands, is a RAO.

Figure 1a – TPAH 34 Concentrations in NAPL Migrating to the Study Area

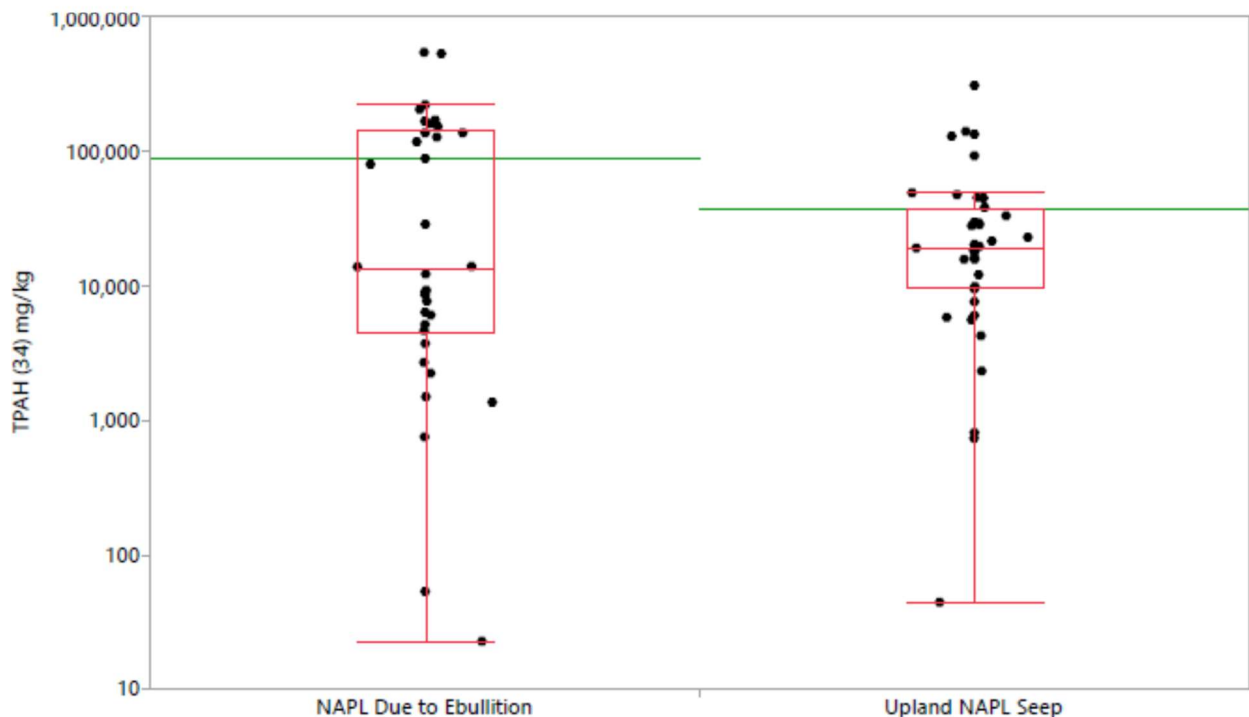


Figure 1b – C19-C36 Aliphatic Petroleum Hydrocarbon Concentrations in NAPL at the Study Area

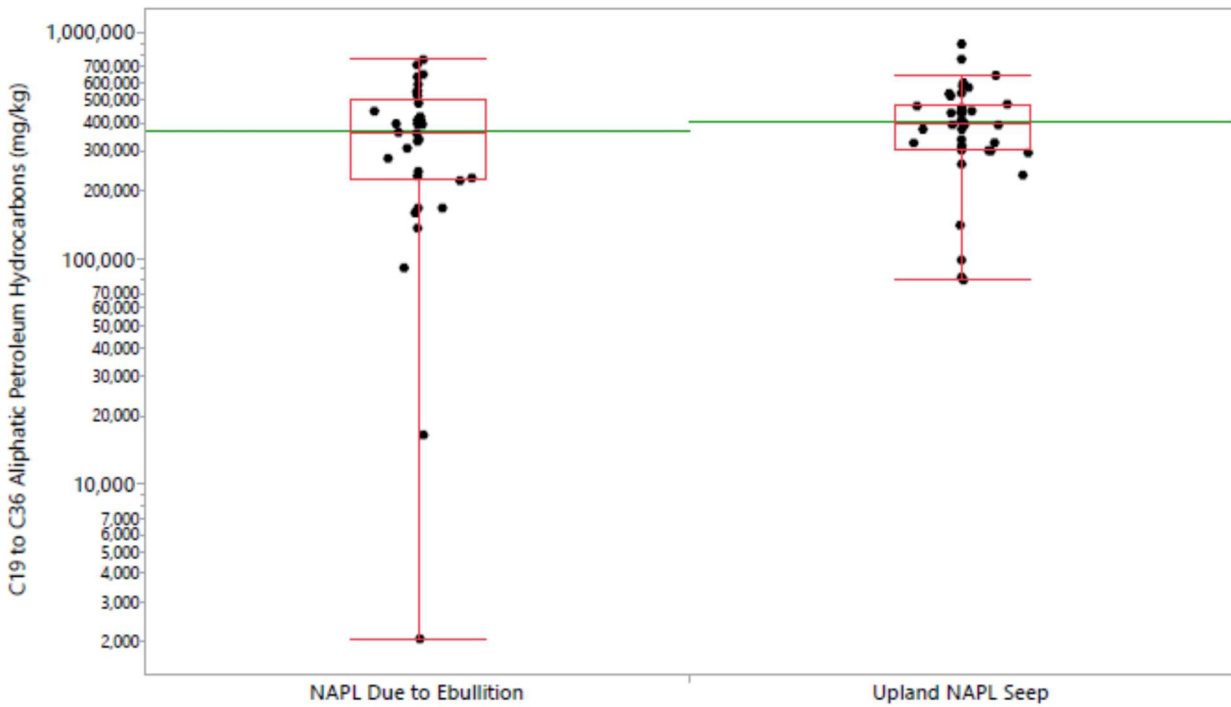
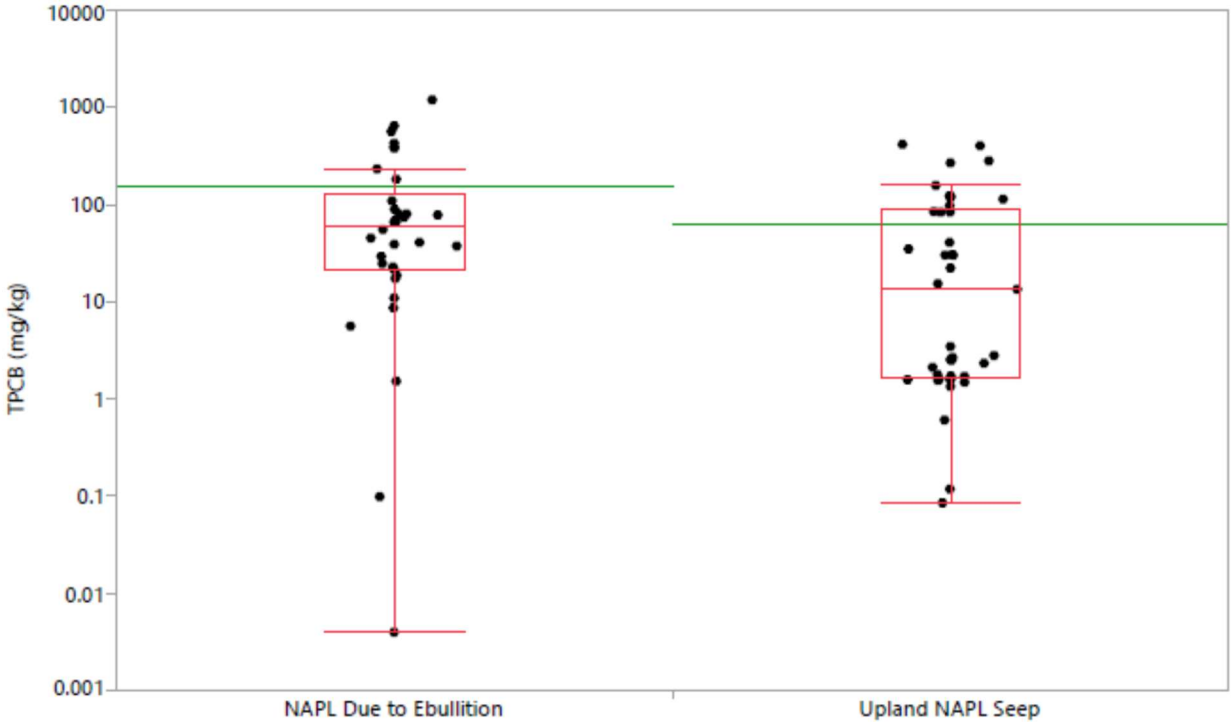


