

Final Draft Technical Memorandum

Preliminary Assessment for Disposal of Waste Flows From the Proposed scwd² Seawater Desalination Plant To the City of Santa Cruz's Sanitary Sewer System

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Purpose

The main objective of this task is to assess the potential impacts of the proposed Seawater Desalination Plant with respect to disposal of waste flows to the City's wastewater collection system and processing the waste flows at the City's Wastewater Treatment Facility (WWTF). The two largest potential waste flows were evaluated in this assessment: 1) concentrated sludge from the proposed clarifiers/thickeners; and 2) chemically enhanced backwashes (CEBs) from the proposed microfiltration/ultrafiltration membranes. The primary concerns raised by the City of Santa Cruz Public Works Department included:

- Potential that anticipated waste flows will exceed the hydraulic capacity of the existing collection system
- Potential impacts of total suspended solids (TSS) of up to 2 percent dry solids by weight entering the collection system; typically the City limits discharges to 0.3 percent (3,000 mg/L) or less
- Ability of the collection system to convey the waste flows (with potentially high concentrations of suspended solids) to the WWTF; potential for settling of solids, partial blockages and reduction of flow capacity
- Potential impact of increased salinity on the treatment process at the WWTF

CDM Smith conducted a preliminary analysis to help scwd² and Public Works better understand the potential impacts of discharging waste flows to the City's wastewater system, and commented on the feasibility of the proposed disposal strategy. The findings are summarized in this Technical Memorandum.

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Summary

Hydraulic Capacity in the Collection System - The assessment included a wide range of potential waste flow scenarios which resulted in estimated flows ranging from approximately 2,000 gallons per day (gal/d) to 233,000 gal/d. The City's existing wastewater collection system appears to be adequately sized to convey the anticipated waste flows from the proposed Seawater Desalination Plant to the existing WWTF. **Hydraulic capacity at the City's WWTF was not addressed in this assessment.**

Solids Deposition in the Collection System - The additional solids from the proposed Seawater Desalination plant could range from 340 pounds per day (lbs/d) to 5,230 lbs/day; however the high solids loading is anticipated to occur only 30 days (4 weeks) per year. The City's existing wastewater collection system from Delaware Avenue to Chace Street includes several pipe segments with slopes less than 0.3 percent. These low slopes produce in-pipe velocities less than 2.0 feet per second, the generally accepted minimum recommended velocity to keep solids in suspension. The extent of settling or maintenance required for the collection system in the area of the proposed project is not fully understood at this time. The additional solids could potentially exacerbate settling of solids in the collection system. However, additional monitoring and intermittent maintenance of the collection system should be considered as design progresses and a disposal strategy is developed and implemented.

Salinity Impacts on Wastewater Treatment - Under the anticipated range of conditions, salinity at the City's existing WWTF will increase from its current average of approximately 1,000 milligrams per liter (mg/L) to a range of approximately 1,010 to 2,230 mg/L. Experience and research literature suggest that salinity will not begin to adversely affect wastewater treatment processes until the salinity exceeds approximately 10,000 mg/L. Based on this assessment, waste flows from the proposed Seawater Desalination Plant will not significantly impact treatment at the City's WWTF even under the most conservative and unlikely "worst case" scenarios.

Assumptions

The following assumptions for the proposed Seawater Desalination Plant were discussed with scwd² and Public Works prior to initiating the evaluations:

- Two potential drinking water plant capacities will be evaluated: 1) Proposed initial drinking water production capacity of 2.5 mgd; and 2) Potential future (ultimate) drinking water production capacity of 4.5 mgd.
- Initial solids production: 1) Average solids production of 340 pounds per day (lbs/d) at average drinking water production of 1.6 million gallons per day (mgd); and 2) Maximum solids production 2,950 lbs/d at 2.5 mgd; average solids production will occur approximately 335 days or 48 weeks per year
- Ultimate solids production: 1) Average solids production of 590 pounds per day (lbs/d) at average drinking water production of 3.0 million gallons per day (mgd); and 2) Maximum solids production 5,230 lbs/d at 4.5 mgd; maximum solids production will occur approximately 30 days or 4 weeks per year

- Range of total suspended solids (TDS) for sludge will be 0.30 to 2.0 percent dry solids by weight; corresponds to 3,000 to 20,000 milligrams per liter (mg/L).
- TSS in the collection system (primarily leachate from the landfill) is approximately 0.01 percent dry solids by weight; corresponds to 100 mg/L.
- Total dissolved solids (TDS) in the sludge will be approximately 36,000 mg/L.
- TDS in the influent to the WWTF is approximately 1,000 mg/L.
- Chemically enhanced backwashes (or CEBs) will consist of approximately: 1) 16,000 gallons per day (gpd) for the Initial production capacity of 2.5 mgd; and 2) 24,000 gallons per day (gpd) for the Ultimate production capacity of 4.5 mgd.
- CEBs will include TSS of 0.01% dry solids by weight (100 mg/L) and TDS of 36,000 mg/L.
- Because CEBs may be discharged to the sanitary sewer or recycled at the proposed Seawater Desalination Plant, this preliminary assessment evaluated the impacts of both alternatives on TSS, TDS and in-pipe velocities.
- The waste flows disposal evaluation will not evaluate the disposal of membrane cleaning solutions due to the relatively small volumes, low TSS and infrequent discharges (typically monthly) associated with these waste streams.

Anticipated Site of Proposed Seawater Desalination Plant

The proposed **scwd**² Seawater Desalination Plant will likely be located on the West side of the City of Santa Cruz in the industrial area generally bounded by Natural Bridges Drive to the West, Mission Boulevard to the North, Swift Avenue to the East, and Delaware Avenue to the South. Figure 1 presents a map of the City's wastewater collection system and illustrates:

- Approximate area that includes the designated potential sites for the proposed Seawater Desalination Plant.
- Point at which leachate from the City's landfill is discharged into the collection system near Mission Boulevard and Natural Bridges Drive is also shown on the map.
- Potential discharge points from the proposed Seawater Desalination Plant to the City's wastewater collection system.
- Anticipated route of flow through the existing collection system to the WWTF.

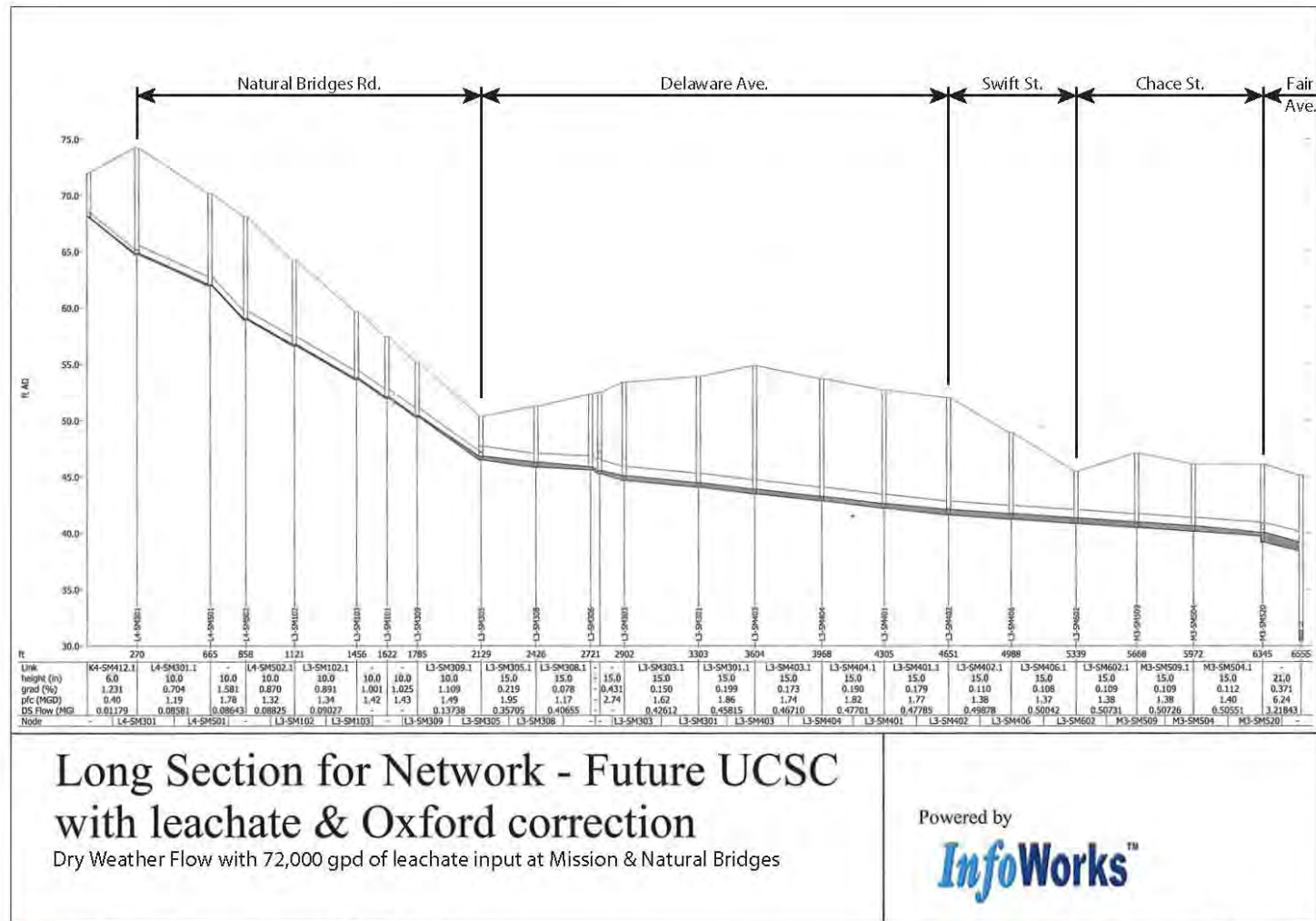
The City also provided two (2) profiles of the wastewater collection system piping that would likely convey the waste streams from the proposed Seawater Desalination Plant to the existing WWTF:

- Figure 2: Dry Weather Flow with 72,000 gpd of leachate.
- Figure 3: Wet Weather Flow with 72,000 gpd of leachate.

The City provided leachate flow data from July 2003 through June 2012; this information is presented in Appendix A.



Figure 1
Map of Potential WTP Sites and
Proposed Route for Conveyance of Residuals



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Figure 2
Existing Collection System Profile and Dry Weather Flow Data



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Evaluation Procedures and Results

The Solids Disposal Assessment consisted of the following four (4) procedures:

1. Calculate the anticipated waste flows (in gallons per day or gpd) that would be discharged from the proposed Seawater Desalination Plant at the initial production capacity of 2.5 mgd and the potential future (ultimate) production capacity of 4.5 mgd.
2. Estimate the TSS in the collection system using the assumptions listed above and the monthly leachate flow data. This assessment only calculated the TSS for the combined leachate and waste flows; and did not account for additional dilution that would occur in collection system.
3. Calculate the total flow in collection system and estimate the in-pipe velocity. The assessment included the projected waste flows and the dry weather and wet weather flows at several locations along the anticipated route from the proposed Seawater Desalination Plant to the existing WWTF.
4. Calculate the salinity of the influent to the WWTF. The assessment calculated the TDS at the influent to the existing WWTF assuming that the waste flows from the proposed Seawater Desalination Plant will mix with existing sanitary sewer flows as they travel through the collection system and combine with other flows at the headworks of the WWTF.

Each of these procedures was conducted using the assumptions listed above and data provided by the City. At this preliminary stage of design, the intent of the assessment is to develop understanding of how solids and salinity from the proposed Seawater Desalination Plant might impact collection and treatment at the existing WWTF under the range of anticipated flows and water quality conditions. Further discussions, refinement of the assumptions and additional calculations will be required advance the design and develop a comprehensive solids disposal strategy and operating procedures.

To evaluate the anticipated range of values, calculations were developed for the eight (8) scenarios shown in Table 1.

Table 1: Waste Flows Disposal Scenarios Evaluated in Preliminary Assessment

Scenario Number	Wastewater Flow Conditions		Solids Production ¹		Waste Flows ²	
	Dry Weather	Wet Weather	Average (lbs/d)	Maximum (lbs/d)	Sludge Only	Sludge and CEBs
Proposed Initial Drinking Water Production Capacity of 2.5 mgd						
1	X		340		X	
2	X		340			X
3	X			2,950	X	
4	X			2,950		X
5		X	340		X	
6		X	340			X
7		X		2,950	X	
8		X		2,950		X
Ultimate Drinking Water Production Capacity of 4.5 mgd						
9	X		590		X	
10	X		590			X
11	X			5,230	X	

Table 1: Waste Flows Disposal Scenarios Evaluated in Preliminary Assessment

Scenario Number	Wastewater Flow Conditions		Solids Production ¹		Waste Flows ²	
	Dry Weather	Wet Weather	Average (lbs/d)	Maximum (lbs/d)	Sludge Only	Sludge and CEBs
12	X			5,230		X
13		X	590		X	
14		X	590			X
15		X		5,230	X	
16		X		5,230		X

¹ Sludge flow volumes and corresponding in-pipe TSS calculations were evaluated based on thickening the sludge to 0.3, 0.5, 1.0, 1.5 and 2.0% dry solids by weight.

² Total daily volume for chemically enhanced backwashes (CEBs) assumed to be 16,000 gpd for scenarios under the Initial Drinking Water Production Capacity of 2.5 mgd; and 24,000 scenarios under the Ultimate Drinking Water Production Capacity of 4.5 mgd.

Calculate Anticipated Waste Flows

Estimated waste flows from the proposed Seawater Desalination Plant are presented in Table 2. The values were prepared for average and maximum solids production at the Initial and Ultimate capacities of 2.5 and 4.5 mgd, respectively.

The proposed gravity thickeners/clarifiers will provide flexibility in operations, and staff will be able to control the approximate concentration of the sludge. CDM Smith calculated the waste flows volumes over a range of sludge concentrations ranging from 0.3 to 2.0 percent dry solids by weight to better understand the impacts of sludge concentration on TSS in the collection system.

Initial calculations indicated that sludge volumes can vary from approximately 2,000 gal/d (at 2% sludge during average solids conditions and plant production at 2.5 mgd) to nearly 209,000 gal/d (at 0.3% sludge during maximum solids conditions and plant production at 4.5 mgd). Knowing that CEBs could generate approximately 16,000 to 24,000 gpd/d of additional waste flows characterized by low solids (TSS 0.01% or 100 mg/L) and high salinity (TDS 36,000 mg/L), CDM Smith prepared calculations to assess the impacts of discharging the sludge and CEBs.

Table 2: Estimated Waste Flows from the Proposed Seawater Desalination Plant

Sludge Concentration (% by weight)	Sludge		CEBs		Average Waste Flows		Maximum Waste Flows	
	Average (gpd)	Maximum (gpd)	Recycled (gpd)	Discharged (gpd)	Sludge Only (gpd)	Sludge and CEBs (gpd)	Sludge Only (gpd)	Sludge and CEBs (gpd)
Proposed Initial Drinking Water Production Capacity of 2.5 mgd								
0.3	13,589	117,906	0	16,000	13,589	29,589	117,906	133,906
0.5	8,153	70,743	0	16,000	8,153	24,153	70,743	86,743
1.0	4,077	35,372	0	16,000	4,077	20,077	35,372	51,372
1.5	2,718	23,581	0	16,000	2,718	18,718	23,581	39,581
2.0	2,038	17,686	0	16,000	2,038	18,038	17,686	33,686
Ultimate Drinking Water Production Capacity of 4.5 mgd								
0.3	23,581	209,033	0	24,000	23,581	47,581	209,033	233,033
0.5	14,149	125,420	0	24,000	14,149	38,149	125,420	149,420
1.0	7,074	62,710	0	24,000	7,074	31,074	62,710	86,710
1.5	4,716	41,807	0	24,000	4,716	28,716	41,807	65,807
2.0	3,537	31,355	0	24,000	3,537	27,537	31,355	55,355

Estimate TSS in the Collection System and Assess Impacts of Sludge Thickening and Discharge of CEBs

CDM Smith calculated values for TSS after mixing waste flows from the proposed Seawater Desalination Plant (listed in Table 2) with the leachate flows from three years (January 2009 to December 2011) of monthly leachate flow data provided by the City. The assessment was limited to the “worst case” scenario with no additional flows in the collection system. In practice, additional flows in the collection system would further dilute the TSS of the combined flow as it travels through the system to the WWTF. The tables for the calculated TSS values are provided in Appendix B and the findings are summarized in the following paragraphs.

Proposed Initial Production Capacity of 2.5 mgd

- Average sludge production (340 lbs/d): At sludge concentrations ranging from 0.30 to 2.0 percent by weight, the inline TSS will range from 0.03 to 0.19 percent by weight; this range will occur with or without the disposal of CEBs, respectively, and would be anticipated to occur approximately 48 weeks per year.
- Maximum sludge production (2,950 lbs/d) and No CEBs Discharged: With no CEBs discharged and sludge concentrations ranging from 0.3 to 2.0 percent by weight, the following inline TSS concentrations will be observed approximately 4 weeks per year:
 - Sludge 0.30% by weight: 0.14 to 0.26% dry solids by weight
 - Sludge 0.50% by weight: 0.18 to 0.39% dry solids by weight
 - Sludge 1.00% by weight: 0.21 to 0.64% dry solids by weight
 - Sludge 1.50% by weight: 0.23 to 0.81% dry solids by weight
 - Sludge 2.00% by weight: 0.24 to 0.94% dry solids by weight
- Maximum sludge production (2,950 lbs/d) and CEBs Discharged: With CEBs discharges and sludge concentrations ranging from 0.30 to 2.0 percent by weight, , the following inline TSS concentrations will be observed approximately 4 weeks per year::
 - Sludge 0.30% by weight: 0.14 to 0.23% dry solids by weight
 - Sludge 0.50% by weight: 0.17to 0.33% dry solids by weight
 - Sludge 1.00% by weight: 0.20 to 0.50% dry solids by weight
 - Sludge 1.50% by weight: 0.21 to 0.60% dry solids by weight
 - Sludge 2.00% by weight: 0.22 to 0.66% dry solids by weight

Potential Future (Ultimate) Production Capacity of 4.5 mgd

- Average sludge production (590 lbs/d): At sludge concentrations ranging from 0.30 to 2.0 percent by weight, the inline TSS will range from 0.05 to 0.31 percent by weight; this range will occur with or without the disposal of CEBs and would be anticipated to occur approximately 48 weeks per year.

