

Jefferson County Department of Public Works  
**Port Hadlock UGA Sewer Facility Plan**

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**APPENDIX C.**  
**COMPARATIVE LIFE CYCLE COST ESTIMATES**

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September 2008



Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

Updated Unit Costs

Item	Description	Unit cost, \$	Unit	CORE PLUS ALCOHOL						RHODY DRIVE					
				2010		2011		2012		2013		2014		2015	
				ERUs Flow (mgd) Quantity	432 0.10 Cost, \$	ERUs Flow (mgd) Quantity	502 0.12 Cost, \$	ERUs Flow (mgd) Quantity	584 0.14 Cost, \$	ERUs Flow (mgd) Quantity	679 0.16 Cost, \$	ERUs Flow (mgd) Quantity	789 0.19 Cost, \$	ERUs Flow (mgd) Quantity	918 0.22 Cost, \$
<b>COLLECTION - STEP SYSTEM</b>															
<b>Capital Cost Estimate</b>															
<i>Structural</i>															
	2" PVC Pressure Mains	\$15	LF	15,450	\$231,750	0		0		11,475	\$ 172,125	0		0	\$0
	3" PVC Pressure Mains	\$16	LF	3,450	\$55,200	0		0		2,650	\$ 42,400	0		0	\$0
	4" PVC Pressure Mains	\$18	LF	1,575	\$28,350	0		0		0	\$ -	0		0	\$0
	6" PVC Pressure Mains	\$22	LF	5,250	\$115,500	0		0		0	\$ -	0		0	\$0
	1.5" HDPE Pressure Laterals - STEP	\$1,500	EA	432	\$647,727	70	\$105,459	82	\$122,630	95	\$ 142,596	111	\$165,812	129	\$192,809
	1.5" HDPE Pressure Laterals - extra for existing houses	\$500	EA	15	\$7,500	15	\$7,500	15	\$7,500	15	\$ 7,500	15	\$7,500	42	\$21,000
	Lateral Kits	\$250	EA	432	\$107,955	70	\$17,577	82	\$20,438	95	\$ 23,766	111	\$27,635	129	\$32,135
	Clean Out Installation	\$1,500	EA	222	\$333,000	0		0		111	\$ 166,500	0		0	\$0
	Air Release Valve Installation	\$2,000	EA	5	\$10,000	0		0		1	\$ 2,000	0		0	\$0
	Dewatering	\$5,000	LS	2	\$10,000	0		0		1	\$ 5,000	0		0	\$0
	AC Surface Restoration	\$12	SY	6,800	\$81,600	0		0		3,800	\$ 45,600	0		0	\$0
	Native Surface Restoration	\$1	SY	17,300	\$17,300	0		0		5,500	\$ 5,500	0		0	\$0
	Abandon Septic Tank	\$750	EA	15	\$11,250	0		0		15	\$ 11,250	0		0	\$0
	<b>Subtotal Structural</b>				<b>\$1,657,132</b>		<b>\$130,536</b>		<b>\$150,568</b>		<b>\$624,237</b>		<b>\$200,948</b>		<b>\$245,944</b>
	Septic Tank w/ Pump (Installed)	\$4,000	EA	432	\$1,727,273	70	\$281,225	82	\$327,013	95	\$380,255	111	\$442,166	129	\$514,157
	Septic Tank w/ Pump - extra for existing houses	\$1,500	EA	15	\$22,500	15	\$22,500	15	\$22,500	15	\$22,500	15	\$22,500	42	\$63,000
	Site Electrical Connections - STEP	\$250	EA	432	\$107,955	70	\$17,577	82	\$20,438	95	\$23,766	111	\$27,635	129	\$32,135
	Site Electrical Connections - STEP, extra for existing houses	\$1,000	EA	15	\$15,000	15	\$15,000	15	\$15,000	15	\$15,000	15	\$15,000	42	\$42,000
	Main Pump Station	\$500,000	EA	1	\$500,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Odor Control	\$50,000	LS	2	\$100,000	0	\$0	0	\$0	1	\$50,000	0	\$0	0	\$0
	<b>Subtotal Equipment</b>				<b>\$2,472,727</b>		<b>\$336,302</b>		<b>\$384,951</b>		<b>\$491,521</b>		<b>\$507,301</b>		<b>\$651,292</b>
	Installation, Miscellaneous Mechanical		of Equip	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Electrical		of Equip	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Instrumentation and Control		of Equip	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>				<b>\$4,129,859</b>		<b>\$466,838</b>		<b>\$535,519</b>		<b>\$1,115,757</b>		<b>\$708,249</b>		<b>\$897,235</b>
	Contractor O&P		of Sub Cost	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Mobilization, demobilization, bond		of Sub cost	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Total estimated current construction cost</b>				<b>\$4,129,859</b>		<b>\$466,838</b>		<b>\$535,519</b>		<b>\$1,115,757</b>		<b>\$708,249</b>		<b>\$897,235</b>
	Escalation to time of construction			3.50%	\$144,545	3.50%	\$16,339	3.50%	\$18,743	3.50%	\$39,052	3.50%	\$24,789	3.50%	\$31,403
	<b>Total estimated construction cost</b>				<b>\$4,274,404</b>		<b>\$483,177</b>		<b>\$554,262</b>		<b>\$1,154,809</b>		<b>\$733,038</b>		<b>\$928,639</b>
	Contingency			30%	\$1,282,321	30%	\$144,953	30%	\$166,279	30%	\$346,443	30%	\$219,911	30%	\$278,592
	Engineering Design (not included for onsite costs)			15%	\$234,309	15%	\$0	15%	\$0	15%	\$67,384	15%	\$0	15%	\$0
	Construction Management (not included for onsite costs)			10%	\$156,206	10%	\$0	10%	\$0	10%	\$44,923	10%	\$0	10%	\$0
	Sales Tax			8.4%	\$466,765	8.4%	\$52,763	8.4%	\$60,525	8.4%	\$126,105	8.4%	\$80,048	8.4%	\$101,407
	<b>Total Estimated Capital Cost</b>				<b>\$6,414,000</b>		<b>\$681,000</b>		<b>\$781,000</b>		<b>\$1,740,000</b>		<b>\$1,033,000</b>		<b>\$1,309,000</b>
	<b>Total Estimated Onsite Capital Cost</b>				<b>\$4,330,000</b>		<b>\$681,000</b>		<b>\$781,000</b>		<b>\$1,140,000</b>		<b>\$1,033,000</b>		<b>\$1,309,000</b>

**Project:** Port Hadlock UGA Sewer Facility Plan  
**Subject:** Treatment System Analysis  
**By :** Tt  
**Date :** 11-Aug-08  
**July 2008**  
**ENR:** 8361.74

Item	Description	RESIDENTIAL #1				RESIDENTIAL AREA #2				2021		2022			
		2016		2017		2018		2019		2020		2021		2022	
		ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$
<b>COLLECTION - STEP SYSTEM</b>															
<b>Capital Cost Estimate</b>															
<i>Structural</i>															
	2" PVC Pressure Mains	5,738	\$86,063	5,738	\$86,063	0		1,342	\$20,125	1,342	\$20,125	1,342	\$20,125	0	\$0
	3" PVC Pressure Mains	1,325	\$21,200	1,325	\$21,200	0		0	\$0	0	\$0	0	\$0	0	\$0
	4" PVC Pressure Mains	0	\$0	0	\$0	0		0	\$0	0	\$0	0	\$0	0	\$0
	6" PVC Pressure Mains	0	\$0	0	\$0	0		0	\$0	0	\$0	0	\$0	0	\$0
	1.5" HDPE Pressure Laterals - STEP	149	\$224,201	174	\$260,704	202	\$303,150	235	\$352,508	273	\$409,901	318	\$476,639	369	\$554,243
	1.5" HDPE Pressure Laterals - extra for existing houses	42	\$21,000	41	\$20,500	41	\$20,500	42	\$21,000	26	\$13,000	40	\$20,000	40	\$20,000
	Lateral Kits	149	\$37,367	174	\$43,451	202	\$50,525	235	\$58,751	273	\$68,317	318	\$79,440	369	\$92,374
	Clean Out Installation	111	\$166,500	0	\$0	0		111	\$166,500	0	\$0	0	\$0	0	\$0
	Air Release Valve Installation	1	\$2,000	0	\$0	0		1	\$2,000	0	\$0	1	\$2,000	0	\$0
	Dewatering	1	\$5,000	0	\$0	0		1	\$5,000	0	\$0	1	\$5,000	0	\$0
	AC Surface Restoration	2,350	\$28,200	2,350	\$28,200	0		433	\$5,200	433	\$5,200	433	\$5,200	0	\$0
	Native Surface Restoration	6,850	\$6,850	6,850	\$6,850	0		3,400	\$3,400	3,400	\$3,400	3,400	\$3,400	0	\$0
	Abandon Septic Tank	42	\$31,500	0	\$0	0		42	\$31,500	0	\$0	40	\$30,000	0	\$0
	<b>Subtotal Structural</b>		<b>\$629,880</b>		<b>\$466,967</b>		<b>\$374,176</b>		<b>\$665,984</b>		<b>\$519,943</b>		<b>\$641,804</b>		<b>\$666,616</b>
	Septic Tank w/ Pump (Installed)	149	\$597,869	174	\$695,211	202	\$808,401	235	\$940,021	273	\$1,093,070	318	\$1,271,037	369	\$1,477,981
	Septic Tank w/ Pump - extra for existing houses	42	\$63,000	41	\$61,500	41	\$61,500	42	\$63,000	26	\$39,000	40	\$60,000	40	\$60,000
	Site Electrical Connections - STEP	149	\$37,367	174	\$43,451	202	\$50,525	235	\$58,751	273	\$68,317	318	\$79,440	369	\$92,374
	Site Electrical Connections - STEP, extra for existing houses	42	\$42,000	41	\$41,000	41	\$41,000	42	\$42,000	26	\$26,000	40	\$40,000	40	\$40,000
	Main Pump Station	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Odor Control	1	\$50,000	0	\$0	0	\$0	1	\$50,000	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>		<b>\$790,236</b>		<b>\$841,162</b>		<b>\$961,426</b>		<b>\$1,153,772</b>		<b>\$1,226,387</b>		<b>\$1,450,477</b>		<b>\$1,670,354</b>
	Installation, Miscellaneous Mechanical	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Electrical	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Instrumentation and Control	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>		<b>\$1,420,116</b>		<b>\$1,308,129</b>		<b>\$1,335,602</b>		<b>\$1,819,756</b>		<b>\$1,746,329</b>		<b>\$2,092,281</b>		<b>\$2,336,971</b>
	Contractor O&P	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Mobilization, demobilization, bond	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Total estimated current construction cost</b>		<b>\$1,420,116</b>		<b>\$1,308,129</b>		<b>\$1,335,602</b>		<b>\$1,819,756</b>		<b>\$1,746,329</b>		<b>\$2,092,281</b>		<b>\$2,336,971</b>
	Escalation to time of construction	3.50%	\$49,704	3.50%	\$45,785	3.50%	\$46,746	3.50%	\$63,691	3.50%	\$61,122	3.50%	\$73,230	3.50%	\$81,794
	<b>Total estimated construction cost</b>		<b>\$1,469,820</b>		<b>\$1,353,913</b>		<b>\$1,382,348</b>		<b>\$1,883,447</b>		<b>\$1,807,451</b>		<b>\$2,165,511</b>		<b>\$2,418,765</b>
	Contingency	30%	\$440,946	30%	\$406,174	30%	\$414,704	30%	\$565,034	30%	\$542,235	30%	\$649,653	30%	\$725,629
	Engineering Design (not included for onsite costs)	15%	\$46,584	15%	\$28,722	15%	\$0	15%	\$23,659	15%	\$5,797	15%	\$13,265	15%	\$0
	Construction Management (not included for onsite costs)	10%	\$31,056	10%	\$19,148	10%	\$0	10%	\$15,773	10%	\$3,865	10%	\$8,843	10%	\$0
	Sales Tax	8.4%	\$160,504	8.4%	\$147,847	8.4%	\$150,952	8.4%	\$205,672	8.4%	\$197,374	8.4%	\$236,474	8.4%	\$264,129
	<b>Total Estimated Capital Cost</b>		<b>\$2,149,000</b>		<b>\$1,956,000</b>		<b>\$1,948,000</b>		<b>\$2,694,000</b>		<b>\$2,557,000</b>		<b>\$3,074,000</b>		<b>\$3,409,000</b>
	<b>Total Estimated Onsite Capital Cost</b>		<b>\$1,735,000</b>		<b>\$1,700,000</b>		<b>\$1,948,000</b>		<b>\$2,483,000</b>		<b>\$2,505,000</b>		<b>\$2,956,000</b>		<b>\$3,409,000</b>

Project: Port Hadlock UGA Sewer Facility Plan  
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		RESIDENTIAL AREA #3																
		2023		2024			2025		2026		2027		2028		2029		2030	
Item	Description	ERUs	3069	ERUs	3568	ERUs	3666	ERUs	3768	ERUs	3872	ERUs	3978	ERUs	4088	ERUs	4201	
		Flow (mgd)	0.73	Flow (mgd)	0.85	Flow (mgd)	0.87	Flow (mgd)	0.90	Flow (mgd)	0.92	Flow (mgd)	0.95	Flow (mgd)	0.97	Flow (mgd)	1.00	
		Quantity	Cost, \$	Quantity	Unit Cost, \$	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>COLLECTION - STEP SYSTEM</b>																		
<b>Capital Cost Estimate</b>																		
<i>Structural</i>																		
	2" PVC Pressure Mains	0	\$0	7,636		\$114,536	7,636	\$114,536	7,636	\$114,536	7,636	\$114,536	7,636	\$114,536	7,636	\$114,536	7,636	\$114,536
	3" PVC Pressure Mains	0	\$0	486		\$7,771	486	\$7,771	486	\$7,771	486	\$7,771	486	\$7,771	486	\$7,771	486	\$7,771
	4" PVC Pressure Mains	0	\$0	364		\$6,557	364	\$6,557	364	\$6,557	364	\$6,557	364	\$6,557	364	\$6,557	364	\$6,557
	6" PVC Pressure Mains	0	\$0	929		\$20,429	929	\$20,429	929	\$20,429	929	\$20,429	929	\$20,429	929	\$20,429	929	\$20,429
	1.5" HDPE Pressure Laterals - STEP	430	\$644,481	500		\$749,412	98	\$147,389	101	\$151,736	104	\$155,922	107	\$160,224	110	\$164,644	113	\$169,187
	1.5" HDPE Pressure Laterals - extra for existing houses	50	\$25,000	50		\$25,000	24	\$12,000	48	\$24,000	48	\$24,000	48	\$24,000	107	\$53,500	107	\$53,500
	Lateral Kits	430	\$107,414	500		\$124,902	98	\$24,565	101	\$25,289	104	\$25,987	107	\$26,704	110	\$27,441	113	\$28,198
	Clean Out Installation	0	\$0	111		\$166,500	0	\$0	0	\$0	0	\$0	111	\$166,500	0	\$0	0	\$0
	Air Release Valve Installation	0	\$0	1		\$2,000	0	\$0	1	\$2,000	0	\$0	1	\$2,000	0	\$0	0	\$0
	Dewatering	0	\$0	1		\$5,000	0	\$0	1	\$5,000	0	\$0	1	\$5,000	0	\$0	0	\$0
	AC Surface Restoration	0	\$0	933		\$11,200	0	\$0	933	\$11,200	933	\$11,200	933	\$11,200	1,400	\$16,800	1,400	\$16,800
	Native Surface Restoration	0	\$0	6,667		\$6,667	0	\$0	1,333	\$1,333	1,400	\$1,400	1,433	\$1,433	2,200	\$2,200	2,250	\$2,250
	Abandon Septic Tank	0	\$0	50		\$37,500	0	\$0	48	\$36,000	48	\$36,000	48	\$36,000	107	\$80,250	107	\$80,250
	<b>Subtotal Structural</b>		<b>\$776,895</b>			<b>\$1,277,474</b>		<b>\$333,247</b>		<b>\$405,851</b>		<b>\$403,802</b>		<b>\$582,354</b>		<b>\$494,128</b>		<b>\$499,478</b>
	Septic Tank w/ Pump (Installed)	430	\$1,718,617	500		\$1,998,433	98	\$393,037	101	\$404,628	104	\$415,792	107	\$427,264	110	\$439,052	113	\$451,165
	Septic Tank w/ Pump - extra for existing houses	50	\$75,000	50		\$75,000	24	\$36,000	48	\$72,000	48	\$72,000	48	\$72,000	107	\$160,500	107	\$160,500
	Site Electrical Connections - STEP	430	\$107,414	500		\$124,902	98	\$24,565	101	\$25,289	104	\$25,987	107	\$26,704	110	\$27,441	113	\$28,198
	Site Electrical Connections - STEP, extra for existing houses	50	\$50,000	50		\$50,000	24	\$24,000	48	\$48,000	48	\$48,000	48	\$48,000	107	\$107,000	107	\$107,000
	Main Pump Station	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Odor Control	0	\$0	1		\$50,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>		<b>\$1,951,031</b>			<b>\$2,298,335</b>		<b>\$477,602</b>		<b>\$549,918</b>		<b>\$561,779</b>		<b>\$573,968</b>		<b>\$733,993</b>		<b>\$746,863</b>
	Installation, Miscellaneous Mechanical	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Electrical	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Instrumentation and Control	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>		<b>\$2,727,926</b>			<b>\$3,575,809</b>		<b>\$810,848</b>		<b>\$955,769</b>		<b>\$965,581</b>		<b>\$1,156,322</b>		<b>\$1,228,121</b>		<b>\$1,246,341</b>
	Contractor O&P	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Mobilization, demobilization, bond	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Total estimated current construction cost</b>		<b>\$2,727,926</b>			<b>\$3,575,809</b>		<b>\$810,848</b>		<b>\$955,769</b>		<b>\$965,581</b>		<b>\$1,156,322</b>		<b>\$1,228,121</b>		<b>\$1,246,341</b>
	Escalation to time of construction	3.50%	\$95,477	3.50%		\$125,153	3.50%	\$28,380	3.50%	\$33,452	3.50%	\$33,795	3.50%	\$40,471	3.50%	\$42,984	3.50%	\$43,622
	<b>Total estimated construction cost</b>		<b>\$2,823,403</b>			<b>\$3,700,962</b>		<b>\$839,228</b>		<b>\$989,220</b>		<b>\$999,376</b>		<b>\$1,196,793</b>		<b>\$1,271,105</b>		<b>\$1,289,963</b>
	Contingency	30%	\$847,021	30%		\$1,110,289	30%	\$251,768	30%	\$296,766	30%	\$299,813	30%	\$359,038	30%	\$381,331	30%	\$386,989
	Engineering Design (not included for onsite costs)	15%	(\$0)	15%		\$52,809	15%	\$30,131	15%	\$41,339	15%	\$39,940	15%	\$41,359	15%	\$50,162	15%	\$50,172
	Construction Management (not included for onsite costs)	10%	(\$0)	10%		\$35,206	10%	\$20,087	10%	\$27,559	10%	\$26,626	10%	\$27,573	10%	\$33,441	10%	\$33,448
	Sales Tax	8.4%	\$308,316	8.4%		\$404,145	8.4%	\$91,644	8.4%	\$108,023	8.4%	\$109,132	8.4%	\$130,690	8.4%	\$138,805	8.4%	\$140,864
	<b>Total Estimated Capital Cost</b>		<b>\$3,979,000</b>			<b>\$5,303,000</b>		<b>\$1,233,000</b>		<b>\$1,463,000</b>		<b>\$1,475,000</b>		<b>\$1,755,000</b>		<b>\$1,875,000</b>		<b>\$1,901,000</b>
	<b>Total Estimated Onsite Capital Cost</b>		<b>\$3,979,000</b>			<b>\$4,834,000</b>		<b>\$965,000</b>		<b>\$1,095,000</b>		<b>\$1,120,000</b>		<b>\$1,388,000</b>		<b>\$1,429,000</b>		<b>\$1,455,000</b>



