

Appendix G
Cost Estimates for Candidate Remediation and
Control Projects

Summary of Costs for Selected SMP Projects

Table G-1 in this section summarizes the costs for selected SMP projects and also includes costs for construction, engineering, construction management and administration, capital, contingency, and total capital. The table also reflects costs for operations and maintenance, equipment, structures, piping, and the equivalent annual cost for the selected projects.

TABLE G-1
City of Newport CSO Program
Summary of Costs for Selected SMP Projects

Project Code	Name/Brief Description	Construction Cost (in 2012 \$)	Engineering (15% construction)	Construction Mgmt and Admin (10% construction)	Capital Cost Subtotal (Constr+Eng+CM)	Contingency (30% Subtotal)	Total Capital Cost	Change in Annual O&M Cost	Equipment	Structures	Piping	Equivalent Annual Cost	Private Property Cost or Public Cost?
II-4	Downspout Disconnection	\$ 8,388,000	\$ 1,258,000	\$ 839,000	\$ 10,484,000	\$ 3,145,000	\$ 13,630,000	\$ (27000)	\$ 3,407,000	\$ 3,407,000	\$ 6,815,000	\$ 472,000	Private
II-A	Inflow Reduction - Private Sources (Not Including Downspouts)	\$ 36,174,000	\$ 5,426,000	\$ 3,617,000	\$ 45,218,000	\$ 13,565,000	\$ 58,783,000	\$ (63000)	\$ 14,696,000	\$ 14,696,000	\$ 29,391,000	\$ 2,089,000	Private
II-B	Inflow Reduction - Public Sources	\$ 1,146,000	\$ 172,000	\$ 115,000	\$ 1,432,000	\$ 430,000	\$ 1,862,000	\$ (3000)	\$ 465,000	\$ 465,000	\$ 931,000	\$ 65,000	Public
II-C	Additional Inflow Removal (to Achieve 50% Inflow Removal)	\$ 14,266,000	\$ 2,140,000	\$ 1,427,000	\$ 17,833,000	\$ 5,350,000	\$ 23,183,000	\$ (46000)	\$ 5,796,000	\$ 5,796,000	\$ 11,591,000	\$ 802,000	Private
II-14	Inflow Removal for Middletown	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Public
II-15	Inflow Removal for the Naval Station Newport	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Public
SO-1	WPCP Flow Optimization		\$ -	\$ -	\$ -	\$ -	\$ -					\$ -	Public
SO-2	Increased Pumping Capacity/Better Use of System Capacity		\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,000				\$ 22,000	Public
SO-3	Weirs	\$ 116,000	\$ 17,000	\$ 12,000	\$ 145,000	\$ 44,000	\$ 189,000			\$ 189,000		\$ 6,000	Public
CU-6	Stormwater Conveyance Improvements for E1	\$ 46,600,000	\$ 6,990,000	\$ 4,660,000	\$ 58,250,000	\$ 17,475,000	\$ 75,725,000	\$ -	\$ 15,145,000	\$ 37,863,000	\$ 22,718,000	\$ 2,737,000	Public
CU-7	Stormwater Conveyance Improvements for C1A	\$ 5,061,000	\$ 759,000	\$ 506,000	\$ 6,326,000	\$ 1,898,000	\$ 8,224,000	\$ -	\$ 1,645,000	\$ 4,112,000	\$ 2,467,000	\$ 297,000	Public
SW-1	Stormwater Treatment - WSCSO Facility	\$ 2,097,000	\$ 315,000	\$ 210,000	\$ 2,621,000	\$ 786,000	\$ 3,408,000	\$ 98,000	\$ 682,000	\$ 1,704,000	\$ 1,022,000	\$ 221,000	Public
SW-2	Stormwater Treatment - WACSO Facility	\$ 10,187,000	\$ 1,528,000	\$ 1,019,000	\$ 12,734,000	\$ 3,820,000	\$ 16,554,000	\$ 428,000	\$ 3,311,000	\$ 8,277,000	\$ 4,966,000	\$ 1,026,000	Public
CSOT-1.1	Enhanced CSO Treatment (Wellington)	\$ 14,500,000	\$ 2,175,000	\$ 1,450,000	\$ 18,125,000	\$ 5,438,000	\$ 23,563,000	\$ 160,000	\$ 4,713,000	\$ 11,781,000	\$ 7,069,000	\$ 1,012,000	Public
CSOT-1.2	Enhanced CSO Treatment (Washington)	\$ 23,649,000	\$ 3,547,000	\$ 2,365,000	\$ 29,562,000	\$ 8,868,000	\$ 38,430,000	\$ 160,000	\$ 7,686,000	\$ 19,215,000	\$ 11,529,000	\$ 1,549,000	Public
CSOT-2	Modify Treatment with Dechlor at Washington	\$ 101,000	\$ 15,000	\$ 10,000	\$ 126,000	\$ 38,000	\$ 164,000	\$ 1,000	\$ 33,000	\$ 82,000	\$ 49,000	\$ 7,000	Public
CU-2	Catchment 10 Reroute (new 3.5 mgd PS)	\$ 2,947,000	\$ 442,000	\$ 295,000	\$ 3,683,000	\$ 1,105,000	\$ 4,788,000	\$ 68,000	\$ 958,000	\$ 2,394,000	\$ 1,436,000	\$ 241,000	Public
CU-3	Additional Pumping Long Wharf (Bigger pumps - 3, 14 mgd pumps)	\$ 1,422,000	\$ 213,000	\$ 142,000	\$ 1,778,000	\$ 533,000	\$ 2,311,000	\$ 20,000	\$ 462,000	\$ 1,155,000	\$ 693,000	\$ 104,000	Public
CU-4	Additional Pumping of WACSOTF Sanitary Pumps (2 mgd)	\$ 530,000	\$ 79,000	\$ 53,000	\$ 662,000	\$ 199,000	\$ 861,000	\$ 15,000	\$ 172,000	\$ 431,000	\$ 258,000	\$ 46,000	Public
CU-5	Upsize Wellington Forcemain	\$ 126,000	\$ 19,000	\$ 13,000	\$ 157,000	\$ 47,000	\$ 204,000	\$ -	\$ 41,000	\$ 102,000	\$ 61,000	\$ 7,000	Public
OS-2	WPCP Storage (2MG)	\$ 10,256,000	\$ 1,538,000	\$ 1,026,000	\$ 12,821,000	\$ 3,846,000	\$ 16,667,000	\$ 24,000	\$ 1,667,000	\$ 12,500,000	\$ 2,500,000	\$ 590,000	Public
OS-11	Washington CSO Facility Storage (3MG)	\$ 13,272,000	\$ 1,991,000	\$ 1,327,000	\$ 16,590,000	\$ 4,977,000	\$ 21,567,000	\$ 26,000	\$ 2,157,000	\$ 16,175,000	\$ 3,235,000	\$ 759,000	Public
OS-19	King Park, Wellington Ave by CSO Facility, Storage (0.9MG)	\$ 10,849,000	\$ 1,627,000	\$ 1,085,000	\$ 13,561,000	\$ 4,068,000	\$ 17,629,000	\$ 27,000	\$ 1,763,000	\$ 13,222,000	\$ 2,644,000	\$ 626,000	Public
WPCP-1.1	WPCP Upgrade & Expansion, Option 1 (headworks, disinfection, solids handling)	\$ 8,452,000	\$ 1,268,000	\$ 845,000	\$ 10,565,000	\$ 3,170,000	\$ 13,735,000						Public
WPCP-1.2	WPCP Upgrade & Expansion, Option 2 (primary clarifiers)	\$ 3,772,000	\$ 566,000	\$ 377,000	\$ 4,715,000	\$ 1,415,000	\$ 6,130,000		\$ 1,839,000	\$ 3,065,000	\$ 1,226,000	\$ 243,000	Public
WPCP-1.3	WPCP Upgrade & Expansion, Option 3 (aeration tank & final clarifier)	\$ 6,672,000	\$ 1,001,000	\$ 667,000	\$ 8,340,000	\$ 2,502,000	\$ 10,842,000		\$ 2,168,000	\$ 5,421,000	\$ 3,253,000	\$ 392,000	Public
WPCP-1.4	WPCP Upgrade & Expansion, CEPT	\$ 5,243,000	\$ 786,000	\$ 524,000	\$ 6,553,000	\$ 1,966,000	\$ 8,519,000	\$ 424,000	\$ 1,704,000	\$ 4,260,000	\$ 2,556,000	\$ 732,000	Public

Inflow Reduction Costs for Selected SMP Projects

Estimated costs for private and public inflow reduction are detailed in this section. For details on identified inflow source counts, refer to Appendix F.

Cost Estimates for Candidate Remediation and Control Projects Private Property Disconnections

PREPARED BY: CH2M HILL

DATE: March 2012

PROJECT NUMBER: 401892

Private Property Disconnection Cost Estimates

TABLE G-2
Private Defect Disconnection Cost Estimates

Infiltration Source	Repair	Unit	Estimated Cost Range	Average Estimated Cost	Estimated Unit Cost with 20% Contingency ^a
Downspout	Cut downspout and discharge to splash block (i.e., Cut and splash)	Per disconnection	\$53- \$1,000	\$375	N/A
Downspout	Disconnect downspout from sanitary and connect to storm drain (i.e. external reroute to storm drain)	Per property	\$1,000 – 3,000	\$2,500 ^b	N/A
Downspout	Re-route interior plumbing and connect to storm drain (i.e. internal reroute to storm drain)	Per property	\$10,000 - \$25,000	\$25,000 ^b	N/A
Sump Pump	Disconnect sump pump from sanitary and connect to storm drain (i.e. external reroute to storm drain)	Per disconnection	\$1,000 - \$4,300	\$3,000	N/A
Sump Pump	Re-route interior plumbing and connect to storm drain (i.e. internal reroute to storm drain)	Per property	N/A	\$25,000	N/A
Private Area Drain	Disconnect drain, reroute flow to storm sewer lateral or appropriate location	Per disconnection	\$2,350 - \$4,600	\$3,620	\$4,340
Driveway Drain	Disconnect drain, reroute flow to storm sewer lateral or appropriate location	Per disconnection	\$2,340 - \$8,250	\$4,500	\$5,400
Foundation Drain	Disconnect drain, reroute flow to storm sewer lateral or appropriate location	Per disconnection	\$1,650 - \$8,590	\$5,340	\$6,410
Stairwell Drain	Disconnect drain, reroute flow to storm sewer lateral or appropriate location	Per disconnection	\$1,650 - \$4,600	\$3,650	\$4,380
Window Well Drain	Disconnect drain, reroute flow to storm sewer lateral or appropriate location	Per disconnection	\$825 - \$4,600	\$2,360	\$2,830
Uncapped Cleanout	Replace 3' of riser and install water-tight plug	Per cleanout	\$55 - \$500	\$310	\$370

a) Sufficient data available to support unit costs for downspout and sump pump disconnection. Contingency not included.

b) Costs per disconnection were estimated by assuming each property would have two downspouts that would be disconnected using this repair method. (i.e. costs per connection for external and internal reroute to storm drain are \$1,250 and \$12,500, respectively).

TABLE G-3
Private Source Disconnection Unit Costs¹

Defect	Cost	Unit ²	Cost Type	Program	City	State	Year
Downspout	\$300	per disconnection					2011
Downspout	\$175	per disconnection			Hartford	Connecticut	
Downspout	\$250	per downspout		Onondaga 10 Year Green Program	Onodaga County	New York	2009
Downspout	\$250	per disconnection	Unit Cost, From Contractor	Clintonville Private Source I/I Assessment Pilot Program	Clintonville	Ohio	2004
Downspout	\$100	per property	Planning assumed for Capital Cost	Onondaga 10 Year Green Program	Onodaga County	New York	2009
Downspout	\$278	per disconnection		City of Detroit (1996. Demonstration fo Downspout Disconnection Effectiveness)	Detroit	Michigan	1996
Downspout	\$53	per disconnection	Incentive Cost	Clean River Rewards Incentive Program	Portland	Oregon	2006
Downspout	\$250	per disconnection		MSD CSO LTCP	Milwaukee	Wisconsin	
Downspout	\$500	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Downspout	\$85	per disconnection		Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Downspout	\$80	per disconnection		City of Toronto Voluntary Downspout Program	Toronto		
Downspout	\$350	per building		Reserved Channel CSO Separation Project	South Boston	Massachusetts	2010
Downspout	\$1,000	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Downspout	\$550	per disconnection	Planning level - Estimate		Kansas City	Missouri	2012
Downspout	\$1,000	per disconnection	Unit Rehabilitation Construction Cost				
Downspout	\$400	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011
Downspout with Hard Piping	\$2,000	per building		Reserved Channel CSO Separation Project	South Boston	Massachusetts	2010
Downspout with Hard Piping	\$2,490	per disconnection	materials and labor estimate	No House Left Behind, Hartford	Hartford	Connecticut	
Downspout with Piping	\$3,000	per property					
Disconnection Primarily Exterior	\$25,364	per property		No House Left Behind, Hartford	Hartford	Connecticut	
Sump Pump	\$27,027	per property		No House Left Behind, Hartford	Hartford	Connecticut	
Sump Pump	\$19,875	per property		No House Left Behind, Hartford	Hartford	Connecticut	
Sump Pump	\$300	per disconnection					2012
Sump Pump	\$165	per disconnection		Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Sump Pump	\$500				Canton Township	Michigan	
Sump Pump	\$250	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Sump Pump	\$860	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Sump Pump	\$289	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Sump Pump	\$165	per disconnection		Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Sump Pump	\$650	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Sump Pump	\$1,000	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Sump Pump	\$2,900	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011
Sump Pump	\$3,000	per disconnection	Planning level - Estimate		Kansas City	Missouri	2012
Sump Pump	\$3,300	per disconnection	Unit Cost, From Contractor	Clintonville Private Source I/I Assessment Pilot Program	Clintonville	Ohio	2004
Sump Pump	\$3,800	per disconnection	Construction Estimate		Cincinnati	Ohio	2004
Sump Pump	\$1,480	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Sump Pump	\$2,300	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Sump Pump	\$3,350	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Sump Pump	\$4,400	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Reroute interior plumbing to new tap	\$16,400	per property		Easter and Delta Avenue Sewer Project			2008
Reroute interior plumbing to grinder pump	\$25,000	per property		Easter and Delta Avenue Sewer Project			2008
Area Drain	\$3,070	per disconnection	Estimated Removal Cost	Johnson County Wastewater MTM1 Private Sector I/I Removal Cost Estimate	Johnson County	Kansas	2010
Area Drain	\$3,500	per disconnection	Planning level - Estimate		Kansas City	Missouri	2012
Area Drain	\$4,500	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Area Drain	\$4,600	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011
Area Drain	\$2,200-\$2,500	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Area Drain	\$4,400-\$4,700	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Area Drain	\$2,750	per disconnection	Estimated Unit Cost	Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Driveway Drain	\$2,341	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Driveway Drain	\$2,750	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Driveway Drain	\$3,000	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Driveway Drain	\$3,500	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010

TABLE G-3

Private Source Disconnection Unit Costs¹

Defect	Cost	Unit ²	Cost Type	Program	City	State	Year
Driveway Drain	\$3,858	per disconnection	Estimated Removal Cost	Johnson County Wastewater MTM1 Private Sector I/I Removal Cost Estimate	Johnson County	Kansas	2010
Driveway Drain	\$4,000	per disconnection	Planning level - Estimate		Kansas City	Missouri	2012
Driveway Drain	\$4,300	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011
Driveway Drain	\$4,500	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Driveway Drain	\$4,500	per disconnection	Unit Rehabilitation Construction Cost				
Driveway Drain	\$6,590	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Driveway Drain	\$6,900	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Driveway Drain	\$3,500-\$5,000	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Driveway Drain	\$8,250	per disconnection	Estimated Unit Cost	Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Foundation Drain	\$3,300	per disconnection	Unit Cost, From Contractor	Clintonville Private Source I/I Assessment Pilot Program	Clintonville	Ohio	2004
Foundation Drain	\$5,000	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Foundation Drain	\$6,000	per disconnection	Planning level - Estimate		Kansas City	Missouri	2012
Foundation Drain	\$6,500	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011
Foundation Drain	\$4,400	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Foundation Drain	\$5,120	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Foundation Drain	\$5,900	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Foundation Drain	\$6,900	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Foundation Drain	\$8,585	per disconnection	Contractor Estimate	Johnson County	Johnson County	Kansas	2010
Foundation Drain	\$1,650	per disconnection	Estimated Unit Cost	Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Stairwell Drain	\$3,000	per disconnection	Planning level - Estimate		Kansas City	Missouri	2012
Stairwell Drain	\$4,500	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Stairwell Drain	\$4,500	per disconnection	Unit Rehabilitation Construction Cost				
Stairwell Drain	\$4,600	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011
Stairwell Drain	\$1,650	per disconnection	Estimated Unit Cost	Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Uncapped Cleanout	\$100	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Uncapped Cleanout	\$250	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Uncapped Cleanout	\$376	per disconnection	Estimated Removal Cost	Johnson County Wastewater MTM1 Private Sector I/I Removal Cost Estimate	Johnson County	Kansas	2010
Uncapped Cleanout	\$400	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011
Uncapped Cleanout	\$425	per disconnection	Planning level - Estimate		Kansas City	Missouri	2012
Uncapped Cleanout	\$500	per disconnection	Unit Rehabilitation Construction Cost				
Uncapped Cleanout	\$250-\$550	per disconnection	Plumber Cost	Nelson Complex/Leadwood I/I Pilot Study			2010
Uncapped Cleanout	\$55	per disconnection	Estimated Unit Cost	Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Window Well Drain	\$825	per disconnection	Estimated Unit Cost	Newport CSO LTCP Implementation	Newport	Rhode Island	2011
Window Well Drain	\$2,000	per disconnection	Unit Rehabilitation Construction Cost				
Window Well Drain	\$2,000	per disconnection	Unit Rehabilitation cost	City of Rochester I/I Project	Rochester	Minnesota	
Window Well Drain	\$4,600	per disconnection	Unit Rehabilitation Construction Cost	Nelson WWTP Complex I/I Pilot Study	Johnson County	Kansas	2011

¹Unit costs obtained from CH2M HILL project database and previous CH2M HILL projects.

TABLE G-4

Downspout Disconnection (II-4)

	Downspouts
Number of Identified Sources¹	3,232
Projected Number of Additional Sources	2,868
Total Number of Sources (Identified and Additional Projected)	6,100
Estimated Unit Cost (per source)²	\$375, \$2,500, \$25,000
Estimated Cost of Identified Sources	\$4,444,000
Estimated Cost of Additional Projected Sources	\$3,943,500
Total Estimated Cost (Identified and Additional Projected Sources)	\$8,387,500
Estimated Cost of Downspout Disconnection (II-4)	\$8,387,500

¹Data presented in this table is based on extraneous flow investigation work completed before July 31, 2012. Excludes sources abated prior to July 31, 2012.

²Assumed 50% Cut and Splash, 45% External Reroute to Storm Drain, and 5% Internal Reroute to Storm Drain

TABLE G-5
Inflow Reduction - Private Sources (Not Including Downspouts) II - A

	Downspouts	Sump Pumps	Area Drains	Driveway Drains	Foundation Drains	Stairwell Drains	Uncapped Cleanouts	Window Well Drains	Total
Number of Identified Sources¹	3,232	943	199	157	6	74	105	84	4,800
Projected Number of Additional Sources	2,868	1,404	141	94	4	59	137	84	4,791
Total Number of Sources (Identified and Additional Projected)	6,100	2,347	340	251	10	133	242	168	9,591
Contributing Area per Source (sq. ft.)	265	265	2,000	500	100	100	50	50	
Contributing Area (sq. ft.) of Identified Sources	856,480	249,895	398,000	78,500	600	7,400	5,250	4,200	1,600,325
Contributing Area (sq. ft.) of Additional Projected Sources	760,020	372,060	282,000	47,000	400	5,900	6,850	4,200	1,478,430
Total Contributing Area (sq. ft.) (Identified and Additional Projected Sources)	1,616,500	621,955	680,000	125,500	1,000	13,300	12,100	8,400	3,078,755
Total Impervious Area (sq. ft)									6,388,812
Total Impervious Area Identified (sq. ft.) (Private and Public Sources)									3,162,805
Remaining Impervious Area (sq. ft.) (Private Sources)									3,140,277
Additional Sources Required to Eliminate Inflow	6,222	2,394	347	257	11	136	247	172	
Estimated Unit Cost (per source)²	\$375, \$2,500, \$25,000	\$3,000, \$25,000	\$4,340	\$5,400	\$6,410	\$4,380	\$370	\$2,830	
Estimated Cost of Inflow Reduction - Private Sources (Not Including II-4 Downspout Disconnection) II-A	\$8,555,250	\$19,438,100	\$2,981,580	\$2,743,200	\$134,610	\$1,178,220	\$180,930	\$962,200	\$36,174,090

¹Data presented in this table is based on extraneous flow investigation work completed before July 31, 2012. Excludes sources abated prior to July 31, 2012.

