



# Memorandum

**To:** Town of Ipswich Selectboard

**From:** Neal Price and Gary Hedman, LSP, Horsley Witten Group, Inc.

**Date:** December 11, 2024

**Re:** Ipswich Mills Dam Removal Sediment Sampling Summary

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This technical memorandum summarizes recent sediment sampling activities completed as part of the permitting process for the Ipswich Mills Dam Removal Project.

The sediment quality data summarized in this technical memorandum will be utilized to inform Project permitting through the Massachusetts Department of Environmental Protection (MassDEP) 401 Water Quality Certification (WQC) program.

## **Prior Sediment Sampling**

Previous sediment sampling in the Ipswich River was conducted by the United States Geological Survey (USGS) in 2005, and by Clean Soils Environmental, Ltd. (CSE) and the Ipswich River Watershed Association (IRWA) in 2012. The results from the 2005 and 2012 sediment sampling indicated that sediment within the project area had a very low likelihood of toxicity when viewed independently, and in relation to other dams in Massachusetts. The 2005 and 2012 results are discussed in greater detail in the March 2024 SEIR.

## **Due Diligence Review**

As a component of the March 2024 Single Environmental Impact Report (SEIR) filing with the Massachusetts Executive Office of Energy and Environmental Affairs (EEA), HW provided a Due Diligence Review & Sediment Sampling Plan, identifying potential contaminants of concern (COCs) and proposed sediment sampling locations upstream and downstream of the dam in order to fully evaluate the presence and distribution of those COCs.

The Ipswich River and surrounding land has a long history of industrial and commercial use, with mills making use of the hydropower since the 17<sup>th</sup> century. Of note are the Ipswich Manufacturing Company and Ipswich Mills Company, the Tanning Process Company (a subsidiary of the United Shoe Machinery Company), and the Hygrade Sylvania Corporation (which produced proximity fuses, transformers, tungsten coils, and later quartz glass for lighting) as well as nearby dry cleaner and autobody businesses. Rail lines now managed

by the Massachusetts Bay Transportation Association (MBTA) operate west of the Ipswich River, crossing the river approximately 7,200 feet upstream of the dam. That MBTA railroad bridge represents the approximate upstream limit of the impoundment above which the dam does not affect water levels and, therefore, above which we do not anticipate sediment will mobilize as a result of dam removal. In addition, discharge of stormwater from impervious surfaces within the watershed carries non-point source anthropogenic pollutants from the watershed into the river. As part of the due diligence review, records of known and reported releases of oil and/or hazardous material (OHM) were accessed from Environmental Data Resources Inc. (EDR) and MassDEP to identify potential COCs for the project area and help in determining proposed sediment sampling locations.

### **Determination of Chemical Parameters for Sampling**

The MassDEP 401 WQC permitting process requires that a sufficient number of sediment samples be collected in support of projects with the potential to impact water quality. The historical industrial nature of activity around the river and dam indicated the potential for poly-chlorinated biphenyls (PCBs), metals, semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs). Polycyclic aromatic hydrocarbons (PAHs) are also a COC for river sediment, due primarily to the discharge of untreated stormwater from impervious surfaces within the watershed. All of these COCs are required analytes under the 401 WQC permitting program. The results of the Due Diligence Report helped identify project specific potential COCs, including perchlorate and herbicides. Perchlorate was identified as a potential COC due to the former operation of a Sylvania facility along the River. The Sylvania plant served military operations in WWII, though it is unknown if munitions (a potential source of perchlorate) were ever produced at the facility.

In addition to the COCs associated with industrial and commercial land use, pesticides and herbicides were included in the analysis of sediment, due to their potential usage in clearing vegetation along railroad right-of-ways at the upstream railroad crossing of the River. The final list of parameters included metals, VOCs, SVOCs (including perchlorate), PCBs, organochlorine pesticides and herbicides, extractable petroleum hydrocarbons (EPH), total petroleum hydrocarbons (TPH), total organic carbon (TOC), percent water, and grain size distribution.

### **Sampling Locations**

Sampling locations were selected over more than two miles of river length, from upstream of the MBTA bridge (i.e., above the limit of the impounding influence of the dam) to downstream of the Project area in the estuary in order to evaluate the distribution of potential COCs and to allow for an evaluation of the implications of impounded sediment

mobilizing (moving downstream) after dam removal. A total of 12 sediment samples were collected during the 2024 activities. Sediment sampling locations are depicted on Figures 1 and 2 in Attachment A. They include:

- **US-1** – Located approximately 1.5 miles upstream of the dam (upstream of the MBTA Railroad bridge and beyond the impounding influence of the dam).
- **US -2** – Located 1.20 – 1.30 miles upstream of the dam representing the river reach at the Miles River confluence and below the MBTA Railroad bridge.
- **US-3** – Located approximately 0.95 – 1.05 miles upstream of the dam representing the river reach adjacent to the next MBTA Railroad influence.
- **US-4** – Located approximately 0.70 – 0.80 miles upstream of the dam representing the river reach between Kimball Brook and the MBTA Railroad.
- **US-5** – Located approximately 0.45 – 0.55 miles upstream of the dam representing the river reach between Saltonstall Brook and Kimball Brook.
- **US-6** – Located approximately 0.25 miles upstream of the dam representing the river reach between the broader section of the dam impoundment and Kimball Brook.
- **US-7** – Located approximately 200-1,000 feet upstream of the dam representing the wider impounded river reach relatively close to the dam.
- **US-BANK** – Located between US-7 and US-8, along the river’s submerged bank.
- **US-8** – Located immediately upstream of the dam.
- **DS-1** – Located within the first 1,000 feet downstream of the dam.
- **DS-2** – Located approximately 1,500-2,000 feet downstream of the dam.
- **DS-3** – Located approximately 1-3 miles downstream of the dam.

These potential sampling locations were discussed with MassDEP on January 4, 2024, included in a Sediment Sampling Plan submitted to MassDEP on February 21, 2024, and approved by MassDEP on February 28, 2024.

### **Sampling Activities Summary**

Sediment sampling occurred on September 11<sup>th</sup> and 17<sup>th</sup>, 2024. Sample locations were accessed via a 12-foot-long aluminum work boat. Sampling was carried out initially using an AMS™ sediment sampler core barrel. The 2-foot long, 2-inch diameter AMS core barrel is advanced through sediment utilizing a slide hammer, and retrieved once refusal is encountered. Coarse sediment (i.e. 2-inch angular stone) resulted in shallow refusal and damaged the core barrel during the collection of the first sediment sample (sample IR-US-

1) and, therefore, collection of subsequent samples was achieved utilizing a 14-inch long, 4-inch diameter stainless steel AMS hand auger.

At each of the approved sampling locations, three sediment cores were collected at the approximate locations depicted on Figures 1 and 2 in Attachment A and placed into individual labelled plastic bags. The three sediment cores were then combined into one composite sample and submitted to ESS Laboratory of Cranston, Rhode Island, for laboratory analysis of the previously discussed COCs, as discussed in greater detail below.

### **Results of Sampling**

Laboratory analytical results are detailed in the Massachusetts Division of Ecological Restoration (MassDER) sediment data spreadsheet format included as Attachment B. The MassDER spreadsheet includes established human health and ecological criteria to compare the analytical results against, along with mean COC concentrations for sediment within project reaches. Complete laboratory analytical reports are provided in Attachment C. Table 1, below, summarizes the detected concentrations of COCs in the various Project reaches (i.e., upstream, impoundment and downstream) relative to the freshwater and marine ecological threshold concentrations. There were no exceedances of the MCP S! values at any of the sampling locations.

The Marine TEL/ PEL concentrations are generally lower than the corresponding freshwater TEL/ PEL concentrations, although not always. On the Attachment B spreadsheet and the Table 1 summary, the color chosen for any given cell with an ecological threshold exceedance represents the highest concentration of the relevant freshwater or marine standard exceeded (e.g. if sample A exceeded both the PEL and the PEC but the PEC concentration was a higher value, that cell was colored for the PEC concentration). Sediment samples are arranged from upstream to downstream in all of the tables and discussion points below.

### Applicable Criteria

The MassDEP 401 WQC permitting process incorporates several established criteria which laboratory analytical results are compared to. These criteria include the sediment ecological criteria for Threshold Effect Concentrations (TEC) and Probable Effect Concentrations (PEC)<sup>1</sup> for freshwater settings, and Threshold Effects Level (TEL) and Probable Effects Level (PEL)<sup>2</sup> for marine settings. The TEL and PEL ecological criteria are

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<sup>1</sup> MacDonald et al. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems.

<sup>2</sup> Buchman, Michael F. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration.

appropriate for comparison as the dam is located at the head of the tide. Additional criteria include the Massachusetts Contingency Plan (MCP) Method 1 and Method 2 S-1 standards, Method 2 S-2 standards, and Method 3 Ceiling Limits, which are established to evaluate risk of harm to human health, public welfare, and the environment.

The TEC/PEC and TEL/PEL criteria are ecological thresholds associated with the impacts of sediment (located below mean high water) quality on the health of benthic organisms and communities, while the MCP Methods 1, 2, and 3 soil (located above mean high water) standards are associated with potential risk to human health through direct exposure to COCs in soil. MassDEP Method 1 standards for soil and groundwater represent the concentrations beneath which a condition of No Significant Risk (NSR) has been achieved. The Method 1 S-1 standards represent unrestricted or residential-type exposures, such as might occur in a playground or yard/garden.

Method 2 and Method 3 standards are less restrictive based upon site-specific exposure potential and frequency. Soil Category S-2 represents moderate or commercial-type exposures that may be less frequent or direct. It is important to note that the MCP soil regulations are not directly applicable to sediment (i.e. materials beneath water bodies) because sediment is by regulatory definition not soil. However, removal of the dam and lowering of the water impoundment will expose some areas of current sediment along the bankside edges of the impoundment (thereby making it soil) and a comparison of current sediment quality to the established MCP soil concentrations is therefore an appropriate evaluation of potential risk given the urbanized setting and recreational use of the area. In addition to the regulatory criteria discussed above, sediment concentrations are also compared to the MassDEP background levels of PAHs and metals for context and to provide a comparison to levels that MassDEP has determined are anticipated to occur in natural and urban settings<sup>3</sup>.

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<sup>3</sup> Massachusetts Department of Environmental Protection Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil, 1992.

Table 1. Summary of COC Ecological Threshold Exceedances

		Ecological Thresholds (aquatic)				Summary Concentration Statistics			
Parameters	Units	Freshwater		Marine		Upstream	Impoundment Upstream	Impoundment at Dam	Downstream
		TEC/TEL	PEC/PEL	TEL	PEL	Mean	Mean	Mean	Mean
<b>Metals (mg/kg)</b>									
Arsenic	mg/kg (ppm)	9.79	33.0	7.24	41.60	2.24	5.73	8.90	6.38
Cadmium	mg/kg (ppm)	0.99	4.98	0.68	4.20	0.10	0.09	0.20	0.13
Chromium (TOTAL)	mg/kg (ppm)	43.4	111	52.30	160.00	8.40	18.47	23.90	29.17
Chromium III	mg/kg (ppm)	-	-	-	-	-	-	-	-
Chromium VI (Hexavalent)	mg/kg (ppm)	-	-	-	-	-	-	-	-
Copper	mg/kg (ppm)	31.6	149	18.70	108.00	2.95	9.96	16.30	19.27
Lead	mg/kg (ppm)	35.8	128	30.24	112.00	5.32	11.64	34.50	58.40
Mercury	mg/kg (ppm)	0.18	1.06	0.13	0.70	0.01	0.05	0.07	0.20
Nickel	mg/kg (ppm)	22.7	48.6	15.90	42.80	5.74	13.18	14.94	12.29
Zinc	mg/kg (ppm)	121	459	124.00	271.00	29.80	43.26	75.20	57.80
<b>PAHs (ug/kg)</b>									
Total PAHs	ug/kg (ppb)	1,610	22,800	1,684.00	16,770.40	12.00	391.00	10,928.33	5,018.00
<b>PCBs (mg/kg or ppm)</b>									
Total PCBs (mg/kg)	mg/kg (ppm)	0.0598	0.676	0.020	0.180	0.002970	0.002790	0.031122	0.021375
<b>Pesticides (ug/kg or ppb)</b>									
4,4'-DDD	ug/kg (ppb)	4.88	28	1.22	7.81	1.55	1.44	1.75	4.42
4,4'-DDE	ug/kg (ppb)	3.16	31.30	2.07	374	1.55	1.44	1.75	2.95
4,4'-DDT	ug/kg (ppb)	4.16	62.90	1.19	4.77	1.55	1.44	1.75	22.08
Chlordane	ug/kg (ppb)	3.24	17.6	2.26	4.8	12.30	11.54	14.00	13.35
Dieldrin	ug/kg (ppb)	1.90	61.8	0.72	4.3	1.55	1.44	1.75	1.67
<b>TPH and EPH (mg/kg or ppm)</b>									
TPH and EPH analytes were not detected above laboratory reporting limits and/or comparison criteria.									
<b>Volatile Organic Compounds (VOCs)</b>									
VOCs were not detected above laboratory reporting limits and/or comparison criteria.									
<b>Extra/Additional Parameters</b>									
Extra/Additional Parameters were not detected above laboratory reporting limits and/or comparison criteria.									

**Legend and Notes**

Only Parameters with ecological threshold exceedances shown.

No parameters exceeded MCP S1 standards

mg/kg = milligrams per kilogram

ug/kg = micrograms per kilogram

ppm = parts per million

ppb = parts per billion

TEC / PEC = Threshold / Probable Effect Concentration from MacDonald et al. 2000

TEL / PEL = Threshold / Probable Effect Levels from NOAA Screening Quick Reference Table

Green text font indicates the sample was below the laboratory detection limit and is reported as 1/2 of that limit

Hyphens (-) indicate the parameter was not analyzed

Entries that exceed ecological or human exposure criteria are shaded to match the criteria exceeded. Colorization represents the highest concentration standard exceeded.

Total PCBs calculated as a sum of the entries for each congener, where a congener was non-detect, half the detection limit used.

## Discussion of Sediment Quality Sampling Results

Sediment quality sampling results are discussed below from upstream to downstream. Sampling locations are indicated on Figures 1, 2, and 3, for reference, and included in Attachment A. Laboratory analytical results are detailed in the sediment summary spreadsheet included as Attachment B. Table 1 above depicts a high-level summary of the overall sampling results. In general, the average concentrations of COCs were consistent upstream and downstream of the dam, demonstrating that dam out conditions are unlikely to result in degradation of sediment quality.

### Upstream Sample: US-1

US-1 is the most upstream sample. It is representative of “background conditions” for the river, as it is located upstream of both the dam impoundment and the MBTA rail crossing. Water levels at US-1 are modeled to be unchanged under dam out conditions and no sediment mobilization is anticipated. Laboratory analysis indicated the presence of metals (arsenic, chromium, copper, lead, nickel, zinc) and phenanthrene (a PAH) at concentrations above laboratory reporting limits, but all concentrations were below the associated Method 1 standard and PEC/TEC and PEL/TEL criteria. All other analytes were below laboratory reporting limits.

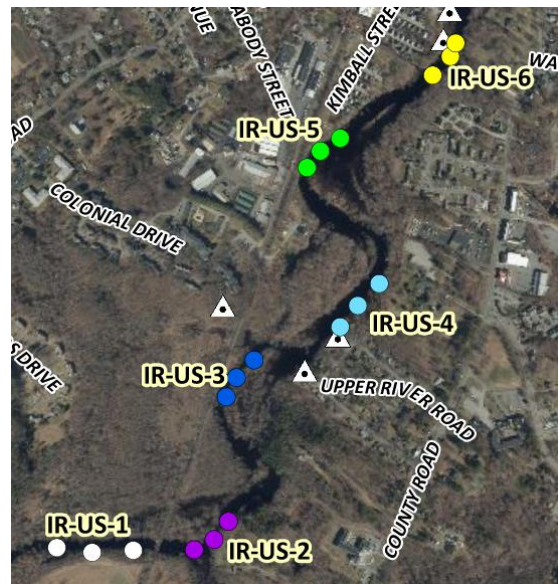


Figure 1 Upstream Sampling Locations US-1 - US-6

### Upstream Samples: US-2 through US-6

Moving downstream, sampling locations US-2 through US-6 are within the area of the river where water levels are impounded by the dam, but upstream of the wider, more pond-like section of the river closer to the dam. Samples US-2 and US-3 indicated similar sediment quality to US-1, though they also had detectable levels of mercury, at concentrations below all comparison criteria.

Sediment sample US-2 exceeded the TEL for mercury, and, sample US-4 exceeded the TEC for arsenic, and sample US-5 exceeds the TEC for acenaphthylene and dibenzo(a,h)anthracene. Arsenic is a naturally occurring metal but can also be present due to anthropogenic sources (i.e. herbicide application). Acenaphthylene and dibenzo(a,h)anthracene both fall into the family of polycyclic aromatic hydrocarbons (PAHs), which are generated by the incomplete combustion of fuel products (i.e. fuel oil,

diesel) and can be transported through untreated stormwater discharges or atmospheric deposition. The reported concentrations of mercury, arsenic, acenaphthylene and dibenzo(a,h)anthracene were all below the MCP Method 1 criteria that are applicable to unrestricted uses (i.e. residential)

Sediment sample US-6 did not exceed any ecological or human exposure thresholds.

Collectively, samples US-2 through US-6 represent the extent of the project area upstream of the dam, where some alteration to water levels and/or migration of mobile sediment is anticipated to occur following dam removal. The sediment quality data for this reach of the Ipswich River does not indicate the potential for increased risk of harm to ecological receptors or human health and, despite the low-level detections of certain COCs, is not significantly different from the background conditions represented by sediment sample US-1.

#### Impoundment at Dam Samples: US-7, US-BANK, and US-8

The samples discussed here were taken from the area at and immediately upstream of the dam. This group of samples generally have a greater number of TEC/PEC and TEL/PEL threshold exceedances, but all results were below the Method 1 S-1 standards that are associated with unrestricted use (i.e. residential). Sample US-BANK was collected along the riverbanks but below the waterline and is therefore representative of sediment that could potentially be exposed when water levels are lowered under a dam out scenario.

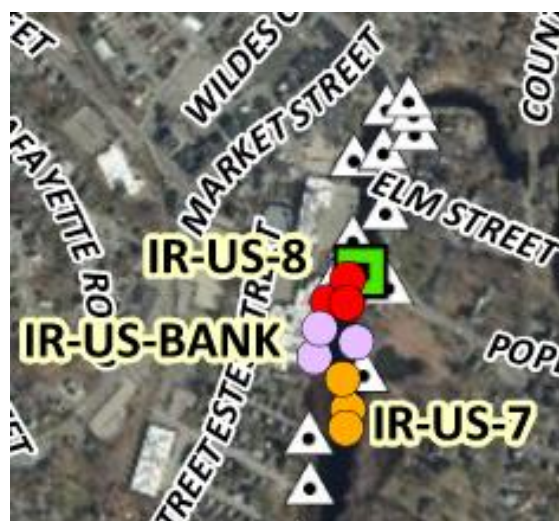


Figure 2 Upstream Sampling Locations US-7 - US-8

The US-BANK sample exceeded the TEC/TEL and/or TEL/PEL for most PAHs, as well as for arsenic, copper, mercury, lead, zinc, and total PCB congeners. Dieldrin was not detected above laboratory method detection limits, but the laboratory reporting limits exceeded the TEC and TEL. The US-BANK sample results were all below the Method 1 S-1 standards and thus meet the condition of No Significant Risk and are eligible for unrestricted use. Following dam removal, exposed areas of sediment are quickly (typically in less than one growing season) revegetated, reducing the potential for both human exposure and future mobilization of sediment/soil from the exposed banks to the waterway. We therefore do not anticipate these sediments to mobilize in any significant quantity with dam removal, and thus they have negligible potential to impact conditions downstream of the dam.



Sediment sample US-7, has higher sediment quality that more closely resembles upstream sampling points, with only one PAH (dibenzo(a,h)anthracene) detected above the TEL criteria. Nickel was also identified above the TEC and TEL.

Sediment sample US-8 exceeded the TEC and/or TEL thresholds for several PAHs, six of which also exceed the PEC and PEL. The elevated levels of PAHs in the impounded sediment are not unexpected in an urban setting, as they can be released from a variety of sources, including vehicle exhaust, and pavement binder/sealing products that can be transported to the river in stormwater runoff from roadways and other impervious surfaces. For further context, it is notable that the identified concentrations of COCs in the sediment samples were below MassDEP's background levels of PAHs and metals in soil, for both natural and urban settings.

### Downstream Samples: DS-1, DS-2, DS-3

The downstream samples are similar to the impoundment samples with regard to the presence of COCs, and exceedances of TEC/PEC and TEL/PEL thresholds for PAHs and metals.

Sample location DS-1 exceeded the TEC and TEL for copper, lead, nickel, and mercury, with several PAHs and PCB

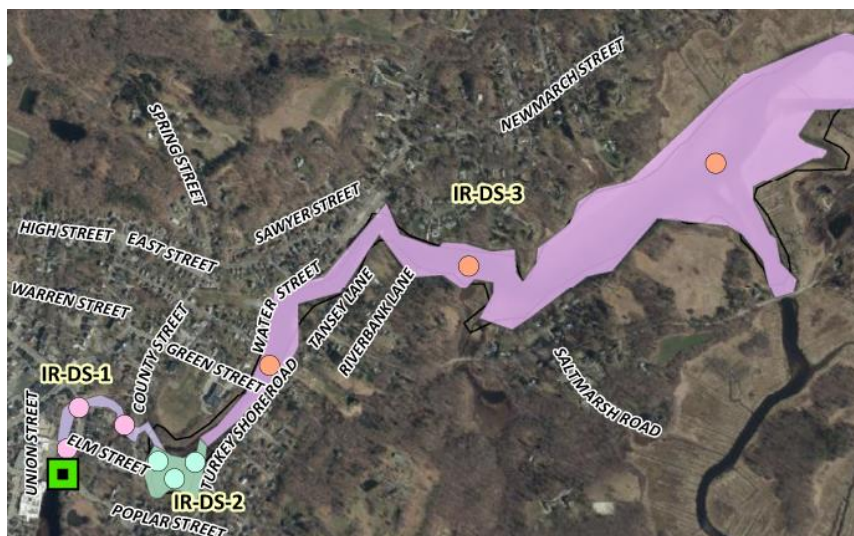


Figure 2 Downstream Sample Locations DS-1, DS-2, and DS-3

congeners identified at concentrations above laboratory reporting limits, but below all comparison criteria. The river bed in this stretch of river is primarily large cobble and minimal sediment accumulation occurs due to the scouring effects of increased flow velocity downstream of the Dam.

Sample location DS-2 has levels of PAHs that are similar to the impoundment samples, as well as detectable levels of most PCB congeners. Sample location DS-2 was also the only location where pesticides (4,4'-DDD, 4,4'-DDE, and 4,4'-DDT, dicamba, dichloprop, MCPA, MCPP) were detected above laboratory reporting limits. EPH compounds (C19-C36 Aliphatic Hydrocarbons and C11-C22 Aromatic Hydrocarbons) were also detected, at

relatively low concentrations. The DS-2 sample was collected from a reach of the river below the lower falls where the stream channel widens and deepens, resulting in reduced flow velocity and the subsequent settling and accumulation of sediment. This section of the river is also tidally influenced, and backwatering of the river is likely to further increase sediment deposition in conjunction with the river morphology. Based on these factors, this area would be the most likely area of initial sediment deposition under a dam out scenario.

Sediment quality at sample location DS-3 closely resembled location DS-1, with slightly lower concentrations of metals, and slightly higher concentrations of PAHs identified. Dibenzo(a)anthracene was detected above the TEC and TEL, and fluoranthene was detected above the TEL. No additional COCs were detected above the comparison criteria.

The sediment quality data collected during this study, and particularly relative to the results from DS-2, supports the concept that the stretch of river represented by DS-2 is the most likely to accumulate significant quantities of sediment mobilized from the upstream reaches of the river above the dam. As represented by the sediment sampling results, such sediment migration from upstream and settlement in the DS-2 area has previously and continues to occur, particularly during peak season flows or severe weather events. As the sediment quality at location DS-2 is comparable to the impounded sediment most likely to mobilize, the downstream conditions are not anticipated to change significantly. Fine sediments, which are more capable of binding to COCs, are modeled not to settle considerably in the initial downstream stretch represented by DS-1 due to the higher water velocities present. The large area and tidal influence in the region represented by DS-3 indicate that upstream mobilized sediment in this area will be distributed and diluted across the expansive area. None of the downstream regions are likely to have significantly different sediment quality under dam out conditions as compared to current.

#### Laboratory Representativeness

Laboratory quality assurance / quality control (QA/QC) measures for each of the specified analyses are provided in ESS Laboratory Reports 24i0467 and 24i0584. Method specific QA/QC deficiencies are noted in the Project Narrative for each report. Overall, the laboratory analytical data are viewed to be representative and of sufficient quality to support an evaluation of sediment quality and potential risk associated with COCs in sediment. The laboratory detection limit for chlordane exceeds the TEC and TEL/PEL, so while all of the samples were below the detection limit, they are all marked as exceeding this sediment quality threshold. Additionally, many PAHs are analyzed during both the SVOC analysis and EPH analysis. No gross deficiencies or data failures that would result in the laboratory data being unusable were identified in the laboratory QA/QC narrative, and

the data are therefore considered to be representative of current sediment quality within the project area.

## **Conclusions**

The 2024 sediment sampling of the Ipswich River was completed as part of the MassDEP 401 WQC permitting process, and in accordance with the MassDEP approved Sediment Sampling and Analysis Plan. The 2024 sediment sampling activities provide the most comprehensive assessment of the nature and extent of COCs throughout the Project area to date and are consistent with the 2005 and 2012 sediment sampling results that were limited in scope and breadth. Key information learned from this sediment sampling program is listed below.

- Sediment quality was found to be of good overall quality, with no exceedances of the MassDEP MCP Method 1 S-1 standards. This means that sediment from all sample locations pose No Significant Risk to human health would be suitable for upland placement, subject to MassDEP 401 WQC program review and approval.
- In comparison to other sediment evaluations completed in support of dam removal and restoration project throughout the Commonwealth, the impounded sediment quality documented through the 2024 sampling activities is better than typically encountered in urban, industrialized settings. This is supported by a comparison of the sediment quality data to MassDEP's background levels of PAHs and metals in urban and natural soil. No sediment samples exceeded the MassDEP urban background levels, and, with the exception of zinc in the US-BANK sample, all sample locations were also below the MassDEP natural soil background levels.
- As discussed above, COCs that exceeded the ecological sediment quality guideline criteria (TEC/PEC and TEL/PEL) are below the MassDEP soil background levels that would be expected in relatively urban watershed setting, with historic utilization of surrounding properties. The most predominant COCs were PAHs, which are the byproduct of incomplete combustion of fossil fuel sources and are also found in asphalt pavement and pavement sealant products. The presence of these COCs can be partially attributed to the discharge of stormwater from impervious surfaces within the river's watershed, though their presence can also potentially be attributed to atmospheric deposition and other non-point sources.
- The highest concentrations of COC's detected were from the bank and impoundment areas shortly upstream of the dam (US-BANK and US-8) and at the downstream area below the lower falls (DS-2) where sediment accumulates and would continue to do so under a dam out scenario. Notably the observed

concentrations of COCs at these two potential sources and receiving area locations are consistent.

- While the US-BANK COC results are the highest of those observed upstream of the dam, they are below applicable MCP S-1 soil standards and the MassDEP background levels for urban soil. Therefore, under dam out conditions, when those bank sediments become regulated as soil, those soils would be below all applicable regulatory standards for unrestricted use. In addition, following dam removal exposed areas of sediment are quickly (typically in approximately one growing season) revegetated, reducing the potential for both human exposure and future mobilization of sediment/soil from the exposed banks to the waterway. Therefore, the sediments in this area have a low likelihood of mobilization and low potential to impact conditions downstream of the dam.
- The documented conditions upstream and downstream of the dam demonstrate that mobilization of sediment continues to occur with the dam in place, particularly during periods of peak season flows or severe weather events. Under a dam out scenario, mobilized sediment is not expected to significantly alter the sediment quality downstream, as the concentrations of COCs in downstream regions where the bulk of the material is predicted to settle (and has historically settled) are comparable to the concentrations of COC in sediment upstream of the dam.
- Further upstream from the dam (above US-8), the observed concentrations of COCs are generally lower than those at downstream receiving location DS-2. Since most of the potentially mobile sediment volume above the dam would originate from this much larger upstream river area, the transport of sediment with lower concentrations of COCs is likely to result in improved conditions downstream of the dam, as natural migration and deposition of material will eventually replenish areas that are currently sediment starved.

## **Sediment Management**

During the 401 WQC permitting process, various sediment management alternatives for construction are identified and evaluated and reviewed/approved by MassDEP based on the site-specific criteria generated through the sediment sampling and analysis summarized within this technical memorandum.

The least intrusive, most ecologically beneficial, and most cost effective method for sediment management is controlled downstream release of sediment. Absent significant contamination concerns, controlled downstream release is the least ecologically

disruptive of the potential sediment management alternatives. It allows for the natural sediment dynamics that would have existed prior to dam construction, allows for the sedimentation of currently sediment starved downstream reaches, and avoids the disturbance to benthic communities that would occur from dredging.

Controlled downstream release is appropriate for projects where the type and concentration of COCs is relatively similar upstream and downstream of the dam, as is the case at Ipswich Mills. During dam removal, best management practices (BMPs) are implemented (i.e. phased lowering of the water level behind the dam, temporary erosion control measures) to minimize construction period mobilization of sediment. Following construction, natural revegetation of exposed areas of sediment typically occurs within one growing season, and the river is allowed to naturally revert to an unaltered state.

Active sediment management activities (i.e. excavation of soft sediment from upstream of the dam) is typically reserved for dam removal projects where the quality or quantity of sediment upstream of the dam would result in degradation of the water downstream of the dam following release. Dredging is damaging to the benthic environment, requires greater energy use and associated greenhouse gas emissions, and has impacts (e.g. odor and space requirements) associated with stockpiling and dewatering and disposal. Active management of sediment also significantly increases the costs of dam removal, as the material must be transported and disposed of at upland locations (i.e. landfills). Based on the observed type and concentration of COCs in the Ipswich River, and the anticipated volume of potentially mobile sediment, active sediment management would not significantly benefit the environment or the dam removal project.

A hybrid approach, involving active removal of sediment from certain portions of the impoundment above the dam, and placement/stabilization of that material along the shorelines of the river is also an approach that has been employed at some dam removal projects in the Commonwealth. As previously mentioned, areas of sediment that are exposed (no longer under water) following dam removal typically revegetate within one growing season. Revegetation of exposed sediment serves an important role in restoration of impoundment areas, as the sediment becomes stabilized in place, reducing the potential for mobilization during periods of increase flow due to seasonal variations and severe weather events.

Based on the observed type and concentration of COCs in the Ipswich River, and the anticipated volume of potentially mobile sediment, such a hybrid sediment management approach would also not significantly benefit the environment or the dam removal project. The hybrid approach would have the same negative environmental impacts of dredging (e.g., benthic disturbance, greenhouse gas emissions, and odor), and cost factors

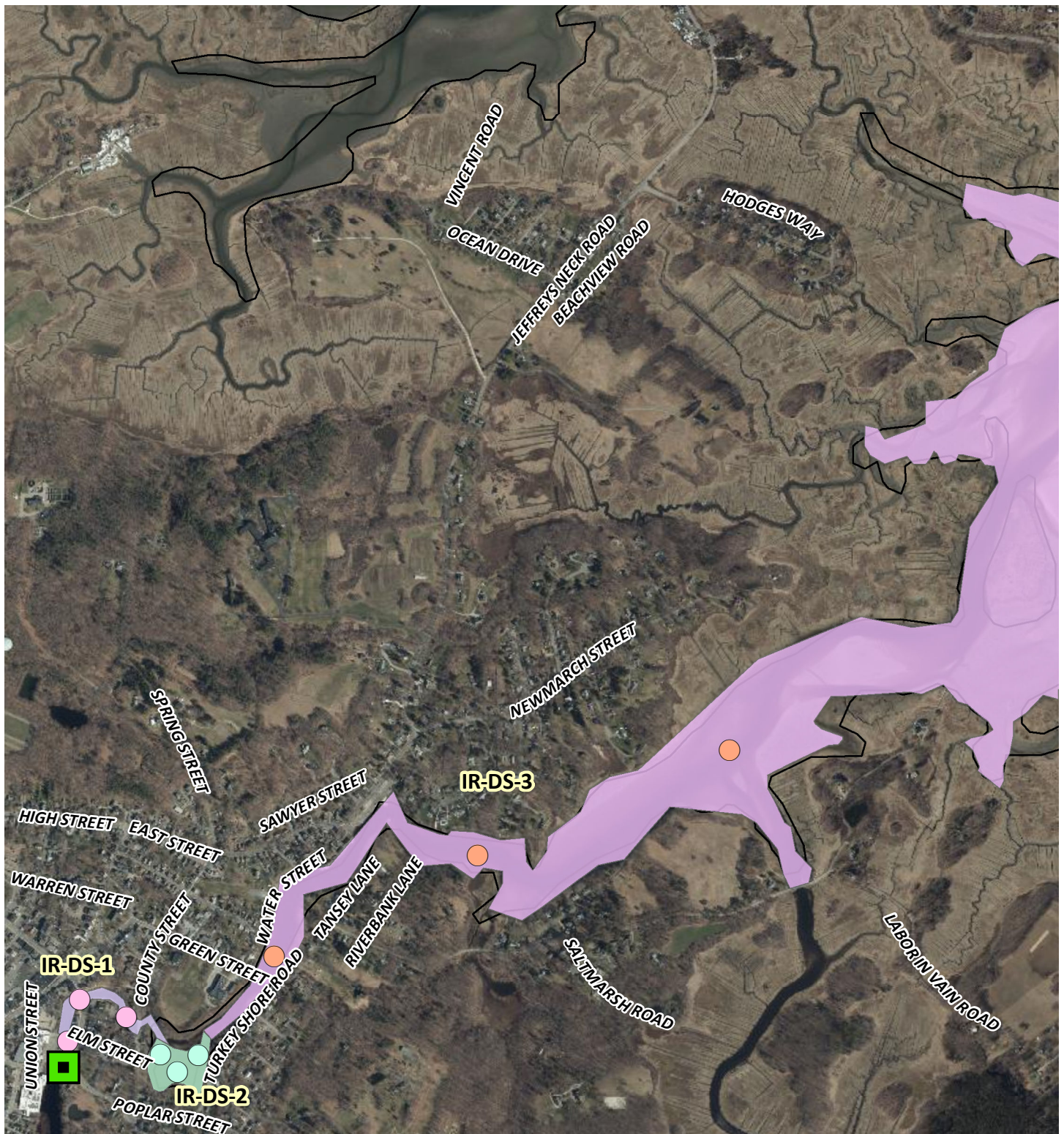
associated with sediment movement and stabilization, though to a lesser extent due to the decreased quantity of dredging.

Given the specific factors at the Ipswich Mills dam project site, controlled downstream release of sediment is the preferred sediment management approach. The quality considerations of the impounded sediment, as detailed above, make it highly suitable for downstream release. The sediment characteristics are generally similar between the impounded source areas and the downstream receiving areas. In fact, the sediment from the upper reaches of the impoundment, from which the majority of the total mobile sediment volume would eventually originate over time, has generally lower COC concentrations than does the primary downstream receiving area. Based on past experience with other projects, MassDEP is likely to approve controlled downstream release of sediment as the preferred sediment management methodology during forthcoming Water Quality Certification permitting.

**Attachment A – Sediment Sampling Location Figures**







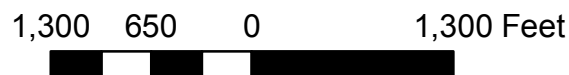


Document Path: H:\Projects\2016\16041 DER\_Ipswich Dam Removal Feasibility Study\GIS\Maps\Downstream Sediment Sampling Plan.mxd

**Legend**

 Dam Location

 Discrete Samples  
Discrete sediment samples were collected at the locations shown and were composited in the field into one sample.



\*2021 NAIP imagery service



**Horsley Witten Group**  
Sustainable Environmental Solutions

90 Route 6A • Unit 1 • Sandwich, MA 02563  
508-333-9500 • horsleywitten.com



**Sediment Sampling Plan  
(Downstream)  
Ipswich River Dam  
Ipswich, MA**

Date: 12/4/2024

Figure 7

**Attachment B – MassDER Sediment Summary Table**





**Attachment C – Laboratory Analytical Reports**

*CERTIFICATE OF ANALYSIS*

Neal Price  
Horsley & Witten  
90 Route 6A  
Sandwich, MA 02563

**RE: Ipswich River (16041L)**  
**ESS Laboratory Work Order Number: 24I0467**

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.



Laurel Stoddard  
Laboratory Director

**REVIEWED**  
*By ESS Laboratory at 1:23 pm, Oct 01, 2024*

**Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

**Subcontracted Analyses**

CTS - Cranston, RI  
Lancaster Laboratories, Inc. - Lancaster, PA

Grain Size Analysis, Water Content  
Perchlorate

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**SAMPLE RECEIPT**

The following samples were received on September 13, 2024 for the analyses specified on the enclosed Chain of Custody Record.

**Samples 24I0467-01 through 24I0467-08 for Metals were air dried prior to extraction and relogged in as Samples 24I0467-16 through 24I0467-23. This was done to increase the dry weight of the sample extracted which decreases variability of results and lowers the detection limits for samples with high water content.**

**Low Level VOA vials were frozen by ESS Laboratory on 9/13/24 at 17:50.**

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
24I0467-01	IR-DS-1	Soil	8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-02	IR-DS-2	Soil	8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-03	IR-DS-3	Soil	8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-04	IR-US-1	Soil	8081B, 8082A Cong, 8100M, 8151A, 8260D Low, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-05	IR-US-2	Soil	8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-06	IR-US-3	Soil	8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-07	IR-US-4	Soil	8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-08	IR-US-5	Soil	8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0467-09	IR-US-2.1	Soil	8260D Low
24I0467-10	IR-US-3.1	Soil	8260D Low
24I0467-11	IR-US-4.3	Soil	8260D Low
24I0467-12	IR-US-5.2	Soil	8260D Low
24I0467-13	IR-DS-1.3	Soil	8260D Low
24I0467-14	IR-DS-2.2	Soil	8260D Low
24I0467-15	IR-DS-3.2	Soil	8260D Low
24I0467-16	IR-DS-1 - Oven Dried	Soil	6010D, 7010, 7471B
24I0467-17	IR-DS-2 - OVEN DRIED	Soil	6010D, 7010, 7471B
24I0467-18	IR-DS-3 - OVEN DRIED	Soil	6010D, 7010, 7471B
24I0467-19	IR-US-1 - OVEN DRIED	Soil	6010D, 7010, 7471B

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten

Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

24I0467-20	IR-US-2 - OVEN DRIED	Soil	6010D, 7010, 7471B
24I0467-21	IR-US-3 - OVEN DRIED	Soil	6010D, 7010, 7471B
24I0467-22	IR-US-4 - OVEN DRIED	Soil	6010D, 7010, 7471B
24I0467-23	IR-US-5 - OVEN DRIED	Soil	6010D, 7010, 7471B



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**PROJECT NARRATIVE**

**8081B Organochlorine Pesticides**

- 24I0467-02 Lower value is used due to matrix interferences (LC).  
4,4'-DDD [2C]
- 24I0467-02 Percent difference between primary and confirmation results exceeds 40% (P).  
4,4'-DDD [2C]

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

- 24I0467-02 Lower value is used due to matrix interferences (LC).  
BZ#138 , BZ#170 , BZ#18 [2C]
- 24I0467-02 Percent difference between primary and confirmation results exceeds 40% (P).  
BZ#138 , BZ#170 , BZ#18 [2C]
- 24I0467-03 Lower value is used due to matrix interferences (LC).  
BZ#18 [2C]
- 24I0467-03 Percent difference between primary and confirmation results exceeds 40% (P).  
BZ#153 , BZ#18 [2C] , BZ#52
- D4I0321-CCV2 Continuing Calibration %Diff/Drift is above control limit (CD+).  
BZ#105 (22% @ 20%), BZ#206 (26% @ 20%)

**Semi-Volatile Organic Compounds**

- 24I0467-01 Surrogate recovery(ies) above upper control limit (S+).  
2,4,6-Tribromophenol (137% @ 30-130%)
- 24I0467-02 Surrogate recovery(ies) above upper control limit (S+).  
2,4,6-Tribromophenol (130% @ 30-130%)
- 24I0467-03 Surrogate recovery(ies) above upper control limit (S+).  
2,4,6-Tribromophenol (131% @ 30-130%)
- 24I0467-05 Surrogate recovery(ies) above upper control limit (S+).  
2,4,6-Tribromophenol (136% @ 30-130%)
- 24I0467-06 Surrogate recovery(ies) above upper control limit (S+).  
2,4,6-Tribromophenol (131% @ 30-130%)
- D4I0249-CCV1 Calibration required quadratic regression (Q).  
2,4-Dinitrophenol (136% @ 40-160%)
- D4I0249-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).  
3,3'-Dichlorobenzidine (21% @ 20%), Dibenzo(a,h)Anthracene (21% @ 20%)
- D4I0272-CCV1 Calibration required quadratic regression (Q).  
2,4-Dinitrophenol (93% @ 40-160%), Di-n-octylphthalate (105% @ 80-120%)
- D4I0272-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).  
3,3'-Dichlorobenzidine (20% @ 20%), Azobenzene (20% @ 20%), Benzo(g,h,i)perylene (31% @ 20%),  
Dibenzo(a,h)Anthracene (25% @ 20%), Indeno(1,2,3-cd)Pyrene (24% @ 20%)
- D4I0273-CCV1 Calibration required quadratic regression (Q).  
2,4-Dinitrophenol (113% @ 40-160%)
- D4I0273-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten

Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Benzo(g,h,i)perylene (21% @ 20%), Butylbenzylphthalate (21% @ 20%), Dibenzo(a,h)Anthracene (22% @ 20%)

DI41326-BLK1 Surrogate recovery(ies) above upper control limit (S+).

2,4,6-Tribromophenol (139% @ 30-130%), p-Terphenyl-d14 (130% @ 30-130%)

DI41326-BS1 Surrogate recovery(ies) above upper control limit (S+).

2,4,6-Tribromophenol (132% @ 30-130%)

DI41326-BSD1 Surrogate recovery(ies) above upper control limit (S+).

2,4,6-Tribromophenol (131% @ 30-130%)

**No other observations noted.**

**End of Project Narrative.**

**DATA USABILITY LINKS**

*To ensure you are viewing the most current version of the documents below, please clear your internet cookies for [www.ESSLaboratory.com](http://www.ESSLaboratory.com). Consult your IT Support personnel for information on how to clear your internet cookies.*

[Definitions of Quality Control Parameters](#)

[Semivolatile Organics Internal Standard Information](#)

[Semivolatile Organics Surrogate Information](#)

[Volatile Organics Internal Standard Information](#)

[Volatile Organics Surrogate Information](#)

[EPH and VPH Alkane Lists](#)

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**CURRENT SW-846 METHODOLOGY VERSIONS**

**Analytical Methods**

1010A - Flashpoint  
6010D - ICP  
6020B - ICP MS  
7010 - Graphite Furnace  
7196A - Hexavalent Chromium  
7470A - Aqueous Mercury  
7471B - Solid Mercury  
8011 - EDB/DBCP/TCP  
8015C - GRO/DRO  
8081B - Pesticides  
8082A - PCB  
8100M - TPH  
8151A - Herbicides  
8260D - VOA  
8270E - SVOA  
8270E SIM - SVOA Low Level  
9014 - Cyanide  
9038 - Sulfate  
9040C - Aqueous pH  
9045D - Solid pH (Corrosivity)  
9050A - Specific Conductance  
9056A - Anions (IC)  
9060A - TOC  
9095B - Paint Filter  
MADEP 19-2.1 - EPH  
MADEP 18-2.1 - VPH

**Prep Methods**

3005A - Aqueous ICP Digestion  
3020A - Aqueous Graphite Furnace / ICP MS Digestion  
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion  
3060A - Solid Hexavalent Chromium Digestion  
3510C - Separatory Funnel Extraction  
3520C - Liquid / Liquid Extraction  
3540C - Manual Soxhlet Extraction  
3546 - Microwave Extraction  
3580A - Waste Dilution  
5030B - Aqueous Purge and Trap  
5030C - Aqueous Purge and Trap  
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 19.6g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.033)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
1,2,4-Trichlorobenzene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
1,2-Dichlorobenzene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
1,3-Dichlorobenzene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
1,4-Dichlorobenzene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2,4,5-Trichlorophenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2,4,6-Trichlorophenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2,4-Dichlorophenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2,4-Dimethylphenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2,4-Dinitrophenol	ND (1.34)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2,4-Dinitrotoluene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2,6-Dinitrotoluene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2-Chloronaphthalene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2-Chlorophenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2-Methylnaphthalene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2-Methylphenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
2-Nitrophenol	ND (0.668)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
3,3'-Dichlorobenzidine	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
3+4-Methylphenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
4-Bromophenyl-phenylether	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
4-Chloroaniline	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
4-Nitrophenol	ND (1.34)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Acenaphthene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Acenaphthylene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Acetophenone	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Aniline	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Anthracene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 19.6g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Benzo(a)anthracene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Benzo(a)pyrene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Benzo(b)fluoranthene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Benzo(g,h,i)perylene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Benzo(k)fluoranthene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
bis(2-Chloroethoxy)methane	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
bis(2-Chloroethyl)ether	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
bis(2-chloroisopropyl)Ether	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
bis(2-Ethylhexyl)phthalate	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Butylbenzylphthalate	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Chrysene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Dibenzo(a,h)Anthracene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Dibenzofuran	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Diethylphthalate	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Dimethylphthalate	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Di-n-butylphthalate	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Di-n-octylphthalate	ND (0.668)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Fluoranthene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Fluorene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Hexachlorobenzene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Hexachlorobutadiene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Hexachloroethane	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Indeno(1,2,3-cd)Pyrene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Isophorone	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Naphthalene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Nitrobenzene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
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 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Pentachlorophenol	ND (1.34)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Phenanthrene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Phenol	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326
Pyrene	ND (0.334)	---	8270E	---	1	TJ	09/14/24 2:20	D4I0249	DI41326

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	112 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	137 %	S+	30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	120 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	110 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	120 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	110 %		30-130
<i>Surrogate: Phenol-d6</i>	124 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	118 %		30-130

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 24.1g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/13/24 19:23

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (20.4)	---	MADEP-EPH	---	1	JDN	09/16/24 22:27	D4I0279	DI41316
C19-C36 Aliphatics1	ND (20.4)	---	MADEP-EPH	---	1	JDN	09/16/24 22:27	D4I0279	DI41316
C11-C22 Unadjusted Aromatics1	ND (20.4)	---	EPH8270	---	1	IBM	09/17/24 14:14	D4I0258	DI41316
C11-C22 Aromatics1,2	ND (20.6)	---	EPH8270	---		TJ	09/17/24 22:20	---	[CALC]
2-Methylnaphthalene	ND (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
Acenaphthene	ND (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
Naphthalene	ND (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Phenanthrene</b>	<b>0.026</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
Acenaphthylene	ND (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
Anthracene	ND (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Benzo(a)anthracene</b>	<b>0.033</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Benzo(a)pyrene</b>	<b>0.035</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Benzo(b)fluoranthene</b>	<b>0.021</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Benzo(g,h,i)perylene</b>	<b>0.022</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Benzo(k)fluoranthene</b>	<b>0.025</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Chrysene</b>	<b>0.033</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
Dibenzo(a,h)Anthracene	ND (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Fluoranthene</b>	<b>0.063</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
Fluorene	ND (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.016</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316
<b>Pyrene</b>	<b>0.077</b> (0.011)	---	EPH8270SIM	---	1	TJ	09/17/24 22:20	D4I0318	DI41316

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	83 %		40-140
Surrogate: 2-Bromonaphthalene	107 %		40-140
Surrogate: 2-Fluorobiphenyl	106 %		40-140
Surrogate: O-Terphenyl	88 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 19.3g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 10:15

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
4,4'-DDE	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
4,4'-DDT	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Aldrin	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
alpha-BHC	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
alpha-Chlordane	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
beta-BHC	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Chlordane (Total)	ND (0.0271)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
delta-BHC	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Dieldrin	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Endosulfan I	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Endosulfan II	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Endosulfan Sulfate	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Endrin	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Endrin Ketone	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
gamma-BHC (Lindane)	ND (0.0020)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
gamma-Chlordane	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Heptachlor	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Heptachlor Epoxide	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Hexachlorobenzene	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606
Methoxychlor	ND (0.0034)	---	8081B	---	1	09/17/24 10:22	D4I0282	DI41606

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	64 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	65 %		30-150



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 10.1g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 15:36

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.012)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
2,4,5-TP (Silvex)	ND (0.012)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
2,4-D	ND (0.061)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
2,4-DB	ND (0.062)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
Dalapon	ND (0.059)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
Dicamba	ND (0.012)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
Dichlorprop	ND (0.061)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
MCPA	ND (3.02)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652
MCPP [2C]	ND (3.05)	---	8151A	---	1	09/18/24 16:34	D4I0319	DI41652

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	96 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 19.4g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/13/24 18:45

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (13.5)	---	8100M	---	1	09/16/24 16:41	---	DI41327
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		84 %		40-140				

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	1290 (500)	---	LK	---	1	CCP	09/23/24 12:16	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 30.5g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-01  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#18	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#28	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#44	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#52 [2C]	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#66	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
<b>BZ#101</b>	<b>0.00043</b> (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#105	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#118	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#128	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#138	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#153 [2C]	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#170	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#180	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#187	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#195	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#206	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707
BZ#209	ND (0.00035)	---	8082A Cong	---	1	09/18/24 12:37	D4I0321	DI41707

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	56 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 20.1g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.029)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
1,2,4-Trichlorobenzene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
1,2-Dichlorobenzene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
1,3-Dichlorobenzene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
1,4-Dichlorobenzene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2,4,5-Trichlorophenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2,4,6-Trichlorophenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2,4-Dichlorophenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2,4-Dimethylphenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2,4-Dinitrophenol	ND (1.18)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2,4-Dinitrotoluene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2,6-Dinitrotoluene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2-Chloronaphthalene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2-Chlorophenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2-Methylnaphthalene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2-Methylphenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
2-Nitrophenol	ND (0.588)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
3,3'-Dichlorobenzidine	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
3+4-Methylphenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
4-Bromophenyl-phenylether	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
4-Chloroaniline	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
4-Nitrophenol	ND (1.18)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Acenaphthene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Acenaphthylene</b>	<b>0.389</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Acetophenone	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Aniline	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Anthracene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 20.1g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Benzo(a)anthracene</b>	<b>0.870</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Benzo(a)pyrene</b>	<b>1.04</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Benzo(b)fluoranthene</b>	<b>1.02</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Benzo(g,h,i)perylene</b>	<b>0.650</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Benzo(k)fluoranthene</b>	<b>0.423</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
bis(2-Chloroethoxy)methane	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
bis(2-Chloroethyl)ether	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
bis(2-chloroisopropyl)Ether	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
bis(2-Ethylhexyl)phthalate	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Butylbenzylphthalate	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Chrysene</b>	<b>0.922</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Dibenzo(a,h)Anthracene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Dibenzofuran	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Diethylphthalate	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Dimethylphthalate	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Di-n-butylphthalate	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Di-n-octylphthalate	ND (0.588)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Fluoranthene</b>	<b>1.43</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Fluorene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Hexachlorobenzene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Hexachlorobutadiene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Hexachloroethane	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.611</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Isophorone	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Naphthalene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Nitrobenzene	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 20.1g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Pentachlorophenol	ND (1.18)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Phenanthrene</b>	<b>0.453</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
Phenol	ND (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326
<b>Pyrene</b>	<b>1.62</b> (0.294)	---	8270E	---	1	TJ	09/14/24 2:50	D4I0249	DI41326

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	113 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	130 %	S+	30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	120 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	112 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	118 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	110 %		30-130
<i>Surrogate: Phenol-d6</i>	124 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	120 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 24.7g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/13/24 19:23

**MADEP-EPH Extractable Petroleum Hydrocarbons**

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (18.0)	---	MADEP-EPH	---	1	JDN	09/16/24 23:02	D4I0279	DI41316
C19-C36 Aliphatics1	18.9 (18.0)	---	MADEP-EPH	---	1	JDN	09/16/24 23:02	D4I0279	DI41316
C11-C22 Unadjusted Aromatics1	45.7 (18.0)	---	EPH8270	---	1	IBM	09/17/24 14:50	D4I0258	DI41316
C11-C22 Aromatics1,2	31.8 (18.1)	---	EPH8270	---		TJ	09/17/24 22:48	---	[CALC]
2-Methylnaphthalene	0.034 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Acenaphthene	0.079 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Naphthalene	0.073 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Phenanthrene	1.12 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Acenaphthylene	0.133 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Anthracene	0.304 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Benzo(a)anthracene	1.21 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Benzo(a)pyrene	1.35 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Benzo(b)fluoranthene	0.880 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Benzo(g,h,i)perylene	0.835 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Benzo(k)fluoranthene	1.04 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Chrysene	1.13 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Dibenzo(a,h)Anthracene	0.420 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Fluoranthene	2.23 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Fluorene	0.131 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Indeno(1,2,3-cd)Pyrene	0.705 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316
Pyrene	2.27 (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 22:48	D4I0318	DI41316

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	78 %		40-140
Surrogate: 2-Bromonaphthalene	120 %		40-140
Surrogate: 2-Fluorobiphenyl	117 %		40-140
Surrogate: O-Terphenyl	75 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 20.1g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 10:15

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD [2C]	P, LC 0.0097 (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
4,4'-DDE	0.0053 (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
4,4'-DDT	0.0627 (0.0147)	---	8081B	---	5	09/17/24 13:08	D4I0282	DI41606
Aldrin	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
alpha-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
alpha-Chlordane	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
beta-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Chlordane (Total)	ND (0.0235)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
delta-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Dieldrin	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Endosulfan I	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Endosulfan II	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Endosulfan Sulfate	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Endrin	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Endrin Ketone	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
gamma-BHC (Lindane)	ND (0.0018)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
gamma-Chlordane	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Heptachlor	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Heptachlor Epoxide	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Hexachlorobenzene	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606
Methoxychlor	ND (0.0029)	---	8081B	---	1	09/17/24 10:50	D4I0282	DI41606

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	60 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	52 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 10.1g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 15:36

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.011)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
2,4-D	ND (0.055)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
2,4-DB	ND (0.056)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
Dalapon	ND (0.053)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
Dicamba	ND (0.011)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
Dichlorprop	ND (0.055)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
MCPA	ND (2.72)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652
MCPP	ND (2.75)	---	8151A	---	1	09/18/24 17:01	D4I0319	DI41652

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	91 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 19.4g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/13/24 18:45

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	160 (12.2)	---	8100M	---	1	09/16/24 18:35	---	DI41327

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: O-Terphenyl</i>	93 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	12900 (500)	---	LK	---	1	CCP	09/23/24 13:22	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 30.1g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-02  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#18 [2C]</b>	<b>P, LC 0.00064</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#28</b>	<b>0.00063</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#44 [2C]</b>	<b>0.00154</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#52</b>	<b>0.00356</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
BZ#66	ND (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#101 [2C]</b>	<b>0.00528</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#105 [2C]</b>	<b>0.00323</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#118</b>	<b>0.00553</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#128</b>	<b>0.00136</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#138</b>	<b>P, LC 0.00568</b> (0.00159)	---	8082A Cong	---	5	09/18/24 16:42	D4I0321	DI41707
<b>BZ#153</b>	<b>0.00397</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#170</b>	<b>P, LC 0.00096</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#180</b>	<b>0.00199</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#187 [2C]</b>	<b>0.00114</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
BZ#195 [2C]	ND (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#206 [2C]</b>	<b>0.00445</b> (0.00032)	---	8082A Cong	---	1	09/18/24 13:08	D4I0321	DI41707
<b>BZ#209 [2C]</b>	<b>0.0143</b> (0.00159)	---	8082A Cong	---	5	09/18/24 16:42	D4I0321	DI41707

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	60 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 19.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.037)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
1,2,4-Trichlorobenzene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
1,2-Dichlorobenzene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
1,3-Dichlorobenzene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
1,4-Dichlorobenzene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2,4,5-Trichlorophenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2,4,6-Trichlorophenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2,4-Dichlorophenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2,4-Dimethylphenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2,4-Dinitrophenol	ND (1.49)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2,4-Dinitrotoluene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2,6-Dinitrotoluene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2-Chloronaphthalene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2-Chlorophenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2-Methylnaphthalene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2-Methylphenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
2-Nitrophenol	ND (0.744)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
3,3'-Dichlorobenzidine	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
3+4-Methylphenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
4-Bromophenyl-phenylether	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
4-Chloroaniline	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
4-Nitrophenol	ND (1.49)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Acenaphthene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Acenaphthylene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Acetophenone	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Aniline	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Anthracene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 19.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Benzo(a)anthracene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Benzo(a)pyrene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Benzo(b)fluoranthene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Benzo(g,h,i)perylene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Benzo(k)fluoranthene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
bis(2-Chloroethoxy)methane	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
bis(2-Chloroethyl)ether	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
bis(2-chloroisopropyl)Ether	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
bis(2-Ethylhexyl)phthalate	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Butylbenzylphthalate	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Chrysene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Dibenzo(a,h)Anthracene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Dibenzofuran	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Diethylphthalate	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Dimethylphthalate	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Di-n-butylphthalate	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Di-n-octylphthalate	ND (0.744)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Fluoranthene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Fluorene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Hexachlorobenzene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Hexachlorobutadiene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Hexachloroethane	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Indeno(1,2,3-cd)Pyrene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Isophorone	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Naphthalene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Nitrobenzene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 19.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Pentachlorophenol	ND (1.49)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Phenanthrene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Phenol	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326
Pyrene	ND (0.372)	---	8270E	---	1	TJ	09/14/24 3:20	D4I0249	DI41326

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	106 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	131 %	S+	30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	113 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	104 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	109 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	102 %		30-130
<i>Surrogate: Phenol-d6</i>	113 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	115 %		30-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 24.5g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/13/24 19:23

**MADEP-EPH Extractable Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
C9-C18 Aliphatics1	ND (21.9)	---	MADEP-EPH	---	1	JDN	09/16/24 23:37	D4I0279	DI41316
C19-C36 Aliphatics1	ND (21.9)	---	MADEP-EPH	---	1	JDN	09/16/24 23:37	D4I0279	DI41316
C11-C22 Unadjusted Aromatics1	ND (21.9)	---	EPH8270	---	1	IBM	09/17/24 15:25	D4I0258	DI41316
C11-C22 Aromatics1,2	ND (22.1)	---	EPH8270	---		TJ	09/17/24 23:16	---	[CALC]
2-Methylnaphthalene	ND (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
Acenaphthene	ND (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
Naphthalene	ND (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Phenanthrene</b>	<b>0.068</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
Acenaphthylene	ND (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Anthracene</b>	<b>0.017</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Benzo(a)anthracene</b>	<b>0.065</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Benzo(a)pyrene</b>	<b>0.062</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Benzo(b)fluoranthene</b>	<b>0.056</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Benzo(g,h,i)perylene</b>	<b>0.041</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Benzo(k)fluoranthene</b>	<b>0.053</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Chrysene</b>	<b>0.066</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Dibenzo(a,h)Anthracene</b>	<b>0.018</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Fluoranthene</b>	<b>0.154</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
Fluorene	ND (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.035</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316
<b>Pyrene</b>	<b>0.124</b> (0.012)	---	EPH8270SIM	---	1	TJ	09/17/24 23:16	D4I0318	DI41316

