CENWS-OD-TS-DMMO

MEMORANDUM FOR: RECORD February 13, 2014

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM LONGVIEW FIBRE PAPER AND PACKAGING DOING BUSINESS AS KAPSTONE KRAFT PAPER CORPORATION, COWLITZ COUNTY, WA EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR FLOW-LANE DISPOSAL IN THE COLUMBIA RIVER OR FOR BENEFICIAL USE.

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington State Department of Ecology, Washington State Department of Natural Resources, and the Environmental Protection Agency) regarding the suitability of up to 316,264 cubic yards (cy) of dredged material from Longview Fibre Paper and Packaging doing business as KapStone Kraft Paper Corporation for flow-lane disposal in the Columbia River or for beneficial use.

2. Background. Periodic dredging of the Old Cowlitz Channel has been necessary since the Old Cowlitz River Channel was closed and a new channel was dredged, which was completed in 1927. The most recent dredging of the project area was emergency dredging of the mouth of the Old Cowlitz River Channel in summer 2011 following a winter of extremely heavy rainfall and heavy snowpack that deposited large amounts of material in the channel.

   The applicant proposes to conduct maintenance dredging in the mainstem Columbia River and within an off-channel area referred to as the Old Cowlitz River Channel (Figure 1). In addition to maintenance dredging, Longview Fibre Paper and Packaging doing business as KapStone Kraft Paper Corporation is also proposing to expand the footprint of the dredge prism and to increase the depth in the Old Cowlitz River Channel from -12 ft Columbia River Datum (CRD) to -14 ft CRD in order to accommodate larger barges that are now able to navigate the Columbia River.

3. Project Summary. Table 1 includes project summary and tracking information.

Table 1. Project Summary

Project ranking	Low-moderate
Proposed dredging volume	316,264 cy
Proposed dredging depth	-14 ft CRD at Chip Dock and Navigation Channel -43 ft CRD at Oil Dock and Outfall
1st draft SAP received	May 7, 2012
DMMO comments provided	May 8, 2012
2nd draft SAP received	July 11, 2012

DMMP comments provided	July 27, 2012
3rd draft SAP received	September 20, 2012
DMMP comments provided	October 9, 2012
4th draft SAP received	October 31, 2012
DMMP comments provided	November 15, 2012
5th draft SAP received	December 10, 2012
DMMP comments provided	December 21, 2012
Final SAP received	January 9, 2013
SAP approved	January 10, 2013
Sampling dates	January 14 – 30, 2013
Draft data report received	August 12, 2013
Comments provided on draft data report	August 15, 2013
2nd draft data report received	December 11, 2013
Comments provided on 2nd draft report	December 13, 2013
3rd draft data report received	February 5th, 2014
Comments provided on 3rd draft report	February 5th, 2014
Final sediment characterization report	February 12, 2014
EIM Study ID	LVFIB13
USACE Permit Application Number	
Recency Determination (low-moderate = 6 years)	January 2019

4. Project Ranking and Sampling Requirements. This project was ranked low-moderate by the DMMP agencies according to the guidelines set out in the User's Manual based on the results of previous testing. In a low-moderate-ranked area the number of samples and analyses are calculated using the following guidelines (DMMP, 2008a):
    - Maximum volume of sediment represented by each field sample = 8,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the upper 4-feet of the dredging prism (surface sediment) =32,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the subsurface portion of the dredging prism = 48,000 cubic yards

    This project was divided into 9 DMMUs in the Old Cowlitz River Channel area; with six surface DMMUs and three subsurface DMMUs, see Figure 2 for DMMU configuration. DMMUs 5, 7 and 8 are part of the area previously dredged under a permit to Longview Fibre to a depth of -12 ft CRD, so these three surface DMMUs were characterized to a depth of -12 ft CRD. DMMU 6, the subsurface DMMU underneath DMMUs 5, 7 and 8, was characterized from -12 to -14 ft CRD. DMMUs 1, 3 and 9 were previously dredged as part of the Portland District Army Corps of Engineers navigational dredging, and were only characterized to -10 ft CRD. Therefore these three surface DMMUs were characterized to -10 ft CRD, and the two subsurface DMMUs (DMMUs 2 and 4) underneath were characterized from -10 to -14 ft CRD.

The outfall and oil dock dredging area, DMMU 10, is located within the mainstem Columbia River. Due to the high-energy nature of this environment, a tiered approach requiring a single sample with testing to confirm exclusionary status was approved for this area.

5. Sampling. Sampling was conducted by Northern Resource Consultants from January 14 - 30, 2013 using a Vibracore sampler. Twenty-five cores were collected and composited into 10 analytical samples representing 10 DMMUs. Table 2 includes sampling coordinates and Table 3 gives compositing information. Sampling difficulties and deviations from the DMMP-approved SAP (ELS, 2013) are described below.

   Multiple coring attempts were required at each sample location due to bent core tubes and core refusal on rock, logs or other debris at less than the required sampling depth. As a result, coring stations were moved until an acceptable core was retrieved. Several locations required more than three attempts to retrieve an acceptable core. However, the expected mudline elevations at the station locations were not adjusted for movement of the station locations.

