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DEPARTMENT OF ECOLOGY
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June 22, 2020

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Project Manager
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201 South Jackson Street, Suite 701
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Re: Remedial Investigation Report for Vashon Island Closed Landfill, Final Agency Draft, May 2020

The Washington State Department of Ecology (Ecology) has reviewed the Final Agency Draft Remedial Investigation (RI) Report for the Vashon Island Closed Landfill, dated May 2020, for the Vashon Island Landfill site (Site). King County Solid Waste Division (KCSWD) has modified the RI to address Ecology's opinion letters, dated December 6, 2018 and December 17, 2019, and Ecology's subsequent comments on March 23, 2020. Attachment A provides a table with specific comments and responses from December 2018 to June 2020, and Attachment B provides specific comments and responses for the preliminary cleanup levels.

Ecology recommends the RI be modified to address:

- Site delineation data gaps;
- Additional components of the beneficial use survey;
- Preliminary cleanup levels for soil; and
- Preliminary cleanup levels for the terrestrial ecological exposure pathway.

Site Delineation and Points of Compliance in Groundwater

One of the primary objectives of the RI is to identify chemicals of potential concern and evaluate preliminary cleanup levels, and then to define the Site boundary by delineating the extent of contamination that exceeds the preliminary cleanup levels. The RI demonstrates the Site boundary is primarily defined by the migration of vinyl chloride in the Cc2 aquifer. The

preliminary cleanup level of vinyl chloride in groundwater is driven by surface water quality criteria. Vinyl chloride contamination extends in groundwater to the outcrop of the Cc2 formation on the west hillside. The extent of vinyl chloride contamination has not been defined near the southern boundary of the landfill property.

KCSWD has proposed that the delineation of vinyl chloride contamination near the southern boundary be identified as a data gap in the RI since the concentrations of vinyl chloride are below the less stringent drinking water criteria. In this specific case, Ecology concurs that the additional site characterization may be integrated into the development of cleanup activities in the feasibility study, as allowed in WAC 173-350(7)(a). Ecology recommends that the planned feasibility study include an RI data gap section. The RI data gap section should evaluate the extent of vinyl chloride contamination that exceeds the preliminary cleanup level by installing additional monitoring well(s) at, and potentially beyond the property boundary. As warranted, the RI data gap section should evaluate the extent of the Cc2 aquifer south of the property boundary and groundwater seepage from the formation.

The feasibility study should recommend points of compliance near the plume boundaries or the seepage areas, and propose preliminary cleanup levels or remediation levels for these points of compliance.

The RI should clearly and consistently state that the extent of contamination has not been delineated. Specifically, Figure 10.1 should have a note that identifies this data gap and states that the data gap will be evaluated in the feasibility study.

Beneficial Use Survey

Please cross-correlate groundwater and spring water rights claims using Ecology's Water Resource Explorer website: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-Resources-Explorer. Please evaluate Lot 82 further by mailing to the appropriate address where tax documents are received by the owner (this address is available on the King County Assessors website) if this was not done in the initial mailing. Please reach out to Lot 64 and ask if water levels can be collected to evaluate whether the well is completed in Cc1 or Cc2 aquifer. KCSWD should determine if they should provide access to the appropriate water system when the Cc2 aquifer is further delineated to the south. Please include the DW-GE spring in routine off-site sampling. Please include the completed mailers and a blank copy of the form (it is not present in the draft we received).

Preliminary Cleanup Levels for Soil

Soil samples were collected along the west hillslope to evaluate the terrestrial ecological exposure pathway (see Section 8). Preliminary cleanup levels were developed based on direct

contact and ecological exposure pathways, but did not consider the groundwater-protective exposure pathway for soil. The soil-to-groundwater exposure pathway is complete at the Site based on empirical evidence; although the gas-to-groundwater exposure pathway may also contribute. Soil contamination is suspected beneath the landfill containment system and in the aquifer downgradient from the landfill. Ecology is not suggesting that the extent of soil contamination be delineated. Ecology anticipates that KCSWD will eventually demonstrate compliance with the soil cleanup levels using an empirical demonstration based on compliance with the groundwater cleanup standards.

Ecology recommends that preliminary cleanup levels be established for soil in Section 5, and summarized in a new table, e.g., Table 5.2, along with the corresponding soil points of compliance for each pathway in accordance with WAC 173-340-740(6). This section could provide a forward reference to Section 8 to incorporate the ecological exposure screening levels. The soil samples collected for the terrestrial ecological evaluation should be compared to the direct contact, ecological exposure, and groundwater-protective preliminary cleanup levels, as applicable for the points of compliance.

Terrestrial Ecological Evaluation

Ecology calculated preliminary cleanup levels for the terrestrial ecological exposure pathway for the contaminants that were listed the Sampling and Analysis Plan (July 2019). In email correspondence to KCSWD on May 21, 2020, Ecology identified contaminants to be retained as chemicals of potential concern based on preliminary cleanup levels and the highest detected values in soil. These recommendations, summarized in the following table, should be incorporated into the RI.