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1-Chlorooctadecane</i>	83 %		40-140
<i>Surrogate: 2-Bromonaphthalene</i>	110 %		40-140
<i>Surrogate: 2-Fluorobiphenyl</i>	104 %		40-140
<i>Surrogate: O-Terphenyl</i>	85 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 19.4g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 10:15

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
4,4'-DDE	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
4,4'-DDT [2C]	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Aldrin	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
alpha-BHC	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
alpha-Chlordane	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
beta-BHC	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Chlordane (Total)	ND (0.0295)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
delta-BHC	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Dieldrin	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Endosulfan I	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Endosulfan II	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Endosulfan Sulfate	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Endrin	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Endrin Ketone	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
gamma-BHC (Lindane)	ND (0.0022)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
gamma-Chlordane	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Heptachlor	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Heptachlor Epoxide	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Hexachlorobenzene	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606
Methoxychlor	ND (0.0037)	---	8081B	---	1	09/17/24 11:18	D4I0282	DI41606

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	62 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	60 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 10.2g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 15:36

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.013)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
2,4,5-TP (Silvex)	ND (0.013)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
2,4-D	ND (0.066)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
2,4-DB	ND (0.067)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
Dalapon	ND (0.064)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
Dicamba	ND (0.013)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
Dichlorprop	ND (0.066)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
MCPA	ND (3.26)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652
MCPP	ND (3.29)	---	8151A	---	1	09/18/24 17:27	D4I0319	DI41652

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	91 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 19.5g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/13/24 18:45

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (14.7)	---	8100M	---	1	09/16/24 17:19	---	DI41327
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		87 %		40-140				

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	16400 (500)	---	LK	---	1	CCP	09/23/24 18:29	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 30.1g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-03  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
<b>BZ#18 [2C]</b>	<b>P, LC 0.00041</b> (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#28	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#44	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
<b>BZ#52</b>	<b>P 0.00059</b> (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#66 [2C]	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
<b>BZ#101 [2C]</b>	<b>0.00044</b> (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#105 [2C]	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
<b>BZ#118 [2C]</b>	<b>0.00062</b> (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#128 [2C]	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
<b>BZ#138 [2C]</b>	<b>0.00093</b> (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
<b>BZ#153</b>	<b>P 0.00071</b> (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#170 [2C]	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#180 [2C]	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#187	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#195	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#206 [2C]	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707
BZ#209	ND (0.00038)	---	8082A Cong	---	1	09/18/24 13:38	D4I0321	DI41707

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	68 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 6.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
1,4-Dioxane	ND (0.102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
2-Butanone	ND (0.0510)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
2-Chlorotoluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
2-Hexanone	ND (0.0510)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
4-Chlorotoluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 6.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0510)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Acetone	ND (0.0510)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Benzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Bromobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Bromochloromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Bromodichloromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Bromoform	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Bromomethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Carbon Disulfide	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Chlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Chloroethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Chloroform	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Chloromethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Dibromochloromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Dibromomethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Diethyl Ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Di-isopropyl ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Ethylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Isopropylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Methylene Chloride	ND (0.0255)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 6.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
n-Butylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
n-Propylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
sec-Butylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Styrene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
tert-Butylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Tetrachloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Tetrahydrofuran	ND (0.0204)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Toluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Trichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Vinyl Chloride	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Xylene O	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Xylene P,M	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739
Xylenes (Total)	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 21:06	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>99 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>101 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>99 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 19.9g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.031)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
1,2,4-Trichlorobenzene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
1,2-Dichlorobenzene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
1,3-Dichlorobenzene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
1,4-Dichlorobenzene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2,4,5-Trichlorophenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2,4,6-Trichlorophenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2,4-Dichlorophenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2,4-Dimethylphenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2,4-Dinitrophenol	ND (1.25)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2,4-Dinitrotoluene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2,6-Dinitrotoluene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2-Chloronaphthalene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2-Chlorophenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2-Methylnaphthalene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2-Methylphenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
2-Nitrophenol	ND (0.625)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
3,3'-Dichlorobenzidine	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
3+4-Methylphenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
4-Bromophenyl-phenylether	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
4-Chloroaniline	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
4-Nitrophenol	ND (1.25)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Acenaphthene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Acenaphthylene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Acetophenone	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Aniline	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Anthracene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 19.9g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Benzo(a)anthracene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Benzo(a)pyrene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Benzo(b)fluoranthene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Benzo(g,h,i)perylene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Benzo(k)fluoranthene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
bis(2-Chloroethoxy)methane	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
bis(2-Chloroethyl)ether	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
bis(2-chloroisopropyl)Ether	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
bis(2-Ethylhexyl)phthalate	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Butylbenzylphthalate	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Chrysene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Dibenzo(a,h)Anthracene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Dibenzofuran	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Diethylphthalate	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Dimethylphthalate	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Di-n-butylphthalate	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Di-n-octylphthalate	ND (0.625)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Fluoranthene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Fluorene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Hexachlorobenzene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Hexachlorobutadiene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Hexachloroethane	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Indeno(1,2,3-cd)Pyrene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Isophorone	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Naphthalene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Nitrobenzene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
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 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/13/24 18:54

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Pentachlorophenol	ND (1.25)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Phenanthrene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Phenol	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326
Pyrene	ND (0.313)	---	8270E	---	1	TJ	09/14/24 3:51	D4I0249	DI41326

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	105 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	127 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	110 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	101 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	106 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	98 %		30-130
<i>Surrogate: Phenol-d6</i>	113 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	115 %		30-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 24.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/13/24 19:23

**MADEP-EPH Extractable Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
C9-C18 Aliphatics1	ND (19.3)	---	MADEP-EPH	---	1	JDN	09/17/24 0:11	D4I0279	DI41316
C19-C36 Aliphatics1	ND (19.3)	---	MADEP-EPH	---	1	JDN	09/17/24 0:11	D4I0279	DI41316
C11-C22 Unadjusted Aromatics1	ND (19.3)	---	EPH8270	---	1	IBM	09/17/24 16:01	D4I0258	DI41316
C11-C22 Aromatics1,2	ND (19.5)	---	EPH8270	---		TJ	09/17/24 23:44	---	[CALC]
2-Methylnaphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Acenaphthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Naphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
<b>Phenanthrene</b>	<b>0.012</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Acenaphthylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Benzo(a)anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Benzo(a)pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Benzo(b)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Benzo(g,h,i)perylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Benzo(k)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Chrysene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Dibenzo(a,h)Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Fluorene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Indeno(1,2,3-cd)Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316
Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/17/24 23:44	D4I0318	DI41316

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1-Chlorooctadecane</i>	88 %		40-140
<i>Surrogate: 2-Bromonaphthalene</i>	108 %		40-140
<i>Surrogate: 2-Fluorobiphenyl</i>	104 %		40-140
<i>Surrogate: O-Terphenyl</i>	82 %		40-140



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 20.2g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 10:15

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
4,4'-DDE	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
4,4'-DDT	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Aldrin	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
alpha-BHC	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
alpha-Chlordane	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
beta-BHC	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Chlordane (Total)	ND (0.0246)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
delta-BHC	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Dieldrin	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Endosulfan I	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Endosulfan II	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Endosulfan Sulfate	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Endrin	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Endrin Ketone	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
gamma-BHC (Lindane)	ND (0.0018)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
gamma-Chlordane	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Heptachlor	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Heptachlor Epoxide	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Hexachlorobenzene	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606
Methoxychlor	ND (0.0031)	---	8081B	---	1	09/17/24 11:45	D4I0282	DI41606

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	67 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	61 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 10.5g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 15:36

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.011)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
2,4-D	ND (0.056)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
2,4-DB	ND (0.056)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
Dalapon	ND (0.054)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
Dicamba	ND (0.011)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
Dichlorprop	ND (0.056)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
MCPA	ND (2.76)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652
MCPP	ND (2.79)	---	8151A	---	1	09/18/24 17:54	D4I0319	DI41652

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	94 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 19.7g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/13/24 18:45

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (12.6)	---	8100M	---	1	09/16/24 17:57	---	DI41327
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		91 %		40-140				

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	4420 (500)	---	LK	---	1	CCP	09/23/24 14:29	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 80  
 Initial Volume: 30.4g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-04  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#18	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#28	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#44	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#52	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#66	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#101	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#105	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#118	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#128	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#138	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#153	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#170	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#180	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#187	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#195	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#206	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707
BZ#209	ND (0.00033)	---	8082A Cong	---	1	09/18/24 14:09	D4I0321	DI41707

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	68 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 20.8g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.028)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
1,2,4-Trichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
1,2-Dichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
1,3-Dichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
1,4-Dichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2,4,5-Trichlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2,4,6-Trichlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2,4-Dichlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2,4-Dimethylphenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2,4-Dinitrophenol	ND (1.14)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2,4-Dinitrotoluene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2,6-Dinitrotoluene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2-Chloronaphthalene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2-Chlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2-Methylnaphthalene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2-Methylphenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
2-Nitrophenol	ND (0.569)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
3,3'-Dichlorobenzidine	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
3+4-Methylphenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
4-Bromophenyl-phenylether	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
4-Chloroaniline	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
4-Nitrophenol	ND (1.14)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Acenaphthene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Acenaphthylene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Acetophenone	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Aniline	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Anthracene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 20.8g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Benzo(a)anthracene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Benzo(a)pyrene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Benzo(b)fluoranthene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Benzo(g,h,i)perylene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Benzo(k)fluoranthene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
bis(2-Chloroethoxy)methane	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
bis(2-Chloroethyl)ether	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
bis(2-chloroisopropyl)Ether	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
bis(2-Ethylhexyl)phthalate	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Butylbenzylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Chrysene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Dibenzo(a,h)Anthracene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Dibenzofuran	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Diethylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Dimethylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Di-n-butylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Di-n-octylphthalate	ND (0.569)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Fluoranthene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Fluorene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Hexachlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Hexachlorobutadiene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Hexachloroethane	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Indeno(1,2,3-cd)Pyrene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Isophorone	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Naphthalene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Nitrobenzene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 20.8g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Pentachlorophenol	ND (1.14)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Phenanthrene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Phenol	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607
Pyrene	ND (0.285)	---	8270E	---	1	TJ	09/17/24 4:15	D4I0273	DI41607

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>96 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>136 %</i>	<i>S+</i>	<i>30-130</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>104 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>95 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorophenol</i>	<i>102 %</i>		<i>30-130</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>93 %</i>		<i>30-130</i>
<i>Surrogate: Phenol-d6</i>	<i>104 %</i>		<i>30-130</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>105 %</i>		<i>30-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 24.4g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/13/24 19:23

**MADEP-EPH Extractable Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
C9-C18 Aliphatics1	ND (18.2)	---	MADEP-EPH	---	1	JDN	09/17/24 6:31	D4I0281	DI41316
C19-C36 Aliphatics1	ND (18.2)	---	MADEP-EPH	---	1	JDN	09/17/24 6:31	D4I0281	DI41316
C11-C22 Unadjusted Aromatics1	ND (18.2)	---	EPH8270	---	1	IBM	09/17/24 16:37	D4I0258	DI41316
C11-C22 Aromatics1,2	ND (18.4)	---	EPH8270	---		TJ	09/18/24 0:12	---	[CALC]
2-Methylnaphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Acenaphthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Naphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
<b>Phenanthrene</b>	<b>0.015</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Acenaphthylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Benzo(a)anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Benzo(a)pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Benzo(b)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Benzo(g,h,i)perylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Benzo(k)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Chrysene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Dibenzo(a,h)Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Fluorene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Indeno(1,2,3-cd)Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316
Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 0:12	D4I0318	DI41316

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1-Chlorooctadecane</i>	72 %		40-140
<i>Surrogate: 2-Bromonaphthalene</i>	86 %		40-140
<i>Surrogate: 2-Fluorobiphenyl</i>	84 %		40-140
<i>Surrogate: O-Terphenyl</i>	75 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 20.7g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 10:15

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
4,4'-DDE	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
4,4'-DDT	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Aldrin	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
alpha-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
alpha-Chlordane	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
beta-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Chlordane (Total)	ND (0.0229)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
delta-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Dieldrin	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Endosulfan I	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Endosulfan II	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Endosulfan Sulfate	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Endrin	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Endrin Ketone	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
gamma-BHC (Lindane)	ND (0.0017)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
gamma-Chlordane	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Heptachlor	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Heptachlor Epoxide	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Hexachlorobenzene	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606
Methoxychlor	ND (0.0029)	---	8081B	---	1	09/17/24 12:13	D4I0282	DI41606

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	70 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	72 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 10.1g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 15:36

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.011)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
2,4-D	ND (0.055)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
2,4-DB	ND (0.056)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
Dalapon	ND (0.053)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
Dicamba	ND (0.011)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
Dichlorprop	ND (0.055)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
MCPA	ND (2.72)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652
MCPP	ND (2.75)	---	8151A	---	1	09/18/24 18:20	D4I0319	DI41652

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	93 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 19g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/16/24 9:55

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (12.5)	---	8100M	---	1	09/17/24 21:57	---	DI41608

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: O-Terphenyl</i>	84 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	1480 (500)	---	LK	---	1	CCP	09/23/24 14:45	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 30.5g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-05  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#18	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#28	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#44	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#52	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#66	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#101	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#105	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#118	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#128	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#138	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#153	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#170	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#180	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#187	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#195	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#206	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707
BZ#209	ND (0.00031)	---	8082A Cong	---	1	09/18/24 14:39	D4I0321	DI41707

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	70 %		30-150



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 20g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.030)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
1,2,4-Trichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
1,2-Dichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
1,3-Dichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
1,4-Dichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2,4,5-Trichlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2,4,6-Trichlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2,4-Dichlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2,4-Dimethylphenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2,4-Dinitrophenol	ND (1.21)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2,4-Dinitrotoluene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2,6-Dinitrotoluene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2-Chloronaphthalene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2-Chlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2-Methylnaphthalene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2-Methylphenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
2-Nitrophenol	ND (0.603)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
3,3'-Dichlorobenzidine	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
3+4-Methylphenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
4-Bromophenyl-phenylether	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
4-Chloroaniline	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
4-Nitrophenol	ND (1.21)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Acenaphthene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Acenaphthylene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Acetophenone	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Aniline	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Anthracene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 20g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Benzo(a)anthracene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Benzo(a)pyrene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Benzo(b)fluoranthene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Benzo(g,h,i)perylene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Benzo(k)fluoranthene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
bis(2-Chloroethoxy)methane	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
bis(2-Chloroethyl)ether	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
bis(2-chloroisopropyl)Ether	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
bis(2-Ethylhexyl)phthalate	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Butylbenzylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Chrysene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Dibenzo(a,h)Anthracene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Dibenzofuran	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Diethylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Dimethylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Di-n-butylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Di-n-octylphthalate	ND (0.603)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Fluoranthene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Fluorene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Hexachlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Hexachlorobutadiene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Hexachloroethane	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Indeno(1,2,3-cd)Pyrene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Isophorone	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Naphthalene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Nitrobenzene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 20g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Pentachlorophenol	ND (1.21)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Phenanthrene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Phenol	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607
Pyrene	ND (0.302)	---	8270E	---	1	TJ	09/17/24 4:46	D4I0273	DI41607

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	95 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	131 %	S+	30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	104 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	92 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	100 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	84 %		30-130
<i>Surrogate: Phenol-d6</i>	103 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	102 %		30-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 24.3g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/17/24 10:45

**MADEP-EPH Extractable Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
C9-C18 Aliphatics1	ND (18.6)	---	MADEP-EPH	---	1	JDN	09/17/24 16:08	D4I0312	DI41703
C19-C36 Aliphatics1	ND (18.6)	---	MADEP-EPH	---	1	JDN	09/17/24 16:08	D4I0312	DI41703
C11-C22 Unadjusted Aromatics1	ND (18.6)	---	EPH8270	---	1	IBM	09/17/24 17:39	D4I0257	DI41703
C11-C22 Aromatics1,2	ND (18.8)	---	EPH8270	---		TJ	09/18/24 2:05	---	[CALC]
2-Methylnaphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Acenaphthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Naphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Phenanthrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Acenaphthylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Benzo(a)anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Benzo(a)pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Benzo(b)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Benzo(g,h,i)perylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Benzo(k)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Chrysene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Dibenzo(a,h)Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Fluorene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Indeno(1,2,3-cd)Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703
Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/18/24 2:05	D4I0318	DI41703

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1-Chlorooctadecane</i>	73 %		40-140
<i>Surrogate: 2-Bromonaphthalene</i>	81 %		40-140
<i>Surrogate: 2-Fluorobiphenyl</i>	78 %		40-140
<i>Surrogate: O-Terphenyl</i>	81 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 20.8g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 10:15

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
4,4'-DDE	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
4,4'-DDT	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Aldrin	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
alpha-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
alpha-Chlordane	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
beta-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Chlordane (Total)	ND (0.0232)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
delta-BHC	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Dieldrin	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Endosulfan I	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Endosulfan II	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Endosulfan Sulfate	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Endrin	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Endrin Ketone	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
gamma-BHC (Lindane)	ND (0.0017)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
gamma-Chlordane	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Heptachlor	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Heptachlor Epoxide	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Hexachlorobenzene	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606
Methoxychlor	ND (0.0029)	---	8081B	---	1	09/17/24 12:41	D4I0282	DI41606

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	58 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	59 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 10.5g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/19/24 13:30

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.011)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
2,4-D	ND (0.054)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
2,4-DB	ND (0.055)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
Dalapon	ND (0.052)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
Dicamba	ND (0.011)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
Dichlorprop	ND (0.054)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
MCPA	ND (2.67)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831
MCPP	ND (2.70)	---	8151A	---	1	09/23/24 9:18	D4I0425	DI41831

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	87 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 20.8g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/16/24 9:55

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (11.6)	---	8100M	---	1	09/17/24 22:37	---	DI41608

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: O-Terphenyl</i>	82 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	10400 (500)	---	LK	---	1	CCP	09/23/24 15:02	mg/kg	[CALC]



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 30.2g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-06  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#18	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#28	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#44	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#52	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#66	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#101	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#105	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#118	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#128	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#138	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#153	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#170	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#180	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#187	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#195	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#206	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707
BZ#209	ND (0.00032)	---	8082A Cong	---	1	09/18/24 15:10	D4I0321	DI41707

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	83 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 20.5g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.028)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
1,2,4-Trichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
1,2-Dichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
1,3-Dichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
1,4-Dichlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2,4,5-Trichlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2,4,6-Trichlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2,4-Dichlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2,4-Dimethylphenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2,4-Dinitrophenol	ND (1.14)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2,4-Dinitrotoluene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2,6-Dinitrotoluene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2-Chloronaphthalene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2-Chlorophenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2-Methylnaphthalene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2-Methylphenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
2-Nitrophenol	ND (0.570)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
3,3'-Dichlorobenzidine	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
3+4-Methylphenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
4-Bromophenyl-phenylether	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
4-Chloroaniline	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
4-Nitrophenol	ND (1.14)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Acenaphthene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Acenaphthylene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Acetophenone	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Aniline	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Anthracene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 20.5g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Benzo(a)anthracene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Benzo(a)pyrene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Benzo(b)fluoranthene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Benzo(g,h,i)perylene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Benzo(k)fluoranthene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
bis(2-Chloroethoxy)methane	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
bis(2-Chloroethyl)ether	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
bis(2-chloroisopropyl)Ether	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
bis(2-Ethylhexyl)phthalate	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Butylbenzylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Chrysene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Dibenzo(a,h)Anthracene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Dibenzofuran	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Diethylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Dimethylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Di-n-butylphthalate	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Di-n-octylphthalate	ND (0.570)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Fluoranthene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Fluorene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Hexachlorobenzene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Hexachlorobutadiene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Hexachloroethane	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Indeno(1,2,3-cd)Pyrene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Isophorone	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Naphthalene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Nitrobenzene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 20.5g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Pentachlorophenol	ND (1.14)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Phenanthrene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Phenol	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607
Pyrene	ND (0.285)	---	8270E	---	1	TJ	09/16/24 23:36	D4I0272	DI41607

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	90 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	83 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	99 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	96 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	96 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	86 %		30-130
<i>Surrogate: Phenol-d6</i>	101 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	107 %		30-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 24.6g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/17/24 10:45

**MADEP-EPH Extractable Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
C9-C18 Aliphatics1	ND (17.8)	---	MADEP-EPH	---	1	JDN	09/17/24 16:43	D4I0312	DI41703
C19-C36 Aliphatics1	ND (17.8)	---	MADEP-EPH	---	1	JDN	09/17/24 16:43	D4I0312	DI41703
C11-C22 Unadjusted Aromatics1	ND (17.8)	---	EPH8270	---	1	IBM	09/17/24 18:19	D4I0257	DI41703
C11-C22 Aromatics1,2	ND (18.0)	---	EPH8270	---		TJ	09/18/24 2:33	---	[CALC]
2-Methylnaphthalene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Acenaphthene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Naphthalene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Phenanthrene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Acenaphthylene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Anthracene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Benzo(a)anthracene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Benzo(a)pyrene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Benzo(b)fluoranthene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Benzo(g,h,i)perylene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Benzo(k)fluoranthene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Chrysene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Dibenzo(a,h)Anthracene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Fluoranthene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Fluorene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Indeno(1,2,3-cd)Pyrene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703
Pyrene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 2:33	D4I0318	DI41703

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1-Chlorooctadecane</i>	73 %		40-140
<i>Surrogate: 2-Bromonaphthalene</i>	92 %		40-140
<i>Surrogate: 2-Fluorobiphenyl</i>	85 %		40-140
<i>Surrogate: O-Terphenyl</i>	84 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 20.9g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 10:20

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
4,4'-DDE	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
4,4'-DDT	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Aldrin	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
alpha-BHC	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
alpha-Chlordane	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
beta-BHC	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Chlordane (Total)	ND (0.0224)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
delta-BHC	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Dieldrin	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Endosulfan I	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Endosulfan II	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Endosulfan Sulfate	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Endrin	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Endrin Ketone	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
gamma-BHC (Lindane)	ND (0.0017)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
gamma-Chlordane	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Heptachlor	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Heptachlor Epoxide	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Hexachlorobenzene	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708
Methoxychlor	ND (0.0028)	---	8081B	---	1	09/19/24 3:50	D4I0345	DI41708

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	59 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	65 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 10.2g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 15:36

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.011)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
2,4-D	ND (0.054)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
2,4-DB	ND (0.054)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
Dalapon	ND (0.052)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
Dicamba	ND (0.011)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
Dichlorprop	ND (0.054)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
MCPA	ND (2.66)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652
MCPP	ND (2.69)	---	8151A	---	1	09/18/24 19:13	D4I0319	DI41652

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	81 %		30-150



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 20.9g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/16/24 9:55

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	14.1 (11.2)	---	8100M	---	1	09/17/24 23:17	---	DI41608

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: O-Terphenyl</i>	80 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	2230 (500)	---	LK	---	1	CCP	09/23/24 15:19	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 30.1g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-07  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#18	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#28	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#44	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#52	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#66	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#101	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#105	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#118	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#128	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#138	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#153	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#170	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#180	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#187	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#195	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#206	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707
BZ#209	ND (0.00031)	---	8082A Cong	---	1	09/18/24 15:41	D4I0321	DI41707

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	72 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 20.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.028)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
1,2,4-Trichlorobenzene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
1,2-Dichlorobenzene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
1,3-Dichlorobenzene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
1,4-Dichlorobenzene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2,4,5-Trichlorophenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2,4,6-Trichlorophenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2,4-Dichlorophenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2,4-Dimethylphenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2,4-Dinitrophenol	ND (1.13)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2,4-Dinitrotoluene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2,6-Dinitrotoluene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2-Chloronaphthalene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2-Chlorophenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2-Methylnaphthalene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2-Methylphenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
2-Nitrophenol	ND (0.563)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
3,3'-Dichlorobenzidine	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
3+4-Methylphenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
4-Bromophenyl-phenylether	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
4-Chloroaniline	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
4-Nitrophenol	ND (1.13)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Acenaphthene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Acenaphthylene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Acetophenone	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Aniline	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Anthracene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 20.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Benzo(a)anthracene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Benzo(a)pyrene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Benzo(b)fluoranthene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Benzo(g,h,i)perylene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Benzo(k)fluoranthene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
bis(2-Chloroethoxy)methane	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
bis(2-Chloroethyl)ether	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
bis(2-chloroisopropyl)Ether	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
bis(2-Ethylhexyl)phthalate	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Butylbenzylphthalate	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Chrysene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Dibenzo(a,h)Anthracene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Dibenzofuran	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Diethylphthalate	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Dimethylphthalate	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Di-n-butylphthalate	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Di-n-octylphthalate	ND (0.563)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Fluoranthene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Fluorene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Hexachlorobenzene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Hexachlorobutadiene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Hexachloroethane	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Indeno(1,2,3-cd)Pyrene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Isophorone	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Naphthalene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Nitrobenzene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 20.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/16/24 9:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Pentachlorophenol	ND (1.13)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Phenanthrene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Phenol	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607
Pyrene	ND (0.281)	---	8270E	---	1	TJ	09/17/24 0:06	D4I0272	DI41607

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>92 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>80 %</i>		<i>30-130</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>101 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>99 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorophenol</i>	<i>98 %</i>		<i>30-130</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>87 %</i>		<i>30-130</i>
<i>Surrogate: Phenol-d6</i>	<i>102 %</i>		<i>30-130</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>105 %</i>		<i>30-130</i>

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 24.5g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Prepared: 9/17/24 10:45

**MADEP-EPH Extractable Petroleum Hydrocarbons**

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (17.4)	---	MADEP-EPH	---	1	JDN	09/17/24 17:17	D4I0312	DI41703
<b>C19-C36 Aliphatics1</b>	<b>20.1</b> (17.4)	---	MADEP-EPH	---	1	JDN	09/17/24 17:17	D4I0312	DI41703
C11-C22 Unadjusted Aromatics1	ND (17.4)	---	EPH8270	---	1	IBM	09/17/24 18:59	D4I0257	DI41703
C11-C22 Aromatics1,2	ND (17.6)	---	EPH8270	---		TJ	09/18/24 3:01	---	[CALC]
2-Methylnaphthalene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
Acenaphthene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Naphthalene</b>	<b>0.012</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Phenanthrene</b>	<b>0.062</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Acenaphthylene</b>	<b>0.018</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Anthracene</b>	<b>0.012</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Benzo(a)anthracene</b>	<b>0.104</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Benzo(a)pyrene</b>	<b>0.107</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Benzo(b)fluoranthene</b>	<b>0.101</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Benzo(g,h,i)perylene</b>	<b>0.074</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Benzo(k)fluoranthene</b>	<b>0.105</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Chrysene</b>	<b>0.113</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Dibenzo(a,h)Anthracene</b>	<b>0.040</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Fluoranthene</b>	<b>0.182</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
Fluorene	ND (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.065</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703
<b>Pyrene</b>	<b>0.137</b> (0.009)	---	EPH8270SIM	---	1	TJ	09/18/24 3:01	D4I0318	DI41703

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	80 %		40-140
Surrogate: 2-Bromonaphthalene	88 %		40-140
Surrogate: 2-Fluorobiphenyl	85 %		40-140
Surrogate: O-Terphenyl	90 %		40-140



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 19.4g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 10:20

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
4,4'-DDE	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
4,4'-DDT	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Aldrin	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
alpha-BHC	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
alpha-Chlordane	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
beta-BHC	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Chlordane (Total)	ND (0.0234)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
delta-BHC	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Dieldrin	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Endosulfan I	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Endosulfan II	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Endosulfan Sulfate	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Endrin	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Endrin Ketone	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
gamma-BHC (Lindane)	ND (0.0018)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
gamma-Chlordane	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Heptachlor	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Heptachlor Epoxide	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Hexachlorobenzene	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708
Methoxychlor	ND (0.0029)	---	8081B	---	1	09/19/24 4:18	D4I0345	DI41708

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	62 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	52 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 10.5g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/16/24 15:36

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.010)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
2,4,5-TP (Silvex)	ND (0.010)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
2,4-D	ND (0.051)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
2,4-DB	ND (0.051)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
Dalapon	ND (0.049)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
Dicamba	ND (0.010)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
Dichlorprop	ND (0.051)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
MCPA	ND (2.52)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652
MCPP	ND (2.54)	---	8151A	---	1	09/18/24 19:40	D4I0319	DI41652

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	100 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 20.7g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/16/24 9:55

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (11.0)	---	8100M	---	1	09/17/24 14:07	---	DI41608
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		92 %		40-140				

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Total Organic Carbon (Average)	9870 (500)	---	LK	---	1	CCP	09/23/24 16:08	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 30.6g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-08  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/17/24 11:30

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#18	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#28	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#44	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#52	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#66	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#101	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#105	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#118	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#128	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#138	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#153	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#170	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#180	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#187	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#195	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#206	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707
BZ#209	ND (0.00030)	---	8082A Cong	---	1	09/18/24 16:11	D4I0321	DI41707

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	65 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2.1  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 6.4g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-09  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
1,4-Dioxane	ND (0.0925)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
2-Butanone	ND (0.0462)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
2-Chlorotoluene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
2-Hexanone	ND (0.0462)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
4-Chlorotoluene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2.1  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 6.4g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-09  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0462)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Acetone	ND (0.0462)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Benzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Bromobenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Bromochloromethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Bromodichloromethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Bromoform	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Bromomethane	ND (0.0092)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Carbon Disulfide	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Chlorobenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Chloroethane	ND (0.0092)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Chloroform	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Chloromethane	ND (0.0092)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Dibromochloromethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Dibromomethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0092)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Diethyl Ether	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Di-isopropyl ether	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Ethylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Isopropylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Methylene Chloride	ND (0.0231)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2.1  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 84  
 Initial Volume: 6.4g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-09  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
n-Butylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
n-Propylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
sec-Butylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Styrene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
tert-Butylbenzene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Tetrachloroethene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Tetrahydrofuran	ND (0.0185)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Toluene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Trichloroethene	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Vinyl Chloride	ND (0.0092)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Xylene O	ND (0.0046)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Xylene P,M	ND (0.0092)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739
Xylenes (Total)	ND (0.0092)	---	8260D Low	---	1	MD	09/17/24 21:32	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>103 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>99 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>100 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>99 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3.1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 9.2g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-10  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
1,4-Dioxane	ND (0.0656)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
2-Butanone	ND (0.0328)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
2-Chlorotoluene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
2-Hexanone	ND (0.0328)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
4-Chlorotoluene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3.1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 9.2g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-10  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0328)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Acetone	ND (0.0328)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Benzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Bromobenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Bromochloromethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Bromodichloromethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Bromoform	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Bromomethane	ND (0.0066)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Carbon Disulfide	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Chlorobenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Chloroethane	ND (0.0066)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Chloroform	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Chloromethane	ND (0.0066)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Dibromochloromethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Dibromomethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0066)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Diethyl Ether	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Di-isopropyl ether	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Ethylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Isopropylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Methylene Chloride	ND (0.0164)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3.1  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 83  
 Initial Volume: 9.2g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-10  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
n-Butylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
n-Propylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
sec-Butylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Styrene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
tert-Butylbenzene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Tetrachloroethene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Tetrahydrofuran	ND (0.0131)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Toluene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Trichloroethene	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Vinyl Chloride	ND (0.0066)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Xylene O	ND (0.0033)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Xylene P,M	ND (0.0066)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739
Xylenes (Total)	ND (0.0066)	---	8260D Low	---	1	MD	09/17/24 21:57	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>98 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>100 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>99 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4.3  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 5.7g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-11  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
1,4-Dioxane	ND (0.102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
2-Butanone	ND (0.0512)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
2-Chlorotoluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
2-Hexanone	ND (0.0512)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
4-Chlorotoluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4.3  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 5.7g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-11  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0512)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Acetone	ND (0.0512)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Benzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Bromobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Bromochloromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Bromodichloromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Bromoform	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Bromomethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Carbon Disulfide	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Chlorobenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Chloroethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Chloroform	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Chloromethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Dibromochloromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Dibromomethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Diethyl Ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Di-isopropyl ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Ethylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Isopropylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Methylene Chloride	ND (0.0256)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4.3  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 86  
 Initial Volume: 5.7g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-11  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
n-Butylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
n-Propylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
sec-Butylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Styrene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
tert-Butylbenzene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Tetrachloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Tetrahydrofuran	ND (0.0205)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Toluene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Trichloroethene	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Vinyl Chloride	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Xylene O	ND (0.0051)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Xylene P,M	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739
Xylenes (Total)	ND (0.0102)	---	8260D Low	---	1	MD	09/17/24 22:23	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>98 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>101 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>99 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5.2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 9.5g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-12  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
1,4-Dioxane	ND (0.0598)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
2-Butanone	ND (0.0299)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
2-Chlorotoluene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
2-Hexanone	ND (0.0299)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
4-Chlorotoluene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5.2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 9.5g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-12  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0299)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Acetone	ND (0.0299)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Benzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Bromobenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Bromochloromethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Bromodichloromethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Bromoform	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Bromomethane	ND (0.0060)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Carbon Disulfide	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Chlorobenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Chloroethane	ND (0.0060)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Chloroform	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Chloromethane	ND (0.0060)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Dibromochloromethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Dibromomethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0060)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Diethyl Ether	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Di-isopropyl ether	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Ethylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Isopropylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Methylene Chloride	ND (0.0150)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5.2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 88  
 Initial Volume: 9.5g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-12  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
n-Butylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
n-Propylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
sec-Butylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Styrene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
tert-Butylbenzene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Tetrachloroethene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Tetrahydrofuran	ND (0.0120)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Toluene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Trichloroethene	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Vinyl Chloride	ND (0.0060)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Xylene O	ND (0.0030)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Xylene P,M	ND (0.0060)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739
Xylenes (Total)	ND (0.0060)	---	8260D Low	---	1	MD	09/17/24 22:49	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>99 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>100 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>100 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1.3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 7.2g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-13  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
1,4-Dioxane	ND (0.0910)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
2-Butanone	ND (0.0455)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
2-Chlorotoluene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
2-Hexanone	ND (0.0455)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
4-Chlorotoluene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1.3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 7.2g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-13  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0455)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Acetone	ND (0.0455)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Benzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Bromobenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Bromochloromethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Bromodichloromethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Bromoform	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Bromomethane	ND (0.0091)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Carbon Disulfide	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Chlorobenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Chloroethane	ND (0.0091)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Chloroform	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Chloromethane	ND (0.0091)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Dibromochloromethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Dibromomethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0091)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Diethyl Ether	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Di-isopropyl ether	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Ethylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Isopropylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Methylene Chloride	ND (0.0227)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1.3  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 76  
 Initial Volume: 7.2g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-13  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
n-Butylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
n-Propylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
sec-Butylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Styrene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
tert-Butylbenzene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Tetrachloroethene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Tetrahydrofuran	ND (0.0182)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Toluene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Trichloroethene	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Vinyl Chloride	ND (0.0091)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Xylene O	ND (0.0045)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Xylene P,M	ND (0.0091)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739
Xylenes (Total)	ND (0.0091)	---	8260D Low	---	1	MD	09/17/24 23:15	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>98 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>100 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>99 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2.2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 5.9g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-14  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
1,4-Dioxane	ND (0.100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
2-Butanone	ND (0.0501)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
2-Chlorotoluene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
2-Hexanone	ND (0.0501)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
4-Chlorotoluene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2.2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 5.9g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-14  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0501)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Acetone	ND (0.0501)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Benzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Bromobenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Bromochloromethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Bromodichloromethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Bromoform	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Bromomethane	ND (0.0100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Carbon Disulfide	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Chlorobenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Chloroethane	ND (0.0100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Chloroform	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Chloromethane	ND (0.0100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Dibromochloromethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Dibromomethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Diethyl Ether	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Di-isopropyl ether	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Ethylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Isopropylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Methylene Chloride	ND (0.0251)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2.2  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 85  
 Initial Volume: 5.9g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-14  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
n-Butylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
n-Propylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
sec-Butylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Styrene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
tert-Butylbenzene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Tetrachloroethene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Tetrahydrofuran	ND (0.0200)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Toluene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Trichloroethene	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Vinyl Chloride	ND (0.0100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Xylene O	ND (0.0050)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Xylene P,M	ND (0.0100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739
Xylenes (Total)	ND (0.0100)	---	8260D Low	---	1	MD	09/17/24 23:41	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>106 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>94 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>101 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>102 %</i>		<i>70-130</i>



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3.2  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 9.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-15  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,1,1-Trichloroethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,1,2,2-Tetrachloroethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,1,2-Trichloroethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,1-Dichloroethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,1-Dichloroethene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,1-Dichloropropene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2,3-Trichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2,3-Trichloropropane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2,4-Trichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2,4-Trimethylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2-Dibromo-3-Chloropropane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2-Dibromoethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2-Dichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2-Dichloroethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,2-Dichloropropane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,3,5-Trimethylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,3-Dichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,3-Dichloropropane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,4-Dichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
1,4-Dioxane	ND (0.0785)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
2,2-Dichloropropane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
2-Butanone	ND (0.0392)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
2-Chlorotoluene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
2-Hexanone	ND (0.0392)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
4-Chlorotoluene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
4-Isopropyltoluene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3.2  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 9.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-15  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0392)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
<b>Acetone</b>	<b>0.0402</b> (0.0392)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Benzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Bromobenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Bromochloromethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Bromodichloromethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Bromoform	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Bromomethane	ND (0.0078)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Carbon Disulfide	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Carbon Tetrachloride	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Chlorobenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Chloroethane	ND (0.0078)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Chloroform	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Chloromethane	ND (0.0078)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
cis-1,2-Dichloroethene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
cis-1,3-Dichloropropene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Dibromochloromethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Dibromomethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Dichlorodifluoromethane	ND (0.0078)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Diethyl Ether	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Di-isopropyl ether	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Ethyl tertiary-butyl ether	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Ethylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Hexachlorobutadiene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Isopropylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Methyl tert-Butyl Ether	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Methylene Chloride	ND (0.0196)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3.2  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 70  
 Initial Volume: 9.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-15  
 Sample Matrix: Soil  
 Units: mg/kg dry  
 Analyst: MD  
 Prepared: 9/17/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
n-Butylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
n-Propylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
sec-Butylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Styrene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
tert-Butylbenzene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Tertiary-amyl methyl ether	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Tetrachloroethene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Tetrahydrofuran	ND (0.0157)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Toluene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
trans-1,2-Dichloroethene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
trans-1,3-Dichloropropene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Trichloroethene	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Trichlorofluoromethane	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Vinyl Chloride	ND (0.0078)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Xylene O	ND (0.0039)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Xylene P,M	ND (0.0078)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739
Xylenes (Total)	ND (0.0078)	---	8260D Low	---	1	MD	09/18/24 0:07	D4I0314	DI41739

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>106 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>90 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>101 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>107 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-1 - Oven Dried  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 99

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-16  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	9.44 (0.99)	---	7010	---	10	CEV	09/18/24 12:07	5.1 100	DI41709
Cadmium	ND (0.20)	---	6010D	---	1	KJB	09/17/24 16:23	5.1 100	DI41709
Chromium	31.2 (0.39)	---	6010D	---	1	KJB	09/17/24 16:23	5.1 100	DI41709
Copper	27.1 (2.96)	---	6010D	---	3	KJB	09/20/24 12:36	5.1 100	DI41709
Lead	77.4 (5.92)	---	6010D	---	3	KJB	09/20/24 12:36	5.1 100	DI41709
Mercury	0.253 (0.091)	---	7471B	---	10	AFV	09/17/24 17:53	2.2 40	DI41710
Nickel	22.0 (0.99)	---	6010D	---	1	KJB	09/17/24 16:23	5.1 100	DI41709
Zinc	60.3 (0.99)	---	6010D	---	1	KJB	09/17/24 16:23	5.1 100	DI41709

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-2 - OVEN DRIED  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-17  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	5.94 (0.96)	---	7010	---	10	CEV	09/18/24 12:13	5.22 100	DI41709
Cadmium	0.19 (0.19)	---	6010D	---	1	KJB	09/17/24 16:26	5.22 100	DI41709
Chromium	40.0 (0.38)	---	6010D	---	1	KJB	09/17/24 16:26	5.22 100	DI41709
Copper	22.4 (0.96)	---	6010D	---	1	KJB	09/17/24 16:26	5.22 100	DI41709
Lead	83.1 (1.92)	---	6010D	---	1	KJB	09/17/24 16:26	5.22 100	DI41709
Mercury	0.293 (0.087)	---	7471B	---	10	AFV	09/17/24 18:04	2.28 40	DI41710
Nickel	8.50 (0.96)	---	6010D	---	1	KJB	09/17/24 16:26	5.22 100	DI41709
Zinc	78.3 (0.96)	---	6010D	---	1	KJB	09/17/24 16:26	5.22 100	DI41709

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-DS-3 - OVEN DRIED  
 Date Sampled: 09/11/24 15:00  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-18  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	3.76 (0.94)	---	7010	---	10	CEV	09/18/24 12:19	5.3 100	DI41709
Cadmium	ND (0.19)	---	6010D	---	1	KJB	09/17/24 16:28	5.3 100	DI41709
Chromium	16.3 (0.38)	---	6010D	---	1	KJB	09/17/24 16:28	5.3 100	DI41709
Copper	8.30 (0.94)	---	6010D	---	1	KJB	09/17/24 16:28	5.3 100	DI41709
Lead	14.7 (1.89)	---	6010D	---	1	KJB	09/17/24 16:28	5.3 100	DI41709
Mercury	0.067 (0.010)	---	7471B	---	1	AFV	09/17/24 17:10	2 40	DI41710
Nickel	6.37 (0.94)	---	6010D	---	1	KJB	09/17/24 16:28	5.3 100	DI41709
Zinc	34.8 (0.94)	---	6010D	---	1	KJB	09/17/24 16:28	5.3 100	DI41709

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-1 - OVEN DRIED  
 Date Sampled: 09/11/24 11:30  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-19  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	2.24 (0.97)	---	7010	---	10	CEV	09/18/24 12:37	5.14 100	DI41709
Cadmium	ND (0.19)	---	6010D	---	1	KJB	09/17/24 16:35	5.14 100	DI41709
Chromium	8.40 (0.39)	---	6010D	---	1	KJB	09/17/24 16:35	5.14 100	DI41709
Copper	2.95 (0.97)	---	6010D	---	1	KJB	09/17/24 16:35	5.14 100	DI41709
Lead	5.32 (1.95)	---	6010D	---	1	KJB	09/17/24 16:35	5.14 100	DI41709
Mercury	ND (0.010)	---	7471B	---	1	AFV	09/17/24 17:17	2.05 40	DI41710
Nickel	5.74 (0.97)	---	6010D	---	1	KJB	09/17/24 16:35	5.14 100	DI41709
Zinc	29.8 (0.97)	---	6010D	---	1	KJB	09/17/24 16:35	5.14 100	DI41709

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-2 - OVEN DRIED  
 Date Sampled: 09/11/24 12:30  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-20  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	2.90 (0.99)	---	7010	---	10	CEV	09/18/24 12:43	5.05 100	DI41709
Cadmium	ND (0.20)	---	6010D	---	1	KJB	09/17/24 16:37	5.05 100	DI41709
Chromium	8.33 (0.40)	---	6010D	---	1	KJB	09/17/24 16:37	5.05 100	DI41709
Copper	6.57 (0.99)	---	6010D	---	1	KJB	09/17/24 16:37	5.05 100	DI41709
Lead	5.98 (1.98)	---	6010D	---	1	KJB	09/17/24 16:37	5.05 100	DI41709
Mercury	0.144 (0.009)	---	7471B	---	1	AFV	09/17/24 17:19	2.09 40	DI41710
Nickel	5.39 (0.99)	---	6010D	---	1	KJB	09/17/24 16:37	5.05 100	DI41709
Zinc	34.9 (0.99)	---	6010D	---	1	KJB	09/17/24 16:37	5.05 100	DI41709



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-3 - OVEN DRIED  
 Date Sampled: 09/11/24 13:00  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-21  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	5.87 (0.99)	---	7010	---	10	CEV	09/18/24 12:50	5.05 100	DI41709
Cadmium	ND (0.20)	---	6010D	---	1	KJB	09/17/24 16:39	5.05 100	DI41709
Chromium	19.2 (0.40)	---	6010D	---	1	KJB	09/17/24 16:39	5.05 100	DI41709
Copper	8.66 (0.99)	---	6010D	---	1	KJB	09/17/24 16:39	5.05 100	DI41709
Lead	16.0 (1.98)	---	6010D	---	1	KJB	09/17/24 16:39	5.05 100	DI41709
Mercury	0.037 (0.009)	---	7471B	---	1	AFV	09/17/24 17:21	2.12 40	DI41710
Nickel	13.3 (0.99)	---	6010D	---	1	KJB	09/17/24 16:39	5.05 100	DI41709
Zinc	41.5 (0.99)	---	6010D	---	1	KJB	09/17/24 16:39	5.05 100	DI41709

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-4 - OVEN DRIED  
 Date Sampled: 09/11/24 13:30  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-22  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	10.0 (4.68)	---	7010	---	50	CEV	09/18/24 13:02	5.34 100	DI41709
Cadmium	ND (0.19)	---	6010D	---	1	KJB	09/17/24 16:41	5.34 100	DI41709
Chromium	30.6 (0.37)	---	6010D	---	1	KJB	09/17/24 16:41	5.34 100	DI41709
Copper	13.9 (0.94)	---	6010D	---	1	KJB	09/17/24 16:41	5.34 100	DI41709
Lead	12.4 (3.75)	---	6010D	---	2	KJB	09/30/24 14:49	5.34 100	DI41709
Mercury	0.014 (0.009)	---	7471B	---	1	AFV	09/17/24 17:23	2.21 40	DI41710
Nickel	23.3 (0.94)	---	6010D	---	1	KJB	09/17/24 16:41	5.34 100	DI41709
Zinc	53.8 (0.94)	---	6010D	---	1	KJB	09/17/24 16:41	5.34 100	DI41709

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-5 - OVEN DRIED  
 Date Sampled: 09/11/24 14:00  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0467  
 ESS Laboratory Sample ID: 24I0467-23  
 Sample Matrix: Soil  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	4.32 (0.93)	---	7010	---	10	CEV	09/18/24 13:08	5.35 100	DI41709
Cadmium	ND (0.19)	---	6010D	---	1	KJB	09/17/24 16:43	5.35 100	DI41709
Chromium	14.6 (0.37)	---	6010D	---	1	KJB	09/17/24 16:43	5.35 100	DI41709
Copper	9.45 (0.93)	---	6010D	---	1	KJB	09/17/24 16:43	5.35 100	DI41709
Lead	10.8 (1.87)	---	6010D	---	1	KJB	09/17/24 16:43	5.35 100	DI41709
Mercury	0.028 (0.010)	---	7471B	---	1	AFV	09/17/24 17:26	2.07 40	DI41710
Nickel	10.6 (0.93)	---	6010D	---	1	KJB	09/17/24 16:43	5.35 100	DI41709
Zinc	39.4 (0.93)	---	6010D	---	1	KJB	09/17/24 16:43	5.35 100	DI41709

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Total Metals**

**Batch DI41709 - 3050B**

**Blank**

Cadmium	ND	0.48	mg/kg wet							
Chromium	ND	0.96	mg/kg wet							
Copper	ND	2.40	mg/kg wet							
Lead	ND	4.81	mg/kg wet							
Nickel	ND	2.40	mg/kg wet							
Zinc	ND	2.40	mg/kg wet							

**Blank**

Arsenic	ND	2.40	mg/kg wet							
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**LCS**

Cadmium	150	1.54	mg/kg wet	165.0		91	80-120			
Chromium	189	3.08	mg/kg wet	194.0		97	80-120			
Copper	188	7.69	mg/kg wet	215.0		88	80-120			
Lead	121	15.4	mg/kg wet	124.0		98	80-120			
Nickel	103	7.69	mg/kg wet	103.0		100	80-120			
Zinc	371	7.69	mg/kg wet	404.0		92	80-120			

**LCS**

Arsenic	107	38.5	mg/kg wet	99.50		107	80-120			
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**LCS Dup**

Cadmium	163	1.52	mg/kg wet	165.0		99	80-120	8	30	
Chromium	198	3.03	mg/kg wet	194.0		102	80-120	5	30	
Copper	202	7.58	mg/kg wet	215.0		94	80-120	7	30	
Lead	129	15.2	mg/kg wet	124.0		104	80-120	6	30	
Nickel	109	7.58	mg/kg wet	103.0		106	80-120	6	30	
Zinc	395	7.58	mg/kg wet	404.0		98	80-120	6	30	

**LCS Dup**

Arsenic	111	37.9	mg/kg wet	99.50		112	80-120	4	30	
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**Batch DI41710 - 7471B**

**Blank**

Mercury	ND	0.030	mg/kg wet							
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**LCS**

Mercury	13.7	3.30	mg/kg wet	14.40		95	80-120			
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**LCS Dup**

Mercury	12.1	3.00	mg/kg wet	14.40		84	80-120	12	30	
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**Volatile Organics Low Level**

**Batch DI41739 - 5035**

**Blank**

1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0050	mg/kg wet							

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Volatile Organics Low Level**

**Batch DI41739 - 5035**

1,1,2-Trichloroethane	ND	0.0050	mg/kg wet
1,1-Dichloroethane	ND	0.0050	mg/kg wet
1,1-Dichloroethene	ND	0.0050	mg/kg wet
1,1-Dichloropropene	ND	0.0050	mg/kg wet
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet
1,2-Dibromoethane	ND	0.0050	mg/kg wet
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet
1,2-Dichloroethane	ND	0.0050	mg/kg wet
1,2-Dichloropropane	ND	0.0050	mg/kg wet
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet
1,3-Dichloropropane	ND	0.0050	mg/kg wet
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet
1,4-Dioxane	ND	0.100	mg/kg wet
2,2-Dichloropropane	ND	0.0050	mg/kg wet
2-Butanone	ND	0.0500	mg/kg wet
2-Chlorotoluene	ND	0.0050	mg/kg wet
2-Hexanone	ND	0.0500	mg/kg wet
4-Chlorotoluene	ND	0.0050	mg/kg wet
4-Isopropyltoluene	ND	0.0050	mg/kg wet
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet
Acetone	ND	0.0500	mg/kg wet
Benzene	ND	0.0050	mg/kg wet
Bromobenzene	ND	0.0050	mg/kg wet
Bromochloromethane	ND	0.0050	mg/kg wet
Bromodichloromethane	ND	0.0050	mg/kg wet
Bromoform	ND	0.0050	mg/kg wet
Bromomethane	ND	0.0100	mg/kg wet
Carbon Disulfide	ND	0.0050	mg/kg wet
Carbon Tetrachloride	ND	0.0050	mg/kg wet
Chlorobenzene	ND	0.0050	mg/kg wet
Chloroethane	ND	0.0100	mg/kg wet
Chloroform	ND	0.0050	mg/kg wet
Chloromethane	ND	0.0100	mg/kg wet
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet
Dibromochloromethane	ND	0.0050	mg/kg wet
Dibromomethane	ND	0.0050	mg/kg wet
Dichlorodifluoromethane	ND	0.0100	mg/kg wet
Diethyl Ether	ND	0.0050	mg/kg wet

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Volatile Organics Low Level

**Batch DI41739 - 5035**

Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0250	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0200	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							
Xylene P,M	ND	0.0100	mg/kg wet							

Surrogate: 1,2-Dichloroethane-d4	0.0510		mg/kg wet	0.05000		102	70-130
Surrogate: 4-Bromofluorobenzene	0.0494		mg/kg wet	0.05000		99	70-130
Surrogate: Dibromofluoromethane	0.0490		mg/kg wet	0.05000		98	70-130
Surrogate: Toluene-d8	0.0497		mg/kg wet	0.05000		99	70-130

**LCS**

1,1,1,2-Tetrachloroethane	0.0545	0.0050	mg/kg wet	0.05000		109	70-130
1,1,1-Trichloroethane	0.0529	0.0050	mg/kg wet	0.05000		106	70-130
1,1,2,2-Tetrachloroethane	0.0481	0.0050	mg/kg wet	0.05000		96	40-160
1,1,2-Trichloroethane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130
1,1-Dichloroethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130
1,1-Dichloroethene	0.0565	0.0050	mg/kg wet	0.05000		113	70-130
1,1-Dichloropropene	0.0529	0.0050	mg/kg wet	0.05000		106	70-130
1,2,3-Trichlorobenzene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130
1,2,3-Trichloropropane	0.0473	0.0050	mg/kg wet	0.05000		95	70-130
1,2,4-Trichlorobenzene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130
1,2,4-Trimethylbenzene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130
1,2-Dibromo-3-Chloropropane	0.0480	0.0050	mg/kg wet	0.05000		96	70-130
1,2-Dibromoethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130
1,2-Dichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Volatile Organics Low Level

Batch DI41739 - 5035

1,2-Dichloroethane	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
1,2-Dichloropropane	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
1,3,5-Trimethylbenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130			
1,3-Dichlorobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
1,3-Dichloropropane	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
1,4-Dichlorobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
1,4-Dioxane	1.09	0.100	mg/kg wet	1.000		109	70-130			
2,2-Dichloropropane	0.0557	0.0050	mg/kg wet	0.05000		111	70-130			
2-Butanone	0.272	0.0500	mg/kg wet	0.2500		109	40-160			
2-Chlorotoluene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
2-Hexanone	0.255	0.0500	mg/kg wet	0.2500		102	40-160			
4-Chlorotoluene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
4-Isopropyltoluene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
4-Methyl-2-Pentanone	0.229	0.0500	mg/kg wet	0.2500		92	40-160			
Acetone	0.318	0.0500	mg/kg wet	0.2500		127	40-160			
Benzene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
Bromobenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130			
Bromochloromethane	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
Bromodichloromethane	0.0543	0.0050	mg/kg wet	0.05000		109	70-130			
Bromoform	0.0472	0.0050	mg/kg wet	0.05000		94	40-160			
Bromomethane	0.0593	0.0100	mg/kg wet	0.05000		119	40-160			
Carbon Disulfide	0.0575	0.0050	mg/kg wet	0.05000		115	70-130			
Carbon Tetrachloride	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
Chlorobenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			
Chloroethane	0.0617	0.0100	mg/kg wet	0.05000		123	40-160			
Chloroform	0.0517	0.0050	mg/kg wet	0.05000		103	70-130			
Chloromethane	0.0536	0.0100	mg/kg wet	0.05000		107	40-160			
cis-1,2-Dichloroethene	0.0537	0.0050	mg/kg wet	0.05000		107	70-130			
cis-1,3-Dichloropropene	0.0537	0.0050	mg/kg wet	0.05000		107	40-160			
Dibromochloromethane	0.0515	0.0050	mg/kg wet	0.05000		103	40-160			
Dibromomethane	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Dichlorodifluoromethane	0.0364	0.0100	mg/kg wet	0.05000		73	40-160			
Diethyl Ether	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
Di-isopropyl ether	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
Ethyl tertiary-butyl ether	0.0537	0.0050	mg/kg wet	0.05000		107	70-130			
Ethylbenzene	0.0546	0.0050	mg/kg wet	0.05000		109	70-130			
Hexachlorobutadiene	0.0528	0.0050	mg/kg wet	0.05000		106	40-160			
Isopropylbenzene	0.0604	0.0050	mg/kg wet	0.05000		121	70-130			
Methyl tert-Butyl Ether	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Methylene Chloride	0.0528	0.0250	mg/kg wet	0.05000		106	70-130			
Naphthalene	0.0572	0.0050	mg/kg wet	0.05000		114	40-160			
n-Butylbenzene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			
n-Propylbenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
sec-Butylbenzene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Volatile Organics Low Level

Batch DI41739 - 5035

Styrene	0.0540	0.0050	mg/kg wet	0.05000		108	40-160			
tert-Butylbenzene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
Tertiary-amyl methyl ether	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
Tetrachloroethene	0.0484	0.0050	mg/kg wet	0.05000		97	70-130			
Tetrahydrofuran	0.0531	0.0200	mg/kg wet	0.05000		106	70-130			
Toluene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130			
trans-1,2-Dichloroethene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
trans-1,3-Dichloropropene	0.0504	0.0050	mg/kg wet	0.05000		101	70-130			
Trichloroethene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130			
Trichlorofluoromethane	0.0543	0.0050	mg/kg wet	0.05000		109	40-160			
Vinyl Chloride	0.0467	0.0100	mg/kg wet	0.05000		93	70-130			
Xylene O	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Xylene P,M	0.106	0.0100	mg/kg wet	0.1000		106	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0501</i>		mg/kg wet	<i>0.05000</i>		<i>100</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0499</i>		mg/kg wet	<i>0.05000</i>		<i>100</i>	<i>70-130</i>			
<i>Surrogate: Dibromofluoromethane</i>	<i>0.0499</i>		mg/kg wet	<i>0.05000</i>		<i>100</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0504</i>		mg/kg wet	<i>0.05000</i>		<i>101</i>	<i>70-130</i>			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0543	0.0050	mg/kg wet	0.05000		109	70-130	0.5	20	
1,1,1-Trichloroethane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	0.7	20	
1,1,2,2-Tetrachloroethane	0.0479	0.0050	mg/kg wet	0.05000		96	40-160	0.4	20	
1,1,2-Trichloroethane	0.0504	0.0050	mg/kg wet	0.05000		101	70-130	0.8	20	
1,1-Dichloroethane	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	1	20	
1,1-Dichloroethene	0.0575	0.0050	mg/kg wet	0.05000		115	70-130	2	20	
1,1-Dichloropropene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	5	20	
1,2,3-Trichlorobenzene	0.0567	0.0050	mg/kg wet	0.05000		113	70-130	2	20	
1,2,3-Trichloropropane	0.0467	0.0050	mg/kg wet	0.05000		93	70-130	1	20	
1,2,4-Trichlorobenzene	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	1	20	
1,2,4-Trimethylbenzene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	0.07	20	
1,2-Dibromo-3-Chloropropane	0.0477	0.0050	mg/kg wet	0.05000		95	70-130	0.7	20	
1,2-Dibromoethane	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	0.3	20	
1,2-Dichlorobenzene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	0.9	20	
1,2-Dichloroethane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	0.8	20	
1,2-Dichloropropane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	0.7	20	
1,3,5-Trimethylbenzene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	0.3	20	
1,3-Dichlorobenzene	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	0.4	20	
1,3-Dichloropropane	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	2	20	
1,4-Dichlorobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	0.08	20	
1,4-Dioxane	1.25	0.100	mg/kg wet	1.000		125	70-130	14	20	
2,2-Dichloropropane	0.0559	0.0050	mg/kg wet	0.05000		112	70-130	0.5	20	
2-Butanone	0.270	0.0500	mg/kg wet	0.2500		108	40-160	0.7	20	
2-Chlorotoluene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	0.7	20	
2-Hexanone	0.249	0.0500	mg/kg wet	0.2500		99	40-160	2	20	



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Volatile Organics Low Level**