- Maximum sludge production (5,230 lbs/d) and No CEBs Discharged: With no CEBs discharged and sludge concentrations ranging from 0.3 to 2.0 percent by weight, the following inline TSS concentrations will be observed approximately 4 weeks per year:
 - Sludge 0.30% by weight: 0.19 to 0.27% dry solids by weight
 - Sludge 0.50% by weight: 0.25 to 0.43% dry solids by weight
 - Sludge 1.00% by weight: 0.32 to 0.76% dry solids by weight
 - Sludge 1.50% by weight: 0.36 to 1.01% dry solids by weight
 - Sludge 2.00% by weight: 0.38 to 1.22% dry solids by weight
- Maximum sludge production (5,230 lbs/d) and CEBs Discharged: With CEBs discharges and sludge concentrations ranging from 0.30 to 2.0 percent by weight, , the following inline TSS concentrations will be observed approximately 4 weeks per year:
 - Sludge 0.30% by weight: 0.17 to 0.25% dry solids by weight
 - Sludge 0.50% by weight: 0.23to 0.37% dry solids by weight
 - Sludge 1.00% by weight: 0.29 to 0.59% dry solids by weight
 - Sludge 1.50% by weight: 0.32 to 0.73% dry solids by weight
 - Sludge 2.00% by weight: 0.34 to 0.84% dry solids by weight

The calculations at the 2.5 mgd and 4.5 mgd production rates are based on daily averages and may require the discharges to be flow paced to coincide with periods of high and low flows in the collection system.

Note that seasonal flow variations and flow variations from year to year will impact the inline TSS. For example, leachate flows in 2009 were consistently lower than in 2010 or 2011, and therefore in 2009 the inline TSS was considerably higher for most months as compared to 2010 and 2011.

Estimate Collection System Velocities and Assess Potential for Solids Settling and Flow Restrictions

Inline velocity calculations were prepared for the six (6) pipe sections in the City's collection system as shown in Figure 4 and Table 3. To be consistent with the TSS calculations previously described in this memorandum, the inline velocities were calculated for: 1) wet weather and dry weather flows in the collection system; 2) average (340 lbs/d) and maximum (2,950 lbs/d) solids production; 3) waste flows consisting of sludge only and combined sludge and CEBs; and 4) variations in sludge concentrations ranging from 0.30 to 2.0 percent dry solids by weight.



Figure 4
Map of Pipe Segments Evaluated for Flow and Velocity

Table 3: Descriptions of Collection System Pipe Segments Included in the Velocity Assessment

Street Location	Segment (InfoWorks Model Link ID)	Pipe Diameter (inches)	Pipe Slope (%)	Capacity (mgd)
Natural Bridges Drive	L4-SM502.1	10	1.581	1.78
Natural Bridges Drive	L3-SM309.1	10	1.109	1.49
Delaware Avenue	L3-SM305.1	15	0.219	1.95
Delaware Avenue	L3-SM401.1	15	0.179	1.77
Chace Street	M3-SM504.1	15	0.112	1.40
Fair Avenue	Not Reported	21	0.371	6.24

Flow and velocity were calculated using Manning's equation; and the findings from the assessment are summarized in Table 4. The complete set of calculated values are provided in Appendix C.

Findings from the velocity assessment include:

- All segments evaluated have sufficient hydraulic capacity to convey the potential waste flows from the proposed Seawater Desalination Plant (2.5 mgd capacity) to the WWTF; this includes both sludge and CEBs.
- Pipe segments with slopes greater than 0.20% will consistently produce velocities greater than 2 feet per second (fps) in the collection system.
- Slopes less than 0.30% in the 15-inch pipe segments in Delaware Avenue (L3-SM301.1 AND L3-401.1) and Chace Street (M3-SM504.1) will result in velocities less than 2.0 feet per second (fps); the low velocities will occur with or without waste flows from the proposed Seawater Desalination Plant.

The results of the velocity evaluations represent average flows and would likely require discharges to be flow paced to coincide with periods of high and low flows in the collection system. Note that the proposed solids handling and disposal system could be operated to optimize discharges to meet objectives for suspended solids and velocities.

Table 4: Summary of Estimated Velocities in the City's Collection System

Scenarios			Inline Velocity (fps) at Selected Pipe Segments in the Distribution System ^{1, 2}					
Flow	Sludge	CEBs	Natural Bridges Dr. L4-SM502.1 D = 10-inch S = 1.581%	Natural Bridges Dr. L3-SM309.1 D = 10-inch S = 1.109%	Delaware Ave. L3-SM301.1 D = 15-inch S = 0.219%	Delaware Ave. L3-401.1 D = 15-inch S = 0.179%	Chace St. M3-SM504.1 D = 15-inch S = 0.112%	Fair Ave. Not Reported D = 21-inch S = 0.371%
Proposed Initial Drinking Water Production Capacity of 2.5 mgd								
Dry	Average	No	2.5	2.6	1.9	1.8	1.6	4.0
Dry	Average	Yes	2.5	2.6	2.0	1.9	1.8	4.0
Dry	Maximum	No	2.9-3.4	2.9-3.4	1.9-2.0	1.9-2.0	1.7	4.1
Dry	Maximum	Yes	2.6-3.4	2.7-3.2	1.9-2.0	1.9-2.0	1.9-2.0	4.1
Wet	Average	No	3.1	3.2	2.0	2.1	1.8	4.5
Wet	Average	Yes	3.0	3.2	2.5	2.1	1.8	4.6
Wet	Maximum	No	3.0-3.5	3.2-3.5	2.0-2.2	2.1-2.2	1.8-1.9	4.6
Wet	Maximum	Yes	3.1-3.5	3.2-3.5	2.0-2.2	2.0-2.1	1.8-1.9	4.5
Ultimate Drinking Water Production Capacity of 4.5 mgd								
Dry	Average	No	2.5-2.7	2.7	1.7	1.8	1.6	4.0
Dry	Average	Yes	2.6-2.7	2.7-2.8	1.9	1.8-1.9	1.6-1.7	4.0
Dry	Maximum	No	2.6-3.5	2.8-3.5	1.7-2.0	1.7-2.1	1.6-1.7	4.0
Dry	Maximum	Yes	3.0-3.8	2.8-3.5	1.9-2.1	1.8-2.1	1.8-2.0	4.0-4.1
Wet	Average	No	2.9-3.0	3.2	1.9-2.0	2.2	1.8	4.4
Wet	Average	Yes	3.2	3.3-3.4	2.0	2.2	2.1	4.5
Wet	Maximum	No	3.1-3.8	3.4-3.8	2.0-2.4	2.1	1.8-1.9	4.4
Wet	Maximum	Yes	3.4-4.0	3.4-3.8	2.1-2.5	2.1-2.2	1.8-1.9	4.5

¹Estimated velocities shown as ranges calculated for sludge concentrations ranging from 0.30 to 2.0%.

²Street locations, model ID (link ID), pipe diameter (D), and slope (S) shown for each pipe segment.

Estimate Salinity of Influent to the WWTF and Assess Potential Impacts on Treatment

Salinity from the sludge and CEBs discharged from the proposed Seawater Desalination Plant will blend with wastewater in the collection system and increase the average TDS of the influent to the City's WWTF. The calculations assumed the TDS in the City's wastewater will average 1,000 mg/L and the TDS of the potential discharges from the proposed Seawater Desalination Plant will average 36,000 mg/L.

Table 5 summarizes the calculated values for TDS in the blended WWTF influent from three (3) years of daily flow data (January 2009 through December 2010). The complete set of calculated TDS values are provided in Appendix D.

Table 5: Estimated Total Dissolved Solids in City's WWTF Influent

Scenario Sludge (% by wt)	Total Dissolved Solids 2009			Total Dissolved Solids 2010			Total Dissolved Solids 2011		
	Minimum (mg/L)	Average (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Average (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Average (mg/L)	Maximum (mg/L)
Proposed Initial Drinking Water Production 2.5 mgd; Low Solids Production (340 lbs/d); Sludge Only (No CEBs)									
0.30%	1,014	1,054	1,070	1,015	1,048	1,065	1,013	1,050	1,074
2.00%	1,002	1,008	1,010	1,002	1,007	1,010	1,002	1,007	1,011
Proposed Initial Drinking Water Production 2.5 mgd; Low Solids Production (340 lbs/d); Sludge and CEBs									
0.30%	1,031	1,116	1,151	1,033	1,104	1,142	1,029	1,118	1,162
2.00%	1,019	1,071	1,092	1,020	1,064	1,087	1,017	1,066	1,099
Proposed Initial Drinking Water Production 2.5 mgd; High Solids Production (2,950 lbs/d); Sludge Only; No CEBs									
0.30%	1,122	1,460	1,595	1,130	1,412	1,560	1,114	1,424	1,635
2.00%	1,018	1,070	1,091	1,020	1,062	1,085	1,017	1,064	1,097
Proposed Initial Drinking Water Production 2.5 mgd; High Solids Production (2,950 lbs/d); Sludge and CEBs									
0.30%	1,138	1,521	1,674	1,148	1,467	1,635	1,129	1,481	1,719
2.00%	1,035	1,133	1,172	1,037	1,119	1,162	1,033	1,122	1,184
Potential Future (Ultimate) Drinking Water Production 4.5 mgd; Low Solids Production (590 lbs/d); Sludge Only (No CEBs)									
0.30%	1,024	1,093	1,121	1,026	1,083	1,113	1,023	1,086	1,129
2.00%	1,004	1,014	1,018	1,004	1,013	1,017	1,003	1,013	1,019
Potential Future (Ultimate) Drinking Water Production 4.5 mgd; Low Solids Production (590 lbs/d); Sludge and CEBs									
0.30%	1,049	1,187	1,242	1,053	1,167	1,228	1,046	1,173	1,259
2.00%	1,029	1,108	1,141	1,030	1,097	1,132	1,027	1,100	1,150
Potential Future (Ultimate) Drinking Water Production 4.5 mgd; High Solids Production (5,230 lbs/d); Sludge Only; No CEBs									
0.30%	1,215	1,806	2,041	1,230	1,724	1,981	1,201	1,745	2,110
2.00%	1,032	1,123	1,160	1,035	1,111	1,151	1,030	1,114	1,171
Potential Future (Ultimate) Drinking Water Production 4.5 mgd; High Solids Production (5,230 lbs/d); Sludge and CEBs									
0.30%	1,240	1,897	2,156	1,256	1,805	2,090	1,224	1,829	2,233
2.00%	1,057	1,217	1,282	1,061	1,195	1,265	1,053	1,201	1,301

Preliminary findings from the TDS assessment are summarized in the following paragraphs.

Proposed Initial Production Capacity of 2.5 mgd

- Average sludge production discharged at 0.30% by weight will increase TDS to approximately 1,050 mg/L (5% increase) without CEBs; and increase TDS to approximately 1,110 mg/L (11% increase) with CEBs.
- Average sludge production discharged at 2.0% by weight will increase TDS to approximately 1,010 mg/L (1% increase) without CEBs; and increase TDS to approximately 1,070 mg/L (7% increase) with CEBs.
- Maximum sludge production discharged at 0.30% by weight will increase TDS to approximately 1,430 mg/L (43% increase) without CEBs; and increase TDS to approximately 1,490 mg/L (49% increase) with CEBs.
- Maximum sludge production discharged at 2.0% by weight will increase TDS to approximately 1,070 mg/L (7% increase) without CEBs; and increase TDS to approximately 1,120 mg/L (12% increase) with CEBs.

Potential Future (Ultimate) Production Capacity of 4.5 mgd

- Average sludge production discharged at 0.30% by weight will increase TDS to approximately 1,090 mg/L (9% increase) without CEBs; and increase TDS to approximately 1,180 mg/L (18% increase) with CEBs.
- Average sludge production discharged at 2.0% by weight will increase TDS to approximately 1,010 mg/L (1% increase) without CEBs; and increase TDS to approximately 1,100 mg/L (10% increase) with CEBs.
- Maximum sludge production discharged at 0.30% by weight will increase TDS to approximately 1,760 mg/L (76% increase) without CEBs; and increase TDS to approximately 1,840 mg/L (84% increase) with CEBs.
- Maximum sludge production discharged at 2.0% by weight will increase TDS to approximately 1,120 mg/L (12% increase) without CEBs; and increase TDS to approximately 1,200 mg/L (20% increase) with CEBs.

Conveyance and Treatment Implications

Potential Impact of Increased Solids in the Collection System

The potential discharge of sludge from the proposed 2.5 mgd Seawater Desalination Plant will increase solids loading in the collection system on average about 340 lbs/d when operating at the average production rate of 1.6 mgd. The anticipated solids will typically consist of precipitated iron oxides and inorganic particulates removed from the raw seawater by coagulation with ferric chloride (FeCl_3); no organic polymers will be used in the treatment process. Under normal conditions, a small fraction of the solids will be organic (from algae or natural organic matter in the seawater).

Although the characteristics of the solids have not been thoroughly studied, the average solids are not believed to cause fouling, odors, excessive nutrient loading or high biological or chemical oxygen demands.

The anticipated average discharge of solids to the collection system is not believed to result in significant settling or obstruction in the collection system beyond what is currently experienced. This conclusion is based on the following findings from the assessment for normal raw seawater conditions estimated to occur approximately 44 weeks per year:

- Total solids discharged will be low; approximately 340 lbs/d for the Initial Plant (2.5 mgd) and 590 lbs/day for the Ultimate Plant (4.5 mgd).
- After dilution in the collection system, the estimated concentration of solids will remain less than 0.30% by weight in the affected segments; this will occur if the sludge is discharged at concentrations up to 2.0% by weight.
- Velocities of wastewater in the affected segments of the collection system are determined primarily by the slopes; most velocities are above 2.0 fps which would tend to keep solids suspended.

The primary concern would be for solids to settle in several segments of the 15-inch diameter pipe in Delaware Avenue, Swift Street and Chace Street. In these segments, the slope of the 15-inch diameter

pipe ranges from 0.219 to 0.078 percent (or feet of vertical drop per 100 feet of horizontal length). The assessment showed that these pipe segments currently produce velocities below the recommended minimum of 2.0 fps. The increased flow from the proposed Seawater Desalination Plant would slightly increase the velocities, but not enough to consistently maintain the velocities at 2.0 fps or greater.

Under more challenging water quality conditions (e.g., red tide or storm events) with the proposed Seawater Desalination Plant operating at the design capacity of 2.5 mgd, the maximum solids loading is estimated at 2,950 lbs/d, increasing to 5,230 lbs/d at the 4.5 mgd. These conditions are not anticipated to last more than approximately 4 weeks per year; and may or may not coincide with maximum production at the proposed Seawater Desalination Plant. Therefore, the assessment presented in this memorandum simulates the anticipated “worst case” condition.

The assessment indicates that the collection system piping has sufficient hydraulic capacity to convey the anticipated flows to the WWTF. However, during the worst-case scenarios characterized by maximum solids production coinciding with dry weather flows, the inline TSS concentrations could range as high as approximately 0.9% (for 2% sludge discharged from the 2.5 mgd plant) to 1.2% (for 2% sludge discharged from the 4.5 mgd plant). As described above for the average conditions, the same concerns exist for the adverse conditions due to the low slope and potential settling of solids exist for the affected segments of the collection system in Delaware Avenue, Swift Street and Chace Street.

Potential Impact of Increased Salinity at the WWTF

The assessment indicates that the discharge of saline sludge and CEBs from the proposed Seawater Desalination Plant will increase the TDS of the influent to the City's WWTF from its current concentration of approximately 1,000 mg/L. Under average conditions (anticipated 48 weeks per year), the TDS of the influent to the WWTF will increase to a maximum of about 1,200 mg/L. During worst-case conditions (anticipated 4 weeks per year), TDS in the WWTF influent would rise to a range between of approximately 1,500 to 2,000 mg/L.

The anticipated increases in salinity will alter both the water chemistry and physical characteristics (such as density) of the influent; however, the relative changes would be considered small. Based on CDM Smith' experience and a brief literature search regarding the impacts of salinity on wastewater treatment, the anticipated discharges from the proposed Seawater Desalination Plant will not significantly impact the treatment requirements or performance at the City's WWTF.

From research and practical experience it can be concluded that salinity does not adversely impact treatment at municipal wastewater plants until the salt concentrations reach approximately 1% by weight (10,000 mg/L). The following excerpt from a paper titled Biological Treatment of High Salinity Wastewater Using Yeast and Bacterial Systems¹ acknowledges the potential adverse impacts that highly salinity can have on conventional wastewater treatment:

- *Limited extent of adaptation:* Conventional cultures cannot be effectively used to treat saline wastewaters with salt contents above 3%.

¹ Dan N. P. (2001) Biological Treatment of High Salinity Wastewater Using Yeast and Bacterial Systems. Bangkok, Thailand. Asian Institute of Technology School of Environment, Resources and Development

- *Sensitivity to changes in ionic strength:* Shifts in salt content from 0.5 to 2% usually cause disruptions in system performance. Rapid change in salt contents causes more adverse effects than gradual change. Equalization to constant salt content is necessary before biological treatment.
- *Reduced degradation kinetics:* Biological degradation rates decrease with increasing salt content. Therefore, saline wastewaters should be treated at lower food to mass ratios.
- *High effluent suspended solids:* Salt content in wastewater reduces the population of protozoa, resulting in low settleability. Salt content in wastewater increases the buoyancy forces, causing low sedimentation efficiencies.