Contaminant	Preliminary Cleanup Level (mg/kg)	Highest Concentration Detected in Soil (mg/kg)	Note
Arsenic	20	59.2	Cleanup levels can be upward adjusted to area background only under specific circumstances.
Lead	50	86.9	Cleanup levels can be upward adjusted to area background only under specific circumstances.
Manganese	1,200	7,010	A new wildlife value was proposed, but 1,200 mg/kg is based on another eco-receptor.
Mercury	0.1	0.324	Based on WAC 173-340, Table 749-3.
Acetone	1,200	3,110	Based on Sampling and Analysis Plan, Table 3.
Acrolein	50	65.4	Based of practical quantitation limit.
Bromomethane (methyl bromide)	2	8.2	Based of practical quantitation limit.

Contaminant	Preliminary Cleanup Level (mg/kg)	Highest Concentration Detected in Soil (mg/kg)	Note
Methyl iodide	1.23	53.4	Based on benchmark value.
Diesel and oil range hydrocarbons	260	543	Based on protection of soil biota.

Ecology's Opinion on the RI

Ecology looks forward to providing comments and cleanup recommendations for the Final Remedial Investigation Report under authorities granted in WAC 173-351-460 for overseeing KCSWD's independent cleanup action of the Vashon Island Landfill.

Please contact us with any questions you have about our comments.

Sincerely,

Tim O'Connor, LG, LHG
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Attachments:

Attachment A
Attachment B

cc: Darshan Dhillon, Public Health – Seattle & King County
Steven Williams, Ecology, Solid Waste Management Program

Attachment A Deliverable Review Form

RI Report Specific Comments

Project Name: Vashon Island Closed Landfill Remedial Investigation- MTCA Independent Action
Contract #:
Reviewer: Tim O'Connor/Ecology, Madeline Wall/Ecology & Alan Noell/Ecology
Deliverable Name: Agency Draft Vashon Island Closed Landfill Remedial Investigation Report, Volumes 1 and 2

Review Date: *10/9/2019*
Response Date: *12/6/2018*
Aspect Response Date: *12/31/2018*
Ecology Response Date: *12/17/2019*
Aspect Response Date: **01/11/2020**

