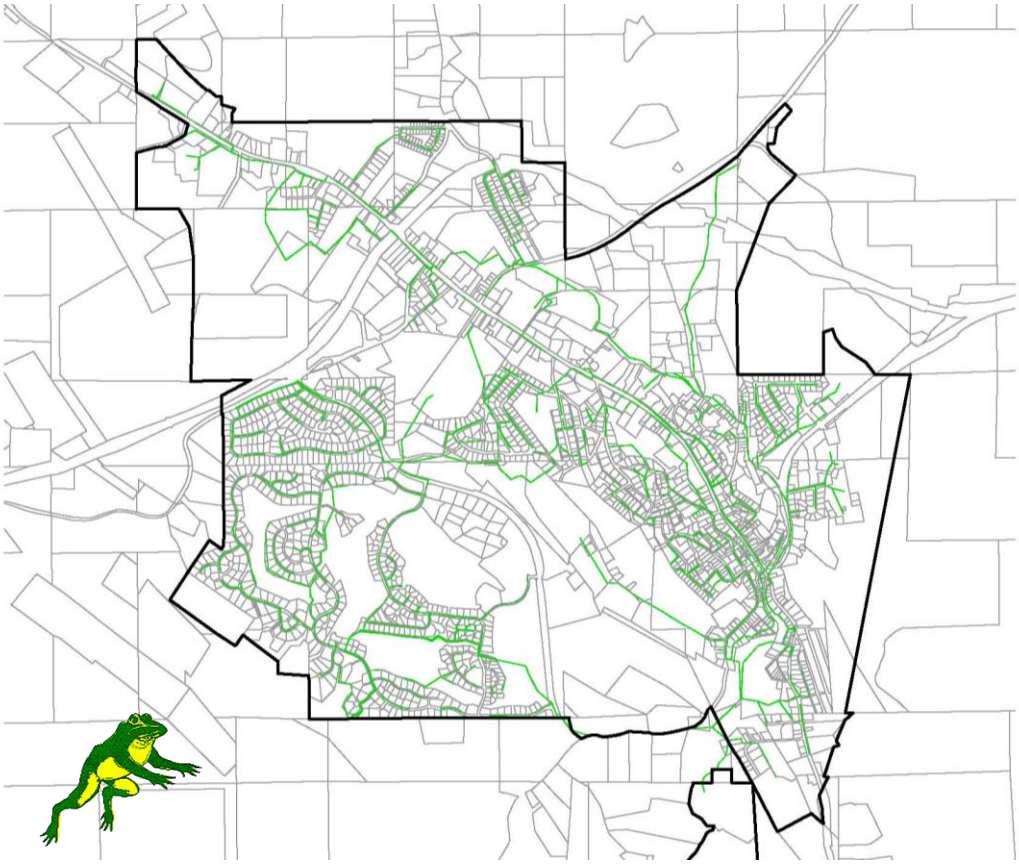
CITY OF ANGELS
WASTEWATER MASTER PLAN

VOLUME TWO



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APRIL 2012

NOLTE VERTICALFIVE

CITY OF ANGELS
WASTEWATER MASTER PLAN

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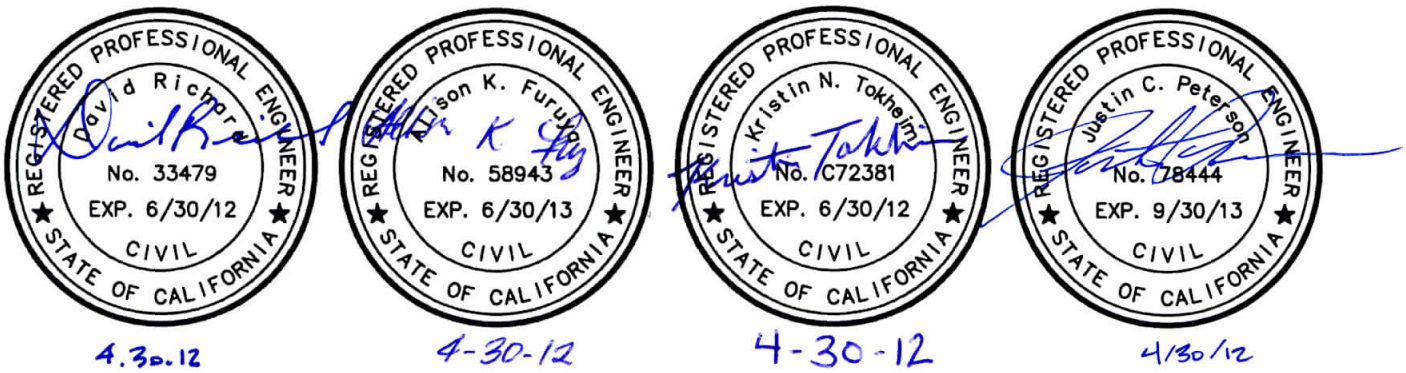

APRIL 2012

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APPENDIX A

WWTP PROCESS FLOW DIAGRAM

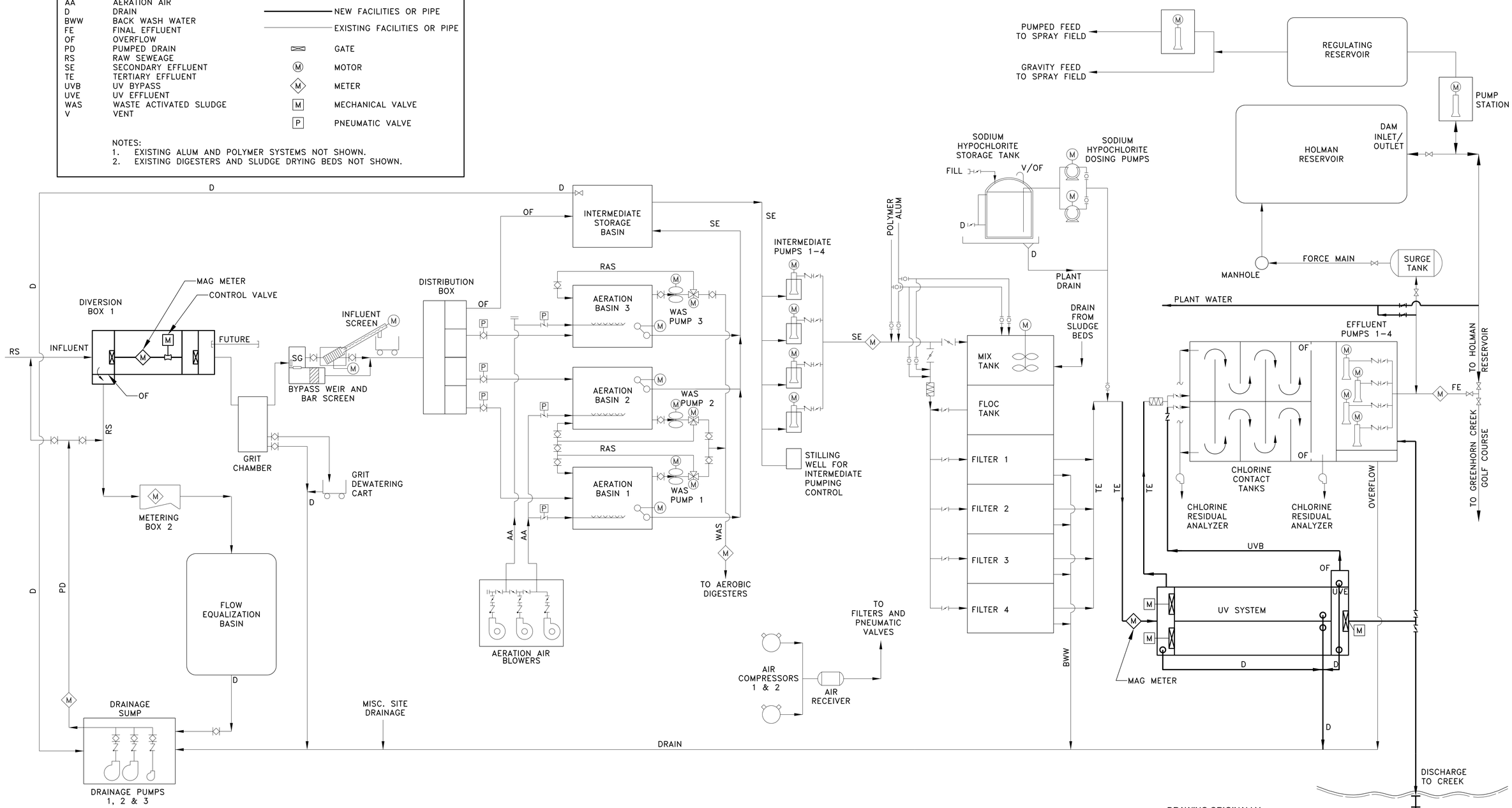
REVISION	DESCRIPTION	BY	APP	CITY	DATE

LEGEND

AA	AERATION AIR
D	DRAIN
BWW	BACK WASH WATER
FE	FINAL EFFLUENT
OF	OVERFLOW
PD	PUMPED DRAIN
RS	RAW SEWEAGE
SE	SECONDARY EFFLUENT
TE	TERTIARY EFFLUENT
UVB	UV BYPASS
UVE	UV EFFLUENT
WAS	WASTE ACTIVATED SLUDGE
V	VENT

NEW FACILITIES OR PIPE
EXISTING FACILITIES OR PIPE
GATE
MOTOR
METER
MECHANICAL VALVE
PNEUMATIC VALVE

NOTES:
1. EXISTING ALUM AND POLYMER SYSTEMS NOT SHOWN.
2. EXISTING DIGESTERS AND SLUDGE DRYING BEDS NOT SHOWN.



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RECORD DRAWING

SCALE	DATE	DESIGNED	ECO:LOGIC	CITY OF ANGELS	PROCESS FLOW DIAGRAM	DRAWING NUMBER	SHEET NUMBER
NONE	JUNE 2009	ERD	Engineering, Nevada City, California	WASTEWATER TREATMENT PLANT PHASE III IMPROVEMENT PROJECT ©		G7	7 OF 82
BAR IS ONE INCH AT FULL SCALE (0 — 1") IF NOT ONE INCH ON THIS SHEET SCALE ACCORDINGLY	FILE ANGL08-002	DRAWN ERD					
		CHECKED GIA					

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PLOT DATE: Apr 27, 2011 - 2:04pm

APPENDIX B

WASTEWATER COLLECTION SYSTEM MAINTENANCE PROGRAM

TABLE B-1
CITY OF ANGELS WASTEWATER MASTER PLAN
WASTEWATER COLLECTION SYSTEM MAINTENANCE PROGRAM

Pipe Segment	Location	Cleaning Start Year	Cleaning Schedule												Frequency (Months/Year)	Comments
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
101_100-1	Angels MH Court	2002		x			x			x			x		4	1/4-1/2 full pipe
101-1_Downstream	Bergantz on 49	2002		x			x			x			x		4	1/4-1/2 full pipe, degreaser used in Aug 09
101-1-1_101-1	Bergantz on 49	2002		x			x			x					3	1/4-1/2 full pipe
101-3_101-1-1	CDK	2005	x	x	x	x	x	x	x	x	x	x	x	x	12	1/2 full pipe (06), 1/4-1/3 full pipe since '06, low flow
101-3_101-3-3	CDK, Bergantz Access Rd	2003	x	x	x	x		x	x	x	x	x	x	x	11	Low flow, 1/4 full pipe
101-3_101-4	Bergantz Access Rd	2003					x			x			x		3	1/4-1/3 full pipe
103-4_103-3	Angels MH Park	2002		x		x		x		x		x			5	Low flow, Sand
104-2_104-1	Clifton Ln	2004	x		x		x		x		x				5	Grit (06-07), 1/4-1/2 full pipe
104-2_104-2-3	Clifton Ln	2005	x				x		x		x		x		5	1/4-1/2 full pipe, low flow (Jul)
104-3_104-4	Dogtown Road	2003					x								1	Low flow
104-5_Hwy49	Dogtown Road	2003		x			x			x					3	Low flow
15-3-2_15-3-1	Martina St	2002	x							x					2	Low flow
15-6_end	Martina St	2006	x			x			x			x			4	Low flow
17-13_17-12	Finnegan Ln	2002	x						x						2	1/3-1/2 full pipe
17-13_17-13-1	Easy St & Alley	2005	x						x		x				3	Low flow
17-15_17-16	Finnegan Ln	2002			x			x			x			x	4	1/4-1/2 full pipe, gravel and grit
17-15_17-49	Finnegan Ln	2002											x		1	1/2-2/3 full pipe
17-16_17-16-1	Finnegan Ln	2002			x			x			x			x	4	1/4-1/2 full pipe, gravel and grit
17-16-1_17-16-2	Birds Way	2002				x				x				x	3	Low flow, 1/2 full pipe (Dec 08/09), gravel and grit
17-18-1_17-18	Raspberry	2002	x						x						2	Low flow
17-33_17-33-1	Sultana Rd	2005	x	x	x	x	x	x	x	x	x	x	x	x	12	Low flow
17-33-1_end	Sultana Rd	2005	x	x	x	x	x	x	x		x		x	x	10	Low flow
17-42_17-41	Mark Twain School	2002						x			x			x	3	Low flow
17-49-7_17-49-6	Mark Twain Rd @ Fairview	2003					x	x						x	3	Low flow
17-50-2	Minnard	2005	x		x		x		x		x		x		6	Low flow
17-51-10A_17-51-10	Mark Twain Rd & Alley	2004						x							1	Low flow
17-51-8_17-51-8A	Mark Twain Rd	2002						x					x		2	Low flow
17-53_17-52	Utica Park	2002									x				1	1/4-1/3 full pipe (2/3 full pipe in 2009)
17-53_17-54	Utica Park	2002									x				1	1/4-1/3 full pipe (2/3 full pipe in 2009)
17-58-8A_17-51-9	Mark Twain Rd	2002						x							1	Low flow
17-62	Bush Street extension	2002				x				x					2	Low flow, small amount of roots
17-67_17-66	Gold Cliff	2002	x						x						2	Grit, low flow
17-67-2_17-68	1275 Gold Cliff	2008			x				x				x		3	Grit, low flow, roots
17-68	1269 Gold Cliff	2008							x				x		2	Roots, low flow
17-74-1_DeadEnd	Tuolumne Ave	2005						x						x	2	Low flow
17-76-2_17-76-1	Hillside Ln/Ct	2002	x				x				x				3	Low flow, No flow Sep 06-10
17-76-2_DeadEnd	Hillside Ct	2002	x				x				x				3	Low flow, No flow Sep 06-10
17-76-3_17-76-6	Placer & Tuolumne	2002	x			x			x			x			4	Grease and gravel, low flow
17-76-5_17-76-1	Tuolumne Ave & Placer	2002			x			x			x			x	4	Low flow
17-78_17-79	Amador St	2002		x			x		x				x		4	1/4-1/2 full pipe
17-78_77-77	Amador St	2003					x								1	1/4 full pipe
17-78-1_17-78	Alpine St	2005	x		x		x		x		x		x		6	Low flow
17-78-1_towardsHessHouse	Alpine St	2005					x		x		x		x		4	Low flow, minor roots
17-79_17-81	Amador St	2005	x		x		x		x		x		x		6	Minor grit, 1/3-1/2 full pipe
17-81	677 Amador	2005	x						x						2	Low flow

TABLE B-1
CITY OF ANGELS WASTEWATER MASTER PLAN
WASTEWATER COLLECTION SYSTEM MAINTENANCE PROGRAM

Pipe Segment	Location	Cleaning Start Year	Cleaning Schedule												Frequency (Months/Year)	Comments
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
17-83_17-83-1	San Joaquin St	2002				x				x				x	3	Low flow, 1/4-1/2 full pipe
17-83_17-84	San Joaquin St	2002				x				x				x	3	Low flow, 1/4-1/2 full pipe
17-84	San Joaquin St & Alpine	2002				x				x				x	3	Low flow
41-1_41-1-1	Depot and 4	2002		x					x						2	Low flow (2007-2010)
44-A_44-A-1	Booster Way	2004	x			x			x			x			4	3/4 full pipe, surcharged (2010), gravel, grit, grease
45_44	Booster Way	2002	x	x	x	x		x	x	x	x	x	x	x	11	1/2-3/4 full pipe, full pipe 2008-2011
48-5_48-4	Bret Harte Rd	2002									x				1	Low flow
75_76	Murphys Grade	2004	x	x	x					x					4	80%, 2/3, 1/4, 1/2 and 1/3 full (2007-2011)
76_79	Murphys Grade	2004	x	x	x					x	x				5	80%, 2/3, 1/4, 1/2 and 1/3 full (2007-2011)
77-1_77-6	Murphys Grade	2008		x				x				x			3	Low flow, 1/8-1/3 full pipe, minor gravel/grease/grit
77-12_77-14	Gardner Ln & Easy St	2002						x			x			x	3	Low flow
77-16-8_77-16-7	Lee Ln	2002	x			x						x			3	Grit/gravel starting in 2006, 1/4, 1/2 full pipe
77-16-8_77-16-8A	Lee Ln	2002	x			x						x			3	Grit/gravel starting in 2006, 1/4, 1/2 full pipe
77-24-4_77-24-3	Monte Verda	2002	x							x					2	Low flow
77-25-2	Hwy 49 @ Mikes Pizza	2004						x						x	2	Low flow
77-28_77-25	Stockton Rd	2003	x				x				x				3	Low flow, 1/8-1/3 full pipe
77-28_77-29	Stockton Rd	2003	x				x				x				3	Grit (2006), 1/8-1/3 full pipe
77-6-2_77-6-1	Casey St	2002			x			x			x			x	4	1/4-1/3 full pipe
77-7-1_77-8	Holly, off Gardner	2002		x			x			x			x		4	Low flow
77-8_77-8-1	Holly, off Gardner	2002		x			x			x			x		4	Low flow
9-1	Finnegan Ln	2002				x		x							2	Exit surcharged when pump on (Apr 06)
98-4_98-5	Wilson Ave	2004	x	x	x	x	x	x	x	x	x	x	x	x	12	Low flow
98-4_98-6	Wilson Ave	2004	x	x		x	x	x	x	x	x	x	x	x	11	Low flow

APPENDIX C

SUMMARY OF SSO EVENTS

TABLE C-1
CITY OF ANGELS WASTEWATER MASTER PLAN
SUMMARY OF SSO EVENTS

Date	SSO Event ID	Location	Nearest Identified Manhole	SSO Event Type	Private Lateral?	Reached Surface Water?	Reached Storm Drain pipe?	Estimated Spill Volume (gal)
03/03/11	764064	962 Mark Twain Rd	17-51-10A	Category 2	No	No	No	20
11/21/10	758896	1699 S. Main St	15-3-3 or 15-6	Category 2	No	No	No	15
10/10/10	757676	603 Holly St	77-7	Category 2	No	No	No	100
09/24/10	757231	Sierra Ave	17-76-10 or 17-76-9	Category 2	No	No	No	300
01/13/10	748344	834 N Tuolumne Ave	17-77	Category 2	No	No	No	500
06/29/09	740304	Sand Flats	15-3	Category 2		No	No	150
03/30/09	735743	530 Amador Ave	17-79-A	Category 2		No	No	475
11/12/08	729244	Stockton Rd MH		Category 2		No	No	25
10/05/08	727402	Lift Station behind Savemart off Stockton Rd	77-29-1	Category 2		No	No	100
10/02/08	727264	Raggio Ct	G-21 or G-22	Category 2		No	No	500
07/12/08	722555	MH behind 1375 Finnegan Ln	17-12	Category 1		Yes	No	100
01/16/08	711371	Cleanout overflow: 441 Murphys Grade	Between 77-16-1 and 77-16-2	Category 2		No	No	200
11/04/07	707496	570 San Joaquin Ave	17-40	Category 2		No	No	4

APPENDIX D

WWTP DESIGN CRITERIA

REVISION	DESCRIPTION	BY	APP	CITY	DATE

DESIGN CRITERIA – EXISTING	UNIT	VALUE
DESIGN LOADING		
AVG DRY WEATHER FLOW (ADWF)	MGAL/D	0.6
PEAK WET WEATHER FLOW (PWWF)	MGAL/D	3.1
MAXIMUM FLOW TO PROCESS (MFP)	MGAL/D	1.9
BOD5 AT ADWF	MG/L	220
SUSPENDED SOLIDS AT ADWF	MG/L	220
BOD5 AT MFP	MG/L	110
EQUALIZATION BASIN		
VOLUME	MG	3.0
SEQUENCING BATCH REACTORS		
NUMBER	–	3
ACTIVE VOLUME IN EACH	MG	0.26
HYDRAULIC RETENTION TIME AT ADWF	HRS	30
HYDRAULIC RETENTION TIME AT MFP	HRS	9
MLSS	MG/L	1,000 TO 4,000
SBR BLOWERS		
NUMBER	–	3
CAPACITY	CFM	600
HORSEPOWER	HP	30
AERATION DIFFUSERS	–	FINE BUBBLE
WASTE ACTIVATED SLUDGE PUMPS		
NUMBER	–	3
CAPACITY	GPM	60
HORSEPOWER	HP	3
INTERMEDIATE PUMPING STATION		
NUMBER OF PUMPS	–	4
CAPACITY EACH	GPM	445
TOTAL DYNAMIC HEAD	FT	25
HORSEPOWER	HP	5
CONTINUOUS BACKWASH FILTERS		
NUMBER OF CELLS	–	8
AREA PER CELL	SF	50
FILTRATION RATE AT ADWF (W/6 CELLS IN OPERATION)	GPM/SF	1.4
FILTRATION RATE AT MFP (W/6 CELLS IN OPERATION)	GPM/SF	4.4
CHLORINE CONTACT TANKS		
NUMBER	–	2
VOLUME (TOTAL)	GAL	198,000
DETENTION TIME AT ADWF	HRS	8
DETENTION TIME AT MFP	HRS	2.5
MAXIMUM CHLORINE DOSE AT MFP	MG/L	10
ALUM STORAGE		
VOLUME (TOTAL)	GAL	2,000
EFFLUENT PUMPING STATION		
NUMBER OF PUMPS	–	4
CAPACITY EACH	GPM	540
TOTAL DYNAMIC HEAD	FT	222
HORSEPOWER	HP	50
AEROBIC DIGESTER		
NUMBER	–	2
VOLUME (EACH)	GAL	125,000
WATER DEPTH	FT	18
SOLIDS RETENTION TIME	DAYS	40
AERATOR/MIXERS	EACH	2
AERATOR/MIXER O2 CAPACITY (EACH)	O2/HR	53
SLUDGE PUMPS		
NUMBER	–	2
CAPACITY (EACH)	GPM	250
HORSEPOWER	HP	10
SLUDGE DRYING BEDS (OLDER EXISTING)		
NUMBER	–	2
AREA (EACH)	SF	600
LOADING RATE (IN DRY LBS/SF/CYCLE)	LBS/SF/CYCLE	2
CYCLE TIME	WEEKS	2
PERCENT SOLIDS AT END OF CYCLE	%	30
SLUDGE DRYING BEDS (NEWER EXISTING)		
NUMBER	–	6
AREA (EACH)	SF	800
LOADING RATE (IN DRY LBS/SF/CYCLE)	LBS/SF/CYCLE	2
CYCLE TIME	WEEKS	2
PERCENT SOLIDS AT END OF CYCLE	%	30

NOTE: EXISTING DESIGN CRITERIA TAKEN FROM LEE & RO 'WASTEWATER TREATMENT PLANT 0.6 MGD EXPANSION' PLAN SET DATED FEBRUARY 25, 2004.

DESIGN CRITERIA – ELEMENTS MODIFIED WITH THIS PROJECT	UNIT	VALUE
INFLUENT FLOW MEASUREMENT		
TYPE	–	MAGNETIC
SIZE	INCHES	10
FLOW RANGE	MGAL/D	0.3*–1.9
EQUALIZATION FLOW DIVERSION		
CONTROL TYPE	–	PINCH VALVE
SIZE	INCHES	10
TERTIARY EFFLUENT FLOW MEASUREMENT		
TYPE	–	MAGNETIC
SIZE	INCHES	10
FLOW RANGE	MGAL/D	0.3*–1.9
ULTRAVIOLET DISINFECTION		LOW PRESSURE/
TYPE	–	HIGH INTENSITY
NUMBER OF CHANNELS	EA	2
NUMBER OF BANKS PER CHANNEL	EA	3
NUMBER OF LAMPS PER BANK	EA	48
TOTAL NUMBER OF LAMPS	–	288
ASSUMED TRANSMITTANCE	%	55
MINIMUM UV DOSE/CHANNEL	MJ/CM^2	100
OUTFALL		
TYPE	–	DIFFUSER
DIFFUSER SIZE	IN	8
PORT SIZE	IN	2
PORT NUMBER	–	12
TOTAL LENGTH	FT	11
PLANT WATER SYSTEM FILTER		
TYPE	–	AUTOMATIC FLUSHING
PRESSURE (MIN)	PSI	75
PRESSURE (MAX)	PSI	130
FLOW	GPM	200
SIZE	MICRONS	200

* FLOW METER WILL MEASURE FLOWS BELOW 0.3 MGAL/DAY, WITH REDUCED ACCURACY.

NOTES:

1. EQUALIZATION BASIN FLOW METER MAXIMUM CAPACITY IS 2 MGAL/D.
2. FOR ITEMS BEING MODIFIED WITH THIS PROJECT, THE HYDRAULIC PROFILE HAS CHANGED. SEE MECHANICAL DRAWINGS FOR REVISED HIGH WATER ELEVATIONS.

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RECORD DRAWING

SCALE	BAR IS ONE INCH AT FULL SCALE	DATE	DESIGNED GIA	ECO:LOGIC	CITY OF ANGELS	DESIGN CRITERIA	DRAWING NUMBER	SHEET NUMBER
AS SHOWN	0 1" IF NOT ONE INCH ON THIS SHEET SCALE ACCORDINGLY	JUNE 2009	DRAWN ERD	Engineering Nevada City, California	CITY OF ANGELS WASTEWATER TREATMENT PLANT PHASE III IMPROVEMENT PROJECT ©		G6	6 OF 82
		FILE ANGL08-002	CHECKED GIA					

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PLOT DATE: Mar 2, 2010
PLOT BY: Gabriel Aronow

APPENDIX E

LAND USE SUMMARY

TABLE E-1
CITY OF ANGELS WASTEWATER MASTER PLAN
LAND USE SUMMARY - DEVELOPED LAND USES

Basin	Use	Current Status	Total Area (ac)	Total Parcels	ESU Conversion (ESU/ac)	Total ESU
Basin 1	SFR	Developed	24.04	83	4.0	96
	SP	Developed	1.69	1	1.5	3
	Basin 1 Total					**99**
Basin 2	CC	Developed	3.21	2	2.0	6
	HDR	Developed	29.03	5	5.0	145
	HDR (Worldmark)	Developed	21.10	19	9.5	200
	MDR	Developed	11.95	44	3.0	36
	P	Developed	0.96	2	5.0	5
	PR	Developed	9.71	4	4.0	39
	PR-Golf	Developed	124.40	4	1.5	187
	SFR	Developed	68.25	269	4.0	273
	SP	Developed	3.29	1	1.5	5
	Basin 2 Total					**896**
Basin 3	PR	Developed	0.41	1	4.0	2
	PR-Golf	Developed	19.48	1	1.5	29
	SFR	Developed	81.87	222	4.0	327
	OS	Developed	11.97	3	0.0	0
	Basin 3 Total					**358**
Basin 4	BAE	Developed	9.79	8	2.0	20
	HDR	Developed	28.83	75	5.0	144
	MDR	Developed	10.45	4	3.0	31
	PR	Developed	0.57	1	4.0	2
	SC	Developed	25.10	32	2.0	50
	SFR	Developed	12.18	30	4.0	49
	SP	Vacant	0.00	0	1.5	0
	OS	Developed	0.09	2	0.0	0
	Basin 4 Total					**296**
Basin 5	BAE	Developed	18.36	14	2.0	37
	CC	Developed	61.65	98	2.0	123
	HC	Developed	15.93	79	2.0	32
	HDR	Developed	37.81	56	5.0	189
	I	Developed	16.38	5	2.0	33
	MDR	Developed	29.02	20	3.0	87
	P	Developed	26.94	20	5.0	135
	PR	Developed	6.85	3	4.0	27
	P-SCH	Developed	49.53	8	10.0	495
	RE	Developed	13.55	10	2.0	27
	SC	Developed	6.43	7	2.0	13
	SFR	Developed	186.37	587	4.0	745
	SP	Developed	6.20	2	1.5	9
	Basin 5 Total					**1,952**
TOTAL						**3,601**

TABLE E-2
CITY OF ANGELS WASTEWATER MASTER PLAN
LAND USE SUMMARY - BUILDOUT LAND USES

Basin	Use	Current Status	Total Area (ac)	Total Parcels	ESU Conversion (ESU/ac)	Total ESU
Basin 1	SFR	Developed	24.04	83	4.0	96
	SFR	Vacant	0.87	3	6.0	5
	SP	Developed	1.69	1	1.5	3
	SP	Vacant	2.49	4	1.5	4
	Basin 1 Total					**108**
Basin 2	CC	Developed	2.87	1	2.0	6
	HDR (Worldmark)	Developed	21.10	19	9.5	200
	SFR	Developed	26.99	125	4.0	108
	SFR	Vacant	5.42	22	6.0	33
	SP	Developed	3.29	1	1.5	5
	SP	Vacant	18.31	3	1.5	27
	PR	Developed	1.77	1	4.0	7
	PR-Golf	Developed	124.40	4	1.5	187
	Basin 2 Total					**573**
Basin 3	SFR	Developed	81.87	222	4.0	327
	SFR	Vacant	51.79	142	6.0	311
	PR-Golf	Developed	19.48	1	1.5	29
	PR	Developed	0.41	1	4.0	2
	OS	Developed	11.97	3	0.0	0
	Basin 3 Total					**669**
Basin 4	BAE	Developed	9.79	8	2.0	20
	BAE	Vacant	10.41	2	1.0	10
	HDR	Developed	27.85	74	5.0	139
	HDR	Vacant	21.84	3	15.0	328
	MDR	Developed	10.45	4	3.0	31
	MDR	Vacant	0.27	1	10.0	3
	SC	Developed	22.88	31	2.0	46
	SC	Vacant	30.47	9	15.0	457
	SFR	Developed	12.18	30	4.0	49
	SP	Vacant	93.82	4	1.5	141
	SC	Partial	22.16	1	2.0	44
	HDR	Partial	3.28	1	5.0	16
	OS	Developed	0.09	2	0.0	0
	PR	Developed	0.57	1	4.0	2
	Basin 4 Total					**1,286**

TABLE E-2
CITY OF ANGELS WASTEWATER MASTER PLAN
LAND USE SUMMARY - BUILDOUT LAND USES
(continued)

Basin	Use	Current Status	Total Area (ac)	Total Parcels	ESU Conversion (ESU/ac)	Total ESU
Basin 5	BAE	Developed	18.36	14	2	37
	BAE	Vacant	20.73	7	1.0	21
	CC	Developed	61.65	98	2.0	123
	CC	Vacant	36.74	32	15.0	551
	HC	Developed	15.93	79	2.0	32
	HC	Vacant	4.67	6	15.0	70
	HDR	Developed	37.20	55	5.0	186
	HDR	Vacant	72.08	22	15.0	1,081
	HDR	Partial	6.06	1	5.0	30
	I	Developed	16.38	5	2.0	33
	I	Vacant	15.23	6	2.0	30
	MDR	Developed	29.02	20	3.0	87
	MDR	Vacant	1.36	4	10.0	14
	P	Developed	26.94	20	5.0	135
	PR	Developed	6.85	3	4.0	27
	PR	Vacant	4.25	1	4.0	17
	P-SCH	Developed	49.53	8	10.0	495
	P	Vacant	1.82	4	5.0	9
	RE	Developed	13.55	10	2.0	27
	RE	Vacant	112.29	16	0.5	56
	SC	Developed	6.43	7	2.0	13
	SC	Vacant	14.61	2	15.0	219
	SFR	Developed	186.20	586	4.0	745
	SFR	Vacant	71.24	103	6.0	427
	SFR	Partial	1.69	1	4.0	7
	SP	Developed	6.20	2	1.5	9
	SP	Vacant	148.00	16	1.5	222
	Basin 5 Total					**4,703**
Basin 6	CC	Developed	0.34	1	2.0	1
	HDR	Developed	27.51	3	5.0	138
	HDR	Vacant	22.32	2	15.0	335
	HDR	Partial	5.06	2	5.0	25
	MDR	Developed	11.95	44	3.0	36
	MDR	Vacant	0.59	2	10.0	6
	P	Developed	0.96	2	5.0	5
	P	Vacant	0.98	2	5.0	5
	SFR	Developed	41.26	144	4.0	165
	SFR	Vacant	3.27	12	6.0	20
	SP	Vacant	23.38	5	1.5	35
	PR	Developed	7.94	3	4.0	32
	Basin 6 Total					**803**
TOTAL						**8,142**

APPENDIX F

TREATMENT PLANT FLOW SUMMARY, 2009-2011

TABLE F-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009 EFFLUENT FLOWS FOR WWTP (MGD)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.401	0.258	0.494	0.314	0.423	0.285	0.346	0.320	0.305	0.217	0.270	0.287
2	0.348	0.647	1.037	0.355	0.698	0.251	0.496	0.368	0.308	0.317	0.299	0.304
3	0.245	0.608	0.493	0.357	0.341	0.354	0.364	0.383	0.293	0.362	0.295	0.287
4	0.546	0.246	1.261	0.410	0.418	0.494	0.435	0.275	0.278	0.330	0.282	0.290
5	0.300	0.329	0.607	0.431	0.303	0.318	0.246	0.395	0.288	0.344	0.221	0.262
6	0.329	0.539	0.555	0.324	0.360	0.345	0.365	0.372	0.313	0.363	0.271	0.334
7	0.339	0.439	0.577	0.256	0.364	0.298	0.364	0.285	0.323	0.363	0.234	0.384
8	0.385	0.321	0.695	0.394	0.425	0.299	0.292	0.293	0.324	0.327	0.319	0.292
9	0.402	0.491	0.508	0.400	0.361	0.459	0.436	0.364	0.297	0.323	0.299	0.359
10	0.381	0.335	0.345	0.432	0.285	0.284	0.440	0.380	0.450	0.316	0.239	0.305
11	0.377	0.379	0.367	0.404	0.407	0.411	0.374	0.321	0.275	0.313	0.276	0.677
12	0.308	0.433	0.361	0.330	0.452	0.406	0.283	0.361	0.322	0.296	0.278	0.401
13	0.336	0.545	0.380	0.378	0.484	0.472	0.342	0.323	0.298	0.634	0.175	0.800
14	0.308	0.835	0.392	0.379	0.449	0.241	0.352	0.290	0.274	0.247	0.307	0.368
15	0.301	0.584	0.404	0.406	0.384	0.395	0.306	0.432	0.242	0.294	0.311	0.477
16	0.310	0.562	0.396	0.399	0.399	0.348	0.492	0.270	0.258	0.326	0.380	0.715
17	0.344	0.872	0.341	0.341	0.404	0.320	0.385	0.348	0.385	0.379	0.279	0.448
18	0.314	0.773	0.380	0.384	0.375	0.402	0.366	0.344	0.324	0.431	0.185	0.432
19	0.394	0.510	0.348	0.340	0.372	0.329	0.291	0.277	0.272	0.328	0.325	0.394
20	0.341	0.431	0.372	0.340	0.395	0.086	0.371	0.355	0.273	0.448	0.322	0.505
21	0.338	0.422	0.387	0.317	0.373	0.401	0.346	0.276	0.235	0.255	0.353	0.372
22	0.302	0.584	0.450	0.318	0.401	0.392	0.397	0.371	0.410	0.305	0.344	0.415
23	0.450	0.972	0.404	0.366	0.424	0.212	0.551	0.348	0.232	0.258	0.333	0.387
24	0.228	0.676	0.406	0.386	0.370	0.385	0.352	0.362	0.251	0.329	0.356	0.408
25	0.827	0.513	0.379	0.349	0.436	0.520	0.380	0.318	0.259	0.298	0.318	0.336
26	0.859	0.445	0.315	0.338	0.266	0.353	0.271	0.292	0.258	0.286	0.344	0.313
27	0.286	0.373	0.346	0.381	0.248	0.352	0.295	0.295	0.304	0.299	0.344	0.422
28	0.432	0.476	0.356	0.362	0.418	0.264	0.398	0.317	0.296	0.256	0.361	0.390
29	0.619	-	0.363	0.329	0.465	0.483	0.190	0.300	0.253	0.295	0.319	0.365
30	0.469	-	0.333	0.166	0.373	0.253	0.312	0.278	0.119	0.278	0.245	0.368
31	0.004	-	0.317	-	0.352	-	0.342	0.369	-	0.261	-	0.390
Total Month (MG)	11.8	14.6	14.4	10.7	12.2	10.4	11.2	10.3	8.7	10.1	8.9	12.5
Average Daily (mgd)	0.381	0.521	0.464	0.356	0.394	0.347	0.361	0.332	0.291	0.325	0.296	0.403
Maximum Day (mgd)	0.859	0.972	1.261	0.432	0.698	0.520	0.551	0.432	0.450	0.634	0.380	0.800

TABLE F-2
CITY OF ANGELS WASTEWATER MASTER PLAN
2010 EFFLUENT FLOWS FOR WWTP (MGD)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.316	0.367	0.540	0.354	0.375	0.376	0.348	0.339	0.320	0.309	0.309	0.365
2	0.357	0.346	0.509	0.421	0.369	0.339	0.441	0.332	0.303	0.316	0.311	0.335
3	0.402	0.346	0.869	0.403	0.321	0.223	0.445	0.326	0.294	0.313	0.305	0.315
4	0.322	0.383	0.885	0.378	0.377	0.602	0.378	0.319	0.328	0.328	0.313	0.280
5	0.354	0.444	0.571	0.835	0.363	0.794	0.362	0.321	0.335	0.327	0.323	0.404
6	0.318	0.535	0.489	0.455	0.344	0.869	0.400	0.319	0.336	0.291	0.304	0.463
7	0.301	0.584	0.476	0.415	0.331	0.380	0.370	0.329	0.330	0.192	0.538	0.134
8	0.335	0.496	0.448	0.442	0.374	0.326	0.391	0.325	0.304	0.245	0.362	0.534
9	0.368	0.532	0.431	0.359	0.329	0.356	0.391	0.328	0.303	0.325	0.338	0.473
10	0.216	0.449	0.418	0.494	0.414	0.384	0.412	0.332	0.321	0.453	0.333	0.389
11	0.283	0.384	0.358	0.463	0.329	0.458	0.403	0.333	0.319	0.495	0.313	0.334
12	0.312	0.383	0.477	0.787	0.389	0.311	0.389	0.320	0.316	0.265	0.322	0.378
13	0.404	0.395	0.577	0.743	0.323	0.541	0.350	0.332	0.164	0.295	0.329	0.321
14	0.394	0.415	0.501	0.433	0.406	0.334	0.374	0.331	0.259	0.273	0.341	0.472
15	0.359	0.377	0.449	0.420	0.352	0.367	0.385	0.342	0.234	0.313	0.333	0.805
16	0.412	0.365	0.414	0.434	0.384	0.464	0.333	0.418	0.226	0.315	0.325	0.439
17	0.543	0.365	0.365	0.371	0.320	0.350	0.382	0.377	0.321	0.337	0.316	0.644
18	0.863	0.365	0.343	0.518	0.317	0.414	0.422	0.336	0.398	0.307	0.296	1.385
19	0.815	0.362	0.364	0.419	0.353	0.393	0.414	0.226	0.363	0.162	0.332	1.450
20	0.908	0.364	0.452	0.663	0.380	0.388	0.400	0.333	0.252	0.123	0.618	1.452
21	1.012	0.387	0.415	0.531	0.395	0.332	0.413	0.343	0.324	0.446	0.850	0.937
22	1.323	0.443	0.364	0.453	0.289	0.365	0.348	0.432	0.312	0.402	0.493	0.608
23	0.846	0.375	0.361	0.453	0.418	0.449	0.386	0.258	0.305	0.341	0.872	0.536
24	0.545	0.680	0.306	0.422	0.470	0.382	0.359	0.329	0.292	0.902	0.633	0.513
25	0.584	0.533	0.321	0.399	0.532	0.378	0.412	0.297	0.320	0.448	0.518	0.624
26	0.402	0.514	0.326	0.407	0.355	0.376	0.371	0.312	0.324	0.314	0.414	0.645
27	0.460	1.366	0.357	0.373	0.355	0.461	0.371	0.308	0.321	0.321	0.651	0.854
28	0.408	0.669	0.364	0.425	0.413	0.341	0.358	0.325	0.155	0.314	0.611	0.745
29	0.384	-	0.399	0.473	0.384	0.375	0.358	0.327	0.349	0.376	0.410	0.780
30	0.462	-	0.350	0.391	0.431	0.358	0.173	0.322	0.327	0.328	0.380	0.839
31	0.380	-	0.405	-	0.427	-	0.316	0.306	-	0.320	-	0.759
Total Month (MG)	15.4	13.2	13.9	14.1	11.6	12.5	11.7	10.2	9.1	10.5	12.8	19.2
Average Daily (mgd)	0.496	0.472	0.449	0.471	0.375	0.416	0.376	0.328	0.302	0.339	0.426	0.620
Maximum Day (mgd)	1.323	1.366	0.885	0.835	0.532	0.869	0.445	0.432	0.398	0.902	0.872	1.452

TABLE F-3
CITY OF ANGELS WASTEWATER MASTER PLAN
2011 EFFLUENT FLOWS FOR WWTP (MGD)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.762	0.336	0.425	0.799	0.375	0.320	0.351	0.438	-	-	-	-
2	1.090	0.321	0.532	0.636	0.345	0.367	0.363	0.362	-	-	-	-
3	0.959	0.295	0.585	0.515	0.337	0.344	0.345	0.375	-	-	-	-
4	0.892	0.328	0.809	0.399	0.338	0.394	0.351	0.385	-	-	-	-
5	0.565	0.341	0.602	0.428	0.358	0.469	0.350	0.383	-	-	-	-
6	0.495	0.345	0.506	0.432	0.338	0.520	0.347	0.372	-	-	-	-
7	0.858	0.334	0.850	0.410	0.359	0.377	0.335	0.357	-	-	-	-
8	0.839	0.330	0.743	0.423	0.354	0.379	0.365	0.333	-	-	-	-
9	0.881	0.313	0.515	0.421	0.361	0.346	0.356	0.394	-	-	-	-
10	0.477	0.314	0.429	0.433	0.362	0.339	0.371	0.185	-	-	-	-
11	0.382	0.319	0.401	0.380	0.329	0.363	0.358	0.315	-	-	-	-
12	0.381	0.337	0.438	0.346	0.339	0.392	0.345	0.539	-	-	-	-
13	0.379	0.330	0.397	0.400	0.335	0.355	0.340	0.377	-	-	-	-
14	0.360	0.333	0.472	0.475	0.353	0.347	0.340	0.364	-	-	-	-
15	0.461	0.323	0.390	0.275	0.444	0.383	0.348	0.298	-	-	-	-
16	0.446	0.533	0.779	0.372	0.372	0.402	0.348	0.298	-	-	-	-
17	0.414	0.494	0.783	0.400	0.372	0.400	0.353	0.298	-	-	-	-
18	0.357	1.054	0.518	0.334	0.455	0.361	0.349	0.398	-	-	-	-
19	0.350	1.049	0.869	0.441	0.447	0.332	0.334	0.450	-	-	-	-
20	0.360	0.945	1.019	0.278	0.403	0.338	0.403	0.398	-	-	-	-
21	0.356	0.905	1.131	0.358	0.378	0.341	0.377	0.380	-	-	-	-
22	0.378	0.726	1.109	0.512	0.369	0.342	0.399	0.360	-	-	-	-
23	0.374	0.428	1.080	0.484	0.341	0.340	0.371	0.383	-	-	-	-
24	0.359	0.450	1.101	0.426	0.335	0.335	0.374	0.358	-	-	-	-
25	0.348	0.804	1.012	0.399	0.369	0.259	0.359	0.358	-	-	-	-
26	0.343	0.946	1.032	0.379	0.401	0.421	0.377	0.153	-	-	-	-
27	0.331	0.845	1.077	0.304	0.398	0.369	0.389	0.193	-	-	-	-
28	0.333	0.438	0.935	0.382	0.365	0.363	0.410	0.160	-	-	-	-
29	0.329	-	0.857	0.376	0.375	0.415	0.368	0.156	-	-	-	-
30	0.516	-	0.980	0.393	0.360	0.367	0.371	0.148	-	-	-	-
31	0.362	-	0.799	-	0.332	-	0.371	0.164	-	-	-	-
Total Month (MG)	15.7	14.5	23.2	12.6	11.4	11.1	11.2	10.1	-	-	-	-
Average Daily (mgd)	0.508	0.518	0.748	0.420	0.368	0.369	0.362	0.327	-	-	-	-
Maximum Day (mgd)	1.090	1.054	1.131	0.799	0.455	0.520	0.410	0.539	-	-	-	-

APPENDIX G

PUMPING STATION FLOW SUMMARY, 2010-2011

TABLE G-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
9/1/2010	1.40	1.40	1.50	4.30	133,392	0.50	0.60	1.10	18,150	4.00	0.60	1.27	11,400	0.50	0.50	1.00	30,000
9/2/2010	1.40	1.30	1.30	4.00	124,128	0.60	0.60	1.20	19,800	6.00	0.60	1.60	14,400	0.70	0.50	1.20	36,000
9/3/2010	1.26	1.32	1.24	3.82	118,463	0.52	0.66	1.18	19,470	2.60	0.46	0.89	8,040	0.50	0.44	0.94	28,200
9/4/2010	1.26	1.32	1.24	3.82	118,463	0.52	0.66	1.18	19,470	2.60	0.46	0.89	8,040	0.50	0.44	0.94	28,200
9/5/2010	1.26	1.32	1.24	3.82	118,463	0.52	0.66	1.18	19,470	2.60	0.46	0.89	8,040	0.50	0.44	0.94	28,200
9/6/2010	1.26	1.32	1.24	3.82	118,463	0.52	0.66	1.18	19,470	2.60	0.46	0.89	8,040	0.50	0.44	0.94	28,200
9/7/2010	1.26	1.32	1.24	3.82	118,463	0.52	0.66	1.18	19,470	2.60	0.46	0.89	8,040	0.50	0.44	0.94	28,200
9/8/2010	1.40	1.40	1.20	4.00	124,068	0.70	0.30	1.00	16,500	3.00	0.60	1.10	9,900	0.70	0.50	1.20	36,000
9/9/2010	1.20	1.30	1.40	3.90	120,936	0.50	0.50	1.00	16,500	3.00	0.60	1.10	9,900	0.60	0.60	1.20	36,000
9/10/2010	1.40	1.60	1.30	4.30	133,272	0.50	0.60	1.10	18,150	4.00	0.60	1.27	11,400	0.60	0.60	1.20	36,000
9/11/2010	1.50	1.53	1.60	4.63	143,714	0.60	0.67	1.27	20,900	3.67	0.53	1.14	10,300	0.63	0.60	1.23	37,000
9/12/2010	1.50	1.53	1.60	4.63	143,714	0.60	0.67	1.27	20,900	3.67	0.53	1.14	10,300	0.63	0.60	1.23	37,000
9/13/2010	1.50	1.53	1.60	4.63	143,714	0.60	0.67	1.27	20,900	3.67	0.53	1.14	10,300	0.63	0.60	1.23	37,000
9/14/2010	1.30	1.20	1.50	4.00	124,146	0.50	0.50	1.00	16,500	3.00	0.50	1.00	9,000	0.60	0.70	1.30	39,000
9/15/2010	1.40	1.30	1.20	3.90	121,020	0.60	0.70	1.30	21,450	3.00	0.60	1.10	9,900	0.60	0.50	1.10	33,000
9/16/2010	1.10	1.30	1.20	3.60	111,570	0.50	0.50	1.00	16,500	3.00	0.50	1.00	9,000	0.70	0.70	1.40	42,000
9/17/2010	1.40	1.30	1.40	4.10	127,236	0.60	0.60	1.20	19,800	3.00	0.70	1.20	10,800	0.70	0.60	1.30	39,000
9/18/2010	1.43	1.50	1.53	4.47	138,526	0.70	0.67	1.37	22,550	3.00	0.50	1.00	9,000	0.63	0.67	1.30	39,000
9/19/2010	1.43	1.50	1.53	4.47	138,526	0.70	0.67	1.37	22,550	3.00	0.50	1.00	9,000	0.63	0.67	1.30	39,000
9/20/2010	1.43	1.50	1.53	4.47	138,526	0.70	0.67	1.37	22,550	3.00	0.50	1.00	9,000	0.63	0.67	1.30	39,000
9/21/2010	1.40	1.60	1.40	4.40	136,380	0.60	0.70	1.30	21,450	4.00	0.60	1.27	11,400	0.90	0.60	1.50	45,000
9/22/2010	1.30	1.30	1.30	3.90	120,978	0.50	0.60	1.10	18,150	3.00	0.60	1.10	9,900	0.50	0.60	1.10	33,000
9/23/2010	1.50	1.40	1.30	4.20	130,326	0.60	0.90	1.50	24,750	3.00	0.60	1.10	9,900	0.60	0.50	1.10	33,000
9/24/2010	1.30	1.30	1.30	3.90	120,978	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.60	0.60	1.20	36,000
9/25/2010	1.50	1.53	1.53	4.57	141,642	0.63	0.67	1.30	21,450	3.67	0.63	1.24	11,200	0.67	0.67	1.33	40,000
9/26/2010	1.50	1.53	1.53	4.57	141,642	0.63	0.67	1.30	21,450	3.67	0.63	1.24	11,200	0.67	0.67	1.33	40,000
9/27/2010	1.50	1.53	1.53	4.57	141,642	0.63	0.67	1.30	21,450	3.67	0.63	1.24	11,200	0.67	0.67	1.33	40,000
9/28/2010	1.20	1.20	1.40	3.80	117,888	0.50	0.60	1.10	18,150	3.00	0.50	1.00	9,000	0.60	0.60	1.20	36,000
9/29/2010	1.30	1.30	1.30	3.90	120,978	0.50	0.60	1.10	18,150	3.00	0.60	1.10	9,900	0.70	0.60	1.30	39,000
9/30/2010	1.30	1.30	1.50	4.10	127,194	0.60	0.60	1.20	19,800	4.00	0.50	1.17	10,500	0.60	0.70	1.30	39,000
10/1/2010	1.30	1.30	1.40	4.00	124,086	0.60	0.60	1.20	19,800	4.00	0.70	1.37	12,300	0.70	0.60	1.30	39,000
10/2/2010	1.60	1.53	1.70	4.83	149,972	0.93	0.97	1.90	31,350	3.67	0.67	1.28	11,500	0.33	0.63	0.97	29,000
10/3/2010	1.60	1.53	1.70	4.83	149,972	0.93	0.97	1.90	31,350	3.67	0.67	1.28	11,500	0.33	0.63	0.97	29,000
10/4/2010	1.60	1.53	1.70	4.83	149,972	0.93	0.97	1.90	31,350	3.67	0.67	1.28	11,500	0.33	0.63	0.97	29,000
10/5/2010	1.50	1.40	1.40	4.30	133,434	0.50	0.60	1.10	18,150	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000
10/6/2010	1.40	1.30	1.50	4.20	130,344	0.60	0.60	1.20	19,800	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
10/7/2010	1.40	1.40	1.60	4.40	136,500	0.60	0.60	1.20	19,800	4.00	0.80	1.47	13,200	0.70	0.60	1.30	39,000
10/8/2010	1.40	1.50	1.30	4.20	130,224	0.50	0.60	1.10	18,150	3.00	0.40	0.90	8,100	0.80	0.80	1.60	48,000
10/9/2010	1.53	1.53	1.55	4.60	142,694	0.63	0.65	1.28	21,038	3.75	0.63	1.25	11,250	0.73	0.73	1.45	43,500
10/10/2010	1.53	1.53	1.55	4.60	142,694	0.63	0.65	1.28	21,038	3.75	0.63	1.25	11,250	0.73	0.73	1.45	43,500
10/11/2010	1.53	1.53	1.55	4.60	142,694	0.63	0.65	1.28	21,038	3.75	0.63	1.25	11,250	0.73	0.73	1.45	43,500

TABLE G-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
10/12/2010	1.53	1.53	1.55	4.60	142,694	0.63	0.65	1.28	21,038	3.75	0.63	1.25	11,250	0.73	0.73	1.45	43,500
10/13/2010	1.20	1.40	1.50	4.10	127,092	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
10/14/2010	1.30	1.30	1.40	4.00	124,086	0.40	0.50	0.90	14,850	3.00	0.60	1.10	9,900	0.70	0.60	1.30	39,000
10/15/2010	1.30	1.30	1.30	3.90	120,978	0.60	0.50	1.10	18,150	5.00	0.90	1.73	15,600	0.80	0.80	1.60	48,000
10/16/2010	1.47	1.57	1.57	4.60	142,644	0.63	0.70	1.33	22,000	4.33	0.73	1.46	13,100	0.67	0.67	1.33	40,000
10/17/2010	1.47	1.57	1.57	4.60	142,644	0.63	0.70	1.33	22,000	4.33	0.73	1.46	13,100	0.67	0.67	1.33	40,000
10/18/2010	1.47	1.57	1.57	4.60	142,644	0.63	0.70	1.33	22,000	4.33	0.73	1.46	13,100	0.67	0.67	1.33	40,000
10/19/2010	1.50	1.50	1.40	4.40	136,482	0.70	0.70	1.40	23,100	5.00	0.80	1.63	14,700	0.70	0.60	1.30	39,000
10/20/2010	1.40	1.40	1.30	4.10	127,176	0.60	0.60	1.20	19,800	5.00	0.90	1.73	15,600	0.70	0.70	1.40	42,000
10/21/2010	1.30	1.20	1.30	3.80	117,930	0.60	0.70	1.30	21,450	5.00	0.80	1.63	14,700	0.60	0.60	1.20	36,000
10/22/2010	1.30	1.30	1.30	3.90	120,978	0.60	0.60	1.20	19,800	3.00	0.60	1.10	9,900	0.90	0.90	1.80	54,000
10/23/2010	2.27	0.77	2.43	5.47	170,396	0.77	0.80	1.57	25,850	4.67	0.83	1.61	14,500	1.07	1.07	2.13	64,000
10/24/2010	2.27	0.77	2.43	5.47	170,396	0.77	0.80	1.57	25,850	4.67	0.83	1.61	14,500	1.07	1.07	2.13	64,000
10/25/2010	2.27	0.77	2.43	5.47	170,396	0.77	0.80	1.57	25,850	4.67	0.83	1.61	14,500	1.07	1.07	2.13	64,000
10/26/2010	1.20	1.40	1.20	3.80	117,768	0.60	0.70	1.30	21,450	5.00	0.90	1.73	15,600	0.90	0.70	1.60	48,000
10/27/2010	1.20	1.30	1.60	4.10	127,152	0.60	0.60	1.20	19,800	4.00	0.90	1.57	14,100	0.80	0.90	1.70	51,000
10/28/2010	1.10	1.40	1.10	3.60	111,510	0.50	0.60	1.10	18,150	4.00	0.60	1.27	11,400	0.70	0.70	1.40	42,000
10/29/2010	1.30	1.20	1.30	3.80	117,930	0.60	0.70	1.30	21,450	0.60	0.70	0.80	7,200	0.70	0.70	1.40	42,000
10/30/2010	1.43	1.40	1.63	4.47	138,586	0.67	0.70	1.37	22,550	3.67	0.77	1.38	12,400	0.73	0.73	1.47	44,000
10/31/2010	1.43	1.40	1.63	4.47	138,586	0.67	0.70	1.37	22,550	3.67	0.77	1.38	12,400	0.73	0.73	1.47	44,000
11/1/2010	1.43	1.40	1.63	4.47	138,586	0.67	0.70	1.37	22,550	3.67	0.77	1.38	12,400	0.73	0.73	1.47	44,000
11/2/2010	1.30	1.30	1.40	4.00	124,086	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.80	0.70	1.50	45,000
11/3/2010	1.20	1.20	1.20	3.60	111,672	0.50	0.60	1.10	18,150	4.00	0.90	1.57	14,100	0.70	0.70	1.40	42,000
11/4/2010	1.20	1.30	1.30	3.80	117,828	0.50	0.60	1.10	18,150	5.00	0.60	1.43	12,900	0.70	0.60	1.30	39,000
11/5/2010	1.20	1.30	1.20	3.70	114,720	0.60	0.60	1.20	19,800	3.00	0.60	1.10	9,900	0.70	0.70	1.40	42,000
11/6/2010	1.57	2.13	2.40	6.10	188,966	0.70	0.77	1.47	24,200	4.67	0.83	1.61	14,500	0.83	0.83	1.67	50,000
11/7/2010	1.57	2.13	2.40	6.10	188,966	0.70	0.77	1.47	24,200	4.67	0.83	1.61	14,500	0.83	0.83	1.67	50,000
11/8/2010	1.57	2.13	2.40	6.10	188,966	0.70	0.77	1.47	24,200	4.67	0.83	1.61	14,500	0.83	0.83	1.67	50,000
11/9/2010	2.10	0.10	2.20	4.40	137,574	0.60	0.80	1.40	23,100	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
11/10/2010	2.20	0.00	2.20	4.40	137,676	0.70	0.70	1.40	23,100	5.00	0.90	1.73	15,600	0.70	0.80	1.50	45,000
11/11/2010	2.05	0.00	1.90	3.95	123,627	0.55	0.70	1.25	20,625	5.50	0.80	1.72	15,450	0.75	0.65	1.40	42,000
11/12/2010	2.05	0.00	1.90	3.95	123,627	0.55	0.70	1.25	20,625	5.50	0.80	1.72	15,450	0.75	0.65	1.40	42,000
11/13/2010	2.37	0.00	2.47	4.83	151,214	0.67	0.77	1.43	23,650	4.67	0.87	1.64	14,800	0.77	0.77	1.53	46,000
11/14/2010	2.37	0.00	2.47	4.83	151,214	0.67	0.77	1.43	23,650	4.67	0.87	1.64	14,800	0.77	0.77	1.53	46,000
11/15/2010	2.37	0.00	2.47	4.83	151,214	0.67	0.77	1.43	23,650	4.67	0.87	1.64	14,800	0.77	0.77	1.53	46,000
11/16/2010	2.00	0.00	2.10	4.10	128,268	0.70	0.70	1.40	23,100	5.00	0.90	1.73	15,600	0.70	0.70	1.40	42,000
11/17/2010	2.10	0.00	2.00	4.10	128,310	0.60	0.70	1.30	21,450	5.00	0.80	1.63	14,700	0.70	0.70	1.40	42,000
11/18/2010	2.00	0.00	2.10	4.10	128,268	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.80	0.70	1.50	45,000
11/19/2010	2.10	0.00	2.10	4.20	131,418	0.60	0.70	1.30	21,450	5.00	0.90	1.73	15,600	0.70	0.70	1.40	42,000
11/20/2010	3.17	0.00	3.07	6.23	195,062	0.90	1.03	1.93	31,900	5.67	1.03	1.98	17,800	1.03	1.00	2.03	61,000
11/21/2010	3.17	0.00	3.07	6.23	195,062	0.90	1.03	1.93	31,900	5.67	1.03	1.98	17,800	1.03	1.00	2.03	61,000

TABLE G-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
11/22/2010	3.17	0.00	3.07	6.23	195,062	0.90	1.03	1.93	31,900	5.67	1.03	1.98	17,800	1.03	1.00	2.03	61,000
11/23/2010	2.70	0.00	3.10	5.80	181,398	0.90	1.10	2.00	33,000	6.00	0.90	1.90	17,100	0.90	1.00	1.90	57,000
11/24/2010	4.50	0.00	4.30	8.80	275,394	1.10	1.30	2.40	39,600	7.00	1.30	2.47	22,200	1.70	1.40	3.10	93,000
11/25/2010	3.16	0.00	3.44	6.60	206,455	0.98	1.14	2.12	34,980	5.00	0.90	1.73	15,600	0.84	0.88	1.72	51,600
11/26/2010	3.16	0.00	3.44	6.60	206,455	0.98	1.14	2.12	34,980	5.00	0.90	1.73	15,600	0.84	0.88	1.72	51,600
11/27/2010	3.16	0.00	3.44	6.60	206,455	0.98	1.14	2.12	34,980	5.00	0.90	1.73	15,600	0.84	0.88	1.72	51,600
11/28/2010	3.16	0.00	3.44	6.60	206,455	0.98	1.14	2.12	34,980	5.00	0.90	1.73	15,600	0.84	0.88	1.72	51,600
11/29/2010	3.16	0.00	3.44	6.60	206,455	0.98	1.14	2.12	34,980	5.00	0.90	1.73	15,600	0.84	0.88	1.72	51,600
11/30/2010	2.20	0.00	2.30	4.50	140,784	0.70	0.70	1.40	23,100	5.00	0.80	1.63	14,700	0.80	0.70	1.50	45,000
12/1/2010	2.00	0.00	2.40	4.40	137,592	0.80	0.90	1.70	28,050	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000
12/2/2010	1.90	0.00	2.30	4.20	131,334	0.70	0.80	1.50	24,750	5.00	0.80	1.63	14,700	0.80	0.70	1.50	45,000
12/3/2010	2.20	0.00	2.10	4.30	134,568	0.60	0.70	1.30	21,450	3.00	0.70	1.20	10,800	0.70	0.70	1.40	42,000
12/4/2010	2.27	0.00	2.40	4.67	145,992	0.70	0.73	1.43	23,650	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
12/5/2010	2.27	0.00	2.40	4.67	145,992	0.70	0.73	1.43	23,650	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
12/6/2010	2.27	0.00	2.40	4.67	145,992	0.70	0.73	1.43	23,650	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
12/7/2010	2.10	0.00	2.40	4.50	140,742	0.60	0.80	1.40	23,100	4.00	0.70	1.37	12,300	0.80	0.70	1.50	45,000
12/8/2010	0.20	0.00	3.80	4.00	124,404	0.70	0.70	1.40	23,100	5.00	0.70	1.53	13,800	0.70	0.70	1.40	42,000
12/9/2010	2.00	0.00	2.50	4.50	140,700	0.60	0.70	1.30	21,450	3.00	0.70	1.20	10,800	0.80	0.70	1.50	45,000
12/10/2010	2.40	0.00	2.60	5.00	156,408	0.70	0.80	1.50	24,750	4.00	0.70	1.37	12,300	0.80	0.80	1.60	48,000
12/11/2010	3.10	0.00	3.20	6.30	197,106	0.90	1.00	1.90	31,350	5.33	0.93	1.82	16,400	1.00	1.27	2.27	68,000
12/12/2010	3.10	0.00	3.20	6.30	197,106	0.90	1.00	1.90	31,350	5.33	0.93	1.82	16,400	1.00	1.27	2.27	68,000
12/13/2010	3.10	0.00	3.20	6.30	197,106	0.90	1.00	1.90	31,350	5.33	0.93	1.82	16,400	1.00	1.27	2.27	68,000
12/14/2010	2.00	0.00	2.10	4.10	128,268	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.60	0.80	1.40	42,000
12/15/2010	2.90	0.00	3.30	6.20	193,914	0.50	0.90	1.40	23,100	5.00	0.80	1.63	14,700	1.60	1.50	3.10	93,000
12/16/2010	2.30	0.00	2.60	4.90	153,258	0.70	0.80	1.50	24,750	3.00	0.70	1.20	10,800	1.10	0.80	1.90	57,000
12/17/2010	2.20	0.00	2.40	4.60	143,892	0.70	0.80	1.50	24,750	5.00	0.70	1.53	13,800	0.80	0.80	1.60	48,000
12/18/2010	5.10	0.00	4.83	9.93	310,870	1.20	1.33	2.53	41,800	7.33	1.30	2.52	22,700	2.87	3.27	6.13	184,000
12/19/2010	5.10	0.00	4.83	9.93	310,870	1.20	1.33	2.53	41,800	7.33	1.30	2.52	22,700	2.87	3.27	6.13	184,000
12/20/2010	5.10	0.00	4.83	9.93	310,870	1.20	1.33	2.53	41,800	7.33	1.30	2.52	22,700	2.87	3.27	6.13	184,000
12/21/2010	3.40	0.00	3.60	7.00	218,988	0.60	0.90	1.50	24,750	5.00	0.90	1.73	15,600	1.40	1.30	2.70	81,000
12/22/2010	3.00	0.00	3.20	6.20	193,956	1.10	0.90	2.00	33,000	5.00	0.80	1.63	14,700	1.20	1.10	2.30	69,000
12/23/2010	3.58	0.00	3.74	7.32	229,009	0.92	1.02	1.94	32,010	4.80	0.86	1.66	14,940	1.22	1.18	2.40	72,000
12/24/2010	3.58	0.00	3.74	7.32	229,009	0.92	1.02	1.94	32,010	4.80	0.86	1.66	14,940	1.22	1.18	2.40	72,000
12/25/2010	3.58	0.00	3.74	7.32	229,009	0.92	1.02	1.94	32,010	4.80	0.86	1.66	14,940	1.22	1.18	2.40	72,000
12/26/2010	3.58	0.00	3.74	7.32	229,009	0.92	1.02	1.94	32,010	4.80	0.86	1.66	14,940	1.22	1.18	2.40	72,000
12/27/2010	3.58	0.00	3.74	7.32	229,009	0.92	1.02	1.94	32,010	4.80	0.86	1.66	14,940	1.22	1.18	2.40	72,000
12/28/2010	3.40	0.00	3.30	6.70	209,664	0.90	1.10	2.00	33,000	4.00	0.80	1.47	13,200	1.00	1.00	2.00	60,000
12/29/2010	4.70	0.00	5.50	10.20	318,990	1.50	1.60	3.10	51,150	8.00	1.30	2.63	23,700	3.30	3.00	6.30	189,000
12/30/2010	5.30	0.00	4.70	10.00	313,026	1.30	1.40	2.70	44,550	8.00	1.40	2.73	24,600	2.60	2.50	5.10	153,000
12/31/2010	3.83	0.00	4.35	8.18	255,686	1.03	1.18	2.20	36,300	6.00	1.08	2.08	18,675	1.85	1.78	3.63	108,750
1/1/2011	3.83	0.00	4.35	8.18	255,686	1.03	1.18	2.20	36,300	6.00	1.08	2.08	18,675	1.85	1.78	3.63	108,750

TABLE G-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
1/2/2011	3.83	0.00	4.35	8.18	255,686	1.03	1.18	2.20	36,300	6.00	1.08	2.08	18,675	1.85	1.78	3.63	108,750
1/3/2011	3.83	0.00	4.35	8.18	255,686	1.03	1.18	2.20	36,300	6.00	1.08	2.08	18,675	1.85	1.78	3.63	108,750
1/4/2011	3.30	0.00	3.40	6.70	209,622	0.80	0.90	1.70	28,050	6.00	1.00	2.00	18,000	1.50	1.30	2.80	84,000
1/5/2011	2.90	0.00	2.90	5.80	181,482	0.70	0.80	1.50	24,750	5.00	0.90	1.73	15,600	1.20	1.20	2.40	72,000
1/6/2011	2.50	0.00	2.60	5.10	159,558	0.80	0.80	1.60	26,400	5.00	0.80	1.63	14,700	0.90	0.90	1.80	54,000
1/7/2011	2.50	0.00	2.70	5.20	162,666	0.70	0.80	1.50	24,750	5.00	0.90	1.73	15,600	0.90	0.90	1.80	54,000
1/8/2011	2.40	0.00	2.63	5.03	157,444	0.73	0.80	1.53	25,300	4.33	0.77	1.49	13,400	0.83	0.77	1.60	48,000
1/9/2011	2.40	0.00	2.63	5.03	157,444	0.73	0.80	1.53	25,300	4.33	0.77	1.49	13,400	0.83	0.77	1.60	48,000
1/10/2011	2.40	0.00	2.63	5.03	157,444	0.73	0.80	1.53	25,300	4.33	0.77	1.49	13,400	0.83	0.77	1.60	48,000
1/11/2011	2.10	0.00	2.20	4.30	134,526	0.60	0.70	1.30	21,450	3.00	0.60	1.10	9,900	0.70	0.70	1.40	42,000
1/12/2011	2.30	0.00	2.20	4.50	140,826	0.80	0.80	1.60	26,400	5.00	0.80	1.63	14,700	0.80	0.90	1.70	51,000
1/13/2011	1.90	0.00	2.00	3.90	122,010	0.50	0.60	1.10	18,150	4.00	0.70	1.37	12,300	0.70	0.60	1.30	39,000
1/14/2011	2.10	0.00	2.00	4.10	128,310	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.80	0.70	1.50	45,000
1/15/2011	2.38	0.00	2.63	5.00	156,398	0.70	0.80	1.50	24,750	3.75	0.70	1.33	11,925	0.78	0.73	1.50	45,000
1/16/2011	2.38	0.00	2.63	5.00	156,398	0.70	0.80	1.50	24,750	3.75	0.70	1.33	11,925	0.78	0.73	1.50	45,000
1/17/2011	2.38	0.00	2.63	5.00	156,398	0.70	0.80	1.50	24,750	3.75	0.70	1.33	11,925	0.78	0.73	1.50	45,000
1/18/2011	2.38	0.00	2.63	5.00	156,398	0.70	0.80	1.50	24,750	3.75	0.70	1.33	11,925	0.78	0.73	1.50	45,000
1/19/2011	2.00	0.00	2.00	4.00	125,160	0.70	0.70	1.40	23,100	5.00	0.80	1.63	14,700	0.70	0.60	1.30	39,000
1/20/2011	1.70	0.00	1.80	3.50	109,494	0.50	0.60	1.10	18,150	4.00	0.70	1.37	12,300	0.80	0.60	1.40	42,000
1/21/2011	1.90	0.00	1.90	3.80	118,902	0.60	0.60	1.20	19,800	4.00	0.70	1.37	12,300	0.60	0.70	1.30	39,000
1/22/2011	2.07	0.00	2.33	4.40	137,620	0.67	0.73	1.40	23,100	4.00	0.70	1.37	12,300	0.70	0.67	1.37	41,000
1/23/2011	2.07	0.00	2.33	4.40	137,620	0.67	0.73	1.40	23,100	4.00	0.70	1.37	12,300	0.70	0.67	1.37	41,000
1/24/2011	2.07	0.00	2.33	4.40	137,620	0.67	0.73	1.40	23,100	4.00	0.70	1.37	12,300	0.70	0.67	1.37	41,000
1/25/2011	2.20	0.00	2.00	4.20	131,460	0.80	0.90	1.70	28,050	4.00	0.80	1.47	13,200	0.60	0.70	1.30	39,000
1/26/2011	1.90	0.00	1.90	3.80	118,902	0.70	0.80	1.50	24,750	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
1/27/2011	1.80	0.00	1.80	3.60	112,644	0.80	0.70	1.50	24,750	4.00	0.60	1.27	11,400	0.70	0.50	1.20	36,000
1/28/2011	1.80	0.00	2.10	3.90	121,968	0.70	0.90	1.60	26,400	4.00	0.70	1.37	12,300	0.60	0.60	1.20	36,000
1/29/2011	2.27	0.00	2.37	4.63	144,956	0.73	0.77	1.50	24,750	4.33	0.77	1.49	13,400	0.70	0.67	1.37	41,000
1/30/2011	2.27	0.00	2.37	4.63	144,956	0.73	0.77	1.50	24,750	4.33	0.77	1.49	13,400	0.70	0.67	1.37	41,000
1/31/2011	2.27	0.00	2.37	4.63	144,956	0.73	0.77	1.50	24,750	4.33	0.77	1.49	13,400	0.70	0.67	1.37	41,000
2/1/2011	1.80	0.00	2.10	3.90	121,968	0.60	0.70	1.30	21,450	5.00	0.80	1.63	14,700	0.70	0.70	1.40	42,000
2/2/2011	2.00	0.00	1.90	3.90	122,052	0.70	0.70	1.40	23,100	4.00	0.80	1.47	13,200	0.70	0.50	1.20	36,000
2/3/2011	1.80	0.00	1.90	3.70	115,752	0.70	0.70	1.40	23,100	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000
2/4/2011	1.40	0.80	1.60	3.80	118,212	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.60	0.40	1.00	30,000
2/5/2011	1.37	1.40	1.37	4.13	128,198	0.73	0.77	1.50	24,750	4.33	0.73	1.46	13,100	0.60	0.60	1.20	36,000
2/6/2011	1.37	1.40	1.37	4.13	128,198	0.73	0.77	1.50	24,750	4.33	0.73	1.46	13,100	0.60	0.60	1.20	36,000
2/7/2011	1.37	1.40	1.37	4.13	128,198	0.73	0.77	1.50	24,750	4.33	0.73	1.46	13,100	0.60	0.60	1.20	36,000
2/8/2011	1.40	1.30	1.30	4.00	124,128	0.70	0.70	1.40	23,100	4.00	0.80	1.47	13,200	1.60	0.70	2.30	69,000
2/9/2011	1.20	1.10	1.20	3.50	108,624	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.70	0.60	1.30	39,000
2/10/2011	1.10	1.00	1.20	3.30	102,426	0.50	0.60	1.10	18,150	4.00	0.70	1.37	12,300	0.60	0.60	1.20	36,000
2/11/2011	1.30	1.20	1.00	3.50	108,606	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.70	0.60	1.30	39,000

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PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
2/12/2011	1.57	1.40	1.63	4.60	142,786	0.63	0.67	1.30	21,450	4.00	0.73	1.40	12,600	0.60	0.53	1.13	34,000
2/13/2011	1.57	1.40	1.63	4.60	142,786	0.63	0.67	1.30	21,450	4.00	0.73	1.40	12,600	0.60	0.53	1.13	34,000
2/14/2011	1.57	1.40	1.63	4.60	142,786	0.63	0.67	1.30	21,450	4.00	0.73	1.40	12,600	0.60	0.53	1.13	34,000
2/15/2011	1.30	1.30	1.40	4.00	124,086	0.60	0.70	1.30	21,450	5.00	0.70	1.53	13,800	0.70	0.70	1.40	42,000
2/16/2011	1.30	1.40	1.50	4.20	130,242	0.70	0.60	1.30	21,450	5.00	0.90	1.73	15,600	0.80	0.80	1.60	48,000
2/17/2011	1.70	1.40	1.60	4.70	145,950	0.50	0.70	1.20	19,800	4.00	0.80	1.47	13,200	0.80	0.70	1.50	45,000
2/18/2011	2.10	2.20	1.40	5.70	176,718	1.20	1.20	2.40	39,600	5.00	0.90	1.73	15,600	2.50	2.20	4.70	141,000
2/19/2011	2.33	2.15	2.60	7.08	219,578	0.90	1.00	1.90	31,350	5.00	0.83	1.66	14,925	1.70	1.58	3.28	98,250
2/20/2011	2.33	2.15	2.60	7.08	219,578	0.90	1.00	1.90	31,350	5.00	0.83	1.66	14,925	1.70	1.58	3.28	98,250
2/21/2011	2.33	2.15	2.60	7.08	219,578	0.90	1.00	1.90	31,350	5.00	0.83	1.66	14,925	1.70	1.58	3.28	98,250
2/22/2011	2.33	2.15	2.60	7.08	219,578	0.90	1.00	1.90	31,350	5.00	0.83	1.66	14,925	1.70	1.58	3.28	98,250
2/23/2011	1.50	1.60	1.70	4.80	148,854	0.70	0.70	1.40	23,100	3.00	0.70	1.20	10,800	0.80	0.80	1.60	48,000
2/24/2011	1.50	1.40	1.60	4.50	139,650	0.50	0.70	1.20	19,800	4.00	0.60	1.27	11,400	0.80	0.80	1.60	48,000
2/25/2011	1.60	1.80	2.10	5.50	170,532	1.00	0.90	1.90	31,350	4.00	0.70	1.37	12,300	1.10	1.10	2.20	66,000
2/26/2011	2.27	2.10	2.47	6.83	212,072	0.87	0.93	1.80	29,700	5.33	0.90	1.79	16,100	1.63	1.63	3.27	98,000
2/27/2011	2.27	2.10	2.47	6.83	212,072	0.87	0.93	1.80	29,700	5.33	0.90	1.79	16,100	1.63	1.63	3.27	98,000
2/28/2011	2.27	2.10	2.47	6.83	212,072	0.87	0.93	1.80	29,700	5.33	0.90	1.79	16,100	1.63	1.63	3.27	98,000
3/1/2011	1.50	1.70	1.50	4.70	145,686	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.80	0.70	1.50	45,000
3/2/2011	1.50	1.40	1.60	4.50	139,650	0.60	0.70	1.30	21,450	3.00	0.60	1.10	9,900	0.90	0.80	1.70	51,000
3/3/2011	1.70	1.60	1.70	5.00	155,154	0.80	0.80	1.60	26,400	5.00	0.80	1.63	14,700	1.30	1.10	2.40	72,000
3/4/2011	1.60	1.50	1.50	4.60	142,740	0.70	0.80	1.50	24,750	3.00	0.60	1.10	9,900	1.00	1.00	2.00	60,000
3/5/2011	2.03	1.80	2.07	5.90	183,146	0.87	0.93	1.80	29,700	4.67	0.80	1.58	14,200	1.30	1.23	2.53	76,000
3/6/2011	2.03	1.80	2.07	5.90	183,146	0.87	0.93	1.80	29,700	4.67	0.80	1.58	14,200	1.30	1.23	2.53	76,000
3/7/2011	2.03	1.80	2.07	5.90	183,146	0.87	0.93	1.80	29,700	4.67	0.80	1.58	14,200	1.30	1.23	2.53	76,000
3/8/2011	1.70	1.80	2.00	5.50	170,574	0.70	0.80	1.50	24,750	5.00	0.90	1.73	15,600	1.50	1.30	2.80	84,000
3/9/2011	1.50	1.40	1.60	4.50	139,650	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	1.00	0.90	1.90	57,000
3/10/2011	1.30	1.30	1.60	4.20	130,302	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	1.10	1.90	3.00	90,000
3/11/2011	1.40	1.60	1.70	4.70	145,704	0.70	0.80	1.50	24,750	5.00	0.80	1.63	14,700	0.90	0.80	1.70	51,000
3/12/2011	1.53	1.47	1.63	4.63	143,768	0.67	0.73	1.40	23,100	4.67	0.77	1.54	13,900	0.73	0.70	1.43	43,000
3/13/2011	1.53	1.47	1.63	4.63	143,768	0.67	0.73	1.40	23,100	4.67	0.77	1.54	13,900	0.73	0.70	1.43	43,000
3/14/2011	1.53	1.47	1.63	4.63	143,768	0.67	0.73	1.40	23,100	4.67	0.77	1.54	13,900	0.73	0.70	1.43	43,000
3/15/2011	1.40	1.60	1.60	4.60	142,596	0.70	0.80	1.50	24,750	5.00	0.80	1.63	14,700	0.90	1.00	1.90	57,000
3/16/2011	1.70	1.60	1.60	4.90	152,046	0.80	0.90	1.70	28,050	4.00	0.80	1.47	13,200	1.60	1.50	3.10	93,000
3/17/2011	1.90	1.80	1.80	5.50	170,658	0.70	0.80	1.50	24,750	5.00	0.90	1.73	15,600	1.80	1.60	3.40	102,000
3/18/2011	1.90	1.50	1.70	5.10	158,406	0.70	0.20	0.90	14,850	5.00	0.90	1.73	15,600	1.00	1.00	2.00	60,000
3/19/2011	2.93	2.73	3.47	9.13	283,456	1.17	1.23	2.40	39,600	6.67	1.17	2.28	20,500	3.13	2.90	6.03	181,000
3/20/2011	2.93	2.73	3.47	9.13	283,456	1.17	1.23	2.40	39,600	6.67	1.17	2.28	20,500	3.13	2.90	6.03	181,000
3/21/2011	2.93	2.73	3.47	9.13	283,456	1.17	1.23	2.40	39,600	6.67	1.17	2.28	20,500	3.13	2.90	6.03	181,000
3/22/2011	2.70	2.60	2.70	8.00	248,214	1.00	1.10	2.10	34,650	6.00	1.10	2.10	18,900	2.60	2.50	5.10	153,000
3/23/2011	2.10	2.00	2.20	6.30	195,486	0.90	1.00	1.90	31,350	6.00	1.10	2.10	18,900	1.90	1.90	3.80	114,000
3/24/2011	2.10	2.20	2.30	6.60	204,690	0.80	0.90	1.70	28,050	5.00	0.80	1.63	14,700	2.00	1.90	3.90	117,000

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Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
3/25/2011	3.00	2.60	3.10	8.70	270,096	1.10	1.30	2.40	39,600	7.00	1.20	2.37	21,300	1.30	3.20	4.50	135,000
3/26/2011	2.57	2.37	3.00	7.93	246,226	0.97	1.13	2.10	34,650	7.00	1.17	2.33	21,000	2.40	2.43	4.83	145,000
3/27/2011	2.57	2.37	3.00	7.93	246,226	0.97	1.13	2.10	34,650	7.00	1.17	2.33	21,000	2.40	2.43	4.83	145,000
3/28/2011	2.57	2.37	3.00	7.93	246,226	0.97	1.13	2.10	34,650	7.00	1.17	2.33	21,000	2.40	2.43	4.83	145,000
3/29/2011	2.00	2.00	2.00	6.00	186,120	0.70	0.80	1.50	24,750	6.00	1.20	2.20	19,800	1.20	1.20	2.40	72,000
3/30/2011	1.80	1.80	1.90	5.50	170,616	0.70	0.80	1.50	24,750	6.00	1.00	2.00	18,000	1.10	1.20	2.30	69,000
3/31/2011	1.70	1.50	1.50	4.70	145,890	0.60	0.80	1.40	23,100	4.00	1.00	1.67	15,000	1.30	1.10	2.40	72,000
4/1/2011	1.60	1.80	1.90	5.30	164,316	0.80	0.90	1.70	28,050	5.00	0.70	1.53	13,800	1.00	0.90	1.90	57,000
4/2/2011	1.73	1.60	1.87	5.20	161,384	0.80	0.87	1.67	27,500	4.33	0.77	1.49	13,400	0.73	0.77	1.50	45,000
4/3/2011	1.73	1.60	1.87	5.20	161,384	0.80	0.87	1.67	27,500	4.33	0.77	1.49	13,400	0.73	0.77	1.50	45,000
4/4/2011	1.73	1.60	1.87	5.20	161,384	0.80	0.87	1.67	27,500	4.33	0.77	1.49	13,400	0.73	0.77	1.50	45,000
4/5/2011	1.50	1.60	1.50	4.60	142,638	0.80	0.80	1.60	26,400	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
4/6/2011	1.50	1.40	1.60	4.50	139,650	0.70	0.80	1.50	24,750	4.00	0.80	1.47	13,200	0.60	0.70	1.30	39,000
4/7/2011	1.40	1.50	1.50	4.40	136,440	0.80	0.90	1.70	28,050	4.00	0.70	1.37	12,300	0.60	0.50	1.10	33,000
4/8/2011	1.40	1.50	1.10	4.00	124,008	0.80	0.90	1.70	28,050	5.00	0.70	1.53	13,800	0.80	0.70	1.50	45,000
4/9/2011	1.60	1.63	1.77	5.00	155,092	0.87	0.93	1.80	29,700	4.33	0.77	1.49	13,400	0.80	0.83	1.63	49,000
4/10/2011	1.60	1.63	1.77	5.00	155,092	0.87	0.93	1.80	29,700	4.33	0.77	1.49	13,400	0.80	0.83	1.63	49,000
4/11/2011	1.60	1.63	1.77	5.00	155,092	0.87	0.93	1.80	29,700	4.33	0.77	1.49	13,400	0.80	0.83	1.63	49,000
4/12/2011	1.20	1.50	1.40	4.10	127,032	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.60	0.60	1.20	36,000
4/13/2011	1.40	1.40	1.50	4.30	133,392	0.70	0.80	1.50	24,750	4.00	0.80	1.47	13,200	0.60	0.50	1.10	33,000
4/14/2011	1.30	1.10	1.30	3.70	114,882	0.80	0.80	1.60	26,400	4.00	0.70	1.37	12,300	0.60	0.60	1.20	36,000
4/15/2011	1.40	1.40	1.50	4.30	133,392	0.90	0.90	1.80	29,700	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
4/16/2011	1.53	1.47	1.50	4.50	139,624	0.80	0.87	1.67	27,500	4.33	0.77	1.49	13,400	0.57	0.63	1.20	36,000
4/17/2011	1.53	1.47	1.50	4.50	139,624	0.80	0.87	1.67	27,500	4.33	0.77	1.49	13,400	0.57	0.63	1.20	36,000
4/18/2011	1.53	1.47	1.50	4.50	139,624	0.80	0.87	1.67	27,500	4.33	0.77	1.49	13,400	0.57	0.63	1.20	36,000
4/19/2011	1.50	1.60	1.70	4.80	148,854	0.80	0.80	1.60	26,400	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000
4/20/2011	1.50	1.50	1.70	4.70	145,806	0.80	0.80	1.60	26,400	5.00	0.80	1.63	14,700	0.80	0.80	1.60	48,000
4/21/2011	1.50	1.30	1.70	4.50	139,710	0.80	0.80	1.60	26,400	4.00	0.80	1.47	13,200	0.60	0.70	1.30	39,000
4/22/2011	1.60	1.60	1.80	5.00	155,112	0.70	0.80	1.50	24,750	4.00	0.90	1.57	14,100	0.70	0.70	1.40	42,000
4/23/2011	1.60	1.70	1.97	5.27	163,340	1.17	0.87	2.03	33,550	4.33	0.83	1.56	14,000	0.67	0.67	1.33	40,000
4/24/2011	1.60	1.70	1.97	5.27	163,340	1.17	0.87	2.03	33,550	4.33	0.83	1.56	14,000	0.67	0.67	1.33	40,000
4/25/2011	1.60	1.70	1.97	5.27	163,340	1.17	0.87	2.03	33,550	4.33	0.83	1.56	14,000	0.67	0.67	1.33	40,000
4/26/2011	1.30	1.30	1.60	4.20	130,302	0.80	0.80	1.60	26,400	5.00	0.90	1.73	15,600	0.80	0.80	1.60	48,000
4/27/2011	1.40	1.30	1.40	4.10	127,236	0.70	0.70	1.40	23,100	3.00	0.70	1.20	10,800	0.60	0.70	1.30	39,000
4/28/2011	1.20	1.30	1.50	4.00	124,044	0.80	0.80	1.60	26,400	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
4/29/2011	1.60	1.20	1.50	4.30	133,596	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.60	0.60	1.20	36,000
4/30/2011	1.60	1.50	1.80	4.90	152,064	0.90	0.97	1.87	30,800	4.33	0.83	1.56	14,000	0.70	0.73	1.43	43,000
5/1/2011	1.60	1.50	1.80	4.90	152,064	0.90	0.97	1.87	30,800	4.33	0.83	1.56	14,000	0.70	0.73	1.43	43,000
5/2/2011	1.60	1.50	1.80	4.90	152,064	0.90	0.97	1.87	30,800	4.33	0.83	1.56	14,000	0.70	0.73	1.43	43,000
5/3/2011	1.30	1.30	1.50	4.10	127,194	0.80	0.70	1.50	24,750	5.00	0.80	1.63	14,700	0.60	0.60	1.20	36,000
5/4/2011	1.40	1.30	1.40	4.10	127,236	0.70	0.90	1.60	26,400	4.00	0.70	1.37	12,300	0.80	0.80	1.60	48,000

TABLE G-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
5/5/2011	1.50	1.20	1.40	4.10	127,338	0.80	0.30	1.10	18,150	3.00	0.80	1.30	11,700	0.70	0.70	1.40	42,000
5/6/2011	1.90	0.30	1.90	4.10	128,046	0.70	0.80	1.50	24,750	5.00	0.80	1.63	14,700	0.60	0.70	1.30	39,000
5/7/2011	1.53	1.37	1.70	4.60	142,792	0.67	0.67	1.33	22,000	4.00	0.77	1.43	12,900	0.70	0.67	1.37	41,000
5/8/2011	1.53	1.37	1.70	4.60	142,792	0.67	0.67	1.33	22,000	4.00	0.77	1.43	12,900	0.70	0.67	1.37	41,000
5/9/2011	1.53	1.37	1.70	4.60	142,792	0.67	0.67	1.33	22,000	4.00	0.77	1.43	12,900	0.70	0.67	1.37	41,000
5/10/2011	1.20	1.30	1.40	3.90	120,936	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.70	0.80	1.50	45,000
5/11/2011	1.20	1.20	1.40	3.80	117,888	0.60	0.60	1.20	19,800	4.00	0.80	1.47	13,200	0.70	0.60	1.30	39,000
5/12/2011	1.30	1.30	1.40	4.00	124,086	0.60	0.60	1.20	19,800	3.00	0.60	1.10	9,900	0.50	0.60	1.10	33,000
5/13/2011	1.40	1.30	1.40	4.10	127,236	0.60	0.50	1.10	18,150	5.00	0.80	1.63	14,700	0.70	0.50	1.20	36,000
5/14/2011	1.47	1.60	1.60	4.67	144,696	0.67	0.73	1.40	23,100	4.00	0.80	1.47	13,200	0.67	0.70	1.37	41,000
5/15/2011	1.47	1.60	1.60	4.67	144,696	0.67	0.73	1.40	23,100	4.00	0.80	1.47	13,200	0.67	0.70	1.37	41,000
5/16/2011	1.47	1.60	1.60	4.67	144,696	0.67	0.73	1.40	23,100	4.00	0.80	1.47	13,200	0.67	0.70	1.37	41,000
5/17/2011	1.40	1.30	1.40	4.10	127,236	0.80	0.80	1.60	26,400	4.00	0.70	1.37	12,300	0.90	0.90	1.80	54,000
5/18/2011	1.40	1.70	1.40	4.50	139,428	0.70	0.80	1.50	24,750	4.00	0.80	1.47	13,200	0.80	0.90	1.70	51,000
5/19/2011	1.30	1.40	1.60	4.30	133,350	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.80	0.80	1.60	48,000
5/20/2011	1.40	1.40	1.60	4.40	136,500	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.80	0.60	1.40	42,000
5/21/2011	1.60	1.87	1.70	5.17	160,132	0.70	0.77	1.47	24,200	3.67	0.80	1.41	12,700	0.93	0.83	1.77	53,000
5/22/2011	1.60	1.87	1.70	5.17	160,132	0.70	0.77	1.47	24,200	3.67	0.80	1.41	12,700	0.93	0.83	1.77	53,000
5/23/2011	1.60	1.87	1.70	5.17	160,132	0.70	0.77	1.47	24,200	3.67	0.80	1.41	12,700	0.93	0.83	1.77	53,000
5/24/2011	1.30	1.30	1.70	4.30	133,410	0.60	0.70	1.30	21,450	4.00	0.80	1.47	13,200	0.40	0.70	1.10	33,000
5/25/2011	1.50	1.30	1.70	4.50	139,710	0.80	0.80	1.60	26,400	4.00	0.90	1.57	14,100	0.70	0.90	1.60	48,000
5/26/2011	1.50	1.50	1.60	4.60	142,698	0.70	0.80	1.50	24,750	4.00	0.80	1.47	13,200	0.80	0.70	1.50	45,000
5/27/2011	1.60	1.70	1.70	5.00	155,052	0.80	0.90	1.70	28,050	5.00	0.90	1.73	15,600	0.70	0.80	1.50	45,000
5/28/2011	1.78	1.80	1.75	5.33	165,167	0.85	0.88	1.73	28,463	4.25	0.83	1.53	13,800	0.78	0.78	1.55	46,500
5/29/2011	1.78	1.80	1.75	5.33	165,167	0.85	0.88	1.73	28,463	4.25	0.83	1.53	13,800	0.78	0.78	1.55	46,500
5/30/2011	1.78	1.80	1.75	5.33	165,167	0.85	0.88	1.73	28,463	4.25	0.83	1.53	13,800	0.78	0.78	1.55	46,500
5/31/2011	1.78	1.80	1.75	5.33	165,167	0.85	0.88	1.73	28,463	4.25	0.83	1.53	13,800	0.78	0.78	1.55	46,500
6/1/2011	1.50	1.50	1.50	4.50	139,590	0.70	0.70	1.40	23,100	4.00	0.80	1.47	13,200	0.80	0.80	1.60	48,000
6/2/2011	1.40	1.40	1.70	4.50	139,608	0.80	0.60	1.40	23,100	4.00	0.80	1.47	13,200	0.80	0.70	1.50	45,000
6/3/2011	1.60	1.70	1.60	4.90	151,944	0.70	0.70	1.40	23,100	5.00	0.90	1.73	15,600	0.80	0.70	1.50	45,000
6/4/2011	1.83	1.67	1.83	5.33	165,530	0.73	0.77	1.50	24,750	4.33	0.87	1.59	14,300	0.90	0.87	1.77	53,000
6/5/2011	1.83	1.67	1.83	5.33	165,530	0.73	0.77	1.50	24,750	4.33	0.87	1.59	14,300	0.90	0.87	1.77	53,000
6/6/2011	1.83	1.67	1.83	5.33	165,530	0.73	0.77	1.50	24,750	4.33	0.87	1.59	14,300	0.90	0.87	1.77	53,000
6/7/2011	1.60	1.60	1.60	4.80	148,896	0.70	0.70	1.40	23,100	4.00	0.90	1.57	14,100	0.70	0.80	1.50	45,000
6/8/2011	1.60	1.50	1.70	4.80	148,956	0.80	0.90	1.70	28,050	5.00	0.80	1.63	14,700	0.60	0.50	1.10	33,000
6/9/2011	1.40	1.50	1.50	4.40	136,440	0.80	0.80	1.60	26,400	4.00	0.80	1.47	13,200	0.60	0.50	1.10	33,000
6/10/2011	1.50	1.60	1.80	4.90	151,962	0.80	0.90	1.70	28,050	4.00	0.90	1.57	14,100	0.60	0.70	1.30	39,000
6/11/2011	1.53	1.80	1.73	5.07	157,036	0.80	0.93	1.73	28,600	4.00	0.77	1.43	12,900	0.63	0.63	1.27	38,000
6/12/2011	1.53	1.80	1.73	5.07	157,036	0.80	0.93	1.73	28,600	4.00	0.77	1.43	12,900	0.63	0.63	1.27	38,000
6/13/2011	1.53	1.80	1.73	5.07	157,036	0.80	0.93	1.73	28,600	4.00	0.77	1.43	12,900	0.63	0.63	1.27	38,000
6/14/2011	1.80	1.60	1.80	5.20	161,412	0.90	0.90	1.80	29,700	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000

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CITY OF ANGELS WASTEWATER MASTER PLAN
PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
6/15/2011	1.40	1.60	1.70	4.70	145,704	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.60	0.60	1.20	36,000
6/16/2011	1.40	1.40	1.80	4.60	142,716	0.80	0.90	1.70	28,050	4.00	0.80	1.47	13,200	0.60	0.60	1.20	36,000
6/17/2011	1.50	1.70	2.00	5.20	161,226	0.80	0.90	1.70	28,050	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000
6/18/2011	1.67	1.83	1.83	5.33	165,360	0.80	0.87	1.67	27,500	3.67	0.80	1.41	12,700	0.67	0.67	1.33	40,000
6/19/2011	1.67	1.83	1.83	5.33	165,360	0.80	0.87	1.67	27,500	3.67	0.80	1.41	12,700	0.67	0.67	1.33	40,000
6/20/2011	1.67	1.83	1.83	5.33	165,360	0.80	0.87	1.67	27,500	3.67	0.80	1.41	12,700	0.67	0.67	1.33	40,000
6/21/2011	1.80	1.60	1.60	5.00	155,196	0.80	0.80	1.60	26,400	4.00	0.70	1.37	12,300	0.80	0.70	1.50	45,000
6/22/2011	1.60	1.50	1.60	4.70	145,848	0.60	0.60	1.20	19,800	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000
6/23/2011	1.50	1.60	1.90	5.00	155,070	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.80	0.60	1.40	42,000
6/24/2011	1.50	1.60	1.60	4.70	145,746	0.50	0.70	1.20	19,800	3.00	0.70	1.20	10,800	0.80	0.80	1.60	48,000
6/25/2011	1.73	1.77	1.80	5.30	164,392	0.63	0.67	1.30	21,450	4.00	0.73	1.40	12,600	0.77	0.77	1.53	46,000
6/26/2011	1.73	1.77	1.80	5.30	164,392	0.63	0.67	1.30	21,450	4.00	0.73	1.40	12,600	0.77	0.77	1.53	46,000
6/27/2011	1.73	1.77	1.80	5.30	164,392	0.63	0.67	1.30	21,450	4.00	0.73	1.40	12,600	0.77	0.77	1.53	46,000
6/28/2011	1.60	1.70	1.70	5.00	155,052	0.50	0.70	1.20	19,800	4.00	0.80	1.47	13,200	0.60	0.60	1.20	36,000
6/29/2011	1.60	1.50	1.80	4.90	152,064	0.60	0.60	1.20	19,800	3.00	0.70	1.20	10,800	0.70	0.80	1.50	45,000
6/30/2011	1.70	1.60	2.00	5.30	164,478	0.60	0.70	1.30	21,450	4.00	0.70	1.37	12,300	0.70	0.80	1.50	45,000
7/1/2011	1.60	1.80	1.80	5.20	161,208	0.70	0.70	1.40	23,100	4.00	0.70	1.37	12,300	0.70	0.70	1.40	42,000
7/2/2011	1.78	1.78	1.90	5.45	169,067	0.78	1.08	1.85	30,525	3.75	0.70	1.33	11,925	0.73	0.73	1.45	43,500
7/3/2011	1.78	1.78	1.90	5.45	169,067	0.78	1.08	1.85	30,525	3.75	0.70	1.33	11,925	0.73	0.73	1.45	43,500
7/4/2011	1.78	1.78	1.90	5.45	169,067	0.78	1.08	1.85	30,525	3.75	0.70	1.33	11,925	0.73	0.73	1.45	43,500
7/5/2011	1.78	1.78	1.90	5.45	169,067	0.78	1.08	1.85	30,525	3.75	0.70	1.33	11,925	0.73	0.73	1.45	43,500
7/6/2011	1.60	1.70	1.90	5.20	161,268	0.70	0.70	1.40	23,100	4.00	0.80	1.47	13,200	0.70	0.70	1.40	42,000
7/7/2011	2.00	0.70	2.30	5.00	155,820	0.60	0.70	1.30	21,450	3.00	0.60	1.10	9,900	0.80	1.50	2.30	69,000
7/8/2011	1.80	1.30	1.60	4.70	146,052	0.70	0.60	1.30	21,450	4.00	0.70	1.37	12,300	0.90	0.90	1.80	54,000
7/9/2011	1.63	1.80	1.77	5.20	161,222	0.57	0.67	1.23	20,350	3.67	0.73	1.34	12,100	0.83	0.83	1.67	50,000
7/10/2011	1.63	1.80	1.77	5.20	161,222	0.57	0.67	1.23	20,350	3.67	0.73	1.34	12,100	0.83	0.83	1.67	50,000
7/11/2011	1.63	1.80	1.77	5.20	161,222	0.57	0.67	1.23	20,350	3.67	0.73	1.34	12,100	0.83	0.83	1.67	50,000
7/12/2011	2.30	2.20	2.20	6.70	207,882	0.70	2.70	3.40	56,100	6.00	1.00	2.00	18,000	1.20	1.20	2.40	72,000
7/13/2011	1.50	1.30	1.50	4.30	133,494	0.50	0.70	1.20	19,800	2.00	0.60	0.93	8,400	0.60	0.70	1.30	39,000
7/14/2011	1.50	1.40	1.50	4.40	136,542	0.60	0.60	1.20	19,800	4.00	0.80	1.47	13,200	0.90	0.80	1.70	51,000
7/15/2011	1.70	1.50	1.70	4.90	152,106	0.70	0.80	1.50	24,750	4.00	0.70	1.37	12,300	0.90	0.90	1.80	54,000
7/16/2011	1.90	1.80	1.90	5.60	173,766	0.77	0.97	1.73	28,600	3.67	0.70	1.31	11,800	0.93	0.97	1.90	57,000
7/17/2011	1.90	1.80	1.90	5.60	173,766	0.77	0.97	1.73	28,600	3.67	0.70	1.31	11,800	0.93	0.97	1.90	57,000
7/18/2011	1.90	1.80	1.90	5.60	173,766	0.77	0.97	1.73	28,600	3.67	0.70	1.31	11,800	0.93	0.97	1.90	57,000
7/19/2011	2.10	1.60	1.70	5.40	167,754	1.00	0.80	1.80	29,700	4.00	0.80	1.47	13,200	0.90	0.90	1.80	54,000
7/20/2011	1.50	1.70	1.60	4.80	148,794	0.60	0.60	1.20	19,800	4.00	0.70	1.37	12,300	0.80	0.90	1.70	51,000
7/21/2011	1.80	2.10	2.10	6.00	185,976	0.80	0.80	1.60	26,400	4.00	0.90	1.57	14,100	0.90	0.90	1.80	54,000
7/22/2011	1.50	1.50	1.50	4.50	139,590	0.60	0.60	1.20	19,800	3.00	0.50	1.00	9,000	0.70	0.70	1.40	42,000
7/23/2011	1.83	1.70	1.93	5.47	169,654	0.70	0.73	1.43	23,650	4.00	0.73	1.40	12,600	0.93	0.93	1.87	56,000
7/24/2011	1.83	1.70	1.93	5.47	169,654	0.70	0.73	1.43	23,650	4.00	0.73	1.40	12,600	0.93	0.93	1.87	56,000
7/25/2011	1.83	1.70	1.93	5.47	169,654	0.70	0.73	1.43	23,650	4.00	0.73	1.40	12,600	0.93	0.93	1.87	56,000

TABLE G-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PUMP RUN TIMES AND PUMP STATION FLOW ESTIMATES

Date	Total Pump Run Times (hours)																
	Greenhorn Creek #1					Greenhorn Creek #2				Angel Oaks				Altaville			
	Pump #1	Pump #2	Pump #3	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)	Pump #1[a]	Pump #2	Total Time	Daily Flow (gpm)	Pump #1	Pump #2	Total Time	Daily Flow (gpm)
Design Flow (gpm)	525	508	518	-	-	275	275	-	-	150	150	-	-	500	500	-	-
7/26/2011	1.70	1.80	1.60	5.10	158,142	0.70	0.80	1.50	24,750	4.00	0.90	1.57	14,100	0.90	0.90	1.80	54,000
7/27/2011	1.70	1.80	1.60	5.10	158,142	0.70	0.60	1.30	21,450	4.00	0.70	1.37	12,300	0.90	0.70	1.60	48,000
7/28/2011	1.70	1.70	1.80	5.20	161,310	0.50	0.60	1.10	18,150	5.00	0.80	1.63	14,700	0.70	0.70	1.40	42,000
7/29/2011	1.80	1.60	1.90	5.30	164,520	0.50	0.60	1.10	18,150	4.00	0.80	1.47	13,200	0.50	0.70	1.20	36,000
7/30/2011	1.90	1.73	1.83	5.47	169,662	0.70	0.67	1.37	22,550	3.33	0.70	1.26	11,300	0.63	0.60	1.23	37,000
7/31/2011	1.90	1.73	1.83	5.47	169,662	0.70	0.67	1.37	22,550	3.33	0.70	1.26	11,300	0.63	0.60	1.23	37,000
8/1/2011	1.90	1.73	1.83	5.47	169,662	0.70	0.67	1.37	22,550	3.33	0.70	1.26	11,300	0.63	0.60	1.23	37,000
8/2/2011	1.90	1.80	1.70	5.40	167,550	0.70	0.60	1.30	21,450	4.00	0.70	1.37	12,300	0.80	0.80	1.60	48,000
8/3/2011	1.70	1.60	1.90	5.20	161,370	0.60	0.70	1.30	21,450	4.00	0.60	1.27	11,400	0.60	0.70	1.30	39,000
8/4/2011	1.90	1.70	1.80	5.40	167,610	0.50	0.60	1.10	18,150	3.00	0.70	1.20	10,800	0.70	0.70	1.40	42,000
8/5/2011	1.80	1.70	1.60	5.10	158,244	0.50	0.70	1.20	19,800	4.00	0.70	1.37	12,300	0.70	0.60	1.30	39,000
8/6/2011	1.73	1.73	1.87	5.33	165,448	0.60	0.60	1.20	19,800	3.67	0.70	1.31	11,800	0.73	0.73	1.47	44,000
8/7/2011	1.73	1.73	1.87	5.33	165,448	0.60	0.60	1.20	19,800	3.67	0.70	1.31	11,800	0.73	0.73	1.47	44,000
8/8/2011	1.73	1.73	1.87	5.33	165,448	0.60	0.60	1.20	19,800	3.67	0.70	1.31	11,800	0.73	0.73	1.47	44,000
8/9/2011	1.80	1.80	1.80	5.40	167,508	0.60	0.60	1.20	19,800	3.00	0.60	1.10	9,900	0.60	0.60	1.20	36,000
8/10/2011	1.70	1.70	1.90	5.30	164,418	0.60	0.60	1.20	19,800	3.00	0.60	1.10	9,900	0.70	0.70	1.40	42,000
8/11/2011	1.60	1.60	1.70	4.90	152,004	0.60	0.50	1.10	18,150	4.00	0.70	1.37	12,300	0.70	0.60	1.30	39,000
8/12/2011	1.80	1.70	1.50	5.00	155,136	0.70	0.80	1.50	24,750	3.00	0.60	1.10	9,900	0.80	0.90	1.70	51,000
8/13/2011	1.90	1.80	1.90	5.60	173,766	0.60	0.60	1.20	19,800	3.67	0.70	1.31	11,800	0.77	0.73	1.50	45,000
8/14/2011	1.90	1.80	1.90	5.60	173,766	0.60	0.60	1.20	19,800	3.67	0.70	1.31	11,800	0.77	0.73	1.50	45,000
8/15/2011	1.90	1.80	1.90	5.60	173,766	0.60	0.60	1.20	19,800	3.67	0.70	1.31	11,800	0.77	0.73	1.50	45,000
8/16/2011	1.80	1.80	1.70	5.30	164,400	0.60	0.70	1.30	21,450	4.00	0.80	1.47	13,200	0.80	0.80	1.60	48,000
8/17/2011	1.80	1.60	1.70	5.10	158,304	0.50	0.60	1.10	18,150	4.00	0.90	1.57	14,100	0.70	0.60	1.30	39,000
8/18/2011	1.60	1.70	1.90	5.20	161,268	0.60	0.60	1.20	19,800	4.00	0.60	1.27	11,400	0.70	0.70	1.40	42,000
8/19/2011	2.10	1.80	1.90	5.80	180,066	0.60	0.60	1.20	19,800	3.00	0.70	1.20	10,800	0.80	0.80	1.60	48,000
8/20/2011	1.83	1.73	1.93	5.50	170,670	0.60	0.60	1.20	19,800	3.67	0.67	1.28	11,500	0.67	0.67	1.33	40,000
8/21/2011	1.83	1.73	1.93	5.50	170,670	0.60	0.60	1.20	19,800	3.67	0.67	1.28	11,500	0.67	0.67	1.33	40,000
8/22/2011	1.83	1.73	1.93	5.50	170,670	0.60	0.60	1.20	19,800	3.67	0.67	1.28	11,500	0.67	0.67	1.33	40,000
8/23/2011	1.60	1.70	1.50	4.80	148,836	0.60	0.60	1.20	19,800	3.00	0.70	1.20	10,800	0.70	0.70	1.40	42,000
8/24/2011	1.50	1.50	1.80	4.80	148,914	0.50	0.60	1.10	18,150	3.00	0.60	1.10	9,900	0.70	0.70	1.40	42,000
8/25/2011	1.80	1.70	2.00	5.50	170,676	0.70	0.60	1.30	21,450	5.00	0.80	1.63	14,700	0.70	0.70	1.40	42,000
8/26/2011	1.60	1.70	1.60	4.90	151,944	0.60	0.60	1.20	19,800	3.00	0.60	1.10	9,900	0.70	0.70	1.40	42,000
8/27/2011	1.83	1.87	1.73	5.43	168,518	0.60	0.67	1.27	20,900	3.67	0.70	1.31	11,800	0.80	0.83	1.63	49,000
8/28/2011	1.83	1.87	1.73	5.43	168,518	0.60	0.67	1.27	20,900	3.67	0.70	1.31	11,800	0.80	0.83	1.63	49,000
8/29/2011	1.83	1.87	1.73	5.43	168,518	0.60	0.67	1.27	20,900	3.67	0.70	1.31	11,800	0.80	0.83	1.63	49,000
8/30/2011	1.50	1.60	1.50	4.60	142,638	0.60	0.60	1.20	19,800	3.00	0.60	1.10	9,900	0.80	0.70	1.50	45,000
8/31/2011	1.70	1.50	1.50	4.70	145,890	0.60	0.60	1.20	19,800	4.00	0.60	1.27	11,400	0.60	0.50	1.10	33,000
Peak Flow					**318,990**				**56,100**				**24,600**				**189,000**
Average Flow (ADWF)[b]					**160,855**				**23,243**				**12,300**				**45,098**

[a] The meter readings for Pump #1 at Angel Oaks Pump Station represent 10 minute increments.
[b] June 1, 2011 - August 31, 2011 (Dry Weather).

APPENDIX H

ESTIMATED FLOWS BY BASIN FOR EXISTING AREAS

TABLE H-1
CITY OF ANGELS WASTEWATER MASTER PLAN
EXISTING FLOWS BY BASIN FOR EXISTING AREAS

Basin	Use	Current Status	Total Area (ac)	Total Parcels	ESU Conversion (ESU/ac)	Total ESU	WGF (gpd/ESU)	Estimated ADWF (gpd)	Target ADWF (gpd)	Percent Difference
Basin 1	SFR	Developed	24.04	83	4.0	96	100	9,600		
	SP	Developed	1.69	1	1.5	3	100	300		
	Basin 1 Total		**25.74**	**84**		**99**		**9,900**	**9,900**	**0%**
Basin 2	CC	Developed	3.21	2	2.0	6	100	600		
	HDR	Developed	29.03	5	5.0	145	100	14,500		
	HDR (Worldmark)	Developed	21.10	19	9.5	200	100	20,000		
	MDR	Developed	11.95	44	3.0	36	100	3,600		
	P	Developed	0.96	2	5.0	5	100	500		
	PR	Developed	9.71	4	4.0	39	100	3,900		
	PR-Golf	Developed	124.40	4	1.5	187	100	18,700		
	SFR	Developed	68.25	269	4.0	273	100	27,300		
	SP	Developed	3.29	1	1.5	5	100	500		
	Basin 2 Total		**271.91**	**350**		**896**		**89,600**	**89,600**	**0%**
Basin 3	PR	Developed	0.41	1	4.0	2	100	200		
	PR-Golf	Developed	19.48	1	1.5	29	100	2,900		
	SFR	Developed	81.87	222	4.0	327	100	32,700		
	OS	Developed	11.97	3	0.0	0	100	0		
	Basin 3 Total		**113.72**	**227**		**358**		**35,800**	**35,800**	**0%**
Basin 4	BAE	Developed	9.79	8	2.0	20	100	2,000		
	HDR	Developed	28.83	75	5.0	144	100	14,400		
	MDR	Developed	10.45	4	3.0	31	100	3,100		
	PR	Developed	0.57	1	4.0	2	100	200		
	SC	Developed	25.10	32	2.0	50	100	5,000		
	SFR	Developed	12.18	30	4.0	49	100	4,900		
	SP	Developed	0.00	0	1.5	0	100	0		
	OS	Developed	0.09	2	0.0	0	100	0		
	Basin 4 Total		**87.01**	**152**		**296**		**29,600**	**29,600**	**0%**
Basin 5	BAE	Developed	18.36	14	2.0	37	100	3,700		
	CC	Developed	61.65	98	2.0	123	100	12,300		
	HC	Developed	15.93	79	2.0	32	100	3,200		
	HDR	Developed	37.81	56	5.0	189	100	18,900		
	I	Developed	16.38	5	2.0	33	100	3,300		
	MDR	Developed	29.02	20	3.0	87	100	8,700		
	P	Developed	26.94	20	5.0	135	100	13,500		
	PR	Developed	6.85	3	4.0	27	100	2,700		
	P-SCH	Developed	49.53	8	10.0	495	100	49,500		
	RE	Developed	13.55	10	2.0	27	100	2,700		
	SC	Developed	6.43	7	2.0	13	100	1,300		
	SFR	Developed	186.37	587	4.0	745	100	74,500		
	SP	Developed	6.20	2	1.5	9	100	900		
	Basin 5 Total		**475.02**	**909**		**1,952**		**195,200**	**195,200**	**0%**
CITY TOTAL			**973.39**	**1,722**		**3,601**		**360,100**	**360,100**	**0%**

APPENDIX I

PROJECTED GROWTH AND WASTEWATER FLOWS BY BASIN

TABLE I-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PROJECTED FLOWS WITHOUT WATER CONSERVATION

Year	City Growth Rate	Capita	Basin 1[a]			Basins 2, 6			Basin 3			Basin 4			Basin 5		
			Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]
2011	**2.16%**	**3,919**	**99.0**	**9,900**	**92%**	**896**	**89,600**	**65%**	**358**	**35,800**	**54%**	**296**	**29,600**	**23%**	**1,952**	**195,200**	**42%**
2012	2.16%	4,004	101.1	10,114	94%	915	91,535	67%	366	36,573	55%	302	30,239	24%	1,994	199,416	42%
2013	2.16%	4,090	103.3	10,332	96%	935	93,513	68%	374	37,363	56%	309	30,893	24%	2,037	203,724	43%
2014	2.16%	4,178	105.6	10,555	98%	955	95,532	69%	382	38,170	57%	316	31,560	25%	2,081	208,124	44%
2015	2.16%	4,269	107.8	10,783	100%	976	97,596	71%	390	38,995	58%	322	32,242	25%	2,126	212,620	45%
2016	2.16%	4,361	108.0	10,800	100%	997	99,704	72%	398	39,837	60%	329	32,938	26%	2,172	217,212	46%
2017	2.16%	4,455	108.0	10,800	100%	1,019	101,858	74%	407	40,698	61%	336	33,649	26%	2,219	221,904	47%
2018	2.16%	4,551	108.0	10,800	100%	1,041	104,058	76%	416	41,577	62%	344	34,376	27%	2,267	226,697	48%
2019	2.16%	4,650	108.0	10,800	100%	1,063	106,305	77%	425	42,475	63%	351	35,119	27%	2,316	231,594	49%
2020	2.16%	4,750	108.0	10,800	100%	1,086	108,602	79%	434	43,392	65%	359	35,877	28%	2,366	236,596	50%
2021	**2.16%**	**4,853**	**108.0**	**10,800**	**100%**	**1,109**	**110,947**	**81%**	**443**	**44,329**	**66%**	**367**	**36,652**	**29%**	**2,417**	**241,707**	**51%**
2022	2.16%	4,957	108.0	10,800	100%	1,133	113,344	82%	453	45,287	68%	374	37,444	29%	2,469	246,928	53%
2023	2.16%	5,064	108.0	10,800	100%	1,158	115,792	84%	463	46,265	69%	383	38,253	30%	2,523	252,261	54%
2024	2.16%	5,174	108.0	10,800	100%	1,183	118,293	86%	473	47,264	71%	391	39,079	30%	2,577	257,710	55%
2025	2.16%	5,286	108.0	10,800	100%	1,208	120,848	88%	483	48,285	72%	399	39,923	31%	2,633	263,277	56%
2026	2.16%	5,400	108.0	10,800	100%	1,235	123,459	90%	493	49,328	74%	408	40,785	32%	2,690	268,963	57%
2027	2.16%	5,516	108.0	10,800	100%	1,261	126,125	92%	504	50,394	75%	417	41,666	32%	2,748	274,773	58%
2028	2.16%	5,636	108.0	10,800	100%	1,288	128,850	94%	515	51,482	77%	426	42,566	33%	2,807	280,708	60%
2029	2.16%	5,757	108.0	10,800	100%	1,316	131,633	96%	526	52,594	79%	435	43,486	34%	2,868	286,771	61%
2030	2.16%	5,882	108.0	10,800	100%	1,345	134,476	98%	537	53,730	80%	444	44,425	35%	2,930	292,966	62%
2031	**2.16%**	**6,009**	**108**	**10,800**	**100%**	**1,374**	**137,381**	**99.8%**	**549**	**54,891**	**82%**	**454**	**45,385**	**35%**	**2,993**	**299,294**	**64%**
Buildout ESU				**108**			**1,376**			**669**			**1,286**			**4,703**	
Remaining ESU to Buildout																	
Existing (2011)				**9**			**480**			**311**			**990**			**2,751**	
10-Year (2021)				**0**			**267**			**226**			**919**			**2,286**	
20-Year (2031)				**0**			**2**			**120**			**832**			**1,710**	

[a] Basin 1 expected to reach buildout capacity at or before 2016 at projected City Growth Rate

[b] Percent Capacity equals Total ESU (by year) divided by Buildout ESU

TABLE I-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PROJECTED FLOWS WITH WATER CONSERVATION

Year	City Growth Rate	Capita	Basin 1[a]			Basins 2, 6			Basin 3			Basin 4			Basin 5		
			Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]	Total ESU	ADWF (gpd)	Percent Capacity[b]
2011	**2.16%**	**3,919**	**99.0**	**9,900**	**92%**	**896**	**89,600**	**65%**	**358**	**35,800**	**54%**	**296**	**29,600**	**23%**	**1,952**	**195,200**	**42%**
2012	2.16%	4,004	101.1	10,092	94%	915	91,342	67%	366	36,496	55%	302	30,175	24%	1,994	198,995	42%
2013	2.16%	4,090	103.3	10,289	96%	935	93,121	68%	374	37,207	56%	309	30,763	24%	2,037	202,871	43%
2014	2.16%	4,178	105.6	10,490	98%	955	94,939	69%	382	37,933	57%	316	31,364	25%	2,081	206,832	44%
2015	2.16%	4,269	107.8	10,695	100%	976	96,796	71%	390	38,675	58%	322	31,977	25%	2,126	210,878	45%
2016	2.16%	4,361	108.0	10,710	100%	997	98,694	72%	398	39,433	60%	329	32,604	26%	2,172	215,011	46%
2017	2.16%	4,455	108.0	10,710	100%	1,019	100,632	74%	407	40,208	61%	336	33,244	26%	2,219	219,234	47%
2018	2.16%	4,551	108.0	10,710	100%	1,041	102,612	76%	416	40,999	62%	344	33,899	27%	2,267	223,547	48%
2019	2.16%	4,650	108.0	10,710	100%	1,063	104,635	77%	425	41,807	63%	351	34,567	27%	2,316	227,954	49%
2020	2.16%	4,750	108.0	10,710	100%	1,086	106,701	79%	434	42,633	65%	359	35,250	28%	2,366	232,457	50%
2021	**2.16%**	**4,853**	**108.0**	**10,710**	**100%**	**1,109**	**108,813**	**81%**	**443**	**43,476**	**66%**	**367**	**35,947**	**29%**	**2,417**	**237,056**	**51%**
2022	2.16%	4,957	108.0	10,710	100%	1,133	110,969	82%	453	44,338	68%	374	36,660	29%	2,469	241,755	53%
2023	2.16%	5,064	108.0	10,710	100%	1,158	113,173	84%	463	45,219	69%	383	37,387	30%	2,523	246,555	54%
2024	2.16%	5,174	108.0	10,710	100%	1,183	115,424	86%	473	46,118	71%	391	38,131	30%	2,577	251,459	55%
2025	2.16%	5,286	108.0	10,710	100%	1,208	117,723	88%	483	47,037	72%	399	38,891	31%	2,633	256,469	56%
2026	2.16%	5,400	108.0	10,710	100%	1,235	120,073	90%	493	47,975	74%	408	39,667	32%	2,690	261,587	57%
2027	2.16%	5,516	108.0	10,710	100%	1,261	122,473	92%	504	48,934	75%	417	40,460	32%	2,748	266,816	58%
2028	2.16%	5,636	108.0	10,710	100%	1,288	124,925	94%	515	49,914	77%	426	41,270	33%	2,807	272,157	60%
2029	2.16%	5,757	108.0	10,710	100%	1,316	127,429	96%	526	50,915	79%	435	42,097	34%	2,868	277,614	61%
2030	2.16%	5,882	108.0	10,710	100%	1,345	129,988	98%	537	51,937	80%	444	42,943	35%	2,930	283,189	62%
2031	**2.16%**	**6,009**	**108.0**	**10,710**	**100%**	**1,374**	**132,603**	**100%**	**549**	**52,982**	**82%**	**454**	**43,806**	**35%**	**2,993**	**288,884**	**64%**
Buildout ESU			**108**			**1,376**			**669**			**1,286**			**4,703**		
Remaining ESU to Buildout																	
Existing (2011)			**9**			**480**			**311**			**990**			**2,751**		
10-Year (2021)			**0**			**267**			**226**			**919**			**2,286**		
20-Year (2031)			**0**			**2**			**120**			**832**			**1,710**		
Percent Reduction in Flow																	
10-Year (2021)			**0.8%**			**1.9%**			**1.9%**			**1.9%**			**1.9%**		
20-Year (2031)			**0.8%**			**2.1%**			**2.1%**			**2.1%**			**2.1%**		

[a] Basin 1 expected to reach buildout capacity at or before 2016 at projected City Growth Rate

[b] Percent Capacity equals Total ESU (by year) divided by Buildout ESU

APPENDIX J

BUILDOUT FLOW SUMMARY BY BASIN

TABLE J-1
CITY OF ANGELS WASTEWATER MASTER PLAN
BUILDOUT FLOW SUMMARY BY BASIN

Basin	Use	Current Status	Total Area (ac)	Total Parcels	ESU Conversion (ESU/ac)	Total ESU	Without Conservation		With Conservation		
							WGF (gpd/ESU)	Estimated ADWF (gpd)	WGF (gpd/ESU)	Estimated ADWF (gpd)	Percent Reduction
Basin 1	SFR	Developed	24.04	83	4.0	96	100	9,600	100	9,600	
	SFR	Vacant	0.87	3	6.0	5	100	500	90	450	
	SP	Developed	1.69	1	1.5	3	100	300	100	300	
	SP	Vacant	2.49	4	1.5	4	100	400	90	360	
	Basin 1 Total		**29.09**	**91**		**108**		**10,800**		**10,710**	**1%**
Basin 2	CC	Developed	2.87	1	2.0	6	100	600	100	600	
	HDR (Worldmark)	Developed	21.10	19	9.5	200	100	20,000	100	20,000	
	SFR	Developed	26.99	125	4.0	108	100	10,800	100	10,800	
	SFR	Vacant	5.42	22	6.0	33	100	3,300	100	3,300	
	SP	Developed	3.29	1	1.5	5	100	500	100	500	
	SP	Vacant	18.31	3	1.5	27	100	2,700	100	2,700	
	PR	Developed	1.77	1	4.0	7	100	700	90	630	
	PR-Golf	Developed	124.40	4	1.5	187	100	18,700	100	18,700	
	Basin 2 Total		**204.15**	**176**		**573**		**57,300**		**57,230**	**0%**
Basin 3	SFR	Developed	81.87	222	4.0	327	100	32,700	100	32,700	
	SFR	Vacant	51.79	142	6.0	311	100	31,100	100	31,100	
	PR-Golf	Developed	19.48	1	1.5	29	100	2,900	100	2,900	
	PR	Developed	0.41	1	4.0	2	100	200	100	200	
	OS	Developed	11.97	3	0.0	0	100	0	100	0	
	Basin 3 Total		**165.51**	**369**		**669**		**66,900**		**66,900**	**0%**
Basin 4	BAE	Developed	9.79	8	2.0	20	100	2,000	100	2,000	
	BAE	Vacant	10.41	2	1.0	10	100	1,000	90	900	
	HDR	Developed	27.85	74	5.0	139	100	13,900	100	13,900	
	HDR	Vacant	21.84	3	15.0	328	100	32,800	90	29,520	
	MDR	Developed	10.45	4	3.0	31	100	3,100	100	3,100	
	MDR	Vacant	0.27	1	10.0	3	100	300	90	270	
	SC	Developed	22.88	31	2.0	46	100	4,600	100	4,600	
	SC	Vacant	30.47	9	15.0	457	100	45,700	100	45,700	
	SFR	Developed	12.18	30	4.0	49	100	4,900	100	4,900	
	SP	Vacant	93.82	4	1.5	141	100	14,100	90	12,690	
	SC	Partial	22.16	1	2.0	44	100	4,400	100	4,400	
	HDR	Partial	3.28	1	5.0	16	100	1,600	90	1,440	
	OS	Developed	0.09	2	0.0	0	100	0	100	0	
	PR	Developed	0.57	1	4.0	2	100	200	90	180	
	Basin 4 Total		**266.05**	**171**		**1,286**		**128,600**		**123,600**	**4%**

TABLE J-1
CITY OF ANGELS WASTEWATER MASTER PLAN
BUILDOUT FLOW SUMMARY BY BASIN
(continued)

Basin	Use	Current Status	Total Area (ac)	Total Parcels	ESU Conversion (ESU/ac)	Total ESU	Without Conservation		With Conservation		
							WGF (gpd/ESU)	Estimated ADWF (gpd)	WGF (gpd/ESU)	Estimated ADWF (gpd)	Percent Reduction
Basin 5	BAE	Developed	18.36	14	2.0	37	100	3,700	100	3,700	
	BAE	Vacant	20.73	7	1.0	21	100	2,100	90	1,890	
	CC	Developed	61.65	98	2.0	123	100	12,300	100	12,300	
	CC	Vacant	36.74	32	15.0	551	100	55,100	90	49,590	
	HC	Developed	15.93	79	2.0	32	100	3,200	100	3,200	
	HC	Vacant	4.67	6	15.0	70	100	7,000	100	7,000	
	HDR	Developed	37.20	55	5.0	186	100	18,600	90	16,740	
	HDR	Vacant	72.08	22	15.0	1,081	100	108,100	100	108,100	
	HDR	Partial	6.06	1	5.0	30	100	3,000	100	3,000	
	I	Developed	16.38	5	2.0	33	100	3,300	100	3,300	
	I	Vacant	15.23	6	2.0	30	100	3,000	90	2,700	
	MDR	Developed	29.02	20	3.0	87	100	8,700	100	8,700	
	MDR	Vacant	1.36	4	10.0	14	100	1,400	90	1,260	
	P	Developed	26.94	20	5.0	135	100	13,500	100	13,500	
	PR	Developed	6.85	3	4.0	27	100	2,700	90	2,430	
	PR	Vacant	4.25	1	4.0	17	100	1,700	100	1,700	
	P-SCH	Developed	49.53	8	10.0	495	100	49,500	100	49,500	
	P	Vacant	1.82	4	5.0	9	100	900	100	900	
	RE	Developed	13.55	10	2.0	27	100	2,700	90	2,430	
	RE	Vacant	112.29	16	0.5	56	100	5,600	100	5,600	
	SC	Developed	6.43	7	2.0	13	100	1,300	100	1,300	
	SC	Vacant	14.61	2	15.0	219	100	21,900	90	19,710	
	SFR	Developed	186.20	586	4.0	745	100	74,500	100	74,500	
	SFR	Vacant	71.24	103	6.0	427	100	42,700	100	42,700	
	SFR	Partial	1.69	1	4.0	7	100	700	90	630	
	SP	Developed	6.20	2	1.5	9	100	900	90	810	
	SP	Vacant	148.00	16	1.5	222	100	22,200	100	22,200	
	Basin 5 Total		**985.02**	**1,128**		**4,703**		**470,300**		**459,390**	**2%**
Basin 6	CC	Developed	0.34	1	2.0	1	100	100	100	100	
	HDR	Developed	27.51	3	5.0	138	100	13,800	100	13,800	
	HDR	Vacant	22.32	2	15.0	335	100	33,500	90	30,150	
	HDR	Partial	5.06	2	5.0	25	100	2,500	90	2,250	
	MDR	Developed	11.95	44	3.0	36	100	3,600	100	3,600	
	MDR	Vacant	0.59	2	10.0	6	100	600	90	540	
	P	Developed	0.96	2	5.0	5	100	500	100	500	
	P	Vacant	0.98	2	5.0	5	100	500	100	500	
	SFR	Developed	41.26	144	4.0	165	100	16,500	100	16,500	
	SFR	Vacant	3.27	12	6.0	20	100	2,000	100	2,000	
	SP	Vacant	23.38	5	1.5	35	100	3,500	90	3,150	
	PR	Developed	7.94	3	4.0	32	100	3,200	100	3,200	
	Basin 6 Total		**145.57**	**222**		**803**		**80,300**		**76,290**	**5%**
CITY TOTAL			**1,795.38**	**2,157**		**8,142**		**814,200**		**794,120**	

[a] Worldmark Club assigned unique WGF

APPENDIX K

PHASED IMPROVEMENT PLAN FOR SPRAYFIELD DISPOSAL SYSTEM

TABLE K-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PROPOSED SPRAYFIELD IMPROVEMENT PROJECTS

Phase	Project Description
I	Lower Pump House Rebuild: 1. Install meter for flow to re-regulate pond 2. Install meter for flow to and from Holman Reservoir 3. Install tee and valve for the emergency release for water from Holman Reservoir 4. Replace outdated split-case pump 5. Replace existing piping, valves, swing-check valves, and surge valve 6. Incorporate SCADA into electrical for flows, operations, and alarm settings a. Meter flows for Holman meter and flow alarms b. Meter flows for meter to re-regulating reservoir and flow alarms c. Holman level sensor and alarm d. Communications alarm between upper and lower pump houses e. Programmed shut-downs for alarms Upper Pump House Rebuild: 1. Install meter for flow to fields 2. Install VFD for upper pump to allow for soft starts and stops 3. Replace existing piping, valves, and swing-check valves 4. Incorporate sprayfield timers and sequences into SCADA to monitor operations better and allow for flow alarm shutdowns a. Install monitor at upper pump house to run fields from remote location 5. Establish radio signal communication between sprayfields and WWTP 6. Adapt sprayfield SCADA system and related pages into existing WWTP SCADA 7. Incorporate SCADA into electrical for flows, operations, and alarm settings a. Meter flows for re-regulating meter and flow alarms b. Re-regulating level sensor alarm c. Programmed shut-downs for alarms
II	Distribution System Upgrades: 1. Replace existing Schedule 40 piping with Class C900 PVC piping for force mains from lower pump house to upper pump house 2. Replace existing Schedule 40 piping with Class C900 PVC piping for force mains from upper pump house to each of the eight fields 3. Replace solenoid valves for all eight fields 4. Replace wooden boxes with reinforced concrete boxes 5. Install isolation valves
III	Re-grade all existing roads and install culverts where needed Re-grade drainage ditch and slide gate system around Holman Reservoir perimeter

APPENDIX L

2009-2011 INFLUENT WATER QUALITY FOR WWTP

TABLE L-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 INFLUENT CONSTITUENTS AT WWTP

Date	BOD_5 (mg/L)	Settleable Solids (mL/L)	Ammonia as N (mg/L)	Alkalinity (mg/L as $CaCO_3$)	Nitrate as N (mg/L)	TKN Ammonia (mg/L)	TSS (mg/L)	TDS (mg/L)	Electrical Conductivity (µmhos/cm)
1/6/2009	154	18	16		2.30		198		
1/12/2009		13							
1/13/2009	262				0.05		276	274	620
1/19/2009		16							
1/20/2009	252						239		
1/26/2009		5							
1/27/2009	162						149		
2/2/2009		6							
2/3/2009	120		20		2.40		127		
2/10/2009	201	15	36				163		
2/16/2009		9							
2/17/2009	114						176		
2/23/2009		5							
2/24/2009	97						114		
3/2/2009		15							
3/3/2009	111		12		1.40		126		
3/10/2009	254	15					276		
3/15/2009		15							
3/17/2009	221						224		
3/23/2009		20							
3/24/2009	346						277		
3/30/2009		20							
3/31/2009	302						340		
4/7/2009	945	19	71		<.05		811	485	961
4/14/2009	256	15					210		
4/21/2009	191	16					215		
4/27/2009		14							
4/28/2009	297						318		
5/4/2009		14							
5/5/2009	209		20		0.81	33	241		
5/11/2009		10							
5/12/2009	207						200		
5/18/2009		21							
5/19/2009	324						386		
5/25/2009		15							
5/27/2009	366						341		
6/1/2009		19							
6/2/2009	544		28		0.52	60	860		
6/8/2009		16							
6/9/2009	138						165		
6/15/2009		19							
6/16/2009	401						495		
6/22/2009		24							
6/23/2009	215						218		
6/29/2009		14							
6/30/2009	448						740		
7/6/2009		11							
7/7/2009	160		15		0.60		385		
7/13/2009		9							
7/14/2009	311						656		
7/20/2009		11							
7/21/2009	203						227		
7/27/2009		23							
7/28/2009	148						209		
8/3/2009		15							
8/4/2009	180		18		0.05		232	255	500
8/10/2009		13							
8/11/2009	192						270		
8/17/2009		18							
8/18/2009	201						222		
8/24/2009		11							
8/25/2009	204						185		
8/31/2009		14							
9/1/2009	235		22		0.05		275		
9/7/2009		10							
9/8/2009	237						256		

TABLE L-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 INFLUENT CONSTITUENTS AT WWTP

Date	BOD_5 (mg/L)	Settleable Solids (mL/L)	Ammonia as N (mg/L)	Alkalinity (mg/L as $CaCO_3$)	Nitrate as N (mg/L)	TKN Ammonia (mg/L)	TSS (mg/L)	TDS (mg/L)	Electrical Conductivity (µmhos/cm)
9/14/2009		12							
9/15/2009	184						183		
9/21/2009		20							
9/22/2009	147						156		
9/28/2009		14							
9/29/2009	198						288		
10/5/2009		15							
10/6/2009	235		20		0.37		254		
10/12/2009		12							
10/13/2009	171						188		
10/19/2009		10							
10/20/2009	174						198		
10/26/2009		13							
10/27/2009	213						267		
11/2/2009		19							
11/3/2009	216		20		0.36		361	272	558
11/9/2009		10							
11/10/2009	335						322		
11/17/2009	317						240		
11/20/2009		30							
11/23/2009		16							
11/24/2009	245						242		
11/30/2009		14							
12/1/2009	261	15	20	138	<.05		227		
12/7/2009		17							
12/8/2009	226						194		
12/14/2009		15							
12/15/2009	192		6	188			200		
12/21/2009		13							
12/28/2009		9							
12/29/2009	226		23				197		
1/4/2010		9							
1/5/2010	215		21	236	0.61		258		
1/11/2010		11							
1/12/2010	240		42	216			194	271	647
1/18/2010		8							
1/19/2010	69		16	158			128		448
1/25/2010		7							
1/26/2010	38		13	150			133		
2/1/2010		25							
2/2/2010	366		22	228	1.40		620	351	639
2/7/2010		18							
2/9/2010	237		22	176			286		501
2/14/2010		14							
2/16/2010	171		29	206			175		573
2/23/2010	105	8	34	279			412		730
3/1/2010		8							
3/2/2010	132		24	194	2.90		147	262	
3/8/2010		4							
3/9/2010	178		26	192			251		546
3/14/2010		40							
3/16/2010	129		27	217			310		617
3/22/2010		9							
3/23/2010	209		36	308			289		718
3/29/2010		8							
3/30/2010	324		44	250			452		
4/5/2010		20							
4/6/2010	165		34	232			196	304	634
4/11/2010		25							
4/13/2010	90		14	160			94		428
4/18/2010		20							
4/20/2010	249		21	184			361		538
4/26/2010		30							
4/27/2010	192		33	208			217		620
5/4/2010	362		28	184	5.10		610	227	
5/5/2010		15							

TABLE L-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 INFLUENT CONSTITUENTS AT WWTP

Date	BOD_5 (mg/L)	Settleable Solids (mL/L)	Ammonia as N (mg/L)	Alkalinity (mg/L as $CaCO_3$)	Nitrate as N (mg/L)	TKN Ammonia (mg/L)	TSS (mg/L)	TDS (mg/L)	Electrical Conductivity (µmhos/cm)
5/10/2010		13							
5/11/2010	292		15	150			416		459
5/18/2010	286	23	33	152			370		497
5/25/2010	333	9	<.5	158			393		504
5/31/2010		11						351	
6/1/2010	316		43	226	0.05		284	286	628
6/7/2010		30							
6/8/2010	382		46	236	1.10		537		
6/14/2010		27							
6/15/2010	324		54	268			26		710
6/20/2010		18							
6/22/2010	227		44	232			300		695
6/28/2010		18							
6/29/2010	215		51	248			287		
7/5/2010		10							
7/6/2010	306		35	138	1.00		472	310	525
7/12/2010		9							
7/13/2010	189		45	216			433		
7/19/2010		7							
7/20/2010	195		48	240			391		
7/26/2010		8							
7/27/2010	215						281		
8/2/2010		6							
8/3/2010	210		41	220	0.05		246		
8/10/2010	215		30	184					
8/11/2010		8					235		
8/16/2010		9							
8/17/2010	222		40	210			247		
8/24/2010	171			2					
8/26/2010			30				197		
8/30/2010		6							
8/31/2010	154		27	180			189		
9/7/2010	229		30	168	0.05		216		
9/13/2010		8							
9/14/2010	210		38	200			242		
9/20/2010		6							
9/21/2010	190		50	236			226		
9/27/2010		7							
9/28/2010	156		24	156			228		537
10/4/2010		24							
10/5/2010	164		29	138	1.30		223	185	459
10/12/2010	215		39	206			353		
10/18/2010		16							
10/19/2010	190		46	202			310		596
10/25/2010		10							
10/26/2010	153		40	220			174		667
11/1/2010		15							
11/2/2010	230		39	202	<.050		396		
11/8/2010		13							
11/9/2010	183		40	140			250		
11/15/2010		9							
11/16/2010	123		30	194			153		
11/22/2010		7							
11/23/2010	135		10	96			178		
11/30/2010	117		16	140			118		
12/6/2010		14							
12/7/2010	168		21	206	<.50		202	334	563
12/13/2010		11							
12/14/2010	189		18	200			272		
12/20/2010		4							
12/21/2010	63		13	160			74		470
12/27/2010		13							
12/28/2010	120		16	184			127		551
1/3/2011		5							
1/4/2011	52						62		
1/10/2011		12							

TABLE L-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 INFLUENT CONSTITUENTS AT WWTP

Date	BOD_5 (mg/L)	Settleable Solids (mL/L)	Ammonia as N (mg/L)	Alkalinity (mg/L as $CaCO_3$)	Nitrate as N (mg/L)	TKN Ammonia (mg/L)	TSS (mg/L)	TDS (mg/L)	Electrical Conductivity (µmhos/cm)
1/11/2011	213		30	202			248		
1/18/2011	72		24	208			76		
1/24/2011		15							
1/25/2011	196						209		
1/31/2011		12							
2/1/2011	350		28	190	<.05		628	322	582
2/7/2011		11							
2/8/2011	250		34	200			440		
2/14/2011		17							
2/15/2011	210		36	224			239		
2/22/2011	186	7	18	192			108		
2/28/2011		7							
3/1/2011	270		27	208	<.05		407		
3/7/2011		9							460
3/8/2011	96						80		
3/14/2011		5							
3/15/2011	160		28	200			169		
3/22/2011	69						72		
3/29/2011	68		12	128			62		
4/5/2011	210	14	37	220			227		637
4/12/2011	177	11	35	232			147		
4/19/2011	260	2	33	218			129		680
4/26/2011	213	5	39	212			312		611
5/3/2011	189	8	19	236			179	392	700
5/9/2011		6							640
5/10/2011	189		38	224			176		
5/15/2011		12							
5/17/2011	190		41	212			276		
5/23/2011		11							
5/24/2011	183		41	198			142		
5/29/2011		23							
5/31/2011	194		16	220			300		
6/6/2011		16							
6/7/2011	176		43	232			256		
6/13/2011		17							
6/14/2011	220		61	236			289		
6/19/2011		18							
6/21/2011	155		46	218			238		
6/26/2011		17							
6/28/2011	105		26	864			172		
7/5/2011	195	15	40	196			304		
7/11/2011		9							
7/12/2011	129		41	264			261		741
7/20/2011	215	5	21	180			241		
7/25/2011		15							
7/26/2011	210		39	192			325		
8/1/2011		15							
8/2/2011	170		22	176			62		
8/8/2011		18							
8/9/2011	214		25	180			216		
8/15/2011		4							
8/16/2011	215		43	252			457		
8/22/2011		22							
8/23/2011	179		27	180			233		
8/29/2011		22							
8/30/2011	185		38	192			256		