**Batch DI41739 - 5035**

4-Chlorotoluene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	0.2	20	
4-Isopropyltoluene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	0.2	20	
4-Methyl-2-Pentanone	0.229	0.0500	mg/kg wet	0.2500		92	40-160	0.2	20	
Acetone	0.307	0.0500	mg/kg wet	0.2500		123	40-160	4	20	
Benzene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	2	20	
Bromobenzene	0.0546	0.0050	mg/kg wet	0.05000		109	70-130	0.9	20	
Bromochloromethane	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	0.3	20	
Bromodichloromethane	0.0547	0.0050	mg/kg wet	0.05000		109	70-130	0.6	20	
Bromoform	0.0470	0.0050	mg/kg wet	0.05000		94	40-160	0.3	20	
Bromomethane	0.0607	0.0100	mg/kg wet	0.05000		121	40-160	2	20	
Carbon Disulfide	0.0582	0.0050	mg/kg wet	0.05000		116	70-130	1	20	
Carbon Tetrachloride	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	2	20	
Chlorobenzene	0.0526	0.0050	mg/kg wet	0.05000		105	70-130	0.3	20	
Chloroethane	0.0640	0.0100	mg/kg wet	0.05000		128	40-160	4	20	
Chloroform	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	1	20	
Chloromethane	0.0564	0.0100	mg/kg wet	0.05000		113	40-160	5	20	
cis-1,2-Dichloroethene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	1	20	
cis-1,3-Dichloropropene	0.0539	0.0050	mg/kg wet	0.05000		108	40-160	0.3	20	
Dibromochloromethane	0.0512	0.0050	mg/kg wet	0.05000		102	40-160	0.5	20	
Dibromomethane	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	0.6	20	
Dichlorodifluoromethane	0.0378	0.0100	mg/kg wet	0.05000		76	40-160	4	20	
Diethyl Ether	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	0.6	20	
Di-isopropyl ether	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	1	20	
Ethyl tertiary-butyl ether	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	0.9	20	
Ethylbenzene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	0.4	20	
Hexachlorobutadiene	0.0540	0.0050	mg/kg wet	0.05000		108	40-160	2	20	
Isopropylbenzene	0.0606	0.0050	mg/kg wet	0.05000		121	70-130	0.2	20	
Methyl tert-Butyl Ether	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	0.5	20	
Methylene Chloride	0.0544	0.0250	mg/kg wet	0.05000		109	70-130	3	20	
Naphthalene	0.0578	0.0050	mg/kg wet	0.05000		116	40-160	1	20	
n-Butylbenzene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130	0	20	
n-Propylbenzene	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	0.1	20	
sec-Butylbenzene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130	0.2	20	
Styrene	0.0539	0.0050	mg/kg wet	0.05000		108	40-160	0.2	20	
tert-Butylbenzene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130	0.1	20	
Tertiary-amyl methyl ether	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	0.9	20	
Tetrachloroethene	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	1	20	
Tetrahydrofuran	0.0520	0.0200	mg/kg wet	0.05000		104	70-130	2	20	
Toluene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	0.6	20	
trans-1,2-Dichloroethene	0.0547	0.0050	mg/kg wet	0.05000		109	70-130	1	20	
trans-1,3-Dichloropropene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	0.4	20	
Trichloroethene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	0.7	20	
Trichlorofluoromethane	0.0551	0.0050	mg/kg wet	0.05000		110	40-160	2	20	
Vinyl Chloride	0.0435	0.0100	mg/kg wet	0.05000		87	70-130	7	20	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Volatile Organics Low Level**

**Batch DI41739 - 5035**

Xylene O	0.0527	0.0050	mg/kg wet	0.05000		105	70-130	0.4	20	
Xylene P,M	0.107	0.0100	mg/kg wet	0.1000		107	70-130	1	20	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0495</i>		mg/kg wet	<i>0.05000</i>		<i>99</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0497</i>		mg/kg wet	<i>0.05000</i>		<i>99</i>	<i>70-130</i>			
<i>Surrogate: Dibromofluoromethane</i>	<i>0.0497</i>		mg/kg wet	<i>0.05000</i>		<i>99</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0502</i>		mg/kg wet	<i>0.05000</i>		<i>100</i>	<i>70-130</i>			

**Semi-Volatile Organic Compounds**

**Batch DI41326 - 3546**

<b>Blank</b>										
1,1-Biphenyl	ND	0.025	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.250	mg/kg wet							
1,2-Dichlorobenzene	ND	0.250	mg/kg wet							
1,3-Dichlorobenzene	ND	0.250	mg/kg wet							
1,4-Dichlorobenzene	ND	0.250	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.250	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.250	mg/kg wet							
2,4-Dichlorophenol	ND	0.250	mg/kg wet							
2,4-Dimethylphenol	ND	0.250	mg/kg wet							
2,4-Dinitrophenol	ND	1.00	mg/kg wet							
2,4-Dinitrotoluene	ND	0.250	mg/kg wet							
2,6-Dinitrotoluene	ND	0.250	mg/kg wet							
2-Chloronaphthalene	ND	0.250	mg/kg wet							
2-Chlorophenol	ND	0.250	mg/kg wet							
2-Methylnaphthalene	ND	0.250	mg/kg wet							
2-Methylphenol	ND	0.250	mg/kg wet							
2-Nitrophenol	ND	0.500	mg/kg wet							
3,3'-Dichlorobenzidine	ND	0.250	mg/kg wet							
3+4-Methylphenol	ND	0.250	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.250	mg/kg wet							
4-Chloroaniline	ND	0.250	mg/kg wet							
4-Nitrophenol	ND	1.00	mg/kg wet							
Acenaphthene	ND	0.250	mg/kg wet							
Acenaphthylene	ND	0.250	mg/kg wet							
Acetophenone	ND	0.250	mg/kg wet							
Aniline	ND	0.250	mg/kg wet							
Anthracene	ND	0.250	mg/kg wet							
Azobenzene	ND	0.250	mg/kg wet							
Benzo(a)anthracene	ND	0.250	mg/kg wet							
Benzo(a)pyrene	ND	0.250	mg/kg wet							
Benzo(b)fluoranthene	ND	0.250	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.250	mg/kg wet							
Benzo(k)fluoranthene	ND	0.250	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

Batch DI41326 - 3546

bis(2-Chloroethoxy)methane	ND	0.250	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.250	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.250	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.250	mg/kg wet							
Butylbenzylphthalate	ND	0.250	mg/kg wet							
Chrysene	ND	0.250	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.250	mg/kg wet							
Dibenzofuran	ND	0.250	mg/kg wet							
Diethylphthalate	ND	0.250	mg/kg wet							
Dimethylphthalate	ND	0.250	mg/kg wet							
Di-n-butylphthalate	ND	0.250	mg/kg wet							
Di-n-octylphthalate	ND	0.500	mg/kg wet							
Fluoranthene	ND	0.250	mg/kg wet							
Fluorene	ND	0.250	mg/kg wet							
Hexachlorobenzene	ND	0.250	mg/kg wet							
Hexachlorobutadiene	ND	0.250	mg/kg wet							
Hexachloroethane	ND	0.250	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.250	mg/kg wet							
Isophorone	ND	0.250	mg/kg wet							
Naphthalene	ND	0.250	mg/kg wet							
Nitrobenzene	ND	0.250	mg/kg wet							
N-Nitrosodimethylamine	ND	0.250	mg/kg wet							
Pentachlorophenol	ND	1.00	mg/kg wet							
Phenanthrene	ND	0.250	mg/kg wet							
Phenol	ND	0.250	mg/kg wet							
Pyrene	ND	0.250	mg/kg wet							

Surrogate: 1,2-Dichlorobenzene-d4	2.93		mg/kg wet	2.500		117	30-130			
Surrogate: 2,4,6-Tribromophenol	5.22		mg/kg wet	3.750		139	30-130			S+
Surrogate: 2-Chlorophenol-d4	4.65		mg/kg wet	3.750		124	30-130			
Surrogate: 2-Fluorobiphenyl	2.85		mg/kg wet	2.500		114	30-130			
Surrogate: 2-Fluorophenol	4.52		mg/kg wet	3.750		121	30-130			
Surrogate: Nitrobenzene-d5	2.70		mg/kg wet	2.500		108	30-130			
Surrogate: Phenol-d6	4.74		mg/kg wet	3.750		126	30-130			
Surrogate: p-Terphenyl-d14	3.26		mg/kg wet	2.500		130	30-130			S+

LCS

1,1-Biphenyl	2.48	0.025	mg/kg wet	2.500		99	40-140			
1,2,4-Trichlorobenzene	2.27	0.250	mg/kg wet	2.500		91	40-140			
1,2-Dichlorobenzene	2.38	0.250	mg/kg wet	2.500		95	40-140			
1,3-Dichlorobenzene	2.33	0.250	mg/kg wet	2.500		93	40-140			
1,4-Dichlorobenzene	2.36	0.250	mg/kg wet	2.500		94	40-140			
2,4,5-Trichlorophenol	2.68	0.250	mg/kg wet	2.500		107	30-130			
2,4,6-Trichlorophenol	2.45	0.250	mg/kg wet	2.500		98	30-130			
2,4-Dichlorophenol	2.09	0.250	mg/kg wet	2.500		83	30-130			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI41326 - 3546**

2,4-Dimethylphenol	2.75	0.250	mg/kg wet	2.500		110	30-130			
2,4-Dinitrophenol	2.39	1.00	mg/kg wet	2.500		96	15-140			
2,4-Dinitrotoluene	2.46	0.250	mg/kg wet	2.500		98	40-140			
2,6-Dinitrotoluene	2.47	0.250	mg/kg wet	2.500		99	40-140			
2-Chloronaphthalene	2.56	0.250	mg/kg wet	2.500		103	40-140			
2-Chlorophenol	2.45	0.250	mg/kg wet	2.500		98	30-130			
2-Methylnaphthalene	2.13	0.250	mg/kg wet	2.500		85	40-140			
2-Methylphenol	2.31	0.250	mg/kg wet	2.500		93	15-140			
2-Nitrophenol	2.10	0.500	mg/kg wet	2.500		84	30-130			
3,3'-Dichlorobenzidine	2.77	0.250	mg/kg wet	2.500		111	40-140			
3+4-Methylphenol	5.09	0.250	mg/kg wet	5.000		102	15-140			
4-Bromophenyl-phenylether	2.59	0.250	mg/kg wet	2.500		104	40-140			
4-Chloroaniline	2.19	0.250	mg/kg wet	2.500		88	15-140			
4-Nitrophenol	2.27	1.00	mg/kg wet	2.500		91	15-140			
Acenaphthene	2.62	0.250	mg/kg wet	2.500		105	40-140			
Acenaphthylene	2.76	0.250	mg/kg wet	2.500		110	40-140			
Acetophenone	2.31	0.250	mg/kg wet	2.500		92	40-140			
Aniline	2.23	0.250	mg/kg wet	2.500		89	40-140			
Anthracene	2.58	0.250	mg/kg wet	2.500		103	40-140			
Azobenzene	2.53	0.250	mg/kg wet	2.500		101	40-140			
Benzo(a)anthracene	2.54	0.250	mg/kg wet	2.500		102	40-140			
Benzo(a)pyrene	2.58	0.250	mg/kg wet	2.500		103	40-140			
Benzo(b)fluoranthene	2.34	0.250	mg/kg wet	2.500		94	40-140			
Benzo(g,h,i)perylene	2.79	0.250	mg/kg wet	2.500		112	40-140			
Benzo(k)fluoranthene	2.58	0.250	mg/kg wet	2.500		103	40-140			
bis(2-Chloroethoxy)methane	2.20	0.250	mg/kg wet	2.500		88	40-140			
bis(2-Chloroethyl)ether	2.32	0.250	mg/kg wet	2.500		93	40-140			
bis(2-chloroisopropyl)Ether	2.14	0.250	mg/kg wet	2.500		86	40-140			
bis(2-Ethylhexyl)phthalate	2.61	0.250	mg/kg wet	2.500		105	40-140			
Butylbenzylphthalate	2.75	0.250	mg/kg wet	2.500		110	40-140			
Chrysene	2.57	0.250	mg/kg wet	2.500		103	40-140			
Dibenzo(a,h)Anthracene	2.81	0.250	mg/kg wet	2.500		112	40-140			
Dibenzofuran	2.44	0.250	mg/kg wet	2.500		98	40-140			
Diethylphthalate	2.75	0.250	mg/kg wet	2.500		110	40-140			
Dimethylphthalate	2.68	0.250	mg/kg wet	2.500		107	15-140			
Di-n-butylphthalate	2.76	0.250	mg/kg wet	2.500		110	40-140			
Di-n-octylphthalate	2.57	0.500	mg/kg wet	2.500		103	40-140			
Fluoranthene	2.51	0.250	mg/kg wet	2.500		100	40-140			
Fluorene	2.55	0.250	mg/kg wet	2.500		102	40-140			
Hexachlorobenzene	2.55	0.250	mg/kg wet	2.500		102	40-140			
Hexachlorobutadiene	2.14	0.250	mg/kg wet	2.500		86	40-140			
Hexachloroethane	2.38	0.250	mg/kg wet	2.500		95	40-140			
Indeno(1,2,3-cd)Pyrene	2.52	0.250	mg/kg wet	2.500		101	40-140			
Isophorone	2.11	0.250	mg/kg wet	2.500		85	40-140			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI41326 - 3546**

Naphthalene	2.08	0.250	mg/kg wet	2.500		83	40-140			
Nitrobenzene	2.15	0.250	mg/kg wet	2.500		86	40-140			
N-Nitrosodimethylamine	2.41	0.250	mg/kg wet	2.500		96	40-140			
Pentachlorophenol	2.43	1.00	mg/kg wet	2.500		97	15-140			
Phenanthrene	2.49	0.250	mg/kg wet	2.500		100	40-140			
Phenol	2.34	0.250	mg/kg wet	2.500		94	15-140			
Pyrene	2.66	0.250	mg/kg wet	2.500		107	40-140			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>2.88</i>		mg/kg wet	<i>2.500</i>		<i>115</i>	<i>30-130</i>			
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>4.93</i>		mg/kg wet	<i>3.750</i>		<i>132</i>	<i>30-130</i>			<i>S+</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>4.75</i>		mg/kg wet	<i>3.750</i>		<i>127</i>	<i>30-130</i>			
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>2.98</i>		mg/kg wet	<i>2.500</i>		<i>119</i>	<i>30-130</i>			
<i>Surrogate: 2-Fluorophenol</i>	<i>4.45</i>		mg/kg wet	<i>3.750</i>		<i>119</i>	<i>30-130</i>			
<i>Surrogate: Nitrobenzene-d5</i>	<i>2.47</i>		mg/kg wet	<i>2.500</i>		<i>99</i>	<i>30-130</i>			
<i>Surrogate: Phenol-d6</i>	<i>4.85</i>		mg/kg wet	<i>3.750</i>		<i>129</i>	<i>30-130</i>			
<i>Surrogate: p-Terphenyl-d14</i>	<i>3.10</i>		mg/kg wet	<i>2.500</i>		<i>124</i>	<i>30-130</i>			

**LCS Dup**

1,1-Biphenyl	2.52	0.025	mg/kg wet	2.500		101	40-140	2	30	
1,2,4-Trichlorobenzene	2.16	0.250	mg/kg wet	2.500		86	40-140	5	30	
1,2-Dichlorobenzene	2.32	0.250	mg/kg wet	2.500		93	40-140	3	30	
1,3-Dichlorobenzene	2.35	0.250	mg/kg wet	2.500		94	40-140	0.6	30	
1,4-Dichlorobenzene	2.44	0.250	mg/kg wet	2.500		98	40-140	4	30	
2,4,5-Trichlorophenol	2.69	0.250	mg/kg wet	2.500		108	30-130	0.4	30	
2,4,6-Trichlorophenol	2.54	0.250	mg/kg wet	2.500		102	30-130	3	30	
2,4-Dichlorophenol	2.18	0.250	mg/kg wet	2.500		87	30-130	4	30	
2,4-Dimethylphenol	2.78	0.250	mg/kg wet	2.500		111	30-130	1	30	
2,4-Dinitrophenol	2.53	1.00	mg/kg wet	2.500		101	15-140	6	30	
2,4-Dinitrotoluene	2.49	0.250	mg/kg wet	2.500		100	40-140	1	30	
2,6-Dinitrotoluene	2.54	0.250	mg/kg wet	2.500		102	40-140	3	30	
2-Chloronaphthalene	2.54	0.250	mg/kg wet	2.500		102	40-140	0.9	30	
2-Chlorophenol	2.49	0.250	mg/kg wet	2.500		100	30-130	2	30	
2-Methylnaphthalene	2.12	0.250	mg/kg wet	2.500		85	40-140	0.4	30	
2-Methylphenol	2.39	0.250	mg/kg wet	2.500		96	15-140	3	30	
2-Nitrophenol	2.15	0.500	mg/kg wet	2.500		86	30-130	2	30	
3,3'-Dichlorobenzidine	2.82	0.250	mg/kg wet	2.500		113	40-140	2	30	
3+4-Methylphenol	5.17	0.250	mg/kg wet	5.000		103	15-140	2	30	
4-Bromophenyl-phenylether	2.71	0.250	mg/kg wet	2.500		108	40-140	4	30	
4-Chloroaniline	2.22	0.250	mg/kg wet	2.500		89	15-140	1	30	
4-Nitrophenol	2.12	1.00	mg/kg wet	2.500		85	15-140	7	30	
Acenaphthene	2.61	0.250	mg/kg wet	2.500		104	40-140	0.2	30	
Acenaphthylene	2.75	0.250	mg/kg wet	2.500		110	40-140	0.3	30	
Acetophenone	2.36	0.250	mg/kg wet	2.500		94	40-140	2	30	
Aniline	2.29	0.250	mg/kg wet	2.500		92	40-140	3	30	
Anthracene	2.68	0.250	mg/kg wet	2.500		107	40-140	4	30	

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

Batch DI41326 - 3546

Azobenzene	2.59	0.250	mg/kg wet	2.500		103	40-140	2	30	
Benzo(a)anthracene	2.56	0.250	mg/kg wet	2.500		102	40-140	0.7	30	
Benzo(a)pyrene	2.63	0.250	mg/kg wet	2.500		105	40-140	2	30	
Benzo(b)fluoranthene	2.40	0.250	mg/kg wet	2.500		96	40-140	3	30	
Benzo(g,h,i)perylene	2.82	0.250	mg/kg wet	2.500		113	40-140	1	30	
Benzo(k)fluoranthene	2.62	0.250	mg/kg wet	2.500		105	40-140	2	30	
bis(2-Chloroethoxy)methane	2.07	0.250	mg/kg wet	2.500		83	40-140	6	30	
bis(2-Chloroethyl)ether	2.36	0.250	mg/kg wet	2.500		95	40-140	2	30	
bis(2-chloroisopropyl)Ether	2.20	0.250	mg/kg wet	2.500		88	40-140	3	30	
bis(2-Ethylhexyl)phthalate	2.68	0.250	mg/kg wet	2.500		107	40-140	3	30	
Butylbenzylphthalate	2.75	0.250	mg/kg wet	2.500		110	40-140	0.2	30	
Chrysene	2.62	0.250	mg/kg wet	2.500		105	40-140	2	30	
Dibenzo(a,h)Anthracene	2.84	0.250	mg/kg wet	2.500		114	40-140	1	30	
Dibenzofuran	2.42	0.250	mg/kg wet	2.500		97	40-140	1	30	
Diethylphthalate	2.77	0.250	mg/kg wet	2.500		111	40-140	0.8	30	
Dimethylphthalate	2.65	0.250	mg/kg wet	2.500		106	15-140	1	30	
Di-n-butylphthalate	2.90	0.250	mg/kg wet	2.500		116	40-140	5	30	
Di-n-octylphthalate	2.60	0.500	mg/kg wet	2.500		104	40-140	1	30	
Fluoranthene	2.57	0.250	mg/kg wet	2.500		103	40-140	2	30	
Fluorene	2.56	0.250	mg/kg wet	2.500		102	40-140	0.1	30	
Hexachlorobenzene	2.59	0.250	mg/kg wet	2.500		104	40-140	2	30	
Hexachlorobutadiene	2.09	0.250	mg/kg wet	2.500		84	40-140	2	30	
Hexachloroethane	2.51	0.250	mg/kg wet	2.500		100	40-140	5	30	
Indeno(1,2,3-cd)Pyrene	2.58	0.250	mg/kg wet	2.500		103	40-140	3	30	
Isophorone	2.12	0.250	mg/kg wet	2.500		85	40-140	0.5	30	
Naphthalene	2.08	0.250	mg/kg wet	2.500		83	40-140	0.05	30	
Nitrobenzene	2.15	0.250	mg/kg wet	2.500		86	40-140	0.3	30	
N-Nitrosodimethylamine	2.48	0.250	mg/kg wet	2.500		99	40-140	3	30	
Pentachlorophenol	2.55	1.00	mg/kg wet	2.500		102	15-140	5	30	
Phenanthrene	2.54	0.250	mg/kg wet	2.500		101	40-140	2	30	
Phenol	2.38	0.250	mg/kg wet	2.500		95	15-140	1	30	
Pyrene	2.68	0.250	mg/kg wet	2.500		107	40-140	0.6	30	

Surrogate: 1,2-Dichlorobenzene-d4	2.87		mg/kg wet	2.500		115	30-130			
Surrogate: 2,4,6-Tribromophenol	4.90		mg/kg wet	3.750		131	30-130			S+
Surrogate: 2-Chlorophenol-d4	4.66		mg/kg wet	3.750		124	30-130			
Surrogate: 2-Fluorobiphenyl	2.90		mg/kg wet	2.500		116	30-130			
Surrogate: 2-Fluorophenol	4.38		mg/kg wet	3.750		117	30-130			
Surrogate: Nitrobenzene-d5	2.48		mg/kg wet	2.500		99	30-130			
Surrogate: Phenol-d6	4.79		mg/kg wet	3.750		128	30-130			
Surrogate: p-Terphenyl-d14	3.05		mg/kg wet	2.500		122	30-130			

Batch DI41607 - 3546

Blank										
1,1-Biphenyl	ND	0.025	mg/kg wet							

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

**Batch DI41607 - 3546**

1,2,4-Trichlorobenzene	ND	0.250	mg/kg wet
1,2-Dichlorobenzene	ND	0.250	mg/kg wet
1,3-Dichlorobenzene	ND	0.250	mg/kg wet
1,4-Dichlorobenzene	ND	0.250	mg/kg wet
2,4,5-Trichlorophenol	ND	0.250	mg/kg wet
2,4,6-Trichlorophenol	ND	0.250	mg/kg wet
2,4-Dichlorophenol	ND	0.250	mg/kg wet
2,4-Dimethylphenol	ND	0.250	mg/kg wet
2,4-Dinitrophenol	ND	1.00	mg/kg wet
2,4-Dinitrotoluene	ND	0.250	mg/kg wet
2,6-Dinitrotoluene	ND	0.250	mg/kg wet
2-Chloronaphthalene	ND	0.250	mg/kg wet
2-Chlorophenol	ND	0.250	mg/kg wet
2-Methylnaphthalene	ND	0.250	mg/kg wet
2-Methylphenol	ND	0.250	mg/kg wet
2-Nitrophenol	ND	0.500	mg/kg wet
3,3'-Dichlorobenzidine	ND	0.250	mg/kg wet
3+4-Methylphenol	ND	0.250	mg/kg wet
4-Bromophenyl-phenylether	ND	0.250	mg/kg wet
4-Chloroaniline	ND	0.250	mg/kg wet
4-Nitrophenol	ND	1.00	mg/kg wet
Acenaphthene	ND	0.250	mg/kg wet
Acenaphthylene	ND	0.250	mg/kg wet
Acetophenone	ND	0.250	mg/kg wet
Aniline	ND	0.250	mg/kg wet
Anthracene	ND	0.250	mg/kg wet
Azobenzene	ND	0.250	mg/kg wet
Benzo(a)anthracene	ND	0.250	mg/kg wet
Benzo(a)pyrene	ND	0.250	mg/kg wet
Benzo(b)fluoranthene	ND	0.250	mg/kg wet
Benzo(g,h,i)perylene	ND	0.250	mg/kg wet
Benzo(k)fluoranthene	ND	0.250	mg/kg wet
bis(2-Chloroethoxy)methane	ND	0.250	mg/kg wet
bis(2-Chloroethyl)ether	ND	0.250	mg/kg wet
bis(2-chloroisopropyl)Ether	ND	0.250	mg/kg wet
bis(2-Ethylhexyl)phthalate	ND	0.250	mg/kg wet
Butylbenzylphthalate	ND	0.250	mg/kg wet
Chrysene	ND	0.250	mg/kg wet
Dibenzo(a,h)Anthracene	ND	0.250	mg/kg wet
Dibenzofuran	ND	0.250	mg/kg wet
Diethylphthalate	ND	0.250	mg/kg wet
Dimethylphthalate	ND	0.250	mg/kg wet
Di-n-butylphthalate	ND	0.250	mg/kg wet
Di-n-octylphthalate	ND	0.500	mg/kg wet

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

**Batch DI41607 - 3546**

Fluoranthene	ND	0.250	mg/kg wet							
Fluorene	ND	0.250	mg/kg wet							
Hexachlorobenzene	ND	0.250	mg/kg wet							
Hexachlorobutadiene	ND	0.250	mg/kg wet							
Hexachloroethane	ND	0.250	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.250	mg/kg wet							
Isophorone	ND	0.250	mg/kg wet							
Naphthalene	ND	0.250	mg/kg wet							
Nitrobenzene	ND	0.250	mg/kg wet							
N-Nitrosodimethylamine	ND	0.250	mg/kg wet							
Pentachlorophenol	ND	1.00	mg/kg wet							
Phenanthrene	ND	0.250	mg/kg wet							
Phenol	ND	0.250	mg/kg wet							
Pyrene	ND	0.250	mg/kg wet							

<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.16		mg/kg wet	2.500		86	30-130			
<i>Surrogate: 2,4,6-Tribromophenol</i>	4.12		mg/kg wet	3.750		110	30-130			
<i>Surrogate: 2-Chlorophenol-d4</i>	3.45		mg/kg wet	3.750		92	30-130			
<i>Surrogate: 2-Fluorobiphenyl</i>	2.18		mg/kg wet	2.500		87	30-130			
<i>Surrogate: 2-Fluorophenol</i>	3.35		mg/kg wet	3.750		89	30-130			
<i>Surrogate: Nitrobenzene-d5</i>	2.10		mg/kg wet	2.500		84	30-130			
<i>Surrogate: Phenol-d6</i>	3.51		mg/kg wet	3.750		94	30-130			
<i>Surrogate: p-Terphenyl-d14</i>	2.62		mg/kg wet	2.500		105	30-130			

**LCS**

1,1-Biphenyl	2.13	0.025	mg/kg wet	2.500		85	40-140			
1,2,4-Trichlorobenzene	1.99	0.250	mg/kg wet	2.500		79	40-140			
1,2-Dichlorobenzene	2.06	0.250	mg/kg wet	2.500		82	40-140			
1,3-Dichlorobenzene	2.07	0.250	mg/kg wet	2.500		83	40-140			
1,4-Dichlorobenzene	2.10	0.250	mg/kg wet	2.500		84	40-140			
2,4,5-Trichlorophenol	2.32	0.250	mg/kg wet	2.500		93	30-130			
2,4,6-Trichlorophenol	2.12	0.250	mg/kg wet	2.500		85	30-130			
2,4-Dichlorophenol	1.75	0.250	mg/kg wet	2.500		70	30-130			
2,4-Dimethylphenol	2.40	0.250	mg/kg wet	2.500		96	30-130			
2,4-Dinitrophenol	1.98	1.00	mg/kg wet	2.500		79	15-140			
2,4-Dinitrotoluene	2.35	0.250	mg/kg wet	2.500		94	40-140			
2,6-Dinitrotoluene	2.36	0.250	mg/kg wet	2.500		94	40-140			
2-Chloronaphthalene	2.17	0.250	mg/kg wet	2.500		87	40-140			
2-Chlorophenol	2.17	0.250	mg/kg wet	2.500		87	30-130			
2-Methylnaphthalene	1.82	0.250	mg/kg wet	2.500		73	40-140			
2-Methylphenol	2.02	0.250	mg/kg wet	2.500		81	15-140			
2-Nitrophenol	1.92	0.500	mg/kg wet	2.500		77	30-130			
3,3'-Dichlorobenzidine	2.52	0.250	mg/kg wet	2.500		101	40-140			
3+4-Methylphenol	4.51	0.250	mg/kg wet	5.000		90	15-140			
4-Bromophenyl-phenylether	2.48	0.250	mg/kg wet	2.500		99	40-140			



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI41607 - 3546**

4-Chloroaniline	1.99	0.250	mg/kg wet	2.500		80	15-140			
4-Nitrophenol	2.16	1.00	mg/kg wet	2.500		86	15-140			
Acenaphthene	2.24	0.250	mg/kg wet	2.500		90	40-140			
Acenaphthylene	2.29	0.250	mg/kg wet	2.500		92	40-140			
Acetophenone	2.08	0.250	mg/kg wet	2.500		83	40-140			
Aniline	2.00	0.250	mg/kg wet	2.500		80	40-140			
Anthracene	2.46	0.250	mg/kg wet	2.500		99	40-140			
Azobenzene	2.34	0.250	mg/kg wet	2.500		94	40-140			
Benzo(a)anthracene	2.40	0.250	mg/kg wet	2.500		96	40-140			
Benzo(a)pyrene	2.46	0.250	mg/kg wet	2.500		98	40-140			
Benzo(b)fluoranthene	2.31	0.250	mg/kg wet	2.500		92	40-140			
Benzo(g,h,i)perylene	2.72	0.250	mg/kg wet	2.500		109	40-140			
Benzo(k)fluoranthene	2.40	0.250	mg/kg wet	2.500		96	40-140			
bis(2-Chloroethoxy)methane	1.94	0.250	mg/kg wet	2.500		78	40-140			
bis(2-Chloroethyl)ether	2.11	0.250	mg/kg wet	2.500		85	40-140			
bis(2-chloroisopropyl)Ether	1.97	0.250	mg/kg wet	2.500		79	40-140			
bis(2-Ethylhexyl)phthalate	2.67	0.250	mg/kg wet	2.500		107	40-140			
Butylbenzylphthalate	2.77	0.250	mg/kg wet	2.500		111	40-140			
Chrysene	2.55	0.250	mg/kg wet	2.500		102	40-140			
Dibenzo(a,h)Anthracene	2.69	0.250	mg/kg wet	2.500		107	40-140			
Dibenzofuran	2.20	0.250	mg/kg wet	2.500		88	40-140			
Diethylphthalate	2.65	0.250	mg/kg wet	2.500		106	40-140			
Dimethylphthalate	2.59	0.250	mg/kg wet	2.500		103	15-140			
Di-n-butylphthalate	2.83	0.250	mg/kg wet	2.500		113	40-140			
Di-n-octylphthalate	2.71	0.500	mg/kg wet	2.500		108	40-140			
Fluoranthene	2.42	0.250	mg/kg wet	2.500		97	40-140			
Fluorene	2.34	0.250	mg/kg wet	2.500		94	40-140			
Hexachlorobenzene	2.34	0.250	mg/kg wet	2.500		94	40-140			
Hexachlorobutadiene	1.82	0.250	mg/kg wet	2.500		73	40-140			
Hexachloroethane	2.08	0.250	mg/kg wet	2.500		83	40-140			
Indeno(1,2,3-cd)Pyrene	2.45	0.250	mg/kg wet	2.500		98	40-140			
Isophorone	1.91	0.250	mg/kg wet	2.500		76	40-140			
Naphthalene	1.80	0.250	mg/kg wet	2.500		72	40-140			
Nitrobenzene	1.85	0.250	mg/kg wet	2.500		74	40-140			
N-Nitrosodimethylamine	2.08	0.250	mg/kg wet	2.500		83	40-140			
Pentachlorophenol	2.34	1.00	mg/kg wet	2.500		94	15-140			
Phenanthrene	2.38	0.250	mg/kg wet	2.500		95	40-140			
Phenol	2.10	0.250	mg/kg wet	2.500		84	15-140			
Pyrene	2.60	0.250	mg/kg wet	2.500		104	40-140			

Surrogate: 1,2-Dichlorobenzene-d4	2.26		mg/kg wet	2.500		90	30-130			
Surrogate: 2,4,6-Tribromophenol	3.77		mg/kg wet	3.750		101	30-130			
Surrogate: 2-Chlorophenol-d4	3.52		mg/kg wet	3.750		94	30-130			
Surrogate: 2-Fluorobiphenyl	2.19		mg/kg wet	2.500		88	30-130			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

**Batch DI41607 - 3546**

Surrogate: 2-Fluorophenol	3.28		mg/kg wet	3.750		88	30-130			
Surrogate: Nitrobenzene-d5	1.89		mg/kg wet	2.500		76	30-130			
Surrogate: Phenol-d6	3.64		mg/kg wet	3.750		97	30-130			
Surrogate: p-Terphenyl-d14	2.59		mg/kg wet	2.500		104	30-130			

**LCS Dup**

1,1-Biphenyl	2.32	0.025	mg/kg wet	2.500		93	40-140	9	30	
1,2,4-Trichlorobenzene	2.05	0.250	mg/kg wet	2.500		82	40-140	3	30	
1,2-Dichlorobenzene	2.13	0.250	mg/kg wet	2.500		85	40-140	3	30	
1,3-Dichlorobenzene	2.14	0.250	mg/kg wet	2.500		85	40-140	3	30	
1,4-Dichlorobenzene	2.20	0.250	mg/kg wet	2.500		88	40-140	5	30	
2,4,5-Trichlorophenol	2.58	0.250	mg/kg wet	2.500		103	30-130	11	30	
2,4,6-Trichlorophenol	2.28	0.250	mg/kg wet	2.500		91	30-130	7	30	
2,4-Dichlorophenol	1.89	0.250	mg/kg wet	2.500		76	30-130	8	30	
2,4-Dimethylphenol	2.53	0.250	mg/kg wet	2.500		101	30-130	5	30	
2,4-Dinitrophenol	2.34	1.00	mg/kg wet	2.500		94	15-140	16	30	
2,4-Dinitrotoluene	2.47	0.250	mg/kg wet	2.500		99	40-140	5	30	
2,6-Dinitrotoluene	2.48	0.250	mg/kg wet	2.500		99	40-140	5	30	
2-Chloronaphthalene	2.36	0.250	mg/kg wet	2.500		94	40-140	9	30	
2-Chlorophenol	2.21	0.250	mg/kg wet	2.500		88	30-130	2	30	
2-Methylnaphthalene	1.92	0.250	mg/kg wet	2.500		77	40-140	5	30	
2-Methylphenol	2.09	0.250	mg/kg wet	2.500		84	15-140	3	30	
2-Nitrophenol	1.86	0.500	mg/kg wet	2.500		74	30-130	3	30	
3,3'-Dichlorobenzidine	2.56	0.250	mg/kg wet	2.500		103	40-140	2	30	
3+4-Methylphenol	4.62	0.250	mg/kg wet	5.000		92	15-140	2	30	
4-Bromophenyl-phenylether	2.61	0.250	mg/kg wet	2.500		104	40-140	5	30	
4-Chloroaniline	1.97	0.250	mg/kg wet	2.500		79	15-140	1	30	
4-Nitrophenol	2.24	1.00	mg/kg wet	2.500		90	15-140	4	30	
Acenaphthene	2.38	0.250	mg/kg wet	2.500		95	40-140	6	30	
Acenaphthylene	2.41	0.250	mg/kg wet	2.500		96	40-140	5	30	
Acetophenone	2.13	0.250	mg/kg wet	2.500		85	40-140	2	30	
Aniline	2.10	0.250	mg/kg wet	2.500		84	40-140	5	30	
Anthracene	2.57	0.250	mg/kg wet	2.500		103	40-140	4	30	
Azobenzene	2.43	0.250	mg/kg wet	2.500		97	40-140	4	30	
Benzo(a)anthracene	2.49	0.250	mg/kg wet	2.500		99	40-140	4	30	
Benzo(a)pyrene	2.53	0.250	mg/kg wet	2.500		101	40-140	3	30	
Benzo(b)fluoranthene	2.34	0.250	mg/kg wet	2.500		94	40-140	1	30	
Benzo(g,h,i)perylene	2.80	0.250	mg/kg wet	2.500		112	40-140	3	30	
Benzo(k)fluoranthene	2.46	0.250	mg/kg wet	2.500		99	40-140	3	30	
bis(2-Chloroethoxy)methane	1.97	0.250	mg/kg wet	2.500		79	40-140	2	30	
bis(2-Chloroethyl)ether	2.26	0.250	mg/kg wet	2.500		90	40-140	6	30	
bis(2-chloroisopropyl)Ether	2.00	0.250	mg/kg wet	2.500		80	40-140	1	30	
bis(2-Ethylhexyl)phthalate	2.75	0.250	mg/kg wet	2.500		110	40-140	3	30	
Butylbenzylphthalate	2.84	0.250	mg/kg wet	2.500		114	40-140	3	30	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI41607 - 3546**

Chrysene	2.62	0.250	mg/kg wet	2.500		105	40-140	3	30	
Dibenzo(a,h)Anthracene	2.76	0.250	mg/kg wet	2.500		110	40-140	3	30	
Dibenzofuran	2.30	0.250	mg/kg wet	2.500		92	40-140	4	30	
Diethylphthalate	2.76	0.250	mg/kg wet	2.500		110	40-140	4	30	
Dimethylphthalate	2.67	0.250	mg/kg wet	2.500		107	15-140	3	30	
Di-n-butylphthalate	2.90	0.250	mg/kg wet	2.500		116	40-140	3	30	
Di-n-octylphthalate	2.77	0.500	mg/kg wet	2.500		111	40-140	2	30	
Fluoranthene	2.45	0.250	mg/kg wet	2.500		98	40-140	1	30	
Fluorene	2.46	0.250	mg/kg wet	2.500		98	40-140	5	30	
Hexachlorobenzene	2.52	0.250	mg/kg wet	2.500		101	40-140	7	30	
Hexachlorobutadiene	1.96	0.250	mg/kg wet	2.500		78	40-140	7	30	
Hexachloroethane	2.22	0.250	mg/kg wet	2.500		89	40-140	7	30	
Indeno(1,2,3-cd)Pyrene	2.58	0.250	mg/kg wet	2.500		103	40-140	5	30	
Isophorone	1.94	0.250	mg/kg wet	2.500		78	40-140	2	30	
Naphthalene	1.85	0.250	mg/kg wet	2.500		74	40-140	3	30	
Nitrobenzene	1.93	0.250	mg/kg wet	2.500		77	40-140	5	30	
N-Nitrosodimethylamine	2.19	0.250	mg/kg wet	2.500		88	40-140	5	30	
Pentachlorophenol	2.28	1.00	mg/kg wet	2.500		91	15-140	3	30	
Phenanthrene	2.43	0.250	mg/kg wet	2.500		97	40-140	2	30	
Phenol	2.12	0.250	mg/kg wet	2.500		85	15-140	0.9	30	
Pyrene	2.72	0.250	mg/kg wet	2.500		109	40-140	5	30	

<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.24		mg/kg wet	2.500		90	30-130			
<i>Surrogate: 2,4,6-Tribromophenol</i>	3.87		mg/kg wet	3.750		103	30-130			
<i>Surrogate: 2-Chlorophenol-d4</i>	3.52		mg/kg wet	3.750		94	30-130			
<i>Surrogate: 2-Fluorobiphenyl</i>	2.31		mg/kg wet	2.500		93	30-130			
<i>Surrogate: 2-Fluorophenol</i>	3.32		mg/kg wet	3.750		88	30-130			
<i>Surrogate: Nitrobenzene-d5</i>	1.88		mg/kg wet	2.500		75	30-130			
<i>Surrogate: Phenol-d6</i>	3.54		mg/kg wet	3.750		94	30-130			
<i>Surrogate: p-Terphenyl-d14</i>	2.66		mg/kg wet	2.500		106	30-130			

**MADEP-EPH Extractable Petroleum Hydrocarbons**

**Batch DI41316 - 3546**

<b>Blank</b>										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							

<i>Surrogate: 1-Chlorooctadecane</i>	1.29		mg/kg wet	2.000		64	40-140			
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<b>Blank</b>										
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							

<i>Surrogate: 2-Bromonaphthalene</i>	2.03		mg/kg wet	2.000		102	40-140			
<i>Surrogate: 2-Fluorobiphenyl</i>	2.05		mg/kg wet	2.000		103	40-140			
<i>Surrogate: O-Terphenyl</i>	1.64		mg/kg wet	2.000		82	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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MADEP-EPH Extractable Petroleum Hydrocarbons

**Batch DI41316 - 3546**

**Blank**

2-Methylnaphthalene	ND	0.008	mg/kg wet							
Acenaphthene	ND	0.008	mg/kg wet							
Acenaphthylene	ND	0.008	mg/kg wet							
Anthracene	ND	0.008	mg/kg wet							
Benzo(a)anthracene	ND	0.008	mg/kg wet							
Benzo(a)pyrene	ND	0.008	mg/kg wet							
Benzo(b)fluoranthene	ND	0.008	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.008	mg/kg wet							
Benzo(k)fluoranthene	ND	0.008	mg/kg wet							
Chrysene	ND	0.008	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.008	mg/kg wet							
Fluoranthene	ND	0.008	mg/kg wet							
Fluorene	ND	0.008	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.008	mg/kg wet							
Naphthalene	ND	0.008	mg/kg wet							
Phenanthrene	ND	0.008	mg/kg wet							
Pyrene	ND	0.008	mg/kg wet							

**LCS**

C19-C36 Aliphatics1	14.4	15.0	mg/kg wet	16.00		90	40-140			
C9-C18 Aliphatics1	9.3	15.0	mg/kg wet	12.00		77	40-140			
<i>Surrogate: 1-Chlorooctadecane</i>	<i>1.52</i>		mg/kg wet	<i>2.000</i>		<i>76</i>	<i>40-140</i>			

**LCS**

C11-C22 Unadjusted Aromatics1	27.9	15.0	mg/kg wet	34.00		82	40-140			
<i>Surrogate: 2-Bromonaphthalene</i>	<i>2.03</i>		mg/kg wet	<i>2.000</i>		<i>102</i>	<i>40-140</i>			
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>2.03</i>		mg/kg wet	<i>2.000</i>		<i>102</i>	<i>40-140</i>			
<i>Surrogate: O-Terphenyl</i>	<i>1.67</i>		mg/kg wet	<i>2.000</i>		<i>84</i>	<i>40-140</i>			

**LCS**

2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			

**LCS**

2-Methylnaphthalene	1.48	0.040	mg/kg wet	2.000		74	40-140			
Acenaphthene	1.50	0.040	mg/kg wet	2.000		75	40-140			
Acenaphthylene	1.69	0.040	mg/kg wet	2.000		84	40-140			
Anthracene	1.70	0.040	mg/kg wet	2.000		85	40-140			
Benzo(a)anthracene	1.68	0.040	mg/kg wet	2.000		84	40-140			
Benzo(a)pyrene	1.52	0.040	mg/kg wet	2.000		76	40-140			
Benzo(b)fluoranthene	1.58	0.040	mg/kg wet	2.000		79	40-140			
Benzo(g,h,i)perylene	1.61	0.040	mg/kg wet	2.000		81	40-140			
Benzo(k)fluoranthene	1.66	0.040	mg/kg wet	2.000		83	40-140			
Chrysene	1.67	0.040	mg/kg wet	2.000		83	40-140			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>MADEP-EPH Extractable Petroleum Hydrocarbons</b>										
<b>Batch DI41316 - 3546</b>										
Dibenzo(a,h)Anthracene	1.66	0.040	mg/kg wet	2.000		83	40-140			
Fluoranthene	1.81	0.040	mg/kg wet	2.000		91	40-140			
Fluorene	1.65	0.040	mg/kg wet	2.000		83	40-140			
Indeno(1,2,3-cd)Pyrene	1.60	0.040	mg/kg wet	2.000		80	40-140			
Naphthalene	1.39	0.040	mg/kg wet	2.000		69	40-140			
Phenanthrene	1.55	0.040	mg/kg wet	2.000		78	40-140			
Pyrene	1.71	0.040	mg/kg wet	2.000		86	40-140			
<b>LCS Dup</b>										
C19-C36 Aliphatics1	12.5	15.0	mg/kg wet	16.00		78	40-140	14	25	
C9-C18 Aliphatics1	8.3	15.0	mg/kg wet	12.00		69	40-140	11	25	
<i>Surrogate: 1-Chlorooctadecane</i>	<i>1.31</i>		mg/kg wet	<i>2.000</i>		<i>65</i>	<i>40-140</i>			
<b>LCS Dup</b>										
C11-C22 Unadjusted Aromatics1	27.4	15.0	mg/kg wet	34.00		81	40-140	2	25	
<i>Surrogate: 2-Bromonaphthalene</i>	<i>2.02</i>		mg/kg wet	<i>2.000</i>		<i>101</i>	<i>40-140</i>			
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>2.03</i>		mg/kg wet	<i>2.000</i>		<i>102</i>	<i>40-140</i>			
<i>Surrogate: O-Terphenyl</i>	<i>1.59</i>		mg/kg wet	<i>2.000</i>		<i>80</i>	<i>40-140</i>			
<b>LCS Dup</b>										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	
<b>LCS Dup</b>										
2-Methylnaphthalene	1.53	0.040	mg/kg wet	2.000		76	40-140	3	30	
Acenaphthene	1.54	0.040	mg/kg wet	2.000		77	40-140	3	30	
Acenaphthylene	1.73	0.040	mg/kg wet	2.000		87	40-140	3	30	
Anthracene	1.73	0.040	mg/kg wet	2.000		86	40-140	2	30	
Benzo(a)anthracene	1.67	0.040	mg/kg wet	2.000		83	40-140	0.4	30	
Benzo(a)pyrene	1.52	0.040	mg/kg wet	2.000		76	40-140	0.3	30	
Benzo(b)fluoranthene	1.55	0.040	mg/kg wet	2.000		77	40-140	2	30	
Benzo(g,h,i)perylene	1.61	0.040	mg/kg wet	2.000		81	40-140	0.1	30	
Benzo(k)fluoranthene	1.69	0.040	mg/kg wet	2.000		84	40-140	2	30	
Chrysene	1.67	0.040	mg/kg wet	2.000		84	40-140	0.3	30	
Dibenzo(a,h)Anthracene	1.66	0.040	mg/kg wet	2.000		83	40-140	0.3	30	
Fluoranthene	1.84	0.040	mg/kg wet	2.000		92	40-140	1	30	
Fluorene	1.68	0.040	mg/kg wet	2.000		84	40-140	2	30	
Indeno(1,2,3-cd)Pyrene	1.60	0.040	mg/kg wet	2.000		80	40-140	0.04	30	
Naphthalene	1.46	0.040	mg/kg wet	2.000		73	40-140	5	30	
Phenanthrene	1.58	0.040	mg/kg wet	2.000		79	40-140	2	30	
Pyrene	1.71	0.040	mg/kg wet	2.000		85	40-140	0.3	30	
<b>Batch DI41703 - 3546</b>										
<b>Blank</b>										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>MADEP-EPH Extractable Petroleum Hydrocarbons</b>										
<b>Batch DI41703 - 3546</b>										
<i>Surrogate: 1-Chlorooctadecane</i>	1.59		mg/kg wet	2.000		80	40-140			
<b>Blank</b>										
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
<i>Surrogate: 2-Bromonaphthalene</i>	1.80		mg/kg wet	2.000		90	40-140			
<i>Surrogate: 2-Fluorobiphenyl</i>	1.76		mg/kg wet	2.000		88	40-140			
<i>Surrogate: O-Terphenyl</i>	1.79		mg/kg wet	2.000		90	40-140			
<b>Blank</b>										
2-Methylnaphthalene	ND	0.008	mg/kg wet							
Acenaphthene	ND	0.008	mg/kg wet							
Acenaphthylene	ND	0.008	mg/kg wet							
Anthracene	ND	0.008	mg/kg wet							
Benzo(a)anthracene	ND	0.008	mg/kg wet							
Benzo(a)pyrene	ND	0.008	mg/kg wet							
Benzo(b)fluoranthene	ND	0.008	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.008	mg/kg wet							
Benzo(k)fluoranthene	ND	0.008	mg/kg wet							
Chrysene	ND	0.008	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.008	mg/kg wet							
Fluoranthene	ND	0.008	mg/kg wet							
Fluorene	ND	0.008	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.008	mg/kg wet							
Naphthalene	ND	0.008	mg/kg wet							
Phenanthrene	ND	0.008	mg/kg wet							
Pyrene	ND	0.008	mg/kg wet							
<b>LCS</b>										
C19-C36 Aliphatics1	14.8	15.0	mg/kg wet	16.00		92	40-140			
C9-C18 Aliphatics1	9.0	15.0	mg/kg wet	12.00		75	40-140			
<i>Surrogate: 1-Chlorooctadecane</i>	1.78		mg/kg wet	2.000		89	40-140			
<b>LCS</b>										
C11-C22 Unadjusted Aromatics1	28.6	15.0	mg/kg wet	34.00		84	40-140			
<i>Surrogate: 2-Bromonaphthalene</i>	1.84		mg/kg wet	2.000		92	40-140			
<i>Surrogate: 2-Fluorobiphenyl</i>	1.78		mg/kg wet	2.000		89	40-140			
<i>Surrogate: O-Terphenyl</i>	1.80		mg/kg wet	2.000		90	40-140			
<b>LCS</b>										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
<b>LCS</b>										
2-Methylnaphthalene	1.55	0.040	mg/kg wet	2.000		78	40-140			
Acenaphthene	1.58	0.040	mg/kg wet	2.000		79	40-140			
Acenaphthylene	1.82	0.040	mg/kg wet	2.000		91	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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MADEP-EPH Extractable Petroleum Hydrocarbons

Batch DI41703 - 3546

Anthracene	1.80	0.040	mg/kg wet	2.000		90	40-140			
Benzo(a)anthracene	1.78	0.040	mg/kg wet	2.000		89	40-140			
Benzo(a)pyrene	1.62	0.040	mg/kg wet	2.000		81	40-140			
Benzo(b)fluoranthene	1.66	0.040	mg/kg wet	2.000		83	40-140			
Benzo(g,h,i)perylene	1.68	0.040	mg/kg wet	2.000		84	40-140			
Benzo(k)fluoranthene	1.75	0.040	mg/kg wet	2.000		87	40-140			
Chrysene	1.73	0.040	mg/kg wet	2.000		86	40-140			
Dibenzo(a,h)Anthracene	1.74	0.040	mg/kg wet	2.000		87	40-140			
Fluoranthene	1.90	0.040	mg/kg wet	2.000		95	40-140			
Fluorene	1.74	0.040	mg/kg wet	2.000		87	40-140			
Indeno(1,2,3-cd)Pyrene	1.68	0.040	mg/kg wet	2.000		84	40-140			
Naphthalene	1.47	0.040	mg/kg wet	2.000		73	40-140			
Phenanthrene	1.63	0.040	mg/kg wet	2.000		82	40-140			
Pyrene	1.81	0.040	mg/kg wet	2.000		91	40-140			

LCS Dup

C19-C36 Aliphatics1	15.1	15.0	mg/kg wet	16.00		94	40-140	2	25	
C9-C18 Aliphatics1	8.8	15.0	mg/kg wet	12.00		74	40-140	2	25	

Surrogate: 1-Chlorooctadecane

1.77 mg/kg wet 2.000 88 40-140

LCS Dup

C11-C22 Unadjusted Aromatics1	28.7	15.0	mg/kg wet	34.00		84	40-140	0.5	25	
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Surrogate: 2-Bromonaphthalene

1.82 mg/kg wet 2.000 91 40-140

Surrogate: 2-Fluorobiphenyl

1.73 mg/kg wet 2.000 86 40-140

Surrogate: O-Terphenyl

1.85 mg/kg wet 2.000 93 40-140

LCS Dup

2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	

LCS Dup

2-Methylnaphthalene	1.46	0.040	mg/kg wet	2.000		73	40-140	6	30	
Acenaphthene	1.56	0.040	mg/kg wet	2.000		78	40-140	1	30	
Acenaphthylene	1.75	0.040	mg/kg wet	2.000		87	40-140	4	30	
Anthracene	1.87	0.040	mg/kg wet	2.000		93	40-140	4	30	
Benzo(a)anthracene	1.83	0.040	mg/kg wet	2.000		91	40-140	3	30	
Benzo(a)pyrene	1.68	0.040	mg/kg wet	2.000		84	40-140	4	30	
Benzo(b)fluoranthene	1.75	0.040	mg/kg wet	2.000		87	40-140	5	30	
Benzo(g,h,i)perylene	1.77	0.040	mg/kg wet	2.000		89	40-140	5	30	
Benzo(k)fluoranthene	1.81	0.040	mg/kg wet	2.000		90	40-140	3	30	
Chrysene	1.80	0.040	mg/kg wet	2.000		90	40-140	4	30	
Dibenzo(a,h)Anthracene	1.81	0.040	mg/kg wet	2.000		91	40-140	4	30	
Fluoranthene	1.98	0.040	mg/kg wet	2.000		99	40-140	4	30	
Fluorene	1.75	0.040	mg/kg wet	2.000		87	40-140	0.5	30	
Indeno(1,2,3-cd)Pyrene	1.77	0.040	mg/kg wet	2.000		88	40-140	5	30	
Naphthalene	1.37	0.040	mg/kg wet	2.000		69	40-140	7	30	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**MADEP-EPH Extractable Petroleum Hydrocarbons**

**Batch DI41703 - 3546**

Phenanthrene	1.68	0.040	mg/kg wet	2.000		84	40-140	3	30	
Pyrene	1.87	0.040	mg/kg wet	2.000		93	40-140	3	30	

**8081B Organochlorine Pesticides**

**Batch DI41606 - 3546**

<b>Blank</b>										
4,4'-DDD	ND	0.0025	mg/kg wet							
4,4'-DDD [2C]	ND	0.0025	mg/kg wet							
4,4'-DDE	ND	0.0025	mg/kg wet							
4,4'-DDE [2C]	ND	0.0025	mg/kg wet							
4,4'-DDT	ND	0.0025	mg/kg wet							
4,4'-DDT [2C]	ND	0.0025	mg/kg wet							
Aldrin	ND	0.0025	mg/kg wet							
Aldrin [2C]	ND	0.0025	mg/kg wet							
alpha-BHC	ND	0.0025	mg/kg wet							
alpha-BHC [2C]	ND	0.0025	mg/kg wet							
alpha-Chlordane	ND	0.0025	mg/kg wet							
alpha-Chlordane [2C]	ND	0.0025	mg/kg wet							
beta-BHC	ND	0.0025	mg/kg wet							
beta-BHC [2C]	ND	0.0025	mg/kg wet							
Chlordane (Total)	ND	0.0200	mg/kg wet							
Chlordane (Total) [2C]	ND	0.0200	mg/kg wet							
delta-BHC	ND	0.0025	mg/kg wet							
delta-BHC [2C]	ND	0.0025	mg/kg wet							
Dieldrin	ND	0.0025	mg/kg wet							
Dieldrin [2C]	ND	0.0025	mg/kg wet							
Endosulfan I	ND	0.0025	mg/kg wet							
Endosulfan I [2C]	ND	0.0025	mg/kg wet							
Endosulfan II	ND	0.0025	mg/kg wet							
Endosulfan II [2C]	ND	0.0025	mg/kg wet							
Endosulfan Sulfate	ND	0.0025	mg/kg wet							
Endosulfan Sulfate [2C]	ND	0.0025	mg/kg wet							
Endrin	ND	0.0025	mg/kg wet							
Endrin [2C]	ND	0.0025	mg/kg wet							
Endrin Ketone	ND	0.0025	mg/kg wet							
Endrin Ketone [2C]	ND	0.0025	mg/kg wet							
gamma-BHC (Lindane)	ND	0.0015	mg/kg wet							
gamma-BHC (Lindane) [2C]	ND	0.0015	mg/kg wet							
gamma-Chlordane	ND	0.0025	mg/kg wet							
gamma-Chlordane [2C]	ND	0.0025	mg/kg wet							
Heptachlor	ND	0.0025	mg/kg wet							
Heptachlor [2C]	ND	0.0025	mg/kg wet							
Heptachlor Epoxide	ND	0.0025	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41606 - 3546

Heptachlor Epoxide [2C]	ND	0.0025	mg/kg wet							
Hexachlorobenzene	ND	0.0025	mg/kg wet							
Hexachlorobenzene [2C]	ND	0.0025	mg/kg wet							
Methoxychlor	ND	0.0025	mg/kg wet							
Methoxychlor [2C]	ND	0.0025	mg/kg wet							
Toxaphene	ND	0.125	mg/kg wet							
Toxaphene [2C]	ND	0.125	mg/kg wet							
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.00969</i>		mg/kg wet	<i>0.01250</i>		<i>78</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.0102</i>		mg/kg wet	<i>0.01250</i>		<i>81</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00753</i>		mg/kg wet	<i>0.01250</i>		<i>60</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00767</i>		mg/kg wet	<i>0.01250</i>		<i>61</i>	<i>30-150</i>			

LCS

4,4'-DDD	0.0110	0.0025	mg/kg wet	0.01250		88	40-140			
4,4'-DDD [2C]	0.0114	0.0025	mg/kg wet	0.01250		91	40-140			
4,4'-DDE	0.0098	0.0025	mg/kg wet	0.01250		79	40-140			
4,4'-DDE [2C]	0.0105	0.0025	mg/kg wet	0.01250		84	40-140			
4,4'-DDT	0.0115	0.0025	mg/kg wet	0.01250		92	40-140			
4,4'-DDT [2C]	0.0117	0.0025	mg/kg wet	0.01250		93	40-140			
Aldrin	0.0096	0.0025	mg/kg wet	0.01250		77	40-140			
Aldrin [2C]	0.0098	0.0025	mg/kg wet	0.01250		79	40-140			
alpha-BHC	0.0097	0.0025	mg/kg wet	0.01250		78	40-140			
alpha-BHC [2C]	0.0097	0.0025	mg/kg wet	0.01250		78	40-140			
alpha-Chlordane	0.0095	0.0025	mg/kg wet	0.01250		76	40-140			
alpha-Chlordane [2C]	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
beta-BHC	0.0097	0.0025	mg/kg wet	0.01250		77	40-140			
beta-BHC [2C]	0.0092	0.0025	mg/kg wet	0.01250		73	40-140			
delta-BHC	0.0099	0.0025	mg/kg wet	0.01250		79	40-140			
delta-BHC [2C]	0.0102	0.0025	mg/kg wet	0.01250		82	40-140			
Dieldrin	0.0108	0.0025	mg/kg wet	0.01250		87	40-140			
Dieldrin [2C]	0.0111	0.0025	mg/kg wet	0.01250		89	40-140			
Endosulfan I	0.0097	0.0025	mg/kg wet	0.01250		77	40-140			
Endosulfan I [2C]	0.0102	0.0025	mg/kg wet	0.01250		82	40-140			
Endosulfan II	0.0107	0.0025	mg/kg wet	0.01250		85	40-140			
Endosulfan II [2C]	0.0109	0.0025	mg/kg wet	0.01250		88	40-140			
Endosulfan Sulfate	0.0103	0.0025	mg/kg wet	0.01250		83	40-140			
Endosulfan Sulfate [2C]	0.0109	0.0025	mg/kg wet	0.01250		87	40-140			
Endrin	0.0105	0.0025	mg/kg wet	0.01250		84	40-140			
Endrin [2C]	0.0107	0.0025	mg/kg wet	0.01250		86	40-140			
Endrin Ketone	0.0118	0.0025	mg/kg wet	0.01250		94	40-140			
Endrin Ketone [2C]	0.0122	0.0025	mg/kg wet	0.01250		98	40-140			
gamma-BHC (Lindane)	0.0099	0.0015	mg/kg wet	0.01250		79	40-140			
gamma-BHC (Lindane) [2C]	0.0102	0.0015	mg/kg wet	0.01250		82	40-140			
gamma-Chlordane	0.0113	0.0025	mg/kg wet	0.01250		90	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41606 - 3546

gamma-Chlordane [2C]	0.0115	0.0025	mg/kg wet	0.01250		92	40-140			
Heptachlor	0.0098	0.0025	mg/kg wet	0.01250		78	40-140			
Heptachlor [2C]	0.0108	0.0025	mg/kg wet	0.01250		86	40-140			
Heptachlor Epoxide	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
Heptachlor Epoxide [2C]	0.0103	0.0025	mg/kg wet	0.01250		83	40-140			
Hexachlorobenzene	0.0087	0.0025	mg/kg wet	0.01250		69	40-140			
Hexachlorobenzene [2C]	0.0085	0.0025	mg/kg wet	0.01250		68	40-140			
Methoxychlor	0.0116	0.0025	mg/kg wet	0.01250		93	40-140			
Methoxychlor [2C]	0.0122	0.0025	mg/kg wet	0.01250		98	40-140			
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.0104</i>		mg/kg wet	<i>0.01250</i>		<i>84</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.0109</i>		mg/kg wet	<i>0.01250</i>		<i>87</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00905</i>		mg/kg wet	<i>0.01250</i>		<i>72</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00911</i>		mg/kg wet	<i>0.01250</i>		<i>73</i>	<i>30-150</i>			

