PROCESS WATER REUSE FACILITY Capital Facilities Plan/Engineering Report



Rev. #1 June 2019 Rev. #2 November 2019





VOLUME 2

APPENDICES

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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix A

Impacts of Increased Grimmway Flow and Loading On Planned PWRF Improvements Jacobs, Karla Kasick, PE, March 15, 2019





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TECHNICAL MEMORANDUM

IMPACTS OF INCREASED FLOW AND LOADING ON PWRF IMPROVEMENTS

> **Grimmway Farms** Pasco, Washington

> > Prepared For:

Grimmway Farms P.O. Box 81498 Bakersfield, California 93380

March 2018

Prepared By:

PACE Engineers, Inc. 11255 Kirkland Way #300 Kirkland, WA 98033



Impacts of Increased Grimmway Flow and Loading on Planned PWRF Improvements

Grimmway Farms P.O. Box 81498 Bakersfield, California 93380 Telephone: 661.854.6260

Shem Oesch







PROJECT CERTIFICATION

The technical material and data contained in this report was prepared by PACE Engineers, Inc., under the supervision of the below listed individuals. Those responsible staff members who are registered professional engineers are licensed in the State of Washington.



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Impacts of Increased Grimmway Flow and Loading on Planned PWRF Improvements

PREPARED FOR:	PACE Engineers, Inc. Grimmway Enterprises
PREPARED BY:	Karla Kasick, PE (Jacobs)
REVIEWED BY:	Andrew Ryder Rebecca Maco
DATE:	March 15, 2019

Introduction and Purpose

Grimmway Enterprises, Inc. (Grimmway) is a vegetable processor located in Pasco, WA that processes carrots. The wash water used for the processing operation is currently conveyed to the City of Pasco's municipal wastewater treatment plant (WWTP) for treatment. The City of Pasco (City) also owns and operates the Pasco Water Reuse Facility (PWRF) where other vegetable processors in the area send their vegetable processing water. The City and Grimmway both have a strong desire to remove Grimmway's wash water from the WWTP and send it the PWRF for pretreatment and land application.

Grimmway would come online in Phase 2 of the proposed PWRF expansion. The expansion phases are defined as:

- Existing Reser's, Freeze Pack, Pasco Processing, and Twin City Foods
- Phase 1 (2018) Existing processors plus Simplot
- Phase 2 (2020) Phase 1 processors plus Grimmway plus 30 percent growth at Reser's
- Phase 3 (2026) Phase 2 processors plus Lamb Weston
- Phase 4 (2030) Phase 3 processors plus one 2.5 MGD year-round new processor
- Phase 5 (2040) Phase 4 processors plus one 2.5 MGD year-round new processor

Grimmway is permitted for a maximum day flow of 1.2 million gallons per day (mgd) and a maximum day biochemical oxygen demand (BOD) of 300 milligrams per liter (mg/L) to the City's municipal WWTP. Grimmway wash water flows into a 3 million gallon (MG) equalization (EQ) pond on-site. Rental dissolved air floatation tank (DAFT) and moving bed biofilm reactor (MBBR) units are installed downstream of the pond to polish the effluent prior to discharge to the WWTP. Grimmway's process flow diagram is included as Appendix A

The City has prepared a PWRF Facility Plan (FP) which includes treatment capacity for Grimmway flow and loading based on their current discharge monitoring reports (DMRs) for wastewater sent to the WWTP. However, Grimmway is expected to expand in the next 3 to 10 years. The expansion would include increased flows to the PWRF according to the following flow regime:

- 2.1 mgd between June 1 and November 30
- 0.7 mgd between December 1 to December 31
- 20,000 gpd average and 40,000 gpd maximum between May 1 and May 30

• No flow from January 1 to April 30

This flow regime equates to an average summer flow rate of 1.75 mgd and an average winter flow rate of 0.47 mgd.

In addition to increased flows, Grimmway would like to relax their BOD and total suspended solids (TSS) from the municipal requirements of 300 mg/L to in the range of 2,500 – 8,000 mg/L BOD and 300 – 1,000 mg/L TSS in order to align with the other processors that discharge to the PWRF. These BOD and TSS ranges correspond to summer season (May – October) limits on the low end and winter season (November – April) limits on the high end.

As a result of these permit changes, Grimmway would like to remove the rental DAFT and MBBR units and potentially decommission the 3 MG EQ Pond.

This technical memorandum discusses the impact of these proposed changes to the planned capacity and treatment upgrades to the PWRF and provides a recommendation of whether to use or bypass Grimmway's existing 3 MG equalization pond.

Flow and Loading

Flow

Review of the existing 2016 – 2018 DMRs confirms that the existing Grimmway flows range from 1.1 mgd to 1.2 mgd during the summer season. The proposed Grimmway expansion has the following impacts on the flow projections for Phase 2 as presented in Table 1.

Table 1 - Phase 2 Flow Comparison

	PWRF FP	New
Item	Phase 2	Requirement
Summer Peak (mgd)	8.12	8.67
Summer Average (mgd)	4.84	5.63

BOD and TSS

A summary of the discharge from the existing 3 MG equalization pond over the last 3 years is presented in Table 2. Grimmway's BOD and TSS concentrations range between 2,100 (362 mg/L) pounds per day to 8,700 (498 mg/L) pounds per day for BOD and 1,200 (210 mg/L) pounds per day to 7,500 (434 mg/L) pounds per day TSS. The BOD and TSS loadings are relatively low compared to other processors discharging to the PWRF, despite the removal of the rental pretreatment facilities.

Table 2 - Existing Loading after the 3 MG EQ Pond

	Total Volume	Maximum Flow	Max. BOD	Avg. BOD	Max. TSS	Avg. TSS
Time Period	MG	mgd	lb/d	lb/d	lb/d	lb/d
January - April 30	0	0	0	0	0	0
May 1 - May 31	0.62	0.04	166	60	145	35
June 1 - November 30	384.3	2.1	8,722	6,340	7,598	3,686
December 1 - December 31	21.7	0.7	2,907	2,113	2,533	1,229

Notes: MG = million gallons mgd = million gallons per day

lbs/day = pounds per day

Equipment Sizing

Headworks Screens

The two existing PWRF headworks screens are rated for a hydraulic capacity of 8.64 mgd. A third screen was included in the City's Facility Plan for the PWRF. The third screen is not only needed for reliability and redundancy, but the existing screens are not operating at nameplate capacity. The third screen provides additional capacity since each screen is only operating at a portion of their rated capacity.

As presented in Table 3, the expansion of Grimmway's flows from their current permit will require the third screen prior to Phase 2 to manage the increased Grimmway flows. As outlined in the FP, three screens will be required to manage Phase 3 flows; it was not required, although, it was recommended for Phase 2 flows if Grimmway did not expand.

Screens Comparison	PWRF FP Phase 2	New Requirement
Peak Flows (mgd)	8.12	8.67
Screen Capacity (mgd)	12.98	12.98
Total Number Provided	3	3

Table 3 - Screen Capacity Comparison

Notes:

mgd = million gallons per day

Primary Clarification

A new primary clarifier is required at the PWRF to manage high flows during the summer period. The recommended surface loading for a new primary clarifier would be 1,000 gallons per day per square foot (gpd/sf) for average flow and 1,500 gpd/sf for peak flow conditions. A new 95-foot diameter clarifier is included in the PWRF Facility Plan Capital Improvements for Phase 2, with a second, identical clarifier to be installed in Phase 4.

Table 4 shows the impact of the Grimmway expansion on the clarifier sizing. The 95-foot diameter clarifier will have enough capacity to handle the increased flow and loading in Phase 2 and Phase 3. A second, identical clarifier will be required prior to Phase 4. This sizing is unchanged from the FP.

Table 4 - 95 Foot Diameter Clarifier	Surface Load	ling for Summe	er Operation	with Grimmw	ay Expansion
	Average	Surface		Surface	

	Average	Surface		Surface
	Flow	Loading	Peak Flow	Loading
95 ft Diameter Clarifier	(mgd)	(gpd/sf)	(mgd)	(gpd/sf)
Phase 2	5.63	794	8.67	1,224
Phase 3	7.06	995	10.18	1,437

Notes:

gpd/sf = gallons per day per square foot ft = foot mgd = million gallons per day

Land Treatment Capacity

Based on preliminary discussions with Cascade Earth Sciences, the nitrogen application capacity is likely to be less than the 866,246 pounds per year allowed by the current permit. Preliminary indications are that the crop removal rate may be approximately 609,000 pounds per year. Allowing for 16 percent loss

during application, the allowable application rate may be approximately 720,700 pounds per year. Refer to the City of Pasco Land Treatment Site Capacity Assessment prepared March 24, 2018 for more information.

As shown in Table 5, the increased nitrogen loading to the PWRF fields because of Grimmway's expansion are still within the capacity of the existing fields during Phase 2, regardless of whether Grimmway maintains the 3 MG EQ Pond.

	Average		
	Without		
	PWRF FP	With 3 MG EQ	MG EQ
Parameter	Phase 2	Pond	Pond
Nitrogen to the fields (lbs/yr)	459,927	496,449	528,768

Table F. Fatimental	Nither man Arrivel					
Table 5 - Estimated	Nitrogen Appi	ed to the PV	VRF Fleids Con	nparison Due to	o Grimmway E	xpansior

Notes: lbs/yr = pounds per year

3 MG Equalization Pond

The 3 MG EQ Pond located at Grimmway's facility provides some BOD and TSS removal from Grimmway's discharge. It was assumed that the nitrogen concentration is correlated to the BOD concentration, thus, the pond helps to limit nitrogen loading to the fields (See Table 5). The BOD and TSS reductions account for a 48 percent reduction in solids compared to the case without the pond.

The pond also provides Grimmway with a small storage capacity for reliability, in case of unforeseen downtime at the PWRF. For these reasons, it is recommended that the 3 MG equalization pond be retained.

Cost of Improvements

Table 6 presents a cost comparison between the current planned PWRF improvements and the additional improvements required for the Grimmway expansion. The increased storage requirement causes the total storage cost at Phase 2 to increase by 56 percent. The total cost for solids handling would need to be increased by 4 – 8 percent to account for the additional solids quantity contributed by Grimmway. It is anticipated that Grimmway's percentage of the cost-share would increase proportionally to their contribution to the flow and loading increases.

	PWRF FP	New	Cost	
Item	Phase 2	Requirement	Increase	
Screens	\$261,800	\$261,800	\$0	
Clarifier	\$1,473,669	\$1,473,669	\$0	
Storage	\$8,661,000	\$13,477,000	\$4,816,000	
Solids	\$761,800	\$791,467	\$29,667	

Table 6 - Cost Comparison

Summary

Table 7 presents the impacts Grimmway's expansion would have on the City's FP. The planned improvements to the screens and primary clarifier remain unchanged, however, it is anticipated that Grimmway's percentage of the cost-share would increase proportionally to their contribution to the flow and loading increases. An additional 70 MG of storage is required to store the increased Grimmway winter flows. Additional solids handling is also required for the increased solids load. It is important to

note that the contingencies inherent in Facilities Planning have resulted in equipment sizing that are conservative. The increased flow and loading from Grimmway removes some of the contingency from the PWRF facilities.

Table 7 - Summary of Required Improvements

	PWRF FP	New
Item	Phase 2	Requirement
Screens	3	3
Clarifier	1 95-foot	1 95-foot
Storage	100	170
Solids Quantity (lbs/yr)	15,562,140	16,168,186

Notes:

lbs/yr = pounds per year



Impacts of Increased Grimmway Flow and Loading on Planned PWRF Improvements Pasco, Washington

Appendix A Grimmway Process Flow Diagram Grimmway Farms Construction and Engineering





Impacts of Increased Grimmway Flow and Loading on Planned PWRF Improvements Pasco, Washington

Appendix B Impacts of Increased Grimmway Flow and Loading on Cost Allocations PACE Engineers, Inc., and FCS Group, March 25, 2019

APPENDIX B

Impacts of Increased Grimmway Flow and Loading on Cost Allocations

Prepared For: Grimmway Farms

Prepared by: PACE Engineers, Inc. FCS Group

Date: March 25, 2019

Capital Cost Impacts:

An analysis of the flow and loading potential for increasing discharge from the Grimmway Plant, Pasco, WA was completed and findings and conclusions were summarized in the technical memorandum herewith. The Land Treatment system can reliably treat the additional flow requested by Grimmway with or without the use of the 3 MG equalization pond. However, certain pretreatment process trains are impacted and would require additional capacity. As presented in Table 7 – Summary of Required Equipment, only the storage capacity and solids handling process trains are impacted. The total annual storage volume increases to170 MG required and Solids production increasing to 16,168,186 lbs/year. This capital cost impact is presented in Table 6 – Cost Comparison.

CIP Matrix Revisions:

The Capital Improvements matrix provided with the Capital Facilities/Engineering Report, dated October 1, 2018 was revised including the cost refinements, corrections, and removal of biological treatment from Phase 2. Further, all Phase 3 biological treatment costs are not allocated to the Phase 2 processors, as their treatment and disposal needs are satisfied with the current system in place. Table 8 summarizes the revised Capital Improvements program for the Pasco PWRF.

Table No. 9 was prepared to reflect the cost impacts defined in table 7 of the Jacobs memorandum, dated March 15, 2019. Only the pretreatment costs change from \$26,702,269.00 to \$31,547,936.00. The main difference between table 8 and table 9 are the increased cost for additional storage and increase solids handling strictly a result of the future flow request from Grimmway Farms.

Cost Allocations:

Grimmway flow/loadings increases impact not only the capital costs, but the cost allocation parameters, and percentages for each processor. The following spreadsheets will show three tables for each scenario: revenue requirement/annual cost allocations, proportional allocation percentages and finally, allocation parameters.

Scenario 1 is the initial phase II analysis that was presented to the processors on 11/7/18 – signified by the grey boxes.

Scenario 2 will show the cost allocations associated with the revised capital costs that represent no changes to the flow and loadings for Grimmway – signified by the blue boxes. Scenario 2 summarizes reductions in the overall annual cost allocations for the Phase 2 processors compared to the original 11/7/18 matrix. The annual total for all processors decreases from \$11,346,827.00 to \$8,716,074.00, or approximately 23 percent. Since the allocation parameters and allocation factors remain unchanged, the only variable s the CIP costs

Scenario 3 will show the cost allocations associated with the revised capital costs that represent elevated flow/loadings for Grimmway – represented by the green boxes. Scenario 3 represents the annual cost allocations as a result of the Grimmway request to increase flow and loading. In this scenario, both the cost matrix is increased and the allocation parameters, and allocation factors are revised. The annual total for all customers is \$8,998,551.00 increasing approximately 3.0 percent above scenario 2.

Summary:

It is possible for the existing Land Treatment system at the PWRF treat and dispose of the proposed future flows proposed by Grimmway. This increase will only impact available storage capacity and solids handling pretreatment costs. Scenario 3 increases their annual cost allocation to \$2,140,112. However, scenario 3 allows Grimmway to avoid future lease costs for the DAF and MBBR. The annual lease costs were not made available to the consultant team, therefore, we cannot comment on the overall savings realized this represents. It is recommended Grimmway consider keeping the 3 MG equalization pond active as it does have value buffering peak flows and lowering BOD, Nitrogen, and TSS values.

TABLE 8: REVISED CAPITAL IMPROVEMENT PROGRAM

No.	Description	Category/Need	Cost	Schedule	hedule Customer								Functio	ns of PWRF \$	Service	
						Pasco	Twin City	Reser's Fine	Freeze							
FOSTER WE	ELLS SERVICE AREA (Collection/Convevance)				City	Processing	Foods	Foods	Раск	Simplot	Grimmway	Flow	BOD	Nitrogen	155	рн
FW-1	ATS Replacement	O&M Existing	\$467,000.00	2019		x	x	x				100%				
FW-2	Odor Control Improvements Foster Wells PS	O&M Existing	\$150,000.00	2019		x	x	x				50%	25%			25%
FW-3	Forcemain Replacement Foster Wells	O&M Existing	\$4,000,000.00	2019		x	x	x				100%				
		Subtotal:	\$4,617,000.00													
COLUMBIA	EAST SERVICE AREA (Collection/Conveyance)															
CE-1	Columbia East Pump Station and Forcemain includes right-of-way	Additional Capacity (G+S+FP)	\$9,211,000.00	2019-2020					x	x	x	100%				
CE-2	Grimmway Discharge Modifications	Additional Capacity	\$30,000.00	2020							x	100%				
CE-3	Simplot Discharge to Columbia East PS	Additional Conseitur	¢204.000.00	0000								4000/				
	Gravity Sewer	Additional Capacity	\$301,000.00	2020						X		100%				
CE-4	Freeze Pack Discharge Modifications	Additional Capacity	\$45,000.00	2020					X			100%				
PWRF PRE-	TREATMENT IMPROVEMENTS (Treatment)	Gubtotal.	\$3,007,000.00													
	Pretreatment Improvements Phase 1 and 2															
PWRF-1	Irrigation Pump Station	O&M Existing	\$4,272,000.00	2019		x	x	x	x	x	x	100%				
	IPS Discharge Piping 24 in.	O&M Existing	\$2,687,000.00	2019		x	x	x	х	x	x	100%				
PWRF-2	Existing Solids Removal and Disposal Locally	O&M Existing	\$2,500,000.00	2019		x	x	x	х						100%	
PWRF-3	8 MG EQ Basin Aerators	O&M Existing	\$1,195,000.00	2020		x	x	x	x	x	x	25%	50%		25%	
PWRF - 4	Install Third Drum Screen	Capacity	\$261,800.00	2020		x	x	x	x	x	x	50%			50%	
PWRF-5	New Primary Clarifier (95 ft Dia.)	Capacity	\$1,473,669.00	2020		x	x	x	x	x	x	50%			50%	
PWRF-5	pH Control Equipment	Capacity	\$520,000.00	2020		x	x	x	x	x	x	50%				50%
PWRF-6	Solids Handling	Capacity	\$761,800.00	2020		x	x	x	x	x	x				100%	
PWRF-7	100 MG New Storage	Capacity	\$8,661,000.00	2020		x	x	x	x	x	x	100%				
PWRF-8	New Office/Lab Building (42' x 48' CMU/metal roof)	Capacity	\$670,000.00	2023		x	x	x	x	x	x	20%	20%	20%	20%	20%
PWRF-9	Existing115 & 35 MG Pond Modifications and New Liners	O&M Existing	\$3,700,000.00	2026		x	x	x	x	x	x	100%				
	1	Phase 1 & 2 Subtotal:	\$26,702,269.00													
PWRF - 10	Future Pre-treatment Process Phase 3									1			1			
	Biological Treatment (SBR + UASB)	Capacity	\$36,078,000.00	2040								10%	40%	40%	10%	
	390 MG New Storage	Capacity	\$33,800,000.00	2040								100%				
	1	Phase 3 Subtotal:	\$69,878,000.00		1	1	1	1	1	1			1			1
PWRF-5	Expand Pretreatment Process Phase 4	TBD	TBD	2050												
PWRF-6	Expand Pretreatment Improvements Phase 5	TBD	TBD	2050												
	TMENT SYSTEM IMPROVEMENTS				Citv	Pasco Processing	Twin City Foods	Reser's Fine	Freeze Pack	Simplot	Grimmway	Flow	BOD	Nitrogen	TSS	ъH
		00115	\$50,000,00	1015	City	litecooling	1 00000	10000	- uon	ompior	Chining	1101		Introgen	100	Pii
LI-1	Iriple-Beam Towers (100% City)	O&M Existing	\$50,000.00	ASAP	X											
LT-2	Install Variable Frequency Drive on Well #4 (100% City)	Capacity	\$50,000.00	2019	x											
LT-3	Replace Well #6 (100% City)	U&M Existing	\$75,000.00	2019	X											
LT-4	Replace Well #8 (100% City)	O&M Existing	\$75,000.00	2020	x											
LT-5	Replace Circle 7 Pivot (70% City - 30% Processors)	O&M Existing	\$125,000.00	2019	x	x	x	x	x	x	x	50%	25%	25%		
LT-6	Replace Circle 5 Pivot (70% City - 30% Processors)	O&M Existing	\$125,000.00	2022	x	x	x	x	x	x	x	50%	25%	25%		
		Subtotal:	\$500,000.00													

TABLE 9: CAPITAL IMPROVEMENTS (FUTURE GRIMMWAY FLOW AND LOADING)

No.	Description	Category/Need	Cost	Schedule Customer						Fu	nctions o	of PWRF	Servi	се		
								Reser's	_							
					Citv	Pasco	Twin City Foods	Fine	Freeze Pack	Simplot	Grimmway	Flow		itrogen	TSS	рН
FOSTER W	ELLS SERVICE AREA (Collection/Conveyance)				City	l'i coccoilig	10000	10040	- aon	ompior	Chining	1101				P 11
FW-1	ATS Replacement	O&M Existing	\$467,000.00	2019		x	x	х				100%				
FW-2	Odor Control Improvements Foster Wells PS	O&M Existing	\$150,000.00	2019		x	x	x				50%	25%			25%
FW-3	Forcemain Replacement Foster Wells	O&M Existing	\$4,000,000.00	2019		x	x	x				100%				
		Subtotal:	\$4,617,000.00													
COLUMBIA	EAST SERVICE AREA (Collection/Conveyance)			1		1			1	1	1					
CE-1	Columbia East Pump Station and Forcemain	Additional Capacity	* ~ ~ <i>.</i>									40004				
	Includes right-of-way	(G+S+FP)	\$9,211,000.00	2019-2020					X	X	X	100%				
CE-2	Grimmway Discharge Modifications	Additional Capacity	\$30,000.00	2020							X	100%				
CE-3		Additional Capacity	\$301,000.00	2020						X		100%				
CE-4	Freeze Pack Discharge Modifications	Additional Capacity	\$45,000.00 \$9.587.000.00	2020					X			100%				
PWRF PRF	-TREATMENT IMPROVEMENTS (Treatment)	••••••	<i>v</i> ,,.													
	Pretreatment Improvements Phase 1 and 2														_	
PWRF-1	Irrigation Pump Station	O&M Existing	\$4,272,000.00	2019		x	x	х	x	x	x	100%				
	IPS Discharge Piping 24 in.	O&M Existing	\$2,687,000.00	2019		x	x	х	x	x	x	100%				
PWRF-2	Existing Solids Removal and Disposal Locally	O&M Existing	\$2.500.000.00	2019		x	x	x	x						100%	
PWRF-3	8 MG EQ Basin Aerators	O&M Existing	\$1.195.000.00	2020		X	X	X	x	x	x	25%	50%		25%	
PWRF - 4	Install Third Drum Screen	Capacity	\$261,800.00	2020		x	X	X	X	X	x	50%			50%	
PWRF-5	New Primary Clarifier (95 ft Dia.)	Capacity	\$1,473,669.00	2020		x	х	х	x	X	x	50%			50%	
PWRF-5	pH Control Equipment	Capacity	\$520,000.00	2020		X	Х	х	X	X	x	50%				50%
PWRF-6	Solids Handling	Capacity	\$791,467.00	2020		x	Х	Х	X	X	x				100%	
PWRF-7	170 MG New Storage	Capacity	\$13,477,000.00	2020		x	X	Х	X	X	x	100%				
PWRF-8	New Office/Lab Building (42' x 48' CMU/metal roof)	Capacity	\$670,000.00	2023		X	X	Х	X	X	X	20%	20%	20%	20%	20%
PWRF-9	Existing115 & 35 MG Pond Modifications and New Liners	O&M Existing	\$3,700,000.00	2026		X	X	Х	X	X	X	100%				
	Future Funeration Dreatment Dreases Dhees 2	Phase 1 & 2 Subtotal:	\$31,547,936.00													
PWRF - 10	Puture Expansion Pre-treatment Process Phase 3	Capacity	¢26 079 000 00	2020								400/	10%	40%	10%	
	300 MC New Storage	Capacity	\$30,078,000.00	2030								10%	40 %	40 %	10 %	
	390 MO New Storage	Phase 3 Subtotal:	\$69 878 000 00	2030								100 /0				
PWRF-5	Expand Pretreatment Process Phase 4	TBD	TBD													
PWRF-6	Expand Pretreatment Process Phase 5	TBD	TBD													
								Reser's								
						Pasco	Twin City	Fine	Freeze							
LAND TRE	ATMENT SYSTEM IMPROVEMENTS				City	Processing	Foods	Foods	Pack	Simplot	Grimmway	Flow	BOD N	itrogen	TSS	рН
LT-1	Triple-Beam Towers (100% City)	O&M Existing	\$50,000.00	ASAP	X											
LT-2	Install Variable Frequency Drive on Well #4 (100% City)	Capacity	\$50,000.00	2019	X											
LT-3	Replace Well #6 (100% City)	O&M Existing	\$75,000.00	2019	x											ļ
LT-4	Replace Well #8 (100% City)	O&M Existing	\$75,000.00	2020	x											
LT-5	Replace Circle 7 Pivot (70% City - 30% Processors)	O&M Existing	\$125,000.00	2019	X	x	X	Х	X	X	X	50%	25%	25%		<u> </u>
LT-6	Replace Circle 5 Pivot (70% City - 30% Processors)	O&M Existing	\$125,000.00	2022	x	x	x	х	x	x	x	50%	25%	25%		
		Subtotal:	\$500,000.00													



Table 10: Cost Allocation Comparison

Allocation Summary - Original Phase II Version - Presented 11/7/18 to Processors															
Class		Customer		Existing Debt Service		Future Debt Service		Depreciation Funding		Flow	Nitrogen	TSS	BOD		Total
Reser	\$	165,146	\$	5 210,167	\$	536,013	\$	56,381	Ş	\$ 126,832	\$ 50,416	\$ 165,456	\$ 20,089	\$	1,330,500
Pasco Processing		165,146		353,165		1,822,278		274,537		617,586	116,101	404,936	21,239		3,774,989
TCF		165,146		149,536		961,264		149,282		335,817	95,721	60,576	17,234		1,934,575
Freeze Pack		165,146		-		201,968		18,580		41,797	11,864	33,937	1,703		474,995
Simplot		165,146		308,824		1,080,482		103,792		233,487	34,816	151,888	44,346		2,122,780
Grimmway		165,146		-		1,126,833		102,511		230,604	28,668	47,306	7,917		1,708,986
Total	\$	990,874	\$	5 1,021,692	\$	5,728,838	\$	705,083	\$	\$ 1,586,124	\$ 337,587	\$ 864,100	\$ 112,529	\$	11,346,827

Allocation Summary - Revised Capital Costs - Same Flow/Loadings

Class	Customer	Existing Debt Service	Future Debt Service	Depreciation Funding	Flow	Nitrogen	TSS	BOD	Total
Reser	\$ 130,580	\$ 5 210,167	\$ 281,001	\$ 56,381	\$ \$ 126,838	\$ 47,564	\$ 168,260	\$ 18,953	\$ 1,039,744
Pasco Processing	130,580	353,165	964,406	274,537	617,613	109,534	411,797	20,038	2,881,671
TCF	130,580	149,536	536,615	149,282	335,832	90,306	61,602	16,259	1,470,013
Freeze Pack	130,580	-	123,627	18,580	41,799	11,193	34,512	1,607	361,897
Simplot	130,580	308,824	666,984	103,792	233,497	32,846	154,462	41,837	1,672,823
Grimmway	130,580	-	743,597	102,511	230,614	27,047	48,108	7,470	1,289,926
Total	\$ 783,481	\$ 5 1,021,692	\$ 3,316,231	\$ 705,083	\$ \$ 1,586,191	\$ 318,490	\$ 878,741	\$ 5 106,163	\$ 8,716,074
Change vs. Original	(207,392)	-	(2,412,607)	-	68	(19,097)	14,641	(6,366)	(2,630,753)

Allocation Summary - Revised Capital Costs - Revised Grimmway Flow/Loadings

Class	Customer	Existing Debt Service	Future Debt Service	Depreciation Funding	Flow	Nitrogen	TSS	BOD	Total
Reser	\$ 133,698	\$ 210,167	\$ 276,555	\$ 46,872	\$ \$ 105,298	\$ 46,831	\$ 146,341	\$ 17,097	\$ 982,860
Pasco Processing	133,698	353,165	969,409	228,237	512,730	107,846	358,153	18,076	2,681,314
TCF	133,698	149,536	551,069	124,105	278,801	88,915	53,577	14,667	1,394,369
Freeze Pack	133,698	-	102,211	15,447	34,701	11,021	30,016	1,449	328,542
Simplot	133,698	308,824	544,278	86,288	193,844	32,340	134,341	37,740	1,471,353
Grimmway	133,698	-	1,136,746	204,135	458,585	37,767	149,971	19,211	2,140,112
Total	\$ 802,188	\$ 1,021,692	\$ 3,580,268	\$ 705,083	\$ \$ 1,583,958	\$ 324,721	\$ 872,400	\$ 108,240	\$ 8,998,551



Table 11: Proportional Allocations

	Customer	Existing Debt	New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounto	Current Split	% of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Current Spin	Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	16.7%	20.6%	9.4%	8.0%	8.0%	14.9%	19.1%	17.9%
Pasco Processing	16.7%	34.6%	31.8%	38.9%	38.9%	34.4%	46.9%	18.9%
TCF	16.7%	14.6%	16.8%	21.2%	21.2%	28.4%	7.0%	15.3%
Freeze Pack	16.7%	0.0%	3.5%	2.6%	2.6%	3.5%	3.9%	1.5%
Simplot	16.7%	30.2%	18.9%	14.7%	14.7%	10.3%	17.6%	39.4%
Grimmway	16.7%	0.0%	19.7%	14.5%	14.5%	8.5%	5.5%	7.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

	Customer	Existing Debt	New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounto	Current Split	% of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Current Spin	Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	16.7%	20.6%	8.5%	8.0%	8.0%	14.9%	19.1%	17.9%
Pasco Processing	16.7%	34.6%	29.1%	38.9%	38.9%	34.4%	46.9%	18.9%
TCF	16.7%	14.6%	16.2%	21.2%	21.2%	28.4%	7.0%	15.3%
Freeze Pack	16.7%	0.0%	3.7%	2.6%	2.6%	3.5%	3.9%	1.5%
Simplot	16.7%	30.2%	20.1%	14.7%	14.7%	10.3%	17.6%	39.4%
Grimmway	16.7%	0.0%	22.4%	14.5%	14.5%	8.5%	5.5%	7.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Revised Proportional Allocations:

	Customer	Existing Debt	New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounto	Current Split	% of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Current Spin	Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	16.7%	20.6%	7.7%	6.6%	6.6%	14.4%	16.8%	15.8%
Pasco Processing	16.7%	34.6%	27.1%	32.4%	32.4%	33.2%	41.1%	16.7%
TCF	16.7%	14.6%	15.4%	17.6%	17.6%	27.4%	6.1%	13.6%
Freeze Pack	16.7%	0.0%	2.9%	2.2%	2.2%	3.4%	3.4%	1.3%
Simplot	16.7%	30.2%	15.2%	12.2%	12.2%	10.0%	15.4%	34.9%
Grimmway	16.7%	0.0%	31.8%	29.0%	29.0%	11.6%	17.2%	17.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%



Table 12: Allocation Factors

	Customer	Ex	isting Debt		New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounto	<u></u>	urrant Calit	%	6 of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	U	ment opin		Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	1	\$	210,285	\$	536,013	176	176	83,331	1,435,511	1,502,926
Pasco Processing	1		353,364		1,822,278	857	857	191,900	3,513,254	1,588,965
TCF	1		149,620		961,264	466	466	158,214	525,559	1,289,336
Freeze Pack	1		-		201,968	58	58	19,610	294,440	127,395
Simplot	1		308,997		1,080,482	324	324	57,546	1,317,794	3,317,575
Grimmway	1		-		1,126,833	320	320	47,385	410,434	592,317
Total	6	\$	1,022,266	\$	5,728,838	2,201	2,201	557,986	7,496,992	8,418,514

	Customer	Exi	sting Debt		New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounts	<u></u>	rrant Salit	%	6 of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Cu	rient Spin		Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	1	\$	210,285	\$	281,001	176	176	83,331	1,435,511	1,502,926
Pasco Processing	1		353,364		964,406	857	857	191,900	3,513,254	1,588,965
TCF	1		149,620		536,615	466	466	158,214	525,559	1,289,336
Freeze Pack	1		-		123,627	58	58	19,610	294,440	127,395
Simplot	1		308,997		666,984	324	324	57,546	1,317,794	3,317,575
Grimmway	1		-		743,597	320	320	47,385	410,434	592,317
Total	6	\$	1,022,266	\$	3,316,231	2,201	2,201	557,986	7,496,992	8,418,514

Revised Allocation Factors

	Customer	Ex	isting Debt		New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounts	<u>_</u>	urrant Solit	%	6 of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	U	inent opin		Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	1	\$	210,285	\$	276,555	176	176	83,331	1,435,511	1,502,926
Pasco Processing	1		353,364		969,409	857	857	191,900	3,513,254	1,588,965
TCF	1		149,620		551,069	466	466	158,214	525,559	1,289,336
Freeze Pack	1		-		102,211	58	58	19,610	294,440	127,395
Simplot	1		308,997		544,278	324	324	57,546	1,317,794	3,317,575
Grimmway	1		-		1,136,746	767	767	67,202	1,471,120	1,688,740
Total	6	\$	1,022,266	\$	3,580,268	2,648	2,648	577,803	8,557,678	9,514,937



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix B PWRF Flow and Loading Projections Jacobs, Andrew Ryder, PE, March 30, 2019





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PWRF Flow and Loading Projections

PREPARED FOR:	PACE Engineers, Inc.
	City of Pasco, WA
PREPARED BY:	Andrew Ryder (CH2M)
REVIEWED BY:	Karla Kasick, PE (CH2M)
DATE:	March 30, 2018

Introduction

The City of Pasco (City) has owned and operated the Process Wastewater Reuse Facility (PWRF) since 1995. The PWRF and associated farm properties are located in an area of irrigated agriculture production fields on approximately 1,856 acres north of Pasco and east of Highway 395 in Franklin County (Figure 1). The PWRF has a State Waste Discharge Permit (No. ST0005369) from the Washington State Department of Ecology and discharges its treated water via center pivot irrigators onto land leased by agricultural operators.

The City designed the PWRF to manage process wastewater from a variety of potential vegetable processing facilities, located in two different geographical areas. The Foster Wells Service Area is located on the north side of Pasco, west of Highway 395 at Foster Wells Road. Foster Wells has three food processors discharging to the PWRF: Pasco Processing, Twin City Foods, and Reser's Fine Foods. Process wastewater from these facilities is combined at the Pasco Processing Center and pumped to the PWRF.

The Columbia East Service Area is located on the east side of Pasco, near the Highway 12/Pasco-Kahlotus Highway interchange. Columbia East presently has only one food processor discharging to the PWRF (Freeze Pack), with a second undergoing renovation (Columbia River Foods (CRF), now owned by Simplot) and a third discharging to the Pasco Wastewater Treatment Plant (Grimmway). Simplot (formerly CRF) is scheduled to begin operations in 2018. Simplot has a privately-owned force main which is currently used by Freeze Pack to discharge to the PWRF.

The purpose of this technical memorandum is to develop representative flow and loading projections for the PWRF influent based on existing and future processor wastewater quantity and quality. This information will be used to determine the necessary treatment requirements at the PWRF to meet Permit and spray field limitations.

Existing and Future Processors

Reser's, Freeze Pack, Pasco Processing, and Twin City Foods will continue to discharge process wastewater to the PWRF. Reser's anticipates approximately 30 percent growth in the near future. Pasco Processing, Freeze Pack, and Twin City Foods anticipate that future operation will remain consistent with current flows and loadings. In addition to the existing processors, it is anticipated that several other processors will discharge process wastewater to the PWRF. Simplot is renovating the existing CRF facility and will begin operating and discharging process wastewater to the PWRF in 2018. Grimmway is currently located in the Columbia East Service Area and discharges process wastewater to the City municipal sewer plant. Grimmway is planning to divert flows to the PWRF as soon as capacity becomes available. Lamb Weston, located in the Foster Wells area, owns and operates a processing facility and wastewater land treatment system; however, they have expressed an interest in closing their treatment

facilities and discharging to the PWRF. The City also plans to provide capacity for additional future processors with year-round flow rates in the range of 2.5 million gallons per day (mgd).

The City plans to phase in new processors and additional treatment capacity at the PWRF. Each phase will incorporate new treatment capacity based on the flow and loading projections discussed in this document. It is anticipated that phasing will occur in the following order:

- **Existing** Reser's, Freeze Pack, Pasco Processing, and Twin City Foods
- Phase 1 (2018) Existing processors plus Simplot
- Phase 2 (2020) Phase 1 processors plus Grimmway plus 30 percent growth at Reser's
- Phase 3 (2026) Phase 2 processors plus Lamb Weston
- Phase 4 (2030) Phase 3 processors plus one 2.5 mgd year-round new processor
- Phase 5 (2040) Phase 4 processors plus one 2.5 mgd year-round new processor

Processor Permits and Fact Sheets

The extent of treatment required at the PWRF is determined by the difference between the influent water quality and the capacity of the spray fields in which the treated water is discharged. Influent flow is comprised of all the processor discharges, which are guided by individual processor discharge permits. Table 1 presents processor permit limitations and fact sheet values. The fact sheets were developed during the permitting process in an effort to characterize typical flow and loadings for each processor. The combined permit limits provide a representation of the PWRF influent if each processor operates at its limits. However, not all processor permits restrict the same parameters. For example, Pasco Processing and Freeze Pack are not limited by average biochemical oxygen demand (BOD) loadings. Unrestricted parameters for each processor are left blank in Table 1.

Assumptions

Process wastewater flow and loadings were calculated for each phase based on the discharge monitoring reports (DMRs) provided and the following assumptions:

- The May 2014 daily BOD and total suspended solids (TSS) concentrations for Pasco Processing were significantly higher than other results for this processor. These results were deemed outliers and removed from the data set.
- Total nitrogen/biochemical oxygen demand (TN/BOD) ratios were used to calculate TN concentrations for periods when processors reported BOD but did not report TN. These ratios were calculated for each processor during months when both TN and BOD results were reported. The median ratio for each processor was used to fill the following gaps:
 - Grimmway does not report TN on their DMR's. Since Pasco Processing and Grimmway operate similar processes, the Pasco Processing TN/BOD ratio of 0.08 was used to calculate TN using Grimmway's lab measured BOD concentrations.
 - Freeze Pack's missing TN results were calculated using the TN/BOD ratio of 0.21. This ratio was
 calculated using average monthly TN and BOD values over periods when these parameters were
 analyzed for by the laboratory.
- If no flow was reported for a particular DMR, it was assumed that the processor did not operate during that time frame.

Table 1. Processor Permit Limits and Fact Sheet Values

			Reser Fine Foods		Freeze Pack		Pasco Processing		CRF		TCF		Grimmway		Combined Processors	
Parameter	Metric	Unit	Permit	Fact Sheet	Permit	Fact Sheet	Permit	Fact Sheet	Permit	Fact Sheet	Permit	Fact Sheet	Permit	Fact Sheet	Permit	Fact Sheet
Flow	Total Annual	MG/yr	215	115			383	383	205	205	220	200			818	903
	Average	GPD	300,000	300,000	90,000		2,500,000	2,500,000		1,250,000	2,400,000	2,400,000	1,200,000		5,290,000	6,450,000
	Maximum	GPD			150,000				1,250,000				1,200,000			
рН	Minimum	s.u.	5.0	5.0	5.5		5.0	5.3	5.0	3.7	5.0	4.8	5.5			
	Maximum	s.u.	12.0	6.8	9.0		11.0	6.8	12.0	12.5	12.0	6.9	9.0			
Total Nitrogen	Average	mg/L		208.00				85.13		58.20		69.43				79.78
		lbs/day		520.42				1,774.96		606.74		1,389.71				4,291.82
	Maximum	mg/L		374.00				107.60		102.00		86.36				111.00
		lbs/day		935.75				2,243.46		1,063.35		1,728.58				5,971.14
	Total Annual	lbs/period	72,000	72,000			270,000	127,000	150,000	150,000	225,000	213,000			567,000	1,566,515
Nitrate + Nitrite (as N)	Average	mg/L		5.00				1.63		1.50		0.48				1.33
		lbs/day		12.51				33.99		15.64		9.61				71.74
	Maximum	mg/L		11.00	14.10			3.10		2.50		2.16				2.97
		lbs/day		27.19				63.86		25.75		42.72				159.52
BOD-5	Average	mg/L		7,372				3,617		2,694		5,796				4,424
		lbs/day	7,200	18,445				75,414	70,000	28,085	140,000	116,013			147,200	237,957
	Maximum	mg/L		13,491	300			11,520		6,664		10,190	300			10,176
		lbs/day		33,754			127,000	240,192	80,000	69,472	160,000	203,963			287,000	547,382
	Total Annual	lbs/period														86,854,261
TSS	Average	mg/L		7,278				2,707		1,074		2,042				2,356
		lbs/day		18,210				56,441		11,196		40,873				126,720
	Maximum	mg/L		15,498	300			5,673		3,250		3,679				4,918
		lbs/day		38,776				118,282		33,881		73,639				264,578
	Total Annual	lbs/period														46,252,664

Note:

Blanks are not required by the permit or recorded on the fact sheet

MG/yr = million gallons per year

GPD = gallons per day

s.u. = standard units

mg/L = milligrams per liter

lbs./day = pounds per day

BOD-5 = 5-day biochemical oxygen demand

TSS = total suspended solids
PWRF Influent Characterization

Figure 2 presents individual average monthly flow rates for each processor and the total average monthly flow. The total flow is representative of influent flow to the PWRF. Peak seasonal flows remained relatively constant between 2014 and 2017 despite CRF closing their facility in early 2016. This is primarily due to the steady increase in production at Grimmway over the years. Although Grimmway doesn't currently discharge to the PWRF, they are included in Figure 2 to demonstrate the contributing seasonal flow fluctuations.

There is a sharp contrast in flow rates during the summer and winter months, because of processors like Twin City Foods and Pasco Processing. These processors are the largest flow and loading contributors to the PWRF and have high fluctuations between summer and winter. The seasonal variations are accounted for by splitting the flow and loading criteria into summer and winter seasons. The summer season includes May through October and the winter season includes November through April. The individual processor flow and loadings were combined to create representative characterizations of PWRF influent during each season. These characterizations were used to develop the PWRF design criteria described in the next section.

Flow and Loading Design Criteria Development

Assumptions

The following assumptions were made in the development of the design criteria for each phase of buildout at the PWRF:

- November 2016 October 2017 DMR results for Reser's, Pasco Processing, Freeze Pack, and Twin City foods were assumed to be representative of current operations at these facilities These data were used to develop design criteria.
- Simplot flow and loadings were assumed to be equal to historical CRF flow and loadings between November 2014 and October 2015.
- Future flows are proposed as follows:
 - December 1 through April 30: No flow
 - May 1 through May 30: max flow 40,000 gpd (avg. 20,000 gpd)
 - June 1 through October 31: 1.8 mgd
 - November 1 through 10 days after the PWRF can no longer send water to the land treatment site: 1.1 mgd
 - November 1 through November 30: 0.70 mgd

Grimmway would like to explore increasing their BOD and total suspended solids (TSS) limits from the municipal requirements of 300 mg/L to 2,500 – 8,000 lb/day BOD and 300 – 1,000 lb/day TSS in order to align with the other processors that discharge to the PWRF. Grimmway's projected BOD and TSS loadings are included in Table 3-3 and Table 3-4 defining summer and winter Phase 2 demands. Grimmway BOD was forecast at 5,282 lb/d during summer operations and 1,413 lb/d during winter operations. Their TSS was forecast at 3,064 lb/d during summer operations and 820 lb/d during winter operations. These BOD and TSS ranges correspond to summer season (May – October) limits on the low end and winter season (November – April) limits on the high end. These modifications are documented and discussed in Appendix A Grimmway Flow and Loading Technical Memorandum.

- Lamb Weston flow and loading projections were assumed to be equal to the Fact Sheet values since no other data was available at the time of this evaluation. Summer and winter flow and loadings were assumed to be equal to each other.
- Summer and winter flow and loading projections for each of the two future 2.5 mgd year-round processors were assumed to be equal to each other.
- TN, BOD and TSS concentrations were assumed to remain unchanged with the addition of each future 2.5 mgd processor (Phases 4 and 5). Loadings were recalculated based on the flow rate increases.



Figure 2. Processor Average Monthly Flow Rates

Results

Lab reported DMR data and calculated values were tabulated and separated by season (summer and winter) for each existing processor (Reser's, Freeze Pack, Pasco Processing, and Twin City Foods). The individual processor flow and loadings were combined to create a single stream representative of PWRF influent during each season. These DMR derived values were compared to the PWRF influent characterization from the 2016 City sampling campaign to determine which data set was most representative of current operations at the PWRF for each parameter studied. These comparisons are separated by season and presented in Tables 2 and 3. The selected design criteria are bold.

Parameter	Average City Influent	Median City Influent	Processor DMRs May 2016 - Oct 2016	Processor DMRs May 2016 - Oct 2017
Average Flow (mgd)	3.28	3.51	2.92	2.49
BOD5 (mg/L)	980	976	752	673
BOD5 (lb/d)	26,849	28,595	18,306	13,994
TSS (mg/L)	436	381	539	653
TSS (lb/d)	11,949	11,168	13,117	13,591
TN (mg/L)	88	73	75	67
TN (lb/d)	2,424	2,136	1,836	1,395

Tahle 2	Fristina	Condition	Summer	Data	Selection
TUDIC 2.	LAISLING	conuntion	Juillier	Dutu	Jerecuon

Table 3. Existing Condition Winter Data Selection

Parameter	Average City Influent	Median City Influent	Processor DMRs Nov 2015 - Mar 2016	Processor DMRs Nov 2016 - Mar 2017
Average Flow (mgd)	3.28	3.51	1.14	1.22
BOD5 (mg/L)	980	976	2,037	620
BOD5 (lb/d)	26,849	28,595	19,323	6,300
TSS (mg/L)	436	381	3,015	1,618
TSS (lb/d)	11,949	11,168	28,599	16,437
TN (mg/L)	88	73	67	63
TN (lb/d)	2,424	2,136	640	637

The combined processor DMR data was deemed to be more accurate than the City sampling campaign due to inconsistencies in the City results. These data are discussed further in the System Description and Capacity Information Technical Memorandum (CH2M, 2018).

The combined processor DMR summaries over the last 2 years were compared to select the design criteria for each parameter in both summer and winter seasons. For the summer season, the larger of the two concentrations was selected to be the design criteria for each parameter. For the winter season, the Nov 2016 – Apr 2017 results was selected for each parameter. These data were selected due to data gaps in the Nov 2015 – Apr 2016 season.

Individual processor data during the selected periods was tabulated and compared to the selected design criteria for the existing condition, shown in Table 4 for the summer season and Table 5 for the winter season. Average and maximum flow rates from each processor were summed and rounded to determine the existing condition flow rates.

		Pasco	Twin City		
Parameter	Reser	Processing	Foods	Freeze Pack	Existing
Total Volume (MG)	44	220	259	14	552
Max Flow (mgd)	0.57	2.41	2.47	0.15	5.60
Average Flow (mgd)	0.24	1.19	1.41	0.08	3.00
BOD-5 (mg/L)	2,310	630	593	693	752
BOD-5 (lbs/day)	4,627	6,278	6,958	444	18,815
TSS (mg/L)	2,145	679	242	1,998	653
TSS (lbs/day)	4,297	6,766	2,841	1,279	16,338
TN (mg/L)	180	58	73	71	75
TN (lb/d)	361	575	855	45	1,877

Table 4. Existing Condition Summer Design Criteria

Table 5. Existing Condition Winter Design Criteria

		Pasco	Twin City		
Parameter	Reser	Processing	Foods	Freeze Pack	Existing
Total Volume (MG)	43	160	2	16	217
Max Flow (mgd)	0.40	2.28	0.06	0.16	3.00
Average Flow (mgd)	0.24	0.88	0.01	0.09	1.20
BOD-5 (mg/L)	1,833	325	521	346	620
BOD-5 (lbs/day)	3,600	2,397	50	253	6,205
TSS (mg/L)	1,814	1,701	165	447	1,618
TSS (lbs/day)	3 <i>,</i> 563	12,532	16	326	16,193
TN (mg/L)	48	65	56	85	63
TN (lb/d)	93	476	5	62	631

Phase 1 design criteria were calculated by adding the Simplot (formerly CRF) flow and loadings to the existing condition design criteria. Average CRF DMR data observed in the November 2014 – April 2015 and May 2015 – October 2015 seasons were assumed to be representative of Simplot future flows and loadings. It is also assumed that Simplot will process the same type of commodity that CRF has produced and therefore, effluent quality and quantity would be similar. The summer and winter design criteria are presented in Tables 6 and 7, respectively.

Table 6. Pha	ise 1 Summe	^r Design (Criteria
--------------	-------------	-----------------------	----------

Parameter	Existing	Simplot	Phase 1
Total Volume (MG)	552	148	700
Max Flow (mgd)	5.60	1.15	6.75
Average Flow (mgd)	3.00	0.80	3.80
BOD-5 (mg/L)	752	2,568	1,136
BOD-5 (lbs/day)	18,815	17,229	36,044
TSS (mg/L)	653	1,037	734
TSS (lbs/day)	16,338	6,958	23,296
TN (mg/L)	75	42	68
TN (lb/d)	1,877	281	2,158

Table 7. Phase 1 Winter Design Criteria

Parameter	Existing	Simplot	Phase 1
Total Volume (MG)	217	24	241
Max Flow (mgd)	3.00	0.62	3.62
Average Flow (mgd)	1.20	0.13	1.33
BOD-5 (mg/L)	620	737	632
BOD-5 (lbs/day)	6,205	815	7,020
TSS (mg/L)	1,618	187	1,476
TSS (lbs/day)	16,193	207	16,400
TN (mg/L)	63	29	60
TN (lb/d)	631	32	662

The design criteria for Phase 2 were calculated by adding the historical Grimmway flow and loadings to the Phase 1 design criteria. Average Grimmway DMR data observed in the November 2016 to April 2017 and May 2017 to October 2017 seasons were assumed to be representative of current conditions. Reser's plans to expand their operation by approximately 30 percent in Phase 2. A 30 percent growth factor was included in the Phase 2 design criteria based on Reser's existing conditions. The Phase 2 design criteria are presented in Tables 8 and 9.

Table 8. Phase 2 Summer Design Criteria

Parameter	Phase 1	Grimmway	Reser+30%	Phase 2
Total Volume (MG)	700	177	13	890
Max Flow (mgd)	6.75	1.19	0.17	8.12
Average Flow (mgd)	3.80	0.96	0.07	4.84
BOD-5 (mg/L)	1,136	386	693	980
BOD-5 (lbs/day)	36,044	3,087	416	39,547
TSS (mg/L)	734	265	644	640
TSS (lbs/day)	23,296	2,117	387	25,800
TN (mg/L)	68	31	54	60
TN (lb/d)	2,158	247	32	2,437

Table 9. Phase 2 Winter Design Criteria

Parameter	Phase 1	Grimmway	Reser+30%	Phase 2
Total Volume (MG)	241	8	13	262
Max Flow (mgd)	3.62	0.55	0.12	4.29
Average Flow (mgd)	1.33	0.05	0.07	1.45
BOD5 (mg/L)	632	350	550	619
BOD5 (lb/d)	7,020	134	324	7,478
TSS (mg/L)	1,476	300	544	1,393
TSS (lb/d)	16,400	115	321	16,836
TN (mg/L)	60	28	14	56
TN (lb/d)	662	11	8	682

Phase 3 design criteria were calculated by adding the Lamb Weston Fact Sheet values to the Phase 2 design criteria. It was assumed that Lamb Weston summer and winter flows and loadings would be equal to each other. The Phase 3 design criteria are presented in Tables 10 and 11.

Table 10. Phase 3 Summer Design Criteria

		Lamb	
Parameter	Phase 2	Weston	Phase 3
Total Volume (MG)	890	259	1149
Max Flow (mgd)	8.12	1.50	9.62
Average Flow (mgd)	4.84	1.43	6.27
BOD-5 (mg/L)	980	2,249	1,270
BOD-5 (lbs/day)	39,547	26,825	66,372
TSS (mg/L)	640	250	551
TSS (lbs/day)	25,800	2,982	28,782
TN (mg/L)	60	130	76
TN (lb/d)	2,437	1,550	3,988

Table 11. Phase 3 Winter Design Criteria

		Lamb	
Parameter	Phase 2	Weston	Phase 3
Total Volume (MG)	262	259	521
Max Flow (mgd)	4.29	1.50	5.80
Average Flow (mgd)	1.45	1.43	2.88
BOD-5 (mg/L)	619	2,249	1,428
BOD-5 (lbs/day)	7,478	26,825	34,303
TSS (mg/L)	1,393	250	825
TSS (lbs/day)	16,836	2,982	19,817
TN (mg/L)	56	130	93
TN (lb/d)	682	1,550	2,232

Phase 4 and Phase 5 design criteria were calculated by increasing the flow rate by 2.5 mgd for each phase while maintaining the design concentrations for TN, BOD, and TSS reported in Phase 3. The design criteria for Phase 4 and 5 are presented for summer in Table 12 and winter in Table 13.

Parameter	Phase 3	Processor	Phase 4	Processor	Phase 5
Total Volume (MG)	1,149	460	2,230	460	2,690
Max Flow (mgd)	9.62	2.50	12.12	2.50	14.62
Average Flow (mgd)	6.27	2.50	8.77	2.50	11.27
BOD-5 (mg/L)	1,270	1,270	1,270	1,270	1,270
BOD-5 (lbs/day)	66,372	26,480	92,852	26,480	119,332
TSS (mg/L)	551	551	551	551	551
TSS (lbs/day)	28,782	11,483	40,265	11,483	51,747
TN (mg/L)	76	76	76	76	76
TN (lb/d)	3,988	1,591	5,579	1,591	7,170

Table 12. Phases 4 and 5 Summer Design Criteria

Table 13. Phases 4 and 5 Winter Design Criteria

Parameter	Phase 3	Processor	Phase 4	Processor	Phase 5
Total Volume (MG)	521	453	1,502	453	1,954
Max Flow (mgd)	5.80	2.50	8.30	2.50	10.80
Average Flow (mgd)	2.88	2.50	5.38	2.50	7.88
BOD-5 (mg/L)	1,428	1,428	1,428	1,428	1,428
BOD-5 (lbs/day)	34,303	29,783	64,086	29,783	93,869
TSS (mg/L)	825	825	825	825	825
TSS (lbs/day)	19,817	17,206	37,024	17,206	54,230
TN (mg/L)	93	93	93	93	93
TN (lb/d)	2,232	1,938	4,170	1,938	6,108

Conclusions

Flow and loading projections were developed for the existing condition and five phases of buildout at the PWRF based on processor DMRs and fact sheets. Tables 14 and 15 present the existing and phase buildout of the facility under summer and winter conditions. These conditions provide the basis in the evaluation of capacity deficiencies at the PWRF during each phase of expansion and the treatment technologies available to resolve the capacity and treatment deficiencies.

Several assumptions were made during the preparation of this technical memo in order to arrive at existing conditions characterization and design criteria for the phasing of improvements. These assumptions should be carefully reviewed and vetted with City staff input during this work package since these projections provide the basis of design for future improvements and technologies. Further vetting will take place during the next phase of this project, whereby processors will be engaged to provide additional information regarding their future planned operations and confirm or deny the accuracy of the assumptions made in this document. In addition, the City will need to continue sampling at the PWRF including sampling after the screens and sedimentation basin so that the data can be used to verify assumptions and fine tune the design conditions.

		Pasco		Freeze							Lamb					
Parameter	Reser	Ρ.	TCF	Pack	Existing	Simplot	Phase 1	GW	Reser+30%	Phase 2	Weston	Phase 3	Processor	Phase 4	Processor	Phase 5
Total Volume (MG)	44	220	259	14	552	148	700	177	13	890	259	1149	523	191	148	460
Max Flow (mgd)	0.57	2.41	2.47	0.15	5.60	1.15	6.75	1.19	0.17	8.12	1.50	9.62	5.45	1.35	1.15	2.50
Average Flow (mgd)	0.24	1.19	1.41	0.08	3.00	0.80	3.80	0.96	0.07	4.84	1.43	6.27	2.84	1.04	0.80	2.50
BOD-5 (mg/L)	2,310	630	593	693	752	2,568	1,136	386	693	980	2,249	1,270	754	408	2,568	1,270
BOD-5 (lbs/day)	4,627	6,278	6,958	444	18,815	17,229	36,044	3,087	416	39,547	26,825	66,372	17,863	3,531	17,229	26,480
TSS (mg/L)	2,145	679	242	1,998	653	1,037	734	265	644	640	250	551	587	393	1,037	551
TSS (lbs/day)	4,297	6,766	2,841	1,279	16,338	6,958	23,296	2,117	387	25,800	2,982	28,782	13,904	3 <i>,</i> 396	6,958	11,483
TN (mg/L)	180	58	73	71	75	42	68	31	54	60	130	76	76	34	42	76
TN (lb/d)	361	575	855	45	1,877	281	2,158	247	32	2,437	1,550	3,988	1,791	292	281	1,591

Table 14. Summer Design Criteria Development Summary

Table 15. Winter Design Criteria Development Summary

		Pasco		Freeze							Lamb					
Parameter	Reser	Ρ.	TCF	Pack	Existing	Simplot	Phase 1	GW	Reser+30%	Phase 2	Weston	Phase 3	Processor	Phase 4	Processor	Phase 5
Total Vol (MG)	43	160	2	16	217	24	241	8	13	262	259	521	205	24	24	453
Max Flow (mgd)	0.40	2.28	0.06	0.16	3.00	0.62	3.62	0.55	0.12	4.29	1.50	5.80	2.74	0.71	0.62	2.50
Average Flow (mgd)	0.24	0.88	0.01	0.09	1.20	0.13	1.33	0.05	0.07	1.45	1.43	2.88	1.13	0.13	0.13	2.50
BOD-5 (mg/L)	1,833	325	521	346	620	737	632	350	550	619	2,249	1,428	641	347	737	1,428
BOD-5 (lbs/day)	3,600	2,397	50	253	6,205	815	7,020	134	324	7,478	26,825	34,303	6,047	387	815	29,783
TSS (mg/L)	1,814	1,701	165	447	1,618	187	1,476	300	544	1,393	250	825	1,709	396	187	825
TSS (lbs/day)	3,563	12,532	16	326	16,193	207	16,400	115	321	16,836	2,982	19,817	16,111	442	207	17,206
TN (mg/L)	48	65	56	85	63	29	60	28	14	56	130	93	61	66	29	93
TN (lb/d)	93	476	5	62	631	32	662	11	8	682	1,550	2,232	574	73	32	1,938



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix C PWRF OPERATIONS Records Information for 2017





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Permit #ST000	5369									Discharg. MONTH:	e Monitorir IAN	ig Report veve:	2047		
					Influent		-						107		
	Flow	Volume	Hđ		BOD ₅		ЃГ	otal Nitroge		Flow	Volume	Hď		BOD ₅	
Freq.	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	Summery Only	1/week	2/month	2/month	Summary Only
Date	MGD	MG	s.u.	mg/L	lbs/day	sql	mg/L	lbs/day	lbs	MGD	MG	S.U.	mg/L	lbs/day	sdt
1/1/2017	1.490														
1/2/2017	1.690		5.1												
1/3/2017	1.657														
1/4/2017	1.399														
1/5/2017	1.238			3,246	33514.7		67.2	693.8							
1/6/2017	066.0														
1/7/2017	0.831														
1/8/2017	1.088														
1/9/2017	1.223		5.1												
1/10/2017	1.036														
1/11/2017	0.709														
1/12/2017	0.705														
1/13/2017	0.915														
1/14/2017	0.662				Î										
1/15/2017	0.860														
1/16/2017	1.222														
1/17/2017	1.222		4.7												
1/18/2017	1.437														
1/19/2017	0.943			3,282	25811.7		64.8	509.6							· · ·
1/20/2017	1.168														
1/21/2017	1.005			-											
1/22/2017	1.031														
1/23/2017	1.136		4.5												
1/24/2017	1.430														
1/25/2017	1.344			-											
1/26/2017	1.229														
1/27/2017	1.246														
1/28/2017	1.212														
1/29/2017	0.786														
1/30/2017	0.829		4.8												
1/31/2017	0.896														
Max.	1.7		5.1	3282.0	33514.7		67.2	693.8		0.0		0.0	0.0	0.0	
Min.			4.5										2	2	
Avm.	1.1			3264.0	29663.2		66.0	601.7		#DIV/0			#DIV/01	#DIV/01	
Monthly Total		34.6				59326.4			1203.5		0.0				00
Annual Total		34.6				59326.4			1203.5						
Max.															
Min.	-														
Avm.				-											
	lane for calar	nel / neuropu	- Dan 1/2							-					

UA - Total gallons for calendar year (Jan - Dec). Value must be entered manually. Use Total Annual Tracking Sheet to track annual totals.

This DMR is for copy/paste only. Do not send in.

Permit #ST000	5369									MONTH:	FEB	YEAR:	2017		
					Influent										
	Flow	Volume	Hđ		BOD5		Ē	otal Nitroger	<u> </u>	Flow	Volume	Hq		BOD5	
Freq.	Continuous	Summary Only	1 fweek	2/month	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	Summary Only	1/week	2/month	2/month	Summary Only
Date	MGD	MG	S.U.	mg/L	lbs/day	sql	mg/L	lbs/day	bs	MGD	MG	s.u.	mg/L	lbs/day	sql
2/1/2016	1.2														
2/2/2016	1.1			2870.0	27047.5		70.8	667.2							
2/3/2016	1.2											3			
2/4/2016	1.3														
2/5/2016	0.8						-								
2/6/2016	1.1		4.4												
2/7/2016	1.1														
2/8/2016	1.0														
2/9/2016	1.1														
2/10/2016	1.1														
2/11/2016	6.0														
2/12/2016	6.0					•••									
2/13/2016	1.3		4.9												
2/14/2016	1.3														
2/15/2016	1.4							3							
2/16/2016	1.2	- - - - -													
2/17/2016	1.2														
2/18/2016	1.2														
2/19/2016	0.8														
2/20/2016	1.1			1436.0	13461.3		81.3	762.1							
2/21/2016	1.2														
2/22/2016	1.3														
2/23/2016	1.3			_											
2/24/2016	1.3		5.6												
2/25/2016	1.0														
2/26/2016	0.6														
2/2//2016															
2/28/2016	0.6														
9102/62/2															
Marc	1 11		F 81	00.0790	37047 AE		04 20	760.40		000				<	
Min			4 42		0+ 1+0.17		00.10	1 201				0.00	nnn	0.0	
Avm	1 00			2153 M	20264 27		76 DF	714 68				20-0			
Monthly Total		30.41		20.00	10.10303	40508 75	000		14.20.25				10/A1/1#	:0//I/I#	
Acres (Total		EE OA				00005 40			00.0411		00.0				0.00
Miriual I dial		10.00				89030.1Z			2032.81		0.00				0.00
Max.															
AVID									<u> </u>						
Aww															
TOA Total of	lione for colo	ol / noon incom						- - -		-					

10A - Total gallons for calendar year (Jan - Dec). Value must be entered manually. Use Total Annual Tracking Sheet to track annual totals.

Discharge Monitoring Report

Pasco Industrial

Permit #ST000	5369									MONTH:	MAR	YEAR:	2017		
					Influent										
	Flow	Volume	Hd.		BOD ₅		F	otal Nitroger	_	Flow	Volume	Hq		BOD5	
Freq.	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month	2/month	Summary Only	Cantinuaus	Summary Only	1/week	2/month	2/month	Summary Only
Date	MGD	MG	s.u.	mg/L	lbs/day	sql	mg/L	kab/sdl	sql	MGD	MG	s.u.	mg/L	lbs/day	şđ
3/1/2017	0.630	-											,		
3/2/2017	0.702			3,126	18301.7		75.1	439.7							
3/3/2017	0.951														
3/4/2017	0.740														
3/5/2017	0.526														
3/6/2017	0.438		4.7				5								
3/7/2017	0.902														
3/8/2017	0.994														
3/9/2017	0.955														
3/10/2017	0.899														
3/11/2017	0.585														
3/12/2017	0.628														
3/13/2017	0.725		5.5												
3/14/2017	0.780														
3/15/2017	0.981								j.						
3/16/2017	0.751			3.612	22623.2		84.0	526.1						<u>. </u>	
3/17/2017	0.478														
3/18/2017	0.472														
3/19/2017	0.663														
3/20/2017	0.944		5.4												
3/21/2017	0.927														
3/22/2017	0.944											İ			
3/23/2017	0.883														
3/24/2017	0.907														
3/25/2017	0.843														
3/26/2017	0.496											1			
3/27/2017	0.855													-	
3/28/2017	0.763		3.8												-
3/29/2017	0.806														
3/30/2017	0.961													-	
3/31/2017	0.987														
Max.	1.0		5.5	3612.0	22623.2		84.0	526.1		0.0		0.0	0.0	0.0	
Min.			3.8									0.0			
Avm.	0.8			3369.0	20462.5		79.6	482.9		#DIV/0			#DIV/0	#DIV/0	
Monthly Total		24.1				40924.9			965.8		0.0				
Annual Total		89.2				140760.0			3598.6		0.0				0.0
Max.											2				0.0
Min.						. *			-						
Avm.	-										• •				
Avw.		_				• <u> </u>			_		_				
TOA - Total da	lions for caler	hdar vear (a	n - Dac/ Va	lise miret he	ontered more		Annual Inte	Traching Chy							

nually. Use I otal Annual I racking Sheet to track annual totals. 2 5

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Discharge Monitoring Report

Pasco Industrial

Pasco Indu	ustrial									Discharge	Monitorir	ig Report	1		
	2208				Infilant					MONIH	APK	YEAR:	2017		
	Flow	Volume	На		BOD5		F .	otal Nitroge		Flow	Volume	Hq		BOD5	
Freq.	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	Summary Only	1/week	2/month	2/month	Summary Only
Date	MGD	MG	S.U.	mg/L	lbs/day	lbs	mg/L	lbs/day	sq	MGD	MG	s.u.	mg/L	Ibs/day	sql
4/1/2017	0.834									0.000					
4/2/2017	0.771									0.000					
4/3/2017	1.134		4.66							0.000					
4/4/2017	1.097									0.000					
4/5/2017	1.094									0.000					
4/6/2017	1.102									4.046					
4/7/2017	. 1.215									4.335		3.80	.		
4/8/2017	1.209									4.152					
4/9/2017	0.812									4.110			-		
4/10/2017	1.039		9.66							4.476		3.75			
4/11/2017	0.898			1756.0	13151.2		82.1	614.9		4.506			1653.0	62119.8	
4/12/2017	0.948									4.461					
4/13/2017	0.854									4,461					
4/14/2017	0.854									5.254					
4/15/2017	0.612					1 1 - 1 - 1 - 1				4.554					
4/16/2017	0.778	· .								4.630					
4/17/2017	1.014									2.926					
4/18/2017	0.965		5.13							4.316		3.63			•
4/19/2017	1.038									4.727	1				
4/20/2017	1.158									4.335					
1102/12/14	1.030							i		4.126		1		· .	
412212017	2010									3.097					
4/24/2017	0.856		£ 38							3.489					
4/25/2017	0.896		200	3358.0	25003 1					0.030		86.5	00700	1,101	
4/26/2017	1.039.			20000						2 562			N.U 62	00/45.1	
4/27/2017	0.919						78.3	600.1		2.351		-			
4/28/2017	0.958									3.059					
4/29/2017	0.722									3.291					
4/30/2017	0.575									3.100					
					1										-
Max.	1.2		9.7	3358.0	25093.1		82.1	614.9		5.3		3.8	2310.0	62119.8	
Min.			4.7									3.6			
Avm.	0.9			2557.0	19122.2		80.2	607.5		3.2			1981.5	56432.4	
Monthly Total		27.666				38244.371			1215.000		96.533				112864.870
Annual Total		116.821				179004.406			4813.622		96.533				112864.870
Max															
Min. Avm															
Aw.															
TOA - Total ga	illons for cale	ndar year (Jai	n - Dec). Va	lue must be	entered ma	nually. Use T	otal Annual	Tracking Sh	eet to track a	nnual totals.					

Image: black I	Permit #ST00	06369									MONTH:	MAY	YEAR:	2017						
						Influent													inal Wastev	/ater - Ir
The control		Flow	Volume	H		BODs		Ë,	tal Nitroger		Flow	Volume	Hđ		BOD5			E		
Matrix Matrix<	Freq.	Continuous	Summary Only	1/week	2/manth	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month	2/month	Summary Only	2/month
Matrix 1.80 3.80 1.80 3.80 1.80 <	Date	I MGD	WG	S.U.	mg/L	lbs/day	sđ	mg/L	lbs/day	ସ	MGD	MG	S.U.	mg/L	lbs/day	sql	mg/L	ibs/day	a	ma/L
Matrix 1 2 <th>5/1/2017</th> <th>0.931</th> <th></th> <th>3.96</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>3.167</th> <th>Anna an /th> <th>3.8</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	5/1/2017	0.931		3.96							3.167	Anna an	3.8							
Member 139 319<	5/2/2017	1.187									2.237									
Memory 1 379 0000 1 479 0000 1 470 1 470	5/3/2017	1.288									3.319									
Member 1.00 1.00 Member	5/4/2017	1.379			996.0	11454.9		64.2	738.4		2 882			2055.0	10202 7	eocrosomenters. El Seneration de Contra	0.004	- UF 07 7		
Memory Benery Freezing Costs Costs Freezing Costs Costs Freezing Costs Costs Freezing Costs Costs Freezing Costs Costs Freezing Costs Costs Freezing Costs Costs Freezing Costs Costs Freezing Costs Costs Freezing Costs Freezing Costs Freezing <thcosts Free</thcosts 	5/5/2017	1.100									4 666	determinent for outer and the second s Second second s		210002	1.08004		423.0	1.04%.7		39.7
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Better 1,07 58 48 38 <	5/7/2017	0.824			-						1010.4									
Setter 100	5/8/2017	1072		5 58							4.361					の日本のプロセスの				
FUENT 0.62 0.60 </th <th>5/9/2017</th> <th>1.043</th> <th></th> <th>20.0</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>4.815</th> <th></th> <th>3.68</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	5/9/2017	1.043		20.0							4.815		3.68							
CHORPT 0.66 0.6 0.60 </th <th>5/10/2017</th> <th>0.621</th> <th></th> <th></th> <th></th> <th></th> <th>第二次はないのないが、 第二次によっていたが、 ので、こので、こので、 ので、</th> <th></th> <th></th> <th></th> <th>2.084</th> <th>「大学校のない」</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	5/10/2017	0.621					第二次はないのないが、 第二次によっていたが、 ので、こので、こので、 ので、				2.084	「大学校のない」								
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House Aussist	511212047										3.634									
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Histority 1 0.49 3.26 1	5/14/2017	0.076		_							3.104									
Firstitit 0.40 1 </td <th>6/15/2017</th> <td>0.464</td> <td></td> <td>3.82</td> <td></td> <td></td> <td>Contraction of the second s</td> <td></td> <td><u></u></td> <td></td> <td>1 761</td> <td>「「「「「「「「「」」」」」」」」」」」」」」」」」」」」」」」」」」」」」</td> <td>27</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	6/15/2017	0.464		3.82			Contraction of the second s		<u></u>		1 761	「「「「「「「「「」」」」」」」」」」」」」」」」」」」」」」」」」」」」」	27							
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ENERPTY 1.07° 0.002 472.0 570.0 472.0 570.0 320.0 EXCOMPT 0.109 1.06 1.06 1.06 1.06 1.06 1.00 2.000 472.0 570.0 2.000 2.000 472.0 570.0 2.000	5/18/2017	0.883		-	1952 n	14375.0		AF 0	105.0		1.145									
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DESERDIT 1100 2100 1100 1000	5/24/2017	1 360 *							<u></u>		2.193			-	- ¥4			9.27		
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Britation 100 100 1430	11070700	1.101							<u> </u>		1.858	「「「「「「」」」」」			.132			193		
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Dubblicity U.050/ (2012) U.051/ (2012) U.051/ (201	1107117/0										1.577	a 10.000 ki kan tanan Berteke kan panasa			<u></u>					
Montenent Undel 4.b 4.b 4.b 2.728 3.8 3.8 1<	51012011							-	<u> 1</u>		1.497									
Discription Location Location <thlocation< th=""> Location Location</thlocation<>	1107/07/1	0.02		4.0		<u>24</u> /8 -			<u>. 7. 5. 5</u>		2.728		3.8		<u>793</u>			1.024		
Max. 1.73 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.163 2.1643	1020000	1.000						-	292		2.567	and the second second	_		1000	行いたのである		<u>- 1121</u>		
	1 07/1 6/0	1.134					a da				2.193		-		343					
Min. 38 38 37 700 7000 </td <th>Max.</th> <td>1.8</td> <td></td> <td>5.6</td> <td>1952.0</td> <td>14375.0</td> <td>a and the</td> <td>62.9</td> <td>738.4</td> <td>No state of the</td> <td>4.8</td> <td></td> <td>3.8</td> <td>2648.0</td> <td>49393.7</td> <td></td> <td>493.0</td> <td>11840 7</td> <td></td> <td>20.7</td>	Max.	1.8		5.6	1952.0	14375.0	a and the	62.9	738.4	No state of the	4.8		3.8	2648.0	49393.7		493.0	11840 7		20.7
Nm. 03 1474.0 12914.9 65.1 611.8 275 40697.0 482.5 8776.8 33.9 Month Total 29.0 25829.8 1223.7 255.1.5 40697.0 482.5 8776.8 38.9 Month Total 29.0 1223.7 85.1 1233.7 25629.8 1755.3.6 38.9 Annual Total 2145.8 1223.7 131.6 51.333.9 482.5 87.76.7 1755.3.6 Annual Total 2048.4.2 5037.3 181.6 181.6 1756.8 1755.3.6 4557.6.7 Min. 145.8 143.6.7 181.6 181.6 1542.6.7 1755.3.6 Max. 145.8 181.6 181.6 181.6 181.6 1755.3.6 1755.3.6 1755.3.6 Max. 145.8 181.6 181.6 181.6 185.7 185.7 185.7 185.7 185.7 1755.3.6 1755.3.6 1755.3.6 1755.3.6 1755.3.6 1755.3.6 1755.7.6 1755.7.6 185.	Min.			3.8		la statistica a la f							37							1.50
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Annual Total 145.8 145.8 1733.0 171.03.0 Max Max 181.6 194266.9 45346.7 Max Max 1734.0 1733.0 161.6 Max 1 1745.6 173.0 17346.7 Max 1 17.03.0 161.6 173.0 Max 1 17.03.0 17.03.0 173.0 Ave 1 17.03.0 17.0 17.00.0 Min. 1 17.0 17.0 17.0 Ave Min. 17.0 17.0 17.0	Monthly Total		29.0		and the second		25829.8			1223.7	教育学校の	85.1			Add Strategy	81202 0			ATER AND	20.2
	Annual Total		145.8		di ta di kana kana kana kana kana kana kana kan	日本の小学校の	204834.2			6037.3		181.6				194258.8			11 330 0 0	
Mh. Sey mg/L Avm.	Max.								<u>,</u>				de la constante déserve en setemente de la constante de la constan					an second states	- notont	30.000
Avm.	Min.		- 		•												957 mg/L	<u></u>		
	Àvm.																1,000			
	Avw.						<u> </u>			·				-			ra4 mg/L		•	

Discharge Monitoring Report

Permit #ST00	05369				·				-	MONTH:	NNr	YEAR:	2017												
					nfluent									-			Final Wastews	tter - Irrig:	ted Efflur	ent				-	
-	Flow	Volume	Ha		BODs		Ĕ.	otal Nitroger.	_	Flow	Volume	Hď		30Ds		FDS			TKN			NH ^s		N,	
Freq.	Continuous	Summary Only	1 husek	2/month	2imonth	Summary Only	21month	2/month	Summary Only	Confinuous	immery Only	1/waak 2	month 2tr	tonth Summary Or	nly 2/month	2/month	Summery Only	2/month 2	Month Sun	mary Only	2/month	2/manlh Su	mmary Only Su	menty Only 2	Hund
Dale	MGD	MG	5.0.	ացվե	bsiday	sqi	mg/L	bs/day	bs.	MGD	MG	B,U.	mg/L lb8	vídey Ibs	шGЛ	lbs/day	80 	mg/L	bs/day	- 8	mgn.	Ibsiday	ے ع	89 81	mg/L
6/1/2017	1.921			2218.0	35534.9	2000 (C	62.2	996.5	「「「「「「「」」」	2.352			1750.0 34	1327.4 Sec. 6	S 478.1	9376.2	3 (PESSE)	38.0	745.4	a desta de	29.5	578.7 5	1월 4월 1944	1947 - N	0.61
6/2/2017	1.718				^ي ەرىپى					2.867					28				943) 799)			120			
6/3/2017	1.723								ALC: NO.	3.008										のないない		44.34		145.000 (A)	ļ
6/4/2017	1.616				sec.					3.127					20				主義の			33			
6/5/2017	1.999		4,2	-	<u>-:</u> .44					2.826		3.7		のないでは、					N. N.			12		「「ないないない」	
6/6/2017	2.069				368					2.728		 	<u> </u>		100			╞	.97% .3.5						
6/7/2017	2,145									2.970			<u> </u>					╞		「「「「「「「」」」		17.0			
6/8/2017	2.100	THE REAL PROPERTY.		-	1 243					2.836			╞	「「「「「「「」」」											
6/9/2017	2.236			_	0.0					2.985	主要ななな				100	. 		╞			-				
6/10/2017	1.818					STATES STATES				2.321	State of the second	-			S.			-			-	32		のの語の	
6/11/2017	1.425		-		1.0	であたったが				1.612	「「「「ない」」			の時間の設置						設備構成				なが、「「「「「「」」」	
6/12/2017	2.067		4.38	_	-337				and a line of the	2.254 🖒		3.95					の意思が変				-	N.	構成など		
6/13/2017	2.163				<u>c≈ 8</u> 2				18-4-18-3-3-3-	2.120 🔅	17. SA				्रव							<u>iă</u>	22 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
6/14/2017	2.226	民族總裁			40.5	State State				2.343					1 10		の必要認		1			16			
6/16/2017	2.283				232	a solution				2.234							の語識の語								
6/16/2017	1.920			•	N 5	「「「「「「「「「」」」」	-			2.627					29 20		なるのである		2			125		A DATA ANA	
6/17/2017	1.663	S. A. S.			-194					2,141	的现在分词				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				20			K.		1000	
6/18/2017	1.822	的影響的			.¥					1.791		<u> </u>	_		N.:			╞				2.11			
6/19/2017	2.078								a state and	2.068	and the second				100		Marine South		1000 C	6282 A			9888 B	and a second	
6/20/2017	2.215		4.17		<u>845</u>	の変換の変換				2.185		3.51	2183.0 39	962.8 (2018)	449.0	8182.1		36.5	665.1 🔅	対対対理	21.0	6392.6		APPENDED	0.54
6/21/2017	1.688	新潟の設施			26,75			 		1.873				Souther States				:	ála.					1988 AN	
6/22/2017	1.849			1509.D	23269.8		52.3	806.5		1.653					N.							234) 177		9.286. E.R.	
6/23/2017	2.123				-63				の経営に対応	2.055	8488-83		_		20		2400000000		1.00	a an			alessar Sa	a barra	
6/24/2017	1.667			+	<u></u>					1.929					3				10	Sources 2		3	1997) 1997) 1997)	at an	
6/25/2017	1.979				W."	なななな				2.133			_		Na.		2000 A 1000 A			Said and		194 			
6/26/2017	1.630		3.7	┨	246	後年になってい				1.565		3.3			~		14.08.28.2.03 1		1999 1997	1948 (M		100	S & & & & & & & & & & & & & & & & & & &	The second	
6/27/2017	2.062				2005					<u>े 1001</u>				保護法院	334								2.54.69.88	al the second	
6/28/2017	2.098				<u>172 - 1</u>			~		2.043 🖔					44A					1999 (M		52		6.88 M	
6/29/2017	2.247 5		-	-						2.011		_			<u>.</u> 35		a the second					3		and the second second	
6/30/2017	2.152				.189					2.061 🖗				金属語の	S.					14.20 M			경찰 전화		
	- 630-				<u>**</u>					<u> </u>			_		<u>(</u>)									and the second	
Mex.	2.283 §		4.4	2218.0	35534.9	「湯水水」が	62.2	996.5	国際協会学校	3.127 🗞	1	4.0	2193.0 39	962.8	k 478.L	9376.3	3 Hard & Ward & W	38.0	745.4 8 %		29.5	6392.6		Correction of the	9.0
Man.	の学校のないであ	「「「「「「「「」」」」	3.7 🔅					64666360 s		1997 - 1997 -		3.3 🖉						24.00	665.1 (3)		報告的主任				
Åvm,	1.957			1863.5	29402.3	大学を	57.3	901.5	S. S	2.277	19 279 2 2 A		1971.5 37	145.1 Mar 200 200 200	463.4	8779.2	1.200 A.	37.3	705.3	に調整部	25.3	3485.6			0.6
Monthly Total		58.7			No. State State	58804.7 🖗		ALC: NO.	1803.0	9000000	68.3			3 (2) 74290	13 5 5 5 5 5 5 5		17558.4			1410.5	のなどを		6971.3	1410.5	
Annuel Tolel		204.5	のないである			263638.9			7840.3		250.0			268549 268549	3.0 (Sale 23,		62905.1		- 2020. 2020	5093.5	1993 (M		9626.5	5093.5	
Mex						- 1.				· .					1,6w / 19										
UN .				· . ·				· · ·		<u></u> .			-		- -										
Avm.		•				• .					 ,	• 、			794 mg/r										
				-	-	-																			ĺ

TOA - Total gallons for calendar year (Jan - Dec), Value must be entered manually. Use Total Annual Tracking Sheet to track annual totals.

This DMR is for copy/paste only. Do not send in.

Discharge Monitoring Report

Pasco Industrial

	Pasco Inc	lustrial								<u> </u>	lischarge	Monitoring	Report VFAR-	2047											
10- 10- <th></th> <th></th> <th></th> <th></th> <th></th> <th>Influent</th> <th></th> <th>Final Waste</th> <th>water - In</th> <th>gated Efflue</th> <th>ant</th> <th></th> <th></th> <th></th> <th></th>						Influent												Final Waste	water - In	gated Efflue	ant				
No. Norw		Flow	Volume	표		BOD			Total Nitroge		Flow	Volume	E		sop		Ê			TKN		HN	3	Υ.	
	Franc.	Continuous	Summary Only	1fweek	2tmanth	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	tummery Only	1/week	Zimonth 24	manth Summa	ny Only 2/mon	th 2/month	Summery Orly	24morath	2imonth Sun	mary Only 21m	onth 21mo	nth Summary O	nly Summary Or	ly 2/month
	Oale	MGD	щe	8.UL	тр	Ibs/day	শ্ব	սեր	Ibalday	\$ 1	MGD	MG	\$,0.	mgr. 1b	isitiay lb	Ngm ad	belday	a A	hgl	Ibs/day	E 	g/L Iba/d	al Is	<u>8</u>	ugu
Option 1.00 0.00 <	7/1/2017	1.976	1222220							のないので	2215	1998 - 1998 1998 - 1998 1999 - 1998 - 1998 1999 - 1999 - 1998 1999 - 1998 - 1998 - 1998 1999 - 1998 - 1998 - 1998 1999 - 1998 - 19									and the second		A MARK		22
	7/2/2017	2,152					で設定部				2.061					Reverses Survey		School and a stress			al an airtean ai teoleanach				
Number Control Control <th< th=""><th>7/3/2017</th><th>1.690</th><th>言語を描述し</th><th>3.9</th><th></th><th></th><th></th><th></th><th></th><th></th><th>2.112 😓</th><th></th><th>3.2</th><th></th><th></th><th>1.000 (1.000) 1.000 (1.000)</th><th></th><th>a na ang ang</th><th></th><th>99) (19)</th><th>a straight and a /th><th></th><th></th><th></th><th>1</th></th<>	7/3/2017	1.690	言語を描述し	3.9							2.112 😓		3.2			1.000 (1.000) 1.000 (1.000)		a na ang ang		99) (19)	a straight and a				1
New 1 New 2 New 2 New	7/4/2017	1.972						2.154			1,726	27. N.								1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.					~ 0
New New <th>715/2017</th> <td>1,736</td> <td></td> <td></td> <td></td> <td>·</td> <td></td> <td></td> <td></td> <td></td> <td>2,337</td> <td>ないのない</td> <td></td> <td></td> <td>A CONTRACT OF A CONTRACT OF</td> <td></td> <td></td> <td></td> <td></td> <td>22</td> <td>などがある。</td> <td></td> <td></td> <td></td> <td>20 20</td>	715/2017	1,736				·					2,337	ないのない			A CONTRACT OF					22	などがある。				20 20
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TOA - Total gallons for calendar year (Jan - Dec). Value must be entered manually. Use Total Annual Tracking Sheet to track annual totals.