   Coordinates of the actual sampling locations were recorded to 4 decimal places (ten thousandths of a decimal degree) instead of 5 decimal places as required in the SAP. The horizontal accuracy of coordinates recorded to 4 decimal places is approximately 36 ft latitude and 25 ft longitude.

   At the time of sampling, the mudline elevations relative to Columbia River Datum (CRD) were not calculated. Instead, it was assumed that the mudline elevation at the actual sampling location was the same as that calculated during preparation of the SAP for the target sampling locations. This method fails to account for a) uncertainties in horizontal location due to imprecise coordinates, b) movement of sampling location due to sampling difficulties, and c) changes in the mudline elevations due to sediment deposition or scouring between the time the bathymetric survey elevations were collected and sampling. As a result, 27 of the 40 samples (or 17 of the 25 cores) collected varied from the vertical extent of the dredge prism by more than 1 foot.

   Clearly, these discrepancies seriously compromise the integrity of this characterization. As a result, the DMMP agencies expended unusual amounts of time attempting to understand field compositing decisions and then, after-the-fact, determining the actual segments of the cores that were sampled and what they actually represent with respect to the dredge prism.

   The DMMP agencies considered all the above information during deliberations on whether the sampling and testing results were representative enough to be used in making a suitability determination for the project. The DMMP agencies determined they would accept the sampling and testing results for this project for the following reasons:
   - There was no systematic bias in the vertical deviations from the proposed dredge prism. Some cores under-represented the DMMU and some over-represented the DMMU.
   - Chemical results for every single DMMU were either undetected or detected at concentrations well below screening levels.

6. Chemical Analysis. Chemical analysis for all standard DMMP COC's was conducted by King County Environmental Laboratory, Seattle, WA. Dioxin analysis was conducted by Analytical Resources, Inc. of Tukwila, WA. Chemical results compared to the 2006 Interim Freshwater guidelines for those chemicals that have freshwater values, and to marine guidelines for those chemicals that do not have freshwater values are shown in Table 4. Dioxin results are in Table 5. The quality control guidelines specified by the DMMP agencies were generally met.

   Results of the conventionals analysis demonstrated the material in DMMU 10, within the mainstem Columbia River, was loamy sand with 85.1% sand and extremely low TOC (0.05% U). Material from DMMU 10 was determined to meet the exclusionary criteria under Section 404(b)1 of the Clean Water Act (CFR 40 Section 230.60, subparagraph a), which states that dredged or fill material is most likely to be free from chemical, biological or other pollutants where it is sufficiently removed from sources of pollution, and it is composed primarily of sand, gravel or other naturally occurring inert material. Such dredged material is generally found in areas of high current or wave energy. Therefore, no further testing of material from DMMU 10 was required.

   Conventionals results from the Old Cowlitz River Channel show that grain size changes rapidly from sandy loam at the confluence with the Columbia River to silty loam and then silt at the head of Old Cowlitz River Channel. Near the mouth of the Columbia River, material was still predominantly sand, with 67.8% sand and 39.7% fines; but % fines content quickly increased towards the head of the Old Cowlitz River Channel, to a maximum of 89% fines in DMMU 8. TOC content was low throughout the Old Cowlitz River Channel, ranging from 0.15 to 0.8%.

   Chemical results showed that there were no detected or undetected exceedances of DMMP COCs in any of the DMMUs.

   Some limited dioxin testing was required by the DMMP agencies due to the historical use of chlorine bleaching and the deepening of the dredge prism to depths that had never before been characterized. Two samples were chosen by the DMMP agencies for dioxin testing based on TOC and % fines content of the DMMUs. These two samples, DMMU 6 and DMMU 8, were both found to have very low levels of dioxin at 0.97 and 1.39 pptr TEQ, respectively. Therefore, dioxin was not considered to be a concern for this project and no further testing was required.

7. Sediment Exposed by Dredging. The sediment to be exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 1995) or the State's antidegradation standard (DMMP, 2008b).

   As demonstrated by the results of the chemical analysis, the sediment to be exposed by dredging is not considered to be degraded relative to the currently exposed sediment surface. On this basis the DMMP agencies conclude that this project is in compliance with the State of Washington anti-degradation policy.

8. Suitability Determination. This memorandum documents the evaluation of the suitability of sediment proposed for dredging from Longview Fibre Paper and Packaging doing business as KapStone Kraft Paper Corporation for flow-lane disposal in the Columbia River or beneficial use. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program.

   In summary, based on the results of the previously described testing, the DMMP agencies conclude that all 316,264 cy are suitable for flow-lane disposal in the Columbia River, at a site designated by the Portland District Corps of Engineers, or for beneficial use

   This suitability determination does ***not*** constitute final agency approval of the project. During the public comment period that follows a public notice, the resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

   A pre-dredge meeting with Ecology and the Corps of Engineers is required at least 7 days prior to dredging. A dredging quality control plan must be developed and submitted to the Regulatory Branch of the Seattle District Corps of Engineers at least 7 days prior to the pre-dredge meeting.

9. References.

   DMMP, 2011. *Marine Sediment Quality Screening Levels: Adopting RSET Marine SLs for Use in DMMP.* A Clarification Paper prepared by Laura Inouye (Ecology) and David Fox (USACE) for the Dredged Material Management Program, June 2011.

