

**Response to Comments on
Draft Dioxin/Furan Stormwater Sampling Work Plan, March 2022**

DEQ Comments Dated May 6, 2022		
Comment Identifier	Comment	NWP Response
Specific Comment 1	Section 3-Stormwater Sampling Methodology. This section states that if the first two sampling events result in concentrations less than the ROD RALs, DEQ and EPA have indicated Northwest Pipe Company may propose suspending the final two sampling events. As noted by EPA in their Primary Comment 1, the RALs apply to sediment, not stormwater. Therefore, please revise the work plan to indicate NW Pipe may propose eliminating the final two rounds depending on the results from the first two events. DEQ will consider the reduction, with EPA consultation, based on the information provided at that time.	See response to EPA primary comment 1.
Specific Comment 2	Section 3.1-Sampling Frequency and Location. As noted by EPA in To Be Considered Comment 4, the proposed target storm events do not include the Joint Source Control Strategy (DEQ and EPA 2005) storm event criteria. Heavy rain events may be targeted as suggested based on the known flow conditions of the system, but they should still be consistent with the JSCS guidance. Please revise the work plan to include the target criteria. Of particular importance is the antecedent dry period.	The sampling frequency was edited to include the antecedent dry period. The minimum predicted rainfall volume is already included but was clarified. Due to the presence of the holding tanks associated with the treatment system, which makes the storm duration irrelevant, that criteria was not added.
Specific Comment 3	Section 7-Reporting. In order to support DEQ's evaluation of the data, please submit results and TEQ calculations in an Excel electronic format to DEQ.	Text will be modified to state that data will be provided in an Excel electronic format to DEQ.

EPA Comments Dated April 20, 2022		
Comment Identifier	Comment	NWP Response
Primary Comment 1	The Dioxin/Furan Stormwater SAP should be revised to comply with EPA's February 28, 2022, comment on the Response to DEQ Questions on Dioxins memo. EPA indicated that, "If the first two sampling events result in concentrations below clean up levels, EPA may consider a proposal to suspend the final two sampling events" (emphasis added). The Dioxin/Furan Stormwater SAP appears to conflate Portland Harbor Superfund Site (PHSS) Record of Decision (ROD) remedial action levels (RALs) and cleanup levels (CULs) (EPA 2017). RALs apply to sediment	Text was modified to state the following: "If the first two sampling events result in concentrations below clean up levels, EPA and DEQ may consider a proposal to suspend the final two sampling events." However, NWP does not see how this would be an option, since the cleanup level (CUL) for 2,3,7,8-TCDD toxic equivalency (TCDD eq.) of 5.1E-10 µg/L is below technically achievable laboratory reporting

	(units µg/kg) and trigger active remediation, and CULs are the long-term contaminant concentrations that need to be achieved to meet remedial action objectives. The surface water CUL for 2,3,7,8-TCDD toxic equivalency (TCDD eq.) is the appropriate criteria for dioxins/furans in stormwater and should be integrated into Table 3-1 with units of micrograms per liter (µg/L).	limit (RLs) and/or method detection limits (MDLs). Attached is documentation from several laboratories identifying their technically achievable RLs and MDLs. A laboratory that can achieve the CUL has not been located. Regardless, NWP will use the Eurofins laboratory, as it offers the closest to the CUL, but note that there is a high likelihood that results below the detection limits will present a data management gap. Lastly, please note that NWP did not conflate the Portland Harbor Superfund Site Record of Decision remedial action levels (RALs) and CULs. Table 17 CULs for surface water does not list any values for the other dioxin and furans that DEQ and EPA have indicated are of concern. As a result, NWP opted to utilize the RALs for comparison.
To be considered comment (TBC) 1	The reporting limits indicated in Table 5-1 are above the surface water CUL for TCDD eq. When results from the sampling are presented, the uncertainty associated with reporting limits greater than screening levels should be discussed and incorporated into a weight of evidence evaluation regarding the recontamination potential of the stormwater pathway. To calculate TCDD eq., refer to the summing rules presented in the PHSS Program Data Management Plan (EPA 2020).	See response to primary comment 1. In addition, NWP will include an uncertainty evaluation should the sampling results be below the detection limits, since the screening levels are below the laboratories achievable limits.
TBC 2	Given the proximity of reporting limits and CULs, EPA recommends performing Stage 2b data validation.	Stage 2b validation will be conducted. Text was edited to reflect this change.
TBC 3	Section 2.1 Nature of Dioxins and Furans: The text states that manufacturing processes at the Site are not known to produce dioxins and furans. EPA recommends revising this section to mention the June 17, 1961, fire discussed in the Response to DEQ Question on Dioxins memo (Haute-Géologie, LLC 2021) that could have produced dioxins/furans.	Text was edited to include the reference to the 1961 fire. Note that the fire was not due to manufacturing processes.
TBC 4	Section 3.1 Sampling Frequency and Location: Understanding that the configuration of the stormwater system makes "first flush" somewhat irrelevant, EPA recommends that the Dioxin/Furan Stormwater SAP be	The sampling frequency was edited to include the antecedent dry period. The minimum predicted rainfall volume is already included but was clarified.

