CENWS-OD-TS-NR-DMMO

MEMORANDUM FOR: RECORD September 3, 2015

SUBJECT: DMMP ADVISORY DETERMINATION REGARDING THE POTENTIAL SUITABILITY OF DREDGED MATERIAL FROM WEST WATERWAY FOR UNCONFINED OPEN-WATER DISPOSAL AT THE ELLIOTT BAY SITE.

1. Introduction. This memorandum reflects the consensus advisory determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability of dredged material from West Waterway for placement at the Elliott Bay disposal site. The DMMP agencies cooperatively manage eight open-water disposal sites in Puget Sound. The disposal site in closest proximity to Seattle Harbor is the non-dispersive site located in Elliott Bay. Dredged material evaluation guidelines for disposal at the Elliott Bay site can be found in the DMMP Dredged Material Evaluation and Disposal Procedures User Manual (DMMP, 2014). These procedures are summarized in Exhibit A of this memorandum.

West Waterway is an authorized federal navigation channel located along the western side of Harbor Island in Seattle, Washington (Figure 1). The waterway has an authorized depth of -34 feet MLLW and a Corps-maintained width of 500 feet. The U.S. Army Corps of Engineers (USACE) and Port of Seattle (POS) are conducting a feasibility study to investigate potential deepening and widening alternatives for both West and East Waterways. Depths from -51 to -55 feet MLLW are being evaluated. This DMMP memorandum presents and evaluates sediment characterization data collected from West Waterway with the purpose of advising USACE and POS regarding the potential suitability of sediment from West Waterway for open-water disposal. East Waterway is not under evaluation by the DMMP agencies.

Two Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup sites are present within West Waterway: the Lockheed West Superfund Site and the Harbor Island Superfund Site, the latter of which contains the Lockheed Shipyard Sediment Operable Unit (OU), Todd Shipyard OU, and West Waterway OU (Figure 2). Remedies for the Todd Shipyard and Lockheed Shipyard OUs have been completed. EPA determined that no remedial action was necessary in the West Waterway OU (EPA, 2003). A record of decision was issued for the Lockheed West site in 2013 and includes the removal of more than 150,000 cubic yards (cy) of contaminated material (EPA, 2013); cleanup is pending. The DMMP characterization of sediment from West Waterway was conducted in consultation with EPA Superfund.

A Tier 1 evaluation of West Waterway was completed during the initial appraisal of the Seattle Harbor navigation improvement project (USACE, 2012). Existing data from CERCLA evaluations and from sediment testing performed by USACE in support of maintenance dredging were reviewed. Numerous problem chemicals have been identified in West

Waterway, including heavy metals, tributyltin (TBT), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and other semivolatile organic compounds (SVOCs). Exceedances of the DMMP bioaccumulation trigger (BT) for TBT were widespread. BTs were also exceeded for PCBs, mercury and other chemicals of concern.

Data gaps included the existence of very little data from deeper subsurface sediment. The CERCLA evaluations were largely restricted to surface sediment; relatively little data existed for deeper cores. Exceptions included coring at Lockheed West in 2007, limited coring within the federal navigation channel in 2012, and cores collected by POS in the Terminal 5 (T-5) berthing area on several occasions. Very little dioxin data had been collected in West Waterway. The little data that existed indicated moderate levels of dioxin, including some exceedances of the dioxin BT of 10 parts per trillion (pptr) toxicity equivalents (TEQ).

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

Status of Lockheed West – It was assumed that cleanup actions at Lockheed West will be managed separately from construction actions during the widening and deepening of West Waterway. Existing data from the site would be used by the USACE/Port project team to estimate the volume of deepening material remaining at the site following cleanup that would be suitable for open-water disposal. Therefore, additional sediment sampling and testing within the Lockheed West site would not be conducted as part of this DMMP characterization and Lockheed West would not be included in the DMMP evaluation.

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). West Waterway is considered an area of high concern by the DMMP agencies (DMMP, 2014). The recency period for high-ranked areas is three years. Since it was highly unlikely that construction would occur within three 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 the 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 35% level of effort would suffice. This level of effort would provide a meaningful representation of levels of contamination in West Waterway, without incurring the expense of a full characterization.

Terminal 5 Sediment Characterization – POS operates T-5 along the west side of West Waterway and is responsible for maintenance dredging of the berthing area along the pier

face. The Port recently characterized the T-5 berthing area for deepening. The deepening material was found suitable for open-water disposal (DMMP, 2015). Due to the recency of the data and the responsibility of the Port to maintain its own berthing areas, the study team decided not to collect additional sediment characterization data from the west side of the waterway in the vicinity of T-5 and not to include T-5 in the DMMP suitability evaluation.

PCB CAD – In 1984 the Corps of Engineers constructed a confined aquatic disposal (CAD) site in West Waterway for the management of PCB- and metal-contaminated material. The elevation of the surface of the cap overlying the contaminated material is between -55 and -57 feet MLLW. If deepening is to -55 feet or less, dredging will not be needed within the cap footprint. Therefore, no special sampling or testing was deemed necessary in this area for the feasibility study.

3. DMMP Sampling and Testing Requirements. DMMP sampling and testing requirements are dependent on the rank of the project. As indicated previously, West Waterway is ranked "high" due to historical and/or ongoing sources of contamination. For high-ranked projects, one field sample (typically a 4-foot core section) must be taken for every 4,000 cy of sediment. Dredged material management units (DMMUs) are limited to 4,000 cy in size for surface sediment (top 4 feet), while subsurface DMMUs can be up to 12,000 cy in size, depending on site-specific conditions. 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.

   The dredged material volume 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, a variety of potential alternatives were explored (Table 1). The dredged material volume associated with each alternative was calculated, along with the number of field samples required for full DMMP characterization. The alternative with the largest calculated volume (a 750-ft wide channel deepened to -57 ft MLLW including 2 ft of overdepth) was selected to determine the sampling and testing requirements for the feasibility study. The number of field samples required for full characterization was multiplied by 0.35 (for a 35% level of effort), resulting in a required 19 and 31 field samples for the surface and subsurface sediment respectively.

   Normally, for full characterization, three subsurface samples would be composited to represent each subsurface DMMU. However, in order to provide higher-resolution data for the feasibility study, a decision was made not to composite, but to analyze individual field samples instead. Also, in order to get a good spatial distribution, several sampling stations were added beyond the nominal number of 19 calculated for characterization of the surface sediment. For each surface sample added, a subsurface sample was removed from the list of samples to be analyzed. In the end, a total of 23 sampling stations were identified, yielding 23 surface samples and 27 subsurface samples for analysis (Anchor, 2015a). Sediment was archived from other subsurface samples for potential analysis in the event that additional data were needed. However, analysis of the archived samples proved to be unnecessary.

4. Sampling. Field sampling took place February 2-5, 2015 using a vibracore sampler. Samples were collected within 10 feet of the target coordinates, with some exceptions (Anchor, 2015b).

The target sampling depth was -57 feet MLLW in the inner portion of the waterway (Stations WWD01 to WWD15). Samples in the outer waterway (Stations WWD16 to WWD23) were taken to -59 feet MLLW in order to accommodate a deepening scenario of -57 feet plus 2 feet of overdredge allowance in the entrance channel. Figure 3 shows both the target and actual sampling locations. Tables 2 and 3 include information for the samples collected.

5. Chemical Analysis.

Table 4 lists the sediment samples delivered to the analytical lab for each of the sampling stations and depth intervals. Due to the cost of dioxin/furan analysis, these chemicals were only analyzed on a subset of the samples. Also, due to the sediment volume requirements for conducting porewater TBT analysis, and the difficulty in extracting a sufficient volume of porewater from some sediment samples, bulk TBT was analyzed rather than porewater TBT.

Table 5 presents the sediment conventional and chemistry results. A number of chemicals of concern were detected above the current DMMP guideline values. These exceedances are summarized in Table 6.

Chemicals exceeding DMMP screening levels (SLs) included the following, with the number of samples exceeding the SL in parentheses: PCBs (15); mercury (12); benzoic acid (2); zinc (1); arsenic (1); benzyl alcohol (1); pyrene (1); butyl benzyl phthalate (1); and 1,4-dichlorobenzene (1).

Chemicals exceeding DMMP BTs included the following, with the number of samples exceeding the BT in parentheses: TBT (9); PCBs (2); and mercury (1).

Dioxin concentrations were elevated in many of the surface samples, with 8 of 13 surface samples exceeding the DMMP disposal site management objective of 4 pptr TEQ (with U = ½ estimated detection limit). Five of these samples also exceeded the BT of 10 pptr TEQ, all located in the southern half of the waterway. Concentrations in the surface samples ranged from 0.12 to 32.7 pptr TEQ. Concentrations in subsurface samples ranged from 0.07 to 3.7 pptr TEQ.

Stage 4 data validation was performed by Laboratory Data Consultants (LDC) for dioxins/furans. Stage 2b validation was performed by LDC for the sediment conventionals and all other chemistry data. The validation process resulted in the rejection of nine results due to low matrix spike/matrix spike duplicate percent recoveries. Eight semivolatile organic compound (SVOC) results (benzyl alcohol or 2,4-dimethylphenol) were rejected, and one pesticide result (4,4'-DDT) was rejected. Certain other chemical results were qualified as estimated for a particular analysis based on a specified protocol or technical advisory. Due to method blank contamination, some results were qualified as nondetects at raised reporting limits (Anchor, 2015b). The chemistry results in Table 5 include the validation qualifiers assigned by LDC.

6. Bioassays. Bioassays were conducted on a limited number of samples. Because of the volume of sediment needed for bioassays and the fact that single 4-foot core segments were

used for chemical analysis, samples for which bioassays were run required a second core to be taken at the same location in order to collect enough sediment. Rather than taking double cores at every location, certain sampling stations were pre-selected; double cores were taken at those locations. Only those individual core segments from the double-core stations that had SL exceedances were actually subjected to bioassays. This included WWD02-0-4, WWD02-4-8, WWD05-0-4 and WWD12-0-4. Numerous other samples with SL exceedances were not subjected to bioassays because they had not been pre-selected to have double cores taken. These included samples from the top four feet of sediment from stations WWD01, WWD03, WWD04, WWD06, WWD07, WWD08, WWD09, WWD10, WWD13, WWD15, WWD16, WWD22 and WWD23; and a sample from 4-8 feet below mudline at station WWD01.

For those samples undergoing bioassay testing, the standard suite of three DMMP marine bioassays (amphipod mortality, larval development, and juvenile infaunal growth) was performed. The DMMP interpretation guidelines for nondispersive disposal sites were used to assess the bioassay results. The interpretation guidelines are found in Table 7. A sediment sample from Carr Inlet – collected March 19, 2015 – was used as the reference sediment. Table 8 includes the sediment conventional data for the reference sediment and the test samples for which bioassays were run. The fines content of the test samples matched well with the reference sediment with the exception of WWD12-0-4, which had a significantly lower fines content (15.2%) than the reference (45.8%). This had no bearing on the bioassay results, with WWD12-0-4 performing as well or better than the negative control in all bioassays. The negative controls and reference sediment met the DMMP performance criteria for all three bioassays (Table 7).

Amphipod Mortality. The amphipod bioassay was run using *Eohaustorius estuarius* as the test species. Test results are shown in Table 9. Test sediment samples WWD02-4-8 and WWD12-0-4 performed well and passed the amphipod test. Samples WWD02-0-4 and WWD05-0-4 had mortality rates of 27% and 25% respectively. The mortality rates of the control and reference sediments were 1% and 5% respectively. Both test samples had mortality rates exceeding the control by more than 20% and both had statistically significant differences in mortality when compared to the reference sediment. However, neither of these test samples exceeded the reference sediment mortality by more than 30%. Therefore, samples WWD02-0-4 and WWD05-0-4 both had hits under the DMMP 2-hit rule for nondispersive sites, but did not fail outright under the 1-hit rule. A hit in another bioassay would be required to fail these test samples.

Juvenile Infaunal Growth. The juvenile infaunal growth test was run using *Neanthes arenaceodentata* as the test species. Test results are shown in Table 10. All test sediments had mean individual growth rates greater than 80% of that of the control. Growth rates also exceeded the growth rate in the reference sediment. Therefore, there were no hits of any kind for any of the test samples in this bioassay.

Larval Development. The larval development bioassay was run using *Mytilus galloprovincialis*. The first time the bioassay was run, the mean normal survival rate of the reference sediment was only 61% of that of the negative control, which is less than the 65% performance standard for reference sediments. The test results were rejected and

the bioassay was rerun using a new batch of test organisms.

In the second test, the reference sediment met its performance standard, with a mean normal survival rate of 90%. None of the test sediments had a mean normal survival rate that was statistically different from reference. Therefore, there were no hits of any kind in the larval development test. Results of the second test are shown in Table 11.

Table 12 includes the overall interpretation of the bioassay results. While samples WWD02-0-4 and WWD05-0-4 both had hits under the DMMP 2-hit rule in the amphipod test, there were no corroborating hits in the juvenile infaunal growth or larval development tests. Therefore, all four test samples passed bioassay testing.

7. DMMP Advisory Suitability Evaluation. A DMMP suitability determination is normally made 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. In order to predict the suitability determination that will be made following full characterization during PED, changes that are on the horizon and might reasonably be anticipated to be implemented by the time full characterization is conducted were considered by the DMMP agencies in evaluating the potential suitability of West Waterway sediment for open-water disposal.

   One change that is likely to occur before full characterization is completed for West Waterway is the evaluation procedure for PAHs. The National Marine Fisheries Service (NMFS) proposed a screening level of 2,000 ug/kg total PAH for the protection of fish at the Regional Sediment Evaluation Team annual meeting in November 2014. This screening level has not yet been adopted for use, but the DMMP agencies are evaluating the proposal and will likely adopt a new screening level for total PAH in the next two years. If adopted, the PAH screening level might be something other than the 2,000 ug/kg concentration proposed by NMFS. However, for this advisory suitability evaluation of West Waterway sediment, the DMMP agencies used the proposed screening level of 2,000 ug/kg total PAH.

   Other changes are possible in the DMMP evaluation guidelines prior to full characterization. Those changes could include updates to the bioaccumulation triggers or testing guidelines. It is also possible that Ecology will implement numerical standards based on natural or regional background. However, there are no such changes currently pending. Therefore, with the exception of the screening level for total PAH discussed previously, the DMMP agencies used the current DMMP evaluation guidelines.

   Table 13 presents 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 this table, Interval A refers to the surface sediment (i.e. 0-4 ft below mudline). Intervals B, C and D refer to subsurface strata (4-8, 8-12 and 12+ ft below mudline respectively). For each station/interval tested, one of the following determinations was provided:

   Suitable – no SL or BT exceedances; total PAHs < 2,000 ug/kg; dioxins/furans below 10 pptr TEQ (or anticipated to be below 10 pptr TEQ based on testing data at nearby stations).

Likely Suitable – SL exceedances occurred, but samples with even higher chemical concentrations passed bioassay testing; no BT exceedances or low-level BT exceedances that are likely to result in passes in bioaccumulation testing; total PAHs < 2,000 ug/kg; dioxins/furans below 10 pptr TEQ (or anticipated to be below 10 pptr TEQ based on testing data at nearby stations).

Unsuitable – dioxins/furans > 10 pptr TEQ or anticipated to be greater than 10 pptr TEQ based on testing data at nearby stations. While the dioxin/furan results provided the clearest indication of unsuitability, there was other corroborating evidence, including total PAH > 2,000 ug/kg; one or more exceedance of a bioaccumulation trigger; and/or bioassay hits.

Likely Unsuitable – dioxins/furans < 10 pptr TEQ, but total PAHs > 2,000 ug/kg; and/or one or more exceedance of a bioaccumulation trigger.

To facilitate the use of this information in the estimation of quantities of suitable and unsuitable dredged material for the Seattle Harbor Navigation Improvement Project, the DMMP agencies adopted a probability approach for West Waterway. Sampling stations with similar suitability characteristics in the upper four feet of sediment were grouped to form four distinct sections within the waterway (Table 14; Figure 4). Given dioxin/furan concentrations in the southern end of the waterway that were as high as 32.7 pptr TEQ and consistently greater than 10 pptr TEQ, the probability of material from this section being suitable for open-water disposal is very low. For planning purposes it can be considered zero. Sediment conditions improve north of this section, with the probability of material being found suitable for open-water disposal increasing with distance from the southern end of the waterway. To establish a logical segmentation of the waterway for planning purposes, numerical probabilities were assigned to each station and those probabilities averaged and rounded. Numeric probabilities were assigned as follows:

- suitable = 100% probability of being suitable for open-water disposal
- likely suitable = 75%
- likely unsuitable = 25%
- unsuitable = 0%

Just north of the southernmost unsuitable segment were four stations (WWD06 through WWD09) with a mix of probabilities, predominated by low-probability assignments. These stations were grouped together to form the second segment. The average probability in this segment was 31.25%.

With one exception (WWD15), Stations WWD10 through WWD21 were all determined to be either suitable or likely suitable for open-water disposal. Station WWD15 was anomalous in that it did have a low-level BT exceedance for TBT. This third segment had an average suitability probability of 87.5%.

The trend of decreasing contaminant concentrations in the northern portion of the waterway was broken at the entrance to the waterway, with stations WWD22 and WWD23 assigned a 25% probability of being found suitable for open-water disposal. These two stations were

grouped to form the fourth and last segment, with an average suitability probability of 25%.

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 to the nearest 10%. Also, because there were two segments with low (but not zero) suitability probability, the overall probability of these segments was combined prior to rounding. The rounded probability values are found in Table 14 and illustrated in Figure 4.

The same probability approach was applied to Interval B (4-8 ft below mudline). The only unsuitable material in this interval was located at the southern end of the waterway. Table 14 includes the probability designations and calculations for the two segments identified in this stratum. Figure 5 displays the resulting probabilities. As can be seen the vast majority of sediment in Interval B is suitable for open-water disposal.

A limited number of samples from Interval C were analyzed. All were suitable for open-water disposal. Interval D was reached at only two of the sampling stations, and the samples from these stations were archived. Given the clear trend of decreasing contaminant concentrations with depth, it is assumed that all sediment in Interval D is suitable for open-water disposal.

In summary, Interval A showed a range of contaminant concentrations. The probability of suitability for open-water disposal was determined by the DMMP agencies for four segments in Interval A, as shown in Figure 4. Nearly all sediment deeper than 4 feet below the existing mudline is suitable for open-water disposal, with the exception of the one short segment shown in Figure 5.

8. Underlying Assumptions. Several key assumptions were made by the DMMP agencies in conducting this advisory suitability evaluation. The 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. A DMMU with a concentration at or below 4 pptr TEQ could be dredged independently of all other DMMUs and still qualify for open-water disposal. Concentrations of dioxins/furans between 4 and 10 pptr TEQ were considered likely to be eligible for open-water disposal because the large volume of clean native material that will need to be dredged during deepening will bring the project volume-weighted average below the site management objective of 4 pptr TEQ. It was also assumed that dredging and disposal will be sequenced such that dredged material with higher concentrations of dioxins/furans will be placed first at the Elliott 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 above10 pptr TEQ were determined to be unsuitable for open-water disposal. DMMUs with dioxin/furan concentrations above 10 pptr TEQ would need to be subjected to bioaccumulation testing and pass in order to qualify for open-water disposal. The DMMP agencies assumed for the purpose of this evaluation that either bioaccumulation testing for dioxins/furans would not be pursued or, if tested, these

samples would fail bioaccumulation testing.

Other Bioaccumulatives – Exceedances of the BTs for TBT, PCB and mercury would trigger the requirement for bioaccumulation testing. It was assumed that the USACE/Port will either not pursue bioaccumulation testing due to the time required or expense – in which case these DMMUs would be ineligible for open-water disposal – or, if tested, DMMUs exceeding one or more BT would have a 50% failure rate. Taken together, the probability of a DMMU with one or more BT exceedance being found suitable for open-water disposal was assumed to be only 25%. This may be a conservative assumption, and depends to a large extent on the decision by the USACE/Port to test or not.

Bioassays – Bioassay testing was only conducted on a subset of the intervals with SL exceedances. All tested intervals passed the suite of bioassays, despite hits under the DMMP 2-hit rule in the amphipod test for Interval A from stations WWD02 and WWD05. The untested samples from Interval A with SL exceedances had chemical concentrations less than some of those samples that had passed bioassay testing. Extrapolating the results, it was assumed that the untested samples would also likely pass bioassay testing. These samples were given a 75% chance of being found suitable for open-water disposal, which may be a conservative assumption, but accounts for the uncertainty inherent in biological testing.

Total PAH – As previously discussed, DMMP does not currently have an SL for total PAH for the protection of fish. However, it was assumed for the purpose of this evaluation that by the time full DMMP characterization is completed for the navigation improvement project, such an SL will have been implemented and will be equal to the concentration of 2,000 ug/kg proposed by NMFS. Implementation of this SL will, by necessity, also include a test-out option. This will likely be a bioassay of some kind, but has yet to be determined. Some of the DMMUs subjected to this test-out option may pass the test and be found suitable for open-water disposal. Therefore, the assumption that any DMMU with a total PAH concentration above 2,000 ug/kg will be found unsuitable for open-water disposal is considered a conservative assumption.

9. Sediment Exposed by Dredging. Sediment exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 2013) or the State's antidegradation standard (DMMP, 2008b). The sediment characterization in West Waterway clearly demonstrated that contamination decreases with depth. It is anticipated that sediment exposed by the deepening project will meet the State's antidegradation standard.

10. DMMP Guidance for Full Characterization and Dredging. As indicated previously, full characterization of potential dredged material from West Waterway must be completed prior to dredging. The testing results from the feasibility study corroborated the 'high' rank assigned by the DMMP agencies to the waterway. Therefore, sampling requirements for full characterization will be based on this rank.

    The concentrations of chemicals of concern in sediment 4 to 8 ft below mudline proved to be consistently lower than in the overlying material, with the exception of station WWD01 at the south end of the project. Therefore, sediment 4 to 8 ft below mudline is approved for testing

under the less-intensive guidelines for subsurface material in a high-ranked area. That is, while the maximum volume of dredged material in DMMUs from the top 4 feet will be restricted to 4,000 cy, the DMMUs in the 4 to 8 ft stratum may be up to 12,000 cy in size. The exception is the south end of the waterway (the shoaled area in the vicinity of WWD01, WWD02 and WWD03), where DMMUs in the 4 to 8 ft stratum will be restricted to 4,000 cy.

The concentrations of chemicals of concern in sediment deeper than 8 ft below mudline were far below the DMMP SLs. Therefore, throughout the project area, sediment deeper than 8 ft will be assumed to be suitable for open-water disposal by the DMMP agencies and will be exempt from analysis during full characterization.

Due to the high probability that sediment samples from the upper stratum (i.e. four feet or less below mudline) will exceed one or more SL, an adequate volume of sediment will need to be collected for samples from this stratum in order to conduct bioassay testing. This is also true of sediment from the 4 to 8 ft stratum in the south end of the project (i.e. in the shoaled area in the vicinity of WWD01, WWD02 and WWD03). This may require two cores to be taken from each surface DMMU and from each DMMU in the 4 to 8 ft stratum in the south end of the project. Since the other subsurface DMMUs will be represented by composited cores from several sampling stations, collecting sufficient volumes of sediment from these DMMUs for bioassays should not be a problem.

There is also a high probability of encountering BT exceedances during full characterization, particularly in the southern half of the project. Bioaccumulation testing requires large volumes of sediment. Whether or not to collect an adequate volume of sediment to conduct this testing will be up to USACE and the Port of Seattle.

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 one-foot vertical 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, the top five feet of sediment will need to be dredged and taken upland. The one-foot 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. Corps planners will need to include the one-foot buffer in volume calculations for upland disposal.

Maintenance dredging has not occurred in West Waterway for many years, with the exception of dredging by the Port of Seattle in the berthing area of T-5. Therefore, there is a good chance that debris will be encountered during dredging. This debris must be removed from sediment taken to the Elliott Bay open-water disposal site. The dredger will likely be required to screen the top four feet of sediment 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.

11. References.

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USACE, 2012. *Seattle Harbor Initial Appraisal*. U.S. Army Corps of Engineers, Seattle District. March 2012.

12. Agency Signatures.

Concur:

signed copy on file in DMMO - Seattle District office

_____	_____
Date	David Fox, P.E. - Seattle District Corps of Engineers
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Exhibit A – DMMP Evaluation Procedures

The DMMP evaluation procedures are fully described in DMMP (2014). This exhibit includes information about several key elements relevant for the West 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 high-ranked area, each field sample and DMMU can represent no more than 4,000 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 12,000 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 West Waterway sediment characterization in 2015. 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 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.