LCS Dup

4,4'-DDD	0.0116	0.0025	mg/kg wet	0.01250		93	40-140	5	30	
4,4'-DDD [2C]	0.0121	0.0025	mg/kg wet	0.01250		97	40-140	6	30	
4,4'-DDE	0.0102	0.0025	mg/kg wet	0.01250		82	40-140	4	30	
4,4'-DDE [2C]	0.0110	0.0025	mg/kg wet	0.01250		88	40-140	5	30	
4,4'-DDT	0.0122	0.0025	mg/kg wet	0.01250		98	40-140	6	30	
4,4'-DDT [2C]	0.0126	0.0025	mg/kg wet	0.01250		100	40-140	7	30	
Aldrin	0.0093	0.0025	mg/kg wet	0.01250		74	40-140	3	30	
Aldrin [2C]	0.0096	0.0025	mg/kg wet	0.01250		77	40-140	3	30	
alpha-BHC	0.0092	0.0025	mg/kg wet	0.01250		74	40-140	5	30	
alpha-BHC [2C]	0.0093	0.0025	mg/kg wet	0.01250		74	40-140	5	30	
alpha-Chlordane	0.0099	0.0025	mg/kg wet	0.01250		79	40-140	4	30	
alpha-Chlordane [2C]	0.0104	0.0025	mg/kg wet	0.01250		83	40-140	4	30	
beta-BHC	0.0098	0.0025	mg/kg wet	0.01250		78	40-140	0.9	30	
beta-BHC [2C]	0.0093	0.0025	mg/kg wet	0.01250		75	40-140	2	30	
delta-BHC	0.0103	0.0025	mg/kg wet	0.01250		83	40-140	4	30	
delta-BHC [2C]	0.0107	0.0025	mg/kg wet	0.01250		85	40-140	5	30	
Dieldrin	0.0114	0.0025	mg/kg wet	0.01250		91	40-140	5	30	
Dieldrin [2C]	0.0117	0.0025	mg/kg wet	0.01250		94	40-140	5	30	
Endosulfan I	0.0101	0.0025	mg/kg wet	0.01250		81	40-140	4	30	
Endosulfan I [2C]	0.0107	0.0025	mg/kg wet	0.01250		85	40-140	4	30	
Endosulfan II	0.0113	0.0025	mg/kg wet	0.01250		91	40-140	6	30	
Endosulfan II [2C]	0.0116	0.0025	mg/kg wet	0.01250		93	40-140	6	30	
Endosulfan Sulfate	0.0110	0.0025	mg/kg wet	0.01250		88	40-140	6	30	
Endosulfan Sulfate [2C]	0.0115	0.0025	mg/kg wet	0.01250		92	40-140	6	30	
Endrin	0.0111	0.0025	mg/kg wet	0.01250		89	40-140	6	30	
Endrin [2C]	0.0114	0.0025	mg/kg wet	0.01250		91	40-140	6	30	
Endrin Ketone	0.0126	0.0025	mg/kg wet	0.01250		101	40-140	7	30	
Endrin Ketone [2C]	0.0131	0.0025	mg/kg wet	0.01250		105	40-140	7	30	
gamma-BHC (Lindane)	0.0098	0.0015	mg/kg wet	0.01250		78	40-140	2	30	

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41606 - 3546

gamma-BHC (Lindane) [2C]	0.0101	0.0015	mg/kg wet	0.01250		81	40-140	1	30	
gamma-Chlordane	0.0117	0.0025	mg/kg wet	0.01250		94	40-140	4	30	
gamma-Chlordane [2C]	0.0120	0.0025	mg/kg wet	0.01250		96	40-140	4	30	
Heptachlor	0.0095	0.0025	mg/kg wet	0.01250		76	40-140	4	30	
Heptachlor [2C]	0.0105	0.0025	mg/kg wet	0.01250		84	40-140	2	30	
Heptachlor Epoxide	0.0103	0.0025	mg/kg wet	0.01250		83	40-140	4	30	
Heptachlor Epoxide [2C]	0.0107	0.0025	mg/kg wet	0.01250		86	40-140	3	30	
Hexachlorobenzene	0.0080	0.0025	mg/kg wet	0.01250		64	40-140	8	30	
Hexachlorobenzene [2C]	0.0079	0.0025	mg/kg wet	0.01250		63	40-140	8	30	
Methoxychlor	0.0123	0.0025	mg/kg wet	0.01250		99	40-140	6	30	
Methoxychlor [2C]	0.0132	0.0025	mg/kg wet	0.01250		106	40-140	8	30	

Surrogate: Decachlorobiphenyl	0.0107		mg/kg wet	0.01250		86	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0111		mg/kg wet	0.01250		88	30-150			
Surrogate: Tetrachloro-m-xylene	0.00783		mg/kg wet	0.01250		63	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.00794		mg/kg wet	0.01250		64	30-150			

Batch DI41708 - 3546

Blank										
4,4'-DDD	ND	0.0025	mg/kg wet							
4,4'-DDD [2C]	ND	0.0025	mg/kg wet							
4,4'-DDE	ND	0.0025	mg/kg wet							
4,4'-DDE [2C]	ND	0.0025	mg/kg wet							
4,4'-DDT	ND	0.0025	mg/kg wet							
4,4'-DDT [2C]	ND	0.0025	mg/kg wet							
Aldrin	ND	0.0025	mg/kg wet							
Aldrin [2C]	ND	0.0025	mg/kg wet							
alpha-BHC	ND	0.0025	mg/kg wet							
alpha-BHC [2C]	ND	0.0025	mg/kg wet							
alpha-Chlordane	ND	0.0025	mg/kg wet							
alpha-Chlordane [2C]	ND	0.0025	mg/kg wet							
beta-BHC	ND	0.0025	mg/kg wet							
beta-BHC [2C]	ND	0.0025	mg/kg wet							
Chlordane (Total)	ND	0.0200	mg/kg wet							
Chlordane (Total) [2C]	ND	0.0200	mg/kg wet							
delta-BHC	ND	0.0025	mg/kg wet							
delta-BHC [2C]	ND	0.0025	mg/kg wet							
Dieldrin	ND	0.0025	mg/kg wet							
Dieldrin [2C]	ND	0.0025	mg/kg wet							
Endosulfan I	ND	0.0025	mg/kg wet							
Endosulfan I [2C]	ND	0.0025	mg/kg wet							
Endosulfan II	ND	0.0025	mg/kg wet							
Endosulfan II [2C]	ND	0.0025	mg/kg wet							
Endosulfan Sulfate	ND	0.0025	mg/kg wet							
Endosulfan Sulfate [2C]	ND	0.0025	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41708 - 3546

Endrin	ND	0.0025	mg/kg wet							
Endrin [2C]	ND	0.0025	mg/kg wet							
Endrin Ketone	ND	0.0025	mg/kg wet							
Endrin Ketone [2C]	ND	0.0025	mg/kg wet							
gamma-BHC (Lindane)	ND	0.0015	mg/kg wet							
gamma-BHC (Lindane) [2C]	ND	0.0015	mg/kg wet							
gamma-Chlordane	ND	0.0025	mg/kg wet							
gamma-Chlordane [2C]	ND	0.0025	mg/kg wet							
Heptachlor	ND	0.0025	mg/kg wet							
Heptachlor [2C]	ND	0.0025	mg/kg wet							
Heptachlor Epoxide	ND	0.0025	mg/kg wet							
Heptachlor Epoxide [2C]	ND	0.0025	mg/kg wet							
Hexachlorobenzene	ND	0.0025	mg/kg wet							
Hexachlorobenzene [2C]	ND	0.0025	mg/kg wet							
Methoxychlor	ND	0.0025	mg/kg wet							
Methoxychlor [2C]	ND	0.0025	mg/kg wet							
Toxaphene	ND	0.125	mg/kg wet							
Toxaphene [2C]	ND	0.125	mg/kg wet							

Surrogate: Decachlorobiphenyl	0.00877		mg/kg wet	0.01250		70	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.00876		mg/kg wet	0.01250		70	30-150			
Surrogate: Tetrachloro-m-xylene	0.00674		mg/kg wet	0.01250		54	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.00625		mg/kg wet	0.01250		50	30-150			

LCS

4,4'-DDD	0.0101	0.0025	mg/kg wet	0.01250		81	40-140			
4,4'-DDD [2C]	0.0094	0.0025	mg/kg wet	0.01250		75	40-140			
4,4'-DDE	0.0094	0.0025	mg/kg wet	0.01250		75	40-140			
4,4'-DDE [2C]	0.0087	0.0025	mg/kg wet	0.01250		69	40-140			
4,4'-DDT	0.0099	0.0025	mg/kg wet	0.01250		79	40-140			
4,4'-DDT [2C]	0.0092	0.0025	mg/kg wet	0.01250		74	40-140			
Aldrin	0.0080	0.0025	mg/kg wet	0.01250		64	40-140			
Aldrin [2C]	0.0075	0.0025	mg/kg wet	0.01250		60	40-140			
alpha-BHC	0.0078	0.0025	mg/kg wet	0.01250		62	40-140			
alpha-BHC [2C]	0.0073	0.0025	mg/kg wet	0.01250		59	40-140			
alpha-Chlordane	0.0086	0.0025	mg/kg wet	0.01250		69	40-140			
alpha-Chlordane [2C]	0.0081	0.0025	mg/kg wet	0.01250		65	40-140			
beta-BHC	0.0085	0.0025	mg/kg wet	0.01250		68	40-140			
beta-BHC [2C]	0.0075	0.0025	mg/kg wet	0.01250		60	40-140			
delta-BHC	0.0095	0.0025	mg/kg wet	0.01250		76	40-140			
delta-BHC [2C]	0.0086	0.0025	mg/kg wet	0.01250		69	40-140			
Dieldrin	0.0098	0.0025	mg/kg wet	0.01250		78	40-140			
Dieldrin [2C]	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
Endosulfan I	0.0085	0.0025	mg/kg wet	0.01250		68	40-140			
Endosulfan I [2C]	0.0081	0.0025	mg/kg wet	0.01250		65	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41708 - 3546

Endosulfan II	0.0096	0.0025	mg/kg wet	0.01250		77	40-140			
Endosulfan II [2C]	0.0091	0.0025	mg/kg wet	0.01250		72	40-140			
Endosulfan Sulfate	0.0093	0.0025	mg/kg wet	0.01250		74	40-140			
Endosulfan Sulfate [2C]	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
Endrin	0.0094	0.0025	mg/kg wet	0.01250		75	40-140			
Endrin [2C]	0.0087	0.0025	mg/kg wet	0.01250		69	40-140			
Endrin Ketone	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
Endrin Ketone [2C]	0.0098	0.0025	mg/kg wet	0.01250		78	40-140			
gamma-BHC (Lindane)	0.0082	0.0015	mg/kg wet	0.01250		66	40-140			
gamma-BHC (Lindane) [2C]	0.0079	0.0015	mg/kg wet	0.01250		63	40-140			
gamma-Chlordane	0.0102	0.0025	mg/kg wet	0.01250		82	40-140			
gamma-Chlordane [2C]	0.0093	0.0025	mg/kg wet	0.01250		75	40-140			
Heptachlor	0.0079	0.0025	mg/kg wet	0.01250		63	40-140			
Heptachlor [2C]	0.0075	0.0025	mg/kg wet	0.01250		60	40-140			
Heptachlor Epoxide	0.0088	0.0025	mg/kg wet	0.01250		71	40-140			
Heptachlor Epoxide [2C]	0.0082	0.0025	mg/kg wet	0.01250		65	40-140			
Hexachlorobenzene	0.0071	0.0025	mg/kg wet	0.01250		57	40-140			
Hexachlorobenzene [2C]	0.0067	0.0025	mg/kg wet	0.01250		53	40-140			
Methoxychlor	0.0095	0.0025	mg/kg wet	0.01250		76	40-140			
Methoxychlor [2C]	0.0093	0.0025	mg/kg wet	0.01250		74	40-140			
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.00976</i>		mg/kg wet	<i>0.01250</i>		<i>78</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.00992</i>		mg/kg wet	<i>0.01250</i>		<i>79</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00752</i>		mg/kg wet	<i>0.01250</i>		<i>60</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00711</i>		mg/kg wet	<i>0.01250</i>		<i>57</i>	<i>30-150</i>			

LCS Dup

4,4'-DDD	0.0088	0.0025	mg/kg wet	0.01250		70	40-140	14	30	
4,4'-DDD [2C]	0.0082	0.0025	mg/kg wet	0.01250		66	40-140	14	30	
4,4'-DDE	0.0085	0.0025	mg/kg wet	0.01250		68	40-140	11	30	
4,4'-DDE [2C]	0.0078	0.0025	mg/kg wet	0.01250		63	40-140	10	30	
4,4'-DDT	0.0088	0.0025	mg/kg wet	0.01250		70	40-140	12	30	
4,4'-DDT [2C]	0.0081	0.0025	mg/kg wet	0.01250		65	40-140	12	30	
Aldrin	0.0077	0.0025	mg/kg wet	0.01250		61	40-140	5	30	
Aldrin [2C]	0.0072	0.0025	mg/kg wet	0.01250		57	40-140	4	30	
alpha-BHC	0.0073	0.0025	mg/kg wet	0.01250		59	40-140	6	30	
alpha-BHC [2C]	0.0070	0.0025	mg/kg wet	0.01250		56	40-140	5	30	
alpha-Chlordane	0.0079	0.0025	mg/kg wet	0.01250		63	40-140	9	30	
alpha-Chlordane [2C]	0.0074	0.0025	mg/kg wet	0.01250		59	40-140	8	30	
beta-BHC	0.0079	0.0025	mg/kg wet	0.01250		63	40-140	7	30	
beta-BHC [2C]	0.0070	0.0025	mg/kg wet	0.01250		56	40-140	7	30	
delta-BHC	0.0086	0.0025	mg/kg wet	0.01250		69	40-140	10	30	
delta-BHC [2C]	0.0078	0.0025	mg/kg wet	0.01250		63	40-140	9	30	
Dieldrin	0.0089	0.0025	mg/kg wet	0.01250		72	40-140	9	30	
Dieldrin [2C]	0.0083	0.0025	mg/kg wet	0.01250		66	40-140	8	30	

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41708 - 3546

Endosulfan I	0.0078	0.0025	mg/kg wet	0.01250		63	40-140	8	30	
Endosulfan I [2C]	0.0075	0.0025	mg/kg wet	0.01250		60	40-140	7	30	
Endosulfan II	0.0085	0.0025	mg/kg wet	0.01250		68	40-140	12	30	
Endosulfan II [2C]	0.0079	0.0025	mg/kg wet	0.01250		63	40-140	13	30	
Endosulfan Sulfate	0.0081	0.0025	mg/kg wet	0.01250		65	40-140	14	30	
Endosulfan Sulfate [2C]	0.0080	0.0025	mg/kg wet	0.01250		64	40-140	12	30	
Endrin	0.0085	0.0025	mg/kg wet	0.01250		68	40-140	9	30	
Endrin [2C]	0.0079	0.0025	mg/kg wet	0.01250		63	40-140	9	30	
Endrin Ketone	0.0087	0.0025	mg/kg wet	0.01250		70	40-140	14	30	
Endrin Ketone [2C]	0.0084	0.0025	mg/kg wet	0.01250		67	40-140	15	30	
gamma-BHC (Lindane)	0.0077	0.0015	mg/kg wet	0.01250		62	40-140	7	30	
gamma-BHC (Lindane) [2C]	0.0075	0.0015	mg/kg wet	0.01250		60	40-140	6	30	
gamma-Chlordane	0.0094	0.0025	mg/kg wet	0.01250		75	40-140	9	30	
gamma-Chlordane [2C]	0.0085	0.0025	mg/kg wet	0.01250		68	40-140	9	30	
Heptachlor	0.0076	0.0025	mg/kg wet	0.01250		61	40-140	4	30	
Heptachlor [2C]	0.0074	0.0025	mg/kg wet	0.01250		59	40-140	2	30	
Heptachlor Epoxide	0.0082	0.0025	mg/kg wet	0.01250		66	40-140	7	30	
Heptachlor Epoxide [2C]	0.0077	0.0025	mg/kg wet	0.01250		62	40-140	6	30	
Hexachlorobenzene	0.0067	0.0025	mg/kg wet	0.01250		54	40-140	6	30	
Hexachlorobenzene [2C]	0.0064	0.0025	mg/kg wet	0.01250		51	40-140	4	30	
Methoxychlor	0.0084	0.0025	mg/kg wet	0.01250		67	40-140	12	30	
Methoxychlor [2C]	0.0081	0.0025	mg/kg wet	0.01250		65	40-140	14	30	

Surrogate: Decachlorobiphenyl	0.00808		mg/kg wet	0.01250		65	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.00807		mg/kg wet	0.01250		65	30-150			
Surrogate: Tetrachloro-m-xylene	0.00708		mg/kg wet	0.01250		57	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.00649		mg/kg wet	0.01250		52	30-150			

8151A Chlorinated Herbicides

Batch DI41652 - 3546

Blank										
2,4,5-T	ND	0.010	mg/kg wet							
2,4,5-T [2C]	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex)	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex) [2C]	ND	0.010	mg/kg wet							
2,4-D	ND	0.047	mg/kg wet							
2,4-D [2C]	ND	0.047	mg/kg wet							
2,4-DB	ND	0.048	mg/kg wet							
2,4-DB [2C]	ND	0.048	mg/kg wet							
Dalapon	ND	0.046	mg/kg wet							
Dalapon [2C]	ND	0.046	mg/kg wet							
Dicamba	ND	0.009	mg/kg wet							
Dicamba [2C]	ND	0.009	mg/kg wet							
Dichlorprop	ND	0.047	mg/kg wet							

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8151A Chlorinated Herbicides**

**Batch DI41652 - 3546**

Dichlorprop [2C]	ND	0.047	mg/kg wet							
MCPA	ND	2.32	mg/kg wet							
MCPA [2C]	ND	2.32	mg/kg wet							
MCPP	ND	2.35	mg/kg wet							
MCPP [2C]	ND	2.35	mg/kg wet							
<i>Surrogate: DCAA</i>	<i>0.209</i>		mg/kg wet	<i>0.2000</i>		<i>105</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.206</i>		mg/kg wet	<i>0.2000</i>		<i>103</i>	<i>30-150</i>			

**LCS**

2,4,5-T	0.014	0.010	mg/kg wet	0.01900		76	40-140			
2,4,5-T [2C]	0.011	0.010	mg/kg wet	0.01900		60	40-140			
2,4,5-TP (Silvex)	0.015	0.010	mg/kg wet	0.01900		78	40-140			
2,4,5-TP (Silvex) [2C]	0.013	0.010	mg/kg wet	0.01900		70	40-140			
2,4-D	0.131	0.047	mg/kg wet	0.1880		70	40-140			
2,4-D [2C]	0.142	0.047	mg/kg wet	0.1880		76	40-140			
2,4-DB	0.151	0.048	mg/kg wet	0.1900		79	40-140			
2,4-DB [2C]	0.131	0.048	mg/kg wet	0.1900		69	40-140			
Dalapon	0.347	0.046	mg/kg wet	0.4550		76	40-140			
Dalapon [2C]	0.347	0.046	mg/kg wet	0.4550		76	40-140			
Dicamba	0.014	0.009	mg/kg wet	0.01880		72	40-140			
Dicamba [2C]	0.014	0.009	mg/kg wet	0.01880		74	40-140			
Dichlorprop	0.176	0.047	mg/kg wet	0.1880		93	40-140			
Dichlorprop [2C]	0.146	0.047	mg/kg wet	0.1880		78	40-140			
MCPA	15.9	2.32	mg/kg wet	18.60		85	40-140			
MCPA [2C]	15.5	2.32	mg/kg wet	18.60		84	40-140			
MCPP	15.2	2.35	mg/kg wet	18.80		81	40-140			
MCPP [2C]	15.5	2.35	mg/kg wet	18.80		82	40-140			
<i>Surrogate: DCAA</i>	<i>0.185</i>		mg/kg wet	<i>0.2000</i>		<i>93</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.174</i>		mg/kg wet	<i>0.2000</i>		<i>87</i>	<i>30-150</i>			

**LCS Dup**

2,4,5-T	0.014	0.010	mg/kg wet	0.01900		76	40-140	0	30	
2,4,5-T [2C]	0.012	0.010	mg/kg wet	0.01900		64	40-140	6	30	
2,4,5-TP (Silvex)	0.015	0.010	mg/kg wet	0.01900		78	40-140	0	30	
2,4,5-TP (Silvex) [2C]	0.014	0.010	mg/kg wet	0.01900		74	40-140	6	30	
2,4-D	0.134	0.047	mg/kg wet	0.1880		71	40-140	2	30	
2,4-D [2C]	0.151	0.047	mg/kg wet	0.1880		80	40-140	6	30	
2,4-DB	0.157	0.048	mg/kg wet	0.1900		82	40-140	4	30	
2,4-DB [2C]	0.141	0.048	mg/kg wet	0.1900		74	40-140	7	30	
Dalapon	0.349	0.046	mg/kg wet	0.4550		77	40-140	0.6	30	
Dalapon [2C]	0.351	0.046	mg/kg wet	0.4550		77	40-140	1	30	
Dicamba	0.014	0.009	mg/kg wet	0.01880		74	40-140	3	30	
Dicamba [2C]	0.014	0.009	mg/kg wet	0.01880		76	40-140	3	30	
Dichlorprop	0.179	0.047	mg/kg wet	0.1880		95	40-140	2	30	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8151A Chlorinated Herbicides**

**Batch DI41652 - 3546**

Dichlorprop [2C]	0.148	0.047	mg/kg wet	0.1880		79	40-140	1	30	
MCPA	16.1	2.32	mg/kg wet	18.60		86	40-140	1	30	
MCPA [2C]	16.6	2.32	mg/kg wet	18.60		89	40-140	6	30	
MCPP	15.6	2.35	mg/kg wet	18.80		83	40-140	3	30	
MCPP [2C]	16.1	2.35	mg/kg wet	18.80		85	40-140	4	30	
<i>Surrogate: DCAA</i>	<i>0.192</i>		mg/kg wet	<i>0.2000</i>		<i>96</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.181</i>		mg/kg wet	<i>0.2000</i>		<i>91</i>	<i>30-150</i>			

**Batch DI41831 - 3546**

<b>Blank</b>										
2,4,5-T	ND	0.010	mg/kg wet							
2,4,5-T [2C]	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex)	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex) [2C]	ND	0.010	mg/kg wet							
2,4-D	ND	0.047	mg/kg wet							
2,4-D [2C]	ND	0.047	mg/kg wet							
2,4-DB	ND	0.048	mg/kg wet							
2,4-DB [2C]	ND	0.048	mg/kg wet							
Dalapon	ND	0.046	mg/kg wet							
Dalapon [2C]	ND	0.046	mg/kg wet							
Dicamba	ND	0.009	mg/kg wet							
Dicamba [2C]	ND	0.009	mg/kg wet							
Dichlorprop	ND	0.047	mg/kg wet							
Dichlorprop [2C]	ND	0.047	mg/kg wet							
MCPA	ND	2.32	mg/kg wet							
MCPA [2C]	ND	2.32	mg/kg wet							
MCPP	ND	2.35	mg/kg wet							
MCPP [2C]	ND	2.35	mg/kg wet							
<i>Surrogate: DCAA</i>	<i>0.186</i>		mg/kg wet	<i>0.2000</i>		<i>93</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.185</i>		mg/kg wet	<i>0.2000</i>		<i>93</i>	<i>30-150</i>			

<b>LCS</b>										
2,4,5-T	0.014	0.010	mg/kg wet	0.01900		72	40-140			
2,4,5-T [2C]	0.012	0.010	mg/kg wet	0.01900		64	40-140			
2,4,5-TP (Silvex)	0.014	0.010	mg/kg wet	0.01900		76	40-140			
2,4,5-TP (Silvex) [2C]	0.014	0.010	mg/kg wet	0.01900		74	40-140			
2,4-D	0.142	0.047	mg/kg wet	0.1880		75	40-140			
2,4-D [2C]	0.117	0.047	mg/kg wet	0.1880		62	40-140			
2,4-DB	0.163	0.048	mg/kg wet	0.1900		86	40-140			
2,4-DB [2C]	0.143	0.048	mg/kg wet	0.1900		75	40-140			
Dalapon	0.316	0.046	mg/kg wet	0.4550		69	40-140			
Dalapon [2C]	0.309	0.046	mg/kg wet	0.4550		68	40-140			
Dicamba	0.014	0.009	mg/kg wet	0.01880		72	40-140			
Dicamba [2C]	0.014	0.009	mg/kg wet	0.01880		76	40-140			



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8151A Chlorinated Herbicides**

**Batch DI41831 - 3546**

Dichlorprop	0.177	0.047	mg/kg wet	0.1880		94	40-140			
Dichlorprop [2C]	0.149	0.047	mg/kg wet	0.1880		79	40-140			
MCPA	17.1	2.32	mg/kg wet	18.60		92	40-140			
MCPA [2C]	15.9	2.32	mg/kg wet	18.60		85	40-140			
MCPP	15.9	2.35	mg/kg wet	18.80		85	40-140			
MCPP [2C]	15.8	2.35	mg/kg wet	18.80		84	40-140			
<i>Surrogate: DCAA</i>	<i>0.219</i>		mg/kg wet	<i>0.2000</i>		<i>110</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.209</i>		mg/kg wet	<i>0.2000</i>		<i>104</i>	<i>30-150</i>			

**LCS Dup**

2,4,5-T	0.015	0.010	mg/kg wet	0.01900		80	40-140	11	30	
2,4,5-T [2C]	0.013	0.010	mg/kg wet	0.01900		70	40-140	9	30	
2,4,5-TP (Silvex)	0.016	0.010	mg/kg wet	0.01900		82	40-140	8	30	
2,4,5-TP (Silvex) [2C]	0.015	0.010	mg/kg wet	0.01900		80	40-140	8	30	
2,4-D	0.149	0.047	mg/kg wet	0.1880		79	40-140	5	30	
2,4-D [2C]	0.125	0.047	mg/kg wet	0.1880		67	40-140	7	30	
2,4-DB	0.174	0.048	mg/kg wet	0.1900		92	40-140	7	30	
2,4-DB [2C]	0.152	0.048	mg/kg wet	0.1900		80	40-140	6	30	
Dalapon	0.323	0.046	mg/kg wet	0.4550		71	40-140	2	30	
Dalapon [2C]	0.320	0.046	mg/kg wet	0.4550		70	40-140	3	30	
Dicamba	0.014	0.009	mg/kg wet	0.01880		76	40-140	5	30	
Dicamba [2C]	0.015	0.009	mg/kg wet	0.01880		80	40-140	5	30	
Dichlorprop	0.185	0.047	mg/kg wet	0.1880		98	40-140	4	30	
Dichlorprop [2C]	0.155	0.047	mg/kg wet	0.1880		83	40-140	4	30	
MCPA	16.9	2.32	mg/kg wet	18.60		91	40-140	1	30	
MCPA [2C]	16.2	2.32	mg/kg wet	18.60		87	40-140	2	30	
MCPP	16.8	2.35	mg/kg wet	18.80		89	40-140	5	30	
MCPP [2C]	16.7	2.35	mg/kg wet	18.80		89	40-140	5	30	
<i>Surrogate: DCAA</i>	<i>0.210</i>		mg/kg wet	<i>0.2000</i>		<i>105</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.201</i>		mg/kg wet	<i>0.2000</i>		<i>101</i>	<i>30-150</i>			

**8100M Total Petroleum Hydrocarbons**

**Batch DI41327 - 3546**

**Blank**

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Hexatriacontane (C36)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8100M Total Petroleum Hydrocarbons

Batch DI41327 - 3546

Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons (C9-C36)	ND	10.0	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							
<i>Surrogate: O-Terphenyl</i>	<i>6.36</i>		mg/kg wet	<i>5.000</i>		<i>127</i>	<i>40-140</i>			

LCS

Decane (C10)	1.8	0.2	mg/kg wet	2.500		73	40-140			
Docosane (C22)	2.2	0.2	mg/kg wet	2.500		87	40-140			
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		80	40-140			
Eicosane (C20)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Hexacosane (C26)	2.1	0.2	mg/kg wet	2.500		85	40-140			
Hexadecane (C16)	2.2	0.2	mg/kg wet	2.500		88	40-140			
Hexatriacontane (C36)	2.0	0.2	mg/kg wet	2.500		80	40-140			
Nonadecane (C19)	2.3	0.2	mg/kg wet	2.500		92	40-140			
Nonane (C9)	1.7	0.2	mg/kg wet	2.500		66	30-140			
Octacosane (C28)	2.0	0.2	mg/kg wet	2.500		81	40-140			
Octadecane (C18)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Tetracosane (C24)	2.0	0.2	mg/kg wet	2.500		80	40-140			
Tetradecane (C14)	2.1	0.2	mg/kg wet	2.500		85	40-140			
Total Petroleum Hydrocarbons (C9-C36)	28.7	10.0	mg/kg wet	35.00		82	40-140			
Triacontane (C30)	2.0	0.2	mg/kg wet	2.500		79	40-140			
<i>Surrogate: O-Terphenyl</i>	<i>4.40</i>		mg/kg wet	<i>5.000</i>		<i>88</i>	<i>40-140</i>			

LCS Dup

Decane (C10)	1.8	0.2	mg/kg wet	2.500		73	40-140	0.07	25	
Docosane (C22)	2.2	0.2	mg/kg wet	2.500		87	40-140	0.2	25	
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		79	40-140	0.8	25	
Eicosane (C20)	2.2	0.2	mg/kg wet	2.500		88	40-140	1	25	
Hexacosane (C26)	2.1	0.2	mg/kg wet	2.500		85	40-140	0.1	25	
Hexadecane (C16)	2.1	0.2	mg/kg wet	2.500		86	40-140	3	25	
Hexatriacontane (C36)	2.0	0.2	mg/kg wet	2.500		79	40-140	0.8	25	
Nonadecane (C19)	2.3	0.2	mg/kg wet	2.500		90	40-140	2	25	
Nonane (C9)	1.7	0.2	mg/kg wet	2.500		67	30-140	1	25	
Octacosane (C28)	2.0	0.2	mg/kg wet	2.500		81	40-140	0.5	25	
Octadecane (C18)	2.2	0.2	mg/kg wet	2.500		87	40-140	2	25	
Tetracosane (C24)	2.0	0.2	mg/kg wet	2.500		80	40-140	0.06	25	
Tetradecane (C14)	2.1	0.2	mg/kg wet	2.500		83	40-140	3	25	
Total Petroleum Hydrocarbons (C9-C36)	28.6	10.0	mg/kg wet	35.00		82	40-140	0.3	25	
Triacontane (C30)	2.0	0.2	mg/kg wet	2.500		78	40-140	1	25	
<i>Surrogate: O-Terphenyl</i>	<i>4.32</i>		mg/kg wet	<i>5.000</i>		<i>86</i>	<i>40-140</i>			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8100M Total Petroleum Hydrocarbons**

**Batch DI41608 - 3546**

**Blank**

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Hexatriacontane (C36)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons (C9-C36)	ND	10.0	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							

<i>Surrogate: O-Terphenyl</i>	<i>3.93</i>		mg/kg wet	<i>5.000</i>		<i>79</i>	<i>40-140</i>			
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**LCS**

Decane (C10)	1.4	0.2	mg/kg wet	2.500		58	40-140			
Docosane (C22)	1.9	0.2	mg/kg wet	2.500		77	40-140			
Dodecane (C12)	1.6	0.2	mg/kg wet	2.500		63	40-140			
Eicosane (C20)	1.9	0.2	mg/kg wet	2.500		75	40-140			
Hexacosane (C26)	2.0	0.2	mg/kg wet	2.500		81	40-140			
Hexadecane (C16)	1.7	0.2	mg/kg wet	2.500		68	40-140			
Hexatriacontane (C36)	2.2	0.2	mg/kg wet	2.500		87	40-140			
Nonadecane (C19)	2.3	0.2	mg/kg wet	2.500		93	40-140			
Nonane (C9)	1.3	0.2	mg/kg wet	2.500		50	30-140			
Octacosane (C28)	2.0	0.2	mg/kg wet	2.500		79	40-140			
Octadecane (C18)	1.7	0.2	mg/kg wet	2.500		70	40-140			
Tetracosane (C24)	1.9	0.2	mg/kg wet	2.500		74	40-140			
Tetradecane (C14)	1.7	0.2	mg/kg wet	2.500		66	40-140			
Total Petroleum Hydrocarbons (C9-C36)	26.8	10.0	mg/kg wet	35.00		77	40-140			
Triacontane (C30)	1.9	0.2	mg/kg wet	2.500		78	40-140			

<i>Surrogate: O-Terphenyl</i>	<i>3.39</i>		mg/kg wet	<i>5.000</i>		<i>68</i>	<i>40-140</i>			
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**LCS Dup**

Decane (C10)	1.5	0.2	mg/kg wet	2.500		60	40-140	3	25	
Docosane (C22)	2.0	0.2	mg/kg wet	2.500		81	40-140	6	25	
Dodecane (C12)	1.6	0.2	mg/kg wet	2.500		65	40-140	4	25	
Eicosane (C20)	2.0	0.2	mg/kg wet	2.500		79	40-140	5	25	
Hexacosane (C26)	2.2	0.2	mg/kg wet	2.500		87	40-140	7	25	
Hexadecane (C16)	1.8	0.2	mg/kg wet	2.500		73	40-140	7	25	
Hexatriacontane (C36)	2.3	0.2	mg/kg wet	2.500		91	40-140	5	25	

*CERTIFICATE OF ANALYSIS*

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ESS Laboratory Work Order: 24I0467

**Quality Control Data**

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**8100M Total Petroleum Hydrocarbons**

**Batch DI41608 - 3546**

Nonadecane (C19)	2.6	0.2	mg/kg wet	2.500		103	40-140	10	25	
Nonane (C9)	1.3	0.2	mg/kg wet	2.500		52	30-140	4	25	
Octacosane (C28)	2.1	0.2	mg/kg wet	2.500		84	40-140	6	25	
Octadecane (C18)	1.9	0.2	mg/kg wet	2.500		75	40-140	7	25	
Tetracosane (C24)	2.0	0.2	mg/kg wet	2.500		79	40-140	6	25	
Tetradecane (C14)	1.7	0.2	mg/kg wet	2.500		70	40-140	5	25	
Total Petroleum Hydrocarbons (C9-C36)	28.1	10.0	mg/kg wet	35.00		80	40-140	5	25	
Triacontane (C30)	2.1	0.2	mg/kg wet	2.500		82	40-140	5	25	

*Surrogate: O-Terphenyl* 3.46 mg/kg wet 5.000 69 40-140

**Classical Chemistry**

**Batch DI41639 - General Preparation**

<b>Blank</b>										
Total Organic Carbon (1)	ND	500	mg/kg							
Total Organic Carbon (2)	ND	500	mg/kg							
<b>LCS</b>										
Total Organic Carbon (1)	9410	500	mg/kg	10010		94	80-120			
Total Organic Carbon (2)	9680	500	mg/kg	10010		97	80-120			
<b>LCS Dup</b>										
Total Organic Carbon (1)	9360	500	mg/kg	10010		94	80-120	0.5	25	
Total Organic Carbon (2)	9260	500	mg/kg	10010		93	80-120	4	25	

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

**Batch DI41707 - 3540C**

<b>Blank</b>										
BZ#101	ND	0.00027	mg/kg wet							
BZ#101 [2C]	ND	0.00027	mg/kg wet							
BZ#105	ND	0.00027	mg/kg wet							
BZ#105 [2C]	ND	0.00027	mg/kg wet							
BZ#118	ND	0.00027	mg/kg wet							
BZ#118 [2C]	ND	0.00027	mg/kg wet							
BZ#128	ND	0.00027	mg/kg wet							
BZ#128 [2C]	ND	0.00027	mg/kg wet							
BZ#138	ND	0.00027	mg/kg wet							
BZ#138 [2C]	ND	0.00027	mg/kg wet							
BZ#153	ND	0.00027	mg/kg wet							
BZ#153 [2C]	ND	0.00027	mg/kg wet							
BZ#170	ND	0.00027	mg/kg wet							
BZ#170 [2C]	ND	0.00027	mg/kg wet							
BZ#18	ND	0.00027	mg/kg wet							
BZ#18 [2C]	ND	0.00027	mg/kg wet							
BZ#180	ND	0.00027	mg/kg wet							

CERTIFICATE OF ANALYSIS

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 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

Quality Control Data

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8082 Polychlorinated Biphenyls (PCB) / Congeners

Batch DI41707 - 3540C

BZ#180 [2C]	ND	0.00027	mg/kg wet							
BZ#187	ND	0.00027	mg/kg wet							
BZ#187 [2C]	ND	0.00027	mg/kg wet							
BZ#195	ND	0.00027	mg/kg wet							
BZ#195 [2C]	ND	0.00027	mg/kg wet							
BZ#206	ND	0.00027	mg/kg wet							
BZ#206 [2C]	ND	0.00027	mg/kg wet							
BZ#209	ND	0.00027	mg/kg wet							
BZ#209 [2C]	ND	0.00027	mg/kg wet							
BZ#28	ND	0.00027	mg/kg wet							
BZ#28 [2C]	ND	0.00027	mg/kg wet							
BZ#44	ND	0.00027	mg/kg wet							
BZ#44 [2C]	ND	0.00027	mg/kg wet							
BZ#52	ND	0.00027	mg/kg wet							
BZ#52 [2C]	ND	0.00027	mg/kg wet							
BZ#66	ND	0.00027	mg/kg wet							
BZ#66 [2C]	ND	0.00027	mg/kg wet							
BZ#8	ND	0.00027	mg/kg wet							
BZ#8 [2C]	ND	0.00027	mg/kg wet							

Surrogate: Tetrachloro-m-xylene	0.00235		mg/kg wet	0.003333		70	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.00232		mg/kg wet	0.003333		69	30-150			

LCS

BZ#101	0.00242	0.00027	mg/kg wet	0.003333		73	40-140			
BZ#101 [2C]	0.00227	0.00027	mg/kg wet	0.003333		68	40-140			
BZ#105	0.00309	0.00027	mg/kg wet	0.003333		93	40-140			
BZ#105 [2C]	0.00288	0.00027	mg/kg wet	0.003333		86	40-140			
BZ#118	0.00266	0.00027	mg/kg wet	0.003333		80	40-140			
BZ#118 [2C]	0.00263	0.00027	mg/kg wet	0.003333		79	40-140			
BZ#128	0.00277	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#128 [2C]	0.00273	0.00027	mg/kg wet	0.003333		82	40-140			
BZ#138	0.00265	0.00027	mg/kg wet	0.003333		80	40-140			
BZ#138 [2C]	0.00257	0.00027	mg/kg wet	0.003333		77	40-140			
BZ#153	0.00246	0.00027	mg/kg wet	0.003333		74	40-140			
BZ#153 [2C]	0.00242	0.00027	mg/kg wet	0.003333		73	40-140			
BZ#170	0.00300	0.00027	mg/kg wet	0.003333		90	40-140			
BZ#170 [2C]	0.00286	0.00027	mg/kg wet	0.003333		86	40-140			
BZ#18	0.00223	0.00027	mg/kg wet	0.003333		67	40-140			
BZ#18 [2C]	0.00212	0.00027	mg/kg wet	0.003333		64	40-140			
BZ#180	0.00276	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#180 [2C]	0.00272	0.00027	mg/kg wet	0.003333		81	40-140			
BZ#187	0.00245	0.00027	mg/kg wet	0.003333		74	40-140			
BZ#187 [2C]	0.00240	0.00027	mg/kg wet	0.003333		72	40-140			
BZ#195	0.00289	0.00027	mg/kg wet	0.003333		87	40-140			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8082 Polychlorinated Biphenyls (PCB) / Congeners**

**Batch DI41707 - 3540C**

BZ#195 [2C]	0.00285	0.00027	mg/kg wet	0.003333		86	40-140			
BZ#206	0.00306	0.00027	mg/kg wet	0.003333		92	40-140			
BZ#206 [2C]	0.00298	0.00027	mg/kg wet	0.003333		89	40-140			
BZ#209	0.00287	0.00027	mg/kg wet	0.003333		86	40-140			
BZ#209 [2C]	0.00271	0.00027	mg/kg wet	0.003333		81	40-140			
BZ#28	0.00252	0.00027	mg/kg wet	0.003333		76	40-140			
BZ#28 [2C]	0.00261	0.00027	mg/kg wet	0.003333		78	40-140			
BZ#44	0.00236	0.00027	mg/kg wet	0.003333		71	40-140			
BZ#44 [2C]	0.00229	0.00027	mg/kg wet	0.003333		69	40-140			
BZ#52	0.00229	0.00027	mg/kg wet	0.003333		69	40-140			
BZ#52 [2C]	0.00263	0.00027	mg/kg wet	0.003333		79	40-140			
BZ#66	0.00271	0.00027	mg/kg wet	0.003333		81	40-140			
BZ#66 [2C]	0.00249	0.00027	mg/kg wet	0.003333		75	40-140			
BZ#8	0.00244	0.00027	mg/kg wet	0.003333		73	40-140			
BZ#8 [2C]	0.00217	0.00027	mg/kg wet	0.003333		65	40-140			

<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00242</i>		mg/kg wet	<i>0.003333</i>		<i>72</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00236</i>		mg/kg wet	<i>0.003333</i>		<i>71</i>	<i>30-150</i>			

**LCS Dup**

BZ#101	0.00242	0.00027	mg/kg wet	0.003333		73	40-140	0.09	30	
BZ#101 [2C]	0.00228	0.00027	mg/kg wet	0.003333		68	40-140	0.5	30	
BZ#105	0.00306	0.00027	mg/kg wet	0.003333		92	40-140	0.7	30	
BZ#105 [2C]	0.00286	0.00027	mg/kg wet	0.003333		86	40-140	0.7	30	
BZ#118	0.00266	0.00027	mg/kg wet	0.003333		80	40-140	0.1	30	
BZ#118 [2C]	0.00259	0.00027	mg/kg wet	0.003333		78	40-140	1	30	
BZ#128	0.00276	0.00027	mg/kg wet	0.003333		83	40-140	0.6	30	
BZ#128 [2C]	0.00272	0.00027	mg/kg wet	0.003333		82	40-140	0.3	30	
BZ#138	0.00265	0.00027	mg/kg wet	0.003333		79	40-140	0.2	30	
BZ#138 [2C]	0.00257	0.00027	mg/kg wet	0.003333		77	40-140	0.03	30	
BZ#153	0.00247	0.00027	mg/kg wet	0.003333		74	40-140	0.3	30	
BZ#153 [2C]	0.00244	0.00027	mg/kg wet	0.003333		73	40-140	0.5	30	
BZ#170	0.00297	0.00027	mg/kg wet	0.003333		89	40-140	0.9	30	
BZ#170 [2C]	0.00285	0.00027	mg/kg wet	0.003333		85	40-140	0.5	30	
BZ#18	0.00225	0.00027	mg/kg wet	0.003333		67	40-140	0.9	30	
BZ#18 [2C]	0.00212	0.00027	mg/kg wet	0.003333		64	40-140	0.2	30	
BZ#180	0.00276	0.00027	mg/kg wet	0.003333		83	40-140	0.06	30	
BZ#180 [2C]	0.00271	0.00027	mg/kg wet	0.003333		81	40-140	0.3	30	
BZ#187	0.00247	0.00027	mg/kg wet	0.003333		74	40-140	0.8	30	
BZ#187 [2C]	0.00242	0.00027	mg/kg wet	0.003333		73	40-140	0.7	30	
BZ#195	0.00289	0.00027	mg/kg wet	0.003333		87	40-140	0.2	30	
BZ#195 [2C]	0.00284	0.00027	mg/kg wet	0.003333		85	40-140	0.5	30	
BZ#206	0.00301	0.00027	mg/kg wet	0.003333		90	40-140	1	30	
BZ#206 [2C]	0.00293	0.00027	mg/kg wet	0.003333		88	40-140	2	30	
BZ#209	0.00286	0.00027	mg/kg wet	0.003333		86	40-140	0.3	30	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8082 Polychlorinated Biphenyls (PCB) / Congeners</b>										
<b>Batch DI41707 - 3540C</b>										
BZ#209 [2C]	0.00272	0.00027	mg/kg wet	0.003333		82	40-140	0.2	30	
BZ#28	0.00256	0.00027	mg/kg wet	0.003333		77	40-140	2	30	
BZ#28 [2C]	0.00258	0.00027	mg/kg wet	0.003333		77	40-140	1	30	
BZ#44	0.00237	0.00027	mg/kg wet	0.003333		71	40-140	0.3	30	
BZ#44 [2C]	0.00230	0.00027	mg/kg wet	0.003333		69	40-140	0.3	30	
BZ#52	0.00229	0.00027	mg/kg wet	0.003333		69	40-140	0.1	30	
BZ#52 [2C]	0.00266	0.00027	mg/kg wet	0.003333		80	40-140	0.8	30	
BZ#66	0.00270	0.00027	mg/kg wet	0.003333		81	40-140	0.5	30	
BZ#66 [2C]	0.00243	0.00027	mg/kg wet	0.003333		73	40-140	2	30	
BZ#8	0.00244	0.00027	mg/kg wet	0.003333		73	40-140	0.1	30	
BZ#8 [2C]	0.00218	0.00027	mg/kg wet	0.003333		65	40-140	0.8	30	
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00236</i>		mg/kg wet	<i>0.003333</i>		<i>71</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00232</i>		mg/kg wet	<i>0.003333</i>		<i>70</i>	<i>30-150</i>			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**Notes and Definitions**

Z-08	See Attached
U	Analyte included in the analysis, but not detected
S+	Surrogate recovery(ies) above upper control limit (S+).
Q	Calibration required quadratic regression (Q).
P	Percent difference between primary and confirmation results exceeds 40% (P).
LC	Lower value is used due to matrix interferences (LC).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too numerous to Count
CFU	Colony Forming Units



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0467

**ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS**

**ENVIRONMENTAL**

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/OutOfStateCommercialLaboratories.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutOfStateCommercialLaboratories.pdf)

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

[http://datamine2.state.nj.us/DEP\\_OPR/OpraMain/pi\\_main?mode=pi\\_by\\_site&sort\\_order=PI\\_NAMEA&Select+a+Site:=58715](http://datamine2.state.nj.us/DEP_OPR/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715)

Pennsylvania: 68-01752

<http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

# ANALYTICAL REPORT

## PREPARED FOR

Attn: ESS ProjectManagement  
ESS Laboratory  
185 Frances Ave  
Cranston, Rhode Island 02910

Generated 9/30/2024 12:10:23 PM

## JOB DESCRIPTION

24I0467

## JOB NUMBER

410-188546-1

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

## Authorization



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Authorized for release by  
Nicole Brown, Project Manager  
[Nicole.Brown@et.eurofinsus.com](mailto:Nicole.Brown@et.eurofinsus.com)  
(717)471-3265

## Compliance Statement

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

This report shall not be reproduced except in full, without the written approval of the laboratory.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied, except as otherwise agreed. We disclaim any other warranties, expressed or implied, including a warranty of fitness for particular purpose and warranty of merchantability. In no event shall Eurofins Lancaster Laboratories Environmental, LLC be liable for indirect, special, consequential, or incidental damages including, but not limited to, damages for loss of profit or goodwill regardless of (A) the negligence (either sole or concurrent) of Eurofins Lancaster Laboratories Environmental and (B) whether Eurofins Lancaster Laboratories Environmental has been informed of the possibility of such damages. We accept no legal responsibility for the purposes for which the client uses the test results. Except as otherwise agreed, no purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.



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## Definitions/Glossary

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: ESS Laboratory  
Project: 2410467

Job ID: 410-188546-1

**Job ID: 410-188546-1**

**Eurofins Lancaster Laboratories Environment**

## **Job Narrative 410-188546-1**

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

### **Receipt**

The samples were received on 9/18/2024 8:40 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.1°C.

### **LCMS**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

### **General Chemistry**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# Detection Summary

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

**Client Sample ID: 24I0467-01**

**Lab Sample ID: 410-188546-1**

No Detections.

**Client Sample ID: 24I0467-02**

**Lab Sample ID: 410-188546-2**

No Detections.

**Client Sample ID: 24I0467-03**

**Lab Sample ID: 410-188546-3**

No Detections.

**Client Sample ID: 24I0467-04**

**Lab Sample ID: 410-188546-4**

No Detections.

**Client Sample ID: 24I0467-05**

**Lab Sample ID: 410-188546-5**

No Detections.

**Client Sample ID: 24I0467-06**

**Lab Sample ID: 410-188546-6**

No Detections.

**Client Sample ID: 24I0467-07**

**Lab Sample ID: 410-188546-7**

No Detections.

**Client Sample ID: 24I0467-08**

**Lab Sample ID: 410-188546-8**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Environment Testing, LLC





# Client Sample Results

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

**Client Sample ID: 24I0467-01**

**Lab Sample ID: 410-188546-1**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	6.3		1.0		%			09/19/24 07:14	1
Percent Solids (EPA Moisture)	93.7		1.0		%			09/19/24 07:14	1

**Client Sample ID: 24I0467-01**

**Lab Sample ID: 410-188546-1**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 93.7

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0045		ppm	☼	09/19/24 11:12	09/27/24 17:17	1

**Client Sample ID: 24I0467-02**

**Lab Sample ID: 410-188546-2**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	11.3		1.0		%			09/19/24 07:14	1
Percent Solids (EPA Moisture)	88.7		1.0		%			09/19/24 07:14	1

**Client Sample ID: 24I0467-02**

**Lab Sample ID: 410-188546-2**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 88.7

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0055		ppm	☼	09/19/24 11:12	09/27/24 17:27	1

**Client Sample ID: 24I0467-03**

**Lab Sample ID: 410-188546-3**

Date Collected: 09/11/24 15:00

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	49.3		1.0		%			09/19/24 07:14	1
Percent Solids (EPA Moisture)	50.7		1.0		%			09/19/24 07:14	1

**Client Sample ID: 24I0467-03**

**Lab Sample ID: 410-188546-3**

Date Collected: 09/11/24 15:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 50.7

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0096		ppm	☼	09/19/24 11:12	09/27/24 17:38	1

**Client Sample ID: 24I0467-04**

**Lab Sample ID: 410-188546-4**

Date Collected: 09/11/24 11:30

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	13.7		1.0		%			09/19/24 07:14	1

# Client Sample Results

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

**Client Sample ID: 24I0467-04**

**Lab Sample ID: 410-188546-4**

Date Collected: 09/11/24 11:30

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (EPA Moisture)	86.3		1.0		%			09/19/24 07:14	1

**Client Sample ID: 24I0467-04**

**Lab Sample ID: 410-188546-4**

Date Collected: 09/11/24 11:30

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 86.3

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0054		ppm	☼	09/19/24 11:12	09/27/24 17:48	1

**Client Sample ID: 24I0467-05**

**Lab Sample ID: 410-188546-5**

Date Collected: 09/11/24 12:30

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	13.6		1.0		%			09/19/24 07:14	1
Percent Solids (EPA Moisture)	86.4		1.0		%			09/19/24 07:14	1

**Client Sample ID: 24I0467-05**

**Lab Sample ID: 410-188546-5**

Date Collected: 09/11/24 12:30

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 86.4

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0057		ppm	☼	09/19/24 11:12	09/27/24 18:09	1

**Client Sample ID: 24I0467-06**

**Lab Sample ID: 410-188546-6**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	10.5		1.0		%			09/19/24 07:14	1
Percent Solids (EPA Moisture)	89.5		1.0		%			09/19/24 07:14	1

**Client Sample ID: 24I0467-06**

**Lab Sample ID: 410-188546-6**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 89.5

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0045		ppm	☼	09/19/24 11:12	09/27/24 18:19	1

**Client Sample ID: 24I0467-07**

**Lab Sample ID: 410-188546-7**

Date Collected: 09/11/24 13:30

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	23.9		1.0		%			09/19/24 07:14	1
Percent Solids (EPA Moisture)	76.1		1.0		%			09/19/24 07:14	1

# Client Sample Results

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

**Client Sample ID: 24I0467-07**

**Lab Sample ID: 410-188546-7**

Date Collected: 09/11/24 13:30

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 76.1

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0060		ppm	☼	09/19/24 11:12	09/27/24 18:30	1

**Client Sample ID: 24I0467-08**

**Lab Sample ID: 410-188546-8**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	14.4		1.0		%			09/19/24 07:14	1
Percent Solids (EPA Moisture)	85.6		1.0		%			09/19/24 07:14	1

**Client Sample ID: 24I0467-08**

**Lab Sample ID: 410-188546-8**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 85.6

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0054		ppm	☼	09/19/24 11:12	09/27/24 18:40	1

# QC Sample Results

Client: ESS Laboratory  
Project/Site: 2410467

Job ID: 410-188546-1

## Method: 6850 - Perchlorate by LC/MS or LC/MS/MS

**Lab Sample ID: MB 410-553278/1-A**  
**Matrix: Solid**  
**Analysis Batch: 554975**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 553278**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0050		ppm		09/19/24 11:12	09/27/24 16:35	1

**Lab Sample ID: LCS 410-553278/2-A**  
**Matrix: Solid**  
**Analysis Batch: 554975**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 553278**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perchlorate	0.0100	0.00983		ppm		98	80 - 120

**Lab Sample ID: LCSD 410-553278/3-A**  
**Matrix: Solid**  
**Analysis Batch: 554975**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 553278**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perchlorate	0.0100	0.00964		ppm		96	80 - 120	2	15

# QC Association Summary

Client: ESS Laboratory  
Project/Site: 2410467

Job ID: 410-188546-1

## LCMS

### Prep Batch: 553278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-188546-1	2410467-01	Total/NA	Solid	6850	
410-188546-2	2410467-02	Total/NA	Solid	6850	
410-188546-3	2410467-03	Total/NA	Solid	6850	
410-188546-4	2410467-04	Total/NA	Solid	6850	
410-188546-5	2410467-05	Total/NA	Solid	6850	
410-188546-6	2410467-06	Total/NA	Solid	6850	
410-188546-7	2410467-07	Total/NA	Solid	6850	
410-188546-8	2410467-08	Total/NA	Solid	6850	
MB 410-553278/1-A	Method Blank	Total/NA	Solid	6850	
LCS 410-553278/2-A	Lab Control Sample	Total/NA	Solid	6850	
LCSD 410-553278/3-A	Lab Control Sample Dup	Total/NA	Solid	6850	

### Analysis Batch: 554975

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-188546-1	2410467-01	Total/NA	Solid	6850	553278
410-188546-2	2410467-02	Total/NA	Solid	6850	553278
410-188546-3	2410467-03	Total/NA	Solid	6850	553278
410-188546-4	2410467-04	Total/NA	Solid	6850	553278
410-188546-5	2410467-05	Total/NA	Solid	6850	553278
410-188546-6	2410467-06	Total/NA	Solid	6850	553278
410-188546-7	2410467-07	Total/NA	Solid	6850	553278
410-188546-8	2410467-08	Total/NA	Solid	6850	553278
MB 410-553278/1-A	Method Blank	Total/NA	Solid	6850	553278
LCS 410-553278/2-A	Lab Control Sample	Total/NA	Solid	6850	553278
LCSD 410-553278/3-A	Lab Control Sample Dup	Total/NA	Solid	6850	553278

## General Chemistry

### Analysis Batch: 553102

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-188546-1	2410467-01	Total/NA	Solid	Moisture	
410-188546-2	2410467-02	Total/NA	Solid	Moisture	
410-188546-3	2410467-03	Total/NA	Solid	Moisture	
410-188546-4	2410467-04	Total/NA	Solid	Moisture	
410-188546-5	2410467-05	Total/NA	Solid	Moisture	
410-188546-6	2410467-06	Total/NA	Solid	Moisture	
410-188546-7	2410467-07	Total/NA	Solid	Moisture	
410-188546-8	2410467-08	Total/NA	Solid	Moisture	

# Lab Chronicle

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

**Client Sample ID: 24I0467-01**

**Lab Sample ID: 410-188546-1**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

**Client Sample ID: 24I0467-01**

**Lab Sample ID: 410-188546-1**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 93.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 17:17

**Client Sample ID: 24I0467-02**

**Lab Sample ID: 410-188546-2**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

**Client Sample ID: 24I0467-02**

**Lab Sample ID: 410-188546-2**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 88.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 17:27

**Client Sample ID: 24I0467-03**

**Lab Sample ID: 410-188546-3**

Date Collected: 09/11/24 15:00

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

**Client Sample ID: 24I0467-03**

**Lab Sample ID: 410-188546-3**

Date Collected: 09/11/24 15:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 50.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 17:38

**Client Sample ID: 24I0467-04**

**Lab Sample ID: 410-188546-4**

Date Collected: 09/11/24 11:30

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

# Lab Chronicle

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

**Client Sample ID: 24I0467-04**

**Lab Sample ID: 410-188546-4**

Date Collected: 09/11/24 11:30

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 86.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 17:48

**Client Sample ID: 24I0467-05**

**Lab Sample ID: 410-188546-5**

Date Collected: 09/11/24 12:30

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

**Client Sample ID: 24I0467-05**

**Lab Sample ID: 410-188546-5**

Date Collected: 09/11/24 12:30

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 86.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 18:09

**Client Sample ID: 24I0467-06**

**Lab Sample ID: 410-188546-6**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

**Client Sample ID: 24I0467-06**

**Lab Sample ID: 410-188546-6**

Date Collected: 09/11/24 13:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 89.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 18:19

**Client Sample ID: 24I0467-07**

**Lab Sample ID: 410-188546-7**

Date Collected: 09/11/24 13:30

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

# Lab Chronicle

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

**Client Sample ID: 24I0467-07**

**Lab Sample ID: 410-188546-7**

Date Collected: 09/11/24 13:30

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 76.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 18:30

**Client Sample ID: 24I0467-08**

**Lab Sample ID: 410-188546-8**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	553102	E5GC	ELLE	09/19/24 07:14

**Client Sample ID: 24I0467-08**

**Lab Sample ID: 410-188546-8**

Date Collected: 09/11/24 14:00

Matrix: Solid

Date Received: 09/18/24 08:40

Percent Solids: 85.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			553278	VVE5	ELLE	09/19/24 11:12
Total/NA	Analysis	6850		1	554975	VVE5	ELLE	09/27/24 18:40

**Laboratory References:**

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300



# Accreditation/Certification Summary

Client: ESS Laboratory  
Project/Site: 2410467

Job ID: 410-188546-1

## Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Rhode Island	State	LAO00338	12-30-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6850	6850	Solid	Perchlorate
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids



# Method Summary

Client: ESS Laboratory  
Project/Site: 2410467

Job ID: 410-188546-1

Method	Method Description	Protocol	Laboratory
6850	Perchlorate by LC/MS or LC/MS/MS	EPA	ELLE
Moisture	Percent Moisture	EPA	ELLE
6850	Shake Extraction with Ultrasonic Bath Extraction	SW846	ELLE

**Protocol References:**

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300



# Sample Summary

Client: ESS Laboratory  
Project/Site: 24I0467

Job ID: 410-188546-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
410-188546-1	24I0467-01	Solid	09/11/24 13:00	09/18/24 08:40
410-188546-2	24I0467-02	Solid	09/11/24 14:00	09/18/24 08:40
410-188546-3	24I0467-03	Solid	09/11/24 15:00	09/18/24 08:40
410-188546-4	24I0467-04	Solid	09/11/24 11:30	09/18/24 08:40
410-188546-5	24I0467-05	Solid	09/11/24 12:30	09/18/24 08:40
410-188546-6	24I0467-06	Solid	09/11/24 13:00	09/18/24 08:40
410-188546-7	24I0467-07	Solid	09/11/24 13:30	09/18/24 08:40
410-188546-8	24I0467-08	Solid	09/11/24 14:00	09/18/24 08:40

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2410467

### SENDING LABORATORY

ESS Laboratory  
185 Frances Avenue  
Cranston, RI 02910  
Phone: (401) 461-7181

### RECEIVING LABORATORY

Lancaster Laboratories, Inc.  
2425 New Holland Pike  
Lancaster, PA 17601  
Phone: (717) 656-2300



### PROJECT NOTES

**Project Name:** 2410467      **Project Location:** MA  
**Project PO Number:** 16041L      **Due Date:** Standard  
**Send Report To:** smorrell@thielsch.com; MDean@thielsch.com; ESSProjectManagement@thielsch.com

**Sample ID:** 2410467-01      **Sampled:** 09/11/24 13:00  
**Sample Matrix:** Soil      **Sample Type:** Composite  
**Sampled By:** Client  
**Container - Preservation:** 1 x 4 oz. Jar - Unpres      **Hold Time Expires:** 10/9/2024  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

~~**Container - Preservation:** 1 x 8 oz. Jar - Unpres      **Hold Time Expires:** 10/9/2024  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A~~

**Sample ID:** 2410467-02      **Sampled:** 09/11/24 14:00  
**Sample Matrix:** Soil      **Sample Type:** Composite  
**Sampled By:** Client  
**Container - Preservation:** 1 x 4 oz. Jar - Unpres      **Hold Time Expires:** 10/9/2024  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

~~**Container - Preservation:** 1 x 8 oz. Jar - Unpres      **Hold Time Expires:** 10/9/2024  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A~~

R: 3.3  
C: 3.1

Released By	Date	Received By	Date
			9/18/24 0840
Released By	Date	Received By	Date

HA

2410467

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Sample ID: 2410467-03

Sampled: 09/11/24 15:00

Sample Matrix: Soil

Sample Type: Composite

Sampled By: Client

Container - Preservation: 1 x 4 oz. Jar - Unpres

Hold Time Expires 10/9/2024

Analysis Perchlorate

Analysis Comments: N/A

~~Container - Preservation: 1 x 8 oz. Jar - Unpres~~

~~Hold Time Expires 10/9/2024~~

~~Analysis Perchlorate~~

~~Analysis Comments: N/A~~

Sample ID: 2410467-04

Sampled: 09/11/24 11:30

Sample Matrix: Soil

Sample Type: Grab

Sampled By: Client

Container - Preservation: 1 x 4 oz. Jar - Unpres

Hold Time Expires 10/9/2024

Analysis Perchlorate

Analysis Comments: N/A

~~Container - Preservation: 1 x 8 oz. Jar - Unpres~~

~~Hold Time Expires 10/9/2024~~

~~Analysis Perchlorate~~

~~Analysis Comments: N/A~~

Sample ID: 2410467-05

Sampled: 09/11/24 12:30

Sample Matrix: Soil

Sample Type: Composite

Sampled By: Client

Container - Preservation: 1 x 4 oz. Jar - Unpres

Hold Time Expires 10/9/2024

Analysis Perchlorate

Analysis Comments: N/A

~~Container - Preservation: 1 x 8 oz. Jar - Unpres~~

~~Hold Time Expires 10/9/2024~~

~~Analysis Perchlorate~~

~~Analysis Comments: N/A~~

Sample ID: 2410467-06

Sampled: 09/11/24 13:00

Sample Matrix: Soil

Sample Type: Composite

Sampled By: Client

D: 3.3  
C: 3.1

Released By	Date	Received By	Date
<i>[Signature]</i>		<i>[Signature]</i>	9/18/24 0840
Released By	Date	Received By	Date
<i>[Signature]</i>		<i>[Signature]</i>	

*LAA*

2410467

Container - Preservation: 1 x 4 oz. Jar - Unpres Hold Time Expires 10/9/2024  
 Analysis Perchlorate  
 Analysis Comments: N/A

~~Container - Preservation: 1 x 8 oz. Jar - Unpres Hold Time Expires 10/9/2024  
 Analysis Perchlorate  
 Analysis Comments: N/A~~

Sample ID: 2410467-07 Sampled: 09/11/24 13:30  
 Sample Matrix: Soil Sample Type: Composite  
Sampled By: Client

Container - Preservation: 1 x 4 oz. Jar - Unpres Hold Time Expires 10/9/2024  
 Analysis Perchlorate  
 Analysis Comments: N/A

~~Container - Preservation: 1 x 8 oz. Jar - Unpres Hold Time Expires 10/9/2024  
 Analysis Perchlorate  
 Analysis Comments: N/A~~

Sample ID: 2410467-08 Sampled: 09/11/24 14:00  
 Sample Matrix: Soil Sample Type: Composite  
Sampled By: Client

Container - Preservation: 1 x 4 oz. Jar - Unpres Hold Time Expires 10/9/2024  
 Analysis Perchlorate  
 Analysis Comments: N/A

~~Container - Preservation: 1 x 8 oz. Jar - Unpres Hold Time Expires 10/9/2024  
 Analysis Perchlorate  
 Analysis Comments: N/A~~

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*[Handwritten Signature]*

R: 3.3  
 C: 3.1

	Date	Received By	Date
<i>[Signature]</i>		<i>[Signature]</i>	9/18/24 0840
	Date	Received By	Date
<i>[Signature]</i>		<i>[Signature]</i>	

*[Handwritten Initials]*

## Login Sample Receipt Checklist

Client: ESS Laboratory

Job Number: 410-188546-1

**Login Number: 188546**

**List Source: Eurofins Lancaster Laboratories Environment Testing, LLC**

**List Number: 1**

**Creator: Arroyo, Haley**

Question	Answer	Comment
The cooler's custody seal is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature acceptable, where thermal pres is required (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temp acceptable, where thermal pres is required (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	



195 Frances Avenue  
 Cranston RI, 02910  
 Phone: (401)-467-6454  
 Fax: (401)-467-2398  
[cts.thielsch.com](http://cts.thielsch.com)  
*Let's Build a Solid Foundation*

Client Information:  
 Horsley Witten Group  
 Sandwich, MA  
 Project Manager: Neal Price  
 Assigned By: ESS Laboratory  
 Collected By: Caroline Gran

Project Information:  
 Ipswich River  
 Ipswich, MA  
 Project Number: 2410467  
 Summary Page: 1 of 1  
 Report Date: 9/19/2024

**LABORATORY TESTING DATA SHEET, Report No.: 7424-J-221**

Material Source	Sample ID	Depth (ft)	Laboratory No.	Identification Tests										Proctor / CBR / Permeability Tests							Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Organic Content %	pH	9 <sub>d</sub> MAX (pcf) W <sub>opt</sub> (%)	9 <sub>d</sub> MAX (pcf) W <sub>opt</sub> (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318			D6913			D2974	D4792	D1557								
Sediment	IR-DS-1		2410467-01	21.4				55.7	36.8	7.5	0.6										Grey well-graded gravel with silt and sand
Sediment	IR-DS-2		2410467-02	19.2				51.0	48.8	0.2	1.3										Dark Brown poorly graded gravel with sand
Sediment	IR-DS-3		2410467-03	62.3				17.1	80.9	2.0	3.4										Dark Brown well-graded sand with gravel
Sediment	IR-US-1		2410467-04	16.3				52.3	47.5	0.2	0.8										Dark Brown poorly graded gravel with sand
Sediment	IR-US-2		2410467-05	22.8				46.5	53.4	0.1	0.4										Dark Brown poorly graded sand with gravel
Sediment	IR-US-3		2410467-06	24.7				58.4	32.1	9.5	0.7										Grey poorly graded gravel with silt and sand
Sediment	IR-US-4		2410467-07	19.5				57.3	33.3	9.4	0.6										Dark Brown poorly graded gravel with silt and sand
Sediment	IR-US-5		2410467-08	14.5				57.4	34.7	7.9	0.5										Grey poorly graded gravel with silt and sand

Organic Content tested by RB 9-19-24.

