Table 1

Response to Washington State Department of Ecology Comments on Remedial Investigation Report
Mossman Property (VCP Project ID NW3321)
Sammamish, Washington

Comment Number	Reference	Ecology Comment	Response
1	General	*Sequential Site assessments were conducted to investigate contaminations at this Site between 2012 and 2021. As a result, contamination was detected in various media (soil, groundwater and indoor air), while sediment was found not affected. The contamination was also identified due to releases from a heating-oil underground storage tank (UST).*	No response needed.
2	General	*Based on the laboratory results summarized in the RI Report (June 2021), TPH-D, TPH-O, benzene, xylenes and naphthalene in soil, groundwater and/or indoor air were defined as the chemicals of concern (COCs), since their concentrations exceeded either the applicable MTCA Method A cleanup levels or the MTCA Method B air screening levels.*	No response needed.
3	General	*Following the heating oil underground storage tank (UST) removal in late 2012, impacted soil at the UST was excavated in 2018. The remedial efforts included monitoring the contaminants in groundwater and periodically removing the light non-aqueous phase liquid (LNAPL) from three recovery wells located near MW-2 (Appendix A, Figure 2) until 2021.*	No response needed.
4	General	*Ecology does not concur with the statement in the RI Report that the nature and extent of contamination has been sufficiently characterized to support development of a Feasibility Study (FS) and Cleanup Action Plan (CAP). Ecology has identified the following data gaps in the RI:*	See responses to each sub-comment 4a through 4i below.

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4a	General	*Only three groundwater samples have been tested for benzene, and identified COC in soil and indoor air. At least four consecutive quarters on benzene below the Method A groundwater cleanup level need to be documented prior to eliminating benzene as a COC in groundwater.*	The Ecology requirements for eliminating benzene as a COC in groundwater are noted and will be applied to the remediation compliance monitoring program at the site as indicated in the dCAP. Further review of the benzene data for the site indicates the following conditions: 1) The only detection of benzene in the subsurface (soil, groundwater, and soil vapor) is in a soil sample with very high concentrations of TPH-D, suggesting that the detection may be affected by matrix interference. 3) Benzene was not detected above the MTCA Method B screening level in sub-slab vapor samples from under the Mossman residence. Benzene in soil vapor (and by proxy likely in soil and groundwater) is therefore not a significant issue at the site. 4) Benzene is commonly found in indoor air from a variety of sources other than petroleum fuel releases. Benzene detections in indoor and crawlspace air samples at the site were each measured within 2x the benzene concentration detected in outdoor ambient air, suggesting that the indoor and crawlspace air results reflect area benzene sources that are not related to subsurface heating oil/TPH-D at the site. 5) Sub-slab vapor in the corner of the Mossman residence affected by the heating oil release is characterized by elevated concentrations of naphthalene, which has not been detected in the indoor air samples. This further suggests that the benzene detected in indoor air is not from intrusion from sub-slab vapor. In aggregate, these conditions strongly suggest that although benzene is technically a COC because of the single detection in soil, benzene does not appear to be a component of the heating oil released to soil and groundwater at the site. Based on the available data, benzene is not considered to be a determinant contaminant at the site. In other words, removal and attenuation of TPH-D and other more prominent COCs to MTCA-compliant concentrations are expected to address benzene concentrations in those media as well.
4b		*The current downgradient extent of LNAPL and impacts to groundwater, between Lake Sammamish and existing wells MW-2 and MW-1, has not been determined.*	A soil and groundwater evaluation completed in 2021 (report included as appendix to dCAP) has addressed this comment. No evidence of LNAPL or of MTCA-noncompliant soil conditions was identified is soil samples collected from four borings installated between wells MW-1 and MW-2 and the water line of the lake at that time. Dissolved-phase TPH-D was identified in groundwater in the four borings at concentrations ranging from 165 to 9,290 micrograms per liter.

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4c	General	*The current status of impacts to Lake Sammamish surface water have not been determined, including collection of surface water samples near points of groundwater discharge.*	Based on the well construction data compiled under the response to Comment 4d, the most current comprehensive groundwater quality table included in the dCAP has been revised to include an indication of whether the top of the well screen was emergent or submerged with regard to the water table during each groundwater
4d		*Construction details for the three recovery wells were not included in the RI Report.*	Monitoring well construction details are compiled in a table and issued to Ecology in the revised dCAP.
4e		*A summary table of monitoring well construction details is needed, along with identification of groundwater sampling events when well screens were submerged below the water table, and therefore unable to detect LNAPL.*	Based on the well construction data developed under the response to Task 4d, the groundwater monitoring results table included in the dCAP has been revised to include an indication of whether the top of the well screen was emergent or submerged with regard to the water table during each groundwater sampling event. Note that Washington well installation regulation requirements limit optimization of well construction at the site, as groundwater is at or very near the ground surface across much of the site during wetter months.
4f		*A surveyed staff gage is needed on the dock located on the property, in order to include Lake stage elevations on future groundwater elevation contour maps.*	A review of the dock at the site indicates it is dilapidated and unsafe for worker access because of fall, impalement, and drowning hazards. Beasue of these and other conditions, the dock does not present an appropriately stable platform for establishing a static gauge. As such, establishing and taking surface water level measurements at a station on the dock is not feasible. The USGS maintains a website that reports the NGVD 29 elevation of Lake Sammamish water surface to the nearest hundredth of a foot on a real-time basis. The website is at: https://nwis.waterdata.usgs.gov/wa/nwis/uv/?cb_all_62614=on&format=gif_default&period=120&site_no=12122000. The technical team will include the applicable lake level data from this source in future reporting of groundwater elevations at the site. Current well casing elevation data for the site is developed based on the NGVD 29 datum, so the USGS and site-specific elevation data are compatible without conversion.