Figure 5 (Kargi and Uygur, 1996²) illustrates the impact of salinity on removal of chemical oxygen demand (COD) in a rotating biodisc reactor. As salt concentration increases from zero to 1% (10,000 mg/L), there is little or no impact on COD removal as it remains at approximately 95%. As salinity increase from 1% to 3% (approximately the same salinity as seawater), COD removal decreases linearly to approximately 70%. COD removal efficiency drops to about 60% as salinity increases from 3% to 5%.

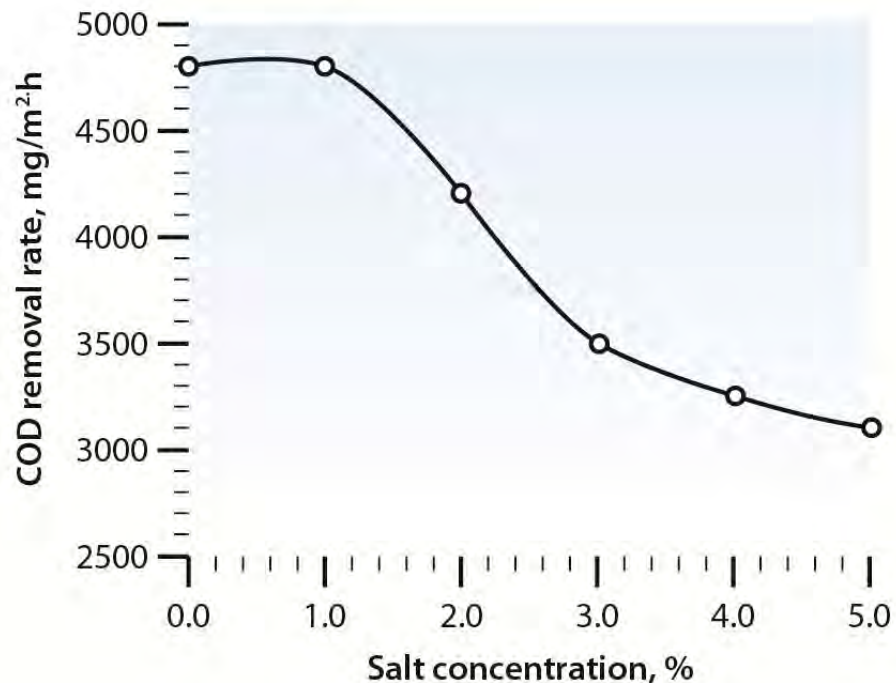


Figure 5
Impact of Salinity on Removal of Chemical Oxygen Demand
(Adapted from Kargi and Uygur, 1996)

² Kargi F. and Uygur A. (1996) Biological Treatment of Saline Wastewater in an Aerated Percolator Unit Utilizing Halophilic Bacteria. Env. Tech., 17, 325-320.

Next Steps

As the design of the proposed Seawater Desalination Plant advances, the following steps are recommended as part a more comprehensive and systematic plan to further develop the preferred disposal strategy for waste flows:

- **Assess Collection System-** Assess the condition, identify concerns, and document the type and frequency of maintenance procedures for the wastewater collection system from the anticipated point of discharge to the collection system.
- **Confirm Hydraulic Capacity-** Conduct additional hydraulic modeling for the collection system using the anticipated waste flows and a range of wet weather and dry weather flows to confirm initial results presented in this memorandum.
- **Expand Solids Deposition Analysis-** Calculate impacts of existing dry- and wet-weather wastewater flows on the dilution of TSS from the proposed Seawater Desalination Plant as the waste flows combine in the collection system to the WWTF.
- **Review Sludge Disposal Practices-** Review sludge disposal practices at the Graham Hill Water Treatment Plant, Beltz Filter Plant and possibly other drinking water treatment facilities. Document sludge characteristics, volumes, discharge schedules and the impacts or problems associated with discharging to wastewater collection systems.
- **Develop Design and Operating Criteria-** Establish design criteria to control solids deposition in the collection system; and develop monitoring and maintenance procedures to mitigate potential problems.

Appendix A

Leachate Flow Data from July 2003 through June 2012

City of Santa Cruz Resource Recovery Facility

Leachate Pump Records

Gallons of Leachate Treated

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	AVG	Daily
Jan		1,060,990	2,221,120	3,377,530	1,675,890	2,255,760	742,210	1,424,430	2,164,750	864,900	1,754,176	56,586
Feb		1,325,000	2,359,980	2,048,970	1,793,590	3,236,110	1,718,840	2,050,100	2,233,050	693,810	1,939,939	69,284
Mar		1,713,320	2,780,900	4,839,070	2,059,600	2,511,570	1,290,580	2,617,170	4,206,300	877,920	2,544,048	82,066
Apr		1,549,450	2,776,820	5,745,270	1,896,700	1,768,460	920,090	1,936,780	2,633,450	989,520	2,403,378	80,113
May		1,945,680	2,141,610	3,788,360	2,188,070	1,232,440	897,200	1,691,250	1,251,190	963,480	1,891,975	61,031
Jun		1,658,410	1,523,640	1,991,160	2,299,350	882,160	659,120	1,236,070	1,288,050	862,110	1,442,245	48,075
Jul	1,085,120	738,780	1,189,460	1,703,060	1,933,530	909,380	659,120	1,083,680	1,501,020		1,214,754	39,186
Aug	962,110	692,160	1,003,960	1,534,420	2,063,270	867,240	685,760	875,720	1,126,120		1,106,081	35,680
Sep	867,060	558,930	819,680	1,391,150	2,195,080	674,920	1,018,020	769,340	940,230		1,045,919	34,864
Oct	1,281,930	674,580	801,350	1,403,360	1,968,540	934,770	724,620	745,750	808,170		1,007,643	32,505
Nov	648,200	628,060	807,080	1,595,060	1,005,620	883,330	843,930	888,580	936,510		948,521	31,617
Dec	1,086,660	778,360	1,312,830	1,752,300	1,155,620	848,920	756,050	1,732,630	625,890		1,120,325	36,140
Total		13,323,720	19,738,430	31,169,710	22,234,860	17,005,060	10,915,540	17,051,500	19,714,730		18,894,194	51,765

Totalizer 07-08

Note: The Totalizer Readings must be multiplied by 10 to equal Gallons Pumped					
When the totalizer hits 999,999 (10,000,000 gallons) it resets to zero					
	Start Date	Totalizer Reading	End Date	Totalizer Reading	Total Monthly Gallons
Jul-07	7/2/2007	503,506	7/30/2007	696,859	1,933,530
Aug-07	7/30/2007	696,859	8/31/2007	903,186	2,063,270
Sep-07	8/31/2007	903,186	10/1/2007	122,694	2,195,080
Oct-07	10/1/2007	122,694	11/2/2007	319,584	1,968,900
Nov-07	11/2/2007	319,584	11/30/2007	420,110	1,005,260
Dec-07	11/30/2007	420,110	1/7/2008	535,672	1,155,620
Jan-08	1/7/2008	535,672	1/31/2008	761,248	2,255,760
Feb-08	1/31/2008	761,248	2/28/2008	84,859	3,236,110
Mar-08	2/28/2008	84,859	3/31/2008	336,016	2,511,570
Apr-08	3/31/2008	336,016	5/2/2008	512,862	1,768,460
May-08	5/2/2008	512,862	6/3/2008	636,106	1,232,440
Jun-08	6/3/2008	636,106	6/30/2008	724,322	882,160
				Fiscal Year Total Gallons	22,208,160
				Fiscal Year Total CCF	29,690

Totalizer 08-09

Note: The Totalizer Readings must be multiplied by 10 to equal Gallons Pumped					
When the totalizer hits 999,999 (10,000,000 gallons) it resets to zero					
	Start Date	Totalizer Reading	End Date	Totalizer Reading	Total Monthly Gallons
Jul-08	6/30/2008	724,322	8/1/2008	815,260	909,380
Aug-08	8/1/2008	815,260	9/4/2008	901,984	867,240
Sep-08	9/4/2008	901,984	10/3/2008	969,476	674,920
Oct-08	10/3/2008	969,476	10/31/2008	62,953	934,770
Nov-08	10/31/2008	62,953	12/1/2008	151,286	883,330
Dec-08	12/1/2008	151,286	1/2/2009	236,178	848,920
Jan-09	1/2/2009	236,178	1/30/2009	310,399	742,210
Feb-09	1/30/2009	310,399	3/2/2009	482,283	1,718,840
Mar-09	3/2/2009	482,283	4/2/2009	611,341	1,290,580
Apr-09	4/2/2009	611,341	4/30/2009	703,350	920,090
May-09	4/30/2009	703,350	6/1/2009	793,070	897,200
Jun-09	6/1/2009	793,070	7/2/2009	868,867	757,970
				Fiscal Year Total Gallons	11,445,450
				Fiscal Year Total CCF	15,301

Totalizer 09-10

Note: The Totalizer Readings must be multiplied by 10 to equal Gallons Pumped						
When the totalizer hits 999,999 (10,000,000 gallons) it resets to zero						
	Start Date	Totalizer Reading	End Date	Totalizer Reading	Total Monthly Gallons	
Jul-09	7/2/2009	868,867	7/31/2009	934,779	659,120	
Aug-09	7/31/2009	934,779	8/31/2009	3,355	685,760	
Sep-09	8/31/2009	3,355	10/2/2009	105,157	1,018,020	
Oct-09	10/2/2009	105,157	10/30/2009	177,619	724,620	
Nov-09	10/30/2009	177,619	12/4/2009	262,012	843,930	
Dec-09	12/4/2009	262,012	12/30/2009	337,617	756,050	
Jan-10	12/30/2009	337,617	2/1/2010	480,060	1,424,430	
Feb-10	2/1/2010	480,060	3/1/2010	685,070	2,050,100	
Mar-10	3/1/2010	685,070	4/2/2010	946,787	2,617,170	
Apr-10	4/2/2010	946,787	4/30/2010	140,465	1,936,780	
May-10	4/30/2010	140,465	6/1/2010	309,590	1,691,250	
Jun-10	6/1/2010	309,590	7/1/2010	433,197	1,236,070	
Fiscal Year Total Gallons					15,643,300	
Fiscal Year Total CCF					20,914	

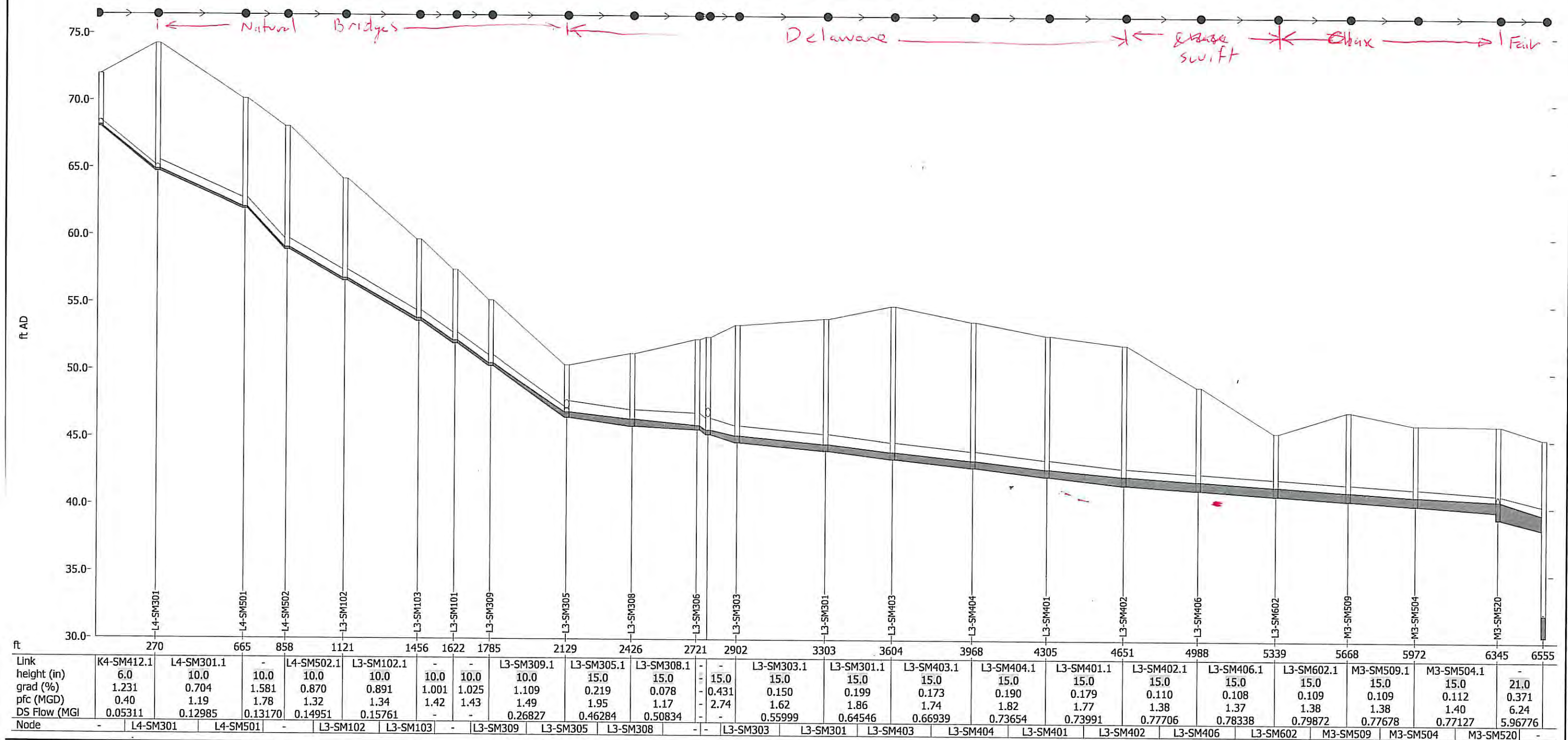
Totalizer 10-11

Note: The Totalizer Readings must be multiplied by 10 to equal Gallons Pumped						
When the totalizer hits 999,999 (10,000,000 gallons) it resets to zero						
	Start Date	Totalizer Reading	End Date	Totalizer Reading	Total Monthly Gallons	
Jul-10	7/1/2010	433,197	7/30/2010	541,565	1,083,680	
Aug-10	7/30/2010	541,565	8/31/2010	629,137	875,720	
Sep-10	8/31/2010	629,137	10/1/2010	706,071	769,340	
Oct-10	10/1/2010	706,071	11/1/2010	780,646	745,750	
Nov-10	11/1/2010	780,646	12/6/2010	869,504	888,580	
Dec-10	12/6/2010	869,504	1/3/2011	42,767	1,732,630	
Jan-11	1/3/2011	42,767	1/31/2011	259,242	2,164,750	
Feb-11	1/31/2011	259,242	2/28/2011	482,547	2,233,050	
Mar-11	2/28/2011	482,547	4/1/2011	903,177	4,206,300	
Apr-11	4/1/2011	903,177	5/1/2011	166,522	2,633,450	
May-11	5/1/2011	166,522	5/31/2011	291,641	1,251,190	
Jun-11	5/31/2011	291,641	6/27/2011	420,446	1,288,050	
				Fiscal Year Total Gallons	19,872,490	
				Fiscal Year Total CCF	26,568	

Totalizer 11-12

Note: The Totalizer Readings must be multiplied by 10 to equal Gallons Pumped						
When the totalizer hits 999,999 (10,000,000 gallons) it resets to zero						
	Start Date	Totalizer Reading	End Date	Totalizer Reading	Total Monthly Gallons	
Jul-11	6/27/2011	420,446	8/1/2011	570,548	1,501,020	
Aug-11	8/1/2011	570,548	9/2/2011	683,160	1,126,120	
Sep-11	9/2/2011	683,160	10/2/2011	777,183	940,230	
Oct-11	10/2/2011	777,183	10/31/2011	858,000	808,170	
Nov-11	10/31/2011	858,000	12/5/2011	951,651	936,510	
Dec-11	12/5/2011	951,651	12/30/2011	1,014,240	625,890	
Jan-12	12/30/2011	1,014,240	2/3/2012	1,100,730	864,900	
Feb-12	2/3/2012	1,100,730	3/2/2012	1,170,111	693,810	
Mar-12	3/2/2012	1,170,111	4/2/2012	1,257,903	877,920	
Apr-12	4/2/2012	1,257,903	5/1/2012	1,356,855	989,520	
May-12	5/1/2012	1,356,855	6/1/2012	1,453,203	963,480	
Jun-12	6/1/2012	1,453,203	7/2/2012	1,539,414	862,110	
				Fiscal Year Total Gallons	11,189,680	
				Fiscal Year Total CCF	14,959	