Date Received: 9/16/2024

Reviewed By: 

Date Reviewed: 9/19/2024

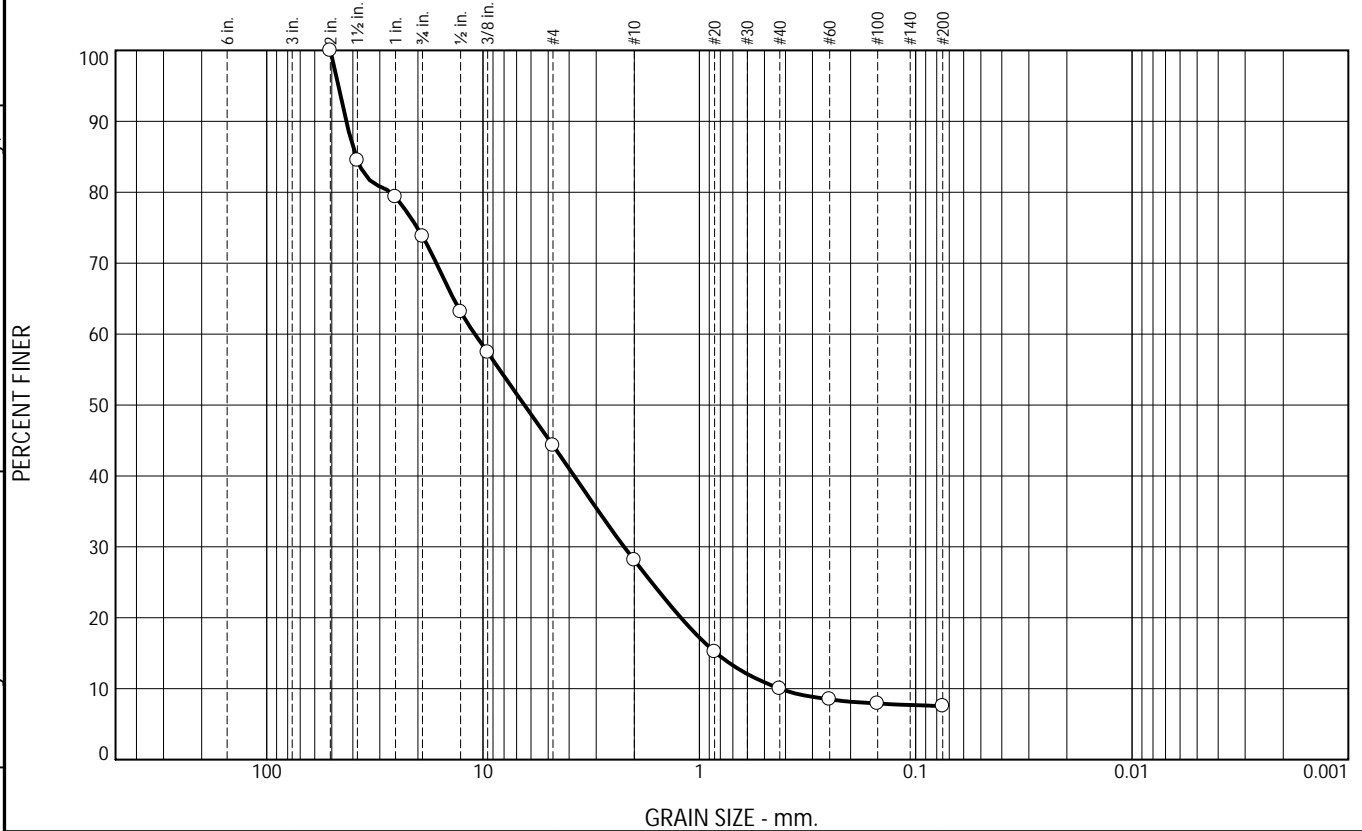
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This report shall not be reproduced, except in full, without prior written approval from the Agency, as defined in ASTM E329.



These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspected and/or tested. No warranty, expressed or implied, is made.

## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.2	29.5	16.2	18.1	2.5	7.5	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100.0		
1 1/2"	84.5		
1"	79.3		
3/4"	73.8		
1/2"	63.2		
3/8"	57.4		
#4	44.3		
#10	28.1		
#20	15.2		
#40	10.0		
#60	8.5		
#100	7.9		
#200	7.5		

\* (no specification provided)

Soil Description

Grey well-graded gravel with silt and sand

Atterberg Limits  
 PL= NP      LL= NV      PI= NP

Coefficients  
 D<sub>90</sub>= 42.8564    D<sub>85</sub>= 38.6334    D<sub>60</sub>= 10.9071  
 D<sub>50</sub>= 6.4380      D<sub>30</sub>= 2.2295      D<sub>15</sub>= 0.8347  
 D<sub>10</sub>= 0.4242      C<sub>u</sub>= 25.71        C<sub>c</sub>= 1.07

Classification  
 USCS= GW-GM      AASHTO= A-1-a

Remarks

Source of Sample: Sediment      Depth: -  
 Sample Number: IR-DS-1

Date: 9.19.24

**Thielsch Engineering Inc.**

**Cranston, RI**

Client: ESS Laboratory  
 Project: Ipswich River  
 Ipswich, MA  
 Project No: 24I0467

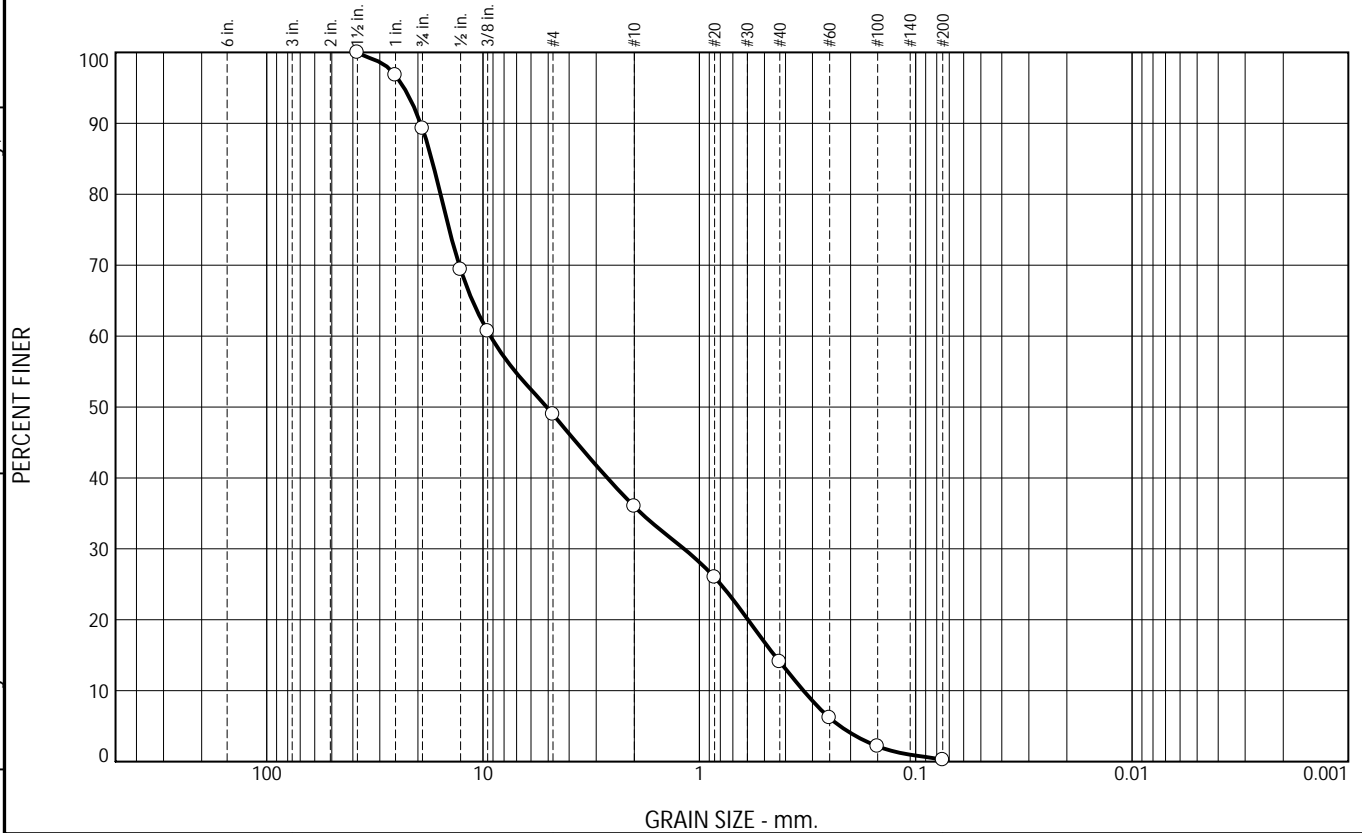
Fig. 24I0467-01

Tested By: MCS/SBR

Checked By: Kris Roland

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspected and/or tested. No warranty, expressed or implied, is made.

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.7	40.3	13.0	21.9	13.9	0.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	96.8		
3/4"	89.3		
1/2"	69.4		
3/8"	60.7		
#4	49.0		
#10	36.0		
#20	26.0		
#40	14.1		
#60	6.2		
#100	2.2		
#200	0.2		

Soil Description

Dark Brown poorly graded gravel with sand

Atterberg Limits  
 PL= NP      LL= NV      PI= NP

Coefficients  
 D<sub>90</sub>= 19.4359      D<sub>85</sub>= 17.2936      D<sub>60</sub>= 9.2429  
 D<sub>50</sub>= 5.0814      D<sub>30</sub>= 1.1777      D<sub>15</sub>= 0.4500  
 D<sub>10</sub>= 0.3302      C<sub>u</sub>= 27.99      C<sub>c</sub>= 0.45

Classification  
 USCS= GP      AASHTO= A-1-a

Remarks

\* (no specification provided)

Source of Sample: Sediment      Depth: -  
 Sample Number: IR-DS-2

Date: 9.19.24

<b>Thielsch Engineering Inc.</b>  Cranston, RI	Client: ESS Laboratory Project: Ipswich River Ipswich, MA Project No: 24I0467
Fig. 24I0467-02	

Tested By: MCS/SBR      Checked By: Kris Roland

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## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.2	16.9	10.6	39.1	31.2	2.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	99.8		
3/4"	99.8		
1/2"	92.7		
3/8"	91.2		
#4	82.9		
#10	72.3		
#20	54.6		
#40	33.2		
#60	21.9		
#100	12.9		
#200	2.0		

\* (no specification provided)

Soil Description

Dark Brown well-graded sand with gravel

Atterberg Limits  
 PL= NP      LL= NV      PI= NP

Coefficients  
 D<sub>90</sub>= 8.4144      D<sub>85</sub>= 5.6081      D<sub>60</sub>= 1.0615  
 D<sub>50</sub>= 0.7241      D<sub>30</sub>= 0.3727      D<sub>15</sub>= 0.1699  
 D<sub>10</sub>= 0.1253      C<sub>u</sub>= 8.47      C<sub>c</sub>= 1.04

Classification  
 USCS= SW      AASHTO= A-1-b

Remarks

Source of Sample: Sediment      Depth: -  
 Sample Number: IR-DS-3

Date: 9.19.24

**Thielsch Engineering Inc.**

**Cranston, RI**

Client: ESS Laboratory  
 Project: Ipswich River  
 Ipswich, MA  
 Project No: 24I0467

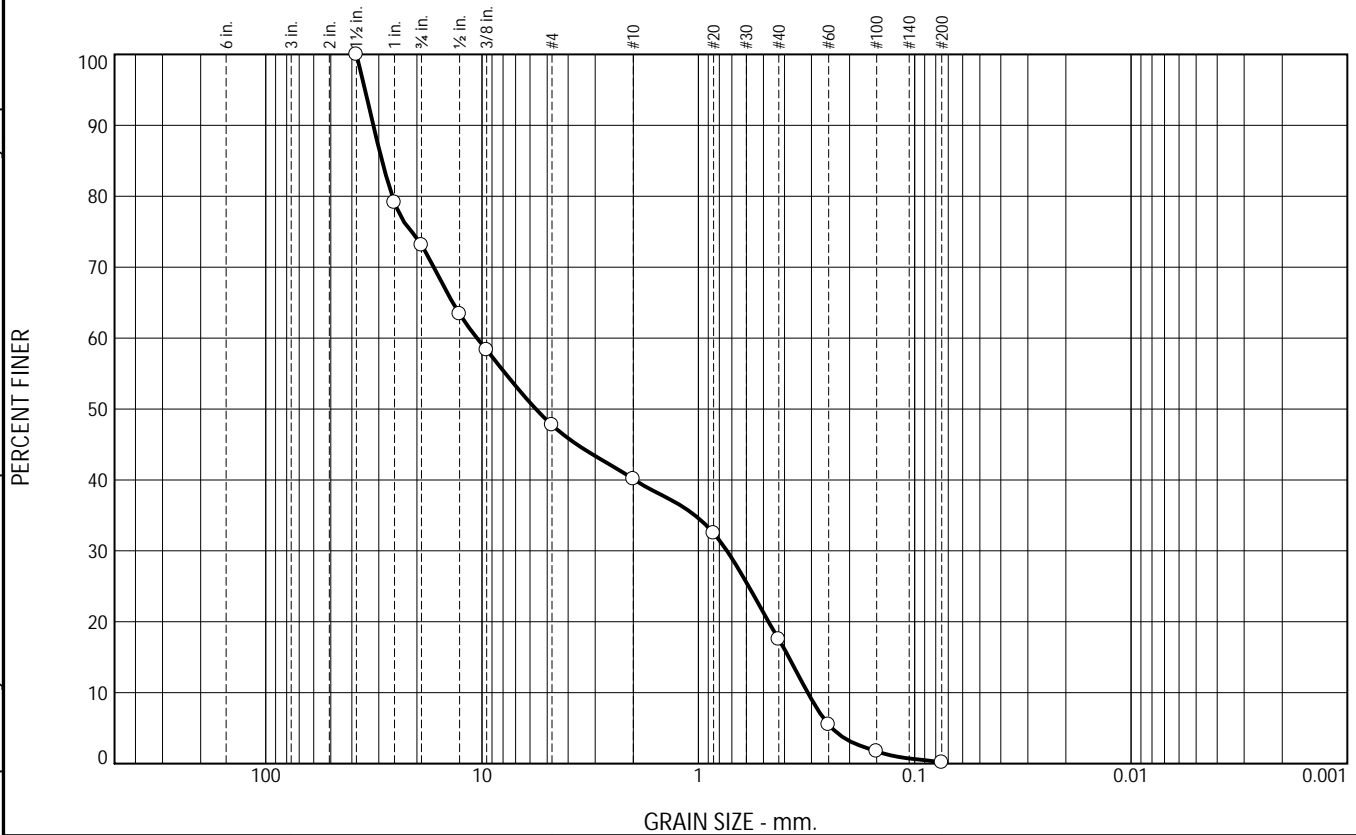
Fig. 24I0467-03

Tested By: MCS/SBR

Checked By: Kris Roland

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## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.9	25.4	7.6	22.6	17.3	0.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	79.1		
3/4"	73.1		
1/2"	63.4		
3/8"	58.3		
#4	47.7		
#10	40.1		
#20	32.5		
#40	17.5		
#60	5.5		
#100	1.7		
#200	0.2		

Soil Description

Dark Brown poorly graded gravel with sand

Atterberg Limits  
 PL= NP      LL= NV      PI= NP

Coefficients  
 D<sub>90</sub>= 31.7990      D<sub>85</sub>= 28.9908      D<sub>60</sub>= 10.5460  
 D<sub>50</sub>= 5.6398      D<sub>30</sub>= 0.7375      D<sub>15</sub>= 0.3820  
 D<sub>10</sub>= 0.3124      C<sub>u</sub>= 33.76      C<sub>c</sub>= 0.17

Classification  
 USCS= GP      AASHTO= A-1-a

Remarks

\* (no specification provided)

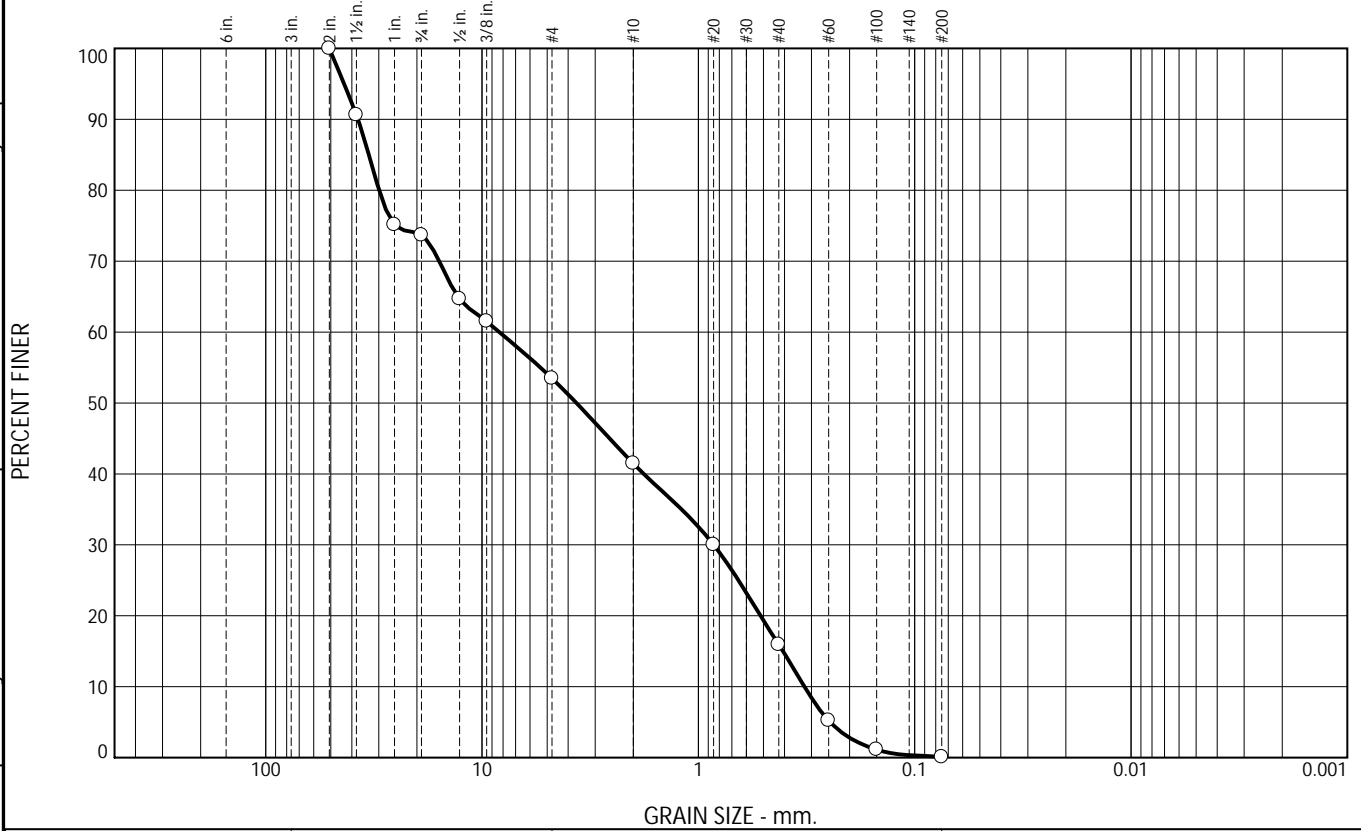
Source of Sample: Sediment      Depth: -      Date: 9.19.24  
 Sample Number: IR-US-1

<b>Thielsch Engineering Inc.</b>  Cranston, RI	Client: ESS Laboratory Project: Ipswich River Ipswich, MA Project No: 24I0467
Fig. 24I0467-04	

Tested By: MCS/SBR      Checked By: Kris Roland

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## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.3	20.2	12.0	25.6	15.8	0.1	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100.0		
1 1/2"	90.6		
1"	75.1		
3/4"	73.7		
1/2"	64.7		
3/8"	61.5		
#4	53.5		
#10	41.5		
#20	30.0		
#40	15.9		
#60	5.2		
#100	1.1		
#200	0.1		

Soil Description

Dark Brown poorly graded sand with gravel

PL= NP	<u>Atterberg Limits</u> LL= NV	PI= NP
--------	-----------------------------------	--------

<u>Coefficients</u>		
D <sub>90</sub> = 37.4422	D <sub>85</sub> = 33.3708	D <sub>60</sub> = 8.3224
D <sub>50</sub> = 3.6614	D <sub>30</sub> = 0.8493	D <sub>15</sub> = 0.4065
D <sub>10</sub> = 0.3236	C <sub>u</sub> = 25.72	C <sub>c</sub> = 0.27

USCS= SP	<u>Classification</u> AASHTO= A-1-a
----------	--

Remarks

\* (no specification provided)

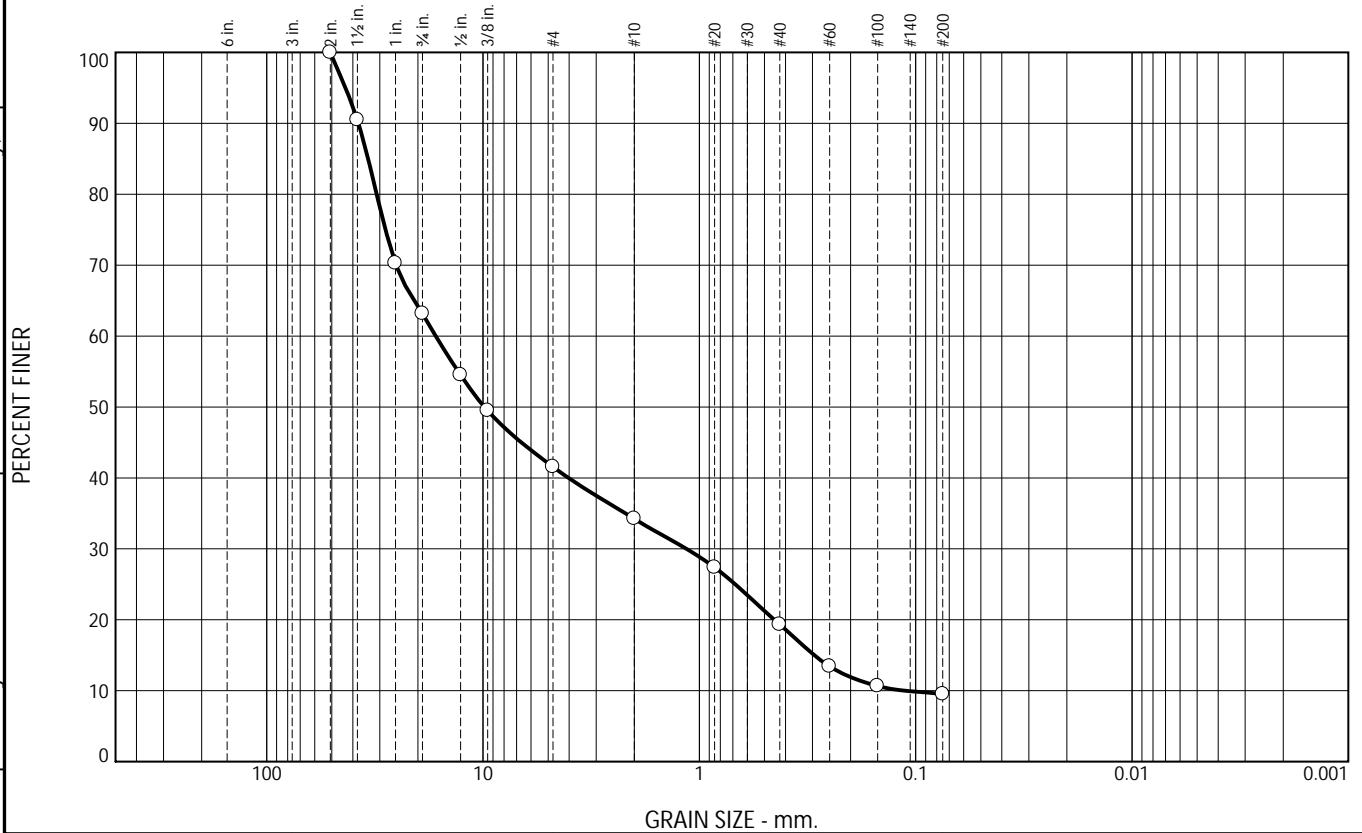
Source of Sample: Sediment      Depth: -      Date: 9.19.24  
 Sample Number: IR-US-2

<b>Thielsch Engineering Inc.</b>  Cranston, RI	Client: ESS Laboratory Project: Ipswich River Ipswich, MA Project No: 24I0467
Fig. 24I0467-05	

Tested By: MCS/SBR      Checked By: Kris Roland

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## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	36.8	21.6	7.4	14.9	9.8	9.5	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100.0		
1 1/2"	90.5		
1"	70.3		
3/4"	63.2		
1/2"	54.5		
3/8"	49.5		
#4	41.6		
#10	34.2		
#20	27.4		
#40	19.3		
#60	13.4		
#100	10.7		
#200	9.5		

Soil Description

Grey poorly graded gravel with silt and sand

PL= NP	<u>Atterberg Limits</u> LL= NV	PI= NP
--------	-----------------------------------	--------

<u>Coefficients</u>		
D <sub>90</sub> = 37.6580	D <sub>85</sub> = 33.9871	D <sub>60</sub> = 16.5456
D <sub>50</sub> = 9.8625	D <sub>30</sub> = 1.1479	D <sub>15</sub> = 0.2942
D <sub>10</sub> = 0.1125	C <sub>u</sub> = 147.10	C <sub>c</sub> = 0.71

USCS= GP-GM	<u>Classification</u> AASHTO= A-1-a
-------------	--

Remarks

\* (no specification provided)

Source of Sample: Sediment      Depth: -  
 Sample Number: IR-US-3

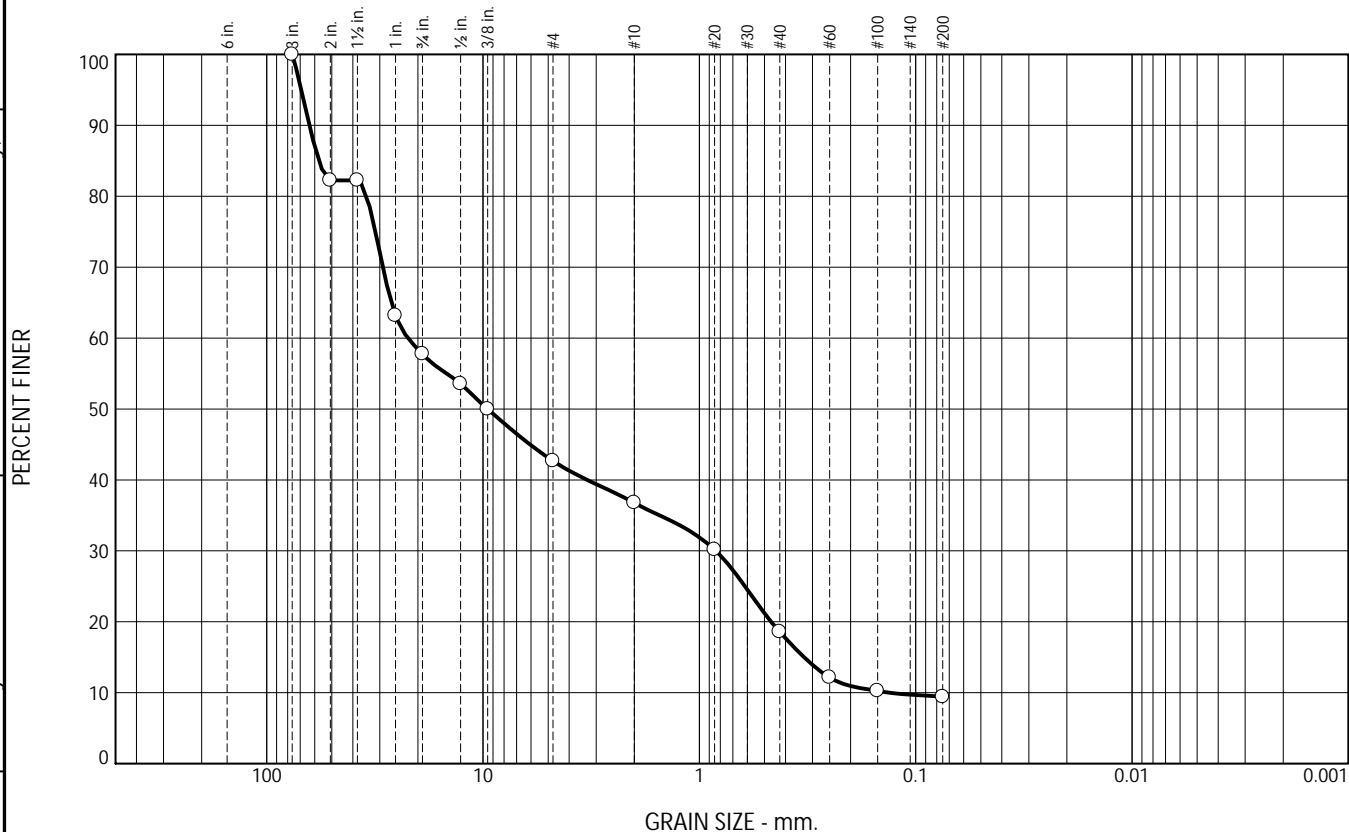
Date: 9.19.24

<b>Thielsch Engineering Inc.</b>  Cranston, RI	Client: ESS Laboratory Project: Ipswich River Ipswich, MA Project No: 24I0467
Fig. 24I0467-06	

Tested By: MCS/SBR      Checked By: Kris Roland

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## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	42.3	15.0	5.9	18.2	9.2	9.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	82.2		
1 1/2"	82.2		
1"	63.2		
3/4"	57.7		
1/2"	53.6		
3/8"	50.0		
#4	42.7		
#10	36.8		
#20	30.2		
#40	18.6		
#60	12.1		
#100	10.2		
#200	9.4		

\* (no specification provided)

Soil Description

Dark Brown poorly graded gravel with silt and sand

Atterberg Limits  
 PL= NP      LL= NV      PI= NP

Coefficients  
 D<sub>90</sub>= 63.4528    D<sub>85</sub>= 57.4217    D<sub>60</sub>= 22.2675  
 D<sub>50</sub>= 9.5407      D<sub>30</sub>= 0.8392      D<sub>15</sub>= 0.3282  
 D<sub>10</sub>= 0.1332      C<sub>u</sub>= 167.16      C<sub>c</sub>= 0.24

Classification  
 USCS= GP-GM      AASHTO= A-1-a

Remarks

Source of Sample: Sediment      Depth: -  
 Sample Number: IR-US-4

Date: 9.19.24

**Thielsch Engineering Inc.**

**Cranston, RI**

Client: ESS Laboratory  
 Project: Ipswich River  
 Ipswich, MA  
 Project No: 24I0467

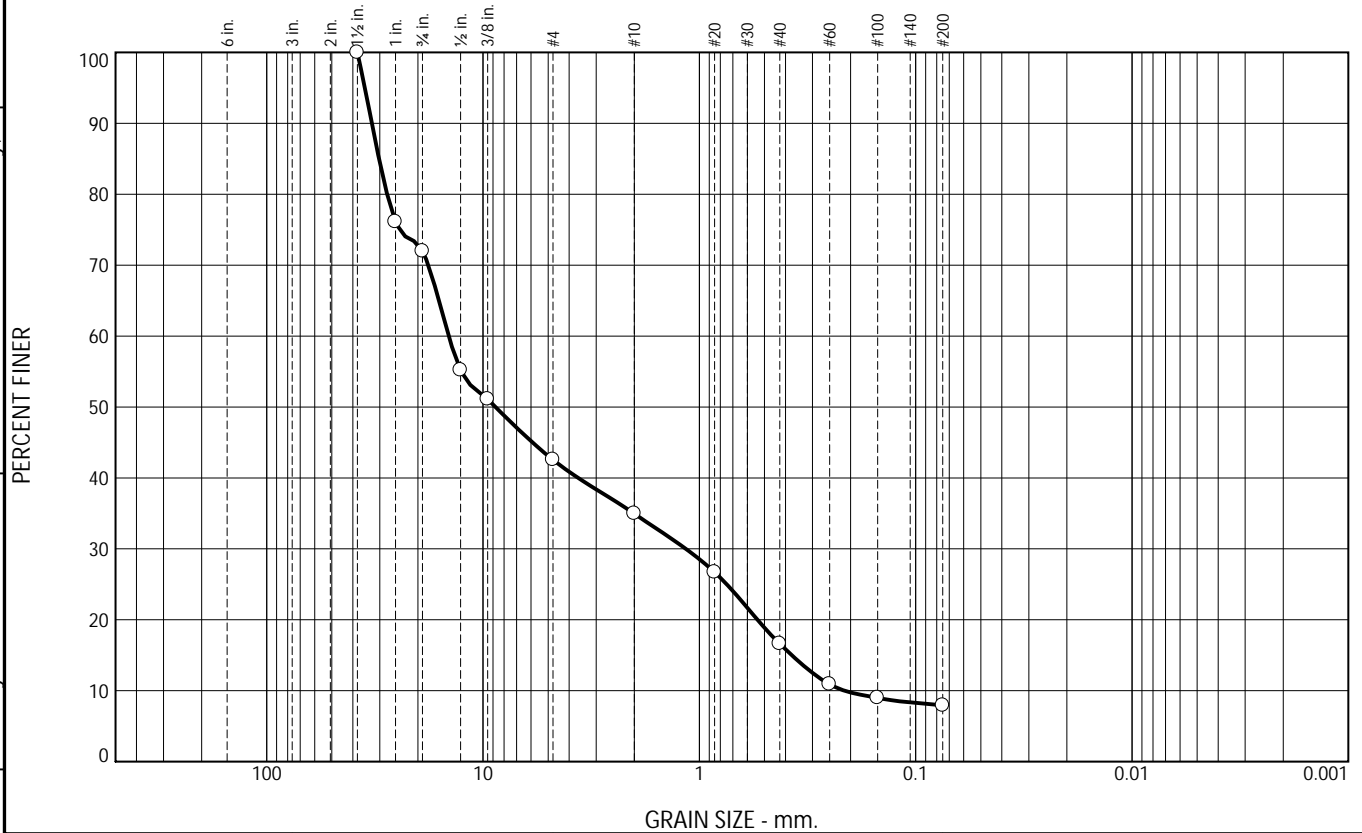
Fig. 24I0467-07

Tested By: MCS/SBR

Checked By: Kris Roland

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspected and/or tested. No warranty, expressed or implied, is made.

## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	28.0	29.4	7.6	18.4	8.7	7.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	76.1		
3/4"	72.0		
1/2"	55.2		
3/8"	51.1		
#4	42.6		
#10	35.0		
#20	26.7		
#40	16.6		
#60	10.9		
#100	9.0		
#200	7.9		

\* (no specification provided)

Soil Description

Grey poorly graded gravel with silt and sand

PL= NP      Atterberg Limits      LL= NV      PI= NP  
 D<sub>90</sub>= 32.6475      D<sub>85</sub>= 30.2462      D<sub>60</sub>= 14.4005  
 D<sub>50</sub>= 8.7585      D<sub>30</sub>= 1.1547      D<sub>15</sub>= 0.3736  
 D<sub>10</sub>= 0.2136      C<sub>u</sub>= 67.43      C<sub>c</sub>= 0.43

Classification

USCS= GP-GM      AASHTO= A-1-a

Remarks

Source of Sample: Sediment      Depth: -  
 Sample Number: IR-US-5

Date: 9.19.24

<b>Thielsch Engineering Inc.</b>  Cranston, RI	Client: ESS Laboratory Project: Ipswich River Ipswich, MA Project No: 24I0467
Fig. 24I0467-08	

Tested By: MCS/SBR      Checked By: Kris Roland



### ESS Laboratory Sample and Cooler Receipt Checklist

Client: Horsley Witten Group - TJM

ESS Project ID: 2410467

Date Received: 9/13/2024

Shipped/Delivered Via: ESS Courier

Project Due Date: 9/20/2024

Days for Project: 5 Day

- 1. Air bill manifest present?  No  
Air No.: NA
- 2. Were custody seals present?  No
- 3. Is radiation count <100 CPM?  Yes
- 4. Is a Cooler Present?  Yes  
Temp: 5.7 Iced with: Ice
- 5. Was COC signed and dated by client?  Yes

- 6. Does COC match bottles?  Yes
- 7. Is COC complete and correct?  Yes
- 8. Were samples received intact?  Yes
- 9. Were labs informed about short holds & rushes?  Yes /  No /  NA
- 10. Were any analyses received outside of hold time?  Yes /  No

- 11. Any Subcontracting needed?  Yes /  No  
ESS Sample IDs: 1--8  
Analysis: Grain size, Perchlorate  
TAT: 5 day

- 12. Were VOAs received?  Yes /  No
  - a. Air bubbles in aqueous VOAs?  Yes /  No
  - b. Does methanol cover soil completely?  Yes /  No /  NA

- 13. Are the samples properly preserved? Yes  No   
 a. If metals preserved upon receipt:  Yes /  No Date: 9/13/24  
 b. If dissolved metals are requested, are they:  Yes /  No Field Filtered  
 c. Low Level VOA vials frozen:  Yes /  No Date: 9/13/24

Time: \_\_\_\_\_ By/Acid Lot#: \_\_\_\_\_  
 Yes / No To Be Lab Filtered  
 Time: 1750 By: ML

Sample Receiving Notes: To 9/13/24  
**No % solids jar for samples 9--10-15. MEDH doesn't cover sample #13. make by**

- 14. Was there a need to contact Project Manager?  Yes /  No  
 a. Was there a need to contact the client?  Yes /  No  
 Who was contacted? Caroline Gran Date: 9/16/24 Time: \_\_\_\_\_ By: ML

Resolution: Use % solids from the corresponding sample jars

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	591562	Yes	N/A	Yes	Driller Jar	NP	
1	591570	Yes	N/A	Yes	8 oz jar	NP	
1	591571	Yes	N/A	Yes	8 oz jar	NP	
1	591615	Yes	N/A	Yes	8 oz jar	NP	
1	591623	Yes	N/A	Yes	4 oz. Jar	NP	
1	591631	Yes	N/A	Yes	Plastic Baggie	NP	
2	591563	Yes	N/A	Yes	Driller Jar	NP	
2	591572	Yes	N/A	Yes	8 oz jar	NP	
2	591573	Yes	N/A	Yes	8 oz jar	NP	
2	591616	Yes	N/A	Yes	8 oz jar	NP	
2	591624	Yes	N/A	Yes	4 oz. Jar	NP	
2	591632	Yes	N/A	Yes	Plastic Baggie	NP	
3	591564	Yes	N/A	Yes	Driller Jar	NP	
3	591574	Yes	N/A	Yes	8 oz jar	NP	
3	591575	Yes	N/A	Yes	8 oz jar	NP	
3	591617	Yes	N/A	Yes	8 oz jar	NP	
3	591625	Yes	N/A	Yes	4 oz. Jar	NP	
3	591633	Yes	N/A	Yes	Plastic Baggie	NP	
4	591538	Yes	N/A	Yes	VOA Vial	DI Water	
4	591539	Yes	N/A	Yes	VOA Vial	DI Water	

**ESS Laboratory Sample and Cooler Receipt Checklist**

Client: Horsley Witten Group - TJM

ESS Project ID: 2410467

Date Received: 9/13/2024

4	591554	Yes	N/A	Yes	VOA Vial	MeOH
4	591565	Yes	N/A	Yes	Driller Jar	NP
4	591576	Yes	N/A	Yes	8 oz jar	NP
4	591577	Yes	N/A	Yes	8 oz jar	NP
4	591618	Yes	N/A	Yes	8 oz jar	NP
4	591626	Yes	N/A	Yes	4 oz. Jar	NP
4	591634	Yes	N/A	Yes	Plastic Baggie	NP
5	591566	Yes	N/A	Yes	Driller Jar	NP
5	591578	Yes	N/A	Yes	8 oz jar	NP
5	591579	Yes	N/A	Yes	8 oz jar	NP
5	591619	Yes	N/A	Yes	8 oz jar	NP
5	591627	Yes	N/A	Yes	4 oz. Jar	NP
5	591635	Yes	N/A	Yes	Plastic Baggie	NP
6	591567	Yes	N/A	Yes	Driller Jar	NP
6	591580	Yes	N/A	Yes	8 oz jar	NP
6	591581	Yes	N/A	Yes	8 oz jar	NP
6	591620	Yes	N/A	Yes	8 oz jar	NP
6	591628	Yes	N/A	Yes	4 oz. Jar	NP
6	591636	Yes	N/A	Yes	Plastic Baggie	NP
7	591568	Yes	N/A	Yes	Driller Jar	NP
7	591582	Yes	N/A	Yes	8 oz jar	NP
7	591583	Yes	N/A	Yes	8 oz jar	NP
7	591621	Yes	N/A	Yes	8 oz jar	NP
7	591629	Yes	N/A	Yes	4 oz. Jar	NP
7	591637	Yes	N/A	Yes	Plastic Baggie	NP
8	591569	Yes	N/A	Yes	Driller Jar	NP
8	591584	Yes	N/A	Yes	8 oz jar	NP
8	591585	Yes	N/A	Yes	8 oz jar	NP
8	591622	Yes	N/A	Yes	8 oz jar	NP
8	591630	Yes	N/A	Yes	4 oz. Jar	NP
8	591638	Yes	N/A	Yes	Plastic Baggie	NP
9	591540	Yes	N/A	Yes	VOA Vial	DI Water
9	591541	Yes	N/A	Yes	VOA Vial	DI Water
9	591555	Yes	N/A	Yes	VOA Vial	MeOH
10	591542	Yes	N/A	Yes	VOA Vial	DI Water
10	591543	Yes	N/A	Yes	VOA Vial	DI Water
10	591556	Yes	N/A	Yes	VOA Vial	MeOH
11	591544	Yes	N/A	Yes	VOA Vial	DI Water
11	591545	Yes	N/A	Yes	VOA Vial	DI Water
11	591557	Yes	N/A	Yes	VOA Vial	MeOH
12	591546	Yes	N/A	Yes	VOA Vial	DI Water
12	591547	Yes	N/A	Yes	VOA Vial	DI Water
12	591558	Yes	N/A	Yes	VOA Vial	MeOH
13	591548	Yes	N/A	Yes	VOA Vial	DI Water
13	591549	Yes	N/A	Yes	VOA Vial	DI Water
13	591559	Yes	N/A	Yes	VOA Vial	MeOH
14	591550	Yes	N/A	Yes	VOA Vial	DI Water
14	591551	Yes	N/A	Yes	VOA Vial	DI Water
14	591560	Yes	N/A	Yes	VOA Vial	MeOH
15	591552	Yes	N/A	Yes	VOA Vial	DI Water
15	591553	Yes	N/A	Yes	VOA Vial	DI Water
15	591561	Yes	N/A	Yes	VOA Vial	MeOH

**2nd Review**

Were all containers scanned into storage/lab?  
Are barcode labels on correct containers?

Initials TJ  
Yes / No  Yes  No

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Horsley Witten Group - TJM

ESS Project ID: 2410467

Date Received: 9/13/2024

- Are all Flashpoint stickers attached/container ID # circled?
- Are all Hex Chrome stickers attached?
- Are all QC stickers attached?
- Are VOA stickers attached if bubbles noted?

Yes / No / NA  
Yes / No / NA  
Yes / No / NA  
Yes / No / NA

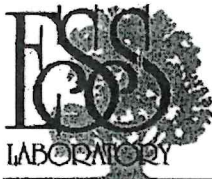
8

Completed By: [Signature]

Date & Time: 9/13/24 1727

Reviewed By: [Signature]

Date & Time: 9/13/24 1750



185 Frances Avenue  
Cranston, RI 02921  
Phone: 401-461-7181  
www.esslaboratory.com

### CHAIN OF CUSTODY

ESS Lab # 21104107 Page 1 of 2

Turn Time  >5  5  4  3  2  1  Same Day

Regulatory State: MA Criteria:

Is this project for any of the following?:

CT RCP  MA MCP  RGP  Permit  401 WQ

**ELECTRONIC DELIVERABLES (Final Reports are PDF)**

Limit Checker  State Forms  EQUIS  
 Excel  Hard Copy  Enviro Data  
 CLP-Like Package  Other (Specify) →

**CLIENT INFORMATION**

Client: Horsley Witten Group  
 Address: 90 Route 6A  
Sandwich, MA  
 Phone: 508-833-6600  
 Email Distribution List: cgran@horsleywitten.com  
nprice@horsleywitten.com  
ghedman@horsleywitten.com

**PROJECT INFORMATION**

Project Name: Ipswich River  
 Project Location: Ipswich, MA  
 Project Number: 10041L  
 Project Manager: Neal Price  
 Bill to:  
 PO#:  
 Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

**REQUESTED ANALYSES**

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Metals (Ar, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	SVOCs	Pest. & Herbs.	PCBs w/ Congeners	EPH	TPH	TOC	% Water	Grain Size (ASTM D422)	Perchlorate	VOCs	Total Number of Bottles
1	9/11/24	1300	Comp	Sed	IR-DS-1	X	X	X	X	X	X	X	X	X	X		
2		1400	↓		IR-DS-2	X	X	X	X	X	X	X	X	X	X		
3		1600	↓		IR-DS-3	X	X	X	X	X	X	X	X	X	X		
4		1130	Grab		IR-US-1	X	X	X	X	X	X	X	X	X	X	X	
5		1230	Comp		IR-US-2	X	X	X	X	X	X	X	X	X	X		
6		1300	↓		IR-US-3	X	X	X	X	X	X	X	X	X	X		
7		1330	↓		IR-US-4	X	X	X	X	X	X	X	X	X	X		
8		1400	↓		IR-US-5	X	X	X	X	X	X	X	X	X	X		
9		1230	Grab		IR-US-1A IR-US-2.1											X	
10		1300	Grab		IR-US-3.1											X	

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial

Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other\*

Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-D1 H2O 11-Other\*

Sampled by: Caroline Gran Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only

Cooler Temperature (°C): 5.7  
19

Comments: \* Please specify "Other" preservative and containers types in this space D.I. Vocs frozen w/in 48hrs  
Please run for 401 WQC parameters; sub SVOCs for PAHs; meet 401 reporting limits. Run grain size on driller jars & use extra bagged material. Please run TCUP if exceed 20x rule.  
 All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration  
 Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
<u>Caroline Gran</u>	<u>9/13/24</u>	<u>1455</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>9/13/24</u>	<u>16:42</u>	<u>Caroline Gran</u>



185 Frances Avenue  
 Cranston, RI 02910  
 Phone: 401-461-7181  
 Fax: 401-461-4486  
 www.esslaboratory.com

### CHAIN OF CUSTODY

ESS Lab # **2410467**

Page **2** of **2**

Turn Time (Days)  > 5  5  4  3  2  1  Same Day

**ELECTRONIC DELIVERABLES (Final Reports are PDF)**

Regulatory State: **MA** Criteria:

Limit Checker  State Forms  EQUIS

Is this project for any of the following?:

Excel  Hard Copy  Enviro Data

CT RCP  MA MCP  RGP  Permit  401 WQ

CLP-Like Package  Other (Specify) →

#### CLIENT INFORMATION

#### PROJECT INFORMATION

#### REQUESTED ANALYSES

Client: **Horsley Witten Group**  
 Address: **90 Route 1A Sandwich, MA**  
 Phone: **508-833-6600**  
 Email: **cgran@horsleywitten.com**  
 Distribution: **ghedman@horsleywitten.com**  
 List: **nprice@horsleywitten.com**

Project Name: **Ipswich River**  
 Project Location: **Ipswich, MA**  
 Project Number: **160414**  
 Project Manager: **Neal Price**  
 Bill to:  
 PO#:  
 Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs											
<b>VOCS</b>											

Total Number of Bottles

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID													
11	9/11/24	1330	Grab	sed	IR-US-4.3	X												
12		1400			IR-US-5.2	X												
13		1300			IR-DS-1.3	Y												
14		1400			IR-DS-2.2	X												
15		1500			IR-DS-3.2	X												

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial

Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other\*

Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other\*

Sampled by: **Caroline Gran**

Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only  
 Cooler Temperature (°C): **5.7**  
**100**

Comments: \* Please specify "Other" preservative and containers types in this space  
**please run for 401 WAC parameters and please meet 401 reporting limits. D.I. VOCS frozen w/in 48 hours. \*Sample IDs = US → upstream, DS → downstream**

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration  
 Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	9/13/24	1455			9/13/24	18:42	

*CERTIFICATE OF ANALYSIS*

Neal Price  
Horsley & Witten  
90 Route 6A  
Sandwich, MA 02563

**RE: Ipswich River (16041L)**  
**ESS Laboratory Work Order Number: 24I0584**

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.



Laurel Stoddard  
Laboratory Director

**REVIEWED**  
*By ESS Laboratory at 4:05 pm, Oct 16, 2024*

**Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

**Subcontracted Analyses**

CTS - Cranston, RI  
Lancaster Laboratories, Inc. - Lancaster, PA

Grain Size Analysis, Water Content  
Perchlorate

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**SAMPLE RECEIPT**

The following samples were received on September 18, 2024 for the analyses specified on the enclosed Chain of Custody Record.

