June 25, 2019

Prepared by:
Dredged Material Management Office
Seattle District, U.S. Army Corps of Engineers

MEMORANDUM FOR: RECORD

SUBJECT: DMMP ADVISORY DETERMINATION REGARDING THE POTENTIAL SUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE BLAIR WATERWAY IN TACOMA HARBOR FOR UNCONFINED OPEN-WATER DISPOSAL AT THE COMMENCEMENT BAY DISPOSAL SITE OR FOR BENEFICIAL USE.

1. **Introduction**. This memorandum reflects the consensus advisory determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington State Department of Ecology, Washington State Department of Natural Resources, and the Environmental Protection Agency) regarding the potential suitability of up to 2.5 million cubic yards (cy) of dredged material from the Blair Waterway for open-water disposal at the Commencement Bay disposal site or for potential beneficial use.

   The DMMP agencies cooperatively manage eight open-water disposal sites in Puget Sound. The disposal site in closest proximity to Tacoma Harbor is the non-dispersive site located in Commencement Bay. Dredged material evaluation guidelines for disposal at the Commencement Bay site can be found in the DMMP Dredged Material Evaluation and Disposal Procedures User Manual (DMMP, 2018). These procedures are summarized in Exhibit A of this memorandum.

   Blair Waterway is an authorized federal navigation channel located in Tacoma, Washington. The existing authorized dimensions of the waterway are 520 ft wide from the mouth to 11th Street, 345 ft wide through the 11th Street reach, 520 ft from 11th Street to Lincoln Avenue, 330 ft from Lincoln Avenue to the turning basin, and a 1300 ft turning basin, all to a depth of -51 feet MLLW. During the last deepening event in 2000-2001, the waterway was dredged to -51 feet MLLW, plus 2 ft of overdepth. Due to minimal accumulation of sediments since then, mudline elevations within the existing navigation channel remain at -51 ft MLLW or deeper.

   The U.S. Army Corps of Engineers (USACE) and Port of Tacoma (POT) are conducting a feasibility study to investigate potential deepening and widening alternatives for the Blair Waterway (Figure 1). Depths up to -58 feet MLLW, plus 2 feet of overdepth, are being evaluated. **This DMMP memorandum presents and evaluates sediment characterization data collected from Blair Waterway with the purpose of advising USACE and POT regarding the probable suitability of sediment from Blair Waterway for open-water disposal or beneficial use.**

   Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the U.S. EPA designated the Commencement Bay Nearshore/Tideflats Superfund site in 1983. The site includes three main components: remediation of the sediments and source control for Commencement Bay waterways, remediation of Tacoma Tar Pits, and remediation of the Asarco Smelter Facility and surrounding impacted areas. Multiple waterways within Commencement Bay are covered under the sediment operable unit for the Superfund Site. Blair Waterway was originally included under the sediment and source control operable unit, but was delisted by the U.S. EPA in 1996 because it was

cleaned up under an agreement known as the Puyallup Land Claim Settlement between EPA, the Port of Tacoma, and the Puyallup Tribe. Another notable Superfund action in Blair Waterway included dredging of tributyltin (TBT) contaminated sediments at Pier 4 as part of a Time Critical Removal Action. This action was completed in 2016 under the regulatory authority of the U.S. EPA and included removal of 71,000 cubic yards of contaminated sediment in conjunction with the redevelopment of Pier 4.

Project summary and tracking information is shown in Table 1.

Table 1. Project Summary

Project ranking	Channel: Low-moderate
	Sideslopes: Moderate
Proposed dredging volume	2.5 million cy
Maximum proposed dredging depth	- 58 ft MLLW, plus 2 feet overdepth
Sampling Dates	February 18 – February 22, 2019
EIM Study ID	POTBD19

2. **Sediment Evaluation Strategy for the Tacoma Harbor Feasibility Study.** Several factors were taken into consideration in development of a sediment evaluation strategy for the Blair Waterway.

DMMP Recency Guidelines – The DMMP recency guidelines specify the length of time that sediment characterization data remain adequate and valid for decision-making without further testing. The length of the recency period is determined by the rank of a project, the rank being driven by the available information on chemical and biological-response characteristics of project sediments and the number, kinds, and proximity of chemical sources (existing and historical). Blair Waterway has a split ranking; the existing navigation channel is ranked low and areas outside the navigation channel have project-specific rankings based on site characteristics (DMMP, 2018). For the purpose of this advisory evaluation, the DMMP agencies agreed to consider the entire project area as having an overall rank of low-moderate. The recency period for low-moderate-ranked areas is six years. Since it was unlikely that construction would occur within six years following sediment sampling for the feasibility study, a decision was made to wait until the Preconstruction Engineering Design (PED) phase of the project to conduct a full DMMP characterization for final decision-making. More limited sediment characterization would be done during this feasibility study.

Level of Effort – Since full DMMP characterization will not be completed until PED, the study team needed to determine the level of effort that would be adequate to support the evaluation of alternatives during feasibility. In consultation with the DMMP agencies, the study team decided that a 20% level of effort would suffice. Additionally, bioassays and bioaccumulation testing were not conducted for this effort. This level of effort was selected to provide a meaningful representation of levels and patterns of contamination in Blair Waterway, without incurring the expense of a full characterization.

3. **DMMP Sampling and Testing Requirements.** DMMP sampling and testing requirements are dependent on the rank of the project. As indicated previously, Blair Waterway was ranked "low-moderate" for this evaluation in order to determine the appropriate level of sampling. For low-moderate-ranked projects, one field sample must be taken for every 8,000 cy of sediment.

Typically the dredge prism would be divided up into dredged material management units (DMMUs) based on the design of the project. A DMMU is a volume of sediment that can be independently dredged from adjacent sediment and for which a separate disposal decision can be made. Allowed volumes per DMMU are based on rank, surface versus subsurface DMMUs, and homogeneity/heterogeneity of the sediments. However, since the study is in the feasibility phase a specific dredge design has not been developed. The dredged material volume and prism associated with the selected alternative will not be known until the feasibility study has been completed.

For the purposes of sediment characterization conducted during feasibility, the dredged material volume associated with maximum proposed dredging was calculated, along with the number of field samples required for full DMMP characterization, see Table 2 below. The number of field samples required for full characterization was multiplied by 0.20 (for a 20% level of effort), resulting in a need for 63 field samples for the advisory-level characterization.

Table 2
Sampling Rationale

Waterway	Total Volume (cubic yards)[1]	Rank[2]	Total Number of Cores	Total Number of Samples Required for Full Characterization	20% of Total Number of Samples Required for Advisory-level Characterization
Blair Navigation Channel	2,247,500	Low-moderate: 8,000 cy/sample	20 (2 to 3 samples analyzed per core)	313	63
Side slopes	209,500		5 (2 to 3 samples analyzed per core)		

Notes:
1. The total estimated volume including navigation channel and side slopes is 2,457,000 cy.

To provide higher-resolution data for the feasibility study, a decision was made to not composite individual samples, as is often done in DMMP sediment characterization, but to instead analyze individual field samples. To get a good spatial distribution, 25 sampling locations were identified throughout the waterway (Figure 2). The location of the sampling stations was determined in coordination with the Port of Tacoma, the Port's contractor, the DMMP agencies and the Puyallup Tribe. Due to elevated concern over the quality of the material in the sideslopes, 5 sampling locations were placed in the side slopes in to characterize these areas at a sampling intensity closer to a moderate-rank level. For a moderate-rank project one sample is required for every 4,000 cy of material. The estimated volume of the sideslopes is 209,500 cy – so 11 samples are needed to sample the sideslopes at 20% of the "moderate-ranked" intensity. Thus the 5 identified cores, with 2 to 3 samples each (a single core can provide multiple depth interval samples), was sufficient to meet the 20% level of effort for the side slopes. The additional samples collected in the side slopes were subtracted from the total number of samples needed in the rest of the waterway, so that the total number of samples analyzed equaled 63.

Native Material – An additional goal of sampling was to determine the elevation of the native horizon. Previous deepening of Blair Waterway was to -51 ft MLLW plus 2 ft of overdepth. The native horizon was expected to be around -53 ft MLLW.

The native horizon was identified based on evaluation of the core lithology by sampling personnel familiar with the characteristics of the native sediments in Tacoma Harbor. Based on review of uplands geotechnical boring and available sediment cores in the Blair Waterway, the native unit was expected to consist of moist, medium dense to dense, gray to grayish brown, fine to medium sand with various amounts of silt and trace shell hash and occasional interbeds of moist, medium stiff, light gray, clayey silt.

4. **Sampling**. Field sampling took place February 18-22, 2019 using a vibracore sampler. Cores were processed at the Port of Tacoma facility at the head of the Sitcum Waterway in Tacoma, WA and samples were then transported to ARI in Tukwila, WA and submitted for analysis. Figure 2 shows the target and actual coring locations and Table 3 gives the station coordinates and other core collection data. Samples were collected within 10 feet of the target location coordinates, with the following exceptions:
   - Location C-8 was moved 85 feet northeast due to core refusal on a hard, uneven bottom, likely riprap
   - Location C-13 was moved 41 feet to the southeast to avoid contact with buried sewer lines
   - Location C-25 was shifted 84 feet due to the presence of a cargo vessel for the extent of field sampling operations

   The approved sampling and analysis plan (Anchor QEA, 2019a) was followed to the maximum extent possible. Additional deviations from the SAP were reported in the final sediment characterization report (Anchor QEA, 2019b), including:
   - Holding cores overnight before processing, which was done to minimize the number of field sampling days. Cores held overnight were securely stored upright on the sampling vessel behind a locked gate. Ambient overnight temperatures during the sampling period ranged from 3.3 to 5 ºC, with an average of 4.3 ºC. These holding conditions are in accordance with standard custody and temperature requirements for holding sediment cores.
   - As a result of holding cores overnight, additional compaction of some cores occurred between the time they were collected and processed. This additional compaction was not accounted for in the core logs and depths reported in the data report and in this advisory memo.
   - Due to the difficulty of collecting cores in the sideslopes, only three cores were collected from sideslopes instead of the five that were originally planned. During SAP development C-1 was initially considered a sideslope sample, but during finalization of the sampling plan that location was moved to the edge of navigation channel and therefore was not considered a side slope sample. Location C-8 was moved out of the sideslopes during sampling due to difficulty coring. Nine samples were analyzed for the full DMMP list of chemicals from the three sideslope samples (C-12, C-13, and C-17) in Round 1, and an additional four samples were analyzed for conventionals and dioxins/furans in Round 2. In total, 13 sideslope samples were analyzed, sufficient to meet the sampling intensity for a moderate rank.

Core intervals collected for sampling were determined based on the core lithology to avoid excessive testing of the native material while simultaneously ensuring that the native material was adequately tested. The following guidelines were used:

- At least two samples (depth intervals) from each core were analyzed.
- Samples were analyzed from the top down, and no more than three samples per core were analyzed.
- Minimum sample size was a 2-foot interval, in order to have sufficient volume of sediment for all analyses.
- The length of the top non-native interval was determined by the depth of the native horizon. As many 2-foot intervals as could be delineated were collected and analyzed from the non-native layer.
- At a minimum the surface non-native or mixed interval and the top interval of native material were analyzed.
- In sideslope samples, the first interval of native material was analyzed as long as it was within the top three depth intervals of the core. If not, the native intervals were archived and analysis was only triggered if there were SL or BT exceedances in the shallower interval.

6. Chemical Analysis.

To avoid excessive testing of native sediments a tiered testing approach was used. Analysis by the analytical laboratory occurred in two rounds. Round 1 included 57 samples identified based on the core lithology. All Round 1 samples included testing of the full suite of DMMP COCs, including conventionals, metals, semivolatiles, pesticides, PCBs, bulk TBT and dioxins/furans. Table 4 lists the sediment samples that were analyzed in Round 1 and Round 2. Six analyses were triggered for Round 2 based on the results of Round 1, as described below:

- Location C-2: This location did not have any SL or BT exceedances, but TBT increased with depth from 7.35 µg/kg in the 0-2 ft sample to 17.3 µg/kg in the 2-4 ft sample. Based on proximity to historically elevated TBT concentrations at depth (2016 EPA TBT Time Critical Removal Action) and the observed increasing concentrations with depth, Round 2 chemistry results were triggered in the next two deeper samples to evaluate the chemical trend. Results were non-detect in both intervals.
- Location C-12: Dioxin/furan concentrations were above 10 pptr TEQ in the 0-2 ft, 2-4 ft, and 4-6 ft intervals (56.21, 54.47, and 17.74 pptr TEQ, respectively). Round 2 chemistry samples were triggered in the next two deeper samples and were below the SL of 4 pptr TEQ. Additionally, total PCBs were above the SL of 130 µg/kg in the 0-2 ft interval (173.3 µg/kg), but below the SL in the 2-4 ft interval.
- Location C-13: Dioxin/furan concentrations were above 4 pptr TEQ in the 0-2 and 2-4 ft intervals (5.34 and 7.73 pptr TEQ, respectively) and above 10 pptr TEQ in the 4-6 ft interval (11.88 pptr TEQ). Round 2 chemistry samples were triggered in the next two deeper samples. The 6-8 ft. interval was above 4 pptr TEQ (7.64 pptr TEQ), and the 8-10 interval was below 4 pptr TEQ.

Tables 5 and 6 present the sediment conventionals and chemistry results, respectively. Figure 3 shows boxplots of TOC, percent sand and percent fines for the project. Samples were grouped into one of three categories based on core lithology: 1) samples that were identified as native, 2) samples from cores where the native layer was undetermined and 3) samples identified as non-native material.

Samples identified as native have a higher percentage of sand and lower percentage of fines than the non-native and unidentified material, consistent with the expected characteristics of the native material. The depth (in ft MLLW) of the native layer as identified during core processing is shown in Figure 4.

A total of 8 cores out of the 25 collected contained one or more samples with at least one SL or BT exceedance. The other 17 cores did not contain any samples with SL or BT exceedances. Figure 5 provides a summary of all the detected and undetected SL exceedances from all analytical results. The non-native surface intervals of C-3 and C-11 had nondetected exceedances of the SL for total chlordane (when all five total chlordane constituents were reported at the lower method detection limit). There were three cores with detected exceedances of SLs: C-7 was above the SL for hexachlorobutadiene in the 2-4 foot (native) interval, C-10 was above the BT for TBT in the 2-4 foot (non-native) interval, and C-12 was above the SL for total PCBs in the non-native surface interval.

Dioxin/furan results are summarized in Table 7. Elevated dioxins/furans were found throughout the mouth and middle sections of the waterway. Dioxin concentrations above 4 pptr TEQ and less than 10 pptr TEQ were found in non-native samples in cores C-7, C-8, C-10, C-11 and C-12. Dioxin concentrations above the bioaccumulation trigger of 10 pptr TEQ were found in three cores: C-12, C-13 and C-15. As mentioned above, additional samples from C-12 and C-13 were triggered in Round 2 to identify the vertical extent of elevated dioxin/furan concentrations. In all cores, samples were analyzed at deeper intervals until dioxin/furan concentrations less than 4 pptr TEQ were found. All native samples contained dioxins/furans less than 4 pptr TEQ, and all samples (both non-native and native) from the head of the waterway had dioxin/furan concentrations less than 4 pptr TEQ.

7. <u>DMMP Advisory Suitability Evaluation</u>. A DMMP suitability determination is typically based solely on the evaluation guidelines found in the DMMP User Manual current at the time of testing. However, the dredged material evaluation guidelines used by the DMMP agencies are constantly evolving as technological and scientific advances are made. Those changes could include updates to the bioaccumulation triggers or testing guidelines. However, there are no such changes currently pending. Therefore the DMMP agencies used the current evaluation guidelines to determine the potential suitability of Blair Waterway sediments for open-water disposal.

Tables 8 and 9 present the results of the DMMP evaluation, along with the rationale for determining the potential suitability or unsuitability of each sample for open-water disposal. In these tables, samples were separated into those identified as native sediment (Table 9) and those identified as non-native or undetermined sediment (Table 8). Sample ID refers to the intervals of sediment core starting with A at the top of each core. For each station/interval tested, one of the following determinations was provided:

Suitable – No SL or BT exceedances; dioxins/furans below 4 pptr TEQ.

Likely Suitable – No SL or BT exceedances occurred; dioxins/furans below 10 pptr TEQ but above 4 pptr TEQ.

Possibly Suitable – Detected or undetected SL exceedances and dioxins/furans < 10 pptr TEQ.

Unsuitable – BT exceedance and/or dioxins/furans > 10 pptr TEQ, with or without other SL exceedance.

To facilitate the use of this information in the estimation of quantities of suitable and unsuitable dredged material for the Tacoma Harbor Deepening feasibility study, the DMMP agencies adopted a probability approach for the Blair Waterway. Sampling stations with similar suitability characteristics in the non-native intervals of sediment were grouped to form three distinct sections within the waterway (Table 8; Figure 6) regardless of whether they were on the sideslope or in the channel. To establish a logical segmentation of the waterway for planning purposes, numerical probabilities were assigned to each station and those probabilities averaged and rounded down to the nearest 5%. Numeric probabilities were assigned as follows:

- suitable = 100% probability of being suitable for open-water disposal
- likely suitable = 75%
- possibly suitable = 50%
- unsuitable = 0%

At the head of the waterway all samples in all cores were below SLs and dioxins/furans were less than 4 pptr TEQ. All of this material was classified as suitable and the average suitability probability was 100%.

The middle portion of the waterway had the lowest suitability probabilities. Three cores, C-12, C-13 and C-15 contained unsuitable material due to dioxins/furans above 10 pptr TEQ and one core, C-10, contained unsuitable material due to TBT. One sample in core C-11 contained possibly unsuitable material due to a non-detect exceedance of total chlordane and dioxins/furans between 4-10 pptr TEQ. In all of these cores, lower intervals of the core were analyzed until clean material was confirmed. Overall, the average suitability probability for surface non-native material in the middle portion of the waterway is 63.6%.

The mouth of the waterway was largely suitable, with only one sample (C-3) with a possibly suitable classification due to a single non-detect exceedance of total chlordane. The average suitability probability for surface non-native material in the mouth of the waterway is 92.9%.

The same probability approach was applied to the native sediments. Among all sediments throughout the waterway that were identified as native material, only one sample was classified as possibly suitable (due to a single exceedance of hexachlorobutadiene in C-7) and the rest were classified as suitable. Therefore, the average suitability probability of identified native sediments is 98.1%

The predictive ability of the feasibility-level sediment characterization completed for the deepening study does not match the mathematical precision of the calculated probability averages. Therefore, the calculated averages were rounded down to the nearest 5%. The rounded probability values are found in Tables 8 and 9 and illustrated in Figures 6 and 7.

In summary, the non-native sediments showed a range of contaminant concentrations. The probability of suitability for open-water disposal was estimated by the DMMP agencies in the non-native sediments to be 90% suitable in mouth, 60% suitable in the middle and 100% suitable in the head, as shown in

Figure 6. Nearly all identified native sediment is suitable for open-water disposal, with an average probability of being suitable for open-water disposal of 95%.

This advisory determination only applies to the areas identified and documented in this document. Additional areas not considered here, especially in the sideslopes and/or near outfalls, may have a different sediment contaminant profile. The results from the sideslope samples in this study as well as historical information from cutback projects throughout Blair Waterway give a strong indication that material outside of the navigation channel (i.e. closer to shore) considered in this advisory memo is more likely to be unsuitable. The DMMP agencies recommend a more conservative assumption of the probability of suitability for areas outside the areas evaluated in this advisory memo.

8. **Suitability for Beneficial Use.** The DMMP agencies do not determine the suitability of material for beneficial use projects. It is up to the project proponents, the site receiving the material, and other interested stakeholders including applicable resource agencies and Tribes to determine the physical and chemical suitability of dredged materials for a beneficial use site.

However, typically the first step taken to evaluate sediments for beneficial use is comparison against the State's Sediment Quality Standards (SQS), which has been done in Tables 10 and 11. Many of the SQS standards are in organic carbon normalized units. Ecology's recommendation for organic carbon normalizing is to only use this approach for sediments with TOC concentrations between 0.5 – 3.5% (Ecology, 2017). Samples were divided into two groups, those with TOC between 0.5 – 3.5% (12 samples) and those with TOC less than 0.5% (51 samples). There were no samples with TOC greater than 3.5%.

For the 12 samples with TOC greater than 0.5%, results are compared to SQS and are shown in Table 10. Non-detect results for two chemicals, 1,2,4-trichlorobenzene and hexachlorobenzene, were above the SQS as initially reported by the laboratory. As is typically done by the DMMP agencies when there is a non-detect exceedance, the results are re-evaluated by the analytical laboratory to see if there was any evidence that the compounds of interest were detected at levels between the method detection limit (MDL) and the method reporting limit (MRL). If there is no evidence, then the results are reported as non-detect at the lower MDL. For these samples (and all samples in the project) there was no evidence that 1,2,4-trichlorobenzene or hexachlorobenzene were detected above the MDL, so the results for these two compounds were reported at the lower level, as indicated in Table 10.

11 of the 12 samples in Table 10 were less than the SQS. Sample C-12-A exceeds the SQS for PCBs and is not suitable for beneficial use. All other samples are below SQS, indicating that they would likely be suitable for beneficial use.

For the 51 samples with TOC less than 0.5%, results are compared to the dry weight based SQS values and are shown in Table 11. The dry-weight SQS values are based on the same apparent effects thresholds (AET) as the DMMP SLs, and are the same for all but two chemicals. The dry-weight SQS for pentachlorophenol is 360 µg/kg, lower than the DMMP SL of 400 µg/kg, and the dry-weight SQS for acenaphthylene is 1300 µg/kg, higher than the DMMP SL of 560 µg/kg. With only one exception, all samples for all chemicals, including pentachlorophenol, are less than the dry-weight SQS, indicating these sediments would likely be suitable for beneficial use. Sample C-7-B had a

detected concentration of hexachlorobutadiene above the dry-weight SQS, indicating that this material is likely not suitable for beneficial use.

Comparison to SQS is not the only consideration in assessing beneficial use. Based on initial coordination with other resource agencies and the Puyallup Tribe, the following assumptions were also taken into consideration:

- If material is unsuitable for the Commencement Bay open-water disposal site then it is also unsuitable for beneficial use
- NMFS' proposed PAH level for the protection of fish of 2,000 µg/kg[1] is appropriate for aquatic beneficial use
- Only material with dioxin less than 4 pptr TEQ is appropriate for beneficial use

Table 12 shows the average percent likelihood of suitability for beneficial use of this material based on all these considerations. The results are summarized below:

Table 12. Summary of Beneficial Use Suitability for Tacoma Harbor

Area	Average percent likelihood of suitability for beneficial use
Mouth	85%
Middle	40%
Head	100%
Native	95%

9. **Sediment Exposed by Dredging**. The sediment to be exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) or the State's Antidegradation standard (Ecology, 2013) as outlined by DMMP guidance (DMMP, 2008).

This sediment core characterization in the Blair Waterway clearly demonstrated that contamination decreases with depth. With the exception of cores C-7, C-10, and C-13, the highest COC concentrations were found at the top of the core with contamination decreasing with depth. For C-7, there was elevated hexachlorobutadiene in the 2-4 foot layer that was not observed at the surface, but the layer below, representing -54 to -56 ft MLLW, was less than SL and SQS. For C-10, TBT was elevated (but below screening levels) in the 2-4 foot layer but decreased with depth and was no longer detected at depths below -53 ft MLLW. For the sideslope sample C-13, dioxins appeared to be highest in the 4-6 foot layer (11.88 pptr TEQ), and was below 4 pptr TEQ in the 8-10 foot layer (-47 to -49 ft MLLW).

At the current level of sampling density and dredge design, it is difficult to determine antidegradation within the side slope regions, although the data gathered in this characterization indicates that antidegradation can be met without need for cover. This uncertainty is being addressed by new rankings for sideslopes during full characterization.

The available information indicates that it is highly likely that antidegradation will be met in the

[1] The National Marine Fisheries Service (NMFS) proposed a screening level of 2,000 µg/kg total PAH for the protection of fish at the Regional Sediment Evaluation Team annual meeting in November 2014.

navigation channel once native material is reached.

10. **Underlying Assumptions.** Several key assumptions were made by the DMMP agencies in conducting this advisory suitability evaluation. These assumptions are discussed in the following paragraphs.

    Dioxins/Furans - Samples with concentrations of dioxins/furans at or below 4 pptr TEQ were deemed suitable for open-water disposal, as this concentration is the site management objective for nondispersive disposal sites. Concentrations of dioxins/furans between 4 and 10 pptr TEQ were considered likely to be eligible for open-water disposal because there is a large volume of clean native material that would be dredged during deepening, and this material can be used to bring the project volume-weighted average below the site management objective of 4 pptr TEQ. USACE planners will need to plan for the additional volume of clean sediment required to meet the volume-weighted average guidelines at the Commencement Bay disposal site. This will likely reduce the amount of material available for beneficial use. It was also assumed that dredging and disposal will be sequenced such that suitable dredged material with relatively higher concentrations of dioxins/furans will be placed first at the Commencement Bay site, followed by native material with very low concentrations, thereby leaving a surface layer of sediment at the disposal site with a low dioxin/furan concentration. Dioxin/furan concentrations above 10 pptr TEQ were determined to be unsuitable for open-water disposal. DMMUs with dioxin/furan concentrations above 10 pptr TEQ would need to pass bioaccumulation testing in order to qualify for open-water disposal. The DMMP agencies made the conservative assumption for the purpose of this evaluation that either bioaccumulation testing for dioxins/furans would not be conducted or, if tested, these samples would fail bioaccumulation testing.

    Bioassays – Bioassay testing was not conducted for this advisory-level characterization due to schedule restrictions. Therefore the assignment of potential suitability of samples with SL exceedances was based on the experience and best professional judgment of the DMMP agencies assuming that bioassays would be conducted during full characterization. There were only two samples with SL exceedances with no other exceedances (i.e. they did not have dioxin above 4 pptr TEQ or other BT exceedance) – one detected exceedance of hexachlorobutadiene and one non-detect exceedance of total chlordane. Based on prior experience testing sediments with minor SL exceedances of these chemicals, the DMMP assigned both of these samples a 50% chance of being suitable for open-water disposal.

11. **DMMP Guidance for Full Characterization and Dredging.** As indicated previously, full characterization of potential dredged material from the Blair Waterway must be completed in order to complete a suitability determination for this project prior to dredging. The testing results from this feasibility study indicated that the appropriate ranking for full characterization is variable throughout the waterway. Therefore, unless new information becomes available in the interim, sampling requirements for full characterization will be based on rank according to the following chart:

Sediment Category	Waterway Area	Rank
Sideslopes	Head	Moderate to High
	Middle	High
	Mouth	Moderate to High
Surface material	Head	Low-Moderate
	Middle	Moderate to High
	Mouth	Low-Moderate to Moderate
Confirmed native material	Throughout waterway	No further testing, except for confirmatory testing around C-7 and where full characterization identifies SL/BT failures at the native/non-native boundary

Two of the three side slope cores (C12, C13) were determined to be unsuitable without further testing (bioaccumulation for dioxins for both; PCB toxicity for C12). Since most of the nearshore areas are not often dredged, and are closer to sources of contamination, DMMP is assigning ranks to the sideslopes that are higher than originally assigned for sampling for this advisory determination. For the full determination, it will be important to have sufficient dredge design details to inform where sideslopes will either be dredged or will slough due to dredging along the base of the slope, so that appropriate sediment locations and depths are characterized.

The concentrations of chemicals of concern in the identified native material were far below the DMMP SLs, with only one exception. There was a detected exceedance of SL for one chemical in a single sample in the middle section of the waterway (C-7). Therefore, throughout the project area, confirmed native sediment will be assumed to be suitable for open-water disposal by the DMMP agencies and will be exempt from analysis during full characterization with two exceptions: native material around C-7 which will require confirmatory testing to verify its suitability, and where full characterization identifies SL/BT failures at the native/non-native boundary. Samples from native material DMMUs will need to be collected and archived pending results of overlying DMMUs.

There is also a high probability of encountering BT exceedances for dioxin, and to a lesser extent TBT, during full characterization, particularly in the middle portion of the waterway and in sideslopes. Bioaccumulation testing requires large volumes of sediment and the testing is costly. Whether and when to collect adequate volumes of sediment to conduct this testing will be up to USACE and the Port of Tacoma.

DMMUs that are found unsuitable for open-water disposal will need to be disposed in an appropriate upland facility. To ensure that the unsuitable material is separated from the suitable material during dredging, a minimum one-foot vertical buffer and an appropriate horizontal buffer will need to be added to the unsuitable portions of the dredge prism. This means that in areas where the top four feet are found unsuitable for open-water disposal, at minimum the top five feet of sediment will need to be dredged and taken upland. The one-foot vertical buffer is not the same as the overdepth allowance. If the dredging contract includes one foot of overdepth, the dredge cut would be five feet, plus one foot of overdepth. USACE planners will need to include the horizontal and vertical buffers in volume calculations for upland disposal.

Since the last deepening of the Blair Waterway in 2000/2001, maintenance dredging has not occurred in the navigation channel, and has occurred in the berthing areas three times for different areas: at GP Gypsum, Husky Terminal and Washington United Terminal. Therefore, there is a good chance that debris will be encountered during dredging. This debris must be removed from sediment prior to disposal at the Commencement Bay open-water disposal site. The dredger will likely be required to screen the surface non-native sediments in areas with suitable material using a grid with a maximum opening size of 12 inches by 12 inches. Native material and material found unsuitable for open-water disposal will not need to be screened. However, if large (greater than 12 inches by 12 inches) woody debris or other large natural debris is found in native sediments, this debris will need to be removed from the dredged material prior to disposal at the Commencement Bay open-water disposal site.