²Assumed 50% Cut and Splash, 45% External Reroute to Storm Drain, and 5% Internal Reroute to Storm Drain for downspout disconnections. Assumed 95% External Reroute and 5% Internal Reroute for sump pump disconnections.

TABLE G-6
Inflow Reduction - Public Sources II - B

	Cover to Rim	Vented Cover	Indirect Storm	Frame Seal	Catch Basins	Total
Number of Identified Sources ¹	6	25	10	107	57 ²	148
Projected Number of Additional Sources	0	13	7	5	15	40
Total Number of Sources (Identified and Additional Projected)	6	38	17	112	15	188
Contributing Area per Source (sq. ft)	50	100	50	50	4,900	
Contributing Area (sq. ft) of Identified Sources	300	2,500	500	5,350	N/A	8,650
Contributing Area (sq. ft) of Additional Projected Sources	0	1,300	350	250	73,500	75,400
Total Contributing Area (sq. ft) (Identified and Additional Projected Sources)	300	3,800	850	5,600	73,500	84,050
Total Impervious Area (sq. ft.)						6,388,812
Total Impervious Area Identified (sq. ft.) (Private and Public Sources)						3,162,805
Remaining Impervious Area (sq. ft.) (Public Sources)						81,816
Additional Sources Required to Eliminate Inflow	6	37	17	110	15	
Estimated Unit Cost (per source)	\$1,510	\$1,510	\$6,600	\$720	\$21,000	
Estimated Cost of Inflow Reduction - Public Sources II-B	\$18,120	\$113,250	\$224,400	\$159,840	\$630,000	\$1,145,610

¹Data presented in this table is based on extraneous flow investigation work completed before July 31, 2012. Excludes sources abated prior to July 31, 2012.

²Catch basins known to be connected to the sanitary/combined sewer as of July 2012. The design and implementation of the disconnection of these catch basins to be started in FY 2013. Identified catch basins not included in totals.

TABLE G-7

Additional Inflow Removal (to Achieve 50% Inflow Removal) II-C

	Downspouts	Sump Pumps	Area Drains	Driveway Drains	Foundation Drains	Stairwell Drains	Uncapped Cleanouts	Window Well Drains	Total
Number of Identified Sources¹	3,232	943	199	157	6	74	105	84	4,800
Projected Number of Additional Sources	2,868	1,404	141	94	4	59	137	84	4,791
Total Number of Sources (Identified and Additional Projected)	6,100	2,347	340	251	10	133	242	168	9,591
Contributing Area per Source (sq. ft.)	265	265	2,000	500	100	100	50	50	
Contributing Area (sq. ft.) of Identified Sources	856,480	249,895	398,000	78,500	600	7,400	5,250	4,200	1,600,325
Contributing Area (sq. ft.) of Additional Projected Sources	760,020	372,060	282,000	47,000	400	5,900	6,850	4,200	1,478,430
Total Contributing Area (sq. ft.) (Identified and Projected Sources)	1,616,500	621,955	680,000	125,500	1,000	13,300	12,100	8,400	3,078,755
Total Impervious Area (sq. ft.)									6,388,812
50% of Total Impervious Area (sq. ft.)									3,194,406
Remaining Impervious Area (sq. ft.)									115,651
Estimated Unit Cost (per source)²	\$375, \$2,500, \$25,000	\$3,000, \$25,000	\$4,340	\$5,400	\$6,410	\$4,380	\$370	\$2,830	
Estimated Cost of Additional Inflow Removal (to Achieve 50% Inflow Removal) II-C³	\$600,875	\$9,622,700	\$1,475,600	\$1,355,400	\$64,100	\$582,540	\$89,540	\$475,440	\$14,266,195

¹Data presented in this table is based on extraneous flow investigation work completed before July 31, 2012. Excludes sources abated prior to July 31, 2012.

²Assumed 50% Cut and Splash, 45% External Reroute to Storm Drain, and 5% Internal Reroute to Storm Drain for downspout disconnections. Assumed 95% External Reroute and 5% Internal Reroute for sump pump disconnections.

³Downspout Disconnections (II-4) not included in II-C total.

System Optimization Costs for Selected SMP Projects

Estimated system optimization costs for selected SMP projects are detailed in this section.

Newport Task 18
Construction Cost Estimate for Conceptual Design

Project name	MH Weir Rehab
Estimator	Tweneboa-Kodua, A
Project Number	401892
Business Group	WBG
Estimate Class 1-5	4
Design Stage	Conceptual
Project Manager	Karen Rendall/BOS
Rev No. / Date	Rev01/4/25/2012

The construction cost estimate (s) shown herein have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project will depend on actual labor and material costs, competitive market conditions, final project costs, implementation schedule and other variable factors. As a result, the final costs will vary from the estimates presented herein. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding. Our estimate is based on material, equipment, and labor pricing as of the estimate revision date. The owner should be cautioned that such prices are highly subject to variation as a result of shortages resulting from recent natural disasters and current escalation trends.

Description	Quantity	Total	
		Unit Cost	Amount
55 Thames to Wellington Weir - Option 1	1.00 EA	6,587.32 /EA	6,587
56 Long Wharf Sewer	1.00 LS	61,715.47 /LS	61,715

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	32,823		636.502 hrs	
Material	15,568			
Subcontract	14,318			
Equipment	5,593		389.000 hrs	
Other				
Total Direct Cost	68,302	68,302		
Project Staff & Home Office OH	6,830			10.000 %
Total Overhead	6,830	75,132		
General Conditions	7,513			10.000 %
Total General Conditions	7,513	82,645		
Material Sales & Use Tax - %				
Construction Equip Tax - %				
Total Taxes		82,645		
Mobilization/Demobilization	3,684			3.000 %
Blder's Risk & Gen Liab Ins -%	1,228			1.000 %
CCI Payment & Performance Bond	1,424			1.160 %
Total Bonds and Insurances	6,336	88,981		
Profit on Previous Subtotal	13,347			15.000 %
Total Profit	13,347	102,328		
Mech Owner-Provided Equip				
Elec Owner-Provided Equip				
Total Owner-Provided Equipment		102,328		
Contingency - %	20,466			20.000 %
Total Contingency	20,466	122,794		
Escalation on Estimate Total				
Total Escalation		122,794		
Construction Total		122,794		



Facility Summary

Job Size:

Duration:

Project: MH Weir Rehab

Project No.: 401892

Design Stage: Conceptual

Estimator: Tweneboa-Kodua, A

Revision / Date: Rev01/4/25/2012

Estimate Class: 4

Facility	Work Pkg	WorkActi v	Description	Total Amount	Percent of Total
55			Thames to Wellington Weir - Option 1		
	31.0		Site/Civil		
		TBK-001	Raising Weir #1	11,843	9.644
			31.0 Site/Civil	11,843	9.644
			55 Thames to Wellington Weir - Option 1	11,843	9.644
56			Long Wharf Sewer		
	31.0		Site/Civil		
		TBK-002	Raising Weir #1, 6"-12" High Straight	21,165	17.236
		TBK-003	Raising Weir #2, 6"-12" High Curve	21,500	17.509
		TBK-004	Raising Weir #3, 6"-12" High Curve	22,617	18.418
		TBK-005	Raising Weir #4, 6"-12" High Straight	22,257	18.125
		TBK-006	Raising Weir #5, 6"-12" High Curve	23,414	19.068
			31.0 Site/Civil	110,953	90.356
			56 Long Wharf Sewer	110,953	90.356

Detail Report

Project: MH Weir Rehab
Project No.: 401892
Design Stage: Conceptual

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/4/25/2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
55					Thames to Wellington Weir - Option 1									
	31.0				Site/Civil									
		33-40			Pipeline Structures									
			TBK-001		Raising Weir #1									
				33-15-03-04	Weir Structure									
					Traffic Control, Labor per Day	2.00 day	24.0	1,993	899	-	-	-	1,446.00 /day	2,892
					Bypass pumping , includg temporary piping and all necessary accessories to divert flow	2.00 day	40.0	3,939	-	-	1,223	-	2,580.92 /day	5,162
					Supply and install Brick weir in confined space, standard 4" x 2 2/3" x 8"	9.00 SF		-	-	2,427	-	-	269.67 /SF	2,427
					Surface preparation, pressure wash 2500lb, inside structure, confined space	164.00 sf	16.4	1,362	-	-	-	-	8.31 /sf	1,362
					33-15-03-04 Weir Structure	1.00 EA	80.4	7,294	899	2,427	1,223		11,842.82 /EA	11,843
					TBK-001 Raising Weir #1	1.00 EA	80.4	7,294	899	2,427	1,223		11,842.82 /EA	11,843
					33-40 Pipeline Structures	1.00 LS	80.4	7,294	899	2,427	1,223		11,842.82 /LS	11,843
					31.0 Site/Civil	1.00 LS	80.4	7,294	899	2,427	1,223		11,842.82 /LS	11,843
					55 Thames to Wellington Weir - Option 1	1.00 EA	80.4	7,294	899	2,427	1,223		11,842.82 /EA	11,843
56					Long Wharf Sewer									
	31.0				Site/Civil									
		33-40			Pipeline Structures									
			TBK-002		Raising Weir #1, 6"-12" High Straight									
				33-15-03-04	Weir Structure									
					Traffic Control, Labor per Day	2.00 day	24.0	1,993	899	-	-	-	1,445.99 /day	2,892
					Remove existing ladder	1.00 ea	4.0	334	-	-	-	-	334.38 /ea	334
					Bypass pumping , includg temporary piping and all necessary accessories to divert flow	2.00 day	40.0	3,939	-	-	1,223	-	2,580.92 /day	5,162
					Forms in place, structural walls, to 8' high, hand set	24.00 sf	10.8	1,112	129	-	-	-	51.75 /sf	1,242
					Speed Dowels, #8	12.00 ea		-	2,265	-	-	-	188.77 /ea	2,265
					Reinforcing in place, A615 Gr 60, priced per lbs.	80.00 lb		-	216	86	-	-	3.78 /lb	302
					Concrete, ready mix, 4000 psi, short load	0.46 CY		-	211	-	-	-	458.44 /CY	211
					Placing concrete, bucket, incldg curing for concrete wall to 12" thick	0.44 cy	1.3	110	-	-	-	-	247.19 /cy	110
					Patch & plug tieholes	24.00 sf	1.1	89	3	-	-	-	3.81 /sf	92
					Surface preparation, pressure wash 2500lb, inside structure, confined space	164.00 sf	16.4	1,362	-	-	-	-	8.31 /sf	1,362
					33-15-03-04 Weir Structure	1.00 EA	97.6	8,940	3,723	86	1,223		13,971.46 /EA	13,971
				33-40-01-03	Manhole Cover									
					Grade Ring, 30"	2.00 ea	2.0	229	90	-	136	-	227.22 /ea	454
					Frame & Cover, 30"	2.00 ea	6.0	686	1,079	-	408	-	1,086.18 /ea	2,172
					33-40-01-03 Manhole Cover	2.00 EA	8.0	914	1,169		544		1,313.40 /EA	2,627
				40-00-04-30	Core Drilling, 30"									
					Core drill through concrete, 30" diameter (depth is in inches)	24.00 in		-	-	3,668	-	-	152.81 /in	3,668
					Grout around covers	2.00 ea		-	-	899	-	-	449.46 /ea	899
					40-00-04-30 Core Drilling, 30"	2.00 EA				4,566			2,283.23 /EA	4,566
					TBK-002 Raising Weir #1, 6"-12" High Straight	10.00 LF	105.6	9,854	4,891	4,653	1,767		2,116.47 /LF	21,165
			TBK-003		Raising Weir #2, 6"-12" High Curve									
				33-15-03-04	Weir Structure									
					Traffic Control, Labor per Day	2.00 day	24.0	1,993	899	-	-	-	1,446.00 /day	2,892
					Remove existing ladder	1.00 ea	4.0	334	-	-	-	-	334.37 /ea	334
					Bypass pumping , includg temporary piping and all necessary accessories to divert flow	2.00 day	40.0	3,939	-	-	1,223	-	2,580.93 /day	5,162
					Forms in place, structural walls, to 8' high, hand set	24.00 sf	11.3	1,168	136	-	-	-	54.32 /sf	1,304
					Speed Dowels, #8 @ 12" O/C	12.00 ea		-	2,379	-	-	-	198.21 /ea	2,379
					Reinforcing in place, A615 Gr 60, priced per lbs.	80.00 lb		-	227	91	-	-	3.96 /lb	317
					Concrete, ready mix, 4000 psi, short load	0.46 CY		-	221	-	-	-	481.40 /CY	221
					Placing concrete, bucket, incldg curing for concrete wall to 12" thick	0.44 cy	1.4	115	-	-	-	-	259.55 /cy	115
					Patch & plug tieholes	24.00 sf	1.1	93	3	-	-	-	4.01 /sf	96
					Surface preparation, pressure wash 2500lb, inside structure, confined space	179.00 sf	17.9	1,487	-	-	-	-	8.31 /sf	1,487
					33-15-03-04 Weir Structure	1.00 EA	99.8	9,130	3,864	91	1,223		14,306.92 /EA	14,307
				33-40-01-03	Manhole Cover									
					Grade Ring, 30"	2.00 ea	2.0	229	90	-	136	-	227.22 /ea	454
					Frame & Cover, 30"	2.00 ea	6.0	686	1,079	-	408	-	1,086.18 /ea	2,172

Detail Report

Project: MH Weir Rehab
Project No.: 401892
Design Stage: Conceptual

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/4/25/2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
					33-40-01-03 Manhole Cover	2.00 EA	8.0	914	1,169		544		1,313.39 /EA	2,627
				40-00-04-30	Core Drilling, 30"									
					Core drill through concrete, 30" diameter (depth is in inches)	24.00 in		-	-	3,668	-	-	152.82 /in	3,668
					Grout around covers	2.00 ea				899	-	-	449.45 /ea	899
					40-00-04-30 Core Drilling, 30"	2.00 EA				4,566			2,283.23 /EA	4,566
					TBK-003 Raising Weir #2, 6"-12" High Curve	10.00 LF	107.8	10,044	5,033	4,657	1,767		2,150.02 /LF	21,500
			TBK-004		Raising Weir #3, 6"-12" High Curve									
					33-15-03-04 Weir Structure									
					Traffic Control, Labor per Day	2.00 day	24.0	1,993	899	-	-	-	1,446.00 /day	2,892
					Remove existing ladder	1.00 ea	4.0	334		-	-	-	334.40 /ea	334
					Bypass pumping , includg temporary piping and all necessary accessories to divert flow	2.00 day	40.0	3,939	-	-	1,223	-	2,580.91 /day	5,162
					Forms in place, structural walls, to 8' high, hand set	27.00 sf	12.8	1,314	153	-	-	-	54.32 /sf	1,467
					Speed Dowels, #8	15.00 ea		-	2,973	-	-	-	198.21 /ea	2,973
					Reinforcing in place, A615 Gr 60, priced per lbs.	90.00 lb		-	255	102	-	-	3.96 /lb	357
					Concrete, ready mix, 4000 psi	0.53 CY		-	255	-	-	-	481.36 /CY	255
					Placing concrete, bucket, incldg curing for concrete wall to 12" thick	0.50 cy	4.7	389	-	-	-	-	778.68 /cy	389
					Patch & plug tieholes	27.00 sf	1.3	105	3	-	-	-	4.01 /sf	108
					Surface preparation, pressure wash 2500lb, inside structure, confined space	179.00 sf	17.9	1,487	-	-	-	-	8.31 /sf	1,487
					33-15-03-04 Weir Structure	1.00 EA	104.7	9,562	4,538	102	1,223		15,423.95 /EA	15,424
					33-40-01-03 Manhole Cover									
					Grade Ring, 30"	2.00 ea	2.0	229	90	-	136	-	227.22 /ea	454
					Frame & Cover, 30"	2.00 ea	6.0	686	1,079	-	408	-	1,086.19 /ea	2,172
					33-40-01-03 Manhole Cover	2.00 EA	8.0	914	1,169		544		1,313.40 /EA	2,627
					40-00-04-30 Core Drilling, 30"									
					Core drill through concrete, 30" diameter (depth is in inches)	24.00 in		-	-	3,668	-	-	152.81 /in	3,668
					Grout around covers	2.00 ea				899	-	-	449.46 /ea	899
					40-00-04-30 Core Drilling, 30"	2.00 EA				4,566			2,283.23 /EA	4,566
					TBK-004 Raising Weir #3, 6"-12" High Curve	13.50 LF	112.7	10,476	5,707	4,668	1,767		1,675.35 /LF	22,617
			TBK-005		Raising Weir #4, 6"-12" High Straight									
					33-15-03-04 Weir Structure									
					Traffic Control, Labor per Day	2.00 day	24.0	1,993	899	-	-	-	1,445.99 /day	2,892
					Remove existing ladder	1.00 ea	4.0	334		-	-	-	334.39 /ea	334
					Bypass pumping , includg temporary piping and all necessary accessories to divert flow	2.00 day	40.0	3,939	-	-	1,223	-	2,580.91 /day	5,162
					Forms in place, structural walls, to 8' high, hand set	26.00 sf	11.7	1,205	140	-	-	-	51.73 /sf	1,345
					Speed Dowels, #8	15.00 ea		-	2,832	-	-	-	188.77 /ea	2,832
					Reinforcing in place, A615 Gr 60, priced per lbs.	86.67 lb		-	234	93	-	-	3.78 /lb	327
					Concrete, ready mix, 4000 psi	0.50 CY		-	229	-	-	-	458.42 /CY	229
					Placing concrete, bucket, incldg curing for concrete wall to 12" thick	0.48 cy	4.3	357	-	-	-	-	741.64 /cy	357
					Patch & plug tieholes	26.00 sf	1.2	96	3	-	-	-	3.82 /sf	99
					Surface preparation, pressure wash 2500lb, inside structure, confined space	179.00 sf	17.9	1,487	-	-	-	-	8.31 /sf	1,487
					33-15-03-04 Weir Structure	1.00 EA	103.1	9,411	4,336	93	1,223		15,063.70 /EA	15,064
					33-40-01-03 Manhole Cover									
					Grade Ring, 30"	2.00 ea	2.0	229	90	-	136	-	227.21 /ea	454
					Frame & Cover, 30"	2.00 ea	6.0	686	1,079	-	408	-	1,086.18 /ea	2,172
					33-40-01-03 Manhole Cover	2.00 EA	8.0	914	1,169		544		1,313.39 /EA	2,627
					40-00-04-30 Core Drilling, 30"									
					Core drill through concrete, 30" diameter (depth is in inches)	24.00 in		-	-	3,668	-	-	152.82 /in	3,668
					Grout around covers	2.00 ea				899	-	-	449.46 /ea	899
					40-00-04-30 Core Drilling, 30"	2.00 EA				4,566			2,283.24 /EA	4,566
					TBK-005 Raising Weir #4, 6"-12" High Straight	13.00 LF	111.1	10,325	5,505	4,660	1,767		1,712.07 /LF	22,257
			TBK-006		Raising Weir #5, 6"-12" High Curve									
					33-15-03-04 Weir Structure									
					Traffic Control, Labor per Day	2.00 day	24.0	1,993	899	-	-	-	1,446.00 /day	2,892
					Remove existing ladder	1.00 ea	4.0	334		-	-	-	334.38 /ea	334
					Bypass pumping , includg temporary piping and all necessary accessories to divert flow	2.00 day	40.0	3,939	-	-	1,223	-	2,580.92 /day	5,162
					Forms in place, structural walls, to 8' high, hand set	29.00 sf	13.7	1,411	164	-	-	-	54.32 /sf	1,575
					Speed Dowels, #8	16.00 ea		-	3,171	-	-	-	198.21 /ea	3,171
					Reinforcing in place, A615 Gr 60, priced per lbs.	96.67 lb		-	274	109	-	-	3.96 /lb	383
					Concrete, ready mix, 4000 psi	0.57 CY		-	274	-	-	-	481.35 /CY	274