**Samples 24I0584-01 through 24I0584-04 for Metals were oven dried at 60 degrees Celsius prior to digestion and relogged in as Samples 24I0584-09 through 24I0584-12. This was done to increase the dry weight of the sample digested which decreases variability of results and lowers the detection limits for samples with high water content.**

**Low Level VOA vials were frozen by ESS Laboratory on 9/18/24 at 17:23.**

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
24I0584-01	IR-US-6	Sediment	2540G, 8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0584-02	IR-US-7	Sediment	2540G, 8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0584-03	IR-US-8	Sediment	2540G, 8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0584-04	IR-US-BANK	Sediment	2540G, 8081B, 8082A Cong, 8100M, 8151A, 8270E, EPH8270, EPH8270SIM, LK, MADEP-EPH, SUB
24I0584-05	IR-US-6	Sediment	8260D Low
24I0584-06	IR-US-7	Sediment	8260D Low
24I0584-07	IR-US-8	Sediment	8260D Low
24I0584-08	IR-US-BANK	Sediment	8260D Low
24I0584-09	IR-US-6 - OVEN DRIED	Sediment	6010D, 7471B
24I0584-10	IR-US-7 - OVEN DRIED	Sediment	6010D, 7471B
24I0584-11	IR-US-8 - OVEN DRIED	Sediment	6010D, 7471B
24I0584-12	IR-US-BANK - OVEN DRIED	Sediment	6010D, 7471B

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

PROJECT NARRATIVE

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

- 24I0584-04 Lower value is used due to matrix interferences (LC).  
BZ#18 [2C] , BZ#8 [2C]
- 24I0584-04 Percent difference between primary and confirmation results exceeds 40% (P).  
BZ#18 [2C] , BZ#8 [2C]

**8100M Total Petroleum Hydrocarbons**

- DI41732-BS1 Blank Spike recovery is below lower control limit (B-).  
Hexatriacontane (C36) (37% @ 40-140%)
- DI41732-BSD1 Blank Spike recovery is below lower control limit (B-).  
Hexatriacontane (C36) (33% @ 40-140%)

**MADEP-EPH Extractable Petroleum Hydrocarbons**

- 24I0584-01 Present in Method Blank (B).  
Phenanthrene
- 24I0584-02 Present in Method Blank (B).  
Phenanthrene
- 24I0584-03 Present in Method Blank (B).  
Phenanthrene
- 24I0584-04 Present in Method Blank (B).  
Phenanthrene

**Semi-Volatile Organic Compounds**

- D4I0317-CCV1 Calibration required quadratic regression (Q).  
2,4-Dinitrophenol (57% @ 40-160%), Di-n-octylphthalate (100% @ 80-120%)
- D4I0317-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).  
3,3'-Dichlorobenzidine (26% @ 20%), Benzo(g,h,i)perylene (28% @ 20%), Dibenzo(a,h)Anthracene (26% @ 20%), Indeno(1,2,3-cd)Pyrene (26% @ 20%)
- D4I0376-CCV1 Calibration required quadratic regression (Q).  
2,4-Dinitrophenol (88% @ 40-160%)
- D4I0376-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).  
2,4-Dimethylphenol (33% @ 20%), Aniline (36% @ 20%), Isophorone (20% @ 20%)
- D4I0608-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).  
2,4-Dimethylphenol (26% @ 20%), Aniline (46% @ 20%), Azobenzene (24% @ 20%), Di-n-octylphthalate (21% @ 20%), Isophorone (21% @ 20%), Phenol-d6 (21% @ 20%)
- D4I0624-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).  
2,4-Dimethylphenol (43% @ 20%), Aniline (40% @ 20%)

**Volatile Organics Low Level**

- DI41917-BS1 Blank Spike recovery is above upper control limit (B+).  
Isopropylbenzene (131% @ 70-130%)



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**No other observations noted.**

**End of Project Narrative.**

**DATA USABILITY LINKS**

*To ensure you are viewing the most current version of the documents below, please clear your internet cookies for [www.ESSLaboratory.com](http://www.ESSLaboratory.com). Consult your IT Support personnel for information on how to clear your internet cookies.*

[Definitions of Quality Control Parameters](#)

[Semivolatile Organics Internal Standard Information](#)

[Semivolatile Organics Surrogate Information](#)

[Volatile Organics Internal Standard Information](#)

[Volatile Organics Surrogate Information](#)

[EPH and VPH Alkane Lists](#)

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**CURRENT SW-846 METHODOLOGY VERSIONS**

**Analytical Methods**

1010A - Flashpoint  
6010D - ICP  
6020B - ICP MS  
7010 - Graphite Furnace  
7196A - Hexavalent Chromium  
7470A - Aqueous Mercury  
7471B - Solid Mercury  
8011 - EDB/DBCP/TCP  
8015C - GRO/DRO  
8081B - Pesticides  
8082A - PCB  
8100M - TPH  
8151A - Herbicides  
8260D - VOA  
8270E - SVOA  
8270E SIM - SVOA Low Level  
9014 - Cyanide  
9038 - Sulfate  
9040C - Aqueous pH  
9045D - Solid pH (Corrosivity)  
9050A - Specific Conductance  
9056A - Anions (IC)  
9060A - TOC  
9095B - Paint Filter  
MADEP 19-2.1 - EPH  
MADEP 18-2.1 - VPH

**Prep Methods**

3005A - Aqueous ICP Digestion  
3020A - Aqueous Graphite Furnace / ICP MS Digestion  
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion  
3060A - Solid Hexavalent Chromium Digestion  
3510C - Separatory Funnel Extraction  
3520C - Liquid / Liquid Extraction  
3540C - Manual Soxhlet Extraction  
3546 - Microwave Extraction  
3580A - Waste Dilution  
5030B - Aqueous Purge and Trap  
5030C - Aqueous Purge and Trap  
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 19.3g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.030)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
1,2,4-Trichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
1,2-Dichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
1,3-Dichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
1,4-Dichlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2,4,5-Trichlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2,4,6-Trichlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2,4-Dichlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2,4-Dimethylphenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2,4-Dinitrophenol	ND (1.21)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2,4-Dinitrotoluene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2,6-Dinitrotoluene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2-Chloronaphthalene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2-Chlorophenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2-Methylnaphthalene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2-Methylphenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
2-Nitrophenol	ND (0.604)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
3,3'-Dichlorobenzidine	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
3+4-Methylphenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
4-Bromophenyl-phenylether	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
4-Chloroaniline	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
4-Nitrophenol	ND (1.21)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Acenaphthene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Acenaphthylene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Acetophenone	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Aniline	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Anthracene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 19.3g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Benzo(a)anthracene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Benzo(a)pyrene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Benzo(b)fluoranthene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Benzo(g,h,i)perylene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Benzo(k)fluoranthene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
bis(2-Chloroethoxy)methane	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
bis(2-Chloroethyl)ether	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
bis(2-chloroisopropyl)Ether	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
bis(2-Ethylhexyl)phthalate	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Butylbenzylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Chrysene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Dibenzo(a,h)Anthracene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Dibenzofuran	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Diethylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Dimethylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Di-n-butylphthalate	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Di-n-octylphthalate	ND (0.604)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Fluoranthene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Fluorene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Hexachlorobenzene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Hexachlorobutadiene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Hexachloroethane	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Indeno(1,2,3-cd)Pyrene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Isophorone	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Naphthalene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Nitrobenzene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 19.3g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Pentachlorophenol	ND (1.21)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Phenanthrene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Phenol	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728
Pyrene	ND (0.302)	---	8270E	---	1	TJ	09/19/24 19:18	D4I0376	DI41728

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	102 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	98 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	105 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	88 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	106 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	100 %		30-130
<i>Surrogate: Phenol-d6</i>	116 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	105 %		30-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 24.4g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Prepared: 9/19/24 8:51

**MADEP-EPH Extractable Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
C9-C18 Aliphatics1	ND (17.9)	---	MADEP-EPH	---	1	JDN	09/19/24 20:53	D4I0383	DI41905
C19-C36 Aliphatics1	ND (17.9)	---	MADEP-EPH	---	1	JDN	09/19/24 20:53	D4I0383	DI41905
C11-C22 Unadjusted Aromatics1	ND (17.9)	---	EPH8270	---	1	NXL	09/20/24 11:23	D4I0374	DI41905
C11-C22 Aromatics1,2	ND (18.1)	---	EPH8270	---		TJ	09/20/24 11:23	---	[CALC]
2-Methylnaphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Acenaphthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Naphthalene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
<b>Phenanthrene</b>	<b>B 0.026 (0.010)</b>	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Acenaphthylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Benzo(a)anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Benzo(a)pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Benzo(b)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Benzo(g,h,i)perylene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Benzo(k)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Chrysene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Dibenzo(a,h)Anthracene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Fluorene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Indeno(1,2,3-cd)Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905
Pyrene	ND (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 22:04	D4I0377	DI41905

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1-Chlorooctadecane</i>	68 %		40-140
<i>Surrogate: 2-Bromonaphthalene</i>	84 %		40-140
<i>Surrogate: 2-Fluorobiphenyl</i>	82 %		40-140
<i>Surrogate: O-Terphenyl</i>	75 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 19.9g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/19/24 10:10

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
4,4'-DDE	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
4,4'-DDT	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Aldrin	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
alpha-BHC	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
alpha-Chlordane	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
beta-BHC	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Chlordane (Total)	ND (0.0235)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
delta-BHC	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Dieldrin	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Endosulfan I	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Endosulfan II	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Endosulfan Sulfate	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Endrin	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Endrin Ketone	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
gamma-BHC (Lindane)	ND (0.0018)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
gamma-Chlordane	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Heptachlor	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Heptachlor Epoxide	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Hexachlorobenzene	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908
Methoxychlor	ND (0.0029)	---	8081B	---	1	09/19/24 18:53	D4I0365	DI41908

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	66 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	66 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 10.1g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/18/24 17:51

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.011)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
2,4-D	ND (0.054)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
2,4-DB	ND (0.055)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
Dalapon	ND (0.053)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
Dicamba	ND (0.011)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
Dichlorprop	ND (0.054)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
MCPA	ND (2.69)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831
MCPP [2C]	ND (2.71)	---	8151A	---	1	09/20/24 4:35	D4I0367	DI41831

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	111 %		30-150



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 20.4g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/18/24 18:00

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (11.4)	---	8100M	---	1	09/19/24 15:50	---	DI41732
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		87 %		40-140				

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Percent Moisture	14 (1)	---	2540G	---	1	CCP	09/18/24 17:42	%	DI41849
Total Organic Carbon (Average)	2720 (500)	---	LK	---	1	CCP	09/23/24 16:58	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 86  
 Initial Volume: 30.2g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-01  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/23/24 12:15

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#18	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#28	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#44	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#52	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#66	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#101	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#105	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#118	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#128	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#138	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#153	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#170	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#180	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#187	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#195	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#206	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304
BZ#209	ND (0.00031)	---	8082A Cong	---	1	09/24/24 20:32	D4I0481	DI42304

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	67 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 20.1g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.031)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
1,2,4-Trichlorobenzene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
1,2-Dichlorobenzene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
1,3-Dichlorobenzene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
1,4-Dichlorobenzene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2,4,5-Trichlorophenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2,4,6-Trichlorophenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2,4-Dichlorophenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2,4-Dimethylphenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2,4-Dinitrophenol	ND (1.23)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2,4-Dinitrotoluene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2,6-Dinitrotoluene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2-Chloronaphthalene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2-Chlorophenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2-Methylnaphthalene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2-Methylphenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
2-Nitrophenol	ND (0.616)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
3,3'-Dichlorobenzidine	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
3+4-Methylphenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
4-Bromophenyl-phenylether	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
4-Chloroaniline	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
4-Nitrophenol	ND (1.23)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Acenaphthene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Acenaphthylene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Acetophenone	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Aniline	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Anthracene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 20.1g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Benzo(a)anthracene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Benzo(a)pyrene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Benzo(b)fluoranthene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Benzo(g,h,i)perylene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Benzo(k)fluoranthene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
bis(2-Chloroethoxy)methane	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
bis(2-Chloroethyl)ether	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
bis(2-chloroisopropyl)Ether	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
bis(2-Ethylhexyl)phthalate	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Butylbenzylphthalate	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Chrysene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Dibenzo(a,h)Anthracene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Dibenzofuran	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Diethylphthalate	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Dimethylphthalate	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Di-n-butylphthalate	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Di-n-octylphthalate	ND (0.616)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Fluoranthene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Fluorene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Hexachlorobenzene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Hexachlorobutadiene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Hexachloroethane	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Indeno(1,2,3-cd)Pyrene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Isophorone	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Naphthalene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Nitrobenzene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 20.1g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Pentachlorophenol	ND (1.23)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Phenanthrene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Phenol	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728
Pyrene	ND (0.308)	---	8270E	---	1	TJ	09/19/24 19:48	D4I0376	DI41728

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	103 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	93 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	106 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	89 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	109 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	100 %		30-130
<i>Surrogate: Phenol-d6</i>	117 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	103 %		30-130

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 24.4g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Prepared: 9/19/24 8:51

**MADEP-EPH Extractable Petroleum Hydrocarbons**

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (19.0)	---	MADEP-EPH	---	1	JDN	09/19/24 21:28	D4I0383	DI41905
C19-C36 Aliphatics1	ND (19.0)	---	MADEP-EPH	---	1	JDN	09/19/24 21:28	D4I0383	DI41905
C11-C22 Unadjusted Aromatics1	ND (19.0)	---	EPH8270	---	1	NXL	09/20/24 11:59	D4I0374	DI41905
C11-C22 Aromatics1,2	ND (19.2)	---	EPH8270	---		NXL	09/23/24 16:03	---	[CALC]
2-Methylnaphthalene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Acenaphthene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Naphthalene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
<b>Phenanthrene</b>	<b>B 0.031</b> (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Acenaphthylene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Anthracene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Benzo(a)anthracene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Benzo(a)pyrene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Benzo(b)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
<b>Benzo(g,h,i)perylene</b>	<b>0.016</b> (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Benzo(k)fluoranthene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Chrysene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
<b>Dibenzo(a,h)Anthracene</b>	<b>0.011</b> (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
<b>Fluoranthene</b>	<b>0.011</b> (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Fluorene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.012</b> (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905
Pyrene	ND (0.010)	---	EPH8270SIM	---	1	NXL	09/23/24 16:03	D4I0434	DI41905

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	76 %		40-140
Surrogate: 2-Bromonaphthalene	84 %		40-140
Surrogate: 2-Fluorobiphenyl	81 %		40-140
Surrogate: O-Terphenyl	80 %		40-140



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 19g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/19/24 10:10

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
4,4'-DDE	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
4,4'-DDT	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Aldrin	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
alpha-BHC	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
alpha-Chlordane	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
beta-BHC	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Chlordane (Total)	ND (0.0261)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
delta-BHC	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Dieldrin	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Endosulfan I	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Endosulfan II	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Endosulfan Sulfate	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Endrin	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Endrin Ketone	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
gamma-BHC (Lindane)	ND (0.0020)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
gamma-Chlordane	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Heptachlor	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Heptachlor Epoxide	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Hexachlorobenzene	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908
Methoxychlor	ND (0.0033)	---	8081B	---	1	09/19/24 19:21	D4I0365	DI41908

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	72 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	72 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 10.1g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/18/24 17:51

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.012)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
2,4,5-TP (Silvex)	ND (0.012)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
2,4-D	ND (0.058)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
2,4-DB	ND (0.058)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
Dalapon	ND (0.056)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
Dicamba	ND (0.012)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
Dichlorprop	ND (0.058)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
MCPA	ND (2.85)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831
MCPP	ND (2.88)	---	8151A	---	1	09/20/24 5:02	D4I0367	DI41831

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	120 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 19.8g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/18/24 18:00

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	ND (12.5)	---	8100M	---	1	09/19/24 16:29	---	DI41732
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		87 %		40-140				

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Percent Moisture	19 (1)	---	2540G	---	1	CCP	09/18/24 17:42	%	DI41849
Total Organic Carbon (Average)	4720 (500)	---	LK	---	1	CCP	09/23/24 17:15	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 81  
 Initial Volume: 30.1g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-02  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/23/24 12:15

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#18	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#28	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#44	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#52	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#66	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#101	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#105	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#118	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#128	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#138	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#153	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#170	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#180	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#187	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#195	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#206	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304
BZ#209	ND (0.00033)	---	8082A Cong	---	1	09/24/24 21:02	D4I0481	DI42304

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	81 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 19.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.031)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
1,2,4-Trichlorobenzene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
1,2-Dichlorobenzene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
1,3-Dichlorobenzene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
1,4-Dichlorobenzene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2,4,5-Trichlorophenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2,4,6-Trichlorophenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2,4-Dichlorophenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2,4-Dimethylphenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2,4-Dinitrophenol	ND (1.25)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2,4-Dinitrotoluene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2,6-Dinitrotoluene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2-Chloronaphthalene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2-Chlorophenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2-Methylnaphthalene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2-Methylphenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
2-Nitrophenol	ND (0.625)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
3,3'-Dichlorobenzidine	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
3+4-Methylphenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
4-Bromophenyl-phenylether	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
4-Chloroaniline	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
4-Nitrophenol	ND (1.25)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Acenaphthene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Acenaphthylene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Acetophenone	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Aniline	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Anthracene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 19.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Benzo(a)anthracene</b>	<b>0.474</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Benzo(a)pyrene</b>	<b>0.469</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Benzo(b)fluoranthene</b>	<b>0.576</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Benzo(g,h,i)perylene</b>	<b>0.326</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Benzo(k)fluoranthene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
bis(2-Chloroethoxy)methane	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
bis(2-Chloroethyl)ether	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
bis(2-chloroisopropyl)Ether	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
bis(2-Ethylhexyl)phthalate	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Butylbenzylphthalate	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Chrysene</b>	<b>0.600</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Dibenzo(a,h)Anthracene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Dibenzofuran	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Diethylphthalate	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Dimethylphthalate	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Di-n-butylphthalate	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Di-n-octylphthalate	ND (0.625)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Fluoranthene</b>	<b>1.37</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Fluorene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Hexachlorobenzene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Hexachlorobutadiene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Hexachloroethane	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Indeno(1,2,3-cd)Pyrene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Isophorone	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Naphthalene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Nitrobenzene	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 19.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: TJ  
 Prepared: 9/18/24 18:00

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Pentachlorophenol	ND (1.25)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Phenanthrene</b>	<b>1.06</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
Phenol	ND (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728
<b>Pyrene</b>	<b>1.27</b> (0.312)	---	8270E	---	1	TJ	09/19/24 21:51	D4I0376	DI41728

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	100 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	86 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	102 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	88 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	106 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	95 %		30-130
<i>Surrogate: Phenol-d6</i>	114 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	99 %		30-130

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 25g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Prepared: 9/19/24 8:51

**MADEP-EPH Extractable Petroleum Hydrocarbons**

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (18.0)	---	MADEP-EPH	---	1	JDN	09/19/24 22:03	D4I0383	DI41905
C19-C36 Aliphatics1	ND (18.0)	---	MADEP-EPH	---	1	JDN	09/19/24 22:03	D4I0383	DI41905
<b>C11-C22 Unadjusted Aromatics1</b>	<b>30.3</b> (18.0)	---	EPH8270	---	1	NXL	09/20/24 12:35	D4I0374	DI41905
C11-C22 Aromatics1,2	ND (18.2)	---	EPH8270	---		NXL	09/23/24 16:59	---	[CALC]
<b>2-Methylnaphthalene</b>	<b>0.028</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Acenaphthene</b>	<b>0.187</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Naphthalene</b>	<b>0.055</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Phenanthrene</b>	<b>B 2.37</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Acenaphthylene</b>	<b>0.017</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Anthracene</b>	<b>0.528</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Benzo(a)anthracene</b>	<b>1.47</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Benzo(a)pyrene</b>	<b>1.36</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Benzo(b)fluoranthene</b>	<b>1.31</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Benzo(g,h,i)perylene</b>	<b>0.828</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Benzo(k)fluoranthene</b>	<b>1.23</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Chrysene</b>	<b>1.40</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Dibenzo(a,h)Anthracene</b>	<b>0.129</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Fluoranthene</b>	<b>3.56</b> (0.019)	---	EPH8270SIM	---	2	NXL	09/23/24 16:59	D4I0377	DI41905
<b>Fluorene</b>	<b>0.237</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.764</b> (0.010)	---	EPH8270SIM	---	1	TJ	09/19/24 23:01	D4I0377	DI41905
<b>Pyrene</b>	<b>3.04</b> (0.019)	---	EPH8270SIM	---	2	NXL	09/23/24 16:59	D4I0377	DI41905

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	70 %		40-140
Surrogate: 2-Bromonaphthalene	85 %		40-140
Surrogate: 2-Fluorobiphenyl	82 %		40-140
Surrogate: O-Terphenyl	77 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 19.8g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/19/24 10:10

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
4,4'-DDE	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
4,4'-DDT	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Aldrin	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
alpha-BHC	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
alpha-Chlordane	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
beta-BHC	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Chlordane (Total)	ND (0.0242)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
delta-BHC	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Dieldrin	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Endosulfan I	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Endosulfan II	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Endosulfan Sulfate	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Endrin	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Endrin Ketone	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
gamma-BHC (Lindane)	ND (0.0018)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
gamma-Chlordane	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Heptachlor	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Heptachlor Epoxide	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Hexachlorobenzene	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908
Methoxychlor	ND (0.0030)	---	8081B	---	1	09/19/24 19:49	D4I0365	DI41908

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	60 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	56 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 10.5g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/18/24 17:51

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.011)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
2,4,5-TP (Silvex)	ND (0.011)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
2,4-D	ND (0.054)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
2,4-DB	ND (0.054)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
Dalapon	ND (0.052)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
Dicamba	ND (0.011)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
Dichlorprop	ND (0.054)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
MCPA	ND (2.66)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831
MCPP	ND (2.69)	---	8151A	---	1	09/20/24 8:38	D4I0367	DI41831

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	118 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 20g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/18/24 18:00

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	40.8 (12.0)	---	8100M	---	1	09/19/24 17:07	---	DI41732

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: O-Terphenyl</i>	87 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Percent Moisture	17 (1)	---	2540G	---	1	CCP	09/18/24 17:42	%	DI41849
Total Organic Carbon (Average)	10200 (500)	---	LK	---	1	CCP	09/23/24 18:05	mg/kg	[CALC]

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 83  
 Initial Volume: 30.1g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-03  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/23/24 12:15

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
BZ#8	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#18 [2C]	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#28	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#44	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#52 [2C]	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#66	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#101 [2C]	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#105	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#118 [2C]	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#128	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#138	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#153	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#170	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#180	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#187	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#195	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#206	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304
BZ#209	ND (0.00032)	---	8082A Cong	---	1	09/24/24 21:33	D4I0481	DI42304

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	68 %		30-150



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 19.7g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: EEB  
 Prepared: 9/27/24 19:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.043)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
1,2,4-Trichlorobenzene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
1,2-Dichlorobenzene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
1,3-Dichlorobenzene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
1,4-Dichlorobenzene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2,4,5-Trichlorophenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2,4,6-Trichlorophenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2,4-Dichlorophenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2,4-Dimethylphenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2,4-Dinitrophenol	ND (1.70)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2,4-Dinitrotoluene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2,6-Dinitrotoluene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2-Chloronaphthalene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2-Chlorophenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2-Methylnaphthalene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2-Methylphenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
2-Nitrophenol	ND (0.851)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
3,3'-Dichlorobenzidine	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
3+4-Methylphenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
4-Bromophenyl-phenylether	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
4-Chloroaniline	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
4-Nitrophenol	ND (1.70)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Acenaphthene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Acenaphthylene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Acetophenone	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Aniline	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Anthracene</b>	<b>0.431</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 19.7g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: EEB  
 Prepared: 9/27/24 19:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Azobenzene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Benzo(a)anthracene</b>	<b>1.10</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Benzo(a)pyrene</b>	<b>1.02</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Benzo(b)fluoranthene</b>	<b>0.780</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Benzo(g,h,i)perylene</b>	<b>0.600</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Benzo(k)fluoranthene</b>	<b>0.866</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
bis(2-Chloroethoxy)methane	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
bis(2-Chloroethyl)ether	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
bis(2-chloroisopropyl)Ether	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
bis(2-Ethylhexyl)phthalate	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Butylbenzylphthalate	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Chrysene</b>	<b>1.12</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Dibenzo(a,h)Anthracene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Dibenzofuran	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Diethylphthalate	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Dimethylphthalate	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Di-n-butylphthalate	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Di-n-octylphthalate	ND (0.851)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Fluoranthene</b>	<b>2.75</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Fluorene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Hexachlorobenzene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Hexachlorobutadiene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Hexachloroethane	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.627</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Isophorone	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Naphthalene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Nitrobenzene	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 19.7g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: EEB  
 Prepared: 9/27/24 19:45

**Semi-Volatile Organic Compounds**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
N-Nitrosodimethylamine	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Pentachlorophenol	ND (1.70)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Phenanthrene</b>	<b>1.88</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
Phenol	ND (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723
<b>Pyrene</b>	<b>2.12</b> (0.426)	---	8270E	---	1	EEB	09/30/24 15:34	D4I0624	DI42723

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	89 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	99 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	99 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	93 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	96 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	92 %		30-130
<i>Surrogate: Phenol-d6</i>	105 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	104 %		30-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 25.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Prepared: 9/19/24 8:51

**MADEP-EPH Extractable Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
C9-C18 Aliphatics1	ND (24.9)	---	MADEP-EPH	---	1	JDN	09/19/24 22:38	D4I0383	DI41905
C19-C36 Aliphatics1	ND (24.9)	---	MADEP-EPH	---	1	JDN	09/19/24 22:38	D4I0383	DI41905
<b>C11-C22 Unadjusted Aromatics1</b>	<b>29.4</b> (24.9)	---	EPH8270	---	1	NXL	09/20/24 13:11	D4I0374	DI41905
C11-C22 Aromatics1,2	ND (25.2)	---	EPH8270	---		TJ	09/20/24 13:11	---	[CALC]
<b>2-Methylnaphthalene</b>	<b>0.051</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Acenaphthene</b>	<b>0.249</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Naphthalene</b>	<b>0.071</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Phenanthrene</b>	<b>B 2.39</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Acenaphthylene</b>	<b>0.028</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Anthracene</b>	<b>0.621</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Benzo(a)anthracene</b>	<b>1.12</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Benzo(a)pyrene</b>	<b>0.868</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Benzo(b)fluoranthene</b>	<b>0.852</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Benzo(g,h,i)perylene</b>	<b>0.507</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Benzo(k)fluoranthene</b>	<b>0.762</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Chrysene</b>	<b>1.01</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Dibenzo(a,h)Anthracene</b>	<b>0.082</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Fluoranthene</b>	<b>2.64</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Fluorene</b>	<b>0.306</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Indeno(1,2,3-cd)Pyrene</b>	<b>0.444</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905
<b>Pyrene</b>	<b>2.19</b> (0.013)	---	EPH8270SIM	---	1	TJ	09/19/24 23:29	D4I0377	DI41905

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1-Chlorooctadecane</i>	72 %		40-140
<i>Surrogate: 2-Bromonaphthalene</i>	92 %		40-140
<i>Surrogate: 2-Fluorobiphenyl</i>	88 %		40-140
<i>Surrogate: O-Terphenyl</i>	79 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 19.9g  
 Final Volume: 5ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/19/24 10:10

**8081B Organochlorine Pesticides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4,4'-DDD	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
4,4'-DDE	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
4,4'-DDT	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Aldrin	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
alpha-BHC	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
alpha-Chlordane	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
beta-BHC [2C]	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Chlordane (Total)	ND (0.0337)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
delta-BHC	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Dieldrin	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Endosulfan I	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Endosulfan II	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Endosulfan Sulfate	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Endrin	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Endrin Ketone	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
gamma-BHC (Lindane)	ND (0.0025)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
gamma-Chlordane	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Heptachlor	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Heptachlor Epoxide	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Hexachlorobenzene	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908
Methoxychlor	ND (0.0042)	---	8081B	---	1	09/19/24 20:16	D4I0365	DI41908

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	67 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	62 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 10g  
 Final Volume: 4ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/18/24 17:51

**8151A Chlorinated Herbicides**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2,4,5-T	ND (0.016)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
2,4,5-TP (Silvex)	ND (0.016)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
2,4-D	ND (0.079)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
2,4-DB	ND (0.080)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
Dalapon	ND (0.076)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
Dicamba	ND (0.016)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
Dichlorprop	ND (0.079)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
MCPA	ND (3.90)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831
MCPP	ND (3.94)	---	8151A	---	1	09/20/24 9:05	D4I0367	DI41831

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	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: DCAA</i>	117 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 20.2g  
 Final Volume: 1ml  
 Extraction Method: 3546

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: JDN  
 Prepared: 9/18/24 18:00

**8100M Total Petroleum Hydrocarbons**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons (C9-C36)	201 (16.6)	---	8100M	---	1	09/19/24 17:46	---	DI41732

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: O-Terphenyl</i>	81 %		40-140

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment

**Classical Chemistry**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Percent Moisture	40 (1)	---	2540G	---	1	CCP	09/18/24 17:42	%	DI41849
Total Organic Carbon (Average)	17000 (500)	---	LK	---	1	CCP	09/23/24 18:21	mg/kg	[CALC]



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment

**Subcontracted Analysis**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Grain Size	See Attached (N/A)	---		---				%	
Perchlorate	See Attached (N/A)	---		---				mg/kg	
Water Content	See Attached (N/A)	---		---				%	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 60  
 Initial Volume: 30.4g  
 Final Volume: 2ml  
 Extraction Method: 3540C

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-04  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: DMC  
 Prepared: 9/23/24 12:15

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
<b>BZ#8 [2C]</b>	<b>P, LC 0.00060</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#18 [2C]</b>	<b>P, LC 0.00062</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#28 [2C]</b>	<b>0.00269</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#44 [2C]</b>	<b>0.00445</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#52</b>	<b>0.0127</b> (0.00089) ---	---	8082A Cong	---	2	09/25/24 12:38	D4I0481	DI42304
<b>BZ#66</b>	<b>0.0101</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#101</b>	<b>0.0151</b> (0.00089) ---	---	8082A Cong	---	2	09/25/24 12:38	D4I0481	DI42304
<b>BZ#105</b>	<b>0.00238</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#118</b>	<b>0.0110</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#128</b>	<b>0.00210</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#138 [2C]</b>	<b>0.00843</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#153</b>	<b>0.0105</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#170 [2C]</b>	<b>0.00140</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#180</b>	<b>0.00184</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#187 [2C]</b>	<b>0.00141</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#195 [2C]</b>	ND (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#206 [2C]</b>	<b>0.00074</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304
<b>BZ#209 [2C]</b>	<b>0.00123</b> (0.00045) ---	---	8082A Cong	---	1	09/24/24 22:04	D4I0481	DI42304

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	62 %		30-150

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 83  
 Initial Volume: 7g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-05  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,1,1-Trichloroethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,1,2,2-Tetrachloroethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,1,2-Trichloroethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,1-Dichloroethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,1-Dichloroethene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,1-Dichloropropene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2,3-Trichlorobenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2,3-Trichloropropane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2,4-Trichlorobenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2,4-Trimethylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2-Dibromo-3-Chloropropane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2-Dibromoethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2-Dichlorobenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2-Dichloroethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,2-Dichloropropane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,3,5-Trimethylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,3-Dichlorobenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,3-Dichloropropane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,4-Dichlorobenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
1,4-Dioxane	ND (0.0861)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
2,2-Dichloropropane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
2-Butanone	ND (0.0430)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
2-Chlorotoluene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
2-Hexanone	ND (0.0430)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
4-Chlorotoluene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
4-Isopropyltoluene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 83  
 Initial Volume: 7g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-05  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0430)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Acetone	ND (0.0430)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Benzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Bromobenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Bromochloromethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Bromodichloromethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Bromoform	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Bromomethane	ND (0.0086)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Carbon Disulfide	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Carbon Tetrachloride	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Chlorobenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Chloroethane	ND (0.0086)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Chloroform	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Chloromethane	ND (0.0086)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
cis-1,2-Dichloroethene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
cis-1,3-Dichloropropene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Dibromochloromethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Dibromomethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Dichlorodifluoromethane	ND (0.0086)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Diethyl Ether	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Di-isopropyl ether	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Ethyl tertiary-butyl ether	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Ethylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Hexachlorobutadiene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Isopropylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Methyl tert-Butyl Ether	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Methylene Chloride	ND (0.0215)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 83  
 Initial Volume: 7g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-05  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
n-Butylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
n-Propylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
sec-Butylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Styrene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
tert-Butylbenzene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Tertiary-amyl methyl ether	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Tetrachloroethene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Tetrahydrofuran	ND (0.0172)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Toluene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
trans-1,2-Dichloroethene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
trans-1,3-Dichloropropene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Trichloroethene	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Trichlorofluoromethane	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Vinyl Chloride	ND (0.0086)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Xylene O	ND (0.0043)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Xylene P,M	ND (0.0086)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917
Xylenes (Total)	ND (0.0086)	---	8260D Low	---	1	MEK	09/19/24 12:31	D4I0360	DI41917

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>116 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>91 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>109 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>100 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 71  
 Initial Volume: 6.6g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-06  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,1,1-Trichloroethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,1,2,2-Tetrachloroethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,1,2-Trichloroethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,1-Dichloroethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,1-Dichloroethene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,1-Dichloropropene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2,3-Trichlorobenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2,3-Trichloropropane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2,4-Trichlorobenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2,4-Trimethylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2-Dibromo-3-Chloropropane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2-Dibromoethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2-Dichlorobenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2-Dichloroethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,2-Dichloropropane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,3,5-Trimethylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,3-Dichlorobenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,3-Dichloropropane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,4-Dichlorobenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
1,4-Dioxane	ND (0.106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
2,2-Dichloropropane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
2-Butanone	ND (0.0530)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
2-Chlorotoluene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
2-Hexanone	ND (0.0530)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
4-Chlorotoluene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
4-Isopropyltoluene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 71  
 Initial Volume: 6.6g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-06  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0530)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Acetone	ND (0.0530)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Benzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Bromobenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Bromochloromethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Bromodichloromethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Bromoform	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Bromomethane	ND (0.0106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Carbon Disulfide	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Carbon Tetrachloride	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Chlorobenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Chloroethane	ND (0.0106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Chloroform	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Chloromethane	ND (0.0106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
cis-1,2-Dichloroethene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
cis-1,3-Dichloropropene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Dibromochloromethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Dibromomethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Dichlorodifluoromethane	ND (0.0106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Diethyl Ether	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Di-isopropyl ether	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Ethyl tertiary-butyl ether	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Ethylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Hexachlorobutadiene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Isopropylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Methyl tert-Butyl Ether	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Methylene Chloride	ND (0.0265)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 71  
 Initial Volume: 6.6g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-06  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
n-Butylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
n-Propylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
sec-Butylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Styrene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
tert-Butylbenzene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Tertiary-amyl methyl ether	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Tetrachloroethene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Tetrahydrofuran	ND (0.0212)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Toluene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
trans-1,2-Dichloroethene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
trans-1,3-Dichloropropene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Trichloroethene	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Trichlorofluoromethane	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Vinyl Chloride	ND (0.0106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Xylene O	ND (0.0053)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Xylene P,M	ND (0.0106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917
Xylenes (Total)	ND (0.0106)	---	8260D Low	---	1	MEK	09/19/24 12:57	D4I0360	DI41917

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>116 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>92 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>110 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>101 %</i>		<i>70-130</i>



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 81  
 Initial Volume: 8.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-07  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,1,1-Trichloroethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,1,2,2-Tetrachloroethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,1,2-Trichloroethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,1-Dichloroethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,1-Dichloroethene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,1-Dichloropropene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2,3-Trichlorobenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2,3-Trichloropropane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2,4-Trichlorobenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2,4-Trimethylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2-Dibromo-3-Chloropropane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2-Dibromoethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2-Dichlorobenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2-Dichloroethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,2-Dichloropropane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,3,5-Trimethylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,3-Dichlorobenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,3-Dichloropropane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,4-Dichlorobenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
1,4-Dioxane	ND (0.0759)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
2,2-Dichloropropane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
2-Butanone	ND (0.0380)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
2-Chlorotoluene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
2-Hexanone	ND (0.0380)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
4-Chlorotoluene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
4-Isopropyltoluene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 81  
 Initial Volume: 8.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-07  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0380)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Acetone	ND (0.0380)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Benzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Bromobenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Bromochloromethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Bromodichloromethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Bromoform	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Bromomethane	ND (0.0076)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Carbon Disulfide	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Carbon Tetrachloride	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Chlorobenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Chloroethane	ND (0.0076)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Chloroform	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Chloromethane	ND (0.0076)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
cis-1,2-Dichloroethene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
cis-1,3-Dichloropropene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Dibromochloromethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Dibromomethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Dichlorodifluoromethane	ND (0.0076)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Diethyl Ether	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Di-isopropyl ether	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Ethyl tertiary-butyl ether	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Ethylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Hexachlorobutadiene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Isopropylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Methyl tert-Butyl Ether	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Methylene Chloride	ND (0.0190)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 81  
 Initial Volume: 8.1g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-07  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
n-Butylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
n-Propylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
sec-Butylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Styrene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
tert-Butylbenzene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Tertiary-amyl methyl ether	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Tetrachloroethene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Tetrahydrofuran	ND (0.0152)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Toluene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
trans-1,2-Dichloroethene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
trans-1,3-Dichloropropene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Trichloroethene	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Trichlorofluoromethane	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Vinyl Chloride	ND (0.0076)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Xylene O	ND (0.0038)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Xylene P,M	ND (0.0076)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917
Xylenes (Total)	ND (0.0076)	---	8260D Low	---	1	MEK	09/19/24 13:22	D4I0360	DI41917

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>119 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>112 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>101 %</i>		<i>70-130</i>

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 71  
 Initial Volume: 8.9g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-08  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,1,1-Trichloroethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,1,2,2-Tetrachloroethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,1,2-Trichloroethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,1-Dichloroethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,1-Dichloroethene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,1-Dichloropropene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2,3-Trichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2,3-Trichloropropane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2,4-Trichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2,4-Trimethylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2-Dibromo-3-Chloropropane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2-Dibromoethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2-Dichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2-Dichloroethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,2-Dichloropropane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,3,5-Trimethylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,3-Dichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,3-Dichloropropane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,4-Dichlorobenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
1,4-Dioxane	ND (0.0788)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
2,2-Dichloropropane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
2-Butanone	ND (0.0394)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
2-Chlorotoluene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
2-Hexanone	ND (0.0394)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
4-Chlorotoluene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
4-Isopropyltoluene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 71  
 Initial Volume: 8.9g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-08  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
4-Methyl-2-Pentanone	ND (0.0394)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
<b>Acetone</b>	<b>0.0623</b> (0.0394)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Benzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Bromobenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Bromochloromethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Bromodichloromethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Bromoform	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Bromomethane	ND (0.0079)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Carbon Disulfide	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Carbon Tetrachloride	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Chlorobenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Chloroethane	ND (0.0079)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Chloroform	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Chloromethane	ND (0.0079)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
cis-1,2-Dichloroethene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
cis-1,3-Dichloropropene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Dibromochloromethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Dibromomethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Dichlorodifluoromethane	ND (0.0079)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Diethyl Ether	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Di-isopropyl ether	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Ethyl tertiary-butyl ether	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Ethylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Hexachlorobutadiene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Isopropylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Methyl tert-Butyl Ether	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Methylene Chloride	ND (0.0197)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 71  
 Initial Volume: 8.9g  
 Final Volume: 10ml  
 Extraction Method: 5035

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-08  
 Sample Matrix: Sediment  
 Units: mg/kg dry  
 Analyst: MEK  
 Prepared: 9/19/24 8:00

**Volatile Organics Low Level**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Naphthalene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
n-Butylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
n-Propylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
sec-Butylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Styrene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
tert-Butylbenzene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Tertiary-amyl methyl ether	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Tetrachloroethene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Tetrahydrofuran	ND (0.0158)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Toluene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
trans-1,2-Dichloroethene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
trans-1,3-Dichloropropene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Trichloroethene	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Trichlorofluoromethane	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Vinyl Chloride	ND (0.0079)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Xylene O	ND (0.0039)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Xylene P,M	ND (0.0079)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917
Xylenes (Total)	ND (0.0079)	---	8260D Low	---	1	MEK	09/19/24 13:47	D4I0360	DI41917

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	122 %		70-130
<i>Surrogate: 4-Bromofluorobenzene</i>	92 %		70-130
<i>Surrogate: Dibromofluoromethane</i>	114 %		70-130
<i>Surrogate: Toluene-d8</i>	99 %		70-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-6 - OVEN DRIED  
 Date Sampled: 09/17/24 10:30  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-09  
 Sample Matrix: Sediment  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	5.57 (0.37)	---	6010D	---	1	CEV	09/24/24 17:52	5.47 100	DI42022
Cadmium	ND (0.09)	---	6010D	---	1	KJB	09/23/24 17:35	5.47 100	DI42022
Chromium	19.6 (0.37)	---	6010D	---	1	KJB	09/23/24 17:35	5.47 100	DI42022
Copper	11.2 (0.91)	---	6010D	---	1	KJB	09/23/24 17:35	5.47 100	DI42022
Lead	13.0 (1.83)	---	6010D	---	1	KJB	09/23/24 17:35	5.47 100	DI42022
Mercury	0.014 (0.009)	---	7471B	---	1	AFV	09/20/24 20:22	2.09 40	DI42024
Nickel	13.3 (0.37)	---	6010D	---	1	KJB	09/23/24 17:35	5.47 100	DI42022
Zinc	46.7 (0.91)	---	6010D	---	1	KJB	09/23/24 17:35	5.47 100	DI42022

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-7 - OVEN DRIED  
 Date Sampled: 09/17/24 11:30  
 Percent Solids: 99

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-10  
 Sample Matrix: Sediment  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	5.42 (0.37)	---	6010D	---	1	CEV	09/24/24 17:56	5.48 100	DI42022
Cadmium	ND (0.09)	---	6010D	---	1	KJB	09/23/24 17:43	5.48 100	DI42022
Chromium	35.5 (0.37)	---	6010D	---	1	KJB	09/23/24 17:43	5.48 100	DI42022
Copper	17.2 (0.92)	---	6010D	---	1	KJB	09/23/24 17:43	5.48 100	DI42022
Lead	13.4 (1.85)	---	6010D	---	1	KJB	09/23/24 17:43	5.48 100	DI42022
Mercury	0.022 (0.009)	---	7471B	---	1	AFV	09/20/24 20:24	2.17 40	DI42024
Nickel	25.1 (0.37)	---	6010D	---	1	KJB	09/23/24 17:43	5.48 100	DI42022
Zinc	61.8 (0.92)	---	6010D	---	1	KJB	09/23/24 17:43	5.48 100	DI42022



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-8 - OVEN DRIED  
 Date Sampled: 09/17/24 12:00  
 Percent Solids: 100

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-11  
 Sample Matrix: Sediment  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	4.27 (0.37)	---	6010D	---	1	CEV	09/24/24 18:01	5.45 100	DI42022
Cadmium	ND (0.09)	---	6010D	---	1	KJB	09/23/24 17:45	5.45 100	DI42022
Chromium	13.0 (0.37)	---	6010D	---	1	KJB	09/23/24 17:45	5.45 100	DI42022
Copper	12.8 (0.92)	---	6010D	---	1	KJB	09/23/24 17:45	5.45 100	DI42022
Lead	21.0 (1.83)	---	6010D	---	1	KJB	09/23/24 17:45	5.45 100	DI42022
Mercury	0.032 (0.009)	---	7471B	---	1	AFV	09/20/24 20:26	2.22 40	DI42024
Nickel	8.21 (0.37)	---	6010D	---	1	KJB	09/23/24 17:45	5.45 100	DI42022
Zinc	37.8 (0.92)	---	6010D	---	1	KJB	09/23/24 17:45	5.45 100	DI42022

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River  
 Client Sample ID: IR-US-BANK - OVEN DRIED  
 Date Sampled: 09/17/24 12:45  
 Percent Solids: 99

ESS Laboratory Work Order: 24I0584  
 ESS Laboratory Sample ID: 24I0584-12  
 Sample Matrix: Sediment  
 Units: mg/kg dry

Extraction Method: 3050B

**Total Metals**

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>IV / FV</u>	<u>Batch</u>
Arsenic	17.0 (0.36)	---	6010D	---	1	CEV	09/24/24 18:16	5.58 100	DI42022
Cadmium	0.52 (0.09)	---	6010D	---	1	KJB	09/23/24 17:47	5.58 100	DI42022
Chromium	23.2 (0.36)	---	6010D	---	1	KJB	09/23/24 17:47	5.58 100	DI42022
Copper	18.9 (0.91)	---	6010D	---	1	KJB	09/23/24 17:47	5.58 100	DI42022
Lead	69.1 (1.81)	---	6010D	---	1	KJB	09/23/24 17:47	5.58 100	DI42022
Mercury	0.166 (0.042)	---	7471B	---	5	AFV	09/20/24 20:29	2.4 40	DI42024
Nickel	11.5 (0.36)	---	6010D	---	1	KJB	09/23/24 17:47	5.58 100	DI42022
Zinc	126 (0.91)	---	6010D	---	1	KJB	09/23/24 17:47	5.58 100	DI42022

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Total Metals**

**Batch DI42022 - 3050B**

**Blank**

Arsenic	ND	0.93	mg/kg wet
Cadmium	ND	0.23	mg/kg wet
Chromium	ND	0.93	mg/kg wet
Copper	ND	2.33	mg/kg wet
Lead	ND	4.65	mg/kg wet
Nickel	ND	0.93	mg/kg wet
Zinc	ND	2.33	mg/kg wet

**LCS**

Arsenic	107	2.60	mg/kg wet	99.50	107	80-120
Cadmium	165	0.65	mg/kg wet	165.0	100	80-120
Chromium	205	2.60	mg/kg wet	194.0	106	80-120
Lead	137	13.0	mg/kg wet	124.0	110	80-120

**LCS**

Copper	23.2	2.31	mg/kg wet	23.15	100	80-120
Nickel	23.4	0.93	mg/kg wet	23.15	101	80-120
Zinc	24.7	2.31	mg/kg wet	23.15	107	80-120

**LCS Dup**

Arsenic	103	3.33	mg/kg wet	99.50	104	80-120	4	30
Cadmium	168	0.83	mg/kg wet	165.0	102	80-120	2	30
Chromium	201	3.33	mg/kg wet	194.0	104	80-120	2	30
Lead	138	16.7	mg/kg wet	124.0	111	80-120	1	30

**LCS Dup**

Copper	23.9	2.38	mg/kg wet	23.81	100	80-120	3	30
Nickel	24.3	0.95	mg/kg wet	23.81	102	80-120	4	30
Zinc	25.6	2.38	mg/kg wet	23.81	107	80-120	4	30

**Reference**

Lead	3710	15.6	mg/kg wet	4490	83	81-120
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**Batch DI42024 - 7471B**

**Blank**

Mercury	ND	0.032	mg/kg wet
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**LCS**

Mercury	12.1	3.05	mg/kg wet	14.40	84	80-120
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**LCS Dup**

Mercury	13.5	3.25	mg/kg wet	14.40	94	80-120	11	30
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**Volatile Organics Low Level**

**Batch DI41917 - 5035**

**Blank**

1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Volatile Organics Low Level**

**Batch DI41917 - 5035**

1,1,2,2-Tetrachloroethane	ND	0.0050	mg/kg wet
1,1,2-Trichloroethane	ND	0.0050	mg/kg wet
1,1-Dichloroethane	ND	0.0050	mg/kg wet
1,1-Dichloroethene	ND	0.0050	mg/kg wet
1,1-Dichloropropene	ND	0.0050	mg/kg wet
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet
1,2-Dibromoethane	ND	0.0050	mg/kg wet
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet
1,2-Dichloroethane	ND	0.0050	mg/kg wet
1,2-Dichloropropane	ND	0.0050	mg/kg wet
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet
1,3-Dichloropropane	ND	0.0050	mg/kg wet
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet
1,4-Dioxane	ND	0.100	mg/kg wet
2,2-Dichloropropane	ND	0.0050	mg/kg wet
2-Butanone	ND	0.0500	mg/kg wet
2-Chlorotoluene	ND	0.0050	mg/kg wet
2-Hexanone	ND	0.0500	mg/kg wet
4-Chlorotoluene	ND	0.0050	mg/kg wet
4-Isopropyltoluene	ND	0.0050	mg/kg wet
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet
Acetone	ND	0.0500	mg/kg wet
Benzene	ND	0.0050	mg/kg wet
Bromobenzene	ND	0.0050	mg/kg wet
Bromochloromethane	ND	0.0050	mg/kg wet
Bromodichloromethane	ND	0.0050	mg/kg wet
Bromoform	ND	0.0050	mg/kg wet
Bromomethane	ND	0.0100	mg/kg wet
Carbon Disulfide	ND	0.0050	mg/kg wet
Carbon Tetrachloride	ND	0.0050	mg/kg wet
Chlorobenzene	ND	0.0050	mg/kg wet
Chloroethane	ND	0.0100	mg/kg wet
Chloroform	ND	0.0050	mg/kg wet
Chloromethane	ND	0.0100	mg/kg wet
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet
Dibromochloromethane	ND	0.0050	mg/kg wet
Dibromomethane	ND	0.0050	mg/kg wet
Dichlorodifluoromethane	ND	0.0100	mg/kg wet

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Volatile Organics Low Level

Batch DI41917 - 5035

Diethyl Ether	ND	0.0050	mg/kg wet							
Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0250	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0200	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							
Xylene P,M	ND	0.0100	mg/kg wet							

Surrogate: 1,2-Dichloroethane-d4	0.0577		mg/kg wet	0.05000		115	70-130
Surrogate: 4-Bromofluorobenzene	0.0448		mg/kg wet	0.05000		90	70-130
Surrogate: Dibromofluoromethane	0.0544		mg/kg wet	0.05000		109	70-130
Surrogate: Toluene-d8	0.0499		mg/kg wet	0.05000		100	70-130

LCS

1,1,1,2-Tetrachloroethane	0.0542	0.0050	mg/kg wet	0.05000		108	70-130
1,1,1-Trichloroethane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130
1,1,2,2-Tetrachloroethane	0.0545	0.0050	mg/kg wet	0.05000		109	40-160
1,1,2-Trichloroethane	0.0544	0.0050	mg/kg wet	0.05000		109	70-130
1,1-Dichloroethane	0.0553	0.0050	mg/kg wet	0.05000		111	70-130
1,1-Dichloroethene	0.0648	0.0050	mg/kg wet	0.05000		130	70-130
1,1-Dichloropropene	0.0590	0.0050	mg/kg wet	0.05000		118	70-130
1,2,3-Trichlorobenzene	0.0612	0.0050	mg/kg wet	0.05000		122	70-130
1,2,3-Trichloropropane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130
1,2,4-Trichlorobenzene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130
1,2,4-Trimethylbenzene	0.0637	0.0050	mg/kg wet	0.05000		127	70-130
1,2-Dibromo-3-Chloropropane	0.0550	0.0050	mg/kg wet	0.05000		110	70-130
1,2-Dibromoethane	0.0523	0.0050	mg/kg wet	0.05000		105	70-130

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Volatile Organics Low Level**

**Batch DI41917 - 5035**

1,2-Dichlorobenzene	0.0562	0.0050	mg/kg wet	0.05000		112	70-130			
1,2-Dichloroethane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
1,2-Dichloropropane	0.0553	0.0050	mg/kg wet	0.05000		111	70-130			
1,3,5-Trimethylbenzene	0.0631	0.0050	mg/kg wet	0.05000		126	70-130			
1,3-Dichlorobenzene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130			
1,3-Dichloropropane	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
1,4-Dichlorobenzene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130			
1,4-Dioxane	0.958	0.100	mg/kg wet	1.000		96	70-130			
2,2-Dichloropropane	0.0599	0.0050	mg/kg wet	0.05000		120	70-130			
2-Butanone	0.303	0.0500	mg/kg wet	0.2500		121	40-160			
2-Chlorotoluene	0.0605	0.0050	mg/kg wet	0.05000		121	70-130			
2-Hexanone	0.270	0.0500	mg/kg wet	0.2500		108	40-160			
4-Chlorotoluene	0.0600	0.0050	mg/kg wet	0.05000		120	70-130			
4-Isopropyltoluene	0.0585	0.0050	mg/kg wet	0.05000		117	70-130			
4-Methyl-2-Pentanone	0.237	0.0500	mg/kg wet	0.2500		95	40-160			
Acetone	0.292	0.0500	mg/kg wet	0.2500		117	40-160			
Benzene	0.0576	0.0050	mg/kg wet	0.05000		115	70-130			
Bromobenzene	0.0598	0.0050	mg/kg wet	0.05000		120	70-130			
Bromochloromethane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130			
Bromodichloromethane	0.0581	0.0050	mg/kg wet	0.05000		116	70-130			
Bromoform	0.0484	0.0050	mg/kg wet	0.05000		97	40-160			
Bromomethane	0.0569	0.0100	mg/kg wet	0.05000		114	40-160			
Carbon Disulfide	0.0628	0.0050	mg/kg wet	0.05000		126	70-130			
Carbon Tetrachloride	0.0564	0.0050	mg/kg wet	0.05000		113	70-130			
Chlorobenzene	0.0516	0.0050	mg/kg wet	0.05000		103	70-130			
Chloroethane	0.0630	0.0100	mg/kg wet	0.05000		126	40-160			
Chloroform	0.0548	0.0050	mg/kg wet	0.05000		110	70-130			
Chloromethane	0.0586	0.0100	mg/kg wet	0.05000		117	40-160			
cis-1,2-Dichloroethene	0.0600	0.0050	mg/kg wet	0.05000		120	70-130			
cis-1,3-Dichloropropene	0.0614	0.0050	mg/kg wet	0.05000		123	40-160			
Dibromochloromethane	0.0546	0.0050	mg/kg wet	0.05000		109	40-160			
Dibromomethane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130			
Dichlorodifluoromethane	0.0393	0.0100	mg/kg wet	0.05000		79	40-160			
Diethyl Ether	0.0634	0.0050	mg/kg wet	0.05000		127	70-130			
Di-isopropyl ether	0.0613	0.0050	mg/kg wet	0.05000		123	70-130			
Ethyl tertiary-butyl ether	0.0618	0.0050	mg/kg wet	0.05000		124	70-130			
Ethylbenzene	0.0579	0.0050	mg/kg wet	0.05000		116	70-130			
Hexachlorobutadiene	0.0558	0.0050	mg/kg wet	0.05000		112	40-160			
Isopropylbenzene	0.0654	0.0050	mg/kg wet	0.05000		131	70-130			B+
Methyl tert-Butyl Ether	0.0607	0.0050	mg/kg wet	0.05000		121	70-130			
Methylene Chloride	0.0552	0.0250	mg/kg wet	0.05000		110	70-130			
Naphthalene	0.0555	0.0050	mg/kg wet	0.05000		111	40-160			
n-Butylbenzene	0.0636	0.0050	mg/kg wet	0.05000		127	70-130			
n-Propylbenzene	0.0634	0.0050	mg/kg wet	0.05000		127	70-130			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Volatile Organics Low Level

Batch DI41917 - 5035

sec-Butylbenzene	0.0594	0.0050	mg/kg wet	0.05000		119	70-130			
Styrene	0.0488	0.0050	mg/kg wet	0.05000		98	40-160			
tert-Butylbenzene	0.0576	0.0050	mg/kg wet	0.05000		115	70-130			
Tertiary-amyl methyl ether	0.0608	0.0050	mg/kg wet	0.05000		122	70-130			
Tetrachloroethene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
Tetrahydrofuran	0.0501	0.0200	mg/kg wet	0.05000		100	70-130			
Toluene	0.0571	0.0050	mg/kg wet	0.05000		114	70-130			
trans-1,2-Dichloroethene	0.0611	0.0050	mg/kg wet	0.05000		122	70-130			
trans-1,3-Dichloropropene	0.0488	0.0050	mg/kg wet	0.05000		98	70-130			
Trichloroethene	0.0561	0.0050	mg/kg wet	0.05000		112	70-130			
Trichlorofluoromethane	0.0570	0.0050	mg/kg wet	0.05000		114	40-160			
Vinyl Chloride	0.0563	0.0100	mg/kg wet	0.05000		113	70-130			
Xylene O	0.0504	0.0050	mg/kg wet	0.05000		101	70-130			
Xylene P,M	0.101	0.0100	mg/kg wet	0.1000		101	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0495</i>		mg/kg wet	<i>0.05000</i>		<i>99</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0481</i>		mg/kg wet	<i>0.05000</i>		<i>96</i>	<i>70-130</i>			
<i>Surrogate: Dibromofluoromethane</i>	<i>0.0497</i>		mg/kg wet	<i>0.05000</i>		<i>99</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0477</i>		mg/kg wet	<i>0.05000</i>		<i>95</i>	<i>70-130</i>			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	1	20	
1,1,1-Trichloroethane	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	6	20	
1,1,2,2-Tetrachloroethane	0.0527	0.0050	mg/kg wet	0.05000		105	40-160	3	20	
1,1,2-Trichloroethane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	5	20	
1,1-Dichloroethane	0.0527	0.0050	mg/kg wet	0.05000		105	70-130	5	20	
1,1-Dichloroethene	0.0627	0.0050	mg/kg wet	0.05000		125	70-130	3	20	
1,1-Dichloropropene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130	6	20	
1,2,3-Trichlorobenzene	0.0603	0.0050	mg/kg wet	0.05000		121	70-130	2	20	
1,2,3-Trichloropropane	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	5	20	
1,2,4-Trichlorobenzene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	0.4	20	
1,2,4-Trimethylbenzene	0.0634	0.0050	mg/kg wet	0.05000		127	70-130	0.5	20	
1,2-Dibromo-3-Chloropropane	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	5	20	
1,2-Dibromoethane	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	0.04	20	
1,2-Dichlorobenzene	0.0553	0.0050	mg/kg wet	0.05000		111	70-130	2	20	
1,2-Dichloroethane	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	5	20	
1,2-Dichloropropane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	4	20	
1,3,5-Trimethylbenzene	0.0624	0.0050	mg/kg wet	0.05000		125	70-130	1	20	
1,3-Dichlorobenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	2	20	
1,3-Dichloropropane	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	0.1	20	
1,4-Dichlorobenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	1	20	
1,4-Dioxane	0.926	0.100	mg/kg wet	1.000		93	70-130	3	20	
2,2-Dichloropropane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	6	20	
2-Butanone	0.287	0.0500	mg/kg wet	0.2500		115	40-160	5	20	
2-Chlorotoluene	0.0609	0.0050	mg/kg wet	0.05000		122	70-130	0.7	20	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Volatile Organics Low Level**

**Batch DI41917 - 5035**

2-Hexanone	0.265	0.0500	mg/kg wet	0.2500		106	40-160	2	20	
4-Chlorotoluene	0.0587	0.0050	mg/kg wet	0.05000		117	70-130	2	20	
4-Isopropyltoluene	0.0576	0.0050	mg/kg wet	0.05000		115	70-130	2	20	
4-Methyl-2-Pentanone	0.220	0.0500	mg/kg wet	0.2500		88	40-160	7	20	
Acetone	0.279	0.0500	mg/kg wet	0.2500		112	40-160	4	20	
Benzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	4	20	
Bromobenzene	0.0598	0.0050	mg/kg wet	0.05000		120	70-130	0.03	20	
Bromochloromethane	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	3	20	
Bromodichloromethane	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	5	20	
Bromoform	0.0476	0.0050	mg/kg wet	0.05000		95	40-160	2	20	
Bromomethane	0.0542	0.0100	mg/kg wet	0.05000		108	40-160	5	20	
Carbon Disulfide	0.0599	0.0050	mg/kg wet	0.05000		120	70-130	5	20	
Carbon Tetrachloride	0.0539	0.0050	mg/kg wet	0.05000		108	70-130	5	20	
Chlorobenzene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	1	20	
Chloroethane	0.0603	0.0100	mg/kg wet	0.05000		121	40-160	4	20	
Chloroform	0.0521	0.0050	mg/kg wet	0.05000		104	70-130	5	20	
Chloromethane	0.0555	0.0100	mg/kg wet	0.05000		111	40-160	5	20	
cis-1,2-Dichloroethene	0.0577	0.0050	mg/kg wet	0.05000		115	70-130	4	20	
cis-1,3-Dichloropropene	0.0593	0.0050	mg/kg wet	0.05000		119	40-160	3	20	
Dibromochloromethane	0.0540	0.0050	mg/kg wet	0.05000		108	40-160	1	20	
Dibromomethane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	6	20	
Dichlorodifluoromethane	0.0361	0.0100	mg/kg wet	0.05000		72	40-160	9	20	
Diethyl Ether	0.0607	0.0050	mg/kg wet	0.05000		121	70-130	4	20	
Di-isopropyl ether	0.0589	0.0050	mg/kg wet	0.05000		118	70-130	4	20	
Ethyl tertiary-butyl ether	0.0594	0.0050	mg/kg wet	0.05000		119	70-130	4	20	
Ethylbenzene	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	1	20	
Hexachlorobutadiene	0.0554	0.0050	mg/kg wet	0.05000		111	40-160	0.8	20	
Isopropylbenzene	0.0647	0.0050	mg/kg wet	0.05000		129	70-130	1	20	
Methyl tert-Butyl Ether	0.0582	0.0050	mg/kg wet	0.05000		116	70-130	4	20	
Methylene Chloride	0.0526	0.0250	mg/kg wet	0.05000		105	70-130	5	20	
Naphthalene	0.0546	0.0050	mg/kg wet	0.05000		109	40-160	2	20	
n-Butylbenzene	0.0630	0.0050	mg/kg wet	0.05000		126	70-130	0.9	20	
n-Propylbenzene	0.0628	0.0050	mg/kg wet	0.05000		126	70-130	0.9	20	
sec-Butylbenzene	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	2	20	
Styrene	0.0492	0.0050	mg/kg wet	0.05000		98	40-160	0.8	20	
tert-Butylbenzene	0.0570	0.0050	mg/kg wet	0.05000		114	70-130	1	20	
Tertiary-amyl methyl ether	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	4	20	
Tetrachloroethene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130	4	20	
Tetrahydrofuran	0.0461	0.0200	mg/kg wet	0.05000		92	70-130	8	20	
Toluene	0.0548	0.0050	mg/kg wet	0.05000		110	70-130	4	20	
trans-1,2-Dichloroethene	0.0589	0.0050	mg/kg wet	0.05000		118	70-130	4	20	
trans-1,3-Dichloropropene	0.0470	0.0050	mg/kg wet	0.05000		94	70-130	4	20	
Trichloroethene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	5	20	
Trichlorofluoromethane	0.0538	0.0050	mg/kg wet	0.05000		108	40-160	6	20	



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Volatile Organics Low Level**