The DMMP agencies are in the process of revising the disposal site monitoring program for all disposal sites in Puget Sound. The process is expected to be completed within a few years, but there are many unknowns at this time. Currently the following changes are reasonably likely to have an impact on future use of the disposal sites:

Disposal tipping fees - DNR is likely to pursue an increase in the disposal tipping fee within the next 5-10 years. The current tipping fee of $0.45/cy was last increased in 1994. It is premature to estimate what the increased fee might be.

Preventing off-site migration of dredged material - Off-site migration has historically been an issue at the Commencement Bay disposal site, even resulting in the need to temporarily shut down use of the site after significant off-site migration. For projects disposing of a large amount of material in a short period of time there is an increased concern over off-site migration.

In 2009 the DMMP agencies completed a supplemental EIS (SAIC, 2009) for reauthorization of the Commencement Bay open-water disposal site. The preferred alternative chosen for management of the disposal site, Alternative 2, included increasing the cumulative disposal volume of the site to 23 million cubic yards (mcy) with three coordinate shifts within the target area and consideration of the need to implement institutional controls on disposal to better manage the site. Institutional controls considered and studied included specific requirements for tug/barge orientation or direction during disposal and disposal during a specified portion of the tidal cycle.

Due to the potential large volume of material from this project that could be disposed at the Commencement Bay site, additional measures will need to be taken to ensure that the disposed material is not migrating off-site. The DMMP agencies recommend physical monitoring of the site before the start of the project to get a baseline and subsequent physical monitoring of the site after every 500,000 cy disposed or at the end of each dredging year, whichever is more frequent. Physical monitoring includes a multibeam bathymetric survey and SPI monitoring.

If results of the physical monitoring indicate that significant off-site migration is occurring, the DMMP agencies will consider implementation of institutional controls to better manage the site.

12. **References**.

Anchor, 2019a. *Sampling and Analysis Plan – Dredged Material Characterization – Tacoma Harbor Deepening Study.* Prepared by Anchor QEA, LLC for Port of Tacoma, February 2019

Anchor, 2019b. *Sediment Characterization Data Report – Dredged Material Characterization – Tacoma Harbor Deepening Study*. Prepared by Anchor QEA, LLC for Northwest Seaport Alliance, April 2019

DMMP, 2018. *Dredged Material Evaluation and Disposal Procedures (Users Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, December 2018.

DMMP, 2011. *Marine Sediment Quality Screening Levels: Adopting RSET Marine SLs for Use in DMMP.* A Clarification Paper prepared by Laura Inouye (Ecology) and David Fox (USACE) for the Dredged Material Management Program, June 2011.

DMMP, 2010. *Dredged Material Management Program New Interim Guidelines for Dioxins*. December 6, 2010.

DMMP, 2008. *Quality of Post-Dredge Sediment Surfaces (Updated).* A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, February 2013.

Ecology, 2017. *Sediment Cleanup User's Manual II (SCUM II), Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC.* Prepared by the Toxics Cleanup Program, Department of Ecology. Final originally published March 2015, revised December 2017.

SAIC, 2009. *Reauthorization of Dredged Material Management Program Disposal Site at Commencement Bay, Supplemental Environmental Impact Statement.* Prepared by SAIC for the Dredged Material Management Program, August 2009.

10. Agency Signatures.

The signed copy is on file in the Dredged Material Management Office.

Concur:

_____ _____
Date Kelsey van der Elst - Seattle District Corps of Engineers

_____ _____
Date Justine Barton - Environmental Protection Agency

_____ _____
Date Laura Inouye, Ph.D. - Washington Department of Ecology

_____ _____
Date Abby Barnes - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Kristine Koch, EPA Superfund RPM
Tony Warfield, Port of Tacoma Project Manager
Joy Dunay, Anchor QEA
Dan Berlin, Anchor QEA
Kristine Ceragioli, USACE Project Manager
Donald Kramer, USACE Planner
Kristen Kerns, USACE Risk Assessor
Daniel Bernal, USACE Coastal Engineer
Walker Messer, USACE Economist
Kaitlin Whitlock, USACE Biologist

Exhibit A – DMMP Evaluation Procedures

The DMMP evaluation procedures are fully described in DMMP (2018). This exhibit includes information about several key elements relevant for the Blair Waterway suitability evaluation.

Ranking:

For DMMP dredged material evaluations, dredging projects are assigned to one of four possible ranks: high, moderate, low-moderate, or low. These ranks reflect the potential for adverse biological effects or elevated concentrations of chemicals of concern. The higher the rank, the higher the concern, and the more intense the sampling and testing requirements needed to adequately characterize the dredged material. Project or area ranking is based on the available information on chemical and biological-response characteristics of the sediments, as well as the number, kinds, and proximity of chemical sources (existing and historical).

DMMUs:

Tiered testing is conducted for smaller units within the area to be dredged. These units are termed Dredged Material Management Units (DMMUs). A DMMU is the smallest volume of dredged material capable of being dredged independently from adjacent units and for which a separate disposal decision can be made.

Full Characterization:

Full DMMP characterization includes minimum sampling and testing requirements, which are typically based on the rank, volume and depth of the dredging project. For example, in a moderate-ranked area, field samples are restricted to representing no more than 4,000 cubic yards and each DMMU can represent no more than 16,000 cubic yards of dredged material in the surface layer (0-4 feet below mudline). In subsurface sediment (> 4 feet below mudline), field samples are restricted to representing no more than 4,000 cubic yards, but DMMUs can represent up to 24,000 cubic yards, depending on site-specific conditions. Best professional judgment may need to be applied in addressing certain scenarios, for example areas with increasing contamination with depth or adjacent to a cleanup site. Full characterization typically results in a DMMP suitability determination.

Tiered Testing:

The DMMP dredged material suitability determination process consists of four tiers of evaluation and testing. A brief discussion of these tiers follows.

Tier 1 analysis involves the review of existing sediment data and site history, including all potential sources (e.g., outfalls, spills, etc.) for sediment contamination. The Tier 1 evaluation informs the sediment evaluation process for the project.

Tier 2 analysis consists of chemical testing of sediment samples. Table 5 includes the chemicals of concern analyzed in DMMP projects at the time of the Blair Waterway sediment characterization

in 2019. This list includes metals, semivolatiles, pesticides and PCBs, which are all considered standard chemicals of concern. Certain other chemicals of concern, including dioxins/furans and tributyltin, are analyzed in areas that are of concern for these chemicals.

Tier 3 consists of biological testing. DMMUs with exceedances of the chemical screening levels (SLs) or bioaccumulation triggers (BTs) listed in Table 5 require biological testing in Tier 3 to determine their toxicity and/or bioaccumulation potential respectively.

If the Tier 2 analysis indicates that all chemical concentrations are below the SLs and BTs, then no biological testing is necessary. If there is one or more SL exceedance, the DMMU is subjected to a suite of Tier 3 bioassays, consisting of an amphipod mortality test, a larval development test, and the juvenile infaunal growth test. If one or more BT is exceeded, the DMMU is subjected to bioaccumulation testing for the chemical/s exceeding BT.

Tier 4 evaluations are conducted only if standard chemical and biological evaluations are insufficient to determine the suitability of dredged material for open-water disposal. A Tier 4 assessment is a special, non-routine evaluation which might include time-sequenced bioaccumulation or tissue analysis of organisms collected from the area to be dredged. Tier 4 could also include a risk assessment. Tier 4 assessments are rarely needed.

Dioxin Guidelines:

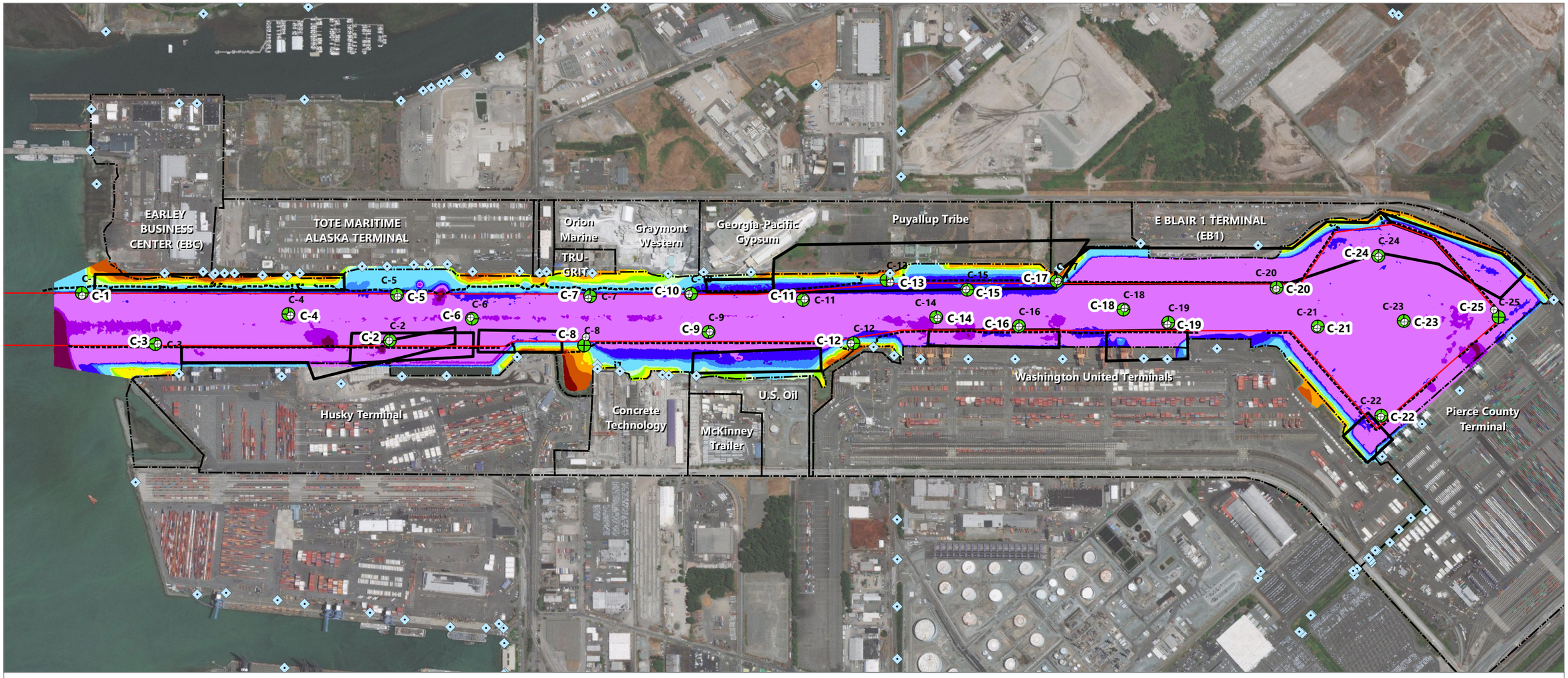
The DMMP agencies implemented revised dioxin/furan guidelines in 2010 for dredged material disposed at the eight multiuser open-water disposal sites in Puget Sound. Implementation of the revised guidelines followed a 3-year study, which included analysis of dioxins/furans in sediment and tissue samples collected from the five non-dispersive sites, as well as determination of background sediment concentrations of dioxins/furans at non-urban sites throughout the Sound (including Hood Canal, the San Juan Islands and the Strait of Juan de Fuca).

The background sediment concentration was determined to be 4 pptr TEQ. The TEQ is the summation of all 17 congeners of dioxins/furans having 2005 World Health Organization Toxic Equivalency Factors. The revised dioxin guidelines for Puget Sound disposal sites are based on this background concentration.

The non-dispersive site management objective is 4 pptr TEQ. DMMUs with dioxin/furan concentrations below 10 pptr TEQ are allowed for disposal as long as the volume-weighted average concentration of dioxins/furans in material from the entire dredging project does not exceed 4 pptr TEQ. DMMUs exceeding 10 pptr may still be placed at non-dispersive sites if they pass bioaccumulation testing that show that the dioxins/furans are not bioavailable. The dioxin concentrations of DMMUs passing bioaccumulation testing are not included in the volume-weighted average.

Figure 1
Site Map and Study Area

Tacoma Harbor Deepening Study



LEGEND:

- Outfall
- Actual Sampling Location
- Proposed Sampling Location
- Proposed Navigation Channel Boundary
- Property Boundary
- Historical Dredged Material Characterization Area
- Approximate 2H:1V Daylight Limits

MLLW Elevation (Feet)

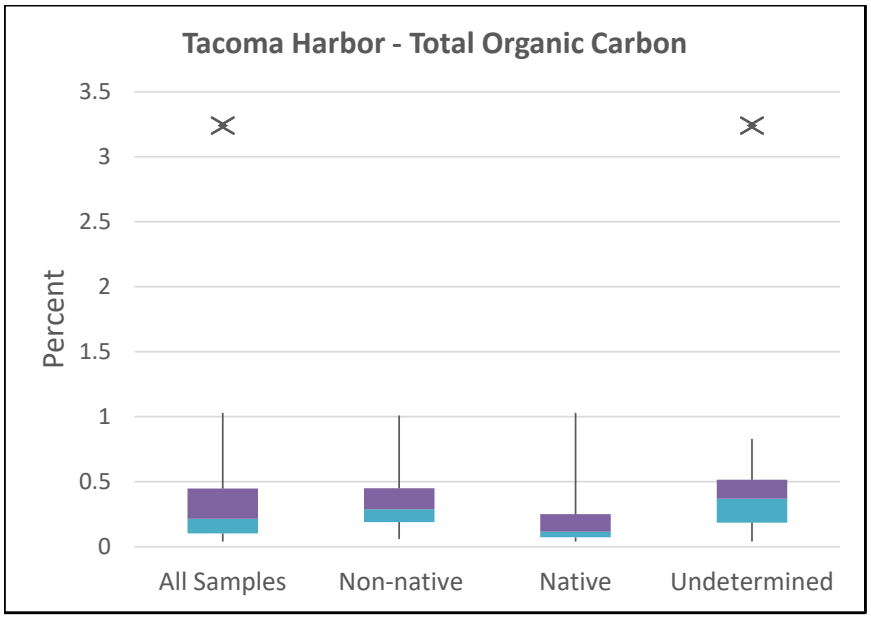
- < -58
- -58 - -55
- -55 - -50
- -50 - -45
- -45 - -40
- -40 - -25
- -25 - -20
- -20 - -15
- -15 - -10
- -10 - -5
- -5 - 0
- 0 - 20

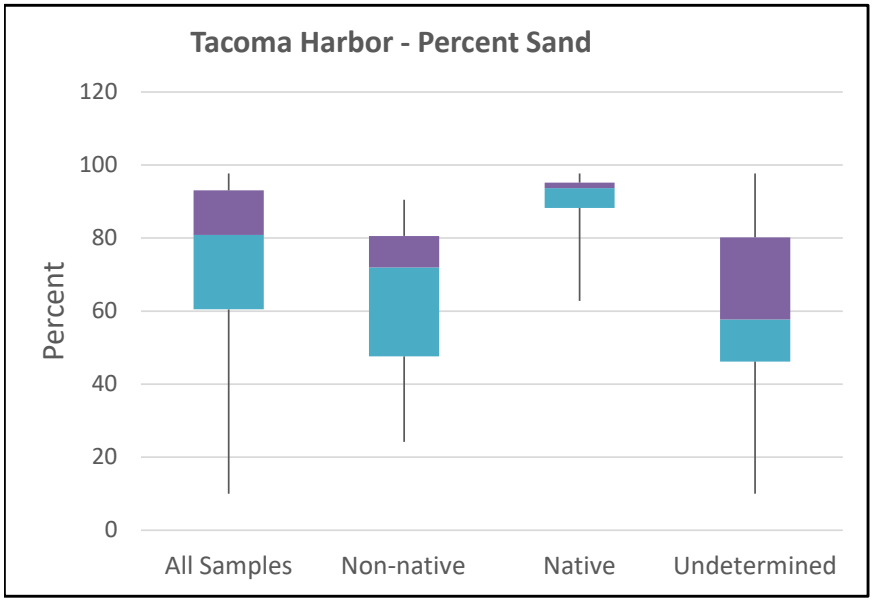
NOTES:
1. Bathymetry from November 2018.

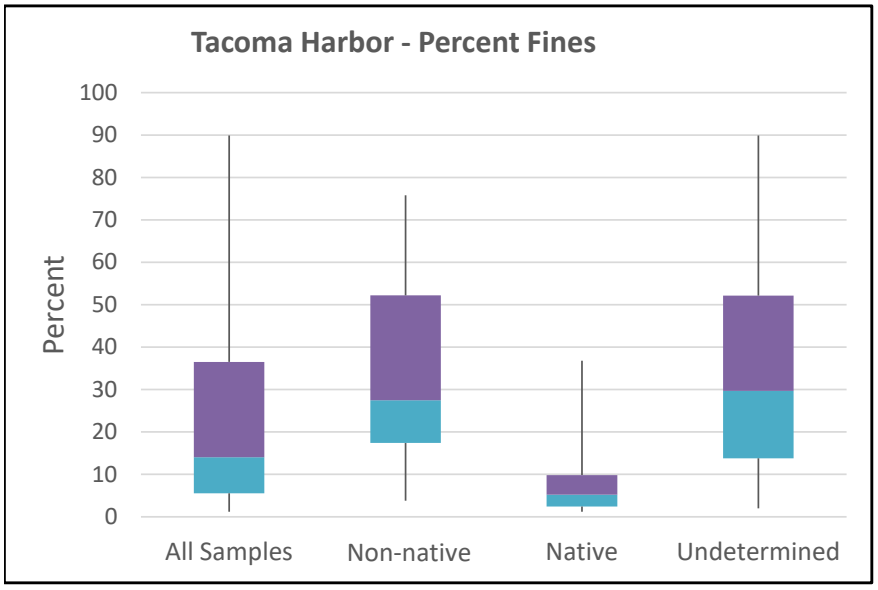
0 2,000
Feet

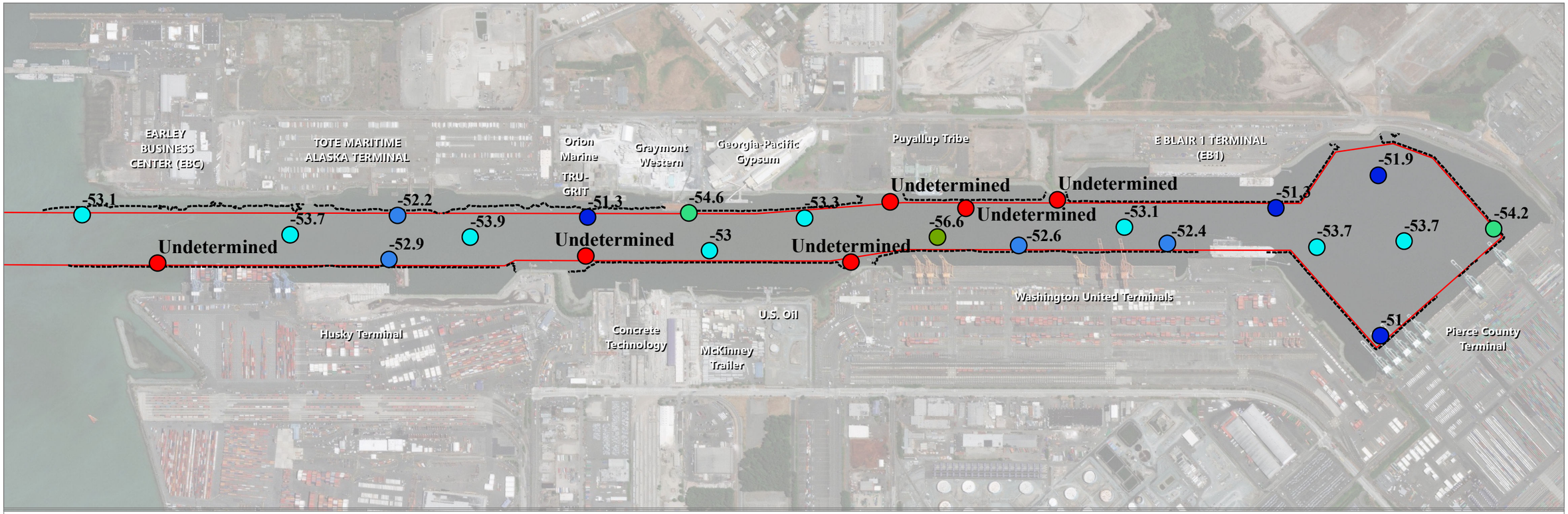
Figure 2
Proposed and Actual Sampling Locations
Tacoma Harbor Deepening Study

Figure 3. Boxplots of conventionals results from Tacoma Harbor Deepening Study









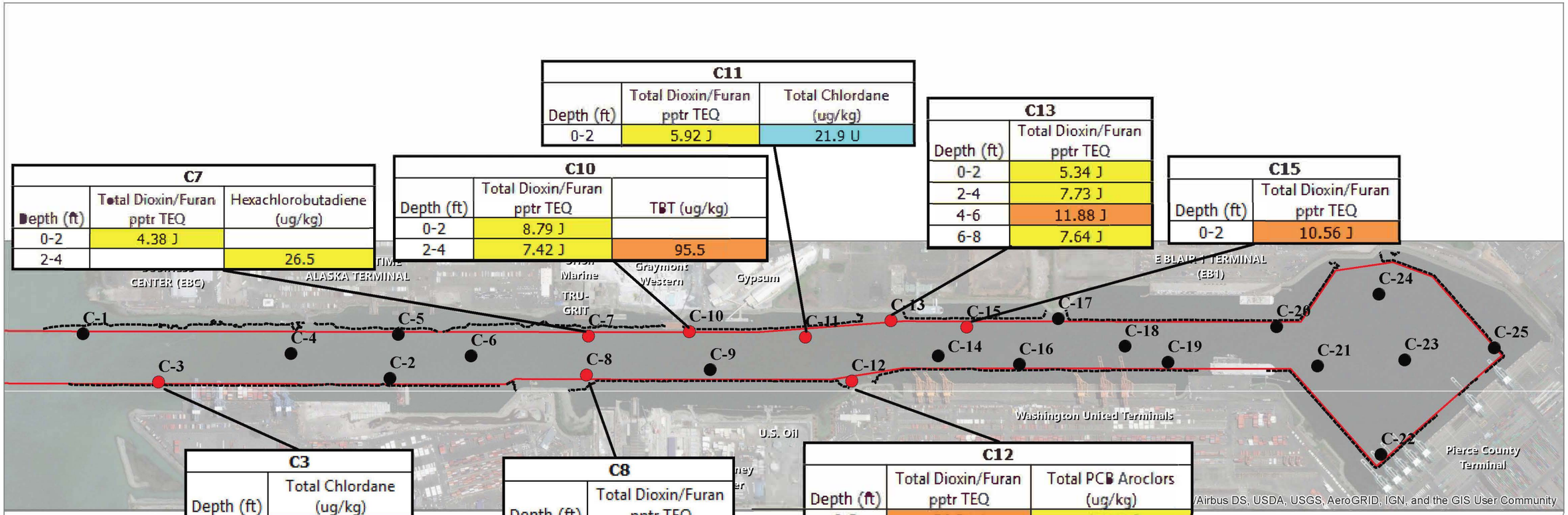
LEGEND:

Native Horizon (ft MLLW)

- -56.6 - -55.0
- -54.99- -54.0
- -53.99- -53.0
- -52.99- -52.0
- -51.99 - -51.0
- Native Horizion Unknown
- Proposed Navigation Channel Boundary
- Approximate 2H:1V Daylight Limits

0 2,000
Feet

Figure 4
Depth of Native Horizon (ft MLLW)
Tacoma Harbor Deepening Study



C7

Depth (ft)	Total Dioxin/Furan pptr TEQ	Hexachlorobutadiene (ug/kg)
0-2	4.38 J	
2-4		26.5

C10

Depth (ft)	Total Dioxin/Furan pptr TEQ	TBT (ug/kg)
0-2	8.79 J	
2-4	7.42 J	95.5

C11

Depth (ft)	Total Dioxin/Furan pptr TEQ	Total Chlordane (ug/kg)
0-2	5.92 J	21.9 U

C13

Depth (ft)	Total Dioxin/Furan pptr TEQ
0-2	5.34 J
2-4	7.73 J
4-6	11.88 J
6-8	7.64 J

C15

Depth (ft)	Total Dioxin/Furan pptr TEQ
0-2	10.56 J

C3

Depth (ft)	Total Chlordane (ug/kg)
0-2.7	24.9 U

C8

Depth (ft)	Total Dioxin/Furan pptr TEQ
0-2	5.00 J

C12

Depth (ft)	Total Dioxin/Furan pptr TEQ	Total PCB Aroclors (ug/kg)
0-2	56.21 J	173.3 J
2-4	54.47 J	
4-6	17.74 J	

LEGEND:

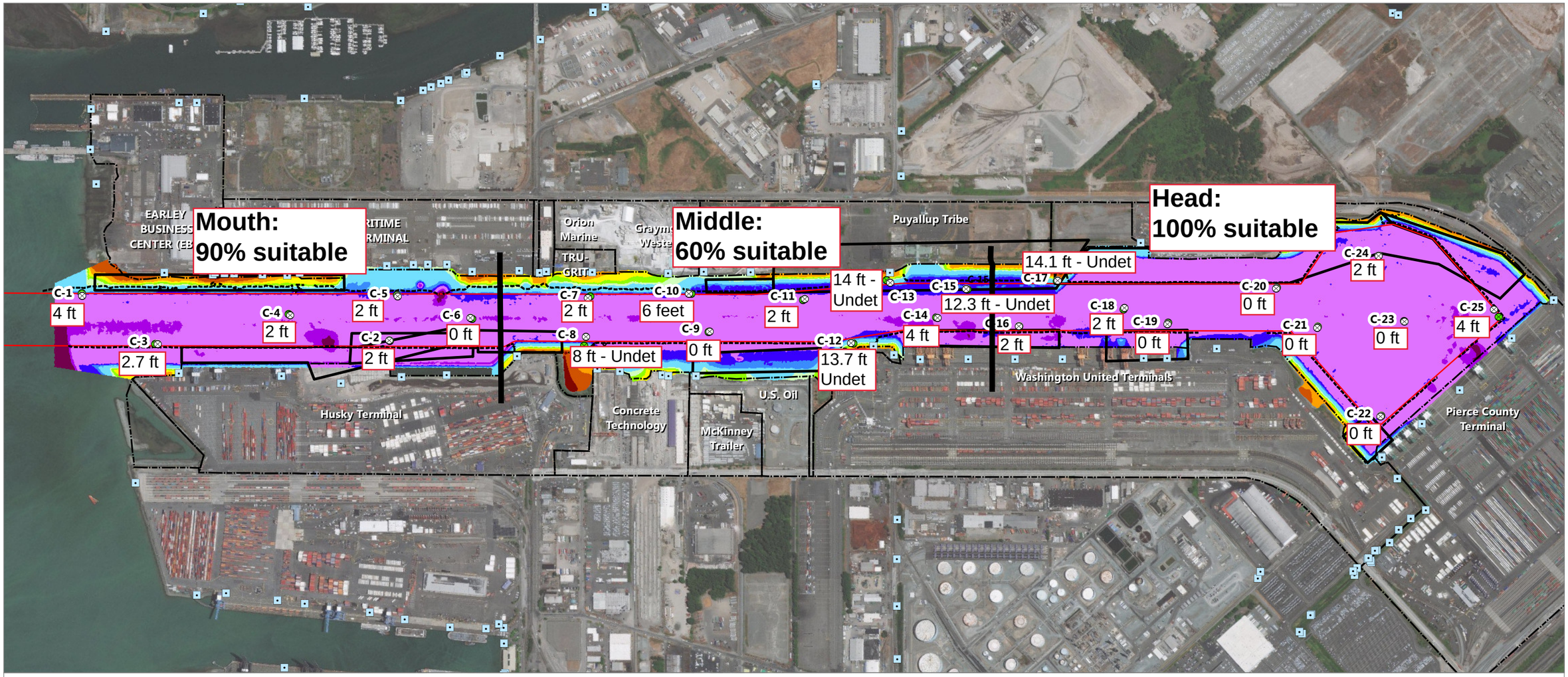
- Suitable
- Unsuitable
- Proposed Navigation Channel Boundary
- Approximate 2H:1V Daylight Limits

NOTES:
1. Bathymetry from November 2018.