   DMMP, 2010. *Dredged Material Management Program New Interim Guidelines for Dioxins*. December 6, 2010.

   DMMP, 2008a. *Dredged Material Evaluation and Disposal Procedures (Users Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 2008.

   DMMP, 2008b. *Quality of Post-Dredge Sediment Surfaces (Updated).* A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

   Ecology, 1995. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, December 1995.

   ELS, 2013. Final Sediment Sampling and Analysis Plan Level 1 and Level 2 Reports for Maintenance Dredging at Longview Fibre Paper and Packaging, Inc. Longview, WA. Prepared by Ecological Land Services, Inc. January 8, 2013.

10. Agency Signatures.

The signed copy is on file in the Dredged Material Management Office

Concur:

_____ _____
Date Kelsey van der Elst - Seattle District Corps of Engineers

_____ _____
Date Justine Barton - Environmental Protection Agency

_____ _____
Date Laura Inouye, Ph.D. - Washington Department of Ecology

_____ _____
Date Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories

Danette Guy, Corps Regulatory PM

Lynn Simpson, Ecological Land Services

Brian Perleberg, Northern Resource Consultants

Ronald Domreis, Longview Fibre Paper and Packaging dba KapStone Kraft Paper Co.

Table 2. Station coordinates in decimal degrees (NAD83)

		Latitude	Longitude
Station	LF1	46.0966	-122.9301
	LF2	46.0964	-122.9300
	LF3	46.0969	-122.9294
	LF4	46.0967	-122.9292
	LF5	46.097	-122.9285
	LF6	46.0969	-122.9278
	LF7	46.0976	-122.9268
	LF8	46.0974	-122.9267
	LF9	46.0982	-122.9246
	LF10	46.0981	-122.9246
	LF11	46.0979	-122.9245
	LF12	46.0991	-122.9226
	LF13	46.0989	-122.9225
	LF14	46.0988	-122.9224
	LF15	46.1001	-122.9201
	LF16	46.0998	-122.9203
	LF17	46.0996	-122.9200
	LF18	46.1005	-122.9189
	LF19	46.1003	-122.9187
	LF20	46.1009	-122.918
	LF21	46.1007	-122.9178
	LF22	46.1005	-122.9176
	LF23	46.0978	-122.9264
	LF24	46.0985	-122.9247
	LF25	46.0983	-122.9352

Table 3. Sampling and Compositing information, depths in feet Columbia River Datum (CRD)

		DMMU 1	DMMU 2	DMMU 3	DMMU 4	DMMU 5	DMMU 6	DMMU 7	DMMU 8	DMMU 9	DMMU 10	Total
SAP volume (CY):		32,000	32,000	32,000	48,000	28,354	31,381	32,000	32,000	8,529	40,000	316,264
Target elevations:		surface to -10	-10 to -14	surface to -10	-10 to -14	surface to -12	-12 to -14	surface to -12	surface to -12	surface to -10	surface grab	
Station	LF1	-1.71 to -9.71	-9.71 to -13.71									
	LF2	-4.21 to -13.21	-13.21 to -15.21									
	LF3	-2.71 to -7.71	-7.71 to -11.71									
	LF4	-0.21 to -8.21	-8.21 to -12.21									
	LF5			-7.71 to -9.71	-9.71 to -13.71							
	LF6			-5.51 to -12.51	-12.51 to -16.51							
	LF7					-6.71 to -9.71						
	LF8					-4.95 to -6.95						
	LF9					-9.46 to -11.46	-11.46 to -13.46					
	LF10					-4.21 to -6.21						
	LF11			-7.21 to -10.21	-10.21 to -14.21							
	LF12							-6.21 to -9.21				
	LF13							-8.21 to -12.21				
	LF14			-6.71 to -10.71	-10.71 to -14.71							
	LF15						-10.71 to -12.71	-1.71 to -10.71				
	LF16							-4.21 to -13.21				
	LF17				-6.71 to -10.71					-4.71 to -6.71		
	LF18								-2.21 to -11.21			
	LF19								-1.71 to -6.71			
	LF20						-7.71 to -9.71		-4.71 to -7.71			
	LF21								-1.21 to -7.21			
	LF22				-11.96 to -15.96					-6.96 to -11.96		
	LF23					-5.46 to -17.46	-17.46 to -19.46					
	LF24					-10.71 to -19.71	-19.71 to -21.71					
	LF25										-35.71 to -45.71	

Notes:

1) The design depth for project is -14 ft CRD, including 2 feet of overdredge allowance

2) Composited depths are best guesses calculated based on incomplete field notes

samples that deviated from target elevations by more than 1 ft

Table 4. Chemical results compared to DMMP regulatory guidelines.