Figure 1c – Total PCB Concentrations in NAPL Migrating to the Study Area



NAPLs can be seen entering the Creek during low tide (twice daily) along with the groundwater discharging from the intertidal zone¹. The NAPL then moves through the Creek on the ebbing tide. Some NAPL interacts with the suspended solids in the water column forming oil particle aggregates which settle on the Creek bed and forms surface sediment. NAPL also settles on the Creek due to density differences. Ecological receptors such as birds, fish, bivalves, crabs, etc. are directly exposed to the NAPL on the water surface and in sediments and the associated elevated COPC concentrations. The exposure and the effects (i.e., risk) are demonstrated by the failure of the second bivalve study that had been started for the Site during the RI, which could not be completed due to the very high mortality. The NAPL observations, chemical measurements of NAPLs, and the bivalve study challenges all make it clear that "ongoing sources to the Creek that are not part of the Study Area" will impact the protectiveness of the remedy. As a result, the source control RAO must also include upland properties. This would facilitate data collection (systematic surveys, samples etc.) under pre-design investigation for identifying NAPL seeps coming in from upcoming properties and an approach for upland control, either under USEPA or NYSDEC. If the RAOs do not include upland sources, there will be ecological risks and human health risks from surface water and sediments that is not accounted for in the remedy. Data gaps regarding NAPL sources and transport remain because the surface water data collected during the RI did not characterize the horizon where NAPL migrates during ebullition/seepages from the banks (the immediate water surface) and the collected data do not include water samples that capture NAPL, and so the surface water risk pathway is not completely characterized.

3) Use of Interim Performance Measures instead of Anthropogenic Background: The EA documents seem to refer to anthropogenic background for the Creek as Interim Performance Measures (IPM). An excel-based model has been used to estimate the Long-Term Equilibrium (LTE) concentrations in the surface sediments of the Creek after the entire Creek has been remediated and any ongoing sources to the Creek would continue. The only ongoing sources to the Creek included in this model are point sources, the East River, eroding shorelines, atmospheric deposition, and groundwater (assumed to be uncontaminated). NAPL migration – both from within and outside (i.e. upland seeps) the Study area is not considered as an ongoing source to the Creek for this calculation. This calculation is effectively the anthropogenic background for the Creek after remedial action has taken place. **Figures 2a-e** below presents a comparison of the risk-based PRGs with the anthropogenic background for the Site calculated for each Creek reach using available data for the RI/FS. As shown in the figure, the anthropogenic background for the contaminants of concern is at or below the risk-based PRGs for all contaminants except Total Dioxin/Furan TEQ. Even for Total Dioxin/Furan, the risk is significantly reduced if the Site is at the anthropogenic background. The entire New York harbor currently poses risk due to elevated Total Dioxin Furan TEQ concentrations in the sediments, as demonstrated by the concentrations at reference areas selected for risk assessment for the Site. Testing at the four waterbodies, Westchester Creek, Gerritsen Creek, Spring Creek and Head of Bay, representative of the urban areas in the NY harbor show presence of toxicity to human health due to elevated concentrations of TPCB and Total Dioxin Furans in sediments.

¹ The current OU1 CSM includes the limited description that “lateral groundwater discharges through permeable vertical shorelines” (emphasis added). This description is not supported by the extant literature and observations in the Creek and is unnecessarily limiting. To point, the extant literature agrees groundwater discharge focuses on the intertidal zone regardless of the angle from horizontal. The City strongly recommends that this description be removed from future documents and replaced with “intertidal zone groundwater discharge”, which is an accurate assessment of the process occurring in the Creek.