Deliverable Review						Response						
Comment No.	Reviewer Name	Page, Figure, Specification or Sheet No.	Ecology 6/20 Review	Section / Paragraph	Reviewer's Comment on 2018 Draft RI	Responder Name	County Response 8/15/19 (*)	Aspect Response 11/7/2019 (without *)	Ecology Response 12/6/19	Aspect Response 01/11/2020	Ecology Response 03/23/2020	Ecology Comment on Final Agency Draft RI 06/19/2020
0					*Be as specific as possible. Minimize open ended comments. PM to resolve conflicting or out-of-scope comments*			*Agreed/Incorporate as stated.* *Agreed/Describe how comment will be incorporated.*	*Agreed/Incorporate as stated.* *Agreed/Describe how comment will be incorporated.*			
1	Wall	Pages ES-1 and 1	done	2nd paragraph on both pages	Please include the Remedial Investigation was conducted due to the exceedance of a groundwater protection standard in the explanation as referenced in Ecology's correspondance letters dated August 27th and 30th, 2010.	DC	Agreed *	Agreed. Reference to this rationale for the RI will be added as requested.	Concur			Done
2	O'Connor	ES-2	done	Extent of Impact	Include COC's for surface water in second bullet.	DC	Agreed *	Agreed. COC will be added, following reanalysis based on Comment 5 below.	Concur			Done
2.5	O'Connor	Revised Draft ES-3	new comment	Extent of Impact								The statement that "Exceedances of drinking water standard by groundwater COCs are constrained within the property boundary" is not true. Between MW-2 and MW-20 the plume may diverge south. In addition, I believe you stated in the presentation that for vinyl chloride "drinking water standards" mean Modified MTCA Method B (carcinogen) screening level of 0.29 ug/L. The other COCs (dissolved arsenic and iron) drinking water standards are not used in Table 5.1 making this statement false if you do mean Federal Drinking Water Standards. Revise this comment. Alan's recommendation - Revise sentence on top of page ES-3 to "The limits of the PCULs for groundwater ingestion do not extend to surface water or beyond the property boundary." MTCA allows the PCUL of arsenic to be bound by background, but MTCA doesn't modify the actual drinking water standard.
3	O'Connor	ES-3	done	Extent of Impact	Last sentence, make clear you're discussing surface water; perhaps discuss that the Cc2 aquifer ends to west in the ravine.	DC	Agreed *	Agreed. Clarification will be added that discussion is regarding surface water.	Concur			Done
4	O'Connor	ES-3	done	Exposure Pathways	Also state that further evaluation of current Group A/B drinking water connections to residences south of the VLF property will be conducted. Also note the MCL for VC is 2 ug/L but PCUL is .02 ug/L.	KSL	Agreed *	Agreed. A statement will be added regarding the domestic well survey to be conducted to the south of VLF. Further discussion with Ecology may be warranted in regards to scope of this survey.	Concur			Done
5	O'Connor	ES-3	update per 6/20 comment	Exposure Pathways	See Attachment B for Ecology's review of PCULs for COCs. Also, the PCUL of 1,000 ug/L for Fe and 2,200 ug/L for Mn are appropriate for protecting health, however MTCA requires using a the lower secondary MCL (300 ug/L for Fe and 50 ug/L for Mn). The Concise Explanatory Statement in the 2001 revision to MTCA (General Question 10.1.8 on e-page 185) indicates that secondary MCLs listed in the DOH regulation are considered ARARs under MTCA. Ecology supports calculating background groundwater levels using upgradient/residential well data for these COCs (aquifer specific) which can be used in place of these secondary MCLs if they are higher. Reevaluation of the extent of contamination should be conducted based on Attachment B.	DC	*See Attachment B	Partially agreed. PCULs will be updated based using those proposed by Ecology as noted in responses in Attachment B. A desktop study of background concentrations will be conducted and the results presented in the RI. Reevaluation of contaminant extent (including table and figure updates) will be completed accordingly.	Please submit a letter/technical memorandum with the Cc2 aquifer background metals calculations for review/approval by Ecology before incorporating them into the RI. The arsenic level of 8 ug/L in groundwater referenced in the Draft Natural Background Arsenic Concentrations in Washington State (Publication No. 14-09-044) Puget Sound Lowlands number.can be used in this RI. Also the new MTCA B value for manganese is appropriate.	We agree with the use of Ecology proposed PCULs for arsenic, iron, and manganese in the RI, as listed in Attachment B of this comment matrix. We recognize that background levels may be used to make an upward adjustment of cleanup levels under MTCA, but do not propose to make that evaluation for the RI.		Please consistently use the vinyl chloride surface water PCUL in discussion of delination of COCs. If you want to make the statement that exceedances of MTCA Method B or Federal Drinking Water Standards it is inconsistent with MTCA rules. One PCUL is to be used site-side.