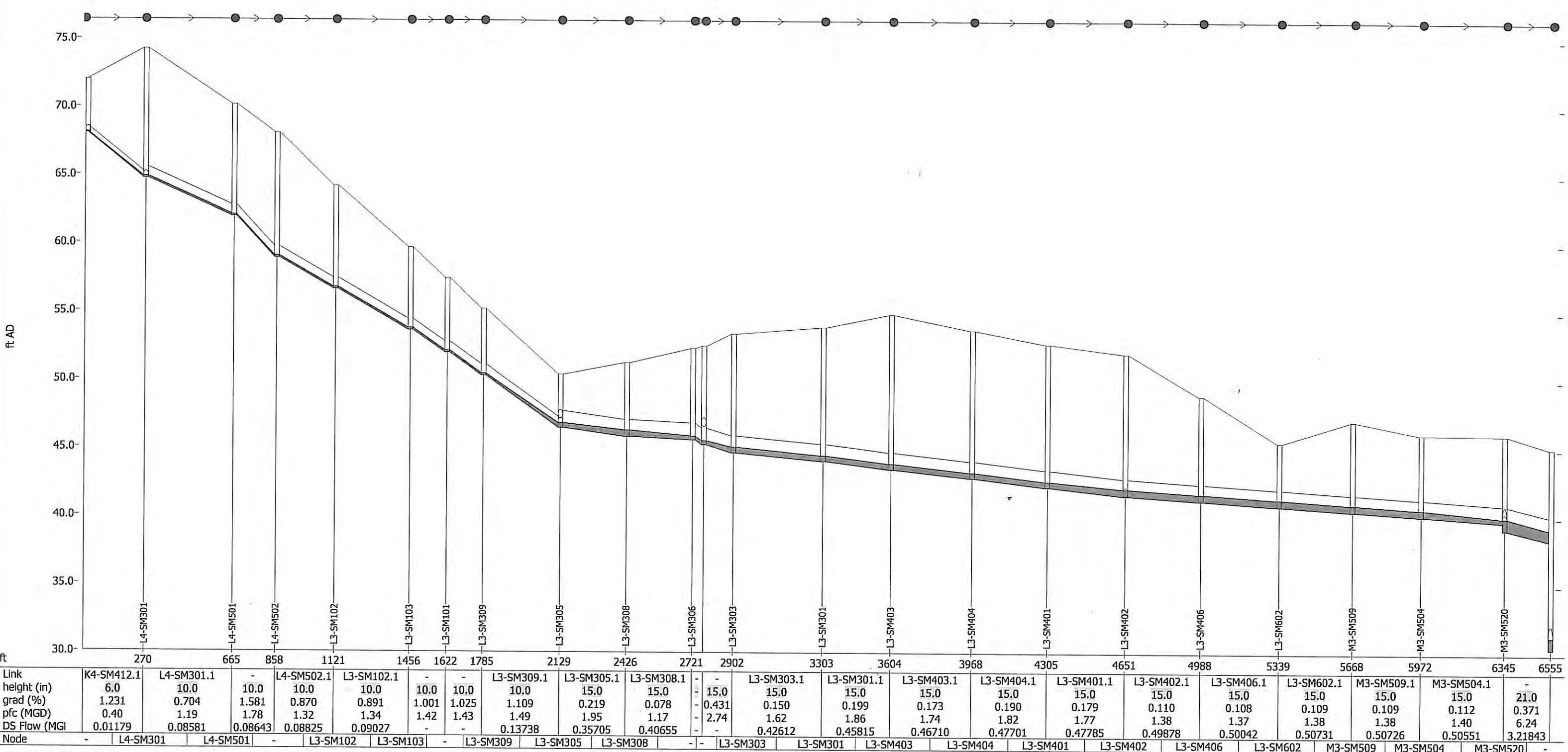


Long Section for Network - Future UCSC with leachate & Oxford correction

Wet weather flow w/ 72,000 gpd of leachate

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Long Section for Network - Future UCSC with leachate & Oxford correction

Dry Weather Flow w/72,000 gpd of leachate input at Mission & Natural Bridges



Appendix B

Calculated TSS Values

Proposed Seawater Desalination Plant (Initial Capacity 2.5 mgd)
Projected Total Suspended Solids in Collection System with Contributions from Proposed Seawater Desalination Plant- Solids Disposal Only (No Chemically Enhanced Backwash Flows)
Average Solids Production (340 pounds/day)

LEGEND:

Dry Solids = 340 lbs/day

Leachate TSS by Wt = 0.01%

Sludge TSS by Wt = 0.30%

Sludge Flow = 13,589

0.50%

1.00%

1.50%

2.00%

8,153

4,077

2,718

2,038 gal/day

TSS ≤ 0.30

0.31 ≤ TSS ≤ 0.50

0.51 ≤ TSS ≤ 1.00

1.01 ≤ TSS ≤ 1.50

Month	Leachate Flow in gallons per month			Leachate Flow in gallons per day			In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight				
							2009					2010					2011				
	2009	2010	2011	2009	2010	2011	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%
JAN	742,210	1,424,430	2,164,750	23,942	45,949	69,831	0.12%	0.13%	0.15%	0.16%	0.17%	0.08%	0.08%	0.09%	0.09%	0.09%	0.06%	0.06%	0.06%	0.07%	0.07%
FEB	1,718,840	2,050,100	2,233,050	61,387	73,218	79,752	0.06%	0.07%	0.07%	0.07%	0.07%	0.06%	0.06%	0.06%	0.06%	0.06%	0.05%	0.06%	0.06%	0.06%	0.06%
MAR	1,290,580	2,617,170	4,206,300	41,632	84,425	135,687	0.08%	0.09%	0.10%	0.10%	0.10%	0.05%	0.05%	0.06%	0.06%	0.06%	0.04%	0.04%	0.04%	0.04%	0.04%
APR	920,090	1,936,780	2,633,450	30,670	64,559	87,782	0.10%	0.11%	0.13%	0.13%	0.13%	0.06%	0.06%	0.07%	0.07%	0.07%	0.05%	0.05%	0.05%	0.05%	0.06%
MAY	897,200	1,691,250	1,251,190	28,942	54,556	40,361	0.10%	0.12%	0.13%	0.14%	0.14%	0.07%	0.07%	0.08%	0.08%	0.08%	0.08%	0.09%	0.10%	0.10%	0.11%
JUN	659,120	1,236,070	1,288,050	21,971	41,202	42,935	0.12%	0.14%	0.16%	0.17%	0.18%	0.08%	0.09%	0.10%	0.10%	0.10%	0.08%	0.09%	0.10%	0.10%	0.10%
JUL	659,120	1,083,680	1,501,020	21,262	34,957	48,420	0.12%	0.15%	0.17%	0.18%	0.18%	0.09%	0.10%	0.11%	0.12%	0.12%	0.07%	0.08%	0.09%	0.09%	0.09%
AUG	685,760	875,720	1,126,120	22,121	28,249	36,326	0.12%	0.14%	0.16%	0.17%	0.18%	0.10%	0.12%	0.13%	0.14%	0.14%	0.09%	0.10%	0.11%	0.11%	0.12%
SEP	1,018,020	769,340	940,230	33,934	25,645	31,341	0.09%	0.10%	0.12%	0.12%	0.12%	0.11%	0.13%	0.15%	0.15%	0.16%	0.10%	0.11%	0.12%	0.13%	0.13%
OCT	724,620	745,750	808,170	23,375	24,056	26,070	0.12%	0.14%	0.16%	0.17%	0.17%	0.11%	0.13%	0.15%	0.16%	0.17%	0.11%	0.13%	0.14%	0.15%	0.15%
NOV	843,930	888,580	936,510	28,131	29,619	31,217	0.10%	0.12%	0.14%	0.14%	0.14%	0.10%	0.12%	0.13%	0.14%	0.14%	0.10%	0.11%	0.12%	0.13%	0.13%
DEC	756,050	1,732,630	625,890	24,389	55,891	20,190	0.11%	0.13%	0.15%	0.16%	0.16%	0.07%	0.07%	0.08%	0.08%	0.08%	0.13%	0.15%	0.18%	0.19%	0.19%
Minimum =	659,120	745,750	625,890	21,262	24,056	20,190	0.06%	0.07%	0.07%	0.07%	0.07%	0.05%	0.05%	0.06%	0.06%	0.06%	0.04%	0.04%	0.04%	0.04%	0.04%
Average =	909,628	1,420,958	1,642,894	30,146	46,861	54,159	0.10%	0.12%	0.14%	0.14%	0.15%	0.08%	0.09%	0.10%	0.10%	0.11%	0.08%	0.09%	0.10%	0.10%	0.10%
Maximum =	1,718,840	2,617,170	4,206,300	61,387	84,425	135,687	0.12%	0.15%	0.17%	0.18%	0.18%	0.11%	0.13%	0.15%	0.16%	0.17%	0.13%	0.15%	0.18%	0.19%	0.19%

Proposed Seawater Desalination Plant (Initial Capacity 2.5 mgd)
Projected Total Suspended Solids in Collection System with Contributions from Proposed Seawater Desalination Plant- Solids Disposal Only (No Chemically Enhanced Backwash Flows)
Maximum Solids Production (2,950 pounds/day)

LEGEND:

Dry Solids = 2,950 lbs/day

Leachate TSS by Wt = 0.01%

Sludge TSS by Wt = 0.30%

Sludge Flow = 117,906

0.50%

1.00%

1.50%

2.00%

70,743

35,372

23,581

17,686 gal/day

TSS ≤ 0.30

0.31 ≤ TSS ≤ 0.50

0.51 ≤ TSS ≤ 1.00

1.01 ≤ TSS ≤ 1.50

Month	Leachate Flow in gallons per month			Leachate Flow in gallons per day			In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight				
							2009					2010					2011				
	2009	2010	2011	2009	2010	2011	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%
JAN	742,210	1,424,430	2,164,750	23,942	45,949	69,831	0.25%	0.38%	0.60%	0.75%	0.86%	0.22%	0.31%	0.44%	0.52%	0.56%	0.19%	0.26%	0.34%	0.39%	0.41%
FEB	1,718,840	2,050,100	2,233,050	61,387	73,218	79,752	0.20%	0.27%	0.37%	0.42%	0.46%	0.19%	0.25%	0.33%	0.37%	0.40%	0.18%	0.24%	0.31%	0.35%	0.37%
MAR	1,290,580	2,617,170	4,206,300	41,632	84,425	135,687	0.22%	0.32%	0.46%	0.55%	0.60%	0.18%	0.23%	0.30%	0.34%	0.35%	0.14%	0.18%	0.21%	0.23%	0.24%
APR	920,090	1,936,780	2,633,450	30,670	64,559	87,782	0.24%	0.35%	0.54%	0.66%	0.74%	0.20%	0.27%	0.36%	0.41%	0.44%	0.18%	0.23%	0.29%	0.33%	0.34%
MAY	897,200	1,691,250	1,251,190	28,942	54,556	40,361	0.24%	0.36%	0.55%	0.68%	0.76%	0.21%	0.29%	0.40%	0.46%	0.50%	0.23%	0.32%	0.47%	0.56%	0.62%
JUN	659,120	1,236,070	1,288,050	21,971	41,202	42,935	0.25%	0.38%	0.62%	0.78%	0.90%	0.22%	0.32%	0.47%	0.55%	0.61%	0.22%	0.31%	0.46%	0.54%	0.59%
JUL	659,120	1,083,680	1,501,020	21,262	34,957	48,420	0.26%	0.39%	0.63%	0.79%	0.91%	0.23%	0.34%	0.51%	0.61%	0.68%	0.22%	0.30%	0.43%	0.50%	0.54%
AUG	685,760	875,720	1,126,120	22,121	28,249	36,326	0.25%	0.38%	0.62%	0.78%	0.89%	0.24%	0.36%	0.56%	0.69%	0.78%	0.23%	0.33%	0.50%	0.60%	0.66%
SEP	1,018,020	769,340	940,230	33,934	25,645	31,341	0.24%	0.34%	0.52%	0.62%	0.69%	0.25%	0.37%	0.58%	0.72%	0.82%	0.24%	0.35%	0.53%	0.65%	0.73%
OCT	724,620	745,750	808,170	23,375	24,056	26,070	0.25%	0.38%	0.61%	0.76%	0.87%	0.25%	0.38%	0.60%	0.75%	0.85%	0.25%	0.37%	0.58%	0.72%	0.81%
NOV	843,930	888,580	936,510	28,131	29,619	31,217	0.24%	0.36%	0.56%	0.69%	0.78%	0.24%	0.36%	0.55%	0.67%	0.75%	0.24%	0.35%	0.54%	0.65%	0.73%
DEC	756,050	1,732,630	625,890	24,389	55,891	20,190	0.25%	0.37%	0.60%	0.74%	0.85%	0.21%	0.28%	0.39%	0.45%	0.49%	0.26%	0.39%	0.64%	0.81%	0.94%
Minimum =	659,120	745,750	625,890	21,262	24,056	20,190	0.20%	0.27%	0.37%	0.42%	0.46%	0.18%	0.23%	0.30%	0.34%	0.35%	0.14%	0.18%	0.21%	0.23%	0.24%
Average =	909,628	1,420,958	1,642,894	30,146	46,861	54,159	0.24%	0.36%	0.56%	0.69%	0.78%	0.22%	0.31%	0.46%	0.54%	0.60%	0.21%	0.30%	0.44%	0.53%	0.58%
Maximum =	1,718,840	2,617,170	4,206,300	61,387	84,425	135,687	0.26%	0.39%	0.63%	0.79%	0.91%	0.25%	0.38%	0.60%	0.75%	0.85%	0.26%	0.39%	0.64%	0.81%	0.94%

Proposed Seawater Desalination Plant (Ultimate Capacity 4.5 mgd)
Projected Total Suspended Solids in Collection System with Contributions from Proposed Seawater Desalination Plant- Solids Disposal Only (No Chemically Enhanced Backwash Flows)
Average Solids Production (590 pounds/day)

LEGEND:

Dry Solids = 590 lbs/day

Leachate TSS by Wt = 0.01%

Sludge TSS by Wt = 0.30%

Sludge Flow = 23,581

0.50%

1.00%

1.50%

2.00%

14,149

7,074

4,716

3,537 gal/day

TSS ≤ 0.30

0.31 ≤ TSS ≤ 0.50

0.51 ≤ TSS ≤ 1.00

1.01 ≤ TSS ≤ 1.50

Month	Leachate Flow in gallons per month			Leachate Flow in gallons per day			In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight				
							2009					2010					2011				
	2009	2010	2011	2009	2010	2011	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%
JAN	742,210	1,424,430	2,164,750	23,942	45,949	69,831	0.15%	0.19%	0.24%	0.26%	0.27%	0.11%	0.13%	0.14%	0.15%	0.15%	0.08%	0.09%	0.10%	0.10%	0.11%
FEB	1,718,840	2,050,100	2,233,050	61,387	73,218	79,752	0.09%	0.10%	0.11%	0.12%	0.12%	0.08%	0.09%	0.10%	0.10%	0.10%	0.08%	0.08%	0.09%	0.09%	0.09%
MAR	1,290,580	2,617,170	4,206,300	41,632	84,425	135,687	0.11%	0.13%	0.15%	0.16%	0.17%	0.07%	0.08%	0.09%	0.09%	0.09%	0.05%	0.06%	0.06%	0.06%	0.06%
APR	920,090	1,936,780	2,633,450	30,670	64,559	87,782	0.14%	0.16%	0.20%	0.21%	0.22%	0.09%	0.10%	0.11%	0.11%	0.11%	0.07%	0.08%	0.08%	0.09%	0.09%
MAY	897,200	1,691,250	1,251,190	28,942	54,556	40,361	0.14%	0.17%	0.20%	0.22%	0.23%	0.10%	0.11%	0.12%	0.13%	0.13%	0.12%	0.14%	0.16%	0.17%	0.17%
JUN	659,120	1,236,070	1,288,050	21,971	41,202	42,935	0.16%	0.20%	0.25%	0.27%	0.29%	0.12%	0.14%	0.16%	0.16%	0.17%	0.11%	0.13%	0.15%	0.16%	0.16%
JUL	659,120	1,083,680	1,501,020	21,262	34,957	48,420	0.16%	0.21%	0.26%	0.28%	0.29%	0.13%	0.15%	0.18%	0.19%	0.19%	0.10%	0.12%	0.14%	0.14%	0.15%
AUG	685,760	875,720	1,126,120	22,121	28,249	36,326	0.16%	0.20%	0.25%	0.27%	0.28%	0.14%	0.17%	0.21%	0.22%	0.23%	0.12%	0.15%	0.17%	0.18%	0.19%
SEP	1,018,020	769,340	940,230	33,934	25,645	31,341	0.13%	0.15%	0.18%	0.19%	0.20%	0.15%	0.18%	0.22%	0.24%	0.25%	0.13%	0.16%	0.19%	0.20%	0.21%
OCT	724,620	745,750	808,170	23,375	24,056	26,070	0.16%	0.19%	0.24%	0.26%	0.27%	0.15%	0.19%	0.23%	0.25%	0.27%	0.15%	0.18%	0.22%	0.24%	0.25%
NOV	843,930	888,580	936,510	28,131	29,619	31,217	0.14%	0.17%	0.21%	0.22%	0.23%	0.14%	0.17%	0.20%	0.21%	0.22%	0.13%	0.16%	0.19%	0.21%	0.21%
DEC	756,050	1,732,630	625,890	24,389	55,891	20,190	0.15%	0.19%	0.23%	0.25%	0.26%	0.10%	0.11%	0.12%	0.13%	0.13%	0.17%	0.21%	0.27%	0.29%	0.31%
Minimum =	659,120	745,750	625,890	21,262	24,056	20,190	0.09%	0.10%	0.11%	0.12%	0.12%	0.07%	0.08%	0.09%	0.09%	0.09%	0.05%	0.06%	0.06%	0.06%	0.06%
Average =	909,628	1,420,958	1,642,894	30,146	46,861	54,159	0.14%	0.17%	0.21%	0.23%	0.24%	0.11%	0.13%	0.16%	0.17%	0.17%	0.11%	0.13%	0.15%	0.16%	0.17%
Maximum =	1,718,840	2,617,170	4,206,300	61,387	84,425	135,687	0.16%	0.21%	0.26%	0.28%	0.29%	0.15%	0.19%	0.23%	0.25%	0.27%	0.17%	0.21%	0.27%	0.29%	0.31%

Proposed Seawater Desalination Plant (Ultimate Capacity 4.5 mgd)
Projected Total Suspended Solids in Collection System with Contributions from Proposed Seawater Desalination Plant- Solids Disposal Only (No Chemically Enhanced Backwash Flows)
Maximum Solids Production (5,230 pounds/day)

LEGEND:

