Basin 44 and 45 Cost Summary Table - With Basins 44 & 45 Combined

*Distributed Storage					
Basins	**Description**	**Average [1]Total Project Cost ($Million) -30% to 50%**			**Average [2]Net Present Value ($Million)**
44	2.4 MG Storage Tank in Seward Park or Private Property (*excludes Storage Pipe in Lake Wa. Blvd.)	$ 42.3	to	$ 81.2	$ 72.6
45	0.2 MG Storage Tank in Martha Washington Park or Private Property near MW Park or Storage in 57th Ave S (Right of Way)				

Tunnel Storage					
Basin	**Description**	**[1] Total Project Cost ($Million) -30% to 50%**			**[2] Net Present Value ($Million)**
44 to 45	Tunnel from Seward Park to Martha Washington Park	$ 83.7	to	$ 96.0	$ 85.0

Conveyance and Storage					
Basin	**Description**	**[1] Total Project Cost ($Million) -30% to 50%**			**[2] Net Present Value ($Million)**
44 to 45	Pump Station at S. Orcas St. & Conveyance to 2.6 MG Storage tank at Martha Washington Park	$ 43.7	to	$ 91.6	$ 82.3

Infiltration & Inflow Reduction					
Basin	**Description**	**[1] Total Project Cost ($Million) -30% to 50%**			**[2] Net Present Value ($Million)**
44 and 45	Complete Separation	$ 57.5	to	$ 123.2	$ 107.8

1 Total Project Cost = Hard Cost + Soft Cost, and Hard Cost is calculated using Budgeted Construction Cost Estimate (-30% and +50%) and includes property costs

2 Net Present Value is calculated using a 3% discount factor and uses the Budgeted Construction Cost Estimate (+50%)

* Values shown for distributed storage exclude the Storage Pipe in Lake Washington Boulevard because it is is not representative of the average cost

Basin 44 and 45 Cost Summary Table

Distributed Storage						
Basin	**Description**	**[1] Total Project Cost Range ($Million) -30% to +50%**				**[2] Net Present Value ($Million)**
44	2.4 MG Storage Tank in Seward Park	$ 32.7	to	$ 67.0		$ 59.1
44	2.4 MG Storage Pipe in Lake Washington Boulevard	$ 60.1	to	$ 117.5		$ 103.9
44	2.4 MG Storage Tank in Private Property	$ 41.1	to	$ 75.4		$ 66.5
45	0.2 MG Storage Tank in Martha Washington Park	$ 4.5	to	$ 8.6		$ 8.7
45	0.2 MG Storage in 57th Ave S. (Right of Way)	$ 5.8	to	$ 11.7		$ 10.8
45	0.2 MG Storage in Private Property near MW Park	$ 5.9	to	$ 10.0		$ 10.0
Tunnel Storage						
Basin	**Description**	**[1] Total Project Cost Range ($Million) -30% to +50%**				**[2] Net Present Value ($Million)**
44 to 45	Tunnel from Seward Park to Martha Washington Park	$ 83.7	to	$ 96.0		$ 85.0
Conveyance and Storage						
Basin	**Description**	**[1] Total Project Cost Range ($Million) -30% to +50%**				**[2] Net Present Value ($Million)**
44 to 45	Pump Station at S. Orcas St. & Conveyance to 2.6 MG Storage tank at Martha Washington Park	$ 43.7	to	$ 91.6		$ 82.3
Infiltration & Inflow Reduction						
Basin	**Description**	**[1] Total Project Cost Range ($Million) -30% to +50%**				**[2] Net Present Value ($Million)**
44 and 45	Complete Separation	$ 57.5	to	$ 123.2		$ 107.8

1 Total Project Cost = Hard Cost + Soft Cost, and Hard Cost is calculated using Budgeted Construction Cost Estimate (-30% and +50%) and includes property costs

2 Net Present Value is calculated using a 3% discount factor and uses the Budgeted Construction Cost Estimate (+50%)

Distributed Storage Basin 44 and 45 Cost Summary Table

Distributed Storage						
Basin	**Description**	**[1] Total Project Cost Range ($Million) - 30% to +50%**				**[2] Net Present Value ($Million)**
44	2.4 MG Storage Tank in Seward Park	$ 32.7	to	$ 67.0		$ 59.1
44	2.4 MG Storage Pipe in Lake Washington Boulevard	$ 60.1	to	$ 117.5		$ 103.9
44	2.4 MG Storage Tank in Private Property	$ 41.1	to	$ 75.4		$ 66.5
45	0.2 MG Storage Tank in Martha Washington Park	$ 4.5	to	$ 8.6		$ 8.7
45	0.2 MG Storage in 57th Ave S. (Right of Way)	$ 5.8	to	$ 11.7		$ 11.6
45	0.2 MG Storage in Private Property near MW Park	$ 5.9	to	$ 10.0		$ 10.0
Basin	**Description**	**Average [1] Total Project Cost Range ($Million) - 30% to +50%**				**Average [2] Net Present Value ($Million)**
44 and 45	2.4 MG Storage Tank in Seward Park or Private Property (***excludes** Storage Pipe in Lake Wa. Blvd.) 0.2 MG Storage Tank in Martha Washington Park **or** Private Property near MW Park **or** Storage in 57th Ave S (Right of Way)	$ 42.3	to	$ 81.2		$ 72.9

Combining Basin 44 & 45 Alternatives

Basin 44	**Basin 45**	**[1] Total Project Cost Range ($Million) - 30% to +50%**				**[2] Net Present Value ($Million)**
2.4 MG Storage Tank in Seward Park	0.2 MG Storage Tank in Martha Washington Park	$ 37.2	to	$ 75.5		$ 67.8
	0.2 MG Storage in 57th Ave S. (Right of Way)	$ 38.5	to	$ 78.7		$ 70.7
	0.2 MG Storage in Private Property near MW Park	$ 38.6	to	$ 76.9		$ 69.0

Combining Basin 44 & 45 Alternatives

Basin 44	**Basin 45**	**[1] Total Project Cost Range ($Million) - 30% to +50%**				**[2] Net Present Value ($Million)**
2.4 MG Storage Pipe in Lake Washington Boulevard	0.2 MG Storage Tank in Martha Washington Park	$ 64.7	to	$ 126.1		$ 112.6
	0.2 MG Storage in 57th Ave S. (Right of Way)	$ 65.9	to	$ 129.2		$ 115.5
	0.2 MG Storage in Private Property near MW Park	$ 66.1	to	$ 127.5		$ 113.8

Combining Basin 44 & 45 Alternatives

Basin 44	**Basin 45**	**[1] Total Project Cost Range ($Million) - 30% to +50%**				**[2] Net Present Value ($Million)**
2.4 MG Storage Tank in Private Property	0.2 MG Storage Tank in Martha Washington Park	$ 45.6	to	$ 83.9		$ 75.2
	0.2 MG Storage in 57th Ave S. (Right of Way)	$ 46.9	to	$ 87.1		$ 78.1
	0.2 MG Storage in Private Property near MW Park	$ 47.0	to	$ 85.3		$ 76.5

1 Total Project Cost = Hard Cost + Soft Cost, and Hard Cost is calculated using Budgeted Construction Cost Estimate (-30% and +50%) and includes property costs

2 Net Present Value is calculated using a 3% discount factor and uses the Budgeted Construction Cost Estimate (+50%)

*Values shown in yellow exclude the Storage Pipe in Lake Washington Boulevard because it is is not representative of the average cost

AACE CLASS 5 ESTIMATE - OFF-2-44 Storage in Seward Park		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$22,400,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$2,128,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$24,528,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$49,056,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$12,264,000
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$36,792,000

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$3.55	5.3%
Project Development	$0	$2.68	4.0%
Preliminary Engineering	$0	$2.34	3.5%
Property Acquisition	$1,550,000	$0.67	1.0%
Permitting	$0	$0.67	1.0%
Design	$0	$8.04	12.0%
Construction	$36,792,000	$9.37	14.0%
Closeout	$0	$1.34	2.0%

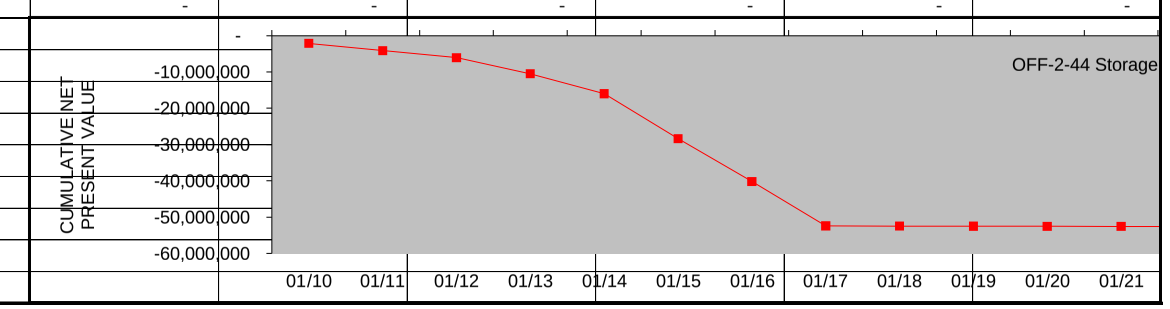
SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$38.3**	**57.2%**
TOTAL SOFT COST=	**$28.7**	**42.8%**
TOTAL PROJECT COST =	**$67.0**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$13.8**	**57.2%**
TOTAL SOFT COST=	**$10.3**	**42.8%**
TOTAL PROJECT COST =	**$24.1**	**100.0%**

SUMMARY +100% Contingency (Class 5 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$50.6**	**57.2%**
TOTAL SOFT COST=	**$37.9**	**42.8%**
TOTAL PROJECT COST =	**$88.5**	**100.0%**

SUMMARY -30% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$18.7**	**57.2%**
TOTAL SOFT COST=	**$14.0**	**42.8%**
TOTAL PROJECT COST =	**$32.7**	**100.0%**

Discount Rate	3%		OFF-2-44 Storage in Seward Park			66,949,939								
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$57,183,285	2,115,954	2,115,954	2,115,954	5,130,854	6,680,854	15,817,052	15,817,052	17,156,264	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			57,183,285	2,115,954	2,115,954	2,115,954	5,130,854	6,680,854	15,817,052	15,817,052	17,156,264	-	-	-
OPERATING COSTS														
Annual O&M		-	$1,505,763	-	-	-	-	-	-	-	57,512	57,512	57,512	57,512
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$211,613	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$194,622	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			1,911,998	-	-	-	-	-	-	-	57,512	57,512	57,512	57,512
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			59,095,283	2,115,954	2,115,954	2,115,954	5,130,854	6,680,854	15,817,052	15,817,052	17,213,776	57,512	57,512	57,512
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 59,095,283	**$ 53,347,471**	$ 48,370,080							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 59,095,283	**-$ 53,347,471**	-$ 48,370,080							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Henderson Area Alternative OFF-2-44 Storage in Seward Park (Parking Lot or Tennis Courts)

Note: Magnuson/Windermere project costs were used as a basis because it is similar in complexity and size.

*Magnuson Park Cost Estimate for 2.05 MG Storage Tank:	**$ 19,110,000**	*
Alt OFF-2-44 Storage in Seward Park, 2.40 MG Tank:	**$ 22,400,000**	
Total	**$ 22,400,000**	
Property	**$ 1,540,000**	

*Note: See Reference Document "Magnuson Park Cost Estimate: 2.05 MG Off-Line Storage Tank"

PROPERTY COSTS: ALT. OFF-2-44 Storage in Seward Park

Property ID	AREA (SQ FT)	Value ($/SQ FT)	Total Assessed Value ($)	Notes
2324049007	43560	$ 35.27	$1,540,000	Assume one acre of land in Seward Park
Total			**$1,540,000**	

Operation and Maintenance Cost Template

Alternative Number		**OFF-2-44**							
Alternative Description		**2.4 Storage Tank at Seward Park**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical	400	LF	$ 1.75	1	$ 700	1	$ 700
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	1	ea	$ 1,000	4	$ 2,040	1.5	$ 3,060
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP	1	ea	$ 5,000	1	$ 5,000	1.25	$ 6,250
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG	1	MG	$ 14,012	1	$ 14,012	1.5	$ 21,017
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket	6	ea	$ 1,040	1	$ 6,240	1.5	$ 9,360
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 41,692		$ 57,512

Seattle Public Utilities
Windermere Basin CSO - Magnuson Park Site
Cost Estimate

Takeoff By: CSO Team
Estimate By: C Moore & M. H. VanDerAa
Date: 10/05/24 Rev: 10/06/04
Rev: 10/05/25 Rev:
Rev: 10/05/27 Rev:
Rev: 10/06/03 Rev:

Alternative 1: 2.05 MG Magnuson Park Parcel 9 CSO Storage Tank Estimate

DESCRIPTION	QTY	UNIT	TOTAL UNIT COST	TOTAL COST	COMMENTS	Updated By	Date
DIVISION 1 - GENERAL REQUIREMENTS							
Temporary Traffic Control - Sand Point Way	1	LS	$ 298,048	$ 298,047.81	2% allowance, trucks entering/leaving site minor street work; haul route signage; 3-year construction period, arterrial street	CVH	24-May
Temporary Traffic Control - NE 65th Street	1	LS	$ 147,409	$ 147,408.57	1% allowance, trucks entering/leaving site minor street work; haul route signage; 3-year construction period, non-arterial street	CVH	24-May
Temporary Erosion and Sediment Control	1	LS	$ 447,072	$ 447,071.71	3% allowance	CVH	24-May
DIVISION 2 - SITE WORK							
Clearing and Grubbing (Magnuson Park Parcel 9)	9,444	SY	$9.02	$85,157.61	2007 SPU Unit Cost Report For CSL Site on southern portion	CVH	24-May
Building Demolition	4,500	SF	$6.34	$28,512.00	RS Means 024116130020	CVH	24-May
Concrete Foundation Removal	9,000	SF	$2.32	$20,880.00	RS Means 024113175300	CVH	24-May
Buidling and slab waste	743	CY	$22.20	$16,505.10			
Large Tree Removal	45	EA	$232.85	$10,478.16		CVH	24-May
Clearing and Grubbing (NE 65th Street R/W)	2,150	SY	$9.02	$19,385.88	2007 SPU Unit Cost Report For CSL Site on Northern portion	CVH	24-May
Clearing and Grubbing (Sand Point R/W)	587	SY	$9.02	$5,292.80	2007 SPU Unit Cost Report For Entire Frontage along SPW and median	CMM	1-Jun
NE 65th Street ACP Removal And Replacement	1,100	SF			Only areas affected by pipe installation, up to overlay level	CVH	3-Jun
Remove ACP Pavement (QTY<400)	122	SY	$27.05	$3,306.12	2007 SPU Unit Cost Report	CVH	3-Jun
Total Area of Replacement, including 3' widening	489	SY			Includes area of replacement due to trenching and 3' widening	CVH	3-Jun
Pavement, HMA (CL 1/2), Based on 4" Depth	111	TN	$120.22	$13,403.85	2007 SPU Unit Cost Report, includes labor and material	CVH	3-Jun
Mineral Aggregate, Type 2 (QTY(TN)<500), Based on 6" Depth	151	TN	$48.09	$7,250.62	2007 SPU Unit Cost Report, includes labor and material	CVH	3-Jun
Curb and Gutter, Cem Concrete	452	LF	$30.06	$13,585.14	2007 SPU Unit Cost Report, includes labor and material	CVH	24-May
Cold planing, AC Pavement	3,056	SY	$7.20	$22,003.20	Based on April 2010 WSDOT Planning Costs	CVH	3-Jun
Pavement, HMA (CL 1/2), Overlay, 2" depth	780	TN	$120.22	$93,799.52	2007 SPU Unit Cost Report, includes labor and material	CVH	3-Jun
Sand Point Way Pavement Removal and Replacement							
Remove PCC Pavement	2,067	SY	$36.07	$74,537.95	2007 SPU Unit Cost Report	CVH	3-Jun
Replace PCC Pavement, 8" depth	2,244	SY	$92.17	$206,871.76	2007 SPU Unit Cost Report, includes labor and material	CVH	3-Jun
New Sidewalk Curb and Gutter, Sand Point Way							
Sidewalk/Crosswalk Landings	120	SY	$50.09	$6,011.13	2007 SPU Unit Cost Report, includes labor and material	CVH	24-May
Curb and Gutter, Cem Concrete	1,150	LF	$30.06	$34,563.97	2007 SPU Unit Cost Report, includes labor and material	CMM	21-May
New Sidewalk Curb and Gutter, NE 65th Street							
Sidewalk/Crosswalk Landings	361	SY	$50.09	$18,100.17	2007 SPU Unit Cost Report, includes labor and material	CVH	24-May
Curb and Gutter, Cem Concrete	452	LF	$30.06	$13,585.14	2007 SPU Unit Cost Report, includes labor and material	CVH	24-May
New Pedestrian AC Pathway, NE 65th Street	400	SY					
Pavement, HMA (CL 1/2), Based on 4" Depth	91	TN	$120.22	$10,964.29	2007 SPU Unit Cost Report, includes labor and material		
Parcel 9 ACP Construction	11,300	SF			Pavement surfaced Access Road	CVH	24-May
Pavement, HMA (CL 1/2), Based on 4" Depth	286	TN	$120.22	$34,415.70	2007 SPU Unit Cost Report, includes labor and material		
Mineral Aggregate, Type 2 (QTY(TN)<500), Based on 6" Depth	387	TN	$48.09	$18,616.68	2007 SPU Unit Cost Report, includes labor and material		
Parks Parcel ACP Path Construction (not in R/W)	1,500	SF			Pavement surfaced pedestrian pathway west of tank	CVH	3-Jun
Pavement, HMA (CL 1/2), Based on 4" Depth	38	TN	$120.22	$4,568.46	2007 SPU Unit Cost Report, includes labor and material		
Mineral Aggregate, Type 2 (QTY(TN)<500), Based on 6" Depth	51	TN	$48.09	$2,471.24	2007 SPU Unit Cost Report, includes labor and material		
Pavement Saw Cutting							
NE 65th Street - New Diversion Piping and FM connections	1,300	LF	$5.01	$6,512.05	2007 SPU Unit Cost Report Perimeter of area requiring asphalt concrete removal and replacement	CVH	3-Jun
Sand Point - New Diversion Piping	1,000	LF	$5.01	$5,009.27	2007 SPU Unit Cost Report Cement Pavement removal to install drainage and new connection pipes/mhs	CMM	25-May
Excavation							
Storage Tank and Facility Vault	35,100	CY	$8.57			CVH	3-Jun
Dozer fed Excavation of site	35,100	CY	$6.99	$245,188.94			
Belt Conveyor for truck loading	23,400	CY	$2.38	$55,743.29	Based on 2/3 of total volume		
Diversion Sewer & Force Main, NE 65th Street	2,950	CY	$5.23	$15,419.65		CVH	3-Jun
Electical Conduit, SPW	756	CY	$5.23	$3,951.61		CVH	3-Jun
Electical Conduit, NE 65th Street	400	CY	$5.23	$2,090.80		CVH	3-Jun
Force Main Over Tank	80	CY	$5.23	$418.16		CVH	3-Jun
Force Main Drain Line, NE 65th Street	400	CY	$5.23	$2,090.80		CVH	3-Jun
NPW Water Supply Piping	120	CY	$5.23	$627.24	Allowance	CVH	3-Jun
New Storm Drainage System - NE 65th Street	900	CY	$5.23	$4,704.30		ALR	24-May
New Storm Drainage System - Parcel 9	130	CY	$5.23	$679.51		ALR	24-May
Backfill (Place and compaction)							
Storage Tank and Facility Vault	11,400	CY				CVH	3-Jun
Place material and compact	11,400	CY	$15.42	$175,842.94			
Diversion Sewer & Force Main, NE 65th Street	2,817	CY				CVH	3-Jun
Place material and compact	2,817	CY	$15.42	$43,451.72			
Electrical Conduit, SPW	750	CY				CVH	3-Jun
Place material and compact	750	CY	$15.42	$11,568.61			
Electrical Conduit, NE 65th Street	395	CY				CVH	3-Jun
Place material and compact	395	CY	$15.42	$6,092.80			
Force Main Over Tank	77	CY				CVH	3-Jun
Place material and compact	77	CY	$15.42	$1,187.71			
Force Main Drain Line, NE 65th Street	394	CY				CVH	3-Jun
Place material and compact	394	CY	$15.42	$6,077.38			
NPW Water Supply Piping	110	CY				CVH	3-Jun
Place material and compact	110	CY	$15.42	$1,696.73			
Type 2 - Sidewalk Leveling, Right of Way, SPW	50	CY				CVH	3-Jun
Place material and compact	50	CY	$15.42	$771.24			
Type 2 - Sidewalk Leveling, Right of Way, NE 65th Street	100	CY				CVH	3-Jun
Place material and compact	100	CY	$15.42	$1,542.48			
New Storm Drainage System - NE 65th Street	533	CY				CVH	3-Jun
Place material and compact	533	CY	$15.42	$8,226.57			
New Storm Drainage System - Parcel 9	267	CY				CVH	3-Jun
Place material and compact	267	CY	$15.42	$4,113.29			
Waste of Excess Native Materials					Haul to site within 10 miles. Includes $2/cy disposal fee. Does not include waste from imported backfill.		
Storage Tank and Facility Vault	23,700	CY	$9.20	$218,138.97	All native materials wasted offsite	CVH	3-Jun
Diversion Sewer & Force Main, SPW	160	CY	$9.20	$1,472.67	All native materials wasted offsite	CVH	3-Jun
Diversion Sewer & Force Main, NE 65th Street	130	CY	$9.20	$1,196.54	All native materials wasted offsite	CVH	3-Jun
Electrical Conduit, SPW	5	CY	$9.20	$46.02	All native materials wasted offsite	CVH	3-Jun
Electrical Conduit, NE 65th Street	5	CY	$9.20	$46.02	All native materials wasted offsite	CVH	3-Jun
Force Main Over Tank	5	CY	$9.20	$46.02	All native materials wasted offsite	CVH	3-Jun
Force Main Drain Line, NE 65th Street	5	CY	$9.20	$46.02	All native materials wasted offsite	CVH	3-Jun
NPW Water Supply Piping	5	CY	$9.20	$46.02	All native materials wasted offsite	CVH	3-Jun
Sidewalk Leveling of SPW	10	CY	$9.20	$92.04	All native materials wasted offsite	CVH	3-Jun
Sidewalk Leveling of NE 65th Street Right	10	CY	$9.20	$92.04	All native materials wasted offsite	CVH	3-Jun
New Storm Drainage System - NE 65th Street	15	CY	$9.20	$138.06	All native materials wasted offsite	CVH	3-Jun
New Storm Drainage System - Parcel 9	40	CY	$9.20	$368.17	All native materials wasted offsite	CVH	3-Jun
Imported Backfill (Material and Waste Only)		CY			Material and displaced material waste.		
Storage Tank and Facility Vault	11,400	CY	$25.00	$285,000.00	Type 17 - Keep in Estimate to Verify once Geotech available	CVH	3-Jun
Diversion Sewer & Force Main, SPW	1,800	CY	$25.00	$45,000.00	Type 17, includes diversion vault & piping	CVH	3-Jun
Diversion Sewer & Force Main, NE 65th Street	1,500	CY	$25.00	$37,500.00	Type 17	CVH	3-Jun
Electrical Conduit, SPW	720	CY	$25.00	$18,000.00	Type 17	CVH	3-Jun
Electrical Conduit, NE 65th Street	370	CY	$25.00	$9,250.00	Type 17	CVH	3-Jun
Force Main Over Tank	49	CY	$25.00	$1,225.00	Type 17	CVH	3-Jun
Force Main Drain Line, NE 65th Street	133	CY	$25.00	$3,325.00	Type 17	CVH	3-Jun
NPW Water Supply Piping	85	CY	$25.00	$2,125.00	Type 17	CVH	3-Jun
Type 2 - Sidewalk Leveling, Right of Way, SPW	50	CY	$25.00	$1,250.00	Type 17, allowance needed until final topo obtained	CVH	3-Jun
Type 2 - Sidewalk Leveling, Right of Way, NE 65th Street	100	CY	$25.00	$2,500.00	Type 17, allowance needed until final topo obtained	CVH	3-Jun
Rev'd Storm Drainage System - NE 65th Street	212	CY	$25.00	$5,300.00	Type 17, Placeholder until final topo/survey obtained	CVH	3-Jun
New Storm Drainage System - Parcel 9	184	CY	$25.00	$4,600.00	Type 17	CVH	3-Jun
Pipe Bedding							
Diversion Sewer & Force Main, SPW	1,747	CY	$48.51	$84,746.59	Type 9, includes diversion vault piping	CVH	3-Jun