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 Subject: Treatment System Analysis  
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		RESIDENTIAL #1				RESIDENTIAL AREA #2									
		2016		2017		2018		2019		2020		2021		2022	
		ERUs	1067	ERUs	1241	ERUs	1443	ERUs	1678	ERUs	1952	ERUs	2269	ERUs	2639
		Flow (mgd)	0.25	Flow (mgd)	0.30	Flow (mgd)	0.34	Flow (mgd)	0.40	Flow (mgd)	0.46	Flow (mgd)	0.54	Flow (mgd)	0.63
Item	Description	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>COLLECTION - STEP SYSTEM</b>															
<b>Operations and Maintenance Cost Estimate (per year)</b>															
Item	Description														
	Labor	1119.489269	\$44,780	1293.291982	\$51,732	1495.392294	\$59,816	1730.397464	\$69,216	2003.664879	\$80,147	2321.424187	\$92,857	2690.919313	\$107,637
	Septic tank pumping	213	\$64,049	248	\$74,478	289	\$86,604	336	\$100,704	390	\$117,100	454	\$136,165	528	\$158,335
	Diesel oil	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Power	290550	\$21,791	337855	\$25,339	392863	\$29,465	456827	\$34,262	531205	\$39,840	617693	\$46,327	718262	\$53,870
	Chemicals	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Hypochlorite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sodium Bisulfite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Polymer	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc expenses	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Total Annual Cost</b>		<b>\$130,620</b>		<b>\$151,548</b>		<b>\$175,884</b>		<b>\$204,182</b>		<b>\$237,087</b>		<b>\$275,349</b>		<b>\$319,842</b>
	Structural Maintenance	2%	\$72,785	2%	\$82,124	2%	\$89,608	2%	\$102,927	2%	\$113,326	2%	\$126,162	2%	\$139,495
	Equipment replacement	4%	\$225,373	4%	\$259,020	4%	\$297,477	4%	\$343,628	4%	\$392,683	4%	\$450,702	4%	\$517,516
	<b>Total Annual Cost with Replacement Costs</b>		<b>\$428,778</b>		<b>\$492,692</b>		<b>\$562,968</b>		<b>\$650,737</b>		<b>\$743,096</b>		<b>\$852,214</b>		<b>\$976,853</b>

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		RESIDENTIAL AREA #3																
		2023		2024		2025		2026		2027		2028		2029		2030		
Item	Description	ERUs	3069	ERUs	3568	ERUs	3666	ERUs	3768	ERUs	3872	ERUs	3978	ERUs	4088	ERUs	4201	
		Flow (mgd)	0.73	Flow (mgd)	0.85	Flow (mgd)	0.87	Flow (mgd)	0.90	Flow (mgd)	0.92	Flow (mgd)	0.95	Flow (mgd)	0.97	Flow (mgd)	1.00	
		Quantity	Cost, \$	Quantity	Unit Cost, \$	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>COLLECTION - STEP SYSTEM</b>																		
<b>Operations and Maintenance Cost Estimate (per year)</b>																		
Item	Description																	
	Labor	3120.573596	\$124,823	3620.181819		\$144,807	3718.441072	\$148,738	3819.598133	\$152,784	3923.546116	\$156,942	4030.362023	\$161,214	4140.124978	\$165,605	4252.916293	\$170,117
	Septic tank pumping	614	\$184,114	714		\$214,091	733	\$219,986	754	\$226,056	774	\$232,293	796	\$238,702	818	\$245,287	840	\$252,055
	Diesel oil	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Power	835206	\$62,640	971190		\$72,839	997934	\$74,845	1025467	\$76,910	1053759	\$79,032	1082833	\$81,212	1112708	\$83,453	1143407	\$85,756
	Chemicals	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Hypochlorite	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sodium Bisulfite	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Polymer	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc expenses	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Total Annual Cost</b>		<b>\$371,578</b>			<b>\$431,737</b>		<b>\$443,569</b>		<b>\$455,750</b>		<b>\$468,267</b>		<b>\$481,129</b>		<b>\$494,346</b>		<b>\$507,927</b>
	Structural Maintenance	2%	\$155,033	2%		\$180,582	2%	\$187,247	2%	\$195,364	2%	\$203,440	2%	\$215,087	2%	\$224,970	2%	\$234,959
	Equipment replacement	4%	\$595,558	4%		\$687,491	4%	\$706,595	4%	\$728,592	4%	\$751,063	4%	\$774,022	4%	\$803,381	4%	\$833,256
	<b>Total Annual Cost with Replacement Costs</b>		<b>\$1,122,168</b>			<b>\$1,299,810</b>		<b>\$1,337,411</b>		<b>\$1,379,706</b>		<b>\$1,422,769</b>		<b>\$1,470,237</b>		<b>\$1,522,697</b>		<b>\$1,576,142</b>

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Updated Unit Costs

Item	Description	Unit cost, \$	Unit	CORE PLUS ALCOHOL				RHODY DRIVE							
				2010		2011		2012		2013		2014		2015	
				ERUs Flow (mgd)	432 Cost, \$	ERUs Flow (mgd)	502 Cost, \$	ERUs Flow (mgd)	584 Cost, \$	ERUs Flow (mgd)	679 Cost, \$	ERUs Flow (mgd)	789 Cost, \$	ERUs Flow (mgd)	918 Cost, \$
<b>COLLECTION - GRAVITY SYSTEM</b>				Quantity	116	Quantity		Quantity		Quantity	204	Quantity		Quantity	
<b>Capital Cost Estimate</b>															
<i>Structural</i>															
	8" PVC Gravity Main (8' to 10' deep)	\$80	LF	5,307	\$424,560	0	\$0	0	\$0	4119	\$329,520	0	\$0	0	\$0
	8" PVC Gravity Main (10' to 12' deep)	\$90	LF	1,030	\$92,700	0	\$0	0	\$0	1142	\$102,780	0	\$0	0	\$0
	8" PVC Gravity Main (12' to 14' deep)	\$100	LF	1,487	\$148,700	0	\$0	0	\$0	1251	\$125,100	0	\$0	0	\$0
	8" PVC Gravity Main (14' to 16' deep)	\$125	LF	1,702	\$212,750	0	\$0	0	\$0	1940	\$242,500	0	\$0	0	\$0
	8" PVC Gravity Main (16'-20' deep)	\$126	LF	2,760	\$347,760	0	\$0	0	\$0	2803	\$353,178	0	\$0	0	\$0
	8" PVC Gravity Main (20' to 25' deep)	\$180	LF	837	\$150,660	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	8" PVC Gravity Main (25' to 30' deep)	\$217	LF	391	\$84,847	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	10" PVC Gravity Main (20' to 25' deep)	\$190	LF	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (8' to 10' deep)	\$96	LF	1,040	\$99,840	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (10' to 12' deep)	\$108	LF	387	\$41,796	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (12' to 14' deep)	\$120	LF	672	\$80,640	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (14' to 16' deep)	\$150	LF	152	\$22,800	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (16'-20' deep)	\$151	LF	500	\$75,600	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (20' to 25' deep)	\$183	LF	1,648	\$301,584	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	14" PVC Gravity Main (8' to 10' deep)	\$109	LF	1,171	\$127,405	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	14" PVC Gravity Main (10' to 12' deep)	\$122	LF	451	\$55,202	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	4" PVC Force Main	\$32	LF	8,176	\$261,632	0	\$0	0	\$0	1827	\$58,464	0	\$0	0	\$0
	12" PVC Force Main	\$65	LF	7,323	\$475,995	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	4" PVC Gravity Laterals (Side Sewers)	\$2,000	EA	432	\$863,636	70	\$140,613	82	\$163,506	95	\$190,127	111	\$221,083	129	\$257,078
	4" PVC Gravity Laterals - extra for existing houses	\$1,000	EA	15	\$15,000	15	\$15,000	15	\$15,000	15	\$15,000	15	\$15,000	42	\$42,000
	1.5" HDPE Pressure Laterals - Grinder	\$2,400	EA	8	\$19,200	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Lateral Kits	\$250	EA	8	\$2,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (8' to 10' deep)	\$ 3,225	EA	12	\$38,701	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (8' to 12' deep)	\$ 3,925	EA	4	\$15,701	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (12' to 14' deep)	\$ 4,626	EA	4	\$18,502	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (14' to 16' deep)	\$ 5,326	EA	4	\$21,303	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (16' to 20' deep)	\$ 6,376	EA	2	\$12,752	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (20' to 25' deep)	\$ 7,952	EA	2	\$15,903	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (25' to 30' deep)	\$ 9,702	EA	5	\$48,512	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Dewatering	\$50,000	LS	1	\$50,000	0	\$0	0	\$0	1	\$50,000	0	\$0	0	\$0
	AC Surface Restoration	\$30	SY	6,512	\$195,350	0	\$0	0	\$0	3,752	\$112,550	0	\$0	0	\$0
	Native Surface Restoration	\$1	SY	17,300	\$17,300	2,800	\$2,800	3,300	\$3,300	3,800	\$3,800	4,400	\$4,400	5,100	\$5,100
	Abandon Septic Tank	\$750	EA	15	\$11,250	15	\$11,250	15	\$11,250	15	\$11,250	15	\$11,250	42	\$31,500
<b>Subtotal Structural</b>					\$4,349,584		\$169,663		\$193,056		\$1,594,269		\$251,733		\$335,678
	Grinder Pump (Installed)	\$4,500	EA	8	\$36,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Electrical Connections - Grinder	\$500	EA	8	\$4,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Main Pump Station (2.1 mgd)	\$500,000	EA	1	\$500,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Medium Pump Station	\$375,000	EA	0	\$0	0	\$0	0	\$0	1	\$375,000	0	\$0	0	\$0
	Small Pump Station (0.036 mgd)	\$250,000	EA	2	\$500,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
<b>Subtotal Equipment</b>					\$1,040,000		\$0		\$0		\$375,000		\$0		\$0
	Installation, Miscellaneous Mechanical		of Equip	40%	\$200,000	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Electrical		of Equip	20%	\$100,000	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Instrumentation and Control		of Equip	15%	\$75,000	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>					\$5,764,584		\$169,663		\$193,056		\$1,969,269		\$251,733		\$335,678
	Contractor O&P		of Sub Cost	15%	\$75,000	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Mobilization, demobilization, bond		of Sub cost	6%	\$30,000	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
<b>Total estimated current construction cost</b>					\$5,869,584		\$169,663		\$193,056		\$1,969,269		\$251,733		\$335,678
	Escalation to time of construction			3.50%	\$205,435	3.50%	\$5,938	3.50%	\$6,757	3.50%	\$68,924	3.50%	\$8,811	3.50%	\$11,749
<b>Total estimated construction cost</b>					\$6,075,019		\$175,601		\$199,813		\$2,038,194		\$260,544		\$347,427
	Contingency			30%	\$1,822,506	30%	\$52,680	30%	\$59,944	30%	\$611,458	30%	\$78,163	30%	\$104,228
	Engineering Design			15%	\$989,184	15%	\$0	15%	\$0	15%	\$353,010	15%	\$0	15%	(\$0)
	Construction Management			10%	\$659,456	10%	\$0	10%	\$0	10%	\$235,340	10%	\$0	10%	(\$0)
	Sales Tax			8.4%	\$663,392	8.4%	\$19,176	8.4%	\$21,820	8.4%	\$222,571	8.4%	\$28,451	8.4%	\$37,939
<b>Total Estimated Capital Cost</b>					\$10,210,000		\$247,000		\$282,000		\$3,461,000		\$367,000		\$490,000
<b>Total Estimated Onsite Capital Cost</b>					\$1,412,000		\$247,000		\$282,000		\$321,000		\$367,000		\$490,000

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Item	Description	RESIDENTIAL #1				RESIDENTIAL AREA #2									
		2016		2017		2018		2019		2020		2021		2022	
		ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$
	<b>COLLECTION - GRAVITY SYSTEM</b>	102				1443			1678			1952			2639
	<b>Capital Cost Estimate</b>														
	<i>Structural</i>														
	8" PVC Gravity Main (8' to 10' deep)	1,297	\$103,760	1,297	\$103,760	0	\$0	700	\$56,000	700	\$56,000	700	\$56,000	0	\$0
	8" PVC Gravity Main (10' to 12' deep)	716	\$64,395	716	\$64,395	0	\$0	197	\$17,700	197	\$17,700	197	\$17,700	0	\$0
	8" PVC Gravity Main (12' to 14' deep)	1,166	\$116,600	1,166	\$116,600	0	\$0	357	\$35,733	357	\$35,733	357	\$35,733	0	\$0
	8" PVC Gravity Main (14' to 16' deep)	528	\$66,000	528	\$66,000	0	\$0	103	\$12,875	103	\$12,875	103	\$12,875	0	\$0
	8" PVC Gravity Main (16'-20' deep)	1,252	\$157,689	1,252	\$157,689	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	8" PVC Gravity Main (20' to 25' deep)	443	\$79,650	443	\$79,650	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	8" PVC Gravity Main (25' to 30' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	10" PVC Gravity Main (20' to 25' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (8' to 10' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (10' to 12' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (12' to 14' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (14' to 16' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (16'-20' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (20' to 25' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	14" PVC Gravity Main (8' to 10' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	14" PVC Gravity Main (10' to 12' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	4" PVC Force Main	0	\$0	0	\$0	0	\$0	2829	\$90,528	0	\$0	0	\$0	0	\$0
	12" PVC Force Main	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	4" PVC Gravity Laterals (Side Sewers)	149	\$298,935	174	\$347,605	202	\$404,201	235	\$470,010	273	\$546,535	318	\$635,519	369	\$738,990
	4" PVC Gravity Laterals - extra for existing houses	42	\$42,000	41	\$41,000	41	\$41,000	42	\$42,000	26	\$26,000	40	\$40,000	40	\$40,000
	1.5" HDPE Pressure Laterals - Grinder	5	\$12,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Lateral Kits	5	\$1,250	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (8' to 10' deep)	4	\$12,900	3	\$9,675	0	\$0	3	\$9,675	2	\$6,450	2	\$6,450	0	\$0
	48" MH (8' to 12' deep)	2	\$7,851	2	\$7,851	0	\$0	1	\$3,925	1	\$3,925	0	\$0	0	\$0
	48" MH (12' to 14' deep)	3	\$13,877	3	\$13,877	0	\$0	2	\$9,251	1	\$4,626	1	\$4,626	0	\$0
	48" MH (14' to 16' deep)	2	\$10,652	1	\$5,326	0	\$0	1	\$5,326	0	\$0	0	\$0	0	\$0
	48" MH (16' to 20' deep)	4	\$25,505	3	\$19,129	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (20' to 25' deep)	2	\$15,903	1	\$7,952	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (25' to 30' deep)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Dewatering	1	\$50,000	1	\$50,000	0	\$0	1	\$50,000	1	\$50,000	1	\$50,000	0	\$0
	AC Surface Restoration	1,800	\$54,005	1,800	\$54,005	0	\$0	452	\$13,570	452	\$13,570	452	\$13,570	0	\$0
	Native Surface Restoration	6,000	\$6,000	7,000	\$7,000	8,100	\$8,100	9,400	\$9,400	10,900	\$10,900	12,700	\$12,700	14,800	\$14,800
	Abandon Septic Tank	42	\$31,500	41	\$30,750	41	\$30,750	42	\$31,500	26	\$19,500	40	\$30,000	40	\$30,000
	<b>Subtotal Structural</b>		<b>\$1,170,472</b>		<b>\$1,182,263</b>		<b>\$484,051</b>		<b>\$857,494</b>		<b>\$803,814</b>		<b>\$915,173</b>		<b>\$823,790</b>
	Grinder Pump (Installed)	5	\$22,500	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Electrical Connections - Grinder	5	\$2,500	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Main Pump Station (2.1 mgd)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Medium Pump Station	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Small Pump Station (0.036 mgd)	0	\$0	0	\$0	0	\$0	1	\$250,000	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>		<b>\$25,000</b>		<b>\$0</b>		<b>\$0</b>		<b>\$250,000</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
	Installation, Miscellaneous Mechanical	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Electrical	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Instrumentation and Control	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>		<b>\$1,195,472</b>		<b>\$1,182,263</b>		<b>\$484,051</b>		<b>\$1,107,494</b>		<b>\$803,814</b>		<b>\$915,173</b>		<b>\$823,790</b>
	Contractor O&P	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Mobilization, demobilization, bond	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Total estimated current construction cost</b>		<b>\$1,195,472</b>		<b>\$1,182,263</b>		<b>\$484,051</b>		<b>\$1,107,494</b>		<b>\$803,814</b>		<b>\$915,173</b>		<b>\$823,790</b>
	Escalation to time of construction	3.50%	\$41,842	3.50%	\$41,379	3.50%	\$16,942	3.50%	\$38,762	3.50%	\$28,134	3.50%	\$32,031	3.50%	\$28,833
	<b>Total estimated construction cost</b>		<b>\$1,237,313</b>		<b>\$1,223,643</b>		<b>\$500,992</b>		<b>\$1,146,257</b>		<b>\$831,948</b>		<b>\$947,204</b>		<b>\$852,623</b>
	Contingency	30%	\$371,194	30%	\$367,093	30%	\$150,298	30%	\$343,877	30%	\$249,584	30%	\$284,161	30%	\$255,787
	Engineering Design	15%	\$157,179	15%	\$152,561	15%	\$0	15%	\$111,929	15%	\$40,543	15%	\$39,750	15%	\$0
	Construction Management	10%	\$104,786	10%	\$101,707	10%	\$0	10%	\$74,619	10%	\$27,028	10%	\$26,500	10%	\$0
	Sales Tax	8.4%	\$135,115	8.4%	\$133,622	8.4%	\$54,708	8.4%	\$125,171	8.4%	\$90,849	8.4%	\$103,435	8.4%	\$93,106
	<b>Total Estimated Capital Cost</b>		<b>\$2,006,000</b>		<b>\$1,979,000</b>		<b>\$706,000</b>		<b>\$1,802,000</b>		<b>\$1,240,000</b>		<b>\$1,401,000</b>		<b>\$1,202,000</b>
	<b>Total Estimated Onsite Capital Cost</b>		<b>\$608,000</b>		<b>\$622,000</b>		<b>\$706,000</b>		<b>\$806,000</b>		<b>\$879,000</b>		<b>\$1,048,000</b>		<b>\$1,202,000</b>