Table 1
Conceptual Dredge Plan

Mudline (feet MLLW)	Number of Core Locations	Sampling Interval	Number of Samples
-44	1 (deeper core)	A	1
		B	1
		C	1
		D (2 ft Archive)	1
-45	6 (2 deeper cores)	A	6
		B	6
		C	6
		D (2 ft Archive)[4]	2
-47	4 (1 deeper core)	A	4
		B	4
		C (2 ft Archive)	3
		C[4]	1
-48	1	A	1
		B	1
-49	1 (deeper core)	A	1
		B	1
		C (2 ft Archive)[4]	1
-51	5 (1 deeper core)	A	5
		B (2 ft)	4
		B (4 ft)[4]	1
-52	5 (2 deeper cores)	A	5
		B[4]	2
Total Core Locations	**23**	**Total Samples**	**58**
		Surface Samples	23
		Subsurface Samples	35

Authorized Depth/ Overdredge	Estimated Dredge Volumes (cubic yards)[1] and Target Sample Number Based on 35% Design and 100% Design								
		750-foot Nav with Vertical Cut[3]		**750-foot Nav with 3:1 Side Slope[1]**		**500-foot Nav with Vertical Cut[3]**		**500-foot Nav with 3:1 Side Slope[1]**	
		35%	**100%**	**35%**	**100%**	**35%**	**100%**	**35%**	**100%**
-55/-57	**Total Volume including OD (cy)**	566,167	566,167	435,016	435,016	301,072	301,072	325,805	325,805
	Surface Volume (cy)	212,837	212,837	192,984	192,984	152,229	152,229	168,825	168,825
	Subsurface Volume (cy)	353,330	353,330	242,032	242,032	148,843	148,843	156,980	156,980
	Total Samples[2]	50	142	38	109	26	75	29	81
	Surface Samples[2]	19	53	17	48	13	38	15	42
	Subsurface samples[2]	31	88	21	61	13	37	14	39
-53/-55	**Total Volume including OD (cy)**	405,823	405,823	283,571	283,571	168,230	168,230	182,850	182,850
	Surface Volume (cy)	143,688	143,688	120,014	120,014	76,090	76,090	77,166	77,166
	Subsurface Volume (cy)	262,135	262,135	163,557	163,557	92,140	92,140	105,684	105,684
	Total Samples[2]	36	101	25	71	15	42	16	46
	Surface Samples[2]	13	36	11	30	7	19	7	19
	Subsurface samples[2]	23	66	14	41	8	23	9	26
-51/-53	**Total Volume including OD (cy)**	281,080	281,080	169,836	169,836	70,827	70,827	79,002	79,002
	Surface Volume (cy)	99,543	99,543	73,357	73,357	29,238	29,238	34,988	34,988
	Subsurface Volume (cy)	181,537	181,537	96,479	96,479	41,589	41,589	44,014	44,014
	Total Samples[2]	25	70	15	42	6	18	7	20
	Surface Samples[2]	9	25	6	18	3	7	3	9
	Subsurface samples[2]	16	45	8	24	4	10	4	11

Notes:
See Table 2 for sample design including testing parameters.
1. Volume calculations are based on bathymetric survey by USACE dated June 2, 2014. Dredge volumes include overdepth (+2 feet) except for the 3:1 daylight side slopes.
2. Sample counts were determined by dividing the dredge volume by 4,000 (multiplied by 0.35 for 35% design scenario).
3. The southern dredge boundary was shifted north to preserve the integrity of adjacent structures.
4. These samples are only relevant to cores WWD16 to WWD23 (-59 feet MLLW target depth).
cy = cubic yards
MLLW = mean lower low water
Nav = navigation channel
OD = 2-foot overdredge

Table 2
Core Collection Data

Sample Location	Core Number	Date Collected	Location (WA NAD 83)		Water Depth (feet)	Mudline Elevation (feet MLLW)	Preliminary 6-minute Water Level (feet MLLW)[1]	Drive Penetration (feet)	Recovery Measurement (feet)	Recovery (%)
			X	Y						
WWD01	1	2/5/2015	1263527	213168	56.7	-46.0	10.7	9.5	10.4	109.5
WWD02	1	2/4/2015	1263866	213221	54.6	-45.2	9.4	14.0	14.0	100.0
WWD02	2	2/4/2015	1263865	213225	55.2	-47.4	7.8	14.0	13.5	96.4
WWD03	1	2/2/2015	1263773	213415	55.8	-48.8	7.0	12.0	9.8	81.7
WWD04	1	2/2/2015	1263916	214164	54.8	-46.8	8.0	14.0	11.6	82.9
WWD05	1	2/4/2015	1263930	214825	49.5	-43.5	6.0	14.0	13.6	97.1
WWD05	2	2/4/2015	1263927	214819	49.7	-43.5	6.2	14.0	13.5	96.4
WWD06	1	2/2/2015	1263970	215298	55.5	-46.7	8.8	13.0	10.9	83.8
WWD07	1	2/3/2015	1263775	215366	61.0	-53.0	8.0	8.0	6.0	75.0
WWD08	1	2/2/2015	1263816	215857	58.3	-51.3	7.0	10.1	9.0	89.1
WWD09	1	2/2/2015	1263957	216030	54.5	-44.2	10.3	14.0	11.7	83.6
WWD10	1	2/2/2015	1263833	216172	61.5	-50.7	10.8	12.0	9.3	77.5
WWD11	1	2/3/2015	1263515	216310	58.3	-51.8	6.5	10.1	7.9	78.2
WWD12	1	2/4/2015	1263956	216331	53.2	-46.7	6.5	14.0	13.2	94.2
WWD12	2	2/4/2015	1263957	216335	54.2	-46.5	7.7	14.0	12.4	88.0
WWD13	1	2/3/2015	1263921	216574	57.1	-50.8	6.3	8.9	9.0	101.1
WWD14	1	2/3/2015	1263829	216754	59.1	-51.7	7.4	8.8	7.5	85.2
WWD15	1	2/3/2015	1263894	216957	59.4	-51.1	8.3	9.6	9.4	97.9
WWD16	1	2/3/2015	1263821	217185	60.8	-51.3	9.5	10.6	10.5	99.1
WWD17	1	2/5/2015	1264008	217307	53.6	-43.2	10.4	14.0	13.1	93.6
WWD18	1	2/4/2015	1263849	217441	55.2	-46.5	8.7	14.0	13.8	98.6
WWD18	2	2/4/2015	1263847	217443	56.7	-46.7	10.0	14.0	13.7	97.9
WWD19	1	2/5/2015	1263628	217834	59.2	-51.7	7.5	12.2	11.8	96.7
WWD20	1	2/5/2015	1264004	217894	55.2	-45.8	9.4	14.0	13.9	99.3
WWD21	1	2/5/2015	1263681	217996	57.1	-50.5	6.6	13.1	12.5	95.4
WWD22	1	2/5/2015	1263869	218126	55.0	-48.2	6.8	12.0	11.9	99.2
WWD23	1	2/5/2015	1263914	218269	58.5	-50.6	7.9	12.7	12.3	96.9

Notes:
1. NOAA Preliminary Water Levels, Station ID: 9447130, Seattle, Washington
MLLW = mean lower low water
WA NAD 83 = Washington State Plane, North American Datum of 1983

Table 3
Sample Interval Elevations

Station	Core	Mudline Elevation (feet)	Dredged Material Sample Elevation Interval (feet MLLW)	Sample Interval[1]
WWD01	1	-46.0	-46.0 to -50.0	0-4
			-50.0 to 54.0	4-8
			-54.0 to -55.6	8-9.6
WWD02[2]	1	-45.2	-45.2 to -49.2	0-4
			-49.2 to -53.2	4-8
			-53.2 to -57.0	8-11.8
	2	-47.4	-47.4 to -49.2	0-1.8
			-49.2 to -53.2	1.8-5.8
			-53.2 to -57.0	5.8-9.6
WWD03	1	-48.8	-48.8 to -52.8	0-4
			-52.8 to -57.0	4-8
WWD04	1	-46.8	-46.8 to -50.8	0-4
			-50.8 to -54.8	4-8
			-54.8 to -56.6	8-10
WWD05[2]	1	-43.5	-43.5 to -47.5	0-4
			-47.5 to -51.5	4-8
			-51.5 to -55.5	8-12
	2	-43.5	-43.5 to -47.5	0-4
			-47.5 to -51.5	4-8
			-51.5 to -55.5	8-12
WWD06	1	-46.7	-46.7 to -50.7	0-4
			-50.7 to -54.7	4-8
			-54.7 to -57.0	8-10.3
WWD07	1	-53.0	-53.0 to -57.0	0-4
WWD08	1	-51.3	-51.3 to -55.3	0-4
			-55.3 to -57.0	4-5.7
WWD09	1	-44.2	-44.2 to -48.2	0-4
			-48.2 to -52.2	4-8
			-52.2 to -55.3	8-11.1
WWD10	1	-50.7	-50.7 to -54.7	0-4
			-54.7 to -57.0	4-6.3
WWD11	1	-51.8	-51.8 to -55.8	0-4
WWD12[2]	1	-46.7	-46.7 to -50.7	0-4
			-50.7 to -54.7	4-8
			-54.7 to -57.0	8-10.3
	2	-46.5	-46.5 to -50.5	0-4
			-50.5 to -54.5	4-8
			-54.5 to -57.0	8-10.3
WWD13	1	-50.8	-50.8 to -54.8	0-4
			-54.8 to -57.0	4-6.2
WWD14	1	-51.7	-51.7 to -55.7	0-4
WWD15	1	-51.1	-51.1 to -55.1	0-4
			-55.1 to -57.0	4-5.9
WWD16	1	-51.3	-51.3 to -55.3	0-4
			-55.3 to -59.0	4-7.7
WWD17	1	-43.2	-43.2 to -47.2	0-4
			-47.2 to -51.7	4-8
			-51.7 to -55.7	8-12
			-55.7 to -56.5	12-12.8
WWD18[2]	1	-46.6	-46.6 to -50.6	0-4
			-50.6 to -54.6	4-8
			-54.6 to -58.6	8-12
	2	-46.7	-46.7 to -50.7	0-4
			-50.7 to -54.7	4-8
			-54.7 to -58.7	8-12
WWD19	1	-51.7	-51.7 to -55.7	0-4
			-55.7 to -59.0	4-7.3
WWD20	1	-45.8	-45.8 to -49.8	0-4
			-49.8 to -53.8	4-8
			-53.8 to -57.8	8-12
			-57.8 to -59.0	12-13.2
WWD21	1	-50.5	-50.5 to -54.5	0-4
			-54.5 to -58.5	4-8
WWD22	1	-48.2	-48.2 to -52.2	0-4
			-52.2 to -56.2	4-8
			-56.2 to -59.0	8-10.8
WWD23	1	-50.6	-50.6 to -54.6	0-4
			-54.6 to -58.6	4-8

Notes:
1. Sample interval represents feet below mudline
2. Corresponding intervals from two co-located cores were composited for sufficient sediment volume
MLLW = mean lower low water

Table 4
Sample Inventory

Sample Location	Sample ID	Sample Interval (feet)	Samples Delivered to ARI										
			Grain Size	TS/ TOC/ TVS	Total Metals	SVOCs/ PAHs/ Pest/ PCBs	TBT (Bulk)	Total Sulfides	Ammonia	Dioxins/ Furans	Marine Bioassay	Archive	MS/ MSD
WWD01	WWD01-0-4-150206	0-4	X	X	X	X	X	X	X				
WWD01	WWD01-4-8-150206	4-8	X	X	X	X	X	X	X				
WWD01	WWD01-8-9.6-150206	8-9.6	X	X	X	X	X	X	X				
WWD02	WWD02-0-4-150205	0-4	X	X	X	X	X	X	X	X	X		
WWD02	WWD02-4-8-150205	4-8	X	X	X	X	X	X	X	X	X		
WWD02	WWD02-8-11.8-150205	8-11.8	X	X	X	X	X	X	X	X	X		
WWD03	WWD03-0-4-150203	0-4	X	X	X	X	X	X	X	X			
WWD03	WWD03-4-8-150203	4-8	X	X	X	X	X	X	X	X			
WWD04	WWD04-0-4-150203	0-4	X	X	X	X	X	X	X	X			
WWD04	WWD04-4-8-150203	4-8	X	X	X	X	X	X	X	X			
WWD04	WWD04-8-10-150203	8-10										X	
WWD05	WWD05-0-4-150206	0-4	X	X	X	X	X	X	X	X	X		
WWD05	WWD05-4-8-150206	4-8	X	X	X	X	X	X	X	X	X		
WWD05	WWD05-8-12-150206	8-12	X	X	X	X	X	X	X	X	X		
WWD06	WWD06-0-4-150203	0-4	X	X	X	X	X	X	X	X			
WWD06	WWD06-4-8-150203	4-8	X	X	X	X	X	X	X	X			
WWD06	WWD06-8-10.3-150203	8-10.3										X	
WWD07	WWD07-0-4-150204	0-4	X	X	X	X	X	X	X				X
WWD08	WWD08-0-4-150204	0-4	X	X	X	X	X	X	X	X			
WWD08	WWD08-4-5.7-150204	4-5.7	X	X	X	X	X	X	X	X			
WWD09	WWD09-0-4-150203	0-4	X	X	X	X	X	X	X				
WWD09	WWD09-4-8-150203	4-8	X	X	X	X	X	X	X				
WWD09	WWD09-8-11.1-150203	8-11.1	X	X	X	X	X	X	X				
WWD10	WWD10-0-4-150203	0-4	X	X	X	X	X	X	X				
WWD10	WWD10-4-6.3-150203	4-6.3	X	X	X	X	X	X	X				
WWD11	WWD11-0-4-150204	0-4	X	X	X	X	X	X	X	X			
WWD12	WWD12-0-4-150206	0-4	X	X	X	X	X	X	X	X	X		
WWD12	WWD12-4-8-150206	4-8	X	X	X	X	X	X	X	X	X		
WWD12	WWD12-8-10.3-150206	8-10.3										X	
WWD13	WWD13-0-4-150204	0-4	X	X	X	X	X	X	X				
WWD13	WWD13-4-6.2-150204	4-6.2	X	X	X	X	X	X	X				
WWD14	WWD14-0-4-150204	0-4	X	X	X	X	X	X	X	X			
WWD15	WWD15-0-4-150204	0-4	X	X	X	X	X	X	X				
WWD15	WWD15-4-5.9-150204	4-5.9	X	X	X	X	X	X	X				
WWD16	WWD16-0-4-150204	0-4	X	X	X	X	X	X	X	X			
WWD16	WWD16-4-7.7-150204	4-7.7	X	X	X	X	X	X	X				
WWD17	WWD17-0-4-150209	0-4	X	X	X	X	X	X	X				
WWD17	WWD17-4-8-150209	4-8	X	X	X	X	X	X	X				
WWD17	WWD17-8-12-150209	8-12	X	X	X	X	X	X	X				
WWD17	WWD17-12-12.8-150209	12-12.8										X	
WWD18	WWD18-0-4-150205	0-4	X	X	X	X	X	X	X	X	X		
WWD18	WWD18-4-8-150205	4-8	X	X	X	X	X	X	X	X	X		
WWD18	WWD18-8-12-150205	8-12	X	X	X	X	X	X	X		X		
WWD19	WWD19-0-4-150209	0-4	X	X	X	X	X	X	X				
WWD19	WWD19-4-7.3-150209	4-7.3	X	X	X	X	X	X	X				
WWD20	WWD20-0-4-150209	0-4	X	X	X	X	X	X	X				
WWD20	WWD20-4-8-150209	4-8	X	X	X	X	X	X	X				
WWD20	WWD20-8-12-150209	8-12	X	X	X	X	X	X	X				
WWD20	WWD20-12-13.2-150209	12-13.2										X	
WWD21	WWD21-0-4-150209	0-4	X	X	X	X	X	X	X	X			
WWD21	WWD21-4-8-150209	4-8	X	X	X	X	X	X	X	X			
WWD22	WWD22-0-4-150209	0-4	X	X	X	X	X	X	X	X			X
WWD22	WWD22-4-8-150209	4-8	X	X	X	X	X	X	X	X			X
WWD22	WWD22-8-10.8-150209	8-10.8										X	
WWD23	WWD23-0-4-150209	0-4	X	X	X	X	X	X	X				
WWD23	WWD23-4-8-150209	4-8	X	X	X	X	X	X	X				

Notes:
MS/MSD = matrix spike/matrix spike duplicate
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
Pest = pesticides
SVOC = semivolatile organic compound
TBT = tributyltin
TOC = total organic carbon
TS = total solids
TVS = total volatile solids

Table 5
Sample Results Summary

Location ID					WWD01_2015	WWD01_2015	WWD01_2015	WWD02_2015	WWD02_2015	WWD02_2015	WWD03_2015	WWD03_2015	WWD04_2015
Sample ID					WWD01-0-4-150206	WWD01-4-8-150206	WWD01-8-9.6-150206	WWD02-0-4-150205	WWD02-4-8-150205	WWD02-8-11.8-150205	WWD03-0-4-150203	WWD03-4-8-150203	WWD04-0-4-150203
Sample Date					02/06/2015	02/06/2015	02/06/2015	02/05/2015	02/05/2015	02/05/2015	02/03/2015	02/03/2015	02/03/2015
Depth					0 - 4 ft	4 - 8 ft	8 - 9.6 ft	0 - 4 ft	4 - 8 ft	8 - 11.8 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft
X					1263527	1263527	1263527	1263866	1263866	1263866	1263773	1263773	1263916
Y					213168	213168	213168	213221	213221	213221	213415	213415	214164
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**									
Conventional Parameters (mg/kg)													
Ammonia as nitrogen	E350.1M				30.7	70	35.5	6.65	12.4	17.2	2.49	1.14	7.16
Sulfide	SM4500S2D				956 J	1900 J	35 J	627	277	71.2	396 J	47.9 J	1080 J
Conventional Parameters (pct)													
Total organic carbon	Plumb 1981				2.56	3.72	0.384	1.87	0.67	0.202	0.821	0.189	0.727
Total solids	SM2540G				62.21	57.69	76.28	63.83	72.5	76.61	86.66	86.35	71.03
Total solids (preserved)	SM2540G				60.7	64.33	68.22	66.37	69.99	73.21	64.92	70.1	66.47
Total volatile solids	SM2540G				5.23	7.4	1.79	4.51	2.42	1.4	3.88	1.57	2.97
Grain Size (pct retained by sieve size in microns)													
Gravel (>2000)	PSEP				0.9	0.4	2.7	0.4	0.6	0.1 U	0.1	0.2	0.5
Sand, very coarse (2000 to 1000)	PSEP				1.1	0.7	2	0.7	0.3	0.1 U	0.5	0.8	1.5
Sand, coarse (1000 to 500)	PSEP				2.7	1.7	1.9	2.6	0.5	0.1	2.4	7.7	9.9
Sand, medium (500 to 250)	PSEP				13.5	5.2	4.3	11.6	2.7	12.2	20.1	41.7	32.1
Sand, fine (250 to 125)	PSEP				17.9	9.5	8.9	14.6	13.3	37.8	30.3	33.1	19.9
Sand, very fine (125 to 62)	PSEP				13.4	14.7	12.1	15.5	29.8	23.1	17.2	12	11.7
Total Sand (2000 to 62.5)	PSEP				48.6	31.8	29.2	45	46.6	73.2	70.5	95.3	75.1
Silt, coarse (62.5 to 31.0)	PSEP				10.8	13	19.8	12.5	19.2	11.8	6.3	1.9	2.2
Silt, medium (31.0 to 15.6)	PSEP				8.2	13.8	17.7	11	12.7	4.8	5.2	0.6	4.5
Silt, fine (15.6 to 7.8)	PSEP				9.6	13.6	10.8	9.4	6.3	4.8	4.7	0.4	5
Silt, very fine (7.8 to 3.9)	PSEP				6	8.3	6	6.8	4.5	0.3	3.6	0.4	3.7
Clay, coarse (3.9 to 2.0)	PSEP				4.6	4.9	3.7	4.6	3.1	1.3	3.1	0.3	2.8
Clay, medium (2.0 to 1.0)	PSEP				3.6	5.1	2.7	3.6	2.4	1	2.2	0.2	2.1
Clay, fine (<1.0)	PSEP				7.6	8.9	7.4	6.8	4.7	2.7	4.3	0.7	4.2
Total fines (<62.5)	PSEP				50.4	67.6	68.1	54.7	52.9	26.7	29.4	4.5	24.5
Metals (mg/kg dry weight)													
Antimony	SW6010C	150		200	1.68 J	2.7 J	0.8 J	1.9 J	0.88 J	6 UJ	0.95 J	0.51 J	1.52 J
Arsenic	SW6010C	57	507.1	700	15	24	7	15	8	4.5 J	10	3.88 J	11
Cadmium	SW6010C	5.1	11.3	14	0.8	1.6	0.3	0.9	0.4	0.19 J	0.4	0.2 J	0.4
Chromium	SW6010C	260	260		37.1	55.7	20.8	69.9	21.8	19.5	21.4	10.6	27.5
Copper	SW6010C	390	1027	1300	91.7 J	151 J	20.8 J	94.1 J	30.9 J	13.5 J	49.9 J	11.4 J	126 J
Lead	SW6010C	450	975	1200	81 J	179 J	3 J	105 J	16 J	1.52 J	49 J	1.9 J	56 J
Mercury	SW7471A	0.41	1.5	2.3	0.38 J	0.85 J	0.04 J	0.43 J	0.11 J	0.0138 J	0.2 J	0.017 J	0.5 J
Nickel	SW6010C				25	27	17	21	14	11	14	8	15
Selenium	SW6020A		3		0.36 J	0.42 J	0.19 J	0.29 J	0.16 J	0.6 U	0.15 J	0.5 U	0.23 J
Silver	SW6010C	6.1	6.1	8.4	0.23 J	0.9	0.4 U	0.29 J	0.4 U	0.4 U	0.17 J	0.3 U	0.07 J
Zinc	SW6010C	410	2783	3800	159	272	34	195 J	53 J	24 J	72 J	23 J	138 J
Organometallic Compounds (µg/kg)													
Tributyltin ion (bulk)	Krone		73		270	200	3.6 U	250	9.2	3.4 U	100	3.8 U	110 J
Polycyclic Aromatic Hydrocarbons (µg/kg dry weight)													
Naphthalene	SW8270DSIM	2100		2400	180 J	340 J	4.6 UJ	140 J	31 J	4.8 UJ	34 J	8 J	99 J
Acenaphthylene	SW8270DSIM	560		1300	73 J	77 J	4.6 UJ	46 J	6.3 J	4.8 UJ	13 J	4.8 UJ	36 J
Acenaphthene	SW8270DSIM	500		2000	87 J	230 J	4.6 UJ	54 J	13 J	4.8 UJ	17 J	4.8 UJ	61 J
Fluorene	SW8270DSIM	540		3600	85 J	240 J	4.6 UJ	67 J	14 J	4.8 UJ	21 J	4.8 UJ	77 J
Phenanthrene	SW8270DSIM	1500		21000	370	780	3.1 J	300 J	64 J	3.5 J	100 J	13 J	500 J
Anthracene	SW8270DSIM	960		13000	210 J	370 J	4.6 UJ	120 J	26 J	4.8 UJ	42 J	2.6 J	120 J
2-Methylnaphthalene	SW8270DSIM	670		1900	82 J	130 J	4.6 UJ	74 J	10 J	4.8 UJ	15 J	6.9 J	33 J
Total LPAH (DMMP) (U = 0)	SW8270DSIM	5200		29000	1005 J	2037 J	3.1 J	727 J	154.3 J	3.5 J	227 J	23.6 J	893 J
Fluoranthene	SW8270DSIM	1700	4600	30000	620 J	1400 J	2.7 J	510	85	2.8 J	160	13	590
Pyrene	SW8270DSIM	2600	11980	16000	1000 J	3100 J	4.6 J	790 J	150 J	4.8 UJ	220 J	18 J	940 J
Benzo(a)anthracene	SW8270DSIM	1300		5100	320 J	460 J	4.6 UJ	170 J	29 J	4.8 UJ	73 J	3.4 J	190 J
Chrysene	SW8270DSIM	1400		21000	460 J	700 J	4.6 UJ	260	38	4.8 U	100	5.3	290
Total Benzofluoranthenes (b,j,k) (U = 0)	SW8270DSIM	3200		9900	1300	1500	4.6 U	750	110	4.8 U	310	12	700
Benzo(a)pyrene	SW8270DSIM	1600		3600	530 J	670 J	4.6 UJ	310 J	51 J	4.8 UJ	140 J	6.2 J	340 J
Indeno(1,2,3-c,d)pyrene	SW8270DSIM	600		4400	270 J	330 J	4.6 UJ	170	28	4.8 U	79	4.3 J	190
Dibenzo(a,h)anthracene	SW8270DSIM	230		1900	91	130	4.6 U	87	10	4.8 U	34	4.9 U	82