Detail Report

Project: MH Weir Rehab
Project No.: 401892
Design Stage: Conceptual

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/4/25/2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
				33-15-03-04	Weir Structure									
					Placing concrete, bucket, incldg curing for concrete wall to 12" thick	0.57 cy	5.4	444	-	-	-	-	778.68 /cy	444
					Patch & plug tieholes	29.00 sf	1.4	113	3	-	-	-	4.01 /sf	116
					Surface preparation, pressure wash 2500lb, inside structure, confined space	225.00 sf	22.5	1,869	-	-	-	-	8.31 /sf	1,869
					33-15-03-04 Weir Structure	1.00 EA	111.0	10,103	4,786	109	1,223		16,220.95 /EA	16,221
				33-40-01-03	Manhole Cover									
					Grade Ring, 30"	2.00 ea	2.0	229	90	-	136	-	227.22 /ea	454
					Frame & Cover, 30"	2.00 ea	6.0	686	1,079	-	408	-	1,086.18 /ea	2,172
					33-40-01-03 Manhole Cover	2.00 EA	8.0	914	1,169		544		1,313.40 /EA	2,627
				40-00-04-30	Core Drilling, 30"									
					Core drill through concrete, 30" diameter (depth is in inches)	24.00 in		-	-	3,668	-	-	152.82 /in	3,668
					Grout around covers	2.00 ea				899	-	-	449.45 /ea	899
					40-00-04-30 Core Drilling, 30"	2.00 EA				4,566			2,283.23 /EA	4,566
					TBK-006 Raising Weir #5, 6"-12" High Curve	14.50 LF	119.0	11,017	5,954	4,676	1,767		1,614.77 /LF	23,414
					33-40 Pipeline Structures	1.00 LS	556.1	51,716	27,090	23,314	8,833		110,953.24 /LS	110,953
					31.0 Site/Civil	1.00 LS	556.1	51,716	27,090	23,314	8,833		110,953.24 /LS	110,953
					56 Long Wharf Sewer	1.00 LS	556.1	51,716	27,090	23,314	8,833		110,953.24 /LS	110,953

*Cost for manhole covers (\$7,193) is not included in SO-3 Weirs project cost total. Manholes covers do not need to be replaced.

Stormwater Improvement Costs for Selected SMP Projects

Estimated stormwater improvement costs for selected SMP projects are detailed in this section.

Costs for Converting WSCSO Facility to Stormwater Treatment (SW-1)

Project would include the following:

Retrofit current basin effluent channel for lamella plates for sedimentation
Add dechlorination

Assumptions:

Essentially, same operation as existing facility - just flow through of stormwater rather than wastewater
30 MGD capacity
18 wet weather events/year
700,000 gal/event
1 hr/event
Sodium bisulfite chemical addition used for dechlorination
No new building needed
Retrofit existing facility to inject chemical just upstream of effluent pumps to allow for mixing
1 standby chem feed pump
Chemical storage for 7 days (i.e., 7 wet weather events)
10 mg/L residual chlorine
1.46:1 (mass ratio for sodium bisulfite:free chlorine) for complete dechlorination (from WEF dechlorination fact sheet)
\$998/dry ton of sodium bisulfite (CPES)
Minimal construction required for retrofit for lamella plates (no concrete/excavation costs included)

Summary of Costs:

Construction Costs ¹	
dechlorination	\$97,000
lamella plates	\$2,000,000
O&M costs	
Chemical	\$758
Maintenance/repair for lamella plat	\$97,000

¹Does not include any markups, additional project costs, escalation, or location adjustment

*(electric costs were minimal due to only using equipment 1 hr/day)

*maintenance/repair costs for dechlor not considered (minimal)

Costs for Converting WACSO Facility to Stormwater Treatment (SW-2)

Project would include the following:

- Replace existing bar screen with mechanical fine screen ($\leq 1/4$ " screen)
- Demo existing microstrainers
- Retrofit microstrainer basin for new vortex partical separator
- Retrofit existing second tank for UV disinfection

Assumptions:

- Essentially, same operational conditions as existing facility - just flow through of stormwater rather than wastewater
- 25 MGD capacity
- 12 wet weather events/year
- 700,000 gal/event
- 1 hr/event
- No new building needed
- Minimal construction required for retrofits
- 2 UV banks

Summary of Costs:

Construction Costs ¹	
New fine screen	\$1,600,000
Demo microstrainers	\$80,000
New vortex particle separator	\$407,000
New UV equipment	\$8,100,000
O&M costs (annual)	
Fine screen maintenance/repair	\$36,000
Pista grit maintenance/repair	\$12,000
UV maintenance/repair	\$215,000
Solids disposal (screenings and grit)	\$165,000

¹Does not include any markups, additional project costs, escalation, or location adjustment

*(electric costs were minimal due to only using equipment 1 hr/day)

TABLE G-8

Stormwater Conveyance Improvements for E1 (CU-6)

Total Length of Pipe (ft) ¹	Estimated Length of Pipe to be Added/Replaced (ft) ²	Estimated Approximate Size of Pipe to be Added/Replaced	Unit Cost (per foot) ³	Estimated Total Cost for Adding/Replacing Pipe
257,613	64,400	24" - 36"	\$723	\$46,600,000

¹ Estimate of Total Length of Pipe includes channels/ditches

² Assumed trunk sewers in Catchment 1, 10 and 11, or 25% of existing stormwater system, to be replaced

³ Cost of adding/replacing 24 - 36" pipe

TABLE G-9

Stormwater Conveyance Improvements for C1A (CU-7)

Total Length of Pipe (ft) ¹	Estimated Length of Pipe to be Added/Replaced (ft) ²	Estimated Approximate Size of Pipe to be Added/Replaced	Unit Cost (per foot) ³	Estimated Total Cost for Adding/Replacing Pipe
257,613	7,000	24" - 36"	\$723	\$5,061,000

¹ Estimate of Total Length of Pipe includes channels/ditches

² Assumed 2.7% of existing stormwater system to be replaced

³ Cost of adding/replacing 24 - 36" pipe

CSO Treatment Costs for Selected SMP Projects

Estimated CSO treatment costs for selected SMP projects are detailed in this section.

TABLE G-10

Cost Estimate for Enhanced CSO Treatment at Wellington (CSOT - 1.1)

Description	Quantity	Unit	Installed Unit Cost ¹	Installed Subtotal	Overhead (10%)	Profit (5%)	Mob/Bond/Insurance (5%)	Contingency (25%)	Total
HRT System	1	ls	\$9,159,516	\$9,160,000	\$916,000	\$503,000	\$458,000	\$2,290,000	\$13,327,000
Chemical Feed System	1	ls	\$839,601	\$840,000	\$84,000	\$46,000	\$42,000	\$210,000	\$1,222,000
Total Construction Cost				\$10,000,000	\$1,000,000	\$549,000	\$500,000	\$2,500,000	\$14,549,000

¹ Estimate: HRT 10 MGD

TABLE G-11

Cost Estimate for Enhanced CSO Treatment at Washington (CSOT - 1.2)

Description	Quantity	Unit	Installed Unit Cost ¹	Installed Subtotal	Overhead (10%)	Profit (5%)	Mob/Bond/Insurance (5%)	Contingency (25%)	Total
HRT System	1	ls	\$14,879,677	\$14,880,000	\$1,488,000	\$818,000	\$744,000	\$3,720,000	\$21,650,000
Chemical Feed System	1	ls	\$1,374,775	\$1,375,000	\$137,000	\$75,000	\$68,000	\$344,000	\$1,999,000
Total Construction Cost				\$16,255,000	\$1,625,000	\$893,000	\$812,000	\$4,064,000	\$23,649,000

¹ Estimate: HRT 20 MGD

TABLE G-12

Cost Estimate for Enhanced CSO Treatment at Wellington (CSOT-1.1) and Washington (CSOT-1.2)

Ballasted Flocculation Type

Facility ID	*Peak Treatment Rate (MGD)	Estimated # of Events/Yr	Additional Annual Volume Treated (MG)	Odor Control	Total Cost Per Facility	Design MGD	Scale Factor
A	20	0	0	X	\$ 14,879,677	10	\$ 9,159,516
B	40	0	0	X	\$ 21,457,085	15	\$ 12,165,680
C	60	0	0	X	\$ 27,811,043	20	\$ 14,879,677
D	80	0	0	X	\$ 34,393,436		
E	100	0	0	X	\$ 41,656,148		
F	120	0	0	X	\$ 50,051,064		
G	140	0	0	X	\$ 60,030,068		

Note - The ballasted flocculation curve includes fine screening, Actiflo treatment system, UV disinfection, standby generator and small dewatering pumps for the actiflo tanks. Equalization and storage tanks along with pumping in or out will need to be added using the appropriate value entry worksheets.

* - Typical maximum unit size is 100MGD. Use several units if Peak Treatment Rate is higher than 100 MGD.

For Economy of Scale when dealing with the facility worksheets for a facility that's size is greater than the largest available on the curve use the following Economy of Scale equation to adjust the cost and enter the adjustment in the Misc. Extra Cost:

$$C = Cr (Qc / Qr) ^ m$$

Cr = known cost for reference size Qr

Qc = design size

Qr = reference design size

C = cost for design size Qc

Cr = known cost for reference size Qr

Qc = design size

Qr = reference design size

m = correlation exponent (0 < m < 1) Use 0.6 for all structures except treatment and use 0.7 for treatment structures.

Costs for addition of Dechlorination at the existing WSCSO Facility (CSOT-2)

Assumptions:

30 MGD capacity
18 wet weather events/year
700,000 gal/event
1 hr/event
Sodium bisulfite chemical addition used for dechlor
No new building needed
Retrofit existing facility to inject chemical just upstream of effluent pumps to allow for mixing
1 standby chem feed pump
Storage for 7 days (i.e., 7 wet weather events)
10 mg/L residual chlorine
1.46:1 (mass ratio for sodium bisulfite:free chlorine) for complete dechlorination (from WEF dechlorination fact sheet)
\$998/dry ton of sodium bisulfite (CPES)

Summary of Costs:

Construction Costs ¹	
Dechlorination	\$101,000
O&M costs	
Chemical	\$758

¹Does not include any markups, additional project costs, escalation, or location adjustment

*(electric costs were minimal due to only using equipment 1 hr/day)

*maintenance/repair costs not considered

Capacity Upgrades and Offline Storage Costs for Selected SMP Projects

Estimated capacity upgrade and offline storage costs for selected SMP projects are detailed in this section.

**Newport CSO Program Management
Wellington & Long Wharf Pump Station
Construction Cost Estimate for Conceptual Design**

Project name	Newport CSO Rev0 7-27-201
Estimator	Tweneboa-Kodua, A
Project Number	401892
Business Group	WBG
Estimate Class	4
Design Stage	Concept
Project Manager	Dave Patterson/MSP
Rev. No./Date	Rev01/7AUG2012

The construction cost estimate (s) shown herein have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project will depend on actual labor and material costs, competitive market conditions, final project costs, implementation schedule and other variable factors. As a result, the final costs will vary from the estimates presented herein. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding. Our estimate is based on material, equipment, and labor pricing as of the estimate revision date. The owner should be cautioned that such prices are highly subject to variation as a result of shortages resulting from recent natural disasters and current escalation trends.



Facility Summary

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/7AUG2012
Estimate Class: 4

Facility	Description	Total Amount	Percent of Total
CU-3	Long Wharf Pump Station	1,422,126	3.621
CU-4	Wellington Pump Station	529,968	1.349



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/7AUG2012
Estimate Class: 4

Facility	Work Pkg	Trade Pkg	WorkActiv	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
CU-3				Long Wharf Pump Station										
	02.0			Existing Conditions										
		02-01		Demolition										
			TBK-019	Demolition Existing Pumps										
				Demolish existing pumps, load and haul offsite	3.00 ea	3,172		-	3,312	-	2,161.38 /ea	6,484	3,604.36 /ea	10,813
				Miscellaneous demolition	1.00 ls			3,500	-	-	3,500.00 /ls	3,500	5,836.68 /ls	5,837
				TBK-019 Demolition Existing Pumps	3.00 EA	3,172		3,500	3,312		3,328.04 /EA	9,984	5,549.92 /EA	16,650
				02-01 Demolition	1.00 LS	3,172		3,500	3,312		9,984.13 /LS	9,984	16,649.75 /LS	16,650
				02.0 Existing Conditions	1.00 LS	3,172		3,500	3,312		9,984.13 /LS	9,984	16,649.75 /LS	16,650
	04.0			Architectural										
		03-36		Structural Modifications										
			TBK-021	Modifications to Existing Structure										
				Structural modifications to accommodate new pump	1.00 ls	8,335	45,000	-	-	-	53,335.20 /ls	53,335	88,942.95 /ls	88,943
				TBK-021 Modifications to Existing Structure	1.00 LS	8,335	45,000				53,335.20 /LS	53,335	88,942.95 /LS	88,943
				03-36 Structural Modifications	1.00 LS	8,335	45,000				53,335.20 /LS	53,335	88,942.95 /LS	88,943
				04.0 Architectural	1.00 SF	8,335	45,000				53,335.20 /SF	53,335	88,942.95 /SF	88,943
	26.0			Electrical Work										
		26-00		Electrical										
			TBK-022	Electrical Upgrade										
				Allowance for electrical and I&C	1.00 ls	-	-	45,000	-	-	45,000.00 /ls	45,000	75,042.96 /ls	75,043
				Variable frequency drives, enclosed, 460 volt, 250 HP motor size, NEMA 1	3.00 ea	8,998	103,500	-	945	-	37,814.29 /ea	113,443	63,059.92 /ea	189,180
				TBK-022 Electrical Upgrade	1.00 LS	8,998	103,500	45,000	945		158,442.86 /LS	158,443	264,222.71 /LS	264,223
				26-00 Electrical	1.00 SF	8,998	103,500	45,000	945		158,442.86 /SF	158,443	264,222.71 /SF	264,223
				26.0 Electrical Work	1.00 SF	8,998	103,500	45,000	945		158,442.86 /SF	158,443	264,222.71 /SF	264,223
	40.0			Process Piping										
		40-00		Process Pipe - Furnish and Install										
			TBK-023	Miscellaneous Piping										
				Miscellaneous piping and fittings	1.00 ls	-		35,000	-	-	35,000.00 /ls	35,000	58,366.76 /ls	58,367
				TBK-023 Miscellaneous Piping	1.00 LS			35,000			35,000.00 /LS	35,000	58,366.76 /LS	58,367
				40-00 Process Pipe - Furnish and Install	1.00 LF			35,000			35,000.00 /LF	35,000	58,366.76 /LF	58,367
				40.0 Process Piping	1.00 LF			35,000			35,000.00 /LF	35,000	58,366.76 /LF	58,367
	43.0			Process Equipment										
		43-05		Furnish and Install Process Equipment										
			TBK-020	Submersible Pump										
				Functional Testing, Submersible Pumps, 101 - 250 hp	3.00 ea	1,047	300	-	-	-	448.93 /ea	1,347	748.64 /ea	2,246
				FURNISH Submersible Pump,10,000gpm 101 - 250 hp	3.00 EA	-	579,804	-	-	-	193,268.00 /EA	579,804	322,297.89 /EA	966,894
				Set base elbow / pump assembly, 101 - 250 hp	3.00 ea	8,374	300	-	-	-	2,891.42 /ea	8,674	4,821.80 /ea	14,465
				Stainless steel guide rails, 4",	150.00 lf	3,271	2,250	-	-	-	36.81 /lf	5,521	61.38 /lf	9,207
				Install intermediate guide rail bracket	6.00 ea	393	60	-	-	-	75.42 /ea	453	125.78 /ea	755
				Install upper guide rail bracket	3.00 ea	196	30	-	-	-	75.42 /ea	226	125.78 /ea	377
				TBK-020 Submersible Pump	3.00 EA	13,281	582,744				198,675.02 /EA	596,025	331,314.76 /EA	993,944
				43-05 Furnish and Install Process Equipment	1.00 SF	13,281	582,744				596,025.06 /SF	596,025	993,944.27 /SF	993,944
				43.0 Process Equipment	1.00 SF	13,281	582,744				596,025.06 /SF	596,025	993,944.27 /SF	993,944
				CU-3 Long Wharf Pump Station	1.00 LS	33,786	731,244	83,500	4,257		852,787.25 /LS	852,787	1,422,126.44 /LS	1,422,126



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/7AUG2012
Estimate Class: 4

Facility	Work Pkg	Trade Pkg	WorkActiv	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
CU-4				Wellington Pump Station										
	02.0			Existing Conditions										
		02-01		Demolition										
			TBK-019	Demolition Existing Pumps										
				Demolish existing pumps, load and haul offsite	3.00 ea	3,172		-	3,312	-	2,161.38 /ea	6,484	3,604.36 /ea	10,813
				Miscellaneous demolition	1.00 ls			3,500	-	-	3,500.00 /ls	3,500	5,836.68 /ls	5,837
				TBK-019 Demolition Existing Pumps	3.00 EA	3,172		3,500	3,312		3,328.04 /EA	9,984	5,549.92 /EA	16,650
				02-01 Demolition	1.00 LS	3,172		3,500	3,312		9,984.13 /LS	9,984	16,649.76 /LS	16,650
				02.0 Existing Conditions	1.00 LS	3,172		3,500	3,312		9,984.13 /LS	9,984	16,649.76 /LS	16,650
	04.0			Architectural										
		03-36		Structural Modifications										
			TBK-021	Modifications to Existing Structure										
				Structural modifications to accommodate new pump	1.00 ls	8,335	32,000	-	-	-	40,335.20 /ls	40,335	67,263.85 /ls	67,264
				TBK-021 Modifications to Existing Structure		8,335	32,000				/LS	40,335	/LS	67,264
				03-36 Structural Modifications	1.00 LS	8,335	32,000				40,335.20 /LS	40,335	67,263.85 /LS	67,264
				04.0 Architectural	1.00 SF	8,335	32,000				40,335.20 /SF	40,335	67,263.85 /SF	67,264
	26.0			Electrical Work										
		26-00		Electrical										
			TBK-022	Electrical Upgrade										
				Allowance for electrical and I&C	1.00 ls	-	-	30,000	-	-	30,000.00 /ls	30,000	50,028.65 /ls	50,029
				Variable frequency drives, enclosed, 460 volt, 100 HP motor size, NEMA 1	3.00 ea	7,558	45,000	-	794	-	17,784.00 /ea	53,352	29,656.98 /ea	88,971
				TBK-022 Electrical Upgrade		7,558	45,000	30,000	794		/LS	83,352	/LS	139,000
				26-00 Electrical	1.00 SF	7,558	45,000	30,000	794		83,352.00 /SF	83,352	138,999.58 /SF	139,000
				26.0 Electrical Work	1.00 SF	7,558	45,000	30,000	794		83,352.00 /SF	83,352	138,999.58 /SF	139,000
	40.0			Process Piping										
		40-00		Process Pipe - Furnish and Install										
			TBK-023	Miscellaneous Piping										
				Miscellaneous piping and fittings	1.00 ls	-		35,000	-	-	35,000.00 /ls	35,000	58,366.77 /ls	58,367
				TBK-023 Miscellaneous Piping	1.00 LS			35,000			35,000.00 /LS	35,000	58,366.77 /LS	58,367
				40-00 Process Pipe - Furnish and Install	1.00 LF			35,000			35,000.00 /LF	35,000	58,366.77 /LF	58,367
				40.0 Process Piping	1.00 LF			35,000			35,000.00 /LF	35,000	58,366.77 /LF	58,367
	43.0			Process Equipment										
		43-05		Furnish and Install Process Equipment										
			TBK-020	Submersible Pump										
				Functional Testing, Submersible Pumps, 51 - 100 hp	3.00 ea	1,047	300	-	-	-	448.93 /ea	1,347	748.64 /ea	2,246
				FURNISH Submersible Pump, 51 - 100 hp	3.00 EA	-	135,000	-	-	-	45,000.00 /EA	135,000	75,042.97 /EA	225,129
				Set base elbow / pump assembly, 51 - 100 hp	3.00 ea	6,281	300	-	-	-	2,193.57 /ea	6,581	3,658.04 /ea	10,974
				Stainless steel guide rails, 4"	150.00 lf	3,271	2,250	-	-	-	36.81 /lf	5,521	61.38 /lf	9,207
				Install intermediate guide rail bracket	6.00 ea	393	60	-	-	-	75.42 /ea	453	125.78 /ea	755
				Install upper guide rail bracket	3.00 ea	196	30	-	-	-	75.42 /ea	226	125.78 /ea	377
				TBK-020 Submersible Pump	3.00 EA	11,187	137,940				49,709.16 /EA	149,127	82,896.07 /EA	248,688
				43-05 Furnish and Install Process Equipment	1.00 SF	11,187	137,940				149,127.49 /SF	149,127	248,688.22 /SF	248,688
				43.0 Process Equipment	1.00 SF	11,187	137,940				149,127.49 /SF	149,127	248,688.22 /SF	248,688
				CU-4 Wellington Pump Station	1.00 LS	30,253	214,940	68,500	4,106		317,798.82 /LS	317,799	529,968.18 /LS	529,968