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

		RESIDENTIAL AREA #3																
		2023		2024		2025		2026		2027		2028		2029		2030		
		ERUs	3069	ERUs	3568	ERUs	3666	ERUs	3768	ERUs	3872	ERUs	3978	ERUs	4088	ERUs	4201	
		Flow (mgd)	0.73	Flow (mgd)	0.85	Flow (mgd)	0.87	Flow (mgd)	0.90	Flow (mgd)	0.92	Flow (mgd)	0.95	Flow (mgd)	0.97	Flow (mgd)	1.00	
Item	Description	Quantity	Cost, \$	Quantity	Unit Cost, \$	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>COLLECTION - GRAVITY SYSTEM</b>																		
<b>Capital Cost Estimate</b>																		
<i>Structural</i>																		
	8" PVC Gravity Main (8' to 10' deep)	0	\$0	1,432		\$114,526	1,432	\$114,526	1,432	\$114,526	1,432	\$114,526	1,432	\$114,526	1,432	\$114,526	1,432	\$114,526
	8" PVC Gravity Main (10' to 12' deep)	0	\$0	569		\$51,210	569	\$51,210	569	\$51,210	569	\$51,210	569	\$51,210	569	\$51,210	569	\$51,210
	8" PVC Gravity Main (12' to 14' deep)	0	\$0	642		\$64,157	642	\$64,157	642	\$64,157	642	\$64,157	642	\$64,157	642	\$64,157	642	\$64,157
	8" PVC Gravity Main (14' to 16' deep)	0	\$0	2,198		\$274,696	398	\$49,696	398	\$49,696	398	\$49,696	398	\$49,696	398	\$49,696	398	\$49,696
	8" PVC Gravity Main (16'-20' deep)	0	\$0	3,835		\$483,174	2,035	\$256,374	2,035	\$256,374	2,035	\$256,374	2,035	\$256,374	2,035	\$256,374	2,035	\$256,374
	8" PVC Gravity Main (20' to 25' deep)	0	\$0	1,007		\$181,209	1,121	\$201,780	1,121	\$201,780	1,121	\$201,780	1,121	\$201,780	1,121	\$201,780	1,121	\$201,780
	8" PVC Gravity Main (25' to 30' deep)	0	\$0	442		\$95,914	442	\$95,914	442	\$95,914	442	\$95,914	442	\$95,914	442	\$95,914	442	\$95,914
	10" PVC Gravity Main (20' to 25' deep)	0	\$0	800		\$152,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (8' to 10' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (10' to 12' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (12' to 14' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (14' to 16' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (16'-20' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Gravity Main (20' to 25' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	14" PVC Gravity Main (8' to 10' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	14" PVC Gravity Main (10' to 12' deep)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	4" PVC Force Main	0	\$0	2,857		\$91,424	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	12" PVC Force Main	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	4" PVC Gravity Laterals (Side Sewers)	430	\$859,309	500		\$999,216	98	\$196,519	101	\$202,314	104	\$207,896	107	\$213,632	110	\$219,526	113	\$225,583
	4" PVC Gravity Laterals - extra for existing houses	50	\$50,000	50		\$50,000	24	\$24,000	48	\$48,000	48	\$48,000	48	\$48,000	107	\$107,000	107	\$107,000
	1.5" HDPE Pressure Laterals - Grinder	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Lateral Kits	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	48" MH (8' to 10' deep)	0	\$0	0		\$0	5	\$15,051	5	\$15,051	5	\$15,051	5	\$15,051	5	\$15,051	5	\$15,051
	48" MH (8' to 12' deep)	0	\$0	0		\$0	2	\$7,851	2	\$7,851	2	\$7,851	2	\$7,851	2	\$7,851	2	\$7,851
	48" MH (12' to 14' deep)	0	\$0	0		\$0	2	\$10,022	2	\$10,022	2	\$10,022	2	\$10,022	2	\$10,022	2	\$10,022
	48" MH (14' to 16' deep)	0	\$0	0		\$0	2	\$12,427	2	\$12,427	2	\$12,427	2	\$12,427	2	\$12,427	2	\$12,427
	48" MH (16' to 20' deep)	0	\$0	21		\$133,900	5	\$28,693	5	\$28,693	5	\$28,693	5	\$28,693	5	\$28,693	5	\$28,693
	48" MH (20' to 25' deep)	0	\$0	0		\$0	4	\$27,831	4	\$27,831	4	\$27,831	4	\$27,831	4	\$27,831	4	\$27,831
	48" MH (25' to 30' deep)	0	\$0	0		\$0	1	\$9,702	1	\$9,702	1	\$9,702	1	\$9,702	1	\$9,702	1	\$9,702
	Dewatering	0	\$0	3		\$150,000	0	\$0	0	\$0	0	\$0	1	\$50,000	1	\$50,000	0	\$0
	AC Surface Restoration	0	\$0	3,641		\$109,231	2,212	\$66,374	2,212	\$66,374	2,212	\$66,374	2,212	\$66,374	2,212	\$66,374	2,212	\$66,374
	Native Surface Restoration	17,200	\$17,200	20,000		\$20,000	3,900	\$3,900	4,000	\$4,000	4,200	\$4,200	4,300	\$4,300	4,400	\$4,400	4,500	\$4,500
	Abandon Septic Tank	50	\$37,500	50		\$37,500	24	\$18,000	48	\$36,000	48	\$36,000	48	\$36,000	107	\$80,250	107	\$80,250
	<b>Subtotal Structural</b>		<b>\$964,009</b>			<b>\$3,008,158</b>		<b>\$1,254,027</b>		<b>\$1,301,922</b>		<b>\$1,307,704</b>		<b>\$1,363,540</b>		<b>\$1,472,784</b>		<b>\$1,428,941</b>
	Grinder Pump (Installed)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Electrical Connections - Grinder	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Main Pump Station (2.1 mgd)	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Medium Pump Station	0	\$0	1		\$375,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Small Pump Station (0.036 mgd)	0	\$0	1		\$250,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>		<b>\$0</b>			<b>\$625,000</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
	Installation, Miscellaneous Mechanical	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Electrical	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Instrumentation and Control	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>		<b>\$964,009</b>			<b>\$3,633,158</b>		<b>\$1,254,027</b>		<b>\$1,301,922</b>		<b>\$1,307,704</b>		<b>\$1,363,540</b>		<b>\$1,472,784</b>		<b>\$1,428,941</b>
	Contractor O&P	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	Mobilization, demobilization, bond	0%	\$0	0%		\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$0
	<b>Total estimated current construction cost</b>		<b>\$964,009</b>			<b>\$3,633,158</b>		<b>\$1,254,027</b>		<b>\$1,301,922</b>		<b>\$1,307,704</b>		<b>\$1,363,540</b>		<b>\$1,472,784</b>		<b>\$1,428,941</b>
	Escalation to time of construction	3.50%	\$33,740	3.50%		\$127,161	3.50%	\$43,891	3.50%	\$45,567	3.50%	\$45,770	3.50%	\$47,724	3.50%	\$51,547	3.50%	\$50,013
	<b>Total estimated construction cost</b>		<b>\$997,749</b>			<b>\$3,760,318</b>		<b>\$1,297,918</b>		<b>\$1,347,490</b>		<b>\$1,353,474</b>		<b>\$1,411,264</b>		<b>\$1,524,332</b>		<b>\$1,478,954</b>
	Contingency	30%	\$299,325	30%		\$1,128,096	30%	\$389,375	30%	\$404,247	30%	\$406,042	30%	\$423,379	30%	\$457,299	30%	\$443,686
	Engineering Design	15%	(\$0)	15%		\$509,899	15%	\$204,168	15%	\$204,168	15%	\$204,168	15%	\$214,259	15%	\$214,259	15%	\$204,168
	Construction Management	10%	(\$0)	10%		\$339,933	10%	\$136,112	10%	\$136,112	10%	\$136,112	10%	\$142,839	10%	\$142,839	10%	\$136,112
	Sales Tax	8.4%	\$108,954	8.4%		\$410,627	8.4%	\$141,733	8.4%	\$147,146	8.4%	\$147,799	8.4%	\$154,110	8.4%	\$166,457	8.4%	\$161,502
	<b>Total Estimated Capital Cost</b>		<b>\$1,406,000</b>			<b>\$6,149,000</b>		<b>\$2,169,000</b>		<b>\$2,239,000</b>		<b>\$2,248,000</b>		<b>\$2,346,000</b>		<b>\$2,505,000</b>		<b>\$2,424,000</b>
	<b>Total Estimated Onsite Capital Cost</b>		<b>\$1,406,000</b>			<b>\$1,614,000</b>		<b>\$354,000</b>		<b>\$423,000</b>		<b>\$432,000</b>		<b>\$440,000</b>		<b>\$600,000</b>		<b>\$609,000</b>

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Updated Unit Costs

			CORE PLUS ALCOHOL						RHODY DRIVE					
			2010		2011		2012		2013		2014		2015	
Item	Description	Unit cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>COLLECTION - GRAVITY SYSTEM</b>														
<b>Operations and Maintenance Cost Estimate (per year)</b>														
Item	Description													
	Labor	\$40	188	\$7,520	188	\$7,520	188	\$7,520	240	\$9,600	240	\$9,600	240	\$9,600
	Septic tank pumping	\$300		\$0		\$0		\$0		\$0		\$0		\$0
	Diesel oil	\$4.50		\$0		\$0		\$0		\$0		\$0		\$0
	Power	\$0.08	123390	\$9,254	125571	\$9,418	128109	\$9,608	185495	\$13,912	188926	\$14,169	192915	\$14,469
	Structural Maintenance			\$0		\$0		\$0		\$0		\$0		\$0
	Equipment replacement			\$0		\$0		\$0		\$0		\$0		\$0
	Chemicals	\$0.00		\$0		\$0		\$0		\$0		\$0		\$0
	Hypochlorite	\$0.60	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sodium Bisulfite	\$0.20	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Polymer	\$3.00		\$0		\$0		\$0		\$0		\$0		\$0
	Misc expenses allowance			\$0		\$0		\$0		\$0		\$0		\$0
<b>Total Annual Cost</b>				\$16,774		\$16,938		\$17,128		\$23,512		\$23,769		\$24,069
Structural Maintenance			2%	\$86,992	2%	\$90,385	2%	\$94,246	2%	\$126,131	2%	\$131,166	2%	\$137,880
Equipment replacement			4%	\$41,600	4%	\$41,600	4%	\$41,600	4%	\$56,600	4%	\$56,600	4%	\$56,600
<b>Total Annual Cost with Replacement Costs</b>				\$145,366		\$148,923		\$152,974		\$206,244		\$211,536		\$218,548

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		RESIDENTIAL #1				RESIDENTIAL AREA #2									
		2016		2017		2018		2019		2020		2021		2022	
		ERUs	1067	ERUs	1241	ERUs	1443	ERUs	1678	ERUs	1952	ERUs	2269	ERUs	2639
		Flow (mgd)	0.25	Flow (mgd)	0.30	Flow (mgd)	0.34	Flow (mgd)	0.40	Flow (mgd)	0.46	Flow (mgd)	0.54	Flow (mgd)	0.63
Item	Description	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>COLLECTION - GRAVITY SYSTEM</b>															
<b>Operations and Maintenance Cost Estimate (per year)</b>															
Item	Description														
	Labor	260	\$10,400	260	\$10,400	260	\$10,400	312	\$12,480	312	\$12,480	312	\$12,480	312	\$12,480
	Septic tank pumping		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Diesel oil		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Power	251990	\$18,899	257384	\$19,304	263656	\$19,774	325385	\$24,404	333866	\$25,040	343727	\$25,780	300759	\$22,557
	Structural Maintenance	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0
	Equipment replacement	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0
	Chemicals		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Hypochlorite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sodium Bisulfite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Polymer		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Misc expenses		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	<b>Total Annual Cost</b>		<b>\$29,299</b>		<b>\$29,704</b>		<b>\$30,174</b>		<b>\$36,884</b>		<b>\$37,520</b>		<b>\$38,260</b>		<b>\$35,037</b>
	Structural Maintenance	2%	\$161,289	2%	\$184,934	2%	\$194,615	2%	\$211,765	2%	\$227,842	2%	\$246,145	2%	\$262,621
	Equipment replacement	4%	\$57,600	4%	\$57,600	4%	\$57,600	4%	\$67,600	4%	\$67,600	4%	\$67,600	4%	\$67,600
	<b>Total Annual Cost with Replacement Costs</b>		<b>\$248,188</b>		<b>\$272,238</b>		<b>\$282,390</b>		<b>\$316,249</b>		<b>\$332,961</b>		<b>\$352,005</b>		<b>\$365,258</b>

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		RESIDENTIAL AREA #3																
		2023		2024		2025		2026		2027		2028		2029		2030		
Item	Description	ERUs	3069	ERUs	3568	ERUs	3666	ERUs	3768	ERUs	3872	ERUs	3978	ERUs	4088	ERUs	4201	
		Flow (mgd)	0.73	Flow (mgd)	0.85	Flow (mgd)	0.87	Flow (mgd)	0.90	Flow (mgd)	0.92	Flow (mgd)	0.95	Flow (mgd)	0.97	Flow (mgd)	1.00	
		Quantity	Cost, \$	Quantity	Unit Cost, \$	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>COLLECTION - GRAVITY SYSTEM</b>																		
<b>Operations and Maintenance Cost Estimate (per year)</b>																		
Item	Description																	
	Labor	312	\$12,480	416		\$16,640	416	\$16,640	416	\$16,640	416	\$16,640	416	\$16,640	416	\$16,640	416	\$16,640
	Septic tank pumping		\$0			\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Diesel oil		\$0			\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Power	368529	\$27,640	492906		\$36,968	495956	\$37,197	499095	\$37,432	502321	\$37,674	505636	\$37,923	509043	\$38,178	512543	\$38,441
	Structural Maintenance	2%	\$0	2%		\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0
	Equipment replacement	4%	\$0	4%		\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0
	Chemicals		\$0			\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Hypochlorite	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sodium Bisulfite	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Polymer		\$0			\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Misc expenses		\$0			\$0		\$0		\$0		\$0		\$0		\$0		\$0
	<b>Total Annual Cost</b>		<b>\$40,120</b>			<b>\$53,608</b>		<b>\$53,837</b>		<b>\$54,072</b>		<b>\$54,314</b>		<b>\$54,563</b>		<b>\$54,818</b>		<b>\$55,081</b>
	Structural Maintenance	2%	\$281,901	2%		\$342,064	2%	\$367,145	2%	\$393,183	2%	\$419,337	2%	\$446,608	2%	\$476,064	2%	\$504,643
	Equipment replacement	4%	\$67,600	4%		\$92,600	4%	\$92,600	4%	\$92,600	4%	\$92,600	4%	\$92,600	4%	\$92,600	4%	\$92,600
	<b>Total Annual Cost with Replacement Costs</b>		<b>\$389,621</b>			<b>\$488,272</b>		<b>\$513,581</b>		<b>\$539,855</b>		<b>\$566,251</b>		<b>\$593,771</b>		<b>\$623,482</b>		<b>\$652,323</b>



**Project:** Port Hadlock UGA Sewer Facility Plan  
**Subject:** Discharge and Reuse Analysis

**By:** Tt  
**Date:** 1-Mar-06  
**Option:** Phase III - 2000 High Flows (Long) Slow Rate Land Disposal & Storage South of Service Area,  
**Item:** Capital Cost Estimate

Description	Quantity	Unit	Unit cost, \$	Cost, \$
Earthwork for Discharge - included in drip emitter cost		CY	\$8	\$0
Site Process Piping and Valving	1,000	lf	\$25	\$25,000
Electrical Conduit, Siterwork, Lighting	1	LS	\$15,000	\$15,000
Land Acquisition: Infiltration	23	AC	\$28,032	\$643,517
Land Purchase: Buffers	6	AC	\$28,032	\$160,879
Land Acquisition: Storage	0	AC	\$28,032	\$0
Storage Basin - Siterwork	0	CY	\$8	\$0
Monitoring Wells	3	EA	\$10,000	\$30,000
Drip Emitter Network	1,000,000	LF	\$1	\$1,000,000
				\$0
<b>Subtotal Structural</b>				<b>\$1,070,000</b>
Distribution Piping & Equipment	1	EA	\$20,000	\$20,000
Reclaimed Water Pumps/Filter	1	EA	\$50,000	\$50,000
				\$0
<b>Subtotal Equipment</b>				<b>\$70,000</b>
Contractor O&P	15%	of Sub Cost		\$171,000
Mobilization, demobilization, bond	6%	of Sub cost		\$68,400
<b>Total estimated current construction cost</b>				<b>\$2,187,736</b>
Escalation to time of construction	8.68%			\$189,470
<b>Total estimated construction cost</b>				<b>\$2,373,266</b>
Contingency	30%			\$711,880
Engineering Design	15%			\$326,414
Construction Management	10%			\$217,609
Sales Tax	8.3%			\$180,616
<b>Total Estimated Capital Cost</b>				<b>\$3,810,000</b>

Item	Description	Quantity	Unit	Unit Cost	Annual Cost
Labor		520	HR	\$30	\$15,600
Diesel oil			GAL	\$2.00	\$0
Power		16,331	kWh	\$0.07	\$1,143
Structural Maintenance		2%			\$28,257
Equipment replacement		4%			\$3,043
Chemicals		0	LS	\$5,000	\$0
Hypochlorite		0	LB	\$0.60	\$0
Sodium Bisulfite		0	GAL	\$0.20	\$0
Polymer			LB	\$3.00	\$0
Misc expenses			allowance		\$0
<b>Total Annual Cost</b>					<b>\$43,043</b>
<b>Present Worth Factor</b>		14.6061			
<b>Present Worth Cost</b>					<b>\$629,000</b>

Total Present Worth Project Cost Estimate	
Capital	\$3,810,000
Operations and Maintenance	\$629,000
<b>Total Present Worth</b>	<b>\$4,439,000</b>

Assume 0.1 cy per lf. Excavation. Cost included in installed cost of pipe, additional for PVC supply/flush lines  
 1,000,000 gpd at 2 gpd/sf Infiltration Rate  
 20 Days at 1,000,000 gpd at 7 feet deep  
 7 feet deep basin. Berms 20 Days at 1,000,000 gpd at 7 feet deep  
 (Geoflow, Rodney Ruskin #30/30; about \$1/ft installed (pipe \$0.20/ft, rest is controls, valves, labor); includes controls, valves, not including pump W/O Land

Land Cost	\$804,396	
	\$69,791	
	\$874,187	
	\$262,256	0%
	\$0	100%
	\$0	\$0.00
	\$0	\$1,136,443.32
	\$1,136,443	

Date : 8-Sep-08  
 Option: Phase III - 2030 High Flow (1mgd): Rapid Rate Land Disposal & Storage South of Service Area,  
 Capital Cost Estimate

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
	Site Process Piping and Valving	500	LF	\$65	\$32,500
	Land Purchase, Storage/8'Dike/20days/Buildout MM Flows	0	Acres	\$28,032	\$0
	Land Purchase, Disposal/Buildout MM Flows	5.7	Acres	\$28,032	\$160,879
	Land Purchase, Buffers	1	Acres	\$28,032	\$40,220
	Rapid Infiltration Basins - Sitework	37,037	CY	\$8	\$296,296
	Storage Basins - Sitework	0	CY	\$8	\$0
	Site Process Piping and Valving	1	LS	\$25,000	\$25,000
	Electrical Conduit, Sitework, Lighting	1	LS	\$10,000	\$10,000
	Monitoring Wells	3	EA	\$10,000	\$30,000

RS Means  
 Used 8 gpd/sf, Doubled land area for full redundancy  
 4 feet deep basin.  
 7 feet deep basin. Bermed top. 20 Days at 1,000,000 gpd at 7 feet deep  
 W/O Land \$393,796

Subtotal	Equipment	Cost
Total estimated current construction cost		\$393,796
Escalation to time of construction		\$778,796
Total estimated construction cost		\$20,249
Contingency		\$799,045
Engineering Design		
Construction Management		
Sales Tax		
Total Estimated Capital Cost		\$2,679,006

Item	Description	Quantity	Unit	Unit Cost	Annual Cost
	Land Cost				\$201,099
	Land				\$5,229
	Storage				\$206,328
	Disposal				\$61,808
	Storage				\$0
	Disposal				\$0
	Land Costs not included				\$268,225.99
	Land Costs not included				\$268,225.99

Operations and Maintenance Cost Estimate (per year)	Item	Description	Quantity	Unit	Unit Cost	Annual Cost
	Labor		104	hr	\$30	\$3,120
	Power		326617	kWh	\$0.07	\$22,863
	Structural Maintenance		2%		\$8,081	\$8,081
	Equipment replacement		4%		\$15,800	\$15,800
	Misc expenses			allowance	\$0	\$0
	Total Annual Cost					\$49,864
	Present Worth Factor		14.6061			\$728,000
	Present Worth Cost					\$728,000

Total Present Worth Project Cost Estimate	Item	Description	Cost
	Capital		\$1,679,006
	Operations and Maintenance		\$728,000
	Total Present Worth		\$2,407,006

Infiltration Rate (in/hr) 2 29.924 8 Shown in Alex Slide  
 20year period, 3.2% discount factor

Date: 8-Sep-08

Option: Phase III - 2030 High Flow (1mgd): Constructed Wetlands, 20 days storage, 1.2 gpd/sf disposal