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3.200 3.014 2.167 2.167 2.176 660 1776.0 660 1776.0 178 2016 1 <td></td> <td>3.087</td> <td></td> <td></td> <td>_</td> <td></td> <td>26</td> <td></td> <td></td> <td>59</td> <td>13</td> <td>Į.</td> <td></td> <td></td> <td>Variation of the second</td> <td></td> <td></td> <td>a ana an</td> <td></td> <td></td> <td></td> <td> . </td> <td></td> <td></td> <td></td>		3.087			_		26			59	13	Į.			Variation of the second			a ana an				. 			
3201 3.014 3.014 3.014 3.014 3.014 1 </td <td></td> <td>3.207</td> <td></td> <td>81</td> <td>02.0 216(</td> <td>699.2 (Sec. 1)</td> <td></td> <td>81.8</td> <td>187.9</td> <td>3.0</td> <td>74 300 200</td> <td>25</td> <td>268</td> <td>2.0 230016</td> <td>8</td> <td>496.0</td> <td>12716.0</td> <td>2. S. S. S. W.</td> <td>63.5</td> <td>1628.0</td> <td></td> <td>6:2</td> <td>201.5</td> <td></td> <td></td>		3.207		81	02.0 216(699.2 (Sec. 1)		81.8	187.9	3.0	74 300 200	25	268	2.0 230016	8	496.0	12716.0	2. S. S. S. W.	63.5	1628.0		6:2	201.5		
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2310 2.786 2.786 742.3 1825.6 1165.3 2.36 7.3 177.5 8600.3 21740.0 2304.3 202.17 1825.6 483.5 1165.3 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.3 177.5 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 7.4 256.10 <td></td> <td></td> <td></td> <td>4.1</td> <td></td> <td>아이는 아이는 아이는 아이는 아이는 아이는 아이는 아이는 아이는 아이는</td> <td>11 A. A. A.</td> <td></td> <td></td> <td>の一次の一方</td> <td></td> <td></td> <td>3.2 0.00</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1333.0</td> <td></td> <td></td> <td></td> <td></td> <td></td>				4.1		아이는	11 A. A. A.			の一次の一方			3.2 0.00							1333.0					
302.11 302.11		2.910		<u>8</u> 81	00.3 2174	190.8		80.5 2	004.3	2.7	98	国際の変	74	2.3 182809	0	488.5	11683.3		619	1480.5		73	177.5		
393.257/101 393.254 2001.2001 303.014 303.014 1001.2055 6001.2001 2001.2001 2001.2001 2001.2001 1001.2055 6001.2001 2001.2001 2001.2001 2001.2001 1001.2055 6001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 1001.2057 2001.2001 2001.2001 2001.2001 2001.2001 100		Contraction of the second s	90.217	2000 (All 1990) 2000 (All 1990)		ं 65247	2.5		<u>201</u> 400	8.6	§6.7	4			548426.9			23366.7			2961.0			87.4 20	81.00
	2 (A) 2 (A) 2 (A)	0×13	356.767 😓 🖓		1993 (1993) 1993 (1993)	<u>्र</u> े 1102884.1	<u> 7</u> 22		14009	2	398.2	54			937066.946			102858.648			9330.360		10812	052 93	10
																857 mg/L		:							
																794 mg/L	· · ·	. <u> </u>							

Discharge Monitoring Report

Pasco Industrial

This DMR is for copy/paste only. Do not send in,

Pasco Industrial

Discharge Monitoring Report

Permit #ST00	05369									MONTH:	SEP	YEAR:	2017			
					Influent							-				
	Flow	Volume	Hd		BOD5		T	otal Nitroger		Flow	Volume	Hđ		BOD5		
Freq.	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month
Date	MGD	MG	S.U.	mg/L	lbs/day	l sd	mg/L	lbs/day	ସା	MGD	MG	S.U.	mg/L.	lbs/day	lbs	mg/L
9/1/2017	3.094	S. N. M. M. S. S.							and the second	2.828	のですが、「ない」					
9/2/2017	3.210									2.751						
9/3/2017	2.963									3.083						
9/4/2017	3.064		4.18							2.913		3.14				
9/5/2017	3.225									3.198						
9/6/2017	3.151									3.346						
9/7/2017	2.994			6975.0	174165.5		80.2	2002.6		3.045			7460.0	189448.9		425.0
9/8/2017	2.976									2.925						
9/9/2017	2.893	の変形がない								2.173			Ì			
9/10/2017	2.847									2.374						
9/11/2017	2.924		4.27							3.218		3.33				
9/12/2017	2.995	の記録を読	ł							2.678						
9/13/2017	2.966									3,436						
9/14/2017	2.882									2.166						
9/15/2017	2.836									3.253						Γ
9/16/2017	2.981									2.998		-				
9/17/2017	2.905				-					2.699						
9/18/2017	2.834	ala dan seria ang ang ang ang ang ang ang ang ang an	4.35							2.841		3.47				
9/19/2017	2.814			8610.0	202066.0		82.3	1931.5		2.905	に来る思想で		8823.0	213761.0		453.0
9/20/2017	3.181					学校の教育の方が				2.662						
9/21/2017	3.397									2.717						
9/22/2017	3.229									2.689						
9/23/2017	3.081						••••			2.903						
9/24/2017	3.080	Service States and								2.740						
9/25/2017	2.819		3.92						to do the total of the	1.386	State of the	4,41				
9/26/2017	3.020					教育にある意思			V. X. V. V. V. V.	2.750			2			
9/27/2017	3.179									2.713						
9/28/2017	3.153							· <u>^ </u>		2.684					an a	
9/29/2017	3.303									3.037						
9/30/2017	000.5									2.778					a state	
			ļ			ale and a first of the state of					ates at the					
Max.	3.397		4.4	8610.0	202066.0		82.3	2002.6	a the second of	3.436	inter a state	4.4	8823.0	213761.0		453.0
Min.			3.9					<u> (16 49 3</u> 2				3.1				
Avm.	3.035			7792.5	188115.7	彼る語言語	81.3	1967.0	i an teachadhail	2.796			8141.5	201605.0		439.0
Monthly Total		91.046				376231.5 🖗	etter for der der		3934.1		83.889				403209.9	
Annual Total		447.813				1479115.722	RESERVED A	an a baine and	17943.191		482.143				1340276.881	
Max.		-														957 mg/L
Aum.															•	
Avve																794 mg/L
										-				-		

TOA - Total gallons for calendar year (Jan - Dec). Value must be entered manually. Use Total Annual Tracking Sheet to track annual totals.

Final Final <th< th=""><th>Permit #ST000</th><th>5369</th><th>-</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>MONTH:</th><th>OCT</th><th>YEAR:</th><th>2017</th><th></th><th></th></th<>	Permit #ST000	5369	-								MONTH:	OCT	YEAR:	2017		
						Influent										
Question Summer, low		Flow	Volume	Hd		BOD ₅		Ξ.	otal Nitroger		Flow	Volume	Hd		BOD5	
MUC MUC <th>Freq.</th> <th>Continuous</th> <th>Summary Only</th> <th>1/week</th> <th>2/month</th> <th>2/month</th> <th>Summary Only</th> <th>2/month</th> <th>2/month</th> <th>Summary Only</th> <th>Continuous</th> <th>Summary Only</th> <th>1/week</th> <th>2/month</th> <th>2/month</th> <th>Summary Only</th>	Freq.	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	Summary Only	1/week	2/month	2/month	Summary Only
000000000 2170 00000000 2446 4.00 00000000 310 246 4.00 2.646 0000000 310 2000 2.646 2.646 4.00 0000000 310 2000 2.646 2.646 2.646 2.646 0000000 2.646 2.646 2.646 2.646 2.646 2.646 0000000 2.646 2.646 2.646 2.646 2.646 2.646 00000000 2.646 2.646 2.646 2.646 2.646 2.646 00000000 2.646 2.646 2.646 2.646 2.646 2.646 00000000 2.646 2.646 2.646 2.646 2.646 2.646 00000000 2.646 <	Date	MGD	MG	S.U.	mg/L.	lbs/day	sd	mg/L	lbs/day	lbs	MGD	MG	s.u.	mg/L	lbs/day	lbs
(0023017 313	10/1/2017	2.770									2.748					
0.0020017 3.016 1 1 2.556 1 2.660 1 6000 600	10/2/2017	3:073		3.88							2.442		4.03			
Outwort 3.17 Code	10/3/2017	3.016									2.535					
Operative 3000 > Yetuto 2560 > 66000 66000 Operative 260 -	10/4/2017	3.174									2.456					
0000011 300 0000011 2000 2000 0000011 2000 000001 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 000000000 000000000 000000000 000000000 000000000 000000000 000000000 000000000 000000000 000000000 000000000 000000000 0000000000 0000000000 0000000000 0000000000 000000000 000000000 0000000000 0000000000 00000000000000 00000000000000 00000000000000 0000000000000000 000000000000000000 00000000000000000000000 0000000000000000000000000 000000000000000000000000000000000000	10/5/2017	3.030			7940.0	200645.4		76.7	1938.2		2.338			8362.0	163050.0	
(1077877 2364 2365 377	10/6/2017	3.091									2.569					
00080111 2.544 0 1 1 2 0 3.75 1	10/7/2017	2.965									2.355					
Unstant 3221 4.00 1 1 2.005 0.77 1 1 1 01/100/11 3223 01/100/11 3223 02 01/100/11 2031 01/100/11 01/100/11 01/100/11 01/100/11 0 1	10/8/2017	2.644									2.659					
University 3.230 Indext of the state of	10/9/2017	3.221		4.00							2.283		3.75			
UNUMATION 2,223 UNUMATION 2,571 2,511 0,01132017 2,511 0,01132017 2,511 0,01132017 2,511 0,01132017 2,511 0,01132017 2,511 0,01132017 2,511 0,01132017 2,511 0,01132017 2,511 0,01132017 2,511 0,011 2,511 0,011 2,511 0,011 2,511 0,011 2,511 0,011 2,511 0,011	10/10/2017	3.220									2.535					
001123011 2147 01 1 1 2 15 1	10/11/2017	3.223									2.531					
001420117 3117 011 2.815 01 1 1 1 00142017 2.901 3.60 3.60 2.615 3.60 2.615 1 1 1 00142017 2.911 3.60 2.57 2.615 3.60 2.615 1	10/12/2017	2.947								`*	2.753					
(1) (1) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	10/13/2017	3.177									2.571					
1000000000000000000000000000000000000	10/14/2017	2.989									2.615					
Ontrisent 3.067 3.064 3.06 3.067 3.067 3.067 3.067 3.067 3.067 3.067 3.067 3.067 3.067 3.067 3.067 3.067 3.071 3.067 3.071	10/15/2017	2.911									2.614					
(10172017 1.941 (1) (1) (2.99) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90) (1) (2.90)	10/16/2017	3.067		3.86							2.574		3.60			
1014820017 1.7136 1 5327.0 5153.32 0 90.4 96.83 1.236 1 7004.0 882.65.7 1012320171 1.400 1.400 1.400 1.236 1 1.266 1	10/17/2017	1.941				2	ж. К.				2.597					
(10014)011 1.266 (1232017) (1232017) (1326) <t< td=""><td>10/18/2017</td><td>1.798</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1.250</td><td></td><td></td><td></td><td></td><td></td></t<>	10/18/2017	1.798									1.250					
1102 1102 <th< td=""><td>10/19/2017</td><td>1.295</td><td></td><td></td><td>5327.0</td><td>57533.2</td><td></td><td>80.4</td><td>868.3</td><td></td><td>1.356</td><td></td><td></td><td>7804.0</td><td>88255.7</td><td></td></th<>	10/19/2017	1.295			5327.0	57533.2		80.4	868.3		1.356			7804.0	88255.7	
1102 1102 1102 1126 1266 1268 1246 1246 1246 1246 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1268 1269 <th< td=""><td>10/20/2017</td><td>1.400</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1.320</td><td></td><td></td><td></td><td></td><td></td></th<>	10/20/2017	1.400									1.320					
10/02/2017 1.686 1 1.153 <t< td=""><td>10/21/2017</td><td>1.702</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1.296</td><td></td><td></td><td></td><td></td><td>2.</td></t<>	10/21/2017	1.702									1.296					2.
10/23/2017 1664 3.57 1673 3.69 3.69 3.69 7 7 10/23/2017 1.801 1.801 1.805 1.245 </td <td>10/22/2017</td> <td>1.688</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1.253</td> <td></td> <td></td> <td></td> <td></td> <td></td>	10/22/2017	1.688									1.253					
100442017 1881 1245	10/23/2017	1.864		3.57							1.408		3.49			
1025/2017 1.760 1.760 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.660 1.600 1.756 1.750 1.756	10/24/2017	1.881							-		1.245					
105/22017 1630 1630 1630 13033 1303 1303	10/25/2017	1.760									1.660					
10/22/2017 1.616 1 1 1.222 1 1.222 1	10/26/2017	1.630									1.808					
10/22/2017 1.566 1 1.566 1 1.566 1 1.567 1 1.57 1 1.67 1 <	10/27/2017	1.616									1.292					
10/28/2017 1.604 1.604 1.604 1.604 1.604 1.607 1.607 1.607 1.607 1.607 1.607 1.607 1.607 1.607 1.607 1.768 1.769	10/28/2017	1.586									2.026					
10/30/2017 1.851 3.67 3.67 3.67 3.67 3.67 3.62	10/29/2017	1.604									1.257					
Wax. 1.758 $1.6020.0$ $1.6020.0$ $1.6025.0$	10/30/2017	1.851		3.67							1.981		3.62			
Max. 4.0 7940.0 20044 1938.2 2.753 4.0 8352.0 163050.0 Min 3.6 3.6 3.6 9.0 3.6 9.2 16305.0 8352.0 163050.0 Ann. 2.375 5 12 983.5 129089.3 78.6 1403.3 2.067 8083.0 125652.9 251305.7 Annull Total 2.3.52 129089.3 258178.6 1403.3 2.067 8083.0 125652.9 251305.7 Annull Total 521.434 1737294.308 2.0749.760 64.085 8083.0 1591592.596 Annull Total 521.434 1737294.308 2.0749.760 546.228 1591592.596 Annull <total< td=""> 521.434 1737294.308 2.0749.760 546.228 1591592.596</total<>	102115001	1.40/									1.758					
Min. 3.6 3.6 3.6 3.5 2 067 3.5 0 3.5 Ann. 2.375 12 6633.5 129089.3 78.6 1403.3 2.067 8083.0 125652.9 Monthy Total 73.621 2.56178.6 2.56178.6 2.067 8083.0 125652.9 Annual Total 73.621 2.538178.6 2.067 64.085 9.08 1591592.596 Annual Total 521.434 1737294.308 2.0749.760 546.228 7 1591592.596 Annual Total 540.206 546.228 7 546.228 7 1591592.596	Max.	3.223		4.0	7940.0	200645.4		80.4	1938.2		2.753	•	4.0	8362.0	163050.0	
Avn. 2.375 6633.5 129089.3 78.6 1403.3 2.067 8083.0 125652.9 Monthly Total 73.621 2 258178.6 78.6 1403.3 2067 8083.0 125652.9 Monthly Total 73.621 2 258178.6 78.6 1403.3 2806.6 64.085 251305.7 Annual Total 521.434 1737294.308 1737294.308 20749.760 64.085 78.0 78.06 Max Min. 1737294.308 20749.760 5546.228 78.06 78.0	Min.			3.6	· · · · · · · · · · · · · · · · · · ·			:					3.5		•	
Monthly Total 73.621 258178.6 258178.6 258176.7 251305.7 Annual Total 521.434 2 1737294.308 20749.760 546.228 7 1591582.508 Max Min. 20749.760 546.228 7 1591582.508 1 Max Min. Annual 20749.760 546.228 7 1 1	Avm.	2.375			6633.5	129089.3		78.6	1403.3		2.067		- - 	8083.0	125652.9	
Annual Total 521.434 1737294.308 20749.760 546.228 1591582.598 Max. Min. Max. Min. Max. Min.	Monthly Total		73.621				258178.6			2806.6		64.085			<u>е</u> .	251305.7
	Annual Total		521.434				1737294.308			20749.760		546.228				1591582.598
	Mex. Min. Avm.															
	Aw.				-									-		

Discharge Monitoring Report

Pasco Industrial

Permit #ST000	5369									MONTH:	NON	YEAR	2017		
					Influent										
	Flow	Volume	Hd		BOD ₅		Ţ	otal Nitroger		Flow	Volume	Ha		BOD5	
Freq.	Continuous	Summary Only	1/week	2/month	2/month	Summary Only	2/month	2/month	Summary Only	Continuous	Summary Only	1/week	2/month	2/month	Summary Only
Date	MGD	MG	s.u.	mg/L	lbs/day	sđ	mg/L	lbs/day	sql	MGD	MG	s.u.	mg/L	lbs/day	lbs
11/1/2017	1.503									1.787					
11/2/2017	1.378			2179.0	25042.2		73.8	848.1		1.132	•		2721.0	25688.6	
11/3/2017	1.466									1.578					
11/4/2017	1.248									0.948					
11/5/2017	1.091									0.829					
11/6/2017	1.567		4.11							1.463		3.91			
11/7/2017	1.251									1.432					
11/8/2017	1.349									1.158					
11/9/2017	1.314									0.422					
11/10/2017	1.282									0.000			-		
11/11/2017	1.281					ан 1911 1942				0.000					
11/12/2017	1.341									0.000					
11/13/2017	1.180		4.05							3.564		3.60		İ	
11/14/2017	1.401									000.0		2			
11/15/2017	1.743				и					1.752					
11/16/2017	1.966	•		3749.0	61470.3		76.0	1246.1		2.031			2916.0	49302 R	
11/17/2017	1.784									0.649			20107	0.3000-	
11/18/2017	1.706	5								0.000					
11/19/2017	0.117									0.000					
11/20/2017	1.784		3.94							3.582		3.32			
11/21/2017	1.792							-		3.270					
11/22/2017	1.420		1							1.018					
11/23/2017	0.501									0.000					
11/24/2017	1.190		İ					-		0.000					
11/25/2017	1.311									1.290	•				
11/26/2017	1.224			-				-		1.314					
11/2//2/11	1./40		3.55							1.276		3.51			
11/20/2011	1.090									2.505				2	
11/30/2017	1 581									1./3/				_	
	100.1									0.960					
Max.	1.966		4.1	3749.0	61470.3		76.0	1246.1		3.582		3.9	2916.0	49392.8	
Min.			3.6									2 C C			
Avm.	1.399			2964.0	43256.2		74.9	1047.1		1.190		1 12	2818.5	37540 7	
Monthly Total		41.967				86512.5			2094.3		35.697				75081.4
Annual Total		563.401				1823806.762			22844.037		581.925				1666664.015
Max.		-													1
Min.															
Avw.															
TOA - Total ga	lions for cale	ndar year (Jar	n - Dec). Va	lue must be	entered mai	nually. Use To	tal Annual Ti	racking Shee	et to track an	nual totals.					ļ

Discharge Monitoring Report

Pasco Industrial

Pasco Indu	ıstrial 2000									Discharge	e Monitorin	g Report veve			
	2000				Influent								1107		
	Flow	Volume	Hđ		BOD5		Ĕ	otal Nitroger		Flow	Volume	Hd		BOD5	
Freq.	Continuous	Summary Only	1fweek	2/month	2/month	Summary Only	2/month	2/manth	Summary Only	Continuous	Summary Only	1/week	2/month	2/month	Summary Only
Date	MGD	MG	. S.U.	mg/L	lbs/day	sdl	mg/L	lbs/day	lbs	MGD	MG	s.u.	mg/L	lbs/day	sql
12/1/2017	1.270														
12/2/2017	1.114														
12/3/2017	1.167														
12/4/2017	1.136		5.44												
12/5/2017	0.939														
12/6/2017	1.060														
12/7/2017	1.115			2928.0	27227.8										
12/8/2017	1.106			-			-								
12/9/2017	0.822														
12/10/2017	0.993														
12/11/2017	0.737														
12/12/2017	0.870		6.11												
12/13/2017	0.836										•• • •				
12/14/2017	0.847														
12/15/2017	0.868														
12/16/2017	0.425														
12/17/2017	0.635											-			
12/18/2017	0.861		6.43												
12/19/2017	0.549			2090.0	9569.4										
12/20/2017	1.067														
12/21/2017	0.936														
12/22/2017	0.841														
12/23/2017	0.754												-		
12/24/2017	0.200														
12/25/2017	0.172														
12/26/2017	0.350														
12/27/2017	0.750								-						
12/28/2017	0.796		7.00												
12/29/2017	0.779														
12/30/2017	0.789														
12/31/2017	0.303														
Max	1.270		7.0	2928.0	27227.8		0.0	0.0		0.000	· · ·	0.0	0.0	0.0	
Min.	,		5.4									0.0			
Avm.	0.809			2509.0	18398.6		10//IO#	#DIV/0i		#DIV/IO			i0//IC#	i0//IC#	
Monthly Total		25.087				36797.2			0.0		0.000		1.		0.0
Annual Total		588.488	10 N			##########			22844.037		581.925				****
Max.															
Min.															
Avm.															
Awv.		_										_			
TOA - Total ga	illons for cale.	ndar year (Jai	n - Dec). Va	lue must be	entered mai	nually. Use T	otal Annual	Tracking Sh	eet to track a	annual totals.					

Use columns to calculate Total Annual Values

2017

· · · · · · · · · · · · · · · · · · ·	Influent Flow
January	34.63
February	30.41
March	24.12
April	27.67
May	29.02
June	58.70
July	62.00
August	90.22
September	91.05
October	73.62
November	41.97
December	25.09
Annual Total	588.49

	Influent BOD5
January	59,326.37
February	40,508.75
March	40,924.91
April	38,244.37
May	25,829.81
June	58,804.66
July	186,772.87
August	652,472.47
September	376,231.49
October	258,178.59
November	86,512.45
December	36,797.16
Annual Total	1,860,603.93

· · · · · · · · · · · · · · · · · · ·	Effluent Flow
January	0.00
February	0.00
March	0.00
April	96.53
May	85.10
June	68.32
July	61.56
August	86.74
September	83.89
October	64.09
November	35.70
December	0.00
Annual Total	581.93

	Influent TN
January	1,203.46
February	1,429.35
March	965.81
April	1,215.00
May	1,223.66
June	1,803.02
July	2,160.22
August	4,008.61
September	3,934.07
October	2,806.57
November	2,094.28
December	0.00
Annual Total	22,844.04

•



PWRF Irrigation Pump Station Replacement Pasco, Washington

Appendix D Pump Manufacturer Selection Curves and Data Phase 2 This Page Is Intentionally Left Blank.





APPENDIX D

Whitney Equipment Company Inc

Manufactures' Representative

16120 Woodinville-Redmond Rd NE Ste 3 Woodinville, WA 98072 Phone 425-486-9499 Fax 425-485-7409

Name:	Michael Maranan, E.I.T.
Company:	Pace Engineering

Email:	michaelm@paceengrs.com
Phone:	425.827.2014
Re:	Pasco Irrigation

Comments or Special Instructions:

This quote does not include installation, electrical, or any other products and services not specifically listed. All conduits, anchors, piping, fasteners, and interconnection supplied by others.

Quantity	Description	EACH	TOTAL
	Flygt Standard Large Pumps (Media Cooled): 15,041 GPM @ 231' TDH in Parallel		
3	Flygt CZ 3240.845 Grey Cast Iron 470 mm C-Impeller Submersible Pump with 460V/3P 455 HP Media Cooled Motor, Horizontal Z-Installation	\$163,274.00	\$489,822.00
3	Flygt Z-Installation Standard Accessories: Standard Sensor MAS 711 Unit, 50' Cable, 50' Pilot, Z-Stand	\$42,645.00	\$127,935.00
	Flygt Standard Large Pumps (Close Loop Cooled): 15,041 GPM @ 231' TDH in Parallel		
3	Flygt CZ 3240.845 Grey Cast Iron 470 mm C-Impeller Submersible Pump with 460V/3P 455 HP Close Loop Cooled Motor, Horizontal Z-Installation	\$180,226.00	\$540,678.00
3	Flygt Z-Installation Standard Accessories: Standard Sensor MAS 711 Unit, 50' Cable, 50' Pilot, Z-Stand	\$42,645.00	\$127,935.00
	Flygt Standard Large Pump Sled Installation (Optional)		
3	Flygt Z-Installation Sled for Large Pumps	\$26,467.00	\$79,401.00
	Flygt Standard Jockey Pumps: 2,102 GPM @ 167' TDH in Parallel		
2	Flygt NZ 3202 HT 465 Adaptive Hard Iron N Submersible Pump with 460V/3P, 70 HP Submersible Motor, Hard Iron Adaptive N-Impeller, 50' Combined Power/Signal Cable, FLS Leakage Sensor, Horizontal Z-Installation	\$52,367.00	\$104,734.00
2	Flygt Z-Installation Accessories: N 3202 Z-Stand Kit (Kit includes suction unit with telescopic opening, motor support and hardware.)	\$3,604.00	\$7,208.00
	Flygt Standard Recirculation Pump: 1967 GPM @ 71.2' TDH		
1	Flygt NZ 3202 MT 460 Adaptive Hard Iron N Submersible Pump with 460V/3P, 60 HP Submersible Motor, Hard Iron Adaptive N-Impeller, 50' Combined Power/Signal Cable, FLS Leakage Sensor, Horizontal Z-Installation	\$53,976.00	\$53,976.00
1	Flygt Z-Installation Accessories: N 3202 Z-Stand Kit (Kit includes suction unit with telescopic opening, motor support and hardware.)	\$3,604.00	\$3,604.00

Note: These are budget prices that are subject to change at the time of purchase. We have reviewed no project plans or specifications to

Please make purchase orders out to: Whitney Equipment Company Inc.

uotation

DATE: 12/05/2018

> Quote#: **Flygt Pump Budget Quote**

Quotation valid for 30 days Prepared by: Joseph McConaughy Phone: 425-486-9499 FAX: 425-485-7409 joseph@weci.com



APPENDIX D1 PUMP Nos. 1, 2, and 3 FLYGT CZ 3240/845 3~ 450) PHASE 2 ONLY





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Pumps 1, 2, & 3

CZ 3240/845 3~450

Shrouded single or multi-channel impeller pumps with large throughlets and single volute pump casing for liquids containing solids and fibres. Cast iron design with double sealing technology.



Technical specification





Configuration

Motor number C0845.000 54-52-4AA-D 455hp

Z - Horizontal Permanent, Dry

Impeller diameter 460 mm Discharge diameter 7 7/8 inch

Installation type

Pump information

Impeller diameter 460 mm

Discharge diameter 7 7/8 inch

Inlet diameter 250 mm

Maximum operating speed 1790 rpm

Number of blades 2

Throughlet diameter 3 1/16 inch

Materials

. Grey cast iron

Project Block Created by Created on 6/3/2019 Last update

CЛ

a xylem brand

CZ 3240/845 3~450

Technical specification

Motor - General

Motor number C0845.000 54-52-4AA-D 455hp

Approval FM

Frequency 60 Hz

Number of poles 4 Rated voltage 460 V

Phases

3~

Rated speed 1790 rpm

Rated current 510 A

Insulation class

н

455 hp Stator variant 1

Rated power

Type of Duty S1

Motor - Technical

Power factor - 1/1 Load Motor efficiency - 1/1 Load Total moment of inertia Starts per hour max. 0.88 94.5 % $212 \text{ lb } \text{ft}^2$ 15 Power factor - 3/4 Load Motor efficiency - 3/4 Load Starting current, direct starting 94.0 % 4510 A 0.85 Motor efficiency - 1/2 Load Power factor - 1/2 Load Starting current, star-delta 0.77 93.0 % 1500 A

Project Block




	Individual pump			Total					
Pumps running /System	Flow	Head	Shaft power	Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
3 / 1 2 / 1 1 / 1	5270 US g.p.m. 5850 US g.p.m. 6290 US g.p.m.	207 ft 184 ft 163 ft	357 hp 368 hp 375 hp	15800 US g.p.m. 11700 US g.p.m. 6290 US g.p.m.	207 ft 184 ft 163 ft	1070 hp 736 hp 375 hp	77.3 % 73.8 % 69.2	892 kWh/US MG 828 kWh/US MG 785 kWh/US MG	33.6 ft 40.6 ft 46.9 ft

Project Block Created by Created on 6/3/2019 Last update

CZ 3240/845 3~450



Curves according to: Water, pure [100%] ; 39.2°F; 62.43lb/ft³; 1.6889E-5ft²/s



a xylem brand

CZ 3240/845 3~ 450

VFD Analysis



/System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	energy	NPSHre
3 / 1 3 / 1 3 / 1 3 / 1 2 / 1 2 / 1 2 / 1 2 / 1 2 / 1 2 / 1 2 / 1 1 / 1	60 Hz 55 Hz 50 Hz 45 Hz 40 Hz 50 Hz 50 Hz 50 Hz 40 Hz 50 Hz 40 Hz 60 Hz 50 Hz 40 Hz 55 Hz	5270 US g.p.m. 4350 US g.p.m. 3290 US g.p.m. 2070 US g.p.m. 5850 US g.p.m. 4840 US g.p.m. 3650 US g.p.m. 676 US g.p.m. 676 US g.p.m. 5220 US g.p.m. 5220 US g.p.m.	207 ft 191 ft 175 ft 163 ft 184 ft 184 ft 175 ft 166 ft 159 ft 155 ft 163 ft 163 ft	357 hp 267 hp 186 hp 115 hp 56 hp 368 hp 276 hp 195 hp 119 hp 56.4 hp 375 hp 282 hp	15800 US g.p.m. 13100 US g.p.m. 9880 US g.p.m. 6220 US g.p.m. 1970 US g.p.m. 17700 US g.p.m. 7290 US g.p.m. 1350 US g.p.m. 6290 US g.p.m. 5220 US g.p.m.	207 ft 191 ft 175 ft 163 ft 156 ft 184 ft 175 ft 166 ft 159 ft 155 ft 163 ft 163 ft	1070 hp 801 hp 559 hp 344 hp 736 hp 736 hp 553 hp 238 hp 113 hp 375 hp 282 hp	77.3 % 78.6 % 78.3 % 74.5 % 46.3 % 73.8 % 77.3 % 77.3 % 75.6 % 47.1 % 69.2 % 75.1 %	892 kWh/US MC 814 kWh/US MC 765 kWh/US MC 1330 kWh/US MC 1330 kWh/US MC 757 kWh/US MC 757 kWh/US MC 744 kWh/US MC 1300 kWh/US MC 1300 kWh/US MC 717 kWh/US MC	33.6 ft 25.7 ft 225.7 ft 216.9 ft 316.9 ft 316.9 ft 340.6 ft 340.6 ft 320.9 ft 316.9
Project Block				Created by Created on	6/3/2019		Last up	date		21.9 ft 17 ft 15.1 ft

CZ 3240/845 3~450

Dimensional drawing





Last update

APPENDIX D2 PUMP NOS. 4 AND 5 FLYGT (NZ 3202 HT 3~ 465)





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Pumps 4 & 5



xylem

NZ 3202 HT 3~ 465 **Technical specification**



Installation: Z - Horizontal Permanent, Dry





Note: Picture might not correspond to the current configuration.

General Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

Impeller material Discharge Flange Diameter Suction Flange Diameter Impeller diameter Number of blades

Hard-Iron ™
3 15/16 inch
7 7/8 inch
370 mm
2

Motor Motor

Motor #	N3202.095 30-29-4AA-D 70hp FM
Stator variant Frequency Rated voltage Number of poles Phases Rated power	1 60 Hz 460 V 4 3~ 70 bp
Rated current Starting current Rated speed	79 A 550 A 1775 rpm
Power factor 1/1 Load 3/4 Load 1/2 Load	0.90 0.87 0.80
Motor efficiency 1/1 Load 3/4 Load 1/2 Load	92.5 % 93.0 % 93.0 %

Configuration

Project	Project ID	Created by	Created on	Last update
			11/26/2018	



Performance curve



APPENDIX D

Pump Motor Discharge Flange Diameter 3 15/16 inch Motor # Suction Flange Diameter 200 mm N3202.095 30-29-4AA-D 70hp Power factor Suction Flange Diameter 0.90 1/1 Load 14⁹/16" Stator variant Impeller diameter 3/4 Load 0.87 1 Number of blades 2 Frequency 60 Hz 0.80 1/2 Load Rated voltage 460 V Number of poles 4 Motor efficiency 92.5 % Phases 3~ 1/1 Load Rated power Rated current 70 hp 79 A 3/4 Load 93.0 % 1/2 Load 93.0 % Starting current Rated speed 550 A 1775 rpm [ft] Head 240-220-200-180-167 ft Eff 70.9% 160-140-120-100-80-¥65 370mm 60-40-20-0 70.8 % Pump Efficiency [%] Overall Efficiency 65.8 % 40 20-0 Pow er input P1 [hp] Shaft pow er P2 60 62.7 hp 40-20-[ft] NPSH-values ~465 370mm 35 30-25 20 15 14 ft 1051 US g.p.m. 10-1 200 400 600 800 1000 1200 1400 1600 1800 [US g.p.m.] 0 Water, pure Curve ISO

Project	Project ID	Created by	Created on	Last update
			11/26/2018	



NZ 3202 HT 3~ 465

Duty Analysis







NZ 3202 HT 3~ 465

VFD Curve







NZ 3202 HT 3~ 465

VFD Analysis



running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
2 / 1 2 / 1 2 / 1 2 / 1 2 / 1 2 / 1	60 Hz 55 Hz 50 Hz 45 Hz 40 Hz	1050 US g.p.m. 676 US g.p.m. 194 US g.p.m.	167 ft 161 ft 157 ft	62.7 hp 42.6 hp 24.5 hp	2100 US g.p.m. 1350 US g.p.m. 387 US g.p.m.	167 ft 161 ft 157 ft	125 hp 85.1 hp 49 hp	70.8 % 64.7 % 31.5 %	799 kWh/US MG 840 kWh/US MG 1710 kWh/US MC	14 ft 12.2 ft 513.2 ft
1 / 1 1 / 1 1 / 1 1 / 1 1 / 1 1 / 1	60 Hz 55 Hz 50 Hz 45 Hz 40 Hz	1130 US g.p.m. 720 US g.p.m. 198 US g.p.m.	160 ft 158 ft 157 ft	64.7 hp 43.5 hp 24.6 hp	1130 US g.p.m. 720 US g.p.m. 198 US g.p.m.	160 ft 158 ft 157 ft	64.7 hp 43.5 hp 24.6 hp	70.9 % 66.3 % 32 %	765 kWh/US MG 805 kWh/US MG 1670 kWh/US MC	14.7 ft 12 ft 513.1 ft

roject	Project ID	Created by	Created on	Last update
			11/26/2018	
			11/20/2010	





NZ 3202 HT 3~ 465 Dimensional drawing





|--|

APPENDIX D3 PUMP No. 6 FLYGT (NZ 3202 MT 3~ 640)





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APPENDIX D

Pump 6



xylem

NZ 3202 MT 3~ 640



Installation: Z - Horizontal Permanent, Dry





Note: Picture might not correspond to the current configuration.

General Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

mpener	
Impeller material Discharge Flange Diameter	Hard-Iron ™ 7 7/8 inch
Suction Flange Diameter	9 13/16 inch
Impeller diameter	376 mm
Number of blades	2

Motor	
Motor #	N3202.185 30-29-6AA-D 60hp Standard
Stator variant	1
Frequency	60 Hz
Rated voltage	460 V
Number of poles	6
Phases	3~
Rated power	60 hp
Rated current	72 A
Starting current	420 A
Rated speed	1170 rpm
Power factor	
1/1 Load	0.86
3/4 Load	0.83
1/2 Load	0.74
Motor efficiency	
1/1 Load	90.5 %
3/4 Load	91.0 %
1/2 Load	91.0 %

Configuration

Project	Project ID	Created by	Created on	Last update
			12/4/2018	

xylem

NZ 3202 MT 3~ 640



Performance curve

Pu	mp

Motor

harge F on Flai Iller dia ber of b	lange Diameter 7 nge Diameter 25 ameter 14 olades 2	7/8 inch 50 mm 4 ^{13/} 16"	Motor # Stator variant Frequency Rated voltage Number of poles Phases Rated power Rated current Starting current Rated speed		N3202.185 30 60 Hz 460 V 6 3~ 60 hp 72 A 420 A 1170 rpm	0-29-6AA-D 60	Jhp	Power factor 1/1 Load 3/4 Load 1/2 Load Motor efficier 1/1 Load 3/4 Load 1/2 Load	0.86 0.83 0.74 ncy 90.5 % 91.0 % 91.0 %
[ft]	Head]
115									
110									
105									
100									
95									
90									
85									
80			\sim						
75									
70									71.2
65]
60				80.1%					
55									
50						\searrow			
45									
40									
35									
30								L	
25								\searrow	
20								640 37	76mm
15									
10									
5									
									78 7
[%]	Pump Efficiency								1011
60-	Overall Efficiency								72
00									
40								640 37	⁷ êmm
-								01001	
20-									
-									
[hp]	Pow er input P1								
50	Shaft pow er P2					_		<u> </u>	nm 49.2 r
40	·								151
201									431
201									
201									
10									ĺ
[ft]	NPSH-values							-640 376m	n Í
25									
35									ĺ
30									1
25									ĺ
201						_			1
4 - 3				F					13.1
15			1007 10	2					

Project ID Created by Created on Last update
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NZ 3202 MT 3~ 640

Duty Analysis







NZ 3202 MT 3~ 640 VFD Curve







NZ 3202 MT 3~ 640

VFD Analysis



Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1 1 1 1	60 Hz 55 Hz 50 Hz 45 Hz 40 Hz	1970 US g.p.m. 1800 US g.p.m. 1640 US g.p.m. 1470 US g.p.m. 1310 US g.p.m.	71.2 ft 59.8 ft 49.4 ft 40.1 ft 31.6 ft	45 hp 34.7 hp 26 hp 19 hp 13 3 hp	1970 US g.p.m. 1800 US g.p.m. 1640 US g.p.m. 1470 US g.p.m. 1310 US g.p.m.	71.2 ft 59.8 ft 49.4 ft 40.1 ft 31.6 ft	45 hp 34.7 hp 26 hp 19 hp 13 3 hp	78.7 % 78.7 % 78.7 % 78.7 % 78.7 %	311 kWh/US MG 261 kWh/US MG 218 kWh/US MG 179 kWh/US MG 146 kWh/US MG	13.1 ft 11.4 ft 9.78 ft 8.26 ft 6.84 ft

Project	Project ID	Created by	Created on	Last update
			12/4/2018	



FLYGT



NZ 3202 MT 3~ 640 Dimensional drawing





	Project F	Project ID	Created by	Created on 12/4/2018	Last update
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PWRF Irrigation Pump Station Replacement Pasco, Washington

Appendix E Pump Manufacturer Selection Curves and Data Phases 4 and 5 This Page Is Intentionally Left Blank.







PUMP Nos. 1, 2, and 3 FLYGT (CT 3351/976 3~ 650) PHASES 4 AND 5





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APPENDIX E



Block

3

Created on 5/20/2019

Technical specification	on		FLYGT
Motor - General			a xylem branc
Motor number C0976.000 66-92-6IE-D 885hp	Phases 3~	Rated speed 1195 rpm	Rated power 885 hp
Approval FM	Number of poles 6	Rated current 970 A	Stator variant 1
Frequency 60 Hz	Rated voltage 460 V	Insulation class H	Type of Duty S1
Motor - Technical			
Powerfactor - 1/1 Load	Motor efficiency - 1/1 Load 97.4 %	Total moment of inertia 889 lb ft ²	Starts per hour max. 10
0.88			
0.88 Power factor - 3/4 Load 0.86	Motor efficiency - 3/4 Load 97.6 %	Starting current, direct starting 6070 A	





Project Block Created by Created on 5/20/2019 Last update

CT 3351/976 3~ 650

FLYGT

VFD Curve





3 / 1 3 / 1 3 / 1 3 / 1 2 / 1 2 / 1 2 / 1 2 / 1 2 / 1 2 / 1 2 / 1 1 / 1	60 Hz 55 Hz 50 Hz 45 Hz 40 Hz 55 Hz 55 Hz 45 Hz 40 Hz 60 Hz 60 Hz 55 Hz	11000 US g.p.m. 236 9570 US g.p.m. 204 8090 US g.p.m. 147 4620 US g.p.m. 147 4620 US g.p.m. 188 12000 US g.p.m. 175 10300 US g.p.m. 153 8170 US g.p.m. 116	ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ ሺ	801 hp 606 hp 443 hp 307 hp 196 hp 871 hp 658 hp 482 hp 337 hp 215 hp	33000 US g.p.m. 236 ft 28700 US g.p.m. 204 ft 19400 US g.p.m. 174 ft 19400 US g.p.m. 147 ft 13900 US g.p.m. 186 ft 24400 US g.p.m. 198 ft 24400 US g.p.m. 175 ft 20600 US g.p.m. 133 ft 11500 US g.p.m. 116 ft	2400 hp 1820 hp 1330 hp 922 hp 587 hp 1740 hp 1320 hp 964 hp 674 hp 431 hp	82 % 81.4 % 80.3 % 78.4 % 74.2 % 80.8 % 82.6 % 82.6 % 81.9 % 78.4 %	928 kWh/US MG 26.9 ft 806 kWh/US MG 22.4 ft 701 kWh/US MG 18.3 ft 607 kWh/US MG 14.9 ft 544 kWh/US MG 12.4 ft 793 kWh/US MG 42.6 ft 686 kWh/US MG 22.7 ft 599 kWh/US MG 23.7 ft 527 kWh/US MG 12.3 ft
Project Block				Created by Created on	5/20/2019	Lastu	ıpdate	45.6 ft 25.7 ft 13.7 ft



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F State Waste Discharge Permits Washington Department of Ecology

City of Pasco Foster Wells Permit No. ST0005369 CRF Frozen Foods, LLC, Permit No. IWDP 000200 Freeze Pack, Temporary Under Permit No. IWDP 000500 Freeze Pack, Permit No. ST0008108 Grimmway Enterprises, Inc., Permit No. IWDP 000500 Pasco Processing, LLC, Permit No. ST0005388 Reser's Fine Foods, Inc., Permit No. IWDP 000300 Twin City Foods, Permit No. IWDP 000100





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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F1 City of Pasco Foster Wells Permit No. ST0005369 Washington Department of Ecology





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APPENDIX F1 Page 1 of 36 Permit No. ST0005369

Issue Date: May 20, 2015 Effective Date: July 1, 2015 Expiration Date: June 30, 2020

State Waste Discharge Permit Number ST0005369

State of Washington DEPARTMENT OF ECOLOGY Eastern Regional Office 4601 North Monroe Street Spokane, Washington 99205-1295

In compliance with the provisions of the State of Washington Water Pollution Control Law Chapter 90.48 Revised Code of Washington, as amended,

> City of Pasco P.O. Box 293 Pasco, Washington 99301

Is authorized to discharge wastewater in accordance with the special and general conditions, which follow.

Facility Location: 981 East Foster Wells Road, Pasco, Washington	Discharge Location: Approximately 1800 acres; Sec. 3 and 11, and N ½ and SW ¼ Sec. 2, T.9, R. 30; and, S ½ Sec. 34, T.10, R. 30 EWM Latitude: 46.294167 Longitude: -119.065278
Treatment Type: Spray irrigation via center pivots Industry Type: Municipally owned combined vegetable processing wastewater collection and treatment.	SIC Code: 2037 NAICS Code: 311411

James m. Bell

James Bellatty Eastern Regional Office Section Manager Washington State Department of Ecology

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Appe	ndix A	

April 25, 2016

April 1, 2016

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Summary of Permit Report Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Discharge Monitoring Report (DMR)	Monthly	August 15, 2015
S3.F	Reporting Permit Violations	As necessary	-
S4.A	Operations and Maintenance Manual - Update	1/permit cycle	June 1, 2016
S4.B	Reporting Bypasses	As necessary	-
S4.D	Best Management Practices	1/permit cycle	-
S6.A.5	Pretreatment Report	Annual	March 31, 2016
S6.C	Reporting of Monitoring Results	Annual	March 31, 2016
S7.	Application for Permit Renewal	1/permit cycle	June 30, 2019
S9.	Engineering Report - Update	1/permit cycle	April 1, 2018
S10.	Land Management Plan - Update	1/permit cycle	April 1, 2018
S11.	Electronic Leak Detection Survey Report	1/permit cycle	April 15, 2020

Annual

1/permit cycle

As necessary

As necessary

As necessary

As necessary

As necessary

S12.

S13.

G1.

G4.

G5.

G7.

G10.

Farm Operations Report

Irrigation Wells - Meta-Data

Changes to the Discharge

Notice of Permit Transfer

Duty to Provide Information

Modification Activities

Notice of Change in Authorization

Permit Application for Substantive

Engineering Report for Construction or

Refer to the Special and General Conditions of this permit for additional submittal requirements.

APPENDIX F1 Page 5 of 36 Permit No. ST0005369 Effective 07/01/2015

Special Conditions

S1. Discharge limits

S1.A. Effluent limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

Beginning on the effective date of this permit, this permit authorizes the Permittee to apply process wastewater to the designated land treatment site via spray irrigation not to exceed the agronomic rates for nitrogen and water, and at rates for any other wastewater constituents to protect background water quality.

The Permittee may only apply wastewater seasonally from March 1 through November 31. The Permittee must request in writing any changes to the application season and must not discharge outside of the permitted seasonal range until Ecology approves the request.

This permit authorizes the Permittee to apply process wastewater for final treatment on the following designated land treatment sites:

Approximately 1,800 acres located approximately five (5) miles north of the City of Pasco, one mile east of U.S. Highway 395, and north of East Foster Wells Road: Sec. 3 and 11, and N ¹/₂ and SW ¹/₄ Sec. 2, T.9, R. 30; and, S ¹/₂ Sec. 34, T.10, R. 30 EWM

Total nitrogen and water applied to the land treatment site must not exceed the crop requirements as determined by the Permittee's Farm Operations Report, Special Condition S12 and must not exceed the Facility Loading specified in Special Condition S8.

The Permittee must operate the sprayfields in is such a manner as to:

- 1. Protect the existing and future beneficial uses of both groundwater and surface water.
- 2. Not cause a violation of the groundwater standards (chapter 173-200 WAC) or the surface water quality standards (chapter 173-201A WAC).

S1.B. Enforcement limits - Interim

Beginning on the effective date of this permit, the Permittee must comply with the following groundwater enforcement limits.

Groundwater Enforcement Limits - Interim			
	Discharges are subject to the following limits. The point of compliance is at monitoring wells MW-2 to MW-8. Two consecutive exceedances of an enforcement limit for the same parameter at the same well is a violation.		

Groundwater Enforcement Limits - Interim		
Nitrate	38.6 mg/L	
рН	6.5 to 8.5 standard units	

S1.C. Performance-based irrigated wastewater limits - Interim

Beginning on the effective date of this permit, the Permittee must comply with the following performance-based irrigated wastewater limits.

	Effluent Limits: Outfall # 001 Latitude: 46.293574 Longitude: -119.064286				
	Parameter Average Monthly ^a Maximum Daily ^b				
Fixed Dissolved Solids 794 mg/L 957 mg/L			957 mg/L		
а	^a Average Monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured.				
b	 ^b Maximum Daily effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. 				

S1.D. Best management practices/pollution prevention

The Permittee must comply with the following Best Management Practices to prevent pollution to waters of the State:

- 1. Do <u>not</u> commingle process wastewater streams with sanitary (domestic) sewage.
- 2. Do <u>not</u> discharge in excess of the hydraulic capacity of the storage ponds or equalization basins so that they overflow.

S2. Monitoring requirements

S2.A. Process wastewater monitoring

The Permittee must monitor in accordance with the following schedule and the requirements specified in **Appendix A**. The Permittee must:

- 1. Collect influent samples at a location and in a manner that best represents the quantity of water discharged from all treatment system users.
- 2. Collect effluent samples at a location and in a manner that represents the quality of the water being spray irrigated.

Parameter	Units & Speciation	Monthly Calculations	Sampling Frequency	Sample Type
(1) Wastewater - Influent				
Flow	Million Gallons/Day (MGD)	Avg., Max. Daily	Continuous ^a	Meter
Flow Volume	Million Gallons (MG)	Total Monthly; Total Annual ^b	1/month ^g	Calculated
Biochemical Oxygen Demand (BOD ₅)	mg/L	Avg., Max. Daily	2/month	24-Hour Composite
BOD ₅	lbs/day	Avg., Max. Daily	2/month	Calculated ^d
BOD ₅	lbs	Total Monthly, Total Annual	1/month ^g	Calculated
Total Nitrogen (TN) °	mg/L	Avg., Max. Daily	2/month	24-Hour Composite
TN	lbs/day	Avg., Max. Daily	2/month	Calculated ^d
TN	lbs	Total Monthly, Total Annual	1/month ^g	Calculated
рН	standard units	Min., Max Daily	1/week	Grab
(2) Final Wastewater - Irrigated Effluer	nt			
Flow	MGD	Avg., Max.	Continuous ^a	Meter
Flow Volume	MG	Total Monthly; Total Annual	1/month ^g	Calculated
рН	Standard Units	Min.; Max. Daily	1/week	Grab
BOD₅	mg/L	Avg., Max. Daily	2/month	24-Hour Composite
BOD₅	lbs/day	Avg., Max. Daily	2/month	Calculated ^d
BOD ₅	lbs	Total Monthly; Total Annual	1/month ^g	Calculated
Fixed Dissolved Solids (FDS)	mg/L	Avg., Max. Daily	2/month	24-Hour Composite
FDS	lbs/day	Avg., Max. Daily	2/month	Calculated ^d
FDS	lbs	Total Monthly; Total Annual	1/month ^g	Calculated
ТКМ	mg/L as N	Avg., Max. Daily	2/month	24-Hour Composite
TKN	lbs/day	Avg., Max. Daily	2/month	Calculated ^d
TKN	lbs	Total Monthly; Total Annual	1/month ^{e,g}	Calculated

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	Parameter	Units & Speciation	Monthly Calculations	Sampling Frequency	Sample Type
Nitra NO2	te plus Nitrite Nitrogen (NO3 +)	mg/L as N	Avg., Max. Daily	2/month ^e	24-Hour Composite
NO3	+ NO2	lbs/day	Avg., Max. Daily	2/month ^e	Calculated ^d
NO3	+ NO2	lbs	Total Monthly; Total Annual	1/month ^{e,g}	Calculated
NH₃	Nitrogen	mg/L as N	Avg., Max. Daily	2/month ^e	24-Hour Composite
NH ₃	Nitrogen	lbs/day	Avg., Max. Daily	2/month ^e	Calculated
NH ₃	Nitrogen	lbs	Total Monthly; Total Annual	1/month ^{e,g}	Calculated
Tota	l Nitrogen	lbs	Total Monthly; Total Annual	1/month ^{e,g}	Calculated °
Sodi	um	mg/L	N/A	2/year f	24-Hour Composite
Calc	ium	mg/L	N/A	2/year f	24-Hour Composite
Mag	nesium	mg/L	N/A	2/year f	24-Hour Composite
Sulfa	ate	mg/L	N/A	2/year ^f	24-Hour Composite
Chlo	ride	mg/L	N/A	2/year f	24-Hour Composite
Alka	linity	mg/L	N/A	2/year f	24-Hour Composite
Tota	Phosphate (as P)	mg/L	N/A	2/year ^f	24-Hour Composite
а	Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The time interval for the associated data logger must be no greater than 30 minutes. The Permittee must sample hourly when continuous monitoring is not possible.				
b	Total Annual means a calendar year.				
с	TN = Total Kjeldahl Nitrogen (TKN)				
d	lbs/day = (concentration, mg/L) x ((flow, MGD) x (8	.34)		
е	2/month - The testing frequency for	or NO3 + NO2 w	ill be from January 20	16 through Decer	nber 2017
f	2/year means May and September				
g	Daily values are not reported on the Discharge Monitoring Report; only a monthly summary value is reported				

S2.B. Supplemental Irrigation Water Monitoring

The Permittee must sample the supplemental irrigation water from each of the eleven (11) fresh water supply wells. *The results must be reported with the annual Farm Operations Report; Section S12.*

Parameter	Units	Sampling Frequency	Sample Type
NO3 + NO2	mg/L as N	1/year ª	Grab

APPENDIX F1

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	Parameter	Units	Sampling Frequency	Sample Type
Tota	I Dissolved Solids	mg/L	1/year ^a	Grab
а	1/year means August			

S2.C. Groundwater monitoring

The Permittee must monitor the groundwater at monitoring wells **MW-2 through MW-9** in accordance with the following schedule and the requirements specified in **Appendix A**.

Measured Depth to GroundwaterFeet (nearest 0.01 ft)1/monthField MeasuremeMeasured Elevation to GroundwaterFeet (nearest 0.01 ft)1/monthCalculated aNO3 + NO2 Nitrogenmg/L as N1/monthGrab	ре
Measured Elevation to GroundwaterFeet (nearest 0.01 ft)1/monthCalculated aNO3 + NO2 Nitrogenmg/L as N1/monthGrab	ement
NO3 + NO2 Nitrogen mg/L as N 1/month Grab	a
Total Dissolved Solids mg/L 1/month Grab	
pH Standard Units 1/month Grab	
 Measured elevation to groundwater: MW-2: 527.92 ft –(measured depth to groundwater) MW-3: 508.16 ft – (measured depth to groundwater) MW-4: 505.23 ft – (measured depth to groundwater) MW-5: 503.52 ft – (measured depth to groundwater) MW-6: 496.17 ft – (measured depth to groundwater) MW-7: 542.75 ft – (measured depth to groundwater) 	
MW-8: 509.44 ft – (measured depth to groundwater) MW-9: 516 53 ft – (measured depth to groundwater)	

S2.D. Soil monitoring

The Permittee must monitor soil on the land treatment site as follows:

- 1. Monitor once per year at a time that best represents soil conditions at the end of the crop-growing season.
- 2. Locate sampling sites in the same vicinity each year, if possible, so they represent each land treatment site or as identified in the crop management plan.
- 3. Test soil at each sampling site at one-foot soil increments.
- 4. Submit results annually with the Farm Operations Plan; S12.
- 5. Composite a minimum of four (4) core samples at the depth increments as defined in the table below (or until auger refusal).

The Permittee must monitor the soils in the center pivot sprayfields according to the following schedule:

Parameter	Units & Speciation	Sample Point	Depth Increments ^a
Nitrate Nitrogen	mg/Kg as N	Each field	1 – 5
Conductivity	mmhos/cm	Each field	1 – 5

The Permittee must monitor soil on the land treatment site as follows:

- 1. Monitor once per permit cycle (2016) that best represents soil conditions at the beginning and the end of the crop-growing season.
- 2. Locate sampling sites in the same vicinity each year, if possible, so they represent each land treatment site or as identified in the crop management plan.
- 3. Submit results with the Farm Operations Plan; S12.
- 4. Composite a minimum of four (4) core samples at the depth increments as defined in the table below (or until auger refusal).

Parameter		Units & Speciation	Sample Point	Depth Increments ^a
Exchangeable Sodium Percentage		%	Each field	1 – 5, 10
Cation Exchange Capa	icity	meq/100g	Each field	1 – 5, 10
Organic Matter		%	Each field	1 – 5, 10
Total Kjeldahl Nitrogen	(TKN)	mg/Kg as N	Each field	1 – 5, 10
Nitrate Nitrogen		mg/Kg as N	Each field	1 – 5, 10
NH₃ Nitrogen		mg/Kg as N	Each field	1 – 5, 10
Phosphorus (Total)		mg/Kg	Each field	1 – 5, 10
Conductivity		micromhos/cm	Each field	1 – 5, 10
Sodium (Total)		meq/100g	Each field	1 – 5, 10
Calcium (Total)		meq/100g	Each field	1 – 5, 10
Magnesium (Total)		meq/100g	Each field	1 – 5, 10
Potassium (Total)		mg/Kg	Each field	1 – 5, 10
Sulfate		mg/Kg as S	Each field	1 – 5, 10
рН		Standard Units	Each field	1 – 5, 10
а	Depth increment (ft.) vs. Depth (inches) for composite samples:			:
Increment 1	0 -12 inches			
Increment 2	12-24 inches			

Parameter		Units & Speciation	Sample Point	Depth Increments ^a
Increment 3	24-36 inc	ches		
Increment 4	36-48 inches			
Increment 5	48-60 inc	ches		
Increment 10	108-120	inches		

S2.E. Crop monitoring

The Permittee must:

- 1. Monitor the crops for the parameters listed below on each field once per harvest.
- 2. Comprise composite samples of at least ten (10) random samples collected from each center-pivot field.
- 3. Submit results annually with the Farm Operations.

Parameter	Units, Speciation, & Measurement Basis		
Crop Production	dry tons/acre		
Moisture Content	%		
Total Kjeldahl Nitrogen	%		
Nitrate Nitrogen	mg/Kg as N (dry weight)		
Total Phosphorus	mg/Kg as N (dry weight)		
Ash Weight	mg/Kg (dry weight)		

S2.F. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Groundwater sampling must conform to the latest protocols in the *Implementation Guidance for the Ground Water Quality Standards*, (Ecology 2005).

Sampling and analytical methods used to meet the water and wastewatermonitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by Ecology.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

Page 12 of 36 Permit No. ST0005369 Effective 07/01/2015

The Permittee must conduct and report all soil analysis in accordance with the Western States Laboratory Plant, Soil and Water Analysis Manual, *Soil, Plant and Water Reference Methods for the Western Region, 3rd Edition,* 2005. You can find more information at:

http://isnap.oregonstate.edu/WERA_103/Soil_Methods.htm.

The Permittee must also participate in a proficiency-testing program such as the North American Proficiency Testing Program. More information is available at: <u>http://www.naptprogram.org/</u>.

S2.G. Flow measurement devices

The Permittee must:

- 1. Select and use appropriate flow measurement and methods consistent with accepted scientific practices.
- 2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard, the manufacturer's recommendation, and approved O&M manual procedures for the device and the wastestream.
- 3. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
- 4. Establish a calibration frequency for each device or instrument in the O&M manual that conforms to the frequency recommended by the manufacturer.
- 5. Maintain calibration records for at least three years.

S2.H. Laboratory accreditation

The Permittee must ensure that all monitoring data required by Ecology for permit specified parameters is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Flow, conductivity, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for conductivity if it must receive accreditation or registration for other parameters.

Crops and soils data are process control parameters, which do not require preparation by an accredited laboratory. However, the Permittee must obtain this data from a reputable agricultural test lab that is an active participant in a nationally recognized agricultural laboratory proficiency-testing program.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to Ecology is a violation of the terms and conditions of this permit.

S3.A. Discharge monitoring reports

The first monitoring period begins on the effective date of the permit (unless otherwise specified). The Permittee must:

1. Summarize, report, and submit monitoring data obtained during each monitoring period on the electronic discharge monitoring report (DMR) form provided by Ecology within the Water Quality Permitting Portal. Include data for each of the parameters tabulated in Special Condition S2 and as required by the form. Report a value for each day sampling occurred (unless specifically exempted in the permit) and for the summary values (when applicable) included on the electronic form.

To find out more information and to sign up for the Water Quality Permitting Portal go to: <u>http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html</u>

- 2. Enter the "No Discharge" reporting code for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.
- 3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the test method did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
- 4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in **Appendix A**.
- 5. Calculate average values and calculated total values (unless otherwise specified in the permit) using:
 - a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
 - b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample from the same monitoring point for the reporting period.
 - c. Zero (for values reported below detection) if the lab did not detect the parameter in another sample for the reporting period.
- 6. Ensure that DMRs are electronically submitted no later than the dates specified below, unless otherwise specified in this permit.
- 7. Submit DMRs for parameters with the monitoring frequencies specified in S2 (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
 - a. Submit **monthly** DMRs by the 15th day of the following month.

- b. Submit 1/year test data by September 15 each year
- c. Submit 2/year test data by June 15 and October 15 each year.

S3.B. Permit Submittals and Schedules

The Permittee must use the Water Quality Permitting Portal – Permit Submittals application (unless otherwise specified in the permit) to submit all other written permit-required reports by the date specified in the permit.

When another permit condition requires submittal of a paper (hard copy) report, the Permittee must ensure that it is postmarked or received by Ecology no later than the dates specified by this permit. Send these paper reports to Ecology at:

> Water Quality Program Department of Ecology Eastern Regional Office 4601 North Monroe Street Spokane, WA 99205-1295

S3.C. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

The Permittee must retain all records pertaining to the monitoring of sludge for a minimum of five years.

S3.D. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

- 1. The date, exact place, method, and time of sampling or measurement
- 2. The individual who performed the sampling or measurement
- 3. The dates the analyses were performed
- 4. The individual who performed the analyses
- 5. The analytical techniques or methods used
- 6. The results of all analyses

S3.E. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Special Condition S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Special Condition S2.

S3.F. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

- 1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
- 2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to Ecology within thirty (30) days of sampling.

a. Immediate reporting

The Permittee must immediately report to the Department of Ecology and the Department of Health, Drinking Water Program (at the numbers listed below), all:

• Overflows or leaks of storage ponds, or transmission or irrigation pipelines that discharge or have a potential to discharge to a water body used as a source of drinking or irrigation water.

Eastern Regional Office	509-329-3400
Department of Health, Drinking Water Program	800-521-0323 (business hours) 877-481-4901 (after business hours)
Benton/Franklin County Health District	509-582-7761

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

- 1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
- 2. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Part S4.B., "Bypass Procedures").

- 3. Any upset that causes an exceedance of an effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- 4. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit. This requirement does not include industrial process wastewater overflows to impermeable surfaces, which are collected and routed to the treatment works.
- 5. When a monitoring well exceeds an enforcement limit for the same parameter in two consecutive sampling events.

c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

- 1. A description of the noncompliance and its cause.
- 2. Maps, drawings, aerial photographs, or pictures to show the location and cause(s) of the non-compliance.
- 3. The period of noncompliance, including exact dates and times.
- 4. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.
- 5. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
- 6. If the noncompliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

d. Waiver of written reports

Ecology may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for S3.A ("Reporting"). The reports must contain the information listed in subpart c, above.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

S3.G. Other reporting

a. Spills of Oil or Hazardous Materials

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280 and chapter 173-303-145. You can obtain further instructions at the following website: http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm .

b. Failure to submit relevant or correct facts

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to Ecology, it must submit such facts or information promptly.

S3.H. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to Ecology inspectors.

S4. Operation and maintenance

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes keeping a daily operation logbook (paper or electronic), adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

S4.A. Operations and maintenance (O&M) manual - Update

a. O&M manual submittal and requirements

The Permittee must:

- 1. Update the O&M Manual that meets the requirements of 173-240-150 WAC and submit it to Ecology for approval **by June 1, 2016**. The
- 2. Submit to Ecology for review and approval substantial changes or updates to the O&M Manual whenever it incorporates them into the manual.
- 3. Keep the approved O&M Manual at the permitted facility.
- 4. Follow the instructions and procedures of this manual.

5. Submit reviews, changes, and updates to Ecology through the WQWebPortal.

b. O&M manual components

In addition to the requirements of WAC 173-240-150, the O&M Manual must be consistent with the guidance in Table G1-3 in the *Criteria for Sewage Works Design* (Orange Book) 2008. The O&M Manual must include:

- 1. Emergency procedures for plant shutdown and cleanup in the event of a wastewater system upset or failure including pipeline leaks.
- 2. Irrigation system operational controls and procedures.
- 3. Wastewater system maintenance procedures that contribute to the generation of wastewater.
- 4. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)
- 5. Treatment plant process control monitoring schedule.
- 6. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.
- 7. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.
- 8. Protocols and procedures for sampling and testing the groundwater monitoring network, crop, and soils.
- 9. Protocols and procedures for conducting visual inspections of all impoundments with synthetic liner.
- 10. A **Solid Waste Control Plan** that describes the procedures of managing and disposing of solid wastes collected from screens, settling basins, pumping wells, and impoundments.

The solid waste control plan must:

- a. Follow Ecology's guidance for preparing a solid waste control plan for industrial permittees (<u>www.ecy.wa.gov/biblio/0710024.html</u>) and address all solid wastes generated by the Permittee.
- b. Include at a minimum a description, source, generation rate, and disposal methods of these solid wastes.
- c. Not conflict with local or state solid waste regulations.

11. An **Emergency Response Plan** that will lessen the potential impact on the environment in the event of a leak or catastrophic failure of a wastewater transmission pipeline, sprinkler system, or impoundment.

S4.B. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility.

Ecology may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely affect public health as determined by Ecology prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass is unavoidable, unanticipated, and results in noncompliance of this permit.

This permit authorizes such a bypass only if:

- a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which would cause them to become inoperable, or substantial and permanent loss of natural resources, which can reasonably be expected to occur in the absence of a bypass.
- b. No feasible alternatives to the bypass exist, such as:
 - The use of auxiliary treatment facilities.
 - Retention of untreated wastes.
 - Stopping production.
 - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
 - Transport of untreated wastes to another treatment facility.
- c. The Permittee has properly notified Ecology of the bypass as required in Special Condition S3.F of this permit.
- 3. If bypass is anticipated and has the potential to result in noncompliance of this permit.
 - a. The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

- A description of the bypass and its cause.
- The minimum and maximum duration of the bypass.
- The projected date of bypass initiation and end.
- b. For probable construction bypasses, the Permittee must notify Ecology of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during the project planning and design process. The project-specific engineering report or facilities plan as well as the plans and specifications must include details of probable construction bypasses to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.
- c. Ecology will consider the following prior to issuing an administrative order for this type of bypass:
 - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
 - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
 - If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve or deny the request. Ecology will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve a request to bypass and may issue an administrative order under RCW 90.48.120.

S4.C. Irrigation land application best management practices

The Permittee must:

- 1. Operate the sprayfield system to protect the existing and future beneficial uses of the groundwater, and not cause a violation of the groundwater standards.
- 2. Not allow spray irrigation practices to result in runoff of wastewater to any surface waters of the state or to any land not owned by or under its control.
- 3. Use recognized good practices, and all available and reasonable procedures to control odors from the land application system.
- 4. Implement measures to reduce odors to a reasonable minimum when notified by Ecology.
- 5. Not apply wastewater to the land treatment sites in quantities that:
 - a. Significantly reduce or destroy the long-term infiltration rate of the soil.

- b. Would cause long-term anaerobic conditions in the soil.
- c. Would cause ponding of wastewater and produce objectionable odors or support insects or vectors.
- d. Would cause leaching losses of constituents of concern beyond the treatment zone or in excess of the approved design. Constituents of concern are constituents in the wastewater, partial decomposition products, or soil constituents that would alter groundwater quality in amounts that would affect current and future beneficial uses.
- 6. Maintain all irrigation agreements for lands not owned for the duration of the permit cycle. Any reduction in irrigation lands by termination of any irrigation agreements may result in permit modification or revocation.
- 7. Immediately inform Ecology in writing of any proposed changes to existing irrigation agreements.
- 8. Maintain a viable and healthy cover crop on all fields that receive wastewater.
- 9. Use supplemental water or precipitation to meet the leaching requirement to control soil salinity.
- 10. Adjust irrigation plans during high precipitation events to minimize percolate losses.
- 11. Manage the BOD load to each field not to exceed 100 lbs/acre/day.
- 12. Discontinue operation during periods of heavy or prolonged rainfall to prevent ground saturation and runoff.

S4.D. Best management practices

The Permittee must:

- 1. Implement whenever and wherever possible, irrigation best management practices as described in "*Irrigation Management Practices to Protect Ground Water and Surface Water Quality, State of Washington*' (Ecology, 1995; Publ. No. 96-013).
- 2. Continuously maintain all pumps and equipment provided for wastewater conveyance to provide effective operation.
- 3. Keep wastewater applications to newly seeded or fallow fields to a minimum.
- 4. Visually inspect daily the route of the main wastewater transmission line for any signs of leakage.
- 5. Consider wind direction and speed when operating each center pivot with wastewater to reduce off-site drift and odors.
- 6. Operate to insure a stable or declining end-of-year soil profile nitrate and conductivity concentration trend over a continuous yearly period.

- 7. Adjust the irrigation plans during low evapotranspiration periods to minimize percolate loss on fields that show an increasing trend in soil nitrate or conductivity.
- 8. Manage irrigation to the fields in a manner that results in a leaching fraction equal to or less than the leaching requirement for each field.

S5. Solid wastes

S5.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

S5.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, Chapter 173-200 WAC. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S6. Pretreatment

S6.A. General requirements

1. The Permittee must implement the Industrial Pretreatment Program, and perform review and approval of engineering documents in accordance with the legal authorities, policies, procedures, and financial provisions described in the Permittee's Ecology-approved pretreatment program submittal entitled "Industrial Pretreatment Program" and dated October 31, 2014; any approved revisions thereto; and the General Pretreatment Regulations (40 CFR Part 403).

At a minimum, the Permittee must undertake the following pretreatment implementation activities:

- a. Enforce categorical pretreatment standards under Section 307(b) and (c) of the Federal Clean Water Act (hereinafter, the Act), prohibited discharge standards as set forth in 40 CFR 403.5, local limits specified in Chapter 13.62(Wastewater Regulations) of City of Pasco's (Permittee) Municipal Code, or state standards, whichever are most stringent or apply at the time of issuance or modification of a local industrial waste discharge permit. Locally-derived limits are defined as pretreatment standards under Section 307(d) of the Act and are not limited to categorical industrial facilities.
- b. Issue industrial waste discharge permits to all industrial users contributing to the treatment system, including those from other jurisdictions.

Industrial waste discharge permits must contain, at a minimum, all the requirements of 40 CFR 403.8 (f)(l)(iii). The Permittee must coordinate the permitting process with Ecology regarding any industrial facility that may possess a State Waste Discharge Permit issued by Ecology. Once issued, an industrial waste discharge permit takes precedence over a state-issued waste discharge permit.

- c. Maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by industrial users to the POTW. The Permittee must maintain records for at least a three-year period.
- d. Perform inspections, surveillance, and monitoring activities on industrial users to determine or confirm compliance with pretreatment standards and requirements. The Permittee must conduct a thorough inspection of the industrial users annually. The Permittee must conduct regular local monitoring of industrial wastewaters commensurate with the character and volume of the wastewater but not less than once per year. The Permittee must collect and analyze samples in accordance with 40 CFR Part 403.12(b)(5)(ii)-(v) and 40 CFR Part 136.
- e. Enforce and obtain remedies for noncompliance by any industrial user with applicable pretreatment standards and requirements. Once it identifies violations, the Permittee must take timely and appropriate enforcement action to address the noncompliance. The Permittee's action must follow its enforcement response procedures and any amendments, thereof.
- f. Publish, at least annually in the largest daily newspaper in the Permittee's service area, a list of all non-domestic users which, at any time in the previous 12 months, were in significant noncompliance as defined in 40 CFR 403.8(f)(2)(vii).
- g. If the Permittee elects to conduct sampling of an industrial user's discharge in lieu of requiring user self-monitoring, it must satisfy all requirements of 40 CFR Part 403.12. This includes monitoring and record keeping requirements of Sections 403.12(g) and (o).

For industrial users subject to categorical standards (CIUs), the Permittee may either complete baseline and initial compliance reports for the CIU (when required by 403.12(b) and (d)) or require these of the CIU. The Permittee must ensure that it provides industrial users the results of sampling in a timely manner, inform industrial users of their right to sample, their obligations to report any sampling they do, to respond to non-compliance, and to submit other notifications. These include a slug load report (403.12(f)), notice of changed discharge (403.12(j)), and hazardous waste notifications (403.12(p)).

If sampling for the industrial user, the Permittee must not sample less than once in every six-month period unless the Permittee's approved program includes procedures for reduction of monitoring for Middle-Tier or Non-Significant Categorical Users per 403.12(e)(2) and (3) and those procedures have been followed.

- h. The Permittee must develop and maintain a data management system designed to track the status of the Permittee's industrial user inventory, industrial user discharge characteristics, and compliance status.
- i. The Permittee must maintain adequate staff, funds, and equipment to implement its pretreatment program.
- j. The Permittee must establish, where necessary, contracts or legally binding agreements with contributing jurisdictions to ensure compliance with applicable pretreatment requirements by commercial or industrial users within these jurisdictions. These contracts or agreements must identify the agency responsible to perform the various implementation and enforcement activities in the contributing jurisdiction. In addition, the Permittee must develop a Memorandum of Understanding (or Inter-local Agreement) that outlines the specific roles, responsibilities, and pretreatment activities of each jurisdiction.
- 2. The Permittee must implement the Accidental Spill Prevention Program described in the approved Industrial Pretreatment Program dated October 31, 2014. Additionally, Pasco must review, change if necessary, and submit to Ecology for approval by October 1, 2015; an updated Accidental Spill Prevention Program.
- 3. The Permittee must evaluate any new designated Significant Industrial User within one year of designation for a plan or other action to control Slug Discharges and also in accordance with 40 CFR 403.8(f)(1)(iii)(B)(6), 40 CFR 403.8(f)(2)(vi), and 40 CFR 403
- 4. Whenever Ecology determines that any waste source contributes pollutants to the Permittee's treatment works in violation of Section (b), (c), or (d) of Section 307 of the Act, and the Permittee has not taken adequate corrective action, Ecology will notify the Permittee of this determination. If the Permittee fails to take appropriate enforcement action within 30 days of this notification, Ecology may take appropriate enforcement action against the source or the Permittee.
- 5. Pretreatment Report

No later than March 31, 2016 and annually thereafter, The Permittee must provide to Ecology an annual report that briefly describes its program activities during the previous calendar year. The annual report must include the requirements listed in 40 CFR 403.12(h)(i)(1)-(5) and the following information:

a. An updated non-domestic inventory (Industrial User Survey).

- b. Results of wastewater sampling at the treatment plant as specified in Section S2. The Permittee must evaluate the adequacy of the existing local limits in Chapter 13.62 (wastewater Regulations) of the Permittee's Municipal Code, in prevention of treatment plant interference, pass through of pollutants, and sludge contamination.
- c. Status of program implementation, including:
 - 1. Any substantial modifications to the pretreatment program as originally approved by Ecology, including staffing and funding levels.
 - 2. Any interference, upset, or permit violations experienced at the POTW that are directly attributable to wastes from industrial users.
 - 3. Listing of industrial users inspected and/or monitored, and a summary of the results.
 - 4. Listing of industrial users scheduled for inspection and/or monitoring for the next year, and expected frequencies.
 - Listing of industrial users notified of promulgated pretreatment standards and/or local standards as required in 40 CFR 403.8(f)(2)(iii). The list must indicate which industrial users are on compliance schedules and the final date of compliance for each.
 - 6. Listing of industrial users issued industrial waste discharge permits.
 - 7. Planned changes in the approved local pretreatment program. (See Subsection A.5.e. below)
 - 8. Reviews and/or approvals of engineering reports, plans and specifications, and operations and maintenance manuals. This needs to include dates of reviews and/or approvals, the type of review/approval, the name of the facility, and permit number.
- d. Status of compliance activities, including:
 - 1. Listing of industrial users that failed to baseline submit monitoring reports or any other reports required under 40 CFR 403.12 and the Permittee's current Industrial Pretreatment program's Enforcement Plan and Industrial Sampling and Monitoring Guidance Manual.
 - 2. Listing of industrial users that were at any time during the reporting period not complying with federal, state, or local pretreatment standards or with applicable compliance schedules for achieving those standards, and the duration of such noncompliance.
 - 3. Summary of enforcement activities and other corrective actions taken or planned against non-complying industrial users. The Permittee must supply to Ecology a copy of the public notice of facilities that were in significant noncompliance.
- e. Local Limits updates specified in subsection S6.D. below.

f. The Permittee must request and obtain approval from Ecology before making any significant changes to the approved local pretreatment program. The Permittee must follow the procedure in 40 CFR 403.18 (b) and (c).

S6 B. Monitoring requirements.

The Permittee must monitor and report its influent and effluent as summarized below.

1. The Permittee must sample the POTW's influent and effluent on a day when industrial discharges are occurring at normal to maximum levels.

Pretreatment Monitoring				
To be reported in the pretreatment annual report				
Parameters	Sample Point	Sample Frequency	Sample Type	
pH, Oil and Grease (nonpolar),CBOD, TSS, & Ammonia	Influent and Effluent	Quarterly	24-Hour Composite	

S6.C. Reporting of Monitoring Results

Pasco must include a summary of monitoring results (Section S6.B.) in the Annual Pretreatment Report **due March 31, 2016, and on March 31 annually thereafter.**

S6.D. Local limit development

As sufficient data become available, the Permittee, in consultation with Ecology, must reevaluate its local limits in order to prevent pass through or interference. If Ecology determines that any pollutant present causes pass through or interference, or exceeds established sludge standards, the Permittee must establish new local limits or revise existing local limits as required by 40 CFR 403.5. Ecology may also require the Permittee to revise or establish local limits for any pollutant discharged from the POTW that has a reasonable potential to exceed the Water Quality Standards, Sediment Standards, or established effluent limits, or causes whole effluent toxicity. Ecology makes this determination in the form of an Administrative Order.

Ecology may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern. Any permit modification is subject to formal due process procedures under state and federal law and regulation.

S7. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit by June 30, 2019.

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

S8. Facility loading

S8.A. Design criteria

The influent flows or waste loads for the permitted facility must not exceed the following design criteria:

Maximum Average Month Flow	10.6 MGD
Total Annual Flow	1003.4 MG
Maximum Monthly BOD ₅ Load	355,600 lbs
Total Annual Nitrogen Load	866,246 lbs

S9. Engineering Report – Update

- 1. No later than April 1, 2018, the Permittee must submit an approvable stand-alone update to the 1990 Hickerson-Jacobs engineering report.
- 2. The report must contain:
 - a. The determination of the design limiting parameter for the sprayfield site.
 - b. All appropriate requirements as described in "Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems" (Washington State Department of Ecology, 1993).
 - i. Updated design criteria
 - c. The design treatment capacity of the site.
 - d. A water balance such that the leaching fraction is less than or equal to the leaching requirement.
 - e. The organic loading (soluble BOD; lbs/acre/day) that will not cause anaerobic or reducing conditions in the vadose zone.
 - f. An updated 1992 Land Management Plan
 - g. A "Salt Management Plan" that describes how the City will operate the system to comply with the groundwater enforcement limit for TDS; 631 mg/L.

h. The AKART that will be used to continuously comply with the pH enforcement limits.

S10. Land Management Plan – Update

No later than April 1, 2018, the Permittee must submit an update to the 1992 Land Management Plan. At a minimum, the plan must include:

- 1. An update Section 6.0 entitled, "Crop and Management Options". It must include:
 - a. The characteristics of the nitrogen (organic and inorganic), biochemical oxygen demand, and dissolved salt characteristics of the irrigated wastewater and supplemental fresh water sources.
 - b. A recommended crop rotation for each field.
 - c. Nitrogen mineralization and soil residual available nitrogen
 - d. Technically defensible site-specific values for nitrogen loss factors (e.g., volatilization and denitrification) for the irrigated wastewater, supplemental water, and commercial fertilizer.
 - e. Total irrigated acres.
 - f. Historical (5 years) crop removal values for nitrogen and dissolved salts.
 - g. No assumed values.
- 2. An update to Section 7.0 entitled, "Monitoring".
- 3. An update to the Appendix.

S11. Electronic Leak Detection Survey

The Permittee must conduct an electronic leak detection survey of its industrial wastewater impoundments and submit the results **no later than April 15, 2020.** The written results must contain:

- 1. A description and location of all rips, tears, punctures, etc. found in the liner for each impoundment.
- 2. The steps taken by the City to repair the damages.

S12. Farm Operations Report

The Permittee must submit a Farm Operations Report annually **by April 25th of each year** for Ecology review. The report must be prepared by a soil scientist and must generally conform to the Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems, Ecology 1993.

The report must include an annual summary of farm operations for the previous year and a cropping and irrigation schedule for the upcoming year as described in the sections below.

S12.A. Annual Summary of Farm Operations for Previous Year

The annual summary must include:

- 1. For each crop grown, the total acreage and quantity harvested.
- 2. The monthly water, nitrogen, FDS, and BOD₅ loads to each field.
 - a. Estimated soluble BOD₅ loading to each field (lbs/acre/day) based on the relationship between soluble BOD₅ and BOD₅ presented in the fact sheet for this permit.
- 3. Calculated balances for nitrogen, fixed dissolved solids (FDS), or other design limiting parameters. The calculations must include crop consumptive use, wastewater loadings of nitrogen, FDS, or other design limiting parameters, contributions from commercial fertilizers applied, and supplemental water.

The Permittee may use literature values for nutrient uptake for crops that are not grass/grain-line (e.g., non-forage crops), and for those crops that have a large amount of vegetative growth; e.g., corn; potatoes.

- 4. A water balance including the following calculations:
 - a. Irrigation system efficiency and application uniformity.
 - b. The quantity of supplemental irrigation water and wastewater applied.
 - c. Crop consumptive use.
 - d. Water stored in the soil profile outside the normal growing season.
 - e. Salt leaching requirements.
 - f. The leaching fraction (LF) for each field.
 - i. Compare the LF to the leaching requirement (LR) for each field.
- 5. A comparison of the actual total net nitrogen, water, fixed dissolved solids, (other parameters) loads, and the leaching fractions for each field to the estimated values presented in the previous year's estimated values.
- 6. A narrative on the Permittee meeting the Best Management practices in Section S4.D.
- 7. A summary and evaluation of the **soil testing results**.
 - a. The report must include for each sprayfield a continuous yearly trend analysis for soil nitrate and conductivity at each one-foot depth as measured in Section S2.E. The trend analysis must begin with the October 2000 soil test data.
- 8. The Farm Operations Report for 2016 must include a comparison of the onceper-permit cycle test results in Section S2.E with the values reported by the Permittee for 2006 and 2011.
- 9. A summary and evaluation of the **crop testing results**.

- 10. A continuous trend analysis of the TDS concentration at each downgradient monitoring well relative to the final enforcement limit for TDS; 631 mg/L.
- 11. A description of any changes in the irrigation management of the sprayfields to comply with the final groundwater enforcement limits described in the fact sheet for this permit.

S12.B. Cropping and irrigation Schedule for Upcoming Year

This schedule must include:

- 1. Crop Management information including:
 - a. The proposed acreage for each crop.
 - b. Cultivation and harvesting requirements.
 - c. Expected crop yields.
 - d. Methods for establishing a crop.
 - e. Proposed schedule for herbicide, pesticide, and fertilizer application.
- 2. Irrigation Management information including:
 - a. The frequency and timing of wastewater and supplemental irrigation water application (including harvest and non-harvest periods).
 - b. Recommended rest cycles for wastewater application where organic or hydraulic loading is of concern.
 - c. An estimation of the leaching requirement for each field and the plan to meet the requirement.
- 3. The estimated annual total nitrogen and water load capacity, and the fixed dissolved solids and BOD₅ load to each field based on the estimated wastewater discharge and planned crop rotation.

S13. Irrigation Wells – meta-data

No later than April 1, 2016, the Permittee must submit the meta-data for all of its supplemental irrigation water wells like that reported in Table 2 of the 1990 engineering report.

1. The meta-data must include the water right information for each well; i.e., place of use; annual allowed volume (acre-feet); owner.

General Conditions

G1. Signatory requirements

All applications, reports, or information submitted to Ecology must be signed as follows:

- 1. All permit applications must be signed by either a principal executive officer or ranking elected official.
- 2. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by the person described above and is submitted to Ecology at the time of authorization, and
 - b. The authorization specifies either a named individual or any individual occupying a named position.
- 3. Changes to authorization. If an authorization under paragraph G1.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. Right of entry

Representatives of Ecology have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when Ecology suspects a violation requiring immediate inspection. Representatives of Ecology must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. Permit actions

This permit is subject to modification, suspension, or termination, in whole or in part by Ecology for any of the following causes:

- 1. Violation of any permit term or condition;
- 2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;
- 3. A material change in quantity or type of waste disposal;
- 4. A material change in the condition of the waters of the state; or
- 5. Nonpayment of fees assessed pursuant to RCW 90.48.465.

Ecology may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. Reporting a cause for modification

The Permittee must submit a new application at least one hundred eighty (180) days before it wants to discharge more of any pollutant, a new pollutant, or more flow than allowed under this permit. The Permittee should use the State Waste Discharge Permit application, and submit required plans at the same time. Required plans include an Engineering Report, Plans and Specifications, and an Operations and Maintenance manual, (see Chapter 173-240 WAC). Ecology may waive these plan requirements for small changes, so contact Ecology if they do not appear necessary. The Permittee must obtain the written concurrence of the receiving POTW on the application before submitting it to Ecology. The Permittee must continue to comply with the existing permit until it is modified or reissued. Submitting a notice of dangerous waste discharge (to comply with Pretreatment or Dangerous Waste rules) triggers this requirement as well.

G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

This permit is automatically transferred to a new owner or operator if:

- 1. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to Ecology;
- 2. A copy of the permit is provided to the new owner and;
- 3. Ecology does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to Section 1. above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by Ecology.

G8. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by Ecology. Ecology may revoke this permit if the permit fees established under Chapter 173-224 WAC are not paid.

G9. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is a separate and distinct violation.

G10. Duty to provide information

The Permittee must submit to Ecology, within a reasonable time, all information that Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

G11. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of chapter 90.48 RCW and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

Appendix A

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to Ecology with appropriate laboratory documentation.

Ecology added this appendix to the permit in order to reduce the number of analytical "nondetects" in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

The lists below include conventional pollutants (as defined in CWA section 502(6) and 40 CFR Part 122.

Pollutant	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Biochemical Oxygen Demand		SM5210-B		2 mg/L
Oil and Grease (HEM) (Hexane Extractable Material)		1664 A or B	1,400	5,000
рН		SM4500-H⁺ B	N/A	N/A
Total Suspended Solids		SM2540-D		5 mg/L

CONVENTIONAL POLLUTANTS
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NONCONVENTIONAL POLLUTANTS

Pollutant & CAS No. (if available)	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Alkalinity, Total		SM2320-B		5 mg/L as CaCO3
Aluminum, Total	7429-90- 5	200.8	2.0	10
Ammonia, Total (as N)		SM4500-NH3-B and C/D/E/G/H		20
Barium Total	7440-39- 3	200.8	0.5	2.0
Boron, Total	7440-42- 8	200.8	2.0	10.0
Chemical Oxygen Demand		SM5220-D		10 mg/L
Chloride		SM4500-CI B/C/D/E and SM4110 B		Sample and limit dependent
Cobalt, Total	7440-48- 4	200.8	0.05	0.25
Color		SM2120 B/C/E		10 color units
Dissolved oxygen		SM4500-OC/OG		0.2 mg/L
Flow		Calibrated device		
Fluoride	16984- 48-8	SM4500-F E	25	100
Hardness, Total		SM2340B		200 as CaCO3
Iron, Total	7439-89- 6	200.7	12.5	50
Magnesium, Total	7439-95- 4	200.7	10	50
Manganese, Total	7439-96- 5	200.8	0.1	0.5

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NONCONVENTIONAL POLLUTANTS

Pollutant & CAS No. (if available)	CAS Number (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Molybdenum, Total	7439-98- 7	200.8	0.1	0.5
Nitrate + Nitrite Nitrogen (as N)		SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)		SM4500-N _{org} B/C and SM4500NH ₃ - B/C/D/EF/G/H		300
Phosphorus, Total (as P)		SM 4500 PB followed by SM4500-PE/PF	3	10
Soluble Reactive Phosphorus (as P)		SM4500-P E/F/G	3	10
Sulfate (as mg/L SO ₄)		SM4110-B		0.2 mg/L
Sulfide (as mg/L S)		SM4500- S²F/D/E/G		0.2 mg/L
Sulfite (as mg/L SO ₃)		SM4500-SO3B		2 mg/L
Tin, Total	7440-31- 5	200.8	0.3	1.5
Titanium, Total	7440-32- 6	200.8	0.5	2.5
Total Organic Carbon		SM5310-B/C/D		1 mg/L
Total Dissolved Solids		SM2540 C		20 mg/L
Fixed Dissolved Solids		SM2540 E		



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F2 CRF Frozen Foods, LLC, Permit No. IWDP 000200 Washington Department of Ecology





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APPENDIX F2 Issuance Date: 07/01/2015 Effective Date: 07/01/2015 Expiration Date: 06/30/2018



City of Pasco Industrial Wastewater Discharge Permit Number IWDP 000200

City of Pasco

INDUSTRIAL PRETREATMENT PROGRAM 525 North 3rd Avenue Pasco, WA 99301

In compliance with the provisions of the City of Pasco's Municipal Code, Chapter 13.62, as amended,

CRF Frozen Foods, LLC. PO Box 2508 Pasco, WA 99302

is authorized to discharge wastewater in accordance with the special and general conditions which follow.