DESCRIPTION	QTY	UNIT	TOTAL UNIT COST	TOTAL COST	COMMENTS	Updated By	Date
Diversion Sewer & Force Main, NE 65th Street	2,975	CY	$48.51	$144,316.60	Type 9	CVH	3-Jun
Electrical Conduit, SPW	25	CY	$48.51	$1,212.74	Type 9	CVH	3-Jun
Electrical Conduit, NE 65th Street	20	CY	$48.51	$970.20	Type 9	CVH	3-Jun
Force Main Over Tank	23	CY	$48.51	$1,115.73	Type 9	CVH	3-Jun
Force Main Drain Line, NE 65th Street	133	CY	$48.51	$6,451.80	Type 9	CVH	3-Jun
NPW Water Supply Piping	20	CY	$48.51	$970.20	Type 9	CVH	3-Jun
Foul Air Duct, 36" Inlet Air Duct	212	CY	$48.51	$10,284.07	Type 9, native backfill above pipe counted in native fill for tank	CVH	3-Jun
Foul Air Duct, 30" Exhaust Air Duct	20	CY	$48.51	$970.20	Type 9, supports exhaust stack, allowance	CVH	3-Jun
Foul Air Duct, 24" Make Up Air Duct	50	CY	$48.51	$2,425.49	Type 9, for 5 locations, 10 cy each location	CVH	3-Jun
New Storm Drainage System - NE 65th Street	306	CY	$48.51	$14,843.99	Type 9	CVH	3-Jun
New Storm Drainage System - Parcel 9	43	CY	$48.51	$2,085.92	Type 9	CVH	3-Jun
Dewatering							
Storage Tank and Facility Vault							
Submersible Pump	1,300	WK	$93.12	$121,056.00	25 pumps for 52 wks	CVH	24-May
Diesel Generator	104	WK	$3,714.72	$386,330.88	2 genset for 52 weeks	CVH	24-May
4" HDPE Piping	2,000	LF	$18.71	$37,416.23		CVH	24-May
Diversion Gravity Sewer, SPW							
Submersible Pump	24	WK	$93.12	$2,234.88	2 pumps for 12 wks	CVH	24-May
Diesel Generator	12	WK	$3,714.72	$44,576.64	1 genset for 1 weeks	CVH	24-May
4" HDPE Piping	500	LF	$18.71	$9,354.06	Piping to tank for treatment and connection to nearest MH	CVH	24-May
Diversion Gravity Sewer and Forcemain, NE 65th Street							
Submersible Pump	24	WK	$93.12	$2,234.88	2 pumps for 12 wks	CVH	24-May
Diesel Generator	12	WK	$3,714.72	$44,576.64	1 genset for 1 weeks	CVH	24-May
4" HDPE Piping	500	LF	$18.71	$9,354.06	Piping to tank for treatment and connection to nearest MH	CVH	24-May
Drain Force Main, NE 65th Street							
Submersible Pump	4	WK	$93.12	$372.48	2 pumps for 2 wks	CVH	24-May
Diesel Generator	2	WK	$3,714.72	$7,429.44	1 genset for 1 weeks	CVH	24-May
4" HDPE Piping	200	LF	$18.71	$3,741.62	Piping to tank for treatment and connection to nearest MH	CVH	24-May
Anchor Rod Tiedowns (25' deep)	315	EA			8 ft on center	CMM	20-May
Tiedown Rod, 2" diameter	7,875	VLF	$60.89	$479,517.95	RS Means 316233105080, 25 feet depth each	CMM	20-May
Shoring							
Storage Tank and Facility Vault	22,617	SF	$46.63	$1,054,527.31	Drilled steel solder pipes and lagging, walers, salvaged with tiebacks	CVH	24-May
Diversion Sewer and Force Main - SPW, deep	9,750	SF	$12.49	$121,748.23	Mechanical Trench Support System (Proprietary), includes diversion vault & piping	CMM	25-May
Diversion Sewer and Force Main - SPW, shallow	800	LF	$3.20	$2,558.17	Trench Box	CMM	21-May
Force Main Over Tank	125	LF	$3.20	$399.71	Trench Box	CMM	25-May
NPW Water Supply Piping	250	LF	$3.20	$799.43	Trench Box	CMM	25-May
Force Main Drain Line, NE 65th Street	460	LF	$3.20	$1,470.95	Trench Box	CVH	24-May
New Storm Drainage System - NE 65th Street	1,610	LF	$3.20	$5,148.32	Trench Box	ALR	24-May
New Storm Drainage System - Parcel 9	280	LF	$3.20	$895.36	Trench Box	ALR	24-May
Pipe (30" dia, DI) SPW	1,505	LF	$73.66	$110,852.63	RS Means 331113253030; Diversion pipe, SPW only	CMM	1-Jun
Pipe (10" dia, AWWA C900 Class 150) SPW	1,505	LF	$20.09	$30,232.56	RS Means 331113254540; Force Main, SPW only	CMM	1-Jun
Pipe (3" dia, CLDI)	50	LF	$36.90	$1,845.01	RS Means 331113152020; NPW Supply Piping to Vault	CVH	24-May
Pipe (6" dia, CLDI)	250	LF	$46.18	$11,545.06	RS Means 331113152040; NPW Supply Piping to Tipping Buckets	CVH	24-May
Pipe (6" dia, CLDI)	130	LF	$46.18	$6,003.43	RS Means 331113152040; Force Mains to valve vault	CMM	24-May
Pipe (10" dia, CLDI)	160	LF	$62.81	$10,049.33	RS Means 331113152080; Force Main from valve vault to tee	CMM	24-May
Pipe (PVC, 36" dia, ASTM D3034 SDR 35)	250	LF	$262.14	$65,535.14	RS Means 331113253090; Foul Air Duct, Inlet Air	CVH	24-May
Pipe (PVC, 30" dia, ASTM D3034 SDR 35)	20	LF	$190.14	$3,802.81	RS Means 331113253080; Treated Air Duct, Exhaust Air	CVH	24-May
Pipe (PVC, 24" dia, ASTM D3034 SDR 35)	60	LF	$123.88	$7,433.04	RS Means 331113253070; Make up Air Duct	CVH	24-May
Pipe (PVC, 24" dia, ASTM D3034 SDR 35)	100	LF	$123.88	$12,388.41	RS Means 331113253070; Relocation of existing storm drains	CVH	24-May
Pipe (PVC, 12" dia, ASTM D3034 SDR 35)	1,730	LF	$46.06	$79,677.28	RS Means 331113253030; New storm drain, NE 65th Street R/W	ALR	24-May
Pipe (PVC, 8" dia, ASTM D3034 SDR 35)	327	LF	$24.73	$8,086.52	RS Means 331113252210; New storm drain, Parcel 9	ALR	24-May
Pipe (PVC, 6" dia, ASTM D3034 SDR 35)	460	LF	$18.50	$8,507.77	RS Means 331113252200; Force Main Drain Line, NE 65th St	CMM	24-May
Pipe Fittings, (PVC, 36" dia) 36x18 Tee	8	EA	$2,500.00	$20,000.00	RS Means 331113253030; Foul Air Duct, Inlet Air, Fitting at Tank	CVH	24-May
Pipe Fittings, (PVC, 36" dia) 36 BL FL	4	EA	$800.00	$3,200.00	RS Means 331113253030; Foul Air Duct, Inlet Air, Blind flange	CVH	24-May
Maintenance Holes (54" diameter, 12' deep)	6	EA	$6,330.03	$37,980.21	RS Means 334913101150 Diversion Gravity Sewer. Type 200A	CMM	25-May
Maintenance Holes (48" diameter, 8' deep)	7	EA	$4,165.22	$29,156.56	RS Means 334913101130 Storm Drain, Right of Way, Alignment Deflection MHs, Type 200A	ALR	24-May
Maintenance Holes (84" diameter, 20' deep)	3	EA	$14,112.05	$42,336.14	Hanson Pipe Quote Type 202A, Inlet Grate with Pipe Pass Thru	CMM	1-Jun
Maintenance Holes (48" diameter, 4' deep)		EA	$3,631.22	$0.00	RS Means 334913101130 Storm Drain, Parcel 9, Type 200A		
Catch Basin, Type 241A		EA	$3,739.22	$0.00	RS Means 334913101130 Storm Drain, Right of Way, Inlets at Curb		
Precast Utility Vault - 4'x6'x4'	4	EA	$8,790.80	$35,163.20	Plenum Vaults for HVAC Quote from Utility Vault, includes hatch	CVH	24-May
Temporary Accommodation of Sewer Flows	1	LS	$5,000.00	$5,000.00	Allowance	CVH	24-May
Hydroseeding, Right of Way, SPW	5,280	SF	$2.25	$11,902.03	2007 SPU Unit Cost Report, includes labor and material. Includes all of Planting Strip in Right of Way	CVH	1-Jun
Lawn and Planting Areas Restoration	1	LS	$500,000.00	$500,000.00	Allowance, to be determined by landscape architect	CVH	24-May
Water Service	1	LS	$50,000.00	$50,000.00	Allowance includes pipe, meter, connections, et	CVH	24-May
Bioretention Planters, NE 65th Street Right of Way	28,000	SF	$7.83	$219,240.00	Based on SPU Unit Price, CSO Capital Costs, 2009, per sf of impervious surface managed (Right of Way). Includes material and labor.	ALR	24-May
DIVISION 3 - CONCRETE							
Cast in Place Reinforced Concrete - Slabs on Grade	3,856	CY					
Storage Tank							
Concrete, 4000 PSI for Slab on Grade	3,531	CY	$432.38	$1,526,729.26	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	20-May
Steel Reinforcing Bar, Grade 60	529,650	LBS	$1.41	$747,485.47	Per RS Means 032110600702		
Facility Vault							
Concrete, 4000 PSI for Slab on Grade	325	CY	$432.38	$140,523.08	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	21-May
Steel Reinforcing Bar, Grade 60	48,750	LBS	$1.41	$68,799.99	Per RS Means 032110600702		
Diversion Structure at CSO 23							
Concrete, 4000 PSI for Slab on Grade	7	CY	$432.38	$3,026.65	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	25-May
Steel Reinforcing Bar, Grade 60	1,050	LBS	$1.41	$1,481.85	Per RS Means 032110600702		
Cast in Place Reinforced Concrete - Walls and Columns	2,219	CY					
Storage Tank							
Concrete, 4000 PSI for Walls and Columns	1,705	CY	$703.14	$1,198,847.64	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	20-May
Steel Reinforcing Bar, Grade 60	383,625	LBS	$1.41	$541,403.03	Per RS Means 032110600702		
Air Break Tank							
Concrete, 4000 PSI for Walls and Columns		CY	$703.14	$0.00	Material cost per "The Guide, Construction Material Prices" Winter 2009		
Steel Reinforcing Bar, Grade 60	0	LBS	$1.41	$0.00	Per RS Means 032110600702		
Facility Vault		CY					
Concrete, 4000 PSI for Walls and Columns	514	CY	$703.14	$361,412.13	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	21-May
Steel Reinforcing Bar, Grade 60	115,650	LBS	$1.41	$163,214.75	Per RS Means 032110600702		
Diversion Structure at CSO 23		CY					
Concrete, 4000 PSI for Walls and Columns	30	CY	$703.14	$21,094.09	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	25-May
Steel Reinforcing Bar, Grade 60	6,750	LBS	$1.41	$9,526.15	Per RS Means 032110600702		
Cast in Place Reinforced Concrete - Suspended Slabs and Beams	2,056	CY					
Storage Tank							
Concrete, 4000 PSI for Suspended Slab	1,731	CY	$645.73	$1,117,751.62	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	20-May
Steel Reinforcing Bar, Grade 60	389,475	LBS	$1.41	$549,659.03	Per RS Means 032110600702		
Facility Vault							
Concrete, 4000 PSI for Suspended Slab	325	CY	$645.73	$209,860.93	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	21-May
Steel Reinforcing Bar, Grade 60	73,125	LBS	$1.41	$103,199.99	Per RS Means 032110600702		
Diversion Structure at CSO 23							
Concrete, 4000 PSI for Suspended Slab	7	CY	$645.73	$4,520.08	Material cost per "The Guide, Construction Material Prices" Winter 2009	CMM	25-May
Steel Reinforcing Bar, Grade 60	1,575	LBS	$1.41	$2,222.77	Per RS Means 032110600702		
Precast Removable Panels (12x6x1)	11	EA	$4,294.81	$47,242.86	Based on $1000/cy for PC panel concrete	CMM	21-May