Capital Cost Estimate

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
	Site Process Piping and Valving	500	L/F	\$65	\$32,500
	Land Purchase: Storage/8' Dike/20days/Buidout MV	3	Acres	\$25,000	\$62,500
	Land Purchase: Wetland Disposal/Buidout MM Flov	38	Acres	\$25,000	\$956,535
	Land Purchase: Buffers	10	Acres	\$25,000	\$254,759
	Wetlands - Sitework	1,666,667	SF	\$15	\$25,000,000
	Storage Basins - Sitework	28,233	CY	\$8	\$225,867
	Site Process Piping and Valving	1	LS	\$25,000	\$25,000
	Electrical Conduit, Sitework, Lighting	1	LS	\$10,000	\$10,000
	Monitoring Wells	3	EA	\$10,000	\$30,000
	<i>Subtotal Structural</i>				<i>\$26,597,160</i>
	Main Pump Station (2.1 mgd)	0	EA	\$500,000	\$0
	Medium Pump Station	1	EA	\$375,000	\$375,000
	Small Pump Station (0.036 mgd)	0	EA	\$250,000	\$0
	Distribution Piping & Equipment	1	EA	\$10,000	\$10,000
	<i>Subtotal Equipment</i>				<i>\$385,000</i>
	<i>Total estimated current construction cost</i>				<i>\$26,982,160</i>
	Escalation to time of construction	2.60%			\$701,536
	Total estimated construction cost				\$27,683,697
	Contingency	30%			\$8,921,073
	Engineering Design	15%			\$5,366,588
	Construction Management	10%			\$3,577,725
	Sales Tax	8.8%			\$3,148,398
	Total Estimated Capital Cost				<i>\$48,697,481</i>

Operations and Maintenance Cost Estimate (per year)

Item	Description	Quantity	Unit	Unit Cost	Annual Cost
	Labor	104	hr	\$30	\$3,120
	Power	326617	kWh	\$0.07	\$22,863
	Structural Maintenance	2%			\$519,635
	Equipment replacement	4%			\$15,800
	Misc expenses		allowance		\$0
	Total Annual Cost				\$561,419
	Present Worth Factor	14.6061			
	Present Worth Cost				\$8,200,000

Total Present Worth Project Cost Estimate

Capital					\$48,697,481
Operations and Maintenance					\$8,200,000
Total Present Worth					\$56,897,500

RS Means  
Used 1.2 gpd/sf  
Infiltration Rat gpd/sf  
2 29.924  
1.2 Shown in Alex' Slide

7 feet deep basin, Bermed top.  
20 Days at 1,000,000 gpd at 7 feet deep

W/O Land  
\$25,323,367

Land Cost  
\$1,273,794  
\$33,119  
\$1,306,912  
\$392,074  
\$0  
Storage \$104,203.13  
Disposal \$1,594,783.06  
\$1,698,986

\$25,708,367  
\$668,418  
\$26,376,784  
Land Costs not included  
Land Costs not included  
Land Costs not included

2hrs/week maintenance on pump station  
12hr/day run time, 100hp pump station

20year period, 3.2% discount factor

For Land Outside the UGA

Average Value/Acre

\$25,000

***Land Value per Acre Calculation South End of UGA***

**Parcels**

This calculation will sum the County Assessed Value (or latest sale value) for the six parcels, multiply by escalation factor to estimate the market value, and divide by the total acreage to get a value/acre.

Parcel #	Assessed Value	Escalation Factor	Estimated Market Value	Acres	\$/Acre
901112002	\$85,500	1.5	\$128,250	9.8	\$13,140
901111019	\$375,000	1.5	\$562,500	6.4	\$87,499
901112010	\$55,265	1.5	\$82,898	9.4	\$8,784
901112012	\$80,700	1.5	\$121,050	5.9	\$20,458
901112041	\$47,875	1.5	\$71,813	7.0	\$10,276

Average Value/Acre

\$28,032



Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

Updated Unit Costs

Item	Description	Unit cost, \$	Unit	CORE PLUS ALCOHOL						RHODY DRIVE					
				2010		2011		2012		2013		2014		2015	
				ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity
				432		502		584		679		789		918	
				0.10		0.12		0.14		0.16		0.19		0.22	
				Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
				Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>TREATMENT - SBR</b>															
<b>Capital Cost Estimate</b>															
Item	Description	Unit Cost	Unit	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
	Administration/Lab Building	\$250	SF	400	\$100,000	0	\$0	0	\$0	0	\$250	\$0	0	\$0	\$0
	Electrical Building (generator outside)	\$200	SF	720	\$144,000	0	\$0	0	\$0	0	\$200	\$0	0	\$0	\$0
	Mechanical Building	\$200	SF	2,320	\$464,000	0	\$0	0	\$0	0	\$200	\$0	0	\$0	\$0
	Filter & Chemical Building	\$200	SF	800	\$160,000	0	\$0	0	\$0	0	\$200	\$0	0	\$0	\$0
	Excavation	\$20	CY	4,116	\$82,320	0	\$0	0	\$0	1,062	\$20	\$21,240	0	\$0	\$0
	Backfill	\$15	CY	1,694	\$25,410	0	\$0	0	\$0	514	\$15	\$7,710	0	\$0	\$0
	Slab Concrete and Rebar	\$500	CY	554	\$276,972	0	\$0	0	\$0	105	\$500	\$52,556	0	\$0	\$0
	Straight Wall Concrete and Rebar	\$700	CY	659	\$461,155	0	\$0	0	\$0	87	\$700	\$61,172	0	\$0	\$0
	Headworks Concrete	\$1,500	CY	37	\$55,556	0	\$0	0	\$0	0	\$1,500	\$0	0	\$0	\$0
	Deck - Aerator Support Concrete	\$800	CY	0	\$0	0	\$0	0	\$0	0	\$800	\$0	0	\$0	\$0
	Access Bridge Concrete	\$800	CY	30	\$24,000	0	\$0	0	\$0	10	\$800	\$8,000	0	\$0	\$0
	Influent and Effluent Weir Concrete	\$700	CY	0	\$0	0	\$0	0	\$0	0	\$700	\$0	0	\$0	\$0
	Misc Metals (Handrailing, Covers, etc.) Phase 1	\$53,349	LS	1	\$53,349	0	\$0	0	\$0	1	\$8,521	\$8,521	0	\$0	\$0
	Site Stormwater Piping and Valving	\$15,000	AC	3	\$45,000	0	\$0	0	\$0	0	\$15,000	\$0	0	\$0	\$0
	Site Process Piping and Valving	\$98,026	LS	1	\$98,026	0	\$0	0	\$0	1	\$30,000	\$30,000	0	\$0	\$0
	Indoor Process Piping and Valving	\$392,104	LS	1	\$392,104	0	\$0	0	\$0	1	\$40,000	\$40,000	0	\$0	\$0
	Manholes	\$6,000	EA	7	\$42,000	0	\$0	0	\$0	0	\$6,000	\$0	0	\$0	\$0
	Stormwater Detention Tank and Control Structures	\$100,000	LS	1	\$100,000	0	\$0	0	\$0	0	\$100,000	\$0	0	\$0	\$0
	Paving	\$30	SY	4,840	\$145,200	0	\$0	0	\$0	0	\$30	\$0	0	\$0	\$0
	Sitework	\$100,000	LS	1	\$100,000	0	\$0	0	\$0	1	\$50,000	\$50,000	0	\$0	\$0
	Landscaping	\$100,000	LS	1	\$100,000	0	\$0	0	\$0	1	\$10,000	\$10,000	0	\$0	\$0
	Electrical Conduit, Sitework	\$40,000	LS	1	\$40,000	0	\$0	0	\$0	1	\$10,000	\$10,000	0	\$0	\$0
	Site Lighting	\$40,000	LS	1	\$40,000	0	\$0	0	\$0	1	\$5,000	\$5,000	0	\$0	\$0
	Laboratory Equipment	\$20,000	LS	1	\$20,000	0	\$0	0	\$0	0	\$20,000	\$0	0	\$0	\$0
	Furniture	\$25,000	LS	1	\$25,000	0	\$0	0	\$0	0	\$25,000	\$0	0	\$0	\$0
	Land Acquisition	\$28,000	AC	6	\$168,000	0	\$0	0	\$0	0	\$80,700	\$0	0	\$0	\$0
	Land Purchase: Storage/8' Dike/20days/Buidout MM Flows	\$49,000	AC	0	\$0	0	\$0	0	\$0	0.00	\$49,000	\$0	0	\$0	\$0
	Land Purchase: Buffers	\$49,000	AC	0	\$0	0	\$0	0	\$0	0.00	\$49,000	\$0	0	\$0	\$0
	Storage Basins - Sitework	\$8	CY	0	\$0	0	\$0	0	\$0	6,551	\$8	\$52,408	0	\$0	\$0
	Site Process Piping and Valving	\$50,000	LS	0	\$0	0	\$0	0	\$0	1	\$50,000	\$50,000	0	\$0	\$0
	Liner	\$1.75	SF	0	\$0	0	\$0	0	\$0	17,963	\$1.75	\$31,434	0	\$0	\$0
	Concrete Access Ramps	\$500	CY	0	\$0	0	\$0	0	\$0	10	\$500	\$5,000	0	\$0	\$0
	Inlet / Outlet Structures	\$15,000	EA	0	\$0	0	\$0	0	\$0	2	\$15,000	\$30,000	0	\$0	\$0
	<b>Subtotal Structural</b>			0	\$3,162,092	0	\$0	0	\$0		\$473,041	\$0	\$0	\$0	\$0
	<b>SBR Equipment</b>	\$416,860	LS	1	\$416,860	0	\$0	0	\$0	1	\$119,103	\$119,103	0	\$0	\$0
	(3 Transfer pumps @ 2.4 hp)														
	(3 Blowers @ 40 hp)														
	(3 Mixers @ 5 hp)														
	(3 Submersible Pumps for Eq @ 3 hp)														
	WAS Pumps	\$7,500	EA	3	\$22,500	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Influent Screen - 1/8 in	\$100,000	EA	1	\$100,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Magnetic Flow Meters	\$5,000	EA	2	\$10,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Yard Pump Station Pumps	\$7,500	EA	0	\$0	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Plant Water Pumps	\$5,000	EA	2	\$10,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Strainer (Manual duplex)	\$2,000	EA	1	\$2,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Hydro Tank	\$4,000	EA	1	\$4,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Odor Control - Carbon Adsorber, Fans, Piping	\$75,000	LS	1	\$75,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Generator	\$200	kW	750	\$150,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Generator Silencer, Louvers, Acoustics	\$5,000	LS	1	\$5,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Underground Fuel Storage Tank, Pumps	\$15,000	LS	1	\$15,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Automatic Transfer Switch	\$15,000	LS	1	\$15,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Motor Control Centers/Variable Frequency Drives	\$75,000	LS	1	\$75,000	0	\$0	0	\$0	1	\$30,000	\$30,000	0	\$0	\$0
	PLC	\$100,000	LS	1	\$100,000	0	\$0	0	\$0	1	\$20,000	\$20,000	0	\$0	\$0
	Filter Equipment	\$292,400	LS	1	\$292,400	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Chemical Storage Tanks	\$10,000	LS	1	\$10,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Chemical Feed Pumps	\$7,500	LS	1	\$7,500	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Flow Pacing Controller	\$5,000	LS	1	\$5,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	Flocculation Tank	\$10,000	LS	1	\$10,000	0	\$0	0	\$0	0	\$0	\$0	0	\$0	\$0
	<b>Subtotal Equipment</b>				\$1,325,260	0	\$0	0	\$0		\$169,103	\$0	\$0	\$0	\$0

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

		RESIDENTIAL #1				RESIDENTIAL AREA #2										
		2016		2017		2018		2019		2020		2021		2022		
		ERUs	1067	ERUs	1241	ERUs	1443	ERUs	1678	ERUs	1952	ERUs	2269	ERUs	2639	
		Flow (mgd)	0.25	Flow (mgd)	0.30	Flow (mgd)	0.34	Flow (mgd)	0.40	Flow (mgd)	0.46	Flow (mgd)	0.54	Flow (mgd)	0.63	
Item	Description	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	
<b>TREATMENT - SBR</b>																
<b>Capital Cost Estimate</b>																
Item	Description	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	
	Administration/Lab Building	0	\$0	0	\$0	2,100	\$250	\$525,000	0	\$0	0	\$0	0	\$0	0	\$0
	Electrical Building (generator outside)	0	\$0	0	\$0	0	\$200	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Mechanical Building	0	\$0	0	\$0	800	\$200	\$160,000	0	\$0	0	\$0	0	\$0	0	\$0
	Filter & Chemical Building	0	\$0	0	\$0	0	\$200	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Excavation	0	\$0	0	\$0	2,457	\$20	\$49,140	0	\$0	0	\$0	0	\$0	0	\$0
	Backfill	0	\$0	0	\$0	985	\$15	\$14,775	0	\$0	0	\$0	0	\$0	0	\$0
	Slab Concrete and Rebar	0	\$0	0	\$0	238	\$500	\$118,833	0	\$0	0	\$0	0	\$0	0	\$0
	Straight Wall Concrete and Rebar	0	\$0	0	\$0	252	\$700	\$176,244	0	\$0	0	\$0	0	\$0	0	\$0
	Headworks Concrete	0	\$0	0	\$0	0	\$500	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Deck - Aerator Support Concrete	0	\$0	0	\$0	0	\$800	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Access Bridge Concrete	0	\$0	0	\$0	33	\$800	\$26,667	0	\$0	0	\$0	0	\$0	0	\$0
	Influent and Effluent Weir Concrete	0	\$0	0	\$0	0	\$700	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc Metals (Handrailing, Covers, etc.) Phase 1	0	\$0	0	\$0	1	\$22,522	\$22,522	0	\$0	0	\$0	0	\$0	0	\$0
	Site Stormwater Piping and Valving	0	\$0	0	\$0	0	\$15,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Process Piping and Valving	0	\$0	0	\$0	1	\$49,013	\$49,013	0	\$0	0	\$0	0	\$0	0	\$0
	Indoor Process Piping and Valving	0	\$0	0	\$0	1	\$196,052	\$196,052	0	\$0	0	\$0	0	\$0	0	\$0
	Manholes	0	\$0	0	\$0	0	\$6,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Stormwater Detention Tank and Control Structures	0	\$0	0	\$0	0	\$100,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Paving	0	\$0	0	\$0	0	\$30	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sitework	0	\$0	0	\$0	1	\$60,000	\$60,000	0	\$0	0	\$0	0	\$0	0	\$0
	Landscaping	0	\$0	0	\$0	1	\$12,000	\$12,000	0	\$0	0	\$0	0	\$0	0	\$0
	Electrical Conduit, Sitework	0	\$0	0	\$0	1	\$40,000	\$40,000	0	\$0	0	\$0	0	\$0	0	\$0
	Site Lighting	0	\$0	0	\$0	1	\$12,000	\$12,000	0	\$0	0	\$0	0	\$0	0	\$0
	Laboratory Equipment	0	\$0	0	\$0	1	\$15,000	\$15,000	0	\$0	0	\$0	0	\$0	0	\$0
	Furniture	0	\$0	0	\$0	1	\$7,000	\$7,000	0	\$0	0	\$0	0	\$0	0	\$0
	Land Acquisition	0	\$0	0	\$0	0	\$80,700	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Land Purchase: Storage/8' Dike/20days/Buidout MM Flows	0	\$0	0	\$0	0.00	\$49,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Land Purchase: Buffers	0	\$0	0	\$0	0.00	\$49,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Storage Basins - Sitework	0	\$0	0	\$0	0	\$8	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Process Piping and Valving	0	\$0	0	\$0	0	\$50,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Liner	0	\$0	0	\$0	0	\$1.75	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Concrete Access Ramps	0	\$0	0	\$0	0	\$500	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Inlet / Outlet Structures	0	\$0	0	\$0	0	\$15,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Structural</b>		\$0		\$0		\$1,484,247		\$0		\$0		\$0		\$0	
	SBR Equipment	0	\$0	0	\$0	1	\$241,476	\$241,476	0	\$0	0	\$0	0	\$0	0	\$0
	(3 Transfer pumps @ 2.4 hp)															
	(3 Blowers @ 40 hp)															
	(3 Mixers @ 5 hp)															
	(3 Submersible Pumps for Eq @ 3 hp)															
	WAS Pumps	0	\$0	0	\$0	0	\$7,500	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Influent Screen - 1/8 in	0	\$0	0	\$0	0	\$100,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Magnetic Flow Meters	0	\$0	0	\$0	0	\$5,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Yard Pump Station Pumps	0	\$0	0	\$0	0	\$7,500	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Plant Water Pumps	0	\$0	0	\$0	0	\$5,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Strainer (Manual duplex)	0	\$0	0	\$0	0	\$2,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Hydro Tank	0	\$0	0	\$0	0	\$4,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Odor Control - Carbon Adsorber, Fans, Piping	0	\$0	0	\$0	0	\$75,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Generator	0	\$0	0	\$0	0	\$175	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Generator Silencer, Louvers, Acoustics	0	\$0	0	\$0	0	\$5,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Underground Fuel Storage Tank, Pumps	0	\$0	0	\$0	0	\$10,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Automatic Transfer Switch	0	\$0	0	\$0	0	\$15,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Motor Control Centers/Variable Frequency Drives	0	\$0	0	\$0	1	\$30,000	\$30,000	0	\$0	0	\$0	0	\$0	0	\$0
	PLC	0	\$0	0	\$0	1	\$10,000	\$10,000	0	\$0	0	\$0	0	\$0	0	\$0
	Filter Equipment	0	\$0	0	\$0	1	\$292,400	\$292,400	0	\$0	0	\$0	0	\$0	0	\$0
	Chemical Storage Tanks	0	\$0	0	\$0	1	\$10,000	\$10,000	0	\$0	0	\$0	0	\$0	0	\$0
	Chemical Feed Pumps	0	\$0	0	\$0	1	\$7,500	\$7,500	0	\$0	0	\$0	0	\$0	0	\$0
	Flow Pacing Controller	0	\$0	0	\$0	1	\$5,000	\$5,000	0	\$0	0	\$0	0	\$0	0	\$0
	Flocculation Tank	0	\$0	0	\$0	1	\$10,000	\$10,000	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>		\$0		\$0		\$606,376		\$0		\$0		\$0		\$0	

**Project:** Port Hadlock UGA Sewer Facility Plan  
**Subject:** Treatment System Analysis  
**By :** Tt  
**Date :** 11-Aug-08  
**July 2008**  
**ENR:** 8361.74