Facility Location: 1825 Commercial Avenue.	SIC Code: 2037
Pasco, WA 99301	NAICS Code: 311411
Industry Type: Vegetable Processor	POTW Receiving Discharge: City of Pasco Industrial Wastewater Facility (ST0005369) and City of Pasco Municipal Wastewater Treatment Facility (WA-004496-2)

Ahmad Qayoumi Public Works Director City of Pacso

APPENDIX F2

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Summary of Permit Report Submittals

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Discharge Monitoring Report (DMR)	Monthly	August 25, 2015
S3.A	DMR - Priority Pollutant Data - Single Sample Data	1/permit cycle	June 30, 2016
S3.F	Reporting Permit Violations	As necessary	***
S4.A.	Operation and Maintenance Manual - Update	1/permit cycle	June 30, 2016
S4.A.	Operation and Maintenance Manual Review Confirmation Letter	Annually	Begin June 30, 2017
S4.B	Reporting Bypasses	As necessary	***
S7.C.	Solid Waste Control Plan - Update	1/permit cycle	June 30, 2017
S8.	Application for Permit Renewal	1/permit cycle	June 30, 2017
S9.	Spill Plan - Update	1/permit cycle	December 31, 2017
S10.	Compliance Schedule	1/permit cycle	December 31, 2016
G1.	Notice of Change in Authorization	As necessary	***
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	***
G5.	Engineering Report for Construction or Modification Activities	As necessary	***
G7.	Notice of Permit Transfer	As necessary	***
G8.	Payment of Fees	As assessed	***
G10.	Duty to Provide Information	As necessary	***

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Special Conditions

S1. Discharge limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than or at a concentration in excess of that authorized by this permit violates the terms and conditions of this permit.

A discharge of a pollutant in excess of local limits set by the City of Pasco's (City) industrial and municipal wastewater treatment facilites violates the terms and conditions of this permit.

Beginning on the effective date and lasting through the expiration date of this permit, the Permittee is authorized to discharge wastewater to the City's industrial wastewater treatment facility subject to the following limits **from March 1 to February 29**; unless a waiver is granted by the City:

Effluent Limits to the Industrial Wastewater Treatment Facility*: Outfall #001a					
Latitude 46.293578 Longitude -119			Longitude -119.064	1331	
	Parameter	Total Annual	Average Monthly	Maximum Daily ^a	
Flov	N	205 MG	N/A	1.25 MGD	
Bio Den	chemical Oxygen nand (BOD ₅)	N/A	70,000 lbs/day	80,000 lbs/day	
Tota	al Nitrogen	150,000 lbs	N/A	N/A	
	Parameter Minimum		nimum	Maximum	
pН		5.0 standard units		12.0 standard units	
*	CRF is authorized to utilitize the allotted 25 MG winter storage at the Industrial Wastewater Treatment Facility unless the City provides notification otherwise.				
a	Maximum daily effluent limit means the highest allowable daily discharge. The daily				
	discharge means the discharge of a pollutant measured during a calendar day. For pollutants				
	with limits expressed in units of mass, calculate the daily discharge as the total mass of the				
	pollutant discharged ove	r the day. For oth	ner units of measuren	nent, the daily discharge is the	
	average measurement of	the pollutant over	the day. This does no	t apply to pH.	

Beginning on the effective date and lasting through the expiration date of this permit, the Permittee is authorized to discharge wastewater to the City's Municipal Wastewater Treatment Facility subject to the following limits **from October 1 to June 30;** unless a waiver is granted by the City:

Effluent Limits to the Municipal Wastewater Treatment Facility: Outfall # 001b				
	La	titude 46.22314 Longitude -11	19.08636	
	Parameter	Average Monthly	Maximum Daily ^a	
Flow		N/A	50,000 GPD	
Bioche Demai	emical Oxygen nd (BOD ₅)	N/A	300 mg/L	
Tempe	erature	N/A	104 degrees Fahrenheit	
	Parameter Minimum		Maximum	
pН		5.5 standard units	9.0 standard units	
a Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limits expressed in units of mass, calculate the daily discharge as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the				

S2. Monitoring requirements

S2.A. Monitoring requirements

S2.A.1 Outfall #001a – Monitoring of Disharge to Industrial Wastewater Treatment Facility

average measurement of the pollutant over the day. This does not apply to pH.

The Permittee must monitor the wastewater in accordance with the following schedule and the requirements specified in **Appendix A**. Samples must be taken at a location that best represents the quality of the water discharged to the City.

Parameter	Units	Sampling Frequency	Sample Type
#001a – Process Wastewater Monitorin	g		
Flow (Monthly Avg.; Max)	MGD	Continuous ^a	Meter
Flow Volume (Total Annual) ^b	MG	Recorded ^c	Calculated
рН	Standard Units	1/day	Grab ^d
BOD ₅ (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f
BOD ₅ (Total Monthly, Total Annual) ^b	lbs	Recorded ^c	Calculated
TSS (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f
TKN as N (Monthly Avg.; Max)	mg/l; lbs/day	2/month ^f	24-Hr Composite ^f

City Permit - Industrial to POTW/Private

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	Parameter	Units	Sampling Frequency	Sample Type
#001a	– Process Wastewater Monitorin	g		
TKN a	as N (Total Annual) ^{b,}	lbs	Recorded ^c	Calculated
NO ₂ +J	NO ₃ as N (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f
NO ₂ +	NO ₃ as N (Total Annual) ^b	lbs	Recorded ^c	Calculated
Total Max)	Nitrogen as N (Monthly Avg.;	mg/L; lbs/day	2/month ^e	Calculated ^g
Total	Nitrogen as N (Total Annual) ^b	lbs	Recorded ^c	Calculated ^g
Condu	ctivity (Monthly Avg.; Max)	umhos/cm	2/month ^e	Grab ^d
#001a	– Process Wastewater Priority P	ollutant Scan (v	with repack operat	ion running)
Cyani	de	μg/L	June 30, 2016	Grab ^d
Total	Phenolic Compounds	μg/L	June 30, 2016	Grab ^d
Priorit	y Pollutants (PP) – Total Metals	μg/L: ng/L for mercury	June 30, 2016	24-Hr Composite ^f
PP – V	Volatile Organic Compounds	μg/L	June 30, 2016	Grab ^d
PP - A	Acid-extractable Compounds	µg/L	June 30, 2016	24-Hr Composite ^f
PP – E	Base-neutral Compounds	µg/L	June 30, 2016	24-Hr Composite ^f
PP – I	Dioxin	pg/L	June 30, 2016	24-Hr Composite ^f
PP – F	Pesticides/PCBs	µg/L	June 30, 2016	24-Hr Composite ^f
a Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The Permittee must sample hourly when continuous monitoring is not possible.				
b	Total Annual means total gallons	or lbs for a cale	endar year (January -	– December).
с	Recorded means daily values are not reported on the Discharge Monitoring Report; only monthly summary is reported.			
d	Grab means an individual sample	collected over a	a fifteen (15) minute	or less period.
e	2/month on alternate weeks.			
f	24-hour composite means a serie a 24-hour period into a single cont	s of individual f ainer and analyz	low-proportional szed as one sample.	samples collected over
g	$TN = TKN + (NO_2 + NO_3).$			

S2.A.2. Outfall #001b - Monitoring of Discharge to Municipal Wastewater Treatment Facility

The Permittee must monitor the wastewater prior to the discharge to the City's sanitary sewer system according to the following schedule and the requirements specified in **Appendix A:**

#001b – Monitoring of Discharge to Municipal Wastewater Treatment Facility				
Par	ameter	Units	Sampling Frequency	Sample Type
Flow (Monthly A	vg.; Max)	GPD	Continuous ^a	Metered
рН		Standard Units	1/week	Grab ^b
BOD ₅ (Max)		mg/l	1/month	Grab ^b
Temperature		Degrees Farenheit	5/week	Grab ^b
^a Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The Permittee must sample hourly when continuous monitoring is not possible.				
^b Grab means an individual sample collected over a fifteen (15) minute or less period.				

S2.B. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by the City.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

S2.C. Flow measurement, field measurement, and continuous monitoring devices

The Permittee must:

1. Select and use appropriate flow measurement, field measurement, and continuous monitoring devices and methods consistent with accepted scientific practices.

- 2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendations for that type of device.
- 3. Calibrate continuous monitoring instruments as per the manufacturer's requirements. The Permittee:
 - a. May calibrate apparatus for continuous monitoring of dissolved oxygen by air calibration.
 - b. Must calibrate continuous pH measurement instruments per manufacturer's specifications for method and frequency.
- 4. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
- 5. Establish a calibration frequency for each device or instrument in the Operation and Maintenance (O&M) manual that conforms to the frequency recommended by the manufacturer.
- 6. Calibrate flow-monitoring devices per manufacturer's specifications at a minimum frequency of at least one calibration per year.
- 7. Maintain calibration records for at least three years.

S2.D. Laboratory accreditation

The Permittee must ensure that all monitoring data required by the City is prepared by a laboratory registered or accredited under the provisions of WAC 173-50, *Accreditation of Environmental Laboratories*. Flow, pH, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for pH if it must receive accreditation or registration for other parameters.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to the City is a violation of the terms and conditions of this permit.

S3.A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

1. Summarize, report, and submit monitoring data obtained during each monitoring period in the discharge monitoring report (DMR) spreadsheet provided by the City. Include data for each of the parameters tabulated in Special Condition S2 of this permit and as required by the spreadsheet. Report a value for each day sampling occurred (unless specifically exempted in the permit) and for the summary values (when applicable) included on the spreadsheet.

- 2. Enter "No Discharge" or "ND" for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.
- 3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
- 4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in **Appendix A** of this permit.
- 5. Calculate average values and calculated total values (unless otherwise specified in the permit) using:
 - a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
 - b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample from the same monitoring point for the reporting period.
 - c. **Do not use** zero for any data entry values. For flow, leave the data field blank when there is no discharge.
- 6. Submit laboratory reports for single-sample grouped parameters (for example: priority pollutants, PAHs, pulp and paper chlorophenolics, TTOs (as necessary). The laboratory reports must also include: sample date, concentration detected with units, detection limit (DL) (as necessary), laboratory quantitation level (QL) (as necessary), information on the chain of custody, QA/QC results, and documentation of accreditation for the parameter (annual submission of the lab's accredited parameters will suffice).
- 7. Ensure that DMRs are submitted no later than the dates specified below, unless otherwise specified in this permit.
- 8. Submit DMRs for parameters with the monitoring frequencies specified in Section S2 of this permit (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
 - a. Submit **monthly** DMRs by the 25th day of the following month.
 - b. First monthly DMR is due August 25, 2015.
 - c. Submit Priority Pollutant Scan lab reports as required in Special Condition S2.A.1 and S2.A.2 of this permit by **June 30, 2016**.

S3.B. Permit Submittals and Schedules

The Permittee must submit all permit-required reports in paper (hard-copy) and electronic (PDF) format.

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The Permittee must ensure that the hard-copy report is postmarked or received by the City no later than the dates specified by this permit. Send these paper reports to the City at:

> Pretreatment Program Coordinator City of Pasco 525 North 3rd Avenue Pasco, WA 99301

The Permittee must also submit an electronic copy of a permit-required report in PDF format by the date the report is due to both of the City personnel listed below:

Leah Fisk: fiskl@pasco-wa.gov

<u>AND</u>

Heath Bateman: <u>batemanh@pasco-wa.gov</u>

S3.C. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the City.

S3.D. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

- 1. The date, exact place, method, and time of sampling or measurement.
- 2. The individual who performed the sampling or measurement.
- 3. The dates the analyses were performed.
- 4. The individual who performed the analyses.
- 5. The analytical techniques or methods used.
- 6. The results of all analyses.

S3.E. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Section S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Section S2 of this permit.

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S3.F. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

- 1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
- 2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to the City within thirty (30) days of sampling.

a. Immediate reporting

The Permittee must report any noncompliance that may endanger health or the environment immediately to the City and the Department of Ecology's (Ecology) Regional Office 24-hr. number listed below:

City of Pasco, Industrial Wastewater Treatment Facility	509-531-5338. If no answer; 509-727-7289*
City of Pasco, Municipal Wastewater Treatment Facility	509-947-4170*
Ecology's Eastern Regional Office	509-329-3400
*After hours:	509-727-7291

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of noncompliance by telephone, to the City at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

- 1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
- 2. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Section S4.B of this permit, "Bypass Procedures").
- 3. Any upset that causes an exceedance of an effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- 4. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1 of this permit.

5. Any overflow whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.

c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

- 1. A description of the noncompliance and its cause.
- 2. The period of noncompliance, including exact dates and times.
- 3. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.
- 4. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
- 5. If the noncompliance involves an overflow, or pipeline leak or spill, an estimate of the quantity (in gallons) of untreated overflow.
- 6. An aerial map or figure that shows the location and extent of the non-compliance.

d. Waiver of written reports

The City may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for Section S3.A of this permit ("Reporting"). The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

f. Report submittal

The Permittee must submit reports to the address listed in Section S3.A of this permit.

S3.G. Other reporting

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280. You can obtain further instructions at the following website:

http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm.

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When the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the City, it must submit such facts or information promptly.

S3.H. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to the City inspectors.

S3.I. Dangerous waste discharge notification

The Permittee must notify the City and the Ecology in writing of the intent to discharge into the industrial or sanitary system any substance designated as a dangerous waste in accordance with the provisions of WAC 173-303-070. It must make this notification at least 90 days prior to the date that it proposes to initiate the discharge. The Permittee must not discharge this substance until authorized by the City and Ecology. It must also comply with the notification requirements of Special Condition S8 and General Condition G4 of this permit.

S3.J. Spill notification

The Permittee must notify the City immediately (as soon as discovered) of all discharges that could cause problems to the Industrial or Municipal Wastewater Treatment Facility, such as process spills and unauthorized discharges (including slug discharges).

S4. Operation and maintenance

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

S4.A. Operations and maintenance manual

a. O&M manual submittal and requirements

The Permittee must:

- 1. Update the O&M Manual to meet the requirements of WAC 173-240-150 and submit it to the City for approval by **June 30, 2016.**
- 2. Review the O&M Manual at least annually and confirm this review by letter to the City starting June 30, 2017 and then annually by January 31 of each year.

- 3. Submit to the City for review and approval of substantial changes or updates to the O&M Manual whenever they incorporate them into the manual.
- 4. Keep the approved O&M Manual at the permitted facility.
- 5. Follow the instructions and procedures of this O&M manual.

b. O&M manual components

In addition to the requirements of WAC 173-240-150, the O&M manual must include:

- 1. Emergency procedures for plant shutdown and cleanup in the event of a wastewater system upset, spill, failure, or demand by the publicly owned treatment works (POTW) treating the discharge.
- 2. Wastewater system maintenance procedures that contribute to the generation of process wastewater.
- 3. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)
- 4. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.
- 5. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.
- 6. Treatment plant process control monitoring schedule.
- 7. O&M for the pump station and the main wastewater transmission pipeline.

S4.B. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility. The City may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by the City prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

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2. Bypass is unavoidable, unanticipated, and results in noncompliance of this permit.

This permit authorizes such a bypass only if:

- a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.
- b. No feasible alternatives to the bypass exist, such as:
 - The use of auxiliary treatment facilities.
 - Retention of untreated wastes.
 - Stopping production.
 - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
 - Transport of untreated wastes to another treatment facility.
- c. The Permittee has properly notified the City of the bypass as required in Condition S3.F of this permit.
- 3. If bypass is anticipated and has the potential to result in noncompliance of this permit.
 - a. The Permittee must notify the City at least thirty (30) days before the planned date of bypass. The notice must contain:
 - A description of the bypass and its cause.
 - An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
 - A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
 - The minimum and maximum duration of bypass under each alternative.
 - A recommendation as to the preferred alternative for conducting the bypass.
 - The projected date of bypass initiation.
 - A statement of compliance with SEPA.
 - A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedance of any water quality standard is anticipated.
 - Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.
 - b. For probable construction bypasses, the Permittee must notify the City of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during the project

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planning and design process. The project-specific engineering report or facilities plan as well as the plans and specifications must include details of probable construction bypasses to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

- c. The City will consider the following prior to issuing an administrative order for this type of bypass:
 - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
 - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
 - If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, the City will approve or deny the request. The City will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. The City will approve a request to bypass by issuing an administrative order.

S5. Prohibited discharges

The Permittee must comply with these General and Specific Prohibitions as referenced in the City of Pasco Municial Code (PMC) Chapter 13.62.

S5.A. General prohibitions

The Permittee must not introduce into the City's industrial (outfall 001a) or Municipal Wastewater Treatment Facility (outfall 001b) pollutant(s), which cause Pass Through or Interference.

S5.B. Specific prohibitions

In addition, the Permittee must not introduce the following into the Municipal Wastewater Treatment Facility (outfall 001b):

- 1. Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 60 degrees C (140 degrees F) using the test methods specified in 40 CFR 261.21.
- 2. Solid or viscous pollutants in amounts, which will cause obstruction to the flow in the POTW resulting in interference.

- 3. Any pollutant (including oxygen-demanding pollutants (BOD₅, etc.), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW.
- 4. Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees C (104 degrees F) unless the approval authority, upon request of the POTW, approves alternative temperature limits.
- 5. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.
- 6. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.
- 7. Any trucked or hauled pollutants, except at discharge points designated by the POTW.
- 8. Pollutants that will cause corrosive structural damage to the POTW.

S5.C. Prohibited unless approved

Any of the following discharges are prohibited unless approved by the City under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or a need to augment sewage flows due to septic conditions):

- 1. Noncontact cooling water in significant volumes
- 2. Storm water and other direct inflow sources
- 3. Wastewaters significantly affecting system hydraulic loading, which do not require treatment or would not be afforded a significant degree of treatment by the system
- 4. The discharge of dangerous wastes as defined in WAC 173-303 (unless specifically authorized in this permit).

S6. Dilution prohibited

The Permittee must not dilute the wastewater discharge with stormwater or increase the use of potable water, process water, noncontact cooling water, or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limits contained in this permit.

S7. Solid waste disposal

S7.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

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S7.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, WAC 173-201A, or the State Ground Water Quality Standards, WAC 173-200. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S5.C. Solid waste control plan

The Permittee must submit all proposed revisions or modifications to the solid waste control plan to the City for review and approval at least 30 days prior to implementation. Once approved, the Permittee must comply with any plan modifications. The Permittee must submit an update of the solid waste control plan by **June 30, 2017**. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

S8. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit by **June 30, 2017**. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

S9. Spill control plan

The Permittee must submit all proposed revisions or modifications to the spill control plan to the City for review and approval at least 30 days prior to implementation. Once approved, the Permittee must comply with any plan modifications. The Permittee must submit an update of the solid waste control plan by **December 31, 2017**. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

S10. Compliance schedule

By the date listed in the table below, the Permittee must complete the following tasks and submit a report describing, at a minimum:

- Whether it completed the task and, if not, the date on which it expects to complete the task.
- The reasons for delay and the steps it is taking to return the project to the established schedule.

	Tasks	Date Due
1.	Install and program a sampler with the capability to perform flow proportional sampling.	December 31, 2016

General Conditions

G1. Signatory requirements

All applications, reports, or information submitted to the City must be signed as follows:

- 1. All permit applications must be signed by either a principal executive officer.
- 2. All reports required by this permit and other information requested by the City must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by the person described above and is submitted to the City at the time of authorization, and
 - b. The authorization specifies either a named individual or any individual occupying a named position.
- 3. Changes to authorization. If an authorization under paragraph G1.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the City prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. Right of entry

Representatives of the City have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when the City suspects a violation requiring immediate inspection. Representatives of the City must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit;

to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. Permit actions

This permit is subject to modification, suspension, or termination, in whole or in part by the City for any of the following causes:

- 1. Violation of any permit term or condition;
- 2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;
- 3. A material change in quantity or type of waste disposal;
- 4. A material change in the condition of the waters of the state; or
- 5. Nonpayment of fees assessed pursuant to PMC 13.62.

The City may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. Reporting a cause for modification

The Permittee must submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least one hundred eighty (180) days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to the City for approval in accordance with WAC 173-240. Engineering reports, plans, and specifications should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

This permit is automatically transferred to a new owner or operator if:

1. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to the City;

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- 2. A copy of the permit is provided to the new owner and;
- 3. The City does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to 1 above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by the City.

G8. Reduced production for compliance

The Permittee must control production or discharge to the extent necessary to maintain compliance with the terms and conditions of this permit upon reduction of efficiency, loss, or failure of its treatment facility until the treatment capacity is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power for the treatment facility is reduced, lost, or fails.

G9. Removed substances

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the effluent stream for discharge.

G10. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by the City. The City may revoke this permit if the permit fees established under PMC 13.62 are not paid.

G11. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is a separate and distinct violation.

G12. Duty to provide information

The Permittee must submit to the City, within a reasonable time, all information which the City may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to the City upon request, copies of records required to be kept by this permit.

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G13. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of PMC 13.62 and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

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APPENDIX A

LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to the City with appropriate laboratory documentation.

When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from the City's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

The City added this appendix to the permit in order to reduce the number of analytical "nondetects" in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Soluble Biochemical Oxygen Demand	SM5210-B ³		2 mg/L
Chemical Oxygen Demand	SM5220-D		10 mg/L
Total Organic Carbon	SM5310-B/C/D		1 mg/L
Total Suspended Solids	SM2540-D		5 mg/L
Total Ammonia (as N)	SM4500-NH3-B and		20

CONVENTIONAL PARAMETERS

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Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
	C/D/E/G/H		
Flow	Calibrated device		
Dissolved Oxygen	SM4500-OC/OG		0.2 mg/L
Temperature (max. 7-day avg.)	Analog recorder or Use micro- recording devices known as thermistors		0.2° C
pH	$SM4500-H^+B$	N/A	N/A

NONCONVENTIONAL PARAMETERS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Total Alkalinity	SM2320-B		5 mg/L as CaCO3
Chlorine, Total Residual	SM4500 Cl G		50.0
Color	SM2120 B/C/E		10 color units
Fecal Coliform	SM 9221E,9222	N/A	Specified in method - sample aliquot dependent
Fluoride (16984-48-8)	SM4500-F E	25	100
Nitrate + Nitrite Nitrogen (as N)	SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)	SM4500-N _{org} B/C and SM4500NH ₃ - B/C/D/EF/G/H		300
Soluble Reactive Phosphorus (as P)	SM4500- PE/PF	3	10
Phosphorus, Total (as P)	SM 4500 PB followed by SM4500-PE/PF	3	10
Oil and Grease (HEM)	1664 A or B	1,400	5,000
Salinity	SM2520-B		3 practical salinity units or scale (PSU or PSS)
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO ₄)	SM4110-B		200
Sulfide (as mg/L S)	SM4500-S ² F/D/E/G		200
Sulfite (as mg/L SO ₃)	SM4500-SO3B		2000
Total Coliform	SM 9221B, 9222B, 9223B	N/A	Specified in method - sample aliquot dependent
Total Dissolved Solids	SM2540 C		20 mg/L
Total Hardness	SM2340B		200 as CaCO3
Aluminum, Total (7429-90-5)	200.8	2.0	10
Barium Total (7440-39-3)	200.8	0.5	2.0
BTEX (benzene +toluene +	EPA SW 846	1	2
ethylbenzene + m,o,p xylenes)	8021/8260		
Boron Total (7440-42-8)	200.8	2.0	10.0
Cobalt, Total (7440-48-4)	200.8	0.05	0.25

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Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Iron, Total (7439-89-6)	200.7	12.5	50
Magnesium, Total (7439-95-4)	200.7	10	50
Molybdenum, Total (7439-98-7)	200.8	0.1	0.5
Manganese, Total (7439-96-5)	200.8	0.1	0.5
NWTPH Dx ⁴	Ecology NWTPH Dx	250	250
NWTPH Gx ⁵	Ecology NWTPH Gx	250	250
Tin, Total (7440-31-5)	200.8	0.3	1.5
Titanium, Total (7440-32-6)	200.8	0.5	2.5

PRIORITY POLLUTANTS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified	
METAL	S, CYANIDE & TOTA	AL PHENOLS		
Antimony, Total (7440-36-0)	200.8	0.3	1.0	
Arsenic, Total (7440-38-2)	200.8	0.1	0.5	
Beryllium, Total (7440-41-7)	200.8	0.1	0.5	
Cadmium, Total (7440-43-9)	200.8	0.05	0.25	
Chromium (hex) dissolved (18540-29-9)	SM3500-Cr EC	0.3	1.2	
Chromium, Total (7440-47-3)	200.8	0.2	1.0	
Copper, Total (7440-50-8)	200.8	0.4	2.0	
Lead, Total (7439-92-1)	200.8	0.1	0.5	
Mercury, Total (7439-97-6)	1631E	0.0002	0.0005	
Nickel, Total (7440-02-0)	200.8	0.1	0.5	
Selenium, Total (7782-49-2)	200.8	1.0	1.0	
Silver, Total (7440-22-4)	200.8	0.04	0.2	
Thallium, Total (7440-28-0)	200.8	0.09	0.36	
Zinc, Total (7440-66-6)	200.8	0.5	2.5	
Cyanide, Total (57-12-5)	335.4	5	10	
Cyanide, Weak Acid Dissociable	SM4500-CN I	5	10	
Cyanide, Free Amenable to Chlorination (Available Cyanide)	SM4500-CN G	5	10	
Phenols, Total	EPA 420.1		50	
ACID COMPOUNDS				
2-Chlorophenol (95-57-8)	625	1.0	2.0	
2,4-Dichlorophenol (120-83-2)	625	0.5	1.0	
2,4-Dimethylphenol (105-67-9)	625	0.5	1.0	
4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol)	625/1625B	1.0	2.0	

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Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
2,4 dinitrophenol (51-28-5)	625	1.0	2.0
2-Nitrophenol (88-75-5)	625	0.5	1.0
4-nitrophenol (100-02-7)	625	0.5	1.0
Parachlorometa cresol (59-50-7) (4-chloro-3-methylphenol)	625	1.0	2.0
Pentachlorophenol (87-86-5)	625	0.5	1.0
Phenol (108-95-2)	625	2.0	4.0
2,4,6-Trichlorophenol (88-06-2)	625	2.0	4.0
	VOLATILE COMPOU	UNDS	
Acrolein (107-02-8)	624	5	10
Acrylonitrile (107-13-1)	624	1.0	2.0
Benzene (71-43-2)	624	1.0	2.0
Bromoform (75-25-2)	624	1.0	2.0
Carbon tetrachloride (56-23-5)	624/601 or SM6230B	1.0	2.0
Chlorobenzene (108-90-7)	624	1.0	2.0
Chloroethane (75-00-3)	624/601	1.0	2.0
2-Chloroethylvinyl Ether	624	1.0	2.0
(110-75-8)			
Chloroform (67-66-3)	624 or SM6210B	1.0	2.0
Dibromochloromethane (124-48-1)	624	1.0	2.0
1,2-Dichlorobenzene (95-50-1)	624	1.9	7.6
1,3-Dichlorobenzene (541-73-1)	624	1.9	7.6
1,4-Dichlorobenzene (106-46-7)	624	4.4	17.6
Dichlorobromomethane (75-27-4)	624	1.0	2.0
1,1-Dichloroethane (75-34-3)	624	1.0	2.0
1,2-Dichloroethane (107-06-2)	624	1.0	2.0
1,1-Dichloroethylene (75-35-4)	624	1.0	2.0
1,2-Dichloropropane (78-87-5)	624	1.0	2.0
1,3-dichloropropene (mixed isomers) (1,2-dichloropropylene) (542-75-6)	624	1.0	2.0
Ethylbenzene (100-41-4)	624	1.0	2.0
Methyl bromide (74-83-9) (Bromomethane)	624/601	5.0	10.0
Methyl chloride (74-87-3) (Chloromethane)	624	1.0	2.0
Methylene chloride (75-09-2)	624	5.0	10.0
1,1,2,2-Tetrachloroethane (79-34-5)	624	1.9	2.0
Tetrachloroethylene (127-18-4)	624	1.0	2.0
Toluene (108-88-3)	624	1.0	2.0
1.2-Trans-Dichloroethylene	624	1.0	2.0
(156-60-5) (Ethylene dichloride)		2.0	

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
1,1,1-Trichloroethane (71-55-6)	624	1.0	2.0
1,1,2-Trichloroethane (79-00-5)	624	1.0	2.0
Trichloroethylene (79-01-6)	624	1.0	2.0
Vinyl chloride (75-01-4)	624/SM6200B	1.0	2.0
Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
BASE/NEUTRAL C	COMPOUNDS (compou	nds in bold are Ecol	ogy PBTs)
Acenaphthene (83-32-9)	625	0.2	0.4
Acenaphthylene (208-96-8)	625	0.3	0.6
Anthracene (120-12-7)	625	0.3	0.6
Benzidine (92-87-5)	625	12	24
Benzyl butyl phthalate (85-68-7)	625	0.3	0.6
Benzo(<i>a</i>)anthracene (56-55-3)	625	0.3	0.6
Benzo(b)fluoranthene (34-benzofluoranthene) (205-99-2) ⁷	610/625	0.8	1.6
Benzo(j)fluoranthene (205-82-3)	625	0.5	1.0
Benzo(k)fluoranthene (11,12-benzofluoranthene) (207-08-9) ⁷	610/625	0.8	1.6
Benzo(r,s,t)pentaphene (189-55-9)	625	0.5	1.0
Benzo(<i>a</i>)pyrene (50-32-8)	610/625	0.5	1.0
Benzo(<i>ghi</i>)Perylene (191-24-2)	610/625	0.5	1.0
Bis(2-chloroethoxy)methane (111- 91-1)	625	5.3	21.2
Bis(2-chloroethyl)ether (111-44-4)	611/625	0.3	1.0
Bis(2-chloroisopropyl)ether (39638-32-9)	625	0.3	0.6
Bis(2- <i>ethylhexyl</i>)phthalate (117-81-7)	625	0.1	0.5
4-Bromophenyl phenyl ether (101- 55-3)	625	0.2	0.4
2-Chloronaphthalene (91-58-7)	625	0.3	0.6
4-Chlorophenyl phenyl ether (7005-72-3)	625	0.3	0.5
Chrysene (218-01-9)	610/625	0.3	0.6
Dibenzo (a,h)acridine (226-36-8)	610M/625M	2.5	10.0
Dibenzo (a,j)acridine (224-42-0)	610M/625M	2.5	10.0
Dibenzo(a- <i>h</i>)anthracene (53-70-3)(1,2,5,6-dibenzanthracene)	625	0.8	1.6
Dibenzo(a,e)pyrene (192-65-4)	610M/625M	2.5	10.0
Dibenzo(a,h)pyrene (189-64-0)	625M	2.5	10.0

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
3,3-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
Diethyl phthalate (84-66-2)	625	1.9	7.6
Dimethyl phthalate (131-11-3)	625	1.6	6.4
Di-n-butyl phthalate (84-74-2)	625	0.5	1.0
2,4-dinitrotoluene (121-14-2)	609/625	0.2	0.4
2,6-dinitrotoluene (606-20-2)	609/625	0.2	0.4

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
BASE/NEUTRAL (COMPOUNDS (compou	nds in bold are Ecol	ogy PBTs)
Di-n-octyl phthalate (117-84-0)	625	0.3	0.6
1,2-Diphenylhydrazine (as	1625B	5.0	20
Azobenzene) (122-66-7)			
Fluoranthene (206-44-0)	625	0.3	0.6
Fluorene (86-73-7)	625	0.3	0.6
Hexachlorobenzene (118-74-1)	612/625	0.3	0.6
Hexachlorobutadiene (87-68-3)	625	0.5	1.0
Hexachlorocyclopentadiene	1625B/625	0.5	1.0
(77-47-4)			
Hexachloroethane (67-72-1)	625	0.5	1.0
Indeno(1,2,3-cd)Pyrene	610/625	0.5	1.0
(193-39-5)			
Isophorone (78-59-1)	625	0.5	1.0
3-Methyl cholanthrene (56-49-5)	625	2.0	8.0
Naphthalene (91-20-3)	625	0.3	0.6
Nitrobenzene (98-95-3)	625	0.5	1.0
N-Nitrosodimethylamine (62-75-	607/625	2.0	4.0
N-Nitrosodi-n-propylamine	607/625	0.5	1.0
(621-64-7)			
N-Nitrosodiphenylamine (86-30-6)	625	0.5	1.0
Perylene (198-55-0)	625	1.9	7.6
Phenanthrene (85-01-8)	625	0.3	0.6
Pyrene (129-00-0)	625	0.3	0.6
1,2,4-Trichlorobenzene	625	0.3	0.6
(120-82-1)			
DIOXIN			
2,3,7,8-Tetra-Chlorodibenzo-P-	1613B	1.3 pg/L	5 pg/L
Dioxin (176-40-16) (2,3,7,8 TCDD)			
	PESTICIDES/PCI	Bs	
Aldrin (309-00-2)	608	0.025	0.05

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Pollutant & CAS No.	Recommended	Detection	Quantitation
(if available)	Analytical Protocol	$(\mathbf{DL})^1 \mu g/L$	Level $(OL)^2 \mu g/L$
		unless specified	unless specified
BASE/NEUTRAL (COMPOUNDS (compou	nds in bold are Ecol	ogy PBTs)
alpha-BHC (319-84-6)	608	0.025	0.05
beta-BHC (319-85-7)	608	0.025	0.05
gamma-BHC (58-89-9)	608	0.025	0.05
delta-BHC (319-86-8)	608	0.025	0.05
Chlordane (57-74-9) ⁸	608	0.025	0.05
4,4'-DDT (50-29-3)	608	0.025	0.05
4,4'-DDE (72-55-9)	608	0.025	0.05^{10}
4,4' DDD (72-54-8)	608	0.025	0.05
Dieldrin (60-57-1)	608	0.025	0.05
alpha-Endosulfan (959-98-8)	608	0.025	0.05
beta-Endosulfan (33213-65-9)	608	0.025	0.05
Endosulfan Sulfate (1031-07-8)	608	0.025	0.05
Endrin (72-20-8)	608	0.025	0.05
Endrin Aldehyde (7421-93-4)	608	0.025	0.05
Heptachlor (76-44-8)	608	0.025	0.05
Heptachlor Epoxide (1024-57-3)	608	0.025	0.05
PCB-1242 (53469-21-9) ⁹	608	0.25	0.5
PCB-1254 (11097-69-1)	608	0.25	0.5
PCB-1221 (11104-28-2)	608	0.25	0.5
PCB-1232 (11141-16-5)	608	0.25	0.5
PCB-1248 (12672-29-6)	608	0.25	0.5
PCB-1260 (11096-82-5)	608	0.13	0.5
PCB-1016 (12674-11-2) ⁹	608	0.13	0.5
Toxaphene (8001-35-2)	608	0.24	0.5

- 1. <u>Detection level (DL)</u> or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.
- Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10ⁿ, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose.

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(Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

- 3. <u>Soluble Biochemical Oxygen Demand</u> method note: First, filter the sample through a Millipore Nylon filter (or equivalent) pore size of 0.45-0.50 um (prep all filters by filtering 250 ml of laboratory grade deionized water through the filter and discard). Then, analyze sample as per method 5210-B.
- 4. <u>NWTPH Dx ⁻</u>Northwest Total Petroleum Hydrocarbons Diesel Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 5. <u>NWTPH Gx</u> Northwest Total Petroleum Hydrocarbons Gasoline Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 6. <u>1, 3-dichloroproylene (mixed isomers)</u> You may report this parameter as two separate parameters: cis-1, 3-dichlorpropropene (10061-01-5) and trans-1, 3-dichloropropene (10061-02-6).
- 7. <u>Total Benzofluoranthenes</u> Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.
- 8. <u>Chlordane</u> You may report alpha-chlordane (5103-71-9) and gamma-chlordane (5103-74-2) in place of chlordane (57-74-9). If you report alpha and gamma-chlordane, the DL/PQLs that apply are 0.025/0.050.
- 9. <u>PCB 1016 & PCB 1242</u> You may report these two PCB compounds as one parameter called PCB 1016/1242.


Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F3 Freeze Pack, Temporary Under Permit No. IWDP 000500 Washington Department of Ecology





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City of Pasco Industrial Pretreatment Program

IN THE MATTER OF AN ADMINISTRATIVE ORDER AGAINST: Oregon Potato Company d/b/a Freeze Pack

To: Mr. Tim Tippett Oregon Potato Company d/b/a Freeze Pack 6610 W. Court Street Pasco, WA 99301

Re: Temporary Discharge Permit - Oregon Potato Company d/b/a Freeze Pack

LEGAL AUTHORITY

The following findings have been made and this Order issued pursuant to the authority vested in the Public Works Director, under Section 13.62.100 of the City of Pasco's Sewer Use Ordinance. This Order is based on findings of violation of the conditions of the Wastewater Discharge permit issued under Section 13.62.050 of the City's Sewer Use Ordinance.

Violation: Oregon Potato Company d/b/a Freeze Pack is authorized to discharge wastewater to the City of Pasco Industrial Process Water Reuse Facility under temporary Waste Discharge Permit Number IWDP-000500 effective November 9, 2015. This temporary permit does not have the monitoring and other requirements needed to protect the City of Pasco's wastewater collection system and the City of Pasco's Industrial Process Water Reuse Facility.

For these reasons and in accordance with the City of Pasco's Sewer Use Ordinance, it is ordered that Oregon Potato Company d/b/a Freeze Pack takes the following actions. These actions are required at the Freeze Pack Facility located at 400 Commercial Avenue in Pasco, Washington for their discharges to the City of Pasco's Industrial Process Water Reuse Facility.

Corrective Actions:

Action 1 – Discharge Limitations

The discharge of any of the following pollutants by Freeze Pack more frequently than, or at a concentration in excess of, the following effluent limitations is a violation of this Order.

Effluent Limits				
Parameter	Average Monthly ^a	Maximum Daily		
Flow	90,000 gallons per day	150,000 gallons per day		
Nitrate (as N)	N/A	14.1 mg/L		
Parameter	Minimum	Maximum		
pH	5.5 standard units	9.0 standard units		
^a Average Monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured				

Action 2 - Wastewater Monitoring

Starting immediately, Oregon Potato Company d/b/a Freeze Pack must monitor their wastewater effluent according to the following schedule:

Parameter	Units	Sampling Frequency	Sample Type
Flow (Monthly Avg.; Max)	MGD	Continuous ^a	Meter
Flow Volume (Total Annual) ^b	MG	Recorded ^c	Calculated
рН	Standard Units	1/day	Grab ^d
BOD ₅ (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f
BOD ₅ (Total Monthly, Total Annual) ^b	lbs	Recorded ^c	Calculated
TSS (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f
TKN as N (Monthly Avg.; Max)	mg/l; lbs/day	2/month ^f	24-Hr Composite ^f
TKN as N (Total Annual) ^{b,}	lbs	Recorded ^c	Calculated
NO ₂ +NO ₃ as N (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^c	24-Hr Composite ^f
NO ₂ +NO ₃ as N (Total Annual) ^b	lbs	Recorded ^c	Calculated
Total Nitrogen as N (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	Calculated ^g
Total Nitrogen as N (Total Annual) ^b	lbs	Recorded ^c	Calculated ^g
Conductivity (Monthly Avg.; Max)	umhos/cm	2/month ^c	Grab ^d
		February and	24-Hr
Arsenic (total)	mg/1	August of each year	Composite ^f
Cadmium (total)	mg/l	February and August of each year	24-Hr Composite ^f
Copper (total)	mg/l	February and August of each year	24-Hr Composite ^f

э.

	Parameter	Units	Sampling Frequency	Sample Type
L and (total)		mg/l	February and	24-Hr
Leau	(total)	Ing/1	August of each year	Composite ¹
Merci	ury (total)	ma/l	February and	24-Hr
Wieree		Ing/1	August of each year	Composite ¹
Malu	denum (total)	mg/l	February and	24-Hr
WOIY	Juenum (total)	Ing/1	August of each year	Composite ^t
Nicka	l (total)	ma	February and	24-Hr
NICKE		Ing/1	August of each year	Composite ^t
Salani	um (total)	ma/l	February and	24-Hr
Selem		Ing/1	August of each year	Composite ^f
Tino (total)	mg/l	February and	24-Hr
			August of each year	Composite ^t
Driorit	ty pollutant analysis	µg/l	November 1, 2016	24-Hr
FIIOIII	ty ponutant analysis			Composite ^f
a	Continuous means uninterrupted	except for brief	lengths of time for calib	oration, power
	failure, or unanticipated equipmen	t repair or main	tenance. The Permittee	must sample
	hourly when continuous monitorin	ng is not possible	2.	
b	Total Annual means total gallons	or lbs for a cale	ndar year (January – D	ecember).
с	Recorded means daily values are	not reported on	the Discharge Monitori	ng Report; only
	monthly summary is reported.			
d	Grab means an individual sample	collected over a	a fifteen (15) minute or	less period.
e	2/month on alternate weeks.			
f	24-hour composite means a series	s of individual f	low-proportional samp	les collected over
	a 24-hour period into a single cont	ainer and analyz	zed as one sample.	
g	$TN = TKN + (NO_2 + NO_3).$			

A. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by the City.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

B. Flow Measurement

Oregon Potato Company d/b/a Freeze Pack must:

- 1. Select and use appropriate flow measurement, field measurement, and continuous monitoring devices and methods consistent with accepted scientific practices.
- 2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendations for that type of device.
- 3. Calibrate continuous monitoring instruments as per the manufacturer's requirements. The Permittee:
 - a. May calibrate apparatus for continuous monitoring of dissolved oxygen by air calibration.
 - b. Must calibrate continuous pH measurement instruments per manufacturer's specifications for method and frequency.
- 4. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
- 5. Calibrate flow-monitoring devices per manufacturer's specifications at a minimum frequency of at least one calibration per year.
- 6. Maintain calibration records for at least three years.

C. Lab Accreditation

Oregon Potato Company d/b/a Freeze Pack must ensure that all monitoring data required by the City of Pasco is prepared by a laboratory registered or accredited under the provisions of WAC 173-50, Accreditation of Environmental Laboratories. Flow, pH, and internal process control parameters are exempt from this requirement. The Oregon Potato Company d/b/a Freeze Pack must obtain accreditation for pH if it must receive accreditation or registration for other parameters.

Action 3 – Reporting and Recordkeeping Requirements

A. Reporting

- 1. Starting December 25, 2015, Oregon Potato Company d/b/a Freeze Pack must submit monitoring results monthly for the previous months sampling.
- 2. All reports required by this permit shall be signed by either a principal executive officer or duly authorized representative of that person.
- Summarize, report, and submit monitoring data obtained during each monitoring period on a Discharge Monitoring Report (DMR) form provided, or otherwise approved, by the City of Pasco.
- 4. Submit DMR forms monthly whether or not the facility was discharging. If the facility did not discharge during a given monitoring period, submit the form as required with the words "NO DISCHARGE" entered in place of the monitoring results.

- 5. Ensure DMR forms are postmarked or received by the City of Pasco no later than the 25th of the month following the completed monitoring period, unless otherwise specified in this permit.
- 6. Submit priority pollutant analysis data no later than November 1, 2016.
- 7. Submit all report(s) in paper (hard-copy) and electronic (PDF) format.
 - i. The Permittee must ensure that the hard-copy report is postmarked or received by the City no later than the dates specified by this permit. Send these paper reports to the City at:

Pretreatment Program Coordinator Engineering Department City of Pasco 525 North 3rd Avenue Pasco, WA 99301

ii. The Permittee must also submit an electronic copy of a permit-required report in PDF format by the date the report is due to the City personnel listed below:

Leah Fisk: fiskl@pasco-wa.gov

8. All laboratory reports providing data for organic and metal parameters must include the following information: sampling date, sample location, date of analysis, parameter name, CAS number, analytical method/number, method detection limit (MDL), laboratory practical quantitation limit (PQL), reporting units, and concentration detected. Analytical results from samples sent to a contract laboratory must include information on the chain of custody, the analytical method, QA/QC results, and documentation of accreditation for the parameter.

Action 4 – Engineering Documents

- Oregon Potato Company d/b/a Freeze Pack must prepare and submit two copies of an approvable engineering report for the Freeze Pack facility in accordance with WAC 173-240 to the City of Pasco for review and approval by March 31, 2016. The report must also include the appropriate requirements so that the Permittee can meet the City of Pasco's Industrial Process Water Reuse Facility discharge limits.
- 2. The Permittee must prepare and submit two copies of approvable as-built plans and specifications to the City of Pasco for review and approval in accordance with WAC 173-240 by March 31, 2016.
- 3. The Permittee must submit an updated permit application by March 31, 2016.

Action 5 - Compliance with Local Regulations

Oregon Potato Company d/b/a Freeze Pack must comply with the City of Pasco's Sewer Use Ordinance.

This temporary Order is effective immediately and will remain in force until a revised permit containing limits and monitoring requirements is issued for this facility.

Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

You have the right to appeal this Order. To appeal this Order you must:

• File your appeal and a copy of this permit with the City of Pasco Engineering Department (see addresses below). Filing means actual receipt by the City of Pasco Engineering Department during regular business hours.

Street Addresses

City of Pasco Attn: Public Works Director 525 North 3rd Avenue Pasco, WA 99301 **City of Pasco** Attn: Public Works Director PO Box 293 Pasco, WA 99301

Mailing Addresses

Signed: Leah C. Fisk

Pretreatment Coordinator City of Pasco



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F4 Freeze Pack, Permit No. ST0008108 Washington Department of Ecology





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APPENDIX F4 Page 1 of 29 Permit No. ST0008108

Issuance Date: July 10, 2013 Effective Date: August 1, 2013 Expiration Date: July 31, 2018

State Waste Discharge Permit Number ST0008108

State of Washington DEPARTMENT OF ECOLOGY Olympia, Washington 98504-7600

> Eastern Regional Office 4601 North Monroe Street Spokane, WA 99205-1295

In compliance with the provisions of the State of Washington Water Pollution Control Law Chapter 90.48 Revised Code of Washington, as amended,

> Oregon Potato Company D/B/A Freeze Pack

PO Box 2087, Pasco, WA 99302 400 Commercial Avenue, Pasco, WA 99301

is authorized to discharge wastewater in accordance with the special and general conditions which follow.

<u>Facility Location:</u> Along the southeastern city limits of Pasco; just east of state Highway 12.	Discharge Location: Approximately 57 acres; NE ¼ of Sec. 27, T. 9N, R. 30 EWM
Latitude: 46.236241	Latitude: 46.236495
<u>Longitude:</u> -119.046623	Longitude: -119.03742
<u>Treatment Type:</u> facultative lagoon and spray irrigation <u>Industry Type:</u> individually quick frozen (IQF) diced onions	<u>SIC Code:</u> 2037 <u>NAICS Code:</u> 311411

James M. Bellatty Water Quality Section Manager Eastern Regional Office Washington State Department of Ecology

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G4.	Reporting a cause for modification	
G5.	Plan review required	
G6.	Compliance with other laws and statutes	
G7.	Transfer of this permit	
G8.	Payment of fees	
G9.	Penalties for violating permit conditions	
G10.	Duty to provide information	
G11.	Duty to comply	
Appen	ndix A	

Summary of Permit Report Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Discharge Monitoring Report	Monthly	September 15, 2013
S3.E	Reporting Permit Violations	As necessary	***
S3.F	Other Reporting	As necessary	***
S4.A	Operations and Maintenance Manual - Update	1/permit cycle	January 6, 2015
S4.B	Reporting Bypasses	As necessary	***
S6.	Application for Permit Renewal	1/permit cycle	July 31, 2017
S7.	Engineering Report - Update	1/permit cycle	July 1, 2014
S8.	Irrigation and Crop Management Plan	1/year	May 1, 2014
G1.	Notice of Change in Authorization	As necessary	***
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	***
G5.	Engineering Report for Construction or Modification Activities	As necessary	***
G7.	Notice of Permit Transfer	As necessary	***
G8.	Payment of Fees	As assessed	***
G10.	Duty to Provide Information	As necessary	***

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Special Conditions

S1. Discharge limits

S1.A. Effluent limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

Beginning on the effective date and lasting through the expiration date of this permit, the Permittee is authorized to apply process wastewater to the designated irrigation lands via spray irrigation not to exceed the agronomic rates for nitrogen and water, and at rates for any other wastewater constituents to protect background groundwater quality.

The Permittee is authorized to apply process wastewater for final treatment on the following designated irrigation lands:

Approximately 57 acres located in the NE ¼ of Sec. 27, T. 9N, R. 30 EWM

Total nitrogen and water applied to the irrigation lands must not exceed the crop requirements as determined by the Permittee's Irrigation and Crop Management Plan, Special Condition S8.

The Permittee must operate the sprayfields in such a manner as to:

- 1. Protect the existing and future beneficial uses of both groundwater and surface water.
- 2. Not cause a violation of the groundwater standards (chapter 173-200 WAC) or the surface water quality standards (chapter 173-201A WAC).

Discharges from the processing facility to the storage pond are subject to the following limits:

Processing Facility Effluent Limits: Outfall # 001 Latitude 46.236495 Longitude -119.03742					
	Parameter Average Monthly ^a Maximum Daily				
Flow ^b 20,000 gallons per day (gpd) N/A		N/A			
Total Annual Flow		4.96 MG			
а	<u>Average Monthly</u> effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured.				
b	Ecology uses the flow data submitted in the application to set permit fees. The Permittee must report to Ecology when actual flows exceed the values reported on the permit application.				

Discharges from the storage pond to the sprayfields are subject to the following limits:

	Spray Irrigation Limits: Outfall # 002 Latitude 46.236495 Longitude -119.046623				
	Parameter	Average Monthly	Maximum Daily ^a		
Nitrate (as N)		N/A	14.1 mg/L		
	Minimum Maximum		Maximum		
рН		6.5 standard units	8.5 standard units		
Ma Lar	ximum Average Monthly Idscape Irrigation Flow ^b	1,000 gpd			
а	<u>Maximum Daily</u> effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day.				
b	Landscape Irrigation Flow values to each field shall be reported in the annual Irrigation and Crop Management Plan; Section S8.				

S1.B. Best management practices/pollution prevention

The Permittee must comply with the following Best Management Practices to prevent pollution to waters of the State:

- 1. Do <u>not</u> commingle process wastewater streams with sanitary (domestic) sewage.
- 2. Do <u>not</u> discharge in excess of the design hydraulic capacity of the storage lagoon.

S2. Monitoring requirements

S2.A. Process wastewater monitoring

The Permittee must monitor the wastewater discharged from the processing facility in accordance with the following schedule and the requirements specified in **Appendix A**.

Parameter		Units & Speciation	Sampling Frequency	Sample Type	
(1) P	(1) Process Wastewater				
Flow		Gallons Per Day (GPD)	Continuous ^a	Meter	
Flow Volume		Total Annual	Reported ^b	Meter	
a	<u>Continuous</u> means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. Sampling must be taken hourly when continuous monitoring is not possible.				

	Parameter	Units & Speciation	Sampling Frequency	Sample Type
b	Recorded means daily val monthly summary value is	ues are not reported on the reported.	e Discharge Monitoring	Report; only a

S2.B. Irrigation wastewater monitoring

The Permittee must sample at a location that best represents the process wastewater pumped and applied to the sprayfield.

The Permittee must monitor in accordance with the following schedule and the requirements specified in **Appendix A**.

Parameter	Units & Speciation	Monthly Calculations	Sampling Frequency	Sample Type	
(2) Irrigation Wastewater					
Flow ^a	Gallons Per Day (GPD)	Daily Average; Total Monthly; Total Annual	Continuous while irrigating	Meter	
Total Kjeldahl Nitrogen (TKN)	mg/L as N	Average and Max Daily	2/month	Grab	
ТКМ	lbs/day as N	Average and Max Daily	2/month	Calculated ^b	
Nitrate plus Nitrite Nitrogen	mg/L as N	Average and Max Daily	2/month	Grab	
Nitrate plus Nitrite Nitrogen	lbs/day as N	Average and Max Daily	2/month	Calculated ^b	
BOD₅	mg/L	Average and Max Daily	2/month	Grab	
BOD₅	lbs/day	Average and Max Daily	2/month	Calculated ^b	
Soluble BOD ₅ (estimated)	mg/L	Average and Max Daily	2/month	Calculated ^c	
Soluble BOD ₅ (estimated)	lbs/day	Average and Max Daily	2/month	Calculated ^b	
Fixed Dissolved Solids	mg/L	Average and Max Daily	2/month	Grab	
Fixed Dissolved Solids	lbs/day	Average and Max Daily	2/month	Calculated ^b	
рН	Standard Units	Minimum and Maximum	2/month	Grab	
^a Flow values to each field shall be reported in the annual Irrigation and Crop Management Plan; Section S8.					
b lbs/day = concentration (m	g/L) x flow (MGD) x 8.3	34			
^c Soluble BOD (mg/L) = 1.03 (BOD, mg/L) + 215					

S2.C. Landscape irrigation water monitoring

The Permittee must sample the wastewater used for landscape irrigation according to the following schedule. The sampling point shall be at the irrigation pump house where the wastewater is pumped from the storage pond to the landscape site (s).

Parameter	Units & Speciation	Monthly Calculations	Sampling Frequency	Sample Type
(3) Landscape Irrigation				
Flow	GPD	Total Daily	Continuous while irrigating	Meter
	Gallons	Total Monthly		

S2.D. Dust abatement monitoring

The Permittee must monitor the wastewater that is trucked off-site and used for dust abatement according to the following schedule:

	Parameter	Units & Speciation	Monthly Calculations	Sampling Frequency	Sample Type
(4) Dust Abatement					
Flow	Volume	Gallons ^a	Total Monthly	Per Truckload (if used)	Calculated
Flow	Volume	gallons/acre/day ^b	Total Monthly	Per Truckload (if used)	Calculated
Flow	Volume	gallons/acre/year ^c	Total Annual	Recorded ^d	Calculated
Fixe	d Dissolved Solids	mg/L	N/A	1/day	Grab
рН		Standard Units	N/A	1/day	Grab
Appl	blication area 1, 2, or 3		N/A	1/day	Field measurement
^a Total amount of gallons applied each day (all truckloads combined)					
^b Total gallons applied to total acres each day (all truckloads combined)					
^c Total gallons applied to total acres for a calendar year (January through December)					
^d <u>Recorded</u> means daily values are not reported on the Discharge Monitoring Report; only a monthly summary value is reported.					

S2.E. Groundwater monitoring

The Permittee must monitor the groundwater at monitoring wells **GWM-1, -2,** and -3 in accordance with the following schedule and the requirements specified in **Appendix A**.

Parameter	Units & Speciation	Sampling Frequency	Sample Type
(5) Groundwater Monitoring – GWM 1, 2 and 3			
Measured Depth to Groundwater	Feet (nearest 0.01 ft)	1/month	Field Measurement
рН	Standard Units	1/month	Field Measurement
Nitrate plus Nitrite Nitrogen	mg/L as N	1/month	Grab
Total Dissolved Solids	mg/L	1/month	Grab
Ferrous Iron	Present/Absent	1/month	Field Measurement
TKN	mg/L as N	3/year ^a	Grab
Ammonia Nitrogen	mg/L as N	3/year ^a	Grab
Total Dissolved Iron	ug/L	2/year ^b	Grab
Total Dissolved Manganese	ug/L	2/year ^b	Grab
 <u>3/year</u> means: May, August, and October Sampling must be done in the specified months above. The Permittee must report the data by the 15th day of the month following the sampling event. <u>2/year means: March and October</u> 			
Sampling must be done in the specified months above. The Permittee must report the data by the 15 th day of the month following the sampling event.			

S2.F. Soil monitoring

The Permittee must monitor soil on the irrigation lands as follows; the Permittee must:

- 1. Monitor once per year unless otherwise specified. Collect samples at a time that best represents soil conditions at the beginning and the end of the crop-growing season.
- 2. Locate sampling sites so they represent the irrigation site or as identified in the crop management plan.
- 3. Locate sampling sites in the same vicinity each year if possible.
- 4. Test soil at each sampling site at one-foot soil increments.
- 5. Submit results annually by May 1st with the Irrigation and Crop Management Plan; Section S8.
- 6. Composite a minimum of four (4) core samples at the depth increments defined in the table below (or until auger refusal).

The Permittee must monitor the soils in the sprayfield according to the following schedule:

Parame	ter	Units & Speciation	Sample Point	Depth Increments ^a
Exchangeable Percentage	Sodium	%	The sprayfield	1 - 4
Cation Exchan Capacity	ge	meq/100g	The sprayfield	1 - 4
Organic Matter	r	%	The sprayfield	1 - 4
Moisture Conte	ent	%	The sprayfield	1 - 4
Total Kjeldahl ((TKN)	Nitrogen	mg/Kg as N (dry weight)	The sprayfield	1 - 4
Nitrate plus Nit Nitrogen	trite	mg/Kg as N (dry weight)	The sprayfield	1 - 4
NH ₃ Nitrogen		mg/Kg as N (dry weight)	The sprayfield	1 - 4
Phosphorus (T	otal)	mg/Kg (dry weight)	The sprayfield	1 - 4
Soluble Salts		micromhos/cm	The sprayfield	1 - 4
Sodium (Total)		meq/100g	The sprayfield	1 - 4
Calcium (Total)		meq/100g	The sprayfield	1 - 4
Magnesium (Total)		meq/100g	The sprayfield	1 - 4
Potassium (Total) mg/Kg (dry weig		mg/Kg (dry weight)	The sprayfield	1 - 4
Sulfate		mg/Kg as S (dry weight)	The sprayfield	1 - 4
Chloride	nloride mg/Kg (dry weight) The sprayfield		1 - 4	
pН		Standard Units	The sprayfield	1 - 4
а	Depth increment (ft.) vs. Depth (inches) for composite samples:			
Increment 1	0 -12 inches			
Increment 2	12-24 inches			
Increment 3	24-36 inches			
Increment 4	36-48 inches			
а	Depth (inches) vs. Depth increment (ft.) for composite samples:			
	0 -12" (1ft); 12-24" (2ft); 24-36" (3ft); 36-48" (4ft); 48-60" (5ft); 60-72" (6ft)			
b	The Perm	nittee must test surficial soil	s (to 6 inch depth) for the	presence or absence of
	ferrous iron using the 1000 mg/liter 2-2' dipyridyl indicator solution, (Field Techniques			
	for Measuring Wetland Soil Parameters, Faulkner, et. al., Mav-June, 1989).			

S2.G. Crop monitoring

The Permittee must:

- 1. Monitor the crops for the parameters listed below on the sprayfield once per harvest.
- 2. Comprise composite samples of at least ten (10) random samples collected from the sprayfield.
- 3. <u>Submit results annually by May 1st with the Irrigation and Crop Management</u> <u>Plan; Section S8.</u>

Parameter	Units, Speciation, & Measurement Basis
Crop Production	dry tons/acre
Moisture Content	%

Parameter	Units, Speciation, & Measurement Basis
Total Kjeldahl Nitrogen	%
Nitrate plus Nitrite Nitrogen	mg/Kg as N (dry weight)
Phosphorus	mg/Kg as N (dry weight)
Solids (Total Fixed) (Ash	mg/Kg (dry weight)
Weight)	

S2.H. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Groundwater sampling must conform to the latest protocols in the Implementation Guidance for the Ground Water Quality Standards, (Ecology 2005).

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by Ecology.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

The Permittee must conduct and report all soil analysis in accordance with the Western States Laboratory Plant, Soil and Water Analysis Manual, Soil, Plant and Water Reference Methods for the Western Region. 3rd Edition. 2003. You can find more information online at:

http://isnap.oregonstate.edu/WERA_103/Soil_Methods.htm.

S2.I. Flow measurement and field measurement, and continuous monitoring devices

The Permittee must:

- 1. Select and use appropriate flow measurement, field measurement, and continuous monitoring devices and methods consistent with accepted scientific practices.
- 2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendation for that type of device.
- 3. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.

- 4. Calibrate these devices at the frequency recommended by the manufacturer.
- 5. Maintain calibration records for at least three years.

S2.J. Laboratory accreditation

The Permittee must ensure that all monitoring data required by Ecology for permit specified parameters is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Flow, pH and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for pH if it must receive accreditation or registration for other parameters.

Crops and soils data are process control parameters, which do not require preparation by an accredited laboratory. However, the Permittee must obtain this data from a reputable agricultural test lab that is an active participant in a nationally recognized agricultural laboratory proficiency testing program.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to Ecology is a violation of the terms and conditions of this permit.

S3.A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

1. Summarize, report, and submit monitoring data obtained during each monitoring period on the electronic Discharge Monitoring Report (DMR) form provided by Ecology within WQWebDMR. Include data for each of the parameters tabulated in Special Condition S2 and as required by the form.

Report a value for each day sampling occurred (unless specifically exempted in the permit) and for the summary values (when applicable) included on the electronic form.

To find out more information and to sign up for WQWebDMR go to: <u>http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html</u>.

If unable to submit electronically (for example, if you do not have an internet connection), the Permittee must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR.

2. Enter the "NO DISCHARGE" reporting code for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.

- 3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
- 4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in Appendix A.
- 5. Calculate average values (unless otherwise specified in the permit) using:
 - a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
 - b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample for the reporting period.
- 6. Ensure that DMRs are electronically submitted no later than the dates specified below, unless otherwise specified in this permit.
- 7. Submit DMRs for parameters with the monitoring frequencies specified in S2 (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
 - a. Submit monthly DMRs by the 15th day of the following month.
 - b. Submit 3/year DMRs, unless otherwise specified in the permit, by the 15th day of the month following the sampling event. 3/year sampling is May, August, and October.
- 8. Submit reports to Ecology online using Ecology's electronic WQWebDMR submittal forms (electronic DMRs) as required above.
- 9. Send paper reports to Ecology at:

Mr. Don Nichols Water Quality Program Department of Ecology 4601 N. Monroe Street Spokane, WA 99205

S3.B. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

The Permittee must retain all records pertaining to the monitoring of sludge for a minimum of five years.

S3.C. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

- 1. The date, exact place, method, and time of sampling or measurement
- 2. The individual who performed the sampling or measurement
- 3. The dates the analyses were performed
- 4. The individual who performed the analyses
- 5. The analytical techniques or methods used
- 6. The results of all analyses

S3.D. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Special Condition S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Special Condition S2.

S3.E. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit limit or condition:

- 1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
- 2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to Ecology within thirty (30) days of sampling.

a. Immediate reporting

The Permittee must immediately report to the Department of Ecology and the Department of Health, Drinking Water Program (at the numbers listed below), all:

• Overflows or leaks of transmission or irrigation pipelines that discharge to a waterbody used as a source of drinking or irrigation water.

Eastern Regional Office	509-329-3400
Department of Health,	800-521-0323 (business hours)
Drinking Water Program	877-481-4901 (after business hours)

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of non-compliance by telephone, to Ecology at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

- 1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
- 2. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Part S4.B., "Bypass Procedures").
- 3. Any upset that causes an exceedance of an effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- 4. Any violation of a maximum daily discharge limit in Section S1.A of this permit.
- 5. Any overflow prior to the storage pond, whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.
- 6. Any leak or failure of the wastewater transmission pipeline or irrigation pipeline distribution system.

c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

- 1. A description of the non-compliance and its cause.
- 2. Maps, drawings, aerial photographs, or pictures to show the location and cause(s) of the non-compliance.
- 3. The period of non-compliance, including exact dates and times.
- 4. The estimated time the Permittee expects the non-compliance to continue if not yet corrected.
- 5. Steps taken or planned to reduce, eliminate, and prevent recurrence of the non-compliance.
- 6. If the non-compliance involves an overflow prior to the storage pond, an estimate of the quantity (in gallons) of untreated overflow.

d. Waiver of written reports

Ecology may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for S3.A ("Reporting"). The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

f. Report submittal

The Permittee must submit reports to the address listed in S3A.

S3.F. Other reporting

a. Spills of Oil or Hazardous Materials

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280 and chapter 173-303-145. You can obtain further instructions at the following website: http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm.

b. Failure to submit relevant or correct facts

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to Ecology, it must submit such facts or information promptly.

S3.G. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to Ecology inspectors

S4. Operation and maintenance

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit.

Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

S4.A. Operations and maintenance (O&M) manual - Update

a. O&M manual submittal and requirements

The Permittee must:

- 1. Update the O&M Manual that meets the requirements of 173-240-150 WAC and submit it to Ecology for approval **by January 6, 2015**. <u>The</u> <u>Permittee must submit a paper copy and an electronic copy (preferably in a portable document format (PDF)).</u>
- 2. Submit to Ecology for review and approval substantial changes or updates to the O&M Manual whenever it incorporates them into the manual. <u>The</u> <u>Permittee must submit a paper copy and an electronic copy (preferably as a PDF).</u>
- 3. Keep the approved O&M Manual at the permitted facility.
- 4. Follow the instructions and procedures of this manual.

b. O&M manual components

In addition to the requirements of WAC 173-240-080 (1) through (5), the O&M Manual must include:

- 1. Emergency procedures for plant shutdown and cleanup in the event of a wastewater system failure including pipeline leaks.
- 2. Irrigation system operational controls and procedures.
- 3. Wastewater system maintenance procedures that contribute to the generation of wastewater.
- 4. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)
- 5. Treatment plant process control monitoring schedule.
- 6. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.
- 7. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.
- 8. Protocols and procedures for the groundwater monitoring network, and soil sampling and testing.
- 9. Protocols and procedures for implementing the leak detection plan for the storage/irrigation pond.

S4.B. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility.

Ecology may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by Ecology prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass is unavoidable, unanticipated, and results in noncompliance of this permit.

This permit authorizes such a bypass only if:

- a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.
- b. No feasible alternatives to the bypass exist, such as:
 - The use of auxiliary treatment facilities.
 - Retention of untreated wastes.
 - Stopping production.
 - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
 - Transport of untreated wastes to another treatment facility or preventative maintenance), or transport of untreated wastes to another treatment facility.
- c. The Permittee has properly notified Ecology of the bypass as required in Special Condition S3.E of this permit.
- 3. If bypass is anticipated and has the potential to result in noncompliance of this permit.
 - a. The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:
 - A description of the bypass, and its cause or reason.
 - The projected date of bypass initiation and end date.

- b. For probable construction bypasses, the Permittee must notify Ecology of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during preparation of the engineering report or facilities plan and plans and specifications and must include these to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.
- c. Ecology will consider the following prior to issuing an administrative order for this type of bypass:
 - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
 - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
 - If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve or deny the request. Ecology will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve a request to bypass by issuing an administrative order under RCW 90.48.120.

S4.C. Irrigation land application best management practices

The Permittee must:

- 1. Operate the sprayfield system to protect the existing and future beneficial uses of the groundwater, and not cause a violation of the groundwater standards.
- 2. Not allow spray irrigation practices to result in runoff of wastewater to any surface waters of the state or to any land not owned by or under its control.
- 3. Use recognized good practices, and all available and reasonable procedures to control odors from the land application system.
- 4. Implement measures to reduce odors to a reasonable minimum when notified by Ecology.
- 5. Not apply wastewater to the irrigation lands in quantities that:
 - a. Significantly reduce or destroy the long-term infiltration rate of the soil.
 - b. Would cause long-term anaerobic conditions in the soil.
 - c. Would cause ponding of wastewater and produce objectionable odors or support insects or vectors.

- d. Would cause leaching losses of constituents of concern beyond the treatment zone or in excess of the approved design. Constituents of concern are constituents in the wastewater, partial decomposition products, or soil constituents that would alter groundwater quality in amounts that would affect current and future beneficial uses.
- 6. Maintain all irrigation agreements for lands not owned for the duration of the permit cycle. Any reduction in irrigation lands by termination of any irrigation agreements may result in permit modification or revocation.
- 7. Immediately inform Ecology in writing of any proposed changes to existing irrigation agreements.
- 8. Maintain a viable and healthy cover crop on all fields that receive wastewater.
- 9. Use supplemental water or precipitation to meet the leaching requirement to control soil salinity.
- 10. Adjust irrigation plans during high precipitation events to minimize percolate losses.
- 11. Discontinue operation during periods of heavy or prolonged rainfall to prevent ground saturation and runoff.

S4.D. Best management practices – Dust abatement

The Permittee must not apply wastewater:

- 1. At a rate that results in ponding or runoff
- 2. Within 100 feet of any drinking water or irrigation well.

S5. Solid wastes

S5.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

S5.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, Chapter 173-200 WAC. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S5.C. Solid waste control plan

The Permittee must submit all proposed revisions or modifications to the solid waste control plan to Ecology for review and approval at least 30 days prior to implementation. The Permittee must comply with the approved solid waste control plan and any modifications once approved.

S6. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit **by July 31, 2017.** The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

S7. Engineering report - Update

- 1. The Permittee must prepare and submit two copies of an approvable update of the 2008 **engineering report** in accordance with WAC 173-240-130 and WAC 173-200 to Ecology for review and approval **by July 1, 2014.**
- 2. The report must contain any appropriate requirements as described in "Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems" (Washington State Department of Ecology, 1993), "Implementation Guidance for the Ground Water Quality Standards" (Washington State Department of Ecology, 2005), and "Guidance on Land Treatment of Nutrients in Wastewater, with Emphasis on Nitrogen" (Washington State Department of Ecology, 1994)
- 3. The update must also contain a Leak Detection Plan for the storage/irrigation pond.

S8. Irrigation and crop management plan

The Permittee must submit an Irrigation and Crop Management Plan annually **by May 1st** of each year for Ecology review. <u>The Permittee must submit a paper copy and an</u> <u>electronic copy (preferably as a PDF)</u>. The plan must be prepared by a soil scientist and must generally conform to the Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems, Ecology 1993.

The Irrigation and Crop Management Plan must include an annual summary of farm operations for the previous year and a cropping and irrigation schedule for the upcoming year as described in the sections below.

S8.A. Annual Summary of Farm Operations for Previous Year

The annual summary must include:

1. For each crop grown, the total acreage and quantity harvested.

- 2. Monthly BOD, soluble BOD, water, nitrogen, and FDS loading to the sprayfield.
- 3. Calculated balances for nutrients, FDS, or other design limiting parameters. The calculations must include crop consumptive use, wastewater loadings of nutrients, TFDS or other design limiting parameters, contributions from commercial fertilizers applied, and supplemental water.
- 4. A water balance including the following calculations:
 - a. Monthly loading to sprayfield
 - b. Irrigation system efficiency and application uniformity
 - c. The quantity of supplemental irrigation water and wastewater applied
 - d. Crop consumptive use
 - e. Water stored in the soil profile outside the normal growing season
 - f. Salt leaching requirements
 - g. The leaching fraction for the field
- 5. A comparison of the actual total net nitrogen, water, fixed dissolved solids, BOD and soluble BOD loads, and the leaching fractions for the sprayfield to the estimated values presented in the previous year's Irrigation and Crop Plan, **and** to the design load values in the 2008 engineering report.
- 6. A summary and evaluation of the soil testing results.
- 7. A summary and evaluation of the **crop testing results**.
- 8. A narrative on meeting the BMPs listed in Section S4.C and D of this permit.
- 9. The results of the landscape and dust abatement monitoring in Section S2.C and D, and a comparison to the average and maximum rate values in the 2008 Road Management Plan.

S8.B. Cropping and irrigation Schedule for Upcoming Year

This schedule must include:

- 1. Crop Management information including:
 - a. The proposed acreage for each crop
 - b. Cultivation and harvesting requirements
 - c. Expected crop yields
 - d. Methods for establishing a crop
 - e. Proposed schedule for herbicide, pesticide, and fertilizer application
- 2. Irrigation Management information including:
 - a. The frequency and timing of wastewater and supplemental irrigation water application (including harvest and non-harvest periods)

- b. Recommended rest cycles for wastewater application where organic or hydraulic loading is of concern
- c. An estimation of the leaching requirement for each field and the plan to meet the requirement
- 3. The estimated annual total net nitrogen and water load capacity, and the total fixed dissolved solids, and BOD and soluble BOD load to each field based on the estimated wastewater discharge and planned crop rotation.

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General Conditions

G1. Signatory requirements

All applications, reports, or information submitted to Ecology must be signed as follows:

- 1. All permit applications must be signed by either a principal executive officer or ranking elected official.
- 2. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by the person described above and is submitted to Ecology at the time of authorization, and
 - b. The authorization specifies either a named individual or any individual occupying a named position.
- 3. Changes to authorization. If an authorization under paragraph G1.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. Right of entry

Representatives of Ecology have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when Ecology suspects a violation requiring immediate inspection. Representatives of Ecology must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. Permit actions

This permit is subject to modification, suspension, or termination, in whole or in part by Ecology for any of the following causes:

- 1. Violation of any permit term or condition;
- 2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;
- 3. A material change in quantity or type of waste disposal;
- 4. A material change in the condition of the waters of the state; or
- 5. Nonpayment of fees assessed pursuant to RCW 90.48.465.

Ecology may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. Reporting a cause for modification

The Permittee must submit a new application at least one hundred eighty (180) days before it wants to discharge more of any pollutant, a new pollutant, or more flow than allowed under this permit. The Permittee should use the State Waste Discharge Permit application, and submit required plans at the same time. Required plans include an Engineering Report, Plans and Specifications, and an Operations and Maintenance manual, (see Chapter 173-240 WAC). Ecology may waive these plan requirements for small changes, so contact Ecology if they do not appear necessary. The Permittee must obtain the written concurrence of the receiving POTW on the application before submitting it to Ecology. The Permittee must continue to comply with the existing permit until it is modified or reissued. Submitting a notice of dangerous waste discharge (to comply with Pretreatment or Dangerous Waste rules) triggers this requirement as well.

G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

This permit is automatically transferred to a new owner or operator if:

- 1. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to Ecology;
- 2. A copy of the permit is provided to the new owner and;
- 3. Ecology does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to Section 1. above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by Ecology.

G8. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by Ecology. Ecology may revoke this permit if the permit fees established under Chapter 173-224 WAC are not paid.

G9. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is a separate and distinct violation.

G10. Duty to provide information

The Permittee must submit to Ecology, within a reasonable time, all information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

G11. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of chapter 90.48 RCW and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.
Appendix A

LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to Ecology with appropriate laboratory documentation.

Ecology added this appendix to the permit in order to reduce the number of analytical "nondetects" in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Total Ammonia (as N)	SM4500-NH3-B and C/D/E/G/H		20
Flow	Calibrated device		
Dissolved oxygen	SM4500-OC/OG		0.2 mg/L
рН	SM4500-H⁺ B	N/A	N/A

CONVENTIONAL PARAMETERS

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NONCONVENTIONAL PARAMETERS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Total Alkalinity	SM2320-B		5 mg/L as CaCO3
Chlorine, Total Residual	SM4500 CI G		50.0
Color	SM2120 B/C/E		10 color units
Fecal Coliform	SM 9221E,9222	N/A	Specified in method - sample aliquot dependent
Iron	EPA 200.7	12.5	50
Manganese	EPA 200.7	10	50
Nitrate + Nitrite Nitrogen (as N)	SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)	SM4500-N _{org} B/C and SM4500NH ₃ - B/C/D/EF/G/H		300
Soluble Reactive Phosphorus (as P)	SM4500- PE/PF	3	10
Phosphorus, Total (as P)	SM 4500 PB followed by SM4500-PE/PF	3	10
Oil and Grease (HEM)	1664 A or B	1,400	5,000
Salinity	SM2520-B		3 practical salinity units or scale (PSU or PSS)
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO ₄)	SM4110-B		200
Sulfide (as mg/L S)	SM4500-S ² F/D/E/G		200

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Sulfite (as mg/L SO ₃)	SM4500-SO3B		2000
Total Coliform	SM 9221B, 9222B, 9223B	N/A	Specified in method - sample aliquot dependent
Fixed dissolved solids	SM2540 E		20 mg/L

- <u>Detection level (DL)</u> or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.
- Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10ⁿ, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F5 Grimmway Enterprises, Inc., Permit No. IWDP 000500 Washington Department of Ecology





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APPENDIX F5



Issuance Date: 06/30/2016 Effective Date: 07/1/2016 Expiration Date: 06/30/2021

City of Pasco Industrial Wastewater Discharge Permit Number IWDP 000500

City of Pasco

INDUSTRIAL PRETREATMENT PROGRAM 525 North 3rd Avenue Pasco, WA 99301

In compliance with the provisions of the City of Pasco's Municipal Code, Chapter 13.62, as amended,

> Grimmway Enterprises, Inc. P. O. Box 2027 Pasco, WA 99302

is authorized to discharge wastewater in accordance with the special and general conditions which follow.

Facility Location:	1315 Dietrich Road Pasco, WA 99302	SIC Code: 2099 NAICS Code: 311991
Industry Type: Food Processor		POTW Receiving Discharge: City of Pasco Municipal Wastewater Treatment Facility (WA- 004496-2)

Ahmad Qayoumi Public Works Director City of Pacso

APPENDIX F5

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Summary of Permit Report Submittals

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Discharge Monitoring Report (DMR)	Monthly	August 25, 2016
S3.A	DMR - Priority Pollutant Data	1/permit cycle	October 25, 2016
S3.A	DMR - Priority Pollutant Data	3/permit cycle	February 25, 2017 August 25, 2017 February 25, 2018
S3.F	Reporting Permit Violations	As necessary	***
S4.A.	Operation and Maintenance Manual - Update	1/permit cycle	August 31, 2017
S4.A.	Operation and Maintenance Manual Review Confirmation Letter	Annually	Begin August 31, 2018
S4.B	Reporting Bypasses	As necessary	***
S7.C.	Solid Waste Control Plan - Update	1/permit cycle	October 31, 2018
S8.	Application for Permit Renewal	1/permit cycle	June 30, 2020
S9.	Spill Plan - Update	1/permit cycle	December 31, 2019
G1.	Notice of Change in Authorization	As necessary	***
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	***
G5.	Engineering Report for Construction or Modification Activities	As necessary	***
G7.	Notice of Permit Transfer	As necessary	***
G8.	Payment of Fees	As assessed	***
G10.	Duty to Provide Information	As necessary	***

Special Conditions

S1. Discharge limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than or at a concentration in excess of that authorized by this permit violates the terms and conditions of this permit.

A discharge of a pollutant in excess of local limits set by the City of Pasco's (City) municipal wastewater treatment facilities violates the terms and conditions of this permit.

Beginning on the effective date and lasting through the expiration date of this permit, the Permittee is authorized to discharge wastewater to the City's sewer system subject to the following limits. No discharge of industrial wastewater is allowed from January 1 through April 30 each year.

Effluent Limits ^c : Outfall # 001 (July 1 to November 30) Latitude: 46.243732 Longitude: 119.051471		
Parameter	Average Monthly ^a	Maximum Daily ^a
Flow	1.2 million gallons per day (MGD)	1.2 MGD
Biochemical Oxygen Demand (BOD ₅)		300 mg/L
Parameter	Minimum	Maximum
рН	5.5 standard units	9.0 standard units

a	Average Monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of
	each daily discharge measured during a calendar month and divide this sum by the total number of
	daily discharges measured.
b	Maximum Daily effluent limit means the highest allowable daily discharge. The daily discharge
	means the discharge of a pollutant measured during a calendar day. For pollutants with limits
	expressed in units of mass, calculate the daily discharge as the total mass of the pollutant
	discharged over the day. For other units of measurement, the daily discharge is the average
	measurement of the pollutant over the day. This does not apply to pH.
с	Additions and/or changes to Effluent Limits and permit modification may be necessary after
	revision to the City of Pasco's Local Limits and/or effects of the Permittee wastewater discharge
	to the City of Pasco's POTW.

Effluent Limits: Outfall # 001 (May 1 to June 30; December 1 to December 31) Latitude: 46.243732 Longitude: 119.051471		
Parameter	Average Monthly ^a	Maximum Daily ^a
Flow	20,000 gpd	40,000 gpd

Parameter	Minimum	Maximum
рН	5.5 standard units	9.0 standard units

а	Average Monthly effluent limit means the highest allowable average of daily discharges over a
	calendar month. To calculate the discharge value to compare to the limit, you add the value of
	each daily discharge measured during a calendar month and divide this sum by the total number of
	daily discharges measured.
b	Maximum Daily effluent limit means the highest allowable daily discharge. The daily discharge
-	means the discharge of a pollutant measured during a calendar day. For pollutants with limits
	expressed in units of mass, calculate the daily discharge as the total mass of the pollutant
	discharged over the day. For other units of measurement, the daily discharge is the average
	measurement of the pollutant over the day. This does not apply to pH.

S2. Monitoring requirements

S2.A. Monitoring requirements

The Permittee must monitor the wastewater in accordance with the following schedule and the requirements specified in **Appendix A**. Samples must be taken at a location that best represents the quality of the water discharged to the City.

Parameter	Units	Sampling Frequency	Sample Type	
(1) Outfall #001 – Final Wastewater Effluent (July 1 to November 30)				
Flow	MGD	Continuous ^a	Metered	
pH ^e	Standard Units	Continuous ^a	Metered	
BOD ₅	mg/L	2/month	24-Hr Composite ^c	
BOD ₅	lbs/day	2/month	Calculated	
Total Suspended Solids (TSS)	mg/L	2/month	24-Hr Composite ^c	
TSS	lbs/day	2/month	Calculated	
Soluble BOD ₅	mg/L	2/month	24-Hr Composite ^c	
Soluble BOD ₅	lbs/day	2/month	24-Hr Composite ^c	

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Parameter	Units	Sampling Frequency	Sample Type	
(2) Outfall # 001: Effluent Characterization – Final Wastewater Effluent (July 1 to November 30)				
Molybdenum (Total)	μg/L	1/permit cycle ^d	24-Hour Composite ^c	
Cyanide (Total)	μg/L	1/permit cycle ^d	Grab ^b	
Total Petroleum hydrocarbon	μg/L	1/permit cycle ^d	Grab ^b	
Fats, Oil, and Grease (FOG)	μg/L	1/permit cycle ^d	Grab ^b	
Total Phenolic Compounds	μg/L	1/permit cycle ^d	Grab ^b	
Priority Pollutants (PP) – Total Metals	μg/L; ng/L for mercury	1/permit cycle ^d	24-Hour Composite ^c ; Grab ^b for mercury	
PP – Volatile Organic Compounds	μg/L	1/permit cycle ^d	Grab ^b	
PP – Acid-extractable Compounds	μg/L	1/permit cycle ^d	24-Hour Composite ^c	
PP – Base-neutral Compounds	μg/L	1/permit cycle ^d	24-Hour Composite ^c	
PP - Dioxin	μg/L	1/permit cycle ^d	24-Hour Composite ^c	
PP – Pesticides/PCBs	μg/L	1/permit cycle ^d	24-Hour Composite ^c	

Parameter	Units	Sampling Frequency	Sample Type	
(3) Outfall # 001: Effluent Characterization Final Wastewater Effluent (May 1 to June 30; December 1 to December 31)				
Flow	gpd	Continuous ^a	Metered	
pH ^e	Standard Units	Continuous ^a	Metered	
Total Suspended Solids (TSS)	mg/L	1/month	24-Hour Composite ^c	
Total Petroleum Hydrocarbon	mg/L	1/month	Grab ^b	
Molybdenum (Total)	μg/L	3/permit cycle ^f	24-Hour Composite ^c	
Priority Pollutants (PP) – Total Metals	μg/L; ng/L for mercury	3/permit cycle ^f	24-Hour Composite ^c Grab ^b for mercury	

a	Continuous means uninterrupted except for brief lengths of time for calibration, for power
	failure, or for unanticipated equipment repair or maintenance. The Permittee must sample 4
	times a day over a 24 hour period when continuous monitoring is not possible.
b	Grab means an individual sample collected over a fifteen (15) minute, or less, period.
с	24-Hour Composite means a series of individual samples collected over a 24-hour period into
	a single container, and analyzed as one sample. This can be either by time or flow.
d	1/permit cycle means1 time during the permit cycle in August 2017. The Permittee must
	report data no later than October 25, 2017 in accordance with permit section S3.
e	The Permittee must report the instantaneous maximum and minimum pH monthly. Do not
	average pH values.
f	3/permit cycle means1 time during the permit cycle in the months of December 2016, June
	2017, and December 2017. The data report must be included with the monthly DMR by the
	25 th of the following month.

S2.B. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by the City.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

S2.C. Flow measurement, field measurement, and continuous monitoring devices

The Permittee must:

- 1. Select and use appropriate flow measurement, field measurement, and continuous monitoring devices and methods consistent with accepted scientific practices.
- 2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendations for that type of device.
- 3. Calibrate continuous monitoring instruments as per the manufacturer's requirements. The Permittee:
 - a. May calibrate apparatus for continuous monitoring of dissolved oxygen by air calibration.

- b. Must calibrate continuous pH measurement instruments per manufacturer's specifications for method and frequency.
- 4. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
- 5. Establish a calibration frequency for each device or instrument in the Operation and Maintenance (O&M) manual that conforms to the frequency recommended by the manufacturer.
- 6. Calibrate flow-monitoring devices per manufacturer's specifications at a minimum frequency of at least one calibration per year.
- 7. Maintain calibration records for at least three years.

S2.D. Laboratory accreditation

The Permittee must ensure that all monitoring data required by the City is prepared by a laboratory registered or accredited under the provisions of WAC 173-50, *Accreditation of Environmental Laboratories*. Flow, pH, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for pH if it must receive accreditation or registration for other parameters.

S2.E. Request for reduction in monitoring

The Permittee may request a reduction of the sampling frequency after twelve (12) months of monitoring. Ecology will review each request and at its discretion grant the request when it reissues the permit or by a permit modification.

The Permittee must:

- 1. Provide a written request.
- 2. Clearly state the parameters for which it is requesting reduced monitoring.
- 3. Clearly state the justification for the reduction.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to the City is a violation of the terms and conditions of this permit.

S3.A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

1. Summarize, report, and submit monitoring data obtained during each monitoring period in the discharge monitoring report (DMR) spreadsheet provided by the City. Include data for each of the parameters tabulated in Special Condition S2 of this permit and as required by the spreadsheet. Report a value for each day sampling occurred (unless specifically exempted

in the permit) and for the summary values (when applicable) included on the spreadsheet.

- 2. Enter "No Discharge" or "ND" for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.
- 3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
- 4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in **Appendix A** of this permit.
- 5. Calculate average values and calculated total values (unless otherwise specified in the permit) using:
 - a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
 - b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample from the same monitoring point for the reporting period.
 - c. **Do not use** zero for any data entry values. For flow, leave the data field blank when there is no discharge.
- 6. Submit laboratory reports for single-sample grouped parameters (for example: priority pollutants, PAHs, pulp and paper chlorophenolics, TTOs (as necessary). The laboratory reports must also include: sample date, concentration detected with units, detection limit (DL) (as necessary), laboratory quantitation level (QL) (as necessary), information on the chain of custody, QA/QC results, and documentation of accreditation for the parameter (annual submission of the lab's accredited parameters will suffice).
- 7. Ensure that DMRs are submitted no later than the dates specified below, unless otherwise specified in this permit.
- 8. Submit DMRs for parameters with the monitoring frequencies specified in Section S2 of this permit (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
 - a. Submit **monthly** DMRs by the 25th day of the following month.
 - b. First monthly DMR is due August 25, 2016.
 - c. Submit Priority Pollutant Scan lab reports as required in Special Condition S2 of this permit by **October 25, 2016 (1/permit); February**

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25, 2017 (3/permit); August 25, 2017 (3/permit); February 25, 2018 (3/permit).

S3.B. Permit Submittals and Schedules

The Permittee must submit all permit-required reports in paper (hard-copy) and electronic (PDF) format.

The Permittee must ensure that the hard-copy report is postmarked or received by the City no later than the dates specified by this permit. Send these paper reports to the City at:

> Pretreatment Program Coordinator Engineering Department City of Pasco 525 North 3rd Avenue Pasco, WA 99301

The Permittee must also submit an electronic copy of a permit-required report in PDF format by the date the report is due to the City personnel listed below:

Leah Fisk: fiskl@pasco-wa.gov

S3.C. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the City.