**Newport CSO Program Management
Construction Cost Estimate for Conceptual Design**

Project name	Newport CSO Rev0 7-27-201
Estimator	Tweneboa-Kodua, A
Project Number	401892
Business Group	WBG
Estimate Class	4
Design Stage	Concept
Project Manager	Dave Patterson/MSP
Rev. No./Date	Rev01/27JUL2012

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Facility Summary

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Facility	Trade Pkg	WorkActiv	Description	Total Amount	Grand Total	Percent of Total
CU-2			Containment 10 Pump Station	1,766,897	2,946,515	7.895
OS-11			Washington Street Storage	7,958,522	13,271,804	35.559
OS-19			Kings Park Storage	6,505,386	10,848,523	29.066
OS-2			WPCP STORAGE	6,150,334	10,256,430	27.480

Description	Quantity	Total	
		Unit Cost	Amount
CU-2 Containment 10 Pump Station	3.50 MG	504,827.634/MG	1,766,897
OS-11 Washington Street Storage	2.70 MG	2,947,600.90 /MG	7,958,522
OS-19 Kings Park Storage	2.20 MG	2,956,993.823/MG	6,505,386
OS-2 WPCP STORAGE	1.80 MG	3,416,852.26 /MG	6,150,334

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	4,362,372		643,045.225	
Material	10,497,139			
Subcontract	3,838,193			
Equipment	3,398,435		88,051.700	
Other	285,000			
Total Before Markups	22,381,139	22,381,139		
Project Staff & Home Office OH	1,790,491			8.000 %
Total Overhead	1,790,491	24,171,630		
General Conditions	1,692,014			7.000 %
Total General Conditions	1,692,014	25,863,644		
Material Sales & Use Tax - %				
Construction Equip Tax - %				
Total Taxes		25,863,644		
Profit on Previous Subtotal	2,069,092			8.000 %
Total Profit	2,069,092	27,932,736		
Contractor MU on OFCI Equip				
Total MU on OFCI Equip		27,932,736		
Mobilization/Demobilization	1,119,698			3.000 %
Blder's Risk & Gen Liab Ins -%	373,233			1.000 %
Payment & Performance Bonds	432,950			1.160 %
Total Bonds and Insurances	1,925,881	29,858,617		
Contingency - %	7,464,654			25.000 %
Total Contingency	7,464,654	37,323,271		
Escalation on Estimate Total				
Total Escalation		37,323,271		
Mech Owner-Provided Equip				
Elec Owner-Provided Equip				
Total Owner-Provided Equipment		37,323,271		
Construction Total		37,323,271		



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
CU-2					Containment 10 Pump Station										
	03.0				Concrete Work										
		03-10			Cast-In-Place Concrete Work										
			TBK-301		Concrete Slab on Grade										
				03-10-05-24	Cast-In-Place Concrete, Slabs on Grade, 24" thick										
					Fine grade, for slab on grade, by hand	1,600.00 sf	401	16	-	-	-	0.26 /sf	417	0.43 /sf	696
					Concrete pumping, subcontract, all inclusive price	118.52 cy	-	-	1,422	-	-	12.00 /cy	1,422	20.01 /cy	2,372
					Slab on grade edge forms, 12" to 24"	320.00 sf	3,125	320	-	-	-	10.77 /sf	3,445	17.95 /sf	5,745
					Reinforcing in place, A615 Gr 60, priced per lbs.	21,333.33 lb	-	10,667	4,267	-	-	0.70 /lb	14,933	1.17 /lb	24,903
					Concrete, ready mix, 4000 psi	118.52 CY	-	12,207	-	-	-	103.00 /CY	12,207	171.77 /CY	20,357
					Add for concrete waste, 4000 psi	5.93 cy	-	610	-	-	-	103.00 /cy	610	171.77 /cy	1,018
					Placing concrete, concrete pump	118.52 cy	3,184	-	-	-	-	26.86 /cy	3,184	44.80 /cy	5,309
					Finishing floors, monolithic, trowel finish (machine)	1,600.00 sf	1,320	32	-	-	-	0.85 /sf	1,352	1.41 /sf	2,254
					Curing, membrane spray	1,600.00 sf	115	64	-	-	-	0.11 /sf	179	0.19 /sf	298
					Polyethelene vapor barrier, 10 mil thick	16.00 sq	153	96	-	-	-	15.57 /sq	249	25.97 /sq	415
					03-10-05-24 Cast-In-Place Concrete, Slabs on Grade, 24" thick	118.52 CY	8,297	24,013	5,689			320.61 /CY	37,998	534.65 /CY	63,367
			TBK-302		TBK-301 Concrete Slab on Grade	118.52 CY	8,297	24,013	5,689			320.61 /CY	37,998	534.65 /CY	63,367
				03-10-06-20	Cast-In-Place Concrete, Straight Walls, 20" thick										
					Concrete pumping, subcontract, all inclusive price	217.28 cy	-	-	2,607	-	-	12.00 /cy	2,607	20.01 /cy	4,348
					Forms in place, structural walls, > 16' high, hand set	7,040.00 sf	53,125	9,504	-	-	-	8.90 /sf	62,629	14.84 /sf	104,441
					Waterstop, PVC, center bulb, 9" wide	160.00 lf	568	480	-	-	-	6.55 /lf	1,048	10.92 /lf	1,748
					Reinforcing in place, A615 Gr 60, priced per lbs.	43,456.79 lb	-	21,728	8,691	-	-	0.70 /lb	30,420	1.17 /lb	50,729
					Concrete, ready mix, 4000 psi	217.28 CY	-	22,380	-	-	-	103.00 /CY	22,380	171.77 /CY	37,322
					Add for concrete waste, 4000 psi	10.86 cy	-	1,119	-	-	-	103.00 /cy	1,119	171.76 /cy	1,866
					Placing concrete, concrete pump, for structural wall >12" - 24" thick	217.28 cy	5,837	-	-	-	-	26.86 /cy	5,837	44.80 /cy	9,733
					Patch & plug tieholes	7,040.00 sf	3,782	141	-	-	-	0.56 /sf	3,923	0.93 /sf	6,542
					Sack rub	7,040.00 sf	10,086	211	-	-	-	1.46 /sf	10,297	2.44 /sf	17,171
					Curing, membrane spray	7,040.00 sf	504	282	-	-	-	0.11 /sf	786	0.19 /sf	1,311
					Below grade damproofing, Bituminous Asphalt	3,520.00 sf	-	3,520	-	-	-	1.00 /sf	3,520	1.67 /sf	5,870
					03-10-06-20 Cast-In-Place Concrete, Straight Walls, 20" thick	217.28 CY	73,902	59,365	11,299			665.34 /CY	144,566	1,109.54 /CY	241,081
			TBK-303		TBK-302 Concrete Wall	217.28 CY	73,902	59,365	11,299			665.34 /CY	144,566	1,109.54 /CY	241,081
				03-10-10-12	Cast-In-Place Concrete, Elevated Decks, 12" thick										
					Concrete pumping, subcontract, all inclusive price	59.26 cy	-	-	711	-	-	12.00 /cy	711	20.01 /cy	1,186
					Forms in place, elevated slab, soffit	1,600.00 sf	14,204	2,000	-	-	-	10.13 /sf	16,204	16.89 /sf	27,023
					Forms in place, elevated slab, edge form	160.00 sf	1,776	200	-	-	-	12.35 /sf	1,976	20.59 /sf	3,295
					Slab shoring	35,200.00 cf	10,937	1,760	-	-	-	0.36 /cf	12,697	0.60 /cf	21,175
					Reinforcing in place, A615 Gr 60, priced per lbs.	11,851.85 lb	-	5,926	2,370	-	-	0.70 /lb	8,296	1.17 /lb	13,835
					Concrete, ready mix, 4000 psi	59.26 CY	-	6,104	-	-	-	103.00 /CY	6,104	171.77 /CY	10,179
					Add for concrete waste, 4000 psi	2.96 cy	-	305	-	-	-	103.00 /cy	305	171.77 /cy	509
					Placing concrete, concrete pump, for elevated slab to 12" thick	59.26 cy	1,061	-	-	-	-	17.91 /cy	1,061	29.86 /cy	1,770
					Curing, membrane spray	1,600.00 sf	115	64	-	-	-	0.11 /sf	179	0.19 /sf	298
					03-10-10-12 Cast-In-Place Concrete, Elevated Decks, 12" thick	59.26 CY	28,093	16,359	3,081			802.12 /CY	47,534	1,337.63 /CY	79,268
			TBK-304		TBK-303 Elevated Concrete Slab	59.26 CY	28,093	16,359	3,081			802.12 /CY	47,534	1,337.63 /CY	79,268
				03-10-15-00	Cast-In-Place Concrete, Stairs										
					Form concrete stairs, 4' wide, 27bf (board feet) per riser	42.00 risr	4,847	1,134	-	-	-	142.41 /risr	5,981	237.49 /risr	9,975
					Strip forms, concrete stair	42.00 risr	1,119	-	-	-	-	26.63 /risr	1,119	44.41 /risr	1,865
					Form intermediate stair landing	2.00 ea	1,332	2	-	-	-	666.84 /ea	1,334	1,112.04 /ea	2,224
					Strip forms, intermediate stair landing	2.00 ea	133	-	-	-	-	66.59 /ea	133	111.04 /ea	222
					Shoring for Stair	1,600.00 cf	781	96	-	-	-	0.55 /cf	877	0.91 /cf	1,463
					Shoring for Landing	320.00 cf	156	19	-	-	-	0.55 /cf	175	0.91 /cf	293
					Stair tread nosings, avg. 3 feet long, add for abrasive nosing, galvanized	42.00 ea	-	153	-	-	-	3.64 /ea	153	6.07 /ea	255
					Reinforcing in place, A615 Gr 60, priced per lbs.	237.04 lb	-	119	47	-	-	0.70 /lb	166	1.17 /lb	277
					Concrete, ready mix, 4000 psi	15.98 CY	-	1,645	-	-	-	103.00 /CY	1,645	171.77 /CY	2,744
					Add for concrete waste, 4000 psi	0.80 cy	-	82	-	-	-	103.00 /cy	82	171.78 /cy	137



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
				03-10-15-00	Cast-In-Place Concrete, Stairs										
					Placing & finish concrete stairs	42.00 rsr	1,203	-	-	-	-	28.65 /rsr	1,203	47.78 /rsr	2,007
					Placing & finish concrete stair landing	2.00 ea	215	-	-	-	-	107.45 /ea	215	179.20 /ea	358
					Handrail, aluminum, wall mounted, 1 1/2" dia., clear anodized	45.00 lf	434	540	-	-	-	21.64 /lf	974	36.08 /lf	1,624
				03-10-15-00	Cast-In-Place Concrete, Stairs	15.19 CY	10,220	3,790	47			925.47 /CY	14,058	1,543.33 /CY	23,443
					TBK-304 Stairs	15.19 CY	10,220	3,790	47			925.47 /CY	14,058	1,543.33 /CY	23,443
					03-10 Cast-In-Place Concrete Work	410.25 CY	120,512	103,527	20,117			595.14 /CY	244,156	992.47 /CY	407,159
					03.0 Concrete Work	410.25 CY	120,512	103,527	20,117			595.14 /CY	244,156	992.47 /CY	407,159
04.0					Architectural										
		04-00			Masonry										
			TBK-401		CMU Building										
				04-00-04-01	Masonry Building										
					Pump station building, above grade	1,600.00 sf	-	-	320,000	-	-	200.00 /sf	320,000	333.52 /sf	533,639
					04-00-04-01 Masonry Building				320,000			/SF	320,000	/SF	533,639
					TBK-401 CMU Building	1,600.00 SF			320,000			200.00 /SF	320,000	333.52 /SF	533,639
					04-00 Masonry	1,600.00 SF			320,000			200.00 /SF	320,000	333.52 /SF	533,639
					04.0 Architectural	1,600.00 SF			320,000			200.00 /SF	320,000	333.52 /SF	533,639
26.0					Electrical Work										
		26-00			Electrical										
			TBK-260		Electrical										
				26-00-99-00	Electrical, Other										
					Allowance for electrical work includin	1.00 E	50	-	100,000	-	-	100,050.20 /E	100,050	166,845.87 /E	166,846
					26-00-99-00 Electrical, Other		50		100,000			/LS	100,050	/LS	166,846
					TBK-260 Electrical	1.00 LS	50		100,000			100,050.20 /LS	100,050	166,845.87 /LS	166,846
			TBK-262		Emergency Generator										
				26-25-07-02	Electrical Equipment, Generators - >100 to 200 KW										
					Emergency Generator 100 KW incldg transfer switch & enclosure	1.00 E	2,410	45,000	-	-	-	47,409.74 /E	47,410	79,061.52 /E	79,062
					26-25-07-02 Electrical Equipment, Generators - >100 to 200 KW		2,410	45,000				/EA	47,410	/EA	79,062
					TBK-262 Emergency Generator	1.00 EA	2,410	45,000				47,409.74 /EA	47,410	79,061.52 /EA	79,062
					26-00 Electrical	1,600.00 SF	2,460	45,000	100,000			92.16 /SF	147,460	153.69 /SF	245,907
					26.0 Electrical Work	1,600.00 SF	2,460	45,000	100,000			92.16 /SF	147,460	153.69 /SF	245,907
31.0					Site/Civil										
		31-15			Site Preparation										
			TBK-201		Site Preparation										
				31-15-01-00	Site Preparation, Clearing and Grubbing										
					Miscellaneous preparation	1,600.00 sf			5,600	-	-	3.50 /sf	5,600	5.84 /sf	9,339
					31-15-01-00 Site Preparation, Clearing and Grubbing				5,600			/AC	5,600	/AC	9,339
					TBK-201 Site Preparation				5,600			/AC	5,600	/AC	9,339
			TBK-202		Site Erosion Control										
				31-15-04-00	Site Preparation, Erosion Controls / Pre-construction										
					Silt Fence, Heavy-Duty, Subcontracted	250.00 lf		-	1,125	-	-	4.50 /lf	1,125	7.50 /lf	1,876
					Temp Seed	6,000.00 sf		-	900	-	-	0.15 /sf	900	0.25 /sf	1,501
					Inlet Protection, Subcontracted	1.00 ea		-	450	-	-	450.00 /ea	450	750.42 /ea	750
					Stabilized Construction Entrance, Clean Rock, 1-1/2" thru 3"	99.56 tn	841	1,991	-	966	-	38.15 /tn	3,798	63.61 /tn	6,333
					Filter Fabric under Stabilized Construction Entrance	186.67 sy		280	-	-	-	1.50 /sy	280	2.50 /sy	467
					Maintenance, erosion control during construction	1.00 ls	3,574	-	-	-	-	3,574.12 /ls	3,574	5,960.28 /ls	5,960
					Remove erosion control	1.00 ls	500	-	0	-	-	500.00 /ls	500	833.82 /ls	834
					31-15-04-00 Site Preparation, Erosion Controls / Pre-construction		4,915	2,271	2,475	966		/AC	10,627	/AC	17,722
					TBK-202 Site Erosion Control		4,915	2,271	2,475	966		/AC	10,627	/AC	17,722
					31-15 Site Preparation		4,915	2,271	8,075	966		/AC	16,227	/AC	27,060
		31-25			Earthworks, Structural										
			TBK-204		Structural Excavation										
				31-25-01-00	Earthworks, Structural, Excavation										