		RESIDENTIAL AREA #3																
		2023		2024			2025		2026		2027		2028		2029		2030	
		ERUs	3069	ERUs	3568	ERUs	3666	ERUs	3768	ERUs	3872	ERUs	3978	ERUs	4088	ERUs	4201	
		Flow (mgd)	0.73	Flow (mgd)	0.85	Flow (mgd)	0.87	Flow (mgd)	0.90	Flow (mgd)	0.92	Flow (mgd)	0.95	Flow (mgd)	0.97	Flow (mgd)	1.00	
Item	Description	Quantity	Cost, \$	Quantity	Unit Cost, \$	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>TREATMENT - SBR</b>																		
<b>Capital Cost Estimate</b>																		
<b>Item</b>	<b>Description</b>	<b>Quantity</b>	<b>Cost, \$</b>	<b>Quantity</b>	<b>Unit Cost, \$</b>	<b>Cost, \$</b>	<b>Quantity</b>	<b>Cost, \$</b>	<b>Quantity</b>	<b>Cost, \$</b>	<b>Quantity</b>	<b>Cost, \$</b>	<b>Quantity</b>	<b>Cost, \$</b>	<b>Quantity</b>	<b>Cost, \$</b>	<b>Quantity</b>	<b>Cost, \$</b>
	Administration/Lab Building	0	\$0	0	\$250	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Electrical Building (generator outside)	0	\$0	0	\$200	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Mechanical Building	0	\$0	0	\$200	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Filter & Chemical Building	0	\$0	0	\$200	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Excavation	0	\$0	2,457	\$20	\$49,140	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Backfill	0	\$0	985	\$15	\$14,775	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Slab Concrete and Rebar	0	\$0	238	\$500	\$118,833	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Straight Wall Concrete and Rebar	0	\$0	252	\$700	\$176,244	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Headworks Concrete	0	\$0	0	\$500	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Deck - Aerator Support Concrete	0	\$0	0	\$800	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Access Bridge Concrete	0	\$0	33	\$800	\$26,667	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Influent and Effluent Weir Concrete	0	\$0	0	\$700	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc Metals (Handrailing, Covers, etc.) Phase 1	0	\$0	1	\$22,522	\$22,522	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Stormwater Piping and Valving	0	\$0	0	\$15,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Process Piping and Valving	0	\$0	1	\$49,013	\$49,013	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Indoor Process Piping and Valving	0	\$0	1	\$196,052	\$196,052	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Manholes	0	\$0	0	\$6,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Stormwater Detention Tank and Control Structures	0	\$0	0	\$100,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Paving	0	\$0	0	\$30	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sitework	0	\$0	1	\$60,000	\$60,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Landscaping	0	\$0	1	\$12,000	\$12,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Electrical Conduit, Sitework	0	\$0	1	\$40,000	\$40,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Lighting	0	\$0	1	\$12,000	\$12,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Laboratory Equipment	0	\$0	0	\$15,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Furniture	0	\$0	0	\$25,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Land Acquisition	0	\$0	0	\$80,700	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Land Purchase: Storage/8' Dike/20days/Buidout MM Flows	0	\$0	0	\$49,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Land Purchase: Buffers	0	\$0	0	\$49,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Storage Basins - Sitework	0	\$0	0	\$8	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Process Piping and Valving	0	\$0	0	\$50,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Liner	0	\$0	0	\$1.75	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Concrete Access Ramps	0	\$0	0	\$500	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Inlet / Outlet Structures	0	\$0	0	\$15,000	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Structural</b>		\$0			\$777,247		\$0		\$0		\$0		\$0		\$0		\$0
	SBR Equipment	0	\$0	1	\$241,476	\$241,476	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	(3 Transfer pumps @ 2.4 hp)																	
	(3 Blowers @ 40 hp)																	
	(3 Mixers @ 5 hp)																	
	(3 Submersible Pumps for Eq @ 3 hp)																	
	WAS Pumps	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Influent Screen - 1/8 in	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Magnetic Flow Meters	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Yard Pump Station Pumps	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Plant Water Pumps	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Strainer (Manual duplex)	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Hydro Tank	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Odor Control - Carbon Adsorber, Fans, Piping	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Generator	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Generator Silencer, Louvers, Acoustics	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Underground Fuel Storage Tank, Pumps	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Automatic Transfer Switch	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Motor Control Centers/Variable Frequency Drives	0	\$0	1	\$30,000	\$30,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	PLC	0	\$0	1	\$10,000	\$10,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Filter Equipment	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Chemical Storage Tanks	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Chemical Feed Pumps	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Flow Pacing Controller	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Flocculation Tank	0	\$0	0	\$0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>		\$0			\$281,476		\$0		\$0		\$0		\$0		\$0		\$0

Project: Port Hadlock UGA Sewer Facility Plan  
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 ENR: 8361.74

Updated Unit Costs

TREATMENT - SBR				CORE PLUS ALCOHOL				RHODY DRIVE					
				2010		2011		2012		2013		2014	
Item	Description	Unit cost, \$	Unit	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$
	Installation, Miscellaneous Mechanical			40%	\$530,104	40%	\$0	40%	\$0	40%	\$67,641	40%	\$0
	Electrical			20%	\$265,052	20%	\$0	20%	\$0	20%	\$33,821	20%	\$0
	Instrumentation and Control			15%	\$198,789	15%	\$0	15%	\$0	15%	\$25,365	15%	\$0
	<i>Subtotal Structural, Mechanical, Elect, I&amp;C</i>				\$5,481,297		\$0		\$0		\$768,971		\$0
	Contractor O&P			15%	\$822,195	15%	\$0	15%	\$0	15%	\$115,346	15%	\$0
	Mobilization, demobilization, bond			6%	\$328,878	6%	\$0	6%	\$0	6%	\$46,138	6%	\$0
	<i>Total estimated current construction cost</i>				\$6,632,369		\$0		\$0		\$930,455		\$0
	Escalation to time of construction			3.50%	\$232,133	3.50%	\$0	3.50%	\$0	3.50%	\$32,566	3.50%	\$0
	<i>Total estimated construction cost</i>				\$6,864,502		\$0		\$0		\$963,021		\$0
	Contingency			30%	\$2,059,351	30%	\$0	30%	\$0	30%	\$288,906	30%	\$0
	Engineering Design			15%	\$1,338,578	15%	\$0	15%	\$0	15%	\$187,789	15%	\$0
	Construction Management			10%	\$892,385	10%	\$0	10%	\$0	10%	\$125,193	10%	\$0
	Sales Tax			8.4%	\$749,604	8.4%	\$0	8.4%	\$0	8.4%	\$105,162	8.4%	\$0
	<i>Total Estimated Capital Cost</i>				\$11,904,000		\$0		\$0		\$1,670,000		\$0
<b>Operations and Maintenance Cost Estimate (per year)</b>													
Item	Description	Unit Cost	Unit	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost
	Labor	\$40	HR	2,080	\$83,200	2,080	\$83,200	2,080	\$83,200	2,080	\$83,200	2,080	\$83,200
	Diesel oil	\$4.50	GAL		\$0		\$0		\$0		\$0		\$0
	Power	\$0.075	kWh	108,325	\$8,124	116,835	\$8,763	126,731	\$9,505	138,239	\$10,368	151,620	\$11,371
	Chemicals - alum coagulant for filter	\$0.15	LB	7,823	\$1,173	9,096	\$1,364	10,577	\$1,587	12,299	\$1,845	14,302	\$2,145
	Hypochlorite	\$0.60	LB	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Laboratory Testing at Port Townsend	\$20.00	Test	416	\$8,320	416	\$8,320	416	\$8,320	416	\$8,320	416	\$8,320
	Polymer	\$3.00	LB	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc expenses		allowance		\$0		\$0		\$0		\$0		\$0
	<i>Total Annual Cost</i>				\$100,818		\$101,647		\$102,611		\$103,733		\$105,037
	Structural Maintenance			2%	\$63,242	2%	\$63,242	2%	\$63,242	2%	\$72,703	2%	\$72,703
	Equipment replacement			4%	\$53,010	4%	\$53,010	4%	\$53,010	4%	\$59,775	4%	\$59,775
	<i>Total Annual Cost with Replacement Costs</i>				\$217,070		\$217,899		\$218,864		\$236,210		\$237,514
	<i>DISCOUNTED Total Annual Cost</i>				\$100,818		\$98,687		\$96,721		\$94,930		\$93,324
	DISCOUNTED Structural Maintenance			2%	\$63,242	2%	\$61,400	2%	\$59,611	2%	\$66,533	2%	\$64,595
	DISCOUNTED Equipment replacement			4%	\$53,010	4%	\$51,466	4%	\$49,967	4%	\$54,702	4%	\$53,109
	<i>DISCOUNTED Total Annual Cost with Replacement Costs</i>				\$217,070		\$211,553		\$206,300		\$216,166		\$211,028

"overhead" horsepower = 9  
 "overhead" horsepower with expansion = 16

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**Date :** 11-Aug-08  
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TREATMENT - SBR		RESIDENTIAL #1					RESIDENTIAL AREA #2									
		2016		2017		2018		2019		2020		2021		2022		
Item	Description	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	
	Installation, Miscellaneous Mechanical	40%	\$0	40%	\$0	40%	\$242,550	40%	\$0	40%	\$0	40%	\$0	40%	\$0	
	Electrical	20%	\$0	20%	\$0	20%	\$121,275	20%	\$0	20%	\$0	20%	\$0	20%	\$0	
	Instrumentation and Control	15%	\$0	15%	\$0	15%	\$90,956	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	<i>Subtotal Structural, Mechanical, Elect, I&amp;C</i>		\$0		\$0		\$2,545,404		\$0		\$0		\$0		\$0	
	Contractor O&P	15%	\$0	15%	\$0	15%	\$381,811	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	Mobilization, demobilization, bond	6%	\$0	6%	\$0	6%	\$152,724	6%	\$0	6%	\$0	6%	\$0	6%	\$0	
	<i>Total estimated current construction cost</i>		\$0		\$0		\$3,079,939		\$0		\$0		\$0		\$0	
	Escalation to time of construction	3.50%	\$0	3.50%	\$0	3.50%	\$107,798	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	
	<i>Total estimated construction cost</i>		\$0		\$0		\$3,187,737		\$0		\$0		\$0		\$0	
	Contingency	30%	\$0	30%	\$0	30%	\$956,321	30%	\$0	30%	\$0	30%	\$0	30%	\$0	
	Engineering Design	15%	\$0	15%	\$0	15%	\$621,609	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	Construction Management	10%	\$0	10%	\$0	10%	\$414,406	10%	\$0	10%	\$0	10%	\$0	10%	\$0	
	Sales Tax	8.4%	\$0	8.4%	\$0	8.4%	\$348,101	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	
	<b>Total Estimated Capital Cost</b>		\$0		\$0		\$5,528,000		\$0		\$0		\$0		\$0	
<b>Operations and Maintenance Cost Estimate (per year)</b>																
Item	Description	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Unit Cost	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost
	Labor	2,080	\$83,200	2,496	\$99,840	3,120		\$124,800	3,120	\$124,800	3,120	\$124,800	3,120	\$124,800	3,120	\$124,800
	Diesel oil		\$0		\$0			\$0		\$0		\$0		\$0		\$0
	Power	185,272	\$13,895	252,753	\$18,956	277,217		\$20,791	305,665	\$22,925	338,743	\$25,406	377,208	\$28,291	421,935	\$31,645
	Chemicals - alum coagulant for filter	19,338	\$2,901	22,487	\$3,373	26,148		\$3,922	30,405	\$4,561	35,356	\$5,303	41,112	\$6,167	47,806	\$7,171
	Hypochlorite	0	\$0	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Laboratory Testing at Port Townsend	416	\$8,320	416	\$8,320	416		\$8,320	416	\$8,320	416	\$8,320	416	\$8,320	416	\$8,320
	Polymer	0	\$0	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc expenses		\$0		\$0			\$0		\$0		\$0		\$0		\$0
	<b>Total Annual Cost</b>		\$108,316		\$130,490			\$157,834		\$160,606		\$163,829		\$167,577		\$171,936
	Structural Maintenance	2%	\$72,703	2%	\$72,703	2%		\$102,388	2%	\$102,388	2%	\$102,388	2%	\$102,388	2%	\$102,388
	Equipment replacement	4%	\$59,775	4%	\$59,775	4%		\$84,030	4%	\$84,030	4%	\$84,030	4%	\$84,030	4%	\$84,030
	<b>Total Annual Cost with Replacement Costs</b>		\$240,793		\$262,967			\$344,251		\$347,023		\$350,246		\$353,995		\$358,353
	<b>DISCOUNTED Total Annual Cost</b>		\$90,713		\$106,100			\$124,595		\$123,091		\$121,904		\$121,061		\$120,592
	DISCOUNTED Structural Maintenance	2%	\$60,887	2%	\$59,114	2%		\$80,826	2%	\$78,472	2%	\$76,186	2%	\$73,967	2%	\$71,813
	DISCOUNTED Equipment replacement	4%	\$50,060	4%	\$48,602	4%		\$66,334	4%	\$64,402	4%	\$62,526	4%	\$60,705	4%	\$58,937
	<b>DISCOUNTED Total Annual Cost with Replacement Costs</b>		\$201,661		\$213,816			\$271,755		\$265,964		\$260,616		\$255,733		\$251,342

"overhead" horsepower =  
 "overhead" horsepower with expansion =

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

TREATMENT - SBR		RESIDENTIAL AREA #3															
		2023		2024		2025		2026		2027		2028		2029		2030	
Item	Description	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Unit Cost, \$	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	
	Installation, Miscellaneous Mechanical	40%	\$0	40%		\$112,590	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0	
	Electrical	20%	\$0	20%		\$56,295	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0	
	Instrumentation and Control	15%	\$0	15%		\$42,221	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	<i>Subtotal Structural, Mechanical, Elect, I&amp;C</i>		\$0			\$1,269,829		\$0		\$0		\$0		\$0		\$0	
	Contractor O&P	15%	\$0	15%		\$190,474	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	Mobilization, demobilization, bond	6%	\$0	6%		\$76,190	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0	
	<i>Total estimated current construction cost</i>		\$0			\$1,536,493		\$0		\$0		\$0		\$0		\$0	
	Escalation to time of construction	3.50%	\$0	3.50%		\$53,777	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	
	<i>Total estimated construction cost</i>		\$0			\$1,590,271		\$0		\$0		\$0		\$0		\$0	
	Contingency	30%	\$0	30%		\$477,081	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0	
	Engineering Design	15%	\$0	15%		\$310,103	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	Construction Management	10%	\$0	10%		\$206,735	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0	
	Sales Tax	8.4%	\$0	8.4%		\$173,658	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	
	<b>Total Estimated Capital Cost</b>		\$0			\$2,758,000		\$0		\$0		\$0		\$0		\$0	
<b>Operations and Maintenance Cost Estimate (per year)</b>																	
Item	Description	Quantity	Annual Cost	Quantity	Unit Cost	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	
	Labor	3,120	\$124,800	3,640		\$145,600	3,640	\$145,600	3,640	\$145,600	3,640	\$145,600	3,640	\$145,600	3,640	\$145,600	
	Diesel oil		\$0			\$0		\$0		\$0		\$0		\$0		\$0	
	Power	473,944	\$35,546	534,422		\$40,082	546,316	\$40,974	558,561	\$41,892	571,144	\$42,836	584,074	\$43,806	597,360	\$44,802	
	Chemicals - alum coagulant for filter	55,589	\$8,338	64,640		\$9,696	66,420	\$9,963	68,253	\$10,238	70,136	\$10,520	72,071	\$10,811	74,059	\$11,109	
	Hypochlorite	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Laboratory Testing at Port Townsend	416	\$8,320	416		\$8,320	416	\$8,320	416	\$8,320	416	\$8,320	416	\$8,320	416	\$8,320	
	Polymer	0	\$0	0		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Misc expenses		\$0			\$0		\$0		\$0		\$0		\$0		\$0	
	<b>Total Annual Cost</b>		\$177,004			\$203,698		\$204,857		\$206,050		\$207,276		\$208,536		\$209,831	
	Structural Maintenance	2%	\$102,388	2%		\$117,933	2%	\$117,933	2%	\$117,933	2%	\$117,933	2%	\$117,933	2%	\$117,933	
	Equipment replacement	4%	\$84,030	4%		\$95,289	4%	\$95,289	4%	\$95,289	4%	\$95,289	4%	\$95,289	4%	\$95,289	
	<b>Total Annual Cost with Replacement Costs</b>		\$363,421			\$416,919		\$418,078		\$419,271		\$420,497		\$421,757		\$423,052	
	<b>DISCOUNTED Total Annual Cost</b>		\$120,531			\$134,668		\$131,490		\$128,404		\$125,405		\$122,493		\$119,664	
	DISCOUNTED Structural Maintenance	2%	\$69,721	2%		\$77,967	2%	\$75,696	2%	\$73,492	2%	\$71,351	2%	\$69,273	2%	\$67,255	
	DISCOUNTED Equipment replacement	4%	\$57,220	4%		\$62,997	4%	\$61,162	4%	\$59,381	4%	\$57,651	4%	\$55,972	4%	\$54,342	
	<b>DISCOUNTED Total Annual Cost with Replacement Costs</b>		\$247,472			\$275,632		\$268,348		\$261,276		\$254,408		\$247,738		\$241,261	

"overhead" horsepower =  
 "overhead" horsepower with expansion =

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

Updated Unit Costs

Item	Description	Unit cost, \$	Unit	CORE PLUS ALCOHOL				RHODY DRIVE							
				2010		2011		2012		2013		2014		2015	
				ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity	ERUs Flow (mgd)	Quantity
<b>Capital Cost Estimate</b>															
<i>Structural</i>															
	Administration/Lab Building	\$250	SF	400	\$100,000										
	Electrical Building (generator outside)	\$200	SF	720	\$144,000										
	Mechanical Building	\$200	SF	2,320	\$464,000										
	Excavation	\$20	CY	2,828	\$56,560										
	Backfill	\$15	CY	1,173	\$17,595										
	Headworks Concrete	\$1,500	CY	37	\$55,556										
	Slab Concrete and Rebar	\$500	CY	331	\$165,519										
	Straight Wall Concrete and Rebar	\$700	CY	383	\$268,411										
	Access Bridge Concrete	\$800	CY	34	\$27,467										
	Effluent Weir Concrete	\$700	CY	14	\$9,722										
	Misc Metals (Handrailing, Covers, etc.)	\$32,298	LS	1	\$32,298										
	Site Stormwater Piping and Valving	\$15,000	AC	2	\$30,000										
	Site Process Piping and Valving	\$23,600	LS	1	\$23,600				1	\$20,000	\$20,000				
	Indoor Process Piping and Valving	\$94,400	LS	1	\$94,400				1	\$7,500	\$7,500				
	Membrane Bioreactor Piping and Valving	\$414,153	LS	1	\$414,153										
	Manholes	\$6,000	EA	7	\$42,000										
	Stormwater Detention Tank and Control Structures	\$90,000	LS	1	\$90,000										
	Paving	\$30	SY	4,840	\$145,200										
	Sitework	\$90,000	LS	1	\$90,000										
	Landscaping	\$90,000	LS	1	\$90,000										
	Electrical Conduit, Sitework	\$55,000	LS	1	\$55,000				1	\$10,000	\$10,000				
	Site Lighting	\$36,000	LS	1	\$36,000				1	\$5,000	\$5,000				
	Laboratory Equipment	\$20,000	LS	1	\$20,000										
	Furniture	\$25,000	LS	1	\$25,000										
	Land Acquisition	\$28,000	AC	6	\$168,000										
	Land Purchase: Storage/8' Dike/20days/Buidout MM Flows	\$49,000	AC	0	\$0				0	\$0	\$0				
	Land Purchase: Buffers	\$49,000	AC	0	\$0				0	\$0	\$0				
	Storage Basins - Sitework	\$8	CY	0	\$0				6551	\$52,408	\$52,408				
	Electrical Conduit, Sitework, Lighting	\$50,000	LS	0	\$0				1	\$50,000	\$50,000				
	Liner	\$1.75	SF	0	\$0				17962.56	\$31,434	\$31,434				
	Concrete Access Ramps	\$500	CY	0	\$0				10	\$5,000	\$5,000				
	Inlet / Outlet Structures	\$15,000	EA	0	\$0				2	\$30,000	\$30,000				
	<b>Subtotal Structural</b>				<b>\$2,664,480</b>		<b>\$0</b>			<b>\$211,342</b>			<b>\$0</b>		<b>\$0</b>
	<b>Equipment</b>	<b>\$1,380,511</b>	<b>EA</b>	<b>1</b>	<b>\$1,380,511</b>			<b>1</b>	<b>\$351,895</b>						
	Biological air blowers (@ 40 hp)														
	Blower piping														
	Biological air diffuser systems														
	Anoxic Mixers (@ 2.5 hp)														
	Influent Screen - 1/8 in.														
	Transfer Pump from Membrane to Anoxic Basin														
	Washer Compactor														
	Permeate Pumps														
	Redundant Influent Screen	\$100,000	EA	1	\$100,000										
	WAS Pumps	\$7,500	EA	2	\$15,000										
	Magnetic Flow Meters	\$5,000	EA	3	\$15,000										
	Yard Pump Station Pumps	\$7,500	EA	0	\$0										
	Plant Water Pumps	\$5,000	EA	2	\$10,000										
	Strainer (Manual duplex)	\$2,000	EA	1	\$2,000										
	Overhead Crane	\$100,000	EA	1	\$100,000										
	Hydro Tank	\$4,000	EA	1	\$4,000										
	Odor Control - Carbon Adsorber, Fans, Piping	\$75,000	LS	1	\$75,000										
	Generator	\$200	kW	1,000	\$200,000										
	Generator Silencer, Louvers, Acoustics	\$5,000	LS	1	\$5,000										
	Underground Fuel Storage Tank, Pumps	\$15,000	LS	1	\$15,000										
	Automatic Transfer Switch	\$15,000	LS	1	\$15,000										
	Motor Control Centers/Variable Frequency Drives	\$100,000	LS	1	\$100,000				1	\$20,000	\$20,000				
	PLC	\$100,000	LS	1	\$100,000				1	\$10,000	\$10,000				
	Main Pump Station (2.1 mgd)	\$500,000	EA	0	\$0				0	\$0	\$0				
	Medium Pump Station	\$375,000	EA	0	\$0				0	\$0	\$0				
	Small Pump Station (0.036 mgd)	\$250,000	EA	0	\$0				0	\$0	\$0				
	Distribution Piping & Equipment	\$91	LF	0	\$0				500	\$45,500	\$45,500				
	Aspirating Aerator	\$1,000	hp	0	\$0				7.5	\$7,500	\$7,500				
	<b>Subtotal Equipment</b>				<b>\$2,136,511</b>		<b>\$0</b>		<b>\$351,895</b>		<b>\$83,000</b>		<b>\$0</b>		<b>\$0</b>