	Detected concentration is greater than DMMP SL screening level
	Detected concentration is greater than DMMP bioaccumulation trigger(BT)
	Non-detected concentration is above one or more identified screening levels

0 2,000
Feet

Figure 5
Summary of SL/BT Exceedances
Tacoma Harbor Deepening



LEGEND:

- Outfall
- Actual Sampling Location
- Proposed Sampling Location
- Proposed Navigation Channel Boundary
- Property Boundary
- Historical Dredged Material Characterization Area
- Approximate 2H:1V Daylight Limits

MLLW Elevation (Feet)

- < -58
- -58 - -55
- -55 - -50
- -50 - -45
- -45 - -40
- -40 - -25
- -25 - -20
- -20 - -15
- -15 - -10
- -10 - -5
- -5 - 0
- 0 - 20

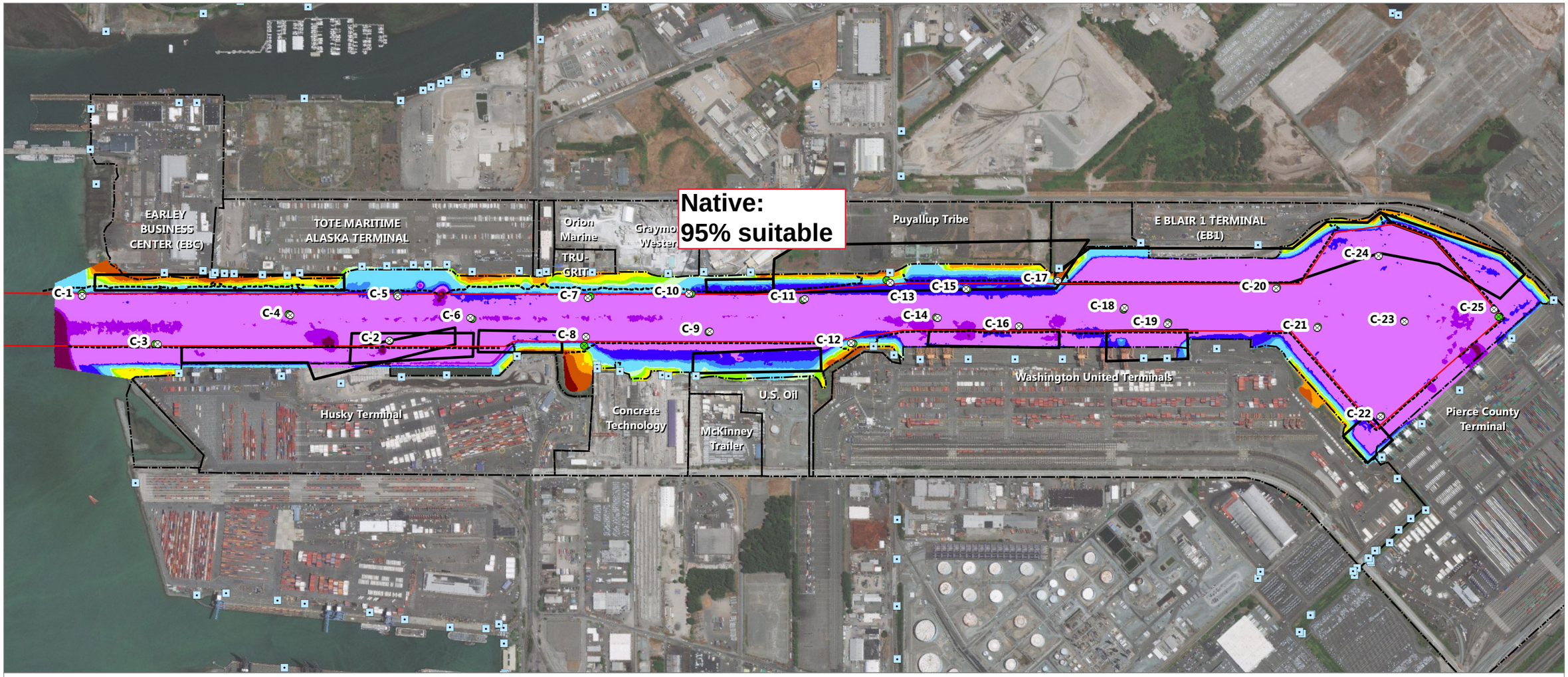
ft indicates the depth of the non-native layer based on core samples.

NOTES:
1. Bathymetry from November 2018.

0 2,000
Feet

Figure 6
Probability of Suitability for Open-Water Disposal of Non-Native Material

Tacoma Harbor Deepening Study



LEGEND:

- Outfall
- Actual Sampling Location
- Proposed Sampling Location
- Proposed Navigation Channel Boundary
- Property Boundary
- Historical Dredged Material Characterization Area
- Approximate 2H:1V Daylight Limits

MLLW Elevation (Feet)

- < -58
- -58 - -55
- -55 - -50
- -50 - -45
- -45 - -40
- -40 - -25
- -25 - -20
- -20 - -15
- -15 - -10
- -10 - -5
- -5 - 0
- 0 - 20

NOTES:
1. Bathymetry from November 2018.
2. Native interval identified based on core lithology

0 2,000
Feet

Figure 7
Probability of Suitability for Open-Water Disposal for Native Material

Tacoma Harbor Deepening Study

Table 3
Sample Coordinates and Core Collection Data

Station	Date	Location[1]		Measured Water Depth (feet)	Water Level (ft MLLW)[2]	Mudline Elevation (feet MLLW)	Drive Penetration (feet)	Collection Recovery Measurement (feet)	Recovery[3] (%)	Native Horizon Elevation (feet MLLW)
		X Coordinate	Y Coordinate							
C-1	2/18/2019	1165157.4	715708.8	61.7	11.8	-49.9	13.5	13.1	97.0	-53.1
C-2	2/18/2019	1166970.1	713363.2	63.2	11.8	-51.4	11.0	9.7	88.2	-52.9
C-3	2/18/2019	1165354.3	714876.0	59.2	6.7	-52.5	12.0	11.9	99.2	Undetermined
C-4	2/18/2019	1166455.2	714192.3	61.5	7.8	-53.7	9.7	9.7	100.0	-53.7
C-5	2/20/2019	1167320.0	713610.6	58.5	7.0	-51.5	14.6	14.0	95.9	-52.2
C-6	2/18/2019	1167677.8	712979.4	65.6	11.7	-53.9	10.0	9.6	96.0	-53.9
C-7	2/20/2019	1168617.2	712335.3	59.2	8.8	-50.4	13.8	13.5	97.8	-51.3
C-8	2/21/2019	1168345.9	712082.2	55.8	3.8	-52.0	11.0	9.5	86.4	Undetermined
C-9	2/20/2019	1169230.3	711295.5	59.4	6.4	-53.0	9.7	9.5	97.9	-53.0
C-10	2/20/2019	1169339.5	711694.4	59.9	10.9	-49.0	13.5	13.4	99.3	-54.6
C-11	2/20/2019	1170100.3	710890.6	56.7	5.1	-51.6	13.9	13.0	93.5	-53.3
C-12	2/22/2019	1170124.7	710281.3	27.7	5.0	-22.7	14.7	14.7	100.0	Undetermined
C-13	2/22/2019	1170797.6	710436.2	48.4	9.4	-39.0	14.7	14.3	97.3	Undetermined
C-14	2/21/2019	1170888.7	709878.9	57.0	4.4	-52.6	9.6	9.2	95.8	-56.6
C-15	2/22/2019	1171275.8	709886.8	57.3	11.7	-45.6	14.7	12.6	85.7	Undetermined
C-16	2/22/2019	1171390.8	709280.6	62.2	11.6	-50.6	9.7	9.6	99.0	-52.6
C-17	2/22/2019	1171960.3	709337.6	31.2	9.5	-21.7	15.0	14.5	96.7	Undetermined
C-18	2/19/2019	1172236.9	708704.3	63.4	11.2	-52.2	9.0	7.1	78.9	-53.1
C-19	2/19/2019	1172424.4	708310.0	62.7	10.3	-52.4	9.6	8.0	83.3	-52.4
C-20	2/19/2019	1173409.8	707832.4	57.0	5.7	-51.3	13.8	13.6	98.6	-51.3
C-21	2/19/2019	1173431.1	707291.8	59.4	5.7	-53.7	9.6	8.6	89.6	-53.7
C-22	2/19/2019	1173278.7	706259.8	56.7	5.7	-51.0	13.2	13.0	98.5	-51.0
C-23	2/21/2019	1174069.4	706752.9	64.1	10.4	-53.7	8.5	7.5	88.2	-53.7
C-24	2/22/2019	1174329.1	707378.1	61.2	10.1	-51.1	9.7	9.3	95.9	-51.9
C-25	2/22/2019	1174764.8	706243.0	56.7	5.3	-51.4	9.7	9.6	99.0	-54.2

Notes

1. Coordinates are in North American Datum of 1983 Washington State Plane South, U.S. feet.

2. Water level obtained using real-time kinematic GPS.

3. Percent recovery calculated based on collection measurement.

MLLW: mean lower low water

Table 4
Core Sampling Intervals and Analysis

Station	Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Round 1 Sampling Status[1]	Round 2 Analyses
C-1	C-1-A-190219	0 to 2	-49.9 to -51.9	Full Suite	
	C-1-B-190219	2 to 4	-51.9 to -53.9	Full Suite	
	C-1-C-190219	4 to 6	-53.9 to -55.9	Full Suite	
	C-1-D-190219	6 to 8	-55.9 to -57.9	Archive	
	C-1-E-190219	8 to 9.9	-57.9 to -59.8	Archive	
C-2	C-2-A-190219	0 to 2	-51.4 to -53.4	Full Suite	
	C-2-B-190219	2 to 4	-53.4 to -55.4	Full Suite	
	C-2-C-190219	4 to 6	-55.4 to -57.4	Archive	Conventionals and TBT
	C-2-D-190219	6 to 8.6	57.4 to -60.0	Archive	Conventionals and TBT
C-3	C-3-A-190218	0 to 2.7	-52.5 to -55.2	Full Suite	
	C-3-B-190218	2.7 to 5.8	-55.2 to -58.3	Full Suite	
	C-3-C-190218	5.8 to 7.5	-58.3 to -60.0	Archive	
	C-3-Z-190218	7.5 to 9.5	-60.0 to -62.0	Archive	
	C-3-Z2-190218	9.5 to 11.2	-62.0 to -63.7	Archive	
C-4	C-4-A-190218	0 to 2	-53.6 to -55.6	Full Suite	
	C-4-B-190218	2 to 4	-55.6 to -57.6	Full Suite	
	C-4-C-190218	4 to 6	-57.6 to -59.6	Archive	
	C-4-Z-190218	6 to 8.2	-59.6 to -61.8	Archive	
C-5	C-5-A-190221	0 to 2	-51.5 to -53.5	Full Suite	
	C-5-B-190221	2 to 4	-53.5 to -55.5	Full Suite	
	C-5-C-190221	4 to 6	-55.5 to -57.5	Archive	
	C-5-D-190221	6 to 8.5	-57.5 to -60.0	Archive	
	C-5-Z-190221	8.5 to 10.5	-60.0 to -62.0	Archive	
C-6	C-6-A-190219	0 to 2	-53.9 to -55.9	Full Suite	
	C-6-B-190219	2 to 4	-55.9 to -57.9	Full Suite	
	C-6-C-190219	4 to 6.1	-57.9 to -60.0	Archive	
	C-6-Z-190219	6.1 to 8.1	60.0 to -62.0	Archive	
C-7	C-7-A-190221	0 to 2	-50.4 to -52.4	Full Suite	
	C-7-B-190221	2 to 4	-52.4 to -54.4	Full Suite	
	C-7-C-190221	4 to 6	-54.4 to -56.4	Full Suite	
	C-7-D-190221	6 to 8	-56.4 to -58.4	Archive	

Table 4
Core Sampling Intervals and Analysis

Station	Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Round 1 Sampling Status[1]	Round 2 Analyses
	C-7-E-190221	8 to 9.6	-58.4 to -60.0	Archive	
	C-7-Z-190221	9.6 to 11.6	-60.0 to -62.0	Archive	
C-8	C-8-A-190221	0 to 2	-52.0 to -54.0	Full Suite	
	C-8-B-190221	2 to 4	-54.0 to -56.0	Full Suite	
	C-8-C-190221	4 to 6	-56.0 to -58.0	Archive	
	C-8-D-190221	6 to 8	-58.0 to -60.0	Archive	
	C-8-Z-190221	8 to 8.3	-60.0 to -60.3	Archive	
C-9	C-9-A-190220	0 to 2	-53.0 to -55.0	Full Suite	
	C-9-B-190220	2 to 4	-55.0 to -57.0	Full Suite	
	C-9-C-190220	4 to 7	-57.0 to -60.0	Archive	
	C-9-Z-190220	7 to 9	-60.0 to -62.0	Archive	
C-10	C-10-A-190221	0 to 2	-49.0 to -51.0	Full Suite	
	C-10-B-190221	2 to 4	-51.0 to -53.0	Full Suite	
	C-10-C-190221	4 to 6	-53.0 to -55.0	Full Suite	
	C-10-D-190221	6 to 8	-55.0 to -57.0	Archive	
	C-10-E-190221	8 to 11	-57.0 to -60.0	Archive	
	C-10-Z-190221	11 to 13	-60.0 to -62.0	Archive	
C-11	C-11-A-190220	0 to 2	-51.6 to -53.6	Full Suite	
	C-11-B-190220	2 to 4	-53.6 to -55.6	Full Suite	
	C-11-C-190220	4 to 6.3	-55.6 to -57.9	Archive	
	C-11-D-190220	6.3 to 8.4	-57.9 to -60.0	Archive	
	C-11-Z-190220	8.4 to 10.4	-60.0 to -62.0	Archive	
C-12	C-12-A-190223	0 to 2	-22.7 to -24.7	Full Suite	
	C-12-B-190223	2 to 4	-24.7 to -26.7	Full Suite	
	C-12-C-190223	4 to 6	-26.7 to -28.7	Full Suite	
	C-12-D-190223	6 to 8	-28.7 to -30.7	Archive	conventionals and D/F
	C-12-E-190223	8 to 10	-30.7 to -32.7	Archive	conventionals and D/F
	C-12-F-190223	10 to 12	-32.7 to -34.7	Archive	
	C-12-G-190223	12 to 13.7	-34.7 to -36.4	Archive	
C-13	C-13-A-190223	0 to 2	-39.0 to -41	Full Suite	
	C-13-B-190223	2 to 4	-41.0 to -43.0	Full Suite	

Table 4
Core Sampling Intervals and Analysis

Station	Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Round 1 Sampling Status[1]	Round 2 Analyses
	C-13-C-190223	4 to 6	-43.0 to -45.0	Full Suite	
	C-13-D-190223	6 to 8	-45.0 to -47.0	Archive	conventionals and D/F
	C-13-E-190223	8 to 10	-47.0 to -49.0	Archive	conventionals and D/F
	C-13-F-190223	10 to 12	-49.0 to -51.0	Archive	
	C-13-G-190223	12 to 14	-51.0 to -53.0	Archive	
C-14	C-14-A-190221	0 to 2	-52.6 to -54.6	Full Suite	
	C-14-B-190221	2 to 4	-54.6 to -56.6	Full Suite	
	C-14-C-190221	4 to 6	-56.6 to -58.6	Archive	
	C-14-C-190221	6 to 7.4	-58.6 to -60.0	Archive	
	C-14-Z-190221	7.4 to 7.6	-60.0 to -60.6	Archive	
C-15	C-15-A-190222	0 to 2	-45.6 to -47.6	Full Suite	
	C-15-B-190222	2 to 4	-47.6 to -49.6	Full Suite	
	C-15-C-190222	4 to 6	-49.6 to -51.6	Full Suite	
	C-15-D-190222	6 to 8	-51.6 to -53.6	Archive	
	C-15-E-190222	8 to 10	-53.6 to -55.6	Archive	
	C-15-F-190222	10 to 12.3	-55.6 to -57.9	Archive	
C-16	C-16-A-190223	0 to 2	-50.6 to -52.6	Full Suite	
	C-16-B-190223	2 to 4	-52.6 to -54.6	Full Suite	
	C-16-C-190223	4 to 6.5	-54.6 to -57.1	Archive	
C-17	C-17-A-190222	0 to 2	-19.7 to -21.7	Full Suite	
	C-17-B-190222	2 to 4	-21.7 to -23.7	Full Suite	
	C-17-C-190222	4 to 8	-23.7 to -25.7	Full Suite	
	C-17-D-190222	8 to 10	-25.7 to -27.7	Archive	
	C-17-E-190222	10 to 12	-27.7 to -29.7	Archive	
	C-17-F-190222	12 to 14.1	-29.7 to -31.8	Archive	
C-18	C-18-A1-190220	0 to 2.3	-52.2 to -54.5	Full Suite	
	C-18-B1-190220	3.9 to 6.3	-54.5 to -56.9	Full Suite	
C-19	C-19-A-190220	0 to 2	-52.4 to -54.4	Full Suite	
	C-19-B-190220	2 to 4	-54.4 to -56.4	Full Suite	
	C-19-C-190220	4 to 6	-56.4 to -58.4	Archive	
	C-19-D-190220	6 to 7.9	-58.4 to -60.3	Archive	

Table 4
Core Sampling Intervals and Analysis

Station	Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Round 1 Sampling Status[1]	Round 2 Analyses
C-20	C-20-A-190219	0 to 2	-51.3 to -53.3	Full Suite	
	C-20-B-190219	2 to 4	-53.3 to -55.3	Full Suite	
	C-20-C-190219	4 to 6	-55.3 to -57.3	Archive	
	C-20-D-190219	6 to 8.7	-57.3 to -60.0	Archive	
	C-20-Z-190219	8.7 to 10.6	-60.0 to -61.9	Archive	
C-21	C-21-A-190219	0 to 2	-53.7 to -55.7	Full Suite	
	C-21-B-190219	2 to 4	-55.7 to -57.7	Full Suite	
	C-21-C-190219	4 to 6.3	-57.7 to -60.0	Archive	
	C-21-Z-190219	6.3 to 8.3	-60.0 to -62.0	Archive	
C-22	C-22-A-190219	0 to 2	-51.0 to -53.0	Full Suite	
	C-22-B-190219	2 to 4	-53.0 to -55.0	Full Suite	
	C-22-C-190219	4 to 6	-55.0 to -57.0	Archive	
	C-22-D-190219	6 to 9	-57.0 to -60.0	Archive	
	C-22-Z-190219	9 to 11	-60.0 to -62.0	Archive	
C-23	C-23-A1-190222	0 to 2	-53.7 to -55.7	Full Suite	
	C-23-B1-190222	2 to 4	-55.7 to -57.7	Full Suite	
C-24	C-24-A-190223	0 to 2	-51.1 to -53.1	Full Suite	
	C-24-B-190223	2 to 4	-53.1 to -55.1	Full Suite	
	C-24-C-190223	4 to 6.6	-55.1 to -57.7	Archive	
C-25	C-25-A-190222	0 to 2	-51.4 to -53.4	Full Suite	
	C-25-B-190222	2 to 4	-53.4 to -55.4	Full Suite	
	C-25-C-190222	4 to 6	-55.4 to -57.4	Archive	
	C-25-D-190222	6 to 8.6	-57.4 to -60.0	Archive	
	C-25-Z-190222	8.6 to 9.3	-60.0 to -60.7	Archive	

Notes:

1. The full suite of testing parameters include semivolatile organic compounds, polycyclic aromatic hydrocarbons, pesticides, polychlorinated biphenyls, metals, sulfide, ammonia, total organic carbon, grain size, total volatile solids, and total solids, dioxins and furans, and tributytin.

MLLW: mean lower low water

Table 5
Sample Results Summary - Conventionals and Physical Tests

Sample ID / Depth / Analyte	Method	C-1-A-190219 0 - 2 ft	C-1-B-190219 2 - 4 ft	C-1-C-190219 4 - 6 ft	C-2-A-190219 0 - 2 ft	C-2-B-190219 2 - 4 ft	C-2-C-190219 4 - 6 ft	C-2-D-190219 6 - 8.6 ft	C-3-A-190218 0 - 2.7 ft	C-3-B-190218 2.7 - 5.8 ft	C-4-A-190218 0 - 2 ft
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	SM4500NH3H	**2.09**	**0.81**	**0.68**	**2.64**	**2.24**	--	--	**3.01**	**8.74**	**0.63**
Sulfide	SM4500S2D	**388**	**104**	**93.3**	**117**	**1.89**	--	--	**529**	**115**	**29.6**
Conventional Parameters (%)											
Total organic carbon	SW9060A	**0.71**	**0.21**	**0.09**	**0.37**	**0.26**	**1.03**	**0.45**	**0.49**	**0.27**	**0.15**
Total solids	SM2540G	**71.88**	**80.16**	**78.63**	**74.57**	**78.53**	**73.42**	**80.56**	**68.43**	**77.92**	**78.72**
Total volatile solids	PSEP-TVS	**2.4**	**1.34**	**1.23**	**1.88**	**1.45**	--	--	**2.1**	**1.56**	**1.35**
Grain Size (%)											
Gravel	PSEP-PS	**0**	**0.3**	**0**	**0.5**	**0.1**	**0.4**	**0.5**	**0**	**0.1**	**0.1**
Sand, very coarse	PSEP-PS	**0.2**	**0.6**	**0.7**	**0.5**	**0.9**	**0.7**	**0.9**	**0.7**	**0.1**	**0.2**
Sand, coarse	PSEP-PS	**3.1**	**9.1**	**8.9**	**7**	**12.9**	**2.9**	**6.2**	**3.2**	**0.2**	**3.3**
Sand, medium	PSEP-PS	**12.5**	**33.4**	**38.9**	**28.6**	**38.4**	**17.6**	**32.3**	**8.3**	**1**	**25**
Sand, fine	PSEP-PS	**13.6**	**25.1**	**31.1**	**24.8**	**18.7**	**36.8**	**38.7**	**15.8**	**26.5**	**46**
Sand, very fine	PSEP-PS	**12.5**	**12.4**	**10.4**	**11.1**	**5.1**	**20.7**	**9.4**	**16**	**42.4**	**16**
Total Sand	PSEP-PS	**41.9**	**80.6**	**90**	**72**	**76**	**78.7**	**87.5**	**44**	**70.2**	**90.5**
Silt, coarse	PSEP-PS	**12.9**	**5.3**	**3.7**	**7.3**	**6.1**	**9.3**	**3.8**	**11.2**	**8**	**4.3**
Silt, medium	PSEP-PS	**14.3**	**4.6**	**1.8**	**6**	**6.7**	**4.5**	**2.5**	**12.9**	**8.6**	**1.3**
Silt, fine	PSEP-PS	**11**	**3.3**	**1.4**	**4.8**	**4.5**	**2.3**	**1.7**	**11.1**	**3.3**	**1**
Silt, very fine	PSEP-PS	**5.6**	**1.6**	**0.7**	**2.6**	**2.5**	**1.4**	**1.1**	**4.7**	**2.4**	**0.5**
Clay, coarse	PSEP-PS	**4.2**	**1.2**	**0.6**	**1.8**	**1.3**	**0.9**	**0.8**	**4.6**	**2**	**0.5**
Clay, medium	PSEP-PS	**3**	**0.9**	**0.4**	**1.5**	**0.8**	**0.7**	**0.5**	**3.6**	**1.6**	**0.4**
Clay, fine	PSEP-PS	**6.9**	**2.2**	**1.3**	**3.5**	**2**	**1.8**	**1.5**	**7.8**	**3.8**	**1.4**
Total Fines	PSEP-PS	**57.9**	**19.1**	**9.9**	**27.5**	**23.9**	**20.9**	**11.9**	**55.9**	**29.7**	**9.4**

Notes:

Bold: Detected result

ft: feet

J: Estimated value

mg/kg: milligram per kilogram

U: Compound analyzed, but not detected above detection limit

Table 5
Sample Results Summary - Conventionals and Physical Tests

Sample ID / Depth / Analyte	C-4-B-190218 2 - 4 ft	C-5-A-190221 0 - 2 ft	C-5-B-190221 2 - 4 ft	C-6-A-190219 0 - 2 ft	C-6-B-190219 2 - 4 ft	C-7-A-190221 0 - 2 ft	C-7-B-190221 2 - 4 ft	C-7-C-190221 4 - 6 ft	C-8-A-190221 0 - 2 ft	C-8-B-190221 2 - 4 ft	C-9-A-190220 0 - 2 ft
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	0.5 U	**3.9**	**14.8**	0.41 U	**1.58**	**4.01**	**1.06**	**1.18**	**6.98**	**27.9**	**5.97**
Sulfide	**8.33**	**32.9**	**6.35**	**13.5**	1.11 U	**258**	**7.28**	0.887 U	**153**	**4.52**	0.984 U
Conventional Parameters (%)											
Total organic carbon	**0.12**	**0.28**	**0.74 J**	**0.22**	**0.71**	**0.55**	**0.44**	**0.2**	**0.54**	**0.39**	**0.11**
Total solids	**79.07**	**80.52**	**74.08**	**90.85**	**77.91**	**60.4**	**79.72**	**81.42**	**74.91**	**74.88**	**84.21**
Total volatile solids	**1.07**	**3.39**	**2.45**	**1.36**	**2.26**	**1.33**	**1.57**	**1.28**	**1.95**	**2.13**	**0.92**
Grain Size (%)											
Gravel	**0.3**	**0.1**	**0.5**	**1.1**	**0.5**	**0.4**	**0.3**	**0.2**	**3.6**	**0**	**0.1**
Sand, very coarse	**0.3**	**0.7**	**2.2**	**1**	**0.9**	**0.4**	**0.9**	**0.4**	**0.6**	**0.2**	**0.5**
Sand, coarse	**5.2**	**8.4**	**14.2**	**16.9**	**4.5**	**2.5**	**4.4**	**2.9**	**2**	**0.3**	**8.4**
Sand, medium	**34.2**	**28.9**	**19.1**	**51**	**34.4**	**21.9**	**36.5**	**26.4**	**7**	**0.4**	**35.9**
Sand, fine	**45.5**	**26.2**	**18.7**	**21.5**	**42.8**	**28**	**44.9**	**49.2**	**14.8**	**1.4**	**33**
Sand, very fine	**10.3**	**11.5**	**16.6**	**3.7**	**11.3**	**11.3**	**6.9**	**13.9**	**18.7**	**8.4**	**9.3**
Total Sand	**95.5**	**75.7**	**70.8**	**94.1**	**93.9**	**64.1**	**93.6**	**92.8**	**43.1**	**10.7**	**87.1**
Silt, coarse	4.1 U	**8.5**	**9.6**	**1.4**	**1.1**	**7.9**	**1.5**	**3.1**	**16.3**	**17.7**	**3.8**
Silt, medium	4.1 U	**5.4**	**8**	**1**	**1.2**	**8.4**	**1.1**	**1.1**	**11.7**	**24.6**	**3**
Silt, fine	4.1 U	**3.4**	**3.8**	**0.7**	**1**	**6.3**	**0.8**	**0.6**	**8.1**	**17.4**	**2.3**
Silt, very fine	4.1 U	**2.1**	**2**	**0.4**	**0.5**	**3.9**	**0.6**	**0.3**	**5**	**10.4**	**1.1**
Clay, coarse	4.1 U	**1.4**	**1.4**	**0.4**	**0.2**	**2.8**	**0.5**	**0.4**	**3.5**	**5.8**	**0.5**
Clay, medium	4.1 U	**0.9**	**1**	**0.3**	**0.3**	**1.8**	**0.3**	**0.2**	**2.4**	**4.1**	**0.4**
Clay, fine	4.1 U	**2.5**	**2.7**	**0.7**	**1.2**	**4.6**	**1.4**	**1.2**	**6.4**	**9.3**	**1.5**
Total Fines	4.1 U	**24.2**	**28.5**	**4.9**	**5.5**	**35.7**	**6.2**	**6.9**	**53.4**	**89.3**	**12.6**

Notes:

Bold: Detected result

ft: feet

J: Estimated value

mg/kg: milligram per kilogram

U: Compound analyzed, but not detected
above detection limit

Table 5
Sample Results Summary - Conventionals and Physical Tests

Sample ID / Depth / Analyte	C-9-B-190220 2 - 4 ft	C-10-A-190221 0 - 2 ft	C-10-B-190221 2 - 4 ft	C-10-C-190221 4 - 6 ft	C-11-A-190220 0 - 2 ft	C-11-B-190220 2 - 4 ft	C-12-A-190223 0 - 2 ft	C-12-B-190223 2 - 4 ft	C-12-C-190223 4 - 6 ft	C-12-D-190223 6 - 8 ft	C-12-E-190223 8 - 10 ft
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	**36.4**	**8.44**	**8.05**	**11.9**	**4.27**	**0.95**	**3.31**	**4.36**	**12**	--	--
Sulfide	1.03 U	**627**	**592**	0.989 U	**605**	1.12 U	**57.1**	**104**	**113**	--	--
Conventional Parameters (%)											
Total organic carbon	**0.19**	**1.01**	**0.45**	**0.19**	**0.86**	**0.14**	**0.61 J**	**0.37 J**	**0.75 J**	**0.1**	**0.21**
Total solids	**78.65**	**66.64**	**73.29**	**99.27**	**68.52**	**80.63**	**72.61**	**74.39**	**75.94**	**82.52**	**81.81**
Total volatile solids	**1.34**	**2.88**	**1.92**	**1.67**	**2.45**	**1.06**	**2.13**	**2.08**	**1.86**	--	--
Grain Size (%)											
Gravel	**0.2**	**0.7**	**0.1**	**0.2**	**0.2**	**0.3**	**3.5**	**2.9**	**0.6**	**2.8**	**13.7**
Sand, very coarse	**0.3**	**0.2**	**0.2**	**0.5**	**0.4**	**0.3**	**2.5**	**1.8**	**0.5**	**4**	**13.9**
Sand, coarse	**2.7**	**0.9**	**2.1**	**6.5**	**2.5**	**3.9**	**14.5**	**8.5**	**3.5**	**34**	**26.5**
Sand, medium	**9.2**	**5**	**7.2**	**19.8**	**12.5**	**35.6**	**16.9**	**14.2**	**10.5**	**29.5**	**15.9**
Sand, fine	**22**	**12.9**	**15.5**	**20.1**	**20.1**	**43.9**	**13.1**	**17**	**18.8**	**11.8**	**10.6**
Sand, very fine	**28.6**	**12.9**	**19.7**	**12.8**	**12.1**	**9.4**	**10.7**	**12.9**	**15.1**	**4.6**	**8.8**
Total Sand	**62.8**	**31.9**	**44.7**	**59.7**	**47.6**	**93.1**	**57.7**	**54.4**	**48.4**	**83.9**	**75.7**
Silt, coarse	**9.3**	**13.8**	**14.3**	**9.7**	**10.7**	**2**	**9.7**	**9.2**	**10.5**	**3.2**	**3.5**
Silt, medium	**9.2**	**14.5**	**13.5**	**8.9**	**14.2**	**1.1**	**8.2**	**9.9**	**13.3**	**2.7**	**1.7**
Silt, fine	**7.6**	**13.4**	**9.9**	**7.1**	**11.9**	**0.7**	**6.2**	**7.4**	**8.7**	**2.2**	**1.5**
Silt, very fine	**3.5**	**7.5**	**5.1**	**4.1**	**5.8**	**0.6**	**3.9**	**4.6**	**5.5**	**1.5**	**1.2**
Clay, coarse	**2.4**	**5.7**	**3.7**	**3**	**3**	**0.4**	**2.9**	**3.3**	**3.6**	**1.1**	**0.9**
Clay, medium	**1.5**	**3.4**	**2.1**	**1.9**	**1.7**	**0.3**	**2.5**	**2.6**	**2.9**	**0.8**	**0.7**
Clay, fine	**3.3**	**9.2**	**6.7**	**5.5**	**4.9**	**1.5**	**5.4**	**5.7**	**6.4**	**1.8**	**1.1**
Total Fines	**36.8**	**67.5**	**55.3**	**40.2**	**52.2**	**6.6**	**38.8**	**42.7**	**50.9**	**13.3**	**10.6**