6	O'Connor	ES-3	update per 6/20 comment	Exposure Pathways	Exposed upland soil provides a potential complete pathway for upland ecological receptors. Any areas within the Site with exposed upland soil (with suspected contamination) shallower than a depth of 15 ft bgs should be included in the RI. A conditional point of compliance (as per WAC 173-340-7490(4)) requires an agreed upon institutional control (restrictive covenant). If a conditional point of compliance (and resulting restrictive covenant/institutional control) is agreed upon with Ecology, and all contamination is deeper than the default biologically active zone (6ft bgs), then the final protective values may be adjusted to reflect an exclusion from the Terrestrial Ecological Evaluation (TEE). However, at this Site there appear to be seeps from the West Hillslope area that expose suspected contaminated water to soil at the surface. As a result, it is recommended that a complete exposure pathway exists from surface soil to uplands ecological receptors. Conditional point of compliance at the biologically active zone (0 to 6 ft bgs) does not appear appropriate for this Site, and the RI should include uplands ecological risk towards evaluation of nature and extent of contamination. If subsequent soil sampling indicates that contamination does not exist in the areas discussed above, then a conditional point of compliance may be approved by Ecology (excluding the site from the TEE), providing verification that the conditions listed in WAC 173-340-7490 (4)(a) and WAC 173-340-7491(1)(a) have been met. Until that occurs, protection of upland ecological receptors should remain included in the RI.	KSL	Partially Agree	Partially Agree. A wetlands survey and soil sampling were conducted and a site specific TEE for the West Hillslope is in progress. Results and recommendations from these evaluations will be presented in the RI to address potential ecological risk in regards to the nature and extent of contamination.	Concur			Update per Ecology's 5/21/20 email. For the purposes of the RI, the following contaminants should be retained as Chemicals of Potential Concern (COPC's) based on Preliminary Cleanup Levels (PCUL's) and highest detected values in the soil. Three attachments: TEE PCUL and COPC List.xlsx = Preliminary Cleanup Levels and Contaminants of Potential Concern included in a matrix RAIS Output.xlsx = Risk Assessment Information System – Benchmark value derivation CLARC_Master 05-12-20.xlsx = Version of CLARC that contaminant info was derived  Contaminant / PCUL (mg/kg) / Highest Concentration Detected in the Soil (mg/kg) / Note Arsenic 20 59.2 Cleanup levels can only be upward adjusted to area background only under specific circumstances. Lead 50 86.9 Cleanup levels can only be upward adjusted to area background only under specific circumstances. Manganese 3,090 7050 A new wildlife value was proposed, but 1830 is based on another eco receptor. Mercury 0.1 0.324 Based on Table 749-3 Acetone 3,090 3100 Based on SAP Table 3 Aroclors 50 65.4 Based on PQL. Bromomethane (Methyl Bromide) 2 8.2 Based on PQL. Methyl Iodide 5.23 53.4 Based on benchmark value. Diesel + HO 260 543 Based on protection of Soil Biota.
6.5	O'Connor	ES-4/5	new comment	Data Gaps								The data gap for the extent of vinyl chloride along south property bounday should be specific to groundwater and surface water. Delineation of groundwater may preclude the need for delineation of surface water, but not visa-versa. Be either non-specific or inclusive of both. Add a statement that this will be further evaluated in the Feasibility Study.
7	Wall	Pg. 10	done	Section 3.1	Figure 2.1 should show stream leaving site at south end going into tributary of Judd Creak	DC	Disagree	Disagree. This is an ephemeral stream meaning it does not flow year round. The source files for stream locations (Washington Department of Natural Resources and King County GIS) do not have this tributary digitized. The stream source reference will be added to the legend.	Concur			
8	T O'Connor /ECY	Pg. 15	done	3.4.2.1	The 85-Acre well is 145' deep and may not be completed in the Unit D aquifer as the report states. I suggest contacting 85 acres and Smith-Shiratori Water District Management for copies of the well logs. There are multiple wells that are shallower and may be completed in Unit C aquifer, please review logs and attempt to locate via information on the well logs. An evaluation of the homes serviced by Group A/B water systems south of the VLF property line was discussed in the November 7, 2018 presentation. This task should be completed and an assessment of next steps conducted. The statement in the 3rd paragraph on page 15 is misleading as D-D' doesn't include any geologic information.	DC	Disagree	Disagree. Based on information added to D-D' using well logs per Comment 24 below, the County has determined that wells to the south and west, including 85-Acres are not completed in Unit C, but rather is completed in a deeper unit. As requested in Comment 24 below, Nestor, Thomas and Monier wells have been added to D-D'. Where insufficient well location information was available, well location was determined through review of property ownership data avilable on line through King County Assessor's website. We have assumed wells were located on the parcel adjacent to the structures and not located along steep slopes. Using the general topographical elevation of the assumed location of the wells, the approximate completion of the Thomas and Nestor wells were estimated to be completed in a unit deeper than Unit C. Monier well may be completed in Unit C; however this well is located at least 700 feet southwest of the landfill; however the Monier property appears to be connected to the 85-acres water system. The County is updating the domestic well survey previously conducted in 2002 that identifies connections to 85-acres, Group B systems, vacant lots, and private wells. The update includes sending out a survey questionaire mailer to residents in the landfill vicinity and search of Agency records. The County has contacted puryeors to aquire well logs for Smith-Shiratori and 85 Acres. These well logs are not available. Note that Smith-Shiratori is a private well. The County expects responses to survey questionaire mailer by October 25. Results will be evaluated and a meeting with the Agencies to review results and recommendations to be set in mid-December.	Concur			