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
				31-25-01-00	Earthworks, Structural, Excavation										
					Dewatering Minor, Generator and Pumps, Mob	1.00 ea		-	1,500	-	-	1,500.00 /ea	1,500	2,501.43 /ea	2,501
					Dewatering Minor, Set-up Generator and Install Pumps	1.00 ea	314	-	-	94	-	407.82 /ea	408	680.09 /ea	680
					Dewatering Minor, Sump Rock, delivered	4.40 cy	-	88	-	-	-	20.00 /cy	88	33.35 /cy	147
					Dewatering Minor, Large Generator and 1 Pumps, Rental, Monthly	3.00 mo	-	-	-	15,101	-	5,033.50 /mo	15,101	8,393.98 /mo	25,182
					Dewatering Minor, Generator and Pumps, Operation - Labor to maintain / check pumps/ fuel and lube	3.00 mo	10,043	-	-	1,945	-	3,996.03 /mo	11,988	6,663.87 /mo	19,992
					Dewatering Minor, Remove Generator and Pumps	1.00 ea	314	-	-	94	-	407.82 /ea	408	680.07 /ea	680
					Dewatering Minor, Generator and Pumps, Demob	1.00 ea		-	1,500	-	-	1,500.00 /ea	1,500	2,501.45 /ea	2,501
					Shoring, sheet pile, subcontracted	6,000.00 sf		-	180,000	-	-	30.00 /sf	180,000	50.03 /sf	300,172
					Structural Excavation, Excavator and Trucks, Medium Crew, 15' depth	2,314.80 cy	5,073	-	-	7,177	-	5.29 /cy	12,250	8.83 /cy	20,428
					Grade for slabs / Scarify and Recompact, Dozer and Traxcavator or Loader, Medium Crew	277.70 sy	596	-	-	533	-	4.06 /sy	1,129	6.78 /sy	1,882
					Import Aggregate Base - under slab, Dozer and Traxcavator or Loader, Medium Crew	129.62 tn	417	2,592	-	373	-	26.10 /tn	3,383	43.52 /tn	5,641
					Import Aggregate Base - along walls, Dozer and Traxcavator or Loader, Medium Crew	11.00 tn	40	220	-	39	-	27.26 /tn	300	45.45 /tn	500
					Structural Backfill, Dozer and Traxcavator or Loader, Medium Crew	832.50 cy	2,446	-	-	2,387	-	5.81 /cy	4,834	9.68 /cy	8,061
					Load Excess for Hauling, Rubber Tire Loader, Cat 950	1,481.00 cy	324	-	-	402	-	0.49 /cy	726	0.82 /cy	1,211
					Haul / Remove Excess, 12 yd capacity, 15 miles RT	1,481.00 cy	3,271	-	-	6,433	-	6.55 /cy	9,704	10.93 /cy	16,182
					Dump Charges for For Excess, 12 yd tandem, per cy	1,481.00 cy	-	18,513	-	-	-	12.50 /cy	18,513	20.85 /cy	30,872
					31-25-01-00 Earthworks, Structural, Excavation		22,839	21,413	183,000	34,577		/CY	261,829	/CY	436,632
					TBK-204 Structural Excavation		22,839	21,413	183,000	34,577		/CY	261,829	/CY	436,632
					31-25 Earthworks, Structural		22,839	21,413	183,000	34,577		/CY	261,829	/CY	436,632
					31.0 Site/Civil	1.00 ACRE	27,754	23,684	191,075	35,544		278,056.13 /ACR E	278,056	463,692.40 /ACR E	463,692
	33.0				Buried Piping										
		33-00			Yard Piping										
			TBK-215		Influent Pipe 18" Diameter										
				40-10-01-18	Process Pipe, Ductile Iron, 18"										
					Trench Box, 8' x 24' x 10'	1.00 mo	-	-	-	2,300	-	2,300.00 /mo	2,300	3,835.53 /mo	3,836
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	246.93 CY	292	-	-	506	-	3.23 /CY	798	5.39 /CY	1,331
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	69.18 cy	363	-	-	322	-	9.89 /cy	684	16.50 /cy	1,141
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	183.05 cy	232	-	-	269	-	2.74 /cy	501	4.56 /cy	835
					Pipe zone material	69.18 cy	-	1,937	-	-	-	28.00 /cy	1,937	46.69 /cy	3,230
					Pipe bedding material	6.85 cy	-	192	-	-	-	28.00 /cy	192	46.69 /cy	320
					Imported backfill material	183.05 cy	-	3,661	-	-	-	20.00 /cy	3,661	33.35 /cy	6,105
					Haul spoils, offsite, up to 10 miles	246.93 cy	-	-	2,469	-	-	10.00 /cy	2,469	16.68 /cy	4,118
					Dump fees, trench spoils	246.93 ls	-	-	3,087	-	-	12.50 /ls	3,087	20.85 /ls	5,147
					18" pipe, DI, R.J, excav/bkfill not included, 350#	270.00 LF	3,707	20,731	-	2,621	-	100.22 /LF	27,059	167.12 /LF	45,124
					18" DI, R.J, Ell, 45	2.00 ea	606	2,380	-	429	-	1,707.24 /ea	3,414	2,847.03 /ea	5,694
					18" DI, R.J, Ell, 22 1/2	1.00 ea	303	1,200	-	214	-	1,717.23 /ea	1,717	2,863.67 /ea	2,864
					Polywrap, 18" pipe	220.00 lf	-	161	-	-	-	0.73 /lf	161	1.22 /lf	268
					Add for tie-in to existing	1.00 ea	3,060	500	-	-	-	3,560.12 /ea	3,560	5,936.94 /ea	5,937
					Pipe Marking, ID Tape	220.00 lf	112	29	-	-	-	0.64 /lf	141	1.07 /lf	235
					40-10-01-18 Process Pipe, Ductile Iron, 18"		8,675	30,790	5,556	6,661		/LF	51,681	/LF	86,185
					TBK-215 Influent Pipe 18" Diameter	220.00 LF	8,675	30,790	5,556	6,661		234.92 /LF	51,681	391.75 /LF	86,185
					33-00 Yard Piping	220.00 LF	8,675	30,790	5,556	6,661		234.92 /LF	51,681	391.75 /LF	86,185
		33-35			Pipelines										
			TBK-213		Maintenance of Traffic										
				32-50-03-00	Site Improvements, Traffic Control Devices										
					Traffic Control, Labor per Day	90.00 day	52,115	-	-	-	-	579.06 /day	52,115	965.65 /day	86,908
					32-50-03-00 Site Improvements, Traffic Control Devices	90.00 DAY	52,115					579.06 /DAY	52,115	965.65 /DAY	86,908
					TBK-213 Maintenance of Traffic	90.00 day	52,115					579.06 /day	52,115	965.65 /day	86,908
			TBK-214		Effluent Pipe 12" Diameter										
				33-35-01-12	Pipelines, Ductile Iron, 12"										
					Traffic Control, Labor per Day	60.00 day	34,743	-	-	-	-	579.06 /day	34,743	965.65 /day	57,939
					Trench Box, 8' x 24' x 10'	3.00 mo	-	-	-	6,900	-	2,300.00 /mo	6,900	3,835.53 /mo	11,507
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	1,485.90 CY	1,760	-	-	3,045	-	3.23 /CY	4,805	5.39 /CY	8,012



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
				33-35-01-12	Pipelines, Ductile Iron, 12"										
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	282.88 cy	1,483	-	-	1,316	-	9.89 /cy	2,799	16.50 /cy	4,667
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	1,248.27 cy	1,583	-	-	1,833	-	2.74 /cy	3,416	4.56 /cy	5,697
					Pipe zone material	282.88 cy	-	7,921	-	-	-	28.00 /cy	7,921	46.69 /cy	13,209
					Pipe bedding material	80.75 cy	-	2,261	-	-	-	28.00 /cy	2,261	46.69 /cy	3,770
					Imported backfill material	1,248.27 cy	-	24,965	-	-	-	20.00 /cy	24,965	33.35 /cy	41,633
					Haul spoils, offsite, up to 10 miles	1,485.90 cy	-	-	14,859	-	-	10.00 /cy	14,859	16.68 /cy	24,779
					Dump fees, trench spoils	1,485.90 ls	-	-	18,574	-	-	12.50 /ls	18,574	20.85 /ls	30,974
					12" pipe, DI, RJ, excav/bkfill included, 350#	1,200.00 LF	13,633	48,048	-	9,642	-	59.44 /LF	71,324	99.12 /LF	118,941
					12" DI, RJ, Ell, 45	4.00 ea	-	1,560	-	-	-	390.00 /ea	1,560	650.38 /ea	2,602
					Polywrap, 12" pipe	1,200.00 lf	-	636	-	-	-	0.53 /lf	636	0.88 /lf	1,061
					Add for tie-in to existing	1.00 ea	-	-	4,500	-	-	4,500.00 /ea	4,500	7,504.30 /ea	7,504
					Pipe Marking, ID Tape	1,200.00 lf	612	156	-	-	-	1.07 /lf	768	1.07 /lf	1,281
					33-35-01-12 Pipelines, Ductile Iron, 12"	1,200.00 LF	53,814	85,547	37,933	22,736		166.69 /LF	200,030	277.98 /LF	333,574
					TBK-214 Effluent Pipe 12" Diameter	1,200.00 LF	53,814	85,547	37,933	22,736		166.69 /LF	200,030	277.98 /LF	333,574
			TBK-216		Surface Restoration										
				33-30-99-01	Buried Pipe, Other										
					Seeding, mechanical seeding, fine grading and seeding, with equipment, includes lime, fertilizer & seed	1,333.33 sy	2,928	533	-	445	-	2.93 /sy	3,906	4.89 /sy	6,515
					33-30-99-01 Buried Pipe, Other	1,200.00 LF	2,928	533		445		3.26 /LF	3,906	5.43 /LF	6,515
					TBK-216 Surface Restoration	1,200.00 LF	2,928	533		445		3.26 /LF	3,906	5.43 /LF	6,515
					33-35 Pipelines	1,200.00 LF	108,857	86,080	37,933	23,181		213.38 /LF	256,051	355.83 /LF	426,997
					33.0 Buried Piping	1,420.00 LF	117,532	116,870	43,489	29,842		216.71 /LF	307,733	361.40 /LF	513,182
	40.0				Process Piping										
		40-10			Exposed Process Pipe										
			TBK-400		Process Mechanical Pipe										
				40-00-01-01	Process Pipe, General										
					Allowance for process mechanical piping for Pump Station - DI pipe & fittings	1.00 ls	-	-	100,000	-	-	100,000.00 /ls	100,000	166,762.17 /ls	166,762
					40-00-01-01 Process Pipe, General				100,000			/LNF	100,000	/LNF	166,762
					TBK-400 Process Mechanical Pipe				100,000				100,000		166,762
					40-10 Exposed Process Pipe	1.00 LF			100,000			100,000.00 /LF	100,000	166,762.17 /LF	166,762
					40.0 Process Piping	1.00 LF			100,000			100,000.00 /LF	100,000	166,762.17 /LF	166,762
	40.9				Instrumentation & Controls										
		40-90			Instrumentation & Controls										
			TBK-409		I&C										
				40-90-01-37	I&C, Other										
					Allowance for Instrumentation and Controls	1.00 ls	-	-	75,000	-	-	75,000.00 /ls	75,000	125,071.62 /ls	125,072
					40-90-01-37 I&C, Other				75,000			/EA	75,000	/EA	125,072
					TBK-409 I&C				75,000				75,000		125,072
					40-90 Instrumentation & Controls				75,000			/SF	75,000	/SF	125,072
					40.9 Instrumentation & Controls	1,600.00 SF			75,000			46.88 /SF	75,000	78.17 /SF	125,072
	43.0				Process Equipment										
		43-05			Furnish and Install Process Equipment										
			TBK-445		Equipment Pump										
				44-05-49-03	Submersible Pump: 51hp-100hp										
					Functional Testing, Pumps, 51-100 hp	3.00 ea	262	150	-	-	-	137.23 /ea	412	228.85 /ea	687
					Sleeved anchor bolts - Medium	24.00 ea	366	504	-	-	-	36.27 /ea	870	60.48 /ea	1,451
					Non-Shrink Machine Grout	18.00 cuft	746	1,332	-	-	-	115.44 /cuft	2,078	192.50 /cuft	3,465
					Grease, Oil, and Lube Pumps, 51-100 hp	3.00 ea	523	225	-	-	-	249.46 /ea	748	416.01 /ea	1,248
					FURNISH Pump, 51 - 100 hp	3.00 EA	-	-	-	-	285,000	95,000.00 /EA	285,000	158,424.05 /EA	475,272
					Set pump assembly, 51 - 100 hp	3.00 ea	5,234	150	-	-	-	1,794.64 /ea	5,384	2,992.78 /ea	8,978
					44-05-49-03 Submersible Pump: 51hp-100hp	3.00 EA	7,131	2,361			285,000	98,164.07 /EA	294,492	163,700.52 /EA	491,102
					TBK-445 Equipment Pump	3.00 EA	7,131	2,361			285,000	98,164.07 /EA	294,492	163,700.52 /EA	491,102
					43-05 Furnish and Install Process Equipment	1,600.00 SF	7,131	2,361			285,000	184.06 /SF	294,492	306.94 /SF	491,102



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
					43.0 Process Equipment	1,600.00 SF	7,131	2,361			285,000	184.06 /SF	294,492	306.94 /SF	491,102
OS-11					CU-2 Containment 10 Pump Station	3.50 MG	275,389	291,442	849,680	65,385	285,000	504,827.63 /MG	1,766,897	841,861.46 /MG	2,946,515
	02.0				Washington Street Storage										
		02-01			Existing Conditions										
			TBK-211		Demolition										
				02-01-01-01	Site Demolition										
					General Site Demolition, Asphalt Pavement										
					relocate existing catch basin	1.00 ea	2,510	-	-	1,693	-	4,202.90 /ea	4,203	7,008.85 /ea	7,009
					Temporary Fencing, chain link, rented up to 12 months, 6' high, 11 ga, to 1000'	861.80 lf	1,494	5,429	-	-	-	8.03 /lf	6,924	13.40 /lf	11,546
					Demolish, remove pavement & curb, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	6,037.78 sy	28,208	-	-	16,998	-	7.49 /sy	45,206	12.49 /sy	75,386
					Site demo, for disposal off site, to 5 mis,	1,006.30 cy	4,618	-	-	8,739	-	13.27 /cy	13,357	22.13 /cy	22,274
					Site demo, dumping fees	1,006.30 cy	-	-	15,094	-	-	15.00 /cy	15,094	25.01 /cy	25,172
					Selective demolition, saw cutting, each additional inch of depth over 3"	4,500.00 lf	4,154	495	-	1,074	-	1.27 /lf	5,723	2.12 /lf	9,545
					02-01-01-01 General Site Demolition, Asphalt Pavement	6,037.78 SY	40,985	5,924	15,094	28,504		14.99 /SY	90,507	25.00 /SY	150,931
					TBK-211 Site Demolition	1.00 LS	40,985	5,924	15,094	28,504		90,506.93 /LS	90,507	150,931.31 /LS	150,931
					02-01 Demolition	1.00 LS	40,985	5,924	15,094	28,504		90,506.93 /LS	90,507	150,931.31 /LS	150,931
					02.0 Existing Conditions	1.00 LS	40,985	5,924	15,094	28,504		90,506.93 /LS	90,507	150,931.31 /LS	150,931
	31.0				Site/Civil										
		31-15			Site Preparation										
			TBK-201		Site Preparation										
				31-15-01-00	Site Preparation, Clearing and Grubbing										
					Miscellaneous preparation	1.24 acre	-	-	3,100	-	-	2,500.00 /acre	3,100	4,169.06 /acre	5,170
					31-15-01-00 Site Preparation, Clearing and Grubbing				3,100			/AC	3,100	/AC	5,170
					TBK-201 Site Preparation	1.24 AC			3,100			2,500.00 /AC	3,100	4,169.06 /AC	5,170
			TBK-202		Site Erosion Control										
				31-15-04-00	Site Preparation, Erosion Controls / Pre-construction										
					Silt Fence, Heavy-Duty, Subcontracted	1,500.00 lf	-	-	6,750	-	-	4.50 /lf	6,750	7.50 /lf	11,256
					Erosion control, hay bales, staked, Subcontracted, Install and Remove	4.00 ea	-	-	80	-	-	20.00 /ea	80	33.35 /ea	133
					Temp Seed	6,000.00 sf	-	-	900	-	-	0.15 /sf	900	0.25 /sf	1,501
					Inlet Protection, Subcontracted	5.00 ea	-	-	2,250	-	-	450.00 /ea	2,250	750.43 /ea	3,752
					Stabilized Construction Entrance, Clean Rock, 1-1/2" thru 3"	99.56 tn	841	1,991	-	966	-	38.15 /tn	3,798	63.61 /tn	6,333
					Filter Fabric under Stabilized Construction Entrance	186.67 sy	-	280	-	-	-	1.50 /sy	280	2.50 /sy	467
					Maintenance, erosion control during construction	1.00 ls	7,148	-	-	-	-	7,148.24 /ls	7,148	11,920.58 /ls	11,921
					Remove erosion control	1.00 ls	500	-	2,500	-	-	3,000.00 /ls	3,000	5,002.85 /ls	5,003
					31-15-04-00 Site Preparation, Erosion Controls / Pre-construction	1.24 AC	8,489	2,271	12,480	966		19,520.94 /AC	24,206	32,553.53 /AC	40,366
			TBK-202		Site Erosion Control	1.24 AC	8,489	2,271	12,480	966		19,520.94 /AC	24,206	32,553.53 /AC	40,366
			TBK-203		Site Grading										
				31-20-12-00	Earthworks, Sitework, Site Grading										
					Rough Site Grading, Large Crew	6,037.78 sy	2,549	-	-	4,710	-	1.20 /sy	7,259	2.00 /sy	12,105
					Fine grade site machine	6,037.78 sy	4,325	60	-	-	-	0.73 /sy	4,385	1.21 /sy	7,313
					31-20-12-00 Earthworks, Sitework, Site Grading	6,037.78 SY	6,874	60		4,710		1.93 /SY	11,644	3.22 /SY	19,418
					TBK-203 Site Grading	6,037.78 SY	6,874	60		4,710		1.93 /SY	11,644	3.22 /SY	19,418
					31-15 Site Preparation	1.24 AC	15,363	2,332	15,580	5,676		31,411.21 /AC	38,950	52,382.01 /AC	64,954
	32-50				Site, Improvements										
			TBK-212		Asphalt Pavement										
				32-40-02-00	Site Improvements, Paving, Bituminous Asphalt										
					Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	4,644.44 sy	1,873	-	-	1,418	-	0.71 /sy	3,292	1.18 /sy	5,489
					Base course drainage layers, aggregate base course for roadways and large paved areas, crushed stone base, compacted, crushed 1-1/2" stone base, 6" deep	4,644.44 sy	2,794	27,634	-	3,736	-	7.36 /sy	34,164	12.27 /sy	56,973
					Base course drainage layers, for roadways and large paved areas, stabilization fabric, polypropylene, 6 oz./S.Y.	4,644.44 sy	527	5,295	-	155	-	1.29 /sy	5,977	2.15 /sy	9,968