S3.D. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

- 1. The date, exact place, method, and time of sampling or measurement.
- 2. The individual who performed the sampling or measurement.
- 3. The dates the analyses were performed.
- 4. The individual who performed the analyses.
- 5. The analytical techniques or methods used.
- 6. The results of all analyses.

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S3.E. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Section S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Section S2 of this permit.

S3.F. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

- 1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
- 2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to the City within thirty (30) days of sampling.

a. Immediate reporting

The Permittee must report any noncompliance that may endanger health or the environment immediately to the City and the Department of Ecology's (Ecology) Regional Office 24-hr. number listed below:

City of Pasco, Municipal Wastewater Treatment 509-947-4170* Facility

Ecology's Eastern Regional Office	509-329-3400
*After hours:	509-727-7291

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of noncompliance by telephone, to the City at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

- 1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
- 2. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Section S4.B of this permit, "Bypass Procedures").
- 3. Any upset that causes an exceedance of an effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

- 4. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1 of this permit.
- 5. Any overflow whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.

c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

- 1. A description of the noncompliance and its cause.
- 2. The period of noncompliance, including exact dates and times.
- 3. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.
- 4. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
- 5. If the noncompliance involves an overflow, or pipeline leak or spill, an estimate of the quantity (in gallons) of untreated overflow.
- 6. An aerial map or figure that shows the location and extent of the non-compliance.

d. Waiver of written reports

The City may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for Section S3.A of this permit ("Reporting"). The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

f. Report submittal

The Permittee must submit reports to the address listed in Section S3.A of this permit.

S3.G. Other reporting

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280. You can obtain further instructions at the following website:

http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm.

When the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the City, it must submit such facts or information promptly.

S3.H. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to the City inspectors.

S3.I. Dangerous waste discharge notification

The Permittee must notify the City and the Ecology in writing of the intent to discharge into the sanitary system any substance designated as a dangerous waste in accordance with the provisions of WAC 173-303-070. It must make this notification at least 90 days prior to the date that it proposes to initiate the discharge. The Permittee must not discharge this substance until authorized by the City and Ecology. It must also comply with the notification requirements of Special Condition S8 and General Condition G4 of this permit.

S3.J. Spill notification

The Permittee must notify the City immediately (as soon as discovered) of all discharges that could cause problems to the Municipal Wastewater Treatment Facility, such as process spills and unauthorized discharges (including slug discharges).

S4. Operation and maintenance

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

S4.A. Operations and maintenance manual

a. O&M manual submittal and requirements

The Permittee must:

- 1. Update the O&M Manual to meet the requirements of WAC 173-240-150 and submit it to the City for approval by **August 31, 2017.**
- 2. Review the O&M Manual at least annually and confirm this review by letter to the City starting August 31, 2018 and then annually by August 31 of each year.

- 3. Submit to the City for review and approval of substantial changes or updates to the O&M Manual whenever they incorporate them into the manual.
- 4. Keep the approved O&M Manual at the permitted facility.
- 5. Follow the instructions and procedures of this O&M manual.

b. O&M manual components

In addition to the requirements of WAC 173-240-150, the O&M manual must include:

- 1. Emergency procedures for plant shutdown and cleanup in the event of a wastewater system upset, spill, failure, or demand by the publicly owned treatment works (POTW) treating the discharge.
- 2. Wastewater system maintenance procedures that contribute to the generation of process wastewater.
- 3. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)
- 4. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.
- 5. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.
- 6. Treatment plant process control monitoring schedule.
- 7. O&M for the pump station and the main wastewater transmission pipeline.

S4.B. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility. The City may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by the City prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass. 2. Bypass is unavoidable, unanticipated, and results in noncompliance of this permit.

This permit authorizes such a bypass only if:

- a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.
- b. No feasible alternatives to the bypass exist, such as:
 - The use of auxiliary treatment facilities.
 - Retention of untreated wastes.
 - Stopping production.
 - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
 - Transport of untreated wastes to another treatment facility.
- c. The Permittee has properly notified the City of the bypass as required in Condition S3.F of this permit.
- 3. If bypass is anticipated and has the potential to result in noncompliance of this permit.
 - a. The Permittee must notify the City at least thirty (30) days before the planned date of bypass. The notice must contain:
 - A description of the bypass and its cause.
 - An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
 - A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
 - The minimum and maximum duration of bypass under each alternative.
 - A recommendation as to the preferred alternative for conducting the bypass.
 - The projected date of bypass initiation.
 - A statement of compliance with SEPA.
 - A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedance of any water quality standard is anticipated.
 - Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.
 - b. For probable construction bypasses, the Permittee must notify the City of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during the project

planning and design process. The project-specific engineering report or facilities plan as well as the plans and specifications must include details of probable construction bypasses to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

- c. The City will consider the following prior to issuing an administrative order for this type of bypass:
 - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
 - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
 - If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, the City will approve or deny the request. The City will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. The City will approve a request to bypass by issuing an administrative order.

S5. Prohibited discharges

The Permittee must comply with these General and Specific Prohibitions as referenced in the City of Pasco Municial Code (PMC) Chapter 13.62.

S5.A. General prohibitions

The Permittee must not introduce into the City's Municipal Wastewater Treatment Facility pollutant(s), which cause Pass Through or Interference.

S5.B. Specific prohibitions

In addition, the Permittee must not introduce the following into the Municipal Wastewater Treatment Facility:

- 1. Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 60 degrees C (140 degrees F) using the test methods specified in 40 CFR 261.21.
- 2. Solid or viscous pollutants in amounts, which will cause obstruction to the flow in the POTW resulting in interference.
- 3. Any pollutant (including oxygen-demanding pollutants (BOD₅, etc.), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW.

- 4. Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees C (104 degrees F) unless the approval authority, upon request of the POTW, approves alternative temperature limits.
- 5. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.
- 6. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.
- 7. Any trucked or hauled pollutants, except at discharge points designated by the POTW.
- 8. Pollutants that will cause corrosive structural damage to the POTW.

S5.C. Prohibited unless approved

Any of the following discharges are prohibited unless approved by the City under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or a need to augment sewage flows due to septic conditions):

- 1. Noncontact cooling water in significant volumes
- 2. Storm water and other direct inflow sources
- 3. Wastewaters significantly affecting system hydraulic loading, which do not require treatment or would not be afforded a significant degree of treatment by the system
- 4. The discharge of dangerous wastes as defined in WAC 173-303 (unless specifically authorized in this permit).

S6. Dilution prohibited

The Permittee must not dilute the wastewater discharge with stormwater or increase the use of potable water, process water, noncontact cooling water, or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limits contained in this permit.

S7. Solid waste disposal

S7.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

S7.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of

treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, WAC 173-201A, or the State Ground Water Quality Standards, WAC 173-200. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S7.C. Solid waste control plan

The Permittee must submit all proposed revisions or modifications to the solid waste control plan to the City for review and approval at least 30 days prior to implementation. Once approved, the Permittee must comply with any plan modifications. The Permittee must submit an update of the solid waste control plan by **October 31, 2018**. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

S8. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit by **June 30, 2020**. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

S9. Spill control plan

The Permittee must submit all proposed revisions or modifications to the spill control plan to the City for review and approval at least 30 days prior to implementation. Once approved, the Permittee must comply with any plan modifications. The Permittee must submit an update of the solid waste control plan by **December 31, 2019**. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

General Conditions

G1. Signatory requirements

All applications, reports, or information submitted to the City must be signed as follows:

- 1. All permit applications must be signed by either a principal executive officer.
- 2. All reports required by this permit and other information requested by the City must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by the person described above and is submitted to the City at the time of authorization, and

- b. The authorization specifies either a named individual or any individual occupying a named position.
- 3. Changes to authorization. If an authorization under paragraph G1.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the City prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. Right of entry

Representatives of the City have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when the City suspects a violation requiring immediate inspection. Representatives of the City must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. Permit actions

This permit is subject to modification, suspension, or termination, in whole or in part by the City for any of the following causes:

- 1. Violation of any permit term or condition;
- 2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;
- 3. A material change in quantity or type of waste disposal;
- 4. A material change in the condition of the waters of the state; or
- 5. Nonpayment of fees assessed pursuant to PMC 13.62.

The City may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

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G4. Reporting a cause for modification

The Permittee must submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least one hundred eighty (180) days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to the City for approval in accordance with WAC 173-240. Engineering reports, plans, and specifications should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

This permit is automatically transferred to a new owner or operator if:

- 1. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to the City;
- 2. A copy of the permit is provided to the new owner and;
- 3. The City does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to 1 above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by the City.

G8. Reduced production for compliance

The Permittee must control production or discharge to the extent necessary to maintain compliance with the terms and conditions of this permit upon reduction of efficiency, loss, or failure of its treatment facility until the treatment capacity is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power for the treatment facility is reduced, lost, or fails.

G9. Removed substances

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the effluent stream for discharge.

G10. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by the City. The City may revoke this permit if the permit fees established under PMC 13.62 are not paid.

G11. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is a separate and distinct violation.

G12. Duty to provide information

The Permittee must submit to the City, within a reasonable time, all information which the City may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to the City upon request, copies of records required to be kept by this permit.

G13. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of PMC 13.62 and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

APPENDIX A

LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to the City with appropriate laboratory documentation.

When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from the City's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

The City added this appendix to the permit in order to reduce the number of analytical "nondetects" in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Soluble Biochemical Oxygen Demand	SM5210-B ³		2 mg/L
Chemical Oxygen Demand	SM5220-D		10 mg/L
Total Organic Carbon	SM5310-B/C/D		1 mg/L
Total Suspended Solids	SM2540-D		5 mg/L
Total Ammonia (as N)	SM4500-NH3-B and		20

CONVENTIONAL PARAMETERS

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Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
	C/D/E/G/H		
Flow	Calibrated device		
Dissolved Oxygen	SM4500-OC/OG		0.2 mg/L
Temperature (max. 7-day avg.)	Analog recorder or Use micro- recording devices known as thermistors		0.2° C
pH	$SM4500-H^+B$	N/A	N/A

NONCONVENTIONAL PARAMETERS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Total Alkalinity	SM2320-B		5 mg/L as CaCO3
Chlorine, Total Residual	SM4500 Cl G		50.0
Color	SM2120 B/C/E		10 color units
Fecal Coliform	SM 9221E,9222	N/A	Specified in method - sample aliquot dependent
Fluoride (16984-48-8)	SM4500-F E	25	100
Nitrate + Nitrite Nitrogen (as N)	SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)	SM4500-N _{org} B/C and SM4500NH ₃ - B/C/D/EF/G/H		300
Soluble Reactive Phosphorus (as P)	SM4500- PE/PF	3	10
Phosphorus, Total (as P)	SM 4500 PB followed by SM4500-PE/PF	3	10
Oil and Grease (HEM)	1664 A or B	1,400	5,000
Salinity	SM2520-B		3 practical salinity units or scale (PSU or PSS)
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO ₄)	SM4110-B		200
Sulfide (as mg/L S)	SM4500-S ² F/D/E/G		200
Sulfite (as mg/L SO ₃)	SM4500-SO3B		2000
Total Coliform	SM 9221B, 9222B, 9223B	N/A	Specified in method - sample aliquot dependent
Total Dissolved Solids	SM2540 C		20 mg/L
Total Hardness	SM2340B		200 as CaCO3
Aluminum, Total (7429-90-5)	200.8	2.0	10
Barium Total (7440-39-3)	200.8	0.5	2.0
BTEX (benzene +toluene + ethylbenzene + m,o,p xylenes)	EPA SW 846 8021/8260	1	2
Boron Total (7440-42-8)	200.8	2.0	10.0
Cobalt, Total (7440-48-4)	200.8	0.05	0.25

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Iron, Total (7439-89-6)	200.7	12.5	50
Magnesium, Total (7439-95-4)	200.7	10	50
Molybdenum, Total (7439-98-7)	200.8	0.1	0.5
Manganese, Total (7439-96-5)	200.8	0.1	0.5
NWTPH Dx ⁴	Ecology NWTPH Dx	250	250
NWTPH Gx ⁵	Ecology NWTPH Gx	250	250
Tin, Total (7440-31-5)	200.8	0.3	1.5
Titanium, Total (7440-32-6)	200.8	0.5	2.5

PRIORITY POLLUTANTS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified	
METAL	S, CYANIDE & TOTA	AL PHENOLS		
Antimony, Total (7440-36-0)	200.8	0.3	1.0	
Arsenic, Total (7440-38-2)	200.8	0.1	0.5	
Beryllium, Total (7440-41-7)	200.8	0.1	0.5	
Cadmium, Total (7440-43-9)	200.8	0.05	0.25	
Chromium (hex) dissolved (18540-29-9)	SM3500-Cr EC	0.3	1.2	
Chromium, Total (7440-47-3)	200.8	0.2	1.0	
Copper, Total (7440-50-8)	200.8	0.4	2.0	
Lead, Total (7439-92-1)	200.8	0.1	0.5	
Mercury, Total (7439-97-6)	1631E	0.0002	0.0005	
Nickel, Total (7440-02-0)	200.8	0.1	0.5	
Selenium, Total (7782-49-2)	200.8	1.0	1.0	
Silver, Total (7440-22-4)	200.8	0.04	0.2	
Thallium, Total (7440-28-0)	200.8	0.09	0.36	
Zinc, Total (7440-66-6)	200.8	0.5	2.5	
Cyanide, Total (57-12-5)	335.4	5	10	
Cyanide, Weak Acid Dissociable	SM4500-CN I	5	10	
Cyanide, Free Amenable to Chlorination (Available Cyanide)	SM4500-CN G	5	10	
Phenols, Total	EPA 420.1		50	
ACID COMPOUNDS				
2-Chlorophenol (95-57-8)	625	1.0	2.0	
2,4-Dichlorophenol (120-83-2)	625	0.5	1.0	
2,4-Dimethylphenol (105-67-9)	625	0.5	1.0	
4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol)	625/1625B	1.0	2.0	

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
2,4 dinitrophenol (51-28-5)	625	1.0	2.0
2-Nitrophenol (88-75-5)	625	0.5	1.0
4-nitrophenol (100-02-7)	625	0.5	1.0
Parachlorometa cresol (59-50-7)	625	1.0	2.0
(4-chloro-3-methylphenol)			
Pentachlorophenol (87-86-5)	625	0.5	1.0
Phenol (108-95-2)	625	2.0	4.0
2,4,6-Trichlorophenol (88-06-2)	625	2.0	4.0
	VOLATILE COMPOU	UNDS	
Acrolein (107-02-8)	624	5	10
Acrylonitrile (107-13-1)	624	1.0	2.0
Benzene (71-43-2)	624	1.0	2.0
Bromoform (75-25-2)	624	1.0	2.0
Carbon tetrachloride (56-23-5)	624/601 or SM6230B	1.0	2.0
Chlorobenzene (108-90-7)	624	1.0	2.0
Chloroethane (75-00-3)	624/601	1.0	2.0
2-Chloroethylvinyl Ether	624	1.0	2.0
(110-75-8)		110	2.0
Chloroform (67-66-3)	624 or SM6210B	1.0	2.0
Dibromochloromethane	624	1.0	2.0
(124-48-1)	-		
1,2-Dichlorobenzene (95-50-1)	624	1.9	7.6
1,3-Dichlorobenzene (541-73-1)	624	1.9	7.6
1,4-Dichlorobenzene (106-46-7)	624	4.4	17.6
Dichlorobromomethane (75-27-4)	624	1.0	2.0
1,1-Dichloroethane (75-34-3)	624	1.0	2.0
1.2-Dichloroethane (107-06-2)	624	1.0	2.0
1,1-Dichloroethylene (75-35-4)	624	1.0	2.0
1.2-Dichloropropane (78-87-5)	624	1.0	2.0
1.3-dichloropropene (mixed	624	1.0	2.0
isomers) (1,2-dichloropropylene) (542-75-6)			
Ethylbenzene (100-41-4)	624	1.0	2.0
Methyl bromide (74-83-9)	624/601	5.0	10.0
(Bromomethane)	021/001	210	10.0
Methyl chloride (74-87-3) (Chloromethane)	624	1.0	2.0
Methylene chloride (75-09-2)	624	5.0	10.0
1,1,2,2-Tetrachloroethane	624	1.9	2.0
(79-34-5)			
Tetrachloroethylene (127-18-4)	624	1.0	2.0
Toluene (108-88-3)	624	1.0	2.0
1,2-Trans-Dichloroethylene	624	1.0	2.0
(156-60-5) (Ethylene dichloride)			

Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection $(DL)^1 \mu g/L$ unless specified	Quantitation Level (QL) ² µg/L unless specified
1,1,1-Trichloroethane (71-55-6)	624	1.0	2.0
1,1,2-Trichloroethane (79-00-5)	624	1.0	2.0
Trichloroethylene (79-01-6)	624	1.0	2.0
Vinvl chloride (75-01-4)	624/SM6200B	1.0	2.0
Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
BASE/NEUIRAL (COMPOUNDS (compou	nds in bold are Ecol	ogy PBTs)
Acenaphthene (83-32-9)	625	0.2	0.4
Acenaphthylene (208-96-8)	625	0.3	0.6
Anthracene (120-12-7)	625	0.3	0.6
Benzidine (92-87-5)	625	12	24
Benzyl butyl phthalate (85-68-7)	625	0.3	0.6
Benzo(<i>a</i>)anthracene (56-55-3)	625	0.3	0.6
Benzo(b)fluoranthene	610/625	0.8	1.6
(3,4-benzofluoranthene) (205-99-2)	<0.5	0.5	1.0
Benzo(j)fluoranthene (205-82-3)	625	0.5	1.0
Benzo(k)fluoranthene (11,12-benzofluoranthene) (207-08-9) ⁷	610/625	0.8	1.6
Benzo(r,s,t)pentaphene (189-55-9)	625	0.5	1.0
Benzo(a)pyrene (50-32-8)	610/625	0.5	1.0
Benzo(<i>ghi</i>)Perylene (191-24-2)	610/625	0.5	1.0
Bis(2-chloroethoxy)methane (111- 91-1)	625	5.3	21.2
Bis(2-chloroethyl)ether (111-44-4)	611/625	0.3	1.0
Bis(2-chloroisopropyl)ether (39638-32-9)	625	0.3	0.6
Bis(2- <i>ethylhexyl</i>)phthalate (117-81-7)	625	0.1	0.5
4-Bromophenyl phenyl ether (101- 55-3)	625	0.2	0.4
2-Chloronaphthalene (91-58-7)	625	0.3	0.6
4-Chlorophenyl phenyl ether (7005-72-3)	625	0.3	0.5
Chrysene (218-01-9)	610/625	0.3	0.6
Dibenzo (a,h)acridine (226-36-8)	610M/625M	2.5	10.0
Dibenzo (a,j)acridine (224-42-0)	610M/625M	2.5	10.0
Dibenzo(a- <i>h</i>)anthracene (53-70-3)(1.2,5,6-dibenzanthracene)	625	0.8	1.6
Dibenzo(a,e)pyrene (192-65-4)	610M/625M	2.5	10.0
Dibenzo(a,h)pyrene (189-64-0)	625M	2.5	10.0

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
3,3-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
Diethyl phthalate (84-66-2)	625	1.9	7.6
Dimethyl phthalate (131-11-3)	625	1.6	6.4
Di-n-butyl phthalate (84-74-2)	625	0.5	1.0
2,4-dinitrotoluene (121-14-2)	609/625	0.2	0.4
2,6-dinitrotoluene (606-20-2)	609/625	0.2	0.4

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified		
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)					
Di-n-octyl phthalate (117-84-0)	625	0.3	0.6		
1,2-Diphenylhydrazine (as	1625B	5.0	20		
Azobenzene) (122-66-7)					
Fluoranthene (206-44-0)	625	0.3	0.6		
Fluorene (86-73-7)	625	0.3	0.6		
Hexachlorobenzene (118-74-1)	612/625	0.3	0.6		
Hexachlorobutadiene (87-68-3)	625	0.5	1.0		
Hexachlorocyclopentadiene	1625B/625	0.5	1.0		
(77-47-4)					
Hexachloroethane (67-72-1)	625	0.5	1.0		
Indeno(1,2,3-cd)Pyrene	610/625	0.5	1.0		
(193-39-5)					
Isophorone (78-59-1)	625	0.5	1.0		
3-Methyl cholanthrene (56-49-5)	625	2.0	8.0		
Naphthalene (91-20-3)	625	0.3	0.6		
Nitrobenzene (98-95-3)	625	0.5	1.0		
N-Nitrosodimethylamine (62-75-	607/625	2.0	4.0		
9)					
N-Nitrosodi-n-propylamine	607/625	0.5	1.0		
(621-64-7)					
N-Nitrosodiphenylamine (86-30-6)	625	0.5	1.0		
Perylene (198-55-0)	625	1.9	7.6		
Phenanthrene (85-01-8)	625	0.3	0.6		
Pyrene (129-00-0)	625	0.3	0.6		
1,2,4-Trichlorobenzene	625	0.3	0.6		
(120-82-1)					
DIOXIN					
2,3,7,8-Tetra-Chlorodibenzo-P-	1613B	1.3 pg/L	5 pg/L		
Dioxin (176-40-16) (2,3,7,8 TCDD)		~ -	~ -		
PESTICIDES/PCBs					
Aldrin (309-00-2)	608	0.025	0.05		

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified		
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)					
alpha-BHC (319-84-6)	608	0.025	0.05		
beta-BHC (319-85-7)	608	0.025	0.05		
gamma-BHC (58-89-9)	608	0.025	0.05		
delta-BHC (319-86-8)	608	0.025	0.05		
Chlordane (57-74-9) ⁸	608	0.025	0.05		
4,4'-DDT (50-29-3)	608	0.025	0.05		
4,4'-DDE (72-55-9)	608	0.025	0.05^{10}		
4,4' DDD (72-54-8)	608	0.025	0.05		
Dieldrin (60-57-1)	608	0.025	0.05		
alpha-Endosulfan (959-98-8)	608	0.025	0.05		
beta-Endosulfan (33213-65-9)	608	0.025	0.05		
Endosulfan Sulfate (1031-07-8)	608	0.025	0.05		
Endrin (72-20-8)	608	0.025	0.05		
Endrin Aldehyde (7421-93-4)	608	0.025	0.05		
Heptachlor (76-44-8)	608	0.025	0.05		
Heptachlor Epoxide (1024-57-3)	608	0.025	0.05		
PCB-1242 (53469-21-9) ⁹	608	0.25	0.5		
PCB-1254 (11097-69-1)	608	0.25	0.5		
PCB-1221 (11104-28-2)	608	0.25	0.5		
PCB-1232 (11141-16-5)	608	0.25	0.5		
PCB-1248 (12672-29-6)	608	0.25	0.5		
PCB-1260 (11096-82-5)	608	0.13	0.5		
PCB-1016 (12674-11-2) ⁹	608	0.13	0.5		
Toxaphene (8001-35-2)	608	0.24	0.5		

- 1. <u>Detection level (DL)</u> or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.
- Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10ⁿ, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose.
(Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

- 3. <u>Soluble Biochemical Oxygen Demand</u> method note: First, filter the sample through a Millipore Nylon filter (or equivalent) pore size of 0.45-0.50 um (prep all filters by filtering 250 ml of laboratory grade deionized water through the filter and discard). Then, analyze sample as per method 5210-B.
- 4. <u>NWTPH Dx ⁻</u>Northwest Total Petroleum Hydrocarbons Diesel Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 5. <u>NWTPH Gx</u> Northwest Total Petroleum Hydrocarbons Gasoline Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 6. <u>1, 3-dichloroproylene (mixed isomers)</u> You may report this parameter as two separate parameters: cis-1, 3-dichlorpropropene (10061-01-5) and trans-1, 3-dichloropropene (10061-02-6).
- 7. <u>Total Benzofluoranthenes</u> Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.
- 8. <u>Chlordane</u> You may report alpha-chlordane (5103-71-9) and gamma-chlordane (5103-74-2) in place of chlordane (57-74-9). If you report alpha and gamma-chlordane, the DL/PQLs that apply are 0.025/0.050.
- 9. <u>PCB 1016 & PCB 1242</u> You may report these two PCB compounds as one parameter called PCB 1016/1242.



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F6 Pasco Processing, LLC, Permit No. ST0005388 Washington Department of Ecology





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APPENDIX F6

Page 1 of 21 Permit No. ST0005388

Issue Date: October 3, 2013 Effective Date: November 1, 2013 Expiration Date: October 31, 2018

State Waste Discharge Permit Number ST0005388

State of Washington DEPARTMENT OF ECOLOGY Olympia, Washington 98504-7600

Eastern Regional Office 4601 North Monroe Street Spokane, Washington 99205-1295

In compliance with the provisions of the State of Washington Water Pollution Control Law Chapter 90.48 Revised Code of Washington, as amended,

> Pasco Processing, LLC 5815 Industrial Way Pasco, Washington 99301

is authorized to discharge wastewater in accordance with the special and general conditions which follow.

Facility Location: One mile north of the City of Pasco (Franklin County); at the intersection of W. Foster Wells Road and U.S. Highway 395	Discharge Location: Latitude: 46.282068 Longitude: -119.096717
Industry Type: Vegetable processor	<u>SIC Code:</u> 2037
<u>POTW Receiving Discharge:</u> City of Pasco Industrial Wastewater Treatment Facility	<u>NAICS Code:</u> 311411

Bell

James M. Bellatty Water Quality Section Manager Eastern Regional Office Washington State Department of Ecology

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Summary of Permit Report Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Discharge Monitoring Report	Monthly	November 15, 2013
S3.E	Reporting Permit Violations	As necessary	***
S3.F	Other Reporting	As necessary	***
S4.A	Operation and Maintenance Manual - Update	As necessary	***
S4.B	Reporting Bypasses	As necessary	***
S8.	Application for Permit Renewal	1/permit cycle	October 31, 2017
G1.	Notice of Change in Authorization	As necessary	***
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	***
G5.	Engineering Report for Construction or Modification Activities	As necessary	***
G7.	Notice of Permit Transfer	As necessary	***
G8.	Payment of Fees	As assessed	***
G10.	Duty to Provide Information	As necessary	***

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Special Conditions

S1. Discharge limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

Beginning on the effective date, the Permittee is authorized to discharge wastewater to the City of Pasco's industrial wastewater collection and treatment system subject to the following limits:

Effluent Limits: Outfall # 001			
Latitude: 4	16.282068	Longitude: -119.0967	<i>1</i>
Parameter		LIMI	[
Maximum Average Monthly Flow	2.5 MGD		
Total Annual Flow	383.41 MG		
Total Annual Nitrogen Load	270,000 lbs		
Maximum Daily ROD Load		127 000 lb	xc/day
	127,000 IDS/day		
Parameter		Minimum	Maximum
рН		5.0 s.u.	11.0 s.u.

S2. Monitoring requirements

S2.A. Process wastewater monitoring requirements

The Permittee must monitor the process wastewater according to the following schedule and the requirements specified in **Appendix A**:

Parameter	Units	Monthly Calculations	Sampling Frequency	Sample Type		
(1) Process Wastewater Ef	(1) Process Wastewater Effluent (after the rotary screen)					
Flow	MGD	Monthly Avg., Max.	Continuous ^a	Metered		
Flow Volume	MG	Total Monthly, Total Annual	Recorded ^d	Metered		
рН	Standard Units	Monthly Min and Max	5/week	Grab		
BOD ₅	mg/L	Monthly Avg., Max	1/2 weeks	Grab		

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	Parameter	Units	Monthly Calculations	Sampling Frequency	Sample Type	
(1)	Process Wastewater Ef	fluent (after the ro	otary screen)			
вс	DD₅	lbs/day	Monthly Avg., Max	1/2 weeks	Calculated	
To N)	tal Kjeldahl Nitrogen (as	mg/L	Monthly Avg., Max.	1/2 weeks	24-Hour Composite ^b	
тк	N (as N)	lbs/day	Monthly Avg., Max	1/2 weeks	Calculated	
тк	N (as N)	lbs	Total Annual	Recorded ^d	Calculated	
Nit	rate + Nitrite (as N)	mg/L	Monthly Avg., Max.	1/2 weeks	24-Hour Composite ^b	
Nitrate + Nitrite (as N)		lbs/day	Monthly Avg., Max	1/2 weeks	Calculated	
Nitrate + Nitrite (as N) Ibs			Total Annual	Recorded ^d	Calculated	
Total Nitrogen (as N)		mg/L	Monthly Avg., Max.	1/2 weeks	Calculated ^c	
То	tal Nitrogen (as N)	lbs/day	Monthly Avg., Max	1/2 weeks	Calculated ^c	
То	tal Nitrogen (as N)	lbs	Total Annual	Recorded ^d	Calculated	
а	^a Continuous means uninterrupted except for brief lengths of time for calibration, for power failure, or for unanticipated equipment repair or maintenance. Readings must be taken hourly when continuous monitoring is not possible.					
b	^b 24-Hour Composite is defined as a flow-proportional sample collected over a 24-Hour period					
с	^c Total Nitrogen = TKN + (nitrate + nitrite)					
d	Recorded means daily values are not reported on the Discharge Monitoring Report; only a monthly summary value is reported.					

S2.B. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by Ecology.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

S2.C. Flow measurement and continuous monitoring devices

The Permittee must:

- 1. Select and use appropriate flow measurement, and continuous monitoring devices and methods consistent with accepted scientific practices.
- 2. Install and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendation for that type of device.
- 3. Calibrate continuous monitoring instruments per the manufacturer's requirements. The Permittee:
 - a. Must calibrate continuous pH measurement instruments using a grab sample analyzed in the lab with a pH meter calibrated with standard buffers and analyzed within 15 minutes of sampling.
- 4. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
- 5. Maintain calibration records for at least three years.

S2.D. Laboratory accreditation

The Permittee must ensure that all monitoring data required by Ecology for permit specified parameters is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for pH if it must receive accreditation or registration for other parameters.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to Ecology is a violation of the terms and conditions of this permit.

S3.A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

 Summarize, report, and submit monitoring data obtained during each monitoring period on the electronic Discharge Monitoring Report (DMR) form provided by Ecology within WQWebDMR. Include data for each of the parameters tabulated in Special Condition S2 and as required by the reporting form. Report a value for each day sampling occurred (unless specifically exempted in the permit) and for the summary values (when applicable) included on the electronic form.

To find out more information and to sign up for WQWebDMR go to: http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html

2. Enter the "NO DISCHARGE" reporting code (C) for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.

- 3. Report single analytical values below detection as "less than the detection level (DL)" by entering the symbol < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
- 4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in **Appendix A**.
- 5. Calculate average values (unless otherwise specified in the permit) using:
 - a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
 - b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample for the reporting period.
 - c. Zero (for values reported below detection) if the lab did not detect the parameter in another sample for the reporting period.
- 6. Ensure that DMRs are electronically submitted no later than the dates specified below, unless otherwise specified in this permit.
- 7. Submit DMRs for parameters with the monitoring frequencies specified in S2 (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
 - a. Submit **monthly** DMRs by the 15th day of the following month.
- 8. Submit reports to Ecology online using Ecology's electronic WAWebDMR submittal forms (electronic DMRs) as required above.
- 9. Inform Ecology of all changes to the responsible official and the staff who operate and/or maintain the wastewater collection and treatment system.
- 10. Changes to WQWebDMR users. The Permittee must notify Ecology when WQWebDMR users are no longer authorized to use WebDMR on behalf of the Permittee. The notice must be sent within 10 days in writing by mail or via email to the Permit Manager.

S3.B. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit.

The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

S3.C. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

- 1. The date, exact place, method, and time of sampling or measurement
- 2. The individual who performed the sampling or measurement
- 3. The dates the analyses were performed
- 4. The individual who performed the analyses
- 5. The analytical techniques or methods used
- 6. The results of all analyses

S3.D. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Condition S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Condition S2.

S3.E. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

- 1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
- 2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to Ecology within thirty (30) days of sampling.

a. Immediate reporting

The Permittee must report any noncompliance or wastewater spill that may endanger health or the environment immediately to the Department of Ecology's Regional Office 24-hr. number, and any spill that would cause an upset, collection system/treatment failure to the City of Pasco's wastewater treatment facility at the phone numbers listed below:

Eastern Regional Office	509-329-3400
City of Pasco	509-544-3083

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of noncompliance by telephone, to Ecology and the City of Pasco at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

- 1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
- 2. Any unanticipated bypass of the treatment system that causes an exceedance of an effluent limit in the permit (See Part S4.B., "Bypass Procedures").

3. Any upset that causes an exceedance of an effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee.

An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

4. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.

c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

- 1. A description of the non-compliance and its cause.
- 2. The period of non-compliance, including exact dates and times.
- 3. The estimated time the Permittee expects the non-compliance to continue if not yet corrected.
- 4. Steps taken or planned to reduce, eliminate, and prevent recurrence of the non-compliance.
- 5. If the non-compliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

d. Waiver of written reports

Ecology may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits each discharge monitoring report described in S3.A ("Reporting").

The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

f. Report submittal

The Permittee must submit reports to:

Mr. Scott Mallery, P.E. Water Quality Program Department of Ecology 4601 N. Monroe Street Spokane, WA 99205

S3.F. Other reporting

a. Spills of Oil or Hazardous Materials

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280 and chapter 173-303-145. You can obtain further instructions online at the following website: http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm.

b. Failure to submit relevant or correct facts

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to Ecology, it must submit such facts or information promptly.

S3.G. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to Ecology inspectors.

S3.H. Dangerous waste discharge notification

The Permittee must notify the City of Pasco and Ecology in writing of their intent to discharge into the POTW any substance designated as a dangerous waste in accordance with the provisions of WAC 173-303-070. It must make this notification at least 90 days prior to the date that it proposes to initiate the discharge. The Permittee must not discharge this substance until authorized by Ecology and the city. It must also comply with the notification requirements of Special Condition S8 and General Condition G4.

S3.I. Spill notification

The Permittee must notify the City of Pasco immediately (as soon as discovered) of all discharges that could cause problems to the POTW, such as process spills and unauthorized discharges (including slug discharges).

S4. Operation and maintenance

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

S4.A. Operations and maintenance manual

a. O&M manual submittal and requirements

The Permittee must:

- 1. Submit to Ecology for review and approval substantial changes or updates to the O&M Manual whenever it incorporates them into the manual.
- 2. Keep the approved O&M Manual at the permitted facility.
- 3. Follow the instructions and procedures of this manual.

b. O&M manual components

In addition to the requirements of WAC 173-240-150(1) and (2), the O&M manual must include:

- 1. Emergency procedures for plant shutdown and cleanup in event of wastewater system upset, spill, failure, or demand by the publicly owned treatment works (POTW) treating the discharge.
- 2. Wastewater system maintenance procedures that contribute to the generation of process wastewater.
- 3. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)
- 4. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.
- 5. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.
- 6. Treatment plant process control monitoring schedule.
- 7. Emergency procedures for processing facility shutdown in the event of a failure of the City of Pasco's industrial wastewater collection and treatment system.
- 8. Directions for cleaning, maintaining, and calibrating the composite sampler, wastewater flow meter, magnesium hydroxide injection system, and inline pH probe.
- 9. Operations and procedures to report and prevent the discharge of slug loads to the city's POTW.

S4.B. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility.

Ecology may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by Ecology prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass is unavoidable, unanticipated, and results in noncompliance of this permit.

This permit authorizes such a bypass only if:

- a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.
- b. No feasible alternatives to the bypass exist, such as:
 - The use of auxiliary treatment facilities.
 - Retention of untreated wastes.
 - Stopping production.
 - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
 - Transport of untreated wastes to another treatment facility.
- c. The Permittee has properly notified Ecology of the bypass as required in Condition S3.E of this permit.
- 3. If bypass is anticipated and has the potential to result in noncompliance of this permit.
 - a. The Permittee must notify Ecology and the City of Pasco at least thirty (30) days before the planned date of bypass. The notice must contain:
 - A description of the bypass and its cause or reason
 - The estimated start and stop times of the bypass
 - The projected date of bypass initiation
 - What steps or actions will be taken to insure the bypass will not cause the City of Pasco to violate the terms and conditions of its State Waste Discharge Permit
 - b. For probable construction bypasses, the Permittee must notify Ecology and the City of Pasco of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during preparation of the engineering report or facilities plan and plans and specifications and must include these to the extent practical.

In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

- c. Ecology will consider the following prior to approving or issuing an administrative order for this type of bypass:
 - If the City of Pasco approves the bypass
 - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
 - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
 - If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve or deny the request. Ecology will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve a request to bypass in writing or by issuing an administrative order under RCW 90.48.120.

S5. Prohibited discharges

The Permittee must comply with these General and Specific Prohibitions.

S5.A. General prohibitions

The Permittee must not introduce into the City of Pasco's POTW pollutant(s), which cause Pass Through or Interference.

S5.B. Specific prohibitions

In addition, the Permittee must not introduce the following into the POTW:

- 1. Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 60 degrees C (140 degrees F) using the test methods specified in 40 CFR 261.21
- 2. Solid or viscous pollutants in amounts, which will cause obstruction to the flow in the POTW resulting in interference
- 3. Any pollutant (including oxygen-demanding pollutants (BOD₅, etc.), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW
- 4. Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees C (104 degrees F) unless the approval authority, upon request of the POTW, approves alternative temperature limits
- 5. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through

- 6. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems
- 7. Any trucked or hauled pollutants, except at discharge points designated by the POTW
- 8. Pollutants that will cause corrosive structural damage to the POTW.

S5.C. Prohibited unless approved

Any of the following discharges are prohibited unless approved by Ecology and the City of Pasco under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or a need to augment sewage flows due to septic conditions):

- 1. Noncontact cooling water in significant volumes
- 2. Storm water and other direct inflow sources
- 3. Wastewaters significantly affecting system hydraulic loading, which do not require treatment or would not be afforded a significant degree of treatment by the system
- 4. The discharge of dangerous wastes as defined in Chapter 173-303 WAC (Unless specifically authorized in this permit)

S6. Dilution prohibited

The Permittee must not dilute the wastewater discharge with stormwater or increase the use of potable water, process water, noncontact cooling water, or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limits contained in this permit.

S7. Solid waste disposal

S7.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

S7.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, Chapter 173-200 WAC. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S8. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit **by October 31**, **2017.** The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

General Conditions

G1. Signatory requirements

All applications, reports, or information submitted to Ecology must be signed as follows:

- 1. All permit applications must be signed by either a principal executive officer or ranking elected official.
- 2. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by the person described above and is submitted to Ecology at the time of authorization, and
 - b. The authorization specifies either a named individual or any individual occupying a named position.
- 3. Changes to authorization. If an authorization under paragraph G1.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. Right of entry

Representatives of Ecology have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when Ecology suspects a violation requiring immediate inspection. Representatives of Ecology must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. Permit actions

This permit is subject to modification, suspension, or termination, in whole or in part by Ecology for any of the following causes:

1. Violation of any permit term or condition;

- 2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;
- 3. A material change in quantity or type of waste disposal;
- 4. A material change in the condition of the waters of the state; or
- 5. Nonpayment of fees assessed pursuant to RCW 90.48.465.

Ecology may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. Reporting a cause for modification

The Permittee must submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least one hundred eighty (180) days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

This permit is automatically transferred to a new owner or operator if:

- 1. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to Ecology;
- 2. A copy of the permit is provided to the new owner and;
- 3. Ecology does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to Section 1. above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by Ecology.

G8. Reduced production for compliance

The Permittee must control production or discharge to the extent necessary to maintain compliance with the terms and conditions of this permit upon reduction of efficiency, loss, or failure of its treatment facility until the treatment capacity is restored or an alternative method of treatment is provided.

This requirement applies in the situation where, among other things, the primary source of power for the treatment facility is reduced, lost, or fails.

G9. Removed substances

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the effluent stream for discharge.

G10. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by Ecology. Ecology may revoke this permit if the permit fees established under Chapter 173-224 WAC are not paid.

G11. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is a separate and distinct violation.

G12. Duty to provide information

The Permittee must submit to Ecology, within a reasonable time, all information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

G13. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of chapter 90.48 RCW and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

Appendix A

LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to Ecology with appropriate laboratory documentation.

When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from Ecology's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

Ecology added this appendix to the permit in order to reduce the number of analytical "non-detects" in permitrequired monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Total Ammonia (as N)	SM4500-NH3-B and C/D/E/G/H		20
Flow	Calibrated device		
рН	SM4500-H⁺ B	N/A	N/A

CONVENTIONAL PARAMETERS

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NONCONVENTIONAL PARAMETERS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Total Alkalinity	SM2320-B		5 mg/L as CaCO3
Nitrate + Nitrite Nitrogen (as N)	SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)	SM4500-N _{org} B/C and SM4500NH ₃ - B/C/D/EF/G/H		300
Sulfate (as mg/L SO ₄)	SM4110-B		200
Sulfite (as mg/L SO ₃)	SM4500-SO3B		2000
Total Coliform	SM 9221B, 9222B, 9223B	N/A	Specified in method - sample aliquot dependent
Total dissolved solids	SM2540 C		20 mg/L

- 1. <u>Detection level (DL)</u> or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.
- 2. <u>Quantitation Level (QL)</u> also known as Minimum Level of Quantitation (ML) The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10ⁿ, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F7 Reser's Fine Foods, Inc., Permit No. IWDP 000300 Washington Department of Ecology





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APPENDIX F7



Issance Date: 07/01/2015 Effective Date: 07/01/2015 Expiration Date: 06/30/2020

City of Pasco Industrial Wastewater Discharge Permit Number IWDP 000300

City of Pasco INDUSTRIAL PRETREATMENT PROGRAM 525 North 3rd Avenue Pasco, WA 99301

In compliance with the provisions of the City of Pasco's Municipal Code, Chapter 13.62, as amended,

> Reser's Fine Foods, Inc. 5310 N. Industrial Way Pasco, WA 99301

is authorized to discharge wastewater in accordance with the special and general conditions which follow.

Facility Location: 5310 N. Industrial Way.	SIC Code: 2099
Pasco, WA 99301	NAICS Code: 311411
Industry Type: Food Preparations. Freshly	POTW Receiving Discharge: City of Pasco
processed potato products; vegetable and	Industrial Wastewater Treatment Facility
pasta side dishes	(ST0005369)

Ahmad Qayoumi Public Works Director City of Pacso

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Summary of Permit Report Submittals

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.A.	Discharge Monitoring Report (DMR)	Monthly	August 25, 2015
\$3.A.	DMR - Priority Pollutant Data - Single Sample Data	1/permit cycle	June 30, 2018
S3.F.	Reporting Permit Violations	As necessary	***
S4.A.	Operation and Maintenance Manual (O&M)	1/permit cycle	December 31, 2016
S4.A.	O&M Manual Review Confirmation Letter	Annually	Begin December 31, 2017
S4.B.	Reporting Bypasses	As necessary	***
S7.C.	Solid Waste Control Plan	1/permit cycle	June 30, 2017
S8.	Application for Permit Renewal	1/permit cycle	June 30, 2019
S9.	Spill Plan - Update	1/permit cycle	March 15, 2016
G1.	Notice of Change in Authorization	As necessary	***
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	***
G5.	Engineering Report for Construction or Modification Activities	As necessary	***
G7.	Notice of Permit Transfer	As necessary	***
G8.	Payment of Fees	As assessed	***
G10.	Duty to Provide Information	As necessary	***

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Special Conditions

S1. Discharge limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

A discharge of a pollutant in excess of local limits set by the City of Pasco's (City) Industrial Wastewater Treatment Facility violates the terms and conditions of this permit.

Beginning on the effective date and lasting through the expiration date of this permit, the Permittee is authorized to discharge wastewater to the City's Industrial Wastewater Treatment Facility subject to the following limits:

Effluent Limits: Outfall # 001				
Latitude 46.271666 Longitude -119.095				527
Parameter		Total Annual	Average Monthly	Maximum Daily
Flow		115 MG	300,000 gpd	N/A
Biochemical Oxygen Demand (BOD ₅)		N/A	7,200 lbs/day	N/A
Total Nitrogen		72,000 lbs	N/A	N/A
Parameter		Minimum		Maximum
рН		5.0 standard units		12.0 standard units
a	A Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limits expressed in units of mass, calculate the daily discharge as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day. This does not apply to pH.			

S2. Monitoring requirements

S2.A. Monitoring requirements – Discharge to Industrial Wastewater Treatment Facility

The Permittee must monitor the wastewater in accordance with the following schedule and the requirements specified in **Appendix A**. Samples must be taken at a location that best represents the quality of the water discharged to the City.

	Parameter	Units	Sampling Frequenc	y Sample Type	
#001 – Process Wastewater Monitoring					
Flow (Monthly Avg.; Max)		MGD	Continuous ^a	Meter	
Flow Volume (Total Annual) ^b		MG	Recorded ^c	Calculated	
pН		Standard Units	1/day	Grab ^d	
BOD ₅	(Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f	
BOD ₅	(Total Monthly, Total Annual) ^b	lbs	Recorded ^c	Calculated	
TSS (N	Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f	
TKN a	as N (Monthly Avg.; Max)	mg/l; lbs/day	2/month ^f	24-Hr Composite ^f	
TKN a	as N (Total Annual) ^{b,}	lbs	Recorded ^c	Calculated	
NO ₂ +N	NO ₃ as N (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite ^f	
NO ₂ +N	NO ₃ as N (Total Annual) ^b	lbs	Recorded ^c	Calculated	
Total I	Nitrogen as N (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	Calculated ^g	
Total I	Nitrogen as N (Total Annual) ^b	lbs	Recorded ^c	Calculated ^g	
Condu	ctivity (Monthly Avg.; Max)	umhos/cm	2/month ^e	Grab ^d	
#001 -	- Process Wastewater Priority Pollutan	t Scan	·		
Cyanic	le	μg/L	June 30, 2018	Grab ^d	
Total I	Phenolic Compounds	μg/L	June 30, 2018	Grab ^d	
Priority Pollutants (PP) – Total Metals		μg/L: ng/L for mercury	June 30, 2018	24-Hr Composite ^f	
PP – Volatile Organic Compounds		μg/L	June 30, 2018	Grab ^d	
PP – Acid-extractable Compounds		μg/L	June 30, 2018	24-Hr Composite ^f	
PP – Base-neutral Compounds		μg/L	June 30, 2018	24-Hr Composite ^f	
PP - Dioxin		pg/L	June 30, 2018	24-Hr Composite ^f	
PP – Pesticides/PCBs		μg/L	June 30, 2018	24-Hr Composite ^f	
a Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The Permittee must sample hourly when continuous monitoring is not possible.					
b	Total Annual means total gallons or lbs for a calendar year (January – December).				
c	Recorded means daily values are not reported on the Discharge Monitoring Report; only monthly summary is reported.				
d	Grab means an individual sample collected over a fifteen (15) minute, or less, period.				

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Parameter		Units	Sampling Frequency	Sample Type
#001 – Process Wastewater Monitoring				
e	2/month on alternate weeks.			
f	24-hour composite means a series of individual flow-proportional samples collected over a 24-hour period into a single container, and analyzed as one sample.			
g	$TN = TKN + (NO_2 + NO_3).$			

As a service, the City will sample, collect, and process the 24-hr composite samples for outfall #001 at the 2/month frequency for the following parameters: BOD5, TSS, TKN, NO2+NO3, and Conductivity. Lab reports will be provided to the Permittee. The Permittee will be responsible for all other monitoring and calculations.

S2.B. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by the City.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136.
- Standard Methods for the Examination of Water and Wastewater (APHA).

S2.C. Flow measurement, field measurement, and continuous monitoring devices

The Permittee must:

- 1. Select and use appropriate flow measurement, field measurement, and continuous monitoring devices and methods consistent with accepted scientific practices.
- 2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendations for that type of device.
- 3. Calibrate continuous monitoring instruments as per the manufacturer's requirements. The Permittee:
 - a. May calibrate apparatus for continuous monitoring of dissolved oxygen by air calibration.
 - b. Must calibrate continuous pH measurement instruments per manufacturer's specifications for method and frequency.
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- 4. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
- 5. Establish a calibration frequency for each device or instrument in the O&M manual that conforms to the frequency recommended by the manufacturer.
- 6. Calibrate flow-monitoring devices per manufacturer's specifications at a minimum frequency of at least one calibration per year.
- 7. Maintain calibration records for at least three years.

S2.D. Laboratory accreditation

The Permittee must ensure that all monitoring data required by the City is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Flow, pH, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for pH if it must receive accreditation or registration for other parameters.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to the City is a violation of the terms and conditions of this permit.

S3.A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

- 1. Summarize, report, and submit monitoring data obtained during each monitoring period in the DMR spreadsheet provided by the City. Include data for each of the parameters tabulated in Special Condition S2 of this permit and as required by the spreadsheet. Report a value for each day sampling occurred (unless specifically exempted in the permit) and for the summary values (when applicable) included on the spreadsheet.
- 2. Enter "No Discharge" or "ND" for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.
- 3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
- 4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in **Appendix A**.

- 5. Calculate average values and calculated total values (unless otherwise specified in the permit) using:
 - a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
 - b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample from the same monitoring point for the reporting period.
 - c. **Do not use** zero for any data entry values. For flow, leave the data field blank when there is no discharge.
- 6. Submit laboratory reports for single-sample grouped parameters (for example: priority pollutants, PAHs, pulp and paper chlorophenolics, TTOs (as necessary). The laboratory reports must also include: sample date, concentration detected with units, detection limit (DL) (as necessary), laboratory quantitation level (QL) (as necessary), information on the chain of custody, QA/QC results, and documentation of accreditation for the parameter (annual submission of the lab's accredited parameters will suffice).
- 7. Ensure that DMRs are submitted no later than the dates specified below, unless otherwise specified in this permit.
- 8. Submit DMRs for parameters with the monitoring frequencies specified in Section S2 of this permit (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
 - a. Submit **monthly** DMRs by the 25^{th} day of the following month.
 - b. First monthly DMR is due August 25, 2015.
 - c. Submit Priority Pollutant Scan lab reports as required in Special Condition S2.A.1 of this permit by **June 30, 2018**.

S3.B. Permit Submittals and Schedules

The Permittee must submit all permit-required reports in paper (hard-copy) and electronic (PDF) format.

The Permittee must ensure that the hard-copy report is postmarked or received by the City no later than the dates specified by this permit. Send these paper reports to the City at:

> Pretreatment Program Coordinator City of Pasco 525 North 3rd Avenue Pasco, WA 99301

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The Permittee must also submit an electronic copy of a permit-required report in PDF format by the date the report is due to both of the City personnel listed below:

Leah Fisk: <u>fiskl@pasco-wa.gov</u>

<u>AND</u>

Heath Bateman: <u>batemanh@pasco-wa.gov</u>

S3.C. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the City.

S3.D. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

- 1. The date, exact place, method, and time of sampling or measurement.
- 2. The individual who performed the sampling or measurement.
- 3. The dates the analyses were performed.
- 4. The individual who performed the analyses.
- 5. The analytical techniques or methods used.
- 6. The results of all analyses.

S3.E. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Section S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Section S2 of this permit.

S3.F. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.

2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to the City within thirty (30) days of sampling.

a. Immediate reporting

The Permittee must report any noncompliance that may endanger health or the environment immediately to the City and the Department of Ecology's (Ecology) Regional Office 24-hr. number listed below:

City of Pasco, Industrial Wastewater Treatment Facility	509-531-5338. If no answer; 509-727-7289*
City of Pasco, Municipal Wastewater Treatment Facility	509-947-4170*
Ecology's Eastern Regional Office	509-329-3400
* A ft 1	

*After hours: 509-727-7291

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of noncompliance by telephone, to the City at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

- 1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
- 2. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (see Section S4.B. of this permit, "Bypass Procedures").
- 3. Any upset that causes an exceedance of an effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- 4. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1 of this permit.
- 5. Any overflow whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.

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c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

- 1. A description of the noncompliance and its cause.
- 2. The period of noncompliance, including exact dates and times.
- 3. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.
- 4. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
- 5. If the noncompliance involves an overflow, or pipeline leak or spill, an estimate of the quantity (in gallons) of untreated overflow.
- 6. An aerial map or figure that shows the location and extent of the non-compliance.

d. Waiver of written reports

The City may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for Section S3.A of this permit ("Reporting"). The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

f. Report submittal

The Permittee must submit reports to the address listed in Section S3.A of this permit.

S3.G. Other reporting

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280. You can obtain further instructions at the following website:<u>http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm</u>.

When the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit

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application, or in any report to the City, it must submit such facts or information promptly.

S3.H. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to the City inspectors.

S3.I. Dangerous waste discharge notification

The Permittee must notify the City and Ecology in writing of the intent to discharge into the industrial or sanitary system any substance designated as a dangerous waste in accordance with the provisions of WAC 173-303-070. It must make this notification at least 90 days prior to the date that it proposes to initiate the discharge. The Permittee must not discharge this substance until authorized by the City and Ecology. It must also comply with the notification requirements of Special Condition S8 and General Condition G4 of this permit.

S3.J. Spill notification

The Permittee must notify the City immediately (as soon as discovered) of all discharges that could cause problems to the industrial or municipal system, such as process spills and unauthorized discharges (including slug discharges).

S4. Operation and maintenance

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

S4.A. Operations and maintenance manual

a. O&M manual submittal and requirements

The Permittee must:

- 1. Prepare an O&M Manual that meets the requirements of WAC 173-240-150 and submit it to the City for approval by **December 31, 2016**.
- 2. Review the O&M Manual at least annually and confirm this review by letter to the City starting December 31, 2017 and then annually by December 31 of each year.
- 3. Submit to the City for review and approval of substantial changes or updates to the O&M Manual whenever they incorporate them into the manual.
- 4. Keep the approved O&M Manual at the permitted facility.

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5. Follow the instructions and procedures of this O&M manual.

b. O&M manual components

In addition to the requirements of WAC 173-240-150, the O&M manual must include:

- 1. Emergency procedures for plant shutdown and cleanup in the event of a wastewater system upset, spill, failure, or demand by the publicly owned treatment works (POTW) treating the discharge.
- 2. Wastewater system maintenance procedures that contribute to the generation of process wastewater.
- 3. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine).
- 4. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.
- 5. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.
- 6. Treatment plant process control monitoring schedule.

S4.B. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility. The City may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by the City prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass is unavoidable, unanticipated, and results in noncompliance of this permit.

This permit authorizes such a bypass only if:

a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural

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resources which can reasonably be expected to occur in the absence of a bypass.

- b. No feasible alternatives to the bypass exist, such as:
 - The use of auxiliary treatment facilities.
 - Retention of untreated wastes.
 - Stopping production.
 - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
 - Transport of untreated wastes to another treatment facility.
- c. The Permittee has properly notified the City of the bypass as required in Section S3.F of this permit.
- 3. If bypass is anticipated and has the potential to result in noncompliance of this permit.
 - a. The Permittee must notify the City at least thirty (30) days before the planned date of bypass. The notice must contain:
 - A description of the bypass and its cause.
 - An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
 - A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
 - The minimum and maximum duration of bypass under each alternative.
 - A recommendation as to the preferred alternative for conducting the bypass.
 - The projected date of bypass initiation.
 - A statement of compliance with SEPA.
 - A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedance of any water quality standard is anticipated.
 - Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.
 - b. For probable construction bypasses, the Permittee must notify the City of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during the project planning and design process. The project-specific engineering report or facilities plan as well as the plans and specifications must include details of probable construction bypasses to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

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- c. The City will consider the following prior to issuing an administrative order for this type of bypass:
 - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
 - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
 - If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, the City will approve or deny the request. The City will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. The City will approve a request to bypass by issuing an administrative order.

S5. Prohibited discharges

The Permittee must comply with these General and Specific Prohibitions as referenced in the City of Pasco Municipal Code (PMC) Chapter 13.62.

S5.A. General prohibitions

The Permittee must not introduce into the POTW pollutant(s), which cause Pass Through or Interference.

S5.B. Specific prohibitions

In addition, the Permittee must not introduce the following into the POTW:

- 1. Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 60 degrees C (140 degrees F) using the test methods specified in 40 CFR 261.21.
- 2. Solid or viscous pollutants in amounts, which will cause obstruction to the flow in the POTW resulting in interference.
- 3. Any pollutant (including oxygen-demanding pollutants (BOD₅, etc.), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW.
- 4. Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees C (104 degrees F) unless the approval authority, upon request of the POTW, approves alternative temperature limits.
- 5. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.

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- 6. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.
- 7. Any trucked or hauled pollutants, except at discharge points designated by the POTW.
- 8. Pollutants that will cause corrosive structural damage to the POTW.

S5.C. Prohibited unless approved

Any of the following discharges are prohibited unless approved by the City under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or a need to augment sewage flows due to septic conditions):

- 1. Noncontact cooling water in significant volumes.
- 2. Storm water and other direct inflow sources.
- 3. Wastewaters significantly affecting system hydraulic loading, which do not require treatment or would not be afforded a significant degree of treatment by the system.
- 4. The discharge of dangerous wastes as defined in WAC 173-303 (unless specifically authorized in this permit).

S6. Dilution prohibited

The Permittee must not dilute the wastewater discharge with stormwater or increase the use of potable water, process water, noncontact cooling water, or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limits contained in this permit.

S7. Solid waste disposal

S7.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

S7.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, WAC 173-200. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters

S7.C. Solid waste control plan

a. Submittal requirements

The Permittee must:

- 1. Submit a solid waste control plan to the City by June 30, 2017.
- 2. Submit to the City any proposed revision or modification of the solid waste control plan for review and approval at least 30 days prior to implementation
- 3. Review the plan at least annually and update the spill plan as needed.
- 4. Comply with the plan and any modifications.

b. Solid waste control plan content

The solid waste control plan must:

- 1. Follow Ecology's guidance for preparing a solid waste control plan (<u>www.ecy.wa.gov/biblio/0710024.html</u>) and address all solid wastes generated by the permittee.
- 2. Include at a minimum a description, source, generation rate, and disposal methods of these solid wastes.
- 3. Not conflict with local or state solid waste regulations.

S8. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit by **June 30, 2019**. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

S9. Spill control plan - update

S9.A. Spill control plan submittals and requirements

The Permittee must:

- 1. Submit to the City an update to the existing spill control plan by March 15, 2016. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).
- 2. Review the plan at least annually and update the spill plan as needed.
- 3. Send changes to the plan to the City.
- 4. Follow the plan and any supplements throughout the term of the permit.

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S9.B. Spill control plan components

The spill control plan must include the following:

- 1. A list of all oil and petroleum products and other materials used and/or stored on-site, which when spilled, or otherwise released into the environment, designate as Dangerous Waste (DW) or Extremely Hazardous Waste (EHW) by the procedures set forth in WAC 173-303-070. Include other materials used and/or stored on-site, which may become pollutants or cause pollution upon reaching state's waters.
- 2. A description of preventive measures and facilities (including an overall facility plot showing drainage patterns) which prevent, contain, or treat spills of these materials.
- 3. A description of the reporting system the Permittee will use to alert responsible managers and legal authorities in the event of a spill.
- 4. A description of operator training to implement the plan.

The Permittee may submit plans and manuals required by 40 CFR Part 112, contingency plans required by WAC 173-303, or other plans required by other agencies, which meet the intent of this section.

General Conditions

G1. Signatory requirements

All applications, reports, or information submitted to the City must be signed as follows:

- 1. All permit applications must be signed by either a principal executive officer.
- 2. All reports required by this permit and other information requested by the City must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by the person described above and is submitted to the City at the time of authorization, and
 - b. The authorization specifies either a named individual or any individual occupying a named position.
- 3. Changes to authorization. If an authorization under paragraph G1.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the City prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that

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qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. Right of entry

Representatives of the City have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when the City suspects a violation requiring immediate inspection. Representatives of the City must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. Permit actions

This permit is subject to modification, suspension, or termination, in whole or in part by the City for any of the following causes:

- 1. Violation of any permit term or condition;
- 2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;
- 3. A material change in quantity or type of waste disposal;
- 4. A material change in the condition of the waters of the state; or
- 5. Nonpayment of fees assessed pursuant to PMC 13.62.

The City may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. Reporting a cause for modification

The Permittee must submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least one hundred eighty (180) days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

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G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to the City for approval in accordance with WAC 173-240. Engineering reports, plans, and specifications should be submitted at least one hundred eighty (180) days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

This permit is automatically transferred to a new owner or operator if:

- 1. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to the City;
- 2. A copy of the permit is provided to the new owner and;
- 3. The City does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to 1. above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by the City.

G8. Reduced production for compliance

The Permittee must control production or discharge to the extent necessary to maintain compliance with the terms and conditions of this permit upon reduction of efficiency, loss, or failure of its treatment facility until the treatment capacity is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power for the treatment facility is reduced, lost, or fails.

G9. Removed substances

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the effluent stream for discharge.

G10. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by the City. The City may revoke this permit if the permit fees established under PMC 13.62 are not paid.

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G11. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is a separate and distinct violation.

G12. Duty to provide information

The Permittee must submit to the City, within a reasonable time, all information which the City may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to the City upon request, copies of records required to be kept by this permit.

G13. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of PMC 13.62 and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

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APPENDIX A

LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to the City with appropriate laboratory documentation.

When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from the City's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

The City added this appendix to the permit in order to reduce the number of analytical "nondetects" in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Soluble Biochemical Oxygen Demand	SM5210-B ³		2 mg/L
Chemical Oxygen Demand	SM5220-D		10 mg/L
Total Organic Carbon	SM5310-B/C/D		1 mg/L
Total Suspended Solids	SM2540-D		5 mg/L
Total Ammonia (as N)	SM4500-NH3-B and		20

CONVENTIONAL PARAMETERS

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Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
	C/D/E/G/H		
Flow	Calibrated device		
Dissolved Oxygen	SM4500-OC/OG		0.2 mg/L
Temperature (max. 7-day avg.)	Analog recorder or Use micro- recording devices known as thermistors		0.2° C
pH	$SM4500-H^+B$	N/A	N/A

NONCONVENTIONAL PARAMETERS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Total Alkalinity	SM2320-B		5 mg/L as CaCO3
Chlorine, Total Residual	SM4500 Cl G		50.0
Color	SM2120 B/C/E		10 color units
Fecal Coliform	SM 9221E,9222	N/A	Specified in method - sample aliquot dependent
Fluoride (16984-48-8)	SM4500-F E	25	100
Nitrate + Nitrite Nitrogen (as N)	SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)	SM4500-N _{org} B/C and SM4500NH ₃ - B/C/D/EF/G/H		300
Soluble Reactive Phosphorus (as P)	SM4500- PE/PF	3	10
Phosphorus, Total (as P)	SM 4500 PB followed by SM4500-PE/PF	3	10
Oil and Grease (HEM)	1664 A or B	1,400	5,000
Salinity	SM2520-B		3 practical salinity units or scale (PSU or PSS)
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO ₄)	SM4110-B		200
Sulfide (as mg/L S)	SM4500-S ² F/D/E/G		200
Sulfite (as mg/L SO ₃)	SM4500-SO3B		2000
Total Coliform	SM 9221B, 9222B, 9223B	N/A	Specified in method - sample aliquot dependent
Total Dissolved Solids	SM2540 C		20 mg/L
Total Hardness	SM2340B		200 as CaCO3
Aluminum, Total (7429-90-5)	200.8	2.0	10
Barium Total (7440-39-3)	200.8	0.5	2.0
BTEX (benzene +toluene +	EPA SW 846	1	2
ethylbenzene + m,o,p xylenes)	8021/8260	2.0	10.0
Boron Total (7440-42-8)	200.8	2.0	10.0
Cobalt, Total (7440-48-4)	200.8	0.05	0.25

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Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Iron, Total (7439-89-6)	200.7	12.5	50
Magnesium, Total (7439-95-4)	200.7	10	50
Molybdenum, Total (7439-98-7)	200.8	0.1	0.5
Manganese, Total (7439-96-5)	200.8	0.1	0.5
NWTPH Dx ⁴	Ecology NWTPH Dx	250	250
NWTPH Gx ⁵	Ecology NWTPH Gx	250	250
Tin, Total (7440-31-5)	200.8	0.3	1.5
Titanium, Total (7440-32-6)	200.8	0.5	2.5

PRIORITY POLLUTANTS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
METAL	S, CYANIDE & TOTA	AL PHENOLS	
Antimony, Total (7440-36-0)	200.8	0.3	1.0
Arsenic, Total (7440-38-2)	200.8	0.1	0.5
Beryllium, Total (7440-41-7)	200.8	0.1	0.5
Cadmium, Total (7440-43-9)	200.8	0.05	0.25
Chromium (hex) dissolved (18540-29-9)	SM3500-Cr EC	0.3	1.2
Chromium, Total (7440-47-3)	200.8	0.2	1.0
Copper, Total (7440-50-8)	200.8	0.4	2.0
Lead, Total (7439-92-1)	200.8	0.1	0.5
Mercury, Total (7439-97-6)	1631E	0.0002	0.0005
Nickel, Total (7440-02-0)	200.8	0.1	0.5
Selenium, Total (7782-49-2)	200.8	1.0	1.0
Silver, Total (7440-22-4)	200.8	0.04	0.2
Thallium, Total (7440-28-0)	200.8	0.09	0.36
Zinc, Total (7440-66-6)	200.8	0.5	2.5
Cyanide, Total (57-12-5)	335.4	5	10
Cyanide, Weak Acid Dissociable	SM4500-CN I	5	10
Cyanide, Free Amenable to Chlorination (Available Cyanide)	SM4500-CN G	5	10
Phenols, Total	EPA 420.1		50

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
	ACID COMPOUN	DS	
2-Chlorophenol (95-57-8)	625	1.0	2.0
2 4-Dichlorophenol (120-83-2)	625	0.5	1.0
2.4-Dimethylphenol (105-67-9)	625	0.5	1.0
4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol)	625/1625B	1.0	2.0
2,4 dinitrophenol (51-28-5)	625	1.0	2.0
2-Nitrophenol (88-75-5)	625	0.5	1.0
4-nitrophenol (100-02-7)	625	0.5	1.0
Parachlorometa cresol (59-50-7) (4-chloro-3-methylphenol)	625	1.0	2.0
Pentachlorophenol (87-86-5)	625	0.5	1.0
Phenol (108-95-2)	625	2.0	4.0
2,4,6-Trichlorophenol (88-06-2)	625	2.0	4.0
	VOLATILE COMPOU	UNDS	
Acrolein (107-02-8)	624	5	10
Acrylonitrile (107-13-1)	624	1.0	2.0
Benzene (71-43-2)	624	1.0	2.0
Bromoform (75-25-2)	624	1.0	2.0
Carbon tetrachloride (56-23-5)	624/601 or SM6230B	1.0	2.0
Chlorobenzene (108-90-7)	624	1.0	2.0
Chloroethane (75-00-3)	624/601	1.0	2.0
2-Chloroethylvinyl Ether (110-75-8)	624	1.0	2.0
Chloroform (67-66-3)	624 or SM6210B	1.0	2.0
Dibromochloromethane (124-48-1)	624	1.0	2.0
1,2-Dichlorobenzene (95-50-1)	624	1.9	7.6
1,3-Dichlorobenzene (541-73-1)	624	1.9	7.6
1,4-Dichlorobenzene (106-46-7)	624	4.4	17.6
Dichlorobromomethane (75-27-4)	624	1.0	2.0
1,1-Dichloroethane (75-34-3)	624	1.0	2.0
1,2-Dichloroethane (107-06-2)	624	1.0	2.0
1,1-Dichloroethylene (75-35-4)	624	1.0	2.0
1,2-Dichloropropane (78-87-5)	624	1.0	2.0
1,3-dichloropropene (mixed	624	1.0	2.0
isomers) (1,2-dichloropropylene) (542-75-6) 6			
Ethylbenzene (100-41-4)	624	1.0	2.0
Methyl bromide (74-83-9) (Bromomethane)	624/601	5.0	10.0
Methyl chloride (74-87-3) (Chloromethane)	624	1.0	2.0
Methylene chloride (75-09-2)	624	5.0	10.0

Pollutant & CAS No. <i>(if available)</i>	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
1,1,2,2-Tetrachloroethane	624	1.9	2.0
(79-34-5)			
Tetrachloroethylene (127-18-4)	624	1.0	2.0
Toluene (108-88-3)	624	1.0	2.0
1,2-Trans-Dichloroethylene	624	1.0	2.0
(156-60-5) (Ethylene dichloride)	(24	1.0	2.0
1,1,1-1richloroethane (/1-55-6)	624	1.0	2.0
1,1,2-Trichloroethane (79-00-5)	624	1.0	2.0
Viewl chloride (75, 01, 4)	624	1.0	2.0
BASE/NEUTRAL (COMPOUNDS (compou	nds in bold are Ecol	ogy PBTs)
Acenaphthene (83-32-9)	625	0.2	0.4
Acting the same $(120, 12, 7)$	625	0.3	0.6
$\begin{array}{c} \text{Anumacene} (120-12-7) \\ \text{Bonziding} (02,87,5) \end{array}$	625	0.5	0.0
Benzyl butyl phthalate (85,68,7)	625	0.3	0.6
Benzo(a)anthracene (56-55-3)	625	0.3	0.0
Benzo(h)fluoranthene	610/625	0.5	1.6
$(3.4-\text{benzofluoranthene})(205-99-2)^7$	010/025	0.0	1.0
Benzo(j)fluoranthene (205-82-3)	625	0.5	1.0
Benzo(k)fluoranthene (11.12 herzefluoranthene) (207.08.9) ⁷	610/625	0.8	1.6
Benzo(r s t)pentanhene	625	0.5	1.0
(189-55-9)	025	0.5	1.0
Benzo(a)pyrene (50-32-8)	610/625	0.5	1.0
$\frac{1}{\text{Benzo}(ghi)\text{Pervlene}(191-24-2)}$	610/625	0.5	1.0
Bis(2-chloroethoxy)methane (111-	625	5.3	21.2
91-1)			
Bis(2-chloroethyl)ether (111-44-4)	611/625	0.3	1.0
Bis(2-chloroisopropyl)ether (39638-32-9)	625	0.3	0.6
Bis(2- <i>ethylhexyl</i>)phthalate (117-81-7)	625	0.1	0.5
4-Bromophenyl phenyl ether (101- 55-3)	625	0.2	0.4
2-Chloronaphthalene (91-58-7)	625	0.3	0.6
4-Chlorophenyl phenyl ether (7005-72-3)	625	0.3	0.5
Chrysene (218-01-9)	610/625	0.3	0.6
Dibenzo (a.h)acridine (226-36-8)	610M/625M	2.5	10.0
Dibenzo (a,i)acridine (224-42-0)	610M/625M	2.5	10.0
Dibenzo $(a-h)$ anthracene (53-70-3)(1.2.5.6-dibenzanthracene)	625	0.8	1.6

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection $(DL)^1 \mu g/L$ unless specified	Quantitation Level (QL) ² µg/L unless specified
Dibenzo(a,e)pyrene (192-65-4)	610M/625M	2.5	10.0
Dibenzo(a,h)pyrene (189-64-0)	625M	2.5	10.0
3,3-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
Diethyl phthalate (84-66-2)	625	1.9	7.6
Dimethyl phthalate (131-11-3)	625	1.6	6.4
Di-n-butyl phthalate (84-74-2)	625	0.5	1.0
2,4-dinitrotoluene (121-14-2)	609/625	0.2	0.4
2,6-dinitrotoluene (606-20-2)	609/625	0.2	0.4
BASE/NEUTRAL C	COMPOUNDS (compou	nds in bold are Ecol	ogy PBTs)
Di-n-octyl phthalate (117-84-0)	625	0.3	0.6
1,2-Diphenylhydrazine (as	1625B	5.0	20
Azobenzene) (122-66-7)			
Fluoranthene (206-44-0)	625	0.3	0.6
Fluorene (86-73-7)	625	0.3	0.6
Hexachlorobenzene (118-74-1)	612/625	0.3	0.6
Hexachlorobutadiene (87-68-3)	625	0.5	1.0
Hexachlorocyclopentadiene	1625B/625	0.5	1.0
(77-47-4)			
Hexachloroethane (67-72-1)	625	0.5	1.0
Indeno(1,2,3-cd)Pyrene	610/625	0.5	1.0
(193-39-5)			
Isophorone (78-59-1)	625	0.5	1.0
3-Methyl cholanthrene (56-49-5)	625	2.0	8.0
Naphthalene (91-20-3)	625	0.3	0.6
Nitrobenzene (98-95-3)	625	0.5	1.0
N-Nitrosodimethylamine (62-75-	607/625	2.0	4.0
9)			
N-Nitrosodi-n-propylamine	607/625	0.5	1.0
(621-64-7)			
N-Nitrosodiphenylamine (86-30-6)	625	0.5	1.0
Perylene (198-55-0)	625	1.9	7.6
Phenanthrene (85-01-8)	625	0.3	0.6
Pyrene (129-00-0)	625	0.3	0.6
1,2,4-Trichlorobenzene	625	0.3	0.6
(120-82-1)			
	DIOXIN		
2,3,7,8-Tetra-Chlorodibenzo-P-	1613B	1.3 pg/L	5 pg/L
Dioxin (176-40-16) (2,3,7,8 TCDD)			

Pollutant & CAS No.	Recommended	Detection	Quantitation
(if available)	Analytical Protocol	$(\mathbf{DL})^1 \mu g/L$	Level $(OL)^2 \mu g/L$
		unless specified	unless specified
	PESTICIDES/PCI	Bs	
Aldrin (309-00-2)	608	0.025	0.05
alpha-BHC (319-84-6)	608	0.025	0.05
beta-BHC (319-85-7)	608	0.025	0.05
gamma-BHC (58-89-9)	608	0.025	0.05
delta-BHC (319-86-8)	608	0.025	0.05
Chlordane (57-74-9) ⁸	608	0.025	0.05
4,4'-DDT (50-29-3)	608	0.025	0.05
4,4'-DDE (72-55-9)	608	0.025	0.05^{10}
4,4' DDD (72-54-8)	608	0.025	0.05
Dieldrin (60-57-1)	608	0.025	0.05
alpha-Endosulfan (959-98-8)	608	0.025	0.05
beta-Endosulfan (33213-65-9)	608	0.025	0.05
Endosulfan Sulfate (1031-07-8)	608	0.025	0.05
Endrin (72-20-8)	608	0.025	0.05
Endrin Aldehyde (7421-93-4)	608	0.025	0.05
Heptachlor (76-44-8)	608	0.025	0.05
Heptachlor Epoxide (1024-57-3)	608	0.025	0.05
PCB-1242 (53469-21-9) ⁹	608	0.25	0.5
PCB-1254 (11097-69-1)	608	0.25	0.5
PCB-1221 (11104-28-2)	608	0.25	0.5
PCB-1232 (11141-16-5)	608	0.25	0.5
PCB-1248 (12672-29-6)	608	0.25	0.5
PCB-1260 (11096-82-5)	608	0.13	0.5
PCB-1016 (12674-11-2) 9	608	0.13	0.5
Toxaphene (8001-35-2)	608	0.24	0.5

- 1. <u>Detection level (DL)</u> or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.
- Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10ⁿ, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose.

(Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

- 3. <u>Soluble Biochemical Oxygen Demand</u> method note: First, filter the sample through a Millipore Nylon filter (or equivalent) pore size of 0.45-0.50 um (prep all filters by filtering 250 ml of laboratory grade deionized water through the filter and discard). Then, analyze sample as per method 5210-B.
- 4. <u>NWTPH Dx ⁻</u>Northwest Total Petroleum Hydrocarbons Diesel Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 5. <u>NWTPH Gx</u> Northwest Total Petroleum Hydrocarbons Gasoline Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 6. <u>1, 3-dichloroproylene (mixed isomers)</u> You may report this parameter as two separate parameters: cis-1, 3-dichlorpropropene (10061-01-5) and trans-1, 3-dichloropropene (10061-02-6).
- 7. <u>Total Benzofluoranthenes</u> Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.
- 8. <u>Chlordane</u> You may report alpha-chlordane (5103-71-9) and gamma-chlordane (5103-74-2) in place of chlordane (57-74-9). If you report alpha and gamma-chlordane, the DL/PQLs that apply are 0.025/0.050.
- 9. <u>PCB 1016 & PCB 1242</u> You may report these two PCB compounds as one parameter called PCB 1016/1242.



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix F8 Twin City Foods, Permit No. IWDP 000100 Washington Department of Ecology





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 Issuance Date:
 07/01/2015

 Effective Date:
 07/01/2015

 Expiration Date:
 06/30/2019

City of Pasco Industrial Wastewater Discharge Permit Industrial to POTW

Twin City Foods Wastewater Discharge Permit Number IWDP-000100

City of Pasco INDUSTRIAL PRETREATMENT PROGRAM 525 North 3rd Avenue Pasco, WA 99301

In compliance with the provisions of the State of Washington Water Pollution Control Law Chapter 90.48 Revised Code of Washington, as amended,

Twin City Foods 5405 Industrial Way Pasco, WA 99301

is authorized to discharge wastewater in accordance with the special and general conditions which follow.

<u>SIC Code:</u> 2037
<u>NAICS Code:</u> 311411
Significant Industrial User

Ahmad Qayoumi City of Pasco Public Works Director

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Summary of Permit Report Submittals

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Discharge Monitoring Report (DMR)	Monthly	August 25, 2015
S3.A	DMR - Priority Pollutant Scan Data - Single Sample Data (outfall #001)	1/permit cycle	September 25, 2017
S3.F	Other Reporting	As necessary	
S4.A	Operation and Maintenance (O&M) Manual Update	1/permit cycle	July 01, 2016
S4.A.	O&M Manual Update or Review Confirmation Letter	Annually	July 01, 2017
S4.B	Reporting Bypasses	As necessary	
S7.C.	Solid Waste Control Plan Update	1/permit cycle	July 01, 2017
S8.	Application for Permit Renewal	1/permit cycle	July 01, 2018
S9.	Spill Control Plan Update	Annually	July 01, 2017
G1.	Notice of Change in Authorization	As necessary	
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	
G5.	Engineering Report for Construction or Modification Activities	As necessary	
G7	Notice of Permit Transfer	As necessary	
G10	Payment of Fees	As assessed	
G12	Duty to Provide Information	As necessary	

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Special Conditions

S1. Discharge limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

A discharge of a pollutant in excess of local limits set by the City of Pasco's Sewer Use Ordinance violates the terms and conditions of this permit.

Beginning on the effective date, the Permittee is authorized to discharge wastewater to City of Pasco's POTW sewer system subject to the following limits:

Effluent Limits: Outfall #001 (Process Wastewater) (Discharge to City of Pasco's <i>Industrial</i> Wastewater Treatment System from March 1 to November 30)							
			Latitude <u>46.2738</u>	<u>33 Longitude -119</u>	.0925		
	Parameter	Т	otal Annual	Average Month	nly ^a	Maximum Daily ^b	
Flow		220	million gallons (MG)	2.4 million gallons (MG)		NA	
Bioch Dema	emical Oxygen nd (BOD₅)		NA	140,000 lbs/d	ay	160,000 lbs/day	
Nitrog	en	2	25,000 lbs	NA		NA	
	Parameter		Minimum			Maximum	
рН			5.0 s.u.			12.0 s.u.	
а	a Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured						
 Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limits expressed in units of mass, calculate the daily discharge as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day. This does not apply to pH. 							
NA	NA Not Applicable						

	Effluent Limits: Outfall #002 (Brine Water)				
(D	ischarge to City of	Pasco's	Municipal Wastewater Treatment	System from May 1 to November 1)	
		L	_atitude	<u>092733</u>	
	Parameter		Average M	onthly ^a	
Flow		50,000 gallons per day (gpd)			
Parameter Minimum Maximum			Maximum		
рН			5.5 s.u.	9.0 s.u.	
а	a Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured.				

	Effluent Limits: Outfall #003 (Repack Water to Municipal)				
	Discharge to City of	Pasco's	Municipal Wastewater Treatment Syste	em from December 1 to February 29)	
	Parameter		Latitude <u>40.274007</u> Longitude - <u>115.</u> Average M	onthly ^a	
Flow			100,000 gallons	per day (gpd)	
	Parameter		Minimum	Maximum	
рН			5.5 s.u.	9.0 s.u.	
а	Average monthly e month. To calculat discharge measure discharges measure	ffluent li e the di d during ed.	mit means the highest allowable aver scharge value to compare to the limit, g a calendar month and divide this su	age of daily discharges over a calendar you add the value of each daily m by the total number of daily	
	Ef (Discharge to City of	fluent L Pasco's	imits: Outfall #003b (Repack Wate Industrial Wastewater Treatment Syste Latitude <u>46.273833 Longitude119</u>	er to Industrial)* em from December 1 to February 29) 0.0925	
	Parameter		Average M	onthly ^a	
Flow			54,945 gallons p	per day (gpd)	
	Parameter		Minimum	Maximum	
pН	oH 5.0 s.u. 12.0 s.u.				
*	* Upon request to and approval by the City, TCF may utilize the allotted 5MG winter storage at the Industrial Facility. <i>TCF must monitor according to</i> S2.A1 (via grab samples) when discharging to the Industrial Facility.				
а	Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured.				

S2. Monitoring requirements

S2.A. Monitoring requirements

S2.A.1. Outfall #001 (Process Wastewater Monitoring)

The Permittee must monitor the process wastewater after the hydrosieve screens in accordance with the following schedule and the requirements specified in **Appendix A:**

Parameter	Units	Sampling Frequency	Sample Type
#001 – Process Wastewater Monitoring			
Flow (Monthly Avg.; Max)	MGD	Continuous ^ª	Meter
Flow Volume (Total Annual) ^b	MG	Recorded ^c	Calculated
рН	Standard	1/day	Grab ^d
	Units		
BOD ₅ (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite [†]
BOD ₅ (Total Monthly, Total Annual) ^b	lbs	Recorded ^c	Calculated
TSS (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite [†]

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Parameter	Units	Sampling Frequen	cy Sample Type		
#001 – Process Wastewater Monitoring					
TKN as N (Monthly Avg.; Max)	mg/l; lbs/day	2/month [†]	24-Hr Composite [†]		
TKN as N (Total Annual) ^{b,}	lbs	Recorded ^c	Calculated		
NO_2 +NO ₃ as N (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	24-Hr Composite [†]		
NO_2 +NO ₃ as N (Total Annual) ^b	lbs	Recorded ^c	Calculated		
Total Nitrogen as N (Monthly Avg.; Max)	mg/L; lbs/day	2/month ^e	Calculated ^g		
Total Nitrogen as N (Total Annual) ^b	lbs	Recorded ^c	Calculated ^g		
Conductivity (Monthly Avg.; Max)	umhos/cm	2/month ^e	Grab ^d		
#001 – Process Wastewater Priority Poll	utant Scan (with	repack operation ru	nning)		
Cyanide	μg/L	July, 2017	Grab ^d		
Total Phenolic Compounds	μg/L	July, 2017	Grab ^d		
Priority Pollutants (PP) – Total Metals	µg/L: ng/L for mercury	July, 2017	24-Hr Composite [†]		
PP – Volatile Organic Compounds	µg/L	July, 2017	Grab ^d		
PP – Acid-extractable Compounds	µg/L	July, 2017	24-Hr Composite [†]		
PP – Base-neutral Compounds	µg/L	July, 2017	24-Hr Composite [†]		
PP - Dioxin	pg/L	July, 2017	24-Hr Composite [†]		
PP – Pesticides/PCBs	μg/L	July, 2017	24-Hr Composite [†]		
a Continuous means uninterrupted ex unanticipated equipment repair or ma continuous monitoring is not possible	a Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The Permittee must sample hourly when continuous monitoring is not possible.				
b Total Annual means total gallons or	Total Annual means total gallons or lbs for a calendar year (January – December).				
c Recorded means daily values are no summary is reported.	Recorded means daily values are not reported on the Discharge Monitoring Report; only monthly summary is reported.				
d Grab means an individual sample co	Grab means an individual sample collected over a fifteen (15) minute, or less, period.				
e 2/month on alternate weeks.	2/month on alternate weeks.				
f 24-hour composite means a series hour period into a single container, a	of individual flow- nd analyzed as or	proportional sample ne sample.	s collected over a 24-		
$g \qquad TN = TKN + (NO_2 + NO_3).$	<u>.</u>				

*As a service, the City will sample, collect, and process the 24-Hr composite samples for outfall #001 at the 2/month frequency for the following parameters: BOD₅, TSS, TKN, NO₂+NO₃, and Conductivity. Lab reports will be provided to the Permittee. The Permittee will be responsible for all other monitoring and calculations for all outfalls.

S2.A.2. Outfall #002 (Brine Water Monitoring)

The Permittee must monitor the brine water before the discharge to the City's municipal wastewater system according to the following schedule and the requirements specified in **Appendix A:**

Parameter	Units	Sampling Frequency	Sample Type
#002 – Brine Water Monitoring			
Flow (Monthly Avg.; Max)	GPD	Continuous ^a	Metered
рН	Standard	1/week	Grab [⊳]

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Parameter		Units	Sampling Frequency	Sample Type	
#002	#002 – Brine Water Monitoring				
		Units			
Total Dissolved Solids (TDS) (Max) mg/l 1/month			1/month	Grab [▷]	
а	^a Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The Permittee must sample hourly when continuous monitoring is not possible.				
b	Grab means an individual sample col	llected over a fifte	en (15) minute, or less, po	eriod.	

S2.A.3. Outfall #003 (Repack Water Monitoring)

The Permittee must monitor the repack water before the discharge to the City's Municipal wastewater system according to the following schedule and the requirements specified in **Appendix A:**

Parameter		Units	Sampling Frequency	Sample Type		
#003	#003 – Repack Water Monitoring					
Flow (Monthly Avg.; Max)		GPD	Continuous ^ª	Metered		
рН		Standard Units	1/week	Grab [⊳]		
BOD ₅	(Max)	mg/l	1/month	Grab ^b		
^a Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The Permittee must sample hourly when continuous monitoring is not possible.						
b	Grab means an individual sample collected over a fifteen (15) minute, or less, period.					

TCF has a winter storage alloment of 5MG at the Industrial facility. Upon approval by the City, TCF may discharge repack wastewater to the Industrial facility from December 1^{st} – Febuary 29th. TCF must monitor the repack wastewater according to the requirements of **outfall #001** as addressed in **S2.A.1** using grab samples.

S2.B. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by the City.

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

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S2.C. Flow measurement, field measurement, and continuous monitoring devices

The Permittee must:

- 1. Select and use appropriate flow measurement, field measurement, and continuous monitoring devices and methods consistent with accepted scientific practices.
- 2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard, the manufacturer's recommendation, and approved O&M manual procedures for the device and the wastestream.
- 3. Calibrate continuous monitoring instruments weekly unless it can demonstrate a longer period is sufficient based on monitoring records. The Permittee:
 - a. Must calibrate continuous pH measurement instruments per manufacturers specifications for method and frequency.
- 4. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
- 5. Establish a calibration frequency for each device or instrument in the O&M manual that conforms to the frequency recommended by the manufacturer.
- 6. Calibrate flow-monitoring devices per manufacturers specifications, at a minimum frequency of at least one calibration per year.
- 7. Maintain calibration records for at least three years.