Figure 2a Comparison of Anthropogenic Background/IPM/LTE to Risk PRGs – TPAH 34

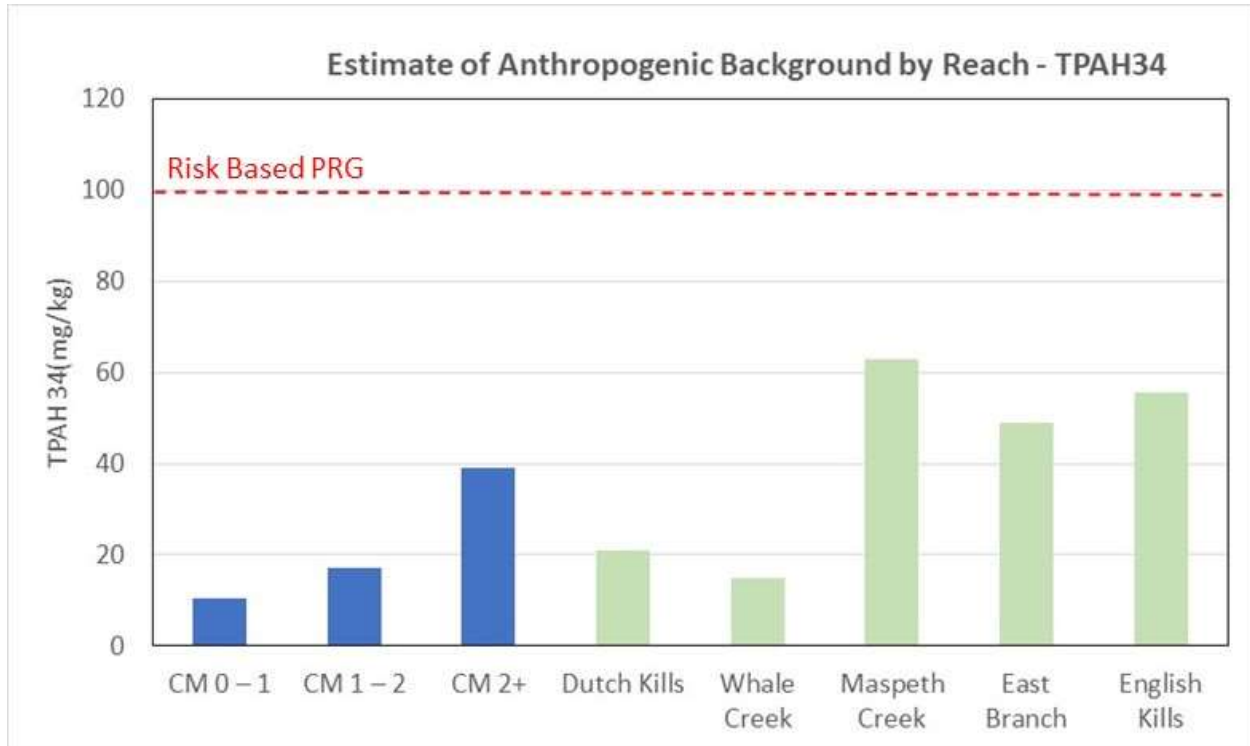


Figure 2b Comparison of Anthropogenic Background/IPM/LTE to Risk PRGs – Copper

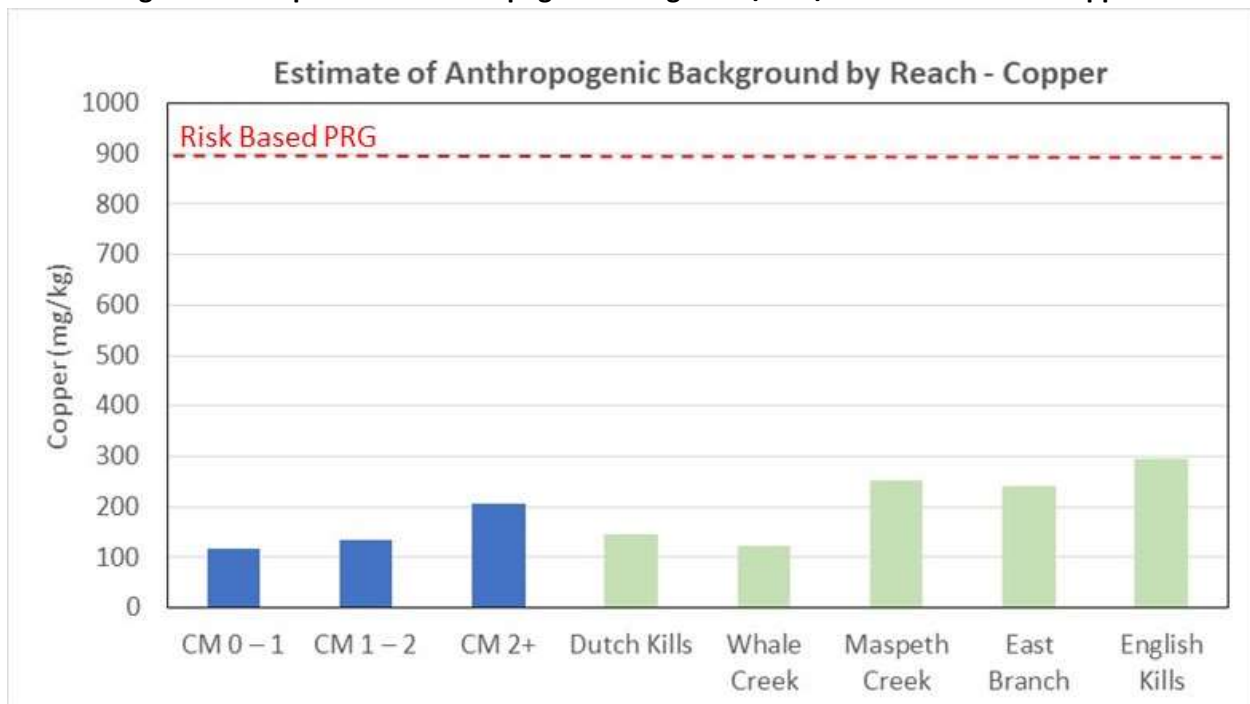


Figure 2c Comparison of Anthropogenic Background/IPM/LTE to Risk-Based PRGs – TPCB