APPENDIX M

2009-2011 EFFLUENT WATER QUALITY FOR WWTP

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
1/1/2009	0.4			584.0	0.8	7.1	280.0	2.0													
1/2/2009	0.3			599.0	1.1	7.4	286.0	2.0													
1/3/2009	0.2			579.0	1.2	7.2	277.0	2.0													
1/4/2009	0.5			576.0	1.2	7.3	275.0	2.0													
1/5/2009	0.3			672.0	1.4	7.1	323.0	2.0													
1/6/2009	0.3	5.3	0.1	561.0	1.5	7.4	291.0	2.0		9.0	0.5	6.7	82.0	80.0							
1/7/2009	0.3			559.0	1.2	7.4	267.0	2.0													
1/8/2009	0.4			551.0	1.6	7.1	264.0	2.0													
1/9/2009	0.4			541.0	1.8	7.2	258.0	2.0													
1/10/2009	0.4			540.0	1.8	7.1	257.0	2.0													
1/11/2009	0.4			587.0	1.9	7.3	281.0	2.0													
1/12/2009	0.3		0.1	565.0	1.9	7.2	271.0	2.0													
1/13/2009	0.3	2.6		558.0	1.9	7.0	355.0	2.0			0.4		70.0	76.0							
1/14/2009	0.3			550.0	1.9	7.3	263.0	2.0													
1/15/2009	0.3			531.0	1.9	7.3	254.0	2.0													
1/16/2009	0.3			531.0	1.8	7.2	253.0	2.0													
1/17/2009	0.3			561.0	1.6	7.2	268.0	2.0													
1/18/2009	0.3			586.0	1.5	7.2	280.0	2.0													
1/19/2009	0.4		0.1	600.0	1.4	7.3	287.0	2.0													
1/20/2009	0.3	3.1		587.0	1.5	7.3	280.0	2.0													
1/21/2009	0.3			580.0	2.0	7.5	278.0	2.0													
1/22/2009	0.3			592.0	1.7	7.3	284.0	2.0													
1/23/2009	0.5			542.0	1.5	7.4	259.0	2.0													
1/24/2009	0.2			461.0	1.9	7.4	220.0	2.0													
1/25/2009	0.8			440.0	2.1	7.5	210.0	2.0													
1/26/2009	0.9		0.1	465.0	2.4	7.4	222.0	2.0													
1/27/2009	0.3	2.6		557.0	1.8	7.4	266.0	2.0													
1/28/2009	0.4			549.0	1.1	7.6	262.0	2.0													
1/29/2009	0.6			539.0	2.0	7.8	257.0	2.0													
1/30/2009	0.5			558.0	1.5	7.5	267.0	2.0													
1/31/2009	0.0			543.0	2.0	7.5	285.0	2.0													
2/1/2009	0.3			614.0	3.7	7.6	293.0	2.0													
2/2/2009	0.6		0.1	586.0	2.1	7.4	281.0	2.0													
2/3/2009	0.6	2.4		598.0	2.2	7.2	286.0	2.0		17.0	0.3	14.0	63.0	60.0							
2/4/2009	0.2			621.0	2.4	7.5	297.0	2.0													
2/5/2009	0.3			601.0	1.7	7.6	288.0	2.0													
2/6/2009	0.5			554.0	1.5	7.3	264.0	2.0													
2/7/2009	0.4			536.0	1.2	7.6	256.0	2.0													
2/8/2009	0.3			589.0	2.9	7.6	281.0	2.0													
2/9/2009	0.5			565.0	1.9	7.3	270.0	2.0													
2/10/2009	0.3	1.3	0.1	549.0	1.3	7.3	262.0	2.0		12.0		11.0									
2/11/2009	0.4			530.0	0.9	7.8	254.0	2.0													
2/12/2009	0.4			475.0	0.8	7.6	227.0	2.0													
2/13/2009	0.5			971.0	0.7	7.4	470.0	2.0													
2/14/2009	0.8			835.0	1.0	7.4	402.0	2.0													
2/15/2009	0.6			1033.0	1.7	7.2	498.0	2.0													
2/16/2009	0.6		0.1	588.0	1.8	7.1	281.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
2/17/2009	0.9	4.0		503.0	1.0	7.4	240.0	2.0													
2/18/2009	0.8			455.0	0.9	7.6	217.0	2.0													
2/19/2009	0.5			546.0	1.2	7.6	261.0	2.0													
2/20/2009	0.4			582.0	1.4	7.5	277.0	2.0													
2/21/2009	0.4			599.0	1.0	7.1	286.0	2.0													
2/22/2009	0.6		0.1	625.0	1.3	7.7	300.0	2.0													
2/23/2009	1.0			611.0	2.0	7.2	293.0	2.0													
2/24/2009	0.7	3.3		476.0	1.3	7.2	228.0	2.0													
2/25/2009	0.5			555.0	1.6	7.3	266.0	2.0													
2/26/2009	0.4			602.0	1.8	7.6	288.0	2.0													
2/27/2009	0.4			589.0	1.1	7.0	282.0	2.0													
2/28/2009	0.5			587.0	1.1	7.6	281.0	2.0													
3/1/2009	0.5			634.0	1.9	7.4	304.0	2.0													
3/2/2009	1.0		0.1	518.0	0.8	7.2	248.0	2.0													
3/3/2009	0.5	1.6		404.0	0.5	7.0	57.0	2.0		3.6	0.6	2.4	31.0	28.0							
3/4/2009	1.3			350.0	1.4	7.1	167.0	2.0													
3/5/2009	0.6			448.0	0.7	7.1	214.0	2.0													
3/6/2009	0.6			544.0	0.6	7.0	261.0	2.0													
3/7/2009	0.6			750.0	0.6	7.3	360.0	2.0													
3/8/2009	0.7			588.0	0.8	7.2	281.0	2.0													
3/9/2009	0.5			593.0	0.8	7.3	288.0	2.0													
3/10/2009	0.3	2.9	0.1	615.0	0.4	7.5	294.0	2.0													
3/11/2009	0.4			644.0	0.5	7.3	308.0	2.0													
3/12/2009	0.4			636.0	1.7	7.5	306.0	2.0													
3/13/2009	0.4			641.0	0.9	7.7	307.0	2.0													
3/14/2009	0.4			629.0	0.7	7.4	301.0	2.0													
3/15/2009	0.4			636.0	0.6	7.4	305.0	2.0													
3/16/2009	0.4		0.1	733.0	1.0	7.3	352.0	2.0													
3/17/2009	0.3	3.7		657.0	0.8	7.2	316.0	2.0													
3/18/2009	0.4			701.0	0.8	7.4	338.0	2.0													
3/19/2009	0.3			621.0	0.7	7.5	298.0	2.0													
3/20/2009	0.4			573.0	0.8	7.2	273.0	2.0													
3/21/2009	0.4			663.0	1.0	7.5	316.0	2.0													
3/22/2009	0.5			580.0	1.2	7.4	278.0	2.0													
3/23/2009	0.4			558.0	0.8	7.2	267.0	2.0													
3/24/2009	0.4	2.6	0.1	535.0	0.5	7.2	256.0	2.0													
3/25/2009	0.4			578.0	0.6	7.5	277.0	2.0													
3/26/2009	0.3			578.0	0.7	7.5	277.0	2.0													
3/27/2009	0.3			577.0	0.6	7.0	277.0	2.0													
3/28/2009	0.4			626.0	0.9	7.4	300.0	2.0													
3/29/2009	0.4			599.0	0.7	7.4	288.0	2.0													
3/30/2009	0.3		0.1	631.0	0.7	7.2	303.0	2.0													
3/31/2009	0.3	3.7		673.0	1.4	7.4	324.0	2.0													
4/1/2009	0.3			657.0	0.9	7.5	315.0	2.0													
4/2/2009	0.4			662.0	0.6	7.5	318.0	2.0													
4/3/2009	0.4			682.0	0.6	7.2	327.0	2.0													
4/4/2009	0.4			674.0	0.6	7.3	324.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
4/5/2009	0.4			695.0	1.7	7.5	333.0	2.0													
4/6/2009	0.3			729.0	1.5	7.4	351.0	2.0													
4/7/2009	0.3	3.9	0.1	686.0	1.4	7.5	330.0	2.0		15.0	0.7	14.0	69.0	65.0							
4/8/2009	0.4			661.0	1.1	7.5	316.0	2.0													
4/9/2009	0.4			672.0	1.4	7.4	323.0	2.0													
4/10/2009	0.4			670.0	1.5	7.5	322.0	4.0													
4/11/2009	0.4			502.0	1.4	7.2	232.0	2.0													
4/12/2009	0.3			661.0	0.8	7.5	318.0	2.0													
4/13/2009	0.4		0.1	676.0	0.8	7.4	324.0	2.0													
4/14/2009	0.4	4.6		656.0	0.7	7.5	315.0	2.0													
4/15/2009	0.4			594.0	0.8	7.5	285.0	2.0													
4/16/2009	0.4			586.0	0.9	7.5	281.0	2.0													
4/17/2009	0.3			586.0	0.8	7.4	281.0	2.0													
4/18/2009	0.4			595.0	0.9	7.4	285.0	2.0													
4/19/2009	0.3			595.0	0.9	7.4	285.0	2.0													
4/20/2009	0.3		0.1	581.0	0.8	7.4	278.0	2.0													
4/21/2009	0.3	2.9		551.0	1.1	7.3	264.0	2.0													
4/22/2009	0.3			541.0	0.8	7.4	259.0	2.0													
4/23/2009	0.4			536.0	1.1	7.0	257.0	2.0													
4/24/2009	0.4			525.0	0.9	7.5	251.0	2.0													
4/25/2009	0.3			520.0	0.8	7.3	249.0	2.0													
4/26/2009	0.3			532.0	0.9	7.1	255.0	2.0													
4/27/2009	0.4		0.1	526.0	0.8	7.0	253.0	2.0													
4/28/2009	0.4	3.5		557.0	0.8	7.2	267.0	2.0													
4/29/2009	0.3			567.0	0.9	7.3	272.0	2.0													
4/30/2009	0.2			542.0	0.9	7.3	260.0	2.0													
5/1/2009	0.4			521.0	0.7	7.3	250.0	2.0													
5/2/2009	0.7			448.0	0.8	7.2	214.0	2.0													
5/3/2009	0.3			474.0	0.6	7.5	227.0	2.0													
5/4/2009	0.4		0.1	489.0	0.5	6.9	233.0	2.0													
5/5/2009	0.3	2.0		495.0	1.3	7.0	257.0	2.0		6.4	1.3	6.0	52.0	50.0							
5/6/2009	0.4			495.0	1.0	7.2	237.0	2.0													
5/7/2009	0.4			483.0	0.6	7.3	231.0	2.0													
5/8/2009	0.4			479.0	0.6	7.2	229.0	2.0													
5/9/2009	0.4			485.0	0.6	7.0	232.0	2.0													
5/10/2009	0.3			515.0	0.6	7.2	247.0	2.0													
5/11/2009	0.4		0.1	520.0	0.7	7.0	250.0	2.0													
5/12/2009	0.5	4.5		506.0	0.7	6.9	242.0	2.0													
5/13/2009	0.5			492.0	0.7	7.0	235.0	2.0													
5/14/2009	0.4			479.0	0.8	7.4	229.0	2.0													
5/15/2009	0.4			465.0	0.8	7.1	222.0	2.0													
5/16/2009	0.4			461.0	0.7	6.9	220.0	2.0													
5/17/2009	0.4			484.0	0.7	7.1	232.0	4.0													
5/18/2009	0.4		0.1	503.0	0.8	7.0	241.0	2.0													
5/19/2009	0.4	1.7		578.0	0.9	6.8	277.0	2.0													
5/20/2009	0.4			569.0	1.1	7.3	273.0	2.0													
5/21/2009	0.4			569.0	1.2	7.1	272.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
5/22/2009	0.4			566.0	1.1	7.3	271.0	2.0													
5/23/2009	0.4			540.0	1.1	7.3	259.0	2.0													
5/24/2009	0.4			568.0	1.1	7.2	272.0	2.0													
5/25/2009	0.4		0.1	588.0	1.1	6.9	282.0	2.0													
5/26/2009	0.3			606.0	1.1	6.8	290.0	2.0													
5/27/2009	0.2	1.0		627.0	1.4	7.2	301.0	2.0													
5/28/2009	0.4			598.0	1.3	7.2	287.0	2.0													
5/29/2009	0.5			569.0	1.7	7.5	273.0	2.0													
5/30/2009	0.4			523.0	0.8	7.4	250.0	2.0													
5/31/2009	0.4			500.0	0.7	7.5	239.0	2.0													
6/1/2009	0.3		0.1		0.7	7.2		2.0													
6/2/2009	0.3	6.2		505.0	0.6	7.4	230.0	2.0		5.3	0.7	4.0	61.0	52.0							
6/3/2009	0.4				0.9	7.2		2.0													
6/4/2009	0.5				1.0	7.3		2.0													
6/5/2009	0.3				0.8	7.3		2.0													
6/6/2009	0.3				1.4	7.4		2.0													
6/7/2009	0.3				1.1	7.2		2.0													
6/8/2009	0.3		0.1		1.0	6.9		2.0													
6/9/2009	0.5	3.1		525.0	1.4	7.0		2.0													
6/10/2009	0.3				1.3	7.6		2.0													
6/11/2009	0.4				1.2	7.5		2.0													
6/12/2009	0.4				1.5	7.5		2.0													
6/13/2009	0.5				0.9	7.1		2.0													
6/14/2009	0.2				1.1	7.1		2.0													
6/15/2009	0.4		0.1		0.9	7.1		2.0													
6/16/2009	0.3	1.2		544.0	0.7	7.2		2.0													
6/17/2009	0.3				0.8	7.4		2.0													
6/18/2009	0.4				0.8	7.2		2.0													
6/19/2009	0.3				0.7	7.2		2.0													
6/20/2009	0.1				0.8	7.3		2.0													
6/21/2009	0.4				0.7	7.4		2.0													
6/22/2009	0.4		0.1		0.7	7.2		2.0													
6/23/2009	0.2	2.4		566.0	1.0	6.9		2.0													
6/24/2009	0.4				0.9	7.3		2.0													
6/25/2009	0.5				0.7	7.0		2.0													
6/26/2009	0.4				0.7	7.3		2.0													
6/27/2009	0.4				0.6	7.3		2.0													
6/28/2009	0.3				0.7	7.4		2.0													
6/29/2009	0.5		0.1		0.6	7.0		2.0													
6/30/2009	0.3	1.0		522.0	0.8	7.2		2.0													
7/1/2009	0.3			553.0	0.6	7.3	264.0	2.0													
7/2/2009	0.5			541.0	0.6	7.3	259.0	2.0													
7/3/2009	0.4			566.0	0.8	7.3	271.0	2.0													
7/4/2009	0.4			592.0	0.6	7.3	283.0	2.0													
7/5/2009	0.2			573.0	0.7	7.3	274.0	2.0													
7/6/2009	0.4		0.1	557.0	0.5	6.9	266.0	2.0													
7/7/2009	0.4	1.1		541.0	0.5	7.0	259.0	2.0		8.1	0.5	8.2	56.0	60.0							

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
7/8/2009	0.3			529.0	0.5	7.4	253.0	2.0													
7/9/2009	0.4			512.0	0.5	7.3	244.0	2.0													
7/10/2009	0.4			540.0	0.5	7.4	258.0	2.0													
7/11/2009	0.4			529.0	0.4	6.8	253.0	2.0													
7/12/2009	0.3			531.0	0.4	6.8	254.0	2.0													
7/13/2009	0.3		0.1	520.0	0.4	7.0	248.0	2.0													
7/14/2009	0.4	4.1		531.0	0.6	7.2	254.0	2.0													
7/15/2009	0.3			527.0	0.4	7.3	252.0	2.0													
7/16/2009	0.5			512.0	0.3	7.4	245.0	2.0													
7/17/2009	0.4			505.0	0.3	7.1	241.0	2.0													
7/18/2009	0.4			502.0	0.4	7.3	240.0	2.0													
7/19/2009	0.3			497.0	0.3	7.2	237.0	2.0													
7/20/2009	0.4		0.1	588.0	0.4	7.1	281.0	2.0													
7/21/2009	0.3	3.3		533.0	0.4	6.8	254.0	2.0													
7/22/2009	0.4			518.0	0.3	7.3	248.0	2.0													
7/23/2009	0.6			501.0	0.3	7.2	239.0	2.0													
7/24/2009	0.4			500.0	0.4	7.3	239.0	2.0													
7/25/2009	0.4			489.0	0.3	7.1	233.0	2.0													
7/26/2009	0.3			484.0	0.3	7.4	231.0	2.0													
7/27/2009	0.3		0.1	478.0	0.6	6.8	228.0	2.0													
7/28/2009	0.4	2.7		474.0	0.4	7.0	226.0	2.0													
7/29/2009	0.2			464.0	0.4	7.3	222.0	2.0													
7/30/2009	0.3			488.0	0.5	7.3	233.0	2.0													
7/31/2009	0.3			483.0	0.4	7.3	230.0	2.0													
8/1/2009	0.3			485.0	0.4	7.2	231.0	2.0													
8/2/2009	0.4			496.0	0.4	7.1	237.0	2.0													
8/3/2009	0.4		0.1	488.0	0.4	6.9	233.0	2.0													
8/4/2009	0.3	2.3		486.0	0.4	7.1	232.0	2.0		2.5	1.4	2.0	65.0	60.0							
8/5/2009	0.4			516.0	0.5	7.2	246.0	2.0													
8/6/2009	0.4			536.0	0.7	7.1	256.0	2.0													
8/7/2009	0.3			585.0	0.6	7.0	280.0	2.0													
8/8/2009	0.3			561.0	0.5	6.9	268.0	2.0													
8/9/2009	0.4			560.0	0.5	7.0	267.0	2.0													
8/10/2009	0.4		0.1	571.0	0.4	6.9	272.0	2.0													
8/11/2009	0.3	2.8		474.0	0.5	6.7	226.0	2.0													
8/12/2009	0.4			469.0	0.7	6.8	224.0	2.0													
8/13/2009	0.3			497.0	0.6	7.1	238.0	2.0													
8/14/2009	0.3			525.0	0.5	7.3	252.0	2.0													
8/15/2009	0.4			637.0	0.8	7.7	306.0	2.0													
8/16/2009	0.3			593.0	0.7	7.5	284.0	2.0													
8/17/2009	0.3		0.1	578.0	0.5	6.8	277.0	2.0													
8/18/2009	0.3	2.7		534.0	0.6	7.1	255.0	2.0													
8/19/2009	0.3			540.0	0.5	7.3	258.0	2.0													
8/20/2009	0.4			518.0	0.5	7.2	247.0	2.0													
8/21/2009	0.3			554.0	0.4	7.2	265.0	2.0													
8/22/2009	0.4			531.0	0.6	7.2	254.0	2.0													
8/23/2009	0.3			519.0	0.5	7.2	248.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
8/24/2009	0.4		0.1	486.0	0.4	6.8	232.0	2.0													
8/25/2009	0.3	3.3		461.0	0.3	6.8	220.0	2.0													
8/26/2009	0.3			531.0	0.5	7.5	253.0	2.0													
8/27/2009	0.3			535.0	0.6	7.3	256.0	2.0													
8/28/2009	0.3			557.0	0.5	7.4	267.0	2.0													
8/29/2009	0.3			618.0	0.5	7.6	296.0	2.0													
8/30/2009	0.3			632.0	0.6	7.3	303.0	2.0													
8/31/2009	0.4		0.1	622.0	0.9	7.2	298.0	2.0													
9/1/2009	0.3	7.9		581.0	0.5	7.0	308.0	2.0		11.0	0.7	9.4	68.0	71.0							
9/2/2009	0.3			622.0	0.5	7.4		2.0													
9/3/2009	0.3			652.0	0.5	7.1		2.0													
9/4/2009	0.3			615.0	0.4	7.5		2.0													
9/5/2009	0.3			644.0	0.4	7.4		2.0													
9/6/2009	0.3			623.0	0.3	7.3		2.0													
9/7/2009	0.3		0.1	620.0	0.4	7.2		2.0													
9/8/2009	0.3	2.2		645.0	0.5	7.5		2.0													
9/9/2009	0.3			647.0	0.5	7.6		2.0													
9/10/2009	0.5			637.0	0.4	7.4		2.0													
9/11/2009	0.3			589.0	0.5	7.3		2.0													
9/12/2009	0.3			558.0	0.3	7.3		2.0													
9/13/2009	0.3			516.0	0.3	7.6		2.0													
9/14/2009	0.3		0.1	547.0	0.3	7.2		2.0													
9/15/2009	0.2	2.4		627.0	0.4	7.4		2.0													
9/16/2009	0.3			612.0	0.6	7.3		2.0													
9/17/2009	0.4			624.0	0.6	7.4		2.0													
9/18/2009	0.3			653.0	0.7	7.5		2.0													
9/19/2009	0.3			600.0	0.9	7.5		2.0													
9/20/2009	0.3			555.0	1.0	7.3		2.0													
9/21/2009	0.2		0.1	547.0	0.6	6.9		2.0													
9/22/2009	0.4	1.9		541.0	0.6	7.3		2.0													
9/23/2009	0.2			533.0	0.7	7.4		2.0													
9/24/2009	0.3			561.0	0.7	7.4		2.0													
9/25/2009	0.3			528.0	0.6	6.8		2.0													
9/26/2009	0.3			499.0	0.7	7.6		2.0													
9/27/2009	0.3			589.0	1.3	7.5		2.0													
9/28/2009	0.3		0.1	585.0	0.4	7.2		2.0													
9/29/2009	0.3	5.2		526.0	0.3	7.0		2.0													
9/30/2009	0.1			492.0	0.4	7.1		2.0													
10/1/2009	0.2			494.0	0.5	7.0	238.0	2.0													
10/2/2009	0.3			498.0	0.5	7.1	238.0	2.0													
10/3/2009	0.4			495.0	0.7	7.2	236.0	2.0													
10/4/2009	0.3			468.0	1.2	7.3	224.0	2.0													
10/5/2009	0.3		0.1	504.0	1.0	6.9	241.0	2.0													
10/6/2009	0.4	4.2		482.0	1.0	6.9	272.0	2.0		5.5	4.3	0.7	69.3	67.0							
10/7/2009	0.4			459.0	0.9	6.9	219.0	2.0													
10/8/2009	0.3			454.0	0.8	7.3	217.0	2.0													
10/9/2009	0.3			474.0	0.8	7.1	227.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
10/10/2009	0.3			501.0	0.8	7.3	240.0	2.0													
10/11/2009	0.3			522.0	1.3	7.3	250.0	2.0													
10/12/2009	0.3		0.1	589.0	1.3	7.1	283.0	2.0													
10/13/2009	0.6	10.0		544.0	0.9	7.2	261.0	2.0													
10/14/2009	0.2			881.0	2.4	7.4	425.0	2.0													
10/15/2009	0.3			501.0	1.1	7.3	240.0	2.0													
10/16/2009	0.3			452.0	1.0	7.0	216.0	2.0													
10/17/2009	0.4			454.0	1.1	7.1	217.0	2.0													
10/18/2009	0.4			500.0	1.5	6.8	239.0	2.0													
10/19/2009	0.3		0.1	546.0	1.6	6.9	261.0	2.0													
10/20/2009	0.4	6.0		543.0	0.8	7.0	259.0	2.0													
10/21/2009	0.3			529.0	0.8	7.1	253.0	2.0													
10/22/2009	0.3			513.0	0.4	7.1	245.0	2.0													
10/23/2009	0.3			519.0	0.6	7.2	249.0	2.0													
10/24/2009	0.3			602.0	1.0	7.5	289.0	2.0													
10/25/2009	0.3			671.0	0.5	7.4	323.0	2.0													
10/26/2009	0.3		0.1	723.0	0.8	7.5	347.0	2.0													
10/27/2009	0.3	5.5		665.0	0.5	7.1	319.0	2.0													
10/28/2009	0.3			571.0	0.3	7.3	275.0	2.0													
10/29/2009	0.3			542.0	0.5	7.2	260.0	2.0													
10/30/2009	0.3			702.0	0.7	7.5	338.0	2.0													
10/31/2009	0.3			794.0	0.7	7.4	383.0	2.0													
11/1/2009	0.3			761.0	0.4	7.5	366.0	2.0													
11/2/2009	0.3		0.1	642.0	0.4	6.9	308.0	2.0													
11/3/2009	0.3	8.0		617.0	0.4	7.4	296.0	2.0		13.0	12.0	0.2	67.8	66.0							
11/4/2009	0.3			588.0	0.5	7.3	282.0	2.0													
11/5/2009	0.2			589.0	0.5	7.3	283.0	2.0													
11/6/2009	0.3			575.0	0.4	7.4	275.0	2.0													
11/7/2009	0.2			543.0	0.4	7.4	260.0	2.0													
11/8/2009	0.3			507.0	0.4	7.4	242.0	2.0													
11/9/2009	0.3		0.1	514.0	0.3	7.0	246.0	2.0													
11/10/2009	0.2	2.7		479.0	0.8	7.1	229.0	2.0													
11/11/2009	0.3			465.0	0.6	7.1	223.0	2.0													
11/12/2009	0.3			458.0	0.4	7.1	218.0	2.0													
11/13/2009	0.2			461.0	0.5	6.9	220.0	2.0													
11/14/2009	0.3			463.0	0.5	7.3	221.0	2.0													
11/15/2009	0.3			451.0	0.4	7.0	215.0	2.0													
11/16/2009	0.4			469.0	1.7	6.6	222.0	2.0													
11/17/2009	0.3	1.7			0.5	7.4		2.0													
11/18/2009	0.2				0.5	7.0		2.0													
11/19/2009	0.3			187.0	0.7	7.7	108.0	2.0													
11/20/2009	0.3		0.1	349.0	0.7	7.0	203.0	2.0													
11/21/2009	0.4			389.0	0.6	7.3	186.0	2.0													
11/22/2009	0.3			391.0	0.7	7.1	187.0	2.0													
11/23/2009	0.3			403.0	1.0	7.4	192.0	2.0													
11/24/2009	0.4	8.0	0.1	399.0	1.1	7.3	190.0	2.0													
11/25/2009	0.3			398.0	0.8	7.0	191.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
11/26/2009	0.3			416.0	0.8	7.0	199.0	2.0													
11/27/2009	0.3			424.0	1.0	7.0	202.0	2.0													
11/28/2009	0.4			433.0	1.4	7.2	207.0	2.0													
11/29/2009	0.3			434.0	1.1	6.9	207.0	2.0													
11/30/2009	0.2		0.1	419.0	0.8	6.9	200.0	2.0													
12/1/2009	0.3	3.4	0.1		0.6	7.0	300.0	2.0		7.7	0.4	2.4	57.0	52.0							
12/2/2009	0.3				5.0	7.0		2.0													
12/3/2009	0.3				0.6	7.3		2.0													
12/4/2009	0.3				0.9	7.3		2.0													
12/5/2009	0.3				0.8	7.2		2.0													
12/6/2009	0.3				0.7	7.4															
12/7/2009	0.4		0.1		1.0	7.0		11.0													
12/8/2009	0.3	2.4		395.0	1.0	6.9		2.0													
12/9/2009	0.4				0.6	7.0		2.0													
12/10/2009	0.3				0.9	7.2		2.0													
12/11/2009	0.7				0.6	6.9		2.0													
12/12/2009	0.4				1.1	7.3		2.0													
12/13/2009	0.8				3.0	7.2		2.0													
12/14/2009	0.4		0.1		3.0	7.1		2.0													
12/15/2009	0.5	2.9		450.0	0.6	7.3		2.0			15.0	6.2									
12/16/2009	0.7				0.8	7.5		2.0													
12/17/2009	0.4				0.7	7.3		2.0													
12/18/2009	0.4				0.7	7.4		2.0													
12/19/2009	0.4				0.8	7.7		2.0													
12/20/2009	0.5				0.9	7.6		2.0													
12/21/2009	0.4		0.1		0.8	7.2		2.0													
12/22/2009	0.4				0.5	7.1		2.0													
12/23/2009	0.4				0.5	7.2		2.0													
12/24/2009	0.4				0.5	7.4		2.0													
12/25/2009	0.3				0.4	7.3		2.0													
12/26/2009	0.3				0.5	7.7		2.0													
12/27/2009	0.4				0.8	7.6		2.0													
12/28/2009	0.4		0.1		0.5	7.1		2.0													
12/29/2009	0.4	5.2		604.0	0.8	7.6		2.0				19.0									
12/30/2009	0.4				0.6	7.7		2.0													
12/31/2009	0.4				0.4	7.3		2.0													
1/1/2010	0.3				3.4	7.0		2.0													
1/2/2010	0.4				0.4	7.5		2.0													
1/3/2010	0.4				0.6	7.7		2.0													
1/4/2010	0.3		0.1		0.4	7.5		2.0													
1/5/2010	0.4	6.9		586.0	0.3	7.7	280.0	2.0	184.0	15.0	0.1	15.0	57.0	56.0							
1/6/2010	0.3				0.4	7.6		2.0													
1/7/2010	0.3				0.6	7.4		2.0													
1/8/2010	0.3				0.5	7.4		2.0													
1/9/2010	0.4				0.5	7.6		2.0													
1/10/2010	0.2				0.6	7.4		2.0													
1/11/2010	0.3		0.1		0.6	7.2		2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
1/12/2010	0.3	3.8		522.0	0.7	7.4	257.0	2.0	140.0			15.0									
1/13/2010	0.4				0.8	6.8		2.0													
1/14/2010	0.4				1.0	7.2		2.0													
1/15/2010	0.4				0.7	7.7		2.0													
1/16/2010	0.4				0.7	7.5		2.0													
1/17/2010	0.5				1.0	7.5		2.0													
1/18/2010	0.9		0.1		2.1	7.4		2.0													
1/19/2010	0.8	2.3		368.0	1.8	7.4		2.0	100.0			5.0									
1/20/2010	0.9				1.7	7.5		2.0													
1/21/2010	1.0				1.4	7.6		2.0													
1/22/2010	1.3				1.6	7.7		2.0													
1/23/2010	0.8				1.4	7.4		2.0													
1/24/2010	0.5				1.2	7.5		2.0													
1/25/2010	0.6		0.1		1.3	7.4		2.0													
1/26/2010	0.4	3.2		510.0	1.9	7.2		2.0	142.0			12.0									
1/27/2010	0.5				1.0	7.2		2.0													
1/28/2010	0.4				1.1	7.3		2.0													
1/29/2010	0.4				0.8	7.4		4.0													
1/30/2010	0.5				0.7	7.6		4.0													
1/31/2010	0.4				1.1	7.6		2.0													
2/1/2010	0.4		0.1		0.9	7.4		2.0													
2/2/2010	0.3	6.5		715.0	1.0	7.8	360.0	2.0	250.0	22.0	0.1	19.0	51.0	47.0							
2/3/2010	0.3				0.8	7.3		2.0													
2/4/2010	0.4				0.8	7.7		2.0													
2/5/2010	0.4				1.5	7.6		2.0													
2/6/2010	0.5				1.1	7.6		2.0													
2/7/2010	0.6				1.4	7.8		2.0													
2/8/2010	0.5		0.1		1.4	7.7		2.0													
2/9/2010	0.5	4.8		783.0	1.4	7.8		2.0	244.0			16.0									
2/10/2010	0.4				1.7	7.7		2.0													
2/11/2010	0.4				1.0	8.2		2.0													
2/12/2010	0.4				0.7	8.0		2.0													
2/13/2010	0.4				0.8	8.0		2.0													
2/14/2010	0.4				0.8	8.2		2.0													
2/15/2010	0.4		0.1		1.6	7.9		2.0													
2/16/2010	0.4	8.6		766.0	1.2	7.8		2.0	284.0			22.0									
2/17/2010	0.4				2.1	8.1		8.0													
2/18/2010	0.4				2.6	7.9		13.0													
2/19/2010	0.4				1.4	8.3		2.0													
2/20/2010	0.4				1.9	7.9		4.0													
2/21/2010	0.4				2.4	8.0		2.0													
2/22/2010	0.4		0.1		2.6	7.9		2.0													
2/23/2010	0.4	3.6		781.0	2.1	7.9		2.0	300.0			20.0									
2/24/2010	0.7				2.0	8.0		2.0													
2/25/2010	0.5				1.3	7.9		2.0													
2/26/2010	0.5				0.8	7.9		2.0													
2/27/2010	1.4				2.6	7.9		4.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
2/28/2010	0.7				2.1	8.1		2.0													
3/1/2010	0.5		0.1		2.3	7.7		2.0													
3/2/2010	0.5	3.3		665.0	1.9	7.5	360.0	2.0	240.0	11.0	0.4	11.0	40.6	39.0							
3/3/2010	0.9				1.1	7.7		2.0													
3/4/2010	0.9				1.5	7.6		2.0													
3/5/2010	0.6				1.5	7.8		2.0													
3/6/2010	0.5				1.3	7.9		2.0													
3/7/2010	0.5				1.9	8.3		2.0													
3/8/2010	0.4				1.4	8.0		2.0													
3/9/2010	0.4	5.5	0.1	743.0	1.5	7.7		2.0	280.0			12.0									
3/10/2010	0.4				0.9	7.6		2.0													
3/11/2010	0.4				1.3	7.6		2.0													
3/12/2010	0.5				0.9	7.7		2.0													
3/13/2010	0.6				1.9	7.9		2.0													
3/14/2010	0.5				0.8	7.6		2.0													
3/15/2010	0.4		0.1		1.1	7.7		2.0													
3/16/2010	0.4	4.1		668.0	1.0	7.7		2.0	232.0			13.0									
3/17/2010	0.4				1.4	7.9		2.0													
3/18/2010	0.3				1.0	7.5		2.0													
3/19/2010	0.4				1.1	7.8		2.0													
3/20/2010	0.5				0.8	7.5		2.0													
3/21/2010	0.4				0.9	7.5		2.0													
3/22/2010	0.4		0.1		0.9	7.5		2.0													
3/23/2010	0.4	3.0		587.0	0.9	7.5		2.0	188.0			11.0									
3/24/2010	0.3				0.8	7.4		2.0													
3/25/2010	0.3				0.9	7.7		2.0													
3/26/2010	0.3				0.7	7.3		2.0													
3/27/2010	0.4				1.0	7.5		2.0													
3/28/2010	0.4				0.9	7.6		2.0													
3/29/2010	0.4		0.1		0.9	7.5		2.0													
3/30/2010	0.4	11.0		769.0	1.6	7.6		2.0	228.0			9.4									
3/31/2010	0.4				1.1	7.5		2.0													
4/1/2010	0.4				1.5	8.0		2.0													
4/2/2010	0.4				1.5	7.8		2.0													
4/3/2010	0.4				1.7	7.4		2.0													
4/4/2010	0.4				1.8	7.7		2.0													
4/5/2010	0.8		0.1		1.9	7.8		2.0													
4/6/2010	0.5	4.9		542.0	1.9	7.5	312.0	2.0	190.0	7.3	0.4	6.3	42.0	0.0							
4/7/2010	0.4				1.8	7.6		2.0													
4/8/2010	0.4				2.1	7.5		2.0													
4/9/2010	0.4				1.8	7.7		2.0													
4/10/2010	0.5				1.6	7.6		2.0													
4/11/2010	0.5				2.0	7.6		2.0													
4/12/2010	0.8		0.1		1.1	7.5		2.0													
4/13/2010	0.7	4.2		415.0	1.5	7.6		2.0	134.0			3.7									
4/14/2010	0.4				1.7	7.2		2.0													
4/15/2010	0.4				1.1	7.3		2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
4/16/2010	0.4				1.1	7.6		2.0													
4/17/2010	0.4				1.5	7.2		2.0													
4/18/2010	0.5				1.2	7.0		2.0													
4/19/2010	0.4		0.1		1.8	7.5		2.0													
4/20/2010	0.7	2.3		622.0	1.9	7.4		2.0	208.0			6.6									
4/21/2010	0.5				1.0	7.5		2.0													
4/22/2010	0.5				1.0	7.8		2.0													
4/23/2010	0.5				1.0	7.9		2.0													
4/24/2010	0.4				1.2	7.6		2.0													
4/25/2010	0.4				1.5	7.0		2.0													
4/26/2010	0.4		0.1		1.6	7.3		2.0													
4/27/2010	0.4	2.3		506.0	1.4	7.3		2.0	146.0			5.2									
4/28/2010	0.4				1.7	7.9		2.0													
4/29/2010	0.5				0.9	8.0		2.0													
4/30/2010	0.4				0.9	7.3		2.0													
5/1/2010	0.4				1.3	7.1		2.0													
5/2/2010	0.4				0.8	7.2		2.0													
5/3/2010	0.3				1.2	7.3		2.0													
5/4/2010	0.4	1.8		646.0	1.2	7.4	310.0	2.0		4.3	0.8	3.2	56.0	60.0							
5/5/2010	0.4		0.1		0.9	7.7		2.0													
5/6/2010	0.3				0.7	7.8		2.0													
5/7/2010	0.3				1.2	7.4		2.0													
5/8/2010	0.4				0.8	7.6		2.0													
5/9/2010	0.3				0.7	7.1		2.0													
5/10/2010	0.4		0.1		0.9	7.5		2.0													
5/11/2010	0.3	2.6		465.0	0.7	7.5	270.0	2.0	126.0												
5/12/2010	0.4				0.8	7.1		2.0													
5/13/2010	0.3				0.9	7.5		2.0													
5/14/2010	0.4				1.0	7.3		2.0													
5/15/2010	0.4				2.0	7.3		2.0													
5/16/2010	0.4				0.9	7.7		4.0													
5/17/2010	0.3				1.2	7.4		2.0													
5/18/2010	0.3	1.2		493.0	1.4	7.2	280.0	2.0	120.0												
5/19/2010	0.4				0.8	7.1		2.0													
5/20/2010	0.4				1.7	7.4		2.0													
5/21/2010	0.4				1.3	7.0		2.0													
5/22/2010	0.3				0.9	7.2		2.0													
5/23/2010	0.4				0.9	7.2		2.0													
5/24/2010	0.5				1.1	7.2		2.0													
5/25/2010	0.5	1.0	0.1	558.0	0.6	7.1	268.0	2.0	76.0												
5/26/2010	0.4				1.8	7.2		2.0													
5/27/2010	0.4				1.2	7.2		2.0													
5/28/2010	0.4				1.7	7.2		2.0													
5/29/2010	0.4				1.5	7.0		2.0													
5/30/2010	0.4				0.9	7.0		2.0													
5/31/2010	0.4		0.1		1.2	7.0		2.0													
6/1/2010	0.4	1.6		534.0	1.5	7.0	363.0	2.0	84.0	3.4	3.8	2.2	78.0	86.0							

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
6/2/2010	0.3				1.4	7.1		2.0													
6/3/2010	0.2				1.5	6.8		2.0													
6/4/2010	0.6				1.4	7.3		2.0													
6/5/2010	0.8				2.2	7.1		2.0													
6/6/2010	0.9				3.2	7.0		13.0													
6/7/2010	0.4		0.1		3.0	7.3		2.0													
6/8/2010	0.3	3.8		521.0	2.3	7.2		2.0	112.0			3.4									
6/9/2010	0.4				1.3	7.2		2.0													
6/10/2010	0.4				0.9	6.8		2.0													
6/11/2010	0.5				1.0	7.4		2.0													
6/12/2010	0.3				0.9	7.2		2.0													
6/13/2010	0.5				0.5	6.9		2.0													
6/14/2010	0.3		0.1		0.7	7.1		2.0													
6/15/2010	0.4	1.1		520.0	0.6	7.0		2.0	5.0			1.8									
6/16/2010	0.5				0.6	7.2		2.0													
6/17/2010	0.4				0.5	6.9		2.0													
6/18/2010	0.4				0.6	6.9		2.0													
6/19/2010	0.4				0.5	6.9		2.0													
6/20/2010	0.4				0.5	7.4		2.0													
6/21/2010	0.3		0.1		0.4	7.4		2.0													
6/22/2010	0.4	1.4		483.0	0.7	7.4		2.0	76.0			1.6									
6/23/2010	0.4				0.7	7.0		2.0													
6/24/2010	0.4				0.6	7.1		2.0													
6/25/2010	0.4				0.6	7.2		2.0													
6/26/2010	0.4				0.6	7.2		14.0													
6/27/2010	0.5				0.6	6.9		2.0													
6/28/2010	0.3		0.1		0.7	7.2		2.0													
6/29/2010	0.4	1.6		505.0	0.8	7.1		4.0	88.0			3.1									
6/30/2010	0.4				0.7	7.2		2.0													
7/1/2010	0.3				0.7	7.1		2.0													
7/2/2010	0.4				0.8	7.2		2.0													
7/3/2010	0.4				1.1	7.1		2.0													
7/4/2010	0.4				1.4	6.9		2.0													
7/5/2010	0.4		0.1		2.1	7.1		2.0													
7/6/2010	0.4	2.6			2.0	7.2	332.0	2.0	126.0	17.0	1.2	15.0	66.0	66.0							
7/7/2010	0.4				1.1	7.2		2.0													
7/8/2010	0.4				1.2	7.2		2.0													
7/9/2010	0.4				0.8	7.3		2.0													
7/10/2010	0.4				1.0	7.3		2.0													
7/11/2010	0.4				0.9	7.3		2.0													
7/12/2010	0.4		0.1		0.8	7.3		2.0													
7/13/2010	0.4	1.4		614.0	1.0	7.4		2.0	160.0			26.0									
7/14/2010	0.4				0.9	7.3		2.0													
7/15/2010	0.4				0.7	7.2		2.0													
7/16/2010	0.3				1.0	7.2		2.0													
7/17/2010	0.4				0.6	7.1		2.0													
7/18/2010	0.4				1.0	7.2		2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
7/19/2010	0.4		0.1		1.0	7.2		2.0													
7/20/2010	0.4	1.7		692.0	0.9	7.2		2.0				12.0									
7/21/2010	0.4				0.8	7.1		2.0													
7/22/2010	0.3				0.8	7.1		2.0													
7/23/2010	0.4				0.7	7.1		2.0													
7/24/2010	0.4				0.5	7.2		2.0													
7/25/2010	0.4				0.5	7.1		2.0													
7/26/2010	0.4		0.1		0.5	7.1		2.0													
7/27/2010	0.4	2.1		514.0	0.7	7.1		2.0	72.0			0.6									
7/28/2010	0.4				0.5	7.2		2.0													
7/29/2010	0.4				0.4	7.2		2.0													
7/30/2010	0.2				0.5	7.1		2.0													
7/31/2010	0.3				0.5	7.2		2.0													
8/1/2010	0.3				0.4	7.2		2.0													
8/2/2010	0.3		0.1		0.5	7.3		2.0													
8/3/2010	0.3	1.6		546.0	0.5	7.3	318.0	2.0	114.0	2.1	3.3	1.8	67.0	71.0							
8/4/2010	0.3				0.5	7.3		2.0													
8/5/2010	0.3				0.5	7.3		2.0													
8/6/2010	0.3				0.5	7.4		2.0													
8/7/2010	0.3				0.5	7.4		2.0													
8/8/2010	0.3				0.5	7.4		2.0													
8/9/2010	0.3				0.4	7.3		2.0													
8/10/2010	0.3	3.2			0.4	7.3		2.0				3.2									
8/11/2010	0.3		0.1		0.4	7.3		2.0													
8/12/2010	0.3				0.5	7.4		2.0													
8/13/2010	0.3				0.5	7.4		2.0													
8/14/2010	0.3				0.4	7.3		2.0													
8/15/2010	0.3				0.4	7.3		2.0													
8/16/2010	0.4		0.1		0.4	7.3		2.0													
8/17/2010	0.4	5.9		581.0	0.7	7.3		2.0	130.0			2.2									
8/18/2010	0.3				0.4	7.1		2.0													
8/19/2010	0.2				0.4	7.2		2.0													
8/20/2010	0.3				0.4	7.2		2.0													
8/21/2010	0.3				0.4	7.2		2.0													
8/22/2010	0.4				0.5	7.1		2.0													
8/23/2010	0.3				0.8	7.0		2.0													
8/24/2010	0.3	1.3		456.0	0.5	7.0		2.0	64.0			0.8									
8/25/2010	0.3				0.3	6.9		2.0	8.0												
8/26/2010	0.3				0.7	6.9		2.0													
8/27/2010	0.3				0.4	6.9		2.0													
8/28/2010	0.3				0.4	6.9		2.0													
8/29/2010	0.3				0.6	7.1		2.0													
8/30/2010	0.3		0.1		0.6	7.2		2.0													
8/31/2010	0.3	1.0		552.0	0.6	7.3		2.0	112.0			0.5									
9/1/2010	0.3				0.6	7.3		2.0													
9/2/2010	0.3				0.4	7.3		2.0													
9/3/2010	0.3				0.5	7.2		2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
9/4/2010	0.3				0.4	7.3		2.0													
9/5/2010	0.3				0.4	7.3		2.0													
9/6/2010	0.3				0.3	7.3		2.0													
9/7/2010	0.3	2.0		546.0	0.5	7.3	309.0	2.0	116.0	1.5	4.9	0.6	60.0	66.0							
9/8/2010	0.3				0.4	7.3		2.0													
9/9/2010	0.3				0.4	7.4		2.0													
9/10/2010	0.3				0.3	7.4		2.0													
9/11/2010	0.3				0.3	7.4		2.0													
9/12/2010	0.3				0.2	7.4		2.0													
9/13/2010	0.2		0.1		0.5	7.4		2.0													
9/14/2010	0.3	2.0		472.0	0.3	7.3		2.0	92.0			0.5									
9/15/2010	0.2				0.2	7.4		2.0													
9/16/2010	0.2				0.4	7.2		2.0													
9/17/2010	0.3				0.4	7.1		2.0													
9/18/2010	0.4				0.3	7.2		2.0													
9/19/2010	0.4				0.4	7.2		2.0													
9/20/2010	0.3		0.1		0.3	7.2		2.0													
9/21/2010	0.3	2.0		523.0	0.5	7.2		2.0	92.0			0.9									
9/22/2010	0.3				0.4	7.4		2.0													
9/23/2010	0.3				0.5	7.3		2.0													
9/24/2010	0.3				0.4	7.4		2.0													
9/25/2010	0.3				0.2	7.4		2.0													
9/26/2010	0.3				0.4	7.2		2.0													
9/27/2010	0.3		0.1		0.9	7.2		2.0													
9/28/2010	0.2	2.6		457.0	0.4	7.1		2.0	72.0			0.5									
9/29/2010	0.3				0.3	7.1		2.0													
9/30/2010	0.3				0.3	7.1		2.0													
10/1/2010	0.3				0.3	7.1		2.0													
10/2/2010	0.3				0.3	7.0		2.0													
10/3/2010	0.3				0.3	7.0		2.0													
10/4/2010	0.3		0.1		0.4	7.0		2.0													
10/5/2010	0.3	5.5		459.0	0.4	7.0	236.0	2.0	50.0	1.0	0.1	0.5	59.0	67.0							
10/6/2010	0.3				0.5	7.1		2.0													
10/7/2010	0.2				0.5	7.1		2.0													
10/8/2010	0.2				0.5	7.1		2.0													
10/9/2010	0.3				0.4	7.2		2.0													
10/10/2010	0.5				0.3	7.2		2.0													
10/11/2010	0.5				0.4	7.3		2.0													
10/12/2010	0.3	2.0		594.0	0.5	7.2		2.0	98.0			1.0									
10/13/2010	0.3				0.5	7.2		2.0													
10/14/2010	0.3				0.5	7.2		2.0													
10/15/2010	0.3				0.5	7.2		4.0													
10/16/2010	0.3				0.5	7.1		2.0													
10/17/2010	0.3				0.5	7.1		2.0													
10/18/2010	0.3		0.1		0.6	7.3		2.0													
10/19/2010	0.2	2.6		543.0	0.6	7.3		2.0	120.0			0.5									
10/20/2010	0.1				0.0	0.0		2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
10/21/2010	0.4				0.6	7.5		2.0													
10/22/2010	0.4				0.5	7.4		2.0													
10/23/2010	0.3				0.5	7.4		2.0													
10/24/2010	0.9				0.4	7.4		2.0													
10/25/2010	0.4		0.1		0.8	7.1		2.0													
10/26/2010	0.3	2.2		424.0	0.4	7.0		2.0				0.5									
10/27/2010	0.3				0.4	7.2		2.0													
10/28/2010	0.3				0.5	7.2		2.0													
10/29/2010	0.4				0.4	7.2		2.0													
10/30/2010	0.3				0.4	7.1		2.0													
10/31/2010	0.3				0.5	7.1		2.0													
11/1/2010	0.3		0.1		0.5	7.2		2.0													
11/2/2010	0.3	2.0		531.0	0.5	7.4	332.0	2.0	104.0	1.0	5.9	0.5	63.0	70.0							
11/3/2010	0.3				0.7	7.2		2.0													
11/4/2010	0.3				0.7	7.4		2.0													
11/5/2010	0.3				0.8	7.4		2.0													
11/6/2010	0.3				0.7	7.5		2.0													
11/7/2010	0.5				0.7	7.4		2.0													
11/8/2010	0.4		0.1		0.5	7.6		2.0													
11/9/2010	0.3	2.0		587.0	0.8	7.6		2.0	140.0			0.5									
11/10/2010	0.3				0.7	7.5		2.0													
11/11/2010	0.3				0.5	7.5		2.0													
11/12/2010	0.3				0.3	7.4		2.0													
11/13/2010	0.3				0.3	7.4		2.0													
11/14/2010	0.3				0.2	7.4		2.0													
11/15/2010	0.3		0.1		0.3	7.4		2.0													
11/16/2010	0.3	2.0		591.0	0.3	7.5		2.0	152.0			0.6									
11/17/2010	0.3				0.2	7.5		2.0													
11/18/2010	0.3				0.3	7.5		8.0													
11/19/2010	0.3				0.3	7.4		8.0													
11/20/2010	0.6				0.6	7.4		2.0													
11/21/2010	0.9				0.4	7.4		2.0													
11/22/2010	0.5		0.1		0.8	7.5		2.0													
11/23/2010	0.9	2.0		620.0	0.4	7.6		2.0	160.0			0.5									
11/24/2010	0.6				0.5	7.3		2.0													
11/25/2010	0.5				0.4	7.3		2.0													
11/26/2010	0.4				0.5	7.2		2.0													
11/27/2010	0.7				0.6	7.1		2.0													
11/28/2010	0.6				0.5	7.0		2.0													
11/29/2010	0.4				0.6	7.1		2.0													
11/30/2010	0.4	3.9		473.0	0.5	7.2		2.0	82.0			0.5									
12/1/2010	0.4				0.4	7.2	242.0	2.0													
12/2/2010	0.3				0.6	7.5	278.0	2.0													
12/3/2010	0.3				0.3	7.5	299.0	2.0													
12/4/2010	0.3				0.3	7.4	302.0	2.0													
12/5/2010	0.4				0.3	7.5	302.0	2.0													
12/6/2010	0.5		0.1		0.5	7.5	283.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
12/7/2010	0.1	2.7		553.0	0.4	7.5	273.0	2.0	132.0	1.0	4.3	0.5	52.0	54.0							
12/8/2010	0.5				0.3	7.4	446.0	2.0													
12/9/2010	0.5			491.0	0.3	7.3	398.0	2.0					40.0	41.0							
12/10/2010	0.4				0.3	7.3	378.0	2.0													
12/11/2010	0.3				0.3	7.5	422.0	2.0													
12/12/2010	0.4				0.2	7.4	266.0	2.0													
12/13/2010	0.3		0.1		0.2	7.5	265.0	2.0													
12/14/2010	0.5	2.0		564.0	0.2	7.5	282.0	2.0	180.0			0.5									
12/15/2010	0.8				3.3	8.2	255.0	2.0													
12/16/2010	0.4				1.5	8.1	235.0	2.0													
12/17/2010	0.6				1.5	8.1	268.0	2.0													
12/18/2010	1.4				0.5	7.6	196.0	2.0													
12/19/2010	1.5				1.5	8.1	185.0	2.0													
12/20/2010	1.5		0.1		0.7	7.5	196.0	2.0													
12/21/2010	0.9	4.2		470.0	1.4	7.6	218.0	2.0				1.4									
12/22/2010	0.6				1.2	7.8	235.0	2.0													
12/23/2010	0.5				0.5	7.4	256.0	2.0													
12/24/2010	0.5				0.3	7.4	258.0	2.0													
12/25/2010	0.6				0.5	7.4	251.0	2.0													
12/26/2010	0.6				0.4	7.3	217.0	2.0													
12/27/2010	0.9		0.1		0.8	7.6	258.0	2.0													
12/28/2010	0.7	2.0		515.0	0.8	7.4	266.0	2.0	154.0			4.9									
12/29/2010	0.8				1.2	7.3	193.0	2.0													
12/30/2010	0.8				0.4	7.4	197.0	2.0													
12/31/2010	0.8				0.5	7.5	213.0	2.0													
1/1/2011	0.8				0.5	7.3	218.0	2.0													
1/2/2011	1.1				0.8	7.6	199.0	4.0													
1/3/2011	1.0		0.1		0.8	7.4	176.0	2.0													
1/4/2011	0.9	2.0			0.8	7.2	183.0	2.0	69.0	1.0	0.1	2.2		24.0							
1/5/2011	0.6				1.8	7.3	207.0	2.0													
1/6/2011	0.5				0.6	7.4	264.0	2.0													
1/7/2011	0.9				0.4	7.5	235.0	2.0													
1/8/2011	0.8				0.4	7.3	212.0	2.0													
1/9/2011	0.9				0.5	7.4	224.0	2.0													
1/10/2011	0.5		0.1		0.3	7.6	264.0	2.0													
1/11/2011	0.4	2.0			0.4	7.5	277.0	2.0	172.0	4.1	4.4	3.6	38.0	37.0							
1/12/2011	0.4				0.2	7.5	250.0	2.0													
1/13/2011	0.4				0.2	7.5	258.0	2.0													
1/14/2011	0.4				0.3	7.3	237.0	2.0													
1/15/2011	0.5				0.2	7.4	235.0	2.0													
1/16/2011	0.4				0.2	7.5	270.0	2.0													
1/17/2011	0.4				0.3	7.4	269.0	2.0													
1/18/2011	0.4	2.0		547.0	0.8	7.5	269.0	2.0	162.0			0.6									
1/19/2011	0.4				0.2	7.8	280.0	2.0													
1/20/2011	0.4				0.3	7.5	283.0	2.0													
1/21/2011	0.4				0.2	7.5	247.0	2.0													
1/22/2011	0.4				0.2	7.4	248.0	2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
1/23/2011	0.4				0.2	7.4	248.0	2.0													
1/24/2011	0.4		0.1		0.2	7.5	259.0	2.0													
1/25/2011	0.3				0.3	7.5	260.0	2.0													
1/26/2011	0.3				0.3	7.3	233.0	2.0													
1/27/2011	0.3				0.2	7.4	287.0	2.0													
1/28/2011	0.3				0.3	7.4	294.0	2.0													
1/29/2011	0.3				0.3	7.5	317.0	2.0													
1/30/2011	0.5				0.2	7.5	316.0	2.0													
1/31/2011	0.4	2.0	0.1		0.2	7.5	310.0	2.0													
2/1/2011	0.3	2.7			0.2	7.5	347.0	2.0		1.0	3.5	0.5		43.0							
2/2/2011	0.3				0.3	7.2		2.0													
2/3/2011	0.3				0.2	7.2		2.0													
2/4/2011	0.3				0.2	7.3		2.0													
2/5/2011	0.3				0.3	7.3		2.0													
2/6/2011	0.3				0.3	7.4		2.0													
2/7/2011	0.3		0.1		0.3	7.4		2.0													
2/8/2011	0.3	2.0		545.0	0.4	7.4		2.0	160.0			0.9	51.0								
2/9/2011	0.3				0.4	7.5		2.0													
2/10/2011	0.3				0.2	7.5		2.0													
2/11/2011	0.3				0.3	7.4		2.0													
2/12/2011	0.3				0.2	7.5		2.0													
2/13/2011	0.3				0.3	7.4		2.0													
2/14/2011	0.3		0.1		0.2	7.5		2.0													
2/15/2011	0.3	2.7		550.0	0.3	7.4		2.0	168.0			0.5									
2/16/2011	0.5				0.2	7.7		2.0													
2/17/2011	0.5				0.4	7.4		2.0													
2/18/2011	1.1				0.5	7.3		2.0													
2/19/2011	1.0				0.4	7.5		2.0													
2/20/2011	0.9				0.4	7.4		2.0													
2/21/2011	0.9				0.4	7.4		2.0													
2/22/2011	0.7	2.1	0.1	422.0	0.4	7.4		2.0	118.0			0.7									
2/23/2011	0.4				0.5	7.4		2.0													
2/24/2011	0.5				0.4	7.6		2.0													
2/25/2011	0.8				0.4	7.4		2.0													
2/26/2011	0.9				0.7	7.4		2.0													
2/27/2011	0.8				0.8	7.4		2.0													
2/28/2011	0.4		0.1		1.0	7.3		2.0													
3/1/2011	0.4	2.0	0.0	424.0	0.5	7.3		2.0	98.0	1.1	0.1	1.0	33.0	34.0	5.0						
3/2/2011	0.5				0.6	7.2		2.0													
3/3/2011	0.6				1.7	8.0		2.0													
3/4/2011	0.8				0.6	7.7		2.0													
3/5/2011	0.6				0.2	7.5		2.0													
3/6/2011	0.5				0.6	7.3		2.0													
3/7/2011	0.9		0.1		0.7	7.5		2.0													
3/8/2011	0.7	2.0		423.0	0.8	7.5		2.0	136.0			0.9			5.0						
3/9/2011	0.5				0.8	7.5		2.0													
3/10/2011	0.4				0.5	7.5		2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
3/11/2011	0.4				0.9	7.5		2.0													
3/12/2011	0.4				0.7	7.4		2.0													
3/13/2011	0.4				0.7	7.1		2.0													
3/14/2011	0.5				0.6	7.4		2.0													
3/15/2011	0.4	2.4	0.1	422.0	0.9	7.3		2.0	116.0			0.5			5.0						
3/16/2011	0.8				0.9	7.5		2.0													
3/17/2011	0.8				0.2	7.5		2.0													
3/18/2011	0.5				0.8	7.6		2.0													
3/19/2011	0.9				0.7	7.4		2.0													
3/20/2011	1.0				1.0	7.2		2.0													
3/21/2011	1.1				1.3	7.2		2.0													
3/22/2011	1.1	2.0	0.1	286.0	1.3	7.3		2.0	77.0			1.6			5.0						
3/23/2011	1.1				1.3	7.6		2.0													
3/24/2011	1.1				1.5	7.7		2.0													
3/25/2011	1.0	2.0	0.1	278.0	1.5	7.6	181.0	2.0			3.9	0.5			5.0	0.08	6.2	ND	21	ND	
3/26/2011	1.0	2.0	0.1		1.6	7.2		2.0							5.0						
3/27/2011	1.1	2.0	0.1		1.4	7.3		2.0							5.0						
3/28/2011	0.9	2.0	0.1		1.4	7.2		2.0							5.0		5.7	ND	23	ND	
3/29/2011	0.9	2.0	0.1	332.0	1.3	7.8		2.0	80.0			0.5			5.0						
3/30/2011	1.0	2.0	0.1		1.2	7.2		4.0							5.0						
3/31/2011	0.8	2.0	0.1		1.5	7.2		2.0							5.0						ND
4/1/2011	0.8	2	0.1		0.7	7.2		2.0							5.0						
4/2/2011	0.6	2	0.1		1.0	7.2		2.0							5.0						
4/3/2011	0.5	2	0.1		0.6	7.2		2.0							5.0						
4/4/2011	0.4	2	0.1		0.6	7.2		2.0							5.0						
4/5/2011	0.4	2	0.1	420.0	0.5	7.2	265.0	2.0			2.4	0.1			5.0	0.08	2.7	ND	41	ND	
4/6/2011	0.4	2	0.1		1.2	7.2		2.0							5.0						
4/7/2011	0.4	2	0.1		1.2	7.8		2.0							5.0						
4/8/2011	0.4	2	0.1		0.6	7.2		2.0							5.0						
4/9/2011	0.4	2	0.1		0.6	7.2		2.0							5.0						
4/10/2011	0.4	2	0.1		0.8	7.1		2.0							5.0						
4/11/2011	0.4	2	0.1		0.6	7.1		2.0							5.0						
4/12/2011	0.3	2.2	0.1		0.5	7.1		8.0	94.0			0.1			5.0						
4/13/2011	0.4	2.6	0.1		0.6	7.1		2.0							5.0						
4/14/2011	0.5	2	0.1		0.6	7.0		2.0							5.0						
4/15/2011	0.3				0.9	7.6		2.0													
4/16/2011	0.4				0.5	7.1		2.0													
4/17/2011	0.4				0.4	7.0		2.0													
4/18/2011	0.3				1.1	7.0		2.0													
4/19/2011	0.4	2.2	0.1	393.0	1.1	7.0		2.0	86.0			1.8			5.0						
4/20/2011	0.3				~	~		2.0													
4/21/2011	0.4				1.3	7.8		30.0													
4/22/2011	0.5				1.6	7.8		2.0													
4/23/2011	0.5				1.4	7.2		2.0													
4/24/2011	0.4				1.1	7.3		2.0													
4/25/2011	0.4				1.1	7.9		2.0													
4/26/2011	0.4	3.0	0.1	533.0	0.9	8.1		2.0	180.0			0.1			5.0						

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
4/27/2011	0.3				0.7	7.9		2.0													
4/28/2011	0.4				1.3	7.7		2.0													
4/29/2011	0.4				0.9	7.7		2.0													
4/30/2011	0.4				1.1	7.1		2.0													
5/1/2011	0.4				0.4	7.2		2.0													
5/2/2011	0.3				1.2	7.2		2.0													
5/3/2011	0.3	2.4	0.1	469.0	0.5	7.3	297.0	2.0	116.0	1.0	0.1	0.5	45.0	48.0							
5/4/2011	0.3				0.4	7.2		2.0													
5/5/2011	0.4				0.8	7.7		2.0													
5/6/2011	0.3				1.0	7.2		2.0													
5/7/2011	0.4				0.7	7.1		2.0													
5/8/2011	0.4				0.9	7.2		2.0													
5/9/2011	0.4		0.1		0.6	7.3		2.0													
5/10/2011	0.4	3.8		478.0	0.5	7.3		2.0	120.0			0.5									
5/11/2011	0.3				0.5	7.8		2.0													
5/12/2011	0.3				0.7	7.7		2.0													
5/13/2011	0.3				0.7	7.6		2.0													
5/14/2011	0.4				0.6	7.5		2.0													
5/15/2011	0.4				0.8	7.1		2.0													
5/16/2011	0.4		0.1		0.6	7.4		2.0													
5/17/2011	0.4	2.8		435.0	0.8	7.2		2.0	100.0			0.5									
5/18/2011	0.5				0.5	7.4		2.0													
5/19/2011	0.4				0.5	7.3		2.0													
5/20/2011	0.4				0.5	7.5		2.0													
5/21/2011	0.4				0.5	7.5		2.0													
5/22/2011	0.4				0.4	7.2		2.0													
5/23/2011	0.3		0.1		0.5	7.1		2.0													
5/24/2011	0.3	2.0		395.0	0.6	7.1		2.0	72.0			0.7									
5/25/2011	0.4				0.6	7.1		2.0													
5/26/2011	0.4				0.7	7.3		2.0													
5/27/2011	0.4				0.5	7.1		2.0													
5/28/2011	0.4				0.5	7.0		2.0													
5/29/2011	0.4				0.5	7.0		2.0													
5/30/2011	0.4		0.1		0.4	6.3		2.0													
5/31/2011	0.3	2.0	0.0	380.0	0.4	6.9		2.0	62.0			0.5									
6/1/2011	0.3				0.5	7.1		2.0													
6/2/2011	0.4				0.4	7.3		2.0													
6/3/2011	0.3				0.8	7.3		2.0													
6/4/2011	0.4				0.6	7.4		2.0													
6/5/2011	0.5				0.5	7.4		2.0													
6/6/2011	0.5		0.1		0.8	7.3		2.0													
6/7/2011	0.4	2.0		495.0	0.7	7.3	319.0	2.0	120.0	1.1	0.1	0.5	35.0	34.0							
6/8/2011	0.4				0.7	7.3		2.0													
6/9/2011	0.3				0.8	7.1		2.0													
6/10/2011	0.3				0.8	7.0		2.0													
6/11/2011	0.4				0.8	6.9		2.0													
6/12/2011	0.4				0.9	7.1		2.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
6/13/2011	0.4		0.1		1.1	7.2		2.0													
6/14/2011	0.3	3.8		582.0	1.1	7.2		2.0	236.0			1.3									
6/15/2011	0.4				0.9	7.3		2.0													
6/16/2011	0.4				0.8	7.8		2.0													
6/17/2011	0.4				0.8	7.1		2.0													
6/18/2011	0.4				0.8	7.3		2.0													
6/19/2011	0.3				0.8	7.3		2.0													
6/20/2011	0.3		0.1		0.9	7.4		2.0													
6/21/2011	0.3	6.3		556.0	1.7	7.4		2.0	150.0			3.5									
6/22/2011	0.3				0.7	7.4		2.0													
6/23/2011	0.3				0.6	7.3		2.0													
6/24/2011	0.3				0.6	7.1		2.0													
6/25/2011	0.3				1.2	7.3		2.0													
6/26/2011	0.4				0.8	7.1		2.0													
6/27/2011	0.4		0.1		1.2	7.2		2.0													
6/28/2011	0.4	6.3		528.0	1.0	7.2		2.0	140.0			0.7									
6/29/2011	0.4				0.8	7.3		9.0													
6/30/2011	0.4				0.7	7.3		2.0													
7/1/2011	0.4				0.7	7.3		2.0													
7/2/2011	0.4				0.5	7.3		2.0													
7/3/2011	0.3				0.6	7.4		2.0													
7/4/2011	0.4				0.6	7.2		2.0													
7/5/2011	0.4	8.3	0.1	569.0	0.7	7.3	336.0	2.0	162.0	2.4		2.7	43.0	48.0							
7/6/2011	0.3				0.6	7.3		2.0													
7/7/2011	0.3				0.6	7.4		2.0			3.9										
7/8/2011	0.4				0.6	7.3		2.0													
7/9/2011	0.4				0.6	7.4		2.0													
7/10/2011	0.4				0.3	7.2		2.0													
7/11/2011	0.4		0.1		0.8	7.4		2.0													
7/12/2011	0.3	2.8		502.0	0.3	7.3		2.0	132.0			0.5									
7/13/2011	0.3				0.5	7.3		2.0													
7/14/2011	0.3				0.4	7.3		2.0													
7/15/2011	0.3				0.3	7.3		2.0													
7/16/2011	0.3				0.4	7.1		2.0													
7/17/2011	0.4				0.4	7.0		2.0													
7/18/2011	0.3				0.4	7.1		2.0													
7/19/2011	0.3				0.4	7.3		4.0													
7/20/2011	0.4	2.0	0.1	533.0	0.4	7.4		2.0	148.0			0.5									
7/21/2011	0.4				0.4	7.7		2.0													
7/22/2011	0.4				0.4	7.3		2.0													
7/23/2011	0.4				0.5	7.3		2.0													
7/24/2011	0.4				0.4	7.2		2.0													
7/25/2011	0.4		0.1		0.5	7.1		2.0													
7/26/2011	0.4	2.0		432.0	0.3	7.1		2.0	94.0			0.5									
7/27/2011	0.4				0.3	7.0		2.0													
7/28/2011	0.4				0.5	7.4		2.0													
7/29/2011	0.4				0.4	7.1		4.0													

TABLE M-1
CITY OF ANGELS WASTEWATER MASTER PLAN
2009-2011 DAILY EFFLUENT CONSTITUENTS AT WWTP

Date	Effluent Flow (mgd)	BOD_5 (mg/L)	Settleable Solids (mL/L)	Electrical Conductivity (µmhos/cm)	Turbidity (NTU)	pH	TDS (mg/L)	Total Coliform (MPN/100mL)	Total Alkalinity (mg/L as CaCO3)	TKN (mg/L)	Nitrate as N (mg/L)	Ammonia as N (mg/L)	Sodium (mg/L)	Chloride (mg/L)	TSS (mg/L)	Nitrite (mg/L)	Copper (ug/L)	Lead (ug/L)	Zinc (ug/L)	Bis(2-chloroethyl) ether (µg/L)	Dichlorobromomethane (µg/L)
7/30/2011	0.4				0.3	7.0		2.0													
7/31/2011	0.4				0.3	7.2		2.0													
8/1/2011	0.4		0.1		0.7	7.3		2.0													
8/2/2011	0.4	3.5		500.0	0.5	7.2	294.0	2.0	136.0	1.0	2.3	0.7	44.0	42.0							
8/3/2011	0.4				1.1	7.3		2.0													
8/4/2011	0.4				0.4	7.3		2.0													
8/5/2011	0.4				0.4	7.3		2.0													
8/6/2011	0.4				0.3	7.3		4.0													
8/7/2011	0.4				0.5	7.3		2.0													
8/8/2011	0.3		0.1		0.4	7.2		2.0													
8/9/2011	0.4	3.5		416.0	0.4	7.1		2.0	84.0			0.5									
8/10/2011	0.2				0.1	7.1		2.0													
8/11/2011	0.3				0.3	7.1		2.0													
8/12/2011	0.5				0.2	7.3		2.0													
8/13/2011	0.4				0.3	7.3		2.0													
8/14/2011	0.4				1.4	7.0															
8/15/2011	0.3		0.1		0.6	7.1		2.0													
8/16/2011	0.3	4.8		660.0	1.2	7.5		2.0	212.0			16.0									
8/17/2011	0.3				0.6	7.3		2.0													
8/18/2011	0.4				0.5	7.3		2.0													
8/19/2011	0.5				0.5	7.3		2.0													
8/20/2011	0.4				0.4	7.2		2.0													
8/21/2011	0.4				0.5	7.1		2.0													
8/22/2011	0.4		0.1		0.4	7.1		2.0													
8/23/2011	0.4	10.0		474.0	0.6	7.2		2.0	120.0			13.0									
8/24/2011	0.4				0.5	7.3		2.0													
8/25/2011	0.4				0.4	7.1		2.0													
8/26/2011	0.2				0.5	7.2		2.0													
8/27/2011	0.2				0.5	7.2		2.0													
8/28/2011	0.2				0.6	7.4		2.0													
8/29/2011	0.2		0.1		1.0	7.4		2.0													
8/30/2011	0.1	10.0		634.0	1.0	7.4		2.0	220.0			14.0									
8/31/2011	0.2				0.7	7.6		2.0													

APPENDIX N

INTERMEDIATE PUMP STATION HYDRAULIC CALCULATIONS

TABLE N-1
CITY OF ANGELS WASTEWATER MASTER PLAN
INTERMEDIATE PUMP STATION - PUMP CURVES

	Flow (gpm)[a]		
Head (ft)[a]	1 Pump Operating	2 Pumps Operating	3 Pumps Operating
24.0	0	0	0
21.8	150	300	450
19.4	300	600	900
18.0	400	800	1,200
17.0	440	880	1,320
15.8	480	960	1,440
13.5	560	1,120	1,680
12.0	600	1,200	1,800

[a] Flow/head determined from Floway pump performance curve.

TABLE N-2
CITY OF ANGELS WASTEWATER MASTER PLAN
INTERMEDIATE PUMP STATION - SYSTEM CURVE[a]

System Curve Point	Head (ft)	Flow (gpm)
1[b]	15.2	0
2[c]	16.0	445

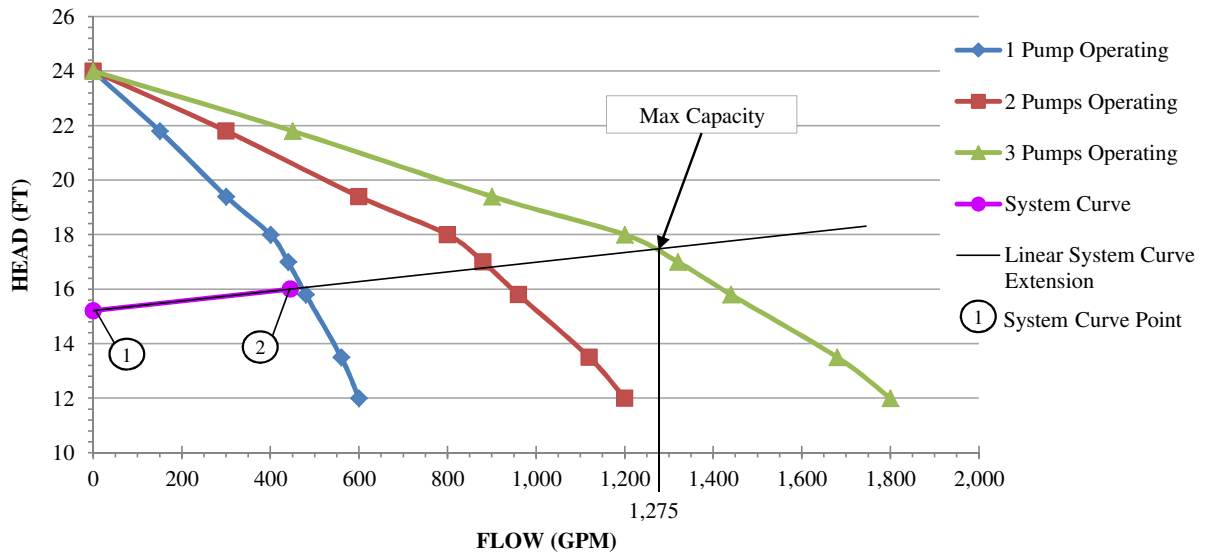
[a] Assumptions for the system curve are based on limited information.

[b] System Curve Point #1 is the maximum static lift identified in the Phase II and Phase III WWTP Improvements Record Drawings [31, 41].

[c] System Curve Point #2 is the operating point identified from the Floway pump performance curve and operating parameters listed in WWTP O&M Manual (Lee & Ro) [43].

Max Capacity	**1,275 gpm**
(3 Pumps in Parallel)	**1.84 mgd**

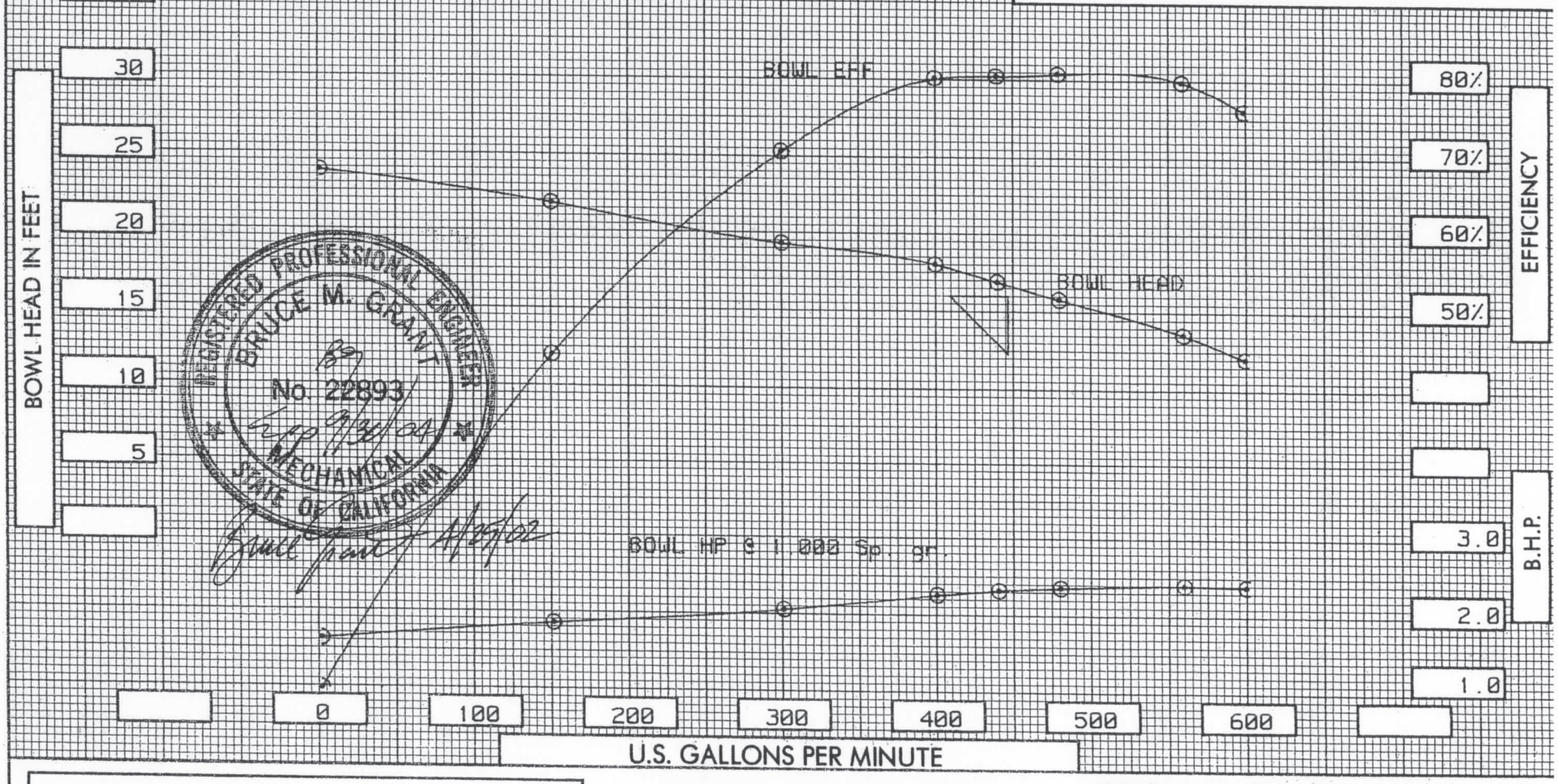
FIGURE N-1 INTERMEDIATE PUMP STATION



ANGELS CAMP WASTE WATER

INTERMEDIATE PUMP

PUMP TEST: PC # 28048



REGISTERED PROFESSIONAL ENGINEER
BRUCE M. GRANT
No. 22893
MECHANICAL
STATE OF CALIFORNIA

BRADFORD. ALAN A INC.
4970 PEABODY ROAD
FAIRFIELD CA 94533

DWG. NO. 44647-1-1-T3

FLOWAY PUMPS
FRESNO, CALIFORNIA

A WEIR COMPANY

TYPE 10 DOH
NO. OF STAGES 1
R.P.M. 1191
PUMP SERIAL NO. 44647-1-1

DWN. BY BMT DATE 04-22-2002

PF-614

APPENDIX O

EQUALIZATION BASIN CAPACITY ANALYSIS

TABLE O-1
CITY OF ANGELS WASTEWATER MASTER PLAN
WWTP DAILY DRY WEATHER FLOWS - JULY 2011

Date	Metered Flow: Adjusted EQ Basin [a] (gpd)	Metered Flow: Influent (gpd)	Metered Flow: Drainage (gpd)	Drainage as % of Influent	Precipitation (in)	Filter Backwash Flow Estimate [b] (gpd)
7/1/2011	1,811	404,715	99,560	25%	0	20,160 - 40,320
7/2/2011	940	426,290	111,625	26%	0	20,160 - 40,320
7/3/2011	854	415,414	104,271	25%	0	20,160 - 40,320
7/4/2011	626	406,541	101,766	25%	0	20,160 - 40,320
7/5/2011	536	425,256	126,064	30%	0	20,160 - 40,320
7/6/2011	509	420,203	118,485	28%	0	20,160 - 40,320
7/7/2011	431	447,786	158,622	35%	0	20,160 - 40,320
7/8/2011	0	419,347	124,779	30%	0	20,160 - 40,320
7/9/2011	374	416,026	104,204	25%	0	20,160 - 40,320
7/10/2011	791	434,128	116,507	27%	0	20,160 - 40,320
7/11/2011	686	402,635	109,927	27%	0	20,160 - 40,320
7/12/2011	568	409,863	110,096	27%	0	20,160 - 40,320
7/13/2011	815	405,185	119,419	29%	0	20,160 - 40,320
7/14/2011	616	410,990	115,322	28%	0	20,160 - 40,320
7/15/2011	786	407,911	109,320	27%	0	20,160 - 40,320
7/16/2011	861	424,055	113,105	27%	0	20,160 - 40,320
7/17/2011	993	414,339	107,153	26%	0	20,160 - 40,320
7/18/2011	814	414,488	122,793	30%	0	20,160 - 40,320
7/19/2011	862	396,411	110,345	28%	0	20,160 - 40,320
7/20/2011	749	417,184	122,900	29%	0	20,160 - 40,320
7/21/2011	710	394,225	109,089	28%	0	20,160 - 40,320
7/22/2011	641	404,000	122,257	30%	0	20,160 - 40,320
7/23/2011	294	412,379	107,815	26%	0	20,160 - 40,320
7/24/2011	276	398,360	105,792	27%	0	20,160 - 40,320
7/25/2011	283	400,642	103,332	26%	0	20,160 - 40,320
7/26/2011	437	407,256	104,889	26%	0	20,160 - 40,320
7/27/2011	483	422,355	120,786	29%	0	20,160 - 40,320
7/28/2011	484	404,542	117,874	29%	0	20,160 - 40,320
7/29/2011	508	406,351	104,069	26%	0	20,160 - 40,320
7/30/2011	390	398,884	103,469	26%	0	20,160 - 40,320
7/31/2011	0	422,577	115,960	27%	0	20,160 - 40,320
Average	617	412,592	113,600	28%	0	20,160 - 40,320

[a] Flow rate of 0 gpd assumed for negative flow meter readings.

[b] Backwash flow estimate of 14-28 gpm/filter provided by Parkson [44]. One filter assumed to be in service for July flows.

TABLE O-2
CITY OF ANGELS WASTEWATER MASTER PLAN
EQUALIZATION BASIN CAPACITY EVALUATION - MARCH 2011

		Metered Flow				EQ Basin			
Date Time	Precipitation (in)	Adjusted EQ Basin (gpd)	Influent (gpd)	Drainage (gpd)	Process/Site Drainage Flows, 20% of Influent (gpd)	Flow out of Basin (gpd)	Rate of Storage (gpd)	Incremental Storage Volume (gal)	Total Storage Volume (gal)
3/18/2011 0:00		4,885	546,203	135,219	109,241	-	-	-	-
3/18/2011 1:00		4,949	490,646	128,737	98,129	-	-	-	-
3/18/2011 2:00		4,106	379,343	118,187	75,869	-	-	-	-
3/18/2011 3:00		3,980	412,639	115,164	82,528	-	-	-	-
3/18/2011 4:00		4,244	392,686	124,121	78,537	-	-	-	-
3/18/2011 5:00		4,297	347,345	126,487	69,469	-	-	-	-
3/18/2011 6:00		4,295	405,309	125,344	81,062	-	-	-	-
3/18/2011 7:00		4,270	461,590	132,896	92,318	-	-	-	-
3/18/2011 8:00		4,279	589,522	113,834	117,904	-	-	-	-
3/18/2011 9:00		4,295	660,144	112,578	132,029	-	-	-	-
3/18/2011 10:00		4,252	700,748	160,285	140,150	-	-	-	-
3/18/2011 11:00	0.64	4,048	672,436	131,189	134,487	-	-	-	-
3/18/2011 12:00		1,757	680,994	157,247	136,199	-	-	-	-
3/18/2011 13:00		1,010	680,775	118,452	136,155	-	-	-	-
3/18/2011 14:00		1,789	623,876	132,961	124,775	-	-	-	-
3/18/2011 15:00		1,036	619,997	133,903	123,999	-	-	-	-
3/18/2011 16:00		1,287	617,623	117,014	123,525	-	-	-	-
3/18/2011 17:00		2,020	705,371	149,688	141,074	-	-	-	0
3/18/2011 18:00		53,769	911,546	167,857	182,309	-	53,769	2,240	2,240
3/18/2011 19:00		324,597	974,546	240,895	194,909	45,986	278,611	11,609	13,849
3/18/2011 20:00		564,308	985,971	268,410	197,194	71,216	493,093	20,546	34,395
3/18/2011 21:00		634,619	989,386	257,881	197,877	60,004	574,615	23,942	58,337
3/18/2011 22:00		402,952	976,525	251,122	195,305	55,817	347,134	14,464	72,801
3/18/2011 23:00		251,327	969,299	231,195	193,860	37,335	213,992	8,916	81,717
3/19/2011 0:00		191,527	964,008	242,262	192,802	49,461	142,067	5,919	87,637
3/19/2011 1:00		102,803	955,021	243,082	191,004	52,078	50,726	2,114	89,750
3/19/2011 2:00		42,420	936,618	261,916	187,324	74,593	-32,173	-1,341	88,410
3/19/2011 3:00		23,452	918,061	252,397	183,612	68,785	-45,333	-1,889	86,521
3/19/2011 4:00		7,307	937,326	249,601	187,465	62,136	-54,829	-2,285	84,236
3/19/2011 5:00		5,116	897,570	242,995	179,514	63,481	-58,365	-2,432	81,804
3/19/2011 6:00		4,300	862,233	241,610	172,447	69,163	-64,863	-2,703	79,102
3/19/2011 7:00		7,415	857,506	258,052	171,501	86,551	-79,136	-3,297	75,804
3/19/2011 8:00		15,129	913,983	270,170	182,797	87,373	-72,244	-3,010	72,794
3/19/2011 9:00		207,232	972,520	345,795	194,504	151,291	55,941	2,331	75,125
3/19/2011 10:00		394,275	985,797	396,126	197,159	198,967	195,308	8,138	83,263
3/19/2011 11:00	0.29	362,467	980,640	306,159	196,128	110,031	252,436	10,518	93,781
3/19/2011 12:00		289,567	974,078	244,046	194,816	49,231	240,337	10,014	103,795
3/19/2011 13:00		260,528	968,622	254,306	193,724	60,582	199,946	8,331	112,126
3/19/2011 14:00		182,777	964,363	243,050	192,873	50,177	132,600	5,525	117,651
3/19/2011 15:00		110,382	954,863	246,201	190,973	55,228	55,154	2,298	119,949
3/19/2011 16:00		70,918	947,431	250,105	189,486	60,619	10,300	429	120,379
3/19/2011 17:00		212,212	971,972	371,817	194,394	177,422	34,789	1,450	121,828
3/19/2011 18:00		197,970	971,623	370,760	194,325	176,436	21,534	897	122,725
3/19/2011 19:00		93,182	949,356	252,152	189,871	62,281	30,901	1,288	124,013
3/19/2011 20:00		83,754	944,125	252,264	188,825	63,439	20,314	846	124,859
3/19/2011 21:00		61,113	945,561	247,746	189,112	58,633	2,480	103	124,963
3/19/2011 22:00		23,138	919,008	241,558	183,802	57,756	-34,618	-1,442	123,520
3/19/2011 23:00		164,045	946,913	401,306	189,383	211,923	-47,879	-1,995	121,525
3/20/2011 0:00		12,750	896,148	264,460	179,230	85,230	-72,481	-3,020	118,505
3/20/2011 1:00		4,320	881,847	278,712	176,369	102,343	-98,023	-4,084	114,421
3/20/2011 2:00		8,410	917,155	259,038	183,431	75,607	-67,197	-2,800	111,621
3/20/2011 3:00		94,669	961,221	291,632	192,244	99,388	-4,719	-197	111,424
3/20/2011 4:00		235,191	978,169	288,503	195,634	92,869	142,322	5,930	117,355
3/20/2011 5:00		528,818	996,331	286,857	199,266	87,591	441,226	18,384	135,739
3/20/2011 6:00		806,472	1,010,188	306,206	202,038	104,168	702,303	29,263	165,002
3/20/2011 7:00		1,080,127	1,022,950	274,129	204,590	69,539	1,010,588	42,108	207,109
3/20/2011 8:00		1,315,427	1,034,958	303,980	206,992	96,989	1,218,439	50,768	257,878
3/20/2011 9:00		1,713,826	1,053,908	294,100	210,782	83,318	1,630,508	67,938	325,816
3/20/2011 10:00		2,135,698	1,066,825	316,119	213,365	102,754	2,032,944	84,706	410,522
3/20/2011 11:00	0.98	2,587,017	998,826	897,516	199,765	697,751	1,889,267	78,719	489,241
3/20/2011 12:00		2,189,704	1,062,655	377,971	212,531	165,440	2,024,264	84,344	573,585
3/20/2011 13:00		2,050,086	1,073,326	343,678	214,665	129,013	1,921,073	80,045	653,630
3/20/2011 14:00		1,767,661	1,208,938	394,098	241,788	152,311	1,615,350	67,306	720,936
3/20/2011 15:00		1,833,135	1,234,381	376,184	246,876	129,308	1,703,827	70,993	791,929
3/20/2011 16:00		1,808,420	1,243,816	328,987	248,763	80,224	1,728,196	72,008	863,937
3/20/2011 17:00		1,529,741	1,326,175	421,612	265,235	156,377	1,373,365	57,224	921,161
3/20/2011 18:00		1,507,455	1,304,712	559,016	260,942	298,073	1,209,382	50,391	971,552
3/20/2011 19:00		1,458,746	1,264,483	589,169	252,897	336,272	1,122,474	46,770	1,018,321
3/20/2011 20:00		1,427,375	1,263,200	602,197	252,640	349,557	1,077,818	44,909	1,063,230
3/20/2011 21:00		1,368,220	1,258,604	572,782	251,721	321,061	1,047,158	43,632	1,106,862
3/20/2011 22:00		1,263,223	1,252,338	578,419	250,468	327,952	935,272	38,970	1,145,832
3/20/2011 23:00		1,226,289	1,249,725	604,410	249,945	354,465	871,824	36,326	1,182,158

TABLE O-2
CITY OF ANGELS WASTEWATER MASTER PLAN
EQUALIZATION BASIN CAPACITY EVALUATION - MARCH 2011

		Metered Flow				EQ Basin			
Date Time	Precipitation (in)	Adjusted EQ Basin (gpd)	Influent (gpd)	Drainage (gpd)	Process/Site Drainage Flows, 20% of Influent (gpd)	Flow out of Basin (gpd)	Rate of Storage (gpd)	Incremental Storage Volume (gal)	Total Storage Volume (gal)
3/21/2011 0:00		1,136,684	1,245,350	597,763	249,070	348,693	787,991	32,833	1,214,991
3/21/2011 1:00		948,122	1,233,821	559,330	246,764	312,566	635,556	26,482	1,241,472
3/21/2011 2:00		857,830	1,229,050	587,539	245,810	341,729	516,101	21,504	1,262,976
3/21/2011 3:00		781,077	1,224,892	601,424	244,978	356,445	424,632	17,693	1,280,669
3/21/2011 4:00		829,994	1,228,796	609,337	245,759	363,577	466,417	19,434	1,300,103
3/21/2011 5:00		913,949	1,235,696	568,991	247,139	321,852	592,097	24,671	1,324,774
3/21/2011 6:00		851,441	1,231,660	575,985	246,332	329,653	521,788	21,741	1,346,515
3/21/2011 7:00		786,036	1,229,444	597,197	245,889	351,308	434,728	18,114	1,364,629
3/21/2011 8:00		785,407	1,229,338	559,079	245,868	313,212	472,195	19,675	1,384,304
3/21/2011 9:00		920,338	1,238,419	722,991	247,684	475,308	445,031	18,543	1,402,847
3/21/2011 10:00		879,099	1,234,729	708,225	246,946	461,279	417,820	17,409	1,420,256
3/21/2011 11:00	0.70	831,929	1,230,696	704,698	246,139	458,559	373,370	15,557	1,435,813
3/21/2011 12:00		788,580	1,226,892	705,582	245,378	460,204	328,376	13,682	1,449,495
3/21/2011 13:00		602,689	1,215,163	595,236	243,033	352,204	250,485	10,437	1,459,932
3/21/2011 14:00		537,524	1,212,221	592,085	242,444	349,641	187,883	7,828	1,467,761
3/21/2011 15:00		530,711	1,209,862	655,003	241,972	413,031	117,680	4,903	1,472,664
3/21/2011 16:00		411,286	1,204,063	598,728	240,813	357,915	53,371	2,224	1,474,888
3/21/2011 17:00		433,449	1,207,528	600,958	241,506	359,452	73,997	3,083	1,477,971
3/21/2011 18:00		578,309	1,215,780	607,786	243,156	364,630	213,679	8,903	1,486,874
3/21/2011 19:00		1,340,637	1,262,815	1,009,727	252,563	757,164	583,473	24,311	1,511,186
3/21/2011 20:00		1,159,623	1,250,574	726,403	250,115	476,288	683,335	28,472	1,539,658
3/21/2011 21:00		886,561	1,234,246	567,536	246,849	320,687	565,873	23,578	1,563,236
3/21/2011 22:00		725,736	1,224,683	568,953	244,937	324,016	401,720	16,738	1,579,974
3/21/2011 23:00		607,818	1,218,100	595,666	243,620	352,046	255,772	10,657	1,590,632
3/22/2011 0:00		443,141	1,210,491	552,284	242,098	310,186	132,955	5,540	1,596,171
3/22/2011 1:00		332,484	1,204,059	580,429	240,812	339,617	-7,133	-297	1,595,874
3/22/2011 2:00		279,918	1,201,967	584,252	240,393	343,859	-63,941	-2,664	1,593,210
3/22/2011 3:00		186,724	1,192,506	543,436	238,501	304,934	-118,210	-4,925	1,588,285
3/22/2011 4:00		167,477	1,193,685	594,708	238,737	355,971	-188,494	-7,854	1,580,431
3/22/2011 5:00		159,258	1,190,196	565,980	238,039	327,941	-168,682	-7,028	1,573,402
3/22/2011 6:00		123,907	1,178,283	559,640	235,657	323,983	-200,076	-8,337	1,565,066
3/22/2011 7:00		179,972	1,187,942	591,264	237,588	353,676	-173,704	-7,238	1,557,828
3/22/2011 8:00		268,346	1,202,108	546,230	240,422	305,808	-37,462	-1,561	1,556,267
3/22/2011 9:00		348,607	1,207,008	580,413	241,402	339,011	9,595	400	1,556,667
3/22/2011 10:00		362,752	1,207,458	581,532	241,492	340,040	22,712	946	1,557,613
3/22/2011 11:00	0.29	351,640	1,205,750	548,816	241,150	307,666	43,974	1,832	1,559,445
3/22/2011 12:00		312,721	1,203,129	596,628	240,626	356,002	-43,281	-1,803	1,557,642
3/22/2011 13:00		257,705	1,198,713	564,505	239,743	324,762	-67,057	-2,794	1,554,848
3/22/2011 14:00		224,105	1,196,104	566,857	239,221	327,636	-103,530	-4,314	1,550,534
3/22/2011 15:00		219,964	1,192,085	595,450	238,417	357,033	-137,069	-5,711	1,544,823
3/22/2011 16:00		145,396	1,184,403	548,968	236,881	312,087	-166,691	-6,945	1,537,878
3/22/2011 17:00		183,545	1,192,588	583,713	238,518	345,196	-161,651	-6,735	1,531,142
3/22/2011 18:00		150,369	1,184,231	574,476	236,846	337,630	-187,261	-7,803	1,523,340
3/22/2011 19:00		147,919	1,183,827	548,672	236,765	311,907	-163,988	-6,833	1,516,507
3/22/2011 20:00		229,316	1,196,850	590,502	239,370	351,132	-121,816	-5,076	1,511,431
3/22/2011 21:00		216,482	1,193,546	549,605	238,709	310,896	-94,414	-3,934	1,507,497
3/22/2011 22:00		147,967	1,182,608	568,567	236,522	332,045	-184,078	-7,670	1,499,827
3/22/2011 23:00		159,856	1,181,238	577,486	236,248	341,239	-181,382	-7,558	1,492,270
3/23/2011 0:00		53,284	1,156,779	539,573	231,356	308,217	-254,933	-10,622	1,481,647
3/23/2011 1:00		17,348	1,131,854	590,371	226,371	364,000	-346,652	-14,444	1,467,204
3/23/2011 2:00		2,858	1,080,263	540,223	216,053	324,171	-321,313	-13,388	1,453,816
3/23/2011 3:00		633	1,061,896	580,691	212,379	368,312	-367,679	-15,320	1,438,496
3/23/2011 4:00		18,524	1,110,858	567,473	222,172	345,301	-326,777	-13,616	1,424,880
3/23/2011 5:00		31,417	1,113,346	571,448	222,669	348,779	-317,362	-13,223	1,411,657
3/23/2011 6:00		46,444	1,141,356	599,451	228,271	371,180	-324,735	-13,531	1,398,126
3/23/2011 7:00		61,719	1,153,522	537,590	230,704	306,886	-245,167	-10,215	1,387,911
3/23/2011 8:00		153,231	1,185,097	590,574	237,019	353,554	-200,323	-8,347	1,379,564
3/23/2011 9:00		340,277	1,203,788	684,425	240,758	443,667	-103,391	-4,308	1,375,256
3/23/2011 10:00		346,516	1,200,558	712,252	240,112	472,140	-125,624	-5,234	1,370,022
3/23/2011 11:00	0.41	280,664	1,193,621	586,652	238,724	347,928	-67,264	-2,803	1,367,219
3/23/2011 12:00		243,268	1,185,350	585,140	237,070	348,070	-104,803	-4,367	1,362,852
3/23/2011 13:00		208,552	1,179,277	544,193	235,855	308,337	-99,785	-4,158	1,358,694
3/23/2011 14:00		226,071	1,177,981	570,150	235,596	334,554	-108,483	-4,520	1,354,174
3/23/2011 15:00		227,074	1,182,799	561,965	236,560	325,406	-98,331	-4,097	1,350,077
3/23/2011 16:00		286,410	1,186,547	579,933	237,309	342,624	-56,214	-2,342	1,347,735
3/23/2011 17:00		344,347	1,188,413	577,908	237,683	340,225	4,122	172	1,347,907
3/23/2011 18:00		354,737	1,189,083	569,602	237,817	331,786	22,951	956	1,348,863
3/23/2011 19:00		306,296	1,186,350	548,286	237,270	311,016	-4,720	-197	1,348,666
3/23/2011 20:00		326,128	1,186,623	588,181	237,325	350,857	-24,728	-1,030	1,347,636
3/23/2011 21:00		251,383	1,179,856	535,931	235,971	299,960	-48,577	-2,024	1,345,612
3/23/2011 22:00		261,193	1,180,206	578,138	236,041	342,097	-80,903	-3,371	1,342,241
3/23/2011 23:00		207,706	1,174,890	556,187	234,978	321,209	-113,502	-4,729	1,337,512

TABLE O-2
CITY OF ANGELS WASTEWATER MASTER PLAN
EQUALIZATION BASIN CAPACITY EVALUATION - MARCH 2011

		Metered Flow				EQ Basin			
Date Time	Precipitation (in)	Adjusted EQ Basin (gpd)	Influent (gpd)	Drainage (gpd)	Process/Site Drainage Flows, 20% of Influent (gpd)	Flow out of Basin (gpd)	Rate of Storage (gpd)	Incremental Storage Volume (gal)	Total Storage Volume (gal)
3/24/2011 0:00		126,684	1,161,307	557,784	232,261	325,522	-198,838	-8,285	1,329,227
3/24/2011 1:00		95,513	1,141,159	575,734	228,232	347,502	-251,989	-10,500	1,318,727
3/24/2011 2:00		47,126	1,112,579	537,884	222,516	315,369	-268,242	-11,177	1,307,550
3/24/2011 3:00		7,913	1,108,296	587,881	221,659	366,222	-358,309	-14,930	1,292,621
3/24/2011 4:00		21,228	1,091,000	528,090	218,200	309,890	-288,662	-12,028	1,280,593
3/24/2011 5:00		12,285	1,097,299	589,823	219,460	370,363	-358,079	-14,920	1,265,673
3/24/2011 6:00		26,299	1,103,401	532,999	220,680	312,319	-286,020	-11,918	1,253,756
3/24/2011 7:00		91,965	1,154,079	577,584	230,816	346,768	-254,803	-10,617	1,243,139
3/24/2011 8:00		194,248	1,172,788	548,963	234,558	314,406	-120,158	-5,007	1,238,132
3/24/2011 9:00		259,430	1,180,921	566,779	236,184	330,595	-71,165	-2,965	1,235,167
3/24/2011 10:00		445,387	1,191,292	613,529	238,258	375,271	70,116	2,922	1,238,089
3/24/2011 11:00	1.27	453,919	1,189,123	558,925	237,825	321,100	132,819	5,534	1,243,623
3/24/2011 12:00		539,071	1,195,604	675,814	239,121	436,693	102,378	4,266	1,247,889
3/24/2011 13:00		581,846	1,197,202	713,648	239,440	474,208	107,638	4,485	1,252,374
3/24/2011 14:00		553,410	1,194,917	672,397	238,983	433,414	119,996	5,000	1,257,373
3/24/2011 15:00		408,824	1,185,192	570,544	237,038	333,505	75,319	3,138	1,260,512
3/24/2011 16:00		424,115	1,183,963	614,500	236,793	377,708	46,407	1,934	1,262,445
3/24/2011 17:00		379,624	1,181,406	566,852	236,281	330,570	49,053	2,044	1,264,489
3/24/2011 18:00		482,202	1,188,390	592,311	237,678	354,633	127,570	5,315	1,269,805
3/24/2011 19:00		774,231	1,207,375	544,568	241,475	303,093	471,138	19,631	1,289,435
3/24/2011 20:00		1,137,380	1,231,429	577,353	246,286	331,068	806,312	33,596	1,323,032
3/24/2011 21:00		1,341,546	1,243,058	604,446	248,612	355,834	985,712	41,071	1,364,103
3/24/2011 22:00		1,331,186	1,240,100	597,984	248,020	349,964	981,222	40,884	1,404,987
3/24/2011 23:00		1,030,393	1,221,358	566,182	244,272	321,911	708,482	29,520	1,434,507
3/25/2011 0:00		799,944	1,208,413	557,476	241,683	315,794	484,150	20,173	1,454,680
3/25/2011 1:00		679,851	1,202,808	587,424	240,562	346,862	332,989	13,875	1,468,555
3/25/2011 2:00		490,073	1,191,525	536,614	238,305	298,309	191,764	7,990	1,476,545
3/25/2011 3:00		442,666	1,191,558	578,152	238,312	339,841	102,825	4,284	1,480,829
3/25/2011 4:00		359,868	1,186,804	566,208	237,361	328,847	31,020	1,293	1,482,122
3/25/2011 5:00		264,728	1,180,558	546,617	236,112	310,505	-45,777	-1,907	1,480,214
3/25/2011 6:00		243,616	1,180,042	586,613	236,008	350,604	-106,988	-4,458	1,475,757
3/25/2011 7:00		318,064	1,184,858	539,523	236,972	302,551	15,513	646	1,476,403
3/25/2011 8:00		327,785	1,186,328	572,820	237,266	335,554	-7,769	-324	1,476,079
3/25/2011 9:00		448,711	1,191,956	567,251	238,391	328,860	119,851	4,994	1,481,073
3/25/2011 10:00		407,952	1,189,985	553,737	237,997	315,740	92,212	3,842	1,484,915
3/25/2011 11:00	0.03	423,619	1,189,429	598,866	237,886	360,980	62,639	2,610	1,487,525
3/25/2011 12:00		451,718	1,188,929	615,659	237,786	377,874	73,844	3,077	1,490,602
3/25/2011 13:00		495,585	1,189,129	718,564	237,826	480,738	14,847	619	1,491,221
3/25/2011 14:00		336,468	1,180,317	586,977	236,063	350,914	-14,446	-602	1,490,619
3/25/2011 15:00		295,255	1,177,578	567,655	235,516	332,139	-36,884	-1,537	1,489,082
3/25/2011 16:00		364,612	1,181,201	671,169	236,240	434,929	-70,318	-2,930	1,486,152
3/25/2011 17:00		302,165	1,174,000	640,320	234,800	405,520	-103,355	-4,306	1,481,846
3/25/2011 18:00		238,628	1,166,906	533,492	233,381	300,111	-61,483	-2,562	1,479,284
3/25/2011 19:00		224,061	1,169,306	578,657	233,861	344,795	-120,735	-5,031	1,474,253
3/25/2011 20:00		239,120	1,168,113	562,794	233,623	329,171	-90,051	-3,752	1,470,501
3/25/2011 21:00		200,819	1,163,550	542,927	232,710	310,217	-109,398	-4,558	1,465,943
3/25/2011 22:00		245,909	1,166,333	582,055	233,267	348,788	-102,879	-4,287	1,461,656
3/25/2011 23:00		168,537	1,159,471	542,972	231,894	311,077	-142,541	-5,939	1,455,717
3/26/2011 0:00		111,014	1,144,724	562,016	228,945	333,071	-222,057	-9,252	1,446,465
3/26/2011 1:00		93,112	1,139,647	570,651	227,929	342,721	-249,609	-10,400	1,436,064
3/26/2011 2:00		20,191	1,098,050	534,414	219,610	314,804	-294,613	-12,276	1,423,789
3/26/2011 3:00		35,565	1,115,125	594,698	223,025	371,673	-336,109	-14,005	1,409,784
3/26/2011 4:00		134,561	1,144,096	585,662	228,819	356,843	-222,282	-9,262	1,400,522
3/26/2011 5:00		241,739	1,168,063	572,859	233,613	339,246	-97,507	-4,063	1,396,460
3/26/2011 6:00		403,547	1,181,066	590,622	236,213	354,409	49,138	2,047	1,398,507
3/26/2011 7:00		614,260	1,191,101	601,378	238,220	363,158	251,102	10,463	1,408,970
3/26/2011 8:00		848,850	1,203,240	605,805	240,648	365,157	483,693	20,154	1,429,124
3/26/2011 9:00		1,107,367	1,219,968	601,397	243,994	357,403	749,964	31,249	1,460,372
3/26/2011 10:00		1,094,735	1,215,192	556,878	243,038	313,840	780,895	32,537	1,492,909
3/26/2011 11:00	1.24	1,152,355	1,217,288	650,747	243,458	407,290	745,065	31,044	1,523,954
3/26/2011 12:00		1,089,983	1,210,996	654,442	242,199	412,242	677,741	28,239	1,552,193
3/26/2011 13:00		924,172	1,197,315	543,706	239,463	304,243	619,928	25,830	1,578,023
3/26/2011 14:00		963,379	1,200,790	696,630	240,158	456,473	506,907	21,121	1,599,144
3/26/2011 15:00		1,313,720	1,224,197	1,025,816	244,839	780,977	532,743	22,198	1,621,342
3/26/2011 16:00		1,259,382	1,224,056	1,004,129	244,811	759,317	500,064	20,836	1,642,178
3/26/2011 17:00		1,006,263	1,208,764	731,121	241,753	489,368	516,894	21,537	1,663,715
3/26/2011 18:00		867,623	1,201,371	594,747	240,274	354,473	513,150	21,381	1,685,097
3/26/2011 19:00		999,046	1,209,825	601,175	241,965	359,210	639,835	26,660	1,711,756
3/26/2011 20:00		1,108,762	1,215,388	563,988	243,078	320,911	787,851	32,827	1,744,583
3/26/2011 21:00		1,084,309	1,214,483	598,267	242,897	355,370	728,938	30,372	1,774,956
3/26/2011 22:00		959,791	1,206,408	572,328	241,282	331,046	628,745	26,198	1,801,154
3/26/2011 23:00		795,613	1,193,825	561,248	238,765	322,483	473,130	19,714	1,820,867

TABLE O-2
CITY OF ANGELS WASTEWATER MASTER PLAN
EQUALIZATION BASIN CAPACITY EVALUATION - MARCH 2011

		Metered Flow				EQ Basin				
Date Time	Precipitation (in)	Adjusted EQ Basin (gpd)	Influent (gpd)	Drainage (gpd)	Process/Site Drainage Flows, 20% of Influent (gpd)	Flow out of Basin (gpd)	Rate of Storage (gpd)	Incremental Storage Volume (gal)	Total Storage Volume (gal)	
3/27/2011 0:00		693,524	1,221,783	593,957	244,357	349,600	343,924	14,330	1,835,198	
3/27/2011 1:00		515,659	1,213,660	547,411	242,732	304,679	210,979	8,791	1,843,988	
3/27/2011 2:00		405,771	1,206,615	580,878	241,323	339,555	66,216	2,759	1,846,747	
3/27/2011 3:00		347,909	1,201,443	576,958	240,289	336,669	11,239	468	1,847,216	← Max Volume Stored
3/27/2011 4:00		241,472	1,191,349	549,740	238,270	311,470	-69,998	-2,917	1,844,299	
3/27/2011 5:00		260,893	1,212,242	592,600	242,448	350,152	-89,259	-3,719	1,840,580	
3/27/2011 6:00		175,853	1,202,338	548,973	240,468	308,505	-132,652	-5,527	1,835,053	
3/27/2011 7:00		200,311	1,205,373	576,534	241,075	335,460	-135,148	-5,631	1,829,422	
3/27/2011 8:00		252,147	1,210,756	575,766	242,151	333,615	-81,468	-3,395	1,826,027	
3/27/2011 9:00		311,017	1,215,015	546,767	243,003	303,764	7,253	302	1,826,329	
3/27/2011 10:00		460,868	1,226,021	591,198	245,204	345,994	114,874	4,786	1,831,116	
3/27/2011 11:00	0.00	470,448	1,224,204	555,501	244,841	310,660	159,788	6,658	1,837,773	
3/27/2011 12:00		444,437	1,221,996	570,896	244,399	326,497	117,940	4,914	1,842,688	
3/27/2011 13:00		435,347	1,219,179	591,469	243,836	347,633	87,714	3,655	1,846,342	
3/27/2011 14:00		602,511	1,230,704	859,066	246,141	612,925	-10,414	-434	1,845,908	
3/27/2011 15:00		413,760	1,218,883	742,707	243,777	498,930	-85,170	-3,549	1,842,360	
3/27/2011 16:00		350,645	1,213,350	676,670	242,670	434,000	-83,355	-3,473	1,838,887	
3/27/2011 17:00		209,644	1,199,788	560,981	239,958	321,024	-111,380	-4,641	1,834,246	
3/27/2011 18:00		236,114	1,202,000	564,326	240,400	323,926	-87,812	-3,659	1,830,587	
3/27/2011 19:00		262,512	1,204,175	589,072	240,835	348,237	-85,725	-3,572	1,827,015	
3/27/2011 20:00		198,313	1,198,238	540,970	239,648	301,323	-103,009	-4,292	1,822,723	
3/27/2011 21:00		246,523	1,201,504	579,095	240,301	338,794	-92,271	-3,845	1,818,878	
3/27/2011 22:00		263,828	1,198,763	571,668	239,753	331,915	-68,087	-2,837	1,816,041	
3/27/2011 23:00		148,715	1,188,008	545,151	237,602	307,549	-158,835	-6,618	1,809,423	
3/28/2011 0:00		123,439	1,173,879	588,455	234,776	353,679	-230,239	-9,593	1,799,830	
3/28/2011 1:00		43,494	1,147,671	548,602	229,534	319,068	-275,574	-11,482	1,788,348	
3/28/2011 2:00		11,094	1,109,579	572,495	221,916	350,579	-339,485	-14,145	1,774,203	
3/28/2011 3:00		4,107	1,103,172	565,343	220,634	344,709	-340,602	-14,192	1,760,011	
3/28/2011 4:00		3,671	1,050,824	554,539	210,165	344,374	-340,703	-14,196	1,745,815	
3/28/2011 5:00		6,491	1,086,604	582,914	217,321	365,594	-359,102	-14,963	1,730,852	
3/28/2011 6:00		1,041	1,035,454	531,879	207,091	324,788	-323,747	-13,489	1,717,363	
3/28/2011 7:00		39,950	1,118,008	587,895	223,602	364,294	-324,344	-13,514	1,703,848	
3/28/2011 8:00		710,535	249,213	241,401	49,843	191,559	518,976	21,624	1,725,472	
3/28/2011 9:00		710,007	269,831	140,642	53,966	86,676	623,332	25,972	1,751,445	
3/28/2011 10:00		332,393	624,370	154,707	124,874	29,833	302,559	12,607	1,764,051	
3/28/2011 11:00	0.00	296,790	624,244	123,954	124,849	0	296,790	12,366	1,776,418	
3/28/2011 12:00		630,222	634,129	471,785	126,826	344,960	285,262	11,886	1,788,303	
3/28/2011 13:00		357,585	988,216	573,747	197,643	376,104	-18,520	-772	1,787,532	
3/28/2011 14:00		167,801	1,206,651	676,149	241,330	434,819	-267,018	-11,126	1,776,406	
3/28/2011 15:00		253,185	1,191,778	743,020	238,356	504,664	-251,479	-10,478	1,765,928	
3/28/2011 16:00		230,255	1,217,815	779,756	243,563	536,193	-305,937	-12,747	1,753,180	
3/28/2011 17:00		184,674	1,216,250	750,879	243,250	507,629	-322,955	-13,456	1,739,724	
3/28/2011 18:00		226,804	1,219,414	775,242	243,883	531,360	-304,555	-12,690	1,727,034	
3/28/2011 19:00		227,596	1,218,540	748,153	243,708	504,445	-276,849	-11,535	1,715,499	
3/28/2011 20:00		209,348	1,217,310	751,438	243,462	507,976	-298,628	-12,443	1,703,056	
3/28/2011 21:00		244,916	1,219,348	751,083	243,870	507,214	-262,298	-10,929	1,692,127	
3/28/2011 22:00		252,203	1,220,875	750,498	244,175	506,323	-254,120	-10,588	1,681,538	
3/28/2011 23:00		189,739	1,215,982	749,348	243,196	506,151	-316,412	-13,184	1,668,355	
3/29/2011 0:00		92,054	1,202,130	748,140	240,426	507,714	-415,660	-17,319	1,651,035	
3/29/2011 1:00		37,408	1,180,304	747,447	236,061	511,386	-473,978	-19,749	1,631,286	
3/29/2011 2:00		37,521	1,168,844	746,269	233,769	512,500	-474,979	-19,791	1,611,496	
3/29/2011 3:00		5,392	1,109,027	744,650	221,805	522,845	-517,453	-21,561	1,589,935	
3/29/2011 4:00		10,378	1,137,692	744,150	227,538	516,612	-506,234	-21,093	1,568,842	
3/29/2011 5:00		4,893	1,113,677	742,197	222,735	519,462	-514,569	-21,440	1,547,402	
3/29/2011 6:00		4,256	1,116,156	741,074	223,231	517,842	-513,586	-21,399	1,526,002	
3/29/2011 7:00		41,942	1,166,959	739,887	233,392	506,495	-464,554	-19,356	1,506,646	
3/29/2011 8:00		588,432	468,888	484,105	93,778	390,327	198,104	8,254	1,514,900	
3/29/2011 9:00		558,323	465,498	362,133	93,100	269,034	289,290	12,054	1,526,954	
3/29/2011 10:00		822,025	698,667	795,877	139,733	656,143	165,882	6,912	1,533,866	
3/29/2011 11:00	0.00	928,033	699,001	892,190	139,800	752,390	175,643	7,318	1,541,184	
3/29/2011 12:00		920,336	703,483	925,096	140,697	784,399	135,937	5,664	1,546,848	
3/29/2011 13:00		487,506	1,045,118	889,511	209,024	680,487	-192,981	-8,041	1,538,807	
3/29/2011 14:00		191,404	1,155,273	746,757	231,055	515,703	-324,299	-13,512	1,525,295	
3/29/2011 15:00		127,657	1,121,279	636,362	224,256	412,106	-284,449	-11,852	1,513,443	
3/29/2011 16:00		40,840	907,661	349,975	181,532	168,443	-127,603	-5,317	1,508,126	
3/29/2011 17:00		0	780,574	212,987	156,115	56,872	-56,872	-2,370	1,505,756	
3/29/2011 18:00		11,600	837,250	378,743	167,450	211,293	-199,692	-8,321	1,497,436	
3/29/2011 19:00		155,805	1,155,058	712,037	231,012	481,025	-325,220	-13,551	1,483,885	
3/29/2011 20:00		165,293	1,153,779	705,972	230,756	475,216	-309,923	-12,913	1,470,971	
3/29/2011 21:00		177,716	1,152,554	704,641	230,511	474,130	-296,414	-12,351	1,458,621	
3/29/2011 22:00		177,078	1,151,196	703,823	230,239	473,584	-296,506	-12,354	1,446,266	
3/29/2011 23:00		111,259	1,145,424	702,713	229,085	473,629	-362,369	-15,099	1,431,168	

TABLE O-2
CITY OF ANGELS WASTEWATER MASTER PLAN
EQUALIZATION BASIN CAPACITY EVALUATION - MARCH 2011

		Metered Flow				EQ Basin			
Date Time	Precipitation (in)	Adjusted EQ Basin (gpd)	Influent (gpd)	Drainage (gpd)	Process/Site Drainage Flows, 20% of Influent (gpd)	Flow out of Basin (gpd)	Rate of Storage (gpd)	Incremental Storage Volume (gal)	Total Storage Volume (gal)
3/30/2011 0:00		51,250	1,134,313	701,215	226,863	474,353	-423,102	-17,629	1,413,538
3/30/2011 1:00		2,458	1,079,151	700,287	215,830	484,457	-481,999	-20,083	1,393,455
3/30/2011 2:00		1,214	1,075,502	699,532	215,100	484,431	-483,217	-20,134	1,373,321
3/30/2011 3:00		0	995,153	697,796	199,031	498,765	-498,765	-20,782	1,352,539
3/30/2011 4:00		3,622	1,046,448	696,911	209,290	487,621	-483,999	-20,167	1,332,373
3/30/2011 5:00		4,950	978,817	694,953	195,763	499,190	-494,240	-20,593	1,311,779
3/30/2011 6:00		5,501	1,059,456	694,442	211,891	482,551	-477,050	-19,877	1,291,902
3/30/2011 7:00		4,871	1,061,992	694,091	212,398	481,693	-476,821	-19,868	1,272,035
3/30/2011 8:00		94,329	1,143,401	694,192	228,680	465,512	-371,182	-15,466	1,256,569
3/30/2011 9:00		152,876	1,153,619	694,125	230,724	463,401	-310,525	-12,939	1,243,630
3/30/2011 10:00		163,283	1,155,683	696,346	231,137	465,209	-301,926	-12,580	1,231,050
3/30/2011 11:00	0.00	262,685	1,162,521	770,215	232,504	537,711	-275,026	-11,459	1,219,591
3/30/2011 12:00		236,736	1,159,863	777,851	231,973	545,878	-309,142	-12,881	1,206,710
3/30/2011 13:00		227,057	1,159,083	775,822	231,817	544,005	-316,948	-13,206	1,193,503
3/30/2011 14:00		113,155	1,149,367	736,784	229,873	506,911	-393,756	-16,407	1,177,097
3/30/2011 15:00		162,706	1,152,142	811,025	230,428	580,597	-417,891	-17,412	1,159,685
3/30/2011 16:00		158,910	1,149,979	818,182	229,996	588,186	-429,276	-17,886	1,141,798
3/30/2011 17:00		70,425	1,140,379	705,894	228,076	477,818	-407,394	-16,975	1,124,824
3/30/2011 18:00		58,287	1,138,771	697,367	227,754	469,613	-411,326	-17,139	1,107,685
3/30/2011 19:00		108,437	1,143,485	692,722	228,697	464,025	-355,588	-14,816	1,092,869
3/30/2011 20:00		90,214	1,142,890	689,204	228,578	460,626	-370,413	-15,434	1,077,435
3/30/2011 21:00		124,855	1,145,885	686,770	229,177	457,593	-332,739	-13,864	1,063,571
3/30/2011 22:00		133,132	1,144,231	686,167	228,846	457,321	-324,189	-13,508	1,050,063
3/30/2011 23:00		88,551	1,138,544	683,190	227,709	455,481	-366,930	-15,289	1,034,774
3/31/2011 0:00		18,342	1,119,443	681,848	223,889	457,960	-439,618	-18,317	1,016,457
3/31/2011 1:00		1,457	1,070,190	681,889	214,038	467,851	-466,393	-19,433	997,024
3/31/2011 2:00		3,238	1,025,794	680,101	205,159	474,942	-471,703	-19,654	977,369
3/31/2011 3:00		3,657	958,925	676,993	191,785	485,208	-481,552	-20,065	957,305
3/31/2011 4:00		4,075	957,146	676,933	191,429	485,504	-481,429	-20,060	937,245
3/31/2011 5:00		4,493	963,533	676,287	192,707	483,581	-479,087	-19,962	917,283
3/31/2011 6:00		4,912	957,929	673,266	191,586	481,680	-476,769	-19,865	897,418
3/31/2011 7:00		5,330	1,012,301	673,782	202,460	471,322	-465,992	-19,416	878,002
3/31/2011 8:00		36,849	1,120,357	674,434	224,071	450,362	-413,513	-17,230	860,772
3/31/2011 9:00		122,621	1,146,324	674,992	229,265	445,727	-323,107	-13,463	847,309
3/31/2011 10:00		126,518	1,148,603	677,383	229,721	447,663	-321,144	-13,381	833,928
3/31/2011 11:00	0.00	143,039	1,150,324	677,746	230,065	447,681	-304,642	-12,693	821,235
3/31/2011 12:00		130,050	1,149,182	675,215	229,836	445,378	-315,329	-13,139	808,096
3/31/2011 13:00		107,913	1,141,725	670,041	228,345	441,696	-333,783	-13,908	794,188
3/31/2011 14:00		87,489	1,141,085	667,954	228,217	439,737	-352,248	-14,677	779,511
3/31/2011 15:00		57,256	1,024,142	464,314	204,828	259,485	-202,229	-8,426	771,085
3/31/2011 16:00		0	759,317	284,663	151,863	132,799	-132,799	-5,533	765,552
3/31/2011 17:00		0	787,025	310,605	157,405	153,200	-153,200	-6,383	759,168
3/31/2011 18:00		0	816,835	315,601	163,367	152,234	-152,234	-6,343	752,825
3/31/2011 19:00		0	826,961	313,806	165,392	148,413	-148,413	-6,184	746,642
3/31/2011 20:00		0	865,608	337,360	173,122	164,238	-164,238	-6,843	739,798
3/31/2011 21:00		0	878,502	313,283	175,700	137,583	-137,583	-5,733	734,066
3/31/2011 22:00		0	874,003	312,848	174,801	138,047	-138,047	-5,752	728,314
3/31/2011 23:00		0	836,677	314,871	167,335	147,536	-147,536	-6,147	722,166

TABLE O-3
CITY OF ANGELS WASTEWATER MASTER PLAN
ESTIMATED EQUALIZATION BASIN SIZING REQUIREMENTS

Assumptions

2009-2011 ADWF	357,000 gpd	MFP Setpoint	1,300,000 gpd
Total Service Area	828 acres	Total Wastewater Volume Stored during Storm Event	2,084,258 gallons
Storm Event Reviewed	3/20/2011 6:00 to 3/21/2011 12:00	10-year Projection Total Service Area	1,228 acres
		20-year Projection Total Service Area	1,520 acres

Storm event selected based on period when equalization storage begins (i.e. when the MFP setpoint is exceeded) and when cumulative storage volume begins to decrease (i.e. when the MFP setpoint is no longer exceeded)

	Metered Flow											
Date Time	Adjusted EQ Basin [a] (gpd)	Influent (gpd)	Drainage (gpd)	Process/Site Drainage Flows, 20% of Influent (gpd)	Estimated Incoming Flow (gpd)	Hourly Storage Volume Required (gal)	Cumulative Storage Volume Used (gal)	Estimated Flow from I/I (gpd)	Estimated I/I (gal)	Total I/I during Storm Event (gal)	Total Incoming Flow during Storm Event (gal)	Total Hours until Storage Not Used
3/20/2011 6:00	806,472	1,010,188	306,206	202,038	1,510,454	8,769	8,769	1,153,454	48,061	48,061	62,936	1
3/20/2011 7:00	1,080,127	1,022,950	274,129	204,590	1,828,948	22,039	30,808	1,471,948	61,331	109,392	139,142	2
3/20/2011 8:00	1,315,427	1,034,958	303,980	206,992	2,046,405	31,100	61,909	1,689,405	70,392	179,784	224,409	3
3/20/2011 9:00	1,713,826	1,053,908	294,100	210,782	2,473,635	48,901	110,810	2,116,635	88,193	267,977	327,477	4
3/20/2011 10:00	2,135,698	1,066,825	316,119	213,365	2,886,404	66,100	176,910	2,529,404	105,392	373,369	447,744	5
3/20/2011 11:00	2,587,017	998,826	897,516	199,765	2,688,328	57,847	234,757	2,331,328	97,139	470,507	559,757	6
3/20/2011 12:00	2,189,704	1,062,655	377,971	212,531	2,874,388	65,600	300,357	2,517,388	104,891	575,398	679,523	7
3/20/2011 13:00	2,050,086	1,073,326	343,678	214,665	2,779,734	61,656	362,012	2,422,734	100,947	676,346	795,346	8
3/20/2011 14:00	1,767,661	1,208,938	394,098	241,788	2,582,501	53,438	415,450	2,225,501	92,729	769,075	902,950	9
3/20/2011 15:00	1,833,135	1,234,381	376,184	246,876	2,691,331	57,972	473,422	2,334,331	97,264	866,339	1,015,089	10
3/20/2011 16:00	1,808,420	1,243,816	328,987	248,763	2,723,249	59,302	532,724	2,366,249	98,594	964,932	1,128,557	11
3/20/2011 17:00	1,529,741	1,326,175	421,612	265,235	2,434,304	47,263	579,987	2,077,304	86,554	1,051,487	1,229,987	12
3/20/2011 18:00	1,507,455	1,304,712	559,016	260,942	2,253,151	39,715	619,701	1,896,151	79,006	1,130,493	1,323,868	13
3/20/2011 19:00	1,458,746	1,264,483	589,169	252,897	2,134,061	34,753	654,454	1,777,061	74,044	1,204,537	1,412,787	14
3/20/2011 20:00	1,427,375	1,263,200	602,197	252,640	2,088,378	32,849	687,303	1,731,378	72,141	1,276,678	1,499,803	15
3/20/2011 21:00	1,368,220	1,258,604	572,782	251,721	2,054,042	31,418	718,721	1,697,042	70,710	1,347,388	1,585,388	16
3/20/2011 22:00	1,263,223	1,252,338	578,419	250,468	1,937,142	26,548	745,269	1,580,142	65,839	1,413,227	1,666,102	17
3/20/2011 23:00	1,226,289	1,249,725	604,410	249,945	1,871,604	23,817	769,086	1,514,604	63,109	1,476,336	1,744,086	18
3/21/2011 0:00	1,136,684	1,245,350	597,763	249,070	1,784,271	20,178	789,264	1,427,271	59,470	1,535,805	1,818,430	19
3/21/2011 1:00	948,122	1,233,821	559,330	246,764	1,622,613	13,442	802,706	1,265,613	52,734	1,588,539	1,886,039	20
3/21/2011 2:00	857,830	1,229,050	587,539	245,810	1,499,341	8,306	811,012	1,142,341	47,598	1,636,137	1,948,512	21
3/21/2011 3:00	781,077	1,224,892	601,424	244,978	1,404,545	4,356	815,368	1,047,545	43,648	1,679,785	2,007,035	22
3/21/2011 4:00	829,994	1,228,796	609,337	245,759	1,449,454	6,227	821,595	1,092,454	45,519	1,725,303	2,067,428	23
3/21/2011 5:00	913,949	1,235,696	568,991	247,139	1,580,653	11,694	833,289	1,223,653	50,986	1,776,289	2,133,289	24
3/21/2011 6:00	851,441	1,231,660	575,985	246,332	1,507,117	8,630	841,919	1,150,117	47,922	1,824,210	2,196,085	25
3/21/2011 7:00	786,036	1,229,444	597,197	245,889	1,418,283	4,928	846,847	1,061,283	44,220	1,868,431	2,255,181	26
3/21/2011 8:00	785,407	1,229,338	559,079	245,868	1,455,666	6,486	853,333	1,098,666	45,778	1,914,208	2,315,833	27
3/21/2011 9:00	920,338	1,238,419	722,991	247,684	1,435,766	5,657	858,990	1,078,766	44,949	1,959,157	2,375,657	28
3/21/2011 10:00	879,099	1,234,729	708,225	246,946	1,405,604	4,400	863,390	1,048,604	43,692	2,002,849	2,434,224	29
3/21/2011 11:00	831,929	1,230,696	704,698	246,139	1,357,927	2,414	865,804	1,000,927	41,705	2,044,554	2,490,804	30
3/21/2011 12:00	788,580	1,226,892	705,582	245,378	1,309,890	412	866,216	952,890	39,704	2,084,258	2,545,383	31
3/21/2011 13:00	602,689	1,215,163	595,236	243,033	1,222,615	-3,224	862,992	865,615	36,067			
3/21/2011 14:00	537,524	1,212,221	592,085	242,444	1,157,660	-5,931	857,061	800,660	33,361			

[a] Flow rate of 0 gpd assumed for negative flow meter readings.

APPENDIX P

EXISTING AND PROJECTED I/I FLOWS

TABLE P-1
CITY OF ANGELS WASTEWATER MASTER PLAN
EXISTING AND PROJECTED I/I FLOWS

	Existing I/I (mgd)				Projected 10-Year I/I [c] (mgd)				Projected 20-Year I/I [d] (mgd)				Projected Buildout I/I w/Conservation [e] (mgd)				Projected Buildout I/I w/out Conservation [f] (mgd)			
Month	**N-yr [a]**	**10-yr [b]**	**25-yr [b]**	**100-yr [b]**	**N-yr**	**10-yr**	**25-yr**	**100-yr**	**N-yr**	**10-yr**	**25-yr**	**100-yr**	**N-yr**	**10-yr**	**25-yr**	**100-yr**	**N-yr**	**10-yr**	**25-yr**	**100-yr**
Oct	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nov	0.004	0.006	0.006	0.007	0.005	0.007	0.008	0.009	0.006	0.009	0.010	0.011	0.009	0.013	0.014	0.016	0.009	0.013	0.014	0.017
Dec	0.154	0.217	0.243	0.279	0.196	0.277	0.310	0.355	0.241	0.339	0.380	0.436	0.347	0.489	0.548	0.628	0.355	0.501	0.561	0.643
Jan	0.104	0.147	0.165	0.189	0.133	0.188	0.210	0.241	0.163	0.230	0.258	0.296	0.235	0.332	0.372	0.426	0.241	0.340	0.381	0.436
Feb	0.147	0.207	0.232	0.266	0.187	0.264	0.295	0.338	0.229	0.323	0.362	0.415	0.330	0.466	0.522	0.598	0.339	0.477	0.535	0.613
Mar	0.196	0.276	0.309	0.355	0.250	0.352	0.394	0.452	0.306	0.432	0.484	0.554	0.441	0.622	0.697	0.798	0.452	0.637	0.714	0.818
Apr	0.059	0.083	0.093	0.106	0.075	0.105	0.118	0.135	0.092	0.129	0.145	0.166	0.132	0.186	0.208	0.239	0.135	0.191	0.214	0.245
May	0.022	0.030	0.034	0.039	0.028	0.039	0.044	0.050	0.034	0.048	0.053	0.061	0.049	0.069	0.077	0.088	0.050	0.070	0.079	0.090
Jun	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sep	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[a] Existing I/I for N-yr precipitation determined by subtracting ADWF from monthly average effluent for 2009 - 2011.

[b] Existing I/I for 10-yr, 25-yr and 100-yr precipitation determined by multiplying N-yr I/I by precipitation factors:

10-yr Precipitation Factor = Ratio of 10-yr precipitation from DWR Station #B30 020900 in Angels Camp to N-yr precipitation for Sonora Station #B40 835300 in Sonora = 1.41 [5, 6, 52].

25-yr Precipitation Factor = Ratio of 25-yr precipitation from DWR Station #B30 020900 in Angels Camp to N-yr precipitation for Sonora Station #B40 835300 in Sonora = 1.58 [5, 6, 52].

100-yr Precipitation Factor = Ratio of 100-yr precipitation from DWR Station #B30 020900 in Angels Camp to N-yr precipitation for Sonora Station #B40 835300 in Sonora = 1.81 [5, 6, 52].

[c] Projected 10-year I/I for various precipitation conditions determined by increasing existing I/I by the % increase in 10-year projection ADWF from existing ADWF (27% increase).

[d] Projected 20-year I/I for various precipitation conditions determined by increasing existing I/I by the % increase in 20-year projection ADWF from existing ADWF (56% increase).

[e] Projected buildout I/I w/conservation for various precipitation conditions determined by increasing existing I/I by the % increase in buildout projection ADWF w/conservation from existing ADWF (125% increase).

[f] Projected buildout I/I w/out conservation for various precipitation conditions determined by increasing existing I/I by the % increase in buildout projection ADWF w/out conservation from existing ADWF (131% increase).