DESCRIPTION	QTY	UNIT	TOTAL UNIT COST	TOTAL COST	COMMENTS	Updated By	Date
Precast Removable Panels (5x5x1)	6	EA	$1,740.00	$10,439.97	Based on $1000/cy for PC panel concrete		
DIVISION 4 - MASONRY (See Div 13)							
DIVISION 5 - METALS							
Access Hatch (4'x4', Aluminum)	11	EA	$2,657.28	$29,230.10	RS Means, Inspection Hatches, Storage Tank	CMM	20-May
Access Hatch (6'x6', Aluminum)	2	EA	$4,457.28	$8,914.56	RS Means, Facility Vault Equipment Access	CVH	24-May
Access Hatch (6'x4', Aluminum)	13	EA	$3,329.28	$43,280.66	RS Means, Tipping Bucket Hinge Access	CMM	20-May
Access Hatch (3'x4', Aluminum)	3	EA	$1,985.28	$5,955.85	RS Means, Pump Access Hatches	CMM	20-May
Access Hatch (12'x4', Aluminum, Two-Door)	3	EA	$6,658.56	$19,975.69	RS Means, Access to Facilities Vault	CMM	20-May
DIVISION 6 - WOOD AND PLASTIC (See Div 13)							
DIVISION 7 - THERMAL & MOISTURE PROTECTION (See Div 13)							
DIVISION 8 - DOORS AND WINDOWS (See Div 13)							
Facility Vault (Not Including Concrete)	**2,269**	**SF**					
Building, Double Doors	1	EA	$1,953.57	$ 1,953.57			
DIVISION 9 - FINISHES (See Div 13)							
DIVISION 10 - SPECIALTIES (None)							
DIVISION 11 - EQUIPMENT							
Pumping Units (570 gpm, 118' TDH, 40 hp)	3	EA	$36,231.78	$108,695.34	2009 PROS+SE quote; Dewatering Pumps	CMM	20-May
DIVISION 12 - FURNISHINGS (None)							
DIVISION 13 - SPECIAL CONSTRUCTION							
Activated Carbon Odor Control Units, 12,000 CFM	1	EA	$95,877.45	$95,877.45	Larger Odor Control Vessel		
FRP Vessel Allowance, Connections	1	LS	$2,504.64	$2,504.64	Increased due to larger size duct work		
Activated Carbon	1	LS	$32,059.33	$32,059.33	Carbon load has doubled in size from previous estimate		
Noise Control	1	LS	$28,953.74	$ 28,953.74	Allowance		
Facility Vault (Not Including Concrete)	**3,750**	**SF**				CVH	24-May
Ceiling Insulation	3,750	SF	$1.95	$ 7,300.76	acoustic insulation for noise protection	CVH	24-May
Railing, Alumin, 3 rail	86	LF	$86.98	$ 7,480.24		CVH	24-May
Floor Plate Stairs	116	RISE	$525.07	$ 60,908.22		CVH	24-May
Landing	78	SF	$124.85	$ 9,738.63		CVH	24-May
Building, HVAC/Mech	3,750	SF	$15.00	$ 56,250.00	Sheet Metal - does not include fans	CVH	24-May
Building, Electr/Lighting	3,750	SF	$20.00	$ 75,000.00	Doesn't include MCC or PLC panels	CVH	24-May
Minor Misc Items	10%	LS	$216,677.84	$ 21,667.78		CVH	24-May
DIVISION 14 - CONVEYING SYSTEMS (None)							
DIVISION 15 - MECHANICAL							
Plug Valves (30" dia) Motor Operated	2	EA	$57,005.21	$114,010.41	CH2M Database; Diversion line redundant shut off	CMM	24-May
Plug Valves (6" dia) Motor Operated	1	EA	$7,021.30	$7,021.30	CH2M Database; One for force main drain line	CMM	24-May
Plug Valves (6" dia)	3	EA	$2,311.30	$6,933.91	CH2M Database; One each for dewatering pumps.	CMM	24-May
Plug Valves (3" dia)	4	EA	$568.99	$2,275.95	RS Means 230523707010 Two each on each side of NPW booster pumps	CMM	24-May
Check Valves (6" dia)	3	EA	$2,730.10	$8,190.31	CH2M Database; One each for dewatering pumps.	CMM	24-May
Check Valves (3" dia)	2	EA	$1,096.99	$2,193.98	RS Means 230523801450 One each for NPW booster pumps.	CMM	24-May
Dismantling Joint(30" dia)	2	EA	$2,890.56	$5,781.11	CH2M Database; One each for diversion line shut off	CMM	24-May
Flow Meter (8")	1	EA	$4,813.74	$4,813.74	RS Means 232120880300. NPW supply flow meter.	CMM	24-May
Sluice Gates (3'x3', power operated)	0	EA	$12,702.21	$0.00	Accounted for in CSO 23 Retrofit allowance	CMM	20-May
Special Flushing Devices of Systems (Tipping Buckets)	6	EA	$109,025.11	$654,150.67	Tipping Buckets from Jones+Attwood Criteria	CMM	20-May
Fiberglass Reinforced Plastic (FRP) Ductwork	1	LS	$3,105.75	$3,105.75		CVH	24-May
FRP Ductwork, 24-inch in vault	25	LF	$115.21	$2,880.33		CVH	24-May
FRP Ductwork, 36-inch blind flange	1	EA	$1,051.95	$1,051.95		CVH	24-May
FRP Ductwork, 30-inch in vault	15	LF	$160.30	$2,404.45		CVH	24-May
FRP Ductwork, 30-inch 90 bend	2	EA	$776.44	$1,552.87		CVH	24-May
FRP Ductwork, 36-inch/30-inch reducer	1	EA	$661.22	$661.22		CVH	24-May
FRP Ductwork, 30-inch damper	2	EA	$3,256.03	$6,512.05		CVH	24-May
FRP Ductwork, 36-inch in vault	45	LF	$248.71	$11,191.73	RS Means 233116163570	CVH	24-May
FRP Ductwork, 36-inch 90 bend	2	EA	$2,351.34	$4,702.68	RS Means 233116163606	CVH	24-May
FRP Ductwork, 36-inch/24-inch reducer	1	EA	$1,465.38	$1,465.38	RS Means 233116163756	CVH	24-May
FRP Ductwork, 36-inchx24-inch tee	3	EA	$2,413.26	$7,239.79	RS Means 233116163676	CVH	24-May
FRP Ductwork, 36-inchx36-inch tee	1	EA	$2,413.26	$2,413.26	RS Means 233116163676	CVH	24-May
FRP Ductwork, 36-inch damper	2	EA	$3,907.23	$7,814.46		CVH	24-May
Piping General Requirements	1	LS	$2,003.71	$2,003.71		CVH	24-May
Steel Pipe	245	LF	$3.64	$891.00		CVH	24-May
Steel pipe, 1"	245	LF	$3.64	$891.00		CVH	24-May
Ductile Iron Pipe	1	LS	$1,001.85	$1,001.85		CVH	24-May
Plastic Piping	50	LF	$38.07	$1,903.52		CVH	24-May
Copper Piping	30	LF	$16.13	$483.90		CVH	24-May
Piping, Copper water service, 1-1/2", Type L	15	LF	$25.05	$375.70		CVH	24-May
Stainless Steel Pipe	34	LF	$701.30	$23,844.13		CVH	24-May
Metal Duct Loop, Arch Finish, 30-inch dia	12	LF	$541.00	$6,492.02		CVH	24-May
Metal Duct Gooseneck, Arch Finish, 24-inch dia	2	EA	$2,504.64	$5,009.27		CVH	24-May
Wall Penetration Seals	1	LS	$2,504.64	$2,504.64		CVH	24-May
Pipe Hangers and Supports	1	LS	$5,009.27	$5,009.27		CVH	24-May
Solenoid Valves	1	EA	$250.46	$250.46		CVH	24-May
Heat Tracing Tape	1	LS	$1,001.85	$1,001.85		CVH	24-May
Plumbing, Drains	10	EA	$250.46	$2,504.64		CVH	24-May
Air Gap Tank with Fittings and Appurtenances	1	LS	$5,510.20	$5,510.20		CVH	24-May
HVAC						CVH	24-May
Electrical Unit Space Heaters	1	EA	$2,454.54	$2,454.54		CVH	24-May
Centrifugal Fiberglass Reinforced Plastic (FRP) Fans, 50 HP	1	EA	$41,033.05	$41,033.05	RS Mean 233416104320 + 30% for FRP	CVH	24-May
In-Line Centrifugal Fans	2	EA	$3,706.86	$7,413.72		CVH	24-May
Vault Exhaust Fan	2	EA	$3,706.86	$7,413.72		CVH	24-May
Mist and Grease Eliminator	1	EA	$9,818.17	$9,818.17		CVH	24-May
Sheet Metal Duct Work	1	LS	$1,001.85	$1,001.85		CVH	24-May
Sheet Metal Duct Work, Aluminum	300	LB	$20.04	$6,011.13		CVH	24-May
Sheet Metal Duct Work	1	LS	$5,009.27	$5,009.27		CVH	24-May
Sound Traps	1,600	SCFM	$0.25	$400.74		CVH	24-May
In-Line Duct Silencer, 30" Aluminum	1	EA	$4,007.42	$4,007.42		CVH	24-May
HVAC Testing and Air Balancing	1	LS	$1,001.85	$1,001.85		CVH	24-May
DIVISION 16 - ELECTRICAL							
Electrical Allowance	1	EA	$100,000.00	$100,000.00		CVH	24-May
480 Volt Variable Frequency Drives (25HP)	2	EA				LK	11/17/2010
481 Volt Variable Frequency Drives (75HP)	1	EA				LK	11/17/2010
Active Harmonic Filter (100 Amp)	1	EA				LK	11/17/2010
Electrical Conduit for Site Receptacles (assume 2" RGS)	600	EA				LK	11/17/2010
Electrical Conduit for Tipping Bucket Limit Switches (2" RGS)	300	EA				LK	11/17/2010
Electrical Conduit, SPW, includes trench & backfill	1,590	LF	$9.40	$14,946.00	2 - 2" conduits, HDPE	CMM	6/1/2010
Handhole, 1'x2'x2' I.D. Light duty	5	EA	$1,040.05	$5,200.24	RS Means 330516130400		
Odor Control Related Electrical							
General Requirements, Electrical Work	1	LS	$9,517.62	$9,517.62	Based on King Street Odor Control Project	CVH	24-May
New Power Service, Seattle City Light	1	LS	$20,037.08	$20,037.08	Based on King Street Odor Control Project	CVH	24-May
Electrical Testing	1	LS	$3,005.56	$3,005.56	Based on King Street Odor Control Project	CVH	24-May
600 Volt Conductors	1	LS	$26,048.21	$26,048.21	Based on King Street Odor Control Project	CVH	24-May
Wiring Devices	1	LS	$2,003.71	$2,003.71	Based on King Street Odor Control Project	CVH	24-May
480 Volt Variable Frequency Drives	1	EA	$16,029.67	$16,029.67	Based on King Street Odor Control Project	CVH	24-May
Transient Voltage Surge Suppression	1	LS	$7,012.98	$7,012.98	Based on King Street Odor Control Project	CVH	24-May

DESCRIPTION	QTY	UNIT	TOTAL UNIT COST	TOTAL COST	COMMENTS	Updated By	Date
Arc Flash Report	1	LS	$1,001.85	$1,001.85	Based on King Street Odor Control Project	CVH	24-May
Grounding System	1	LS	$11,020.40	$11,020.40	Based on King Street Odor Control Project	CVH	24-May
Dry Type Transformers (600 Volts or Less)	1	EA	$3,005.56	$3,005.56	Based on King Street Odor Control Project	CVH	24-May
Lighting and Power Distribution Panelboards	1	EA	$7,012.98	$7,012.98	Based on King Street Odor Control Project	CVH	24-May
Lighting Fixtures	1	LS	$4,508.34	$4,508.34	Based on King Street Odor Control Project	CVH	24-May
Telephone and Computer Data Provisions	1	LS	$4,516.41	$4,516.41	Based on King Street Odor Control Project	CVH	24-May
I&C Allowance	1	EA	$100,000.00	$100,000.00	Allowance for storage controls	CVH	24-May
Odor Control Related I&C							
Process Instrumentation and Controls	1	LS	$21,038.94	$21,038.94	Based on King Street Odor Control Project	CVH	24-May
Panels	1	LS	$14,025.96	$14,025.96	Based on King Street Odor Control Project	CVH	24-May
Power Supply And Conditioning Equipment	1	LS	$500.93	$500.93	Based on King Street Odor Control Project	CVH	24-May
Single Phase Uninterruptible Power Supply Equipment	1	LS	$5,009.27	$5,009.27	Based on King Street Odor Control Project	CVH	24-May
Instrument Air Transmission Systems	1	LS	$1,001.85	$1,001.85	Based on King Street Odor Control Project	CVH	24-May
Process Switches	1	LS	$7,012.98	$7,012.98	Based on King Street Odor Control Project	CVH	24-May
Process Switches, Pressure Switches	1	LS	$3,005.56	$3,005.56	Based on King Street Odor Control Project	CVH	24-May
Graphical Operator Interface	1	LS	$4,508.34	$4,508.34	Based on King Street Odor Control Project	CVH	24-May
PLC Programming	1	LS	$3,005.56	$3,005.56	Based on King Street Odor Control Project	CVH	24-May
Communications	1	LS	$2,003.71	$2,003.71	Based on King Street Odor Control Project	CVH	24-May
PLC Testing	1	LS	$2,003.71	$2,003.71	Based on King Street Odor Control Project	CVH	24-May
Electric Power Service	1	LS	$136,458.00	$136,458.00	Per Electrical Power Service Cost Estimate TM March 23,2009. Cost don't include TC or Contingency. These cost are itemized separately		
SUBTOTAL				**$ 15,794,918**	**$ 15,794,918**		
MISCELLANEOUS DETAIL ALLOWANCE	**10%**			**$ 1,579,492**			
SUBTOTAL (ROUNDED)				**$ 17,370,000**			
MOB, B&I, TEMP FAC, H&S, DEMOB	**10%**			**$ 1,737,000**			
CONSTRUCTION SUBTOTAL (ROUNDED)				**$ 19,110,000**			
EQUIPMENT REPLACEMENT SUBTOTAL				**$ 1,083,000**			
MISCELLANEOUS DETAIL ALLOWANCE	**10%**			**$ 108,300**			
SUBTOTAL (ROUNDED)				**$ 1,190,000**			
MOB, B&I, TEMP FAC, H&S, DEMOB	**10%**			**$ 119,000**			
EQUIPMENT SUBTOTAL (ROUNDED)				**$ 1,310,000**			

TRADES			T&I	OH&P	Seattle Factor
Carpenter	1	48.63	1.40	1.2	1.2
Cement Mason	1	49.15	1.40	1.2	1.2
Electrician	1	57.74	1.40	1.2	1.2
Fence Laborer	1	18.71	1.40	1.2	1.2
Flagger	1	33.93	1.40	1.2	1.2
Ironworker	1	54.27	1.40	1.2	1.2
Laborer	1	40.03	1.40	1.2	1.2
Pipe Layer	1	40.77	1.40	1.2	1.2
Millwright	1	49.47	1.40	1.2	1.2
Oper-Heavy	1	51.51	1.40	1.2	1.2
Oiler	1	50.94	1.40	1.2	1.2
Painter	1	34.87	1.40	1.2	1.2
Plumber	1	64.84	1.40	1.2	1.2
Roofer	1	40.05	1.40	1.2	1.2
Sheetmetal Worker	1	59.32	1.40	1.2	1.2
Teamster	1	46.47	1.40	1.2	1.2
Welder (Field)	1	54.27	1.40	1.2	1.2

CREWS

Excavation

Foreman	1	52.51	52.51
Oper-Heavy	1	51.51	51.51
Oiler	1	50.94	50.94
Laborer	1	40.03	40.03
			194.99
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$393.10

Additional Dozer to feed Excavator

Foreman	0	52.51	0.00
Oper-Heavy	1	51.51	51.51
Oiler	0	50.94	0.00
Laborer	0	40.03	0.00
			51.51
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$103.84

Conveyor Loading System

Foreman	0	52.51	0.00
Oper-Heavy	1	51.51	51.51
Oiler	1	50.94	50.94
Laborer	0	40.03	0.00
			102.45
		T&I	1.40
		OH&P	1.20

	City of Seattle Factor		1.20
			$206.54

Stockpile Handling

Foreman	0	52.51	0.00
Oper-Heavy	1	51.51	51.51
Oiler	0.5	50.94	25.47
Laborer	0	40.03	0.00
			76.98
	T&I		1.40
	OH&P		1.20
	City of Seattle Factor		1.20
			$155.19

Grub and Clear

Foreman	1	52.51	52.51
Oper-Heavy	1	51.51	51.51
Oiler	0.5	50.94	25.47
Laborer	0	40.03	0.00
			129.49
	T&I		1.40
	OH&P		1.20
	City of Seattle Factor		1.20
			$261.05

Hand Excavation

Foreman	1	52.51	52.51
Oper-Heavy	1	51.51	51.51
Oiler	0	50.94	0.00
Laborer	3	40.03	120.09
			224.11
	T&I		1.40
	OH&P		1.20
	City of Seattle Factor		1.20
			$451.81

Demolition Crew

Foreman	1	52.51	52.51
Oper-Heavy	2	51.51	103.02
Oiler	0.5	50.94	25.47
Laborer	1	40.03	40.03
			221.03
	T&I		1.40
	OH&P		1.20
	City of Seattle Factor		1.20
			$445.60

Pile Driver

Foreman	1	49.63	49.63
Operator	2	48.63	97.26
Oiler	1	50.94	50.94
Laborer	3	40.03	120.09

			317.92
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$640.93

Bed & Zone

Foreman	1	49.63	49.63
Operator	1	48.63	48.63
Laborer	3	40.03	120.09
			218.35
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$440.19

Backfill

Foreman	1	49.63	49.63
Operator	2	48.63	97.26
Laborer	1	40.03	40.03
			186.92
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$376.83

Steel Pipe

Foreman	1	52.51	52.51
Welder	2	54.27	108.54
Oper-Heavy	1	51.51	51.51
Oiler	1	50.94	50.94
Laborer	3	40.03	120.09
			383.59
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$773.32

Large DI Pipe

Foreman	1	52.51	52.51
Welder	0	54.27	0.00
Oper-Heavy	1	51.51	51.51
Oiler	1	50.94	50.94
Laborer	4	40.03	160.12
			315.08
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$635.20

PVC Pipe

Foreman	1	52.51	52.51
Welder	0	54.27	0.00
Oper-Heavy	1	51.51	51.51
Oiler	0	50.94	0.00
Laborer	3	40.03	120.09
			224.11
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$451.81

Aeration System PVC Pipe

Foreman	1	52.51	52.51
Welder	0	54.27	0.00
Oper-Heavy	0	51.51	0.00
Oiler	0	50.94	0.00
Laborer	3	40.03	120.09
			172.60
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$347.96

Waste

Teamster	1	46.47	46.47
			46.47
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$93.68

Masonry

Foreman	1	49.63	49.63
Carpenter/Laborer	3	48.63	145.89
			195.52
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$394.17

Misc

Foreman	1	49.63	49.63
Carpenter/Laborer	2	48.63	97.26
			146.89
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$296.13

Fencing Crew

Foreman/Operator	1	51.51	51.51
Fence Laborer	3	18.71	56.13
			107.64

		T&I	1.40	
		OH&P	1.20	
		City of Seattle Factor	1.20	
			$217.00	
Metals				
Foreman	1	52.51	52.51	
Ironworkers	2	54.27	108.54	
Oper-Heavy	1	51.51	51.51	
Oiler	0.5	50.94	25.47	
Laborer	2	40.03	80.06	
			318.09	
		T&I	1.40	
		OH&P	1.20	
		City of Seattle Factor	1.20	
			$641.27	
Formwork				
Foreman	1	49.63	49.63	1
Carpenter	1	48.63	48.63	1
Laborer	1	40.03	40.03	
			138.29	
		T&I	1.40	
		OH&P	1.20	
		City of Seattle Factor	1.20	
			$278.79	
Rebar				
Ironworker Foreman	1	55.27	55.27	1
Ironworker	2	54.27	108.54	1
			163.81	
		T&I	1.40	
		OH&P	1.20	
		City of Seattle Factor	1.20	
			$330.24	
Placement & Finishing				
Foreman	1	49.63	49.63	1
Carpenter	1	48.63	48.63	
Cement Finisher	1	40.77	40.77	1
Laborer	1	40.03	40.03	1
			179.06	
		T&I	1.40	
		OH&P	1.20	
		City of Seattle Factor	1.20	
			$360.98	
Equipment				
Foreman	1	52.51	52.51	
Plumber/Elect	2	57.74	115.48	
Oper-Heavy	1	51.51	51.51	
Oiler	1	50.94	50.94	

Laborer	2	40.03	80.06
			350.50
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$706.61

Plumbing

Foreman	1	65.84	65.84
Plumbing	1	64.84	64.84
			130.68
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$263.45

Electrical

Foreman	1	58.74	58.74
Electrician	1	57.74	57.74
			116.48
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$234.82

Ductwork & Fans

Foreman	1	52.51	52.51
Plumber/Elect	1	57.74	57.74
Oper-Heavy	1	51.51	51.51
Oiler	1	50.94	50.94
Sheetmetal	2	59.32	118.64
			331.34
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$667.98

Roofing & Siding

Foreman	1	60.32	60.32
Laborer	2	40.03	80.06
Oper-Heavy	0	51.51	0.00
Oiler	0	50.94	0.00
Sheetmetal	2	59.32	118.64
			259.02
		T&I	1.40
		OH&P	1.20
		City of Seattle Factor	1.20
			$522.18

Total Burdened Rate
$98.04
$99.09
$116.40
$37.72
$68.40
$109.41
$80.70
$82.19
$99.73
$103.84
$102.70
$70.30
$130.72
$80.74
$119.59
$93.68
$109.41

King County
Effective: 3/4/2009

Pickup	10.00	
Trench Box	0.00	
Excavator	80.00	
	90.00	
OH&P	1.20	
City of Seattle Factor	1.20	
	$129.60	**$522.70**

Pickup	0.00	
Trench Box	0.00	
Dozer	50.00	
	50.00	
OH&P	1.20	
City of Seattle Factor	1.20	
	$72.00	**$175.84**

Pickup	0.00
Trench Box	0.00
Conveyor System	22.00
	22.00
OH&P	1.20

City of Seattle Factor	1.20		
	$31.68		**$238.22**
Pickup	10.00		
Trench Box	0.00		
Dozer	50.00		
	60.00		
OH&P	1.20		
City of Seattle Factor	1.20		
	$86.40		**$241.59**
Pickup	10.00		
Trench Box	0.00		
Dozer	50.00		
	60.00		
OH&P	1.20		
City of Seattle Factor	1.20		
	$86.40	**$**	**347.45**
Pickup	10.00		
Trench Box	0.00		
Tractor/Backhoe	25.00		
	35.00		
OH&P	1.20		
City of Seattle Factor	1.20		
	$50.40	**$**	**502.21**
Pickup	10		
Excavator	80		
Loader	50		
	140		
OH&P	1.20		
City of Seattle Factor	1.20		
	$201.60	**$**	**647.20**
Pickup	10		
60 ton crane	70		
Forklift	35		
Compactor	0		

	115		
OH&P	1.20		
City of Seattle Factor	1.20		
	$165.60	**$**	**806.53**
Hand Compactor (2)	3		
Loader	80		
Pickup	10		
	93		
OH&P	1.20		
City of Seattle Factor	1.20		
	$133.92		**$574.11**
Pickup	10		
Loader	80		
Compactor	50		
	140		
OH&P	1.20		
City of Seattle Factor	1.20		
	$201.60	**$**	**578.43**
Pickup	10		
Welder	25		
Crane	100		
	135		
OH&P	1.20		
City of Seattle Factor	1.20		
	$194.40	**$**	**967.72**
Pickup	10		
Welder	0		
Crane	100		
	110		
OH&P	1.20		
City of Seattle Factor	1.20		
	$158.40	**$**	**793.60**