	<p>revised to target Joint Source Control Strategy (DEQ and EPA 2005) storm event criteria as follows:</p> <ul style="list-style-type: none"> ▪ Antecedent dry period of at least 24 hours (as defined by <0.1 inches over the previous 24 hours) ▪ Minimum predicted rainfall volume of >0.2 inches per event ▪ Expected duration of storm event of at least 3 hours 	<p>Due to the presence of the holding tanks associated with the treatment system, which makes the storm duration irrelevant, that criteria was not added.</p>
TBC 5	<p>Section 3.1 Sampling Frequency and Location: The text states that water from the system will be allowed to flow for a minimum of five minutes prior to sample collection. Clarify whether the system automatically pumps collected runoff into the Aquip vault or whether field personnel initiate the pump upon arrival. It appears that the Aquip system pump is automatically triggered by accumulated runoff, rather than manually activated.</p>	<p>Text was modified to clarify.</p>
TBC 6	<p>Section 7.0 Reporting: In addition to the summary of analytical results, the data report should provide an evaluation of results that exceed CULs.</p>	<p>Text was edited as requested.</p>
Matter of Style Comment 1	<p>The method for analysis is stated as "Method E1613". The Dioxin/Furan Stormwater SAP should be revised to state that "EPA Method 1613" will be used.</p>	<p>Text was edited as requested.</p>

Summary of laboratory TEQ eq. values for dioxin/ furans

	Laboratory			
	ALS	Vista	Eurofins	Bureau Veritas
Total Dioxin Equivalentents ($\mu\text{g/L}$)	0.00000139	0.00000868	0.0000006	0.00000247
Total Furan Equivalentents ($\mu\text{g/L}$)	0.00000042	0.00000437	0.00000024	0.0000008
Total TEQs; Dioxin + Furans ($\mu\text{g/L}$)	0.0000018	0.0000131	0.00000083	0.0000033
	1.81E-06	1.31E-05	8.34E-07	3.27E-06

Values for the individual laboratories are provided on the following pages.

Laboratory - ALS:

TEQ eq. values for dioxin/ furans

Polychlorinated dibenzodioxins			
Congener	Concentration (µg/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDD	0.00000072	1	0.00000072
1,2,3,7,8-PeCDD	0.00000048	1	0.00000048
1,2,3,4,7,8-HxCDD	0.00000053	0.1	0.000000053
1,2,3,6,7,8-HxCDD	0.00000074	0.1	0.000000074
1,2,3,7,8,9-HxCDD	0.00000044	0.1	0.000000044
1,2,3,4,6,7,8-HpCDD	0.00000015	0.01	0.000000015
OCDD	0.00000036	0.0003	0.000000011
Total Dioxin Equivalents=			0.00000139

Polychlorinated dibenzofurans			
Congener	Concentration (µg/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDF	0.00000006	0.1	0.000000006
1,2,3,7,8-PeCDF	0.00000069	0.03	0.0000000207
2,3,4,7,8-PeCDF	0.00000036	0.3	0.000000108
1,2,3,4,7,8-HxCDF	0.00000006	0.1	0.000000006
1,2,3,6,7,8-HxCDF	0.00000053	0.1	0.000000053
1,2,3,7,8,9-HxCDF	0.00000069	0.1	0.000000069
2,3,4,6,7,8-HxCDF	0.00000004	0.1	0.000000004
1,2,3,4,6,7,8-HpCDF	0.00000058	0.01	0.0000000058
1,2,3,4,7,8,9-HpCDF	0.00000058	0.01	0.0000000058
OCDF	0.00000016	0.0003	0.00000000048
Total Furan Equivalents =			0.00000042

Total TEQs; Dioxins + Furans= 0.0000018

Laboratory – Vista:

TEQ eq. values for dioxin/ furans

Polychlorinated dibenzodioxins			
Congener	Concentration (µg/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDD	0.00000178	1	0.00000178
1,2,3,7,8-PeCDD	0.00000563	1	0.00000563
1,2,3,4,7,8-HxCDD	0.00000418	0.1	0.000000418
1,2,3,6,7,8-HxCDD	0.00000351	0.1	0.000000351
1,2,3,7,8,9-HxCDD	0.00000446	0.1	0.000000446
1,2,3,4,6,7,8-HpCDD	0.0000048	0.01	0.0000000484
OCDD	0.0000164	0.0003	0.0000000049
Total Dioxin Equivalents=			0.00000868

