



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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December 17, 2019

Kenny Chan  
Project Manager  
King County Department of Natural Resources and Parks  
Solid Waste Division  
King Street Center  
201 South Jackson Street, Suite 701  
Seattle, Washington 98104

**Re: Review Comments and additional Correspondence on the *Vashon Island Closed Landfill Remedial Investigation Report, Agency Draft, October 9, 2018***

King County Solid Waste Division (KCSWD) submitted a Draft Remedial Investigation (RI) Report for the Vashon Island Closed Landfill (VLF) to document the investigations required when a groundwater protection standard is exceeded (as defined by WAC 173-200) at a landfill under WAC 173-351-440(6).

Ecology provided comments on the Draft RI on December 6, 2018. KCSWD responded to Ecology's comments in separate letters and response tables on August 15 and November 7, 2019. This letter and the updated response tables provide Ecology's concurrence and recommendations. Beyond the specific comments in the attached response tables, Ecology wants to emphasize the need to:

Delineate and evaluate the concentrations of vinyl chloride/COCs in the Cc2 aquifer.  
Determine representative concentrations of arsenic, manganese, and iron as both groundwater cleanup levels under the Model Toxics Control Act (MTCA) (Chapter 173-340 WAC) and groundwater quality standards for post-closure care for municipal solid waste (MSW) landfills (Chapter 173-351 WAC).

**Delineation of Vinyl Chloride/COCs in the Cc2 Aquifer**

The Draft RI (Section 8.1.1) indicates that the extent of vinyl chloride exceedances in Unit Cc2 groundwater remains undefined. Ecology recommends installing an additional well near the south property line in the ravine to delineate the extent of vinyl chloride/COCs in the Cc2 aquifer. The new well should be sampled quarterly for chemicals of concern (COCs) designated in the RI.



Ecology recommends developing a compliance point in the Cc2 aquifer on the West Hillslope. Ecology suggests redeveloping MW-30, MW-31, and MW-32 (if water is present) and/or installing a new monitoring well as a compliance point.

The groundwater wells/compliance points should be sampled quarterly for COCs designated in the RI; the VLF Environmental Monitoring Sampling and Analysis Plan and Quality Assurance Project Plan should be modified accordingly.

### **Background Concentrations for Naturally Occurring Metals**

Ecology recommends calculating representative background concentrations for arsenic, manganese, and iron for Site groundwater in accordance with WAC 173-340-709 and Section 7.3 of the Unified Guidance<sup>1</sup>. MTCA provides specific statistical criteria for background and the Unified Guidance provides guidance for evaluating sample population, non-detects, sample distributions, and Type I errors. Representative background concentrations can be used a groundwater cleanup levels under WAC 173-340 (MTCA) and groundwater quality criteria under WAC 173-351 (Criteria for MSW Landfills). As described in Attachment B, Ecology can accept the following groundwater cleanup levels under MTCA:

Regional background concentration of 8.0 ug/L arsenic in the Puget Sound Basin.

Method B groundwater cleanup level of 750 ug/L manganese.

Surface water protective screening level of 1,000 ug/L iron (see Table 5.1 of Draft RI).

However, Site-specific representative background concentrations of arsenic, manganese, and iron are recommended in lieu of the groundwater quality criteria in WAC 173-200-040 for post-closure care monitoring under WAC 173-351. Ecology recommends that KCSWD prepare a technical memorandum describing representative background concentrations for review prior to finalizing the RI.

### **Closing**

This letter provides Ecology's opinion. We are providing this opinion under the authority of Chapter 173-340 WAC (MTCA) and Chapter 70.105D RCW. Ecology's opinions for independent remedial actions are advisory only, and are not official comments, endorsements, or approvals of the document's conclusions and recommendations.

This opinion is based on an analysis of whether this RI meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA").

This opinion applies only to the Site. The Site is defined by the nature and extent of contamination associated with releases of hazardous substances to the environment as presented in hydrogeology, water quality, and environmental investigations conducted to date.

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<sup>1</sup> Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, U.S. Environmental Protection Agency, EPA 530-R-09-007, March 2009.

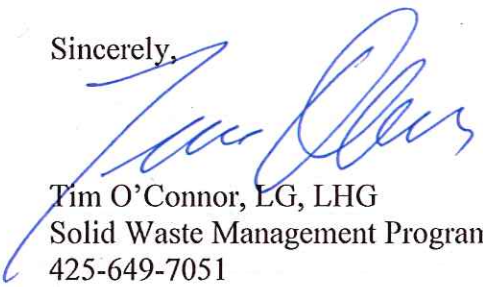
Kenny Chan  
December 17, 2019  
Page 3

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

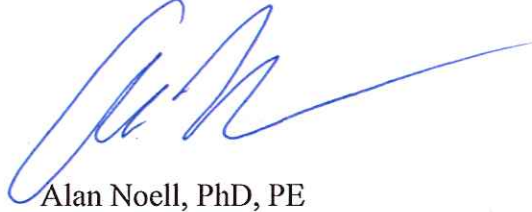
The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

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

Sincerely,



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Enclosures (2)

Attachment A – RI Report Specific Comments  
Attachment B – PCULs

cc: Darshan Dhillon, Public Health – Seattle & King County  
Peter Christiansen, 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 & 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

Deliverable Review					Response			
Comment No.	Reviewer Name	Page, Figure, Specification or Sheet No.	Section / Paragraph	Reviewer's Comment	Responder Name	County Response 8/15/19 (*)	Aspect Response 11/7/2019 (without *)	Ecology Response 12/6/19
1	Wall	Pages ES-1 and 1	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
2	O'Connor	ES-2	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
3	O'Connor	ES-3	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
4	O'Connor	ES-3	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
5	O'Connor	ES-3	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.
6	O'Connor	ES-3	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

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7	Wall	Pg. 10	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	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 available 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 questionnaire mailer to residents in the landfill vicinity and search of Agency records. The County has contacted purveyors to acquire 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 questionnaire 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
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 doesn't 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
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

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11	Wall	Pg. 26	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	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	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	Pg 1-6	See Attachment B for Ecology's review 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	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	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	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	6.1.2.3 last paragraph	The TCP detection in MW-12: when did that occur?	DC	Agreed *	Based on comment reference, we assume the commenter was referring to the TCE detection at MW-12. The date of the detection, May 2004, will be added to the text.	Concur
19	O'Connor	Pg. 44	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	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	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

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22	O'Connor	50	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	7.4.5.1	See Comment 6	KSL	Partially Agree	See response to Comment 6	Concur
24	O'Connor	Vol 2 Table C-1		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		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	8.1.1	Mention domestic water samples from DW-PA and DW-85 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	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	8.1.1	The section also indentified the Cc2 aquifer as "not a primary drinking water source." Ecology requested a corss-section be extended to include the geology for the 85-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 85-Acres (DW-85) location. Followign 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 lgos 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
29	Ecology	General		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
30	Ecology	General		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 teh 3rd Quarter 2019 LFG Evaluation and Recommendations are Report, the Group A/B water system service is evaluated for residences south of the lanfill, 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.

**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

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. <a href="https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables">https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables</a>
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.	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	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 therefore 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.	
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