Notes:

Bold: Detected result

ft: feet

J: Estimated value

mg/kg: milligram per kilogram

U: Compound analyzed, but not detected above detection limit

Table 5
Sample Results Summary - Conventionals and Physical Tests

Sample ID / Depth / Analyte	C-13-A-190223 0 - 2 ft	C-13-B-190223 2 - 4 ft	C-13-C-190223 4 - 6 ft	C-13-D-190223 6 - 8 ft	C-13-E-190223 8 - 10 ft	C-14-A-190221 0 - 2 ft	C-14-B-190221 2 - 4 ft	C-15-A-190222 0 - 2 ft	C-15-B-190222 2 - 4 ft	C-15-C-190222 4 - 6 ft	C-16-A-190223 0 - 2 ft
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	**4.85**	**19.3**	**23.8**	--	--	**8.62**	**20.3**	**2.33**	**2.08**	**2.4**	**2.82**
Sulfide	**402**	**339**	**5.5**	--	--	**11.4**	1.1 U	**224**	1.12 U	1.07 U	**203**
Conventional Parameters (%)											
Total organic carbon	**0.59 J**	**0.39 J**	**0.18 J**	**0.19**	**0.04**	**0.09**	**0.15**	**0.25 J**	**0.1 J**	**0.17 J**	**0.25 J**
Total solids	**77.45**	**74.72**	**83.95**	**84.57**	**85.03**	**86.15**	**84.18**	**75.49**	**82.44**	**83.22**	**94.31**
Total volatile solids	**1.73**	**1.92**	**1.12**	--	--	**0.88**	**1.27**	**1.69**	**1.08**	**1.23**	**18.98**
Grain Size (%)											
Gravel	**24.4**	**0.9**	**4.4**	**7.9**	**0.2**	**10.8**	**1.2**	**4.3**	**6.5**	**1.1**	**1.4**
Sand, very coarse	**3.6**	**1.5**	**3.8**	**4**	**1.7**	**6.9**	**3.8**	**3**	**5.9**	**3.5**	**1.8**
Sand, coarse	**10.1**	**8.6**	**16.1**	**18.5**	**18.5**	**25.9**	**16.9**	**14.2**	**21.2**	**19.6**	**13.3**
Sand, medium	**19.6**	**18.8**	**33.2**	**35.9**	**56.2**	**34.3**	**34.1**	**31.2**	**37.9**	**38.7**	**40.7**
Sand, fine	**14.8**	**15.4**	**20**	**14.9**	**19.9**	**15.3**	**23.5**	**22.3**	**16.9**	**20.9**	**18.7**
Sand, very fine	**6.5**	**12.5**	**8.1**	**3.4**	**1.4**	**2.9**	**6.9**	**8.5**	**4.7**	**5.8**	**5.7**
Total Sand	**54.6**	**56.8**	**81.2**	**76.7**	**97.7**	**85.3**	**85.2**	**79.2**	**86.6**	**88.5**	**80.2**
Silt, coarse	**4.2**	**9.7**	**4.7**	**1.6**	2 U	**0.7**	**4.6**	**3.2**	**2.3**	**2.8**	**3.8**
Silt, medium	**4.3**	**9**	**2.6**	**3.6**	2 U	**0.5**	**2.5**	**3.6**	**1.1**	**1.9**	**3.4**
Silt, fine	**4.5**	**7.2**	**2.1**	**3.3**	2 U	**0.6**	**1.8**	**4.1**	**0.8**	**1.4**	**4.1**
Silt, very fine	**2**	**4.2**	**1.5**	**2.4**	2 U	**0.5**	**1.3**	**1.4**	**0.8**	**1.1**	**1.9**
Clay, coarse	**1.7**	**3.6**	**0.9**	**1.4**	2 U	**0.5**	**1**	**0.9**	**0.4**	**0.9**	**1.3**
Clay, medium	**1.5**	**2.7**	**0.7**	**1**	2 U	**0.3**	**0.8**	**0.8**	**0.4**	**0.6**	**1.2**
Clay, fine	**2.9**	**5.8**	**1.8**	**2**	2 U	**0.7**	**1.8**	**2.3**	**1.2**	**1.7**	**2.6**
Total Fines	**21.1**	**42.2**	**14.3**	**15.3**	2 U	**3.8**	**13.8**	**16.3**	**7**	**10.4**	**18.3**

Notes:

Bold: Detected result

ft: feet

J: Estimated value

mg/kg: milligram per kilogram

U: Compound analyzed, but not detected above detection limit

Table 5
Sample Results Summary - Conventionals and Physical Tests

Sample ID / Depth / Analyte	C-16-B-190223 2 - 4 ft	C-17-A-190222 0 - 2 ft	C-17-B-190222 2 - 4 ft	C-17-C-190222 4 - 8 ft	C-18-A1-190220 0 - 2.3 ft	C-18-B1-190220 3.9 - 6.3 ft	C-19-A-190220 0 - 2 ft	C-19-B-190220 2 - 4 ft	C-20-A-190219 0 - 2 ft	C-20-B-190219 2 - 4 ft	C-21-A-190219 0 - 2 ft
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	**1.8**	**9.64**	**24.6**	**21.8**	**1.73**	**0.88**	**0.41**	**0.62**	**3.61**	**3.17**	0.44 U
Sulfide	1.11 U	**491**	1.73 U	1.07 U	**98.7**	0.97 U	1.01 U	**4.57**	**27.1**	1.01 U	**7.09**
Conventional Parameters (%)											
Total organic carbon	**0.05 J**	**0.83 J**	**3.24 J**	**0.39 J**	**0.29 J**	**0.13 J**	**0.09**	**0.1**	**0.08**	**0.04**	**0.49**
Total solids	**82.56**	**66.23**	**52.51**	**72.42**	**79.18**	**89.34**	**96.68**	**84.76**	**83.46**	**88.17**	**86.32**
Total volatile solids	**0.98**	**3.54**	**9.48**	**6.55**	**1.34**	**1.55**	**0.85**	**1.11**	**0.96**	**0.96**	**1.72**
Grain Size (%)											
Gravel	**1.5**	**0**	**0.2**	**0**	**1.1**	**3.1**	**2.1**	**2.5**	**1.1**	**4.7**	**1.1**
Sand, very coarse	**4.1**	**0.8**	**3.1**	**0.1**	**3.7**	**9.1**	**8.8**	**7**	**7.2**	**9.7**	**4.1**
Sand, coarse	**20.2**	**1.3**	**1.7**	**0.4**	**21.6**	**33.5**	**40.9**	**25.7**	**31**	**46.7**	**17.2**
Sand, medium	**55.6**	**2.1**	**1.7**	**1.5**	**36.5**	**44.3**	**33.7**	**33.7**	**32.6**	**31.8**	**43.2**
Sand, fine	**14.1**	**2.5**	**2.4**	**5.6**	**14.9**	**7.3**	**10.4**	**17.7**	**15.4**	**5.5**	**31.1**
Sand, very fine	**1.6**	**3.3**	**5.2**	**21.7**	**4.8**	**0.6**	**1.6**	**3.6**	**6.1**	**0.5**	**2.1**
Total Sand	**95.6**	**10**	**14.1**	**29.3**	**81.5**	**94.8**	**95.4**	**87.7**	**92.3**	**94.2**	**97.7**
Silt, coarse	2.8 U	**5.5**	**6.8**	**20.2**	**3.8**	2 U	2.4 U	**2.3**	**2.5**	1.2 U	1.3 U
Silt, medium	2.8 U	**12.9**	**13.7**	**18.6**	**3.7**	2 U	2.4 U	**2.5**	**1.2**	1.2 U	1.3 U
Silt, fine	2.8 U	**18.7**	**18.5**	**11.3**	**3**	2 U	2.4 U	**1.8**	**0.8**	1.2 U	1.3 U
Silt, very fine	2.8 U	**19.4**	**17**	**7.2**	**2.3**	2 U	2.4 U	**0.9**	**0.5**	1.2 U	1.3 U
Clay, coarse	2.8 U	**13.6**	**10.9**	**4.5**	**1.4**	2 U	2.4 U	**0.5**	**0.4**	1.2 U	1.3 U
Clay, medium	2.8 U	**7.6**	**6.9**	**2.8**	**1.2**	2 U	2.4 U	**0.3**	**0.3**	1.2 U	1.3 U
Clay, fine	2.8 U	**12.2**	**12**	**6**	**2**	2 U	2.4 U	**1.4**	**1**	1.2 U	1.3 U
Total Fines	2.8 U	**89.9**	**85.8**	**70.6**	**17.4**	2 U	2.4 U	**9.7**	**6.7**	1.2 U	1.3 U

Notes:

Bold: Detected result

ft: feet

J: Estimated value

mg/kg: milligram per kilogram

U: Compound analyzed, but not detected above detection limit

Table 5
Sample Results Summary - Conventionals and Physical Tests

Sample ID / Depth / Analyte	C-21-B-190219 2 - 4 ft	C-22-A-190219 0 - 2 ft	C-22-B-190219 2 - 4 ft	C-23-A1-190222 0 - 2 ft	C-23-B1-190222 2 - 4 ft	C-24-A-190223 0 - 2 ft	C-24-B-190223 2 - 4 ft	C-25-A-190222 0 - 2 ft	C-25-B-190222 2 - 4 ft
Conventional Parameters (mg/kg)									
Ammonia as nitrogen	0.45 U	**1.95**	**2.19**	0.41 U	0.38 U	**1.68**	**1.79**	**36.7**	**41.9**
Sulfide	1.19 U	1.01 U	1.07 U	1.01 U	1.07 U	**1.76**	1 U	1.31 U	1.17 U
Conventional Parameters (%)									
Total organic carbon	**0.11**	**0.07**	**0.04**	**0.07**	**0.04**	**0.06 J**	**0.04 J**	**0.29 J**	**0.44 J**
Total solids	**87**	**91.38**	**90.92**	**91.48**	**90.58**	**84.92**	**90.11**	**77.35**	**75.07**
Total volatile solids	**1.1**	**0.83**	**0.93**	**1.01**	**0.83**	**1.05**	**0.98**	**1.66**	**2.67**
Grain Size (%)									
Gravel	**0.4**	**0.4**	**0.4**	**2.6**	**4.1**	**15.3**	**4.5**	**0.1**	**0.5**
Sand, very coarse	**4.2**	**2.2**	**2.4**	**11.4**	**13.8**	**13.7**	**18.3**	**0.4**	**0.5**
Sand, coarse	**17.3**	**19.9**	**22.9**	**42.4**	**48.7**	**26.9**	**33**	**2**	**2.8**
Sand, medium	**43.5**	**45.3**	**47.6**	**32.9**	**26.9**	**26.7**	**34.2**	**5.3**	**31.1**
Sand, fine	**30.5**	**25.3**	**22.5**	**5.4**	**3.7**	**9.5**	**7.9**	**6.9**	**24.2**
Sand, very fine	**1.6**	**2.6**	**2.1**	**0.8**	**0.6**	**2.4**	**0.6**	**9.6**	**5.9**
Total Sand	**97.1**	**95.3**	**97.5**	**92.9**	**93.7**	**79.2**	**94**	**24.2**	**64.5**
Silt, coarse	2.5 U	**1.4**	2 U	**0.9**	2.1 U	**1.1**	1.4 U	**19.7**	**6.2**
Silt, medium	2.5 U	**0.9**	2 U	**0.6**	2.1 U	**1**	1.4 U	**25.3**	**12.2**
Silt, fine	2.5 U	**0.8**	2 U	**0.9**	2.1 U	**0.9**	1.4 U	**13.8**	**6.9**
Silt, very fine	2.5 U	**0.3**	2 U	**0.7**	2.1 U	**0.7**	1.4 U	**6.4**	**3.6**
Clay, coarse	2.5 U	**0.2**	2 U	**0.5**	2.1 U	**0.5**	1.4 U	**3.1**	**1.9**
Clay, medium	2.5 U	**0.1**	2 U	**0.2**	2.1 U	**0.4**	1.4 U	**2.2**	**1.4**
Clay, fine	2.5 U	**0.6**	2 U	**0.5**	2.1 U	**1.1**	1.4 U	**5.3**	**2.9**
Total Fines	2.5 U	**4.3**	2 U	**4.3**	2.1 U	**5.7**	1.4 U	**75.8**	**35.1**

Notes:

Bold: Detected result

ft: feet

J: Estimated value

mg/kg: milligram per kilogram

U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID Depth Analyte	DMMP SL	DMMP BT	C-1-A-190219 0 - 2 ft	C-1-B-190219 2 - 4 ft	C-1-C-190219 4 - 6 ft	C-2-A-190219 0 - 2 ft	C-2-B-190219 2 - 4 ft	C-2-C-190219 4 - 6 ft	C-2-D-190219 6 - 8.6 ft
Metals (mg/kg)									
Antimony	150	--	0.28 UJ	0.23 UJ	0.23 UJ	0.25 UJ	0.24 UJ	--	--
Arsenic	57	507.1	**3.24**	**1.67**	**1.06**	**4.97**	**1.95**	--	--
Cadmium	5.1	--	**0.09 J**	0.11 U	0.12 U	**0.05 J**	**0.05 J**	--	--
Chromium	260	--	**14.7**	**11**	**9.49**	**12.5**	**12.7**	--	--
Copper	390	--	**26.7**	**13.7**	**10.3**	**18.3**	**16.6**	--	--
Lead	450	975	**6.01**	**2.33**	**1.33**	**3.46**	**2.15**	--	--
Mercury	0.41	1.5	**0.0423**	**0.025**	**0.0114 J**	**0.0249 J**	**0.0167 J**	--	--
Selenium	--	3	**0.97**	**0.72**	**0.69**	**0.95**	**1.11**	--	--
Silver	6.1	--	**0.12 J**	**0.06 J**	**0.03 J**	**0.08 J**	**0.05 J**	--	--
Zinc	410	--	**33.3**	**19.3**	**14.9**	**27**	**23.7**	--	--
Organometallic Compounds (µg/kg)									
Tributyltin (ion)	--	73	**0.913 J**	3.42 U	3.49 U	**7.35**	**17.3**	3.6 U	3.43 U
Semivolatile Organics (µg/kg)									
1,2,4-Trichlorobenzene	31	--	5 U	4.8 U	4.8 U	4.9 U	4.9 U	--	--
1,2-Dichlorobenzene	35	--	5 U	4.8 U	4.8 U	4.9 U	4.9 U	--	--
1,4-Dichlorobenzene	110	--	5 U	4.8 U	4.8 U	4.9 U	4.9 U	--	--
2,4-Dimethylphenol	29	--	24.9 UJ	24 UJ	24.1 UJ	24.4 UJ	24.3 UJ	--	--
2-Methylphenol (o-Cresol)	63	--	**3 J**	4.8 U	4.8 U	4.9 U	4.9 U	--	--
4-Methylphenol (p-Cresol)	670	--	**5**	4.8 U	4.8 U	**2.9 J**	4.9 U	--	--
Benzoic acid	650	--	**84.7 J**	95.9 UJ	96.3 UJ	97.5 UJ	97 UJ	--	--
Benzyl alcohol	57	--	19.9 U	19.2 U	19.3 U	19.5 U	19.4 U	--	--
bis(2-Ethylhexyl)phthalate	1300	--	49.8 U	47.9 U	48.2 U	48.8 U	48.5 U	--	--
Butylbenzyl phthalate	63	--	19.9 U	19.2 U	19.3 U	19.5 U	19.4 U	--	--
Diethyl phthalate	200	--	19.9 U	19.2 U	19.3 U	19.5 U	19.4 U	--	--
Dimethyl phthalate	71	--	5 U	4.8 U	4.8 U	4.9 U	4.9 U	--	--
Di-n-butyl phthalate	1400	--	**37.3**	**22.5**	**22.4**	**40.6**	**14.9 J**	--	--
Di-n-octyl phthalate	6200	--	19.9 U	19.2 U	19.3 U	19.5 U	19.4 U	--	--
Hexachlorobenzene	22	168	5 U	4.8 U	4.8 U	4.9 U	4.9 U	--	--
Hexachlorobutadiene	11	--	5 U	4.8 U	4.8 U	4.9 U	4.9 U	--	--
n-Nitrosodiphenylamine	28	--	5 U	4.8 U	4.8 U	4.9 U	4.9 U	--	--
Pentachlorophenol	400	504	19.9 UJ	19.2 UJ	19.3 UJ	19.5 UJ	19.4 UJ	--	--
Phenol	420	--	13.5 U	4.8 U	4.8 U	7.8 U	4.9 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene	670	--	**24.7**	**8.6 J**	19.3 U	19.5 U	**6.4 J**	--	--
Acenaphthene	500	--	19.9 U	19.2 U	19.3 U	19.5 U	19.4 U	--	--
Acenaphthylene	560	--	19.9 U	19.2 U	19.3 U	19.5 U	19.4 U	--	--
Anthracene	960	--	**14.8 J**	19.2 U	19.3 U	**7.7 J**	19.4 U	--	--
Benzo(a)anthracene	1300	--	**24.1**	**16.6 J**	19.3 U	**17.5 J**	**5.2 J**	--	--
Benzo(a)pyrene	1600	--	**20.3**	**16.7 J**	19.3 U	**16.3 J**	19.4 U	--	--
Benzo(b,j,k)fluoranthenes	--	--	**57.7**	**35.3 J**	38.5 U	**38.8 J**	38.8 U	--	--
Benzo(g,h,i)perylene	670	--	**14.6 J**	**8 J**	19.3 U	**10.1 J**	19.4 U	--	--
Chrysene	1400	--	**37.5**	**21.2**	19.3 U	**24**	**6.7 J**	--	--
Dibenzo(a,h)anthracene	230	--	**4.4 J**	**3.7 J**	4.8 U	**2.7 J**	4.9 U	--	--
Dibenzofuran	540	--	**8.7 J**	19.2 U	19.3 U	19.5 U	19.4 U	--	--
Fluoranthene	1700	4600	**47.4**	**22**	19.3 U	**32.1**	**7.7 J**	--	--
Fluorene	540	--	**8.3 J**	19.2 U	19.3 U	19.5 U	19.4 U	--	--
Indeno(1,2,3-c,d)pyrene	600	--	**13.4 J**	**7.4 J**	19.3 U	**8.3 J**	19.4 U	--	--
Naphthalene	2100	--	**21.5**	**8.7 J**	19.3 U	**11.7 J**	**5.3 J**	--	--
Phenanthrene	1500	--	**45.7**	**13.6 J**	19.3 U	**24.9**	**13 J**	--	--
Pyrene	2600	11980	**61.5**	**27.1**	19.3 U	**39.5**	**9.3 J**	--	--
Total Benzofluoranthenes (b,j,k) (U = 0)	3200	--	**57.7**	**35.3 J**	38.5 U	**38.8 J**	38.8 U	--	--
Total HPAH (DMMP) (U = 0)[1]	12000	--	**280.9 J**	**158 J**	38.5 U	**189.3 J**	**28.9 J**	--	--
Total LPAH (DMMP) (U = 0)[2]	5200	--	**90.3 J**	**22.3 J**	19.3 U	**44.3 J**	**18.3 J**	--	--
Total PAH (DMMP) (U = 0)	--	--	**371.2 J**	**180.3 J**	38.5 U	**233.6 J**	**47.2 J**	--	--
Pesticides (µg/kg)[3]									
4,4'-DDD (p,p'-DDD)	16	--	0.31 U	0.31 U	0.32 U	0.32 U	0.32 U	--	--
4,4'-DDE (p,p'-DDE)	9	--	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	--	--
4,4'-DDT (p,p'-DDT)	12	--	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	--	--
Aldrin	9.5	--	0.36 U	0.36 U	0.36 U	0.37 U	0.37 U	--	--
Chlordane, alpha- (Chlordane, cis-)	--	--	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	--	--
Chlordane, beta- (Chlordane, trans-)	--	--	2.04 U	0.97 U	0.32 U	0.33 U	0.32 U	--	--
Dieldrin	1.9	--	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	--	--
Heptachlor	1.5	--	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	--	--
Nonachlor, cis-	--	--	0.2 U	0.2 U	0.21 U	0.21 U	0.21 U	--	--
Nonachlor, trans-	--	--	0.22 U	0.22 U	0.22 U	0.23 U	0.23 U	--	--
Oxychlordane	--	--	0.12 U	0.12 U	0.13 U	0.13 U	0.13 U	--	--
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	--	50	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	--	--
Total DMMP Chlordane (U = 0)[5]	2.8	37	2.04 U	0.97 U	0.32 U	0.33 U	0.32 U	--	--
PCB Aroclors (µg/kg)									
Aroclor 1016	--	--	3.9 U	3.9 U	4 U	4 U	4 U	--	--
Aroclor 1221	--	--	3.9 U	3.9 U	4 U	4 U	4 U	--	--
Aroclor 1232	--	--	3.9 U	3.9 U	4 U	4 U	4 U	--	--
Aroclor 1242	--	--	3.9 U	3.9 U	4 U	4 U	4 U	--	--
Aroclor 1248	--	--	3.9 U	3.9 U	4 U	4 U	4 U	--	--
Aroclor 1254	--	--	**3 J**	3.9 U	4 U	**2 J**	4 U	--	--
Aroclor 1260	--	--	**2.1 J**	3.9 U	4 U	4 U	4 U	--	--
Aroclor 1262	--	--	3.9 U	3.9 U	4 U	4 U	4 U	--	--
Aroclor 1268	--	--	3.9 U	3.9 U	4 U	4 U	4 U	--	--
Total DMMP PCB Aroclors (U = 0)	130	--	**5.1 J**	3.9 U	4 U	**2 J**	4 U	--	--
PCB Aroclors (mg/kg-OC)[6]									
Total DMMP PCB Aroclors (U = 0)	--	38	**0.72 J**	1.86 U	4.44 U	**0.54 J**	1.54 U	--	--

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID / Depth / Analyte	C-3-A-190218 0 - 2.7 ft	C-3-B-190218 2.7 - 5.8 ft	C-4-A-190218 0 - 2 ft	C-4-B-190218 2 - 4 ft	C-5-A-190221 0 - 2 ft	C-5-B-190221 2 - 4 ft	C-6-A-190219 0 - 2 ft	C-6-B-190219 2 - 4 ft
Metals (mg/kg)								
Antimony	0.29 UJ	0.25 UJ	0.25 UJ	0.24 UJ	0.23 UJ	0.25 UJ	0.21 UJ	0.26 UJ
Arsenic	**3.7**	**1.77**	**1.12**	**1.01**	**1.59**	**1.63**	**1.14**	**1.41**
Cadmium	**0.06 J**	0.12 U	0.12 U	0.12 U	**0.04 J**	**0.05 J**	**0.12**	0.13 U
Chromium	**12.3**	**10.9**	**11.8**	**10.8**	**11.3**	**12.7**	**9.11**	**11.1**
Copper	**25.5**	**14.9**	**11.9**	**10.8**	**14.4**	**16.9**	**10.3**	**15.6**
Lead	**6.26**	**1.55**	**1.26**	**1.21**	**2.25**	**1.86**	**1.42**	**1.46**
Mercury	**0.0599 J**	0.0231 UJ	0.026 UJ	0.0254 UJ	0.0269 U	0.0227 U	0.0241 U	**0.00982 J**
Selenium	**0.93**	**0.81**	0.61 U	**0.77**	**0.79**	**0.76**	**0.77**	**0.74**
Silver	**0.12 J**	**0.04 J**	**0.04 J**	**0.04 J**	**0.06 J**	**0.06 J**	**0.04 J**	**0.06 J**
Zinc	**34.4**	**19.9**	**20**	**19.4**	**21.1**	**24**	**17.9**	**18.8**
Organometallic Compounds (µg/kg)								
Tributyltin (ion)	**2.16 J**	3.54 UJ	3.49 UJ	3.79 UJ	**0.768 J**	3.48 U	**1.05 J**	**0.477 J**
Semivolatile Organics (µg/kg)								
1,2,4-Trichlorobenzene	4.8 U	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
1,2-Dichlorobenzene	4.8 U	4.9 U	4.9 U	4.7 U	5 U	**0.9 J**	5 U	4.9 U
1,4-Dichlorobenzene	4.8 U	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
2,4-Dimethylphenol	24.1 UJ	24.6 UJ	24.3 UJ	23.6 UJ	24.9 U	24.4 U	24.8 UJ	24.6 UJ
2-Methylphenol (o-Cresol)	4.8 U	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
4-Methylphenol (p-Cresol)	**5.4**	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
Benzoic acid	**85.1 J**	**15.8 J**	**16.8 J**	94.3 UJ	**21.2 J**	**56.2 J**	99.1 UJ	**37.8 J**
Benzyl alcohol	**13.4 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
bis(2-Ethylhexyl)phthalate	**29.5 J**	49.2 U	48.6 U	47.1 U	49.8 U	48.9 U	49.5 U	49.2 U
Butylbenzyl phthalate	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Diethyl phthalate	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Dimethyl phthalate	4.8 U	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
Di-n-butyl phthalate	**118**	**69.7**	**96.1**	**108**	19.9 U	23.3 U	**43.4**	**56.1**
Di-n-octyl phthalate	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Hexachlorobenzene	4.8 U	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
Hexachlorobutadiene	4.8 U	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
n-Nitrosodiphenylamine	4.8 U	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
Pentachlorophenol	19.3 UJ	19.7 UJ	19.4 UJ	18.9 UJ	**5.4 J**	**5.5 J**	19.8 UJ	19.7 UJ
Phenol	**30**	6.1 U	5.6 U	4.7 U	6.4 U	8.1 U	5 U	6.4 U
Polycyclic Aromatic Hydrocarbons (µg/kg)								
2-Methylnaphthalene	**18.4 J**	**8 J**	19.4 U	18.9 U	19.9 U	**17.2 J**	19.8 U	**21.3**
Acenaphthene	**7 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Acenaphthylene	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Anthracene	**13.9 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Benzo(a)anthracene	**20.7**	19.7 U	19.4 U	18.9 U	**7.4 J**	**5.2 J**	19.8 U	19.7 U
Benzo(a)pyrene	**26.8**	19.7 U	19.4 U	18.9 U	**8.5 J**	19.5 U	19.8 U	19.7 U
Benzo(b,j,k)fluoranthenes	**75.9**	39.4 U	38.9 U	37.7 U	**26.9 J**	39.1 U	39.6 U	39.3 U
Benzo(g,h,i)perylene	**20.1**	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Chrysene	**34.4**	**5.3 J**	19.4 U	18.9 U	**11.7 J**	**7.1 J**	19.8 U	**7.4 J**
Dibenzo(a,h)anthracene	**7.6**	4.9 U	4.9 U	4.7 U	5 U	4.9 U	5 U	4.9 U
Dibenzofuran	**12 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	**5.4 J**
Fluoranthene	**38.3**	19.7 U	19.4 U	18.9 U	**11.9 J**	19.5 U	19.8 U	19.7 U
Fluorene	**11 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Indeno(1,2,3-c,d)pyrene	**16.7 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.5 U	19.8 U	19.7 U
Naphthalene	**31**	19.7 U	19.4 U	18.9 U	19.9 U	**7.9 J**	19.8 U	**11.1 J**
Phenanthrene	**36.9**	**13 J**	**5.9 J**	18.9 U	**12.9 J**	**19.1 J**	19.8 U	**23.7**
Pyrene	**63.5**	19.7 U	19.4 U	18.9 U	**15.9 J**	19.5 U	**6.3 J**	19.7 U
Total Benzofluoranthenes (b,j,k) (U = 0)	**75.9**	39.4 U	38.9 U	37.7 U	**26.9 J**	39.1 U	39.6 U	39.3 U
Total HPAH (DMMP) (U = 0)[1]	**304 J**	**5.3 J**	38.9 U	37.7 U	**82.3 J**	**12.3 J**	**6.3 J**	**7.4 J**
Total LPAH (DMMP) (U = 0)[2]	**99.8 J**	**13 J**	**5.9 J**	18.9 U	**12.9 J**	**27 J**	19.8 U	**34.8 J**
Total PAH (DMMP) (U = 0)	**403.8 J**	**18.3 J**	**5.9 J**	37.7 U	**95.2 J**	**39.3 J**	**6.3 J**	**42.2 J**
Pesticides (µg/kg)[3]								
4,4'-DDD (p,p'-DDD)	1.59 U	0.32 U	1.58 UJ	1.54 U	0.32 U	0.32 U	0.32 U	0.32 U
4,4'-DDE (p,p'-DDE)	0.67 U	0.13 U	0.67 U	0.65 U	0.13 U	0.13 U	0.13 U	0.13 U
4,4'-DDT (p,p'-DDT)	1.62 U	0.32 U	1.6 UJ	1.57 U	0.32 U	0.32 UJ	0.32 U	0.32 U
Aldrin	1.84 U	0.37 U	1.82 U	1.78 U	0.37 U	0.37 U	0.37 U	0.37 U
Chlordane, alpha- (Chlordane, cis-)	0.55 U	0.11 U	0.55 U	0.54 U	0.11 U	0.11 U	0.11 U	0.11 U
Chlordane, beta- (Chlordane, trans-)	24.9 U	0.33 U	1.61 U	1.58 U	0.33 U	0.33 U	0.32 U	0.33 U
Dieldrin	0.57 U	0.11 U	0.57 U	0.55 U	0.11 U	0.11 U	0.11 U	0.11 U
Heptachlor	0.23 U	0.05 U	0.23 U	0.22 U	0.05 U	0.05 U	0.05 U	0.05 U
Nonachlor, cis-	1.04 U	0.21 U	1.04 UJ	1.01 U	0.21 U	0.21 U	0.21 U	0.21 U
Nonachlor, trans-	1.13 U	0.23 U	1.13 UJ	1.1 U	0.23 U	0.23 U	0.23 U	0.23 U
Oxychlordane	0.64 U	0.13 U	0.63 UJ	0.62 U	0.13 U	0.13 U	0.13 U	0.13 U
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	1.62 U	0.32 U	1.6 UJ	1.57 U	0.32 U	0.32 UJ	0.32 U	0.32 U
Total DMMP Chlordane (U = 0)[5]	24.9 U	0.33 U	1.61 UJ	1.58 U	0.33 U	0.33 U	0.32 U	0.33 U
PCB Aroclors (µg/kg)								
Aroclor 1016	4 U	4 U	4 U	3.9 U	3.8 U	4 U	3.9 U	4 U
Aroclor 1221	4 U	4 U	4 U	3.9 U	3.8 U	4 U	3.9 U	4 U
Aroclor 1232	4 U	4 U	4 U	3.9 U	3.8 U	4 U	3.9 U	4 U
Aroclor 1242	4 U	4 U	4 U	3.9 U	3.8 U	4 U	3.9 U	4 U
Aroclor 1248	4 U	4 U	4 U	3.9 U	3.8 U	4 U	3.9 U	4 U
Aroclor 1254	4 U	4 U	4 U	3.9 U	3.8 U	4 U	**1.9 J**	4 U
Aroclor 1260	**3.8 J**	4 U	4 U	3.9 U	**0.8 J**	4 U	3.9 U	4 U
Aroclor 1262	4 UJ	4 U	4 U	3.9 U	3.8 U	4 U	3.9 U	4 U
Aroclor 1268	4 UJ	4 U	4 U	3.9 U	3.8 U	4 U	3.9 U	4 U
Total DMMP PCB Aroclors (U = 0)	**3.8 J**	4 U	4 U	3.9 U	**0.8 J**	4 U	**1.9 J**	4 U
PCB Aroclors (mg/kg-OC)[6]								
Total DMMP PCB Aroclors (U = 0)	**0.78 J**	1.48 U	2.67 U	3.25 U	**0.29 J**	0.54 U	**0.86 J**	0.56 U