Deliverable Review						Response						
Comment No.	Reviewer Name	Page, Figure, Specification or Sheet No.	Ecology 6/20 Review	Section / Paragraph	Reviewer's Comment on 2018 Draft RI	Responder Name	County Response 8/15/19 (*)	Aspect Response 11/7/2019 (without *)	Ecology Response 12/6/19	Aspect Response 01/11/2020	Ecology Response 03/23/2020	Ecology Comment on Final Agency Draft RI 06/19/2020
9	O'Connor	Pg. 15		3.4.2.2	In the latest quarterly report (3rd Quarter 2018) the potentiometric surface map for the Cc2 aquifer indicates a northwest/west/southwestern gradient. Other quarterly and annual reports Cc2 also suggest this south-southwest gradient: cross-section C-C' shows the Cc2 aquifer between MW-20 and MW-33. The Berryman 2006a report shows two Cc2 scenarios (Figures 3-8 and 3-9); discuss how the southern gradient in the Cc2 aquifer may vary and any impacts to the extent of contamination of COCs to the south. Add groundwater potentiometric surface maps for Unit Cc3.	DC	Disagree	Disagree. Additional investigations completed since 2006 have helped refine the VLF Conceptual Site Model. This RI included a detailed review and synthesis of previous investigations to further understand site stratigraphy and hydrogeology, including Geospatial Modeling, western and southern hillslope studies and recent sonic boring drilling. The most current potentiometric map was submitted with these comment responses. In 2011, the County completed the West Hillslope Investigation, which included a survey of geology outcrops and seep elevations along the western slope. This investigation also presented trilinear plots that show demonstrate the relationship between the seep water quality and the Unit Cc2 groundwater quality. Recent potentiometric maps for Unit Cc2 have incorporated these surveyed seep elevations and the hydrogeologic model has been revised to indicate a westerly flow direction. The water quality results from Unit C are consistent with westerly direction of groundwater flow. If a southerly groundwater flow direction was present, it would result in higher COC concentrations in wells along the southern side of the site than what has been observed. Water quality along the south side of the site will be reevaluated after 3Q 2019 sampling event to confirm these conditions. Additionally, the 3rd quarter 2018 potentiometric map did not include the west hillslope springs. This p-map was revised in the Vashon 2018 Annual, which showed the groundwater in Cc2 flowing to the west. Insufficient data is available to complete a potentiometric surface for Unit Cc3.	Ecology suggests the extent of the Cc2 aquifer in the lower ravine area to confirm the Cc2 aquifer doesnt have a southern gradient. Ecology also suggests evaluating MW-30, MW-31, and MW-32 (if water is present) on the West Hillslope and/or adding a new compliance well in the Cc2 aquifer west of the Westside Highway. This will be useful for ending Corrective Action. **TIM TO REVIEW**	As discussed in the December 18, 2019 meting with Ecology, we agree with sampling of MW-30 or 32 (or similar sampling point), if water is present, for compliance purposes. MW-31 is mapped as completed in the Cc3 and will not be sampled. See response to Comment 30 regarding contaminant extent in Cc2 and south ravine area.		Recommend using MW-30 or MW-32 for a compliance point on West Hillslope or install a "spring box" at seeps. Discontinue use of weirs as groundwater compliance points on hillside.
10	Wall	Pg. 26		4.4.1.1, last paragraph	Why was LFG monitoring started in MW-13 and MW-24 in 2010?		This resulted from a change in monitoring staff.	A change in monitoring staff occurred in July 2010. The initiation of monitoring was not event driven.	Concur			
11	Wall	Pg. 26	done	4.4.1.2, first paragraph	Include explanation of VTP-1D installation when 1S was decommissioned.	DC	Agreed	Agreed. After VTP-1S was installed in a tight portion of the glacial till unit, no methane was observed. VTP-1S filled with water during the first wet season without subsequently draining, thus causing water blockage of the screen section that prevents gas measurements from being collected. VTP-1D was installed to a greater depth in the underlying advance outwash unit to assess the extent of methane at that location.	Concur			
12	Wall	Pg. 32	done	5.1 7th Bullet	Why call out just the LFG requirements of Subtitle D? Why include subtitle D at all as WA is delegated to implement Subtitle D through our 351 regulation.	DC	Agreed *	Agreed. Modify bullet: "Resource Conservation and Recovery Act (RCRA) and Subtitle C regulations, to the extent that hazardous wastes are discovered during the remedial action."	Concur			
13	Wall	Pg. 32	done	5.1 last bullet	Should include PSCAA regulations.	DC	Agreed *	Agreed. Modify bullet: "Federal, State, and Local air quality laws and regulations (Clean Air Act 42 USC 7401 et seq.; 40 CFR 50; 70.94 RCW; WAC 173-400; WAC 173-460; Regulations I and III of the Puget Sound Clean Air Agency) to the extent that air emissions are generated during interim measures and long-term remedies (i.e., LFG flares, soil vapor extraction, and vapor mitigation)."	Concur			
14	O'Connor	Table 5.1	done	Pg 1-6	See Attachment B for Ecology'sreview of PCUL's for COCs. Evaluate the protectiveness of the MCL for cis-1,2-DCE and adjust it down to HQ=1 (MTCA equation 720-1). This will produce a value of 16 ug/L. Consider renaming the column labeled "Modified MTCA Method B" for both ground water and surface water "Risk of 1E-5". "Modified Method B" could be confused with WAC 173-340-720(4)(c) and WAC 173-340-730(3)(c), neither of which allows adjusting the risk to 1E-5.	DC	Partially Agree	Partially Agree. Cis-1,2-DCE PCUL will be adjusted to 16 ug/L. The note in this column heading, as explained at the bottom of the Table, clearly identifies the modification as relating to a 1x10-5 cancer risk and references the MTCA sections that this modification is in accordance with. The column heading will remain as presented in the draft.	Concur			
15	Wall	Pg. 36	done	5.5.1 last paragraph	What about carcinogenic effects of TCE, and what is the Method B non-carcinogenic level?	KSL	*Looks like this was already incorporated into the RI.	Both the carcinogenic (0.54 ug/L) and non-carcinogenic (4 ug/L) are presented on Table 5.1. The PCUL selected for this RI was driven by the CWA Effective Criteria, Section 304, which was 0.3 ug/L. This value is more stringent than MTCA Method B.	Concur			
16	Wall	Pg. 38	done	6.1.1 second to last paragraph	Please add the date of the one time nitrate exceeded the PCUL.	DC	Agreed *	Agreed. The one nitrate exceedance was at MW-27 at 10.3 mg/L in March 2015.	Concur			