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
				32-40-02-00	Site Improvements, Paving, Bituminous Asphalt										
					Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	4,644.44 sy	1,681	-	-	1,660	-	0.72 /sy	3,341	1.20 /sy	5,572
					Bituminous-stabilized base courses, for roadways and large paved areas, liquid application to gravel base, asphalt emulsion	928.89 gal	125	6,224	-	128	-	6.97 /gal	6,477	11.63 /gal	10,802
					Plant-mix asphalt paving, for highways and large paved areas, binder course, 2" thick, no hauling included	4,644.44 sy	3,055	46,444	-	1,856	-	11.06 /sy	51,355	18.44 /sy	85,642
					Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	4,644.44 sy	3,392	55,733	-	2,022	-	13.17 /sy	61,147	21.96 /sy	101,971
					Painted pavement markings, thermoplastic, white or yellow, 4" wide, less than 6000 L.F.	1,500.00 lf	175	420	-	130	-	0.48 /lf	725	0.81 /lf	1,209
					Pavement markings, parking stall, paint, white, 4" wide	100.00 still	1,340	650	-	572	-	25.63 /still	2,563	42.73 /still	4,273
					32-40-02-00 Site Improvements, Paving, Bituminous Asphalt	4,644.44 SY	14,963	142,400		11,678		36.40 /SY	169,042	60.70 /SY	281,897
					TBK-212 Asphalt Pavement	4,644.44 SY	14,963	142,400		11,678		36.40 /SY	169,042	60.70 /SY	281,897
			TBK-213		Maintenance of Traffic										
				32-50-03-00	Site Improvements, Traffic Control Devices										
					Traffic Control, Labor per Day	90.00 day	52,115	-	-	-	-	579.06 /day	52,115	965.65 /day	86,908
					32-50-03-00 Site Improvements, Traffic Control Devices	90.00 DAY	52,115					579.06 /DAY	52,115	965.65 /DAY	86,908
					TBK-213 Maintenance of Traffic	90.00 day	52,115					579.06 /day	52,115	965.65 /day	86,908
					32-50 Site, Improvements	1.24 ACRE	67,079	142,400		11,678		178,352.10 /ACR E	221,157	297,423.82 /ACR E	368,806
					31.0 Site/Civil	1.24 ACRE	82,441	144,732	15,580	17,353		209,763.31 /ACR E	260,107	349,805.83 /ACR E	433,759
	33.0				Buried Piping										
		33-00			Yard Piping										
			TBK-209		Dewatering Pipe 18" Diameter										
				40-10-01-18	Process Pipe, Ductile Iron, 18"										
					Trench Box, 8' x 24' x 10'	1.00 mo	-	-	-	2,300	-	2,300.00 /mo	2,300	3,835.53 /mo	3,836
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	246.93 CY	292	-	-	506	-	3.23 /CY	798	5.39 /CY	1,331
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	69.18 cy	363	-	-	322	-	9.89 /cy	684	16.50 /cy	1,141
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	183.05 cy	232	-	-	269	-	2.74 /cy	501	4.56 /cy	835
					Pipe zone material	69.18 cy	-	1,937	-	-	-	28.00 /cy	1,937	46.69 /cy	3,230
					Pipe bedding material	6.85 cy	-	192	-	-	-	28.00 /cy	192	46.69 /cy	320
					Imported backfill material	183.05 cy	-	3,661	-	-	-	20.00 /cy	3,661	33.35 /cy	6,105
					Haul spoils, offsite, up to 10 miles	246.93 cy	-	-	2,469	-	-	10.00 /cy	2,469	16.68 /cy	4,118
					Dump fees, trench spoils	246.93 cy	-	-	3,087	-	-	12.50 /cy	3,087	20.85 /cy	5,147
					18" pipe, DI, RJ, excav/bkfill not included, 350#	220.00 LF	3,020	16,892	-	2,136	-	100.22 /LF	22,048	167.12 /LF	36,767
					18" DI, RJ, Ell, 45	2.00 ea	606	2,380	-	429	-	1,707.24 /ea	3,414	2,847.02 /ea	5,694
					18" DI, RJ, Ell, 22 1/2	1.00 ea	303	1,200	-	214	-	1,717.23 /ea	1,717	2,863.70 /ea	2,864
					Polywrap, 18" pipe	220.00 lf	-	161	-	-	-	0.73 /lf	161	1.22 /lf	268
					Add for tie-in to existing (Adjust productivity)	1.00 ea	4,080	-	-	-	-	4,080.16 /ea	4,080	6,804.16 /ea	6,804
					Pipe Marking, ID Tape	220.00 lf	112	29	-	-	-	0.64 /lf	141	1.07 /lf	235
					40-10-01-18 Process Pipe, Ductile Iron, 18"	220.00 LF	9,009	26,451	5,556	6,175		214.50 /LF	47,191	357.71 /LF	78,696
					TBK-209 Dewatering Pipe 18" Diameter	222.00 LF	9,009	26,451	5,556	6,175		212.57 /LF	47,191	354.49 /LF	78,696
			TBK-210		Dewatering Pipe 8" Diameter										
				40-10-01-08	Process Pipe, Ductile Iron, 8"										
					Trench Box, 8' x 24' x 10'	1.00 mo	-	-	-	2,300	-	2,300.00 /mo	2,300	3,835.52 /mo	3,836
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	197.62 CY	234	-	-	405	-	3.23 /CY	639	5.39 /CY	1,066
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	40.87 cy	214	-	-	190	-	9.89 /cy	404	16.50 /cy	674
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	162.48 cy	206	-	-	239	-	2.74 /cy	445	4.56 /cy	742
					Pipe zone material	40.87 cy	-	1,144	-	-	-	28.00 /cy	1,144	46.69 /cy	1,908
					Pipe bedding material	13.25 cy	-	371	-	-	-	28.00 /cy	371	46.69 /cy	619
					Imported backfill material	162.48 cy	-	3,250	-	-	-	20.00 /cy	3,250	33.35 /cy	5,419
					Haul spoils, offsite, up to 10 miles	197.62 cy	-	-	1,976	-	-	10.00 /cy	1,976	16.68 /cy	3,296
					Dump fees, trench spoils	197.62 cy	-	-	2,470	-	-	12.50 /cy	2,470	20.85 /cy	4,119
					8" pipe, DI, RJ, excav/bkfill not included, 350#	220.00 LF	2,083	5,348	-	1,473	-	40.47 /LF	8,904	67.49 /LF	14,849
					8" DI, RJ, Ell, 90	2.00 ea	284	420	-	201	-	452.46 /ea	905	754.53 /ea	1,509
					8" DI, RJ, Ell, 45	2.00 ea	284	380	-	201	-	432.46 /ea	865	721.18 /ea	1,442
					8" DI, RJ, Ell, 22 1/2	1.00 ea	142	180	-	100	-	422.45 /ea	422	704.46 /ea	704



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
				40-10-01-08	Process Pipe, Ductile Iron, 8"										
					Polywrap, 8" pipe	220.00 lf	-	90	-	-	-	0.41 /lf	90	0.68 /lf	150
					Pipe Marking, ID Tape	220.00 lf	112	29	-	-	-	0.64 /lf	141	1.07 /lf	235
					40-10-01-08 Process Pipe, Ductile Iron, 8"	220.00 LF	3,559	11,212	4,446	5,109		110.58 /LF	24,327	184.40 /LF	40,568
					TBK-210 Dewatering Pipe 8" Diameter	22.00 LF	3,559	11,212	4,446	5,109		1,105.77 /LF	24,327	1,844.00 /LF	40,568
					33-00 Yard Piping	444.00 LF	12,568	37,663	10,002	11,284		161.08 /LF	71,517	268.61 /LF	119,264
	33-40				Pipeline Structures										
			TBK-208		Storage Conduit										
				03-00-99-00	Concrete Blind, 54"										
					Fine grade, for slab on grade, by hand	41,800.00 sf	10,480	418	-	-	-	0.26 /sf	10,898	0.43 /sf	18,173
					Concrete pumping, subcontract, all inclusive price	4,644.00 cy	-	-	55,728	-	-	12.00 /cy	55,728	20.01 /cy	92,933
					Concrete, ready mix, 3500 psi	4,644.00 CY	-	476,010	-	-	-	102.50 /CY	476,010	170.93 /CY	793,805
					Add for concrete waste, 3500 psi	232.00 cy	-	23,780	-	-	-	102.50 /cy	23,780	170.93 /cy	39,656
					Placing concrete, concrete pump	4,644.00 cy	124,747	-	-	-	-	26.86 /cy	124,747	44.80 /cy	208,031
					Polyethylene vapor barrier, 10 mil thick	418.00 sq	4,001	2,508	-	-	-	15.57 /sq	6,509	25.97 /sq	10,854
					03-00-99-00 Concrete Blind, 54"	4,644.00 CY	139,227	502,716	55,728			150.23 /CY	697,671	250.53 /CY	1,163,452
				31-16-01-00	Earthworks, Sheeting and Shoring										
					Shoring, sheet pile, subcontracted	22,492.60 sf	-	-	674,778	-	-	30.00 /sf	674,778	50.03 /sf	1,125,274
					31-16-01-00 Earthworks, Sheeting and Shoring	22,492.60 SF			674,778			30.00 /SF	674,778	50.03 /SF	1,125,274
				31-19-01-00	Site Preparation, Dewatering, Sump Pump										
					Dewatering Minor, Generator and Pumps, Mob	2.00 ea	-	-	3,000	-	-	1,500.00 /ea	3,000	2,501.44 /ea	5,003
					Dewatering Minor, Set-up Generator and Install Pumps	4.00 ea	1,257	-	-	375	-	407.82 /ea	1,631	680.09 /ea	2,720
					Dewatering Minor, Sump Rock, delivered	21.30 cy	-	426	-	-	-	20.00 /cy	426	33.35 /cy	710
					Dewatering Minor, Large Generator and 2 Pumps, Rental, Monthly	12.00 mo	-	-	-	114,398	-	9,533.15 /mo	114,398	15,897.69 /mo	190,772
					Dewatering Minor, Generator and Pumps, Operation - Labor to maintain / check pumps/ fuel and lube	12.00 mo	321,373	-	-	62,245	-	31,968.24 /mo	383,619	53,310.93 /mo	639,731
					Dewatering Minor, Remove Generator and Pumps	4.00 ea	1,257	-	-	375	-	407.82 /ea	1,631	680.09 /ea	2,720
					Dewatering Minor, Generator and Pumps, Demob	2.00 ea	-	-	3,000	-	-	1,500.00 /ea	3,000	2,501.43 /ea	5,003
					31-19-01-00 Site Preparation, Dewatering, Sump Pump	6.00 MO	323,887	426	6,000	177,392		84,617.54 /MO	507,705	141,110.04 /MO	846,660
				31-25-01-00	Earthworks, Structural, Excavation										
					Structural Excavation, Excavator and Trucks, Large Crew, 20' and greater depth	38,239.00 cy	107,599	-	-	167,136	-	7.19 /cy	274,734	11.98 /cy	458,153
					Grade/ Scarify and Recompact bottom of excavation, Dozer and Traxcavator or Loader, Large Crew	6,037.78 sy	12,351	-	-	12,415	-	4.10 /sy	24,766	6.84 /sy	41,300
					Import Aggregate Base - bedding, Dozer and Traxcavator or Loader, Large Crew	2,817.62 tn	8,070	56,352	-	8,111	-	25.74 /tn	72,533	42.93 /tn	120,957
					Import Aggregate Base - pipe zone, Dozer and Traxcavator or Loader, Large Crew	8,760.00 tn	28,276	175,200	-	33,298	-	27.03 /tn	236,774	45.07 /tn	394,850
					Structural Backfill & compaction, native material, Dozer and Traxcavator or Loader, Large Crew	6,618.28 cy	17,803	-	-	20,964	-	5.86 /cy	38,767	9.77 /cy	64,648
					Load Excess for Hauling, Rubber Tire Loader, Cat 950	29,414.00 cy	6,430	-	-	7,989	-	0.49 /cy	14,419	0.82 /cy	24,045
					Haul / Remove Excess, 12 yd capacity, 15 miles RT	29,414.00 cy	64,972	-	-	127,756	-	6.55 /cy	192,728	10.93 /cy	321,397
					Dump Charges for For Excess, 12 yd tandem, per cy	29,414.00 cy	-	367,675	-	-	-	12.50 /cy	367,675	20.85 /cy	613,143
					31-25-01-00 Earthworks, Structural, Excavation	38,329.00 CY	245,500	599,227		377,668		31.89 /CY	1,222,396	53.18 /CY	2,038,493
				33-40-03-02	Pipeline Structures, Storage Conduit										
					Purchase concrete storage conduit 8' x 12' culvert	3,790.00 LF	-	2,728,800	-	-	-	720.00 /LF	2,728,800	1,200.69 /LF	4,550,606
					Install concrete storage conduit, 8' x 12' culvert	3,790.00 LF	798,532	189,500	-	717,009	-	449.88 /LF	1,705,041	750.23 /LF	2,843,364
					33-40-03-02 Pipeline Structures, Storage Conduit	3,790.00 LF	798,532	2,918,300		717,009		1,169.88 /LF	4,433,841	1,950.92 /LF	7,393,970
					TBK-208 Storage Conduit	3,790.00 LF	1,507,146	4,020,669	736,506	1,272,070		1,988.49 /LF	7,536,392	3,316.06 /LF	12,567,849
					33-40 Pipeline Structures	3,790.00 LF	1,507,146	4,020,669	736,506	1,272,070		1,988.49 /LF	7,536,392	3,316.06 /LF	12,567,849
					33.0 Buried Piping	4,234.00 LF	1,519,714	4,058,332	746,508	1,283,354		1,796.86 /LF	7,607,909	2,996.48 /LF	12,687,113
					OS-11 Washington Street Storage	2.70 MG	1,643,140	4,208,988	777,183	1,329,211		2,947,600.90 /MG	7,958,522	4,915,482.91 /MG	13,271,804



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
OS-19					Kings Park Storage										
	31.0				Site/Civil										
		31-15			Site Preparation										
			TBK-201		Site Preparation										
				31-15-01-00	Site Preparation, Clearing and Grubbing										
					Selective clearing, brush, medium clearing, with dozer, ball and chain, excludes removal offsite	1.18 acre	2,380	-	-	3,667	-	5,124.26 /acre	6,047	8,545.33 /acre	10,083
					Topsoil stripping and stockpiling,600' haul, topsoil, clay, medium hard, ideal conditions, 300 H.P. dozer	953.00 cy	503	-	-	4,093	-	4.82 /cy	4,596	8.04 /cy	7,665
					Load & place Topsoil from stockpiling,600' haul, topsoil, clay, medium hard, ideal conditions, 300 H.P. dozer	953.00 cy	754	-	-	4,093	-	5.09 /cy	4,848	8.48 /cy	8,084
					31-15-01-00 Site Preparation, Clearing and Grubbing	1.18 AC	3,637			11,853		13,127.37 /AC	15,490	21,891.50 /AC	25,832
					TBK-201 Site Preparation	1.18 AC	3,637			11,853		13,127.37 /AC	15,490	21,891.50 /AC	25,832
			TBK-202		Site Erosion Control										
				31-15-04-00	Site Preparation, Erosion Controls / Pre-construction										
					Silt Fence, Heavy-Duty, Subcontracted	1,500.00 lf	-	-	6,750	-	-	4.50 /lf	6,750	7.50 /lf	11,256
					Erosion control, hay bales, staked, Subcontracted, Install and Remove	4.00 ea	-	-	80	-	-	20.00 /ea	80	33.35 /ea	133
					Temp Seed	6,000.00 sf	-	-	900	-	-	0.15 /sf	900	0.25 /sf	1,501
					Permanent Seeding	51,480.00 sf	-	-	7,722	-	-	0.15 /sf	7,722	0.25 /sf	12,877
					Temp Mulching	666.00 sy	-	-	2,331	-	-	3.50 /sy	2,331	5.84 /sy	3,887
					Inlet Protection, Subcontracted	5.00 ea	-	-	2,250	-	-	450.00 /ea	2,250	750.43 /ea	3,752
					Stabilized Construction Entrance, Clean Rock, 1-1/2" thru 3"	99.56 tn	841	1,991	-	966	-	38.15 /tn	3,798	63.61 /tn	6,333
					Filter Fabric under Stabilized Construction Entrance	186.67 sy	-	280	-	-	-	1.50 /sy	280	2.50 /sy	467
					Maintenance, erosion control during construction	1.00 ls	7,148	-	-	-	-	7,148.24 /ls	7,148	11,920.55 /ls	11,921
					Remove erosion control	1.00 ls	500	-	2,500	-	-	3,000.00 /ls	3,000	5,002.86 /ls	5,003
					31-15-04-00 Site Preparation, Erosion Controls / Pre-construction	1.18 AC	8,489	2,271	22,533	966		29,033.02 /AC	34,259	48,416.08 /AC	57,131
					TBK-202 Site Erosion Control	1.18 AC	8,489	2,271	22,533	966		29,033.02 /AC	34,259	48,416.08 /AC	57,131
			TBK-203		Site Grading										
				31-20-12-00	Earthworks, Sitework, Site Grading										
					Rough Site Grading, Large Crew	5,720.00 sy	2,415	-	-	4,462	-	1.20 /sy	6,877	2.00 /sy	11,467
					Fine grade site machine	5,720.00 sy	4,097	57	-	-	-	0.73 /sy	4,155	1.21 /sy	6,928
					31-20-12-00 Earthworks, Sitework, Site Grading	5,720.00 SY	6,512	57		4,462		1.93 /SY	11,031	3.22 /SY	18,396
					TBK-203 Site Grading	5,720.00 SY	6,512	57		4,462		1.93 /SY	11,031	3.22 /SY	18,396
					31-15 Site Preparation	1.18 AC	18,638	2,328	22,533	17,281		51,508.78 /AC	60,780	85,897.15 /AC	101,359
					31.0 Site/Civil	1.18 ACRE	18,638	2,328	22,533	17,281		51,508.78 /ACR E	60,780	85,897.15 /ACR E	101,359
	33.0				Buried Piping										
		33-00			Yard Piping										
			TBK-217		Pipe 16"										
				33-00-04-16	Yard Pipe, Ductile Iron, 16"										
					Traffic Control, Labor per Day	30.00 day	17,372	-	-	-	-	579.06 /day	17,372	965.65 /day	28,969
					Trench Box, 8' x 24' x 10'	1.00 mo	-	-	2,300	-	-	2,300.00 /mo	2,300	3,835.54 /mo	3,836
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	111.01 CY	131	-	227	-	-	3.23 /CY	359	5.39 /CY	599
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	28.77 cy	151	-	134	-	-	9.89 /cy	285	16.50 /cy	475
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	81.79 cy	104	-	120	-	-	2.74 /cy	224	4.56 /cy	373
					Pipe zone material	28.77 cy	-	806	-	-	-	28.00 /cy	806	46.69 /cy	1,343
					Pipe bedding material	7.44 cy	-	208	-	-	-	28.00 /cy	208	46.69 /cy	347
					Imported backfill material	81.79 cy	-	981	-	-	-	12.00 /cy	981	20.01 /cy	1,637
					Haul spoils, offsite, up to 10 miles	111.01 cy	-	-	1,110	-	-	10.00 /cy	1,110	16.68 /cy	1,851
					Dump fees, trench spoils	111.01 cy	-	-	1,388	-	-	12.50 /cy	1,388	20.85 /cy	2,314
					16" pipe, DI, RJ, excav/bkfill not included, 350#	100.00 LF	1,373	6,490	-	971	-	88.34 /LF	8,834	147.31 /LF	14,731
					16" DI, RJ, Ell, 90	1.00 ea	270	1,030	-	191	-	1,490.67 /ea	1,491	2,485.87 /ea	2,486
					16" DI, RJ, Ell, 45	2.00 ea	540	1,700	-	382	-	1,310.66 /ea	2,621	2,185.68 /ea	4,371
					Polywrap, 16" pipe	100.00 lf	-	67	-	-	-	0.67 /lf	67	1.12 /lf	112
					Add for tie-in to existing	1.00 ea	4,080	-	-	-	-	4,080.16 /ea	4,080	6,804.16 /ea	6,804
					Pipe Marking, ID Tape	100.00 lf	51	13	-	-	-	0.64 /lf	64	1.07 /lf	107