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

Item Description	RESIDENTIAL #1				RESIDENTIAL AREA #2									
	2016		2017		2018		2019		2020		2021		2022	
	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$
<b>TREATMENT - MBR</b>														
<b>Capital Cost Estimate</b>														
<i>Structural</i>														
Administration/Lab Building					2,100	\$250	\$525,000							
Electrical Building (generator outside)					0	\$200	\$0							
Mechanical Building					800	\$200	\$160,000							
Excavation					2,828	\$20	\$56,560							
Backfill					1,173	\$15	\$17,595							
Headworks Concrete					0	\$1,500	\$0							
Slab Concrete and Rebar					322	\$500	\$160,963							
Straight Wall Concrete and Rebar					306	\$700	\$214,200							
Access Bridge Concrete					34	\$800	\$27,467							
Effluent Weir Concrete					6	\$700	\$3,889							
Misc Metals (Handrailing, Covers, etc.)					1	\$28,184	\$28,184							
Site Stormwater Piping and Valving					1	\$15,000	\$15,000							
Site Process Piping and Valving					1	\$23,600	\$23,600							
Indoor Process Piping and Valving					1	\$94,400	\$94,400							
Membrane Bioreactor Piping and Valving					1	\$414,153	\$414,153							
Manholes					0	\$6,000	\$0							
Stormwater Detention Tank and Control Structures					0	\$60,000	\$0							
Paving					1,000		\$0							
Sitework					1	\$50,000	\$50,000							
Landscaping					1	\$10,000	\$10,000							
Electrical Conduit, Sitework					1	\$55,000	\$55,000							
Site Lighting					1	\$10,000	\$10,000							
Laboratory Equipment					1	\$15,000	\$15,000							
Furniture					1	\$7,000	\$7,000							
Land Acquisition					0	\$49,000	\$0							
Land Purchase: Storage/8' Dike/20days/Buidout MM Flows														
Land Purchase: Buffers														
Storage Basins - Sitework														
Electrical Conduit, Sitework, Lighting														
Liner														
Concrete Access Ramps														
Inlet / Outlet Structures														
<b>Subtotal Structural</b>		\$0		\$0		\$1,888,011		\$0		\$0		\$0		\$0
<b>Equipment</b>					1	\$1,136,892	\$1,136,892							
Biological air blowers (@ 40 hp)														
Blower piping														
Biological air diffuser systems														
Anoxic Mixers (@ 2.5 hp)														
Influent Screen - 1/8 in.														
Transfer Pump from Membrane to Anoxic Basin														
Washer Compactor														
<b>Permeate Pumps</b>														
Redundant Influent Screen														
WAS Pumps					1	\$7,500	\$7,500							
Magnetic Flow Meters					1	\$5,000	\$5,000							
Yard Pump Station Pumps					0	\$7,500	\$0							
Plant Water Pumps					0	\$5,000	\$0							
Strainer (Manual duplex)					0	\$2,000	\$0							
Overhead Crane					1	\$45,000	\$45,000							
Hydro Tank					0	\$4,000	\$0							
Odor Control - Carbon Adsorber, Fans, Piping					0	\$75,000	\$0							
Generator					0	\$175	\$0							
Generator Silencer, Louvers, Acoustics					0	\$5,000	\$0							
Underground Fuel Storage Tank, Pumps					0	\$15,000	\$0							
Automatic Transfer Switch					0	\$15,000	\$0							
Motor Control Centers/Variable Frequency Drives					1	\$45,000	\$45,000							
PLC					1	\$20,000	\$20,000							
Main Pump Station (2.1 mgd)														
Medium Pump Station														
Small Pump Station (0.036 mgd)														
Distribution Piping & Equipment														
Aspirating Aerator														
<b>Subtotal Equipment</b>		\$0		\$0		\$1,259,392		\$0		\$0		\$0		\$0

**Project:** Port Hadlock UGA Sewer Facility Plan  
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		RESIDENTIAL AREA #3															
		2023		2024		2025		2026		2027		2028		2029		2030	
Item	Description	ERUs	Cost, \$	ERUs	Unit Cost, \$	ERUs	Cost, \$	ERUs	Cost, \$	ERUs	Cost, \$	ERUs	Cost, \$	ERUs	Cost, \$	ERUs	Cost, \$
		Flow (mgd)	Quantity	Flow (mgd)	Quantity	Flow (mgd)	Quantity	Flow (mgd)	Quantity	Flow (mgd)	Quantity	Flow (mgd)	Quantity	Flow (mgd)	Quantity	Flow (mgd)	Quantity
<b>TREATMENT - MBR</b>																	
<b>Capital Cost Estimate</b>																	
<i>Structural</i>																	
	Administration/Lab Building																
	Electrical Building (generator outside)																
	Mechanical Building																
	Excavation																
	Backfill																
	Headworks Concrete																
	Slab Concrete and Rebar																
	Straight Wall Concrete and Rebar																
	Access Bridge Concrete																
	Effluent Weir Concrete																
	Misc Metals (Handrailing, Covers, etc.)																
	Site Stormwater Piping and Valving																
	Site Process Piping and Valving																
	Indoor Process Piping and Valving																
	Membrane Bioreactor Piping and Valving																
	Manholes																
	Stormwater Detention Tank and Control Structures																
	Paving																
	Sitework																
	Landscaping																
	Electrical Conduit, Sitework																
	Site Lighting																
	Laboratory Equipment																
	Furniture																
	Land Acquisition																
	Land Purchase: Storage/8' Dike/20days/Buidout MM Flows																
	Land Purchase: Buffers																
	Storage Basins - Sitework																
	Electrical Conduit, Sitework, Lighting																
	Liner																
	Concrete Access Ramps																
	Inlet / Outlet Structures																
	<b>Subtotal Structural</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	<b>Equipment</b>			1	\$351,895		\$351,895										
	Biological air blowers (@ 40 hp)																
	Blower piping																
	Biological air diffuser systems																
	Anoxic Mixers (@ 2.5 hp)																
	Influent Screen - 1/8 in.																
	Transfer Pump from Membrane to Anoxic Basin																
	Washer Compactor																
	Permeate Pumps																
	Redundant Influent Screen																
	WAS Pumps																
	Magnetic Flow Meters																
	Yard Pump Station Pumps																
	Plant Water Pumps																
	Strainer (Manual duplex)																
	Overhead Crane																
	Hydro Tank																
	Odor Control - Carbon Adsorber, Fans, Piping																
	Generator																
	Generator Silencer, Louvers, Acoustics																
	Underground Fuel Storage Tank, Pumps																
	Automatic Transfer Switch																
	Motor Control Centers/Variable Frequency Drives																
	PLC																
	Main Pump Station (2.1 mgd)																
	Medium Pump Station																
	Small Pump Station (0.036 mgd)																
	Distribution Piping & Equipment																
	Aspirating Aerator																
	<b>Subtotal Equipment</b>		\$0		\$351,895		\$0		\$0		\$0		\$0		\$0		\$0

Project: Port Hadlock UGA Sewer Facility Plan  
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 ENR: 8361.74

Updated Unit Costs

TREATMENT - MBR				CORE PLUS ALCOHOL						RHODY DRIVE					
				2010		2011		2012		2013		2014		2015	
Item	Description	Unit cost, \$	Unit	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$		
	Installation, Miscellaneous Mechanical		of Equip	40%	\$854,604		\$0		\$140,758		\$33,200		\$0		
	Electrical		of Equip	20%	\$427,302		\$0		\$70,379		\$16,600		\$0		
	Instrumentation and Control		of Equip	15%	\$320,477		\$0		\$52,784		\$12,450		\$0		
	<i>Subtotal Structural, Mechanical, Elect, I&amp;C</i>				<i>\$6,403,375</i>		<i>\$0</i>		<i>\$615,816</i>		<i>\$356,592</i>		<i>\$0</i>		
	Contractor O&P		of Sub Cost	15%	\$960,506		\$0		\$92,372		\$53,489		\$0		
	Mobilization, demobilization, bond		of Sub cost	6%	\$384,202		\$0		\$36,949		\$21,396		\$0		
	<i>Total estimated current construction cost</i>				<i>\$7,748,083</i>		<i>\$0</i>		<i>\$745,138</i>		<i>\$431,477</i>		<i>\$0</i>		
	Escalation to time of construction			3.50%	\$271,183		\$0		\$26,080		\$15,102		\$0		
	<i>Total estimated construction cost</i>				<i>\$8,019,266</i>		<i>\$0</i>		<i>\$771,217</i>		<i>\$446,579</i>		<i>\$0</i>		
	Contingency			30%	\$2,405,780		\$0		\$231,365		\$133,974		\$0		
	Engineering Design			15%	\$1,563,757		\$0		\$87,083		\$87,083		\$0		
	Construction Management			10%	\$1,042,505		\$0		\$100,258		\$58,055		\$0		
	Sales Tax			8.4%	\$875,704		\$0		\$84,217		\$48,766		\$0		
	<i>Total Estimated Capital Cost</i>				<i>\$13,907,000</i>		<i>\$0</i>		<i>\$1,337,000</i>		<i>\$774,000</i>		<i>\$0</i>		
<b>Operations and Maintenance Cost Estimate (per year)</b>															
Item	Description	Unit Cost	Unit	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost		
	Labor	\$40	HR	2,080	\$83,200	2,080	\$83,200	2,080	\$83,200	2,080	\$83,200	2,080	\$83,200		
	Membrane Replacement	\$75	panel	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0		
	Diesel oil	\$4.50	GAL	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0		
	Power	\$0.075	kWh	173,736	\$13,030	186,686	\$14,001	201,745	\$15,131	219,256	\$16,444	239,617	\$17,971		
	Other utilities (water, garbage, etc.)	\$1,000	month	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000		
	Chemicals - membrane cleaning	\$3,380	LS	2	\$6,760	2	\$6,760	2	\$6,760	2	\$6,760	2	\$6,760		
	Hypochlorite	\$1.50	LB	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0		
	Laboratory Testing at Port Townsend	\$25.00	Test	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400		
	Polymer	\$3.00	LB	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0		
	Misc expenses		allowance	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0		
	<i>Total Annual Cost</i>				<i>\$125,390</i>		<i>\$126,361</i>		<i>\$127,491</i>		<i>\$128,804</i>		<i>\$130,331</i>		
	Structural Replacement			2%	\$53,290	2%	\$53,290	2%	\$53,290	2%	\$53,290	2%	\$53,290		
	Capital Replacement			4%	\$85,460	4%	\$85,460	4%	\$85,460	4%	\$85,460	4%	\$85,460		
	<i>Total Annual Cost with Replacement Costs</i>				<i>\$264,140</i>		<i>\$265,112</i>		<i>\$266,241</i>		<i>\$267,554</i>		<i>\$270,857</i>		
	"overhead" horsepower =		9												
	"overhead" power with expansion =		16												

**Project:** Port Hadlock UGA Sewer Facility Plan  
**Subject:** Treatment System Analysis  
**By :** Tt  
**Date :** 11-Aug-08  
**July 2008**  
**ENR:** 8361.74

TREATMENT - MBR		RESIDENTIAL #1				RESIDENTIAL AREA #2									
		2016		2017		2018		2019		2020		2021		2022	
Item	Description	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$		
	Installation, Miscellaneous Mechanical	1067	\$0	1241	\$0	1443	\$503,757	1678	\$0	1952	\$0	2269	\$0	2639	\$0
	Electrical	0.25	\$0	0.30	\$0	0.34	\$251,878	0.40	\$0	0.46	\$0	0.54	\$0	0.63	\$0
	Instrumentation and Control		\$0		\$0		\$188,909		\$0		\$0		\$0		\$0
	<i>Subtotal Structural, Mechanical, Elect, I&amp;C</i>		\$0		\$0		\$4,091,946		\$0		\$0		\$0		\$0
	Contractor O&P		\$0		\$0		\$613,792		\$0		\$0		\$0		\$0
	Mobilization, demobilization, bond		\$0		\$0		\$245,517		\$0		\$0		\$0		\$0
	<i>Total estimated current construction cost</i>		\$0		\$0		\$4,951,255		\$0		\$0		\$0		\$0
	Escalation to time of construction		\$0		\$0		\$173,294		\$0		\$0		\$0		\$0
	<i>Total estimated construction cost</i>		\$0		\$0		\$5,124,549		\$0		\$0		\$0		\$0
	Contingency		\$0		\$0		\$1,537,365		\$0		\$0		\$0		\$0
	Engineering Design		\$0		\$0		\$999,287		\$0		\$0		\$0		\$0
	Construction Management		\$0		\$0		\$666,191		\$0		\$0		\$0		\$0
	Sales Tax		\$0		\$0		\$559,601		\$0		\$0		\$0		\$0
	<i>Total Estimated Capital Cost</i>		\$0		\$0		\$8,887,000		\$0		\$0		\$0		\$0
<b>Operations and Maintenance Cost Estimate (per year)</b>															
Item	Description														
	Labor	2,080	\$83,200	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840
	Membrane Replacement	400	\$30,000	400	\$30,000	800	\$60,000	800	\$60,000	800	\$60,000	400	\$30,000	400	\$30,000
	Diesel oil	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Power	290,825	\$21,812	323,555	\$24,267	406,508	\$30,488	404,069	\$30,305	454,404	\$34,080	512,935	\$38,470	580,995	\$43,575
	Other utilities (water, garbage, etc.)	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000
	Chemicals - membrane cleaning	2	\$6,760	3	\$10,140	3	\$10,140	3	\$10,140	3	\$10,140	3	\$10,140	3	\$10,140
	Hypochlorite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Laboratory Testing at Port Townsend	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400
	Polymer	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc expenses	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<i>Total Annual Cost</i>		\$164,172		\$238,647		\$274,868		\$274,685		\$278,460		\$252,850		\$257,955
	Structural Replacement	2%	\$53,290	2%	\$53,290	2%	\$91,050	2%	\$91,050	2%	\$91,050	2%	\$91,050	2%	\$91,050
	Capital Replacement	4%	\$85,460	4%	\$85,460	4%	\$135,836	4%	\$135,836	4%	\$135,836	4%	\$135,836	4%	\$135,836
	<i>Total Annual Cost with Replacement Costs</i>		\$302,922		\$377,397		\$501,754		\$501,571		\$505,346		\$479,736		\$484,841

"overhead" horsepower =  
 "overhead" power with expansion =

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

TREATMENT - MBR		RESIDENTIAL AREA #3															
		2023		2024		2025		2026		2027		2028		2029		2030	
Item	Description	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Unit Cost, \$ Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$	ERUs Flow (mgd) Quantity	Cost, \$		
	Installation, Miscellaneous Mechanical		\$0		\$140,758		\$0		\$0		\$0		\$0		\$0		
	Electrical		\$0		\$70,379		\$0		\$0		\$0		\$0		\$0		
	Instrumentation and Control		\$0		\$52,784		\$0		\$0		\$0		\$0		\$0		
	<i>Subtotal Structural, Mechanical, Elect, I&amp;C</i>		\$0		\$615,816		\$0		\$0		\$0		\$0		\$0		
	Contractor O&P		\$0		\$92,372		\$0		\$0		\$0		\$0		\$0		
	Mobilization, demobilization, bond		\$0		\$36,949		\$0		\$0		\$0		\$0		\$0		
	<i>Total estimated current construction cost</i>		\$0		\$745,138		\$0		\$0		\$0		\$0		\$0		
	Escalation to time of construction		\$0		\$26,080		\$0		\$0		\$0		\$0		\$0		
	<i>Total estimated construction cost</i>		\$0		\$771,217		\$0		\$0		\$0		\$0		\$0		
	Contingency		\$0		\$231,365		\$0		\$0		\$0		\$0		\$0		
	Engineering Design		\$0		\$150,387		\$0		\$0		\$0		\$0		\$0		
	Construction Management		\$0		\$100,258		\$0		\$0		\$0		\$0		\$0		
	Sales Tax		\$0		\$84,217		\$0		\$0		\$0		\$0		\$0		
	<i>Total Estimated Capital Cost</i>		\$0		\$1,337,000		\$0		\$0		\$0		\$0		\$0		
<b>Operations and Maintenance Cost Estimate (per year)</b>																	
Item	Description																
	Labor	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	3,796	\$151,840	4,004	\$160,160
	Membrane Replacement	0	\$0	400	\$30,000	400	\$30,000	800	\$60,000	800	\$60,000	800	\$60,000	400	\$30,000	800	\$60,000
	Diesel oil	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Power	660,137	\$49,510	797,890	\$59,842	815,989	\$61,199	834,622	\$62,597	853,769	\$64,033	873,444	\$65,508	893,662	\$67,025	914,438	\$68,583
	Other utilities (water, garbage, etc.)	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000	12	\$12,000
	Chemicals - membrane cleaning	3	\$10,140	4	\$13,520	4	\$13,520	4	\$13,520	4	\$13,520	4	\$13,520	4	\$13,520	4	\$13,520
	Hypochlorite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Laboratory Testing at Port Townsend	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400	416	\$10,400
	Polymer	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc expenses	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<i>Total Annual Cost</i>		\$233,890		\$277,602		\$278,959		\$310,357		\$311,793		\$313,268		\$284,785		\$324,663
	Structural Replacement	2%	\$91,050	2%	\$91,050	2%	\$91,050	2%	\$91,050	2%	\$91,050	2%	\$91,050	2%	\$91,050	2%	\$91,050
	Capital Replacement	4%	\$135,836	4%	\$149,912	4%	\$149,912	4%	\$149,912	4%	\$149,912	4%	\$149,912	4%	\$149,912	4%	\$149,912
	<i>Total Annual Cost with Replacement Costs</i>		\$460,776		\$518,563		\$519,921		\$551,318		\$552,754		\$554,230		\$525,746		\$565,625