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4g	General	*Time-series plots of quarterly groundwater monitoring data are needed to assess behavior of the contaminant plume over time.*	While the contaminant concentrations at individual wells exhibit variation between groundwater monitoring events, the general distribution and extent of contaminants in groundwater are similar among the events, suggesting the plume is at or near steady state with dilution, dispersion, and natural degradation slowly reducing groundwater contaminant concentrations over time. Since source removal has not been completed at the site, and since the current groundwater contaminant degradation rates will not likely result in MTCA-compliant conditions within the current adjudicated timeframe set for remediation (less than 2 years), additional evaluation of small-scale changes in groundwater conditions is not a valuable exercise.
4h		*An updated table of preliminary cleanup levels (PCUL) for all affected media is needed, including cleanup level ARARs (Applicable of Relevant and Appropriate Requirements) and selection of the lowest ARAR as the PCUL for each medium.*	The CULs established in the RI and dCAP represent reasonable cleanup standards consistent with the most stringent ARARs for the site contaminants, media, and conditions. If Ecology does not agree with a CUL, then specific concerns should be described.
4i		*Review the Ecology guidance document Implementation Memorandum No. 16, Developing Conditional Points of Compliance at MTCA Sites Where Groundwater Discharges to Surface Water, Revised December 20173, to assess groundwater compliance monitoring options for this Site.*	The referenced document has been reviewed and will be used to establish the final groundwater/surface water compliance monitoring well network after contaminated soil removal is completed at the site.
5	General	*To fill the data gaps, Ecology recommends that additional soil and groundwater data is collected. Before further work is completed, Ecology encourages the development of a work plan for Ecology review, to ensure that sufficient data is collected and to avoid unnecessary expenditure of time and money.*	Additional investigation was completed in 2021 that specifically addresses the data gap identified by Ecology for groundwater contamination downgradient of wells MW-1 and MW-2. The 2021 supplemental investigation report is appended to the dCAP already submitted to Ecology. With the inclusion of the 2021 data, the RI demonstrates that sufficient environmental media sampling data are available to support the remediation plan for this relatively small area of TPH-D impacts using model remedy approaches.
6	Section 5.0	*Ecology concurs with the need for completing a site-specific Terrestrial Ecological Evaluation (TEE). This step is necessary to determine if soil cleanup levels must be adjusted for protection of biota.*	Note that the RI indicates that the site qualifies for an exclusion from the TEE based on the absence of sufficient contiguous undeveloped land within 500 feet of the site per Chapter 173-340-7491(c)(i) WAC. No further TEE is planned.

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7	Tables 1 and 2	*As evaluating compliance of the Method A soil and groundwater cleanup level for TPH-D and TPH-O, concentrations of the two fractions are required adding and comparing their laboratory results to the cleanup level, in accordance to Ecology guidance documents:* *Implementation Memorandum #4, Determining Compliance with Method A Cleanup Levels for Diesel and Heavy Oil, Publication No. 04-09- 086, June 2004 (https://apps.ecology.wa.gov/publications/SummaryPages/0409086.html)* *Guidance for Remediation of Petroleum Contaminated Sites, Publication No. 10-09-057, revised June 2016 (https://apps.ecology.wa.gov/publications/SummaryPages/1009057.html* *Therefore, please incorporate these changes into future versions of Tables 1, 2 and 3 of the RI/FS by adding a column for TPH-D+O.*	TPH-D and TPH-O concentration values will be combined for future soil and groundwater compliance evaluation. A review of the available data indicate that interpretation of results from a single groundwater sample from one well would be modified by applying this approach to the data as presented in the RI. This modification of the compliance status based on those results does not affect the conceptual site model or conclusions presented in the RI.
8	Section 6.2	*Note that surface-water cleanup levels for gasoline-, diesel-, and oil-range organics, benzene, toluene, ethylbenzene, and total xylenes were updated in Implementation Memorandum No. 23, dated August 25, 2021. Please update the surface-water cleanup levels in Section 6.2 of the RI Report with these cleanup levels in future Site reports.*	With one minor exception (the lack of inclusion of TPH-O for compliance with the TPH-D standard), the proposed site-specific groundwater cleanup levels in the RI are consistent with the requirements of this publication to address the groundwater to surface water pathway. The dCAP has been revised to clearly acknowledge the need to sum TPH-D and TPH-O results for evaluating media compliance. Note that Section 6.2 of the RI states that regulatory standards for surface water pathway were addressed specifically in the development of the groundwater CULs, and the CULs in the RI reflect the CULs in the referenced Ecology memo.
9	General	*Ecology appreciates uploading of Site data to the Environmental Information Management (EIM) database. The last EIM data corresponds to a field collection end date of 5/19/2020. Please upload additional data as it is collected*	Additional data developed by consultants other than TRC are available and will be uploaded to the EIM.