Pickup	10		
Welder	0		
Excavator	80		
	90		
OH&P	1.20		
City of Seattle Factor	1.20		
	$129.60	**$**	**581.41**
Pickup	10		
Welder	0		
Excavator	0		
	10		
OH&P	1.20		
City of Seattle Factor	1.20		
	$14.40	**$**	**362.36**
Truck & Trailer	35		
	35		
OH&P	1.20		
City of Seattle Factor	1.20		
	$50.40	**$**	**144.08**
Misc	10		
	10		
OH&P	1.20		
City of Seattle Factor	1.20		
	$14.40	**$**	**408.57**
Misc	5		
	5		
OH&P	1.20		
City of Seattle Factor	1.20		
	$7.20	**$**	**303.33**
Crew Truck	10.00		
Tractor/Backhoe	25.00		
	35		

OH&P	1.20		
City of Seattle Factor	1.20		
	$50.40	**$**	**267.40**
Pickup	10		
Misc	10		
Crane	100		
	120		
OH&P	1.20		
City of Seattle Factor	1.20		
	$172.80	**$**	**814.07**
Pickup	8		
Misc	10		
	18		
OH&P	1.20		
City of Seattle Factor	1.20		
	$25.92		**$304.71**
Misc	10		
Forklift	25		
	35		
OH&P	1.20		
City of Seattle Factor	1.20		
	$50.40		**$380.64**
Pickup	8		
Power Trowel	5		
Vibrator & Misc	10		
	23		
OH&P	1.20		
City of Seattle Factor	1.20		
	$33.12		**$394.10**
Pickup	10		
Misc	25		
Crane	100		

	135		
OH&P	1.20		
City of Seattle Factor	1.20		
	$194.40	**$**	**901.01**

Misc	5		
	5		
OH&P	1.20		
City of Seattle Factor	1.20		
	$7.20	**$**	**270.65**

Misc	5		
	5		
OH&P	1.20		
City of Seattle Factor	1.20		
	$7.20	**$**	**242.02**

Pickup	10		
Misc	25		
Lifting Equipment	50		
	85		
OH&P	1.20		
City of Seattle Factor	1.20		
	$122.40	**$**	**790.38**

Pickup	10		
Misc	25		
Lifting Equipment	0	with decking crew	
	35		
OH&P	1.20		
City of Seattle Factor	1.20		
	$50.40	**$**	**572.58**

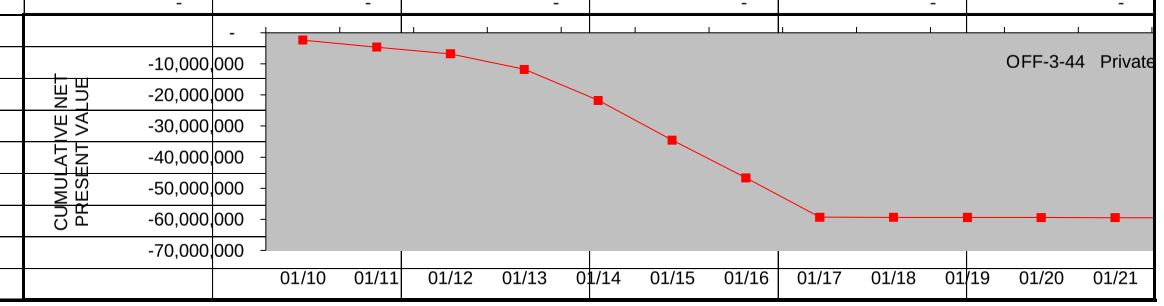
AACE CLASS 5 ESTIMATE - OFF-3-44 Private Property near Seward Park		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$22,400,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$2,128,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$24,528,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$49,056,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$12,264,000
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$36,792,000

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$3.99	5.3%
Project Development	$0	$3.01	4.0%
Preliminary Engineering	$0	$2.64	3.5%
Property Acquisition	$6,350,000	$0.75	1.0%
Permitting	$0	$0.75	1.0%
Design	$0	$9.04	12.0%
Construction	$36,792,000	$10.55	14.0%
Closeout	$0	$1.51	2.0%

SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$43.1**	**57.2%**
TOTAL SOFT COST=	**$32.3**	**42.8%**
TOTAL PROJECT COST =	**$75.4**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$18.6**	**57.2%**
TOTAL SOFT COST=	**$13.9**	**42.8%**
TOTAL PROJECT COST =	**$32.5**	**100.0%**

Discount Rate	3%	OFF-3-44 Private Property near Seward Park Alterna				75,341,077								
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$64,584,155	2,381,228	2,381,228	2,381,228	5,774,100	12,124,100	16,264,029	16,264,029	17,771,135	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			64,584,155	2,381,228	2,381,228	2,381,228	5,774,100	12,124,100	16,264,029	16,264,029	17,771,135	-	-	-
OPERATING COSTS														
Annual O&M		-	$1,505,763	-	-	-	-	-	-	-	57,512	57,512	57,512	57,512
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$211,613	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$194,622	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			1,911,998	-	-	-	-	-	-	-	57,512	57,512	57,512	57,512
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			66,496,153	2,381,228	2,381,228	2,381,228	5,774,100	12,124,100	16,264,029	16,264,029	17,828,647	57,512	57,512	57,512
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 66,496,153	**$ 60,252,271**	$ 54,790,862							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 66,496,153	**-$ 60,252,271**	-$ 54,790,862							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Henderson Area Alternative OFF-3-44 Storage in Private Property near Seward Park

Note: Magnuson/Windermere project costs were used as a basis because it is similar in complexity and size.

*Magnuson Park Cost Estimate for 2.05 MG Storage Tank:	**$ 19,110,000**	*
Alt OFF-3-44 Storage in Seward Park, 2.40 MG Tank:	**$ 22,400,000**	
Total	**$ 22,400,000**	
Private Property	**$ 6,355,000**	

*Note: See Reference Document "Magnuson Park Cost Estimate: 2.05 MG Off-Line Storage Tank"

PROPERTY COSTS: ALT. OFF 3-44 Storage in Private Property near Seward Park

	Property ID	Total Assessed Value ($)	Notes
	8835400115	$559,000	
	8835400110	$622,000	
	8835400105	$663,000	
	8835400100	$722,000	
	8835400095	$1,263,000	
	8835400090	$782,000	
	8835400085	$900,000	
	8835400080	$844,000	
Totals		**$6,355,000**	

*Easement Lengths were measured from G.I.S. and King County's Parcel Viewer (http://www5.kingcounty.gov/parcelviewer/viewer/kingcounty/viewer.asp?App=Buffer&size=large) and are accurate to +/- 3 feet

Operation and Maintenance Cost Template

Alternative Number		**OFF-2-44**							
Alternative Description		**2.4 Storage Tank in**							
		Private Property near							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/***	***Ann***	***Anticipated***	***Variability***	***High End***
					Base Cost	***Freq***	***Annual Cost***	***Multiplier***	***Annual Cost***
Conveyance Pipeline-	7	Typical	400	LF	$ 1.75	1	$ 700	1	$ 700
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	1	ea	$ 1,000	4	$ 2,040	1.5	$ 3,060
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP	1	ea	$ 5,000	1	$ 5,000	1.25	$ 6,250
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG	1	MG	$ 14,012	1	$ 14,012	1.5	$ 21,017
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket	6	ea	$ 1,040	1	$ 6,240	1.5	$ 9,360
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 41,692		$ 57,512

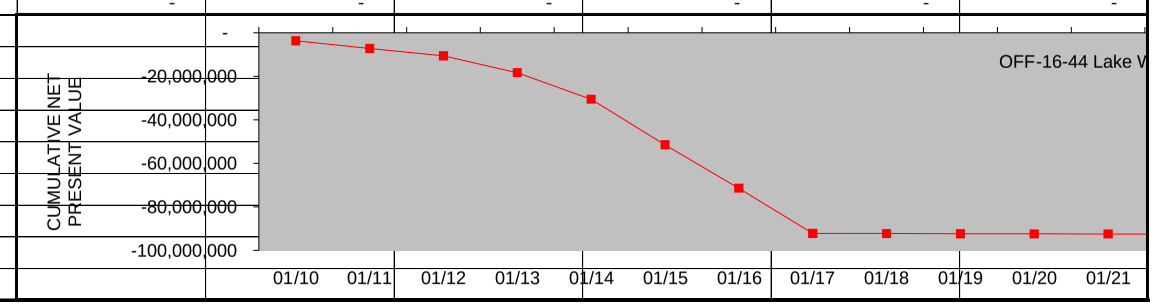
AACE CLASS 5 ESTIMATE - OFF-16-44 Storage Pipe in Lake Wash. Blvd.		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$37,400,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$3,553,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$40,953,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$81,906,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$20,476,500
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$61,429,500

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$6.2	5.3%
Project Development	$0	$4.7	4.0%
Preliminary Engineering	$0	$4.1	3.5%
Property Acquisition	$5,780,000	$1.2	1.0%
Permitting	$0	$1.2	1.0%
Design	$0	$14.1	12.0%
Construction	$61,429,500	$16.5	14.0%
Closeout	$0	$2.4	2.0%

SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$67.2**	**57.2%**
TOTAL SOFT COST=	**$50.3**	**42.8%**
TOTAL PROJECT COST =	**$117.5**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$26.3**	**57.2%**
TOTAL SOFT COST=	**$19.7**	**42.8%**
TOTAL PROJECT COST =	**$46.0**	**100.0%**

Discount Rate	3%		OFF-16-44 Lake WA Blvd Storage			117,412,808								
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$100,441,547	3,713,000	3,713,000	3,713,000	9,003,438	14,783,438	26,712,311	26,712,311	29,062,311	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			100,441,547	3,713,000	3,713,000	3,713,000	9,003,438	14,783,438	26,712,311	26,712,311	29,062,311	-	-	-
OPERATING COSTS														
Annual O&M		-	$3,004,221	-	-	-	-	-	-	-	114,745	114,745	114,745	114,745
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$211,613	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$194,622	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			3,410,456	-	-	-	-	-	-	-	114,745	114,745	114,745	114,745
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			103,852,003	3,713,000	3,713,000	3,713,000	9,003,438	14,783,438	26,712,311	26,712,311	29,177,056	114,745	114,745	114,745
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 103,852,003	**$ 93,849,286**	$ 85,176,153							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 103,852,003	**-$ 93,849,286**	-$ 85,176,153							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Henderson Area Alternative OFF-16-44 Storage in Lake Washington Boulevard using 12' Diameter Storage Pipes

12' Diameter, 2840' Long Storage Pipe	$21,468,140	
Odor Control	$2,300,000	*
End Flushing Gate Structure for Storage Pipe	$1,100,000	*
Intermediate Flushing Gate Structure for Storage Pipe (6 total)	$11,400,000	*
Access/Pump Out Structure	$1,100,000	*
Total Cost	**$37,400,000**	
Property	**$5,780,000**	

Description of Alternative OFF 16-44: This alternative would be off-line storage located in Lake Washington Boulevard via a 12-foot diameter, 2545 foot long storage pipe that would extend from South Juneau Street to just beyond South Dawson Street.

Alternative Description:

- A 12-foot diameter, 2840 foot long storage pipe that would extend from South Juneau Street to just
- Odor Control for the Storage Pipe
- Additional costs for an end flushing structures in the 12 foot diameter storage pipe
- Additional costs for intermediate flushing gate structures at each bend in the storage pipe as well as

* Costs Per Reference Document "Hen Gen Cost Estimating Assumptions"

Cost Calculations for Pipe: OFF 16-44 Storage Pipe in Lake Washington Boulevard
*All costs and unit costs are derived from Tabula unless modified per
Reference Document "Hen Gen Cost Estimating Assumptions"
Project year: 2009

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2009
Length: 2840 ft
Conduit Type: Gravity
Depth of Cover: 12 ft
Trench Backfill Type: Imported
Disposal Type: $5/CY
Manhole Spacing: Far (1000 ft)
Existing Utilities: Complex
Street Removal/Restoration: Full Right-of-Way
Dewatering: Significant+
Traffic: Heavy
Trench Safety: Special Shoring
Pipe Diameter: 144 in.

Pipe Storage Volume Calculations

Prelim. Est. Cont. Vol. for Basins 44 =			2.40	MG
*Assume 12' diameter storage				
I.D. =	144	inches or	12	feet
Area =			113	sf
Length=			2840	feet
/olume of each pipe =			321196	cf
or			2,400,000	gallons

Geometry

Outer Diameter	14	ft
Trench Width	20.7	ft
Excavation Depth	27	ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	Comments
Excavation	58,800	CY	$13	$764,400	Tabula
Backfill	24,000	CY	$34	$816,000	Tabula
CDF	6,400	CY	$200	$1,280,000	Tabula
Pavement Removal & Restoration	2,720	LF	$900	$2,448,000	*
Trench Safety	153,000	SF	$17	$2,601,000	Tabula
Disposal	58,800	CY	$5	$294,000	*
Spoil Load and Haul	58,800	CY	$16	$940,800	Tabula
Pipe Unit Material Cost	2,840	lf	$1,590	$4,515,600	Tabula
Pipe Installation	2,840	lf	$646	$1,834,640	Tabula
Place Pipe Zone Fill	18,600	CY	$34	$632,400	Tabula
Existing Utilities	2,840	lf	$1,190	$3,379,600	Tabula
Dewatering	2,840	lf	$300	$852,000	*
Traffic Control	2,840	lf	$100	$284,000	Tabula
		Year 2008 Subtotal		$20,642,440	

*Note: See Reference Document "Hen Gen Cost Estimating Assumptions"

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8865 (2009)	0.98
Effective Multiplier	1.04

Construction Year 2009 Subtotal	**$21,468,140**

Property Costs OFF-16-44 Storage in Lake Washington Boulevard

Address	Length of Easement (ft)	Width of Easement (ft)	Square Footage	Land Value ($/SF)	**Cost**
Lake Washington Blvd.	2840	70	198800	$29	**$5,780,000**

Operation and Maintenance Cost Template

Alternative Number		**OFF-16-44**							
Alternative Description		**Storage Pipe along Lake Washington Boulevard**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical		LF	$ 1.75	1	$ -	1	$ -
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	1	ea	$ 1,000	4	$ 2,040	1.5	$ 3,060
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP		ea	$ 5,000	1	$ -	1.25	$ -
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
		Type 5 - 144-in Pipe	2840	LF	$ 24	2	$ 68,160	1.25	$ 85,200
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket	6	ea	$ 1,040	1	$ 6,240	1.5	$ 9,360
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 90,140		$ 114,745

AACE CLASS 5 ESTIMATE - CON-1-44a Orcas Street Pump Station and Force Main		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$7,000,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$665,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$7,665,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$15,330,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$3,832,500
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$11,497,500

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$1.1	5.3%
Project Development	$0	$0.8	4.0%
Preliminary Engineering	$0	$0.7	3.5%
Property Acquisition	$60,000	$0.2	1.0%
Permitting	$0	$0.2	1.0%
Design	$0	$2.4	12.0%
Construction	$11,497,500	$2.8	14.0%
Closeout	$0	$0.4	2.0%

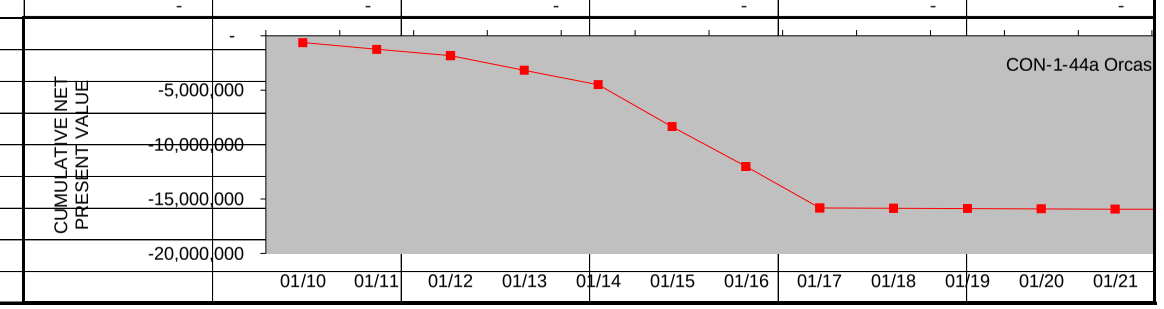
SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$11.60**	**57.2%**
TOTAL SOFT COST=	**$8.68**	**42.8%**
TOTAL PROJECT COST =	**$20.28**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$3.9**	**57.2%**
TOTAL SOFT COST=	**$2.9**	**42.8%**
TOTAL PROJECT COST =	**$6.8**	**100.0%**

SUMMARY +100% Contingency (Class 5 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$15.4**	**57.2%**
TOTAL SOFT COST=	**$11.5**	**42.8%**
TOTAL PROJECT COST =	**$26.9**	**100.0%**

SUMMARY -30% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$5.40**	**57.2%**
TOTAL SOFT COST=	**$4.04**	**42.8%**
TOTAL PROJECT COST =	**$9.44**	**100.0%**

Discount Rate	3%			CON-1-44a Orcas Street Pump S		20,221,310									
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$17,251,919	640,835	640,835	640,835	1,553,924	1,613,924	4,908,455	4,908,455	5,314,047	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			17,251,919	640,835	640,835	640,835	1,553,924	1,613,924	4,908,455	4,908,455	5,314,047	-	-	-
OPERATING COSTS														
Annual O&M		-	$1,113,639	-	-	-	-	-	-	-	42,535	42,535	42,535	42,535
PS Structural Replacement (50 years)		-	$331,428	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$584,721	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$259,496	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			2,289,284	-	-	-	-	-	-	-	42,535	42,535	42,535	42,535
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			19,541,203	640,835	640,835	640,835	1,553,924	1,613,924	4,908,455	4,908,455	5,356,582	42,535	42,535	42,535
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 19,541,203	**$ 16,909,390**	$ 15,029,094							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 19,541,203	**-$ 16,909,390**	-$ 15,029,094							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Henderson Area Alternative CON 1-44a Orcas Pump Station & Forcemain

Force Main	$2,600,000
Pump Station in S. Orcas St.	$4,400,000
Total	**$7,000,000**

Property	$60,000

Alternative Description:
- Pump Station located in S. Orcas St. ROW
- A new forcemain sewer pipe, 16 inch diameter and approx. 3925 feet long

*NOTE: This alternative is paired with OFF-3-45 Storage in Martha Washington Park.
Costs for OFF-3-45 are shown in a separate worksheet.

Cost Calculations for Force Main CON 1-44a (from Orcas Pump Station)

***All costs and unit costs are derived from Tabula unless modified per**
Reference Document "Hen Gen Cost Estimating Assumptions"

Project year: 2009

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions

Construction Year: 2009
Length: 3925 ft
Conduit Type: Force Main
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Disposal Type: $5/CY
Manhole Spacing: None
Existing Utilities: Complex
Street Removal/Restoration: Partial Street
Dewatering: Minimal
Traffic: Major
Trench Safety: Standard
Pipe Diameter: 16 in.

Geometry

Outer Diameter	1.45	ft
Trench Width	4.38	ft
Excavation Depth	6.45	ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	Comments
Excavation	5,390.00	CY	$13	$70,070	Tabula
Backfill	3,190	CY	$34	$108,460	Tabula
Pavement Removal & Restoration	3,580.00	LF	$350	$1,253,000	*
Trench Safety	66,300.00	SF	$1	$66,300	Tabula
Disposal	5,390.00	CY	$5	$26,950	*
Spoil Load and Haul	5,390.00	CY	$16	$86,240	Tabula
Pipe Unit Material Cost	3,930.00	lf	$75	$294,750	Tabula
Pipe Installation	3,930.00	lf	$27	$106,110	Tabula
Place Pipe Zone Fill	1,960.00	CY	$34	$66,640	Tabula
Existing Utilities	3,930.00	lf	$3	$11,790	Tabula
Dewatering	3,930.00	lf	$87	$341,910	Tabula
Traffic Control	3,930.00	lf	$16	$62,880	Tabula
			Year 2008 Subtotal	$2,495,100	Tabula

*Note: See Reference Document "Hen Gen Cost Estimating Assumptions"

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008	0.98
Effective Multiplier	1.04

Construction Year 2009 Subtotal	**$2,594,900**

Cost Calculations for Orcas Pump Station: Pump Station CON-1-44a

*All costs and unit costs are derived from Tabula unless modified per Reference Document "Hen Gen Cost Estimating Assumptions

Project year: 2009

The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc.).