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID / Depth / Analyte	C-7-A-190221 0 - 2 ft	C-7-B-190221 2 - 4 ft	C-7-C-190221 4 - 6 ft	C-8-A-190221 0 - 2 ft	C-8-B-190221 2 - 4 ft	C-9-A-190220 0 - 2 ft	C-9-B-190220 2 - 4 ft
Metals (mg/kg)							
Antimony	0.32 UJ	0.23 UJ	0.24 UJ	0.26 UJ	0.25 UJ	0.23 UJ	0.24 UJ
Arsenic	**4.52**	**1.76**	**1.39**	**4.3**	**2.66**	**2.08**	**2.58**
Cadmium	**0.08 J**	0.12 U	0.12 U	**0.07 J**	**0.07 J**	0.11 U	**0.09 J**
Chromium	**16.3**	**8.75**	**9.6**	**13.6**	**16.8**	**11.3**	**11.8**
Copper	**25.2**	**10.1**	**9.06**	**24.4**	**28.3**	**10.7**	**14.4**
Lead	**6.14**	**1.11**	**1.06**	**5.97**	**3.39**	**1.25**	**1.61**
Mercury	**0.0278 J**	0.0266 U	0.0214 U	**0.0351 J**	**0.0183 J**	0.0217 U	**0.00517 J**
Selenium	**1.05**	**0.66**	**0.56 J**	**0.89**	**0.94**	**0.76**	**0.84**
Silver	**0.11 J**	**0.04 J**	**0.03 J**	**0.11 J**	**0.09 J**	**0.04 J**	**0.06 J**
Zinc	**37.2**	**16.4**	**16.7**	**34.1**	**32.1**	**18**	**19.7**
Organometallic Compounds (µg/kg)							
Tributyltin (ion)	**2.55 J**	3.45 U	3.76 U	**3.45 J**	3.65 U	3.85 UJ	3.79 UJ
Semivolatile Organics (µg/kg)							
1,2,4-Trichlorobenzene	5 U	4.9 U	4.9 U	4.9 U	5 U	5 U	4.8 U
1,2-Dichlorobenzene	5 U	4.9 U	4.9 U	4.9 U	5 U	5 U	4.8 U
1,4-Dichlorobenzene	5 U	4.9 U	4.9 U	4.9 U	5 U	5 U	4.8 U
2,4-Dimethylphenol	24.8 U	24.3 U	24.7 U	24.4 U	24.9 U	24.8 UJ	23.8 UJ
2-Methylphenol (o-Cresol)	5 U	4.9 U	4.9 U	4.9 U	5 U	5 U	4.8 U
4-Methylphenol (p-Cresol)	5 U	4.9 U	4.9 U	4.9 U	5 U	5 U	4.8 U
Benzoic acid	**26.5 J**	97.1 U	98.8 U	**37.1 J**	99.5 U	99.1 UJ	95.3 UJ
Benzyl alcohol	19.9 U	19.4 U	19.8 U	19.5 U	19.9 U	**10.1 J**	**9.7 J**
bis(2-Ethylhexyl)phthalate	**29.9 J**	48.6 U	49.4 U	48.8 U	49.8 U	49.5 U	47.7 U
Butylbenzyl phthalate	19.9 U	19.4 U	19.8 U	19.5 U	19.9 U	19.8 U	19.1 U
Diethyl phthalate	19.9 U	19.4 U	25.5 U	67 U	27.7 U	19.8 U	19.1 U
Dimethyl phthalate	5 U	4.9 U	4.9 U	4.9 U	5 U	5 U	4.8 U
Di-n-butyl phthalate	48.3 U	19.4 U	30.6 U	19.5 U	19.9 U	**23.4**	**40.5**
Di-n-octyl phthalate	19.9 U	19.4 U	19.8 U	19.5 U	19.9 U	19.8 U	19.1 U
Hexachlorobenzene	5 U	**3 J**	4.9 U	4.9 U	5 U	5 U	4.8 U
Hexachlorobutadiene	5 U	**26.5**	4.9 U	4.9 U	5 U	5 U	4.8 U
n-Nitrosodiphenylamine	5 U	4.9 U	4.9 U	4.9 U	5 U	5 U	4.8 U
Pentachlorophenol	19.9 UJ	19.4 UJ	19.8 UJ	19.5 UJ	19.9 UJ	19.8 UJ	19.1 UJ
Phenol	6.2 U	5.4 U	4.9 U	4.9 U	5 U	5 U	5.3 U
Polycyclic Aromatic Hydrocarbons (µg/kg)							
2-Methylnaphthalene	19.9 U	**7.8 J**	**9.8 J**	**35.1**	**9.8 J**	19.8 U	19.1 U
Acenaphthene	19.9 U	19.4 U	19.8 U	**7.7 J**	19.9 U	19.8 U	19.1 U
Acenaphthylene	19.9 U	19.4 U	19.8 U	**6.4 J**	19.9 U	19.8 U	19.1 U
Anthracene	**13.2 J**	19.4 U	19.8 U	**20.1**	19.9 U	19.8 U	19.1 U
Benzo(a)anthracene	**29.8**	19.4 U	19.8 U	**38.4**	**5.4 J**	19.8 U	19.1 U
Benzo(a)pyrene	**37.8**	19.4 U	19.8 U	**41.8**	19.9 U	19.8 U	19.1 U
Benzo(b,j,k)fluoranthenes	**121**	38.8 U	39.5 U	**98.7**	39.8 U	39.6 U	38.1 U
Benzo(g,h,i)perylene	**29.3**	19.4 U	19.8 U	**27.1**	19.9 U	19.8 U	19.1 U
Chrysene	**50.8**	19.4 U	19.8 U	**71.7**	**17.6 J**	19.8 U	19.1 U
Dibenzo(a,h)anthracene	**8.8**	4.9 U	4.9 U	**11.8**	5 U	5 U	4.8 U
Dibenzofuran	19.9 U	19.4 U	19.8 U	**12.3 J**	19.9 U	19.8 U	19.1 U
Fluoranthene	**47.3**	19.4 U	19.8 U	**64.5**	19.9 U	19.8 U	19.1 U
Fluorene	**5.8 J**	19.4 U	19.8 U	**10.3 J**	19.9 U	19.8 U	19.1 U
Indeno(1,2,3-c,d)pyrene	**27.7**	19.4 U	19.8 U	**25.1**	19.9 U	19.8 U	19.1 U
Naphthalene	**17 J**	19.4 U	**8.5 J**	**26**	19.9 U	19.8 U	19.1 U
Phenanthrene	**33.8**	**14.7 J**	19.8 U	**59.9**	**22.6**	19.8 U	**14.7 J**
Pyrene	**65.8**	19.4 U	19.8 U	**81.6**	19.9 U	19.8 U	19.1 U
Total Benzofluoranthenes (b,j,k) (U = 0)	**121**	38.8 U	39.5 U	**98.7**	39.8 U	39.6 U	38.1 U
Total HPAH (DMMP) (U = 0)[1]	**418.3**	38.8 U	39.5 U	**460.7**	**23 J**	39.6 U	38.1 U
Total LPAH (DMMP) (U = 0)[2]	**69.8 J**	**14.7 J**	**8.5 J**	**130.4 J**	**22.6**	19.8 U	**14.7 J**
Total PAH (DMMP) (U = 0)	**488.1 J**	**14.7 J**	**8.5 J**	**591.1 J**	**45.6 J**	39.6 U	**14.7 J**
Pesticides (µg/kg)[3]							
4,4'-DDD (p,p'-DDD)	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.31 U
4,4'-DDE (p,p'-DDE)	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
4,4'-DDT (p,p'-DDT)	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Aldrin	0.37 U	0.36 U	0.37 U	0.37 U	0.37 U	0.37 U	0.36 U
Chlordane, alpha- (Chlordane, cis-)	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Chlordane, beta- (Chlordane, trans-)	0.32 U	0.32 U	0.32 U	0.33 U	0.33 U	0.33 U	0.32 U
Dieldrin	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nonachlor, cis-	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Nonachlor, trans-	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.22 U
Oxychlordane	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Total DMMP Chlordane (U = 0)[5]	0.32 U	0.32 U	0.32 U	0.33 U	0.33 U	0.33 U	0.32 U
PCB Aroclors (µg/kg)							
Aroclor 1016	4 U	4 U	4 U	4 U	3.9 U	4 U	3.9 U
Aroclor 1221	4 U	4 U	4 U	4 U	3.9 U	4 U	3.9 U
Aroclor 1232	4 U	4 U	4 U	4 U	3.9 U	4 U	3.9 U
Aroclor 1242	4 U	4 U	4 U	4 U	3.9 U	4 U	3.9 U
Aroclor 1248	**3.4 J**	4 U	4 U	**3.8 J**	3.9 U	4 U	3.9 U
Aroclor 1254	**3.9 J**	4 U	4 U	**5**	3.9 U	4 U	3.9 U
Aroclor 1260	**2.1 J**	4 U	4 U	**3 J**	3.9 U	4 U	3.9 U
Aroclor 1262	4 U	4 U	4 U	4 U	3.9 U	4 U	3.9 U
Aroclor 1268	4 U	4 U	4 U	4 U	3.9 U	4 U	3.9 U
Total DMMP PCB Aroclors (U = 0)	**9.4 J**	4 U	4 U	**11.8 J**	3.9 U	4 U	3.9 U
PCB Aroclors (mg/kg-OC)[6]							
Total DMMP PCB Aroclors (U = 0)	**1.71 J**	0.91 U	2 U	**2.19 J**	1 U	3.64 U	2.05 U

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID / Depth / Analyte	C-10-A-190221 0 - 2 ft	C-10-B-190221 2 - 4 ft	C-10-C-190221 4 - 6 ft	C-11-A-190220 0 - 2 ft	C-11-B-190220 2 - 4 ft	C-12-A-190223 0 - 2 ft	C-12-B-190223 2 - 4 ft	C-12-C-190223 4 - 6 ft
Metals (mg/kg)								
Antimony	0.28 UJ	0.25 UJ	0.2 UJ	0.28 UJ	0.25 UJ	0.27 UJ	0.25 UJ	0.25 UJ
Arsenic	**5.95**	**3.4**	**1.88**	**4.8**	**1.3**	**6.8**	**5.07**	**5.07**
Cadmium	**0.13 J**	**0.12 J**	**0.1**	**0.09 J**	0.12 U	**0.14**	**0.13**	**0.14**
Chromium	**15.6**	**11.3**	**8.23**	**14.3**	**10.7**	**16.3**	**16.2**	**16.7**
Copper	**31.8**	**19.1**	**11.8**	**27.3**	**11.1**	**29.2**	**23.8**	**24.7**
Lead	**8.1**	**4.2**	**1.46**	**6.34**	**1.33**	**14.8**	**6.32**	**5.11**
Mercury	**0.0428 J**	**0.0271 J**	**0.00691 J**	**0.0352**	0.0241 U	**0.0703**	**0.0607**	**0.0549**
Selenium	**1**	**0.74**	**0.61**	**1.04**	**0.61 J**	**0.79**	**1.03**	**0.73**
Silver	**0.16 J**	**0.09 J**	**0.04 J**	**0.13 J**	**0.04 J**	**0.14 J**	**0.09 J**	**0.09 J**
Zinc	**43.4**	**25.5**	**15.8**	**36.7**	**18.7**	**43.7**	**30.4**	**29.8**
Organometallic Compounds (µg/kg)								
Tributyltin (ion)	**5.67**	**95.5**	3.81 U	**2.8 J**	3.79 UJ	**13.4**	**0.525 J**	3.65 U
Semivolatile Organics (µg/kg)								
1,2,4-Trichlorobenzene	4.9 U	4.8 U	4.8 U	4.7 U	4.7 U	4.8 U	5 U	5 U
1,2-Dichlorobenzene	4.9 U	4.8 U	4.8 U	4.7 U	4.7 U	**6.1**	5 U	5 U
1,4-Dichlorobenzene	4.9 U	4.8 U	4.8 U	4.7 U	4.7 U	**3.7 J**	5 U	5 U
2,4-Dimethylphenol	**3.4 J**	23.8 U	24 U	**3.1 J**	23.5 UJ	**10.6 J**	**2.8 J**	24.9 U
2-Methylphenol (o-Cresol)	4.9 U	4.8 U	4.8 U	**2.2 J**	4.7 U	4.8 U	5 U	5 U
4-Methylphenol (p-Cresol)	**6.4**	**2.7 J**	4.8 U	**6.8**	4.7 U	**14.4**	**5.1**	**2.8 J**
Benzoic acid	**146**	**43.3 J**	96 U	**93.3 J**	94 UJ	**228 J**	**77 J**	**46.1 J**
Benzyl alcohol	19.7 U	19.1 U	19.2 U	**17.9 J**	18.8 U	19 U	19.8 U	19.9 U
bis(2-Ethylhexyl)phthalate	**56.7**	**32.8 J**	48 U	**30.2 J**	47 U	**106**	**32.9 J**	49.8 U
Butylbenzyl phthalate	19.7 U	19.1 U	19.2 U	19 U	18.8 U	19 U	19.8 U	19.9 U
Diethyl phthalate	19.7 U	19.1 U	24.5 U	--	18.8 U	19 U	38.2 U	19.9 U
Dimethyl phthalate	4.9 U	4.8 U	4.8 U	4.7 U	4.7 U	**3.1 J**	5 U	5 U
Di-n-butyl phthalate	41.4 U	20.6 U	30.4 U	**72.2**	**17.7 J**	19 U	**6 J**	19.9 U
Di-n-octyl phthalate	19.7 U	19.1 U	19.2 U	19 U	18.8 U	19 U	19.8 U	19.9 U
Hexachlorobenzene	4.9 U	4.8 U	4.8 U	4.7 U	4.7 U	4.8 U	5 U	5 U
Hexachlorobutadiene	4.9 U	4.8 U	4.8 U	4.7 U	4.7 U	4.8 U	5 U	5 U
n-Nitrosodiphenylamine	**3.4 J**	4.8 U	4.8 U	4.7 U	4.7 U	4.8 U	5 U	5 U
Pentachlorophenol	**9.3 J**	19.1 UJ	19.2 UJ	**4.1 J**	18.8 UJ	**11.2 J**	**10.1 J**	19.9 UJ
Phenol	15 U	9.7 U	4.8 U	**20.3**	4.7 U	53 U	23.1 U	17.5 U
Polycyclic Aromatic Hydrocarbons (µg/kg)								
2-Methylnaphthalene	**28.6**	**10.6 J**	19.2 U	**17.7 J**	18.8 U	**21.5**	19.8 U	19.9 U
Acenaphthene	**7.5 J**	19.1 U	19.2 U	19 U	18.8 U	**21.1**	**8.2 J**	19.9 U
Acenaphthylene	**11 J**	19.1 U	19.2 U	19 U	18.8 U	**10.9 J**	19.8 U	19.9 U
Anthracene	**28.7**	**16.1 J**	19.2 U	**18.6 J**	18.8 U	**26.6 J**	**14.4 J**	**8.5 J**
Benzo(a)anthracene	**56.2**	**33.6**	19.2 U	**42.5**	18.8 U	**25.1**	**13.1 J**	**8 J**
Benzo(a)pyrene	**67.2**	**45.7**	19.2 U	**46.1**	18.8 U	**40.3**	**18.8 J**	**9.7 J**
Benzo(b,j,k)fluoranthenes	**205**	**115**	38.4 U	**118**	37.6 U	**114**	**49.2**	**22.5 J**
Benzo(g,h,i)perylene	**48.5**	**30.3**	19.2 U	**33.1**	18.8 U	**30.8**	**17.2 J**	**9.7 J**
Chrysene	**82.7**	**53.7**	19.2 U	**61.4**	18.8 U	**51.1**	**23.4**	**11.8 J**
Dibenzo(a,h)anthracene	**18.8**	**12.4**	4.8 U	**9.2**	4.7 U	**11**	**6**	**2.7 J**
Dibenzofuran	**16.6 J**	**7.2 J**	19.2 U	**9 J**	18.8 U	**23.9**	**9.6 J**	19.9 U
Fluoranthene	**110**	**52**	19.2 U	**52.1**	18.8 U	**90.9**	**36**	**18.5 J**
Fluorene	**15.7 J**	**7.3 J**	19.2 U	**8 J**	18.8 U	**28**	**12.5 J**	19.9 U
Indeno(1,2,3-c,d)pyrene	**43.9**	**28.7**	19.2 U	**29.5**	18.8 U	**25.4**	**14.6 J**	**7.3 J**
Naphthalene	**27.7**	**15.9 J**	19.2 U	**20.1**	18.8 U	**60.2**	**27.9**	**16.9 J**
Phenanthrene	**53.3**	**43**	**7.7 J**	**39.2**	18.8 U	**78.3**	**38.5**	**24.2**
Pyrene	**174**	**79.1**	**6.6 J**	**76**	18.8 U	**215**	**71.1**	**40.1**
Total Benzofluoranthenes (b,j,k) (U = 0)	**205**	**115**	38.4 U	**118**	37.6 U	**114**	**49.2**	**22.5 J**
Total HPAH (DMMP) (U = 0)[1]	**806.3**	**450.5**	**6.6 J**	**467.9**	37.6 U	**603.6**	**249.4 J**	**130.3 J**
Total LPAH (DMMP) (U = 0)[2]	**143.9 J**	**82.3 J**	**7.7 J**	**85.9 J**	18.8 U	**225.1 J**	**101.5 J**	**49.6 J**
Total PAH (DMMP) (U = 0)	**950.2 J**	**532.8 J**	**14.3 J**	**553.8 J**	37.6 U	**828.7 J**	**350.9 J**	**179.9 J**
Pesticides (µg/kg)[3]								
4,4'-DDD (p,p'-DDD)	1.59 U	0.32 U	0.32 U	0.32 U	0.31 U	0.32 U	0.31 U	1.93 U
4,4'-DDE (p,p'-DDE)	0.67 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
4,4'-DDT (p,p'-DDT)	1.61 U	0.32 U	0.32 U	0.32 U	0.31 U	3.96 U	3.39 U	2.42 U
Aldrin	1.83 U	0.37 U	0.36 U	0.37 U	0.35 U	0.37 U	0.36 U	0.36 U
Chlordane, alpha- (Chlordane, cis-)	0.55 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Chlordane, beta- (Chlordane, trans-)	1.62 U	0.32 U	0.32 U	14.9 U	0.31 U	0.32 U	0.32 U	0.32 U
Dieldrin	0.57 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Heptachlor	0.23 U	0.05 U	0.05 U	1.49 U	0.04 U	0.05 U	0.04 U	0.04 U
Nonachlor, cis-	1.04 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.2 U	0.2 U
Nonachlor, trans-	1.13 U	0.23 U	0.22 U	0.23 U	0.22 U	0.23 U	0.22 U	0.22 U
Oxychlordane	0.64 U	0.13 U	0.13 U	21.9 U	0.12 U	0.13 U	0.12 U	0.12 U
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	1.61 U	0.32 U	0.32 U	0.32 U	0.31 U	3.96 U	3.39 U	2.42 U
Total DMMP Chlordane (U = 0)[5]	1.62 U	0.32 U	0.32 U	21.9 U	0.31 U	0.32 U	0.32 U	0.32 U
PCB Aroclors (µg/kg)								
Aroclor 1016	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	3.9 U	3.8 U
Aroclor 1221	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	3.9 U	3.8 U
Aroclor 1232	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	3.9 U	3.8 U
Aroclor 1242	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	3.9 U	3.8 U
Aroclor 1248	**5.8**	**4.1**	3.9 U	4 U	3.8 U	**52.7**	**44.9**	**11**
Aroclor 1254	**9**	**5 J**	3.9 U	**3.4 J**	3.8 U	**94.3 J**	**33.5 J**	**7.8**
Aroclor 1260	**5.5 J**	**2.1 J**	3.9 U	**2.6 J**	3.8 U	**26.3 J**	**11.7 J**	**5.7 J**
Aroclor 1262	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 UJ	3.9 UJ	3.8 UJ
Aroclor 1268	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 UJ	3.9 UJ	3.8 UJ
Total DMMP PCB Aroclors (U = 0)	**20.3 J**	**11.2 J**	3.9 U	**6 J**	3.8 U	**173.3 J**	**90.1 J**	**24.5 J**
PCB Aroclors (mg/kg-OC)[6]								
Total DMMP PCB Aroclors (U = 0)	**2.01 J**	**2.49 J**	2.05 U	**0.70 J**	2.71 U	**28.41 J**	**24.35 J**	**3.27 J**

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID / Depth / Analyte	C-13-A-190223 0 - 2 ft	C-13-B-190223 2 - 4 ft	C-13-C-190223 4 - 6 ft	C-14-A-190221 0 - 2 ft	C-14-B-190221 2 - 4 ft	C-15-A-190222 0 - 2 ft	C-15-B-190222 2 - 4 ft	C-15-C-190222 4 - 6 ft
Metals (mg/kg)								
Antimony	0.24 UJ	0.25 UJ	0.22 UJ	0.23 UJ	0.23 UJ	0.25 UJ	0.22 UJ	0.22 UJ
Arsenic	**6.08**	**6.67**	**3.88**	**4.18**	**5.08**	**6.4**	**2.74**	**4.28**
Cadmium	**0.11 J**	**0.11 J**	**0.05 J**	0.11 U	**0.06 J**	**0.05 J**	0.11 U	**0.04 J**
Chromium	**13**	**13.5**	**12**	**11.3**	**13**	**12.4**	**9.38**	**11.5**
Copper	**66.1**	**22.7**	**14.1**	**12.3**	**14.6**	**21.3**	**11.5**	**14.3**
Lead	**4.5**	**5.04**	**1.67**	**1.54**	**1.8**	**5.36**	**1.36**	**1.74**
Mercury	**0.0252**	**0.0381**	**0.011 J**	0.0216 U	0.0216 U	**0.027 J**	**0.0142 J**	**0.0148 J**
Selenium	**0.77**	**0.89**	**0.73**	**0.95**	**0.78**	**0.77**	**0.62**	**0.66**
Silver	**0.08 J**	**0.11 J**	**0.05 J**	**0.04 J**	**0.05 J**	**0.09 J**	**0.04 J**	**0.05 J**
Zinc	**43.1**	**34.2**	**22.2**	**21.7**	**22.2**	**30**	**18**	**22.5**
Organometallic Compounds (µg/kg)								
Tributyltin (ion)	**1.68 J**	**3.69**	3.81 U	3.74 U	3.82 U	**1.99 J**	3.77 U	3.84 U
Semivolatile Organics (µg/kg)								
1,2,4-Trichlorobenzene	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
1,2-Dichlorobenzene	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
1,4-Dichlorobenzene	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 UJ	5 UJ	5 UJ
2,4-Dimethylphenol	24.5 U	24.8 U	24.5 U	24.3 U	24.7 U	23.6 UJ	24.8 UJ	24.8 UJ
2-Methylphenol (o-Cresol)	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
4-Methylphenol (p-Cresol)	4.9 U	**3.1 J**	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
Benzoic acid	**71.1 J**	**76.3 J**	**22.3 J**	97.1 U	98.6 U	**79.4 J**	99 U	99 UJ
Benzyl alcohol	19.6 U	**3.4 J**	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
bis(2-Ethylhexyl)phthalate	**30.4 J**	**41.7 J**	49 U	**54.7**	49.3 U	**61.8**	49.5 U	49.5 U
Butylbenzyl phthalate	19.6 U	19.9 U	19.6 U	19.4 U	19.7 U	**7.8 J**	19.8 U	19.8 U
Diethyl phthalate	19.6 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	31.9 U
Dimethyl phthalate	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
Di-n-butyl phthalate	19.6 U	19.9 U	19.6 U	34.4 U	39.9 U	121 U	81.4 U	38.6 U
Di-n-octyl phthalate	19.6 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Hexachlorobenzene	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
Hexachlorobutadiene	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
n-Nitrosodiphenylamine	4.9 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
Pentachlorophenol	19.6 UJ	19.9 UJ	19.6 UJ	19.4 UJ	**7.7 J**	18.9 UJ	19.8 UJ	19.8 UJ
Phenol	23.7 U	31.6 U	8.2 U	4.9 U	4.9 U	13.7 U	5.9 U	7 U
Polycyclic Aromatic Hydrocarbons (µg/kg)								
2-Methylnaphthalene	**7.1 J**	**7 J**	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Acenaphthene	19.6 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Acenaphthylene	19.6 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Anthracene	**6.9 J**	**10.6 J**	19.6 UJ	19.4 U	19.7 U	**6.1 J**	19.8 UJ	19.8 UJ
Benzo(a)anthracene	**17.1 J**	**19.2 J**	19.6 U	19.4 U	19.7 U	**10.2 J**	19.8 U	19.8 U
Benzo(a)pyrene	**23.1**	**29.4**	19.6 U	19.4 U	19.7 U	**18.9**	19.8 U	19.8 U
Benzo(b,j,k)fluoranthenes	**62.9**	**85.1**	39.2 U	38.8 U	39.4 U	**54.5**	39.6 U	39.6 U
Benzo(g,h,i)perylene	**20.8**	**26.9**	19.6 U	19.4 U	19.7 U	**10.9 J**	19.8 U	19.8 U
Chrysene	**27.8**	**32.4**	19.6 U	19.4 U	19.7 U	**17 J**	19.8 U	19.8 U
Dibenzo(a,h)anthracene	**6.6**	**8.6**	4.9 U	4.9 U	4.9 U	**4.8**	5 U	5 U
Dibenzofuran	19.6 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Fluoranthene	**25.5**	**25.2**	19.6 U	19.4 U	19.7 U	**16.5 J**	19.8 U	19.8 U
Fluorene	19.6 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Indeno(1,2,3-c,d)pyrene	**15.9 J**	**21.9**	19.6 U	19.4 U	19.7 U	**10.6 J**	19.8 U	19.8 U
Naphthalene	**7.9 J**	**9 J**	19.6 U	19.4 U	19.7 U	**8.9 J**	19.8 UJ	19.8 UJ
Phenanthrene	**16.3 J**	**21.4**	**5.8 J**	19.4 U	19.7 U	**15.8 J**	**6.1 J**	19.8 U
Pyrene	**48.8**	**68.5**	19.6 U	19.4 U	19.7 U	**27.5**	19.8 U	19.8 U
Total Benzofluoranthenes (b,j,k) (U = 0)	**62.9**	**85.1**	39.2 U	38.8 U	39.4 U	**54.5**	39.6 U	39.6 U
Total HPAH (DMMP) (U = 0)[1]	**248.5 J**	**317.2 J**	39.2 U	38.8 U	39.4 U	**170.9 J**	39.6 U	39.6 U
Total LPAH (DMMP) (U = 0)[2]	**31.1 J**	**41 J**	**5.8 J**	19.4 U	19.7 U	**30.8 J**	**6.1 J**	19.8 UJ
Total PAH (DMMP) (U = 0)	**279.6 J**	**358.2 J**	**5.8 J**	38.8 U	39.4 U	**201.7 J**	**6.1 J**	39.6 UJ
Pesticides (µg/kg)[3]								
4,4'-DDD (p,p'-DDD)	0.32 U	0.31 U	0.32 U	0.32 U	0.32 U	0.31 U	0.32 U	0.32 U
4,4'-DDE (p,p'-DDE)	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
4,4'-DDT (p,p'-DDT)	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.31 U	0.32 U	0.32 U
Aldrin	0.37 U	0.36 U	0.36 U	0.37 U	0.37 U	0.35 U	0.37 U	0.37 U
Chlordane, alpha- (Chlordane, cis-)	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Chlordane, beta- (Chlordane, trans-)	0.32 U	1.94 U	0.32 U	0.32 U	0.33 U	0.31 U	0.32 U	0.32 U
Dieldrin	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U
Nonachlor, cis-	0.21 U	0.2 U	0.21 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U
Nonachlor, trans-	0.23 U	0.22 U	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U	0.23 U
Oxychlordane	0.13 U	0.12 U	0.13 U	0.13 U	0.13 U	0.12 U	0.13 U	0.13 U
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.31 U	0.32 U	0.32 U
Total DMMP Chlordane (U = 0)[5]	0.32 U	1.94 U	0.32 U	0.32 U	0.33 U	0.31 U	0.32 U	0.32 U
PCB Aroclors (µg/kg)								
Aroclor 1016	4 U	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	4 U
Aroclor 1221	4 U	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	4 U
Aroclor 1232	4 U	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	4 U
Aroclor 1242	4 U	3.9 U	3.9 U	3.9 U	4 U	3.8 U	4 U	4 U
Aroclor 1248	**6.5**	**8**	**3.7 J**	3.9 U	4 U	**8.2**	4 U	4 U
Aroclor 1254	**3.3 J**	**5.9**	3.9 U	3.9 U	4 U	**8.1 J**	4 U	4 U
Aroclor 1260	**1.9 J**	**9.2 J**	3.9 U	3.9 U	4 U	**3.1 J**	4 U	4 U
Aroclor 1262	4 UJ	3.9 UJ	3.9 U	3.9 U	4 U	3.8 U	4 U	4 U
Aroclor 1268	4 UJ	3.9 UJ	3.9 U	3.9 U	4 U	3.8 U	4 U	4 U
Total DMMP PCB Aroclors (U = 0)	**11.7 J**	**23.1 J**	**3.7 J**	3.9 U	4 U	**19.4 J**	4 U	4 U
PCB Aroclors (mg/kg-OC)[6]								
Total DMMP PCB Aroclors (U = 0)	**1.98 J**	**5.92 J**	**2.06 J**	4.33 U	2.67 U	**7.76 J**	4 U	2.35 U