Table 5
Sample Results Summary

Location ID					WWD01_2015	WWD01_2015	WWD01_2015	WWD02_2015	WWD02_2015	WWD02_2015	WWD03_2015	WWD03_2015	WWD04_2015
Sample ID					WWD01-0-4-150206	WWD01-4-8-150206	WWD01-8-9.6-150206	WWD02-0-4-150205	WWD02-4-8-150205	WWD02-8-11.8-150205	WWD03-0-4-150203	WWD03-4-8-150203	WWD04-0-4-150203
Sample Date					02/06/2015	02/06/2015	02/06/2015	02/05/2015	02/05/2015	02/05/2015	02/03/2015	02/03/2015	02/03/2015
Depth					0 - 4 ft	4 - 8 ft	8 - 9.6 ft	0 - 4 ft	4 - 8 ft	8 - 11.8 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft
X					1263527	1263527	1263527	1263866	1263866	1263866	1263773	1263773	1263916
Y					213168	213168	213168	213221	213221	213221	213415	213415	214164
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**									
Benzo(g,h,i)perylene	SW8270DSIM	670		3200	**300 J**	**390 J**	4.6 UJ	**200**	**32**	4.8 U	**86**	**5.6**	**220**
Total HPAH (DMMP) (U = 0)	SW8270DSIM	12000		69000	**4891 J**	**8680 J**	**7.3 J**	**3247 J**	**533 J**	**2.8 J**	**1202 J**	**67.8 J**	**3542 J**
Total PAH	SW8270DSIM				**5978 J**	**10847 J**	**10.4 J**	**4048 J**	**697.3 J**	**6.3 J**	**1444 J**	**98.3 J**	**4468 J**
Chlorinated Hydrocarbons (µg/kg dry weight)													
1,4-Dichlorobenzene	SW8270D-DUALSCAN	110		120	**27**	**14**	4.6 U	**8.8 J**	4.8 U	4.8 U	**3.4 J**	4.9 U	**150**
1,2-Dichlorobenzene	SW8270D-DUALSCAN	35		110	**2.5 J**	**5.8**	4.6 U	**3.7 J**	4.8 U	4.8 U	4.9 U	4.9 U	4.9 U
1,2,4-Trichlorobenzene	SW8270D-DUALSCAN	31		64	4.7 U	4.9 U	4.6 U	4.9 U	4.8 U	4.8 U	4.9 U	4.9 U	4.9 U
Hexachlorobenzene	SW8081B	22	168	230	0.95 U	0.99 U	0.96 U	0.97 U	1 U	0.98 U	0.95 U	0.97 U	4.8 U
Phthalates (µg/kg dry weight)													
Dimethyl phthalate	SW8270D-DUALSCAN	71		1400	**6.1**	4.9 U	4.6 U	**5.8**	4.8 U	4.8 U	4.9 U	4.9 U	4.9 U
Diethyl phthalate	SW8270D-DUALSCAN	200		1200	19 U	20 U	18 U	20 U	19 U	19 U	**20**	**18 J**	20 U
Di-n-butyl phthalate	SW8270D-DUALSCAN	1400		5100	**30**	**66**	**15 J**	**52**	**66**	**45**	20 U	19 U	**45**
Butylbenzyl phthalate	SW8270D-DUALSCAN	63		970	**290**	**31**	**3.6 J**	**25**	**6.7**	4.8 U	**7.5**	**2.6 J**	**17 J**
bis(2-Ethylhexyl)phthalate	SW8270D-DUALSCAN	1300		8300	**430**	**580**	46 U	**340**	**58**	48 U	**93**	49 U	**120**
Di-n-octyl phthalate	SW8270D-DUALSCAN	6200		6200	19 U	39 U	18 U	20 U	19 U	19 U	20 U	19 U	20 U
Phenols (µg/kg dry weight)													
Phenol	SW8270D-DUALSCAN	420		1200	220 U	180 U	66 U	**56**	22 U	**9.9 J**	35 U	8 U	**67**
2-Methylphenol (o-Cresol)	SW8270D-DUALSCAN	63		77	**13 J**	**19 J**	4.6 UJ	**6**	**2.6 J**	4.8 U	**4.6 J**	**9.3**	**8.9**
4-Methylphenol (p-Cresol)	SW8270D-DUALSCAN	670		3600	**43**	**71**	4.6 U	**29**	**14**	**3.6 J**	**15 J**	**13**	**76**
2,4-Dimethylphenol	SW8270D-DUALSCAN	29		210	**10 J**	**17 J**	**-- R**	24 UJ	24 UJ	24 UJ	24 UJ	24 UJ	**16 J**
Pentachlorophenol	SW8270D-DUALSCAN	400	504	690	**47**	**78 J**	18 U	97 UJ	19 U	19 U	**15 J**	19 UJ	**28 J**
Miscellaneous Extractables (µg/kg dry weight)													
Benzyl alcohol	SW8270D-DUALSCAN	57		870	19 U	**310 J**	18 U	20 U	19 U	19 U	20 UJ	19 UJ	20 UJ
Benzoic acid	SW8270D-DUALSCAN	650		760	**960 J**	**630 J**	180 U	**86 J**	**74 J**	190 U	**150 J**	190 U	**260**
Dibenzofuran	SW8270DSIM	540		1700	**72 J**	**150 J**	4.6 UJ	**52 J**	**12 J**	4.8 UJ	**17 J**	**2.7 J**	**63 J**
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8081B	11		270	0.95 U	0.99 U	0.96 U	0.97 U	1 U	0.98 U	0.95 U	0.97 UJ	4.8 U
n-Nitrosodiphenylamine	SW8270D-DUALSCAN	28		130	4.7 UJ	4.9 UJ	4.6 UJ	4.9 UJ	4.8 UJ	4.8 UJ	4.9 UJ	4.9 UJ	4.9 UJ
Pesticides (µg/kg dry weight)													
4,4'-DDD (p,p'-DDD)	SW8081B	16			0.95 U	0.99 U	0.96 U	0.97 U	1 U	0.98 U	0.95 U	0.97 U	4.8 U
4,4'-DDE (p,p'-DDE)	SW8081B	9			1.2 U	2.2 U	0.96 U	0.97 U	1 U	0.98 U	0.95 U	0.97 U	4.8 U
4,4'-DDT (p,p'-DDT)	SW8081B	12			12 U	17 U	0.96 U	13 U	5.9 U	0.98 U	8.9 U	0.97 U	9.8 U
Sum 4,4 DDT, DDE, DDD (U = 0)			50	69	12 U	17 U	0.96 U	13 U	5.9 U	0.98 U	8.9 U	0.97 U	9.8 U
Aldrin	SW8081B	9.5			0.93 U	1.7 U	0.48 U	0.49 U	0.5 U	0.49 U	0.48 U	0.48 U	2.4 U
Total DMMP Chlordane (U = 0)		2.8	37		1.4 U	3.4 U	0.96 U	7.5 U	1.5 U	0.98 U	2.6 U	0.97 U	200 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B				0.75 U	0.49 U	0.48 U	0.49 U	0.5 U	0.49 U	0.48 U	0.48 U	2.4 U
Chlordane, beta- (Chlordane, trans-)	SW8081B				0.96 U	0.56 U	0.48 U	2.7 U	1.5 U	0.49 U	1.6 U	0.48 U	2.4 U
Nonachlor, cis-	SW8081B				0.95 U	0.99 U	0.96 U	7.5 U	1.4 U	0.98 U	2.6 U	0.97 U	4.8 U
Nonachlor, trans-	SW8081B				1.4 U	3.4 U	0.96 U	2.7 U	1 U	0.98 U	1.6 U	0.97 U	76 U
Oxychlordane	SW8081B				0.95 U	0.99 U	0.96 U	4.7 U	1 U	0.98 U	2.5 U	0.97 U	200 U
Dieldrin	SW8081B	1.9		1700	1.7 U	2 U	0.96 U	0.97 U	1.9 U	0.98 U	1.8 U	0.97 U	4.8 U
Heptachlor	SW8081B	1.5		270	0.67 U	1.6 U	0.48 U	0.49 U	0.5 U	0.49 U	0.48 U	0.48 UJ	2.4 U
PCB Aroclors (µg/kg)													
Aroclor 1016	SW8082A				8.9 U	9.2 U	9.4 U	9.7 UJ	9.6 U	8.9 U	9.7 U	9.7 U	9.8 U
Aroclor 1221	SW8082A				8.9 U	9.2 U	9.4 U	9.7 UJ	9.6 U	8.9 U	9.7 U	9.7 U	9.8 U
Aroclor 1232	SW8082A				8.9 U	9.2 U	9.4 U	9.7 UJ	9.6 U	8.9 U	9.7 U	9.7 U	9.8 U
Aroclor 1242	SW8082A				8.9 U	9.2 U	9.4 U	9.7 UJ	9.6 U	8.9 U	9.7 U	9.7 U	9.8 U
Aroclor 1248	SW8082A				**120**	**450**	9.4 U	**100 J**	**66**	8.9 U	**78**	9.7 U	**52**
Aroclor 1254	SW8082A				**190**	**940**	9.4 U	**110 J**	**84**	8.9 U	**100**	9.7 U	**78**
Aroclor 1260	SW8082A				**93 J**	**230 J**	9.4 U	**78**	**26**	8.9 U	**42**	9.7 U	**47**
Total DMMP PCB Aroclors (U = 0)		130		3100	**403 J**	**1620 J**	9.4 U	**288 J**	**176**	8.9 U	**220**	9.7 U	**177**
PCB Aroclors (mg/kg-OC)													
Total DMMP PCB Aroclors (U = 0)			38		**15.7 J**	**43.5 J**	2.45 U	**15.4 J**	**26.3**	4.41 U	**26.8**	5.13 U	**24.3**
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	--	--	**1.01**	0.277 U	0.0837 U	0.476 U	0.0648 U	0.496 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	--	--	**4.32**	0.941 U	0.0499 U	**1.49**	0.0806 U	**1.59**

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD01_2015 WWD01-0-4-150206 02/06/2015 0 - 4 ft 1263527 213168	WWD01_2015 WWD01-4-8-150206 02/06/2015 4 - 8 ft 1263527 213168	WWD01_2015 WWD01-8-9.6-150206 02/06/2015 8 - 9.6 ft 1263527 213168	WWD02_2015 WWD02-0-4-150205 02/05/2015 0 - 4 ft 1263866 213221	WWD02_2015 WWD02-4-8-150205 02/05/2015 4 - 8 ft 1263866 213221	WWD02_2015 WWD02-8-11.8-150205 02/05/2015 8 - 11.8 ft 1263866 213221	WWD03_2015 WWD03-0-4-150203 02/03/2015 0 - 4 ft 1263773 213415	WWD03_2015 WWD03-4-8-150203 02/03/2015 4 - 8 ft 1263773 213415	WWD04_2015 WWD04-0-4-150203 02/03/2015 0 - 4 ft 1263916 214164
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	**4.88**	**1.17**	0.0598 U	**2.16**	0.0904 U	**2.29**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	**38**	**3.71**	0.0718 U	**9.5**	0.348 U	**11.2**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	**18.6**	**2.21**	0.11 U	**4.4**	0.24 U	**4.47**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	--	--	**720**	**89.7**	1.66 U	**300**	7.67 U	**364**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B				--	--	--	**5990 J**	**754**	12.1 U	**2680**	61.2 U	**3460**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	--	--	**17.5 J**	**3.74 J**	**0.409 J**	**6.53 J**	**0.669 J**	**8.09 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	--	--	**34.2 J**	**7.53 J**	**0.231 J**	**12.1**	**0.697 J**	**14.8 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	**294 J**	**32.7**	**1.69 J**	**79.7**	**3.23 J**	**96.7 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	--	--	**1720**	**199**	**4.68 J**	**708**	**16 J**	**895**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B				--	--	--	**3.37**	**0.792 J**	0.0279 U	**1.34**	0.0589 U	**1.29 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	--	--	**2.07**	0.519 U	0.0399 U	**1.12**	0.0648 U	**1.11**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	--	--	**4.85 J**	**1.13**	0.0419 U	**2.15**	0.0629 U	**1.97**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	**12.8 J**	**2.99 J**	0.0319 U	**8.81 J**	**0.56 J**	**6.11 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	**5.06**	**0.967 J**	0.0319 U	**2.83**	0.136 U	**2.14**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	**2.65 J**	**0.635 J**	0.0419 U	**2.07 J**	0.143 UJ	**1.52 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	**7.71**	**1.33**	0.0339 U	**2.22**	**0.216 J**	**1.5**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B				--	--	--	**132**	**19.7**	**0.138 J**	**72.4**	**3.84**	**73.2**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B				--	--	--	**8.92**	**1.62**	0.0459 U	**6.25**	0.328 U	**5.43**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B				--	--	--	**410**	**53.2**	0.369 U	**216**	**9.54**	**410**
Total Tetrachlorodibenzofuran (TCDF)	E1613B				--	--	--	**78.1 J**	**18.3 J**	**0.055 J**	**26.5 J**	**0.925 J**	**24.9 J**
Total Pentachlorodibenzofuran (PeCDF)	E1613B				--	--	--	**98.9 J**	**19 J**	0.0419 U	**41.5 J**	**1.66 J**	**34.5 J**
Total Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	**210 J**	**34.4 J**	**0.0524 J**	**111 J**	**5.11 J**	**111 J**
Total Heptachlorodibenzofuran (HpCDF)	E1613B				--	--	--	**479**	**67.3 J**	**0.345 J**	**257 J**	**11.5 J**	**334**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)		4			--	--	--	**26.7 J**	**3.69 J**	**0.106 J**	**10.4 J**	**0.302 J**	**11.1 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		4			--	--	--	**26.7 J**	**3.07 J**	**0.001 J**	**10.2 J**	**0.119 J**	**10.9 J**

Notes:
Detected concentration is greater than DMMPSL2014 (DMMP Screening Level) criteria
Detected concentration is greater than DMMPBT2014 (DMMP bioaccumulation trigger) criteria
Detected concentration is greater than DMMPML2014 (DMMP maximum level) criteria
Non-detect limit is greater than one or more screening level
Bold = Detected result
J = Estimated value
R = Rejected
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
8270D-DUALSCAN captures data in both full scan and selected ion monitoring (SIM) mode. The highest detected value or lowest non-detected value has been selected
2-methylnaphthalene is not included in the summation of LPAH but is included in the summation of Total PAH

Table 5
Sample Results Summary

Location ID					WWD04_2015	WWD05_2015	WWD05_2015	WWD05_2015	WWD06_2015	WWD06_2015	WWD07_2015	WWD08_2015	WWD08_2015
Sample ID					WWD04-4-8-150203	WWD05-0-4-150206	WWD05-4-8-150206	WWD05-8-12-150206	WWD06-0-4-150203	WWD06-4-8-150203	WWD07-0-4-150204	WWD08-0-4-150204	WWD08-4-5.7-150204
Sample Date					02/03/2015	02/06/2015	02/06/2015	02/06/2015	02/03/2015	02/03/2015	02/04/2015	02/04/2015	02/04/2015
Depth					4 - 8 ft	0 - 4 ft	4 - 8 ft	8 - 12 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	0 - 4 ft	4 - 5.7 ft
X					1263916	1263930	1263930	1263930	1263970	1263970	1263775	1263816	1263816
Y					214164	214825	214825	214825	215298	215298	215366	215857	215857
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**									
Conventional Parameters (mg/kg)													
Ammonia as nitrogen	E350.1M				3.24	6.77	0.96	2.31	9.68	8.44	1.14	5.52	34.3
Sulfide	SM4500S2D				31.5 J	2050 J	14.4 J	30.3 J	448 J	26.7 J	58.3 J	321 J	99.8 J
Conventional Parameters (pct)													
Total organic carbon	Plumb 1981				0.224	1.46	0.149	0.272	1.78	0.45	1.04	1.22	0.39
Total solids	SM2540G				67.99	63.28	88.86	78.31	68.4	81.64	73.64	69	72.79
Total solids (preserved)	SM2540G				82.8	58.4	82.42	75.93	63.86	81.48	69.16	64.3	72.58
Total volatile solids	SM2540G				1.16	4.18	0.95	1.35	3.97	2.96	8.57	3.62	2.27
Grain Size (pct retained by sieve size in microns)													
Gravel (>2000)	PSEP				6.2	2.5	0.8	0.1	0.7	0.1	0.4	0.2	0.1 U
Sand, very coarse (2000 to 1000)	PSEP				3.3	1.4	1.5	0.7	0.5	0.4	0.6	0.4	0.1 U
Sand, coarse (1000 to 500)	PSEP				19.2	4.8	15	4.6	1.2	5	5.5	1	0.1
Sand, medium (500 to 250)	PSEP				46.6	15.4	49.3	15.1	10.8	44.9	24.2	4.5	0.3
Sand, fine (250 to 125)	PSEP				12.4	15.3	15	23.9	34.9	33.5	24.4	14.9	1.6
Sand, very fine (125 to 62)	PSEP				4.7	11.7	4.3	23.7	14.8	4.9	12.7	24.1	23.4
Total Sand (2000 to 62.5)	PSEP				86.2	48.6	85.1	68	62.2	88.7	67.4	44.9	25.4
Silt, coarse (62.5 to 31.0)	PSEP				2.5	9	5	13.2	7.6	1.8	6.5	16.4	33.8
Silt, medium (31.0 to 15.6)	PSEP				1.6	9.2	3.4	7.4	9.1	2.7	7.1	11.9	17.5
Silt, fine (15.6 to 7.8)	PSEP				1.2	8.3	2.3	3.7	6.3	2.2	5.5	8.2	8
Silt, very fine (7.8 to 3.9)	PSEP				0.7	5.5	1.1	2.3	4.2	1.4	3.8	5	5
Clay, coarse (3.9 to 2.0)	PSEP				0.6	4.5	0.8	1.3	2.9	1	2.9	4.1	3.4
Clay, medium (2.0 to 1.0)	PSEP				0.4	3.7	0.5	0.9	2.3	0.7	2	3.3	2.5
Clay, fine (<1.0)	PSEP				0.7	8.4	1.2	3	4.6	1.5	4.4	6	4.3
Total fines (<62.5)	PSEP				7.7	48.6	14.3	31.8	37.0	11.3	32.2	54.9	74.5
Metals (mg/kg dry weight)													
Antimony	SW6010C	150		200	0.72 J	17 J	1.28 J	0.47 J	3.57 J	0.59 J	1.79 J	2.42 J	1.05 J
Arsenic	SW6010C	57	507.1	700	4.59 J	69	4.01 J	3.92 J	17	4.92 J	12	16	6
Cadmium	SW6010C	5.1	11.3	14	0.18 J	1.1	0.13 J	0.18 J	0.6	0.21 J	0.5	0.7	0.24 J
Chromium	SW6010C	260	260		10.6	101	15	20.5	21.6	11.5	24.8	33.8	15.7
Copper	SW6010C	390	1027	1300	10.9 J	188 J	9.9 J	13.6 J	65.2 J	14.4 J	60	99.9	23.4
Lead	SW6010C	450	975	1200	1.14 J	350 J	1.54 J	1.43 J	76 J	3 J	48	74	3
Mercury	SW7471A	0.41	1.5	2.3	0.0049 J	3.89 J	0.0028 J	0.0123 J	0.84 J	0.0163 J	0.54	1.19	0.03
Nickel	SW6010C				9	34	9	12	15	9	15	18	11
Selenium	SW6020A		3		0.5 U	0.4 J	0.5 U	0.6 U	0.26 J	0.6 U	0.17 J	0.26 J	0.19 J
Silver	SW6010C	6.1	6.1	8.4	0.3 U	0.6	0.3 U	0.4 U	0.4 U	0.4 U	0.07 J	0.18 J	0.4 U
Zinc	SW6010C	410	2783	3800	24 J	509	21	23	115 J	24 J	109	142	31
Organometallic Compounds (µg/kg)													
Tributyltin ion (bulk)	Krone		73		3.6 U	220	3.7 U	3.4 U	2.3 J	3.4 U	26	63	3.7 U
Polycyclic Aromatic Hydrocarbons (µg/kg dry weight)													
Naphthalene	SW8270DSIM	2100		2400	2.9 J	150 J	2.5 J	3 J	290 J	13 J	110 J	180 J	3.1 J
Acenaphthylene	SW8270DSIM	560		1300	4.7 UJ	45 J	4.7 UJ	4.7 UJ	64 J	5 J	32 J	59 J	4.8 UJ
Acenaphthene	SW8270DSIM	500		2000	4.7 UJ	63 J	4.7 UJ	4.7 UJ	110 J	8.9 J	34 J	150 J	4.8 UJ
Fluorene	SW8270DSIM	540		3600	4.4 J	67 J	4.7 UJ	4.7 UJ	110 J	11 J	34 J	120 J	4.8 UJ
Phenanthrene	SW8270DSIM	1500		21000	16 J	280	2.9 J	2.6 J	300 J	95 J	130	340	5.8
Anthracene	SW8270DSIM	960		13000	6.8 J	140 J	4.7 UJ	4.7 UJ	150 J	16 J	61 J	120 J	4.8 UJ
2-Methylnaphthalene	SW8270DSIM	670		1900	3 J	39 J	4.7 UJ	4.7 UJ	77 J	4.7 J	29 J	54 J	2.7 J
Total LPAH (DMMP) (U = 0)	SW8270DSIM	5200		29000	30.1 J	745 J	5.4 J	5.6 J	1024 J	148.9 J	401 J	969 J	8.9 J
Fluoranthene	SW8270DSIM	1700	4600	30000	18	470 J	2.7 J	4.7 UJ	330	85 J	180	330	3.9 J
Pyrene	SW8270DSIM	2600	11980	16000	12 J	1000 J	4.8 J	3.4 J	1000 J	93 J	260 J	530 J	6.7 J
Benzo(a)anthracene	SW8270DSIM	1300		5100	9.8 J	250 J	4.7 UJ	4.7 UJ	110 J	18 J	72 J	110 J	4.8 UJ
Chrysene	SW8270DSIM	1400		21000	4.7	350 J	4.7 UJ	4.7 UJ	220	22 J	83	170	3.1 J
Total Benzofluoranthenes (b,j,k) (U = 0)	SW8270DSIM	3200		9900	11	980	4.7 U	4.7 U	860	38 J	270	450	2.8 J
Benzo(a)pyrene	SW8270DSIM	1600		3600	3 J	460 J	4.7 UJ	4.7 UJ	450 J	18 J	130 J	220 J	4.8 UJ
Indeno(1,2,3-c,d)pyrene	SW8270DSIM	600		4400	3.1 J	240 J	4.7 UJ	4.7 UJ	220	9.8 J	64	110	4.8 U
Dibenzo(a,h)anthracene	SW8270DSIM	230		1900	4.6 U	160	4.8 U	4.8 U	42	4.7 U	35	60	4.8 U

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD04_2015 WWD04-4-8-150203 02/03/2015 4 - 8 ft 1263916 214164	WWD05_2015 WWD05-0-4-150206 02/06/2015 0 - 4 ft 1263930 214825	WWD05_2015 WWD05-4-8-150206 02/06/2015 4 - 8 ft 1263930 214825	WWD05_2015 WWD05-8-12-150206 02/06/2015 8 - 12 ft 1263930 214825	WWD06_2015 WWD06-0-4-150203 02/03/2015 0 - 4 ft 1263970 215298	WWD06_2015 WWD06-4-8-150203 02/03/2015 4 - 8 ft 1263970 215298	WWD07_2015 WWD07-0-4-150204 02/04/2015 0 - 4 ft 1263775 215366	WWD08_2015 WWD08-0-4-150204 02/04/2015 0 - 4 ft 1263816 215857	WWD08_2015 WWD08-4-5.7-150204 02/04/2015 4 - 5.7 ft 1263816 215857
Benzo(g,h,i)perylene	SW8270DSIM	670		3200	**3.5 J**	**280 J**	4.7 UJ	4.7 UJ	**270**	**13 J**	**77**	**120**	**7.4**
Total HPAH (DMMP) (U = 0)	SW8270DSIM	12000		69000	**65.1 J**	**4190 J**	**7.5 J**	**3.4 J**	**3502 J**	**296.8 J**	**1171 J**	**2100 J**	**23.9 J**
Total PAH	SW8270DSIM				**98.2 J**	**4974 J**	**12.9 J**	**9 J**	**4603 J**	**450.4 J**	**1601 J**	**3123 J**	**35.5 J**
Chlorinated Hydrocarbons (µg/kg dry weight)													
1,4-Dichlorobenzene	SW8270D-DUALSCAN	110		120	4.6 U	**13**	4.8 U	4.8 U	**12 J**	4.7 U	**4.1 J**	**11 J**	4.8 U
1,2-Dichlorobenzene	SW8270D-DUALSCAN	35		110	4.6 U	**8.6**	4.8 U	4.8 U	4.8 U	4.7 U	**2.6 J**	**11 J**	4.8 U
1,2,4-Trichlorobenzene	SW8270D-DUALSCAN	31		64	4.6 U	4.8 U	4.8 U	4.8 U	4.8 U	4.7 U	4.8 U	4.8 U	4.8 U
Hexachlorobenzene	SW8081B	22	168	230	0.93 U	0.96 U	0.97 U	0.96 U	0.96 U	0.96 U	0.99 U	0.95 U	0.99 U
Phthalates (µg/kg dry weight)													
Dimethyl phthalate	SW8270D-DUALSCAN	71		1400	**2.5 J**	**7**	4.8 U	4.8 U	**21**	4.7 U	4.8 U	4.8 U	4.8 U
Diethyl phthalate	SW8270D-DUALSCAN	200		1200	19 U	19 U	19 U	19 U	19 U	**22**	19 U	19 U	19 U
Di-n-butyl phthalate	SW8270D-DUALSCAN	1400		5100	**84**	**30 J**	19 U	**15 J**	19 U	19 U	**14 J**	**21**	19 U
Butylbenzyl phthalate	SW8270D-DUALSCAN	63		970	4.6 U	**15**	4.8 U	4.8 U	**6.4**	4.7 U	**8.6**	**10**	4.8 U
bis(2-Ethylhexyl)phthalate	SW8270D-DUALSCAN	1300		8300	46 U	**280**	48 U	48 U	48 U	47 U	**78**	**120**	48 U
Di-n-octyl phthalate	SW8270D-DUALSCAN	6200		6200	19 U	38 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
Phenols (µg/kg dry weight)													
Phenol	SW8270D-DUALSCAN	420		1200	11 U	270 U	56 U	92 U	**180**	11 U	33 U	**69**	12 U
2-Methylphenol (o-Cresol)	SW8270D-DUALSCAN	63		77	4.6 U	**12 J**	4.8 UJ	4.8 UJ	**12 J**	4.7 U	**3.5 J**	**7.8**	4.8 U
4-Methylphenol (p-Cresol)	SW8270D-DUALSCAN	670		3600	**5.6**	**51**	4.8 U	4.8 U	**97**	4.7 U	**18 J**	**44**	**6.4**
2,4-Dimethylphenol	SW8270D-DUALSCAN	29		210	23 UJ	**15 J**	**-- R**	**-- R**	**18 J**	24 UJ	24 UJ	**12 J**	24 UJ
Pentachlorophenol	SW8270D-DUALSCAN	400	504	690	19 UJ	**210**	19 U	19 U	19 UJ	19 UJ	**20 J**	**39 J**	19 U
Miscellaneous Extractables (µg/kg dry weight)													
Benzyl alcohol	SW8270D-DUALSCAN	57		870	**-- R**	**33**	19 U	19 UJ	19 UJ	19 UJ	19 UJ	19 UJ	19 UJ
Benzoic acid	SW8270D-DUALSCAN	650		760	190 U	**920 J**	190 U	**91 J**	190 U	190 U	190 U	200 U	190 U
Dibenzofuran	SW8270DSIM	540		1700	4.7 UJ	**52 J**	4.7 UJ	4.7 UJ	**110 J**	**11 J**	**32 J**	**110 J**	4.8 UJ
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8081B	11		270	0.93 U	0.96 U	0.97 U	0.96 U	0.96 U	0.96 U	0.99 U	0.95 U	0.99 U
n-Nitrosodiphenylamine	SW8270D-DUALSCAN	28		130	4.6 UJ	**22 J**	4.8 UJ	4.8 UJ	4.8 UJ	4.7 UJ	4.8 U	4.8 U	4.8 U
Pesticides (µg/kg dry weight)													
4,4'-DDD (p,p'-DDD)	SW8081B	16			0.93 U	0.96 U	0.97 U	0.96 U	0.96 U	0.96 U	0.99 U	0.95 U	0.99 U
4,4'-DDE (p,p'-DDE)	SW8081B	9			0.93 U	0.96 U	0.97 U	0.96 U	0.96 U	0.96 U	2.2 U	2.7 U	0.99 U
4,4'-DDT (p,p'-DDT)	SW8081B	12			0.93 U	10 U	0.97 U	0.96 U	0.96 U	0.96 U	0.99 U	0.95 U	0.99 U
Sum 4,4 DDT, DDE, DDD (U = 0)			50	69	0.93 U	10 U	0.97 U	0.96 U	0.96 U	0.96 U	2.2 U	2.7 U	0.99 U
Aldrin	SW8081B	9.5			0.47 U	0.48 U	0.49 U	0.48 U	0.48 U	0.48 U	0.5 UJ	0.99 U	0.5 U
Total DMMP Chlordane (U = 0)		2.8	37		1.8 U	1.8 U	0.97 U	0.96 U	2.5 U	0.96 U	6.8 UJ	3.5 U	0.99 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B				0.47 U	0.48 U	0.49 U	0.48 U	0.48 U	0.48 U	0.5 U	0.48 U	0.5 U
Chlordane, beta- (Chlordane, trans-)	SW8081B				0.47 U	0.53 U	0.49 U	0.48 U	0.48 U	0.48 U	0.5 UJ	0.48 U	0.5 U
Nonachlor, cis-	SW8081B				0.93 U	0.96 U	0.97 U	0.96 U	0.96 U	0.96 U	6.8 U	3.5 U	0.99 U
Nonachlor, trans-	SW8081B				0.93 U	1.8 U	0.97 U	0.96 U	2 U	0.96 U	0.99 U	2.4 U	0.99 U
Oxychlordane	SW8081B				1.8 U	0.96 U	0.97 U	0.96 U	2.5 U	0.96 U	0.99 U	0.95 U	0.99 U
Dieldrin	SW8081B	1.9		1700	0.93 U	1.2 U	0.97 U	0.96 U	0.96 U	0.96 U	3.4 U	2.6 U	0.99 U
Heptachlor	SW8081B	1.5		270	0.47 U	0.48 U	0.74 U	0.48 U	0.48 U	0.48 U	0.5 UJ	0.48 U	0.5 U
PCB Aroclors (µg/kg)													
Aroclor 1016	SW8082A				9.3 U	9.6 U	9.7 U	8.9 U	9.1 U	8.7 U	9.6 U	9 U	9.6 U
Aroclor 1221	SW8082A				9.3 U	9.6 U	9.7 U	8.9 U	9.1 U	8.7 U	9.6 U	9 U	9.6 U
Aroclor 1232	SW8082A				9.3 U	9.6 U	9.7 U	8.9 U	9.1 U	8.7 U	9.6 U	9 U	9.6 U
Aroclor 1242	SW8082A				9.3 U	9.6 U	9.7 U	8.9 U	9.1 U	8.7 U	9.6 U	9 U	9.6 U
Aroclor 1248	SW8082A				9.3 U	**200**	9.7 U	8.9 U	9.1 U	8.7 U	**84**	**100**	9.6 U
Aroclor 1254	SW8082A				9.3 U	**340**	9.7 U	8.9 U	9.1 U	8.7 U	**140**	**180**	9.6 U
Aroclor 1260	SW8082A				9.3 U	**160 J**	9.7 U	8.9 U	9.1 U	8.7 U	**64**	**96**	9.6 U
Total DMMP PCB Aroclors (U = 0)		130		3100	9.3 U	**700 J**	9.7 U	8.9 U	9.1 U	8.7 U	**288**	**376**	9.6 U
PCB Aroclors (mg/kg-OC)													
Total DMMP PCB Aroclors (U = 0)			38		4.15 U	**47.9 J**	6.51 U	3.27 U	0.511 U	1.93 U	**27.7**	**30.8**	2.46 U
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				0.147 U	**1.05 J**	0.0359 U	0.034 U	0.464 U	0.056 U	--	**0.781 J**	0.0415 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				0.031 U	**4.66**	**0.134 J**	**0.0939 J**	**1.33**	0.1 U	--	**2.53**	0.0415 U