CHEMICAL	Marine Guidelines			Interim Freshwater Guidelines		DMMU 1		DMMU 2		DMMU 3		DMMU 4		DMMU 5		DMMU 6		DMMU 7		DMMU 8		DMMU 9		DMMU 10	
	SL	BT	ML	SL1	SL2	conc	LQ	conc	LQ	conc	LQ	conc	LQ	conc	LQ	conc	LQ	conc	LQ	conc	LQ	conc	LQ	conc	LQ
CONVENTIONALS																									
Gravel, %						---		---		---		---		---		---		---		---		---		---		---	
Sand, %						66.3		67.8		36.5		24.4		36.1		20.8		26.5		4.5		3.6		85.1	
Silt, %						21.1		38.4		60		65.5		64.4		72.5		60.8		83		76.9		6.9	
Clay, %						2.7		1.3		3.9		4.9		2.4		3.9		4		6.1		9.9		0.8	
Fines (Silt + Clay), %						23.8		39.7		63.9		70.4		66.8		76.4		64.8		89.1		86.8		7.7	
Total Solids, %						76.9		77.3		72.1		69.4		72.3		70.1		70.3		69.9		66.4		77.6	
Volatile Soilids, %						1.02		1.01		1.46		1.82		1.77		2.3		2.7		2.3		2.95		0.372	
Total Organic Carbon, %						0.146		0.235		0.43		0.532		0.521		0.563		0.74		0.661		0.806		0.05	U
Total Sulfides, mg/kg						0.64	U	1.01		7.82		25.2		28.4		15.8		15.6		8.24	J	9.46		0.58	U
Total Ammonia, mg N/kg						16.4		86.8		21.9		25.1		38.6		37.9		22.8		37.6		32.7		4.86	
METALS (mg/kg dry)																									
Antimony	150	---	200			0.095	UJ	0.093	UJ	0.11	UJ	0.1	UJ	0.11	UJ	0.11	UJ	0.12	UJ	0.11	UJ	0.12	UJ	---	
Arsenic				20	51	0.853		1.29		1.48		1.61		1.33		2.3		1.92		1.9		2.09		---	
Cadmium				1.1	1.5	0.034	J	0.045	J	0.087	J	0.085	J	0.058	J	0.0991		0.131		0.149		0.113		---	
Chromium				95	100	3.47		4.63		4.51		5.14		4.94		7.63		6.51		6.21		5.93		---	
Copper				80	830	16.1	J	20.4		23.9	J	28.7	J	21.9	J	32.8	J	26.6	J	30.3	J	31.6	J	---	
Lead				340	430	0.835		1.31		1.72		1.96		1.54		2.72		2.83		2.59		2.61		---	
Mercury				0.3	0.8	0.0064	U	0.011	J	0.013	J	0.013	J	0.013	J	0.012	J	0.018	J	0.014	J	0.02	J	---	
Selenium	---	3	---			0.16	U	0.16	UJ	0.17	U	0.19	U	0.18	U	0.19	UJ	0.17	UJ	0.31	J	0.21	J	---	
Silver				2.0	2.5	0.027	J	0.031	J	0.039	J	0.05	J	0.035	J	0.058	J	0.055	J	0.062	J	0.059	J	---	
Zinc				130	400	16.1	J	19.9	J	25.4	J	29.3	J	23.8	J	50.9	J	39.1	J	37.5	J	36.4	J	---	
PAHs (ug/kg dry)																									
Total LPAH				6,600	9,200	14	U	14	U	110		7.6	U	19.4		70		111		14	J	9.8	J	---	
Naphthalene				500	1,300	14	U	14	U	57		7.6	U	15	U	7.6	U	7.5	U	7.6	U	17	UJ	---	
Acenaphthylene				470	640	6.9	U	6.9	U	7.4	U	7.6	U	7.3	U	7.6	U	7.5	U	7.6	U	8	U	---	
Acenaphthene				1,100	1,300	6.9	U	6.9	U	18		7.6	U	7.3	U	9.6	J	12	J	7.6	U	8	U	---	
Fluorene				1,000	3,000	6.9	U	6.9	U	13	J	7.6	U	7.3	U	7.7	J	9.1	J	7.6	U	8	U	---	
Phenanthrene				6,100	7,600	6.9	U	6.9	U	22.5		7.6	U	19.4		52.8		69.3		14	J	9.8	J	---	
Anthracene				1,200	1,600	6.9	U	6.9	U	7.4	U	7.6	U	7.3	U	7.6	U	20.9		7.6	U	8	U	---	
2-Methylnaphthalene				470	560	14	U	14	U	205		7.6	U	15	U	7.6	U	7.5	U	7.6	U	17	U	---	
Total HPAH				31,000	55,000	6.9	U	6.9	U	84.3		54.8		147		327		480		85.4		70.6		---	
Fluoranthene				11,000	15,000	6.9	U	6.9	U	24.1		17		42.5		98.4		124		24.7		23.8		---	
Pyrene				8,800	16,000	6.9	U	6.9	U	22.5		15.9		37.1		87.4		103		22.7		22.7		---	
Benzo(a)anthracene				4,300	5,800	6.9	U	6.9	U	7.5	J	7.6	U	15.4		33.5		49.5		8.3	J	8	U	---	
Chrysene				5,900	6,400	6.9	U	6.9	U	13	J	9.4	J	26		40.7		67.3		14	J	8	U	---	
Total benzofluoranthenes				600	4,000	6.9	U	6.9	U	17.6		13	J	26		50.9		76.8		15.7		24.1		---	
Benzo[a]pyrene				3,300	4,800	6.9	U	6.9	U	7.4	U	7.6	U	7.3	U	16.4		33		7.6	U	8	U	---	
Indeno(1,2,3-c,d)pyrene				4,100	5,300	6.9	U	6.9	U	7.4	U	7.6	U	7.3	U	7.6	U	14	J	7.6	U	8	U	---	
Dibenzo(a,h)anthracene				800	840	6.9	U	6.9	U	7.4	U	7.6	U	7.3	U	7.6	U	7.5	U	7.6	U	8	U	---	
Benzo(g,h,i)perylene				4,000	5,200	6.9	U	6.9	U	7.4	U	7.6	U	7.3	U	7.6	U	12	J	7.6	U	8	U	---	
CHLORINATED BENZENES (ug/kg dry)																									
1,4-Dichlorobenzene	110	---	120			10.4	U	10.3	U	11.1	U	11.5	U	11.1	U	11.4	U	11.4	U	11.4	U	12	U	---	
1,2-Dichlorobenzene	35	---	110			6.93	U	6.9	U	7.39	U	7.68	U	7.37	U	7.6	U	7.58	U	7.63	U	8.03	U	---	
1,2,4-Trichlorobenzene	31	---	64			1.4	U	1.4	U	0.74	U	0.76	U	1.5	U	0.76	U	0.75	U	0.76	U	1.7	U	---	
Hexachlorobenzene	22	168	230			0.69	U	0.69	U	0.74	U	0.76	U	0.73	U	0.76	U	0.75	U	0.76	U	0.8	U	---	