**Batch DI41917 - 5035**

Vinyl Chloride	0.0536	0.0100	mg/kg wet	0.05000		107	70-130	5	20	
Xylene O	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	2	20	
Xylene P,M	0.103	0.0100	mg/kg wet	0.1000		103	70-130	2	20	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0471</i>		mg/kg wet	<i>0.05000</i>		<i>94</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0460</i>		mg/kg wet	<i>0.05000</i>		<i>92</i>	<i>70-130</i>			
<i>Surrogate: Dibromofluoromethane</i>	<i>0.0475</i>		mg/kg wet	<i>0.05000</i>		<i>95</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0492</i>		mg/kg wet	<i>0.05000</i>		<i>98</i>	<i>70-130</i>			

**Semi-Volatile Organic Compounds**

**Batch DI41728 - 3546**

<b>Blank</b>										
1,1-Biphenyl	ND	0.025	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.250	mg/kg wet							
1,2-Dichlorobenzene	ND	0.250	mg/kg wet							
1,3-Dichlorobenzene	ND	0.250	mg/kg wet							
1,4-Dichlorobenzene	ND	0.250	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.250	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.250	mg/kg wet							
2,4-Dichlorophenol	ND	0.250	mg/kg wet							
2,4-Dimethylphenol	ND	0.250	mg/kg wet							
2,4-Dinitrophenol	ND	1.00	mg/kg wet							
2,4-Dinitrotoluene	ND	0.250	mg/kg wet							
2,6-Dinitrotoluene	ND	0.250	mg/kg wet							
2-Chloronaphthalene	ND	0.250	mg/kg wet							
2-Chlorophenol	ND	0.250	mg/kg wet							
2-Methylnaphthalene	ND	0.250	mg/kg wet							
2-Methylphenol	ND	0.250	mg/kg wet							
2-Nitrophenol	ND	0.500	mg/kg wet							
3,3'-Dichlorobenzidine	ND	0.250	mg/kg wet							
3+4-Methylphenol	ND	0.250	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.250	mg/kg wet							
4-Chloroaniline	ND	0.250	mg/kg wet							
4-Nitrophenol	ND	1.00	mg/kg wet							
Acenaphthene	ND	0.250	mg/kg wet							
Acenaphthylene	ND	0.250	mg/kg wet							
Acetophenone	ND	0.250	mg/kg wet							
Aniline	ND	0.250	mg/kg wet							
Anthracene	ND	0.250	mg/kg wet							
Azobenzene	ND	0.250	mg/kg wet							
Benzo(a)anthracene	ND	0.250	mg/kg wet							
Benzo(a)pyrene	ND	0.250	mg/kg wet							
Benzo(b)fluoranthene	ND	0.250	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.250	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

**Batch DI41728 - 3546**

Benzo(k)fluoranthene	ND	0.250	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.250	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.250	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.250	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.250	mg/kg wet							
Butylbenzylphthalate	ND	0.250	mg/kg wet							
Chrysene	ND	0.250	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.250	mg/kg wet							
Dibenzofuran	ND	0.250	mg/kg wet							
Diethylphthalate	ND	0.250	mg/kg wet							
Dimethylphthalate	ND	0.250	mg/kg wet							
Di-n-butylphthalate	ND	0.250	mg/kg wet							
Di-n-octylphthalate	ND	0.500	mg/kg wet							
Fluoranthene	ND	0.250	mg/kg wet							
Fluorene	ND	0.250	mg/kg wet							
Hexachlorobenzene	ND	0.250	mg/kg wet							
Hexachlorobutadiene	ND	0.250	mg/kg wet							
Hexachloroethane	ND	0.250	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.250	mg/kg wet							
Isophorone	ND	0.250	mg/kg wet							
Naphthalene	ND	0.250	mg/kg wet							
Nitrobenzene	ND	0.250	mg/kg wet							
N-Nitrosodimethylamine	ND	0.250	mg/kg wet							
Pentachlorophenol	ND	1.00	mg/kg wet							
Phenanthrene	ND	0.250	mg/kg wet							
Phenol	ND	0.250	mg/kg wet							
Pyrene	ND	0.250	mg/kg wet							

Surrogate: 1,2-Dichlorobenzene-d4	2.38		mg/kg wet	2.500		95	30-130			
Surrogate: 2,4,6-Tribromophenol	3.20		mg/kg wet	3.750		85	30-130			
Surrogate: 2-Chlorophenol-d4	3.96		mg/kg wet	3.750		106	30-130			
Surrogate: 2-Fluorobiphenyl	2.45		mg/kg wet	2.500		98	30-130			
Surrogate: 2-Fluorophenol	3.75		mg/kg wet	3.750		100	30-130			
Surrogate: Nitrobenzene-d5	2.36		mg/kg wet	2.500		94	30-130			
Surrogate: Phenol-d6	4.07		mg/kg wet	3.750		109	30-130			
Surrogate: p-Terphenyl-d14	2.50		mg/kg wet	2.500		100	30-130			

**LCS**

1,1-Biphenyl	2.38	0.025	mg/kg wet	2.500		95	40-140			
1,2,4-Trichlorobenzene	2.07	0.250	mg/kg wet	2.500		83	40-140			
1,2-Dichlorobenzene	2.38	0.250	mg/kg wet	2.500		95	40-140			
1,3-Dichlorobenzene	2.29	0.250	mg/kg wet	2.500		92	40-140			
1,4-Dichlorobenzene	2.38	0.250	mg/kg wet	2.500		95	40-140			
2,4,5-Trichlorophenol	2.43	0.250	mg/kg wet	2.500		97	30-130			
2,4,6-Trichlorophenol	2.44	0.250	mg/kg wet	2.500		98	30-130			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI41728 - 3546**

2,4-Dichlorophenol	2.18	0.250	mg/kg wet	2.500		87	30-130			
2,4-Dimethylphenol	2.66	0.250	mg/kg wet	2.500		106	30-130			
2,4-Dinitrophenol	1.34	1.00	mg/kg wet	2.500		54	15-140			
2,4-Dinitrotoluene	2.53	0.250	mg/kg wet	2.500		101	40-140			
2,6-Dinitrotoluene	2.53	0.250	mg/kg wet	2.500		101	40-140			
2-Chloronaphthalene	2.18	0.250	mg/kg wet	2.500		87	40-140			
2-Chlorophenol	2.35	0.250	mg/kg wet	2.500		94	30-130			
2-Methylnaphthalene	2.11	0.250	mg/kg wet	2.500		84	40-140			
2-Methylphenol	2.50	0.250	mg/kg wet	2.500		100	15-140			
2-Nitrophenol	2.14	0.500	mg/kg wet	2.500		86	30-130			
3,3'-Dichlorobenzidine	2.76	0.250	mg/kg wet	2.500		110	40-140			
3+4-Methylphenol	5.13	0.250	mg/kg wet	5.000		103	15-140			
4-Bromophenyl-phenylether	2.70	0.250	mg/kg wet	2.500		108	40-140			
4-Chloroaniline	2.10	0.250	mg/kg wet	2.500		84	15-140			
4-Nitrophenol	2.06	1.00	mg/kg wet	2.500		82	15-140			
Acenaphthene	2.37	0.250	mg/kg wet	2.500		95	40-140			
Acenaphthylene	2.45	0.250	mg/kg wet	2.500		98	40-140			
Acetophenone	2.39	0.250	mg/kg wet	2.500		96	40-140			
Aniline	2.11	0.250	mg/kg wet	2.500		84	40-140			
Anthracene	2.51	0.250	mg/kg wet	2.500		101	40-140			
Azobenzene	2.51	0.250	mg/kg wet	2.500		100	40-140			
Benzo(a)anthracene	2.47	0.250	mg/kg wet	2.500		99	40-140			
Benzo(a)pyrene	2.56	0.250	mg/kg wet	2.500		103	40-140			
Benzo(b)fluoranthene	2.28	0.250	mg/kg wet	2.500		91	40-140			
Benzo(g,h,i)perylene	2.80	0.250	mg/kg wet	2.500		112	40-140			
Benzo(k)fluoranthene	2.42	0.250	mg/kg wet	2.500		97	40-140			
bis(2-Chloroethoxy)methane	2.15	0.250	mg/kg wet	2.500		86	40-140			
bis(2-Chloroethyl)ether	2.37	0.250	mg/kg wet	2.500		95	40-140			
bis(2-chloroisopropyl)Ether	2.21	0.250	mg/kg wet	2.500		88	40-140			
bis(2-Ethylhexyl)phthalate	2.48	0.250	mg/kg wet	2.500		99	40-140			
Butylbenzylphthalate	2.67	0.250	mg/kg wet	2.500		107	40-140			
Chrysene	2.53	0.250	mg/kg wet	2.500		101	40-140			
Dibenzo(a,h)Anthracene	2.76	0.250	mg/kg wet	2.500		110	40-140			
Dibenzofuran	2.34	0.250	mg/kg wet	2.500		94	40-140			
Diethylphthalate	2.62	0.250	mg/kg wet	2.500		105	40-140			
Dimethylphthalate	2.58	0.250	mg/kg wet	2.500		103	15-140			
Di-n-butylphthalate	2.82	0.250	mg/kg wet	2.500		113	40-140			
Di-n-octylphthalate	2.52	0.500	mg/kg wet	2.500		101	40-140			
Fluoranthene	2.46	0.250	mg/kg wet	2.500		99	40-140			
Fluorene	2.49	0.250	mg/kg wet	2.500		99	40-140			
Hexachlorobenzene	2.40	0.250	mg/kg wet	2.500		96	40-140			
Hexachlorobutadiene	2.13	0.250	mg/kg wet	2.500		85	40-140			
Hexachloroethane	2.31	0.250	mg/kg wet	2.500		92	40-140			
Indeno(1,2,3-cd)Pyrene	2.62	0.250	mg/kg wet	2.500		105	40-140			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI41728 - 3546**

Isophorone	2.09	0.250	mg/kg wet	2.500		84	40-140			
Naphthalene	2.01	0.250	mg/kg wet	2.500		81	40-140			
Nitrobenzene	2.19	0.250	mg/kg wet	2.500		87	40-140			
N-Nitrosodimethylamine	2.23	0.250	mg/kg wet	2.500		89	40-140			
Pentachlorophenol	1.77	1.00	mg/kg wet	2.500		71	15-140			
Phenanthrene	2.37	0.250	mg/kg wet	2.500		95	40-140			
Phenol	2.52	0.250	mg/kg wet	2.500		101	15-140			
Pyrene	2.66	0.250	mg/kg wet	2.500		106	40-140			

<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.34		mg/kg wet	2.500		94	30-130			
<i>Surrogate: 2,4,6-Tribromophenol</i>	3.76		mg/kg wet	3.750		100	30-130			
<i>Surrogate: 2-Chlorophenol-d4</i>	4.00		mg/kg wet	3.750		107	30-130			
<i>Surrogate: 2-Fluorobiphenyl</i>	2.53		mg/kg wet	2.500		101	30-130			
<i>Surrogate: 2-Fluorophenol</i>	3.76		mg/kg wet	3.750		100	30-130			
<i>Surrogate: Nitrobenzene-d5</i>	2.17		mg/kg wet	2.500		87	30-130			
<i>Surrogate: Phenol-d6</i>	4.18		mg/kg wet	3.750		111	30-130			
<i>Surrogate: p-Terphenyl-d14</i>	2.67		mg/kg wet	2.500		107	30-130			

**LCS Dup**

1,1-Biphenyl	2.45	0.025	mg/kg wet	2.500		98	40-140	3	30	
1,2,4-Trichlorobenzene	2.11	0.250	mg/kg wet	2.500		84	40-140	2	30	
1,2-Dichlorobenzene	2.44	0.250	mg/kg wet	2.500		98	40-140	3	30	
1,3-Dichlorobenzene	2.34	0.250	mg/kg wet	2.500		94	40-140	2	30	
1,4-Dichlorobenzene	2.45	0.250	mg/kg wet	2.500		98	40-140	3	30	
2,4,5-Trichlorophenol	2.45	0.250	mg/kg wet	2.500		98	30-130	0.5	30	
2,4,6-Trichlorophenol	2.52	0.250	mg/kg wet	2.500		101	30-130	3	30	
2,4-Dichlorophenol	2.25	0.250	mg/kg wet	2.500		90	30-130	3	30	
2,4-Dimethylphenol	2.70	0.250	mg/kg wet	2.500		108	30-130	2	30	
2,4-Dinitrophenol	1.38	1.00	mg/kg wet	2.500		55	15-140	3	30	
2,4-Dinitrotoluene	2.52	0.250	mg/kg wet	2.500		101	40-140	0.08	30	
2,6-Dinitrotoluene	2.53	0.250	mg/kg wet	2.500		101	40-140	0.1	30	
2-Chloronaphthalene	2.23	0.250	mg/kg wet	2.500		89	40-140	2	30	
2-Chlorophenol	2.38	0.250	mg/kg wet	2.500		95	30-130	2	30	
2-Methylnaphthalene	2.14	0.250	mg/kg wet	2.500		86	40-140	2	30	
2-Methylphenol	2.49	0.250	mg/kg wet	2.500		100	15-140	0.3	30	
2-Nitrophenol	2.24	0.500	mg/kg wet	2.500		90	30-130	5	30	
3,3'-Dichlorobenzidine	2.78	0.250	mg/kg wet	2.500		111	40-140	0.9	30	
3+4-Methylphenol	5.10	0.250	mg/kg wet	5.000		102	15-140	0.6	30	
4-Bromophenyl-phenylether	2.89	0.250	mg/kg wet	2.500		116	40-140	7	30	
4-Chloroaniline	2.12	0.250	mg/kg wet	2.500		85	15-140	0.8	30	
4-Nitrophenol	2.04	1.00	mg/kg wet	2.500		82	15-140	0.9	30	
Acenaphthene	2.40	0.250	mg/kg wet	2.500		96	40-140	1	30	
Acenaphthylene	2.47	0.250	mg/kg wet	2.500		99	40-140	1	30	
Acetophenone	2.40	0.250	mg/kg wet	2.500		96	40-140	0.5	30	
Aniline	2.12	0.250	mg/kg wet	2.500		85	40-140	0.7	30	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI41728 - 3546**

Anthracene	2.57	0.250	mg/kg wet	2.500		103	40-140	2	30	
Azobenzene	2.64	0.250	mg/kg wet	2.500		106	40-140	5	30	
Benzo(a)anthracene	2.54	0.250	mg/kg wet	2.500		102	40-140	3	30	
Benzo(a)pyrene	2.65	0.250	mg/kg wet	2.500		106	40-140	3	30	
Benzo(b)fluoranthene	2.38	0.250	mg/kg wet	2.500		95	40-140	4	30	
Benzo(g,h,i)perylene	3.01	0.250	mg/kg wet	2.500		120	40-140	7	30	
Benzo(k)fluoranthene	2.48	0.250	mg/kg wet	2.500		99	40-140	3	30	
bis(2-Chloroethoxy)methane	2.22	0.250	mg/kg wet	2.500		89	40-140	3	30	
bis(2-Chloroethyl)ether	2.46	0.250	mg/kg wet	2.500		98	40-140	4	30	
bis(2-chloroisopropyl)Ether	2.28	0.250	mg/kg wet	2.500		91	40-140	3	30	
bis(2-Ethylhexyl)phthalate	2.54	0.250	mg/kg wet	2.500		102	40-140	3	30	
Butylbenzylphthalate	2.80	0.250	mg/kg wet	2.500		112	40-140	5	30	
Chrysene	2.62	0.250	mg/kg wet	2.500		105	40-140	4	30	
Dibenzo(a,h)Anthracene	2.91	0.250	mg/kg wet	2.500		117	40-140	5	30	
Dibenzofuran	2.41	0.250	mg/kg wet	2.500		96	40-140	3	30	
Diethylphthalate	2.62	0.250	mg/kg wet	2.500		105	40-140	0.002	30	
Dimethylphthalate	2.61	0.250	mg/kg wet	2.500		104	15-140	1	30	
Di-n-butylphthalate	2.81	0.250	mg/kg wet	2.500		112	40-140	0.3	30	
Di-n-octylphthalate	2.64	0.500	mg/kg wet	2.500		105	40-140	4	30	
Fluoranthene	2.41	0.250	mg/kg wet	2.500		97	40-140	2	30	
Fluorene	2.49	0.250	mg/kg wet	2.500		99	40-140	0	30	
Hexachlorobenzene	2.48	0.250	mg/kg wet	2.500		99	40-140	3	30	
Hexachlorobutadiene	2.22	0.250	mg/kg wet	2.500		89	40-140	4	30	
Hexachloroethane	2.33	0.250	mg/kg wet	2.500		93	40-140	0.8	30	
Indeno(1,2,3-cd)Pyrene	2.78	0.250	mg/kg wet	2.500		111	40-140	6	30	
Isophorone	2.14	0.250	mg/kg wet	2.500		85	40-140	2	30	
Naphthalene	2.03	0.250	mg/kg wet	2.500		81	40-140	1	30	
Nitrobenzene	2.24	0.250	mg/kg wet	2.500		90	40-140	2	30	
N-Nitrosodimethylamine	2.33	0.250	mg/kg wet	2.500		93	40-140	4	30	
Pentachlorophenol	1.82	1.00	mg/kg wet	2.500		73	15-140	3	30	
Phenanthrene	2.43	0.250	mg/kg wet	2.500		97	40-140	2	30	
Phenol	2.50	0.250	mg/kg wet	2.500		100	15-140	0.9	30	
Pyrene	2.86	0.250	mg/kg wet	2.500		114	40-140	7	30	
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Surrogate: 1,2-Dichlorobenzene-d4	2.31		mg/kg wet	2.500		92	30-130			
Surrogate: 2,4,6-Tribromophenol	3.79		mg/kg wet	3.750		101	30-130			
Surrogate: 2-Chlorophenol-d4	3.79		mg/kg wet	3.750		101	30-130			
Surrogate: 2-Fluorobiphenyl	2.44		mg/kg wet	2.500		97	30-130			
Surrogate: 2-Fluorophenol	3.67		mg/kg wet	3.750		98	30-130			
Surrogate: Nitrobenzene-d5	2.11		mg/kg wet	2.500		85	30-130			
Surrogate: Phenol-d6	3.99		mg/kg wet	3.750		106	30-130			
Surrogate: p-Terphenyl-d14	2.74		mg/kg wet	2.500		110	30-130			

**Batch DI42723 - 3546**

**Blank**

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**Semi-Volatile Organic Compounds**

**Batch DI42723 - 3546**

1,1-Biphenyl	ND	0.025	mg/kg wet
1,2,4-Trichlorobenzene	ND	0.250	mg/kg wet
1,2-Dichlorobenzene	ND	0.250	mg/kg wet
1,3-Dichlorobenzene	ND	0.250	mg/kg wet
1,4-Dichlorobenzene	ND	0.250	mg/kg wet
2,4,5-Trichlorophenol	ND	0.250	mg/kg wet
2,4,6-Trichlorophenol	ND	0.250	mg/kg wet
2,4-Dichlorophenol	ND	0.250	mg/kg wet
2,4-Dimethylphenol	ND	0.250	mg/kg wet
2,4-Dinitrophenol	ND	1.00	mg/kg wet
2,4-Dinitrotoluene	ND	0.250	mg/kg wet
2,6-Dinitrotoluene	ND	0.250	mg/kg wet
2-Chloronaphthalene	ND	0.250	mg/kg wet
2-Chlorophenol	ND	0.250	mg/kg wet
2-Methylnaphthalene	ND	0.250	mg/kg wet
2-Methylphenol	ND	0.250	mg/kg wet
2-Nitrophenol	ND	0.500	mg/kg wet
3,3'-Dichlorobenzidine	ND	0.250	mg/kg wet
3+4-Methylphenol	ND	0.250	mg/kg wet
4-Bromophenyl-phenylether	ND	0.250	mg/kg wet
4-Chloroaniline	ND	0.250	mg/kg wet
4-Nitrophenol	ND	1.00	mg/kg wet
Acenaphthene	ND	0.250	mg/kg wet
Acenaphthylene	ND	0.250	mg/kg wet
Acetophenone	ND	0.250	mg/kg wet
Aniline	ND	0.250	mg/kg wet
Anthracene	ND	0.250	mg/kg wet
Azobenzene	ND	0.250	mg/kg wet
Benzo(a)anthracene	ND	0.250	mg/kg wet
Benzo(a)pyrene	ND	0.250	mg/kg wet
Benzo(b)fluoranthene	ND	0.250	mg/kg wet
Benzo(g,h,i)perylene	ND	0.250	mg/kg wet
Benzo(k)fluoranthene	ND	0.250	mg/kg wet
bis(2-Chloroethoxy)methane	ND	0.250	mg/kg wet
bis(2-Chloroethyl)ether	ND	0.250	mg/kg wet
bis(2-chloroisopropyl)Ether	ND	0.250	mg/kg wet
bis(2-Ethylhexyl)phthalate	ND	0.250	mg/kg wet
Butylbenzylphthalate	ND	0.250	mg/kg wet
Chrysene	ND	0.250	mg/kg wet
Dibenzo(a,h)Anthracene	ND	0.250	mg/kg wet
Dibenzofuran	ND	0.250	mg/kg wet
Diethylphthalate	ND	0.250	mg/kg wet
Dimethylphthalate	ND	0.250	mg/kg wet
Di-n-butylphthalate	ND	0.250	mg/kg wet

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

Batch DI42723 - 3546

Di-n-octylphthalate	ND	0.500	mg/kg wet							
Fluoranthene	ND	0.250	mg/kg wet							
Fluorene	ND	0.250	mg/kg wet							
Hexachlorobenzene	ND	0.250	mg/kg wet							
Hexachlorobutadiene	ND	0.250	mg/kg wet							
Hexachloroethane	ND	0.250	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.250	mg/kg wet							
Isophorone	ND	0.250	mg/kg wet							
Naphthalene	ND	0.250	mg/kg wet							
Nitrobenzene	ND	0.250	mg/kg wet							
N-Nitrosodimethylamine	ND	0.250	mg/kg wet							
Pentachlorophenol	ND	1.00	mg/kg wet							
Phenanthrene	ND	0.250	mg/kg wet							
Phenol	ND	0.250	mg/kg wet							
Pyrene	ND	0.250	mg/kg wet							

Surrogate: 1,2-Dichlorobenzene-d4	2.57		mg/kg wet	2.500		103	30-130			
Surrogate: 2,4,6-Tribromophenol	3.80		mg/kg wet	3.750		101	30-130			
Surrogate: 2-Chlorophenol-d4	4.12		mg/kg wet	3.750		110	30-130			
Surrogate: 2-Fluorobiphenyl	2.46		mg/kg wet	2.500		99	30-130			
Surrogate: 2-Fluorophenol	4.36		mg/kg wet	3.750		116	30-130			
Surrogate: Nitrobenzene-d5	2.75		mg/kg wet	2.500		110	30-130			
Surrogate: Phenol-d6	4.59		mg/kg wet	3.750		122	30-130			
Surrogate: p-Terphenyl-d14	2.71		mg/kg wet	2.500		108	30-130			

LCS

1,1-Biphenyl	2.43	0.025	mg/kg wet	2.500		97	40-140			
1,2,4-Trichlorobenzene	2.13	0.250	mg/kg wet	2.500		85	40-140			
1,2-Dichlorobenzene	2.36	0.250	mg/kg wet	2.500		94	40-140			
1,3-Dichlorobenzene	2.42	0.250	mg/kg wet	2.500		97	40-140			
1,4-Dichlorobenzene	2.46	0.250	mg/kg wet	2.500		98	40-140			
2,4,5-Trichlorophenol	2.49	0.250	mg/kg wet	2.500		100	30-130			
2,4,6-Trichlorophenol	2.41	0.250	mg/kg wet	2.500		96	30-130			
2,4-Dichlorophenol	2.10	0.250	mg/kg wet	2.500		84	30-130			
2,4-Dimethylphenol	2.70	0.250	mg/kg wet	2.500		108	30-130			
2,4-Dinitrophenol	2.15	1.00	mg/kg wet	2.500		86	15-140			
2,4-Dinitrotoluene	2.54	0.250	mg/kg wet	2.500		102	40-140			
2,6-Dinitrotoluene	2.56	0.250	mg/kg wet	2.500		102	40-140			
2-Chloronaphthalene	2.42	0.250	mg/kg wet	2.500		97	40-140			
2-Chlorophenol	2.50	0.250	mg/kg wet	2.500		100	30-130			
2-Methylnaphthalene	2.17	0.250	mg/kg wet	2.500		87	40-140			
2-Methylphenol	2.55	0.250	mg/kg wet	2.500		102	15-140			
2-Nitrophenol	2.20	0.500	mg/kg wet	2.500		88	30-130			
3,3'-Dichlorobenzidine	2.57	0.250	mg/kg wet	2.500		103	40-140			
3+4-Methylphenol	5.36	0.250	mg/kg wet	5.000		107	15-140			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

**Batch DI42723 - 3546**

4-Bromophenyl-phenylether	2.56	0.250	mg/kg wet	2.500		102	40-140			
4-Chloroaniline	1.97	0.250	mg/kg wet	2.500		79	15-140			
4-Nitrophenol	2.33	1.00	mg/kg wet	2.500		93	15-140			
Acenaphthene	2.52	0.250	mg/kg wet	2.500		101	40-140			
Acenaphthylene	2.71	0.250	mg/kg wet	2.500		108	40-140			
Acetophenone	2.56	0.250	mg/kg wet	2.500		102	40-140			
Aniline	1.94	0.250	mg/kg wet	2.500		78	40-140			
Anthracene	2.62	0.250	mg/kg wet	2.500		105	40-140			
Azobenzene	3.00	0.250	mg/kg wet	2.500		120	40-140			
Benzo(a)anthracene	2.61	0.250	mg/kg wet	2.500		104	40-140			
Benzo(a)pyrene	2.69	0.250	mg/kg wet	2.500		108	40-140			
Benzo(b)fluoranthene	2.45	0.250	mg/kg wet	2.500		98	40-140			
Benzo(g,h,i)perylene	2.75	0.250	mg/kg wet	2.500		110	40-140			
Benzo(k)fluoranthene	2.65	0.250	mg/kg wet	2.500		106	40-140			
bis(2-Chloroethoxy)methane	2.46	0.250	mg/kg wet	2.500		99	40-140			
bis(2-Chloroethyl)ether	2.68	0.250	mg/kg wet	2.500		107	40-140			
bis(2-chloroisopropyl)Ether	2.26	0.250	mg/kg wet	2.500		91	40-140			
bis(2-Ethylhexyl)phthalate	2.98	0.250	mg/kg wet	2.500		119	40-140			
Butylbenzylphthalate	3.05	0.250	mg/kg wet	2.500		122	40-140			
Chrysene	2.60	0.250	mg/kg wet	2.500		104	40-140			
Dibenzo(a,h)Anthracene	2.67	0.250	mg/kg wet	2.500		107	40-140			
Dibenzofuran	2.36	0.250	mg/kg wet	2.500		94	40-140			
Diethylphthalate	2.78	0.250	mg/kg wet	2.500		111	40-140			
Dimethylphthalate	2.74	0.250	mg/kg wet	2.500		109	15-140			
Di-n-butylphthalate	3.01	0.250	mg/kg wet	2.500		120	40-140			
Di-n-octylphthalate	3.21	0.500	mg/kg wet	2.500		128	40-140			
Fluoranthene	2.56	0.250	mg/kg wet	2.500		102	40-140			
Fluorene	2.52	0.250	mg/kg wet	2.500		101	40-140			
Hexachlorobenzene	2.22	0.250	mg/kg wet	2.500		89	40-140			
Hexachlorobutadiene	2.16	0.250	mg/kg wet	2.500		87	40-140			
Hexachloroethane	2.56	0.250	mg/kg wet	2.500		102	40-140			
Indeno(1,2,3-cd)Pyrene	2.57	0.250	mg/kg wet	2.500		103	40-140			
Isophorone	2.46	0.250	mg/kg wet	2.500		98	40-140			
Naphthalene	2.22	0.250	mg/kg wet	2.500		89	40-140			
Nitrobenzene	2.56	0.250	mg/kg wet	2.500		103	40-140			
N-Nitrosodimethylamine	2.33	0.250	mg/kg wet	2.500		93	40-140			
Pentachlorophenol	1.75	1.00	mg/kg wet	2.500		70	15-140			
Phenanthrene	2.55	0.250	mg/kg wet	2.500		102	40-140			
Phenol	2.66	0.250	mg/kg wet	2.500		106	15-140			
Pyrene	2.82	0.250	mg/kg wet	2.500		113	40-140			

Surrogate: 1,2-Dichlorobenzene-d4	2.54		mg/kg wet	2.500		102	30-130			
Surrogate: 2,4,6-Tribromophenol	3.59		mg/kg wet	3.750		96	30-130			
Surrogate: 2-Chlorophenol-d4	4.10		mg/kg wet	3.750		109	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

Batch DI42723 - 3546

Surrogate: 2-Fluorobiphenyl	2.55		mg/kg wet	2.500		102	30-130			
Surrogate: 2-Fluorophenol	4.27		mg/kg wet	3.750		114	30-130			
Surrogate: Nitrobenzene-d5	2.54		mg/kg wet	2.500		102	30-130			
Surrogate: Phenol-d6	4.62		mg/kg wet	3.750		123	30-130			
Surrogate: p-Terphenyl-d14	2.69		mg/kg wet	2.500		108	30-130			

LCS Dup

1,1-Biphenyl	2.48	0.025	mg/kg wet	2.500		99	40-140	2	30	
1,2,4-Trichlorobenzene	2.19	0.250	mg/kg wet	2.500		87	40-140	3	30	
1,2-Dichlorobenzene	2.45	0.250	mg/kg wet	2.500		98	40-140	4	30	
1,3-Dichlorobenzene	2.52	0.250	mg/kg wet	2.500		101	40-140	4	30	
1,4-Dichlorobenzene	2.47	0.250	mg/kg wet	2.500		99	40-140	0.4	30	
2,4,5-Trichlorophenol	2.58	0.250	mg/kg wet	2.500		103	30-130	3	30	
2,4,6-Trichlorophenol	2.52	0.250	mg/kg wet	2.500		101	30-130	4	30	
2,4-Dichlorophenol	2.17	0.250	mg/kg wet	2.500		87	30-130	3	30	
2,4-Dimethylphenol	2.70	0.250	mg/kg wet	2.500		108	30-130	0.2	30	
2,4-Dinitrophenol	2.27	1.00	mg/kg wet	2.500		91	15-140	5	30	
2,4-Dinitrotoluene	2.61	0.250	mg/kg wet	2.500		104	40-140	3	30	
2,6-Dinitrotoluene	2.51	0.250	mg/kg wet	2.500		101	40-140	2	30	
2-Chloronaphthalene	2.51	0.250	mg/kg wet	2.500		100	40-140	4	30	
2-Chlorophenol	2.68	0.250	mg/kg wet	2.500		107	30-130	7	30	
2-Methylnaphthalene	2.17	0.250	mg/kg wet	2.500		87	40-140	0.2	30	
2-Methylphenol	2.60	0.250	mg/kg wet	2.500		104	15-140	2	30	
2-Nitrophenol	2.24	0.500	mg/kg wet	2.500		89	30-130	2	30	
3,3'-Dichlorobenzidine	2.69	0.250	mg/kg wet	2.500		107	40-140	4	30	
3+4-Methylphenol	5.58	0.250	mg/kg wet	5.000		112	15-140	4	30	
4-Bromophenyl-phenylether	2.67	0.250	mg/kg wet	2.500		107	40-140	4	30	
4-Chloroaniline	1.99	0.250	mg/kg wet	2.500		79	15-140	1	30	
4-Nitrophenol	2.45	1.00	mg/kg wet	2.500		98	15-140	5	30	
Acenaphthene	2.63	0.250	mg/kg wet	2.500		105	40-140	4	30	
Acenaphthylene	2.81	0.250	mg/kg wet	2.500		112	40-140	4	30	
Acetophenone	2.66	0.250	mg/kg wet	2.500		106	40-140	4	30	
Aniline	2.01	0.250	mg/kg wet	2.500		80	40-140	3	30	
Anthracene	2.72	0.250	mg/kg wet	2.500		109	40-140	4	30	
Azobenzene	3.13	0.250	mg/kg wet	2.500		125	40-140	4	30	
Benzo(a)anthracene	2.70	0.250	mg/kg wet	2.500		108	40-140	4	30	
Benzo(a)pyrene	2.76	0.250	mg/kg wet	2.500		110	40-140	2	30	
Benzo(b)fluoranthene	2.53	0.250	mg/kg wet	2.500		101	40-140	3	30	
Benzo(g,h,i)perylene	2.86	0.250	mg/kg wet	2.500		115	40-140	4	30	
Benzo(k)fluoranthene	2.70	0.250	mg/kg wet	2.500		108	40-140	2	30	
bis(2-Chloroethoxy)methane	2.44	0.250	mg/kg wet	2.500		98	40-140	0.9	30	
bis(2-Chloroethyl)ether	2.75	0.250	mg/kg wet	2.500		110	40-140	2	30	
bis(2-chloroisopropyl)Ether	2.39	0.250	mg/kg wet	2.500		95	40-140	5	30	
bis(2-Ethylhexyl)phthalate	3.08	0.250	mg/kg wet	2.500		123	40-140	3	30	

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Semi-Volatile Organic Compounds

Batch DI42723 - 3546

Butylbenzylphthalate	3.23	0.250	mg/kg wet	2.500		129	40-140	6	30	
Chrysene	2.65	0.250	mg/kg wet	2.500		106	40-140	2	30	
Dibenzo(a,h)Anthracene	2.75	0.250	mg/kg wet	2.500		110	40-140	3	30	
Dibenzofuran	2.41	0.250	mg/kg wet	2.500		97	40-140	2	30	
Diethylphthalate	2.74	0.250	mg/kg wet	2.500		110	40-140	1	30	
Dimethylphthalate	2.77	0.250	mg/kg wet	2.500		111	15-140	1	30	
Di-n-butylphthalate	3.12	0.250	mg/kg wet	2.500		125	40-140	3	30	
Di-n-octylphthalate	3.26	0.500	mg/kg wet	2.500		130	40-140	2	30	
Fluoranthene	2.61	0.250	mg/kg wet	2.500		104	40-140	2	30	
Fluorene	2.55	0.250	mg/kg wet	2.500		102	40-140	1	30	
Hexachlorobenzene	2.37	0.250	mg/kg wet	2.500		95	40-140	6	30	
Hexachlorobutadiene	2.20	0.250	mg/kg wet	2.500		88	40-140	1	30	
Hexachloroethane	2.67	0.250	mg/kg wet	2.500		107	40-140	4	30	
Indeno(1,2,3-cd)Pyrene	2.67	0.250	mg/kg wet	2.500		107	40-140	4	30	
Isophorone	2.44	0.250	mg/kg wet	2.500		98	40-140	0.8	30	
Naphthalene	2.25	0.250	mg/kg wet	2.500		90	40-140	1	30	
Nitrobenzene	2.55	0.250	mg/kg wet	2.500		102	40-140	0.4	30	
N-Nitrosodimethylamine	2.48	0.250	mg/kg wet	2.500		99	40-140	7	30	
Pentachlorophenol	1.96	1.00	mg/kg wet	2.500		79	15-140	11	30	
Phenanthrene	2.65	0.250	mg/kg wet	2.500		106	40-140	4	30	
Phenol	2.79	0.250	mg/kg wet	2.500		111	15-140	5	30	
Pyrene	2.93	0.250	mg/kg wet	2.500		117	40-140	4	30	

Surrogate: 1,2-Dichlorobenzene-d4	2.60		mg/kg wet	2.500		104	30-130			
Surrogate: 2,4,6-Tribromophenol	3.61		mg/kg wet	3.750		96	30-130			
Surrogate: 2-Chlorophenol-d4	4.13		mg/kg wet	3.750		110	30-130			
Surrogate: 2-Fluorobiphenyl	2.54		mg/kg wet	2.500		101	30-130			
Surrogate: 2-Fluorophenol	4.40		mg/kg wet	3.750		117	30-130			
Surrogate: Nitrobenzene-d5	2.44		mg/kg wet	2.500		98	30-130			
Surrogate: Phenol-d6	4.54		mg/kg wet	3.750		121	30-130			
Surrogate: p-Terphenyl-d14	2.75		mg/kg wet	2.500		110	30-130			

MADEP-EPH Extractable Petroleum Hydrocarbons

Batch DI41905 - 3546

Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							

Surrogate: 1-Chlorooctadecane	1.65		mg/kg wet	2.000		82	40-140			
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Blank										
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Surrogate: 2-Bromonaphthalene	1.76		mg/kg wet	2.000		88	40-140			
Surrogate: 2-Fluorobiphenyl	1.74		mg/kg wet	2.000		87	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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MADEP-EPH Extractable Petroleum Hydrocarbons

Batch DI41905 - 3546

<i>Surrogate: O-Terphenyl</i>	1.61		mg/kg wet	2.000		80	40-140			
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Blank										
2-Methylnaphthalene	ND	0.008	mg/kg wet							
Acenaphthene	ND	0.008	mg/kg wet							
Acenaphthylene	ND	0.008	mg/kg wet							
Anthracene	ND	0.008	mg/kg wet							
Benzo(a)anthracene	ND	0.008	mg/kg wet							
Benzo(a)pyrene	ND	0.008	mg/kg wet							
Benzo(b)fluoranthene	ND	0.008	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.008	mg/kg wet							
Benzo(k)fluoranthene	ND	0.008	mg/kg wet							
Chrysene	ND	0.008	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.008	mg/kg wet							
Fluoranthene	ND	0.008	mg/kg wet							
Fluorene	ND	0.008	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.008	mg/kg wet							
Naphthalene	ND	0.008	mg/kg wet							
Phenanthrene	0.017	0.008	mg/kg wet							
Pyrene	ND	0.008	mg/kg wet							

LCS										
C19-C36 Aliphatics1	13.4	15.0	mg/kg wet	16.00		84	40-140			
C9-C18 Aliphatics1	8.1	15.0	mg/kg wet	12.00		68	40-140			

<i>Surrogate: 1-Chlorooctadecane</i>	1.43		mg/kg wet	2.000		71	40-140			
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LCS										
C11-C22 Unadjusted Aromatics1	21.6	15.0	mg/kg wet	34.00		63	40-140			

<i>Surrogate: 2-Bromonaphthalene</i>	1.46		mg/kg wet	2.000		73	40-140			
<i>Surrogate: 2-Fluorobiphenyl</i>	1.52		mg/kg wet	2.000		76	40-140			
<i>Surrogate: O-Terphenyl</i>	1.36		mg/kg wet	2.000		68	40-140			

LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			

LCS										
2-Methylnaphthalene	1.22	0.040	mg/kg wet	2.000		61	40-140			
Acenaphthene	1.23	0.040	mg/kg wet	2.000		62	40-140			
Acenaphthylene	1.33	0.040	mg/kg wet	2.000		67	40-140			
Anthracene	1.41	0.040	mg/kg wet	2.000		70	40-140			
Benzo(a)anthracene	1.47	0.040	mg/kg wet	2.000		73	40-140			
Benzo(a)pyrene	1.31	0.040	mg/kg wet	2.000		66	40-140			
Benzo(b)fluoranthene	1.60	0.040	mg/kg wet	2.000		80	40-140			
Benzo(g,h,i)perylene	1.40	0.040	mg/kg wet	2.000		70	40-140			
Benzo(k)fluoranthene	1.50	0.040	mg/kg wet	2.000		75	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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MADEP-EPH Extractable Petroleum Hydrocarbons

Batch DI41905 - 3546

Chrysene	1.46	0.040	mg/kg wet	2.000		73	40-140			
Dibenzo(a,h)Anthracene	1.41	0.040	mg/kg wet	2.000		70	40-140			
Fluoranthene	1.57	0.040	mg/kg wet	2.000		79	40-140			
Fluorene	1.36	0.040	mg/kg wet	2.000		68	40-140			
Indeno(1,2,3-cd)Pyrene	1.37	0.040	mg/kg wet	2.000		68	40-140			
Naphthalene	1.14	0.040	mg/kg wet	2.000		57	40-140			
Phenanthrene	1.31	0.040	mg/kg wet	2.000		66	40-140			
Pyrene	1.47	0.040	mg/kg wet	2.000		74	40-140			

LCS Dup

C19-C36 Aliphatics1	14.7	15.0	mg/kg wet	16.00		92	40-140	10	25	
C9-C18 Aliphatics1	9.6	15.0	mg/kg wet	12.00		80	40-140	17	25	

Surrogate: 1-Chlorooctadecane

1.52 mg/kg wet 2.000 76 40-140

LCS Dup

C11-C22 Unadjusted Aromatics1	23.5	15.0	mg/kg wet	34.00		69	40-140	9	25	
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Surrogate: 2-Bromonaphthalene

1.53 mg/kg wet 2.000 77 40-140

Surrogate: 2-Fluorobiphenyl

1.59 mg/kg wet 2.000 80 40-140

Surrogate: O-Terphenyl

1.48 mg/kg wet 2.000 74 40-140

LCS Dup

2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	

LCS Dup

2-Methylnaphthalene	1.53	0.040	mg/kg wet	2.000		76	40-140	22	30	
Acenaphthene	1.55	0.040	mg/kg wet	2.000		77	40-140	23	30	
Acenaphthylene	1.67	0.040	mg/kg wet	2.000		83	40-140	22	30	
Anthracene	1.70	0.040	mg/kg wet	2.000		85	40-140	19	30	
Benzo(a)anthracene	1.73	0.040	mg/kg wet	2.000		86	40-140	17	30	
Benzo(a)pyrene	1.56	0.040	mg/kg wet	2.000		78	40-140	17	30	
Benzo(b)fluoranthene	1.91	0.040	mg/kg wet	2.000		96	40-140	18	30	
Benzo(g,h,i)perylene	1.67	0.040	mg/kg wet	2.000		84	40-140	18	30	
Benzo(k)fluoranthene	1.80	0.040	mg/kg wet	2.000		90	40-140	18	30	
Chrysene	1.73	0.040	mg/kg wet	2.000		86	40-140	17	30	
Dibenzo(a,h)Anthracene	1.68	0.040	mg/kg wet	2.000		84	40-140	17	30	
Fluoranthene	1.88	0.040	mg/kg wet	2.000		94	40-140	18	30	
Fluorene	1.70	0.040	mg/kg wet	2.000		85	40-140	22	30	
Indeno(1,2,3-cd)Pyrene	1.64	0.040	mg/kg wet	2.000		82	40-140	18	30	
Naphthalene	1.44	0.040	mg/kg wet	2.000		72	40-140	23	30	
Phenanthrene	1.60	0.040	mg/kg wet	2.000		80	40-140	19	30	
Pyrene	1.75	0.040	mg/kg wet	2.000		87	40-140	17	30	

8081B Organochlorine Pesticides

Batch DI41908 - 3546

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

**Batch DI41908 - 3546**

**Blank**

4,4'-DDD	ND	0.0025	mg/kg wet							
4,4'-DDD [2C]	ND	0.0025	mg/kg wet							
4,4'-DDE	ND	0.0025	mg/kg wet							
4,4'-DDE [2C]	ND	0.0025	mg/kg wet							
4,4'-DDT	ND	0.0025	mg/kg wet							
4,4'-DDT [2C]	ND	0.0025	mg/kg wet							
Aldrin	ND	0.0025	mg/kg wet							
Aldrin [2C]	ND	0.0025	mg/kg wet							
alpha-BHC	ND	0.0025	mg/kg wet							
alpha-BHC [2C]	ND	0.0025	mg/kg wet							
alpha-Chlordane	ND	0.0025	mg/kg wet							
alpha-Chlordane [2C]	ND	0.0025	mg/kg wet							
beta-BHC	ND	0.0025	mg/kg wet							
beta-BHC [2C]	ND	0.0025	mg/kg wet							
Chlordane (Total)	ND	0.0200	mg/kg wet							
Chlordane (Total) [2C]	ND	0.0200	mg/kg wet							
delta-BHC	ND	0.0025	mg/kg wet							
delta-BHC [2C]	ND	0.0025	mg/kg wet							
Dieldrin	ND	0.0025	mg/kg wet							
Dieldrin [2C]	ND	0.0025	mg/kg wet							
Endosulfan I	ND	0.0025	mg/kg wet							
Endosulfan I [2C]	ND	0.0025	mg/kg wet							
Endosulfan II	ND	0.0025	mg/kg wet							
Endosulfan II [2C]	ND	0.0025	mg/kg wet							
Endosulfan Sulfate	ND	0.0025	mg/kg wet							
Endosulfan Sulfate [2C]	ND	0.0025	mg/kg wet							
Endrin	ND	0.0025	mg/kg wet							
Endrin [2C]	ND	0.0025	mg/kg wet							
Endrin Ketone	ND	0.0025	mg/kg wet							
Endrin Ketone [2C]	ND	0.0025	mg/kg wet							
gamma-BHC (Lindane)	ND	0.0015	mg/kg wet							
gamma-BHC (Lindane) [2C]	ND	0.0015	mg/kg wet							
gamma-Chlordane	ND	0.0025	mg/kg wet							
gamma-Chlordane [2C]	ND	0.0025	mg/kg wet							
Heptachlor	ND	0.0025	mg/kg wet							
Heptachlor [2C]	ND	0.0025	mg/kg wet							
Heptachlor Epoxide	ND	0.0025	mg/kg wet							
Heptachlor Epoxide [2C]	ND	0.0025	mg/kg wet							
Hexachlorobenzene	ND	0.0025	mg/kg wet							
Hexachlorobenzene [2C]	ND	0.0025	mg/kg wet							
Methoxychlor	ND	0.0025	mg/kg wet							
Methoxychlor [2C]	ND	0.0025	mg/kg wet							
Toxaphene	ND	0.125	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41908 - 3546

Toxaphene [2C]	ND	0.125	mg/kg wet							
Surrogate: Decachlorobiphenyl	0.0108		mg/kg wet	0.01250		86	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0113		mg/kg wet	0.01250		91	30-150			
Surrogate: Tetrachloro-m-xylene	0.00938		mg/kg wet	0.01250		75	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.00912		mg/kg wet	0.01250		73	30-150			

LCS

4,4'-DDD	0.0104	0.0025	mg/kg wet	0.01250		84	40-140			
4,4'-DDD [2C]	0.0107	0.0025	mg/kg wet	0.01250		86	40-140			
4,4'-DDE	0.0097	0.0025	mg/kg wet	0.01250		78	40-140			
4,4'-DDE [2C]	0.0099	0.0025	mg/kg wet	0.01250		79	40-140			
4,4'-DDT	0.0106	0.0025	mg/kg wet	0.01250		85	40-140			
4,4'-DDT [2C]	0.0107	0.0025	mg/kg wet	0.01250		85	40-140			
Aldrin	0.0088	0.0025	mg/kg wet	0.01250		71	40-140			
Aldrin [2C]	0.0091	0.0025	mg/kg wet	0.01250		73	40-140			
alpha-BHC	0.0089	0.0025	mg/kg wet	0.01250		71	40-140			
alpha-BHC [2C]	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
alpha-Chlordane	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
alpha-Chlordane [2C]	0.0093	0.0025	mg/kg wet	0.01250		74	40-140			
beta-BHC	0.0091	0.0025	mg/kg wet	0.01250		72	40-140			
beta-BHC [2C]	0.0088	0.0025	mg/kg wet	0.01250		71	40-140			
delta-BHC	0.0095	0.0025	mg/kg wet	0.01250		76	40-140			
delta-BHC [2C]	0.0097	0.0025	mg/kg wet	0.01250		78	40-140			
Dieldrin	0.0102	0.0025	mg/kg wet	0.01250		81	40-140			
Dieldrin [2C]	0.0103	0.0025	mg/kg wet	0.01250		82	40-140			
Endosulfan I	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
Endosulfan I [2C]	0.0094	0.0025	mg/kg wet	0.01250		75	40-140			
Endosulfan II	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
Endosulfan II [2C]	0.0101	0.0025	mg/kg wet	0.01250		81	40-140			
Endosulfan Sulfate	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
Endosulfan Sulfate [2C]	0.0103	0.0025	mg/kg wet	0.01250		82	40-140			
Endrin	0.0098	0.0025	mg/kg wet	0.01250		79	40-140			
Endrin [2C]	0.0100	0.0025	mg/kg wet	0.01250		80	40-140			
Endrin Ketone	0.0105	0.0025	mg/kg wet	0.01250		84	40-140			
Endrin Ketone [2C]	0.0108	0.0025	mg/kg wet	0.01250		86	40-140			
gamma-BHC (Lindane)	0.0091	0.0015	mg/kg wet	0.01250		72	40-140			
gamma-BHC (Lindane) [2C]	0.0095	0.0015	mg/kg wet	0.01250		76	40-140			
gamma-Chlordane	0.0106	0.0025	mg/kg wet	0.01250		85	40-140			
gamma-Chlordane [2C]	0.0108	0.0025	mg/kg wet	0.01250		86	40-140			
Heptachlor	0.0089	0.0025	mg/kg wet	0.01250		71	40-140			
Heptachlor [2C]	0.0090	0.0025	mg/kg wet	0.01250		72	40-140			
Heptachlor Epoxide	0.0093	0.0025	mg/kg wet	0.01250		74	40-140			
Heptachlor Epoxide [2C]	0.0095	0.0025	mg/kg wet	0.01250		76	40-140			
Hexachlorobenzene	0.0080	0.0025	mg/kg wet	0.01250		64	40-140			

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8081B Organochlorine Pesticides</b>										
<b>Batch DI41908 - 3546</b>										
Hexachlorobenzene [2C]	0.0080	0.0025	mg/kg wet	0.01250		64	40-140			
Methoxychlor	0.0102	0.0025	mg/kg wet	0.01250		82	40-140			
Methoxychlor [2C]	0.0105	0.0025	mg/kg wet	0.01250		84	40-140			
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.00988</i>		mg/kg wet	<i>0.01250</i>		<i>79</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.0102</i>		mg/kg wet	<i>0.01250</i>		<i>82</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00816</i>		mg/kg wet	<i>0.01250</i>		<i>65</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00832</i>		mg/kg wet	<i>0.01250</i>		<i>67</i>	<i>30-150</i>			
<b>LCS Dup</b>										
4,4'-DDD	0.0102	0.0025	mg/kg wet	0.01250		82	40-140	2	30	
4,4'-DDD [2C]	0.0105	0.0025	mg/kg wet	0.01250		84	40-140	3	30	
4,4'-DDE	0.0094	0.0025	mg/kg wet	0.01250		75	40-140	3	30	
4,4'-DDE [2C]	0.0097	0.0025	mg/kg wet	0.01250		78	40-140	2	30	
4,4'-DDT	0.0103	0.0025	mg/kg wet	0.01250		83	40-140	3	30	
4,4'-DDT [2C]	0.0104	0.0025	mg/kg wet	0.01250		83	40-140	3	30	
Aldrin	0.0087	0.0025	mg/kg wet	0.01250		69	40-140	2	30	
Aldrin [2C]	0.0087	0.0025	mg/kg wet	0.01250		70	40-140	4	30	
alpha-BHC	0.0086	0.0025	mg/kg wet	0.01250		69	40-140	4	30	
alpha-BHC [2C]	0.0087	0.0025	mg/kg wet	0.01250		70	40-140	3	30	
alpha-Chlordane	0.0088	0.0025	mg/kg wet	0.01250		70	40-140	2	30	
alpha-Chlordane [2C]	0.0091	0.0025	mg/kg wet	0.01250		73	40-140	2	30	
beta-BHC	0.0089	0.0025	mg/kg wet	0.01250		71	40-140	2	30	
beta-BHC [2C]	0.0086	0.0025	mg/kg wet	0.01250		69	40-140	3	30	
delta-BHC	0.0097	0.0025	mg/kg wet	0.01250		78	40-140	2	30	
delta-BHC [2C]	0.0096	0.0025	mg/kg wet	0.01250		77	40-140	1	30	
Dieldrin	0.0100	0.0025	mg/kg wet	0.01250		80	40-140	2	30	
Dieldrin [2C]	0.0101	0.0025	mg/kg wet	0.01250		81	40-140	1	30	
Endosulfan I	0.0088	0.0025	mg/kg wet	0.01250		70	40-140	3	30	
Endosulfan I [2C]	0.0092	0.0025	mg/kg wet	0.01250		74	40-140	1	30	
Endosulfan II	0.0098	0.0025	mg/kg wet	0.01250		79	40-140	2	30	
Endosulfan II [2C]	0.0100	0.0025	mg/kg wet	0.01250		80	40-140	2	30	
Endosulfan Sulfate	0.0096	0.0025	mg/kg wet	0.01250		77	40-140	3	30	
Endosulfan Sulfate [2C]	0.0100	0.0025	mg/kg wet	0.01250		80	40-140	2	30	
Endrin	0.0097	0.0025	mg/kg wet	0.01250		77	40-140	2	30	
Endrin [2C]	0.0098	0.0025	mg/kg wet	0.01250		79	40-140	1	30	
Endrin Ketone	0.0102	0.0025	mg/kg wet	0.01250		81	40-140	3	30	
Endrin Ketone [2C]	0.0104	0.0025	mg/kg wet	0.01250		84	40-140	3	30	
gamma-BHC (Lindane)	0.0088	0.0015	mg/kg wet	0.01250		71	40-140	2	30	
gamma-BHC (Lindane) [2C]	0.0092	0.0015	mg/kg wet	0.01250		74	40-140	2	30	
gamma-Chlordane	0.0104	0.0025	mg/kg wet	0.01250		83	40-140	2	30	
gamma-Chlordane [2C]	0.0106	0.0025	mg/kg wet	0.01250		84	40-140	2	30	
Heptachlor	0.0087	0.0025	mg/kg wet	0.01250		70	40-140	2	30	
Heptachlor [2C]	0.0087	0.0025	mg/kg wet	0.01250		70	40-140	3	30	
Heptachlor Epoxide	0.0091	0.0025	mg/kg wet	0.01250		73	40-140	2	30	

CERTIFICATE OF ANALYSIS

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8081B Organochlorine Pesticides

Batch DI41908 - 3546

Heptachlor Epoxide [2C]	0.0093	0.0025	mg/kg wet	0.01250		75	40-140	2	30	
Hexachlorobenzene	0.0078	0.0025	mg/kg wet	0.01250		62	40-140	2	30	
Hexachlorobenzene [2C]	0.0078	0.0025	mg/kg wet	0.01250		63	40-140	2	30	
Methoxychlor	0.0098	0.0025	mg/kg wet	0.01250		79	40-140	4	30	
Methoxychlor [2C]	0.0101	0.0025	mg/kg wet	0.01250		81	40-140	4	30	
Surrogate: Decachlorobiphenyl	0.00901		mg/kg wet	0.01250		72	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.00946		mg/kg wet	0.01250		76	30-150			
Surrogate: Tetrachloro-m-xylene	0.00791		mg/kg wet	0.01250		63	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.00782		mg/kg wet	0.01250		63	30-150			

8151A Chlorinated Herbicides

Batch DI41831 - 3546

Blank										
2,4,5-T	ND	0.010	mg/kg wet							
2,4,5-T [2C]	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex)	ND	0.010	mg/kg wet							
2,4,5-TP (Silvex) [2C]	ND	0.010	mg/kg wet							
2,4-D	ND	0.047	mg/kg wet							
2,4-D [2C]	ND	0.047	mg/kg wet							
2,4-DB	ND	0.048	mg/kg wet							
2,4-DB [2C]	ND	0.048	mg/kg wet							
Dalapon	ND	0.046	mg/kg wet							
Dalapon [2C]	ND	0.046	mg/kg wet							
Dicamba	ND	0.009	mg/kg wet							
Dicamba [2C]	ND	0.009	mg/kg wet							
Dichlorprop	ND	0.047	mg/kg wet							
Dichlorprop [2C]	ND	0.047	mg/kg wet							
MCPA	ND	2.32	mg/kg wet							
MCPA [2C]	ND	2.32	mg/kg wet							
MCPP	ND	2.35	mg/kg wet							
MCPP [2C]	ND	2.35	mg/kg wet							
Surrogate: DCAA	0.186		mg/kg wet	0.2000		93	30-150			
Surrogate: DCAA [2C]	0.185		mg/kg wet	0.2000		93	30-150			

LCS										
2,4,5-T	0.014	0.010	mg/kg wet	0.01900		72	40-140			
2,4,5-T [2C]	0.012	0.010	mg/kg wet	0.01900		64	40-140			
2,4,5-TP (Silvex)	0.014	0.010	mg/kg wet	0.01900		76	40-140			
2,4,5-TP (Silvex) [2C]	0.014	0.010	mg/kg wet	0.01900		74	40-140			
2,4-D	0.142	0.047	mg/kg wet	0.1880		75	40-140			
2,4-D [2C]	0.117	0.047	mg/kg wet	0.1880		62	40-140			
2,4-DB	0.163	0.048	mg/kg wet	0.1900		86	40-140			
2,4-DB [2C]	0.143	0.048	mg/kg wet	0.1900		75	40-140			



*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8151A Chlorinated Herbicides**

**Batch DI41831 - 3546**

Dalapon	0.316	0.046	mg/kg wet	0.4550		69	40-140			
Dalapon [2C]	0.309	0.046	mg/kg wet	0.4550		68	40-140			
Dicamba	0.014	0.009	mg/kg wet	0.01880		72	40-140			
Dicamba [2C]	0.014	0.009	mg/kg wet	0.01880		76	40-140			
Dichlorprop	0.177	0.047	mg/kg wet	0.1880		94	40-140			
Dichlorprop [2C]	0.149	0.047	mg/kg wet	0.1880		79	40-140			
MCPA	17.1	2.32	mg/kg wet	18.60		92	40-140			
MCPA [2C]	15.9	2.32	mg/kg wet	18.60		85	40-140			
MCPP	15.9	2.35	mg/kg wet	18.80		85	40-140			
MCPP [2C]	15.8	2.35	mg/kg wet	18.80		84	40-140			

<i>Surrogate: DCAA</i>	<i>0.219</i>		mg/kg wet	<i>0.2000</i>		<i>110</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.209</i>		mg/kg wet	<i>0.2000</i>		<i>104</i>	<i>30-150</i>			

**LCS Dup**

2,4,5-T	0.015	0.010	mg/kg wet	0.01900		80	40-140	11	30	
2,4,5-T [2C]	0.013	0.010	mg/kg wet	0.01900		70	40-140	9	30	
2,4,5-TP (Silvex)	0.016	0.010	mg/kg wet	0.01900		82	40-140	8	30	
2,4,5-TP (Silvex) [2C]	0.015	0.010	mg/kg wet	0.01900		80	40-140	8	30	
2,4-D	0.149	0.047	mg/kg wet	0.1880		79	40-140	5	30	
2,4-D [2C]	0.125	0.047	mg/kg wet	0.1880		67	40-140	7	30	
2,4-DB	0.174	0.048	mg/kg wet	0.1900		92	40-140	7	30	
2,4-DB [2C]	0.152	0.048	mg/kg wet	0.1900		80	40-140	6	30	
Dalapon	0.323	0.046	mg/kg wet	0.4550		71	40-140	2	30	
Dalapon [2C]	0.320	0.046	mg/kg wet	0.4550		70	40-140	3	30	
Dicamba	0.014	0.009	mg/kg wet	0.01880		76	40-140	5	30	
Dicamba [2C]	0.015	0.009	mg/kg wet	0.01880		80	40-140	5	30	
Dichlorprop	0.185	0.047	mg/kg wet	0.1880		98	40-140	4	30	
Dichlorprop [2C]	0.155	0.047	mg/kg wet	0.1880		83	40-140	4	30	
MCPA	16.9	2.32	mg/kg wet	18.60		91	40-140	1	30	
MCPA [2C]	16.2	2.32	mg/kg wet	18.60		87	40-140	2	30	
MCPP	16.8	2.35	mg/kg wet	18.80		89	40-140	5	30	
MCPP [2C]	16.7	2.35	mg/kg wet	18.80		89	40-140	5	30	