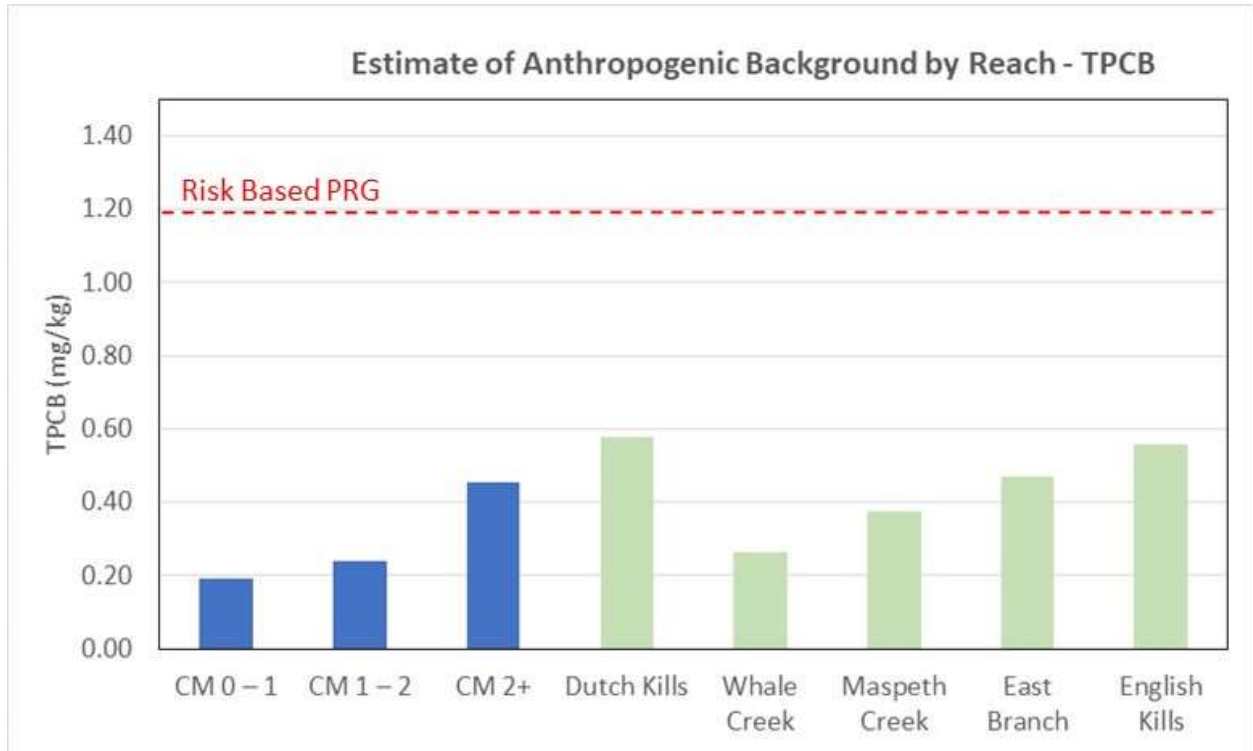


Figure 2d Comparison of Anthropogenic Background/IPM/LTE to Human Health Risk-Based PRGs – TPCB

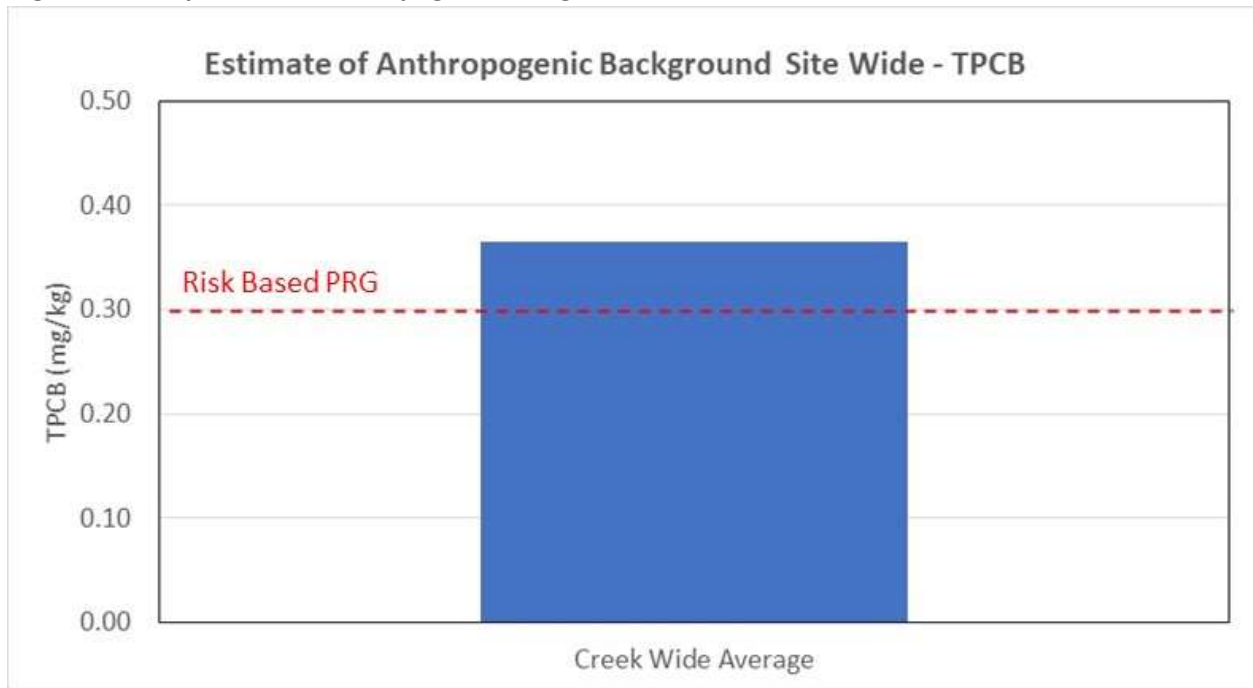
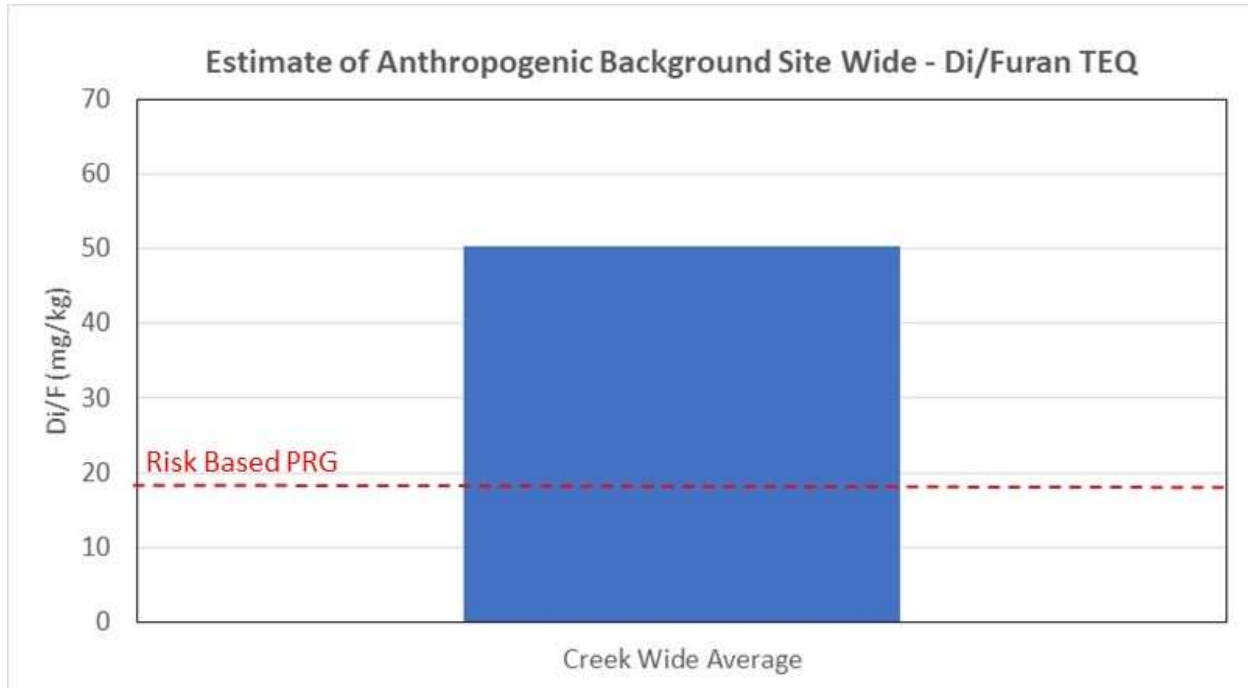