Table 4. Chemical results compared to DMMP regulatory guidelines.

CHEMICAL	Marine Guidelines SL	BT	ML	Interim Freshwater Guidelines SL1	SL2	DMMU 1	DMMU 2	DMMU 3	DMMU 4	DMMU 5	DMMU 6	DMMU 7	DMMU 8	DMMU 9	DMMU 10
PHTHALATE ESTERS (ug/kg dry)															
Dimethyl phthalate				46	440	13.9 U	13.8 U	14.8 U	15.4 U	14.8 U	15.3 U	15.2 U	15.3 U	16.1 U	---
Diethyl phthalate	200	---	1,200	---	---	20 J	27 J	15 U	16 U	15 U	43.4	40.1	38.2	17 U	---
Di-n-butyl phthalate	1,400	---	5,100	---	---	14 U	14 U	15 U	16 U	15 U	16 U	18 U	16 U	17 U	---
Butyl benzyl phthalate				260	370	10.4 U	10.3 U	11.1 U	11.5 U	11.1 U	11.4 U	11.4 U	11.4 U	12 U	---
Bis(2-ethylhexyl)phthalate				220	320	18 J	18 J	108	22 J	21 J	23 J	24 J	23 J	21 J	---
Di-n-octyl phthalate				26	45	13.9 J	13.8 U	14.8 U	15.4 U	14.8 U	15.3 U	15.2 U	15.3 U	16.1 U	---
PHENOLS (ug/kg dry)															
Phenol	420	---	1,200	---	---	35 U	35 U	37 U	39 U	37 U	39 U	38 U	39 U	41 U	---
2 Methylphenol	63	---	77	---	---	6.9 U	6.9 U	7.4 U	7.6 U	7.3 U	7.6 U	7.5 U	7.6 U	8 U	---
4 Methylphenol	670	---	3,600	---	---	35 U	35 U	37 U	39 U	37 U	39 U	38 U	39 U	41 U	---
2,4-Dimethylphenol	29	---	210	---	---	14 U	14 U	7.4 U	7.6 U	15 U	7.6 U	7.5 U	7.6 U	17 U	---
Pentachlorophenol	400	504	690	---	---	104 U	103 U	111 U	115 U	111 U	114 U	114 U	114 U	120 U	---
MISCELLANEOUS EXTRACTABLES (ug/kg dry)															
Benzyl alcohol	57	---	870	---	---	17.3 U	17.2 U	18.4 U	19.2 U	18.4 U	19 U	18.9 U	19 U	20 U	
Benzoic acid	650	---	760	---	---	277 U	276 U	148 U	154 U	295 U	153 U	152 U	153 U	321 U	---
Dibenzofuran				400	440	6.9 U	6.9 U	7.4 U	7.6 U	7.3 U	7.6 U	7.5 U	7.6 U	8 U	---
Hexachlorobutadiene	11	---	270	---	---	6.9 U	6.9 U	3.7 U	3.9 U	7.3 U	3.9 U	3.8 U	3.9 U	8 U	---
N-Nitrosodiphenylamine	28	---	130	---	---	17.3 U	17.2 U	18.4 U	19.2 U	18.4 U	19 U	18.9 U	19 U	20 U	---
PESTICIDES (ug/kg dry)															
Aldrin	10	---	---			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
Total Chlordane	3	37	---			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
Dieldrin	2	---	---			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
Heptachlor	2	---	---			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
p,p'-DDE	9	---	---			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
p,p'-DDD	16	---	---			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
p,p'-DDT	5	---	---			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
Total DDT		50	69			0.52 U	0.52 U	0.55 U	0.58 U	0.55 U	0.57 U	0.57 U	0.57 U	0.6 U	---
PCBs (ug/kg dry)															
Total PCBs	130	---	3,100			5.2 U	5.2 U	13.7	5.8 U	5.5 U	5.7 U	5.7 U	5.7 U	6 U	---
Total PCBs (mg/kg OC)	---	38	---			3.56 U	2.21 U	3.19	1.09 U	1.06 U	1.01 U	0.77 U	0.86 U	0.74 U	---
DMMP DETERMINATION						pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
DMMU volume						32,000 cy	32,000 cy	32,000 cy	48,000 cy	28,354 cy	31,381 cy	32,000 cy	32,000 cy	8,529 cy	40,000 cy
Rank						low-moderate	low-moderate	low-moderate	low-moderate	low-moderate	low-moderate	low-moderate	low-moderate	low-moderate	low-moderate
Mean sample depth															
Maximum sampling depth															