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD04_2015 WWD04-4-8-150203 02/03/2015 4 - 8 ft 1263916 214164	WWD05_2015 WWD05-0-4-150206 02/06/2015 0 - 4 ft 1263930 214825	WWD05_2015 WWD05-4-8-150206 02/06/2015 4 - 8 ft 1263930 214825	WWD05_2015 WWD05-8-12-150206 02/06/2015 8 - 12 ft 1263930 214825	WWD06_2015 WWD06-0-4-150203 02/03/2015 0 - 4 ft 1263970 215298	WWD06_2015 WWD06-4-8-150203 02/03/2015 4 - 8 ft 1263970 215298	WWD07_2015 WWD07-0-4-150204 02/04/2015 0 - 4 ft 1263775 215366	WWD08_2015 WWD08-0-4-150204 02/04/2015 0 - 4 ft 1263816 215857	WWD08_2015 WWD08-4-5.7-150204 02/04/2015 4 - 5.7 ft 1263816 215857
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				0.0233 U	**6.28**	0.204 U	**0.104 J**	**1.09**	0.141 U	--	**2.39**	0.0613 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				0.0291 U	**32.1**	0.745 U	**0.144 J**	**2.52**	0.16 U	--	**15**	0.0949 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				0.0581 U	**13.6**	0.329 U	**0.21 J**	**2.07**	0.183 U	--	**5.14**	0.213 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				0.744 U	**1020**	**20.2**	1.95 U	**37.9**	1.5 U	--	**396**	1.87 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B				5.36 U	**9430 J**	**188**	13.8 U	**231**	9.38 U	--	**3110**	13.1 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				**0.303 J**	**20.1 J**	**0.467 J**	**0.295 J**	**14.8 J**	**0.592 J**	--	**22.2 J**	**0.488 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				**0.0742 J**	**39.8**	**1.03 J**	**0.236 J**	**16.2 J**	**0.655 J**	--	**27.3**	**0.488 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				**0.589 J**	**275 J**	**6.18 J**	**1.32 J**	**28.9 J**	**1.69 J**	--	**107**	**1.99 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				**2.02 J**	**2710**	**52.8**	**4.67 J**	**84.4**	**4.05 J**	--	**821**	**4.73 J**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B				0.0329 U	**3.77**	0.128 U	0.03 U	**1.28**	0.0753 U	--	**2.59**	0.0356 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				0.105 U	**3.09**	0.204 U	0.0619 U	**0.968 J**	**0.0792 J**	--	**1.94**	0.0375 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				0.0446 U	**6.11**	**0.184 J**	0.0619 U	**1.21**	**0.0849 J**	--	**3.67**	0.0375 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				**0.0853 J**	**21.1 J**	**0.511 J**	0.0759 UJ	**1.9 J**	0.1 UJ	--	**13.1 J**	0.0277 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				0.0814 U	**6.75**	0.271 U	0.032 U	**1.47**	0.0869 U	--	**4.23**	0.0257 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B				0.0736 UJ	**4.68 J**	0.19 UJ	0.128 UJ	**0.771 J**	**0.153 J**	--	**2.42 J**	0.0316 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				0.0271 U	**4.44 J**	**0.168 J**	0.032 U	**1.74**	**0.0811 J**	--	**6.18**	0.0277 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B				**0.138 J**	**231**	**4.57**	0.368 U	**26.9**	0.145 U	--	**143**	0.083 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B				0.0213 U	**16**	**0.397 J**	0.0539 U	**1.38**	**0.104 J**	--	**10.4**	0.0435 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B				**0.167 J**	**906**	**18**	0.791 U	**61.3**	0.351 U	--	**604**	0.364 U
Total Tetrachlorodibenzofuran (TCDF)	E1613B				**0.694 J**	**74 J**	**2.54 J**	**0.0352 J**	**25.5 J**	0.0753 U	--	**52.2 J**	**0.097**
Total Pentachlorodibenzofuran (PeCDF)	E1613B				**0.715 J**	**105 J**	**3.3 J**	**0.153 J**	**26.3 J**	**0.164 J**	--	**70.9 J**	0.0375 U
Total Hexachlorodibenzofuran (HxCDF)	E1613B				**0.708 J**	**316 J**	**5.95 J**	**0.268 J**	**32.1 J**	**0.421 J**	--	**186 J**	**0.0375 J**
Total Heptachlorodibenzofuran (HpCDF)	E1613B				**0.331 J**	**888 J**	**16.7 J**	**0.798 J**	**70.4**	**0.29 J**	--	**587**	**0.308 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)		4			**0.128 J**	**32.7 J**	**0.685 J**	**0.196 J**	**3.99 J**	**0.177 J**	--	**16.2 J**	0.042 U
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		4			**0.010 J**	**32.7 J**	**0.571 J**	**0.140 J**	**3.76 J**	**0.052 J**	--	**16.2 J**	0.042 U

Notes:
Detected concentration is greater than DMMPSL2014 (DMMP Screening Level) criteria
Detected concentration is greater than DMMPBT2014 (DMMP bioaccumulation trigger) criteria
Detected concentration is greater than DMMPML2014 (DMMP maximum level) criteria
Non-detect limit is greater than one or more screening level
Bold = Detected result
J = Estimated value
R = Rejected
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
8270D-DUALSCAN captures data in both full scan and selected ion monitoring (SIM) mode. The highest detected value or lowest non-detected value has been selected
2-methylnaphthalene is not included in the summation of LPAH but is included in the summation of Total PAH

Table 5
Sample Results Summary

Location ID					WWD09_2015	WWD09_2015	WWD09_2015	WWD10_2015	WWD10_2015	WWD11_2015	WWD12_2015	WWD12_2015	WWD13_2015
Sample ID					WWD09-0-4-150203	WWD09-4-8-150203	WWD09-8-11.1-150203	WWD10-0-4-150203	WWD10-4-6.3-150203	WWD11-0-4-150204	WWD12-0-4-150206	WWD12-4-8-150206	WWD13-0-4-150204
Sample Date					02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/04/2015	02/06/2015	02/06/2015	02/04/2015
Depth					0 - 4 ft	4 - 8 ft	8 - 11.1 ft	0 - 4 ft	4 - 6.3 ft	0 - 4 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft
X					1263957	1263957	1263957	1263833	1263833	1263515	1263956	1263956	1263921
Y					216030	216030	216030	216172	216172	216310	216331	216331	216574
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**									
Conventional Parameters (mg/kg)													
Ammonia as nitrogen	E350.1M				1.08	1.38	0.65	7.14	6.77	6.47	1.04	1.93	2.78
Sulfide	SM4500S2D				571 J	77.2 J	34.6 J	44.8 J	42.1 J	52.1 J	139 J	40.3 J	209 J
Conventional Parameters (pct)													
Total organic carbon	Plumb 1981				0.593	1.01	0.252	1.46	0.317	0.573	0.52	0.234	0.357
Total solids	SM2540G				73.7	79.95	81.35	67.91	83.24	95.44	76.67	88.09	75.86
Total solids (preserved)	SM2540G				68.85	70.93	73.64	65.3	78.3	70.09	73.29	75.68	69.71
Total volatile solids	SM2540G				2.62	2.42	1.54	3.93	1.82	2.62	1.96	1.18	2.35
Grain Size (pct retained by sieve size in microns)													
Gravel (>2000)	PSEP				0.8	0.2	0.2	0.2	0.8	0.3	0.2	1.3	0.4
Sand, very coarse (2000 to 1000)	PSEP				0.5	0.4	0.3	0.4	0.2	0.3	0.3	0.9	0.2
Sand, coarse (1000 to 500)	PSEP				5.4	2.8	0.8	1	2.1	1.7	4.7	10.6	1.5
Sand, medium (500 to 250)	PSEP				35	38.2	32.6	7.2	23.8	12.3	35.3	45.8	19.5
Sand, fine (250 to 125)	PSEP				31.5	39.1	52.7	15.9	37.7	30.8	34.4	30.7	31.9
Sand, very fine (125 to 62)	PSEP				8.9	8.8	8.8	15.9	16	23.9	9.8	5.9	17.3
Total Sand (2000 to 62.5)	PSEP				81.3	89.3	95.2	40.4	79.8	69	84.5	93.9	70.4
Silt, coarse (62.5 to 31.0)	PSEP				3.3	3.5	1.3	14.4	8.1	11.5	3.9	1.8	9.3
Silt, medium (31.0 to 15.6)	PSEP				2.8	2.1	0.9	14.3	4.1	6.4	2.8	1	6
Silt, fine (15.6 to 7.8)	PSEP				3.2	1.4	0.6	10.3	2.4	4.2	2	0.6	4
Silt, very fine (7.8 to 3.9)	PSEP				2.2	1.1	0.4	6.9	1.5	2.3	1.7	0.4	2.8
Clay, coarse (3.9 to 2.0)	PSEP				1.7	0.7	0.3	3.9	0.9	1.8	1.1	0.3	2.1
Clay, medium (2.0 to 1.0)	PSEP				1.5	0.5	0.2	3.3	0.7	1.6	1	0.2	1.7
Clay, fine (<1.0)	PSEP				3	1.3	1	6.5	1.7	3	2.7	0.7	3.3
Total fines (<62.5)	PSEP				17.7	10.6	4.7	59.6	19.4	30.8	15.2	5.0	29.2
Metals (mg/kg dry weight)													
Antimony	SW6010C	150		200	2.78 J	0.52 J	0.48 J	1.47 J	0.7 J	1.1 J	1.07 J	0.56 J	3.49 J
Arsenic	SW6010C	57	507.1	700	18	4.65 J	3.55 J	12	5.35 J	7	8	3.59 J	13
Cadmium	SW6010C	5.1	11.3	14	0.4	0.18 J	0.15 J	0.5	0.2 J	0.4	0.3	0.15 J	0.4
Chromium	SW6010C	260	260		49.1	10.2	9.8	21.6	13.6	16.6	27.9	10.3	25.7
Copper	SW6010C	390	1027	1300	73.4 J	16.1 J	10 J	53.3 J	15.5 J	31.1	38.8 J	9.4 J	73.6
Lead	SW6010C	450	975	1200	111 J	4 J	1.26 J	30 J	1.9 J	17	26 J	1.2 J	55
Mercury	SW7471A	0.41	1.5	2.3	0.35 J	0.08 J	0.0108 J	0.52 J	0.0086 J	0.34	0.29 J	0.0122 J	0.66
Nickel	SW6010C				18	7	7	15	9	11	13	8	12
Selenium	SW6020A		3		0.17 J	0.6 U	0.6 U	0.31 J	0.6 U	0.18 J	0.7 U	0.5 U	0.17 J
Silver	SW6010C	6.1	6.1	8.4	0.09 J	0.4 U	0.4 U	0.4 U	0.3 U	0.4 U	0.4 U	0.3 U	0.071 J
Zinc	SW6010C	410	2783	3800	127 J	25 J	20 J	69 J	25 J	47	64	21	121
Organometallic Compounds (µg/kg)													
Tributyltin ion (bulk)	Krone		73		140	3.4 U	3.4 U	35	3.3 U	3.6	16	3.7 U	34
Polycyclic Aromatic Hydrocarbons (µg/kg dry weight)													
Naphthalene	SW8270DSIM	2100		2400	31 J	22 J	4.7 UJ	74 J	4.6 UJ	120 J	31 J	4.7 UJ	43 J
Acenaphthylene	SW8270DSIM	560		1300	17 J	5.5 J	4.7 UJ	32 J	4.6 UJ	25 J	10 J	4.7 UJ	20 J
Acenaphthene	SW8270DSIM	500		2000	24 J	7.1 J	4.7 UJ	24 J	4.6 UJ	40 J	11 J	4.7 UJ	22 J
Fluorene	SW8270DSIM	540		3600	27 J	8.4 J	4.7 UJ	29 J	4.6 UJ	32 J	12 J	4.7 UJ	26 J
Phenanthrene	SW8270DSIM	1500		21000	150 J	31 J	4.4 J	130 J	2.7 J	99	61	3.5 J	120
Anthracene	SW8270DSIM	960		13000	54 J	14 J	4.7 UJ	61 J	4.6 UJ	50 J	26 J	4.7 UJ	49 J
2-Methylnaphthalene	SW8270DSIM	670		1900	12 J	9 J	4.7 UJ	21 J	4.6 UJ	21 J	12 J	4.7 UJ	16 J
Total LPAH (DMMP) (U = 0)	SW8270DSIM	5200		29000	303 J	88 J	4.4 J	350 J	2.7 J	366 J	151 J	3.5 J	280 J
Fluoranthene	SW8270DSIM	1700	4600	30000	230	34	4.7 U	150	4.6 U	170	89 J	4.7 UJ	160
Pyrene	SW8270DSIM	2600	11980	16000	280 J	63 J	4.7 UJ	250 J	2.9 J	320 J	120 J	4.7 UJ	290 J
Benzo(a)anthracene	SW8270DSIM	1300		5100	100 J	14 J	4.7 UJ	63 J	4.6 UJ	52 J	38 J	4.7 UJ	70 J
Chrysene	SW8270DSIM	1400		21000	150	24	4.7 U	86	4.6 U	67	49 J	4.7 UJ	96
Total Benzofluoranthenes (b,j,k) (U = 0)	SW8270DSIM	3200		9900	400	73	4.7 U	260	4.6 U	240	160	4.7 U	320
Benzo(a)pyrene	SW8270DSIM	1600		3600	180 J	35 J	4.7 UJ	130 J	4.6 UJ	110 J	79 J	4.7 UJ	150 J
Indeno(1,2,3-c,d)pyrene	SW8270DSIM	600		4400	98	22	4.7 U	73	4.6 U	53	43 J	4.7 UJ	80
Dibenzo(a,h)anthracene	SW8270DSIM	230		1900	48	7.6	4.7 U	26	4.6 U	33	23	4.7 U	55

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD09_2015 WWD09-0-4-150203 02/03/2015 0 - 4 ft 1263957 216030	WWD09_2015 WWD09-4-8-150203 02/03/2015 4 - 8 ft 1263957 216030	WWD09_2015 WWD09-8-11.1-150203 02/03/2015 8 - 11.1 ft 1263957 216030	WWD10_2015 WWD10-0-4-150203 02/03/2015 0 - 4 ft 1263833 216172	WWD10_2015 WWD10-4-6.3-150203 02/03/2015 4 - 6.3 ft 1263833 216172	WWD11_2015 WWD11-0-4-150204 02/04/2015 0 - 4 ft 1263515 216310	WWD12_2015 WWD12-0-4-150206 02/06/2015 0 - 4 ft 1263956 216331	WWD12_2015 WWD12-4-8-150206 02/06/2015 4 - 8 ft 1263956 216331	WWD13_2015 WWD13-0-4-150204 02/04/2015 0 - 4 ft 1263921 216574
Benzo(g,h,i)perylene	SW8270DSIM	670		3200	**110**	**30**	4.7 U	**87**	4.6 U	**54**	**52 J**	4.7 UJ	**86**
Total HPAH (DMMP) (U = 0)	SW8270DSIM	12000		69000	**1596 J**	**302.6 J**	4.7 UJ	**1125 J**	**2.9 J**	**1099 J**	**653 J**	4.7 UJ	**1307 J**
Total PAH	SW8270DSIM				**1911 J**	**399.6 J**	**4.4 J**	**1496 J**	**5.6 J**	**1486 J**	**816 J**	**3.5 J**	**1603 J**
Chlorinated Hydrocarbons (µg/kg dry weight)													
1,4-Dichlorobenzene	SW8270D-DUALSCAN	110		120	**5.8**	4.8 U	4.7 U	**2.9 J**	4.6 U	**3.2 J**	4.8 U	4.7 U	**4.2 J**
1,2-Dichlorobenzene	SW8270D-DUALSCAN	35		110	**3.6 J**	4.8 U	4.7 U	**2.9 J**	4.6 U	4.7 U	4.8 U	4.7 U	**3.1 J**
1,2,4-Trichlorobenzene	SW8270D-DUALSCAN	31		64	4.7 U	4.8 U	4.7 U	4.9 U	4.6 U	4.7 U	4.8 U	4.7 U	4.6 U
Hexachlorobenzene	SW8081B	22	168	230	0.96 U	0.97 U	0.96 U	0.96 U	0.94 U	0.97 U	0.98 U	0.95 U	0.96 U
Phthalates (µg/kg dry weight)													
Dimethyl phthalate	SW8270D-DUALSCAN	71		1400	**4.1 J**	4.8 U	4.7 U	4.9 U	4.6 U	4.7 U	4.8 U	4.7 U	4.6 U
Diethyl phthalate	SW8270D-DUALSCAN	200		1200	19 U	19 U	19 U	20 U	18 U	**40**	19 U	19 U	**21**
Di-n-butyl phthalate	SW8270D-DUALSCAN	1400		5100	19 U	19 U	19 U	**56**	**44**	19 U	**15 J**	19 U	**14 J**
Butylbenzyl phthalate	SW8270D-DUALSCAN	63		970	**6.4**	**2.4 J**	4.7 U	**5.1**	4.6 U	4.7 U	**3.6 J**	4.7 U	**7.2**
bis(2-Ethylhexyl)phthalate	SW8270D-DUALSCAN	1300		8300	**110**	48 U	47 U	49 U	46 U	**35 J**	**38 J**	47 U	**99**
Di-n-octyl phthalate	SW8270D-DUALSCAN	6200		6200	19 U	19 U	19 U	20 U	18 U	19 U	19 U	19 U	18 U
Phenols (µg/kg dry weight)													
Phenol	SW8270D-DUALSCAN	420		1200	21 U	12 U	9.3 U	**71**	9.4 U	21 U	77 U	62 U	23 U
2-Methylphenol (o-Cresol)	SW8270D-DUALSCAN	63		77	**4.8**	**3.2 J**	4.7 U	**5.2**	4.6 U	**4 J**	4.8 UJ	4.7 UJ	**8.5**
4-Methylphenol (p-Cresol)	SW8270D-DUALSCAN	670		3600	**11**	**3.4 J**	4.7 U	**28**	4.6 U	**27**	**3.9 J**	4.7 U	**18**
2,4-Dimethylphenol	SW8270D-DUALSCAN	29		210	23 UJ	24 UJ	24 UJ	24 UJ	23 UJ	24 UJ	**-- R**	**-- R**	23 UJ
Pentachlorophenol	SW8270D-DUALSCAN	400	504	690	**12 J**	19 UJ	19 UJ	**12 J**	18 UJ	19 U	19 U	19 U	**23 J**
Miscellaneous Extractables (µg/kg dry weight)													
Benzyl alcohol	SW8270D-DUALSCAN	57		870	19 UJ	19 UJ	19 UJ	48 UJ	18 UJ	19 UJ	19 U	19 U	18 UJ
Benzoic acid	SW8270D-DUALSCAN	650		760	190 U	190 U	190 U	**280**	180 U	190 U	**130 J**	190 U	180 U
Dibenzofuran	SW8270DSIM	540		1700	**21 J**	**8.4 J**	4.7 UJ	**26 J**	4.6 UJ	**30 J**	**11 J**	4.7 UJ	**23 J**
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8081B	11		270	0.96 U	0.97 U	0.96 U	0.96 U	0.94 U	0.97 U	0.98 U	0.95 U	0.96 U
n-Nitrosodiphenylamine	SW8270D-DUALSCAN	28		130	4.7 UJ	4.8 UJ	4.7 UJ	4.9 UJ	4.6 UJ	4.7 U	4.8 UJ	4.7 UJ	4.6 U
Pesticides (µg/kg dry weight)													
4,4'-DDD (p,p'-DDD)	SW8081B	16			1.6 U	0.97 U	0.96 U	0.96 U	0.94 U	0.97 U	0.98 U	0.95 U	0.96 U
4,4'-DDE (p,p'-DDE)	SW8081B	9			3.6 U	0.97 U	0.96 U	0.96 U	0.94 U	0.97 U	0.98 U	0.95 U	2.8 U
4,4'-DDT (p,p'-DDT)	SW8081B	12			17 U	1.7 U	0.96 U	7.2 U	0.94 U	0.97 U	6.6 U	0.95 U	0.96 U
Sum 4,4 DDT, DDE, DDD (U = 0)			50	69	17 U	1.7 U	0.96 U	7.2 U	0.94 U	0.97 U	6.6 U	0.95 U	2.8 U
Aldrin	SW8081B	9.5			0.48 U	0.49 U	0.48 U	0.48 U	0.47 U	0.48 U	0.49 U	0.47 U	0.48 U
Total DMMP Chlordane (U = 0)		2.8	37		11 U	1.9 U	0.96 U	2.3 U	1.6 U	1.6 U	0.98 U	0.95 U	3.7 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B				0.48 U	0.49 U	0.48 U	0.48 U	0.47 U	0.48 U	0.49 U	0.47 U	0.48 U
Chlordane, beta- (Chlordane, trans-)	SW8081B				2.2 U	0.49 U	0.48 U	0.48 U	0.47 U	0.48 U	0.49 U	0.47 U	0.48 U
Nonachlor, cis-	SW8081B				11 U	0.97 U	0.96 U	1.5 U	0.94 U	1.6 U	0.98 U	0.95 U	3.7 U
Nonachlor, trans-	SW8081B				2 U	0.97 U	0.96 U	1.4 U	0.94 U	0.97 U	0.98 U	0.95 U	0.96 U
Oxychlordane	SW8081B				3 U	1.9 U	0.96 U	2.3 U	1.6 U	0.97 U	0.98 U	0.95 U	0.96 U
Dieldrin	SW8081B	1.9		1700	4.8 U	0.97 U	0.96 U	1.1 U	0.94 U	1.1 U	0.98 U	0.95 U	2.8 U
Heptachlor	SW8081B	1.5		270	0.48 U	0.49 U	0.48 U	0.48 U	0.47 U	0.48 U	0.49 U	0.47 U	0.48 U
PCB Aroclors (µg/kg)													
Aroclor 1016	SW8082A				9.3 U	8.9 U	8.7 U	9.1 U	8.6 U	9.4 U	9 U	9.6 U	9.2 U
Aroclor 1221	SW8082A				9.3 U	8.9 U	8.7 U	9.1 U	8.6 U	9.4 U	9 U	9.6 U	9.2 U
Aroclor 1232	SW8082A				9.3 U	8.9 U	8.7 U	9.1 U	8.6 U	9.4 U	9 U	9.6 U	9.2 U
Aroclor 1242	SW8082A				9.3 U	8.9 U	8.7 U	9.1 U	8.6 U	9.4 U	9 U	9.6 U	9.2 U
Aroclor 1248	SW8082A				**90**	8.9 U	8.7 U	14 U	8.6 U	19 U	**58**	9.6 U	**83**
Aroclor 1254	SW8082A				**180**	**8 J**	8.7 U	**27**	8.6 U	**53**	**92**	9.6 U	**140**
Aroclor 1260	SW8082A				**59**	8.9 U	8.7 U	**22**	8.6 U	**21**	**37 J**	9.6 U	**69**
Total DMMP PCB Aroclors (U = 0)		130		3100	**329**	**8 J**	8.7 U	**49**	8.6 U	**74**	**187 J**	9.6 U	**292**
PCB Aroclors (mg/kg-OC)													
Total DMMP PCB Aroclors (U = 0)			38		**55.5**	**0.792 J**	3.45 U	**3.36**	2.71 U	**12.9**	**36.0 J**	4.10 U	**81.8**
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	--	--	--	--	0.258 U	0.317 U	0.0818 U	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	--	--	--	--	0.657 U	**0.887 J**	0.0533 U	--