Figure 2e Comparison of Anthropogenic Background/IPM to Human Health Risk-Based PRGs – Dioxin/Furan TEQ



As per USEPA guidance (USEPA 2002), the CERCLA program does not set cleanup levels below anthropogenic background concentrations. Setting the PRGs for this Site at the risk-based values and not the anthropogenic background goes against USEPA guidance. Instead, an unprecedented approach of calling the anthropogenic background an IPM is applied. No definition of what “interim” represents has been provided. The approach also states that, “EPA expects loading from ongoing sources to decrease over time due to improved BMPs in general, ongoing cleanup actions, and additional regulatory control.” in support of using an “interim measure”. While in general this statement is true and COPC concentrations can be expected decrease over time, the rate of decrease is unknown and has been not quantified. It is not clear from this approach when the Site is expected to achieve the risk-based PRGs for chemicals where the anthropogenic background is above the risk-based PRG.

4) Use of Interim Measures to Control Sources: As discussed in the previous comment, the LTE model has been used to calculate IPM/anthropogenic background. The inputs to the model are point sources, East River, groundwater, eroding shoreline and atmospheric deposition. NAPL migration from upland sites and within the study area is **not** an input to the model. The LTE model is also proposed to “Assess the need for additional source control measures that could be implemented to reduce LTE concentrations and potentially achieve the risk-based PRGs.” Based on the inputs defined for the model, this tool will be used to evaluate solids-based sources, such as point sources, to achieve the risk-based PRGs, even if the Creek sediments will already be very close to the risk-based PRGs. Additional reductions of stormwater or other point sources to the Creek may not be feasible due to the limits of technology and infrastructure, which requires consideration under CERCLA. More importantly, a focus on controlling stormwater to achieve risk-based controls is misplaced when NAPL (a principal threat waste for most Sites) with elevated COPC concentrations potentially enters the Creek from uncontrolled upland sites and poses a significant risk to

ecological receptors and impact the Study Area. There is no current proposal in the EB EA for a sampling program or pre-design investigation or performance monitoring which will systematically survey and sample NAPL seeping from upland Sites to understand the impact of NAPLs on the sediments and on risk. The data collected by the City and NYSDEC has not been included as part of the RI/FS to develop an understanding of NAPL on the Site sediments.

In addition to NAPL impacts from upland properties, the shoreline erosion also brings in contaminant concentrations well above the risk-based PRGs. All along the Creek, many of the shorelines are caving into the Creek and have decrepit bulkheads at former brownfield and ongoing properties (e.g. Frito Lay). **Figures 3a-f** shows pictures of some representative conditions of shorelines along the Creek. Despite this, controlling upland sites – some of which have been in cleanup programs for decades, is not one of the source control pathways included in the limited definition of the source control RAO or the setup of the LTE model. The City strongly opposes the use of the IPM to target point sources to the Creek in an effort to reduce the anthropogenic background, which is marginally above the risk-based levels especially when NAPL, principal threat waste at most sites, can enter the study area uncontrolled.

Figure 3a – Examples of Degraded Shorelines in the Study Area



Figure 3b – Examples of Degraded Shorelines in the Study Area



Figure 3c – Examples of Degraded Shorelines in the Study Area



Figure 3d – Examples of Degraded Shorelines in the Study Area



Figure 3e – Examples of Degraded Shorelines in the Study Area



Figure 3f – Examples of Degraded Shorelines in the Study Area



5) External Sources that may need Further Control for EB: The “East Branch Early Action Overview” memorandum does not provide a comprehensive list of external sources that may not be controlled by EA and will need additional control to remain protective of the remedy. The list provided includes lateral groundwater but does not include NAPL seeps documented in EB. The City has documented a NAPL seep from the bulkhead of the Western Beef property which abuts the eastern lobe of EB. The City has documented NAPL seeping from this property, both before and after the new bulkhead was installed at the property location. The purpose and the design of the new bulkhead is unknown. It is not clear how deep the bulkhead goes and the purpose of the bulkhead – stability or NAPL control.

The figure below shows a picture of NAPL/oil sample collected by the City from the NAPL seeping from the Western Beef property during an extensive program conducted by the City to characterize documented NAPL seeps in 2017 (NYCDEP 2020). The contaminant concentrations in the sample are elevated – TPAH34 concentration of 9,000 mg/kg, TPCB concentration of 130 mg/kg and C19-C36 petroleum aliphatics concentration of 360,000 mg/kg. It is also noteworthy that the eastern lobe of EB, where the property is located, the contaminant concentrations in the sediment are elevated when compared to other parts of the Creek. The eastern lobe of the EB is an area where NAPL migration due to ebullition is more pronounced and NAPL loading is elevated.

The FFS for EB must clearly document the ongoing impacts from uncontrolled NAPL seeping to the Creek from Western Beef and other upland sites and state how the EA will address this source of contamination.