APPENDIX Q

WATER BALANCES FOR CITY OF ANGELS WASTEWATER MANAGEMENT SYSTEM

TABLE Q-1
CITY OF ANGELS WASTEWATER MASTER PLAN
N-YR WATER BALANCE FOR WWTP AT EXISTING FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																Net Vol				Net Vol									Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume								
		N-yr	Evap/							Change					WW out to	after		Total	Total	after Creek			Water	Percolated	Soil	Available	Net	Allowable	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream		Allowable		Actual	
		Precip	ET	ADWF	I/I	WW in	Precip	Evap	WW out	in Vol	WW in	Precip	Seepage	Evap	Irrigation	Irrigation		WW out	Change	Discharge		Capacity	Surface	Precip	Capacity	Capacity	ET	Disposal											Flow		Discharge		Discharge	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	1.7	4.4	0.357	0.000	34.0	0.2	0.2	34.0	0.0	34.0	1.9	0.1	0.3	35.5	0.0	0.0	35.5	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.7	5.7	29.0	9.4	52.2	17.0	5.7	0.7	29.0	9.4	6.5	2.1	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	3.5	1.8	0.357	0.004	33.2	0.4	0.1	33.5	0.0	33.5	3.9	0.2	0.4	18.6	18.3	5.9	18.6	18.3	18.3	5.9	9%	2.4	1.7	3.0	1.3	0.0	1.3	6.6	2.2	11.9	3.9	1.3	1.3	6.6	2.2	11.9	3.9	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	5.3	1.0	0.357	0.154	48.6	0.5	0.0	49.1	0.0	49.1	6.0	0.1	0.5	0.0	72.7	23.7	0.0	54.5	72.7	23.7	36%	6.5	4.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	6.2	1.0	0.357	0.104	43.9	0.6	0.0	44.5	0.0	44.5	7.2	0.0	0.8	0.0	123.6	40.3	0.0	50.9	123.6	40.3	61%	9.3	5.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	0.0	0.0	0.0	0.0
Feb	28	5.7	1.5	0.357	0.147	43.3	0.6	0.1	43.8	0.0	43.8	6.7	0.0	1.3	0.0	172.7	56.3	0.0	49.1	172.7	56.3	85%	11.0	4.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	0.0	0.0
Mar	31	5.4	2.8	0.357	0.196	52.6	0.6	0.1	53.0	0.0	53.0	6.4	0.0	2.7	4.6	224.9	73.3	27.0	29.8	202.5	66.0	100%	11.6	2.7	3.0	0.3	0.0	0.3	1.6	0.5	2.9	1.0	0.3	0.3	1.6	0.5	2.9	1.0	74.1	47.9	180.7	58.9	22.4	7.3
Apr	30	2.7	4.2	0.357	0.059	38.3	0.3	0.2	38.4	0.0	38.4	3.2	0.5	3.9	63.8	176.0	57.3	63.8	-26.6	176.0	57.3	87%	11.1	0.0	3.0	3.0	1.5	4.5	22.8	7.4	41.0	13.4	4.5	4.5	22.8	7.4	41.0	13.4	56.7	36.6	168.6	54.9	0.0	0.0
May	31	1.3	6.4	0.357	0.022	36.0	0.1	0.3	35.9	0.0	35.9	1.5	0.7	4.1	114.5	94.1	30.7	114.5	-81.9	94.1	30.7	46%	7.8	0.0	3.0	3.0	5.0	8.0	40.8	13.3	73.6	24.0	8.0	8.0	40.8	13.3	73.6	24.0	43.3	28.0	0.0	0.0	0.0	0.0
Jun	30	0.3	8.2	0.357	0.000	32.9	0.0	0.3	32.6	0.0	32.6	0.3	0.1	0.5	126.4	0.0	0.0	126.4	-94.1	0.0	0.0	0%	0.7	0.0	3.0	3.0	7.9	10.9	55.3	18.0	99.7	32.5	10.9	7.8	55.3	18.0	71.1	23.2	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.0	0.1	0.6	32.9	0.0	0.0	32.9	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.8	12.8	64.8	21.1	116.9	38.1	6.5	0.0	32.9	10.7	0.0	0.0	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.1	0.1	0.6	33.0	0.0	0.0	33.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.6	20.4	112.8	36.8	6.5	0.0	33.0	10.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.4	7.0	0.357	0.000	32.9	0.0	0.3	32.6	0.0	32.6	0.5	0.1	0.4	32.6	0.0	0.0	32.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.5	9.5	48.5	15.8	87.4	28.5	6.4	0.0	32.6	10.6	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	32.6	57.3	-	-	463.5	3.3	2.4	464.4	0.0	464.4	37.7	1.9	16.0	461.8	-	-	484.2	0.0	-	-	-	-	18.0	36.0	22.6	42.7	65.3	332.0	108.2	598.6	195.1	50.1	22.6	254.6	83.0	207.2	67.5	-	-	489.0	159.3	22.4	7.3

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual normal-year (N-yr) precipitation (32.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Existing average dry weather flow (ADWF) over the months of Jun - Aug from 2009 - 2011 daily effluent flow data
(4) N-yr inflow and infiltration (I/I) determined by subtracting existing ADWF from monthly average effluent from 2009 - 2011
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals N-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals N-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals N-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - N-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-2
CITY OF ANGELS WASTEWATER MASTER PLAN
10-YR WATER BALANCE FOR WWTP AT EXISTING FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		10-yr Precip	Evap/ ET	ADWF	I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume				N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
																												Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.4	4.4	0.357	0.000	34.0	0.2	0.2	34.0	0.0	34.0	2.6	0.1	0.3	36.3	0.0	0.0	36.3	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.0	5.0	25.5	8.3	45.9	15.0	5.0	1.2	25.5	8.3	10.8	3.5	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	4.9	1.8	0.357	0.006	33.4	0.5	0.1	33.8	0.0	33.8	5.5	0.3	0.6	0.0	38.3	12.5	0.0	38.3	38.3	12.5	19%	4.0	3.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	7.4	1.0	0.357	0.217	54.6	0.8	0.0	55.3	0.0	55.3	8.5	0.2	0.7	0.0	101.4	33.0	0.0	63.0	101.4	33.0	50%	8.2	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	8.7	1.0	0.357	0.147	48.0	0.9	0.0	48.8	0.0	48.8	10.2	0.0	0.9	0.0	159.4	52.0	0.0	58.1	159.4	52.0	79%	10.6	7.6	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	0.0	0.0
Feb	28	7.9	1.5	0.357	0.207	48.4	0.8	0.1	49.2	0.0	49.2	9.4	0.0	1.4	0.0	216.6	70.6	14.0	43.1	202.5	66.0	100%	11.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	14.0	4.6
Mar	31	7.6	2.8	0.357	0.276	60.2	0.8	0.1	60.9	0.0	60.9	9.0	0.0	2.7	0.0	269.7	87.9	67.2	0.0	202.5	66.0	100%	11.6	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	67.2	21.9
Apr	30	3.8	4.2	0.357	0.083	40.5	0.4	0.2	40.7	0.0	40.7	4.5	0.5	4.0	48.3	195.0	63.5	48.3	-7.6	195.0	63.5	96%	11.5	0.0	3.0	3.0	0.4	3.4	17.2	5.6	31.1	10.1	3.4	3.4	17.2	5.6	31.1	10.1	56.7	36.6	168.6	54.9	0.0	0.0
May	31	1.8	6.4	0.357	0.030	36.9	0.2	0.3	36.8	0.0	36.8	2.1	0.8	4.9	107.0	121.3	39.5	107.0	-73.7	121.3	39.5	60%	9.2	0.0	3.0	3.0	4.5	7.5	38.2	12.4	68.8	22.4	7.5	7.5	38.2	12.4	68.8	22.4	43.3	28.0	0.0	0.0	0.0	0.0
Jun	30	0.4	8.2	0.357	0.000	32.9	0.0	0.3	32.6	0.0	32.6	0.5	0.1	0.5	153.3	0.4	0.1	153.3	-120.9	0.4	0.1	0%	0.8	0.0	3.0	3.0	7.8	10.8	54.7	17.8	98.6	32.1	10.8	10.8	54.7	17.8	98.6	32.1	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.0	0.1	0.6	33.3	0.0	0.0	33.3	-0.4	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.8	21.1	116.8	38.1	6.6	0.0	33.3	10.9	0.0	0.0	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.1	0.1	0.6	33.0	0.0	0.0	33.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.4	20.3	112.5	36.7	6.5	0.0	33.0	10.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.6	7.0	0.357	0.000	32.9	0.1	0.3	32.6	0.0	32.6	0.7	0.1	0.4	32.8	0.0	0.0	32.8	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.4	9.4	47.6	15.5	85.8	28.0	6.5	0.0	32.8	10.7	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	45.7	57.3	-	-	489.6	4.6	2.4	491.8	0.0	491.8	53.1	2.3	17.5	444.0	-	-	525.3	0.0	-	-	-	-	28.4	36.0	21.0	40.0	61.0	310.3	101.1	559.5	182.3	46.2	22.8	234.7	76.5	209.3	68.2	-	-	635.1	207.0	81.2	26.5

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (10-yr) precipitation (45.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 10-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Existing average dry weather flow (ADWF) over the months of Jun - Aug from 2009 - 2011 daily effluent flow data
(4) 10-yr inflow and infiltration (I/I) determined by multiplying N-yr I/I by a 10-yr precipitation factor from Station #B30 020900 in Angels Camp
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 10-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 10-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 10-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 10-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-3
CITY OF ANGELS WASTEWATER MASTER PLAN
25-YR WATER BALANCE FOR WWTP AT EXISTING FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		25-yr Precip	Evap/ ET	ADWF	I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume				N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
																													Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.7	4.4	0.357	0.000	34.0	0.3	0.2	34.1	0.0	34.1	3.0	0.1	0.3	36.7	0.0	0.0	36.7	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	1.7	4.7	23.9	7.8	43.1	14.0	4.7	1.4	23.9	7.8	12.8	4.2	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	5.5	1.8	0.357	0.006	33.4	0.6	0.1	33.9	0.0	33.9	6.2	0.3	0.6	0.0	39.1	12.8	0.0	39.1	39.1	12.8	19%	4.1	3.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	8.3	1.0	0.357	0.243	57.1	0.8	0.0	57.9	0.0	57.9	9.6	0.2	0.7	0.0	105.9	34.5	0.0	66.7	105.9	34.5	52%	8.5	7.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	9.8	1.0	0.357	0.165	49.7	1.0	0.0	50.6	0.0	50.6	11.5	0.0	0.9	0.0	167.0	54.4	0.0	61.2	167.0	54.4	82%	10.9	8.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	0.0	0.0
Feb	28	8.9	1.5	0.357	0.232	50.6	0.9	0.1	51.4	0.0	51.4	10.6	0.0	1.4	0.0	227.6	74.2	25.1	35.5	202.5	66.0	100%	11.6	7.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	25.1	8.2
Mar	31	8.6	2.8	0.357	0.309	63.4	0.9	0.1	64.2	0.0	64.2	10.2	0.0	2.7	0.0	274.2	89.3	71.6	0.0	202.5	66.0	100%	11.6	5.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	71.6	23.3
Apr	30	4.3	4.2	0.357	0.093	41.4	0.4	0.2	41.6	0.0	41.6	5.1	0.5	4.0	41.3	203.4	66.3	42.2	0.0	202.5	66.0	100%	11.6	0.1	3.0	2.9	0.0	2.9	14.7	4.8	26.6	8.7	2.9	2.9	14.7	4.8	26.6	8.7	56.7	36.6	168.6	54.9	0.9	0.3
May	31	2.1	6.4	0.357	0.034	37.2	0.2	0.3	37.2	0.0	37.2	2.4	0.8	5.1	103.6	132.6	43.2	103.6	-69.9	132.6	43.2	65%	9.7	0.0	3.0	3.0	4.3	7.3	36.9	12.0	66.6	21.7	7.3	7.3	36.9	12.0	66.6	21.7	43.3	28.0	0.0	0.0	0.0	0.0
Jun	30	0.5	8.2	0.357	0.000	32.9	0.0	0.3	32.6	0.0	32.6	0.5	0.2	1.2	152.5	11.7	3.8	152.5	-120.9	11.7	3.8	6%	1.8	0.0	3.0	3.0	7.7	10.7	54.4	17.7	98.1	32.0	10.7	10.7	54.4	17.7	98.1	32.0	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.1	0.1	0.6	44.7	0.0	0.0	44.7	-11.7	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	8.8	0.0	44.7	14.6	0.0	0.0	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.1	0.1	0.6	33.0	0.0	0.0	33.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.3	20.3	112.4	36.6	6.5	0.0	33.0	10.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.7	7.0	0.357	0.000	32.9	0.1	0.3	32.6	0.0	32.6	0.8	0.1	0.4	32.9	0.0	0.0	32.9	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.3	9.3	47.2	15.4	85.1	27.7	6.5	0.0	32.9	10.7	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	51.6	57.3	-	-	500.4	5.2	2.4	503.3	0.0	503.3	60.0	2.4	18.5	444.7	-	-	542.3	0.0	-	-	-	-	33.2	36.0	20.9	39.0	59.8	304.2	99.1	548.6	178.8	47.3	22.3	240.6	78.4	204.1	66.5	-	-	635.1	207.0	97.6	31.8

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (25-yr) precipitation (51.5 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 25-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Existing average dry weather flow (ADWF) over the months of Jun - Aug from 2009 - 2011 daily effluent flow data
(4) 25-yr inflow and infiltration (I/I) determined by multiplying N-yr precipitation by a 25-yr precipitation factor
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 25-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 25-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 25-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 25-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-4
CITY OF ANGELS WASTEWATER MASTER PLAN
100-YR WATER BALANCE FOR WWTP AT EXISTING FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																Net Vol after Irrigation				Net Vol after Creek Discharge									Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume								
		100-yr Precip	Evap/ ET	ADWF	I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation			Total WW out	Total Change in Vol			Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	3.1	3.4	0.357	0.000	34.0	0.3	0.1	34.1	0.0	34.1	3.4	0.1	0.2	37.2	0.0	0.0	37.2	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	0.2	3.2	16.5	5.4	29.8	9.7	3.2	2.3	16.5	5.4	20.7	6.8	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	6.3	1.4	0.357	0.007	33.5	0.6	0.1	34.1	0.0	34.1	7.1	0.4	0.5	0.0	40.4	13.2	0.0	40.4	40.4	13.2	20%	4.2	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	9.5	0.7	0.357	0.279	60.5	1.0	0.0	61.4	0.0	61.4	11.1	0.2	0.5	0.0	112.1	36.5	0.0	71.8	112.1	36.5	55%	8.8	8.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	11.2	0.8	0.357	0.189	52.0	1.1	0.0	53.1	0.0	53.1	13.2	0.0	0.7	0.0	177.7	57.9	0.0	65.5	177.7	57.9	88%	11.1	10.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	0.0	0.0
Feb	28	10.2	1.1	0.357	0.266	53.5	1.0	0.0	54.5	0.0	54.5	12.1	0.0	1.1	0.0	243.2	79.2	40.6	24.9	202.5	66.0	100%	11.6	9.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	40.6	13.2
Mar	31	9.9	2.1	0.357	0.355	67.7	1.0	0.1	68.6	0.0	68.6	11.7	0.0	2.0	0.0	280.7	91.5	78.2	0.0	202.5	66.0	100%	11.6	7.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	78.2	25.5
Apr	30	4.9	3.2	0.357	0.106	42.6	0.5	0.1	43.0	0.0	43.0	5.8	0.5	3.1	18.0	229.8	74.9	45.3	0.0	202.5	66.0	100%	11.6	1.7	3.0	1.3	0.0	1.3	6.4	2.1	11.6	3.8	1.3	1.3	6.4	2.1	11.6	3.8	56.7	36.6	168.6	54.9	27.3	8.9
May	31	2.4	6.4	0.357	0.039	37.7	0.2	0.3	37.7	0.0	37.7	2.8	0.8	5.2	99.2	137.7	44.9	99.2	-64.9	137.7	44.9	68%	9.9	0.0	3.0	3.0	4.0	7.0	35.4	11.5	63.8	20.8	7.0	7.0	35.4	11.5	63.8	20.8	43.3	28.0	0.0	0.0	0.0	0.0
Jun	30	0.6	8.2	0.357	0.000	32.9	0.1	0.3	32.6	0.0	32.6	0.6	0.3	1.6	151.5	17.5	5.7	151.5	-120.2	17.5	5.7	9%	2.3	0.0	3.0	3.0	7.6	10.6	54.1	17.6	97.5	31.8	10.6	10.6	54.1	17.6	97.5	31.8	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.1	9.8	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.1	0.1	0.6	50.4	0.0	0.0	50.4	-17.5	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	9.9	0.0	50.4	16.4	0.0	0.0	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.357	0.000	34.0	0.0	0.4	33.6	0.0	33.6	0.1	0.1	0.6	33.1	0.0	0.0	33.1	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.2	12.2	62.3	20.3	112.3	36.6	6.5	0.0	33.1	10.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.8	7.0	0.357	0.000	32.9	0.1	0.3	32.7	0.0	32.7	0.9	0.1	0.4	33.0	0.0	0.0	33.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.2	9.2	46.7	15.2	84.1	27.4	6.5	0.0	33.0	10.8	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	59.1	53.3	-	-	515.0	6.0	2.2	518.8	0.0	518.8	68.8	2.5	16.5	422.5	-	-	568.6	0.0	-	-	-	-	42.8	36.0	19.3	37.0	56.3	286.0	93.2	515.8	168.1	45.0	21.1	228.9	74.6	193.7	63.1	-	-	635.1	207.0	146.1	47.6

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual 100-year (100-yr) precipitation (59.0 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 100-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8 and assuming 76% of N-yr Evap/ET for Oct - Apr to account for anticipated decrease in Evap/ET during 100-yr precipitation.
(3) Existing average dry weather flow (ADWF) over the months of Jun - Aug from 2009 - 2011 daily effluent flow data
(4) 100-yr inflow and infiltration (I/I) determined by multiplying N-yr precipitation by a 100-yr precipitation factor
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 100-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
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(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 100-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 100-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 100-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
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(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-5
CITY OF ANGELS WASTEWATER MASTER PLAN
N-YR WATER BALANCE FOR WWTP AT PROJECTED 10-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																													Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume									
																													Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	N-yr Precip	Evap/ ET	Projected 10-Year ADWF	Projected 10-Year I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth											N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
		in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	1.7	4.4	0.455	0.000	43.3	0.2	0.2	43.3	0.0	43.3	1.9	0.1	0.3	44.8	0.0	0.0	44.8	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.7	5.7	29.0	9.4	52.2	17.0	5.7	1.7	29.0	9.4	15.8	5.2	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	3.5	1.8	0.455	0.005	42.4	0.4	0.1	42.6	0.0	42.6	3.9	0.3	0.5	18.6	27.2	8.9	18.6	27.2	27.2	8.9	13%	3.1	1.7	3.0	1.3	0.0	1.3	6.6	2.2	11.9	3.9	1.3	1.3	6.6	2.2	11.9	3.9	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	5.3	1.0	0.455	0.196	61.9	0.5	0.0	62.4	0.0	62.4	6.1	0.2	0.6	0.0	95.0	30.9	0.0	67.7	95.0	30.9	47%	7.9	4.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	6.2	1.0	0.455	0.133	56.0	0.6	0.0	56.5	0.0	56.5	7.3	0.0	0.9	0.0	157.8	51.4	0.0	62.9	157.8	51.4	78%	10.6	5.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	0.0	0.0
Feb	28	5.7	1.5	0.455	0.187	55.2	0.6	0.1	55.7	0.0	55.7	6.7	0.0	1.4	0.0	218.8	71.3	16.3	44.7	202.5	66.0	100%	11.6	4.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	16.3	5.3
Mar	31	5.4	2.8	0.455	0.250	67.0	0.6	0.1	67.5	0.0	67.5	6.4	0.0	2.7	4.6	269.2	87.7	71.2	0.0	202.5	66.0	100%	11.6	2.7	3.0	0.3	0.0	0.3	1.6	0.5	2.9	1.0	0.3	0.3	1.6	0.5	2.9	1.0	74.1	47.9	180.7	58.9	66.6	21.7
Apr	30	2.7	4.2	0.455	0.075	48.8	0.3	0.2	48.9	0.0	48.9	3.2	0.5	4.0	63.8	186.4	60.7	63.8	-16.1	186.4	60.7	92%	11.3	0.0	3.0	3.0	1.5	4.5	22.8	7.4	41.0	13.4	4.5	4.5	22.8	7.4	41.0	13.4	56.7	36.6	168.6	54.9	0.0	0.0
May	31	1.3	6.4	0.455	0.028	45.9	0.1	0.3	45.8	0.0	45.8	1.5	0.7	4.7	114.5	113.8	37.1	114.5	-72.6	113.8	37.1	56%	8.8	0.0	3.0	3.0	5.0	8.0	40.8	13.3	73.6	24.0	8.0	8.0	40.8	13.3	73.6	24.0	43.3	28.0	0.0	0.0	0.0	0.0
Jun	30	0.3	8.2	0.455	0.000	41.9	0.0	0.3	41.6	0.0	41.6	0.3	0.1	0.5	155.0	0.1	0.0	155.0	-113.7	0.1	0.0	0%	0.7	0.0	3.0	3.0	7.9	10.9	55.3	18.0	99.7	32.5	10.9	10.9	55.3	18.0	99.7	32.5	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.0	0.1	0.6	42.3	0.0	0.0	42.3	-0.1	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.8	12.8	64.8	21.1	116.9	38.1	8.3	0.0	42.3	13.8	0.0	0.0	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.1	0.1	0.6	42.3	0.0	0.0	42.3	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.6	20.4	112.8	36.8	8.3	0.0	42.3	13.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.4	7.0	0.455	0.000	41.9	0.0	0.3	41.6	0.0	41.6	0.5	0.1	0.4	41.6	0.0	0.0	41.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.5	9.5	48.5	15.8	87.4	28.5	8.2	0.0	41.6	13.6	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	32.6	57.3	-	-	590.7	3.3	2.4	591.7	0.0	591.7	37.9	2.1	17.1	527.5	-	-	610.4	0.0	-	-	-	-	18.0	36.0	22.6	42.7	65.3	332.0	108.2	598.6	195.1	55.5	26.7	282.4	92.0	245.1	79.9	-	-	635.1	207.0	82.9	27.0

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual normal-year (N-yr) precipitation (32.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected 10-year average dry weather flow (ADWF)
(4) Projected 10-year inflow and infiltration (I/I) for N-yr precipitation assumed to increase in line with ADWF from existing I/I for N-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals N-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals N-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals N-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - N-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-6
CITY OF ANGELS WASTEWATER MASTER PLAN
10-YR WATER BALANCE FOR WWTP AT PROJECTED 10-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																													Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume									
																													Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	10-yr Precip in	Evap/ ET in	Projected 10-Year ADWF mgd	Projected 10-Year I/I mgd	WW in ac-ft	Precip ac-ft	Evap ac-ft	WW out ac-ft	Change in Vol ac-ft	WW in ac-ft	Precip ac-ft	Seepage ac-ft	Evap ac-ft	WW out to Irrigation ac-ft	Net Vol after Irrigation ac-ft	Net Vol after Irrigation MG	Total WW out ac-ft	Total Change in Vol ac-ft	Net Vol after Creek Discharge ac-ft	Net Vol after Creek Discharge MG	Capacity %	Water Surface Area ac	Percolated Precip in	Soil Capacity in	Available Soil Capacity in	Net ET in	Allowable Disposal Depth in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.4	4.4	0.455	0.000	43.3	0.2	0.2	43.3	0.0	43.3	2.6	0.1	0.3	45.6	0.0	0.0	45.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.0	5.0	25.5	8.3	45.9	15.0	5.0	2.2	25.5	8.3	20.2	6.6	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	4.9	1.8	0.455	0.007	42.5	0.5	0.1	43.0	0.0	43.0	5.5	0.4	0.7	0.0	47.4	15.4	0.0	47.4	47.4	15.4	23%	4.7	3.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	7.4	1.0	0.455	0.277	69.6	0.8	0.0	70.3	0.0	70.3	8.6	0.2	0.7	0.0	125.3	40.8	0.0	78.0	125.3	40.8	62%	9.4	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	8.7	1.0	0.455	0.188	61.1	0.9	0.0	62.0	0.0	62.0	10.2	0.0	1.0	0.0	196.6	64.1	0.0	71.2	196.6	64.1	97%	11.5	7.6	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	0.0	0.0
Feb	28	7.9	1.5	0.455	0.264	61.7	0.8	0.1	62.5	0.0	62.5	9.4	0.0	1.4	0.0	267.0	87.0	64.5	6.0	202.5	66.0	100%	11.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	64.5	21.0
Mar	31	7.6	2.8	0.455	0.352	76.8	0.8	0.1	77.4	0.0	77.4	9.0	0.0	2.7	0.0	286.3	93.3	83.7	0.0	202.5	66.0	100%	11.6	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	83.7	27.3
Apr	30	3.8	4.2	0.455	0.105	51.6	0.4	0.2	51.8	0.0	51.8	4.5	0.5	4.0	48.3	206.0	67.1	51.8	0.0	202.5	66.0	100%	11.6	0.0	3.0	3.0	0.4	3.4	17.2	5.6	31.1	10.1	3.4	3.4	17.2	5.6	31.1	10.1	56.7	36.6	168.6	54.9	3.5	1.1
May	31	1.8	6.4	0.455	0.039	47.0	0.2	0.3	46.9	0.0	46.9	2.2	0.8	5.3	107.0	138.6	45.2	107.0	-64.0	138.6	45.2	68%	9.9	0.0	3.0	3.0	4.5	7.5	38.2	12.4	68.8	22.4	7.5	7.5	38.2	12.4	68.8	22.4	43.3	28.0	0.0	0.0	0.0	0.0
Jun	30	0.4	8.2	0.455	0.000	41.9	0.0	0.3	41.6	0.0	41.6	0.5	0.4	2.0	153.3	24.9	8.1	153.3	-113.6	24.9	8.1	12%	2.9	0.0	3.0	3.0	7.8	10.8	54.7	17.8	98.6	32.1	10.8	10.8	54.7	17.8	98.6	32.1	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.0	0.1	0.6	67.2	0.0	0.0	67.2	-24.9	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.8	21.1	116.8	38.1	12.7	0.3	64.8	21.1	2.4	0.8	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.1	0.1	0.6	42.4	0.0	0.0	42.4	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.4	20.3	112.5	36.7	8.3	0.0	42.4	13.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.6	7.0	0.455	0.000	41.9	0.1	0.3	41.7	0.0	41.7	0.7	0.1	0.4	41.8	0.0	0.0	41.8	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.4	9.4	47.6	15.5	85.8	28.0	8.2	0.0	41.8	13.6	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	45.7	57.3	-	-	624.0	4.6	2.4	626.2	0.0	626.2	53.3	2.7	19.7	505.5	-	-	657.2	0.0	-	-	-	-	28.4	36.0	21.0	40.0	61.0	310.3	101.1	559.5	182.3	56.0	24.1	284.5	92.7	221.0	72.0	-	-	635.1	207.0	151.7	49.4

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (10-yr) precipitation (45.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 10-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected 10-year average dry weather flow (ADWF)
(4) Projected 10-year inflow and infiltration (I/I) for 10-yr precipitation assumed to increase in line with ADWF from existing I/I for 10-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 10-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 10-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 10-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 10-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-7
CITY OF ANGELS WASTEWATER MASTER PLAN
25-YR WATER BALANCE FOR WWTP AT PROJECTED 10-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																													Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume									
		25-yr Precip	Evap/ ET	Projected 10-Year ADWF	Projected 10-Year I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.7	4.4	0.455	0.000	43.3	0.3	0.2	43.4	0.0	43.4	3.0	0.1	0.3	46.0	0.0	0.0	46.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	1.7	4.7	23.9	7.8	43.1	14.0	4.7	2.4	23.9	7.8	22.1	7.2	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	5.5	1.8	0.455	0.008	42.6	0.6	0.1	43.1	0.0	43.1	6.2	0.4	0.7	0.0	48.2	15.7	0.0	48.2	48.2	15.7	24%	4.8	3.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	8.3	1.0	0.455	0.310	72.8	0.8	0.0	73.6	0.0	73.6	9.7	0.2	0.8	0.0	130.5	42.5	0.0	82.3	130.5	42.5	64%	9.6	7.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	9.8	1.0	0.455	0.210	63.3	1.0	0.0	64.2	0.0	64.2	11.6	0.0	1.0	0.0	205.4	66.9	2.8	72.0	202.5	66.0	100%	11.6	8.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	2.8	0.9
Feb	28	8.9	1.5	0.455	0.295	64.5	0.9	0.1	65.3	0.0	65.3	10.6	0.0	1.4	0.0	277.0	90.3	74.5	0.0	202.5	66.0	100%	11.6	7.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	74.5	24.3
Mar	31	8.6	2.8	0.455	0.394	80.8	0.9	0.1	81.6	0.0	81.6	10.2	0.0	2.7	0.0	291.6	95.0	89.0	0.0	202.5	66.0	100%	11.6	5.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	89.0	29.0
Apr	30	4.3	4.2	0.455	0.118	52.7	0.4	0.2	53.0	0.0	53.0	5.1	0.5	4.0	41.3	214.8	70.0	53.6	0.0	202.5	66.0	100%	11.6	0.1	3.0	2.9	0.0	2.9	14.7	4.8	26.6	8.7	2.9	2.9	14.7	4.8	26.6	8.7	56.7	36.6	168.6	54.9	12.3	4.0
May	31	2.1	6.4	0.455	0.044	47.4	0.2	0.3	47.4	0.0	47.4	2.4	0.8	5.3	103.6	142.6	46.5	103.6	-59.9	142.6	46.5	70%	10.1	0.0	3.0	3.0	4.3	7.3	36.9	12.0	66.6	21.7	7.3	7.3	36.9	12.0	66.6	21.7	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.5	8.2	0.455	0.000	41.9	0.0	0.3	41.6	0.0	41.6	0.5	0.4	2.3	152.5	29.5	9.6	152.5	-113.1	29.5	9.6	15%	3.3	0.0	3.0	3.0	7.7	10.7	54.4	17.7	98.1	32.0	10.7	10.7	54.4	17.7	98.1	32.0	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.1	0.1	0.6	71.8	0.0	0.0	71.8	-29.5	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	0.8	64.7	21.1	7.0	2.3	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.1	0.1	0.6	42.4	0.0	0.0	42.4	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.3	20.3	112.4	36.6	8.3	0.0	42.4	13.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.7	7.0	0.455	0.000	41.9	0.1	0.3	41.7	0.0	41.7	0.8	0.1	0.4	41.9	0.0	0.0	41.9	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.3	9.3	47.2	15.4	85.1	27.7	8.2	0.0	41.9	13.7	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	51.6	57.3	-	-	637.8	5.2	2.4	640.6	0.0	640.6	60.2	2.7	20.0	499.4	-	-	678.1	0.0	-	-	-	-	33.2	36.0	20.9	39.0	59.8	304.2	99.1	548.6	178.8	54.9	24.0	279.0	90.9	220.4	71.8	-	-	699.6	228.0	178.6	58.2

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (25-yr) precipitation (51.5 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 25-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected 10-year average dry weather flow (ADWF)
(4) Projected 10-year inflow and infiltration (I/I) for 25-yr precipitation assumed to increase in line with ADWF from existing I/I for 25-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 25-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 25-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 25-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 25-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-8
CITY OF ANGELS WASTEWATER MASTER PLAN
100-YR WATER BALANCE FOR WWTP AT PROJECTED 10-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL															SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course															Discharge to Angels Creek					
																														Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume								
		100-yr Precip	Evap/ ET	Projected 10-Year ADWF	Projected 10-Year I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	3.1	3.4	0.455	0.000	43.3	0.3	0.1	43.5	0.0	43.5	3.4	0.1	0.2	46.3	0.3	0.1	46.3	0.3	0.3	0.1	0%	0.8	0.0	3.0	3.0	0.2	3.2	16.5	5.4	29.8	9.7	3.2	3.2	16.5	5.4	29.8	9.7	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	6.3	1.4	0.455	0.009	42.7	0.6	0.1	43.3	0.0	43.3	7.1	0.4	0.6	0.0	49.8	16.2	0.0	49.5	49.8	16.2	25%	4.9	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	9.5	0.7	0.455	0.355	77.1	1.0	0.0	78.0	0.0	78.0	11.2	0.2	0.6	0.0	138.1	45.0	0.0	88.4	138.1	45.0	68%	9.9	8.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	11.2	0.8	0.455	0.241	66.2	1.1	0.0	67.3	0.0	67.3	13.2	0.0	0.8	0.0	217.9	71.0	15.4	64.4	202.5	66.0	100%	11.6	10.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	15.4	5.0
Feb	28	10.2	1.1	0.455	0.338	68.2	1.0	0.0	69.2	0.0	69.2	12.1	0.0	1.1	0.0	282.7	92.1	80.2	0.0	202.5	66.0	100%	11.6	9.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	80.2	26.1
Mar	31	9.9	2.1	0.455	0.452	86.3	1.0	0.1	87.2	0.0	87.2	11.7	0.0	2.0	0.0	299.3	97.5	96.8	0.0	202.5	66.0	100%	11.6	7.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	96.8	31.5
Apr	30	4.9	3.2	0.455	0.135	54.3	0.5	0.1	54.7	0.0	54.7	5.8	0.5	3.1	18.0	241.5	78.7	57.0	0.0	202.5	66.0	100%	11.6	1.7	3.0	1.3	0.0	1.3	6.4	2.1	11.6	3.8	1.3	1.3	6.4	2.1	11.6	3.8	56.7	36.6	168.6	54.9	39.0	12.7
May	31	2.4	6.4	0.455	0.050	48.0	0.2	0.3	48.0	0.0	48.0	2.8	0.9	5.4	99.2	147.8	48.2	99.2	-54.7	147.8	48.2	73%	10.3	0.0	3.0	3.0	4.0	7.0	35.4	11.5	63.8	20.8	7.0	7.0	35.4	11.5	63.8	20.8	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.6	8.2	0.455	0.000	41.9	0.1	0.3	41.6	0.0	41.6	0.6	0.5	2.6	151.5	35.4	11.5	151.5	-112.4	35.4	11.5	17%	3.8	0.0	3.0	3.0	7.6	10.6	54.1	17.6	97.5	31.8	10.6	10.6	54.1	17.6	97.5	31.8	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.1	9.8	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.1	0.1	0.6	77.7	0.0	0.0	77.7	-35.4	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	1.4	64.7	21.1	13.0	4.2	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.455	0.000	43.3	0.0	0.4	42.9	0.0	42.9	0.1	0.1	0.6	42.4	0.0	0.0	42.4	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.2	12.2	62.3	20.3	112.3	36.6	8.3	0.0	42.4	13.8	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.8	7.0	0.455	0.000	41.9	0.1	0.3	41.7	0.0	41.7	0.9	0.1	0.4	42.0	0.0	0.0	42.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.2	9.2	46.7	15.2	84.1	27.4	8.3	0.0	42.0	13.7	0.0	0.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	59.1	53.3	-	-	656.4	6.0	2.2	660.2	0.0	660.2	69.0	2.8	17.9	477.1	-	-	708.5	0.0	-	-	-	-	42.8	36.0	19.3	37.0	56.3	286.0	93.2	515.8	168.1	51.4	23.5	261.5	85.2	215.6	70.3	-	-	699.6	228.0	231.3	75.4

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual 100-year (100-yr) precipitation (59.0 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 100-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8 and assuming 76% of N-yr Evap/ET for Oct - Apr to account for anticipated decrease in Evap/ET during 100-yr precipitation.
(3) Projected 10-year average dry weather flow (ADWF)
(4) Projected 10-year inflow and infiltration (I/I) for 100-yr precipitation assumed to increase in line with ADWF from existing I/I for 100-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 100-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 100-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 100-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 100-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-9
CITY OF ANGELS WASTEWATER MASTER PLAN
N-YR WATER BALANCE FOR WWTP AT PROJECTED 20-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL															SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course															Discharge to Angels Creek					
																													Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume									
																													Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	N-yr Precip in	Evap/ ET in	Projected 20-Year ADWF mgd	Projected 20-Year I/I mgd	WW in ac-ft	Precip ac-ft	Evap ac-ft	WW out ac-ft	Change in Vol ac-ft	WW in ac-ft	Precip ac-ft	Seepage ac-ft	Evap ac-ft	WW out to Irrigation ac-ft	Net Vol after Irrigation ac-ft	Net Vol after Irrigation MG	Total WW out ac-ft	Total Change in Vol ac-ft	Net Vol after Creek Discharge ac-ft	Net Vol after Creek Discharge MG	Capacity %	Water Surface Area ac	Percolated Precip in	Soil Capacity in	Available Soil Capacity in	Net ET in	Allowable Disposal Depth in	Allowable Disposal Volume Sprayfields ac-ft	Allowable Disposal Volume Sprayfields MG	Allowable Disposal Volume GHC ac-ft	Allowable Disposal Volume GHC MG	Applied Disposal Depth Sprayfields in	Applied Disposal Depth GHC in	Applied Disposal Volume Sprayfields ac-ft	Applied Disposal Volume Sprayfields MG	Applied Disposal Volume GHC ac-ft	Applied Disposal Volume GHC MG	N-yr Stream Flow cfs	N-yr Stream Flow mgd	Allowable Discharge Volume ac-ft	Allowable Discharge Volume MG	Actual Discharge Volume ac-ft	Actual Discharge Volume MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	1.7	4.4	0.558	0.000	53.1	0.2	0.2	53.1	0.0	53.1	1.9	0.1	0.3	54.6	0.0	0.0	54.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.7	5.7	29.0	9.4	52.2	17.0	5.7	2.8	29.0	9.4	25.6	8.4	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	3.5	1.8	0.558	0.006	51.9	0.4	0.1	52.2	0.0	52.2	3.9	0.3	0.6	18.6	36.7	11.9	18.6	36.7	36.7	11.9	18%	3.9	1.7	3.0	1.3	0.0	1.3	6.6	2.2	11.9	3.9	1.3	1.3	6.6	2.2	11.9	3.9	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	5.3	1.0	0.558	0.241	76.0	0.5	0.0	76.5	0.0	76.5	6.1	0.2	0.7	0.0	118.3	38.6	0.0	81.7	118.3	38.6	58%	9.1	4.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	0.0	0.0	0.0	0.0
Jan	31	6.2	1.0	0.558	0.163	68.6	0.6	0.0	69.2	0.0	69.2	7.3	0.0	1.0	0.0	193.9	63.2	0.0	75.5	193.9	63.2	96%	11.4	5.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	0.0	0.0
Feb	28	5.7	1.5	0.558	0.229	67.6	0.6	0.1	68.2	0.0	68.2	6.7	0.0	1.4	0.0	267.3	87.1	64.8	8.7	202.5	66.0	100%	11.6	4.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	64.8	21.1
Mar	31	5.4	2.8	0.558	0.306	82.2	0.6	0.1	82.6	0.0	82.6	6.4	0.0	2.7	4.6	284.3	92.7	86.4	0.0	202.5	66.0	100%	11.6	2.7	3.0	0.3	0.0	0.3	1.6	0.5	2.9	1.0	0.3	0.3	1.6	0.5	2.9	1.0	74.1	47.9	180.7	58.9	81.8	26.7
Apr	30	2.7	4.2	0.558	0.092	59.8	0.3	0.2	59.9	0.0	59.9	3.2	0.5	4.0	63.8	197.4	64.3	63.8	-5.2	197.4	64.3	97%	11.5	0.0	3.0	3.0	1.5	4.5	22.8	7.4	41.0	13.4	4.5	4.5	22.8	7.4	41.0	13.4	56.7	36.6	168.6	54.9	0.0	0.0
May	31	1.3	6.4	0.558	0.034	56.3	0.1	0.3	56.2	0.0	56.2	1.5	0.8	5.2	114.5	134.6	43.9	114.5	-62.7	134.6	43.9	66%	9.8	0.0	3.0	3.0	5.0	8.0	40.8	13.3	73.6	24.0	8.0	8.0	40.8	13.3	73.6	24.0	43.3	28.0	0.0	0.0	0.0	0.0
Jun	30	0.3	8.2	0.558	0.000	51.4	0.0	0.3	51.1	0.0	51.1	0.3	0.4	2.2	155.0	28.4	9.2	155.0	-106.3	28.4	9.2	14%	3.2	0.0	3.0	3.0	7.9	10.9	55.3	18.0	99.7	32.5	10.9	10.9	55.3	18.0	99.7	32.5	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.0	0.1	0.6	80.4	0.0	0.0	80.4	-28.4	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.8	12.8	64.8	21.1	116.9	38.1	12.8	1.7	64.8	21.1	15.6	5.1	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.1	0.1	0.6	52.1	0.0	0.0	52.1	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.6	20.4	112.8	36.8	10.3	0.0	52.1	17.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.4	7.0	0.558	0.000	51.4	0.0	0.3	51.1	0.0	51.1	0.5	0.1	0.4	51.1	0.0	0.0	51.1	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.5	9.5	48.5	15.8	87.4	28.5	9.5	0.3	48.5	15.8	2.6	0.9	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	32.6	57.3	-	-	724.5	3.3	2.4	725.4	0.0	725.4	38.1	2.6	19.6	594.6	-	-	741.2	0.0	-	-	-	-	18.0	36.0	22.6	42.7	65.3	332.0	108.2	598.6	195.1	63.3	29.8	321.5	104.8	273.1	89.0	-	-	635.1	207.0	146.6	47.8

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual normal-year (N-yr) precipitation (32.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected 20-year average dry weather flow (ADWF)
(4) Projected 20-year inflow and infiltration (I/I) for N-yr precipitation assumed to increase in line with ADWF from existing I/I for N-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals N-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals N-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals N-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - N-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
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(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
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(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
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(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-10
CITY OF ANGELS WASTEWATER MASTER PLAN
10-YR WATER BALANCE FOR WWTP AT PROJECTED 20-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																													Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume									
		10-yr Precip	Evap/ ET	Projected 20-Year ADWF	Projected 20-Year I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.4	4.4	0.558	0.000	53.1	0.2	0.2	53.1	0.0	53.1	2.6	0.1	0.3	55.4	0.0	0.0	55.4	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.0	5.0	25.5	8.3	45.9	15.0	5.0	3.3	25.5	8.3	29.9	9.8	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	4.9	1.8	0.558	0.009	52.2	0.5	0.1	52.6	0.0	52.6	5.5	0.5	0.8	0.0	56.9	18.5	0.0	56.9	56.9	18.5	28%	5.4	3.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	7.4	1.0	0.558	0.339	85.4	0.8	0.0	86.1	0.0	86.1	8.7	0.2	0.8	0.0	150.6	49.1	0.0	93.7	150.6	49.1	74%	10.4	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	0.0	0.0
Jan	31	8.7	1.0	0.558	0.230	75.0	0.9	0.0	75.8	0.0	75.8	10.2	0.0	1.0	0.0	235.6	76.8	33.1	52.0	202.5	66.0	100%	11.6	7.6	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	33.1	10.8
Feb	28	7.9	1.5	0.558	0.323	75.7	0.8	0.1	76.5	0.0	76.5	9.4	0.0	1.4	0.0	287.0	93.5	84.4	0.0	202.5	66.0	100%	11.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	84.4	27.5
Mar	31	7.6	2.8	0.558	0.432	94.1	0.8	0.1	94.8	0.0	94.8	9.0	0.0	2.7	0.0	303.7	99.0	101.1	0.0	202.5	66.0	100%	11.6	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	101.1	33.0
Apr	30	3.8	4.2	0.558	0.129	63.3	0.4	0.2	63.5	0.0	63.5	4.5	0.5	4.0	48.3	217.7	70.9	63.4	0.0	202.5	66.0	100%	11.6	0.0	3.0	3.0	0.4	3.4	17.2	5.6	31.1	10.1	3.4	3.4	17.2	5.6	31.1	10.1	56.7	36.6	168.6	54.9	15.2	4.9
May	31	1.8	6.4	0.558	0.048	57.6	0.2	0.3	57.5	0.0	57.5	2.2	0.9	5.5	107.0	149.0	48.5	107.0	-53.6	149.0	48.5	74%	10.3	0.0	3.0	3.0	4.5	7.5	38.2	12.4	68.8	22.4	7.5	7.5	38.2	12.4	68.8	22.4	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.4	8.2	0.558	0.000	51.4	0.0	0.3	51.1	0.0	51.1	0.5	0.6	3.0	153.3	43.6	14.2	153.3	-105.4	43.6	14.2	22%	4.5	0.0	3.0	3.0	7.8	10.8	54.7	17.8	98.6	32.1	10.8	10.8	54.7	17.8	98.6	32.1	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.0	0.1	0.6	95.7	0.0	0.0	95.7	-43.6	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.8	21.1	116.8	38.1	12.7	3.4	64.8	21.1	30.9	10.1	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.1	0.1	0.6	52.2	0.0	0.0	52.2	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.4	20.3	112.5	36.7	10.3	0.0	52.2	17.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.6	7.0	0.558	0.000	51.4	0.1	0.3	51.1	0.0	51.1	0.7	0.1	0.4	51.3	0.0	0.0	51.3	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.4	9.4	47.6	15.5	85.8	28.0	9.4	0.4	47.6	15.5	3.7	1.2	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	45.7	57.3	-	-	765.2	4.6	2.4	767.5	0.0	767.5	53.4	3.0	21.1	563.1	-	-	796.9	0.0	-	-	-	-	28.4	36.0	21.0	40.0	61.0	310.3	101.1	559.5	182.3	59.0	28.7	300.0	97.8	263.1	85.7	-	-	880.3	286.9	233.8	76.2

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (10-yr) precipitation (45.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 10-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected 20-year average dry weather flow (ADWF)
(4) Projected 20-year inflow and infiltration (I/I) for 10-yr precipitation assumed to increase in line with ADWF from existing I/I for 10-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 10-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 10-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 10-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 10-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-11
CITY OF ANGELS WASTEWATER MASTER PLAN
25-YR WATER BALANCE FOR WWTP AT PROJECTED 20-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																														Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume								
		25-yr Precip	Evap/ ET	Projected 20-Year ADWF	Projected 20-Year I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.7	4.4	0.558	0.000	53.1	0.3	0.2	53.2	0.0	53.2	3.0	0.1	0.3	55.8	0.0	0.0	55.8	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	1.7	4.7	23.9	7.8	43.1	14.0	4.7	3.5	23.9	7.8	31.9	10.4	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	5.5	1.8	0.558	0.010	52.3	0.6	0.1	52.8	0.0	52.8	6.2	0.5	0.8	0.0	57.7	18.8	0.0	57.7	57.7	18.8	28%	5.5	3.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	8.3	1.0	0.558	0.380	89.2	0.8	0.0	90.1	0.0	90.1	9.8	0.2	0.8	0.0	156.5	51.0	0.0	98.8	156.5	51.0	77%	10.5	7.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	0.0	0.0
Jan	31	9.8	1.0	0.558	0.258	77.6	1.0	0.0	78.6	0.0	78.6	11.6	0.0	1.0	0.0	245.6	80.0	43.1	46.0	202.5	66.0	100%	11.6	8.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	43.1	14.0
Feb	28	8.9	1.5	0.558	0.362	79.1	0.9	0.1	79.9	0.0	79.9	10.6	0.0	1.4	0.0	291.6	95.0	89.1	0.0	202.5	66.0	100%	11.6	7.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	89.1	29.0
Mar	31	8.6	2.8	0.558	0.484	99.1	0.9	0.1	99.9	0.0	99.9	10.2	0.0	2.7	0.0	309.9	101.0	107.3	0.0	202.5	66.0	100%	11.6	5.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	107.3	35.0
Apr	30	4.3	4.2	0.558	0.145	64.7	0.4	0.2	64.9	0.0	64.9	5.1	0.5	4.0	41.3	226.7	73.9	65.5	0.0	202.5	66.0	100%	11.6	0.1	3.0	2.9	0.0	2.9	14.7	4.8	26.6	8.7	2.9	2.9	14.7	4.8	26.6	8.7	56.7	36.6	168.6	54.9	24.2	7.9
May	31	2.1	6.4	0.558	0.053	58.2	0.2	0.3	58.1	0.0	58.1	2.4	0.9	5.5	103.6	153.1	49.9	103.6	-49.4	153.1	49.9	76%	10.4	0.0	3.0	3.0	4.3	7.3	36.9	12.0	66.6	21.7	7.3	7.3	36.9	12.0	66.6	21.7	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.5	8.2	0.558	0.000	51.4	0.0	0.3	51.1	0.0	51.1	0.5	0.6	3.3	152.5	48.3	15.7	152.5	-104.8	48.3	15.7	24%	4.8	0.0	3.0	3.0	7.7	10.7	54.4	17.7	98.1	32.0	10.7	10.7	54.4	17.7	98.1	32.0	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.1	0.1	0.6	100.4	0.0	0.0	100.4	-48.3	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	3.9	64.7	21.1	35.6	11.6	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.1	0.1	0.6	52.2	0.0	0.0	52.2	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.3	20.3	112.4	36.6	10.3	0.0	52.2	17.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.7	7.0	0.558	0.000	51.4	0.1	0.3	51.1	0.0	51.1	0.8	0.1	0.4	51.4	0.0	0.0	51.4	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.3	9.3	47.2	15.4	85.1	27.7	9.3	0.5	47.2	15.4	4.2	1.4	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	51.6	57.3	-	-	782.2	5.2	2.4	785.0	0.0	785.0	60.3	3.0	21.4	557.1	-	-	820.9	0.0	-	-	-	-	33.2	36.0	20.9	39.0	59.8	304.2	99.1	548.6	178.8	57.8	28.7	294.1	95.8	263.1	85.7	-	-	880.3	286.9	263.7	85.9

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (25-yr) precipitation (51.5 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 25-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected 20-year average dry weather flow (ADWF)
(4) Projected 20-year inflow and infiltration (I/I) for 25-yr precipitation assumed to increase in line with ADWF from existing I/I for 25-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 25-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 25-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 25-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 25-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-12
CITY OF ANGELS WASTEWATER MASTER PLAN
100-YR WATER BALANCE FOR WWTP AT PROJECTED 20-YEAR FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		100-yr Precip	Evap/ ET	Projected 20-Year ADWF	Projected 20-Year I/I	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume				N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
																												Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	3.1	3.4	0.558	0.000	53.1	0.3	0.1	53.3	0.0	53.3	3.4	0.2	0.5	46.3	9.8	3.2	46.3	9.8	9.8	3.2	5%	1.6	0.0	3.0	3.0	0.2	3.2	16.5	5.4	29.8	9.7	3.2	3.2	16.5	5.4	29.8	9.7	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	6.3	1.4	0.558	0.011	52.4	0.6	0.1	53.0	0.0	53.0	7.2	0.5	0.7	0.0	68.7	22.4	0.0	58.9	68.7	22.4	34%	6.3	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	9.5	0.7	0.558	0.436	94.5	1.0	0.0	95.5	0.0	95.5	11.3	0.2	0.7	0.0	174.5	56.9	0.0	105.8	174.5	56.9	86%	11.0	8.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	0.0	0.0
Jan	31	11.2	0.8	0.558	0.296	81.2	1.1	0.0	82.3	0.0	82.3	13.2	0.0	0.8	0.0	269.3	87.8	66.8	28.0	202.5	66.0	100%	11.6	10.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	66.8	21.8
Feb	28	10.2	1.1	0.558	0.415	83.6	1.0	0.0	84.6	0.0	84.6	12.1	0.0	1.1	0.0	298.2	97.2	95.6	0.0	202.5	66.0	100%	11.6	9.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	95.6	31.2
Mar	31	9.9	2.1	0.558	0.554	105.8	1.0	0.1	106.7	0.0	106.7	11.7	0.0	2.0	0.0	318.8	103.9	116.3	0.0	202.5	66.0	100%	11.6	7.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	116.3	37.9
Apr	30	4.9	3.2	0.558	0.166	66.6	0.5	0.1	67.0	0.0	67.0	5.8	0.5	3.1	18.0	253.8	82.7	69.3	0.0	202.5	66.0	100%	11.6	1.7	3.0	1.3	0.0	1.3	6.4	2.1	11.6	3.8	1.3	1.3	6.4	2.1	11.6	3.8	56.7	36.6	168.6	54.9	51.3	16.7
May	31	2.4	6.4	0.558	0.061	58.9	0.2	0.3	58.9	0.0	58.9	2.8	0.9	5.6	99.2	158.5	51.6	99.2	-44.1	158.5	51.6	78%	10.6	0.0	3.0	3.0	4.0	7.0	35.4	11.5	63.8	20.8	7.0	7.0	35.4	11.5	63.8	20.8	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.6	8.2	0.558	0.000	51.4	0.1	0.3	51.1	0.0	51.1	0.6	0.7	3.6	151.5	54.4	17.7	151.5	-104.1	54.4	17.7	27%	5.3	0.0	3.0	3.0	7.6	10.6	54.1	17.6	97.5	31.8	10.6	10.6	54.1	17.6	97.5	31.8	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.1	9.8	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.1	0.1	0.6	106.5	0.0	0.0	106.5	-54.4	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	4.6	64.7	21.1	41.8	13.6	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.558	0.000	53.1	0.0	0.4	52.7	0.0	52.7	0.1	0.1	0.6	52.2	0.0	0.0	52.2	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.2	12.2	62.3	20.3	112.3	36.6	10.3	0.0	52.2	17.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.8	7.0	0.558	0.000	51.4	0.1	0.3	51.2	0.0	51.2	0.9	0.1	0.4	51.5	0.0	0.0	51.5	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.2	9.2	46.7	15.2	84.1	27.4	9.2	0.5	46.7	15.2	4.9	1.6	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	59.1	53.3	-	-	805.0	6.0	2.2	808.8	0.0	808.8	69.2	3.3	19.5	525.2	-	-	855.2	0.0	-	-	-	-	42.8	36.0	19.3	37.0	56.3	286.0	93.2	515.8	168.1	54.3	27.2	275.9	89.9	249.3	81.2	-	-	880.3	286.9	330.0	107.5

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual 100-year (100-yr) precipitation (59.0 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 100-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8 and assuming 76% of N-yr Evap/ET for Oct - Apr to account for anticipated decrease in Evap/ET during 100-yr precipitation.
(3) Projected 20-year average dry weather flow (ADWF)
(4) Projected 20-year inflow and infiltration (I/I) for 100-yr precipitation assumed to increase in line with ADWF from existing I/I for 100-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 100-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 100-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 100-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 100-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-13
CITY OF ANGELS WASTEWATER MASTER PLAN
N-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITH WATER CONSERVATION

						TREATMENT					STORAGE														LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir														Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		N-yr Precip	Evap/ ET	Buildout ADWF w/Conservation	Buildout I/I w/Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume				N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
																													Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	1.7	4.4	0.804	0.000	76.5	0.2	0.2	76.5	0.0	76.5	1.9	0.1	0.3	78.0	0.0	0.0	78.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.7	5.7	29.0	9.4	52.2	17.0	5.7	5.3	29.0	9.4	49.0	16.0	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	3.5	1.8	0.804	0.009	74.8	0.4	0.1	75.1	0.0	75.1	3.9	0.5	0.8	18.6	59.2	19.3	18.6	59.2	59.2	19.3	29%	5.6	1.7	3.0	1.3	0.0	1.3	6.6	2.2	11.9	3.9	1.3	1.3	6.6	2.2	11.9	3.9	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	5.3	1.0	0.804	0.347	109.5	0.5	0.0	110.0	0.0	110.0	6.2	0.2	0.9	0.0	174.3	56.8	0.0	115.1	174.3	56.8	86%	11.0	4.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	0.0	0.0
Jan	31	6.2	1.0	0.804	0.235	98.9	0.6	0.0	99.5	0.0	99.5	7.3	0.0	1.0	0.0	280.1	91.3	77.5	28.3	202.5	66.0	100%	11.6	5.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	77.5	25.3
Feb	28	5.7	1.5	0.804	0.330	97.5	0.6	0.1	98.0	0.0	98.0	6.7	0.0	1.4	0.0	305.8	99.7	103.3	0.0	202.5	66.0	100%	11.6	4.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	103.3	33.7
Mar	31	5.4	2.8	0.804	0.441	118.4	0.6	0.1	118.9	0.0	118.9	6.4	0.0	2.7	4.6	320.6	104.5	122.6	0.0	202.5	66.0	100%	11.6	2.7	3.0	0.3	0.0	0.3	1.6	0.5	2.9	1.0	0.3	0.3	1.6	0.5	2.9	1.0	74.1	47.9	180.7	58.9	118.0	38.5
Apr	30	2.7	4.2	0.804	0.132	86.2	0.3	0.2	86.3	0.0	86.3	3.2	0.5	4.0	63.8	223.7	72.9	85.0	0.0	202.5	66.0	100%	11.6	0.0	3.0	3.0	1.5	4.5	22.8	7.4	41.0	13.4	4.5	4.5	22.8	7.4	41.0	13.4	56.7	36.6	168.6	54.9	21.2	6.9
May	31	1.3	6.4	0.804	0.049	81.1	0.1	0.3	81.0	0.0	81.0	1.6	0.9	5.7	114.5	164.0	53.4	114.5	-38.5	164.0	53.4	81%	10.8	0.0	3.0	3.0	5.0	8.0	40.8	13.3	73.6	24.0	8.0	8.0	40.8	13.3	73.6	24.0	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.3	8.2	0.804	0.000	74.0	0.0	0.3	73.7	0.0	73.7	0.3	0.9	4.7	155.0	77.5	25.3	155.0	-86.5	77.5	25.3	38%	6.8	0.0	3.0	3.0	7.9	10.9	55.3	18.0	99.7	32.5	10.9	10.9	55.3	18.0	99.7	32.5	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.0	0.1	0.6	152.9	0.0	0.0	152.9	-77.5	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.8	12.8	64.8	21.1	116.9	38.1	12.8	9.6	64.8	21.1	88.1	28.7	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.1	0.1	0.6	75.5	0.0	0.0	75.5	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.6	20.4	112.8	36.8	12.3	1.4	62.6	20.4	13.0	4.2	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.4	7.0	0.804	0.000	74.0	0.0	0.3	73.8	0.0	73.8	0.5	0.1	0.4	73.7	0.0	0.0	73.7	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.5	9.5	48.5	15.8	87.4	28.5	9.5	2.8	48.5	15.8	25.3	8.2	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	32.6	57.3	-	-	1043.8	3.3	2.4	1044.8	0.0	1044.8	38.2	3.3	23.0	736.7	-	-	1056.6	0.0	-	-	-	-	18.0	36.0	22.6	42.7	65.3	332.0	108.2	598.6	195.1	65.3	44.1	332.0	108.2	404.7	131.9	-	-	880.3	286.9	320.0	104.3

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual normal-year (N-yr) precipitation (32.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected buildout average dry weather flow (ADWF) w/conservation
(4) Projected buildout inflow and infiltration (I/I) w/conservation for N-yr precipitation assumed to increase in line with ADWF from existing I/I for N-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals N-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals N-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals N-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - N-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-14
CITY OF ANGELS WASTEWATER MASTER PLAN
10-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITH WATER CONSERVATION

						TREATMENT					STORAGE														LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir														Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		10-yr Precip	Evap/ ET	Buildout ADWF w/Conservation	Buildout I/I w/Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume Sprayfields		Allowable Disposal Volume GHC		Applied Disposal Depth Sprayfields	Applied Disposal Depth GHC	Applied Disposal Volume Sprayfields		Applied Disposal Volume GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.4	4.4	0.804	0.000	76.5	0.2	0.2	76.5	0.0	76.5	2.6	0.2	0.5	71.4	7.1	2.3	71.4	7.1	7.1	2.3	4%	1.4	0.0	3.0	3.0	2.0	5.0	25.5	8.3	45.9	15.0	5.0	5.0	25.5	8.3	45.9	15.0	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	4.9	1.8	0.804	0.013	75.2	0.5	0.1	75.6	0.0	75.6	5.6	0.6	1.1	0.0	86.6	28.2	0.0	79.5	86.6	28.2	43%	7.4	3.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	7.4	1.0	0.804	0.489	123.0	0.8	0.0	123.7	0.0	123.7	8.7	0.2	0.9	0.0	217.9	71.0	15.3	115.9	202.5	66.0	100%	11.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	15.3	5.0
Jan	31	8.7	1.0	0.804	0.332	108.0	0.9	0.0	108.9	0.0	108.9	10.2	0.0	1.0	0.0	320.7	104.5	118.1	0.0	202.5	66.0	100%	11.6	7.6	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	118.1	38.5
Feb	28	7.9	1.5	0.804	0.466	109.1	0.8	0.1	109.9	0.0	109.9	9.4	0.0	1.4	0.0	320.3	104.4	117.8	0.0	202.5	66.0	100%	11.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	117.8	38.4
Mar	31	7.6	2.8	0.804	0.622	135.7	0.8	0.1	136.3	0.0	136.3	9.0	0.0	2.7	0.0	345.2	112.5	142.6	0.0	202.5	66.0	100%	11.6	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	142.6	46.5
Apr	30	3.8	4.2	0.804	0.186	91.1	0.4	0.2	91.3	0.0	91.3	4.5	0.5	4.0	48.3	245.6	80.0	91.3	0.0	202.5	66.0	100%	11.6	0.0	3.0	3.0	0.4	3.4	17.2	5.6	31.1	10.1	3.4	3.4	17.2	5.6	31.1	10.1	56.7	36.6	168.6	54.9	43.1	14.0
May	31	1.8	6.4	0.804	0.069	83.0	0.2	0.3	82.9	0.0	82.9	2.2	0.9	5.8	107.0	173.9	56.7	107.0	-28.6	173.9	56.7	86%	11.0	0.0	3.0	3.0	4.5	7.5	38.2	12.4	68.8	22.4	7.5	7.5	38.2	12.4	68.8	22.4	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.4	8.2	0.804	0.000	74.0	0.0	0.3	73.7	0.0	73.7	0.5	0.9	5.1	153.3	88.8	28.9	153.3	-85.2	88.8	28.9	44%	7.5	0.0	3.0	3.0	7.8	10.8	54.7	17.8	98.6	32.1	10.8	10.8	54.7	17.8	98.6	32.1	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.0	0.1	0.6	164.2	0.0	0.0	164.2	-88.8	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.8	21.1	116.8	38.1	12.7	10.8	64.8	21.1	99.5	32.4	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.1	0.1	0.6	75.6	0.0	0.0	75.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.4	20.3	112.5	36.7	12.3	1.4	62.4	20.3	13.1	4.3	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.6	7.0	0.804	0.000	74.0	0.1	0.3	73.8	0.0	73.8	0.7	0.1	0.4	73.9	0.0	0.0	73.9	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.4	9.4	47.6	15.5	85.8	28.0	9.4	2.9	47.6	15.5	26.4	8.6	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	45.7	57.3	-	-	1102.6	4.6	2.4	1104.9	0.0	1104.9	53.6	3.7	24.2	693.7	-	-	1130.6	0.0	-	-	-	-	28.4	36.0	21.0	40.0	61.0	310.3	101.1	559.5	182.3	61.0	41.8	310.3	101.1	383.4	124.9	-	-	880.3	286.9	437.0	142.4

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (10-yr) precipitation (45.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 10-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected buildout average dry weather flow (ADWF) w/conservation
(4) Projected buildout inflow and infiltration (I/I) w/conservation for 10-yr precipitation assumed to increase in line with ADWF from existing I/I for 10-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 10-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 10-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = -0.0019*(storage volume)2 + 0.2896*(storage volume) + 0.7217)
(23) Percolated precipitation equals 10-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 10-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
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(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
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(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-15
CITY OF ANGELS WASTEWATER MASTER PLAN
25-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITH WATER CONSERVATION

						TREATMENT					STORAGE														LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir														Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		25-yr Precip	Evap/ ET	Buildout ADWF w/Conservation	Buildout I/I w/Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume Sprayfields		Allowable Disposal Volume GHC		Applied Disposal Depth Sprayfields	Applied Disposal Depth GHC	Applied Disposal Volume Sprayfields		Applied Disposal Volume GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.7	4.4	0.804	0.000	76.5	0.3	0.2	76.6	0.0	76.6	3.0	0.2	0.7	67.0	11.7	3.8	67.0	11.7	11.7	3.8	6%	1.8	0.0	3.0	3.0	1.7	4.7	23.9	7.8	43.1	14.0	4.7	4.7	23.9	7.8	43.1	14.0	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	5.5	1.8	0.804	0.014	75.3	0.6	0.1	75.8	0.0	75.8	6.3	0.6	1.1	0.0	92.0	30.0	0.0	80.3	92.0	30.0	45%	7.7	3.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	8.3	1.0	0.804	0.548	128.6	0.8	0.0	129.4	0.0	129.4	9.9	0.2	0.9	0.0	230.2	75.0	27.6	110.5	202.5	66.0	100%	11.6	7.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	27.6	9.0
Jan	31	9.8	1.0	0.804	0.372	111.9	1.0	0.0	112.8	0.0	112.8	11.6	0.0	1.0	0.0	325.9	106.2	123.4	0.0	202.5	66.0	100%	11.6	8.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	123.4	40.2
Feb	28	8.9	1.5	0.804	0.522	113.9	0.9	0.1	114.8	0.0	114.8	10.6	0.0	1.4	0.0	326.5	106.4	123.9	0.0	202.5	66.0	100%	11.6	7.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	123.9	40.4
Mar	31	8.6	2.8	0.804	0.697	142.8	0.9	0.1	143.5	0.0	143.5	10.2	0.0	2.7	0.0	353.6	115.2	151.0	0.0	202.5	66.0	100%	11.6	5.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	151.0	49.2
Apr	30	4.3	4.2	0.804	0.208	93.2	0.4	0.2	93.5	0.0	93.5	5.1	0.5	4.0	41.3	255.3	83.2	94.0	0.0	202.5	66.0	100%	11.6	0.1	3.0	2.9	0.0	2.9	14.7	4.8	26.6	8.7	2.9	2.9	14.7	4.8	26.6	8.7	56.7	36.6	168.6	54.9	52.7	17.2
May	31	2.1	6.4	0.804	0.077	83.8	0.2	0.3	83.8	0.0	83.8	2.5	0.9	5.9	103.6	178.4	58.1	103.6	-24.2	178.4	58.1	88%	11.1	0.0	3.0	3.0	4.3	7.3	36.9	12.0	66.6	21.7	7.3	7.3	36.9	12.0	66.6	21.7	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.5	8.2	0.804	0.000	74.0	0.0	0.3	73.7	0.0	73.7	0.6	1.0	5.3	152.5	93.8	30.6	152.5	-84.5	93.8	30.6	46%	7.8	0.0	3.0	3.0	7.7	10.7	54.4	17.7	98.1	32.0	10.7	10.7	54.4	17.7	98.1	32.0	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.1	0.1	0.6	169.3	0.0	0.0	169.3	-93.8	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	11.4	64.7	21.1	104.5	34.1	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.1	0.1	0.6	75.6	0.0	0.0	75.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.3	20.3	112.4	36.6	12.3	1.4	62.3	20.3	13.2	4.3	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.7	7.0	0.804	0.000	74.0	0.1	0.3	73.8	0.0	73.8	0.8	0.1	0.4	74.0	0.0	0.0	74.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.3	9.3	47.2	15.4	85.1	27.7	9.3	2.9	47.2	15.4	26.9	8.8	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	51.6	57.3	-	-	1127.0	5.2	2.4	1129.8	0.0	1129.8	60.5	3.8	24.6	683.3	-	-	1161.9	0.0	-	-	-	-	33.2	36.0	20.9	39.0	59.8	304.2	99.1	548.6	178.8	59.8	41.3	304.2	99.1	379.0	123.5	-	-	880.3	286.9	478.7	156.0

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (25-yr) precipitation (51.5 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 25-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected buildout average dry weather flow (ADWF) w/conservation
(4) Projected buildout inflow and infiltration (I/I) w/conservation for 25-yr precipitation assumed to increase in line with ADWF from existing I/I for 25-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 25-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 25-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = -0.0019*(storage volume)2 + 0.2896*(storage volume) + 0.7217)
(23) Percolated precipitation equals 25-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 25-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-16

CITY OF ANGELS WASTEWATER MASTER PLAN

100-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITH WATER CONSERVATION

						TREATMENT					STORAGE													LAND DISPOSAL															SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course															Discharge to Angels Creek					
		100-yr Precip	Evap/ ET	Buildout ADWF w/Conservation	Buildout I/I w/Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume Sprayfields		Allowable Disposal Volume GHC		Applied Disposal Depth Sprayfields	Applied Disposal Depth GHC	Applied Disposal Volume Sprayfields		Applied Disposal Volume GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	3.1	3.4	0.804	0.000	76.5	0.3	0.1	76.7	0.0	76.7	3.5	0.4	1.0	46.3	32.4	10.6	46.3	32.4	32.4	10.6	16%	3.6	0.0	3.0	3.0	0.2	3.2	16.5	5.4	29.8	9.7	3.2	3.2	16.5	5.4	29.8	9.7	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	6.3	1.4	0.804	0.016	75.5	0.6	0.1	76.1	0.0	76.1	7.3	0.7	1.0	0.0	114.1	37.2	0.0	81.7	114.1	37.2	56%	8.9	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	9.5	0.7	0.804	0.628	136.2	1.0	0.0	137.1	0.0	137.1	11.3	0.2	0.7	0.0	261.6	85.2	59.1	88.4	202.5	66.0	100%	11.6	8.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	59.1	19.2
Jan	31	11.2	0.8	0.804	0.426	117.0	1.1	0.0	118.1	0.0	118.1	13.2	0.0	0.8	0.0	333.1	108.6	130.6	0.0	202.5	66.0	100%	11.6	10.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	130.6	42.6
Feb	28	10.2	1.1	0.804	0.598	120.5	1.0	0.0	121.5	0.0	121.5	12.1	0.0	1.1	0.0	335.0	109.2	132.5	0.0	202.5	66.0	100%	11.6	9.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	132.5	43.2
Mar	31	9.9	2.1	0.804	0.798	152.4	1.0	0.1	153.4	0.0	153.4	11.7	0.0	2.0	0.0	365.5	119.1	162.9	0.0	202.5	66.0	100%	11.6	7.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	162.9	53.1
Apr	30	4.9	3.2	0.804	0.239	96.0	0.5	0.1	96.4	0.0	96.4	5.8	0.5	3.1	18.0	283.2	92.3	98.6	0.0	202.5	66.0	100%	11.6	1.7	3.0	1.3	0.0	1.3	6.4	2.1	11.6	3.8	1.3	1.3	6.4	2.1	11.6	3.8	56.7	36.6	168.6	54.9	80.6	26.3
May	31	2.4	6.4	0.804	0.088	84.9	0.2	0.3	84.8	0.0	84.8	2.8	0.9	6.0	99.2	184.1	60.0	99.2	-18.5	184.1	60.0	91%	11.3	0.0	3.0	3.0	4.0	7.0	35.4	11.5	63.8	20.8	7.0	7.0	35.4	11.5	63.8	20.8	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.6	8.2	0.804	0.000	74.0	0.1	0.3	73.7	0.0	73.7	0.6	1.0	5.6	151.5	100.3	32.7	151.5	-83.7	100.3	32.7	50%	8.2	0.0	3.0	3.0	7.6	10.6	54.1	17.6	97.5	31.8	10.6	10.6	54.1	17.6	97.5	31.8	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.1	9.8	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.1	0.1	0.6	175.8	0.0	0.0	175.8	-100.3	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	12.1	64.7	21.1	111.1	36.2	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.804	0.000	76.5	0.0	0.4	76.1	0.0	76.1	0.1	0.1	0.6	75.6	0.0	0.0	75.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.2	12.2	62.3	20.3	112.3	36.6	12.2	1.5	62.3	20.3	13.3	4.3	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.8	7.0	0.804	0.000	74.0	0.1	0.3	73.8	0.0	73.8	0.9	0.1	0.4	74.2	0.0	0.0	74.2	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.2	9.2	46.7	15.2	84.1	27.4	9.2	3.0	46.7	15.2	27.5	9.0	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	59.1	53.3	-	-	1159.9	6.0	2.2	1163.7	0.0	1163.7	69.5	4.2	22.7	640.6	-	-	1206.3	0.0	-	-	-	-	42.8	36.0	19.3	37.0	56.3	286.0	93.2	515.8	168.1	56.3	38.7	286.0	93.2	354.6	115.5	-	-	880.3	286.9	565.7	184.4

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual 100-year (100-yr) precipitation (59.0 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 100-yr precipitation factor from Station #B30 020900 in Angels Camp

(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8 and assuming 76% of N-yr Evap/ET for Oct - Apr to account for anticipated decrease in Evap/ET during 100-yr precipitation.

(3) Projected buildout average dry weather flow (ADWF) w/conservation

(4) Projected buildout inflow and infiltration (I/I) w/conservation for 100-yr precipitation assumed to increase in line with ADWF from existing I/I for 100-yr precipitation

(5) Wastewater in equals sum of ADWF and I/I, times days per month

(6) Precipitation in equals 100-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)

(7) Evaporation out equals Evap/ET depth times water surface area at WWTP

(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained

(9) Change in stored volume equals WW in + precipitation - evaporation - WW out

(10) Wastewater in equals WW out from WWTP

(11) Precipitation in equals 100-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)

(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall

(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume

(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]

(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September

(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September

(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek

(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek

(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek

(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek

(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume

(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)

(23) Percolated precipitation equals 100-yr precipitation depth - Evap/ET depth, zero when negative

(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month

(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative

(26) Net ET equals Evap/ET depth - 100-yr precipitation depth, zero when negative

(27) Allowable disposal depth equals available soil capacity + net ET

(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands

(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands

(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course

(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course

(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands

(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course

(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands

(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands

(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands

(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands

(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.

(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.

(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)

(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)

(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-17
CITY OF ANGELS WASTEWATER MASTER PLAN
N-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITHOUT WATER CONSERVATION

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																														Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume								
		N-yr Precip	Evap/ ET	Buildout ADWF w/out Conservation	Buildout I/I w/out Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	1.7	4.4	0.824	0.000	78.4	0.2	0.2	78.4	0.0	78.4	1.9	0.1	0.3	79.9	0.0	0.0	79.9	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.7	5.7	29.0	9.4	52.2	17.0	5.7	5.6	29.0	9.4	50.9	16.6	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	3.5	1.8	0.824	0.009	76.7	0.4	0.1	77.0	0.0	77.0	4.0	0.5	0.9	18.6	61.0	19.9	18.6	61.0	61.0	19.9	30%	5.7	1.7	3.0	1.3	0.0	1.3	6.6	2.2	11.9	3.9	1.3	1.3	6.6	2.2	11.9	3.9	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	5.3	1.0	0.824	0.355	112.2	0.5	0.0	112.7	0.0	112.7	6.2	0.2	0.9	0.0	178.8	58.3	0.0	117.8	178.8	58.3	88%	11.1	4.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	0.0	0.0
Jan	31	6.2	1.0	0.824	0.241	101.3	0.6	0.0	101.9	0.0	101.9	7.3	0.0	1.0	0.0	287.1	93.5	84.5	23.7	202.5	66.0	100%	11.6	5.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	84.5	27.5
Feb	28	5.7	1.5	0.824	0.339	99.9	0.6	0.1	100.4	0.0	100.4	6.7	0.0	1.4	0.0	308.2	100.4	105.7	0.0	202.5	66.0	100%	11.6	4.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	105.7	34.4
Mar	31	5.4	2.8	0.824	0.452	121.4	0.6	0.1	121.8	0.0	121.8	6.4	0.0	2.7	4.6	323.5	105.4	125.6	0.0	202.5	66.0	100%	11.6	2.7	3.0	0.3	0.0	0.3	1.6	0.5	2.9	1.0	0.3	0.3	1.6	0.5	2.9	1.0	74.1	47.9	180.7	58.9	121.0	39.4
Apr	30	2.7	4.2	0.824	0.135	88.3	0.3	0.2	88.4	0.0	88.4	3.2	0.5	4.0	63.8	225.8	73.6	87.1	0.0	202.5	66.0	100%	11.6	0.0	3.0	3.0	1.5	4.5	22.8	7.4	41.0	13.4	4.5	4.5	22.8	7.4	41.0	13.4	56.7	36.6	168.6	54.9	23.3	7.6
May	31	1.3	6.4	0.824	0.050	83.1	0.1	0.3	83.0	0.0	83.0	1.6	0.9	5.7	114.5	166.0	54.1	114.5	-36.5	166.0	54.1	82%	10.8	0.0	3.0	3.0	5.0	8.0	40.8	13.3	73.6	24.0	8.0	8.0	40.8	13.3	73.6	24.0	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.3	8.2	0.824	0.000	75.9	0.0	0.3	75.5	0.0	75.5	0.3	0.9	4.8	155.0	81.2	26.4	155.0	-84.8	81.2	26.4	40%	7.1	0.0	3.0	3.0	7.9	10.9	55.3	18.0	99.7	32.5	10.9	10.9	55.3	18.0	99.7	32.5	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.0	0.1	0.6	158.5	0.0	0.0	158.5	-81.2	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.8	12.8	64.8	21.1	116.9	38.1	12.8	10.2	64.8	21.1	93.7	30.5	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.1	0.1	0.6	77.4	0.0	0.0	77.4	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.6	20.4	112.8	36.8	12.3	1.6	62.6	20.4	14.9	4.8	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.4	7.0	0.824	0.000	75.9	0.0	0.3	75.6	0.0	75.6	0.5	0.1	0.4	75.6	0.0	0.0	75.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.5	9.5	48.5	15.8	87.4	28.5	9.5	3.0	48.5	15.8	27.1	8.8	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	32.6	57.3	-	-	1069.8	3.3	2.4	1070.7	0.0	1070.7	38.2	3.4	23.2	747.8	-	-	1082.4	0.0	-	-	-	-	18.0	36.0	22.6	42.7	65.3	332.0	108.2	598.6	195.1	65.3	45.4	332.0	108.2	415.9	135.5	-	-	880.3	286.9	334.5	109.0

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual normal-year (N-yr) precipitation (32.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected buildout average dry weather flow (ADWF) w/out conservation
(4) Projected buildout inflow and infiltration (I/I) w/out conservation for N-yr precipitation assumed to increase in line with ADWF from existing I/I for N-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals N-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals N-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals N-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - N-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-18
CITY OF ANGELS WASTEWATER MASTER PLAN
10-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITHOUT WATER CONSERVATION

						TREATMENT					STORAGE														LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir														Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		10-yr Precip	Evap/ ET	Buildout ADWF w/out Conservation	Buildout I/I w/out Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume				N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
																													Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.4	4.4	0.824	0.000	78.4	0.2	0.2	78.4	0.0	78.4	2.6	0.2	0.6	71.4	8.9	2.9	71.4	8.9	8.9	2.9	4%	1.5	0.0	3.0	3.0	2.0	5.0	25.5	8.3	45.9	15.0	5.0	5.0	25.5	8.3	45.9	15.0	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	4.9	1.8	0.824	0.013	77.0	0.5	0.1	77.5	0.0	77.5	5.6	0.6	1.1	0.0	90.2	29.4	0.0	81.3	90.2	29.4	45%	7.6	3.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	7.4	1.0	0.824	0.501	126.0	0.8	0.0	126.8	0.0	126.8	8.7	0.2	0.9	0.0	224.6	73.2	22.1	112.3	202.5	66.0	100%	11.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	22.1	7.2
Jan	31	8.7	1.0	0.824	0.340	110.7	0.9	0.0	111.6	0.0	111.6	10.2	0.0	1.0	0.0	323.3	105.4	120.8	0.0	202.5	66.0	100%	11.6	7.6	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	120.8	39.4
Feb	28	7.9	1.5	0.824	0.477	111.8	0.8	0.1	112.6	0.0	112.6	9.4	0.0	1.4	0.0	323.1	105.3	120.5	0.0	202.5	66.0	100%	11.6	6.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	120.5	39.3
Mar	31	7.6	2.8	0.824	0.637	139.0	0.8	0.1	139.7	0.0	139.7	9.0	0.0	2.7	0.0	348.5	113.6	146.0	0.0	202.5	66.0	100%	11.6	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	146.0	47.6
Apr	30	3.8	4.2	0.824	0.191	93.4	0.4	0.2	93.6	0.0	93.6	4.5	0.5	4.0	48.3	247.9	80.8	93.6	0.0	202.5	66.0	100%	11.6	0.0	3.0	3.0	0.4	3.4	17.2	5.6	31.1	10.1	3.4	3.4	17.2	5.6	31.1	10.1	56.7	36.6	168.6	54.9	45.3	14.8
May	31	1.8	6.4	0.824	0.070	85.1	0.2	0.3	85.0	0.0	85.0	2.2	0.9	5.9	107.0	176.0	57.3	107.0	-26.6	176.0	57.3	87%	11.1	0.0	3.0	3.0	4.5	7.5	38.2	12.4	68.8	22.4	7.5	7.5	38.2	12.4	68.8	22.4	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.4	8.2	0.824	0.000	75.9	0.0	0.3	75.6	0.0	75.6	0.5	1.0	5.3	153.3	92.5	30.1	153.3	-83.5	92.5	30.1	46%	7.7	0.0	3.0	3.0	7.8	10.8	54.7	17.8	98.6	32.1	10.8	10.8	54.7	17.8	98.6	32.1	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.0	0.1	0.6	169.8	0.0	0.0	169.8	-92.5	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.8	21.1	116.8	38.1	12.7	11.5	64.8	21.1	105.1	34.2	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.1	0.1	0.6	77.5	0.0	0.0	77.5	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.4	20.3	112.5	36.7	12.3	1.6	62.4	20.3	15.1	4.9	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.6	7.0	0.824	0.000	75.9	0.1	0.3	75.6	0.0	75.6	0.7	0.1	0.4	75.8	0.0	0.0	75.8	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.4	9.4	47.6	15.5	85.8	28.0	9.4	3.1	47.6	15.5	28.2	9.2	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	45.7	57.3	-	-	1130.0	4.6	2.4	1132.3	0.0	1132.3	53.6	3.8	24.4	703.0	-	-	1157.7	0.0	-	-	-	-	28.4	36.0	21.0	40.0	61.0	310.3	101.1	559.5	182.3	61.0	42.8	310.3	101.1	392.7	128.0	-	-	880.3	286.9	454.7	148.2

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (10-yr) precipitation (45.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 10-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected buildout average dry weather flow (ADWF) w/out conservation
(4) Projected buildout inflow and infiltration (I/I) w/out conservation for 10-yr precipitation assumed to increase in line with ADWF from existing I/I for 10-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 10-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 10-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = -0.0019*(storage volume)2 + 0.2896*(storage volume) + 0.7217)
(23) Percolated precipitation equals 10-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 10-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-19

CITY OF ANGELS WASTEWATER MASTER PLAN

25-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITHOUT WATER CONSERVATION

						TREATMENT					STORAGE														LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir														Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
		25-yr Precip	Evap/ ET	Buildout ADWF w/out Conservation	Buildout I/I w/out Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume				N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
																													Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC							
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	2.7	4.4	0.824	0.000	78.4	0.3	0.2	78.5	0.0	78.5	3.0	0.2	0.7	67.0	13.5	4.4	67.0	13.5	13.5	4.4	7%	2.0	0.0	3.0	3.0	1.7	4.7	23.9	7.8	43.1	14.0	4.7	4.7	23.9	7.8	43.1	14.0	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	5.5	1.8	0.824	0.014	77.2	0.6	0.1	77.7	0.0	77.7	6.3	0.7	1.2	0.0	95.7	31.2	0.0	82.2	95.7	31.2	47%	7.9	3.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	8.3	1.0	0.824	0.561	131.8	0.8	0.0	132.6	0.0	132.6	9.9	0.2	0.9	0.0	237.0	77.2	34.5	106.8	202.5	66.0	100%	11.6	7.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	34.5	11.2
Jan	31	9.8	1.0	0.824	0.381	114.6	1.0	0.0	115.6	0.0	115.6	11.6	0.0	1.0	0.0	328.7	107.1	126.1	0.0	202.5	66.0	100%	11.6	8.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	126.1	41.1
Feb	28	8.9	1.5	0.824	0.535	116.8	0.9	0.1	117.6	0.0	117.6	10.6	0.0	1.4	0.0	329.3	107.3	126.8	0.0	202.5	66.0	100%	11.6	7.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	126.8	41.3
Mar	31	8.6	2.8	0.824	0.714	146.3	0.9	0.1	147.1	0.0	147.1	10.2	0.0	2.7	0.0	357.1	116.4	154.6	0.0	202.5	66.0	100%	11.6	5.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	154.6	50.4
Apr	30	4.3	4.2	0.824	0.214	95.5	0.4	0.2	95.8	0.0	95.8	5.1	0.5	4.0	41.3	257.6	83.9	96.3	0.0	202.5	66.0	100%	11.6	0.1	3.0	2.9	0.0	2.9	14.7	4.8	26.6	8.7	2.9	2.9	14.7	4.8	26.6	8.7	56.7	36.6	168.6	54.9	55.1	17.9
May	31	2.1	6.4	0.824	0.079	85.9	0.2	0.3	85.8	0.0	85.8	2.5	0.9	5.9	103.6	180.4	58.8	103.6	-22.1	180.4	58.8	89%	11.2	0.0	3.0	3.0	4.3	7.3	36.9	12.0	66.6	21.7	7.3	7.3	36.9	12.0	66.6	21.7	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.5	8.2	0.824	0.000	75.9	0.0	0.3	75.6	0.0	75.6	0.6	1.0	5.5	152.5	97.5	31.8	152.5	-82.9	97.5	31.8	48%	8.0	0.0	3.0	3.0	7.7	10.7	54.4	17.7	98.1	32.0	10.7	10.7	54.4	17.7	98.1	32.0	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.1	0.1	0.6	174.9	0.0	0.0	174.9	-97.5	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	12.0	64.7	21.1	110.2	35.9	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.1	0.1	0.6	77.5	0.0	0.0	77.5	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.3	20.3	112.4	36.6	12.3	1.7	62.3	20.3	15.1	4.9	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.7	7.0	0.824	0.000	75.9	0.1	0.3	75.6	0.0	75.6	0.8	0.1	0.4	75.9	0.0	0.0	75.9	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.3	9.3	47.2	15.4	85.1	27.7	9.3	3.1	47.2	15.4	28.7	9.4	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	51.6	57.3	-	-	1155.0	5.2	2.4	1157.9	0.0	1157.9	60.6	3.9	24.9	692.6	-	-	1189.7	0.0	-	-	-	-	33.2	36.0	20.9	39.0	59.8	304.2	99.1	548.6	178.8	59.8	42.4	304.2	99.1	388.4	126.6	-	-	880.3	286.9	497.0	162.0

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual wet-year (25-yr) precipitation (51.5 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 25-yr precipitation factor from Station #B30 020900 in Angels Camp

(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8

(3) Projected buildout average dry weather flow (ADWF) w/out conservation

(4) Projected buildout inflow and infiltration (I/I) w/out conservation for 25-yr precipitation assumed to increase in line with ADWF from existing I/I for 25-yr precipitation

(5) Wastewater in equals sum of ADWF and I/I, times days per month

(6) Precipitation in equals 25-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)

(7) Evaporation out equals Evap/ET depth times water surface area at WWTP

(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained

(9) Change in stored volume equals WW in + precipitation - evaporation - WW out

(10) Wastewater in equals WW out from WWTP

(11) Precipitation in equals 25-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)

(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall

(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume

(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]

(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September

(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September

(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek

(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek

(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek

(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek

(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume

(22) Reservoir water surface area is a function of the net volume after creek discharge (area = -0.0019*(storage volume)2 + 0.2896*(storage volume) + 0.7217)

(23) Percolated precipitation equals 25-yr precipitation depth - Evap/ET depth, zero when negative

(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month

(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative

(26) Net ET equals Evap/ET depth - 25-yr precipitation depth, zero when negative

(27) Allowable disposal depth equals available soil capacity + net ET

(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands

(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands

(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course

(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course

(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands

(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course

(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands

(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands

(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands

(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands

(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.

(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.

(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)

(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)

(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-20
CITY OF ANGELS WASTEWATER MASTER PLAN
100-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITHOUT WATER CONSERVATION

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																														Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume								
		100-yr Precip	Evap/ ET	Buildout ADWF w/out Conservation	Buildout I/I w/out Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		N-yr Stream Flow		Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	3.1	3.4	0.824	0.000	78.4	0.3	0.1	78.6	0.0	78.6	3.5	0.5	1.0	46.3	34.3	11.2	46.3	34.3	34.3	11.2	17%	3.7	0.0	3.0	3.0	0.2	3.2	16.5	5.4	29.8	9.7	3.2	3.2	16.5	5.4	29.8	9.7	15.1	9.8	0.0	0.0	0.0	0.0
Nov	30	6.3	1.4	0.824	0.017	77.4	0.6	0.1	78.0	0.0	78.0	7.3	0.8	1.0	0.0	117.8	38.4	0.0	83.5	117.8	38.4	58%	9.0	4.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	16.5	0.0	0.0	0.0	0.0
Dec	31	9.5	0.7	0.824	0.643	139.6	1.0	0.0	140.5	0.0	140.5	11.3	0.2	0.7	0.0	268.7	87.6	66.1	84.7	202.5	66.0	100%	11.6	8.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6	40.4	180.7	58.9	66.1	21.6
Jan	31	11.2	0.8	0.824	0.436	119.9	1.1	0.0	121.0	0.0	121.0	13.2	0.0	0.8	0.0	336.0	109.5	133.5	0.0	202.5	66.0	100%	11.6	10.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	30.7	146.2	47.6	133.5	43.5
Feb	28	10.2	1.1	0.824	0.613	123.5	1.0	0.0	124.5	0.0	124.5	12.1	0.0	1.1	0.0	338.0	110.2	135.5	0.0	202.5	66.0	100%	11.6	9.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.3	32.5	139.6	45.5	135.5	44.2
Mar	31	9.9	2.1	0.824	0.818	156.2	1.0	0.1	157.1	0.0	157.1	11.7	0.0	2.0	0.0	369.3	120.3	166.7	0.0	202.5	66.0	100%	11.6	7.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.1	47.9	180.7	58.9	166.7	54.3
Apr	30	4.9	3.2	0.824	0.245	98.4	0.5	0.1	98.7	0.0	98.7	5.8	0.5	3.1	18.0	285.6	93.1	101.0	0.0	202.5	66.0	100%	11.6	1.7	3.0	1.3	0.0	1.3	6.4	2.1	11.6	3.8	1.3	1.3	6.4	2.1	11.6	3.8	56.7	36.6	168.6	54.9	83.0	27.1
May	31	2.4	6.4	0.824	0.090	87.0	0.2	0.3	87.0	0.0	87.0	2.8	0.9	6.0	99.2	186.1	60.7	99.2	-16.4	186.1	60.7	92%	11.3	0.0	3.0	3.0	4.0	7.0	35.4	11.5	63.8	20.8	7.0	7.0	35.4	11.5	63.8	20.8	43.3	28.0	64.4	21.0	0.0	0.0
Jun	30	0.6	8.2	0.824	0.000	75.9	0.1	0.3	75.6	0.0	75.6	0.6	1.0	5.7	151.5	104.1	33.9	151.5	-82.1	104.1	33.9	51%	8.4	0.0	3.0	3.0	7.6	10.6	54.1	17.6	97.5	31.8	10.6	10.6	54.1	17.6	97.5	31.8	33.1	21.4	0.0	0.0	0.0	0.0
Jul	31	0.1	9.8	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.1	0.1	0.6	181.4	0.0	0.0	181.4	-104.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.7	12.7	64.7	21.1	116.7	38.0	12.7	12.7	64.7	21.1	116.7	38.0	25.8	16.7	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.1	0.1	0.6	77.5	0.0	0.0	77.5	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.2	12.2	62.3	20.3	112.3	36.6	12.2	1.7	62.3	20.3	15.3	5.0	25.5	16.5	0.0	0.0	0.0	0.0
Sep	30	0.8	7.0	0.824	0.000	75.9	0.1	0.3	75.6	0.0	75.6	0.9	0.1	0.4	76.0	0.0	0.0	76.0	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.2	9.2	46.7	15.2	84.1	27.4	9.2	3.2	46.7	15.2	29.3	9.6	28.0	18.1	0.0	0.0	0.0	0.0
Total	365	59.1	53.3	-	-	1188.8	6.0	2.2	1192.6	0.0	1192.6	69.5	4.2	22.9	650.0	-	-	1234.9	0.0	-	-	-	-	42.8	36.0	19.3	37.0	56.3	286.0	93.2	515.8	168.1	56.3	39.7	286.0	93.2	364.0	118.6	-	-	880.3	286.9	584.9	190.6

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual 100-year (100-yr) precipitation (59.0 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora multiplied by a 100-yr precipitation factor from Station #B30 020900 in Angels Camp
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8 and assuming 76% of N-yr Evap/ET for Oct - Apr to account for anticipated decrease in Evap/ET during 100-yr precipitation.
(3) Projected buildout average dry weather flow (ADWF) w/out conservation
(4) Projected buildout inflow and infiltration (I/I) w/out conservation for 100-yr precipitation assumed to increase in line with ADWF from existing I/I for 100-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals 100-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals 100-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals 100-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - 100-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(29) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
(30) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
(32) Applied disposal depth equals applied disposal volume for City sprayfield disposal lands divided by irrigation disposal area for City sprayfield disposal lands
(33) Applied disposal depth equals applied disposal volume for Greenhorn Creek Golf Course divided by irrigation disposal area for Greenhorn Creek Golf Course
(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(35) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(37) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
(38) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected N-yr stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

TABLE Q-21

CITY OF ANGELS WASTEWATER MASTER PLAN

N-YR WATER BALANCE FOR WWTP AT PROJECTED BUILDOUT FLOWS WITHOUT WATER CONSERVATION - DRY YEAR STREAM FLOWS

						TREATMENT					STORAGE													LAND DISPOSAL																SURFACE WATER DISPOSAL					
						WWTP					Holman Reservoir													Irrigation of City Sprayfield Disposal Lands and Greenhorn Creek Golf Course																Discharge to Angels Creek					
																													Allowable Disposal Volume				Applied Disposal Depth		Applied Disposal Volume									
		N-yr Precip	Evap/ ET	Buildout ADWF w/out Conservation	Buildout I/I w/out Conservation	WW in	Precip	Evap	WW out	Change in Vol	WW in	Precip	Seepage	Evap	WW out to Irrigation	Net Vol after Irrigation		Total WW out	Total Change in Vol	Net Vol after Creek Discharge		Capacity	Water Surface Area	Percolated Precip	Soil Capacity	Available Soil Capacity	Net ET	Allowable Disposal Depth	Sprayfields		GHC		Sprayfields	GHC	Sprayfields		GHC		Dry-yr Stream Flow	Allowable Discharge Volume		Actual Discharge Volume	
Month	Day	in	in	mgd	mgd	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	MG	ac-ft	ac-ft	ac-ft	MG	%	ac	in	in	in	in	in	ac-ft	MG	ac-ft	MG	in	in	ac-ft	MG	ac-ft	MG	cfs	mgd	ac-ft	MG	ac-ft	MG
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Oct	31	1.7	4.4	0.824	0.000	78.4	0.2	0.2	78.4	0.0	78.4	1.9	0.1	0.3	79.9	0.0	0.0	79.9	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	2.7	5.7	29.0	9.4	52.2	17.0	5.7	5.6	29.0	9.4	50.9	16.6	11.4	7.4	0.0	0.0	0.0	0.0
Nov	30	3.5	1.8	0.824	0.009	76.7	0.4	0.1	77.0	0.0	77.0	4.0	0.5	0.9	18.6	61.0	19.9	18.6	61.0	61.0	19.9	30%	5.7	1.7	3.0	1.3	0.0	1.3	6.6	2.2	11.9	3.9	1.3	1.3	6.6	2.2	11.9	3.9	19.3	12.5	0.0	0.0	0.0	0.0
Dec	31	5.3	1.0	0.824	0.355	112.2	0.5	0.0	112.7	0.0	112.7	6.2	0.2	0.9	0.0	178.8	58.3	0.0	117.8	178.8	58.3	88%	11.1	4.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.4	30.7	145.9	47.5	0.0	0.0
Jan	31	6.2	1.0	0.824	0.241	101.3	0.6	0.0	101.9	0.0	101.9	7.3	0.0	1.0	0.0	287.1	93.5	84.5	23.7	202.5	66.0	100%	11.6	5.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.1	23.3	110.8	36.1	84.5	27.5
Feb	28	5.7	1.5	0.824	0.339	99.9	0.6	0.1	100.4	0.0	100.4	6.7	0.0	1.4	0.0	308.2	100.4	105.7	0.0	202.5	66.0	100%	11.6	4.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.1	24.6	105.9	34.5	105.7	34.4
Mar	31	5.4	2.8	0.824	0.452	121.4	0.6	0.1	121.8	0.0	121.8	6.4	0.0	2.7	4.6	323.5	105.4	125.6	0.0	202.5	66.0	100%	11.6	2.7	3.0	0.3	0.0	0.3	1.6	0.5	2.9	1.0	0.3	0.3	1.6	0.5	2.9	1.0	56.2	36.3	172.7	56.3	121.0	39.4
Apr	30	2.7	4.2	0.824	0.135	88.3	0.3	0.2	88.4	0.0	88.4	3.2	0.5	4.0	63.8	225.8	73.6	87.1	0.0	202.5	66.0	100%	11.6	0.0	3.0	3.0	1.5	4.5	22.8	7.4	41.0	13.4	4.5	4.5	22.8	7.4	41.0	13.4	41.1	26.6	122.3	39.9	23.3	7.6
May	31	1.3	6.4	0.824	0.050	83.1	0.1	0.3	83.0	0.0	83.0	1.6	0.9	5.7	114.5	166.0	54.1	114.5	-36.5	166.0	54.1	82%	10.8	0.0	3.0	3.0	5.0	8.0	40.8	13.3	73.6	24.0	8.0	8.0	40.8	13.3	73.6	24.0	33.4	21.6	49.7	16.2	0.0	0.0
Jun	30	0.3	8.2	0.824	0.000	75.9	0.0	0.3	75.5	0.0	75.5	0.3	0.9	4.8	155.0	81.2	26.4	155.0	-84.8	81.2	26.4	40%	7.1	0.0	3.0	3.0	7.9	10.9	55.3	18.0	99.7	32.5	10.9	10.9	55.3	18.0	99.7	32.5	31.0	20.0	0.0	0.0	0.0	0.0
Jul	31	0.0	9.8	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.0	0.1	0.6	158.5	0.0	0.0	158.5	-81.2	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.8	12.8	64.8	21.1	116.9	38.1	12.8	10.2	64.8	21.1	93.7	30.5	22.2	14.4	0.0	0.0	0.0	0.0
Aug	31	0.1	9.4	0.824	0.000	78.4	0.0	0.4	78.0	0.0	78.0	0.1	0.1	0.6	77.4	0.0	0.0	77.4	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	9.3	12.3	62.6	20.4	112.8	36.8	12.3	1.6	62.6	20.4	14.9	4.8	19.8	12.8	0.0	0.0	0.0	0.0
Sep	30	0.4	7.0	0.824	0.000	75.9	0.0	0.3	75.6	0.0	75.6	0.5	0.1	0.4	75.6	0.0	0.0	75.6	0.0	0.0	0.0	0%	0.7	0.0	3.0	3.0	6.5	9.5	48.5	15.8	87.4	28.5	9.5	3.0	48.5	15.8	27.1	8.8	20.6	13.3	0.0	0.0	0.0	0.0
Total	365	32.6	57.3	-	-	1069.8	3.3	2.4	1070.7	0.0	1070.7	38.2	3.4	23.2	747.8	-	-	1082.4	0.0	-	-	-	-	18.0	36.0	22.6	42.7	65.3	332.0	108.2	598.6	195.1	65.3	45.4	332.0	108.2	415.9	135.5	-	-	707.3	230.5	334.5	109.0

WWTP and Holman Storage Reservoir Areas

WWTP Water Surface Area, ac	0.5
WWTP Land Catchment Area, ac	0.8
Reservoir Maximum Storage Volume, MG	66
Reservoir Maximum Water Surface Area, ac	11.6
Reservoir Total Catchment Area, ac	14.5 (including reservoir water surface)
Reservoir Water Surface Area, ac =	$-0.0019*(\text{volume})^2 + 0.2896*(\text{volume}) + 0.7217$
Runoff Coefficient	0.9

(Applied to land catchment areas at WWTP and Holman Reservoir to estimate runoff from precipitation collected by the facility)

Land Disposal Areas

City Sprayfield Disposal Lands, ac	61
Greenhorn Creek Golf Course (GHC), ac	110

Land Disposal Areas - Percolation Rate for Irrigation

Assumed Irrigation Area Perc Rate, in/hr	0.04
Perc Safety Factor	10%

Storage Volume Requirements

Additional Storage Volume Required, MG	0.0
Existing Storage and Disposal Facilities are Adequate	

Notes

(1) Annual normal-year (N-yr) precipitation (32.6 in/yr) from California Department of Water Resources, Station #B40 835300 in Sonora
(2) Evaporation/Evapotranspiration (Evap/ET) values from Western Regional Climate Center, Class A pan evaporation for New Melones Dam with pan evaporation/Kc factor of 0.8
(3) Projected buildout average dry weather flow (ADWF) w/out conservation
(4) Projected buildout inflow and infiltration (I/I) w/out conservation for N-yr precipitation assumed to increase in line with ADWF from existing I/I for N-yr precipitation
(5) Wastewater in equals sum of ADWF and I/I, times days per month
(6) Precipitation in equals N-yr precipitation depth times water surface area and land catchment area at WWTP (with a runoff coefficient of 0.9)
(7) Evaporation out equals Evap/ET depth times water surface area at WWTP
(8) Wastewater out equals WW in + precipitation - evaporation so that constant volume is maintained
(9) Change in stored volume equals WW in + precipitation - evaporation - WW out
(10) Wastewater in equals WW out from WWTP
(11) Precipitation in equals N-yr precipitation depth times water surface area of Holman Reservoir as a function of storage volume and remaining land catchment area (with a runoff coefficient of 0.9)
(12) Seepage out equals assumed irrigation area perc rate times perc safety factor times reduction factor of 50% to account for suspended solids accumulation at bottom of reservoir times water surface area of Holman Reservoir as a function of storage volume and a seasonal reduction applied to account for months with saturated shallow soils and rising water table elevation as a result of rainfall
(13) Evaporation out equals Evap/ET depth times water surface area of Holman Reservoir as a function of storage volume
(14) Wastewater out to irrigation equals lesser of [net vol from previous month + WW in + precipitation - seepage - evaporation] and [allowable disposal volume in land disposal area]
(15) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(16) Net volume after irrigation equals running total of stored volume prior to discharge to Angels Creek for that month, assuming zero storage at end of September
(17) Total wastewater out equals WW out to irrigation + actual discharge volume to Angels Creek
(18) Total change in stored volume equals WW in + precipitation - seepage - evaporation - WW out to irrigation - actual discharge volume to Angels Creek
(19) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(20) Net volume after creek discharge equals net volume after irrigation - actual discharge volume to Angels Creek
(21) Percent capacity of Holman Reservoir equals net volume after creek discharge divided by maximum reservoir volume
(22) Reservoir water surface area is a function of the net volume after creek discharge (area = $-0.0019*(\text{storage volume})^2 + 0.2896*(\text{storage volume}) + 0.7217$)
(23) Percolated precipitation equals N-yr precipitation depth - Evap/ET depth, zero when negative
(24) Soil capacity equals assumed irrigation area perc rate times perc safety factor times days per month
(25) Available soil capacity equals soil capacity - percolated precipitation, zero when negative
(26) Net ET equals Evap/ET depth - N-yr precipitation depth, zero when negative
(27) Allowable disposal depth equals available soil capacity + net ET
(28) Allowable disposal volume for City sprayfield disposal land equals allowable disposal depth for City sprayfield disposal land times irrigation disposal area for City sprayfield disposal lands
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(31) Allowable disposal volume for Greenhorn Creek Golf Course equals allowable disposal depth for Greenhorn Creek Golf Course times irrigation disposal area for Greenhorn Creek Golf Course
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(34) Applied disposal volume to City sprayfield disposal lands equals WW out from Holman Reservoir up to allowable disposal volume for City sprayfield disposal lands
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(36) Applied disposal volume to Greenhorn Creek Golf Course is the remaining volume not disposed to the City sprayfield disposal lands: WW out from Holman Reservoir - Applied disposal volume to City sprayfield disposal lands
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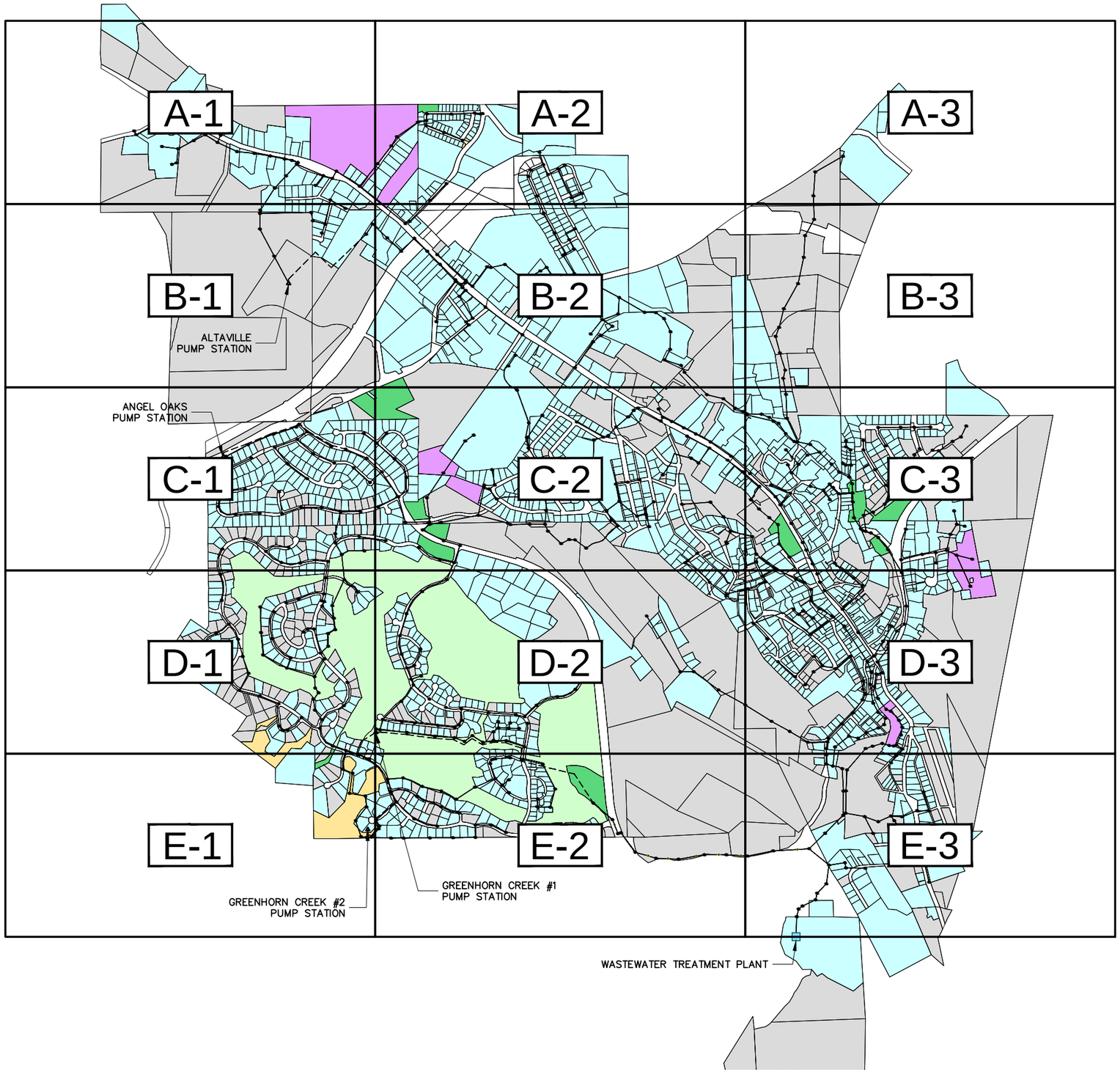
(38) Projected dry year stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(39) Projected dry year stream flows for Angels Creek at WWTP discharge point scaled from historical flows provided by Utica Power Authority for 2010-2011.
(40) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(41) Allowable discharge volume to Angels Creek is limited to the lesser of a maximum average daily discharge of 1.9 mgd and a 20:1 ratio of Angels Creek flows to effluent flows, times days per month from November 15 - May 15 (allowable discharge volume is zero if unused storage volume in Holman Reservoir is more than 20 MG)
(42) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows
(43) Actual discharge volume to Angels Creek is the amount of storage volume in excess of the maximum reservoir volume, not to exceed allowable discharge volume, and zero when there is sufficient storage capacity in Holman Reservoir to contain flows

APPENDIX R

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS



LEGEND

- DEVELOPED PARCEL
- PARTIALLY DEVELOPED
- VACANT PARCEL
- GOLF COURSE
- PARK
- OPEN SPACE
- RIGHT-OF-WAY
- EXISTING PUMP STATION

N

0 700 1,400

1" = 1,400'

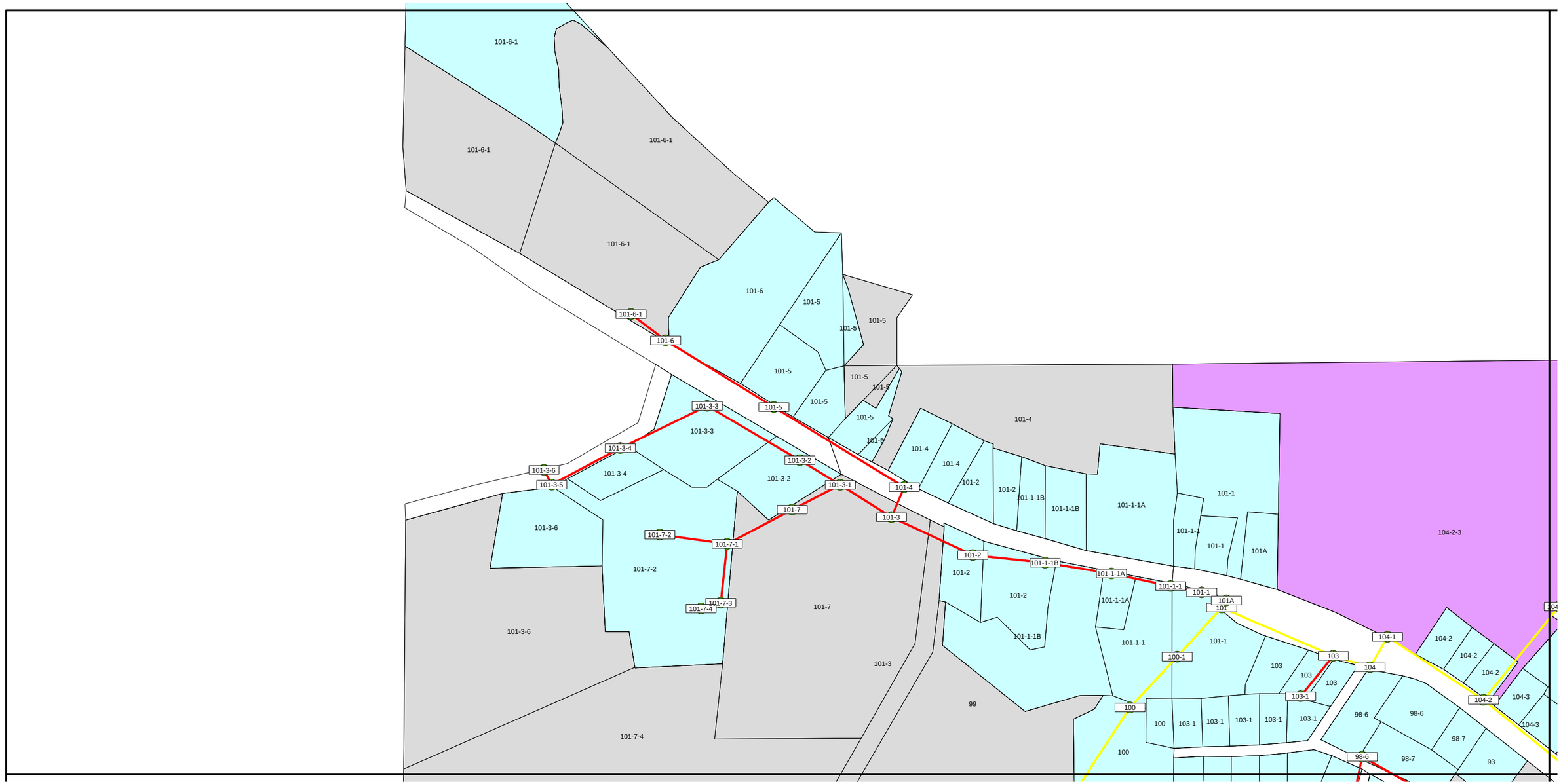
FIGURE R

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Appendix R-Loading.dwg JCP 3/6/2012



LEGEND

- 6-INCH DIAMETER SEWER
- 8-INCH DIAMETER SEWER
- 10-INCH DIAMETER SEWER
- 12-INCH DIAMETER SEWER
- 15-INCH DIAMETER SEWER
- 18-INCH DIAMETER SEWER
- FORCE MAIN
- 101-3-6 MANHOLE 101-3-6
- DEVELOPED PARCEL
- PARTIALLY DEVELOPED PARCEL
- VACANT PARCEL
- GOLF COURSE
- PARK
- OPEN SPACE
- RIGHT-OF-WAY
- 101-3-6 PARCEL WASTEWATER FLOW ASSIGNED TO MANHOLE 101-3-6

N

0 150 300

1" = 150'

FIGURE A-1

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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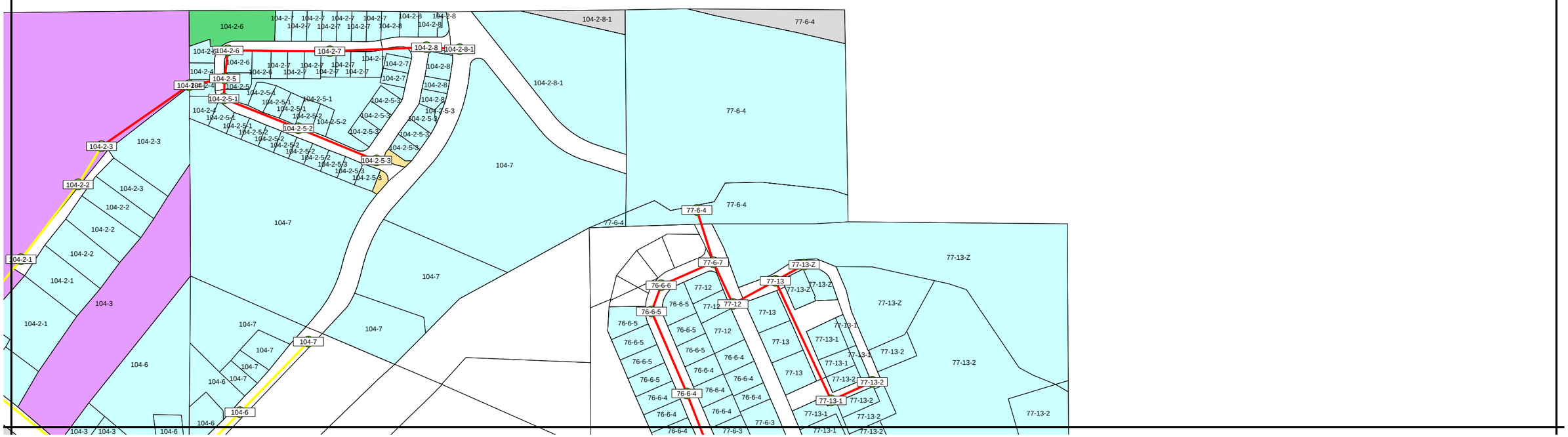

LEGEND

- 6-INCH DIAMETER SEWER
- 8-INCH DIAMETER SEWER
- 10-INCH DIAMETER SEWER
- 12-INCH DIAMETER SEWER
- 15-INCH DIAMETER SEWER
- 18-INCH DIAMETER SEWER
- FORCE MAIN
- 101-3-6 MANHOLE 101-3-6

- DEVELOPED PARCEL
- PARTIALLY DEVELOPED PARCEL
- VACANT PARCEL
- GOLF COURSE
- PARK
- OPEN SPACE
- RIGHT-OF-WAY
- 101-3-6 PARCEL WASTEWATER FLOW ASSIGNED TO MANHOLE 101-3-6

N

0 150 300

1" = 150'

FIGURE A-2

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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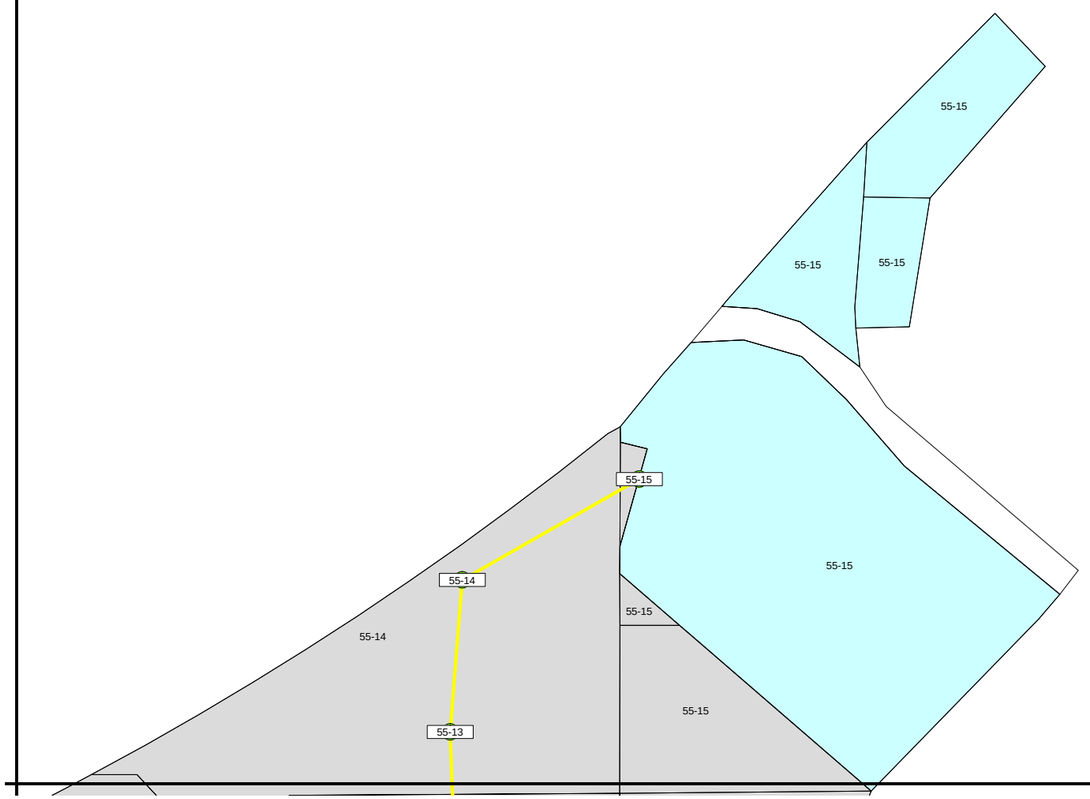

LEGEND

- 6-INCH DIAMETER SEWER
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N

0 150 300

1" = 150'

FIGURE A-3

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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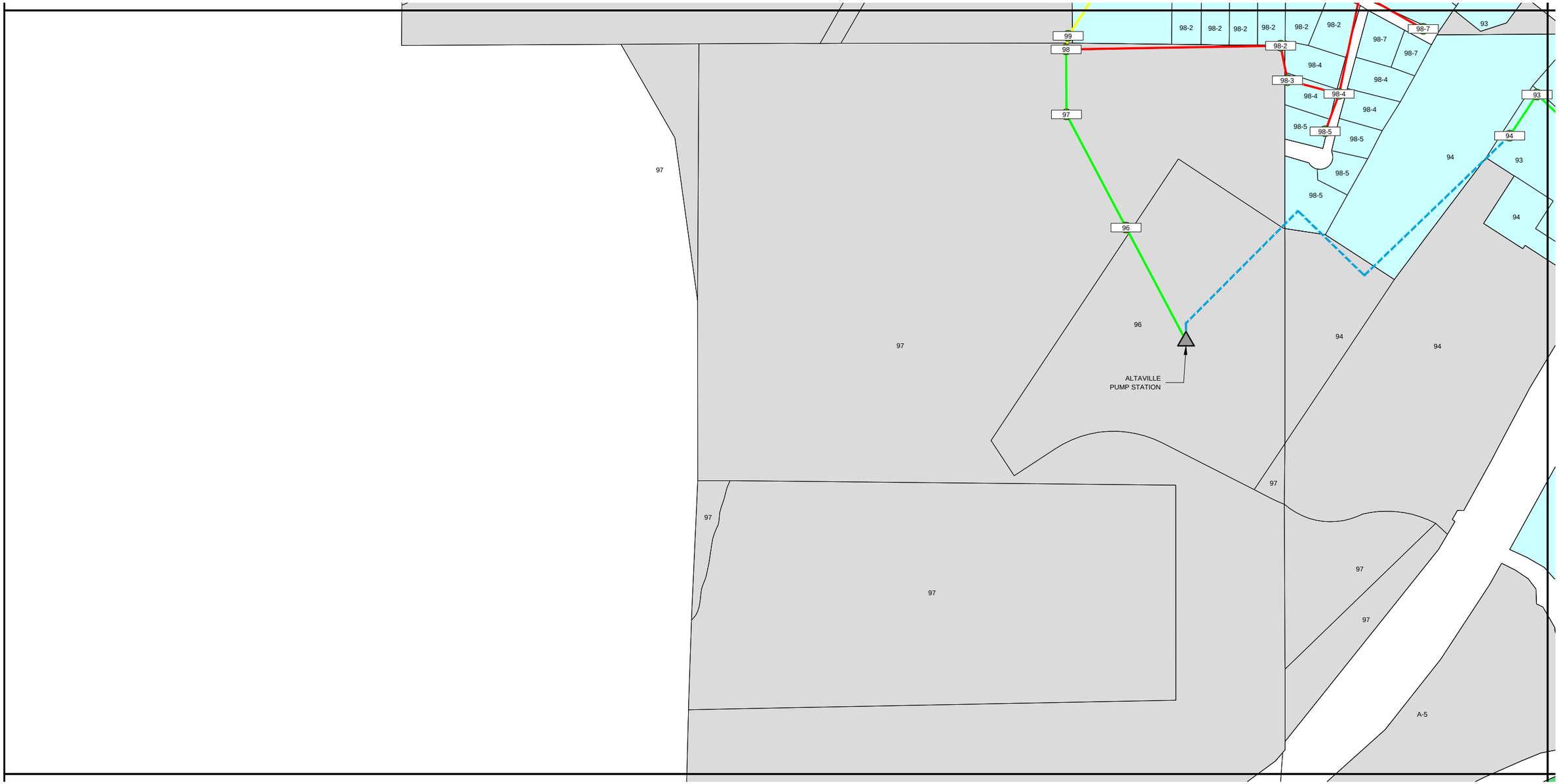

LEGEND

- 6-INCH DIAMETER SEWER
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N

0 150 300

1" = 150'

FIGURE B-1

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
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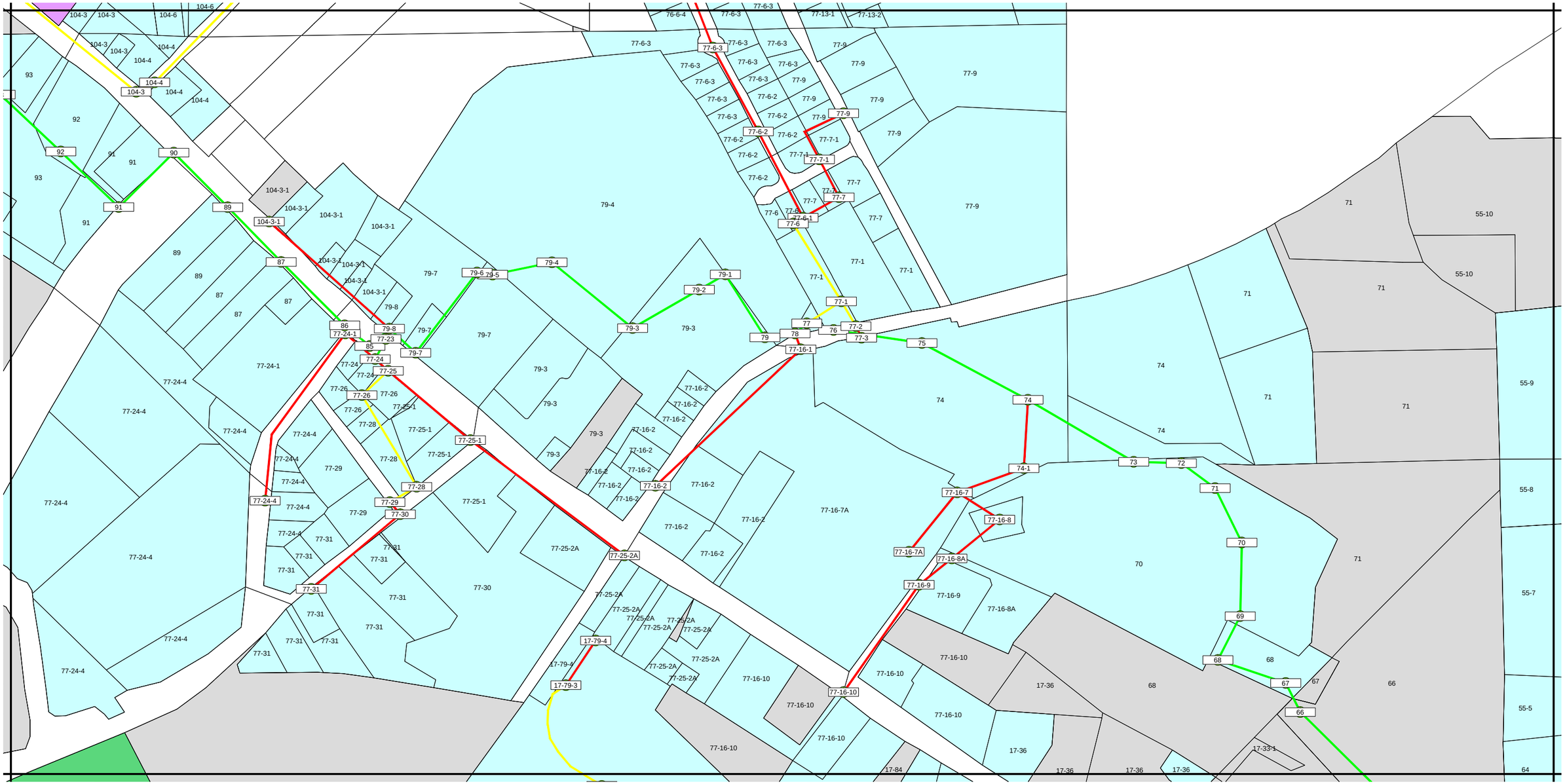

LEGEND

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N

0 150 300

1" = 150'

FIGURE B-2

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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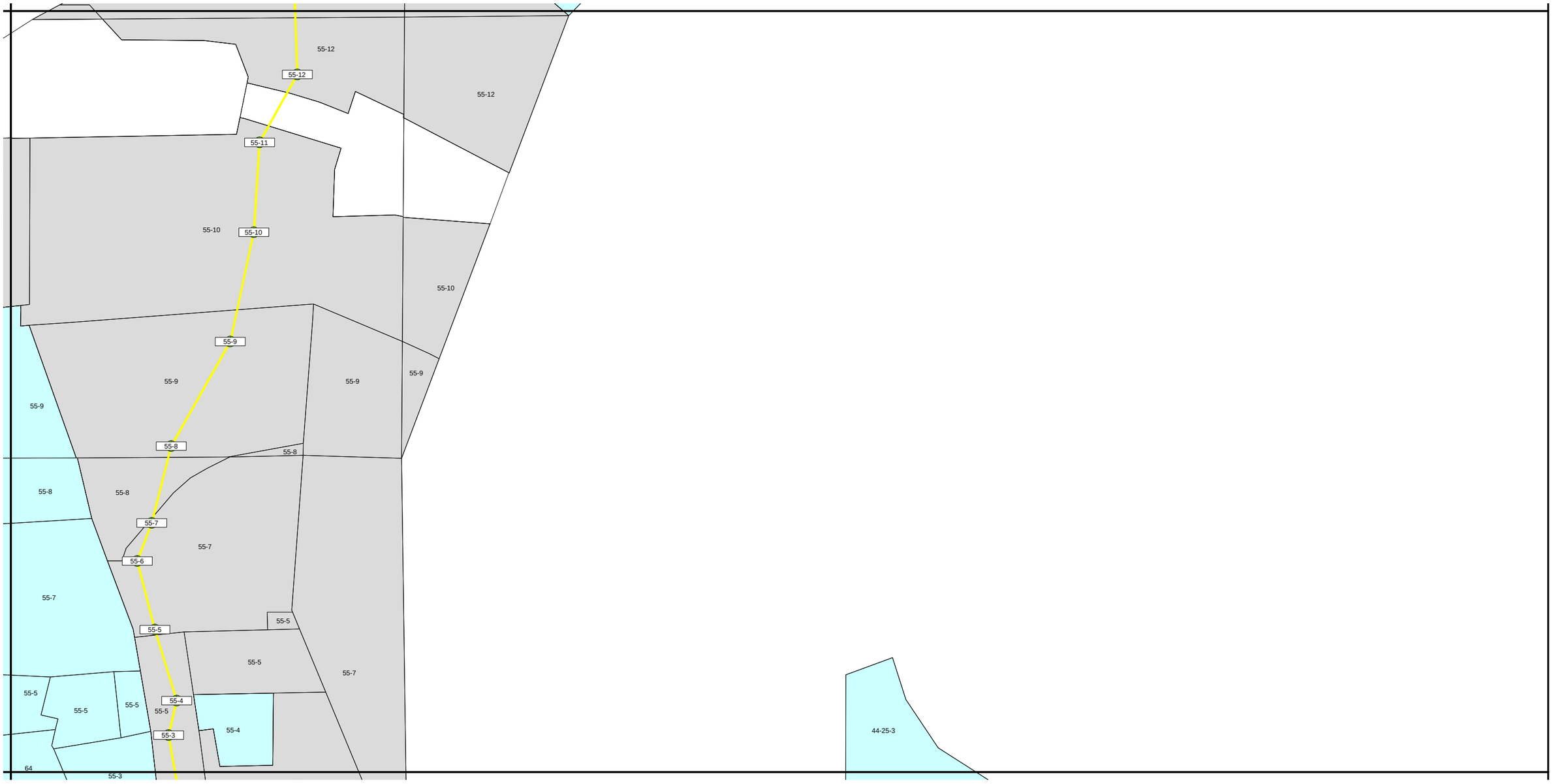

LEGEND

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N

0 150 300

1" = 150'

FIGURE B-3

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
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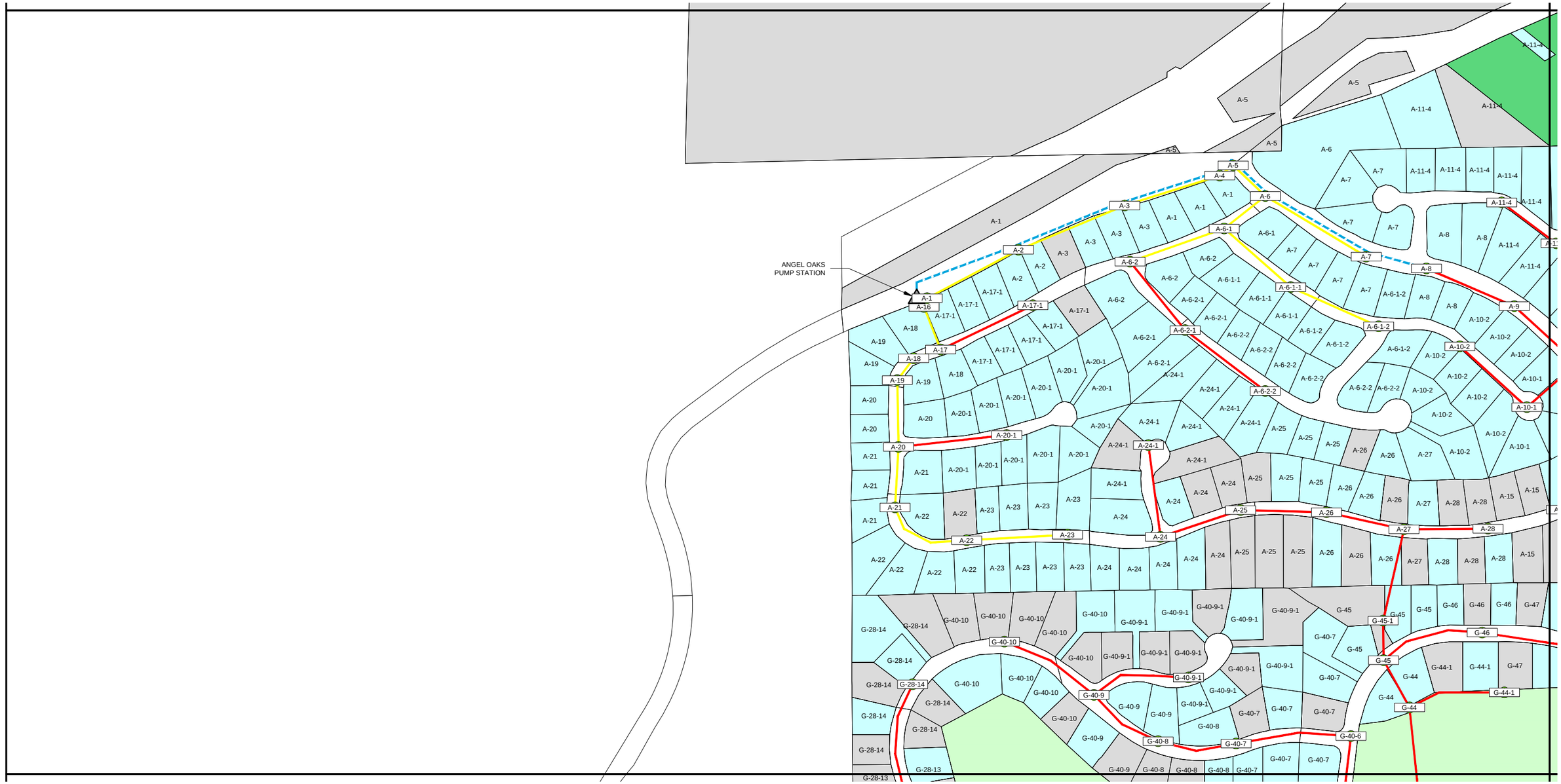

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N

0 150 300

1" = 150'

FIGURE C-1

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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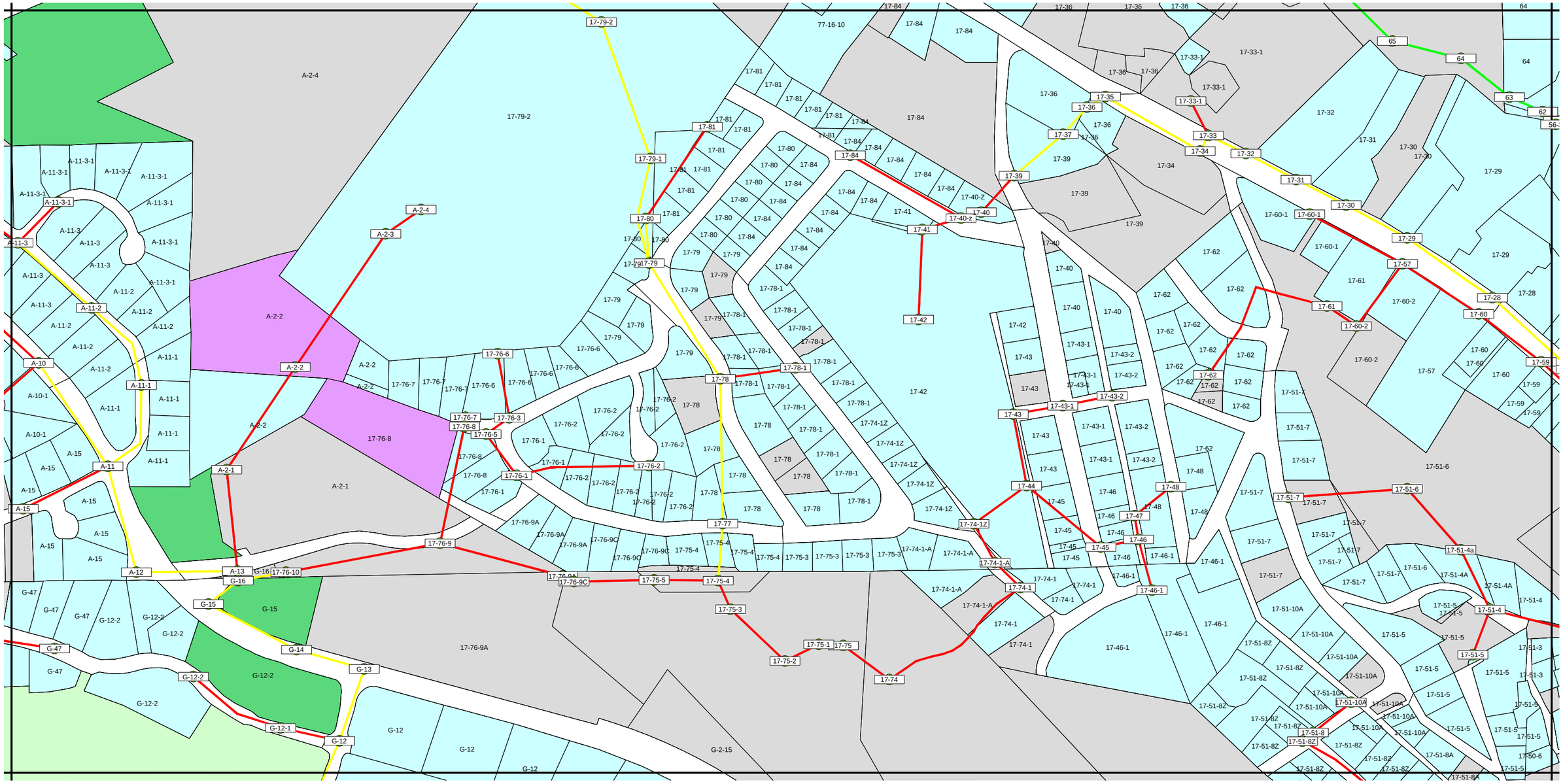

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N

0 150 300

1" = 150'

FIGURE C-2

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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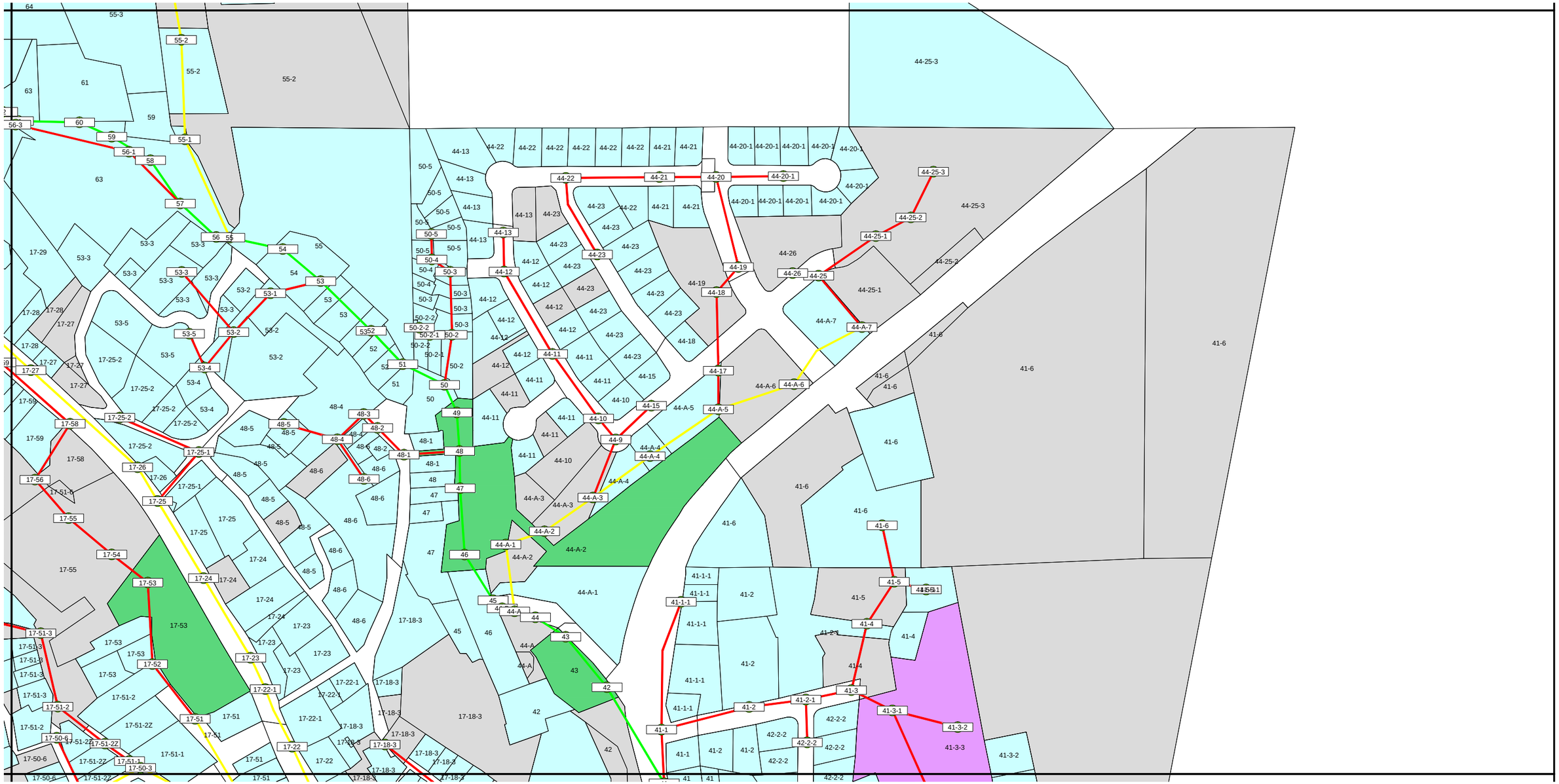

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0 150 300

1" = 150'

FIGURE C-3

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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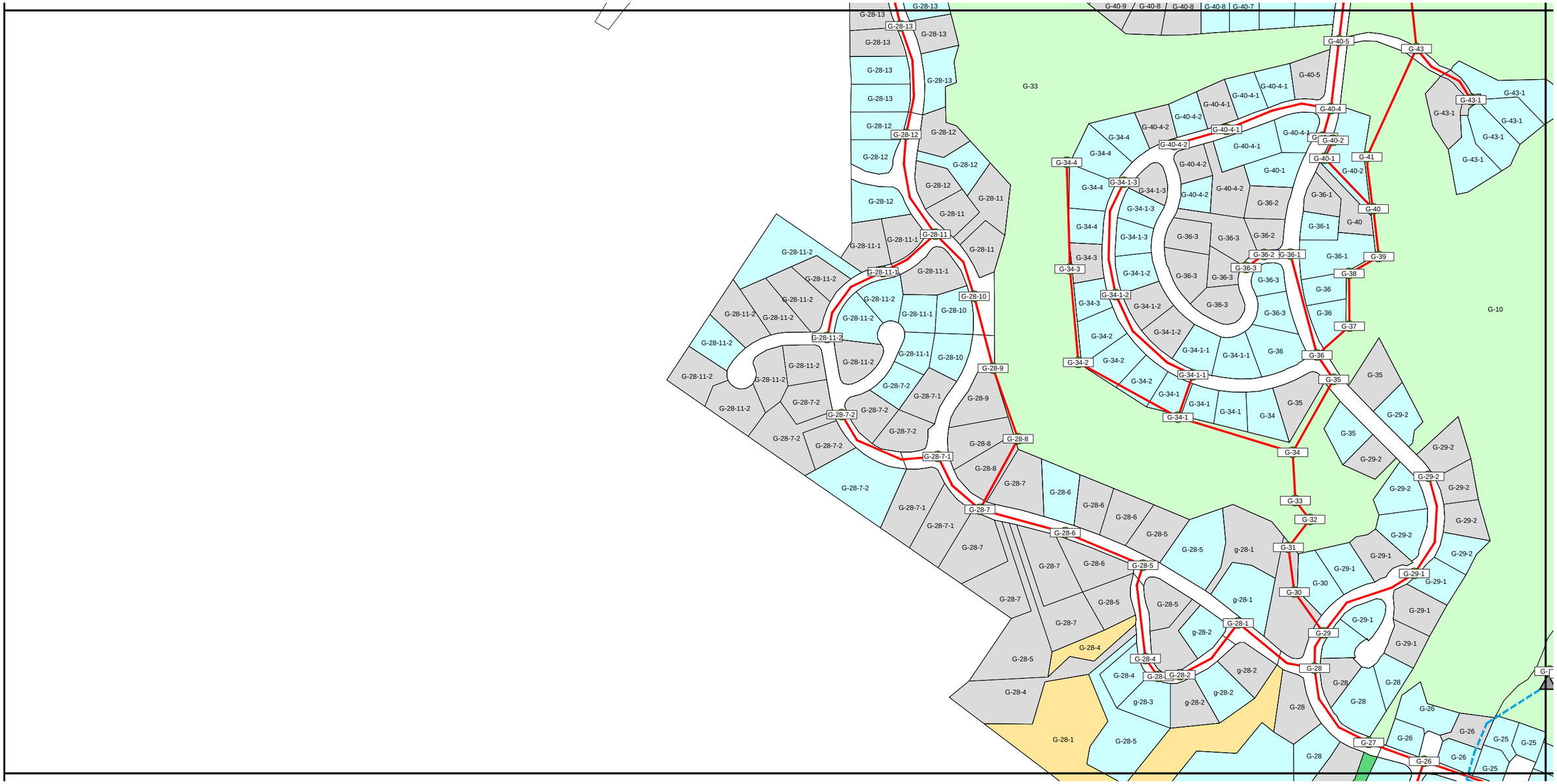

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FIGURE D-1

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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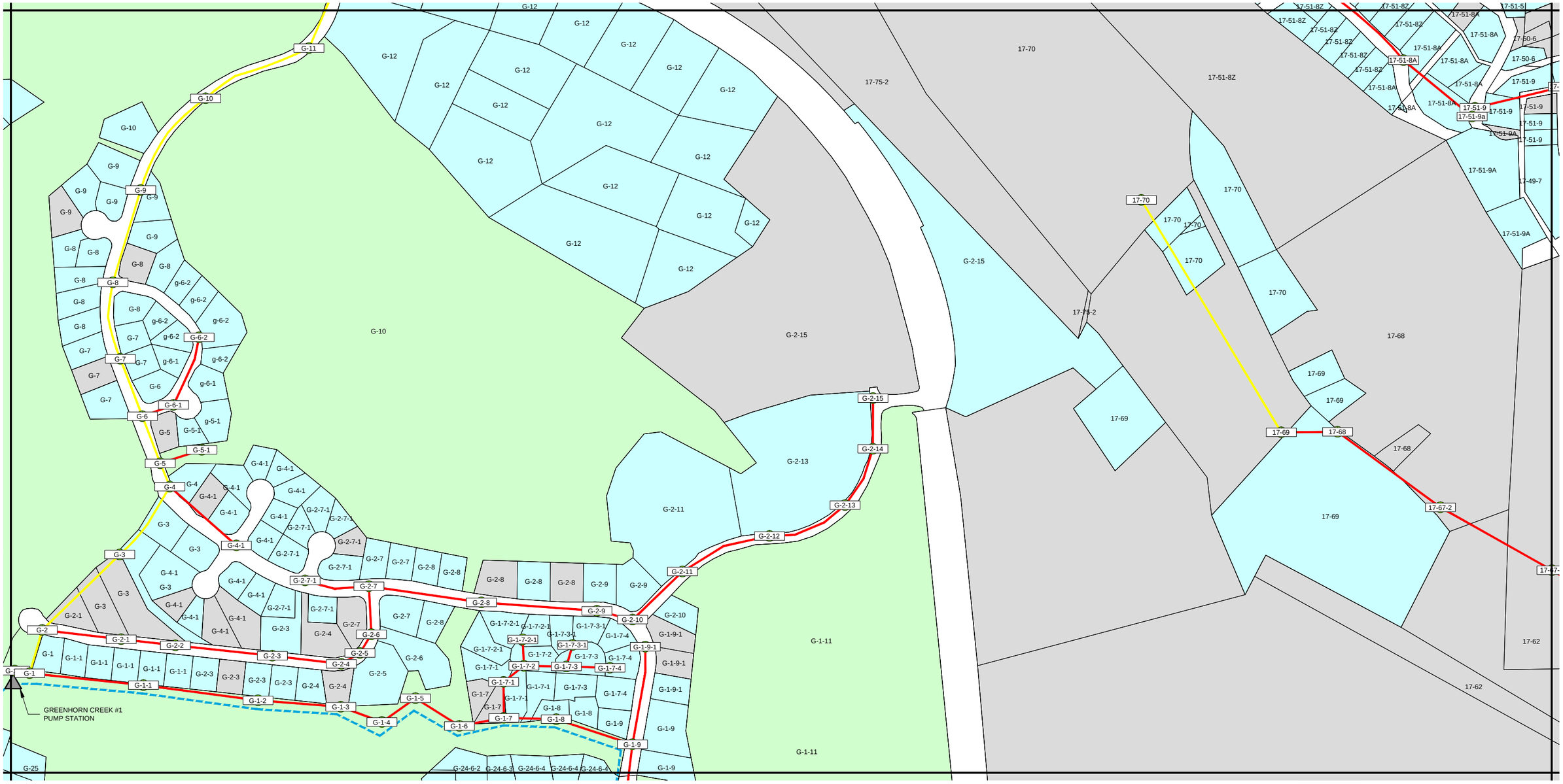

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N

0 150 300

1" = 150'

FIGURE D-2

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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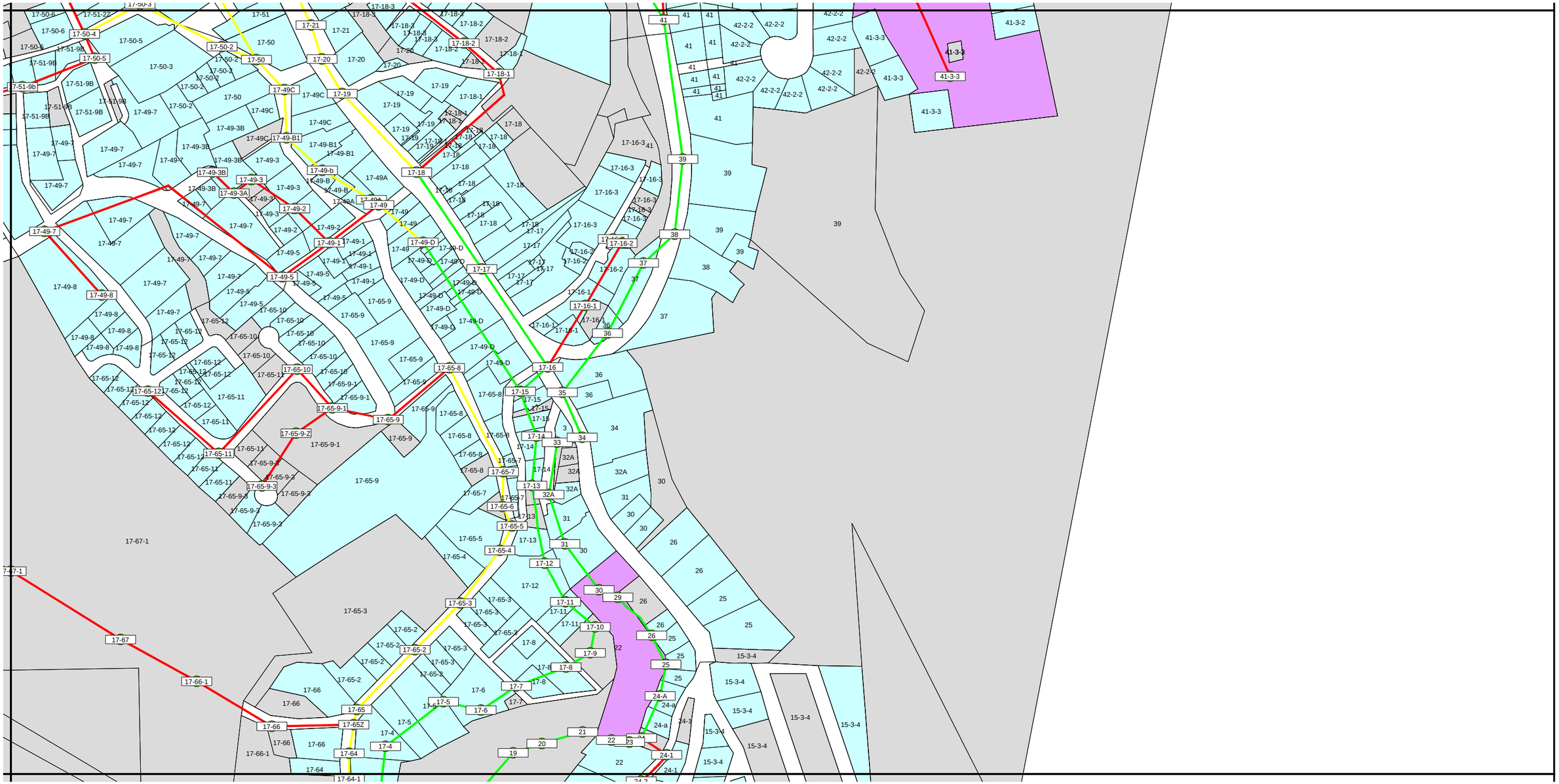

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N

0 150 300

1" = 150'