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID Depth Analyte	C-16-A-190223 0 - 2 ft	C-16-B-190223 2 - 4 ft	C-17-A-190222 0 - 2 ft	C-17-B-190222 2 - 4 ft	C-17-C-190222 4 - 8 ft	C-18-A1-190220 0 - 2.3 ft	C-18-B1-190220 3.9 - 6.3 ft
Metals (mg/kg)							
Antimony	0.2 UJ	0.23 UJ	0.28 UJ	0.37 UJ	0.25 UJ	0.24 U	0.22 U
Arsenic	**3.82**	**2.21**	**3.74**	**3.44**	**2.15**	**3.2**	**3.89**
Cadmium	**0.07 J**	0.11 U	**0.05 J**	**0.21**	**0.04 J**	**0.05 J**	0.11 U
Chromium	**10.2**	**10.6**	**16.3**	**16.4**	**14.4**	**11.5**	**10.1**
Copper	**14.9**	**10.5**	**32.6**	**30.7**	**21.2**	**16.1**	**13**
Lead	**2.82**	**1.29**	**3.94**	**3.12**	**2.07**	**2.81**	**1.51**
Mercury	**0.0195 J**	**0.00813 J**	**0.0296**	**0.0373**	**0.0201 J**	0.0291 U	0.021 U
Selenium	**0.67**	**0.69**	**1.11**	**1.22**	**0.98**	**0.7**	**0.88**
Silver	**0.08 J**	**0.04 J**	**0.1 J**	**0.1 J**	**0.07 J**	**0.05 J**	**0.04 J**
Zinc	**22.5**	**19.7**	**30.4**	**25.3**	**23.9**	**25.6**	**29.6**
Organometallic Compounds (µg/kg)							
Tributyltin (ion)	**15.8**	**0.895 J**	3.61 U	3.84 U	3.69 U	**2.31 J**	3.64 UJ
Semivolatile Organics (µg/kg)							
1,2,4-Trichlorobenzene	4.8 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.7 U
1,2-Dichlorobenzene	4.8 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.7 U
1,4-Dichlorobenzene	4.8 U	4.9 U	5 UJ	4.9 UJ	4.8 UJ	4.8 U	4.7 U
2,4-Dimethylphenol	23.9 U	24.6 U	24.8 UJ	**2.6 J**	23.9 UJ	24.2 U	23.6 U
2-Methylphenol (o-Cresol)	4.8 U	4.9 U	**2.7 J**	**3.1 J**	4.8 U	4.8 U	4.7 U
4-Methylphenol (p-Cresol)	4.8 U	4.9 U	**4.7 J**	**7.6**	**2 J**	**3.1 J**	4.7 U
Benzoic acid	**68.4 J**	98.6 UJ	**310**	**164**	**32.9 J**	**214 J**	**60.2 J**
Benzyl alcohol	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	19.4 U	18.9 U
bis(2-Ethylhexyl)phthalate	47.8 U	49.3 U	49.7 U	48.7 U	**29.6 J**	48.4 U	47.2 U
Butylbenzyl phthalate	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	19.4 U	18.9 U
Diethyl phthalate	23.2 U	19.7 U	19.9 U	19.5 U	24.6 U	**7.2 J**	**9.2 J**
Dimethyl phthalate	4.8 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.7 U
Di-n-butyl phthalate	19.1 U	19.7 U	97.9 U	99.9 U	91.1 U	19.4 U	18.9 U
Di-n-octyl phthalate	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	19.4 U	18.9 U
Hexachlorobenzene	4.8 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.7 U
Hexachlorobutadiene	4.8 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.7 U
n-Nitrosodiphenylamine	4.8 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.7 U
Pentachlorophenol	19.1 UJ	19.7 UJ	**4.5 J**	19.5 UJ	19.2 UJ	19.4 UJ	18.9 UJ
Phenol	18.3 U	8.1 U	**41**	**34.7**	7.3 U	**38.7**	13.4 U
Polycyclic Aromatic Hydrocarbons (µg/kg)							
2-Methylnaphthalene	19.1 U	19.7 U	**11.7 J**	**7.1 J**	**6.2 J**	19.4 U	**7.5 J**
Acenaphthene	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	19.4 U	18.9 U
Acenaphthylene	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	19.4 U	18.9 U
Anthracene	**8.8 J**	19.7 UJ	19.9 UJ	19.5 UJ	19.2 UJ	**5.9 J**	18.9 U
Benzo(a)anthracene	**11.9 J**	19.7 U	**6.5 J**	19.5 U	19.2 U	**9 J**	18.9 U
Benzo(a)pyrene	**10.8 J**	19.7 U	19.9 U	19.5 U	19.2 U	**16.4 J**	18.9 U
Benzo(b,j,k)fluoranthenes	38.2 U	39.4 U	**22.7 J**	39 U	38.3 U	**42.2**	37.8 U
Benzo(g,h,i)perylene	**7.7 J**	19.7 U	19.9 U	19.5 U	19.2 U	**9.7 J**	18.9 U
Chrysene	**28.8**	19.7 U	**14.7 J**	**8.8 J**	**5.9 J**	**18.2 J**	18.9 U
Dibenzo(a,h)anthracene	**2.7 J**	4.9 U	**2.6 J**	4.9 U	4.8 U	**3.8 J**	4.7 U
Dibenzofuran	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	19.4 U	18.9 U
Fluoranthene	**12.3 J**	19.7 U	**8 J**	19.5 U	**4.9 J**	**13.9 J**	18.9 U
Fluorene	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	19.4 U	18.9 U
Indeno(1,2,3-c,d)pyrene	19.1 U	19.7 U	19.9 U	19.5 U	19.2 U	**8.2 J**	18.9 U
Naphthalene	19.1 U	19.7 U	**6.3 J**	**6.8 J**	**8.1 J**	**7.9 J**	**5.4 J**
Phenanthrene	**15.8 J**	19.7 U	**25.2**	**13.7 J**	**14.6 J**	**11.9 J**	**6.3 J**
Pyrene	**23.5**	19.7 U	**21.3**	19.5 U	**6.2 J**	**48.3**	18.9 U
Total Benzofluoranthenes (b,j,k) (U = 0)	38.2 U	39.4 U	**22.7 J**	39 U	38.3 U	**42.2**	37.8 U
Total HPAH (DMMP) (U = 0)[1]	**97.7 J**	39.4 U	**75.8 J**	**8.8 J**	**17 J**	**169.7 J**	37.8 U
Total LPAH (DMMP) (U = 0)[2]	**24.6 J**	19.7 UJ	**31.5 J**	**20.5 J**	**22.7 J**	**25.7 J**	**11.7 J**
Total PAH (DMMP) (U = 0)	**122.3 J**	39.4 UJ	**107.3 J**	**29.3 J**	**39.7 J**	**195.4 J**	**11.7 J**
Pesticides (µg/kg)[3]							
4,4'-DDD (p,p'-DDD)	0.31 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
4,4'-DDE (p,p'-DDE)	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
4,4'-DDT (p,p'-DDT)	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Aldrin	0.36 U	0.37 U	0.37 U	0.37 U	0.36 U	0.36 U	0.37 U
Chlordane, alpha- (Chlordane, cis-)	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Chlordane, beta- (Chlordane, trans-)	0.32 U	0.33 U	0.33 U	0.33 U	0.32 U	0.99 U	0.32 U
Dieldrin	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nonachlor, cis-	0.2 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Nonachlor, trans-	0.22 U	0.23 U	0.23 U	0.23 U	0.22 U	0.22 U	0.23 U
Oxychlordane	0.12 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Total DMMP Chlordane (U = 0)[5]	0.32 U	0.33 U	0.33 U	0.33 U	0.32 U	0.99 U	0.32 U
PCB Aroclors (µg/kg)							
Aroclor 1016	4 U	4 U	4 U	4 U	4 U	3.9 U	4 U
Aroclor 1221	4 U	4 U	4 U	4 U	4 U	3.9 U	4 U
Aroclor 1232	4 U	4 U	4 U	4 U	4 U	3.9 U	4 U
Aroclor 1242	4 U	4 U	4 U	4 U	4 U	3.9 U	4 U
Aroclor 1248	**2 J**	4 U	**2.5 J**	4 U	4 U	3.9 U	4 U
Aroclor 1254	**2.2 J**	4 U	**2.4 J**	4 U	4 U	3.9 U	4 U
Aroclor 1260	**1.1 J**	4 U	**1.1 J**	4 U	4 U	3.9 UJ	4 U
Aroclor 1262	4 U	4 U	4 U	4 U	4 U	3.9 UJ	4 U
Aroclor 1268	4 U	4 U	4 U	4 U	4 U	3.9 UJ	4 U
Total DMMP PCB Aroclors (U = 0)	**5.3 J**	4 U	**6 J**	4 U	4 U	3.9 UJ	4 U
PCB Aroclors (mg/kg-OC)[6]							
Total DMMP PCB Aroclors (U = 0)	**2.12 J**	8 U	**0.72 J**	0.12 U	1.03 U	1.34 UJ	3.08 U

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID / Depth / Analyte	C-19-A-190220 0 - 2 ft	C-19-B-190220 2 - 4 ft	C-20-A-190219 0 - 2 ft	C-20-B-190219 2 - 4 ft	C-21-A-190219 0 - 2 ft	C-21-B-190219 2 - 4 ft	C-22-A-190219 0 - 2 ft	C-22-B-190219 2 - 4 ft
Metals (mg/kg)								
Antimony	0.19 UJ	0.23 UJ	0.23 UJ	0.21 UJ	0.23 UJ	0.21 UJ	0.2 UJ	0.2 UJ
Arsenic	**1.89**	**2.53**	**1.28**	**1.1**	**4.41**	**2.26**	**1.59**	**1.31**
Cadmium	0.1 U	0.12 U	**0.05 J**	**0.03 J**	0.11 U	**0.05 J**	0.1 U	0.1 U
Chromium	**9.73**	**10.3**	**9.69**	**10.4**	**7.99**	**8.59**	**11.3**	**9.53**
Copper	**12.7**	**15.2**	**13.9**	**14**	**14.9**	**14.9**	**12.7**	**10.9**
Lead	**1.54**	**1.84**	**1.41**	**1.5**	**1.43**	**1.49**	**1.36**	**1.41**
Mercury	0.0187 U	0.0204 U	**0.00698 J**	**0.00973 J**	**0.0112 J**	**0.0134 J**	**0.00859 J**	**0.00788 J**
Selenium	**0.62**	**0.77**	**0.51 J**	**0.82**	**0.82**	**0.82**	**0.72**	**0.84**
Silver	**0.04 J**	**0.05 J**	**0.04 J**	**0.04 J**	**0.04 J**	**0.03 J**	**0.03 J**	**0.03 J**
Zinc	**20.9**	**21.3**	**18.7**	**20.1**	**18**	**20.1**	**19.2**	**17.6**
Organometallic Compounds (µg/kg)								
Tributyltin (ion)	**0.417 J**	**1.07 J**	3.79 U	3.76 U	3.63 U	3.76 U	3.53 U	3.57 U
Semivolatile Organics (µg/kg)								
1,2,4-Trichlorobenzene	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
1,2-Dichlorobenzene	4.9 U	4.9 U	5 U	**0.8 J**	4.8 U	4.8 U	4.9 U	4.9 U
1,4-Dichlorobenzene	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
2,4-Dimethylphenol	24.4 UJ	24.6 UJ	24.8 UJ	24.3 UJ	23.9 UJ	24.2 UJ	24.7 UJ	24.7 UJ
2-Methylphenol (o-Cresol)	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
4-Methylphenol (p-Cresol)	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Benzoic acid	97.7 UJ	**19.6 J**	99.1 UJ	97.1 UJ	95.7 UJ	96.7 UJ	98.7 UJ	98.6 UJ
Benzyl alcohol	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
bis(2-Ethylhexyl)phthalate	48.9 U	49.2 U	49.5 U	48.6 U	47.9 U	48.3 U	49.4 U	49.3 U
Butylbenzyl phthalate	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Diethyl phthalate	19.5 U	19.7 U	35.8 U	28.9 U	19.1 U	19.3 U	19.7 U	21.9 U
Dimethyl phthalate	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Di-n-butyl phthalate	**161**	**133**	**36.8**	**22.6**	**17.2 J**	**39.8**	**18.8 J**	19.7 U
Di-n-octyl phthalate	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Hexachlorobenzene	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Hexachlorobutadiene	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
n-Nitrosodiphenylamine	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Pentachlorophenol	19.5 UJ	19.7 UJ	19.8 UJ	19.4 UJ	19.1 UJ	19.3 UJ	19.7 UJ	19.7 UJ
Phenol	4.9 U	5.3 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Polycyclic Aromatic Hydrocarbons (µg/kg)								
2-Methylnaphthalene	19.5 U	19.7 U	19.8 U	19.4 U	**7.3 J**	19.3 U	19.7 U	19.7 U
Acenaphthene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Acenaphthylene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Anthracene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Benzo(a)anthracene	19.5 U	19.7 U	19.8 U	19.4 U	**7 J**	19.3 U	19.7 U	19.7 U
Benzo(a)pyrene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Benzo(b,j,k)fluoranthenes	39.1 U	39.3 U	39.6 U	38.9 U	38.3 U	38.7 U	39.5 U	39.5 U
Benzo(g,h,i)perylene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Chrysene	19.5 U	19.7 U	19.8 U	19.4 U	**14.3 J**	19.3 U	19.7 U	19.7 U
Dibenzo(a,h)anthracene	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Dibenzofuran	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Fluoranthene	19.5 U	19.7 U	19.8 U	19.4 U	**5.8 J**	19.3 U	19.7 U	19.7 U
Fluorene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Indeno(1,2,3-c,d)pyrene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Naphthalene	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Phenanthrene	19.5 U	19.7 U	19.8 U	19.4 U	**38.1**	19.3 U	19.7 U	19.7 U
Pyrene	19.5 U	**5.5 J**	**5.9 J**	19.4 U	**8.1 J**	19.3 U	19.7 U	19.7 U
Total Benzofluoranthenes (b,j,k) (U = 0)	39.1 U	39.3 U	39.6 U	38.9 U	38.3 U	38.7 U	39.5 U	39.5 U
Total HPAH (DMMP) (U = 0)[1]	39.1 U	**5.5 J**	**5.9 J**	38.9 U	**35.2 J**	38.7 U	39.5 U	39.5 U
Total LPAH (DMMP) (U = 0)[2]	19.5 U	19.7 U	19.8 U	19.4 U	**38.1**	19.3 U	19.7 U	19.7 U
Total PAH (DMMP) (U = 0)	39.1 U	**5.5 J**	**5.9 J**	38.9 U	**73.3 J**	38.7 U	39.5 U	39.5 U
Pesticides (µg/kg)[3]								
4,4'-DDD (p,p'-DDD)	0.31 U	0.31 U	0.3 U	0.31 U	0.31 U	0.31 U	0.31 U	0.32 U
4,4'-DDE (p,p'-DDE)	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
4,4'-DDT (p,p'-DDT)	0.31 U	0.32 U	0.31 U	0.32 U	0.31 U	0.32 U	0.32 U	0.32 U
Aldrin	0.36 U	0.36 U	0.35 U	0.36 U	0.35 U	0.36 U	0.36 U	0.36 U
Chlordane, alpha- (Chlordane, cis-)	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Chlordane, beta- (Chlordane, trans-)	0.32 U	0.32 U	0.31 U	0.32 U	0.31 U	0.32 U	0.32 U	0.32 U
Dieldrin	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Heptachlor	0.04 U	0.05 U	0.04 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U
Nonachlor, cis-	0.2 U	0.21 U	0.2 U	0.21 U	0.2 U	0.2 U	0.21 U	0.21 U
Nonachlor, trans-	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Oxychlordane	0.12 U	0.12 U	0.12 U	0.13 U	0.12 U	0.12 U	0.13 U	0.13 U
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	0.31 U	0.32 U	0.31 U	0.32 U	0.31 U	0.32 U	0.32 U	0.32 U
Total DMMP Chlordane (U = 0)[5]	0.32 U	0.32 U	0.31 U	0.32 U	0.31 U	0.32 U	0.32 U	0.32 U
PCB Aroclors (µg/kg)								
Aroclor 1016	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1221	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1232	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1242	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1248	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1254	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1260	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1262	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Aroclor 1268	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
Total DMMP PCB Aroclors (U = 0)	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U
PCB Aroclors (mg/kg-OC)[6]								
Total DMMP PCB Aroclors (U = 0)	4.22 U	3.9 U	4.75 U	9.75 U	0.78 U	3.55 U	5.57 U	10 U

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 6

Sample Results Summary - Metals, TBT, Semivolatiles, Pesticides, and PCBs

Sample ID / Depth / Analyte	C-23-A1-190222 0 - 2 ft	C-23-B1-190222 2 - 4 ft	C-24-A-190223 0 - 2 ft	C-24-B-190223 2 - 4 ft	C-25-A-190222 0 - 2 ft	C-25-B-190222 2 - 4 ft
Metals (mg/kg)						
Antimony	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.24 UJ	0.24 UJ
Arsenic	**2.41**	**2**	**1.99**	**1.16**	**2.79**	**2.59**
Cadmium	**0.04 J**	**0.04 J**	0.11 U	0.1 U	**0.05 J**	0.12 U
Chromium	**10.1**	**9.02**	**11.3**	**9.86**	**15.5**	**13.2**
Copper	**15.1**	**12.8**	**13.4**	**11.2**	**27.7**	**19.4**
Lead	**1.84**	**1.45**	**1.64**	**1.6**	**2.42**	**1.79**
Mercury	0.0232 U	**0.0101 J**	**0.0112 J**	**0.00818 J**	**0.0219 J**	**0.0191 J**
Selenium	**0.66**	**0.84**	**0.62**	**0.64**	**0.85**	**0.73**
Silver	**0.04 J**	**0.04 J**	**0.04 J**	**0.04 J**	**0.07 J**	**0.05 J**
Zinc	**23.8**	**21.2**	**23**	**22.4**	**73.9**	**20.1**
Organometallic Compounds (µg/kg)						
Tributyltin (ion)	3.51 U	3.46 U	3.78 U	3.53 U	3.6 U	3.77 U
Semivolatile Organics (µg/kg)						
1,2,4-Trichlorobenzene	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
1,2-Dichlorobenzene	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
1,4-Dichlorobenzene	5 UJ	4.9 UJ	4.9 U	4.9 U	4.9 UJ	4.8 UJ
2,4-Dimethylphenol	24.9 UJ	24.6 UJ	24.5 U	24.7 U	24.7 UJ	24.2 UJ
2-Methylphenol (o-Cresol)	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
4-Methylphenol (p-Cresol)	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Benzoic acid	**15.4 J**	98.6 U	**43.9 J**	**25.5 J**	**33.6 J**	**84.3 J**
Benzyl alcohol	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
bis(2-Ethylhexyl)phthalate	49.9 U	49.3 U	49.1 U	49.4 U	**30.4 J**	**31.4 J**
Butylbenzyl phthalate	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Diethyl phthalate	30.9 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Dimethyl phthalate	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Di-n-butyl phthalate	87.1 U	142 U	19.6 U	19.8 U	140 U	171 U
Di-n-octyl phthalate	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Hexachlorobenzene	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Hexachlorobutadiene	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
n-Nitrosodiphenylamine	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Pentachlorophenol	20 UJ	19.7 UJ	19.6 UJ	19.8 UJ	19.8 UJ	19.3 UJ
Phenol	6.8 U	6.5 U	10 U	7.9 U	14.8 U	19.5 U
Polycyclic Aromatic Hydrocarbons (µg/kg)						
2-Methylnaphthalene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	**17.9 J**
Acenaphthene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Acenaphthylene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Anthracene	20 UJ	19.7 UJ	19.6 UJ	19.8 UJ	19.8 UJ	19.3 UJ
Benzo(a)anthracene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Benzo(a)pyrene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Benzo(b,j,k)fluoranthenes	39.9 U	39.4 U	39.3 U	39.6 U	39.5 U	38.7 U
Benzo(g,h,i)perylene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Chrysene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Dibenzo(a,h)anthracene	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Dibenzofuran	20 U	19.7 U	19.6 U	19.8 U	19.8 U	**5.9 J**
Fluoranthene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Fluorene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Indeno(1,2,3-c,d)pyrene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Naphthalene	20 UJ	19.7 UJ	19.6 U	19.8 U	19.8 UJ	**5.8 J**
Phenanthrene	20 U	19.7 U	19.6 U	19.8 U	**6.7 J**	**15 J**
Pyrene	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Total Benzofluoranthenes (b,j,k) (U = 0)	39.9 U	39.4 U	39.3 U	39.6 U	39.5 U	38.7 U
Total HPAH (DMMP) (U = 0)[1]	39.9 U	39.4 U	39.3 U	39.6 U	39.5 U	38.7 U
Total LPAH (DMMP) (U = 0)[2]	20 UJ	19.7 UJ	19.6 UJ	19.8 UJ	**6.7 J**	**20.8 J**
Total PAH (DMMP) (U = 0)	39.9 UJ	39.4 UJ	39.3 UJ	39.6 UJ	**6.7 J**	**20.8 J**
Pesticides (µg/kg)[3]						
4,4'-DDD (p,p'-DDD)	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
4,4'-DDE (p,p'-DDE)	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
4,4'-DDT (p,p'-DDT)	0.32 U	0.31 U	0.32 U	0.32 U	0.31 U	0.32 U
Aldrin	0.36 U	0.36 U	0.36 U	0.36 U	0.35 U	0.36 U
Chlordane, alpha- (Chlordane, cis-)	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Chlordane, beta- (Chlordane, trans-)	0.32 U	0.31 U	0.32 U	0.32 U	0.31 U	0.32 U
Dieldrin	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Heptachlor	0.05 U	0.04 U	0.05 U	0.05 U	0.04 U	0.05 U
Nonachlor, cis-	0.2 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
Nonachlor, trans-	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Oxychlordane	0.12 U	0.12 U	0.13 U	0.13 U	0.12 U	0.12 U
Sum 4,4 DDT, DDE, DDD (U = 0)[4]	0.32 U	0.31 U	0.32 U	0.32 U	0.31 U	0.32 U
Total DMMP Chlordane (U = 0)[5]	0.32 U	0.31 U	0.32 U	0.32 U	0.31 U	0.32 U
PCB Aroclors (µg/kg)						
Aroclor 1016	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1221	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1232	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1242	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1248	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1254	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1260	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1262	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1268	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Total DMMP PCB Aroclors (U = 0)	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
PCB Aroclors (mg/kg-OC)[6]						
Total DMMP PCB Aroclors (U = 0)	5.57 U	9.75 U	6.5 U	10 U	1.31 U	0.89 U

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Non-detected concentration is above one or more identified screening levels

TOC is <0.5% (see footnote 6)

Bold: Detected result

1. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
2. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
3. Pesticides are reported to the method detection limit.
4. Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
5. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
6. The normal range for OC-normalization is 0.5% to 3.5%. Several TOC values are <0.5%, and the dry weight result should be used for screening.