Figure 4- Picture of NAPL Sample Collected from a Seep from Western Beef Property



6) Alternatives proposed for the EA do not consider bulkhead stability: The alternatives proposed for the EB EA do not consider control for ongoing sources from upland sites or bulkhead stability. The FFS for the EB EA must consider bulkheads and the potential need to repair or replace them during alternative development in the feasibility study and not the remedial design phase. Shoreline stability should be evaluated in the feasibility study to consider the range of technologies available to address the shoreline conditions. The FFS evaluation should be informed by stability, logistical, construction, or remedy feasibility/effectiveness evaluations. Consideration of these issues have been required for the OU1 alternatives memorandum development. The City strongly recommends consideration of the shoreline stability issue for East Branch early action.

7) Data gaps are present in the understanding of fate and transport processes in EB and the CSM: There are data gaps associated with the fate and transport processes for the RI/FS. For EB, these include NAPL and contaminated groundwater entering the Creek from the intertidal zone. No samples have been collected under the RI/FS to characterize this pathway. Data collected by the City and the NYSDEC show that these sources are a significant source of contaminants to the Creek and the EB. Furthermore, given the tidal nature of the Creek, NAPL migrating from other parts of the Creek also impacts the EB. Due to lack of characterization of these ongoing sources to the Creek, the fate and transport processes and the CSM developed for the EB EA are incomplete. Therefore, the remedial alternatives developed using the

incomplete fate and transport processes and CSM will not be effective in controlling recontamination from uncharacterized sources. More importantly, the recontamination due to uncharacterized sources could be attributed to other sources in the form of modeling or data uncertainty. The EA FFS must acknowledge the presence of data gaps and must collect necessary data during predesign investigation.

These data gaps are not unique to the EB portion of the Study Area. Data gaps associated due to lack of data for groundwater and NAPL entering through the intertidal zone are present for the entire Site. There is also significant uncertainty associated the loads associated with NAPL migrating due to the ebullition. This is largely driven by the poor understanding of the spatial extent of areas over which NAPL migration due to ebullition is occurring. The CSM and the CFT model compensates for the lack of characterization of these sources by attributing their impacts to point sources – especially CSOs and MS4s. For example, in the CFT model, the contaminant loads from groundwater and NAPL seeps entering the Creek from the intertidal zone are set to **zero**. The approach used in the CFT model to set the contaminant inputs loads to zero is incorrect for a site with obvious NAPL impacts. The CFT model is uncalibrated and its inability to predict the elevated concentrations in the sediment has been attributed to uncertainty in point sources.

Figures 5a-c below show the concentrations of contaminants measured in point sources compared to Creek sediments as well as other regional waterbodies. As shown below, the RI data collected for point sources and other Sites shows that the contaminant concentrations in point sources are low and have low variability. Point sources cannot explain the significantly elevated concentrations in the surface sediment of the Creek. This is further supported by the LTE analysis, which shows that if the point sources were allowed to continue, concentrations in the surface sediment of the Creek would be comparable to the risk-based remedial goals for most contaminants.

Figure 5a – TPAH concentrations (mg/kg) in Point Sources, Superfund Sites, and Regional Waterbodies

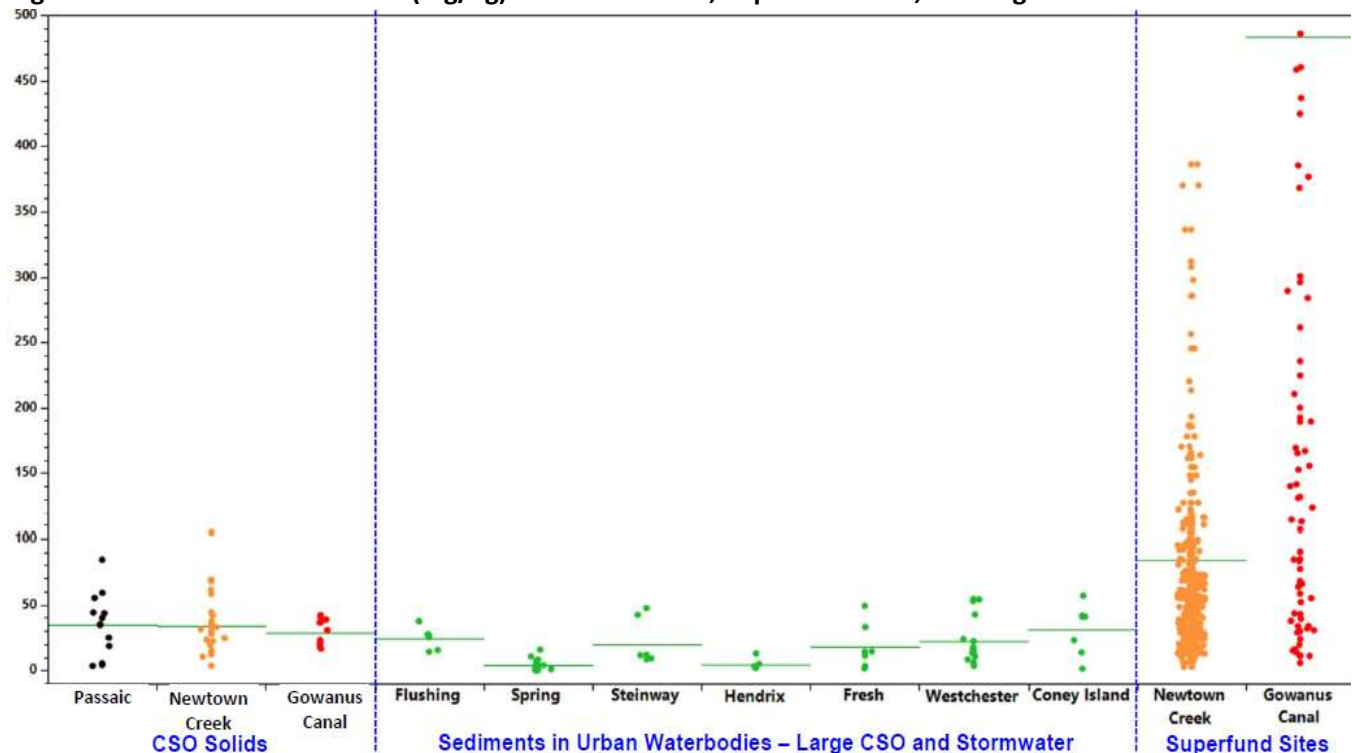


Figure 5b – TPCB (mg/kg) concentration in Point Sources, Superfund Sites, and Regional Waterbodies