FIGURE D-3

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
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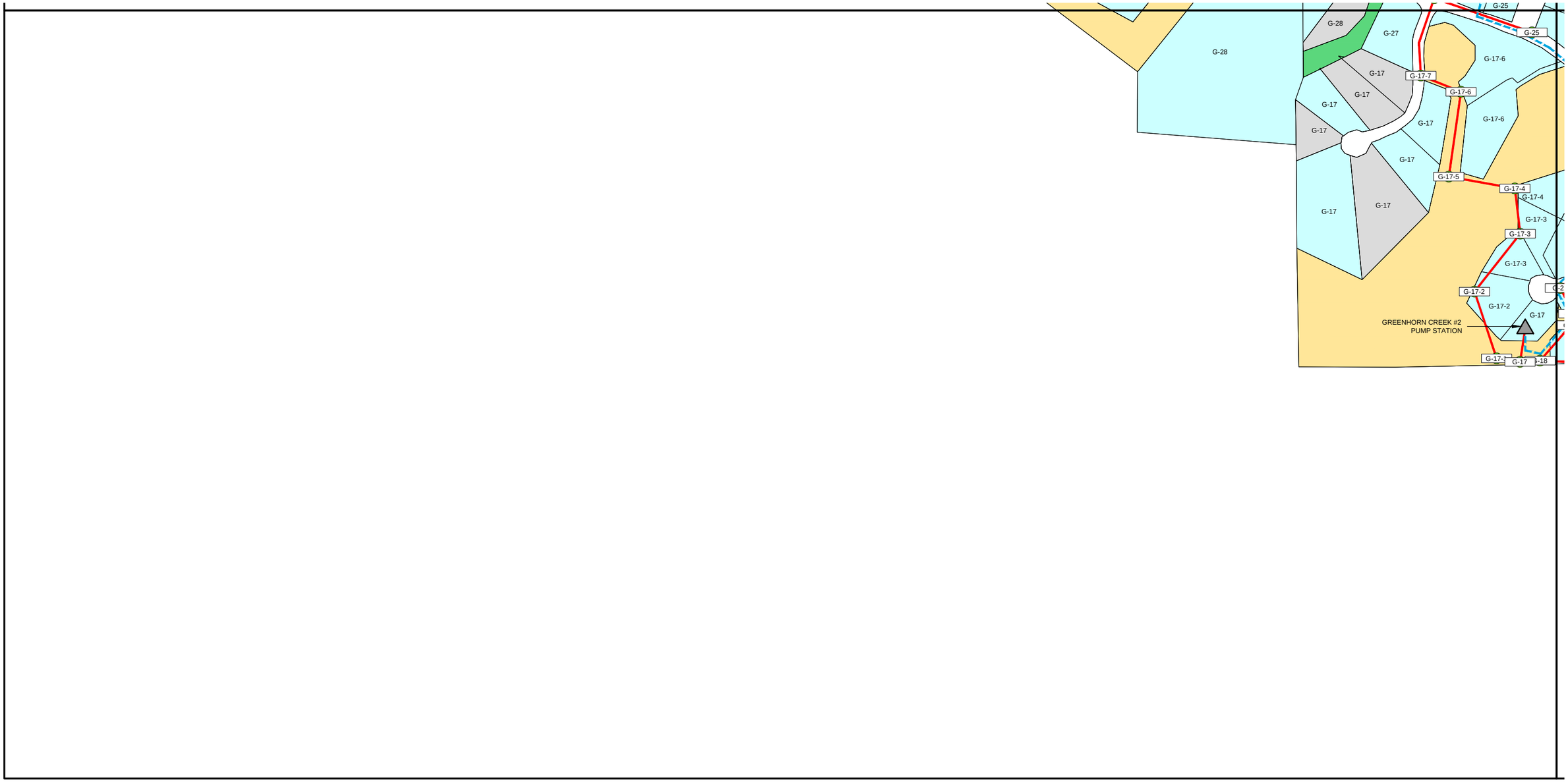

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N

0 150 300

1" = 150'

FIGURE E-1

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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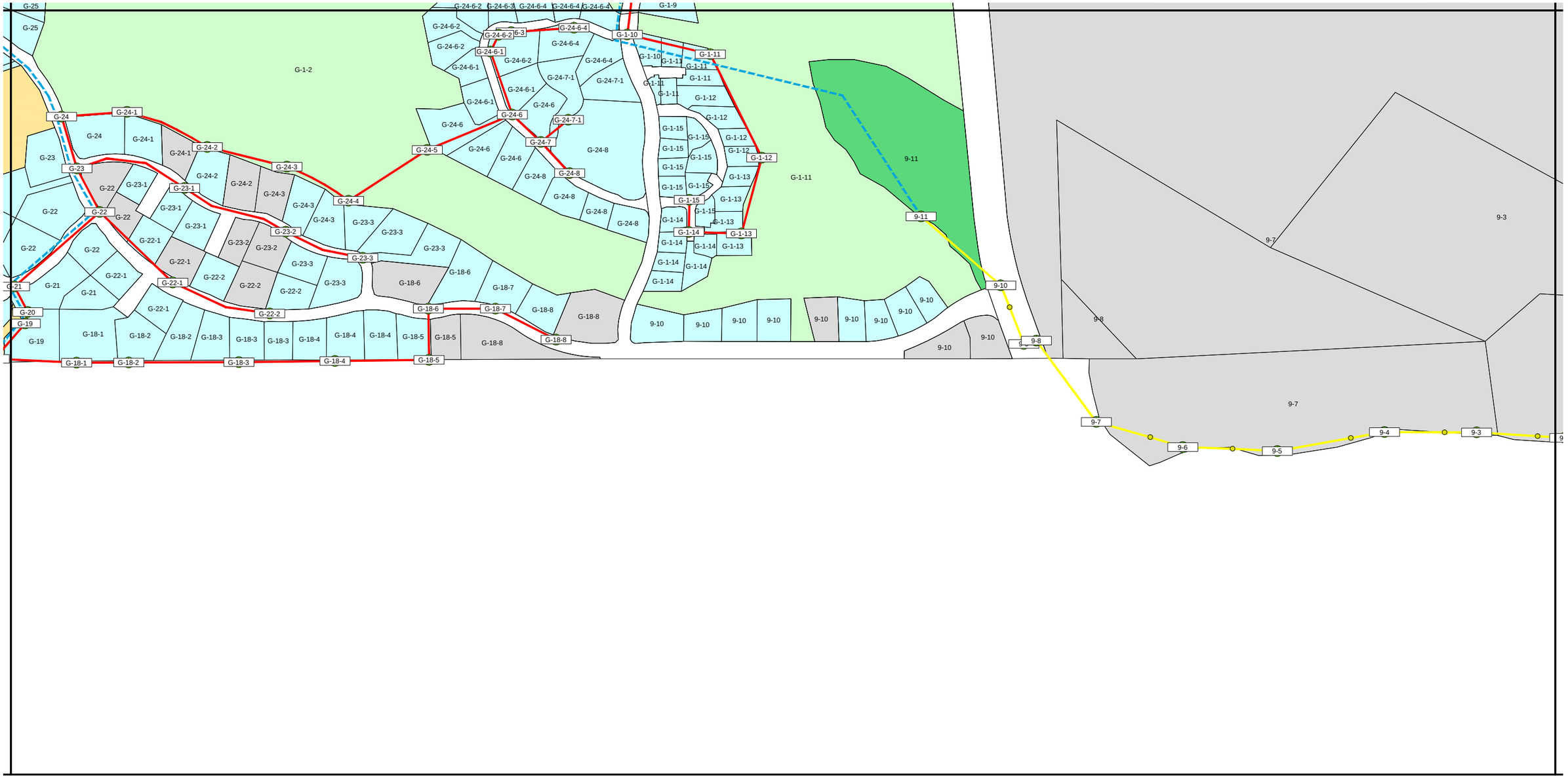

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N

0 150 300

1" = 150'

FIGURE E-2

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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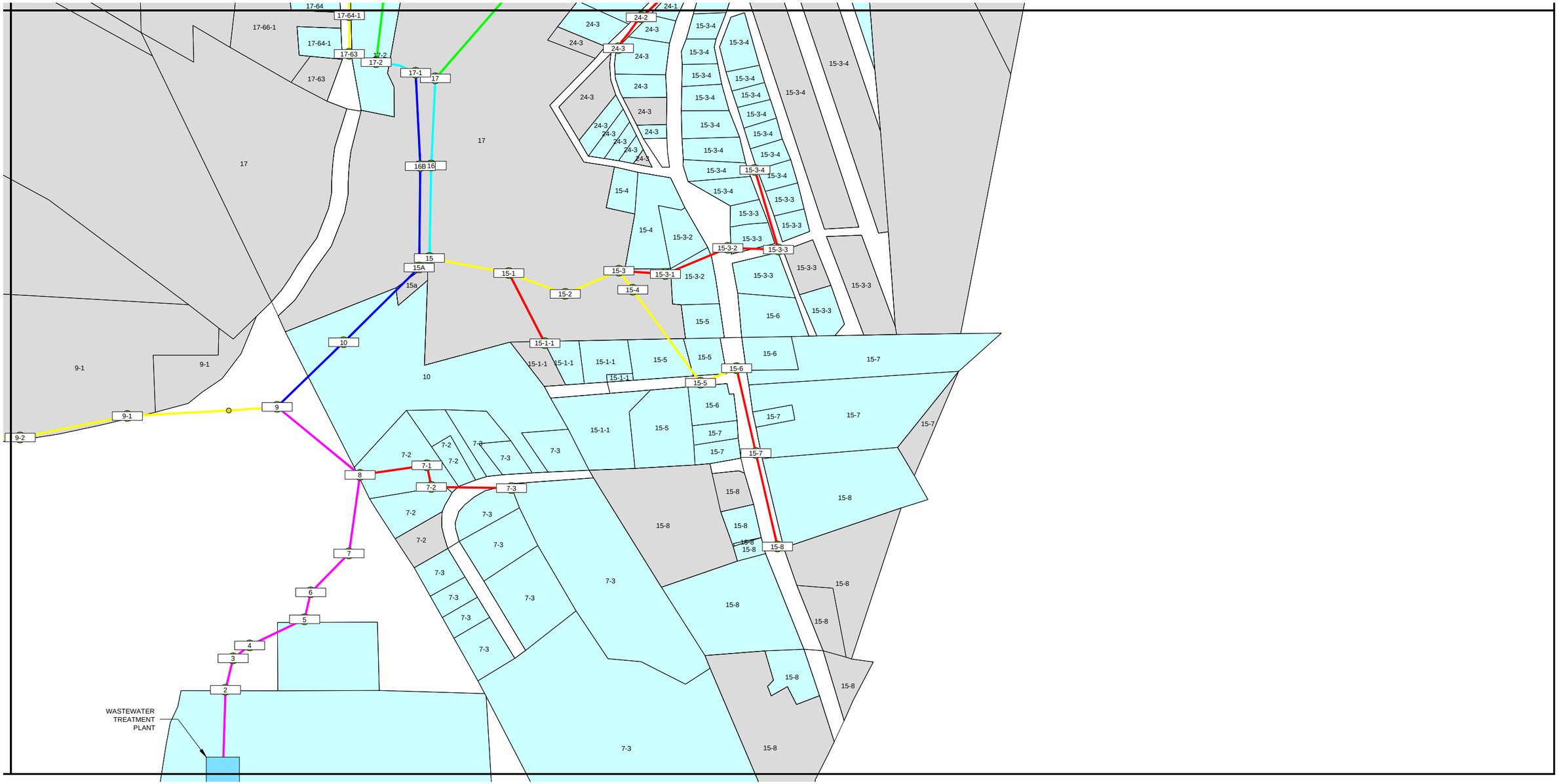

LEGEND

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N

0 150 300

1" = 150'

FIGURE E-3

CITY OF ANGELS
WASTEWATER MASTER PLAN

PARCEL ASSIGNMENTS FOR HYDRAULIC MODEL LOADS

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

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APPENDIX S

PEAK WET WEATHER FLOW CALCULATIONS FOR HYDRAULIC MODEL LOADS

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
100	4	HDR	D	1.91	5.0	10.63	1,063	1,435	5,014	6,449
	4	SFR	D	0.27	4.0					
101-1-1A	4	BAE	D	0.36	2.0	4.66	466	629	5,362	5,991
	4	SC	D	1.97	2.0					
101-1-1	4	BAE	D	1.45	2.0	3.63	363	490	4,175	4,665
101-1-1	4	SC	D	0.37	2.0	3.63	363	490	4,175	4,665
101-1-1B	4	BAE	D	2.78	2.0	7.66	766	1,034	8,812	9,846
	4	SC	D	1.05	2.0					
101-1	4	HDR	D	1.62	5.0	13.56	1,356	1,831	10,024	11,855
	4	SC	D	2.74	2.0					
101-2	4	BAE	D	1.88	2.0	5.47	547	738	6,291	7,030
	4	SC	D	0.86	2.0					
101-3-2	4	BAE	D	1.06	2.0	2.13	213	288	2,447	2,735
101-3-3	4	BAE	D	1.74	2.0	3.47	347	468	3,996	4,464
101-3-4	4	BAE	D	0.52	2.0	1.04	104	140	1,197	1,337
101-3-6	4	HDR	D	1.56	5.0	7.82	782	1,056	3,599	4,655
101-4	4	SC	D	1.06	2.0	2.12	212	286	2,435	2,722
101-5	4	SC	D	3.05	2.0	6.1	610	824	7,009	7,833
101-6-1	4	SC	D	4.75	2.0	9.5	950	1,283	10,923	12,206
101-6	4	SC	D	3.26	2.0	6.51	651	879	7,491	8,369
101-7-2	4	HDR	D	4.81	5.0	24.05	2,405	3,247	11,062	14,308
101A	4	SC	D	0.51	2.0	1.02	102	138	1,169	1,307
103-1	4	SFR	D	1.48	4.0	5.94	594	802	3,415	4,217
103	4	HDR	D	0.98	5.0	4.91	491	663	2,260	2,923
104-2-1	4	SFR	D	1.46	4.0	5.83	583	787	3,352	4,139
104-2-2	4	SFR	D	1.29	4.0	5.15	515	695	2,960	3,655
104-2-3	4	SC	P	2.22	2.0	9.89	989	1,335	8,236	9,571
	4	SFR	D	1.37	4.0					
104-2-4	4	HDR	D	0.32	5.0	1.59	159	215	731	946
104-2-5-1	4	HDR	D	1.39	5.0	6.93	693	936	3,186	4,122
104-2-5-2	4	HDR	D	0.60	5.0	3	300	405	1,381	1,786
104-2-5-3	4	HDR	D	0.90	5.0	4.49	449	606	2,261	2,867
	4	OS	D	0.09	0.0					
104-2-5	4	HDR	D	0.09	5.0	0.47	47	63	215	279
104-2-6	4	HDR	D	0.34	5.0	3.98	398	537	2,095	2,633
	4	PR	D	0.57	4.0					
104-2-7	4	HDR	D	1.45	5.0	7.26	726	980	3,340	4,320
104-2-8-1	4	MDR	D	2.58	3.0	7.73	773	1,044	5,930	6,973
104-2-8	4	HDR	D	0.65	5.0	3.26	326	440	1,498	1,938
104-2	4	SC	D	0.95	2.0	1.9	190	257	2,181	2,438
104-3-1	5	CC	D	2.27	2.0	4.53	453	612	5,210	5,822
104-3	4	HDR	P	0.98	5.0	7.54	754	1,018	5,278	6,295
	4	SC	D	1.31	2.0					
104-4	4	HDR	D	0.10	5.0	2.54	254	343	2,568	2,911

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	4	SC	D	1.01	2.0					
104-6	4	HDR	D	2.72	5.0	13.58	1,358	1,833	6,246	8,079
104-7	4	HDR	D	6.65	5.0	56.86	5,686	7,676	33,395	41,071
	4	MDR	D	7.87	3.0					
10	5	SFR	D	5.03	4.0	20.1	2,010	2,714	11,559	14,273
15-1-1	5	SFR	D	1.69	4.0	6.77	677	914	3,894	4,808
15-3-2	5	SFR	D	0.81	4.0	3.23	323	436	1,859	2,295
15-3-3	5	SFR	D	1.43	4.0	5.71	571	771	3,284	4,055
15-3-4	5	SFR	D	4.70	4.0	18.79	1,879	2,537	10,807	13,343
15-4	5	SFR	D	0.95	4.0	3.8	380	513	2,185	2,698
15-5	5	SFR	D	1.96	4.0	7.86	786	1,061	4,519	5,580
15-6	5	SFR	D	1.24	4.0	4.95	495	668	2,846	3,515
15-7	5	SFR	D	4.76	4.0	19.03	1,903	2,569	10,945	13,514
15-8	5	CC	D	4.90	2.0	9.8	980	1,323	11,267	12,590
17-11	5	SFR	D	0.33	4.0	1.34	134	181	768	949
17-12	5	SFR	D	0.70	4.0	2.78	278	375	1,599	1,974
17-13	5	SFR	D	0.21	4.0	0.83	83	112	478	590
17-14	5	SFR	D	0.26	4.0	1.03	103	139	589	729
17-15	5	HC	D	0.20	2.0	0.84	84	113	710	824
	5	SFR	D	0.11	4.0					
17-16-1	5	HC	D	0.50	2.0	1.01	101	136	1,161	1,298
17-16-2	5	HDR	D	0.39	5.0	1.94	194	262	891	1,153
17-16-3	5	HDR	D	1.12	5.0	5.62	562	759	2,587	3,345
17-17	5	HC	D	1.13	2.0	2.27	227	306	2,609	2,916
17-18-1	5	HC	D	0.07	2.0	1.44	144	194	913	1,107
	5	SFR	D	0.32	4.0					
17-18-2	5	SFR	D	0.38	4.0	1.51	151	204	868	1,072
17-18-3	5	HDR	D	0.94	5.0	10.16	1,016	1,372	5,300	6,671
	5	SFR	D	1.36	4.0					
17-18	5	HC	D	1.49	2.0	5.12	512	691	4,500	5,192
	5	MDR	D	0.09	3.0					
	5	P	D	0.38	5.0					
17-19	5	HC	D	0.73	2.0	3.01	301	406	2,574	2,980
	5	SFR	D	0.38	4.0					
17-20	5	HC	D	0.33	2.0	0.84	84	113	865	979
	5	SFR	D	0.04	4.0					
17-21	5	HC	D	0.22	2.0	0.44	44	59	501	560
17-22-1	5	HC	D	0.46	2.0	1.91	191	258	1,631	1,889
	5	SFR	D	0.25	4.0					
17-22	5	HC	D	0.28	2.0	0.55	55	74	635	709
17-23	5	HC	D	1.13	2.0	2.27	227	306	2,610	2,916
17-24	5	HC	D	0.64	2.0	2.58	258	348	2,218	2,567
	5	SFR	D	0.33	4.0					
17-25-1	5	HC	D	0.23	2.0	0.45	45	61	521	582
17-25-2	5	HC	D	0.39	2.0	5.87	587	792	3,826	4,619

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	5	SFR	D	1.27	4.0					
17-25	5	HC	D	0.36	2.0	3.02	302	408	2,152	2,560
	5	SFR	D	0.58	4.0					
17-26	5	HC	D	0.14	2.0	0.28	28	38	322	360
17-27	5	HC	D	0.11	2.0	0.21	21	28	242	271
17-28	5	CC	D	0.85	2.0	1.91	191	258	2,194	2,452
	5	HC	D	0.10	2.0					
17-29	5	CC	D	2.07	2.0	17.4	1,740	2,349	10,862	13,211
	5	P	D	2.65	5.0					
17-2	5	SFR	D	1.00	4.0	4.02	402	543	2,311	2,854
17-30	5	CC	D	0.87	2.0	1.73	173	234	1,994	2,228
17-31	5	HDR	D	1.01	5.0	5.06	506	683	2,326	3,009
17-32	5	CC	D	1.85	2.0	3.69	369	498	4,247	4,745
17-33-1	5	CC	D	0.14	2.0	0.28	28	38	327	364
17-36	5	CC	D	2.39	2.0	4.78	478	645	5,494	6,139
17-39	5	CC	D	0.92	2.0	1.84	184	248	2,118	2,366
17-40	5	SFR	D	0.93	4.0	3.71	371	501	2,131	2,632
17-40-Z	5	SFR	D	0.33	4.0	1.31	131	177	755	932
17-41	5	SFR	D	0.28	4.0	1.13	113	153	651	803
17-42	5	P-SCH	D	9.60	10.0	97	9,700	13,095	22,660	35,755
	5	SFR	D	0.25	4.0					
17-43-1	2	SFR	D	0.97	4.0	3.88	388	524	2,229	2,753
17-43-2	2	SFR	D	0.79	4.0	3.17	317	428	1,822	2,250
17-43	2	SFR	D	0.76	4.0	3.06	306	413	1,758	2,171
17-45	2	SFR	D	0.63	4.0	2.52	252	340	1,452	1,792
17-46-1	2	SFR	D	4.37	4.0	17.48	1,748	2,360	10,051	12,411
17-46	2	SFR	D	0.66	4.0	2.64	264	356	1,515	1,872
17-48	2	SFR	D	1.04	4.0	4.15	415	560	2,388	2,948
17-49-1	5	SFR	D	0.54	4.0	2.16	216	292	1,244	1,536
17-49-2	5	SFR	D	0.54	4.0	2.15	215	290	1,238	1,528
17-49-3B	5	SFR	D	0.98	4.0	3.9	390	527	2,243	2,769
17-49-3	5	SFR	D	0.58	4.0	2.31	231	312	1,325	1,637
17-49-5	5	SFR	D	1.06	4.0	4.22	422	570	2,429	2,998
17-49-7	5	SFR	D	5.87	4.0	23.48	2,348	3,170	13,501	16,671
17-49-8	5	SFR	D	1.66	4.0	6.63	663	895	3,813	4,708
17-49A	5	P	D	0.45	5.0	2.25	225	304	1,036	1,340
17-49-B1	5	HC	D	0.57	2.0	1.14	114	154	1,312	1,466
17-49-B	5	HC	D	0.14	2.0	0.28	28	38	327	365
17-49C	5	HC	D	0.50	2.0	1.63	163	220	1,516	1,736
	5	SFR	D	0.16	4.0					
17-49-D	5	HC	D	1.95	2.0	3.91	391	528	4,493	5,021
17-49	5	HC	D	0.52	2.0	1.03	103	139	1,186	1,325
17-4	5	SFR	D	0.43	4.0	1.73	173	234	994	1,227
17-50-2	5	SFR	D	0.58	4.0	2.34	234	316	1,343	1,659
17-50-3	5	HDR	D	0.80	5.0	4	400	540	1,841	2,381

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
17-50-5	5	HDR	D	0.45	5.0	2.26	226	305	1,038	1,343
17-50-6	5	SFR	D	0.61	4.0	2.45	245	331	1,407	1,738
17-50	5	HC	D	0.51	2.0	2.68	268	362	2,123	2,485
	5	SFR	D	0.41	4.0					
17-51-10A	5	SFR	D	1.73	4.0	6.9	690	932	3,970	4,902
17-51-1	5	SFR	D	0.63	4.0	2.5	250	338	1,439	1,777
17-51-2	5	SFR	D	0.85	4.0	3.4	340	459	1,956	2,415
17-51-2Z	5	SFR	D	0.98	4.0	3.9	390	527	2,244	2,770
17-51-3	5	SFR	D	0.66	4.0	2.63	263	355	1,513	1,868
17-51-4A	5	SFR	D	0.74	4.0	2.98	298	402	1,711	2,114
17-51-4	5	SFR	D	0.40	4.0	1.62	162	219	929	1,147
17-51-5	5	SFR	D	3.00	4.0	12	1,200	1,620	6,901	8,521
17-51-6	5	SFR	D	0.30	4.0	1.2	120	162	689	851
17-51-7	5	SFR	D	2.83	4.0	11.31	1,131	1,527	6,500	8,027
17-51-8A	5	SFR	D	2.00	4.0	8.01	801	1,081	4,608	5,689
17-51-8Z	5	SFR	D	4.14	4.0	16.57	1,657	2,237	9,531	11,767
17-51-9A	5	SFR	D	1.26	4.0	5.04	504	680	2,898	3,578
17-51-9B	5	SFR	D	1.02	4.0	4.08	408	551	2,348	2,899
17-51-9	5	SFR	D	0.69	4.0	2.74	274	370	1,577	1,947
17-51	5	HC	D	0.75	2.0	1.5	150	203	1,722	1,924
17-53	5	PR	D	2.25	4.0	12.09	1,209	1,632	6,948	8,580
	5	SFR	D	0.77	4.0					
17-57	5	CC	D	1.91	2.0	3.83	383	517	4,404	4,921
17-59	5	CC	D	0.28	2.0	2.17	217	293	2,489	2,782
	5	HC	D	0.80	2.0					
17-5	5	SFR	D	0.97	4.0	3.88	388	524	2,228	2,752
17-60-1	5	CC	D	0.95	2.0	1.9	190	257	2,183	2,440
17-60-2	5	CC	D	0.64	2.0	1.28	128	173	1,471	1,643
17-60	5	CC	D	0.90	2.0	1.79	179	242	2,059	2,301
17-61	5	CC	D	0.83	2.0	1.65	165	223	1,899	2,122
17-62	5	CC	D	1.22	2.0	13.14	1,314	1,774	8,956	10,730
	5	SFR	D	2.67	4.0					
17-64-1	5	SFR	D	0.27	4.0	1.09	109	147	624	772
17-64	5	SFR	D	0.16	4.0	0.65	65	88	375	463
17-65-10	5	SFR	D	0.87	4.0	3.49	349	471	2,004	2,475
17-65-11	5	SFR	D	0.89	4.0	3.56	356	481	2,049	2,530
17-65-12	5	SFR	D	1.81	4.0	7.23	723	976	4,154	5,131
17-65-2	5	SFR	D	0.85	4.0	3.39	339	458	1,946	2,404
17-65-3	5	SFR	D	0.95	4.0	3.79	379	512	2,179	2,691
17-65-4	5	SFR	D	0.28	4.0	1.1	110	149	633	782
17-65-5	5	SFR	D	0.52	4.0	2.09	209	282	1,200	1,482
17-65-7	5	SFR	D	0.32	4.0	1.27	127	171	731	902
17-65-8	5	SFR	D	0.85	4.0	3.39	339	458	1,947	2,404
17-65-9-1	5	SFR	D	0.31	4.0	1.25	125	169	716	885
17-65-9-3	5	SFR	D	0.34	4.0	1.36	136	184	783	966

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
17-65-9	5	RE	D	3.11	2.0	12.64	1,264	1,706	10,848	12,554
	5	SFR	D	1.60	4.0					
17-66	5	SFR	D	0.84	4.0	3.35	335	452	1,929	2,381
17-69	5	RE	D	7.61	2.0	15.22	1,522	2,055	17,500	19,554
17-6	5	SFR	D	0.60	4.0	2.42	242	327	1,390	1,717
17-70	5	RE	D	2.82	2.0	5.65	565	763	6,492	7,255
17-74-1-A	2	SFR	D	0.95	4.0	3.78	378	510	2,176	2,687
17-74-1	2	SFR	D	1.05	4.0	4.22	422	570	2,424	2,993
17-74-1Z	2	SFR	D	1.08	4.0	4.32	432	583	2,486	3,070
17-75-3	2	SFR	D	0.78	4.0	3.13	313	423	1,799	2,221
17-75-4	2	MDR	D	0.61	3.0	2.48	248	335	1,777	2,112
	2	SFR	D	0.16	4.0					
17-76-1	2	MDR	D	0.76	3.0	2.28	228	308	1,746	2,054
17-76-2	2	MDR	D	3.15	3.0	9.45	945	1,276	7,246	8,521
17-76-6	2	MDR	D	1.58	3.0	4.75	475	641	3,641	4,282
17-76-7	2	MDR	D	0.91	3.0	2.73	273	369	2,091	2,460
17-76-8	2	HDR	P	0.58	5.0	4.75	475	641	2,756	3,397
	2	MDR	D	0.62	3.0					
17-76-9A	2	MDR	D	0.90	3.0	2.7	270	365	2,073	2,437
17-76-9C	2	MDR	D	0.64	3.0	1.91	191	258	1,462	1,720
17-78-1	2	SFR	D	3.45	4.0	13.81	1,381	1,864	7,941	9,806
17-78	2	MDR	D	1.21	3.0	6.66	666	899	4,527	5,426
	2	SFR	D	0.76	4.0					
17-79-2	2	HDR	D	25.25	5.0	126.23	12,623	17,041	58,067	75,108
17-79-4	2	CC	D	0.34	2.0	0.69	69	93	793	886
17-79	2	MDR	D	1.22	3.0	6.77	677	914	4,594	5,508
	2	SFR	D	0.78	4.0					
17-80	2	SFR	D	1.04	4.0	4.16	416	562	2,390	2,952
17-81	2	HDR	D	0.39	5.0	10	1,000	1,350	5,528	6,878
	2	SFR	D	2.01	4.0					
17-84	5	CC	D	0.99	2.0	12.69	1,269	1,713	8,432	10,145
	5	SFR	D	2.68	4.0					
17-8	5	SFR	D	0.79	4.0	3.16	316	427	1,819	2,246
22	5	SFR	D	0.51	4.0	2.71	271	366	1,558	1,924
	5	SFR	P	0.17	4.0					
24-1	5	SFR	D	0.17	4.0	0.68	68	92	390	482
24-3	5	SFR	D	1.71	4.0	6.85	685	925	3,939	4,864
24-a	5	SFR	D	0.29	4.0	1.16	116	157	670	826
25	5	MDR	D	1.01	3.0	4.43	443	598	3,132	3,730
	5	SFR	D	0.35	4.0					
26	5	MDR	D	1.02	3.0	3.48	348	470	2,589	3,059
	5	SFR	D	0.11	4.0					
30	5	MDR	D	0.30	3.0	3.02	302	408	1,910	2,318
	5	SFR	D	0.53	4.0					
31	5	MDR	D	0.23	3.0	1.7	170	230	1,111	1,340

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	5	SFR	D	0.25	4.0					
32A	5	MDR	D	0.30	3.0	1.3	130	176	917	1,093
	5	SFR	D	0.10	4.0					
34	5	MDR	D	0.77	3.0	2.31	231	312	1,773	2,085
36	5	HC	D	0.87	2.0	1.74	174	235	1,999	2,234
37	5	HC	D	0.79	2.0	3.46	346	467	2,681	3,148
	5	P	D	0.38	5.0					
38	5	P	D	0.54	5.0	2.68	268	362	1,234	1,596
39	5	SFR	D	1.60	4.0	6.41	641	865	3,685	4,550
3	5	SFR	D	0.10	4.0	0.39	39	53	223	276
41-1-1	5	SFR	D	1.35	4.0	5.41	541	730	3,113	3,843
41-1	5	SFR	D	0.21	4.0	0.83	83	112	480	592
41-2-1	5	HDR	D	1.38	5.0	6.9	690	932	3,176	4,107
41-2	5	SFR	D	2.15	4.0	8.59	859	1,160	4,941	6,101
41-3-2	5	HDR	D	0.58	5.0	2.91	291	393	1,339	1,732
41-3-3	5	HDR	D	0.32	5.0	6.93	693	936	3,451	4,387
	5	HDR	P	0.61	5.0					
	5	SFR	D	0.58	4.0					
41-4	5	HDR	D	0.29	5.0	1.43	143	193	656	849
41-5-1	5	HDR	D	0.44	5.0	2.19	219	296	1,008	1,304
41-6	5	CC	D	3.25	2.0	10.37	1,037	1,400	9,698	11,098
	5	SFR	D	0.97	4.0					
41	5	SFR	D	1.44	4.0	5.74	574	775	3,301	4,076
42-2-2	5	SFR	D	3.17	4.0	12.69	1,269	1,713	7,294	9,007
42	5	P	D	0.58	5.0	5.46	546	737	5,278	6,015
	5	SP	D	1.72	1.5					
43	5	PR	D	0.77	4.0	3.08	308	416	1,770	2,186
44-10	5	SFR	D	0.21	4.0	0.83	83	112	477	589
44-11	5	SFR	D	1.36	4.0	5.42	542	732	3,119	3,850
44-12	5	SFR	D	1.39	4.0	5.56	556	751	3,199	3,950
44-13	5	SFR	D	1.07	4.0	4.27	427	576	2,457	3,034
44-15	5	SFR	D	0.23	4.0	0.92	92	124	527	651
44-18	5	SFR	D	0.19	4.0	0.76	76	103	435	538
44-20-1	5	SFR	D	1.97	4.0	7.9	790	1,067	4,541	5,608
44-21	5	SFR	D	0.89	4.0	3.58	358	483	2,058	2,541
44-22	5	SFR	D	1.53	4.0	6.11	611	825	3,516	4,340
44-23	5	SFR	D	2.59	4.0	10.37	1,037	1,400	5,964	7,364
44-25-3	5	HDR	D	6.89	5.0	34.46	3,446	4,652	15,850	20,502
44-A-1	5	CC	D	1.45	2.0	2.9	290	392	3,332	3,724
44-A-4	5	SFR	D	0.55	4.0	2.21	221	298	1,270	1,569
44-A-5	5	SFR	D	0.67	4.0	2.67	267	360	1,536	1,897
44-A-7[a]	5	CC	D	0.81	2.0	91.37	9,137	12,335	141,478	153,813
45	5	P	D	0.28	5.0	1.42	142	192	654	846
46	5	P	D	0.90	5.0	4.51	451	609	2,072	2,681
47	5	HDR	D	0.72	5.0	4.72	472	637	2,301	2,938

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	5	SFR	D	0.28	4.0					
48-1	5	SFR	D	0.28	4.0	1.12	112	151	644	795
48-2	5	SFR	D	0.08	4.0	0.31	31	42	177	219
48-4	5	SFR	D	1.32	4.0	5.27	527	711	3,031	3,742
48-5	5	SFR	D	1.82	4.0	7.28	728	983	4,185	5,167
48-6	5	SFR	D	2.51	4.0	10.04	1,004	1,355	5,771	7,126
48	5	SFR	D	0.14	4.0	0.57	57	77	329	406
50-2-1	5	HDR	D	0.11	5.0	0.56	56	76	257	332
50-2-2	5	HDR	D	0.22	5.0	1.1	110	149	506	654
50-2	5	HDR	D	0.39	5.0	1.93	193	261	888	1,148
50-3	5	HDR	D	0.44	5.0	2.21	221	298	1,015	1,314
50-4	5	HDR	D	0.28	5.0	1.4	140	189	642	831
50-5	5	HDR	D	1.14	5.0	5.7	570	770	2,621	3,390
50	5	SFR	D	0.48	4.0	1.93	193	261	1,110	1,371
51	5	SFR	D	0.18	4.0	0.73	73	99	421	519
52	5	SFR	D	0.38	4.0	1.53	153	207	880	1,087
53-2	5	SFR	D	2.17	4.0	8.69	869	1,173	4,995	6,168
53-3	5	SFR	D	2.27	4.0	9.08	908	1,226	5,224	6,450
53-4	5	SFR	D	0.39	4.0	1.56	156	211	895	1,106
53-5	5	SFR	D	0.97	4.0	3.87	387	522	2,227	2,749
53	5	SFR	D	0.72	4.0	2.86	286	386	1,645	2,032
54	5	SFR	D	0.84	4.0	3.37	337	455	1,937	2,392
55-15	5	I	D	13.35	2.0	26.69	2,669	3,603	30,696	34,299
55-2	5	SFR	D	0.97	4.0	3.89	389	525	2,237	2,762
55-3	5	HDR	D	1.82	5.0	9.11	911	1,230	4,189	5,418
55-4	5	SFR	D	1.01	4.0	4.06	406	548	2,333	2,881
55-5	5	HDR	D	2.49	5.0	12.44	1,244	1,679	5,722	7,402
55-7	5	HDR	D	5.13	5.0	25.66	2,566	3,464	11,803	15,267
55-8	5	HDR	D	1.73	5.0	8.65	865	1,168	3,981	5,149
55-9	5	HDR	D	2.97	5.0	14.85	1,485	2,005	6,832	8,836
55	5	SFR	D	5.37	4.0	21.47	2,147	2,898	12,348	15,246
59	5	MDR	D	0.41	3.0	1.24	124	167	952	1,120
61	5	MDR	D	1.27	3.0	3.81	381	514	2,918	3,433
63	5	MDR	D	4.81	3.0	14.44	1,444	1,949	11,074	13,023
64	5	HDR	D	1.46	5.0	9.29	929	1,254	4,889	6,143
	5	MDR	D	0.67	3.0					
68	5	BAE	D	0.95	2.0	1.91	191	258	2,192	2,450
70	5	BAE	D	10.69	2.0	21.39	2,139	2,888	24,596	27,483
71	5	BAE	D	3.95	2.0	7.89	789	1,065	9,077	10,143
7-2	5	SFR	D	2.07	4.0	8.28	828	1,118	4,761	5,879
7-3	5	SFR	D	19.48	4.0	77.93	7,793	10,521	44,811	55,332
74	5	P-SCH	D	12.84	10.0	128.36	12,836	17,329	29,523	46,852
76-6-4	5	SFR	D	1.43	4.0	5.72	572	772	3,290	4,062
76-6-5	5	SFR	D	1.22	4.0	4.87	487	657	2,802	3,460
77-12	5	SFR	D	0.54	4.0	2.15	215	290	1,235	1,526

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
77-13-1	5	SFR	D	0.86	4.0	3.45	345	466	1,981	2,447
77-13-2	5	MDR	D	3.48	3.0	16.03	1,603	2,164	11,217	13,381
	5	SFR	D	1.40	4.0					
77-13	5	SFR	D	0.72	4.0	2.86	286	386	1,645	2,031
77-13-Z	5	MDR	D	5.25	3.0	21.12	2,112	2,851	15,166	18,017
	5	SFR	D	1.34	4.0					
77-16-10	5	CC	D	5.04	2.0	10.08	1,008	1,361	11,592	12,953
77-16-2	5	CC	D	4.05	2.0	8.09	809	1,092	9,307	10,399
77-16-7A	5	P-SCH	D	9.16	10.0	91.64	9,164	12,371	21,077	33,449
77-16-8A	5	CC	D	0.88	2.0	1.77	177	239	2,032	2,271
77-16-8	5	BAE	D	0.33	2.0	0.67	67	90	768	858
77-16-9	5	CC	D	0.76	2.0	1.52	152	205	1,751	1,956
77-1	5	SFR	D	2.50	4.0	10.01	1,001	1,351	5,757	7,109
77-24-1	5	P	D	2.08	5.0	10.39	1,039	1,403	4,780	6,182
77-24-4	5	BAE	D	1.10	2.0	68.85	6,885	9,295	37,879	47,174
	5	CC	D	0.37	2.0					
	5	I	D	3.03	2.0					
	5	P	D	11.97	5.0					
77-24	5	CC	D	0.27	2.0	0.54	54	73	624	697
77-25-1	5	CC	D	1.73	2.0	3.45	345	466	3,970	4,436
77-25-2A	5	CC	D	3.44	2.0	6.88	688	929	7,909	8,838
77-26	5	CC	D	0.43	2.0	1.8	180	243	1,418	1,661
	5	P	D	0.19	5.0					
77-28	5	CC	D	0.60	2.0	1.19	119	161	1,372	1,533
77-29	5	BAE	D	0.60	2.0	3.65	365	493	2,507	3,000
	5	P	D	0.49	5.0					
77-30	5	CC	D	4.95	2.0	9.89	989	1,335	11,378	12,713
77-31	5	BAE	D	0.74	2.0	19.98	1,998	2,697	10,224	12,921
	5	CC	D	0.01	2.0					
	5	HDR	D	3.70	5.0					
77-6-2	5	SFR	D	0.98	4.0	3.93	393	531	2,260	2,790
77-6-3	5	SFR	D	2.52	4.0	10.07	1,007	1,359	5,787	7,147
77-6-4	5	MDR	D	9.40	3.0	28.21	2,821	3,808	21,624	25,432
77-6	5	SFR	D	0.30	4.0	1.19	119	161	685	845
77-7-1	5	SFR	D	0.40	4.0	1.61	161	217	927	1,145
77-7	5	SFR	D	0.89	4.0	3.55	355	479	2,039	2,519
77-9	5	SFR	D	11.20	4.0	44.8	4,480	6,048	25,763	31,811
77	5	P-SCH	D	0.10	10.0	1.03	103	139	236	375
79-3	5	CC	D	2.33	2.0	35.84	3,584	4,838	12,522	17,361
	5	P-SCH	D	3.12	10.0					
79-4	5	P-SCH	D	14.71	10.0	147.11	14,711	19,860	33,835	53,695
79-7	5	CC	D	3.76	2.0	7.51	751	1,014	8,639	9,653
79-8	5	CC	D	0.19	2.0	0.38	38	51	439	490
87	5	CC	D	1.65	2.0	3.3	330	446	3,792	4,237
89	5	CC	D	1.73	2.0	3.47	347	468	3,988	4,456

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
9-10	5	SFR	D	2.08	4.0	8.33	833	1,125	4,791	5,915
9-11	5	PR	D	3.83	4.0	15.33	1,533	2,070	8,813	10,882
91	5	SC	D	1.55	2.0	3.09	309	417	3,555	3,972
92	5	SC	D	1.16	2.0	2.31	231	312	2,662	2,974
93	5	P	D	0.55	5.0	8.46	846	1,142	7,823	8,965
	5	SC	D	2.85	2.0					
94	5	P	D	5.50	5.0	29.28	2,928	3,953	14,680	18,633
	5	SC	D	0.88	2.0					
98-2	4	SFR	D	2.08	4.0	8.31	831	1,122	4,777	5,899
98-4	4	SFR	D	1.44	4.0	5.77	577	779	3,318	4,097
98-5	4	SFR	D	1.50	4.0	6	600	810	3,450	4,260
98-6	4	HDR	D	1.41	5.0	7.06	706	953	3,246	4,199
98-7	4	HDR	D	0.35	5.0	6.95	695	938	3,795	4,733
	4	SFR	D	1.30	4.0					
A-10-1	2	SFR	D	1.55	4.0	6.2	620	837	3,566	4,403
A-10-2	2	SFR	D	3.06	4.0	12.23	1,223	1,651	7,032	8,683
A-11-1	2	SFR	D	1.96	4.0	7.84	784	1,058	4,510	5,568
A-11-2	2	SFR	D	2.10	4.0	8.4	840	1,134	4,828	5,962
A-11-3-1	2	SFR	D	3.25	4.0	12.99	1,299	1,754	7,467	9,220
A-11-3	2	SFR	D	2.00	4.0	7.99	799	1,079	4,592	5,670
A-11-4	2	P	D	0.96	5.0	37.13	3,713	5,013	20,802	25,814
	2	PR	D	5.70	4.0					
	2	SFR	D	2.38	4.0					
A-13	2	PR	D	1.20	4.0	4.8	480	648	2,761	3,409
A-15	2	SFR	D	2.35	4.0	9.41	941	1,270	5,411	6,682
A-17-1	1	SFR	D	1.78	4.0	7.12	712	961	4,097	5,058
A-18	1	SFR	D	0.63	4.0	2.53	253	342	1,453	1,794
A-19	1	SFR	D	0.91	4.0	3.63	363	490	2,085	2,575
A-1	1	SFR	D	0.85	4.0	3.4	340	459	1,954	2,413
A-20-1	1	SFR	D	3.96	4.0	15.84	1,584	2,138	9,107	11,245
A-20	1	SFR	D	0.77	4.0	3.1	310	419	1,781	2,200
A-21	1	SFR	D	1.07	4.0	4.27	427	576	2,457	3,033
A-2-2	2	HDR	D	1.87	5.0	15.11	1,511	2,040	7,272	9,312
	2	HDR	P	0.94	5.0					
	2	MDR	D	0.35	3.0					
A-22	1	SFR	D	1.78	4.0	7.12	712	961	4,096	5,057
A-23	1	SFR	D	2.25	4.0	8.99	899	1,214	5,167	6,381
A-24-1	3	SFR	D	2.43	4.0	9.72	972	1,312	5,592	6,904
A-24	3	SFR	D	1.84	4.0	7.37	737	995	4,236	5,231
A-25	3	SFR	D	1.28	4.0	5.13	513	693	2,950	3,643
A-26	3	SFR	D	1.50	4.0	6.02	602	813	3,460	4,273
A-27	3	SFR	D	0.69	4.0	2.75	275	371	1,583	1,955
A-28	3	SFR	D	0.57	4.0	2.27	227	306	1,307	1,614
A-2	1	SFR	D	0.50	4.0	2	200	270	1,152	1,422
A-3	1	SFR	D	0.83	4.0	3.32	332	448	1,907	2,356

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
A-6-1-1	1	SFR	D	0.88	4.0	3.54	354	478	2,033	2,511
A-6-1-2	1	SFR	D	1.14	4.0	4.56	456	616	2,621	3,237
A-6-1	1	SFR	D	0.37	4.0	1.47	147	198	843	1,041
A-6-2-1	1	SFR	D	1.40	4.0	5.62	562	759	3,231	3,990
A-6-2-2	1	SFR	D	1.53	4.0	6.12	612	826	3,521	4,348
A-6-2	1	SFR	D	0.96	4.0	3.83	383	517	2,200	2,717
A-6	1	SP	D	1.69	1.5	2.54	254	343	3,896	4,239
A-7	1	SFR	D	2.43	4.0	9.73	973	1,314	5,595	6,908
A-8	2	SFR	D	1.33	4.0	5.31	531	717	3,055	3,772
G-10	2	PR-Golf	D	74.36	1.5	113.08	11,308	15,266	171,920	187,186
	2	SFR	D	0.38	4.0					
G-1-10	2	SFR	D	0.16	4.0	0.65	65	88	375	463
G-1-11	2	PR-Golf	D	24.79	1.5	39.36	3,936	5,314	58,260	63,574
	2	SFR	D	0.54	4.0					
G-1-12	2	SFR	D	0.65	4.0	2.6	260	351	1,495	1,846
G-1-13	2	SFR	D	0.60	4.0	2.39	239	323	1,372	1,695
G-1-14	2	SFR	D	0.79	4.0	3.17	317	428	1,823	2,251
G-1-15	2	SFR	D	0.96	4.0	3.85	385	520	2,216	2,736
G-1-1	2	SFR	D	0.91	4.0	3.65	365	493	2,099	2,591
G-12-2	2	PR	D	1.77	4.0	16.86	1,686	2,276	9,696	11,972
	2	SFR	D	2.44	4.0					
G-12	2	HDR-WRLDMRK	D	21.10	9.5	200.46	20,046	27,062	48,533	75,595
G-1-2	2	PR-Golf	D	25.25	1.5	37.88	3,788	5,114	58,080	63,193
G-15	2	PR	D	1.04	4.0	4.17	417	563	2,397	2,960
G-1-7-1	2	SFR	D	0.68	4.0	2.72	272	367	1,565	1,933
G-1-7-2-1	2	SFR	D	0.68	4.0	2.72	272	367	1,563	1,930
G-17-2	3	SFR	D	0.56	4.0	2.24	224	302	1,287	1,589
G-1-7-2	2	SFR	D	0.23	4.0	0.93	93	126	532	658
G-1-7-3-1	2	SFR	D	0.35	4.0	1.4	140	189	802	991
G-17-3	3	SFR	D	0.71	4.0	2.84	284	383	1,635	2,019
G-1-7-3	2	SFR	D	0.49	4.0	1.98	198	267	1,137	1,405
G-17-4	3	SFR	D	0.43	4.0	1.73	173	234	995	1,229
G-1-7-4	2	SFR	D	0.63	4.0	2.51	251	339	1,441	1,780
G-17-5	3	OS	D	8.45	0.0	0	0	0	19,428	19,428
G-17-6	3	SFR	D	1.75	4.0	7.02	702	948	4,036	4,984
G-17	3	SFR	D	3.10	4.0	12.42	1,242	1,677	7,139	8,816
G-18-1	3	SFR	D	0.63	4.0	2.52	252	340	1,451	1,791
G-18-2	3	SFR	D	0.75	4.0	2.99	299	404	1,722	2,126
G-18-3	3	SFR	D	0.84	4.0	3.37	337	455	1,936	2,391
G-18-4	3	SFR	D	0.98	4.0	3.92	392	529	2,254	2,783
G-18-5	3	SFR	D	0.30	4.0	1.2	120	162	692	854
G-18-6	3	SFR	D	0.46	4.0	1.86	186	251	1,068	1,319
G-18-7	3	SFR	D	0.35	4.0	1.41	141	190	809	999
G-18-8	3	SFR	D	0.32	4.0	1.3	130	176	747	922
G-1-8	2	SFR	D	0.29	4.0	1.17	117	158	674	832

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
G-1-9-1	2	SFR	D	0.21	4.0	0.83	83	112	475	587
G-19	3	SFR	D	0.58	4.0	2.31	231	312	1,326	1,638
G-1-9	2	SFR	D	0.93	4.0	3.73	373	504	2,147	2,650
G-1	2	SFR	D	0.19	4.0	0.77	77	104	443	546
G-2-10	2	SFR	D	0.21	4.0	0.83	83	112	478	590
G-2-11	2	CC	D	2.87	2.0	5.74	574	775	6,598	7,373
G-2-13	2	SP	D	3.29	1.5	4.94	494	667	7,567	8,234
G-2-15	5	SP	D	4.48	1.5	6.73	673	909	10,314	11,222
G-21	3	SFR	D	0.68	4.0	2.74	274	370	1,574	1,944
G-22-1	3	SFR	D	0.79	4.0	3.17	317	428	1,825	2,253
G-22-2	3	SFR	D	0.57	4.0	2.27	227	306	1,306	1,613
G-22	3	SFR	D	1.24	4.0	4.94	494	667	2,843	3,510
G-23-1	3	SFR	D	0.69	4.0	2.77	277	374	1,594	1,968
G-23-3	3	SFR	D	1.73	4.0	6.93	693	936	3,985	4,921
G-23	3	SFR	D	0.39	4.0	1.57	157	212	903	1,115
G-2-3	2	SFR	D	0.89	4.0	3.55	355	479	2,041	2,520
G-24-1	3	SFR	D	0.31	4.0	1.25	125	169	719	887
G-24-2	3	SFR	D	0.36	4.0	1.43	143	193	822	1,015
G-24-3	3	SFR	D	0.64	4.0	2.56	256	346	1,470	1,815
G-24-6-1	3	SFR	D	0.73	4.0	2.94	294	397	1,690	2,087
G-24-6-2	3	SFR	D	1.20	4.0	4.8	480	648	2,759	3,407
G-24-6-3	3	SFR	D	0.17	4.0	0.67	67	90	387	477
G-24-6-4	3	SFR	D	1.21	4.0	4.85	485	655	2,790	3,445
G-24-6	3	SFR	D	1.47	4.0	5.86	586	791	3,370	4,161
G-24-7-1	3	SFR	D	0.74	4.0	2.95	295	398	1,697	2,096
G-24-8	3	SFR	D	2.43	4.0	9.74	974	1,315	5,599	6,914
G-24	3	SFR	D	0.47	4.0	1.88	188	254	1,081	1,335
G-2-4	2	SFR	D	0.19	4.0	0.76	76	103	440	542
G-25	3	SFR	D	1.15	4.0	4.59	459	620	2,636	3,256
G-2-5	2	SFR	D	0.57	4.0	2.29	229	309	1,319	1,628
G-26	3	SFR	D	0.78	4.0	3.13	313	423	1,798	2,221
G-2-6	2	SFR	D	0.47	4.0	1.88	188	254	1,081	1,335
G-2-7-1	2	SFR	D	1.24	4.0	4.96	496	670	2,850	3,520
G-27	3	PR	D	0.41	4.0	3.96	396	535	2,277	2,812
	3	SFR	D	0.58	4.0					
G-2-7	2	SFR	D	0.70	4.0	2.79	279	377	1,607	1,984
G-28-10	3	SFR	D	0.65	4.0	2.59	259	350	1,488	1,838
G-28-11-1	3	SFR	D	0.53	4.0	2.11	211	285	1,213	1,497
G-28-11-2	3	SFR	D	1.72	4.0	6.87	687	927	3,953	4,880
G-28-12	3	SFR	D	1.33	4.0	5.31	531	717	3,052	3,768
G-28-13	3	SFR	D	1.35	4.0	5.41	541	730	3,113	3,844
G-28-14	3	SFR	D	1.18	4.0	4.71	471	636	2,711	3,346
G-28-1	3	OS	D	3.20	0.0	2.3	230	311	8,673	8,984
	3	SFR	D	0.57	4.0					
g-28-2	3	SFR	D	0.69	4.0	2.77	277	374	1,593	1,967

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
g-28-3	3	SFR	D	0.35	4.0	1.4	140	189	805	994
G-28-4	3	OS	D	0.32	0.0	1.29	129	174	1,487	1,661
	3	SFR	D	0.32	4.0					
G-28-5	3	SFR	D	1.61	4.0	6.44	644	869	3,701	4,571
G-28-6	3	SFR	D	0.40	4.0	1.58	158	213	909	1,122
G-28-7-2	3	SFR	D	1.11	4.0	4.42	442	597	2,543	3,140
G-28	3	SFR	D	5.81	4.0	23.25	2,325	3,139	13,368	16,507
G-2-8	2	SFR	D	0.84	4.0	3.38	338	456	1,942	2,398
G-29-1	3	SFR	D	0.88	4.0	3.54	354	478	2,033	2,511
G-29-2	3	SFR	D	1.32	4.0	5.29	529	714	3,043	3,757
G-29	3	SFR	D	0.23	4.0	0.9	90	122	519	641
G-2-9	2	SFR	D	0.60	4.0	2.42	242	327	1,391	1,718
G-30	3	SFR	D	0.37	4.0	1.5	150	203	862	1,064
G-33	3	PR-Golf	D	19.48	1.5	29.21	2,921	3,943	44,793	48,736
G-34-1-1	3	SFR	D	0.65	4.0	2.61	261	352	1,498	1,850
G-34-1-2	3	SFR	D	0.27	4.0	1.09	109	147	627	774
G-34-1-3	3	SFR	D	0.48	4.0	1.91	191	258	1,098	1,356
G-34-1	3	SFR	D	0.69	4.0	2.76	276	373	1,586	1,958
G-34-2	3	SFR	D	0.97	4.0	3.89	389	525	2,234	2,759
G-34-3	3	SFR	D	0.24	4.0	0.97	97	131	560	691
G-34-4	3	SFR	D	1.29	4.0	5.15	515	695	2,961	3,656
G-34	3	SFR	D	0.33	4.0	1.32	132	178	759	937
G-35	3	SFR	D	0.33	4.0	1.3	130	176	749	925
G-36-1	3	SFR	D	0.75	4.0	2.98	298	402	1,714	2,116
G-36-3	3	SFR	D	0.46	4.0	1.83	183	247	1,049	1,297
G-36	3	SFR	D	0.95	4.0	3.8	380	513	2,187	2,700
G-3	2	SFR	D	0.98	4.0	3.91	391	528	2,247	2,775
G-40-10	3	SFR	D	1.50	4.0	6.01	601	811	3,456	4,268
G-40-1	3	SFR	D	0.33	4.0	1.32	132	178	758	936
G-40-2	3	SFR	D	0.64	4.0	2.55	255	344	1,469	1,813
G-40-4-1	3	SFR	D	1.25	4.0	4.99	499	674	2,872	3,545
G-40-4-2	3	SFR	D	0.44	4.0	1.76	176	238	1,014	1,251
G-40-7	3	SFR	D	2.06	4.0	8.26	826	1,115	4,747	5,862
G-40-8	3	SFR	D	0.57	4.0	2.27	227	306	1,307	1,614
G-40-9-1	3	SFR	D	2.01	4.0	8.06	806	1,088	4,632	5,721
G-40-9	3	SFR	D	0.97	4.0	3.89	389	525	2,239	2,764
G-4-1	2	SFR	D	2.17	4.0	8.67	867	1,170	4,983	6,154
G-43-1	3	SFR	D	1.75	4.0	7	700	945	4,028	4,973
G-44-1	3	SFR	D	0.36	4.0	1.45	145	196	835	1,031
G-44	3	SFR	D	0.65	4.0	2.62	262	354	1,504	1,858
G-45	3	SFR	D	0.84	4.0	3.36	336	454	1,932	2,386
G-46	3	SFR	D	0.46	4.0	1.82	182	246	1,049	1,295
G-47	3	SFR	D	1.76	4.0	7.05	705	952	4,055	5,007
G-4	2	SFR	D	0.22	4.0	0.89	89	120	512	632
G-5-1	2	SFR	D	0.39	4.0	1.57	157	212	901	1,113

TABLE S-1
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - EXISTING DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
g-6-1	2	SFR	D	0.38	4.0	1.52	152	205	872	1,077
g-6-2	2	SFR	D	1.21	4.0	4.85	485	655	2,791	3,445
G-6	2	SFR	D	0.20	4.0	0.81	81	109	468	577
G-7	2	SFR	D	0.85	4.0	3.39	339	458	1,952	2,409
G-8	2	SFR	D	1.50	4.0	6	600	810	3,448	4,258
G-9	2	SFR	D	1.23	4.0	4.93	493	666	2,833	3,498

[a] Manhole 44-A-7 includes flow from Six Mile Village

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
100	4	HDR	D	1.91	5.0	10.63	1,169	1,579	5,014	6,592
	4	SFR	D	0.27	4.0					
101-1-1A	4	BAE	D	0.36	2.0	4.66	513	692	5,362	6,054
	4	SC	D	1.97	2.0					
101-1-1	4	BAE	D	1.45	2.0	3.63	399	539	4,175	4,714
	4	SC	D	0.37	2.0					
101-1-1B	4	BAE	D	2.78	2.0	7.66	843	1,138	8,812	9,950
	4	SC	D	1.05	2.0					
101-1	4	HDR	D	1.62	5.0	13.56	1,492	2,014	10,024	12,038
	4	SC	D	2.74	2.0					
101-2	4	BAE	D	1.88	2.0	5.47	602	812	6,291	7,103
	4	SC	D	0.86	2.0					
101-3-2	4	BAE	D	1.06	2.0	2.13	234	316	2,447	2,763
101-3-3	4	BAE	D	1.74	2.0	3.47	382	515	3,996	4,511
101-3-4	4	BAE	D	0.52	2.0	1.04	114	154	1,197	1,351
101-3-6	4	HDR	D	1.56	5.0	127.51	14,026	18,935	21,952	40,887
	4	HDR	V	7.98	15.0					
101-3	4	BAE	V	1.17	1.0	1.17	129	174	2,702	2,876
101-4	4	SC	D	1.06	2.0	76	8,360	11,286	13,764	25,050
	4	SC	V	4.93	15.0					
101-5	4	SC	D	3.05	2.0	23.56	2,592	3,499	9,687	13,185
	4	SC	V	1.16	15.0					
101-6-1	4	SC	D	4.75	2.0	194.21	21,363	28,840	39,246	68,086
	4	SC	V	12.31	15.0					
101-6	4	SC	D	3.26	2.0	6.51	716	967	7,491	8,457
101-7-2	4	HDR	D	4.81	5.0	24.05	2,646	3,571	11,062	14,633
101-7-4	4	HDR	V	8.63	15.0	129.48	14,243	19,228	19,853	39,081
101-7	4	BAE	V	9.23	1.0	9.23	1,015	1,371	21,232	22,603
101A	4	SC	D	0.51	2.0	1.02	112	151	1,169	1,321
103-1	4	SFR	D	1.48	4.0	5.94	653	882	3,415	4,297
103	4	HDR	D	0.98	5.0	4.91	540	729	2,260	2,989
104-2-1	4	SFR	D	1.46	4.0	5.83	641	866	3,352	4,218
104-2-2	4	SFR	D	1.29	4.0	5.15	567	765	2,960	3,725
104-2-3	4	SC	P	22.16	2.0	49.78	5,476	7,392	54,104	61,496
	4	SFR	D	1.37	4.0					
104-2-4	4	HDR	D	0.32	5.0	1.59	175	236	731	968
104-2-5-1	4	HDR	D	1.39	5.0	6.93	762	1,029	3,186	4,216
104-2-5-2	4	HDR	D	0.60	5.0	3	330	446	1,381	1,826
104-2-5-3	4	HDR	D	0.90	5.0	4.49	494	667	2,261	2,928
	4	OS	D	0.09	0.0					
104-2-5	4	HDR	D	0.09	5.0	0.47	52	70	215	285
104-2-6	4	HDR	D	0.34	5.0	3.98	438	591	2,095	2,686
	4	PR	D	0.57	4.0					
104-2-7	4	HDR	D	1.45	5.0	7.26	799	1,078	3,340	4,418
104-2-8-1	4	MDR	D	2.58	3.0	10.46	1,151	1,553	6,557	8,110
	4	MDR	V	0.27	10.0					

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
104-2-8	4	HDR	D	0.65	5.0	3.26	359	484	1,498	1,982
104-2	4	SC	D	0.95	2.0	1.9	209	282	2,181	2,463
104-3-1	5	CC	D	2.27	2.0	9.5	1,045	1,411	5,973	7,383
	5	CC	V	0.33	15.0					
104-3	4	HDR	P	3.28	5.0	19	2,090	2,822	10,553	13,375
	4	SC	D	1.31	2.0					
104-4	4	HDR	D	0.10	5.0	2.54	279	377	2,568	2,946
	4	SC	D	1.01	2.0					
104-6	4	HDR	D	2.72	5.0	13.58	1,494	2,017	6,246	8,262
104-7	4	HDR	D	6.65	5.0	56.86	6,255	8,444	33,395	41,839
	4	MDR	D	7.87	3.0					
10	5	SFR	D	5.03	4.0	20.1	2,211	2,985	11,559	14,544
15-1-1	5	SFR	D	1.69	4.0	8.33	916	1,237	4,490	5,727
	5	SFR	V	0.26	6.0					
15-3-2	5	SFR	D	0.81	4.0	3.23	355	480	1,859	2,339
15-3-3	5	SFR	D	1.43	4.0	11.99	1,319	1,781	5,691	7,472
	5	SFR	V	1.05	6.0					
15-3-4	5	MDR	V	0.17	10.0	60.24	6,626	8,946	43,549	52,494
	5	SFR	D	4.70	4.0					
	5	SFR	V	4.14	6.0					
	5	SP	V	9.93	1.5					
15-4	5	SFR	D	0.95	4.0	3.8	418	564	2,185	2,750
15-5	5	SFR	D	1.96	4.0	7.86	865	1,167	4,519	5,686
15-6	5	SFR	D	1.24	4.0	4.95	545	735	2,846	3,582
15-7	5	SFR	D	4.76	4.0	20.91	2,300	3,105	11,665	14,770
	5	SFR	V	0.31	6.0					
15-8	5	CC	D	4.90	2.0	105.78	11,636	15,708	29,224	44,932
	5	CC	V	5.46	15.0					
	5	SFR	V	2.35	6.0					
15a	5	SFR	V	0.11	6.0	0.67	74	99	255	355
17-10	5	SFR	V	0.50	6.0	2.99	329	444	1,147	1,591
17-11	5	SFR	D	0.33	4.0	1.34	147	199	768	967
17-12	5	SFR	D	0.70	4.0	2.78	306	413	1,599	2,012
17-13	5	SFR	D	0.21	4.0	1.65	182	245	793	1,038
	5	SFR	V	0.14	6.0					
17-14	5	SFR	D	0.26	4.0	1.03	113	153	589	742
17-15	5	HC	D	0.20	2.0	1.65	182	245	835	1,080
	5	HC	V	0.05	15.0					
	5	SFR	D	0.11	4.0					
17-16-1	5	HC	D	0.50	2.0	2.75	303	408	1,428	1,836
	5	HC	V	0.12	15.0					
17-16-2	5	HDR	D	0.39	5.0	1.94	213	288	891	1,180
17-16-3	5	HDR	D	1.12	5.0	12.22	1,344	1,815	3,598	5,413
	5	HDR	V	0.44	15.0					

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
17-17	5	HC	D	1.13	2.0	2.27	250	337	2,609	2,946
17-18-1	5	HC	D	0.07	2.0	4.29	472	637	4,783	5,420
	5	SFR	D	0.32	4.0					
	5	SFR	V	0.07	6.0					
	5	SP	V	1.61	1.5					
17-18-2	5	SFR	D	0.38	4.0	3.27	360	486	1,544	2,029
	5	SFR	V	0.29	6.0					
17-18-3	5	HDR	D	0.94	5.0	49.96	5,496	7,419	12,119	19,538
	5	HDR	V	2.45	15.0					
	5	SFR	D	1.36	4.0					
	5	SFR	V	0.52	6.0					
17-18	5	HC	D	1.49	2.0	7.32	805	1,087	6,342	7,429
	5	MDR	D	0.09	3.0					
	5	MDR	V	0.12	10.0					
	5	P	D	0.38	5.0					
	5	SP	V	0.68	1.5					
17-19	5	HC	D	0.73	2.0	3.01	331	447	2,574	3,021
	5	SFR	D	0.38	4.0					
17-20	5	HC	D	0.33	2.0	1.62	178	241	1,164	1,404
	5	SFR	D	0.04	4.0					
	5	SFR	V	0.13	6.0					
17-21	5	HC	D	0.22	2.0	0.44	48	65	501	566
17-22-1	5	HC	D	0.46	2.0	1.91	210	284	1,631	1,914
	5	SFR	D	0.25	4.0					
17-22	5	HC	D	0.28	2.0	0.55	61	82	635	716
17-23	5	HC	D	1.13	2.0	2.27	250	337	2,610	2,947
17-24	5	HC	D	0.64	2.0	6.04	664	897	2,749	3,646
	5	HC	V	0.23	15.0					
	5	SFR	D	0.33	4.0					
17-25-1	5	HC	D	0.23	2.0	0.45	50	67	521	588
17-25-2	5	HC	D	0.39	2.0	5.87	646	872	3,826	4,698
	5	SFR	D	1.27	4.0					
17-25	5	HC	D	0.36	2.0	3.02	332	448	2,152	2,601
	5	SFR	D	0.58	4.0					
17-26	5	HC	D	0.14	2.0	0.28	31	42	322	364
17-27	5	HC	D	0.11	2.0	5.9	649	876	1,625	2,502
	5	HC	V	0.23	15.0					
	5	SFR	V	0.37	6.0					
17-28	5	CC	D	0.85	2.0	3.25	358	483	2,709	3,191
	5	HC	D	0.10	2.0					
	5	SFR	V	0.22	6.0					
17-29	5	CC	D	2.07	2.0	17.4	1,914	2,584	10,862	13,446
	5	P	D	2.65	5.0					
17-2	5	SFR	D	1.00	4.0	4.02	442	597	2,311	2,908
17-30	5	CC	D	0.87	2.0	17.24	1,896	2,560	4,372	6,932

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	5	CC	V	1.03	15.0					
17-31	5	HDR	D	1.01	5.0	5.06	557	751	2,326	3,077
17-32	5	CC	D	1.85	2.0	3.69	406	548	4,247	4,795
17-33-1	5	CC	D	0.14	2.0	68.68	7,555	10,199	10,815	21,014
	5	CC	V	4.56	15.0					
17-34	5	CC	V	1.24	15.0	18.56	2,042	2,756	2,846	5,602
17-36	5	CC	D	2.39	2.0	62.08	6,829	9,219	14,280	23,498
	5	CC	V	3.82	15.0					
17-39	5	CC	D	0.92	2.0	44.18	4,860	6,561	8,610	15,171
	5	CC	V	2.82	15.0					
17-40	5	SFR	D	0.93	4.0	3.94	433	585	2,218	2,803
	5	SFR	V	0.04	6.0					
17-40-Z	5	SFR	D	0.33	4.0	1.31	144	195	755	950
17-41	5	SFR	D	0.28	4.0	1.13	124	168	651	818
17-42	5	P-SCH	D	9.60	10.0	97	10,670	14,405	22,660	37,065
	5	SFR	D	0.25	4.0					
17-43-1	6	SFR	D	0.97	4.0	3.88	427	576	2,229	2,805
17-43-2	6	SFR	D	0.79	4.0	3.17	349	471	1,822	2,292
17-43	6	SFR	D	0.76	4.0	4.51	496	670	2,314	2,983
	6	SFR	V	0.24	6.0					
17-45	6	SFR	D	0.63	4.0	2.52	277	374	1,452	1,826
17-46-1	6	SFR	D	4.37	4.0	17.48	1,923	2,596	10,051	12,647
17-46	6	SFR	D	0.66	4.0	2.64	290	392	1,515	1,907
17-48	6	SFR	D	1.04	4.0	4.15	457	616	2,388	3,004
17-49-1	5	SFR	D	0.54	4.0	2.16	238	321	1,244	1,565
17-49-2	5	SFR	D	0.54	4.0	2.15	237	319	1,238	1,557
17-49-3A	5	SFR	V	0.08	6.0	0.49	54	73	189	262
17-49-3B	5	SFR	D	0.98	4.0	3.9	429	579	2,243	2,822
17-49-3	5	SFR	D	0.58	4.0	2.7	297	401	1,476	1,877
	5	SFR	V	0.07	6.0					
17-49-5	5	SFR	D	1.06	4.0	4.22	464	627	2,429	3,055
17-49-7	5	SFR	D	5.87	4.0	25.49	2,804	3,785	14,271	18,056
	5	SFR	V	0.33	6.0					
17-49-8	5	SFR	D	1.66	4.0	6.63	729	985	3,813	4,797
17-49A	5	P	D	0.45	5.0	2.25	248	334	1,036	1,371
17-49-B1	5	HC	D	0.57	2.0	1.14	125	169	1,312	1,481
17-49-B	5	HC	D	0.14	2.0	0.28	31	42	327	368
17-49C	5	HC	D	0.50	2.0	2.65	292	394	1,907	2,301
	5	SFR	D	0.16	4.0					
	5	SFR	V	0.17	6.0					
17-49-D	5	HC	D	1.95	2.0	3.91	430	581	4,493	5,074
17-49	5	HC	D	0.52	2.0	1.03	113	153	1,186	1,339
17-4	5	SFR	D	0.43	4.0	1.73	190	257	994	1,251
17-50-2	5	SFR	D	0.58	4.0	2.34	257	347	1,343	1,691
17-50-3	5	HDR	D	0.80	5.0	4	440	594	1,841	2,435

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
17-50-5	5	HDR	D	0.45	5.0	2.26	249	336	1,038	1,373
17-50-6	5	SFR	D	0.61	4.0	6.56	722	974	2,981	3,956
	5	SFR	V	0.68	6.0					
17-50	5	HC	D	0.51	2.0	2.68	295	398	2,123	2,521
	5	SFR	D	0.41	4.0					
17-51-10A	5	SFR	D	1.73	4.0	8.78	966	1,304	4,691	5,995
	5	SFR	V	0.31	6.0					
17-51-1	5	SFR	D	0.63	4.0	2.5	275	371	1,439	1,811
17-51-2	5	SFR	D	0.85	4.0	3.4	374	505	1,956	2,461
17-51-2Z	5	SFR	D	0.98	4.0	3.9	429	579	2,244	2,823
17-51-3	5	SFR	D	0.66	4.0	3.07	338	456	1,681	2,137
	5	SFR	V	0.07	6.0					
17-51-4A	5	SFR	D	0.74	4.0	2.98	328	443	1,711	2,154
17-51-4	5	SFR	D	0.40	4.0	1.62	178	241	929	1,169
17-51-5	5	SFR	D	3.00	4.0	16.34	1,797	2,426	8,563	10,990
	5	SFR	V	0.72	6.0					
17-51-6	5	HDR	V	9.30	15.0	140.67	15,474	20,889	22,074	42,964
	5	SFR	D	0.30	4.0					
17-51-7	5	SFR	D	2.83	4.0	17.16	1,888	2,548	8,742	11,290
	5	SFR	V	0.97	6.0					
17-51-8A	5	SFR	D	2.00	4.0	8.87	976	1,317	4,938	6,256
	5	SFR	V	0.14	6.0					
17-51-8Z	5	RE	V	10.62	0.5	21.88	2,407	3,249	33,964	37,213
	5	SFR	D	4.14	4.0					
17-51-9A	5	SFR	D	1.26	4.0	5.44	598	808	3,049	3,857
	5	SFR	V	0.07	6.0					
17-51-9B	5	SFR	D	1.02	4.0	5.12	563	760	2,746	3,507
	5	SFR	V	0.17	6.0					
17-51-9	5	SFR	D	0.69	4.0	3.45	380	512	1,848	2,360
	5	SFR	V	0.12	6.0					
17-51	5	HC	D	0.75	2.0	1.5	165	223	1,722	1,945
17-53	5	PR	D	2.25	4.0	12.09	1,330	1,795	6,948	8,743
	5	SFR	D	0.77	4.0					
17-55	5	HC	V	3.49	15.0	52.41	5,765	7,783	8,036	15,819
17-57	5	CC	D	1.91	2.0	3.83	421	569	4,404	4,973
17-58	5	HC	V	0.55	15.0	8.19	901	1,216	1,256	2,472
17-59	5	CC	D	0.28	2.0	2.17	239	322	2,489	2,811
	5	HC	D	0.80	2.0					
17-5	5	SFR	D	0.97	4.0	3.88	427	576	2,228	2,804
17-60-1	5	CC	D	0.95	2.0	1.9	209	282	2,183	2,466
17-60-2	5	CC	D	0.64	2.0	12.7	1,397	1,886	3,222	5,108
	5	CC	V	0.76	15.0					
17-60	5	CC	D	0.90	2.0	1.79	197	266	2,059	2,325
17-61	5	CC	D	0.83	2.0	1.65	182	245	1,899	2,144
17-62	5	CC	D	1.22	2.0	17.96	1,976	2,667	26,414	29,081

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	5	RE	V	7.40	0.5					
	5	SFR	D	2.67	4.0					
	5	SFR	V	0.19	6.0					
17-63	5	SFR	V	0.28	6.0	1.68	185	249	646	895
17-64-1	5	SFR	D	0.27	4.0	1.09	120	162	624	786
17-64	5	SFR	D	0.16	4.0	0.65	72	97	375	472
17-65-10	5	SFR	D	0.87	4.0	5.16	568	766	2,644	3,410
	5	SFR	V	0.28	6.0					
17-65-11	5	SFR	D	0.89	4.0	5.3	583	787	2,715	3,502
	5	SFR	V	0.29	6.0					
17-65-12	5	SFR	D	1.81	4.0	8.05	886	1,195	4,469	5,665
	5	SFR	V	0.14	6.0					
17-65-2	5	SFR	D	0.85	4.0	3.39	373	503	1,946	2,450
17-65-3	5	SFR	D	0.95	4.0	24.62	2,708	3,656	10,164	13,820
	5	SFR	V	3.47	6.0					
17-65-4	5	SFR	D	0.28	4.0	1.1	121	163	633	797
17-65-5	5	SFR	D	0.52	4.0	2.09	230	310	1,200	1,511
17-65-7	5	SFR	D	0.32	4.0	1.73	190	257	907	1,164
	5	SFR	V	0.08	6.0					
17-65-8	5	SFR	D	0.85	4.0	4.13	454	613	2,231	2,845
	5	SFR	V	0.12	6.0					
17-65-9-1	5	SFR	D	0.31	4.0	9.03	993	1,341	3,697	5,038
	5	SFR	V	1.30	6.0					
17-65-9-3	5	SFR	D	0.34	4.0	4.85	534	720	2,120	2,840
	5	SFR	V	0.58	6.0					
17-65-9	5	RE	D	3.11	2.0	13.52	1,487	2,008	11,186	13,194
	5	SFR	D	1.60	4.0					
	5	SFR	V	0.15	6.0					
17-66-1	5	RE	V	1.38	0.5	0.69	76	102	3,171	3,274
17-66	5	SFR	D	0.84	4.0	5.84	642	867	2,881	3,749
	5	SFR	V	0.41	6.0					
17-67-1	5	RE	V	20.22	0.5	10.11	1,112	1,501	46,500	48,002
17-68	5	RE	V	12.67	0.5	6.34	697	941	29,147	30,088
17-69	5	RE	D	7.61	2.0	15.22	1,674	2,260	17,500	19,760
17-6	5	SFR	D	0.60	4.0	2.42	266	359	1,390	1,749
17-70	5	RE	D	2.82	2.0	40.08	4,409	5,952	59,283	65,235
	5	SP	V	22.95	1.5					
17-74-1-A	6	SFR	D	0.95	4.0	6.44	708	956	3,195	4,152
	6	SFR	V	0.44	6.0					
17-74-1	6	SFR	D	1.05	4.0	6.6	726	980	3,336	4,316
	6	SFR	V	0.40	6.0					
17-74-1Z	6	SFR	D	1.08	4.0	4.32	475	642	2,486	3,128
17-75-2	6	SP	V	14.01	1.5	21.01	2,311	3,120	32,215	35,335
17-75-3	6	SFR	D	0.78	4.0	3.13	344	465	1,799	2,263
17-75-4	6	MDR	D	0.61	3.0	4.29	472	637	3,140	3,777
	6	MDR	V	0.11	10.0					

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	6	SFR	D	0.16	4.0					
	6	SP	V	0.48	1.5					
17-76-1	6	MDR	D	0.76	3.0	2.28	251	339	1,746	2,085
17-76-2	6	MDR	D	3.15	3.0	9.45	1,040	1,403	7,246	8,649
17-76-6	6	MDR	D	1.58	3.0	4.75	523	705	3,641	4,346
17-76-7	6	MDR	D	0.91	3.0	2.73	300	405	2,091	2,497
17-76-8	6	HDR	P	1.92	5.0	11.48	1,263	1,705	5,854	7,559
	6	MDR	D	0.62	3.0					
17-76-9A	6	MDR	D	0.90	3.0	12.36	1,360	1,835	16,887	18,723
	2	SP	V	6.44	1.5					
17-76-9C	6	MDR	D	0.64	3.0	1.91	210	284	1,462	1,746
17-76-9	6	SP	V	1.70	1.5	2.55	281	379	3,910	4,289
17-78-1	6	SFR	D	3.45	4.0	14.5	1,595	2,153	8,206	10,359
	6	SFR	V	0.11	6.0					
17-78	6	MDR	D	1.21	3.0	14.2	1,562	2,109	6,680	8,789
	6	MDR	V	0.48	10.0					
	6	SFR	D	0.76	4.0					
	6	SFR	V	0.46	6.0					
17-79-2	6	HDR	D	25.25	5.0	126.23	13,885	18,745	58,067	76,812
17-79-4	6	CC	D	0.34	2.0	0.69	76	102	793	895
17-79	6	MDR	D	1.22	3.0	9.16	1,008	1,360	5,510	6,870
	6	SFR	D	0.78	4.0					
	6	SFR	V	0.40	6.0					
17-7	5	SFR	V	0.04	6.0	0.25	28	37	98	135
17-80	6	SFR	D	1.04	4.0	4.16	458	618	2,390	3,008
17-81	6	HDR	D	0.39	5.0	10	1,100	1,485	5,528	7,013
	6	SFR	D	2.01	4.0					
17-84	5	CC	D	0.99	2.0	69.96	7,696	10,389	17,213	27,602
	5	CC	V	3.82	15.0					
	5	SFR	D	2.68	4.0					
17-8	5	SFR	D	0.79	4.0	3.16	348	469	1,819	2,288
17	5	SFR	V	24.74	6.0	148.44	16,328	22,043	56,902	78,945
22	5	SFR	D	0.51	4.0	8.78	966	1,304	5,053	6,356
	5	SFR	P	1.69	4.0					
24-1	5	SFR	D	0.17	4.0	1.28	141	190	621	812
	5	SFR	V	0.10	6.0					
24-3	5	SFR	D	1.71	4.0	12.08	1,329	1,794	5,943	7,737
	5	SFR	V	0.87	6.0					
24-a	5	SFR	D	0.29	4.0	1.16	128	172	670	842
24	5	SFR	V	0.11	6.0	0.63	69	94	242	336
25	5	MDR	D	1.01	3.0	4.43	487	658	3,132	3,790
	5	SFR	D	0.35	4.0					
26	5	MDR	D	1.02	3.0	4.94	543	734	3,149	3,883
	5	SFR	D	0.11	4.0					
	5	SFR	V	0.24	6.0					
30	5	MDR	D	0.30	3.0	8.15	897	1,210	3,089	4,299

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	5	MDR	V	0.51	10.0					
	5	SFR	D	0.53	4.0					
31	5	MDR	D	0.23	3.0	1.7	187	252	1,111	1,363
	5	SFR	D	0.25	4.0					
32A	5	MDR	D	0.30	3.0	2.35	259	349	1,320	1,669
	5	SFR	D	0.10	4.0					
	5	SFR	V	0.18	6.0					
34	5	MDR	D	0.77	3.0	2.31	254	343	1,773	2,116
36	5	HC	D	0.87	2.0	1.74	191	258	1,999	2,258
37	5	HC	D	0.79	2.0	3.46	381	514	2,681	3,195
	5	P	D	0.38	5.0					
38	5	P	D	0.54	5.0	2.68	295	398	1,234	1,632
39	5	SFR	D	1.60	4.0	41.17	4,529	6,114	17,626	23,740
	5	SFR	V	5.70	6.0					
	5	SP	V	0.36	1.5					
3	5	SFR	D	0.10	4.0	0.46	51	68	249	318
	5	SFR	V	0.01	6.0					
41-1-1	5	SFR	D	1.35	4.0	5.41	595	803	3,113	3,916
41-1	5	SFR	D	0.21	4.0	0.83	91	123	480	603
41-2-1	5	HDR	D	1.38	5.0	6.9	759	1,025	3,176	4,200
41-2	5	SFR	D	2.15	4.0	8.59	945	1,276	4,941	6,217
41-3-2	5	HDR	D	0.58	5.0	2.91	320	432	1,339	1,771
41-3-3	5	HDR	D	0.32	5.0	111.92	12,311	16,620	134,030	150,650
	5	HDR	P	6.06	5.0					
	5	HDR	V	0.06	15.0					
	5	SFR	D	0.58	4.0					
	5	SP	V	51.27	1.5					
41-4	5	HDR	D	0.29	5.0	13.04	1,434	1,936	2,437	4,373
	5	HDR	V	0.77	15.0					
41-5-1	5	HDR	D	0.44	5.0	2.19	241	325	1,008	1,333
41-5	5	HDR	V	1.00	15.0	15.02	1,652	2,230	2,303	4,533
41-6	5	CC	D	3.25	2.0	56.32	6,195	8,364	70,445	78,809
	5	CC	V	2.26	15.0					
	5	RE	V	24.15	0.5					
	5	SFR	D	0.97	4.0					
41	5	P	V	0.79	5.0	10.75	1,183	1,596	6,747	8,343
	5	SFR	D	1.44	4.0					
	5	SP	V	0.71	1.5					
42-2-2	5	SFR	D	3.17	4.0	13.56	1,492	2,014	7,629	9,643
	5	SFR	V	0.15	6.0					
42	5	P	D	0.58	5.0	7.87	866	1,169	6,388	7,557
	5	P	V	0.48	5.0					
	5	SP	D	1.72	1.5					
43	5	PR	D	0.77	4.0	3.08	339	457	1,770	2,227
44-10	5	SFR	D	0.21	4.0	4.11	452	610	1,733	2,344
	5	SFR	V	0.55	6.0					

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
44-11	5	SFR	D	1.36	4.0	7.55	831	1,121	3,934	5,055
	5	SFR	V	0.35	6.0					
44-12	5	SFR	D	1.39	4.0	8.38	922	1,244	4,279	5,523
	5	SFR	V	0.47	6.0					
44-13	5	SFR	D	1.07	4.0	5.84	642	867	3,058	3,925
	5	SFR	V	0.26	6.0					
44-15	5	SFR	D	0.23	4.0	0.92	101	137	527	664
44-18	5	SFR	D	0.19	4.0	0.76	84	113	435	548
44-19	5	SFR	V	1.20	6.0	7.22	794	1,072	2,767	3,840
44-20-1	5	SFR	D	1.97	4.0	7.9	869	1,173	4,541	5,714
44-21	5	SFR	D	0.89	4.0	3.58	394	532	2,058	2,589
44-22	5	SFR	D	1.53	4.0	6.11	672	907	3,516	4,423
44-23	5	SFR	D	2.59	4.0	13.16	1,448	1,954	7,033	8,987
	5	SFR	V	0.46	6.0					
44-25-1	5	CC	V	0.91	15.0	13.61	1,497	2,021	2,086	4,107
44-25-2	5	HDR	V	0.26	15.0	3.93	432	584	602	1,186
44-25-3	5	HDR	D	6.89	5.0	110.49	12,154	16,408	27,508	43,916
	5	HDR	V	5.07	15.0					
44-26	5	SFR	V	1.06	6.0	6.39	703	949	2,448	3,397
44-A-1	5	CC	D	1.45	2.0	2.9	319	431	3,332	3,763
44-A-2	5	PR	V	4.25	4.0	19.69	2,166	2,924	10,806	13,730
	5	SFR	V	0.45	6.0					
44-A-3	5	SFR	V	0.93	6.0	5.56	612	826	2,131	2,957
44-A-4	5	SFR	D	0.55	4.0	2.21	243	328	1,270	1,598
44-A-5	5	SFR	D	0.67	4.0	2.67	294	396	1,536	1,933
44-A-6	5	CC	V	1.31	15.0	19.61	2,157	2,912	3,007	5,919
44-A-7[a]	5	CC	D	0.81	2.0	104.57	11,503	15,529	141,478	157,006
44-A	5	SFR	V	0.39	6.0	2.35	259	349	902	1,251
45	5	P	D	0.28	5.0	1.42	156	211	654	865
46	5	P	D	0.90	5.0	4.51	496	670	2,072	2,742
47	5	HDR	D	0.72	5.0	4.72	519	701	2,301	3,002
	5	SFR	D	0.28	4.0					
48-1	5	SFR	D	0.28	4.0	1.12	123	166	644	811
48-2	5	SFR	D	0.08	4.0	0.31	34	46	177	223
48-4	5	SFR	D	1.32	4.0	5.27	580	783	3,031	3,814
48-5	5	SFR	D	1.82	4.0	8.36	920	1,241	4,600	5,841
	5	SFR	V	0.18	6.0					
48-6	5	SFR	D	2.51	4.0	11.76	1,294	1,746	6,429	8,175
	5	SFR	V	0.29	6.0					
48	5	SFR	D	0.14	4.0	0.57	63	85	329	414
50-2-1	5	HDR	D	0.11	5.0	0.56	62	83	257	340

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
50-2-2	5	HDR	D	0.22	5.0	1.1	121	163	506	669
50-2	5	HDR	D	0.39	5.0	1.93	212	287	888	1,174
50-3	5	HDR	D	0.44	5.0	2.21	243	328	1,015	1,343
50-4	5	HDR	D	0.28	5.0	1.4	154	208	642	850
50-5	5	HDR	D	1.14	5.0	5.7	627	846	2,621	3,467
50	5	SFR	D	0.48	4.0	1.93	212	287	1,110	1,397
51	5	SFR	D	0.18	4.0	0.73	80	108	421	529
52	5	SFR	D	0.38	4.0	1.53	168	227	880	1,108
53-2	5	SFR	D	2.17	4.0	8.69	956	1,290	4,995	6,285
53-3	5	SFR	D	2.27	4.0	9.08	999	1,348	5,224	6,572
53-4	5	SFR	D	0.39	4.0	1.56	172	232	895	1,127
53-5	5	SFR	D	0.97	4.0	3.87	426	575	2,227	2,801
53	5	SFR	D	0.72	4.0	2.86	315	425	1,645	2,070
54	5	SFR	D	0.84	4.0	3.37	371	500	1,937	2,437
55-10	5	BAE	V	5.77	1.0	230.28	25,331	34,197	47,699	81,896
	5	HDR	V	14.97	15.0					
55-12	5	HDR	V	3.37	15.0	58.19	6,401	8,641	16,575	25,216
	5	I	V	3.84	2.0					
55-13	5	I	V	0.15	2.0	0.3	33	45	350	394
55-14	5	I	V	8.63	2.0	17.26	1,899	2,563	19,853	22,416
55-15	5	I	D	13.35	2.0	31.9	3,509	4,737	36,688	41,425
	5	I	V	2.61	2.0					
55-2	5	SFR	D	0.97	4.0	41.76	4,594	6,201	16,753	22,954
	5	SFR	V	6.31	6.0					
55-3	5	HDR	D	1.82	5.0	9.11	1,002	1,353	4,189	5,541
55-4	5	SFR	D	1.01	4.0	4.06	447	603	2,333	2,936
55-5	5	HDR	D	2.49	5.0	32.54	3,579	4,832	13,468	18,300
	5	P	V	0.10	5.0					
	5	SFR	V	3.26	6.0					
55-7	5	HDR	D	5.13	5.0	208.48	22,933	30,959	39,836	70,795
	5	HDR	V	12.19	15.0					
55-8	5	HDR	D	1.73	5.0	33.77	3,715	5,015	7,832	12,847
	5	HDR	V	1.67	15.0					
55-9	5	HDR	D	2.97	5.0	176.15	19,377	26,158	31,565	57,723
	5	HDR	V	10.75	15.0					
55	5	SFR	D	5.37	4.0	21.47	2,362	3,188	12,348	15,536
59	5	MDR	D	0.41	3.0	1.24	136	184	952	1,137
61	5	MDR	D	1.27	3.0	3.81	419	566	2,918	3,484
63	5	MDR	D	4.81	3.0	14.44	1,588	2,144	11,074	13,218
64	5	HDR	D	1.46	5.0	9.29	1,022	1,380	4,889	6,268
	5	MDR	D	0.67	3.0					
66	5	HDR	V	9.79	15.0	146.83	16,151	21,804	22,514	44,318
67	5	BAE	V	0.16	1.0	0.16	18	24	379	402
68	5	BAE	D	0.95	2.0	68.86	7,575	10,226	12,458	22,683
	5	CC	V	4.46	15.0					
70	5	BAE	D	10.69	2.0	21.39	2,353	3,176	24,596	27,772

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
71	5	BAE	D	3.95	2.0	22.68	2,495	3,368	43,099	46,467
	5	BAE	V	14.79	1.0					
7-2	5	SFR	D	2.07	4.0	10.23	1,125	1,519	5,510	7,029
	5	SFR	V	0.33	6.0					
7-3	5	SFR	D	19.48	4.0	77.93	8,572	11,573	44,811	56,384
74	5	P-SCH	D	12.84	10.0	128.36	14,120	19,061	29,523	48,585
76-6-4	5	SFR	D	1.43	4.0	5.72	629	849	3,290	4,139
76-6-5	5	SFR	D	1.22	4.0	4.87	536	723	2,802	3,525
77-12	5	SFR	D	0.54	4.0	2.15	237	319	1,235	1,555
77-13-1	5	SFR	D	0.86	4.0	3.45	380	512	1,981	2,494
77-13-2	5	MDR	D	3.48	3.0	16.03	1,763	2,380	11,217	13,598
	5	SFR	D	1.40	4.0					
77-13	5	SFR	D	0.72	4.0	2.86	315	425	1,645	2,070
77-13-Z	5	MDR	D	5.25	3.0	21.12	2,323	3,136	15,166	18,302
	5	SFR	D	1.34	4.0					
77-16-10	5	CC	D	5.04	2.0	58.76	6,464	8,726	19,056	27,782
	5	CC	V	3.25	15.0					
77-16-2	5	CC	D	4.05	2.0	8.09	890	1,201	9,307	10,508
77-16-7A	5	P-SCH	D	9.16	10.0	91.64	10,080	13,609	21,077	34,686
77-16-8A	5	CC	D	0.88	2.0	1.77	195	263	2,032	2,295
77-16-8	5	BAE	D	0.33	2.0	0.67	74	99	768	867
77-16-9	5	CC	D	0.76	2.0	1.52	167	226	1,751	1,977
77-1	5	SFR	D	2.50	4.0	10.01	1,101	1,486	5,757	7,244
77-24-1	5	P	D	2.08	5.0	10.39	1,143	1,543	4,780	6,323
77-24-4	5	BAE	D	1.10	2.0	68.85	7,574	10,224	37,879	48,104
	5	CC	D	0.37	2.0					
	5	I	D	3.03	2.0					
	5	P	D	11.97	5.0					
77-24	5	CC	D	0.27	2.0	0.54	59	80	624	704
77-25-1	5	CC	D	1.73	2.0	3.45	380	512	3,970	4,482
77-25-2A	5	CC	D	3.44	2.0	7.53	828	1,118	8,010	9,128
	5	CC	V	0.04	15.0					
77-26	5	CC	D	0.43	2.0	1.8	198	267	1,418	1,686
	5	P	D	0.19	5.0					
77-28	5	CC	D	0.60	2.0	1.19	131	177	1,372	1,549
77-29	5	BAE	D	0.60	2.0	3.65	402	542	2,507	3,049
	5	P	D	0.49	5.0					
77-30	5	CC	D	4.95	2.0	9.89	1,088	1,469	11,378	12,847
77-31	5	BAE	D	0.74	2.0	19.98	2,198	2,967	10,224	13,191
	5	CC	D	0.01	2.0					
	5	HDR	D	3.70	5.0					
77-6-2	5	SFR	D	0.98	4.0	3.93	432	584	2,260	2,843
77-6-3	5	SFR	D	2.52	4.0	10.12	1,113	1,503	5,808	7,311
	5	SFR	V	0.01	6.0					
77-6-4	5	MDR	D	9.40	3.0	33.77	3,715	5,015	22,902	27,917
	5	MDR	V	0.56	10.0					

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
77-6	5	SFR	D	0.30	4.0	1.19	131	177	685	861
77-7-1	5	SFR	D	0.40	4.0	1.61	177	239	927	1,166
77-7	5	SFR	D	0.89	4.0	3.55	391	527	2,039	2,567
77-9	5	SFR	D	11.20	4.0	44.8	4,928	6,653	25,763	32,416
77	5	P-SCH	D	0.10	10.0	1.03	113	153	236	389
79-3	5	CC	D	2.33	2.0	45.95	5,055	6,824	14,072	20,895
	5	CC	V	0.67	15.0					
	5	P-SCH	D	3.12	10.0					
79-4	5	P-SCH	D	14.71	10.0	147.11	16,182	21,846	33,835	55,681
79-7	5	CC	D	3.76	2.0	7.51	826	1,115	8,639	9,754
79-8	5	CC	D	0.19	2.0	0.38	42	56	439	495
87	5	CC	D	1.65	2.0	3.3	363	490	3,792	4,282
89	5	CC	D	1.73	2.0	3.47	382	515	3,988	4,503
9-10	5	SFR	D	2.08	4.0	80.85	8,894	12,006	109,779	121,785
	5	SFR	V	0.90	6.0					
	5	SP	V	44.75	1.5					
9-11	5	PR	D	3.83	4.0	15.33	1,686	2,277	8,813	11,089
9-1	5	RE	V	7.05	0.5	3.53	388	524	16,221	16,746
91	5	SC	D	1.55	2.0	3.09	340	459	3,555	4,014
92	5	SC	D	1.16	2.0	2.31	254	343	2,662	3,005
9-3	5	RE	V	11.09	0.5	5.54	609	823	25,507	26,329
93	5	P	D	0.55	5.0	10.67	1,174	1,584	8,841	10,425
	5	P	V	0.44	5.0					
	5	SC	D	2.85	2.0					
94	5	P	D	5.50	5.0	248.44	27,328	36,893	48,285	85,178
	5	SC	D	0.88	2.0					
	5	SC	V	14.61	15.0					
96	4	SC	V	11.87	15.0	178.02	19,582	26,436	27,297	53,733
9-7	5	RE	V	17.09	0.5	8.55	941	1,270	39,309	40,579
97	4	SC	V	0.19	15.0	149.93	16,492	22,265	225,882	248,146
	5	SP	V	98.02	1.5					
98-2	4	SFR	D	2.08	4.0	8.31	914	1,234	4,777	6,011
98-4	4	SFR	D	1.44	4.0	5.77	635	857	3,318	4,175
98-5	4	SFR	D	1.50	4.0	6	660	891	3,450	4,341
98-6	4	HDR	D	1.41	5.0	7.06	777	1,048	3,246	4,294
98-7	4	HDR	D	0.35	5.0	6.95	765	1,032	3,795	4,827
	4	SFR	D	1.30	4.0					
9-8	5	RE	V	0.61	0.5	0.3	33	45	1,401	1,446
99	4	HDR	V	5.23	15.0	78.4	8,624	11,642	12,022	23,664
A-10-1	6	SFR	D	1.55	4.0	6.2	682	921	3,566	4,487
A-10-2	6	SFR	D	3.06	4.0	12.23	1,345	1,816	7,032	8,848
A-11-1	6	SFR	D	1.96	4.0	7.84	862	1,164	4,510	5,674

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
A-11-2	6	SFR	D	2.10	4.0	8.4	924	1,247	4,828	6,075
A-11-3-1	6	SFR	D	3.25	4.0	12.99	1,429	1,929	7,467	9,396
A-11-3	6	SFR	D	2.00	4.0	7.99	879	1,187	4,592	5,778
A-11-4	6	P	D	0.96	5.0	41.55	4,571	6,170	22,836	29,006
	6	PR	D	5.70	4.0					
	6	P	V	0.88	5.0					
	6	SFR	D	2.38	4.0					
A-13	6	PR	D	1.20	4.0	4.8	528	713	2,761	3,473
A-15	6	SFR	D	2.35	4.0	16.73	1,840	2,484	8,216	10,701
	6	SFR	V	1.22	6.0					
A-17-1	1	SFR	D	1.78	4.0	8.87	976	1,317	4,769	6,086
	1	SFR	V	0.29	6.0					
A-18	1	SFR	D	0.63	4.0	2.53	278	376	1,453	1,828
A-19	1	SFR	D	0.91	4.0	3.63	399	539	2,085	2,624
A-1	1	SFR	D	0.85	4.0	5.8	638	861	5,631	6,492
	1	SP	V	1.60	1.5					
A-20-1	1	SFR	D	3.96	4.0	15.84	1,742	2,352	9,107	11,459
A-20	1	SFR	D	0.77	4.0	3.1	341	460	1,781	2,241
A-2-1	6	HDR	V	4.29	15.0	64.32	7,075	9,552	9,863	19,415
A-21	1	SFR	D	1.07	4.0	4.27	470	634	2,457	3,091
A-2-2	6	HDR	D	1.87	5.0	26.08	2,869	3,873	12,318	16,191
	6	HDR	P	3.13	5.0					
	6	MDR	D	0.35	3.0					
A-22	1	SFR	D	1.78	4.0	8.96	986	1,331	4,802	6,133
	1	SFR	V	0.31	6.0					
A-23	1	SFR	D	2.25	4.0	8.99	989	1,335	5,167	6,502
A-24-1	3	SFR	D	2.43	4.0	14.34	1,577	2,129	7,362	9,491
	3	SFR	V	0.77	6.0					
A-2-4	6	HDR	V	18.03	15.0	270.52	29,757	40,172	41,480	81,652
A-24	3	SFR	D	1.84	4.0	12.64	1,390	1,877	6,255	8,132
	3	SFR	V	0.88	6.0					
A-25	3	SFR	D	1.28	4.0	14.2	1,562	2,109	6,425	8,534
	3	SFR	V	1.51	6.0					
A-26	3	SFR	D	1.50	4.0	10.96	1,206	1,628	5,354	6,981
	3	SFR	V	0.82	6.0					
A-27	3	SFR	D	0.69	4.0	4.31	474	640	2,181	2,821
	3	SFR	V	0.26	6.0					
A-28	3	SFR	D	0.57	4.0	6.96	766	1,034	3,104	4,138
	3	SFR	V	0.78	6.0					
A-2	1	SFR	D	0.50	4.0	2	220	297	1,152	1,449
A-3	1	SFR	D	0.83	4.0	4.94	543	734	2,529	3,262
	1	SFR	V	0.27	6.0					
A-5	1	SP	V	8.11	1.5	12.17	1,339	1,807	18,656	20,464
A-6-1-1	1	SFR	D	0.88	4.0	3.54	389	526	2,033	2,559
A-6-1-2	1	SFR	D	1.14	4.0	4.56	502	677	2,621	3,298
A-6-1	1	SFR	D	0.37	4.0	1.47	162	218	843	1,061

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
A-6-2-1	1	SFR	D	1.40	4.0	5.62	618	835	3,231	4,065
A-6-2-2	1	SFR	D	1.53	4.0	6.12	673	909	3,521	4,430
A-6-2	1	SFR	D	0.96	4.0	3.83	421	569	2,200	2,769
A-6	1	SP	D	1.69	1.5	2.54	279	377	3,896	4,273
A-7	1	SFR	D	2.43	4.0	9.73	1,070	1,445	5,595	7,040
A-8	6	SFR	D	1.33	4.0	5.31	584	789	3,055	3,843
G-10	2	PR-Golf	D	74.36	1.5	113.08	12,439	16,792	171,920	188,712
	2	SFR	D	0.38	4.0					
G-1-10	2	SFR	D	0.16	4.0	0.65	72	97	375	471
G-1-11	2	PR-Golf	D	24.79	1.5	39.36	4,330	5,845	58,260	64,105
	2	SFR	D	0.54	4.0					
G-1-12	2	SFR	D	0.65	4.0	2.6	286	386	1,495	1,881
G-1-13	2	SFR	D	0.60	4.0	2.39	263	355	1,372	1,727
G-1-14	2	SFR	D	0.79	4.0	3.17	349	471	1,823	2,294
G-1-15	2	SFR	D	0.96	4.0	3.85	424	572	2,216	2,788
G-1-1	2	SFR	D	0.91	4.0	3.65	402	542	2,099	2,641
G-12-2	2	PR	D	1.77	4.0	16.86	1,855	2,504	9,696	12,200
	2	SFR	D	2.44	4.0					
G-12	2	HDR-WRLDMRK	D	21.10	9.5	200.46	22,051	29,768	48,533	78,301
G-1-2	2	PR-Golf	D	25.25	1.5	37.88	4,167	5,625	58,080	63,705
G-15	6	PR	D	1.04	4.0	4.17	459	619	2,397	3,017
G-16	6	P	V	0.09	5.0	0.46	51	68	210	278
G-1-7-1	2	SFR	D	0.68	4.0	2.72	299	404	1,565	1,969
G-1-7-2-1	2	SFR	D	0.68	4.0	2.72	299	404	1,563	1,967
G-17-2	3	SFR	D	0.56	4.0	2.24	246	333	1,287	1,619
G-1-7-2	2	SFR	D	0.23	4.0	0.93	102	138	532	670
G-1-7-3-1	2	SFR	D	0.35	4.0	1.4	154	208	802	1,010
G-17-3	3	SFR	D	0.71	4.0	2.84	312	422	1,635	2,057
G-1-7-3	2	SFR	D	0.49	4.0	1.98	218	294	1,137	1,431
G-17-4	3	SFR	D	0.43	4.0	1.73	190	257	995	1,252
G-1-7-4	2	SFR	D	0.63	4.0	2.51	276	373	1,441	1,814
G-17-5	3	OS	D	8.45	0.0	0	0	0	19,428	19,428
G-17-6	3	SFR	D	1.75	4.0	7.02	772	1,042	4,036	5,079
G-17	3	SFR	D	3.10	4.0	26.92	2,961	3,998	12,697	16,694
	3	SFR	V	2.42	6.0					
G-1-7	2	SFR	V	0.31	6.0	1.84	202	273	704	978
G-18-1	3	SFR	D	0.63	4.0	2.52	277	374	1,451	1,825
G-18-2	3	SFR	D	0.75	4.0	2.99	329	444	1,722	2,166
G-18-3	3	SFR	D	0.84	4.0	3.37	371	500	1,936	2,437
G-18-4	3	SFR	D	0.98	4.0	3.92	431	582	2,254	2,836
G-18-5	3	SFR	D	0.30	4.0	2.82	310	419	1,314	1,732
	3	SFR	V	0.27	6.0					
G-18-6	3	SFR	D	0.46	4.0	4.92	541	731	2,240	2,971
	3	SFR	V	0.51	6.0					
G-18-7	3	SFR	D	0.35	4.0	1.41	155	209	809	1,018
G-18-8	3	SFR	D	0.32	4.0	8.83	971	1,311	3,631	4,943

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	3	SFR	V	1.25	6.0					
G-1-8	2	SFR	D	0.29	4.0	1.17	129	174	674	848
G-1-9-1	2	SFR	D	0.21	4.0	3.52	387	523	1,505	2,027
	2	SFR	V	0.45	6.0					
G-19	3	SFR	D	0.58	4.0	2.31	254	343	1,326	1,669
G-1-9	2	SFR	D	0.93	4.0	3.73	410	554	2,147	2,701
G-1	2	SFR	D	0.19	4.0	0.77	85	114	443	557
G-2-10	2	SFR	D	0.21	4.0	0.83	91	123	478	602
G-2-11	2	CC	D	2.87	2.0	5.74	631	852	6,598	7,450
G-2-13	2	SP	D	3.29	1.5	4.94	543	734	7,567	8,301
G-2-15	5	SP	D	4.48	1.5	41.81	4,599	6,209	64,097	70,305
	2	SP	V	23.38	1.5					
G-21	3	SFR	D	0.68	4.0	2.74	301	407	1,574	1,981
G-2-1	2	SFR	V	0.23	6.0	1.39	153	206	533	739
G-22-1	3	SFR	D	0.79	4.0	4.97	547	738	2,514	3,252
	3	SFR	V	0.30	6.0					
G-22-2	3	SFR	D	0.57	4.0	4.36	480	647	2,107	2,754
	3	SFR	V	0.35	6.0					
G-22	3	SFR	D	1.24	4.0	8.15	897	1,210	4,073	5,283
	3	SFR	V	0.53	6.0					
G-23-1	3	SFR	D	0.69	4.0	2.77	305	411	1,594	2,005
G-23-2	3	SFR	V	0.54	6.0	3.21	353	477	1,231	1,707
G-23-3	3	SFR	D	1.73	4.0	6.93	762	1,029	3,985	5,014
G-23	3	SFR	D	0.39	4.0	1.57	173	233	903	1,136
G-2-3	2	SFR	D	0.89	4.0	4.65	512	691	2,464	3,154
	2	SFR	V	0.18	6.0					
G-24-1	3	SFR	D	0.31	4.0	2.82	310	419	1,322	1,740
	3	SFR	V	0.26	6.0					
G-24-2	3	SFR	D	0.36	4.0	3.43	377	509	1,588	2,098
	3	SFR	V	0.33	6.0					
G-24-3	3	SFR	D	0.64	4.0	4.35	479	646	2,154	2,800
	3	SFR	V	0.30	6.0					
G-24-6-1	3	SFR	D	0.73	4.0	2.94	323	437	1,690	2,126
G-24-6-2	3	SFR	D	1.20	4.0	4.8	528	713	2,759	3,472
G-24-6-3	3	SFR	D	0.17	4.0	0.67	74	99	387	486
G-24-6-4	3	SFR	D	1.21	4.0	4.85	534	720	2,790	3,510
G-24-6	3	SFR	D	1.47	4.0	5.86	645	870	3,370	4,240
G-24-7-1	3	SFR	D	0.74	4.0	2.95	325	438	1,697	2,135
G-24-8	3	SFR	D	2.43	4.0	9.74	1,071	1,446	5,599	7,045
G-24	3	SFR	D	0.47	4.0	1.88	207	279	1,081	1,361
G-2-4	2	SFR	D	0.19	4.0	4.09	450	607	1,715	2,323
	2	SFR	V	0.55	6.0					
G-25	3	SFR	D	1.15	4.0	4.59	505	682	2,636	3,318
G-2-5	2	SFR	D	0.57	4.0	2.29	252	340	1,319	1,659
G-2-6	2	SFR	D	0.47	4.0	1.88	207	279	1,081	1,360
G-26	3	SFR	D	0.78	4.0	4.54	499	674	2,339	3,014

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	3	SFR	V	0.24	6.0					
G-2-7-1	2	SFR	D	1.24	4.0	5.85	644	869	3,191	4,060
	2	SFR	V	0.15	6.0					
G-27	3	PR	D	0.41	4.0	3.96	436	588	2,277	2,866
	3	SFR	D	0.58	4.0					
G-2-7	2	SFR	D	0.70	4.0	4.39	483	652	2,219	2,870
	2	SFR	V	0.27	6.0					
G-28-10	3	SFR	D	0.65	4.0	2.59	285	385	1,488	1,872
G-28-11-1	3	SFR	D	0.53	4.0	8.76	964	1,301	3,762	5,063
	3	SFR	V	1.11	6.0					
G-28-11-2	3	SFR	D	1.72	4.0	26.53	2,918	3,940	11,488	15,428
	3	SFR	V	3.28	6.0					
G-28-11	3	SFR	V	1.03	6.0	6.2	682	921	2,375	3,296
G-28-12	3	SFR	D	1.33	4.0	9.06	997	1,345	4,490	5,835
	3	SFR	V	0.63	6.0					
G-28-13	3	SFR	D	1.35	4.0	10.39	1,143	1,543	5,024	6,567
	3	SFR	V	0.83	6.0					
G-28-14	3	SFR	D	1.18	4.0	14.46	1,591	2,147	6,447	8,594
	3	SFR	V	1.62	6.0					
G-28-1	3	OS	D	3.20	0.0	6.42	706	953	10,253	11,206
	3	SFR	D	0.57	4.0					
	3	SFR	V	0.69	6.0					
g-28-2	3	SFR	D	0.69	4.0	7.05	776	1,047	3,235	4,282
	3	SFR	V	0.71	6.0					
g-28-3	3	SFR	D	0.35	4.0	1.4	154	208	805	1,012
G-28-4	3	OS	D	0.32	0.0	3.64	400	541	2,386	2,927
	3	SFR	D	0.32	4.0					
	3	SFR	V	0.39	6.0					
G-28-5	3	SFR	D	1.61	4.0	18.71	2,058	2,778	8,403	11,182
	3	SFR	V	2.04	6.0					
G-28-6	3	SFR	D	0.40	4.0	8.33	916	1,237	3,497	4,734
	3	SFR	V	1.13	6.0					
G-28-7-1	3	SFR	V	1.45	6.0	8.73	960	1,296	3,345	4,641
G-28-7-2	3	SFR	D	1.11	4.0	15.8	1,738	2,346	6,906	9,252
	3	SFR	V	1.90	6.0					
G-28-7	3	SFR	V	3.69	6.0	22.16	2,438	3,291	8,493	11,784
G-28-8	3	SFR	V	0.84	6.0	5.04	554	748	1,934	2,682
G-28-9	3	SFR	V	0.41	6.0	2.46	271	365	941	1,306
G-2-8	2	SFR	D	0.84	4.0	6.77	745	1,005	3,240	4,245
	2	SFR	V	0.56	6.0					
G-28	3	SFR	D	5.81	4.0	30.27	3,330	4,495	16,060	20,555
	3	SFR	V	1.17	6.0					
G-29-1	3	SFR	D	0.88	4.0	9.35	1,029	1,388	4,261	5,649
	3	SFR	V	0.97	6.0					
G-29-2	3	SFR	D	1.32	4.0	12.28	1,351	1,824	5,721	7,545

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	3	SFR	V	1.16	6.0					
G-29	3	SFR	D	0.23	4.0	0.9	99	134	519	653
G-2-9	2	SFR	D	0.60	4.0	2.42	266	359	1,391	1,750
G-30	3	SFR	D	0.37	4.0	5.99	659	890	2,582	3,472
	3	SFR	V	0.75	6.0					
G-33	3	PR-Golf	D	19.48	1.5	29.21	3,213	4,338	44,793	49,131
G-34-1-1	3	SFR	D	0.65	4.0	2.61	287	388	1,498	1,886
G-34-1-2	3	SFR	D	0.27	4.0	4.66	513	692	1,996	2,688
	3	SFR	V	0.60	6.0					
G-34-1-3	3	SFR	D	0.48	4.0	3.18	350	472	1,586	2,058
	3	SFR	V	0.21	6.0					
G-34-1	3	SFR	D	0.69	4.0	2.76	304	410	1,586	1,995
G-34-2	3	SFR	D	0.97	4.0	3.89	428	578	2,234	2,812
G-34-3	3	SFR	D	0.24	4.0	2.43	267	361	1,120	1,481
	3	SFR	V	0.24	6.0					
G-34-4	3	SFR	D	1.29	4.0	5.15	567	765	2,961	3,725
G-34	3	SFR	D	0.33	4.0	1.32	145	196	759	955
G-35	3	SFR	D	0.33	4.0	6.01	661	892	2,553	3,445
	3	SFR	V	0.78	6.0					
G-36-1	3	SFR	D	0.75	4.0	4.34	477	644	2,234	2,879
	3	SFR	V	0.23	6.0					
G-36-2	3	SFR	V	0.50	6.0	3	330	446	1,149	1,595
G-36-3	3	SFR	D	0.46	4.0	11.28	1,241	1,675	4,671	6,346
	3	SFR	V	1.57	6.0					
G-36	3	SFR	D	0.95	4.0	3.8	418	564	2,187	2,751
G-3	2	SFR	D	0.98	4.0	9.5	1,045	1,411	4,391	5,802
	2	SFR	V	0.93	6.0					
G-40-10	3	SFR	D	1.50	4.0	17.9	1,969	2,658	8,013	10,671
	3	SFR	V	1.98	6.0					
G-40-1	3	SFR	D	0.33	4.0	1.32	145	196	758	954
G-40-2	3	SFR	D	0.64	4.0	2.55	281	379	1,469	1,847
G-40-4-1	3	SFR	D	1.25	4.0	6.58	724	977	3,482	4,460
	3	SFR	V	0.27	6.0					
G-40-4-2	3	SFR	D	0.44	4.0	7.01	771	1,041	3,026	4,067
	3	SFR	V	0.87	6.0					
G-40-5	3	SFR	V	0.31	6.0	1.86	205	276	713	989
G-40-7	3	SFR	D	2.06	4.0	11.71	1,288	1,739	6,070	7,809
	3	SFR	V	0.58	6.0					
G-40-8	3	SFR	D	0.57	4.0	5.98	658	888	2,729	3,617
	3	SFR	V	0.62	6.0					
G-40-9-1	3	SFR	D	2.01	4.0	19.61	2,157	2,912	9,061	11,973
	3	SFR	V	1.93	6.0					
G-40-9	3	SFR	D	0.97	4.0	6.03	663	895	3,059	3,954
	3	SFR	V	0.36	6.0					
G-40	3	SFR	V	0.30	6.0	1.8	198	267	689	956
G-4-1	2	SFR	D	2.17	4.0	14.22	1,564	2,112	7,109	9,221

TABLE S-2
CITY OF ANGELS WASTEWATER MASTER PLAN
PEAK WET WEATHER FLOW CALCULATIONS - BUILDOUT DEVELOPMENT

Manhole	Basin	Use	Status	Area (ac)	ESU Conversion (ESU/ac)	Total Manhole ESU	ADWF (gpd)	Peak Diurnal Flow (gpd)	Design Storm I/I (gpd)	Design PWWF (gpd)
	2	SFR	V	0.92	6.0					
G-43-1	3	SFR	D	1.75	4.0	9.99	1,099	1,484	5,175	6,658
	3	SFR	V	0.50	6.0					
G-44-1	3	SFR	D	0.36	4.0	3.62	398	538	1,667	2,204
	3	SFR	V	0.36	6.0					
G-44	3	SFR	D	0.65	4.0	2.62	288	389	1,504	1,893
G-45	3	SFR	D	0.84	4.0	7.17	789	1,065	3,394	4,459
	3	SFR	V	0.64	6.0					
G-46	3	SFR	D	0.46	4.0	3.23	355	480	1,588	2,068
	3	SFR	V	0.23	6.0					
G-47	3	SFR	D	1.76	4.0	10.61	1,167	1,576	5,418	6,994
	3	SFR	V	0.59	6.0					
G-4	2	SFR	D	0.22	4.0	0.89	98	132	512	644
G-5-1	2	SFR	D	0.39	4.0	1.57	173	233	901	1,134
G-5	2	SFR	V	0.18	6.0	1.09	120	162	419	581
g-6-1	2	SFR	D	0.38	4.0	1.52	167	226	872	1,097
g-6-2	2	SFR	D	1.21	4.0	4.85	534	720	2,791	3,511
G-6	2	SFR	D	0.20	4.0	0.81	89	120	468	588
G-7	2	SFR	D	0.85	4.0	4.67	514	693	2,444	3,137
	2	SFR	V	0.21	6.0					
G-8	2	SFR	D	1.50	4.0	7.31	804	1,086	3,950	5,035
	2	SFR	V	0.22	6.0					
G-9	2	SFR	D	1.23	4.0	6.4	704	950	3,394	4,345
	2	SFR	V	0.24	6.0					

[a] Manhole 44-A-7 includes flow from Six Mile Village

APPENDIX T

RESULTS OF HYDRAULIC MODEL

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-1	101A	101	1505.24	1505.12	8	26	9,875	0.0050	0.91	0.08	1,505.30	4.12
P-2	44-B	44-A	1387.45	1387.39	10	38	133,955	0.0020	1.31	0.05	1,387.73	5.14
P-3	A-13	G-16	1443.9	1442.14	8	29	22,618	0.0610	2.86	1.72	1,443.98	3.10
P-4	24	23	1346.94	1346.68	10	38	163,064	0.0070	2.34	0.27	1,347.16	5.08
P-5	15	15A	1318.69	1318.57	12	43	171,331	0.0030	1.69	0.08	1,318.95	4.02
P-6	17-16-3	17-16-2	1368.85	1368.51	6	30	563	0.0110	0.54	0.34	1,368.86	4.76
P-7	45	44-B	1387.69	1387.45	10	37	133,955	0.0060	2.17	0.16	1,387.89	4.56
P-9	77-30	77-29	1534.08	1534.01	6	48	2,987	0.0010	0.44	0.09	1,534.13	1.84
P-10	17-76-7	17-76-8	1461.39	1460.9	6	28	273	0.0180	0.51	0.47	1,461.40	6.57
P-12	G-20	G-19	1314.01	1308.47	6	35	6,334	0.1580	2.85	5.54	1,314.06	4.41
P-13	77-23	79-8	1533.07	1532.84	10	33	12,662	0.0070	1.09	0.08	1,533.13	8.74
P-14	50-2-2	50-2-1	1406.81	1406.54	6	39	110	0.0070	0.29	0.27	1,406.82	6.21
P-15	G-24-6-3	G-24-6-2	1403.76	1398.52	6	39	552	0.1340	1.31	5.24	1,403.77	6.61
P-16	78	77	1511.85	1510.94	10	47	67,635	0.0190	2.61	0.87	1,511.99	5.16
P-17	77-3	77-2	1512.39	1512.24	6	39	0	0.0040	0.00	0.15	1,512.39	3.70
P-18	9-9	9-8	1407.59	1407.15	8	39	138,354	0.0110	2.73	0.47	1,407.80	3.80
P-19	56	55	1426.09	1425.71	10	41	113,100	0.0090	2.34	0.37	1,426.27	3.48
P-20	99	98	1503.04	1502.99	8	42	26,223	0.0010	0.76	0.10	1,503.18	5.00
P-21	17-51-8	17-51-8Z	1577.47	1576.79	6	42	690	0.0160	0.65	0.67	1,577.49	3.29
P-22	77-6-1	77-6	1518.18	1518.04	6	35	14,839	0.0040	1.02	0.15	1,518.27	4.06
P-23	79-6	79-5	1532.01	1532	10	47	48,531	0.0000	0.48	0.10	1,532.21	10.70
P-24	101-3-6	101-3-5	1534.39	1532.33	6	50	782	0.0410	0.95	2.06	1,534.41	4.30
P-25	17-34	17-33	1539.32	1536.47	8	53	12,244	0.0540	2.28	2.85	1,539.38	3.61
P-26	77-25	77-24	1533.38	1533.24	6	53	4,684	0.0030	0.62	0.12	1,533.43	6.87
P-27	62	61	1463.25	1455.26	10	55	112,595	0.1450	6.14	7.99	1,463.43	3.52
P-28	G-24-6-2	G-24-6-1	1398.52	1391.5	6	57	1,032	0.1230	1.53	7.02	1,398.54	6.86
P-29	G-18	G-17	1288.06	1285.46	6	60	8,423	0.0430	1.96	2.54	1,288.12	4.42
P-30	104-2-5-1	104-2-5	1540.05	1536.89	6	60	1,440	0.0530	1.21	3.15	1,540.07	6.20
P-31	30	29	1351.21	1350.68	10	61	161,404	0.0090	2.54	0.55	1,351.43	3.69
P-32	101-7-4	101-7-3	1523.88	1523.27	6	62	0	0.0100	0.00	0.61	1,523.88	6.48
P-33	104-4	104-3	1536.25	1535.99	8	62	7,298	0.0040	0.81	0.27	1,536.31	4.02
P-34	23	22	1346.68	1346.31	10	55	163,064	0.0070	2.32	0.37	1,346.90	4.78
P-35	17-40-z	17-40	1568.19	1564.77	6	64	11,212	0.0530	2.33	3.42	1,568.25	5.75
P-36	17-36	17-35	1543.1	1542.04	8	65	12,244	0.0160	1.50	1.07	1,543.16	5.16
P-37	G-2-5	G-2-4	1393.97	1390.26	6	65	3,597	0.0570	1.67	3.71	1,394.01	4.14
P-38	44-A	44	1387.39	1387.27	10	66	151,890	0.0020	1.43	0.09	1,387.68	2.38
P-39	G-2-6	G-2-5	1397.95	1393.97	6	66	3,368	0.0600	1.68	3.98	1,397.98	4.17
P-40	50-4	50-3	1423.24	1422.55	6	67	709	0.0100	0.57	0.69	1,423.26	6.16
P-41	G-28-4	G-28-3	1342.26	1341.76	6	67	4,075	0.0070	0.86	0.49	1,342.30	3.44
P-42	G-28-3	G-28-2	1341.76	1341.45	6	69	4,215	0.0040	0.72	0.31	1,341.81	3.53
P-43	G-36-3	G-36-2	1422.62	1420.99	6	67	183	0.0240	0.48	1.63	1,422.63	6.34
P-44	50-2-1	50-2	1406.54	1405.53	6	67	166	0.0150	0.43	1.00	1,406.55	5.07
P-45	17-76-5	17-76-8	1465.66	1460.9	6	70	1,648	0.0680	1.37	4.76	1,465.68	4.19
P-47	G-17-1	G-17	1286.16	1285.46	6	71	26,172	0.0100	1.65	0.68	1,286.26	3.46
P-48	15-4	15-3	1350.75	1345.02	8	71	4,543	0.0810	1.97	5.72	1,350.79	4.07
P-49	G-33	G-32	1344.42	1340.22	6	72	15,451	0.0580	2.61	4.23	1,344.49	2.63
P-50	17-47	17-46	1586.77	1581.69	6	73	415	0.0700	0.95	5.06	1,586.78	2.04
P-51	G-5	G-4	1399.81	1399.12	8	77	83,555	0.0090	2.17	0.69	1,399.97	7.54
P-52	34	33	1366.27	1361.51	10	77	160,802	0.0620	5.07	4.85	1,366.49	5.44
P-53	101-1	101A	1505.3	1505.24	6	79	9,773	0.0010	0.50	0.10	1,505.41	4.81
P-54	G-40-2	G-40-1	1409.79	1408.87	6	60	3,780	0.0150	1.07	0.92	1,409.83	6.54
P-55	G-36-2	G-36-1	1420.99	1412.74	6	80	183	0.1030	0.79	8.25	1,421.00	3.62

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-56	17-10	17-9	1353.39	1352.79	10	80	40,295	0.0080	1.60	0.59	1,353.50	4.88
P-57	A-19	A-18	1481.39	1478.56	8	82	4,292	0.0350	1.42	2.83	1,481.43	6.61
P-58	76-6-6	76-6-5	1527.97	1527.35	6	84	7,383	0.0070	1.02	0.61	1,528.02	5.67
P-59	17-63	17-2	1322.45	1321.01	8	85	7,047	0.0170	1.29	1.45	1,322.50	4.71
P-60	17-9	17-8	1352.79	1352.36	10	85	40,295	0.0050	1.39	0.44	1,352.90	4.73
P-61	A-18	A-17	1478.56	1477.63	8	86	4,545	0.0110	0.97	0.93	1,478.60	6.90
P-62	17-76-3	17-76-5	1471.59	1465.66	6	86	476	0.0690	0.98	5.92	1,471.60	3.50
P-63	G-21	G-20	1320.31	1314.01	6	87	6,334	0.0720	2.16	6.32	1,320.36	4.80
P-64	77-2	77-1	1512.24	1512.14	8	87	0	0.0010	0.00	0.03	1,512.24	3.75
P-65	98-5	98-4	1517.93	1517.83	6	120	601	0.0010	0.22	0.09	1,517.96	2.73
P-66	G-36	G-35	1377.91	1366.62	6	90	10,430	0.1250	3.03	11.29	1,377.97	7.31
P-67	77	76	1510.94	1510.68	10	84	83,697	0.0030	1.45	0.29	1,511.12	4.28
P-68	G-40-4	G-40-3	1413.4	1410.17	6	90	3,525	0.0360	1.42	3.24	1,413.44	5.56
P-69	79-2	79-1	1516.11	1514.88	10	91	66,826	0.0140	2.29	1.25	1,516.25	6.16
P-70	24-1	24	1373.28	1348.94	6	91	753	0.2670	1.83	24.35	1,373.30	5.75
P-72	50	49	1403.68	1403.03	10	92	130,434	0.0070	2.22	0.62	1,403.87	3.71
P-73	79	78	1512.92	1511.85	10	92	66,826	0.0120	2.18	1.07	1,513.06	4.71
P-74	79-8	79-7	1532.84	1532.79	10	108	47,780	0.0000	0.63	0.11	1,533.05	9.72
P-75	77-26	77-25	1533.33	1533.38	8	108	3,652	0.0000	0.02	0.02	1,533.46	7.19
P-76	101-1-1	101-1	1506.09	1505.3	6	95	8,417	0.0080	1.11	0.74	1,506.15	4.67
P-77	25	24-A	1348.66	1347.87	10	97	162,195	0.0080	2.48	0.79	1,348.88	4.68
P-78	G-1-15	G-1-14	1408.54	1406.71	6	97	385	0.0190	0.59	1.82	1,408.55	6.80
P-79	26	25	1349.4	1348.66	10	98	161,752	0.0080	2.42	0.74	1,349.62	3.78
P-80	44-10	44-9	1392.86	1391.49	6	82	1,609	0.0170	0.86	1.37	1,392.88	7.22
P-81	67	66	1479.92	1478.29	10	99	110,221	0.0160	2.85	1.67	1,480.10	4.85
P-82	101-4	101-3	1516.73	1515.74	6	99	2,423	0.0100	0.81	0.97	1,516.76	5.52
P-83	77-13-Z	77-13	1556.93	1550.21	6	99	2,111	0.0680	1.51	6.71	1,556.96	4.68
P-84	41-5-1	41-5	1442.65	1425.18	6	100	219	0.1750	1.01	17.45	1,442.66	4.02
P-85	104-2-8-1	104-2-8	1559.5	1558.3	6	100	773	0.0120	0.62	1.20	1,559.52	4.55
P-86	44-19	44-18	1416.31	1404.27	6	100	2,797	0.1200	2.00	12.04	1,416.34	5.10
P-87	G-6-1	G-6	1412.03	1410.22	6	101	636	0.0180	0.66	1.81	1,412.05	4.60
P-88	G-39	G-38	1400.42	1397.89	6	103	9,569	0.0250	1.68	2.54	1,400.48	3.53
P-89	17-23	17-22-1	1439.63	1435.8	8	104	16,717	0.0370	2.19	3.83	1,439.70	3.41
P-90	98-3	98-2	1517.16	1516.59	6	106	2,581	0.0050	0.66	0.57	1,517.19	5.40
P-91	104-1	104	1524.27	1520.73	8	106	14,199	0.0330	2.02	3.56	1,524.34	4.74
P-92	G-32	G-31	1340.22	1339.06	6	106	15,451	0.0110	1.46	1.16	1,340.30	6.26
P-93	60	59	1436.37	1431.02	10	107	112,976	0.0500	4.24	5.35	1,436.55	5.92
P-94	17-21	17-20	1420.87	1417.9	8	108	17,007	0.0270	2.01	2.97	1,420.94	3.17
P-95	17-74-1-A	17-74-1	1563.79	1555.85	6	108	4,500	0.0740	1.94	7.94	1,563.83	2.52
P-96	17-61	17-60-2	1537.1	1531.79	6	108	1,479	0.0490	1.24	5.31	1,537.12	3.26
P-97	17-37	17-36	1544.61	1543.1	8	109	11,767	0.0140	1.42	1.51	1,544.67	7.07
P-98	104-2-5	104-2-4	1536.89	1534.77	6	110	3,710	0.0190	1.15	2.12	1,536.93	7.67
P-99	63	62	1465.33	1463.25	10	110	112,595	0.0190	3.01	2.12	1,465.51	4.90
P-100	G-29	G-28	1337.36	1335.05	6	114	16,574	0.0200	1.86	2.29	1,337.44	7.87
P-101	17-16	17-15	1364.66	1363.77	10	111	20,302	0.0080	1.33	0.86	1,364.74	7.59
P-102	24-2	24-1	1374.17	1373.28	6	111	685	0.0080	0.51	0.89	1,374.19	3.66
P-103	G-2-10	G-2-9	1417.63	1415.12	6	112	1,824	0.0220	1.00	2.51	1,417.66	5.37
P-104	53-5	53-4	1470.18	1465.7	6	112	387	0.0400	0.76	4.48	1,470.19	3.78
P-105	48	47	1402.6	1398.09	10	113	132,891	0.0400	4.11	4.51	1,402.80	3.55
P-107	86	85	1537.81	1537.69	10	98	34,626	0.0010	0.81	0.17	1,537.96	3.98
P-108	48-2	48-1	1430.34	1428.17	6	114	2,288	0.0190	0.99	2.17	1,430.37	4.03
P-109	24-3	24-2	1379.45	1374.17	6	117	685	0.0450	0.95	5.28	1,379.47	4.13

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-110	17-6	17-5	1332.05	1328.77	10	116	40,853	0.0280	2.55	3.28	1,332.16	3.81
P-111	104	103	1520.73	1515.38	8	116	14,199	0.0460	2.25	5.35	1,520.80	3.63
P-112	49	48	1403.03	1402.6	10	116	130,434	0.0040	1.76	0.45	1,403.25	3.71
P-113	44-17	44-A-5	1396.44	1391.19	6	117	2,873	0.0450	1.44	5.26	1,396.47	13.20
P-114	17-11	17-10	1357.32	1353.39	10	118	40,295	0.0330	2.70	3.96	1,357.43	5.90
P-115	44-13	44-12	1409.88	1404.81	6	118	428	0.0430	0.80	5.06	1,409.89	7.34
P-116	17-26	17-25	1474.28	1465.48	8	119	15,299	0.0740	2.72	8.80	1,474.35	4.77
P-117	77-24-1	77-24	1537	1533.57	6	119	7,923	0.0290	1.69	3.44	1,537.05	4.96
P-118	G-45-1	G-45	1444.1	1438.35	6	119	3,327	0.0480	1.54	5.74	1,444.13	5.32
P-119	44-25-2	44-25-1	1447.58	1433.02	6	120	3,446	0.1210	2.15	14.58	1,447.62	4.48
P-121	17-41	17-40-z	1574.27	1568.19	6	122	9,813	0.0500	2.19	6.08	1,574.33	6.87
P-122	17-2	17-1	1320.68	1320.48	12	125	48,862	0.0020	0.96	0.24	1,320.84	1.41
P-123	17-33	17-32	1536.47	1534.84	8	126	12,272	0.0130	1.40	1.63	1,536.53	6.36
P-124	77-16-9	77-16-8A	1526.78	1518.32	6	127	1,160	0.0670	1.26	8.15	1,526.80	3.19
P-125	72	71	1499.29	1498.33	10	127	107,101	0.0080	2.14	0.96	1,499.47	7.89
P-126	38	37	1374.39	1373.01	10	128	160,052	0.0110	2.73	1.38	1,374.61	7.38
P-127	G-24-8	G-24-7	1403.69	1392.48	6	128	975	0.0880	1.33	11.21	1,403.71	6.27
P-128	17-7	17-6	1342.54	1332.05	10	129	40,611	0.0810	3.71	10.49	1,342.65	2.82
P-129	42-2-2	41-2-1	1416.96	1416.4	6	129	1,267	0.0040	0.50	0.55	1,416.99	4.25
P-130	G-17-7	G-17-6	1327.42	1321.98	6	130	24,789	0.0420	2.71	5.44	1,327.52	11.64
P-131	G-37	G-36	1381.19	1377.91	6	131	9,569	0.0250	1.70	3.28	1,381.25	3.31
P-132	101-6-1	101-6	1546.66	1529.12	6	131	950	0.1340	1.56	17.53	1,546.68	3.85
P-133	77-1	77	1512.14	1510.94	8	124	15,959	0.0100	1.36	1.09	1,512.21	3.88
P-134	17-12	17-11	1358.24	1357.32	10	132	40,162	0.0070	1.56	0.92	1,358.35	5.85
P-136	A-6	A-5	1475.2	1470.92	8	134	3,743	0.0320	1.33	4.28	1,475.23	9.10
P-137	104-2-3	104-2-2	1529.31	1528.85	8	135	4,858	0.0030	0.66	0.45	1,529.36	2.81
P-138	77-13-2	77-13-1	1566.07	1556.36	6	136	1,605	0.0710	1.39	9.71	1,566.09	4.41
P-139	G-31	G-30	1339.06	1338.22	6	136	15,451	0.0060	1.20	0.84	1,339.14	3.31
P-140	59	58	1431.02	1429.55	10	136	113,100	0.0110	2.47	1.49	1,431.20	7.49
P-141	G-17-4	G-17-3	1296.1	1294.39	6	137	25,664	0.0120	1.79	1.71	1,296.20	3.24
P-142	17-54	17-53	1428.98	1428.34	6	138	2,575	0.0050	0.63	0.64	1,429.02	2.94
P-143	A-17	A-16	1477.63	1465.35	8	138	5,258	0.0890	2.10	12.17	1,477.67	7.10
P-144	53-4	53-2	1465.7	1449.55	6	139	542	0.1160	1.23	16.14	1,465.71	3.25
P-145	41-3-1	41-3	1426.88	1422.74	6	139	984	0.0300	0.89	4.13	1,426.90	4.47
P-146	77-12	77-6-7	1541.12	1533.91	6	139	4,563	0.0520	1.74	7.20	1,541.16	3.63
P-147	52	51	1407.76	1405.81	10	139	128,879	0.0140	2.81	1.95	1,407.95	4.11
P-148	24-A	24	1347.87	1346.94	10	139	162,311	0.0070	2.32	0.93	1,348.09	2.68
P-149	17-22	17-21	1428.41	1420.87	8	140	16,963	0.0540	2.51	7.54	1,428.48	2.99
P-150	17-48	17-47	1590.71	1586.77	6	140	415	0.0280	0.70	3.94	1,590.72	4.98
P-151	41-3	41-2-1	1422.74	1416.4	6	140	2,383	0.0450	1.34	6.33	1,422.77	3.65
P-152	17-18-2	17-18-1	1449.65	1436.42	6	141	1,167	0.0940	1.43	13.23	1,449.67	3.13
P-153	51	50	1405.81	1403.68	10	141	128,952	0.0150	2.89	2.13	1,406.00	6.81
P-154	15-3-1	15-3	1351.58	1345.19	6	141	2,776	0.0450	1.44	6.40	1,351.61	3.83
P-155	77-7-1	77-7	1529.82	1525.86	6	129	4,642	0.0310	1.45	3.96	1,529.86	3.57
P-156	G-19	G-18	1308.47	1288.06	6	142	6,565	0.1440	2.78	20.40	1,308.52	4.73
P-157	101-3-2	101-3-1	1517.87	1517.16	6	143	1,446	0.0050	0.54	0.70	1,517.90	3.41
P-158	17-15	17-14	1363.77	1360.85	10	144	39,699	0.0200	2.25	2.92	1,363.88	6.86
P-159	73	72	1500.38	1499.29	10	144	107,101	0.0080	2.14	1.10	1,500.56	7.29
P-160	48-6	48-4	1455.4	1451.3	6	144	1,003	0.0280	0.88	4.09	1,455.42	3.76
P-161	G-40	G-39	1404.1	1400.42	6	145	9,569	0.0250	1.70	3.69	1,404.16	5.24
P-162	77-13	77-12	1550.21	1541.12	6	146	4,348	0.0620	1.83	9.09	1,550.25	2.64
P-163	G-34	G-33	1352.17	1344.42	6	146	12,530	0.0530	2.40	7.74	1,352.24	3.26

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-164	17-51-10A	17-51-8	1579.8	1577.47	6	147	690	0.0160	0.64	2.33	1,579.82	1.59
P-165	17-49-2	17-49-1	1433.9	1420.94	6	147	836	0.0880	1.28	12.94	1,433.92	5.92
P-166	17-40	17-39	1564.77	1562.28	6	148	11,583	0.0170	1.56	2.50	1,564.83	4.10
P-167	G-23	G-22	1347.22	1341.79	6	148	5,022	0.0370	1.58	5.43	1,347.26	6.03
P-168	57	56	1427.9	1426.09	10	148	113,100	0.0120	2.58	1.84	1,428.08	3.52
P-169	35	34	1367.3	1366.27	10	149	160,571	0.0070	2.34	1.04	1,367.52	5.33
P-170	69	68	1494.79	1490.67	10	149	110,030	0.0280	3.41	4.12	1,494.97	6.82
P-171	17-14	17-13	1360.85	1359.37	10	150	39,801	0.0100	1.75	1.47	1,360.96	3.32
P-172	54	53	1420.86	1418.78	10	150	126,120	0.0140	2.79	2.08	1,421.05	3.95
P-173	G-30	G-29	1338.22	1337.36	6	152	15,601	0.0060	1.17	0.86	1,338.30	3.52
P-174	G-6	G-5	1410.05	1399.81	8	152	83,398	0.0670	4.40	10.24	1,410.21	4.92
P-175	17-43-1	17-43	1592.04	1580.33	6	152	703	0.0770	1.17	11.71	1,592.06	3.51
P-176	77-16-8	77-16-7	1518.58	1517.82	6	152	1,404	0.0050	0.54	0.72	1,518.61	4.90
P-177	17-43-2	17-43-1	1596.13	1592.04	6	153	316	0.0270	0.62	4.09	1,596.14	3.39
P-178	15-3-3	15-3-2	1398.44	1374.45	6	153	2,452	0.1570	2.08	23.99	1,398.47	3.54
P-179	50-2	50	1405.53	1404.01	6	153	1,289	0.0100	0.67	1.52	1,405.55	5.73
P-180	29	26	1350.68	1349.4	10	155	161,404	0.0080	2.49	1.28	1,350.90	3.98
P-181	G-2-15	G-2-14	1448.47	1441.65	6	154	673	0.0440	0.94	6.82	1,448.49	5.72
P-182	44-25-3	44-25-2	1468.75	1447.58	6	154	3,446	0.1370	2.24	21.19	1,468.79	4.97
P-183	17-56	17-55	1462.42	1441.48	6	154	2,575	0.1360	2.08	20.95	1,462.45	4.72
P-184	G-18-6	G-18-5	1377.3	1366.41	6	154	457	0.0710	0.98	10.89	1,377.31	4.74
P-185	53-1	53	1434.84	1419.11	6	156	2,320	0.1010	1.81	15.74	1,434.87	3.15
P-186	17-76-1	17-76-5	1467.89	1465.66	6	156	1,172	0.0140	0.74	2.23	1,467.91	3.27
P-187	32A	31	1358.23	1354.15	10	157	160,932	0.0260	3.74	4.08	1,358.45	4.03
P-188	17-49-3	17-49-2	1441.63	1433.9	6	157	621	0.0490	0.96	7.73	1,441.65	3.87
P-189	G-18-2	G-18-1	1333.29	1317.72	6	157	1,606	0.0990	1.58	15.57	1,333.31	3.50
P-190	A-6-1	A-6	1477.84	1475.2	8	158	2,515	0.0170	0.94	2.63	1,477.87	6.41
P-191	G-41	G-40	1408.35	1404.1	6	159	5,657	0.0270	1.47	4.24	1,408.40	5.67
P-192	G-1-14	G-1-13	1406.71	1405.67	6	159	703	0.0070	0.48	1.04	1,406.73	5.99
P-193	58	57	1429.55	1427.9	10	159	113,100	0.0100	2.44	1.67	1,429.73	5.05
P-194	17-46-1	17-46	1584.42	1581.69	6	159	1,749	0.0170	0.89	2.73	1,584.44	3.58
P-196	G-38	G-37	1397.89	1381.19	6	160	9,569	0.1040	2.77	16.73	1,397.95	3.32
P-197	33	32A	1361.51	1358.23	10	160	160,802	0.0200	3.44	3.28	1,361.73	2.98
P-198	17-8	17-7	1352.36	1342.54	10	160	40,611	0.0610	3.33	9.86	1,352.47	3.81
P-199	G-1-10	G-1-9	1399.68	1397.91	6	161	5,201	0.0110	1.06	1.77	1,399.72	3.99
P-200	98-4	98-3	1517.83	1517.16	6	162	2,581	0.0040	0.61	0.67	1,517.87	5.56
P-201	53-2	53-1	1449.55	1434.84	6	162	2,320	0.0910	1.71	14.72	1,449.58	3.04
P-202	17-79-4	17-79-3	1545.03	1538.81	6	163	69	0.0380	0.47	6.22	1,545.04	4.13
P-203	41-1	41	1390.55	1382.42	6	163	5,825	0.0500	1.84	8.15	1,390.60	3.12
P-204	101-7	101-3-1	1519.01	1517.16	6	163	2,405	0.0110	0.84	1.84	1,519.04	3.94
P-205	G-24	G-23	1348.35	1347.22	6	164	3,894	0.0070	0.83	1.13	1,348.39	4.30
P-206	55	54	1425.71	1420.86	10	164	125,783	0.0300	3.63	4.85	1,425.90	3.48
P-208	G-2-2	G-2-1	1376.83	1365.5	6	165	4,027	0.0690	1.87	11.34	1,376.87	4.13
P-209	G-40-4-2	G-40-4-1	1431.68	1420.89	6	165	177	0.0650	0.68	10.78	1,431.69	6.30
P-210	77-6-4	77-6-7	1535.13	1533.91	6	166	2,820	0.0070	0.76	1.20	1,535.16	7.47
P-211	48-1	48	1428.17	1402.93	6	168	2,400	0.1500	2.03	25.25	1,428.20	4.53
P-212	48-5	48-4	1466.04	1451.3	6	168	727	0.0880	1.23	14.73	1,466.06	3.76
P-213	17-55	17-54	1441.48	1428.98	6	171	2,575	0.0730	1.65	12.49	1,441.51	3.14
P-214	44-21	44-20	1419.12	1417.91	6	171	2,006	0.0070	0.68	1.20	1,419.15	9.42
P-215	77-6-7	76-6-6	1533.91	1527.97	6	172	7,383	0.0350	1.74	5.94	1,533.96	8.51
P-216	31	30	1354.15	1351.21	10	173	161,102	0.0170	3.22	2.94	1,354.37	2.98
P-217	A-2-1	A-13	1446.93	1444.07	6	308	1,512	0.0090	0.68	2.86	1,446.95	5.06