Polychlorinated dibenzofurans			
Congener	Concentration (µg/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDF	0.00000178	0.1	0.000000178
1,2,3,7,8-PeCDF	0.00000501	0.03	0.0000001503
2,3,4,7,8-PeCDF	0.00000499	0.3	0.000001497
1,2,3,4,7,8-HxCDF	0.00000687	0.1	0.000000687
1,2,3,6,7,8-HxCDF	0.00000631	0.1	0.000000631
1,2,3,7,8,9-HxCDF	0.0000058	0.1	0.00000058
2,3,4,6,7,8-HxCDF	0.00000533	0.1	0.000000533
1,2,3,4,6,7,8-HpCDF	0.00000596	0.01	0.0000000596
1,2,3,4,7,8,9-HpCDF	0.00000534	0.01	0.0000000534
OCDF	0.0000113	0.0003	0.0000000034
Total Furan Equivalents =			0.00000437

Total TEQs; Dioxins + Furans= 0.0000131

Laboratory – Eurofins:

TEQ eq. values for dioxin/ furans

Polychlorinated dibenzodioxins			
Congener	Concentration (µg/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDD	0.00000024	1	0.00000024
1,2,3,7,8-PeCDD	0.00000027	1	0.00000027
1,2,3,4,7,8-HxCDD	0.00000025	0.1	0.000000025
1,2,3,6,7,8-HxCDD	0.00000029	0.1	0.000000029
1,2,3,7,8,9-HxCDD	0.00000026	0.1	0.000000026
1,2,3,4,6,7,8-HpCDD	0.00000003	0.01	0.000000003
OCDD	0.00000004	0.0003	0.0000000013
Total Dioxin Equivalents=			0.0000006

Polychlorinated dibenzofurans			
Congener	Concentration (µg/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDF	0.00000028	0.1	0.000000028
1,2,3,7,8-PeCDF	0.00000036	0.03	0.000000108
2,3,4,7,8-PeCDF	0.00000027	0.3	0.000000081
1,2,3,4,7,8-HxCDF	0.00000032	0.1	0.000000032
1,2,3,6,7,8-HxCDF	0.00000027	0.1	0.000000027
1,2,3,7,8,9-HxCDF	0.00000028	0.1	0.000000028
2,3,4,6,7,8-HxCDF	0.00000027	0.1	0.000000027
1,2,3,4,6,7,8-HpCDF	0.00000027	0.01	0.0000000027
1,2,3,4,7,8,9-HpCDF	0.00000043	0.01	0.0000000043
OCDF	0.00000003	0.0003	0.0000000009
Total Furan Equivalents =			0.00000024

Total TEQs; Dioxins + Furans= 0.00000083

Laboratory – Bureau Veritas:

TEQ eq. values for dioxin/ furans

Polychlorinated dibenzodioxins			
Congener	Concentration (ug/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDD	0.00000122	1	0.00000122
1,2,3,7,8-PeCDD	0.00000095	1	0.00000095
1,2,3,4,7,8-HxCDD	0.00000096	0.1	0.000000096
1,2,3,6,7,8-HxCDD	0.00000104	0.1	0.000000104
1,2,3,7,8,9-HxCDD	0.00000093	0.1	0.000000093
1,2,3,4,6,7,8-HpCDD	0.00000103	0.01	0.0000000103
OCDD	0.00000104	0.0003	0.0000000031
Total Dioxin Equivalents=			0.00000247

Polychlorinated dibenzofurans			
Congener	Concentration (ug/L)	WHO 2005 TEFs	2,3,7,8-TCDD Equivalents
2,3,7,8-TCDF	0.00000084	0.1	0.000000084
1,2,3,7,8-PeCDF	0.00000093	0.03	0.0000000279
2,3,4,7,8-PeCDF	0.00000092	0.3	0.000000276
1,2,3,4,7,8-HxCDF	0.00000103	0.1	0.000000103
1,2,3,6,7,8-HxCDF	0.00000101	0.1	0.000000101
1,2,3,7,8,9-HxCDF	0.00000093	0.1	0.000000093
2,3,4,6,7,8-HxCDF	0.00000098	0.1	0.000000098
1,2,3,4,6,7,8-HpCDF	0.00000092	0.01	0.0000000092
1,2,3,4,7,8,9-HpCDF	0.00000087	0.01	0.0000000087
OCDF	0.00000095	0.0003	0.0000000029
Total Furan Equivalents =			0.00000080

Total TEQs; Dioxins + Furans= 0.0000033