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD09_2015 WWD09-0-4-150203 02/03/2015 0 - 4 ft 1263957 216030	WWD09_2015 WWD09-4-8-150203 02/03/2015 4 - 8 ft 1263957 216030	WWD09_2015 WWD09-8-11.1-150203 02/03/2015 8 - 11.1 ft 1263957 216030	WWD10_2015 WWD10-0-4-150203 02/03/2015 0 - 4 ft 1263833 216172	WWD10_2015 WWD10-4-6.3-150203 02/03/2015 4 - 6.3 ft 1263833 216172	WWD11_2015 WWD11-0-4-150204 02/04/2015 0 - 4 ft 1263515 216310	WWD12_2015 WWD12-0-4-150206 02/06/2015 0 - 4 ft 1263956 216331	WWD12_2015 WWD12-4-8-150206 02/06/2015 4 - 8 ft 1263956 216331	WWD13_2015 WWD13-0-4-150204 02/04/2015 0 - 4 ft 1263921 216574
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	--	--	**0.395 J**	**1.08**	0.0266 U	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	--	--	**3.06**	**4**	0.0343 U	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	--	--	1.17 U	**2.06**	0.105 U	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	--	--	--	--	**71.8**	**111**	1.32 U	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B				--	--	--	--	--	**546**	**998**	8.83 U	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	--	--	--	--	**8.56 J**	**7.87 J**	**0.206 J**	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	--	--	--	--	**8.88 J**	**11 J**	**0.0521 J**	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	--	--	--	--	**22.9 J**	**38.5 J**	**1.11 J**	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	--	--	--	--	**144**	**250**	**3.45 J**	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B				--	--	--	--	--	0.667 U	0.965 U	0.0856 U	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	--	--	--	--	**0.602 J**	**0.708 J**	0.0571 U	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	--	--	--	--	**1.05**	**1.35**	0.04 U	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	--	--	**4 J**	**3.35 J**	0.0228 UJ	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	--	--	**1.36**	**1.25 J**	0.0228 U	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	--	--	**0.729 J**	0.879 UJ	**0.0723 J**	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	--	--	**1.96**	0.674 U	0.0228 U	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B				--	--	--	--	--	**42.5**	**27.2**	0.0856 U	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B				--	--	--	--	--	**2.53**	**2.32**	0.0381 U	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B				--	--	--	--	--	**113**	**102**	0.217 U	--
Total Tetrachlorodibenzofuran (TCDF)	E1613B				--	--	--	--	--	**15.1 J**	**18 J**	0.0856 U	--
Total Pentachlorodibenzofuran (PeCDF)	E1613B				--	--	--	--	--	**22.2 J**	**20.6 J**	**0.0563 J**	--
Total Hexachlorodibenzofuran (HxCDF)	E1613B				--	--	--	--	--	**52.3 J**	**44.6 J**	**0.119 J**	--
Total Heptachlorodibenzofuran (HpCDF)	E1613B				--	--	--	--	--	**136 J**	**105**	**0.186 J**	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)		4			--	--	--	--	--	**3.40 J**	**4.51 J**	**0.106 J**	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		4			--	--	--	--	--	**2.85 J**	**4.22 J**	**0.007 J**	--

Notes:
Detected concentration is greater than DMMPSL2014 (DMMP Screening Level) criteria
Detected concentration is greater than DMMPBT2014 (DMMP bioaccumulation trigger) criteria
Detected concentration is greater than DMMPML2014 (DMMP maximum level) criteria
Non-detect limit is greater than one or more screening level
Bold = Detected result
J = Estimated value
R = Rejected
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
8270D-DUALSCAN captures data in both full scan and selected ion monitoring (SIM) mode. The highest detected value or lowest non-detected value has been selected
2-methylnaphthalene is not included in the summation of LPAH but is included in the summation of Total PAH

Table 5
Sample Results Summary

Location ID					WWD13_2015	WWD14_2015	WWD15_2015	WWD15_2015	WWD16_2015	WWD16_2015	WWD17_2015	WWD17_2015
Sample ID					WWD13-4-6.2-150204	WWD14-0-4-150204	WWD15-0-4-150204	WWD15-4-5.9-150204	WWD16-0-4-150204	WWD16-4-7.7-150204	WWD17-0-4-150209	WWD17-4-8-150209
Sample Date					02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/09/2015	02/09/2015
Depth					4 - 6.2 ft	0 - 4 ft	0 - 4 ft	4 - 5.9 ft	0 - 4 ft	4 - 7.7 ft	0 - 4 ft	4 - 8 ft
X					1263921	1263829	1263894	1263894	1263821	1263821	1264008	1264008
Y					216574	216754	216957	216957	217185	217185	217307	217307
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**								
Conventional Parameters (mg/kg)												
Ammonia as nitrogen	E350.1M				39	1.86	1.54	19.5	2.37	29.4	0.46	1.67
Sulfide	SM4500S2D				159 J	67.4 J	108 J	82.6 J	63.1 J	77.4 J	83.8	60
Conventional Parameters (pct)												
Total organic carbon	Plumb 1981				0.486	0.393	0.768	0.486	0.954	0.665	1.19	1.07
Total solids	SM2540G				72.29	76.83	72.87	73.98	73.63	73.27	77.65	78.49
Total solids (preserved)	SM2540G				76.5	73.2	70.52	74.95	66.86	68.83	67.84	72.91
Total volatile solids	SM2540G				2.7	1.72	2.75	2.35	2.72	2.34	2.92	2.84
Grain Size (pct retained by sieve size in microns)												
Gravel (>2000)	PSEP				0.1	0.1	0.3	0.1	0.4	0.1	0.5	0.4
Sand, very coarse (2000 to 1000)	PSEP				0.1	0.1	0.4	0.2	0.4	0.2	0.6	0.6
Sand, coarse (1000 to 500)	PSEP				5	0.7	1.5	0.4	1.3	0.6	3.5	3.5
Sand, medium (500 to 250)	PSEP				0.1 U	21.4	20	6.8	12.5	8.1	24.9	35.6
Sand, fine (250 to 125)	PSEP				10.7	47.8	42	31.5	36	36	33.2	38.6
Sand, very fine (125 to 62)	PSEP				18.5	15	19	30.4	22	25.9	20.1	9.9
Total Sand (2000 to 62.5)	PSEP				34.3	85	82.9	69.3	72.2	70.8	82.3	88.2
Silt, coarse (62.5 to 31.0)	PSEP				22.9	4.4	5.2	10.8	9.1	10.3	6.4	3.3
Silt, medium (31.0 to 15.6)	PSEP				18.4	3.2	2.9	6.6	4.9	6.2	3.4	2.8
Silt, fine (15.6 to 7.8)	PSEP				9	1.8	2	3.9	4.2	4	1.9	1.4
Silt, very fine (7.8 to 3.9)	PSEP				5	1.5	1.9	3	2.5	2.7	1.3	1
Clay, coarse (3.9 to 2.0)	PSEP				3.2	1.2	1.2	1.8	1.9	1.8	1.2	0.8
Clay, medium (2.0 to 1.0)	PSEP				2.3	1	1.2	1.6	1.6	1.4	0.8	0.6
Clay, fine (<1.0)	PSEP				4.7	1.9	2.3	3	3.3	2.7	2.1	1.5
Total fines (<62.5)	PSEP				65.5	15.0	16.7	30.7	27.5	29.1	17.1	11.4
Metals (mg/kg dry weight)												
Antimony	SW6010C	150		200	1.14 J	1.43 J	3.87 J	1.45 J	1.47 J	0.99 J	0.42 J	0.44 J
Arsenic	SW6010C	57	507.1	700	8	8	11	8	8	4.56 J	5.25 J	4.42 J
Cadmium	SW6010C	5.1	11.3	14	0.3	0.3	0.3	0.4	0.3	0.23 J	0.17 J	0.17 J
Chromium	SW6010C	260	260		19.2	18.5	20.6	18.8	17.4	12.8	10.5	9.8
Copper	SW6010C	390	1027	1300	26.3	47.4	54.2	31.6	39	15.6	13.2	10
Lead	SW6010C	450	975	1200	5	24	42	13	24	1.69 J	1.88 J	1.37 J
Mercury	SW7471A	0.41	1.5	2.3	0.11	0.14	0.65	0.32	0.34	0.0301 U	0.0095 J	0.005 J
Nickel	SW6010C				13	11	12	14	11	9	7	7
Selenium	SW6020A		3		0.23 J	0.6 U	0.17 J	0.16 J	0.18 J	0.6 U	0.6 U	0.6 U
Silver	SW6010C	6.1	6.1	8.4	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.3 U
Zinc	SW6010C	410	2783	3800	36	62	99	45	63	24	22	19
Organometallic Compounds (µg/kg)												
Tributyltin ion (bulk)	Krone		73		3.8 U	34	94	3.7 U	32	3.6 U	2.6 J	3.4 U
Polycyclic Aromatic Hydrocarbons (µg/kg dry weight)												
Naphthalene	SW8270DSIM	2100		2400	7 J	26 J	44 J	40 J	60 J	2.7 J	5.6 J	4.8 UJ
Acenaphthylene	SW8270DSIM	560		1300	2.9 J	11 J	17 J	17 J	25 J	4.7 UJ	4.9 UJ	4.8 UJ
Acenaphthene	SW8270DSIM	500		2000	3.3 J	8.8 J	23 J	24 J	16 J	4.7 UJ	4.9 UJ	4.8 UJ
Fluorene	SW8270DSIM	540		3600	4.5 J	11 J	22 J	17 J	19 J	4.7 UJ	3 J	4.8 UJ
Phenanthrene	SW8270DSIM	1500		21000	18	50	140	65	110	12	13	6.5
Anthracene	SW8270DSIM	960		13000	6.9 J	23 J	47 J	31 J	42 J	4.7 UJ	4.2 J	4.8 UJ
2-Methylnaphthalene	SW8270DSIM	670		1900	3.6 J	7.9 J	18 J	14 J	21 J	3.4 J	4 J	2.4 J
Total LPAH (DMMP) (U = 0)	SW8270DSIM	5200		29000	42.6 J	129.8 J	293 J	194 J	272 J	14.7 J	25.8 J	6.5 J
Fluoranthene	SW8270DSIM	1700	4600	30000	17	71	210	86	140	6	13	4.8 U
Pyrene	SW8270DSIM	2600	11980	16000	30 J	120 J	250 J	160 J	180 J	5.4 J	30 J	4.8 UJ
Benzo(a)anthracene	SW8270DSIM	1300		5100	6 J	28 J	94 J	27 J	56 J	4.7 UJ	6.3 J	4.8 UJ
Chrysene	SW8270DSIM	1400		21000	8.5	36	130	38	72	3.7 J	9.8 J	4.8 UJ
Total Benzofluoranthenes (b,j,k) (U = 0)	SW8270DSIM	3200		9900	27	110	320	140	200	4.7 U	24	4.8 U
Benzo(a)pyrene	SW8270DSIM	1600		3600	12 J	51 J	150 J	65 J	97 J	4.7 UJ	11 J	4.8 UJ
Indeno(1,2,3-c,d)pyrene	SW8270DSIM	600		4400	7.3	28	86	33	56	4.7 U	6.8 J	4.8 UJ
Dibenzo(a,h)anthracene	SW8270DSIM	230		1900	4.9 U	14	41	16	61	4.7 U	8.7	4.8 U

Table 5
Sample Results Summary

Location ID					WWD13_2015	WWD14_2015	WWD15_2015	WWD15_2015	WWD16_2015	WWD16_2015	WWD17_2015	WWD17_2015
Sample ID					WWD13-4-6.2-150204	WWD14-0-4-150204	WWD15-0-4-150204	WWD15-4-5.9-150204	WWD16-0-4-150204	WWD16-4-7.7-150204	WWD17-0-4-150209	WWD17-4-8-150209
Sample Date					02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/04/2015	02/09/2015	02/09/2015
Depth					4 - 6.2 ft	0 - 4 ft	0 - 4 ft	4 - 5.9 ft	0 - 4 ft	4 - 7.7 ft	0 - 4 ft	4 - 8 ft
X					1263921	1263829	1263894	1263894	1263821	1263821	1264008	1264008
Y					216574	216754	216957	216957	217185	217185	217307	217307
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**								
Benzo(g,h,i)perylene	SW8270DSIM	670		3200	**11**	**29**	**85**	**40**	**65**	**8.3**	**8.4 J**	4.8 UJ
Total HPAH (DMMP) (U = 0)	SW8270DSIM	12000		69000	**118.8 J**	**487 J**	**1366 J**	**605 J**	**927 J**	**23.4 J**	**118 J**	4.8 UJ
Total PAH	SW8270DSIM				**165 J**	**624.7 J**	**1677 J**	**813 J**	**1220 J**	**41.5 J**	**147.8 J**	**8.9 J**
Chlorinated Hydrocarbons (µg/kg dry weight)												
1,4-Dichlorobenzene	SW8270D-DUALSCAN	110		120	4.9 U	5 U	**4.6 J**	**2.9 J**	**3.9 J**	4.7 U	**7.5**	**2.6 J**
1,2-Dichlorobenzene	SW8270D-DUALSCAN	35		110	4.9 U	5 U	**3.4 J**	**3.2 J**	**4 J**	4.7 U	**6.5**	**2.9 J**
1,2,4-Trichlorobenzene	SW8270D-DUALSCAN	31		64	4.9 U	5 U	4.7 U	4.8 U	4.8 U	4.7 U	4.9 U	4.8 U
Hexachlorobenzene	SW8081B	22	168	230	0.95 U	0.95 U	0.97 U	0.98 U	0.99 U	0.97 U	2.5 U	3 U
Phthalates (µg/kg dry weight)												
Dimethyl phthalate	SW8270D-DUALSCAN	71		1400	4.9 U	5 U	4.7 U	4.8 U	**2.5 J**	4.7 U	**5.1**	**3.1 J**
Diethyl phthalate	SW8270D-DUALSCAN	200		1200	19 U	20 U	19 U	19 U	**28**	19 U	20 U	19 U
Di-n-butyl phthalate	SW8270D-DUALSCAN	1400		5100	**19**	**12 J**	19 U	19 U	**14 J**	19 U	**11 J**	**7.7 J**
Butylbenzyl phthalate	SW8270D-DUALSCAN	63		970	4.9 U	5 U	**8.6**	**4.4 J**	**6.8**	**3.7 J**	**4.4 J**	**2.9 J**
bis(2-Ethylhexyl)phthalate	SW8270D-DUALSCAN	1300		8300	49 U	**33 J**	**43 J**	48 U	**31 J**	47 U	49 U	48 U
Di-n-octyl phthalate	SW8270D-DUALSCAN	6200		6200	19 U	20 U	19 U	19 U	19 U	19 U	20 U	19 U
Phenols (µg/kg dry weight)												
Phenol	SW8270D-DUALSCAN	420		1200	30 U	15 U	34 U	25 U	24 U	24 U	83 U	76 U
2-Methylphenol (o-Cresol)	SW8270D-DUALSCAN	63		77	4.9 U	5 U	**2.8 J**	**2.5 J**	**14**	4.7 U	4.9 U	4.8 U
4-Methylphenol (p-Cresol)	SW8270D-DUALSCAN	670		3600	**5.7**	**4.8 J**	**19**	**8.8**	**12**	**5.9**	**16**	**7.6**
2,4-Dimethylphenol	SW8270D-DUALSCAN	29		210	24 UJ	25 UJ	24 UJ	24 UJ	24 UJ	24 UJ	**10 J**	24 UJ
Pentachlorophenol	SW8270D-DUALSCAN	400	504	690	19 U	20 U	**21 J**	**11 J**	**150 J**	19 U	20 U	19 U
Miscellaneous Extractables (µg/kg dry weight)												
Benzyl alcohol	SW8270D-DUALSCAN	57		870	19 UJ	20 UJ	19 UJ	19 UJ	19 UJ	19 UJ	20 U	19 U
Benzoic acid	SW8270D-DUALSCAN	650		760	190 U	200 U	190 U	190 U	190 U	190 U	**93 J**	**58 J**
Dibenzofuran	SW8270DSIM	540		1700	**4.2 J**	**8.7 J**	**16 J**	**19 J**	**20 J**	**2.4 J**	**3.1 J**	4.8 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8081B	11		270	0.95 U	0.95 U	0.97 U	0.98 U	0.99 U	0.97 U	1.7 U	1.8 U
n-Nitrosodiphenylamine	SW8270D-DUALSCAN	28		130	4.9 U	5 U	4.7 U	4.8 U	4.8 U	4.7 U	4.9 U	4.8 U
Pesticides (µg/kg dry weight)												
4,4'-DDD (p,p'-DDD)	SW8081B	16			0.95 U	0.95 U	0.97 U	0.98 U	5.1 U	0.97 U	0.94 U	0.97 U
4,4'-DDE (p,p'-DDE)	SW8081B	9			0.95 U	0.95 U	4.9 U	0.98 U	0.99 U	0.97 U	0.94 U	0.97 U
4,4'-DDT (p,p'-DDT)	SW8081B	12			0.95 U	0.95 U	52 U	3.4 U	5.7 U	0.97 U	0.94 U	0.97 U
Sum 4,4 DDT, DDE, DDD (U = 0)			50	69	0.95 U	0.95 U	52 U	3.4 U	5.7 U	0.97 U	0.94 U	0.97 U
Aldrin	SW8081B	9.5			0.48 U	0.48 U	0.48 U	0.49 U	0.5 U	0.49 U	0.47 U	0.49 U
Total DMMP Chlordane (U = 0)		2.8	37		0.95 U	0.95 U	33 U	0.98 U	1.4 U	0.97 U	0.94 U	0.97 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B				0.48 U	0.48 U	0.48 U	0.49 U	0.5 U	0.49 U	0.47 U	0.49 U
Chlordane, beta- (Chlordane, trans-)	SW8081B				0.48 U	0.48 U	0.48 U	0.49 U	0.5 U	0.49 U	0.47 U	0.49 U
Nonachlor, cis-	SW8081B				0.95 U	0.95 U	33 U	0.98 U	0.99 U	0.97 U	0.94 U	0.97 U
Nonachlor, trans-	SW8081B				0.95 U	0.95 U	0.97 U	0.98 U	1.4 U	0.97 U	0.94 U	0.97 U
Oxychlordane	SW8081B				0.95 U	0.95 U	0.97 U	0.98 U	0.99 U	0.97 U	0.94 U	0.97 U
Dieldrin	SW8081B	1.9		1700	0.95 U	0.95 U	12 U	0.98 U	0.99 U	0.97 U	0.94 U	0.97 U
Heptachlor	SW8081B	1.5		270	0.48 U	0.48 U	0.48 U	0.49 U	0.5 U	0.49 U	0.47 U	0.49 U
PCB Aroclors (µg/kg)												
Aroclor 1016	SW8082A				9.8 U	9.2 U	9.4 U	9.5 U	9.6 U	9.4 U	9.2 U	8.9 U
Aroclor 1221	SW8082A				9.8 U	9.2 U	9.4 U	9.5 U	9.6 U	9.4 U	9.2 U	8.9 U
Aroclor 1232	SW8082A				9.8 U	9.2 U	9.4 U	9.5 U	9.6 U	9.4 U	9.2 U	8.9 U
Aroclor 1242	SW8082A				9.8 U	9.2 U	9.4 U	9.5 U	9.6 U	9.4 U	9.2 U	8.9 U
Aroclor 1248	SW8082A				9.8 U	9.2 U	38 U	9.5 U	48 U	9.4 U	14 U	8.9 U
Aroclor 1254	SW8082A				9.8 U	**26**	**95**	**18**	**140**	9.4 U	**31**	8.9 U
Aroclor 1260	SW8082A				9.8 U	**14**	**40**	**13**	**35**	9.4 U	9.2 U	8.9 U
Total DMMP PCB Aroclors (U = 0)		130		3100	9.8 U	**40**	**135**	**31**	**175**	9.4 U	**31**	8.9 U
PCB Aroclors (mg/kg-OC)												
Total DMMP PCB Aroclors (U = 0)			38		2.02 U	**10.2**	**17.6**	**6.38**	**18.3**	1.41 U	**2.61**	0.832 U
Dioxin Furans (ng/kg)												
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	0.199 U	--	--	0.322 U	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	**0.362 J**	--	--	**1.01**	--	--	--

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD13_2015 WWD13-4-6.2-150204 02/04/2015 4 - 6.2 ft 1263921 216574	WWD14_2015 WWD14-0-4-150204 02/04/2015 0 - 4 ft 1263829 216754	WWD15_2015 WWD15-0-4-150204 02/04/2015 0 - 4 ft 1263894 216957	WWD15_2015 WWD15-4-5.9-150204 02/04/2015 4 - 5.9 ft 1263894 216957	WWD16_2015 WWD16-0-4-150204 02/04/2015 0 - 4 ft 1263821 217185	WWD16_2015 WWD16-4-7.7-150204 02/04/2015 4 - 7.7 ft 1263821 217185	WWD17_2015 WWD17-0-4-150209 02/09/2015 0 - 4 ft 1264008 217307	WWD17_2015 WWD17-4-8-150209 02/09/2015 4 - 8 ft 1264008 217307
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	**0.394 J**	--	--	**1.18**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	**2.5**	--	--	**6.53**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	0.906 U	--	--	**2.35**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	**74.8**	--	--	**197**	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B				--	**603**	--	--	**1630**	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	**4.16 J**	--	--	**6.52 J**	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	**6.11 J**	--	--	**10.4 J**	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	**19.3 J**	--	--	**49.2**	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	**158**	--	--	**414**	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B				--	0.382 U	--	--	**0.891 J**	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	**0.319 J**	--	--	0.68 U	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	**0.451 J**	--	--	**1.16**	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	**2.27 J**	--	--	**4.36 J**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	0.762 U	--	--	**1.29**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B				--	**0.51 J**	--	--	**1.1 J**	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	**1.1**	--	--	**1.65 J**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B				--	**25.7**	--	--	**64.4 J**	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B				--	**2.12**	--	--	**4.08**	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B				--	**113**	--	--	**262 J**	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	E1613B				--	**6.95 J**	--	--	**16 J**	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	E1613B				--	**9.43 J**	--	--	**20.7 J**	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	E1613B				--	**32.2 J**	--	--	**74.7 J**	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	E1613B				--	**107**	--	--	**256 J**	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)		4			--	**2.63 J**	--	--	**6.69 J**	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		4			--	**2.43 J**	--	--	**6.52 J**	--	--	--

Notes:
Detected concentration is greater than DMMPSL2014 (DMMP Screening Level) criteria
Detected concentration is greater than DMMPBT2014 (DMMP bioaccumulation trigger) criteria
Detected concentration is greater than DMMPML2014 (DMMP maximum level) criteria
Non-detect limit is greater than one or more screening level
Bold = Detected result
J = Estimated value
R = Rejected
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
8270D-DUALSCAN captures data in both full scan and selected ion monitoring (SIM) mode. The highest detected value or lowest non-detected value has been selected
2-methylnaphthalene is not included in the summation of LPAH but is included in the summation of Total PAH

Table 5
Sample Results Summary

Location ID					WWD17_2015	WWD18_2015	WWD18_2015	WWD18_2015	WWD19_2015	WWD19_2015	WWD20_2015	WWD20_2015	WWD20_2015
Sample ID					WWD17-8-12-150209	WWD18-0-4-150205	WWD18-4-8-150205	WWD18-8-12-150205	WWD19-0-4-150209	WWD19-4-7.3-150209	WWD20-0-4-150209	WWD20-4-8-150209	WWD20-8-12-150209
Sample Date					02/09/2015	02/05/2015	02/05/2015	02/05/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Depth					8 - 12 ft	0 - 4 ft	4 - 8 ft	8 - 12 ft	0 - 4 ft	4 - 7.3 ft	0 - 4 ft	4 - 8 ft	8 - 12 ft
X					1264008	1263849	1263849	1263849	1263628	1263628	1264004	1264004	1264004
Y					217307	217441	217441	217441	217834	217834	217894	217894	217894
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**									
Conventional Parameters (mg/kg)													
Ammonia as nitrogen	E350.1M				3.19	3.18	11.8	27.5	0.41	4.64	7.13	33.2	58.7
Sulfide	SM4500S2D				61	64	159	110 J	13	98.1	168	461	632
Conventional Parameters (pct)													
Total organic carbon	Plumb 1981				0.547	0.848	0.811	0.541	0.371	0.726	0.331	0.623	0.386
Total solids	SM2540G				72.35	72.49	73.29	74.6	81.81	79.77	84.56	73.24	72.78
Total solids (preserved)	SM2540G				71.91	70.36	70.27	73.78	76.67	72.17	74.09	69.11	67.24
Total volatile solids	SM2540G				2.23	3.14	2.85	2.46	1.46	2.25	1.39	2.31	2.08
Grain Size (pct retained by sieve size in microns)													
Gravel (>2000)	PSEP				0.4	0.4	0.2	0.1	0.1	0.5	0.1 U	0.1	0.1
Sand, very coarse (2000 to 1000)	PSEP				0.4	0.5	0.3	0.1	0.1	0.3	0.1	0.2	0.1
Sand, coarse (1000 to 500)	PSEP				1.9	1.5	1.4	0.3	0.9	1.7	1.2	0.4	0.3
Sand, medium (500 to 250)	PSEP				32.8	21.2	11.7	5.2	22.4	22.8	28.1	5	1.4
Sand, fine (250 to 125)	PSEP				36.1	24.9	12.7	23.8	41.3	39.7	38.9	33.1	22.8
Sand, very fine (125 to 62)	PSEP				12.7	17.1	19.4	30.6	18	13.1	14.8	26.7	29.1
Total Sand (2000 to 62.5)	PSEP				83.9	65.2	45.5	60	82.7	77.6	83.1	65.4	53.7
Silt, coarse (62.5 to 31.0)	PSEP				6.9	13	17.8	14.2	6.8	8.3	6.3	12.3	18.7
Silt, medium (31.0 to 15.6)	PSEP				3.3	7.3	14.4	8.2	4.5	4.2	4.3	9	11.7
Silt, fine (15.6 to 7.8)	PSEP				0.1	4.3	7.3	5.7	1.4	2.8	1.8	4.7	4.9
Silt, very fine (7.8 to 3.9)	PSEP				1.4	2.4	4.2	2.9	1.6	2.5	1.6	2.7	3.8
Clay, coarse (3.9 to 2.0)	PSEP				1	2.1	3.1	2.7	0.8	1.2	1	1.7	2.1
Clay, medium (2.0 to 1.0)	PSEP				1.2	1.5	2.2	2.1	0.6	0.9	0.4	1.3	1.4
Clay, fine (<1.0)	PSEP				1.7	3.8	5.3	4.1	1.6	1.9	1.5	2.8	3.7
Total fines (<62.5)	PSEP				15.6	34.4	54.3	39.9	17.3	21.8	16.9	34.5	46.3
Metals (mg/kg dry weight)													
Antimony	SW6010C	150		200	6 UJ	0.68 J	0.58 J	0.62 J	0.72 J	0.63 J	6 UJ	0.7 J	0.83 J
Arsenic	SW6010C	57	507.1	700	4.38 J	5.93 J	6.01 J	5.41 J	3.6 J	4.26 J	4.81 J	5.8 J	6 J
Cadmium	SW6010C	5.1	11.3	14	0.3 U	0.24 J	0.24 J	0.22 J	0.13 J	0.2 U	0.15 J	0.21 J	0.19 J
Chromium	SW6010C	260	260		10.7	18.5	19	16	11.4	11.6	12	17.6	14.8
Copper	SW6010C	390	1027	1300	10.9	17 J	19.2 J	17.8 J	10.5	13.1	13.4	20.7	18.1
Lead	SW6010C	450	975	1200	1.34 J	3 J	2.19 J	2.03 J	1.88 J	1.45 J	2	3	2.27 J
Mercury	SW7471A	0.41	1.5	2.3	0.0052 J	0.03 J	0.0216 J	0.04 J	0.02	0.0061 J	0.0094 J	0.0265 J	0.0157 J
Nickel	SW6010C				7	11	12	11	8	8	8	11	10
Selenium	SW6020A		3		0.6 U	0.17 J	0.17 J	0.16 J	0.13 J	0.6 U	0.6 U	0.18 J	0.19 J
Silver	SW6010C	6.1	6.1	8.4	0.4 U	0.4 U	0.4 U	0.4 U	0.3 U	0.4 U	0.3 U	0.4 U	0.4 U
Zinc	SW6010C	410	2783	3800	21	25 J	27 J	25 J	21	22	26	29	27
Organometallic Compounds (µg/kg)													
Tributyltin ion (bulk)	Krone		73		3.6 U	3.7 U	3.7 U	3.7 U	3.3 U	3.4 U	3.3 U	3.6 U	3.7 U
Polycyclic Aromatic Hydrocarbons (µg/kg dry weight)													
Naphthalene	SW8270DSIM	2100		2400	2.9 J	6.3 J	4.8 UJ	4.8 UJ	8.9 J	3.7 J	4.7 UJ	4.8 UJ	4.8 UJ
Acenaphthylene	SW8270DSIM	560		1300	4.8 UJ	4.8 UJ	4.8 UJ	4.8 UJ	4.7 UJ	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Acenaphthene	SW8270DSIM	500		2000	4.8 UJ	4.8 UJ	4.8 UJ	4.8 UJ	3 J	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Fluorene	SW8270DSIM	540		3600	4.8 UJ	4.8 UJ	4.8 UJ	4.8 UJ	2.7 J	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Phenanthrene	SW8270DSIM	1500		21000	11	6.8 J	4.2 J	14 J	10	9.7	3 J	4.5 J	4.1 J
Anthracene	SW8270DSIM	960		13000	4.8 UJ	3.2 J	4.8 UJ	4.8 UJ	5.4 J	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
2-Methylnaphthalene	SW8270DSIM	670		1900	2.9 J	3.7 J	4.8 UJ	12 J	3.5 J	4.8 U	4.7 U	2.4 J	4.8 U
Total LPAH (DMMP) (U = 0)	SW8270DSIM	5200		29000	13.9 J	16.3 J	4.2 J	14 J	30 J	13.4 J	3 J	4.5 J	4.1 J
Fluoranthene	SW8270DSIM	1700	4600	30000	5	8.6	4.8 U	4.8 U	14	3.6 J	3.1 J	4.8 U	4.8 U
Pyrene	SW8270DSIM	2600	11980	16000	3.5 J	8.8 J	4.8 UJ	4.8 UJ	24 J	5.2 J	3.1 J	2.6 J	4.8 UJ
Benzo(a)anthracene	SW8270DSIM	1300		5100	4.8 UJ	3.7 J	4.8 UJ	4.8 UJ	5.3 J	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Chrysene	SW8270DSIM	1400		21000	4.2 J	4.7 J	4.8 U	4.8 U	5.9 J	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Total Benzofluoranthenes (b,j,k) (U = 0)	SW8270DSIM	3200		9900	4.8 U	7.4	4.8 U	4.8 U	14	4.8 U	4.7 U	4.8 U	4.8 U
Benzo(a)pyrene	SW8270DSIM	1600		3600	4.8 UJ	3.4 J	4.8 UJ	4.8 UJ	6.6 J	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Indeno(1,2,3-c,d)pyrene	SW8270DSIM	600		4400	4.8 UJ	4.8 U	4.8 U	4.8 U	3 J	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Dibenzo(a,h)anthracene	SW8270DSIM	230		1900	4.8 U	4.8 U	4.8 U	4.8 U	4.7 U	4.8 U	2.4 J	4.8 U	4.8 U