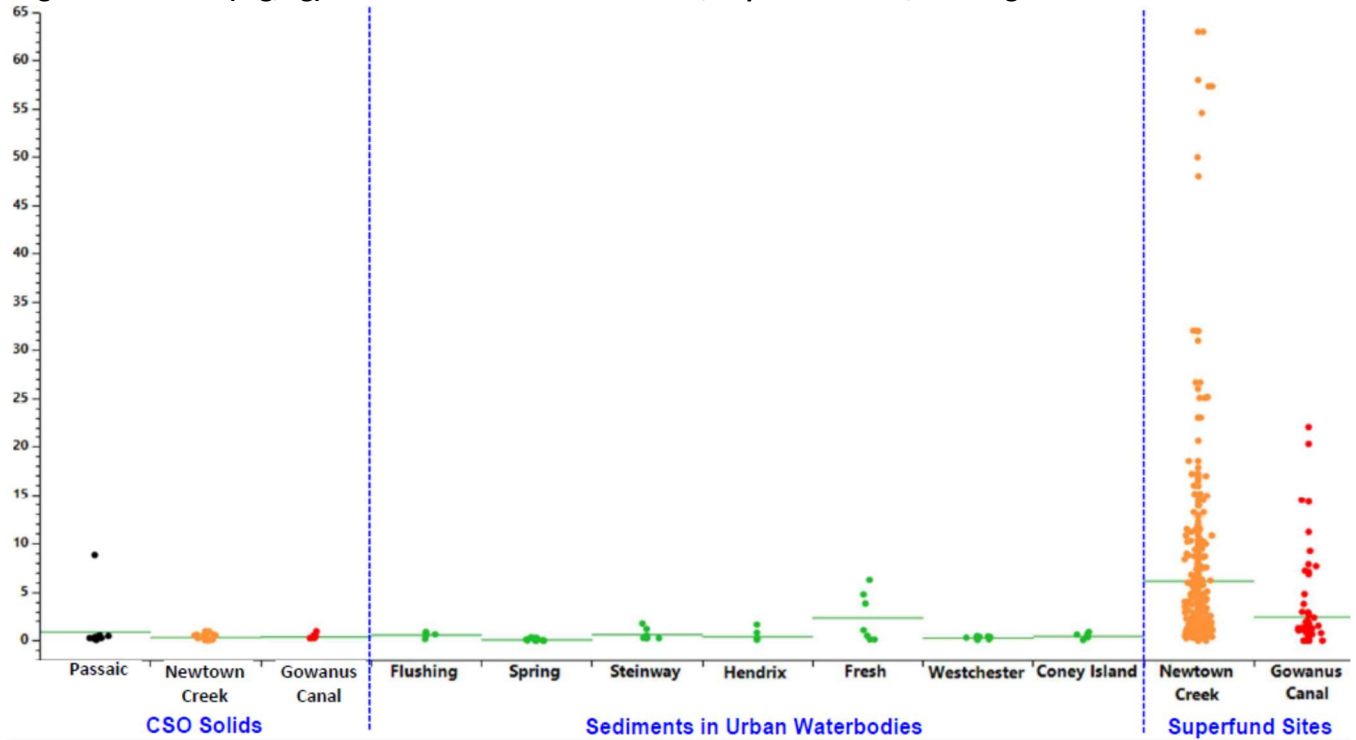
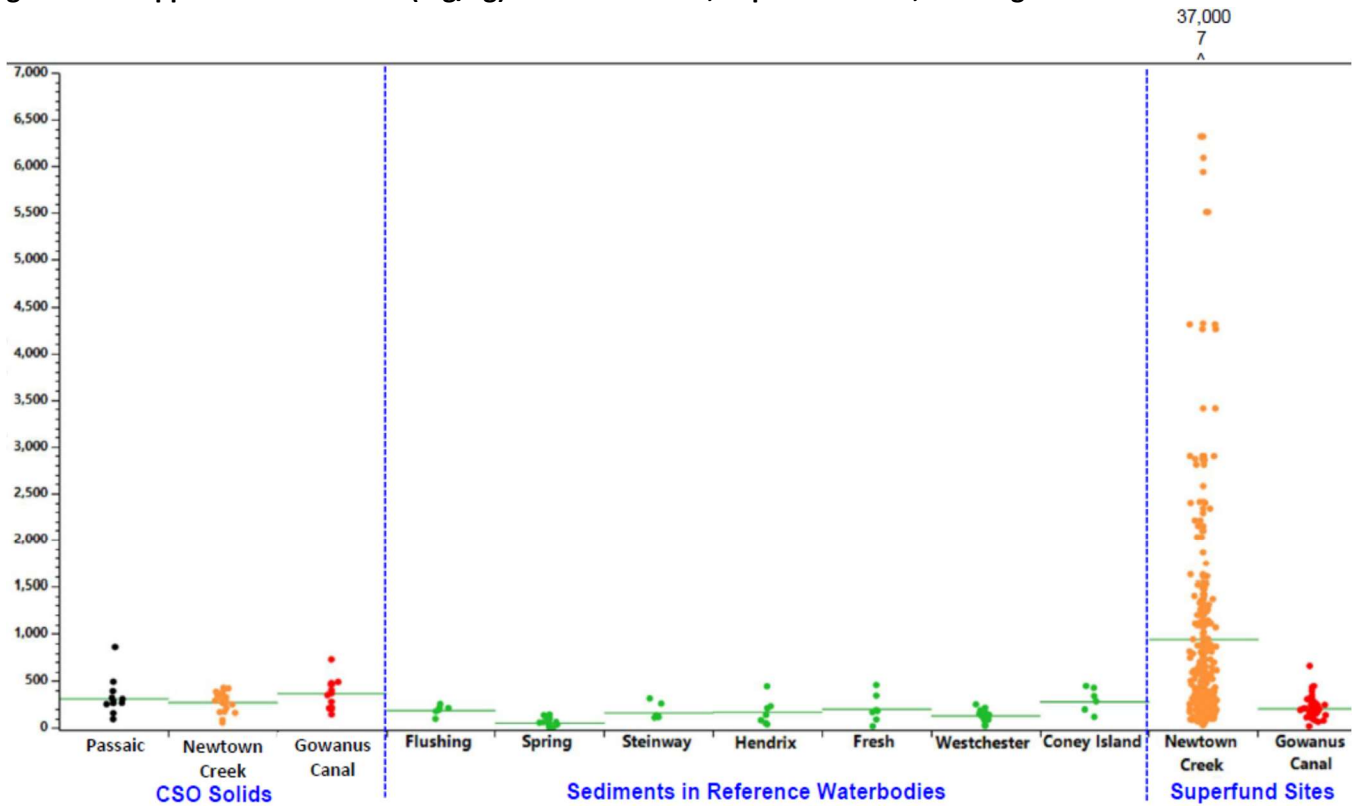