S2.D. Laboratory accreditation

The Permittee must ensure that all monitoring data required by the City for permit specified parameters is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for conductivity and pH if it must receive accreditation or registration for other parameters.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to the City is a violation of the terms and conditions of this permit.

S3.A. Discharge monitoring reports

The first monitoring period begins on the effective date of the permit (unless otherwise specified). The Permittee must:

1. Summarize, report, and submit monitoring data obtained during each monitoring period in the discharge monitoring report (DMR) spreadsheet provided by the City. Include data for each of the parameters tabulated in Special Condition S2 and as required by the spreadsheet. Report a value for

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each day sampling occurred (unless specifically exempted in the permit) and for the summary values (when applicable) included on the spreadsheet.

- 2. Enter "No Discharge" or "ND" for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.
- 3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
- 4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in Appendix A.
- 5. Calculate average values and calculated total values (unless otherwise specified in the permit) using:
 - a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
 - b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample from the same monitoring point for the reporting period.
 - c. **Do not use zero** for any data entry values. For flow, leave the data field blank when there is no discharge.
- 6. Submit laboratory reports for single-sample grouped parameters (for example: priority pollutants, PAHs, pulp and paper chlorophenolics, TTOs (as necessary). The laboratory reports must also include: sample date, concentration detected with units, detection limit (DL) (as necessary), laboratory quantitation level (QL) (as necessary), information on the chain of custody, QA/QC results, and documentation of accreditation for the parameter (annual submission of the lab's accredited parameters will suffice).
- 7. Ensure that DMRs are submitted no later than the dates specified below, unless otherwise specified in this permit.
- 8. Submit DMRs for parameters with the monitoring frequencies specified in S2 (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
 - a. Submit monthly DMRs by the **25th day of the following month**.
 - b. First monthly DMR is due August 25th, 2015.
 - c. Submit Priority Pollutant Scan lab reports as required in Special Condition S2.A.1 and S2.A.2 by September 25, 2017 and S2.A.3 by February 25, 2018.
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S3.B. Permit Submittals and Schedules

The Permittee must submit all permit-required reports in paper (hard-copy) and electronic (PDF) format.

The Permittee must ensure that the hard-copy report is postmarked or received by the City no later than the dates specified by this permit. Send these paper reports to the City at:

> Pretreatment Program Coordinator City of Pasco 525 North 3rd Avenue Pasco, WA 99301

The Permittee must submit an electronic copy of a permit-required report in PDF format by the date the report is due to both of the City personnel listed below:

Leah Fisk: fiskl@pasco-wa.gov

AND

Heath Bateman: <u>batemanh@pasco-wa.gov</u>

S3.C. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the City.

S3.D. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

- 1. The date, exact place, method, and time of sampling or measurement.
- 2. The individual who performed the sampling or measurement.
- 3. The dates the analyses were performed.
- 4. The individual who performed the analyses.
- 5. The analytical techniques or methods used.
- 6. The results of all analyses.

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S3.E. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Condition S2 of this permit, then the Permittee must include the results of such monitoring (including all outside lab results) in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Condition S2.

S3.F. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

- 1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
 - 2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to the City within thirty (30) days of sampling.

a. Immediate reporting

The Permittee must report any noncompliance that may endanger health or the environment immediately to the City and the Department of Ecology's Regional Office 24-hr. number listed below:

Eastern Regional Office	(509) 329-3400
City of Pasco- Industrial	1 st : (509) 531-5338,
Wastewater Facility	if no answer: (509) 727-7289
	After Hours: (509) 727-7291
City of Pasco- Municipal	(509) 947-4170
Facility	After Hours: (509) 727-7291

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of noncompliance by telephone, to the City at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

- 1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
- 2. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Part S4.B, "Bypass Procedures").
- 3. Any upset that causes an exceedance of an effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment

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facilities, lack of preventive maintenance, or careless or improper operation.

- 4. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1 of this permit.
- 5. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit. This requirement does not include industrial process wastewater overflows to impermeable surfaces which are collected and routed to the treatment works.

c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a. or b. above. The report must contain:

- 1. A description of the noncompliance and its cause.
- 2. The period of noncompliance, including exact dates and times.
- 3. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.
- 4. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
- 5. If the noncompliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

d. Waiver of written reports

The City may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for S3.A ("Reporting"). The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

S3.G. Other reporting

a. Spills of Oil or Hazardous Materials

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280 and chapter 173-303-145. You can obtain further instructions at the following website: http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm.

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b. Failure to submit relevant or correct facts

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the City, it must submit such facts or information promptly.

S3.H. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to the City inspectors.

S3.I. Dangerous waste discharge notification

The Permittee must notify the City and Ecology in writing of the intent to discharge into the POTW any substance designated as a dangerous waste in accordance with the provisions of WAC 173-303-070. It must make this notification at least 90 days prior to the date that it proposes to initiate the discharge. The Permittee must not discharge this substance until authorized by the City. It must also comply with the notification requirements of Special Condition S8 and General Condition G4.

S3.J. Spill notification

The Permittee must notify the POTW immediately (as soon as discovered) of all discharges that could cause problems to the POTW, such as process spills and unauthorized discharges (including slug discharges).

S4. Operation and maintenance

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

S4.A. Operations and maintenance manual

a. O&M manual submittal and requirements

The Permittee must:

- 1. Update the Operations and Maintenance (O&M) Manual that meets the requirements of WAC 173-240-150 and submit it to the City for approval by **July 01, 2016**.
- Review the O&M Manual at least annually and confirm this review by letter to the City by starting July 01, 2017 and then by July 1st of each year.

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- 3. Submit to the City for review and approval substantial changes or updates to the O&M Manual whenever it incorporates them into the manual.
- 4. O&M Manual must be submitted as a paper (hard) copy and an electronic copy, preferably as a PDF.
- 5. Keep the approved O&M Manual at the permitted facility.
- 6. Follow the instructions and procedures of the O&M manual.

b. O&M manual components

In addition to the requirements of WAC 173-240-150, the O&M manual must include:

- 1. Emergency procedures for plant shutdown and cleanup in event of wastewater system upset, spill, failure, or demand by the publicly owned treatment works (POTW) treating the discharge.
- 2. Wastewater system maintenance procedures that contribute to the generation of process wastewater.
- 3. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)
- 4. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.
- 5. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.
- 6. Treatment plant process control monitoring schedule.
- 7. Specify other items on case-by-case basis such as O&M for any pump stations, lagoon liners, etc.

S4.B. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility. The City may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by the City prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

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2. Bypass is unavoidable, unanticipated, and results in noncompliance of this permit.

This permit authorizes such a bypass only if:

- a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.
- b. No feasible alternatives to the bypass exist, such as:
 - The use of auxiliary treatment facilities.
 - Retention of untreated wastes.
 - Stopping production.
 - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
 - Transport of untreated wastes to another treatment facility.
- c. The Permittee has properly notified the City of the bypass as required in Condition S3.F of this permit.
- 3. If bypass is anticipated and has the potential to result in noncompliance of this permit.
 - a. The Permittee must notify the City at least thirty (30) days before the planned date of bypass. The notice must contain:
 - A description of the bypass and its cause.
 - An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
 - A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
 - The minimum and maximum duration of bypass under each alternative.
 - A recommendation as to the preferred alternative for conducting the bypass.
 - The projected date of bypass initiation.
 - A statement of compliance with SEPA.
 - A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedance of any water quality standard is anticipated.
 - Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.
 - b. For probable construction bypasses, the Permittee must notify the City of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during the project planning and design process. The project-specific engineering report or

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facilities plan as well as the plans and specifications must include details of probable construction bypasses to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

- c. The City will consider the following prior to issuing an administrative order for this type of bypass:
 - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
 - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
 - If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, the City will approve or deny the request. The City will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. The City will approve a request to bypass by issuing an administrative order under RCW 90.48.120.

S5. Prohibited discharges

The Permittee must comply with these General and Specific Prohibitions, and as referenced in Pasco Municipal Code (PMC) 13.62.

S5.A. General Prohibitions

The Permittee must not introduce into the POTW pollutant(s), which cause Pass Through or Interference.

S5.B. Specific prohibitions

In addition, the Permittee must not introduce the following into the POTW:

- 1. Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 60 degrees C (140 degrees F) using the test methods specified in 40 CFR 261.21
- 2. Solid or viscous pollutants in amounts, which will cause obstruction to the flow in the POTW resulting in interference
- 3. Any pollutant (including oxygen-demanding pollutants (BOD₅, etc.), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW
- 4. Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees C (104 degrees F) unless the

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approval authority, upon request of the POTW, approves alternative temperature limits

- 5. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through
- 6. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems
- 7. Any trucked or hauled pollutants, except at discharge points designated by the POTW
- 8. Pollutants that will cause corrosive structural damage to the POTW.

S5.C. Prohibited unless approved

Any of the following discharges are prohibited unless approved by the City under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or a need to augment sewage flows due to septic conditions):

- 1. Noncontact cooling water in significant volumes
- 2. Storm water and other direct inflow sources
- 3. Wastewaters significantly affecting system hydraulic loading, which do not require treatment or would not be afforded a significant degree of treatment by the system
- 4. The discharge of dangerous wastes as defined in Chapter 173-303 WAC (Unless specifically authorized in this permit)

S6. Dilution prohibited

The Permittee must not dilute the wastewater discharge with stormwater or increase the use of potable water, process water, noncontact cooling water, or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limits contained in this permit.

S7. Solid waste disposal

S7.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

S7.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, Chapter 173-200 WAC. The Permittee must apply for a permit or

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permit modification as may be required for such discharges to state ground or surface waters.

S7.C. Solid waste control plan

The Permittee must:

- 1. Update the solid waste control plan and submit it to the City for approval by **July 01, 2017**.
- 2. The Permittee must submit all proposed revisions or modifications to the solid waste control plan to the City for review and approval at least 30 days prior to implementation. Once approved, the Permittee must comply with any plan modifications.
- 3. Solid waste control plan must be submitted as a paper (hard) copy and an electronic copy, preferably as a PDF.
- 4. Permittee must Follow Ecology's guidance for preparing a solid waste control plan (<u>www.ecy.wa.gov/biblio/0710024.html</u>) and address all solid wastes generated by the Permittee.

S8. Application for permit renewal or modification for facility changes

- 1. The Permittee must submit an application for renewal of this permit **by July 01, 2018**. Renewal must be submitted as a paper (hard) copy and an electronic copy, preferably as a PDF.
- 2. The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.
- 3. Application must be submitted as a paper (hard) copy and an electronic copy, preferably as a PDF.

S9. Spill control plan

S9.A. Spill control plan submittals and requirements

The Permittee must:

- 5. Update the spill control plan and submit it to the City for approval by **July 01**, **2017**.
- 6. Review the existing spill plan at least annually and update the spill plan as needed.
- 7. Send changes to the plan to the City.
- 8. Follow the plan and any supplements throughout the term of the permit.
- 9. Spill control plan must be submitted as a paper (hard) copy and an electronic copy, preferably as a PDF.

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S9.B. Spill control plan components

The spill control plan must include the following:

- 1. A list of all oil and petroleum products and other materials used and/or stored on-site, which when spilled, or otherwise released into the environment, designate as Dangerous Waste (DW) or Extremely Hazardous Waste (EHW) by the procedures set forth in WAC 173-303-070. Include other materials used and/or stored on-site, which may become pollutants or cause pollution upon reaching state's waters.
- 2. A description of preventive measures and facilities (including an overall facility plot showing drainage patterns) which prevent, contain, or treat spills of these materials.
- 3. A description of the reporting system the Permittee will use to alert responsible managers and legal authorities in the event of a spill.
- 4. A description of operator training to implement the plan.

The Permittee may submit plans and manuals required by 40 CFR Part 112, contingency plans required by Chapter 173-303 WAC, or other plans required by other agencies, which meet the intent of this section.

General Conditions

G1. Signatory requirements

All applications, reports, or information submitted to the City must be signed as follows:

- 1. All permit applications must be signed by either a principal executive officer.
- 2. All reports required by this permit and other information requested by the City must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by the person described above and is submitted to the City at the time of authorization, and
 - b. The authorization specifies either a named individual or any individual occupying a named position.
- 3. Changes to authorization. If an authorization under paragraph G1.2. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the City prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted.

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Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. Right of entry

Representatives of the City have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when the City suspects a violation requiring immediate inspection. Representatives of the City must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. Permit actions

This permit is subject to modification, suspension, or termination, in whole or in part by the City for any of the following causes:

- 1. Violation of any permit term or condition;
- 2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;
- 3. A material change in quantity or type of waste disposal;
- 4. A material change in the condition of the waters of the state; or
- 5. Nonpayment of fees assessed pursuant to RCW 90.48.465.

The City may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. Reporting a cause for modification

The Permittee must submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least one hundred eighty (180) days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to the City for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications

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should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

This permit is automatically transferred to a new owner or operator if:

- 1. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to the City;
- 2. A copy of the permit is provided to the new owner and;
- 3. The City does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to #1. above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by the City.

G8. Reduced production for compliance

The Permittee must control production or discharge to the extent necessary to maintain compliance with the terms and conditions of this permit upon reduction of efficiency, loss, or failure of its treatment facility until the treatment capacity is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power for the treatment facility is reduced, lost, or fails.

G9. Removed substances

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the effluent stream for discharge.

G10. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by the City. The City may revoke this permit if the permit fees established under PMC-13.62 are not paid.

G11. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation.

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Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is a separate and distinct violation.

G12. Duty to provide information

The Permittee must submit to the City, within a reasonable time, all information which the City may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to the City upon request, copies of records required to be kept by this permit.

G13. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of PMC-13.62 and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

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APPENDIX A

LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to Ecology with appropriate laboratory documentation.

When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from Ecology's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

Ecology added this appendix to the permit in order to reduce the number of analytical "non-detects" in permitrequired monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Soluble Biochemical Oxygen Demand	SM5210-B ³		2 mg/L
Chemical Oxygen Demand	SM5220-D		10 mg/L
Total Organic Carbon	SM5310-B/C/D		1 mg/L
Total Suspended Solids	SM2540-D		5 mg/L
Total Ammonia (as N)	SM4500-NH3-B and C/D/E/G/H		20
Flow	Calibrated device		

CONVENTIONAL PARAMETERS

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
Dissolved Oxygen	SM4500-OC/OG		0.2 mg/L
Temperature (max. 7-day avg.)	Analog recorder or Use micro- recording devices known as thermistors		0.2° C
рН	SM4500-H⁺ B	N/A	N/A

NONCONVENTIONAL PARAMETERS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
Total Alkalinity	SM2320-B		5 mg/L as CaCO3
Chlorine, Total Residual	SM4500 CI G		50.0
Color	SM2120 B/C/E		10 color units
Fecal Coliform	SM 9221E,9222	N/A	Specified in method - sample aliquot dependent
Fluoride (16984-48-8)	SM4500-F E	25	100
Nitrate + Nitrite Nitrogen (as N)	SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)	SM4500-N _{org} B/C and SM4500NH ₃ - B/C/D/EF/G/H		300
Soluble Reactive Phosphorus (as P)	SM4500- PE/PF	3	10
Phosphorus, Total (as P)	SM 4500 PB followed by SM4500-PE/PF	3	10
Oil and Grease (HEM)	1664 A or B	1,400	5,000
Salinity	SM2520-B		3 practical salinity units or scale (PSU or PSS)
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO ₄)	SM4110-B		200
Sulfide (as mg/L S)	SM4500-S ² F/D/E/G		200
Sulfite (as mg/L SO ₃)	SM4500-SO3B		2000
Total Coliform	SM 9221B, 9222B, 9223B	N/A	Specified in method - sample aliquot dependent
Total Dissolved Solids	SM2540 C		20 mg/L
Total Hardness	SM2340B		200 as CaCO3
Aluminum, Total (7429-90-5)	200.8	2.0	10
Barium Total (7440-39-3)	200.8	0.5	2.0
BTEX (benzene +toluene + ethylbenzene + m,o,p xylenes)	EPA SW 846 8021/8260	1	2
Boron Total (7440-42-8)	200.8	2.0	10.0
Cobalt, Total (7440-48-4)	200.8	0.05	0.25
Iron, Total (7439-89-6)	200.7	12.5	50
Magnesium, Total (7439-95-4)	200.7	10	50
Molybdenum, Total (7439-98-7)	200.8	0.1	0.5
Manganese, Total (7439-96-5)	200.8	0.1	0.5

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
NWTPH Dx ⁴	Ecology NWTPH Dx	250	250
NWTPH Gx ⁵	Ecology NWTPH Gx	250	250
Tin, Total (7440-31-5)	200.8	0.3	1.5
Titanium, Total (7440-32-6)	200.8	0.5	2.5

PRIORITY POLLUTANTS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
META	LS, CYANIDE & TOTAL	PHENOLS	
Antimony, Total (7440-36-0)	200.8	0.3	1.0
Arsenic, Total (7440-38-2)	200.8	0.1	0.5
Beryllium, Total (7440-41-7)	200.8	0.1	0.5
Cadmium, Total (7440-43-9)	200.8	0.05	0.25
Chromium (hex) dissolved (18540- 29-9)	SM3500-Cr EC	0.3	1.2
Chromium, Total (7440-47-3)	200.8	0.2	1.0
Copper, Total (7440-50-8)	200.8	0.4	2.0
Lead, Total (7439-92-1)	200.8	0.1	0.5
Mercury, Total (7439-97-6)	1631E	0.0002	0.0005
Nickel, Total (7440-02-0)	200.8	0.1	0.5
Selenium, Total (7782-49-2)	200.8	1.0	1.0
Silver, Total (7440-22-4)	200.8	0.04	0.2
Thallium, Total (7440-28-0)	200.8	0.09	0.36
Zinc, Total (7440-66-6)	200.8	0.5	2.5
Cyanide, Total (57-12-5)	335.4	5	10
Cyanide, Weak Acid Dissociable	SM4500-CN I	5	10
Cyanide, Free Amenable to	SM4500-CN G	5	10
Chlorination (Available Cyanide)			
Phenols, Total	EPA 420.1		50
Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
ACID COMPOUNDS			
2-Chlorophenol (95-57-8)	625	1.0	2.0
2,4-Dichlorophenol (120-83-2)	625	0.5	1.0
2,4-Dimethylphenol (105-67-9)	625	0.5	1.0
4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol)	625/1625B	1.0	2.0
2,4 dinitrophenol (51-28-5)	625	1.0	2.0
2-Nitrophenol (88-75-5)	625	0.5	1.0

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
4-nitrophenol (100-02-7)	625	0.5	1.0
Parachlorometacresol (59-50-7) (4-chloro-3-methylphenol)	625	1.0	2.0
Pentachlorophenol (87-86-5)	625	0.5	1.0
Phenol (108-95-2)	625	2.0	4.0
2,4,6-Trichlorophenol (88-06-2)	625	2.0	4.0
Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
	VOLATILE COMPOU	NDS	
Acrolein (107-02-8)	624	5	10
Acrylonitrile (107-13-1)	624	1.0	2.0
Benzene (71-43-2)	624	1.0	2.0
Bromoform (75-25-2)	624	1.0	2.0
Carbon tetrachloride (56-23-5)	624/601 or SM6230B	1.0	2.0
Chlorobenzene (108-90-7)	624	1.0	2.0
Chloroethane (75-00-3)	624/601	1.0	2.0
2-Chloroethylvinyl Ether (110-75-8)	624	1.0	2.0
Chloroform (67-66-3)	624 or SM6210B	1.0	2.0
Dibromochloromethane (124-48-1)	624	1.0	2.0
1,2-Dichlorobenzene (95-50-1)	624	1.9	7.6
1,3-Dichlorobenzene (541-73-1)	624	1.9	7.6
1,4-Dichlorobenzene (106-46-7)	624	4.4	17.6
Dichlorobromomethane (75-27-4)	624	1.0	2.0
1,1-Dichloroethane (75-34-3)	624	1.0	2.0
1,2-Dichloroethane (107-06-2)	624	1.0	2.0
1,1-Dichloroethylene (75-35-4)	624	1.0	2.0
1,2-Dichloropropane (78-87-5)	624	1.0	2.0
1,3-dichloropropene (mixed isomers) (1,2-dichloropropylene) (542-75-6)	624	1.0	2.0
Ethylbenzene (100-41-4)	624	1.0	2.0
Methyl bromide (74-83-9) (Bromomethane)	624/601	5.0	10.0
Methyl chloride (74-87-3) (Chloromethane)	624	1.0	2.0
Methylene chloride (75-09-2)	624	5.0	10.0
1,1,2,2-Tetrachloroethane (79-34-5)	624	1.9	2.0
Tetrachloroethylene (127-18-4)	624	10	20
Toluene (108-88-3)	624	1.0	2.0
1.2-Trans-Dichloroethylene	624	1.0	2.0
(156-60-5) (Ethylene dichloride)			

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
1,1,1-Trichloroethane (71-55-6)	624	1.0	2.0
1,1,2-Trichloroethane (79-00-5)	624	1.0	2.0
Trichloroethylene (79-01-6)	624	1.0	2.0
Vinyl chloride (75-01-4)	624/SM6200B	1.0	2.0
Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ μg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
BASE/NEUTRAL C	COMPOUNDS (compound	is in bold are Ecology	(PBTs)
Acenaphthene (83-32-9)	625	0.2	0.4
Acenaphthylene (208-96-8)	625	0.3	0.6
Anthracene (120-12-7)	625	0.3	0.6
Benzidine (92-87-5)	625	12	24
Benzyl butyl phthalate (85-68-7)	625	0.3	0.6
Benzo(a)anthracene (56-55-3)	625	0.3	0.6
Benzo(b)fluoranthene (3.4-benzofluoranthene) (205-99-2) ⁷	610/625	0.8	1.6
Benzo(i)fluoranthene (205-82-3) ⁷	625	0.5	1.0
Benzo(k)fluoranthene	610/625	0.8	1.6
Benzo(r,s,t)pentaphene (189-55-9)	625	0.5	1.0
Benzo(<i>a</i>)pyrene (50-32-8)	610/625	0.5	1.0
Benzo(<i>ahi</i>)Pervlene (191-24-2)	610/625	0.5	1.0
Bis(2-chloroethoxy)methane (111- 91-1)	625	5.3	21.2
Bis(2-chloroethyl)ether (111-44-4)	611/625	0.3	1.0
Bis(2-chloroisopropyl)ether (39638- 32-9)	625	0.3	0.6
Bis(2-ethylhexyl)phthalate	625	0.1	0.5
4-Bromophenyl phenyl ether (101- 55-3)	625	0.2	0.4
2-Chloronaphthalene (91-58-7)	625	0.3	0.6
4-Chlorophenyl phenyl ether (7005- 72-3)	625	0.3	0.5
Chrvsene (218-01-9)	610/625	0.3	0.6
Dibenzo (a,h)acridine (226-36-8)	610M/625M	2.5	10.0
Dibenzo (a,j)acridine (224-42-0)	610M/625M	2.5	10.0
Dibenzo(a-h)anthracene	625	0.8	1.6
(53-70-3)(1,2,5,6-dibenzanthracene)			
Dibenzo(a,e)pyrene (192-65-4)	610M/625M	2.5	10.0
Dibenzo(a,h)pyrene (189-64-0)	625M	2.5	10.0
3,3-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
Diethyl phthalate (84-66-2)	625	1.9	7.6

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
Dimethyl phthalate (131-11-3)	625	1.6	6.4
Di-n-butyl phthalate (84-74-2)	625	0.5	1.0
2,4-dinitrotoluene (121-14-2)	609/625	0.2	0.4
2,6-dinitrotoluene (606-20-2)	609/625	0.2	0.4
Di-n-octyl phthalate (117-84-0)	625	0.3	0.6
1,2-Diphenylhydrazine (as <i>Azobenzene</i>) (122-66-7)	1625B	5.0	20
Fluoranthene (206-44-0)	625	0.3	0.6
Fluorene (86-73-7)	625	0.3	0.6
Hexachlorobenzene (118-74-1)	612/625	0.3	0.6
Hexachlorobutadiene (87-68-3)	625	0.5	1.0
Hexachlorocyclopentadiene (77-47-4)	1625B/625	0.5	1.0
Hexachloroethane (67-72-1)	625	0.5	1.0
Indeno(<i>1,2,3-cd</i>)Pyrene (193-39-5)	610/625	0.5	1.0
Isophorone (78-59-1)	625	0.5	1.0
3-Methyl cholanthrene (56-49-5)	625	2.0	8.0
Naphthalene (91-20-3)	625	0.3	0.6
Nitrobenzene (98-95-3)	625	0.5	1.0
N-Nitrosodimethylamine (62-75-9)	607/625	2.0	4.0
N-Nitrosodi-n-propylamine (621-64-7)	607/625	0.5	1.0
N-Nitrosodiphenylamine (86-30-6)	625	0.5	1.0
Perylene (198-55-0)	625	1.9	7.6
Phenanthrene (85-01-8)	625	0.3	0.6
Pyrene (129-00-0)	625	0.3	0.6
1,2,4-Trichlorobenzene (120-82-1)	625	0.3	0.6
Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
	DIOXIN		
2,3,7,8-Tetra-Chlorodibenzo-P- Dioxin (176-40-16) (2,3,7,8 TCDD)	1613B	1.3 pg/L	5 pg/L

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² µg/L unless specified
PESTICIDES/PCBs			
Aldrin (309-00-2)	608	0.025	0.05
alpha-BHC (319-84-6)	608	0.025	0.05
beta-BHC (319-85-7)	608	0.025	0.05
gamma-BHC (58-89-9)	608	0.025	0.05

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Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL) ¹ µg/L unless specified	Quantitation Level (QL) ² μg/L unless specified
delta-BHC (319-86-8)	608	0.025	0.05
Chlordane (57-74-9) ⁸	608	0.025	0.05
4,4'-DDT (50-29-3)	608	0.025	0.05
4,4'-DDE (72-55-9)	608	0.025	0.05 ¹⁰
4,4' DDD (72-54-8)	608	0.025	0.05
Dieldrin (60-57-1)	608	0.025	0.05
alpha-Endosulfan (959-98-8)	608	0.025	0.05
beta-Endosulfan (33213-65-9)	608	0.025	0.05
Endosulfan Sulfate (1031-07-8)	608	0.025	0.05
Endrin (72-20-8)	608	0.025	0.05
Endrin Aldehyde (7421-93-4)	608	0.025	0.05
Heptachlor (76-44-8)	608	0.025	0.05
Heptachlor Epoxide (1024-57-3)	608	0.025	0.05
PCB-1242 (53469-21-9) ⁹	608	0.25	0.5
PCB-1254 (11097-69-1)	608	0.25	0.5
PCB-1221 (11104-28-2)	608	0.25	0.5
PCB-1232 (11141-16-5)	608	0.25	0.5
PCB-1248 (12672-29-6)	608	0.25	0.5
PCB-1260 (11096-82-5)	608	0.13	0.5
PCB-1016 (12674-11-2) ⁹	608	0.13	0.5
Toxaphene (8001-35-2)	608	0.24	0.5

- 1. <u>Detection level (DL)</u> or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.
- Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10ⁿ, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

3. <u>Soluble Biochemical Oxygen Demand</u> method note: First, filter the sample through a Millipore Nylon filter (or equivalent) - pore size of 0.45-0.50 um (prep all filters by filtering 250 ml of laboratory grade deionized water through the filter and discard). Then, analyze sample as per method 5210-B.

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- 4. <u>NWTPH Dx ⁻</u>Northwest Total Petroleum Hydrocarbons Diesel Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 5. <u>NWTPH Gx</u> Northwest Total Petroleum Hydrocarbons Gasoline Extended Range see <u>http://www.ecy.wa.gov/biblio/97602.html</u>
- 6. <u>1, 3-dichloroproylene (mixed isomers)</u> You may report this parameter as two separate parameters: cis-1, 3-dichlorpropropene (10061-01-5) and trans-1, 3-dichloropropene (10061-02-6).
- 7. <u>Total Benzofluoranthenes</u> Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.
- <u>Chlordane</u> You may report alpha-chlordane (5103-71-9) and gamma-chlordane (5103-74-2) in place of chlordane (57-74-9). If you report alpha and gamma-chlordane, the DL/PQLs that apply are 0.025/0.050.
- 9. <u>PCB 1016 & PCB 1242</u> You may report these two PCB compounds as one parameter called PCB 1016/1242.



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix G PWRF System Description and Capacity Information CH2M, March 30, 2018 THIS PAGE IS INTENTIONALLY LEFT BLANK.





PWRF System Description and Capacity Information

PREPARED FOR:	PACE Engineers
	City of Pasco
PREPARED BY:	Karla Kasick/CH2M John Lee/CH2M
DATE:	March 30, 2018

Facility Description and History

General

The City of Pasco (City) has owned and operated the Process Water Reuse Facility (PWRF) since 1995. The PWRF and associated irrigated farm properties are located north of the City of Pasco, WA and east of Highway 395 in Franklin County. The farm properties is irrigated via center pivot irrigators with the effluent from the PWRF facilities.

The City designed the PWRF to manage process wastewater from a variety of potential vegetable processing facilities. It currently receives process wastewater from four food processors; no sanitary wastewater is discharged into the industrial system. The processors include Pasco Processing, Twin City Foods, Freeze Pack and Reser's Fine Foods. Freeze Pack is connected to Simplot (formerly known as Columbia River Foods (CRF)), which is located on the eastern boundary of the city along State Highway 12. It is important to note the Simplot is in the process of purchasing the CRF facility at the time of the preparation of this document and will assume the same permit currently applicable to CRF. CRF has stopped processing as of January 2016 and therefore the PWRF does not receive process water from this facility.

The City provides potable water to all of the discharge processors. Currently, Pasco Processing is the only food processor permitted by Ecology; the other processors are permitted through the city via industrial wastewater discharge permits. Each processor provides pretreatment of its waste stream before discharge, in accordance with its discharge permit and the City's pretreatment requirements.

The City's Department of Public Works is responsible for the operation of the PWRF. The center pivot irrigators are operated by both the City and lease tenants. Land management and crop production are managed by the agricultural lease tenants.

Existing Processors

The City has a State Waste Discharge Permit (ST0005369) for the industrial wastewater facility (i.e. PWRF) and spray irrigates the combined waste streams from the food processors onto approximately 1,856 acres of land for further treatment. The application of this process wastewater is limited to March 1 to November 30. The City's permit requires that the City continue to comply with effluent limits, to not exceed the agronomic rate for water and nitrogen, and to protect the groundwater for existing and future beneficial uses. The permit includes groundwater enforcement limits for nitrate (38.6 milligrams per liter (mg/L) = background value) and pH (6.5 - 8.5) and performance-based fixed dissolved solids limits for the irrigated wastewater. In addition, the permit includes a fixed dissolved solids limits of 794 mg/L average month and 957 mg/L maximum day.

The food processors that discharge to the PWRF and their characteristics are as follows:

- 1. Pasco Processing (State Waste Discharge Permit No. ST0005388)
 - Year-round processing of assorted vegetable types (potatoes, carrots, and cob and kernel corn), apples, peppers, cherries, asparagus and sugar snap peas.
 - No oil-cooked products
- 2. Twin City Foods (Industrial Waste Discharge Permit No. 000100)
 - Seasonal corn processing that includes blanching and cold storage.
- 3. Reser's Fine Foods (Industrial Waste Discharge Permit No. 000300)
 - Year-round production of contract-specific potato and other hot side dishes
- 4. Simplot (formerly known as CRF Frozen Foods) (Industrial Waste Discharge Permit No. 000200)
 - Seasonal processing of assorted vegetables (peas, corn, and green beans) (It is assumed that once Simplot purchases CRF. the same types and quantities of vegetables will be processes as was previously processed by CRF)
 - No oil-cooked products
- 5. Freeze Pack (Industrial Waste Discharge Permit No. 000300)
 - Year-round processing of onions and seasonal blueberries
 - Permitted by the Washington State Department of Ecology (Ecology) to spray irrigate waste stream during crop growing season for final treatment (State Waste Discharge Permit No. ST0008108)
 - Discharges waste stream via pipeline to Simplot (formerly known as CRF)

Table 1 presents the flows and loadings that are permitted to go to the PWRF.

Food Processor	Total Annual Permitted Flow (MG)	Average Flow — Maximum Month (mgd)	BOD₅ Load — Maximum Month (pounds per day)	BOD₅ Load — Monthly Average (pounds per day)	Total Annual Nitrogen Load (pounds)
Pasco Processing, LLC	383.4	2.5	127,000		270,000
Twin City Foods	220	2.4*	160,000	140,000	225,000
Reser's Fine Foods	115	0.3*		7,200	72,000
Simplot (formally CRF Frozen Foods, LLC) [#]	205	1.25^		70,000	150,000
Total	923.4	6.45	287,000	217,200	717,000
PWRF Design	1003.4	10.6	355,600		866,246
PWRF Reserve	80	4.15	68,600		149,246

Table 1. Food Processor Waste Stream Quantities (2017)

 $BOD_5 = 5$ -day biochemical oxygen demand.

MG = million gallons.

mgd = million gallons per day.

* Value is monthly average

^ Value is daily maximum

Includes Freeze Pack's discharge of approximately 60,000 to 80,000 gallons

The City requires each of the food processors to screen and provide for pH adjustment of its waste stream before discharging into the collection system. Reser's Fine Foods waste stream meets the City's pH requirements (5–11 standard units) without adjustment.

PWRF Purpose

The PWRF was designed and constructed in order to meet the following broad objectives:

- Provide centralized land treatment of food processing wastewater to achieve economies of scale for an important Tri-Cities economic sector while meeting regulatory requirements for discharge water quality
- Provide storage of off-season (predominantly winter) flows from those processors with yearround operations
- Provide an alternative source of irrigation water to leasehold farmers in the immediate vicinity of the PWRF

The process waste stream from the Pasco Processing Center near the PWRF is pumped approximately 2 miles from the Foster Wells Lift Station to the PWRF through a 16-inch and 8-inch PVC force main. Sections of the 16 and 8-inch force mains have been replaced with ductile iron. The waste stream from Simplot (formally CRF) and Freeze Pack is pumped via a separate 10-inch PVC force main directly to the PWRF. The three force mains enter the headworks building at the PWRF. Each force main has a magnetic flow meter. The influent flows are summed by the City in order to record total influent flow. The effluent magnetic flow meter is located in the industrial pump station. This pump station conveys the process wastewater to the spray fields during the spray season of March 1 to November 30 of each year. The waste streams that are received from the processors from December until February are stored in the on-site HDPE lined 115 million gallon (MG) and 35 MG storage ponds. The site also has an 8 MG equalization pond and temporary 5 MG solids storage pond.

There are eleven wells on-site that supplement the process water with fresh water as it is spray irrigated on the spray fields through 16 center pivots. The City leases the land to area farmers who grow a variety of crops included alfalfa, potatoes and corn.

Season Operations

The PWRF functions in 2 seasons: winter (December-February/March), when wastewater cannot be land applied, and land applied in the spray season (March-November). During the winter non-growing season, the City has the capability of storing up to 158 MG of combined waste streams from all of the processors in high-density polyethylene (HDPE) lined 115 and 35 storage ponds and an 8 MB equalization basin. The City manages the irrigation system so the storage ponds are completely emptied by mid-summer.

Equipment Overview

The PWRF receives process wastewater from the Foster Wells and CRF lift stations and has the capability to treat and store the process wastewater until transfer to the land application areas.

The major components of the PWRF are:

- Rotary Screening large solids are removed by two rotary drum screens. Solids are removed via an auger to the screw press while the liquid stream continues to the clarifier/sedimentation basin.
- Clarification/Sedimentation Basin A single rectangular clarifier is used to remove settlable solids (primarily sand) from the process water. Settled solids in the clarifier are removed via a wasting pump and further settled out in a parallel series of sand traps. The settled solids in the sand traps are periodically remove by vacuum truck to a 5 MG HDPE lined basin.
- Screw Press A screw press is used to dewater the solids that are removed by the rotary screens. The solids are stored to be used as livestock feed supplement during the corn processing season or landfilled during other processing seasons.
- Storage Ponds (115 MG, 35 MG) two lined ponds are used to store excess process wastewater, primarily due to winter flows from those processors continuing operations year-round.
- Equalization Basin (8 MG) a 8 MG equalization pond is used to buffer influent flow surges and allow a constant flow to the irrigation pump station.
- Temporary Solids Settling Basin (5 MG) a 5 MG temporary solids setting basin (formerly the equalization basin) located at the southeast corner of the PWRF is used to settle and store solids from the sedimentation basin and screw press filtrate, sand traps, rotary screen overflow.
- Irrigation Pump Station (IPS) The IPS wet well is fed by any combination of pumps from the 8 MG pond, 115 MG pond gravity line, 115 MG transfer pump and directly from the sedimentation basin. The IPS transfers flow to the Farm Operations Distribution System using vertical turbine pumps.
- Farm Operations Distribution System irrigation water is distributed to fourteen full size and two smaller center pivot irrigation systems owned by the City and leased to growers. Field water is supplemented by several wells. Most of the circular fields are approximately 128 acres each; a total of 1,856 acres of cropland exists. The irrigated pivot circles, which comprise the Land Application Area, are arranged in two blocks, with circles 1 through 5 being grouped south of Foster Wells Road and circles 6 through 13 and 15 (14 is not used) being grouped north of the road.

The existing PWRF facility was upgraded in the fall of 2014 to remove additional constituents and improve the quality of the process water to the sprayfields. These improvements include a new headworks to house screening equipment and other smaller components and the installation of a rectangular sedimentation basin. According to the record drawings prepared by Cascade Earth Sciences in September 2014, the basis of design for the PWRF are presented in Table 2.

Parameter	Units	2012/2013 Flow	Design Flow
Minimum System Flow Rate	GPM		750
FWLS Maximum Instantaneous Flow Rate	GPM		4,000
CRF Maximum Instantaneous Flow Rate	mgd		1,500
Jun to Oct Average Flow	mgd	2.8	3.3
Nov to May Average Flow	mgd	0.9	1.1
Maximum Month Average Flow	mgd	4.1	4.8
Peak Day Flow	mgd	5.4	6.3
Annual Flow	MG	607	710

Table 2. PWRF Design Basis (2014)

Peaking factors are the ratio of higher flows, such as maximum day flows, to average annual flow.

The peaking factors for the 2014 upgrades are the following:

- June to October Annual/Maximum Month Flow = 1.45
- June to October Average Annual/Maximum Day Flow = 1.90

Since the maximum month and day flows occur in the June to October processing season, peaking factors outside of this time period are not pertinent.

The flows to the facility, in general, align with the design flows and associated peaking factors.

Rotary Screens

In 2014, two WesTech Cleanflo shear internally-fed drum screens were added to the beginning of the pretreatment process to remove solids from the system. The two rotary screens are used to remove solids greater than 0.02 inches to improve the quality of stored process water prior to discharge to the farm distribution system. Process wastewater enters the process from the 3 influent pipes from the two lift stations and falls onto the screen surface allowing liquid to fall through the cylinder, capturing solids larger than 0.02 inches, and conveys them to the discharge point using spiral flights inside the rotating cylinder.

The existing rotary drum screens have a rated capacity of 3000 gpm each (8.65 mgd combined). The existing screening building was designed and constructed for three screens although only two screens were installed in 2014. The piping and valving for the third screen is in place and allows for a "plug and play" installation of a third rotary drum screen. The existing two screens may be overloaded in the peak summer months; an additional screen may resolve this issue for existing flow and provide redundancy.

Clarifier/Sedimentation Basin

During the 2014 PWRF expansion, a 900 square foot rectangular clarifier was added to remove smaller settlable solids from the process flow. Designed to consist ultimately of four side-by-side clarifiers, the initial installation was limited to a single unit intended to process winter flows.

The rectangular clarifier is a conventional design utilizing two sets of lightweight flights mounted on a chain drive. In the main basin, these flights are approximately the width of the basin and serve to both move settled solids to the waste trough and to skim the surface scum. The main flights failed in 2016 and have been removed and replaced with wood baffles and spray bars. The end cross flight is in need of repairs.

In the PWRF rectangular clarifier, a second set of flights is mounted transversely in the sludge well to move solids from one end of the trough to the sump end with the wasting pump inlet. The PWRF design parameters are shown in Table 3.

Parameter	PWRF
Basin Depth	9.5 feet
Basin Width	20 feet
Basin aspect ratio (L:W)	3:75:1
Detention Time	5.8 hrs (ADF) 2.0 hrs (MDF)
Overflow Rate	1,133 gpd/ft ² (ADF) 3,333 gpd/ft ² (MDF)

Table 3. PWRF Rectangular Clarifier Design Parameters

Weir Loading	26,771 gg
	79 740 an

26,771 gpd/ft (ADF) 78,740 gpd/ft (MDF)

ADF = Average Day Flow MDF = Maximum Day Flow gpd/ft² = gallons per day per square foot

Typical removal of the total suspended solids (TSS) from a rectangular clarifier can be in the range of 35 to 65 percent. In addition, 20 to 40 percent of biochemical oxygen demand (BOD) that is associated with the TSS may also be removed.

As Modified/Temporary Sedimentation Removal

In April 2016, the rectangular clarifier mechanism failed catastrophically, resulting in the basin being inoperable in the manner it was originally intended. As a key process at the PWRF, corrective action was prioritized. As a temporary solution, the broken longitudinal flights were removed from the basin and two timber baffle walls were constructed. These baffle walls were intended to provide energy dissipation of influent flow, allowing the sand to be trapped in the wasting sump (the transverse flights were repaired and the waste pump continues in use). The sand is passed to the sand traps and liquid returned to the clarifier as previously operated.

In 2016, a series of sand traps was added to the clarifier unit process. The purpose of these traps is to provide additional settling of the relatively heavy sand load taken in by the PWRF from the processors. Figure 1 shows these traps. With the modifications to the rectangular clarifier, an additional set of sand traps was installed to provide more flexibility in operations.



Figure 1. PWRF Sand Traps

The traps take the flow from the wasting pump and pass it through twelve 1,000 gallon concrete tanks. Flow through these tanks is by overflow from the proceeding tank; the resulting energy dissipation allows the sand to settle in the traps. Sand is removed using a Vactor truck and the sand is deposited into the 5 MG temporary solids storage basin.

Screw Press

In 2014, a screw press was installed to dewater the solids that were removed through the rotary screens. The screw press dewaters the rotary screen screenings, with the effluent going to the sedimentation basin. The dewatered screenings containing vegetable matter is conveyed and deposited in a truck for feed supplement during corn processing. All other times, the dewatered material goes to the landfill.

Storage Lagoons

The PWRF currently has three lined water storage lagoons on the property:

- 115 MG storage lagoon
- 35 MG storage lagoon
- 8 MG treatment pond

There is also a lined 5 MG pond on the site. It had been previously used as an equalization (EQ) pond but was converted to a temporary solids storage pond in 2016. The 8 MG treatment pond was converted to the new EQ pond.

During winter operation and other periods when process flows exceed irrigation demand, the sedimentation basin and EQ pond discharge into the storage lagoons. When operation of the land application facilities is resumed, water is routed through different pumps and valving to be discharged to the IPS wetwell and conveyed to the center pivot irrigators.

During normal spring/summer/fall operation, the storage lagoons receive water only if there is an excess of process flows over irrigation demand.

115 MG Storage Lagoon

The 115 MG storage lagoon (Figure 2) is intended for use during cold weather or other periods when land application rates cannot be maintained at the desired production rate because of conditions in the irrigation area. The lagoon was initially designed to store approximately 2 months of process water output from the processors from December 1 to processor startup. The estimated volume for storage for cold weather is 50 days at 2.0 mgd or 100 MG, roughly approximating current cold weather flows.



Figure 2. 115 MG Storage Lagoon

35 MG Storage Lagoon

The 35 MG storage lagoon was constructed in 2014 to provide additional cold-weather storage. By adding approximately 17 days of storage at current winter flows, the overall cold weather storage capacity of the PWRF was restored to be greater than 60 days (Table 4).

Table 4. Storage Pond Parameters							
Lagoon Volume (MG)	Storage Days ¹	Lagoon Dimensions (ft)					
115	50	1400 x 800					
35	17	600 x 525					

¹Assumes a flowrate of 2.0 millions gallons per day (mgd). Actual winter flows are currently less than 1.25 mgd

The 35 MG pond was constructed without outlet pipes to connect to the other on-site ponds. In 2016, the 35 MG pond was temporarily connected to the 115 MG Storage basin and the 8 MG Equalization basin via overland piping and electrical transfer pumps to provide additional storage pond capacity during cold weather periods.

8 MG EQ Pond (formerly treatment pond)

Constructed as part of the 2014 capital improvements, the 8 MG EQ (formerly treatment) pond was initially intended to contain a Capped Anaerobic Process (CAP) to achieve a level of BOD reduction to improve product water quality. During the late phases of the design and construction, however, the City re-evaluated the use of CAP.

Due to a need to temporarily store solids in a lined basin, the 5 MG pond was converted from the EQ pond to a solids holding basin in 2016. The 8 MG pond was converted to an EQ pond.

The primary purpose of the EQ pond is short-term storage of the PWRF product water to buffer the operation of irrigation pumps for land application. If the waste stream inflow exceeds the amount that can be delivered for land application, the excess flow will go directly to the 115 and 35 MG storage lagoons. The EQ pond has no over overflow piping to the other storage lagoons.

Temporary Solids Storage (formerly EQ) Pond

As discussed above, the 5 MG pond was initially constructed to provide a buffer for the irrigation pumps. The 5 MG pond is lined with the same HDPE material as the storage lagoons onsite (60 mm HDPE). The inlet, which is located on the southwest corner of the pond, is a 24-inch diameter cast iron pipe embedded in a concrete block in the basin bottom. The pipe is oriented vertically, where it penetrates the basin floor, and discharges 12 inches above the floor of the basin.

In 2016, the 5 MG pond was converted to a temporary solids storage basin since it was lined and was the smallest available basin of the lined on-site ponds. The 5 MG pond has been dredged once to remove the solids to be land applied. A permanent solids handling solution will be evaluated.



Figure 3. 5 MG Pond

PWRF Equipment Capacity Data

As previously mentioned, additional equipment was installed in the fall of 2014 in order to increase the water quality of the process water with the installation of two fine rotary drum screens (0.02 inch mesh) and a sedimentation basin.

A review of the existing permits for the processors reveals that they are not sending their fully permitted flows to the PWRF. It can be reasonably assumed that the processors will eventually send their full permitted flows to the facility since the City has committed to those flows and loads. The existing headworks/screen system is rated for a flow of 8.65 mgd. The July/August 2017 high flow processing month peak flows were approximately 4.6 mgd which is approximately 53 percent of design capacity.

The PWRF has reached a peak day flow rate of approximately 4.9 to 5.0 mgd over the last several years. The base flows during the winter time period (November – March) have been approximately 1.0 to 1.2 mgd. Review of the City's existing industrial permits indicates that the processors are permitted to send a combined maximum month average flow of 6.5 mgd to the PWRF (Table 5 below). Peak day flows could be higher.

Table 5. Industrial Processor Permitted Flow Summary									
Permit and Fact Sheet Data Summary	Twin City	Pasco	asco Reser's Cl		Total				
	Foods	Processing	Fine Foods						
Total Flow (MG)	200	383	115	205	903				
Ave Flow – Max Month (mgd)	2.4	2.5	0.3	1.25	6.5				

City staff started the collection of additional samples within the treatment process train from January to September 2015 to determine the effectiveness of the equipment and to provide a basis for constituent removal assumptions for the design of further treatment. City staff collected samples at the following locations: upstream of screening, upstream of the sedimentation basin, and post sedimentation basin. Tables 6 through 8 provide a summary of this additional sampling and the associated removal efficiencies of the constituents. As noted in Table 8, the process (screening plus sedimentation basin) removed 65-70 percent TSS and 25-30 percent BOD for the nine months of data available in 2015.

Table 6. Screening Removal Efficiency

	Average TSS	Average BOD	Average TKN	Average TN	Average TDS	Average FDS
	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)
Pre-screen	37,645	68,601	1,519	1,447	29,050	10,020
Pre-clarifier	24,878	56,690	1,729	1,743	28,252	9,748
Removal	12,767	11,911	-211	-296	798	272
Screening Percent Removal	33.9%	17.4%	-13.9%	-20.4%	2.7%	2.7%

Note: These results are laboratory reported based on analysis of City samples

Table 7. Clarifier Removal Efficiency

	Average TSS	Average BOD	Average TKN	Average TN	Average TDS	Average FDS
	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)
Pre-clarifier	24,878	56,690	1,729	1,743	28,252	9,748
Post-clarifier	11,695	49,536	1,428	1,439	22,494	9,363
Removal	13,183	7,154	302	304	5,757	384
Clarifier Percent Removal	53.0%	12.6%	17.4%	17.4%	20.4%	3.9%

Note: These results are laboratory reported based on analysis of City samples

Table 8. Overall Removal Efficiency (Pre-screen to Post-Clarifier)

	Average TSS	Average BOD	Average TKN	Average TN	Average TDS	Average FDS
	(lb/day)	(lb/day)	(lb/day)	(ppd)	(lb/day)	(lb/day)
Pre-screen	37,645	68,601	1,519	1,447	29,050	10,020
Post-clarifier	11,695	49,536	1,428	1,439	22,494	9,363
Removal	25,950	19,065	91	8	6,556	657
Screening + Clarifier Percent	68.9%	27.8%	6.0%	0.6%	22.6%	6.6%
Removal						

Note: These results are laboratory reported based on analysis of City samples

The sampling data was further analyzed by dividing the processing season down into two periods. It was noted that the flow during the July to October period was approximately double the first half of the year. Based on this, it was determined that it would be prudent to evaluate the TSS removal by the screens and clarifier using two periods (Jan to Jun) and (July to Dec). This data is presented in Table 9.

Table 9. TSS Average Removal Efficie	encies
--------------------------------------	--------

	Units	Jan-Jun	July-Dec	Total
Total Flow	MG	213.8	587.4	
Pre-Screen	mg/L	3,030	2,031	
Post-Screen	mg/L	1,327	1,884	
Screen TSS Removal	mg/L	1702	147	1,850
Screen TSS Removal	Lbs	3,035,743	721,389	3,757,132
Screen TSS Removal	Tons	1,518	361	1,879
Clarifier TSS Effluent	mg/L	293	1,201	
Clarifier TSS Removal	mg/L	1,034	683	1,717
Clarifier TSS Removal	Lbs	1,844,526	3,344,843	5,189,370
Clarifier TSS Removal	Tons	922	1,672	2,595

The following observations were made from Table 9:

- Flows to the PWRF were double during the latter 6 months of the year compared to the first part of the processing year.
- The pounds of TSS removed through the screens during the latter 6 months was a quarter of the amount removed during the first 6 months.
- The clarifiers removed approximately three times the amount of TSS during the latter 6 months compared to the first 6 months.

Pasco Processing upgraded their pretreatment system in 2016 to improve the removal of suspended and settleable solids. The City performed additional sampling between June and October 2016 across the PWRF pretreatment train. Flows ranged from 2.2 to 3.8 mgd. The median values of 16 data sets are summarized on Table 10. The median, rather than average values, were used to minimize the impact of one day when influent constituent concentrations were approximately 3 to 6 times higher than the maximum value of the remaining 15 data points.

		Total BOD)	Total Suspended Solids		То	Total Nitrogen		
Flow: 3.51 mgd	mg/L	lb/day	Removal	mg/L	lb/day	Removal	mg/L	lb/day	Removal
Influent	732	21,437		393	11,509		68	1,981	
Screen Effluent	941	27,558	-28.6%	400	11,714	-1.8%	71	2,078	-4.9%
Clarifier Effluent	816	23,897	13.3%	319	9,342	20.3%	66	1,938	6.8%
Final Effluent (IPS)	579	16,957	29.0%	191	5,594	40.1%	41	1,205	37.8%
Overall Removal		4,481	20.9%		5,916	51.4%		776	39.2%

Table 10. PWRF Performance: June – October 2016

BOD = biochemical oxygen demand

IPS = irrigation pump station

mg/L = milligrams per litter

lb/day = pounds per day

Screen Performance Analysis

The influent BOD5, TSS and total nitrogen (TN) median values were all less than the screen effluent values for these parameters. This is likely attributed to an issue with the sampling and this resulted in influent characteristics being lower than actual. An analysis of screen performance based on mass loading was completed using 2015 and 2016 data sets (Figure 4).



The plot of screen influent versus effluent solids mass (Figure 4) indicates that approximately 10 to 20 percent of the influent suspended solids are removed below an influent mass load of approximately 8,000 to 12,000 lb/day. Above this range, the suspended solid removal is approximately 95 percent. It appears that it is necessary for a layer of solids to form on the screen to efficiently screen and remove suspended material that are smaller the screen slot size.

Based on the screen data analysis, an estimated median influent TSS mass load was recalculated assuming 17 percent removal of the first 11,000 pounds of TSS applied and 95 percent TSS removal thereafter. Influent total BOD and TN concentrations were estimated from particulate BOD5/TSS and TKN ratios developed from the 2016 data set. Using this approach, the revised 2016 PWRF performance is summarized in Table 11.

	Total BOD			Total Suspended Solids			Total Nitrogen		
Flow: 3.51 mgd	mg/L	lb/day	Removal	mg/L	lb/day	Removal	mg/L	lb/day	Removal
Influent	977	28,624		476	13,932		83	2,425	
Prescreen Effluent	941	27,558	3.7%	400	11,714	15.9%	71	2,078	14.3%
Clarifier Effluent	816	23,897	13.3%	319	9,342	20.3%	66	1,938	6.8%
Final Effluent (IPS)	579	16,957	29.0%	191	5,594	40.1%	41	1,205	37.8%
Overall Removal		11,668	59.2%		8,338	40.2%		1,220	49.7%

Table 11. Revised PWRF Performance: June – October 2016

Comparing the revised 2016 to 2015 data set, the TSS loading was reduced by approximately 63 percent and BOD5 by 58 percent. The 2015 influent TN concentrations were lower than the screen effluent. Comparing the screen effluent TN, the 2016 data indicated a 19 percent increase over 2015.

Based on the 2016 data, overall approximate removals in the PWRF including settling in the EQ basin indicate BOD5 reductions of 59 percent, TSS reductions of 40 percent and TN reductions of 50 percent.
While the significant pretreatment system performance improvements made by Pasco Processing are apparent in the wasteload reductions between 2015 and 2016, it is important to note that the CRF facility (being purchased by Simplot), was not operating in 2016.

The City did not conduct a PWRF sampling and analysis program in 2017. It is strongly encouraged that the City continue the sampling program implemented in 2016 to confirm or revise the data from which design criteria are being developed to accommodate the phased expansion of the PWRF.

Clarifier Performance Analysis

At a flow range of 2.2 to 3.6 mgd, the 2016 screen effluent concentration were in the range of 200 to 500 mg/L. The 2016 clarifier TSS removal efficiencies were low, in the range of 0 to 20%, and did not correlate to flow.

Clarifier effluent TSS vs flow for the 2015 and influent and effluent TSS for 2016 data sets are presented in Figure 5.



At flows above 1 mgd (approximately 1,100 gallons per day (gpd)/sf surface loading), the clarifier effluent TSS remained between 200 to 400 mg/L. At flows above 1 mgd, the 2015 data suggests that the TSS removal efficiency increases linearly with flow. Figure 6 presents the clarifier effluent TSS removal efficiency vs. flow for January to September 2015.



The 2016 and 2017 has revealed that the influent TSS from the processors has been significantly reduced compared to the 2015 and earlier data. If the influent TSS remains below 500 to 600 mg/L, the installation of a new primary clarifier and solids handling system may be able to be delayed to later phases. Based on Figure 6, the recommended surface loading for a new primary clarifier would be 1,000 gpd/sf for average flow and 1,5000 gpd/sf for peak flow conditions.

State Waste Discharge Permit Requirements

The City's permit requires that the City indicate how they are going to comply with the anti-degradation policy of groundwater standards relative to the total dissolved solids concentration in the groundwater.

The results of the performance-based determination resulted in the following interim performancebased irrigated process wastewater effluent limits for TDS:

- Maximum daily limit = 957 mg/L
- Average monthly limit = 794 mg/L

The State Waste Discharge Permit included final groundwater enforcement limits (Table 12) but did not define a time when the City must comply with these final enforcement limits. Instead, the City is required to outline how it will comply with the final enforcement limits as part of an Engineering Report or Facility Plan.

Table 12. Final Groundwater Enforcement Limits

Groundwater Enforcement Limits – Final		
Nitrate	38.6 mg/L	
Total Dissolved Solids	631 mg/L	
рН	6.5 – 8.5 standard units	

The current state waste discharge permit requires the following to be addressed:

- Determination of the design limiting parameter for the sprayfield site;
- Design treatment capacity of the facility for nitrogen;
- Water balance such that the leaching fraction is less than or equal to the leaching requirement;
- A salt management plan that describes how the City will operate the system to comply with the groundwater enforcement limit for TDS of 631 mg/L and comply with the non-degradation policy of the groundwater standards;
- The organic loading in terms of the BOD (lbs/acre/day) that will not cause anaerobic or reducing chemical conditions in the vadose zone;
- All known and available technologies will be applied that results in the compliance with the pH groundwater standards;
- Discussion of water rights and assurance that the well water used is in compliance with the water right law.

In addition, the City's State Waste Discharge permit requires an update to their Land Management Plan. The assumed percentages for the organic and inorganic nitrogen contributions and the assumed losses due to volatilization and denitrification are required to be re-evaluated. According to the permit, the nitrogen design values assumed during the predesign/design of the PWRF in 1992 are obsolete and based on planning assumptions. Actual data submitted by the City contradicts these design values and data exists for the Facility that should be used to update these values. In addition, Ecology is in the process of publishing a literature review of organic loading and provides an updated review of nitrogen loss factors. In general, nitrogen volatilization was found to be 5 percent or less and denitrification loss is typically between 5 and 15 percent.

Next Steps

A majority of this technical memorandum will provide the background and design data for the PWRF Facility Plan as the evaluation of the treatment alternatives are developed to address capacity and quality concerns.



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix H Development of PWRF Solids Handling Alternatives Memo CH2M, June 22, 2018 THIS PAGE IS INTENTIONALLY LEFT BLANK.





TECHNICAL MEMORANDU M

ch2m:

Development of PWRF Solids Handling Alternatives

PREPAREDFOR:	PACE Engineers, Inc
	City of Pasco, WA
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DATE:	June 22, 2018
PROJECT NUMBER:	697159
REVISION NO.:	Draft

Executive Summary

This technical memorandum documents the City of Pasco (City) Process Wastewater Reuse Facility (PWRF) solids handling alternatives evaluation. The following alternatives were evaluated:

- Alternative 0 Do Nothing
- Alternative 1 Combined Solids Thickening and Anaerobic Digestion
- Alternative 2 Combined Solids Dewatering and Composting

The basis for the development of each alternative is presented, as well as a brief discussion of additional alternatives for future consideration. Each alternative includes an order-of-magnitude cost evaluation. Unit process considerations are discussed in fact sheets attached to this memorandum. Alternative 2 – Combined Solids Dewatering and Composting was identified as the preferred alternative to be evaluated further due to its relatively low capital cost, lower life-cycle cost, and higher quality product.

Solids Handling Alternatives Development and Screening

Solids handling alternatives were developed based on input from the City, logistical requirements of various solids handling options, and regulations governing land application of secondary solids that will be produced from the PWRF. At this time, the City is evaluating land application of primary solids either on the PWRF site or other farmlands. Secondary solids will be also be generated after the installation of the biological upgrades. This will result in the generation of more solids and will likely need to be handled. At this time, the regulatory requirements governing the land application of secondary solids is not known. Alternatives to land application are discussed as part of this memorandum.

The following guidance was provided by City staff on the direction of the future solids handling at the PWRF, which was also considered when developing alternatives.

• **Control of Biosolids Fate.** The City prefers to control the final fate of their biosolids or composted product. Therefore, solids handling alternatives that rely on third parties (such as other wastewater treatment facilities or solids management companies) were not considered.

DEVELOPMENT OF PWRF SOLIDS HANDLING ALTERNATIVES

- **Ownership/Operation of Onsite Biosolids Processing.** The City would prefer to maintain ownership of solids processing equipment.
- Land Application. The City would like to use processed biosolids or compost on nearby fields. Marketing to third parties or the public is not preferred.
- **Reliability/Redundancy.** 100% redundancy of all new unit processes is not required. If solids processing equipment is not available, alternative solids management options are available.
- Social Traffic and Trucks. Additional truck traffic for hauling compost product off-site is acceptable, but not preferred.
- **Odors.** Odors generated by the treatment and land application process are a principal concern for the facility. Extensive odor control will be required to minimize odor impacts to neighbors.
- **Combined heat and power (CHP).** CHP equipment has not been included in these evaluations, although there may be advantages to include CHP equipment in the future to beneficially use digester gas created from the UASB and possible anaerobic digesters.

1.1 Alternatives Screening

The following alternatives were developed as potential approaches to achieving the City's solids handling goals.

- Alternative 0 Do nothing. This alternative assumes no changes to the current solids handling systems. This alternative was evaluated on a qualitative basis only and is primarily intended to document the need for additional solids handling upgrades.
- Alternative 1 Combined Solids Thickening and Anaerobic Digestion. This alternative assumes primary and secondary solids will be combined, thickened, and digested in a mesophilic anaerobic digester. Screenings will be processed using a grinder and added to the digester feed. Screenings will not be dewatered and may need to be slurried to pump the material into the digesters. The existing screenings dewatering equipment could potentially be abandoned. Clarifier skimmings will also be added to the digester feed. Digested biosolids will be pumped to local fields for land application.
- Alternative 2 Combined Solids Dewatering and Composting. This alternative assumes primary solids and secondary solids will be combined, dewatered, and composted in an aerated static pile composting facility. Screenings will be dewatered using the existing dewatering equipment, processed using a grinder, and added to the composting feed. Clarifier skimmings will also be composted. Screening would occur immediately after composting so that bulking agent can be recovered and recycled back to the mixing operation and the screened product would then be moved offsite for sale or land application on local fields.

The following alternatives were briefly considered, but eliminated from further consideration:

- Lime Stabilization eliminated due to high cost and low sustainability.
- Incineration eliminated because it is difficult to permit, generally has low public acceptance, and has low sustainability.
- Solar drying eliminated primarily due to large footprint required. Solar dryers generate a product that is non-uniform in size and is likely to be dusty. Managing dusty biosolids material increases the likelihood of thermal events, thus this option was eliminated.
- Land application of raw WAS for this preliminary evaluation, it was assumed that land application of waste activated sludge (WAS) is not allowed and further processing is required to minimize vector attraction and pathogen levels. Further investigation should be performed to determine if land

application of biological sludges without further stabilization is acceptable. Direct land application of WAS would be more economically favorable.

Solids Handling Alternatives Evaluation

For the selected alternatives, a description of each process and a high-level cost estimate were generated. Technology fact sheets were developed to provide technical information on the unit process technologies included in each alternative. They include information on process operation, design requirements, sizing, and integration of equipment for the PWRF. Fact sheets are included in Attachment A.

Solids and energy balance calculations were completed to support the alternatives evaluation. Conceptual-level estimates of capital costs were also developed to facilitate alternatives comparison. Note that cost estimates are accurate to +50% and -30% as defined by the Association for the advancement of cost engineering international for studies or feasibilities and are intended only for comparison between the alternatives. Calculations and design criteria are included in Attachment B.

If it is determined that digestion or composting is required or desired, further evaluation including site layouts and process flow diagrams would be developed in subsequent design stages.

Assumptions Common to All Alternatives

The following assumptions and considerations are common to each alternative evaluated in this analysis:

- The new secondary treatment facilities will be constructed prior to solids handling upgrades.
- Screened solids will be 10 percent total solids and will consist of primarily fibrous food scrap particles.
- The existing solids screening and dewatering equipment can continue to be used for solids processing. Dewatered screenings will be approximately 20 percent solids.
- Additional sludge and cake storage will be provided as noted for each alternative.
- Odor control systems are required for all areas that are regularly staffed, and for concentrated odor sources, such as thickening, dewatering, hoppers, etc. Site footprint and cost allowance for odor control are included for all new facilities. However, detailed requirements such as the type, size, and location of odor control systems, would need to be evaluated at a future design stage.
- Sidestream treatment for struvite control or to reduce nutrient loadings from process streams returned to the liquid treatment are not anticipated.

Mass and energy balances for all analyses assumed the solids loadings presented in Table 1.

		Summer Peak		Winter Peak	
Parameter	Unit	Composting	Digestion	Composting	Digestion
Screened Solids					
Flow	mgd	0.010	0.020	0.005	0.010
TS	lbsTS/day	16,600	16,600	8,800	8,800
VS	lbsVS/day	14,900	14,900	7,900	7,900
RawBlended PS/WAS Sludge					
Flow	mgd	0.2	0.2	0.2	0.2
TS	lbsTS/day	25,300	25,300	21,900	21,900
VS	lbsVS/day	12,800	12,800	10,400	10,400

Table 1. Solids loadings for each alternative.

APPENDIX H

DEVELOPMENT OF PWRF SOLIDS HANDLING ALTERNATIVES

Alternative 0 – Do Nothing

This alternative assumes that no improvements are made to the existing solids handling processes. Screened solids will continue to be dewatered using the existing screw press and stored for livestock feed supplement (when in season) or landfilled. Primary solids will be pumped from the new clarifier to the 5 MG solids storage pond. Secondary solids produced by the new SBRs will be stored with primary solids.

This alternative is not viable due to the large quantity of solids that would need to be processed. Therefore, this alternative is not recommended and has not been developed further.

Alternative 1 – Combined Solids Thickening and Anaerobic Digestion

Upgrades and equipment included as part of this alternative include:

- New primary and secondary solids mechanical thickening (one new gravity belt thickener in a new building were assumed). Refer to Thickening Fact Sheet for more information.
- One new mesophilic digester with a volume of 1.3 million gallons. Refer to Digestion Fact Sheet for more information.
- Two new digester gas boilers with a capacity of 2.0 million British thermal units per hour (MMBTU/hr) output each.
- Two new digester gas flares with a minimum capacity of 300 standard cubic feet per minute (scfm) each. Refer to Waste Gas Burner Fact Sheet for more information.
- Additional pumps and controls as required.

Alternative 2 – Combined Solids Dewatering and Composting

Upgrades and equipment included as part of this alternative include:

- New combined solids dewatering and cake conveyance (one 18" centrifuge in a new building was assumed). Refer to Dewatering Fact Sheet for more information.
- One new covered aerated static pile composting facility sized for a 21-day composting period. Refer to Composting Fact Sheet for more information.

Cost Comparison

Capital costs were developed for each alternative. Cost estimates are order of magnitude and were developed for the purpose of alternatives comparison based on limited engineering data. These costs are not intended for budgeting. Estimated capital costs include contractor cost for materials, equipment, labor, and contractor markups, and project delivery cost for engineering, services during construction, permitting, commissioning, project and construction management, and legal and administrative.

Capital Costs

A comparison of capital costs for each alternative is shown in Table 2. Alternative 2 - Combined Solids Dewatering and Composting is expected to require the lowest capital investment.

Table 2. Capital Cost Comparison

Alternative	Capital Cost (\$)
Alternative 1 – Combined Solids Thickening and Anaerobic Digestion	\$32,354,000
Alternative 2 – Combined Solids Dewatering and Composting	\$27,071,000

The operations and maintenance costs for the dewatering and composting facilities in Alternative 2 will be higher than the facilities required in Alternative 1. Life-cycle cost estimates should be prepared to determine the most cost-efficient alternative.

Recommended Solids Handling Alternative

Based on alternatives evaluation, Alternative 2 - Combined Solids Dewatering and Composting is recommended for further evaluation for solids handling at the PWRF. This alternative would allow the PWRF to process wastewater solids at a lower capital cost than digestion and requires fewer unit processes. This alternative also maximizes the use of existing infrastructure by allowing the continued use of rotary screw presses for the screenings. In addition, ASP composting will produce a Class A compost product which can be sold to local farmers or applied directly to the City-owned fields, whereas digestion would produce a lower-quality Class B biosolids product. Odors from land applying compost will be significantly lower than those for digested biosolids.

ASP composting is a proven technology with a long history of successful application in municipal wastewater treatment facilities. Reference compost facilities include Davenport, IA, Spotsylvania, VA, Couer D'Alene, ID, Latah Sanitation, ID, and Inland Empire, CA. Approximately 2 additional staff are recommended for the new composting facility for product management and distribution. Truck traffic at the plant is expected to increase by 4 trucks per day for bulking agent deliveries and compost product distribution.

Attachment A Fact Sheets

FACT SHEETS



Biosolids and Energy Management Plan

Technology Fact Sheet: Composting

 PREPARED BY:
 CH2M

 PROJECT:
 PWRF Solids Handling Alternatives

 DATE:
 June 22, 2018

Process/Technology Description

Composting is a controlled, aerobic, exothermic, microbial process that converts organic waste materials to a more stable form of a humus-like substance that can be beneficially used as a soil conditioner. During the composting process, exothermic heat will raise temperatures of the composting mass through mesophilic to thermophilic temperatures.

The four main objectives of sludge or biosolids composting are to:

- Kill disease-causing organisms (reduce pathogens);
- Further stabilize biosolids by decomposingodor-producing compounds;
- Dry the biosolids; and
- Produce a stable, manageable, and marketable product.

Although composting is a naturally occurring biological process, the degree of control imposed on a system can vary from the simple method of periodically turning a pile or windrowing to the more involved enclosed or within-vessel system with mechanical agitation and forced aeration.

Over the years a number of composting methods have evolved. These methods offer the following benefits: accelerating a naturally occurring biological process; providing for process control over variables such as moisture, carbon, nitrogen, and oxygen; containing odors and particulates; reducing land area requirements; reliably producing consistent product quality; and integrating aesthetically pleasing facilities into local and regional sites.

As noted there is a wide variety of composting technologies available, however they can be grouped into three categories: Aerated static pile (ASP); Within-Vessel; and Windrow.

• Aerated Static Pile. The aerated static-pile method of composting was developed in Beltsville, MD in the 1970s by the United States Department of Agriculture (USDA) and has been referred to as the Beltsville Method. The ASP method is highly flexible and thus is the most commonly used biosolids composting method in the United States. As the name suggests this method involves aerating piled feedstock material. The compost mixture is constructed into an approximately 6- to 12-feet deep pile over an aeration floor, plenum or perforated piping.

The entire pile is covered with an insulating blanket of wood chips or unscreened finished compost (6 to 12 in. in depth) to ensure that all parts of the mixture meet temperature standards for pathogen kill and vector attraction reduction. Figure 1 provides a typical cross section and layout of an aerated static pile. In small operations, individual piles may be constructed. In large operations, a continuous or extended pile is divided into sections representing each day's contribution. The continuous pile construction is referred to as Extended Aerated Static Pile (EASP). The EASP allows

for constructing a new pile against the shoulder of the previous pile thus extending the pile length and minimizing the overall footprint. In a like manner, piles are broken down once regulatory criteria such as PFRP temperatures (3 days above 55°C) and VAR temperatures (14 days above 40°C) are completed. Piles break down in near vertical walls which can cross two piles material, so space to allow room for pile building and breakdown must be provided for in design of a facility.



Figure 1. Schematic of typical extended aerated static pile.

When using the aerated static-pile method, the mixture remains in the pile for the active composting period, typically ranging from 21 to 28 days. Following this, the piles are broken down and the material is either moved directly to a curing area or first screened and then moved to a curing area. It is critical that the compost solids content be at least 55% for screening. In some facilities, an intensive drying step precedes screening, with a higher aeration rate than active composting. Alternatively, screening can also follow curing. Curing before screening reduces the amount of area needed for curing and minimizes the amount of bulking agent that is degraded (increases the amount of bulking agent which can be recycled). Compost typically remains in curing for a minimum of 30 days to further stabilize the material. This may be longer if the curing process is not aerated. If compost is destined for agricultural use, curing may not be required.

Aerated static-pile composting was originally developed for outdoor sites. However, many facilities have been constructed either partially or fully enclosed. The level of enclosure is generally dictated by the required level of odor capture and control. However, local environmental conditions such as extremes of temperature or rainfall my dictate at least partial enclosure to facilitate operations.

Reference compost facilities include Davenport, IA, Spotsylvania, VA, Couer D'Alene, ID, Latah Sanitation, ID, and Inland Empire, CA.

• Within-Vessel Composting. There are a wide variety of within-vessel composting systems that have been developed over the years but only a few such systems have seen multiple installations with many others being used only once or twice. In general, within-vessel systems incorporate some type of automated material movement combined with aeration.

The detention time for within-vessel systems varies from approximately 14 to 21 days depending on system supplier recommendations, regulatory requirements, and costs. Detention time should be based on desired product characteristics, especially stability, and should take into account the detention time in all process phases. Further stabilization is generally required after the active composting phase in a within-vessel system for 30-60 days to achieve desired product stability.

APPENDIX H

TECHNOLOGY FACT SHEET: COMPOSTING

The most commonly used within-vessel system is the horizontal agitated-bay reactor illustrated in Figure 2. These reactors are rectangular, aerated from the bottom with independently programmable aeration zones, and enclosed in a building. Fresh mix is loaded into the front end by a loader. The agitation device is completely automatic and it typically makes one pass through the reactor each day. The composting material is dug out and re-deposited approximately 11 ft behind the machine. Eventually, the composting material is moved through the entire length of the reactor. Agitated bay reactors can be designed to control odors, but have low flexibility with respect to volume of material processed.



Figure 2. Schematic of typical horizontal agitated-bay reactor.

• Windrow. In windrow composting, the composting mix is formed into long parallel windrows with a trapezoidal or triangular cross section. The material is then periodically turned with a front-end loader or a dedicated windrow turning machine. The purpose of turning is to expose the material to the air, release moisture, and loosen and fluff the material to facilitate air movement through the windrow. Turning is also needed to mix the cooler outside material into the hot core of the pile to expose all the material to high enough temperatures for uniform pathogen kill. Further, anaerobic zones occur in windrows and the agitation is intended to provide needed oxygen to the core of the pile. In practice, during the active phase of composting, the oxygen content is rapidly consumed after turnings in the core of the pile creating anoxic or anaerobic zones.

Windrow composting is performed at open outdoor sites or covered sites. Windrow systems require a large amount of space compared to other composting technologies. This primarily is because of pile geometry and the required allowance between and at the end of piles for maneuvering a windrow-turning machine. Windrows have a low ability to control odors.

These alternatives were briefly evaluated and ASP was selected due to its flexibility to handle changes in loading, ability to design for odor control, and the wide history of operation across the United States.

Reliability and RedundancyCriteria

Covered ASP composting with screening has been assumed and sized for a 21-day composting period. No further onsite curing or product storage has been included because the product use anticipated is for agricultural land application. Screening is intended to occur immediately after composting so that bulking agent can be recovered and recycled back to the mixing operation and the screened product should then be moved offsite for land application. If the ASP system is removed from operation, alternative solids handling arrangements should be made.

APPENDIX H

TECHNOLOGY FACT SHEET: COMPOSTING

Auxiliary Systems/System Integration

The following issues should be considered when adding ASP composting:

- Bulking agent is required to adjust moisture content of the solids prior to composting
- Automated mixing is generally required for large systems to prepare the feedstock
- The facility should be covered in wet weather environments for all weather process control
- Proper aeration system design is critical
- The facility must be designed to control odors.

Costing Basis

Capital costs include allowances for mechanical equipment, buildings, sitework, concrete slab, installation, taxes, contractor markups, contingency, market adjustment factor, and project delivery fees. Expected capital costs of composting are based on new composting equipment, blowers, odor control, buildings, and moving stock.

FACT SHEETS



Biosolids and Energy Management Plan

Technology Fact Sheet: Dewatering

PREPARED BY:	CH2M
PROJECT:	PWRF Solids Handling Alternatives
DATE:	June 22, 2018

Process/Technology Description

Dewatering removes water from sludge to produce a relatively dry cake usually ranging from 15 to 30 percent solids, depending on the material dewatered and the dewatering technology. Dewatering options include centrifuges, belt filter presses, rotary filter presses, screw presses, or volute presses. Other dewatering technologies are available, such as piston presses, plate-and-frame presses, and geotextile tubes. However, these are not common technologies and are not recommended for the PWRF.

• **Centrifuges.** Decanter centrifuges have a cylindrical bowl with a conical end and a scroll for moving the solids along the length of the unit (see Figure 1). Centrifuges rotate at a high speed to apply a centrifugal force to the solids slurry, forcing the heavier solids to separate from the water fraction and collect along the bowl wall. Centrate discharge weirs, located at one end of the unit, control the water depth within the unit, while the solids are conveyed from the bowl up the conical section (the "beach") where the cake is discharged. Centrifuges have been used extensively in municipal wastewater dewatering applications since the 1930s. Therefore, centrifuge technology is a well-established technology with a long list of successful applications.



Figure 1. Schematic of typical decanter centrifuge.

• Belt Filter Presses. Belt filter presses employ a combination of gravity drainage and mechanical compression to dewater solids (see Figure 2). Solids are first conditioned with polymer and uniformly deposited on a porous belt, where free water is removed by gravity drainage leaving a thin layer of solids on the belt. A second belt is applied on top of the solids layer to compress the solids and guide them over a series of rollers. Progressively increasing pressure is applied to the solids by rolling the belts over perforated drums of decreasing

diameter. Water removed by this shearing/squeezing action passes through the belts and into a filtrate drain at the bottom of the unit. Doctor blades scrape and remove the dewatered cake from the belts at the point of discharge and the cake is conveyed to storage or shipment.



Figure 2. Schematic of typical belt filter press.

Belt filter presses were first developed in the 1960s and have continued to be developed as one of the most common dewatering devices in the wastewater industry. A number of modifications and improvements occurred over the years, including the addition and optimization of the gravity drainage zone, variations in the wedge zone design, roller arrangements in the pressure zone, enclosure of the unit for workers' safety and health consideration. More recent improvements on belt press technologies include the extension of the pressure zone by incorporation of additional rollers. Belt press models now can vary from standard 8 roll machines to 12 rolls and up to as many as 15 rolls. Features such as an independently controlled gravity zone are also found to be beneficial.

• Rotary Filter Presses. In a rotary press (see Figure 3), feed solids enter a rectangular cavity created between two rotating stainless steel screens. As the solids rotate through the channel, water filters through the porous screens and cake is extruded at the outlet of the channel. The frictional force of the slowly revolving screens coupled with an outlet restrictor plate generates a cake with a relatively high solids content given the small footprint of the unit.

Rotary press technology is a relatively recent innovation in solids dewatering technology. Rotary presses have been successfully used for dewatering of industrial solids and in the pulp and paper industry since their original development in 1992 by Fournier Industries of Canada. During the last 10 years, rotary presses have been employed in municipal solids dewatering applications in both the US and Canada. However, there are not as many applications using municipal solids compared to BFPs and centrifuges. Further, there are no installations at large WWTPs, and there are very few installations operating on a 24 hours/day, 7 day/week basis



Figure 3. Schematic of typical rotary filter press.

• Screw Presses. A screw press is comprised of a rotating helical screw mounted inside a cylinder. The cylinder is formed from perforated sheets or longitudinal bars that allow water to pass but retain solids within the interior of the unit. Solids are usually fed into one end and discharged from the other end of the press. As solids move through the press, it is subjected to increased pressure created by a decrease in the distance between the cylinder and screw. The reduction is commonly achieved by using either a conical cylinder or a screw with varying diameter. Figure 4 shows a typical cross-section of a screw press.



Figure 4. Schematic of typical screw press.

Screw press technology has been around since the 1950s and has been used in a variety of applications for industries such as pulp and paper, chemical, petrochemical, foods, municipal, and agriculture. In the municipal market, screw presses have been used successfully to dewater secondary solids, aerobic and anaerobic digester solids, and various primary/secondary solids ratios. Using screw presses in municipal WWTPs in North America began to be truly established in the late 1990s.

• Volute Presses. The operation of a volute press is very similar to that for a screw press (see Figure 5). Digested solids are fed into a flocculation tank where polymer coagulant is added. The conditioned solids are then fed to a dewatering drum. The dewatering drum consists of a screw conveyor surrounded by a series of fixed and moving rings secured around the screw

using a tie rod. The gap between the rings acts as a filter for the pressate by allowing water to penetrate the gap and maintaining solids within the chamber. The inner diameter of the moving rings is slightly smaller than the diameter of the screw thread, which forces the moving rings to oscillate within the chamber in response to the turning of the screw. The movement of the rings continuously cleans the ring gaps and prevents clogging of the screw. As the solids are conveyed through the chamber, the pitch of the screw narrows and the gaps between the rings decreases, allowing higher pressures and enhanced dewatering throughout the length of the screw. At the end of the screw, an end plate exerts further pressure on the solids before dewatered cake is extruded.



Figure 5. Schematic of typical volute press.

The volute press is a relatively recent innovation developed in Japan in the 1990s. Since then, volute presses have been installed at over 800 locations, including applications in municipal WWTPs, winery WWTPs, and pulp and paper mills. However, the vast majority of these applications are in Japan and abroad, with very few US applications that are similar to San Mateo. Because volute presses do not have a strong presence in the US, finding local representation for the equipment and establishing a competitive bid could prove challenging.

These alternatives were briefly evaluated and centrifuges were selected due to their high capacity, low footprint, and long history of successful operation.

Along with dewatering equipment, a cake conveyance system will be installed to transport dewatered solids to the composting system. Shafted crew conveyors were selected for cake conveyance because of their reliability and history of successful operation. Shafted screw conveyors consist of flat-faced helical flights radially attached to a central pipe. The screw mechanism rotates inside a trough enclosure to convey solids to a discharge location. A typical schematic of a shafted screw conveyor is shown in Figure 2.



Figure 2. Typical schematic of a shafted screw conveyor.

Reliability and RedundancyCriteria

Only one centrifuge was assumed with a bowl diameter of 18 inches, along with 50 lineal feet of screw conveyors. A redundant centrifuge is not provided, because of the relatively high capital cost. If the centrifuge or screw conveyors are removed from operation, solids would be stored in the existing 5 MG solids storage pond. Additional solids and cake storage is not provided.

Auxiliary Systems/System Integration

The following issues should be considered when adding centrifuges:

- A new polymer system will be necessary, including new control strategies.
- Plant water supply and process air may be required for the new equipment.
- Sidestream treatment may be beneficial to reduce potential struvite issues and nutrient loadings to the plant headworks.

Costing Basis

Capital costs include allowances for mechanical equipment, equipment building or concrete slab, installation, sitework, taxes, contractor markups, contingency, market adjustment factor, and project delivery fees. Expected capital costs of dewatering are based on new dewatering equipment, a cake conveyance system, and an odor-controlled building to house the dewatering system.

FACT SHEETS



Biosolids and Energy Management Plan

Technology Fact Sheet: Anaerobic Digestion

PREPARED BY:	CH2M
PROJECT:	PWRF Solids Handling Alternatives
DATE:	June 22, 2018

Introduction

Anaerobic digestion is a biological process that stabilizes organic matter in the absence of oxygen. During this process, biodegradable organic matter is converted to methane (CH₄) and carbon dioxide (CO₂). Solids remaining after digestion are considered stable due to reduced biological activity and recalcitrant forms of organic materials that are not readily biodegradable. Biosolids are less odorous, attracts fewer vectors (such as rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents), and contains fewer pathogens. Anaerobic digestion reduces the mass of solids produced by wastewater treatment, which reduces solids hauling requirements. Biosolids are also a valuable fertilizer due to a preferable carbon, nitrogen, and phosphorus content. Digester gas produced during anaerobic digestion can be used as a source of renewable energy, reducing dependence on fossil fuels and offsetting emissions of fossil fuel-based greenhouse gases.

This fact sheet documents design parameters and characteristics of anaerobic digestion systems, including an overview of available digester configurations, performance criteria, and recommended design parameters.

Process/Technology Description

Although the biochemical reactions are complex, anaerobic digestion generally involves solids hydrolysis, fermentation, acetogenesis, and methanogenesis. A simplified schematic of the biochemical reactions involved in anaerobic digestion is shown in Figure 1.

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TECHNOLOGY FACT SHEET: ANAEROBIC DIGESTION



Figure 1. Simplified Breakdown of Anaerobic Digestion Biochemical Processes.

In hydrolysis, particulate and high molecular weight compounds are converted to low molecular weight compounds. Hydrolytic transformations include: lipids to fatty acids, polysaccharides to monosaccharides, proteins to amino acids, and nucleic acids to purines and pyrimidines. Fermentation (also referred to as acidogenesis or acid production) further breaks down products of hydrolysis into volatile fatty acids, acetic acid, or hydrogen and carbon dioxide. Acetogenesis converts volatile fatty acids into acetic acid or hydrogen and carbon dioxide. Methanogenesis produces methane by converting either acetic acid or a combination of hydrogen and carbon dioxide.

Successful digestion requires that each of these steps (hydrolysis, fermentation, acetogenesis, and methanogenesis) occur in the proper order and at the proper rate. The rate and extent of the digestion process may be limited by any one of the steps. The primary goals of digester design are to optimize these reaction rates while ensuring a safe and reliable system. There are a number of parameters that can be adjusted in digester design, but only the parameters most relevant to the PWRF are discussed in this fact sheet:

- Hydraulic Loading
- Volatile Solids Loading
- Specific Energy Loading Rate
- Temperature

Hydraulic Loading

The solids retention time (SRT) is a fundamental measure of hydraulic loading to a digester. It is related directly to the specific growth rate of anaerobic microorganisms in the digester. The rates of the anaerobic digestion biochemical reactions discussed above (hydrolysis, fermentation, acetogenesis, and methane formation) are controlled by the specific growth rate of microorganisms responsible for facilitating each reaction. As a result, the extent of each digestion reaction is dependent on a minimum

TECHNOLOGY FACT SHEET: ANAEROBIC DIGESTION

SRT of the digester. The SRT of an anaerobic digester is calculated in the same manner as an activated sludge system. The SRT equals the mass of solids in the digester divided by the mass of solids removed each day. Most digesters are designed and operated as once-through systems in which the SRT is equal to the hydraulic residence time (HRT). HRT is the digester volume divided by the feed solids flow rate. In general, there is a minimum SRT for each reaction. The minimum SRT corresponds to the maximum specific growth rate of the microorganisms. If the operating SRT is less than the minimum SRT, microorganisms cannot grow rapidly enough to remain in the digester.

There are two issues to consider when establishing a minimum SRT: the growth rate of hydrolyzing bacteria and the growth rate of methanogens (methane-forming microorganisms). Many organic compounds can be hydrolyzed and digested at a relatively low SRT, while other biological materials and certain carbohydrates require a particularly long SRT. Likewise, methanogens are relatively slow-growing microorganisms and require a minimum SRT to prevent wash-out. If wash-out occurs, methane formation will cease and organic matter in the solids will not be fully stabilized. In all cases, a minimum SRT is required to ensure that biodegradable organic material in the solids is stabilized. Theoretically, a minimum SRT of 4 days is required under mesophilic conditions, but actual design SRTs are 15 days or longer to meet the 503 regulations for Class B biosolids. Thermophilic digestion can have shorter design SRTs -- typically around 10 days plus or minus a couple days for average conditions or with one unit out of service.