Table 5
Sample Results Summary

Location ID					WWD17_2015	WWD18_2015	WWD18_2015	WWD18_2015	WWD19_2015	WWD19_2015	WWD20_2015	WWD20_2015	WWD20_2015
Sample ID					WWD17-8-12-150209	WWD18-0-4-150205	WWD18-4-8-150205	WWD18-8-12-150205	WWD19-0-4-150209	WWD19-4-7.3-150209	WWD20-0-4-150209	WWD20-4-8-150209	WWD20-8-12-150209
Sample Date					02/09/2015	02/05/2015	02/05/2015	02/05/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Depth					8 - 12 ft	0 - 4 ft	4 - 8 ft	8 - 12 ft	0 - 4 ft	4 - 7.3 ft	0 - 4 ft	4 - 8 ft	8 - 12 ft
X					1264008	1263849	1263849	1263849	1263628	1263628	1264004	1264004	1264004
Y					217307	217441	217441	217441	217834	217834	217894	217894	217894
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**									
Benzo(g,h,i)perylene	SW8270DSIM	670		3200	4.8 UJ	**3.1 J**	4.8 U	4.8 U	**4.9 J**	4.8 UJ	4.7 UJ	4.8 UJ	4.8 UJ
Total HPAH (DMMP) (U = 0)	SW8270DSIM	12000		69000	**12.7 J**	**39.7 J**	4.8 UJ	4.8 UJ	**77.7 J**	**8.8 J**	**8.6 J**	**2.6 J**	4.8 UJ
Total PAH	SW8270DSIM				**29.5 J**	**59.7 J**	**4.2 J**	**26 J**	**111.2 J**	**22.2 J**	**11.6 J**	**9.5 J**	**4.1 J**
Chlorinated Hydrocarbons (µg/kg dry weight)													
1,4-Dichlorobenzene	SW8270D-DUALSCAN	110		120	**3 J**	4.8 U	4.8 U	4.8 U	4.7 U	4.8 U	4.7 U	4.8 U	4.8 U
1,2-Dichlorobenzene	SW8270D-DUALSCAN	35		110	**3 J**	4.8 U	4.8 U	4.8 U	4.7 U	4.8 U	4.7 U	4.8 U	4.8 U
1,2,4-Trichlorobenzene	SW8270D-DUALSCAN	31		64	4.8 U	4.8 U	4.8 U	4.8 U	4.7 U	4.8 U	4.7 U	4.8 U	4.8 U
Hexachlorobenzene	SW8081B	22	168	230	2.1 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Phthalates (µg/kg dry weight)													
Dimethyl phthalate	SW8270D-DUALSCAN	71		1400	**3.7 J**	4.8 U	4.8 U	4.8 U	4.7 U	4.8 U	4.7 U	4.8 U	4.8 U
Diethyl phthalate	SW8270D-DUALSCAN	200		1200	19 U	19 U	19 U	**28**	19 U	19 U	19 U	19 U	19 U
Di-n-butyl phthalate	SW8270D-DUALSCAN	1400		5100	**56**	19 U	**42**	19 U	**16 J**	**60**	**22**	**25**	**27**
Butylbenzyl phthalate	SW8270D-DUALSCAN	63		970	**3.8 J**	**3.4 J**	**4.2 J**	**5**	4.7 U	4.8 U	4.7 U	4.8 U	**3.9 J**
bis(2-Ethylhexyl)phthalate	SW8270D-DUALSCAN	1300		8300	48 U	48 U	48 U	48 U	47 U	48 U	47 U	48 U	48 U
Di-n-octyl phthalate	SW8270D-DUALSCAN	6200		6200	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
Phenols (µg/kg dry weight)													
Phenol	SW8270D-DUALSCAN	420		1200	82 U	27 U	21 U	18 U	43 U	60 U	73 U	77 U	77 U
2-Methylphenol (o-Cresol)	SW8270D-DUALSCAN	63		77	4.8 U	4.8 U	**2.7 J**	4.8 U	4.7 U	4.8 U	4.7 U	4.8 U	4.8 U
4-Methylphenol (p-Cresol)	SW8270D-DUALSCAN	670		3600	**9.6**	**2.6 J**	**9.3**	**5.4**	**3 J**	4.8 U	**4.6 J**	**9.2**	**6.2**
2,4-Dimethylphenol	SW8270D-DUALSCAN	29		210	24 UJ	24 UJ	24 UJ	24 UJ	24 UJ	24 UJ	23 UJ	24 UJ	24 UJ
Pentachlorophenol	SW8270D-DUALSCAN	400	504	690	19 U	19 UJ	**48 J**	19 UJ	19 U	19 U	19 U	19 U	19 U
Miscellaneous Extractables (µg/kg dry weight)													
Benzyl alcohol	SW8270D-DUALSCAN	57		870	19 U	19 UJ	**35 J**	19 UJ	19 U	19 U	19 U	19 U	19 U
Benzoic acid	SW8270D-DUALSCAN	650		760	**63 J**	190 U	**87 J**	**59 J**	190 U	190 U	190 U	**150 J**	**130 J**
Dibenzofuran	SW8270DSIM	540		1700	4.8 U	4.8 UJ	4.8 UJ	**3.9 J**	**2.9 J**	4.8 U	4.7 U	4.8 U	4.8 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8081B	11		270	1.4 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
n-Nitrosodiphenylamine	SW8270D-DUALSCAN	28		130	4.8 U	4.8 UJ	4.8 UJ	4.8 UJ	4.7 U	4.8 U	4.7 U	4.8 U	4.8 U
Pesticides (µg/kg dry weight)													
4,4'-DDD (p,p'-DDD)	SW8081B	16			0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
4,4'-DDE (p,p'-DDE)	SW8081B	9			0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
4,4'-DDT (p,p'-DDT)	SW8081B	12			0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Sum 4,4 DDT, DDE, DDD (U = 0)			50	69	0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Aldrin	SW8081B	9.5			0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.48 U	0.47 U	0.5 U	0.48 U
Total DMMP Chlordane (U = 0)		2.8	37		0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B				0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.48 U	0.47 U	0.5 U	0.51 U
Chlordane, beta- (Chlordane, trans-)	SW8081B				0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.48 U	0.47 U	0.5 U	0.48 U
Nonachlor, cis-	SW8081B				0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Nonachlor, trans-	SW8081B				0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Oxychlordane	SW8081B				0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Dieldrin	SW8081B	1.9		1700	0.98 U	0.99 U	0.98 U	0.98 U	0.96 U	0.97 U	0.95 U	0.99 U	0.94 U
Heptachlor	SW8081B	1.5		270	0.49 U	50 U	1.3 U	0.49 U	0.48 U	0.48 U	0.47 U	0.5 U	0.47 U
PCB Aroclors (µg/kg)													
Aroclor 1016	SW8082A				9.5 U	9.5 U	9.5 U	9.5 U	8.7 U	8.8 U	8.6 U	9.6 U	9.7 U
Aroclor 1221	SW8082A				9.5 U	9.5 U	9.5 U	9.5 U	8.7 U	8.8 U	8.6 U	9.6 U	9.7 U
Aroclor 1232	SW8082A				24 U	9.5 U	9.5 U	9.5 U	22 U	22 U	22 U	9.6 U	24 U
Aroclor 1242	SW8082A				9.5 U	9.5 U	9.5 U	9.5 U	8.7 U	8.8 U	8.6 U	9.6 U	9.7 U
Aroclor 1248	SW8082A				9.5 U	9.5 U	9.5 U	9.5 U	8.7 U	8.8 U	8.6 U	9.6 U	9.7 U
Aroclor 1254	SW8082A				9.5 U	9.5 U	9.5 U	9.5 U	8.7 U	8.8 U	8.6 U	9.6 U	9.7 U
Aroclor 1260	SW8082A				9.5 U	9.5 U	9.5 U	9.5 U	8.7 U	8.8 U	8.6 U	9.6 U	9.7 U
Total DMMP PCB Aroclors (U = 0)		130		3100	24 U	9.5 U	9.5 U	9.5 U	22 U	22 U	22 U	9.6 U	24 U
PCB Aroclors (mg/kg-OC)													
Total DMMP PCB Aroclors (U = 0)			38		4.39 U	1.12 U	1.17 U	1.76 U	5.93 U	3.03 U	6.65 U	1.54 U	6.22 U
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	0.0436 U	0.154 U	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	0.0416 U	0.0439 U	--	--	--	--	--	--

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD17_2015 WWD17-8-12-150209 02/09/2015 8 - 12 ft 1264008 217307	WWD18_2015 WWD18-0-4-150205 02/05/2015 0 - 4 ft 1263849 217441	WWD18_2015 WWD18-4-8-150205 02/05/2015 4 - 8 ft 1263849 217441	WWD18_2015 WWD18-8-12-150205 02/05/2015 8 - 12 ft 1263849 217441	WWD19_2015 WWD19-0-4-150209 02/09/2015 0 - 4 ft 1263628 217834	WWD19_2015 WWD19-4-7.3-150209 02/09/2015 4 - 7.3 ft 1263628 217834	WWD20_2015 WWD20-0-4-150209 02/09/2015 0 - 4 ft 1264004 217894	WWD20_2015 WWD20-4-8-150209 02/09/2015 4 - 8 ft 1264004 217894	WWD20_2015 WWD20-8-12-150209 02/09/2015 8 - 12 ft 1264004 217894
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	0.0694 U	0.0399 U	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	0.172 U	0.0738 U	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	0.149 U	0.152 U	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	5 U	1.42 U	--	--	--	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B				--	37.8 U	9.28 U	--	--	--	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				--	**0.371 J**	**0.477 J**	--	--	--	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				--	**0.538 J**	**0.433 J**	--	--	--	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				--	**2.6 J**	**1.59 J**	--	--	--	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				--	**17.3 J**	**3.74 J**	--	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B				--	0.0317 U	0.0299 U	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	0.0357 U	0.0299 U	--	--	--	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				--	0.0416 U	0.0319 U	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	0.0733 UJ	0.0219 UJ	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	0.0634 U	0.0299 U	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B				--	0.0515 U	0.0259 U	--	--	--	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				--	**0.0892 J**	0.0219 U	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B				--	0.735 U	**0.0698 J**	--	--	--	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B				--	0.0773 U	0.0299 U	--	--	--	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B				--	3.18 U	0.0618 U	--	--	--	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	E1613B				--	**0.116 J**	**0.104 J**	--	--	--	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	E1613B				--	**0.263 J**	0.0319 U	--	--	--	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	E1613B				--	**0.98 J**	**0.0526 J**	--	--	--	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	E1613B				--	**2.74 J**	**0.0696 J**	--	--	--	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)		4			--	**0.124 J**	**0.133 J**	--	--	--	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		4			--	**0.009 J**	**0.001 J**	--	--	--	--	--	--

Notes:
Detected concentration is greater than DMMPSL2014 (DMMP Screening Level) criteria
Detected concentration is greater than DMMPBT2014 (DMMP bioaccumulation trigger) criteria
Detected concentration is greater than DMMPML2014 (DMMP maximum level) criteria
Non-detect limit is greater than one or more screening level
Bold = Detected result
J = Estimated value
R = Rejected
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
8270D-DUALSCAN captures data in both full scan and selected ion monitoring (SIM) mode. The highest detected value or lowest non-detected value has been selected
2-methylnaphthalene is not included in the summation of LPAH but is included in the summation of Total PAH

Table 5
Sample Results Summary

Location ID					WWD21_2015	WWD21_2015	WWD22_2015	WWD22_2015	WWD23_2015	WWD23_2015
Sample ID					WWD21-0-4-150209	WWD21-4-8-150209	WWD22-0-4-150209	WWD22-4-8-150209	WWD23-0-4-150209	WWD23-4-8-150209
Sample Date					02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Depth					0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft
X					1263681	1263681	1263869	1263869	1263914	1263914
Y					217996	217996	218126	218126	218269	218269
Parameter	**Method**	**DMMPSL2014**	**DMMPBT2014**	**DMMPML2014**						
Conventional Parameters (mg/kg)										
Ammonia as nitrogen	E350.1M				**1.83**	**23.6**	**2.16**	**3.71**	**3.99**	**12.7**
Sulfide	SM4500S2D				**81.5**	**75.7**	**59.6**	**27.7**	**122**	**272**
Conventional Parameters (pct)										
Total organic carbon	Plumb 1981				**1.59**	**0.415**	**1.23**	**0.763**	**0.983**	**0.979**
Total solids	SM2540G				**74.26**	**74.98**	**71.03**	**80.83**	**69.9**	**73.43**
Total solids (preserved)	SM2540G				**70.14**	**72.61**	**64.88**	**72.42**	**67.16**	**71.61**
Total volatile solids	SM2540G				**2.22**	**2.07**	**3.06**	**2.3**	**2.94**	**2.24**
Grain Size (pct retained by sieve size in microns)										
Gravel (>2000)	PSEP				**0.6**	0.1 U	**0.6**	**0.2**	**0.1**	**0.1**
Sand, very coarse (2000 to 1000)	PSEP				**0.5**	**0.1**	**0.7**	**0.4**	**0.2**	**0.2**
Sand, coarse (1000 to 500)	PSEP				**1.7**	**0.9**	**1.1**	**2**	**0.6**	**1.5**
Sand, medium (500 to 250)	PSEP				**20.3**	**8.2**	**12.7**	**24.4**	**9.6**	**30.6**
Sand, fine (250 to 125)	PSEP				**35.9**	**11**	**29.5**	**27**	**29.3**	**32.4**
Sand, very fine (125 to 62)	PSEP				**20.1**	**20.4**	**19.9**	**17.5**	**19**	**13.1**
Total Sand (2000 to 62.5)	PSEP				**78.5**	**40.6**	**63.9**	**71.3**	**58.7**	**77.8**
Silt, coarse (62.5 to 31.0)	PSEP				**5.6**	**20**	**12.2**	**10.5**	**13.4**	**7.8**
Silt, medium (31.0 to 15.6)	PSEP				**6.2**	**18.7**	**7.8**	**7.9**	**11.4**	**5.9**
Silt, fine (15.6 to 7.8)	PSEP				**2.6**	**7.5**	**4.3**	**3.3**	**5**	**2.6**
Silt, very fine (7.8 to 3.9)	PSEP				**1.9**	**4.3**	**3.6**	**2.1**	**3.8**	**1.9**
Clay, coarse (3.9 to 2.0)	PSEP				**1.3**	**2.4**	**1.9**	**1.3**	**2.1**	**1.1**
Clay, medium (2.0 to 1.0)	PSEP				**0.9**	**2**	**1.8**	**1**	**1.7**	**0.5**
Clay, fine (<1.0)	PSEP				**2.4**	**4.6**	**4**	**2.2**	**3.7**	**2.3**
Total fines (<62.5)	PSEP				**20.9**	**59.5**	**35.6**	**28.3**	**41.1**	**22.1**
Metals (mg/kg dry weight)										
Antimony	SW6010C	150		200	**0.45 J**	**0.48 J**	**1.18 J**	**0.65 J**	**2.21 J**	**0.47 J**
Arsenic	SW6010C	57	507.1	700	**4.96 J**	**6.16 J**	**10**	**4.7 J**	**15**	**5.9 J**
Cadmium	SW6010C	5.1	11.3	14	**0.15 J**	**0.24 J**	**0.3**	**0.22 J**	**0.4**	**0.19 J**
Chromium	SW6010C	260	260		**12.1**	**16**	**22**	**12.9**	**24.9**	**13.2**
Copper	SW6010C	390	1027	1300	**11.9**	**19.9**	**116**	**14.9 J**	**66.9**	**11.6**
Lead	SW6010C	450	975	1200	**2.56 J**	**2.39 J**	**32**	**2.33 J**	**50**	**1.71 J**
Mercury	SW7471A	0.41	1.5	2.3	**0.0242 J**	**0.0192 J**	**0.87 J**	**0.0114 J**	**1.53**	**0.015 J**
Nickel	SW6010C				**8**	**10**	**15**	**9**	**15**	**9**
Selenium	SW6020A		3		0.6 U	**0.2 J**	**0.16 J**	0.6 U	**0.22 J**	0.6 U
Silver	SW6010C	6.1	6.1	8.4	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Zinc	SW6010C	410	2783	3800	**23**	**28**	**71**	**25**	**113**	**23**
Organometallic Compounds (µg/kg)										
Tributyltin ion (bulk)	Krone		73		**4**	3.6 U	**81**	3.4 U	**23**	3.6 U
Polycyclic Aromatic Hydrocarbons (µg/kg dry weight)										
Naphthalene	SW8270DSIM	2100		2400	**16 J**	4.7 UJ	**130 J**	**9 J**	**96 J**	5 UJ
Acenaphthylene	SW8270DSIM	560		1300	**4.4 J**	4.7 UJ	**58 J**	**15 J**	**37 J**	5 UJ
Acenaphthene	SW8270DSIM	500		2000	**4.1 J**	4.7 UJ	**37 J**	**2.8 J**	**26 J**	5 UJ
Fluorene	SW8270DSIM	540		3600	**5.8 J**	4.7 UJ	**47 J**	**4.5 J**	**29 J**	5 UJ
Phenanthrene	SW8270DSIM	1500		21000	**19**	**3.2 J**	**230 J**	**14**	**140**	**5.3**
Anthracene	SW8270DSIM	960		13000	**10 J**	4.7 UJ	**100 J**	**13 J**	**56 J**	5 UJ
2-Methylnaphthalene	SW8270DSIM	670		1900	**5.1**	4.7 U	**40**	**4.4 J**	**29**	5 U
Total LPAH (DMMP) (U = 0)	SW8270DSIM	5200		29000	**59.3 J**	**3.2 J**	**602 J**	**58.3 J**	**384 J**	**5.3 J**
Fluoranthene	SW8270DSIM	1700	4600	30000	**19**	4.7 U	**290 J**	**74 J**	**160**	**4.4 J**
Pyrene	SW8270DSIM	2600	11980	16000	**28 J**	4.7 UJ	**410 J**	**290 J**	**250 J**	**3.9 J**
Benzo(a)anthracene	SW8270DSIM	1300		5100	**7.6 J**	4.7 UJ	**130 J**	**77 J**	**67 J**	5 UJ
Chrysene	SW8270DSIM	1400		21000	**9.9 J**	4.7 UJ	**180 J**	**81 J**	**84 J**	5 UJ
Total Benzofluoranthenes (b,j,k) (U = 0)	SW8270DSIM	3200		9900	**27**	4.7 U	**460 J**	**130 J**	**260**	5 U
Benzo(a)pyrene	SW8270DSIM	1600		3600	**13 J**	4.7 UJ	**230 J**	**100 J**	**130 J**	5 UJ
Indeno(1,2,3-c,d)pyrene	SW8270DSIM	600		4400	**7.2 J**	4.7 UJ	**120 J**	**48 J**	**77 J**	5 UJ
Dibenzo(a,h)anthracene	SW8270DSIM	230		1900	**4.2 J**	4.7 U	**50 J**	**4 J**	**53**	5 U

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD21_2015 WWD21-0-4-150209 02/09/2015 0 - 4 ft 1263681 217996	WWD21_2015 WWD21-4-8-150209 02/09/2015 4 - 8 ft 1263681 217996	WWD22_2015 WWD22-0-4-150209 02/09/2015 0 - 4 ft 1263869 218126	WWD22_2015 WWD22-4-8-150209 02/09/2015 4 - 8 ft 1263869 218126	WWD23_2015 WWD23-0-4-150209 02/09/2015 0 - 4 ft 1263914 218269	WWD23_2015 WWD23-4-8-150209 02/09/2015 4 - 8 ft 1263914 218269
Benzo(g,h,i)perylene	SW8270DSIM	670		3200	**9.9 J**	4.7 UJ	**150 J**	**59 J**	**98 J**	5 UJ
Total HPAH (DMMP) (U = 0)	SW8270DSIM	12000		69000	**125.8 J**	4.7 UJ	**2020 J**	**863 J**	**1179 J**	**8.3 J**
Total PAH	SW8270DSIM				**190.2 J**	**3.2 J**	**2662 J**	**925.7 J**	**1592 J**	**13.6 J**
Chlorinated Hydrocarbons (µg/kg dry weight)										
1,4-Dichlorobenzene	SW8270D-DUALSCAN	110		120	4.7 U	4.7 U	**4.6 J**	4.8 U	**4.4 J**	5 U
1,2-Dichlorobenzene	SW8270D-DUALSCAN	35		110	4.7 U	4.7 U	**6.1 J**	**2.5 J**	**4.5 J**	5 U
1,2,4-Trichlorobenzene	SW8270D-DUALSCAN	31		64	4.7 U	4.7 U	5 U	4.8 U	5 U	5 U
Hexachlorobenzene	SW8081B	22	168	230	0.98 U	0.97 U	0.97 UJ	0.98 U	0.96 U	0.95 U
Phthalates (µg/kg dry weight)										
Dimethyl phthalate	SW8270D-DUALSCAN	71		1400	4.7 U	4.7 U	5 UJ	4.8 UJ	5 U	5 U
Diethyl phthalate	SW8270D-DUALSCAN	200		1200	19 U	19 U	20 U	19 U	20 U	20 U
Di-n-butyl phthalate	SW8270D-DUALSCAN	1400		5100	**59**	**56**	**61**	**24**	**23**	20 U
Butylbenzyl phthalate	SW8270D-DUALSCAN	63		970	4.7 U	4.7 U	**5.4**	4.8 U	**3.6 J**	5 U
bis(2-Ethylhexyl)phthalate	SW8270D-DUALSCAN	1300		8300	47 U	47 U	**41 J**	48 U	50 U	50 U
Di-n-octyl phthalate	SW8270D-DUALSCAN	6200		6200	19 U	19 U	20 U	19 U	20 U	20 U
Phenols (µg/kg dry weight)										
Phenol	SW8270D-DUALSCAN	420		1200	65 U	70 U	95 UJ	57 UJ	92 U	71 U
2-Methylphenol (o-Cresol)	SW8270D-DUALSCAN	63		77	4.7 U	4.7 U	**4.8 J**	4.8 U	**3.6 J**	5 U
4-Methylphenol (p-Cresol)	SW8270D-DUALSCAN	670		3600	**6.1**	**4 J**	**18**	**4.1 J**	**17 J**	**5.7**
2,4-Dimethylphenol	SW8270D-DUALSCAN	29		210	24 UJ	24 UJ	25 UJ	24 UJ	25 UJ	25 UJ
Pentachlorophenol	SW8270D-DUALSCAN	400	504	690	19 U	19 U	**20**	19 U	**16 J**	20 U
Miscellaneous Extractables (µg/kg dry weight)										
Benzyl alcohol	SW8270D-DUALSCAN	57		870	19 U	19 U	**-- R**	**-- R**	20 U	20 U
Benzoic acid	SW8270D-DUALSCAN	650		760	**70 J**	**69 J**	**140 J**	190 U	**140 J**	200 U
Dibenzofuran	SW8270DSIM	540		1700	**6.4**	4.7 U	**41**	**2.8 J**	**31**	5 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8081B	11		270	0.98 U	0.97 U	0.97 U	0.98 U	1.6 U	0.95 U
n-Nitrosodiphenylamine	SW8270D-DUALSCAN	28		130	4.7 U	4.7 U	5 UJ	4.8 U	5 U	5 U
Pesticides (µg/kg dry weight)										
4,4'-DDD (p,p'-DDD)	SW8081B	16			0.98 U	0.97 U	0.97 U	0.98 U	0.96 U	0.95 U
4,4'-DDE (p,p'-DDE)	SW8081B	9			0.98 U	0.97 U	0.97 UJ	0.98 U	0.96 U	0.95 U
4,4'-DDT (p,p'-DDT)	SW8081B	12			1.7 U	0.97 U	**-- R**	0.98 UJ	2.6 U	0.95 U
Sum 4,4 DDT, DDE, DDD (U = 0)			50	69	1.7 U	0.97 U	0.97 UJ	0.98 UJ	2.6 U	0.95 U
Aldrin	SW8081B	9.5			0.49 U	0.49 U	0.48 UJ	0.49 U	0.48 U	0.48 U
Total DMMP Chlordane (U = 0)		2.8	37		0.98 U	0.97 U	2.2 UJ	0.98 U	1.1 U	0.95 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B				0.49 U	0.49 U	0.48 UJ	0.49 U	0.48 U	0.48 U
Chlordane, beta- (Chlordane, trans-)	SW8081B				0.49 U	0.49 U	0.48 UJ	0.49 U	0.48 U	0.48 U
Nonachlor, cis-	SW8081B				0.98 U	0.97 U	0.97 U	0.98 U	0.96 U	0.95 U
Nonachlor, trans-	SW8081B				0.98 U	0.97 U	2.2 U	0.98 U	1.1 U	0.95 U
Oxychlordane	SW8081B				0.98 U	0.97 U	0.97 U	0.98 U	0.96 U	0.95 U
Dieldrin	SW8081B	1.9		1700	0.98 U	0.97 U	0.97 UJ	0.98 U	0.96 U	0.95 U
Heptachlor	SW8081B	1.5		270	0.49 U	0.49 U	0.48 UJ	0.49 UJ	0.48 U	0.48 U
PCB Aroclors (µg/kg)										
Aroclor 1016	SW8082A				9.5 U	9.4 U	9.9 U	8.9 U	9.9 U	9.2 U
Aroclor 1221	SW8082A				9.5 U	9.4 U	9.9 U	8.9 U	9.9 U	9.2 U
Aroclor 1232	SW8082A				9.5 U	9.4 U	9.9 U	22 U	9.9 U	23 U
Aroclor 1242	SW8082A				9.5 UJ	9.4 UJ	9.9 UJ	8.9 UJ	9.9 U	9.2 U
Aroclor 1248	SW8082A				14 U	9.4 U	**31**	8.9 U	25 U	9.2 U
Aroclor 1254	SW8082A				**25 J**	9.4 UJ	**73 J**	8.9 UJ	**68**	9.2 U
Aroclor 1260	SW8082A				**8.3 J**	9.4 UJ	**54 J**	8.9 UJ	**29 J**	9.2 U
Total DMMP PCB Aroclors (U = 0)		130		3100	**33.3 J**	9.4 UJ	**158 J**	22 UJ	**97 J**	23 U
PCB Aroclors (mg/kg-OC)										
Total DMMP PCB Aroclors (U = 0)			38		**2.09 J**	2.27 UJ	**12.8 J**	2.88 UJ	**9.87 J**	2.35 U
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				0.26 U	0.0438 U	0.528 U	0.0478 U	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				0.314 U	0.0378 U	**1.57**	0.0558 U	--	--