Dry Solids = 5,230 lbs/day

Leachate TSS by Wt = 0.01%

Sludge TSS by Wt = 0.30%

Sludge Flow = 209,033

0.50%

1.00%

1.50%

2.00%

125,420

62,710

41,807

31,355 gal/day

TSS ≤ 0.30

0.31 ≤ TSS ≤ 0.50

0.51 ≤ TSS ≤ 1.00

1.01 ≤ TSS ≤ 1.50

Month	Leachate Flow in gallons per month			Leachate Flow in gallons per day			In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight					In-Pipe TSS Percent by Weight				
							2009					2010					2011				
	2009	2010	2011	2009	2010	2011	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%	0.30%	0.50%	1.00%	1.50%	2.00%
JAN	742,210	1,424,430	2,164,750	23,942	45,949	69,831	0.27%	0.42%	0.73%	0.96%	1.14%	0.25%	0.37%	0.58%	0.72%	0.82%	0.23%	0.32%	0.48%	0.57%	0.63%
FEB	1,718,840	2,050,100	2,233,050	61,387	73,218	79,752	0.23%	0.34%	0.51%	0.61%	0.68%	0.22%	0.32%	0.47%	0.55%	0.61%	0.22%	0.31%	0.45%	0.52%	0.57%
MAR	1,290,580	2,617,170	4,206,300	41,632	84,425	135,687	0.25%	0.38%	0.60%	0.76%	0.86%	0.22%	0.30%	0.43%	0.50%	0.55%	0.19%	0.25%	0.32%	0.36%	0.38%
APR	920,090	1,936,780	2,633,450	30,670	64,559	87,782	0.26%	0.40%	0.67%	0.87%	1.02%	0.23%	0.33%	0.50%	0.60%	0.66%	0.21%	0.30%	0.42%	0.49%	0.53%
MAY	897,200	1,691,250	1,251,190	28,942	54,556	40,361	0.26%	0.41%	0.69%	0.89%	1.04%	0.24%	0.35%	0.54%	0.66%	0.74%	0.25%	0.38%	0.61%	0.77%	0.88%
JUN	659,120	1,236,070	1,288,050	21,971	41,202	42,935	0.27%	0.43%	0.74%	0.99%	1.18%	0.25%	0.38%	0.61%	0.76%	0.87%	0.25%	0.38%	0.60%	0.75%	0.85%
JUL	659,120	1,083,680	1,501,020	21,262	34,957	48,420	0.27%	0.43%	0.75%	1.00%	1.20%	0.26%	0.39%	0.65%	0.82%	0.95%	0.25%	0.36%	0.57%	0.70%	0.79%
AUG	685,760	875,720	1,126,120	22,121	28,249	36,326	0.27%	0.43%	0.74%	0.98%	1.18%	0.27%	0.41%	0.69%	0.90%	1.06%	0.26%	0.39%	0.64%	0.81%	0.93%
SEP	1,018,020	769,340	940,230	33,934	25,645	31,341	0.26%	0.40%	0.65%	0.83%	0.97%	0.27%	0.42%	0.71%	0.93%	1.10%	0.26%	0.40%	0.67%	0.86%	1.01%
OCT	724,620	745,750	808,170	23,375	24,056	26,070	0.27%	0.42%	0.73%	0.97%	1.15%	0.27%	0.42%	0.73%	0.96%	1.14%	0.27%	0.42%	0.71%	0.93%	1.10%
NOV	843,930	888,580	936,510	28,131	29,619	31,217	0.27%	0.41%	0.69%	0.90%	1.06%	0.26%	0.41%	0.68%	0.88%	1.03%	0.26%	0.40%	0.67%	0.86%	1.01%
DEC	756,050	1,732,630	625,890	24,389	55,891	20,190	0.27%	0.42%	0.72%	0.95%	1.13%	0.24%	0.35%	0.53%	0.65%	0.73%	0.27%	0.43%	0.76%	1.01%	1.22%
Minimum =	659,120	745,750	625,890	21,262	24,056	20,190	0.23%	0.34%	0.51%	0.61%	0.68%	0.22%	0.30%	0.43%	0.50%	0.55%	0.19%	0.25%	0.32%	0.36%	0.38%
Average =	909,628	1,420,958	1,642,894	30,146	46,861	54,159	0.26%	0.41%	0.69%	0.89%	1.05%	0.25%	0.37%	0.59%	0.74%	0.85%	0.24%	0.36%	0.57%	0.72%	0.82%
Maximum =	1,718,840	2,617,170	4,206,300	61,387	84,425	135,687	0.27%	0.43%	0.75%	1.00%	1.20%	0.27%	0.42%	0.73%	0.96%	1.14%	0.27%	0.43%	0.76%	1.01%	1.22%

Appendix C

Calculated Velocity Values

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Dry Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Average Solids Production = 340 pounds/day

			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 13,589	0.50% 8,154	1.00% 4,077	1.50% 2,718	2.00% 2,038	
Link	Pipe Diameter (inches)	Pipe Slope (%)		Combined Flows from Collection System and Proposed Seawater Desalination Plant					
				(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.08643	0.10002	0.09458	0.09051	0.08915	0.08847	1.78
Velocity in FT/SEC =				2.5	2.5	2.5	2.5	2.5	
L3-SM309.1	10	1.109	0.13738	0.15097	0.14553	0.14146	0.14010	0.13942	1.49
Velocity in FT/SEC =				2.6	2.6	2.6	2.6	2.6	
L3-SM301.1	15	0.219	0.35705	0.37064	0.36520	0.36113	0.35977	0.35909	1.95
Velocity in FT/SEC =				1.9	1.9	1.9	1.9	1.9	
L3-401.1	15	0.179	0.47785	0.49144	0.48600	0.48193	0.48057	0.47989	1.77
Velocity in FT/SEC =				1.8	1.8	1.8	1.8	1.8	
M3-SM504.1	15	0.112	0.50551	0.51910	0.51366	0.50959	0.50823	0.50755	1.4
Velocity in FT/SEC =				1.6	1.6	1.6	1.6	1.6	
	21	0.371	3.21843	3.23202	3.22658	3.22251	3.22115	3.22047	6.24
Velocity in FT/SEC =				4.0	4.0	4.0	4.0	4.0	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Dry Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Average Solids Production = 340 pounds/day
CEBs = 16,000 gallons/day

CEB 10,000 gallons/day			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30%	0.50%	1.00%	1.50%	2.00%	
				29,589	24,154	20,077	18,718	18,038	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)	(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.08643	0.11602	0.11058	0.10651	0.10515	0.10447	1.78
Velocity in FT/SEC =				2.5	2.5	2.5	2.5	2.5	
L3-SM309.1	10	1.109	0.13738	0.16697	0.16153	0.15746	0.15610	0.15542	1.49
Velocity in FT/SEC =				2.6	2.6	2.6	2.6	2.6	
L3-SM301.1	15	0.219	0.35705	0.38664	0.38120	0.37713	0.37577	0.37509	1.95
Velocity in FT/SEC =				2.0	2.0	2.0	2.0	2.0	
L3-401.1	15	0.179	0.47785	0.50744	0.50200	0.49793	0.49657	0.49589	1.77
Velocity in FT/SEC =				1.9	1.9	1.9	1.9	1.9	
M3-SM504.1	15	0.112	0.50551	0.53510	0.52966	0.52559	0.52423	0.52355	1.4
Velocity in FT/SEC =				1.8	1.8	1.8	1.8	1.8	
	21	0.371	3.21843	3.24802	3.24258	3.23851	3.23715	3.23647	6.24
Velocity in FT/SEC =				4.0	4.0	4.0	4.0	4.0	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Dry Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Maximum Solids Production = 2,950 pounds/day

			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 117,906	0.50% 70,743	1.00% 35,372	1.50% 23,581	2.00% 17,686	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.08643	0.20434	0.15717	0.12180	0.11001	0.10412	1.78
Velocity in FT/SEC =				3.4	3.1	2.9	2.9	2.9	
L3-SM309.1	10	1.109	0.13738	0.25529	0.20812	0.17275	0.16096	0.15507	1.49
Velocity in FT/SEC =				3.4	3.0	2.9	2.9	2.9	
L3-SM301.1	15	0.219	0.35705	0.47496	0.42779	0.39242	0.38063	0.37474	1.95
Velocity in FT/SEC =				2.0	2.0	1.9	1.9	1.9	
L3-401.1	15	0.179	0.47785	0.59576	0.54859	0.51322	0.50143	0.49554	1.77
Velocity in FT/SEC =				2.0	2.0	1.9	1.9	1.9	
M3-SM504.1	15	0.112	0.50551	0.62342	0.57625	0.54088	0.52909	0.52320	1.4
Velocity in FT/SEC =				1.7	1.7	1.7	1.7	1.7	
	21	0.371	3.21843	3.33634	3.28917	3.25380	3.24201	3.23612	6.24
Velocity in FT/SEC =				4.1	4.1	4.1	4.1	4.1	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Dry Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Maximum Solids Production = 2,950 pounds/day
CEBs = 16,000 gallons/day

			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30%	0.50%	1.00%	1.50%	2.00%	
				133,906	86,743	51,372	39,581	33,686	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.08643	0.22034	0.17317	0.13780	0.12601	0.12012	1.78
Velocity in FT/SEC =				3.4	3.0	2.7	2.6	2.6	
L3-SM309.1	10	1.109	0.13738	0.27129	0.22412	0.18875	0.17696	0.17107	1.49
Velocity in FT/SEC =				3.2	3.0	2.9	2.9	2.7	
L3-SM301.1	15	0.219	0.35705	0.49096	0.44379	0.40842	0.39663	0.39074	1.95
Velocity in FT/SEC =				2.0	2.0	1.9	1.9	1.9	
L3-401.1	15	0.179	0.47785	0.61176	0.56459	0.52922	0.51743	0.51154	1.77
Velocity in FT/SEC =				2.0	2.0	2.0	1.9	1.9	
M3-SM504.1	15	0.112	0.50551	0.63942	0.59225	0.55688	0.54509	0.53920	1.4
Velocity in FT/SEC =				1.7	1.7	1.7	1.7	1.7	
	21	0.371	3.21843	3.35234	3.30517	3.26980	3.25801	3.25212	6.24
Velocity in FT/SEC =				4.1	4.1	4.1	4.1	4.1	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Wet Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Average Solids Production = 340 pounds/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 13,589	0.50% 8,154	1.00% 4,077	1.50% 2,718	2.00% 2,038	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.13170	0.14529	0.13985	0.13578	0.13442	0.13374	1.78
Velocity in FT/SEC =				3.1	3.1	3.1	3.1	3.1	
L3-SM309.1	10	1.109	0.26827	0.28186	0.27642	0.27235	0.27099	0.27031	1.49
Velocity in FT/SEC =				3.2	3.2	3.2	3.2	3.2	
L3-SM301.1	15	0.219	0.46284	0.47643	0.47099	0.46692	0.46556	0.46488	1.95
Velocity in FT/SEC =				2.0	2.0	2.0	2.0	2.0	
L3-401.1	15	0.179	0.73991	0.75350	0.74806	0.74399	0.74263	0.74195	1.77
Velocity in FT/SEC =				2.1	2.1	2.1	2.1	2.1	
M3-SM504.1	15	0.112	0.77127	0.78486	0.77942	0.77535	0.77399	0.77331	1.4
Velocity in FT/SEC =				1.8	1.8	1.8	1.8	1.8	
	21	0.371	5.96776	5.98135	5.97591	5.97184	5.97048	5.96980	6.24
Velocity in FT/SEC =				4.5	4.5	4.5	4.5	4.5	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Wet Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Average Solids Production = 340 pounds/day
CEBs = 16,000 gallons/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 29,589	0.50% 24,154	1.00% 20,077	1.50% 18,718	2.00% 18,038	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.13170	0.16129	0.15585	0.15178	0.15042	0.14974	1.78
Velocity in FT/SEC =				3.0	3.0	3.0	3.0	3.0	
L3-SM309.1	10	1.109	0.26827	0.29786	0.29242	0.28835	0.28699	0.28631	1.49
Velocity in FT/SEC =				3.2	3.2	3.2	3.2	3.2	
L3-SM301.1	15	0.219	0.46284	0.49243	0.48699	0.48292	0.48156	0.48088	1.95
Velocity in FT/SEC =				2.5	2.5	2.5	2.5	2.5	
L3-401.1	15	0.179	0.73991	0.76950	0.76406	0.75999	0.75863	0.75795	1.77
Velocity in FT/SEC =				2.1	2.1	2.1	2.1	2.1	
M3-SM504.1	15	0.112	0.77127	0.80086	0.79542	0.79135	0.78999	0.78931	1.4
Velocity in FT/SEC =				1.8	1.8	1.8	1.8	1.8	
	21	0.371	5.96776	5.99735	5.99191	5.98784	5.98648	5.98580	6.24
Velocity in FT/SEC =				4.6	4.6	4.6	4.6	4.6	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Wet Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Maximum Solids Production = 2,950 pounds/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 117,906	0.50% 70,743	1.00% 35,372	1.50% 23,581	2.00% 17,686	
Link	Pipe Diameter (inches)	Pipe Slope (%)		Combined Flows from Collection System and Proposed Seawater Desalination Plant					
				(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.13170	0.24961	0.20244	0.16707	0.15528	0.14939	1.78
Velocity in FT/SEC =				3.5	3.2	3.0	3.0	3.0	
L3-SM309.1	10	1.109	0.26827	0.38618	0.33901	0.30364	0.29185	0.28596	1.49
Velocity in FT/SEC =				3.5	3.4	3.2	3.2	3.2	
L3-SM301.1	15	0.219	0.46284	0.58075	0.53358	0.49821	0.48642	0.48053	1.95
Velocity in FT/SEC =				2.2	2.2	2.1	2.0	2.0	
L3-401.1	15	0.179	0.73991	0.85782	0.81065	0.77528	0.76349	0.75760	1.77
Velocity in FT/SEC =				2.2	2.2	2.1	2.1	2.1	
M3-SM504.1	15	0.112	0.77127	0.88918	0.84201	0.80664	0.79485	0.78896	1.4
Velocity in FT/SEC =				1.9	1.9	1.9	1.8	1.8	
	21	0.371	5.96776	6.08567	6.03850	6.00313	5.99134	5.98545	6.24
Velocity in FT/SEC =				4.6	4.6	4.6	4.6	4.6	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity)
Wet Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Maximum Solids Production = 2,950 pounds/day
CEBs = 16,000 gallons/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30%	0.50%	1.00%	1.50%	2.00%	
				133,906	86,743	51,372	39,581	33,686	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.13170	0.26561	0.21844	0.18307	0.17128	0.16539	1.78
Velocity in FT/SEC =				3.5	3.4	3.1	3.1	3.1	
L3-SM309.1	10	1.109	0.26827	0.40218	0.35501	0.31964	0.30785	0.30196	1.49
Velocity in FT/SEC =				3.5	3.4	3.2	3.2	3.2	
L3-SM301.1	15	0.219	0.46284	0.59675	0.54958	0.51421	0.50242	0.49653	1.95
Velocity in FT/SEC =				2.2	2.0	2.0	2.0	2.0	
L3-401.1	15	0.179	0.73991	0.87382	0.82665	0.79128	0.77949	0.77360	1.77
Velocity in FT/SEC =				2.1	2.1	2.1	2.1	2.0	
M3-SM504.1	15	0.112	0.77127	0.90518	0.85801	0.82264	0.81085	0.80496	1.4
Velocity in FT/SEC =				1.9	1.8	1.8	1.8	1.8	
	21	0.371	5.96776	6.10167	6.05450	6.01913	6.00734	6.00145	6.24
Velocity in FT/SEC =				4.5	4.5	4.5	4.5	4.5	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Dry Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Average Solids Production = 590 pounds/day

			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)			
				0.30% 23,581	0.50% 14,149	1.00% 7,074	1.50% 4,716	2.00% 3,537				
				Combined Flows from Collection System and Proposed Seawater Desalination Plant								
				(mgd)	(mgd)	(mgd)	(mgd)	(mgd)				
Link	Pipe Diameter (inches)	Pipe Slope (%)	L4-SM502.1	10	1.581	0.08643	0.11001	0.10058	0.09350	0.09115	0.08997	1.78
Velocity in FT/SEC =							2.7	2.6	2.5	2.5	2.5	
L3-SM309.1	10	1.109	0.13738	0.16096	0.15153	0.14445	0.14210	0.14092	1.49			
Velocity in FT/SEC =							2.7	2.7	2.7	2.7	2.7	
L3-SM301.1	15	0.219	0.35705	0.38063	0.37120	0.36412	0.36177	0.36059	1.95			
Velocity in FT/SEC =							1.7	1.7	1.7	1.7	1.7	
L3-401.1	15	0.179	0.47785	0.50143	0.49200	0.48492	0.48257	0.48139	1.77			
Velocity in FT/SEC =							1.8	1.8	1.8	1.8	1.8	
M3-SM504.1	15	0.112	0.50551	0.52909	0.51966	0.51258	0.51023	0.50905	1.4			
Velocity in FT/SEC =							1.6	1.6	1.6	1.6	1.6	
	21	0.371	3.21843	3.24201	3.23258	3.22550	3.22315	3.22197	6.24			
Velocity in FT/SEC =							4.0	4.0	4.0	4.0	4.0	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Dry Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Average Solids Production = 590 pounds/day
CEBs = 24,000 gallons/day

			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 47,581	0.50% 38,149	1.00% 31,074	1.50% 28,716	2.00% 27,537	
Combined Flows from Collection System and Proposed Seawater Desalination Plant									
(mgd)	(mgd)	(mgd)		(mgd)	(mgd)				
Link	Pipe Diameter (inches)	Pipe Slope (%)							
L4-SM502.1	10	1.581	0.08643	0.13401	0.12458	0.11750	0.11515	0.11397	1.78
Velocity in FT/SEC =				2.7	2.7	2.6	2.6	2.6	
L3-SM309.1	10	1.109	0.13738	0.18496	0.17553	0.16845	0.16610	0.16492	1.49
Velocity in FT/SEC =				2.8	2.8	2.7	2.7	2.7	
L3-SM301.1	15	0.219	0.35705	0.40463	0.39520	0.38812	0.38577	0.38459	1.95
Velocity in FT/SEC =				1.9	1.9	1.9	1.9	1.9	
L3-401.1	15	0.179	0.47785	0.52543	0.51600	0.50892	0.50657	0.50539	1.77
Velocity in FT/SEC =				1.9	1.9	1.9	1.8	1.8	
M3-SM504.1	15	0.112	0.50551	0.55309	0.54366	0.53658	0.53423	0.53305	1.4
Velocity in FT/SEC =				1.7	1.7	1.7	1.6	1.6	
	21	0.371	3.21843	3.26601	3.25658	3.24950	3.24715	3.24597	6.24
Velocity in FT/SEC =				4.0	4.0	4.0	4.0	4.0	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Dry Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Maximum Solids Production = 5,230 pounds/day