Assumptions	Comments		
Construction Year: 2009	*Preliminary Est. Overflow Rate for Basin 44 =		
Capacity: 5.3 mgd		5.30	MGD
Total Dynamic Head: 60 ft			
Excavation Depth: 30 ft			

Calculated Parameters

Required Pump Power	109	Hp
Base Architectural/Structural Unit Cost	352,000	$/mgd
Architectural/Structural Unit Cost Adjustment	-1,360	$/mgd
Base Mechanical Unit Cost	103,000	$/mgd
Mechanical Unit Cost Adjustment	89,600	$/mgd

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	Comments
Site/Civil	1	LS	1,230,000	1,230,000	Tabula
Electrical/Instrumentation	1	LS	112,000	112,000	Tabula
Architectural/Structural	5.30	mgd	351,000	1,860,300	Tabula
Mechanical	5.30	mgd	193,000	1,022,900	Tabula
		Year 2008 Subtotal		$4,225,200	Tabula

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8865 (2009)	0.98
Effective Multiplier	1.04

Construction Year 2009 Subtotal	**$4,394,208**

PROPERTY COSTS: ALT. CON-1-44a Orcas Pump Station

Property ID	*Assessed Value ($/SF)	Property Cost (130% of Assessed)	Notes
1102001278	$24.30	$31.59	

Temporary Easement		
SF of easement	Cost of Easement (SF x Property Cost x 10% x YRs Construction)	Notes
0	$0	Construction is to occur within ROW

Permanent Above Ground Easement		
SF of easement	Cost of Easement (SF x 50% x Property Cost)	Notes
3,900	$61,601	

Total Costs	$60,000

Operation and Maintenance Cost Template

Alternative Number		**CON-1-44a**							
Alternative Description		**5.3 MGD Pump Station at S. Orcas Street**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical		LF	$ 1.75	1	$ -	1	$ -
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main	3925	LF	$ 2.00	1	$ 7,850	1	$ 7,850
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	1	ea	$ 1,000	4	$ 2,040	1.5	$ 3,060
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up	1	ea	$ 11,600	1	$ 11,600	1.25	$ 14,500
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP		ea	$ 5,000	1	$ -	1.25	$ -
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket		ea	$ 1,040	1	$ -	1.5	$ -
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 35,190		$ 42,535

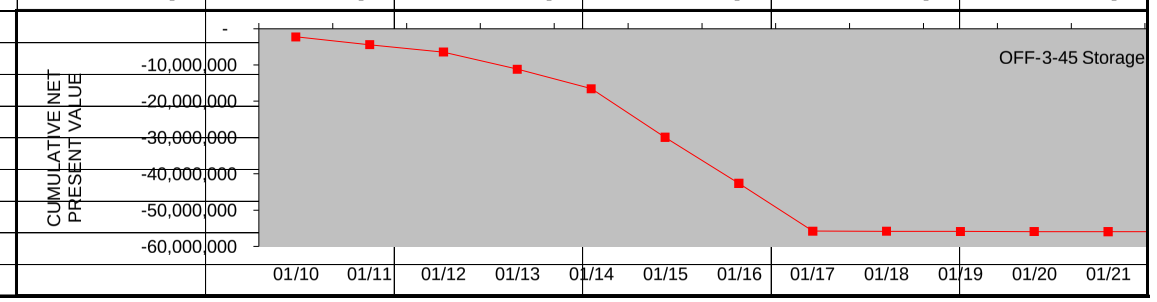
AACE CLASS 5 ESTIMATE - OFF-3-45 Storage in Martha Washington Park (2.6 MG)		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$24,200,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$2,299,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$26,499,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$52,998,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$13,249,500
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$39,748,500

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$3.78	5.3%
Project Development	$0	$2.85	4.0%
Preliminary Engineering	$0	$2.50	3.5%
Property Acquisition	$1,090,000	$0.71	1.0%
Permitting	$0	$0.71	1.0%
Design	$0	$8.56	12.0%
Construction	$39,748,500	$9.99	14.0%
Closeout	$0	$1.43	2.0%

SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$40.8**	**57.2%**
TOTAL SOFT COST=	**$30.5**	**42.8%**
TOTAL PROJECT COST =	**$71.3**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$14.3**	**57.2%**
TOTAL SOFT COST=	**$10.7**	**42.8%**
TOTAL PROJECT COST =	**$25.0**	**100.0%**

Discount Rate	3%		OFF-3-45 Storage in MWP (2.6 mgallons)			71,313,602								
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$60,882,060	2,254,098	2,254,098	2,254,098	5,465,831	6,555,831	17,034,334	17,034,334	18,460,978	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			60,882,060	2,254,098	2,254,098	2,254,098	5,465,831	6,555,831	17,034,334	17,034,334	18,460,978	-	-	-
OPERATING COSTS														
Annual O&M		-	$1,466,490	-	-	-	-	-	-	-	56,012	56,012	56,012	56,012
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$211,613	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$194,622	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			1,872,725	-	-	-	-	-	-	-	56,012	56,012	56,012	56,012
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			62,754,785	2,254,098	2,254,098	2,254,098	5,465,831	6,555,831	17,034,334	17,034,334	18,516,990	56,012	56,012	56,012
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 62,754,785	**$ 56,691,880**	$ 51,412,685							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 62,754,785	**-$ 56,691,880**	-$ 51,412,685							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Henderson Area Alternative OFF-3-45 Storage in Martha Washington Park (2.6 MG)

Note: Magnuson/Windermere project costs were used as a basis because it is similar in complexity and size.

*Magnuson Park Cost Estimate for 2.05 MG Storage Tank:	**$ 19,110,000**	*
Alt OFF-3-45 Storage in Martha Washington Park, 2.60 MG Tank:	**$ 24,240,000**	
Total	**$ 24,200,000**	
Property	**$ 1,090,000**	

*Note: See Reference Document "Magnuson Park Cost Estimate: 2.05 MG Off-Line Storage Tank"

PROPERTY COSTS: ALT. OFF-3-45 Storage in Martha Washington Park (2.6 MG)

Property ID	AREA (SQ FT)	*Assessed Value ($/SF)	Property Cost (= Assessed for Parks)
2324049007	87,120	$27.72	$27.72

Temporary Easement		
SF of easement	Cost of Easement (SF x Property Cost x 10% x 3 YR Construction)	Notes

Operation and Maintenance Cost Template

Alternative Number		**OFF-3-45**							
Alternative Description		**2.6 Storage Tank at Martha Washington Park**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical	400	LF	$ 1.75	1	$ 700	1	$ 700
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic	1	ea	$ 260	4	$ 1,040	1.5	$ 1,560
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized		ea	$ 1,000	4	$ -	1.5	$ -
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP	1	ea	$ 5,000	1	$ 5,000	1.25	$ 6,250
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG	1	MG	$ 14,012	1	$ 14,012	1.5	$ 21,017
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket	6	ea	$ 1,040	1	$ 6,240	1.5	$ 9,360
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 40,692		$ 56,012

Seattle Public Utilities
Henderson and Genesee CSO Reduction Projects
Total Hard Cost, Soft Cost, and Project Cost Estimate

February 8, 2011

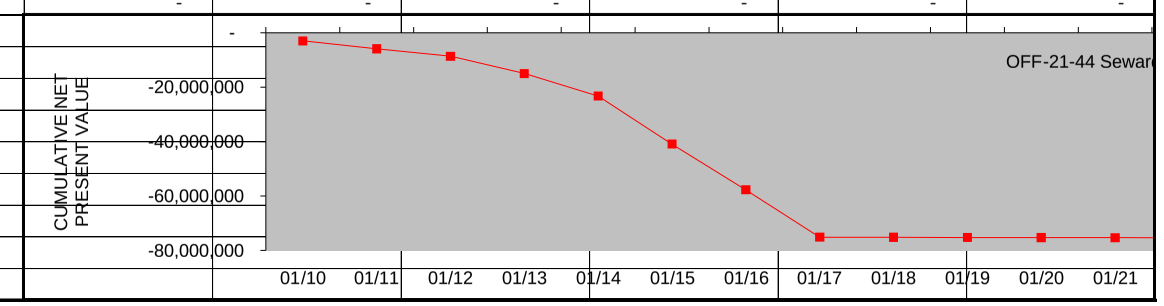
AACE CLASS 5 ESTIMATE - OFF-21-44 Seward Park to MWP Tunnel		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$31,800,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$3,021,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$34,821,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$69,642,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$17,410,500
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$52,231,500

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$5.1	5.3%
Project Development	$0	$3.8	4.0%
Preliminary Engineering	$0	$3.4	3.5%
Property Acquisition	$2,680,000	$1.0	1.0%
Permitting	$0	$1.0	1.0%
Design	$0	$11.5	12.0%
Construction	$52,231,500	$13.4	14.0%
Closeout	$0	$1.9	2.0%

SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$54.9**	**57.2%**
TOTAL SOFT COST=	**$41.1**	**42.8%**
TOTAL PROJECT COST =	**$96.0**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$20.1**	**57.2%**
TOTAL SOFT COST=	**$15.0**	**42.8%**
TOTAL PROJECT COST =	**$35.1**	**100.0%**

Discount Rate	3%			OFF-21-44 Seward Park to MWP		95,913,302									
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$81,945,680	3,032,616	3,032,616	3,032,616	7,353,613	10,033,613	22,502,951	22,502,951	24,422,328	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			81,945,680	3,032,616	3,032,616	3,032,616	7,353,613	10,033,613	22,502,951	22,502,951	24,422,328	-	-	-
OPERATING COSTS														
Annual O&M		-	$2,159,284	-	-	-	-	-	-	-	82,473	82,473	82,473	82,473
PS Structural Replacement (50 years)		-	$229,862	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$529,033	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$108,123	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			3,026,302	-	-	-	-	-	-	-	82,473	82,473	82,473	82,473
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			84,971,983	3,032,616	3,032,616	3,032,616	7,353,613	10,033,613	22,502,951	22,502,951	24,504,801	82,473	82,473	82,473
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 84,971,983	**$ 76,557,568**	$ 69,369,774							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 84,971,983	**-$ 76,557,568**	-$ 69,369,774							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Alternative OFF-21-44 Tunnel between Seward & MW Parks

15 ft Inside Diameter Tunnel (2,350 ft) and shafts	$26,915,493
Odor Control Facility (at Seward Park)	$2,300,000
Tunnel Drain Pumping Station (at Martha Washington Park)	$2,620,000
Total Construction Cost =	**$31,840,000**
Property	$2,680,000

Alternative Description:

This alternative involves installing a 14'-8" ft inside diameter tunnel from Martha Washington Park to Seward Park. The tunnel is approximately 2,350 ft long. This alternative includes the construction of the launch and retrieval portals for the tunneling machine, the odor control facility, the pumping costs, and the property costs

Assumptions

Cost Estimate used 15 ft diameter tunnel because 14'-8" I.D. was not an option in

Cost Calculations for Pipe: Storage Tunnel between Martha Washington Park & Seward Park
*All costs and unit costs are derived from Tabula unless modified per
Reference Document "Hen Gen Cost Estimating Assumptions"

Assumptions

Construction Year: 2009
Inside Diameter: 15 ft.
Length: 2350 ft
Dewatering: Significant
Launch Shaft Existing Utilities: None
Launch Shaft Excavation Depth: 83 ft
Launch Shaft Surface Restoration: Pavement
Retrieval Shaft Excavation Depth: 70 ft
Retrieval Shaft Surface Restoration: Pavement
Retrieval Shaft Existing Utilities: Average
Tunnel Easement Length: 0 ft
Easement Type: None
Land Adjustment Factor: King County Average
Launch Shaft Footprint: Standard
Retrieval Shaft Footprint: Standard

Tunnel Geometry

Outer Diameter	16.5	ft
Spoils Volume	18,600	CY

Launch Shaft Geometry

Width	50	ft
Length	157	ft
Footprint	7,850	SF
Volume	24,100	CY
Easement Footprint	20,700	SF

Retrieval Shaft Geometry

Width	42	ft
Length	58	ft
Footprint	2,440	SF
Volume	6,320	CY
Easement Footprint	9,940	SF

Miscellaneous

Spoils Loads	1,860	loads

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	**Notes:**
Spoils Haul	18,600.00	CY	12	223,200	Tabula
Launch Shaft Excavation	24,100.00	CY	15	361,500	Tabula
Launch Shaft Shoring	34,400.00	SF	164	5,641,600	Tabula
Launch Shaft Backfill	24,100.00	CY	18	433,800	Tabula
Launch Shaft Surface Restoration	872	SY	74	64,528	Tabula
Retrieval Shaft Excavation	6,320.00	CY	15	94,800	Tabula
Retrieval Shaft Shoring	14,000.00	SF	140	1,960,000	Tabula
Retrieval Shaft Existing Utilities	2,440.00	SF	6	14,640	Tabula
Retrieval Shaft Backfill	6,320.00	CY	18	113,760	Tabula
Retrieval Shaft Surface Restoration	271	SY	74	20,054	Tabula
Tunnel Dewatering	1	LS	120,000	120,000	*
TBM Procurment	1	LS	5,960,000	5,960,000	Tabula
Tunnel Boring	2,350.00	ft	4,300	10,105,000	*Revised per Engineer's Judgement (Costs vary from $2,890/LF to $4,500/LF
Receiving Shaft Final Access Structure	1	LS	767,400.00	767,400	*Added because Tabula does not include structure (Allowance for 30 FT diameter CIP Concrete)
		Year 2008 Subtotal		$25,880,282	

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8678 (2009)	0.98
Effective Multiplier	1.04
Construction Year 2009 Subtotal	$26,915,493

Cost Calculations for Pump Station: Pump Station at Martha Washington Park
*All costs and unit costs are derived from Tabula unless modified per
Reference Document "Hen Gen Cost Estimating Assumptions"

Assumptions

Construction Year: 2009
Capacity: 1.5 mgd
Total Dynamic Head: 60 ft
Excavation Depth: 85 ft

Calculated Parameters

Required Pump Power	31	Hp
Base Architectural/Structural Unit Cost	361,000	$/mgd
Architectural/Structural Unit Cost Adjustment	497,000	$/mgd
Base Mechanical Unit Cost	148,000	$/mgd
Mechanical Unit Cost Adjustment	144,000	$/mgd

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost
Site/Civil	1	LS	760,000	760,000
Electrical/Instrumentation	1	LS	37,500	37,500
Architectural/Structural	1.5	mgd	859,000	1,290,000
Mechanical	1.5	mgd	292,000	438,000
		Year 2008 Subtotal		$2,520,000

Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8678 (2009	0.98
Effective Multiplier	1.04
Construction Year 2009 Subtotal	$2,617,776

Odor Control Cost

Total Cost*	$2,300,000

*Odor Control Cost is based on Henderson Genesee Cost Estimate Memorandum

PROPERTY COSTS - OFF-21-44 Tunnel from Martha Washington Park to Seward Park

		Permanent Easement					emporary Construction Easeme		
No.	Property ID	Approx. Length of Easement Needed (ft)	Taxable Land Value per Sq. Ft Cost($)/Area(sf)	Property Cost Cost($)/Area(sf)	Permanent Subsurface Easement for Tunnel alignment (30 ft wide) (30% assessed value)	Permanent Above Ground Easement for Tunnel Portals (35 ft Diameter,	Estimated Area for Construction around portals (sf)	Temporary Construction Easement (10% assessed value, 3 YR Constuction)	Notes
**1	2324049007	400	$35.27	$35.27	$126,972	$33,934	21,250	$224,846	In Seward Park
2	8835400070	50	$47.48	$61.72	$27,775	$0	$ -	$ -	
3	8835400065	107	$99.31	$129.10	$124,321	$0	$ -	$ -	
4	8835400060	104	$93.58	$121.65	$113,864	$0	$ -	$ -	
5	8835400055	108	$86.89	$112.96	$109,798	$0	$ -	$ -	
6	8835400050	105	$76.51	$99.46	$93,992	$0	$ -	$ -	
7	8835400045	102	$71.56	$93.03	$85,398	$0	$ -	$ -	
8	8835400015	112	$66.36	$86.26	$86,953	$0	$ -	$ -	
9	8835400025	107	$54.23	$70.50	$67,888	$0	$ -	$ -	
10	8835400032	67	$28.78	$37.41	$22,561	$0	$ -	$ -	
11	8835400006	60	$28.78	$37.41	$20,204	$0	$ -	$ -	
12	1102001219	118	$31.45	$40.89	$43,420	$0	$ -	$ -	
13	1102001220	20	$36.40	$47.32	$8,518	$0	$ -	$ -	
14	1102001222	65	$25.02	$32.53	$19,028	$0	$ -	$ -	
15	1102001224	65	$31.32	$40.72	$23,819	$0	$ -	$ -	
16	1102001223	40	$31.32	$40.72	$14,658	$0	$ -	$ -	
17	1102001216	50	$29.16	$37.91	$17,059	$0	$ -	$ -	
18	1102001277	150	$24.06	$31.28	$42,225	$0	$ -	$ -	
19	1102001278	130	$24.29	$31.58	$36,945	$0	$ -	$ -	
**20	1102001300	390	$27.72	$27.72	$97,297	$26,670	137,750	$1,145,529	In Martha Washington Park
Totals		2350			**$1,182,694**	**$60,603**		**$1,370,375**	

Total =	**$2,610,000**

*Easement was calculated by adding together the costs for tunnel alignment permanents easements, tunnel portal permanent easements, and temporary construction easements

**Taxable Land Value per Pree Carpenter (SPU) from email dated 1/21/2010

^Temporary Construction Easement Costs do not include easement costs for geotech drilling during design, settlement monitoring during construction, water monitoring, and damage monitoring

PROPERTY COSTS for Pump Station in Seward Park for Tunnel - OFF-21-44

		Permanent Easement					^Temporary Construction Easement	
No.	Property ID	Approx. Length of Easement Needed (ft)	Approx. Width of Easement Needed (ft)	Taxable Land Value per Sq. Ft Cost($)/Area(sf)	Property Cost Cost($)/Area(sf)	Permanent Above Ground Easement	Temporary Construction Easement (10% assessed value, 3 YR Constuction)	Notes
**1	2324049007	50	50	$27.72	$27.72	$69,300	$0	In Seward Park
Totals						**$69,300**	**$0**	
							$70,000	

*Easement was calculated by adding together the costs for tunnel alignment permanents easements, tunnel portal permanent easements, and temporary construction easements

**Taxable Land Value per Pree Carpenter (SPU) from email dated 1/21/2010

^Temporary Construction Easement Costs do not include easement costs for geotech drilling during design, settlement monitoring during construction, water monitoring, and damage monitoring

Complete Separation in Basins 44 & 45

Operation and Maintenance Cost Template

Alternative Number		**OFF-21-44**							
Alternative Description		**Storage Tunnel from Seward Park to Martha Washington Park**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical	500	LF	$ 1.75	1	$ 875	1	$ 875
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	1	ea	$ 1,000	4	$ 2,040	1.5	$ 3,060
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP		ea	$ 5,000	1	$ -	1.25	$ -
		Type 2 - 50HP & up	1	ea	$ 9,600	1	$ 9,600	1.25	$ 12,000
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel	2.6	MG	$ 32,942	1	$ 32,942	1.5	$ 49,413
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket		ea	$ 1,040	1	$ -	1.5	$ -
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 59,157		$ 82,473

AACE CLASS 5 ESTIMATE - Complete Separation in Basin 44 Only with 100% Participation		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$35,770,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$3,398,150
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$39,168,150
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$78,336,300
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$19,584,075
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$58,752,225

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$5.4	5.3%
Project Development	$0	$4.1	4.0%
Preliminary Engineering	$0	$3.6	3.5%
Property Acquisition	$0	$1.0	1.0%
Permitting	$0	$1.0	1.0%
Design	$0	$12.3	12.0%
Construction	$58,752,225	$14.4	14.0%
Closeout	$0	$2.1	2.0%