<i>Surrogate: DCAA</i>	<i>0.210</i>		mg/kg wet	<i>0.2000</i>		<i>105</i>	<i>30-150</i>			
<i>Surrogate: DCAA [2C]</i>	<i>0.201</i>		mg/kg wet	<i>0.2000</i>		<i>101</i>	<i>30-150</i>			

**8100M Total Petroleum Hydrocarbons**

**Batch DI41732 - 3546**

<b>Blank</b>										
Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 2410584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8100M Total Petroleum Hydrocarbons**

**Batch DI41732 - 3546**

Hexadecane (C16)	ND	0.2	mg/kg wet							
Hexatriacontane (C36)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons (C9-C36)	ND	10.0	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							

*Surrogate: O-Terphenyl*      4.46      mg/kg wet      5.000      89      40-140

**LCS**

Decane (C10)	1.9	0.2	mg/kg wet	2.500		75	40-140			
Docosane (C22)	2.4	0.2	mg/kg wet	2.500		97	40-140			
Dodecane (C12)	2.1	0.2	mg/kg wet	2.500		84	40-140			
Eicosane (C20)	2.4	0.2	mg/kg wet	2.500		94	40-140			
Hexacosane (C26)	2.7	0.2	mg/kg wet	2.500		108	40-140			
Hexadecane (C16)	2.3	0.2	mg/kg wet	2.500		91	40-140			
Hexatriacontane (C36)	0.9	0.2	mg/kg wet	2.500		37	40-140			B-
Nonadecane (C19)	2.4	0.2	mg/kg wet	2.500		94	40-140			
Nonane (C9)	1.7	0.2	mg/kg wet	2.500		67	30-140			
Octacosane (C28)	2.6	0.2	mg/kg wet	2.500		105	40-140			
Octadecane (C18)	2.3	0.2	mg/kg wet	2.500		92	40-140			
Tetracosane (C24)	2.4	0.2	mg/kg wet	2.500		96	40-140			
Tetradecane (C14)	2.2	0.2	mg/kg wet	2.500		88	40-140			
Total Petroleum Hydrocarbons (C9-C36)	34.4	10.0	mg/kg wet	35.00		98	40-140			
Triacontane (C30)	2.4	0.2	mg/kg wet	2.500		95	40-140			

*Surrogate: O-Terphenyl*      4.62      mg/kg wet      5.000      92      40-140

**LCS Dup**

Decane (C10)	1.8	0.2	mg/kg wet	2.500		73	40-140	3	25	
Docosane (C22)	2.3	0.2	mg/kg wet	2.500		92	40-140	5	25	
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		81	40-140	4	25	
Eicosane (C20)	2.3	0.2	mg/kg wet	2.500		90	40-140	4	25	
Hexacosane (C26)	2.5	0.2	mg/kg wet	2.500		102	40-140	6	25	
Hexadecane (C16)	2.2	0.2	mg/kg wet	2.500		86	40-140	6	25	
Hexatriacontane (C36)	0.8	0.2	mg/kg wet	2.500		33	40-140	9	25	B-
Nonadecane (C19)	2.3	0.2	mg/kg wet	2.500		90	40-140	5	25	
Nonane (C9)	1.6	0.2	mg/kg wet	2.500		65	30-140	3	25	
Octacosane (C28)	2.5	0.2	mg/kg wet	2.500		99	40-140	6	25	
Octadecane (C18)	2.2	0.2	mg/kg wet	2.500		87	40-140	5	25	
Tetracosane (C24)	2.3	0.2	mg/kg wet	2.500		91	40-140	5	25	
Tetradecane (C14)	2.1	0.2	mg/kg wet	2.500		84	40-140	5	25	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8100M Total Petroleum Hydrocarbons**

**Batch DI41732 - 3546**

Total Petroleum Hydrocarbons (C9-C36)	32.3	10.0	mg/kg wet	35.00		92	40-140	6	25	
Triacotane (C30)	2.2	0.2	mg/kg wet	2.500		89	40-140	6	25	
<i>Surrogate: O-Terphenyl</i>	<i>4.60</i>		mg/kg wet	<i>5.000</i>		<i>92</i>	<i>40-140</i>			

**Classical Chemistry**

**Batch DI41639 - General Preparation**

<b>Blank</b>										
Total Organic Carbon (1)	ND	500	mg/kg							
Total Organic Carbon (2)	ND	500	mg/kg							
<b>LCS</b>										
Total Organic Carbon (1)	9410	500	mg/kg	10010		94	80-120			
Total Organic Carbon (2)	9680	500	mg/kg	10010		97	80-120			
<b>LCS Dup</b>										
Total Organic Carbon (1)	9360	500	mg/kg	10010		94	80-120	0.5	25	
Total Organic Carbon (2)	9260	500	mg/kg	10010		93	80-120	4	25	

**8082 Polychlorinated Biphenyls (PCB) / Congeners**

**Batch DI42304 - 3540C**

<b>Blank</b>										
BZ#101	ND	0.00027	mg/kg wet							
BZ#101 [2C]	ND	0.00027	mg/kg wet							
BZ#105	ND	0.00027	mg/kg wet							
BZ#105 [2C]	ND	0.00027	mg/kg wet							
BZ#118	ND	0.00027	mg/kg wet							
BZ#118 [2C]	ND	0.00027	mg/kg wet							
BZ#128	ND	0.00027	mg/kg wet							
BZ#128 [2C]	ND	0.00027	mg/kg wet							
BZ#138	ND	0.00027	mg/kg wet							
BZ#138 [2C]	ND	0.00027	mg/kg wet							
BZ#153	ND	0.00027	mg/kg wet							
BZ#153 [2C]	ND	0.00027	mg/kg wet							
BZ#170	ND	0.00027	mg/kg wet							
BZ#170 [2C]	ND	0.00027	mg/kg wet							
BZ#18	ND	0.00027	mg/kg wet							
BZ#18 [2C]	ND	0.00027	mg/kg wet							
BZ#180	ND	0.00027	mg/kg wet							
BZ#180 [2C]	ND	0.00027	mg/kg wet							
BZ#187	ND	0.00027	mg/kg wet							
BZ#187 [2C]	ND	0.00027	mg/kg wet							
BZ#195	ND	0.00027	mg/kg wet							
BZ#195 [2C]	ND	0.00027	mg/kg wet							
BZ#206	ND	0.00027	mg/kg wet							

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082 Polychlorinated Biphenyls (PCB) / Congeners

**Batch DI42304 - 3540C**

BZ#206 [2C]	ND	0.00027	mg/kg wet							
BZ#209	ND	0.00027	mg/kg wet							
BZ#209 [2C]	ND	0.00027	mg/kg wet							
BZ#28	ND	0.00027	mg/kg wet							
BZ#28 [2C]	ND	0.00027	mg/kg wet							
BZ#44	ND	0.00027	mg/kg wet							
BZ#44 [2C]	ND	0.00027	mg/kg wet							
BZ#52	ND	0.00027	mg/kg wet							
BZ#52 [2C]	ND	0.00027	mg/kg wet							
BZ#66	ND	0.00027	mg/kg wet							
BZ#66 [2C]	ND	0.00027	mg/kg wet							
BZ#8	ND	0.00027	mg/kg wet							
BZ#8 [2C]	ND	0.00027	mg/kg wet							

<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00306</i>		mg/kg wet	<i>0.003333</i>		<i>92</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00306</i>		mg/kg wet	<i>0.003333</i>		<i>92</i>	<i>30-150</i>			

**LCS**

BZ#101	0.00259	0.00027	mg/kg wet	0.003333		78	40-140			
BZ#101 [2C]	0.00254	0.00027	mg/kg wet	0.003333		76	40-140			
BZ#105	0.00302	0.00027	mg/kg wet	0.003333		90	40-140			
BZ#105 [2C]	0.00292	0.00027	mg/kg wet	0.003333		88	40-140			
BZ#118	0.00276	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#118 [2C]	0.00268	0.00027	mg/kg wet	0.003333		80	40-140			
BZ#128	0.00272	0.00027	mg/kg wet	0.003333		82	40-140			
BZ#128 [2C]	0.00278	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#138	0.00276	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#138 [2C]	0.00268	0.00027	mg/kg wet	0.003333		80	40-140			
BZ#153	0.00262	0.00027	mg/kg wet	0.003333		79	40-140			
BZ#153 [2C]	0.00253	0.00027	mg/kg wet	0.003333		76	40-140			
BZ#170	0.00287	0.00027	mg/kg wet	0.003333		86	40-140			
BZ#170 [2C]	0.00283	0.00027	mg/kg wet	0.003333		85	40-140			
BZ#18	0.00297	0.00027	mg/kg wet	0.003333		89	40-140			
BZ#18 [2C]	0.00291	0.00027	mg/kg wet	0.003333		87	40-140			
BZ#180	0.00276	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#180 [2C]	0.00278	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#187	0.00257	0.00027	mg/kg wet	0.003333		77	40-140			
BZ#187 [2C]	0.00260	0.00027	mg/kg wet	0.003333		78	40-140			
BZ#195	0.00283	0.00027	mg/kg wet	0.003333		85	40-140			
BZ#195 [2C]	0.00282	0.00027	mg/kg wet	0.003333		85	40-140			
BZ#206	0.00277	0.00027	mg/kg wet	0.003333		83	40-140			
BZ#206 [2C]	0.00281	0.00027	mg/kg wet	0.003333		84	40-140			
BZ#209	0.00267	0.00027	mg/kg wet	0.003333		80	40-140			
BZ#209 [2C]	0.00264	0.00027	mg/kg wet	0.003333		79	40-140			
BZ#28	0.00264	0.00027	mg/kg wet	0.003333		79	40-140			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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**8082 Polychlorinated Biphenyls (PCB) / Congeners**

**Batch DI42304 - 3540C**

BZ#28 [2C]	0.00297	0.00027	mg/kg wet	0.003333		89	40-140			
BZ#44	0.00253	0.00027	mg/kg wet	0.003333		76	40-140			
BZ#44 [2C]	0.00251	0.00027	mg/kg wet	0.003333		75	40-140			
BZ#52	0.00305	0.00027	mg/kg wet	0.003333		92	40-140			
BZ#52 [2C]	0.00303	0.00027	mg/kg wet	0.003333		91	40-140			
BZ#66	0.00291	0.00027	mg/kg wet	0.003333		87	40-140			
BZ#66 [2C]	0.00265	0.00027	mg/kg wet	0.003333		80	40-140			
BZ#8	0.00288	0.00027	mg/kg wet	0.003333		86	40-140			
BZ#8 [2C]	0.00290	0.00027	mg/kg wet	0.003333		87	40-140			

<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00270</i>		mg/kg wet	<i>0.003333</i>		<i>81</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00270</i>		mg/kg wet	<i>0.003333</i>		<i>81</i>	<i>30-150</i>			

**LCS Dup**

BZ#101	0.00272	0.00027	mg/kg wet	0.003333		81	40-140	5	30	
BZ#101 [2C]	0.00267	0.00027	mg/kg wet	0.003333		80	40-140	5	30	
BZ#105	0.00319	0.00027	mg/kg wet	0.003333		96	40-140	5	30	
BZ#105 [2C]	0.00309	0.00027	mg/kg wet	0.003333		93	40-140	6	30	
BZ#118	0.00290	0.00027	mg/kg wet	0.003333		87	40-140	5	30	
BZ#118 [2C]	0.00283	0.00027	mg/kg wet	0.003333		85	40-140	6	30	
BZ#128	0.00284	0.00027	mg/kg wet	0.003333		85	40-140	4	30	
BZ#128 [2C]	0.00292	0.00027	mg/kg wet	0.003333		87	40-140	5	30	
BZ#138	0.00288	0.00027	mg/kg wet	0.003333		86	40-140	4	30	
BZ#138 [2C]	0.00280	0.00027	mg/kg wet	0.003333		84	40-140	4	30	
BZ#153	0.00272	0.00027	mg/kg wet	0.003333		82	40-140	4	30	
BZ#153 [2C]	0.00269	0.00027	mg/kg wet	0.003333		81	40-140	6	30	
BZ#170	0.00297	0.00027	mg/kg wet	0.003333		89	40-140	4	30	
BZ#170 [2C]	0.00294	0.00027	mg/kg wet	0.003333		88	40-140	4	30	
BZ#18	0.00328	0.00027	mg/kg wet	0.003333		98	40-140	10	30	
BZ#18 [2C]	0.00312	0.00027	mg/kg wet	0.003333		94	40-140	7	30	
BZ#180	0.00288	0.00027	mg/kg wet	0.003333		86	40-140	4	30	
BZ#180 [2C]	0.00290	0.00027	mg/kg wet	0.003333		87	40-140	4	30	
BZ#187	0.00266	0.00027	mg/kg wet	0.003333		80	40-140	3	30	
BZ#187 [2C]	0.00269	0.00027	mg/kg wet	0.003333		81	40-140	3	30	
BZ#195	0.00291	0.00027	mg/kg wet	0.003333		87	40-140	3	30	
BZ#195 [2C]	0.00290	0.00027	mg/kg wet	0.003333		87	40-140	3	30	
BZ#206	0.00288	0.00027	mg/kg wet	0.003333		86	40-140	4	30	
BZ#206 [2C]	0.00289	0.00027	mg/kg wet	0.003333		87	40-140	3	30	
BZ#209	0.00271	0.00027	mg/kg wet	0.003333		81	40-140	2	30	
BZ#209 [2C]	0.00270	0.00027	mg/kg wet	0.003333		81	40-140	2	30	
BZ#28	0.00293	0.00027	mg/kg wet	0.003333		88	40-140	10	30	
BZ#28 [2C]	0.00317	0.00027	mg/kg wet	0.003333		95	40-140	6	30	
BZ#44	0.00270	0.00027	mg/kg wet	0.003333		81	40-140	7	30	
BZ#44 [2C]	0.00266	0.00027	mg/kg wet	0.003333		80	40-140	6	30	
BZ#52	0.00324	0.00027	mg/kg wet	0.003333		97	40-140	6	30	

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
 Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Quality Control Data**

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8082 Polychlorinated Biphenyls (PCB) / Congeners</b>										
<b>Batch DI42304 - 3540C</b>										
BZ#52 [2C]	0.00322	0.00027	mg/kg wet	0.003333		97	40-140	6	30	
BZ#66	0.00307	0.00027	mg/kg wet	0.003333		92	40-140	6	30	
BZ#66 [2C]	0.00282	0.00027	mg/kg wet	0.003333		85	40-140	6	30	
BZ#8	0.00281	0.00027	mg/kg wet	0.003333		84	40-140	3	30	
BZ#8 [2C]	0.00308	0.00027	mg/kg wet	0.003333		92	40-140	6	30	
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.00287</i>		mg/kg wet	<i>0.003333</i>		<i>86</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.00289</i>		mg/kg wet	<i>0.003333</i>		<i>87</i>	<i>30-150</i>			

*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**Notes and Definitions**

Z-08	See Attached
U	Analyte included in the analysis, but not detected
Q	Calibration required quadratic regression (Q).
P	Percent difference between primary and confirmation results exceeds 40% (P).
LC	Lower value is used due to matrix interferences (LC).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
B+	Blank Spike recovery is above upper control limit (B+).
B-	Blank Spike recovery is below lower control limit (B-).
B	Present in Method Blank (B).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

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*CERTIFICATE OF ANALYSIS*

Client Name: Horsley & Witten  
Client Project ID: Ipswich River

ESS Laboratory Work Order: 24I0584

**ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS**

**ENVIRONMENTAL**

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/find/labs/analytical/ESS.pdf>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/OutOfStateCommercialLaboratories.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutOfStateCommercialLaboratories.pdf)

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/Labcert/Labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

[http://datamine2.state.nj.us/DEP\\_Opra/OpraMain/pi\\_main?mode=pi\\_by\\_site&sort\\_order=PI\\_NAMEA&Select+a+Site:=58715](http://datamine2.state.nj.us/DEP_Opra/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715)

Pennsylvania: 68-01752

<http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>





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*Let's Build a Solid Foundation*


Client Information:  
 Horsley Witten Group  
 Sandwich, MA  
 Project Manager: Neal Price  
 Assigned By: ESS Laboratory  
 Collected By: Caroline Gran

Project Information:  
 Ipswich River  
 Ipswich, MA  
 Project Number: 2410584  
 Summary Page: 1 of 1  
 Report Date: 10/15/2024

**LABORATORY TESTING DATA SHEET, Report No.: 7424-K-130**

Material Source	Sample ID	Depth (ft)	Laboratory No.	Identification Tests										Proctor / CBR / Permeability Tests							Laboratory Log and Soil Description	
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Org. %	pH	$g_d$ MAX (pcf) $W_{opt}$ (%)	$g_d$ MAX (pcf) $W_{opt}$ (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec		
				D2216	D4318			D6913			D2974	D4792	D1557									
Composite	IR-US-6	-	2410584-01					54.1	35.3	10.6												Grey poorly graded gravel with silt and sand
Composite	IR-US-7	-	2410584-02					10.7	65.8	23.5												Grey silty sand
Composite	IR-US-8	-	2410584-03					31.8	64.6	3.6												Brown poorly graded sand with gravel
Composite	IR-US-BANK	-	2410584-04	87.7				0.6	48.5	50.9												Brown Organic sandy silt

Date Received: 10/7/2024

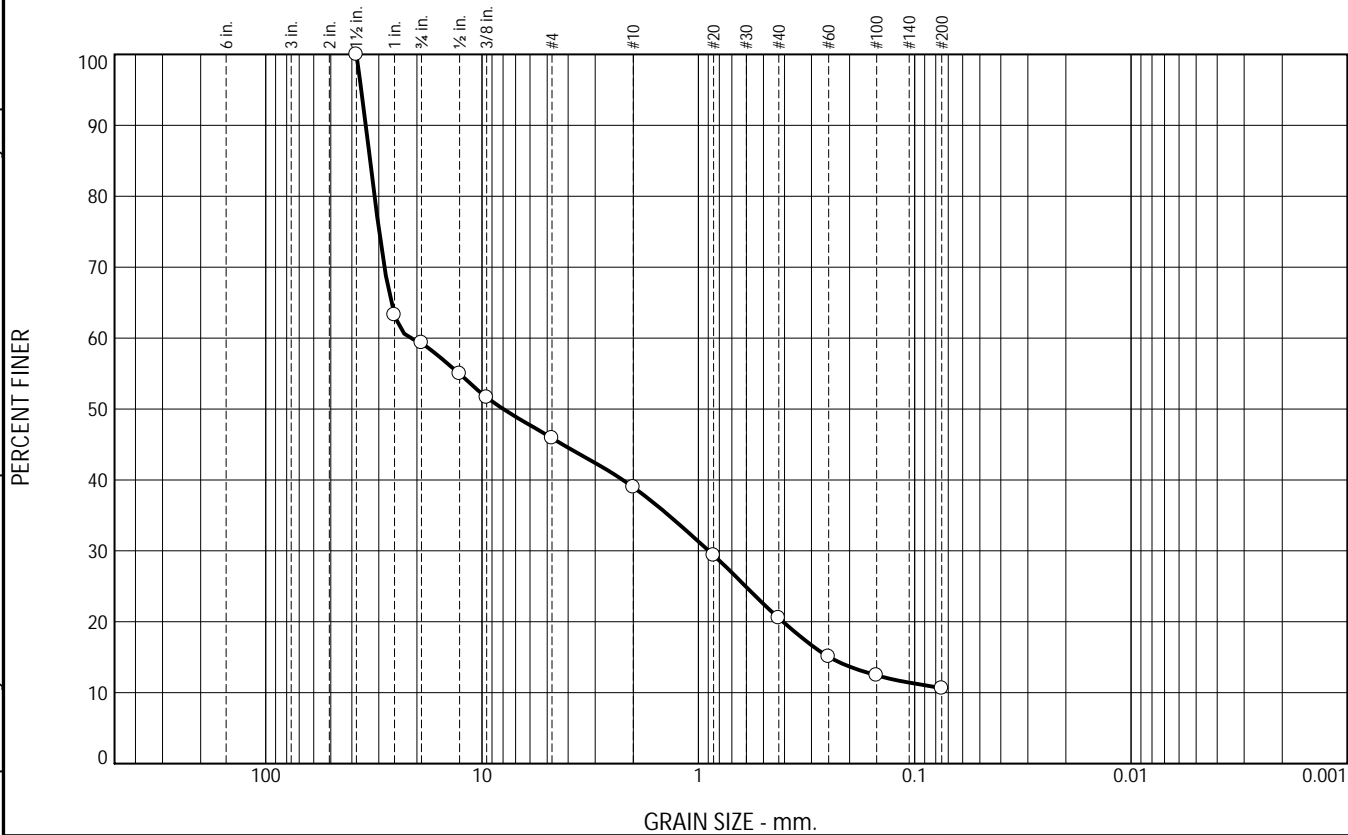
Reviewed By: 

Date Reviewed: 10/15/2024

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 This report shall not be reproduced, except in full, without prior written approval from the Agency, as defined in ASTM E329.

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspected and/or tested. No warranty, expressed or implied, is made.

## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	40.7	13.4	6.9	18.5	9.9	10.6	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	63.3		
3/4"	59.3		
1/2"	55.0		
3/8"	51.6		
#4	45.9		
#10	39.0		
#20	29.4		
#40	20.5		
#60	15.1		
#100	12.4		
#200	10.6		

Soil Description

Grey poorly graded gravel with silt and sand

PL= NP      Atterberg Limits      LL= NV      PI= NP  
  
Coefficients  
 D<sub>90</sub>= 34.4735    D<sub>85</sub>= 32.9016    D<sub>60</sub>= 21.3937  
 D<sub>50</sub>= 7.9743     D<sub>30</sub>= 0.8955     D<sub>15</sub>= 0.2477  
 D<sub>10</sub>=              C<sub>u</sub>=                C<sub>c</sub>=

Classification  
 USCS= GP-GM                      AASHTO= A-1-a  
  
Remarks

\* (no specification provided)

Source of Sample: Composite      Depth: -  
 Sample Number: IR-US-6

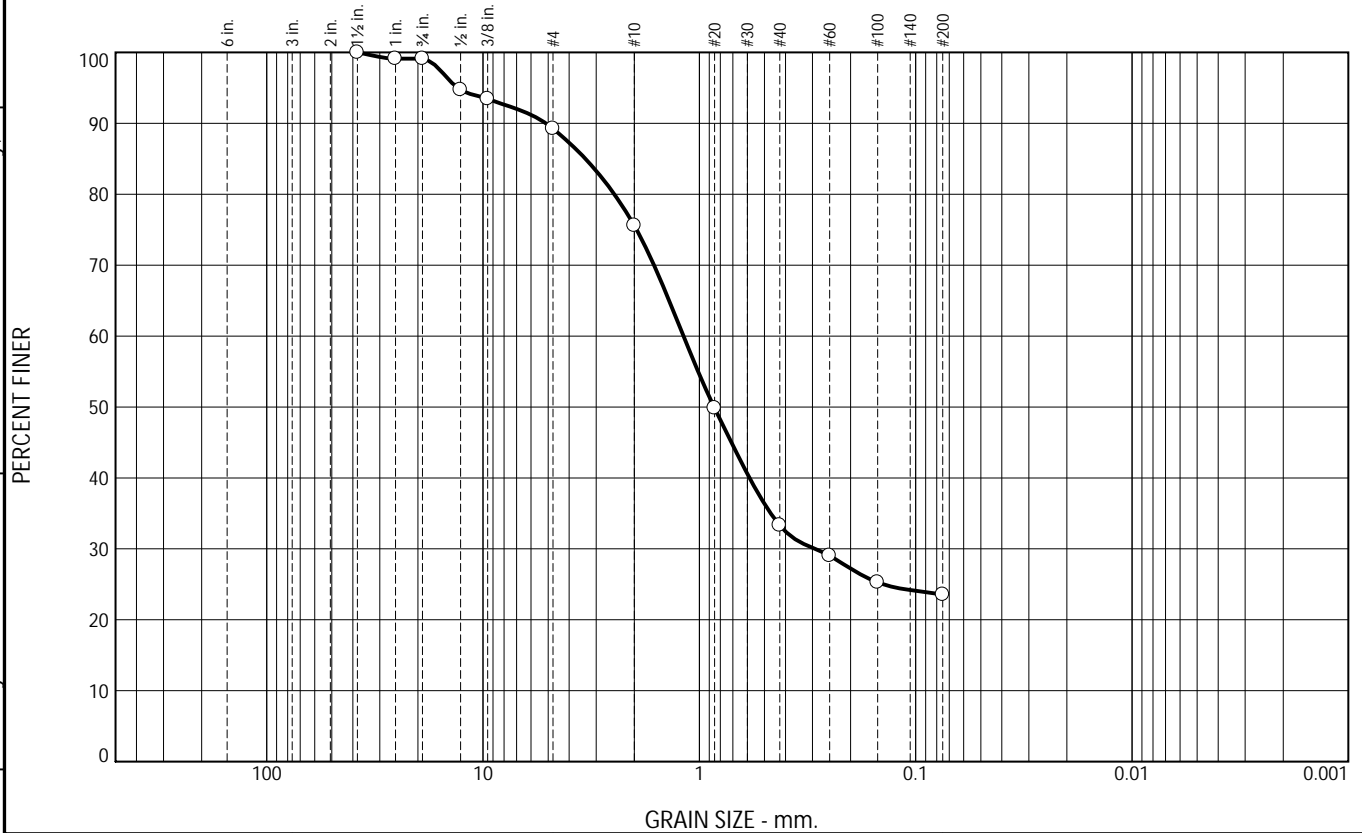
Date: 10.11.24

<b>Thielsch Engineering Inc.</b>  Cranston, RI	Client: ESS Laboratory Project: Ipswich River Ipswich, MA Project No: 24I0584
Fig. 24I0584-01	

Tested By: SBR/MA                      Checked By: Kris Roland

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspected and/or tested. No warranty, expressed or implied, is made.

## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.9	9.8	13.7	42.3	9.8	23.5	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	99.1		
3/4"	99.1		
1/2"	94.7		
3/8"	93.5		
#4	89.3		
#10	75.6		
#20	49.8		
#40	33.3		
#60	29.0		
#100	25.3		
#200	23.5		

Soil Description

Grey silty sand

Atterberg Limits  
 PL= NP      LL= NV      PI= NP

Coefficients  
 D<sub>90</sub>= 5.1178      D<sub>85</sub>= 3.3624      D<sub>60</sub>= 1.1842  
 D<sub>50</sub>= 0.8550      D<sub>30</sub>= 0.2922      D<sub>15</sub>=  
 D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

Classification  
 USCS= SM                      AASHTO= A-1-b

Remarks

\* (no specification provided)

Source of Sample: Composite      Depth: -  
 Sample Number: IR-US-7

Date: 10.10.24

**Thielsch Engineering Inc.**

**Cranston, RI**

Client: ESS Laboratory  
 Project: Ipswich River  
 Ipswich, MA  
 Project No: 24I0584

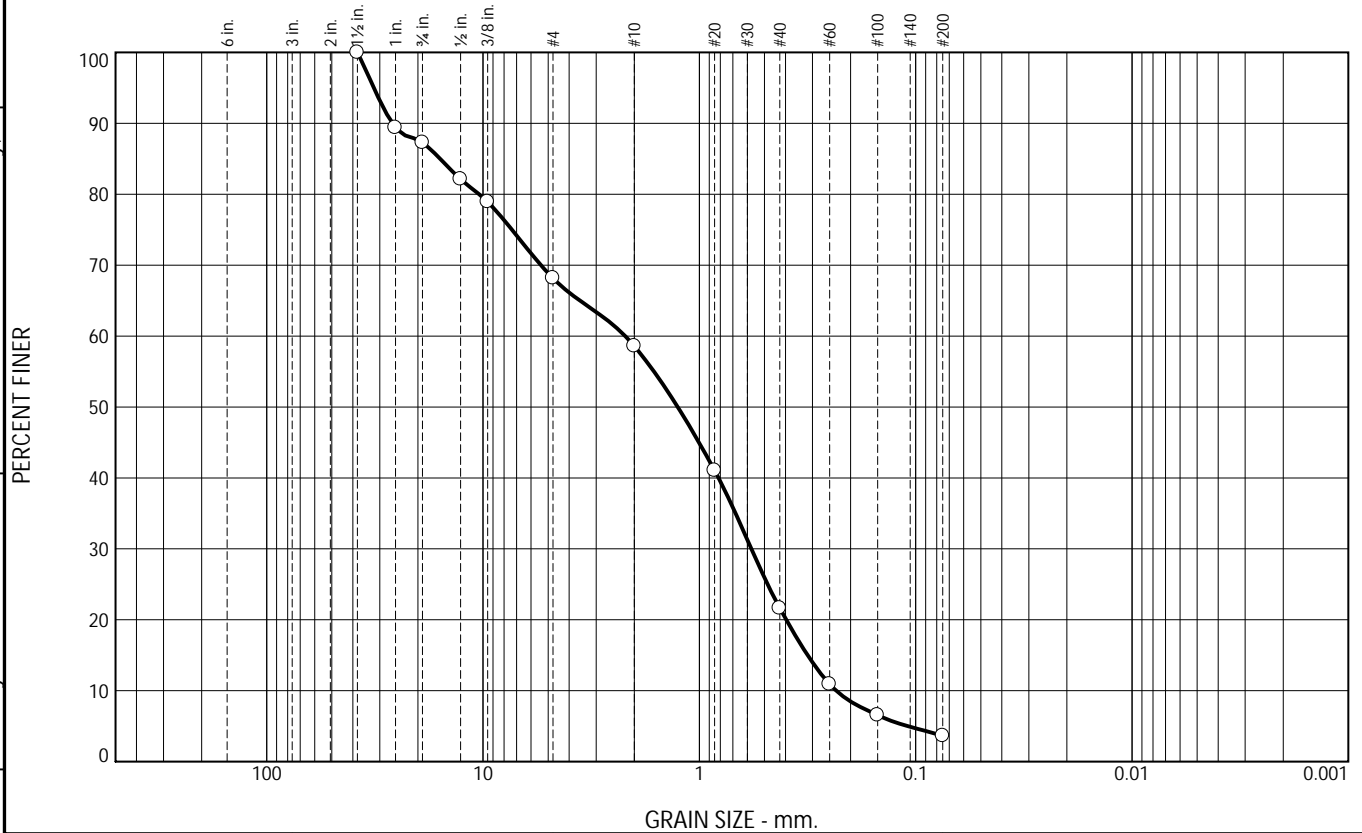
Fig. 24I0584-02

Tested By: SBR/MA

Checked By: Kris Roland

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspected and/or tested. No warranty, expressed or implied, is made.

## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.7	19.1	9.6	37.0	18.0	3.6	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	89.4		
3/4"	87.3		
1/2"	82.1		
3/8"	78.9		
#4	68.2		
#10	58.6		
#20	41.0		
#40	21.6		
#60	10.9		
#100	6.5		
#200	3.6		

Soil Description

Brown poorly graded sand with gravel

Atterberg Limits  
 PL= NP      LL= NV      PI= NP

Coefficients  
 D<sub>90</sub>= 26.2559      D<sub>85</sub>= 15.7836      D<sub>60</sub>= 2.2016  
 D<sub>50</sub>= 1.2593      D<sub>30</sub>= 0.5750      D<sub>15</sub>= 0.3161  
 D<sub>10</sub>= 0.2332      C<sub>u</sub>= 9.44      C<sub>c</sub>= 0.64

Classification  
 USCS= SP      AASHTO= A-1-b

Remarks  
 Sample contains urban debris.

\* (no specification provided)

Source of Sample: Composite      Depth: -  
 Sample Number: IR-US-8

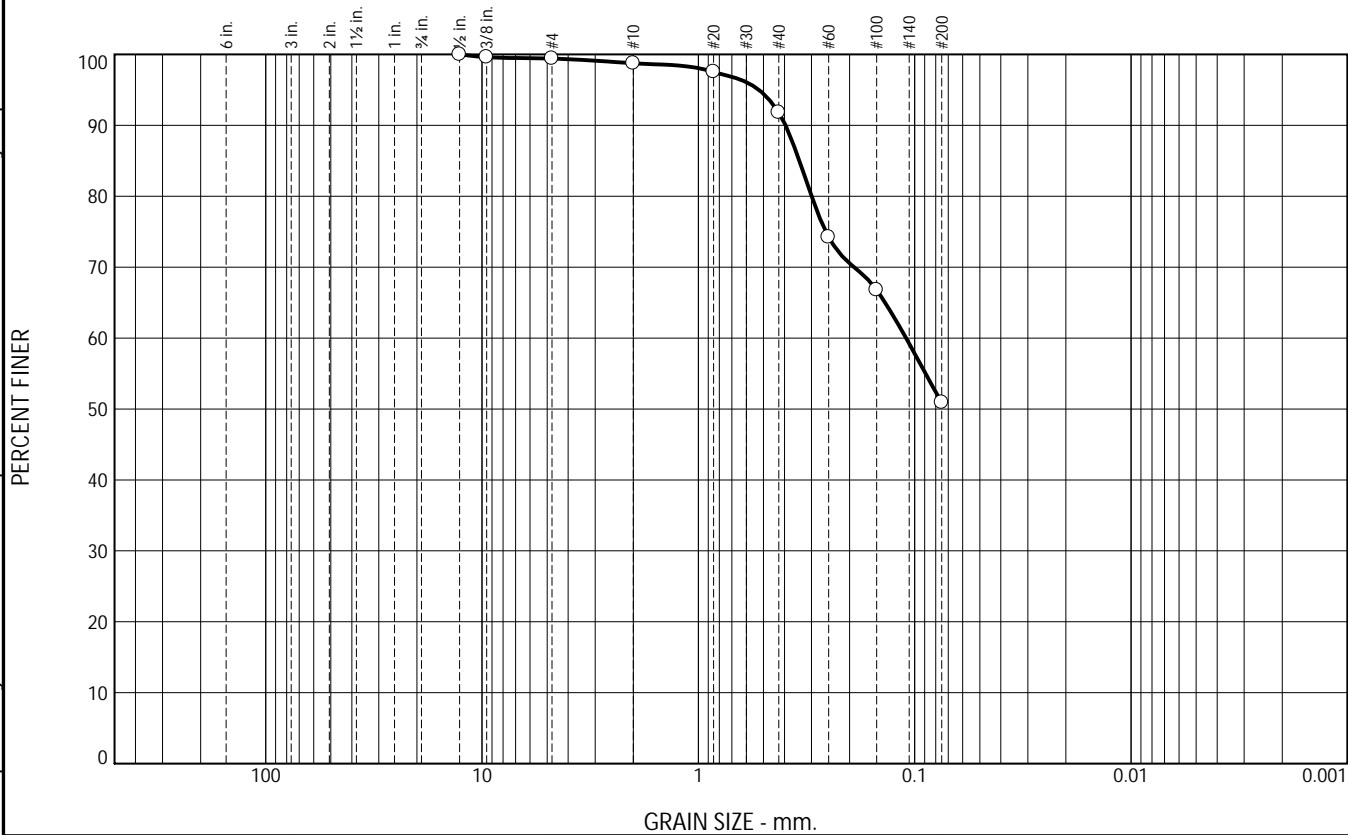
Date: 10.10.24

<b>Thielsch Engineering Inc.</b>  Cranston, RI	Client: ESS Laboratory Project: Ipswich River Ipswich, MA Project No: 24I0584
Fig. 24I0584-03	

Tested By: SBR/MA      Checked By: Kris Roland

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspected and/or tested. No warranty, expressed or implied, is made.

## Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	0.6	7.0	40.9	50.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.6		
#4	99.4		
#10	98.8		
#20	97.5		
#40	91.8		
#60	74.2		
#100	66.8		
#200	50.9		

Soil Description

Brown Organic sandy silt

PL=                      Atterberg Limits

                                 LL=                      PI=

Coefficients

D<sub>90</sub>= 0.3953      D<sub>85</sub>= 0.3414      D<sub>60</sub>= 0.1096

D<sub>50</sub>=                      D<sub>30</sub>=                      D<sub>15</sub>=

D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

Classification

USCS=    ML                      AASHTO=    A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".  
Sample contains fine-grained organic material.

\* (no specification provided)

Source of Sample: Composite      Depth: -  
Sample Number: IR-US-BANK

Date: 10.11.24

<p><b>Thielsch Engineering Inc.</b></p> <p>Cranston, RI</p>	<p>Client:    ESS Laboratory</p> <p>Project:   Ipswich River              Ipswich, MA</p> <p>Project No:    24I0584</p>
<p>Fig. 24I0584-04</p>	

Tested By: SBR/MA                      Checked By: Kris Roland

# ANALYTICAL REPORT

## PREPARED FOR

Attn: ESS ProjectManagement  
ESS Laboratory  
185 Frances Ave  
Cranston, Rhode Island 02910

Generated 10/9/2024 12:10:14 PM

## JOB DESCRIPTION

24I0584

## JOB NUMBER

410-189568-1

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

## Authorization



Generated  
10/9/2024 12:10:14 PM

Authorized for release by  
Nicole Brown, Project Manager  
[Nicole.Brown@et.eurofinsus.com](mailto:Nicole.Brown@et.eurofinsus.com)  
(717)471-3265

## Compliance Statement

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

This report shall not be reproduced except in full, without the written approval of the laboratory.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied, except as otherwise agreed. We disclaim any other warranties, expressed or implied, including a warranty of fitness for particular purpose and warranty of merchantability. In no event shall Eurofins Lancaster Laboratories Environmental, LLC be liable for indirect, special, consequential, or incidental damages including, but not limited to, damages for loss of profit or goodwill regardless of (A) the negligence (either sole or concurrent) of Eurofins Lancaster Laboratories Environmental and (B) whether Eurofins Lancaster Laboratories Environmental has been informed of the possibility of such damages. We accept no legal responsibility for the purposes for which the client uses the test results. Except as otherwise agreed, no purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.



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# Definitions/Glossary

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: ESS Laboratory  
Project: 2410584

Job ID: 410-189568-1

**Job ID: 410-189568-1**

**Eurofins Lancaster Laboratories Environment**

## **Job Narrative 410-189568-1**

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

### **Receipt**

The samples were received on 9/25/2024 8:25 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.5°C.

### **Receipt Exceptions**

The Chain-of-Custody (COC) was incomplete as received. The COC is missing Sample Preservation. This does not meet regulatory requirements. The client was notified and provided an amended COC that now meets regulatory compliance.

### **LCMS**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

### **General Chemistry**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# Detection Summary

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

**Client Sample ID: 24I0584-01**

**Lab Sample ID: 410-189568-1**

No Detections.

**Client Sample ID: 24I0584-02**

**Lab Sample ID: 410-189568-2**

No Detections.

**Client Sample ID: 24I0584-03**

**Lab Sample ID: 410-189568-3**

No Detections.

**Client Sample ID: 24I0584-04**

**Lab Sample ID: 410-189568-4**

No Detections.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Environment Testing, LLC

# Client Sample Results

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

Client Sample ID: 24I0584-01

Lab Sample ID: 410-189568-1

Date Collected: 09/17/24 10:30

Matrix: Solid

Date Received: 09/25/24 08:25

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	30.9		1.0		%			09/26/24 13:52	1
Percent Solids (EPA Moisture)	69.1		1.0		%			09/26/24 13:52	1

Client Sample ID: 24I0584-01

Lab Sample ID: 410-189568-1

Date Collected: 09/17/24 10:30

Matrix: Solid

Date Received: 09/25/24 08:25

Percent Solids: 69.1

## Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0068		ppm	☼	09/30/24 13:07	10/08/24 22:19	1

Client Sample ID: 24I0584-02

Lab Sample ID: 410-189568-2

Date Collected: 09/17/24 11:30

Matrix: Solid

Date Received: 09/25/24 08:25

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	17.2		1.0		%			09/26/24 13:52	1
Percent Solids (EPA Moisture)	82.8		1.0		%			09/26/24 13:52	1

Client Sample ID: 24I0584-02

Lab Sample ID: 410-189568-2

Date Collected: 09/17/24 11:30

Matrix: Solid

Date Received: 09/25/24 08:25

Percent Solids: 82.8

## Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0050		ppm	☼	09/30/24 13:07	10/08/24 22:30	1

Client Sample ID: 24I0584-03

Lab Sample ID: 410-189568-3

Date Collected: 09/17/24 12:00

Matrix: Solid

Date Received: 09/25/24 08:25

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	20.5		1.0		%			09/26/24 13:52	1
Percent Solids (EPA Moisture)	79.5		1.0		%			09/26/24 13:52	1

Client Sample ID: 24I0584-03

Lab Sample ID: 410-189568-3

Date Collected: 09/17/24 12:00

Matrix: Solid

Date Received: 09/25/24 08:25

Percent Solids: 79.5

## Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0061		ppm	☼	09/30/24 13:07	10/08/24 22:40	1

Client Sample ID: 24I0584-04

Lab Sample ID: 410-189568-4

Date Collected: 09/17/24 12:45

Matrix: Solid

Date Received: 09/25/24 08:25

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	53.0		1.0		%			09/26/24 13:52	1

# Client Sample Results

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

**Client Sample ID: 24I0584-04**

**Lab Sample ID: 410-189568-4**

Date Collected: 09/17/24 12:45

Matrix: Solid

Date Received: 09/25/24 08:25

**General Chemistry (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (EPA Moisture)	47.0		1.0		%			09/26/24 13:52	1

**Client Sample ID: 24I0584-04**

**Lab Sample ID: 410-189568-4**

Date Collected: 09/17/24 12:45

Matrix: Solid

Date Received: 09/25/24 08:25

Percent Solids: 47.0

**Method: EPA 6850 - Perchlorate by LC/MS or LC/MS/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.010		ppm	☼	09/30/24 13:07	10/08/24 22:51	1



# QC Sample Results

Client: ESS Laboratory  
Project/Site: 2410584

Job ID: 410-189568-1

## Method: 6850 - Perchlorate by LC/MS or LC/MS/MS

**Lab Sample ID: MB 410-557329/1-A**  
**Matrix: Solid**  
**Analysis Batch: 558510**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 557329**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.0050		ppm		09/30/24 13:07	10/08/24 21:37	1

**Lab Sample ID: LCS 410-557329/2-A**  
**Matrix: Solid**  
**Analysis Batch: 558510**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 557329**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perchlorate	0.0100	0.0101		ppm		101	80 - 120

**Lab Sample ID: LCSD 410-557329/3-A**  
**Matrix: Solid**  
**Analysis Batch: 558510**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 557329**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perchlorate	0.0100	0.0101		ppm		101	80 - 120	0	15

# QC Association Summary

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

## LCMS

### Prep Batch: 557329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-189568-1	24I0584-01	Total/NA	Solid	6850	
410-189568-2	24I0584-02	Total/NA	Solid	6850	
410-189568-3	24I0584-03	Total/NA	Solid	6850	
410-189568-4	24I0584-04	Total/NA	Solid	6850	
MB 410-557329/1-A	Method Blank	Total/NA	Solid	6850	
LCS 410-557329/2-A	Lab Control Sample	Total/NA	Solid	6850	
LCSD 410-557329/3-A	Lab Control Sample Dup	Total/NA	Solid	6850	

### Analysis Batch: 558510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-189568-1	24I0584-01	Total/NA	Solid	6850	557329
410-189568-2	24I0584-02	Total/NA	Solid	6850	557329
410-189568-3	24I0584-03	Total/NA	Solid	6850	557329
410-189568-4	24I0584-04	Total/NA	Solid	6850	557329
MB 410-557329/1-A	Method Blank	Total/NA	Solid	6850	557329
LCS 410-557329/2-A	Lab Control Sample	Total/NA	Solid	6850	557329
LCSD 410-557329/3-A	Lab Control Sample Dup	Total/NA	Solid	6850	557329

## General Chemistry

### Analysis Batch: 556130

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-189568-1	24I0584-01	Total/NA	Solid	Moisture	
410-189568-2	24I0584-02	Total/NA	Solid	Moisture	
410-189568-3	24I0584-03	Total/NA	Solid	Moisture	
410-189568-4	24I0584-04	Total/NA	Solid	Moisture	



# Lab Chronicle

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

**Client Sample ID: 24I0584-01**

**Lab Sample ID: 410-189568-1**

Date Collected: 09/17/24 10:30

Matrix: Solid

Date Received: 09/25/24 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	556130	UVJN	ELLE	09/26/24 13:52

**Client Sample ID: 24I0584-01**

**Lab Sample ID: 410-189568-1**

Date Collected: 09/17/24 10:30

Matrix: Solid

Date Received: 09/25/24 08:25

Percent Solids: 69.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			557329	VVE5	ELLE	09/30/24 13:07
Total/NA	Analysis	6850		1	558510	VVE5	ELLE	10/08/24 22:19

**Client Sample ID: 24I0584-02**

**Lab Sample ID: 410-189568-2**

Date Collected: 09/17/24 11:30

Matrix: Solid

Date Received: 09/25/24 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	556130	UVJN	ELLE	09/26/24 13:52

**Client Sample ID: 24I0584-02**

**Lab Sample ID: 410-189568-2**

Date Collected: 09/17/24 11:30

Matrix: Solid

Date Received: 09/25/24 08:25

Percent Solids: 82.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			557329	VVE5	ELLE	09/30/24 13:07
Total/NA	Analysis	6850		1	558510	VVE5	ELLE	10/08/24 22:30

**Client Sample ID: 24I0584-03**

**Lab Sample ID: 410-189568-3**

Date Collected: 09/17/24 12:00

Matrix: Solid

Date Received: 09/25/24 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	556130	UVJN	ELLE	09/26/24 13:52

**Client Sample ID: 24I0584-03**

**Lab Sample ID: 410-189568-3**

Date Collected: 09/17/24 12:00

Matrix: Solid

Date Received: 09/25/24 08:25

Percent Solids: 79.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			557329	VVE5	ELLE	09/30/24 13:07
Total/NA	Analysis	6850		1	558510	VVE5	ELLE	10/08/24 22:40

**Client Sample ID: 24I0584-04**

**Lab Sample ID: 410-189568-4**

Date Collected: 09/17/24 12:45

Matrix: Solid

Date Received: 09/25/24 08:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	556130	UVJN	ELLE	09/26/24 13:52

# Lab Chronicle

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

**Client Sample ID: 24I0584-04**

**Lab Sample ID: 410-189568-4**

**Date Collected: 09/17/24 12:45**

**Matrix: Solid**

**Date Received: 09/25/24 08:25**

**Percent Solids: 47.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	6850			557329	VVE5	ELLE	09/30/24 13:07
Total/NA	Analysis	6850		1	558510	VVE5	ELLE	10/08/24 22:51

**Laboratory References:**

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300



# Accreditation/Certification Summary

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

## Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Rhode Island	State	LAO00338	12-30-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6850	6850	Solid	Perchlorate
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids



# Method Summary

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

Method	Method Description	Protocol	Laboratory
6850	Perchlorate by LC/MS or LC/MS/MS	EPA	ELLE
Moisture	Percent Moisture	EPA	ELLE
6850	Shake Extraction with Ultrasonic Bath Extraction	SW846	ELLE

**Protocol References:**

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300



# Sample Summary

Client: ESS Laboratory  
Project/Site: 24I0584

Job ID: 410-189568-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
410-189568-1	24I0584-01	Solid	09/17/24 10:30	09/25/24 08:25
410-189568-2	24I0584-02	Solid	09/17/24 11:30	09/25/24 08:25
410-189568-3	24I0584-03	Solid	09/17/24 12:00	09/25/24 08:25
410-189568-4	24I0584-04	Solid	09/17/24 12:45	09/25/24 08:25

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

**SENDING LABORATORY**

ESS Laboratory  
185 Frances Avenue  
Cranston, RI 02910  
Phone: (401) 461-7181

**RECEIVING LABORATORY**

Lancaster Laboratories, Inc.  
2425 New Holland Pike  
Lancaster, PA 17601  
Phone: (717) 656-2300



410-189568 Chain of Custody

**PROJECT NOTES**

**Project Name:** 2410584      **Project Location:** MA  
**Project PO Number:** 16041L      **Due Date:** Standard  
**Send Report To:** smorrell@thielsch.com; MDean@thielsch.com; ESSProjectManagement@thielsch.com

**Sample ID:** 2410584-01  
**Sample Matrix:** Sediment

**Sampled:** 09/17/24 10:30  
**Sample Type:** Composite  
**Sampled By:** Client  
**Hold Time Expires:** 10/15/2024

**Container - Preservation:** 1 x Other  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

**Sample ID:** 2410584-02  
**Sample Matrix:** Sediment

**Sampled:** 09/17/24 11:30  
**Sample Type:** Composite  
**Sampled By:** Client  
**Hold Time Expires:** 10/15/2024

**Container - Preservation:** 1 x Other  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

**Sample ID:** 2410584-03  
**Sample Matrix:** Sediment

**Sampled:** 09/17/24 12:00  
**Sample Type:** Composite  
**Sampled By:** Client  
**Hold Time Expires:** 10/15/2024

**Container - Preservation:** 1 x Other  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

Released By \_\_\_\_\_ Date 9/24/24 10:26

Received By \_\_\_\_\_ Date 9/25/24 08:25

Released By \_\_\_\_\_ Date \_\_\_\_\_

Received By \_\_\_\_\_ Date \_\_\_\_\_

R: 3.7  
C: 3.5

2410584

Sample ID: 2410584-04  
Sample Matrix: Sediment

Sampled: 09/17/24 12:45  
Sample Type: Composite

Sampled By: Client

Container - Preservation: 1 x Other

Hold Time Expires 10/15/2024

Analysis Perchlorate

Analysis Comments: N/A

- 1
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- 12
- 13
- 14

Released By \_\_\_\_\_ Date 9/24/24 10:26

Received By \_\_\_\_\_ Date \_\_\_\_\_

Released By \_\_\_\_\_ Date \_\_\_\_\_

Received By \_\_\_\_\_ Date \_\_\_\_\_

*Handwritten:* Holly Cup 9/25/24 0825

*Handwritten:* R = 3.7  
C = 3.5

*Handwritten:* HAA

**SENDING LABORATORY**

ESS Laboratory  
185 Frances Avenue  
Cranston, RI 02910  
Phone: (401) 461-7181

**RECEIVING LABORATORY**

Lancaster Laboratories, Inc.  
2425 New Holland Pike  
Lancaster, PA 17601  
Phone: (717) 656-2300



410-189568 Chain of Custody

**PROJECT NOTES**

**Project Name:** 2410584      **Project Location:** MA  
**Project PO Number:** 16041L      **Due Date:** Standard  
**Send Report To:** smorrell@thielsch.com; MDean@thielsch.com; ESSProjectManagement@thielsch.com

**Sample ID:** 2410584-01  
**Sample Matrix:** Sediment

**Sampled:** 09/17/24 10:30  
**Sample Type:** Composite  
**Sampled By:** Client  
**Hold Time Expires:** 10/15/2024

**Container - Preservation:** 1 x Other  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

**Sample ID:** 2410584-02  
**Sample Matrix:** Sediment

**Sampled:** 09/17/24 11:30  
**Sample Type:** Composite  
**Sampled By:** Client  
**Hold Time Expires:** 10/15/2024

**Container - Preservation:** 1 x Other  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

**Sample ID:** 2410584-03  
**Sample Matrix:** Sediment

**Sampled:** 09/17/24 12:00  
**Sample Type:** Composite  
**Sampled By:** Client  
**Hold Time Expires:** 10/15/2024

**Container - Preservation:** 1 x Other  
**Analysis:** Perchlorate  
**Analysis Comments:** N/A

Released By

*[Signature]* 9/24/24 10:26

Date

Received By

*[Signature]*

Date

9/25/24 0825

Released By

Date

Received By

Date

R: 3.7  
C: 3.5



2410584

Sample ID: 2410584-04  
Sample Matrix: Sediment

Sampled: 09/17/24 12:45  
Sample Type: Composite

Sampled By: Client

Container - Preservation: 1 x Other

Hold Time Expires 10/15/2024

Analysis Perchlorate

Analysis Comments: N/A

- 1
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- 12
- 13
- 14

Released By

Date

Received By

Date

Released By

Date

Received By

Date

*[Signature]*  
HAA

9/24/24 10:26

*[Signature]*  
Haley Cup

9/25/24 0825

R = 3.7  
C = 3.5

## Login Sample Receipt Checklist

Client: ESS Laboratory

Job Number: 410-189568-1

**Login Number: 189568**

**List Source: Eurofins Lancaster Laboratories Environment Testing, LLC**

**List Number: 1**

**Creator: Arroyo, Haley**

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature acceptable, where thermal pres is required (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temp acceptable, where thermal pres is required (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	N/A	Refer to Job Narrative for details.
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	True	
Sample custody seals are intact.	N/A	Not present.
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	

### ESS Laboratory Sample and Cooler Receipt Checklist

Client: Horsley Witten Group - TJM

ESS Project ID: 2410584

Date Received: 9/18/2024

Shipped/Delivered Via: ESS Courier

Project Due Date: 9/25/2024

Days for Project: 5 Day

1. Air bill manifest present?  No  
Air No.: NA

6. Does COC match bottles?  Yes

2. Were custody seals present?  No

7. Is COC complete and correct?  Yes

3. Is radiation count <100 CPM?  Yes

8. Were samples received intact?  Yes

4. Is a Cooler Present?  Yes  
Temp: 4.4 Iced with: Ice

9. Were labs informed about short holds & rushes? Yes / No /  NA

10. Were any analyses received outside of hold time? Yes /  No

5. Was COC signed and dated by client?  Yes

11. Any Subcontracting needed?  Yes / No  
ESS Sample IDs: 6-4  
Analysis: Perchlorate free  
TAT: SFD

12. Were VOAs received?  Yes / No  
a. Air bubbles in aqueous VOAs?  Yes / No  
b. Does methanol cover soil completely?  Yes / No / NA

13. Are the samples properly preserved?  Yes / No  
a. If metals preserved upon receipt: Date: \_\_\_\_\_  
b. If dissolved metals are requested, are they: Yes / No Field Filtered  
c. Low Level VOA vials frozen: Date: 9/18/24

Time: \_\_\_\_\_ By/Acid Lot#: \_\_\_\_\_  
Yes / No To Be Lab Filtered  
Time: 1723 By: TD

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes /  No  
a. Was there a need to contact the client? Yes / No  
Who was contacted? \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ By: \_\_\_\_\_

Resolution:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	592478	Yes	N/A	Yes	8 oz jar	NP	
1	592479	Yes	N/A	Yes	8 oz jar	NP	
1	592480	Yes	N/A	Yes	8 oz jar	NP	
1	592490	Yes	N/A	Yes	4 oz. Jar	NP	
1	592494	Yes	N/A	Yes	Plastic Baggie	NP	
2	592481	Yes	N/A	Yes	8 oz jar	NP	
2	592482	Yes	N/A	Yes	8 oz jar	NP	
2	592483	Yes	N/A	Yes	8 oz jar	NP	
2	592491	Yes	N/A	Yes	4 oz. Jar	NP	
2	592495	Yes	N/A	Yes	Plastic Baggie	NP	
3	592484	Yes	N/A	Yes	8 oz jar	NP	
3	592485	Yes	N/A	Yes	8 oz jar	NP	
3	592486	Yes	N/A	Yes	8 oz jar	NP	
3	592492	Yes	N/A	Yes	4 oz. Jar	NP	
3	592496	Yes	N/A	Yes	Plastic Baggie	NP	
4	592487	Yes	N/A	Yes	8 oz jar	NP	
4	592488	Yes	N/A	Yes	8 oz jar	NP	
4	592489	Yes	N/A	Yes	8 oz jar	NP	
4	592493	Yes	N/A	Yes	4 oz. Jar	NP	
4	592497	Yes	N/A	Yes	Plastic Baggie	NP	

**ESS Laboratory Sample and Cooler Receipt Checklist**

Client: Horsley Witten Group - TJM

ESS Project ID: 2410584  
 Date Received: 9/18/2024

5	592498	Yes	N/A	Yes	Driller Jar	NP
5	592502	Yes	N/A	Yes	VOA Vial	MeOH
5	592506	Yes	N/A	Yes	VOA Vial	DI Water
5	592515	Yes	N/A	Yes	VOA Vial	DI Water
6	592499	Yes	N/A	Yes	Driller Jar	NP
6	592503	Yes	N/A	Yes	VOA Vial	MeOH
6	592508	Yes	N/A	Yes	VOA Vial	DI Water
6	592517	Yes	N/A	Yes	VOA Vial	DI Water
7	592500	Yes	N/A	Yes	Driller Jar	NP
7	592504	Yes	N/A	Yes	VOA Vial	MeOH
7	592510	Yes	N/A	Yes	VOA Vial	DI Water
7	592511	Yes	N/A	Yes	VOA Vial	DI Water
8	592501	Yes	N/A	Yes	Driller Jar	NP
8	592505	Yes	N/A	Yes	VOA Vial	MeOH
8	592512	Yes	N/A	Yes	VOA Vial	DI Water
8	592513	Yes	N/A	Yes	VOA Vial	DI Water

**2nd Review**

**Were all containers scanned into storage/lab?**

Are barcode labels on correct containers?

Are all Flashpoint stickers attached/container ID # circled?

Are all Hex Chrome stickers attached?

Are all QC stickers attached?

Are VOA stickers attached if bubbles noted?

Initials 

Yes / No  
 Yes / No / NA  
 Yes / No / NA  
 Yes / No / NA  
 Yes / No / NA

Completed

By: 

Date & Time: 9/18/24 16:05

Reviewed

By: 

Date & Time: 9/18/24 17:23



185 Frances Avenue  
 Cranston, RI 02910  
 Phone: 401-461-7181  
 Fax: 401-461-4486  
 www.esslaboratory.com

### CHAIN OF CUSTODY

ESS Lab # 2410584 Page 1 of 1

Turn Time (Days)  > 5  5  4  3  2  1  Same Day

**ELECTRONIC DELIVERABLES (Final Reports are PDF)**

Regulatory State: MA Criteria:

Limit Checker  State Forms  EQulS  
 Excel  Hard Copy  Enviro Data  
 CLP-Like Package  Other (Specify) →

Is this project for any of the following?:

CT RCP  MA MCP  RGP  Permit  401 WQ

**CLIENT INFORMATION**

Client: Horsley Witten Group  
 Address: 96 Route 6A  
Sandwich, MA  
 Phone: 508-833-6600  
 Email: cgran@horsleywitten.com  
 Distribution: nprice@horsleywitten.com  
 List: ghedman@horsleywitten.com

**PROJECT INFORMATION**

Project Name: Ipswich River  
 Project Location: Ipswich, MA  
 Project Number: 16041L  
 Project Manager: Neal Price  
 Bill to:  
 PO#:  
 Quote#:

**REQUESTED ANALYSES**

Metals (Ar, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	SVOCs	Pestic & Herbs	PCBs w/ Congeners	EPH	TPH	TOC	1. Water	Grain Size (ASTM D422)	perchlorate	VOCS	Total Number of Bottles
X	X	X	X	X	X	X	X	X	X		
X	X	X	X	X	X	X	X	X	X		
X	X	X	X	X	X	X	X	X	X		
X	X	X	X	X	X	X	X	X	X		
										X	
										X	
										X	
										X	

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID
1	9/17/24	10:30	comp	sed	IR-US-6
2		11:30			IR-US-7
3		12:00			IR-US-8
4		12:45			IR-US-BANK
5		10:30	Grab		IR-US-6. IR-US-6.3
6		11:30			IR-US-7. IR-US-7.1
7		12:00			IR-US-8. IR-US-8.1
8		12:45			IR-US-BANK. IR-US-BANK.2

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial  
 Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other\*  
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other\*

Sampled by: Caroline Gran

Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only  
 Cooler Temperature (°C): 4.4  
10  
 Comments: \* Please specify "Other" preservative and containers types in this space  
 Please run for 401WQC parameters; sub SVOCs for PAHs. Meet 401 reporting limits. Please run TCLP if exceed 20x rule.

All samples submitted are subject to ESS Laboratory's payment terms and conditions.  
 Dissolved Filtration  
 Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
<u>Caroll Gran</u>	9/18/24	13:12	<u>[Signature]</u> 9/18/24 13:14	<u>[Signature]</u>	9/18/24	15:42	<u>[Signature]</u>