17	Wall	Pg. 41	done	6.1.2.1 last bullet	Explain the process of considering a data point as an outlier. Reference the SAP or Unified Guidance.	KSL	"Outlier" replaced with "anomoly".	The term "outlier" will be replaced with the term "anomoly" in the text.	Concur			
18	Wall	Pg. 43	done	6.1.2.3 last paragraph	The TCE detection in MW-12: when did that occur?	DC	Agreed *	The date of the detection, May 2004, will be added to the text.	Concur			
19	O'Connor	Pg. 44	done	6.1.3	Please lower your MDL's for 1,2-dibromomethane and 1,2-dibromo-3-chloropropane as well as all other analysis to meet WAC 173-200 groundwater quality criteria.	KSL	Disagree	Disagree. As per WAC 173-200-010(3)(c), it states that these cleanup standards are not applicable for remedial actions pursuant to MTCA. Therefore achieving lower MDLs to meet WAC 173-200 groundwater quality criteria is out of scope for this Site.	Concur			
20	O'Connor	Pg. 45	done	6.2.1	Please rescreen and update PCULs in Table 6.4 and update Figure 8.1 with the COC's, their levels, and the extent of contamination based on Attachment B.	DC	Agreed *	Agreed. Tables and figures will be updated, as appropriate, based on the agreed upon adjustments presented in Ecology's Attachment B.	Concur			
21	O'Connor	Pg. 46	done	6.2.2	Discuss the question remaining from the 3/2/06 Environmental Evaluation section 4.1.2 where it discusses how impacted groundwater from Cc2 would discharge to Unit Cc3 at some points and then can discharge to the regional aquifer.	KSL	Partially Agree	Partially Agree. Section 6 is just meant to be a data presentation without interpretation. Section 7 is a more appropriate place to add this level of interpretation of the connection between Cc2 and other units. Text will be added in Section 6 that points the reader to Section 7 for this analysis. Based on the reinterpretation of the hydrogeological conceptual site model completed for this RI, there is no evidence to support a connection between the Cc2, Cc3 and D aquifers, as supported by the continuous cores examined during sonic well drilling.	Concur			
22	O'Connor	50	Done	7.1.1	There is not a well that supports the statement in the third paragraph "Unit Cc2 was not observed in borings southeast...of VLF." Cc2 exists in MW-20 and MW-2 and may have a southwesterly gradient. Please rescreen data for all aquifers against Ecology's proposed PCULs to evaluate if groundwater with COCs is limited to Cc2.	DC	Agreed *	Agreed. Text will be clarified to state that Unit Cc2 is thinned (MW-20) to not present (MW-7) in the southeast portion of the VLF. This unit and the amount of saturation thins considerable to the southeast. This is a very low yielding unit. See Comment 20 - Note that all groundwater data in the draft RI Report were screened against PCULs listed in Table 5.1. Data screening was not limited based on the location of the well or hydrogeologic interpretation.	Concur			
23	O'Connor	61-62	Update per Comment 6	7.4.5.1	See Comment 6	KSL	Partially Agree	See response to Comment 6	Concur			
24	O'Connor	Vol 2 Table C-1	done		Put geologic information from Kurt Monier, Dave Nestor, and 112441 wells in cross-sections.	DC	Agreed *	Agreed. These wells will be added to D-D' .	Concur			
25	O'Connor	Vol 2 Table C-1	done		Well 112441 is on the map but not on the table.	DC	Agreed *	Agreed. It will be added to the table.	Concur			
26	O'Connor	63	done	8.1.1	Mention domestic water samples from DW-PA and DW-8S are still routinely collected and no evidence of contamination originating from the VLF has been found.	DC	Agreed	Agreed. This will be added to the text.	Concur			
27	O'Connor	63	See Comment 6.5	8.1.1	The site is not fully delineated as stated in this Section. The 3rd Quarter 2019 LFG Evaluations and Recommendations Report and other additions to the RI discussed in the November 7, 2018 meeting, in this response table, or in Ecology's attached Opinion letter will need to be incorporated into this RI. Ecology will determine the completeness of the RI once these steps are completed. This review of groundwater, surface water, soil, sediment, and LFG analytical data results will determine if further delineation will be necessary.	KSL	Agreed	Agreed. The final RI has a revised anticipated schedule of Q1 2020 to accommodate additional groundwater, surface water, soil, and LFG analytical data evaluation. The FS schedule will likewise be adjusted to accommodate the additional data evaluation.	Concur			
28	Ecology	74	See 6/18/20 Ecology Response	8.1.1	The section also indentified the Cc2 aquifer as "not a primary drinking water source." Ecology requested a cross-section be extended to include the geology for the 8S-Acre water system well south of VLF. This well log was not available therefore Figure 3.6 of the RI is blank south of the landfill except for water system wells DW-SS and 8S-Acres (DW-8S) location. Following the November 7, 2018 meeting discussions, KCSWD will work on including another adjacent well to the south so the Cc2 aquifer can be further evaluated south of the VLF property line (using existing well logs currently available from other residential well logs in Ecology's Water Resouce database or by contracting the water systems and find well logs) south of the VLF property line.		Partially Agree	Nestor, Thomas and Monier wells have been added to cross-section D-D'. (From Ecology letter) *As suggested in the November 7, 2018 meeting, KCSWD will work to determine if residences south of the VLF property line are connected to Group A/B water systems. Specific attention should be paid to the well mentioned in the RI (WELL ID 190701). Identifying connections to Group A/B water systems south of the VLF will assist in evaluating if another well to the south in the Cc2 aquifer is warranted.	Concur			Possibly add a column to Table 7.1 for springs; DW-GE is a spring but entered as a well. Review Ecology's Water Resources Explorer website and cross compare wells/springs with report findings. Additional spring claims are possibly present to the south. Confirm no springs are used for domestic drinking water in water claims. Water claims on the website may also be used to double check spring/well use information. There is one spring outside the study area being used for domestic water supply according to the water rights claim. One additional well appears to be present on study lot number 68: William Gerrier. https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-Resources-Explorer Consider adding DW-GE and study lot 64 well to the KCSWD semi-annual monitoring sampling since they are both possibly from the Unit C aquifer.