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-218	A-11-3-1	A-11-3	1469.65	1468.71	6	175	1,298	0.0050	0.54	0.92	1,469.68	6.29
P-219	G-27	G-26	1329.75	1328.63	6	177	24,017	0.0060	1.37	1.11	1,329.85	4.23
P-220	101-7-3	101-7-1	1523.27	1521.3	6	179	0	0.0110	0.00	1.94	1,523.27	5.48
P-221	77-9	77-7-1	1541.22	1529.82	6	225	4,481	0.0510	1.72	11.40	1,541.26	4.07
P-222	77-16-1	78	1513.22	1512.18	6	51	809	0.0200	0.73	1.04	1,513.24	4.03
P-223	98-2	98	1516.59	1502.82	6	648	3,411	0.0210	1.17	13.71	1,516.62	8.14
P-224	17-49-5	17-49-1	1464.07	1420.94	6	175	3,434	0.2460	2.80	43.12	1,464.10	3.75
P-225	G-43	G-41	1419.84	1408.35	6	360	5,657	0.0320	1.56	11.50	1,419.89	5.23
P-226	17-51-6	17-51-4a	1529.01	1528.22	6	245	1,251	0.0030	0.45	0.79	1,529.04	3.09
P-227	101-3-1	101-3	1517.16	1515.74	6	183	3,851	0.0080	0.86	1.41	1,517.20	2.48
P-228	17-49-7	17-49-5	1529.37	1464.07	6	839	3,011	0.0780	1.75	65.30	1,529.40	2.73
P-229	17-77	17-75-4	1533.57	1525.1	8	173	16,832	0.0490	2.42	8.45	1,533.64	3.46
P-230	77-16-8A	77-16-8	1518.32	1518.58	6	187	1,337	-0.0010	0.01	0.05	1,518.65	2.67
P-231	56-3	56-1	1455.94	1434.21	6	353	0	0.0620	0.00	21.73	1,455.94	2.63
P-232	41-4	41-3	1424.41	1422.74	6	230	1,399	0.0070	0.61	1.67	1,424.43	6.78
P-234	G-2-14	G-2-13	1441.65	1438.09	6	192	673	0.0190	0.68	3.55	1,441.67	4.05
P-235	50-3	50-2	1422.55	1405.53	6	190	930	0.0900	1.32	17.02	1,422.57	6.94
P-236	17-22-1	17-22	1435.8	1428.41	8	193	16,908	0.0380	2.23	7.39	1,435.87	4.80
P-237	17-25-1	17-25	1485.71	1465.65	6	194	631	0.1030	1.22	20.07	1,485.73	3.32
P-238	G-2-7-1	G-2-7	1412.13	1399.86	6	197	496	0.0620	0.95	12.25	1,412.14	5.57
P-239	22	21	1346.31	1343.67	10	91	163,335	0.0290	3.90	2.71	1,346.53	3.78
P-240	17-39	17-37	1562.11	1544.61	8	195	11,767	0.0900	2.70	17.53	1,562.17	3.97
P-241	G-28-11-1	G-28-11	1373.47	1369.05	6	196	899	0.0230	0.78	4.40	1,373.49	5.87
P-242	98	97	1502.82	1497.72	10	196	29,634	0.0260	2.24	5.09	1,502.91	3.51
P-243	G-12-1	G-12	1438.65	1437.7	6	182	1,686	0.0050	0.58	0.95	1,438.68	3.07
P-244	17-65-3	17-65-2	1355.38	1350.56	8	197	4,112	0.0240	1.26	4.82	1,355.42	4.47
P-245	17-45	17-44	1579.45	1576.44	6	292	2,680	0.0100	0.84	3.00	1,579.48	2.85
P-246	G-24-1	G-24	1351.4	1348.35	6	198	3,706	0.0150	1.07	3.05	1,351.44	4.36
P-247	17-28	17-27	1503.69	1492.34	8	322	15,250	0.0350	2.10	11.35	1,503.76	4.09
P-248	17-27	17-26	1492.34	1474.28	8	436	15,271	0.0410	2.22	18.06	1,492.41	3.22
P-249	17-20	17-19	1417.9	1413.49	8	121	17,091	0.0360	2.20	4.41	1,417.97	3.40
P-250	101	100-1	1505.12	1504.28	8	200	25,160	0.0040	1.17	0.83	1,505.22	4.05
P-251	47	46	1398.09	1388.58	10	201	133,362	0.0470	4.37	9.50	1,398.29	3.45
P-252	46	45	1388.58	1387.69	10	163	133,813	0.0050	2.04	0.89	1,388.78	6.50
P-253	A-10-1	A-10	1493.3	1478.2	6	201	1,845	0.0750	1.53	15.06	1,493.33	4.56
P-254	G-24-6-1	G-24-6	1391.5	1384.37	6	201	1,325	0.0350	1.07	7.12	1,391.52	6.87
P-255	A-20	A-19	1493.22	1481.39	8	202	3,929	0.0590	1.69	11.83	1,493.25	6.68
P-256	G-18-7	G-18-6	1380.29	1377.3	6	202	271	0.0150	0.48	2.99	1,380.30	4.80
P-257	101-1-1B	101-1-1A	1509.41	1507.13	6	203	7,588	0.0110	1.19	2.27	1,509.46	4.93
P-258	44-20-1	44-20	1436.15	1417.91	6	203	791	0.0900	1.28	18.22	1,436.17	5.76
P-259	44-25	44-A-7	1415	1403.5	6	203	3,446	0.0570	1.65	11.51	1,415.04	7.03
P-260	41-3-2	41-3-1	1444.26	1426.88	6	204	291	0.0850	0.87	17.37	1,444.27	4.32
P-261	55-3	55-2	1452.62	1445.49	8	204	10,147	0.0350	1.85	7.13	1,452.68	6.19
P-262	15-3-2	15-3-1	1374.45	1351.58	6	204	2,776	0.1120	1.95	22.88	1,374.48	1.59
P-263	G-28-7-1	G-28-7	1363.85	1356.77	6	209	442	0.0340	0.76	7.06	1,363.86	6.39
P-264	A-11-4	A-11-3	1481.89	1468.71	6	205	3,714	0.0640	1.72	13.17	1,481.93	5.91
P-265	101-7-2	101-7-1	1529.89	1521.3	6	205	2,405	0.0420	1.35	8.60	1,529.92	4.77
P-266	G-18-8	G-18-7	1394.28	1380.29	6	205	130	0.0680	0.62	13.99	1,394.29	3.84
P-267	G-40-5	G-40-4	1427.18	1413.4	6	207	2,848	0.0670	1.62	13.78	1,427.21	5.39
P-268	74-1	74	1509.68	1504.12	6	207	10,568	0.0270	1.80	5.58	1,509.74	4.02
P-269	G-40-6	G-40-5	1443.47	1427.18	6	208	2,848	0.0780	1.73	16.30	1,443.50	6.24
P-270	100-1	100	1504.28	1503.71	8	209	25,160	0.0030	1.00	0.56	1,504.39	4.01

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-271	17-30	17-29	1520.88	1514.34	8	209	13,320	0.0310	1.93	6.54	1,520.94	3.78
P-272	G-2-11	G-2-10	1428.2	1417.63	6	210	1,741	0.0500	1.28	10.57	1,428.22	5.46
P-273	G-2-4	G-2-3	1390.26	1385.89	6	210	3,673	0.0210	1.18	4.37	1,390.30	4.00
P-274	44-25-1	44-25	1433.02	1415	6	211	3,446	0.0850	1.93	18.03	1,433.06	4.76
P-275	G-17-2	G-17-1	1287.56	1286.16	6	211	26,172	0.0070	1.44	1.40	1,287.66	3.44
P-276	G-24-4	G-24-3	1360.16	1354.19	6	213	3,182	0.0280	1.26	5.96	1,360.19	6.34
P-277	G-40-1	G-40	1408.87	1404.1	6	213	3,912	0.0220	1.24	4.75	1,408.91	7.34
P-278	G-14	G-13	1439.73	1438.86	8	213	48,205	0.0040	1.40	0.88	1,439.87	4.86
P-279	65	64	1473.18	1466.87	10	214	110,221	0.0290	3.49	6.31	1,473.36	5.68
P-280	53	52	1418.78	1407.76	10	214	128,726	0.0510	4.45	11.02	1,418.97	3.51
P-281	77-16-7	74-1	1517.82	1509.68	6	214	10,568	0.0380	2.03	8.16	1,517.88	8.12
P-282	68	67	1490.67	1479.92	10	216	110,221	0.0500	4.20	10.82	1,490.85	5.02
P-284	G-6-2	G-6-1	1417.21	1412.03	6	220	485	0.0240	0.68	5.18	1,417.22	4.64
P-285	56-1	57	1434.21	1428.23	6	220	0	0.0270	0.00	5.98	1,434.21	2.90
P-286	17-5	17-4	1328.77	1326.68	10	221	41,240	0.0090	1.75	2.09	1,328.88	4.75
P-287	G-17-3	G-17-2	1294.39	1287.56	6	221	25,948	0.0310	2.45	6.83	1,294.49	3.42
P-288	G-28-11	G-28-10	1369.05	1367.85	6	228	2,444	0.0050	0.65	1.20	1,369.08	6.24
P-289	101-7-1	101-7	1521.3	1519.01	6	222	2,405	0.0100	0.82	2.29	1,521.33	11.29
P-290	70	69	1496.96	1494.79	10	222	110,030	0.0100	2.37	2.19	1,497.14	4.47
P-291	79-1	79	1514.88	1512.92	10	225	66,826	0.0090	1.96	1.97	1,515.02	4.16
P-292	36	35	1368.32	1367.3	10	225	160,571	0.0050	2.01	1.04	1,368.55	8.88
P-293	G-28-10	G-28-9	1367.85	1366.46	6	225	2,703	0.0060	0.70	1.39	1,367.88	7.10
P-294	G-43-1	G-43	1420.76	1419.84	6	233	701	0.0040	0.40	0.90	1,420.78	3.50
P-295	G-28-9	G-28-8	1366.46	1359.33	6	227	2,703	0.0310	1.25	7.14	1,366.49	6.52
P-296	39	38	1375.12	1374.39	10	228	159,784	0.0030	1.77	0.77	1,375.37	7.43
P-297	76-6-4	77-6-3	1526.01	1523.67	6	229	8,443	0.0100	1.19	2.34	1,526.07	5.30
P-298	17-78-1	17-78	1553.38	1534	6	230	1,381	0.0840	1.44	19.28	1,553.40	4.23
P-300	89	87	1538.89	1538.47	10	231	34,297	0.0020	0.93	0.43	1,539.02	6.05
P-301	77-16-7A	77-16-7	1521.96	1517.82	6	231	9,164	0.0180	1.50	4.14	1,522.02	7.39
P-302	90	89	1539.96	1538.89	10	232	33,950	0.0050	1.28	1.04	1,540.07	3.54
P-303	79-3	79-2	1526.39	1516.11	10	233	66,826	0.0440	3.46	10.33	1,526.53	5.36
P-304	G-8	G-7	1420.99	1414.21	8	238	82,341	0.0280	3.26	6.78	1,421.15	7.04
P-305	91	90	1540.45	1539.96	10	234	33,950	0.0020	0.97	0.51	1,540.58	8.02
P-306	17-60-2	17-57	1531.79	1516.45	6	234	1,607	0.0660	1.35	15.34	1,531.81	4.39
P-307	101-3-5	101-3-4	1532.33	1528.27	6	235	782	0.0170	0.68	4.06	1,532.35	3.11
P-308	G-13	G-12	1438.86	1437.53	8	230	48,205	0.0060	1.58	1.30	1,438.99	8.82
P-309	G-28-2	G-28-1	1341.45	1339.82	6	241	4,492	0.0070	0.86	1.63	1,341.49	3.44
P-310	G-40-8	G-40-7	1461.66	1456.5	6	241	2,023	0.0210	1.00	5.16	1,461.69	6.05
P-311	G-26	G-17-7	1328.63	1327.42	6	241	24,789	0.0050	1.28	1.22	1,328.73	9.04
P-312	44-18	44-17	1404.27	1396.44	6	237	2,873	0.0330	1.29	7.84	1,404.30	7.06
P-313	17-60	17-59	1502.08	1494.79	6	237	2,359	0.0310	1.19	7.29	1,502.11	5.21
P-314	A-22	A-21	1502.55	1499.72	8	269	1,610	0.0110	0.71	2.83	1,502.57	6.76
P-315	17-13	17-12	1359.37	1358.24	10	238	39,884	0.0050	1.36	1.14	1,359.48	2.75
P-316	37	36	1373.01	1368.32	10	238	160,398	0.0200	3.38	4.67	1,373.23	7.48
P-317	G-40-9	G-40-8	1465.11	1461.66	6	243	1,795	0.0140	0.83	3.45	1,465.14	6.06
P-318	44-11	44-10	1397.08	1392.86	6	239	1,526	0.0180	0.87	4.22	1,397.10	8.05
P-319	A-26	A-27	1492.19	1478.81	6	240	2,824	0.0560	1.56	13.38	1,492.22	6.51
P-320	53-3	53-2	1465.7	1449.55	6	229	909	0.0710	1.20	16.14	1,465.72	1.98
P-321	G-2-1	G-2	1365.5	1347.4	6	241	4,027	0.0750	1.87	18.11	1,365.54	3.92
P-322	44-A-6	44-A-5	1398.56	1391.02	8	242	12,583	0.0310	1.90	7.52	1,398.62	5.26
P-323	17-4	17-2	1326.68	1320.85	10	242	41,413	0.0240	2.44	5.86	1,326.79	4.82
P-324	G-1-9	G-1-8	1397.91	1390.83	6	242	5,657	0.0290	1.52	7.08	1,397.96	6.03

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-325	G-28-8	G-28-7	1359.33	1356.77	6	243	2,703	0.0110	0.85	2.56	1,359.36	3.90
P-326	92	91	1541.8	1540.45	10	243	33,640	0.0060	1.37	1.32	1,541.90	5.17
P-327	104-2-5-2	104-2-5-1	1558.26	1540.05	6	243	748	0.0750	1.18	18.20	1,558.28	4.62
P-328	17-75-2	17-75-3	1527.48	1526.38	6	228	4,922	0.0050	0.78	1.11	1,527.53	5.13
P-329	G-23-3	G-23-2	1372.05	1366.85	6	247	694	0.0210	0.72	5.20	1,372.07	5.98
P-330	17-53	17-52	1428.34	1426.8	6	246	3,784	0.0060	0.79	1.54	1,428.38	3.31
P-331	G-2-13	G-2-12	1438.09	1436.6	6	255	1,167	0.0060	0.54	1.49	1,438.11	4.94
P-332	G-24-3	G-24-2	1354.19	1352.7	6	248	3,438	0.0060	0.76	1.49	1,354.23	4.88
P-333	G-18-1	G-18	1317.72	1288.06	6	249	1,858	0.1190	1.76	29.63	1,317.75	3.60
P-334	44-23	44-22	1427.94	1426.32	6	256	1,037	0.0060	0.54	1.62	1,427.96	8.97
P-335	15-3-4	15-3-3	1404.3	1398.44	6	251	1,881	0.0230	1.02	5.86	1,404.33	3.29
P-336	93	92	1543.22	1541.8	10	251	33,409	0.0060	1.37	1.42	1,543.32	3.60
P-337	G-35	G-34	1366.62	1352.17	6	253	10,560	0.0570	2.35	14.44	1,366.68	11.26
P-338	A-28	A-27	1485.1	1478.81	6	254	227	0.0250	0.56	6.26	1,485.11	6.50
P-339	104-2-5-3	104-2-5-2	1567.82	1558.26	6	255	448	0.0370	0.78	9.56	1,567.83	3.65
P-340	G-28-6	G-28-5	1345.42	1343.94	6	255	3,303	0.0060	0.74	1.48	1,345.46	5.31
P-341	A-24	A-25	1505.57	1496.89	6	255	1,709	0.0340	1.11	8.68	1,505.59	6.54
P-342	G-4	G-3	1399.12	1397.22	8	257	84,510	0.0070	2.04	1.90	1,399.29	7.83
P-344	A-9	A-10	1496.35	1478.2	6	257	10,407	0.0710	2.48	18.15	1,496.41	4.51
P-345	G-1-11	G-1-10	1401.34	1399.68	6	257	5,136	0.0060	0.87	1.66	1,401.39	3.28
P-346	G-17-6	G-17-5	1321.98	1298.64	6	258	25,491	0.0900	3.57	23.38	1,322.08	3.93
P-347	77-6	77-1	1517.87	1512.14	8	277	14,958	0.0210	1.75	5.73	1,517.94	3.33
P-348	A-25	A-26	1496.89	1492.19	6	260	2,222	0.0180	0.96	4.70	1,496.92	6.44
P-349	G-28-11-2	G-28-11-1	1379.96	1373.47	6	280	688	0.0230	0.74	6.49	1,379.98	5.94
P-350	17-25-2	17-25-1	1491.38	1485.71	6	261	586	0.0220	0.70	5.67	1,491.39	3.73
P-351	G-24-2	G-24-1	1352.7	1351.4	6	266	3,581	0.0050	0.71	1.30	1,352.74	3.37
P-352	A-6-2-1	A-6-2	1510.65	1489.06	6	265	1,175	0.0810	1.36	21.59	1,510.67	4.65
P-353	A-11-1	A-11	1450.08	1448.6	8	297	7,434	0.0050	0.86	1.45	1,450.13	5.34
P-354	G-28-7	G-28-6	1356.77	1345.42	6	267	3,145	0.0430	1.46	11.35	1,356.80	7.58
P-355	44-A-7	44-A-6	1403.33	1398.56	8	276	12,583	0.0170	1.54	4.78	1,403.39	9.45
P-356	A-6-1-1	A-6-1	1494.11	1477.84	8	268	810	0.0610	1.07	16.26	1,494.13	5.13
P-357	G-28-1	G-28	1339.82	1335.05	6	276	4,722	0.0170	1.19	4.72	1,339.86	6.37
P-358	76-6-5	76-6-4	1527.35	1526.01	6	269	7,871	0.0050	0.91	1.34	1,527.41	5.38
P-359	76	75	1510.68	1507.66	10	270	83,697	0.0110	2.29	3.04	1,510.83	5.45
P-360	101-3	101-2	1515.74	1513.23	6	271	6,274	0.0090	1.06	2.51	1,515.79	4.18
P-361	17-25	17-24	1465.48	1449.5	8	271	16,232	0.0590	2.56	15.98	1,465.55	5.16
P-362	87	86	1538.47	1537.81	10	271	34,626	0.0020	1.03	0.64	1,538.60	7.00
P-364	17-42	17-41	1575.53	1574.27	6	273	9,700	0.0050	0.94	1.27	1,575.60	3.96
P-365	A-10-2	A-10-1	1517.01	1493.3	6	273	1,224	0.0870	1.41	23.70	1,517.03	5.58
P-366	17-57	17-60	1516.45	1502.08	6	276	2,180	0.0520	1.39	14.37	1,516.48	5.21
P-367	G-28	G-27	1335.05	1329.75	6	300	23,621	0.0180	1.97	5.30	1,335.14	6.79
P-368	G-24-6	G-24-5	1384.37	1365.23	6	278	3,182	0.0690	1.74	19.15	1,384.40	6.78
P-369	A-11-2	A-11-1	1451.54	1450.08	8	293	6,650	0.0050	0.83	1.46	1,451.59	10.20
P-370	17-59	17-58	1494.79	1484.21	6	280	2,575	0.0380	1.32	10.59	1,494.82	3.64
P-371	17-24	17-23	1449.5	1439.63	8	280	16,490	0.0350	2.15	9.87	1,449.57	3.43
P-372	44-20	44-19	1417.91	1416.31	6	280	2,797	0.0060	0.69	1.60	1,417.95	10.51
P-373	10	9	1317.93	1317.61	15	280	222,203	0.0010	1.30	0.43	1,318.27	4.56
P-375	G-28-5	G-28-4	1343.94	1342.26	6	287	3,946	0.0060	0.78	1.68	1,343.98	7.44
P-376	17-1	16B	1320.23	1319.26	15	283	48,862	0.0030	1.22	0.96	1,320.35	4.83
P-377	G-24-5	G-24-4	1365.23	1360.16	6	283	3,182	0.0180	1.08	5.07	1,365.26	5.75
P-378	44-22	44-21	1426.32	1419.12	6	283	1,648	0.0250	0.99	7.20	1,426.34	6.97
P-379	A-27	G-45-1	1478.81	1444.1	6	283	3,327	0.1230	2.13	34.73	1,478.84	5.38

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-380	104-2-2	104-2-1	1528.85	1528.19	8	284	5,373	0.0020	0.60	0.66	1,528.91	2.45
P-381	G-18-5	G-18-4	1366.41	1362.9	6	284	577	0.0120	0.56	3.51	1,366.42	4.32
P-382	G-2-12	G-2-11	1436.6	1428.2	6	288	1,167	0.0290	0.96	8.40	1,436.62	5.10
P-383	16	15	1319.13	1318.69	12	279	163,335	0.0020	1.36	0.47	1,319.42	6.96
P-384	77-6-3	77-6-2	1523.67	1521.07	6	288	9,449	0.0090	1.18	2.60	1,523.73	6.76
P-385	44-12	44-11	1404.81	1397.08	6	289	984	0.0270	0.85	7.73	1,404.83	7.41
P-386	A-8	A-9	1507.45	1496.35	6	289	10,407	0.0380	2.02	11.12	1,507.51	4.49
P-387	15-8	15-7	1361.3	1359.93	6	290	980	0.0050	0.48	1.35	1,361.32	4.24
P-388	G-18-4	G-18-3	1362.9	1351.91	6	290	969	0.0380	0.98	10.99	1,362.92	3.31
P-389	G-40-9-1	G-40-9	1480.03	1465.11	6	306	805	0.0490	1.02	14.91	1,480.05	5.51
P-390	G-44-1	G-44	1436.33	1430.11	6	297	145	0.0210	0.43	6.18	1,436.34	3.30
P-391	A-6-1-2	A-6-1-1	1516.44	1494.11	8	291	456	0.0770	0.93	22.33	1,516.45	5.38
P-392	G-9	G-8	1426.73	1420.99	8	292	81,741	0.0200	2.86	5.74	1,426.89	3.92
P-393	101-3-4	101-3-3	1528.27	1525.34	6	292	886	0.0100	0.60	2.93	1,528.29	4.85
P-394	104-2-8	104-2-7	1558.3	1548.64	6	292	1,098	0.0330	0.95	9.65	1,558.32	6.43
P-395	G-2-3	G-2-2	1385.89	1376.83	6	295	4,027	0.0310	1.39	9.07	1,385.93	5.25
P-396	104-7	104-6	1540.69	1538.15	8	297	5,686	0.0090	0.95	2.53	1,540.73	9.41
P-397	16B	15A	1319.26	1318.57	15	306	48,862	0.0020	1.05	0.54	1,319.40	6.11
P-398	G-29-2	G-29-1	1369.73	1347.15	6	316	529	0.0710	1.02	22.58	1,369.74	3.99
P-399	A-11-3	A-11-2	1468.71	1451.54	8	297	5,811	0.0580	1.85	17.16	1,468.75	6.01
P-400	G-1-9-1	G-1-9	1417.36	1397.91	6	299	83	0.0650	0.59	19.41	1,417.37	4.92
P-401	55-2	55-1	1445.49	1435.72	8	301	10,536	0.0320	1.82	9.79	1,445.55	6.21
P-402	A-6-2	A-6-1	1489.06	1477.84	8	302	1,558	0.0370	1.08	11.21	1,489.08	6.12
P-404	A-6-2-2	A-6-2-1	1522.95	1510.65	6	304	613	0.0400	0.89	12.29	1,522.96	4.71
P-405	9-8	9-7	1407.15	1404.41	8	305	138,354	0.0090	2.51	2.76	1,407.36	6.85
P-406	A-23	A-22	1510.02	1502.55	8	305	898	0.0240	0.77	7.46	1,510.04	6.97
P-407	17-18-3	17-18-2	1459.65	1449.65	6	305	1,016	0.0330	0.93	10.00	1,459.67	2.59
P-408	79-7	79-6	1532.79	1532.01	10	305	48,531	0.0030	1.16	0.72	1,532.94	10.15
P-409	A-12	A-13	1445.51	1443.9	8	306	20,626	0.0050	1.19	1.61	1,445.60	5.60
P-410	77-28	77-26	1533.8	1533.33	8	323	3,472	0.0010	0.44	0.39	1,533.85	2.98
P-411	G-12-2	G-12-1	1440.34	1438.65	6	313	1,686	0.0050	0.58	1.69	1,440.37	3.83
P-412	G-22-2	G-22-1	1374.27	1352.04	6	311	227	0.0710	0.77	22.22	1,374.28	4.94
P-413	104-2-7	104-2-6	1548.64	1538.53	6	308	1,825	0.0330	1.12	10.11	1,548.67	5.83
P-414	A-17-1	A-17	1490.15	1477.63	6	309	713	0.0410	0.92	12.50	1,490.17	3.78
P-415	G-46	G-45	1446.41	1438.35	6	323	887	0.0250	0.81	8.04	1,446.43	6.59
P-416	G-25	G-26	1335.32	1328.63	6	311	459	0.0220	0.65	6.60	1,335.33	4.07
P-417	79-4	79-3	1530.12	1526.39	10	314	63,242	0.0120	2.15	3.73	1,530.25	9.87
P-418	G-28-12	G-28-11	1382.78	1369.05	6	328	1,545	0.0420	1.18	13.72	1,382.80	5.95
P-419	G-40-10	G-40-9	1478.74	1465.11	6	318	601	0.0430	0.90	13.62	1,478.75	6.09
P-420	17-29	17-28	1514.34	1503.69	8	315	15,059	0.0340	2.06	10.65	1,514.41	3.82
P-421	G-28-7-2	G-28-7-1	1385.99	1363.85	6	347	442	0.0640	0.93	22.14	1,386.00	4.91
P-422	17-60-1	17-57	1527.49	1516.45	6	319	190	0.0350	0.56	11.02	1,527.50	3.86
P-423	G-28-14	G-28-13	1459.7	1414.79	6	332	471	0.1350	1.27	44.90	1,459.71	6.20
P-424	G-40-4-1	G-40-4	1420.89	1413.4	6	331	677	0.0230	0.73	7.47	1,420.91	6.77
P-425	104-2-4	104-2-3	1534.77	1529.48	6	322	3,869	0.0160	1.11	5.29	1,534.81	5.01
P-426	17-79-3	17-79-2	1538.64	1537.71	8	401	69	0.0020	0.15	0.86	1,538.65	3.17
P-427	101-3-3	101-3-2	1525.34	1517.87	6	324	1,233	0.0230	0.88	7.46	1,525.36	5.02
P-428	77-25-1	77-25	1540.14	1533.38	6	325	1,032	0.0210	0.82	6.72	1,540.16	5.36
P-429	55-1	55	1435.72	1425.88	8	326	10,536	0.0300	1.78	9.86	1,435.78	7.55
P-430	G-3	G-2	1397.22	1347.23	8	327	84,900	0.1530	5.91	49.99	1,397.39	3.55
P-431	G-29-1	G-29	1347.15	1337.36	6	340	883	0.0290	0.86	9.73	1,347.17	6.17
P-432	A-20-1	A-20	1505.26	1493.22	6	329	1,582	0.0370	1.11	12.03	1,505.28	3.83

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-433	G-28-13	G-28-12	1414.79	1382.78	6	337	1,013	0.0950	1.38	32.01	1,414.81	5.56
P-434	G-23-1	G-23	1359.36	1347.22	6	353	971	0.0340	0.94	12.12	1,359.38	4.96
P-435	17-35	17-34	1542.04	1539.32	8	331	12,244	0.0080	1.19	2.72	1,542.10	3.77
P-436	A-11	A-12	1448.6	1445.51	8	332	20,626	0.0090	1.45	3.08	1,448.68	13.67
P-437	100	99	1503.71	1503.04	8	332	26,223	0.0020	0.92	0.65	1,503.83	3.52
P-438	G-18-3	G-18-2	1351.91	1333.29	6	332	1,306	0.0560	1.21	18.62	1,351.93	3.66
P-439	G-23-2	G-23-1	1366.85	1359.36	6	337	694	0.0220	0.73	7.49	1,366.87	4.91
P-440	15A	10	1318.57	1317.93	15	321	220,193	0.0020	1.58	0.60	1,318.86	5.32
P-441	G-34-1-2	G-34-1-1	1388.21	1374.26	6	349	300	0.0400	0.71	13.95	1,388.22	3.67
P-442	42	41	1383.22	1382.09	10	337	152,744	0.0030	1.78	1.16	1,383.46	4.54
P-443	G-10	G-9	1434.6	1426.73	8	348	81,248	0.0230	2.99	7.87	1,434.76	6.25
P-444	G-34-1-3	G-34-1-2	1427.8	1388.21	6	352	191	0.1120	0.82	39.59	1,427.81	3.73
P-446	G-22	G-21	1341.79	1320.31	6	342	6,060	0.0630	2.02	21.48	1,341.84	5.80
P-447	G-2-8	G-2-7	1401.66	1399.86	6	344	2,404	0.0050	0.64	1.80	1,401.69	8.21
P-448	G-40-7	G-40-6	1456.5	1443.47	6	350	2,848	0.0370	1.32	13.04	1,456.53	6.00
P-449	15-5	15-4	1354.4	1350.75	8	347	4,163	0.0110	0.93	3.65	1,354.44	5.01
P-450	G-11	G-10	1436.45	1434.6	8	351	69,939	0.0050	1.71	1.85	1,436.61	6.24
P-451	G-2-9	G-2-8	1415.12	1401.66	6	350	2,066	0.0380	1.22	13.45	1,415.15	5.31
P-452	77-31	77-30	1536.23	1534.08	6	351	1,998	0.0060	0.64	2.13	1,536.26	3.52
P-454	A-7	A-6	1500.25	1475.2	8	356	974	0.0700	1.18	25.03	1,500.27	7.58
P-455	G-34-1	G-34	1362.09	1352.17	6	363	1,838	0.0270	1.04	9.88	1,362.12	3.31
P-456	75	74	1507.66	1503.79	10	364	83,697	0.0110	2.25	3.85	1,507.81	7.11
P-457	74	73	1503.79	1500.38	10	370	107,101	0.0090	2.30	3.43	1,503.97	5.84
P-458	A-10	A-11	1478.2	1448.6	8	377	12,252	0.0790	2.60	29.58	1,478.26	4.74
P-459	101-6	101-5	1529.12	1526.23	6	384	1,601	0.0080	0.65	2.89	1,529.15	4.16
P-460	97	96	1497.72	1495.67	10	387	29,634	0.0050	1.29	2.05	1,497.82	7.71
P-461	17-18-1	17-18	1436.42	1388.71	6	419	1,312	0.1140	1.58	47.72	1,436.44	1.84
P-462	41-1-1	41-1	1409.65	1390.55	6	396	542	0.0480	0.91	19.07	1,409.66	3.95
P-463	17-51-8Z	17-51-8A	1576.79	1553.27	6	396	2,348	0.0590	1.49	23.52	1,576.82	4.03
P-464	77-16-10	77-16-9	1537.54	1526.78	6	397	1,008	0.0270	0.86	10.76	1,537.56	4.65
P-465	77-13-1	77-13	1556.36	1550.21	6	398	1,950	0.0150	0.88	6.14	1,556.39	3.33
P-466	66	65	1478.29	1473.18	10	399	110,221	0.0130	2.60	5.14	1,478.47	7.02
P-467	17-76-2	17-76-1	1500.44	1467.89	6	403	945	0.0810	1.28	32.55	1,500.46	4.22
P-469	17-62	17-61	1569.4	1537.1	6	527	1,314	0.0610	1.26	32.30	1,569.42	3.98
P-470	41	39	1382.09	1375.12	10	426	159,144	0.0160	3.16	6.93	1,382.30	5.22
P-471	17-78	17-77	1534	1533.57	8	439	16,832	0.0010	0.62	0.48	1,534.12	4.80
P-474	101-5	101-4	1526.23	1516.73	6	462	2,211	0.0210	1.02	9.50	1,526.26	3.58
P-475	17-74-1	17-74	1555.85	1530.07	6	497	4,922	0.0520	1.78	25.78	1,555.89	4.83
P-477	77-25-2A	77-25-1	1542.78	1540.14	6	581	687	0.0050	0.42	2.64	1,542.80	3.99
P-480	104-3	104-2	1535.99	1527.03	8	745	8,053	0.0120	1.19	8.94	1,536.04	4.58
P-484	A-2	A-1	1467.37	1465.33	8	313	4,276	0.0070	0.79	1.91	1,467.41	11.36
P-485	A-3	A-2	1469.1	1467.37	8	347	4,075	0.0050	0.71	1.73	1,469.14	7.33
P-486	A-4	A-3	1470.61	1469.1	8	301	3,743	0.0050	0.70	1.51	1,470.65	4.21
P-487	A-5	A-4	1470.92	1470.61	8	51	3,743	0.0060	0.74	0.31	1,470.96	7.36
P-488	101-2	101-1-1B	1513.23	1509.41	6	219	6,822	0.0170	1.35	3.82	1,513.28	3.53
P-489	103-1	103	1521.68	1515.38	6	157	594	0.0400	0.88	6.25	1,521.69	4.34
P-490	104-2-1	104-2	1528.19	1527.03	8	363	5,956	0.0030	0.69	1.15	1,528.24	8.10
P-491	104-2	104-1	1527.03	1524.27	8	347	14,199	0.0080	1.23	2.76	1,527.10	5.46
P-492	104-2-6	104-2-5	1538.53	1536.89	6	85	2,223	0.0190	1.00	1.63	1,538.56	6.15
P-493	94	93	1546.22	1543.22	10	150	32,563	0.0200	2.12	2.99	1,546.32	4.50
P-494	98-7	98-6	1544.24	1539.99	6	219	696	0.0190	0.70	4.24	1,544.26	2.34
P-495	98-6	98-4	1539.99	1517.83	6	312	1,402	0.0710	1.35	22.15	1,540.01	3.04

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-496	77-16-2	77-16-1	1535.26	1513.22	6	603	809	0.0370	0.92	22.04	1,535.28	3.38
P-497	48-4	48-3	1451.3	1435.35	6	111	2,257	0.1440	1.97	15.96	1,451.33	4.73
P-498	48-3	48-2	1435.35	1430.34	6	59	2,257	0.0850	1.66	5.01	1,435.38	4.57
P-499	50-5	50-4	1423.92	1423.24	6	77	569	0.0090	0.49	0.68	1,423.94	7.41
P-500	44-A-5	44-A-4	1391.02	1390.2	8	250	15,723	0.0030	0.93	0.82	1,391.11	11.92
P-501	44-A-4	44-A-3	1390.2	1389.45	8	213	15,944	0.0040	0.96	0.74	1,390.28	6.43
P-502	44-A-3	44-A-2	1389.45	1388.92	8	178	17,645	0.0030	0.93	0.54	1,389.54	5.21
P-503	44-A-2	44-A-1	1388.92	1388.4	8	124	17,645	0.0040	1.05	0.52	1,389.01	8.20
P-504	44-A-1	44-A	1388.4	1387.39	8	204	17,935	0.0050	1.12	0.80	1,388.48	6.30
P-505	44-9	44-A-3	1391.49	1389.62	6	189	1,701	0.0100	0.72	1.87	1,391.51	10.10
P-506	44-15	44-9	1404.42	1391.49	6	148	92	0.0870	0.67	12.91	1,404.43	6.32
P-507	44-26	44-25	1415.88	1415	6	79	0	0.0110	0.00	0.84	1,415.88	4.74
P-508	41-3-3	41-3-1	1442.6	1426.88	6	429	693	0.0370	0.88	15.72	1,442.62	3.88
P-509	41-2-1	41-2	1416.4	1409.01	6	173	4,340	0.0430	1.60	7.39	1,416.44	2.51
P-510	41-2	41-1	1409.01	1390.55	6	274	5,200	0.0670	1.98	18.46	1,409.05	3.06
P-511	17-16-2	17-16-1	1368.51	1365.79	6	219	756	0.0120	0.63	2.71	1,368.53	5.96
P-512	17-16-1	17-16	1365.79	1365	6	218	856	0.0040	0.42	0.80	1,365.81	4.06
P-513	17-84	17-40-z	1570.53	1568.19	6	386	1,268	0.0060	0.55	2.30	1,570.55	5.06
P-514	G-12	G-11	1437.53	1436.45	8	230	69,939	0.0050	1.64	1.08	1,437.69	6.19
(E) P-515	G-16	G-15	1442.14	1441.32	8	115	47,788	0.0070	1.70	0.81	1,442.26	4.56
P-516	G-15	G-14	1441.32	1439.73	8	300	48,205	0.0050	1.54	1.58	1,441.45	3.90
P-517	17-76-9	17-76-10	1452.14	1443.36	6	475	25,170	0.0180	2.04	8.80	1,452.24	5.64
P-518	17-76-10	G-16	1443.19	1442.14	8	147	25,170	0.0070	1.41	1.02	1,443.28	3.24
P-519	17-76-8	17-76-9	1460.9	1452.14	6	361	2,396	0.0240	1.11	8.69	1,460.93	6.58
P-520	17-75-5	17-76-9C	1500.24	1465.35	6	243	22,313	0.1440	4.03	34.89	1,500.33	5.12
P-521	17-76-9C	17-76-9A	1465.35	1464.88	6	38	22,504	0.0120	1.71	0.47	1,465.44	4.92
P-522	17-76-9A	17-76-9	1464.88	1452.14	6	384	22,774	0.0330	2.43	12.74	1,464.97	5.61
P-523	17-75-4	17-75-5	1525.1	1500.24	6	194	22,313	0.1280	3.86	24.91	1,525.19	11.31
P-524	17-75-3	17-75-4	1526.38	1525.1	6	94	5,234	0.0140	1.15	1.23	1,526.42	7.21
P-525	17-75	17-75-1	1528.7	1528.26	6	74	4,922	0.0060	0.83	0.44	1,528.75	5.08
P-526	17-75-1	17-75-2	1528.26	1527.48	6	114	4,922	0.0070	0.88	0.78	1,528.30	5.07
P-527	17-33-1	17-33	1537.12	1536.47	6	117	28	0.0060	0.18	0.59	1,537.12	4.24
P-528	17-51-7	17-51-6	1564.5	1529.01	6	361	1,131	0.0980	1.44	35.48	1,564.52	3.18
P-529	17-51-8A	17-51-9a	1553.27	1524.37	6	269	3,151	0.1070	2.00	28.90	1,553.30	2.91
P-530	17-51-9a	17-51-9	1524.37	1522.42	6	28	3,655	0.0700	1.81	1.95	1,524.41	3.86
P-531	17-51-9	17-51-9b	1522.42	1495.57	6	275	3,929	0.0980	2.09	26.85	1,522.46	5.36
P-532	17-51-9b	17-50-5	1495.57	1471.62	6	235	4,338	0.1020	2.18	23.95	1,495.61	4.65
P-533	17-50-5	17-50-4	1471.62	1466.3	6	80	4,564	0.0660	1.90	5.34	1,471.66	3.69
P-534	17-50-6	17-50-4	1476.48	1466.3	6	200	245	0.0510	0.68	10.18	1,476.49	4.95
P-535	17-50-4	17-50-3	1466.13	1435.81	8	190	4,809	0.1600	2.51	30.30	1,466.17	4.52
P-536	17-50-3	17-50-2	1435.81	1417.03	8	279	9,363	0.0670	2.28	18.78	1,435.86	4.97
P-537	17-50-2	17-50	1417.03	1408.91	8	111	9,596	0.0730	2.36	8.11	1,417.08	4.54
P-538	17-51-4	17-51-3	1525.73	1474.47	6	284	2,912	0.1800	2.39	51.26	1,525.76	3.46
P-539	17-51-3	17-51-2	1474.47	1469.24	6	228	3,175	0.0230	1.17	5.23	1,474.50	6.62
P-540	17-51-2	17-51-2Z	1469.24	1454.06	6	182	3,515	0.0830	1.92	15.18	1,469.28	3.76
P-541	17-51-5	17-51-4	1553.84	1525.73	6	147	1,202	0.1910	1.88	28.10	1,553.86	4.51
P-542	17-51-4a	17-51-4	1528.22	1525.73	6	201	1,548	0.0120	0.76	2.48	1,528.24	3.48
P-543	17-51-2Z	17-51-1	1454.06	1437.87	6	90	3,904	0.1800	2.56	16.21	1,454.10	3.54
P-544	17-51-1	17-50-3	1437.7	1435.81	8	40	4,154	0.0470	1.57	1.87	1,437.74	4.19
P-545	17-52	17-51	1426.8	1420.28	6	210	3,784	0.0310	1.37	6.53	1,426.84	4.35
P-546	17-51	17-50	1420.11	1408.91	8	367	3,934	0.0310	1.33	11.17	1,420.14	5.31
P-547	17-50	17-49C	1408.91	1405.05	8	124	13,798	0.0310	1.95	3.86	1,408.98	6.14

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-548	17-49-8	17-49-7	1530.08	1529.37	6	259	664	0.0030	0.35	0.70	1,530.10	3.39
P-556	55-15	55-14	1533.2	1527.01	8	403	2,670	0.0150	0.93	6.19	1,533.23	6.19
P-557	55-14	55-13	1527.01	1517.95	8	302	2,670	0.0300	1.19	9.07	1,527.04	4.15
P-558	55-13	55-12	1517.95	1508.06	8	296	2,670	0.0330	1.20	9.90	1,517.98	4.20
P-559	55-12	55-11	1508.06	1497.14	8	235	2,670	0.0460	1.36	10.93	1,508.09	4.13
P-560	55-11	55-10	1497.14	1488.65	8	273	2,670	0.0310	1.21	8.50	1,497.17	4.04
P-561	55-10	55-9	1488.65	1483.56	8	339	2,670	0.0150	0.92	5.08	1,488.68	5.17
P-562	55-9	55-8	1483.56	1481.08	8	365	4,155	0.0070	0.80	2.48	1,483.60	5.22
P-563	55-8	55-7	1481.08	1467.45	8	240	5,020	0.0570	1.78	13.62	1,481.12	6.96
P-564	55-7	55-6	1467.45	1466.67	8	124	7,586	0.0060	0.93	0.78	1,467.50	4.00
P-565	55-6	55-5	1466.67	1460.56	8	214	7,586	0.0290	1.58	6.11	1,466.72	5.00
P-566	55-5	55-4	1460.56	1456.02	8	225	8,830	0.0200	1.46	4.54	1,460.61	5.06
P-567	55-4	55-3	1456.02	1452.62	8	108	9,236	0.0310	1.74	3.40	1,456.07	5.12
P-568	77-7	77-6-1	1525.86	1518.18	6	125	4,997	0.0610	1.90	7.64	1,525.90	2.99
P-569	77-6-2	77-6-1	1521.07	1518.18	6	293	9,842	0.0100	1.23	2.86	1,521.13	6.08
P-571	104-6	104-4	1538.15	1536.25	8	366	7,043	0.0050	0.86	1.90	1,538.20	9.25
P-572	17-80	17-79	1537.38	1535.2	8	135	1,417	0.0160	0.78	2.12	1,537.40	4.60
P-573	17-81	17-80	1555.24	1537.55	6	335	1,002	0.0530	1.11	17.70	1,555.26	3.14
P-574	17-79-1	17-79	1536.26	1535.2	8	326	12,692	0.0030	0.87	1.05	1,536.34	1.93
P-575	17-79	17-78	1535.2	1534	8	411	14,785	0.0030	0.88	1.17	1,535.29	4.49
P-578	17-79-2	17-79-1	1537.71	1536.26	8	439	12,692	0.0030	0.87	1.45	1,537.79	6.02
P-579	17-49C	17-49-B1	1405.05	1401.08	8	146	13,962	0.0270	1.87	3.99	1,405.12	5.31
P-580	17-49-B1	17-49-b	1401.08	1392.57	8	146	14,076	0.0580	2.44	8.51	1,401.15	4.93
P-581	17-49A	17-49	1387.86	1386.86	8	28	14,330	0.0360	2.07	0.99	1,387.93	3.97
P-582	17-49	17-49-D	1386.86	1379.06	8	175	18,920	0.0450	2.43	7.83	1,386.94	4.37
P-583	17-49-D	17-15	1378.89	1363.77	10	538	19,312	0.0280	2.02	15.09	1,378.96	4.68
P-584	15-7	15-6	1359.93	1359.26	6	263	2,883	0.0030	0.53	0.68	1,359.97	3.31
P-585	15-6	15-5	1359.09	1354.4	8	118	3,378	0.0400	1.38	4.69	1,359.12	4.88
P-586	15-1-1	15-1	1326.23	1321.61	6	238	677	0.0190	0.69	4.62	1,326.25	4.81
P-587	15-1	15	1321.44	1319.02	8	244	7,996	0.0100	1.11	2.42	1,321.49	5.31
P-588	15-3	15-2	1345.02	1332.79	8	176	7,319	0.0690	2.15	12.25	1,345.07	3.13
P-589	15-2	15-1	1332.79	1321.44	8	182	7,319	0.0620	2.07	11.35	1,332.84	2.84
P-591	9	8	1317.36	1316.19	18	324	360,557	0.0040	2.20	1.17	1,317.66	5.10
P-592	7-3	7-2	1341.96	1332.8	6	242	7,793	0.0380	1.83	9.16	1,342.01	5.47
P-593	7-2	7-1	1332.8	1325.26	6	67	8,621	0.1130	2.76	7.57	1,332.86	6.07
P-594	7-1	8	1325.26	1317.19	6	204	8,621	0.0400	1.94	8.09	1,325.32	2.96
P-595	8	7	1316.19	1315.31	18	240	369,178	0.0040	2.23	0.87	1,316.49	4.35
P-596	7	6	1315.31	1314.8	18	165	369,178	0.0030	2.10	0.50	1,315.63	4.32
P-597	6	5	1314.8	1314.58	18	83	369,178	0.0030	1.99	0.24	1,315.13	4.38
P-598	5	4	1314.58	1313.94	18	184	369,178	0.0030	2.19	0.67	1,314.89	4.30
P-599	4	3	1313.94	1313.54	18	63	369,178	0.0060	2.71	0.29	1,314.22	4.34
P-600	3	2	1313.54	1313.42	18	98	369,217	0.0010	1.51	0.21	1,313.93	4.25
P-601	9-11	9-10	1418.76	1412.4	8	318	137,522	0.0200	3.34	6.36	1,418.97	4.47
P-602	G-17-5	G-17-4	1298.64	1296.1	6	202	25,491	0.0130	1.79	2.54	1,298.74	3.32
P-603	17-70	17-69	1522.29	1508.5	8	821	565	0.0170	0.60	13.78	1,522.30	2.60
P-604	17-69	17-68	1508.5	1483.61	6	171	2,087	0.1460	1.95	24.90	1,508.53	5.02
P-605	17-68	17-67-2	1483.61	1436.74	6	386	2,087	0.1210	1.81	46.88	1,483.64	3.85
P-606	17-67-2	17-67-1	1436.74	1397.56	6	387	2,087	0.1010	1.77	39.19	1,436.77	2.65
P-607	17-67-1	17-67	1397.56	1355.43	6	390	2,087	0.1080	1.73	42.14	1,397.59	2.55
P-608	17-67	17-66-1	1355.43	1351.61	6	262	2,087	0.0150	0.88	3.82	1,355.46	3.31
P-609	17-66-1	17-66	1351.61	1349.84	6	265	2,087	0.0070	0.67	1.77	1,351.64	3.49
P-610	17-66	17-65Z	1349.84	1345.95	6	247	2,423	0.0160	0.95	3.89	1,349.87	3.38

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-611	17-65Z	17-64	1345.78	1335.35	8	87	6,873	0.1200	2.53	10.43	1,345.83	3.13
P-612	17-64	17-64-1	1335.35	1329.99	8	78	6,938	0.0690	2.12	5.36	1,335.40	4.13
P-613	17-64-1	17-63	1329.99	1322.45	8	117	7,047	0.0640	2.07	7.56	1,330.04	3.31
P-615	17-65-2	17-65	1350.56	1348.03	8	252	4,450	0.0100	0.94	2.53	1,350.60	3.65
P-616	17-65	17-65Z	1348.03	1345.78	8	47	4,450	0.0480	1.61	2.24	1,348.07	4.48
P-617	17-65-8	17-65-7	1396.68	1389.54	8	354	3,286	0.0200	1.09	7.14	1,396.71	3.92
P-618	17-65-7	17-65-6	1389.54	1383.03	8	105	3,414	0.0620	1.61	6.52	1,389.57	3.48
P-619	17-65-6	17-65-5	1383.03	1377.49	8	66	3,414	0.0840	1.81	5.54	1,383.06	4.12
P-620	17-65-5	17-65-4	1377.49	1375.45	8	83	3,623	0.0250	1.20	2.04	1,377.52	3.78
P-621	17-65-4	17-65-3	1375.45	1355.38	8	199	3,733	0.1010	1.99	20.07	1,375.48	3.12
P-622	17-65-10	17-65-9-1	1490.06	1466.1	6	158	1,424	0.1520	1.80	23.96	1,490.08	3.08
P-623	17-65-9-1	17-65-9	1466.1	1434.93	6	173	1,685	0.1800	2.00	31.16	1,466.12	3.75
P-624	17-65-9	17-65-8	1434.93	1396.85	6	242	2,948	0.1570	2.27	38.10	1,434.96	3.84
P-625	17-65-12	17-65-11	1531.69	1517.17	6	285	720	0.0510	1.01	14.52	1,531.71	4.25
P-626	17-65-11	17-65-10	1517.17	1490.06	6	348	1,076	0.0780	1.31	27.11	1,517.19	3.33
P-627	17-65-9-3	17-65-9-Z	1481.04	1469.75	6	189	136	0.0600	0.59	11.29	1,481.05	11.69
P-628	17-65-9-Z	17-65-9-1	1469.75	1466.1	6	133	136	0.0270	0.47	3.63	1,469.76	4.63
P-629	77-29	77-28	1533.84	1533.8	8	93	3,352	0.0000	0.29	0.06	1,533.91	2.57
P-630	77-24-4	77-24-1	1547.02	1537	6	579	6,884	0.0170	1.35	10.02	1,547.07	1.87
P-631	77-24	77-23	1533.24	1533.07	10	69	12,662	0.0020	0.77	0.19	1,533.32	7.41
P-632	85	79-8	1537.69	1532.84	10	79	34,626	0.0610	3.20	4.74	1,537.79	3.70
P-633	G-17	PS2	1285.46	1284.55	6	101	35,836	0.0090	1.76	0.92	1,285.58	4.20
P-634	G-22-1	G-22	1352.04	1341.79	6	306	544	0.0330	0.80	10.22	1,352.05	4.85
P-635	G-24-7	G-24-6	1392.48	1384.37	6	119	1,270	0.0680	1.30	8.10	1,392.50	4.49
P-636	G-24-7-1	G-24-7	1408.56	1392.48	6	107	295	0.1500	1.07	16.07	1,408.57	4.36
P-637	G-34-4	G-34-3	1419.28	1380.24	6	323	515	0.1210	1.24	39.04	1,419.29	3.56
P-638	G-34-3	G-34-2	1380.24	1365.43	6	284	612	0.0520	0.98	14.81	1,380.25	4.05
P-639	G-34-2	G-34-1	1365.43	1362.09	6	344	1,001	0.0100	0.61	3.33	1,365.45	4.61
P-640	G-34-1-1	G-34-1	1374.26	1362.09	6	136	561	0.0890	1.13	12.16	1,374.27	6.87
P-641	G-36-1	G-36	1412.74	1377.91	6	315	481	0.1110	1.18	34.78	1,412.75	7.79
P-642	G-40-3	G-40-2	1410.17	1409.79	6	34	3,525	0.0110	0.94	0.38	1,410.21	6.48
P-645	G-4-1	G-4	1414.5	1399.29	6	269	866	0.0570	1.10	15.22	1,414.52	6.34
P-646	G-1	G-1-A	1344.77	1344.31	8	45	100,154	0.0100	2.39	0.48	1,344.95	5.37
P-647	G-45	G-44	1438.35	1430.11	6	163	4,550	0.0510	1.72	8.24	1,438.39	9.64
P-648	G-44	G-43	1430.11	1419.84	6	319	4,956	0.0320	1.51	10.27	1,430.15	6.89
P-649	A-1	PS3	1465.33	1465.3	8	32	4,616	0.0010	0.41	0.00	1,465.50	8.83
P-650	A-16	PS3	1465.35	1465.3	8	33	5,258	0.0020	0.51	0.00	1,465.50	10.84
P-651	A-15	A-11	1476.91	1448.6	6	286	940	0.0990	1.38	28.25	1,476.93	7.31
P-652	17-74	17-75	1530.07	1528.7	6	174	4,922	0.0080	0.93	1.37	1,530.11	5.03
P-654	G-47	G-46	1450.08	1446.41	6	338	704	0.0110	0.58	3.67	1,450.10	6.48
P-655	G-1-A	PS1	1344.31	1343.91	8	40	100,154	0.0100	2.38	0.42	1,344.49	5.84
P-656	G-2	G-1	1347.23	1344.77	8	137	88,927	0.0180	2.83	2.45	1,347.40	10.40
P-657	G-1-8	G-1-7	1390.83	1384.35	6	159	5,775	0.0410	1.71	6.48	1,390.88	3.95
P-658	G-1-7	G-1-6	1384.35	1378.01	6	137	6,999	0.0460	1.90	6.36	1,384.40	4.85
P-659	G-1-6	G-1-5	1378.01	1372.87	6	157	6,999	0.0330	1.68	5.13	1,378.06	3.34
P-660	G-1-5	G-1-4	1372.87	1372.17	6	124	6,999	0.0060	0.92	0.71	1,372.93	5.34
P-661	G-1-4	G-1-3	1372.17	1369.49	6	133	6,999	0.0200	1.44	2.69	1,372.22	4.52
P-662	G-1-3	G-1-2	1369.49	1365.8	6	251	6,999	0.0150	1.28	3.68	1,369.54	3.90
P-663	G-1-2	G-1-1	1365.8	1360.48	6	349	10,787	0.0150	1.48	5.32	1,365.86	5.47
P-664	G-1-1	G-1	1360.48	1344.94	6	347	11,150	0.0450	2.18	15.56	1,360.54	3.95
P-665	G-1-13	G-1-12	1405.67	1404.4	6	237	941	0.0050	0.49	1.27	1,405.69	5.18
P-666	G-1-12	G-1-11	1404.4	1401.34	6	349	1,201	0.0090	0.63	3.04	1,404.42	7.28

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-667	G-2-7	G-2-6	1399.86	1397.95	6	146	3,180	0.0130	0.96	1.91	1,399.89	9.33
(E) P-668	96	(E) PS4	1495.67	1493.73	10	388	29,634	0.0050	1.26	1.95	1,495.77	7.10
P-669	20	19	1342.67	1324.62	10	91	163,335	0.1980	7.65	18.17	1,342.89	4.18
P-670	19	17	1324.62	1320.18	10	358	163,335	0.0120	2.89	4.48	1,324.84	2.88
P-671	17	16	1320.01	1319.13	12	264	163,335	0.0030	1.78	0.83	1,320.25	5.56
P-672	17-46	17-45	1581.69	1579.45	6	116	2,428	0.0190	1.02	2.24	1,581.72	2.73
P-673	17-43	17-44	1580.33	1576.44	6	221	1,009	0.0180	0.75	3.87	1,580.35	5.48
P-674	17-19	17-18	1413.49	1388.55	8	327	17,392	0.0760	2.86	24.97	1,413.56	3.68
P-675	17-18	17-17	1388.38	1381.52	10	353	19,219	0.0190	1.79	6.86	1,388.45	3.21
P-676	17-17	17-16	1381.52	1364.66	10	357	19,446	0.0470	2.43	16.86	1,381.59	3.06
P-677	104-3-1	79-8	1542.67	1533.17	6	486	454	0.0200	0.63	9.50	1,542.68	3.30
P-678	17-58	17-56	1484.21	1462.42	6	199	2,575	0.1090	1.89	21.80	1,484.24	3.63
P-679	17-49-3B	17-49-3A	1465.88	1459.49	6	91	391	0.0700	0.94	6.39	1,465.89	3.25
P-680	17-76-6	17-76-3	1477.71	1471.59	6	197	476	0.0310	0.76	6.12	1,477.72	4.49
P-681	17-49-3A	17-49-3	1459.49	1441.63	6	67	391	0.2670	1.42	17.86	1,459.50	1.53
P-682	103	101	1515.38	1505.12	8	367	15,285	0.0280	1.94	10.23	1,515.45	3.83
P-683	2	Outfall	1313.42	1312.51	18	254	369,217	0.0040	2.21	0.94	1,313.73	5.33
P-684	A-2-4	A-2-3	1484.52	1471.26	6	130	0	0.1020	0.00	13.26	1,484.52	3.29
P-685	A-2-3	A-2-2	1471.26	1460.34	6	488	0	0.0220	0.00	10.90	1,471.26	10.24
P-686	A-2-2	A-2-1	1460.34	1446.93	6	374	1,512	0.0360	1.09	13.41	1,460.36	13.91
P-687	41-6	41-5	1427.67	1425.18	6	174	1,037	0.0140	0.71	2.48	1,427.69	2.96
P-688	17-49-b	17-49A	1392.57	1387.86	8	173	14,105	0.0270	1.87	4.73	1,392.64	7.51
P-689	A-21	A-20	1499.72	1493.22	8	183	2,037	0.0360	1.15	6.49	1,499.75	7.45
P-690	71	70	1498.33	1496.96	10	183	107,891	0.0070	2.14	1.37	1,498.51	5.62
P-691	101-1-1A	101-1-1	1507.13	1506.09	6	183	8,054	0.0060	0.96	1.04	1,507.19	4.68
P-692	79-5	79-4	1532	1530.12	10	183	48,531	0.0100	1.89	1.86	1,532.12	9.48
P-693	61	60	1455.26	1436.37	10	185	112,976	0.1020	5.43	18.98	1,455.44	5.92
P-694	G-7	G-6	1414.21	1410.05	8	186	82,681	0.0220	2.99	4.16	1,414.37	4.69
P-695	64	63	1466.87	1465.33	10	188	111,150	0.0080	2.23	1.54	1,467.05	9.02
P-696	17-49-1	17-49	1420.94	1387.03	6	188	4,487	0.1800	2.65	33.93	1,420.98	2.87
P-697	41-5	41-4	1425.18	1424.41	6	151	1,256	0.0050	0.53	0.77	1,425.21	3.42
P-702	9-2	9-1	1324.54	1318.56	8	331	138,354	0.0180	3.22	6.03	1,324.75	4.66
P-703	21	20	1343.67	1342.67	10	128	163,335	0.0080	2.45	1.01	1,343.89	2.68
P-704	G-24-6-4	G-24-6-3	1408.37	1403.76	6	112	485	0.0410	0.83	4.61	1,408.38	6.01
P-705	A-24-1	A-24	1531.5	1505.57	6	280	972	0.0930	1.36	25.92	1,531.52	6.72
P-706	44	43	1387.27	1387.14	10	109	151,890	0.0010	1.22	0.24	1,387.59	7.43
P-707	43	42	1387.14	1383.22	10	196	152,198	0.0200	3.36	3.89	1,387.35	10.90
P-708	17-32	17-31	1534.84	1522.3	8	171	12,641	0.0730	2.57	12.54	1,534.90	3.19
P-709	17-31	17-30	1522.3	1520.88	8	170	13,147	0.0080	1.22	1.42	1,522.36	4.64
P-718	9-10	T-1	1412.4	1409.55	8	71	138,354	0.0400	4.28	2.93	1,412.61	4.32
P-719	T-1	9-9	1409.55	1407.59	8	119	138,354	0.0160	3.12	2.01	1,409.76	6.24
P-720	9-7	T-2	1404.41	1403.05	8	169	138,354	0.0080	2.42	1.37	1,404.62	8.10
P-721	T-2	9-6	1403.05	1386.64	8	103	138,354	0.1590	6.92	16.53	1,403.26	8.74
P-722	9-6	T-3	1386.64	1371.56	8	150	138,354	0.1010	5.91	15.19	1,386.85	4.88
P-723	T-3	9-5	1371.56	1360.29	8	135	138,354	0.0830	5.54	11.37	1,371.77	4.98
P-724	9-5	T-4	1360.29	1345.87	8	225	138,354	0.0640	5.05	14.51	1,360.50	4.21
P-725	T-4	9-4	1345.87	1344.34	8	103	138,354	0.0150	3.01	1.57	1,346.08	7.39
P-726	9-4	T-5	1344.34	1336.35	8	182	138,354	0.0440	4.42	8.07	1,344.55	3.43
P-727	T-5	9-3	1336.35	1333.7	8	96	138,354	0.0280	3.75	2.72	1,336.56	4.00
P-728	9-3	T-6	1333.7	1328.82	8	185	138,354	0.0260	3.69	4.94	1,333.91	3.86
P-729	T-6	9-2	1328.82	1324.54	8	82	138,354	0.0520	4.69	4.37	1,329.03	3.37
P-730	9-1	T-7	1318.56	1297.46	8	307	138,354	0.0690	5.17	0.92	1,318.77	6.37

TABLE T-1
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-731	T-7	9	1297.46	1317.46	8	146	138,354	-0.1370	0.61	0.18	1,317.86	5.68
P-805	17-74-1Z	17-74-1-A	1564.56	1563.79	6	134	4,121	0.0060	0.79	0.77	1,564.60	4.61
P-806	17-44	17-74-1Z	1576.44	1564.56	6	197	3,689	0.0600	1.71	11.87	1,576.48	5.64
P-807	G-1-7-1	G-1-7	1396.85	1384.35	6	125	1,224	0.1000	1.48	12.47	1,396.87	6.24
P-808	G-1-7-2	G-1-7-1	1399.66	1396.85	6	49	953	0.0580	1.13	2.81	1,399.68	4.76
P-809	G-1-7-2-1	G-1-7-2	1402.48	1399.66	6	66	272	0.0430	0.72	2.81	1,402.49	4.71
P-810	G-1-7-3	G-1-7-2	1402.52	1399.66	6	136	588	0.0210	0.69	2.86	1,402.53	5.55
P-811	G-1-7-3-1	G-1-7-3	1404.25	1402.52	6	42	139	0.0410	0.54	1.72	1,404.26	4.13
P-812	G-1-7-4	G-1-7-3	1408.25	1402.52	6	140	251	0.0410	0.70	5.73	1,408.26	5.14
P-814	G-5-1	G-5	1402.85	1399.81	6	132	157	0.0230	0.45	2.88	1,402.86	4.23

[a] "T-" prefix indicates a point of change in slope and not an actual manhole

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-1	101A	101	1505.24	1505.12	8	26	99,323	0.0050	1.80	0.03	1,505.45	3.97
P-2	44-B	44-A	1387.45	1387.39	10	38	918,892	0.0020	2.61	0.16	1,389.12	3.75
P-3	A-13	G-16	1443.9	1442.14	8	29	161,022	0.0610	5.17	1.65	1,444.13	2.95
P-4	24	23	1346.94	1346.68	10	38	1,219,483	0.0070	3.77	0.26	1,347.66	4.58
P-5	15	15A	1318.69	1318.57	12	43	1,283,808	0.0030	2.71	0.11	1,319.62	3.35
P-6	17-16-3	17-16-2	1368.85	1368.51	6	30	3,347	0.0110	0.93	0.33	1,368.88	4.74
P-7	45	44-B	1387.69	1387.45	10	37	918,892	0.0060	2.61	0.16	1,389.28	3.17
P-9	77-30	77-29	1534.08	1534.01	6	48	25,634	0.0010	0.84	0.12	1,534.23	1.74
P-10	17-76-7	17-76-8	1461.39	1460.9	6	28	2,460	0.0180	0.99	0.43	1,461.42	6.55
P-12	G-20	G-19	1314.01	1308.47	6	35	44,965	0.1580	5.16	5.54	1,314.14	4.33
P-13	77-23	79-8	1533.07	1532.84	10	33	99,155	0.0070	2.04	0.00	1,533.43	8.44
P-14	50-2-2	50-2-1	1406.81	1406.54	6	39	655	0.0070	0.48	0.27	1,406.83	6.20
P-15	G-24-6-3	G-24-6-2	1403.76	1398.52	6	39	3,922	0.1340	2.29	5.23	1,403.80	6.58
P-16	78	77	1511.85	1510.94	10	47	479,937	0.0190	4.61	0.74	1,512.23	4.92
P-17	77-3	77-2	1512.39	1512.24	6	39	0	0.0040	0.00	0.05	1,512.39	3.70
P-18	9-9	9-8	1407.59	1407.15	8	39	1,156,840	0.0110	5.13	0.86	1,411.60	0.00
P-19	56	55	1426.09	1425.71	10	41	766,170	0.0090	3.98	0.35	1,426.58	3.17
P-20	99	98	1503.04	1502.99	8	42	216,935	0.0010	1.33	0.17	1,503.43	4.75
P-21	17-51-8	17-51-8Z	1577.47	1576.79	6	42	4,902	0.0160	1.18	0.64	1,577.51	3.27
P-22	77-6-1	77-6	1518.18	1518.04	6	35	115,769	0.0040	1.81	0.18	1,518.43	3.90
P-23	79-6	79-5	1532.01	1532	10	47	398,483	0.0000	1.13	0.20	1,532.55	10.36
P-24	101-3-6	101-3-5	1534.39	1532.33	6	50	4,655	0.0410	1.61	2.07	1,534.43	4.28
P-25	17-34	17-33	1539.32	1536.47	8	53	58,770	0.0540	3.68	2.85	1,539.46	3.53
P-26	77-25	77-24	1533.38	1533.24	6	53	45,101	0.0030	1.21	0.08	1,533.55	6.75
P-27	62	61	1463.25	1455.26	10	55	761,618	0.1450	10.82	7.99	1,463.73	3.22
P-28	G-24-6-2	G-24-6-1	1398.52	1391.5	6	57	7,329	0.1230	2.72	7.01	1,398.57	6.83
P-29	G-18	G-17	1288.06	1285.46	6	60	59,790	0.0430	3.56	2.38	1,288.21	4.33
P-30	104-2-5-1	104-2-5	1540.05	1536.89	6	60	8,772	0.0530	2.13	3.12	1,540.11	6.16
P-31	30	29	1351.21	1350.68	10	61	1,206,522	0.0090	4.24	0.52	1,351.84	3.28
P-32	101-7-4	101-7-3	1523.88	1523.27	6	62	0	0.0100	0.00	0.61	1,523.88	6.48
P-33	104-4	104-3	1536.25	1535.99	8	62	52,061	0.0040	1.45	0.27	1,536.39	3.94
P-34	23	22	1346.68	1346.31	10	55	1,219,483	0.0070	3.73	0.47	1,347.40	4.28
P-35	17-40-z	17-40	1568.19	1564.77	6	64	47,634	0.0530	3.58	3.42	1,568.32	5.68
P-36	17-36	17-35	1543.1	1542.04	8	65	58,770	0.0160	2.42	1.09	1,543.24	5.08
P-37	G-2-5	G-2-4	1393.97	1390.26	6	65	40,003	0.0570	3.46	3.71	1,394.09	4.06
P-38	44-A	44	1387.39	1387.27	10	66	1,132,864	0.0020	3.21	0.42	1,388.96	1.10
P-39	G-2-6	G-2-5	1397.95	1393.97	6	66	38,375	0.0600	3.49	3.98	1,398.07	4.08
P-40	50-4	50-3	1423.24	1422.55	6	67	4,220	0.0100	0.98	0.68	1,423.28	6.14
P-41	G-28-4	G-28-3	1342.26	1341.76	6	67	29,671	0.0070	1.55	0.48	1,342.36	3.38
P-42	G-28-3	G-28-2	1341.76	1341.45	6	69	30,665	0.0040	1.31	0.32	1,341.88	3.46
P-43	G-36-3	G-36-2	1422.62	1420.99	6	67	1,296	0.0240	0.91	1.63	1,422.64	6.33
P-44	50-2-1	50-2	1406.54	1405.53	6	67	987	0.0150	0.71	0.98	1,406.56	5.06
P-45	17-76-5	17-76-8	1465.66	1460.9	6	70	14,858	0.0680	2.75	4.75	1,465.73	4.14
P-47	G-17-1	G-17	1286.16	1285.46	6	71	241,330	0.0100	3.04	0.64	1,286.47	3.25
P-48	15-4	15-3	1350.75	1345.02	8	71	37,895	0.0810	3.71	5.70	1,350.86	4.00
P-49	G-33	G-32	1344.42	1340.22	6	72	137,699	0.0580	5.02	4.30	1,344.65	2.47
P-50	17-47	17-46	1586.77	1581.69	6	73	2,948	0.0700	1.66	5.03	1,586.80	2.02
P-51	G-5	G-4	1399.81	1399.12	8	77	625,830	0.0090	3.68	0.65	1,400.28	7.23
P-52	34	33	1366.27	1361.51	10	77	1,201,772	0.0620	9.03	5.04	1,366.88	5.05
P-53	101-1	101A	1505.3	1505.24	6	79	98,017	0.0010	0.90	0.19	1,505.64	4.58
P-54	G-40-2	G-40-1	1409.79	1408.87	6	60	26,839	0.0150	1.95	0.92	1,409.89	6.48
P-55	G-36-2	G-36-1	1420.99	1412.74	6	80	1,296	0.1030	1.52	8.24	1,421.01	3.61

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-56	17-10	17-9	1353.39	1352.79	10	80	284,019	0.0080	2.83	0.59	1,353.68	4.70
P-57	A-19	A-18	1481.39	1478.56	8	82	30,487	0.0350	2.58	2.83	1,481.49	6.55
P-58	76-6-6	76-6-5	1527.97	1527.35	6	84	62,835	0.0070	1.92	0.60	1,528.12	5.57
P-59	17-63	17-2	1322.45	1321.01	8	85	65,623	0.0170	2.53	1.47	1,322.60	4.61
P-60	17-9	17-8	1352.79	1352.36	10	85	284,019	0.0050	2.45	0.44	1,353.09	4.54
P-61	A-18	A-17	1478.56	1477.63	8	86	32,282	0.0110	1.75	0.92	1,478.66	6.84
P-62	17-76-3	17-76-5	1471.59	1465.66	6	86	4,284	0.0690	1.86	5.90	1,471.63	3.47
P-63	G-21	G-20	1320.31	1314.01	6	87	44,965	0.0720	3.90	6.36	1,320.44	4.72
P-64	77-2	77-1	1512.24	1512.14	8	87	0	0.0010	0.00	0.00	1,512.34	3.65
P-65	98-5	98-4	1517.93	1517.83	6	120	4,261	0.0010	0.40	0.08	1,518.00	2.69
P-66	G-36	G-35	1377.91	1366.62	6	90	74,056	0.1250	5.50	11.29	1,378.08	7.20
P-67	77	76	1510.94	1510.68	10	84	604,035	0.0030	2.46	0.38	1,511.49	3.91
P-68	G-40-4	G-40-3	1413.4	1410.17	6	90	25,026	0.0360	2.57	3.26	1,413.50	5.50
P-69	79-2	79-1	1516.11	1514.88	10	91	469,538	0.0140	4.02	1.30	1,516.49	5.92
P-70	24-1	24	1373.28	1348.94	6	91	5,346	0.2670	3.21	24.36	1,373.32	5.73
P-72	50	49	1403.68	1403.03	10	92	894,975	0.0070	3.71	0.49	1,404.22	3.36
P-73	79	78	1512.92	1511.85	10	92	469,538	0.0120	3.81	1.07	1,513.30	4.47
P-74	79-8	79-7	1532.84	1532.79	10	108	388,830	0.0000	1.10	0.19	1,533.43	9.34
P-75	77-26	77-25	1533.33	1533.38	8	108	31,829	0.0000	0.14	0.04	1,533.59	7.06
P-76	101-1-1	101-1	1506.09	1505.3	6	95	86,162	0.0080	2.19	0.64	1,506.27	4.55
P-77	25	24-A	1348.66	1347.87	10	97	1,213,311	0.0080	4.13	0.71	1,349.31	4.25
P-78	G-1-15	G-1-14	1408.54	1406.71	6	97	2,736	0.0190	1.05	1.82	1,408.57	6.78
P-79	26	25	1349.4	1348.66	10	98	1,209,581	0.0080	3.98	0.76	1,350.07	3.33
P-80	44-10	44-9	1392.86	1391.49	6	82	11,424	0.0170	1.55	1.37	1,392.92	7.18
P-81	67	66	1479.92	1478.29	10	99	742,450	0.0160	4.90	1.74	1,480.40	4.55
P-82	101-4	101-3	1516.73	1515.74	6	99	31,129	0.0100	1.75	0.95	1,516.84	5.44
P-83	77-13-Z	77-13	1556.93	1550.21	6	99	18,016	0.0680	2.92	6.69	1,557.01	4.63
P-84	41-5-1	41-5	1442.65	1425.18	6	100	1,304	0.1750	1.85	17.42	1,442.67	4.01
P-85	104-2-8-1	104-2-8	1559.5	1558.3	6	100	6,974	0.0120	1.18	1.19	1,559.55	4.52
P-86	44-19	44-18	1416.31	1404.27	6	100	19,855	0.1200	3.66	12.04	1,416.40	5.04
P-87	G-6-1	G-6	1412.03	1410.22	6	101	4,522	0.0180	1.19	1.55	1,412.07	4.58
P-88	G-39	G-38	1400.42	1397.89	6	103	67,943	0.0250	3.02	2.57	1,400.58	3.43
P-89	17-23	17-22-1	1439.63	1435.8	8	104	98,650	0.0370	3.76	3.83	1,439.81	3.30
P-90	98-3	98-2	1517.16	1516.59	6	106	17,293	0.0050	1.18	0.56	1,517.25	5.34
P-91	104-1	104	1524.27	1520.73	8	106	104,022	0.0330	3.68	3.60	1,524.45	4.63
P-92	G-32	G-31	1340.22	1339.06	6	106	137,699	0.0110	2.75	1.15	1,340.45	6.11
P-93	60	59	1436.37	1431.02	10	107	765,051	0.0500	7.40	5.35	1,436.86	5.61
P-94	17-21	17-20	1420.87	1417.9	8	108	101,808	0.0270	3.43	2.97	1,421.05	3.06
P-95	17-74-1-A	17-74-1	1563.79	1555.85	6	108	31,952	0.0740	3.56	7.93	1,563.90	2.45
P-96	17-61	17-60-2	1537.1	1531.79	6	108	12,852	0.0490	2.35	5.31	1,537.17	3.21
P-97	17-37	17-36	1544.61	1543.1	8	109	52,632	0.0140	2.21	1.50	1,544.74	7.00
P-98	104-2-5	104-2-4	1536.89	1534.77	6	110	24,915	0.0190	2.06	2.12	1,536.99	7.61
P-99	63	62	1465.33	1463.25	10	110	761,618	0.0190	5.19	2.20	1,465.81	4.60
P-100	G-29	G-28	1337.36	1335.05	6	114	145,672	0.0200	3.50	2.26	1,337.60	7.71
P-101	17-16	17-15	1364.66	1363.77	10	111	128,525	0.0080	2.31	0.80	1,364.85	7.48
P-102	24-2	24-1	1374.17	1373.28	6	111	4,864	0.0080	0.93	0.89	1,374.21	3.64
P-103	G-2-10	G-2-9	1417.63	1415.12	6	112	27,419	0.0220	2.24	2.51	1,417.73	5.30
P-104	53-5	53-4	1470.18	1465.7	6	112	2,749	0.0400	1.37	4.47	1,470.21	3.76
P-105	48	47	1402.6	1398.09	10	113	912,429	0.0400	7.15	4.51	1,403.13	3.22
P-107	86	85	1537.81	1537.69	10	98	283,362	0.0010	1.45	0.26	1,538.24	3.70
P-108	48-2	48-1	1430.34	1428.17	6	114	16,253	0.0190	1.81	2.17	1,430.42	3.98
P-109	24-3	24-2	1379.45	1374.17	6	117	4,864	0.0450	1.69	5.28	1,379.49	4.11

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-110	17-6	17-5	1332.05	1328.77	10	116	287,982	0.0280	4.56	3.28	1,332.34	3.63
P-111	104	103	1520.73	1515.38	8	116	104,022	0.0460	4.13	5.34	1,520.91	3.52
P-112	49	48	1403.03	1402.6	10	116	894,975	0.0040	2.78	0.60	1,403.73	3.23
P-113	44-17	44-A-5	1396.44	1391.19	6	117	20,393	0.0450	2.61	5.20	1,396.53	13.14
P-114	17-11	17-10	1357.32	1353.39	10	118	284,019	0.0330	4.82	4.03	1,357.61	5.72
P-115	44-13	44-12	1409.88	1404.81	6	118	3,035	0.0430	1.41	5.05	1,409.91	7.32
P-116	17-26	17-25	1474.28	1465.48	8	119	85,409	0.0740	4.60	8.79	1,474.45	4.67
P-117	77-24-1	77-24	1537	1533.57	6	119	53,355	0.0290	2.97	3.47	1,537.14	4.87
P-118	G-45-1	G-45	1444.1	1438.35	6	119	23,619	0.0480	2.80	5.73	1,444.19	5.26
P-119	44-25-2	44-25-1	1447.58	1433.02	6	120	20,502	0.1210	3.70	14.60	1,447.67	4.43
P-121	17-41	17-40-z	1574.27	1568.19	6	122	36,559	0.0500	3.21	6.06	1,574.39	6.81
P-122	17-2	17-1	1320.68	1320.48	12	125	360,437	0.0020	1.70	0.32	1,321.11	1.14
P-123	17-33	17-32	1536.47	1534.84	8	126	59,135	0.0130	2.23	1.62	1,536.61	6.28
P-124	77-16-9	77-16-8A	1526.78	1518.32	6	127	14,909	0.0670	2.73	8.11	1,526.85	3.14
P-125	72	71	1499.29	1498.33	10	127	702,373	0.0080	3.61	0.96	1,499.75	7.61
P-126	38	37	1374.39	1373.01	10	128	1,194,306	0.0110	4.65	1.38	1,375.00	6.99
P-127	G-24-8	G-24-7	1403.69	1392.48	6	128	6,915	0.0880	2.37	11.20	1,403.74	6.24
P-128	17-7	17-6	1342.54	1332.05	10	129	286,265	0.0810	6.62	10.49	1,342.83	2.64
P-129	42-2-2	41-2-1	1416.96	1416.4	6	129	9,004	0.0040	0.90	0.52	1,417.03	4.21
P-130	G-17-7	G-17-6	1327.42	1321.98	6	130	212,082	0.0420	5.05	5.44	1,327.71	11.45
P-131	G-37	G-36	1381.19	1377.91	6	131	67,943	0.0250	3.04	3.27	1,381.35	3.21
P-132	101-6-1	101-6	1546.66	1529.12	6	131	12,206	0.1340	3.25	17.52	1,546.73	3.80
P-133	77-1	77	1512.14	1510.94	8	124	123,723	0.0100	2.50	0.86	1,512.34	3.75
P-134	17-12	17-11	1358.24	1357.32	10	132	283,072	0.0070	2.76	0.92	1,358.53	5.67
P-136	A-6	A-5	1475.2	1470.92	8	134	28,993	0.0320	2.48	4.28	1,475.30	9.03
P-137	104-2-3	104-2-2	1529.31	1528.85	8	135	35,431	0.0030	1.20	0.44	1,529.44	2.73
P-138	77-13-2	77-13-1	1566.07	1556.36	6	136	13,384	0.0710	2.72	9.70	1,566.14	4.36
P-139	G-31	G-30	1339.06	1338.22	6	136	137,699	0.0060	2.23	0.83	1,339.30	3.15
P-140	59	58	1431.02	1429.55	10	136	766,170	0.0110	4.22	1.53	1,431.51	7.18
P-141	G-17-4	G-17-3	1296.1	1294.39	6	137	237,722	0.0120	3.32	1.71	1,296.41	3.03
P-142	17-54	17-53	1428.98	1428.34	6	138	26,937	0.0050	1.28	0.63	1,429.09	2.87
P-143	A-17	A-16	1477.63	1465.35	8	138	37,341	0.0890	3.83	12.22	1,477.74	7.03
P-144	53-4	53-2	1465.7	1449.55	6	139	3,854	0.1160	2.23	16.11	1,465.74	3.22
P-145	41-3-1	41-3	1426.88	1422.74	6	139	6,118	0.0300	1.56	4.10	1,426.93	4.44
P-146	77-12	77-6-7	1541.12	1533.91	6	139	37,404	0.0520	3.28	7.17	1,541.24	3.55
P-147	52	51	1407.76	1405.81	10	139	885,416	0.0140	4.82	1.95	1,408.28	3.78
P-148	24-A	24	1347.87	1346.94	10	139	1,214,138	0.0070	3.72	0.94	1,348.60	2.17
P-149	17-22	17-21	1428.41	1420.87	8	140	101,248	0.0540	4.33	7.54	1,428.59	2.88
P-150	17-48	17-47	1590.71	1586.77	6	140	2,948	0.0280	1.23	3.95	1,590.74	4.96
P-151	41-3	41-2-1	1422.74	1416.4	6	140	19,369	0.0450	2.58	6.31	1,422.82	3.60
P-152	17-18-2	17-18-1	1449.65	1436.42	6	141	7,743	0.0940	2.51	13.23	1,449.70	3.10
P-153	51	50	1405.81	1403.68	10	141	885,935	0.0150	4.96	2.11	1,406.33	6.48
P-154	15-3-1	15-3	1351.58	1345.19	6	141	19,698	0.0450	2.59	6.42	1,351.67	3.77
P-155	77-7-1	77-7	1529.82	1525.86	6	129	32,957	0.0310	2.64	3.96	1,529.93	3.50
P-156	G-19	G-18	1308.47	1288.06	6	142	46,603	0.1440	5.03	20.39	1,308.60	4.65
P-157	101-3-2	101-3-1	1517.87	1517.16	6	143	13,191	0.0050	1.06	0.69	1,517.95	3.36
P-158	17-15	17-14	1363.77	1360.85	10	144	279,781	0.0200	4.02	2.92	1,364.06	6.68
P-159	73	72	1500.38	1499.29	10	144	702,373	0.0080	3.61	1.10	1,500.84	7.01
P-160	48-6	48-4	1455.4	1451.3	6	144	7,125	0.0280	1.64	4.07	1,455.45	3.73
P-161	G-40	G-39	1404.1	1400.42	6	145	67,943	0.0250	3.06	3.72	1,404.26	5.14
P-162	77-13	77-12	1550.21	1541.12	6	146	35,879	0.0620	3.46	9.09	1,550.33	2.56
P-163	G-34	G-33	1352.17	1344.42	6	146	88,963	0.0530	4.29	7.70	1,352.35	3.15

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-164	17-51-10A	17-51-8	1579.8	1577.47	6	147	4,902	0.0160	1.17	2.34	1,579.84	1.57
P-165	17-49-2	17-49-1	1433.9	1420.94	6	147	5,935	0.0880	2.27	12.90	1,433.95	5.89
P-166	17-40	17-39	1564.77	1562.28	6	148	50,266	0.0170	2.42	2.52	1,564.91	4.02
P-167	G-23	G-22	1347.22	1341.79	6	148	35,646	0.0370	2.87	5.42	1,347.33	5.96
P-168	57	56	1427.9	1426.09	10	148	766,170	0.0120	4.42	1.88	1,428.39	3.21
P-169	35	34	1367.3	1366.27	10	149	1,199,687	0.0070	3.80	1.12	1,368.00	4.85
P-170	69	68	1494.79	1490.67	10	149	740,001	0.0280	5.92	4.12	1,495.27	6.52
P-171	17-14	17-13	1360.85	1359.37	10	150	280,507	0.0100	3.11	1.46	1,361.14	3.14
P-172	54	53	1420.86	1418.78	10	150	865,825	0.0140	4.78	2.07	1,421.38	3.62
P-173	G-30	G-29	1338.22	1337.36	6	152	138,763	0.0060	2.16	0.87	1,338.47	3.35
P-174	G-6	G-5	1410.05	1399.81	8	152	624,717	0.0670	7.92	10.24	1,410.52	4.61
P-175	17-43-1	17-43	1592.04	1580.33	6	152	5,000	0.0770	2.06	11.70	1,592.08	3.49
P-176	77-16-8	77-16-7	1518.58	1517.82	6	152	18,038	0.0050	1.16	0.71	1,518.67	4.84
P-177	17-43-2	17-43-1	1596.13	1592.04	6	153	2,249	0.0270	1.12	4.08	1,596.16	3.37
P-178	15-3-3	15-3-2	1398.44	1374.45	6	153	17,401	0.1570	3.88	23.98	1,398.52	3.49
P-179	50-2	50	1405.53	1404.01	6	153	7,669	0.0100	1.15	1.36	1,405.58	5.70
P-180	29	26	1350.68	1349.4	10	155	1,206,522	0.0080	4.15	1.25	1,351.32	3.56
P-181	G-2-15	G-2-14	1448.47	1441.65	6	154	11,223	0.0440	2.18	6.84	1,448.53	5.68
P-182	44-25-3	44-25-2	1468.75	1447.58	6	154	20,502	0.1370	3.87	21.21	1,468.84	4.92
P-183	17-56	17-55	1462.42	1441.48	6	154	26,937	0.1360	4.17	20.99	1,462.52	4.65
P-184	G-18-6	G-18-5	1377.3	1366.41	6	154	3,241	0.0710	1.77	10.89	1,377.33	4.72
P-185	53-1	53	1434.84	1419.11	6	156	16,473	0.1010	3.26	15.61	1,434.92	3.10
P-186	17-76-1	17-76-5	1467.89	1465.66	6	156	10,574	0.0140	1.44	2.22	1,467.95	3.23
P-187	32A	31	1358.23	1354.15	10	157	1,202,864	0.0260	6.56	4.08	1,358.84	3.64
P-188	17-49-3	17-49-2	1441.63	1433.9	6	157	4,406	0.0490	1.69	7.72	1,441.67	3.85
P-189	G-18-2	G-18-1	1333.29	1317.72	6	157	11,396	0.0990	2.87	15.56	1,333.35	3.46
P-190	A-6-1	A-6	1477.84	1475.2	8	158	17,844	0.0170	1.70	2.62	1,477.91	6.37
P-191	G-41	G-40	1408.35	1404.1	6	159	40,168	0.0270	2.67	4.21	1,408.47	5.60
P-192	G-1-14	G-1-13	1406.71	1405.67	6	159	4,988	0.0070	0.87	1.03	1,406.76	5.96
P-193	58	57	1429.55	1427.9	10	159	766,170	0.0100	4.15	1.70	1,430.04	4.74
P-194	17-46-1	17-46	1584.42	1581.69	6	159	12,412	0.0170	1.61	2.72	1,584.49	3.53
P-196	G-38	G-37	1397.89	1381.19	6	160	67,943	0.1040	5.03	16.78	1,398.05	3.22
P-197	33	32A	1361.51	1358.23	10	160	1,201,772	0.0200	5.99	3.28	1,362.12	2.59
P-198	17-8	17-7	1352.36	1342.54	10	160	286,265	0.0610	5.99	9.95	1,352.65	3.63
P-199	G-1-10	G-1-9	1399.68	1397.91	6	161	72,562	0.0110	2.30	1.77	1,399.85	3.86
P-200	98-4	98-3	1517.83	1517.16	6	162	17,293	0.0040	1.08	0.68	1,517.92	5.51
P-201	53-2	53-1	1449.55	1434.84	6	162	16,473	0.0910	3.14	14.74	1,449.63	2.99
P-202	17-79-4	17-79-3	1545.03	1538.81	6	163	886	0.0380	0.96	6.22	1,545.05	4.12
P-203	41-1	41	1390.55	1382.42	6	163	43,020	0.0500	3.39	7.98	1,390.68	3.04
P-204	101-7	101-3-1	1519.01	1517.16	6	163	14,309	0.0110	1.45	1.82	1,519.08	3.90
P-205	G-24	G-23	1348.35	1347.22	6	164	27,641	0.0070	1.48	1.12	1,348.45	4.24
P-206	55	54	1425.71	1420.86	10	164	863,433	0.0300	6.32	4.85	1,426.23	3.15
P-208	G-2-2	G-2-1	1376.83	1365.5	6	165	43,064	0.0690	3.77	11.38	1,376.96	4.04
P-209	G-40-4-2	G-40-4-1	1431.68	1420.89	6	165	1,253	0.0650	1.28	10.77	1,431.70	6.29
P-210	77-6-4	77-6-7	1535.13	1533.91	6	166	25,431	0.0070	1.47	1.16	1,535.23	7.40
P-211	48-1	48	1428.17	1402.93	6	168	17,048	0.1500	3.80	25.12	1,428.25	4.48
P-212	48-5	48-4	1466.04	1451.3	6	168	5,166	0.0880	2.17	14.71	1,466.08	3.74
P-213	17-55	17-54	1441.48	1428.98	6	171	26,937	0.0730	3.36	12.49	1,441.58	3.07
P-214	44-21	44-20	1419.12	1417.91	6	171	14,246	0.0070	1.22	1.19	1,419.19	9.38
P-215	77-6-7	76-6-6	1533.91	1527.97	6	172	62,835	0.0350	3.33	5.99	1,534.06	8.41
P-216	31	30	1354.15	1351.21	10	173	1,204,205	0.0170	5.58	2.93	1,354.76	2.59
P-217	A-2-1	A-13	1446.93	1444.07	6	308	9,313	0.0090	1.19	2.86	1,446.99	5.02

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-218	A-11-3-1	A-11-3	1469.65	1468.71	6	175	9,219	0.0050	0.98	0.89	1,469.71	6.26
P-219	G-27	G-26	1329.75	1328.63	6	177	206,606	0.0060	2.47	1.09	1,330.06	4.02
P-220	101-7-3	101-7-1	1523.27	1521.3	6	179	0	0.0110	0.00	1.90	1,523.27	5.48
P-221	77-9	77-7-1	1541.22	1529.82	6	225	31,812	0.0510	3.11	11.40	1,541.33	4.00
P-222	77-16-1	78	1513.22	1512.18	6	51	10,399	0.0200	1.61	1.05	1,513.28	3.99
P-223	98-2	98	1516.59	1502.82	6	648	23,191	0.0210	2.09	13.60	1,516.68	8.08
P-224	17-49-5	17-49-1	1464.07	1420.94	6	175	24,379	0.2460	5.02	43.12	1,464.16	3.69
P-225	G-43	G-41	1419.84	1408.35	6	360	40,168	0.0320	2.84	11.53	1,419.96	5.16
P-226	17-51-6	17-51-4a	1529.01	1528.22	6	245	8,878	0.0030	0.81	0.80	1,529.08	3.05
P-227	101-3-1	101-3	1517.16	1515.74	6	183	27,500	0.0080	1.54	1.37	1,517.26	2.42
P-228	17-49-7	17-49-5	1529.37	1464.07	6	839	21,379	0.0780	3.21	65.29	1,529.46	2.67
P-229	17-77	17-75-4	1533.57	1525.1	8	173	106,563	0.0490	4.25	8.42	1,533.76	3.34
P-230	77-16-8A	77-16-8	1518.32	1518.58	6	187	17,180	-0.0010	0.14	0.07	1,518.74	2.58
P-231	56-3	56-1	1455.94	1434.21	6	353	0	0.0620	0.00	21.73	1,455.94	2.63
P-232	41-4	41-3	1424.41	1422.74	6	230	13,251	0.0070	1.22	1.66	1,424.48	6.73
P-234	G-2-14	G-2-13	1441.65	1438.09	6	192	11,223	0.0190	1.60	3.53	1,441.71	4.01
P-235	50-3	50-2	1422.55	1405.53	6	190	5,534	0.0900	2.23	17.01	1,422.59	6.92
P-236	17-22-1	17-22	1435.8	1428.41	8	193	100,539	0.0380	3.83	7.39	1,435.98	4.69
P-237	17-25-1	17-25	1485.71	1465.65	6	194	5,199	0.1030	2.34	20.08	1,485.75	3.30
P-238	G-2-7-1	G-2-7	1412.13	1399.86	6	197	3,520	0.0620	1.72	12.19	1,412.17	5.54
P-239	22	21	1346.31	1343.67	10	91	1,221,407	0.0290	6.87	2.59	1,346.93	3.38
P-240	17-39	17-37	1562.11	1544.61	8	195	52,632	0.0900	4.25	17.56	1,562.24	3.90
P-241	G-28-11-1	G-28-11	1373.47	1369.05	6	196	6,380	0.0230	1.46	4.38	1,373.52	5.84
P-242	98	97	1502.82	1497.72	10	196	240,126	0.0260	4.21	5.09	1,503.09	3.33
P-243	G-12-1	G-12	1438.65	1437.7	6	182	11,972	0.0050	1.04	0.75	1,438.72	3.03
P-244	17-65-3	17-65-2	1355.38	1350.56	8	197	32,795	0.0240	2.34	4.82	1,355.48	4.41
P-245	17-45	17-44	1579.45	1576.44	6	292	19,024	0.0100	1.53	3.00	1,579.53	2.80
P-246	G-24-1	G-24	1351.4	1348.35	6	198	26,306	0.0150	1.94	3.05	1,351.50	4.30
P-247	17-28	17-27	1503.69	1492.34	8	322	84,779	0.0350	3.54	11.35	1,503.86	3.99
P-248	17-27	17-26	1492.34	1474.28	8	436	85,049	0.0410	3.75	18.06	1,492.51	3.12
P-249	17-20	17-19	1417.9	1413.49	8	121	102,787	0.0360	3.79	4.41	1,418.08	3.29
P-250	101	100-1	1505.12	1504.28	8	200	210,486	0.0040	2.14	0.80	1,505.42	3.85
P-251	47	46	1398.09	1388.58	10	201	915,366	0.0470	7.62	8.66	1,398.62	3.12
P-252	46	45	1388.58	1387.69	10	163	918,047	0.0050	2.60	0.69	1,389.96	5.32
P-253	A-10-1	A-10	1493.3	1478.2	6	201	13,089	0.0750	2.75	15.00	1,493.37	4.52
P-254	G-24-6-1	G-24-6	1391.5	1384.37	6	201	9,415	0.0350	1.91	7.10	1,391.56	6.83
P-255	A-20	A-19	1493.22	1481.39	8	202	27,912	0.0590	3.03	11.83	1,493.31	6.62
P-256	G-18-7	G-18-6	1380.29	1377.3	6	202	1,922	0.0150	0.86	2.98	1,380.32	4.78
P-257	101-1-1B	101-1-1A	1509.41	1507.13	6	203	75,506	0.0110	2.35	2.26	1,509.58	4.81
P-258	44-20-1	44-20	1436.15	1417.91	6	203	5,609	0.0900	2.25	18.19	1,436.19	5.74
P-259	44-25	44-A-7	1415	1403.5	6	203	20,502	0.0570	2.84	11.53	1,415.09	6.98
P-260	41-3-2	41-3-1	1444.26	1426.88	6	204	1,732	0.0850	1.52	17.36	1,444.29	4.30
P-261	55-3	55-2	1452.62	1445.49	8	204	79,254	0.0350	3.46	7.13	1,452.78	6.09
P-262	15-3-2	15-3-1	1374.45	1351.58	6	204	19,698	0.1120	3.56	22.91	1,374.54	1.53
P-263	G-28-7-1	G-28-7	1363.85	1356.77	6	209	3,140	0.0340	1.34	7.02	1,363.88	6.37
P-264	A-11-4	A-11-3	1481.89	1468.71	6	205	25,816	0.0640	3.18	13.16	1,481.99	5.85
P-265	101-7-2	101-7-1	1529.89	1521.3	6	205	14,309	0.0420	2.31	8.61	1,529.96	4.73
P-266	G-18-8	G-18-7	1394.28	1380.29	6	205	923	0.0680	1.19	13.98	1,394.30	3.83
P-267	G-40-5	G-40-4	1427.18	1413.4	6	207	20,226	0.0670	2.99	13.77	1,427.27	5.33
P-268	74-1	74	1509.68	1504.12	6	207	51,487	0.0270	2.87	5.60	1,509.82	3.94
P-269	G-40-6	G-40-5	1443.47	1427.18	6	208	20,226	0.0780	3.15	16.33	1,443.56	6.18
P-270	100-1	100	1504.28	1503.71	8	209	210,486	0.0030	1.82	0.53	1,504.62	3.78

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-271	17-30	17-29	1520.88	1514.34	8	209	69,117	0.0310	3.19	6.53	1,521.03	3.69
P-272	G-2-11	G-2-10	1428.2	1417.63	6	210	26,829	0.0500	2.96	10.57	1,428.30	5.38
P-273	G-2-4	G-2-3	1390.26	1385.89	6	210	40,546	0.0210	2.44	4.37	1,390.38	3.92
P-274	44-25-1	44-25	1433.02	1415	6	211	20,502	0.0850	3.25	18.06	1,433.11	4.71
P-275	G-17-2	G-17-1	1287.56	1286.16	6	211	241,330	0.0070	2.59	1.43	1,287.90	3.20
P-276	G-24-4	G-24-3	1360.16	1354.19	6	213	22,588	0.0280	2.28	5.96	1,360.25	6.28
P-277	G-40-1	G-40	1408.87	1404.1	6	213	27,775	0.0220	2.24	4.71	1,408.97	7.28
P-278	G-14	G-13	1439.73	1438.86	8	213	334,693	0.0040	2.37	0.91	1,440.13	4.60
P-279	65	64	1473.18	1466.87	10	214	742,450	0.0290	6.06	6.31	1,473.66	5.38
P-280	53	52	1418.78	1407.76	10	214	884,329	0.0510	7.78	11.02	1,419.30	3.18
P-281	77-16-7	74-1	1517.82	1509.68	6	214	51,487	0.0380	3.24	8.19	1,517.96	8.04
P-282	68	67	1490.67	1479.92	10	216	742,450	0.0500	7.32	10.95	1,491.15	4.72
P-284	G-6-2	G-6-1	1417.21	1412.03	6	220	3,446	0.0240	1.21	5.17	1,417.25	4.61
P-285	56-1	57	1434.21	1428.23	6	220	0	0.0270	0.00	5.82	1,434.21	2.90
P-286	17-5	17-4	1328.77	1326.68	10	221	290,732	0.0090	3.10	2.09	1,329.06	4.57
P-287	G-17-3	G-17-2	1294.39	1287.56	6	221	239,741	0.0310	4.67	6.80	1,294.70	3.21
P-288	G-28-11	G-28-10	1369.05	1367.85	6	228	17,341	0.0050	1.17	1.20	1,369.14	6.18
P-289	101-7-1	101-7	1521.3	1519.01	6	222	14,309	0.0100	1.40	2.29	1,521.37	11.25
P-290	70	69	1496.96	1494.79	10	222	740,001	0.0100	4.03	2.22	1,497.44	4.17
P-291	79-1	79	1514.88	1512.92	10	225	469,538	0.0090	3.43	1.99	1,515.26	3.92
P-292	36	35	1368.32	1367.3	10	225	1,199,687	0.0050	3.40	1.63	1,369.62	7.81
P-293	G-28-10	G-28-9	1367.85	1366.46	6	225	19,179	0.0060	1.28	1.39	1,367.94	7.04
P-294	G-43-1	G-43	1420.76	1419.84	6	233	4,974	0.0040	0.73	0.85	1,420.81	3.47
P-295	G-28-9	G-28-8	1366.46	1359.33	6	227	19,179	0.0310	2.26	7.15	1,366.54	6.47
P-296	39	38	1375.12	1374.39	10	228	1,192,710	0.0030	3.38	1.71	1,376.71	6.09
P-297	76-6-4	77-6-3	1526.01	1523.67	6	229	70,358	0.0100	2.23	2.33	1,526.17	5.20
P-298	17-78-1	17-78	1553.38	1534	6	230	9,805	0.0840	2.59	19.13	1,553.44	4.19
P-300	89	87	1538.89	1538.47	10	231	279,126	0.0020	1.68	0.45	1,539.29	5.78
P-301	77-16-7A	77-16-7	1521.96	1517.82	6	231	33,448	0.0180	2.19	4.11	1,522.07	7.34
P-302	90	89	1539.96	1538.89	10	232	274,670	0.0050	2.35	0.98	1,540.27	3.34
P-303	79-3	79-2	1526.39	1516.11	10	233	469,538	0.0440	6.16	10.43	1,526.77	5.12
P-304	G-8	G-7	1420.99	1414.21	8	238	617,207	0.0280	5.75	6.78	1,421.45	6.74
P-305	91	90	1540.45	1539.96	10	234	274,670	0.0020	1.76	0.56	1,540.83	7.77
P-306	17-60-2	17-57	1531.79	1516.45	6	234	14,495	0.0660	2.69	15.32	1,531.86	4.34
P-307	101-3-5	101-3-4	1532.33	1528.27	6	235	4,655	0.0170	1.19	4.05	1,532.37	3.09
P-308	G-13	G-12	1438.86	1437.53	8	230	334,693	0.0060	2.71	1.24	1,439.22	8.59
P-309	G-28-2	G-28-1	1341.45	1339.82	6	241	32,632	0.0070	1.54	1.62	1,341.56	3.37
P-310	G-40-8	G-40-7	1461.66	1456.5	6	241	14,365	0.0210	1.81	5.15	1,461.73	6.01
P-311	G-26	G-17-7	1328.63	1327.42	6	241	212,082	0.0050	2.26	1.27	1,328.98	8.79
P-312	44-18	44-17	1404.27	1396.44	6	237	20,393	0.0330	2.35	7.86	1,404.36	7.00
P-313	17-60	17-59	1502.08	1494.79	6	237	24,157	0.0310	2.41	7.28	1,502.17	5.15
P-314	A-22	A-21	1502.55	1499.72	8	269	11,437	0.0110	1.27	2.82	1,502.61	6.72
P-315	17-13	17-12	1359.37	1358.24	10	238	281,097	0.0050	2.40	1.15	1,359.68	2.55
P-316	37	36	1373.01	1368.32	10	238	1,197,454	0.0200	5.90	4.00	1,373.62	7.09
P-317	G-40-9	G-40-8	1465.11	1461.66	6	243	12,750	0.0140	1.51	3.45	1,465.18	6.02
P-318	44-11	44-10	1397.08	1392.86	6	239	10,835	0.0180	1.56	4.22	1,397.14	8.01
P-319	A-26	A-27	1492.19	1478.81	6	240	20,050	0.0560	2.80	13.37	1,492.28	6.45
P-320	53-3	53-2	1465.7	1449.55	6	229	6,451	0.0710	2.15	16.12	1,465.75	1.95
P-321	G-2-1	G-2	1365.5	1347.4	6	241	43,064	0.0750	3.92	17.91	1,365.63	3.83
P-322	44-A-6	44-A-5	1398.56	1391.02	8	242	174,315	0.0310	4.17	7.47	1,398.80	5.08
P-323	17-4	17-2	1326.68	1320.85	10	242	291,960	0.0240	4.33	5.92	1,326.97	4.64
P-324	G-1-9	G-1-8	1397.91	1390.83	6	242	75,800	0.0290	3.32	7.08	1,398.08	5.91

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-325	G-28-8	G-28-7	1359.33	1356.77	6	243	19,179	0.0110	1.54	2.55	1,359.41	3.85
P-326	92	91	1541.8	1540.45	10	243	270,696	0.0060	2.51	1.26	1,542.09	4.98
P-327	104-2-5-2	104-2-5-1	1558.26	1540.05	6	243	4,652	0.0750	1.99	18.19	1,558.30	4.60
P-328	17-75-2	17-75-3	1527.48	1526.38	6	228	34,946	0.0050	1.39	1.11	1,527.61	5.05
P-329	G-23-3	G-23-2	1372.05	1366.85	6	247	4,922	0.0210	1.30	5.21	1,372.09	5.96
P-330	17-53	17-52	1428.34	1426.8	6	246	35,517	0.0060	1.54	1.54	1,428.46	3.23
P-331	G-2-13	G-2-12	1438.09	1436.6	6	255	19,456	0.0060	1.26	1.50	1,438.18	4.87
P-332	G-24-3	G-24-2	1354.19	1352.7	6	248	24,403	0.0060	1.36	1.48	1,354.29	4.82
P-333	G-18-1	G-18	1317.72	1288.06	6	249	13,187	0.1190	3.20	29.58	1,317.79	3.56
P-334	44-23	44-22	1427.94	1426.32	6	256	7,364	0.0060	0.97	1.61	1,427.99	8.94
P-335	15-3-4	15-3-3	1404.3	1398.44	6	251	13,346	0.0230	1.83	5.85	1,404.37	3.25
P-336	93	92	1543.22	1541.8	10	251	267,722	0.0060	2.51	1.42	1,543.50	3.42
P-337	G-35	G-34	1366.62	1352.17	6	253	74,980	0.0570	4.18	14.43	1,366.79	11.15
P-338	A-28	A-27	1485.1	1478.81	6	254	1,613	0.0250	0.98	6.22	1,485.12	6.49
P-339	104-2-5-3	104-2-5-2	1567.82	1558.26	6	255	2,866	0.0370	1.33	9.55	1,567.85	3.63
P-340	G-28-6	G-28-5	1345.42	1343.94	6	255	23,441	0.0060	1.32	1.47	1,345.52	5.25
P-341	A-24	A-25	1505.57	1496.89	6	255	12,135	0.0340	2.02	8.67	1,505.64	6.49
P-342	G-4	G-3	1399.12	1397.22	8	257	632,614	0.0070	3.38	1.94	1,399.63	7.49
P-344	A-9	A-10	1496.35	1478.2	6	257	76,296	0.0710	4.54	18.23	1,496.52	4.40
P-345	G-1-11	G-1-10	1401.34	1399.68	6	257	72,100	0.0060	1.91	1.66	1,401.51	3.16
P-346	G-17-6	G-17-5	1321.98	1298.64	6	258	217,066	0.0900	6.69	23.33	1,322.27	3.74
P-347	77-6	77-1	1517.87	1512.14	8	277	116,614	0.0210	3.22	5.72	1,518.06	3.21
P-348	A-25	A-26	1496.89	1492.19	6	260	15,778	0.0180	1.76	4.69	1,496.97	6.39
P-349	G-28-11-2	G-28-11-1	1379.96	1373.47	6	280	4,882	0.0230	1.34	6.48	1,380.00	5.92
P-350	17-25-2	17-25-1	1491.38	1485.71	6	261	4,617	0.0220	1.29	5.67	1,491.42	3.70
P-351	G-24-2	G-24-1	1352.7	1351.4	6	266	25,418	0.0050	1.28	1.31	1,352.81	3.30
P-352	A-6-2-1	A-6-2	1510.65	1489.06	6	265	8,338	0.0810	2.44	21.59	1,510.70	4.62
P-353	A-11-1	A-11	1450.08	1448.6	8	297	52,235	0.0050	1.54	1.40	1,450.22	5.25
P-354	G-28-7	G-28-6	1356.77	1345.42	6	267	22,319	0.0430	2.63	11.34	1,356.86	7.52
P-355	44-A-7	44-A-6	1403.33	1398.56	8	276	174,315	0.0170	3.39	4.82	1,403.57	9.27
P-356	A-6-1-1	A-6-1	1494.11	1477.84	8	268	5,748	0.0610	1.89	16.24	1,494.15	5.11
P-357	G-28-1	G-28	1339.82	1335.05	6	276	41,616	0.0170	2.31	4.61	1,339.94	6.29
P-358	76-6-5	76-6-4	1527.35	1526.01	6	269	66,296	0.0050	1.69	1.35	1,527.52	5.27
P-359	76	75	1510.68	1507.66	10	270	604,035	0.0110	4.02	3.08	1,511.11	5.17
P-360	101-3	101-2	1515.74	1513.23	6	271	58,629	0.0090	2.05	2.50	1,515.89	4.08
P-361	17-25	17-24	1465.48	1449.5	8	271	93,167	0.0590	4.36	15.98	1,465.65	5.06
P-362	87	86	1538.47	1537.81	10	271	283,362	0.0020	1.88	0.60	1,538.84	6.76
P-364	17-42	17-41	1575.53	1574.27	6	273	35,755	0.0050	1.38	1.27	1,575.66	3.90
P-365	A-10-2	A-10-1	1517.01	1493.3	6	273	8,684	0.0870	2.52	23.70	1,517.07	5.54
P-366	17-57	17-60	1516.45	1502.08	6	276	21,856	0.0520	2.81	14.37	1,516.54	5.15
P-367	G-28	G-27	1335.05	1329.75	6	300	203,794	0.0180	3.64	5.27	1,335.33	6.60
P-368	G-24-6	G-24-5	1384.37	1365.23	6	278	22,588	0.0690	3.12	19.18	1,384.46	6.72
P-369	A-11-2	A-11-1	1451.54	1450.08	8	293	46,667	0.0050	1.49	1.45	1,451.67	10.12
P-370	17-59	17-58	1494.79	1484.21	6	280	26,937	0.0380	2.67	10.61	1,494.89	3.57
P-371	17-24	17-23	1449.5	1439.63	8	280	95,734	0.0350	3.67	9.87	1,449.68	3.32
P-372	44-20	44-19	1417.91	1416.31	6	280	19,855	0.0060	1.25	1.61	1,418.00	10.46
P-373	10	9	1317.93	1317.61	15	280	1,658,517	0.0010	2.09	0.71	1,318.99	3.84
P-375	G-28-5	G-28-4	1343.94	1342.26	6	287	28,010	0.0060	1.40	1.68	1,344.05	7.37
P-376	17-1	16B	1320.23	1319.26	15	283	360,437	0.0030	2.21	0.92	1,320.55	4.63
P-377	G-24-5	G-24-4	1365.23	1360.16	6	283	22,588	0.0180	1.95	5.09	1,365.32	5.69
P-378	44-22	44-21	1426.32	1419.12	6	283	11,705	0.0250	1.81	7.19	1,426.39	6.92
P-379	A-27	G-45-1	1478.81	1444.1	6	283	23,619	0.1230	3.87	34.76	1,478.90	5.32

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-380	104-2-2	104-2-1	1528.85	1528.19	8	284	39,087	0.0020	1.08	0.66	1,528.99	2.37
P-381	G-18-5	G-18-4	1366.41	1362.9	6	284	4,095	0.0120	1.02	3.50	1,366.45	4.29
P-382	G-2-12	G-2-11	1436.6	1428.2	6	288	19,456	0.0290	2.22	8.39	1,436.68	5.04
P-383	16	15	1319.13	1318.69	12	279	1,221,407	0.0020	2.41	0.77	1,320.39	5.99
P-384	77-6-3	77-6-2	1523.67	1521.07	6	288	77,503	0.0090	2.19	2.60	1,523.84	6.65
P-385	44-12	44-11	1404.81	1397.08	6	289	6,984	0.0270	1.59	7.72	1,404.86	7.38
P-386	A-8	A-9	1507.45	1496.35	6	289	76,296	0.0380	3.66	11.16	1,507.62	4.38
P-387	15-8	15-7	1361.3	1359.93	6	290	12,590	0.0050	1.03	1.32	1,361.38	4.18
P-388	G-18-4	G-18-3	1362.9	1351.91	6	290	6,878	0.0380	1.76	10.98	1,362.95	3.28
P-389	G-40-9-1	G-40-9	1480.03	1465.11	6	306	5,719	0.0490	1.82	14.90	1,480.08	5.48
P-390	G-44-1	G-44	1436.33	1430.11	6	297	1,031	0.0210	0.82	6.12	1,436.35	3.29
P-391	A-6-1-2	A-6-1-1	1516.44	1494.11	8	291	3,237	0.0770	1.73	22.32	1,516.47	5.36
P-392	G-9	G-8	1426.73	1420.99	8	292	612,949	0.0200	4.99	5.74	1,427.19	3.62
P-393	101-3-4	101-3-3	1528.27	1525.34	6	292	5,992	0.0100	1.07	2.92	1,528.32	4.82
P-394	104-2-8	104-2-7	1558.3	1548.64	6	292	8,910	0.0330	1.84	9.65	1,558.36	6.39
P-395	G-2-3	G-2-2	1385.89	1376.83	6	295	43,064	0.0310	2.86	9.10	1,386.02	5.16
P-396	104-7	104-6	1540.69	1538.15	8	297	41,071	0.0090	1.73	2.52	1,540.80	9.34
P-397	16B	15A	1319.26	1318.57	15	306	360,437	0.0020	1.90	0.13	1,319.64	5.87
P-398	G-29-2	G-29-1	1369.73	1347.15	6	316	3,757	0.0710	1.84	22.57	1,369.77	3.96
P-399	A-11-3	A-11-2	1468.71	1451.54	8	297	40,706	0.0580	3.38	17.15	1,468.82	5.94
P-400	G-1-9-1	G-1-9	1417.36	1397.91	6	299	587	0.0650	1.03	19.30	1,417.37	4.92
P-401	55-2	55-1	1445.49	1435.72	8	301	82,017	0.0320	3.40	9.82	1,445.65	6.11
P-402	A-6-2	A-6-1	1489.06	1477.84	8	302	11,055	0.0370	1.94	11.20	1,489.12	6.08
P-404	A-6-2-2	A-6-2-1	1522.95	1510.65	6	304	4,349	0.0400	1.57	12.28	1,522.99	4.68
P-405	9-8	9-7	1407.15	1404.41	8	305	1,156,840	0.0090	5.13	6.69	1,414.09	0.12
P-406	A-23	A-22	1510.02	1502.55	8	305	6,379	0.0240	1.43	7.45	1,510.06	6.95
P-407	17-18-3	17-18-2	1459.65	1449.65	6	305	6,672	0.0330	1.66	10.00	1,459.70	2.56
P-408	79-7	79-6	1532.79	1532.01	10	305	398,483	0.0030	2.09	0.69	1,533.23	9.86
P-409	A-12	A-13	1445.51	1443.9	8	306	148,300	0.0050	2.11	1.61	1,445.74	5.46
P-410	77-28	77-26	1533.8	1533.33	8	323	30,168	0.0010	0.85	0.35	1,533.94	2.89
P-411	G-12-2	G-12-1	1440.34	1438.65	6	313	11,972	0.0050	1.07	1.69	1,440.41	3.79
P-412	G-22-2	G-22-1	1374.27	1352.04	6	311	1,612	0.0710	1.39	22.22	1,374.29	4.93
P-413	104-2-7	104-2-6	1548.64	1538.53	6	308	13,232	0.0330	2.05	10.10	1,548.71	5.79
P-414	A-17-1	A-17	1490.15	1477.63	6	309	5,060	0.0410	1.64	12.45	1,490.19	3.76
P-415	G-46	G-45	1446.41	1438.35	6	323	6,301	0.0250	1.48	8.00	1,446.46	6.56
P-416	G-25	G-26	1335.32	1328.63	6	311	3,256	0.0220	1.16	6.38	1,335.35	4.05
P-417	79-4	79-3	1530.12	1526.39	10	314	452,178	0.0120	3.80	3.72	1,530.49	9.63
P-418	G-28-12	G-28-11	1382.78	1369.05	6	328	10,962	0.0420	2.12	13.71	1,382.84	5.91
P-419	G-40-10	G-40-9	1478.74	1465.11	6	318	4,267	0.0430	1.60	13.60	1,478.78	6.06
P-420	17-29	17-28	1514.34	1503.69	8	315	82,327	0.0340	3.45	10.65	1,514.50	3.73
P-421	G-28-7-2	G-28-7-1	1385.99	1363.85	6	347	3,140	0.0640	1.69	22.15	1,386.02	4.89
P-422	17-60-1	17-57	1527.49	1516.45	6	319	2,440	0.0350	1.26	10.98	1,527.52	3.84
P-423	G-28-14	G-28-13	1459.7	1414.79	6	332	3,347	0.1350	2.21	44.89	1,459.73	6.18
P-424	G-40-4-1	G-40-4	1420.89	1413.4	6	331	4,800	0.0230	1.32	7.44	1,420.93	6.75
P-425	104-2-4	104-2-3	1534.77	1529.48	6	322	25,860	0.0160	1.97	5.31	1,534.87	4.95
P-426	17-79-3	17-79-2	1538.64	1537.71	8	401	886	0.0020	0.34	0.77	1,538.66	3.16
P-427	101-3-3	101-3-2	1525.34	1517.87	6	324	10,457	0.0230	1.70	7.45	1,525.40	4.98
P-428	77-25-1	77-25	1540.14	1533.38	6	325	13,272	0.0210	1.75	6.66	1,540.21	5.31
P-429	55-1	55	1435.72	1425.88	8	326	82,017	0.0300	3.32	9.66	1,435.88	7.45
P-430	G-3	G-2	1397.22	1347.23	8	327	635,388	0.1530	10.68	49.97	1,397.69	3.25
P-431	G-29-1	G-29	1347.15	1337.36	6	340	6,268	0.0290	1.56	9.60	1,347.20	6.14
P-432	A-20-1	A-20	1505.26	1493.22	6	329	11,243	0.0370	2.03	12.01	1,505.32	3.79

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-433	G-28-13	G-28-12	1414.79	1382.78	6	337	7,192	0.0950	2.46	32.00	1,414.84	5.53
P-434	G-23-1	G-23	1359.36	1347.22	6	353	6,890	0.0340	1.70	12.08	1,359.41	4.93
P-435	17-35	17-34	1542.04	1539.32	8	331	58,770	0.0080	1.90	2.73	1,542.18	3.69
P-436	A-11	A-12	1448.6	1445.51	8	332	148,300	0.0090	2.59	3.08	1,448.82	13.53
P-437	100	99	1503.71	1503.04	8	332	216,935	0.0020	1.64	0.66	1,504.09	3.26
P-438	G-18-3	G-18-2	1351.91	1333.29	6	332	9,269	0.0560	2.21	18.61	1,351.97	3.62
P-439	G-23-2	G-23-1	1366.85	1359.36	6	337	4,922	0.0220	1.32	7.48	1,366.89	4.89
P-440	15A	10	1318.57	1317.93	15	321	1,644,245	0.0020	2.65	0.52	1,319.51	4.67
P-441	G-34-1-2	G-34-1-1	1388.21	1374.26	6	349	2,130	0.0400	1.25	13.94	1,388.24	3.65
P-442	42	41	1383.22	1382.09	10	337	1,141,064	0.0030	3.24	2.27	1,384.97	3.03
P-443	G-10	G-9	1434.6	1426.73	8	348	609,451	0.0230	5.25	7.87	1,435.06	5.95
P-444	G-34-1-3	G-34-1-2	1427.8	1388.21	6	352	1,356	0.1120	1.59	39.58	1,427.82	3.72
P-446	G-22	G-21	1341.79	1320.31	6	342	43,021	0.0630	3.67	21.48	1,341.92	5.72
P-447	G-2-8	G-2-7	1401.66	1399.86	6	344	31,535	0.0050	1.39	1.80	1,401.78	8.12
P-448	G-40-7	G-40-6	1456.5	1443.47	6	350	20,226	0.0370	2.44	13.06	1,456.59	5.94
P-449	15-5	15-4	1354.4	1350.75	8	347	35,197	0.0110	1.79	3.65	1,354.51	4.94
P-450	G-11	G-10	1436.45	1434.6	8	351	422,263	0.0050	2.75	1.82	1,436.88	5.97
P-451	G-2-9	G-2-8	1415.12	1401.66	6	350	29,137	0.0380	2.74	13.45	1,415.22	5.24
P-452	77-31	77-30	1536.23	1534.08	6	351	12,921	0.0060	1.13	2.08	1,536.30	3.48
P-454	A-7	A-6	1500.25	1475.2	8	356	6,910	0.0700	2.13	25.00	1,500.30	7.55
P-455	G-34-1	G-34	1362.09	1352.17	6	363	13,045	0.0270	1.92	9.80	1,362.16	3.27
P-456	75	74	1507.66	1503.79	10	364	604,035	0.0110	3.95	3.83	1,508.09	6.83
P-457	74	73	1503.79	1500.38	10	370	702,373	0.0090	3.89	3.45	1,504.25	5.56
P-458	A-10	A-11	1478.2	1448.6	8	377	89,385	0.0790	4.75	29.55	1,478.37	4.63
P-459	101-6	101-5	1529.12	1526.23	6	384	20,575	0.0080	1.40	2.87	1,529.21	4.10
P-460	97	96	1497.72	1495.67	10	387	240,126	0.0050	2.38	2.05	1,497.99	7.54
P-461	17-18-1	17-18	1436.42	1388.71	6	419	8,852	0.1140	2.79	47.74	1,436.48	1.80
P-462	41-1-1	41-1	1409.65	1390.55	6	396	3,845	0.0480	1.61	19.01	1,409.69	3.92
P-463	17-51-8Z	17-51-8A	1576.79	1553.27	6	396	16,671	0.0590	2.72	23.51	1,576.87	3.98
P-464	77-16-10	77-16-9	1537.54	1526.78	6	397	12,953	0.0270	1.91	10.76	1,537.61	4.60
P-465	77-13-1	77-13	1556.36	1550.21	6	398	15,831	0.0150	1.67	6.11	1,556.44	3.28
P-466	66	65	1478.29	1473.18	10	399	742,450	0.0130	4.46	5.19	1,478.77	6.72
P-467	17-76-2	17-76-1	1500.44	1467.89	6	403	8,522	0.0810	2.45	32.54	1,500.50	4.18
P-469	17-62	17-61	1569.4	1537.1	6	527	10,730	0.0610	2.42	32.29	1,569.46	3.94
P-470	41	39	1382.09	1375.12	10	426	1,188,161	0.0160	5.48	5.99	1,382.70	4.82
P-471	17-78	17-77	1534	1533.57	8	439	106,563	0.0010	1.05	0.55	1,534.31	4.61
P-474	101-5	101-4	1526.23	1516.73	6	462	28,408	0.0210	2.19	9.50	1,526.33	3.51
P-475	17-74-1	17-74	1555.85	1530.07	6	497	34,946	0.0520	3.21	25.82	1,555.96	4.76
P-477	77-25-2A	77-25-1	1542.78	1540.14	6	581	8,836	0.0050	0.91	2.64	1,542.84	3.95
P-480	104-3	104-2	1535.99	1527.03	8	745	58,359	0.0120	2.17	8.91	1,536.13	4.49
P-484	A-2	A-1	1467.37	1465.33	8	313	32,772	0.0070	1.47	1.96	1,467.47	11.30
P-485	A-3	A-2	1469.1	1467.37	8	347	31,348	0.0050	1.32	1.73	1,469.21	7.26
P-486	A-4	A-3	1470.61	1469.1	8	301	28,993	0.0050	1.30	1.51	1,470.71	4.15
P-487	A-5	A-4	1470.92	1470.61	8	51	28,993	0.0060	1.39	0.31	1,471.02	7.30
P-488	101-2	101-1-1B	1513.23	1509.41	6	219	65,660	0.0170	2.64	3.81	1,513.39	3.42
P-489	103-1	103	1521.68	1515.38	6	157	4,217	0.0400	1.55	6.15	1,521.72	4.31
P-490	104-2-1	104-2	1528.19	1527.03	8	363	43,226	0.0030	1.24	1.12	1,528.33	8.01
P-491	104-2	104-1	1527.03	1524.27	8	347	104,022	0.0080	2.22	2.77	1,527.21	5.35
P-492	104-2-6	104-2-5	1538.53	1536.89	6	85	15,864	0.0190	1.81	1.62	1,538.61	6.10
P-493	94	93	1546.22	1543.22	10	150	258,757	0.0200	3.91	2.99	1,546.50	4.32
P-494	98-7	98-6	1544.24	1539.99	6	219	4,735	0.0190	1.24	4.23	1,544.28	2.32
P-495	98-6	98-4	1539.99	1517.83	6	312	8,934	0.0710	2.37	22.13	1,540.05	3.00

TABLE T-2
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HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-496	77-16-2	77-16-1	1535.26	1513.22	6	603	10,399	0.0370	1.99	22.06	1,535.32	3.34
P-497	48-4	48-3	1451.3	1435.35	6	111	16,034	0.1440	3.68	15.99	1,451.38	4.68
P-498	48-3	48-2	1435.35	1430.34	6	59	16,034	0.0850	3.04	5.01	1,435.43	4.52
P-499	50-5	50-4	1423.92	1423.24	6	77	3,389	0.0090	0.86	0.68	1,423.96	7.39
P-500	44-A-5	44-A-4	1391.02	1390.2	8	250	196,604	0.0030	1.92	0.82	1,391.33	11.70
P-501	44-A-4	44-A-3	1390.2	1389.45	8	213	198,172	0.0040	1.98	0.72	1,390.50	6.21
P-502	44-A-3	44-A-2	1389.45	1388.92	8	178	210,248	0.0030	1.88	0.55	1,389.78	4.97
P-503	44-A-2	44-A-1	1388.92	1388.4	8	124	210,248	0.0040	2.14	0.12	1,389.23	7.98
P-504	44-A-1	44-A	1388.4	1387.39	8	204	213,971	0.0050	0.95	0.15	1,389.11	5.67
P-505	44-9	44-A-3	1391.49	1389.62	6	189	12,075	0.0100	1.32	1.78	1,391.56	10.05
P-506	44-15	44-9	1404.42	1391.49	6	148	651	0.0870	1.17	12.88	1,404.44	6.31
P-507	44-26	44-25	1415.88	1415	6	79	0	0.0110	0.00	0.79	1,415.88	4.74
P-508	41-3-3	41-3-1	1442.6	1426.88	6	429	4,387	0.0370	1.52	15.71	1,442.64	3.86
P-509	41-2-1	41-2	1416.4	1409.01	6	173	32,481	0.0430	2.95	7.38	1,416.51	2.44
P-510	41-2	41-1	1409.01	1390.55	6	274	38,583	0.0670	3.62	18.45	1,409.13	2.98
P-511	17-16-2	17-16-1	1368.51	1365.79	6	219	4,499	0.0120	1.05	2.70	1,368.55	5.94
P-512	17-16-1	17-16	1365.79	1365	6	218	5,795	0.0040	0.74	0.80	1,365.85	4.02
P-513	17-84	17-40-z	1570.53	1568.19	6	386	10,144	0.0060	1.05	2.27	1,570.59	5.02
P-514	G-12	G-11	1437.53	1436.45	8	230	422,263	0.0050	2.63	1.10	1,437.98	5.90
P515	G-16	G-15	1442.14	1441.32	8	115	331,734	0.0070	2.93	0.79	1,442.48	4.34
P-516	G-15	G-14	1441.32	1439.73	8	300	334,693	0.0050	2.62	1.56	1,441.69	3.66
P-517	17-76-9	17-76-10	1452.14	1443.36	6	475	170,712	0.0180	3.53	8.84	1,452.40	5.48
P-518	17-76-10	G-16	1443.19	1442.14	8	147	170,712	0.0070	2.45	0.95	1,443.43	3.09
P-519	17-76-8	17-76-9	1460.9	1452.14	6	361	20,715	0.0240	2.12	8.59	1,460.99	6.52
P-520	17-75-5	17-76-9C	1500.24	1465.35	6	243	145,840	0.1440	7.05	34.89	1,500.48	4.97
P-521	17-76-9C	17-76-9A	1465.35	1464.88	6	38	147,559	0.0120	2.93	0.47	1,465.59	4.77
P-522	17-76-9A	17-76-9	1464.88	1452.14	6	384	149,997	0.0330	4.22	12.72	1,465.12	5.46
P-523	17-75-4	17-75-5	1525.1	1500.24	6	194	145,840	0.1280	6.75	24.99	1,525.34	11.16
P-524	17-75-3	17-75-4	1526.38	1525.1	6	94	37,166	0.0140	2.05	1.16	1,526.50	7.13
P-525	17-75	17-75-1	1528.7	1528.26	6	74	34,946	0.0060	1.51	0.44	1,528.82	5.01
P-526	17-75-1	17-75-2	1528.26	1527.48	6	114	34,946	0.0070	1.58	0.77	1,528.38	4.99
P-527	17-33-1	17-33	1537.12	1536.47	6	117	365	0.0060	0.37	0.53	1,537.13	4.23
P-528	17-51-7	17-51-6	1564.5	1529.01	6	361	8,027	0.0980	2.57	35.47	1,564.55	3.15
P-529	17-51-8A	17-51-9a	1553.27	1524.37	6	269	22,363	0.1070	3.66	28.89	1,553.36	2.85
P-530	17-51-9a	17-51-9	1524.37	1522.42	6	28	25,941	0.0700	3.27	1.95	1,524.47	3.80
P-531	17-51-9	17-51-9b	1522.42	1495.57	6	275	27,888	0.0980	3.76	26.84	1,522.52	5.30
P-532	17-51-9b	17-50-5	1495.57	1471.62	6	235	30,788	0.1020	3.93	23.95	1,495.68	4.58
P-533	17-50-5	17-50-4	1471.62	1466.3	6	80	32,131	0.0660	3.44	5.37	1,471.73	3.62
P-534	17-50-6	17-50-4	1476.48	1466.3	6	200	1,738	0.0510	1.28	10.19	1,476.51	4.93
P-535	17-50-4	17-50-3	1466.13	1435.81	8	190	33,869	0.1600	4.53	30.28	1,466.23	4.46
P-536	17-50-3	17-50-2	1435.81	1417.03	8	279	65,740	0.0670	4.12	18.78	1,435.96	4.87
P-537	17-50-2	17-50	1417.03	1408.91	8	111	67,398	0.0730	4.28	8.08	1,417.18	4.44
P-538	17-51-4	17-51-3	1525.73	1474.47	6	284	20,661	0.1800	4.28	51.26	1,525.82	3.40
P-539	17-51-3	17-51-2	1474.47	1469.24	6	228	22,529	0.0230	2.14	5.23	1,474.56	6.56
P-540	17-51-2	17-51-2Z	1469.24	1454.06	6	182	24,944	0.0830	3.44	15.17	1,469.34	3.70
P-541	17-51-5	17-51-4	1553.84	1525.73	6	147	8,524	0.1910	3.32	28.08	1,553.90	4.47
P-542	17-51-4a	17-51-4	1528.22	1525.73	6	201	10,990	0.0120	1.38	2.47	1,528.28	3.44
P-543	17-51-2Z	17-51-1	1454.06	1437.87	6	90	27,713	0.1800	4.68	16.24	1,454.16	3.48
P-544	17-51-1	17-50-3	1437.7	1435.81	8	40	29,490	0.0470	2.86	1.84	1,437.80	4.13
P-545	17-52	17-51	1426.8	1420.28	6	210	35,517	0.0310	2.71	6.55	1,426.92	4.27
P-546	17-51	17-50	1420.11	1408.91	8	367	37,442	0.0310	2.63	11.12	1,420.22	5.23
P-547	17-50	17-49C	1408.91	1405.05	8	124	107,324	0.0310	3.63	3.86	1,409.10	6.02

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-548	17-49-8	17-49-7	1530.08	1529.37	6	259	4,709	0.0030	0.63	0.68	1,530.13	3.36
P-556	55-15	55-14	1533.2	1527.01	8	403	34,301	0.0150	2.02	6.21	1,533.30	6.12
P-557	55-14	55-13	1527.01	1517.95	8	302	34,301	0.0300	2.55	9.09	1,527.11	4.08
P-558	55-13	55-12	1517.95	1508.06	8	296	34,301	0.0330	2.65	9.92	1,518.05	4.13
P-559	55-12	55-11	1508.06	1497.14	8	235	34,301	0.0460	2.97	10.96	1,508.16	4.06
P-560	55-11	55-10	1497.14	1488.65	8	273	34,301	0.0310	2.58	8.52	1,497.24	3.97
P-561	55-10	55-9	1488.65	1483.56	8	339	34,301	0.0150	2.00	5.08	1,488.75	5.10
P-562	55-9	55-8	1483.56	1481.08	8	365	43,137	0.0070	1.62	2.47	1,483.68	5.14
P-563	55-8	55-7	1481.08	1467.45	8	240	48,286	0.0570	3.53	13.61	1,481.20	6.88
P-564	55-7	55-6	1467.45	1466.67	8	124	63,553	0.0060	1.77	0.78	1,467.59	3.91
P-565	55-6	55-5	1466.67	1460.56	8	214	63,553	0.0290	3.01	6.10	1,466.81	4.91
P-566	55-5	55-4	1460.56	1456.02	8	225	70,955	0.0200	2.76	4.54	1,460.71	4.96
P-567	55-4	55-3	1456.02	1452.62	8	108	73,836	0.0310	3.26	3.39	1,456.17	5.02
P-568	77-7	77-6-1	1525.86	1518.18	6	125	35,475	0.0610	3.44	7.54	1,525.97	2.92
P-569	77-6-2	77-6-1	1521.07	1518.18	6	293	80,294	0.0100	2.29	2.81	1,521.24	5.97
P-571	104-6	104-4	1538.15	1536.25	8	366	49,149	0.0050	1.53	1.89	1,538.28	9.17
P-572	17-80	17-79	1537.38	1535.2	8	135	9,831	0.0160	1.40	2.02	1,537.44	4.56
P-573	17-81	17-80	1555.24	1537.55	6	335	6,881	0.0530	1.98	17.71	1,555.29	3.11
P-574	17-79-1	17-79	1536.26	1535.2	8	326	75,994	0.0030	1.47	1.04	1,536.45	1.82
P-575	17-79	17-78	1535.2	1534	8	411	91,332	0.0030	1.49	1.10	1,535.41	4.37
P-578	17-79-2	17-79-1	1537.71	1536.26	8	439	75,994	0.0030	1.48	1.45	1,537.90	5.91
P-579	17-49C	17-49-B1	1405.05	1401.08	8	146	109,062	0.0270	3.48	3.97	1,405.24	5.19
P-580	17-49-B1	17-49-b	1401.08	1392.57	8	146	110,528	0.0580	4.57	8.51	1,401.27	4.81
P-581	17-49A	17-49	1387.86	1386.86	8	28	112,234	0.0360	3.86	0.97	1,388.05	3.85
P-582	17-49	17-49-D	1386.86	1379.06	8	175	145,409	0.0450	4.50	7.88	1,387.08	4.23
P-583	17-49-D	17-15	1378.89	1363.77	10	538	150,431	0.0280	3.77	15.04	1,379.10	4.54
P-584	15-7	15-6	1359.93	1359.26	6	263	26,104	0.0030	1.02	0.70	1,360.06	3.22
P-585	15-6	15-5	1359.09	1354.4	8	118	29,618	0.0400	2.68	4.68	1,359.19	4.81
P-586	15-1-1	15-1	1326.23	1321.61	6	238	4,808	0.0190	1.25	4.63	1,326.27	4.79
P-587	15-1	15	1321.44	1319.02	8	244	62,401	0.0100	2.06	1.96	1,321.58	5.22
P-588	15-3	15-2	1345.02	1332.79	8	176	57,593	0.0690	3.99	12.29	1,345.16	3.04
P-589	15-2	15-1	1332.79	1321.44	8	182	57,593	0.0620	3.85	11.34	1,332.93	2.75
P-591	9	8	1317.36	1316.19	18	324	2,815,357	0.0040	3.85	1.16	1,318.28	4.48
P-592	7-3	7-2	1341.96	1332.8	6	242	55,332	0.0380	3.31	9.15	1,342.10	5.38
P-593	7-2	7-1	1332.8	1325.26	6	67	61,210	0.1130	5.00	7.62	1,332.95	5.98
P-594	7-1	8	1325.26	1317.19	6	204	61,210	0.0400	3.46	8.12	1,325.41	2.87
P-595	8	7	1316.19	1315.31	18	240	2,876,567	0.0040	3.89	0.82	1,317.11	3.73
P-596	7	6	1315.31	1314.8	18	165	2,876,567	0.0030	3.64	0.48	1,316.29	3.66
P-597	6	5	1314.8	1314.58	18	83	2,876,567	0.0030	3.42	0.29	1,315.81	3.70
P-598	5	4	1314.58	1313.94	18	184	2,876,567	0.0030	3.81	0.77	1,315.52	3.67
P-599	4	3	1313.94	1313.54	18	63	2,876,567	0.0060	4.81	0.06	1,314.75	3.81
P-600	3	2	1313.54	1313.42	18	98	2,876,843	0.0010	2.52	0.34	1,314.69	3.49
P-601	9-11	9-10	1418.76	1412.4	8	318	1,150,926	0.0200	5.10	6.91	1,422.68	0.76
P-602	G-17-5	G-17-4	1298.64	1296.1	6	202	236,494	0.0130	3.32	2.54	1,298.95	3.11
P-603	17-70	17-69	1522.29	1508.5	8	821	7,255	0.0170	1.29	13.74	1,522.34	2.56
P-604	17-69	17-68	1508.5	1483.61	6	171	26,809	0.1460	4.25	24.94	1,508.60	4.95
P-605	17-68	17-67-2	1483.61	1436.74	6	386	26,809	0.1210	4.01	46.92	1,483.71	3.78
P-606	17-67-2	17-67-1	1436.74	1397.56	6	387	26,809	0.1010	3.77	39.23	1,436.84	2.58
P-607	17-67-1	17-67	1397.56	1355.43	6	390	26,809	0.1080	3.85	42.18	1,397.66	2.48
P-608	17-67	17-66-1	1355.43	1351.61	6	262	26,809	0.0150	1.91	3.82	1,355.53	3.24
P-609	17-66-1	17-66	1351.61	1349.84	6	265	26,809	0.0070	1.45	1.77	1,351.71	3.42
P-610	17-66	17-65Z	1349.84	1345.95	6	247	29,192	0.0160	2.01	3.91	1,349.94	3.31

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-611	17-65Z	17-64	1345.78	1335.35	8	87	64,390	0.1200	5.00	10.43	1,345.92	3.04
P-612	17-64	17-64-1	1335.35	1329.99	8	78	64,852	0.0690	4.14	5.36	1,335.49	4.04
P-613	17-64-1	17-63	1329.99	1322.45	8	117	65,623	0.0640	4.06	7.60	1,330.14	3.21
P-615	17-65-2	17-65	1350.56	1348.03	8	252	35,198	0.0100	1.75	2.54	1,350.67	3.58
P-616	17-65	17-65Z	1348.03	1345.78	8	47	35,198	0.0480	3.03	2.21	1,348.14	4.41
P-617	17-65-8	17-65-7	1396.68	1389.54	8	354	26,937	0.0200	2.06	7.14	1,396.77	3.86
P-618	17-65-7	17-65-6	1389.54	1383.03	8	105	27,841	0.0620	3.10	6.55	1,389.63	3.42
P-619	17-65-6	17-65-5	1383.03	1377.49	8	66	27,841	0.0840	3.41	5.54	1,383.12	4.06
P-620	17-65-5	17-65-4	1377.49	1375.45	8	83	29,323	0.0250	2.27	2.04	1,377.59	3.71
P-621	17-65-4	17-65-3	1375.45	1355.38	8	199	30,105	0.1010	3.72	20.07	1,375.55	3.05
P-622	17-65-10	17-65-9-1	1490.06	1466.1	6	158	10,129	0.1520	3.21	23.95	1,490.12	3.04
P-623	17-65-9-1	17-65-9	1466.1	1434.93	6	173	11,981	0.1800	3.59	31.14	1,466.17	3.70
P-624	17-65-9	17-65-8	1434.93	1396.85	6	242	24,534	0.1570	4.28	38.13	1,435.02	3.78
P-625	17-65-12	17-65-11	1531.69	1517.17	6	285	5,126	0.0510	1.79	14.51	1,531.73	4.23
P-626	17-65-11	17-65-10	1517.17	1490.06	6	348	7,656	0.0780	2.34	27.10	1,517.22	3.30
P-627	17-65-9-3	17-65-9-Z	1481.04	1469.75	6	189	967	0.0600	1.15	11.30	1,481.06	11.68
P-628	17-65-9-Z	17-65-9-1	1469.75	1466.1	6	133	967	0.0270	0.86	3.60	1,469.77	4.62
P-629	77-29	77-28	1533.84	1533.8	8	93	28,634	0.0000	0.54	0.07	1,534.02	2.46
P-630	77-24-4	77-24-1	1547.02	1537	6	579	47,172	0.0170	2.40	10.01	1,547.15	1.79
P-631	77-24	77-23	1533.24	1533.07	10	69	99,155	0.0020	1.41	0.04	1,533.47	7.26
P-632	85	79-8	1537.69	1532.84	10	79	283,362	0.0610	5.97	4.55	1,537.98	3.51
P-633	G-17	PS2	1285.46	1284.55	6	101	309,935	0.0090	3.07	0.93	1,285.83	3.95
P-634	G-22-1	G-22	1352.04	1341.79	6	306	3,865	0.0330	1.42	10.16	1,352.08	4.82
P-635	G-24-7	G-24-6	1392.48	1384.37	6	119	9,011	0.0680	2.34	8.08	1,392.54	4.45
P-636	G-24-7-1	G-24-7	1408.56	1392.48	6	107	2,095	0.1500	1.97	16.05	1,408.59	4.34
P-637	G-34-4	G-34-3	1419.28	1380.24	6	323	3,656	0.1210	2.17	39.04	1,419.32	3.53
P-638	G-34-3	G-34-2	1380.24	1365.43	6	284	4,347	0.0520	1.72	14.80	1,380.28	4.02
P-639	G-34-2	G-34-1	1365.43	1362.09	6	344	7,106	0.0100	1.11	3.32	1,365.48	4.58
P-640	G-34-1-1	G-34-1	1374.26	1362.09	6	136	3,980	0.0890	2.03	12.14	1,374.30	6.84
P-641	G-36-1	G-36	1412.74	1377.91	6	315	3,412	0.1110	2.06	34.70	1,412.77	7.77
P-642	G-40-3	G-40-2	1410.17	1409.79	6	34	25,026	0.0110	1.70	0.38	1,410.27	6.42
P-645	G-4-1	G-4	1414.5	1399.29	6	269	6,152	0.0570	1.96	14.91	1,414.55	6.31
P-646	G-1	G-1-A	1344.77	1344.31	8	45	830,108	0.0100	3.96	0.45	1,345.35	4.97
P-647	G-45	G-44	1438.35	1430.11	6	163	32,307	0.0510	3.12	8.24	1,438.46	9.57
P-648	G-44	G-43	1430.11	1419.84	6	319	35,194	0.0320	2.73	10.26	1,430.22	6.82
P-649	A-1	PS3	1465.33	1465.3	8	32	35,185	0.0010	0.76	0.02	1,465.52	8.81
P-650	A-16	PS3	1465.35	1465.3	8	33	37,341	0.0020	0.92	0.02	1,465.52	10.82
P-651	A-15	A-11	1476.91	1448.6	6	286	6,680	0.0990	2.45	28.14	1,476.96	7.28
P-652	17-74	17-75	1530.07	1528.7	6	174	34,946	0.0080	1.66	1.36	1,530.18	4.96
P-654	G-47	G-46	1450.08	1446.41	6	338	5,005	0.0110	1.05	3.67	1,450.12	6.46
P-655	G-1-A	PS1	1344.31	1343.91	8	40	830,108	0.0100	3.90	0.46	1,344.90	5.43
P-656	G-2	G-1	1347.23	1344.77	8	137	678,452	0.0180	4.93	2.36	1,347.72	10.08
P-657	G-1-8	G-1-7	1390.83	1384.35	6	159	76,633	0.0410	3.74	6.47	1,391.00	3.83
P-658	G-1-7	G-1-6	1384.35	1378.01	6	137	85,326	0.0460	4.03	6.41	1,384.53	4.72
P-659	G-1-6	G-1-5	1378.01	1372.87	6	157	85,326	0.0330	3.56	5.13	1,378.19	3.21
P-660	G-1-5	G-1-4	1372.87	1372.17	6	124	85,326	0.0060	1.90	0.71	1,373.06	5.21
P-661	G-1-4	G-1-3	1372.17	1369.49	6	133	85,326	0.0200	3.01	2.72	1,372.35	4.39
P-662	G-1-3	G-1-2	1369.49	1365.8	6	251	85,326	0.0150	2.68	3.63	1,369.67	3.77
P-663	G-1-2	G-1-1	1365.8	1360.48	6	349	148,519	0.0150	3.17	5.32	1,366.04	5.29
P-664	G-1-1	G-1	1360.48	1344.94	6	347	151,109	0.0450	4.69	15.37	1,360.72	3.77
P-665	G-1-13	G-1-12	1405.67	1404.4	6	237	6,681	0.0050	0.89	1.27	1,405.72	5.15
P-666	G-1-12	G-1-11	1404.4	1401.34	6	349	8,527	0.0090	1.13	2.95	1,404.46	7.24