J = estimated concentration
U = undetected at the MDL
UJ = undetected, MDL biased low
OC = organic carbon
SL = screening level
BT = bioaccumulation trigger
ML = maximum level
SL1 = lower screening level
SL2 = upper screening level

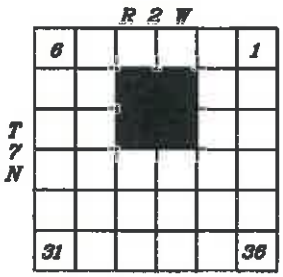
Table 5. Dioxin results.

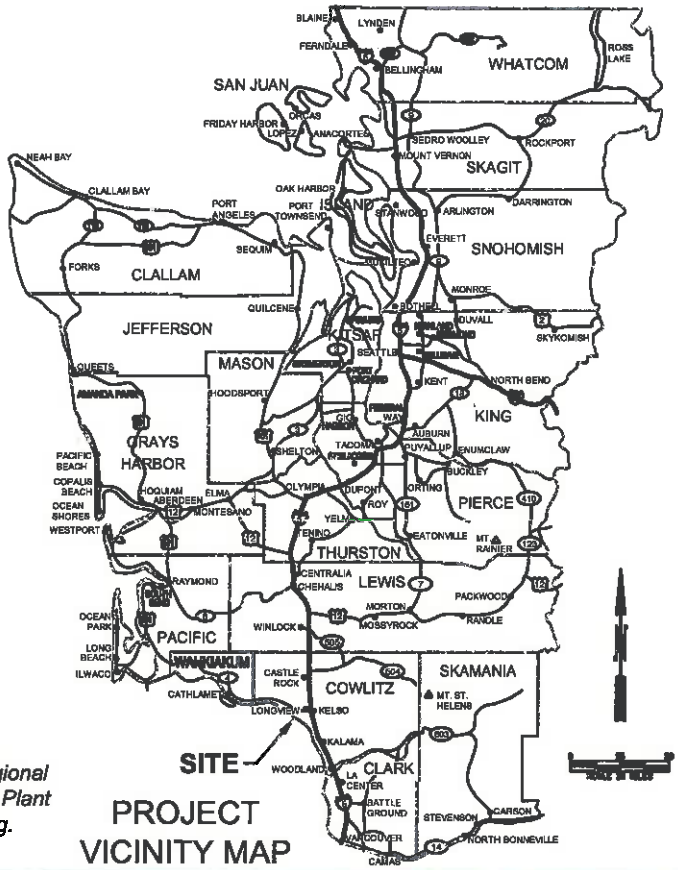
CHEMICAL	TEF	DMMU 6				DMMU 6 - DUP			
DIOXINS/FURANS		conc	VQ	TEQ (U = 0)	TEQ (U = 1/2 RL)	conc	VQ	TEQ (U = 0)	TEQ (U = 1/2 RL)
2,3,7,8-TCDF	0.1	0.622	EMPC	0	0.0311	0.803		0.0803	0.0803
2,3,7,8-TCDD	1	0.114	U	0	0.057	0.0058	U	0	0.0029
1,2,3,7,8-PeCDF	0.03	0.533	JEMPC	0	0.007995	0.454	J	0.01362	0.01362
2,3,4,7,8-PeCDF	0.3	0.197	JEMPC	0	0.02955	0.231	JEMPC	0	0.03465
1,2,3,7,8-PeCDD	1	0.224	J	0.224	0.224	0.242	JEMPC	0	0.121
1,2,3,4,7,8-HxCDF	0.1	0.927	J	0.0927	0.0927	0.761	J	0.0761	0.0761
1,2,3,6,7,8-HxCDF	0.1	0.431	JEMPC	0	0.02155	0.382	J	0.0382	0.0382
2,3,4,6,7,8-HxCDF	0.1	0.329	J	0.0329	0.0329	0.26	JEMPC	0	0.013
1,2,3,7,8,9-HxCDF	0.1	0.108	U	0	0.0054	0.007	U	0	0.00035
1,2,3,4,7,8-HxCDD	0.1	0.224	JEMPC	0	0.0112	0.246	JEMPC	0	0.0123
1,2,3,6,7,8-HxCDD	0.1	1.8		0.18	0.18	1.9		0.19	0.19
1,2,3,7,8,9-HxCDD	0.1	0.801	J	0.0801	0.0801	1.08		0.108	0.108
1,2,3,4,6,7,8-HpCDF	0.01	3.22		0.0322	0.0322	3.21		0.0321	0.0321
1,2,3,4,7,8,9-HpCDF	0.01	0.104	U	0	0.00052	0.0148	U	0	0.000074
1,2,3,4,6,7,8-HpCDD	0.01	15.8		0.158	0.158	21.4		0.214	0.214
OCDF	0.0003	5.15		0.001545	0.001545	5.78		0.001734	0.001734
OCDD	0.0003	124		0.0372	0.0372	162		0.0486	0.0486
TOTAL TEQ				0.839	0.972			0.722	0.907