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
					33-00-04-16 Yard Pipe, Ductile Iron, 16"	100.00 LF	24,071	11,295	2,498	4,325		421.89 /LF	42,189	703.55 /LF	70,355
					TBK-217 Pipe 16"	100.00 LF	24,071	11,295	2,498	4,325		421.89 /LF	42,189	703.55 /LF	70,355
			TBK-218		Pipe 8" Force Main										
			33-35-01-08		Pipelines, Ductile Iron, 8"										
					Traffic Control, Labor per Day	30.00 day	17,372	-	-	-	-	579.06 /day	17,372	965.65 /day	28,969
					Trench Box, 8' x 24' x 10'	1.00 mo	-	-	-	2,300	-	2,300.00 /mo	2,300	3,835.54 /mo	3,836
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	143.72 CY	170	-	-	294	-	3.23 /CY	465	5.39 /CY	775
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	29.73 cy	156	-	-	138	-	9.89 /cy	294	16.50 /cy	490
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	118.16 cy	150	-	-	174	-	2.74 /cy	323	4.56 /cy	539
					Pipe zone material	29.73 cy	-	832	-	-	-	28.00 /cy	832	46.69 /cy	1,388
					Pipe bedding material	9.64 cy	-	270	-	-	-	28.00 /cy	270	46.69 /cy	450
					Imported backfill material	118.16 cy	-	1,418	-	-	-	12.00 /cy	1,418	20.01 /cy	2,365
					Haul spoils, offsite, up to 10 miles	143.72 cy	-	-	1,437	-	-	10.00 /cy	1,437	16.68 /cy	2,397
					Dump fees, trench spoils	143.72 ls	-	-	1,797	-	-	12.50 /ls	1,797	20.85 /ls	2,996
					8" pipe, DI, RJ, excav/bkfill not included, 350#	160.00 LF	1,515	3,890	-	1,071	-	40.47 /LF	6,476	67.49 /LF	10,799
					8" DI, RJ, Ell, 90	2.00 ea	284	420	-	201	-	452.46 /ea	905	754.53 /ea	1,509
					8" DI, RJ, Ell, 45	3.00 ea	426	570	-	301	-	432.45 /ea	1,297	721.17 /ea	2,164
					Polywrap, 8" pipe	160.00 lf	-	66	-	-	-	0.41 /lf	66	0.68 /lf	109
					Add for tie-in to existing	1.00 ea	4,080	-	-	-	-	4,080.16 /ea	4,080	6,804.18 /ea	6,804
					Pipe Marking, ID Tape	160.00 lf	82	21	-	-	-	0.64 /lf	102	1.07 /lf	171
					33-35-01-08 Pipelines, Ductile Iron, 8"	160.00 LF	24,234	7,486	3,234	4,480		246.46 /LF	39,434	411.01 /LF	65,761
					TBK-218 Pipe 8" Force Main	160.00 LF	24,234	7,486	3,234	4,480		246.46 /LF	39,434	411.01 /LF	65,761
					33-00 Yard Piping	260.00 LF	48,305	18,782	5,731	8,805		313.94 /LF	81,623	523.52 /LF	136,116
			33-40		Pipeline Structures										
			TBK-208		Storage Conduit										
			03-00-99-24		Concrete Blind, 24"										
					Fine grade, for slab on grade, by hand	39,600.00 sf	9,928	396	-	-	-	0.26 /sf	10,324	0.43 /sf	17,217
					Concrete pumping, subcontract, all inclusive price	2,933.00 cy	-	-	35,196	-	-	12.00 /cy	35,196	20.01 /cy	58,694
					Concrete, ready mix, 3500 psi	2,933.00 CY	-	300,633	-	-	-	102.50 /CY	300,633	170.93 /CY	501,341
					Add for concrete waste, 3500 psi	146.65 cy	-	15,032	-	-	-	102.50 /cy	15,032	170.93 /cy	25,067
					Placing concrete, concrete pump	2,933.00 cy	78,786	-	-	-	-	26.86 /cy	78,786	44.80 /cy	131,386
					Polyethelene vapor barrier, 10 mil thick	293.30 sq	2,807	1,760	-	-	-	15.57 /sq	4,567	25.97 /sq	7,616
					03-00-99-24 Concrete Blind, 24"	2,933.00 CY	91,522	317,820	35,196			151.56 /CY	444,537	252.75 /CY	741,320
			31-16-01-00		Earthworks, Sheeting and Shoring										
					Shoring, sheet pile, subcontracted	17,646.00 sf	-	-	529,380	-	-	30.00 /sf	529,380	50.03 /sf	882,806
					31-16-01-00 Earthworks, Sheeting and Shoring	17,646.00 SF			529,380			30.00 /SF	529,380	50.03 /SF	882,806
			31-19-01-00		Site Preparation, Dewatering, Sump Pump										
					Dewatering Minor, Generator and Pumps, Mob	2.00 ea	-	-	3,000	-	-	1,500.00 /ea	3,000	2,501.44 /ea	5,003
					Dewatering Minor, Set-up Generator and Install Pumps	4.00 ea	1,257	-	-	375	-	407.82 /ea	1,631	680.09 /ea	2,720
					Dewatering Minor, Sump Rock, delivered	21.30 cy	-	426	-	-	-	20.00 /cy	426	33.35 /cy	710
					Dewatering Minor, Large Generator and 2 Pumps, Rental, Monthly	8.00 mo	-	-	-	76,265	-	9,533.15 /mo	76,265	15,897.69 /mo	127,181
					Dewatering Minor, Generator and Pumps, Operation - Labor to maintain / check pumps/ fuel and lube	8.00 mo	214,249	-	-	41,497	-	31,968.24 /mo	255,746	53,310.93 /mo	426,487
					Dewatering Minor, Remove Generator and Pumps	4.00 ea	1,257	-	-	375	-	407.82 /ea	1,631	680.09 /ea	2,720
					Dewatering Minor, Generator and Pumps, Demob	2.00 ea	-	-	3,000	-	-	1,500.00 /ea	3,000	2,501.45 /ea	5,003
					31-19-01-00 Site Preparation, Dewatering, Sump Pump	4.00 MO	216,762	426	6,000	118,511		85,424.92 /MO	341,700	142,456.45 /MO	569,826
			31-25-01-00		Earthworks, Structural, Excavation										
					Structural Excavation, Excavator and Trucks, Large Crew, 20' and greater depth	28,600.00 cy	80,476	-	-	125,005	-	7.19 /cy	205,481	11.98 /cy	342,665
					Grade/ Scarify and Recompact bottom of excavation, Dozer and Traxcavator or Loader, Large Crew	4,400.00 sy	9,001	-	-	9,047	-	4.10 /sy	18,048	6.84 /sy	30,097
					Import Aggregate Base - bedding, Dozer and Traxcavator or Loader, Large Crew	2,053.33 tn	5,881	41,067	-	5,911	-	25.74 /tn	52,858	42.93 /tn	88,147
					Import Aggregate Base - pipe zone, Dozer and Traxcavator or Loader, Large Crew	2,310.00 tn	7,456	46,200	-	8,781	-	27.03 /tn	62,437	45.07 /tn	104,121
					Structural Backfill & compaction, native material, Dozer and Traxcavator or Loader, Large Crew	4,950.00 cy	13,315	-	-	15,680	-	5.86 /cy	28,995	9.77 /cy	48,352
					Load Excess for Hauling, Rubber Tire Loader, Cat 950	22,000.00 cy	4,809	-	-	5,976	-	0.49 /cy	10,785	0.82 /cy	17,984
					Haul / Remove Excess, 12 yd capacity, 15 miles RT	22,000.00 cy	48,595	-	-	95,554	-	6.55 /cy	144,150	10.93 /cy	240,387



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
				31-25-01-00	Earthworks, Structural, Excavation										
					Dump Charges for For Excess, 12 yd tandem, per cy	22,000.00 cy	-	275,000	-	-	-	12.50 /cy	275,000	20.85 /cy	458,596
					31-25-01-00 Earthworks, Structural, Excavation	32,413.00 CY	169,533	362,267		265,953		24.61 /CY	797,753	41.04 /CY	1,330,350
				33-40-03-02	Pipeline Structures, Storage Conduit										
					Purchase concrete storage conduit, 8' x 10' culvert	3,600.00 LF		2,340,000	-	-	-	650.00 /LF	2,340,000	1,083.95 /LF	3,902,235
					Install concrete storage conduit, 8' x 10' culvert	3,600.00 LF	674,222	180,000	-	605,390	-	405.45 /LF	1,459,613	676.13 /LF	2,434,082
					33-40-03-02 Pipeline Structures, Storage Conduit	3,600.00 LF	674,222	2,520,000		605,390		1,055.45 /LF	3,799,613	1,760.09 /LF	6,336,316
					TBK-208 Storage Conduit	3,600.00 LF	1,152,040	3,200,513	570,576	989,855		1,642.50 /LF	5,912,983	2,739.06 /LF	9,860,618
					33-40 Pipeline Structures	3,600.00 LF	1,152,040	3,200,513	570,576	989,855		1,642.50 /LF	5,912,983	2,739.06 /LF	9,860,618
					33.0 Buried Piping	3,860.00 LF	1,200,345	3,219,294	576,307	998,660		1,553.01 /LF	5,994,606	2,589.83 /LF	9,996,734
	43.0				Process Equipment										
		43-05			Furnish and Install Process Equipment										
			TBK-443		Precast Duplex Pump Station										
				43-00-01-01	Duplex Pump Station										
					Precast duplex pump station complete including electrical & controls bldg and all related works	1.00 ea			450,000	-	-	450,000.00 /ea	450,000	750,429.71 /ea	750,430
					43-00-01-01 Duplex Pump Station	1.00 EA			450,000			450,000.00 /EA	450,000	750,429.71 /EA	750,430
					TBK-443 Precast Duplex Pump Station	1.00 EA			450,000			450,000.00 /EA	450,000	750,429.71 /EA	750,430
					43-05 Furnish and Install Process Equipment	1.00 SF			450,000			450,000.00 /SF	450,000	750,429.71 /SF	750,430
					43.0 Process Equipment	1.00 SF			450,000			450,000.00 /SF	450,000	750,429.71 /SF	750,430
					OS-19 Kings Park Storage	2.20 MG	1,218,983	3,221,622	1,048,840	1,015,941		2,956,993.82 /MG	6,505,386	4,931,146.74 /MG	10,848,523



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
OS-2					WPCP STORAGE										
	31.0				Site/Civil										
		31-15			Site Preparation										
			TBK-201		Site Preparation										
				31-15-01-00	Site Preparation, Clearing and Grubbing										
					Selective clearing, brush, medium clearing, with dozer, ball and chain, excludes removal offsite	0.54 acre	1,097	-	-	1,690	-	5,124.27 /acre	2,788	8,545.37 /acre	4,649
					Topsoil stripping and stockpiling,600' haul, topsoil, clay, medium hard, ideal conditions, 300 H.P. dozer	438.89 cy	232	-	-	1,885	-	4.82 /cy	2,117	8.04 /cy	3,530
					Load & place Topsoil from stockpiling,600' haul, topsoil, clay, medium hard, ideal conditions, 300 H.P. dozer	438.89 cy	347	-	-	1,885	-	5.09 /cy	2,232	8.48 /cy	3,723
					31-15-01-00 Site Preparation, Clearing and Grubbing	0.52 AC	1,676			5,461		13,724.48 /AC	7,137	22,887.25 /AC	11,901
					TBK-201 Site Preparation	0.52 AC	1,676			5,461		13,724.48 /AC	7,137	22,887.25 /AC	11,901
			TBK-202		Site Erosion Control										
				31-15-04-00	Site Preparation, Erosion Controls / Pre-construction										
					Silt Fence, Heavy-Duty, Subcontracted	1,500.00 lf	-	-	6,750	-	-	4.50 /lf	6,750	7.50 /lf	11,256
					Erosion control, hay bales, staked, Subcontracted, Install and Remove	4.00 ea	-	-	80	-	-	20.00 /ea	80	33.35 /ea	133
					Temp Seed	6,000.00 sf	-	-	900	-	-	0.15 /sf	900	0.25 /sf	1,501
					Permanent Seeding	23,700.00 sf	-	-	3,555	-	-	0.15 /sf	3,555	0.25 /sf	5,928
					Temp Mulching	666.00 sy	-	-	2,331	-	-	3.50 /sy	2,331	5.84 /sy	3,887
					Inlet Protection, Subcontracted	5.00 ea	-	-	2,250	-	-	450.00 /ea	2,250	750.43 /ea	3,752
					Stabilized Construction Entrance, Clean Rock, 1-1/2" thru 3"	99.56 tn	841	1,991	-	966	-	38.15 /tn	3,798	63.61 /tn	6,333
					Filter Fabric under Stabilized Construction Entrance	186.67 sy	-	280	-	-	-	1.50 /sy	280	2.50 /sy	467
					Maintenance, erosion control during construction	1.00 ls	7,148	-	-	-	-	7,148.24 /ls	7,148	11,920.56 /ls	11,921
					Remove erosion control	1.00 ls	500	0	2,500	-	-	3,000.00 /ls	3,000	5,002.84 /ls	5,003
					31-15-04-00 Site Preparation, Erosion Controls / Pre-construction	0.52 AC	8,489	2,271	18,366	966		57,869.15 /AC	30,092	96,503.85 /AC	50,182
					TBK-202 Site Erosion Control	0.52 AC	8,489	2,271	18,366	966		57,869.15 /AC	30,092	96,503.85 /AC	50,182
			TBK-203		Site Grading										
				31-20-12-00	Earthworks, Sitework, Site Grading										
					Rough Site Grading, Large Crew	2,633.00 sy	1,111	-	-	2,054	-	1.20 /sy	3,165	2.00 /sy	5,279
					Fine grade site machine	2,633.00 sy	1,886	26	-	-	-	0.73 /sy	1,912	1.21 /sy	3,189
					31-20-12-00 Earthworks, Sitework, Site Grading	2,633.00 SY	2,998	26		2,054		1.93 /SY	5,078	3.22 /SY	8,468
					TBK-203 Site Grading	2,633.00 SY	2,998	26		2,054		1.93 /SY	5,078	3.22 /SY	8,468
					31-15 Site Preparation	0.52 AC	13,163	2,297	18,366	8,480		81,358.58 /AC	42,306	135,675.35 /AC	70,551
					31.0 Site/Civil	0.52 ACRE	13,163	2,297	18,366	8,480		81,358.58 /ACRE	42,306	135,675.35 /ACRE	70,551
	33.0				Buried Piping										
		33-00			Yard Piping										
			TBK-209		Dewatering Pipe 18" Diameter										
				40-10-01-18	Process Pipe, Ductile Iron, 18"										
					Trench Box, 8' x 24' x 10'	1.00 mo	-	-	-	2,300	-	2,300.00 /mo	2,300	3,835.53 /mo	3,836
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	246.93 CY	292	-	-	506	-	3.23 /CY	798	5.39 /CY	1,332
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	69.18 cy	363	-	-	322	-	9.89 /cy	684	16.50 /cy	1,141
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	183.05 cy	232	-	-	269	-	2.74 /cy	501	4.56 /cy	835
					Pipe zone material	69.18 cy	-	1,937	-	-	-	28.00 /cy	1,937	46.69 /cy	3,230
					Pipe bedding material	6.85 cy	-	192	-	-	-	28.00 /cy	192	46.69 /cy	320
					Imported backfill material	183.05 cy	-	3,661	-	-	-	20.00 /cy	3,661	33.35 /cy	6,105
					Haul spoils, offsite, up to 10 miles	246.93 cy	-	-	2,469	-	-	10.00 /cy	2,469	16.68 /cy	4,118
					Dump fees, trench spoils	246.93 cy	-	-	3,087	-	-	12.50 /cy	3,087	20.85 /cy	5,147
					18" pipe, DI, RJ, excav/bkfill not included, 350#	220.00 LF	3,020	16,892	-	2,136	-	100.22 /LF	22,048	167.12 /LF	36,767
					18" DI, RJ, Ell, 45	2.00 ea	606	2,380	-	429	-	1,707.24 /ea	3,414	2,847.02 /ea	5,694
					18" DI, RJ, Ell, 22 1/2	1.00 ea	303	1,200	-	214	-	1,717.23 /ea	1,717	2,863.69 /ea	2,864
					Polywrap, 18" pipe	220.00 lf	-	161	-	-	-	0.73 /lf	161	1.22 /lf	268
					Add for tie-in to existing	1.00 ea	4,080	-	-	-	-	4,080.16 /ea	4,080	6,804.15 /ea	6,804
					Pipe Marking, ID Tape	220.00 lf	112	29	-	-	-	0.64 /lf	141	1.07 /lf	235
					40-10-01-18 Process Pipe, Ductile Iron, 18"		9,009	26,451	5,556	6,175		/LF	47,191	/LF	78,696



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
					TBK-209 Dewatering Pipe 18" Diameter	220.00 LF	9,009	26,451	5,556	6,175		214.50 /LF	47,191	357.71 /LF	78,696
			TBK-210		Dewatering Pipe 8" Diameter										
			40-10-01-08		Process Pipe, Ductile Iron, 8"										
					Trench Box, 8' x 24' x 10'	1.00 mo	-	-	-	2,300	-	2,300.00 /mo	2,300	3,835.53 /mo	3,836
					Excav. pipe trench, w/ trench box, for 4" - 24" pipe	197.62 CY	234	-	-	405	-	3.23 /CY	639	5.39 /CY	1,066
					Backfill / Compact @ pipe zone, for 4" thru 24" pipe	40.87 cy	214	-	-	190	-	9.89 /cy	404	16.50 /cy	674
					Backfill / Compact above pipe zone, for 4" thru 24" pipe	162.48 cy	206	-	-	239	-	2.74 /cy	445	4.56 /cy	741
					Pipe zone material	40.87 cy	-	1,144	-	-	-	28.00 /cy	1,144	46.69 /cy	1,908
					Pipe bedding material	13.25 cy	-	371	-	-	-	28.00 /cy	371	46.69 /cy	619
					Imported backfill material	162.48 cy	-	3,250	-	-	-	20.00 /cy	3,250	33.35 /cy	5,419
					Haul spoils, offsite, up to 10 miles	197.62 cy	-	-	1,976	-	-	10.00 /cy	1,976	16.68 /cy	3,296
					Dump fees, trench spoils	197.62 ls	-	-	2,470	-	-	12.50 /ls	2,470	20.85 /ls	4,119
					8" pipe, DI, RJ, excav/bkfill not included, 350#	220.00 LF	2,083	5,348	-	1,473	-	40.47 /LF	8,904	67.49 /LF	14,849
					8" DI, RJ, Ell, 90	2.00 ea	284	420	-	201	-	452.46 /ea	905	754.53 /ea	1,509
					8" DI, RJ, Ell, 45	2.00 ea	284	380	-	201	-	432.46 /ea	865	721.18 /ea	1,442
					8" DI, RJ, Ell, 22 1/2	1.00 ea	142	180	-	100	-	422.45 /ea	422	704.48 /ea	704
					Polywrap, 8" pipe	220.00 lf	-	90	-	-	-	0.41 /lf	90	0.68 /lf	150
					Pipe Marking, ID Tape	220.00 lf	112	29	-	-	-	0.64 /lf	141	1.07 /lf	235
					40-10-01-08 Process Pipe, Ductile Iron, 8"		3,559	11,212	4,446	5,109		/LF	24,327	/LF	40,568
					TBK-210 Dewatering Pipe 8" Diameter	220.00 LF	3,559	11,212	4,446	5,109		110.58 /LF	24,327	184.40 /LF	40,568
					33-00 Yard Piping	440.00 LF	12,568	37,663	10,002	11,284		162.54 /LF	71,517	271.05 /LF	119,264
			33-40		Pipeline Structures										
			TBK-208		Storage Conduit										
				03-00-99-00	Concrete Blind, 54"										
					Fine grade, for slab on grade, by hand	26,400.80 sf	6,619	264	-	-	-	0.26 /sf	6,883	0.43 /sf	11,478
					Concrete pumping, subcontract, all inclusive price	4,400.13 cy	-	-	52,802	-	-	12.00 /cy	52,802	20.01 /cy	88,053
					Concrete, ready mix, 3500 psi	4,400.13 CY	-	451,014	-	-	-	102.50 /CY	451,014	170.93 /CY	752,120
					Add for concrete waste, 3500 psi	220.01 cy	-	22,551	-	-	-	102.50 /cy	22,551	170.93 /cy	37,606
					Placing concrete, concrete pump	4,400.13 cy	118,196	-	-	-	-	26.86 /cy	118,196	44.80 /cy	197,107
					Polyethylene vapor barrier, 10 mil thick	264.01 sq	2,527	1,584	-	-	-	15.57 /sq	4,111	25.97 /sq	6,855
					03-00-99-00 Concrete Blind, 54"	4,400.13 CY	127,342	475,412	52,802			148.99 /CY	655,556	248.45 /CY	1,093,220
				31-16-01-00	Earthworks, Sheeting and Shoring										
					Shoring, sheet pile, subcontracted	20,844.00 sf	-	-	625,320	-	-	30.00 /sf	625,320	50.03 /sf	1,042,797
					31-16-01-00 Earthworks, Sheeting and Shoring	20,844.00 SF			625,320			30.00 /SF	625,320	50.03 /SF	1,042,797
				31-19-01-00	Site Preparation, Dewatering, Sump Pump										
					Dewatering Minor, Generator and Pumps, Mob	2.00 ea	-	-	3,000	-	-	1,500.00 /ea	3,000	2,501.44 /ea	5,003
					Dewatering Minor, Set-up Generator and Install Pumps	4.00 ea	1,257	-	-	375	-	407.82 /ea	1,631	680.09 /ea	2,720
					Dewatering Minor, Sump Rock, delivered	21.30 cy	-	426	-	-	-	20.00 /cy	426	33.35 /cy	710
					Dewatering Minor, Large Generator and 2 Pumps, Rental, Monthly	12.00 mo	-	-	-	114,398	-	9,533.15 /mo	114,398	15,897.69 /mo	190,772
					Dewatering Minor, Generator and Pumps, Operation - Labor to maintain / check pumps/ fuel and lube	12.00 mo	321,373	-	-	62,245	-	31,968.24 /mo	383,619	53,310.93 /mo	639,731
					Dewatering Minor, Remove Generator and Pumps	4.00 ea	1,257	-	-	375	-	407.82 /ea	1,631	680.09 /ea	2,720
					Dewatering Minor, Generator and Pumps, Demob	2.00 ea	-	-	3,000	-	-	1,500.00 /ea	3,000	2,501.43 /ea	5,003
					31-19-01-00 Site Preparation, Dewatering, Sump Pump	6.00 MO	323,887	426	6,000	177,392		84,617.54 /MO	507,705	141,110.04 /MO	846,660
				31-25-01-00	Earthworks, Structural, Excavation										
					Structural Excavation, Excavator and Trucks, Large Crew, 20' and greater depth	31,078.87 cy	87,451	-	-	135,840	-	7.19 /cy	223,291	11.98 /cy	372,365
					Grade/ Scarify and Recompact bottom of excavation, Dozer and Traxcavator or Loader, Large Crew	2,933.40 sy	6,001	-	-	6,032	-	4.10 /sy	12,032	6.84 /sy	20,065
					Import Aggregate Base - bedding, Dozer and Traxcavator or Loader, Large Crew	1,367.80 tn	3,917	27,356	-	3,937	-	25.74 /tn	35,211	42.93 /tn	58,718
					Import Aggregate Base - pipe zone, Dozer and Traxcavator or Loader, Large Crew	8,760.00 tn	28,276	175,200	-	33,298	-	27.03 /tn	236,774	45.07 /tn	394,850
					Structural Backfill & compaction, native material, Dozer and Traxcavator or Loader, Large Crew	8,176.00 cy	21,993	-	-	25,898	-	5.86 /cy	47,891	9.77 /cy	79,864
					Load Excess for Hauling, Rubber Tire Loader, Cat 950	19,198.53 cy	4,197	-	-	5,215	-	0.49 /cy	9,411	0.82 /cy	15,694
					Haul / Remove Excess, 12 yd capacity, 15 miles RT	19,198.53 cy	42,407	-	-	83,386	-	6.55 /cy	125,794	10.93 /cy	209,776
					Dump Charges for For Excess, 12 yd tandem, per cy	19,198.53 cy	-	239,982	-	-	-	12.50 /cy	239,982	20.85 /cy	400,199