			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 209,033	0.50% 125,420	1.00% 62,710	1.50% 41,807	2.00% 31,355	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.08643	0.29546	0.21185	0.14914	0.12824	0.11778	1.78
Velocity in FT/SEC =				3.5	3.4	2.6	2.6	2.6	
L3-SM309.1	10	1.109	0.13738	0.34641	0.26280	0.20009	0.17919	0.16873	1.49
Velocity in FT/SEC =				3.5	3.1	3.0	2.8	2.8	
L3-SM301.1	15	0.219	0.35705	0.56608	0.48247	0.41976	0.39886	0.38840	1.95
Velocity in FT/SEC =				2.0	1.8	1.7	1.7	1.7	
L3-401.1	15	0.179	0.47785	0.68688	0.60327	0.54056	0.51966	0.50920	1.77
Velocity in FT/SEC =				2.1	1.9	1.7	1.7	1.7	
M3-SM504.1	15	0.112	0.50551	0.71454	0.63093	0.56822	0.54732	0.53686	1.4
Velocity in FT/SEC =				1.7	1.7	1.6	1.6	1.6	
	21	0.371	3.21843	3.42746	3.34385	3.28114	3.26024	3.24978	6.24
Velocity in FT/SEC =				4.0	4.0	4.0	4.0	4.0	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Dry Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Maximum Solids Production = 5,230 pounds/day
CEBs = 24,000 gallons/day

			Dry Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30%	0.50%	1.00%	1.50%	2.00%	
				233,033	149,420	86,710	65,807	55,355	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.08643	0.31946	0.23585	0.17314	0.15224	0.14178	1.78
Velocity in FT/SEC =				3.8	3.6	3.2	3.0	3.0	
L3-SM309.1	10	1.109	0.13738	0.37041	0.28680	0.22409	0.20319	0.19273	1.49
Velocity in FT/SEC =				3.5	3.3	3.0	3.0	2.8	
L3-SM301.1	15	0.219	0.35705	0.59008	0.50647	0.44376	0.42286	0.41240	1.95
Velocity in FT/SEC =				2.1	2.0	1.9	1.9	1.9	
L3-401.1	15	0.179	0.47785	0.71088	0.62727	0.56456	0.54366	0.53320	1.77
Velocity in FT/SEC =				2.1	2.0	1.9	1.9	1.8	
M3-SM504.1	15	0.112	0.50551	0.73854	0.65493	0.59222	0.57132	0.56086	1.4
Velocity in FT/SEC =				2.0	1.9	1.9	1.9	1.8	
	21	0.371	3.21843	3.45146	3.36785	3.30514	3.28424	3.27378	6.24
Velocity in FT/SEC =				4.1	4.1	4.0	4.0	4.0	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Wet Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Average Solids Production = 590 pounds/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 23,581	0.50% 14,149	1.00% 7,074	1.50% 4,716	2.00% 3,537	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.13170	0.15528	0.14585	0.13877	0.13642	0.13524	1.78
Velocity in FT/SEC =				3.0	3.0	3.0	2.9	2.9	
L3-SM309.1	10	1.109	0.26827	0.29185	0.28242	0.27534	0.27299	0.27181	1.49
Velocity in FT/SEC =				3.2	3.2	3.2	3.2	3.2	
L3-SM301.1	15	0.219	0.46284	0.48642	0.47699	0.46991	0.46756	0.46638	1.95
Velocity in FT/SEC =				2.0	1.9	1.9	1.9	1.9	
L3-401.1	15	0.179	0.73991	0.76349	0.75406	0.74698	0.74463	0.74345	1.77
Velocity in FT/SEC =				2.2	2.2	2.2	2.2	2.2	
M3-SM504.1	15	0.112	0.77127	0.79485	0.78542	0.77834	0.77599	0.77481	1.4
Velocity in FT/SEC =				1.8	1.8	1.8	1.8	1.8	
	21	0.371	5.96776	5.99134	5.98191	5.97483	5.97248	5.97130	6.24
Velocity in FT/SEC =				4.4	4.4	4.4	4.4	4.4	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Wet Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Average Solids Production = 590 pounds/day
CEBs = 24,000 gallons/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30% 47,581	0.50% 38,149	1.00% 31,074	1.50% 28,716	2.00% 27,537	
Link	Pipe Diameter (inches)	Pipe Slope (%)		Combined Flows from Collection System and Proposed Seawater Desalination Plant					
				(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.13170	0.17928	0.16985	0.16277	0.16042	0.15924	1.78
Velocity in FT/SEC =				3.2	3.2	3.2	3.2	3.2	
L3-SM309.1	10	1.109	0.26827	0.31585	0.30642	0.29934	0.29699	0.29581	1.49
Velocity in FT/SEC =				3.4	3.3	3.3	3.3	3.3	
L3-SM301.1	15	0.219	0.46284	0.51042	0.50099	0.49391	0.49156	0.49038	1.95
Velocity in FT/SEC =				2.0	2.0	2.0	2.0	2.0	
L3-401.1	15	0.179	0.73991	0.78749	0.77806	0.77098	0.76863	0.76745	1.77
Velocity in FT/SEC =				2.2	2.2	2.2	2.2	2.2	
M3-SM504.1	15	0.112	0.77127	0.81885	0.80942	0.80234	0.79999	0.79881	1.4
Velocity in FT/SEC =				2.1	2.1	2.1	2.1	2.1	
	21	0.371	5.96776	6.01534	6.00591	5.99883	5.99648	5.99530	6.24
Velocity in FT/SEC =				4.5	4.5	4.5	4.5	4.5	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Wet Weather Conditions; Includes Only Solids Disposal Flows (No Chemically Enhanced Backwash Flows)
Maximum Solids Production = 5,230 pounds/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30%	0.50%	1.00%	1.50%	2.00%	
				209,033	125,420	62,710	41,807	31,355	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
L4-SM502.1	10	1.581	0.13170	0.34073	0.25712	0.19441	0.17351	0.16305	1.78
Velocity in FT/SEC =				3.8	3.6	3.3	3.2	3.1	
L3-SM309.1	10	1.109	0.26827	0.47730	0.39369	0.33098	0.31008	0.29962	1.49
Velocity in FT/SEC =				3.8	3.7	3.6	3.4	3.4	
L3-SM301.1	15	0.219	0.46284	0.67187	0.58826	0.52555	0.50465	0.49419	1.95
Velocity in FT/SEC =				2.4	2.1	2.0	2.0	2.0	
L3-401.1	15	0.179	0.73991	0.94894	0.86533	0.80262	0.78172	0.77126	1.77
Velocity in FT/SEC =				2.2	2.1	2.1	2.1	2.1	
M3-SM504.1	15	0.112	0.77127	0.98030	0.89669	0.83398	0.81308	0.80262	1.4
Velocity in FT/SEC =				1.9	1.9	1.8	1.8	1.8	
	21	0.371	5.96776	6.17679	6.09318	6.03047	6.00957	5.99911	6.24
Velocity in FT/SEC =				4.4	4.4	4.4	4.4	4.4	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Estimated Flow Velocities in Collection System- Existing Flows and New Flows from Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity)
Wet Weather Conditions; Includes Solids Disposal and Chemically Enhanced Backwash Flows
Maximum Solids Production = 5,230 pounds/day
CEBs = 24,000 gallons/day

			Wet Weather Flow in Collection System (mgd)	Additional Flow (gpd) from Proposed Seawater Desalination Plant (Solids and CEB) Per TSS of Sludge Disposal from the Proposed Plant					Maximum Flow (mgd)
				0.30%	0.50%	1.00%	1.50%	2.00%	
				233,033	149,420	86,710	65,807	55,355	
				Combined Flows from Collection System and Proposed Seawater Desalination Plant					
Link	Pipe Diameter (inches)	Pipe Slope (%)	(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	(mgd)
L4-SM502.1	10	1.581	0.13170	0.36473	0.28112	0.21841	0.19751	0.18705	1.78
Velocity in FT/SEC =				4.0	3.8	3.4	3.4	3.4	
L3-SM309.1	10	1.109	0.26827	0.50130	0.41769	0.35498	0.33408	0.32362	1.49
Velocity in FT/SEC =				3.8	3.6	3.5	3.4	3.4	
L3-SM301.1	15	0.219	0.46284	0.69587	0.61226	0.54955	0.52865	0.51819	1.95
Velocity in FT/SEC =				2.5	2.2	2.1	2.1	2.1	
L3-401.1	15	0.179	0.73991	0.97294	0.88933	0.82662	0.80572	0.79526	1.77
Velocity in FT/SEC =				2.2	2.2	2.1	2.1	2.1	
M3-SM504.1	15	0.112	0.77127	1.00430	0.92069	0.85798	0.83708	0.82662	1.4
Velocity in FT/SEC =				1.9	1.9	1.8	1.8	1.8	
	21	0.371	5.96776	6.20079	6.11718	6.05447	6.03357	6.02311	6.24
Velocity in FT/SEC =				4.5	4.5	4.5	4.5	4.5	

Yellow highlights indicate low velocity (<2.0 FT/SEC) that could result in settling of solids in the specified pipe segment in the collection system.

Appendix D

Calculated TDS Values

Proposed Seawater Desalination Plant Solids Disposal Evaluation														
Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity) Projected TDS at the Wastewater Treatment Facility After Dilution with WWTF Influent														
Anticipated Waste Streams to Sanitary Sewer Include Solids from Clarifiers/Thickeners Only (No Chemically Enhanced Backwashes)														
WWTF Influent TDS: 1,000 mg/L														
Proposed Seawater Desalination Plant Solids Disposal TDS: 36,000 mg/L														
CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Flow =			CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Fl			CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Flow =			CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Flow =			CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Flow =		
- gal/day 340 lbs/day 0.30% 13,589 gal/day 13,589 gal/day			- gal/day 340 lbs/day 2.00% 2,038 gal/day 2,038 gal/day			- gal/day 2,950 lbs/day 0.30% 117,906 gal/day 117,906 gal/day			- gal/day 2,950 lbs/day 2.00% 17,686 gal/day 17,686 gal/day			- gal/day 2,950 lbs/day 2.00% 17,686 gal/day 17,686 gal/day		
2009	2010	2011	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)
11/21/2009	11/21/2010	11/21/2011	1,056.66	1,035.86	1,046.80	1,008.51	1,005.38	1,007.03	1,485.61	1,308.70	1,401.90	1,073.71	1,046.66	1,060.88
11/22/2009	11/22/2010	11/22/2011	1,054.96	1,037.62	1,049.53	1,008.26	1,005.65	1,007.44	1,471.20	1,323.72	1,425.09	1,071.50	1,048.94	1,064.43
11/23/2009	11/23/2010	11/23/2011	1,056.13	1,037.50	1,050.05	1,008.43	1,005.63	1,007.52	1,481.08	1,322.70	1,429.51	1,073.02	1,048.79	1,065.11
11/24/2009	11/24/2010	11/24/2011	1,057.91	1,042.57	1,051.29	1,008.70	1,006.39	1,007.70	1,496.12	1,365.91	1,440.04	1,075.33	1,055.38	1,066.72
11/25/2009	11/25/2010	11/25/2011	1,059.43	1,047.03	1,054.33	1,008.93	1,007.06	1,008.16	1,508.97	1,403.87	1,465.88	1,077.30	1,061.18	1,070.68
11/26/2009	11/26/2010	11/26/2011	1,062.55	1,049.63	1,054.90	1,009.40	1,007.45	1,008.25	1,535.39	1,425.96	1,470.66	1,081.37	1,064.56	1,071.42
11/27/2009	11/27/2010	11/27/2011	1,063.90	1,032.75	1,053.84	1,009.60	1,004.92	1,008.09	1,546.73	1,282.11	1,461.71	1,083.11	1,042.61	1,070.04
11/28/2009	11/28/2010	11/28/2011	1,061.58	1,039.62	1,055.73	1,009.25	1,005.95	1,008.37	1,527.18	1,340.83	1,477.74	1,080.10	1,051.55	1,072.50
11/29/2009	11/29/2010	11/29/2011	1,057.42	1,043.15	1,056.66	1,008.62	1,006.48	1,008.51	1,491.98	1,370.84	1,485.61	1,074.69	1,056.13	1,073.71
11/30/2009	11/30/2010	11/30/2011	1,058.33	1,045.45	1,059.50	1,008.76	1,006.83	1,008.94	1,499.73	1,390.49	1,509.60	1,075.88	1,059.13	1,077.40
12/1/2009	12/1/2010	12/1/2011	1,058.69	1,046.75	1,062.97	1,008.82	1,007.02	1,009.46	1,502.77	1,401.51	1,538.88	1,076.35	1,060.82	1,081.90
12/2/2009	12/2/2010	12/2/2011	1,059.57	1,048.86	1,060.41	1,008.95	1,007.34	1,009.07	1,510.23	1,419.47	1,517.27	1,077.49	1,063.57	1,078.58
12/3/2009	12/3/2010	12/3/2011	1,059.57	1,053.84	1,059.57	1,008.95	1,008.09	1,008.95	1,510.23	1,461.71	1,510.23	1,077.49	1,070.04	1,077.49
12/4/2009	12/4/2010	12/4/2011	1,061.66	1,052.19	1,054.52	1,009.26	1,007.84	1,008.19	1,527.85	1,447.68	1,467.46	1,080.21	1,067.89	1,070.92
12/5/2009	12/5/2010	12/5/2011	1,059.65	1,037.95	1,033.32	1,008.96	1,005.70	1,005.00	1,510.86	1,326.53	1,287.02	1,077.59	1,049.37	1,043.35
12/6/2009	12/6/2010	12/6/2011	1,052.94	1,051.90	1,059.72	1,007.95	1,007.80	1,008.97	1,454.09	1,445.27	1,511.50	1,068.87	1,067.52	1,077.69
12/7/2009	12/7/2010	12/7/2011	1,053.24	1,054.90	1,058.12	1,008.00	1,008.25	1,008.73	1,456.60	1,470.66	1,497.92	1,069.26	1,071.42	1,075.60
12/8/2009	12/8/2010	12/8/2011	1,059.87	1,046.61	1,058.55	1,008.99	1,007.00	1,008.79	1,512.77	1,400.34	1,501.55	1,077.88	1,060.64	1,076.16
12/9/2009	12/9/2010	12/9/2011	1,060.64	1,047.78	1,065.39	1,009.11	1,007.18	1,009.82	1,519.22	1,410.29	1,559.33	1,078.88	1,062.16	1,085.06
12/10/2009	12/10/2010	12/10/2011	1,054.58	1,053.66	1,060.56	1,008.20	1,008.06	1,009.10	1,467.99	1,460.16	1,518.57	1,071.01	1,069.80	1,078.78
12/11/2009	12/11/2010	12/11/2011	1,057.35	1,053.66	1,055.80	1,008.61	1,008.06	1,008.38	1,491.40	1,460.16	1,478.30	1,074.60	1,069.80	1,072.59
12/12/2009	12/12/2010	12/12/2011	1,040.71	1,052.83	1,057.56	1,006.11	1,007.93	1,008.65	1,350.08	1,453.09	1,493.16	1,052.96	1,068.72	1,074.87
12/13/2009	12/13/2010	12/13/2011	1,047.78	1,057.21	1,061.34	1,007.18	1,008.59	1,009.22	1,410.29	1,490.23	1,525.17	1,062.16	1,074.42	1,079.79
12/14/2009	12/14/2010	12/14/2011	1,056.94	1,051.57	1,061.74	1,008.55	1,007.74	1,009.27	1,487.91	1,442.40	1,528.53	1,074.06	1,067.08	1,080.31
12/15/2009	12/15/2010	12/15/2011	1,060.72	1,055.22	1,057.56	1,009.12	1,008.29	1,008.65	1,519.87	1,473.36	1,493.16	1,078.98	1,071.83	1,074.87
12/16/2009	12/16/2010	12/16/2011	1,060.64	1,053.90	1,062.63	1,009.11	1,008.10	1,009.41	1,519.22	1,462.22	1,536.08	1,078.88	1,070.12	1,081.47
12/17/2009	12/17/2010	12/17/2011	1,061.82	1,037.95	1,060.64	1,009.29	1,005.70	1,009.11	1,529.21	1,326.53	1,519.22	1,080.41	1,049.37	1,078.88
12/18/2009	12/18/2010	12/18/2011	1,057.42	1,023.38	1,058.05	1,008.62	1,003.51	1,008.72	1,491.98	1,201.82	1,497.32	1,074.69	1,030.42	1,075.51
12/19/2009	12/19/2010	12/19/2011	1,057.84	1,023.19	1,061.18	1,008.69	1,003.48	1,009.19	1,495.53	1,200.15	1,523.83	1,075.23	1,030.17	1,079.59
12/20/2009	12/20/2010	12/20/2011	1,058.55	1,034.31	1,060.64	1,008.79	1,005.15	1,009.11	1,501.55	1,295.44	1,519.22	1,076.16	1,044.64	1,078.88
12/21/2009	12/21/2010	12/21/2011	1,056.20	1,028.22	1,060.18	1,008.44	1,004.24	1,009.04	1,481.65	1,243.35	1,515.33	1,073.10	1,036.72	1,078.28
12/22/2009	12/22/2010	12/22/2011	1,058.91	1,032.98	1,063.39	1,008.85	1,004.95	1,009.52	1,504.62	1,284.05	1,542.42	1,076.63	1,042.90	1,082.45
12/23/2009	12/23/2010	12/23/2011	1,061.34	1,040.57	1,063.13	1,009.22	1,006.09	1,009.48	1,525.17	1,348.90	1,540.29	1,079.79	1,052.78	1,082.12
12/24/2009	12/24/2010	12/24/2011	1,062.14	1,044.77	1,070.74	1,009.34	1,006.72	1,010.63	1,531.93	1,384.67	1,604.39	1,080.83	1,058.24	1,092.01
12/25/2009	12/25/2010	12/25/2011	1,069.60	1,029.57	1,074.39	1,010.46	1,004.44	1,011.18	1,594.80	1,254.92	1,635.08	1,090.53	1,038.48	1,096.75
12/26/2009	12/26/2010	12/26/2011	1,041.24	1,035.81	1,063.47	1,006.19	1,005.38	1,009.54	1,354.59	1,308.24	1,543.14	1,053.65	1,046.58	1,082.56
12/27/2009	12/27/2010	12/27/2011	1,045.50	1,041.13	1,062.06	1,006.83	1,006.18	1,009.32	1,390.86	1,353.68	1,531.25	1,059.19	1,053.51	1,080.73
12/28/2009	12/28/2010	12/28/2011	1,048.12	1,015.04	1,061.26	1,007.23	1,002.26	1,009.20	1,413.17	1,130.02	1,524.50	1,062.60	1,019.57	1,079.69
12/29/2009	12/29/2010	12/29/2011	1,041.49	1,022.85	1,061.03	1,006.23	1,003.43	1,009.17	1,356.74	1,197.28	1,522.51	1,053.98	1,029.73	1,079.38
12/30/2009	12/30/2010	12/30/2011	1,043.62	1,031.96	1,060.64	1,006.55	1,004.80	1,009.11	1,374.88	1,275.34	1,519.22	1,056.75	1,041.58	1,078.88
12/31/2009	12/31/2010	12/31/2011	1,046.34	1,032.17	1,059.35	1,006.96	1,004.83	1,008.92	1,398.03	1,277.18	1,508.35	1,060.29	1,041.86	1,077.20
Minimum =			1,014.08	1,015.04	1,013.12	1,002.11	1,002.26	1,001.97	1,121.77	1,130.02	1,113.53	1,018.32	1,019.57	1,017.08
Average =			1,053.60	1,048.00	1,049.46	1,008.05	1,007.21	1,007.43	1,459.54	1,411.98	1,424.41	1,069.72	1,062.45	1,064.35
Maximum =			1,069.60	1,065.48	1,074.39	1,010.46	1,009.84	1,011.18	1,594.80	1,560.09	1,635.08	1,090.53	1,085.17	1,096.75