Deliverable Review						Response						
Comment No.	Reviewer Name	Page, Figure, Specification or Sheet No.	Ecology 6/20 Review	Section / Paragraph	Reviewer's Comment on 2018 Draft RI	Responder Name	County Response 8/15/19 (*)	Aspect Response 11/7/2019 (without *)	Ecology Response 12/6/19	Aspect Response 01/11/2020	Ecology Response 03/23/2020	Ecology Comment on Final Agency Draft RI 06/19/2020
29	Ecology	General	done		Ecology does not direct public outreach in an independent MTCA action: however, we encourage the County to notify the landfill neighbors of the RI and Interim Action work conducted and provide them access to the Final RI.		Agreed	Agreed. The County has contacted landfill neighbors regarding updating the domestic well survey. Likewise, a meeting with the Vashon Groundwater Committee is scheduled for October 23rd to update the committee on RI progress. The County has created a Vashon Island Landfill FAQ flyer for public education purposes.	Concur			A update to the groundwater committee would be beneficial once the RI is approved. Please include Ecology and PHSKC involved.
30	Ecology	General	See 6/18/20 Ecology Response		At the November 7, 2018 meeting additional results were reported which indicate that groundwater, surface water, and LFG concentrations are improving at the landfill (the RI only includes data through the end of 2017 and Interim Action are currently taking place). Once the Interim Actions are reported in the 3rd Quarter 2019 LFG Evaluation and Recommendations Report, the Group A/B water system service is evaluated for residences south of the landfill, and the RI resubmitted, Ecology will evaluate if the VLF RI is complete enough to proceed to the Feasibility Study (FS).		Agreed		The December 6, 2018 Ecology Opinion Letter on the Draft RI included discussions reiterating that Section 8.1.1 of the report states that the site remains undefined. A new well in the Cc2 aquifer was discussed on 8/13/19 and 11/14/19 meetings.	The draft RI concluded that the extent of VC in Unit Cc2 remained undefined for PCULs based on surface water protection. A new well was discussed by Ecology at an 11/14/19 meeting with Aspect and King County to delineate extent of exceedances to the south (new MW located south of MW-2 and 21). In a follow up meeting on 12/18/19, Aspect presented analysis showing the extent of VC drinking water exceedances remained within the property boundary and was constrained by the existing site monitoring network. Subsequent to the draft RI, a new cleanup level for manganese of 750 ug/L was issued by Ecology (in 12/17/19 letter). An evaluation of dissolved manganese extent based on the drinking water PCUL of 750 ug/L was undertaken in responding to these comments and indicates the extent of dissolved Mn exceedances remains within the property boundary and is constrained to the south by MW-2 and 21 (based on most recent 8 quarters of data). Since the extent of COCs exceeding drinking water levels are bound within the property to the south, a new well will not be installed. The south portion of the site, however, has not been delineated for the surface water exposure pathway. This data gap was presented to the Agencies at the 12/18/19 meeting. The RI will be completed recognizing this data gap exists and the data gap will be addressed during the FS in accordance with WAC 173-340-350(7).	Per the meeting with KCSWD and PHSKC on January 11, 2020, Ecology does not agree with the use of drinking water levels to delineate the extent of COCs to the south; Ecology still recommends a new well be installed. The data gap can be moved into the FS per WAC 173-340-350(7).	The text in the revised RI does not consistently discuss the data gap of the souther extent of the contamination plume to the south not being delineated. Please use the surface water PCULs to fully delineate the site.
31	Alan Noell/ Ecology	Section 5.5.1, Section 5.5.2, Section 6.1.2.1, Tables 6.1 to 6.5, Figures 6.1 and 6.2	deferred		Regarding background concentrations of arsenic, see Attachment A, Comment 5 and Attachment B, Comment 2. In Section 5.5.1, revise the paragraph stating the 5 ug/L is the background concentration of arsenic for the state of Washington, and include appropriate reference for using 8 ug/L arsenic background. Add regulatory citation saying that cleanup level should be no more stringent than natural background. Arsenic background is also referenced in Sections 5.5.2 and 6.1.2.1. If using 8 ug/L background, modify the screening comments in Section 6.1.2.1. Ensure that the referenced background concentration is consistent in the report, table, and figures. In Tables 6.1, 6.2, and 6.4, modify the PCUL of arsenic to 8 ug/L (and screening results). In Tables 6.3 and 6.5, change the arsenic background to 8 ug/L and modify the footnote reference. In Figures 6.1 and 6.2, change the screening level for arsenic to 8 ug/L.							