µg/kg: microgram per kilogram
BT: Bioaccumulation Trigger
DMMP: Dredged Material Management Program
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
J: Estimated value
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
mg/kg-OC: milligram per kilogram total organic carbon normalized
ML: Maximum Level
PCB: polychlorinated biphenyl
pct: percent
SL: Screening Level
TOC: total organic carbon
U: Compound analyzed, but not detected above detection limit

Table 7

Summary of Dioxin/Furan Results

Sample ID / Depth / Analyte	C-1-A-190219 0 - 2 ft	C-1-B-190219 2 - 4 ft	C-1-C-190219 4 - 6 ft	C-2-A-190219 0 - 2 ft	C-2-B-190219 2 - 4 ft	C-3-A-190218 0 - 2.7 ft	C-3-B-190218 2.7 - 5.8 ft	C-4-A-190218 0 - 2 ft	C-4-B-190218 2 - 4 ft	C-5-A-190221 0 - 2 ft	C-5-B-190221 2 - 4 ft
Dioxin Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**1.87 J**	**0.51 J**	**0.08 J**	**1.23 J**	**0.26 J**	**2.53 J**	**0.08 J**	0.05 UJ	0.05 UJ	**0.59 J**	**0.67 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**1.78 J**	**0.32 J**	**0.03 J**	**0.96 J**	**0.19 J**	**2.42 J**	**0.02 J**	0.05 UJ	0.05 UJ	**0.36 J**	**0.01 J**

Sample ID / Depth / Analyte	C-6-A-190219 0 - 2 ft	C-6-B-190219 2 - 4 ft	C-7-A-190221 0 - 2 ft	C-7-B-190221 2 - 4 ft	C-7-C-190221 4 - 6 ft	C-8-A-190221 0 - 2 ft	C-8-B-190221 2 - 4 ft	C-9-A-190220 0 - 2 ft	C-9-B-190220 2 - 4 ft	C-10-A-190221 0 - 2 ft	C-10-B-190221 2 - 4 ft
Dioxin Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**0.74 J**	**0.05 J**	**4.38 J**	**0.53 J**	**0.68 J**	**5.00 J**	**0.60 J**	**0.06 J**	**0.06 J**	**8.79 J**	**7.42 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**0.57 J**	**5.60E-04 J**	**4.21 J**	**0.02 J**	**2.97E-05 J**	**4.88 J**	**0.07 J**	**0.01 J**	**2.88E-03 J**	**8.40 J**	**7.29 J**

Sample ID / Depth / Analyte	C-10-C-190221 4 - 6 ft	C-11-A-190220 0 - 2 ft	C-11-B-190220 2 - 4 ft	C-12-A-190223 0 - 2 ft	C-12-B-190223 2 - 4 ft	C-12-C-190223 4 - 6 ft	C-12-D-190223 6 - 8 ft	C-12-E-190223 8 - 10 ft	C-13-A-190223 0 - 2 ft	C-13-B-190223 2 - 4 ft	C-13-C-190223 4 - 6 ft
Dioxin Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**0.61 J**	**5.92 J**	**0.18 J**	**56.21 J**	**54.47 J**	**17.74 J**	**0.63 J**	**0.07 J**	**5.34 J**	**7.73 J**	**11.88 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**0.42 J**	**5.76 J**	**0.09 J**	**56.21 J**	**54.01 J**	**17.55 J**	**0.51 J**	**2.76E-03 J**	**5.06 J**	**7.55 J**	**11.73 J**

Notes:

Detected concentration is greater than DMMP SL screening level (4 ng/kg TEQ)

Detected concentration is greater than DMMP BT screening level (10 ng/kg TEQ)

Bold: Detected result

*: EMPC value reported by laboratory; treated as non-detect (U) in the TEQ calculation

BT: Bioaccumulation Trigger

D/F: dioxins/furans

DMMP: Dredged Material Management Program

J: Estimated value

ML: Maximum Level

ng/kg: nanogram per kilogram

SL: Screening Level

TEF: toxic equivalence factor

TEQ: toxic equivalent

U: Compound analyzed, but not detected above detection limit

Table 7

Summary of Dioxin/Furan Results

Sample ID / Depth / Analyte	C-13-D-190223 6 - 8 ft	C-13-E-190223 8 - 10 ft	C-14-A-190221 0 - 2 ft	C-14-B-190221 2 - 4 ft	C-15-A-190222 0 - 2 ft	C-15-B-190222 2 - 4 ft	C-15-C-190222 4 - 6 ft	C-16-A-190223 0 - 2 ft	C-16-B-190223 2 - 4 ft	C-17-A-190222 0 - 2 ft	C-17-B-190222 2 - 4 ft
Dioxin Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**7.64 J**	**0.07 J**	**0.68 J**	**0.56 J**	**10.56 J**	**0.15 J**	**0.07 J**	**2.75 J**	**0.18 J**	**1.86 J**	**0.19 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**7.29 J**	**0.01 J**	**6.68E-03 J**	**0.07 J**	**9.37 J**	**0.08 J**	**0.01 J**	**2.66 J**	**0.11 J**	**1.81 J**	**0.11 J**

Sample ID / Depth / Analyte	C-17-C-190222 4 - 8 ft	C-18-A1-190220 0 - 2.3 ft	C-18-B1-190220 3.9 - 6.3 ft	C-19-A-190220 0 - 2 ft	C-19-B-190220 2 - 4 ft	C-20-A-190219 0 - 2 ft	C-20-B-190219 2 - 4 ft	C-21-A-190219 0 - 2 ft	C-21-B-190219 2 - 4 ft	C-22-A-190219 0 - 2 ft	C-22-B-190219 2 - 4 ft
Dioxin Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**0.10 J**	**2.99 J**	**0.08 J**	**0.27 J**	**0.39 J**	**0.50 J**	**0.04 J**	**0.08 J**	**0.06 J**	**0.15 J**	**0.13 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**0.02 J**	**2.93 J**	**0.03 J**	**0.14 J**	**0.27 J**	**0.42 J**	**4.80E-04 J**	**0.02 J**	**0.02 J**	**0.09 J**	**0.06 J**

Sample ID / Depth / Analyte	C-23-A1-190222 0 - 2 ft	C-23-B1-190222 2 - 4 ft	C-24-A-190223 0 - 2 ft	C-24-B-190223 2 - 4 ft	C-25-A-190222 0 - 2 ft	C-25-B-190222 2 - 4 ft
Dioxin Furans (ng/kg)						
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**0.35 J**	**0.08 J**	**0.63 J**	**0.05 J**	**0.07 J**	**0.07 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**0.27 J**	**0.01 J**	**0.48 J**	**5.5E-03 J**	**0.02 J**	**0.01 J**

Notes:

Detected concentration is greater than DMMP SL screening level (4 ng/kg TEQ)

Detected concentration is greater than DMMP BT screening level (10 ng/kg TEQ)

Bold: Detected result

*: EMPC value reported by laboratory; treated as non-detect (U) in the TEQ calculation

BT: Bioaccumulation Trigger

D/F: dioxins/furans

DMMP: Dredged Material Management Program

J: Estimated value

ML: Maximum Level

ng/kg: nanogram per kilogram

SL: Screening Level

TEF: toxic equivalence factor

TEQ: toxic equivalent

U: Compound analyzed, but not detected above detection limit

Table 8
Suitability Probabilities for Open-Water Disposal of Non-Native Material

Area	Station	sediment category	Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Analyses[1]	Detected SL/BT Exceedance	Dioxins/furans above 4/10 pptr TEQ	Suitable/Unsuitable	Suitability Probablility	Average suitability probability	Rounded Suitability Probability
Mouth	C-1	surf	A	0 to 2	-49.9 to -51.9	Full Suite	no	no	suitable	100	92.86	90
	C-1	surf	B	2 to 4	-51.9 to -53.9	Full Suite	no	no	suitable	100		
	C-2	surf	A	0 to 2	-51.4 to -53.4	Full Suite	no	no	suitable	100		
	C-3	undetermined	A	0 to 2.7	-52.5 to -55.2	Full Suite	Total Chlordane non-detect	no	possibly suitable	50		
	C-3	undetermined	B	2.7 to 5.8	-55.2 to -58.3	Full Suite	no	no	suitable	100		
	C-4	surf	A	0 to 2	-53.6 to -55.6	Full Suite	no	no	suitable	100		
	C-5	surf	A	0 to 2	-51.5 to -53.5	Full Suite	no	no	suitable	100		
Middle	C-7	surf	A	0 to 2	-50.4 to -52.4	Full Suite	no	4.38	likely suitable	75	63.63636364	60
	C-8	undetermined	A	0 to 2	-52.0 to -54.0	Full Suite	no	5.00	likely suitable	75		
	C-8	undetermined	B	2 to 4	-54.0 to -56.0	Full Suite	no	no	suitable	100		
	C-10	surf	A	0 to 2	-49.0 to -51.0	Full Suite	no	8.79	likely suitable	75		
	C-10	surf	B	2 to 4	-51.0 to -53.0	Full Suite	Tributyltin	7.42	unsuitable	0		
	C-10	surf	C	4 to 6	-53.0 to -55.0	Full Suite	no	no	suitable	100		
	C-11	surf	A	0 to 2	-51.6 to -53.6	Full Suite	Total Chlordane non-detect	5.92	possibly suitable	50		
	C-12	undetermined	A	0 to 2	-22.7 to -24.7	Full Suite	Total PCB Aroclors	56.2	unsuitable	0		
	C-12	undetermined	B	2 to 4	-24.7 to -26.7	Full Suite	no	54.5	unsuitable	0		
	C-12	undetermined	C	4 to 6	-26.7 to -28.7	Full Suite	no	17.7	unsuitable	0		
	C-12	undetermined	D	6 to 8	-28.7 to -30.7	D/F	no	no	suitable	100		
	C-12	undetermined	E	8 to 10	-30.7 to -32.7	D/F	no	no	suitable	100		
	C-13	undetermined	A	0 to 2	-39.0 to -41	Full Suite	no	5.34	likely suitable	75		
	C-13	undetermined	B	2 to 4	-41.0 to -43.0	Full Suite	no	7.73	likely suitbble	75		
	C-13	undetermined	C	4 to 6	-43.0 to -45.0	Full Suite	no	11.88	unsuitable	0		
	C-13	undetermined	D	6 to 8	-45.0 to -47.0	D/F	no	7.64	likely suitable	75		
	C-13	undetermined	E	8 to 10	-47.0 to -49.0	D/F	no	no	suitable	100		
	C-14	surf	A	0 to 2	-52.6 to -54.6	Full Suite	no	no	suitable	100		
	C-14	surf	B	2 to 4	-54.6 to -56.6	Full Suite	no	no	suitable	100		
	C-15	undetermined	A	0 to 2	-45.6 to -47.6	Full Suite	no	10.6	unsuitable	0		
	C-15	undetermined	B	2 to 4	-47.6 to -49.6	Full Suite	no	no	suitable	100		
	C-15	undetermined	C	4 to 6	-49.6 to -51.6	Full Suite	no	no	suitable	100		
Head	C-16	surf	A	0 to 2	-50.6 to -52.6	Full Suite	no	no	suitable	100	100	100
	C-17	undetermined	A	0 to 2	-19.7 to -21.7	Full Suite	no	no	suitable	100		
	C-17	undetermined	B	2 to 4	-21.7 to -23.7	Full Suite	no	no	suitable	100		
	C-17	undetermined	C	4 to 8	-23.7 to -25.7	Full Suite	no	no	suitable	100		
	C-18	surf	A	0 to 2.3	-52.2 to -54.5	Full Suite	no	no	suitable	100		
	C-24	surf	A	0 to 2	-51.1 to -53.1	Full Suite	no	no	suitable	100		
	C-25	surf	A	0 to 2	-51.4 to -53.4	Full Suite	no	no	suitable	100		
	C-25	surf	B	2 to 4	-53.4 to -55.4	Full Suite	no	no	suitable	100		

Legend

	Probability of being suitable during full characterization
suitable	100
likely suitable	75
possibly suitable	50
unsuitable	0

above SL, BT or dioxin above 4 pptr TEQ

dioxin above 10 pptr TEQ

all less than SLs/BTs

Table 9
Suitability Probabilities for Open-Water Disposal of Native Material

Station		Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Analyses[1]	Detected SL/BT Exceedance	Dioxins/furans above 4 pptr TEQ	Suitable/Unsuitable	Suitability Probablility	Average suitability probability	Rounded Suitability Probability
C-1	native	C	4 to 6	-53.9 to -55.9	Full Suite	no	no	suitable	100	98.07692308	95
C-2	native	B	2 to 4	-53.4 to -55.4	Full Suite	no	no	suitable	100		
C-2	native	C	4 to 6	-55.4 to -57.4	TBT	no	no	suitable	100		
C-2	native	D	6 to 8.6	57.4 to -60.0	TBT	no	no	suitable	100		
C-4	native	B	2 to 4	-55.6 to -57.6	Full Suite	no	no	suitable	100		
C-5	native	B	2 to 4	-53.5 to -55.5	Full Suite	no	no	suitable	100		
C-6	native	A	0 to 2	-53.9 to -55.9	Full Suite	no	no	suitable	100		
C-6	native	B	2 to 4	-55.9 to -57.9	Full Suite	no	no	suitable	100		
C-7	native	B	2 to 4	-52.4 to -54.4	Full Suite	Hexachlorobutadiene	no	possibly suitable	50		
C-7	native	C	4 to 6	-54.4 to -56.4	Full Suite	no	no	suitable	100		
C-9	native	A	0 to 2	-53.0 to -55.0	Full Suite	no	no	suitable	100		
C-9	native	B	2 to 4	-55.0 to -57.0	Full Suite	no	no	suitable	100		
C-11	native	B	2 to 4	-53.6 to -55.6	Full Suite	no	no	suitable	100		
C-16	native	B	2 to 4	-52.6 to -54.6	Full Suite	no	no	suitable	100		
C-18	native	B	3.9 to 6.3	-54.5 to -56.9	Full Suite	no	no	suitable	100		
C-19	native	A	0 to 2	-52.4 to -54.4	Full Suite	no	no	suitable	100		
C-19	native	B	2 to 4	-54.4 to -56.4	Full Suite	no	no	suitable	100		
C-20	native	A	0 to 2	-51.3 to -53.3	Full Suite	no	no	suitable	100		
C-20	native	B	2 to 4	-53.3 to -55.3	Full Suite	no	no	suitable	100		
C-21	native	A	0 to 2	-53.7 to -55.7	Full Suite	no	no	suitable	100		
C-21	native	B	2 to 4	-55.7 to -57.7	Full Suite	no	no	suitable	100		
C-22	native	A	0 to 2	-51.0 to -53.0	Full Suite	no	no	suitable	100		
C-22	native	B	2 to 4	-53.0 to -55.0	Full Suite	no	no	suitable	100		
C-23	native	A	0 to 2	-53.7 to -55.7	Full Suite	no	no	suitable	100		
C-23	native	B	2 to 4	-55.7 to -57.7	Full Suite	no	no	suitable	100		
C-24	native	B	2 to 4	-53.1 to -55.1	Full Suite	no	no	suitable	100		

Legend

	Probability of being suitable during full characterization
suitable	100
likely suitable	75
possibly suitable	50
unsuitable	0

above SL, BT or dioxin above 4 pptr TEQ

dioxin above 10 pptr TEQ

all less than SLs/BTs

Table 10
SMS Comparison for Samples with TOC above 0.5%

Sample ID		C-1-A-190219	C-5-B-190221	C-6-B-190219	C-7-A-190221	C-8-A-190221	C-10-A-190221	C-11-A-190220	C-12-A-190223	C-12-C-190223	C-13-A-190223	C-17-A-190222	C-17-B-190222
Sample Date		2/19/2019	2/21/2019	2/19/2019	2/21/2019	2/21/2019	2/21/2019	2/20/2019	2/23/2019	2/23/2019	2/23/2019	2/22/2019	2/22/2019
Depth		0 - 2 ft	2 - 4 ft	2 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	4 - 6 ft	0 - 2 ft	0 - 2 ft	2 - 4 ft
Analyte	SQS	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ	Result Value VQ
Conventional Parameters (%)													
Total organic carbon		0.71	0.74	0.71	0.55	0.54	1.01	0.86	0.61	0.75	0.59	0.83	3.24
Metals (mg/kg)													
Arsenic	57	3.24	1.63	1.41	4.52	4.3	5.95	4.8	6.8	5.07	6.08	3.74	3.44
Cadmium	5.1	0.09 J	0.05 J	0.13 U	0.08 J	0.07 J	0.13 J	0.09 J	0.14	0.14	0.11 J	0.05 J	0.21
Chromium	260	14.7	12.7	11.1	16.3	13.6	15.6	14.3	16.3	16.7	13	16.3	16.4
Copper	390	26.7	16.9	15.6	25.2	24.4	31.8	27.3	29.2	24.7	66.1	32.6	30.7
Lead	450	6.01	1.86	1.46	6.14	5.97	8.1	6.34	14.8	5.11	4.5	3.94	3.12
Mercury	0.41	0.0423	0.0227 U	0.00982 J	0.0278 J	0.0351 J	0.0428 J	0.0352	0.0703	0.0549	0.0252	0.0296	0.0373
Silver	6.1	0.12 J	0.06 J	0.06 J	0.11 J	0.11 J	0.16 J	0.13 J	0.14 J	0.09 J	0.08 J	0.1 J	0.1 J
Zinc	410	33.3	24	18.8	37.2	34.1	43.4	36.7	43.7	29.8	43.1	30.4	25.3
Semivolatile Organics (ug/kg)													
Benzoic acid	650	84.7 J	56.2 J	37.8 J	26.5 J	37.1 J	146	93.3 J	228 J	46.1 J	71.1 J	310	164
Benzyl alcohol	57	19.9 U	19.5 U	19.7 U	19.9 U	19.5 U	19.7 U	17.9 J	19 U	19.9 U	19.6 U	19.9 U	19.5 U
2,4-Dimethylphenol	29	24.9 UJ	24.4 U	24.6 UJ	24.8 U	24.4 U	3.4 J	3.1 J	10.6 J	24.9 U	24.5 U	24.8 UJ	2.6 J
2-Methylphenol (o-Cresol)	63	3 J	4.9 U	4.9 U	5 U	4.9 U	4.9 U	2.2 J	4.8 U	5 U	4.9 U	2.7 J	3.1 J
4-Methylphenol (p-Cresol)	670	5	4.9 U	4.9 U	5 U	4.9 U	6.4	6.8	14.4	2.8 J	4.9 U	4.7 J	7.6
Pentachlorophenol	360	19.9 UJ	5.5 J	19.7 UJ	19.9 UJ	19.5 UJ	9.3 J	4.1 J	11.2 J	19.9 UJ	19.6 UJ	4.5 J	19.5 UJ
Phenol	420	13.5 U	8.1 U	6.4 U	6.2 U	4.9 U	15 U	20.3	53 U	17.5 U	23.7 U	41	34.7
Semivolatile Organics (mg/kg OC)													
1,2,4-Trichlorobenzene	0.81	0.38 U	0.35 U	0.37 U	0.49 U	0.48 U	0.26 U	0.29 U	0.41 U	0.36 U	0.44 U	0.33 U	0.08 U
1,2-Dichlorobenzene	2.3	0.70 U	0.13 J	0.69 U	0.70 U	0.69 U	0.69 U	0.66 U	0.86	0.70 U	0.69 U	0.70 U	0.69 U
1,4-Dichlorobenzene	3.1	0.70 U	0.69 U	0.69 U	0.70 U	0.69 U	0.69 U	0.66 U	0.52 J	0.70 U	0.69 U	0.70 UJ	0.69 UJ
Hexachlorobenzene	0.38	0.10 U	0.09 U	0.10 U	0.13 U	0.13 U	0.07 U	0.08 U	0.11 U	0.09 U	0.12 U	0.08 U	0.02 U
bis(2-Ethylhexyl)phthalate	47	7.01 U	6.89 U	6.93 U	4.21 J	6.87 U	7.99	4.25 J	14.93	7.01 U	4.28 J	7.00 U	6.86 U
Butylbenzyl phthalate	4.9	2.80 U	2.75 U	2.77 U	2.80 U	2.75 U	2.77 U	2.68 U	2.68 U	2.80 U	2.76 U	2.80 U	2.75 U
Diethyl phthalate	61	2.80 U	2.75 U	2.77 U	2.80 U	9.44 U	2.77 U	--	2.68 U	2.80 U	2.76 U	2.80 U	2.75 U
Dimethyl phthalate	53	0.70 U	0.69 U	0.69 U	0.70 U	0.69 U	0.69 U	0.66 U	0.44 J	0.70 U	0.69 U	0.70 U	0.69 U
Di-n-butyl phthalate	220	5.25	3.28 U	7.90	6.80 U	2.75 U	5.83 U	10.17	2.68 U	2.80 U	2.76 U	13.79 U	14.07 U
Di-n-octyl phthalate	58	2.80 U	2.75 U	2.77 U	2.80 U	2.75 U	2.77 U	2.68 U	2.68 U	2.80 U	2.76 U	2.80 U	2.75 U
Hexachlorobutadiene	3.9	0.70 U	0.66 U	0.69 U	0.91 U	0.91 U	0.49 U	0.55 U	0.79 U	0.67 U	0.83 U	0.60 U	0.15 U
Dibenzofuran	15	1.23 J	2.75 U	0.76 J	2.80 U	1.73 J	2.34 J	1.27 J	3.37	2.80 U	2.76 U	2.80 U	2.75 U
n-Nitrosodiphenylamine	11	0.70 U	0.69 U	0.69 U	0.70 U	0.69 U	0.48 J	0.66 U	0.68 U	0.70 U	0.69 U	0.70 U	0.69 U
Polycyclic Aromatic Hydrocarbons (mg/kg OC)													
2-Methylnaphthalene	38	3.48	2.42 J	3.00	2.80 U	4.94	4.03	2.49 J	3.03	2.80 U	1.00 J	1.65 J	1.00 J
Acenaphthene	16	2.80 U	2.75 U	2.77 U	2.80 U	1.08 J	1.06 J	2.68 U	2.97	2.80 U	2.76 U	2.80 U	2.75 U
Acenaphthylene	66	2.80 U	2.75 U	2.77 U	2.80 U	0.90 J	1.55 J	2.68 U	1.54 J	2.80 U	2.76 U	2.80 U	2.75 U
Anthracene	220	2.08 J	2.75 U	2.77 U	1.86 J	2.83	4.04	2.62 J	3.75 J	1.20 J	0.97 J	2.80 UJ	2.75 UJ
Benzo(a)anthracene	110	3.39	0.73 J	2.77 U	4.20	5.41	7.92	5.99	3.54	1.13 J	2.41 J	0.92 J	2.75 U
Benzo(a)pyrene	99	2.86	2.75 U	2.77 U	5.32	5.89	9.46	6.49	5.68	1.37 J	3.25	2.80 U	2.75 U
Benzo(b,j,k)fluoranthenes	230	8.13	5.51 U	5.54 U	17.04	13.90	28.87	16.62	16.06	3.17 J	8.86	3.20 J	5.49 U
Benzo(g,h,i)perylene	31	2.06 J	2.75 U	2.77 U	4.13	3.82	6.83	4.66	4.34	1.37 J	2.93	2.80 U	2.75 U
Chrysene	110	5.28	1.00 J	1.04 J	7.15	10.10	11.65	8.65	7.20	1.66 J	3.92	2.07 J	1.24 J
Dibenzo(a,h)anthracene	12	0.62 J	0.69 U	0.69 U	1.24	1.66	2.65	1.30	1.55	0.38 J	0.93	0.37 J	0.69 U
Fluoranthene	160	6.68	2.75 U	2.77 U	6.66	9.08	15.49	7.34	12.80	2.61 J	3.59	1.13 J	2.75 U
Fluorene	23	1.17 J	2.75 U	2.77 U	0.82 J	1.45 J	2.21 J	1.13 J	3.94	2.80 U	2.76 U	2.80 U	2.75 U
Indeno(1,2,3-c,d)pyrene	34	1.89 J	2.75 U	2.77 U	3.90	3.54	6.18	4.15	3.58	1.03 J	2.24 J	2.80 U	2.75 U
Naphthalene	99	3.03	1.11 J	1.56 J	2.39 J	3.66	3.90	2.83	8.48	2.38 J	1.11 J	0.89 J	0.96 J
Phenanthrene	100	6.44	2.69 J	3.34	4.76	8.44	7.51	5.52	11.03	3.41	2.30 J	3.55	1.93 J
Pyrene	1000	8.66	2.75 U	2.77 U	9.27	11.49	24.51	10.70	30.28	5.65	6.87	3.00	2.75 U
PCB Aroclors (mg/kg-OC)[6]													
Total DMMP PCB Aroclors (U = 0)	12	0.72 J	0.54 U	0.56 U	1.71 J	2.19 J	2.01 J	0.7 J	28.41 J	3.27 J	1.98 J	0.72 J	0.12 U

non-detect reported at MDL
non-detect exceedance
detected exceedance

Table 11

SMS Comparison for Samples with TOC less than 0.5%

Sample ID / Depth / Analyte	SQS	C-1-B-190219 2 - 4 ft	C-1-C-190219 4 - 6 ft	C-2-A-190219 0 - 2 ft	C-2-B-190219 2 - 4 ft	C-3-A-190218 0 - 2.7 ft	C-3-B-190218 2.7 - 5.8 ft	C-4-A-190218 0 - 2 ft	C-4-B-190218 2 - 4 ft	C-5-A-190221 0 - 2 ft	C-6-A-190219 0 - 2 ft	C-7-B-190221 2 - 4 ft	C-7-C-190221 4 - 6 ft	C-8-B-190221 2 - 4 ft
Conventional Parameters (%)														
Total organic carbon		**0.21**	**0.09**	**0.37**	**0.26**	**0.49**	**0.27**	**0.15**	**0.12**	**0.28**	**0.22**	**0.44**	**0.2**	**0.39**
Metals (mg/kg)														
Arsenic	57	**1.67**	**1.06**	**4.97**	**1.95**	**3.7**	**1.77**	**1.12**	**1.01**	**1.59**	**1.14**	**1.76**	**1.39**	**2.66**
Cadmium	5.1	0.11 U	0.12 U	**0.05 J**	**0.05 J**	**0.06 J**	0.12 U	0.12 U	0.12 U	**0.04 J**	**0.12**	0.12 U	0.12 U	**0.07 J**
Chromium	260	**11**	**9.49**	**12.5**	**12.7**	**12.3**	**10.9**	**11.8**	**10.8**	**11.3**	**9.11**	**8.75**	**9.6**	**16.8**
Copper	390	**13.7**	**10.3**	**18.3**	**16.6**	**25.5**	**14.9**	**11.9**	**10.8**	**14.4**	**10.3**	**10.1**	**9.06**	**28.3**
Lead	450	**2.33**	**1.33**	**3.46**	**2.15**	**6.26**	**1.55**	**1.26**	**1.21**	**2.25**	**1.42**	**1.11**	**1.06**	**3.39**
Mercury	0.41	**0.025**	**0.0114 J**	**0.0249 J**	**0.0167 J**	**0.0599 J**	0.0231 UJ	0.026 UJ	0.0254 UJ	0.0269 U	0.0241 U	0.0266 U	0.0214 U	**0.0183 J**
Silver	6.1	**0.06 J**	**0.03 J**	**0.08 J**	**0.05 J**	**0.12 J**	**0.04 J**	**0.04 J**	**0.04 J**	**0.06 J**	**0.04 J**	**0.04 J**	**0.03 J**	**0.09 J**
Zinc	410	**19.3**	**14.9**	**27**	**23.7**	**34.4**	**19.9**	**20**	**19.4**	**21.1**	**17.9**	**16.4**	**16.7**	**32.1**
Semivolatile Organics (ug/kg)														
Benzoic acid	650	95.9 UJ	96.3 UJ	97.5 UJ	97 UJ	**85.1 J**	**15.8 J**	**16.8 J**	94.3 UJ	**21.2 J**	99.1 UJ	97.1 U	98.8 U	99.5 U
Benzyl alcohol	57	19.2 U	19.3 U	19.5 U	19.4 U	**13.4 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Hexachlorobutadiene	11	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	**26.5**	4.9 U	5 U
2,4-Dimethylphenol	29	24 UJ	24.1 UJ	24.4 UJ	24.3 UJ	24.1 UJ	24.6 UJ	24.3 UJ	23.6 UJ	24.9 U	24.8 UJ	24.3 U	24.7 U	24.9 U
2-Methylphenol (o-Cresol)	63	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
4-Methylphenol (p-Cresol)	670	4.8 U	4.8 U	**2.9 J**	4.9 U	**5.4**	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
Pentachlorophenol	360	19.2 UJ	19.3 UJ	19.5 UJ	19.4 UJ	19.3 UJ	19.7 UJ	19.4 UJ	18.9 UJ	**5.4 J**	19.8 UJ	19.4 UJ	19.8 UJ	19.9 UJ
Phenol	420	4.8 U	4.8 U	7.8 U	4.9 U	**30**	6.1 U	5.6 U	4.7 U	6.4 U	5 U	5.4 U	4.9 U	5 U
Semivolatile Organics (ug/kg)														
1,2,4-Trichlorobenzene	31	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
1,2-Dichlorobenzene	35	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
1,4-Dichlorobenzene	110	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
Hexachlorobenzene	22	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	**3 J**	4.9 U	5 U
bis(2-Ethylhexyl)phthalate	1300	47.9 U	48.2 U	48.8 U	48.5 U	**29.5 J**	49.2 U	48.6 U	47.1 U	49.8 U	49.5 U	48.6 U	49.4 U	49.8 U
Butylbenzyl phthalate	63	19.2 U	19.3 U	19.5 U	19.4 U	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Diethyl phthalate	200	19.2 U	19.3 U	19.5 U	19.4 U	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	25.5 U	27.7 U
Dimethyl phthalate	71	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
Di-n-butyl phthalate	1400	**22.5**	**22.4**	**40.6**	**14.9 J**	**118**	**69.7**	**96.1**	**108**	19.9 U	**43.4**	19.4 U	30.6 U	19.9 U
Di-n-octyl phthalate	6200	19.2 U	19.3 U	19.5 U	19.4 U	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Dibenzofuran	540	19.2 U	19.3 U	19.5 U	19.4 U	**12 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
n-Nitrosodiphenylamine	28	4.8 U	4.8 U	4.9 U	4.9 U	4.8 U	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
Polycyclic Aromatic Hydrocarbons (ug/kg)														
2-Methylnaphthalene	670	**8.6 J**	19.3 U	19.5 U	**6.4 J**	**18.4 J**	**8 J**	19.4 U	18.9 U	19.9 U	19.8 U	**7.8 J**	**9.8 J**	**9.8 J**
Acenaphthene	500	19.2 U	19.3 U	19.5 U	19.4 U	**7 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Acenaphthylene	1300	19.2 U	19.3 U	19.5 U	19.4 U	19.3 U	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Anthracene	960	19.2 U	19.3 U	**7.7 J**	19.4 U	**13.9 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Benzo(a)anthracene	1300	**16.6 J**	19.3 U	**17.5 J**	**5.2 J**	**20.7**	19.7 U	19.4 U	18.9 U	**7.4 J**	19.8 U	19.4 U	19.8 U	**5.4 J**
Benzo(a)pyrene	1600	**16.7 J**	19.3 U	**16.3 J**	19.4 U	**26.8**	19.7 U	19.4 U	18.9 U	**8.5 J**	19.8 U	19.4 U	19.8 U	19.9 U
Benzo(b,j,k)fluoranthenes	3200	**35.3 J**	38.5 U	**38.8 J**	38.8 U	**75.9**	39.4 U	38.9 U	37.7 U	**26.9 J**	39.6 U	38.8 U	39.5 U	39.8 U
Benzo(g,h,i)perylene	670	**8 J**	19.3 U	**10.1 J**	19.4 U	**20.1**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Chrysene	1400	**21.2**	19.3 U	**24**	**6.7 J**	**34.4**	**5.3 J**	19.4 U	18.9 U	**11.7 J**	19.8 U	19.4 U	19.8 U	**17.6 J**
Dibenzo(a,h)anthracene	230	**3.7 J**	4.8 U	**2.7 J**	4.9 U	**7.6**	4.9 U	4.9 U	4.7 U	5 U	5 U	4.9 U	4.9 U	5 U
Fluoranthene	1700	**22**	19.3 U	**32.1**	**7.7 J**	**38.3**	19.7 U	19.4 U	18.9 U	**11.9 J**	19.8 U	19.4 U	19.8 U	19.9 U
Fluorene	540	19.2 U	19.3 U	19.5 U	19.4 U	**11 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Indeno(1,2,3-c,d)pyrene	600	**7.4 J**	19.3 U	**8.3 J**	19.4 U	**16.7 J**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	19.8 U	19.9 U
Naphthalene	2100	**8.7 J**	19.3 U	**11.7 J**	**5.3 J**	**31**	19.7 U	19.4 U	18.9 U	19.9 U	19.8 U	19.4 U	**8.5 J**	19.9 U
Phenanthrene	1500	**13.6 J**	19.3 U	**24.9**	**13 J**	**36.9**	**13 J**	**5.9 J**	18.9 U	**12.9 J**	19.8 U	**14.7 J**	19.8 U	**22.6**
Pyrene	2600	**27.1**	19.3 U	**39.5**	**9.3 J**	**63.5**	19.7 U	19.4 U	18.9 U	**15.9 J**	**6.3 J**	19.4 U	19.8 U	19.9 U
PCB Aroclors (µg/kg)														
Total DMMP PCB Aroclors (U = 0)	130	3.9 U	4 U	**2 J**	4 U	**3.8 J**	4 U	4 U	3.9 U	**0.8 J**	**1.9 J**	4 U	4 U	3.9 U