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-667	G-2-7	G-2-6	1399.86	1397.95	6	146	37,040	0.0130	2.02	1.91	1,399.98	9.24
P668	96	(E) PS4	1495.67	1493.73	10	388	240,126	0.0050	2.34	1.95	1,495.95	6.92
P-669	20	19	1342.67	1324.62	10	91	1,221,407	0.1980	13.84	18.42	1,343.29	3.78
P-670	19	17	1324.62	1320.18	10	358	1,221,407	0.0120	4.94	4.10	1,325.24	2.48
P-671	17	16	1320.01	1319.13	12	264	1,221,407	0.0030	2.41	0.74	1,321.13	4.68
P-672	17-46	17-45	1581.69	1579.45	6	116	17,232	0.0190	1.85	2.24	1,581.77	2.68
P-673	17-43	17-44	1580.33	1576.44	6	221	7,171	0.0180	1.38	3.84	1,580.38	5.45
P-674	17-19	17-18	1413.49	1388.55	8	327	105,767	0.0760	4.95	25.02	1,413.68	3.56
P-675	17-18	17-17	1388.38	1381.52	10	353	119,815	0.0190	3.09	6.86	1,388.57	3.09
P-676	17-17	17-16	1381.52	1364.66	10	357	122,730	0.0470	4.25	16.86	1,381.71	2.94
P-677	104-3-1	79-8	1542.67	1533.17	6	486	5,823	0.0200	1.35	9.29	1,542.72	3.26
P-678	17-58	17-56	1484.21	1462.42	6	199	26,937	0.1090	3.88	21.84	1,484.31	3.56
P-679	17-49-3B	17-49-3A	1465.88	1459.49	6	91	2,771	0.0700	1.65	6.40	1,465.91	3.23
P-680	17-76-6	17-76-3	1477.71	1471.59	6	197	4,284	0.0310	1.43	6.13	1,477.75	4.46
P-681	17-49-3A	17-49-3	1459.49	1441.63	6	67	2,771	0.2670	2.62	17.85	1,459.52	1.51
P-682	103	101	1515.38	1505.12	8	367	111,163	0.0280	3.53	10.15	1,515.57	3.71
P-683	2	Outfall	1313.42	1312.51	18	254	2,876,843	0.0040	3.86	1.03	1,314.35	4.71
P-684	A-2-4	A-2-3	1484.52	1471.26	6	130	0	0.1020	0.00	13.26	1,484.52	3.29
P-685	A-2-3	A-2-2	1471.26	1460.34	6	488	0	0.0220	0.00	10.86	1,471.26	10.24
P-686	A-2-2	A-2-1	1460.34	1446.93	6	374	9,313	0.0360	1.91	13.43	1,460.40	13.87
P-687	41-6	41-5	1427.67	1425.18	6	174	11,098	0.0140	1.46	2.48	1,427.73	2.92
P-688	17-49-b	17-49A	1392.57	1387.86	8	173	110,894	0.0270	3.50	4.71	1,392.76	7.39
P-689	A-21	A-20	1499.72	1493.22	8	183	14,470	0.0360	2.07	6.47	1,499.79	7.41
P-690	71	70	1498.33	1496.96	10	183	712,517	0.0070	3.61	1.36	1,498.80	5.33
P-691	101-1-1A	101-1-1	1507.13	1506.09	6	183	81,497	0.0060	1.88	1.05	1,507.32	4.55
P-692	79-5	79-4	1532	1530.12	10	183	398,483	0.0100	3.48	1.86	1,532.35	9.25
P-693	61	60	1455.26	1436.37	10	185	765,051	0.1020	9.57	19.14	1,455.75	5.61
P-694	G-7	G-6	1414.21	1410.05	8	186	619,618	0.0220	5.25	4.16	1,414.67	4.39
P-695	64	63	1466.87	1465.33	10	188	748,594	0.0080	3.78	1.54	1,467.35	8.72
P-696	17-49-1	17-49	1420.94	1387.03	6	188	31,850	0.1800	4.85	33.97	1,421.05	2.80
P-697	41-5	41-4	1425.18	1424.41	6	151	12,402	0.0050	1.05	0.77	1,425.25	3.38
P-702	9-2	9-1	1324.54	1318.56	8	331	1,156,840	0.0180	5.13	7.26	1,329.41	0.00
P-703	21	20	1343.67	1342.67	10	128	1,221,407	0.0080	4.05	1.05	1,344.34	2.23
P-704	G-24-6-4	G-24-6-3	1408.37	1403.76	6	112	3,445	0.0410	1.47	4.61	1,408.41	5.98
P-705	A-24-1	A-24	1531.5	1505.57	6	280	6,904	0.0930	2.41	25.91	1,531.55	6.69
P-706	44	43	1387.27	1387.14	10	109	1,132,864	0.0010	3.21	0.80	1,388.54	6.48
P-707	43	42	1387.14	1383.22	10	196	1,135,049	0.0200	5.86	2.76	1,387.73	10.52
P-708	17-32	17-31	1534.84	1522.3	8	171	63,880	0.0730	4.20	12.54	1,534.98	3.11
P-709	17-31	17-30	1522.3	1520.88	8	170	66,889	0.0080	1.98	1.42	1,522.45	4.55
P-718	9-10	T-1	1412.4	1409.55	8	71	1,156,840	0.0400	5.13	1.56	1,415.77	1.16
P-719	T-1	9-9	1409.55	1407.59	8	119	1,156,840	0.0160	5.13	2.61	1,414.21	1.79
P-720	9-7	T-2	1404.41	1403.05	8	169	1,156,840	0.0080	5.13	3.74	1,407.40	5.32
P-721	T-2	9-6	1403.05	1386.64	8	103	1,156,840	0.1590	12.78	16.74	1,403.66	8.34
P-722	9-6	T-3	1386.64	1371.56	8	150	1,156,840	0.1010	10.79	15.37	1,387.25	4.48
P-723	T-3	9-5	1371.56	1360.29	8	135	1,156,840	0.0830	10.07	11.54	1,372.17	4.58
P-724	9-5	T-4	1360.29	1345.87	8	225	1,156,840	0.0640	9.11	13.66	1,360.90	3.81
P-725	T-4	9-4	1345.87	1344.34	8	103	1,156,840	0.0150	5.13	2.29	1,347.24	6.23
P-726	9-4	T-5	1344.34	1336.35	8	182	1,156,840	0.0440	7.86	7.57	1,344.95	3.03
P-727	T-5	9-3	1336.35	1333.7	8	96	1,156,840	0.0280	5.13	2.11	1,337.37	3.19
P-728	9-3	T-6	1333.7	1328.82	8	185	1,156,840	0.0260	5.13	4.06	1,335.27	2.50
P-729	T-6	9-2	1328.82	1324.54	8	82	1,156,840	0.0520	5.13	1.80	1,331.21	1.19
P-730	9-1	T-7	1318.56	1297.46	8	307	1,156,840	0.0690	5.13	6.74	1,325.14	0.00

TABLE T-2
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - EXISTING DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-731	T-7	9	1297.46	1317.46	8	146	1,156,840	-0.1370	5.13	2.73	1,321.01	2.53
P-805	17-74-1Z	17-74-1-A	1564.56	1563.79	6	134	29,264	0.0060	1.41	0.77	1,564.67	4.54
P-806	17-44	17-74-1Z	1576.44	1564.56	6	197	26,195	0.0600	3.12	11.87	1,576.54	5.58
P-807	G-1-7-1	G-1-7	1396.85	1384.35	6	125	8,692	0.1000	2.65	12.38	1,396.91	6.20
P-808	G-1-7-2	G-1-7-1	1399.66	1396.85	6	49	6,762	0.0580	2.03	2.80	1,399.71	4.73
P-809	G-1-7-2-1	G-1-7-2	1402.48	1399.66	6	66	1,930	0.0430	1.25	2.80	1,402.51	4.69
P-810	G-1-7-3	G-1-7-2	1402.52	1399.66	6	136	4,174	0.0210	1.23	2.85	1,402.56	5.52
P-811	G-1-7-3-1	G-1-7-3	1404.25	1402.52	6	42	990	0.0410	1.01	1.71	1,404.27	4.12
P-812	G-1-7-4	G-1-7-3	1408.25	1402.52	6	140	1,780	0.0410	1.20	5.72	1,408.28	5.12
P-814	G-5-1	G-5	1402.85	1399.81	6	132	1,113	0.0230	0.87	2.59	1,402.87	4.22

[a] "T-" prefix indicates a point of change in slope and not an actual manhole

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-1	101A	101	1505.24	1505.12	8	26	63,437	0.0050	1.59	0.09	1,505.40	4.02
P-2	44-B	44-A	1387.45	1387.39	10	38	230,457	0.0020	1.52	0.05	1,387.83	5.04
P-3	A-13	G-16	1443.9	1442.14	8	29	189,602	0.0610	5.43	1.87	1,444.15	2.93
P-4	24	23	1346.94	1346.68	10	38	301,056	0.0070	2.78	0.27	1,347.24	5.00
P-5	15	15A	1318.69	1318.57	12	43	339,489	0.0030	2.05	0.07	1,319.06	3.91
P-6	17-16-3	17-16-2	1368.85	1368.51	6	30	1,223	0.0110	0.70	0.34	1,368.87	4.75
P-7	45	44-B	1387.69	1387.45	10	37	230,457	0.0060	2.53	0.11	1,387.95	4.50
P-9	77-30	77-29	1534.08	1534.01	6	48	2,987	0.0010	0.44	0.09	1,534.13	1.84
P-10	17-76-7	17-76-8	1461.39	1460.9	6	28	273	0.0180	0.51	0.47	1,461.40	6.57
P-12	G-20	G-19	1314.01	1308.47	6	35	7,901	0.1580	3.03	5.54	1,314.06	4.41
P-13	77-23	79-8	1533.07	1532.84	10	33	12,727	0.0070	1.09	0.10	1,533.13	8.74
P-14	50-2-2	50-2-1	1406.81	1406.54	6	39	110	0.0070	0.29	0.27	1,406.82	6.21
P-15	G-24-6-3	G-24-6-2	1403.76	1398.52	6	39	552	0.1340	1.31	5.24	1,403.77	6.61
P-16	78	77	1511.85	1510.94	10	47	61,710	0.0190	2.54	0.86	1,511.98	5.17
P-17	77-3	77-2	1512.39	1512.24	6	39	0	0.0040	0.00	0.15	1,512.39	3.70
P-18	9-9	9-8	1407.59	1407.15	8	39	356,390	0.0110	3.54	0.48	1,407.94	3.66
P-19	56	55	1426.09	1425.71	10	41	135,476	0.0090	2.47	0.32	1,426.29	3.46
P-20	99	98	1503.04	1502.99	8	42	93,033	0.0010	1.09	0.13	1,503.29	4.89
P-21	17-51-8	17-51-8Z	1577.47	1576.79	6	42	878	0.0160	0.72	0.66	1,577.49	3.29
P-22	77-6-1	77-6	1518.18	1518.04	6	35	15,400	0.0040	1.03	0.15	1,518.27	4.06
P-23	79-6	79-5	1532.01	1532	10	47	41,595	0.0000	0.46	0.09	1,532.20	10.71
P-24	101-3-6	101-3-5	1534.39	1532.33	6	50	12,751	0.0410	2.19	2.08	1,534.46	4.25
P-25	17-34	17-33	1539.32	1536.47	8	53	29,814	0.0540	3.00	2.84	1,539.42	3.57
P-26	77-25	77-24	1533.38	1533.24	6	53	4,749	0.0030	0.63	0.12	1,533.44	6.86
P-27	62	61	1463.25	1455.26	10	55	134,971	0.1450	6.48	7.99	1,463.45	3.50
P-28	G-24-6-2	G-24-6-1	1398.52	1391.5	6	57	1,032	0.1230	1.53	7.02	1,398.54	6.86
P-29	G-18	G-17	1288.06	1285.46	6	60	11,211	0.0430	2.16	2.50	1,288.12	4.42
P-30	104-2-5-1	104-2-5	1540.05	1536.89	6	60	1,440	0.0530	1.21	3.14	1,540.07	6.20
P-31	30	29	1351.21	1350.68	10	61	298,604	0.0090	3.03	0.56	1,351.51	3.61
P-32	101-7-4	101-7-3	1523.88	1523.27	6	62	12,948	0.0100	1.34	0.61	1,523.95	6.41
P-33	104-4	104-3	1536.25	1535.99	8	62	7,298	0.0040	0.81	0.26	1,536.31	4.02
P-34	23	22	1346.68	1346.31	10	55	301,056	0.0070	2.77	0.37	1,346.98	4.70
P-35	17-40-z	17-40	1568.19	1564.77	6	64	16,939	0.0530	2.62	3.42	1,568.27	5.73
P-36	17-36	17-35	1543.1	1542.04	8	65	27,958	0.0160	1.94	1.08	1,543.19	5.13
P-37	G-2-5	G-2-4	1393.97	1390.26	6	65	7,692	0.0570	2.10	3.71	1,394.02	4.13
P-38	44-A	44	1387.39	1387.27	10	66	266,410	0.0020	1.66	0.10	1,387.79	2.27
P-39	G-2-6	G-2-5	1397.95	1393.97	6	66	7,463	0.0600	2.12	3.98	1,398.00	4.15
P-40	50-4	50-3	1423.24	1422.55	6	67	709	0.0100	0.57	0.69	1,423.26	6.16
P-41	G-28-4	G-28-3	1342.26	1341.76	6	67	16,287	0.0070	1.30	0.49	1,342.34	3.40
P-42	G-28-3	G-28-2	1341.76	1341.45	6	69	16,427	0.0040	1.09	0.32	1,341.85	3.49
P-43	G-36-3	G-36-2	1422.62	1420.99	6	67	1,127	0.0240	0.89	1.63	1,422.64	6.33
P-44	50-2-1	50-2	1406.54	1405.53	6	67	166	0.0150	0.43	1.00	1,406.55	5.07
P-45	17-76-5	17-76-8	1465.66	1460.9	6	70	1,648	0.0680	1.37	4.75	1,465.68	4.19
P-47	G-17-1	G-17	1286.16	1285.46	6	71	53,012	0.0100	2.03	0.68	1,286.30	3.42
P-48	15-4	15-3	1350.75	1345.02	8	71	14,329	0.0810	2.75	5.71	1,350.82	4.04
P-49	G-33	G-32	1344.42	1340.22	6	72	26,666	0.0580	3.11	4.24	1,344.52	2.60
P-50	17-47	17-46	1586.77	1581.69	6	73	415	0.0700	0.95	5.06	1,586.78	2.04
P-51	G-5	G-4	1399.81	1399.12	8	77	36,282	0.0090	1.70	0.69	1,399.92	7.59
P-52	34	33	1366.27	1361.51	10	77	297,384	0.0620	6.08	4.89	1,366.57	5.36
P-53	101-1	101A	1505.3	1505.24	6	79	63,335	0.0010	0.83	0.17	1,505.56	4.66
P-54	G-40-2	G-40-1	1409.79	1408.87	6	60	7,927	0.0150	1.36	0.92	1,409.84	6.53
P-55	G-36-2	G-36-1	1420.99	1412.74	6	80	1,427	0.1030	1.56	8.25	1,421.01	3.61

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-56	17-10	17-9	1353.39	1352.79	10	80	97,858	0.0080	2.08	0.59	1,353.56	4.82
P-57	A-19	A-18	1481.39	1478.56	8	82	4,476	0.0350	1.43	2.83	1,481.43	6.61
P-58	76-6-6	76-6-5	1527.97	1527.35	6	84	7,939	0.0070	1.05	0.61	1,528.03	5.66
P-59	17-63	17-2	1322.45	1321.01	8	85	16,462	0.0170	1.68	1.45	1,322.52	4.69
P-60	17-9	17-8	1352.79	1352.36	10	85	97,858	0.0050	1.81	0.44	1,352.97	4.66
P-61	A-18	A-17	1478.56	1477.63	8	86	4,729	0.0110	0.98	0.93	1,478.60	6.90
P-62	17-76-3	17-76-5	1471.59	1465.66	6	86	476	0.0690	0.98	5.92	1,471.60	3.50
P-63	G-21	G-20	1320.31	1314.01	6	87	7,901	0.0720	2.30	6.32	1,320.36	4.80
P-64	77-2	77-1	1512.24	1512.14	8	87	0	0.0010	0.00	0.03	1,512.24	3.75
P-65	98-5	98-4	1517.93	1517.83	6	120	601	0.0010	0.22	0.09	1,517.96	2.73
P-66	G-36	G-35	1377.91	1366.62	6	90	20,544	0.1250	3.75	11.29	1,378.00	7.28
P-67	77	76	1510.94	1510.68	10	84	78,333	0.0030	1.43	0.29	1,511.12	4.28
P-68	G-40-4	G-40-3	1413.4	1410.17	6	90	7,672	0.0360	1.79	3.25	1,413.45	5.55
P-69	79-2	79-1	1516.11	1514.88	10	91	60,901	0.0140	2.23	1.25	1,516.24	6.17
P-70	24-1	24	1373.28	1348.94	6	91	1,336	0.2670	2.20	24.35	1,373.30	5.75
P-72	50	49	1403.68	1403.03	10	92	226,656	0.0070	2.60	0.62	1,403.94	3.64
P-73	79	78	1512.92	1511.85	10	92	60,901	0.0120	2.11	1.07	1,513.05	4.72
P-74	79-8	79-7	1532.84	1532.79	10	108	40,844	0.0000	0.60	0.11	1,533.04	9.73
P-75	77-26	77-25	1533.33	1533.38	8	108	3,652	0.0000	0.02	0.02	1,533.46	7.19
P-76	101-1-1	101-1	1506.09	1505.3	6	95	61,979	0.0080	1.99	0.68	1,506.24	4.58
P-77	25	24-A	1348.66	1347.87	10	97	299,541	0.0080	2.96	0.79	1,348.96	4.60
P-78	G-1-15	G-1-14	1408.54	1406.71	6	97	385	0.0190	0.59	1.82	1,408.55	6.80
P-79	26	25	1349.4	1348.66	10	98	299,098	0.0080	2.88	0.74	1,349.70	3.70
P-80	44-10	44-9	1392.86	1391.49	6	82	2,588	0.0170	0.99	1.37	1,392.89	7.21
P-81	67	66	1479.92	1478.29	10	99	117,914	0.0160	2.90	1.62	1,480.10	4.85
P-82	101-4	101-3	1516.73	1515.74	6	99	30,028	0.0100	1.72	0.95	1,516.84	5.44
P-83	77-13-Z	77-13	1556.93	1550.21	6	99	2,111	0.0680	1.51	6.71	1,556.96	4.68
P-84	41-5-1	41-5	1442.65	1425.18	6	100	219	0.1750	1.01	17.42	1,442.66	4.02
P-85	104-2-8-1	104-2-8	1559.5	1558.3	6	100	1,046	0.0120	0.67	1.20	1,559.52	4.55
P-86	44-19	44-18	1416.31	1404.27	6	100	3,798	0.1200	2.18	12.04	1,416.35	5.09
P-87	G-6-1	G-6	1412.03	1410.22	6	101	636	0.0180	0.66	1.81	1,412.05	4.60
P-88	G-39	G-38	1400.42	1397.89	6	103	18,303	0.0250	2.05	2.55	1,400.50	3.51
P-89	17-23	17-22-1	1439.63	1435.8	8	104	43,728	0.0370	2.95	3.83	1,439.75	3.36
P-90	98-3	98-2	1517.16	1516.59	6	106	2,581	0.0050	0.66	0.57	1,517.19	5.40
P-91	104-1	104	1524.27	1520.73	8	106	19,607	0.0330	2.25	3.56	1,524.35	4.73
P-92	G-32	G-31	1340.22	1339.06	6	106	26,666	0.0110	1.72	1.16	1,340.32	6.24
P-93	60	59	1436.37	1431.02	10	107	135,352	0.0500	4.48	5.35	1,436.57	5.90
P-94	17-21	17-20	1420.87	1417.9	8	108	44,018	0.0270	2.67	2.97	1,420.99	3.12
P-95	17-74-1-A	17-74-1	1563.79	1555.85	6	108	4,911	0.0740	2.01	7.94	1,563.83	2.52
P-96	17-61	17-60-2	1537.1	1531.79	6	108	1,962	0.0490	1.32	5.30	1,537.13	3.25
P-97	17-37	17-36	1544.61	1543.1	8	109	21,751	0.0140	1.70	1.50	1,544.69	7.05
P-98	104-2-5	104-2-4	1536.89	1534.77	6	110	3,983	0.0190	1.18	2.12	1,536.93	7.67
P-99	63	62	1465.33	1463.25	10	110	134,971	0.0190	3.17	2.13	1,465.53	4.88
P-100	G-29	G-28	1337.36	1335.05	6	114	29,518	0.0200	2.21	2.28	1,337.46	7.85
P-101	17-16	17-15	1364.66	1363.77	10	111	52,888	0.0080	1.78	0.85	1,364.78	7.55
P-102	24-2	24-1	1374.17	1373.28	6	111	1,208	0.0080	0.61	0.89	1,374.19	3.66
P-103	G-2-10	G-2-9	1417.63	1415.12	6	112	5,331	0.0220	1.36	2.51	1,417.67	5.36
P-104	53-5	53-4	1470.18	1465.7	6	112	387	0.0400	0.76	4.48	1,470.19	3.78
P-105	48	47	1402.6	1398.09	10	113	229,393	0.0400	4.82	4.61	1,402.86	3.49
P-107	86	85	1537.81	1537.69	10	98	27,128	0.0010	0.75	0.17	1,537.94	4.00
P-108	48-2	48-1	1430.34	1428.17	6	114	2,568	0.0190	1.03	2.17	1,430.37	4.03
P-109	24-3	24-2	1379.45	1374.17	6	117	1,208	0.0450	1.09	5.28	1,379.47	4.13

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-110	17-6	17-5	1332.05	1328.77	10	116	98,441	0.0280	3.32	3.28	1,332.22	3.75
P-111	104	103	1520.73	1515.38	8	116	19,607	0.0460	2.49	5.35	1,520.81	3.62
P-112	49	48	1403.03	1402.6	10	116	226,656	0.0040	2.06	0.46	1,403.32	3.64
P-113	44-17	44-A-5	1396.44	1391.19	6	117	3,874	0.0450	1.58	5.26	1,396.48	13.19
P-114	17-11	17-10	1357.32	1353.39	10	118	97,559	0.0330	3.51	3.99	1,357.49	5.84
P-115	44-13	44-12	1409.88	1404.81	6	118	585	0.0430	0.90	5.06	1,409.89	7.34
P-116	17-26	17-25	1474.28	1465.48	8	119	41,964	0.0740	3.71	8.80	1,474.40	4.72
P-117	77-24-1	77-24	1537	1533.57	6	119	7,923	0.0290	1.69	3.44	1,537.05	4.96
P-118	G-45-1	G-45	1444.1	1438.35	6	119	6,340	0.0480	1.87	5.74	1,444.15	5.30
P-119	44-25-2	44-25-1	1447.58	1433.02	6	120	11,442	0.1210	3.08	14.56	1,447.64	4.46
P-121	17-41	17-40-z	1574.27	1568.19	6	122	9,813	0.0500	2.19	6.06	1,574.33	6.87
P-122	17-2	17-1	1320.68	1320.48	12	125	115,865	0.0020	1.24	0.27	1,320.92	1.33
P-123	17-33	17-32	1536.47	1534.84	8	126	36,683	0.0130	1.93	1.63	1,536.58	6.31
P-124	77-16-9	77-16-8A	1526.78	1518.32	6	127	6,027	0.0670	2.06	8.13	1,526.83	3.16
P-125	72	71	1499.29	1498.33	10	127	106,604	0.0080	2.14	0.96	1,499.46	7.90
P-126	38	37	1374.39	1373.01	10	128	296,634	0.0110	3.26	1.38	1,374.69	7.30
P-127	G-24-8	G-24-7	1403.69	1392.48	6	128	975	0.0880	1.33	11.21	1,403.71	6.27
P-128	17-7	17-6	1342.54	1332.05	10	129	98,199	0.0810	4.81	10.49	1,342.71	2.76
P-129	42-2-2	41-2-1	1416.96	1416.4	6	129	1,354	0.0040	0.51	0.50	1,416.99	4.25
P-130	G-17-7	G-17-6	1327.42	1321.98	6	130	51,629	0.0420	3.36	5.44	1,327.56	11.60
P-131	G-37	G-36	1381.19	1377.91	6	131	18,303	0.0250	2.06	3.27	1,381.27	3.29
P-132	101-6-1	101-6	1546.66	1529.12	6	131	19,422	0.1340	3.78	17.54	1,546.74	3.79
P-133	77-1	77	1512.14	1510.94	8	124	16,520	0.0100	1.38	1.09	1,512.21	3.88
P-134	17-12	17-11	1358.24	1357.32	10	132	97,426	0.0070	2.03	0.92	1,358.41	5.79
P-136	A-6	A-5	1475.2	1470.92	8	134	3,743	0.0320	1.33	4.27	1,475.23	9.10
P-137	104-2-3	104-2-2	1529.31	1528.85	8	135	9,120	0.0030	0.80	0.45	1,529.38	2.79
P-138	77-13-2	77-13-1	1566.07	1556.36	6	136	1,605	0.0710	1.39	9.71	1,566.09	4.41
P-139	G-31	G-30	1339.06	1338.22	6	136	26,666	0.0060	1.41	0.84	1,339.16	3.29
P-140	59	58	1431.02	1429.55	10	136	135,476	0.0110	2.61	1.50	1,431.22	7.47
P-141	G-17-4	G-17-3	1296.1	1294.39	6	137	52,504	0.0120	2.20	1.71	1,296.24	3.20
P-142	17-54	17-53	1428.98	1428.34	6	138	10,260	0.0050	0.96	0.64	1,429.05	2.91
P-143	A-17	A-16	1477.63	1465.35	8	138	5,617	0.0890	2.14	12.17	1,477.67	7.10
P-144	53-4	53-2	1465.7	1449.55	6	139	542	0.1160	1.23	16.14	1,465.71	3.25
P-145	41-3-1	41-3	1426.88	1422.74	6	139	11,483	0.0300	1.91	4.12	1,426.94	4.43
P-146	77-12	77-6-7	1541.12	1533.91	6	139	4,563	0.0520	1.74	7.20	1,541.16	3.63
P-147	52	51	1407.76	1405.81	10	139	225,101	0.0140	3.31	1.95	1,408.02	4.04
P-148	24-A	24	1347.87	1346.94	10	139	299,657	0.0070	2.76	0.93	1,348.17	2.60
P-149	17-22	17-21	1428.41	1420.87	8	140	43,974	0.0540	3.37	7.54	1,428.53	2.94
P-150	17-48	17-47	1590.71	1586.77	6	140	415	0.0280	0.70	3.94	1,590.72	4.98
P-151	41-3	41-2-1	1422.74	1416.4	6	140	20,140	0.0450	2.61	6.34	1,422.83	3.59
P-152	17-18-2	17-18-1	1449.65	1436.42	6	141	5,324	0.0940	2.25	13.23	1,449.69	3.11
P-153	51	50	1405.81	1403.68	10	141	225,174	0.0150	3.40	2.13	1,406.07	6.74
P-154	15-3-1	15-3	1351.58	1345.19	6	141	7,549	0.0450	1.93	6.41	1,351.63	3.81
P-155	77-7-1	77-7	1529.82	1525.86	6	129	4,642	0.0310	1.45	3.96	1,529.86	3.57
P-156	G-19	G-18	1308.47	1288.06	6	142	8,132	0.1440	2.96	20.40	1,308.52	4.73
P-157	101-3-2	101-3-1	1517.87	1517.16	6	143	13,415	0.0050	1.06	0.68	1,517.95	3.36
P-158	17-15	17-14	1363.77	1360.85	10	144	96,881	0.0200	2.95	2.96	1,363.94	6.80
P-159	73	72	1500.38	1499.29	10	144	106,604	0.0080	2.14	1.10	1,500.55	7.30
P-160	48-6	48-4	1455.4	1451.3	6	144	1,175	0.0280	0.95	4.09	1,455.42	3.76
P-161	G-40	G-39	1404.1	1400.42	6	145	18,303	0.0250	2.07	3.70	1,404.18	5.22
P-162	77-13	77-12	1550.21	1541.12	6	146	4,348	0.0620	1.83	9.09	1,550.25	2.64
P-163	G-34	G-33	1352.17	1344.42	6	146	23,745	0.0530	2.90	7.74	1,352.26	3.24

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-164	17-51-10A	17-51-8	1579.8	1577.47	6	147	878	0.0160	0.71	2.33	1,579.82	1.59
P-165	17-49-2	17-49-1	1433.9	1420.94	6	147	924	0.0880	1.31	12.94	1,433.92	5.92
P-166	17-40	17-39	1564.77	1562.28	6	148	17,333	0.0170	1.76	2.50	1,564.85	4.08
P-167	G-23	G-22	1347.22	1341.79	6	148	5,879	0.0370	1.66	5.42	1,347.27	6.02
P-168	57	56	1427.9	1426.09	10	148	135,476	0.0120	2.72	1.84	1,428.10	3.50
P-169	35	34	1367.3	1366.27	10	149	297,153	0.0070	2.78	1.03	1,367.60	5.25
P-170	69	68	1494.79	1490.67	10	149	111,012	0.0280	3.42	4.11	1,494.97	6.82
P-171	17-14	17-13	1360.85	1359.37	10	150	96,983	0.0100	2.29	1.47	1,361.02	3.26
P-172	54	53	1420.86	1418.78	10	150	222,342	0.0140	3.29	2.08	1,421.11	3.89
P-173	G-30	G-29	1338.22	1337.36	6	152	27,265	0.0060	1.37	0.86	1,338.33	3.49
P-174	G-6	G-5	1410.05	1399.81	8	152	36,016	0.0670	3.42	10.24	1,410.16	4.97
P-175	17-43-1	17-43	1592.04	1580.33	6	152	703	0.0770	1.17	11.71	1,592.06	3.51
P-176	77-16-8	77-16-7	1518.58	1517.82	6	152	6,271	0.0050	0.85	0.74	1,518.63	4.88
P-177	17-43-2	17-43-1	1596.13	1592.04	6	153	316	0.0270	0.62	4.09	1,596.14	3.39
P-178	15-3-3	15-3-2	1398.44	1374.45	6	153	7,225	0.1570	2.95	23.99	1,398.49	3.52
P-179	50-2	50	1405.53	1404.01	6	153	1,289	0.0100	0.67	1.52	1,405.55	5.73
P-180	29	26	1350.68	1349.4	10	155	298,604	0.0080	2.97	1.28	1,350.98	3.90
P-181	G-2-15	G-2-14	1448.47	1441.65	6	154	4,180	0.0440	1.60	6.83	1,448.51	5.70
P-182	44-25-3	44-25-2	1468.75	1447.58	6	154	11,049	0.1370	3.18	21.17	1,468.81	4.95
P-183	17-56	17-55	1462.42	1441.48	6	154	5,019	0.1360	2.52	20.92	1,462.46	4.71
P-184	G-18-6	G-18-5	1377.3	1366.41	6	154	1,516	0.0710	1.37	10.89	1,377.32	4.73
P-185	53-1	53	1434.84	1419.11	6	156	2,320	0.1010	1.81	15.74	1,434.87	3.15
P-186	17-76-1	17-76-5	1467.89	1465.66	6	156	1,172	0.0140	0.74	2.23	1,467.91	3.27
P-187	32A	31	1358.23	1354.15	10	157	297,619	0.0260	4.47	4.08	1,358.53	3.95
P-188	17-49-3	17-49-2	1441.63	1433.9	6	157	709	0.0490	0.99	7.73	1,441.65	3.87
P-189	G-18-2	G-18-1	1333.29	1317.72	6	157	2,827	0.0990	1.88	15.57	1,333.32	3.49
P-190	A-6-1	A-6	1477.84	1475.2	8	158	2,515	0.0170	0.94	2.63	1,477.87	6.41
P-191	G-41	G-40	1408.35	1404.1	6	159	10,064	0.0270	1.76	4.23	1,408.41	5.66
P-192	G-1-14	G-1-13	1406.71	1405.67	6	159	703	0.0070	0.48	1.04	1,406.73	5.99
P-193	58	57	1429.55	1427.9	10	159	135,476	0.0100	2.57	1.67	1,429.75	5.03
P-194	17-46-1	17-46	1584.42	1581.69	6	159	1,749	0.0170	0.89	2.73	1,584.44	3.58
P-196	G-38	G-37	1397.89	1381.19	6	160	18,303	0.1040	3.40	16.74	1,397.97	3.30
P-197	33	32A	1361.51	1358.23	10	160	297,384	0.0200	4.11	3.28	1,361.81	2.90
P-198	17-8	17-7	1352.36	1342.54	10	160	98,174	0.0610	4.36	9.82	1,352.53	3.75
P-199	G-1-10	G-1-9	1399.68	1397.91	6	161	5,201	0.0110	1.06	1.77	1,399.72	3.99
P-200	98-4	98-3	1517.83	1517.16	6	162	2,581	0.0040	0.61	0.67	1,517.87	5.56
P-201	53-2	53-1	1449.55	1434.84	6	162	2,320	0.0910	1.71	14.72	1,449.58	3.04
P-202	17-79-4	17-79-3	1545.03	1538.81	6	163	69	0.0380	0.47	6.22	1,545.04	4.13
P-203	41-1	41	1390.55	1382.42	6	163	23,669	0.0500	2.83	8.16	1,390.64	3.08
P-204	101-7	101-3-1	1519.01	1517.16	6	163	16,276	0.0110	1.51	1.82	1,519.09	3.89
P-205	G-24	G-23	1348.35	1347.22	6	164	4,430	0.0070	0.86	1.13	1,348.39	4.30
P-206	55	54	1425.71	1420.86	10	164	222,005	0.0300	4.30	4.85	1,425.96	3.42
P-208	G-2-2	G-2-1	1376.83	1365.5	6	165	8,565	0.0690	2.31	11.33	1,376.89	4.11
P-209	G-40-4-2	G-40-4-1	1431.68	1420.89	6	165	703	0.0650	1.10	10.78	1,431.70	6.29
P-210	77-6-4	77-6-7	1535.13	1533.91	6	166	3,376	0.0070	0.80	1.20	1,535.17	7.46
P-211	48-1	48	1428.17	1402.93	6	168	2,680	0.1500	2.18	25.26	1,428.20	4.53
P-212	48-5	48-4	1466.04	1451.3	6	168	835	0.0880	1.28	14.73	1,466.06	3.76
P-213	17-55	17-54	1441.48	1428.98	6	171	10,260	0.0730	2.50	12.49	1,441.54	3.11
P-214	44-21	44-20	1419.12	1417.91	6	171	2,285	0.0070	0.70	1.20	1,419.15	9.42
P-215	77-6-7	76-6-6	1533.91	1527.97	6	172	7,939	0.0350	1.81	5.94	1,533.96	8.51
P-216	31	30	1354.15	1351.21	10	173	297,789	0.0170	3.85	2.94	1,354.45	2.90
P-217	A-2-1	A-13	1446.93	1444.07	6	308	36,093	0.0090	1.78	2.87	1,447.05	4.96

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-218	A-11-3-1	A-11-3	1469.65	1468.71	6	175	1,298	0.0050	0.54	0.92	1,469.68	6.29
P-219	G-27	G-26	1329.75	1328.63	6	177	50,716	0.0060	1.71	1.11	1,329.89	4.19
P-220	101-7-3	101-7-1	1523.27	1521.3	6	179	12,948	0.0110	1.39	1.96	1,523.34	5.41
P-221	77-9	77-7-1	1541.22	1529.82	6	225	4,481	0.0510	1.72	11.40	1,541.26	4.07
P-222	77-16-1	78	1513.22	1512.18	6	51	809	0.0200	0.73	1.04	1,513.24	4.03
P-223	98-2	98	1516.59	1502.82	6	648	3,411	0.0210	1.17	13.64	1,516.62	8.14
P-224	17-49-5	17-49-1	1464.07	1420.94	6	175	3,635	0.2460	2.84	43.13	1,464.11	3.74
P-225	G-43	G-41	1419.84	1408.35	6	360	10,064	0.0320	1.88	11.51	1,419.90	5.22
P-226	17-51-6	17-51-4a	1529.01	1528.22	6	245	15,782	0.0030	0.96	0.81	1,529.10	3.03
P-227	101-3-1	101-3	1517.16	1515.74	6	183	29,691	0.0080	1.58	1.37	1,517.26	2.42
P-228	17-49-7	17-49-5	1529.37	1464.07	6	839	3,212	0.0780	1.83	65.30	1,529.40	2.73
P-229	17-77	17-75-4	1533.57	1525.1	8	173	17,893	0.0490	2.47	8.45	1,533.64	3.46
P-230	77-16-8A	77-16-8	1518.32	1518.58	6	187	6,204	-0.0010	0.05	0.06	1,518.69	2.63
P-231	56-3	56-1	1455.94	1434.21	6	353	0	0.0620	0.00	21.73	1,455.94	2.63
P-232	41-4	41-3	1424.41	1422.74	6	230	8,657	0.0070	1.07	1.64	1,424.47	6.74
P-234	G-2-14	G-2-13	1441.65	1438.09	6	192	4,180	0.0190	1.18	3.55	1,441.69	4.03
P-235	50-3	50-2	1422.55	1405.53	6	190	930	0.0900	1.32	17.02	1,422.57	6.94
P-236	17-22-1	17-22	1435.8	1428.41	8	193	43,919	0.0380	2.99	7.39	1,435.92	4.75
P-237	17-25-1	17-25	1485.71	1465.65	6	194	631	0.1030	1.22	20.07	1,485.73	3.32
P-238	G-2-7-1	G-2-7	1412.13	1399.86	6	197	585	0.0620	1.01	12.23	1,412.14	5.57
P-239	22	21	1346.31	1343.67	10	91	301,934	0.0290	4.66	2.74	1,346.61	3.70
P-240	17-39	17-37	1562.11	1544.61	8	195	21,751	0.0900	3.24	17.54	1,562.19	3.95
P-241	G-28-11-1	G-28-11	1373.47	1369.05	6	196	3,529	0.0230	1.20	4.40	1,373.51	5.85
P-242	98	97	1502.82	1497.72	10	196	96,444	0.0260	3.21	5.08	1,502.99	3.43
P-243	G-12-1	G-12	1438.65	1437.7	6	182	1,686	0.0050	0.58	0.95	1,438.68	3.07
P-244	17-65-3	17-65-2	1355.38	1350.56	8	197	7,953	0.0240	1.52	4.82	1,355.43	4.46
P-245	17-45	17-44	1579.45	1576.44	6	292	2,680	0.0100	0.84	3.00	1,579.48	2.85
P-246	G-24-1	G-24	1351.4	1348.35	6	198	4,242	0.0150	1.11	3.05	1,351.44	4.36
P-247	17-28	17-27	1503.69	1492.34	8	322	41,346	0.0350	2.85	11.35	1,503.80	4.05
P-248	17-27	17-26	1492.34	1474.28	8	436	41,936	0.0410	3.03	18.06	1,492.46	3.17
P-249	17-20	17-19	1417.9	1413.49	8	121	44,180	0.0360	2.94	4.41	1,418.02	3.35
P-250	101	100-1	1505.12	1504.28	8	200	84,130	0.0040	1.66	0.82	1,505.30	3.97
P-251	47	46	1398.09	1388.58	10	201	229,864	0.0470	5.12	9.50	1,398.35	3.39
P-252	46	45	1388.58	1387.69	10	163	230,315	0.0050	2.38	0.90	1,388.85	6.43
P-253	A-10-1	A-10	1493.3	1478.2	6	201	1,845	0.0750	1.53	14.91	1,493.33	4.56
P-254	G-24-6-1	G-24-6	1391.5	1384.37	6	201	1,325	0.0350	1.07	7.12	1,391.52	6.87
P-255	A-20	A-19	1493.22	1481.39	8	202	4,113	0.0590	1.68	11.83	1,493.26	6.67
P-256	G-18-7	G-18-6	1380.29	1377.3	6	202	1,024	0.0150	0.71	2.99	1,380.31	4.79
P-257	101-1-1B	101-1-1A	1509.41	1507.13	6	203	61,150	0.0110	2.21	2.27	1,509.56	4.83
P-258	44-20-1	44-20	1436.15	1417.91	6	203	791	0.0900	1.28	18.22	1,436.17	5.76
P-259	44-25	44-A-7	1415	1403.5	6	203	13,442	0.0570	2.50	11.53	1,415.07	7.00
P-260	41-3-2	41-3-1	1444.26	1426.88	6	204	291	0.0850	0.87	17.33	1,444.27	4.32
P-261	55-3	55-2	1452.62	1445.49	8	204	80,206	0.0350	3.47	7.13	1,452.78	6.09
P-262	15-3-2	15-3-1	1374.45	1351.58	6	204	7,549	0.1120	2.65	22.89	1,374.50	1.57
P-263	G-28-7-1	G-28-7	1363.85	1356.77	6	209	2,452	0.0340	1.25	7.04	1,363.88	6.37
P-264	A-11-4	A-11-3	1481.89	1468.71	6	205	4,156	0.0640	1.80	13.17	1,481.93	5.91
P-265	101-7-2	101-7-1	1529.89	1521.3	6	205	2,405	0.0420	1.35	8.54	1,529.92	4.77
P-266	G-18-8	G-18-7	1394.28	1380.29	6	205	883	0.0680	1.18	13.99	1,394.30	3.83
P-267	G-40-5	G-40-4	1427.18	1413.4	6	207	6,310	0.0670	2.09	13.77	1,427.23	5.37
P-268	74-1	74	1509.68	1504.12	6	207	15,435	0.0270	2.00	5.58	1,509.76	4.00
P-269	G-40-6	G-40-5	1443.47	1427.18	6	208	6,124	0.0780	2.20	16.29	1,443.52	6.22
P-270	100-1	100	1504.28	1503.71	8	209	84,130	0.0030	1.42	0.55	1,504.49	3.91

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-271	17-30	17-29	1520.88	1514.34	8	209	39,282	0.0310	2.69	6.54	1,520.99	3.73
P-272	G-2-11	G-2-10	1428.2	1417.63	6	210	5,248	0.0500	1.79	10.57	1,428.24	5.44
P-273	G-2-4	G-2-3	1390.26	1385.89	6	210	8,101	0.0210	1.51	4.37	1,390.31	3.99
P-274	44-25-1	44-25	1433.02	1415	6	211	12,803	0.0850	2.86	18.02	1,433.09	4.73
P-275	G-17-2	G-17-1	1287.56	1286.16	6	211	53,012	0.0070	1.76	1.40	1,287.70	3.40
P-276	G-24-4	G-24-3	1360.16	1354.19	6	213	3,182	0.0280	1.26	5.96	1,360.19	6.34
P-277	G-40-1	G-40	1408.87	1404.1	6	213	8,059	0.0220	1.55	4.74	1,408.92	7.33
P-278	G-14	G-13	1439.73	1438.86	8	213	417	0.0040	0.34	0.87	1,439.74	4.99
P-279	65	64	1473.18	1466.87	10	214	132,597	0.0290	3.69	6.31	1,473.38	5.66
P-280	53	52	1418.78	1407.76	10	214	224,948	0.0510	5.25	11.02	1,419.04	3.44
P-281	77-16-7	74-1	1517.82	1509.68	6	214	15,435	0.0380	2.27	8.16	1,517.90	8.10
P-282	68	67	1490.67	1479.92	10	216	117,898	0.0500	4.28	10.75	1,490.85	5.02
P-284	G-6-2	G-6-1	1417.21	1412.03	6	220	485	0.0240	0.68	5.18	1,417.22	4.64
P-285	56-1	57	1434.21	1428.23	6	220	0	0.0270	0.00	5.98	1,434.21	2.90
P-286	17-5	17-4	1328.77	1326.68	10	221	98,828	0.0090	2.27	2.09	1,328.94	4.69
P-287	G-17-3	G-17-2	1294.39	1287.56	6	221	52,788	0.0310	3.03	6.83	1,294.53	3.38
P-288	G-28-11	G-28-10	1369.05	1367.85	6	228	7,541	0.0050	0.91	1.20	1,369.11	6.21
P-289	101-7-1	101-7	1521.3	1519.01	6	222	15,353	0.0100	1.44	2.29	1,521.38	11.24
P-290	70	69	1496.96	1494.79	10	222	111,012	0.0100	2.38	2.19	1,497.14	4.47
P-291	79-1	79	1514.88	1512.92	10	225	60,901	0.0090	1.91	1.97	1,515.01	4.17
P-292	36	35	1368.32	1367.3	10	225	297,153	0.0050	2.39	1.04	1,368.64	8.79
P-293	G-28-10	G-28-9	1367.85	1366.46	6	225	7,800	0.0060	0.98	1.39	1,367.91	7.07
P-294	G-43-1	G-43	1420.76	1419.84	6	233	1,001	0.0040	0.45	0.88	1,420.78	3.50
P-295	G-28-9	G-28-8	1366.46	1359.33	6	227	8,046	0.0310	1.75	7.13	1,366.51	6.50
P-296	39	38	1375.12	1374.39	10	228	296,366	0.0030	2.10	0.78	1,375.47	7.33
P-297	76-6-4	77-6-3	1526.01	1523.67	6	229	8,999	0.0100	1.22	2.34	1,526.07	5.30
P-298	17-78-1	17-78	1553.38	1534	6	230	1,450	0.0840	1.46	19.28	1,553.40	4.23
P-300	89	87	1538.89	1538.47	10	231	26,799	0.0020	0.86	0.43	1,539.01	6.06
P-301	77-16-7A	77-16-7	1521.96	1517.82	6	231	9,164	0.0180	1.50	4.12	1,522.02	7.39
P-302	90	89	1539.96	1538.89	10	232	26,452	0.0050	1.19	1.05	1,540.06	3.55
P-303	79-3	79-2	1526.39	1516.11	10	233	60,901	0.0440	3.36	10.33	1,526.52	5.37
P-304	G-8	G-7	1420.99	1414.21	8	238	34,831	0.0280	2.51	6.78	1,421.09	7.10
P-305	91	90	1540.45	1539.96	10	234	26,452	0.0020	0.90	0.51	1,540.56	8.04
P-306	17-60-2	17-57	1531.79	1516.45	6	234	3,232	0.0660	1.72	15.34	1,531.82	4.38
P-307	101-3-5	101-3-4	1532.33	1528.27	6	235	12,751	0.0170	1.62	4.06	1,532.40	3.06
P-308	G-13	G-12	1438.86	1437.53	8	230	417	0.0060	0.38	1.25	1,438.87	8.94
P-309	G-28-2	G-28-1	1341.45	1339.82	6	241	17,133	0.0070	1.28	1.63	1,341.53	3.40
P-310	G-40-8	G-40-7	1461.66	1456.5	6	241	4,953	0.0210	1.31	5.16	1,461.70	6.04
P-311	G-26	G-17-7	1328.63	1327.42	6	241	51,629	0.0050	1.58	1.22	1,328.78	8.99
P-312	44-18	44-17	1404.27	1396.44	6	237	3,874	0.0330	1.41	7.84	1,404.31	7.05
P-313	17-60	17-59	1502.08	1494.79	6	237	3,984	0.0310	1.39	7.29	1,502.12	5.20
P-314	A-22	A-21	1502.55	1499.72	8	269	1,794	0.0110	0.72	2.83	1,502.57	6.76
P-315	17-13	17-12	1359.37	1358.24	10	238	97,148	0.0050	1.77	1.14	1,359.55	2.68
P-316	37	36	1373.01	1368.32	10	238	296,980	0.0200	4.05	4.67	1,373.31	7.40
P-317	G-40-9	G-40-8	1465.11	1461.66	6	243	4,354	0.0140	1.09	3.45	1,465.15	6.05
P-318	44-11	44-10	1397.08	1392.86	6	239	2,177	0.0180	0.95	4.22	1,397.11	8.04
P-319	A-26	A-27	1492.19	1478.81	6	240	5,212	0.0560	1.86	13.38	1,492.23	6.50
P-320	53-3	53-2	1465.7	1449.55	6	229	909	0.0710	1.20	16.14	1,465.72	1.98
P-321	G-2-1	G-2	1365.5	1347.4	6	241	8,704	0.0750	2.40	18.12	1,365.56	3.90
P-322	44-A-6	44-A-5	1398.56	1391.02	8	242	25,860	0.0310	2.38	7.51	1,398.65	5.23
P-323	17-4	17-2	1326.68	1320.85	10	242	99,001	0.0240	3.15	5.88	1,326.85	4.76
P-324	G-1-9	G-1-8	1397.91	1390.83	6	242	5,926	0.0290	1.54	7.08	1,397.96	6.03

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-325	G-28-8	G-28-7	1359.33	1356.77	6	243	8,551	0.0110	1.21	2.55	1,359.39	3.87
P-326	92	91	1541.8	1540.45	10	243	26,142	0.0060	1.26	1.33	1,541.89	5.18
P-327	104-2-5-2	104-2-5-1	1558.26	1540.05	6	243	748	0.0750	1.18	18.20	1,558.28	4.62
P-328	17-75-2	17-75-3	1527.48	1526.38	6	228	7,672	0.0050	0.89	1.11	1,527.54	5.12
P-329	G-23-3	G-23-2	1372.05	1366.85	6	247	694	0.0210	0.72	5.20	1,372.07	5.98
P-330	17-53	17-52	1428.34	1426.8	6	246	11,469	0.0060	1.10	1.54	1,428.41	3.28
P-331	G-2-13	G-2-12	1438.09	1436.6	6	255	4,674	0.0060	0.82	1.49	1,438.14	4.91
P-332	G-24-3	G-24-2	1354.19	1352.7	6	248	3,617	0.0060	0.77	1.49	1,354.23	4.88
P-333	G-18-1	G-18	1317.72	1288.06	6	249	3,079	0.1190	2.06	29.63	1,317.75	3.60
P-334	44-23	44-22	1427.94	1426.32	6	256	1,316	0.0060	0.57	1.62	1,427.96	8.97
P-335	15-3-4	15-3-3	1404.3	1398.44	6	251	6,026	0.0230	1.43	5.86	1,404.35	3.27
P-336	93	92	1543.22	1541.8	10	251	25,911	0.0060	1.27	1.42	1,543.31	3.61
P-337	G-35	G-34	1366.62	1352.17	6	253	21,145	0.0570	2.87	14.44	1,366.71	11.23
P-338	A-28	A-27	1485.1	1478.81	6	254	696	0.0250	0.76	6.26	1,485.12	6.49
P-339	104-2-5-3	104-2-5-2	1567.82	1558.26	6	255	448	0.0370	0.78	9.56	1,567.83	3.65
P-340	G-28-6	G-28-5	1345.42	1343.94	6	255	14,053	0.0060	1.14	1.48	1,345.50	5.27
P-341	A-24	A-25	1505.57	1496.89	6	255	2,697	0.0340	1.25	8.67	1,505.60	6.53
P-342	G-4	G-3	1399.12	1397.22	8	257	37,791	0.0070	1.61	1.90	1,399.23	7.89
P-344	A-9	A-10	1496.35	1478.2	6	257	141,636	0.0710	5.43	18.26	1,496.59	4.33
P-345	G-1-11	G-1-10	1401.34	1399.68	6	257	5,136	0.0060	0.87	1.66	1,401.39	3.28
P-346	G-17-6	G-17-5	1321.98	1298.64	6	258	52,331	0.0900	4.42	23.41	1,322.12	3.89
P-347	77-6	77-1	1517.87	1512.14	8	277	15,519	0.0210	1.77	5.73	1,517.94	3.33
P-348	A-25	A-26	1496.89	1492.19	6	260	4,116	0.0180	1.16	4.70	1,496.93	6.43
P-349	G-28-11-2	G-28-11-1	1379.96	1373.47	6	280	2,652	0.0230	1.12	6.48	1,379.99	5.93
P-350	17-25-2	17-25-1	1491.38	1485.71	6	261	586	0.0220	0.70	5.67	1,491.39	3.73
P-351	G-24-2	G-24-1	1352.7	1351.4	6	266	3,960	0.0050	0.74	1.30	1,352.74	3.37
P-352	A-6-2-1	A-6-2	1510.65	1489.06	6	265	1,175	0.0810	1.36	21.59	1,510.67	4.65
P-353	A-11-1	A-11	1450.08	1448.6	8	297	7,876	0.0050	0.88	1.31	1,450.14	5.33
P-354	G-28-7	G-28-6	1356.77	1345.42	6	267	13,219	0.0430	2.27	11.34	1,356.84	7.54
P-355	44-A-7	44-A-6	1403.33	1398.56	8	276	23,899	0.0170	1.89	4.77	1,403.42	9.42
P-356	A-6-1-1	A-6-1	1494.11	1477.84	8	268	810	0.0610	1.07	16.26	1,494.13	5.13
P-357	G-28-1	G-28	1339.82	1335.05	6	276	17,775	0.0170	1.79	4.71	1,339.90	6.33
P-358	76-6-5	76-6-4	1527.35	1526.01	6	269	8,427	0.0050	0.93	1.34	1,527.41	5.38
P-359	76	75	1510.68	1507.66	10	270	78,333	0.0110	2.24	3.04	1,510.83	5.45
P-360	101-3	101-2	1515.74	1513.23	6	271	59,836	0.0090	2.06	2.51	1,515.89	4.08
P-361	17-25	17-24	1465.48	1449.5	8	271	42,897	0.0590	3.45	15.98	1,465.60	5.11
P-362	87	86	1538.47	1537.81	10	271	27,128	0.0020	0.96	0.64	1,538.58	7.02
P-364	17-42	17-41	1575.53	1574.27	6	273	9,700	0.0050	0.94	1.27	1,575.60	3.96
P-365	A-10-2	A-10-1	1517.01	1493.3	6	273	1,224	0.0870	1.41	23.70	1,517.03	5.58
P-366	17-57	17-60	1516.45	1502.08	6	276	3,805	0.0520	1.64	14.37	1,516.49	5.20
P-367	G-28	G-27	1335.05	1329.75	6	300	50,320	0.0180	2.46	5.30	1,335.19	6.74
P-368	G-24-6	G-24-5	1384.37	1365.23	6	278	3,182	0.0690	1.74	19.15	1,384.40	6.78
P-369	A-11-2	A-11-1	1451.54	1450.08	8	293	7,092	0.0050	0.85	1.46	1,451.59	10.20
P-370	17-59	17-58	1494.79	1484.21	6	280	4,200	0.0380	1.52	10.58	1,494.83	3.63
P-371	17-24	17-23	1449.5	1439.63	8	280	43,501	0.0350	2.90	9.87	1,449.62	3.38
P-372	44-20	44-19	1417.91	1416.31	6	280	3,076	0.0060	0.71	1.60	1,417.95	10.51
P-373	10	9	1317.93	1317.61	15	280	457,431	0.0010	1.59	0.48	1,318.42	4.41
P-375	G-28-5	G-28-4	1343.94	1342.26	6	287	15,923	0.0060	1.19	1.68	1,344.02	7.40
P-376	17-1	16B	1320.23	1319.26	15	283	115,865	0.0030	1.58	0.95	1,320.42	4.76
P-377	G-24-5	G-24-4	1365.23	1360.16	6	283	3,182	0.0180	1.08	5.07	1,365.26	5.75
P-378	44-22	44-21	1426.32	1419.12	6	283	1,927	0.0250	1.06	7.20	1,426.35	6.96
P-379	A-27	G-45-1	1478.81	1444.1	6	283	6,340	0.1230	2.60	34.73	1,478.86	5.36

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-380	104-2-2	104-2-1	1528.85	1528.19	8	284	9,635	0.0020	0.71	0.66	1,528.92	2.44
P-381	G-18-5	G-18-4	1366.41	1362.9	6	284	1,798	0.0120	0.81	3.51	1,366.44	4.30
P-382	G-2-12	G-2-11	1436.6	1428.2	6	288	4,674	0.0290	1.43	8.40	1,436.64	5.08
P-383	16	15	1319.13	1318.69	12	279	316,778	0.0020	1.64	0.47	1,319.54	6.84
P-384	77-6-3	77-6-2	1523.67	1521.07	6	288	10,010	0.0090	1.20	2.60	1,523.73	6.76
P-385	44-12	44-11	1404.81	1397.08	6	289	1,422	0.0270	0.97	7.72	1,404.83	7.41
P-386	A-8	A-9	1507.45	1496.35	6	289	141,636	0.0380	4.36	11.18	1,507.69	4.31
P-387	15-8	15-7	1361.3	1359.93	6	290	10,578	0.0050	0.97	1.35	1,361.37	4.19
P-388	G-18-4	G-18-3	1362.9	1351.91	6	290	2,190	0.0380	1.23	10.99	1,362.93	3.30
P-389	G-40-9-1	G-40-9	1480.03	1465.11	6	306	1,961	0.0490	1.32	14.91	1,480.06	5.50
P-390	G-44-1	G-44	1436.33	1430.11	6	297	362	0.0210	0.60	6.17	1,436.34	3.30
P-391	A-6-1-2	A-6-1-1	1516.44	1494.11	8	291	456	0.0770	0.93	22.33	1,516.45	5.38
P-392	G-9	G-8	1426.73	1420.99	8	292	34,100	0.0200	2.20	5.74	1,426.83	3.98
P-393	101-3-4	101-3-3	1528.27	1525.34	6	292	12,855	0.0100	1.35	2.93	1,528.34	4.80
P-394	104-2-8	104-2-7	1558.3	1548.64	6	292	1,371	0.0330	1.05	9.66	1,558.32	6.43
P-395	G-2-3	G-2-2	1385.89	1376.83	6	295	8,565	0.0310	1.77	9.08	1,385.95	5.23
P-396	104-7	104-6	1540.69	1538.15	8	297	5,686	0.0090	0.95	2.53	1,540.73	9.41
P-397	16B	15A	1319.26	1318.57	15	306	115,865	0.0020	1.36	0.47	1,319.47	6.04
P-398	G-29-2	G-29-1	1369.73	1347.15	6	316	1,227	0.0710	1.31	22.57	1,369.75	3.98
P-399	A-11-3	A-11-2	1468.71	1451.54	8	297	6,253	0.0580	1.93	17.16	1,468.75	6.01
P-400	G-1-9-1	G-1-9	1417.36	1397.91	6	299	352	0.0650	0.89	19.41	1,417.37	4.92
P-401	55-2	55-1	1445.49	1435.72	8	301	84,382	0.0320	3.43	9.82	1,445.66	6.10
P-402	A-6-2	A-6-1	1489.06	1477.84	8	302	1,558	0.0370	1.08	11.21	1,489.08	6.12
P-404	A-6-2-2	A-6-2-1	1522.95	1510.65	6	304	613	0.0400	0.89	12.29	1,522.96	4.71
P-405	9-8	9-7	1407.15	1404.41	8	305	356,420	0.0090	3.25	2.74	1,407.50	6.71
P-406	A-23	A-22	1510.02	1502.55	8	305	898	0.0240	0.77	7.46	1,510.04	6.97
P-407	17-18-3	17-18-2	1459.65	1449.65	6	305	4,996	0.0330	1.52	10.00	1,459.69	2.57
P-408	79-7	79-6	1532.79	1532.01	10	305	41,595	0.0030	1.11	0.73	1,532.93	10.16
P-409	A-12	A-13	1445.51	1443.9	8	306	153,029	0.0050	2.13	1.60	1,445.75	5.45
P-410	77-28	77-26	1533.8	1533.33	8	323	3,472	0.0010	0.44	0.39	1,533.85	2.98
P-411	G-12-2	G-12-1	1440.34	1438.65	6	313	1,686	0.0050	0.58	1.69	1,440.37	3.83
P-412	G-22-2	G-22-1	1374.27	1352.04	6	311	436	0.0710	0.97	22.22	1,374.28	4.94
P-413	104-2-7	104-2-6	1548.64	1538.53	6	308	2,098	0.0330	1.19	10.11	1,548.67	5.83
P-414	A-17-1	A-17	1490.15	1477.63	6	309	888	0.0410	0.98	12.50	1,490.17	3.78
P-415	G-46	G-45	1446.41	1438.35	6	323	1,383	0.0250	0.94	8.03	1,446.43	6.59
P-416	G-25	G-26	1335.32	1328.63	6	311	459	0.0220	0.65	6.55	1,335.33	4.07
P-417	79-4	79-3	1530.12	1526.39	10	314	56,306	0.0120	2.08	3.72	1,530.25	9.87
P-418	G-28-12	G-28-11	1382.78	1369.05	6	328	3,392	0.0420	1.47	13.71	1,382.81	5.94
P-419	G-40-10	G-40-9	1478.74	1465.11	6	318	1,790	0.0430	1.22	13.62	1,478.77	6.07
P-420	17-29	17-28	1514.34	1503.69	8	315	41,021	0.0340	2.80	10.65	1,514.45	3.78
P-421	G-28-7-2	G-28-7-1	1385.99	1363.85	6	347	1,580	0.0640	1.33	22.13	1,386.01	4.90
P-422	17-60-1	17-57	1527.49	1516.45	6	319	190	0.0350	0.56	11.01	1,527.50	3.86
P-423	G-28-14	G-28-13	1459.7	1414.79	6	332	1,444	0.1350	1.73	44.90	1,459.72	6.19
P-424	G-40-4-1	G-40-4	1420.89	1413.4	6	331	1,362	0.0230	0.90	7.46	1,420.91	6.77
P-425	104-2-4	104-2-3	1534.77	1529.48	6	322	4,142	0.0160	1.13	5.30	1,534.81	5.01
P-426	17-79-3	17-79-2	1538.64	1537.71	8	401	69	0.0020	0.15	0.86	1,538.65	3.17
P-427	101-3-3	101-3-2	1525.34	1517.87	6	324	13,202	0.0230	1.81	7.46	1,525.41	4.97
P-428	77-25-1	77-25	1540.14	1533.38	6	325	1,097	0.0210	0.82	6.72	1,540.16	5.36
P-429	55-1	55	1435.72	1425.88	8	326	84,382	0.0300	3.35	9.89	1,435.89	7.44
P-430	G-3	G-2	1397.22	1347.23	8	327	38,740	0.1530	4.70	49.98	1,397.33	3.61
P-431	G-29-1	G-29	1347.15	1337.36	6	340	2,163	0.0290	1.14	9.71	1,347.18	6.16
P-432	A-20-1	A-20	1505.26	1493.22	6	329	1,582	0.0370	1.11	12.03	1,505.28	3.83

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-433	G-28-13	G-28-12	1414.79	1382.78	6	337	2,485	0.0950	1.78	32.01	1,414.82	5.55
P-434	G-23-1	G-23	1359.36	1347.22	6	353	1,292	0.0340	1.05	12.12	1,359.38	4.96
P-435	17-35	17-34	1542.04	1539.32	8	331	27,958	0.0080	1.52	2.72	1,542.13	3.74
P-436	A-11	A-12	1448.6	1445.51	8	332	153,029	0.0090	2.62	3.08	1,448.82	13.53
P-437	100	99	1503.71	1503.04	8	332	85,193	0.0020	1.28	0.64	1,503.93	3.42
P-438	G-18-3	G-18-2	1351.91	1333.29	6	332	2,527	0.0560	1.48	18.62	1,351.94	3.65
P-439	G-23-2	G-23-1	1366.85	1359.36	6	337	1,015	0.0220	0.84	7.49	1,366.87	4.91
P-440	15A	10	1318.57	1317.93	15	321	455,421	0.0020	1.94	0.57	1,318.99	5.19
P-441	G-34-1-2	G-34-1-1	1388.21	1374.26	6	349	784	0.0400	0.94	13.95	1,388.23	3.66
P-442	42	41	1383.22	1382.09	10	337	267,505	0.0030	2.08	1.16	1,383.55	4.45
P-443	G-10	G-9	1434.6	1426.73	8	348	33,460	0.0230	2.29	7.87	1,434.70	6.31
P-444	G-34-1-3	G-34-1-2	1427.8	1388.21	6	352	318	0.1120	0.99	39.58	1,427.81	3.73
P-446	G-22	G-21	1341.79	1320.31	6	342	7,627	0.0630	2.17	21.48	1,341.84	5.80
P-447	G-2-8	G-2-7	1401.66	1399.86	6	344	6,250	0.0050	0.86	1.80	1,401.71	8.19
P-448	G-40-7	G-40-6	1456.5	1443.47	6	350	6,124	0.0370	1.69	13.04	1,456.55	5.98
P-449	15-5	15-4	1354.4	1350.75	8	347	13,949	0.0110	1.35	3.65	1,354.47	4.98
P-450	G-11	G-10	1436.45	1434.6	8	351	22,151	0.0050	1.22	1.84	1,436.54	6.31
P-451	G-2-9	G-2-8	1415.12	1401.66	6	350	5,573	0.0380	1.66	13.45	1,415.16	5.30
P-452	77-31	77-30	1536.23	1534.08	6	351	1,998	0.0060	0.64	2.13	1,536.26	3.52
P-454	A-7	A-6	1500.25	1475.2	8	356	974	0.0700	1.18	25.03	1,500.27	7.58
P-455	G-34-1	G-34	1362.09	1352.17	6	363	2,468	0.0270	1.14	9.86	1,362.12	3.31
P-456	75	74	1507.66	1503.79	10	364	78,333	0.0110	2.20	3.84	1,507.81	7.11
P-457	74	73	1503.79	1500.38	10	370	106,604	0.0090	2.30	3.43	1,503.96	5.85
P-458	A-10	A-11	1478.2	1448.6	8	377	143,481	0.0790	5.48	29.59	1,478.42	4.58
P-459	101-6	101-5	1529.12	1526.23	6	384	20,073	0.0080	1.39	2.89	1,529.21	4.10
P-460	97	96	1497.72	1495.67	10	387	111,437	0.0050	1.91	2.03	1,497.91	7.62
P-461	17-18-1	17-18	1436.42	1388.71	6	419	5,755	0.1140	2.45	47.73	1,436.47	1.81
P-462	41-1-1	41-1	1409.65	1390.55	6	396	542	0.0480	0.91	19.02	1,409.66	3.95
P-463	17-51-8Z	17-51-8A	1576.79	1553.27	6	396	3,067	0.0590	1.63	23.52	1,576.82	4.03
P-464	77-16-10	77-16-9	1537.54	1526.78	6	397	5,875	0.0270	1.49	10.76	1,537.59	4.62
P-465	77-13-1	77-13	1556.36	1550.21	6	398	1,950	0.0150	0.88	6.14	1,556.39	3.33
P-466	66	65	1478.29	1473.18	10	399	132,597	0.0130	2.75	5.14	1,478.49	7.00
P-467	17-76-2	17-76-1	1500.44	1467.89	6	403	945	0.0810	1.28	32.55	1,500.46	4.22
P-469	17-62	17-61	1569.4	1537.1	6	527	1,797	0.0610	1.41	32.30	1,569.43	3.97
P-470	41	39	1382.09	1375.12	10	426	292,250	0.0160	3.77	6.91	1,382.38	5.14
P-471	17-78	17-77	1534	1533.57	8	439	17,893	0.0010	0.63	0.48	1,534.12	4.80
P-474	101-5	101-4	1526.23	1516.73	6	462	22,428	0.0210	2.04	9.49	1,526.32	3.52
P-475	17-74-1	17-74	1555.85	1530.07	6	497	5,571	0.0520	1.85	25.78	1,555.89	4.83
P-477	77-25-2A	77-25-1	1542.78	1540.14	6	581	752	0.0050	0.42	2.64	1,542.80	3.99
P-480	104-3	104-2	1535.99	1527.03	8	745	9,199	0.0120	1.24	8.94	1,536.04	4.58
P-484	A-2	A-1	1467.37	1465.33	8	313	5,655	0.0070	0.86	1.91	1,467.41	11.36
P-485	A-3	A-2	1469.1	1467.37	8	347	5,454	0.0050	0.78	1.73	1,469.15	7.32
P-486	A-4	A-3	1470.61	1469.1	8	301	4,960	0.0050	0.76	1.51	1,470.65	4.21
P-487	A-5	A-4	1470.92	1470.61	8	51	4,960	0.0060	0.81	0.31	1,470.96	7.36
P-488	101-2	101-1-1B	1513.23	1509.41	6	219	60,384	0.0170	2.59	3.82	1,513.38	3.43
P-489	103-1	103	1521.68	1515.38	6	157	594	0.0400	0.88	6.23	1,521.69	4.34
P-490	104-2-1	104-2	1528.19	1527.03	8	363	10,218	0.0030	0.81	1.15	1,528.26	8.08
P-491	104-2	104-1	1527.03	1524.27	8	347	19,607	0.0080	1.35	2.76	1,527.11	5.45
P-492	104-2-6	104-2-5	1538.53	1536.89	6	85	2,496	0.0190	1.03	1.63	1,538.56	6.15
P-493	94	93	1546.22	1543.22	10	150	24,844	0.0200	1.94	2.99	1,546.30	4.52
P-494	98-7	98-6	1544.24	1539.99	6	219	696	0.0190	0.70	4.24	1,544.26	2.34
P-495	98-6	98-4	1539.99	1517.83	6	312	1,402	0.0710	1.35	22.15	1,540.01	3.04

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Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-496	77-16-2	77-16-1	1535.26	1513.22	6	603	809	0.0370	0.92	22.04	1,535.28	3.38
P-497	48-4	48-3	1451.3	1435.35	6	111	2,537	0.1440	2.12	15.96	1,451.33	4.73
P-498	48-3	48-2	1435.35	1430.34	6	59	2,537	0.0850	1.73	5.01	1,435.38	4.57
P-499	50-5	50-4	1423.92	1423.24	6	77	569	0.0090	0.49	0.68	1,423.94	7.41
P-500	44-A-5	44-A-4	1391.02	1390.2	8	250	30,001	0.0030	1.13	0.82	1,391.14	11.89
P-501	44-A-4	44-A-3	1390.2	1389.45	8	213	30,222	0.0040	1.16	0.74	1,390.32	6.39
P-502	44-A-3	44-A-2	1389.45	1388.92	8	178	33,458	0.0030	1.13	0.54	1,389.58	5.17
P-503	44-A-2	44-A-1	1388.92	1388.4	8	124	35,427	0.0040	1.29	0.52	1,389.04	8.17
P-504	44-A-1	44-A	1388.4	1387.39	8	204	35,717	0.0050	1.37	0.73	1,388.52	6.26
P-505	44-9	44-A-3	1391.49	1389.62	6	189	2,680	0.0100	0.83	1.87	1,391.52	10.09
P-506	44-15	44-9	1404.42	1391.49	6	148	92	0.0870	0.67	12.90	1,404.43	6.32
P-507	44-26	44-25	1415.88	1415	6	79	639	0.0110	0.55	0.83	1,415.90	4.72
P-508	41-3-3	41-3-1	1442.6	1426.88	6	429	11,192	0.0370	2.03	15.72	1,442.66	3.84
P-509	41-2-1	41-2	1416.4	1409.01	6	173	22,184	0.0430	2.63	7.39	1,416.49	2.46
P-510	41-2	41-1	1409.01	1390.55	6	274	23,044	0.0670	3.12	18.46	1,409.10	3.01
P-511	17-16-2	17-16-1	1368.51	1365.79	6	219	1,416	0.0120	0.75	2.71	1,368.53	5.96
P-512	17-16-1	17-16	1365.79	1365	6	218	1,690	0.0040	0.51	0.80	1,365.82	4.05
P-513	17-84	17-40-z	1570.53	1568.19	6	386	6,995	0.0060	0.94	2.32	1,570.58	5.03
P-514	G-12	G-11	1437.53	1436.45	8	230	22,151	0.0050	1.16	1.08	1,437.62	6.26
P-516	G-15	G-14	1441.32	1439.73	8	300	417	0.0050	0.36	1.59	1,441.33	4.02
P-517	17-76-9	17-76-10	1452.14	1443.36	6	475	31,056	0.0180	2.17	8.80	1,452.25	5.63
P-518	17-76-10	G-16	1443.19	1442.14	8	147	31,056	0.0070	1.50	0.91	1,443.29	3.23
P-519	17-76-8	17-76-9	1460.9	1452.14	6	361	3,069	0.0240	1.19	8.69	1,460.93	6.58
P-520	17-75-5	17-76-9C	1500.24	1465.35	6	243	26,305	0.1440	4.26	34.89	1,500.34	5.11
P-521	17-76-9C	17-76-9A	1465.35	1464.88	6	38	26,496	0.0120	1.80	0.47	1,465.45	4.91
P-522	17-76-9A	17-76-9	1464.88	1452.14	6	384	27,732	0.0330	2.58	12.73	1,464.98	5.60
P-523	17-75-4	17-75-5	1525.1	1500.24	6	194	26,305	0.1280	4.06	24.91	1,525.20	11.30
P-524	17-75-3	17-75-4	1526.38	1525.1	6	94	7,984	0.0140	1.30	1.24	1,526.43	7.20
P-525	17-75	17-75-1	1528.7	1528.26	6	74	5,571	0.0060	0.87	0.44	1,528.75	5.08
P-526	17-75-1	17-75-2	1528.26	1527.48	6	114	5,571	0.0070	0.91	0.77	1,528.31	5.06
P-527	17-33-1	17-33	1537.12	1536.47	6	117	6,869	0.0060	0.91	0.60	1,537.17	4.19
P-528	17-51-7	17-51-6	1564.5	1529.01	6	361	1,715	0.0980	1.60	35.42	1,564.53	3.17
P-529	17-51-8A	17-51-9a	1553.27	1524.37	6	269	3,956	0.1070	2.18	28.90	1,553.31	2.90
P-530	17-51-9a	17-51-9	1524.37	1522.42	6	28	4,499	0.0700	1.92	1.95	1,524.41	3.86
P-531	17-51-9	17-51-9b	1522.42	1495.57	6	275	4,844	0.0980	2.25	26.85	1,522.46	5.36
P-532	17-51-9b	17-50-5	1495.57	1471.62	6	235	5,357	0.1020	2.30	23.95	1,495.61	4.65
P-533	17-50-5	17-50-4	1471.62	1466.3	6	80	5,583	0.0660	2.02	5.34	1,471.66	3.69
P-534	17-50-6	17-50-4	1476.48	1466.3	6	200	656	0.0510	0.98	10.18	1,476.50	4.94
P-535	17-50-4	17-50-3	1466.13	1435.81	8	190	6,239	0.1600	2.76	30.27	1,466.17	4.52
P-536	17-50-3	17-50-2	1435.81	1417.03	8	279	25,802	0.0670	3.12	18.78	1,435.90	4.93
P-537	17-50-2	17-50	1417.03	1408.91	8	111	26,035	0.0730	3.18	8.10	1,417.12	4.50
P-538	17-51-4	17-51-3	1525.73	1474.47	6	284	17,877	0.1800	4.12	51.26	1,525.81	3.41
P-539	17-51-3	17-51-2	1474.47	1469.24	6	228	18,184	0.0230	2.00	5.23	1,474.55	6.57
P-540	17-51-2	17-51-2Z	1469.24	1454.06	6	182	18,524	0.0830	3.17	15.18	1,469.32	3.72
P-541	17-51-5	17-51-4	1553.84	1525.73	6	147	1,636	0.1910	2.03	28.05	1,553.86	4.51
P-542	17-51-4a	17-51-4	1528.22	1525.73	6	201	16,079	0.0120	1.55	2.49	1,528.30	3.42
P-543	17-51-2Z	17-51-1	1454.06	1437.87	6	90	18,913	0.1800	4.17	16.23	1,454.14	3.50
P-544	17-51-1	17-50-3	1437.7	1435.81	8	40	19,163	0.0470	2.50	1.88	1,437.78	4.15
P-545	17-52	17-51	1426.8	1420.28	6	210	11,469	0.0310	1.94	6.54	1,426.86	4.33
P-546	17-51	17-50	1420.11	1408.91	8	367	11,619	0.0310	1.84	11.15	1,420.17	5.28
P-547	17-50	17-49C	1408.91	1405.05	8	124	37,922	0.0310	2.66	3.86	1,409.02	6.10
P-548	17-49-8	17-49-7	1530.08	1529.37	6	259	664	0.0030	0.35	0.70	1,530.10	3.39

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-556	55-15	55-14	1533.2	1527.01	8	403	3,191	0.0150	0.99	6.18	1,533.23	6.19
P-557	55-14	55-13	1527.01	1517.95	8	302	4,917	0.0300	1.42	9.06	1,527.05	4.14
P-558	55-13	55-12	1517.95	1508.06	8	296	4,947	0.0330	1.48	9.87	1,517.99	4.19
P-559	55-12	55-11	1508.06	1497.14	8	235	10,766	0.0460	2.08	10.94	1,508.12	4.10
P-560	55-11	55-10	1497.14	1488.65	8	273	10,766	0.0310	1.81	8.44	1,497.20	4.01
P-561	55-10	55-9	1488.65	1483.56	8	339	33,794	0.0150	1.99	5.07	1,488.75	5.10
P-562	55-9	55-8	1483.56	1481.08	8	365	51,410	0.0070	1.71	2.48	1,483.69	5.13
P-563	55-8	55-7	1481.08	1467.45	8	240	54,787	0.0570	3.67	13.61	1,481.21	6.87
P-564	55-7	55-6	1467.45	1466.67	8	124	75,635	0.0060	1.86	0.78	1,467.61	3.89
P-565	55-6	55-5	1466.67	1460.56	8	214	75,635	0.0290	3.17	6.11	1,466.83	4.89
P-566	55-5	55-4	1460.56	1456.02	8	225	78,889	0.0200	2.84	4.54	1,460.72	4.95
P-567	55-4	55-3	1456.02	1452.62	8	108	79,295	0.0310	3.33	3.40	1,456.18	5.01
P-568	77-7	77-6-1	1525.86	1518.18	6	125	4,997	0.0610	1.90	7.63	1,525.90	2.99
P-569	77-6-2	77-6-1	1521.07	1518.18	6	293	10,403	0.0100	1.25	2.86	1,521.13	6.08
P-571	104-6	104-4	1538.15	1536.25	8	366	7,043	0.0050	0.86	1.90	1,538.20	9.25
P-572	17-80	17-79	1537.38	1535.2	8	135	1,417	0.0160	0.78	2.11	1,537.40	4.60
P-573	17-81	17-80	1555.24	1537.55	6	335	1,002	0.0530	1.11	17.70	1,555.26	3.14
P-574	17-79-1	17-79	1536.26	1535.2	8	326	12,692	0.0030	0.87	1.05	1,536.34	1.93
P-575	17-79	17-78	1535.2	1534	8	411	15,024	0.0030	0.88	1.16	1,535.29	4.49
P-578	17-79-2	17-79-1	1537.71	1536.26	8	439	12,692	0.0030	0.87	1.45	1,537.79	6.02
P-579	17-49C	17-49-B1	1405.05	1401.08	8	146	38,188	0.0270	2.54	3.97	1,405.16	5.27
P-580	17-49-B1	17-49-b	1401.08	1392.57	8	146	38,302	0.0580	3.32	8.51	1,401.19	4.89
P-581	17-49A	17-49	1387.86	1386.86	8	28	38,556	0.0360	2.81	0.99	1,387.97	3.93
P-582	17-49	17-49-D	1386.86	1379.06	8	175	43,435	0.0450	3.14	7.84	1,386.98	4.33
P-583	17-49-D	17-15	1378.89	1363.77	10	538	43,827	0.0280	2.60	15.06	1,379.00	4.64
P-584	15-7	15-6	1359.93	1359.26	6	263	12,669	0.0030	0.83	0.69	1,360.02	3.26
P-585	15-6	15-5	1359.09	1354.4	8	118	13,164	0.0400	2.09	4.69	1,359.15	4.85
P-586	15-1-1	15-1	1326.23	1321.61	6	238	833	0.0190	0.72	4.62	1,326.25	4.81
P-587	15-1	15	1321.44	1319.02	8	244	22,711	0.0100	1.53	2.43	1,321.52	5.28
P-588	15-3	15-2	1345.02	1332.79	8	176	21,878	0.0690	2.97	12.26	1,345.10	3.10
P-589	15-2	15-1	1332.79	1321.44	8	182	21,878	0.0620	2.86	11.35	1,332.87	2.81
P-591	9	8	1317.36	1316.19	18	324	815,612	0.0040	2.79	1.17	1,317.81	4.95
P-592	7-3	7-2	1341.96	1332.8	6	242	7,793	0.0380	1.83	9.16	1,342.01	5.47
P-593	7-2	7-1	1332.8	1325.26	6	67	8,816	0.1130	2.78	7.57	1,332.86	6.07
P-594	7-1	8	1325.26	1317.19	6	204	8,816	0.0400	1.95	8.09	1,325.32	2.96
P-595	8	7	1316.19	1315.31	18	240	824,428	0.0040	2.81	0.86	1,316.65	4.19
P-596	7	6	1315.31	1314.8	18	165	824,428	0.0030	2.65	0.49	1,315.79	4.16
P-597	6	5	1314.8	1314.58	18	83	824,428	0.0030	2.50	0.25	1,315.30	4.21
P-598	5	4	1314.58	1313.94	18	184	824,428	0.0030	2.76	0.68	1,315.04	4.15
P-599	4	3	1313.94	1313.54	18	63	824,428	0.0060	3.42	0.24	1,314.36	4.20
P-600	3	2	1313.54	1313.42	18	98	824,474	0.0010	1.89	0.24	1,314.12	4.06
P-601	9-11	9-10	1418.76	1412.4	8	318	127,575	0.0200	3.26	6.22	1,418.96	4.48
P-602	G-17-5	G-17-4	1298.64	1296.1	6	202	52,331	0.0130	2.20	2.54	1,298.78	3.28
P-603	17-70	17-69	1522.29	1508.5	8	821	4,008	0.0170	1.09	13.78	1,522.33	2.57
P-604	17-69	17-68	1508.5	1483.61	6	171	5,530	0.1460	2.65	24.89	1,508.54	5.01
P-605	17-68	17-67-2	1483.61	1436.74	6	386	6,164	0.1210	2.57	46.89	1,483.66	3.83
P-606	17-67-2	17-67-1	1436.74	1397.56	6	387	6,164	0.1010	2.41	39.18	1,436.79	2.63
P-607	17-67-1	17-67	1397.56	1355.43	6	390	7,175	0.1080	2.58	42.15	1,397.61	2.53
P-608	17-67	17-66-1	1355.43	1351.61	6	262	7,175	0.0150	1.29	3.82	1,355.48	3.29
P-609	17-66-1	17-66	1351.61	1349.84	6	265	7,244	0.0070	0.98	1.77	1,351.66	3.47
P-610	17-66	17-65Z	1349.84	1345.95	6	247	7,829	0.0160	1.35	3.90	1,349.89	3.36
P-611	17-65Z	17-64	1345.78	1335.35	8	87	16,120	0.1200	3.28	10.43	1,345.85	3.11

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-612	17-64	17-64-1	1335.35	1329.99	8	78	16,185	0.0690	2.70	5.36	1,335.42	4.11
P-613	17-64-1	17-63	1329.99	1322.45	8	117	16,294	0.0640	2.64	7.54	1,330.06	3.29
P-615	17-65-2	17-65	1350.56	1348.03	8	252	8,291	0.0100	1.13	2.53	1,350.61	3.64
P-616	17-65	17-65Z	1348.03	1345.78	8	47	8,291	0.0480	1.95	2.23	1,348.08	4.47
P-617	17-65-8	17-65-7	1396.68	1389.54	8	354	4,998	0.0200	1.23	7.14	1,396.72	3.91
P-618	17-65-7	17-65-6	1389.54	1383.03	8	105	5,172	0.0620	1.85	6.52	1,389.58	3.47
P-619	17-65-6	17-65-5	1383.03	1377.49	8	66	5,172	0.0840	2.05	5.54	1,383.07	4.11
P-620	17-65-5	17-65-4	1377.49	1375.45	8	83	5,381	0.0250	1.37	2.04	1,377.53	3.77
P-621	17-65-4	17-65-3	1375.45	1355.38	8	199	5,491	0.1010	2.22	20.06	1,375.49	3.11
P-622	17-65-10	17-65-9-1	1490.06	1466.1	6	158	1,846	0.1520	1.93	23.95	1,490.09	3.07
P-623	17-65-9-1	17-65-9	1466.1	1434.93	6	173	3,235	0.1800	2.40	31.16	1,466.13	3.74
P-624	17-65-9	17-65-8	1434.93	1396.85	6	242	4,586	0.1570	2.61	38.10	1,434.97	3.83
P-625	17-65-12	17-65-11	1531.69	1517.17	6	285	802	0.0510	1.03	14.52	1,531.71	4.25
P-626	17-65-11	17-65-10	1517.17	1490.06	6	348	1,331	0.0780	1.39	27.11	1,517.19	3.33
P-627	17-65-9-3	17-65-9-Z	1481.04	1469.75	6	189	486	0.0600	0.93	11.29	1,481.05	11.69
P-628	17-65-9-Z	17-65-9-1	1469.75	1466.1	6	133	486	0.0270	0.72	3.63	1,469.76	4.63
P-629	77-29	77-28	1533.84	1533.8	8	93	3,352	0.0000	0.29	0.06	1,533.91	2.57
P-630	77-24-4	77-24-1	1547.02	1537	6	579	6,884	0.0170	1.35	10.02	1,547.07	1.87
P-631	77-24	77-23	1533.24	1533.07	10	69	12,727	0.0020	0.77	0.19	1,533.32	7.41
P-632	85	79-8	1537.69	1532.84	10	79	27,128	0.0610	2.94	4.74	1,537.78	3.71
P-633	G-17	PS2	1285.46	1284.55	6	101	66,914	0.0090	2.10	0.92	1,285.62	4.16
P-634	G-22-1	G-22	1352.04	1341.79	6	306	933	0.0330	0.92	10.22	1,352.06	4.84
P-635	G-24-7	G-24-6	1392.48	1384.37	6	119	1,270	0.0680	1.30	8.10	1,392.50	4.49
P-636	G-24-7-1	G-24-7	1408.56	1392.48	6	107	295	0.1500	1.07	16.07	1,408.57	4.36
P-637	G-34-4	G-34-3	1419.28	1380.24	6	323	515	0.1210	1.24	39.04	1,419.29	3.56
P-638	G-34-3	G-34-2	1380.24	1365.43	6	284	758	0.0520	1.03	14.81	1,380.26	4.04
P-639	G-34-2	G-34-1	1365.43	1362.09	6	344	1,147	0.0100	0.65	3.33	1,365.45	4.61
P-640	G-34-1-1	G-34-1	1374.26	1362.09	6	136	1,045	0.0890	1.36	12.16	1,374.28	6.86
P-641	G-36-1	G-36	1412.74	1377.91	6	315	1,861	0.1110	1.70	34.77	1,412.77	7.77
P-642	G-40-3	G-40-2	1410.17	1409.79	6	34	7,672	0.0110	1.19	0.38	1,410.22	6.47
P-645	G-4-1	G-4	1414.5	1399.29	6	269	1,420	0.0570	1.24	15.22	1,414.52	6.34
P-646	G-1	G-1-A	1344.77	1344.31	8	45	59,124	0.0100	2.06	0.47	1,344.91	5.41
P-647	G-45	G-44	1438.35	1430.11	6	163	8,440	0.0510	2.07	8.24	1,438.41	9.62
P-648	G-44	G-43	1430.11	1419.84	6	319	9,063	0.0320	1.83	10.27	1,430.17	6.87
P-649	A-1	PS3	1465.33	1465.3	8	32	6,235	0.0010	0.45	0.00	1,465.50	8.83
P-650	A-16	PS3	1465.35	1465.3	8	33	5,617	0.0020	0.52	0.00	1,465.50	10.84
P-651	A-15	A-11	1476.91	1448.6	6	286	1,672	0.0990	1.60	28.11	1,476.93	7.31
P-652	17-74	17-75	1530.07	1528.7	6	174	5,571	0.0080	0.96	1.37	1,530.12	5.02
P-654	G-47	G-46	1450.08	1446.41	6	338	1,059	0.0110	0.65	3.67	1,450.10	6.48
P-655	G-1-A	PS1	1344.31	1343.91	8	40	59,124	0.0100	2.04	0.41	1,344.45	5.88
P-656	G-2	G-1	1347.23	1344.77	8	137	47,444	0.0180	2.34	2.45	1,347.35	10.45
P-657	G-1-8	G-1-7	1390.83	1384.35	6	159	6,044	0.0410	1.74	6.47	1,390.88	3.95
P-658	G-1-7	G-1-6	1384.35	1378.01	6	137	7,452	0.0460	1.93	6.36	1,384.40	4.85
P-659	G-1-6	G-1-5	1378.01	1372.87	6	157	7,452	0.0330	1.71	5.14	1,378.06	3.34
P-660	G-1-5	G-1-4	1372.87	1372.17	6	124	7,452	0.0060	0.93	0.70	1,372.93	5.34
P-661	G-1-4	G-1-3	1372.17	1369.49	6	133	7,452	0.0200	1.46	2.69	1,372.22	4.52
P-662	G-1-3	G-1-2	1369.49	1365.8	6	251	7,452	0.0150	1.31	3.68	1,369.54	3.90
P-663	G-1-2	G-1-1	1365.8	1360.48	6	349	11,240	0.0150	1.50	5.32	1,365.86	5.47
P-664	G-1-1	G-1	1360.48	1344.94	6	347	11,603	0.0450	2.21	15.56	1,360.54	3.95
P-665	G-1-13	G-1-12	1405.67	1404.4	6	237	941	0.0050	0.49	1.27	1,405.69	5.18
P-666	G-1-12	G-1-11	1404.4	1401.34	6	349	1,201	0.0090	0.63	3.04	1,404.42	7.28
P-667	G-2-7	G-2-6	1399.86	1397.95	6	146	7,275	0.0130	1.24	1.91	1,399.91	9.31

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-668	96	(F) 95-6	1495.67	1493.73	10	381	129,239	0.0050	1.97	1.95	1,495.87	7.00
P-669	20	19	1342.67	1324.62	10	91	301,934	0.1980	9.20	18.22	1,342.97	4.10
P-670	19	17	1324.62	1320.18	10	358	301,934	0.0120	3.45	4.49	1,324.92	2.80
P-671	17	16	1320.01	1319.13	12	264	316,778	0.0030	2.15	0.81	1,320.34	5.47
P-672	17-46	17-45	1581.69	1579.45	6	116	2,428	0.0190	1.02	2.24	1,581.72	2.73
P-673	17-43	17-44	1580.33	1576.44	6	221	1,154	0.0180	0.79	3.87	1,580.35	5.48
P-674	17-19	17-18	1413.49	1388.55	8	327	44,481	0.0760	3.82	24.99	1,413.61	3.63
P-675	17-18	17-17	1388.38	1381.52	10	353	50,971	0.0190	2.39	6.86	1,388.50	3.16
P-676	17-17	17-16	1381.52	1364.66	10	357	51,198	0.0470	3.27	16.86	1,381.64	3.01
P-677	104-3-1	79-8	1542.67	1533.17	6	486	951	0.0200	0.78	9.50	1,542.69	3.29
P-678	17-58	17-56	1484.21	1462.42	6	199	5,019	0.1090	2.33	21.81	1,484.25	3.62
P-679	17-49-3B	17-49-3A	1465.88	1459.49	6	91	391	0.0700	0.94	6.39	1,465.89	3.25
P-680	17-76-6	17-76-3	1477.71	1471.59	6	197	476	0.0310	0.76	6.12	1,477.72	4.49
P-681	17-49-3A	17-49-3	1459.49	1441.63	6	67	440	0.2670	1.49	17.86	1,459.50	1.53
P-682	103	101	1515.38	1505.12	8	367	20,693	0.0280	2.14	10.16	1,515.46	3.82
P-683	2	Outfall	1313.42	1312.51	18	254	824,474	0.0040	2.79	0.95	1,313.88	5.18
P-684	A-2-4	A-2-3	1484.52	1471.26	6	130	27,052	0.1020	3.79	13.31	1,484.62	3.19
P-685	A-2-3	A-2-2	1471.26	1460.34	6	488	27,052	0.0220	2.23	10.92	1,471.36	10.14
P-686	A-2-2	A-2-1	1460.34	1446.93	6	374	29,661	0.0360	2.70	13.40	1,460.44	13.83
P-687	41-6	41-5	1427.67	1425.18	6	174	5,632	0.0140	1.20	2.48	1,427.72	2.93
P-688	17-49-b	17-49A	1392.57	1387.86	8	173	38,331	0.0270	2.55	4.71	1,392.68	7.47
P-689	A-21	A-20	1499.72	1493.22	8	183	2,221	0.0360	1.18	6.49	1,499.75	7.45
P-690	71	70	1498.33	1496.96	10	183	108,873	0.0070	2.15	1.37	1,498.51	5.62
P-691	101-1-1A	101-1-1	1507.13	1506.09	6	183	61,616	0.0060	1.74	1.05	1,507.29	4.58
P-692	79-5	79-4	1532	1530.12	10	183	41,595	0.0100	1.80	1.86	1,532.11	9.49
P-693	61	60	1455.26	1436.37	10	185	135,352	0.1020	5.73	18.99	1,455.46	5.90
P-694	G-7	G-6	1414.21	1410.05	8	186	35,299	0.0220	2.32	4.16	1,414.32	4.74
P-695	64	63	1466.87	1465.33	10	188	133,526	0.0080	2.35	1.54	1,467.07	9.00
P-696	17-49-1	17-49	1420.94	1387.03	6	188	4,776	0.1800	2.68	33.93	1,420.98	2.87
P-697	41-5	41-4	1425.18	1424.41	6	151	7,353	0.0050	0.90	0.77	1,425.24	3.39
P-702	9-2	9-1	1324.54	1318.56	8	331	357,829	0.0180	4.21	5.98	1,324.89	4.52
P-703	21	20	1343.67	1342.67	10	128	301,934	0.0080	2.93	1.02	1,343.97	2.60
P-704	G-24-6-4	G-24-6-3	1408.37	1403.76	6	112	485	0.0410	0.83	4.61	1,408.38	6.01
P-705	A-24-1	A-24	1531.5	1505.57	6	280	1,434	0.0930	1.51	25.92	1,531.52	6.72
P-706	44	43	1387.27	1387.14	10	109	266,410	0.0010	1.42	0.27	1,387.69	7.33
P-707	43	42	1387.14	1383.22	10	196	266,718	0.0200	3.95	3.87	1,387.42	10.83
P-708	17-32	17-31	1534.84	1522.3	8	171	37,052	0.0730	3.56	12.54	1,534.95	3.14
P-709	17-31	17-30	1522.3	1520.88	8	170	37,558	0.0080	1.67	1.42	1,522.41	4.59
P-710	(F) 9-19	(F) 9-18	1520.4	1513.4	12	200	220,731	0.0350	4.45	7.09	1,520.64	5.76
P-711	(F) 9-18	(F) 9-17	1513.4	1483.4	12	400	220,731	0.0750	5.83	30.11	1,513.64	7.76
P-712	(F) 9-17	(F) 9-16	1483.4	1460.4	12	300	220,731	0.0770	5.87	23.11	1,483.64	7.76
P-713	(F) 9-16	(F) 9-15	1460.4	1443.4	12	400	220,731	0.0430	4.77	17.09	1,460.64	7.76
P-714	(F) 9-15	(F) 9-14	1443.4	1438.4	12	400	220,731	0.0130	3.10	5.04	1,443.64	6.26
P-715	(F) 9-14	(F) 9-13	1438.4	1435.4	12	400	220,731	0.0080	2.59	2.99	1,438.64	5.76
P-716	(F) 9-13	(F) 9-12	1435.4	1433.4	12	400	220,731	0.0050	2.24	2.01	1,435.65	5.75
P-717	(F) 9-12	9-10	1433.4	1412.4	12	420	220,731	0.0500	5.05	20.89	1,433.64	8.76
P-718	9-10	T-1	1412.4	1409.55	8	71	356,390	0.0400	5.62	2.98	1,412.75	4.18
P-719	T-1	9-9	1409.55	1407.59	8	119	356,390	0.0160	4.07	2.03	1,409.90	6.10
P-720	9-7	T-2	1404.41	1403.05	8	169	357,275	0.0080	3.12	1.37	1,404.76	7.96
P-721	T-2	9-6	1403.05	1386.64	8	103	357,275	0.1590	9.18	16.61	1,403.40	8.60
P-722	9-6	T-3	1386.64	1371.56	8	150	357,275	0.1010	7.81	15.26	1,386.99	4.74
P-723	T-3	9-5	1371.56	1360.29	8	135	357,275	0.0830	7.30	11.44	1,371.91	4.84

TABLE T-3
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DRY WEATHER FLOW

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-724	9-5	T-4	1360.29	1345.87	8	225	357,275	0.0640	6.66	14.58	1,360.64	4.07
P-725	T-4	9-4	1345.87	1344.34	8	103	357,275	0.0150	3.92	1.60	1,346.22	7.25
P-726	9-4	T-5	1344.34	1336.35	8	182	357,275	0.0440	5.80	8.13	1,344.69	3.29
P-727	T-5	9-3	1336.35	1333.7	8	96	357,275	0.0280	4.91	2.65	1,336.70	3.86
P-728	9-3	T-6	1333.7	1328.82	8	185	357,829	0.0260	4.83	4.99	1,334.05	3.72
P-729	T-6	9-2	1328.82	1324.54	8	82	357,829	0.0520	6.18	4.43	1,329.17	3.23
P-730	9-1	T-7	1318.56	1297.46	8	307	358,181	0.0690	6.82	0.68	1,318.91	6.23
P-731	T-7	9	1297.46	1317.46	8	146	358,181	-0.1370	1.59	0.41	1,318.23	5.31
P-805	17-74-1Z	17-74-1-A	1564.56	1563.79	6	134	4,266	0.0060	0.80	0.77	1,564.60	4.61
P-806	17-44	17-74-1Z	1576.44	1564.56	6	197	3,834	0.0600	1.72	11.87	1,576.48	5.64
P-807	G-1-7-1	G-1-7	1396.85	1384.35	6	125	1,224	0.1000	1.48	12.47	1,396.87	6.24
P-808	G-1-7-2	G-1-7-1	1399.66	1396.85	6	49	953	0.0580	1.13	2.81	1,399.68	4.76
P-809	G-1-7-2-1	G-1-7-2	1402.48	1399.66	6	66	272	0.0430	0.72	2.81	1,402.49	4.71
P-810	G-1-7-3	G-1-7-2	1402.52	1399.66	6	136	588	0.0210	0.69	2.86	1,402.53	5.55
P-811	G-1-7-3-1	G-1-7-3	1404.25	1402.52	6	42	139	0.0410	0.54	1.72	1,404.26	4.13
P-812	G-1-7-4	G-1-7-3	1408.25	1402.52	6	140	251	0.0410	0.70	5.73	1,408.26	5.14
P-814	G-5-1	G-5	1402.85	1399.81	6	132	157	0.0230	0.45	2.94	1,402.86	4.23
P-815	G-16	(F) PS6	1442.14	1441	12	69	220,704	0.0170	3.42	1.20	1,442.38	4.44
P-908	(F) 95-6	(F) 95-5	1493.73	1484.7	12	100	129,239	0.0900	5.31	9.00	1,493.91	8.96
P-909	(F) 95-5	(F) 95-4	1484.7	1483.7	12	300	129,239	0.0030	1.66	1.03	1,484.91	5.79
P-910	(F) 95-4	(F) 95-3	1483.7	1469.7	12	300	129,239	0.0470	4.20	13.96	1,483.88	9.32
P-911	(F) 95-3	(F) 95-2	1469.7	1468.7	12	400	129,239	0.0030	1.50	1.00	1,469.93	5.27
P-912	(F) 95-2	(F) 95-1	1468.7	1467.7	12	400	129,239	0.0030	1.50	0.99	1,468.93	7.77
P-913	(F) 95-1	(F) 95	1467.7	1466.9	12	400	129,239	0.0020	1.38	0.86	1,467.94	9.76
P-914	(F) 95	(F) PS5	1466.9	1465	12	260	129,239	0.0070	2.19	1.91	1,467.08	13.82

[a] "T-" prefix indicates a point of change in slope and not an actual manhole

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-1	101A	101	1505.24	1505.12	8	26	276,102	0.0050	1.22	0.03	1,506.13	3.29
P-2	44-B	44-A	1387.45	1387.39	10	38	1,132,455	0.0020	3.21	0.24	1,390.31	2.56
P-3	A-13	G-16	1443.9	1442.14	8	29	1,093,612	0.0610	8.80	1.74	1,444.50	2.58
P-4	24	23	1346.94	1346.68	10	38	1,749,147	0.0070	4.96	0.58	1,348.51	3.73
P-5	15	15A	1318.69	1318.57	12	43	1,969,014	0.0030	3.88	0.31	1,322.97	0.00
P-6	17-16-3	17-16-2	1368.85	1368.51	6	30	5,249	0.0110	1.08	0.34	1,368.89	4.73
P-7	45	44-B	1387.69	1387.45	10	37	1,132,455	0.0060	3.21	0.24	1,390.54	1.91
P-9	77-30	77-29	1534.08	1534.01	6	48	25,634	0.0010	0.84	0.12	1,534.23	1.74
P-10	17-76-7	17-76-8	1461.39	1460.9	6	28	2,460	0.0180	0.99	0.42	1,461.42	6.55
P-12	G-20	G-19	1314.01	1308.47	6	35	53,084	0.1580	5.41	5.54	1,314.15	4.32
P-13	77-23	79-8	1533.07	1532.84	10	33	99,343	0.0070	2.04	0.00	1,533.26	8.61
P-14	50-2-2	50-2-1	1406.81	1406.54	6	39	655	0.0070	0.48	0.27	1,406.83	6.20
P-15	G-24-6-3	G-24-6-2	1403.76	1398.52	6	39	3,922	0.1340	2.29	5.23	1,403.80	6.58
P-16	78	77	1511.85	1510.94	10	47	308,859	0.0190	4.07	0.77	1,512.15	5.00
P-17	77-3	77-2	1512.39	1512.24	6	39	0	0.0040	0.00	0.05	1,512.39	3.70
P-18	9-9	9-8	1407.59	1407.15	8	39	2,510,109	0.0110	11.13	4.03	1,411.60	0.00
P-19	56	55	1426.09	1425.71	10	41	709,242	0.0090	3.91	0.27	1,426.56	3.19
P-20	99	98	1503.04	1502.99	8	42	475,391	0.0010	2.11	0.26	1,503.66	4.52
P-21	17-51-8	17-51-8Z	1577.47	1576.79	6	42	5,876	0.0160	1.26	0.60	1,577.52	3.26
P-22	77-6-1	77-6	1518.18	1518.04	6	35	117,825	0.0040	1.82	0.18	1,518.43	3.90
P-23	79-6	79-5	1532.01	1532	10	47	224,489	0.0000	0.64	0.17	1,532.42	10.49
P-24	101-3-6	101-3-5	1534.39	1532.33	6	50	39,166	0.0410	3.08	2.10	1,534.51	4.20
P-25	17-34	17-33	1539.32	1536.47	8	53	109,482	0.0540	4.43	2.83	1,539.51	3.48
P-26	77-25	77-24	1533.38	1533.24	6	53	45,290	0.0030	1.21	0.10	1,533.55	6.75
P-27	62	61	1463.25	1455.26	10	55	704,690	0.1450	10.58	7.99	1,463.71	3.24
P-28	G-24-6-2	G-24-6-1	1398.52	1391.5	6	57	7,329	0.1230	2.72	7.01	1,398.57	6.83
P-29	G-18	G-17	1288.06	1285.46	6	60	74,236	0.0430	3.78	1.51	1,288.23	4.31
P-30	104-2-5-1	104-2-5	1540.05	1536.89	6	60	8,772	0.0530	2.13	3.12	1,540.11	6.16
P-31	30	29	1351.21	1350.68	10	61	1,732,079	0.0090	4.91	0.91	1,355.12	0.00
P-32	101-7-4	101-7-3	1523.88	1523.27	6	62	37,333	0.0100	1.83	0.62	1,524.00	6.36
P-33	104-4	104-3	1536.25	1535.99	8	62	52,061	0.0040	1.45	0.26	1,536.39	3.94
P-34	23	22	1346.68	1346.31	10	55	1,749,147	0.0070	4.96	0.89	1,347.93	3.75
P-35	17-40-z	17-40	1568.19	1564.77	6	64	64,147	0.0530	3.89	3.42	1,568.35	5.65
P-36	17-36	17-35	1543.1	1542.04	8	65	104,130	0.0160	2.86	1.10	1,543.28	5.04
P-37	G-2-5	G-2-4	1393.97	1390.26	6	65	101,565	0.0570	4.58	3.71	1,394.17	3.98
P-38	44-A	44	1387.39	1387.27	10	66	1,411,978	0.0020	4.01	0.66	1,390.06	0.00
P-39	G-2-6	G-2-5	1397.95	1393.97	6	66	99,937	0.0600	4.63	3.98	1,398.15	4.00
P-40	50-4	50-3	1423.24	1422.55	6	67	4,220	0.0100	0.98	0.68	1,423.28	6.14
P-41	G-28-4	G-28-3	1342.26	1341.76	6	67	92,966	0.0070	2.15	0.47	1,342.45	3.29
P-42	G-28-3	G-28-2	1341.76	1341.45	6	69	93,960	0.0040	1.79	0.33	1,341.98	3.36
P-43	G-36-3	G-36-2	1422.62	1420.99	6	67	6,192	0.0240	1.46	1.62	1,422.67	6.30
P-44	50-2-1	50-2	1406.54	1405.53	6	67	987	0.0150	0.71	0.98	1,406.56	5.06
P-45	17-76-5	17-76-8	1465.66	1460.9	6	70	14,858	0.0680	2.75	4.74	1,465.73	4.14
P-47	G-17-1	G-17	1286.16	1285.46	6	71	380,437	0.0100	3.00	0.78	1,287.50	2.22
P-48	15-4	15-3	1350.75	1345.02	8	71	69,783	0.0810	4.47	5.67	1,350.90	3.96
P-49	G-33	G-32	1344.42	1340.22	6	72	195,822	0.0580	5.57	4.32	1,344.70	2.42
P-50	17-47	17-46	1586.77	1581.69	6	73	2,948	0.0700	1.66	5.03	1,586.80	2.02
P-51	G-5	G-4	1399.81	1399.12	8	77	296,766	0.0090	3.10	0.68	1,400.13	7.38
P-52	34	33	1366.27	1361.51	10	77	1,724,912	0.0620	9.94	5.07	1,366.99	4.94
P-53	101-1	101A	1505.3	1505.24	6	79	274,795	0.0010	2.17	0.45	1,506.58	3.64
P-54	G-40-2	G-40-1	1409.79	1408.87	6	60	48,323	0.0150	2.31	0.92	1,409.92	6.45
P-55	G-36-2	G-36-1	1420.99	1412.74	6	80	7,746	0.1030	2.59	8.24	1,421.04	3.58

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-56	17-10	17-9	1353.39	1352.79	10	80	503,724	0.0080	3.31	0.57	1,353.78	4.60
P-57	A-19	A-18	1481.39	1478.56	8	82	31,442	0.0350	2.61	2.83	1,481.49	6.55
P-58	76-6-6	76-6-5	1527.97	1527.35	6	84	64,864	0.0070	1.94	0.60	1,528.13	5.56
P-59	17-63	17-2	1322.45	1321.01	8	85	226,263	0.0170	3.62	0.48	1,322.72	4.49
P-60	17-9	17-8	1352.79	1352.36	10	85	503,724	0.0050	2.86	0.46	1,353.21	4.42
P-61	A-18	A-17	1478.56	1477.63	8	86	33,236	0.0110	1.76	0.92	1,478.66	6.84
P-62	17-76-3	17-76-5	1471.59	1465.66	6	86	4,284	0.0690	1.86	5.90	1,471.63	3.47
P-63	G-21	G-20	1320.31	1314.01	6	87	53,084	0.0720	4.11	6.36	1,320.45	4.71
P-64	77-2	77-1	1512.24	1512.14	8	87	0	0.0010	0.00	0.00	1,512.34	3.65
P-65	98-5	98-4	1517.93	1517.83	6	120	4,261	0.0010	0.40	0.08	1,518.00	2.69
P-66	G-36	G-35	1377.91	1366.62	6	90	126,471	0.1250	6.44	11.29	1,378.13	7.15
P-67	77	76	1510.94	1510.68	10	84	435,013	0.0030	2.29	0.34	1,511.38	4.02
P-68	G-40-4	G-40-3	1413.4	1410.17	6	90	46,510	0.0360	3.09	3.27	1,413.53	5.47
P-69	79-2	79-1	1516.11	1514.88	10	91	298,459	0.0140	3.54	1.29	1,516.41	6.00
P-70	24-1	24	1373.28	1348.94	6	91	8,368	0.2670	3.76	24.37	1,373.33	5.72
P-72	50	49	1403.68	1403.03	10	92	1,107,087	0.0070	3.14	0.56	1,404.55	3.03
P-73	79	78	1512.92	1511.85	10	92	298,459	0.0120	3.36	1.06	1,513.22	4.55
P-74	79-8	79-7	1532.84	1532.79	10	108	214,836	0.0000	0.94	0.16	1,533.27	9.50
P-75	77-26	77-25	1533.33	1533.38	8	108	31,829	0.0000	0.14	0.04	1,533.59	7.06
P-76	101-1-1	101-1	1506.09	1505.3	6	95	262,941	0.0080	2.07	0.50	1,507.08	3.74
P-77	25	24-A	1348.66	1347.87	10	97	1,739,625	0.0080	4.93	1.46	1,352.07	1.49
P-78	G-1-15	G-1-14	1408.54	1406.71	6	97	2,736	0.0190	1.05	1.82	1,408.57	6.78
P-79	26	25	1349.4	1348.66	10	98	1,735,895	0.0080	4.92	1.47	1,353.40	0.00
P-80	44-10	44-9	1392.86	1391.49	6	82	16,498	0.0170	1.74	1.37	1,392.94	7.16
P-81	67	66	1479.92	1478.29	10	99	643,186	0.0160	4.72	1.61	1,480.36	4.59
P-82	101-4	101-3	1516.73	1515.74	6	99	110,726	0.0100	2.51	0.89	1,516.94	5.34
P-83	77-13-Z	77-13	1556.93	1550.21	6	99	18,016	0.0680	2.92	6.69	1,557.01	4.63
P-84	41-5-1	41-5	1442.65	1425.18	6	100	1,304	0.1750	1.85	17.30	1,442.67	4.01
P-85	104-2-8-1	104-2-8	1559.5	1558.3	6	100	7,969	0.0120	1.24	1.19	1,559.55	4.52
P-86	44-19	44-18	1416.31	1404.27	6	100	25,042	0.1200	3.91	12.04	1,416.41	5.03
P-87	G-6-1	G-6	1412.03	1410.22	6	101	4,522	0.0180	1.19	1.70	1,412.07	4.58
P-88	G-39	G-38	1400.42	1397.89	6	103	113,205	0.0250	3.49	2.59	1,400.63	3.38
P-89	17-23	17-22-1	1439.63	1435.8	8	104	177,402	0.0370	4.47	3.83	1,439.87	3.24
P-90	98-3	98-2	1517.16	1516.59	6	106	17,293	0.0050	1.18	0.56	1,517.25	5.34
P-91	104-1	104	1524.27	1520.73	8	106	163,092	0.0330	4.20	3.62	1,524.50	4.58
P-92	G-32	G-31	1340.22	1339.06	6	106	195,822	0.0110	3.01	1.13	1,340.50	6.06
P-93	60	59	1436.37	1431.02	10	107	708,122	0.0500	7.23	5.35	1,436.84	5.63
P-94	17-21	17-20	1420.87	1417.9	8	108	180,560	0.0270	4.04	2.97	1,421.11	3.00
P-95	17-74-1-A	17-74-1	1563.79	1555.85	6	108	34,082	0.0740	3.62	7.93	1,563.90	2.45
P-96	17-61	17-60-2	1537.1	1531.79	6	108	30,962	0.0490	3.06	5.30	1,537.21	3.17
P-97	17-37	17-36	1544.61	1543.1	8	109	81,471	0.0140	2.51	1.49	1,544.77	6.97
P-98	104-2-5	104-2-4	1536.89	1534.77	6	110	25,910	0.0190	2.09	2.12	1,536.99	7.61
P-99	63	62	1465.33	1463.25	10	110	704,690	0.0190	5.08	2.20	1,465.79	4.62
P-100	G-29	G-28	1337.36	1335.05	6	114	212,755	0.0200	3.87	2.23	1,337.65	7.66
P-101	17-16	17-15	1364.66	1363.77	10	111	229,587	0.0080	2.73	0.76	1,364.92	7.41
P-102	24-2	24-1	1374.17	1373.28	6	111	7,574	0.0080	1.06	0.89	1,374.22	3.63
P-103	G-2-10	G-2-9	1417.63	1415.12	6	112	85,937	0.0220	3.12	2.51	1,417.81	5.22
P-104	53-5	53-4	1470.18	1465.7	6	112	2,749	0.0400	1.37	4.47	1,470.21	3.76
P-105	48	47	1402.6	1398.09	10	113	1,125,992	0.0400	7.57	4.51	1,403.19	3.16
P-107	86	85	1537.81	1537.69	10	98	107,746	0.0010	1.12	0.21	1,538.07	3.87
P-108	48-2	48-1	1430.34	1428.17	6	114	17,704	0.0190	1.85	2.17	1,430.42	3.98
P-109	24-3	24-2	1379.45	1374.17	6	117	7,574	0.0450	1.93	5.28	1,379.50	4.10

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-110	17-6	17-5	1332.05	1328.77	10	116	507,818	0.0280	5.37	3.28	1,332.44	3.53
P-111	104	103	1520.73	1515.38	8	116	163,092	0.0460	4.71	5.34	1,520.96	3.47
P-112	49	48	1403.03	1402.6	10	116	1,107,087	0.0040	3.14	0.80	1,403.99	2.97
P-113	44-17	44-A-5	1396.44	1391.19	6	117	25,580	0.0450	2.80	5.17	1,396.54	13.13
P-114	17-11	17-10	1357.32	1353.39	10	118	502,174	0.0330	5.68	3.93	1,357.71	5.62
P-115	44-13	44-12	1409.88	1404.81	6	118	3,848	0.0430	1.55	5.05	1,409.92	7.31
P-116	17-26	17-25	1474.28	1465.48	8	119	163,162	0.0740	5.57	8.79	1,474.51	4.61
P-117	77-24-1	77-24	1537	1533.57	6	119	53,355	0.0290	2.97	3.47	1,537.14	4.87
P-118	G-45-1	G-45	1444.1	1438.35	6	119	39,240	0.0480	3.26	5.73	1,444.22	5.23
P-119	44-25-2	44-25-1	1447.58	1433.02	6	120	43,557	0.1210	4.65	14.55	1,447.71	4.39
P-121	17-41	17-40-z	1574.27	1568.19	6	122	36,559	0.0500	3.21	6.04	1,574.39	6.81
P-122	17-2	17-1	1320.68	1320.48	12	125	740,913	0.0020	1.46	0.13	1,322.25	0.00
P-123	17-33	17-32	1536.47	1534.84	8	126	129,570	0.0130	2.81	1.63	1,536.68	6.21
P-124	77-16-9	77-16-8A	1526.78	1518.32	6	127	28,943	0.0670	3.34	8.09	1,526.88	3.11
P-125	72	71	1499.29	1498.33	10	127	547,385	0.0080	3.39	0.94	1,499.70	7.66
P-126	38	37	1374.39	1373.01	10	128	1,717,447	0.0110	4.87	1.88	1,377.98	4.01
P-127	G-24-8	G-24-7	1403.69	1392.48	6	128	6,915	0.0880	2.37	11.20	1,403.74	6.24
P-128	17-7	17-6	1342.54	1332.05	10	129	506,102	0.0810	7.81	10.49	1,342.93	2.54
P-129	42-2-2	41-2-1	1416.96	1416.4	6	129	9,457	0.0040	0.91	0.31	1,417.03	4.21
P-130	G-17-7	G-17-6	1327.42	1321.98	6	130	351,189	0.0420	5.77	5.44	1,327.80	11.36
P-131	G-37	G-36	1381.19	1377.91	6	131	113,205	0.0250	3.51	3.27	1,381.40	3.16
P-132	101-6-1	101-6	1546.66	1529.12	6	131	65,466	0.1340	5.43	17.53	1,546.82	3.71
P-133	77-1	77	1512.14	1510.94	8	124	125,779	0.0100	2.51	0.96	1,512.34	3.75
P-134	17-12	17-11	1358.24	1357.32	10	132	501,226	0.0070	3.22	0.92	1,358.63	5.57
P-136	A-6	A-5	1475.2	1470.92	8	134	28,993	0.0320	2.48	4.25	1,475.30	9.03
P-137	104-2-3	104-2-2	1529.31	1528.85	8	135	87,680	0.0030	1.56	0.43	1,529.51	2.66
P-138	77-13-2	77-13-1	1566.07	1556.36	6	136	13,384	0.0710	2.72	9.70	1,566.14	4.36
P-139	G-31	G-30	1339.06	1338.22	6	136	195,822	0.0060	2.42	0.83	1,339.36	3.09
P-140	59	58	1431.02	1429.55	10	136	709,242	0.0110	4.14	1.53	1,431.49	7.20
P-141	G-17-4	G-17-3	1296.1	1294.39	6	137	376,829	0.0120	3.63	1.71	1,296.49	2.95
P-142	17-54	17-53	1428.98	1428.34	6	138	65,813	0.0050	1.64	0.64	1,429.16	2.80
P-143	A-17	A-16	1477.63	1465.35	8	138	39,204	0.0890	3.88	12.22	1,477.74	7.03
P-144	53-4	53-2	1465.7	1449.55	6	139	3,854	0.1160	2.23	16.11	1,465.74	3.22
P-145	41-3-1	41-3	1426.88	1422.74	6	139	150,871	0.0300	4.06	4.07	1,427.12	4.25
P-146	77-12	77-6-7	1541.12	1533.91	6	139	37,404	0.0520	3.28	7.17	1,541.24	3.55
P-147	52	51	1407.76	1405.81	10	139	1,097,527	0.0140	5.07	1.95	1,408.34	3.72
P-148	24-A	24	1347.87	1346.94	10	139	1,740,452	0.0070	4.94	2.10	1,350.61	0.16
P-149	17-22	17-21	1428.41	1420.87	8	140	180,000	0.0540	5.13	7.54	1,428.65	2.82
P-150	17-48	17-47	1590.71	1586.77	6	140	2,948	0.0280	1.23	3.95	1,590.74	4.96
P-151	41-3	41-2-1	1422.74	1416.4	6	140	238,751	0.0450	5.36	6.33	1,423.05	3.37
P-152	17-18-2	17-18-1	1449.65	1436.42	6	141	20,850	0.0940	3.41	13.22	1,449.74	3.06
P-153	51	50	1405.81	1403.68	10	141	1,098,047	0.0150	5.22	1.84	1,406.39	6.42
P-154	15-3-1	15-3	1351.58	1345.19	6	141	61,290	0.0450	3.64	6.45	1,351.73	3.71
P-155	77-7-1	77-7	1529.82	1525.86	6	129	32,957	0.0310	2.64	3.96	1,529.93	3.50
P-156	G-19	G-18	1308.47	1288.06	6	142	54,722	0.1440	5.27	20.39	1,308.61	4.64
P-157	101-3-2	101-3-1	1517.87	1517.16	6	143	47,702	0.0050	1.54	0.64	1,518.02	3.29
P-158	17-15	17-14	1363.77	1360.85	10	144	497,509	0.0200	4.73	2.92	1,364.16	6.58
P-159	73	72	1500.38	1499.29	10	144	547,385	0.0080	3.39	1.11	1,500.79	7.06
P-160	48-6	48-4	1455.4	1451.3	6	144	8,015	0.0280	1.69	4.07	1,455.45	3.73
P-161	G-40	G-39	1404.1	1400.42	6	145	113,205	0.0250	3.53	3.74	1,404.31	5.09
P-162	77-13	77-12	1550.21	1541.12	6	146	35,879	0.0620	3.46	9.09	1,550.33	2.56
P-163	G-34	G-33	1352.17	1344.42	6	146	147,086	0.0530	4.96	7.71	1,352.41	3.09

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-164	17-51-10A	17-51-8	1579.8	1577.47	6	147	5,876	0.0160	1.25	2.34	1,579.85	1.56
P-165	17-49-2	17-49-1	1433.9	1420.94	6	147	6,393	0.0880	2.32	12.90	1,433.95	5.89
P-166	17-40	17-39	1564.77	1562.28	6	148	66,897	0.0170	2.62	2.52	1,564.93	4.00
P-167	G-23	G-22	1347.22	1341.79	6	148	40,087	0.0370	2.98	5.41	1,347.34	5.95
P-168	57	56	1427.9	1426.09	10	148	709,242	0.0120	4.33	1.88	1,428.37	3.23
P-169	35	34	1367.3	1366.27	10	149	1,722,828	0.0070	4.89	2.26	1,369.25	3.60
P-170	69	68	1494.79	1490.67	10	149	621,031	0.0280	5.63	4.11	1,495.22	6.57
P-171	17-14	17-13	1360.85	1359.37	10	150	498,236	0.0100	3.65	1.45	1,361.24	3.04
P-172	54	53	1420.86	1418.78	10	150	1,077,937	0.0140	5.03	2.07	1,421.44	3.56
P-173	G-30	G-29	1338.22	1337.36	6	152	199,213	0.0060	2.35	0.89	1,338.54	3.28
P-174	G-6	G-5	1410.05	1399.81	8	152	295,087	0.0670	6.41	10.24	1,410.37	4.76
P-175	17-43-1	17-43	1592.04	1580.33	6	152	5,000	0.0770	2.06	11.70	1,592.08	3.49
P-176	77-16-8	77-16-7	1518.58	1517.82	6	152	32,073	0.0050	1.38	0.72	1,518.70	4.81
P-177	17-43-2	17-43-1	1596.13	1592.04	6	153	2,249	0.0270	1.12	4.08	1,596.16	3.37
P-178	15-3-3	15-3-2	1398.44	1374.45	6	153	58,994	0.1570	5.59	23.99	1,398.59	3.42
P-179	50-2	50	1405.53	1404.01	6	153	7,669	0.0100	1.15	1.03	1,405.58	5.70
P-180	29	26	1350.68	1349.4	10	155	1,732,079	0.0080	4.91	2.32	1,354.88	0.00
P-181	G-2-15	G-2-14	1448.47	1441.65	6	154	69,740	0.0440	3.75	6.88	1,448.63	5.58
P-182	44-25-3	44-25-2	1468.75	1447.58	6	154	42,424	0.1370	4.82	21.17	1,468.88	4.88
P-183	17-56	17-55	1462.42	1441.48	6	154	50,702	0.1360	5.06	20.92	1,462.56	4.61
P-184	G-18-6	G-18-5	1377.3	1366.41	6	154	8,727	0.0710	2.35	10.88	1,377.36	4.69
P-185	53-1	53	1434.84	1419.11	6	156	16,473	0.1010	3.26	15.55	1,434.92	3.10
P-186	17-76-1	17-76-5	1467.89	1465.66	6	156	10,574	0.0140	1.44	2.22	1,467.95	3.23
P-187	32A	31	1358.23	1354.15	10	157	1,726,550	0.0260	4.90	2.33	1,359.69	2.79
P-188	17-49-3	17-49-2	1441.63	1433.9	6	157	4,865	0.0490	1.74	7.72	1,441.67	3.85
P-189	G-18-2	G-18-1	1333.29	1317.72	6	157	17,722	0.0990	3.31	15.57	1,333.37	3.44
P-190	A-6-1	A-6	1477.84	1475.2	8	158	17,844	0.0170	1.70	2.62	1,477.91	6.37
P-191	G-41	G-40	1408.35	1404.1	6	159	63,013	0.0270	3.04	4.20	1,408.50	5.57
P-192	G-1-14	G-1-13	1406.71	1405.67	6	159	4,988	0.0070	0.87	1.03	1,406.76	5.96
P-193	58	57	1429.55	1427.9	10	159	709,242	0.0100	4.08	1.70	1,430.02	4.76
P-194	17-46-1	17-46	1584.42	1581.69	6	159	12,412	0.0170	1.61	2.72	1,584.49	3.53
P-196	G-38	G-37	1397.89	1381.19	6	160	113,205	0.1040	5.84	16.80	1,398.10	3.17
P-197	33	32A	1361.51	1358.23	10	160	1,724,912	0.0200	6.45	2.54	1,362.23	2.48
P-198	17-8	17-7	1352.36	1342.54	10	160	505,970	0.0610	7.08	9.82	1,352.75	3.53
P-199	G-1-10	G-1-9	1399.68	1397.91	6	161	72,562	0.0110	2.30	1.76	1,399.85	3.86
P-200	98-4	98-3	1517.83	1517.16	6	162	17,293	0.0040	1.08	0.68	1,517.92	5.51
P-201	53-2	53-1	1449.55	1434.84	6	162	16,473	0.0910	3.14	14.74	1,449.63	2.99
P-202	17-79-4	17-79-3	1545.03	1538.81	6	163	886	0.0380	0.96	6.22	1,545.05	4.12
P-203	41-1	41	1390.55	1382.42	6	163	262,854	0.0500	5.71	3.46	1,390.87	2.85
P-204	101-7	101-3-1	1519.01	1517.16	6	163	74,120	0.0110	2.34	1.80	1,519.18	3.80
P-205	G-24	G-23	1348.35	1347.22	6	164	30,418	0.0070	1.52	1.12	1,348.46	4.23
P-206	55	54	1425.71	1420.86	10	164	1,075,545	0.0300	6.70	4.85	1,426.29	3.09
P-208	G-2-2	G-2-1	1376.83	1365.5	6	165	106,923	0.0690	4.95	11.33	1,377.03	3.97
P-209	G-40-4-2	G-40-4-1	1431.68	1420.89	6	165	3,975	0.0650	1.79	10.77	1,431.72	6.27
P-210	77-6-4	77-6-7	1535.13	1533.91	6	166	27,460	0.0070	1.51	1.16	1,535.23	7.40
P-211	48-1	48	1428.17	1402.93	6	168	18,499	0.1500	3.89	25.06	1,428.25	4.48
P-212	48-5	48-4	1466.04	1451.3	6	168	5,727	0.0880	2.24	14.71	1,466.09	3.73
P-213	17-55	17-54	1441.48	1428.98	6	171	65,813	0.0730	4.40	12.48	1,441.64	3.01
P-214	44-21	44-20	1419.12	1417.91	6	171	15,692	0.0070	1.26	1.19	1,419.20	9.37
P-215	77-6-7	76-6-6	1533.91	1527.97	6	172	64,864	0.0350	3.36	5.99	1,534.07	8.40
P-216	31	30	1354.15	1351.21	10	173	1,727,890	0.0170	4.90	2.58	1,357.35	0.00
P-217	A-2-1	A-13	1446.93	1444.07	6	308	112,387	0.0090	2.46	2.64	1,447.14	4.87

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-218	A-11-3-1	A-11-3	1469.65	1468.71	6	175	9,219	0.0050	0.98	0.89	1,469.71	6.26
P-219	G-27	G-26	1329.75	1328.63	6	177	344,982	0.0060	2.72	1.60	1,331.71	2.37
P-220	101-7-3	101-7-1	1523.27	1521.3	6	179	37,333	0.0110	1.91	1.95	1,523.39	5.36
P-221	77-9	77-7-1	1541.22	1529.82	6	225	31,812	0.0510	3.11	11.40	1,541.33	4.00
P-222	77-16-1	78	1513.22	1512.18	6	51	10,399	0.0200	1.61	1.05	1,513.28	3.99
P-223	98-2	98	1516.59	1502.82	6	648	23,191	0.0210	2.09	13.47	1,516.68	8.08
P-224	17-49-5	17-49-1	1464.07	1420.94	6	175	25,420	0.2460	5.08	43.12	1,464.17	3.68
P-225	G-43	G-41	1419.84	1408.35	6	360	63,013	0.0320	3.24	11.54	1,419.99	5.13
P-226	17-51-6	17-51-4a	1529.01	1528.22	6	245	52,122	0.0030	1.36	0.82	1,529.18	2.95
P-227	101-3-1	101-3	1517.16	1515.74	6	183	121,822	0.0080	2.35	1.33	1,517.38	2.30
P-228	17-49-7	17-49-5	1529.37	1464.07	6	839	22,420	0.0780	3.25	65.29	1,529.46	2.67
P-229	17-77	17-75-4	1533.57	1525.1	8	173	111,330	0.0490	4.31	8.39	1,533.76	3.34
P-230	77-16-8A	77-16-8	1518.32	1518.58	6	187	31,214	-0.0010	0.25	0.10	1,518.80	2.52
P-231	56-3	56-1	1455.94	1434.21	6	353	0	0.0620	0.00	21.73	1,455.94	2.63
P-232	41-4	41-3	1424.41	1422.74	6	230	87,880	0.0070	2.10	1.54	1,424.59	6.62
P-234	G-2-14	G-2-13	1441.65	1438.09	6	192	69,740	0.0190	2.75	3.54	1,441.81	3.91
P-235	50-3	50-2	1422.55	1405.53	6	190	5,534	0.0900	2.23	17.01	1,422.59	6.92
P-236	17-22-1	17-22	1435.8	1428.41	8	193	179,291	0.0380	4.55	7.39	1,436.04	4.63
P-237	17-25-1	17-25	1485.71	1465.65	6	194	5,199	0.1030	2.34	20.04	1,485.75	3.30
P-238	G-2-7-1	G-2-7	1412.13	1399.86	6	197	3,981	0.0620	1.79	12.11	1,412.17	5.54
P-239	22	21	1346.31	1343.67	10	91	1,755,385	0.0290	7.46	1.62	1,347.04	3.27
P-240	17-39	17-37	1562.11	1544.61	8	195	81,471	0.0900	4.86	17.58	1,562.27	3.87
P-241	G-28-11-1	G-28-11	1373.47	1369.05	6	196	20,014	0.0230	2.04	4.37	1,373.56	5.80
P-242	98	97	1502.82	1497.72	10	196	498,581	0.0260	5.18	4.96	1,503.21	3.21
P-243	G-12-1	G-12	1438.65	1437.7	6	182	11,972	0.0050	1.04	0.96	1,438.72	3.03
P-244	17-65-3	17-65-2	1355.38	1350.56	8	197	52,703	0.0240	2.70	4.82	1,355.51	4.38
P-245	17-45	17-44	1579.45	1576.44	6	292	19,024	0.0100	1.53	2.99	1,579.53	2.80
P-246	G-24-1	G-24	1351.4	1348.35	6	198	29,083	0.0150	2.00	3.05	1,351.50	4.30
P-247	17-28	17-27	1503.69	1492.34	8	322	160,381	0.0350	4.27	11.35	1,503.92	3.93
P-248	17-27	17-26	1492.34	1474.28	8	436	162,803	0.0410	4.54	18.06	1,492.57	3.06
P-249	17-20	17-19	1417.9	1413.49	8	121	181,943	0.0360	4.48	4.41	1,418.15	3.22
P-250	101	100-1	1505.12	1504.28	8	200	446,336	0.0040	1.98	0.65	1,506.10	3.17
P-251	47	46	1398.09	1388.58	10	201	1,128,928	0.0470	8.06	7.10	1,398.68	3.06
P-252	46	45	1388.58	1387.69	10	163	1,131,609	0.0050	3.21	1.04	1,391.58	3.70
P-253	A-10-1	A-10	1493.3	1478.2	6	201	13,089	0.0750	2.75	14.61	1,493.37	4.52
P-254	G-24-6-1	G-24-6	1391.5	1384.37	6	201	9,415	0.0350	1.91	7.10	1,391.56	6.83
P-255	A-20	A-19	1493.22	1481.39	8	202	28,867	0.0590	3.06	11.83	1,493.32	6.61
P-256	G-18-7	G-18-6	1380.29	1377.3	6	202	5,822	0.0150	1.22	2.98	1,380.34	4.76
P-257	101-1-1B	101-1-1A	1509.41	1507.13	6	203	252,285	0.0110	3.23	1.72	1,509.73	4.66
P-258	44-20-1	44-20	1436.15	1417.91	6	203	5,609	0.0900	2.25	18.19	1,436.19	5.74
P-259	44-25	44-A-7	1415	1403.5	6	203	50,791	0.0570	3.72	11.56	1,415.14	6.93
P-260	41-3-2	41-3-1	1444.26	1426.88	6	204	1,732	0.0850	1.52	17.16	1,444.29	4.30
P-261	55-3	55-2	1452.62	1445.49	8	204	328,666	0.0350	5.23	7.12	1,452.95	5.92
P-262	15-3-2	15-3-1	1374.45	1351.58	6	204	61,290	0.1120	5.00	22.95	1,374.60	1.47
P-263	G-28-7-1	G-28-7	1363.85	1356.77	6	209	13,561	0.0340	2.09	6.98	1,363.92	6.33
P-264	A-11-4	A-11-3	1481.89	1468.71	6	205	28,447	0.0640	3.28	13.17	1,481.99	5.85
P-265	101-7-2	101-7-1	1529.89	1521.3	6	205	14,309	0.0420	2.31	8.52	1,529.96	4.73
P-266	G-18-8	G-18-7	1394.28	1380.29	6	205	4,823	0.0680	1.95	13.99	1,394.32	3.81
P-267	G-40-5	G-40-4	1427.18	1413.4	6	207	38,164	0.0670	3.60	13.77	1,427.30	5.30
P-268	74-1	74	1509.68	1504.12	6	207	65,521	0.0270	3.08	5.61	1,509.84	3.92
P-269	G-40-6	G-40-5	1443.47	1427.18	6	208	37,199	0.0780	3.80	16.29	1,443.59	6.15
P-270	100-1	100	1504.28	1503.71	8	209	446,336	0.0030	1.98	0.68	1,505.44	2.96

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-271	17-30	17-29	1520.88	1514.34	8	209	144,024	0.0310	3.96	6.53	1,521.10	3.62
P-272	G-2-11	G-2-10	1428.2	1417.63	6	210	85,347	0.0500	4.16	10.57	1,428.38	5.30
P-273	G-2-4	G-2-3	1390.26	1385.89	6	210	103,832	0.0210	3.21	4.37	1,390.46	3.84
P-274	44-25-1	44-25	1433.02	1415	6	211	47,480	0.0850	4.23	18.02	1,433.15	4.67
P-275	G-17-2	G-17-1	1287.56	1286.16	6	211	380,437	0.0070	3.00	2.32	1,289.82	1.28
P-276	G-24-4	G-24-3	1360.16	1354.19	6	213	22,588	0.0280	2.28	5.96	1,360.25	6.28
P-277	G-40-1	G-40	1408.87	1404.1	6	213	49,260	0.0220	2.66	4.70	1,409.01	7.24
P-278	G-14	G-13	1439.73	1438.86	8	213	2,960	0.0040	0.60	0.87	1,439.77	4.96
P-279	65	64	1473.18	1466.87	10	214	685,522	0.0290	5.92	6.31	1,473.64	5.40
P-280	53	52	1418.78	1407.76	10	214	1,096,441	0.0510	8.25	11.02	1,419.36	3.12
P-281	77-16-7	74-1	1517.82	1509.68	6	214	65,521	0.0380	3.48	8.19	1,517.98	8.02
P-282	68	67	1490.67	1479.92	10	216	642,785	0.0500	7.03	10.75	1,491.11	4.76
P-284	G-6-2	G-6-1	1417.21	1412.03	6	220	3,446	0.0240	1.21	5.17	1,417.25	4.61
P-285	56-1	57	1434.21	1428.23	6	220	0	0.0270	0.00	5.84	1,434.21	2.90
P-286	17-5	17-4	1328.77	1326.68	10	221	510,569	0.0090	3.62	2.09	1,329.16	4.47
P-287	G-17-3	G-17-2	1294.39	1287.56	6	221	378,848	0.0310	5.24	4.96	1,294.78	3.13
P-288	G-28-11	G-28-10	1369.05	1367.85	6	228	43,766	0.0050	1.54	1.20	1,369.19	6.13
P-289	101-7-1	101-7	1521.3	1519.01	6	222	51,642	0.0100	2.05	2.26	1,521.44	11.18
P-290	70	69	1496.96	1494.79	10	222	621,031	0.0100	3.85	2.22	1,497.39	4.22
P-291	79-1	79	1514.88	1512.92	10	225	298,459	0.0090	3.03	1.99	1,515.18	4.00
P-292	36	35	1368.32	1367.3	10	225	1,722,828	0.0050	4.89	3.33	1,372.58	4.85
P-293	G-28-10	G-28-9	1367.85	1366.46	6	225	45,604	0.0060	1.64	1.39	1,367.99	6.99
P-294	G-43-1	G-43	1420.76	1419.84	6	233	6,526	0.0040	0.79	0.82	1,420.82	3.46
P-295	G-28-9	G-28-8	1366.46	1359.33	6	227	46,877	0.0310	2.94	7.13	1,366.59	6.42
P-296	39	38	1375.12	1374.39	10	228	1,715,851	0.0030	4.87	3.35	1,381.33	1.47
P-297	76-6-4	77-6-3	1526.01	1523.67	6	229	72,387	0.0100	2.24	2.33	1,526.18	5.19
P-298	17-78-1	17-78	1553.38	1534	6	230	10,164	0.0840	2.62	19.13	1,553.44	4.19
P-300	89	87	1538.89	1538.47	10	231	103,510	0.0020	1.28	0.43	1,539.12	5.95
P-301	77-16-7A	77-16-7	1521.96	1517.82	6	231	33,448	0.0180	2.19	4.09	1,522.07	7.34
P-302	90	89	1539.96	1538.89	10	232	99,053	0.0050	1.76	1.02	1,540.14	3.47
P-303	79-3	79-2	1526.39	1516.11	10	233	298,459	0.0440	5.40	10.40	1,526.69	5.20
P-304	G-8	G-7	1420.99	1414.21	8	238	286,912	0.0280	4.67	6.78	1,421.30	6.89
P-305	91	90	1540.45	1539.96	10	234	99,053	0.0020	1.33	0.53	1,540.67	7.93
P-306	17-60-2	17-57	1531.79	1516.45	6	234	35,898	0.0660	3.53	15.33	1,531.91	4.29
P-307	101-3-5	101-3-4	1532.33	1528.27	6	235	39,166	0.0170	2.26	4.06	1,532.45	3.01
P-308	G-13	G-12	1438.86	1437.53	8	230	2,960	0.0060	0.68	1.18	1,438.89	8.92
P-309	G-28-2	G-28-1	1341.45	1339.82	6	241	98,149	0.0070	2.11	1.62	1,341.65	3.28
P-310	G-40-8	G-40-7	1461.66	1456.5	6	241	29,549	0.0210	2.25	5.15	1,461.76	5.98
P-311	G-26	G-17-7	1328.63	1327.42	6	241	351,189	0.0050	2.77	2.31	1,330.11	7.66
P-312	44-18	44-17	1404.27	1396.44	6	237	25,580	0.0330	2.51	7.86	1,404.37	6.99
P-313	17-60	17-59	1502.08	1494.79	6	237	45,559	0.0310	2.90	7.29	1,502.21	5.11
P-314	A-22	A-21	1502.55	1499.72	8	269	12,391	0.0110	1.30	2.82	1,502.61	6.72
P-315	17-13	17-12	1359.37	1358.24	10	238	499,252	0.0050	2.78	1.16	1,359.79	2.44
P-316	37	36	1373.01	1368.32	10	238	1,720,595	0.0200	4.88	3.51	1,376.10	4.61
P-317	G-40-9	G-40-8	1465.11	1461.66	6	243	26,011	0.0140	1.88	3.44	1,465.21	5.99
P-318	44-11	44-10	1397.08	1392.86	6	239	14,210	0.0180	1.69	4.21	1,397.15	8.00
P-319	A-26	A-27	1492.19	1478.81	6	240	32,432	0.0560	3.24	13.37	1,492.30	6.43
P-320	53-3	53-2	1465.7	1449.55	6	229	6,451	0.0710	2.15	16.12	1,465.75	1.95
P-321	G-2-1	G-2	1365.5	1347.4	6	241	107,643	0.0750	5.12	18.09	1,365.70	3.76
P-322	44-A-6	44-A-5	1398.56	1391.02	8	242	212,040	0.0310	4.43	7.46	1,398.83	5.05
P-323	17-4	17-2	1326.68	1320.85	10	242	511,796	0.0240	5.08	4.83	1,327.07	4.54
P-324	G-1-9	G-1-8	1397.91	1390.83	6	242	77,193	0.0290	3.34	7.08	1,398.08	5.91