"overhead" horsepower =  
 "overhead" power with expansion =

**Project:** Port Hadlock Facilities Plan  
**Subject:** Disinfection Analysis  
**By:** Tt  
**Date:** 7-Apr-08  
**Ultraviolet Disinfection + Liquid Hypochlorite for Residual**  
**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$	
	Building enclosure for equipment	100	SF	\$100	\$10,000	
	Slab Concrete and Rebar	22	CY	\$300	\$6,667	10*30 dual channels
	Straight Wall Concrete and Rebar	36	CY	\$400	\$14,222	
	Misc Metals (Handrailing, Covers, etc.)	1	LS	\$5,000	\$5,000	
	Misc Concrete (NaOCl secondary containment)	5	CY	\$500	\$2,500	
	Site Process Piping and Valving	1	LS	\$20,000	\$20,000	
	Sitework	1	LS	\$10,000	\$10,000	
	Electrical Conduit, Sitework	1	LS	\$10,000	\$10,000	
	Site Lighting	1	LS	\$20,000	\$20,000	
	Jib Crane for UV Unit	1	LS	\$5,000	\$5,000	
					\$0	
<b>Subtotal Structural</b>					<b>\$103,389</b>	
	Lamps and Equipment with installation	1	ea	\$100,000	\$100,000	
	Additional Generator Capacity - for UV and add.	65	kW	\$200	\$12,948	
	Storage Tank (3-55 gal drums)	3	ea	\$200	\$600	
	Pumps w/ installation (hypo)	2	ea	\$2,500	\$5,000	
	Tank Mixers	1	ea	\$1,000	\$1,000	
	Feed Pacing Controller	1	ea	\$2,500	\$2,500	
	Chemical Flow Meter	1	ea	\$2,000	\$2,000	
					\$0	
<b>Subtotal Equipment</b>					<b>\$124,048</b>	
	Installation, Miscellaneous Mechanical	40%	of Equip		\$49,619	
	Electrical	20%	of Equip		\$24,810	
	Instrumentation and Control	15%	of Equip		\$18,607	
<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>					<b>\$320,474</b>	
	Contractor O&P	15%	of Sub Cost		\$48,071	
	Mobilization, demobilization, bond	6%	of Sub cost		\$19,228	
<b>Total estimated current construction cost</b>					<b>\$387,773</b>	
	Escalation to time of construction	2.60%			\$10,082	
<b>Total estimated construction cost</b>					<b>\$397,855</b>	
	Dollars per gallon				\$0.80	
	Costs for 1 MGD				\$795,710	
	Escalated ENR to 8500				\$845,971	
	Contingency	30%			\$253,791	
	Engineering Design	15%			\$164,964	
	Construction Management	10%			\$109,976	
	Sales Tax	8.3%			\$91,280	
<b>Total Estimated Capital Cost</b>					<b>\$1,466,000</b>	

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost	
	Labor	208	hr	\$30	\$6,240	2 hours / week to clean. Double for 1 MG
	Septic tank pumping	0	ea	\$300	\$60	
	Diesel oil		gal	\$2.00	\$0	
	Power	30417	kWh	\$0.07	\$2,129	0.5 mgd, 40 gpm/lamp, 200 watts/lamp, 24 hrs/day. Double for :
	Structural Maintenance	2%			\$2,122	
	Equipment replacement	4%			\$5,091	
	Chemicals			\$0.00	\$0	
	Hypochlorite	1832	lb	\$0.60	\$913	0.5 mgd, 0.5 mg/l dose. Double for 1 MG
	Sodium Bisulfite	0	gal	\$0.20	\$0	
	Polymer		lb	\$3.00	\$0	
	Structural Replacement	2%			\$2,068	
	Equipment replacement	4%			\$4,962	
	Misc expenses		allowance		\$0	
<b>Total Annual Cost</b>					<b>\$23,585</b>	
<b>Present Worth Factor</b>					<b>14.6061</b>	
<b>Present Worth Cost</b>					<b>\$344,000</b>	

**Total Present Worth Project Cost Estimate**

Capital	\$1,466,000
Operations and Maintenance	\$344,000
<b>Total Present Worth</b>	<b>\$1,810,000</b>



Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 ENR: 8361.74

Updated Unit Costs

			CORE PLUS ALCOHOL						RHODY DRIVE						
			2010		2011		2012		2013		2014		2015		
			ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	ERUs Flow (mgd)	Cost, \$	
Item	Description	Unit cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	
<b>Liquid Sodium Hypochlorite Disinfection</b>															
<b>Capital Cost Estimate</b>															
Item	Description	Unit cost, \$	Unit	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
	Building enclosure for equipment	\$150	SF	280	\$42,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Excavation	\$20	CY	397	\$7,940	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Backfill	\$15	CY	218	\$3,270	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Slab Concrete and Rebar	\$500	CY	73	\$36,333	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Straight Wall Concrete and Rebar	\$700	CY	67	\$47,144	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc Metals (Handrailing, Covers, etc.)	\$500	LS	1	\$500	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc Concrete (NaOCl secondary containment)	\$600	CY	5	\$3,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Process Piping and Valving	\$25,000	LS	1	\$25,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sitework	\$15,000	LS	1	\$15,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Electrical Conduit, Sitework	\$5,000	LS	1	\$5,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Lighting	\$20,000	LS	1	\$20,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Contact Tank Baffles	\$10,000	LS	1	\$10,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Structural</b>				<b>\$215,187</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
	Storage Tank (3-55 gal drums)	\$200	ea	6	\$1,200	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Pumps w/ installation (hypo)	\$2,500	ea	2	\$5,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Tank Mixers	\$1,000	ea	1	\$1,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Feed Pacing Controller	\$2,500	ea	1	\$2,500	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Chemical Flow Meter	\$2,000	ea	1	\$2,000	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>				<b>\$11,700</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
	Installation, Miscellaneous Mechanical		of Equip	40%	\$4,680	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0
	Electrical		of Equip	20%	\$2,340	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0
	Instrumentation and Control		of Equip	15%	\$1,755	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>				<b>\$235,662</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
	Contractor O&P		of Sub Cost	15%	\$35,349	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0
	Mobilization, demobilization, bond		of Sub cost	6%	\$14,140	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0
	<b>Total estimated current construction cost</b>				<b>\$285,151</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
	Escalation to time of construction			3.50%	\$9,980	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0
	<b>Total estimated construction cost</b>				<b>\$295,131</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
	Contingency			30%	\$88,539	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0
	Engineering Design			15%	\$57,551	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0
	Construction Management			10%	\$38,367	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0
	Sales Tax			8.4%	\$32,228	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0
	<b>Total Estimated Capital Cost</b>				<b>\$512,000</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
<b>Operations and Maintenance Cost Estimate (per year)</b>															
Item	Description	Unit Cost	Unit	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost
	Labor	\$40	hr	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080
	Septic tank pumping	\$300	ea		\$0		\$0		\$0		\$0		\$0		\$0
	Diesel oil	\$4.50	gal		\$0		\$0		\$0		\$0		\$0		\$0
	Power	\$0.08	kWh	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245
	Structural Maintenance			2%	\$4,454	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0
	Equipment replacement			4%	\$484	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0
	Chemicals	\$0.00			\$0		\$0		\$0		\$0		\$0		\$0
	Hypochlorite	\$1.50	lb	156	\$235	182	\$273	212	\$317	246	\$369	286	\$429	333	\$499
	Sodium Bisulfite	\$0.20	gal	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Polymer	\$3.00	lb		\$0		\$0		\$0		\$0		\$0		\$0
	Misc expenses		allowance		\$0		\$0		\$0		\$0		\$0		\$0
	<b>Total Annual Cost</b>				<b>\$7,498</b>		<b>\$2,598</b>		<b>\$2,642</b>		<b>\$2,694</b>		<b>\$2,754</b>		<b>\$2,824</b>
	Structural Maintenance			2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304
	Equipment replacement			4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468
	<b>Total Annual Cost with Replacement Costs</b>				<b>\$12,270</b>		<b>\$7,370</b>		<b>\$7,414</b>		<b>\$7,466</b>		<b>\$7,526</b>		<b>\$7,596</b>

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By : Tt  
 Date : 11-Aug-08  
 July 2008  
 ENR: 8361.74

		RESIDENTIAL #1				RESIDENTIAL AREA #2									
		2016		2017		2018		2019		2020		2021		2022	
		ERUs	1067	ERUs	1241	ERUs	1443	ERUs	1678	ERUs	1952	ERUs	2269	ERUs	2639
		Flow (mgd)	0.25	Flow (mgd)	0.30	Flow (mgd)	0.34	Flow (mgd)	0.40	Flow (mgd)	0.46	Flow (mgd)	0.54	Flow (mgd)	0.63
Item	Description	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>Liquid Sodium Hypochlorite Disinfection</b>															
<b>Capital Cost Estimate</b>															
Item	Description	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
	Building enclosure for equipment	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Excavation	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Backfill	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Slab Concrete and Rebar	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Straight Wall Concrete and Rebar	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc Metals (Handrailing, Covers, etc.)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Misc Concrete (NaOCl secondary containment)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Process Piping and Valving	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Sitework	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Electrical Conduit, Sitework	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Site Lighting	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Contact Tank Baffles	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Structural</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Storage Tank (3-55 gal drums)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Pumps w/ installation (hypo)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Tank Mixers	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Feed Pacing Controller	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Chemical Flow Meter	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	<b>Subtotal Equipment</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Installation, Miscellaneous Mechanical	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0
	Electrical	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0
	Instrumentation and Control	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Contractor O&P	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0
	Mobilization, demobilization, bond	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0
	<b>Total estimated current construction cost</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Escalation to time of construction	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0
	<b>Total estimated construction cost</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Contingency	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0
	Engineering Design	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0
	Construction Management	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0
	Sales Tax	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0
	<b>Total Estimated Capital Cost</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0
<b>Operations and Maintenance Cost Estimate (per year)</b>															
Item	Description	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost
	Labor	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080
	Septic tank pumping		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Diesel oil		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Power	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245
	Structural Maintenance	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0
	Equipment replacement	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0
	Chemicals		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Hypochlorite	387	\$580	450	\$675	523	\$784	608	\$912	707	\$1,061	822	\$1,233	956	\$1,434
	Sodium Bisulfite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
	Polymer		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	Misc expenses		\$0		\$0		\$0		\$0		\$0		\$0		\$0
	<b>Total Annual Cost</b>		\$2,905		\$3,000		\$3,109		\$3,237		\$3,386		\$3,558		\$3,759
	Structural Maintenance	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304
	Equipment replacement	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468
	<b>Total Annual Cost with Replacement Costs</b>		\$7,677		\$7,771		\$7,881		\$8,009		\$8,157		\$8,330		\$8,531

Project: Port Hadlock UGA Sewer Facility Plan  
 Subject: Treatment System Analysis  
 By: Tt  
 Date: 11-Aug-08  
 July 2008  
 ENR: 8361.74

		RESIDENTIAL AREA #3																
		2023		2024		2025		2026		2027		2028		2029		2030		
		ERUs	3069	ERUs	3568	ERUs	3666	ERUs	3768	ERUs	3872	ERUs	3978	ERUs	4088	ERUs	4201	
		Flow (mgd)	0.73	Flow (mgd)	0.85	Flow (mgd)	0.87	Flow (mgd)	0.90	Flow (mgd)	0.92	Flow (mgd)	0.95	Flow (mgd)	0.97	Flow (mgd)	1.00	
Item	Description	Quantity	Cost, \$	Quantity	Unit Cost, \$	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$
<b>Liquid Sodium Hypochlorite Disinfection</b>																		
<b>Capital Cost Estimate</b>																		
Item	Description	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	Quantity	Cost, \$	
	Building enclosure for equipment	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Excavation	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Backfill	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Slab Concrete and Rebar	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Straight Wall Concrete and Rebar	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Misc Metals (Handrailing, Covers, etc.)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Misc Concrete (NaOCl secondary containment)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Site Process Piping and Valving	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Sitework	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Electrical Conduit, Sitework	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Site Lighting	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Contact Tank Baffles	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	<b>Subtotal Structural</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Storage Tank (3-55 gal drums)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Pumps w/ installation (hypo)	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Tank Mixers	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Feed Pacing Controller	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Chemical Flow Meter	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	<b>Subtotal Equipment</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Installation, Miscellaneous Mechanical	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0	40%	\$0	
	Electrical	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0	20%	\$0	
	Instrumentation and Control	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Contractor O&P	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	Mobilization, demobilization, bond	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0	6%	\$0	
	<b>Total estimated current construction cost</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Escalation to time of construction	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	3.50%	\$0	
	<b>Total estimated construction cost</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Contingency	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0	30%	\$0	
	Engineering Design	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	15%	\$0	
	Construction Management	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0	10%	\$0	
	Sales Tax	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	8.4%	\$0	
	<b>Total Estimated Capital Cost</b>		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
<b>Operations and Maintenance Cost Estimate (per year)</b>																		
Item	Description	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	Quantity	Annual Cost	
	Labor	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	52	\$2,080	
	Septic tank pumping		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Diesel oil		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Power	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245	3266	\$245	
	Structural Maintenance	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	2%	\$0	
	Equipment replacement	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	4%	\$0	
	Chemicals		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Hypochlorite	1112	\$1,668	1293	\$1,939	1328	\$1,993	1365	\$2,048	1403	\$2,104	1441	\$2,162	1481	\$2,222	1522	\$2,283	
	Sodium Bisulfite	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	
	Polymer		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	Misc expenses		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	
	<b>Total Annual Cost</b>		\$3,993		\$4,264		\$4,318		\$4,373		\$4,429		\$4,487		\$4,547		\$4,608	
	Structural Maintenance	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	2%	\$4,304	
	Equipment replacement	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468	4%	\$468	
	<b>Total Annual Cost with Replacement Costs</b>		\$8,764		\$9,036		\$9,089		\$9,144		\$9,201		\$9,259		\$9,318		\$9,380	



**Project:** Port Hadlock Facilities Plan  
**Subject:** Solids Handling Analysis  
**By :** Tt  
**Date :** 29-Aug-08  
**Membrane Bioreactors with raw sludge wasting**

**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
	Site Process Piping and Valving	1	LS	\$4,000	\$4,000
	Sitework	1	LS	\$10,000	\$10,000
	Landscaping	1	LS		\$0
<b>Subtotal Structural</b>					<b>\$14,000</b>
	Sludge storage				
	Steel 10k gallon sludge holding tank	1	EA	\$20,000	\$20,000
<b>Subtotal Equipment</b>					<b>\$20,000</b>
	Installation, Miscellaneous Mechanical	40%	of Equip		\$8,000
	Electrical	25%	of Equip		\$5,000
	Instrumentation and Control	15%	of Equip		\$3,000
<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>					<b>\$50,000</b>
	Contractor O&P	15%	of Sub Cost		\$7,500
	Mobilization, demobilization, bond	6%	of Sub cost		\$3,000
<b>Total estimated current construction cost</b>					<b>\$60,500</b>
	Escalation to time of construction	3.50%			\$2,118
<b>Total estimated construction cost</b>					<b>\$62,618</b>
	Contingency	30%			\$18,785
	Engineering Design	15%			\$12,210
	Construction Management	10%			\$8,140
	Sales Tax	8.3%			\$6,756
<b>Total Estimated Capital Cost</b>					<b>\$109,000</b>

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost
	Labor	183	HR	\$40	\$7,300
	Membrane Replacement	0	panel	\$75	\$0
	Diesel oil		GAL	\$2.50	\$0
	Power	0	kWh	\$0.075	\$0
	Structural Maintenance	2%			\$290
	Equipment replacement	4%			\$828
	Misc expenses		allowance		\$0
	Sludge hauling and disposal	1,770,615	GAL	\$0.12	\$212,474
<b>Total Annual Cost</b>					<b>\$220,892</b>
	20 year P/A Factor	20.00			
<b>Present Worth Cost</b>					<b>\$4,418,000</b>

**Total Present Worth Project Cost Estimate**

Capital	\$109,000
Operations and Maintenance	\$4,418,000
<b>Total Present Worth</b>	<b>\$4,527,000</b>

Project: Port Hadlock Facilities Plan  
 Subject: Solids Handling Analysis  
 By: Tt  
 Date: 29-Aug-08

**Membrane Bioreactors With Dewatering**

**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
	Administration/Lab Building	0	SF	\$200	\$0
	Electrical Building (generator outside)	0	SF	\$150	\$0
	Mechanical Building	150	SF	\$150	\$22,500
	Dewatering and sludge truck loading building	1,000	SF	\$150	\$150,000
	Sludge Truck Loading Roofed Area	600	SF	\$50	\$30,000
	Slab Concrete and Rebar	24	CY	\$500	\$11,963
	Straight Wall Concrete and Rebar	48	CY	\$700	\$33,496
	excavation	676	CY	\$20	\$13,520
	backfill	601	CY	\$15	\$9,020
	Site Process Piping and Valving	1	LS	\$30,761	\$30,761
	Indoor Process Piping and Valving	1	LS	\$51,269	\$51,269
	Sitework	1	LS	\$120,000	\$120,000
	Landscaping	1	LS		\$0
<b>Subtotal Structural</b>					<b>\$492,529</b>
	WAS holding tank				
	Blower	2	EA	\$10,000	\$20,000
	Diffuser with piping	2	EA	\$10,000	\$20,000
	Decant pump	0	EA	\$10,000	
	Thickener Facilities				
	Belt Filter Press, w/control panel	1	EA	\$250,000	\$250,000
	Compressor, water booster pump	1	EA	\$5,000	\$5,000
	Dewatering Sludge Conveyor	32	LF	\$1,000	\$32,000
	Odor Control Scrubber	1	EA	\$52,800	\$52,800
	Sludge Pump	2	EA	\$9,105	\$18,210
	Polymer Feed System	1	EA	\$12,140	\$12,140
	HVAC for buildings				\$0
<b>Subtotal Equipment</b>					<b>\$410,150</b>
	Installation, Miscellaneous Mechanical	40%	of Equip		\$164,060
	Electrical	25%	of Equip		\$102,538
	Instrumentation and Control	15%	of Equip		\$61,523
<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>					<b>\$1,230,799</b>
	Contractor O&P	15%	of Sub Cost		\$184,620
	Mobilization, demobilization, bond	6%	of Sub cost		\$73,848
<b>Total estimated current construction cost</b>					<b>\$1,489,267</b>
	Escalation to time of construction	3.50%			\$52,124
<b>Total estimated construction cost</b>					<b>\$1,541,391</b>
	Contingency	30%			\$462,417
	Engineering Design	15%			\$300,571
	Construction Management	10%			\$200,381
	Sales Tax	8.3%			\$166,316
<b>Total Estimated Capital Cost</b>					<b>\$2,671,000</b>

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost
	Labor	780	HR	\$40	\$23,608
	Diesel oil		GAL	\$2.50	\$0
	Power	22,133	kWh	\$0.075	\$1,660
	Structural Maintenance	2%			\$10,195
	Equipment replacement	4%			\$16,980
	Chemicals - membrane cleaning	0	LS	\$2,000	\$0
	Hypochlorite	0	LB	\$0.60	\$0
	Sodium Bisulfite	0	GAL	\$0.20	\$0
	Polymer	2,215	LB	\$3.00	\$6,645
	Misc expenses		allowance		\$0
	Sludge hauling and disposal	165,995	GAL	\$0.25	\$41,499
<b>Total Annual Cost</b>					<b>\$100,588</b>
	20 year P/A Factor	20.00			
<b>Present Worth Cost</b>					<b>\$2,012,000</b>

**Total Present Worth Project Cost Estimate**

Capital	\$2,671,000
Operations and Maintenance	\$2,012,000
<b>Total Present Worth</b>	<b>\$4,683,000</b>