non-detect exceedance
detected exceedance
AET-based SQS different from DMMP SL

Table 11

SMS Comparison for Samples with TOC less than 0.5%

Sample ID / Depth / Analyte	SQS	C-9-A-190220 0 - 2 ft	C-9-B-190220 2 - 4 ft	C-10-B-190221 2 - 4 ft	C-10-C-190221 4 - 6 ft	C-11-B-190220 2 - 4 ft	C-12-B-190223 2 - 4 ft	C-13-B-190223 2 - 4 ft	C-13-C-190223 4 - 6 ft	C-14-A-190221 0 - 2 ft	C-14-B-190221 2 - 4 ft	C-15-A-190222 0 - 2 ft	C-15-B-190222 2 - 4 ft	C-15-C-190222 4 - 6 ft
Conventional Parameters (%)														
Total organic carbon		**0.11**	**0.19**	**0.45**	**0.19**	**0.14**	**0.37**	**0.39**	**0.18**	**0.09**	**0.15**	**0.25**	**0.1**	**0.17**
Metals (mg/kg)														
Arsenic	57	**2.08**	**2.58**	**3.4**	**1.88**	**1.3**	**5.07**	**6.67**	**3.88**	**4.18**	**5.08**	**6.4**	**2.74**	**4.28**
Cadmium	5.1	0.11 U	**0.09 J**	**0.12 J**	**0.1**	0.12 U	**0.13**	**0.11 J**	**0.05 J**	0.11 U	**0.06 J**	**0.05 J**	0.11 U	**0.04 J**
Chromium	260	**11.3**	**11.8**	**11.3**	**8.23**	**10.7**	**16.2**	**13.5**	**12**	**11.3**	**13**	**12.4**	**9.38**	**11.5**
Copper	390	**10.7**	**14.4**	**19.1**	**11.8**	**11.1**	**23.8**	**22.7**	**14.1**	**12.3**	**14.6**	**21.3**	**11.5**	**14.3**
Lead	450	**1.25**	**1.61**	**4.2**	**1.46**	**1.33**	**6.32**	**5.04**	**1.67**	**1.54**	**1.8**	**5.36**	**1.36**	**1.74**
Mercury	0.41	0.0217 U	**0.00517 J**	**0.0271 J**	**0.00691 J**	0.0241 U	**0.0607**	**0.0381**	**0.011 J**	0.0216 U	0.0216 U	**0.027 J**	**0.0142 J**	**0.0148 J**
Silver	6.1	**0.04 J**	**0.06 J**	**0.09 J**	**0.04 J**	**0.04 J**	**0.09 J**	**0.11 J**	**0.05 J**	**0.04 J**	**0.05 J**	**0.09 J**	**0.04 J**	**0.05 J**
Zinc	410	**18**	**19.7**	**25.5**	**15.8**	**18.7**	**30.4**	**34.2**	**22.2**	**21.7**	**22.2**	**30**	**18**	**22.5**
Semivolatile Organics (ug/kg)														
Benzoic acid	650	99.1 UJ	95.3 UJ	**43.3 J**	96 U	94 UJ	**77 J**	**76.3 J**	**22.3 J**	97.1 U	98.6 U	**79.4 J**	99 U	99 UJ
Benzyl alcohol	57	**10.1 J**	**9.7 J**	19.1 U	19.2 U	18.8 U	19.8 U	**3.4 J**	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Hexachlorobutadiene	11	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
2,4-Dimethylphenol	29	24.8 UJ	23.8 UJ	23.8 U	24 U	23.5 UJ	**2.8 J**	24.8 U	24.5 U	24.3 U	24.7 U	23.6 UJ	24.8 UJ	24.8 UJ
2-Methylphenol (o-Cresol)	63	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
4-Methylphenol (p-Cresol)	670	5 U	4.8 U	**2.7 J**	4.8 U	4.7 U	**5.1**	**3.1 J**	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
Pentachlorophenol	360	19.8 UJ	19.1 UJ	19.1 UJ	19.2 UJ	18.8 UJ	**10.1 J**	19.9 UJ	19.6 UJ	19.4 UJ	**7.7 J**	18.9 UJ	19.8 UJ	19.8 UJ
Phenol	420	5 U	5.3 U	9.7 U	4.8 U	4.7 U	23.1 U	31.6 U	8.2 U	4.9 U	4.9 U	13.7 U	5.9 U	7 U
Semivolatile Organics (ug/kg)														
1,2,4-Trichlorobenzene	31	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
1,2-Dichlorobenzene	35	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
1,4-Dichlorobenzene	110	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 UJ	5 UJ	5 UJ
Hexachlorobenzene	22	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
bis(2-Ethylhexyl)phthalate	1300	49.5 U	47.7 U	**32.8 J**	48 U	47 U	**32.9 J**	**41.7 J**	49 U	**54.7**	49.3 U	**61.8**	49.5 U	49.5 U
Butylbenzyl phthalate	63	19.8 U	19.1 U	19.1 U	19.2 U	18.8 U	19.8 U	19.9 U	19.6 U	19.4 U	19.7 U	**7.8 J**	19.8 U	19.8 U
Diethyl phthalate	200	19.8 U	19.1 U	19.1 U	24.5 U	18.8 U	38.2 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	31.9 U
Dimethyl phthalate	71	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
Di-n-butyl phthalate	1400	**23.4**	**40.5**	20.6 U	30.4 U	**17.7 J**	**6 J**	19.9 U	19.6 U	34.4 U	39.9 U	121 U	81.4 U	38.6 U
Di-n-octyl phthalate	6200	19.8 U	19.1 U	19.1 U	19.2 U	18.8 U	19.8 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Dibenzofuran	540	19.8 U	19.1 U	**7.2 J**	19.2 U	18.8 U	**9.6 J**	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
n-Nitrosodiphenylamine	28	5 U	4.8 U	4.8 U	4.8 U	4.7 U	5 U	5 U	4.9 U	4.9 U	4.9 U	4.7 U	5 U	5 U
Polycyclic Aromatic Hydrocarbons (ug/kg)														
2-Methylnaphthalene	670	19.8 U	19.1 U	**10.6 J**	19.2 U	18.8 U	19.8 U	**7 J**	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Acenaphthene	500	19.8 U	19.1 U	19.1 U	19.2 U	18.8 U	**8.2 J**	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Acenaphthylene	1300	19.8 U	19.1 U	19.1 U	19.2 U	18.8 U	19.8 U	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Anthracene	960	19.8 U	19.1 U	**16.1 J**	19.2 U	18.8 U	**14.4 J**	**10.6 J**	19.6 UJ	19.4 U	19.7 U	**6.1 J**	19.8 UJ	19.8 UJ
Benzo(a)anthracene	1300	19.8 U	19.1 U	**33.6**	19.2 U	18.8 U	**13.1 J**	**19.2 J**	19.6 U	19.4 U	19.7 U	**10.2 J**	19.8 U	19.8 U
Benzo(a)pyrene	1600	19.8 U	19.1 U	**45.7**	19.2 U	18.8 U	**18.8 J**	**29.4**	19.6 U	19.4 U	19.7 U	**18.9**	19.8 U	19.8 U
Benzo(b,j,k)fluoranthenes	3200	39.6 U	38.1 U	**115**	38.4 U	37.6 U	**49.2**	**85.1**	39.2 U	38.8 U	39.4 U	**54.5**	39.6 U	39.6 U
Benzo(g,h,i)perylene	670	19.8 U	19.1 U	**30.3**	19.2 U	18.8 U	**17.2 J**	**26.9**	19.6 U	19.4 U	19.7 U	**10.9 J**	19.8 U	19.8 U
Chrysene	1400	19.8 U	19.1 U	**53.7**	19.2 U	18.8 U	**23.4**	**32.4**	19.6 U	19.4 U	19.7 U	**17 J**	19.8 U	19.8 U
Dibenzo(a,h)anthracene	230	5 U	4.8 U	**12.4**	4.8 U	4.7 U	**6**	**8.6**	4.9 U	4.9 U	4.9 U	**4.8**	5 U	5 U
Fluoranthene	1700	19.8 U	19.1 U	**52**	19.2 U	18.8 U	**36**	**25.2**	19.6 U	19.4 U	19.7 U	**16.5 J**	19.8 U	19.8 U
Fluorene	540	19.8 U	19.1 U	**7.3 J**	19.2 U	18.8 U	**12.5 J**	19.9 U	19.6 U	19.4 U	19.7 U	18.9 U	19.8 U	19.8 U
Indeno(1,2,3-c,d)pyrene	600	19.8 U	19.1 U	**28.7**	19.2 U	18.8 U	**14.6 J**	**21.9**	19.6 U	19.4 U	19.7 U	**10.6 J**	19.8 U	19.8 U
Naphthalene	2100	19.8 U	19.1 U	**15.9 J**	19.2 U	18.8 U	**27.9**	**9 J**	19.6 U	19.4 U	19.7 U	**8.9 J**	19.8 UJ	19.8 UJ
Phenanthrene	1500	19.8 U	**14.7 J**	**43**	**7.7 J**	18.8 U	**38.5**	**21.4**	**5.8 J**	19.4 U	19.7 U	**15.8 J**	**6.1 J**	19.8 U
Pyrene	2600	19.8 U	19.1 U	**79.1**	**6.6 J**	18.8 U	**71.1**	**68.5**	19.6 U	19.4 U	19.7 U	**27.5**	19.8 U	19.8 U
PCB Aroclors (µg/kg)														
Total DMMP PCB Aroclors (U = 0)	130	4 U	3.9 U	**11.2 J**	3.9 U	3.8 U	**90.1 J**	**23.1 J**	**3.7 J**	3.9 U	4 U	**19.4 J**	4 U	4 U

non-detect exceedance
detected exceedance
AET-based SQS different from DMMP SL

Table 11
SMS Comparison for Samples with TOC less than 0.5%

Sample ID / Depth / Analyte	SQS	C-16-A-190223 0 - 2 ft	C-16-B-190223 2 - 4 ft	C-17-C-190222 4 - 8 ft	C-18-A1-190220 0 - 2.3 ft	C-18-B1-190220 3.9 - 6.3 ft	C-19-A-190220 0 - 2 ft	C-19-B-190220 2 - 4 ft	C-20-A-190219 0 - 2 ft	C-20-B-190219 2 - 4 ft	C-21-A-190219 0 - 2 ft	C-21-B-190219 2 - 4 ft	C-22-A-190219 0 - 2 ft	C-22-B-190219 2 - 4 ft
Conventional Parameters (%)														
Total organic carbon		**0.25**	**0.05**	**0.39**	**0.29**	**0.13**	**0.09**	**0.1**	**0.08**	**0.04**	**0.49**	**0.11**	**0.07**	**0.04**
Metals (mg/kg)														
Arsenic	57	**3.82**	**2.21**	**2.15**	**3.2**	**3.89**	**1.89**	**2.53**	**1.28**	**1.1**	**4.41**	**2.26**	**1.59**	**1.31**
Cadmium	5.1	**0.07 J**	0.11 U	**0.04 J**	**0.05 J**	0.11 U	0.1 U	0.12 U	**0.05 J**	**0.03 J**	0.11 U	**0.05 J**	0.1 U	0.1 U
Chromium	260	**10.2**	**10.6**	**14.4**	**11.5**	**10.1**	**9.73**	**10.3**	**9.69**	**10.4**	**7.99**	**8.59**	**11.3**	**9.53**
Copper	390	**14.9**	**10.5**	**21.2**	**16.1**	**13**	**12.7**	**15.2**	**13.9**	**14**	**14.9**	**14.9**	**12.7**	**10.9**
Lead	450	**2.82**	**1.29**	**2.07**	**2.81**	**1.51**	**1.54**	**1.84**	**1.41**	**1.5**	**1.43**	**1.49**	**1.36**	**1.41**
Mercury	0.41	**0.0195 J**	**0.00813 J**	**0.0201 J**	0.0291 U	0.021 U	0.0187 U	0.0204 U	**0.00698 J**	**0.00973 J**	**0.0112 J**	**0.0134 J**	**0.00859 J**	**0.00788 J**
Silver	6.1	**0.08 J**	**0.04 J**	**0.07 J**	**0.05 J**	**0.04 J**	**0.04 J**	**0.05 J**	**0.04 J**	**0.04 J**	**0.04 J**	**0.03 J**	**0.03 J**	**0.03 J**
Zinc	410	**22.5**	**19.7**	**23.9**	**25.6**	**29.6**	**20.9**	**21.3**	**18.7**	**20.1**	**18**	**20.1**	**19.2**	**17.6**
Semivolatile Organics (ug/kg)														
Benzoic acid	650	**68.4 J**	98.6 UJ	**32.9 J**	**214 J**	**60.2 J**	97.7 UJ	**19.6 J**	99.1 UJ	97.1 UJ	95.7 UJ	96.7 UJ	98.7 UJ	98.6 UJ
Benzyl alcohol	57	19.1 U	19.7 U	19.2 U	19.4 U	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Hexachlorobutadiene	11	4.8 U	4.9 U	4.8 U	4.8 U	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
2,4-Dimethylphenol	29	23.9 U	24.6 U	23.9 UJ	24.2 U	23.6 U	24.4 UJ	24.6 UJ	24.8 UJ	24.3 UJ	23.9 UJ	24.2 UJ	24.7 UJ	24.7 UJ
2-Methylphenol (o-Cresol)	63	4.8 U	4.9 U	4.8 U	4.8 U	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
4-Methylphenol (p-Cresol)	670	4.8 U	4.9 U	**2 J**	**3.1 J**	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Pentachlorophenol	360	19.1 UJ	19.7 UJ	19.2 UJ	19.4 UJ	18.9 UJ	19.5 UJ	19.7 UJ	19.8 UJ	19.4 UJ	19.1 UJ	19.3 UJ	19.7 UJ	19.7 UJ
Phenol	420	18.3 U	8.1 U	7.3 U	**38.7**	13.4 U	4.9 U	5.3 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Semivolatile Organics (ug/kg)														
1,2,4-Trichlorobenzene	31	4.8 U	4.9 U	4.8 U	4.8 U	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
1,2-Dichlorobenzene	35	4.8 U	4.9 U	4.8 U	4.8 U	4.7 U	4.9 U	4.9 U	5 U	**0.8 J**	4.8 U	4.8 U	4.9 U	4.9 U
1,4-Dichlorobenzene	110	4.8 U	4.9 U	4.8 UJ	4.8 U	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Hexachlorobenzene	22	4.8 U	4.9 U	4.8 U	4.8 U	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
bis(2-Ethylhexyl)phthalate	1300	47.8 U	49.3 U	**29.6 J**	48.4 U	47.2 U	48.9 U	49.2 U	49.5 U	48.6 U	47.9 U	48.3 U	49.4 U	49.3 U
Butylbenzyl phthalate	63	19.1 U	19.7 U	19.2 U	19.4 U	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Diethyl phthalate	200	23.2 U	19.7 U	24.6 U	**7.2 J**	**9.2 J**	19.5 U	19.7 U	35.8 U	28.9 U	19.1 U	19.3 U	19.7 U	21.9 U
Dimethyl phthalate	71	4.8 U	4.9 U	4.8 U	4.8 U	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Di-n-butyl phthalate	1400	19.1 U	19.7 U	91.1 U	19.4 U	18.9 U	**161**	**133**	**36.8**	**22.6**	**17.2 J**	**39.8**	**18.8 J**	19.7 U
Di-n-octyl phthalate	6200	19.1 U	19.7 U	19.2 U	19.4 U	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Dibenzofuran	540	19.1 U	19.7 U	19.2 U	19.4 U	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
n-Nitrosodiphenylamine	28	4.8 U	4.9 U	4.8 U	4.8 U	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Polycyclic Aromatic Hydrocarbons (ug/kg)														
2-Methylnaphthalene	670	19.1 U	19.7 U	**6.2 J**	19.4 U	**7.5 J**	19.5 U	19.7 U	19.8 U	19.4 U	**7.3 J**	19.3 U	19.7 U	19.7 U
Acenaphthene	500	19.1 U	19.7 U	19.2 U	19.4 U	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Acenaphthylene	1300	19.1 U	19.7 U	19.2 U	19.4 U	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Anthracene	960	**8.8 J**	19.7 UJ	19.2 UJ	**5.9 J**	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Benzo(a)anthracene	1300	**11.9 J**	19.7 U	19.2 U	**9 J**	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	**7 J**	19.3 U	19.7 U	19.7 U
Benzo(a)pyrene	1600	**10.8 J**	19.7 U	19.2 U	**16.4 J**	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Benzo(b,j,k)fluoranthenes	3200	38.2 U	39.4 U	38.3 U	**42.2**	37.8 U	39.1 U	39.3 U	39.6 U	38.9 U	38.3 U	38.7 U	39.5 U	39.5 U
Benzo(g,h,i)perylene	670	**7.7 J**	19.7 U	19.2 U	**9.7 J**	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Chrysene	1400	**28.8**	19.7 U	**5.9 J**	**18.2 J**	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	**14.3 J**	19.3 U	19.7 U	19.7 U
Dibenzo(a,h)anthracene	230	**2.7 J**	4.9 U	4.8 U	**3.8 J**	4.7 U	4.9 U	4.9 U	5 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U
Fluoranthene	1700	**12.3 J**	19.7 U	**4.9 J**	**13.9 J**	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	**5.8 J**	19.3 U	19.7 U	19.7 U
Fluorene	540	19.1 U	19.7 U	19.2 U	19.4 U	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Indeno(1,2,3-c,d)pyrene	600	19.1 U	19.7 U	19.2 U	**8.2 J**	18.9 U	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Naphthalene	2100	19.1 U	19.7 U	**8.1 J**	**7.9 J**	**5.4 J**	19.5 U	19.7 U	19.8 U	19.4 U	19.1 U	19.3 U	19.7 U	19.7 U
Phenanthrene	1500	**15.8 J**	19.7 U	**14.6 J**	**11.9 J**	**6.3 J**	19.5 U	19.7 U	19.8 U	19.4 U	**38.1**	19.3 U	19.7 U	19.7 U
Pyrene	2600	**23.5**	19.7 U	**6.2 J**	**48.3**	18.9 U	19.5 U	**5.5 J**	**5.9 J**	19.4 U	**8.1 J**	19.3 U	19.7 U	19.7 U
PCB Aroclors (µg/kg)														
Total DMMP PCB Aroclors (U = 0)	130	**5.3 J**	4 U	4 U	3.9 UJ	4 U	3.8 U	3.9 U	3.8 U	3.9 U	3.8 U	3.9 U	3.9 U	4 U

non-detect exceedance
detected exceedance
AET-based SQS different from DMMP SL

Table 11

SMS Comparison for Samples with TOC less than 0.5%

Sample ID Depth Analyte	SQS	C-23-A1-190222 0 - 2 ft	C-23-B1-190222 2 - 4 ft	C-24-A-190223 0 - 2 ft	C-24-B-190223 2 - 4 ft	C-25-A-190222 0 - 2 ft	C-25-B-190222 2 - 4 ft
Conventional Parameters (%)							
Total organic carbon		**0.07**	**0.04**	**0.06**	**0.04**	**0.29**	**0.44**
Metals (mg/kg)							
Arsenic	57	**2.41**	**2**	**1.99**	**1.16**	**2.79**	**2.59**
Cadmium	5.1	**0.04 J**	**0.04 J**	0.11 U	0.1 U	**0.05 J**	0.12 U
Chromium	260	**10.1**	**9.02**	**11.3**	**9.86**	**15.5**	**13.2**
Copper	390	**15.1**	**12.8**	**13.4**	**11.2**	**27.7**	**19.4**
Lead	450	**1.84**	**1.45**	**1.64**	**1.6**	**2.42**	**1.79**
Mercury	0.41	0.0232 U	**0.0101 J**	**0.0112 J**	**0.00818 J**	**0.0219 J**	**0.0191 J**
Silver	6.1	**0.04 J**	**0.04 J**	**0.04 J**	**0.04 J**	**0.07 J**	**0.05 J**
Zinc	410	**23.8**	**21.2**	**23**	**22.4**	**73.9**	**20.1**
Semivolatile Organics (ug/kg)							
Benzoic acid	650	**15.4 J**	98.6 U	**43.9 J**	**25.5 J**	**33.6 J**	**84.3 J**
Benzyl alcohol	57	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Hexachlorobutadiene	11	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
2,4-Dimethylphenol	29	24.9 UJ	24.6 UJ	24.5 U	24.7 U	24.7 UJ	24.2 UJ
2-Methylphenol (o-Cresol)	63	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
4-Methylphenol (p-Cresol)	670	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Pentachlorophenol	360	20 UJ	19.7 UJ	19.6 UJ	19.8 UJ	19.8 UJ	19.3 UJ
Phenol	420	6.8 U	6.5 U	10 U	7.9 U	14.8 U	19.5 U
Semivolatile Organics (ug/kg)							
1,2,4-Trichlorobenzene	31	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
1,2-Dichlorobenzene	35	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
1,4-Dichlorobenzene	110	5 UJ	4.9 UJ	4.9 U	4.9 U	4.9 UJ	4.8 UJ
Hexachlorobenzene	22	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
bis(2-Ethylhexyl)phthalate	1300	49.9 U	49.3 U	49.1 U	49.4 U	**30.4 J**	**31.4 J**
Butylbenzyl phthalate	63	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Diethyl phthalate	200	30.9 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Dimethyl phthalate	71	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Di-n-butyl phthalate	1400	87.1 U	142 U	19.6 U	19.8 U	140 U	171 U
Di-n-octyl phthalate	6200	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Dibenzofuran	540	20 U	19.7 U	19.6 U	19.8 U	19.8 U	**5.9 J**
n-Nitrosodiphenylamine	28	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Polycyclic Aromatic Hydrocarbons (ug/kg)							
2-Methylnaphthalene	670	20 U	19.7 U	19.6 U	19.8 U	19.8 U	**17.9 J**
Acenaphthene	500	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Acenaphthylene	1300	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Anthracene	960	20 UJ	19.7 UJ	19.6 UJ	19.8 UJ	19.8 UJ	19.3 UJ
Benzo(a)anthracene	1300	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Benzo(a)pyrene	1600	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Benzo(b,j,k)fluoranthenes	3200	39.9 U	39.4 U	39.3 U	39.6 U	39.5 U	38.7 U
Benzo(g,h,i)perylene	670	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Chrysene	1400	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Dibenzo(a,h)anthracene	230	5 U	4.9 U	4.9 U	4.9 U	4.9 U	4.8 U
Fluoranthene	1700	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Fluorene	540	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Indeno(1,2,3-c,d)pyrene	600	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
Naphthalene	2100	20 UJ	19.7 UJ	19.6 U	19.8 U	19.8 UJ	**5.8 J**
Phenanthrene	1500	20 U	19.7 U	19.6 U	19.8 U	**6.7 J**	**15 J**
Pyrene	2600	20 U	19.7 U	19.6 U	19.8 U	19.8 U	19.3 U
PCB Aroclors (µg/kg)							
Total DMMP PCB Aroclors (U = 0)	130	3.9 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U

non-detect exceedance
detected exceedance
AET-based SQS different from DMMP SL

Table 12
Probability of Suitability for Beneficial Use of Non-Native Material

Section	Station	Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Detected SL/BT Exceedance	Dioxins/furans above 4/10 pptr TEQ	PAH above 2000 ug/kg	Beneficial Use Suitable/Unsuitable	Suitability Probablility	Average suitability probability	Rounded Suitability Probability
Mouth	C-1	A	0 to 2	-49.9 to -51.9	no	no	no	suitable	100	85.71	**85**
		B	2 to 4	-51.9 to -53.9	no	no	no	suitable	100		
	C-2	A	0 to 2	-51.4 to -53.4	no	no	no	suitable	100		
	C-3	A	0 to 2.7	-52.5 to -55.2	Total Chlordane non-detect	no	no	unsuitable	0		
		B	2.7 to 5.8	-55.2 to -58.3	no	no	no	suitable	100		
	C-4	A	0 to 2	-53.6 to -55.6	no	no	no	suitable	100		
	C-5	A	0 to 2	-51.5 to -53.5	no	no	no	suitable	100		
Middle	C-7	A	0 to 2	-50.4 to -52.4	no	4.38	no	unsuitable	0	40.91	**40**
	C-8	A	0 to 2	-52.0 to -54.0	no	5.00	no	unsuitable	0		
		B	2 to 4	-54.0 to -56.0	no	no	no	suitable	100		
	C-10	A	0 to 2	-49.0 to -51.0	no	8.79	no	unsuitable	0		
		B	2 to 4	-51.0 to -53.0	Tributyltin	7.42	no	unsuitable	0		
		C	4 to 6	-53.0 to -55.0	no	no	no	suitable	100		
	C-11	A	0 to 2	-51.6 to -53.6	Total Chlordane non-detect	5.92	no	unsuitable	0		
	C-12	A	0 to 2	-22.7 to -24.7	Total PCB Aroclors	56.2	no	unsuitable	0		
		B	2 to 4	-24.7 to -26.7	no	54.5	no	unsuitable	0		
		C	4 to 6	-26.7 to -28.7	no	17.7	no	unsuitable	0		
		D	6 to 8	-28.7 to -30.7	no	no	no	suitable	100		
		E	8 to 10	-30.7 to -32.7	no	no	no	suitable	100		
	C-13	A	0 to 2	-39.0 to -41	no	5.34	no	unsuitable	0		
		B	2 to 4	-41.0 to -43.0	no	7.73	no	unsuitable	0		
		C	4 to 6	-43.0 to -45.0	no	11.88	no	unsuitable	0		
		D	6 to 8	-45.0 to -47.0	no	7.64	no	unsuitable	0		
		E	8 to 10	-47.0 to -49.0	no	no	no	suitable	100		
	C-14	A	0 to 2	-52.6 to -54.6	no	no	no	suitable	100		
		B	2 to 4	-54.6 to -56.6	no	no	no	suitable	100		
	C-15	A	0 to 2	-45.6 to -47.6	no	10.6	no	unsuitable	0		
		B	2 to 4	-47.6 to -49.6	no	no	no	suitable	100		
		C	4 to 6	-49.6 to -51.6	no	no	no	suitable	100		
Head	C-16	A	0 to 2	-50.6 to -52.6	no	no	no	suitable	100	100	**100**
	C-17	A	0 to 2	-19.7 to -21.7	no	no	no	suitable	100		
		B	2 to 4	-21.7 to -23.7	no	no	no	suitable	100		
		C	4 to 8	-23.7 to -25.7	no	no	no	suitable	100		
	C-18	A	0 to 2.3	-52.2 to -54.5	no	no	no	suitable	100		
	C-24	A	0 to 2	-51.1 to -53.1	no	no	no	suitable	100		
	C-25	A	0 to 2	-51.4 to -53.4	no	no	no	suitable	100		
		B	2 to 4	-53.4 to -55.4	no	no	no	suitable	100		

above SL, BT or dioxin above 4 pptr TEQ
dioxin above 10 pptr TEQ
all less than SLs/BTs

Table 13
Native Material - Probability of Suitability for Beneficial Use

Station	Sample ID	Sample Depth (feet)	Sample Elevation (feet MLLW)	Detected SL/BT Exceedance	Dioxins/furans above 4 pptr TEQ	PAH above 2000 ug/kg	Beneficial Use Suitable/Unsuitable	Suitability Probablility	Average suitability probability	Rounded Suitability Probability
C-1	C	4 to 6	-53.9 to -55.9	no	no	no	suitable	100	96.15	95
C-2	B	2 to 4	-53.4 to -55.4	no	no	no	suitable	100		
	C	4 to 6	-55.4 to -57.4	no	no	no	suitable	100		
	D	6 to 8.6	57.4 to -60.0	no	no	no	suitable	100		
C-4	B	2 to 4	-55.6 to -57.6	no	no	no	suitable	100		
C-5	B	2 to 4	-53.5 to -55.5	no	no	no	suitable	100		
C-6	A	0 to 2	-53.9 to -55.9	no	no	no	suitable	100		
	B	2 to 4	-55.9 to -57.9	no	no	no	suitable	100		
C-7	B	2 to 4	-52.4 to -54.4	Hexachlorobutadiene	no	no	unsuitable	0		
	C	4 to 6	-54.4 to -56.4	no	no	no	suitable	100		
C-9	A	0 to 2	-53.0 to -55.0	no	no	no	suitable	100		
	B	2 to 4	-55.0 to -57.0	no	no	no	suitable	100		
C-11	B	2 to 4	-53.6 to -55.6	no	no	no	suitable	100		
C-16	B	2 to 4	-52.6 to -54.6	no	no	no	suitable	100		
C-18	B	3.9 to 6.3	-54.5 to -56.9	no	no	no	suitable	100		
C-19	A	0 to 2	-52.4 to -54.4	no	no	no	suitable	100		
	B	2 to 4	-54.4 to -56.4	no	no	no	suitable	100		
C-20	A	0 to 2	-51.3 to -53.3	no	no	no	suitable	100		
	B	2 to 4	-53.3 to -55.3	no	no	no	suitable	100		
C-21	A	0 to 2	-53.7 to -55.7	no	no	no	suitable	100		
	B	2 to 4	-55.7 to -57.7	no	no	no	suitable	100		
C-22	A	0 to 2	-51.0 to -53.0	no	no	no	suitable	100		
	B	2 to 4	-53.0 to -55.0	no	no	no	suitable	100		
C-23	A	0 to 2	-53.7 to -55.7	no	no	no	suitable	100		
	B	2 to 4	-55.7 to -57.7	no	no	no	suitable	100		
C-24	B	2 to 4	-53.1 to -55.1	no	no	no	suitable	100		

above SL, BT or dioxin above 4 pptr TEQ
dioxin above 10 pptr TEQ
all less than SLs/BTs