CHEMICAL	TEF	DMMU 8				SRM			
DIOXINS/FURANS		conc	VQ	TEQ (U = 0)	TEQ (U = 1/2 RL)	conc	VQ	TEQ (U = 0)	TEQ (U = 1/2 RL)
2,3,7,8-TCDF	0.1	2.03		0.203	0.203	0.889		0.0889	0.0889
2,3,7,8-TCDD	1	0.364	EMPC	0	0.182	0.948		0.948	0.948
1,2,3,7,8-PeCDF	0.03	0.779	JEMPC	0	0.011685	1.05		0.0315	0.0315
2,3,4,7,8-PeCDF	0.3	0.535	JEMPC	0	0.08025	0.753		0.2259	0.2259
1,2,3,7,8-PeCDD	1	0.539	JEMPC	0	0.2695	1.25		1.25	1.25
1,2,3,4,7,8-HxCDF	0.1	1.12	EMPC	0	0.056	2.78		0.278	0.278
1,2,3,6,7,8-HxCDF	0.1	0.513	JEMPC	0	0.02565	0.993		0.0993	0.0993
2,3,4,6,7,8-HxCDF	0.1	0.513	JEMPC	0	0.02565	2.23		0.223	0.223
1,2,3,7,8,9-HxCDF	0.1	0.177	BJEMPC	0	0.00885	0.532	J	0.0532	0.0532
1,2,3,4,7,8-HxCDD	0.1	0.376	JEMPC	0	0.0188	1.37		0.137	0.137
1,2,3,6,7,8-HxCDD	0.1	2.73		0.273	0.273	3.96		0.396	0.396
1,2,3,7,8,9-HxCDD	0.1	1.64	EMPC	0	0.082	2.63		0.263	0.263
1,2,3,4,6,7,8-HpCDF	0.01	4.66		0.0466	0.0466	19		0.19	0.19
1,2,3,4,7,8,9-HpCDF	0.01	0.412	JEMPC	0	0.00206	1.68		0.0168	0.0168
1,2,3,4,6,7,8-HpCDD	0.01	25.3		0.253	0.253	97.3		0.973	0.973
OCDF	0.0003	8.8		0.00264	0.00264	68.6		0.02058	0.02058
OCDD	0.0003	185		0.0555	0.0555	855		0.2565	0.2565
TOTAL TEQ				0.631	1.393			5.362	5.362