Table 5
Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	DMMPSL2014	DMMPBT2014	DMMPML2014	WWD21_2015 WWD21-0-4-150209 02/09/2015 0 - 4 ft 1263681 217996	WWD21_2015 WWD21-4-8-150209 02/09/2015 4 - 8 ft 1263681 217996	WWD22_2015 WWD22-0-4-150209 02/09/2015 0 - 4 ft 1263869 218126	WWD22_2015 WWD22-4-8-150209 02/09/2015 4 - 8 ft 1263869 218126	WWD23_2015 WWD23-0-4-150209 02/09/2015 0 - 4 ft 1263914 218269	WWD23_2015 WWD23-4-8-150209 02/09/2015 4 - 8 ft 1263914 218269
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				**0.338 J**	0.0557 U	**1.62**	0.0458 U	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				**1.9**	0.0617 U	**9.35**	0.0916 U	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				0.797 U	0.101 U	**3.01**	**0.122 J**	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				**59**	1.04 U	**270**	1.69 U	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B				**479**	8.76 U	**2160**	13.1 U	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B				**3.86 J**	**0.304**	**11.8 J**	**0.305 J**	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B				**4.27 J**	**0.115 J**	**18.5 J**	**0.442 J**	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B				**15.1 J**	**0.929 J**	**71.1 J**	**1.39 J**	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B				**123**	**2.77 J**	**546**	**4.33 J**	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B				**0.356 J**	0.0378 U	**1.89 J**	0.0478 U	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				**0.324 J**	**0.0398 J**	**1.02**	0.0378 U	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B				**0.418 J**	0.0279 U	**1.7**	0.0478 UJ	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				**1.38 J**	0.0259 U	**4.32 J**	0.0359 UJ	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				**0.579 J**	0.0259 U	**1.98**	0.0438 U	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B				**0.386 J**	0.0358 UJ	**0.864 J**	**0.0976 J**	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B				0.731 U	0.0239 U	**1.58**	0.0319 U	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B				**21.3**	0.0398 U	**102**	0.223 U	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B				**1.49 J**	0.0517 U	**5.32**	0.0458 U	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B				**82.8**	0.261 U	**397**	0.829 U	--	--
Total Tetrachlorodibenzofuran (TCDF)	E1613B				**6.76 J**	**0.0933 J**	**31.1 J**	**0.0743**	--	--
Total Pentachlorodibenzofuran (PeCDF)	E1613B				**7.45 J**	**0.0596 J**	**33.4 J**	**0.11 J**	--	--
Total Hexachlorodibenzofuran (HxCDF)	E1613B				**22.2 J**	**0.0356 J**	**103 J**	**0.234 J**	--	--
Total Heptachlorodibenzofuran (HpCDF)	E1613B				**82.6 J**	**0.131 J**	**384**	**0.599 J**	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)		4			**1.98 J**	**0.072 J**	**9.38 J**	**0.108 J**	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		4			**1.62 J**	**0.001 J**	**9.11 J**	**0.022 J**	--	--

Notes:
Detected concentration is greater than DMMPSL2014 (DMMP Screening Level) criteria
Detected concentration is greater than DMMPBT2014 (DMMP bioaccumulation trigger) criteria
Detected concentration is greater than DMMPML2014 (DMMP maximum level) criteria
Non-detect limit is greater than one or more screening level
Bold = Detected result
J = Estimated value
R = Rejected
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
8270D-DUALSCAN captures data in both full scan and selected ion monitoring (SIM) mode. The highest detected value or lowest non-detected value has been selected
2-methylnaphthalene is not included in the summation of LPAH but is included in the summation of Total PAH

Table 6
Screening Level Exceedance Summary

Station ID	Surface A Interval	SL and/or BT Detected Exceedances in A Interval	Subsurface B Interval	SL and/or BT Detected Exceedances in B Interval	Subsurface C Interval	SL Detected Exceedances in C Interval	Subsurface D Interval
-57 feet MLLW Target Elevation							
WWD01	DMMP, TBT- Bulk	TBT, SVOC (benzoic acid, butyl benzyl phthalate), total PCB aroclors	DMMP, TBT- Bulk	Hg, TBT, SVOC (benzyl alcohol), PAH (pyrene), total PCB aroclors (SL and BT)	DMMP, TBT- Bulk	No	--
WWD02	DMMP, TBT- Bulk, D/F, Bio	Hg, TBT, total PCB aroclors, total D/F	DMMP, TBT- Bulk, D/F, Bio	Total PCB aroclors	DMMP, TBT- Bulk, D/F	No	--
WWD03	DMMP, TBT- Bulk, D/F	TBT, total PCB aroclors, total D/F	DMMP, TBT- Bulk, D/F	No	--	--	--
WWD04	DMMP, TBT- Bulk, D/F	Hg, TBT, SVOC (1,4-Dichlorobenzene), total PCB aroclors, total D/F	DMMP, TBT- Bulk, D/F	No	2-foot archive	--	--
WWD05	DMMP, TBT- Bulk, D/F, Bio	As, Hg, Zn, TBT, SVOC (benzoic acid), total PCB aroclors (SL and BT), total D/F	DMMP, TBT- Bulk, D/F	No	DMMP, TBT- Bulk, D/F	No	--
WWD06	DMMP, TBT- Bulk, D/F	Hg	DMMP, TBT- Bulk, D/F	No	2-foot archive	--	--
WWD07	DMMP, TBT- Bulk	Hg, total PCB aroclors	--	--	--	--	--
WWD08	DMMP, TBT- Bulk, D/F	Hg, total PCB aroclors, total D/F	DMMP, TBT- Bulk, D/F	No	--	--	--
WWD09	DMMP, TBT- Bulk	TBT, total PCB aroclors (SL and BT)	DMMP, TBT- Bulk	No	DMMP, TBT- Bulk	No	--
WWD10	DMMP, TBT- Bulk	Hg	DMMP, TBT- Bulk	No	--	--	--
WWD11	DMMP, TBT- Bulk, D/F	No	--	--	--	--	--
WWD12	DMMP, TBT- Bulk, D/F, Bio	Total PCB aroclors, total D/F	DMMP, TBT- Bulk, D/F	No	2-foot archive	--	--
WWD13	DMMP, TBT- Bulk	Hg, total PCB aroclors (SL and BT)	DMMP, TBT- Bulk	No	--	--	--
WWD14	DMMP, TBT- Bulk, D/F	No	--	--	--	--	--
WWD15	DMMP, TBT- Bulk	Hg, TBT, total PCB aroclors	DMMP, TBT- Bulk	No	--	--	--
-59 feet MLLW Target Elevation							
WWD16	DMMP, TBT- Bulk, D/F	Total PCB aroclors, total D/F	DMMP, TBT- Bulk	No	--	--	--
WWD17	DMMP, TBT- Bulk	No	DMMP, TBT- Bulk	No	DMMP, TBT- Bulk	No	2-foot archive
WWD18	DMMP, TBT- Bulk, D/F	No	DMMP, TBT- Bulk, D/F	No	DMMP, TBT- Bulk	No	--
WWD19	DMMP, TBT- Bulk	No	DMMP, TBT- Bulk	No	--	--	--
WWD20	DMMP, TBT- Bulk	No	DMMP, TBT- Bulk	No	DMMP, TBT- Bulk	No	2-foot archive
WWD21	DMMP, TBT- Bulk, D/F	No	DMMP, TBT- Bulk, D/F	No	--	--	--
WWD22	DMMP, TBT- Bulk, D/F	Hg, TBT, total PCB aroclors, total D/F	DMMP, TBT- Bulk, D/F	No	2-foot archive	--	--
WWD23	DMMP, TBT- Bulk	Hg	DMMP, TBT- Bulk	No	--	--	--

Notes:
Total of 50 samples, with 18 exceedances
DMMP testing parameters include SVOC, PAH, pesticide, PCB, metals, sulfide, ammonia, TOC, grain size, TVS, and TS
Shaded = Exceedance
"Bio" indicates that bioassays were run
-- = not applicable, no sample proposed or collected
BT = bioaccumulation trigger; TBT only has BT criteria
bulk = bulk sediment
D/F = dioxin/furan
DMMP = Dredged Material Management Program
MLLW = mean lower low water
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SL = screening level
SVOC = semivolatile organic compound
TBT = tributyltin
TOC = total organic carbon
TS = total solids
TVS = total volatile solids

Table 7. Marine Bioassay Performance Standards and Evaluation Guidelines

Bioassay	Negative Control Performance Standard	Reference Sediment Performance Standard	Dispersive Disposal Site Interpretation Guidelines		Nondispersive Disposal Site Interpretation Guidelines	
			1-hit rule	2-hit rule	1-hit rule	2-hit rule
Amphipod Mortality	$M_C \leq 10\%$	$M_R - M_C \leq 20\%$	$M_T - M_C > 20\%$ and M_T vs. M_R SS (p=.05) **AND**			
			$M_T - M_R > 10\%$	NOCN	$M_T - M_R > 30\%$	NOCN
Larval Development	$N_C \div I \geq 0.70$	$N_R \div N_C \geq 0.65$	$N_T \div N_C < 0.80$ and N_T/N_C vs. N_R/N_C SS (p=.10) **AND**			
			$N_R/N_C - N_T/N_C > 0.15$	NOCN	$N_R/N_C - N_T/N_C > 0.30$	NOCN
Neanthes Growth	$M_C \leq 10\%$ and $MIG_C \geq 0.38$	$M_R \leq 20\%$ and $MIG_R \div MIG_C \geq 0.80$	$MIG_T \div MIG_C < 0.80$ and MIG_T vs. MIG_R SS (p=.05) **AND**			
			$MIG_T/MIG_R < 0.70$	NOCN	$MIG_T/MIG_R < 0.50$	$MIG_T/MIG_R < 0.70$

M = mortality
N = normal larvae
I = initial count
MIG = mean individual growth rate (mg/individual/day)
SS = statistically significant
NOCN = no other conditions necessary

Subscripts:
R = reference sediment
C = negative control
T = test sediment

Table 8
Bioassay Conventional Chemistry Sample Results Summary

Location ID Sample ID Sample Date Depth X Y Parameter	Method	WWD02_2015 WWD02-0-4-150205 02/05/2015 0 - 4 ft 1263866 213221	WWD02_2015 WWD02-4-8-150205 02/05/2015 4 - 8 ft 1263866 213221	WWD05_2015 WWD05-0-4-150206 02/06/2015 0 - 4 ft 1263930 214825	WWD12_2015 WWD12-0-4-150206 02/06/2015 0 - 4 ft 1263956 216331	REF WWDREF-150319 03/19/2015 0 - 10 cm 1183501 126952
Conventional Parameters (mg/kg)						
Ammonia as nitrogen	E350.1M	6.65	12.4	6.77	1.04	10.7
Sulfide	SM4500S2D	627	277	2050 J	139 J	220
Conventional Parameters (pct)						
Total organic carbon	Plumb 1981	1.87	0.67	1.46	0.52	0.512
Total solids	SM2540G	63.83	72.5	63.28	76.67	67.00
Total solids (preserved)	SM2540G	66.37	69.99	58.4	73.29	66.92
Grain Size (pct retained by sieve size in microns)						
Gravel (>2000)	PSEP	0.4	0.6	2.5	0.2	0.1
Sand, very coarse (2000 to 1000)	PSEP	0.7	0.3	1.4	0.3	0.3
Sand, coarse (1000 to 500)	PSEP	2.6	0.5	4.8	4.7	1.0
Sand, medium (500 to 250)	PSEP	11.6	2.7	15.4	35.3	2.0
Sand, fine (250 to 125)	PSEP	14.6	13.3	15.3	34.4	9.9
Sand, very fine (125 to 62)	PSEP	15.5	29.8	11.7	9.8	41.0
Total sand (2000 to 62.5)	PSEP	45	46.6	48.6	84.5	54.2
Silt, coarse (62.5 to 31.0)	PSEP	12.5	19.2	9	3.9	21.5
Silt, medium (31.0 to 15.6)	PSEP	11	12.7	9.2	2.8	13.2
Silt, fine (15.6 to 7.8)	PSEP	9.4	6.3	8.3	2.0	2.8
Silt, very fine (7.8 to 3.9)	PSEP	6.8	4.5	5.5	1.7	1.7
Clay, coarse (3.9 to 2.0)	PSEP	4.6	3.1	4.5	1.1	2.1
Clay, medium (2.0 to 1.0)	PSEP	3.6	2.4	3.7	1.0	0.6
Clay, fine (<1.0)	PSEP	6.8	4.7	8.4	2.7	3.8
Total fines (<62.5)	PSEP	54.7	52.9	48.6	15.2	45.8

Notes:
cm = centimeter
ft = foot
mg/kg = milligram per kilogram
pct = percent

Table 9
Eohaustorius estuarius 10-Day Amphipod Mortality Test Results

Sample ID	Percent Mortality	Significantly Different from the Reference? (α = 0.05)	Percent Difference		2-hit Rule Exceedance[1, 3]	1-hit Rule Exceedance[1,2,3]
			From Negative Control	From Reference Value		
Control	1.0 ± 2.2	--	--	--	--	--
WWD02-0-4-150205	27.0 ± 7.6	**Yes**	**26.0**	22.0	**Yes**	No
WWD02-4-8-150205	7.0 ± 2.7	No	6.0	2.0	No	No
WWD05-0-4-150206	25.0 ± 11.7	**Yes**	**24.0**	20.0	**Yes**	No
WWD12-0-4-150206	1.0 ± 2.2	No	0.0	-4.0	No	No
WWDREF-150319	5.0 ± 3.5	--	--	--	--	--

Notes:
1. Samples exceed 2-hit nondispersive rule if result is greater than 20% over mean negative controls response and statistically different (α = 0.05) from the reference sediment
2. Samples fail 1-hit nondispersive rule if the 2-hit rule is exceeded and mortality is greater than 30% over the mean reference sediment response
3. Criteria shown only for nondispersive disposal; dispersive criteria not applicable

Bold indicates an exceedance of criteria

Table 10
Neanthes arenaceodentata 20-Day Juvenile Infaunal Growth Test Results

Sample ID	Individual Ash-free Growth Rate	Significantly Different from the Negative Control? (α = 0.05)	Significantly Different from the Reference? (α = 0.05)	Percent		2-hit Rule Exceedance[1, 3]	1-hit Rule Exceedance[1,2,3]
				Of Negative Control	Of Reference Value		
Control	0.44 ± 0.10	--	--	--	--		--
WWD02-0-4-150205	0.59 ± 0.06	No	No	120	134	No	No
WWD02-4-8-150205	0.57 ± 0.22	No	No	116	130	No	No
WWD05-0-4-150206	0.55 ± 0.06	No	No	112	125	No	No
WWD12-0-4-150206	0.54 ± 0.07	No	No	110	123	No	No
WWDREF-150319	0.49 ± 0.07	--	--	--	--		--

Notes:
1. Samples exceed 2-hit nondispersive rule if result is less than 80% of mean negative control growth rate and statistically different (α = 0.05) from the reference sediment
2. Samples fail 1-hit nondispersive rule if the 2-hit rule is exceeded and mean individual growth rate is less than 50% of the mean reference sediment growth rate
3. Criteria shown only for nondispersive disposal; dispersive criteria not applicable

Table 11
Mytilus galloprovincialis Larval Development Test Results

Sample ID	Number Normal (mean±SD)[4]	Significantly Different from the Reference? (α = 0.10)	Difference from the Reference Value (proportion)	2-hit Rule Exceedance[1, 3]	1-hit Rule Exceedance[1,2,3]
Seawater Control	195 ± 13	--	--	--	--
WWD02-0-4-150205	161 ± 11	No	0.07	No	No
WWD02-4-8-150205	166 ± 12	No	0.05	No	No
WWD05-0-4-150206	151 ± 30	No	0.12	No	No
WWD12-0-4-150206	196 ± 12	No	-0.11	No	No
WWDREF-150319	175 ± 45	--	--	--	--

Notes:
1. Samples exceed 2-hit nondispersive rule if mean result is less than 80% number normal compared to control and statistically different (α = 0.10) from the reference sediment
2. Samples fail 1-hit nondispersive rule if the 2-hit rule is exceeded and result is greater than 30% over mean reference
3. Criteria shown only for nondispersive disposal; dispersive criteria not applicable
4. The number normal was used for data interpretation rather than NCMA due to the NCMA resulting in negative numbers in some replicates
NCMA = normalized combined mortality and abnormality
SD = standard deviation

Table 12
Summary of Biological Testing Results

Sample ID	1-hit Rule Failure[1]			Exceedance of 2-hit Rule[2]			Pass/Fail for Nondispersive Disposal Based on Bioassay Analysis?
	Amphipod Mortality	Juvenile Growth	Larval Development	Amphipod Mortality	Juvenile Growth	Larval Development	
WWD02-0-4-150205	No	No	No	**Yes**	No	No	Pass
WWD02-4-8-150205	No	No	No	No	No	No	Pass
WWD05-0-4-150206	No	No	No	**Yes**	No	No	Pass
WWD12-0-4-150206	No	No	No	No	No	No	Pass

Notes:

1. When any one biological test shows a response that exceeds the bioassay single-hit guidelines, the test sediment is judged to be a 1-hit failure and unsuitable for aquatic disposal
2. When two or more tests show responses that exceed the bioassay two-hit guidelines, the sediment fails under the 2-hit rule and is judged to be unsuitable for unconfined open-water disposal

Table 13
West Waterway
DMMP Suitability Evaluation

Station ID	Surface A Interval	Detected SL/BT Exceedances	Suitable/Unsuitable	Primary Reason	Comments
WWD01	DMMP, TBT- Bulk	TBT, SVOC, PCB	unsuitable	probable D/F > 10	TBT=270>BT; PAH=5,978; PCBs=403; D/F=NA
WWD02	DMMP, TBT- Bulk, D/F, Bio	Hg, TBT, PCB, D/F	unsuitable	D/F=26.7	TBT=250>BT; Hg=0.43; PAH=3,974; PCBs=288; amphipod 2-hit
WWD03	DMMP, TBT- Bulk, D/F	TBT, PCB, D/F	unsuitable	D/F=10.4	TBT=100>BT; PAH=1,429; PCBs=220
WWD04	DMMP, TBT- Bulk, D/F	Hg, TBT, SVOC, PCB, D/F	unsuitable	D/F=11.1	TBT=110>BT; Hg=0.5; PAH=4,475; PCBs=177
WWD05	DMMP, TBT- Bulk, D/F, Bio	As, Hg, Zn, TBT, SVOC, PCB, D/F	unsuitable	D/F=32.7	TBT=220>BT; PAH=4,974; PCBs=700=47.3oc>BT; Hg=3.89>BT; amphipod 2-hit
WWD06	DMMP, TBT- Bulk, D/F	Hg	likely unsuitable	PAH=4,603	Hg=0.84; D/F=3.99
WWD07	DMMP, TBT- Bulk	Hg, PCBs	likely suitable	no BT exceedances; bioassays passed for worse samples	Hg=0.54; PAH=1,601; D/F=NA; PCBs=288
WWD08	DMMP, TBT- Bulk, D/F	Hg, PCBs, D/F	unsuitable	D/F=16.2	Hg=1.19; PAH=3,123; PCBs=376
WWD09	DMMP, TBT- Bulk	TBT, PCB	likely unsuitable	PCBs and TBT both exceed BT	PCBs=329=55.5oc>BT; TBT=140>BT; PAH=1,899; D/F=NA
WWD10	DMMP, TBT- Bulk	Hg	likely suitable	no BT exceedances; bioassays passed for worse samples	Hg=0.52; PAH=1,496; D/F=NA
WWD11	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=3.4; PAH=1,486	--
WWD12	DMMP, TBT- Bulk, D/F, Bio	PCB, D/F	suitable	no bioassay hits; D/F=4.51; PAH=804	PCBs=187
WWD13	DMMP, TBT- Bulk	Hg, PCB	likely suitable	no BT exceedances; bioassays passed for worse samples	Hg=0.66; PAH=1,603; PCBs=292*; D/F=NA
WWD14	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=2.63; PAH=624.7	--
WWD15	DMMP, TBT- Bulk	Hg, TBT, PCB	likely unsuitable	TBT=94>BT	Hg=0.65; PCBs=135; PAH=1,684; D/F=NA
WWD16	DMMP, TBT- Bulk, D/F	SVOC, PCB, D/F	likely suitable	no BT exceedances; bioassays passed for worse samples	PAH=1,220; PCBs=175; D/F=6.69
WWD17	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=147.8	D/F=NA
WWD18	DMMP, TBT- Bulk, D/F, Bio	No	suitable	no COCs>SL; D/F=0.12; PAH=59.7	--
WWD19	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=111.2	D/F=NA
WWD20	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=11.6	D/F=NA
WWD21	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=1.98; PAH=190.2	--
WWD22	DMMP, TBT- Bulk, D/F	Hg, TBT, PCB, D/F	likely unsuitable	PAH=2,662	TBT=81>BT; Hg=0.87; PCBs=158; D/F=9.4
WWD23	DMMP, TBT- Bulk	Hg	likely unsuitable	Hg=1.53>BT	PAH=1,592; D/F=NA

*TOC<0.5%; could not be carbon-normalized
DMMP standard testing parameters include SVOCs, PAHs, pesticides, PCBs, metals, sulfides, ammonia, TOC, grain size, TVS, and TS.

detected SL and/or BT exceedances
suitable or likely suitable for open-water disposal
unsuitable or likely unsuitable for open-water disposal
red text indicates D/F > 10 pptr TEQ; total PAH > 2,000 ug/kg; or BT exceedance

-- = not applicable, no sample proposed or collected; no comments
Bio = bioassays were run
BT = bioaccumulation trigger
bulk = bulk sediment
COC = chemical of concern
D/F = dioxins/furans
DMMP = Dredged Material Management Program standard testing parameters
NA = not analyzed
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls (Aroclors)
SL = screening level
SVOC = semivolatile organic compounds
TBT = tributyltin
TOC = total organic carbon
TS = total solids
TVS = total volatile solids

Table 13
West Waterway
DMMP Suitability Evaluation

Station ID	Subsurface B Interval	Detected SL/BT Exceedances	Suitable/Unsuitable	Primary Reason	Comments
WWD01	DMMP, TBT- Bulk	Hg, TBT, SVOC, PAH (pyrene), PCB	likely unsuitable	PAH=10,847; TBT=200>BT; PCBs=1,620=43.5oc>BT	dioxin=NA; no bioassay hits
WWD02	DMMP, TBT- Bulk, D/F, Bio	PCB	likely suitable	low-level SL exceedance; D/F=3.7; PAH=687	PCBs=176
WWD03	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=0.30; PAH=98.3	--
WWD04	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=0.13; PAH=98.2	--
WWD05	DMMP, TBT- Bulk, D/F, Bio	No	suitable	no COCs>SL; D/F=0.68; PAH=12.9	--
WWD06	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=0.18; PAH=450.4	--
WWD07	--	--	--	--	--
WWD08	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=0.04; PAH=35.5	--
WWD09	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=399.6	dioxin=NA
WWD10	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=5.6	dioxin=NA
WWD11	--	--	--	--	--
WWD12	DMMP, TBT- Bulk,D/F, Bio	No	suitable	no COCs>SL; D/F=0.11; PAH=3.5	--
WWD13	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=165	dioxin=NA
WWD14	--	--	--	--	--
WWD15	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=813; D/F=NA	--
WWD16	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=41.5	dioxin=NA
WWD17	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=8.9	dioxin=NA
WWD18	DMMP, TBT- Bulk,D/F, Bio	No	suitable	no COCs>SL; D/F=0.13; PAH=4.2	--
WWD19	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=22.2	dioxin=NA
WWD20	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=9.5	dioxin=NA
WWD21	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=0.07; PAH=3.2	--
WWD22	DMMP, TBT- Bulk, D/F	No	suitable	no COCs>SL; D/F=0.11; PAH=925.7	--
WWD23	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=13.6	dioxin=NA