Proposed Seawater Desalination Plant Solids Disposal Evaluation														
Proposed Seawater Desalination Plant (2.5 mgd Initial Capacity) Projected TDS at the Wastewater Treatment Facility After Dilution with WWTF Influent														
Anticipated Waste Streams to Sanitary Sewer Include Solids from Clarifiers/Thickeners and Chemically Enhanced Backwashes														
WWTF Influent TDS: 1,000 mg/L														
Proposed Seawater Desalination Plant Solids Disposal: 36,000 mg/L														
CEB Waste = 16,000 gal/day			CEB Waste = 16,000 gal/day			CEB Waste = 16,000 gal/day			CEB Waste = 16,000 gal/day			CEB Waste = 16,000 gal/day		
Dry Solids = 340 lbs/day			Dry Solids = 340 lbs/day			Dry Solids = 2,950 lbs/day			Dry Solids = 2,950 lbs/day			Dry Solids = 2,950 lbs/day		
TSS by Wt = 0.30%			TSS by Wt = 2.00%			TSS by Wt = 0.30%			TSS by Wt = 2.00%			TSS by Wt = 2.00%		
Sludge Flow = 13,589 gal/day			Sludge Flow = 2,038 gal/day			Sludge Flow = 117,906 gal/day			Sludge Flow = 17,686 gal/day			Sludge Flow = 33,686 gal/day		
Total Waste Flow = 29,589 gal/day			Total Waste Fl			Total Waste Flow = 133,906 gal/day			Total Waste Flow = 133,906 gal/day			Total Waste Flow = 133,906 gal/day		
2009	2010	2011	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)
11/21/2009	11/21/2010	11/21/2011	1,123.15	1,077.99	1,101.73	1,075.18	1,047.58	1,062.09	1,550.48	1,350.17	1,455.73	1,140.13	1,088.76	1,115.77
11/22/2009	11/22/2010	11/22/2011	1,119.45	1,081.81	1,107.66	1,072.92	1,049.92	1,065.71	1,534.16	1,367.18	1,481.98	1,135.93	1,093.10	1,122.51
11/23/2009	11/23/2010	11/23/2011	1,121.99	1,081.55	1,108.79	1,074.47	1,049.76	1,066.40	1,545.35	1,366.04	1,486.99	1,138.81	1,092.81	1,123.80
11/24/2009	11/24/2010	11/24/2011	1,125.84	1,092.55	1,111.48	1,076.82	1,056.48	1,068.05	1,562.37	1,414.98	1,498.91	1,143.19	1,105.33	1,126.86
11/25/2009	11/25/2010	11/25/2011	1,129.14	1,102.24	1,118.09	1,078.84	1,062.40	1,072.09	1,576.90	1,457.96	1,528.14	1,146.94	1,116.35	1,134.38
11/26/2009	11/26/2010	11/26/2011	1,135.92	1,107.88	1,119.32	1,082.98	1,065.85	1,072.84	1,606.78	1,482.97	1,533.56	1,154.65	1,122.77	1,135.77
11/27/2009	11/27/2010	11/27/2011	1,138.83	1,071.23	1,117.02	1,084.77	1,043.46	1,071.43	1,619.61	1,320.04	1,523.43	1,157.97	1,081.07	1,133.17
11/28/2009	11/28/2010	11/28/2011	1,133.81	1,086.16	1,121.13	1,081.70	1,052.58	1,073.94	1,597.50	1,386.57	1,541.57	1,152.25	1,098.06	1,137.84
11/29/2009	11/29/2010	11/29/2011	1,124.78	1,093.81	1,123.15	1,076.18	1,057.25	1,075.18	1,557.68	1,420.56	1,550.48	1,141.99	1,106.76	1,140.13
11/30/2009	11/30/2010	11/30/2011	1,126.77	1,098.82	1,129.30	1,077.39	1,060.31	1,078.94	1,566.44	1,442.81	1,577.61	1,144.24	1,112.46	1,147.12
12/1/2009	12/1/2010	12/1/2011	1,127.55	1,101.64	1,136.81	1,077.87	1,062.03	1,083.53	1,569.89	1,455.29	1,610.73	1,145.13	1,115.66	1,155.67
12/2/2009	12/2/2010	12/2/2011	1,129.46	1,106.22	1,131.26	1,079.04	1,064.83	1,080.14	1,578.33	1,475.62	1,586.28	1,147.31	1,120.88	1,149.36
12/3/2009	12/3/2010	12/3/2011	1,129.46	1,117.02	1,129.46	1,079.04	1,071.43	1,079.04	1,578.33	1,523.43	1,578.33	1,147.31	1,133.17	1,147.31
12/4/2009	12/4/2010	12/4/2011	1,133.98	1,113.44	1,118.50	1,081.80	1,069.24	1,072.34	1,598.26	1,507.55	1,529.94	1,152.45	1,129.08	1,134.84
12/5/2009	12/5/2010	12/5/2011	1,129.62	1,082.52	1,072.47	1,079.14	1,050.35	1,044.22	1,579.04	1,370.38	1,325.60	1,147.49	1,093.92	1,082.48
12/6/2009	12/6/2010	12/6/2011	1,115.07	1,112.82	1,129.78	1,070.24	1,068.86	1,079.23	1,514.80	1,504.82	1,579.76	1,130.95	1,128.38	1,147.68
12/7/2009	12/7/2010	12/7/2011	1,115.72	1,119.32	1,126.30	1,070.64	1,072.84	1,077.11	1,517.64	1,533.56	1,564.40	1,131.68	1,135.77	1,143.72
12/8/2009	12/8/2010	12/8/2011	1,130.11	1,101.34	1,127.23	1,079.43	1,061.85	1,077.67	1,581.19	1,453.97	1,568.50	1,148.05	1,115.32	1,144.78
12/9/2009	12/9/2010	12/9/2011	1,131.77	1,103.88	1,142.07	1,080.45	1,063.40	1,086.75	1,588.49	1,465.23	1,633.86	1,149.93	1,118.21	1,161.65
12/10/2009	12/10/2010	12/10/2011	1,118.63	1,116.63	1,131.60	1,072.42	1,071.19	1,080.34	1,530.54	1,521.68	1,587.75	1,135.00	1,132.72	1,149.74
12/11/2009	12/11/2010	12/11/2011	1,124.63	1,116.63	1,121.27	1,076.08	1,071.19	1,074.03	1,557.02	1,521.68	1,542.20	1,141.81	1,132.72	1,138.00
12/12/2009	12/12/2010	12/12/2011	1,088.52	1,114.82	1,125.08	1,054.02	1,070.09	1,076.36	1,397.05	1,513.67	1,559.01	1,100.74	1,130.66	1,142.33
12/13/2009	12/13/2010	12/13/2011	1,103.88	1,124.33	1,133.29	1,063.40	1,075.90	1,081.38	1,465.23	1,555.70	1,595.22	1,118.21	1,141.47	1,151.67
12/14/2009	12/14/2010	12/14/2011	1,123.74	1,112.09	1,134.15	1,075.54	1,068.42	1,081.91	1,553.07	1,501.58	1,599.02	1,140.80	1,127.55	1,152.65
12/15/2009	12/15/2010	12/15/2011	1,131.93	1,120.01	1,125.08	1,080.55	1,073.26	1,076.36	1,589.23	1,536.61	1,559.01	1,150.12	1,136.56	1,142.33
12/16/2009	12/16/2010	12/16/2011	1,131.77	1,117.16	1,136.09	1,080.45	1,071.52	1,083.09	1,588.49	1,524.01	1,607.56	1,149.93	1,133.32	1,154.85
12/17/2009	12/17/2010	12/17/2011	1,134.33	1,082.52	1,131.77	1,082.01	1,050.35	1,080.45	1,599.79	1,370.38	1,588.49	1,152.85	1,093.92	1,149.93
12/18/2009	12/18/2010	12/18/2011	1,124.78	1,050.87	1,126.15	1,076.18	1,031.03	1,077.01	1,557.68	1,229.02	1,563.72	1,141.99	1,057.90	1,143.54
12/19/2009	12/19/2010	12/19/2011	1,125.69	1,050.45	1,132.95	1,076.73	1,030.77	1,081.17	1,561.69	1,227.14	1,593.71	1,143.02	1,057.42	1,151.28
12/20/2009	12/20/2010	12/20/2011	1,127.23	1,074.61	1,131.77	1,077.67	1,045.53	1,080.45	1,568.50	1,335.15	1,588.49	1,144.78	1,084.92	1,149.93
12/21/2009	12/21/2010	12/21/2011	1,122.13	1,061.39	1,130.77	1,074.56	1,037.45	1,079.84	1,545.99	1,276.11	1,584.09	1,138.97	1,069.87	1,148.79
12/22/2009	12/22/2010	12/22/2011	1,128.02	1,071.72	1,137.72	1,078.16	1,043.76	1,084.09	1,571.97	1,322.24	1,614.74	1,145.67	1,081.63	1,156.71
12/23/2009	12/23/2010	12/23/2011	1,133.29	1,088.22	1,137.18	1,081.38	1,053.83	1,083.75	1,595.22	1,395.71	1,612.33	1,151.67	1,100.39	1,156.08
12/24/2009	12/24/2010	12/24/2011	1,135.03	1,097.34	1,153.66	1,082.44	1,059.40	1,093.84	1,602.88	1,436.22	1,684.80	1,153.64	1,110.77	1,174.83
12/25/2009	12/25/2010	12/25/2011	1,151.19	1,064.33	1,161.57	1,092.33	1,039.24	1,098.68	1,673.97	1,289.23	1,719.49	1,172.02	1,073.21	1,183.83
12/26/2009	12/26/2010	12/26/2011	1,089.67	1,077.87	1,137.91	1,054.72	1,047.51	1,084.20	1,402.16	1,349.65	1,615.54	1,102.05	1,088.62	1,156.91
12/27/2009	12/27/2010	12/27/2011	1,098.92	1,089.43	1,134.85	1,060.37	1,054.58	1,082.33	1,443.23	1,401.12	1,602.10	1,112.57	1,101.78	1,153.44
12/28/2009	12/28/2010	12/28/2011	1,104.61	1,032.72	1,133.12	1,063.85	1,019.96	1,081.27	1,468.49	1,147.59	1,594.46	1,119.05	1,037.25	1,151.47
12/29/2009	12/29/2010	12/29/2011	1,090.21	1,049.72	1,132.61	1,055.05	1,030.33	1,080.96	1,404.59	1,223.88	1,592.21	1,102.67	1,056.59	1,150.89
12/30/2009	12/30/2010	12/30/2011	1,094.84	1,069.51	1,131.77	1,057.88	1,042.41	1,080.45	1,425.14	1,312.37	1,588.49	1,107.93	1,079.11	1,149.93
12/31/2009	12/31/2010	12/31/2011	1,100.75	1,069.98	1,128.98	1,061.49	1,042.69	1,078.74	1,451.34	1,314.46	1,576.19	1,114.65	1,079.64	1,146.76
Minimum =			1,030.64	1,032.72	1,028.56	1,018.69	1,019.96	1,017.42	1,138.23	1,147.59	1,128.88	1,034.88	1,037.25	1,032.51
Average =			1,116.49	1,104.35	1,107.52	1,071.11	1,063.69	1,065.63	1,520.96	1,467.10	1,481.18	1,132.56	1,118.94	1,122.35
Maximum =			1,151.19	1,142.26	1,161.57	1,092.33	1,086.87	1,098.68	1,673.97	1,634.72	1,719.49	1,172.02	1,161.87	1,183.83