Attachment B Deliverable Review Form

Project Name: Vashon Island Closed Landfill Remedial Investigation- MTCA Independent Action
Contract #:
Reviewer: Tim O'Connor/Ecology & Madeline Wall & Alan Noell/Ecology
Deliverable Name: Agency Draft Vashon Island Closed Landfill Remedial Investigation Report, Volumes 1 and 2

Review Date: *10/9/2018*
Response Date: *12/6/2018*
Aspect Response Date: *12/31/2018*
Ecology Response Date: *12/17/2019*
Aspect Response Date: 01/11/2020

Deliverable Review					Response			
Comment No.	Chemical	KCSWD Proposed (ug/L)	Ecology Proposed (ug/L)	Basis for Value	Responder Name	County Responses 8/15/19 (8)	Aspect Response	Ecology Response 12/6/2019
1	Antimony	6	5.6	Surface water (NRWQC-human health)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
2	Arsenic	5	8	Natural background	DC	Agreed *	Agreed. PCUL will be changed to Ecology Proposed value if Ecology can provide the source for the background concentration so the proper citation can be added to the tables. It is our understanding that 5 ug/L is background for arsenic in groundwater in Washington state.	Ecology Publication No. 14-09-044 identifies a natural background concentration of 8.0 ug/L of arsenic for the Puget Sound Basin (Note that Ecology has not finalized this publication). Ecology will accept the background concentration of 8.0 ug/L for the Puget Sound Basin as the MTCA cleanup level. If KCSWD calculates representative background concentrations for manganese and iron, Ecology recommends that the representative background of arsenic also be calculated. Ideally, the representative background concentrations would be applicable for all groundwater at the Vashon Island Landfill. The representative background concentration of arsenic potentially exceeds the background concentration for the Puget Sound Basin. Ecology recommends that the background concentration of arsenic be calculated in accordance with WAC 173-340-709 and Section 7.3 (Groundwater Protection Standards) of the Unified Guidance (EPA 530-R-09-007). Ecology recommends that KCSWD prepare a technical memorandum describing representative background concentrations for review prior to finalizing the RI.
3	Barium	2000	1000	Surface water (NRWQC-human health)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
4	Cadmium	1.32	0.72	Surface water (NRWQC-aquatic life)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
5	Chromium	100	74	Surface water (NRWQC-aquatic life)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
6	Cobalt	--	4.8	Drinking water (MTCA eq. 720-1)	KSL	*Need more information	Please provide the reference dose for cobalt that should be used in the MTCA eq. 720-1.	The reference dose of 3E-4 mg/kg-day can be used from EPA's Preliminary Peer Reviewed Toxicity Values database. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables
7	Lead	5.98	2.5	Surface water (NRWQC-aquatic life)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
8	Iron	1000	300	Secondary MCL	KSL	*County to perform background evaluation	Preliminary Iron and Manganese response: The County recognizes that secondary MCLs (SMCLs) are applicable standards under MTCA; however, the SMCLs for iron and manganese were not selected as proposed cleanup levels for the following reasons: 1) The SMCLs for iron and manganese are set for aesthetic qualities relating to public acceptance of drinking water and not based on health implications, and 2) the highest beneficial use for water at VLF is surface water, of which the iron and manganese PCULs identified in the RI are adequately protective. However, the County will perform a desktop background evaluation for Fe and Mn in groundwater for Units Cc2 and D only. None of the groundwater results from 2017 in Units Cc1 and Cc3 exceed the Secondary MCLs for these two compounds and therefor the background evaluation is not warranted. Note: CLARC was updated in 2019 and the new MTCA B value for manganese is 750 ug/L, which will be referenced in the revised RI Report.	Surface water and groundwater protective cleanup levels should apply for the Cc2 aquifer, i.e., there has been no demonstration that the Cc2 aquifer is nonpotable. Ecology agrees that MTCA cleanup level for manganese should be based on health-based criteria (i.e., 750 ug/L Mn) and not aesthetic criteria in the secondary MCL (i.e., 50 ug/L Mn). Also, Ecology agrees that the MTCA cleanup level for iron should be based on surface water criteria (i.e., 1,000 ug/L Fe) and not the secondary MCL (i.e., 300 ug/L Fe). Nevertheless, the secondary MCLs are applicable for post-closure groundwater monitoring under Chapter 173-351 WAC. Ecology recommends that KCSWD calculate representative background concentrations for iron and manganese in accordance with WAC 173-340-709 and Section 7.3 of the Unified Guidance (EPA 530-R-09-007). The representative background concentrations may be used as groundwater quality criteria under both Chapter 173-340 WAC (MTCA) and Chapter 173-351 WAC (Criteria for MSW Landfills). Ecology recommends that KCSWD prepare a technical memorandum describing representative background concentrations, an updated Table 5-1 (Applicable Groundwater and Surface Water Criteria) from the draft Remedial Investigation, and proposed cleanup levels.
9	Manganese	2,200	50	Secondary MCL (NRWQC-human health)	KSL	*County to perform background evaluation		
10	Nickel	80	52	Surface water (NRWQC-aquatic life)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
11	Silver	12.88	3.2	Surface water (NRWQC-aquatic life)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
12	Zinc	207	120	Surface water (NRWQC-aquatic life)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur
13	Methoxychlor	0.03	0.02	Surface water (NRWQC-human health)	KSL	Agreed	Agreed. PCUL changed to Ecology Proposed value. Note: CLARC was updated in 2019 and the new CWA Section 304(a) human health value is 0.02 ug/L, which will be referenced in the revised RI Report.	Concur
14	cis-1,2-DCE	70	16	Drinking water (MCL adjusted to HQ=1)	DC	Agreed *	Agreed. PCUL changed to Ecology Proposed value.	Concur