Volatile Solids Loading

The volatile solids loading rate is the mass of volatile solids added to the digester each day divided by the volume of the digester (lbs VS/ft³/day). Limiting the volatile solids loading rate prevents inhibitory levels of ammonia within the digester, as ammonia is released during degradation of organic matter. As the quantity of organic matter degraded per unit of digester volume increases, the ammonia concentration will also increase. Limiting the volatile solids loading rate also enhances mixing and pumping of digested solids. A limiting value of 0.2 lb VS/ft³/day is often used for mesophilic anaerobic digestion. However, enhanced digestion systems, such as those with thermal hydrolysis, thermophilic digestion, etc., can be operated at higher volatile solids loading rates.

Specific Energy Loading Rate

Hydraulic and solids loading rates typically govern digester designs when treating wastewater solids. However, the specific energy loading rate is useful when evaluating the co-digestion capacity of a digester. The specific energy loading rate is a measure of energy loading relative to the digester biomass, similar to the food-to-mass ratio parameter used in secondary wastewater treatment design. The specific energy loading rate is calculated dividing the mass of chemical oxygen demand added to the digester each day by the mass of volatile solids in the digester (lbs COD/lb VS/day). A limiting value of 1.25 lb COD/lb VS/day is often used for mesophilic anaerobic digestion. However, enhanced digestion systems, such as those with thermal hydrolysis, thermophilic digestion, etc., can be operated at higher loadings.

Temperature

Temperature is an important variable in anaerobic digester design because it influences biological kinetics. Anaerobic digestion processes are typically operated at temperatures in either the mesophilic (95 to 98 degrees F) or thermophilic (115 to 130 degrees F) range. Most anaerobic digesters operate at mesophilic temperatures due to relatively low heat demands, minimal safety concerns, ease of operation, and extensive track record of successful applications. However, thermophilic digesters allow higher solids and hydraulic loading rates, while providing increased volatile solids reduction and digester gas production. Thermophilic digestion also improves pathogen destruction rates and, when operated within specific parameters, is recognized by the EPA as a process capable of producing Class A biosolids. However, there are several potential disadvantages to thermophilic digestion, including higher energy

APPENDIX H

TECHNOLOGY FACT SHEET: ANAEROBIC DIGESTION

requirements, poorer quality supernatant, more odorous solids during processing, and safety concerns regarding the warmer solids.

Design Criteria

Alternative 1 assumed one 1.3 million gallon digester would be installed to provide a minimum 15-day SRT during peak loading events.

Reliability and RedundancyCriteria

If the digester is taken out of service for maintenance, alternative solids handling arrangements should be made.

Auxiliary Systems/System Integration

The primary concern with adding anaerobic digestion is that PWRF would be adding another biological treatment process. Although it would require constant upkeep and monitoring, managing the biosolids product would be fairly easy because it could be pumped directly to nearby fields.

Costing Basis

Capital costs include allowances for mechanical equipment, equipment building or concrete slab, installation, sitework, taxes, contractor markups, contingency, market adjustment factor, and project delivery fees. Capital costs are based on a new digester tank, heat exchangers, solids recirculation pumps, hot water recirculation pumps, solids transfer pumps, auxiliary digester equipment, and an odor-controlled building.

FACT SHEETS



Biosolids and Energy Management Plan

Technology Fact Sheet: Thickening

PREPARED BY:	CH2M
PROJECT:	PWRF Solids Handling Alternatives
DATE:	June 22, 2018

Process/Technology Description

Options for primary and secondary solids thickening includes gravity belt thickeners, rotary drum thickeners, dissolved air flotation thickeners, thickening centrifuges, gravity thickeners, or thickening in the primary clarifiers DAFTs.

• **Gravity belt thickeners** are composed of a gravity drainage zone that allows water to drain through a porous belt while coagulating and flocculating solids. Gravity belt thickeners are simple to operate and have a track record of reliable performance. A schematic of a typical gravity belt thickener is shown in Figure 1.



Figure 1. Schematic of Gravity Belt Thickener.

• Rotary drum thickeners consist of an internally fed cylindrical screen, integral internal screw, and drum drive. Water drains through the rotating screen media while retaining the flocculated solids. The rotating drum creates turbulence to facilitate liquids and solids separation, while the internal screw transports the thickened solids out of the drum. A schematic of a typical rotary drum thickener is shown in Figure 2.

TECHNOLOGY FACT SHEET: THICKENING



Figure 2. Schematic of Rotary Drum Thickener.

- **Dissolved Air Flotation Thickeners (DAFTs)** introduce fine gas bubbles to a settling basin, which attach to solids particles and rise to the surface for collection by a skimmer.
- **Thickening Centrifuges** thicken solids through the use of centrifugal force. For additional information on centrifuges, see the Dewatering factsheet.
- **Gravity Thickeners** require a relatively large footprint and do not typically perform as well as GBTs or RDTs. Although this option may be viable in the future, the use of gravity thickeners was not assumed for this study.
- **Primary solids thickening in the primary clarifiers**. Although enhanced thickening in the primary clarifiers may be possible, the primary clarifiers are not planned for thickening and would not thicken solids as well as other methods.

Each thickening technology has certain advantages and disadvantages associated with it. These factors are summarized in Table 1.

Technology	Advantages	Disadvantages
Gravity Belt Thickener	Small footprint	Potential for odor if not enclosed
	Simple operation	
	Successful historical performance	
	Low power use	
	High solids capture	
Rotary Drum Thickener	Small footprint	Moderately difficult to operate
	Successful historical performance	
	Low power use	
	High solids capture	

Table 1. Advantages and Disadvantages of Thickening Technologies.

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TECHNOLOGY FACT SHEET: THICKENING

Table 1. Advantages and Disadvantages of Thickening Technologies.

Technology	Advantages	Disadvantages
	Containment minimizes odor	
DAFT	 Effective for secondary solids Effective for scum Successful historical performance High solids capture 	 Relatively high power consumption Thickened solids concentration limited Potential for odor if not enclosed Large footprint Relatively high maintenance
Centrifuges	 Small footprint High thickened concentration possible Containment minimizes odor 	 Relatively high power consumption Sophisticated maintenance requirements Moderately difficult to operate Sophisticated polymer requirements Not ideal for primary solids (grit can be abrasive)
Gravity thickener	 Simple Easy to operate Low power consumption Polymer not required 	 Potential for odor Not ideal for secondary solids (thickened solids concentration limited and large space requirements)

Gravity belt thickeners were assumed for this analysis because of their small footprint, easy operation, and track history of acceptable performance in similar applications. Co-thickening primary and secondary is assumed, although other thickening technologies should be considered during preliminary design.

Reliability/Redundancy Criteria

Only one 3-meter GBT was assumed for this study. If the GBT is taken out of service for maintenance, alternative solids handling arrangements should be made.

Auxiliary Systems/System Integration

The following issues should be considered when evaluating the solids thickening process:

- New polymer pumps, additional polymer storage, and increased controls will be necessary.
- Plant water supply and process air may be required for the new equipment.
- Sidestream treatment may be beneficial to minimize struvite issues and reduce nutrient loadings to the secondary treatment system. Sidestream treatment was not considered as part of this analysis

Costing Basis

All costs were developed according to the procedure outlined in TM3 – Costing Basis. Capital costs include allowances for mechanical equipment, equipment building or concrete slab, installation, sitework, taxes, contractor markups, contingency, market adjustment factor, and project delivery fees.

Estimated capital costs are based on new GBTs, polymer injection and mixing valves, washwater booster pumps, thickened solids hoppers and pumps, an electrical control panel, and an odor-controlled building to house the thickening system.

FACT SHEETS



Biosolids and Energy Management Plan

Technology Fact Sheet: Waste Gas Burner

 PREPARED BY:
 CH2M

 PROJECT:
 PWRF Solids Handling Alternatives

 DATE:
 June 22, 2018

Introduction

This fact sheet documents the operating principle and design parameters for waste gas burner technology. The primary purpose of a waste gas burner system is to reliably and efficiently incinerate waste gas. Incineration minimizes odors and reduces pollutant emissions from the facility. Waste gas burners are also an important safety feature because they prevent overpressurization of the digester gas system, which could lead to structural failures or thermal events.

Process/Technology Description

The two main types of waste gas burners are open-flame (candlestick) and enclosed. The main components of a waste gas burner system include the burner, support structure, piping, and pilot system. A description of both waste gas burner configurations is below.

• **Open-Flame.** Open flame burners are the simplest and cheapest system available (see Figure 1). A mixture of pilot gas and air are ignited and directed to the burner exit nozzle. Waste gas flowing through a flame retention nozzle is ignited by the pilot flame front, combusting the gas, and discharging the exhaust stream out the top of the burner stack. Open flame designs have a visible flame and are being phased out in favor of enclosed designs in places where flame stack emissions are controlled or regulated.



Figure 1. Schematic of open-flame waste gas burner.

• Enclosed Burner. There are two types of enclosed burners: pre-mixed and temperature controlled. Pre-mixed burners provide a blower that mix air and fuel in the conveyance pipe before it goes to the burner stack. Pre-mixed units are fairly complex, but provide positive

TECHNOLOGY FACT SHEET: WASTE GAS BURNER

control of the air:fuel ratio during combustion. Temperature-controlled burners rely on the natural draft properties of combustion to passively aspirate the correct air:fuel ratio into the burner for complete combustion of a waste gas stream. In either technology, digester gas is introduced via several nozzles into the combustion chamber zones. The number of nozzles operated at any time is dependent on the flow rate of waste gas. The waste gas stream is ignited by a pilot flame and combusted inside an enclosed combustion chamber. Performing the combustion process within an enclosed chamber provides control of the combustion environment, ensuring maximum destruction efficiency, maximizing the turndown ratio, and protecting the flame from quenching due to high winds. The enclosed chamber also limits flame visibility, enhancing the visual aesthetics of the facility.



Figure 2. Schematic of enclosed waste gas burner.

Because enclosed waste gas burners provide higher destruction efficiencies and lower pollutant emissions, enclosed waste gas burner technology is recommended for the PWRF.

Design Criteria

The waste gas burner system should provide capacity to process a peak gas flow rate as high as 300 scfm per waste gas burner. At least two waste gas burners should be provided to ensure redundancy. A waste gas burner should ensure sufficient turndown capacity to process low gas flow rates during normal operations.

Reliability/Redundancy Criteria

Installing two waste gas burners will increase operational flexibility and will provide redundancy.

Auxiliary Systems/System Integration

The following systems are necessary to integrate the waste gas burner with the existing system.

• Safety devices must be provided in concert with the waste gas burner to ensure a safe and reliable digester gas handling system. Safety devices include flame check valves, flame arrestors, digester gas condensate traps, pressure regulators, and others.

Costing Basis

Capital costs include allowances for mechanical equipment, equipment building or concrete slab, installation, sitework, taxes, contractor markups, contingency, market adjustment factor, and project

delivery fees. Costs are based on two new enclosed waste gas burner and ignition systems, pressure relief and flame trap assembly, automatic drip trap, spark plug, thermocouple, and other auxiliary equipment.

Attachment B Design Criteria Summary Table
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Mass Balance	1				
	Units	SUMM	ER PEAK Digestion	Composting	TER PEAK Digestion
Screened Solids					
Total Solids Load	lb TS/day	16,538	16,538	8,704	8,704
Total Solids Load	lb TS/hr	689	689	363	363
Volatile Solids Loading	lb VS/day	14884	14884	7834	7834
Total Solids Flow	GPD	9,902	19,804	5,211	10,423
Total Solids Flow	gpm	6.9	13.8	3.6	7.2
Total Solids Concentration	%	20%	10%	20%	10%
				2070	
PS/WAS Wasting					
Total Solids Load	lb TS/day	25,249	25,249	21,884	21,884
Total Solids Load	lb TS/hr	1052	1052	912	912
Volatile Solids Loading	lb VS/day	12789	12786	10392	10383
Total Solids Flow	GPD	248,061	248,061	232,828	232,828
Total Solids Flow	gpm	172	172	162	162
Solids Concentration	%	1.2%	1.2%	1 1%	1 1%
VS/TS Batio	%	50.7%	50.6%	47.5%	47.4%
	-	30.776	50.070		47.470
PS/WAS Blended Solids Stora	ge Tank				
Storage Time	hrs		0		0
Storage Volume	gal		0		0
GBT Sizing					
Hydraulic Loading Limit	gpm/meter		250		250
Solids Loading Limit	lb/hr-meter		1,144		1,144
Number of Duty GBTs	-		1		1
GBT hours/day operation	hours/day		24		24
GBT days/week operation	days/week		7		7
GBT Belt Size - Hydraulics	meters		0.69		0.65
GBT Belt Size - Solids	meters		0.92		0.80
Recommended GBT Belt Size	meters		1.0		1.0
Thickened PS/WAS					
Thickened Solids Concentration	%		4.0%		4.0%
	/0 //		90%		90%
Thickened Solids Flow	lb TS/day		22 724		19 695
Thickened Solids Flow	lb VS/day		11,507		9,345
Thickened Solids Flow	GPD		68,118		59,038
Thickened Solids Flow	gpm		47		41
Return Flow	gnm		125		121
Digester Feed					
Solids Flow	lb TS/day		39,262		28,399
Thickened Solids Flow	lb VS/day		26,392		17,179
	1	1	1		

Solids Flow	GPD	87,922	69,461
Solids Flow	gpm	61	48
Net Digester Feed Solids Concentration	%	5.4%	4.9%

Anaerobic Digestion			
Minimum SRT	days	15	15
Digester 1 Volume	MG	1.3	1.3
Digester 2 Volume	MG	0	0
Volatile Solids Loading, WW Solids	lb VS/day	26,392	17,179
Digestion Temperature	deg F	98	98
Volatile Solids Destruction	%	55%	55%
Volatile Solids Destroyed	lb VS/day	14,515	9,448
Volatile Solids Out	lb VS/day	11,876	7,730
Total Solids Out	lb TS/day	24,747	18,951
TS Concentration Out	% TS	3.37%	3.27%
VS Concentration Out	% VS	1.62%	1.33%
Digester Volatile Solids Inventory	lb VS inv/digester	178,143	146,773
VSLR CHECK			
Max VSLR	lb VS/day-cf	0.16	0.16
VSLR	lb VS/day-cf	0.15	0.10
VSLR Check	-	ОК	ОК
SVSLR CHECK			
Max SVSLR	lb VS/day-lb VS inv	0.16	0.16
SVSLR	lb VS/day-lb VS inv	0.148	0.117
SVSLR Check	-	ОК	OK
HYDRAULIC CHECK			
SRT	davs	15.0	19.0
	days	15.0	15.0
Post-Digestion Solids Flow			
Total Hydraulic Flow	GPD	87,922	69,461
Post Digestion Total Solids	lb TS/day	24,747	18,951
Post Digestion Solids Concentration	%	3.37%	3.27%
Post Digestion Volatile Solids, Total	lb VS/day	11,876	7,730
VS/TS Ratio	%	47.99%	40.79%
Digested Solids Storage			
New Solids Storage Tank Volume	MG	-	-
Days of Storage Required	days	0	0
Total Storage Time with No Dewatering	days	0.0	0.0
STORAGE CAPACITY CHECK			
Storage Okay?	-	EXCEEDED	EXCEEDED
Digester Gas Management			
Digester Gas Production Factor	scf/lb VSR	15	15
Total Digester Gas Production	scf/day	217,730	141,723
Total Digester Gas Production	scf/hr	9,072	5,905
Total Digester Gas Production	scfm	151	98
Digester Gas Energy Content	BTU LHV/scf	580	580

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Total Digester Gas Energy Production	kWfuel	1542	1004
Percent of Digester Gas to Boilers	%	38%	47%
Percent of Digester Gas to Flares	%	200%	200%

126

Total Digester Gas Energy Production

MMBTUfuel/day

Heat and Power Production					
Heat Demand for WW Solids	MMBTUth/day		35.2		27.8
Digester Heat Loss Factor	%		10%		10%
Cooling Demand for WW Solids	MMBTUth/day		-		-
Digester Total Heat Demand	MMBTUth/hr		1.6		1.3
Digester Total Heat Demand	kWth		473		374
Digester Heat Demand Achieved	-		100%		100%
BOILER					
Boiler Digester Gas Demand	MMBTUfuel/hr		2.0		1.6
Boiler Digester Gas Demand	kWfuel		591		467
Boiler Natural Gas Demand	MMBTUng/hr		0		0
Boiler Efficiency	%		80%		80%
Boiler Heat Production	MMBTUth/hr		1.6		1.3
Boiler Heat Production	kWth		472.8		373.4
Boiler Max Capacity	MMBTUfuel/br		2		2
Boiler Max Capacity	kWfuel		586		586
Boiler Max Capacity	cofm		530		500
	Sciii		57		57
Boiler Max Heat Output	kWth		469		469
Waste Gas Burner					
Digester Gas Capacity	scfm		302		197
Digester Gas Capacity	kWfuel		3084		2008
Digester Gas Capacity	MMBTUfuel/hr		10.5		6.8
WGB Capacity - New	scfm		300		300
WGB Capacity	kWfuel		3056		3056
WGB Capacity	MMBTUfuel/hr		10.4		10.4
Percent Turndown	%		-1%		34%
Dewatering					
Type of Dewatering		Centrifuges		Centrifuges	
Days/Week Operation	days/week	5		5	
Hrs/Day Operation	hrs/day	12		12	
Dewatering Solids Loading	lb TS/day	35,349		30,637	
Dewatering Solids Loading	lb TS/hr	2,946		2,553	
Dewatering Solids Loading	kg TS/hr	1,339		1,160	
Total Hydraulic Flow to Dewatering	GPD	347,286		325,959	
Total Hydraulic Flow to Dewatering	gal/hr	28,940		27,163	
Total Hydraulic Flow to Dewatering	m3/hr	110		103	
Total Hydraulic Flow to Dewatering	gpm	482		453	
Capture Efficiency	%	90%		90%	
Dewatered Cake Solids Content	%	22.0%		22.0%	
Total Dewatered Solids	lb TS/day	31.814		27,573	
Total Dewatered Solids	wettons/day	77.2		62.7	
Total Downtored Colida	wet tons/udy	12.0		16202	
Total Dewatered Solids	wei ions/yr	19/99	l	10293	

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Dewatering Sidestream Flow	gpm	458	432	
Belt Hydraulic Loading Limit	gpm/m	143	143	
Belt Solids Loading Limit	lb/hr/m	984	984	
BFP Belt Size - Hydraulics	meters	3.38	3.17	
BFP Belt Size - Solids	meters	2.99	2.59	
Recommended GBT Belt Size	meters	3.5 - too big	3.5 - too big	

310,931

329,946

Dewatering Sidestream Flow

GPD

APPENDIX H

Loading to Compost					
Screened Solids Load	lb TS/day	16,538		8,704	
Screened Solids Load	lb VS/day	14,884		7,834	
Screened Solids Flow	GPD	9,902		5,211	
PS/WAS Load	lb TS/day	22,724		19,695	
PS/WAS Load	lb VS/day	11,510		9,352	
PS/WAS Flow	GPD	12,385		10,734	
Total Solids Load	lb TS/day	39,262		28,399	
Volatile Solids Loading	lb VS/day	26394		17186	
Tabal Calible Flags		22.207		45.046	
Total Solids Flow	GPD	22,287		15,946	
Solide Concentration	9/	21 10/		21.4%	
	70	21.170		21.4%	
VS/TS Ratio	%	67.2%		60.5%	
Polymer System					
Polymer Dosage	lb active/DT	20	10	20	10
Neat Polymer Active Content	Ib active/Ib neat	0.37	0.37	0.37	0.37
Delawar Dellawar Deta	lle se et feless	<u> </u>	244	504	205
Polymer Delivery Kate	ib neat/day	682	341	591	296



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix I Foster Wells Pump Repairs/Replacements This Page Is Intentionally Left Blank.





PENTAIR BERKELEY

KKELET

Pentair Electronic Catalog

	Pump Perform	ance Datasheet	
Customer		Quote number	
Customer reference :		Size	: 16E-SS
Item number : Default		Stages	: 3
Service		Based on curve number	: 16_TURB_3720_1800_SS
Quantity : 1		Date last saved	: 01 Dec 2017 5:19 PM
Operating Conditions		Li	quid
Flow, rated : 3	3,890.0 USgpm	Liquid type	:Water
Differential head / pressure, rated (requested)	250.0 π 250.0 π	Additional liquid description	: 0.00 in
Suction pressure rated / max	0.00 / 0.00 psi a	Solids concentration, by volume	: 0.00 %
NPSH available, rated	Ample	Temperature, max	: 68 00 deg E
Frequency : 6	60 Hz	Fluid density, rated / max	: 1.000 / 1.000 SG
Performance	No of Concession, Name	Viscosity, rated	: 1.00 cP
Speed, rated :1	1770 rpm	Vapor pressure, rated	: 0.00 psi.a
Impeller diameter, rated : 1	12.78 in	Ma	iterial
Impeller diameter, maximum : 1	12.78 in	Material selected	: Cast Iron / Bronze
Impeller diameter, minimum : 1	11.38 in	Press	ure Data
Efficiency (bowl / pump) : 8	80.83 / - %	Maximum working pressure	: See the Additional Data page
NPSH required / margin required : 2	27.79/0.00 ft	Maximum allowable working pressu	: See the Additional Data page
nq (Imp. eye now) / S (Imp. eye now) : C	667179 Metric units	Maximum allowable suction pressure	e : N/A
Head maximum rated diameter	- 461 2 ft	Hydrostatic test pressure	: See the Additional Data page
Head rise to shutoff (bowl / pump)	84 50 / - %	Driver & Power L	Data (@Max density)
Flow, best eff. point (bowl / pump)	3.440.7 / - USapm	Margin over specification	: Maximum power
Flow ratio, rated / BEP (bowl / pump) : 1	113.06 / - %	Service factor	1 00
Diameter ratio (rated / max) : 1	100.00 %	Power, hydraulic	: 246 hp
Head ratio (rated dia / max dia) : 9	99.99 %	Power (bowl / pump)	: 304 / - hp
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010] : 1	1.00 / 1.00 / 1.00 / 1.00	Power, maximum, rated diameter	: 304 hp
Selection status : A	Acceptable	Minimum recommended motor rating	g : 350 hp / 261 kW
Pump performance. Adjusted for construc	ction, viscosity, friction and pow The duty point represer	ver losses of lineshaft and thrust bearings. N its the head at the bowl.	ot adjusted for any static lift.
0			
£ 270			Power
a 180			
8			
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	Flow	USapm	
	11000 -	003511	

BERKELEY Pumps / Pentair Water · 293 Wright Street · Delavan, Wisconsin 53115 phone: (888)782-7483 · fax: (800)426-9446 · www.berkeleypumps.com PENTAIR BERKELEY

Pump Performa								ance	ance Datasheet										
Customer	and the second						-			Quote number :									
Customer re	eferend	ce	:							Size					: 14F-	SS			
Item numbe	er		: Default Stages				:2												
Service			:							Based	on cur	ve num	ber		:14 T	URB 31	10 18	00 SS	
Quantity			:1							Date la	ast sav	ed			: 01 D	ec 2017	5:23 P	M	
			Oper	ating	Conditi	ons								L	.iguid				
Flow, rated						: 1,8	25.0 US	Sgpm		Liquid	type					:Wate	r		
Differential h	head /	pressu	re, rate	ed (re	equested	: 180	.0 ft			Additio	onal liqu	uid des	cription			:			
Differential h	head /	pressu	re, rate	ed (a	ctual)	: 180	.4 ft			Solids	diamet	ter, max				: 0.00 in			
Suction pres	ssure.	rated /	max		,	: 0.0	0/0.00	psi.g		Solids	concer	ntration	by vol	ume		: 0.00 %			
NPSH availa	able, r	ated				: Am	ple			Tempe	erature	max				: 68.00 0	deg F		
Frequency						: 60	Hz			Fluid o	lensity.	rated /	max			: 1.000 /	1.000	SG	
			F	Perfo	rmance					Viscos	sity, rate	ed				: 1.00 cF	>		
Speed rate	d					: 177	'0 rpm			Vapor	pressu	re, rate	d			: 0.00 ps	si.a		
Impeller dia	meter	rated				: 11.	50 in			100	·			M	aterial				
Impeller dia	meter.	maxin	num			: 11.	50 in			Materi	al sele	cted				: Cast In	on / Br	onze	
Impeller dia	meter	minim	um			: 10.	50 in						A. S. S. S.	Pres	sure D	ata			
Efficiency (b	owl /	pump)				: 78.	40 / - %	5		Maxim	num wo	rkina p	essure			: See the	e Addit	ional Data	page
NPSH requi	ired / r	nargin	reauire	ed		: 23.	66/0.0	0 ft		Maxim	um alle	owable	working	pressi	Ire	: See the	e Addit	ional Data	page
ng (imp. eve	e flow)	/ S (im	p. eve	flow)		: 57	: 57 / 145 Metric units : -			Maxim	um alle	owable	suction	pressu	re	: N/A	o / la all	ional Data	page
MCSF				,		:-				Hydro	static te	est pres	sure	process		: See the	e Addit	ional Data	page
Head, maxin	mum,	rated d	iamete	er		: 266.0 ft			ingare		Di	iver &	Power	Data (6	DMax de	ensity)		page	
Head rise to	o shuto	off (bov	/ / pun	mp) : 47.79 / - %				Driver	sizina	specific	ation	ower	Data 10	·Maxim		Ner			
Flow, best e	eff. poi	nt (bov	/ / pun	np)		: 2,0	2,066.3 / - USgpm Margin over spe			er specification : 0.00 %									
Flow ratio, r	rated /	BEP (owl/p	pump)	: 88.	: 88.32 / - %		Service factor Power, hydraulic Power (bowl / pump) Power, maximum, rated diameter				1 00						
Diameter ra	tio (rat	ted / m	ax)			: 100	: 100.00 %						: 82.95 hp : 106 / - hp : 112 hp						
Head ratio ((rated	dia / m	ax dia)	,		: 99.	: 99.75 % : 1.00 / 1.00 / 1.00 / 1.00												
Cq/Ch/Ce/C	Cn [AN	SI/HI	9.6.7-2	010]		: 1.0													
Selection st	tatus					: Acc	eptable	е		Minimum recommended motor rating			na	: 125 hp / 93.21 kW					
	Pu	imp per	ormance	e. Adju	usted for co	onstruction	n, viscosi The o	ty, friction duty point	represe	nts the h	ead at th	shaft and e bowl.	thrust b	earings. I	Not adjus	sted for an	ly static	lift.	
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			PWI	RF S	YST	JM PL	JMP	REPA	IRS/I	REPL	ACEN	MEN	<u>[S]</u>			XI	DENOT	ES PLAN	NED F	REBUIL	q
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	Ρ1	REBUILT 4-9				REBUILT 3-2	RE	5-10			REBUILT 1-3		REBUILT 1-2	REBUI 1-16	JT MOTOR 12-18					x	
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	P3			REBUILT 5-4			RE	3BUILT 5-10			REBUILT 5-30		REBUILT 1-27			REBUILT 8-15		MOTOR 2- 17			
	P4								REBUI 1-11	LT				REBUI 1-27	JT MOTOR 12-18					x	
	Ρ1	BOWLS 7-2		REPLACE 6-15	REBUILT 9-13									REBUI 1-27	JT REBUILT 10-28	REBUILT 10-4	MOTOR 11-4	MOTOR RETRO			
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	PII																	REBUILT 3-24			
	P12/13																	REBUILT 3-24			
	P15																				

APPENDIX I



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

> Appendix J Process Flow Diagrams

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PROCESS WATER TO SPRAY FIELDS

APPENDIX J, Page 1



PROCESS WATER TO SPRAY FIELDS

APPENDIX J, Page 2



PROCESS WATER TO SPRAY FIELDS

APPENDIX J, Page 3









Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

> Appendix K Geotechnical Reports

Geotechnical Design Memo – Irrigation Pump Station CH2M, June 14, 2018

Geotechnical Engineering Report – Columbia East Lift Station Shannon & Wilson, Inc., August 6, 2018





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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix K-1 Geotechnical Design Memo – Irrigation Pump Station CH2M, June 14, 2018





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Geotechnical Design Memo - Irrigation Pump Station, City of Pasco, Washington

PREPARED FOR:	City of Pasco
COPY TO:	File
PREPARED BY:	Birsen Zeyrek
REVIEWED BY:	Menzer Pehlivan, PE/Karen Dawson, PE
DATE:	June 14, 2018
PROJECT NUMBER:	697159.03.30.15.05
APPROVED BY:	Karen Dawson. PE

1.0 Introduction

The irrigation pump station project site is located approximately 0.5 mile north of Foster Wells Road and 1.1 miles east of US Highway 395 as shown on Figure 1. The proposed project includes construction of an irrigation pump station, two new 24-inch gravity sewer lines, and two new 30-inch irrigation lines that connect to the pump station building at different elevations below ground. According to the plans provided, the proposed pump station building will have plan dimensions of 49 feet by 41 feet and its base slab/foundation is 32 feet below ground surface.

1.1 Authorization

This document is a deliverable under Task 5, the Process Water Reuse Facility Capital Facilities Plan/ Engineering Report, of the subconsultant services agreement dated August 23, 2017, between CH2M HILL Engineers, Inc. (CH2M) and PACE Engineers, Inc., prime consultant for the City of Pasco for the project.

1.2 Purpose and Scope of Work

This Geotechnical Design Memorandum (GDM) documents the geotechnical design criteria and the design recommendations for the proposed new irrigation pump station near the Process Water Reuse Facility northeast of Pasco, Washington. The new connecting pipelines to the pump station are outside the scope of this memo. Figure 2 shows the plan for the pump station location.

This GDM is based on a review of existing subsurface data for the project area and geotechnical subsurface information collected during the subsurface explorations performed at the project site on April 4 and 5, 2018, by CH2M under subtask Task 5.

The design recommendations in this GDM include estimated soil design parameters, estimated bearing capacity, lateral earth pressure diagrams, seismic design parameters, corrosion considerations, backfill recommendations, and foundation requirements as well as potential temporary shoring options.

2.0 Subsurface Conditions

This section summarizes the local geology at and around the project site. The descriptions are drawn from available existing information and the observations of the April 2018 subsurface explorations.

GEOTECHNICAL DESIGN MEMO - IRRIGATION PUMP STATION, CITY OF PASCO, WASHINGTON



Figure 1. Project Site Location Map

2.1 Area Geology

The project site is in the Pasco Basin of the Columbia Plateau. Area geology consists of geologic units of Tertiary volcanic rocks (Columbia River Basalt Group) overlaid by Quaternary Pleistocene, Holocene, and alluvial deposits. Thick sequences of outburst flood deposits of silt, sand and gravel, and wind-blown silt and sand have been deposited within the basin and overlie basalt rock at depth.

Based on our review of the surficial geology of the site on the Washington State Department of Natural Resources' Geologic Information Portal (<u>https://www.dnr.wa.gov/geologyportal</u>), the site is mapped as Stabilized Dune Sand (Qd). This geologic unit consists of fine to medium sand and silt. This unit is typically underlain by flood deposits of sand and gravel. Sandy soils typically consist of silty fine sand and/or sandy silt.

GEOTECHNICAL DESIGN MEMO - IRRIGATION PUMP STATION, CITY OF PASCO, WASHINGTON



Figure 2. Pump Station Layout and Onsite Borehole (BH-1, BH-2) Locations (Source: PACE)

2.2 Existing Subsurface Data

Four existing water well boring logs surrounding the project site were examined on the Geologic Information Portal. The wells were all drilled below 220 feet deep. The soils logged in the well borings are consistent with the area geology discussed above. Based on the log data, the silty sand and fine silty sand layer in the vicinity is 130 feet to 190 feet deep and overlies the coarser silty, sandy gravel and cobble layer within the basalt rock basin. The groundwater table was recorded at 155 feet deep or greater.

2.3 CH2M Subsurface Explorations

The CH2M subsurface exploration consisted of two 61.5-foot-deep borings drilled at the south and west sides of the proposed irrigation pump station (Figure 2). The CH2M Geotechnical Data Report dated June 2018 describes in detail the conditions observed in the boreholes and the results of the field and laboratory tests performed on the samples collected from the two boreholes.

The soil conditions encountered at the borings were generally consistent with the descriptions in the Geologic Information Portal and well logs discussed above. The soils encountered in the two borings generally consisted of medium-dense to dense Fine Silty Sand (SM) deposits with uncorrected Standard Penetration Test (SPT) N blow counts ranging from 15 to over 50 blows per foot. In both boreholes very loose SM materials were encountered at depths shallower than 5 feet below ground surface (bgs).

The laboratory tests performed on selected samples showed that the moisture content of the SM deposits ranged between 16 and 19 percent in shallow deposits and around 13 percent in deposits

deeper than 50 feet bgs. The pH of the SM deposits (tested because the finer materials tend to be the most corrosive) was around 8.6 with resistivity ranging from 2,900 to 5,300 ohm-centimeters (ohm-cm). Groundwater was not encountered in either of the borings.

Gradation test results for boring BH-1 samples indicate that the fines content of the silty sand (silt/claysized soil particles passing the U.S. No. 200 sieve) was 45 percent in sample S4 at 10-foot depth and 34 percent in sample S7 at 55-foot depth. Gradation test results for boring BH-2 samples show that the fines content of the silty sand in sample S1 at 2.5-foot depth, sample S5 at 12.5-foot depth, and sample S4 at 60-foot depth was between 27 and 29 percent. Layers and lenses of cleaner material were observed in boring BH-2, with some samples having fewer than 5 percent estimated fines.

The soils encountered in the borings have moderate strength, low to moderate compressibility, low to high permeability, high susceptibility to changes in moisture content, and high erosion potential.

3.0 Design Recommendations

3.1 Design Criteria

Design of the irrigation pump station will be controlled by the International Building Code (IBC; 2015).

3.2 Estimated Soil Design Parameters

Table 1 summarizes the proposed engineering design parameters for the SM deposits encountered at the site. For design of the irrigation pump station structure, these properties can be considered representative of the conditions throughout the upper 35 feet of soil at the proposed location. The engineering design properties were estimated based on the SPT N-values and empirical correlations provided by the Washington State Department of Transportation (WSDOT) *Geotechnical Design Manual* (GDM; 2015), laboratory test results, previous practice, and engineering judgement.

Soil Unit Number	Layer Descriptions	Parameter (unit)	Recommended Value
1	Silty Sand	Unit weight, γ (pounds per cubic foot)	120
		Cohesion, c' (pounds per square foot)	0
		Effective friction angle, ϕ' (degree)	35
		Active earth pressure coefficient, Ka (Rankine)	0.33
		Passive earth pressure coefficient, Kp	3.32
		At-rest earth pressure coefficient, Ko	0.43
		Seismic active pressure coefficient, Kae (Mononobe – Okabe) (tons per cubic foot)	0.38
		Modulus of subgrade reaction, k (pounds per square inch)	140

Table 1. Irrigation Pump Station - Engineering Properties of Soils

3.3 Bearing Capacity

The foundation of the irrigation pump station is assumed to be approximately 34 feet bgs and bear on the medium-dense to dense silty sand deposits.

Although the loading of the pump station was not available at the time of writing this report, the pump station building is anticipated to weigh less than the soils that will be excavated for the structure, and no net increase in bearing pressure is anticipated at the bottom of the structure. Therefore, the gravity loads from the structure can be supported on a conventional structural slab or a mat foundation. A net 5,000 pounds per square foot (psf) soil bearing resistance can be used for design.

3.4 Lateral Earth Pressure

Lateral Earth Pressures Acting on the Side Walls of the Irrigation Pump Station. The irrigation pump station is considered as permanent work and loading acting on it is based on long-term loading conditions. Lateral earth pressures acting on the side walls of the irrigation pump station were calculated based on at-rest earth pressure using the coefficient of Ko (Figure 3).





Lateral Earth Pressures Acting on the Temporary Shoring of a Braced Cut. Lateral earth pressures acting on the temporary shoring of a braced cut are calculated using the pressure envelope method described by Terzaghi and Peck (1967) and Peck (1969) as shown in Figure 4.



Figure 4. Lateral Earth Pressure Acting on Braced Cut Walls

3.5 Groundwater Pressure

Groundwater was not encountered at the time of drilling at the project site within the top 61.5 feet bgs. This area has been heavily irrigated and the available subsurface data indicate the groundwater table is more than 155 feet bgs. The groundwater table is not expected to rise enough to affect the proposed structure within its life span unless the ponds begin leaking or there are major increases in irrigation, which are both unlikely. Therefore, no water pressure is applied, and only total stresses should be used for the loading diagrams.

3.6 Surcharge

A uniform vertical surcharge loading of at least 250 psf is recommended for both temporary and permanent loading to represent moderate loads from construction and maintenance equipment. If heavy cranes will be operated within 20 feet of the proposed excavation or structure, their surcharge loads should also be considered. The lateral pressure due to a uniform vertical surcharge of 250 psf is equal to:

- A uniform lateral pressure of 108 psf for permanent loading
- A uniform lateral pressure of 54 psf for the temporary braced condition

The surcharge loading must be added to the above load diagrams.

3.7 Flotation

Potential flotation is not applicable.

3.8 Seismic Design Considerations

The seismic design parameters for the irrigation pump station were developed using guidelines provided in the IBC. Per the 2015 IBC, seismic design parameters were developed for a hazard level of 2 percent probability of exceedance in 50 years (i.e., 2,475-year return period). This section provides recommendations on ground motion design parameters and a discussion of the potential seismic hazards at the project site.

The IBC (2015) defines the reference response spectra for a soft-rock/firm-ground site condition, which is referred to as Site Class B. Soils that do not meet Site Class B requirements will amplify or de-amplify seismic ground motions as they propagate through the soil layers. The code-based design approach accounts for this effect by applying site factors defined by IBC (2015) to the ground motions determined for Site Class B. IBC defines site factors based on the site class, which represents the relative stiffness of the site soils and can be determined based on the average SPT N-value in the top 100 feet bgs.

The project site was determined to be Site Class D, based on the SPT N data obtained during the subsurface explorations. Table 2 presents IBC (2015) ground motion parameters used to develop ground response spectra to be used in seismic evaluation of the facility.

Soil liquefaction is the phase-change phenomenon where a saturated soil substantially loses strength (or the soil is said to exhibit residual shear strength) and stiffness in response to a cyclic shear stress (usually earthquake shaking), causing the soil to behave like a liquid. The susceptibility of a soil deposit to liquefaction is a function of the degree of saturation, soil grain size, relative density, percent fines, age of deposit, plasticity of fines, earthquake ground motion characteristics, and several other factors. Due to the absence of groundwater in the top 60 feet bgs, the project site has very low liquefaction hazard potential.

CENTECHNICAL DECICN NA	
OLOTECHNICKE DESIGN IM	

Site Class:	D		
Site-Specific Parameters:			
Mapped spectral acceleration at short periods on soil/rock interface, S_s (g)	0.380		
Mapped spectral acceleration at 1 second on soil/rock interface, $S_1(g)$	0.147		
Site factor at short periods, Fa	1.496		
Site factor at 1-second, $F_{\rm v}$	2.213		
Maximum spectral acceleration at short periods, $S_{MS}(S_S \times F_a)$ (g)	0.569		
Maximum design spectral acceleration at 1-second, $S_{M1}(S_1 \times F_v)$ (g)	0.325		
Design spectral acceleration at short periods, S _{DS} (S _{MS} x 2/3) (g)	0.379		
Design spectral acceleration at 1-second, S _{D1} (S _{D1} x 2/3) (g)	0.216		
Maximum credible peak ground acceleration, PGA (g)	0.24		
Pseudostatic (seismic) horizontal coefficient, k _h (PGA <i>x</i> 1/2)	0.12		

Table 2. Code-Based Ground Motion Parameters

3.9 Corrosion Considerations

Corrosion Test Results. One sample in each boring was tested for both soil resistivity and pH. The results for the two samples were as follows:

- **pH** The pH results were 8.6 for both samples. This shows that the soils are alkaline and not acidic, indicating lower corrosion potential.
- Soil resistivity The soil resistivity measurements were 2,900 ohm-cm on one sample and 5,300 ohm-cm on the second sample. This is considered to range from moderately corrosive to corrosive (California Department of Transportation, 2015; NACE International, 2001).

Recommendations for Corrosion Protection. Corrosion protection will be required for buried steel and ductile iron construction materials. These corrosion-protection measures may consist of one or a combination of the following.

- Steel pipe and appurtenances: Protective coatings and cathodic protection.
- Steel or cast/ductile iron fittings in non-metallic pipe: Protective coatings, such as epoxy or fusionbonded epoxy. After assembly, steel fasteners should be coated with a suitable material such as wax tape.

4.0 Temporary Excavation and Shoring

Based on the elevation and layout drawings provided by PACE Engineers, the pump station's temporary excavation dimensions are expected to be up to 55 feet by 46 feet, and the excavation depth could be approximately 35 feet. The project area is underlain by cohesionless soils with groundwater table below the subgrade level. The global stability of a 35-foot-deep excavation together with the lined pond has

not been checked. This should be checked to ensure there is no impact during temporary shoring/ excavation.

4.1 Temporary Sloped Excavation

One approach to the excavation is to slope the sides of the excavation to no steeper than 2H:1V (horizontal:vertical). This slope is for planning purposes and would need to be confirmed by the observations of a competent person at the site. In Washington, excavation slopes higher than 20 feet require the design of a professional engineer. CH2M would need to review final design plans and have an inspector onsite during construction to be considered the designer of any temporary slopes.

Suitability of sloped excavation depends on the presence of groundwater; the type of soil; the depth of the excavation; surcharge loading near the excavation; duration of the construction; protection of the slope; and provision that the excavation limits would not undermine any existing structures.

Sloping sides of a 35-foot-deep excavation would require a large footprint based on the recommended 2H:1V maximum gradient. Access roads and one to two intermediate benches wide enough for excavation equipment would probably also be required. Sloping appears to be constrained by the dirt access road (to the Process Water Reuse facility), which is located approximately 20 feet south of the proposed excavation. Sloped excavation also appears to encounter another dirt road and existing slopes to the east, near the 115-million-gallon storage pond.

The north and west edges of the excavations have no restrictions and it is possible, although unlikely because of the large earthwork volumes, that these two sides could be sloped to full depth. On the south and east side of the excavation, a combination of sloped excavation and temporary shoring could be considered for temporary support.

The contractor is responsible for construction site safety and should monitor temporary slopes during earthwork in accordance with applicable Occupational Safety and Health Administration and Washington Industrial Safety and Health Act regulations, as applicable.

4.2 Temporary Shored Excavation

A temporary excavation support system could be installed to reduce the area of excavation and the volume of earthworks. The following temporary shoring methods are feasible for these ground conditions:

- Soldier pile wall and lagging Temporary standup would be required for application of soldier piles and lagging. Because the soldier piles provide solid vertical elements, the danger of complete collapse or failure of the wall due to sloughing in small areas prior to placement of lagging is less than with soil nails. The temporarily exposed soils must be protected from precipitation and surface runoff and their exposure time limited to maintain apparent cohesion. Tiebacks or struts would be needed as lateral support for the soldier and lagging pile wall.
- Sheet piles Sheet piles provide complete confinement of the soil, and standup time is not a consideration. However, the piles are expensive and are unlikely to be recoverable if tiebacks are needed for lateral support. The soils also appear to become substantially denser around the base of the proposed excavation and it may be difficult for the sheetpiles to penetrate these denser materials, which in turn could require multiple levels of bracing to compensate for limited pile toe penetration below the bottom of the excavation. If struts are used as lateral support, it is anticipated that a center strut and diagonal corner struts would be needed. Struts limit the work area and work needs to be carried out around the struts.
- Secant pile wall An interlocking secant pile wall could also be used to support the excavation. Similar to sheet piles, secant piles provide full soil support but are more rigid than sheet piles. The secant pile wall may be costlier but it could be incorporated into the design of the

permanent structure. Temporary lateral supports would still be needed in the form of tie-backs or struts unless top-down excavation combined with construction of the permanent structure can be carried out.

Soil nails and shotcrete are not recommended as a means of temporary support because of the relatively low fines content of the soil, low plasticity of the fines, and inability to excavate test pits to evaluate standup in the deepest and most cohesionless of the soils within the depth of proposed excavations. It might be possible to use vertical nails or other means to increase the temporary standup, but these methods would increase the cost.

5.0 Construction Considerations

5.1 Subgrade Preparation

Even with no groundwater present, the exposed foundation subgrade at the bottom of the excavation is likely to have been disturbed by the construction of temporary shoring. The subgrade should be graded smooth and the upper 6 inches tilled and recompacted to a minimum 95 percent of maximum density as defined by ASTM D1557. The subgrade should be inspected by the engineer of record before tilling and after compaction. A minimum of 6 inches of leveling course should be compacted to at least 95 percent of maximum density defined by ASTM D1557 prior to placing foundation forms and reinforcement. Material conforming to WSDOT (2018) Standard Specification 9-03.9(3) for "Crushed Surfacing" should be used for the leveling course.

5.2 Backfill Requirements

The suitability of onsite soil for reuse as structural fill depends on the fines content and, moisture content at the time of compaction. As the percentage of fines increases, soil becomes sensitive to small changes in moisture content, and adequate compaction becomes more difficult to achieve. The samples tested in the borings indicated high fine contents such as 27 to 45 percent silt and clay soil particles. The silty sand may be generally suitable for use as structural fill, but the fine content should not exceed 10 percent and the soil should only be placed during extended periods of dry weather, provided that the soil can be properly moisture-conditioned before placement and compaction.

Final recommendations for backfill will depend upon the construction schedule (i.e., if wet weather construction will be required). For backfill against and within 5 feet laterally of structural walls, the following materials are recommended:

- Select excavation material having no organics, wood, debris, or particles larger than 4 inches
- Well graded sand and gravel with fewer than 15 percent fines
- Imported WSDOT gravel backfill for walls (9-03.12(2)) compacted in 8-inch maximum lifts to at least 95 percent of maximum density

Structural fill should be compacted to the criteria based on the ASTM D 1557 laboratory test procedure. Fill more than 5 feet laterally from the structure could be onsite excavation material free from organics, wood, debris, or particles larger than 6 inches, or WSDOT select borrow (9-03.14(2)) compacted to at least 95 percent of maximum density.

5.3 Stormwater Management

It is assumed that there will be a drainage system to manage the rain/surface water from the pump station roof and the impervious areas (paving or gravel surface) around the building. Storm drainage should be discharged to the storage ponds or infiltration facilities at least 100 feet from the structure.

Site drainage should direct water away from the structure; an outward slope of 2 percent is recommended within 20 feet of the structure.

Although the soils are moderately permeable, it is good practice to provide a subsurface perimeter drain around the structure. The drain should consist of a 4- to 6-inch perforated pipe surrounded by 6 inches of drain gravel on all sides. The drain gravel should be wrapped in a geotextile corresponding to WSDOT Class A Construction Geotextile for Underground Drainage (9-33) that is nonwoven. The underdrain pipe invert should be at least 3 feet below finish grade.

For an apparent short-term infiltration rate, 1 inch per hour could be used, based on the Washington State Department of Ecology stormwater manual (Ecology, 2012) and the soil type.

5.4 Temporary Slopes

Slopes should be protected from erosion and construction traffic, and materials set back from the edge of the slopes by a minimum of 10 feet unless specifically accounted for in the contractor's temporary shoring design. The contractor should be responsible for continually observing the conditions of the slope, surcharge, and slope protection.

5.5 Wet Weather Considerations during Pump Station Excavation

The following steps should be taken when excavating during wet weather:

- The ground surface in and around the work area should be sloped so that surface water is directed away from the excavation.
- Temporary sump(s) should be installed in the excavation area to collect and pump the water out.
- Earthwork activities should not take place during periods of heavy precipitation or during freezing conditions.
- Construction activities should be scheduled during the dry season so that soil exposure to wet weather is limited.
- Slopes with exposed soil should be covered with plastic sheeting.
- The contractor should take necessary measures to prevent soil to be used as fill from becoming wet or unstable.
- Construction traffic should be restricted to specific areas of the site that are not susceptible to disturbance.
- Site soil is susceptible to erosion; therefore, adequate best management practices for temporary stormwater management should be implemented.

6.0 Potential Obstructions

Obstructions such as boulders, cobbles, and buried logs can present a significant challenge to sheet piles, soldier piles, and secant piles. Although the existing test borings did not encounter any buried boulders, cobbles, or logs, it may reduce contingencies to indicate in the construction contract documents that the contractor should be prepared to remove or drill through these obstructions, and that their presence (which would decrease production, on average, by more than 25 percent) would be considered a changed condition and grounds for additional compensation. Dense soil is not considered a changed condition.

7.0 Suggestions for Adjacent Work

Design recommendations for the pipelines attached to the pumping station were specifically excluded from our scope of work. However, we caution that gravity pipelines more than 30 feet deep can require special design and construction measures. We recommend geotechnical review of the design assumptions and construction specifications for the connecting pipelines.

8.0 Uncertainty and Limitations

This memorandum was prepared for use by PACE Engineers, Inc. and other project team members to support the evaluation of the geotechnical aspects of the construction of the proposed pump station building. The recommendations contained herein are based on a review of existing available data and the subsurface information obtained from two boreholes drilled for this analysis. The study was performed using a mutually agreed-upon scope of work, in accordance with the generally accepted standards of local practice at the time this report was written. No warranty, express or implied, is made.

If the scale or location of the proposed structure changes from what is described in this document, the recommendations must be reevaluated and verified or revised in writing by CH2M.

9.0 References

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Washington State Department of Natural Resources' Geologic Information Portal (<u>https://www.dnr.wa.gov/geologyportal</u>)

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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix K-2

Geotechnical Engineering Report – Columbia East Lift Station Shannon & Wilson, Inc., August 6, 2018





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Geotechnical Engineering Report Columbia East Lift Station Pasco, Washington

August 6, 2018



Excellence. Innovation. Service. Value. Since 1954.

Submitted To: Mr. Robin Nelson, PE PACE Engineers, Inc. 11255 Kirkland Way, Suite 300 Kirkland, Washington 98033

By:

Shannon & Wilson, Inc. 2705 Saint Andrews Loop, Suite A Pasco, Washington 99301

100610-001

APPENDIX K-2

August 6, 2018

Mr. Robin Nelson, PE PACE Engineers, Inc. 11255 Kirkland Way, Suite 300 Kirkland, Washington 98033

RE: GEOTECHNICAL ENGINEERING REPORT; COLUMBIA EAST PUMP STATION, PASCO, WASHINGTON

Dear Mr. Nelson:

Shannon & Wilson, Inc. prepared this Geotechnical Engineering Report for the proposed Columbia East Pump Station project in Pasco, Washington. We provided our services in accordance with our February 28, 2018 proposal.

We appreciate the opportunity to work with PACE Engineers, Inc. and the City of Pasco on this project. Please contact me at (509) 543-2866 if you have comments or questions regarding this report, or if we can be of further service to you.

Sincerely, SHANNON & WILSON, INC.

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Clinton A. Wilson, P.E. Associate

BAL:LJR:CAW:WJP/caw

Enc: Geotechnical Engineering Report, Columbia East Pump Station, Pasco, Washington

100610-001-L1

2705 SAINT ANDREWS LOOP, SUITE A PASCO, WASHINGTON 99301 509•543•2860 FAX 509•492•5970 www.shannonwilson.com

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GEOTECHNICAL ENGINEERING REPORT COLUMBIA EAST PUMP STATION PASCO, WASHINGTON

1.0 INTRODUCTION

Shannon & Wilson, Inc. (Shannon & Wilson) prepared this geotechnical engineering report for the proposed Columbia East sewer pump station in Pasco, Washington. The purpose of this report is to present our geotechnical site evaluation, conclusions, and recommendations in support of the proposed design and construction.

1.1 Scope of Work

To prepare this report, Shannon & Wilson:

- Discussed the proposed design and construction improvements with Mr. Robin Nelson, PE (Project Manager, PACE Engineers, Inc. [PACE]) and the City of Pasco (City);
- Drilled, logged, and observed two (2) exploratory borings;
- Completed laboratory testing on selected soil samples;
- Prepared boring exploration logs; and
- Performed geotechnical engineering analyses and developed recommendations for design and construction of the proposed pump station.

1.2 Authorization

Shannon & Wilson prepared this engineering report for the exclusive use of PACE and their design team in the design and construction of the proposed pump station. We conducted our work in accordance with our proposal dated February 28, 2018. We received notice to proceed with fieldwork in the form of a signed contract dated April 16, 2018.

2.0 **PROJECT AND SITE DESCRIPTION**

The City proposes to complete improvements to the Process Water Reuse Facility (PWRF) that will create additional capacity for the existing and future food processors and remove loading from the City's Wastewater Treatment Plant. The PWRF improvements include construction of a new pump station approximately 300 feet northeast of the intersection of Pasco Kahlotus Road

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and Commercial Avenue in Pasco (Figure 1). The Highway 12 / Pasco Kahlotus Road interchange is south-southwest of the project site approximately 1,700 feet (Figure 1).

An existing City lift station is present at the site west side. Agricultural fields are present east and south-southeast of the site. A equipment storage area and agricultural facilities are present on the site north side.

The site slopes down to the west at less than approximately 10 percent and is covered with sparse weeds/grasses and sagebrush. The surface below the vegetation consists of loose sand soils.

Based on preliminary design reports provided by PACE and the City's request for proposal, we understand the proposed PWRF improvements include:

- 1. A new regional pump station, with
 - a. An approximately 20-foot by 20-foot by 20-foot deep buried, cast-in-place wetwell/dry pit pump station;
 - b. An approximately 12-foot by 20-foot, single-story concrete masonry unit (CMU) building for electrical equipment;
 - c. A reinforced concrete foundation for a generator; and
 - d. A possible retaining wall near the site perimeter;
- 2. An approximately 4-mile force main, and
- 3. Gravity sewer lines to transport the "gray water" generated by the nearby food processors.

Based on the preliminary grading plan provided PACE, we estimate the pump station will be approximately 60 feet east of the existing gravel pad and approximately 70 feet north of the Pasco Kahlotus Road.

Our services at this time pertain strictly to the pump station site as final alignments for the force main and gravity sewer lines have not yet been determined by PACE and the City.

3.0 FIELDWORK AND LABORATORY TESTING

Shannon & Wilson completed the following exploration and testing tasks:

 Drilled, logged, and sampled two (2) exploratory borings (exploration logs provided in Appendix A); and

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 Performed laboratory testing of selected soil samples (laboratory test results provided in Appendix B).

Shannon & Wilson planned the boring locations (Figure 2) and depths based on the proposed pump station with input from PACE. We recorded the boring locations in the field with a handheld global positioning system.

3.1 Borings

Shannon & Wilson completed two (2) borings, designated B-1 and B-2, on May 15, 2018. Our subcontractor (HazTech Drilling, Inc. of Meridian, Idaho) drilled the borings with a CME 85 truck-mounted drill rig, using approximately 4¹/₄-inch inside diameter, 8¹/₂-inch outside diameter (O.D.), hollow-stem augers. The borings extended approximately 36¹/₂ feet below the existing ground surface (bgs).

During the drilling process, we obtained disturbed samples at 2½-foot intervals using a 2-inch O.D Standard Penetration Test (SPT) sampler. We conducted SPTs in accordance with ASTM International (ASTM) Designation: D1586, *Test Method for Penetration Test and Split-Barrel Sampling of Soil*. Drive samples were driven with an automatic hammer weighing 140 pounds and free-falling 30 inches.

Our field representative recorded the number of blows required to advance the split-spoon through each 6-inch increment. ASTM D1586 defines the SPT resistance, or N-value, as the number of blows required to drive the sampler from 6 to 18 inches below the auger/casing. The SPT N-value reported on the logs is the number of blows per 1 foot of penetration. We typically stopped the tests when 50 blows achieved less than 6 inches of penetration. The SPT N-value provides an indication of the relative density or consistency of the soil and is plotted on the boring logs presented in Appendix A.

Our field representative observed the borings, classified the soils, obtained representative soil samples, and compiled exploration field logs based on manual-visual classification. We estimated strata boundaries in the field based on the observed split-spoon samples, drill cuttings, and interpretations of drill action (smoother drilling, rougher drilling, drill chatter, etc.). We sealed the samples in labeled plastic jars for transport to the laboratory. We visually classified the soils according to the Unified Soil Classification System as summarized on Figure A-1, Appendix A (3 sheets).

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The subsurface conditions are known only at the exploration and sample locations on the dates explored and should be considered approximate. Actual subsurface conditions may vary between explorations and within the vicinity of the proposed improvements.

3.2 Laboratory Testing

We completed the following laboratory tests on soil samples obtained from the borings.

- Water Content (ASTM D2216)
- Particle Size Analysis (ASTM D422)
- Corrosion Suite (pH ASTM G 51, sulfates ASTM D 4327, chloride content ASTM D 4327, Redox Potential – ASTM G 200, Resistivity – ASTM G 187, and sulfide – Acetate Paper)

We incorporated the laboratory test results into the boring log soil descriptions. Laboratory test results are presented in Appendix B.

4.0 GEOLOGY AND SUBSURFACE CONDITIONS

4.1 Site Geology

Based on the *Geologic Map of the Richland 1:100,000 Quadrangle, Washington* (Reidel and Fecht, 1994), the site lies within Pleistocene age (between approximately 1.8 million and 11,000 years old) outburst flood sands and gravels (Qfg₄). The publication describes the Qfg₄ geologic unit as the youngest outburst flood gravels varying in grain size from sand to boulders with beds of fine sediment. Holocene age (between 11,000 years old to present) stabilized sand dune deposits (Qds) are mapped northeast of the site.

4.2 Geologic Unit Description and Distribution

This section describes the geologic soil units encountered in borings B-1 and B-2. The units include: stabilized sand dune, outburst flood fine grained, and outburst flood sand and gravel deposits. The geologic unit descriptions and distribution are described below in descending order beginning at the surface. The boring logs in Appendix A provide additional detail.

- Stabilized Sand Dune Deposit Consists of loose to medium dense, Sandy Silt (ML) to Silty Sand (SM).
- Outburst Flood Fine-Grained Deposit Consists of medium dense to dense, Sandy Silt (ML) to Silty Sand (SM) and Poorly Graded Sand with Silt (SP-SM).

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Outburst Flood Sand and Gravel Deposit – The borings encountered outburst flood sand deposits beneath the Outburst Flood Fine-grained and Stabilized Dune deposits. The encountered Outburst Flood Sand and Gravel deposit consists of medium dense to dense, *Poorly Graded Sand with Silt (SP-SM)* to *Well-Graded Sand with Silt (SW)*. These soils are also known as Pasco black sands and contain trace/lenses of gravel encountered in the samples.

4.3 Groundwater

We did not observe groundwater in the completed borings. Based on well logs published on the Washington State Department of Natural Resources website, we anticipate groundwater occurs approximately 60 feet bgs. However, depending on the local irrigation practices/timing, groundwater seepage may occur into the pump station excavation during construction. Due to the relatively permeable nature of the sand soils, we anticipate irrigation-induced seepage will likely be temporary.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed below-grade pump station will be constructed within Stabilized Dune Sand, Outburst Flood Fine-grained, and Outburst Flood Sand and Gravel (a.k.a., Pasco black sands) deposits. The Pasco black sand soils tend to cave, ravel, freely run when excavated too steeply, therefore, excavations to construct the proposed pump station will have to be either sloped or shored.

We present a discussion of excavation/shoring alternatives, lateral earth pressures, foundation, and seismic design parameters for the proposed pump station design and construction in the following sections.

5.1 **Pump Station Excavation**

Based on the distance between the existing site features and proposed excavation depths, we anticipate the excavation can be completed by sloping the excavation sides. If the excavation depths or location changes, temporary shoring maybe required to support the adjacent gravel pad or roadway.

All excavations should be made in accordance with the safety requirements of the U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 1926 Subpart P, Excavations Standards, and other applicable regulations.

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We discuss potential excavation and shoring alternatives in the following sections.

5.1.1 Sloped Excavation

Based on our borings and local experience, we characterize the generally cohesionless, granular site soils as OSHA Type C. Type C soils consist of granular soils including gravel, sand, and loamy sand. OSHA indicates the maximum allowable temporary slope for excavations less than 20 feet deep in Type C soils is 1.5 Horizontal to 1 Vertical (1.5H:1V). Flatter slopes may be required within the Pasco black sands for excavations which exhibit raveling or running sands. OSHA requires an engineer evaluate excavations greater than 20 feet bgs.

The OSHA slope inclinations do not consider surcharge loads placed along excavation benches or perimeter, such as equipment or material stockpiling. Surcharged slopes should be evaluated by the geotechnical engineer based on the Contractor's proposed construction site layout.

Consistent with conventional practice, actual temporary excavation slopes should be made the responsibility of the construction Contractor. The construction Contractor is able to observe the nature and conditions of the subsurface materials encountered and has the responsibility for methods, sequence, and construction schedule. If instability is detected, slopes should be flattened or shored. All temporary excavation slopes should be accomplished in accordance with all local, state, and federal safety regulations.

With the above slope inclinations, an approximately 20- to 25-foot-deep excavation with a 20-foot wide base would require an excavation approximately 80 to 100 feet across at the ground surface. An excavation this size may encroach upon the adjacent city pump station to the west of the proposed pump station and the Pasco Kahlotus Road to the south.

5.1.2 Shoring Alternatives and Selection

In our opinion, there are several feasible shoring alternatives for the site subsurface conditions. Alternative cost, performance expectations, and Owner preferences should be considered when evaluating shoring systems. Potential shoring systems may consist of, but not be limited to:

- 1. Manhole Shields/Trench Boxes,
- 2. Sheet Pile Wall,
- 3. Soldier Pile and Lagging Wall,

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- 4. Caisson, and
- 5. Secant Pile Wall.

Based on the relatively open project site and proximity of adjacent facilities (existing lift station to the west and Pasco Kahlotus Road to the south), it is our opinion that manhole shields and/or trench boxes may be the cost effective shoring options. Manhole shields or trench boxes are often used by Contractors to provide safety for workers in excavations. However, an unsupported excavation would be required to set the shield/box to the excavation base. As previously discussed, the site soils have the potential to ravel and cave. A temporary, unsupported excavation could result in damage to the adjacent properties and structures. The impacts of these methods on adjacent structures and the active street should be evaluated by the Contractor to assess potential impacts of this approach.

5.1.3 Temporary and Permanent Lateral Earth Pressures

The lateral pressures against a buried wall are dependent on many factors, including method of backfill placement and degree of compaction, backfill slope, surcharges, the type of backfill and native soil, drainage, and whether or not the wall can yield or deflect laterally or rotate at the top after or during construction or placement of backfill. If the wall is free to yield at the top an amount equal to approximately 0.001 times the wall height, the soil pressures will be less (active case) than if this movement is not allowed because of stiffness or wall resistance (at-rest condition).

The permanent pump station walls will likely be stiff, therefore at-rest conditions should be used. Recommended lateral earth pressures for at-rest and seismic loading conditions are provided in Figure 3. The recommended equivalent fluid weights are for temporary and permanent walls with horizontal backfill. Due to the static groundwater depth and relatively coarse native soils, we do not include hydrostatic pressures behind the retaining structure walls. The design of the temporary and permanent walls should take into account any surcharge loads, such as adjacent footings, construction equipment, stockpiled material, and traffic loads. Backfill should not be placed behind a wall until the wall is capable of supporting lateral pressures.

Recommended surcharge loading for below-grade walls are provided in Figure 4. In our opinion, the lateral earth pressures for the lift station shoring should include the surcharge load of

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the live traffic along Pasco Kahlotus Road, construction equipment, material stockpiles, and other items at or near the excavation top.

5.2 Foundation Recommendations

In our opinion, the proposed pump station and at-grade CMU building structures may be supported on conventional, shallow foundations bearing on the native, medium dense or denser soils or granular structural fill placed on the medium dense or denser native soils. The loose soils extended to depths of up to 7 feet below the existing ground surface in the borings, or to elevations between approximately 402 and 404 feet. The grading plans indicate that the site ground surface will be lowered to elevation 404, at or a few feet above the elevation of the recommended medium dense or denser native soils.

The native footing subgrade soils should be compacted to a dense and unyielding condition as described in Section 6.2 Earthwork prior to placing the footing or structural fill. Structure fill placed beneath footing areas should consist of a compacted crushed rock such as $\frac{5}{8}$ -inch minus or $1\frac{1}{4}$ -inch minus.

The silty native soils are easily disturbed. Therefore, we recommend placing an 8-inch layer of compacted ⁵/₈-inch minus crushed rock on the native subgrade to create a working surface.

We recommend building foundations have a minimum width of 18 inches for continuous footings and 24 inches for spread footings. Footings should be embedded a minimum 24 inches below adjacent grades for frost and bearing capacity considerations. Footings constructed in accordance with these recommendations may be designed for an allowable 2,000 pounds per square foot (psf) bearing capacity. The allowable bearing capacity may be increased by one-third for short-term loading conditions.

We estimate that foundations designed and constructed in accordance with the above recommendations will experience total settlements less than 1 inch. The settlements should occur as the loads are applied. We anticipate differential settlements will be less than half the total settlements between adjacent columns and along approximately 20 feet of continuous footings. The settlement estimates assume that there is no stress influence from adjacent footings. Footings located within two (2) times the footing width (2B) from each other will increase the stress beneath the adjacent footing, resulting in increased settlement.

Lateral forces can be resisted by passive earth pressure against the buried portions of the structures and friction against the bottom. Passive pressure may develop behind the buried part

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of a foundation subjected to a lateral movement against the backfill and thereby resisting lateral forces acting on the foundation. Passive resistance should be ignored in the upper 24 inches of backfill not covered by a permanent floor, or if there is a possibility that soil providing the resistance could be removed in the future. In our opinion, passive earth pressures developed against shallow footings can be estimated using an equivalent fluid unit weight of 250 pounds per cubic feet. This value assumes that only structural fill is used to backfill alongside footings, and includes an FS of 1.5 to limit lateral movements. Passive earth pressures for retaining wall design are provided in Figure 3.

We recommend using friction coefficient of 0.30 between foundation cast-in-place concrete and native sand. The coefficient of friction may be increased to 0.4 if the footing is placed on crushed rock. These values include a factor of safety (FS) of 1.5.

5.3 Floor Slabs

Concrete slabs-on-grade may be supported on the medium dense or denser native soils or compacted structural fill placed on the medium dense or denser native soil. Prior to placing any slabs, we recommend compacting the top 12 inches of the exposed subgrade to a minimum inplace dry density of 95 percent of the maximum laboratory dry density determined by ASTM D 1557 and a dense and unyielding condition.

If the floor slab surface is moisture sensitive, we recommend placing a capillary break consisting of a minimum 8-inch-thick layer of washed pea gravel (³/₈-inch to No. 8 sieve size) or ³/₄-inchminus washed crushed rock beneath the slab. We also recommend installing a moisture retarder beneath the slab.

Floor slabs constructed on subgrade or structural fill placed and compacted as specified above may be designed for a modulus of subgrade reaction of 100 pounds per cubic inch (pci).

5.4 Seismic Design Ground Motions

Seismic design forces in the 2015 International Building Code (International Code Council, 2015) are based on seismological input and site soil response factors. The seismological inputs are short period spectral acceleration, Ss, and spectral acceleration at the 1 second period, S₁, shown in Figure 1613.5 in the code.

The site soil response factors are based on determination of the Site Class. Based on the subsurface conditions encountered in the explorations and indicated on geologic maps, it is our

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opinion the site can be classified as Site Class D (stiff soil). The site class coefficients, F_a and F_v , corresponding to Site Class D and the mapped S_s and S_1 values are provided in Table 1. The corresponding risk-targeted Maximum Considered Earthquake (MCE_R) spectral accelerations (S_{Ms} and S_{M1}) and the Design Earthquake spectral accelerations (S_{Ds} and S_{D1}) are provided in Table 1.

Symbol	Description	Value
S_s	Spectral Response Acceleration for Short Periods	0.38g
S_{I}	Spectral Response Acceleration at 1-second Period	0.15g
F _a	Site Coefficient	1.49
F_{v}	Site Coefficient	2.21
S_{MS}	MCE_R Spectral Response Acceleration for Short Periods	0.57g
S_{M1}	MCE_R Spectral Response Acceleration at 1-second Period	0.33g
S _{DS}	Design Spectral Response Acceleration for Short Periods	0.38g
S_{D1}	Design Spectral Response Acceleration at 1-second Period	0.22g

TABLE 1IBC PARAMETERS FOR SEISMIC DESIGN OF STRUCTURES

Notes:

g = standard acceleration of gravity

IBC = International Building Code

MCE_R = Risk-targeted Maximum Considered Earthquake

6.0 CONSTRUCTION CONSIDERATIONS

The applicability of our recommendations is contingent upon good construction practices. Poor construction techniques may alter conditions from those on which our recommendations are based and, therefore, result in reduced foundation capacity or additional settlement and movement. The following sections present construction considerations for this project.

6.1 Condition Survey and Monitoring

Deep excavations and construction vibrations could result in damage to the adjacent facilities and/or properties. Prior to commencing construction, we recommend conducting a visual survey of the adjacent facility/property conditions. The survey should include video and still photography of the existing conditions and any existing distress (cracked pavement and concrete, foundations crack, etc.), and a site topography survey. In addition, survey monuments should be

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placed on adjacent structures such as sidewalks and buildings to monitor both vertical and horizontal movements during construction.

6.2 Earthwork

Surface vegetation and topsoil should be stripped from the construction footprint. We anticipate the proposed excavation will remove these deleterious materials. Topsoil and existing/potential *Silty Sand (SM)* to *Sandy Silt (ML)* soil should not be used for structural fill but may be used as general backfill outside of structural areas.

Exposed subgrades beneath structural fill, spread footing foundations, and floor slabs should be observed by a geotechnical engineer or their representative to identify potential soft or unsuitable subgrade soils. If loose and/or wet, spongy soil zones are identified, the soils should be removed and replaced with compacted structural fill, or dried or moistened, as required (including scarifying, mixing, and/or aerating), be reworked, and be adequately compacted to 95 percent of the maximum laboratory dry density as determined by ASTM D1557 and a dense, unyielding condition.

Fill soil placed within the pump station excavation or beneath the building or generator slab should be compacted structural fill. Fill should be free of debris, organic material, and any other deleterious material. Particles larger than 3 inches in dimension should be removed from the fill material. If import material is required, we recommend using a well-graded, 2-inch minus, pitrun sand and gravel with less than 5 percent fines, or crushed rock for structural fill. Shannon & Wilson should review and approve material for import prior to transporting to the site.

Fill materials should be placed in maximum 8-inch-thick loose lifts, depending on compaction equipment size and energy. Uniformly moisture-condition the fill material to within 2 percent of optimum and compact in lifts to a minimum 95 percent of ASTM D1557 and firm, unyielding conditions. If the material is too granular to permit density testing, we recommend a minimum three passes of a moderately-sized, walk-behind or self-propelled, vibratory compactor to densify material to a dense and unyielding condition. A qualified geotechnical engineer or their representative should observe the compaction to determine if the intent of this section has been achieved.

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6.3 Wet Weather and Wet Condition Considerations

The *Sandy Silt (ML)* to *Silty Sand (SM)* soils in the upper 22 feet of the borings are moisture sensitive. We provide the following recommendations if earthwork in these soils occurs during wet weather:

- The ground surface in and surrounding the construction area should be sloped as much as possible and sealed with a smooth-drum roller to promote runoff of precipitation away from work areas and to prevent ponding of water.
- Work areas or slopes should be covered with plastic. The use of sloping, ditching, sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work.
- Subgrades subjected to traffic should be protected from disturbance.
- Earthwork should be accomplished in small sections to minimize exposure to wet conditions. That is, each section should be small enough so that the removal of unsuitable soils and placement and compaction of clean structural fill could be accomplished on the same day. The size of construction equipment may have to be limited to prevent soil disturbance. It may be necessary to excavate soils with a backhoe, or equivalent, and locate them so that equipment does not pass over the excavated area. Thus, subgrade disturbance caused by equipment traffic would be minimized.
- Fill should consist of clean, well-graded, pit-run sand and gravel soils, of which not more than 5 percent fines by dry weight passes the No. 200 mesh sieve, based on wet-sieving the fraction passing the ³/₄-inch mesh sieve. The gravel content should range from between 20 and 50 percent retained on a No. 4 mesh sieve. The fines should be nonplastic. These recommendations would supercede our general fill material recommendations provided in Section 6.2 of this report.
- No soil should be left uncompacted and exposed to moisture.
- In-place soil or fill soil that becomes wet and unstable and/or too wet to suitably
 compact should be removed and replaced with clean, granular soil (see gradation requirements above).
- Excavation and placement of structural fill material should be observed on a full-time basis by Shannon & Wilson to determine that all work is being accomplished in accordance with the project specifications and our recommendations.
- Grading and earthwork should not be accomplished during periods of heavy, continuous rainfall.

The above recommendations should be incorporated into the contract specifications for the proposed construction.

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6.4 Plan Review and Construction Observation

We recommend Shannon & Wilson review the construction plans for the proposed structures and provide construction observations services during shoring and foundation installation. We can provide these services on a time and expense basis.

Variations in soil conditions are possible at the site and may be encountered during construction. Geotechnical design recommendations were developed from a limited number of explorations and tests. Therefore, recommendations may need to be adjusted in the field. Shannon & Wilson should be retained to provide construction observation services during the project earthwork, excavation, shoring installation, and foundation and pavement preparation. Construction observation allows the geotechnical engineer to observe the actual soil conditions exposed during construction, determine if the proposed design is compatible with the design recommendations, and if the conditions encountered at the site are consistent with those observed during the geotechnical study. Construction is conducted to reduce the potential for problems arising during and after construction. However, in all cases, the Contractor is responsible for the quality and completeness of their work and for adhering to the plans, specifications, and recommendations on which their work is based.

7.0 LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based upon site conditions as they presently exist. We further assume that the site explorations are representative of the subsurface conditions throughout the site; i.e., site conditions are not significantly different from those disclosed by the field explorations and observations.

If subsurface conditions different from those encountered in the field explorations are observed or appear to be present during construction, we should be advised at once so that we can review these conditions and reconsider our recommendations, where necessary.

If there is a substantial lapse of time between the submission of this report and the start of construction at the site, or if conditions have changed because of natural forces or construction at the site, we recommend that we review this report to determine the applicability of the conclusions and recommendations contained in this report concerning the time lapse or changed conditions.

The scope of services did not include any environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water,

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groundwater, or air, on or below the site, or for the evaluation or disposal of contaminated soils or groundwater, should any be encountered. We would be pleased to provide you a scope for these services at your request, should these services become necessary.

This report was prepared for the use of PACE and their design team in the design and construction of the proposed Columbia East Pump Station in Pasco, Washington. This report was made for a specific set of proposed structures and locations on the site. Variations from the structure types or locations discussed in this report should be analyzed by Shannon & Wilson to assess the potential geotechnical impacts of those variations on the foundation recommendations included in this report.

As an integral part of this report, we have prepared the attached "Important Information About Your Geotechnical/Environmental Report," (Appendix C) to help you more clearly understand its use and limitations.

SHANNON & WILSON, INC



Clinton A. Wilson, PE Associate Geotechnical Engineer

BAL:LJR:CAW:WJP/caw

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8.0 **REFERENCES**

- International Code Council, Inc., 2015, International building code: Country Club Hills, Ill., International Code Council, Inc., 690 p.
- Reidel, S.P. and Fecht, K.R., 1994, Geologic map of the Richland 1:100,000 quadrangle,Washington, Washington Division of Geology and Earth Resources, Open-File Report 94-8.
- Washington State Department of Transportation (WSDOT), 2018, Standard Specifications for Road, Bridge, and Municipal Construction: Olympia, Wash., WSDOT, publication no. M 41-10, 1 v.

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APPENDIX K-2





- 2. The lateral earth pressures are provided for at-rest and passive conditions. At-rest pressures are applicable when the wall moves less than 0.001 x H.
- Wall embedment should consider kickout resistance. Embedment should be determined by satisfying horizontal static equilibrium about the bottom of the pile. The required depth of embedment should also satisfy the vertical loading considerations.
- 4. The earth pressures shown above assume a horizontal backslope.
- 5. The passive earth pressures presented above include a factor of safety of 1.5.
- 6. Surcharge pressures should be added as required. See Figure 4 for additional details.
- Permanent wall design should consider the seismic loading shown above. The seismic incremental pressure is based on a peak ground acceleration of 0.30g. The full PGA was used for the at-rest and multiple braced conditions.
- Earth pressures provided are for soils above the groundwater table. If piles penetrate below groundwater elvations, a revised earth pressure diagram will be required.

Not to Scale

LEGEND

- h₁ = Height of Soil Stratum 1
- h₂ = Height of Soil Stratum 2
- H = Height of Wall/Excavation (ft.)
- H_1 = Depth to the Uppermost Tieback or Strut (ft.)
- H_n = Height between Tieback or Struts (ft.)
- H_{n+1} = Distance from the Bottom of Excavation to the Lowermost Tieback or Strut (ft.) D = Wall Embedment (ft.)

RECOMMENDED LATERAL EARTH PRESSURE

	Cantilever At-Rest Earth Pressure Condition	Multiple Braced Apparent Earth Pressure Condition
A	60h ₁	
в	48h1	
с	-	40H
E	12H	12H



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APPENDIX A

EXPLORATORY BORING LOGS

Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT ²	FINE-GRAINED SOILS (50% or more fines) ¹	COARSE-GRAINED SOILS (less than 50% fines) ¹	
Major	Silt, Lean Clay, Elastic Silt, or Fat Clay ³	Sand or Gravel ⁴	
Modifying (Secondary)30% or more coarse-grained:Precedes major constituentSandy or Gravelly⁴		More than 12% fine-grained: Silty or Clayey ³	
Minor	15% to 30% coarse-grained: <i>with Sand</i> or <i>with Gravel</i> ⁴	5% to 12% fine-grained: <i>with Silt</i> or <i>with Clay</i> ³	
Follows major constituent	30% or more total coarse-grained and lesser coarse- grained constituent is 15% or more: with Sand or with Gravel ⁵	15% or more of a second coarse- grained constituent: <i>with Sand</i> or <i>with Gravel</i> ⁵	
¹ All percentages are by weight of total specimen passing a 3-inch siove			

²The order of terms is: Modifying Major with Minor.

³Determined based on behavior.

⁴Determined based on which constituent comprises a larger percentage. ⁵Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch

- Moist Damp but no visible water
- Wet Visible free water, from below water table

STANDARD PENETRATION TEST (S	PT)
SPECIFICATIONS	

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm	
	NOTE: If automatic hammers are used, blow counts shown on boring logs should be adjusted to account for efficiency of hammer.	
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches	
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.	
NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.		

_	PARTICLE SIZE DEFINITIONS			
	DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE		
	FINES	< #200 (0.075 mm = 0.003 in.)		
	SAND Fine Medium Coarse	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.) #40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.) #10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)		
	GRAVEL Fine Coarse	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.) 3/4 to 3 in. (19 to 76 mm)		
	COBBLES	3 to 12 in. (76 to 305 mm)		
	BOULDERS	> 12 in. (305 mm)		

RELATIVE DENSITY / CONSISTENCY

COHESION	LESS SOILS	COHESIVE SOILS		
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, <u>BLOWS/FT.</u> (RELATIVE CONSISTENCY	
< 4 4 - 10 10 - 30 30 - 50 > 50	Very loose Loose Medium dense Dense Very dense	< 2 2 - 4 4 - 8 8 - 15 15 - 30 > 30	Very soft Soft Medium stiff Stiff Very stiff Hard	
		- 50	Thatu	

WELL AND BACKFILL SYMBOLS

1 2				
Ē	Screened Casing		Vibrating Wire Piezometer	
	Silica Sand		Non-perforated Casing	
	Cilico Cond		Inclingmator or	
	Bentonite Chips		Slough	
	Bentonite Grout		Asphalt or Cap	
	Bentonite Cement Grout		Surface Cement Seal	

PERCENTAGES TERMS

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

¹Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

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> Columbia East Pump Station Pasco, Washington

SOIL DESCRIPTION AND LOG KEY

August 2018

SHANNON & WILSON, INC.	FIG. A-1	
Geotechnical and Environmental Consultants	Sheet 1 of 3	

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) (Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)								
	MAJOR DIVISION	3	GROUP/	GRAPHIC	TYPICAL IDENTIFICATIONS			
Gravel		Gravel	GW		Well-Graded Gravel; Well-Graded Gravel with Sand			
	Gravels (more than 50%	(less than 5% fines)	GP		Poorly Graded Gravel; Poorly Graded Gravel with Sand			
	of coarse fraction retained on No. 4 sieve)	Silty or Clayey Gravel	GM		Silty Gravel; Silty Gravel with Sand			
COARSE- GRAINED SOILS		(more than 12% fines)	GC		Clayey Gravel; Clayey Gravel with Sand			
(more than 50% retained on No. 200 sieve)		Sand	SW		Well-Graded Sand; Well-Graded Sand with Gravel			
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	(less than 5% fines)	SP		Poorly Graded Sand; Poorly Graded Sand with Gravel			
		Silty or Clayey Sand	SM		Silty Sand; Silty Sand with Gravel			
		(more than 12% fines)	SC		Clayey Sand; Clayey Sand with Gravel			
					Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt			
	Silts and Clays (liquid limit less than 50)	morganic	CL		Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravely Lean Clay			
FINE-GRAINED SOILS		Organic	OL		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay			
passes the No. 200 sieve)		Inorgania	ΜΗ		Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt			
	Silts and Clays (liquid limit 50 or more)	morganic	СН		Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay			
		Organic	ОН		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay			
HIGHLY- ORGANIC SOILS	Primarily organic color, and c	c matter, dark in organic odor	PT		Peat or other highly organic soils (see ASTM D4427)			

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

<u>NOTES</u>

- 1. Dual symbols (symbols separated by a hyphen, i.e., SP-SM, Sand with Silt) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart. Graphics shown on the logs for these soil types are a combination of the two graphic symbols (e.g., SP and SM).
- 2. Borderline symbols (symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand) indicate that the soil properties are close to the defining boundary between two groups.

Columbia East Pump Station Pasco, Washington

SOIL DESCRIPTION AND LOG KEY

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SHANNON & WILSON, INC.	FIG. A-1
Geotechnical and Environmental Consultants	Sheet 2 of 3

SOIL CLASS KEY PG2 100610 COLUMBIA EAST PUMP STATION & FORCEMAIN.GPJ SHAN WIL.GDT 6/29/18

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested. Full range and even distribution of grain sizes
	present. Meets criteria in ASTM D2487, if tested.
	CEMENTATION TERMS ¹
Weak	Crumbles or breaks with handling or slight
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	pressure.
	PLASTICITY ²
DESCRIPTION	APPROX. PLASITICITY VISUAL-MANUAL CRITERIA INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled < 4
Low	A thread can barely be rolled and 4 to 10 a lump cannot be formed when drive then the plactic limit
Medium	A thread is easy to roll and not 10 to 20
	much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit
High	It takes considerable time rolling > 20 and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.
	ADDITIONAL TERMS
Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.
PARTICL	E ANGULARITY AND SHAPE TERMS ¹
Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3 .