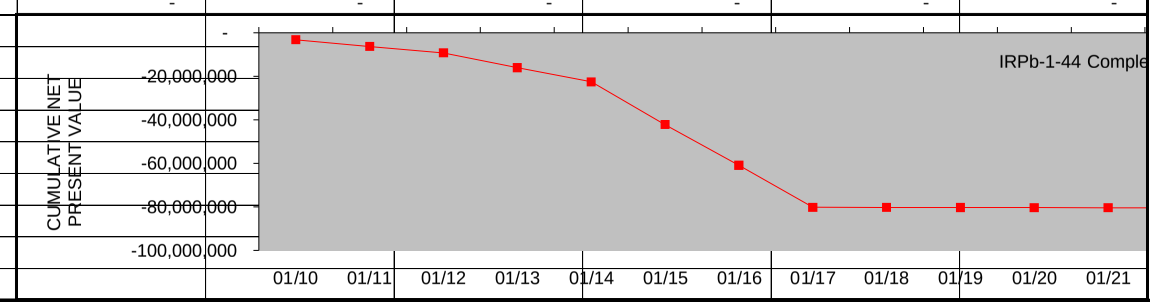
SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$58.8**	**57.2%**
TOTAL SOFT COST=	**$44.0**	**42.8%**
TOTAL PROJECT COST =	**$102.8**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$19.6**	**57.2%**
TOTAL SOFT COST=	**$14.7**	**42.8%**
TOTAL PROJECT COST =	**$34.3**	**100.0%**

SUMMARY +100% Contingency (Class 5 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$78.3**	**57.2%**
TOTAL SOFT COST=	**$58.6**	**42.8%**
TOTAL PROJECT COST =	**$136.9**	**100.0%**

SUMMARY -30% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$27.4**	**57.2%**
TOTAL SOFT COST=	**$20.5**	**42.8%**
TOTAL PROJECT COST =	**$47.9**	**100.0%**

Discount Rate	3%			IRPb-1-44 Complete Separation i		102,660,845									
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$87,566,284	3,247,821	3,247,821	3,247,821	7,875,451	7,875,451	25,036,966	25,036,966	27,092,549	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			87,566,284	3,247,821	3,247,821	3,247,821	7,875,451	7,875,451	25,036,966	25,036,966	27,092,549	-	-	-
OPERATING COSTS														
Annual O&M		-	$2,243,773	-	-	-	-	-	-	-	85,700	85,700	85,700	85,700
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			2,243,773	-	-	-	-	-	-	-	85,700	85,700	85,700	85,700
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			89,810,057	3,247,821	3,247,821	3,247,821	7,875,451	7,875,451	25,036,966	25,036,966	27,178,249	85,700	85,700	85,700
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 89,810,057	**$ 81,287,862**	$ 73,761,875							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 89,810,057	**-$ 81,287,862**	-$ 73,761,875							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Basin 44

Assumptions		
Number of Homes in Basin 44	491	Homes
Participation	100%	
Private Property Separation	100%	
Foundation Drain Mitigation	100%	
Pavement Replacement	4	Panels/Pit
Total Distubed Area (within ROW)	275,600	SF
% of Area providing GSI	50%	

Item	Quantity	Unit	Unit Cost	Year Basis	2009 Unit Cost	Total	Source
Right of Entry Agreements and Coordination with Property Owners	491	Home	$ 1,800	2009	$ 1,800	$ 883,800	Allowance, Real Property Experience (12 hours per property @ $150/hr)
Private Property Site Restoration	491	Home	$ 5,000	2009	$ 5,000	$ 2,455,000	Allowance, Engineering Judgement
Private Property Foundation Drain Mitigation	491	Home	$ 5,000	2009	$ 5,000	$ 2,455,000	Allowance, Engineering Judgement (25% of Homes in Basin)
Private Property Pipe Bursting (Side Sewer + Lateral)	491	Home	$ 11,200	2009	$ 11,200	$ 5,499,200	King County Initial Infiltration and Inflow Reduction Project Alternatives Analysis Report (April 2009)
Private Property GSI - Cisterns	369	Home	$ 1,300	2009	$ 4,450	$ 1,642,050	Assume 75% of homes receive Residential cisterns: $8.90/SF managed x 500 SF managed = $4,450 per lot (updated from R. Kirschbaum 1/13/11)
Private Property GSI - Rain Gardens	99	Home	$ 3,200	2009	$ 7,048	$ 697,752	Assume 20% of homes receive Residential Rain Gardens: $8.81/SF managed x 800 SF managed = $7,050 per lot (updated from R. Kirschbaum 1/13/11)
Private Property Stormwater Lateral	491	Home	$ 6,960	2010	$ 6,744	$ 3,311,326	Assume Length of Lateral Needed = 180 ft per parcel; costs based on RS MEANS (2010) 22 11 13.74 4480 Pipe, Plastic (4" diameter) = $30.50/LF; 31 23 16.14 0750 Excavating, Utility Trench trenching with chain trencher, 12 H.P., Operator Walking (36" deep) = 1.89/LF; 13 13 13.10 0100 Selective Clearing (by hand) = $3,400/acre (Assume 0.02 acres per parcel needed = 950 SF); 2 Laborers for 2 Days ($33.10/hour each)
ROW Concrete Panels - MHs - Residential	198	MH	$ 6,600	2010	$ 6,395	$ 1,266,253	Residental (90% of Streets) Seattle JOC 2010 ($150.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Concrete Panels - Lateral - Residential	442	Home	$ 6,600	2010	$ 6,395	$ 2,826,685	Residental (90% of Streets) Seattle JOC 2010 ($150.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Concrete Panels - MHs - Arterial	22	MH	$ 7,920	2010	$ 7,674	$ 168,834	Arterial (10% of Streets) Seattle JOC 2010 ($180.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Concrete Panels - Lateral - Arterial	50	Home	$ 7,920	2010	$ 7,674	$ 383,713	Seattle JOC 2010 ($180.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Pipe Bursting (Mains)	37384	LF	$ 90	2003	$ 101	$ 3,783,193	King County Initial Infiltration and Inflow Reduction Project Alternatives Analysis Report Bid Tab (2003)
ROW Additional Storm Drain	6325	LF	$ 526	2008	$ 523	$ 3,309,456	Includes Street Restoration, Excavation, Backfill, Material, Trench Safety, Traffic Control, Dewatering, Utility Relocates
ROW SDOT Tree Planting	1804	Tree	$ 500	2010	$ 484	$ 874,013	Seattle JOC 2010 ($500.00 for TREE, DECIDUOUS, 3 IN TO 4 IN CAL)
ROW Stormwater Treatment - Contech Vaults	85	Impervious Acre	$ 45,400	2010	$ 43,991.33	$ 3,739,263	Assume 1 Stormwater Treatment Units per acre. Each unit consists of about 10 filters + Manhole + Road Restoration. Contech Filter ($30,000 per acre + 25% for installation(Mike Smith with Contech) + 8 Concrete Panels/MH *($6,400/MH)
Traffic Control	37,384	LF	$ 12	2009	$ 12.00	$ 448,608	Tabula
					Subtotal	$ 33,744,146	
				Mobilization/Demobilization		6%	
					Total	**$ 35,768,794**	

	Right of Way
	Private Property

Year	Avg CCI	
2002	7560.37	Yearly Average
2003	7713.21	Yearly Average
2004	8014.67	Yearly Average
2005	8264.59	Yearly Average
2006	8517.57	Yearly Average
2007	8623.61	Yearly Average
2008	8714.29	Yearly Average
2009	8672.92	Yearly Average
2010	8950.64	Nov-10

*Note: This spreadsheet is used to calculate values for the Basin 44 & 45Complete Separation Alternatives

Operation and Maintenance Cost Template

Alternative Number		**I and I Reduction**							
Alternative Description		**Complete Separation for**							
		Basins 44 and 45							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical		LF	$ 1.75	1	$ -	1	$ -
special cleaning		Arterial	42563	LF	$ 2.00	1	$ 85,126	1	$ 85,126
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized		ea	$ 1,000	4	$ -	1.5	$ -
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP		ea	$ 5,000	1	$ -	1.25	$ -
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket		ea	$ 1,040	1	$ -	1.5	$ -
Odor Control	12								
				MG	$ 1,700	1	$ -	1.25	$ -
Other special O&M requirements									
GSI - Cisterns			457	ea				1.25	$ -
GSI - Raingardens			123	ea					
Stormwater Treatment Vaults			105	ea	$ 200		$ 21,000	1	$ 21,000
I/I Reduction								1.5	$ -
Annual O&M for Basins 44 & 45							$ 106,126		$ 106,126
Annual O&M for Basin 44 (491 homes)							$ 85,704		$ 85,704
Annual O&M for Basin 45 (117 homes)							$ 20,422		$ 20,422

AACE CLASS 5 ESTIMATE - Complete Separation in Basin 45 Only with 100% Participation		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$7,129,444
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$677,297
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$7,806,742
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$15,613,483
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$3,903,371
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$11,710,112

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$1.1	5.3%
Project Development	$0	$0.8	4.0%
Preliminary Engineering	$0	$0.7	3.5%
Property Acquisition	$0	$0.2	1.0%
Permitting	$0	$0.2	1.0%
Design	$0	$2.5	12.0%
Construction	$11,710,112	$2.9	14.0%
Closeout	$0	$0.4	2.0%

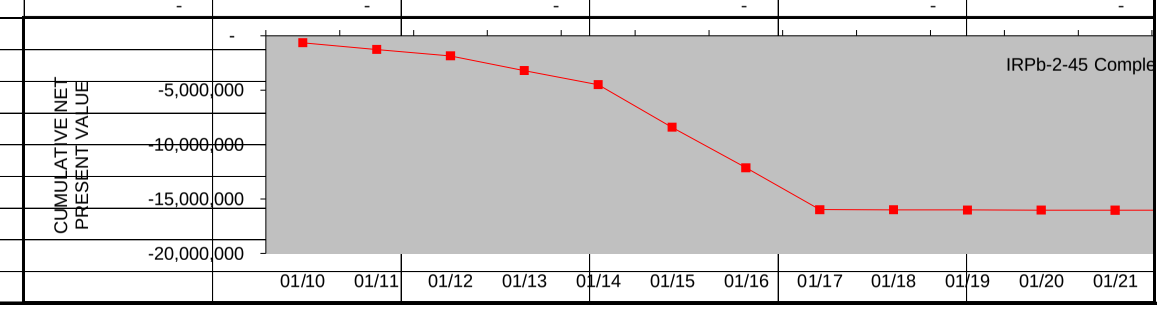
SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$11.7**	**57.2%**
TOTAL SOFT COST=	**$8.8**	**42.8%**
TOTAL PROJECT COST =	**$20.5**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$3.9**	**57.2%**
TOTAL SOFT COST=	**$2.9**	**42.8%**
TOTAL PROJECT COST =	**$6.8**	**100.0%**

SUMMARY +100% Contingency (Class 5 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$15.6**	**57.2%**
TOTAL SOFT COST=	**$11.7**	**42.8%**
TOTAL PROJECT COST =	**$27.3**	**100.0%**

SUMMARY -30% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$5.5**	**57.2%**
TOTAL SOFT COST=	**$4.1**	**42.8%**
TOTAL PROJECT COST =	**$9.6**	**100.0%**

Discount Rate	3%			IRPb-2-45 Complete Separation i		20,454,358									
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$17,446,671	646,793	646,793	646,793	1,568,370	1,568,370	4,989,293	4,989,293	5,398,655	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			17,446,671	646,793	646,793	646,793	1,568,370	1,568,370	4,989,293	4,989,293	5,398,655	-	-	-
OPERATING COSTS														
Annual O&M		-	$534,107	-	-	-	-	-	-	-	20,400	20,400	20,400	20,400
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			534,107	-	-	-	-	-	-	-	20,400	20,400	20,400	20,400
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			17,980,778	646,793	646,793	646,793	1,568,370	1,568,370	4,989,293	4,989,293	5,419,055	20,400	20,400	20,400
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 17,980,778	**$ 16,244,748**	$ 14,727,639							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 17,980,778	**-$ 16,244,748**	-$ 14,727,639							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Basin 45

Assumptions		
Number of Homes in Basin 44	117	Homes
Participation	100%	
Private Property Separation	100%	
Foundation Drain Mitigation	100%	
Pavement Replacement	4	Panels/Pit
Total Distubed Area (within ROW)	62,000	SF
% of Area providing GSI	50%	

Item	Quantity	Unit	Unit Cost	Year Basis	2009 Unit Cost	Total	Source
Right of Entry Agreements and Coordination with Property Owners	117	Home	$ 1,800	2009	$ 1,800	$ 210,600	Allowance, Real Property Experience (12 hours per property @ $150/hr)
Private Property Site Restoration	117	Home	$ 5,000	2009	$ 5,000	$ 585,000	Allowance, Engineering Judgement
Private Property Foundation Drain Mitigation	117	Home	$ 5,000	2009	$ 5,000	$ 585,000	Allowance, Engineering Judgement (25% of Homes in Basin)
Private Property Pipe Bursting (Side Sewer + Lateral)	117	Home	$ 11,200	2009	$ 11,200	$ 1,310,400	King County Initial Infiltration and Inflow Reduction Project Alternatives Analysis Report (April 2009)
Private Property GSI - Cisterns	88	Home	$ 1,300	2009	$ 4,450	$ 391,600	Assume 75% of homes receive Residential cisterns: $8.90/SF managed x 500 SF managed = $4,450 per lot (updated from R. Kirschbaum 1/13/11)
Private Property GSI - Rain Gardens	24	Home	$ 3,200	2009	$ 7,048	$ 169,152	Assume 20% of homes receive Residential Rain Gardens: $8.81/SF managed x 800 SF managed = $7,050 per lot (updated from R. Kirschbaum 1/13/11)
Private Property Stormwater Lateral	117	Home	$ 6,960	2010	$ 6,744	$ 789,053	Assume Length of Lateral Needed = 180 ft per parcel; costs based on RS MEANS (2010) 22 11 13.74 4480 Pipe, Plastic (4" diameter) = $30.50/LF; 31 23 16.14 0750 Excavating, Utility Trench trenching with chain trencher, 12 H.P., Operator Walking (36" deep) = 1.89/LF; 13 13 13.10 0100 Selective Clearing (by hand) = $3,400/acre (Assume 0.02 acres per parcel needed = 950 SF); 2 Laborers for 2 Days ($33.10/hour each)
ROW Concrete Panels - MHs - Residential	38	MH	$ 6,600	2010	$ 6,395	$ 243,018	Residental (90% of Streets) Seattle JOC 2010 ($150.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Concrete Panels - Lateral - Residential	106	Home	$ 6,600	2010	$ 6,395	$ 677,893	Residental (90% of Streets) Seattle JOC 2010 ($150.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Concrete Panels - MHs - Arterial	5	MH	$ 7,920	2010	$ 7,674	$ 38,371	Arterial (10% of Streets) Seattle JOC 2010 ($180.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Concrete Panels - Lateral - Arterial	12	Home	$ 7,920	2010	$ 7,674	$ 92,091	Seattle JOC 2010 ($180.00/SY for 6 IN Concrete Pavement, 100 SF per Panel, 4 Panels per MH) includes removal of existing panel, thickened edge, common ex, gutter
ROW Pipe Bursting (Mains)	5179	LF	$ 90	2003	$ 101	$ 524,105	King County Initial Infiltration and Inflow Reduction Project Alternatives Analysis Report Bid Tab (2003)
ROW Additional Storm Drain	0	LF	$ 526	2008	$ 523	$ -	Includes Street Restoration, Excavation, Backfill, Material, Trench Safety, Traffic Control, Dewatering, Utility Relocates
ROW SDOT Tree Planting	346	Tree	$ 500	2010	$ 484	$ 167,632	Seattle JOC 2010 ($500.00 for TREE, DECIDUOUS, 3 IN TO 4 IN CAL)
ROW Stormwater Treatment - Contech Vaults	20	Impervious Acre	$ 45,400	2010	$ 43,991.33	$ 879,827	Assume 1 Stormwater Treatment Units per acre. Each unit consists of about 10 filters + Manhole + Road Restoration. Contech Filter ($30,000 per acre + 25% for installation(Mike Smith with Contech) + 8 Concrete Panels/MH *($6,400/MH)
Traffic Control	5,179	LF	$ 12	2009	$ 12.00	$ 62,148	Tabula
					Subtotal	$ 6,725,891	
				Mobilization/Demobilization		6%	
					Total	**$ 7,129,444**	

	Right of Way
	Private Property

Year	Avg CCI	
2002	7560.37	Yearly Average
2003	7713.21	Yearly Average
2004	8014.67	Yearly Average
2005	8264.59	Yearly Average
2006	8517.57	Yearly Average
2007	8623.61	Yearly Average
2008	8714.29	Yearly Average
2009	8672.92	Yearly Average
2010	8950.64	Nov-10

*Note: This spreadsheet is used to calculate values for the Basin 44 & 45Complete Separation Alternatives

Operation and Maintenance Cost Template

Alternative Number		**I and I Reduction**							
Alternative Description		**Complete Separation for**							
		Basins 44 and 45							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical		LF	$ 1.75	1	$ -	1	$ -
special cleaning		Arterial	42563	LF	$ 2.00	1	$ 85,126	1	$ 85,126
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized		ea	$ 1,000	4	$ -	1.5	$ -
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP		ea	$ 5,000	1	$ -	1.25	$ -
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket		ea	$ 1,040	1	$ -	1.5	$ -
Odor Control	12								
				MG	$ 1,700	1	$ -	1.25	$ -
Other special O&M requirements									
GSI - Cisterns			457	ea				1.25	$ -
GSI - Raingardens			123	ea					
Stormwater Treatment Vaults			105	ea	$ 200		$ 21,000	1	$ 21,000
I/I Reduction								1.5	$ -
Annual O&M for Basins 44 & 45							$ 106,126		$ 106,126
Annual O&M for Basin 44 (491 homes)							$ 85,704		$ 85,704
Annual O&M for Basin 45 (117 homes)							$ 20,422		$ 20,422

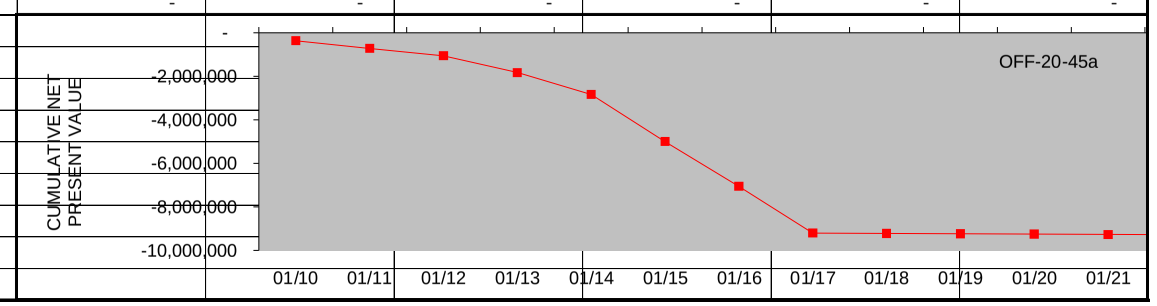
AACE CLASS 5 ESTIMATE - OFF-20-45a 57th Ave S Storage		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$3,900,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$370,500
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$4,270,500
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$8,541,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$2,135,250
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$6,405,750

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$0.6	5.3%
Project Development	$0	$0.5	4.0%
Preliminary Engineering	$0	$0.4	3.5%
Property Acquisition	$320,000	$0.1	1.0%
Permitting	$0	$0.1	1.0%
Design	$0	$1.4	12.0%
Construction	$6,405,750	$1.6	14.0%
Closeout	$0	$0.2	2.0%

SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$6.7**	**57.2%**
TOTAL SOFT COST=	**$5.0**	**42.8%**
TOTAL PROJECT COST =	**$11.7**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$2.5**	**57.2%**
TOTAL SOFT COST=	**$1.9**	**42.8%**
TOTAL PROJECT COST =	**$4.4**	**100.0%**

Discount Rate	3%			OFF-20-45a		11,732,660									
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$10,023,220	370,328	370,328	370,328	897,987	1,217,987	2,757,106	2,757,106	2,991,491	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			10,023,220	370,328	370,328	370,328	897,987	1,217,987	2,757,106	2,757,106	2,991,491	-	-	-
OPERATING COSTS														
Annual O&M		-	$687,008	-	-	-	-	-	-	-	26,240	26,240	26,240	26,240
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$61,256	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$21,625	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			769,889	-	-	-	-	-	-	-	26,240	26,240	26,240	26,240
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			10,793,109	370,328	370,328	370,328	897,987	1,217,987	2,757,106	2,757,106	3,017,731	26,240	26,240	26,240
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 10,793,109	**$ 9,595,401**	$ 8,635,959							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 10,793,109	**-$ 9,595,401**	-$ 8,635,959							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Alternative OFF 20-45a Storage Pipe in 57th Ave S near MW Park
*All costs and unit costs are derived from Tabula unless modified per Reference Document "Hen Gen Cost Estimating Assumptions"
Project year: 2009
Assumptions

Construction Year: 2009
Length: 530 ft
Conduit Type: Gravity
Depth of Cover: 10 ft
Trench Backfill Type: Imported
Disposal Type: $5/CY
Manhole Spacing: Close (250ft)
Existing Utilities: Complex
Dewatering: Significant
Street Removal/Restoration: Full R.O.W.
Traffic: Light
Trench Safety: Special Shoring
Pipe Diameter: 96 in

Geometry

Outer Diameter	9.63	ft
Trench Width	15	ft
Excavation Depth	20.6	ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	Comments
Excavation	6,080	CY	$13	$79,040	Tabula
Backfill	2,650	CY	$34	$90,100	Tabula
Pavement Removal & Restoration	530	LF	$900	$477,000	*
Trench Safety	21,900	SF	$25	$547,500	*
Disposal	6,080	CY	$5	$30,400	*
Spoil Load and Haul	6,080	CY	$16	$97,280	Tabula
Pipe Unit Material Cost	530	lf	658	$348,740	Tabula
Pipe Installation	530	lf	197	$104,410	Tabula
Place Pipe Zone Fill	2,000	CY	34	$68,000	Tabula
Manholes	1	MH	41,700	$41,700	Tabula
Existing Utilities	530	lf	773	$409,690	Tabula
Dewatering	530	lf	167	$88,510	Tabula
Traffic Control	530	lf	50	$26,500	Tabula
		Year 2008 Subtotal		$2,408,870	

*Note: See Reference Document "Hen Gen Cost Estimating Assumptions"	
Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8677 (2009)	0.98
Effective Multiplier	1.04

Construction Year 2009 Subtotal	**$2,505,000**

Alternative OFF 20-45a Gravity Line

*All costs and unit costs are derived from Tabula unless modified per Reference Document "Hen Gen Cost Estimating Assumptions"

Project year: 2009

Assumptions

Construction Year: 2009
Length: 260 ft
Conduit Type: Gravity
Depth of Cover: 8 ft
Trench Backfill Type: Imported
Disposal Type: $5/CY
Manhole Spacing: Close (250 ft)
Existing Utilities: None
Dewatering: Significant
Pavement Restoration: None
Traffic: None
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Special Shoring
Pipe Diameter: 24 in.