*TOC<0.5%; could not be carbon-normalized
DMMP standard testing parameters include SVOCs, PAHs, pesticides, PCBs, metals, sulfides, ammonia, TOC, grain size, TVS, and TS.

detected SL and/or BT exceedances
suitable or likely suitable for open-water disposal
unsuitable or likely unsuitable for open-water disposal
red text indicates D/F > 10 pptr TEQ; total PAH > 2,000 ug/kg; or BT exceedance

-- = not applicable, no sample proposed or collected; no comments
Bio = bioassays were run
BT = bioaccumulation trigger
bulk = bulk sediment
COC = chemical of concern
D/F = dioxins/furans
DMMP = Dredged Material Management Program standard testing parameters
NA = not analyzed
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls (Aroclors)
SL = screening level
SVOC = semivolatile organic compounds
TBT = tributyltin
TOC = total organic carbon
TS = total solids
TVS = total volatile solids

Table 13
West Waterway
DMMP Suitability Evaluation

Station ID	Subsurface C Interval	Detected SL/BT Exceedances	Suitable/Unsuitable	Primary Reason	Comments	Subsurface D Interval
WWD01	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=10.4	dioxin=NA	--
WWD02	DMMP, TBT- Bulk, D/F, Bio	No	suitable	no COCs>SL; D/F=0.11; PAH=6.3	--	--
WWD03	--	--	--	--	--	--
WWD04	2 ft Archive	--	--	--	--	--
WWD05	DMMP, TBT- Bulk, D/F, Bio	No	suitable	no COCs>SL; D/F=0.20; PAH=9.0	--	--
WWD06	2 ft Archive	--	--	--	--	--
WWD07	--	--	--	--	--	--
WWD08	--	--	--	--	--	--
WWD09	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=4.4	dioxin=NA	--
WWD10	--	--	--	--	--	--
WWD11	--	--	--	--	--	--
WWD12	2 ft Archive	--	--	--	--	--
WWD13	--	--	--	--	--	--
WWD14	--	--	--	--	--	--
WWD15	--	--	--	--	--	--
WWD16	--	--	--	--	--	--
WWD17	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=29.5	dioxin=NA	2 ft Archive
WWD18	DMMP, TBT- Bulk, Bio	No	suitable	no COCs>SL; PAH=26	dioxin=NA	--
WWD19	--	--	--	--	--	--
WWD20	DMMP, TBT- Bulk	No	suitable	no COCs>SL; PAH=4.1	dioxin=NA	2 ft Archive
WWD21	--	--	--	--	--	--
WWD22	2 ft Archive	--	--	--	--	--
WWD23	--	--	--	--	--	--

*TOC<0.5%; could not be carbon-normalized
DMMP standard testing parameters include SVOCs, PAHs, pesticides, PCBs, metals, sulfides, ammonia, TOC, grain size, TVS, and TS.

detected SL and/or BT exceedances
suitable or likely suitable for open-water disposal
unsuitable or likely unsuitable for open-water disposal
red text indicates D/F > 10 pptr TEQ; total PAH > 2,000 ug/kg; or BT exceedance

-- = not applicable, no sample proposed or collected; no comments
Bio = bioassays were run
BT = bioaccumulation trigger
bulk = bulk sediment
COC = chemical of concern
D/F = dioxins/furans
DMMP = Dredged Material Management Program standard testing parameters
NA = not analyzed
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls (Aroclors)
SL = screening level
SVOC = semivolatile organic compounds
TBT = tributyltin
TOC = total organic carbon
TS = total solids
TVS = total volatile solids

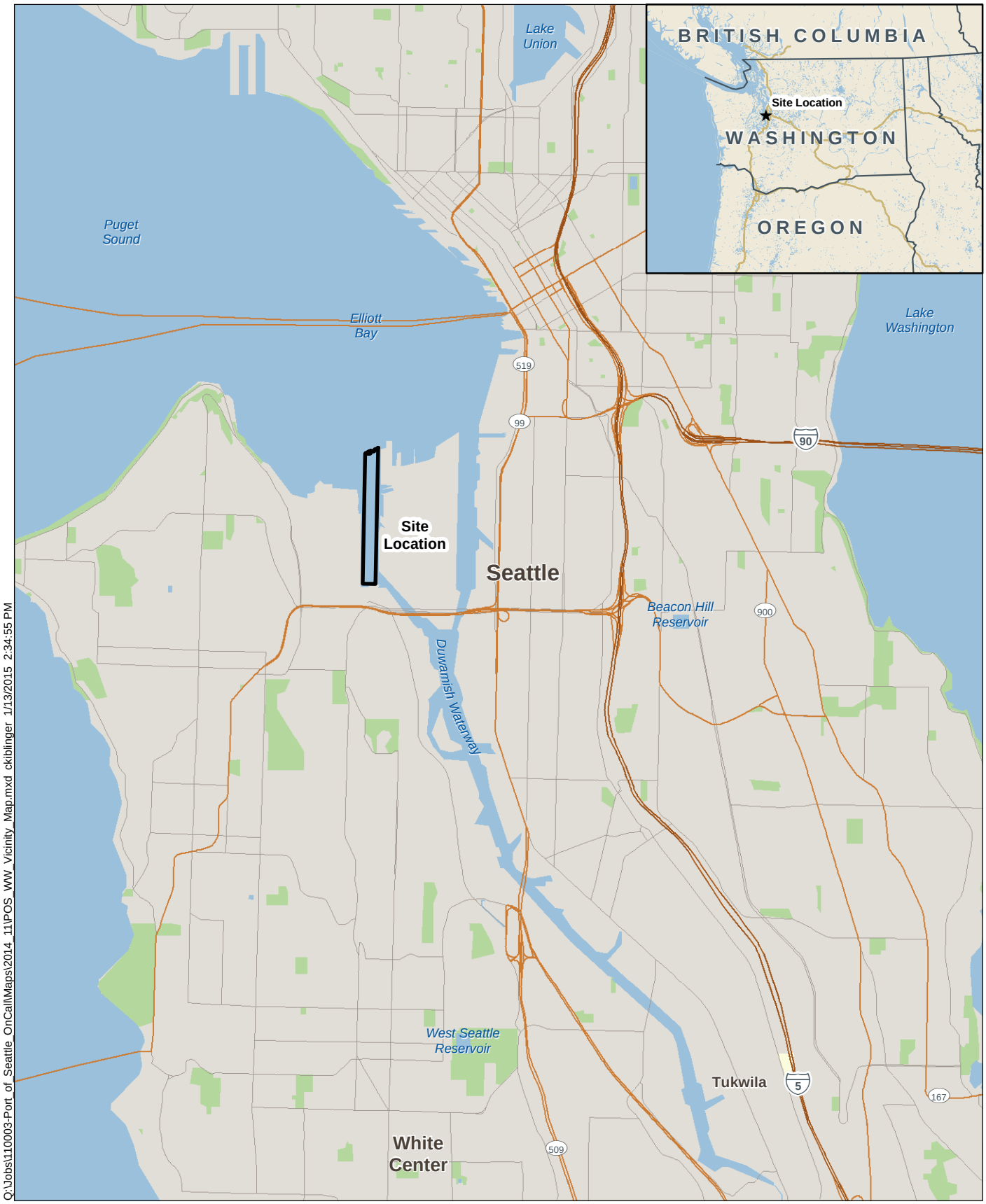
Table 14
West Waterway
Probability Approach

Station ID	Surface A Interval Suitable/Unsuitable	Suitability Probability	Average Suitability Probability	Rounded Suitability Probability
WWD01	unsuitable	0	0	0
WWD02	unsuitable	0		
WWD03	unsuitable	0		
WWD04	unsuitable	0		
WWD05	unsuitable	0		
WWD06	likely unsuitable	25	31.25	30[1]
WWD07	likely suitable	75		
WWD08	unsuitable	0		
WWD09	likely unsuitable	25		
WWD10	likely suitable	75	87.5	90
WWD11	suitable	100		
WWD12	suitable	100		
WWD13	likely suitable	75		
WWD14	suitable	100		
WWD15	likely unsuitable	25		
WWD16	likely suitable	75		
WWD17	suitable	100		
WWD18	suitable	100		
WWD19	suitable	100		
WWD20	suitable	100		
WWD21	suitable	100		
WWD22	likely unsuitable	25	25	30[1]
WWD23	likely unsuitable	25		

[1]rounded mean of stations 6, 7, 8, 9, 22, 23 = 29.2

Station ID	Surface B Interval Suitable/Unsuitable	Suitability Probability	Average Suitability Probability	Rounded Suitability Probability
WWD01	likely unsuitable	25	67.7	70
WWD02	likely suitable	75		
WWD03	suitable	100		
WWD04	suitable	100	100	100
WWD05	suitable	100		
WWD06	suitable	100		
WWD07	--	--		
WWD08	suitable	100		
WWD09	suitable	100		
WWD10	suitable	100		
WWD11	--	--		
WWD12	suitable	100		
WWD13	suitable	100		
WWD14	--	--		
WWD15	suitable	100		
WWD16	suitable	100		
WWD17	suitable	100		
WWD18	suitable	100		
WWD19	suitable	100		
WWD20	suitable	100		
WWD21	suitable	100		
WWD22	suitable	100		
WWD23	suitable	100		

suitable or likely suitable for open-water disposal
unsuitable or likely unsuitable for open-water disposal



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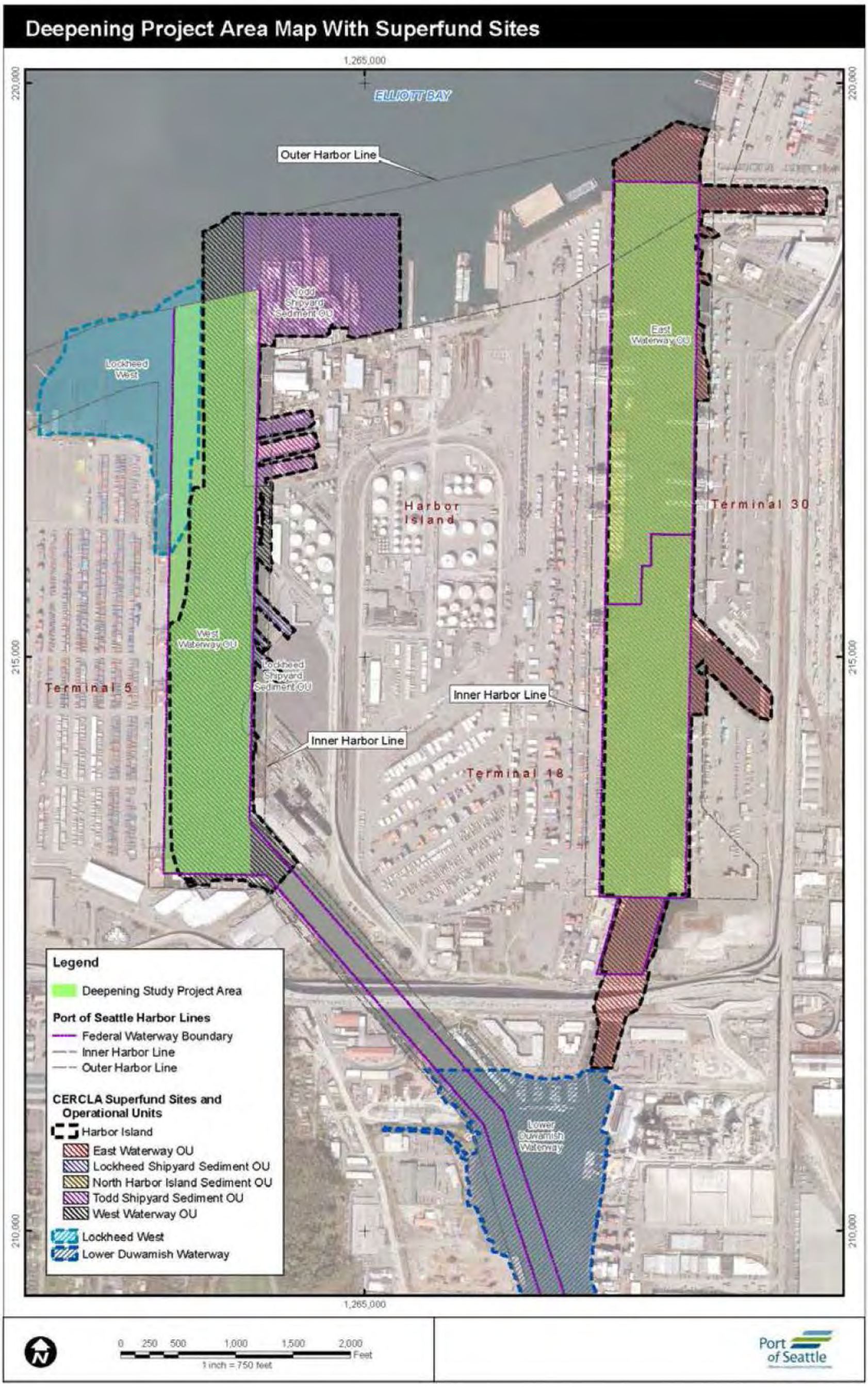
Miles
0 0.5 1

Figure 1
Vicinity Map
West Waterway Sediment Characterization
Port of Seattle



Source: Figure 6-11 from Section 905(b) Analysis (USACE and Port of Seattle 2014)
Note: Boundaries are approximate.

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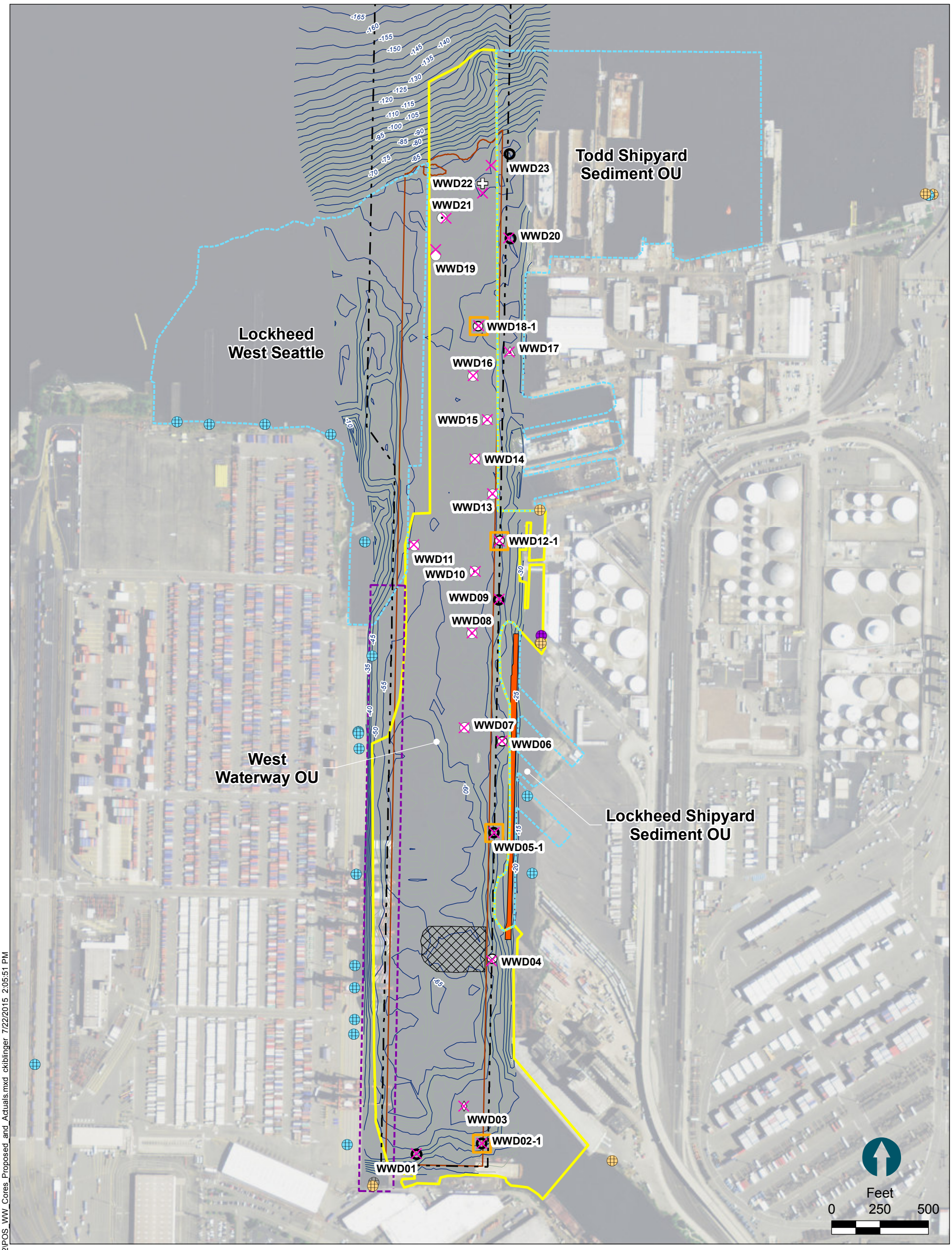
Figure 2
Superfund Site Operable Unit Boundaries
West Waterway Sediment Characterization
Port of Seattle



Actual Locations

Proposed Cores
(Elevation in ft, MLLW)
- -44 ft
- -45 ft
- -47 ft
- -48 ft
- -49 ft
- -51 ft
- -52 ft
- Bioassay Location (2 cores per location)

- Proposed Navigation Channel
- Existing 500-Foot Wide Navigation Channel
- T-5 Berth Upgrade Boundary
- Confined Aquatic Disposal
- West Waterway OU
- Other OUs
- T10 Temporary Buttress

Outfalls
- Port of Seattle
- Seattle Public Utilities
- Private
- Other

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Figure 3
Target and Actual Sample Locations
West Waterway Field Investigation Report
Port of Seattle

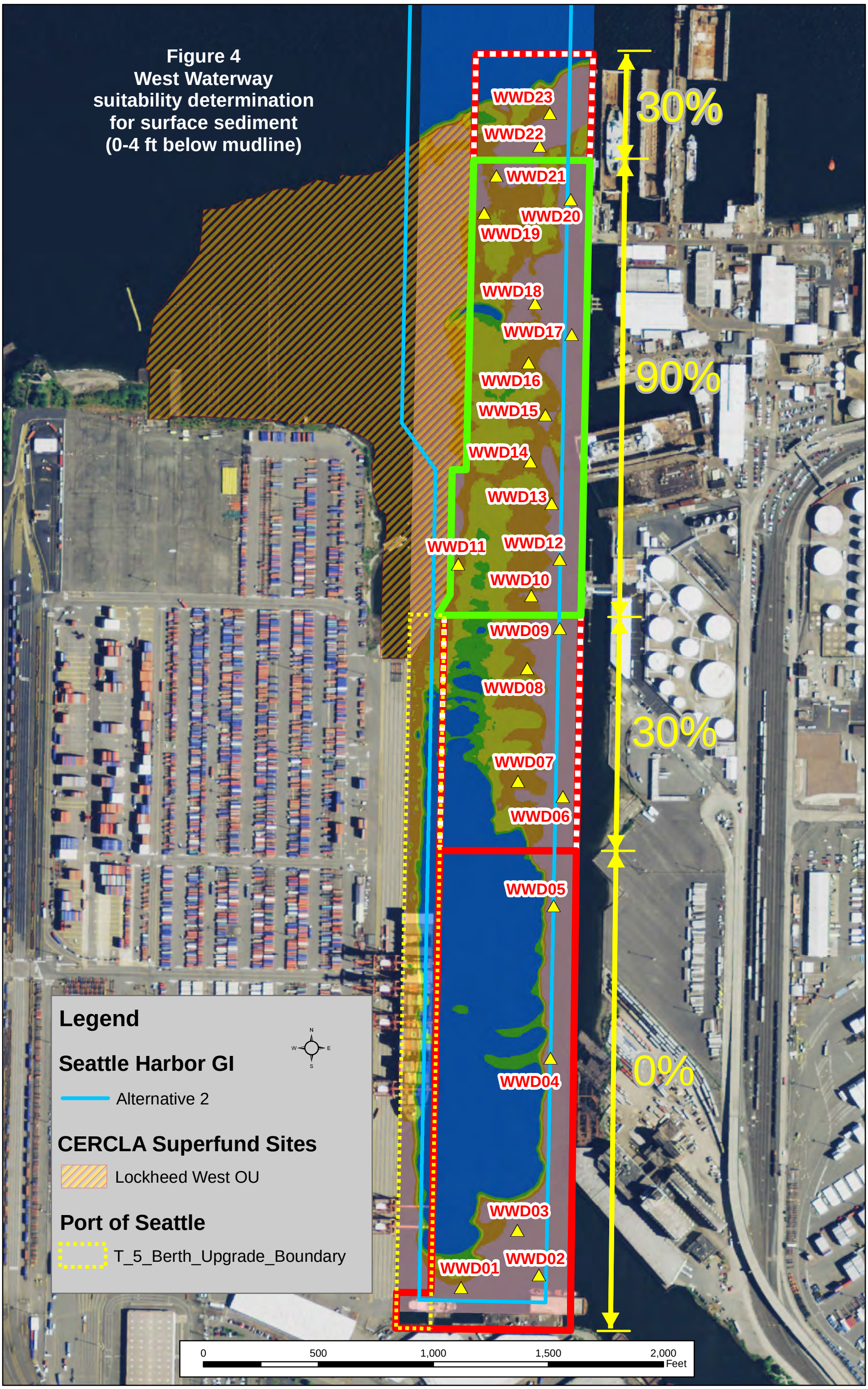
Figure 4
West Waterway
suitability determination
for surface sediment
(0-4 ft below mudline)
WWD23
WWD22
WWD21
WWD20
WWD19
WWD18
WWD17
WWD16
WWD15
WWD14
WWD13
WWD12
WWD11
WWD10
WWD09
WWD08
WWD07
WWD06
WWD05
WWD04
WWD03
WWD02
WWD01
30%
90%
30%
0%
Legend
Seattle Harbor GI
Alternative 2
CERCLA Superfund Sites
Lockheed West OU
Port of Seattle
T_5_Berth_Upgrade_Boundary
N
W
E
S
0
500
1,000
1,500
2,000
Feet

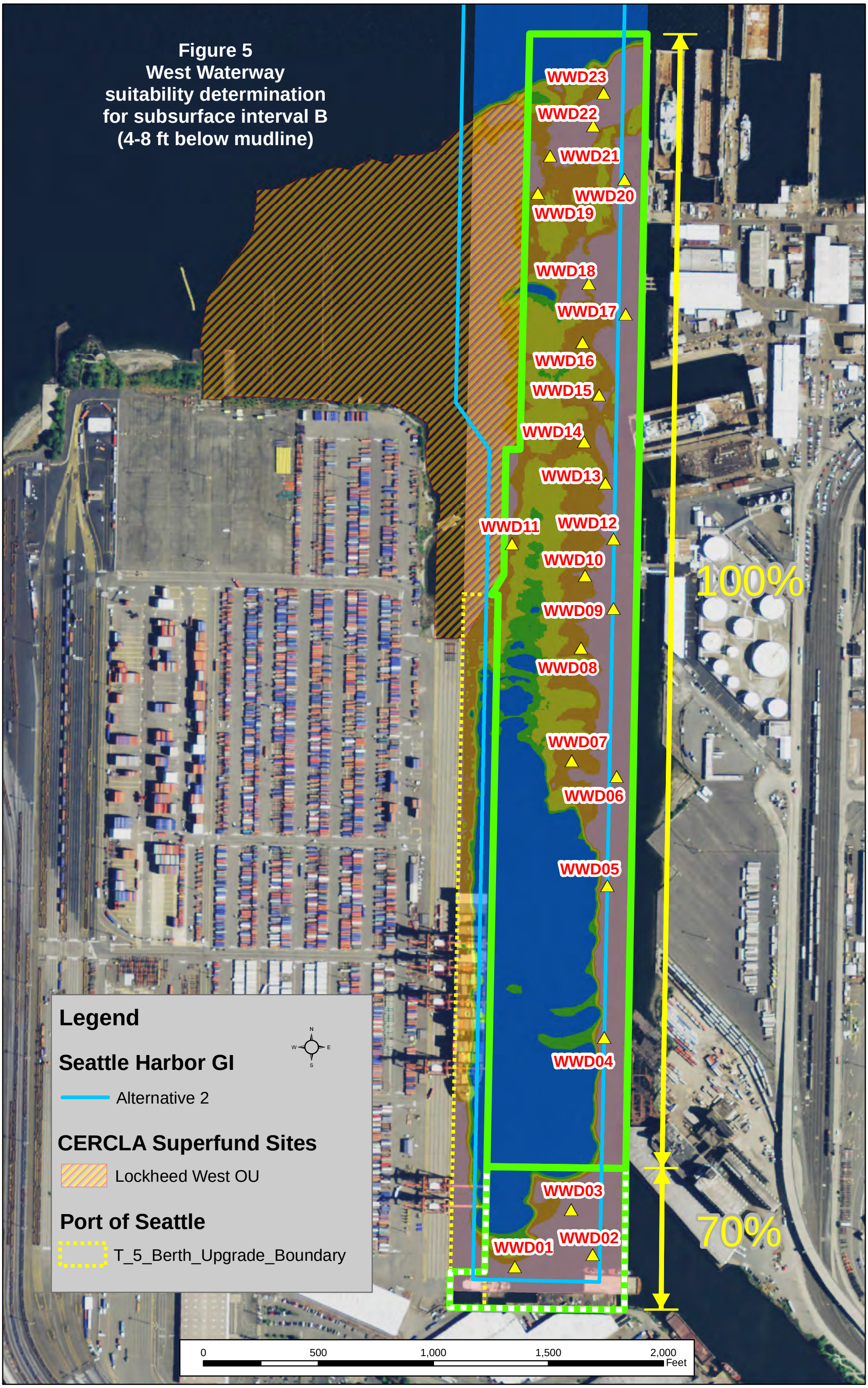
Figure 5
West Waterway
suitability determination
for subsurface interval B
(4-8 ft below mudline)
WWD23
WWD22
WWD21
WWD20
WWD19
WWD18
WWD17
WWD16
WWD15
WWD14
WWD13
WWD12
WWD11
WWD10
WWD09
WWD08
WWD07
WWD06
WWD05
WWD04
WWD03
WWD02
WWD01
100%
70%
Legend
Seattle Harbor GI
Alternative 2
CERCLA Superfund Sites
Lockheed West OU
Port of Seattle
T_5_Berth_Upgrade_Boundary
N
W
E
S
0
500
1,000
1,500
2,000
Feet