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ACRO	ONYMS AND ABBREVIATIONS
ATD	At Time of Drilling
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
qu	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS¹

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick;
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy: sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

Columbia East Pump Station Pasco, Washington

SOIL DESCRIPTION AND LOG KEY

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	Total Depth: Top Elevation: Vert. Datum: Horiz. Datum:	36.5 ft. ~407.5 ft. NA WGS84	Latitude: _ Longitude: _ Station: _ Offset: _	46.24196 N -119.05132 W NA ft. NA	_ D _ Dril _ C	Drill Drilling I Rig Other	ing Met g Comp Equipm Comme	hod: any: nent: ents:	Hollo Haz- CME	ow St Tech -85	e <u>m Auger</u> Hole Dian <u>Drilling</u> Rod Dian Hammer Typ	n.: <u>8 in.</u> n.: <u>NWJ - 2 5/8"</u> pe: <u>Automatic</u>
	Refer to the rep subsurface mater lines indicated be between materia	SOIL DESCI port text for a pri ials and drilling plow represent t I types, and the	RIPTION oper understan methods. The he approximate transition may	ding of the stratification boundaries be gradual.	Depth, ft.	Symbol	Samples	Screen	Design	Depth, ft.	PENETRATION RESIST, ▲ Hammer Wt. & Drop: 0 20	ANCE (blows/foo 140 lbs / 30 inches 40 6
	Loose to medi (<i>ML</i>) to Silty S sand; nonplas STABILI ;	ium dense, Sand (SM); r tic silt. ZED SAND	brown, San noist; fine to DUNE DEP(dy Silt o medium DSIT			3 S-2 S-1			5		
	Medium dense (ML) to Silty S sand; nonplas OUTBUR	e to dense, and (SM); n tic silt. SST FLOOD DEPOS	brown, San noist; fine to FINE-GRAI SIT	dy Silt o medium NED	7.0		6 S-5 S-4 S-			10		
							S-8 S-7 S-	undwater Encountered		15	•	
	Medium dense Well-Graded S fine to coarse OUTBURST	e to dense, g Sand with Si sand; nonpl FLOOD SA DEPOS	gray to brow <i>ilt (SW-SM</i>); astic silt. AND AND GI	/n, moist; RAVEL	22.0		S-11 S-10 S-9	No Gro		25 -	•	
AV. WHE YED NR/ SHA	Medium dense Graded Sand v subrounded, co to coarse sand OUTBURST	e to dense, d with Silt (SF oarse grave I. FLOOD SA DEPOS	dark gray, <i>F</i> P-S <i>M</i>); moist at 27.5ft b ND AND GF SIT	<i>coorly</i> ;; trace, gs; fine RAVEL			S-14 S-13 S-12			30 -		
	Cc	Bottom of E ompleted 05	3oring /15/2018		36.5		S-15			35		
AND LINE STATION &		* Sa [G] Gr ∏ 2.0	LEGEND ample Not Reco ab Sample 0" O.D. Split Spo	vered oon Sample						(0 20	40 66 <0.075mm) Content
	1. Refer to KEY for 2. Groundwater lev	r explanation of rel, if indicated a	NOTES symbols, codes above, is for the	, abbreviations ar date specified ar	nd defini nd may v	itions. vary.					Columbia East Pump St Pasco, Washingtor	
	3. USCS designatio	on is based on v	visual-manual cl	assification and s	elected	iab te	sting.		Augu SHA Geoteo	ust 2	2018 ON & WILSON, INC. and Environmental Consultants	100610-001

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	Total Depth: 36.5 ft. Latitude: 46.24222 N Top Elevation: ~411 ft. Longitude: -119.05135 W Vert. Datum: NA Station: NA ft. Horiz. Datum: WGS84 Offset: NA	[Dril C	Drilli Drilling I Rig I Dther (ng Met I Comp Equipm Comme	hod: _ any: _ nent: _ ents: _	Hollow S Haz-Tech CME-85	tem Auger Hole Diar h Drilling Rod Diar Hammer Ty	n.: <u>8 in.</u> n.: <u>NWJ - 2 5/8"</u> pe: <u>Automatic</u>
	SOIL DESCRIPTION Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.	Depth, ft.	Symbol	Samples	Screen	Depth, ft.	PENETRATION RESIST ▲ Hammer Wt. & Drop:_ 0 20	ANCE (blows/foot) 140 lbs / 30 inches 40 60
	Loose, brown, <i>Silty Sand (SM</i>); moist; fine to medium sand; nonplastic silt. STABILIZED SAND DUNE DEPOSIT			s-3 s-2 s-1		5		
	Medium dense to dense, brown, <i>Poorly</i> <i>Graded Sand with Silt (SP-SM) to Silty Sand</i> <i>(SM)</i> ; moist; fine to medium sand; nonplastic silt. OUTBURST FLOOD FINE-GRAINED DEPOSIT	7.0		S-6 S-5 S-4		10		
				9 S-8 S-7	roundwater Encountered	15 20		
	Dense, gray to brown, <i>Silty Sand (SM</i>); moist; fine to medium sand; nonplastic silt. OUTBURST FLOOD FINE-GRAINED DEPOSIT	22.0		-12 S-11 S-10 S	No G	25	• •	
SEMAIA(9978/8/HRRV: AAA(16077/18/3/48	Medium dense to dense, dark gray, <i>Poorly</i> <i>Graded Sand with Silt (SP-SM)</i> ; moist; trace, subrounded to subangular, fine gravel from 32ft to 36.5ft bgs; fine to coarse sand. OUTBURST FLOOD SAND AND GRAVEL DEPOSIT Bottom of Boring Completed 05/15/2018	29.5		S-15 S-14 S-13 S		30 35		
T PUMP STATION & FORO	LEGEND ★ Sample Not Recovered Grab Sample 1 2.0" O.D. Split Spoon Sample						0 20	40 60 <0.075mm) Content
WT 100610 COLUMBIA EAS	<u>NOTES</u> 1. Refer to KEY for explanation of symbols, codes, abbreviations a 2. Groundwater level, if indicated above, is for the date specified ar 3. USCS designation is based on visual-manual classification and s	nd defin nd may selected	itions. vary. lab tes	sting.			Columbia East Pump S Pasco, Washingto LOG OF BORING	tation n G B-2
STER LOG J					-	August 2	2018	100610-001
MAS				-		Geotechnica	I and Environmental Consultants	110. A-3

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APPENDIX B

LABORATORY TEST RESULTS



MOISTURE CONTENT OF SOILS - ASTM D 2216

STRUCTURE OF STRUCTURE	CLIENT	Shannon & Wilson		DATE TESTED:	6/4/2018	
	PROJECT	Columbia East Pump Station & Forcemain #100610		JOB NUMBER:	18-067	
SAN	IPLE SOURCE:	See Below	WORK OF	RDER NUMBER	18-425	
DA	ATE SAMPLED:	Client Sampled	SAN	IPLE NUMBER:	18-425 1-10	
MA	TERIAL TYPE:	Native		TESTED BY:	STB	
	Sample	ed in accordance with ASTM D 75 an	d reduced in acco	rdance with ASTM	C 702.	
Sample #	Material Type	Location	Wet Weight	Dry Weight	H₂O Weight	Moisture %
18-425-1	Native	B-1, S-3, D=5'	458.5	427.4	31.1	7.3%
18-425-2	Native	B-1, S-5, D=10'	672.1	622.1	50.0	8.0%
18-425-3	Native	B-1, S-8, D=17.5'	699.1	672.3	26.8	4.0%
18-425-4	Native	B-1, S-10, D=22.5'	534.4	507.5	26.9	5.3%
18-425-5	Native	B-1, S-12, D=27.5'	626.1	601.3	24.8	4.1%
18-425-6	Native	B-2, S-2, D=2.5'	515.3	492.5	22.8	4.6%
18-425-7	Native	B-2, S-4, D=7.5'	561.7	517.2	44.5	8.6%
18-425-8	Native	B-2, S-6, D=12.5'	590.5	537.7	52.8	9.8%
18-425-9	Native	B-2, S-8, D=17.5'	604.6	552.0	52.6	9.5%
18-425-10	Native	B-2, S-11, D=25'	651.3	612.0	39.3	6.4%

REMARKS:

REVIEWED BY:

France

Dee Burrie Technical Director Signed by: adavis

> 1106 Ledwich Ave., Yakima, WA 98902 Phone: 509-469-3068 Fax: 509-469-3070



CLIENT: Shannon & Wilson PROJECT: Columbia East Pump Station & Forcemain #100610 SAMPLE SOURCE: B-1, S-3, D=5' MATERIAL TYPE: Native DATE SAMPLED: Client Sampled PROJECT NUMBER: 18-067 WORK ORDER #: 18-425

SAMPLE NUMBER: 18-425-1 DATE TESTED: 6/4/2018 TESTED BY: STB

Sampled in Accordance with ASTM D 75 and reduced in accordance with ASTM C 702 or D 421 unless otherwise noted.

SIEV	E ANALYSIS ASTM	OF AGGREC C 136	BATES			SOIL MOISTURE DETERMINATION - ASTM D 2216
Sieve	Percent		Sieve	Percent		7.3%
<u>Size:</u> 4"	Passing:	Specs:	<u>Size:</u> #4	Passing: 100%	Specs:	SAND EQUIVALENT - D 2419
3"			#8			
2 1/2"			#10	100%		
2"			#16			FRACTURED FACE - D 5821
1 1/2"			#20	99%		
1 1/4"			#30			
1"			#40	98%		FLAT AND ELONGATED - D 4791
3/4"			#50			
5/8"			#60			
1/2"			#80	98%		FINER THAN #200 - C 117
3/8"			#100	97%		37.4%
1/4"	100%		#200	49.0%		



Funie

Dee Burrie Technical Director Signed by: adavis



CLIENT: Shannon & Wilson PROJECT: Columbia East Pump Station & Forcemain #100610 SAMPLE SOURCE: B-1, S-5, D=10' MATERIAL TYPE: Native DATE SAMPLED: Client Sampled PROJECT NUMBER: 18-067 WORK ORDER #: 18-425

SAMPLE NUMBER: 18-425-2 DATE TESTED: 6/4/2018 TESTED BY: STB

Sampled in Accordance with ASTM D 75 and reduced in accordance with ASTM C 702 or D 421 unless otherwise noted.

SIEV	E ANALYSIS ASTM	OF AGGREG C 136	ATES			SOIL MOISTURE DETERMINATION - ASTM D 2216
Sieve <u>Size:</u> 4"	Percent <u>Passing:</u>	Specs:	Sieve <u>Size:</u> #4	Percent <u>Passing:</u> 100%	Specs:	8.0% SAND EQUIVALENT - D 2419
3" 2 1/2" 2"			#8 #10 #16	100%		FRACTURED FACE - D 5821
1 1/2" 1 1/4"			#20 #30	100%		
1" 3/4"			#40 #50	99%		FLAT AND ELONGATED - D 4791
5/8" 1/2"			#60 #80	95%		FINER THAN #200 - C 117
3/8" 1/4"	100%		#100 #200	90% 50.2%		41.8%



Amie

Dee Burrie Technical Director Signed by: adavis



CLIENT: Shannon & Wilson PROJECT: Columbia East Pump Station & Forcemain #100610 SAMPLE SOURCE: B-1, S-10, D=22.5' MATERIAL TYPE: Native DATE SAMPLED: Client Sampled PROJECT NUMBER: 18-067 WORK ORDER #: 18-425

SAMPLE NUMBER: 18-425-4 DATE TESTED: 6/4/2018 TESTED BY: STB

Sampled in Accordance with ASTM D 75 and reduced in accordance with ASTM C 702 or D 421 unless otherwise noted.

E ANALYSIS ASTM	OF AGGREC C 136	GATES			SOIL MOISTURE DETERMINATION - ASTM D 2216
Percent <u>Passing:</u>	<u>Specs:</u>	Sieve <u>Size:</u> #4	Percent <u>Passing:</u> 100%	Specs:	5.3% SAND EQUIVALENT - D 2419
		#8 #10 #16	99%		
		#10 #20 #30	77%		TRACTORED TACE +D 3021
		#30 #40	42%		FLAT AND ELONGATED - D 4791
		#50 #60	40%		
1000/		#80	19% 15%		9.2%
	/E ANALYSIS ASTM Percent <u>Passing:</u> 100%	/E ANALYSIS OF AGGREC ASTM C 136 Percent Passing: Specs:	Percent Sieve Passing: Specs: Size: #4 #8 #10 #10 #16 #20 #30 #40 #50 #60 #80 #100 #100 #200 #30	Zeric Analysis of AGGREGATES ASTM C 136 Sieve Percent Percent Size: Passing: 100% #8 #10 99% #16 #20 77% #30 #40 42% #50 #60 #80 19% #100% #80 19% #100 15%	Zeric Percent Sieve Percent Passing: Specs: Size: Passing: Specs: #4 100% #8 #10 99% #16 #20 77% #30 #40 42% #50 #60 #80 19% #100 15% #100 15% #200 9.4%



Annie

Dee Burrie Technical Director Signed by: adavis



CLIENT: Shannon & Wilson PROJECT: Columbia East Pump Station & Forcemain #100610 SAMPLE SOURCE: B-1, S-12, D=27.5' MATERIAL TYPE: Native DATE SAMPLED: Client Sampled PROJECT NUMBER: 18-067 WORK ORDER #: 18-425

SAMPLE NUMBER: 18-425-5 DATE TESTED: 6/4/2018 TESTED BY: STB

Sampled in Accordance with ASTM D 75 and reduced in accordance with ASTM C 702 or D 421 unless otherwise noted.

SIE	VE ANALYSIS ASTM	OF AGGREC C 136	GATES			SOIL MOISTURE DETERMINATION - ASTM D 2216
Sieve <u>Size:</u>	Percent Passing:	Specs:	Sieve <u>Size:</u>	Percent Passing:	Specs:	4.1%
4" 3"			#4 #8	96%		SAND EQUIVALENT - D 2419
2 1/2" 2"			#10 #16	95%		FRACTURED FACE - D 5821
1 1/2" 1 1/4"			#20 #30	81%		
1"	100%		#40	39%		FLAT AND ELONGATED - D 4791
3/4" 5/8"	97%		#50 #60			
1/2"			#80	13%		FINER THAN #200 - C 117
3/8" 1/4"			#100 #200	11% 6.9%		6.5%



Annie

Dee Burrie Technical Director Signed by: adavis



APPENDIX K, Page 48 of 54

1106 Ledwich Ave. Yakima, WA 98902 (509)469-3068 Office (509)469-3070 Fax

CLIENT: Shannon & Wilson PROJECT: Columbia East Pump Station & Forcemain #100610 SAMPLE SOURCE: B-2, S-2, D=2.5' MATERIAL TYPE: Native DATE SAMPLED: Client Sampled PROJECT NUMBER: 18-067 WORK ORDER #: 18-425

SAMPLE NUMBER: 18-425-6 DATE TESTED: 6/4/2018 TESTED BY: STB

Sampled in Accordance with ASTM D 75 and reduced in accordance with ASTM C 702 or D 421 unless otherwise noted.

SIEV	YE ANALYSIS ASTM	OF AGGREC C 136	GATES			SOIL MOISTURE DETERMINATION - ASTM D 2216
Sieve	Percent		Sieve	Percent		4.6%
Size:	Passing:	Specs:	Size:	Passing:	Specs:	4.078
4"			#4			SAND EQUIVALENT - D 2419
3"			#8			
2 1/2"			#10			
2"			#16			FRACTURED FACE - D 5821
1 1/2"			#20	100%		
1 1/4"			#30			
1"			#40	98%		FLAT AND ELONGATED - D 4791
3/4"			#50			
5/8"			#60			
1/2"			#80	42%		FINER THAN #200 - C 117
3/8"			#100	29%		7.5%
1/4"			#200	9.2%		



Annie

Dee Burrie Technical Director Signed by: adavis


1106 Ledwich Ave. Yakima, WA 98902 (509)469-3068 Office (509)469-3070 Fax

CLIENT: Shannon & Wilson PROJECT: Columbia East Pump Station & Forcemain #100610 SAMPLE SOURCE: B-2, S-8, D=17.5' MATERIAL TYPE: Native DATE SAMPLED: Client Sampled PROJECT NUMBER: 18-067 WORK ORDER #: 18-425

SAMPLE NUMBER: 18-425-9 DATE TESTED: 6/4/2018 TESTED BY: STB

Sampled in Accordance with ASTM D 75 and reduced in accordance with ASTM C 702 or D 421 unless otherwise noted.

SIEV	E ANALYSIS ASTM	OF AGGREC C 136	GATES			SOIL MOISTURE DETERMINATION - ASTM D 2216
Sieve	Percent		Sieve	Percent		0.5%
Size:	Passing:	Specs:	Size:	Passing:	Specs:	9.578
4"			#4			SAND EQUIVALENT - D 2419
3"			#8			
2 1/2"			#10			
2"			#16			FRACTURED FACE - D 5821
1 1/2"			#20	100%		
1 1/4"			#30			
1"			#40	100%		FLAT AND ELONGATED - D 4791
3/4"			#50			
5/8"			#60			
1/2"			#80	77%		FINER THAN #200 - C 117
3/8"			#100	60%		16.7%
1/4"			#200	21.3%		



REVIEWED BY:

Amie

Dee Burrie Technical Director Signed by: adavis



1106 Ledwich Ave. Yakima, WA 98902 (509)469-3068 Office (509)469-3070 Fax

CLIENT: Shannon & Wilson PROJECT: Columbia East Pump Station & Forcemain #100610 SAMPLE SOURCE: B-2, S-11, D=25' MATERIAL TYPE: Native DATE SAMPLED: Client Sampled PROJECT NUMBER: 18-067 WORK ORDER #: 18-425

SAMPLE NUMBER: 18-425-10 DATE TESTED: 6/4/2018 TESTED BY: STB

Sampled in Accordance with ASTM D 75 and reduced in accordance with ASTM C 702 or D 421 unless otherwise noted.

のでいたのないない	SIEV	E ANALYSIS ASTM	OF AGGREO C 136	BATES			SOIL MOISTURE DETERMINATION - ASTM D 2216
	Sieve Size:	Percent Passing:	Specs:	Sieve Size:	Percent Passing:	Specs:	6.4%
	4"			#4	100%		SAND EQUIVALENT - D 2419
	3"			#8			
	2 1/2"			#10	100%		
	2"			#16			FRACTURED FACE - D 5821
	1 1/2"			#20	99%		
	1 1/4"			#30			
	1"			#40	98%		FLAT AND ELONGATED - D 4791
	3/4"			#50			
	5/8"			#60			
	1/2"			#80	43%		FINER THAN #200 - C 117
	3/8"			#100	32%		14.2%
	1/4"	100%		#200	17.3%		



REVIEWED BY:

Annie

Dee Burrie Technical Director Signed by: adavis

B G	ENCHN EOLAB	IARK IS	PUALITY PUALITY			Corrosi	vity Te	ests Su	ummar	ŷ				
BGL #	¥020-	-013	-	Date	:6/14	/2018	-	Tested By:	PJ		Checked:		PJ	
Client Remarks	: Sha : All samples we	annon & Wils ere dry and re	on quired the add	Project dition of a small	:C amount of dist	columbia Eas	t Pump Stat	ion & Forcer	main	•	Proj. No:	10	0610	
Sar	nple Location	or ID	Resistiv	/ity @ 15.5 °C (0	Ohm-cm)	Chloride	Sul	fate	pН	OR	P	Sulfide	Moisture	
			As Rec.	Min	Sat.	mg/kg	mg/kg	%		(Red	ox)	Qualitative	At Test	Soil Visual Description
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	EPA 300.0	EPA 300.0	EPA 300.0	ASTM G51	ASTM G200	Temp °C	Acetate Paper	/0 ASTM D2216	
B-1	S-2	2.5-4	-	-	6,029	5	24	0.0024	8.9	539	20	Negative	8.4	Grayish Brown Silty SAND
B-2	S-5	10-11.5		-	5,878	9	27	0.0027	8.5	542	19	Negative	7.4	Grayish Brown Silty SAND
B-2	S-10	22.5-24	-	-	9,338	4	16	0.0016	8.5	534	19	Negative	5.4	Grayish Brown Silty SAND/ Sandy SILT
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			21 T		· · · ·									

APPENDIX K, Page 52 of 54 SHANNON & WILSON, INC.

APPENDIX C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

100610-001



SHANNON & WILSON, INC. Geotechnical and Environmental Consultants Attachment to and part of Report 100610-001

 Date:
 August 2018

 To:
 Mr. Robin Nelson, PE

 PACE Engineers, Inc.

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as ccess roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work 'ogether to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly eneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. Vhile a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix L

Process Water Re-Use Facility Custom Soil Resource Report Franklin County, Washington USDA Natural Resources Conservation Service This Page Is Intentionally Left Blank.







United States Department of Agriculture

Natural Resources Conservation Service A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Franklin County, Washington

Process Water Re-Use Facility



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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Soil Map	8
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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soillandscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



Custom Soil Resource Report

	MAP LE	EGEN	•	MAP INFORMATION
Area of In	terest (AOI) Area of Interest (AOI)	w	Spoil Area	The soil surveys that comprise your AOI were mapped at 1:20,00
Soils		08	Stony Spot Very Stony Spot	Warning: Soil Map may not be valid at this scale.
}	soil Map Unit Polygons Soil Map Unit Lines	\$	Wet Spot	Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil
	Soil Map Unit Points	⊲ ;	Other Snarial Lina Faaturas	placement. The maps do not show the small areas of contrastit soils that could have been shown at a more detailed scole
Special	Point Features	Motor Fo		סטוס וומן כסטומ וומאל מכלון סווסאון מו מ וווסול מלומוולם סלמולי
э і	Blowout		streams and Canals	Please rely on the bar scale on each map sheet for map
X	BOILOW PIL	Transpor	tation	measurements.
ж	Clay Spot	Ŧ	Rails	Courses of Mon. Notural Decourses Constant Service
0	Closed Depression	\$	Interstate Highways	Vieb Source or Map. Natural Resources Conservation Service Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
℅	Gravel Pit	5	US Routes	Coordinate System: Web Mercator (EPSG:3857)
0 0 0	Gravelly Spot	8	Major Roads	Maps from the Web Soil Survey are based on the Web Mercat
٩	Landfill	8	Local Roads	projection, which preserves direction and shape but distorts
R	Lava Flow	Backgro	nud	uistance and area. A projection that preserves area, such as u Albers equal-area conic projection, should be used if more accu
ų	Marsh or swamp	4	Aerial Photography	calculations of distance or area are required.
«	Mine or Quarry			This product is generated from the USDA-NRCS certified data.
0	Miscellaneous Water			the version date(s) listed below.
0	Perennial Water			Soil Survey Area: Franklin County. Washington
>	Rock Outcrop			Survey Area Data: Version 13, Sep 14, 2015
+	Saline Spot			Soil man units are labeled (as snare allows) for man snalas 1.50
°, ° ° °	Sandy Spot			or larger.
Ŵ	Severely Eroded Spot			
\$	Sinkhole			Date(s) aeriai irriages were priorographeu. Aug o, zu iu
A	Slide or Slip			The only of a state of the state of a state of the state
Ø	Sodic Spot			The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shi
				of map unit boundaries may be evident.

Map Unit Legend

	Franklin County, W	ashington (WA021)	
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
89	Quincy loamy fine sand, 0 to 15 percent slopes	13.8	37.1%
92	Quincy loamy fine sand, loamy substratum, 0 to 10 percent slopes	20.4	54.9%
128	Royal fine sandy loam, 0 to 2 percent slopes	0.8	2.2%
144	Sagemoor very fine sandy loam, 0 to 2 percent slopes	2.1	5.7%
Totals for Area of Interest		37.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Franklin County, Washington

89—Quincy loamy fine sand, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2dtt Elevation: 350 to 1,200 feet Mean annual precipitation: 6 to 12 inches Mean annual air temperature: 48 to 54 degrees F Frost-free period: 150 to 200 days Farmland classification: Farmland of statewide importance

Map Unit Composition

Quincy and similar soils: 85 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quincy

Setting

Landform: Terraces Parent material: Mixed eolian sands

Typical profile

H1 - 0 to 4 inches: loamy fine sand *H2 - 4 to 60 inches:* fine sand

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e Land capability classification (nonirrigated): 7e Hydrologic Soil Group: A Ecological site: SANDS 6-10 PZ (R007XY502WA)

Minor Components

Sagehill

Percent of map unit: 15 percent *Landform:* Terraces, dunes

92—Quincy loamy fine sand, loamy substratum, 0 to 10 percent slopes

Map Unit Setting

National map unit symbol: 2dv6 Elevation: 350 to 1,000 feet Mean annual precipitation: 6 to 9 inches Mean annual air temperature: 50 to 54 degrees F Frost-free period: 180 to 200 days Farmland classification: Farmland of statewide importance

Map Unit Composition

Quincy and similar soils: 85 percent *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Quincy

Setting

Landform: Terraces Parent material: Mixed eolian sands

Typical profile

H1 - 0 to 3 inches: loamy fine sand *H2 - 3 to 52 inches:* loamy fine sand *H3 - 52 to 60 inches:* silt loam

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e Land capability classification (nonirrigated): 7e Hydrologic Soil Group: A Ecological site: SANDS 6-10 PZ (R007XY502WA)

128—Royal fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2dfc Elevation: 400 to 1,400 feet Mean annual precipitation: 6 to 9 inches Mean annual air temperature: 50 to 54 degrees F Frost-free period: 180 to 200 days Farmland classification: Prime farmland if irrigated

Map Unit Composition

Royal and similar soils: 85 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Royal

Setting

Landform: Terraces Parent material: Sandy alluvium

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 15 inches: fine sandy loam
H3 - 15 to 60 inches: stratified fine sand to very fine sandy loam

Properties and qualities

Slope: 0 to 2 percent Depth to restrictive feature: More than 80 inches Natural drainage class: Well drained Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr) Depth to water table: More than 80 inches Frequency of flooding: None Frequency of ponding: None Calcium carbonate, maximum in profile: 15 percent Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm) Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 1 Land capability classification (nonirrigated): 6c Hydrologic Soil Group: A Ecological site: SANDY 6-10 PZ (R007XY501WA)

Minor Components

Sagehill

Percent of map unit: 15 percent Landform: Terraces

144—Sagemoor very fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2dgj Elevation: 400 to 1,000 feet Mean annual precipitation: 6 to 9 inches Mean annual air temperature: 50 to 54 degrees F Frost-free period: 180 to 200 days Farmland classification: Prime farmland if irrigated

Map Unit Composition

Sagemoor and similar soils: 90 percent Minor components: 10 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sagemoor

Setting

Landform: Terraces Parent material: Loess over layered lacustrine deposits

Typical profile

H1 - 0 to 4 inches: very fine sandy loam
H2 - 4 to 9 inches: silt loam
H3 - 9 to 18 inches: silt loam

H4 - 18 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 1 Land capability classification (nonirrigated): 6c Hydrologic Soil Group: C Ecological site: LOAMY 6-10 PZ (R007XY102WA)

Minor Components

Kennewick

Percent of map unit: 10 percent

Landform: Terraces

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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix M Capital Improvement Plan Project Descriptions PACE Engineers, Inc., June 21, 2018 This Page Is Intentionally Left Blank.





CIP NO. PWRF-1

Project Title: Irrigation Pump Station & IPS Influent Piping **Location:** Process Water Reuse Facility

PROBLEM DESCRIPTION:

The City of Pasco pretreats process water received from various vegetable processors to be discharged into a permitted land treatment system augmenting irrigation water to crops upon City-owned agricultural land. The existing irrigation pump station was designed to pump effluent from the PWRF plant site to the land treatment system located generally east/southeast of the plant site. A total of 803 MG (million gallons) of process wastewater was irrigated for land treatment reuse in the 2017 operating year and ranged from 35.7 to 96.53 MG per month in November and April, respectively. Operationally, the existing irrigation pump station has reached the end of its useful life due to the maintenance and cost of operation for the antiquated equipment in this pump station. Vertical turbine can pumps used in the station are not ideal for wastewater process flow applications since items can easily stick on the pump impellers or intake screen and cause clogging or pumping failure. The low pH of the process water and the high concentration of fine sand and soil causes abrasion and damage to the pump components so maintenance and replacement is necessary on an annual basis. The wastewater has also caused severe damage to the piping and valves on the discharge end of the pumps.

PROPOSED IMPROVEMENTS:

A new irrigation pump station with new influent piping.

DESIGN CONSIDERATIONS:

Future projected design flow pumping operations for the IPS will need to include storage basin draining and cleaning operations similar to the current PWRF plane operations in order to direct flows to the spray fields. The PWRF upgrade and expansion must have the capacity for increased flows coming from already established food processing plants in the area, including Simplot, Grimmway, and Lamb Weston in addition to those already discharging to the PWRF, and then any additional flows from new plants opening will necessitate pump replacements. Peak IPS capacity will be based on matching the projected future flows to store water over the winter and then pumped out over a 50 day period beginning in April. Any addition of pretreatment facilities at the PWRF for buffering pH and nitrogen would be able to reduce the firm capacity of the IPS considering additional well water will not be needed to augment the flow for crops in the spray fields. Since the water will be gravity fed into the wet well structure in the IPS, the structure must be a couple of feet higher than the maximum high-water level of the storage basins to reduce the likelihood of over-topping.



Influent piping from the 115 MG pond will flow via gravity. Further description and design considerations are discussed in CIP No. PWRF-9.9

PROJECT DESCRIPTION:

The primary components would include:

- 30" HDPE Gravity Drain Pipes.
- Cast-in-Place Wet Well/Dry Pit & Five Immersible Pumps.
- CMU Block Enclosure with Metal Roofing.
- Influent Piping Modifications.











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COST ESTIMATE:

A cost estimate has been prepared as follows:

Table PWRF-1-1: Estimate of IPS F	Probable Construction C	Cost
CITY OF PASCO	Date:	Project Number:
	3/5/2018	17454
PWRF - Irrigation Pump Station	Estimated	d By: PACE
Option: Wet Well / Dry Pit Pumps	Design St	tatus: 30%

LINE					
NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL
	GENERAL				
1	Mobilization/Demobilization	1	LS	\$175,000	\$175,000
2	Testing and Commissioning	1	LS	\$40,000	\$40,000
3	Construction Surveying	1	LS	\$20,000	\$20,000
4	Temporary Erosion Controls	1	LS	\$5,000	\$5,000
5	Clearing and Grubbing	0.75	ACRE	\$10,000	\$7,500
	Subtotal Genera	I			\$247,500
	PUMP STATION SITE				
6	Excavation	7074	CY	\$4	\$28,296
7	Backfill	4790	CY	\$8	\$38,320
8	Cast In-Place Wet Well/Dry Pit	804	CY	\$550	\$442,200
9	CMU Block Wall for Building	1800	SF	\$75	\$135,000
10	Wood Truss Roofing	1	LS	\$20,000	\$20,000
11	Metal Roofing and Peak Siding	1	LS	\$5,000	\$5,000
12	Building Insulation	3192	SF	\$4	\$12,768
13	Gypsum Board and Drywall	3192	SF	\$5	\$15,960
14	Interior Painting	1	LS	\$4,500	\$4,500
15	Crushed Gravel Surfacing & CSBC	150	CY	\$30	\$4,500
16	Concrete Driveway and Sidewalk	9	CY	\$350	\$3,150
17	Concrete Stairs	6	CY	\$500	\$3,000
18	Handrails	60	LF	\$50	\$3,000
19	Steel I-Beams and Posts for Traveling				
	Crane Hoist	1	LS	\$12,000	\$12,000
20	Doors and Garage Door	1	LS	\$10,800	\$10,800
21	Windows (32" high x 48" long)	7	EA	\$500	\$3,500





LINE							
NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL		
22	Bollards	5	EA	\$1,000	\$5,000		
23	4-inch Water Main Pipe	370	LF	\$45	\$16,650		
24	24-inch HDPE Gravity Drain Pipe– Up						
	to 25' Deep	100	LF	\$175	\$17,500		
	Subtotal Pump Station	n Site			\$781,144		
	PUMP STATION MECHANICAL						
25	Hidrostal Vertical Pier Mount Immersible						
	Pumps 3700 gpm, 250 Hp	3	EA	\$243,225	\$729,675		
26	Hidrostal Vertical Pier Mount Immersible						
	Pumps 1950 GPM, 150 Hp	2	EA	\$161,000	\$322,000		
27	Hidrostal Vertical Transfer Pump 1950						
	GPM, 75 Hp	1	EA	\$75,670	\$75,670		
28	HVAC - Heaters Explosion Proof	1	LS	\$18,000	\$18,000		
	Mechanical (Air Exhaust Blower &						
29	Piping for Drypit/Wet Well)	1	LS	\$15,000	\$15,000		
30	Eccentric Plug Valves	12	EA	\$6,500	\$78,000		
31	Swing Check Valves	6	EA	\$7,000	\$42,000		
32	Suction Bell Piping	1	LS	\$5,700	\$5,700		
33	Discharge Piping and Manifold	1	LS	\$28,000	\$28,000		
34	Pipe Supports and Brackets	1	LS	\$4,500	\$4,500		
35	Magnetic Flow Meter	1	LS	\$14,000	\$14,000		
36	Ultrasonic Level Indicator	1	LS	\$6,000	\$6,000		
37	2-inch Copper Water Line	100	LF	\$30	\$3,000		
38	Yard Hydrant	1	EA	\$2,000	\$2,000		
39	2-inch RPBA	1	EA	\$1,200	\$1,200		
40	Under Running Single Girder Electric						
	Traveling Crane & Hoist	1	EA	\$27,000	\$27,000		
41	Pressure Gages w/ Instrumentation	1	LS	\$7,000	\$7,000		
42	24-inch Slide Gates in Wet Well w/						
	Handwheel Floorstand	3	EA	\$10,000	\$30,000		
Subtotal Pump Station Mechanical\$1,408,745							
	PUMP STATION ELECTRICAL						
43	PUD Line Extension and Transformer	1	LS	\$95,000	\$95,000		
44	Meter Main and Disconnect	1	EA	\$5,000	\$5,000		
45	General Receptacles and Wiring	1	LS	\$12,000	\$12,000		
46	Grounding	1	LS	\$7,000	\$7,000		
47	Motor Control Center	1	LS	\$200,000	\$200,000		




LINE NO.	ITEM	QTY	UNIT			TOTAL	
48	Telemetry Panel	1	LS	\$25,000		\$25,000	
49	Programmable Logic Controller	1	LS	\$10,0	000	\$10,000	
50	Electrical Cabinets	1	LS	\$25,0	000	\$25,000	
51	Pump Disconnects Enclosures	1	LS	\$23,0	000	\$23,000	
52	Float Switches	1	LS	\$600		\$600	
53	Combustible Gas Detector	1	EA	\$2,000		\$2,000	
54	Radio Antennae mounted on building	1	LS	\$8,000		\$8,000	
55	Exterior Lighting on Building	1	LS	\$2,000		\$2,000	
56	Conduit, Receptacles, Wire,						
	Miscellaneous	1	LS	\$20,000		\$20,000	
57	Interior Lighting Building	1	LS	\$2,5	00	\$2,500	
Subtotal Pump Station Electrical						\$437,100	
		Subto	tal Cons	truction		\$2,874,489	
Contingency (design engineering, cost. Admin., and permitting (40%)						\$1,149,796	
	Washington State Sales Tax (8.6%)						
Total Estimated Construction Cost \$4,271,491							





Table PWRF-1-2: Estimate of IPS Influent Piping Probable Construction Cost								
CITY OF PASCO	Date:	Project Number:						
	09/2019	17454						
PWRF - Irrigation Pump Station Estimated By: PACE								
Option: Separated Effluent Design Status: 30%								

ITEM			APPROX.	UNIT					
NO.	DESCRIPTION OF ITEM	UNIT	QTY	PRICE	TOTAL				
1	Trench Safety System	LS	1	\$551,850.00	\$551,850.00				
2	Gravel Road Regrading	LS	1	\$40,000.00	\$40,000.00				
3	60 Mil HDPE Liner (Incl Tie-In to Existing HDPE)	LS	1	\$229,240.00	\$229,240.00				
4	HDPE Liner Install - Contractor Support	LS	1	\$5,000.00	\$5,000.00				
5	Replace HDPE Boot Sleeve	EA	2	\$450.00	\$900.00				
6	60-in. Type-1 Sewer Saddle Manhole, up to 8'								
	Deep	EA	1	\$10,500.00	\$10,500.00				
7	Gate Valve and Other Fittings	LB	500	\$10.00	\$5,000.00				
8	Crushed Rock, Bedding, Backfill	TON	8,300	\$35.00	\$290,500.00				
9	Add'l Cost per Vert. Ft. of MH Deeper than 8'	LF	80	\$500.00	\$40,000.00				
10	Excavation Incl. Haul	CY	7,150	\$40.00	\$286,000.00				
11	18-in. PVC C-900 Forcemain w/ Thrust Blocking	LF	1,215	\$100.00	\$121,500.00				
12	2-ft. x 2-ft. Anchor Trench	LF	1,700	\$5.00	\$8,500.00				
	36-in. Casing Pipe, Jack and Bore (Includes								
13	Contractor Support)	LF	100	\$725.00	\$72,500.00				
14	Concrete Pipe Penetration and Encasement	EA	1	\$2,500.00	\$2,500.00				
15	Existing Liner Removal and Disposal	LS	1	\$5,000.00	\$5,000.00				
16	24-in. PVC C-900 Sewer	LF	300	\$250.00	\$75,000.00				
17	Electric Leak Detection Testing	EA	2	\$15,000.00	\$30,000.00				
		SUBT	OTAL OF A	MOUNT BID \$	\$1.773.990.00				
	8.6% SALES TAX \$ \$152,563.14								
	5% Contingency								
		\$2,015,252.64							





Project Title: 35 MG EQ Basin Aerators **Location:** Process Water Reuse Facility

PROBLEM DESCRIPTION:

During summer months and periods of increased food processing the existing facility is subjected to higher influent flow surges. This requires equalization to act as a buffer and to allow for a constant flow through the treatment system and into the irrigation pump station. The existing 8 MG equalization pond is not large enough to equalize Phase 2 peak summer flows and will not provide sufficient retention time.

Additionally, the existing facility is anticipating increased VFAs, continued low pH, and worsening odor issues due to the increasing influent flows.

PROPOSED IMPROVEMENTS:

Equalization will be provided downstream of the new primary clarifier to prevent flow rate variability and surging in the secondary treatment system. It is proposed that the existing 35 MG pond be used for equalization at Phase 2 and beyond.

Biological treatment is the recommended approach for removing VFAs, raising pH, and eliminating odors. Installation of surface aerators in the 35 MG pond is proposed in addition to the equalization conversion. The 35 MG pond will effectively become an aerated stabilization basin (ASB) as well as an EQ basin.

DESIGN CONSIDERATIONS:

It is estimated that 20 75-hp high speed floating aerators are required to provide adequate aeration during peak summer conditions to meet the oxygen demand and provide a power density of 44 hp/MG. During peak winter operation, 13 of the 20 aerators would be operated and the power density would be less than 30 hp/MG. Aerators would be brought on and offline as needed to handle average and low flow periods.

The power density should be high enough to keep most of the solids suspended during summer operation. The biosolids produced by ASB operation would be deposited in the 115 MG storage basin. During winter season, solids will likely deposit in the 35 MG pond.





PROJECT DESCRIPTION:

The primary components would include:

- Conversion of 35 MG pond from storage to equalization.
- Twenty 75-hp high speed floating aerators





A cost estimate for the 35 MG EQ Basin conversion and installation of aerators is approximately \$5,338,000. The cost breakdown is below and includes labor, materials, equipment, engineering, installation, and tax.

LINE NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL	
1	75-hp High Speed Surface Aerators	20	EA	\$ 80,000.00	\$1,600,000.00	
2	Site Work	1	LS	\$320,000.00	\$ 320,000.00	
3	Mechanical Work	1	LS	\$240,000.00	\$ 240,000.00	
4	Electrical and Control	1	LS	\$320,000.00	\$ 320,000.00	
5	Mobilization/Demobilization	1	LS	\$160,000.00	\$ 160,000.00	
6	Contractor Overhead & Profit/Insurance	1	LS	\$240,000.00	\$ 240,000.00	
7	Construction Change Order Allowance	1	LS	\$160,000.00	\$ 160,000.00	
		\$3,040,000				
	Conting	40%	\$1,216,000			
	Washington State	8.6%	\$261,440			
Engineering, Testing, Contract Administration, Legal 27.0%				\$820,800		
	Total Estimat		\$5,338,240			











Project Title: Install Third Drum Screen & New Primary Clarifier **Location:** Process Water Reuse Facility

PROBLEM DESCRIPTION:

Current pretreatment facilities, in addition to short-term improvements, do not have the capacity for increased flow in the long-term due to expansion of services to nearby food processors. Further, existing pretreatment facilities are 25 years old and are nearing or reached their service life. Increased inorganic loading and low pH in the influent to the PWRF has accelerated the deterioration of the pretreatment facility.

PROPOSED IMPROVEMENTS:

Upgrade the treatment capacity at the PWRF immediately with the installation of a new screen, clarifier, pH adjustment, secondary treatment, solids handling, and storage.

The remainder of CIP No. PWRF-3 will discuss the installation of a new screen and a new primary clarifier.

DESIGN CONSIDERATIONS:

The peak flow rate during Phase 3 is 9.56 mgd and necessitates an additional screen to increase the capacity to a more sufficient 12.98 mgd. A third 3,000 gpm rotary screen will be installed in the headworks building between the two existing screens.

The existing sedimentation basin needs to be replaced as to maintain average surface loadings below 1,000 gpd/sf and peak day surface loadings below 1,500 gpd/sf. A 90-foot diameter primary clarifier will be installed to replace the existing sedimentation basin. The new clarifier is expected to reduce TSS to an average concentration less than 250 mg/L and maximum concentration of approximately 350 mg/L under peak conditions, while reducing BOD₅ and TN.

PROJECT DESCRIPTION:

The primary components would include:

- Installation of third 3,000 gpm rotary drum screen.
- 90-foot diameter circular primary clarifier.
- Sludge pumps.





A cost estimate for the installation of the third drum screen and new primary clarifier is approximately \$5,462,000. The cost breakdown is below and includes labor, materials, equipment, engineering, installation, and tax.

LINE NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL		
1A	Rotary Drum Screen	1	EA	\$ 635,000.00	\$ 635,000.00		
1B	Clarifier Equipment	1	LS	\$1,000,000.00	\$1,000,000.00		
2	Site Work	1	LS	\$ 327,400.00	\$ 327,400.00		
3	Mechanical Work	1	LS	\$ 245,550.00	\$ 245,550.00		
4	Electrical and Control	1	LS	\$ 327,400.00	\$ 327,400.00		
5	Mobilization/Demobilization	1	LS	\$ 163,700.00	\$ 163,700.00		
6	Contractor Overhead & Profit/Insurance	1	LS	\$ 245,550.00	\$ 245,550.00		
7	Construction Change Order Allowance	1	LS	\$ 163,700.00	\$ 163,700.00		
			\$3,110,300				
Contingency & CE 40%				\$1,244,120			
Washington State Sales Tax 8.6%				\$267,486			
Engineering, Testing, Contract Administration, Legal 27.0%				\$839,781			
	Total Estimat		\$5,461,687				







Project Title: pH Control Equipment

Location: Process Water Reuse Facility

PROBLEM DESCRIPTION:

Current pretreatment facilities, in addition to short-term improvements, do not have the capacity for increased flow in the long-term due to expansion of services to nearby food processors. Further, existing pretreatment facilities are 25 years old and are nearing or reached their service life. Increased inorganic loading and low pH in the influent to the PWRF has accelerated the deterioration of the pretreatment facility.

PROPOSED IMPROVEMENTS:

Upgrade the treatment capacity at the PWRF immediately with the installation of a new screen, clarifier, pH adjustment, secondary treatment, solids handling, and storage.

The remainder of CIP No. PWRF-4 will discuss the installation of equipment of pH adjustment.

DESIGN CONSIDERATIONS:

Magnesium hydroxide will be injected downstream of the rotary drum screens to neutralize organic acids and raise the pH in order to mitigate odors in the process wastewater. Magnesium hydroxide is widely used because it is low cost, divalent, and the increased magnesium concentration does not upset downstream processes. Magnesium hydroxide will minimize volatilization of VFAs and raise the pH but should be used secondarily to the ASB because magnesium hydroxide increases the fixed dissolved solids load to the land treatment system.

It is estimated that approximately 4 million pounds of Mg(OH)2 is required per year to raise the pH from 4.5 to 5.5 without additional fresh water dilution. Recent data suggests that the PWRF discharge pH could be as low as 3.5, meaning that nearly 9 million pounds of magnesium hydroxide would be required to reach a pH of 5.5. The installation and use of the ASB to eliminate VFAs are raise the pH will offset the quantity of magnesium hydroxide required.

PROJECT DESCRIPTION:

The primary components would include:

- pH control equipment to reduce pH and odors downstream of the rotary drum screen.
- Metering pumps and all necessary piping, valves, and appurtenances.
- Magnesium hydroxide storage tank and mixer.





A cost estimate for the pH Control Equipment is approximately \$584,000. The cost breakdown is below and includes labor, materials, equipment, engineering, installation, and tax.

LINE NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL		
1A	Storage Tank and Mixer	1	EA	\$ 125,000.00	\$ 125,000.00		
1B	Metering Pump	1	EA	\$ 50,000.00	\$ 50,000.00		
2	Site Work	1	LS	\$ 35,000.00	\$ 35,000.00		
3	Mechanical Work	1	LS	\$ 26,250.00	\$ 26,250.00		
4	Electrical and Control	1	LS	\$ 35,000.00	\$ 35,000.00		
5	Mobilization/Demobilization	1	LS	\$ 17,500.00	\$ 17,500.00		
6	Contractor Overhead & Profit/Insurance	1	LS	\$ 26,250.00	\$ 26,250.00		
7	Construction Change Order Allowance	1	LS	\$ 17,500.00	\$ 17,500.00		
Subtotal					\$332,500		
Contingency & CE			40%	\$133,000			
Washington State Sales Tax			8.6%	\$28,595			
Engineering, Testing, Contract Administration, Legal			27.0%	\$89,775			
Total Estimated Construction Cost					\$583,870		







Project Title: Solids Handling **Location:** Process Water Reuse Facility

PROBLEM DESCRIPTION:

Current pretreatment facilities, in addition to short-term improvements, do not have the capacity for increased flow in the long-term due to expansion of services to nearby food processors. Further, existing pretreatment facilities are 25 years old and are nearing or reached their service life. Increased inorganic loading and low pH in the influent to the PWRF has accelerated the deterioration of the pretreatment facility.

PROPOSED IMPROVEMENTS:

Upgrade the treatment capacity at the PWRF immediately with the installation of a new screen, clarifier, pH adjustment, secondary treatment, solids handling, and storage.

The remainder of CIP No. PWRF-5 will discuss Solids Handling improvements.

DESIGN CONSIDERATIONS:

Solids handling will include removal and disposal of larger particulate (screenings) with the existing rotary drum screens plus the addition of a 3rd identical screen, smaller settleable solids (silts and organics) will be removed from a new primary clarifier, floatable solids removed from surface skimmer in new primary clarifier, and excess biomass generated from the new Aerobic Stabilization Basin. The screenings from the rotary drum screens will discharge into the existing conveyor and on to the functioning existing FKC screw press. The solids will be dewatered and collected in a large dumpster or truck bed to be hauled away for disposal either as cattle food or disposed of at the landfill site. Similarly, the floatable solids removed from the surface of the primary clarifier would be pumped to the FKC screw press for dewatering and disposal. All flow from the dewatering process will be pumped to the 35 MG aerated stabilization basin (ASB) for further treatment.

The remaining settleable solids and biomass collected from the primary clarifier and ASB will be piped and pumped to the existing solids storage pond where it will be stored awaiting final disposal.

Solids retention in the storage pond must be limited to prevent nuisance odor emissions. Frequency of solids removal and disposal will be refined with practice and will vary seasonally. Solids should not be left to accumulate in the storage pond more than 2 -3 days before disposal methods are implemented. It is anticipated that during summer operations approximately 15,000 lbs/day of total solids will be removed and require storage and disposal.





PROJECT DESCRIPTION:

The primary components would include:

• Conveyance piping and sludge pumps to transport solids.

COST ESTIMATE:

A cost estimate for the Solids Handlings improvements is approximately \$761,800. The cost includes labor, materials, equipment, engineering, installation, and tax.







Project Title: 120 MG New Storage **Location:** Process Water Reuse Facility

PROBLEM DESCRIPTION:

Current pretreatment facilities, in addition to short-term improvements, do not have the capacity for increased flow in the long-term due to expansion of services to nearby food processors. Further, existing pretreatment facilities are 25 years old and are nearing or reached their service life. Increased inorganic loading and low pH in the influent to the PWRF has accelerated the deterioration of the pretreatment facility.

PROPOSED IMPROVEMENTS:

Upgrade the treatment capacity at the PWRF immediately with the installation of a new screen, clarifier, pH adjustment, secondary treatment, solids handling, and storage.

The remainder of CIP No. PWRF-6 will discuss storage.

DESIGN CONSIDERATIONS:

The PWRF requires 311 MG of storage by Phase 2 to hold treated process water between November 1 and March 31. The 35 MG pond is no longer available for storage, since it is to be used for equalization. The 8 MG pond which was previously used for equalization is now available for storage. This necessitates the construction of 120 MG of storage. It is recommended that all storage be constructed immediately to handle future processors.

PROJECT DESCRIPTION:

The primary components would include:

• 120 MG new storage



A cost estimate for the new 120 MG storage is approximately \$7,573,000. The cost breakdown is below and includes labor, materials, equipment, engineering, installation, and tax.

LINE NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL		
1A	HDPE Liner and Install	1	EA	\$1,250,000.00	\$1,250,000.00		
2	Site Work	1	LS	\$2,187,500.00	\$2,187,500.00		
3	Mechanical Work	1	LS	\$ 187,500.00	\$ 187,500.00		
4	Electrical and Control	1	LS	\$ 250,000.00	\$ 250,000.00		
5	Mobilization/Demobilization	1	LS	\$ 125,000.00	\$ 125,000.00		
6	Contractor Overhead & Profit/Insurance	1	LS	\$ 187,500.00	\$ 187,500.00		
7	Construction Change Order Allowance	1	LS	\$ 125,000.00	\$ 125,000.00		
			Subtotal	\$4,312,500			
Contingency & CE				\$1,725,000			
Washington State Sales Tax				\$370,875			
Engineering, Testing, Contract Administration, Legal 27.0%				\$1,164,375			
	Total Estimat		\$7,572,750				







Project Title: New Office/Lab Building **Location:** Process Water Reuse Facility

PROBLEM DESCRIPTION:

The PWRF does not have an adequate office and/or lab on site. In conjunction with the proposed improvements to the facility's capacity and operation, the City requested a building for office and lab purposes.

PROPOSED IMPROVEMENTS:

A new office and lab building will be constructed approximately 42 feet by 48 feet. The building will primarily be slab on grade construction with CMU block walls and a standard metal roof.

DESIGN CONSIDERATIONS:

The building will house necessary equipment and appurtenances to allow for rudimentary laboratory work. Additionally, the building will provide for operation personnel to have an office work space including restrooms, lockers, showers, a break/meeting room, storage, and small kitchen space. More in-depth details will be considered during the design phase.

PROJECT DESCRIPTION:

The primary components would include:

• 42' x 48' CMU building with metal roof.





CAPITAL IMPROVEMENT PROJECTS CIP NO. PWRF-7







A cost estimate for the new Office/Lab Building is approximately \$670,000. The cost includes labor, materials, equipment, engineering, installation, and tax.













Project Title: Existing 115 MG Pond Modifications and New Liner

Location: Process Water Reuse Facility

PROBLEM DESCRIPTION:

The existing 115 MG pond is nearing the end of its usable life and is in need of upgrades. The southeastern portion of the pond does not drain properly and requires significant maintenance to operate and clean properly.

PROPOSED IMPROVEMENTS:

The 115 MG pond will be fully drained and the bottom will be regraded allowing the effluent to drain to the southwest rather than draining to the east. A portion of the existing liner will be replaced with new 60-mil HDPE liner. Approximately 100 feet of 36-inch steel casing will need to be installed to allow for the pond to drain to the new IPS. The casing will be installed via jack and bore to minimize impacts to the pond embankment that would otherwise be created by open trench excavation.

DESIGN CONSIDERATIONS:

It is most effective to drain the 115 MG pond to the southwest due to the location of the new IPS. The existing effluent drain is on the east side of the pond and reusing this drain would require additional gravity line to convey flow between the pond and the IPS.

Coordination will be required during construction to allow for ample shutdown periods in order to remove the existing pond liner, regrade the bottom, and to install the new liner.

PROJECT DESCRIPTION:

The primary components would include:

- Excavation and grading of the pond bottom.
- New 60-mil HDPE liner.
- Conveyance piping and appurtenances between the existing pond and the new IPS.
- Jack and bore for a new 36" steel casing approximately 100 feet.





A cost estimate for the 115 MG	pond modifications and new liner	has been prepared as follows:
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LINE NO.	ITEM	QTY	UNIT	UNIT COST		TOTAL	
1	Trench Safety System	1	LS	\$ 5	551,850.00	\$	551,850.00
2	Gravel Road Regrading	1	LS	\$	40,000.00	\$	40,000.00
3	60 Mil HDPE Liner (incl. tie-in to exsiting liner) and install	1	LS	\$ 2	234,240.00	\$	234,240.00
4	Replace HDPE Boot Sleeve	2	EA	\$	450.00	\$	900.00
5	60-in. Type-1 Sewer Saddle Manhole, up to 8' deep	1	EA	\$	10,500.00	\$	10,500.00
6	Gate Valve and misc. fittings	500	LB	\$	10.00	\$	5,000.00
7	Crushed Rock for bedding and backfill	8300	TON	\$	35.00	\$	290,500.00
8	Add'l cost per vert. ft. of MH deeper than 8'	80	LF	\$	500.00	\$	40,000.00
9	Excavation incl. Haul	7150	CY	\$	40.00	\$	286,000.00
10	18-in. PVC C-900 Forcemain w/ Thrust Blocking	1215	LF	\$	100.00	\$	121,500.00
11	2' x 2' Anchor Trench	1700	LF	\$	5.00	\$	8,500.00
12	36-in. Casing Pipe, Jack and Bore (includes Contractor Support)	100	LF	\$	725.00	\$	72,500.00
13	Concrete Pipe Penetration and encasement	1	EA	\$	2,500.00	\$	2,500.00
14	Existing Liner Removal and Disposal	1	LS	\$	5,000.00	\$	5,000.00
15	24-in. PVC C-900 Sewer	300	LF	\$	250.00	\$	75,000.00
Subtotal						\$ 1,743,990	
Contingency & CE 40%					E 40%		\$ 697,596
	Was	hington	State Sa	les Ta	x 8.6%		\$ 149,983
Total Estimated Construction Cost					\$ 2,591,569		







CIP NO. LT-1

Project Title: Triple-Beam Towers

Location: PWRF Application Site

PROBLEM DESCRIPTION:

The City of Pasco treats and reuses process water received from various vegetable processors by application to agricultural crops using a municipality-owned irrigation system. The land treatment system consists of approximately 1,856 acres of agricultural crops that typically include alfalfa, potatoes, wheat, and grain corn on 14 center-pivot irrigated fields located about five miles northeast of Pasco. Center pivot irrigation systems are typically designed to maximize irrigation efficiency by providing just enough flow to meet peak daily evapotranspiration and avoid excess flow capacity to minimize costs. The center pivot irrigation machines can create deep wheel track ruts that cause a variety of issues including: irrigation machines getting stuck, wastewater ponding and runoff, farm equipment damage, and poor cropping. This issue is occurring for four of the center pivot irrigation machines.

PROPOSED IMPROVEMENTS:

Install triple-beam towers on approximately four spans for the four center pivot irrigation machines, so 16 triple-beam towers total.

DESIGN CONSIDERATIONS:

The triple-beam towers would distribute the weight of the irrigation machine more evenly and across a greater area of ground. This would help prevent the wheels on these towers from creating deep wheel track ruts.

PROJECT DESCRIPTION:

The primary components would include:

• 16 Triple-Beam Towers.



















A cost estimate has been prepared as follows: ~\$50,000 (total for all 16 beams). Costs provided by Valmont N.W. Costs include labor, equipment, materials, engineering, installation, and tax.











CIP NO. LT-2

Project Title: Install Variable Frequency Drive on Well #4

Location: PWRF Application Site

PROBLEM DESCRIPTION:

Supplemental fresh water (well water) is provided from groundwater wells to meet the irrigation needs of the crops. There is no variable frequency drive on Well #4 and the motor is already inverter rated. The wastewater delivery rate to the field being supplied by Well #4 is restricted due to lack of a variable frequency drive, thus reducing the optimum/maximum wastewater application. At this time, the City can only deliver about 200 gallons per minute of wastewater for blending with fresh water on the field without over-pressuring the pipe.

PROPOSED IMPROVEMENTS:

Install a Variable Frequency Drive.

DESIGN CONSIDERATIONS:

The variable frequency drive is used to adjust the flow or pressure to the actual demand. It controls the frequency of the electrical power supplied to a pump and can achieve significant power savings.

PROJECT DESCRIPTION:

The primary components would include:

• Variable Frequency Drive.





A cost estimate has been prepared as follows: \$70,000. The cost includes labor, materials, equipment, engineering, installation, and tax.







CIP NO. LT-3

Project Title: Replace Well #6 and Well #8

Location: PWRF Application Site

PROBLEM DESCRIPTION:

Supplemental fresh water (well water) is provided from groundwater wells to meet the irrigation needs of the crops. The screen in Well #6 has failed and the well is not usable at this time. After rehabilitation efforts in 2018, the well screen and structure of Well #8 still appears to be badly fouled. The well will probably last a while longer, but the screen is not stainless, was installed in the 1970s, and it is expected that further rehabilitation could damage the screen to the point of well failure.

PROPOSED IMPROVEMENTS:

Replace Well #6 and Well #8.

DESIGN CONSIDERATIONS:

The screen permits water to enter the well from the saturated soil, prevents sediment from enter the well, and serves structurally to support the underlying material.

PROJECT DESCRIPTION:

The primary components would include:

• Two Well Structures and Screens





Cost estimates have been prepared as follows: \$150,000. The cost includes labor, equipment, materials, installation, permitting, and tax







CIP NO. LT-5

Project Title: Replace Circle Pivot 7

Location: PWRF Application Site

PROBLEM DESCRIPTION:

The land treatment system consists of approximately 1,856 acres of agricultural crops that typically include alfalfa, potatoes, wheat, and grain corn on 14 center-pivot irrigated fields located about five miles northeast of Pasco. Circle Pivot 7 has degraded and needs replacing.

PROPOSED IMPROVEMENTS:

Replace Circle Pivot 7.

PROJECT DESCRIPTION:

The primary components would include:

• Circle Pivot Irrigation Machine



















A cost estimate has been prepared as follows: ~\$125,000. Costs include labor, equipment, materials, installation, and taxes. Estimate provided by Valmont N.W.










CIP NO. LT-6

Project Title: Replace Circle Pivot 5

Location: PWRF Application Site

PROBLEM DESCRIPTION:

The land treatment system consists of approximately 1,856 acres of agricultural crops that typically include alfalfa, potatoes, wheat, and grain corn on 14 center-pivot irrigated fields located about five miles northeast of Pasco. Circle Pivot 5 has degraded and needs replacing.

PROPOSED IMPROVEMENTS:

Replace Circle Pivot 5.

PROJECT DESCRIPTION:

The primary components would include:

• Circle Pivot Irrigation Machine





















COST ESTIMATE:

A cost estimate has been prepared as follows: ~\$125,000. Costs include labor, equipment, materials, installation, and taxes. Estimate provided by Valmont N.W.











CIP NO. CE-1

Project Title: Columbia East Pump Station and Forcemain

Location: N. Commercial Ave and Pasco Kahlotus Rd

PROBLEM DESCRIPTION:

Currently, in the area near Pasco-Kahlotus Road and Commercial Avenue, there are three food processors; Simplot RDO, Grimmway, and Freeze Pack, that generate a relatively large quantity of wastewater with no fecal matter, low biochemical oxygen demand (BOD), high levels of total suspended solids (TSS), high levels of inorganic solids, and low pH. Some of the process wastewater is currently transported to the City's Wastewater Treatment Plant (WWTP), and the remaining is pumped to the PWRF. The amount and quality of the wastewater being transported to the WWTP is substantial enough that it consumes a large portion of its capacity.

PROJECT DESCRIPTION:

A new below-grade pump station including cast-in-place reinforced concrete structure, two 16inch-diameter HDPE forcemains, immersible pumping system and appurtenances, heating and ventilation, electrical service, power distribution, and instrumentation and controls, housed in an electrical building with CMU block construction and a metal roof.

DESIGN CONSIDERATIONS:

The pump station inflow is defined by three distinct food processors as opposed to a basin of residential or commercial constituents therefore the maximum recorded daily flow (MDF) from each is used to estimate the flow capacity of the lift station instead of the average daily (ADF). The MDF from the three food processors range from 93 to 818 gpm and is more representative of consistent and sustained wastewater flow during periods of highest production that the pump station must be capable of processing during the summer and fall. Per Ecology standards and recommendations, sewer forcemains should be designed to keep velocities between 3.5 to 5.0 fps to limit solid settlement, but considering pre-treatment standards require that significant solids are removed prior to discharge from the facility then the minimum velocity can be approximately 3 fps with a maximum velocity of 8 fps to keep friction head-loss and maximum pressures to an acceptable level. The proposed site adjacent to the existing Municipal Kahlotus Pump Station represents a low spot within the area, but not within any flood zones, which is advantageous for the accommodation of gravity inflow lines. This also poses some risk of possible ponding and flooding in the case of pump station failure or severe weather so risk mitigation measures should include backup power generation, wetwell and gravity inlet line storage, and site grading/drainage design. Filling the site to raise the existing grade would also prevent the possibility of ponding but would require a deeper wetwell connection, larger diameter inflow lines or pumping for the food processor wastewater.







































COST ESTIMATE:

A cost estimate has been prepared as follows:

City of Pasco 17003 Columbia East Pump Station Engineer's Construction Estimate PACE Engineers, Inc. R. Nelson, P.E. 8/8/2018

Schedule of Values					
LINE				UNIT	
NO.	ITEM	QTY	UNIT	COST	TOTAL
1	Mobilization/Demobilization	1	LS	\$200,000	\$200,000
2	Testing and Commissioning	1	LS	\$20,000	\$20,000
3	Construction Surveying	1	LS	\$20,000	\$20,000
4	Temporary Erosion Controls	1	LS	\$5,000	\$5,000
5	Clearing and Grubbing	0.5	ACRE	\$10,000	\$5,000
6	Cast In-Place Wetwell/Dry Pit incl. stairs	1	LS	\$625,000	\$625,000
7	Pre-Cast Inlet Manhole, 8' dia. by 10' deep 1 E		EA	\$15,000	\$15,000
8	Chain Link Fence with Gate	350	LF	\$25	\$8,750
9	Site Grading including Gravel Borrow Backfill	3500	CY	\$20	\$70,000
10	Crushed Gravel Surfacing	240	CY	\$50	\$12,000
11	Concrete Equipment Pads & Footings	10	CY	\$250	\$2,500
12	Site Piping	1	LS	\$65,000	\$65,000
13	Wemco Immersible Pumps in place	2	EA	\$225,000	\$450,000
14	Lift Station Interior Piping, Mechanical, & Sump Pump	1	LS	\$85,000	\$85,000
15	HVAC	1	LS	\$7,500	\$7,500
16	Eccentric Plug Valve	3	EA	\$5,000	\$15,000
17	Swing Check Valve	3	EA	\$7,500	\$22,500
18	Magnetic Flow Meter & Vault	1	LS	\$80,000	\$80,000
19	Ultrasonic Level Indicator	1	EA	\$5,000	\$5,000
20	PUD Line Extension and Transformer	1	LS	\$25,000	\$25,000
21	Standby Generator, in place	1	LS	\$135,000	\$135,000
22	Manual Transfer Switch	1	LS	\$2,000	\$2,000
23	Gen Receptacles and Wiring	1	LS	\$10,000	\$10,000
24	Grounding	1	LS	\$5,000	\$5,000
25	Motor Control Center, incl. VFD's	1	LS	\$300,000	\$300,000
26	Telemetry Panel	1	LS	\$95,000	\$95,000
27	Programmable Logic Controller	1	LS	\$55,000	\$55,000
28	CMU Building	1	LS	\$175,000	\$175,000
29	Pump Disconnect Enclosure	1	LS	\$50,000	\$50,000
30	Float Switches	4	EA	\$1,500	\$6,000
31	Combustible Gas Detector	1	EA	\$2,000	\$2,000
32	Light Pole	1	LS	\$10,000	\$10,000
33	Conduit, Receptacles, Wire, Miscellaneous	1	LS	\$20,000	\$20,000
Subtotal					\$2,603,250
Washington State Sales Tax (8.6%)					\$223,880
Total Estimated Construction Cost				\$2.827.130	





Table 4.4-1 Estimate of the Probable Cost of Construction								
CITY OF PASCO	DATE:	PROJECT NUMBER:						
	6/28/2018	18424						
Columbia East Industrial Pump Station Project	ESTIMATED BY:	DESIGN STATUS:						
New 16 Inch Diameter Force Mains	PACE	Conceptual						

	ITEM	ΟΤΧ				ΤΟΤΑΙ		
NO.								
1	Mobilization/Demobilization	1	LS	\$	366.403.98	\$366.403.98		
2	Testing and Commissioning	1	LS	\$	40,000.00	\$40,000.00		
3	Construction Surveying	1	LS	\$	20,000.00	\$20,000.00		
4	Temporary Erosion Controls	1	LS	\$	15,000.00	\$15,000.00		
5	Clearing and Grubbing	3.3	ACRE	\$	10,000.00	\$33,046.37		
6	Force Main 16" High Density Polyethylene (HDPE) Pipe	58,760	LF	\$	58.30	\$3,425,708.00		
7	Trench Excavation and Backfill	58,760	LF	\$	15.00	\$881,400.00		
8	Pavement Sawcutting	2,716	LF	\$	5.00	\$13,580.00		
9	Crushed Surfacing Base Course	1896	TN	\$	22.00	\$41,709.80		
10	Crushed Surfacing Top Course	990	ΤN	\$	30.00	\$29,700.00		
11	4" HMA CI 1'2 PG 64-22	1,065	ΤN	\$	75.00	\$79,905.64		
12	Gravel Borrow for Shoulder	1,426	ΤN	\$	20.00	\$28,520.00		
13	Cement Conc. Curb and Gutter	5,000	LF	\$	21.00	\$105,000.00		
14	16" In-Line Plug Valve	10	EA	\$	5,500.00	\$55,000.00		
15	16" HDPE 45 Degree Sweep	40	EA	\$	2,700.00	\$108,000.00		
16	PWRF Screen Building Extension	1	LS	\$	105,000.00	\$105,000.00		
17	Air Release Valve Assembly	4	EA	\$	7,500.00	\$30,000.00		
	Subtotal			\$5,377,974				
Contingency & CE (20%)			\$1,075,595					
Washington State Sales Tax (8.6%)				\$462,506				
Total Estimated Construction Cost				\$6,916,074				







CIP NO. CE-2

Project Title: Grimmway Discharge Modifications

Location: 1315 Dietrich Rd, Pasco, WA 99301

PROBLEM DESCRIPTION:

Grimmway cleans and packages carrots and plans to increase operations over the next ten years, which will increase wastewater generation and BOD rates. Currently, Grimmway discharges process wastewater to the municipal Kahlotus pump station near the intersection of Commercial Avenue and Kahlotus Road, and is then pumped to a gravity line southwest of US Hwy 395 that leads to the municipal WWTP.

PROPOSED IMPROVEMENTS:

Intercept Grimmway flow at Municipal Kahlotus Pump Station inlet manhole and divert to the new Columbia East Regional Industrial Station.

DESIGN CONSIDERATIONS:

The City of Pasco provided wastewater flow records that show the MDF (Maximum Daily Flow) for Grimmway between July and August 2017, during the more active harvest season. The MDF in the records show that it was 818 gpm, which is well below the permitted maximum flow so a peaking factor (PF) of 1.15 is used to calculate the peak hourly flows (PHF) in order to provide a modest buffer above their MDF. This PF is used with the permitted maximum flow for MDF (833 gpm) in order to determine the design PHF of 960 gpm. As is common with many pump station projects, the flows will vary over time, often growing in phases or with commercial growth. However, given the already conservative design discharge flow for Grimmway, it is assumed to not change over the design life. The City of Pasco also placed a minimum and maximum pH discharge limit of 5.0 to 9.0 standard units on Grimmway's wastewater in order to reduce the likelihood of corrosion of metal surfaces. If the pump station site is filled to raise the existing grade in order to prevent the possibility of ponding, then pumping would likely be the better option for Grimmway due to the high cost for large diameter pipe construction.

PROJECT DESCRIPTION:

The primary components would include:

• 250 LF of 12-inch diameter gravity main.



















COST ESTIMATE:

A cost estimate for the Grimmway Discharge Modifications is approximately \$30,000. The cost includes labor, materials, equipment, engineering, installation, and tax.



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CIP NO. CE-3

Project Title: Simplot RDO Discharge to Columbia East PS Gravity Sewer

Location: 1825 N Commercial Ave

PROBLEM DESCRIPTION:

Columbia River Foods (CRF) had closed and has since reopened with a new name, Simplot RDO. Before its closure and up until now, Columbia River Foods had received discharge from the Freeze Pack and then pumped their wastewater through a 10-inch-diameter PVC forcemain directly to the City's PWRF to the north. The existing forcemain has been in service for 10 years and has had several spot repairs due to pipe failure over that time. The current forcemain alignment is located immediately west of the old Pasco landfill and it is unclear what the extent of VOC soil and groundwater contamination extends into the easement of the forcemain alignment. Considering all three nearby food processing plants need transport to the City's PWRF to the north, the existing forcemain does not have enough capacity for all the resultant process wastewater.

PROPOSED IMPROVEMENTS:

Simplot will redirect flow from their private lift station through the existing 8-inch forcemain connecting Freeze Pack. Flows will be reversed through this pipe to a point of connection with a new 12" gravity main directing the flow to the new Columbia East pump Station. The improvements consist of approximately 800 LF of 12" PVC pipe and two (2) manholes. Depth of gravity piping varies from 5 feet to 10 feet deep.

DESIGN CONSIDERATIONS:

Coordinate with Simplot RDO for modifications to its discharge piping. Project would be completed in conjunction with proposed modifications to Freeze Pack forcemain modifications.

PROJECT DESCRIPTION:

The primary components would include:

- 800 LF of 12-inch diameter PVC gravity main.
- 2 Manholes.



















COST ESTIMATE:

A cost estimate for the Simplot Discharge to Columbia East Pump Station Gravity Sewer is approximately \$301,000. The cost includes labor, materials, equipment, engineering, installation, and tax.









CIP NO. CE-4

Project Title: Freeze Pack Forcemain Modifications

Location: 400 Commercial Avenue

PROBLEM DESCRIPTION:

Freeze Pack operations include washing, cooking, and packaging onions. Freeze Pack currently pumps its process wastewater to the pump house formerly belonging to Columbia River Foods (CRF), now Simplot RDO, via an 8-inch-diameter forcemain discharging to Simplot RDO's wet well. Freeze Pack flows are comingled with Simplot RDO wastewater and pumped to Pasco's PWRF. It was discussed earlier the condition and maintenance challenges with the Simplot RDO forcemain.

PROPOSED IMPROVEMENTS:

Intercept 8" forcemain in Pasco-Kahlotus Road and redirect flow to new Columbia East Pump Station.

DESIGN CONSIDERATIONS:

Require coordination with Freeze Pack and Simplot RDO to conduct modifications. Simplot RDO would have to complete discharge piping modifications to reverse their flows through the existing 8-inch forcemain to Columbia East Pump Station.

PROJECT DESCRIPTION:

The primary components would include:

• 400 LF of 8-inch PVC forcemain.





























COST ESTIMATE:

A cost estimate for the Freeze Pack Discharge Modifications is approximately \$45,000. The cost includes labor, materials, equipment, engineering, installation, and tax.





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CIP NO. FW-1 Project Title: ATS Replacement

Location: E Foster Wells Rd and Industrial Way

PROBLEM DESCRIPTION:

The Foster Wells pump station is equipped with an Automatic Transfer Switch (ATS) which has been damaged and is no longer functional. Emergency power for the pump station must now be manually transferred to the on-site generator in the event of a power outage.

PROPOSED IMPROVEMENTS:

Replace the existing switchgear, ATS, and service equipment.

DESIGN CONSIDERATIONS:

In the event that the primary power fails, automatic transfer switches are necessary for quick transitions to standby power so that sewage backup does not exceed the emergency storage capacity within the wetwell, gravity inflow lines, and any additional overflow storage structures.

PROJECT DESCRIPTION:

The primary components would include:

- Coordinate with the local power utility to revise the power service to the facility.
- Demolish existing switchgear equipment and associated conductors (wire and cable) as shown on the plans.
- Provide new switchgear lineup including service entrance equipment and metering equipment per the serving utility's requirements
- Provide automatic transfer switch and connections for power, generator control and monitoring.
- Provide switchboard with distribution breakers as shown on the plans to replace the existing equipment.
- Provide wire and raceways for all equipment power and control circuits.
- Provide O&M, record drawings and training.

















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COST ESTIMATE:

A cost estimate has been prepared as follows:

ELECTRICAL CONSTRUCTION COST ES	TIMATE SHEE	ΓNO:
FOLLETT ENGINEERING, PLLC ENGINEERING & CONSULTING SEATTLE, WA 425-765-6304	BASIS F (NO D 30% D x (FINAL	OR ESTIMATE ESIGN COMPLETED) ESIGN . DESIGN)
	OTHEI	R (SPECIFY)
Project: Pasco Foster Wells PS Swgr Replace NO:	ESTIMATOR: DATE: LABOR RATE:	V FOLLETT 15-Jul-18

	QUANTITY		MAT	MATERIAL LA		LABOR	
	NO.	UNIT	PER		PER		TOTAL
SUMMARY	UNTS	MEAS.	UNIT	TOTAL	UNIT	TOTAL	COST
ELECTRICAL EQUIPMENT	1	EA	2000	\$2,000	1000	\$1,000	\$3,000
Switchgear Unit with ATS	1	EA	285,000	\$285,000	\$17,100	\$17,100	\$302,100
CONTROL PANELS (MCP)		EA	35000		6000		
OTHER CONTROL							
PANELS (terminal boxes)		EA	2000		500		
			2000		1000		
MISC. MOTOR CONTROL							
EQUIPMENT		EA	2000		500		
switches, breakers,				* • • • •		• • • • •	• · • •
contactors	1	ea	200	\$200	200	\$200	\$400
RACEWAYS AND WIRE	25	unit	600	\$15,000	500	\$12,500	\$27,500
SUBSTRUCTES			2000		1000		
INSTRUMENTATION							
MISC		EA	200		500		
ANALOG		EA	1000		500		
DISCRETE		EA	200		200		
PROGRAMMING/TESTING		HRS	2		120		
VFDS/MOTOR STARTERS							
50hp		EA	9000		2000		
COMMUNICATIONS							
EQUIPMENT		EA	1000		1500		
SITE WORK	40	unit	4	\$160	30	\$1,200	\$1,360
SUBSTRUCTURES		EA	1000		1000		
LIGHT, HVAC MISC ELEC		EA	300		100		
GENERATOR 50KW		EA	35000		5000		
		EA	4000		1500		
Utility Costs	1	EA	500	\$500	3000	\$3,000	\$3,500
SUBTOTALS				\$302,860		\$35,000	\$337,860
MISCELLANEOUS						(10)%	\$33,786





	QUAN	ΤΙΤΥ	MATERIAL		LABOR		
SUMMARY	NO. UNTS	UNIT MEAS.	PER UNIT	TOTAL	PER UNIT	TOTAL	TOTAL COST
				S	UBTOTAL		\$371,646
ТАХ						(8.8)%	\$32,705
MOBILIZATION						(2)%	\$6,757
CONTRACTOR OVERHEAD	(5)%	&	PROFIT	(10)%	=	(15)%	\$55,747
TOTAL							\$466,855







CIP NO. FW-2

Project Title: pH Adjustment/Odor Control Improvements at Foster Wells PS

Location: E Foster Wells Rd and Industrial Way

PROBLEM DESCRIPTION:

Wastewater gas that has collected in the confined space of the pump station wetwell poses risks of toxicity, underground explosions, and damage to inlet and outlet pipes. Methods for alleviating the dangers include aeration and introduction of chemical additives, as well as scented products to ameliorate the odor caused by excess wastewater gas. Further, low pH wastewater becomes corrosive, impedes the pretreatment process, and is toxic to crops used for the land treatment of wastewater.

Low pH can be attributed to wastewater residence time in long forcemains. Oxygen is consumed and formation of organic acids prevails. The wastewater becomes corrosive and reacts with metallic surfaces. Over time, the metallic fittings are compromised and begin to fail.

PROPOSED IMPROVEMENTS:

The proposed improvements include a new magnesium hydroxide feed system and equipment to provide pH adjustment and odor control at the Foster Wells PS. The feed system will include chemical storage tank, metering pump, and all necessary controls, valves, and appurtenances.

DESIGN CONSIDERATIONS:

Coordinate with Processors for downtime of the Foster Wells pump station to conduct the installation work. Sequence improvements during winter months due to anticipated lower flow rates allowing for longer downtime. Access into the wet well will be required. Probes will be required upstream and downstream of the wet well in order to monitor the pH and to send signals to dictate the metering pump speed. A flow meter is recommended to aid in proper dosage of the magnesium hydroxide. Magnesium hydroxide will be injected in the wet well to neutralize organic acids and raise the pH in order to mitigate odors. Magnesium hydroxide is widely used because it is low cost, divalent, and the increased magnesium concentration does not upset downstream processes.

PROJECT DESCRIPTION:

The primary components would include:

- Chemical storage tank and metering pump.
- Provide necessary piping and valves between storage tank and wet well.
- Provide all required probes, level sensors, and controls to ensure proper operation of the feed system.





COST ESTIMATE:

A cost estimate for the pH Adjustment and Odor Control Improvements at the Foster Wells PS is approximately \$150,000. The cost includes labor, materials, equipment, engineering, installation, and tax.









CIP NO. FW-3

Project Title: Forcemain Rehabilitation Foster Wells

Location: E Foster Wells Rd and Industrial Way

PROBLEM DESCRIPTION:

The existing Foster Wells Pump station and associated forcemain lines are subject to a host of existing repairs and maintenance issues. The pump station conveys wastewater flows from three nearby food processing plants: Pasco Processing LLC, Twin City Foods, and Reser's Fine Foods. The wastewater conveyance system consists of two 24-inch sewer mains that leads to a 36-inch sewer main then into a wetwell with four vertical turbine can sewage pumps with capacities ranging from 1,800 gpm to 3,390 gpm. Flows are pumped from the pump station to the Process Water Reuse Facility (PWRF) with two forcemains, one 16-inch and one 8-inch main. Current facilities cause longer residency times of the wastewater so it becomes more anaerobic with the pH becoming more acidic, this has devastating effects on the longevity of the pump impellers and pipeline linings at the Foster Wells Pump Station and forcemains.

PROPOSED IMPROVEMENTS:

Dig up ductile iron fittings on the forcemains and replace with either HDPE or PVC fittings with thrust restraint couplings. Smaller 8-inch-diameter 22.5, 45, and 90-degree bend fitting shall be replaced with C-900 PVC standard fitting and C-900 PVC repair couplings. Larger 16-inch fittings for bends shall be replaced with HDPE fabricated fittings and SST repair couplings with mechanical restraints like Mega-Lug, or similar.

DESIGN CONSIDERATIONS:

The corrosive nature of the wastewater, with a low pH and a high concentration of suspended solids, causes the interior lining of the existing ductile iron fittings to corrode. When similar PVC or HDPE pipe bends are used in forcemain or pump station fittings they are able to withstand the low pH as well as absorb the particle deflection energy without causing wear from the grit in the wastewater. Therefore, all the ductile iron fittings on the forcemains must be dug up and replaced with either HDPE or PVC fittings, depending on whether it is 16-inch or 8-inch forcemain pipes. Considering the ductile iron portion of the 8-inch pipe has already failed and been replaced, the 16-inch ductile iron pipe should also be replaced with 18-inch HDPE to prevent another failure. Sequence of this work will need to be developed to limit down time for processors.

PROJECT DESCRIPTION:

The primary components would include:

• Replace 8-inch and 16-inch existing ductile iron fittings with PVC or HDPE fittings and couplings along forcemain.





- Inspect if ductile iron pipes exist within the 30-inch and 24-inch steel casing pipes under Highway 395, and if so, line casing with polyethylene or replace with HDPE pipes.
- Replace existing ductile iron pipes and fittings in the manifold buried header piping on the east side of the Foster Wells Pump Station.













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COST ESTIMATE:

A cost estimate for the Foster Wells Forcemain Replacement has been prepared as follows:

LINE NO.	ITEM	QTY	UNIT	UNIT COST	TOTAL
1	Minor Changes	1	FA	\$ 50,000.00	\$ 50,000
2	Roadway Surveying	1	LS	\$ 20,000.00	\$ 20,000
3	As-built Plans	1	LS	\$ 2,500.00	\$ 2,500
4	Spill Prevention, Control and Countermeasures (SPCC) Plan	1	LS	\$ 3,000.00	\$ 3,000
5	Mobilization	1	LS	\$250,000.00	\$ 250,000
6	Project Temporary Traffic Control	1	LS	\$ 20,000.00	\$ 20,000
7	Removal of Structures and Obstructions	1	LS	\$ 7,500.00	\$ 7,500
8	Gravel Borrow including Haul for Insertion and Pullback Pit	672	CY	\$ 30.00	\$ 20,160
9	Potholing	41	EA	\$ 500.00	\$ 20,500
10	Shoring or Extra Excavation Class B for Insertion and Pull Back Pit	560	CY	\$ 50.00	\$ 28,000
11	Crushed Surfacing Base Course	660	TN	\$ 24.00	\$ 15,840
12	Crushed Surfacing Top Course	20	TN	\$ 30.00	\$ 600
13	Screened Gravel Surfacing	150	TN	\$ 30.00	\$ 4,500
14	Hot Mix Asphalt Cl. 1/2 PG 64-28	40	TN	\$ 300.00	\$ 12,000
15	Bank Run Gravel for Trench Backfill	8500	CY	\$ 18.00	\$ 153,000
16	High-Density Polyethylene (HDPE) Pipe 18" IPS DR11	12610	LF	\$ 160.00	\$ 2,017,600
17	Extra Trench Excavation	200	CY	\$ 40.00	\$ 8,000
18	Removal and Replacement of Unsuitable Materials	300	CY	\$ 55.00	\$ 16,500
19	36" Steel Casing by Jack and Bore	290	LF	\$ 850.00	\$ 246,500
20	Plug Valve	10	EA	\$ 20,000.00	\$ 200,000
21	Connection to Foster Wells Pump Station	1	LS	\$210,000.00	\$ 210,000
22	Air Vacuum Valve Assembly	11	EA	\$ 7,500.00	\$ 82,500
23	Moving Existing Hydrant	1	EA	\$ 1,000.00	\$ 1,000
24	Water Pollution and Erosion Control	1	LS	\$ 15,000.00	\$ 15,000
25	Topsoil, Type A	490	CY	\$ 15.00	\$ 7,350
26	Property Restoration	1	FA	\$ 25,000.00	\$ 25,000
	Subtotal				\$3,437,050
	Contingence	y & CE	20%		\$687,410
	Washington State Sa	ales Tax	8.6%		\$295,586
	Total Estimated Construction Cost				\$4,420,046



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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

> Appendix N Capital Cost Estimates CH2M

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APPENDIX N CAPITAL COST ESTIMATES

OASD/SDN Alternative capital cost Estimate	
Description	Cost
Rotary Drum Screen	\$ 238,000
Concrete Circular Clarifier	\$ 1,436,669
pH Adjustment	\$ 150,000
EQ Basin Aerators	\$ 345,000
Ambient Temperature UASB	\$ 5,212,934
Pilot Study	\$ 75,000
Equipment	\$ 3,795,000
Biogas Flare and Boiler	\$ 359,185
SBR Reactor A	\$ 1,386,589
SBR Reactor B	\$ 1,386,589
SBR Blowers	\$ 612,685
EQ Pump Station	\$ 725,975
SBR Feed Pump Station	\$ 739,752
Solids Applied Directly To Fields	\$ 761,800
350 MG Storage	\$ 9,622,000

UASB/SBR Alternative Capital Cost Estimate

Subtotal Equipment Costs	\$ 22,978,000
Overall Site Work	\$ 4,595,600
Mechanical Work	\$ 3,446,700
Electrical and Control	\$ 4,595,600
Mobilization/Demobilization	\$ 2,297,800
Contractor Overhead & Profit/Insurance	\$ 3,446,700
Construction Change Order Allowance	\$ 2,297,800

Subtotal Construction Costs	\$ 43,658,200
Тах	\$ 3,754,605
Contingency	\$ 13,097,460
Engineering, Testing, Contract Administration, Legal	\$ 11,787,714

Total Capital Costs (Phase 3 Winter)	\$ 72,298,000



APPENDIX N CAPITAL COST ESTIMATES

Description	Cost
Rotary Drum Screen	\$ 238,000
Concrete Circular Clarifier	\$ 1,436,669
pH Adjustment	\$ 150,000
EQ Basin Aerators	\$ 345,000
UBOX	\$ 5,977,484
UBOX Blowers	\$ 1,305,366
MBBR:	\$ 1,307,439
Biogas Flare	\$ 224,988
EQ Pump Station	\$ 739,752
UBOX Effl. Pump Station	\$ 739,752
Solids Applied Directly To Fields	\$ 761,800
350 MG Storage	\$ 9,622,000

UBOX/MBBR Alternative Capital Cost Estimate

Subtotal Equipment Costs	\$ 22,849,000
Overall Site Work	\$ 4,569,800
Mechanical Work	\$ 3,427,350
Electrical and Control	\$ 4,569,800
Mobilization/Demobilization	\$ 2,284,900
Contractor Overhead & Profit/Insurance	\$ 3,427,350
Construction Change Order Allowance	\$ 2,284,900

Subtotal Construction Costs	\$ 43,413,100
Тах	\$ 3,733,527
Contingency	\$ 13,023,930
Engineering, Testing, Contract Administration, Legal	\$ 11,721,537

Total Capital Costs (Phase 3 Winter)	\$ 71,892,000
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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix O Impacts of Increased Grimmway Flow & Loading On Cost Allocations FCS Group, March 25, 2019





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APPENDIX O

Impacts of Increased Grimmway Flow and Loading on Cost Allocations

Prepared For: Grimmway Farms

- Prepared by: PACE Engineers, Inc. FCS Group
- Date: March 25, 2019

Capital Cost Impacts:

An analysis of the flow and loading potential for increasing discharge from the Grimmway Plant, Pasco, WA was completed and findings and conclusions were summarized in the technical memorandum herewith. The Land Treatment system can reliably treat the additional flow requested by Grimmway with or without the use of the 3 MG equalization pond. However, certain pretreatment process trains are impacted and would require additional capacity. As presented in Table 7 – Summary of Required Equipment, only the storage capacity and solids handling process trains are impacted. The total annual storage volume increases to170 MG required and Solids production increasing to 16,168,186 lbs/year. This capital cost impact is presented in Table 6 – Cost Comparison.

CIP Matrix Revisions:

The Capital Improvements matrix provided with the Capital Facilities/Engineering Report, dated October 1, 2018 was revised including the cost refinements, corrections, and removal of biological treatment from Phase 2. Further, all Phase 3 biological treatment costs are not allocated to the Phase 2 processors, as their treatment and disposal needs are satisfied with the current system in place. Table 8 summarizes the revised Capital Improvements program for the Pasco PWRF.

Table No. 9 was prepared to reflect the cost impacts defined in table 7 of the Jacobs memorandum, dated March 15, 2019. Only the pretreatment costs change from \$26,702,269.00 to \$31,547,936.00. The main difference between table 8 and table 9 are the increased cost for additional storage and increase solids handling strictly a result of the future flow request from Grimmway Farms.

Cost Allocations:

Grimmway flow/loadings increases impact not only the capital costs, but the cost allocation parameters, and percentages for each processor. The following spreadsheets will show three tables for each scenario: revenue requirement/annual cost allocations, proportional allocation percentages and finally, allocation parameters.

PACE Engineers, Inc. 11255 Kirkland Way | Suite 300 Kirkland, Washington 98033-3417 p 425.827.2014 | f 425.827.5043 March 25, 2019 Page 2 of 2

Scenario 1 is the initial phase II analysis that was presented to the processors on 11/7/18 – signified by the grey boxes.

Scenario 2 will show the cost allocations associated with the revised capital costs that represent no changes to the flow and loadings for Grimmway – signified by the blue boxes. Scenario 2 summarizes reductions in the overall annual cost allocations for the Phase 2 processors compared to the original 11/7/18 matrix. The annual total for all processors decreases from \$11,346,827.00 to \$8,716,074.00, or approximately 23 percent. Since the allocation parameters and allocation factors remain unchanged, the only variable s the CIP costs

Scenario 3 will show the cost allocations associated with the revised capital costs that represent elevated flow/loadings for Grimmway – represented by the green boxes. Scenario 3 represents the annual cost allocations as a result of the Grimmway request to increase flow and loading. In this scenario, both the cost matrix is increased and the allocation parameters, and allocation factors are revised. The annual total for all customers is \$8,998,551.00 increasing approximately 3.0 percent above scenario 2.

Summary:

It is possible for the existing Land Treatment system at the PWRF treat and dispose of the proposed future flows proposed by Grimmway. This increase will only impact available storage capacity and solids handling pretreatment costs. Scenario 3 increases their annual cost allocation to \$2,140,112. However, scenario 3 allows Grimmway to avoid future lease costs for the DAF and MBBR. The annual lease costs were not made available to the consultant team, therefore, we cannot comment on the overall savings realized this represents. It is recommended Grimmway consider keeping the 3 MG equalization pond active as it does have value buffering peak flows and lowering BOD, Nitrogen, and TSS values.