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-325	G-28-8	G-28-7	1359.33	1356.77	6	243	49,493	0.0110	2.03	2.53	1,359.47	3.79
P-326	92	91	1541.8	1540.45	10	243	95,080	0.0060	1.86	1.30	1,541.97	5.10
P-327	104-2-5-2	104-2-5-1	1558.26	1540.05	6	243	4,652	0.0750	1.99	18.19	1,558.30	4.60
P-328	17-75-2	17-75-3	1527.48	1526.38	6	228	73,360	0.0050	1.72	1.12	1,527.66	5.00
P-329	G-23-3	G-23-2	1372.05	1366.85	6	247	4,922	0.0210	1.30	5.19	1,372.09	5.96
P-330	17-53	17-52	1428.34	1426.8	6	246	74,393	0.0060	1.89	1.55	1,428.51	3.18
P-331	G-2-13	G-2-12	1438.09	1436.6	6	255	77,974	0.0060	1.88	1.50	1,438.27	4.78
P-332	G-24-3	G-24-2	1354.19	1352.7	6	248	25,329	0.0060	1.37	1.48	1,354.29	4.82
P-333	G-18-1	G-18	1317.72	1288.06	6	249	19,514	0.1190	3.63	29.58	1,317.80	3.55
P-334	44-23	44-22	1427.94	1426.32	6	256	8,810	0.0060	1.02	1.61	1,428.00	8.93
P-335	15-3-4	15-3-3	1404.3	1398.44	6	251	51,684	0.0230	2.74	5.85	1,404.44	3.18
P-336	93	92	1543.22	1541.8	10	251	92,106	0.0060	1.85	1.42	1,543.39	3.53
P-337	G-35	G-34	1366.62	1352.17	6	253	129,836	0.0570	4.91	14.43	1,366.84	11.10
P-338	A-28	A-27	1485.1	1478.81	6	254	4,044	0.0250	1.29	6.21	1,485.14	6.47
P-339	104-2-5-3	104-2-5-2	1567.82	1558.26	6	255	2,866	0.0370	1.33	9.55	1,567.85	3.63
P-340	G-28-6	G-28-5	1345.42	1343.94	6	255	79,162	0.0060	1.88	1.47	1,345.60	5.17
P-341	A-24	A-25	1505.57	1496.89	6	255	17,258	0.0340	2.25	8.66	1,505.65	6.48
P-342	G-4	G-3	1399.12	1397.22	8	257	306,424	0.0070	2.91	1.90	1,399.44	7.68
P-344	A-9	A-10	1496.35	1478.2	6	257	899,389	0.0710	8.63	18.08	1,496.84	4.08
P-345	G-1-11	G-1-10	1401.34	1399.68	6	257	72,100	0.0060	1.91	1.66	1,401.51	3.16
P-346	G-17-6	G-17-5	1321.98	1298.64	6	258	356,173	0.0900	7.70	23.33	1,322.36	3.65
P-347	77-6	77-1	1517.87	1512.14	8	277	118,671	0.0210	3.24	5.72	1,518.07	3.20
P-348	A-25	A-26	1496.89	1492.19	6	260	25,599	0.0180	2.03	4.69	1,496.99	6.37
P-349	G-28-11-2	G-28-11-1	1379.96	1373.47	6	280	15,068	0.0230	1.89	6.48	1,380.03	5.89
P-350	17-25-2	17-25-1	1491.38	1485.71	6	261	4,617	0.0220	1.29	5.67	1,491.42	3.70
P-351	G-24-2	G-24-1	1352.7	1351.4	6	266	27,380	0.0050	1.31	1.31	1,352.81	3.30
P-352	A-6-2-1	A-6-2	1510.65	1489.06	6	265	8,338	0.0810	2.44	21.59	1,510.70	4.62
P-353	A-11-1	A-11	1450.08	1448.6	8	297	54,866	0.0050	0.24	0.01	1,454.54	0.93
P-354	G-28-7	G-28-6	1356.77	1345.42	6	267	74,539	0.0430	3.77	11.34	1,356.94	7.44
P-355	44-A-7	44-A-6	1403.33	1398.56	8	276	206,386	0.0170	3.56	4.77	1,403.59	9.25
P-356	A-6-1-1	A-6-1	1494.11	1477.84	8	268	5,748	0.0610	1.89	16.24	1,494.15	5.11
P-357	G-28-1	G-28	1339.82	1335.05	6	276	109,268	0.0170	3.05	4.60	1,340.03	6.20
P-358	76-6-5	76-6-4	1527.35	1526.01	6	269	68,324	0.0050	1.70	1.35	1,527.53	5.26
P-359	76	75	1510.68	1507.66	10	270	435,013	0.0110	3.68	3.07	1,511.04	5.24
P-360	101-3	101-2	1515.74	1513.23	6	271	235,408	0.0090	2.95	2.51	1,516.05	3.92
P-361	17-25	17-24	1465.48	1449.5	8	271	170,921	0.0590	5.21	15.98	1,465.72	4.99
P-362	87	86	1538.47	1537.81	10	271	107,746	0.0020	1.44	0.62	1,538.69	6.91
P-364	17-42	17-41	1575.53	1574.27	6	273	35,755	0.0050	1.38	1.27	1,575.66	3.90
P-365	A-10-2	A-10-1	1517.01	1493.3	6	273	8,684	0.0870	2.52	23.70	1,517.07	5.54
P-366	17-57	17-60	1516.45	1502.08	6	276	43,259	0.0520	3.44	14.37	1,516.58	5.11
P-367	G-28	G-27	1335.05	1329.75	6	300	342,170	0.0180	4.12	3.71	1,335.42	6.51
P-368	G-24-6	G-24-5	1384.37	1365.23	6	278	22,588	0.0690	3.12	19.18	1,384.46	6.72
P-369	A-11-2	A-11-1	1451.54	1450.08	8	293	49,297	0.0050	0.22	0.01	1,454.55	7.24
P-370	17-59	17-58	1494.79	1484.21	6	280	48,340	0.0380	3.18	10.58	1,494.92	3.54
P-371	17-24	17-23	1449.5	1439.63	8	280	174,485	0.0350	4.38	9.87	1,449.74	3.26
P-372	44-20	44-19	1417.91	1416.31	6	280	21,301	0.0060	1.28	1.60	1,418.00	10.46
P-373	10	9	1317.93	1317.61	15	280	2,724,545	0.0010	3.44	1.19	1,322.83	0.00
P-375	G-28-5	G-28-4	1343.94	1342.26	6	287	90,089	0.0060	1.96	1.69	1,344.14	7.28
P-376	17-1	16B	1320.23	1319.26	15	283	740,913	0.0030	0.93	0.09	1,324.36	0.82
P-377	G-24-5	G-24-4	1365.23	1360.16	6	283	22,588	0.0180	1.95	5.09	1,365.32	5.69
P-378	44-22	44-21	1426.32	1419.12	6	283	13,150	0.0250	1.88	7.19	1,426.39	6.92
P-379	A-27	G-45-1	1478.81	1444.1	6	283	39,240	0.1230	4.53	34.77	1,478.93	5.29

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-380	104-2-2	104-2-1	1528.85	1528.19	8	284	91,335	0.0020	1.38	0.67	1,529.07	2.29
P-381	G-18-5	G-18-4	1366.41	1362.9	6	284	10,421	0.0120	1.36	3.50	1,366.47	4.27
P-382	G-2-12	G-2-11	1436.6	1428.2	6	288	77,974	0.0290	3.34	8.39	1,436.77	4.95
P-383	16	15	1319.13	1318.69	12	279	1,832,326	0.0020	3.61	1.77	1,324.73	1.65
P-384	77-6-3	77-6-2	1523.67	1521.07	6	288	79,560	0.0090	2.21	2.60	1,523.84	6.65
P-385	44-12	44-11	1404.81	1397.08	6	289	9,257	0.0270	1.72	7.72	1,404.87	7.37
P-386	A-8	A-9	1507.45	1496.35	6	289	899,389	0.0380	7.09	17.78	1,512.00	0.00
P-387	15-8	15-7	1361.3	1359.93	6	290	43,504	0.0050	1.48	1.32	1,361.44	4.12
P-388	G-18-4	G-18-3	1362.9	1351.91	6	290	13,205	0.0380	2.16	10.98	1,362.97	3.26
P-389	G-40-9-1	G-40-9	1480.03	1465.11	6	306	11,708	0.0490	2.28	14.89	1,480.10	5.46
P-390	G-44-1	G-44	1436.33	1430.11	6	297	2,156	0.0210	1.00	6.10	1,436.36	3.28
P-391	A-6-1-2	A-6-1-1	1516.44	1494.11	8	291	3,237	0.0770	1.73	22.32	1,516.47	5.36
P-392	G-9	G-8	1426.73	1420.99	8	292	281,975	0.0200	4.06	5.74	1,427.04	3.77
P-393	101-3-4	101-3-3	1528.27	1525.34	6	292	40,503	0.0100	1.89	2.92	1,528.39	4.75
P-394	104-2-8	104-2-7	1558.3	1548.64	6	292	9,906	0.0330	1.89	9.65	1,558.36	6.39
P-395	G-2-3	G-2-2	1385.89	1376.83	6	295	106,923	0.0310	3.73	9.12	1,386.09	5.09
P-396	104-7	104-6	1540.69	1538.15	8	297	41,071	0.0090	1.73	2.52	1,540.80	9.34
P-397	16B	15A	1319.26	1318.57	15	306	740,913	0.0020	0.93	0.10	1,324.28	1.23
P-398	G-29-2	G-29-1	1369.73	1347.15	6	316	7,377	0.0710	2.24	22.56	1,369.78	3.95
P-399	A-11-3	A-11-2	1468.71	1451.54	8	297	43,337	0.0580	3.44	14.27	1,468.83	5.93
P-400	G-1-9-1	G-1-9	1417.36	1397.91	6	299	1,980	0.0650	1.45	19.31	1,417.39	4.90
P-401	55-2	55-1	1445.49	1435.72	8	301	351,057	0.0320	5.17	9.89	1,445.84	5.92
P-402	A-6-2	A-6-1	1489.06	1477.84	8	302	11,055	0.0370	1.94	11.20	1,489.12	6.08
P-404	A-6-2-2	A-6-2-1	1522.95	1510.65	6	304	4,349	0.0400	1.57	12.28	1,522.99	4.68
P-405	9-8	9-7	1407.15	1404.41	8	305	2,511,551	0.0090	11.13	31.54	1,414.21	0.00
P-406	A-23	A-22	1510.02	1502.55	8	305	6,379	0.0240	1.43	7.45	1,510.06	6.95
P-407	17-18-3	17-18-2	1459.65	1449.65	6	305	18,864	0.0330	2.28	10.00	1,459.73	2.53
P-408	79-7	79-6	1532.79	1532.01	10	305	224,489	0.0030	1.80	0.69	1,533.11	9.98
P-409	A-12	A-13	1445.51	1443.9	8	306	977,816	0.0050	4.33	4.82	1,449.32	1.88
P-410	77-28	77-26	1533.8	1533.33	8	323	30,168	0.0010	0.85	0.35	1,533.94	2.89
P-411	G-12-2	G-12-1	1440.34	1438.65	6	313	11,972	0.0050	1.07	1.69	1,440.41	3.79
P-412	G-22-2	G-22-1	1374.27	1352.04	6	311	2,696	0.0710	1.65	22.21	1,374.30	4.92
P-413	104-2-7	104-2-6	1548.64	1538.53	6	308	14,227	0.0330	2.10	10.10	1,548.71	5.79
P-414	A-17-1	A-17	1490.15	1477.63	6	309	5,968	0.0410	1.73	12.45	1,490.20	3.75
P-415	G-46	G-45	1446.41	1438.35	6	323	8,873	0.0250	1.66	7.98	1,446.47	6.55
P-416	G-25	G-26	1335.32	1328.63	6	311	3,256	0.0220	1.16	5.25	1,335.35	4.05
P-417	79-4	79-3	1530.12	1526.39	10	314	278,184	0.0120	3.31	3.72	1,530.41	9.71
P-418	G-28-12	G-28-11	1382.78	1369.05	6	328	20,540	0.0420	2.55	13.68	1,382.87	5.88
P-419	G-40-10	G-40-9	1478.74	1465.11	6	318	10,430	0.0430	2.11	13.59	1,478.80	6.04
P-420	17-29	17-28	1514.34	1503.69	8	315	157,233	0.0340	4.18	10.65	1,514.57	3.66
P-421	G-28-7-2	G-28-7-1	1385.99	1363.85	6	347	9,039	0.0640	2.29	22.13	1,386.05	4.86
P-422	17-60-1	17-57	1527.49	1516.45	6	319	2,440	0.0350	1.26	10.94	1,527.52	3.84
P-423	G-28-14	G-28-13	1459.7	1414.79	6	332	8,396	0.1350	2.92	44.89	1,459.76	6.15
P-424	G-40-4-1	G-40-4	1420.89	1413.4	6	331	8,347	0.0230	1.57	7.41	1,420.94	6.74
P-425	104-2-4	104-2-3	1534.77	1529.48	6	322	26,856	0.0160	1.99	5.31	1,534.87	4.95
P-426	17-79-3	17-79-2	1538.64	1537.71	8	401	886	0.0020	0.34	0.77	1,538.66	3.16
P-427	101-3-3	101-3-2	1525.34	1517.87	6	324	44,968	0.0230	2.61	7.45	1,525.47	4.91
P-428	77-25-1	77-25	1540.14	1533.38	6	325	13,461	0.0210	1.76	6.66	1,540.21	5.31
P-429	55-1	55	1435.72	1425.88	8	326	351,057	0.0300	5.04	9.78	1,436.07	7.26
P-430	G-3	G-2	1397.22	1347.23	8	327	312,096	0.1530	8.71	49.94	1,397.55	3.39
P-431	G-29-1	G-29	1347.15	1337.36	6	340	12,902	0.0290	1.95	9.57	1,347.22	6.12
P-432	A-20-1	A-20	1505.26	1493.22	6	329	11,243	0.0370	2.03	12.01	1,505.32	3.79

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-433	G-28-13	G-28-12	1414.79	1382.78	6	337	14,826	0.0950	3.10	32.00	1,414.86	5.51
P-434	G-23-1	G-23	1359.36	1347.22	6	353	8,554	0.0340	1.84	12.07	1,359.42	4.92
P-435	17-35	17-34	1542.04	1539.32	8	331	104,130	0.0080	2.24	2.72	1,542.22	3.65
P-436	A-11	A-12	1448.6	1445.51	8	332	977,816	0.0090	4.33	5.20	1,454.53	7.82
P-437	100	99	1503.71	1503.04	8	332	452,785	0.0020	2.01	1.10	1,504.76	2.59
P-438	G-18-3	G-18-2	1351.91	1333.29	6	332	15,595	0.0560	2.59	18.62	1,351.99	3.60
P-439	G-23-2	G-23-1	1366.85	1359.36	6	337	6,586	0.0220	1.46	7.48	1,366.90	4.88
P-440	15A	10	1318.57	1317.93	15	321	2,710,272	0.0020	3.42	1.35	1,324.18	0.00
P-441	G-34-1-2	G-34-1-1	1388.21	1374.26	6	349	4,640	0.0400	1.60	13.94	1,388.25	3.64
P-442	42	41	1383.22	1382.09	10	337	1,421,615	0.0030	4.03	3.40	1,388.00	0.00
P-443	G-10	G-9	1434.6	1426.73	8	348	277,717	0.0230	4.26	7.87	1,434.91	6.10
P-444	G-34-1-3	G-34-1-2	1427.8	1388.21	6	352	2,015	0.1120	1.75	39.58	1,427.83	3.71
P-446	G-22	G-21	1341.79	1320.31	6	342	51,140	0.0630	3.86	21.48	1,341.93	5.71
P-447	G-2-8	G-2-7	1401.66	1399.86	6	344	91,809	0.0050	1.89	1.81	1,401.86	8.04
P-448	G-40-7	G-40-6	1456.5	1443.47	6	350	37,199	0.0370	2.93	13.07	1,456.62	5.91
P-449	15-5	15-4	1354.4	1350.75	8	347	67,085	0.0110	2.15	3.65	1,354.55	4.90
P-450	G-11	G-10	1436.45	1434.6	8	351	90,530	0.0050	1.84	1.72	1,436.63	6.22
P-451	G-2-9	G-2-8	1415.12	1401.66	6	350	87,655	0.0380	3.81	13.44	1,415.30	5.16
P-452	77-31	77-30	1536.23	1534.08	6	351	12,921	0.0060	1.13	2.08	1,536.30	3.48
P-454	A-7	A-6	1500.25	1475.2	8	356	6,910	0.0700	2.13	25.00	1,500.30	7.55
P-455	G-34-1	G-34	1362.09	1352.17	6	363	16,313	0.0270	2.05	9.76	1,362.17	3.26
P-456	75	74	1507.66	1503.79	10	364	435,013	0.0110	3.61	3.82	1,508.02	6.90
P-457	74	73	1503.79	1500.38	10	370	547,385	0.0090	3.65	3.45	1,504.20	5.61
P-458	A-10	A-11	1478.2	1448.6	8	377	912,477	0.0790	9.27	24.23	1,478.76	4.24
P-459	101-6	101-5	1529.12	1526.23	6	384	73,836	0.0080	2.03	2.88	1,529.29	4.02
P-460	97	96	1497.72	1495.67	10	387	744,704	0.0050	3.18	2.02	1,498.24	7.29
P-461	17-18-1	17-18	1436.42	1388.71	6	419	26,215	0.1140	3.90	47.76	1,436.52	1.76
P-462	41-1-1	41-1	1409.65	1390.55	6	396	3,845	0.0480	1.61	18.81	1,409.69	3.92
P-463	17-51-8Z	17-51-8A	1576.79	1553.27	6	396	42,795	0.0590	3.59	23.51	1,576.92	3.93
P-464	77-16-10	77-16-9	1537.54	1526.78	6	397	26,987	0.0270	2.37	10.76	1,537.64	4.57
P-465	77-13-1	77-13	1556.36	1550.21	6	398	15,831	0.0150	1.67	6.11	1,556.44	3.28
P-466	66	65	1478.29	1473.18	10	399	685,522	0.0130	4.37	5.19	1,478.75	6.74
P-467	17-76-2	17-76-1	1500.44	1467.89	6	403	8,522	0.0810	2.45	32.54	1,500.50	4.18
P-469	17-62	17-61	1569.4	1537.1	6	527	28,840	0.0610	3.24	32.30	1,569.50	3.90
P-470	41	39	1382.09	1375.12	10	426	1,692,669	0.0160	4.80	6.09	1,387.42	0.10
P-471	17-78	17-77	1534	1533.57	8	439	111,330	0.0010	1.06	0.56	1,534.32	4.60
P-474	101-5	101-4	1526.23	1516.73	6	462	86,702	0.0210	3.04	9.48	1,526.41	3.43
P-475	17-74-1	17-74	1555.85	1530.07	6	497	38,309	0.0520	3.31	25.83	1,555.97	4.75
P-477	77-25-2A	77-25-1	1542.78	1540.14	6	581	9,025	0.0050	0.92	2.64	1,542.85	3.94
P-480	104-3	104-2	1535.99	1527.03	8	745	65,181	0.0120	2.24	8.87	1,536.13	4.49
P-484	A-2	A-1	1467.37	1465.33	8	313	53,911	0.0070	1.71	1.96	1,467.50	11.27
P-485	A-3	A-2	1469.1	1467.37	8	347	52,488	0.0050	1.54	1.74	1,469.24	7.23
P-486	A-4	A-3	1470.61	1469.1	8	301	49,292	0.0050	1.52	1.51	1,470.74	4.12
P-487	A-5	A-4	1470.92	1470.61	8	51	49,292	0.0060	1.62	0.30	1,471.05	7.27
P-488	101-2	101-1-1B	1513.23	1509.41	6	219	242,438	0.0170	3.79	3.81	1,513.54	3.27
P-489	103-1	103	1521.68	1515.38	6	157	4,217	0.0400	1.55	6.10	1,521.72	4.31
P-490	104-2-1	104-2	1528.19	1527.03	8	363	95,474	0.0030	1.56	1.14	1,528.40	7.94
P-491	104-2	104-1	1527.03	1524.27	8	347	163,092	0.0080	2.52	2.77	1,527.26	5.30
P-492	104-2-6	104-2-5	1538.53	1536.89	6	85	16,860	0.0190	1.84	1.62	1,538.61	6.10
P-493	94	93	1546.22	1543.22	10	150	81,824	0.0200	2.79	2.99	1,546.37	4.45
P-494	98-7	98-6	1544.24	1539.99	6	219	4,735	0.0190	1.24	4.23	1,544.28	2.32
P-495	98-6	98-4	1539.99	1517.83	6	312	8,934	0.0710	2.37	22.13	1,540.05	3.00

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-496	77-16-2	77-16-1	1535.26	1513.22	6	603	10,399	0.0370	1.99	22.06	1,535.32	3.34
P-497	48-4	48-3	1451.3	1435.35	6	111	17,485	0.1440	3.77	15.99	1,451.38	4.68
P-498	48-3	48-2	1435.35	1430.34	6	59	17,485	0.0850	3.12	5.01	1,435.43	4.52
P-499	50-5	50-4	1423.92	1423.24	6	77	3,389	0.0090	0.86	0.68	1,423.96	7.39
P-500	44-A-5	44-A-4	1391.02	1390.2	8	250	239,516	0.0030	2.02	0.49	1,391.37	11.66
P-501	44-A-4	44-A-3	1390.2	1389.45	8	213	241,085	0.0040	1.07	0.20	1,390.88	5.83
P-502	44-A-3	44-A-2	1389.45	1388.92	8	178	261,115	0.0030	1.16	0.20	1,390.67	4.08
P-503	44-A-2	44-A-1	1388.92	1388.4	8	124	274,579	0.0040	1.22	0.15	1,390.48	6.73
P-504	44-A-1	44-A	1388.4	1387.39	8	204	278,303	0.0050	1.23	0.26	1,390.32	4.46
P-505	44-9	44-A-3	1391.49	1389.62	6	189	17,149	0.0100	1.46	0.89	1,391.57	10.04
P-506	44-15	44-9	1404.42	1391.49	6	148	651	0.0870	1.17	12.87	1,404.44	6.31
P-507	44-26	44-25	1415.88	1415	6	79	3,311	0.0110	0.92	0.78	1,415.91	4.71
P-508	41-3-3	41-3-1	1442.6	1426.88	6	429	149,139	0.0370	4.35	15.72	1,442.84	3.66
P-509	41-2-1	41-2	1416.4	1409.01	6	173	252,315	0.0430	5.33	7.39	1,416.72	2.23
P-510	41-2	41-1	1409.01	1390.55	6	274	258,417	0.0670	6.34	18.46	1,409.33	2.78
P-511	17-16-2	17-16-1	1368.51	1365.79	6	219	6,401	0.0120	1.18	2.70	1,368.56	5.93
P-512	17-16-1	17-16	1365.79	1365	6	218	8,199	0.0040	0.82	0.80	1,365.86	4.01
P-513	17-84	17-40-z	1570.53	1568.19	6	386	26,656	0.0060	1.40	2.29	1,570.63	4.98
P-514	G-12	G-11	1437.53	1436.45	8	230	90,530	0.0050	1.77	1.09	1,437.72	6.16
P-516	G-15	G-14	1441.32	1439.73	8	300	2,960	0.0050	0.66	1.59	1,441.35	4.00
P-517	17-76-9	17-76-10	1452.14	1443.36	6	475	239,879	0.0180	3.86	8.84	1,452.45	5.43
P-518	17-76-10	G-16	1443.19	1442.14	8	147	239,879	0.0070	2.69	0.72	1,443.47	3.05
P-519	17-76-8	17-76-9	1460.9	1452.14	6	361	24,721	0.0240	2.24	8.55	1,461.00	6.51
P-520	17-75-5	17-76-9C	1500.24	1465.35	6	243	190,628	0.1440	7.61	34.89	1,500.51	4.94
P-521	17-76-9C	17-76-9A	1465.35	1464.88	6	38	192,348	0.0120	3.14	0.46	1,465.63	4.73
P-522	17-76-9A	17-76-9	1464.88	1452.14	6	384	210,903	0.0330	4.63	12.72	1,465.17	5.41
P-523	17-75-4	17-75-5	1525.1	1500.24	6	194	190,628	0.1280	7.31	25.01	1,525.37	11.13
P-524	17-75-3	17-75-4	1526.38	1525.1	6	94	75,580	0.0140	2.52	1.17	1,526.55	7.08
P-525	17-75	17-75-1	1528.7	1528.26	6	74	38,309	0.0060	1.54	0.44	1,528.83	5.00
P-526	17-75-1	17-75-2	1528.26	1527.48	6	114	38,309	0.0070	1.63	0.72	1,528.38	4.99
P-527	17-33-1	17-33	1537.12	1536.47	6	117	20,088	0.0060	1.25	0.54	1,537.21	4.15
P-528	17-51-7	17-51-6	1564.5	1529.01	6	361	11,057	0.0980	2.83	35.38	1,564.56	3.14
P-529	17-51-8A	17-51-9a	1553.27	1524.37	6	269	48,934	0.1070	4.63	28.89	1,553.41	2.80
P-530	17-51-9a	17-51-9	1524.37	1522.42	6	28	52,716	0.0700	4.04	1.95	1,524.51	3.76
P-531	17-51-9	17-51-9b	1522.42	1495.57	6	275	55,029	0.0980	4.61	26.85	1,522.56	5.26
P-532	17-51-9b	17-50-5	1495.57	1471.62	6	235	58,468	0.1020	4.77	23.95	1,495.72	4.54
P-533	17-50-5	17-50-4	1471.62	1466.3	6	80	59,811	0.0660	4.13	5.38	1,471.77	3.58
P-534	17-50-6	17-50-4	1476.48	1466.3	6	200	3,867	0.0510	1.64	10.19	1,476.52	4.92
P-535	17-50-4	17-50-3	1466.13	1435.81	8	190	63,678	0.1600	5.51	30.25	1,466.27	4.42
P-536	17-50-3	17-50-2	1435.81	1417.03	8	279	141,268	0.0670	5.17	18.78	1,436.03	4.80
P-537	17-50-2	17-50	1417.03	1408.91	8	111	142,925	0.0730	5.34	8.06	1,417.25	4.37
P-538	17-51-4	17-51-3	1525.73	1474.47	6	284	66,153	0.1800	6.02	51.26	1,525.89	3.33
P-539	17-51-3	17-51-2	1474.47	1469.24	6	228	68,248	0.0230	2.95	5.23	1,474.63	6.49
P-540	17-51-2	17-51-2Z	1469.24	1454.06	6	182	70,663	0.0830	4.70	15.18	1,469.40	3.64
P-541	17-51-5	17-51-4	1553.84	1525.73	6	147	10,772	0.1910	3.55	28.01	1,553.90	4.47
P-542	17-51-4a	17-51-4	1528.22	1525.73	6	201	54,234	0.0120	2.21	2.47	1,528.36	3.36
P-543	17-51-2Z	17-51-1	1454.06	1437.87	6	90	73,433	0.1800	6.23	16.28	1,454.23	3.41
P-544	17-51-1	17-50-3	1437.7	1435.81	8	40	75,209	0.0470	3.80	1.83	1,437.86	4.07
P-545	17-52	17-51	1426.8	1420.28	6	210	74,393	0.0310	3.37	6.57	1,426.97	4.22
P-546	17-51	17-50	1420.11	1408.91	8	367	76,318	0.0310	3.26	11.08	1,420.27	5.18
P-547	17-50	17-49C	1408.91	1405.05	8	124	221,728	0.0310	4.48	3.86	1,409.18	5.94
P-548	17-49-8	17-49-7	1530.08	1529.37	6	259	4,709	0.0030	0.63	0.67	1,530.13	3.36

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-556	55-15	55-14	1533.2	1527.01	8	403	40,996	0.0150	2.12	6.16	1,533.31	6.11
P-557	55-14	55-13	1527.01	1517.95	8	302	63,179	0.0300	3.06	9.06	1,527.15	4.04
P-558	55-13	55-12	1517.95	1508.06	8	296	63,569	0.0330	3.17	9.86	1,518.09	4.09
P-559	55-12	55-11	1508.06	1497.14	8	235	88,000	0.0460	3.94	10.98	1,508.23	3.99
P-560	55-11	55-10	1497.14	1488.65	8	273	88,000	0.0310	3.42	8.42	1,497.31	3.90
P-561	55-10	55-9	1488.65	1483.56	8	339	166,787	0.0150	3.19	5.05	1,488.88	4.97
P-562	55-9	55-8	1483.56	1481.08	8	365	222,134	0.0070	2.59	2.47	1,483.83	4.99
P-563	55-8	55-7	1481.08	1467.45	8	240	234,524	0.0570	5.65	13.58	1,481.36	6.72
P-564	55-7	55-6	1467.45	1466.67	8	124	302,505	0.0060	2.73	0.79	1,467.78	3.72
P-565	55-6	55-5	1466.67	1460.56	8	214	302,505	0.0290	4.75	6.10	1,466.99	4.73
P-566	55-5	55-4	1460.56	1456.02	8	225	320,366	0.0200	4.26	4.54	1,460.89	4.78
P-567	55-4	55-3	1456.02	1452.62	8	108	323,247	0.0310	5.01	3.40	1,456.35	4.84
P-568	77-7	77-6-1	1525.86	1518.18	6	125	35,475	0.0610	3.44	7.54	1,525.97	2.92
P-569	77-6-2	77-6-1	1521.07	1518.18	6	293	82,350	0.0100	2.30	2.81	1,521.25	5.96
P-571	104-6	104-4	1538.15	1536.25	8	366	49,149	0.0050	1.53	1.89	1,538.28	9.17
P-572	17-80	17-79	1537.38	1535.2	8	135	9,831	0.0160	1.40	2.02	1,537.44	4.56
P-573	17-81	17-80	1555.24	1537.55	6	335	6,881	0.0530	1.98	17.71	1,555.29	3.11
P-574	17-79-1	17-79	1536.26	1535.2	8	326	75,994	0.0030	1.47	1.03	1,536.45	1.82
P-575	17-79	17-78	1535.2	1534	8	411	92,570	0.0030	1.50	1.10	1,535.41	4.37
P-578	17-79-2	17-79-1	1537.71	1536.26	8	439	75,994	0.0030	1.48	1.45	1,537.90	5.91
P-579	17-49C	17-49-B1	1405.05	1401.08	8	146	223,994	0.0270	4.28	3.97	1,405.32	5.11
P-580	17-49-B1	17-49-b	1401.08	1392.57	8	146	225,460	0.0580	5.63	8.51	1,401.35	4.73
P-581	17-49A	17-49	1387.86	1386.86	8	28	227,166	0.0360	4.74	0.98	1,388.14	3.76
P-582	17-49	17-49-D	1386.86	1379.06	8	175	261,841	0.0450	5.34	7.92	1,387.16	4.15
P-583	17-49-D	17-15	1378.89	1363.77	10	538	266,863	0.0280	4.46	15.01	1,379.17	4.47
P-584	15-7	15-6	1359.93	1359.26	6	263	57,992	0.0030	1.28	0.72	1,360.12	3.16
P-585	15-6	15-5	1359.09	1354.4	8	118	61,506	0.0400	3.35	4.68	1,359.23	4.77
P-586	15-1-1	15-1	1326.23	1321.61	6	238	5,615	0.0190	1.31	3.23	1,326.27	4.79
P-587	15-1	15	1321.44	1319.02	8	244	136,688	0.0100	0.61	0.07	1,323.04	3.76
P-588	15-3	15-2	1345.02	1332.79	8	176	131,073	0.0690	5.11	12.32	1,345.23	2.97
P-589	15-2	15-1	1332.79	1321.44	8	182	131,073	0.0620	4.92	9.96	1,333.00	2.68
P-591	9	8	1317.36	1316.19	18	324	5,319,510	0.0040	4.66	1.99	1,322.60	0.16
P-592	7-3	7-2	1341.96	1332.8	6	242	55,332	0.0380	3.31	9.15	1,342.10	5.38
P-593	7-2	7-1	1332.8	1325.26	6	67	62,223	0.1130	5.03	7.62	1,332.95	5.98
P-594	7-1	8	1325.26	1317.19	6	204	62,223	0.0400	3.48	4.80	1,325.41	2.87
P-595	8	7	1316.19	1315.31	18	240	5,381,732	0.0040	4.71	1.51	1,320.61	0.23
P-596	7	6	1315.31	1314.8	18	165	5,381,732	0.0030	4.71	1.04	1,319.11	0.84
P-597	6	5	1314.8	1314.58	18	83	5,381,732	0.0030	4.71	0.52	1,318.07	1.44
P-598	5	4	1314.58	1313.94	18	184	5,381,732	0.0030	4.71	1.16	1,317.55	1.64
P-599	4	3	1313.94	1313.54	18	63	5,381,732	0.0060	4.71	0.40	1,316.39	2.17
P-600	3	2	1313.54	1313.42	18	98	5,382,044	0.0010	4.71	0.62	1,316.00	2.18
P-601	9-11	9-10	1418.76	1412.4	8	318	1,055,636	0.0200	4.68	5.81	1,422.74	0.70
P-602	G-17-5	G-17-4	1298.64	1296.1	6	202	375,601	0.0130	3.63	2.54	1,299.03	3.03
P-603	17-70	17-69	1522.29	1508.5	8	821	64,694	0.0170	2.52	13.75	1,522.43	2.47
P-604	17-69	17-68	1508.5	1483.61	6	171	84,249	0.1460	6.03	24.86	1,508.68	4.87
P-605	17-68	17-67-2	1483.61	1436.74	6	386	114,251	0.1210	6.18	46.98	1,483.82	3.67
P-606	17-67-2	17-67-1	1436.74	1397.56	6	387	114,251	0.1010	5.80	39.14	1,436.95	2.47
P-607	17-67-1	17-67	1397.56	1355.43	6	390	162,116	0.1080	6.56	42.26	1,397.81	2.33
P-608	17-67	17-66-1	1355.43	1351.61	6	262	162,116	0.0150	3.19	3.81	1,355.68	3.09
P-609	17-66-1	17-66	1351.61	1349.84	6	265	165,380	0.0070	2.40	1.78	1,351.88	3.25
P-610	17-66	17-65Z	1349.84	1345.95	6	247	169,051	0.0160	3.32	3.94	1,350.10	3.15
P-611	17-65Z	17-64	1345.78	1335.35	8	87	224,156	0.1200	7.25	10.43	1,346.05	2.91

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-612	17-64	17-64-1	1335.35	1329.99	8	78	224,619	0.0690	5.96	5.36	1,335.62	3.91
P-613	17-64-1	17-63	1329.99	1322.45	8	117	225,390	0.0640	5.83	7.54	1,330.26	3.09
P-615	17-65-2	17-65	1350.56	1348.03	8	252	55,105	0.0100	2.00	2.54	1,350.69	3.56
P-616	17-65	17-65Z	1348.03	1345.78	8	47	55,105	0.0480	3.47	2.11	1,348.16	4.39
P-617	17-65-8	17-65-7	1396.68	1389.54	8	354	35,809	0.0200	2.25	7.14	1,396.79	3.84
P-618	17-65-7	17-65-6	1389.54	1383.03	8	105	36,951	0.0620	3.38	6.55	1,389.65	3.40
P-619	17-65-6	17-65-5	1383.03	1377.49	8	66	36,951	0.0840	3.74	5.54	1,383.14	4.04
P-620	17-65-5	17-65-4	1377.49	1375.45	8	83	38,433	0.0250	2.47	2.04	1,377.60	3.70
P-621	17-65-4	17-65-3	1375.45	1355.38	8	199	39,215	0.1010	4.06	20.05	1,375.56	3.04
P-622	17-65-10	17-65-9-1	1490.06	1466.1	6	158	12,320	0.1520	3.41	23.94	1,490.13	3.03
P-623	17-65-9-1	17-65-9	1466.1	1434.93	6	173	20,012	0.1800	4.24	31.15	1,466.19	3.68
P-624	17-65-9	17-65-8	1434.93	1396.85	6	242	33,022	0.1570	4.68	38.14	1,435.04	3.76
P-625	17-65-12	17-65-11	1531.69	1517.17	6	285	5,552	0.0510	1.83	14.51	1,531.73	4.23
P-626	17-65-11	17-65-10	1517.17	1490.06	6	348	8,981	0.0780	2.45	27.10	1,517.23	3.29
P-627	17-65-9-3	17-65-9-Z	1481.04	1469.75	6	189	2,776	0.0600	1.60	11.30	1,481.07	11.67
P-628	17-65-9-Z	17-65-9-1	1469.75	1466.1	6	133	2,776	0.0270	1.19	3.60	1,469.78	4.61
P-629	77-29	77-28	1533.84	1533.8	8	93	28,634	0.0000	0.54	0.07	1,534.02	2.46
P-630	77-24-4	77-24-1	1547.02	1537	6	579	47,172	0.0170	2.40	10.01	1,547.15	1.79
P-631	77-24	77-23	1533.24	1533.07	10	69	99,343	0.0020	1.41	0.19	1,533.45	7.28
P-632	85	79-8	1537.69	1532.84	10	79	107,746	0.0610	4.49	4.60	1,537.87	3.62
P-633	G-17	PS2	1285.46	1284.55	6	101	471,003	0.0090	3.71	1.74	1,286.72	3.06
P-634	G-22-1	G-22	1352.04	1341.79	6	306	5,881	0.0330	1.61	10.16	1,352.09	4.81
P-635	G-24-7	G-24-6	1392.48	1384.37	6	119	9,011	0.0680	2.34	8.08	1,392.54	4.45
P-636	G-24-7-1	G-24-7	1408.56	1392.48	6	107	2,095	0.1500	1.97	16.05	1,408.59	4.34
P-637	G-34-4	G-34-3	1419.28	1380.24	6	323	3,656	0.1210	2.17	39.03	1,419.32	3.53
P-638	G-34-3	G-34-2	1380.24	1365.43	6	284	5,104	0.0520	1.80	14.80	1,380.28	4.02
P-639	G-34-2	G-34-1	1365.43	1362.09	6	344	7,863	0.0100	1.15	3.32	1,365.48	4.58
P-640	G-34-1-1	G-34-1	1374.26	1362.09	6	136	6,491	0.0890	2.34	12.14	1,374.31	6.83
P-641	G-36-1	G-36	1412.74	1377.91	6	315	10,566	0.1110	2.91	34.67	1,412.80	7.74
P-642	G-40-3	G-40-2	1410.17	1409.79	6	34	46,510	0.0110	2.04	0.38	1,410.30	6.39
P-645	G-4-1	G-4	1414.5	1399.29	6	269	9,026	0.0570	2.20	15.12	1,414.56	6.30
P-646	G-1	G-1-A	1344.77	1344.31	8	45	573,740	0.0100	3.82	0.49	1,345.22	5.10
P-647	G-45	G-44	1438.35	1430.11	6	163	52,475	0.0510	3.61	8.23	1,438.49	9.54
P-648	G-44	G-43	1430.11	1419.84	6	319	56,487	0.0320	3.14	10.26	1,430.26	6.78
P-649	A-1	PS3	1465.33	1465.3	8	32	60,325	0.0010	0.88	0.05	1,465.55	8.78
P-650	A-16	PS3	1465.35	1465.3	8	33	39,204	0.0020	0.93	0.03	1,465.53	10.81
P-651	A-15	A-11	1476.91	1448.6	6	286	10,473	0.0990	2.79	22.44	1,476.97	7.27
P-652	17-74	17-75	1530.07	1528.7	6	174	38,309	0.0080	1.71	1.36	1,530.19	4.95
P-654	G-47	G-46	1450.08	1446.41	6	338	6,848	0.0110	1.14	3.66	1,450.13	6.45
P-655	G-1-A	PS1	1344.31	1343.91	8	40	573,740	0.0100	3.78	0.42	1,344.76	5.57
P-656	G-2	G-1	1347.23	1344.77	8	137	419,739	0.0180	4.39	2.39	1,347.61	10.19
P-657	G-1-8	G-1-7	1390.83	1384.35	6	159	78,026	0.0410	3.76	6.47	1,391.00	3.83
P-658	G-1-7	G-1-6	1384.35	1378.01	6	137	87,671	0.0460	4.06	6.41	1,384.53	4.72
P-659	G-1-6	G-1-5	1378.01	1372.87	6	157	87,671	0.0330	3.59	5.13	1,378.19	3.21
P-660	G-1-5	G-1-4	1372.87	1372.17	6	124	87,671	0.0060	1.92	0.71	1,373.06	5.21
P-661	G-1-4	G-1-3	1372.17	1369.49	6	133	87,671	0.0200	3.03	2.72	1,372.35	4.39
P-662	G-1-3	G-1-2	1369.49	1365.8	6	251	87,671	0.0150	2.70	3.63	1,369.67	3.77
P-663	G-1-2	G-1-1	1365.8	1360.48	6	349	150,865	0.0150	3.19	5.32	1,366.04	5.29
P-664	G-1-1	G-1	1360.48	1344.94	6	347	153,454	0.0450	4.71	15.51	1,360.72	3.77
P-665	G-1-13	G-1-12	1405.67	1404.4	6	237	6,681	0.0050	0.89	1.27	1,405.72	5.15
P-666	G-1-12	G-1-11	1404.4	1401.34	6	349	8,527	0.0090	1.13	2.95	1,404.46	7.24
P-667	G-2-7	G-2-6	1399.86	1397.95	6	146	98,602	0.0130	2.68	1.91	1,400.05	9.17

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-668	96	(F) 95-6	1495.67	1493.73	10	381	796,034	0.0050	3.17	2.00	1,496.23	6.64
P-669	20	19	1342.67	1324.62	10	91	1,755,385	0.1980	15.31	15.68	1,343.40	3.67
P-670	19	17	1324.62	1320.18	10	358	1,755,385	0.0120	4.98	5.50	1,327.72	0.00
P-671	17	16	1320.01	1319.13	12	264	1,832,326	0.0030	3.61	1.67	1,325.81	0.00
P-672	17-46	17-45	1581.69	1579.45	6	116	17,232	0.0190	1.85	2.24	1,581.77	2.68
P-673	17-43	17-44	1580.33	1576.44	6	221	7,923	0.0180	1.42	3.84	1,580.38	5.45
P-674	17-19	17-18	1413.49	1388.55	8	327	184,923	0.0760	5.84	25.06	1,413.74	3.50
P-675	17-18	17-17	1388.38	1381.52	10	353	218,473	0.0190	3.69	6.86	1,388.63	3.03
P-676	17-17	17-16	1381.52	1364.66	10	357	221,388	0.0470	5.07	16.85	1,381.77	2.88
P-677	104-3-1	79-8	1542.67	1533.17	6	486	7,257	0.0200	1.43	9.45	1,542.72	3.26
P-678	17-58	17-56	1484.21	1462.42	6	199	50,702	0.1090	4.71	21.86	1,484.35	3.52
P-679	17-49-3B	17-49-3A	1465.88	1459.49	6	91	2,771	0.0700	1.65	6.39	1,465.91	3.23
P-680	17-76-6	17-76-3	1477.71	1471.59	6	197	4,284	0.0310	1.43	6.13	1,477.75	4.46
P-681	17-49-3A	17-49-3	1459.49	1441.63	6	67	3,026	0.2670	2.67	17.85	1,459.52	1.51
P-682	103	101	1515.38	1505.12	8	367	170,234	0.0280	3.99	9.52	1,515.62	3.66
P-683	2	Outfall	1313.42	1312.51	18	254	5,382,044	0.0040	4.71	1.75	1,315.38	3.68
P-684	A-2-4	A-2-3	1484.52	1471.26	6	130	78,000	0.1020	5.20	13.34	1,484.69	3.12
P-685	A-2-3	A-2-2	1471.26	1460.34	6	488	78,000	0.0220	3.04	10.90	1,471.43	10.07
P-686	A-2-2	A-2-1	1460.34	1446.93	6	374	93,840	0.0360	3.78	13.39	1,460.53	13.74
P-687	41-6	41-5	1427.67	1425.18	6	174	78,048	0.0140	2.59	2.47	1,427.84	2.81
P-688	17-49-b	17-49A	1392.57	1387.86	8	173	225,826	0.0270	4.30	4.71	1,392.84	7.31
P-689	A-21	A-20	1499.72	1493.22	8	183	15,424	0.0360	2.11	6.47	1,499.79	7.41
P-690	71	70	1498.33	1496.96	10	183	593,548	0.0070	3.45	1.36	1,498.76	5.37
P-691	101-1-1A	101-1-1	1507.13	1506.09	6	183	258,276	0.0060	2.04	0.93	1,508.01	3.86
P-692	79-5	79-4	1532	1530.12	10	183	224,489	0.0100	2.96	1.85	1,532.26	9.34
P-693	61	60	1455.26	1436.37	10	185	708,122	0.1020	9.35	19.13	1,455.73	5.63
P-694	G-7	G-6	1414.21	1410.05	8	186	289,988	0.0220	4.29	4.16	1,414.52	4.54
P-695	64	63	1466.87	1465.33	10	188	691,665	0.0080	3.71	1.54	1,467.33	8.74
P-696	17-49-1	17-49	1420.94	1387.03	6	188	33,351	0.1800	4.92	33.89	1,421.05	2.80
P-697	41-5	41-4	1425.18	1424.41	6	151	83,683	0.0050	1.82	0.78	1,425.38	3.25
P-702	9-2	9-1	1324.54	1318.56	8	331	2,578,269	0.0180	11.43	36.08	1,329.41	0.00
P-703	21	20	1343.67	1342.67	10	128	1,755,385	0.0080	4.98	2.02	1,345.42	1.15
P-704	G-24-6-4	G-24-6-3	1408.37	1403.76	6	112	3,445	0.0410	1.47	4.61	1,408.41	5.98
P-705	A-24-1	A-24	1531.5	1505.57	6	280	9,298	0.0930	2.63	25.91	1,531.56	6.68
P-706	44	43	1387.27	1387.14	10	109	1,411,978	0.0010	4.01	1.08	1,391.04	3.98
P-707	43	42	1387.14	1383.22	10	196	1,414,164	0.0200	4.01	1.95	1,389.95	8.30
P-708	17-32	17-31	1534.84	1522.3	8	171	134,315	0.0730	5.25	12.54	1,535.05	3.04
P-709	17-31	17-30	1522.3	1520.88	8	170	137,324	0.0080	2.44	1.41	1,522.51	4.49
P-710	(F) 9-19	(F) 9-18	1520.4	1513.4	12	200	1,333,781	0.0350	7.49	7.23	1,521.01	5.39
P-711	(F) 9-18	(F) 9-17	1513.4	1483.4	12	400	1,333,781	0.0750	9.85	30.30	1,514.01	7.39
P-712	(F) 9-17	(F) 9-16	1483.4	1460.4	12	300	1,333,781	0.0770	9.93	23.30	1,484.01	7.39
P-713	(F) 9-16	(F) 9-15	1460.4	1443.4	12	400	1,333,781	0.0430	8.03	17.25	1,461.01	7.39
P-714	(F) 9-15	(F) 9-14	1443.4	1438.4	12	400	1,333,781	0.0130	5.12	5.10	1,444.01	5.89
P-715	(F) 9-14	(F) 9-13	1438.4	1435.4	12	400	1,333,781	0.0080	4.21	2.93	1,439.01	5.39
P-716	(F) 9-13	(F) 9-12	1435.4	1433.4	12	400	1,333,781	0.0050	3.58	2.07	1,436.09	5.31
P-717	(F) 9-12	9-10	1433.4	1412.4	12	420	1,333,781	0.0500	8.51	17.08	1,434.01	8.39
P-718	9-10	T-1	1412.4	1409.55	8	71	2,510,109	0.0400	11.13	7.33	1,416.93	0.00
P-719	T-1	9-9	1409.55	1407.59	8	119	2,510,109	0.0160	11.13	12.29	1,423.90	0.00
P-720	9-7	T-2	1404.41	1403.05	8	169	2,552,014	0.0080	11.31	18.05	1,412.72	0.00
P-721	T-2	9-6	1403.05	1386.64	8	103	2,552,014	0.1590	15.41	11.98	1,403.71	8.29
P-722	9-6	T-3	1386.64	1371.56	8	150	2,552,014	0.1010	11.31	16.02	1,391.73	0.00
P-723	T-3	9-5	1371.56	1360.29	8	135	2,552,014	0.0830	11.31	14.42	1,379.13	0.00

TABLE T-4
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (2011 PEAK STORM)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-724	9-5	T-4	1360.29	1345.87	8	225	2,552,014	0.0640	11.31	24.03	1,364.71	0.00
P-725	T-4	9-4	1345.87	1344.34	8	103	2,552,014	0.0150	11.31	11.00	1,358.98	0.00
P-726	9-4	T-5	1344.34	1336.35	8	182	2,552,014	0.0440	11.31	19.43	1,347.98	0.00
P-727	T-5	9-3	1336.35	1333.7	8	96	2,552,014	0.0280	11.31	10.25	1,348.02	0.00
P-728	9-3	T-6	1333.7	1328.82	8	185	2,578,269	0.0260	11.43	20.16	1,337.77	0.00
P-729	T-6	9-2	1328.82	1324.54	8	82	2,578,269	0.0520	11.43	8.94	1,338.35	0.00
P-730	9-1	T-7	1318.56	1297.46	8	307	2,594,965	0.0690	11.50	33.89	1,325.14	0.00
P-731	T-7	9	1297.46	1317.46	8	146	2,594,965	-0.1370	11.50	13.73	1,336.34	0.00
P-805	17-74-1Z	17-74-1-A	1564.56	1563.79	6	134	30,016	0.0060	1.42	0.77	1,564.67	4.54
P-806	17-44	17-74-1Z	1576.44	1564.56	6	197	26,947	0.0600	3.15	11.87	1,576.54	5.58
P-807	G-1-7-1	G-1-7	1396.85	1384.35	6	125	8,692	0.1000	2.65	12.37	1,396.91	6.20
P-808	G-1-7-2	G-1-7-1	1399.66	1396.85	6	49	6,762	0.0580	2.03	2.80	1,399.71	4.73
P-809	G-1-7-2-1	G-1-7-2	1402.48	1399.66	6	66	1,930	0.0430	1.25	2.80	1,402.51	4.69
P-810	G-1-7-3	G-1-7-2	1402.52	1399.66	6	136	4,174	0.0210	1.23	2.85	1,402.56	5.52
P-811	G-1-7-3-1	G-1-7-3	1404.25	1402.52	6	42	990	0.0410	1.01	1.71	1,404.27	4.12
P-812	G-1-7-4	G-1-7-3	1408.25	1402.52	6	140	1,780	0.0410	1.20	5.72	1,408.28	5.12
P-814	G-5-1	G-5	1402.85	1399.81	6	132	1,113	0.0230	0.87	2.74	1,402.87	4.22
P-815	G-16	(F) PS6	1442.14	1441	12	69	1,333,762	0.0170	5.68	1.28	1,442.75	4.07
P-908	(F) 95-6	(F) 95-5	1493.73	1484.7	12	100	796,034	0.0900	9.08	8.94	1,494.20	8.67
P-909	(F) 95-5	(F) 95-4	1484.7	1483.7	12	300	796,034	0.0030	2.74	1.09	1,485.26	5.44
P-910	(F) 95-4	(F) 95-3	1483.7	1469.7	12	300	796,034	0.0470	7.18	13.86	1,484.17	9.03
P-911	(F) 95-3	(F) 95-2	1469.7	1468.7	12	400	796,034	0.0030	2.45	1.00	1,470.31	4.89
P-912	(F) 95-2	(F) 95-1	1468.7	1467.7	12	400	796,034	0.0030	2.45	0.95	1,469.31	7.39
P-913	(F) 95-1	(F) 95	1467.7	1466.9	12	400	796,034	0.0020	2.24	0.99	1,468.36	9.34
P-914	(F) 95	(F) PS5	1466.9	1465	12	260	796,034	0.0070	3.67	1.93	1,467.37	13.53

[a] "T-" prefix indicates a point of change in slope and not an actual manhole

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-1	101A	101	1505.24	1505.12	8	26	218,963	0.0050	2.24	0.04	1,505.56	3.86
P-2	44-B	44-A	1387.45	1387.39	10	38	886,051	0.0020	2.51	0.15	1,389.03	3.84
P-3	A-13	G-16	1443.9	1442.14	8	29	842,366	0.0610	8.25	1.99	1,444.44	2.64
P-4	24	23	1346.94	1346.68	10	38	1,346,329	0.0070	3.82	0.34	1,347.84	4.40
P-5	15	15A	1318.69	1318.57	12	43	1,515,803	0.0030	2.99	0.19	1,320.28	2.69
P-6	17-16-3	17-16-2	1368.85	1368.51	6	30	4,170	0.0110	0.99	0.34	1,368.89	4.73
P-7	45	44-B	1387.69	1387.45	10	37	886,051	0.0060	2.51	0.14	1,389.18	3.27
P-9	77-30	77-29	1534.08	1534.01	6	48	19,154	0.0010	0.77	0.11	1,534.21	1.76
P-10	17-76-7	17-76-8	1461.39	1460.9	6	28	1,833	0.0180	0.91	0.43	1,461.42	6.55
P-12	G-20	G-19	1314.01	1308.47	6	35	40,359	0.1580	4.98	5.54	1,314.13	4.34
P-13	77-23	79-8	1533.07	1532.84	10	33	74,696	0.0070	1.87	0.00	1,533.22	8.65
P-14	50-2-2	50-2-1	1406.81	1406.54	6	39	503	0.0070	0.43	0.27	1,406.83	6.20
P-15	G-24-6-3	G-24-6-2	1403.76	1398.52	6	39	2,969	0.1340	2.12	5.23	1,403.79	6.59
P-16	78	77	1511.85	1510.94	10	47	241,195	0.0190	3.79	0.80	1,512.12	5.03
P-17	77-3	77-2	1512.39	1512.24	6	39	0	0.0040	0.00	0.07	1,512.39	3.70
P-18	9-9	9-8	1407.59	1407.15	8	39	1,901,437	0.0110	8.43	2.31	1,411.60	0.00
P-19	56	55	1426.09	1425.71	10	41	551,338	0.0090	3.67	0.28	1,426.50	3.25
P-20	99	98	1503.04	1502.99	8	42	370,451	0.0010	1.64	0.22	1,503.57	4.61
P-21	17-51-8	17-51-8Z	1577.47	1576.79	6	42	4,469	0.0160	1.15	0.61	1,577.51	3.27
P-22	77-6-1	77-6	1518.18	1518.04	6	35	88,716	0.0040	1.69	0.17	1,518.40	3.93
P-23	79-6	79-5	1532.01	1532	10	47	173,989	0.0000	0.66	0.15	1,532.37	10.54
P-24	101-3-6	101-3-5	1534.39	1532.33	6	50	32,580	0.0410	2.93	2.10	1,534.50	4.21
P-25	17-34	17-33	1539.32	1536.47	8	53	88,712	0.0540	4.16	2.83	1,539.49	3.50
P-26	77-25	77-24	1533.38	1533.24	6	53	33,627	0.0030	1.12	0.10	1,533.52	6.78
P-27	62	61	1463.25	1455.26	10	55	547,946	0.1450	9.84	7.99	1,463.66	3.29
P-28	G-24-6-2	G-24-6-1	1398.52	1391.5	6	57	5,548	0.1230	2.49	7.01	1,398.56	6.84
P-29	G-18	G-17	1288.06	1285.46	6	60	56,504	0.0430	3.50	2.32	1,288.21	4.33
P-30	104-2-5-1	104-2-5	1540.05	1536.89	6	60	6,723	0.0530	1.96	3.12	1,540.10	6.17
P-31	30	29	1351.21	1350.68	10	61	1,333,388	0.0090	3.78	0.54	1,352.74	2.38
P-32	101-7-4	101-7-3	1523.88	1523.27	6	62	31,377	0.0100	1.74	0.62	1,523.99	6.37
P-33	104-4	104-3	1536.25	1535.99	8	62	39,399	0.0040	1.33	0.26	1,536.38	3.95
P-34	23	22	1346.68	1346.31	10	55	1,346,329	0.0070	3.82	0.54	1,347.50	4.18
P-35	17-40-z	17-40	1568.19	1564.77	6	64	51,763	0.0530	3.67	3.42	1,568.33	5.67
P-36	17-36	17-35	1543.1	1542.04	8	65	84,214	0.0160	2.69	1.09	1,543.26	5.06
P-37	G-2-5	G-2-4	1393.97	1390.26	6	65	74,212	0.0570	4.17	3.71	1,394.14	4.01
P-38	44-A	44	1387.39	1387.27	10	66	1,096,279	0.0020	3.11	0.40	1,388.88	1.18
P-39	G-2-6	G-2-5	1397.95	1393.97	6	66	72,980	0.0600	4.22	3.98	1,398.12	4.03
P-40	50-4	50-3	1423.24	1422.55	6	67	3,241	0.0100	0.89	0.69	1,423.27	6.15
P-41	G-28-4	G-28-3	1342.26	1341.76	6	67	71,673	0.0070	2.00	0.48	1,342.42	3.32
P-42	G-28-3	G-28-2	1341.76	1341.45	6	69	72,425	0.0040	1.67	0.33	1,341.95	3.39
P-43	G-36-3	G-36-2	1422.62	1420.99	6	67	4,791	0.0240	1.35	1.62	1,422.66	6.31
P-44	50-2-1	50-2	1406.54	1405.53	6	67	758	0.0150	0.64	0.98	1,406.56	5.06
P-45	17-76-5	17-76-8	1465.66	1460.9	6	70	11,067	0.0680	2.53	4.74	1,465.72	4.15
P-47	G-17-1	G-17	1286.16	1285.46	6	71	287,780	0.0100	3.15	0.61	1,286.50	3.22
P-48	15-4	15-3	1350.75	1345.02	8	71	54,653	0.0810	4.14	5.68	1,350.88	3.98
P-49	G-33	G-32	1344.42	1340.22	6	72	147,876	0.0580	5.14	4.30	1,344.66	2.46
P-50	17-47	17-46	1586.77	1581.69	6	73	2,232	0.0700	1.55	5.04	1,586.80	2.02
P-51	G-5	G-4	1399.81	1399.12	8	77	222,429	0.0090	2.87	0.69	1,400.08	7.43
P-52	34	33	1366.27	1361.51	10	77	1,327,877	0.0620	9.29	5.05	1,366.91	5.02
P-53	101-1	101A	1505.3	1505.24	6	79	218,007	0.0010	1.72	0.34	1,505.90	4.32
P-54	G-40-2	G-40-1	1409.79	1408.87	6	60	37,037	0.0150	2.13	0.92	1,409.91	6.46
P-55	G-36-2	G-36-1	1420.99	1412.74	6	80	6,001	0.1030	2.41	8.24	1,421.04	3.58

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-56	17-10	17-9	1353.39	1352.79	10	80	392,242	0.0080	3.09	0.58	1,353.73	4.65
P-57	A-19	A-18	1481.39	1478.56	8	82	23,823	0.0350	2.40	2.83	1,481.48	6.56
P-58	76-6-6	76-6-5	1527.97	1527.35	6	84	48,621	0.0070	1.78	0.60	1,528.10	5.59
P-59	17-63	17-2	1322.45	1321.01	8	85	165,053	0.0170	3.31	1.49	1,322.68	4.53
P-60	17-9	17-8	1352.79	1352.36	10	85	392,242	0.0050	2.68	0.45	1,353.15	4.48
P-61	A-18	A-17	1478.56	1477.63	8	86	25,181	0.0110	1.63	0.92	1,478.65	6.85
P-62	17-76-3	17-76-5	1471.59	1465.66	6	86	3,191	0.0690	1.75	5.90	1,471.62	3.48
P-63	G-21	G-20	1320.31	1314.01	6	87	40,359	0.0720	3.80	6.35	1,320.43	4.73
P-64	77-2	77-1	1512.24	1512.14	8	87	0	0.0010	0.00	0.00	1,512.32	3.67
P-65	98-5	98-4	1517.93	1517.83	6	120	3,226	0.0010	0.37	0.08	1,517.99	2.70
P-66	G-36	G-35	1377.91	1366.62	6	90	96,852	0.1250	5.97	11.29	1,378.10	7.18
P-67	77	76	1510.94	1510.68	10	84	336,236	0.0030	2.15	0.32	1,511.32	4.08
P-68	G-40-4	G-40-3	1413.4	1410.17	6	90	35,665	0.0360	2.85	3.27	1,413.51	5.49
P-69	79-2	79-1	1516.11	1514.88	10	91	233,587	0.0140	3.31	1.28	1,516.37	6.04
P-70	24-1	24	1373.28	1348.94	6	91	6,399	0.2670	3.45	24.37	1,373.33	5.72
P-72	50	49	1403.68	1403.03	10	92	866,754	0.0070	3.68	0.50	1,404.21	3.37
P-73	79	78	1512.92	1511.85	10	92	233,587	0.0120	3.13	1.07	1,513.18	4.59
P-74	79-8	79-7	1532.84	1532.79	10	108	166,928	0.0000	0.88	0.15	1,533.22	9.55
P-75	77-26	77-25	1533.33	1533.38	8	108	23,760	0.0000	0.11	0.04	1,533.56	7.09
P-76	101-1-1	101-1	1506.09	1505.3	6	95	209,160	0.0080	2.76	0.47	1,506.38	4.44
P-77	25	24-A	1348.66	1347.87	10	97	1,339,049	0.0080	3.80	0.87	1,349.95	3.61
P-78	G-1-15	G-1-14	1408.54	1406.71	6	97	2,071	0.0190	0.96	1.82	1,408.57	6.78
P-79	26	25	1349.4	1348.66	10	98	1,336,259	0.0080	3.79	0.87	1,350.83	2.57
P-80	44-10	44-9	1392.86	1391.49	6	82	12,597	0.0170	1.60	1.37	1,392.93	7.17
P-81	67	66	1479.92	1478.29	10	99	497,985	0.0160	4.39	1.62	1,480.31	4.64
P-82	101-4	101-3	1516.73	1515.74	6	99	89,669	0.0100	2.37	0.90	1,516.91	5.37
P-83	77-13-Z	77-13	1556.93	1550.21	6	99	13,466	0.0680	2.67	6.69	1,557.00	4.64
P-84	41-5-1	41-5	1442.65	1425.18	6	100	1,002	0.1750	1.71	17.32	1,442.67	4.01
P-85	104-2-8-1	104-2-8	1559.5	1558.3	6	100	6,002	0.0120	1.14	1.19	1,559.55	4.52
P-86	44-19	44-18	1416.31	1404.27	6	100	19,067	0.1200	3.62	12.04	1,416.39	5.05
P-87	G-6-1	G-6	1412.03	1410.22	6	101	3,422	0.0180	1.10	1.74	1,412.06	4.59
P-88	G-39	G-38	1400.42	1397.89	6	103	86,657	0.0250	3.23	2.58	1,400.60	3.41
P-89	17-23	17-22-1	1439.63	1435.8	8	104	141,894	0.0370	4.18	3.83	1,439.85	3.26
P-90	98-3	98-2	1517.16	1516.59	6	106	13,150	0.0050	1.09	0.57	1,517.24	5.35
P-91	104-1	104	1524.27	1520.73	8	106	122,106	0.0330	3.86	3.61	1,524.47	4.61
P-92	G-32	G-31	1340.22	1339.06	6	106	147,876	0.0110	2.81	1.14	1,340.46	6.10
P-93	60	59	1436.37	1431.02	10	107	550,503	0.0500	6.74	5.35	1,436.78	5.69
P-94	17-21	17-20	1420.87	1417.9	8	108	144,221	0.0270	3.79	2.97	1,421.09	3.02
P-95	17-74-1-A	17-74-1	1563.79	1555.85	6	108	25,846	0.0740	3.33	7.93	1,563.89	2.46
P-96	17-61	17-60-2	1537.1	1531.79	6	108	22,469	0.0490	2.77	5.30	1,537.19	3.19
P-97	17-37	17-36	1544.61	1543.1	8	109	65,839	0.0140	2.36	1.49	1,544.76	6.98
P-98	104-2-5	104-2-4	1536.89	1534.77	6	110	19,750	0.0190	1.92	2.12	1,536.98	7.62
P-99	63	62	1465.33	1463.25	10	110	547,946	0.0190	4.74	2.18	1,465.74	4.67
P-100	G-29	G-28	1337.36	1335.05	6	114	160,885	0.0200	3.60	2.24	1,337.61	7.70
P-101	17-16	17-15	1364.66	1363.77	10	111	182,134	0.0080	2.55	0.78	1,364.89	7.44
P-102	24-2	24-1	1374.17	1373.28	6	111	5,791	0.0080	0.98	0.89	1,374.22	3.63
P-103	G-2-10	G-2-9	1417.63	1415.12	6	112	62,316	0.0220	2.84	2.51	1,417.78	5.25
P-104	53-5	53-4	1470.18	1465.7	6	112	2,081	0.0400	1.24	4.48	1,470.21	3.76
P-105	48	47	1402.6	1398.09	10	113	881,096	0.0400	7.09	4.51	1,403.12	3.23
P-107	86	85	1537.81	1537.69	10	98	86,409	0.0010	1.06	0.20	1,538.05	3.89
P-108	48-2	48-1	1430.34	1428.17	6	114	13,433	0.0190	1.70	2.17	1,430.41	3.99
P-109	24-3	24-2	1379.45	1374.17	6	117	5,791	0.0450	1.78	5.28	1,379.50	4.10

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-110	17-6	17-5	1332.05	1328.77	10	116	395,343	0.0280	5.00	3.28	1,332.39	3.58
P-111	104	103	1520.73	1515.38	8	116	122,106	0.0460	4.33	5.35	1,520.93	3.50
P-112	49	48	1403.03	1402.6	10	116	866,754	0.0040	2.79	0.59	1,403.71	3.25
P-113	44-17	44-A-5	1396.44	1391.19	6	117	19,475	0.0450	2.57	5.21	1,396.52	13.15
P-114	17-11	17-10	1357.32	1353.39	10	118	391,036	0.0330	5.29	3.93	1,357.66	5.67
P-115	44-13	44-12	1409.88	1404.81	6	118	2,931	0.0430	1.43	5.05	1,409.91	7.32
P-116	17-26	17-25	1474.28	1465.48	8	119	131,211	0.0740	5.23	8.80	1,474.49	4.63
P-117	77-24-1	77-24	1537	1533.57	6	119	40,558	0.0290	2.74	3.47	1,537.12	4.89
P-118	G-45-1	G-45	1444.1	1438.35	6	119	30,036	0.0480	3.01	5.73	1,444.21	5.24
P-119	44-25-2	44-25-1	1447.58	1433.02	6	120	35,124	0.1210	4.35	14.56	1,447.69	4.41
P-121	17-41	17-40-z	1574.27	1568.19	6	122	29,565	0.0500	3.03	6.05	1,574.37	6.83
P-122	17-2	17-1	1320.68	1320.48	12	125	565,569	0.0020	1.91	0.36	1,321.23	1.02
P-123	17-33	17-32	1536.47	1534.84	8	126	105,556	0.0130	2.65	1.63	1,536.65	6.24
P-124	77-16-9	77-16-8A	1526.78	1518.32	6	127	22,701	0.0670	3.09	8.10	1,526.87	3.12
P-125	72	71	1499.29	1498.33	10	127	426,345	0.0080	3.17	0.95	1,499.65	7.71
P-126	38	37	1374.39	1373.01	10	128	1,322,348	0.0110	4.72	1.38	1,375.03	6.96
P-127	G-24-8	G-24-7	1403.69	1392.48	6	128	5,235	0.0880	2.18	11.20	1,403.73	6.25
P-128	17-7	17-6	1342.54	1332.05	10	129	394,044	0.0810	7.27	10.49	1,342.88	2.59
P-129	42-2-2	41-2-1	1416.96	1416.4	6	129	7,168	0.0040	0.84	0.35	1,417.02	4.22
P-130	G-17-7	G-17-6	1327.42	1321.98	6	130	266,745	0.0420	5.37	5.44	1,327.75	11.41
P-131	G-37	G-36	1381.19	1377.91	6	131	86,657	0.0250	3.26	3.27	1,381.37	3.19
P-132	101-6-1	101-6	1546.66	1529.12	6	131	53,692	0.1340	5.10	17.53	1,546.80	3.73
P-133	77-1	77	1512.14	1510.94	8	124	94,737	0.0100	2.32	0.99	1,512.32	3.77
P-134	17-12	17-11	1358.24	1357.32	10	132	390,319	0.0070	3.01	0.92	1,358.58	5.62
P-136	A-6	A-5	1475.2	1470.92	8	134	21,811	0.0320	2.28	4.25	1,475.28	9.05
P-137	104-2-3	104-2-2	1529.31	1528.85	8	135	65,070	0.0030	1.43	0.44	1,529.48	2.69
P-138	77-13-2	77-13-1	1566.07	1556.36	6	136	10,019	0.0710	2.46	9.70	1,566.13	4.37
P-139	G-31	G-30	1339.06	1338.22	6	136	147,876	0.0060	2.27	0.83	1,339.32	3.13
P-140	59	58	1431.02	1429.55	10	136	551,338	0.0110	3.88	1.53	1,431.43	7.26
P-141	G-17-4	G-17-3	1296.1	1294.39	6	137	285,048	0.0120	3.46	1.71	1,296.44	3.00
P-142	17-54	17-53	1428.98	1428.34	6	138	50,225	0.0050	1.52	0.64	1,429.13	2.83
P-143	A-17	A-16	1477.63	1465.35	8	138	29,718	0.0890	3.59	12.21	1,477.73	7.04
P-144	53-4	53-2	1465.7	1449.55	6	139	2,918	0.1160	2.01	16.11	1,465.73	3.23
P-145	41-3-1	41-3	1426.88	1422.74	6	139	110,260	0.0300	3.72	4.08	1,427.09	4.28
P-146	77-12	77-6-7	1541.12	1533.91	6	139	28,032	0.0520	3.03	7.18	1,541.22	3.57
P-147	52	51	1407.76	1405.81	10	139	859,433	0.0140	4.79	1.95	1,408.28	3.78
P-148	24-A	24	1347.87	1346.94	10	139	1,339,675	0.0070	3.80	1.24	1,349.09	1.68
P-149	17-22	17-21	1428.41	1420.87	8	140	143,811	0.0540	4.81	7.54	1,428.63	2.84
P-150	17-48	17-47	1590.71	1586.77	6	140	2,232	0.0280	1.14	3.95	1,590.74	4.96
P-151	41-3	41-2-1	1422.74	1416.4	6	140	175,283	0.0450	4.93	6.33	1,423.00	3.42
P-152	17-18-2	17-18-1	1449.65	1436.42	6	141	16,751	0.0940	3.19	13.22	1,449.73	3.07
P-153	51	50	1405.81	1403.68	10	141	859,826	0.0150	4.92	2.12	1,406.33	6.48
P-154	15-3-1	15-3	1351.58	1345.19	6	141	45,961	0.0450	3.34	6.44	1,351.71	3.73
P-155	77-7-1	77-7	1529.82	1525.86	6	129	24,950	0.0310	2.43	3.96	1,529.92	3.51
P-156	G-19	G-18	1308.47	1288.06	6	142	41,599	0.1440	4.86	20.39	1,308.59	4.66
P-157	101-3-2	101-3-1	1517.87	1517.16	6	143	38,824	0.0050	1.45	0.65	1,518.00	3.31
P-158	17-15	17-14	1363.77	1360.85	10	144	387,496	0.0200	4.42	2.92	1,364.11	6.63
P-159	73	72	1500.38	1499.29	10	144	426,345	0.0080	3.17	1.11	1,500.74	7.11
P-160	48-6	48-4	1455.4	1451.3	6	144	6,086	0.0280	1.54	4.08	1,455.45	3.73
P-161	G-40	G-39	1404.1	1400.42	6	145	86,657	0.0250	3.27	3.73	1,404.28	5.12
P-162	77-13	77-12	1550.21	1541.12	6	146	26,877	0.0620	3.18	9.09	1,550.31	2.58
P-163	G-34	G-33	1352.17	1344.42	6	146	112,578	0.0530	4.58	7.72	1,352.38	3.12

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-164	17-51-10A	17-51-8	1579.8	1577.47	6	147	4,469	0.0160	1.14	2.34	1,579.84	1.57
P-165	17-49-2	17-49-1	1433.9	1420.94	6	147	4,849	0.0880	2.11	12.91	1,433.94	5.90
P-166	17-40	17-39	1564.77	1562.28	6	148	53,848	0.0170	2.46	2.52	1,564.91	4.02
P-167	G-23	G-22	1347.22	1341.79	6	148	30,442	0.0370	2.75	5.42	1,347.33	5.96
P-168	57	56	1427.9	1426.09	10	148	551,338	0.0120	4.05	1.88	1,428.31	3.29
P-169	35	34	1367.3	1366.27	10	149	1,326,325	0.0070	3.76	1.34	1,368.25	4.60
P-170	69	68	1494.79	1490.67	10	149	479,682	0.0280	5.24	4.11	1,495.17	6.62
P-171	17-14	17-13	1360.85	1359.37	10	150	388,047	0.0100	3.41	1.45	1,361.19	3.09
P-172	54	53	1420.86	1418.78	10	150	844,602	0.0140	4.75	2.08	1,421.37	3.63
P-173	G-30	G-29	1338.22	1337.36	6	152	150,493	0.0060	2.20	0.87	1,338.49	3.33
P-174	G-6	G-5	1410.05	1399.81	8	152	221,146	0.0670	5.89	10.24	1,410.32	4.81
P-175	17-43-1	17-43	1592.04	1580.33	6	152	3,784	0.0770	1.90	11.70	1,592.08	3.49
P-176	77-16-8	77-16-7	1518.58	1517.82	6	152	24,990	0.0050	1.28	0.73	1,518.69	4.82
P-177	17-43-2	17-43-1	1596.13	1592.04	6	153	1,702	0.0270	1.02	4.08	1,596.15	3.38
P-178	15-3-3	15-3-2	1398.44	1374.45	6	153	44,222	0.1570	5.11	23.99	1,398.57	3.44
P-179	50-2	50	1405.53	1404.01	6	153	5,890	0.0100	1.06	1.37	1,405.58	5.70
P-180	29	26	1350.68	1349.4	10	155	1,333,388	0.0080	3.78	1.37	1,352.20	2.68
P-181	G-2-15	G-2-14	1448.47	1441.65	6	154	50,511	0.0440	3.41	6.87	1,448.61	5.60
P-182	44-25-3	44-25-2	1468.75	1447.58	6	154	34,172	0.1370	4.51	21.17	1,468.86	4.90
P-183	17-56	17-55	1462.42	1441.48	6	154	37,525	0.1360	4.62	20.92	1,462.54	4.63
P-184	G-18-6	G-18-5	1377.3	1366.41	6	154	6,723	0.0710	2.18	10.89	1,377.35	4.70
P-185	53-1	53	1434.84	1419.11	6	156	12,471	0.1010	2.97	15.61	1,434.91	3.11
P-186	17-76-1	17-76-5	1467.89	1465.66	6	156	7,876	0.0140	1.31	2.22	1,467.94	3.24
P-187	32A	31	1358.23	1354.15	10	157	1,329,119	0.0260	6.72	4.27	1,358.87	3.61
P-188	17-49-3	17-49-2	1441.63	1433.9	6	157	3,693	0.0490	1.59	7.72	1,441.67	3.85
P-189	G-18-2	G-18-1	1333.29	1317.72	6	157	13,548	0.0990	3.07	15.57	1,333.36	3.45
P-190	A-6-1	A-6	1477.84	1475.2	8	158	13,510	0.0170	1.58	2.62	1,477.90	6.38
P-191	G-41	G-40	1408.35	1404.1	6	159	48,186	0.0270	2.82	4.20	1,408.48	5.59
P-192	G-1-14	G-1-13	1406.71	1405.67	6	159	3,776	0.0070	0.81	1.03	1,406.75	5.97
P-193	58	57	1429.55	1427.9	10	159	551,338	0.0100	3.82	1.70	1,429.96	4.82
P-194	17-46-1	17-46	1584.42	1581.69	6	159	9,397	0.0170	1.47	2.72	1,584.48	3.54
P-196	G-38	G-37	1397.89	1381.19	6	160	86,657	0.1040	5.42	16.79	1,398.07	3.20
P-197	33	32A	1361.51	1358.23	10	160	1,327,877	0.0200	6.13	3.28	1,362.15	2.56
P-198	17-8	17-7	1352.36	1342.54	10	160	393,942	0.0610	6.58	9.82	1,352.70	3.58
P-199	G-1-10	G-1-9	1399.68	1397.91	6	161	52,899	0.0110	2.11	1.77	1,399.82	3.89
P-200	98-4	98-3	1517.83	1517.16	6	162	13,150	0.0040	0.99	0.68	1,517.91	5.52
P-201	53-2	53-1	1449.55	1434.84	6	162	12,471	0.0910	2.85	14.74	1,449.62	3.00
P-202	17-79-4	17-79-3	1545.03	1538.81	6	163	648	0.0380	0.88	6.22	1,545.05	4.12
P-203	41-1	41	1390.55	1382.42	6	163	193,584	0.0500	5.24	8.10	1,390.83	2.89
P-204	101-7	101-3-1	1519.01	1517.16	6	163	58,476	0.0110	2.19	1.81	1,519.16	3.82
P-205	G-24	G-23	1348.35	1347.22	6	164	23,087	0.0070	1.40	1.12	1,348.44	4.25
P-206	55	54	1425.71	1420.86	10	164	842,791	0.0300	6.27	4.85	1,426.22	3.16
P-208	G-2-2	G-2-1	1376.83	1365.5	6	165	78,316	0.0690	4.51	11.33	1,377.00	4.00
P-209	G-40-4-2	G-40-4-1	1431.68	1420.89	6	165	3,067	0.0650	1.69	10.78	1,431.71	6.28
P-210	77-6-4	77-6-7	1535.13	1533.91	6	166	20,589	0.0070	1.39	1.17	1,535.22	7.41
P-211	48-1	48	1428.17	1402.93	6	168	14,035	0.1500	3.53	25.12	1,428.24	4.49
P-212	48-5	48-4	1466.04	1451.3	6	168	4,347	0.0880	2.02	14.71	1,466.08	3.74
P-213	17-55	17-54	1441.48	1428.98	6	171	50,225	0.0730	4.05	12.48	1,441.62	3.03
P-214	44-21	44-20	1419.12	1417.91	6	171	11,909	0.0070	1.16	1.20	1,419.19	9.38
P-215	77-6-7	76-6-6	1533.91	1527.97	6	172	48,621	0.0350	3.08	5.98	1,534.04	8.43
P-216	31	30	1354.15	1351.21	10	173	1,330,126	0.0170	5.70	2.05	1,354.79	2.56
P-217	A-2-1	A-13	1446.93	1444.07	6	308	93,289	0.0090	2.33	2.68	1,447.12	4.89

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-218	A-11-3-1	A-11-3	1469.65	1468.71	6	175	6,979	0.0050	0.90	0.89	1,469.71	6.26
P-219	G-27	G-26	1329.75	1328.63	6	177	262,029	0.0060	2.57	1.06	1,330.12	3.96
P-220	101-7-3	101-7-1	1523.27	1521.3	6	179	31,377	0.0110	1.81	1.95	1,523.38	5.37
P-221	77-9	77-7-1	1541.22	1529.82	6	225	24,083	0.0510	2.86	11.40	1,541.31	4.02
P-222	77-16-1	78	1513.22	1512.18	6	51	7,607	0.0200	1.48	1.05	1,513.27	4.00
P-223	98-2	98	1516.59	1502.82	6	648	17,615	0.0210	1.93	13.51	1,516.67	8.09
P-224	17-49-5	17-49-1	1464.07	1420.94	6	175	19,266	0.2460	4.62	43.12	1,464.15	3.70
P-225	G-43	G-41	1419.84	1408.35	6	360	48,186	0.0320	3.00	11.53	1,419.97	5.15
P-226	17-51-6	17-51-4a	1529.01	1528.22	6	245	42,877	0.0030	1.28	0.82	1,529.17	2.96
P-227	101-3-1	101-3	1517.16	1515.74	6	183	97,300	0.0080	2.21	1.34	1,517.35	2.33
P-228	17-49-7	17-49-5	1529.37	1464.07	6	839	16,995	0.0780	3.00	65.29	1,529.45	2.68
P-229	17-77	17-75-4	1533.57	1525.1	8	173	85,177	0.0490	3.97	8.40	1,533.74	3.36
P-230	77-16-8A	77-16-8	1518.32	1518.58	6	187	24,362	-0.0010	0.19	0.09	1,518.77	2.55
P-231	56-3	56-1	1455.94	1434.21	6	353	0	0.0620	0.00	21.73	1,455.94	2.63
P-232	41-4	41-3	1424.41	1422.74	6	230	65,023	0.0070	1.93	1.56	1,424.57	6.64
P-234	G-2-14	G-2-13	1441.65	1438.09	6	192	50,511	0.0190	2.51	3.54	1,441.79	3.93
P-235	50-3	50-2	1422.55	1405.53	6	190	4,251	0.0900	2.07	17.01	1,422.59	6.92
P-236	17-22-1	17-22	1435.8	1428.41	8	193	143,293	0.0380	4.25	7.39	1,436.02	4.65
P-237	17-25-1	17-25	1485.71	1465.65	6	194	3,895	0.1030	2.14	20.06	1,485.75	3.30
P-238	G-2-7-1	G-2-7	1412.13	1399.86	6	197	3,024	0.0620	1.66	12.14	1,412.16	5.55
P-239	22	21	1346.31	1343.67	10	91	1,351,051	0.0290	7.04	2.52	1,346.96	3.35
P-240	17-39	17-37	1562.11	1544.61	8	195	65,839	0.0900	4.55	17.57	1,562.26	3.88
P-241	G-28-11-1	G-28-11	1373.47	1369.05	6	196	15,440	0.0230	1.89	4.37	1,373.55	5.81
P-242	98	97	1502.82	1497.72	10	196	388,065	0.0260	4.83	5.00	1,503.16	3.26
P-243	G-12-1	G-12	1438.65	1437.7	6	182	9,063	0.0050	0.97	0.96	1,438.71	3.04
P-244	17-65-3	17-65-2	1355.38	1350.56	8	197	40,113	0.0240	2.49	4.82	1,355.49	4.40
P-245	17-45	17-44	1579.45	1576.44	6	292	14,403	0.0100	1.41	3.00	1,579.52	2.81
P-246	G-24-1	G-24	1351.4	1348.35	6	198	22,076	0.0150	1.84	3.05	1,351.49	4.31
P-247	17-28	17-27	1503.69	1492.34	8	322	129,013	0.0350	4.00	11.35	1,503.90	3.95
P-248	17-27	17-26	1492.34	1474.28	8	436	130,948	0.0410	4.25	18.06	1,492.55	3.08
P-249	17-20	17-19	1417.9	1413.49	8	121	145,255	0.0360	4.19	4.41	1,418.12	3.25
P-250	101	100-1	1505.12	1504.28	8	200	346,507	0.0040	2.42	0.77	1,505.53	3.74
P-251	47	46	1398.09	1388.58	10	201	883,341	0.0470	7.54	8.80	1,398.61	3.13
P-252	46	45	1388.58	1387.69	10	163	885,401	0.0050	2.51	0.64	1,389.81	5.47
P-253	A-10-1	A-10	1493.3	1478.2	6	201	9,909	0.0750	2.50	14.67	1,493.36	4.53
P-254	G-24-6-1	G-24-6	1391.5	1384.37	6	201	7,127	0.0350	1.74	7.10	1,391.55	6.84
P-255	A-20	A-19	1493.22	1481.39	8	202	21,874	0.0590	2.80	11.83	1,493.30	6.63
P-256	G-18-7	G-18-6	1380.29	1377.3	6	202	4,490	0.0150	1.12	2.98	1,380.33	4.77
P-257	101-1-1B	101-1-1A	1509.41	1507.13	6	203	201,366	0.0110	3.06	2.24	1,509.69	4.70
P-258	44-20-1	44-20	1436.15	1417.91	6	203	4,247	0.0900	2.07	18.20	1,436.19	5.74
P-259	44-25	44-A-7	1415	1403.5	6	203	40,998	0.0570	3.49	11.55	1,415.12	6.95
P-260	41-3-2	41-3-1	1444.26	1426.88	6	204	1,330	0.0850	1.43	17.20	1,444.28	4.31
P-261	55-3	55-2	1452.62	1445.49	8	204	262,547	0.0350	4.91	7.12	1,452.92	5.95
P-262	15-3-2	15-3-1	1374.45	1351.58	6	204	45,961	0.1120	4.59	22.93	1,374.58	1.49
P-263	G-28-7-1	G-28-7	1363.85	1356.77	6	209	10,485	0.0340	1.94	6.99	1,363.91	6.34
P-264	A-11-4	A-11-3	1481.89	1468.71	6	205	21,596	0.0640	3.01	13.17	1,481.98	5.86
P-265	101-7-2	101-7-1	1529.89	1521.3	6	205	10,990	0.0420	2.12	8.53	1,529.95	4.74
P-266	G-18-8	G-18-7	1394.28	1380.29	6	205	3,734	0.0680	1.81	13.99	1,394.32	3.81
P-267	G-40-5	G-40-4	1427.18	1413.4	6	207	29,271	0.0670	3.35	13.77	1,427.28	5.32
P-268	74-1	74	1509.68	1504.12	6	207	52,115	0.0270	2.88	5.60	1,509.82	3.94
P-269	G-40-6	G-40-5	1443.47	1427.18	6	208	28,520	0.0780	3.51	16.29	1,443.57	6.17
P-270	100-1	100	1504.28	1503.71	8	209	346,507	0.0030	2.03	0.50	1,504.75	3.65

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-271	17-30	17-29	1520.88	1514.34	8	209	116,727	0.0310	3.73	6.53	1,521.07	3.65
P-272	G-2-11	G-2-10	1428.2	1417.63	6	210	61,869	0.0500	3.79	10.57	1,428.35	5.33
P-273	G-2-4	G-2-3	1390.26	1385.89	6	210	75,965	0.0210	2.94	4.37	1,390.43	3.87
P-274	44-25-1	44-25	1433.02	1415	6	211	38,421	0.0850	3.96	18.02	1,433.14	4.68
P-275	G-17-2	G-17-1	1287.56	1286.16	6	211	287,780	0.0070	2.65	1.46	1,287.96	3.14
P-276	G-24-4	G-24-3	1360.16	1354.19	6	213	17,100	0.0280	2.10	5.96	1,360.24	6.29
P-277	G-40-1	G-40	1408.87	1404.1	6	213	37,746	0.0220	2.46	4.71	1,408.99	7.26
P-278	G-14	G-13	1439.73	1438.86	8	213	2,241	0.0040	0.55	0.87	1,439.76	4.97
P-279	65	64	1473.18	1466.87	10	214	533,567	0.0290	5.53	6.31	1,473.58	5.46
P-280	53	52	1418.78	1407.76	10	214	858,611	0.0510	7.72	11.02	1,419.30	3.18
P-281	77-16-7	74-1	1517.82	1509.68	6	214	52,115	0.0380	3.25	8.19	1,517.96	8.04
P-282	68	67	1490.67	1479.92	10	216	497,698	0.0500	6.54	10.75	1,491.06	4.81
P-284	G-6-2	G-6-1	1417.21	1412.03	6	220	2,608	0.0240	1.11	5.18	1,417.24	4.62
P-285	56-1	57	1434.21	1428.23	6	220	0	0.0270	0.00	5.90	1,434.21	2.90
P-286	17-5	17-4	1328.77	1326.68	10	221	397,426	0.0090	3.38	2.09	1,329.11	4.52
P-287	G-17-3	G-17-2	1294.39	1287.56	6	221	286,577	0.0310	4.89	6.77	1,294.73	3.18
P-288	G-28-11	G-28-10	1369.05	1367.85	6	228	33,691	0.0050	1.43	1.20	1,369.17	6.15
P-289	101-7-1	101-7	1521.3	1519.01	6	222	42,367	0.0100	1.94	2.27	1,521.43	11.19
P-290	70	69	1496.96	1494.79	10	222	479,682	0.0100	3.60	2.21	1,497.34	4.27
P-291	79-1	79	1514.88	1512.92	10	225	233,587	0.0090	2.83	1.98	1,515.14	4.04
P-292	36	35	1368.32	1367.3	10	225	1,326,325	0.0050	3.76	1.97	1,370.23	7.20
P-293	G-28-10	G-28-9	1367.85	1366.46	6	225	35,083	0.0060	1.53	1.39	1,367.97	7.01
P-294	G-43-1	G-43	1420.76	1419.84	6	233	4,973	0.0040	0.73	0.84	1,420.81	3.47
P-295	G-28-9	G-28-8	1366.46	1359.33	6	227	36,074	0.0310	2.73	7.13	1,366.58	6.43
P-296	39	38	1375.12	1374.39	10	228	1,321,122	0.0030	3.75	2.07	1,377.10	5.70
P-297	76-6-4	77-6-3	1526.01	1523.67	6	229	54,316	0.0100	2.07	2.33	1,526.15	5.22
P-298	17-78-1	17-78	1553.38	1534	6	230	7,702	0.0840	2.41	19.16	1,553.43	4.20
P-300	89	87	1538.89	1538.47	10	231	83,311	0.0020	1.20	0.43	1,539.10	5.97
P-301	77-16-7A	77-16-7	1521.96	1517.82	6	231	27,125	0.0180	2.06	4.10	1,522.06	7.35
P-302	90	89	1539.96	1538.89	10	232	80,050	0.0050	1.65	1.02	1,540.12	3.49
P-303	79-3	79-2	1526.39	1516.11	10	233	233,587	0.0440	5.03	10.38	1,526.65	5.24
P-304	G-8	G-7	1420.99	1414.21	8	238	214,945	0.0280	4.30	6.78	1,421.26	6.93
P-305	91	90	1540.45	1539.96	10	234	80,050	0.0020	1.25	0.53	1,540.65	7.95
P-306	17-60-2	17-57	1531.79	1516.45	6	234	26,438	0.0660	3.22	15.33	1,531.89	4.31
P-307	101-3-5	101-3-4	1532.33	1528.27	6	235	32,580	0.0170	2.15	4.06	1,532.44	3.02
P-308	G-13	G-12	1438.86	1437.53	8	230	2,241	0.0060	0.63	1.19	1,438.89	8.92
P-309	G-28-2	G-28-1	1341.45	1339.82	6	241	75,643	0.0070	1.97	1.62	1,341.62	3.31
P-310	G-40-8	G-40-7	1461.66	1456.5	6	241	22,691	0.0210	2.09	5.15	1,461.75	5.99
P-311	G-26	G-17-7	1328.63	1327.42	6	241	266,745	0.0050	2.30	1.31	1,329.06	8.71
P-312	44-18	44-17	1404.27	1396.44	6	237	19,475	0.0330	2.31	7.86	1,404.35	7.01
P-313	17-60	17-59	1502.08	1494.79	6	237	33,506	0.0310	2.65	7.29	1,502.19	5.13
P-314	A-22	A-21	1502.55	1499.72	8	269	9,401	0.0110	1.19	2.82	1,502.60	6.73
P-315	17-13	17-12	1359.37	1358.24	10	238	388,825	0.0050	2.61	1.15	1,359.74	2.49
P-316	37	36	1373.01	1368.32	10	238	1,324,692	0.0200	6.04	3.43	1,373.65	7.06
P-317	G-40-9	G-40-8	1465.11	1461.66	6	243	19,971	0.0140	1.73	3.44	1,465.20	6.00
P-318	44-11	44-10	1397.08	1392.86	6	239	10,829	0.0180	1.56	4.21	1,397.14	8.01
P-319	A-26	A-27	1492.19	1478.81	6	240	24,813	0.0560	2.99	13.37	1,492.29	6.44
P-320	53-3	53-2	1465.7	1449.55	6	229	4,884	0.0710	1.98	16.12	1,465.74	1.96
P-321	G-2-1	G-2	1365.5	1347.4	6	241	78,876	0.0750	4.69	18.18	1,365.67	3.79
P-322	44-A-6	44-A-5	1398.56	1391.02	8	242	158,901	0.0310	4.07	7.47	1,398.79	5.09
P-323	17-4	17-2	1326.68	1320.85	10	242	398,355	0.0240	4.73	5.79	1,327.03	4.58
P-324	G-1-9	G-1-8	1397.91	1390.83	6	242	56,434	0.0290	3.04	7.08	1,398.06	5.93

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-325	G-28-8	G-28-7	1359.33	1356.77	6	243	38,110	0.0110	1.89	2.53	1,359.45	3.81
P-326	92	91	1541.8	1540.45	10	243	77,144	0.0060	1.75	1.30	1,541.95	5.12
P-327	104-2-5-2	104-2-5-1	1558.26	1540.05	6	243	3,559	0.0750	1.85	18.20	1,558.30	4.60
P-328	17-75-2	17-75-3	1527.48	1526.38	6	228	54,458	0.0050	1.58	1.11	1,527.64	5.02
P-329	G-23-3	G-23-2	1372.05	1366.85	6	247	3,727	0.0210	1.19	5.19	1,372.09	5.96
P-330	17-53	17-52	1428.34	1426.8	6	246	56,720	0.0060	1.76	1.54	1,428.49	3.20
P-331	G-2-13	G-2-12	1438.09	1436.6	6	255	56,475	0.0060	1.71	1.50	1,438.24	4.81
P-332	G-24-3	G-24-2	1354.19	1352.7	6	248	19,195	0.0060	1.27	1.48	1,354.28	4.83
P-333	G-18-1	G-18	1317.72	1288.06	6	249	14,905	0.1190	3.37	29.59	1,317.79	3.56
P-334	44-23	44-22	1427.94	1426.32	6	256	6,700	0.0060	0.94	1.61	1,427.99	8.94
P-335	15-3-4	15-3-3	1404.3	1398.44	6	251	38,619	0.0230	2.51	5.85	1,404.42	3.20
P-336	93	92	1543.22	1541.8	10	251	74,969	0.0060	1.74	1.42	1,543.37	3.55
P-337	G-35	G-34	1366.62	1352.17	6	253	99,451	0.0570	4.53	14.44	1,366.82	11.12
P-338	A-28	A-27	1485.1	1478.81	6	254	3,113	0.0250	1.20	6.22	1,485.13	6.48
P-339	104-2-5-3	104-2-5-2	1567.82	1558.26	6	255	2,188	0.0370	1.27	9.55	1,567.85	3.63
P-340	G-28-6	G-28-5	1345.42	1343.94	6	255	61,106	0.0060	1.75	1.47	1,345.58	5.19
P-341	A-24	A-25	1505.57	1496.89	6	255	13,172	0.0340	2.07	8.66	1,505.64	6.49
P-342	G-4	G-3	1399.12	1397.22	8	257	229,801	0.0070	2.69	1.90	1,399.40	7.72
P-344	A-9	A-10	1496.35	1478.2	6	257	686,986	0.0710	8.25	18.14	1,496.83	4.09
P-345	G-1-11	G-1-10	1401.34	1399.68	6	257	52,550	0.0060	1.74	1.66	1,401.48	3.19
P-346	G-17-6	G-17-5	1321.98	1298.64	6	258	270,518	0.0900	7.14	23.33	1,322.31	3.70
P-347	77-6	77-1	1517.87	1512.14	8	277	89,356	0.0210	2.98	5.72	1,518.04	3.23
P-348	A-25	A-26	1496.89	1492.19	6	260	19,586	0.0180	1.87	4.69	1,496.97	6.39
P-349	G-28-11-2	G-28-11-1	1379.96	1373.47	6	280	11,622	0.0230	1.75	6.48	1,380.02	5.90
P-350	17-25-2	17-25-1	1491.38	1485.71	6	261	3,469	0.0220	1.18	5.67	1,491.42	3.70
P-351	G-24-2	G-24-1	1352.7	1351.4	6	266	20,770	0.0050	1.20	1.31	1,352.80	3.31
P-352	A-6-2-1	A-6-2	1510.65	1489.06	6	265	6,313	0.0810	2.25	21.59	1,510.70	4.62
P-353	A-11-1	A-11	1450.08	1448.6	8	297	41,595	0.0050	1.44	0.01	1,450.31	5.16
P-354	G-28-7	G-28-6	1356.77	1345.42	6	267	57,532	0.0430	3.49	11.34	1,356.92	7.46
P-355	44-A-7	44-A-6	1403.33	1398.56	8	276	154,149	0.0170	3.27	4.77	1,403.56	9.28
P-356	A-6-1-1	A-6-1	1494.11	1477.84	8	268	4,352	0.0610	1.73	16.24	1,494.15	5.11
P-357	G-28-1	G-28	1339.82	1335.05	6	276	83,686	0.0170	2.83	4.63	1,340.00	6.23
P-358	76-6-5	76-6-4	1527.35	1526.01	6	269	51,240	0.0050	1.57	1.35	1,527.50	5.29
P-359	76	75	1510.68	1507.66	10	270	336,236	0.0110	3.42	3.07	1,511.00	5.28
P-360	101-3	101-2	1515.74	1513.23	6	271	189,019	0.0090	2.81	2.51	1,516.01	3.96
P-361	17-25	17-24	1465.48	1449.5	8	271	137,020	0.0590	4.88	15.98	1,465.69	5.02
P-362	87	86	1538.47	1537.81	10	271	86,409	0.0020	1.35	0.62	1,538.67	6.93
P-364	17-42	17-41	1575.53	1574.27	6	273	28,957	0.0050	1.30	1.27	1,575.65	3.91
P-365	A-10-2	A-10-1	1517.01	1493.3	6	273	6,574	0.0870	2.32	23.70	1,517.06	5.55
P-366	17-57	17-60	1516.45	1502.08	6	276	31,823	0.0520	3.14	14.37	1,516.56	5.13
P-367	G-28	G-27	1335.05	1329.75	6	300	259,900	0.0180	3.87	5.25	1,335.37	6.56
P-368	G-24-6	G-24-5	1384.37	1365.23	6	278	17,100	0.0690	2.89	19.17	1,384.45	6.73
P-369	A-11-2	A-11-1	1451.54	1450.08	8	293	37,379	0.0050	1.39	1.34	1,451.66	10.13
P-370	17-59	17-58	1494.79	1484.21	6	280	35,540	0.0380	2.90	10.58	1,494.91	3.55
P-371	17-24	17-23	1449.5	1439.63	8	280	139,760	0.0350	4.10	9.87	1,449.71	3.29
P-372	44-20	44-19	1417.91	1416.31	6	280	16,156	0.0060	1.18	1.60	1,417.99	10.47
P-373	10	9	1317.93	1317.61	15	280	2,092,446	0.0010	2.64	0.72	1,319.30	3.53
P-375	G-28-5	G-28-4	1343.94	1342.26	6	287	69,512	0.0060	1.82	1.69	1,344.11	7.31
P-376	17-1	16B	1320.23	1319.26	15	283	565,569	0.0030	2.51	0.49	1,320.64	4.54
P-377	G-24-5	G-24-4	1365.23	1360.16	6	283	17,100	0.0180	1.80	5.08	1,365.31	5.70
P-378	44-22	44-21	1426.32	1419.12	6	283	9,985	0.0250	1.72	7.19	1,426.38	6.93
P-379	A-27	G-45-1	1478.81	1444.1	6	283	30,036	0.1230	4.17	34.76	1,478.92	5.30

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-380	104-2-2	104-2-1	1528.85	1528.19	8	284	67,837	0.0020	1.27	0.67	1,529.04	2.32
P-381	G-18-5	G-18-4	1366.41	1362.9	6	284	8,022	0.0120	1.25	3.50	1,366.46	4.28
P-382	G-2-12	G-2-11	1436.6	1428.2	6	288	56,475	0.0290	3.04	8.39	1,436.75	4.97
P-383	16	15	1319.13	1318.69	12	279	1,410,921	0.0020	2.78	1.05	1,321.33	5.05
P-384	77-6-3	77-6-2	1523.67	1521.07	6	288	59,747	0.0090	2.04	2.60	1,523.82	6.67
P-385	44-12	44-11	1404.81	1397.08	6	289	7,056	0.0270	1.60	7.72	1,404.86	7.38
P-386	A-8	A-9	1507.45	1496.35	6	289	686,986	0.0380	6.38	11.18	1,507.93	4.07
P-387	15-8	15-7	1361.3	1359.93	6	290	34,737	0.0050	1.38	1.33	1,361.43	4.13
P-388	G-18-4	G-18-3	1362.9	1351.91	6	290	10,129	0.0380	2.00	10.98	1,362.96	3.27
P-389	G-40-9-1	G-40-9	1480.03	1465.11	6	306	8,990	0.0490	2.08	14.89	1,480.09	5.47
P-390	G-44-1	G-44	1436.33	1430.11	6	297	1,656	0.0210	0.95	6.12	1,436.35	3.29
P-391	A-6-1-2	A-6-1-1	1516.44	1494.11	8	291	2,451	0.0770	1.60	22.32	1,516.47	5.36
P-392	G-9	G-8	1426.73	1420.99	8	292	211,193	0.0200	3.75	5.74	1,426.99	3.82
P-393	101-3-4	101-3-3	1528.27	1525.34	6	292	33,558	0.0100	1.79	2.92	1,528.38	4.76
P-394	104-2-8	104-2-7	1558.3	1548.64	6	292	7,489	0.0330	1.72	9.65	1,558.35	6.40
P-395	G-2-3	G-2-2	1385.89	1376.83	6	295	78,316	0.0310	3.41	9.11	1,386.06	5.12
P-396	104-7	104-6	1540.69	1538.15	8	297	31,053	0.0090	1.59	2.52	1,540.79	9.35
P-397	16B	15A	1319.26	1318.57	15	306	565,569	0.0020	2.15	0.05	1,320.15	5.36
P-398	G-29-2	G-29-1	1369.73	1347.15	6	316	5,661	0.0710	2.08	22.57	1,369.78	3.95
P-399	A-11-3	A-11-2	1468.71	1451.54	8	297	32,868	0.0580	3.16	17.15	1,468.81	5.95
P-400	G-1-9-1	G-1-9	1417.36	1397.91	6	299	1,528	0.0650	1.33	19.33	1,417.38	4.91
P-401	55-2	55-1	1445.49	1435.72	8	301	279,912	0.0320	4.86	9.88	1,445.80	5.96
P-402	A-6-2	A-6-1	1489.06	1477.84	8	302	8,370	0.0370	1.79	11.21	1,489.11	6.09
P-404	A-6-2-2	A-6-2-1	1522.95	1510.65	6	304	3,293	0.0400	1.43	12.29	1,522.98	4.69
P-405	9-8	9-7	1407.15	1404.41	8	305	1,902,459	0.0090	8.43	18.10	1,414.21	0.00
P-406	A-23	A-22	1510.02	1502.55	8	305	4,829	0.0240	1.31	7.45	1,510.06	6.95
P-407	17-18-3	17-18-2	1459.65	1449.65	6	305	15,228	0.0330	2.14	10.00	1,459.72	2.54
P-408	79-7	79-6	1532.79	1532.01	10	305	173,989	0.0030	1.68	0.70	1,533.07	10.02
P-409	A-12	A-13	1445.51	1443.9	8	306	746,498	0.0050	3.31	2.83	1,447.27	3.93
P-410	77-28	77-26	1533.8	1533.33	8	323	22,524	0.0010	0.78	0.36	1,533.92	2.91
P-411	G-12-2	G-12-1	1440.34	1438.65	6	313	9,063	0.0050	0.98	1.69	1,440.40	3.80
P-412	G-22-2	G-22-1	1374.27	1352.04	6	311	2,064	0.0710	1.52	22.22	1,374.30	4.92
P-413	104-2-7	104-2-6	1548.64	1538.53	6	308	10,808	0.0330	1.93	10.10	1,548.70	5.80
P-414	A-17-1	A-17	1490.15	1477.63	6	309	4,537	0.0410	1.59	12.46	1,490.19	3.76
P-415	G-46	G-45	1446.41	1438.35	6	323	6,772	0.0250	1.54	7.99	1,446.46	6.56
P-416	G-25	G-26	1335.32	1328.63	6	311	2,466	0.0220	1.06	6.29	1,335.35	4.05
P-417	79-4	79-3	1530.12	1526.39	10	314	217,534	0.0120	3.09	3.72	1,530.37	9.75
P-418	G-28-12	G-28-11	1382.78	1369.05	6	328	15,752	0.0420	2.36	13.69	1,382.86	5.89
P-419	G-40-10	G-40-9	1478.74	1465.11	6	318	8,026	0.0430	1.93	13.60	1,478.79	6.05
P-420	17-29	17-28	1514.34	1503.69	8	315	126,678	0.0340	3.92	10.65	1,514.54	3.69
P-421	G-28-7-2	G-28-7-1	1385.99	1363.85	6	347	6,967	0.0640	2.12	22.13	1,386.04	4.87
P-422	17-60-1	17-57	1527.49	1516.45	6	319	1,785	0.0350	1.14	10.96	1,527.52	3.84
P-423	G-28-14	G-28-13	1459.7	1414.79	6	332	6,462	0.1350	2.71	44.89	1,459.75	6.16
P-424	G-40-4-1	G-40-4	1420.89	1413.4	6	331	6,395	0.0230	1.46	7.42	1,420.94	6.74
P-425	104-2-4	104-2-3	1534.77	1529.48	6	322	20,477	0.0160	1.84	5.31	1,534.86	4.96
P-426	17-79-3	17-79-2	1538.64	1537.71	8	401	648	0.0020	0.31	0.79	1,538.66	3.16
P-427	101-3-3	101-3-2	1525.34	1517.87	6	324	36,824	0.0230	2.47	7.45	1,525.46	4.92
P-428	77-25-1	77-25	1540.14	1533.38	6	325	9,867	0.0210	1.61	6.68	1,540.20	5.32
P-429	55-1	55	1435.72	1425.88	8	326	279,912	0.0300	4.74	9.81	1,436.03	7.30
P-430	G-3	G-2	1397.22	1347.23	8	327	234,156	0.1530	7.99	49.94	1,397.50	3.44
P-431	G-29-1	G-29	1347.15	1337.36	6	340	9,908	0.0290	1.80	9.60	1,347.21	6.13
P-432	A-20-1	A-20	1505.26	1493.22	6	329	8,511	0.0370	1.88	12.01	1,505.32	3.79

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-433	G-28-13	G-28-12	1414.79	1382.78	6	337	11,385	0.0950	2.83	32.00	1,414.85	5.52
P-434	G-23-1	G-23	1359.36	1347.22	6	353	6,511	0.0340	1.67	12.08	1,359.41	4.93
P-435	17-35	17-34	1542.04	1539.32	8	331	84,214	0.0080	2.11	2.72	1,542.20	3.67
P-436	A-11	A-12	1448.6	1445.51	8	332	746,498	0.0090	3.31	3.03	1,450.31	12.04
P-437	100	99	1503.71	1503.04	8	332	351,452	0.0020	1.77	0.69	1,504.26	3.09
P-438	G-18-3	G-18-2	1351.91	1333.29	6	332	11,938	0.0560	2.41	18.62	1,351.98	3.61
P-439	G-23-2	G-23-1	1366.85	1359.36	6	337	5,021	0.0220	1.33	7.48	1,366.89	4.89
P-440	15A	10	1318.57	1317.93	15	321	2,081,641	0.0020	2.62	0.80	1,320.10	4.08
P-441	G-34-1-2	G-34-1-1	1388.21	1374.26	6	349	3,565	0.0400	1.48	13.94	1,388.25	3.64
P-442	42	41	1383.22	1382.09	10	337	1,103,468	0.0030	3.13	2.10	1,384.82	3.18
P-443	G-10	G-9	1434.6	1426.73	8	348	207,953	0.0230	3.93	7.87	1,434.86	6.15
P-444	G-34-1-3	G-34-1-2	1427.8	1388.21	6	352	1,539	0.1120	1.65	39.58	1,427.82	3.72
P-446	G-22	G-21	1341.79	1320.31	6	342	38,887	0.0630	3.58	21.48	1,341.91	5.73
P-447	G-2-8	G-2-7	1401.66	1399.86	6	344	66,799	0.0050	1.73	1.81	1,401.83	8.07
P-448	G-40-7	G-40-6	1456.5	1443.47	6	350	28,520	0.0370	2.69	13.06	1,456.60	5.93
P-449	15-5	15-4	1354.4	1350.75	8	347	52,610	0.0110	2.01	3.65	1,354.53	4.92
P-450	G-11	G-10	1436.45	1434.6	8	351	72,342	0.0050	1.72	1.75	1,436.61	6.24
P-451	G-2-9	G-2-8	1415.12	1401.66	6	350	63,617	0.0380	3.47	13.44	1,415.28	5.18
P-452	77-31	77-30	1536.23	1534.08	6	351	9,854	0.0060	1.05	2.09	1,536.29	3.49
P-454	A-7	A-6	1500.25	1475.2	8	356	5,231	0.0700	1.93	25.01	1,500.29	7.56
P-455	G-34-1	G-34	1362.09	1352.17	6	363	12,418	0.0270	1.89	9.78	1,362.16	3.27
P-456	75	74	1507.66	1503.79	10	364	336,236	0.0110	3.37	3.83	1,507.98	6.94
P-457	74	73	1503.79	1500.38	10	370	426,345	0.0090	3.42	3.45	1,504.15	5.66
P-458	A-10	A-11	1478.2	1448.6	8	377	696,895	0.0790	8.63	28.39	1,478.69	4.31
P-459	101-6	101-5	1529.12	1526.23	6	384	59,814	0.0080	1.90	2.88	1,529.27	4.04
P-460	97	96	1497.72	1495.67	10	387	566,423	0.0050	2.99	2.02	1,498.16	7.37
P-461	17-18-1	17-18	1436.42	1388.71	6	419	20,681	0.1140	3.63	47.75	1,436.51	1.77
P-462	41-1-1	41-1	1409.65	1390.55	6	396	2,911	0.0480	1.49	18.86	1,409.68	3.93
P-463	17-51-8Z	17-51-8A	1576.79	1553.27	6	396	31,199	0.0590	3.27	23.51	1,576.90	3.95
P-464	77-16-10	77-16-9	1537.54	1526.78	6	397	21,270	0.0270	2.22	10.76	1,537.63	4.58
P-465	77-13-1	77-13	1556.36	1550.21	6	398	11,872	0.0150	1.53	6.12	1,556.43	3.29
P-466	66	65	1478.29	1473.18	10	399	533,567	0.0130	4.09	5.18	1,478.69	6.80
P-467	17-76-2	17-76-1	1500.44	1467.89	6	403	6,348	0.0810	2.24	32.54	1,500.49	4.19
P-469	17-62	17-61	1569.4	1537.1	6	527	20,916	0.0610	2.93	32.30	1,569.49	3.91
P-470	41	39	1382.09	1375.12	10	426	1,303,228	0.0160	5.59	5.62	1,382.73	4.79
P-471	17-78	17-77	1534	1533.57	8	439	85,177	0.0010	0.99	0.54	1,534.27	4.65
P-474	101-5	101-4	1526.23	1516.73	6	462	69,774	0.0210	2.85	9.48	1,526.39	3.45
P-475	17-74-1	17-74	1555.85	1530.07	6	497	29,072	0.0520	3.06	25.82	1,555.95	4.77
P-477	77-25-2A	77-25-1	1542.78	1540.14	6	581	6,622	0.0050	0.84	2.64	1,542.84	3.95
P-480	104-3	104-2	1535.99	1527.03	8	745	49,353	0.0120	2.06	8.89	1,536.12	4.50
P-484	A-2	A-1	1467.37	1465.33	8	313	40,028	0.0070	1.56	1.96	1,467.48	11.29
P-485	A-3	A-2	1469.1	1467.37	8	347	38,951	0.0050	1.41	1.74	1,469.22	7.25
P-486	A-4	A-3	1470.61	1469.1	8	301	36,514	0.0050	1.39	1.51	1,470.73	4.13
P-487	A-5	A-4	1470.92	1470.61	8	51	36,514	0.0060	1.49	0.30	1,471.03	7.29
P-488	101-2	101-1-1B	1513.23	1509.41	6	219	194,162	0.0170	3.58	3.81	1,513.51	3.30
P-489	103-1	103	1521.68	1515.38	6	157	3,192	0.0400	1.43	6.13	1,521.71	4.32
P-490	104-2-1	104-2	1528.19	1527.03	8	363	70,970	0.0030	1.43	1.14	1,528.37	7.97
P-491	104-2	104-1	1527.03	1524.27	8	347	122,106	0.0080	2.32	2.77	1,527.23	5.33
P-492	104-2-6	104-2-5	1538.53	1536.89	6	85	12,813	0.0190	1.69	1.62	1,538.60	6.11
P-493	94	93	1546.22	1543.22	10	150	67,339	0.0200	2.63	2.99	1,546.36	4.46
P-494	98-7	98-6	1544.24	1539.99	6	219	3,597	0.0190	1.15	4.24	1,544.28	2.32
P-495	98-6	98-4	1539.99	1517.83	6	312	6,822	0.0710	2.19	22.13	1,540.04	3.01

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-496	77-16-2	77-16-1	1535.26	1513.22	6	603	7,607	0.0370	1.79	22.06	1,535.31	3.35
P-497	48-4	48-3	1451.3	1435.35	6	111	13,267	0.1440	3.42	15.98	1,451.37	4.69
P-498	48-3	48-2	1435.35	1430.34	6	59	13,267	0.0850	2.88	5.01	1,435.42	4.53
P-499	50-5	50-4	1423.92	1423.24	6	77	2,602	0.0090	0.79	0.68	1,423.95	7.40
P-500	44-A-5	44-A-4	1391.02	1390.2	8	250	179,811	0.0030	1.88	0.82	1,391.31	11.72
P-501	44-A-4	44-A-3	1390.2	1389.45	8	213	180,999	0.0040	1.93	0.72	1,390.49	6.22
P-502	44-A-3	44-A-2	1389.45	1388.92	8	178	196,331	0.0030	1.85	0.55	1,389.77	4.98
P-503	44-A-2	44-A-1	1388.92	1388.4	8	124	206,553	0.0040	2.13	0.19	1,389.22	7.99
P-504	44-A-1	44-A	1388.4	1387.39	8	204	209,278	0.0050	2.27	0.15	1,389.03	5.75
P-505	44-9	44-A-3	1391.49	1389.62	6	189	13,090	0.0100	1.35	1.79	1,391.56	10.05
P-506	44-15	44-9	1404.42	1391.49	6	148	493	0.0870	1.08	12.87	1,404.43	6.32
P-507	44-26	44-25	1415.88	1415	6	79	2,577	0.0110	0.85	0.79	1,415.91	4.71
P-508	41-3-3	41-3-1	1442.6	1426.88	6	429	108,930	0.0370	3.98	15.72	1,442.80	3.70
P-509	41-2-1	41-2	1416.4	1409.01	6	173	185,605	0.0430	4.90	7.39	1,416.67	2.28
P-510	41-2	41-1	1409.01	1390.55	6	274	190,225	0.0670	5.80	18.46	1,409.28	2.83
P-511	17-16-2	17-16-1	1368.51	1365.79	6	219	5,055	0.0120	1.10	2.70	1,368.55	5.94
P-512	17-16-1	17-16	1365.79	1365	6	218	6,424	0.0040	0.76	0.80	1,365.85	4.02
P-513	17-84	17-40-z	1570.53	1568.19	6	386	21,492	0.0060	1.31	2.29	1,570.62	4.99
P-514	G-12	G-11	1437.53	1436.45	8	230	72,342	0.0050	1.66	1.08	1,437.70	6.18
P-516	G-15	G-14	1441.32	1439.73	8	300	2,241	0.0050	0.61	1.59	1,441.35	4.00
P-517	17-76-9	17-76-10	1452.14	1443.36	6	475	180,490	0.0180	3.58	8.84	1,452.41	5.47
P-518	17-76-10	G-16	1443.19	1442.14	8	147	180,490	0.0070	2.49	0.76	1,443.43	3.09
P-519	17-76-8	17-76-9	1460.9	1452.14	6	361	18,547	0.0240	2.05	8.58	1,460.98	6.53
P-520	17-75-5	17-76-9C	1500.24	1465.35	6	243	144,091	0.1440	7.02	34.89	1,500.48	4.97
P-521	17-76-9C	17-76-9A	1465.35	1464.88	6	38	145,372	0.0120	2.92	0.46	1,465.59	4.77
P-522	17-76-9A	17-76-9	1464.88	1452.14	6	384	158,861	0.0330	4.28	12.72	1,465.13	5.45
P-523	17-75-4	17-75-5	1525.1	1500.24	6	194	144,091	0.1280	6.73	24.98	1,525.34	11.16
P-524	17-75-3	17-75-4	1526.38	1525.1	6	94	56,138	0.0140	2.31	1.19	1,526.53	7.10
P-525	17-75	17-75-1	1528.7	1528.26	6	74	29,072	0.0060	1.43	0.44	1,528.81	5.02
P-526	17-75-1	17-75-2	1528.26	1527.48	6	114	29,072	0.0070	1.50	0.73	1,528.37	5.00
P-527	17-33-1	17-33	1537.12	1536.47	6	117	16,844	0.0060	1.19	0.55	1,537.20	4.16
P-528	17-51-7	17-51-6	1564.5	1529.01	6	361	8,434	0.0980	2.61	35.39	1,564.56	3.14
P-529	17-51-8A	17-51-9a	1553.27	1524.37	6	269	35,857	0.1070	4.19	28.90	1,553.39	2.82
P-530	17-51-9a	17-51-9	1524.37	1522.42	6	28	38,724	0.0700	3.68	1.95	1,524.49	3.78
P-531	17-51-9	17-51-9b	1522.42	1495.57	6	275	40,482	0.0980	4.21	26.85	1,522.54	5.28
P-532	17-51-9b	17-50-5	1495.57	1471.62	6	235	43,097	0.1020	4.36	23.95	1,495.70	4.56
P-533	17-50-5	17-50-4	1471.62	1466.3	6	80	44,128	0.0660	3.77	5.37	1,471.75	3.60
P-534	17-50-6	17-50-4	1476.48	1466.3	6	200	2,973	0.0510	1.53	10.19	1,476.51	4.93
P-535	17-50-4	17-50-3	1466.13	1435.81	8	190	47,101	0.1600	5.04	30.25	1,466.25	4.44
P-536	17-50-3	17-50-2	1435.81	1417.03	8	279	109,338	0.0670	4.79	18.78	1,436.00	4.83
P-537	17-50-2	17-50	1417.03	1408.91	8	111	110,592	0.0730	4.95	8.07	1,417.22	4.40
P-538	17-51-4	17-51-3	1525.73	1474.47	6	284	53,547	0.1800	5.68	51.26	1,525.87	3.35
P-539	17-51-3	17-51-2	1474.47	1469.24	6	228	55,138	0.0230	2.77	5.23	1,474.61	6.51
P-540	17-51-2	17-51-2Z	1469.24	1454.06	6	182	56,966	0.0830	4.41	15.18	1,469.39	3.65
P-541	17-51-5	17-51-4	1553.84	1525.73	6	147	8,203	0.1910	3.28	28.02	1,553.89	4.48
P-542	17-51-4a	17-51-4	1528.22	1525.73	6	201	44,476	0.0120	2.09	2.48	1,528.35	3.37
P-543	17-51-2Z	17-51-1	1454.06	1437.87	6	90	59,063	0.1800	5.84	16.27	1,454.21	3.43
P-544	17-51-1	17-50-3	1437.7	1435.81	8	40	60,408	0.0470	3.55	1.84	1,437.84	4.09
P-545	17-52	17-51	1426.8	1420.28	6	210	56,720	0.0310	3.11	6.57	1,426.95	4.24
P-546	17-51	17-50	1420.11	1408.91	8	367	58,128	0.0310	3.01	11.10	1,420.25	5.20
P-547	17-50	17-49C	1408.91	1405.05	8	124	170,568	0.0310	4.16	3.86	1,409.15	5.97
P-548	17-49-8	17-49-7	1530.08	1529.37	6	259	3,565	0.0030	0.58	0.68	1,530.13	3.36

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-556	55-15	55-14	1533.2	1527.01	8	403	29,989	0.0150	1.94	6.17	1,533.30	6.12
P-557	55-14	55-13	1527.01	1517.95	8	302	46,216	0.0300	2.79	9.06	1,527.13	4.06
P-558	55-13	55-12	1517.95	1508.06	8	296	46,501	0.0330	2.91	9.87	1,518.07	4.11
P-559	55-12	55-11	1508.06	1497.14	8	235	65,959	0.0460	3.62	10.98	1,508.21	4.01
P-560	55-11	55-10	1497.14	1488.65	8	273	65,959	0.0310	3.14	8.43	1,497.29	3.92
P-561	55-10	55-9	1488.65	1483.56	8	339	130,436	0.0150	2.97	5.06	1,488.86	4.99
P-562	55-9	55-8	1483.56	1481.08	8	365	176,313	0.0070	2.43	2.47	1,483.80	5.02
P-563	55-8	55-7	1481.08	1467.45	8	240	186,353	0.0570	5.28	13.59	1,481.33	6.75
P-564	55-7	55-6	1467.45	1466.67	8	124	242,383	0.0060	2.58	0.78	1,467.74	3.76
P-565	55-6	55-5	1466.67	1460.56	8	214	242,383	0.0290	4.45	6.10	1,466.95	4.77
P-566	55-5	55-4	1460.56	1456.02	8	225	256,204	0.0200	4.00	4.54	1,460.85	4.82
P-567	55-4	55-3	1456.02	1452.62	8	108	258,385	0.0310	4.70	3.40	1,456.31	4.88
P-568	77-7	77-6-1	1525.86	1518.18	6	125	26,857	0.0610	3.16	7.56	1,525.96	2.93
P-569	77-6-2	77-6-1	1521.07	1518.18	6	293	61,859	0.0100	2.12	2.83	1,521.22	5.99
P-571	104-6	104-4	1538.15	1536.25	8	366	37,257	0.0050	1.41	1.89	1,538.27	9.18
P-572	17-80	17-79	1537.38	1535.2	8	135	7,455	0.0160	1.29	2.04	1,537.43	4.57
P-573	17-81	17-80	1555.24	1537.55	6	335	5,222	0.0530	1.82	17.71	1,555.28	3.12
P-574	17-79-1	17-79	1536.26	1535.2	8	326	58,336	0.0030	1.36	1.04	1,536.42	1.85
P-575	17-79	17-78	1535.2	1534	8	411	70,883	0.0030	1.39	1.11	1,535.38	4.40
P-578	17-79-2	17-79-1	1537.71	1536.26	8	439	58,336	0.0030	1.37	1.45	1,537.87	5.94
P-579	17-49C	17-49-B1	1405.05	1401.08	8	146	172,262	0.0270	3.97	3.97	1,405.29	5.14
P-580	17-49-B1	17-49-b	1401.08	1392.57	8	146	173,335	0.0580	5.21	8.51	1,401.32	4.76
P-581	17-49A	17-49	1387.86	1386.86	8	28	174,632	0.0360	4.40	0.98	1,388.10	3.80
P-582	17-49	17-49-D	1386.86	1379.06	8	175	200,880	0.0450	4.95	7.90	1,387.12	4.19
P-583	17-49-D	17-15	1378.89	1363.77	10	538	204,554	0.0280	4.12	15.02	1,379.13	4.51
P-584	15-7	15-6	1359.93	1359.26	6	263	45,726	0.0030	1.20	0.71	1,360.10	3.18
P-585	15-6	15-5	1359.09	1354.4	8	118	48,387	0.0400	3.13	4.68	1,359.21	4.79
P-586	15-1-1	15-1	1326.23	1321.61	6	238	4,268	0.0190	1.21	4.63	1,326.27	4.79
P-587	15-1	15	1321.44	1319.02	8	244	104,882	0.0100	2.40	1.34	1,321.62	5.18
P-588	15-3	15-2	1345.02	1332.79	8	176	100,614	0.0690	4.72	12.31	1,345.20	3.00
P-589	15-2	15-1	1332.79	1321.44	8	182	100,614	0.0620	4.55	11.35	1,332.97	2.71
P-591	9	8	1317.36	1316.19	18	324	4,054,008	0.0040	4.07	1.13	1,318.58	4.18
P-592	7-3	7-2	1341.96	1332.8	6	242	41,889	0.0380	3.05	9.15	1,342.08	5.40
P-593	7-2	7-1	1332.8	1325.26	6	67	47,127	0.1130	4.63	7.61	1,332.93	6.00
P-594	7-1	8	1325.26	1317.19	6	204	47,127	0.0400	3.21	7.94	1,325.39	2.89
P-595	8	7	1316.19	1315.31	18	240	4,101,135	0.0040	4.10	0.77	1,317.45	3.39
P-596	7	6	1315.31	1314.8	18	165	4,101,135	0.0030	3.59	0.53	1,316.68	3.27
P-597	6	5	1314.8	1314.58	18	83	4,101,135	0.0030	3.59	0.30	1,316.14	3.37
P-598	5	4	1314.58	1313.94	18	184	4,101,135	0.0030	3.99	0.65	1,315.84	3.35
P-599	4	3	1313.94	1313.54	18	63	4,101,135	0.0060	5.21	0.16	1,315.20	3.36
P-600	3	2	1313.54	1313.42	18	98	4,101,372	0.0010	3.59	0.38	1,315.04	3.14
P-601	9-11	9-10	1418.76	1412.4	8	318	790,603	0.0200	3.50	3.26	1,420.19	3.25
P-602	G-17-5	G-17-4	1298.64	1296.1	6	202	284,118	0.0130	3.47	2.54	1,298.98	3.08
P-603	17-70	17-69	1522.29	1508.5	8	821	46,909	0.0170	2.29	13.76	1,522.41	2.49
P-604	17-69	17-68	1508.5	1483.61	6	171	61,214	0.1460	5.50	24.86	1,508.65	4.90
P-605	17-68	17-67-2	1483.61	1436.74	6	386	82,472	0.1210	5.62	46.96	1,483.79	3.70
P-606	17-67-2	17-67-1	1436.74	1397.56	6	387	82,472	0.1010	5.26	39.15	1,436.92	2.50
P-607	17-67-1	17-67	1397.56	1355.43	6	390	116,387	0.1080	5.96	42.24	1,397.77	2.37
P-608	17-67	17-66-1	1355.43	1351.61	6	262	116,387	0.0150	2.91	3.81	1,355.64	3.13
P-609	17-66-1	17-66	1351.61	1349.84	6	265	118,700	0.0070	2.21	1.77	1,351.83	3.30
P-610	17-66	17-65Z	1349.84	1345.95	6	247	121,507	0.0160	3.03	3.93	1,350.06	3.19
P-611	17-65Z	17-64	1345.78	1335.35	8	87	163,439	0.1200	6.61	10.43	1,346.01	2.95

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-612	17-64	17-64-1	1335.35	1329.99	8	78	163,790	0.0690	5.45	5.36	1,335.58	3.95
P-613	17-64-1	17-63	1329.99	1322.45	8	117	164,374	0.0640	5.31	7.54	1,330.22	3.13
P-615	17-65-2	17-65	1350.56	1348.03	8	252	41,932	0.0100	1.84	2.54	1,350.68	3.57
P-616	17-65	17-65Z	1348.03	1345.78	8	47	41,932	0.0480	3.19	2.13	1,348.15	4.40
P-617	17-65-8	17-65-7	1396.68	1389.54	8	354	27,090	0.0200	2.07	7.14	1,396.77	3.86
P-618	17-65-7	17-65-6	1389.54	1383.03	8	105	27,960	0.0620	3.10	6.55	1,389.63	3.42
P-619	17-65-6	17-65-5	1383.03	1377.49	8	66	27,960	0.0840	3.41	5.54	1,383.12	4.06
P-620	17-65-5	17-65-4	1377.49	1375.45	8	83	29,082	0.0250	2.26	2.04	1,377.59	3.71
P-621	17-65-4	17-65-3	1375.45	1355.38	8	199	29,674	0.1010	3.70	20.05	1,375.55	3.05
P-622	17-65-10	17-65-9-1	1490.06	1466.1	6	158	9,371	0.1520	3.14	23.94	1,490.12	3.04
P-623	17-65-9-1	17-65-9	1466.1	1434.93	6	173	15,318	0.1800	3.86	31.15	1,466.18	3.69
P-624	17-65-9	17-65-8	1434.93	1396.85	6	242	24,972	0.1570	4.28	38.13	1,435.03	3.77
P-625	17-65-12	17-65-11	1531.69	1517.17	6	285	4,211	0.0510	1.69	14.51	1,531.73	4.23
P-626	17-65-11	17-65-10	1517.17	1490.06	6	348	6,825	0.0780	2.26	27.10	1,517.22	3.30
P-627	17-65-9-3	17-65-9-Z	1481.04	1469.75	6	189	2,140	0.0600	1.45	11.30	1,481.07	11.67
P-628	17-65-9-Z	17-65-9-1	1469.75	1466.1	6	133	2,140	0.0270	1.12	3.60	1,469.78	4.61
P-629	77-29	77-28	1533.84	1533.8	8	93	21,402	0.0000	0.50	0.07	1,534.00	2.48
P-630	77-24-4	77-24-1	1547.02	1537	6	579	35,809	0.0170	2.21	10.01	1,547.14	1.80
P-631	77-24	77-23	1533.24	1533.07	10	69	74,696	0.0020	1.30	0.21	1,533.42	7.31
P-632	85	79-8	1537.69	1532.84	10	79	86,409	0.0610	4.19	4.63	1,537.85	3.64
P-633	G-17	PS2	1285.46	1284.55	6	101	356,805	0.0090	3.08	0.96	1,285.89	3.89
P-634	G-22-1	G-22	1352.04	1341.79	6	306	4,495	0.0330	1.48	10.17	1,352.08	4.82
P-635	G-24-7	G-24-6	1392.48	1384.37	6	119	6,822	0.0680	2.16	8.08	1,392.53	4.46
P-636	G-24-7-1	G-24-7	1408.56	1392.48	6	107	1,586	0.1500	1.84	16.05	1,408.58	4.35
P-637	G-34-4	G-34-3	1419.28	1380.24	6	323	2,767	0.1210	2.00	39.03	1,419.31	3.54
P-638	G-34-3	G-34-2	1380.24	1365.43	6	284	3,879	0.0520	1.66	14.80	1,380.28	4.02
P-639	G-34-2	G-34-1	1365.43	1362.09	6	344	5,968	0.0100	1.06	3.32	1,365.48	4.58
P-640	G-34-1-1	G-34-1	1374.26	1362.09	6	136	4,967	0.0890	2.14	12.15	1,374.30	6.84
P-641	G-36-1	G-36	1412.74	1377.91	6	315	8,151	0.1110	2.70	34.69	1,412.79	7.75
P-642	G-40-3	G-40-2	1410.17	1409.79	6	34	35,665	0.0110	1.89	0.38	1,410.28	6.41
P-645	G-4-1	G-4	1414.5	1399.29	6	269	6,893	0.0570	2.03	15.15	1,414.55	6.31
P-646	G-1	G-1-A	1344.77	1344.31	8	45	425,564	0.0100	3.57	0.49	1,345.15	5.17
P-647	G-45	G-44	1438.35	1430.11	6	163	40,152	0.0510	3.33	8.24	1,438.47	9.56
P-648	G-44	G-43	1430.11	1419.84	6	319	43,213	0.0320	2.91	10.26	1,430.24	6.80
P-649	A-1	PS3	1465.33	1465.3	8	32	44,753	0.0010	0.81	0.03	1,465.53	8.80
P-650	A-16	PS3	1465.35	1465.3	8	33	29,718	0.0020	0.86	0.02	1,465.52	10.82
P-651	A-15	A-11	1476.91	1448.6	6	286	8,008	0.0990	2.58	26.66	1,476.96	7.28
P-652	17-74	17-75	1530.07	1528.7	6	174	29,072	0.0080	1.57	1.36	1,530.17	4.97
P-654	G-47	G-46	1450.08	1446.41	6	338	5,223	0.0110	1.06	3.66	1,450.12	6.46
P-655	G-1-A	PS1	1344.31	1343.91	8	40	425,564	0.0100	3.54	0.43	1,344.69	5.64
P-656	G-2	G-1	1347.23	1344.77	8	137	313,032	0.0180	4.05	2.40	1,347.56	10.24
P-657	G-1-8	G-1-7	1390.83	1384.35	6	159	57,065	0.0410	3.43	6.47	1,390.98	3.85
P-658	G-1-7	G-1-6	1384.35	1378.01	6	137	64,389	0.0460	3.70	6.40	1,384.51	4.74
P-659	G-1-6	G-1-5	1378.01	1372.87	6	157	64,389	0.0330	3.29	5.13	1,378.17	3.23
P-660	G-1-5	G-1-4	1372.87	1372.17	6	124	64,389	0.0060	1.76	0.71	1,373.04	5.23
P-661	G-1-4	G-1-3	1372.17	1369.49	6	133	64,389	0.0200	2.77	2.72	1,372.33	4.41
P-662	G-1-3	G-1-2	1369.49	1365.8	6	251	64,389	0.0150	2.47	3.64	1,369.65	3.79
P-663	G-1-2	G-1-1	1365.8	1360.48	6	349	110,159	0.0150	2.92	5.32	1,366.01	5.32
P-664	G-1-1	G-1	1360.48	1344.94	6	347	112,118	0.0450	4.31	15.54	1,360.69	3.80
P-665	G-1-13	G-1-12	1405.67	1404.4	6	237	5,058	0.0050	0.82	1.27	1,405.72	5.15
P-666	G-1-12	G-1-11	1404.4	1401.34	6	349	6,455	0.0090	1.05	2.96	1,404.45	7.25
P-667	G-2-7	G-2-6	1399.86	1397.95	6	146	71,969	0.0130	2.44	1.91	1,400.03	9.19

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-668	96	(F) 95-6	1495.67	1493.73	10	381	609,564	0.0050	3.00	1.98	1,496.14	6.73
P-669	20	19	1342.67	1324.62	10	91	1,351,051	0.1980	14.24	17.74	1,343.32	3.75
P-670	19	17	1324.62	1320.18	10	358	1,351,051	0.0120	3.83	3.26	1,325.58	2.14
P-671	17	16	1320.01	1319.13	12	264	1,410,921	0.0030	2.78	0.99	1,322.32	3.49
P-672	17-46	17-45	1581.69	1579.45	6	116	13,047	0.0190	1.70	2.24	1,581.76	2.69
P-673	17-43	17-44	1580.33	1576.44	6	221	6,012	0.0180	1.31	3.85	1,580.38	5.45
P-674	17-19	17-18	1413.49	1388.55	8	327	147,463	0.0760	5.47	25.04	1,413.71	3.53
P-675	17-18	17-17	1388.38	1381.52	10	353	173,577	0.0190	3.45	6.86	1,388.60	3.06
P-676	17-17	17-16	1381.52	1364.66	10	357	175,710	0.0470	4.73	16.86	1,381.75	2.90
P-677	104-3-1	79-8	1542.67	1533.17	6	486	5,465	0.0200	1.30	9.50	1,542.71	3.27
P-678	17-58	17-56	1484.21	1462.42	6	199	37,525	0.1090	4.29	21.85	1,484.33	3.54
P-679	17-49-3B	17-49-3A	1465.88	1459.49	6	91	2,098	0.0700	1.52	6.39	1,465.91	3.23
P-680	17-76-6	17-76-3	1477.71	1471.59	6	197	3,191	0.0310	1.31	6.13	1,477.74	4.47
P-681	17-49-3A	17-49-3	1459.49	1441.63	6	67	2,297	0.2670	2.51	17.85	1,459.52	1.51
P-682	103	101	1515.38	1505.12	8	367	127,545	0.0280	3.68	10.06	1,515.58	3.70
P-683	2	Outfall	1313.42	1312.51	18	254	4,101,372	0.0040	4.05	1.17	1,314.66	4.40
P-684	A-2-4	A-2-3	1484.52	1471.26	6	130	65,556	0.1020	4.93	13.34	1,484.68	3.13
P-685	A-2-3	A-2-2	1471.26	1460.34	6	488	65,556	0.0220	2.89	10.91	1,471.42	10.08
P-686	A-2-2	A-2-1	1460.34	1446.93	6	374	77,701	0.0360	3.58	13.39	1,460.51	13.76
P-687	41-6	41-5	1427.67	1425.18	6	174	56,915	0.0140	2.36	2.47	1,427.82	2.83
P-688	17-49-b	17-49A	1392.57	1387.86	8	173	173,603	0.0270	3.98	4.71	1,392.81	7.34
P-689	A-21	A-20	1499.72	1493.22	8	183	11,697	0.0360	1.94	6.48	1,499.78	7.42
P-690	71	70	1498.33	1496.96	10	183	459,578	0.0070	3.23	1.36	1,498.70	5.43
P-691	101-1-1A	101-1-1	1507.13	1506.09	6	183	205,748	0.0060	2.37	1.08	1,507.45	4.42
P-692	79-5	79-4	1532	1530.12	10	183	173,989	0.0100	2.75	1.85	1,532.22	9.38
P-693	61	60	1455.26	1436.37	10	185	550,503	0.1020	8.69	19.10	1,455.67	5.69
P-694	G-7	G-6	1414.21	1410.05	8	186	217,288	0.0220	3.96	4.16	1,414.48	4.58
P-695	64	63	1466.87	1465.33	10	188	538,243	0.0080	3.48	1.54	1,467.27	8.80
P-696	17-49-1	17-49	1420.94	1387.03	6	188	25,280	0.1800	4.53	33.96	1,421.04	2.81
P-697	41-5	41-4	1425.18	1424.41	6	151	61,557	0.0050	1.67	0.78	1,425.35	3.28
P-702	9-2	9-1	1324.54	1318.56	8	331	1,949,732	0.0180	8.64	20.63	1,329.41	0.00
P-703	21	20	1343.67	1342.67	10	128	1,351,051	0.0080	3.83	1.12	1,344.44	2.13
P-704	G-24-6-4	G-24-6-3	1408.37	1403.76	6	112	2,608	0.0410	1.36	4.61	1,408.40	5.99
P-705	A-24-1	A-24	1531.5	1505.57	6	280	7,089	0.0930	2.43	25.91	1,531.55	6.69
P-706	44	43	1387.27	1387.14	10	109	1,096,279	0.0010	3.11	0.76	1,388.49	6.53
P-707	43	42	1387.14	1383.22	10	196	1,097,933	0.0200	5.81	2.90	1,387.72	10.53
P-708	17-32	17-31	1534.84	1522.3	8	171	109,027	0.0730	4.93	12.54	1,535.03	3.06
P-709	17-31	17-30	1522.3	1520.88	8	170	111,338	0.0080	2.30	1.42	1,522.49	4.51
P-710	(F) 9-19	(F) 9-18	1520.4	1513.4	12	200	1,023,076	0.0350	6.96	7.20	1,520.93	5.47
P-711	(F) 9-18	(F) 9-17	1513.4	1483.4	12	400	1,023,076	0.0750	9.14	30.26	1,513.93	7.47
P-712	(F) 9-17	(F) 9-16	1483.4	1460.4	12	300	1,023,076	0.0770	9.21	23.26	1,483.93	7.47
P-713	(F) 9-16	(F) 9-15	1460.4	1443.4	12	400	1,023,076	0.0430	7.46	17.22	1,460.93	7.47
P-714	(F) 9-15	(F) 9-14	1443.4	1438.4	12	400	1,023,076	0.0130	4.78	5.10	1,443.93	5.97
P-715	(F) 9-14	(F) 9-13	1438.4	1435.4	12	400	1,023,076	0.0080	3.95	2.96	1,438.93	5.47
P-716	(F) 9-13	(F) 9-12	1435.4	1433.4	12	400	1,023,076	0.0050	3.39	2.04	1,435.97	5.43
P-717	(F) 9-12	9-10	1433.4	1412.4	12	420	1,023,076	0.0500	7.90	17.00	1,433.93	8.47
P-718	9-10	T-1	1412.4	1409.55	8	71	1,901,437	0.0400	8.43	4.21	1,416.93	0.00
P-719	T-1	9-9	1409.55	1407.59	8	119	1,901,437	0.0160	8.43	7.05	1,418.66	0.00
P-720	9-7	T-2	1404.41	1403.05	8	169	1,931,129	0.0080	8.56	10.34	1,412.72	0.00
P-721	T-2	9-6	1403.05	1386.64	8	103	1,931,129	0.1590	14.55	16.69	1,403.71	8.29
P-722	9-6	T-3	1386.64	1371.56	8	150	1,931,129	0.1010	12.13	14.33	1,387.30	4.43
P-723	T-3	9-5	1371.56	1360.29	8	135	1,931,129	0.0830	8.56	8.25	1,372.97	3.78

TABLE T-5
CITY OF ANGELS WASTEWATER MASTER PLAN
HYDRAULIC MODEL OUTPUT - BUILDOUT DESIGN PWWF (REDUCED I/I)

Label	U/S Manhole[a]	D/S Manhole[a]	Start Invert	Stop Invert	Diameter (in)	Length (ft)	Flow (gpd)	Slope (ft/ft)	Velocity (ft/s)	Percent Full	U/S HGL	U/S Unfilled Depth (ft)
P-724	9-5	T-4	1360.29	1345.87	8	225	1,931,129	0.0640	8.56	13.76	1,364.71	0.00
P-725	T-4	9-4	1345.87	1344.34	8	103	1,931,129	0.0150	8.56	6.30	1,354.28	0.00
P-726	9-4	T-5	1344.34	1336.35	8	182	1,931,129	0.0440	8.56	11.13	1,347.98	0.00
P-727	T-5	9-3	1336.35	1333.7	8	96	1,931,129	0.0280	8.56	5.87	1,343.64	0.00
P-728	9-3	T-6	1333.7	1328.82	8	185	1,949,732	0.0260	8.64	11.53	1,337.77	0.00
P-729	T-6	9-2	1328.82	1324.54	8	82	1,949,732	0.0520	8.64	5.11	1,334.52	0.00
P-730	9-1	T-7	1318.56	1297.46	8	307	1,961,562	0.0690	8.69	19.37	1,325.14	0.00
P-731	T-7	9	1297.46	1317.46	8	146	1,961,562	-0.1370	8.69	7.85	1,326.43	0.00
P-805	17-74-1Z	17-74-1-A	1564.56	1563.79	6	134	22,738	0.0060	1.31	0.77	1,564.66	4.55
P-806	17-44	17-74-1Z	1576.44	1564.56	6	197	20,415	0.0600	2.89	11.87	1,576.53	5.59
P-807	G-1-7-1	G-1-7	1396.85	1384.35	6	125	6,582	0.1000	2.45	12.39	1,396.90	6.21
P-808	G-1-7-2	G-1-7-1	1399.66	1396.85	6	49	5,121	0.0580	1.87	2.80	1,399.70	4.74
P-809	G-1-7-2-1	G-1-7-2	1402.48	1399.66	6	66	1,461	0.0430	1.17	2.80	1,402.50	4.70
P-810	G-1-7-3	G-1-7-2	1402.52	1399.66	6	136	3,161	0.0210	1.14	2.85	1,402.55	5.53
P-811	G-1-7-3-1	G-1-7-3	1404.25	1402.52	6	42	750	0.0410	0.94	1.71	1,404.27	4.12
P-812	G-1-7-4	G-1-7-3	1408.25	1402.52	6	140	1,348	0.0410	1.13	5.72	1,408.27	5.13
P-814	G-5-1	G-5	1402.85	1399.81	6	132	843	0.0230	0.78	2.78	1,402.87	4.22
P-815	G-16	(F) PS6	1442.14	1441	12	69	1,023,065	0.0170	5.29	1.27	1,442.67	4.15
P-908	(F) 95-6	(F) 95-5	1493.73	1484.7	12	100	609,564	0.0900	8.40	8.96	1,494.14	8.73
P-909	(F) 95-5	(F) 95-4	1484.7	1483.7	12	300	609,564	0.0030	2.56	1.07	1,485.18	5.52
P-910	(F) 95-4	(F) 95-3	1483.7	1469.7	12	300	609,564	0.0470	6.65	13.89	1,484.11	9.09
P-911	(F) 95-3	(F) 95-2	1469.7	1468.7	12	400	609,564	0.0030	2.30	1.00	1,470.22	4.98
P-912	(F) 95-2	(F) 95-1	1468.7	1467.7	12	400	609,564	0.0030	2.30	0.96	1,469.22	7.48
P-913	(F) 95-1	(F) 95	1467.7	1466.9	12	400	609,564	0.0020	2.11	0.95	1,468.25	9.45
P-914	(F) 95	(F) PS5	1466.9	1465	12	260	609,564	0.0070	3.42	1.93	1,467.31	13.59

[a] "T-" prefix indicates a point of change in slope and not an actual manhole

APPENDIX U

CCR TITLE 23, DIVISION 3, CHAPTER 26 – CLASSIFICATION OF WASTEWATER TREATMENT PLANTS AND OPERATOR CERTIFICATION

Title 23. Waters
Division 3. State Water Resources Control Board and Regional Water Quality Control Boards
Chapter 26. Classification of Wastewater Treatment Plants and Operator Certification

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Title 23. Waters
Division 3. State Water Resources Control Board and Regional Water Quality Control Boards
Chapter 26. classification of Wastewater Treatment Plants and Operator Certification

Article 1. General Provisions

§ 3670. Purpose.