46° 05' 51" N Latitude
122° 55' 47" W Longitude

LOCATION MAP

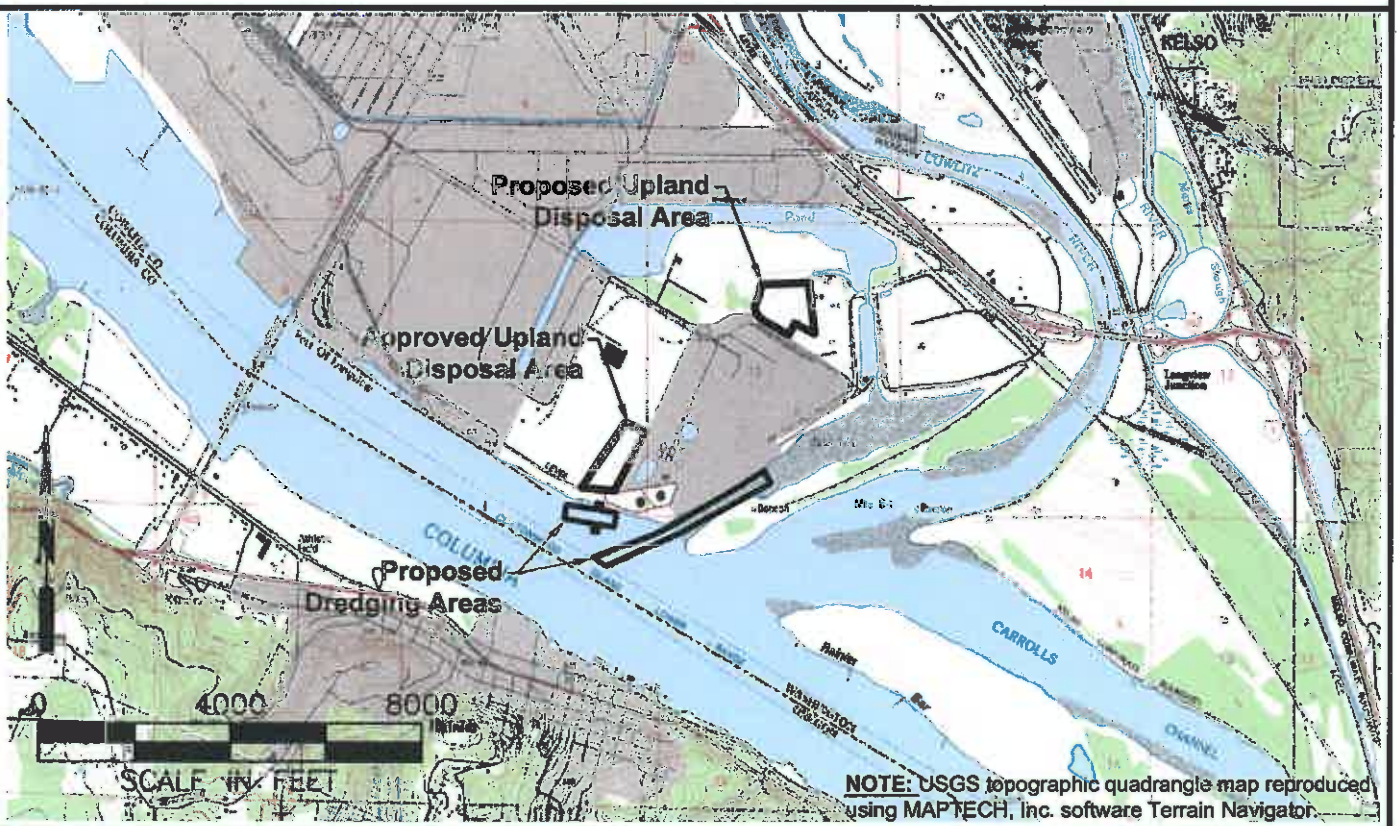




PROJECT VICINITY MAP

ADJACENT PROPERTY OWNERS:

WEST: Port of Longview
NORTH: Three Rivers Regional Waste Treatment Plant
EAST: Longview Booming.



NOTE: USGS topographic quadrangle map reproduced using MAPTECH, Inc. software Terrain Navigator.

PURPOSE: Maintain Channel	VICINITY MAP	**PROPOSED:** Dredging
DATUM: NGVD29/NAD27	**APPLICANT:** Longview Fibre Paper & Packaging, Inc. dba KapStone Kraft Paper Corporation	**IN** : Columbia River
ADJACENT PROPERTY OWNERS: See JARPA	**PROJECT NAME:** Maintenance Dredging	**NEAR:** Longview
	REFERENCE #: Not Yet Assigned	**COUNTY:** Cowlitz **STATE:** WA
	SITE LOCATION ADDRESS: 300 Fibre Way Longview, WA 98632	Figure 1.

FOR GRAIN SIZE ANALYSIS (Archiving Sample)
LF25

OUTFALL LINE

DMMU 10 (Surface)

PROPOSED DREDGING AREA

DMMU 1 (Surface)

DMMU 3 (Surface)

END OF DOCK

DMMU 5 (Surface)

FACE OF DOCK

DMMU 6 (Subsurface)

DMMU 7 (Surface)

END OF DOCK

WATER INTAKE STRUCTURE

DMMU 8 (Surface)

DMMU 2 (Subsurface)

DMMU 4 (Subsurface)

DMMU 9 (Surface)

COLUMBIA RIVER NAVIGATION CHANNEL

EXISTING CORPS NAVIGATION CHANNEL

EXISTING CHIP DOCK PERMIT AREA

LEGEND:

- LF8 ● Proposed Surface Sample Point Location Only
- LF22 ▲ Proposed Surface/Subsurface Sample Point Location
- ○ LF8 Final Surface Sample Point Location Only
- △ LF23 Final Surface/Subsurface Sample Point Location
- LF=Longview Fibre

DREDGING MANAGEMENT UNITS:

Surface DMMUs	Approx. Cu. Yds.	# of Samples
DMMU 1	32,000	4
DMMU 3	32,000	4
DMMU 5	28,354	4
DMMU 7	32,000	4
DMMU 8	32,000	4
DMMU 9	8,529	2
DMMU 10	40,000	1

Subsurface DMMUs	Approx. Cu. Yds.	# of Samples
DMMU 2	32,000	4
DMMU 4	48,000	6
DMMU 6 (Chip Dock Permit Area)	31,381	5

NOTE(S):

1. 2012 aerial photo provided by Google Earth™.
2. LF24 samples collected to the north because a barge was in the slip.

N W E S

0 300 600
SCALE IN FEET

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Avenue, Suite 220
Longview, WA 98632

PURPOSE: Maintain Channel

DATUM: CRD

ADJACENT PROPERTY OWNERS: See JARPA

SAMPLING POINTS

APPLICANT: Longview Fibre Paper & Packaging, Inc. dba KapStone Kraft Paper Corporation

PROJECT NAME: Maintenance Dredging

REFERENCE #: Not Yet Assigned

SITE LOCATION ADDRESS: 300 Fibre Way Longview, WA 98632

PROPOSED: Dredging

Figure 2.