Proposed Seawater Desalination Plant Solids Disposal Evaluation														
Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity) Projected TDS at the Wastewater Treatment Facility After Dilution with WWTF Influent														
Anticipated Waste Streams to Sanitary Sewer Include Solids from Clarifiers/Thickeners Only (No Chemically Enhanced Backwashes)														
Proposed Seawater Desalination Plant Solids Disposal:										WWTF Influent TDS: 1,000 mg/L				
Proposed Seawater Desalination Plant Solids Disposal:										36,000 mg/L				
CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Flow =			- gal/day 590 lbs/day 0.30% 23,581 gal/day 23,581 gal/day			CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Fl			- gal/day 590 lbs/day 2.00% 3,537 gal/day 3,537 gal/day			CEB Waste = Dry Solids = TSS by Wt = Sludge Flow = Total Waste Flow =		
2009	2010	2011	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)
11/21/2009	11/21/2010	11/21/2011	1,098.21	1,062.18	1,081.13	1,014.77	1,009.34	1,012.19	1,851.80	1,543.59	1,706.26	1,130.47	1,082.63	1,107.79
11/22/2009	11/22/2010	11/22/2011	1,095.27	1,065.23	1,085.85	1,014.32	1,009.80	1,012.90	1,826.77	1,569.84	1,746.62	1,126.56	1,086.67	1,114.06
11/23/2009	11/23/2010	11/23/2011	1,097.29	1,065.02	1,086.75	1,014.63	1,009.77	1,013.04	1,843.94	1,568.07	1,754.32	1,129.24	1,086.40	1,115.26
11/24/2009	11/24/2010	11/24/2011	1,100.36	1,073.80	1,088.90	1,015.09	1,011.09	1,013.36	1,870.03	1,643.52	1,772.64	1,133.32	1,098.06	1,118.11
11/25/2009	11/25/2010	11/25/2011	1,102.99	1,081.53	1,094.18	1,015.49	1,012.25	1,014.16	1,892.32	1,709.68	1,817.53	1,136.81	1,108.32	1,125.11
11/26/2009	11/26/2010	11/26/2011	1,108.40	1,086.03	1,095.16	1,016.30	1,012.93	1,014.31	1,938.08	1,748.15	1,825.84	1,143.99	1,114.30	1,126.41
11/27/2009	11/27/2010	11/27/2011	1,110.73	1,056.79	1,093.33	1,016.65	1,008.53	1,014.03	1,957.73	1,497.05	1,810.29	1,147.08	1,075.47	1,123.98
11/28/2009	11/28/2010	11/28/2011	1,106.72	1,068.70	1,096.60	1,016.05	1,010.32	1,014.52	1,923.87	1,599.73	1,838.14	1,141.76	1,091.29	1,128.33
11/29/2009	11/29/2010	11/29/2011	1,099.52	1,074.80	1,098.21	1,014.96	1,011.24	1,014.77	1,862.85	1,652.12	1,851.80	1,132.20	1,099.39	1,130.47
11/30/2009	11/30/2010	11/30/2011	1,101.10	1,078.80	1,103.12	1,015.20	1,011.84	1,015.51	1,876.29	1,686.38	1,893.41	1,134.30	1,104.70	1,136.98
12/1/2009	12/1/2010	12/1/2011	1,101.72	1,081.05	1,109.12	1,015.30	1,012.18	1,016.41	1,881.57	1,705.58	1,944.14	1,135.13	1,107.68	1,144.94
12/2/2009	12/2/2010	12/2/2011	1,103.25	1,084.71	1,104.69	1,015.53	1,012.73	1,015.74	1,894.50	1,736.84	1,906.69	1,137.15	1,112.54	1,139.07
12/3/2009	12/3/2010	12/3/2011	1,103.25	1,093.33	1,103.25	1,015.53	1,014.03	1,015.53	1,894.50	1,810.29	1,894.50	1,137.15	1,123.98	1,137.15
12/4/2009	12/4/2010	12/4/2011	1,106.86	1,090.46	1,094.50	1,016.07	1,013.60	1,014.21	1,925.04	1,785.92	1,820.28	1,141.94	1,120.18	1,125.54
12/5/2009	12/5/2010	12/5/2011	1,103.38	1,065.80	1,057.78	1,015.55	1,009.89	1,008.68	1,895.60	1,574.76	1,505.64	1,137.33	1,087.43	1,076.79
12/6/2009	12/6/2010	12/6/2011	1,091.77	1,089.97	1,103.51	1,013.80	1,013.52	1,015.57	1,797.05	1,781.72	1,896.69	1,121.92	1,119.53	1,137.50
12/7/2009	12/7/2010	12/7/2011	1,092.28	1,095.16	1,100.73	1,013.87	1,014.31	1,015.15	1,801.42	1,825.84	1,873.15	1,122.60	1,126.41	1,133.81
12/8/2009	12/8/2010	12/8/2011	1,103.77	1,080.81	1,101.47	1,015.60	1,012.15	1,015.26	1,898.90	1,703.54	1,879.45	1,137.84	1,107.37	1,134.80
12/9/2009	12/9/2010	12/9/2011	1,105.09	1,082.84	1,113.32	1,015.80	1,012.45	1,017.04	1,910.08	1,720.87	1,979.53	1,139.60	1,110.06	1,150.51
12/10/2009	12/10/2010	12/10/2011	1,094.61	1,093.01	1,104.96	1,014.22	1,013.98	1,015.78	1,821.21	1,807.61	1,908.95	1,125.69	1,123.56	1,139.42
12/11/2009	12/11/2010	12/11/2011	1,099.40	1,093.01	1,096.72	1,014.95	1,013.98	1,014.54	1,861.84	1,807.61	1,839.10	1,132.04	1,123.56	1,128.48
12/12/2009	12/12/2010	12/12/2011	1,070.58	1,091.57	1,099.76	1,010.61	1,013.77	1,015.00	1,615.89	1,795.32	1,864.89	1,093.79	1,121.65	1,132.52
12/13/2009	12/13/2010	12/13/2011	1,082.84	1,099.16	1,106.31	1,012.45	1,014.91	1,015.99	1,720.87	1,859.81	1,920.38	1,110.06	1,131.72	1,141.21
12/14/2009	12/14/2010	12/14/2011	1,098.68	1,089.38	1,107.00	1,014.84	1,013.44	1,016.09	1,855.79	1,776.74	1,926.21	1,131.09	1,118.75	1,142.13
12/15/2009	12/15/2010	12/15/2011	1,105.22	1,095.71	1,099.76	1,015.82	1,014.39	1,015.00	1,911.21	1,830.53	1,864.89	1,139.77	1,127.14	1,132.52
12/16/2009	12/16/2010	12/16/2011	1,105.09	1,093.43	1,108.55	1,015.80	1,014.05	1,016.32	1,910.08	1,811.19	1,939.29	1,139.60	1,124.12	1,144.18
12/17/2009	12/17/2010	12/17/2011	1,107.14	1,065.80	1,105.09	1,016.11	1,009.89	1,015.80	1,927.38	1,574.76	1,910.08	1,142.31	1,087.43	1,139.60
12/18/2009	12/18/2010	12/18/2011	1,099.52	1,040.55	1,100.61	1,014.96	1,006.09	1,015.13	1,862.85	1,356.21	1,872.11	1,132.20	1,053.90	1,133.65
12/19/2009	12/19/2010	12/19/2011	1,100.24	1,040.21	1,106.04	1,015.07	1,006.04	1,015.95	1,869.00	1,353.28	1,918.07	1,133.16	1,053.45	1,140.85
12/20/2009	12/20/2010	12/20/2011	1,101.47	1,059.49	1,105.09	1,015.26	1,008.94	1,015.80	1,879.45	1,520.39	1,910.08	1,134.80	1,079.06	1,139.60
12/21/2009	12/21/2010	12/21/2011	1,097.40	1,048.94	1,104.29	1,014.64	1,007.35	1,015.68	1,844.92	1,429.12	1,903.34	1,129.39	1,065.05	1,138.54
12/22/2009	12/22/2010	12/22/2011	1,102.10	1,057.18	1,109.85	1,015.35	1,008.59	1,016.52	1,884.76	1,500.45	1,950.27	1,135.63	1,075.99	1,145.91
12/23/2009	12/23/2010	12/23/2011	1,106.31	1,070.34	1,109.41	1,015.99	1,010.57	1,016.46	1,920.38	1,613.82	1,946.58	1,141.21	1,093.47	1,145.33
12/24/2009	12/24/2010	12/24/2011	1,107.70	1,077.62	1,122.57	1,016.20	1,011.66	1,018.44	1,932.11	1,676.23	2,057.39	1,143.05	1,103.13	1,162.79
12/25/2009	12/25/2010	12/25/2011	1,120.60	1,051.28	1,128.89	1,018.14	1,007.70	1,019.39	2,040.85	1,449.42	2,110.35	1,160.18	1,068.16	1,171.17
12/26/2009	12/26/2010	12/26/2011	1,071.50	1,062.09	1,109.99	1,010.74	1,009.33	1,016.54	1,623.76	1,542.78	1,951.50	1,095.00	1,082.50	1,146.10
12/27/2009	12/27/2010	12/27/2011	1,078.88	1,071.31	1,107.56	1,011.85	1,010.72	1,016.18	1,687.02	1,622.17	1,930.92	1,104.80	1,094.76	1,142.87
12/28/2009	12/28/2010	12/28/2011	1,083.42	1,026.08	1,106.17	1,012.54	1,003.91	1,015.97	1,725.88	1,229.86	1,919.23	1,110.84	1,034.67	1,141.03
12/29/2009	12/29/2010	12/29/2011	1,071.93	1,039.63	1,105.76	1,010.81	1,005.95	1,015.91	1,627.51	1,348.24	1,915.77	1,095.58	1,052.68	1,140.49
12/30/2009	12/30/2010	12/30/2011	1,075.63	1,055.42	1,105.09	1,011.36	1,008.32	1,015.80	1,659.17	1,485.19	1,910.08	1,100.48	1,073.65	1,139.60
12/31/2009	12/31/2010	12/31/2011	1,080.34	1,055.79	1,102.86	1,012.07	1,008.38	1,015.47	1,699.51	1,488.43	1,891.23	1,106.74	1,074.14	1,136.64
Minimum =			1,024.42	1,026.08	1,022.77	1,003.67	1,003.91	1,003.42	1,215.31	1,229.86	1,200.78	1,032.47	1,034.67	1,030.26
Average =			1,092.90	1,083.21	1,085.74	1,013.97	1,012.51	1,012.89	1,806.39	1,723.53	1,745.21	1,123.42	1,110.55	1,113.91
Maximum =			1,120.60	1,113.47	1,128.89	1,018.14	1,017.07	1,019.39	2,040.85	1,980.84	2,110.35	1,160.18	1,150.72	1,171.17

Proposed Seawater Desalination Plant Solids Disposal Evaluation														
Proposed Seawater Desalination Plant (4.5 mgd Ultimate Capacity) Projected TDS at the Wastewater Treatment Facility After Dilution with WWTF Influent														
Anticipated Waste Streams to Sanitary Sewer Include Solids from Clarifiers/Thickeners and Chemically Enhanced Backwashes														
WWTF Influent TDS: 1,000 mg/L														
Proposed Seawater Desalination Plant Solids Disposal TDS: 36,000 mg/L														
CEB Waste = 24,000 gal/day Dry Solids = 590 lbs/day TSS by Wt = 0.30% Sludge Flow = 23,581 gal/day Total Waste Flow = 47,581 gal/day			CEB Waste = 24,000 gal/day Dry Solids = 590 lbs/day TSS by Wt = 2.00% Sludge Flow = 3,537 gal/day Total Waste Fl = 27,537 gal/day			CEB Waste = 24,000 gal/day Dry Solids = 5,230 lbs/day TSS by Wt = 0.30% Sludge Flow = 209,033 gal/day Total Waste Flow = 233,033 gal/day			CEB Waste = 24,000 gal/day Dry Solids = 5,230 lbs/day TSS by Wt = 2.00% Sludge Flow = 31,355 gal/day Total Waste Flow = 55,355 gal/day					
2009	2010	2011	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)	2009 TDS (mg/L)	2010 TDS (mg/L)	2011 TDS (mg/L)
11/21/2009	11/21/2010	11/21/2011	1,197.61	1,125.24	1,163.31	1,114.64	1,072.59	1,094.70	1,946.95	1,604.92	1,785.53	1,229.68	1,145.61	1,189.84
11/22/2009	11/22/2010	11/22/2011	1,191.69	1,131.36	1,172.80	1,111.20	1,076.14	1,100.21	1,919.21	1,634.08	1,830.31	1,222.81	1,152.73	1,200.87
11/23/2009	11/23/2010	11/23/2011	1,195.75	1,130.95	1,174.61	1,113.55	1,075.90	1,101.27	1,938.24	1,632.11	1,838.85	1,227.52	1,152.25	1,202.97
11/24/2009	11/24/2010	11/24/2011	1,201.92	1,148.59	1,178.92	1,117.14	1,086.15	1,103.77	1,967.17	1,715.89	1,859.17	1,234.69	1,172.75	1,207.98
11/25/2009	11/25/2010	11/25/2011	1,207.19	1,164.11	1,189.51	1,120.21	1,095.17	1,109.93	1,991.87	1,789.33	1,908.96	1,240.81	1,190.78	1,220.28
11/26/2009	11/26/2010	11/26/2011	1,218.05	1,173.16	1,191.47	1,126.52	1,100.42	1,111.07	2,042.58	1,832.00	1,918.17	1,253.41	1,201.28	1,222.56
11/27/2009	11/27/2010	11/27/2011	1,222.71	1,114.40	1,187.80	1,129.24	1,066.30	1,108.93	2,064.35	1,553.22	1,900.93	1,258.83	1,133.02	1,218.29
11/28/2009	11/28/2010	11/28/2011	1,214.67	1,138.35	1,194.38	1,124.56	1,080.20	1,112.76	2,026.83	1,667.28	1,931.81	1,249.50	1,160.84	1,225.93
11/29/2009	11/29/2010	11/29/2011	1,200.22	1,150.61	1,197.61	1,116.16	1,087.32	1,114.64	1,959.20	1,725.44	1,946.95	1,232.71	1,175.09	1,229.68
11/30/2009	11/30/2010	11/30/2011	1,203.40	1,158.64	1,207.45	1,118.00	1,091.99	1,120.36	1,974.10	1,763.47	1,993.07	1,236.40	1,184.42	1,241.11
12/1/2009	12/1/2010	12/1/2011	1,204.65	1,163.15	1,219.48	1,118.73	1,094.61	1,127.36	1,979.95	1,784.77	2,049.29	1,237.86	1,189.66	1,255.08
12/2/2009	12/2/2010	12/2/2011	1,207.71	1,170.50	1,210.60	1,120.51	1,098.88	1,122.19	1,994.28	1,819.46	2,007.80	1,241.41	1,198.19	1,244.77
12/3/2009	12/3/2010	12/3/2011	1,207.71	1,187.80	1,207.71	1,120.51	1,108.93	1,120.51	1,994.28	1,900.93	1,994.28	1,241.41	1,218.29	1,241.41
12/4/2009	12/4/2010	12/4/2011	1,214.95	1,182.05	1,190.16	1,124.72	1,105.59	1,110.31	2,028.12	1,873.90	1,912.01	1,249.82	1,211.62	1,221.03
12/5/2009	12/5/2010	12/5/2011	1,207.97	1,132.51	1,116.40	1,120.66	1,076.81	1,067.46	1,995.50	1,639.55	1,562.76	1,241.71	1,154.07	1,135.34
12/6/2009	12/6/2010	12/6/2011	1,184.68	1,181.06	1,208.23	1,107.12	1,105.02	1,120.81	1,886.25	1,869.24	1,996.71	1,214.66	1,210.47	1,242.02
12/7/2009	12/7/2010	12/7/2011	1,185.71	1,191.47	1,202.66	1,107.72	1,111.07	1,117.57	1,891.09	1,918.17	1,970.62	1,215.86	1,222.56	1,235.54
12/8/2009	12/8/2010	12/8/2011	1,208.75	1,162.67	1,204.15	1,121.12	1,094.33	1,118.44	1,999.16	1,782.51	1,977.60	1,242.62	1,189.10	1,237.27
12/9/2009	12/9/2010	12/9/2011	1,211.40	1,166.74	1,227.89	1,122.66	1,096.69	1,132.25	2,011.55	1,801.74	2,088.50	1,245.70	1,193.83	1,264.84
12/10/2009	12/10/2010	12/10/2011	1,190.38	1,187.17	1,211.13	1,110.43	1,108.57	1,122.50	1,897.95	1,913.03	1,897.95	1,221.28	1,217.56	1,245.39
12/11/2009	12/11/2010	12/11/2011	1,199.98	1,187.17	1,194.60	1,116.02	1,108.57	1,112.89	1,958.08	1,897.95	1,932.87	1,232.43	1,217.56	1,226.19
12/12/2009	12/12/2010	12/12/2011	1,142.12	1,184.27	1,200.70	1,082.39	1,106.88	1,116.44	1,685.22	1,884.32	1,961.47	1,165.23	1,214.19	1,233.27
12/13/2009	12/13/2010	12/13/2011	1,166.74	1,199.50	1,213.85	1,096.69	1,115.74	1,124.08	1,801.74	1,955.83	2,022.97	1,193.83	1,231.88	1,248.54
12/14/2009	12/14/2010	12/14/2011	1,198.55	1,179.89	1,215.23	1,115.18	1,104.34	1,124.88	1,951.37	1,863.72	2,029.42	1,230.77	1,209.10	1,250.14
12/15/2009	12/15/2010	12/15/2011	1,211.67	1,192.58	1,200.70	1,122.82	1,111.71	1,116.44	2,012.80	1,923.37	1,961.47	1,246.01	1,223.84	1,233.27
12/16/2009	12/16/2010	12/16/2011	1,211.40	1,188.01	1,218.33	1,122.66	1,109.06	1,126.69	2,011.55	1,901.93	2,043.92	1,245.70	1,218.54	1,253.74
12/17/2009	12/17/2010	12/17/2011	1,215.51	1,132.51	1,211.40	1,125.05	1,076.81	1,122.66	2,030.72	1,639.55	2,011.55	1,250.46	1,154.07	1,245.70
12/18/2009	12/18/2010	12/18/2011	1,200.22	1,081.72	1,202.41	1,116.16	1,047.34	1,117.43	1,959.20	1,396.64	1,969.47	1,232.71	1,095.04	1,235.26
12/19/2009	12/19/2010	12/19/2011	1,201.67	1,081.05	1,213.30	1,117.00	1,046.95	1,123.76	1,966.02	1,393.39	2,020.41	1,234.40	1,094.25	1,247.90
12/20/2009	12/20/2010	12/20/2011	1,204.15	1,119.83	1,211.40	1,118.44	1,069.45	1,122.66	1,977.60	1,579.15	2,011.55	1,237.27	1,139.33	1,245.70
12/21/2009	12/21/2010	12/21/2011	1,195.98	1,098.61	1,209.80	1,113.69	1,057.14	1,121.73	1,939.32	1,477.72	2,004.08	1,227.79	1,114.67	1,243.84
12/22/2009	12/22/2010	12/22/2011	1,205.41	1,115.19	1,220.94	1,119.17	1,066.76	1,128.21	1,983.49	1,557.00	2,056.08	1,238.74	1,133.94	1,256.77
12/23/2009	12/23/2010	12/23/2011	1,213.85	1,141.64	1,220.06	1,124.08	1,082.11	1,127.70	2,022.97	1,682.92	2,051.99	1,248.54	1,164.67	1,255.75
12/24/2009	12/24/2010	12/24/2011	1,216.63	1,156.26	1,246.44	1,125.70	1,090.60	1,143.05	2,035.96	1,752.20	2,174.72	1,251.77	1,181.66	1,286.37
12/25/2009	12/25/2010	12/25/2011	1,242.49	1,103.32	1,259.09	1,140.75	1,059.87	1,150.42	2,156.40	1,500.28	2,233.34	1,281.79	1,120.15	1,301.06
12/26/2009	12/26/2010	12/26/2011	1,143.97	1,125.05	1,221.23	1,083.46	1,072.48	1,128.38	1,693.96	1,604.02	2,057.45	1,167.37	1,145.39	1,257.11
12/27/2009	12/27/2010	12/27/2011	1,158.79	1,143.59	1,216.35	1,092.08	1,083.25	1,125.54	1,764.18	1,692.19	2,034.65	1,184.60	1,166.94	1,251.44
12/28/2009	12/28/2010	12/28/2011	1,167.92	1,052.59	1,213.57	1,097.38	1,030.45	1,123.92	1,807.30	1,256.06	2,021.69	1,195.20	1,061.16	1,248.22
12/29/2009	12/29/2010	12/29/2011	1,144.84	1,079.88	1,212.75	1,083.97	1,046.28	1,123.44	1,698.12	1,387.78	2,017.86	1,168.39	1,092.90	1,247.27
12/30/2009	12/30/2010	12/30/2011	1,152.26	1,111.64	1,211.40	1,088.28	1,064.70	1,122.66	1,733.27	1,540.03	2,011.55	1,177.01	1,129.81	1,245.70
12/31/2009	12/31/2010	12/31/2011	1,161.72	1,112.39	1,206.94	1,093.78	1,065.13	1,120.06	1,778.03	1,543.63	1,990.66	1,188.00	1,130.68	1,240.51
Minimum =			1,049.24	1,052.59	1,045.91	1,028.52	1,030.45	1,026.58	1,239.87	1,256.06	1,223.68	1,057.28	1,061.16	1,053.39
Average =			1,186.94	1,167.48	1,172.56	1,108.44	1,097.13	1,100.08	1,896.56	1,804.62	1,828.67	1,217.29	1,194.68	1,200.59
Maximum =			1,242.49	1,228.20	1,259.09	1,140.75	1,132.44	1,150.42	2,156.40	2,089.95	2,233.34	1,281.79	1,265.21	1,301.06