Geometry

Outer Diameter	2.5	ft
Trench Width	5.75	ft
Excavation Depth	11.5	ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	Comments
Excavation	637	CY	$13	$8,281	Tabula
Backfill	388	CY	$34	$13,192	Tabula
Trench Safety	5,980	SF	$25	$149,500	*
Disposal	637	CY	$5	$3,185	*
Spoil Load and Haul	637	CY	$ 16	$10,192	Tabula
Pipe Unit Material Cost	260	lf	$ 36	$9,360	Tabula
Pipe Installation	260	lf	$ 33	$8,580	Tabula
Place Pipe Zone Fill	202	CY	$ 34	$6,868	Tabula
Manholes	2	MH	7,390	$14,780	Tabula
Dewatering	260	lf	167	$43,420	Tabula
		Year 2008 Subtotal		$267,358	

*Note: See Reference Document "Hen Gen Cost Estimating Assumptions"	
Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8677 (2009)	0.98
Effective Multiplier	1.04

Construction Year 2009 Subtotal	**$280,000**

PROPERTY COSTS: ALT. OFF-20-45a Storage in 57th Ave S near MW Park

Property ID	AREA (SQ FT)	*Assessed Value ($/SF)	Property Cost (= Assessed for Parks)	Notes
2324049007	87,120	$27.72	$27.72	Martha Washington Park

Temporary Easement		
SF of easement	Cost of Easement (SF x Property Cost x 10% x 2 YR Construction)	Notes
30000	$166,320	Part of Temp Easement will be in ROW

Permanent Above Ground Easement		
SF of easement	Cost of Easement (SF x 100% x Property Cost)	Notes
5400	$149,688	3,200 SF for Storage that goes into Park,

Total Costs	$320,000

*Taxable Land Value per Pree Carpenter (SPU) from email dated 1/21/2010

Operation and Maintenance Cost Template

Alternative Number		**OFF-20-45a**							
Alternative Description		**0.2 Storage Pipe in 57th Ave S. near Martha Washington Park**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical	500	LF	$ 1.75	1	$ 875	1	$ 875
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	2	ea	$ 1,000	4	$ 3,080	1.5	$ 4,620
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP		ea	$ 5,000	1	$ -	1.25	$ -
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe	530	LF	$ 1.75	2	$ 2,895	1.25	$ 3,619
		Type 2 - < 1.5 MG		ea	$ 16,500	1	$ -	1.25	$ -
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket		ea	$ 1,040	1	$ -	1.5	$ -
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 20,550		$ 26,239

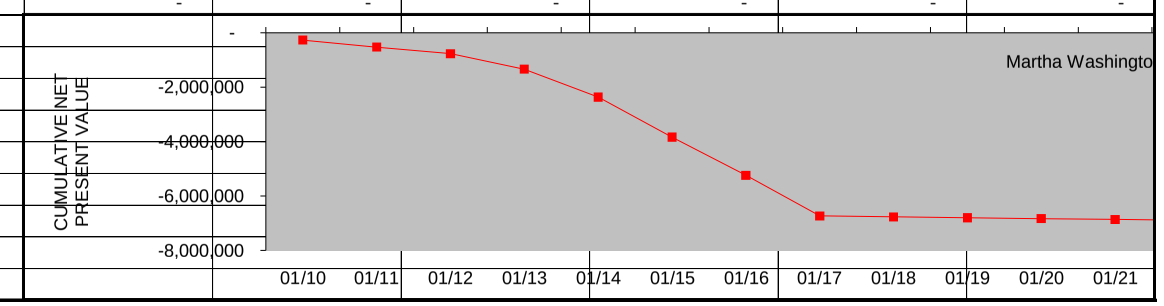
AACE CLASS 5 ESTIMATE - OFF-20-45b - Martha Wasington Park Storage Tank (200k volume)		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$2,600,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$247,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$2,847,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$5,694,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$1,423,500
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$4,270,500

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$0.5	5.3%
Project Development	$0	$0.3	4.0%
Preliminary Engineering	$0	$0.3	3.5%
Property Acquisition	$590,000	$0.1	1.0%
Permitting	$0	$0.1	1.0%
Design	$0	$1.0	12.0%
Construction	$4,270,500	$1.2	14.0%
Closeout	$0	$0.2	2.0%

SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$4.9**	**57.2%**
TOTAL SOFT COST=	**$3.7**	**42.8%**
TOTAL PROJECT COST =	**$8.6**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$2.0**	**57.2%**
TOTAL SOFT COST=	**$1.5**	**42.8%**
TOTAL PROJECT COST =	**$3.5**	**100.0%**

Discount Rate	3%		Martha Washington Park Storage (200k)			8,520,841								
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$7,298,728	270,701	270,701	270,701	656,406	1,246,406	1,878,199	1,878,199	2,049,528	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			7,298,728	270,701	270,701	270,701	656,406	1,246,406	1,878,199	1,878,199	2,049,528	-	-	-
OPERATING COSTS														
Annual O&M		-	$1,332,126	-	-	-	-	-	-	-	50,880	50,880	50,880	50,880
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$61,256	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$21,625	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			1,415,007	-	-	-	-	-	-	-	50,880	50,880	50,880	50,880
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			8,713,735	270,701	270,701	270,701	656,406	1,246,406	1,878,199	1,878,199	2,100,408	50,880	50,880	50,880
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 8,713,735	**$ 7,478,446**	$ 6,616,402							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 8,713,735	**-$ 7,478,446**	-$ 6,616,402							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Henderson Area Alternative OFF-20-45b
Storage Tank in Martha Washington Park

	COST ($)
Tank Costs**	$2,310,000
Gravity Line	$330,000

Total Construction Cost	**$2,600,000**

Property	**$590,000**

Alternative Description:
- 200,000 gallon Tank in Martha Washington Park
- Gravity Line to and from Tank

** Costs based on SPU 2010 Cost Curve for Storage Tanks ($/gallon = 6.9713 x V ^ -0.3139)

Alternative OFF 20-45b Gravity Line for Storage Tank in Martha Washington Park (0.2 MG)

*All costs and unit costs are derived from Tabula unless modified per
Reference Document "Hen Gen Cost Estimating Assumptions"

Project year: 2009

Assumptions

Construction Year: 2009
Length: 330 ft
Conduit Type: Gravity
Depth of Cover: 12 ft
Trench Backfill Type: Imported
Disposal Type: $5/CY
Manhole Spacing: Close (250 ft)
Existing Utilities: None
Dewatering: Significant
Pavement Restoration: None
Traffic: None
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Special Shoring
Pipe Diameter: 24 in.

Geometry

Outer Diameter	2.5	ft
Trench Width	5.75	ft
Excavation Depth	15.5	ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	Comments
Excavation	1,090	CY	13	$14,170	Tabula
Backfill	773	CY	34	$26,282	Tabula
Trench Safety	10,200	SF	17	$173,400	*
Disposal	1,090	CY	$5	$5,450	*
Spoil Load and Haul	1,090	CY	16	$17,440	Tabula
Pipe Unit Material Cost	330	lf	36	$11,880	Tabula
Pipe Installation	330	lf	33	$10,890	Tabula
Place Pipe Zone Fill	256	CY	34	$8,704	Tabula
Manholes	2	MH	7,390	$14,780	Tabula
Dewatering	330	lf	100	$33,000	Tabula
			Year 2008 Subtotal	$315,996	

*Note: See Reference Document "Hen Gen Cost Estimating Assumptions"	
Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8677 (2009)	0.98
Effective Multiplier	1.04

Construction Year 2009 Subtotal	**$329,000**

PROPERTY COSTS: ALT. OFF-20-45b Storage Tank in Martha Washington Park

Property ID	Total Area of Park (SF)	*Assessed Value ($/SF)	Property Cost (= Assessed for Parks)	Notes
2324049007	87,120	$27.72	$27.72	Martha Washington Park

Temporary Easement		
SF of easement	Cost of Easement (SF x Property Cost x 10% x 2 YR Construction)	Notes
100,000	$554,400	Assume an area of approx. 320' x 320'

Permanent Below Ground Easement		
SF of easement	Cost of Easement (SF x 30% x Property Cost)	Notes
4550	$37,838	Assume footprint of below ground facility

Total Costs	$590,000

*Taxable Land Value per Pree Carpenter (SPU) from email dated 1/21/2010

Operation and Maintenance Cost Template

Alternative Number		**OFF-20-45b**							
Alternative Description		**0.2 Storage Tank at Martha Washington Park**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical	400	LF	$ 1.75	1	$ 700	1	$ 700
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	1	ea	$ 1,000	4	$ 2,040	1.5	$ 3,060
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP	1	ea	$ 5,000	1	$ 5,000	1.25	$ 6,250
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG	1	ea	$ 16,500	1	$ 16,500	1.25	$ 20,625
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket	2	ea	$ 1,040	1	$ 2,080	1.5	$ 3,120
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 40,020		$ 50,880

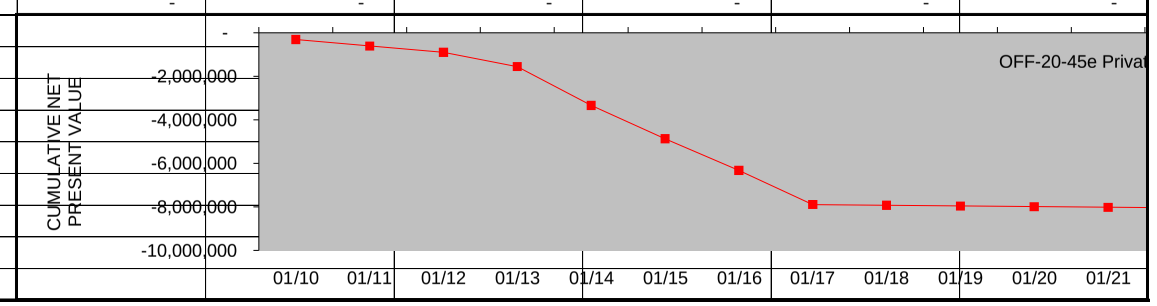
AACE CLASS 5 ESTIMATE - OFF-20-45e Private Property Storage Near MWP		
DESCRIPTION	**COMMENTS**	**AMOUNT**
Base Construction Cost	Parametric Hard Construction Cost	$2,600,000
Sales Tax	Applicable Sales Tax on Construction Equipment & Materials (9.5%)	$247,000
Allowances for Indeterminates	Accounted for in the Range of Class 5 Estimate	$0
Contingency for Unforeseen Events	Accounted for in the Range of Class 5 Estimate	$0
Management Reserve for Risk	Accounted for in the Range of Class 5 Estimate	$0
Sub-Total Construction Cost	Base Construction Cost + Sales Tax	$2,847,000
High End of Construction Cost Range for Class 5 Estimate (+100%)	Sub-Total Construction Cost x 2.0	$5,694,000
Low End of Construction Cost Range for Class 5 Estimate (-50%)	Sub-Total Construction Cost x 0.5	$1,423,500
Budgeted Construction Cost Estimate (+50%)	Sub-Total Construction Cost x 1.5	$4,270,500

COMPONENT	HARD COSTS	SOFT COSTS	
		DOLLARS ($M)	% of TOTAL COSTS
Project Management	$0	$0.5	5.3%
Project Development	$0	$0.4	4.0%
Preliminary Engineering	$0	$0.3	3.5%
Property Acquisition	$1,400,000	$0.1	1.0%
Permitting	$0	$0.1	1.0%
Design	$0	$1.2	12.0%
Construction	$4,270,500	$1.4	14.0%
Closeout	$0	$0.2	2.0%

SUMMARY - Budgeted Cost for Class 5 Estimate (+50% Contingency)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$5.7**	**57.2%**
TOTAL SOFT COST=	**$4.3**	**42.8%**
TOTAL PROJECT COST =	**$10.0**	**100.0%**

SUMMARY -50% Contingency (Class 4 Estimate)		
COMPONENT	**DOLLARS ($M)**	**% of TOTAL COSTS**
TOTAL HARD COST =	**$2.8**	**57.2%**
TOTAL SOFT COST=	**$2.1**	**42.8%**
TOTAL PROJECT COST =	**$4.9**	**100.0%**

Discount Rate	3%		OFF-20-45e Private Property Storage Near MWP			9,926,968								
YEAR				01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20
PERIOD NO			Present Value	0	1	2	3	4	5	6	7	8	9	10
CAPITAL COSTS														
Project Costs		-	$8,538,910	314,736	314,736	314,736	763,185	2,163,185	1,952,397	1,952,397	2,151,597	-	-	-
Commissioning		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS			8,538,910	314,736	314,736	314,736	763,185	2,163,185	1,952,397	1,952,397	2,151,597	-	-	-
OPERATING COSTS														
Annual O&M		-	$1,332,126	-	-	-	-	-	-	-	50,880	50,880	50,880	50,880
PS Structural Replacement (50 years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Mechanical Equipment (25 years)		-	$61,256	-	-	-	-	-	-	-	-	-	-	-
Electrical and Instrumentation (10 years)		-	$21,625	-	-	-	-	-	-	-	-	-	-	-
Plant Establishment (3 Years)		-	$0	-	-	-	-	-	-	-	-	-	-	-
Plant Replacement		-	$0	-	-	-	-	-	-	-	-	-	-	-
Annual Service Fee		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL OPERATING COSTS			1,415,007	-	-	-	-	-	-	-	50,880	50,880	50,880	50,880
RISK COSTS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL RISK COSTS			-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COSTS			9,953,917	314,736	314,736	314,736	763,185	2,163,185	1,952,397	1,952,397	2,202,477	50,880	50,880	50,880
BENEFITS														
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
		-	$0	-	-	-	-	-	-	-	-	-	-	-
TOTAL BENEFITS			-	-	-	-	-	-	-	-	-	-	-	-
DISCOUNT FACTOR					3.0%	**5.0%**	7.0%							
TOTAL PRESENT VALUE of COSTS					$ 9,953,917	**$ 8,635,489**	$ 7,692,319							
TOTAL PRESENT VALUE of BENEFITS					$ -	**$ -**	$ -							
BENEFIT to COST RATIO					0.00	**0.00**	0.00							
NET PRESENT VALUE (NPV)					-$ 9,953,917	**-$ 8,635,489**	-$ 7,692,319							
DISCOUNTED PAYBACK PERIOD (YRS)					>100	**>100**	>100							



Henderson Area Alternative OFF-20-45e Storage Tank in Private Property near Martha

Tank Costs**	$2,310,000
Gravity Line	$330,000

Total Construction Cost	**$2,600,000**

Property	**$1,400,000**

Alternative Description:

- 200,000 gallon Tank in Martha Washington Park
- Gravity Line to and from Tank

** Costs based on SPU 2010 Cost Curve for Storage Tanks ($/gallon = 6.9713 x V ^ -0.3139)

Alternative OFF 20-45e Gravity Line for Storage Tank in Private Property near Martha Washington Park (0.2 MG)

*All costs and unit costs are derived from Tabula unless modified per
Reference Document "Hen Gen Cost Estimating Assumptions"

Project year: 2009

Assumptions

Construction Year: 2009
Length: 330 ft
Conduit Type: Gravity
Depth of Cover: 12 ft
Trench Backfill Type: Imported
Disposal Type: $5/CY
Manhole Spacing: Close (250 ft)
Existing Utilities: None
Dewatering: Significant
Pavement Restoration: None
Traffic: None
Land Acquisition: None
Required Easements: None
Land Adjustment Factor: King County Average
Trench Safety: Special Shoring
Pipe Diameter: 24 in.

Geometry

Outer Diameter	2.5	ft
Trench Width	5.75	ft
Excavation Depth	15.5	ft

Unit Costs (Basis 2008)

Item	Quantity	Unit	Unit Cost	Item Cost	Comments
Excavation	1,090	CY	13	$14,170	Tabula
Backfill	773	CY	34	$26,282	Tabula
Trench Safety	10,200	SF	17	$173,400	*
Disposal	1,090	CY	$5	$5,450	*
Spoil Load and Haul	1,090	CY	16	$17,440	Tabula
Pipe Unit Material Cost	330	lf	36	$11,880	Tabula
Pipe Installation	330	lf	33	$10,890	Tabula
Place Pipe Zone Fill	256	CY	34	$8,704	Tabula
Manholes	2	MH	7,390	$14,780	Tabula
Dewatering	330	lf	100	$33,000	Tabula
			Year 2008 Subtotal	$315,996	

*Note: See Reference Document "Hen Gen Cost Estimating Assumptions"	
Mobilization/Demobilization at 6%	1.06
Multiplier from ENRCCI 8815 (2008) to 8677 (2009)	0.98
Effective Multiplier	1.04

Construction Year 2009 Subtotal	**$329,000**

PROPERTY COSTS: ALT. OFF-20-45e Storage Tank in Private Property Martha Washington Park

	Parcel ID	Address	Taxable Land Value	Square Footage	Land Value per SF	Type of Easement	Type of Location	**Cost**
Lot 1	1102000857	5563 S HOLLY ST	$824,000	3,550	$232.11	Permanent	Private	$824,000
Lot 2	110200-1014	5561 S HOLLY ST	$572,000	2,680	$213.43	Permanent	Private	$572,000
Total Property Costs								**$1,400,000**

Operation and Maintenance Cost Template

Alternative Number		**OFF-20-45b**							
Alternative Description		**0.2 Storage Tank in Private Property near Martha Washington**							
3/11/2011									
Cost Element	***Note***	***Type/Condition***	***Quantity***	***Unit***	***Unit Cost/ Base Cost***	***Ann Freq***	***Anticipated Annual Cost***	***Variability Multiplier***	***High End Annual Cost***
Conveyance Pipeline-	7	Typical	400	LF	$ 1.75	1	$ 700	1	$ 700
special cleaning		Arterial		LF	$ 2.00	1	$ -	1	$ -
		Lakeline		LF	$ 2.00	1	$ -	1	$ -
		Force Main		LF	$ 2.00	1	$ -	1	$ -
Diversion Structure									
		Type 1 - Basic		ea	$ 260	4	$ -	1.5	$ -
	8	Type 2 - Hydrobrake		ea	$ 260	12	$ -	1.5	$ -
		Type 3 - Motorized	1	ea	$ 1,000	4	$ 2,040	1.5	$ 3,060
Undercrossing									
				LF	$ 2	1	$ -	1.5	$ -
Wet weather Pump Station									
		Type 1 - < 50 HP		ea	$ 6,500	1	$ -	1.25	$ -
		Type 2 - 50 HP & up		ea	$ 11,600	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
Effluent Pump Station									
		Type 1 - <50HP	1	ea	$ 5,000	1	$ 5,000	1.25	$ 6,250
		Type 2 - 50HP & up		ea	$ 9,600	1	$ -	1.25	$ -
		Continuous Operation		ea	$ 2,000	1	$ -	1.25	$ -
	9	Demand charge		HP		1	$ -	1	
							$ -		
Storage Tanks	12						$ -		
		Type 1 - < 72-inch pipe		LF	$ 1.75	2	$ -	1.25	$ -
		Type 2 - < 1.5 MG	1	ea	$ 16,500	1	$ 16,500	1.25	$ 20,625
		Type 3 - > 1.5 MG		MG	$ 2,180	1	$ -	1.5	$ -
		Type 4 - Tunnel		MG	$ 2,180	1	$ -	1.5	$ -
Tank cleaning equipment									
	11	Motorized gate		ea	$ 1,040	1	$ -	1.25	$ -
		Tipping bucket	2	ea	$ 1,040	1	$ 2,080	1.5	$ 3,120
Odor Control	12								
			1	MG	$ 13,700	1	$ 13,700	1.25	$ 17,125
Other special O&M requirements									
GSI								1.25	$ -
Retrofit								1	$ -
I/I Reduction								1.5	$ -
Annual O&M							$ 40,020		$ 50,880

Memorandum

To:	**Kathy Robertson, SPU**	**Date:**	**February 1, 2010**
From:	**Edith Hadler, HDR**	**Project:**	**Henderson & Genesee CSO**
Subject:	**Cost Estimating Assumptions**		**Reduction Projects**

Purpose:

The purpose of this memorandum is to document the cost estimating assumptions for the CSO reduction alternatives.