Table 10: Cost Allocation Comparison

Allocation Summary - Original Phase II Version - Presented 11/7/18 to Processors									
Class	Customer	Existing Debt Service	Future Debt Service	Depreciation Funding	Flow	Nitrogen	TSS	BOD	Total
Reser	\$ 165,146	\$ 210,167	\$ 536,013	\$ 56,381	\$ 126,832	\$ 50,416	\$ 165,456	\$ 20,089	\$ 1,330,500
Pasco Processing	165,146	353,165	1,822,278	274,537	617,586	116,101	404,936	21,239	3,774,989
TCF	165,146	149,536	961,264	149,282	335,817	95,721	60,576	17,234	1,934,575
Freeze Pack	165,146	-	201,968	18,580	41,797	11,864	33,937	1,703	474,995
Simplot	165,146	308,824	1,080,482	103,792	233,487	34,816	151,888	44,346	2,122,780
Grimmway	165,146	-	1,126,833	102,511	230,604	28,668	47,306	7,917	1,708,986
Total	\$ 990,874	\$ 1,021,692	\$ 5,728,838	\$ 705,083	\$ 1,586,124	\$ 337,587	\$ 864,100	\$ 112,529	\$ 11,346,827

Allocation Summary - Revised Capital Costs - Same Flow/Loadings

Class	Customer	Existing Debt Service	Future Debt Service	Depreciation Funding		Flow	Nitrogen	TSS	BOD	Total
Reser	\$ 130,580	\$ 5 210,167	\$ 281,001	\$ 56,381	9	\$ 126,838	\$ 47,564	\$ 168,260	\$ \$ 18,953	\$ 1,039,744
Pasco Processing	130,580	353,165	964,406	274,537		617,613	109,534	411,797	20,038	2,881,671
TCF	130,580	149,536	536,615	149,282		335,832	90,306	61,602	16,259	1,470,013
Freeze Pack	130,580	-	123,627	18,580		41,799	11,193	34,512	1,607	361,897
Simplot	130,580	308,824	666,984	103,792		233,497	32,846	154,462	41,837	1,672,823
Grimmway	130,580	-	743,597	102,511		230,614	27,047	48,108	7,470	1,289,926
Total	\$ 783,481	\$ 5 1,021,692	\$ 3,316,231	\$ 705,083	\$	\$ 1,586,191	\$ 318,490	\$ 878,741	\$ \$ 106,163	\$ 8,716,074
Change vs. Original	(207,392)	-	(2,412,607)	-		68	(19,097)	14,641	(6,366)	(2,630,753)

Allocation Summary - Revised Capital Costs - Revised Grimmway Flow/Loadings

Class	Cu	stomer	Existing Debt Service	Future I Servio	Debt ce	Depreciation Funding	Flow	Nitrogen	TSS	BOD	Total
Reser	\$	133,698	\$ 210,167	\$	276,555	\$ 46,872	\$ 105,298	\$ 46,831	\$ 146,341	\$ 17,097	\$ 982,860
Pasco Processing		133,698	353,165	ę	969,409	228,237	512,730	107,846	358,153	18,076	2,681,314
TCF		133,698	149,536	ę	551,069	124,105	278,801	88,915	53,577	14,667	1,394,369
Freeze Pack		133,698	-		102,211	15,447	34,701	11,021	30,016	1,449	328,542
Simplot		133,698	308,824	ł	544,278	86,288	193,844	32,340	134,341	37,740	1,471,353
Grimmway		133,698	-	1,*	136,746	204,135	458,585	37,767	149,971	19,211	2,140,112
Total	\$	802,188	\$ 1,021,692	\$ 3,5	580,268	\$ 705,083	\$ 1,583,958	\$ 324,721	\$ 872,400	\$ 108,240	\$ 8,998,551



Table 11: Proportional Allocations

	Customer	Existing Debt	New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounts	Current Split	% of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Current Spin	Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	16.7%	20.6%	9.4%	8.0%	8.0%	14.9%	19.1%	17.9%
Pasco Processing	16.7%	34.6%	31.8%	38.9%	38.9%	34.4%	46.9%	18.9%
TCF	16.7%	14.6%	16.8%	21.2%	21.2%	28.4%	7.0%	15.3%
Freeze Pack	16.7%	0.0%	3.5%	2.6%	2.6%	3.5%	3.9%	1.5%
Simplot	16.7%	30.2%	18.9%	14.7%	14.7%	10.3%	17.6%	39.4%
Grimmway	16.7%	0.0%	19.7%	14.5%	14.5%	8.5%	5.5%	7.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

	Customer	Existing Debt	New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounto	Current Split	% of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Current Spin	Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	16.7%	20.6%	8.5%	8.0%	8.0%	14.9%	19.1%	17.9%
Pasco Processing	16.7%	34.6%	29.1%	38.9%	38.9%	34.4%	46.9%	18.9%
TCF	16.7%	14.6%	16.2%	21.2%	21.2%	28.4%	7.0%	15.3%
Freeze Pack	16.7%	0.0%	3.7%	2.6%	2.6%	3.5%	3.9%	1.5%
Simplot	16.7%	30.2%	20.1%	14.7%	14.7%	10.3%	17.6%	39.4%
Grimmway	16.7%	0.0%	22.4%	14.5%	14.5%	8.5%	5.5%	7.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Revised Proportional Allocations:

	Customer	Existing Debt	New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounts	Current Split	% of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Current Spin	Capital	Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	16.7%	20.6%	7.7%	6.6%	6.6%	14.4%	16.8%	15.8%
Pasco Processing	16.7%	34.6%	27.1%	32.4%	32.4%	33.2%	41.1%	16.7%
TCF	16.7%	14.6%	15.4%	17.6%	17.6%	27.4%	6.1%	13.6%
Freeze Pack	16.7%	0.0%	2.9%	2.2%	2.2%	3.4%	3.4%	1.3%
Simplot	16.7%	30.2%	15.2%	12.2%	12.2%	10.0%	15.4%	34.9%
Grimmway	16.7%	0.0%	31.8%	29.0%	29.0%	11.6%	17.2%	17.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%



Table 12: Allocation Factors

	Customer	Ex	isting Debt		New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounto	<u></u>	urrant Calit	%	6 of Future	Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS	Current Spin		Capital		Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	1	\$	210,285	\$	536,013	176	176	83,331	1,435,511	1,502,926
Pasco Processing	1		353,364		1,822,278	857	857	191,900	3,513,254	1,588,965
TCF	1		149,620		961,264	466	466	158,214	525,559	1,289,336
Freeze Pack	1		-		201,968	58	58	19,610	294,440	127,395
Simplot	1		308,997		1,080,482	324	324	57,546	1,317,794	3,317,575
Grimmway	1		-		1,126,833	320	320	47,385	410,434	592,317
Total	6	\$	1,022,266	\$	5,728,838	2,201	2,201	557,986	7,496,992	8,418,514

	Customer	Existing Debt			New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounts	Accounts Current Split		% of Future Capital		Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS					Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	1	\$	210,285	\$	281,001	176	176	83,331	1,435,511	1,502,926
Pasco Processing	1		353,364		964,406	857	857	191,900	3,513,254	1,588,965
TCF	1		149,620		536,615	466	466	158,214	525,559	1,289,336
Freeze Pack	1		-		123,627	58	58	19,610	294,440	127,395
Simplot	1		308,997		666,984	324	324	57,546	1,317,794	3,317,575
Grimmway	1		-		743,597	320	320	47,385	410,434	592,317
Total	6	\$	1,022,266	\$	3,316,231	2,201	2,201	557,986	7,496,992	8,418,514

Revised Allocation Factors

	Customer	Ex	isting Debt		New Debt	Depreciation	Flow	Nitrogen	TSS	BOD
Processor	# of Accounts	Current Split		% of Future Capital		Max Flow	Max Flow	Design	Design	Design
	# OF ACCOUNTS					Design	Design	Lbs/Year	Lbs/Year	Lbs/Year
Reser	1	\$	210,285	\$	276,555	176	176	83,331	1,435,511	1,502,926
Pasco Processing	1		353,364		969,409	857	857	191,900	3,513,254	1,588,965
TCF	1		149,620		551,069	466	466	158,214	525,559	1,289,336
Freeze Pack	1		-		102,211	58	58	19,610	294,440	127,395
Simplot	1		308,997		544,278	324	324	57,546	1,317,794	3,317,575
Grimmway	1		-		1,136,746	767	767	67,202	1,471,120	1,688,740
Total	6	\$	1,022,266	\$	3,580,268	2,648	2,648	577,803	8,557,678	9,514,937



Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix P SEPA Environmental Checklist PACE Engineers, Inc., September 27, 2018 This Page Is Intentionally Left Blank.







Community Development Department PO Box 293, 525 N 3rd Ave, Pasco, WA 99301 P: 509.545.3441 / F: 509.545.3499

DETERMINATION OF NON-SIGNIFICANCE

Description of Proposal: The proposed Process Water Reuse Facility (PWRF) Capital Facilities Plan, which includes planning, engineering, environmental review, and construction of the Columbia East Regional Pump Station and Forcemain, Foster Wells Forcemain, Irrigation Pump Station, pretreatment facilities upgrades, and land treatment system improvements.

Proponent: City of Pasco 525 N 3rd Ave Pasco, WA 99301

Location of Proposal: The Process Water Reuse Facility is located at 957 E Foster Wells Road (Parcel #113-090-085) in Franklin County, Washington, north of the City of Pasco.

Lead Agency: City of Pasco

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

□ This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS. Appeals must be filed within 14 days of this determination.

Responsible Official: Rick White

Position/Title: Community & Economic Development Director

Address: PO Box 293, Pasco, WA 99301-0293

Phone: (509) 545-3441

Date: 12/10	0/2019	1	
Signature:	Ru	Inte	12/10/19

ED Number: SEPA2019-058



COMMUNITY DEVELOPMENT DEPARTMENT P.O. Box 293, 525 North Third Avenue, Pasco, Washington 99301 (509) 545-3441/ Fax (509) 545-3499

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to <u>all parts of your proposal</u>, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the <u>SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS</u> (<u>part D</u>). Please completely answer all questions that apply and note that the words "project, applicant," and "property or site" should be read as "proposal, proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background

- **1. Name of proposed project, if applicable:** *Process Water Reuse Facility, Capital Facilities Plan*
- **2.** Name of applicant: *City of Pasco*
- 3. Address and phone number of applicant and contact person:

525 N. 3rd Ave PO Box 293 Pasco, WA 99301 (509) 544-3444 Steve Worley, P.E. Public Works Director

- **4.** Date checklist prepared: *September 26, 2018*
- **5.** Agency requesting checklist: *City of Pasco*

Franklin County

- **6. Proposed timing or schedule (including phasing, if applicable):** *The plan is scheduled to be approved by the City Council on*
- 7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

The facilities plan discusses the City's plans for engineering, environmental review and construction of the Columbia East Regional Pump Station and Forcemain, Foster Wells Forcemain, Irrigation Pump Station, pretreatment facilities upgrades, and land treatment system improvements. A separate SEPA checklist will be prepared for the individual projects as required.

- 8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
 - A Geotechnical Design Memo for the Irrigation Pump Station has been prepared by CH2M, dated June 14, 2018
 - A Geotechnical Engineering Report for the Columbia East Lift Station has been prepared by Shannon & Wilson, dated August 6, 2018
 - CES Land Treatment System Engineering Report, August 2018
- 9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

None known.

10. List any government approvals or permits that will be needed for your proposal, if known.

Franklin County Approval Washington State Department of Ecology approval

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in

this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The City of Pasco has determined the need for planning, engineering, and construction of projects that address both immediate and future facility needs of the Process Water Reuse Facility (PWRF) and facilities servicing it. The projects include planning, engineering, environmental review and construction of the Columbia East Regional Pump Station and Forcemain, Foster Wells Forcemain, Irrigation Pump Station, pretreatment facilities upgrades, and land treatment system improvements. Many key components within the current PWRF facilities are nearing or have exceeded their original design capacity and there is significant demand from current users for expansion as well as strong interests from others to access the facility for expansion purposes.

The CIP includes modifications to the existing facility to accommodate Phase 3 future flows and loadings, reduce odors, and provide additional storage onsite. The modifications include the following facilities:

- headworks screens
- primary treatment
- odor control, including pH adjustment and aeration
- anaerobic and aerobic secondary treatment
- solids handling
- storage

Two secondary treatment alternatives were evaluated:

- Alternative 1: Upflow Anaerobic Sludge Blanket (UASB) followed by Sequencing Batch Reactor (SBR)
- Alternative 2: Paques' UBOX followed by Moving Bed Biofilm Reactor (MBBR)
- 12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The PWRF is located on a 40 acre parcel north of the City of Pasco, east of Highway 395. The site address is 957 East Foster Wells Rd, Pasco WA 99301. The Parcel Number is 113090085. The site is located within the southwest quarter of Section 4, Township 9, Range 30, in Franklin County, Washington.

The service area for the PWRF includes the Foster Wells Service Area and the Columbia East Service Area, which consists of existing and future food processors that will send their vegetable process waste to the PWRF.

B. Environmental Elements

1. Earth

 a. General description of the site: (circle one): Flat, rolling, hilly, steep slopes, mountainous, other ______

b. What is the steepest slope on the site (approximate percent slope)? *Up to 15 percent*

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

The soils were observed onsite by a CES soils scientist and were found to predominantly consist of mixed eolian sands, with minor portions of underlying glaciofluvial deposits. Additional soils consisting of sandy alluvium and loess over layered lacustrine deposits make up approximately 10% of the remaining soils. The soil textures across the site are predominantly loamy fine sand or sandy loam surface soils underlain by fine sand or loamy fine sand.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

None known.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Does not apply to this facilities plan. Filing, excavation and grading may be required for some or all of the proposed projects, quantities unknown, that would affect some areas and will be reviewed individually during the design phase.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Not as a result of this facilities plan. Erosion could occur as a result of construction of proposed projects identified in the plan and appropriate erosion control measures would be addressed in the design phase of individual projects.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

None as a result of this facilities plan. Development of the proposed projects could increase the amount of impervious surfaces within the City. Increases in impervious surfaces would be addressed during the design phase of individual projects.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Does not apply to this facilities plan.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

None as a result of this facilities plan. Emissions from construction equipment and dust are anticipated during construction of the proposed projects discussed in the Plan and would be addressed at time of development.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any: *Does not apply to this facilities plan.*

3. Water

- a. Surface Water:
 - Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

There are no surface water bodies or wetlands mapped within the site boundaries, with the exception of the PWRF water storage basins. To the southeast of the site, just outside the eastern site boundary, there is an intermittent stream that flows toward the southwest in Lower Smith Canyon.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Does not apply to this Facilities Plan. Fill and dredge material would not be placed or removed from any water body.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No. Surface water withdrawals or diversions would be addressed as part of the environmental analysis associated with specific projects as required.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

- b. Ground Water:
 - 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No groundwater would be withdrawn or discharged as a result of this facilities plan or the proposed projects discussed in the plan.
2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Does not apply. Waste material would not be discharged into the ground from septic tanks or other sources as a result of this plan or the proposed facility improvements.

- c. Water runoff (including stormwater):
 - 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Does not apply to this facilities plan. Runoff quantities and sources would be addressed as part of the environmental analysis associated with the specific projects discussed in the plan as needed.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Not as a result of this facilities plan.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No. Drainage patterns that could be affected by development proposed in the facilities plan would be addressed as part of the environmental analysis associated with specific projects.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Does not apply. Approval of this facilities plan will have no affect on surface, ground or runoff water or drainage patterns in the area.

4. Plants

- a. Check the types of vegetation found on the site:
 - _____ deciduous tree: alder, maple, aspen, other
 - _____ evergreen tree: fir, cedar, pine, other
 - ____ shrubs
 - ____ grass
 - ____ pasture
 - __X_ crop or grain
 - Orchards, vineyards or other permanent crops.
 - wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
 - _____ water plants: water lily, eelgrass, milfoil, other
 - _____ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

No vegetation will be removed as a result of this facilities plan. Vegetation removal is not anticipated and would be addressed during the design phase of the individual projects.

c. List threatened and endangered species known to be on or near the site. *None known*.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Does not apply to this facilities plan.

e. List all noxious weeds and invasive species known to be on or near the site. The Early Detection & Distribution Mapping System website lists six possible species known to be within Franklin County. However, there are no known species within the area discussed in the facilities plan.

5. Animals

- a. <u>List</u> any birds and <u>other</u> animals which have been observed on or near the site or are known to be on or near the site.
- b. Examples include:

birds: *hawk*, heron, *eagle*, *songbirds*, other: mammals: *deer*, bear, elk, beaver, other: fish: bass, salmon, trout, herring, shellfish, other:

c. List any threatened and endangered species known to be on or near the site. *None known*.

d. Is the site part of a migration route? If so, explain. *Yes, Pasco is within the Pacific Flyway migration route.*

e. Proposed measures to preserve or enhance wildlife, if any:

Does not apply; impacts to wildlife are not anticipated.

f. List any invasive animal species known to be on or near the site. *None known.*

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

No energy resources will be required for the facilities plan. Energy resource needs for the proposed projects discussed in the Plan will be addressed on an individual basis

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Does not apply to this plan. Energy conservation features would be discussed on an individual basis.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

There are no environmental health hazards associated with this plan. There is a potential for health hazards during construction activities that would be discussed on an individual project basis.

1) Describe any known or possible contamination at the site from present or past uses.

None known.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

There are no hazardous chemicals/conditions that might affect approval of the facilities plan. Any environmental health risk associated with development discussed in the plan would be addressed on an individual basis, under the jurisdiction of the City of Pasco or other controlling jurisdictions.

 Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Does not apply to this facilities plan.

4) Describe special emergency services that might be required. *No special emergency service needs are anticipated.*

5) Proposed measures to reduce or control environmental health hazards, if any: *Does not apply to this facilities plan. No environmental health hazards would be created as a result of this plan. The potential for environmental and health hazards will be addressed on an individual project basis.*

- b. Noise
 - 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

None as a result of this facilities plan. A temporary increase in noise levels may be associated with construction of the proposed improvements. Noise impacts created by construction will be addressed as part of the environmental analysis associated with specific projects.

3) Proposed measures to reduce or control noise impacts, if any: *Does not apply; approval of the facilities plan will not produce noise impacts.*

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The current use of the site discussed in the facilities plan is the existing processing facility. The surrounding areas are agricultural fields.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

The process facility site has been used to process water from vegetable process facilities. The area around the process facility consists of 1,856 acres of irrigated agricultural crop fields. No working farmlands will be converted as a result of this plan.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

The proposal will result in a facilities plan that discusses improvements to the existing waste process facility and will have no affect on surrounding working farmlands.

c. Describe any structures on the site.

Structures on site include the treatment pond, pump station and treatment facilities.

d. Will any structures be demolished? If so, what? *No*.

e. What is the current zoning classification of the site? *Light industrial.*

f. What is the current comprehensive plan designation of the site? *Industrial.*

g. If applicable, what is the current shoreline master program designation of the site?

Does not apply. There are no shorelines of the state within the plan area.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

No.

i. Approximately how many people would reside or work in the completed project? *The completed facility improvements could add between 250 and 400 jobs to the area.*

j. Approximately how many people would the completed project displace? *None*.

k. Proposed measures to avoid or reduce displacement impacts, if any: *Does not apply*.

I. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The facilities plan discusses improvements to the City's existing process facility, which will support existing land uses.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

Improvements to the City's processing facilities is compatible with the nearby agricultural lands use and will continue to process waste from the surrounding areas, while also increasing the facility's capacity.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, mid-dle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any: *Does not apply. There will be no impacts to housing.*

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Does not apply to this facilities plan. Heights of proposed structures would be addressed on an individual project basis as they apply.

b. What views in the immediate vicinity would be altered or obstructed? *Does not apply to this facilities plan.*

c. Proposed measures to reduce or control aesthetic impacts, if any: *Does not apply to this facilities plan. The plan will have no impacts on aesthetics.*

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None as a result of this plan. Light and glare impacts will be addressed on an individual project basis.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Does not apply to this plan. Light and glare impacts would be addressed on an individual project basis.

c. What existing off-site sources of light or glare may affect your proposal? *None*.

d. Proposed measures to reduce or control light and glare impacts, if any: *Does not apply. Approval of this facilities plan will have no light or glare impacts.*

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinitv?

There are no recreational opportunities in the immediate vicinity of the plan area.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: Does not apply.

13. Historic and cultural preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.

No.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

None known.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

A search of Department of Archeological and Historic Preservation WISAARD data and maps was conducted.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

Does not apply. There will be no impacts to resources as a result of this plan.

14. Transportation

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

The site is served by E. Foster Wells Road to the south, which can be accessed from SR 395 to the west.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

No. The nearest transit service is the Pasco Intermodal Transit station located about four miles to the southwest of the facilities site.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

None as a result of this facilities plan. Parking for the process facility improvements will be addressed on an individual project basis.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Does not apply. Approval of this facilities plan would not generate additional vehicular trips. Traffic impacts of the proposed facility improvements will be addressed on an individual project basis.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

Improvements proposed in the facilities plan will result in a beneficial affect to the surrounding agricultural uses by providing increased vegetable process waste capacity.

h. Proposed measures to reduce or control transportation impacts, if any: *Does not apply. The facilities plan and the proposed improvements will have no impacts on transportation.*

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any. *Does not apply. The facilities plan will have no affect on public services.*

16. Utilities

- a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____
- b. Describe the utilities that are proposed for the project, the utility providing the service and the general construction activities on the site or in the immediate vicinity which might be needed.

Utilities are not proposed. The facilities plan discusses the Capital Improvement Plan for the City of Pasco PWRF, which includes modifications to the existing processing facility to accommodate future flows.

RESOURCES:

- Geotechnical Design Memo Irrigation Pump Station, CH2M, June 2018
- City of Pasco, 2007 Comprehensive Plan
- Capital Facilities Plan, Engineering report, Volume 1, PACE Engineers, CH2M, FCS Group, August 2018
- Land Treatment System Engineering Report, CES, August 2018
- A Geotechnical Engineering Report for the Columbia East Lift Station has been prepared by Shannon & Wilson, dated August 6, 2018

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:	
Name of signee:	
Position and Agency/Organization:	

Date Submitted: _____

Community & Economic Development Department

This application was reviewed by the Planning Division of the Community & Economic Development Department. Any comments or changes made by the Department are entered in the body of the checklist and contain initials of the reviewer.

Reviewer Signature

Date

D. Supplemental sheet for nonproject actions

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The Facilities Plan will not result in adverse or increased environmental impacts. Future projects discussed in the Plan would strive to reduce the likelihood of adverse environmental impacts and would have to comply with the requirements of the jurisdiction in which they are located.

Proposed measures to avoid or reduce such increases are: *Does not apply to the proposed action.*

2. How would the proposal be likely to affect plants, animals, fish, or marine life? *The facilities and the improvement projects planned will not affect plants, animals, fish or marine life.*

Proposed measures to protect or conserve plants, animals, fish, or marine life are: *Does not apply.*

3. How would the proposal be likely to deplete energy or natural resources?

The Facilities Plan will not deplete energy or natural resources. Improvements to the process facility could require the use of construction materials and the use of electricity and would be assessed on an individual project basis.

Proposed measures to protect or conserve energy and natural resources are: Does not apply to this plan. Efficient planning, design, equipment and operation of the process facility will be accomplished in a manner that conserves energy as much as possible for the individual projects.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Approval of the facilities plan would have no affect on environmentally sensitive areas and will benefit agriculture and the area economy.

Proposed measures to protect such resources or to avoid or reduce impacts are: The proposed facility improvements would be consistent with the regulations and policies govering the protection of farmlands and the environment.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Approval of the Facilities Plan would not affect land or shoreline use or encourage uses incompatible with existing plans. The plan addresses process needs to meet projected and potential needs for increased vegetable process waste facilities in the area.

Proposed measures to avoid or reduce shoreline and land use impacts are: *Does not apply to the Facilities Plan.*

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The Facilities Plan will have no impact on transportation, public services or utilities. Potential impacts from projects proposed in the plan will be addressed on an individual basis.

Proposed measures to reduce or respond to such demand(s) are: *Does not apply*.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

There will be no conflict with the Facilities Plan and it is not expected that the improvement projects discussed in the plan will conflict with any local, state or federal laws or requirements for protection of the environment.

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Process Water Reuse Facility Capital Facilities and Engineering Plan Pasco, Washington

Appendix Q IPS Influent Piping Alternative Analysis PACE Engineers, Inc., September 2019 This Page Is Intentionally Left Blank.





conveyance system. These aspects will need to be determined as evaluation process.

Figure 6-7: CIP Project #1 - Site of Potential ISSSP Pump

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TECHNICAL MEMORANDUM

IPS INFLUENT PIPING ALTERNATIVE ANALYSIS

April 2019 "Revised" September 2019





IPS INFLUENT PIPING

ALTERNATIVES ANALYSIS

FOR

City of Pasco

Process Water Reuse Facility

Prepared For:

City of Pasco 525 N. 3rd Avenue Pasco, Washington 99301

April 2019 "Revised" September 2019

Prepared By: Robin Nelson, P.E. PACE Engineers, Inc. 11255 Kirkland Way, Suite 300 Kirkland, Washington 98033-3417 p. 425.827.2014 | f. 425.827.5043

PACE Project No. 17454.06





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PROJECT CERTIFICATION

The technical material and data contained in this report was prepared by PACE Engineers, Inc., under the supervision of the below listed individuals. Those responsible staff members who are registered professional engineers are licensed in the State of Washington.



Robin D. Nelson, P.E.

PACE Engineers, Inc.

11255 Kirkland Way, Suite 300 Kirkland, Washington 98033-3417 Phone: 425.827.2014 www.paceengrs.com





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4.	Summary of Costs	4
5.	Recommendation	6

APPENDICES

- Appendix A Alternative A Gravity Pipe Plans and Profile
- Appendix B Alternative B HDPE Liner Plans and Profile
- Appendix C HDPE Liner Literature



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1. PROJECT GOAL

This technical memorandum has been prepared to propose an alternative method to the current 24-inch gravity sewer design submitted in the "Process Water Reuse Facility Irrigation Pump Station Replacement Plans and Specifications." The purpose for the 24-inch gravity sewer line is to convey the effluent flow from the 115 MG storage basin and 8 MG equalization basin to the new IPS (Irrigation Pump Station) constructed at the Process Water Reuse Facility. At the direction of the City, PACE will prepare an alternative piping method to drain the 115 MG pond to the new IPS and convey flow from the 8 MG equalization basin, both for summer and for winter operations. PACE will submit a summary comparing the means and methods of each design, as well as provide rough order of magnitude costs associated with each design alternative.

2. SUMMARY OF PROJECT ALTERNATIVES

Alternative #1 – Original Design Combined Effluent

The 24-inch gravity line originally proposed is designed to utilize the existing conveyance system, both draining the 115 MG storage pond and directing flow from the 8 MG pond to the existing IPS. The proposed design conveys flow to the new IPS via a 24-inch PVC C900 gravity line spanning approximately 1,456 LF connected by three manholes and one saddle manhole.

The proposed 24-inch gravity line begins by connecting to the existing effluent flow control box located next to the existing IPS building. Flow from the control box is conveyed to a manhole placed in the existing solids storage basin. The installation, operation, and maintenance of this manhole requires the solids basin be filled, resulting in challenges associated with coordination for removing the solids in the storage basin. The installation of this manhole will also require the removal and replacement of the HDPE liner in the storage basin.

The depth of the proposed gravity sewer poses another challenge as it is constrained by the outlet IE (invert elevation) at the existing flow control box and inlet IE to the new IPS building. The constraints from the IEs result in minimal slopes of the 24-inch gravity line not exceeding 0.25% and requires excavation and shoring depth averaging thirty (30) feet deep. See excerpt of original proposed design in Appendix A.

Alternative #2 – Separated effluent

The new design alternative for winter operations includes draining the 115 MG basin and reshaping the bottom of the existing 115MG basin so the effluent may drain to the southwest rather than draining to the east further for summer operations, extending the forcemain from the 8 MG pond to the new IPS structure. This option not only provides an opportunity to fix the existing ponding and current maintenance efforts for the basin, but also shortens the length of the 24-inch gravity line necessary for conveying flow from the basin to the new IPS. The scope





of this alternative will require the removal and replacing a portion of existing HDPE liner for the 115 MG Basin, regrading a portion of the 115 MG basin, jack and bore of a 36-inch steel casing, open-cut installation of 24-inch PVC C900 pipe, and extending an existing 12-inch PVC forcemain from the 8 MG pond to a proposed manhole located east of the new IPS. The wetwell of the proposed IPS will need to be lowered 1.5 feet from the original proposal in order to allow adequate slope for the gravity line from the basin outlet to the IPS.

The Capital Facilities Plan for the PWRF includes replacing the existing single 40-mil HDPE liner with a new 60-mil HDPE single liner and continuing to use existing groundwater monitoring wells for leak detection compliance. Discussions with liner suppliers indicate that HDPE liners typically have a design life of 20 years for similar types of projects. Replacing a portion of the existing 40-mil HDPE liner is a temporary fix for this alternative.

Approximately 100 feet of 36-inch steel casing will be installed beneath the dike by method of jack and bore for the effluent outlet from the basin. It is assumed that the jack and bore method will require a 30' x 15' bore pit and a 10' x 10' receiving pit. The benefit to this method of installation in contrast to open-trench installation is that boring will minimize impacts to the dike that would otherwise be created by open trench excavation. The remaining 320 feet of pipe will be installed by open trench excavation from the bore pit to the IPS.

After completion of the jack and bore, the gravity line will be connected to the basin through a steel casing penetration sealed by the HDPE liner. There are three methods for sealing the casing penetration into the HDPE liner. One method is by pipe boot, the second is by mechanical attachment, and the third method is with an embedment strip. There are details of these methods found in the appendices. In all cases, the casing will be encompassed by a concrete platform, typical for the size of the steel casing. The 24-inch PVC pipe will be installed through the 36-inch steel casing with the void spaces filled with sand. The end of the casing on the inside of the basin will be sealed with a casing end seal to prevent the basin effluent from entering the void space between the casing and the PVC. A preliminary detail of the pipe encasement can be found in the appendices, including the embedment strip option, as it was deemed the most cost-efficient by Raven Industries.

In addition to replacing and re-grading the HDPE liner, the effluent pumped from the 8 MG basin to the existing IPS will also need to be addressed. PACE proposes connecting to the existing 12-inch PVC forcemain on the eastern side of the 115 MG basin and rerouting a 12-inch PVC approximately 1,315 LF to Structure #1 per the exhibit located in Appendix B. The proposed forcemain will follow a similar alignment to the gravity main in the original proposal, although the trench depth will remain approximately 4 feet versus 30 feet required by the gravity pipeline.

3. QUALITY ASSURANCE

Alternative #2 requires access into the existing 115 MG storage pond with heavy equipment to conduct the work. A portion of the existing liner will be removed and replaced. This requires joining the new portion of the liner with the existing, thus creating a welded seam joining the two liners. Quality assurances are required to ensure both the integrity of the seaming process and





also that the existing and new liners are not damaged in the process. The Owner will engage and pay for the services of a third-party inspector with extensive experience in installation of HDPE liner to monitor geomembrane installation.

The integrity of the seam between the new portion and existing liner will be field-tested, implementing quality assurance requirements included in the project specifications including the following methods:

- 1. Non-destructive testing may be carried out as the seaming progresses or at completion of all field seaming.
 - a. **Vacuum Testing** Shall be performed in accordance with ASTM D 5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
 - Air Pressure Testing Shall be performed in accordance with ASTM D 5820, Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.
 - c. Air Pressure Testing/Soap Testing This test is used when the seam fails the air pressure test due to slow pressure loss. The procedure is to constantly supply pressure to the seam air channel while spraying the length with a soap and water solution and visually examining the seam for bubbles. Note: This option is not recommended during high wind conditions.
 - d. **Spark Testing** Shall be performed accordance with ASTM D 7240 Standard Practice for Leak Location using Geomembranes with an Insulating Layer in Intimate Contact with a Conductive Layer via Electrical Capacitance Technique (Conductive Geomembrane Spark Test).
- 2. Destructive Testing (performed by Contractor or subcontractor performing installation)
 - a. Location and Frequency of Testing Collect destructive test samples at a frequency of one per every 500 lineal feet of seam length.
 - b. Destructive testing shall be performed in accordance with ASTM D 6392, Standard Test Method for Determining the Integrity of Non-Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

To ensure the integrity of the existing liner was not damaged during the storage pond modifications, Electric Leak Detection testing will be performed. This testing method shall be performed by a third party in accordance with ASTM D 7002. The City will employ third party testing firm and conduct this test prior to the contractor beginning their field work within the 115 MG pond and conduct the same test once the contractor has completed modifications to the storage pond. The first test will establish a baseline condition of the existing liner and the second test determine if any damage has occurred either to the existing liner or the newly installed portion.

Any leaks found either at the seam or within the existing liner or newly installed liner will be the responsibility of the contractor to perform repairs at no cost to the City. The contractor will be required to non-destructively test each repair using methods described above.





4. DEVELOPMENT OF COST

PACE was able to receive a quote from two companies Northwest Linings and Raven Industries for costs associated with replacing half of the existing 40-mil HDPE liner. The pricing provided by both companies includes supplying, installing, and welding the 40-mil HDPE liner to the existing HDPE liner. The installation warranty on welding to existing liners is excluded, existing liner removal and disposal is by others, and the top of slope anchor trench excavation and backfill is by others. The concrete encasement for the casing penetration with the polyethylene embedment channel will be done by others.

From conversations with the suppliers, it is expected that the HDPE liner will be provided by Agru or Solmax. Please see appendices for HDPE liner literature and budgetary estimates.

5. SUMMARY OF COSTS

Table A, "Cost Estimate A" includes our cost estimate for the original design. The rough magnitude of cost was quantified by breaking out the costs associated with constructing the gravity line alone.

Table B, "Cost Estimate B" is representative of the budgetary prices obtained from Northwest Linings. These costs include quality assurance procedures performed by the contractor to ensure the integrity of the seam welding. The City costs to hire a third party tester to perform the Electric Leak Detection testing the existing and newly installed liner are included as a separate line item in Cost Estimate B. Costs to perform the Electric Leak Detection were provided by HGI¹, located in Richland, Washington.

Table A: Cost Estimate A						
City of Pasco Process Water Reuse Facility, Original 24-in. Gravity Sewer Piping						
	R	ough C	Order Magnitude Cost Estimat	e – April 2019		
ITEM NO.	APPROX QTY	UNIT	DESCRIPTION OF ITEM	UNIT PRICE	TOTAL	
1	1	LS	Trench Safety System	\$1,788,000.00	\$1,788,000.00	
2	1	LS	Gravel Road Regrading	\$40,000.00	\$40,000.00	
3	3	EA	60-in. Type-1 Sewer Manhole, up to 8' Deep	\$9,000.00	\$27,000.00	
4	1	EA	60-in. Type-1 Sewer Saddle Manhole, up to 8' Deep	\$10,500.00	\$10,500.00	
5	500	LB	Gate Valve and Other Fittings	\$10.00	\$5,000.00	
6	8,300	TON	Crushed Rock, Bedding, Backfill	\$35.00	\$290,500.00	

¹ HGI – hydroGEOPHYSICS, 1806 Terminal Drive, Richland, WA 99354; phone: 509.946.7111





ITEM	APPROX				
NO.	QTY	UNIT	DESCRIPTION OF ITEM	UNIT PRICE	TOTAL
			Add'l Cost per Vert. Ft. of MH		
7	80	LF	Deeper than 8'	\$500.00	\$40,000.00
8	1,465	LF	24-in. PVC C-900 Sewer	\$250.00	\$366,250.00
SUBTOTAL OF AMOUNT BID \$				\$2,567,250.00	
					•
8.6% SALES TAX \$					\$220,783.50
5% Contingency					\$128,362.50
TOTAL AMOUNT OF BID \$					\$2,916,396.00

Table B: Cost Estimate B						
City of Pasco Process Water Reuse Facility Replacement of HDPE Liner – Northwest Linings						
Rough Order Magnitude Cost Estimate – September 2019						
ITEM NO.	APPROX QTY	UNIT	DESCRIPTION OF ITEM	UNIT PRICE	TOTAL	
1	1	LS	Trench Safety System	\$551,850.00	\$551,850.00	
2	1	LS	Gravel Road Regrading	\$40,000.00	\$40,000.00	
3	1	LS	60 Mil HDPE Liner (Incl Tie-In to Existing HDPE)	\$229,240.00	\$229,240.00	
4	1	LS	HDPE Liner Install - Contractor Support	\$5,000.00	\$5,000.00	
5	2	EA	Replace HDPE Boot Sleeve	\$450.00	\$900.00	
6	1	EA	60-in. Type-1 Sewer Saddle Manhole, up to 8' Deep	\$10,500.00	\$10,500.00	
7	500	LB	Gate Valve and Other Fittings	\$10.00	\$5,000.00	
8	8,300	TON	Crushed Rock, Bedding, Backfill	\$35.00	\$290,500.00	
9	80	LF	Add'l Cost per Vert. Ft. of MH Deeper than 8'	\$500.00	\$40,000.00	
10	7,150	CY	Excavation Incl. Haul	\$40.00	\$286,000.00	
11	1,215	LF	18-in. PVC C-900 Forcemain w/ Thrust Blocking	\$100.00	\$121,500.00	
12	1,700	LF	2-ft. x 2-ft. Anchor Trench	\$5.00	\$8,500.00	





ITEM	APPROX			UNIT	
NO.	QTY	UNIT	DESCRIPTION OF ITEM	PRICE	TOTAL
			36-in. Casing Pipe, Jack and Bore		
13	100	LF	(Includes Contractor Support)	\$725.00	\$72,500.00
			Concrete Pipe Penetration and		
14	1	EA	Encasement	\$2,500.00	\$2,500.00
			Existing Liner Removal and		
15	1	LS	Disposal	\$5,000.00	\$5,000.00
16	300	LF	24-in. PVC C-900 Sewer	\$250.00	\$75,000.00
17	2	EA	Electric Leak Detection Testing	\$15,000.00	\$30,000.00
			¢4 772 000 00		
	SUBTOTAL OF AMOUNT BID \$				\$1,773,990.00
	8.6% SALES TAX \$				\$152,563.14
5% Contingency				\$88,699.50	
TOTAL AMOUNT OF BID \$					\$2,015,252.64

6. **RECOMMENDATION**

Overall, we found that the costs associated with removing and replacing half of the HDPE liner are less than the costs associated with the original design. Not only will this alternative be the cheaper option, but grading of the basin allows for improvement for future maintenance efforts in draining the pond and removes the necessity of removing solids for constructing the original design. One consequence of moving forward with the option of replacing half the liner is the possible difficulty in covering the seams under warranty in the future. The only way to ensure that the new liner will be covered under warranty is to install the entirety of the new liner at one time or replace both halves within a couple of years.

The benefit to the Open-Cut Trench Method and constructing the 24-inch PVC C900 pipe, is that there is no need to replace the HDPE liner in the 115MG Basin at this time. However, the cons to this method include the significant length of thirty (30) feet deep sewer piping and losing an existing portion of storage volume for solids. There will also be timing lost due to permitting necessary to remove solids from the existing storage pond.

The HDPE liner method is not only favorable in terms of time and cost, but by the ability to install pipe with minimal impacts to the 115 MG pond dike, reshaping the pond to improve current maintenance efforts, and the proposed gravity line can maintain consistent 0.25% slope. The cons to this method are the necessity to lower the proposed IPS wetwell by 1.5 feet and the weld to the existing 40-mil single liner cannot be under warranty.







Irrigation Pump Station Influent Piping Alternatives Analysis Pasco, Washington

Appendix A Alternative A Gravity Pipe Plans and Profile PACE Engineers, February 2019 THIS PAGE IS INTENTIONALLY LEFT BLANK.













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CONSTRUCTION NOTES

- CONTRACTOR SHALL INSTALL A 60 INCH DIAMETER SADDLE MANHOLE STRUCTURE OVER EXISTING 24 INCH DUCTILE IRON, AND INCLUDE CAST-IN-PLACE CONCRETE BASE AND CHANNELING.
- CONTRACTOR SHALL CUT EXISTING 24" DUCTILE IRON PIPE AND SLIP LINE WITH 20" OD HDPE DR 32.5 (IPS). FILL ANNULAR SPACE WITH GROUT.
- CONTRACTOR SHALL FILL SOLIDS STORAGE POND TO THE LINES AND GRADE SHOWN WITH GRAVEL BARROW. CONTRACTOR SHALL REMOVE HDPE LINER WITHIN FILL SECTION.



CALL BEFORE YOU DJG 811 UNDERGROUND SERVICE (USA)



Irrigation Pump Station Influent Piping Alternatives Analysis Pasco, Washington

Appendix B Alternative B HDPE Liner Plans and Profile PACE Engineers, February 2019 THIS PAGE IS INTENTIONALLY LEFT BLANK.














Irrigation Pump Station Influent Piping Alternatives Analysis Pasco, Washington

Appendix C HDPE Liner Literature Northwest Linings & Geotextile Products, Inc. THIS PAGE IS INTENTIONALLY LEFT BLANK.





NORTHWEST LININGS & GEOTEXTILE PRODUCTS, INC.





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Date: February 26, 2019

PROPOSAL COVER SHEET

PLEASE DELIVER TO: Estimating Department

FROM: NORTHWEST LININGS & GEOTEXTILE PRODUCTS, INC.

OFFICE NUMBER: (800) 729-6954, EXT.106 FAX NUMBER: (253) 872-0245

TOTAL NUMBER OF PAGES INCLUDING THIS PAGE: 6

PROJECT NAME: City of Pasco Process Water Reuse Facility BUDGET

REFERENCE: 60 mil HDPE 2 sided Textured

MESSAGE: SEE ATTACHED QUOTATION (6 PAGES) CONCERNING SUBJECT BID

With this fax cover page, you should have received the following:

Bid Quotation Letter Project Specific Clarifications and Exceptions Project Site Support Sheet Standard Clarifications and Exceptions

If you did not receive all 6 pages or have any questions concerning this quotation, please contact us at (800) 729-6954, ext. 106.

Sincerely,

Russell Jackson

Chief Estimator <u>russj@northwestlinings.com</u> Northwest Linings & Geotextile Products, Inc.



NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc. 20824 77th Avenue South Kent, WA 98032 (253) 872-0244 • (800) 729-6954 FAX: (253) 872-0245 www.northwestlinings.com

Date: February 26, 2019

Attention:Estimating DepartmentSubject:City of Pasco Process Water Reuse Facility BUDGETReference:60 mil HDPE 2 sided Texture

Gentlemen,

NORTHWEST LININGS & GEOTEXTILE PRODUCTS, INC. can <u>supply & install</u> the following geosynthetic materials for the above referenced project as follows:

Approximately 400,000 SF of 60 mil HDPE Primary liner supplied & installed 3000 sandbags as temporary ballast 1 pipe penetration Zero LF of liner to concrete attachment Industry standard QA/QC Labor and specialty equipment to supply the above materials

\$ 229,240.00

Lead time for HDPE/LLDPE materials is 6-8 weeks from order.

Northwest Linings acknowledges the receipt of the following Addenda: <u>0.</u>

Equipment & Operator (please refer to page three for more information):

Customer (General Contractor / Owner) would be responsible for providing a piece of heavy equipment for NW Linings (loader or forklift capable of lifting 8,000 lb and accessing the area to be lined) and operator for $\underline{7}$ days to stage and deploy material with the Northwest Linings crew. For unloading see project site support sheet attached.

Prices are F.O.B. jobsite and do <u>not</u> include sales and use taxes, local taxes, fees, or bonding (unless otherwise noted). Refer to the "BONDING, TAXES, AND INSURANCE" section of this bid. **Bonding cost is an additional 2.00% for the first year.**

Number of mobilizations included in this bid: 1 additional mobilization(s): \$1985.00 This quote is valid for 14 days from the date of this bid and is based on:

Private Wages Z Public Wages; Classification: General Laborer, Non-Union Open Shop.

There may be an additional charge for the cost of freight at shipping if materials are not shipped within the validity of this quote.

Sincerely, Kirk Lilleshare

Russell Jackson

Kirk LilleskareRussell JacksonVice President ConstructionChief EstimatorNorthwest Linings & Geotextile Products, Inc.

CONTRACTOR'S LICENSES

Accepted by:

Name:

Date:

Company:

WASHINGTON # C001-NORTHLG189J6 • OREGON # 64370 • IDAHO # 10761-A-4(47) MONTANA # 7469 • ALASKA # 22268 • ARIZONA # ROC266860 • CALIFORNIA # 794686 COLORADO # 19-03743-000 • N. DAKOTA # 41692 • WYOMING # 24-0-11195 HAWAII # C-15363 • UTAH # 7599996-5551 • NEW MEXICO # 357582

PROJECT SPECIFIC CLARIFICATIONS AND EXCEPTIONS

Project: City of Pasco Process Water Reuse Facility BUDGET

This Northwest Linings quotation is based on those specific materials and services identified in this 6-page bid package. Any materials, equipment, services, or labor not specifically referenced is not included in this quotation.

Material Quantity Clarifications:

• Northwest Linings has made its best effort to determine the quantities of materials required for this project, which has included a panel layout. Northwest Linings reserves the right to re-bid the project if quantities vary more than 10% from the areas shown in the plans.

Drawing and Detail Clarifications:

- Northwest Linings standard installation guidelines and details and material specifications apply where insufficient detail is shown in the plans.
- NWL recommends standard 2ft by 2ft anchor trench detail.
- NWL cannot warranty or guarantee the attachment to existing old 40 mil liner.

Specification Clarifications:

• Northwest Linings standard installation procedures shall apply where specification is ambiguous.

PROJECT SITE SUPPORT SHEET

Project: City of Pasco Process Water Reuse Facility BUDGET

On-site Contractor or owner to provide the following site support for the above referenced project:

Materials Unloading and Storage: Provide equipment and operator to unload Northwest Linings' geomembrane and other geosynthetic materials from trucks, <u>3</u> estimated equipment hours. Provide secure and adequate on-site storage for the materials that is no more than 100 yards from the area to be lined. Dunnage under the Geosynthetic product and tarps over the product may need to be provided depending upon material manufacturer's, Northwest Linings', Owner's, and/or Engineer's requirements.

Materials Deployment and Contractor Provide Equipment & Operator: Provide approved equipment & certified operator dedicated to Northwest Linings' crew to assist with deployment of geomembrane and other geosynthetic materials, <u>7</u> estimated equipment days. Equipment shall be a four-wheel drive extend-a-boom forklift or front-end loader with a minimum lifting capacity of 8,000 lbs. capable of raising forks or bucket a minimum of eight feet off the ground, stabilizing a 25' wide load, and accessing the area to be lined through temporary access road or other means. If the loader and/or operator are unable to meet these guidelines at the sole discretion of the Northwest Linings supervisor onsite, Northwest Linings personnel will operate the piece of equipment or rent a separate piece of equipment to complete the deployment of the lining material at an additional cost of \$ 350 per day (private wage) to operate and \$ 350 per day for rental equipment. It is recommended, if Northwest Linings operates equipment, that the on-site contractor provide a laborer to assist the Northwest Linings crew. These hours are guidelines and may be exceeded or be less than this estimate. It is the Contractor's responsibility to provide this piece or pieces of equipment at no charge to Northwest Linings for this project and an operator if required.

Northwest Linings requires that earthworks and civil construction activities proceed in such a manner so that continuity of the Liner installation is maintained, and our work can proceed – from start to finish – without delay. The Owner or General Contractor shall have the site ready to receive the Geosynthetic materials, prior to Northwest Linings arrival on site and in sufficient time to allow for the completion of Northwest Linings' work in accordance with the project schedule. All earthworks, subgrade preparation, piping systems installations, anchor trench excavation and backfill and structures are to be the Owner's or General Contractor's responsibility.

Site Support Items: Portable Toilet, Drinking Water, Parking, Staging Areas, and Telephone (if no cell phone reception).

Safety & Health: Site Specific Training and Health Monitoring Safety Training.

Sand or Pea Gravel for Sand Bags: <u>60</u> cubic yards (bags will be provided, filled, and deployed by Northwest Linings personnel unless otherwise stated in this proposal).

Waste Disposal: Liner, Geotextile, GCL, and Geocomposite scraps and cores, pallets, wrapping materials, and associated garbage will be placed by Northwest Linings' personnel at an on-site location or in pre-located garbage bins within 300' of the

liner installation. Labor to load these materials into a truck or bin, haul them off, or other associated tasks will be the responsibility of the Owner or General Contractor along with all related costs.

Subgrade Preparation: It is the Owner's or General Contractor's responsibility to provide a smooth and dry subgrade free of sharp or angular stones, compacted to 90%, and has no sharp elevation changes. (e.g. cat tracks, ruts from rainfall, etc.). Preparation of the subgrade may require raking, picking of rocks, compacting, rolling, construction of a temporary access road(s), or vegetation removal. This may occur prior to or during deployment of liner or related items such as GCL's, geocomposites, geotextiles, etc. All the labor, equipment, and related costs of any of these activities will be the responsibility of the Owner or General Contractor. Any groundwater encountered during the construction process or during the life of the liner shall result in any warranties—workmanship or material—to be null and void.

Subgrade/Cover Soils Interface: Direct shear is a site-specific design test. As such, Northwest Linings cannot guarantee or certify results on an individual project basis. We can provide samples at no charge for testing at a third-party lab but cannot release material for shipment until testing is completed and approved. All direct shear testing will incur additional costs.

Water Removal: Water removal from the subgrade will be the responsibility of the Owner or General Contractor. Northwest Linings responsibility will be limited to removing small rainwater puddles from the liner surface. Removal of more substantial rainwater accumulation or water that has covered the liner from any other source such as a wash-out or infiltration etc. will be the responsibility of the Owner or General Contractor or will require a change order of Northwest Linings to remove the associated water from the liner.

Construction Items that Penetrate the Liner or to which the Liner is Attached: Owner or General Contractor is responsible for completing the installation of all piping, concrete pads, walls, weirs, manholes, or any other items that the geomembrane will be attached to prior to Northwest Linings mobilizing to the site. Concrete surfaces must be smooth and free of rock pockets. Form marks and irregularities must be removed or filled in with cement to provide a continuous contact surface. The installation of all plastic embedment or related items will also be the responsibility of the General Contractor or Owner. These may or may not be supplied and/or included in Northwest Linings' bid. If supplied-only, they will be itemized and priced in the body of this quotation.

Dust Control: Dust can get into the field seams as well as the extrusion-welding bead. Therefore, it is the Owner or General Contractor's responsibility to maintain a dust-free work environment and minimize the dust into the area where Northwest Lining crews are performing seaming operations in order to provide the best conditions for high-strength field seams.

Permits: Owner or general contractor must supply all required permits for the work.

Anchor Trench: Owner or General Contractor is responsible for excavating all perimeter or interior liner anchor trenches prior to Northwest Linings arrival on site. Owner or General Contractor must backfill these anchor trenches in a timely manner as directed by Northwest Linings personnel.

Backfilling: Owner or General Contractor is responsible for placing of backfill materials over the geomembrane liner or over other geosynthetics when required by the plans and specifications.

Site Access / work hours: Owner or General Contractor must provide Northwest Linings with site access to all sides of the project so that the materials in this bid may be deployed in an efficient manner. This may include the installation and subsequent removal/re-grading of a temporary access road(s). Restricted access to the site such as the inability to readily access a particular area from the outside of the lagoon or cap may substantially increase the labor required to deploy our products, and those costs will be added to the contract. Work hours for the site will be as necessary to complete the geosynthetic installation. This may require work hours longer than 8 hours and Sat. & Sun. work if weather will not allow installation during standard contract hours. The cost for owner, inspector or engineer to be onsite for these hours is not Northwest Linings' responsibility.

STANDARD CLARIFICATIONS

Unless otherwise noted in the bid assumes all of the following will apply:

Credit Terms: Northwest Linings requires new customers or those without established credit terms, to pay a deposit in order to order materials or begin work on a project. The deposit will be equal to 50% of the project amount or material costs whichever is less. If you have any questions regarding this requirement, please contact the estimator or project manager.

Materials on hand and installation costs must be paid net 15 days from date of invoice. Credit terms are contingent upon approval by Northwest Linings' credit department. It is understood that Northwest Linings may impose a late fee of .75% per month (9% annual rate) on unpaid balances. Buyer will pay costs of collection including reasonable attorney fees. The buyer agrees that if

credit is granted by Northwest Linings, the Buyer will be responsible for all invoices as presented.

This bid must be accepted in its entirety unless specifically noted. Installation of the listed items has many crossover and related costs and should not be evaluated separately. Northwest Linings reserves the right to revise this proposal in the event of a reduction in scope of work or material quantities of 10% or greater.

Resin Pricing: The prices submitted herein are based on plastic resin prices as of today's date. Northwest Linings' prices may be adjusted to reflect an increase in the price of resin, without allowance for overhead and profit.

Freight Pricing: There may be an additional charge for the cost of freight at shipping if materials are not shipped within the validity of this quote.

Materials Onsite Post-Installation: Material orders are not custom quantities and materials delivered to site are based on quantities of materials per roll and per truck. Contractor/Owner understands that materials not utilized in construction of the project are the property of Northwest Linings unless otherwise noted and shall be loaded for return freight by the contractor/owner.

Warranties: A warranty on Northwest Linings' workmanship will be an industry standard warranty good for 1 year upon completion of the liner installation. A material warranty on the Geomembrane, GCL, products supplied by Northwest Linings will be industry-standard 1 year supplied by the manufacturer of the applicable Geosynthetic (unless otherwise noted in this bid) on a pro-rata basis only. Owners or Contractors failure to promptly pay in full all invoices, change orders, final payment and retention shall operate as an explicit waiver of all warranties set forth and referenced to above concerning this bid and project unless waived in writing by Northwest Linings & Geotextile Products, Inc. (Sample warranties will be provided upon request).

Ballast/Weight to Secure Liner After Installation: Geomembrane liners that are not designed to be left exposed/empty require filling or ballasting shortly after the installation is complete 10-15 days max and kept under ballast at all times during the life of the liner. If the geomembrane liner is left exposed through temperature cycles (day/night, seasonal) for more than 10 days tension/stress/shifting will occur and bridging, stress at structures/pipes, differential wrinkles and tension at seams will cause damage. This will damage the liner at pipe penetration, banding seals, corner areas, seams and any location the liner is fixed to structures that do not move. These are design issues and facility operation issues that Northwest Linings is not responsible for.

Weather-Related Issues: This bid is for installation when temperatures above 40°F can reasonably be expected between the hours of 8:00 AM and 5:00 PM. Installations cannot take place in winds over 15-20 MPH, in the presence of moisture of any kind (fog, rain, high humidity, etc.), or in temperatures below freezing without a major impact on seam quality and work productivity. Northwest Linings' decision to mobilize requires that the closest National Weather Service or airport weather station must forecast at least one more day of workable weather than what we estimate we will need to complete the project.

Northwest Linings will require a certain amount of consecutive good weather days to complete this scope of work, bad weather days will be considered an extension to project schedule with no negative impact on subcontractor in the contract, in the LD's, or delay portion of the contract-whichever fits appropriately. Weather delays, either directly or indirectly, influencing NWL's ability to complete the work shall not incur damages. NWL may choose to demobilize from the site for a certain amount of time to complete work in other areas where work can be completed. Demobilizing from the site shall not been deemed a penalty and shall not incur damages. NWL may request or issue change orders based on crew standby or additional mobilizations to the site if weather, directly or indirectly, influences NWL's ability to work at the site.

If you desire that we attempt installations under cold weather, high wind, or moist conditions, a change order must be signed before work begins acknowledging that possible standby time and other weather-related delays are outside the scope of this bid, and that Northwest Linings will be reimbursed on a pre-construction negotiated basis. Since most liner products are heat-sealed, the presence of moisture within the subgrade or in the air will contribute to failed field seams, patches, etc. at a future date. Northwest Linings will not be responsible for meeting specified standards for seam strength or for providing installation or material warranties if forced to install liner materials under conditions of high wind, temperatures below 40°F, or moisture.

Field Seams: Field seams are very sensitive to a variety of outside weather conditions. Since Northwest Linings is responsible for the quality of the field seams, we reserve the right to stop field seaming operation if we decide conditions are marginal.

Testing: Interface testing, unless specifically noted in the specifications as a conformance test, shall be considered a preproduction quality control test. Manufacturer's test method for any testing by the subcontractor that are not specified shall be completed under manufacturer's standards/methods/frequencies. QC testing is included in this proposal; conformance testing/sampling, or QA testing in not included unless otherwise noted.

Old-to-New Field Seams: The welding of old-to-new materials is difficult due to the aging of the old material by dirt or

chemical products. This old-to-new seam often will not have consistent tensile or peel strength and/or will not meet specified values. Northwest Linings will not be responsible for obtaining full tensile or peel specified values on old-to-new seams.

Back charge Notification: Any potential back charges against Northwest Linings by the Owner or General Contractor must be brought to the attention of Northwest Linings in writing within 24 hours of the event giving rise to the back charge. This prompt notification is necessary to give Northwest Linings the opportunity to correct the situation immediately. The notification must include a description of the problem(s) and an itemized breakdown of the associated costs. Northwest Linings will not be responsible for any back charges sought by the Owner or General Contractor where the written notification described above was not provided, unless this notification requirement is specifically waived by Northwest Linings in writing by the Construction Operations Manager or Northwest Linings Company Officer.

Project Rescheduling: Northwest Linings will attempt to accommodate any re-scheduling by the Owner or General Contractor. However, there may be occasions where we cannot meet the revised schedule due to other commitments. This is especially possible in the months of June through October when the majority of geosynthetic material installations are scheduled. Under these circumstances, Northwest Linings will mobilize as close as possible to the revised date but will not be responsible for any potential costs associated with the delay.

Water Fill Leak Testing (if required in bid documents):

- 1. Test must be performed before any backfilling takes place and segregate all other system from the liner including all piping, valves, concrete and structures to be considered a test of the liner. If this is not possible the test is a test of all the systems in contact with the contained liquid, and Northwest Linings will not be responsible for these items.
- 2. Unless specifically stated in the main bid (page two of this document), Northwest Linings will not be providing personnel or equipment to perform, assist with or witness the leak testing.
- 3. Northwest Linings liability will be limited to leaks found to be caused by failed field seams or welds only, any leaks found to be caused by mechanical puncture or failure of any kind after Northwest Linings has completed the installation will be repaired at the owners or contractors expense. Actual leak locations must be determined and shown to be due to Northwest Lining's installation before Northwest Linings is obligated to correct.
- 4. Parameters for test must be established with method described and allowable leakage values determined before test is performed, these parameters must meet AWWA standards and include evaporation measurement.
- 5. If leaks are found in seams within the applicable warranty period, Northwest Linings will repair the leaks that have been determined. All costs associated with water or wastewater removal, leak location, soil removal/replacement and refilling of the pond are the responsibility of others. All costs associated with additional water leak testing, if required, will be the responsibility of others.
- 6. Northwest Linings can provide a technician to serve as an observer of soil cover placement or leak testing, if required, at additional cost.

BONDING, TAXES, AND INSURANCE

Bonding

Northwest Linings is bondable to \$4,000,000 per project. Northwest Linings' standard bonding rate is 2% unless otherwise noted. Bonding costs are not included in this bid unless otherwise noted on page 2 of this quote

Taxes

Northwest Linings works in the Western United States and is subject to numerous state and local taxes, therefore, we do not include any of these taxes in our bids (unless otherwise noted on page 2). It is the responsibility of the contractor or owner to add taxes to our bid if applicable to this project unless otherwise noted on page 2 of this quote. *Insurance*

Northwest Linings standard insurance limits are as follows:

General Liability		Automobile Liability	
Each Occurrence	\$ 6,000,000	Combined Single Limit	\$1,000,000
Personal & Adv Injury	\$ 6,000,000	(each accident)	
General Aggregate	\$10,000,000	Excess Liability	\$ 2,000,000
Products – Comp/Op Agg	\$ 6,000,000	Excess Aggregate	\$ 2,000,000
Pollution (Each Occurrence)	\$ 5,000,000		
Pollution Aggregate	\$ 10,000,000		

Should these limits be inadequate for this project, any premiums associated with increasing the limits, providing Builders All-Risk Insurance, or purchasing any additional modifications to our policy will be the responsibility of the Contractor or Owner. Owner supplied or "wrap/wrap up" insurance programs are not a value to Northwest Linings and no deducts will be allowed to the subcontract value for this type of plan.



NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc.

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NORTHWEST LININGS & GEOTEXTILES PRODUCTS, INC. CONSTRUCTION QUALITY CONTROL MANUAL FOR HDPE AND LLDPE CONTAINMENT MEMBRANE FIELD INSTALLATIONS

ASTM D5641, D5820, D6365, D6392, GRI GM19

NORTHWEST LININGS AND GEOTEXTILES HDPE/LLDPE-FIELD QUALITY CONTROL MANUAL

I. INTRODUCTION

- A. This manual describes the Quality Control Procedures utilized by Northwest Linings (NWL) Installation Personnel to assure quality workmanship and installation integrity of HDPE/LLDPE Geomembranes.
- B. Geosynthetic components of lining systems which are addressed in this manual are HDPE/LLDPE Geomembranes. NWL recognizes that specific documentation of the specific installation is required to substantiate this Quality Control Program.

II. HDPE/LLDPE GEOMEMBRANE INSTALLATION

A. Earth Work

- 1. The general and/or earthwork contractor shall be responsible for preparing and maintaining the subgrade in a condition suitable for liner installation unless agreed otherwise.
- 2. Surfaces to be lined shall be smooth and free of debris, roots, and angular or sharp rocks to a depth of four (4) inches. All fill shall consist of well-graded material free of organics, trash, clayballs or other harmful matter. No sharp edged stones, stones larger than one (1) inch diameter or hard objects shall be allowed within the top four (4) inches of the subgrade. The surface shall be compacted in accordance with project specifications but in no event below the minimum required to provide a firm unyielding foundation sufficient to permit the movement of vehicles and welding equipment over the surface without causing rutting or other harmful effects. The subgrade shall have no sudden sharp or abrupt changes in grade.
- 3. The earthwork contractor shall protect the subgrade from becoming too dry, flooding and freezing. Protection, if required, may consist of a thin plastic protective cover (or other material as approved by the engineer) installed over the subgrade until the placement of the liner begins. Subgrade found to have cracks greater than 1/2 inch in width or depth or which exhibit swelling, heaving or other similar conditions shall be reworked by the general contractor to remove these defects.
- 4. Surface acceptance: Upon request, NWL will provide the Owner's Representative with a written acceptance of the surface to be lined. This acceptance will be limited to an amount of area that NWL is capable of lining in a particular work shift. Subsequent repairs to the subgrade and the surface shall remain the responsibility of the earthwork contractor.

B. Crest Anchorage System

- 1. The anchor trench shall be excavated by the earthwork contractor to lines and widths shown on the design drawings prior to geomembrane placement.
- Anchor trenches excavated in clay soils susceptible to desiccation cracks should be excavated only the distance required for that day's liner placement to minimize the potential for cracking of the clay soils.
- 3. Corners in the anchor trench shall be slightly rounded where the geomembrane enters the trench to minimize sharp bends in the liner.

C. Preparation for Geomembrane Deployment

- 1. Panel Layout: Prior to liner deployment, layout drawings shall be produced to indicate the panel configuration and location of seams.
- 2. Identification: Each panel used shall be given a numeric or alpha-numeric identifier consistent with the layout drawing. This identification number shall be related to a manufacturing roll number.

D. Field Panel Placement

- 1. Location: NWL will attempt to install field panels at the location indicated on the layout drawing. If panels are positioned in a location other than that indicated on the layout drawings, the revised location shall be noted in the field on a layout drawing which will be modified at the completion of the project to reflect actual panel locations.
- 2. Weather Conditions: Geomembrane deployment shall not be done during any precipitation, in the presence of excessive moisture (i.e. fog, dew), in an area of standing or ponded water, or during high winds.
- 3. Method of Deployment:
 - 1. The method and equipment used to deploy the panels must not damage the geomembrane or the supporting subgrade surface. The supporting sub-grade must be prepared and maintained in a condition to support the equipment needed for the installation.
 - 2. The rolls of liner will be deployed from a spreader bar apparatus supported by a fork lift, loader or other piece of heavy equipment that can safely lift and move the rolls. Heavy equipment will not be allowed to operate directly on geomembrane.
 - 3. No personnel working on the liner will smoke, wear shoes that can damage the geomembrane, or engage in actions which could result in damage to the geomembrane.
 - 4. Adequate temporary ballast and/or anchoring, (i.e. sandbags,) which will not damage the geomembrane, will be placed to prevent uplift of the liner by wind.
 - 5. The geomembrane will be deployed in a manner to minimize wrinkles.
 - 6. Rubber tired and tracked ATV's and similar equipment are acceptable to operate on the geomembrane with ground pressure less than 8 psi. Tires and tracks will be checked for sharp edges, rocks or debris that may damage the liner before operating on the geomembrane. Driving paths will be as straight as possible avoiding sharp turns, sudden stops and starts.
 - 7. Any damage to a panel of geomembrane will be repaired in accordance with Section IV. Any area of a panel seriously damaged (torn, twisted, or crimped) will be marked, cut out, and removed from the work area with resulting seaming and/or repairs performed in accordance with Section IV of this document.

E. Field Seaming

- 1. General Requirements:
 - 1. Layout: In general, seams shall be oriented parallel to the slope, (down hill) not across the slope. Whenever possible, horizontal seams should be located not less than five (5) feet from the toe of the slope. Each seam shall be numbered in a manner compatible with the panel layout drawing for documentation of seam testing results.
 - 2. Personnel: All personnel performing seaming operations shall be trained in the operation of the equipment being used and will qualify by successfully welding a test seam as described herein. The project foreman will provide direct supervision of all personnel seaming to verify proper welding procedures are followed.

F. Equipment:

 Fusion Welding: Fusion Welding consists of placing a heated wedge, mounted on a self propelled vehicular unit, between two (2) overlapped sheets such that both sheets are heated to temperatures ranging from 600 degrees F. to 950 degrees F. After being heated by the wedge, the overlapped edges pass through a set of preset pressure rollers which compress the panels together forming a continuous homogenous fusion weld. The fusion welder is equipped with a temperature readout device which continuously monitors the temperature of the wedge. 2. Extrusion Fillet Welding: Extrusion welding consists of introducing a ribbon of molten resin along the edge of the seam overlap to the two sheets to be welded. The molten polymer causes some of the material of each sheet to be liquefied resulting in a homogeneous bond between the molten weld bead and the surfaces of the sheets. The extrusion welder is equipped with gauges giving the temperature in the apparatus and the preheat temperature at the nozzle.

G. Seam Preparation:

- 1. Fusion Welding:
 - 1. Overlap the panels approximately four (4) inches.
 - 2. Clean the seam area prior to seaming to assure the area is clean and free of moisture, dust, dirt and debris.
 - 3. No grinding is required for fusion welding. T joints with adjoining panels may be ground to facilitate air testing of the seam.
 - 4. Adjust the panels so that seams are aligned with the fewest possible number of wrinkles and "fishmouths".
- 2. Extrusion Welding:
 - 1. Overlap the panels a minimum of three (3) inches.
 - 2. Temporarily bond the panels to be welded taking care not to damage the geomembrane.
 - 3. Grind seam overlap prior to welding within 15 minutes of welding operation in manner that does not cause excessive damage the geomembrane.
 - 4. Clean the seam area prior to seaming to assure the area is clean and free of moisture, dust dirt and debris of any kind.
 - 5. Purge the extruder prior to beginning the seam to remove all heat-degraded Extrudate from the barrel.
 - 6. Keep welding rod clean and dry.

H. Test Seams:

Test seams shall be performed at the beginning of each seaming period and at least once every 5-6 hours for each seaming apparatus used that day. Test seams shall be made on fragment pieces of the liner and under the same conditions as actual seams.

1. Test Seam Length:

The test seam shall be at least three feet long, made by joining 2 pieces at least 9" in width.

- 2. Sample Procedures:
 - 1. Visually inspect the seam for squeeze out, footprint, pressure and general appearance.
 - 2. Two samples one inch wide shall be cut from the test seam. The samples shall then be tested in peel and shall not fail in the seam. Failure shall be a film tear bond (FTB). If a sample fails, the entire procedure shall be repeated. ASTM D6392 will be method of testing samples GRI GM19 will be used for strength and locus of break.
 - 3. If any of the second set of samples fails, the machine shall not be accepted and used for seaming until the problem is corrected and 2 passing tests are achieved.

- 4. After completion of the test the remaining portion of the test seam shall be discarded. Documentation of the test seams will be maintained by listing machine I.D. number, operators name, temperature control setting and test results.
- 5. Passing test results records shall be maintained on NWL's trial weld report form.
- 6. If test samples are to act as destructive samples then the sample shall be marked, logged and saved. If samples are to be cut from the actual finished seam for Lab Testing, the test seams shall be discarded per above.

I. General Seaming Procedures:

- 1. Seaming shall extend to the outside edge of the containment area and may include panels to be placed in the anchor trench.
- 2. While welding a seam, monitor and maintain the proper overlap.
- 3. Inspect seam area to assure area is clean and free of moisture, dust, dirt and debris of any kind.
- 4. While welding a seam, monitor temperature gauges to assure proper settings are maintained and that the machine is operating properly.
- 5. Align wrinkles at the seam overlap to allow welding through a wrinkle.
- 6. Fishmouths or wrinkles at seam overlaps that cannot be welded through shall be cut along the ridge in order to achieve a flat overlap. The cut area shall be seamed. Any portion where the overlap is inadequate shall be patched with an oval or round patch extending six inches beyond the cut in all directions.
- 7. It is preferable for cross/butt (T) seams between two rows of seamed panels to be welded during the coolest time of the day to allow for contraction of the geomembrane if possible.
- 8. All "T" joints shall have the overlap from the wedge welder seam trimmed back to allow an extrusion fillet weld. Then grind two inches on either side of the seam and extrusion weld all of the area prepared by grinding.

J. Weather Conditions:

NWL relies on the experience of the Project Superintendent and the results of test seams to determine seaming restriction by weather. Many factors, such as ambient temperature, humidity, wind, sunshine, etc., can affect the integrity of field seams and must be taken into account when deciding whether or not seaming should proceed. Test seams are required prior to daily production seaming to determine if the weather conditions will affect NWL's ability to produce quality seams. Additional non-destructive and destructive testing of production seams substantiate the decision made by the Project Superintendent to seam on any given day.

SECTION III Seam Testing-Quality & Control-Geomembranes

A. Concept:

NWL installation crews will non-destructively test all field seams over their full length using air pressure testing, vacuum testing or other approved method, to verify the continuity and integrity of the seams.

B. Air Pressure Testing:

The weld seam created by the fusion welding process is composed of two welded seams separated by an unwelded channel approximately 3/8 of an inch wide. This channel permits seams to be tested by inflating the sealed channel with air to a predetermined pressure and observing the stability of the pressurized channel over time. Method of test ASTM D5820 Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.

C. Equipment for air testing:

- 1. An air pump (manual or motor driven) capable of generating and sustaining a pressure of 30 PSI.
- 2. A rubber hose with fittings and connections.
- 3. A sharp hollow needle with a pressure gauge capable of reading and sustaining a pressure of 30 PSI.
- 4. Procedure for air testing:
- 5. Seal both ends of the seam to be tested.
- 6. Insert needle in the sealed channel.
- Inflate the test channel to a pressure between 25 to 30 PSI, in accordance with the following schedule, close valve, and allow 2 minutes for the injected air to come into equilibrium in the channel. Observe initial pressure after approximately 2 minutes.

MATERIAL	(MIL)	MIN. PSI	MAX. PSI	AFTER 5 MINUTES
	40 50 60 80	25 26 27 30	30 30 30 30	4 4 4
	100	30	30	4

* Initial pressure settings are read after a two minute relaxing period. The purpose of this period is to permit the air temperature and pressure to stabilize.

- 8. Observe and record the air pressure five minutes after the relaxing period ends. If loss of pressure exceeds the value above or if the pressure does not stabilize, locate the faulty area and repair.
- 9. Upon completion of the pressure test the end of the seam opposite the pressure gauge is cut. A decrease in gauge pressure must be observed or the air channel will be considered blocked and the test will be repeated after the blockage is corrected.
- 10. Remove needle and seal resulting hole by extrusion welding.
- 11. Record test results on non-destructive test form
- 12. In the event of a Non-Complying Air pressure test, the following procedure shall be followed.
- 13. Check seam-end seals and retest seams.
- 14. If non-compliance reoccurs, cut one inch samples from each end of the seam and additional samples at the distance specified.
- 15. Perform destructive field peel test on the samples.

INITIAL PRESSURE SCHEDULE*

MAX. PRESSURE DIFF.

- 16. If all samples pass destructive testing remove the overlap left by the wedge welder and perform an Air Pressure/Soap Test or vacuum test.
- 17. If a leak is detected by the air pressure/soap or the vacuum test, repair by extrusion welding. Test repair by vacuum testing.
- 18. If no leak is discovered air pressure/soap testing, the seam will pass non-destructive testing.
- 19. If no leak is discovered by vacuum testing, the seam will pass non-destructive testing.
- 20. If one or more samples fail the peel test, additional samples will be taken.
- 21. When two passing samples are located, the seam between these two locations will be considered complying. The area outside of this length will be considered non-complying and the entire length extrusion welded.
- 22. Test the entire length of the repaired seam by vacuum testing.

D. Air Pressure Testing/Soap Testing:

This test is used when the seam fails the air pressure test due to slow pressure loss. The procedure is to constantly supply pressure to the seam air channel while spraying the length with a soap and water solution and visually examining the seam for bubbles. Note: This option is not recommended during high wind conditions.

- 1. Equipment for Air Pressure/Soap Testing:
 - 1. The same equipment as the air pressure test.
 - 2. A soap solution and means to apply the solution.
- 2. Procedure for Air Pressure/Soap Testing:
 - 1. Trim excess overlap material off at edge of seam
 - 2. Insert needle gauge assembly in opposite ends of the seam to be tested to show that pressure is continuous throughout the channel.
 - 3. Maintain 30 psi
 - 4. Apply soap solution to the weld edge and visually examine for bubbles.
 - 5. If no bubbles appear the problem is with the inside track "secondary weld". This seam is acceptable providing it has passed peel tests.
 - 6. If any bubbles appear on the outside track "Primary weld", repair defect by extrusion welding and vacuum test the repair.

E. Vacuum Testing:

This test is used when the geometry of the weld makes air pressure testing impossible or impractical or when attempting to locate the precise location of a defect believed to exist after air pressure testing. Method of testing is based on ASTM D5641 Practice for Geomembrane Seam Evaluation by Vacuum Chamber.

- 1. Equipment for vacuum testing:
 - 1. Vacuum box consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly and a vacuum gauge.

- 2. Electric vacuum motor attached to the housing, a vacuum pump assembly, or a compressor with a venturi equipped with a pressure controller and pipe connections.
- 3. A rubber pressure/vacuum hose with fittings and connections if required.
- 4. A soap solution with a means to apply the solution.
- 2. Procedure for Vacuum Testing:
 - 1. Trim excess overlap from seam.
 - 2. Apply soap solution to the area to be tested.
 - 3. Place the vacuum box over the area and apply sufficient downward pressure to seal the box against the liner.
 - 4. Turn on the vacuum motor attached to the housing, or open the vacuum valve. Apply 3-5 in. Hg vacuum to the area as indicated by the gauge on the box.
 - 5. Ensure that a leak-tight seal is created.
 - 6. For a period of not less than five seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.
 - 7. If no bubbles appear after five to ten seconds, stop the vacuum and move overlap and repeat the process.
- 3. Procedure for non-complying test:
 - 1. Mark all areas where soap bubbles appear and repair the marked areas.
 - 2. Retest repaired areas.

4. Procedure for non-destructive testing of extrusion welds that are not on flat surfaces or accessible for the equipment: ASTM D6365 Practice for Nondestructive Testing of Geomembranes Seams using the Spark Test.

F. Destructive Testing:

The purpose of destructive testing is to determine and evaluate seam strength. These tests require direct sampling and thus subsequent patching. Therefore destructive testing should be held to a minimum to reduce the amount of repairs required.

- 1. Procedure for Destructive Testing:
 - 1.1. Destructive test samples shall be marked and cut out randomly at a minimum average frequency of one test location every 500 feet of seam length.
 - 1.2. Additional test may be taken in areas of contamination, offset welds, visible crystallinity or other potential cause of faulty welds.
 - 1.3. ASTM D6392 will be method of testing samples GRI GM19 will be used for strength and locus of break standards.
- 1) Sample Size:
 - a) The sample should be twelve inches wide with a seam fourteen inches long centered lengthwise in the sample. The sample may be increased in size to accommodate independent lab testing by the owner or by specific project specifications.

- b) 10 one inch sample shall be cut from each test seam sample for field testing on a calibrated field tensiometer. 5 peel and 5 shear tests will be performed and recorded.
- 2) The one inch wide samples shall be tested in the field for peel and shear. If 4 out of 5 samples pass FTB the sample will be considered a passing sample. If 2 field sample fails to pass FTB, it will be assumed the sample fails destructive testing. The procedures outlined in Section 2 shall be followed to locate passing samples to send to the laboratory.
- 1. Procedure in the event of Destructive Test Failure:

1. Cut additional field samples for testing. In the case of a field production seam, the samples must lay a minimum of 10 feet in each direction from the location of the failed sample.

2. If the samples pass, then reconstruct the seam up to the two passing sample locations.

1. Heat tack the overlap along the length of the seam to be reconstructed and extrusion weld.

2. Vacuum test the extrusion weld.

3. If either of the samples fails then additional samples are taken in accordance with the above procedure until two passing samples are found to establish the zone in which the seam should be reconstructed.

4. All passing seams must be bounded by two locations from which samples passing destructive test have been taken.

5. In the case of reconstructed seams exceeding 150 feet, a sample must be taken and pass destructive testing.

6. All destructive seam samples shall be numbered and recorded on a destructive seam test form.

3. Northwest Linings Quality Assurance Laboratory Testing:

The remaining destructive sample will be sent to a qualified laboratory and will be tested in "Seam Strength" and "Peel Adhesion" (ASTM D6392 will be method of testing samples GRI GM19 will be used for strength and locus of break). Five specimens shall be tested for each test method with data recorded. Four out of the five specimens must pass for each test in order for the seam to pass the destructive test.

SECTION IV Defects and Repairs

A. Inspection

1. Northwest Linings Project Superintendent shall conduct a detailed walk through and visually check all seams and non-seam areas of the geomembrane for defects, holes, blisters and signs of damage during installation.

2. All other NWL installation personnel shall at all times be on the lookout for any damaged areas. Damaged areas shall be marked and repaired.

B. Procedure

1. Repair procedures: Any portion of the geomembrane showing a flaw, or failing destructive or nondestructive test shall be repaired. Several methods exist for repairs, and the decision as to the appropriate method shall be made by NWL's Project Superintendent. Methods available for repair:

1. Patching - used to repair large holes, tears and destructive sample locations. All patches shall extend at least six inches beyond the defect and all corners of patches shall be rounded.

- 2. Grinding and welding used to repair sections of extruded seams.
- 3. Spot welding or seaming used to repair small tears, pinholes or other minor localized flaws.
- 4. Capping used to repair lengths of failed extruded areas.
- 5. Removal of a bad seam and replacement with a strip of new material seamed into place.

C. Verification of Repairs:

1. Every repair shall be non-destructively tested using the methods set out in this manual Repairs which pass the non-destructive test shall be deemed adequate. Large repairs may require a destructive test. Repair test results shall be logged on a repair report form. The repair location shall be recorded on a record drawing.









RAVEN INDUSTRIES





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Sam Chapman

From:	Dan Lahr <dan.lahr@ravenind.com></dan.lahr@ravenind.com>			
Sent:	Thursday, February 21, 2019 1:56 PM			
То:	Sam Chapman			
Cc:	Joe McCullough			
Subject:	Raven Budget - Pasco, WA			
Follow Up Flag:	Follow up			
Flag Status:	Flagged			

Hello Sam,

Below is the requested budget pricing based on prevailing wage rates:

Provide & Install – 60 Mil Avg. HDPE Smooth Liner (Includes Tie-In Welding to Existing HDPE Liner) *Installation warranty on seams to existing liner are excluded *Existing liner removal and disposal is by others *Top of slope anchor trench excavation and backfill is by others

361,860 SF @ \$ 1.16 / SF = \$ 419,757.60 + Tax

Thank you, Dan

DAN LAHR

Director of Estimating Raven – CLI Construction, Inc. +1 (303) 951-5919 1062 Singing Hills Road, Parker, CO 80138



www.ravenind.com



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GSE HD Smooth Geomembrane

GSE HD is a smooth high density polyethylene (HDPE) geomembrane manufactured with the highest quality resin specifically formulated for flexible geomembranes. This product is used in applications that require excellent chemical resistance and endurance properties.

[*]

AT THE CORE:

An HDPE geomembrane used in applications that require excellent chemical resistance and endurance properties.

Product Snecifications

Product Specifications				These product specifications meet GRI GM 13			
Test Method	Frequency	Minimum Average Value					
		30 mil	40 mil	60 mil	80 mil	100 mil	
ASTM D 5199	every roll	30 27	40 36	60 54	80 72	100 90	
ASTM D 1505	200,000 lb	0.940	0.940	0.940	0.940	0.94	
ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lb	114 63 700 12	152 84 700 12	228 126 700 12	304 168 700 12	380 210 700 12	
ASTM D 1004	45,000 lb	21	28	42	56	70	
ASTM D 4833	45,000 lb	54	72	108	144	180	
ASTM D 1603*/4218	20,000 lb	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	
ASTM D 5596	45,000 lb	Note ⁽¹⁾	Note(1)	Note ⁽¹⁾	Note ⁽¹⁾	Note ⁽¹⁾	
ASTM D 5397, Appendix	200,000 lb	500	500	500	500	500	
ASTM D 3895, 200°C; O ₂ , 1 atm	200,000 lb	>100	>100	>100	>100	>100	
TYPICAL ROLL DIMENSIONS							
Roll Length ⁽²⁾ , ft			870	560	430	340	
Roll Width ⁽²⁾ , ft			22.5	22.5	22.5	22.5	
		25,200	19,575	12,600	9,675	7,650	
	Test Method ASTM D 5199 ASTM D 1505 ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in ASTM D 1004 ASTM D 1603*/4218 ASTM D 5596 ASTM D 5397, Appendix ASTM D 3895, 200°C; O ₂ , 1 atm	Test Method Frequency ASTM D 5199 every roll ASTM D 1505 200,000 lb ASTM D 6693, Type IV Dumbbell, 2 ipm 20,000 lb G.L. 2.0 in G.L. 1.3 in 40,000 lb ASTM D 1004 45,000 lb ASTM D 1603*/4218 20,000 lb ASTM D 5596 45,000 lb ASTM D 5397, Appendix 200,000 lb ASTM D 3895, 200°C; O ₂ , 1 atm 200,000 lb	Test Method Frequency Minimum Averation ASTM D 5199 every roll 30 27 ASTM D 505 200,000 lb 0.940 ASTM D 1505 200,000 lb 0.940 ASTM D 6693, Type IV Dumbbell, 2 ipm 20,000 lb 114 63 700 12 G.L. 2.0 in G.L. 1.3 in 45,000 lb 21 ASTM D 1004 45,000 lb 21 ASTM D 1603*/4218 20,000 lb 54 ASTM D 1603*/4218 200,000 lb 500 ASTM D 5596 45,000 lb 500 ASTM D 5397, Appendix 200,000 lb 500 ASTM D 3895, 200°C; O _{2*} 1 atm 200,000 lb >100 TYPICAL ROLL DINSIONS 1120 1,120 1,200	Test Method Frequency Minimum Average Value ASTM D 5199 every roll 30 mil 40 mil ASTM D 5199 every roll 30 27 36 ASTM D 1505 200,000 lb 0.940 0.940 ASTM D 6693, Type IV Dumbbell, 2 ipm 20,000 lb 114 152 84 700 152 84 700 G.L. 2.0 in G.L. 1.3 in 45,000 lb 21 28 ASTM D 1004 45,000 lb 21 28 ASTM D 1603*/4218 20,000 lb 2.0 - 3.0 2.0 - 3.0 ASTM D 1603*/4218 20,000 lb 500 S00 S00 ASTM D 5596 45,000 lb Note ⁽¹⁾ Note ⁽¹⁾ Note ⁽¹⁾ ASTM D 5397, Appendix 200,000 lb S00 S00 S00 ASTM D 3895, 200°C; O _{2'} 1 atm 200,000 lb >100 >100 2100 FUPLCAL ROLL DUSCONS 22.5 22.5 22.5	Test Method Frequency Minimum Average Value Image: Comparison of the test of test	Test Method Frequency Minimum Average Value Image: Constraint of the straint o	

NOTES:

• ^(I)Dispersion only applies to mear spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.

⁽²⁾Roll lengths and widths have a tolerance of ±1%.

• GSE HD is available in rolls weighing approximately 3,900 lb.

• All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.

• *Modified.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.



For more information on this product and others, please visit us at DURABILITY RUNS DEEP GSEworld.com, call 800.435.2008 or contact your local sales office.

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GEOSYNTHETICS



Smooth Liner®

HIGH DENSITY POLYETHYLENE

PRODUCT DATA							
Property	Test Method	Frequency	Mi	Minimum Average Values			
Thickness (minimum avg), mil (mm)	ASTM D5199	Per Roll	30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)
Thickness (minimum), mil (mm)			27 (0.68)	36 (0.9)	54 (1.35)	72 (1.8)	90 (2.25)
Density, g/cc, minimum	ASTM D792, Method B	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (both directions)	ASTM D6693, Type IV						
Strength @ Yield, lb/in width (N/mm)	2in/minute	20,000 lb	66 (11.6)	88 (15.4)	132 (23.1)	176 (30.8)	220 (38.5)
Elongation @ Yield, % (GL=1.3 in)			12	12	12	12	12
Strength @ Break, lb/in width (N/mm)			120 (21)	160 (28)	240 (42)	320 (56)	400 (70)
Elongation @ Break, % (GL=2.0 in)			700	700	700	700	700
Tear Resistance, lbs (N)	ASTM D1004	45,000 lb	22 (98)	30 (133)	45 (200)	60 (267)	72 (320)
Puncture Resistance, lbs (N)	ASTM D4833	45,000 lb	60 (267)	80 (356)	120 (534)	160 (712)	190 (845)
Carbon Black Content, % (range)	ASTM D4218	20,000 lb	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3
Carbon Black Dispersion (Category)	ASTM D5596	45,000 lb	Only nea	nly near spherical agglomerates: 10 views Cat. 1 or 2			
Stress Crack Resistance (SP NCTL), hrs.	ASTM D5397 Appendix	200,000 lb	500	500	500	500	500
Oxidative Induction Time, minutes	ASTM D3895, 200°C, 1 atm O ₂	200,000 lb	≥140	≥140	≥140	≥140	≥140

AGRU America's geomembranes are certified to pass Low Temp. Brittleness via ASTM D746 (-80°C), Dimensional Stability via ASTM D1204 (±2% @ 100°C). Oven Aging and UV Resistance are tested per GRI GM 13. These product specifications meet or exceed GRI's GM13.

SUPPLY INFORMATION (STANDARD ROLL DIMENSIONS)								
THICKNESS		WIDTH		LENGTH		AREA (APPROX.)		
mil	mm	ft	m	ft	m	ft²	m²	
30	0.75	23	7	1,175	358	27,025	2,511	
40	1.0	23	7	900	274	20,700	1,923	
60	1.5	23	7	600	183	13,800	1,282	
80	2.0	23	7	455	139	10,465	972	
100	2.5	23	7	365	111	8,395	780	

Note:

Average roll weight is 4,200 lbs (1,905 kg). All rolls are supplied with two slings. Rolls are wound on 6" core. Special length available upon request. Roll length and width have a tolerance of \pm 1%. The weight values may change due to project specifications (i.e. absolute minimum thickness or special roll length) or shipping requirments (i.e. international containerized shipments).

All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, it is the users responsibility to determine the suitability for their own use of the products described herein. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by AGRU America as to the effects of such use or the results to be obtained, nor does AGRU America assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

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