Figure 5c – Copper Concentrations (mg/kg) in Point Sources, Superfund Sites, and Regional Waterbodies



8) Performance Monitoring: Performance monitoring is proposed to evaluate interim remedy success for the EB EA. The performance monitoring must consider the connection between the EB to the rest of the Creek and the contaminant exchange with un-remediated parts of the Creek and associated sources due to tidal exchange. The LTE model used to develop IPMs does not account for contaminant exchange from un-remediated parts of the Creek or from NAPL seeping into the EB and other parts of the Creek from upland sites. It cannot be expected that the EB will meet the IPM if contaminant exchange with un-remediated parts of the Creek continues and NAPL migration from upland properties is uncontrolled. Recontamination from these sources could be erroneously attributed to other sources, such as point sources. The performance monitoring and the predesign investigation must include systematic surveys to document NAPL seeping from upland properties and must take steps to control them. Additional steps also must be taken to understand the impact of exchange with other parts of the Creek on the EB.

9) Presence of NAPL in the sediments of the Creek and OU1 is underestimated: The presence of NAPL in the sediments of the Creek has been underestimated in several ways. First, visual observations of NAPL indicators were not used for delineating NAPL presence. Second, the presence of sheen in a shake test or in visual observations was not considered as an indicator of presence of NAPL in sediments. The workplan that set this standard did not provide any studies or citation to support that claim. Sheen is a non-aqueous phase liquid by definition and guidance from NYSDEC states that sheens are indicators of NAPL. This is also supported by NOAA guidance on open water oil identification as part of a spill response (NOAA 2016). This guidance even defines sheens as, *"Sheen is a very thin layer of oil (less than 0.0002 inches or 0.005 mm) floating on the water surface and is the most common form of oil seen in the later stages of a spill. According to their thickness, sheens vary in color from rainbows, for the thicker layers, to silver/gray for thinner layers, to almost transparent for the thinnest layers."*

There are a significant number of locations where the RI claims that NAPL is not present based on this interpretation (referred to as Category 1A locations), including areas within the EB. The assertion that sheen is not an indicator of NAPL is further disproved by ebullition studies which show NAPL migration from Category 1A areas, including in EB. NAPL migration from ebullition in the EB is estimated at about 155 kg/year, and 500 kg/yr Creek-wide. This has significant impacts on the CSM for EB and the entire Site.

10) NAPL Mobility testing in the Creek is limited and potentially underestimates NAPL mobility: A three-staged approach was used to assess NAPL mobility in the Creek. NAPL is considered mobile only if NAPL migration is documented in all three stages. A sample was tested for subsequent stages of sampling only if NAPL migration is observed in the previous stage. The stage 1 method used to test NAPL mobility was not a standard method that has been proven to test mobility of NAPL in fine grained sediments such as those found in Newtown Creek. Rather, the method used was a deviation of ASTM Method D425 which is a method to test the moisture content in coarse grained soils which drain easily (as stated explicitly in ASTM method D425), **not** soft fine-grained material. The ASTM guidance does not recommend centrifugal analysis to determine moisture content in fine grained material. Furthermore, the forces used for coarse grained material, under ASTM method D425 are 1000 G for 1 hour, as opposed to 25 G for 10 hours. ASTM Method D425 refers to ASTM method 6836 for testing fine grained material for soil water curve. ASTM Method 6836 notes that the centrifuge method (Method E) "is typically used for coarser soils". In both methods ASTM describes using a centrifuge as being appropriate for coarse soils, and by inference not for soft fine-grained sediment, which is what Newtown Creek sediments are (fine-grained).

The reasoning applied was that if the NAPL is immobile at such forces, it is unlikely it will be mobile in-situ. This assertion is incorrect and misleading. Compressing fine grained sediments is well known to be a way to decrease permeability and therefore NAPL mobility. During Stage 1 testing, the sample volume was compressed by the high pressure placed on the soft samples which decreases the permeability. The lab data shows that the sample volume decreases on average by 10%, and as high as 31%, which results in a larger change of the void ratio. Compressing the sample and reducing the void ratio decreases the conductivity of the sediment (because of lower viscosity, water will be expressed from the sediment before the NAPL, so loss of water is the most likely reason for the compression). Therefore, it is inappropriate to rule out NAPL migration when the testing method limited the mobility of NAPL that was being tested. To assess the applicability of the deviation of an ASTM method not designed for fine grained material, at a minimum, samples with high NAPL saturation where Stage 1 ruled out additional testing should be tested using Stage 2 methods. This is a significant flaw in the analysis and brings into question the reliability of the NAPL study given that this method is used as the first step to eliminate samples from further testing.

Despite the unintended effect of preventing NAPL migration by using the method, the labs did document NAPL (product) migration in few samples and for most samples a discoloration and petroleum odor was documented. Samples where discoloration and odor were documented were not selected for analysis.

Rainbow sheen, indicative of NAPL migration, were documented in most samples analyzed using Stage 2 approach. **Figure 6** shows the result of sheens observed as part of Stage 2 testing. However, the RI/FS does not define sheens or even rainbow sheens with petroleum odors as NAPL. This is contrary to all available guidance from NOAA and NYSDEC for indicators of NAPL. So, despite evidence of NAPL migration in Stage 2, samples were not selected for Stage 3 testing due to an unsupported assessment of NAPL mobility. Stage 3 analysis was never applied to any samples. Therefore, by using inappropriate methods and inaccurate definitions of NAPL, the analysis arrived at an extremely uncertain conclusion that NAPL is not mobile in the sediments of the Creek. Despite comments from the City and the State questioning this approach, no alternative methods to assess NAPL mobility in the sediments of the Creek have been applied. The CSM for the Site, which states that NAPL is not mobile, is highly uncertain. NAPL can be observed daily in the Creek and the sediment bed has been demonstrated to contain NAPL.

Figure 6 Example of Rainbow Sheens Indicative of NAPL Migration Documented in Stage 2 Testing



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