Cost estimating assumptions are included for pipes and storage facilities, as well as associated items, such as odor control and mechanical equipment. Tabula (Version 3.0) is one of the primary sources of cost data for these estimates. Items shown bold will be priced using Tabula inputs/outputs. If a category or item does not have a Tabula input, those line items will be priced as stated. If during the course of completing the cost estimates, variations from these assumptions became apparent or were necessary to reasonably estimate the cost of an item, documentation of the variation in the cost worksheet is provided in the comments column of the specific assumptions for that alternative.

1.0 Gravity Sewers and Force Mains:

The following is a list of criteria for estimating new gravity sewer conveyance pipes and force mains. Items which are shown in **bold** are Tabula designations.

- Minimum depth of cover for gravity sewer is 7 feet.
- Minimum depth of cover for force main is 6 feet.
- Existing utilities will be designated as "**Complex**" in Tabula for gravity sewers, force mains, and storage pipes in streets.
- Existing utilities will be designated as "**None**" in Tabula for gravity sewers, force mains, and storage pipes not in streets.
- No "Park Replacement" costs are incurred in estimates for alternatives with gravity sewers, force mains, and storage pipes in Seattle Parks Departments properties.
- Traffic control will be designated as "**Major**" in Tabula for gravity sewers, force mains, and storage pipes in streets.
- Traffic control will be designated as "**Average**" in Tabula for gravity sewers, force mains, and storage pipes not in streets.
- Disposal cost of excavated spoils is $5/CY.
- Disposal cost of excavated spoils classified as "Municipal Solid Waste" is $60/CY. This cost includes all haul, handling, placement at the disposal site, and fees.

2.0 Dewatering:

Table 1 describes the criteria used to evaluate the extent of dewatering necessary for each alternative. Tabula provides two designations, “minimal” and “significant”. An additional designation, “significant +”, has been added for alternatives with an excavation depth greater than 15 feet.

Table 1: Dewatering Criteria

Designation	Cost	Description/Criteria
Minimal	Per Tabula	• Dewatering is accomplished from within the excavation using sump pumps or similar method • The excavation is neither near Lake Washington nor at or below the lake level. • The excavation is less than 10 feet deep.
Significant	Per Tabula	• Dewatering is accomplished using well points or similar method. • The excavation is near Lake Washington or is at or below the lake level. • The excavation depth is greater than 10 feet but not more than 15 feet.
Significant +	1.5 X Significant Cost	• Dewatering is accomplished using deep wells or similar method. • The excavation is near Lake Washington or is at or below the lake level. • The excavation depth is greater than 15 feet.

3.0 Trench Safety:

Tabula provides two designations for shoring, “Standard” and “Special Shoring”. Table 2 shows criteria which were established to provide a higher level of accuracy for trench safety, including the designation “Advanced”, which was added to Tabula’s designations.

Table 2: Trench Safety Criteria

Designation	Cost	Description/Criteria
Standard (Trench Box)	$1/SF	• A trench box or shield is used to protect the workers in the excavation. • The excavation is less than 10 feet deep.
Advanced (Proprietary Rail System)	$15/SF	• A proprietary rail shoring system is used to support the sides of the excavation. • The excavation is more than 10 feet deep but not more than 16 feet deep. • The facility is a single pipe that is less than 72 inches nominal size.
Special Shoring (Soldier Pile and Lagging)	$25/SF	• Soldier piles and lagging are used to support the sides of the excavation. • The excavation is greater than 16 feet deep. • The facility is a single pipe more than 72 inches nominal size or is parallel pipes.

4.0 Street Removal/Restoration:

Tabula does not provide any designation for street removal or right-of-way restoration. Rather, Tabula only provides a designation for pavement restoration and overlay. Table 3 summarizes the designations which have been created to account for street removal and right-of-way restoration. Pipe diameter was used to determine the amount of pavement and/or right-of-way restoration.

Table 3: Street Removal/Restoration Criteria

Designation	Cost	Description/Criteria
Partial Street	$350/LF	• Half of the pavement is removed and restored. • The facility is a single pipe not more than 36-inches nominal diameter.
Half ROW	$450/LF	• Surface improvements on half of the right-of-way are removed and restored. • The facility is a single pipe larger than 36-inches nominal size but not larger than 96-inches nominal size.
Full ROW	$900/LF (See Table 4)	• Surface improvements on the entire right-of-way width are removed and restored. • The facility is a single pipe larger than 96-inches nominal size or is parallel pipes or is parallel pipes.

4.1 Basis for Full Right-of-way Restoration Cost:

Figure 1 is an illustration of a typical right-of-way section. Partial street restoration is assumed for pipes 36 inches in diameter and smaller, half right-of-way restoration is assumed for pipes 36-96 inches in diameter, and a full right-of-way restoration is assumed for pipes greater than 96 inches in diameter.

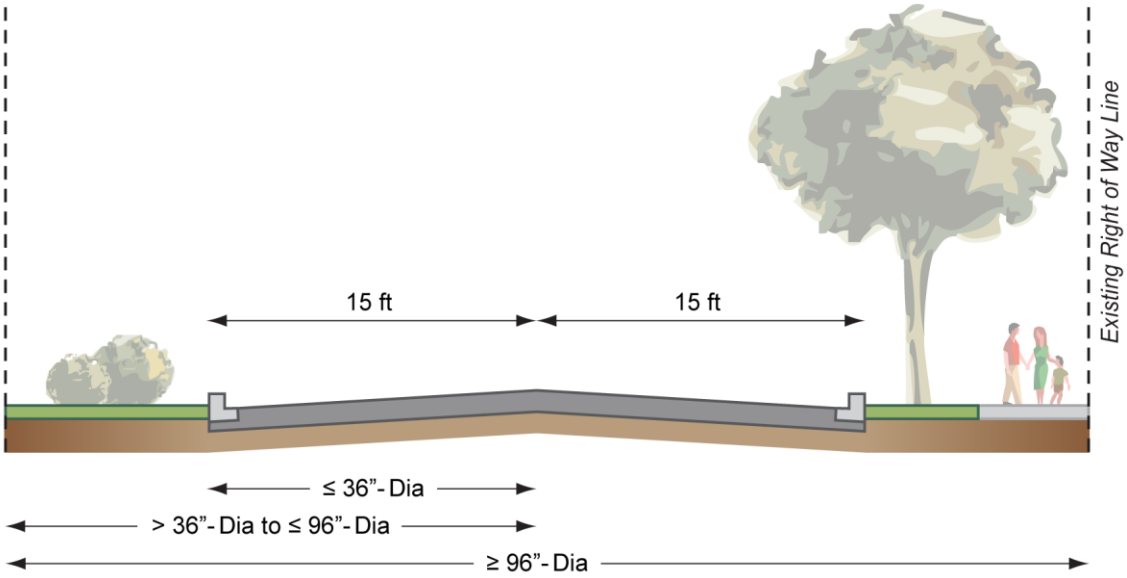


Figure 1: Right-of-way Restoration

Table 4 presents the cost breakdown of items which contribute to the unit cost of full right-of-way replacement cost.

Table 4 – Full Right-of-Way Replacement Cost Breakdown

Item	Cost	Notes
Pavement Restoration:		
Roadway width is 30' 1 CY Concrete Costs $175/CY Cost/LF of Pavement =	**$565**/LF	*Includes base, pavement, and curb and gutter on both sides
Remove and Dispose Concrete Pavement:		
Panels are 15' wide, for every 1' of roadway, Area=15 SF = 1.67 /SY Unit Cost is $40/CY, Cost/LF of Pavement =	**$130**/LF	*Includes pavement, and curb and gutter on both sides
Right-of-way Restoration:		
Width on left side is 15' Unit Cost is $10/SY Cost/LF of right-of-way =	**$16**/LF	
Width on right side is 9' Unit Cost is $10/SY Cost/LF of right-of-way =	**$10**/LF	
Tree Restoration:		
Each tree costs $3000 & average spacing between trees is 25' Cost/LF of right-of-way =	**$120**/LF	
Sidewalk Replacement:		
6' width Cost/LF of right-of-way =	**$60**/LF	
Total:	**$900/LF**	For entire right-of-way removal and restoration

4.0 Tank Storage:

The following criteria were used to estimate the construction cost of storage tanks:

- Construction duration will exceed 12 months.
- Construction activities will require 2 acres.
- Maximum interior depth will be 25 feet, per SPU criteria.
- Tanks having more than 500,000 gallons storage capacity will have tipping bucket flushing mechanisms.
- Maximum flushing channel length will be 150 feet.

- Flushing channel width will be 15 feet.
- Walls, floor slabs and roof slabs will be 2 feet thick reinforced concrete.
- Storage tank structures will be approximately square to minimize property requirements.
- Pump out facilities where required will be included in the estimated cost of the facility.
- Pump out facilities will include 3 submersible pumps (one pump in standby) mounted inside the structure. Valving will also be mounted into the interior of the facility. There will be 200 feet of 6-inch force main piping routed to a nearby discharge point. Pump control panels will be typical pump controls and will be located at the storage facility.
- All storage facilities will have odor control. Odor control facility size will be based on the storage facility volume.
- Standby power is not included in the estimate because tank storage is not deemed as a critical facility.
- Land replacement costs for storage tanks in parks will be calculated by multiplying the area of the park used by the unit assessed value.

5.0 Pump Stations:

The following criteria were used to estimate the construction cost of pump stations:

- Cost estimates will be based on Tabula
- Construction duration will exceed 12 months.
- Construction activities will require 1 acre of land.
- Pump station configuration will be a wet pit/dry pit layout, typical for SPU.
- Standby power generation will be included in the pump station facility cost.
- Storage facility costs will include pump out facilities associated with those structures.
- Land replacement costs for pump stations in parks will be calculated by multiplying the area of the park taken by the unit assessed value.

6.0 Pipe Storage:

The following criteria were used to estimate the construction cost of pipe storage:

- The facility can be built in segments each requiring less than 12 months to construct.
- Tanks having more than 500,000 gallons storage capacity will have flushing gate mechanisms.
- There will be a cast-in-place concrete structure at each end of the facility for access and to house discharge pumping facilities or sluice gates as applicable.
- The estimated cost of an access structure is $150,000 for a single pipe facility. An additional $50,000 will be included for each additional storage pipe in parallel pipe facilities.
- The estimated cost of an access/pump-out structure is $1,100,000 for a single pipe facility. An additional $200,000 will be included for each additional storage pipe in parallel pipe facilities.

- The estimated cost of an access/discharge structure containing sluice gates is $500,000 for a single pipe facility. An additional $200,000 will be included for each additional storage pipe in parallel pipe facilities.
- Pump out facilities will include 3 submersible pumps (one pump in standby) mounted inside the structure. Pump control panels will be typical pump controls and will be located at the storage facility.
- All storage facilities will have odor control. Odor control facility cost will be based on the storage facility volume.

6.1 Flushing Gate Structures (For Pipe Storage):

Table 4 shows the criteria which were used to estimate the construction cost of flushing gate structures:

Table 4: Flushing Gate Structure Costs

Item	Cost	Comment/Source of Estimate
End Flushing Gate Structure	$1,100,000 (Single Pipe) $1,700,000 (Dual Pipes)	Windermere CSO Alternative 14 Evaluation
Intermediate Flushing Gate Structure	$1,900,000 (Single Pipe) $2,800,000 (Dual Pipes)	Windermere CSO Alternative 14 Evaluation

- Flushing gate structures will be used to flush storage pipe facilities in excess of 500,000 gallons capacity.
- Structures will be spaced at the upstream end of the storage pipe (end flushing gate structure) and at 500-foot intervals (intermediate flushing gate structure).
- Structures will provide for maintenance and cleaning access into the storage pipe.
- Walls, floor slabs and roof slabs will be 2 feet thick reinforce concrete.
- Flushing gates will be hydraulically operated and provided with the gate manufacturer's control systems.

7.0 Odor Control Facilities:

Table 5 shows the criteria which were used to estimate the construction costs of odor control facilities:

Table 5: Odor Control Costs

Storage Volume (gal)	Cost	Comment/Source of Estimate
< 500,000	$800,000	Hidden Lake (King County, WA) Odor Control
500,000-1 million	$1,700,000	Windermere CSO (SPU) Alternatives Evaluation
1 million – 3 million	$2,300,000	Windermere CSO (SPU) Alternatives Evaluation

- Odor control facility size will be based on the storage facility volume (See table below)
- Odor control facilities will be buried in concrete vaults with separate spaces for odor control equipment and electrical equipment.
- Tabula costs for odor control will not be used as the basis of cost for odor control due to the complexity and systems involved with buried odor control facilities. A chart showing Tabula costs versus specified design bid tabs or costs derived from designed facilities and quantity take offs is presented below. The Tabula cost curve uses the following equations to calculate costs: Odor Control Cost ($) = $160,000 x (Storage Volume (MG)) +$13,400)
- Odor control facilities will be based on SPU's current facility design standards, including the use activated carbon media filters and providing secondary ventilation function to facilitate manned entry into the storage facility.

7.1 Cost of Odor Control vs. Storage Volume:

Figure 2, below, shows the estimated cost of odor control for a given storage volume from both Tabula as well as other similar projects.

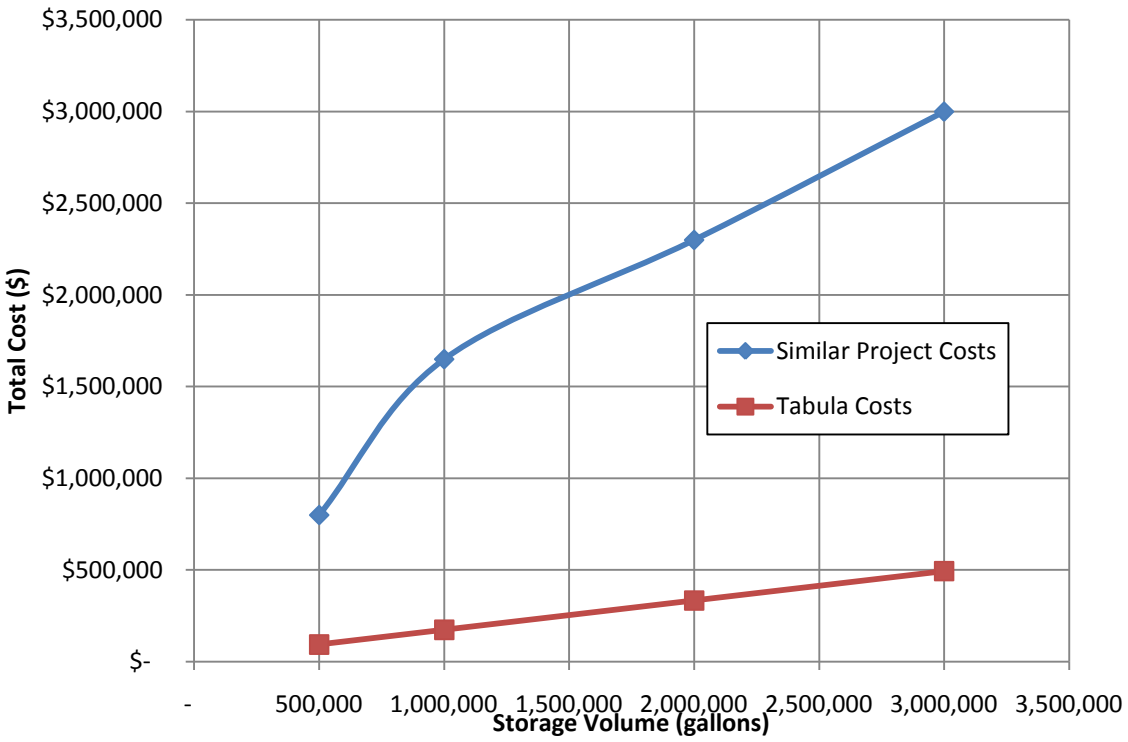


Figure 2: Cost of Odor Control vs. Storage Volume

8.0 Conclusion:

These assumptions and criteria were used to create a preliminary engineer's opinion of probable cost for each alternative. Alternative costs were combined to create area alternative costs. A summary table of each alternative's construction cost will be provided in the Henderson and Genesee Feasibility Analysis Report.

Seattle Public Utilities
Henderson and Genesee CSO Reduction Projects
Replacement Cost Estimates

March 10, 2011

Alt No.	Description	Structure - PS Replacement Structure Cost (50-year)	Electrical - Diversion Structure Replacement Cost ($10,000)	Electrical Pump Station Replacement Cost (from Tabula)	Electrical Total Replacement Cost (10-years)	Mechanical - Diversion Structure Replacement Cost ($20,000)	Mechanical - PS Replacement Cost (from tabula)	Mechanical - Generator Set Replacement Cost ($10,000)	Mechanical - HVAC/Odor Control Replacement Cost (from tabula)	Mechanical - Total Replacement Cost (25-years)
CON 1-44a	PS in Orcas and Force Main to Martha	$ 1,860,000	$ 10,000	$ 112,000	$ 120,000	$ 20,000	$ 1,022,900	$ 10,000		$ 1,050,000
OFF 2-44*	2.4 MG Storage Tank at Seward		$ 10,000	$ 84,000	$ 90,000	$ 20,000	$ 109,000		$ 250,000	$ 380,000
OFF 3-44	2.4 MG Storage Tank in Private Property near Seward		$ 10,000	$ 84,000	$ 90,000	$ 20,000	$ 109,000		$ 250,000	$ 380,000
OFF 3-45*	2.6 MG Storage at Martha		$ 10,000	$ 84,000	$ 90,000	$ 20,000	$ 109,000		$ 250,000	$ 380,000
OFF 20-45a	Offline Storage in 57th Ave		$ 20,000		$ 20,000	$ 40,000			$ 93,400	$ 130,000
OFF 20-45b	0.2 MG Storage in Martha		$ 10,000		$ 10,000	$ 20,000			$ 93,400	$ 110,000
OFF 20-45e	0.2 MG Storage in Private Property near Martha		$ 10,000		$ 10,000	$ 20,000			$ 93,400	$ 110,000
OFF 16-44	2.4 MG Pipe Storage in Lake Washington Blvd		$ 10,000		$ 10,000	$ 20,000			$ 397,000	$ 420,000
OFF 21-44	Storage Tunnel	$ 1,290,000	$ 10,000	$ 37,500	$ 50,000	$ 20,000	$ 438,000		$ 493,000	$ 950,000

*Replacement Costs for these Alternatives are based on the Windermere Alternative 5 Cost Estimate