Detail Report

Job Size:
Duration:

Project: Newport CSO Rev0 7-27-201
Project No.: 401892
Design Stage: Concept

Estimator: Tweneboa-Kodua, A
Revision / Date: Rev01/27JUL2012
Estimate Class: 4

Fac	Work Pkg	Trade Pkg	Work Activity	Unit Price	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	Grand Total Unit Price	Grand Total
					31-25-01-00 Earthworks, Structural, Excavation	31,078.87 CY	194,242	442,538		293,606		29.94 /CY	930,386	49.92 /CY	1,551,531
					33-40-03-02 Pipeline Structures, Storage Conduit										
					Purchase concrete storage conduit, 8' x 14' culvert	2,150.00 LF		1,709,250	-		-	795.00 /LF	1,709,250	1,325.76 /LF	2,850,382
					Install concrete storage conduit, 8' x 14' culvert	2,150.00 LF	553,658	107,500	-	497,135	-	538.74 /LF	1,158,293	898.42 /LF	1,931,595
					33-40-03-02 Pipeline Structures, Storage Conduit	2,150.00 LF	553,658	1,816,750		497,135		1,333.74 /LF	2,867,543	2,224.18 /LF	4,781,977
					TBK-208 Storage Conduit	2,150.00 LF	1,199,129	2,735,126	684,122	968,133		2,598.38 /LF	5,586,510	4,333.11 /LF	9,316,185
					33-40 Pipeline Structures	2,150.00 LF	1,199,129	2,735,126	684,122	968,133		2,598.38 /LF	5,586,510	4,333.11 /LF	9,316,185
					33.0 Buried Piping	2,590.00 LF	1,211,697	2,772,789	694,124	979,418		2,184.57 /LF	5,658,028	3,643.03 /LF	9,435,449
	43.0				Process Equipment										
		43-05			Furnish and Install Process Equipment										
			TBK-443		Precast Duplex Pump Station										
				43-00-01-01	Duplex Pump Station										
					Precast duplex pump station complete including electrical & controls bldg and all related works	1.00 ea			450,000	-	-	450,000.00 /ea	450,000	750,429.71 /ea	750,430
					43-00-01-01 Duplex Pump Station				450,000			/EA	450,000	/EA	750,430
					TBK-443 Precast Duplex Pump Station	3.00 EA			450,000			150,000.00 /EA	450,000	250,143.24 /EA	750,430
					43-05 Furnish and Install Process Equipment	1,600.00 SF			450,000			281.25 /SF	450,000	469.02 /SF	750,430
					43.0 Process Equipment	1.00 SF			450,000			450,000.00 /SF	450,000	750,429.71 /SF	750,430
					OS-2 WPCP STORAGE	1.80 MG	1,224,860	2,775,086	1,162,490	987,898		3,416,852.26 /MG	6,150,334	5,698,016.62 /MG	10,256,430

Cost for Upsizing Wellington Forcemain (CU-5)

Assumptions:

Open cut construction
PVC
730 feet long
14" diameter

Summary of Costs:

Construction Costs ¹	\$ 125,838
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¹Does not include any markups, additional project costs, escalation, or location adjustment

WPCP Upgrade & Expansion Costs for Selected SMP Projects

Estimated WPCP upgrade and expansion costs for selected SMP projects are detailed in this section.

TABLE G-13

Cost Estimate for WPCP Upgrade & Expansion

WPCP-1.1 Option 1 (headworks, disinfection, solids handling)

WPCP-1.2 Option 2 (primary clarifiers)

WPCP-1.3 Option 3 (aeration tank & final clarifier)

Unit Operation/Process	Existing Plant Capacity			Future Plant Capacity			Option 1	Option 2	Option 3	
	Average Day (MGD)	Max. Day (MGD)	Wet Weather Capacity (MGD)	Average Day (MGD)	Max. Day (MGD)	Wet Weather Capacity (MGD)				
Headwork	11	22	22	15.3	30	30	\$3,745,000	\$3,745,000	\$3,745,000	
Primary Clarifier	14	20	20	14.4	20	30		\$4,715,000	\$4,715,000	
Aeration Tank	15	18	22	18	20	30			\$5,125,000	
Final Clarifier	15	18	22	15.3	20	30			\$3,215,000	
Disinfection	14	14	14	15.3	20	30	\$1,975,000	\$1,975,000	\$1,975,000	
Solid Processing	11	n/a	n/a	15.3	20	n/a	\$4,845,000	\$4,845,000	\$4,845,000	
Total Cost¹							\$10,565,000	\$15,280,000	\$23,620,000	
Average Day (MGD)							14	14.4	14.4	
Maximum Day (MGD)							20	20	20	
Overall Plant Capacity							Wet Weather Capacity (MGD)	20	22	30

¹ Total cost includes 15% markup for engineering and a 10% markup for construction management and administration

TABLE G-14

Cost Estimate for WPCP Upgrade & Expansion

Unit Operation/Process	Cost	Cost with Markups (10% overhead, 5% profit, 6% mob/bonds/insurance)	Contingency (30%) ¹	10% Design	Construction Cost Subtotal
Headworks Screening and Grit	\$ 1,770,000	\$ 2,142,000	\$ 2,785,000	\$ 3,064,000	\$ 3,070,000
Gravity Thickener	\$ 960,000	\$ 1,162,000	\$ 1,511,000	\$ 1,662,000	\$ 1,670,000
Gravity Belt Thickener	\$ 1,440,000	\$ 1,742,000	\$ 2,265,000	\$ 2,492,000	\$ 2,500,000
Disinfection Basin Upgrades	\$ 750,000	\$ 908,000	\$ 1,180,000	\$ 1,298,000	\$ 1,300,000.0
Primary Clarifier Mechanisms & Sludge Pumps	\$ 2,330,000	\$ 2,819,000	\$ 3,665,000	\$ 4,032,000	\$ 4,040,000
Flow Splitting	\$ 130,000	\$ 157,000	\$ 204,000	\$ 224,000	\$ 230,000
Aeration Basins	\$ 2,570,000	\$ 3,110,000	\$ 4,043,000	\$ 4,447,000	\$ 4,450,000
Secondary Clarifiers Upgrades	\$ 1,330,000	\$ 1,609,000	\$ 2,092,000	\$ 2,301,000	\$ 2,310,000

¹Contingency for construction cost estimate

TABLE G-15

Cost Estimate for WPCP Upgrade & Expansion Site Work

Unit Operation/Process	Cost	Cost with Markups (10% overhead, 5% profit, 6% mob/bonds/insurance)	Contingency (30%) ¹	10% Design	Construction Cost Subtotal
Demolition	\$ 530,000	\$ 642,000	\$ 835,000	\$ 919,000	\$ 920,000
Overall Sitework	\$ 530,000	\$ 642,000	\$ 835,000	\$ 919,000	\$ 920,000
Plant Computer System					
Yard Electrical	\$ 530,000	\$ 642,000	\$ 835,000	\$ 919,000	\$ 920,000
Yard Piping	\$ 740,000	\$ 896,000	\$ 1,165,000	\$ 1,282,000	\$ 1,290,000
Total Cost					\$ 4,050,000
Cost of Site Work per Unit Operation/Process					\$ 675,000

¹Contingency for construction cost estimate

TABLE G-16

Summary of Cost Estimate for WPCP Upgrade & Expansion Work (Includes Site Work Cost)

Unit Operation/Process	Construction Cost
Headwork	\$ 3,745,000
Disinfection	\$ 1,975,000
Solid Handling	\$ 4,845,000
Primary Clarifier	\$ 4,715,000
Aeration Basins	\$ 5,125,000
Final Clarifier	\$ 3,215,000

TABLE G-17

Cost Estimate for WPCP Upgrade & Expansion, CEPT (WPCP 1.4)

WPCP Upgrade & Expansion, CEPT	
CEPT Chemical Dosing/Storage Building	\$ 1,280,000
Flocculation Basin	\$ 660,000
UV Disinfection	\$ 1,720,000
Chemical Storage/Dosing	
Demolition	\$ 20,000
Overall Sitework	\$ 20,000
Plant Computer System	
Yard Electrical	\$ 20,000
Yard Piping	\$ 620,000
Subtotal	\$ 4,340,000
Overhead 15%	\$ 651,000
Profit 5%	\$ 217,000
Mob/Bonds/Insurance	\$ 34,720
Construction Cost	\$ 5,242,720

Operations and Maintenance Costs for Selected SMP Projects

Estimated operations and maintenance costs for selected SMP projects are detailed in this section.

TABLE G-18

Operations and Maintenance Costs for Inflow/Infiltration Projects

Project Component	Number of units	hp per unit	Total hp	Total KW	Number of CSO Events per Year	Hours in Operation per CSO Event	Total Hours per Year	Total kwhr/year	Annual Demand Charge	Power Cost per CSO Event	Annual Power Cost	Annual Equipment Parts or Chemical Cost	Labor Hours per Event	Annual Labor Cost	Total Annual O&M Cost	Comments	
Wellington CSO Facility																	
Screens-Power	2	3	6	5	12	12	144	678	\$406	\$7	\$485						
Effluent Pumps-Power	4	75	300	235	12	12	144	33,910	\$20,289	\$328	\$24,230						
Chemical Feed pumps-Power	1	3	3	2	12	12	144	339	\$203	\$3	\$242						
Chemicals												\$609					1,000 gal @ \$0.609/gal
Equipment Parts												\$7,000					UW estimate
Labor													8	\$3,648			4 hr/event x 2 operators
Total																\$36,214	
Washington CSO Facility																	
Screens-Power	2	1	2	2	12	12	144	226	\$135	\$2	\$162						
Effluent Pumps-Power	4	75	300	235	12	12	144	33,910	\$20,289	\$328	\$24,230						
Chemical Feed pumps-Power	2	5	10	8	12	12	144	1,130	\$676	\$11	\$808						
Dewatering Pumps-Power	2	10	20	16	12	12	144	2,261	\$1,353	\$22	\$1,615						
Chemicals												\$1,827					3,000 gal @ \$0.609/gal
Equipment Parts												\$9,000					UW estimate
Labor													36	\$16,416			18 hr/event x 2 operators
Total															\$54,057		

TABLE NOTES:

Power Unit Cost \$/kwhr	Monthly Demand Charge Unit Cost \$/kw	Labor Rate \$/hr
\$0.1162	\$7	\$38

TABLE G-19

CSO Reduction (Percentage) - For Prorating O&M Cost

Alternative	WSCSO % Reduction	WASCO % Reduction
Catch basins	15%	0%
Downspouts	19%	45%
Complete Elimination	100%	100%

TABLE G-20

O&M Costs by Alternative

	Added Annual O&M Costs	Reduced Annual O&M Costs	Net Relative O&M Costs
Baseline	\$0	\$8,109	(\$8,109)
Completed Elimination	\$0	\$92,000	(\$92,000)
Downspout Disconnection II-4	\$0	\$26,567	(\$26,567)
Inflow Reduction - Private Sources (Not Including Downspouts) II-A ¹	\$0	\$62,673	(\$62,673)
Inflow Reduction - Public Sources II - B ¹	\$0	\$2,760	(\$2,760)
Additional Inflow Removal (to Achieve 50% Inflow Removal) ²	\$0	\$46,000	(\$46,000)

¹Assumed 97% O&M cost reduction for private sources. Assumed 3% O&M cost reduction for public sources.

²Assumed removal of 50% inflow sources and downspout disconnections would result in 80% reduction in O&M costs.

TABLE G-21

Operations and Maintenance Cost Estimate for Increased Pumping Capacity/Better Use of System Capacity S0-2

Cost Component	Unit Cost	No.	Units	Annual Cost	Comments/Assumptions
Additional Power Costs					
Power Consumption	\$68	12	event/yr	\$821	Additional power consumption for third pump only. Assuming 95% efficient motor.
Power Demand	\$704	12	month/yr	\$8,454	
Equipment Costs					
Pump Parts	\$4,000	1	pump/yr	\$4,000	Parts cost for additional pump usage (estimate)
Total Annual O&M Cost				\$13,275	

Cost Assumption:

CSO Events Per Year	12
Pump Power (hp)	125
Motor Efficiency	95%
Hrs of Operation Per CSO Event	6
Cost Per Kwhr	\$0.12
Monthly Demand Charge per Kw	\$7

TABLE G-22

Operations and Maintenance Cost Estimate for Increased Pumping Capacity/Better Use of System Capacity S0-2

Cost Component	Unit Cost	No.	Units	Annual Cost	Comments/Assumptions
Additional Power Costs					
Power Consumption	\$41	12	event/yr	\$493	Additional power consumption for third pump only. Assuming 95% efficient motor.
Power Demand	\$423	12	month/yr	\$5,072	
Equipment Costs					
Pump Parts	\$4,000	1	pump/yr	\$3,000	Parts cost for additional pump usage (estimate)
Total Annual O&M Cost				\$8,565	

Cost Assumptions:

CSO Events Per Year	12
Pump Power (hp)	125
Motor Efficiency	95%
Hrs of Operation Per CSO Event	6
Cost Per Kwhr	\$0.12
Monthly Demand Charge per Kw	\$7

TABLE G-23

Operations and Maintenance Cost Estimate for Increased Pumping Capacity/Better Use of System Capacity S0-2

Long Wharf Pump Station Total O&M Cost	\$13,275
Wellington Pump Station Total O&M Cost	\$8,565
Cost Estimate for Increased Pumping Capacity/Better Use of System Capacity O&M Cost	\$21,840

TABLE G-24
Operations and Maintenance Cost Estimate for Enhanced CSO Treatment at Wellington (CSOT - 1.1)
Yearly Maintenance Costs

Description	Quantity	Unit	Unit Cost	Subtotal	Contingency (15%)	Total Cost
Polymer Addition	6508	lbs	\$ 2.00	\$ 13,000	\$ 1,950	\$ 15,000
Electrical Usage	10579	kwh	\$ 0.12	\$ 1,000	\$ 150	\$ 1,000
Chemical (Ferric) Cost	32516	lb	\$ 0.40	\$ 13,000	\$ 1,950	\$ 15,000
Microsand	488	lb	\$ 0.40	\$ -	\$ -	\$ -
Sludge Disposal @ 6 %	1220	wet tons	\$82	\$ 100,000	\$ 15,000	\$ 115,000
Operations Labor ¹	312	hrs	\$ 38.00	\$ 12,000	\$ 1,800	\$ 14,000
Total Operations and Maintenance Costs				\$139,000	\$20,850	\$ 160,000

¹ Assumes 12 events X 12 hrs/event X 2 operators

TABLE G-25
Operations and Maintenance Cost Estimate for Enhanced CSO Treatment at Washington (CSOT - 1.2)
Yearly Maintenance Costs

Description	Quantity	Unit	Unit Cost	Subtotal	Contingency (15%)	Total Cost
Polymer Addition	6508	lbs	\$ 2.00	\$ 13,000	\$ 1,950	\$ 15,000
Electrical Usage	10579	kwh	\$ 0.12	\$ 1,000	\$ 150	\$ 1,000
Chemical (Ferric) Cost	32516	lb	\$ 0.40	\$ 13,000	\$ 1,950	\$ 15,000
Microsand	488	lb	\$ 0.40	\$ -	\$ -	\$ -
Sludge Disposal @ 6 %	1220	wet tons	\$82	\$ 100,000	\$ 15,000	\$ 115,000
Operations Labor ¹	312	hrs	\$ 38.00	\$ 12,000	\$ 1,800	\$ 14,000
Total Operations and Maintenance Costs				\$139,000	\$20,850	\$ 160,000

¹Assumes 12 events X 12 hrs/event X 2 operators

TABLE G-26

Operations and Maintenance Costs for Selected SMP Projects

Project Component	Number of units	hp per unit	Total hp	Total KW	Number of CSO Events per Year	Hours in Operation per CSO Event	Total Hours per Year	Total kwhr/year	Annual Demand Charge	Power Cost per CSO Event	Annual Power Cost	Annual Equipment Parts or Chemical Cost	Labor Hours per Event	Annual Labor Cost	Total Annual O&M Cost
CU-2 Catchment 10 Reroute (new 3.5 mgd PS)															
Power	2	60	120	94	365	6	2,190	206,284	\$8,116	\$66	\$32,086		2	\$27,740	\$68,826
Equipment Parts												\$9,000			
CU-3 Additional Pumping Long Wharf (Bigger pumps - 3, 14 mgd pumps)															
Power	3	25	75	59	365	6	2,190	128,928	\$5,072	\$41	\$20,054		0	\$0	\$20,054
Equipment Parts															
CU-4 Additional Pumping of WACSOTF Sanitary Pumps (2 mgd)															
Power	3	25	75	59	40	6	240	14,129	\$5,072	\$41	\$6,714		0	\$0	\$15,714
Equipment Parts												\$9,000			
OS-2 WPCP Storage (2MG)															
Power	2	10	20	16	40	8	320	5,024	\$1,353	\$15	\$1,936		8	\$12,160	\$24,096
Equipment Parts												\$10,000			
OS-11 Washington CSO Facility Storage (3MG)															
Power	2	20	40	31	40	8	320	10,047	\$2,705	\$29	\$3,873		8	\$12,160	\$26,033
Equipment Parts												\$10,000			
OS-19 King Park, Wellington Ave by CSO Facility, Storage (0.9MG)															
Power	2	30	60	47	40	8	320	15,071	\$4,058	\$44	\$5,809		8	\$12,160	\$27,969
Equipment Parts												\$10,000			

TABLE NOTES:

Power Unit Cost \$/kwhr	Monthly Demand Charge Unit Cost \$/kw	Labor Rate \$/hr
\$0.1162	\$7	\$38

TABLE G-27
Operations and Maintenance Cost Estimate for WPCP Upgrade & Expansion, CEPT (WPCP 1.4)

Description	Quantity	Unit	Unit Cost	Subtotal	Total Cost (with 15% Contingency)
Polymer Addition 20lb/dton	5,648	lb	\$ 2.00	\$ 11,000	\$ 13,000
Electrical Usage	17,904	kwh	\$ 0.12	\$ 2,000	\$ 2,000
Chemical (Ferric) Cost	507,315	lb	\$ 0.40	\$ 203,000	\$ 233,000
Sludge Disposal @ 20 %	1,412	wet tons	\$ 82.00	\$ 116,000	\$ 133,000
Operations Labor	960	hrs	\$ 38.00	\$ 37,000	\$ 43,000
Total Operations and Maintenance Cost¹					\$ 424,000

¹Assumes 40 events X 12 hrs/event X 2 operators