**Project:** Port Hadlock Facilities Plan  
**Subject:** Solids Handling Analysis  
**By:** Tt  
**Date:** 29-Aug-08

**Membrane Bioreactors With Thickener  
Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$
	Administration/Lab Building	0	SF	\$200	\$0
	Electrical Building (generator outside)	0	SF	\$150	\$0
	Mechanical Building	150	SF	\$150	\$22,500
	Filter & Chemical Building	650	SF	\$150	\$97,500
	Slab Concrete and Rebar	24	CY	\$500	\$11,963
	Straight Wall Concrete and Rebar	48	CY	\$700	\$33,496
	excavation	676	CY	\$20	\$13,520
	backfill	601	CY	\$15	\$9,020
	Site Process Piping and Valving	1	LS	\$13,926	\$13,926
	Indoor Process Piping and Valving	1	LS	\$23,210	\$23,210
	Sitework	1	LS	\$60,000	\$60,000
	Landscaping	1	LS		\$0
<b>Subtotal Structural</b>					<b>\$305,135</b>
	WAS holding tank				
	Blower	1	EA	\$20,000	\$10,000
	Diffuser with piping	1	EA	\$20,000	\$10,000
	Decant pump	0	EA	\$10,000	
	Thickener Facilities				
	Screw Press Thickener	1	EA	\$54,630	\$54,630
	Odor Control Scrubber	1	EA	\$60,700	\$60,700
	Sludge Pump	2	EA	\$9,105	\$18,210
	Polymer Feed System	1	EA	\$12,140	\$12,140
	HVAC for buildings				\$0
	Thickened sludge storage				
	Steel 10k gallon sludge holding tank	1	EA	\$20,000	\$20,000
<b>Subtotal Equipment</b>					<b>\$185,680</b>
	Installation, Miscellaneous Mechanical	40%	of Equip		\$74,272
	Electrical	25%	of Equip		\$46,420
	Instrumentation and Control	15%	of Equip		\$27,852
<b>Subtotal Structural, Mechanical, Elect, I&amp;C</b>					<b>\$639,359</b>
	Contractor O&P	15%	of Sub Cost		\$95,904
	Mobilization, demobilization, bond	6%	of Sub cost		\$38,362
<b>Total estimated current construction cost</b>					<b>\$773,625</b>
	Escalation to time of construction	3.50%			\$27,077
<b>Total estimated construction cost</b>					<b>\$800,702</b>
	Contingency	30%			\$240,210
	Engineering Design	15%			\$156,137
	Construction Management	10%			\$104,091
	Sales Tax	8.3%			\$86,396
<b>Total Estimated Capital Cost</b>					<b>\$1,388,000</b>

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost
	Labor	560	HR	\$40	\$23,608
	Diesel oil		GAL	\$2.50	\$0
	Power	17,796	kWh	\$0.075	\$1,328
	Structural Maintenance	2%			\$6,316
	Equipment replacement	4%			\$7,687
	Hypochlorite	0	LB	\$0.60	\$0
	Sodium Bisulfite	0	GAL	\$0.20	\$0
	Polymer	1,198	LB	\$3.00	\$3,323
	Misc expenses		allowance		\$0
	Sludge hauling and disposal	663,981	GAL	\$0.20	\$132,796
<b>Total Annual Cost</b>					<b>\$175,058</b>
	20 year P/A Factor	20.00			
<b>Present Worth Cost</b>					<b>\$3,501,000</b>

**Total Present Worth Project Cost Estimate**

Capital	\$1,388,000
Operations and Maintenance	\$3,501,000
<b>Total Present Worth</b>	<b>\$4,889,000</b>

	Alternative 1	Alternative 2	Alternative 3
	Unthickened sludge to Port Townsend	Unthickened sludge to Biocycle	Unthickened sludge to Port Angeles
Capital	\$147,649	\$147,649	\$147,649
Annual O&M	\$150,295	\$50,098	\$91,847
PW O&M			
Total PW			

	WAS gpd	ppd	Alternative 1	Alternative 2	Alternative 3
2010	1,144	191	tipping and hauling	\$0.36	\$0.12
2020	3,681	614			\$0.22
2030	11,849	1,976			

**TANK**

tank volume (ft3)	1337 dimension	18	19	20	under ground	12
wall concrete (cy)	95 cost					
slab concrete (cy)	34 cost					
excavation (cy)	1199 cost					
disposal (cy)	205 cost					
backfill (cy)	993 cost					
diffusers	2 cost					
blowers	2 cost					
Total		\$147,649				

**THICKENER**

total cost	\$654,000 coupeville alternative 1
screw press capacity (gpm)	50 coupeville

2010

	Alternative 1	Alternative 2	Alternative 3
10k gal holding tank	\$147,649	\$147,649	\$147,649
thickener			
<b>total capital cost</b>	\$147,649	\$147,649	\$147,649
hauling and tipping fee	\$150,295	\$50,098	\$91,847
labor (included in fee)			
power (included in fee)			
equipment replacement (included in fee)			
chemicals (included in fee)			
<b>total O&amp;M cost</b>	\$150,295	\$50,098	\$91,847
20-yr. O&M Cost	\$3,005,903	\$1,001,968	\$1,836,941

**20-year Life Cycle**

<b>Cost</b>	<b>\$3,153,551.69</b>	<b>\$1,149,616.49</b>	<b>\$1,984,589.49</b>
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Date : 8-Sep-08

*Option: Rapid Rate Surface Percolation Land Application at East Jefferson Little League/Sheriff's Ballfields, Pump from Ness' Corner Rd. and Shotwell Rd., 1.77 mgd MM Buildout Flows*

**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$	
	12" DIP Force Main Overland (10' to 12' deep)	9,000	LF	\$65	\$585,000	RS Means
	Dewatering	1	LS	\$50,000	\$50,000	
	Asphalt Surface Restoration	2,583	SY	\$30	\$77,500	RS Means Assumes 3-foot trench restoration
	Gravel Surface Restoration	1,667	SY	\$10	\$16,667	RS Means Assumes 3-foot trench restoration
	Land Purchase: Disposal/Buidout MM Flows	5.7	Acres	\$28,032	\$160,879	
	Land Purchase: Treatment	4.0	Acres	\$28,032	\$112,126	
	Land Purchase: Buffers	2	Acres	\$28,032	\$68,251	
	Site Process Piping and Valving	1	LS	\$25,000	\$25,000	
	Electrical Conduit, Sitework, Lighting	1	LS	\$10,000	\$10,000	
	Monitoring Wells	3	EA	\$10,000	\$30,000	
<b>Subtotal Structural</b>					<b>\$1,135,424</b>	W/O Land
	Main Pump Station (2.1 mgd)	0	EA	\$500,000	\$0	\$794,167
	Medium Pump Station	1	EA	\$375,000	\$375,000	
	Small Pump Station (0.036 mgd)	0	EA	\$250,000	\$0	
	Distribution Piping & Equipment	1	EA	\$10,000	\$10,000	
	Reclaimed Water Pumps/Filter	1	EA	\$50,000	\$50,000	
<b>Subtotal Equipment</b>					<b>\$435,000</b>	
<b>Total estimated current construction cost</b>					<b>\$1,570,424</b>	
	Escalation to time of construction	2.60%			\$40,831	\$1,229,167
<b>Total estimated construction cost</b>					<b>\$1,611,255</b>	\$31,958
	Contingency	30%			\$483,376	\$1,261,125
	Engineering Design	15%			\$261,675	
	Construction Management	10%			\$174,450	Land Costs not included
	Sales Tax	8.8%			\$153,516	Land Costs not included
<b>Total Estimated Capital Cost</b>					<b>\$2,684,273</b>	Land Costs not included

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost	
	Labor	104	hr	\$30	\$3,120	2hrs/week maintenance on pump station
	Power	244962	kWh	\$0.07	\$17,147	12hr/day run time, 75hp pump station
	Structural Maintenance	2%			\$23,299	
	Equipment replacement	4%			\$17,852	
	Misc expenses		allowance		\$0	
<b>Total Annual Cost</b>					<b>\$61,419</b>	
<b>Present Worth Factor</b>					<b>20.0000</b>	20year period, 3.2% discount factor
<b>Present Worth Cost</b>					<b>\$1,228,000</b>	

**Total Present Worth Project Cost Estimate**

Capital	\$2,684,273
Operations and Maintenance	\$1,228,000
<b>Total Present Worth</b>	<b>\$3,912,300</b>

Date : 8-Sep-08

Option: Rapid Rate Surface Percolation Land Application adjacent to H.J. Carroll Park, Pump from Ness' Corner Rd. and Shotwell Rd., 1.77 mgd MM Buildout Flows

**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$	
	12" DIP Force Main Overland (10' to 12' deep)	11,000	LF	\$65	\$715,000	RS Means
	Dewatering	1	LS	\$50,000	\$50,000	
	Aphalt Surface Restoration	13,000	SY	\$30	\$390,000	RS Means Assumes Full 12-foot restoration
	Gravel Surface Restoration	1,667	SY	\$10	\$16,667	RS Means
	Land Purchase: Storage/15' Dike/20days/Buidout MM	11	Acres	\$25,000	\$275,000	Assumes Tigher Soils
	Land Purchase: Treatment	4	Acres	\$25,000	\$100,000	
	Land Purchase: Buffers	4	Acres	\$25,000	\$93,750	
	Site Process Piping and Valving	1	LS	\$25,000	\$25,000	
	Electrical Conduit, Sitework, Lighting	1	LS	\$10,000	\$10,000	
	Monitoring Wells	3	EA	\$10,000	\$30,000	
<b>Subtotal Structural</b>					<b>\$1,705,417</b>	
	Main Pump Station (2.1 mgd)	1	EA	\$500,000	\$500,000	W/O Land
	Medium Pump Station	0	EA	\$375,000	\$0	\$1,236,667
	Small Pump Station (0.036 mgd)	0	EA	\$250,000	\$0	
	Distribution Piping & Equipment	1	EA	\$10,000	\$10,000	
	Reclaimed Water Pumps/Filter	1	EA	\$50,000	\$50,000	
<b>Subtotal Equipment</b>					<b>\$560,000</b>	
<b>Total estimated current construction cost</b>					<b>\$2,265,417</b>	
	Escalation to time of construction	2.60%			\$58,901	\$1,796,667
<b>Total estimated construction cost</b>					<b>\$2,324,318</b>	\$46,713
	Contingency	30%			\$697,295	\$1,843,380
	Engineering Design	15%			\$381,101	
	Construction Management	10%			\$254,068	Land Costs not included
	Sales Tax	8.8%			\$223,579	Land Costs not included
<b>Total Estimated Capital Cost</b>					<b>\$3,880,361</b>	Land Costs not included

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost	
	Labor	104	hr	\$30	\$3,120	20year period, 3.2% discount factor 12hr/day run time, 75hp pump station
	Power	326617	kWh	\$0.07	\$22,863	
	Structural Maintenance	2%			\$34,995	
	Equipment replacement	4%			\$22,982	
	Misc expenses		allowance		\$0	
<b>Total Annual Cost</b>					<b>\$83,961</b>	
<b>Present Worth Factor</b>					<b>20.0000</b>	
<b>Present Worth Cost</b>					<b>\$1,679,000</b>	

**Total Present Worth Project Cost Estimate**

Capital	\$3,880,361
Operations and Maintenance	\$1,679,000
<b>Total Present Worth</b>	<b>\$5,559,400</b>

**Option: Rapid Rate Surface Percolation Land Application at Central Site near Hunt/Mason Rds., Pump from Ness' Corner Rd. and Shotwell Rd., 1.77 mgd MM Buildout Flows**

**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$	
	12" DIP Force Main Overland (10' to 12' deep)	3,600	LF	\$65	\$234,000	RS Means
	Dewatering	1	LS	\$50,000	\$50,000	
	Asphalt Surface Restoration	783	SY	\$30	\$23,500	RS Means Assumes 3-foot trench restoration
	Gravel Surface Restoration	1,667	SY	\$10	\$16,667	RS Means Assumes 3-foot trench restoration
	Land Purchase: Disposal/Buildout MM Flows	5.7	Acres	\$28,032	\$160,879	
	Land Purchase: Treatment	4.0	Acres	\$28,032	\$112,126	
	Land Purchase: Buffers	2	Acres	\$28,032	\$68,251	
	Site Process Piping and Valving	1	LS	\$25,000	\$25,000	
	Electrical Conduit, Sitework, Lighting	1	LS	\$10,000	\$10,000	
	Monitoring Wells	3	EA	\$10,000	\$30,000	
<b>Subtotal Structural</b>					<b>\$730,424</b>	
	Main Pump Station (2.1 mgd)	0	EA	\$500,000	\$0	W/O Land \$389,167
	Medium Pump Station	1	EA	\$375,000	\$375,000	
	Small Pump Station (0.036 mgd)	0	EA	\$250,000	\$0	
	Distribution Piping & Equipment	1	EA	\$10,000	\$10,000	
	Reclaimed Water Pumps/Filter	1	EA	\$50,000	\$50,000	
<b>Subtotal Equipment</b>					<b>\$435,000</b>	
<b>Total estimated current construction cost</b>					<b>\$1,165,424</b>	
	Escalation to time of construction	2.60%			\$30,301	\$824,167
<b>Total estimated construction cost</b>					<b>\$1,195,725</b>	\$21,428
	Contingency	30%			\$358,717	\$845,595
	Engineering Design	15%			\$180,647	
	Construction Management	10%			\$120,431	Land Costs not included
	Sales Tax	8.8%			\$105,979	Land Costs not included
<b>Total Estimated Capital Cost</b>					<b>\$1,961,500</b>	Land Costs not included

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost	
	Labor	104	hr	\$30	\$3,120	2hrs/week maintenance on pump station
	Power	244962	kWh	\$0.07	\$17,147	12hr/day run time, 75hp pump station
	Structural Maintenance				\$14,988	
	Equipment replacement	4%			\$17,852	
	Misc expenses		allowance		\$0	
<b>Total Annual Cost</b>					<b>\$53,108</b>	
<b>Present Worth Factor</b>					<b>20.0000</b>	20year period, 3.2% discount factor
<b>Present Worth Cost</b>					<b>\$1,062,000</b>	

**Total Present Worth Project Cost Estimate**

Capital	\$1,961,500
Operations and Maintenance	\$1,062,000
<b>Total Present Worth</b>	<b>\$3,023,500</b>

Date : 8-Sep-08

*Option: Rapid Rate Surface Percolation Land Application at Part of Pt. Townsend Airport, Pump from Ness' Corner Rd. and Shotwell Rd., 1.77 mgd MM Buildout Flows*

**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$	
	12" DIP Force Main Overland (10' to 12' deep)	12,500	LF	\$65	\$812,500	RS Means
	Dewatering	1	LS	\$50,000	\$50,000	
	Aphalt Surface Restoration	15,000	SY	\$30	\$450,000	RS Means Assumes Full 12-foot restoration along Rhody Drive
	Gravel Surface Restoration	1,667	SY	\$10	\$16,667	RS Means
	Land Purchase: Storage/15' Dike/20days/Buidout MM Flows	11	Acres	\$25,000	\$275,000	Assumes Tigher soils
	Land Purchase: Treatment	4	Acres	\$25,000	\$100,000	
	Land Purchase: Buffers	4	Acres	\$25,000	\$93,750	
	Site Process Piping and Valving	1	LS	\$25,000	\$25,000	
	Electrical Conduit, Sitework, Lighting	1	LS	\$10,000	\$10,000	
	Monitoring Wells	3	EA	\$10,000	\$30,000	
<b>Subtotal Structural</b>					<b>\$1,862,917</b>	
	Main Pump Station (2.1 mgd)	1	EA	\$500,000	\$500,000	W/O Land
	Medium Pump Station	0	EA	\$375,000	\$0	\$1,394,167
	Small Pump Station (0.036 mgd)	0	EA	\$250,000	\$0	
	Distribution Piping & Equipment	1	EA	\$10,000	\$10,000	
	Reclaimed Water Pumps/Filter	1	EA	\$50,000	\$50,000	
<b>Subtotal Equipment</b>					<b>\$560,000</b>	
<b>Total estimated current construction cost</b>					<b>\$2,422,917</b>	
	Escalation to time of construction	2.60%			\$62,996	\$1,954,167
<b>Total estimated construction cost</b>					<b>\$2,485,913</b>	\$50,808
	Contingency	30%			\$745,774	\$2,004,975
	Engineering Design	15%			\$412,612	
	Construction Management	10%			\$275,075	Land Costs not included
	Sales Tax	8.8%			\$242,066	Land Costs not included
<b>Total Estimated Capital Cost</b>					<b>\$4,161,439</b>	Land Costs not included

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost	
	Labor	104	hr	\$30	\$3,120	20year period, 3.2% discount factor
	Power	326617	kWh	\$0.07	\$22,863	12hr/day run time, 100hp pump station
	Structural Maintenance	2%			\$38,227	
	Equipment replacement	4%			\$22,982	
	Misc expenses		allowance		\$0	
<b>Total Annual Cost</b>					<b>\$87,193</b>	
<b>Present Worth Factor</b>					<b>20.0000</b>	
<b>Present Worth Cost</b>					<b>\$1,744,000</b>	

**Total Present Worth Project Cost Estimate**

Capital	\$4,161,439
Operations and Maintenance	\$1,744,000
<b>Total Present Worth</b>	<b>\$5,905,400</b>

Date : 8-Sep-08

**Option: Rapid Rate Surface Percolation Land Application adjacent to Chimacum H.S, Pump from Ness' Corner Rd. and Shotwell Rd., 1.77 mgd MM Buildout Flows**

**Capital Cost Estimate**

Item	Description	Quantity	Unit	Unit cost, \$	Cost, \$	
	12" DIP Force Main Overland (10' to 12' deep)	9,200	LF	\$65	\$598,000	RS Means
	Dewatering	1	LS	\$50,000	\$50,000	
	Aphalt Surface Restoration	10,600	SY	\$30	\$318,000	RS Means Assumes Full 12-foot restoration along Rhody Drive
	Gravel Surface Restoration	1,667	SY	\$10	\$16,667	RS Means
	Land Purchase: Storage/15' Dike/20days/Buidout MM Flows	11	Acres	\$25,000	\$275,000	Assumes Tigher soils
	Land Purchase: Treatment	4	Acres	\$25,000	\$100,000	
	Land Purchase: Buffers	4	Acres	\$25,000	\$93,750	
	Site Process Piping and Valving	1	LS	\$25,000	\$25,000	
	Electrical Conduit, Sitework, Lighting	1	LS	\$10,000	\$10,000	
	Monitoring Wells	3	EA	\$10,000	\$30,000	
<b>Subtotal Structural</b>					<b>\$1,516,417</b>	
	Main Pump Station (2.1 mgd)	1	EA	\$500,000	\$500,000	W/O Land \$1,047,667
	Medium Pump Station	0	EA	\$375,000	\$0	
	Small Pump Station (0.036 mgd)	0	EA	\$250,000	\$0	
	Distribution Piping & Equipment	1	EA	\$10,000	\$10,000	
	Reclaimed Water Pumps/Filter	1	EA	\$50,000	\$50,000	
<b>Subtotal Equipment</b>					<b>\$560,000</b>	
<b>Total estimated current construction cost</b>					<b>\$2,076,417</b>	
	Escalation to time of construction	2.60%			\$53,987	\$1,607,667
<b>Total estimated construction cost</b>					<b>\$2,130,404</b>	\$41,799
	Contingency	30%			\$639,121	\$1,649,466
	Engineering Design	15%			\$343,288	
	Construction Management	10%			\$228,859	Land Costs not included
	Sales Tax	8.8%			\$201,396	Land Costs not included
<b>Total Estimated Capital Cost</b>					<b>\$3,543,067</b>	Land Costs not included

**Operations and Maintenance Cost Estimate (per year)**

Item	Description	Quantity	Unit	Unit Cost	Annual Cost	
	Labor	104	hr	\$30	\$3,120	20year period, 3.2% discount factor
	Power	326617	kWh	\$0.07	\$22,863	12hr/day run time, 100hp pump station
	Structural Maintenance	2%			\$31,117	
	Equipment replacement	4%			\$22,982	
	Misc expenses		allowance		\$0	
<b>Total Annual Cost</b>					<b>\$80,082</b>	
<b>Present Worth Factor</b>					<b>20.0000</b>	
<b>Present Worth Cost</b>					<b>\$1,602,000</b>	

**Total Present Worth Project Cost Estimate**

Capital	\$3,543,067
Operations and Maintenance	\$1,602,000
<b>Total Present Worth</b>	<b>\$5,145,100</b>