The primary purpose of the Wastewater Treatment Plant Classification, Operator Certification, and Contract Operator Registration Program is to protect public health and the environment by providing for the effective operation of wastewater and water recycling treatment plants through the certification of wastewater treatment plant operators.

§ 3670.1. Certification Requirements for Operation of Wastewater Treatment Plants.

No person shall operate a wastewater treatment plant within the meaning of these regulations unless that person has been certified by the division as a wastewater treatment plant operator or operator-in-training at a grade appropriate for the class of plant being operated.

§ 3670.2. Certification Requirement for Operation of Water Recycling Treatment Plants.

(a) Except as provided in subsection (b) below, no person shall operate a water recycling treatment plant unless that person has been certified by the division as a wastewater treatment plant operator or operator-in-training at a grade appropriate for the class of plant being operated.

(b) A person certified by the Department of Health Services as a water treatment plant operator may operate a water recycling treatment plant at a grade appropriate for the class of plant operated.

(c) The State Board may refuse to approve use of a certificate issued by the Department of Health Services or suspend or revoke its approval of the use of the certificate if the operator commits any of the prohibited acts described in Article 7 (commencing with section 3710) of Chapter 26 of Division 3 of the California Code of Regulations.

§ 3671. Definitions.

The following definitions shall apply to this chapter:

(a) "Activated sludge treatment" means a wastewater treatment process in which predominantly biodegradable pollutants in wastewater are adsorbed and/or absorbed by a suspended mass of living aerobic organisms called "activated sludge". The suspended mass is subsequently separated from the treated wastewater by a sedimentation process either for further use in the process or for disposal.

(b) "Agency" or "municipality" means any government agency created by federal law or any city, town, county, district, or other government created by or pursuant to state law which owns or operates a wastewater treatment plant. "Agency" also includes any privately-owned organization which owns or operates a wastewater treatment plant regulated by the Public Utilities Commission pursuant to Sections 216 and 230.6 of, and Chapter 4 (commencing with Section 701) of Part 1 of division 1 of the Public Utilities Code.

(c) "Appellant" means a person who appeals a decision made by the Office of Operator Certification or division Chief regarding denial of an application, the results of an examination, or disciplinary action taken.

(d) "Applicant" means a person who files an application for an examination, certification, renewal, or reinstatement as a wastewater treatment plant operator or operator-in-training.

(e) "Basic science courses" means college-level courses in the combined fields of mathematics, physics, chemistry, and biology.

(f) "Biological filtration treatment" (biofiltration) means a wastewater treatment process in which predominantly biodegradable pollutants in wastewater are adsorbed and/or absorbed by masses of living aerobic organisms and which are attached to stationary support media as the wastewater is caused to trickle over the media. Settleable material that may have sloughed from the media surfaces is subsequently separated from the treated wastewater by a sedimentation process for disposal.

(g) "Board" or "State Water Board" as used in this chapter means the five members of the State Water Resources Control Board.

(h) "Chief Plant Operator" means a supervisor who is certified as an operator and who is responsible for the overall operation of a wastewater treatment plant.

(i) "Contract operator" means any person or entity who enters a promissory agreement to operate a wastewater treatment plant.

(j) "Direct supervision" means the oversight and inspection of the work performance of an operator-in-training by the supervisor, without an intervening person, to ensure the safe and proper execution of the duties of the operator-in-training.

(k) "Division" means that unit of the division of the board in which the Office of Operator Certification is located.

(1) "Extended aeration treatment" means a modification of the activated sludge treatment process which utilizes long aeration periods to promote aerobic digestion of the biomass.

(m) "Maintenance" means those activities which will be credited toward operator experience under the certification program. Those activities are limited to the day-to-day servicing, adjustment or regulation of equipment which are performed by an operator and are necessary to maintain reliable operation of major treatment processes.

(n) "Office of Operator Certification" means that unit of the division which administers the Wastewater Treatment Plant Classification and Operator Certification Program.

(o) "Operates" means the performance of day-to-day activities primarily consisting of the control of any process which may affect the quality of the discharge of a wastewater treatment plant. "Operates" may include performance of day-to-day maintenance work so long as the primary function of the operator is control of the process. "Operates" does not include maintenance functions which are not necessary for the reliable operation of major treatment processes.

(p) "Operator" means any person operating a wastewater treatment plant and who occupies a position and performs duties for which the Office of Operator Certification requires an operator certificate.

(q) "Operator-in-training" means any person who operates a wastewater treatment plant under the direct supervision of a certified operator while gaining experience to qualify for an operator certificate.

(r) "Pond treatment" means processing in a pond in which biological oxidation of organic matter is effected by natural or artificially accelerated transfer of oxygen to the water.

(s) "Preliminary treatment" means a process or processes to remove or reduce in size solids which could damage equipment or reduce effectiveness of other treatment processes.

(t) "Primary treatment" means a wastewater treatment process that allows those substances in wastewater that readily settle or float to be separated from the water being treated.

(u) "Secondary treatment" means treatment beyond primary treatment to remove colloidal and dissolved organic matter and further remove suspended matter, usually by biological processes such as activated sludge and biological filtration treatment.

(v) "Shift supervisor" means a certified operator who oversees and directs the operation or a phase of operation of a wastewater treatment plant during a specific work period and who reports to a supervisor or a chief plant operator.

(w) "Supervisor" means a certified operator who oversees and directs the operation of a wastewater treatment plant, who inspects the performance of other operators of a wastewater treatment plant, and who reports to the chief plant operator.

(x) "Tertiary treatment" (advanced waste treatment) means treatment beyond secondary treatment, which may include filtration, coagulation and nutrient removal, but excluding disinfection.

(y) "Wastewater treatment plant" means either of the following:

(l) Any facility owned by a state, local, or federal agency and used in the treatment or reclamation of sewage and industrial wastes.

(2) Any privately-owned facility used in the treatment or reclamation of sewage and industrial wastes, and regulated by the Public Utilities Commission pursuant to Sections 216 and 230.6 of, and Chapter 4 (commencing with Section 701) of Part 1 of Division 1, of the Public Utilities Code.

(z) "Water recycling treatment plant" means a treatment plant that receives and further treats secondary and/or tertiary effluent from a wastewater treatment plant.

Article 2. Classification of Wastewater Treatment Plants and Agency Reporting Requirements

§ 3675. Classification of Wastewater and Water Recycling Treatment Plants.

(a) The division shall classify all wastewater treatment plants, including water recycling treatment plants, according to the following criteria:

Class	Treatment Process	Design Flow (in million gallons per day)
I	Pond……...	All
	Primary……..	1.0 or less
II	Primary……..	Greater than 1.0 through 5.0
	Biofiltration……...	1.0 or less
	Extended Aeration…….	All
III	Primary……..	Greater than 5.0 through 20.0
	Biofiltration……...	Greater than 1.0 through 10.0
	Activated Sludge……...	5.0 or less
	Tertiary……..	1.0 or less
IV	Primary……..	Greater than 20.0
	Biofiltration……...	Greater than 10.0 through 30.0
	Activated Sludge……...	Greater than 5.0 through 20.0
	Tertiary……..	Greater than 1.0 through 10.0
V	Biofiltration……...	Greater than 30.0
	Activated Sludge……...	Greater than 20.0
	Tertiary……..	Greater than 10.0

(b) Plants may be classified in a group different than indicated in this section if:

(1) they have characteristics which make operation more difficult than the operation of other similar plants of the same flow range; or,

(2) the conditions of flow or the use of the receiving waters require an unusually high degree of plant operational control; or,

(3) they use an approved method of wastewater treatment which is not included in this section.

§ 3676. Reporting Requirements by Agencies to the Division.

(a) Within 30 calendar days after a plant begins operating, each agency shall submit to the division a description of the plant's treatment processes, a design f low of the plant, an organization chart, and job descriptions and duty rosters for plant personnel.

(b) Each agency shall notify the division in writing within 30 calendar days of a change in the employment of the person designated as chief plant operator and any change in the reportable items in subsection (a) above which may affect the classification of the wastewater treatment plant.

(c) Each agency shall notify the division in writing within 30 calendar days of any final disciplinary action resulting in suspension, demotion, or discharge of a certified operator or operator-in-training if the disciplinary action is the result of the operator's commission of any of the acts which are grounds for discipline listed in Section 3710. The notice shall identify the name of the operator or operator-in-training, the specific violations and the disciplinary action taken.

(d) Reports regarding final disciplinary action received from agencies shall be retained in state board files for a period of three years unless the state board takes disciplinary action. If the state board takes disciplinary action, reports submitted by agencies shall remain in state board files for ten years.

Article 3. Grades of Operator Certification for the Operation of Wastewater Treatment Plants

§ 3680. Grades of Operator Certification.

(a) Chief Plant Operators - For all plant classes, each chief plant operator shall possess a valid operator certificate of a grade at least equivalent to the class of plant operated.

(b) Supervisors and Shift Supervisors

(l) In Class II, III, and IV plants, supervisors and shift supervisors shall possess valid operator certificates no more than one grade lower than the class of plant operated.

(2) In Class V plants, shift supervisors shall possess at least valid Grade III certificates and supervisors shall possess at least Grade IV certificates.

(c) Operators - Each operator shall possess at least a valid Grade I certificate or a valid operator-in-training certificate. In Class IV and V plants. 50 percent of the operators shall possess at least valid Grade II certificates or valid operator-in-training certificates at the Grade II or higher level.

Article 4. Minimum Qualifications

§ 3683. Education and Experience Requirements.

(a) No person shall be issued a certificate unless that person passes a written examination specified by these regulations and meets the education and experience requirements prescribed by this article.

(b) Persons may apply to take an operator certification examination if:

(1) they have completed the education necessary for the certificate prior to the final filing date for the examination, in accordance with the provisions of subsection (c) of this section; and,

(2) there is sufficient time to gain the experience necessary to qualify for the certificate for which they are applying within four years of June 30 or December 31 (whichever is sooner) following an examination for Grades II, III. IV, and V and within two years of June 30 or December 31 (whichever is sooner) following an examination for Grade I.

(c) Eligibility for certification shall be based on the following qualifications for each grade of wastewater treatment plant operator. Educational points shall be credited pursuant to the provisions of Section 3685.

(1) Grade I:

Education: Six educational points; AND,

Experience: One year of experience performing the functions of a wastewater treatment plant operator

(2) Grade II:

(A) Education: Graduation from high school or equivalent as specified in Section 3686 and six educational points; AND,

Experience: Two years of experience performing the functions of a wastewater treatment plant operator; OR,

(B) Experience: One and one-half years of experience performing the functions of a wastewater treatment plant operator while certified as a Grade I operator.

(3) Grade III:

(A) Education: An associate degree or completion of 60 semester units at a college or university, either of which includes 15 semester units of basic science courses; AND,

Experience: Two years of experience performing the functions of a wastewater treatment plant operator; OR,

(B) Education: Graduation from high school or equivalent as specified in Section 3686 and 16 educational points; AND,

Experience: Fours years of experience performing the functions of a wastewater treatment plant operator; OR,

(C) Experience: Three years of experience performing the functions of a wastewater treatment plant operator while certified as a Grade II operator.

(4) Grade IV:

(A) Education: A bachelor's degree with a major related to wastewater treatment and which includes a minimum of 30 semester units of basic science courses; AND,

Experience: Two years of experience performing the functions of a wastewater treatment plant operator; OR,

(B) Education: An associate degree or completion of 60 semester units at a college or university, either of which includes 15 semester units of basic science courses; AND,

Experience: Fours years of experience performing the functions of a wastewater treatment plant operator; OR,

(C) Education: Graduation from high school or equivalent as specified in Section 3686 and 32 educational points; AND,

Experience: Six years of experience performing the functions of a wastewater treatment plant operator; OR,

(D) Experience: Fours years of experience performing the functions of a wastewater treatment plant operator while certified as a Grade III operator.

(5) Grade V:

(A) Credential: A valid license as a civil or chemical engineer issued by the California Department of Consumer Affairs, Board of Registration for Professional Engineers and Land Surveyors; AND,

Experience: Four years of experience performing the functions of a wastewater treatment plant operator; OR,

(B) Education: A bachelor's degree with a major related to wastewater treatment and which includes a minimum of 30 semester units of basic science courses; AND,

Experience: Five years of experience performing the functions of a wastewater treatment plant operator; OR,

(C) Education: An associate degree or completion of 60 semester units at a college or university, either of which includes 15 semester units of basic science courses; AND,

Experience: Six years of experience performing the functions of a wastewater treatment plant operator; OR,

(D) Education: Graduation from high school or equivalent as specified in Section 3686 and 48 educational points; AND,

Experience: Ten years of experience performing the functions of a wastewater treatment plant operator; OR,

(E) Experience: Six years of experience performing the functions of a wastewater treatment plant operator while certified as a Grade IV operator.

§ 3684. Experience Credits.

(a) Applicants may be credited with one year of experience if they have had two or more years of full-time experience in the operation of a water treatment plant regulated by the California Department of Health Services or by a government agency in another state and while in possession of a valid water treatment plant operator certificate, if:

(1) the water treatment plant where the experience was gained uses two or more of the following processes: coagulation, sedimentation, aeration, filtration, oxidation. or disinfection; and,

(2) at the time of their application for certification, they have had one year of full-time experience in the operation of a wastewater treatment plant.

(b) Applicants, who have one year of experience in the operation of a wastewater treatment plant may substitute 16 educational points for one year of experience. Those educational points used to substitute for experience at one grade may not be used again to substitute for experience at another grade. The substitution may not be made by applicants qualifying under the provisions of Sections 3683 (c) (1) and 3683 (c) (4) (A).

§ 3685. Educational Points.

(a) Pursuant to the provisions of this article, applicants may be required to obtain educational points to qualify for certification. Educational points may be earned as follows:

(1) One completed three-unit semester course which is directly related to wastewater treatment and which is part of the curriculum of an accredited college or university is equal to eight educational points. Completed courses which result in more or less than three units or which are quarter units rather than semester units will be credited with educational points on a proportional basis.

(2) All other courses will be assigned educational points at the rate of one educational point per 10 hours of completed classroom instruction. Subjects which are directly related to wastewater treatment shall be assigned full credit for educational points. Subjects which are indirectly related shall be given one half credit.

(3) One Continuing Education Unit which is directly related to wastewater treatment is equal to one educational point.

(b) Applicants may not substitute experience for educational points.

§ 3686. High School Equivalence.

High school equivalence may be obtained by substituting six educational points for each uncompleted year of high school through grade 12 or by passing an approved General Educational Development test, or by obtaining a Certificate of Proficiency issued by the State Board of Education in accordance with Section 48412 of the Education Code.

Article 5. Examination and Certification of Wastewater Treatment Plant Operators

§ 3700. Application for Examination.

(a) Content - An application for examination shall contain, but not be limited to the following information:

(1) the applicant's full name, mailing address, work telephone number, and date of birth;

(2) information regarding former employment, current operator status, other operator certificates held in California or other states, engineering registrations held, and education and experience gained;

(3) if employed as an operator, the original signature of the chief plant operator, verifying the applicant's experience as an operator;

(4) the applicant's original signature;

(5) copies of college transcripts, grade cards, or certificates of completion for courses related to wastewater treatment to verify completion of education requirements;

(6) any additional information, evidence, statements, or documents to support the application for examination as requested by the division; and,

(7) the application fee and examination fee as prescribed by Article 8.

(b) Submittal - Applications for examination shall be postmarked by the final filing date as specified in this subsection. Applications postmarked after the final filing date shall be held over and processed for the next scheduled examination.

Date of Examination	Final Filing Date
April 10, 1999	February 1, 1999
October 2, 1999	August 1, 1999
April 1, 2000	February 1, 2000
October 7, 2000	August 1, 2000
April 7, 2001	February 1, 2001
October 6, 2001	August 1, 2001
April 6, 2002	February 1, 2002
October 5, 2002	August 1, 2002
April 5, 2003	February 1, 2003
October 4, 2003	August 1, 2003
April 3, 2004	February 1, 2004
October 2, 2004	August 1, 2004

(c) Division review - The division shall review applications and supporting documents to determine eligibility for examination.

Unless otherwise specified by this chapter, division evaluation of experience gained in California will be based on work performed while employed in a position which requires operator certification in California. Evaluation of experience gained outside California will be based on work performed while employed in a position comparable to one which requires operator certification in California. Division evaluation of experience will be based on the actual work performed by the applicant without respect to job titles assigned by the employing agencies.

(d) Notice - The division shall notify applicants in writing within 30 calendar days of receipt of an application whether it is complete or deficient. If there is a deficiency, the division shall identify the deficiency and inform the applicant in writing of the specific information required.

(e) Deficient applications - Applications which do not contain proof of completion of education requirements and the correct application and examination fees shall be considered deficient applications. Deficient applications shall not be processed for the current examination. The applicant shall be required to reapply to take a subsequent examination.

(f) Processing times - the division's median, minimum, and maximum processing times for applications for examination between September 1989 and September 1991 were:

Median - 30 days
Minimum - 3 days
Maximum - 112 days

§ 3701. Examinations.

(a) Written examinations for each wastewater treatment plant operator grade shall contain questions to determine applicants' knowledge of wastewater treatment plant operation. Mathematical problems related to process control and evaluation will be included. Each higher grade examination will require progressively more detailed knowledge of the subject matter.

(b) Content by grade

(l) Grade I examinations shall contain questions regarding knowledge of basic safety practices and hazards related to the operation of wastewater treatment plants; wastewater constituents including simple and routine sampling and analysis procedures; procedures involved in operating and maintaining preliminary and primary treatment facilities including sludge digestion and disinfection; specifics regarding the operation of stabilization ponds; and state regulations regarding the classification of wastewater treatment plants and operator certification.

(2) Grade II examinations shall contain questions regarding knowledge of those components of the Grade I examination as prescribed in (1) above; commonly used processes for preliminary, primary, and secondary treatment including disinfection, sludge handling, and digestion; routine sampling and analysis procedures for evaluation of process and overall plant performance; and basic supervision responsibilities.

(3) Grade III examinations shall contain questions regarding knowledge of those components of the Grade I and II examinations as prescribed in (1) and (2) above; limitations, controls, and performance calculations for primary and secondary treatment and sludge-handling processes; basic principles of tertiary treatment processes; state regulations regarding water recycling; and public health issues.

(4) Grade IV examinations shall contain questions regarding knowledge of those components of the Grade I, II. and III examinations as prescribed in (1), (2), and (3) above; limitations, controls, and performance calculations for tertiary treatment processes; wastewater treatment requirements and practices for water reclamation and reuse; supervision and management responsibilities including energy management, safety program development and control, and operator training and budget development and control.

(5) Grade V examinations shall contain questions regarding knowledge of those components of the Grades I, II, III, and IV examinations as prescribed in (1), (2), (3), and (4) above.

(c) Frequency - A minimum of two examinations shall be given each year.

(d) Dishonest conduct - An applicant who engages in dishonest conduct during an examination shall have his or her examination materials confiscated, shall not have the examination graded, and shall be denied the opportunity to take the next scheduled examination. The application and examination fees paid by the applicant shall not be refunded. The applicant also may be subject to administrative sanctions pursuant to Article 7 and Section 13627 of the Water Code.

(e) Confidentiality of examination questions - Examination questions are confidential. Any person who copies questions or removes all or part of any examination from the examination room or who conveys or exposes all or part of any examination for an unauthorized use may be denied certification pursuant to the provisions of Article 7. The applicant also may be subject to administrative sanctions pursuant to Article 7 and Section 13627 of the Water Code.

(f) Notification of results - Within 90 calendar days after an examination, the division shall notify applicants in writing whether they have passed or failed the examination.

(1) If an applicant fails the examination, he or she may be eligible to take a subsequent examination upon request and upon submitting an application and examination fee prescribed by Article 8. The request for re-examination must be postmarked by the final filing date set forth in Section 3700.

(2) An applicant who passes the examination and who had completed the education and experience requirements before taking the examination shall be instructed in the notice of examination results to remit the applicable certification fee. Within 30 calendar days of receiving the certification fee, the division shall issue the operator certificate.

(3) An applicant who passes the examination before completing the experience requirements shall apply for certification upon completing the requirements in accordance with the provisions of Section 3702.

(g) Expiration of examination results - Examination results are valid for four years from June 30 or December 31 following the examination (whichever date is sooner).

§ 3702. Application for Certification.

(a) If an applicant is qualified for certification at the time of the examination, and has documented such qualification in the application for examination, no application for certification is required. However, if an applicant must gain experience after the final filing date for the examination before being eligible for certification, an application for certification is required in accordance with the provisions of this section.

(b) An application for certification shall include but not be limited to:

(1) the applicant's full name, mailing address, work telephone number, and date of birth;

(2) all employment, education, and experience information not reported on the application for examination, including current employment and current operator status;

(3) the date when the applicant passed the examination;

(4) information regarding current employment and current operator status;

(5) the applicant's original signature;

(6) if employed at a wastewater treatment plant, the chief plant operator's original signature; AND,

(7) the certification fee prescribed by Article 8.

§ 3702.1. Issuance of Certificates.

(a) Operator certificates issued by the division shall contain, but not be limited to the following:

(1) The operator's name and grade;

(2) The certificate number;

(3) The issue date of the certificate;

(4) The State Water Board seal;

(5) The name, "State Water Resources Control Board"; AND,

(6) The signature of a board member or board member designee.

(b) Upon successful completion of the application and examination process and within 30 calendar days of payment of the certification fee prescribed by Article 8, the board shall issue an operator certificate or operator-in-training certificate.

(c) The issue date of a certificate shall be the date of receipt of an application for examination and certification which meets the requirements of these regulations.

(d) The division may refuse to issue a certificate if it has determined that the applicant has committed any act which is grounds for disciplinary action as specified in section 3710.

§ 3702.2. Application for Certificate Renewal.

(a) Renewal dates - Except as specified in Subsection 3709 (d), operator certificates are renewable every two years. Certificates issued for applications with a postmark between May 1 and October 31 shall have a renewal date of June 30. Certificates issued for applications with a postmark between November 1 and April 30 shall have a renewal date of December 31.

(b) Division notice - At least 60 calendar days prior to expiration of an operator certificate, the division shall provide written notification of the expiration date to the certificate holder at his or her address of record. Failure to receive a notice of renewal does not relieve the certificate holder from the responsibility of renewing a certificate on or before the expiration date.

(c) Content - An application for renewal shall include, but not be limited to:

(1) the applicant's name, mailing address, grade, certificate number, and classification or title;

(2) if employed by a wastewater treatment plant as an operator, the name, telephone number, and mailing address of the wastewater treatment plant where employed and the name of the supervisor;

(3) the renewal fee prescribed by Article 8.

(d) Submittal - A certificate holder who wishes to renew a certificate shall submit to the division a completed application as specified in subsection (c) of this section. The application shall be postmarked no later than the expiration date on the certificate.

(e) Division review - Within 15 calendar days of receipt of an application for renewal, the division shall notify the certificate holder if the application is deficient. If there is a deficiency, the division shall inform the certificate holder by telephone or letter of the specific information necessary to complete the application for renewal. Deficiencies will not prevent the Office of Operator Certification from issuing a new certificate if the application and fee are postmarked by the expiration date of the certificate.

§ 3702.3. Issuance of Renewal Certificate.

An operator certificate shall indicate the first expiration date of the certificate. Thereafter, a renewal certificate shall be issued in accordance with the provisions of Section 3702.2 and this section.

(a) Within 30 calendar days of receipt of a completed application for renewal, the division shall issue a renewal certificate or inform the applicant of the reason the certificate will not be issued.

(b) The renewal certificate shall not be issued until any unpaid fees have been paid.

(c) The division may refuse to renew a certificate if it has determined that the applicant has operated a wastewater treatment plant while the operator certificate was expired or at a grade for which the applicant was not certified or that the applicant has committed any act which is grounds for disciplinary action.

(d) A renewal certificate shall contain, but not be limited to the following:

(1) The certificate holder's name and address;

(2) The certificate number and grade;

(3) The expiration date of the certificate.

§ 3702.4. Reinstatement.

(a) An expired operator certificate may be reinstated within one year following the expiration of the certificate, provided the holder of the expired certificate applies for renewal and reinstatement as prescribed by Subsection (b) of this section. A certificate which has been expired for more than one year shall not be reinstated. If the applicant wishes to become certified again, he or she must meet all requirements for an initial operator certificate.

(b) The application for reinstatement shall be considered complete when it includes the renewal and reinstatement fees prescribed by Article 8 and all the information required to renew the certificate as prescribed by Section 3702.2.

(c) The division may refuse to reinstate a certificate if it has determined that the applicant has operated a wastewater treatment plant while his or her certificate was expired or at a grade for which he or she was not certified or has committed any act which is grounds for disciplinary action.

(d) The expiration date of a reinstated certificate shall remain the same as if the certificate had not expired.

§ 3702.5. Replacement.

A certificate which has been lost, stolen, or destroyed may be replaced by the division provided the operator or operator-in-training submits a signed statement explaining the circumstances of the loss, theft or destruction of the certificate. A replacement fee prescribed by Article 8 must be submitted with the signed statement.

§ 3703. Posting Certificates.

Certified operators and operators-in-training shall display their valid certificates at the wastewater treatment plant where employed.

§ 3704. Reciprocity with Other States.

(a) The division may issue Grades I and II operator certificates by reciprocity in accordance with the procedures set forth in Article 5. No examination or examination fee will be required of persons who hold comparable certifications in other states, provided:

(1) the experience and education requirements of that state are comparable to the division's requirements;

(2) the applicant has passed a written examination within the preceding four years in another state that is comparable to the examination given by the division;

(3) reciprocal privileges are granted by the other state to operators certified by the division;

(4) the applicant completes an application for operator certification and meets the minimum qualifications for certification in California; AND,

(5) the applicant pays the application, certification, and reciprocity fees prescribed by Article 8.

(b) The division may refuse to issue an operator's certificate by reciprocity if it has determined that the applicant's certificate to operate a wastewater treatment plant has been revoked or suspended in another state, or if the applicant has been otherwise disciplined in another state for any of the violations set forth in Section 3710.

§ 3707. Employment of an Operator-in-Training.

An agency may employ a person to act in the capacity of any grade of certified operator, provided the person is certified as an operator-in-training, is under the direct supervision of a certified operator of the same or higher grade, and is performing the duties of the grade of operator for which the certificate was issued.

§ 3708. Application for Operator-in-Training Examination and Certification.

(a) Persons may apply for examination and operator-in-training certification in accordance with the procedures set forth in Article 5.

(b) Applicants for Grade I operator-in-training certification may, but are not required to, pass the Grade I examination prior to issuance of the Grade I operator-in-training certificate.

(c) Persons may apply for operator-in-training certification at the Grades II, III, IV, and V levels if they:

(1) meet the minimum education requirements and could meet the minimum experience requirements for the grade for which they are applying as prescribed in Article 4 within four years of June 1 or December 1 following the examination (whichever date is sooner); and,

(2) pass the examination at the grade for which they are applying; and,

(3) make application for examination and operator-in-training certification in accordance with the procedures set forth in Sections 3700, 3701, and 3702 of Article 5; and,

(4) supply the name and telephone number of the supervising operator.

(d) Applications for operator-in-training certification at any grade must be signed by the chief plant operator of the plant where the operator-in-training is to be employed.

Article 6. Operators-in-Training

§ 3709. Issuance, Renewal, and Replacement of Operator-in-Training Certificates.

(a) Operator-in-training certificates shall be issued in the name of the applicant to the mailing address of the employing wastewater treatment plant. Operator-in-training certificates are valid only while the operator is employed at the plant for which the certificate was issued. The expiration date of the operator-in-training certificate shall not exceed the expiration date of the applicant's examination results.

(b) Operator-in-training certificates issued by the division shall contain but not be limited to the following:

(1) The name and grade of the operator-in-training;

(2) The issue date of the certificate; and,

(3) The name of the wastewater treatment plant at which the operator-in-training is to be employed.

(c) Operator-in-training certificates shall be issued, renewed, reinstated, and replaced in accordance with the provisions of Article 5 unless otherwise specified in this article.

(d) Operator-in-training certificates at the Grade I level are valid for up to two years. If the Grade I operator passes the Grade I examination before the expiration of the Grade I operator-in-training certificate, that certificate may be renewed one time for two years. If the Grade I operator-in-training does not pass the Grade I examination before the expiration of the Grade I operator-in-training certificate, the Grade I operator-in-training certificate shall not be renewed. Operator-in-training certificates at the Grades II, III, IV, and V levels are valid for up to two years and may be renewed once pursuant to the provisions of Section 3702.2.

(e) A person certified as an operator-in-training at any grade must complete the education and experience requirements and obtain an operator certificate at that grade or higher before being eligible to apply for an operator-in-training certificate at a higher grade.

Article 7. Prohibited Acts, Disciplinary Action, and Appeal Process

§ 3710. Grounds for Discipline.

(a) A certified operator or operator-in-training may be subject to administrative sanctions including reprimand or denial, suspension, probation, or revocation of a certificate pursuant to Section 13627 of the Water Code for performing, or allowing or causing another to perform, any of the following acts:

(1) willfully or negligently violating, causing, or allowing violation of these regulations;

(2) without regard to intent or negligence, operating or allowing the operation of a wastewater treatment plant by a person who is not certified at the grade necessary for the position or whose certificate has expired;

(3) submitting false or misleading information on any document provided to the division including applications for examination, certification, or renewal;

(4) engaging in dishonest conduct during an examination, or violating confidentiality of examination questions;

(5) using fraud or deception in the course of employment as an operator;

(6) failing to use care or good judgment in the course of employment as an operator or failing to apply knowledge or ability in the performance of duties;

(7) willfully or negligently causing or violating or allowing the violation of appropriate waste discharge requirements as prescribed by Article 4 of Chapter 4 of Division 7 of the Water Code, or the violation of Section 402 of the Clean Water Act which contains the provisions of the National Pollutant Discharge Elimination System permit.

(b) A chief plant operator may be subject to disciplinary actions specified in subsection (a) for willfully or negligently failing to ensure that an operator-in-training is directly supervised as required by section 3707.

§ 3711. Appeals.

Applicants or certificate holders may appeal discretionary decisions made by the Office of Operator Certification regarding denial of an application, the results of an examination, or disciplinary action taken. Appeals must be in writing and postmarked within 30 calendar days of receipt of the Office of Operator Certification decision. Appellants must include with their requests, all documents and evidence to be considered by division staff in its review of the appeal.

§ 3712. Action by Division.

After consideration of an appeal and within 30 calendar days of receipt of the appeal, division staff shall make a recommendation to the division chief. The division chief shall review the evidence and the division recommendation and shall make a determination within 30 calendar days of receipt of the recommendation. The determination shall be in writing, labeled as the division chief's determination, and shall inform the appellant that the determination is final and conclusive unless the appellant petitions the board for review in accordance with the provisions of Section 3713.

§ 3713. Petition for Review by Board.

(a) An appellant who wishes to appeal the division chief's determination may petition the board for a review. The petition must be in writing and postmarked no later than 30 calendar days after the date of receipt of the determination by the appellant.

(b) A petition for review by the board shall contain:

(1) the name and address of the appellant;

(2) the appellant's argument against the Office of Operator Certification decision and the division chief's determination;

(3) the specific action which the appellant seeks from the board.

(c) The appellant may make a written request for a hearing for the purpose of presenting evidence not considered by the division or for presenting oral arguments or both. Any request to present evidence not provided to the division must include a statement as to why the evidence was not presented to the division.

§ 3714. Defective Petitions.

Within 30 calendar days of receipt by the board of a petition which does not comply with the provisions of Section 3713, the board shall notify the appellant in writing in what respect the petition is defective and that an amended petition must be postmarked within 30 calendar days of receipt of notice of the deficiency. If a properly amended petition is not postmarked within 30 calendar days, the petition shall be dismissed unless the appellant can show good cause for an extension of time.

§ 3715. Action by Board.

(a) After consideration of the appellant's petition and the division chief's determination, the board shall:

(1) refuse to consider the petition if it does not meet the requirements of Sections 3713 and 3714; or,

(2) deny the appellant's petition upon a finding that the division chief's determination was proper; or,

(3) set aside or modify the division chief's determination; or,

(4) direct the division to take other appropriate action.

(b) Before taking final action, the board may, in its discretion, hold a hearing for the purpose of oral argument or receipt of additional evidence or both, or the board may provide for an informal meeting between the appellant, division staff, and one or more members of the board and other persons as the board deems suitable for the purpose of attempting to resolve the dispute between the appellant and the division.

(c) If a hearing is scheduled, the board shall mail a notice to the appellant indicating the date, time, and place of the hearing and of the issues to be considered. The hearing shall be conducted in a manner deemed most suitable for securing all relevant evidence without unnecessary delay.

§ 3716. Appeal of Division Processing Times.

(a) The Office of Operator Certification shall process applications for examination and certification within the time limits prescribed by this chapter. Persons whose applications for examination or certification have not been processed within the time limits prescribed by these regulations, may appeal to the board for a refund of fees in accordance with the provisions of Section 3711. If the board finds that the time limits have not been met, and the Office of Operator Certification has not shown good cause why the time limits have not been met, the board shall direct the Office of Operator Certification to reimburse all fees paid by the appellant in connection with the pending application for examination or certification.

(b) The Office of Operator Certification shall have good cause for exceeding the time limits when:

(1) the number of applications to be processed exceeds by 15 percent the number processed in the same calendar quarter of the preceding year.

(2) the Office of Operator Certification must rely on another public or private entity for all or part of the processing and delay is caused by the other entity.

(3) the delay is caused by a delay or omission of the applicant.

Article 8. Fees

§ 3717. Operator and Operator-In-Training Fees.

Except as provided by Section 3716, application fees are nonrefundable.

(a) Application fee for certification as an operator-in-training:

Grade I:	$ 95
Grade II:	$130
Grade III:	$170
Grade IV:	$190
Grade V:	$190

(b) Application fee for an examination:

Grade I:	$40
Grade II:	$50
Grade III:	$70
Grade IV:	$80
Grade V:	$80

(c) Examination fees are:

Grade I:	$ 40
Grade II:	$ 50
Grade III:	$125
Grade IV:	$170
Grade V:	$170

(d) Operator certification fees are:

Grade I:	$ 95
Grade II:	$130
Grade III:	$170
Grade IV:	$190
Grade V:	$190

(e) Operator and operator-in-training certification renewal fees are:

Grade I:	$ 95
Grade II:	$130
Grade III:	$170
Grade IV:	$190
Grade V:	$190

(f) Reinstatement fee - The reinstatement fee for all grades is $50.

(g) Replacement fee - The fee for replacing a lost, damaged or destroyed certificate is $20.

(h) Reciprocal fee - In addition to the application and certification fees, applicants for reciprocal certification shall pay a fee of $50 to cover the cost of verifying and evaluating out-of-state experience and reviewing out-of-state examinations.

Article 9. Advisory Committee

§ 3718. Advisory Committee Membership and Responsibilities.

(a) The advisory committee appointed pursuant to Section 13631 of the Water Code shall consist of nine members. The members of the committee in office on January 1, 1992 shall continue as members of the advisory committee, and their terms shall expire as follows:

(1) On June 30, 1992, one representative from a statewide organization representing local sanitation agencies; one representative from a statewide organization representing wastewater treatment plant operators and supervisors; one representative from a university or state college; and, one representative from an organized labor union which represents wastewater treatment plant operators.

(2) On June 30, 1994, the remaining five members whose terms are scheduled to expire on June 30, 1993.

(b) Thereafter, all members shall serve for a period of four years at which time they shall be eligible for reappointment.

(c) The committee shall meet when necessary to review all proposed regulations and make recommendations to the board prior to adoption of any regulations or changes therein and approve any course for operator training.

Article 10. Wastewater Treatment Plant Contract Operators

§ 3719. Registration Requirement.

No person or entity shall enter a contract to operate a wastewater treatment plant unless that person or entity has been registered by the division as a contract operator. The registration authorizes the contract operator to operate one or more wastewater treatment plants. All wastewater treatment plant operators employed by the contract operator must be certified according to the provisions of this chapter.

§ 3719.10. Term of Registration.

Contract operator registrations shall be valid for a period of one year from the date of issue.

§ 3719.11. Application for Registration.

(a) Application Content - An application for registration as a contract operator shall include but not be limited to:

(1) the name, street address, and telephone number of the person or entity contracting to operate the wastewater treatment plant(s);

(2) the name, address, and telephone number, if known, of the wastewater treatment plant(s) to be operated and the duration of each contract;

(3) the name and grade of each wastewater treatment plant operator employed at the plant(s);

(4) the name and grade of the chief plant operator for each wastewater treatment plant to be operated;

(5) the original signature of the person authorized by the contract operator to enter the contract;

(6) the registration fee as prescribed by section 3719.19.

(b) Application submittal - For persons operating wastewater treatment plants on or before the effective date of these regulations, applications for registration shall be postmarked within 60 calendar days after the effective date of the regulations. If a contract to operate a wastewater treatment plant is entered into after the effective date of these regulations and the contract operator is not already registered, the application for registration shall be submitted and the registration issued before contract operations begin.

(c) Division review of application and notice to applicant - The division shall review applications for registration and shall notify applicants in writing within 30 calendar days of receipt whether the application is deficient. If there is a deficiency, the division shall inform the applicant by telephone or letter of the specific information required to complete the application.

§ 3719.12. Issuance/content of Certificate of Registration.

(a) Content of certificate of registration - The certificate of registration issued by the division shall be in the form of a wall certificate and shall contain, but not be limited to:

(1) the applicant's name, business address, and registration number;

(2) the issue and expiration date of the registration;

(3) the State Water Board seal; AND,

(4) the signature of a State Water Board member or member designee.

(b) Issuance of certificate of registration - Unless otherwise specified in subsection (c), within 30 calendar days of receipt of a complete and approved application for registration, the division shall issue a contract operator certificate of registration. The division shall also issue one wall certificate to the contract operator for each wastewater treatment plant operated. The certificate shall include the name of the wastewater treatment plant to be operated in addition to the items in subsection (a) (1) through (4) above. Certificates are not transferable.

(c) Refusal to issue a certificate of registration - The division may refuse to issue a certificate of registration if it has determined that the applicant has committed any act which is grounds for disciplinary action as specified in section 3710 of Article 7 or section 3719.17 of this article.

§ 3719.13. Renewal of Registration.

(a) Division notice of renewal date - At least 60 calendar days prior to the expiration of a contract operator registration, the division shall provide written notification of the expiration date to the registration holder at his or her address of record. Failure to receive a notice of renewal does not relieve the registration holder from the responsibility of renewing a registration on or before the expiration date.

(b) Content of renewal application - An application for renewal of a contract operator registration shall include, but not be limited to:

(1) the name, business address, telephone number, and registration number of the person or entity contracting to operate the wastewater treatment plant(s);

(2) the name, address, and telephone number of all wastewater treatment plants operated and the duration of each contract;

(3) the name and grade of each wastewater treatment plant operator employed at the plant(s);

(4) the name and grade of the chief plant operator for each wastewater treatment plant to be operated;

(5) the original signature of the person authorized by the contract operator to enter the contract; AND,

(6) the renewal fee as prescribed by section 3719.19.

(c) Renewal application submittal - A registration holder who wishes to renew a registration shall submit to the division a completed application as specified in subsection (b). The application for renewal shall be postmarked no later than 30 calendar days before the expiration of the registration. If the application for renewal is postmarked later than 30 calendar days before expiration, the registration holder shall pay a late fee in an amount prescribed by section 3719.19.

(d) Division review of renewal application and notice to applicant - The division shall review the renewal application and shall notify the registration holder within 30 calendar days whether the application is deficient. If there is a deficiency, the division shall inform the registration holder by telephone or letter of the specific information necessary to complete the application for renewal.

§ 3719.14. Issuance/Content of Renewed Certification of Registration.

(a) Content of renewed certificate of registration - A renewed contract operator registration shall be in the form of a wall certificate and shall contain, but not be limited to:

(1) the registration holder's name, business address, and registration number;

(2) the original issue date and next expiration date of the registration;

(3) the State Water Board seal; AND,

(4) the signature of a State Water Board member or member designee.

(b) Issuance of renewed certificate of registration - Within 30 calendar days of the receipt of a complete and approved renewal application, the division shall issue a certificate of registration or inform the applicant of the reason the certificate will not be issued. The division shall also issue one wall certificate to the contract operator for each wastewater treatment plant operated. The certificate shall include the name of the wastewater treatment plant operated in addition to the items in subsection (a) (1) through (4) above.

(c) Refusal to renew registration - The registration shall not be renewed until any unpaid fees or fines have been paid. The division may refuse to renew a registration if it has determined that the applicant has operated a wastewater treatment plant while the registration was expired or has committed any act which is grounds for disciplinary action pursuant to section 3710 of Article 7 or section 3719.17 of this article.

§ 3719.15. Replacement of Certificate of Registration.

A certificate of registration which has been lost, stolen, or destroyed may be replaced by the division. The replacement fee as prescribed by section 3719.19 must be submitted with a request for replacement.

§ 3719.16. Posting the Certificate of Registration.

A valid, unexpired certificate of registration shall be displayed and clearly visible at each wastewater treatment plant where the registration holder has a contract to provide services.

§ 3719.17. Prohibited Acts and Disciplinary Action.

Grounds for discipline - The State Water Board may refuse to grant, or may suspend or revoke, any registration for good cause, including, but not limited to any of the following reasons:

(a) willfully or negligently violating, causing, or allowing the violation of Articles 1 through 10 of Chapter 26;

(b) without regard to intent or negligence, operating or allowing the operation of a wastewater treatment plant by a person who is not certified at the grade necessary for the position or whose certificate has expired;

(c) operating a wastewater treatment plant without a valid and current registration;

(d) submitting false or misleading information on any document provided to the division including applications for registration or registration renewal;

(e) using fraud or deception in the course of contracting to operate a wastewater treatment plant including, but not limited to, submitting false or misleading documents to the owner(s) of the wastewater treatment plant under contract;

(f) failing to use care or good judgment while operating a wastewater treatment plant;

(g) willfully or negligently causing or violating or allowing the violation of appropriate waste discharge requirements as prescribed by Article 4 of Chapter 4 of Division 7 of the Water Code, or the violation of Section 402 of the Clean Water Act which contains the provisions of the National Pollutant Discharge Elimination System permit.

§ 3719.18. Appeals.

Applicants or registration holders may appeal discretionary decisions made by the division regarding denial of an application for registration, registration renewal, or disciplinary action taken.

Appeals shall be processed in accordance with the provisions of sections 3712 through 3716 of Article 7.

§ 3719.19. Wastewater Treatment Plant Contract Operator Registration Fees.

Contract operator fees are as follows:

(a) Initial Registration Fee - The initial contract operator registration fee is $100. For each operator employed by the contract operator in California, a fee of $25 shall also be paid by the contract operator up to a maximum of $500 in combined contract operator registration fees and employee registration fees.

(b) Renewal Fee - The annual renewal fee is $100 plus $25 for each person employed by the contract operator in California up to a maximum of $500 in combined contract operator fees and employee registration fees.

(c) Late fee - Each contract operator who fails to have a renewal application postmarked at least 30 days before expiration shall pay a late fee of $50 in addition to the renewal fee.

(d) Replacement Fee - The fee for replacing lost, damaged, or destroyed certificates is $30.

APPENDIX V

AGENCY INTERVIEW QUESTIONS, RESPONSES, AND ORGANIZATIONAL CHARTS

APPENDIX V
QUESTIONNAIRE ON ORGANIZATIONAL STRUCTURE OF WASTEWATER COLLECTION AND TREATMENT FACILITIES FOR SELECT AGENCIES

The following Cities/Agencies were interviewed:

Ripon

Escalon (responses not included in technical memorandum because waiting on additional information)

Riverbank

Tuolumne Utility District (TUD)

Groveland

Plymouth

Galt

Calaveras County Water District (CCWD)

East Bay Municipal Utilities District, Pardee Section (EBMUD)

QUESTIONS:

1. How many sewer connections does the City have?
2. Collection System information
    a. How many miles of sewer lines does the City maintain?
3. WWTP information
    a. Is Wastewater staff and Collection staff separated or do they share roles?
        i. How many dedicated to WWTP operations?
    b. What is the WWTP permitted capacity?
    c. What is the average treated influent volume?
4. Do you have treatment and collection operations operating under separate departments or all under same department? (One person oversees both treatment and collections?)
    a. Do you have an organizational chart I may view?
    b. How does the current infrastructure work for the City?
        i. Any issues or improvements?
5. Does City have a Chief Operator that oversees collection and treatment?
6. How many operators for the WWTP?
7. How many maintenance workers are responsible for the Collection System maintenance?
    a. How many dedicated to Collections?
        i. Do they share other roles? (water, storm etc)
        ii. If Roles are shared, what it the designated time spent on the collection system?
8. Dual certified in water and wastewater for any of the operators?
9. Do you have any issues on the current structure of your Wastewater treatment and collections program?

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Ripon (spoke to Ted Johnston, Public Works Director on 12/7/11 209-599-2151)

1. City of Ripon has a population of 14,738. It has approximately 4,800 sewer connections. From Mr. Ted Johnston's comments, the City of Ripon is a small town that only has 28 people under the Public Works Departments. Most of these employees have multiple hats and will work with each other to produce an efficient outcome. If the duties of the Wastewater Treatment plant are fulfilled and there is a need for assistance in the Parks/Landscaping maintenance then crew will move efforts to that area.
2. City of Ripon Public Works is divided into 8 divisions; one of those divisions operates the Treatment Plant and Sewer Collection System.
    a. Mr. Johnston described their WWTP as a simple primary filtration system that has worked well and requires minimal operator attendance and maintenance. Their WWTP does not require 24/7 operator attendance. Currently they have five certified treatment plant operators but only 1 is the main operator. If there is an emergency the other crewmembers are knowledgeable to help in maintaining the plant. This has only happened in rare occasions.
    b. The Wastewater Treatment and Collection has 5 certified operators. They are responsible for maintaining 40 miles of sanitary sewer lines, 30 miles of storm lines, 6 wastewater pump stations and 3 storm water pump stations. None of these require any of their crew to be out in the field more than a few hours a day. Routine Collection system maintenance is done monthly; he feels that because of this, small emergency collection system issues are very rare.
    c. They are permitted to treat up to 1.8 MGD of wastewater and currently are treating 1.2 MGD.
        i. The main treatment plant operator spends about 1-2 hours at the plant per day collecting his samples and daily activities. After he is done he will usually help the crew in other efforts if time permits.
3. Organization chart is not detailed, but is included with this research.
    a. Treatment plant is run by 1 main operator.
        i. Operator reports directly to PW Works Director if there are any issues or necessities.
    b. Collection system is overseen by usually a small crew.
    c. Treatment Plant and Collection system is not 'manned' 24/7, but there is an emergency number to call if residents have issues and the operator and/or crew on call will decide if it's an emergency.
    d. Mr. Johnston serves as the 'Chief Operator' of the Wastewater Treatment System, he oversees any needs of the Treatment or Collection system, but the main operator concentrates on the plants day to day needs.

4. There is one main certified treatment plant operator, but four other crew members have expressed desire to get certified and the City has supported them. They currently have a total of 5 certified operators, but only one is needed for their plant. The City takes advantage of this, just in case there might be a need for extra assistance in times of emergencies.
5. Mr. Johnston commented that he feels that the current structure works well with their small city and simple system. He did comment that they fear regulators will require them to upgrade their treatment system which will require more manpower and currently they cannot afford additional staffing on their budget.

Escalon (spoke to Dave Ruby, Engineering Technician III on 12/6/11, more details on plant/collection information can be given by John Welch Chief Plant Operator at 209-838-4009)

1. City of Escalon has a population of approximately 7,160. It has 2,394 residential and commercial wastewater connections.
    a. City of Escalon has two separate sewer collection systems that are treated separately.
        i. Domestic: that serves all residential and commercial properties. Sewer trunk is a 14" VCP that flows to the WWTP domestic side. The majority of the domestic sewer line ranges from 6"-14" VCP, PVC and ACP.
        ii. Industrial: serves several industrial plants along the McHenry Avenue industrial waste area. During industrial off season the industrial sewer collection system is used to collect the City's storm run-off. The industrial line is an 18" pressure line.
2. The City wastewater treatment and collection operate under the Public Works Department. One full time operator oversees plant and collection system. Chief operator is John Welch.
    a. Chief Operator John Welch is at the treatment plant full time. If there are any issues with the plant that require assistance one other crewmember is pulled from the general staff.
    b. Crew maintains approximately 26 miles of domestic sewer lines.
        i. Domestic Sewer Collection System has 6 lift stations.
    c. WWTP can treat up to 0.90 MGD according to WDRs order No. 2006-0003-DWQ, currently they treat approximately 0.65MGD
3. Organizational chart is not available. But Mr. Ruby did state that Chief Operator reports to the Public Works Director and the Public Works Director reports directly the City Manager.
    a. Any issues in the treatment plan or collection system, then one crewmember that are available will assist in the treatment or collection system.

b. There are currently a staff of eight Public Works employees, which include the Chief Operator, Senior Eng Tech, PW director, Admin, and crew members.

i. Crewmembers are also responsible for other City needs such as Park Maintenance, Seasonal décor on public areas, street sweeping etc.

4. 1 certified operators operate the treatment system full time. There are approximately 3 maintenance crewmembers available that maintain the collection system 24 hours a day/7 days a week.

a. WWTP and Collection system both receive routine maintenance which has minimized any major surprises in both systems.

b. WWTP and Collection system is fairly small and easy to manage with minimal hands on efforts. During peak industrial season is when you see a propensity of minor breakdowns such as aerator replacement.

i. Mr. Ruby did state that during peak industrial season is when operator and crewmembers are extremely busy keeping an eye on the WWTP and Collection system due to high flows of the industrial lines.

5. Mr. Ruby believes that the current operating structure works well for their small City. Their WWTP and Collection system is fairly small compared to other larger cities that require a fleet of staff to operate a treatment system and collection system. The City of Escalon is fairly flat full of rich farming soils and most sewer lines run with minimal slope.

a. Only issue is that domestic sewer lines are fairly small and in some areas a steeper slope is necessary to maintain adequate flows and clean sewer lines.

City of Riverbank (spoke to Darin Smallen, WWTP Manager/Chief Plant Operator on 12/8/11 209-869-7134 and spoke to Darrell Green, Collections on 12/13/11 209-869-7128/ 209-968-4685, also reviewed Finance Annual report that is online)

1. The City of Riverbank has a population of approximately 23,000. It has approximately 8,000 sewer connections.
2. The City wastewater treatment plant and collection system are operated under the Community Development Services. Darin Smallen, the WWTP Supervisor reports directly to the Development Services Director (PW Director).
   a. The WWTP is operated by Darin Smallen, he is the Chief Operator at the plant.
      i. Plant has a permitted treatment capacity of 7.9 MGD and currently treats 2 MGD.
      ii. The WWTP has a total of three operators including Darin.
      iii. According to Darin, three is the minimal number needed for the plant to run efficiently and with minimal headaches. In the past, they used to operate with only two operators, but relieving vacation, holidays and sick times proved problematic. They currently have 3 operators on staff and this covers one person to relieve for vacations, sick days and on-call rotations.

iv. Ideally, an additional operator would add a degree of cushion, but at this time the City does not plan to budget for any additional operators.
v. Current organizational structure works well for the plant, but three operators is the absolute minimum to maintain proper redundancy.

b. The Collection system is overseen by Darrell Green, he is the Streets/Sewer Supervisor. Crew maintains both the sewer mains and laterals.
    i. The Collection system has a total of seven in the crew including Darrell Green. And they are responsible for the maintenance of 100 miles of sewer collection pipeline.
    ii. Crew is also responsible for Storm, Lift Stations, Streets.

3. Organizational chart is not available, but the treatment plant only has 3 operators and the Streets supervisor, Darrell Green has a crew of six (7 including himself). The Public Works Streets/Collections Supervisor Darrell Green typically reports to the Deputy Public Works Director—but currently that position is vacant, so he reports to the Public Works Director.
4. 3 certified operators operate the WW treatment system.
    a. All three treatment operators are dual certified, but not because of requirements but because of leverage. All three operators have multiple certifications including, Water Treatment, Collection and pesticide applicator (for keeping weeds under control at the plant).
5. Water Treatment and Distribution is overseen by the Domestic Water Supervisor under Development Services. The Domestic Water Supervisor report to the Public Works Director.
    a. Eric Tackett is the Domestic Water Supervisor and runs the water treatment/distribution system for Riverbank. He works under Development Services (Public Works) and reports to the Public Works Director.

Tuolumne Utility District (spoke to David Boatright 12/13/11 209-532-5536 x 550)

1. Tuolumne Utilities District (TUD) is a water and wastewater utility serving nearly 44,000 residents in Tuolumne County. TUD wastewater system serves approximately 12,030 single family equivalent sewer connections and treats a combination of 1.8 MGD of sewage.
    a. TUD operates two WWTFs
        i. Approximately 0.15 mgd at the Twain Harte WWTF
        ii. Approximately 1.6 mgd at the Sonora Regional WWTF
    b. TUD serves the Sonora, Twain Harte, Columbia, and Jamestown areas.
    c. Wastewater Collection and treatment run under one group within the Operations Department. Potable water runs under a separate group.
2. The Tuolumne Utilities maintains 140 miles of SS lines within their collection system. The collections system is operated under the Operations Division. The Wastewater Superintendent is responsible for the efficient and reliable service of the TUD Wastewater Treatment System and Collection system. The sewage collection area is bounded by Columbia and Twain Harte to the north and East Sonora to the south.
    a. TUD maintains the collection area with the exception of the Twain Harte collection area that is owned by the Twain Harte Community Service District.
        i. TUD maintains the main trunk line only for the Twain Harte area.

ii. TUD maintains approximately 140 miles of gravity feed and force main sewer lines and 29 lift stations throughout the district.
iii. The Collection System spans a 27 mile radius.
iv. Any construction maintenance such as cutting through asphalt to get to repair a sewer line is done under the Maintenance/Construction Department; they have separate teams for wastewater and water.

b. The WW Superintendent, David Boatright, has a staff of 8.
   i. There are three WWTP operators that oversee the treatment plants (Sonora Regional and Twain Harte). The three divide their time with some overlap. There is seven day coverage with overlaps in the middle of the week for routine maintenance procedures.
   ii. There are five maintenance workers that oversee the collection system.

3. An organization chart does not exist for the department, but briefly chain of command boils to this:
   a. Operators and Collection System teams have their daily duties and routines and report to the Wastewater Chief Operator, David Boatright.
   b. Wastewater Superintendent/Chief Operator, David Boatright, oversees Treatment and Collection teams and has daily regulatory compliance duties. He reports to the Operations Manager, Leonard Mauro.
   c. The Operations Manager, Leonard Mauro oversees Wastewater, Water, Maintenance/Construction, and Raw water distribution. He reports to the General Manager, Pete Kampa.
4. Three certified operators operate the treatment system. The City maintenance crew has a maintenance schedule to service all mains. Currently there are six in the City collection system maintenance crew.
5. Overall Mr. Boatright feels that they run an efficient operation. They keep in touch with other departments on any issues. They feel that their staffing levels are optimum and cannot function as efficiently if they had less staffing.
   a. Mr. Boatright as well as other staff attends general meetings with Jamestown Sanitation District and work closely together to better improve services.

Plymouth (discussed with Richard Prima via email, 12/12/11 richardcprima@gmail.com)

1. The City of Plymouth serves a population of 1,000. It has approximately 550 sewer connections.
2. The Plymouth Public Works department is significantly small they operate both the sewer collection and treatment systems. Maintenance crews are responsible for maintaining approximately 7 miles of sewer collection lines.
   a. The WWTP permitted capacity is 0.185 MGD. Average daily flow is 0.14 MGD.
3. There is minimal full time staff at the Plymouth Public Works Department. They have a Public Works Director, who only works half time.
   a. There are two full-time maintenance workers and one part-time maintenance worker that are responsible for the maintenance of the collection system. They split their time as needed; they handle water distribution, sewer collection, streets and buildings.

b. The WWTP has one full time operator and two part-time operators.

   i. Mr. Prima believes that one operator is pursuing a dual certification of wastewater and water.

c. For the size of Plymouth and the amount of area covered, the staff is sufficient for collections, but since they split their time between other duties sometimes they feel a little shorthanded when other areas such as Water distribution needs more staff. Selby Beck, can provide more insight if needed. As with any system, more staff would be useful.

4. To Mr. Prima's knowledge, there is no 'Chief Operator' per say but Selby Beck does oversee collections and treatment. He is not a certified operator, but operators and crew do report to him any issues in the day to day operations.

5. The staff designations and allocations of time are typically the following:

Name	Parks/Rec	Water	Sewer	Streets/Roads	Public Works/Public Services (Building maintenance/misc)
James, Maintenance I (full time)	10%	50%	20%	20%	
Mark, Maintenance I (part time)	10%	10%	60%	10%	10%
Greg Wood, Maintenance II (full time)	0%		100%		
Rick Allen, Maintenance Worker II (full time)	10%	30%	20%	30%	10%

Calaveras County Water District (spoke to Bill Perley, Director of Utility Services and Engineering 12/13/11 209-754-3543 billp@ccwd.org)

1. Calaveras County Water District serves a population of approximately 12,586 and has approximately 4,609 sewer connections within their district. The District also owns hydroelectric facilities and generates power. District's service area is the communities of Arnold, Copperopolis, West Point, Jenny Lind and Sheep Ranch.
2. CCWDs collection system spans over 45 square miles.
   a. The district is responsible for maintaining a collection system of approximately 100 miles of gravity lines, 30 miles of force mains, 1,670 maintenance manholes, 49 lift stations.
   b. There are 4609 private sewer service laterals and 638 Septic tanks within the district.
3. CCWD operates twelve WWTP facilities
   a. They all range from 15,000 gpd to 100,000 gpd.
4. The Wastewater Treatment and Water Treatment operate under the Water and Wastewater Operations division.

    a. A Senior Supervisor for the W and WW Operations division oversees the Wastewater treatment and Water treatment operators.
        i. There are approximately 8 plant operators, 4 for Wastewater and 4 for Water.
            1. Some are dually certified however their duties are only within one area, either water or wastewater not both.
        ii. There is one Operator in training for Water and one for Wastewater.
5. The Distribution & collections division maintain and oversee the Water distribution and Wastewater collection systems.
    a. A Senior Supervisor for the Distribution and collections division oversees the distribution and collection systems.
        i. There are approximately 6 distribution workers, 3 meter readers, 5 Collection system workers and 2 mechanics.
6. A senior WWTP operator will serve as the Chief operator.
    a. Four operators share duties to operate and maintain 12 wastewater treatment plants that CCWD operates.
7. Per Mr. Bill Perley, he feels that the Water and Wastewater areas are adequately staffed. However he feels that there is always a need for more budgets to upgrade treatment and collection systems.
    a. The average age of their collection system is around 30 years.

East Bay Municipal Utilities District, Pardee Section (EBMUD) (spoke to John Johnson, Pardee Center on 12/11/11 209-772-8267 and with Anthony Boitano on 12/21/11 at 209-772-8368)

1. Mr. John Johnson is the Assistant Superintendent at Pardee Center and oversees WW and W staff that is stationed at Pardee Center.
    a. The equivalent sewer connections are approximately 761. However this is the total connections from four distinct areas: Camanche South Shore, Camanche North Shore, Pardee Center and Pardee Recreational area.
        i. Some of these areas are seasonal and not open year round.
        ii. Sewer connections include residential, campground restrooms, RV facility hookups.
2. The Pardee Section is a division of EBMUD and operates all 4 recreational areas of EBMUD Pardee Area.
    a. Pardee Section maintains the collection and WWTP operations of Camanche South Shore, North Shore, Pardee Recreational area and Pardee Center.
        i. A total of 4 small WWTPs and 4 WTPs. 11 Sewer lift stations, 25 miles of gravity sewer lines and 3 miles of force mains. The larger plants are Camanche North Shore and South Shore.
            1. CNS has a 0.20 MGD WWTP Facultative Pond System with evaporative ponds.

2. CSS has a 0.70 MGD WWTP Small Packaged system with a Sprayfield disposal.
3. Pardee Recreational area has a spray field disposal.

ii. Collection system

1. Crew maintains a total of 25 miles of sewer lines within EBMUD Pardee Section. All are within a 10 mile radius.
2. 4 distinct sewer collections systems (Camanche South Shore, North Shore, Pardee Recreational area and Pardee Center.
3. Collection system has seasonal visitors and portions of the area are closed from November through March.

3. Organizational structure

a. Mr. Johnson is the Assistant Superintendent for Water Quality at Pardee Reservoir. He oversees the operations of the WWTP, WTP and Collections of the Pardee Area as well as they hydroelectric and water transmission lines at Pardee Lake. He reports to Pat Lydon the Pardee Area Superintendent.

i. Mr. Johnson has a staff of 17 that he manages.

1. 5 operators and 12 maintenance specialists.

a. Anthony Boitano, Water Quality Control Supervisor oversees the staff and daily operations.

2. There are a total of 5 operators that are tri-certified in Wastewater and Water treatment and distribution. These 5 operators share duties in WW and W treatment and share on call duties weekly.

a. The Water/Wastewater treatment operations are done by scheduled staff, all five operators operate the Water and Wastewater Treatment facilities on a full time basis.

b. Roughly operators designate their manpower at approximately 60% in Water Treatment operations and 40% in Wastewater Treatment operations.

3. There are a total of 12 maintenance specialists that oversee any collection issues as well as run preventative maintenance on Collection,WWTP, WTP and Hydropower facility.

a. The Wastewater Collection system has 3 maintenance specialists and one instrumentation technician designated to its operations on a full time basis. They maintain the collection system, ponds, and spray fields.

b. The remaining 9 maintenance specialists split their time in Water Treatment, Hydropower and Raw water Transmission line duties.

b. Mr. Johnson's staff oversees all WWTP and WTP facilities in the Pardee Section which encompass a 10 mi radius.

i. As mentioned all operators are tri-certified in Water Treatment and Wastewater Treatment and Water Distribution.

4. Operations run smoothly as their system has been running the same way for several years.

City of Galt (initial contact with Richard Prima at richardcprima@gmail.com (interim Public Works Director) he referred me to Adin Selby, Streets Superintendent (in charge of the WW Collections 209-366-7293) and with Mark Clarkson, Utilities Superintendent (in charge of the WW Treatment Operations 209-366-7260 contact was between on 12/12-12/14/11)

1. The City of Galt serves a population of approximately 24,000. It has about 7,200 sewer connections. The Wastewater Collection and Treatment operate under separate divisions. Collections are under the Streets Division and Treatment is operated under the Utilities Division.
    a. Adin Selby, Streets Superintendent oversees the Streets Division. Streets Division is responsible for the operation and maintenance of City streets, storm drainage facilities, water distribution system maintenance and repair, and wastewater collection system maintenance and repair. Typical functions are street sweeping, street patching, street sign maintenance (replacement), catch basin repair, storm drain repair, drainage ditch maintenance and repair, water service replacement and repair, and wastewater mainline cleaning and repair.
        i. His division maintains approximately 78 miles of Sewer Collection System
        ii. A senior collections/distribution oversees the Collection and Distribution system, he reports directly to Adin Selby—Streets Superintendent.
        iii. There is a total staff of 13 that are responsible for the collection system maintenance as well as other duties mentioned above.
        iv. They are pursuing dual certification in collection and distribution for many of their crew.
    b. Mark Clarkson, Utilities Superintendent oversees the Utilities Division. The Utilities Division is responsible for the operation and maintenance of the wastewater treatment plant and reclamation facility, collection system lift stations, drinking water wells, and drinking water treatment systems. The treated wastewater is reclaimed for irrigation of crops during the dry season of May through October and discharged to Laguna creek during the wet season of November through April. The Utilities Division is divided into a Wastewater and Water Section. The Division maintains a 24-hour a day, 7 days a week operation.
        i. The Galt WWTP capacity is 3.0 MGD, current daily flow is 2.4 MGD.
        ii. Galt has 12 sewer lift stations and they are maintained by the Utilities Division. The utilities division has a mechanical maintenance technician assigned to the WWTP that maintains all lift stations as well.
        iii. A senior treatment plant superintendent oversees the Wastewater Treatment system.

iv. The Wastewater Treatment Section has 5 operators, 2 maintenance worker and 1 plant superintendent. Plant Superintendent reports to Mark Clarkson, Utilities Superintedent.
v. They are actively pursuing a dual certification program and hope to have the majority of operators dual certified within the next 6 months.

2. Both the Street and Utilities Division report to the Interim Public Works Director. Street Division and Utilities Division each have their own staff and do not work externally. However there are many tasks that staff share roles within their division.
3. Some issues identified within the Collection and Treatment systems include:
    a. The WWTP was recently upgrades to tertiary treatment and UV disinfection and it is under compliance requirements to reduce arsenic and nitrogen by mid-2015. All other systems/treatments are being met. The Utilities Division often times provides support interchangeably to the water and wastewater treatment staff.
    b. Both divisions share roles within their divisions. The Streets Division is responsible for collections, distribution, storm drain, streets and signs & markings, fleet maintenance, parks and building maintenance. As far as Collections, the City of Galt has an aging system. Issues are identified for quarterly cleaning. Fortunately very few overflows occur, but there is an annual CIP program for pipeline replacement and Lift Station improvement. The Street Division has one less staff member than it did 20 years ago. Duties manage to get done, but they feel they are losing the battle of being proactive and are becoming more reactive.
4. The senior collections/distribution supervisor, Steve Hessler oversees Collection and Distribution (as well as storm and other duties) for the City of Galt. He reports to the Streets Superintendent--Adin Selby.

5. The current 13 staff in the Streets Division is responsible for multiple elements, they include: Street Maintenance, Collection System Maintenance, Distribution System Maintenance, Storm Drain, Signs & Markings, Building Maintenance.

6. Fleet Maintenance and Parks have their own designated staff under the Streets Division.

7. The 13 staff divides their time between the six duties above. Man-power varies seasonally. Rain season requires more manpower for Storm and Street maintenance. Typically there is a two-man crew for each every day. With some efforts been switched around during rain events.

8. For the Utilities Division, WWTP is also responsible for 13 lift stations, two maintenance mechanics are under wastewater services, and these mechanics from time to time also assist the Water services when issues arise.

9. *the org chart is not up to date, and was provided mainly for organizational structure, employees have been moved around and some only work seasonally (parks)

Groveland Community Service District (spoke to Aaron Randi on 12/7/11, 12/19 and 12/21/11 209-962-7162 x 24))

1. Please note * the org chart that was provided was from 2010. There has been a few changes since 2010. District Engineer/O&M manager Randy Klaahsen passed away and the position has been filled by someone else. Also a few of the operators have moved around between groups as they increase their certification. There is currently no seasonal staff, it is not needed. There is a staff of 14 in the Operations and Maintenance group (15 if you include the manager Gary Mello that just took position mid-year.

2. The Groveland Community Service District (GCSD) serves a population of 3,400. GCSD currently has approximately 1,600 sewer connections and manages 35 miles of gravity sewer lines, seven miles of force mains and 16 lift stations. It also serves reclaimed water to the Pine Mountain Lake golf course.

3. The wastewater Collections and Water Distribution operate under Collections/Distribution Systems Group and the WTP and WWTP operate under the Water/Wastewater Treatment Operations Group.
    i. Both groups have their own certified staff, but a few select treatment operators do have certifications in collection and distribution are able to assist during emergencies with is rare.

4. Wastewater Collections and Wastewater Treatment are under different groups as stated above. The Water/Wastewater Treatment Operations group has a staff of six, including the Treatment Operations Supervisor/Chief, Aaron Randi. Mr. Randi oversees treatment operations for the GCSD WTP and WWTP. He is considered the Supervisor, Chief and Regulatory Compliance contact.
    ii. Aaron Randi oversees a staff of 5 for Water and Wastewater Treatment Operations. One operator is stationed at the WWTP full time. Three are usually designated to the WTP and one is running around doing miscellaneous duties such as checking on spray fields, golf course irrigation and trucking samples to main office for pick up by courier for outside laboratory testing. Operators work 40 hour shifts and do have one person on-call for both systems, on a rotational basis. All operators possess Water Treatment and Wastewater Treatment certifications. A few possess Water Distribution and Wastewater Collection certification.

5. The WWTP permitted capacity of 0.4MGD with an average dry weather influent of 0.16 MGD. Activated sludge plant with spray field disposal on district lands and the Pine Mountain Lake Golf Course. Spray fields are observed by Treatment operators on a daily basis.

6. The Maintenance Mechanical Systems Group and the Collections/Distribution group is overseen by Mr. Ramon Albanez and he has a staff of eight (including himself).
    a. There are currently two maintenance mechanics and five collection/distribution operators. The Collection/Distribution group is dual certified in Distribution and Collections. All staff (collection/distribution opr. and the maintenance mechanics) spends about 45% of their time on Distribution and 45% on Collection. The

remaining time is used for District ground maintenance and maintaining the one park in Groveland which his district property.

7. According to Aaron Randi, he has observed that this organizational system works well for smaller systems, if an when they have enough staff. Currently the staffing levels are good and they don't see a need for seasonal staff, in fact they have not had seasonal staff for two years. Since his group (Water and Wastewater Treatment Operations has several operators that are certified in Collection/distribution--they have helped when needed to the Distribution/Collection group, although very rare--it is an option.

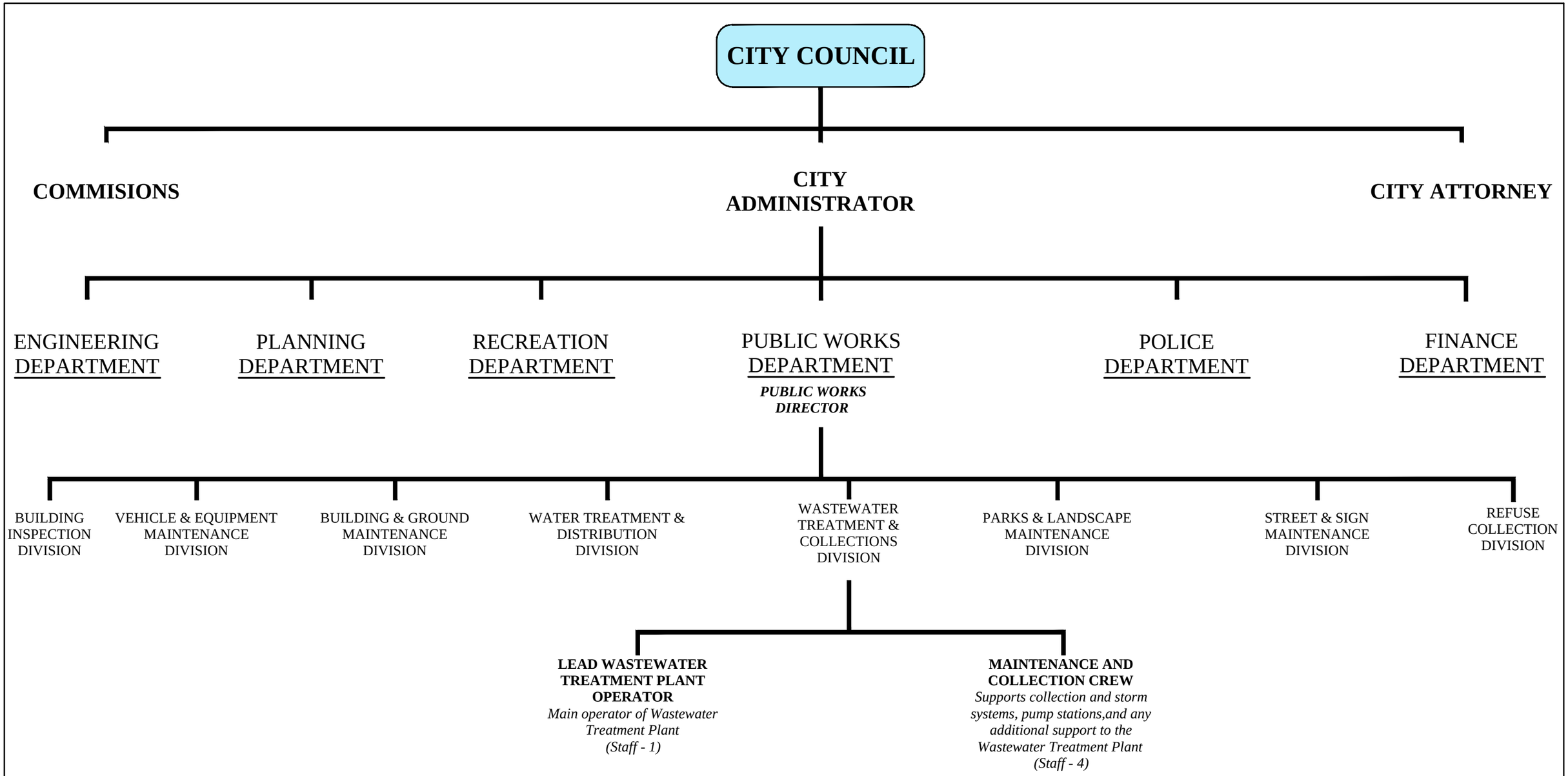


FIGURE V-1

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - CITY OF RIPON

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V1 – Org Chart Ripon.dwg EP 3/6/2012

DEVELOPMENT SERVICES DEPARTMENT

DEVELOPMENT SERVICES DIRECTOR

PLANNING DIVISION

BUILDING DIVISION

NEIGHBORHOOD IMPROVEMENT DIVISION

PUBLIC WORKS DIVISION
Supervisor

MAINTENANCE WORKERS
Provides maintenance support to street, storm, lift stations and wastewater collection
(Staff - 6)

WASTEWATER TREATMENT DIVISION
Wastewater Treatment Plant Supervisor

WASTEWATER TREATEMENT PLANT OPERATORS
Provides support in the daily operation of the WWTP
(Staff - 2)

DOMESTIC WATER DIVISION
Domestic Water Supervisor

WATER TREATMENT PLANT MAINTENANCE WORKERS
Provides support in the daily operation of the water treatment and distribution system
(Staff - 4)

LANDSCAPING AND LIGHTING DIVISION

FIGURE V-2

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - CITY OF RIVERBANK

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V2 – Org Chart Riverbank.dwg EP 2/1/2012

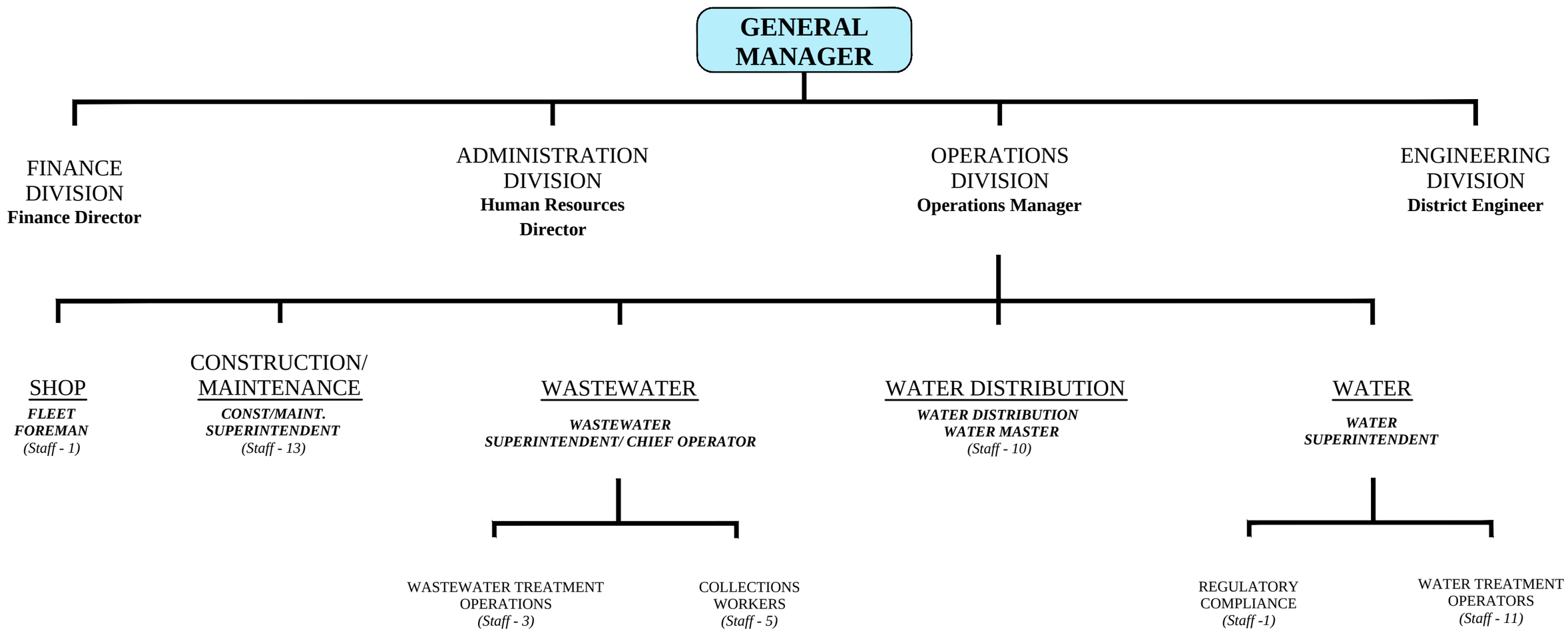


FIGURE V-3

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - TUD

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V3 – Org Chart TUD.dwg EP 2/1/2012

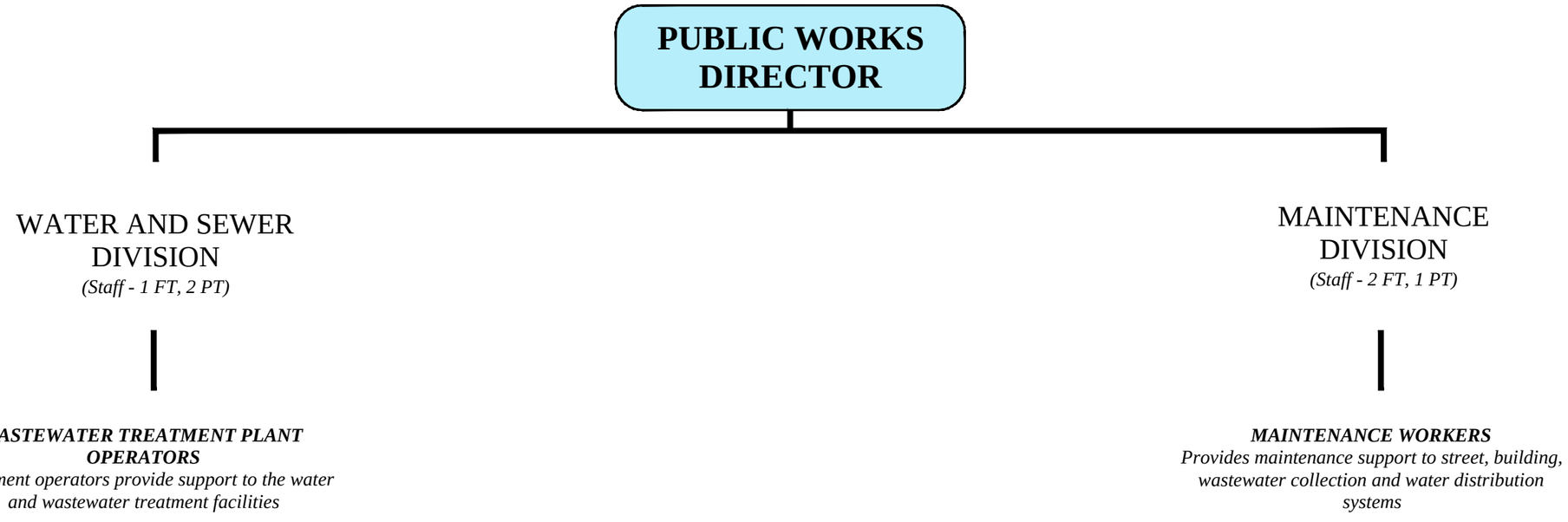


FIGURE V-4

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - CITY OF PLYMOUTH

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V4 – Org Chart Plymouth.dwg EP 2/1/2012

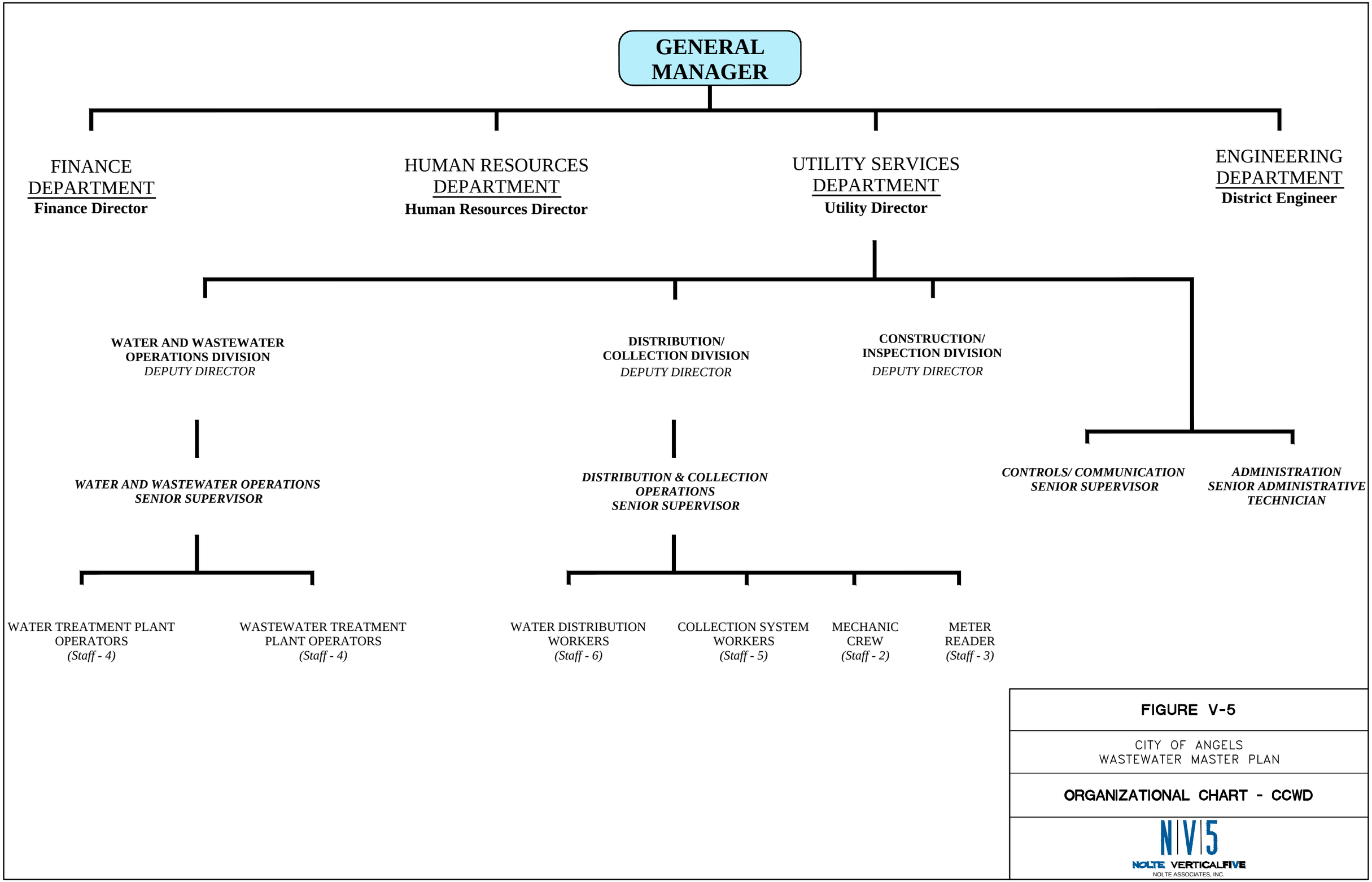


FIGURE V-5

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - CCWD

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V5 – Org Chart CCWD.dwg EP 2/1/2012

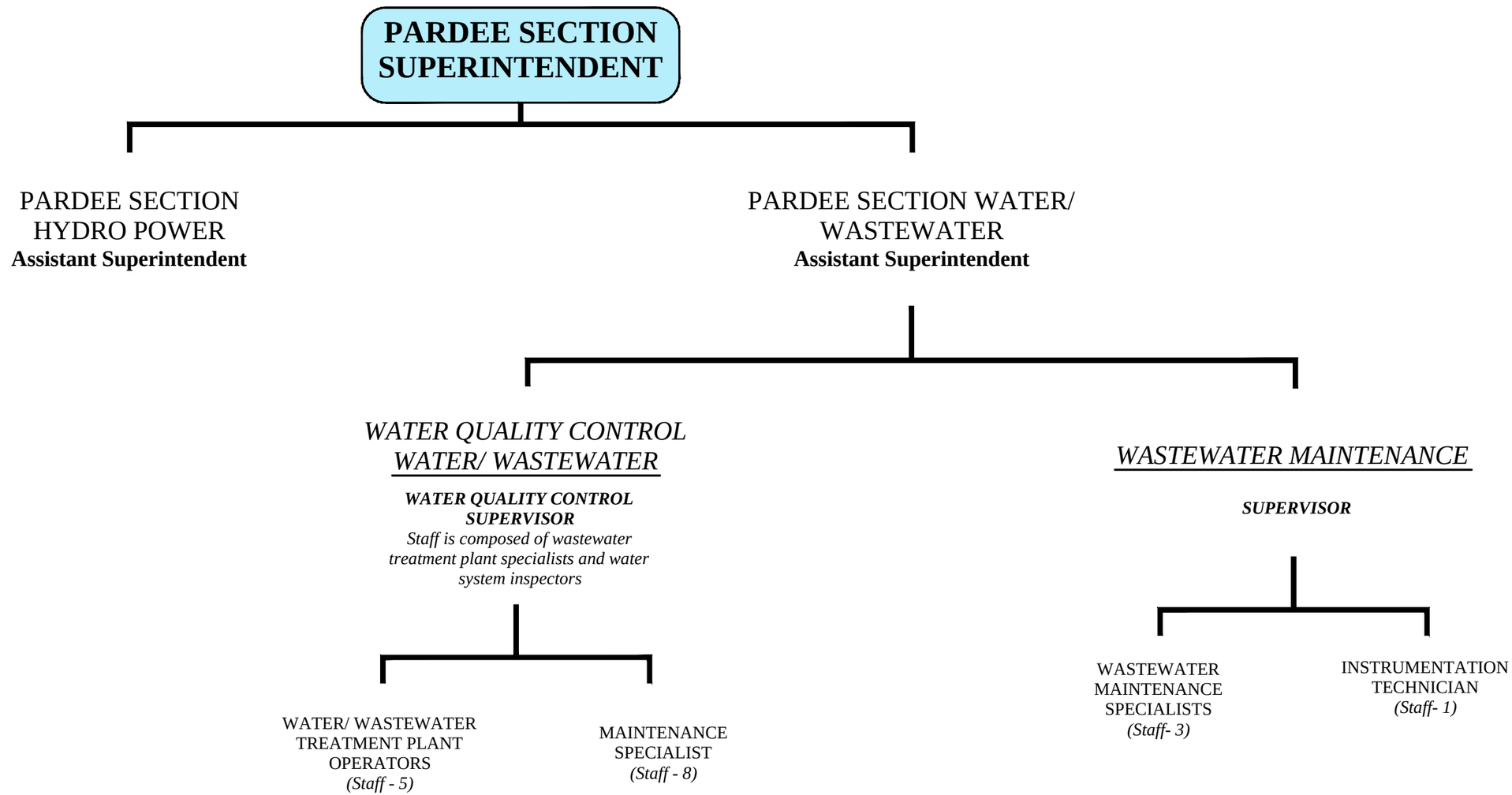


FIGURE V-6

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - EBMUD

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V6 – Org Chart EBMUD.dwg EP 2/1/2012

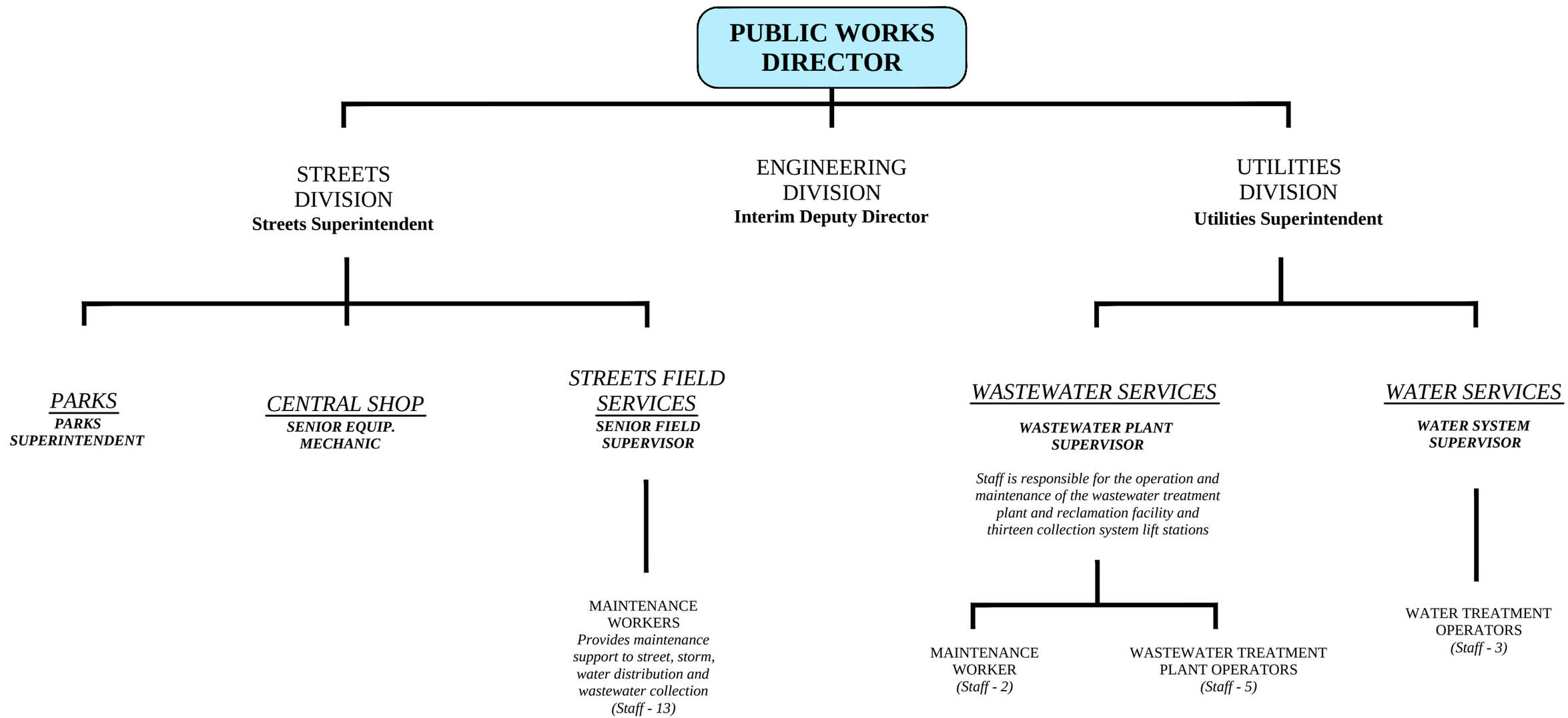


FIGURE V-7

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - CITY OF GALT

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V7 – Org Chart Galt.dwg EP 2/1/2012

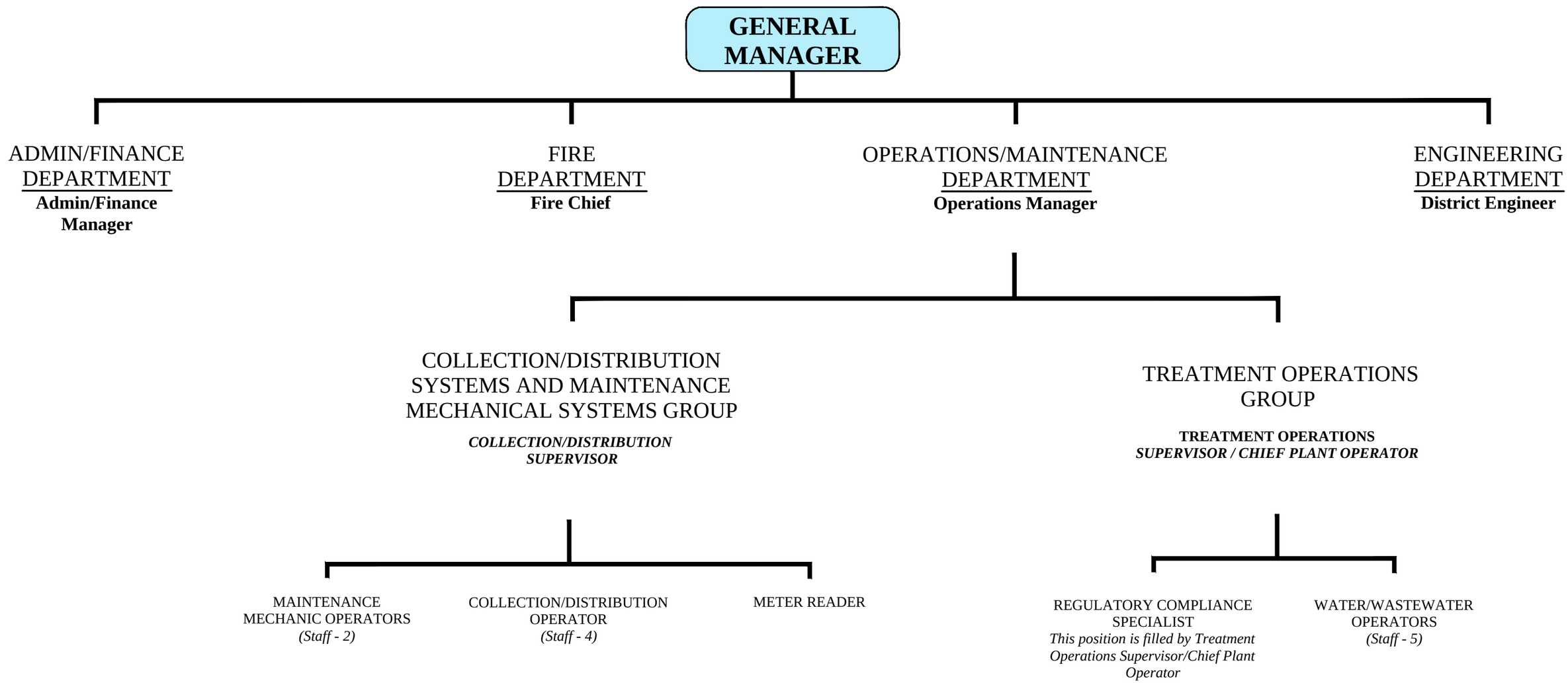


FIGURE V-8

CITY OF ANGELS
WASTEWATER MASTER PLAN

ORGANIZATIONAL CHART - GCSD

NOLTE VERTICALFIVE
NOLTE ASSOCIATES, INC.

N:\MTB020400\Cadd\ET_WW Master Plan\final\Appendices\Figure V8 – Org Chart GCSD.dwg EP 2/1/2012

APPENDIX W

OPERATOR CERTIFICATION NEWSLETTERS ISSUED BY CAL/EPA AND THE STATE WATER RESOURCES CONTROL BOARD

California Environmental Protection Agency
State Water Resources Control Board

Cal/EPA

Wastewater Operator Certification Information

September 2001

What is Operator Certification?

To ensure that wastewater treatment plants in California are properly operated and maintained, the Legislature established the Wastewater Treatment Plant Classification and Operator Certification Program. This law requires every person employed in the operation of a public wastewater treatment plant to have a valid operator certificate. In addition, private plants that are regulated by the Public Utilities Commission (PUC) must have certified operators. The certification level or grade necessary for a specific job is determined by wastewater treatment plant classification criteria. The Office of Operator Certification (OOC) in the Division of Clean Water Programs of the SWRCB is responsible for testing applicants and issuing certifications. The Division also establishes the classification of each wastewater treatment plant.

There are five levels of operator certification. To receive a certificate, a person must meet the minimum experience and education requirements and pass a written test. Any person may take a test by submitting an application form with the appropriate fees and verification of the educational requirements. Complete applications must be postmarked by the published final filing date. These dates are listed on Page 2, Question 6 of this booklet. A person then has time after passing the test to document the experience requirement before receiving their certificate. The amount of experience needed depends on the grade level of the certificate. However, the examination results are valid for four years.

The law establishing the Certificate Program is found in Sections 13625-13633, Chapter 9, Division 7, of the Water Code. Regulations, which implement this law, are found in Sections 3670-3719.19, Chapter 26, Title 23, California Code of Regulations. Copies of the law and regulations can be requested from the OOC.

How to Reach Us

Office of Operator Certification
Division of Clean Water Programs
State Water Resources Control Board
PO Box 944212
Sacramento, CA 94244-2120
www.swrcb.ca.gov/cwphome/opcert
(916) 341-5819

Most frequently asked questions (and answers)

1. How can I get certified?
There are three major things that you must do to get certified. **Number 1** - You must take courses in wastewater treatment plant operations. The number and difficulty depend on the certificate grade you want. **Number 2 –** You must pass a written test. Wastewater treatment plant operator certification tests are given twice each year, once in early April and once in early October. Tests for all five grades are given at the same time at several locations throughout the state. To take a test, you must show that you meet the minimum educational requirements and submit a fee and application. **Number 3 –** You must meet experience requirements and submit a fee and an application for a certificate. Your experience must be in the operation of a wastewater treatment plant with a valid operator certificate or operator-in training certificate. You may submit your application for a certificate up to four years after you pass the written exam.

2. How can I get a job as a wastewater treatment plant operator?
To work in a public wastewater treatment plant or a private wastewater treatment plant regulated by the PUC, you **must** have a valid wastewater treatment plant operator certificate or an operator-in-training certificate. See Question 1 for details. **If you have no experience as an operator, you must get an Operator-in-Training Certificate.** See Question 4 on how to do that. The owners of the plant do the hiring of operators, usually a city, county or special district. You need to contact them to see if there are any jobs available. Other potential sources of job listings are local newspapers and local section of the California Water Environment Association.

3. What is the Office of Operator Certification (OOC)?
The OOC administers the Wastewater Treatment Plant Operator Certification Program to provide certificates for operators. The OOC conducts the tests required by the regulations, including developing the test questions, processing applications, printing and mailing the certificates, mailing out renewal notices, and processing renewal applications. Along with these major duties, OOC does other work including answering questions, updating regulations, investigating violations of the law and regulations by certified operators, and classifying wastewater treatment plants.

4. How much supervision does an OIT need?
The regulations require that an operator-in training (OIT) be under the direct supervision of an operator with a certificate of equal or higher grade. Direct supervision means the oversight and inspection of the OIT's work by the supervisor without an intervening person. An OIT cannot work as the only operator at a plant during swing, late night or weekend shifts. The OIT must have ready access to the supervising operator, so that if the OIT has any doubt about what to do they can ask. On the other hand, the supervising operator need not be the shift supervisor. The regulations only require a certified operator of equal or higher grade. Common sense indicates a well-experienced operator would be the best mentor for an OIT.

5. Where can I get wastewater treatment plant operator training?
Many State University campuses and Community Colleges offer training. There are also nonprofit organizations and for-profit organizations that also offer training. Please be aware that the law only allows us to recognize training given by colleges and universities and by professional associations or other nonprofit private or public agencies as meeting the educational requirements for certification.

6. When are applications due for examinations?
Our regulations list the examination application final filing dates. They are February 1 for tests given in April and August 1 for tests given in October. Your complete application package, including fee, must be postmarked no later than the final filing date. Our regulations allow for no exceptions. On the other hand, you may submit your application as early as you like.

7. Do you need a certificate to work at a plant?
The law requires you to have a certificate to work as an operator at a publicly owned wastewater treatment plant or a privately owned plant regulated by the PUC. You do not need a certificate to work as something other than an operator at a wastewater treatment plant, (e.g., a laboratory technician). You do not need a certificate to work as an operator at a privately owned plant not regulated by the PUC. An example is an industrial wastewater treatment plant owned by a private industry.

8. When is the next test?
Tests are given in April and October each year. Tests for all grades are given each time. The following dates have been set:

October 6, 2001	April 6, 2002
October 5, 2002	April 5, 2003
October 4, 2003	

Examinations begin at 9:00 a.m. on the scheduled date. Examinees must show the notice card <u>and</u> photo identification. No books, notes, or references are allowed at the examination site. Hand calculators may be used. Alphanumeric and programmable calculators are not allowed.

9. How long are certificates valid?
Certificates must be renewed every two years. OOC will send you a renewal notice. You must submit an application for renewal and a fee. It must be postmarked before the expiration date. You will receive a new certificate about 30 days later. Renewal is very important. It is illegal to work as an operator with an expired certificate. If you move, please give us your new address so you will receive a renewal notice. Whether or not you receive a renewal notice, **it is your responsibility to submit your application for renewal before the expiration date.** You do not have to take the examination again.

Remember – there is **no** grace period for an expired certificate. Once it expires, it is no longer valid and you cannot work as an operator.

10. What is the difference between drinking water and wastewater treatment plant operator certification?
Drinking water operator certification is separate from wastewater operator certification. Drinking water treatment plant operator certification is required to work as an operator in a treatment plant that produces water for human consumption in homes and businesses. Wastewater treatment plant operator certification is required to work as an operator

in a treatment plant that receives and treats wastewater from homes and businesses. The Department of Health Services administers the water treatment plant operator certification program. They take applications, give tests and issue certificates on applicants who meet their requirements. The drinking water treatment plant operator certification program may be reached at:

Department of Health Services
Office of Drinking Water
Certification Unit
P.O. Box 942732
Sacramento, CA 94234-7320
(916) 327-1140

Roles and responsibilities of certified operators

When you become a certified operator, you take on certain responsibilities of a profession. As a certified operator, you must use reasonable care and judgement in the operation of your plant. You must not commit fraud or deception in the operation of your plant. You must not allow uncertified operators or operators without the proper grade of certificate to operate your plant. You must not willfully or negligently violate, or cause or allow the violation, of your plant's waste discharge requirements issued by the Regional Water Quality Control Board.

There are five grades of certification. Grade I is the easiest to obtain, requiring the least difficult examination. Each succeeding grade requires more education, experience and knowledge regarding treatment processes up to and including that level; therefore, each higher grade has an increasingly more difficult examination.

Likewise, the responsibility and the role an operator takes changes with each grade. The largest and most complex plants are required to have a Chief Plant Operator with at least a Grade V certificate, shift supervisors a minimum of Grade III certificate and at least half of the operators must have a Grade II certificate or higher. On the other hand, a small plant that consists of a pond needs operators with only a Grade I certificate.

Operators holding OIT certificates have the same general responsibilities as operators with regular certificates. However, an OIT may not be a Chief Plant Operator. Additionally, a certified operator at the same or higher grade must directly supervise OITs.

For more information on roles and responsibilities of Chief Plant Operators and OITs, please see the next two sections.

Chief plant operators

The Chief Plant Operator has a unique position among certified operators. Not only does the Chief Plant Operator have management and supervisory responsibilities at the plant, but also additional responsibilities regarding operator certification.

The job of Chief Plant Operator is defined by regulation (Section 3671(h), Title 23, California code of Regulations) as "a supervisor who is certified as an operator and who is responsible as an operator and who is responsible for the overall operation of a wastewater treatment plant." This places responsibility for the overall operation of a plant and the achievement of the goals of the certification program on the Chief Plant Operator. Because of the importance of this job, the regulations require that agencies keep the OOC informed of who is their Chief Plant Operator. If an operator is employed at a wastewater treatment plant, the Chief Plant Operator must sign applications for examination and for certificates. The Chief Plant Operator must also sign all applications for OIT certificates. In signing these applications, the Chief Plant Operator is verifying that the information about present employment is true and correct.

$ $ $ $ $ $ $ $ $ $ $ $

OPERATOR AND OPERATOR-IN-TRAINING FEES

Grade	Examination[1]	Certificate[2]	Renewal[3]
I	$ 50	50	50
II	60	70	70
III	115	90	90
IV	145	100	100
V	145	100	100

1. This fee includes both application and examination.
2. The fees for an OIT certificate are the same as an operator certificate.
3. The fees for renewal of an OIT certificate are the same as an operator certificate.

Operators-in-Training

It is illegal to operate a public, or private wastewater treatment plant regulated by the PUC, without a valid certificate. If it takes experience to get a certificate, how can someone without a certificate get experience? The answer is the operator-in training (OIT) certificate. The OIT certificate is a valid **temporary** certificate that allows someone to get experience as an operator.

The regulations define OIT as "any person who operates a wastewater treatment plant under the direct supervision of a certified operator while gaining experience to qualify for an operator certificate."

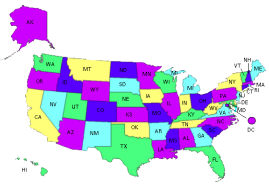
An OIT can hold any job at a plant for which they are qualified, except as Chief Plant Operator. OITs must be directly supervised by a certified operator at the same grade as the OIT or higher. The OIT has the same responsibilities under the operator certification regulations as a certified operator.

OIT certificates are issued at Grades I through V. You may apply for a Grade I OIT without having passed the test or meeting the education requirements for a Grade I certificate. You need only have a job as a plant operator. OIT certificates are valid for two years. You must gain the required education and pass a wastewater exam during these two years. At the end of the two-year period, if you have passed a wastewater exam, but do not yet have sufficient experience for a regular certificate, your OIT may be renewed once for two more years. However, if you do not pass the examination within the two years, your OIT certificate will not be renewed.

If you apply for an OIT certificate at Grades II through V, you must have passed the test for the grade, met the education requirements and be able to meet the experience requirements within four years after you passed the test. Grades II through V OIT certificates are valid for two years and may be renewed once for up to two more years. However, you still only have four years after you pass the test to get the required experience for that grade.

Applications for OIT certificates must be signed by the Chief Plant Operator. OIT certificates are issued for a specific job at a specific treatment plant. If you change jobs while an OIT, you need to apply for a new certificate.

"Reciprocity"



The word describes an agreement between two parties. With the certification program, it means that California's operator certification program is recognized by another state as being equivalent to theirs and that California recognizes that state's program as equivalent to ours. It does **not** mean that you may work in California under a certificate issued by another state. You still need a valid California operator's certificate. However, what is does mean is that you may qualify for a California certificate without having to pass the test, and may use experience gained while holding another state's certificate.

California has reciprocity with all states except Florida and Michigan. We do have limitations on reciprocity with other states:

1. Only Grade I and II operator certificates may be granted through reciprocity.

2. For a state to have reciprocity with California, its experience and education requirements must be comparable to California's and it must grant reciprocal privileges to California certificate holders.

3. You must have passed a written test comparable to California's at the appropriate level within the last four years.

To get a Grade I or II certificate through reciprocity, you must complete an application and submit it along with the appropriate fee to the OOC.

Plant Classifications

The Water Code gives the OOC responsibility for classifying all publicly owned wastewater treatment plants and private plants regulated by the PUC. Agencies may not "class" their own plants nor can the Regional Boards assign the designations.

The OOC asks that the CPO complete a "Wastewater Treatment Plant Class Data Form". Copies of the form may be requested by contacting the OOC. That form along with an organization chart, flow diagram of the plant, job descriptions for all personnel classifications and duty rosters must be submitted to the OOC. Once the OOC reviews the information, the CPO will be sent a letter indicating the classification and appropriate operator grades. However, the OOC does not specify how many operators must be employed at each grade.

Class	Process	Design Flow (MGD)
I	Pond	All
	Primary	1.0 or less
II	Primary	>1.0 through 5.0
	Biofiltration	1.0 or <
	Extended Aeration	All
III	Primary	>5.0 through 20.0
	Biofiltration	>1.0 through 10.0
	Activated Sludge	5.0 or <
	Tertiary	1.0 or <
IV	Primary	>20.0
	Biofiltration	>10.0 through 30.0
	Activated Sludge	>5.0 through 20.0
	Tertiary	>1.0 through 10.0

V	Biofiltration	>30.0
	Activated Sludge	>20.0
	Tertiary	>10.0

Reporting Requirements

Agencies must report the following to the OOC within 30 calendar days of occurrence:

1. A plant begins operation or changes the design flow or treatment process

2. The person designated as CPO changes

3. Final disciplinary action is taken which results in suspension, demotion or discharge of a certified operator or OIT if the disciplinary action is the result of the commission of any of the acts which are grounds for discipline in Section 3710, Title 23, of the California Code of Regulations.

Contract Operators

Effective August 27, 1994, any person or firm that contracts to operate a public or private wastewater treatment plant must be registered with the OOC. In addition, all operators employed by a contract operator must be certified by the OOC. If you currently operate a public or private treatment plant regulated by PUC, under contract and are not registered, you are in violation of Section 3719, Title 23, California Code of Regulations. You should register immediately. If you plan to operate a public or private treatment plant regulated by PUC under contract in the near future, you must be registered before you start operations.

Registration is done by submitting an application and fee to the OOC. Applications and instructions can be obtained by calling OOC. OOC has 30 days after receipt of an application to either issue a registration or tell the applicant why their application is deficient. Registration must be renewed annually. The renewal application must be postmarked no later than 30 days prior to the registration expiration date.

The responsibilities of a contract operator under the contract operator regulations are similar to those of a certified operator

Experience counts . . .

Applicants may be credited with one year of experience if they have had **two or more years of full-time experience in the operation of a water treatment plant** regulated by the California Department of Health Services or by a governmental agency in another state. To receive this credit, applicants must meet the following criteria:

1. Experience was obtained while in possession of a valid water treatment plant operator certificate,

2. The water treatment plant where the experience was gained uses two or more of the following processes: coagulation, sedimentation, aeration, filtration, oxidation, or disinfection, and

3. At the time of the application for wastewater certification, the applicant has had one year of experience in the operation of a wastewater treatment plant.

Educational Opportunities

University of California and State Universities

1. All universities offer bachelor of science degrees in engineering or scientific disciplines applicable to wastewater treatment plant operations.

2. The University of California Extension frequently offers courses related to wastewater treatment plant operation. For instance, U.C. Davis Extension offers courses leading to a certificate in environmental hazard management. U.C. Davis Extension may be contacted at (800) 752-0881 or (916) 757-8777. There are extension offices at other campuses.

3. Some State Universities offer evening courses related to wastewater treatment plant operations.

4. California State University, Sacramento, through its Office of Water Programs, offers home study courses in wastewater treatment plant operations and related areas. Contact them at (916) 278-6142 or www.owp.csu.edu for more information.

Community Colleges

Many Community Colleges offer daytime and evening classes. Examples of some colleges are:

College of the Sequoias	(559) 730-3777
Columbia	(209) 588-5100
Citrus	(626) 914-8821
Hartnell	(831) 755-6875
Imperial Valley	(760) 355-6290
L.A. Trade	(213) 744-9087
Mesa	(619) 627-2803
Mt. San Antonio	(909) 594-5611

Palomar	(760) 744-1150
Orange Coast	(714) 432-0202
Santiago Canyon	(714) 564-4545
Sacramento City	(916) 558-2491
San Bernardino	(909) 888-6511
Santa Barbara	(805) 965-0581
Santa Rosa	(707) 527-4603
Shasta College	(530) 225-4660
Solano College	(707) 864-7155
Ventura College	(805) 654-6452

Non-Profit Organizations

The California Water Environment Association is a professional organization for individuals involved in the design and operation of wastewater treatment plants. The Association also offers courses in wastewater treatment plant operations and related fields. Contact the Association at (510) 382-7800 or www.cwea.org for more information.

Other Courses

There are other organizations, both public and private, that offer training in wastewater treatment plant operations and related fields. However, please be aware that our regulations allow us to only count training taken through colleges and universities, public agencies and nonprofit organizations as satisfying the education requirements for certification.

Suggested reading to prepare for testing

Following is a list of references, which may be useful to applicants preparing to take a certification test. Each reference is subject to revision and the current version should be used. Other references covering similar subjects may be used at the applicant's discretion. The SWRCB does not endorse specific reference materials.

Grades I and II

1. "Operation of Wastewater Treatment Plants, Volumes I and II," Kenneth Kerri, Office of Water Programs, California State University, 6000 J Street, Sacramento, CA 95819-6025

2. Title 23, California Code of Regulations, Division 3, Chapter 26, Section 3670, et seq., "Wastewater Treatment Plant Classification, Operator Certification, and Contract Operator Registration Regulations," SWRCB, OOC, P.O. Box 944212. Sacramento, CA 94244-2120

Grades III

1. Both listed above.

2. "Advanced Waste Treatment," Kenneth Kerri, Office of Water Programs, California State University, 6000 J Street, Sacramento, CA 95819-6025

3. "Pretreatment Facility Inspection," Kenneth Kerri, address listed above.

4. Water Environment Federation Manual of Practice Wythe Street, Alexandria, VA 23314-1994

No. 1, "Safety and Health in Wastewater Systems"
No. OM-9, "Activated Sludge"
No. 11, "Operation of Municipal Wastewater Treatment Plants"

5. Title 8, California Code of Regulations, Division 1, Chapter 4, Article 108, "Confined Spaces", and Section 3203, "Injury and Illness Prevention Program," Division of Occupational Safety and Health, P.O. Box 420603, San Francisco, CA 94142

6. Title 22, California Code of Regulations, Division 4, Chapter 3, "Reclamation Criteria," Environmental Management Branch, Department of Health Services, P.O. Box 942732, Sacramento, CA 94234-7320

Grades IV and V

1. All of the above.

2. "Wastewater Engineering," Metcalf and Eddy, Inc., McGraw Hill Book Company, 1221 Avenue of the Americas, New York, NY 10020.

3. "Industrial Wastewater Treatment", Kenneth Kerri, Office of Water Programs, California State University, 6000 J Street, Sacramento, CA 95819-6025

4. Water Environment Federation Manual of Practice No. SM-4, "Plant Managers' Handbook", 610 Wythe Street, Alexandria, VA 23314-1994

REQUIREMENTS BY GRADE			
Grade I			
Path 1	6 educational points	and	1 year performing duties of operator
Grade II			
Path 1	High School or equivalent and 6 educational points	and	2 years performing duties of operator
Path 2			1 1/2 years as Grade I
Grade III			
Path 1	Associate degree or 60 college semester units including 15 semester units of basic science courses	and	2 years performing duties of operator
Path 2	High School or equivalent and 16 educational points	and	4 years performing duties of operator
Path 3			3 years as Grade II
Grade IV			
Path 1	Bachelor's degree with a major related to wastewater treatment including 30 semester units of basic science courses	and	2 years performing duties of operator
Path 2	Associate degree or 60 college semester units including 15 semester units of basic science courses	and	4 years performing duties of operator
Path 3	High School or equivalent and 32 educational points	and	6 years performing duties of operator
Path 4			4 years as Grade III
Grade V			
Path 1	Valid license as a civil or chemical engineer issued by the California Board of Registration for Professional Engineers and Land Surveyors	and	4 years performing duties of operator
Path 2	Bachelor's degree with a major related to wastewater treatment including 30 semester units of basic science courses	and	5 years performing duties of operator
Path 3	Associate degree or 60 college semester units including 15 semester units of basic science courses	and	6 years performing duties of operator
Path 4	High School or equivalent and 48 educational points	and	10 years performing duties of operator
Path 5			6 years as Grade IV

California Environmental Protection Agency
State Water Resources Control Board

Cal/EPA

Operator Certification

Volume 2 Issue 1 **Spring / Summer 1999**

Defining Compliance

Appropriate Staffing Protects Public and the Operator

The Office of Operator Certification (OOC) recognizes that not all operators are able to personally attend conferences and conventions. This is the second in a series of articles outlining material presented by the OOC at conferences and conventions. A presentation outlining operator certification compliance is available through the OOC at any location showing sufficient interest.

Municipal officials are under constant pressure from residents to limit or reduce municipal budgets. More and more, officials look at cutting costs by cutting wastewater treatment plant operation and maintenance staff.

Optimal staffing maximizes a wastewater treatment plant's capability while inadequate staffing can potentially put water quality and public health at risk. Proper staffing also protects the financial investment of the People of California.

Technology, usually the SCADA system, has been touted as a budget savior to reduce plant personnel costs. But more technology does not always equate to less staff.

Operators are ultimately responsible and may be the first to realize that reduced staffing can lead to serious consequences. The ultimate result may be ongoing violations of waste discharge requirements and subsequent enforcement actions.

The regulations and the OOC do not address specific levels of wastewater plant staffing or even if a plant must be staffed. The regulations do address the appropriate grade level which an operator must hold while on the plant site. The regulations specify a wastewater treatment plant's classification and the operator certification level required whenever an operator is working at the plant site.

Every operator working at the wastewater plant shall possess a valid operator or OIT certificate. The Chief Plant Operator must hold a certificate at least equal to the plant class. Supervisors must hold a certificate no more than one grade lower than the plant class. Shift Supervisors must hold a certificate no more than one grade lower than the plant class, except in Class V Plants where a Grade III is allowed.

Job titles may not exactly match what the Regulations indicate. Generally the Chief Plant Operator is the Plant Manager, the Supervisor is the Assistant Plant Manager, and a Shift Supervisor is sometimes called a Lead-Person. The Supervisor is considered in responsible charge whenever the Chief Plant Operator is on vacation.

A person designated as a Shift Supervisor, or higher level, has authority to give operational or process direction at the facility and must always be on shift whenever operators are at the facility. The only exception to not having a person holding certification of a Shift Supervisor or higher level is when an agency has been given permission, by the OOC, to staff their facility with a Lone Operator.

The OOC has recognized that many agencies have limited budgets and will allow the use of a Lone Operator. A Lone Operator is defined as an operator with a certification level less than that of a Shift Supervisor and working alone, either on a regular shift or during call-out, at the treatment facility. The Lone Operator may NOT be an OIT and must have responsibilities and duties significantly less than a regular shift operator. The Lone Operator's duty statement must have well defined constraints and limits regarding duties and responsibilities that include little operational discretion. An agency MUST HAVE written permission from the Office of Operator Certification prior to implementation.

Prior to staffing with a Lone Operator, an agency must submit: 1. The Lone Operator and the On-Call Supervisor job descriptions or duty statements; 2. Updated work schedules; 3. On-Call list with a fail-safe contact procedure; and 4. The plant O&M Manual staffing recommendation.

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What To Do When You Get Caught Whistling On the Job

During the last several years, the Office of Operator Certification (OOC) has investigated numerous complaints, most of which originated from wastewater treatment plant operators or other employees working in the wastewater treatment field. The OOC is aware that, in most cases, the complainant, and the witnesses who cooperate with the government authorities during the subsequent investigation, may be subject to potential reprisals or discrimination by their employers.

These employees, often referred to as "whistleblowers," may be subject to harassment including intimidation, more careful monitoring by the supervisors, poor performance reviews, denial of certain assignments, transfer to different department, loss of certain privileges or benefits and termination.

The OOC does not have the authority or the means to protect a conscientious operator from reprisals for their whistleblowing activities. These activities can include communication with the media, regulatory or enforcement authorities, members of the Legislature, or environmental and special interest groups. Such activities are protected as long as the employee has reasonable grounds for believing that his information is correct. The Federal law covering whistleblowers at wastewater treatment plants (WWTP's) is the Clean Water Act (CWA).

Section 507 of the CWA states in part: *"No person shall fire, or in and other way discriminate against, or cause to be fired or discriminated against, any employee or authorized representative of employees by reason of fact that such employee or representative has filed, instituted, or caused to be filed or instituted any proceedings under this Act, or has testified or is about to testify in any proceedings resulting from the administration or enforcement of the provisions of this Act."*

This language covers the employees of private industry and state and local government agencies working at wastewater treatment facilities who report violations of Federal and/or State regulations governing operation of the wastewater treatment facilities and compliance with the requirements of an NPDES permit.

The agency that investigates complaints filed pursuant to Section 507 is the Federal Occupational Safety and Health Administration (OSHA). The investigating procedure, described in 29 CFR Part 24, is available from either OSHA or the US Department of Labor.

An advantage to filing a complaint with OSHA is that the regulations require OSHA to complete the investigation within 30 days after it receives a complaint. In reality, a typical investigation will last somewhat longer, but the overall process is extremely efficient by government standards.

The downside of dealing with OSHA is that they will only investigate alleged violations of CWA, Section 507 that occurred during the 30-day period prior to the date the complaint was filed. In other words, if you complained on May 31 that your employer has been harassing you since January 1, OSHA will only investigate those alleged violations which occurred during the month of May. It is possible that prior violations may eventually be considered as well; however, that requires appeal to the Administrative Law Judge. Appeals must be filed within five calendar days from the date you receive OSHA's initial decision.

Another advantage of filing a complaint with OSHA is that the process is relatively simple and usually does not require an attorney. You may hire an attorney if OSHA does not rule in your favor. However, you could end up paying attorney fees. Even if the attorney is working on a contingency basis, you are responsible for certain expenses (e.g. phone calls, copying costs, document filing fees).

To file a claim with OSHA, write to their main office at the San Francisco address provided below. Your letter should state the nature of the complaint (including the date(s) when the alleged retaliation occurred) and the person or agency against which the complaint is filed. You must also include the agency's phone number, address and the representative who has the authority to execute any potential agreements. For complaints that fall under the CWA Section 507, the letter must state that the complaint is being filed "under the provisions of Section 507 (a) of the Federal Water Pollution Control Act (33 USC 1367)."

If you are uncertain that the alleged reprisals fall under the Section 507 of CWA, you should call OSHA first and speak with one of their investigators.

In either case, you will be expected to document the incidents that led to the filing of the complaint. Documentation can be provided in the form of plant records, letters, memos, your personal diary and witnesses.

The more specific your documentation, the more likely it is that the investigator will rule in your favor. Also, have a prepared "wish list," a list of remedies that you want your employer to implement to correct the situation. This may require negotiation, so make certain you do not negotiate away the most important conditions.

Complaints filed under the CWA, Section 507, whistleblower protection statute, should be filed with the United States Department of Labor / OSHA, 71 Stevenson Street, San Francisco, Ca., 94105. Their phone numbers are (800) 475-4020, (415) 975-4342, and (415) 975-4318. Their fax number is (415) 975-4319.

Owners of Wastewater Plants Have Specific Reporting Duties

Section 3676, Title 23, Code of California Regulations (CCR), gives agencies owning or operating wastewater treatment plants specific reporting duties to the Office of Operator Certification (OOC). These requirements are designed to keep the OOC informed about major construction projects, key staffing changes and personnel actions which are related to an operator's duties.

Specifically, an agency must report the following within 30 calendar days of occurrence: 1. After a plant begins operation, the agency must submit a description of the treatment processes, the design flow of the plant, an organization chart and job descriptions and duties rosters for plant personnel; 2. Any change in the employment of the person designated as chief plant operator; 3. Any construction affecting the classification of the plant.

If final disciplinary action is taken against any operator resulting in suspension, demotion, or discharge and the

Continued on Page 4

Emergency Regulations Expire for Operator's Proof of Citizenship

In May 1998 the State Water Resources Control Board (SWRCB) adopted regulations to prevent an ineligible alien from obtaining certification to work as a wastewater treatment plant operator. Persons wishing to become certified, or to renew their existing certification, were required to complete a "Statement of Citizenship, Alienage and Immigration Status for State Public Benefits," and provide specific documentation of their status.

On May 10, 1999, the emergency regulations expired and the SWRCB chose not to extend the requirement. Therefore, beginning on May 11, no one need complete the Statement or supply documentation of status. As you may know from newspapers and television, Proposition 187 (which restricts the provision of government benefits to illegal aliens) is before the California courts for review.

If the courts rule that we must re-introduce proof of status, we will inform you immediately. For those who already sent in the statement and documentation, your information is on file and you will not be asked again by the OOC. For anyone who has the information readily available, you are welcome to have us place it in our records and you also will not be asked in the future. Staff of the Office of Operator Certification would like to thank everyone for the spirit of cooperation shown as we all attempted to implement the new requirement.

Training Directory Available

The OOC has released its 1999 Wastewater Opportunities Training Directory. This updated directory, originally published in January 1997, contains information on training requirements by grade, types of acceptable training and sources throughout the state. Copies may be ordered by calling the OOC at (916) 227-4300.

Administrative Actions by the State Water Resources Control Board

Administrative sanctions include fines, reprimand or denial, suspension, probation, or revocation of a certificate pursuant to Section 13627 of the Water Code and may be taken by the SWRCB against any person, agency, district, or other entity found in violation of specific sections of the Operator Certification Regulations or Water Code.

Actions Against Operator Certificates

The following are administrative sanctions taken by the SWRCB against California certified wastewater plant operators.

Stephen Sanchez

Name of Facility: Capistrano Beach Water District

Misconduct: Illegal Discharge

Discipline: Letter of Reprimand

The Division found that Mr. Sanchez allowed vactor truck washings to be discharged to an area not meant for disposal of wastewater or sewage sludge. The area where vactor truck washings were being disposed had been previously used as sludge drying beds and had been abandoned.

It appeared that the situation was a standard operating procedure prior to Mr. Sanchez becoming the Chief Plant Operator.

Mr. Sanchez pled guilty to one misdemeanor count charged by the Orange County District Attorney.

The SWRCB's discipline took into consideration that Mr. Sanchez was court ordered to complete a 20-hour training course, volunteer 200-hours of community service time, serve a three-year probation, and pay a $100 fine.

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Owners of Wastewater Plants Have Specific Reporting Duties

Continued From Page 3

disciplinary action is the result of the operator's violation of grounds for discipline listed in Section 3710, Title 23, of the CCR. The operator may be subject to further discipline by the OOC. The notice given to OOC must identify the name of the operator or operator-in-training, the specific violations and the disciplinary action taken.

Included in the grounds for discipline are: Violating or causing the violation of OOC regulations; Operating or allowing the operation of a plant by an uncertified person or person of an inappropriate grade; Submitting documentation with false or misleading information; Using fraud or deception in the course of employment; Failing to use good care and judgment in the course of employment; Causing or allowing the violation of waste discharge requirements; and, Failing to ensure the supervision of an operator-in-training.

How to Reach Our Office

Office of Operator Certification
Division of Clean Water Programs
State Water Resources Control Board
P.O. Box 944212
Sacramento, CA 94244-2120

Operator Certification	(916) 227-4300
Compliance Complaints	(916) 227-4362
Newsletter Suggestions	(916) 227-4362

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California Environmental Protection Agency
State Water Resources Control Board

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Operator Certification

Volume 1 Issue 1 **Spring 1998**

Certification Responsibilities

Operator's Role in Environmental Protection

When applicants receive certificates to become wastewater treatment plant operators in the State of California they take on certain responsibilities of the profession. The operator's certificate is their permit to operate a wastewater treatment plant for the purpose of protecting the waters of the State of California. The operator's certificate must be displayed, clearly visible for public view, at the wastewater treatment facility before they can operate the facility.

Certified operators must use reasonable care and judgment in the operation of a wastewater plant. The operator's "creed" is to avoid any conduct that might be construed as being negligent, dishonest, false or misleading, and fraudulent or deceptive while treating wastewater to protect the public's health. Operators should be honorable, conscientious, and trustworthy.

The Chief Plant Operator (CPO) has an uncommon position among certified operators. In addition to the above responsibilities of an operator, the CPO is accountable for:

1. Allowing only certified operators or Operators-in-Training (OIT's) with valid certificates to operate at the treatment facility; and
2. Ensuring the direct supervision of any OIT working within the treatment facility; and
3. Verifying qualifying experience; and
4. The overall operation of the treatment facility; and
5. All of the normal management and supervisorial duties of his position.

Because CPO's are in a position of greater responsibility they should have the qualities of operators as well as being upstanding, honest, with ethical values that are beyond reproach. CPO's are expected to adhere to the highest standards of the operator profession.

The Contract Operator is any person or entity who enters a promissory agreement to operate a wastewater treatment plant as noted in the Title 23 Operator Regulations. No person or entity shall enter a contract to operate a wastewater treatment plant unless that person or entity is registered by the Division of Clean Water Programs (Division) as a Contract Operator. Just as an operator's certificate must be posted to operate at a treatment plant, the Contract Operator's are responsible for displaying their certificates, clearly visible for public view, at the treatment plant before they are permitted to operate at that particular facility.

Contract Operators are bound by the roles and responsibilities outlined for both operators and CPO's. In addition, a contract operator is to keep their registration current and to inform the Division of changes in personnel. The Contract Operator is also responsible for maintaining the appropriate waste discharge requirements of the contracted facility as outlined in the Clean Water Act which include the provisions of the National Pollutant Discharge Elimination System (NPDES) permit.

All wastewater treatment plant Operators, CPO's, and Contract Operators have daily challenges they must face in protecting the public's health. They are "Deputies" working for the people of the State of California, and have the ultimate role of working towards enhancing the quality of California's water resources for the benefit of present and future generations.

Operator Certification is a newsletter published by the State Water Resources Control Board, Office of Operator Certification. Future issues will introduce staff, publish articles of interest to certified operators, and highlight enforcement actions taken throughout the State. To submit story ideas, comments, or suggestions please call (916) 227-4362.

Filing a Complaint Concerning Compliance with the Operator Certification Regulations or Water Code

Any person, organization, or government agency may file an allegation with the State Water Resources Control Board (SWRCB), Division of Clean Water Programs (Division), concerning compliance of:

1. An individual California certified wastewater treatment plant operator; or
1. Any wastewater treatment plant Contract Operator operating in California; or
2. Any person or entity who owns or operates or allows the operation of a wastewater treatment plant as defined in the California Code of Regulations.

A complainant need not have been harmed or involved in the alleged compliance violation. However, the Division requires that there be substantiating evidence before proceeding with the investigation of any allegation.

The Division understands the sensitive issue concerning an operator filing a complaint against another operator or possibly their employer. The complainant is not required to reveal his or her identity. Those complainants wishing to keep identities confidential will be accommodated to the limits of the law.

A confidential complainant will be kept informed on the progress of an investigation and may be requested to testify in front of the State Water Resources Control Board.

Anonymous complainants will, obviously, not need protection as the investigator will not know the complainant's identity. An anonymous complainant will not be given any informational updates concerning the investigation. Information revealed by any complainant to the Division should be as detailed and specific as possible.

To file an Allegation or Complaint, call the Division at (916) 227-4362

Process Leading to Operator Discipline

The State Water Resources Control Board (SWRCB) has taken steps to increase enforcement and compliance of the California Code of Regulations (CCR) and the California Water Code (CWC). Complaints of wastewater treatment plant operator non-compliance will be initially analyzed and if found that the SWRCB has jurisdiction then a preliminary investigation is undertaken.

The preliminary investigation determines if there is enough evidence to support further investigation of the allegation. The preliminary investigation ends with a "Preliminary Investigation Report" that recommends a plan of action that could be anything from not pursuing the allegation to a full-scale investigation.

A full-scale investigation of the allegation involves the review and analysis of all information that can be obtained concerning the allegation. The investigator may engage the aid of Regional Water Quality Control Board personnel and records, interview witnesses, obtain search warrants, as well as use other investigative techniques to obtain necessary information. The full-scale investigation could take several months and a summary of the evidence is compiled in a "Full-Scale Investigation Report" which recommends a plan of action which could range anywhere from dropping the allegations because the evidence did not support the allegations to advocating discipline for the alleged violator.

Should the Full-Scale Investigation Report recommend discipline, then the alleged violator is informed and given 30 days to appeal the decision. There may be as many as two appeals to affirm, reject, or modify the proposed discipline. The first appeal is to the Chief of the Division of Clean Water Programs (Division).

Should the first appeal of discipline be affirmed by the Chief of the Division then a second appeal may be made to the five member SWRCB (Board). Taking an appeal to the Board is similar to a public hearing and alleged violators may be represented and face their accusers. Any decision made by the Board is final.

The alleged violator may accept the proposed discipline at any time by not appealing the proposed discipline or by waiving their right to a hearing.

Administrative Actions by the State Water Resources Control Board

Administrative sanctions include fines, reprimand or denial, suspension, probation, or revocation of a certificate pursuant to Section 13627 of the Water Code and may be taken by the State Water Resources Control Board (SWRCB) against any person, agency, district, or other entity found in violation of specific sections of the Operator Certification Regulations or Water Code. The following are administrative sanctions taken by the SWRCB against entities operating wastewater treatment plants and certified operators of wastewater plants.

Administrative Civil Liability (Fines)

The following are administrative sanctions taken by the SWRCB against entities operating wastewater treatment plants.

Borrego Springs Park Community Services District

Misconduct: Operation of a wastewater treatment plant by personnel without certification

Discipline: $4,300 Administrative Civil Liability paid

The District was found to have operated its wastewater treatment facility for a period of 678 calendar days using two employees who did not have valid wastewater treatment plant operator certificates. The District could have been assessed civil liability for as much as $135,000. The civil liability was proposed at $4,300 which the District paid in February 1998.

City of Ione

Misconduct: Operation of a wastewater treatment plant by personnel without certification

Discipline: $2,800 Administrative Civil Liability paid

An investigation found that between May 23, 1996 through January 8, 1997 the City operated its wastewater treatment plant for 35 calendar days using an employee who did not have a valid wastewater treatment plant operator certificate. A civil liability for as much as $3,500 could have been imposed on the City. The civil liability was proposed at $2,800 which the District paid in September 1997.

Actions Against Operator Certificates

The following are administrative sanctions taken by the SWRCB against California certified operators.

Raymond Guanill

Name of Facility: Rodeo Sanitary District

Misconduct: Falsification of Records; Negligence; OIT's Without Direct Supervision

Discipline: Grade V Certificate Revoked; Cannot reapply for certification for three (3) years.

The Division of Clean Water Programs found that the Chief Plant Operator (CPO) disregarded failing monitoring tests and falsified results. The CPO also was found to be negligent in his duties and had allowed an Operator-in-Training to work without direct supervision. Guanill's Grade V certificate was revoked on March 2, 1998. Any application by Guanill for certification will not be accepted by the Office of Operator Certification for a period of three (3) years.

Michael Valverde

Name of Facility: California Men's Colony Wastewater Treatment Plant

Misconduct: Falsification of Records; Allow Discharge Which Threatened Public Health

Discipline: Grade IV Certificate Revoked; Cannot apply for re-certification for two (2) years

An investigation by the Regional Water Quality Control Board - Central Coast Region along with the Federal Bureau of Investigations (FBI) found that allegations of the Chief Plant Operator (CPO) falsifying records were true. It was also found that the CPO allowed discharges in violation of the National Pollutant Discharge Elimination System (NPDES) permit which threatened public health. The SWRCB revoked the CPO's certificate. Valverde cannot apply for re-certification for a period of two (2) years. Valverde also pled guilty in Federal Court to two felony counts and is awaiting sentencing.

Kenneth R. Caldwell

Name of Facility: Yucaipa Valley Water District Wastewater Treatment Plant

Misconduct: Falsification of Records; Negligence in Duties

(Continued on Page 4, Column 2)

Operator Certification Regulations Amended

Title 23, the California Code of Regulations (CCR) for Wastewater Treatment Plant Classification, Operator Certification, and Contract Operator Registration has been amended and the amended regulations are effective April 27, 1998.

The primary purpose of the amendments is to allow certified water treatment plant operators to operate water recycling treatment plants that accept secondary or better quality treated wastewater and treat it to higher levels for reuse. The current CCR allow only certified wastewater operators to operate water recycling treatment plants.

There have been several local agencies which have requested these amendments to give them the flexibility to hire either certified wastewater treatment plant operators or certified water treatment plant operators. The State Water Resources Control Board (SWRCB) agrees with local agencies and has found that certified water treatment plant operators are qualified to operate water recycling treatment plants.

Actions Against Operator Certificates

(Continued From Page 3)

Discipline: Grade V Certificate Reduced to Grade II for a period of three (3) years

Evidence of falsified records by the Chief Plant Operator (CPO) was compiled by the Regional Water Quality Control Board - Santa Ana Region and forwarded to the Office of Operator Certification. Discipline to reduce Caldwell's certification from a Grade V to a Grade II was imposed in August 1997. Caldwell cannot apply to obtain higher certification for a period of three (3) years.

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APPENDIX X

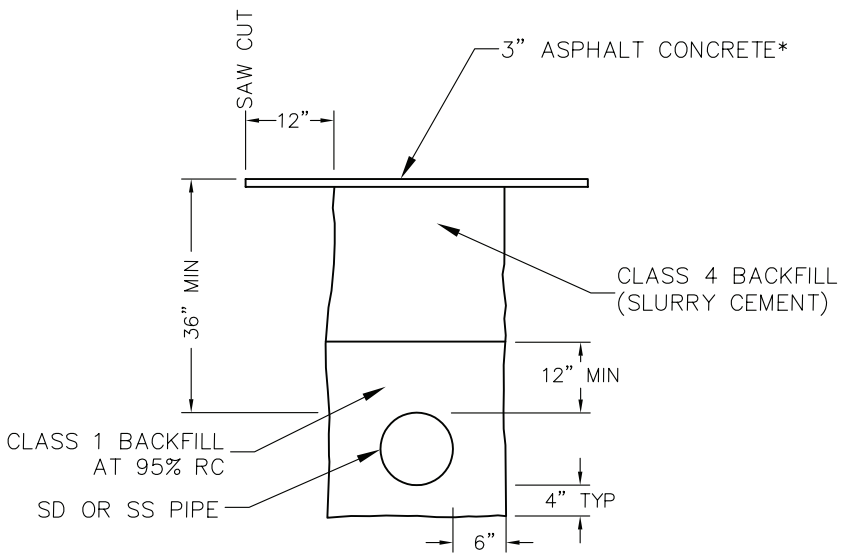
IMPROVEMENT PROJECT CoF AND PoF RATINGS

APPENDIX X
CITY OF ANGELS WASTEWATER MASTER PLAN
IMPROVEMENT PROJECT COF AND POF RATINGS

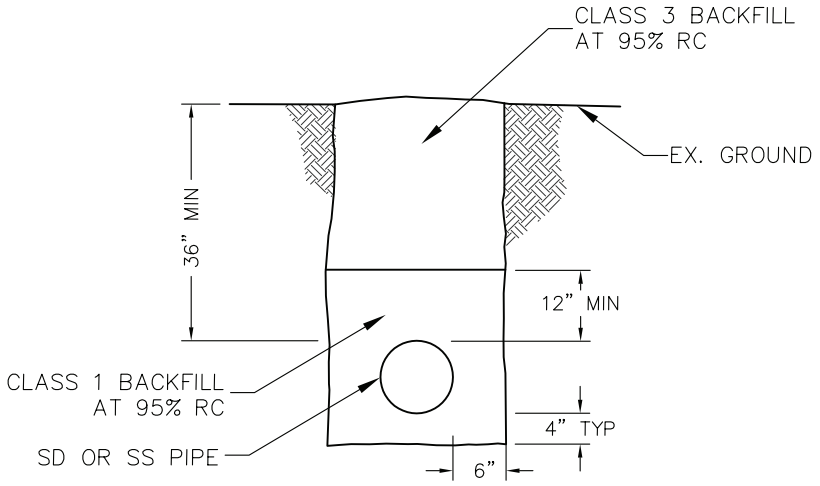
		CoF Categories and Ratings					PoF Categories and Ratings					BRE
Wastewater System	**Improvement Project**	**Flow**	**Potential Costs**	**Environmental Impact**	**Ease of Repair**	**Overall CoF Rating**	**Hydraulic Capacity**	**Regulatory Compliance**	**Safety**	**Operation and Maintenance Requirements**	**Overall PoF Rating**	(CoF x PoF)
Collection System	Phase 1 – Mitigation of Existing Surcharged Sewers, Vallecito Road	3	3	5	5	16	20	0	0	10	20	320
Sprayfields	Sprayfield Improvements – Phase I	5	5	5	0	15	0	20	0	20	20	300
Sprayfields	Sprayfield Improvements – Phase II	5	5	5	0	15	0	20	0	20	20	300
Sprayfields	Sprayfield Improvements – Phase III	5	5	5	0	15	0	20	0	20	20	300
Collection System	Phase 1 – Mitigation of Existing Surcharged Sewers, East Trunk Sewer	3	3	5	1	12	20	0	0	10	20	240
Collection System	Flow monitoring evaluation	5	5	0	0	10	15	0	0	10	15	150
WWTP	Sludge Removal Facilities at EQ Basin	5	0	0	0	5	15	0	10	20	20	100
WWTP	Gunite Side Slopes at EQ Basin	5	0	0	0	5	15	0	10	20	20	100
WWTP	Conversion of Existing Sludge Drying Beds to Stockpile Areas	5	0	0	0	5	15	0	10	20	20	100
WWTP	Concrete Partition Walls at EQ Basin	5	0	0	0	5	15	0	10	20	20	100
WWTP	Pre-filter turbidimeter	5	0	0	0	5	0	20	0	0	20	100
Collection System	Phase 2 –Mitigation of Buildout Surcharged Sewers with reduced I/I, West Trunk Sewer	1	3	0	0	4	20	0	0	10	20	80
WWTP	Grit Chamber at Headworks	5	0	0	0	5	0	0	10	10	10	50
WWTP	Office Building with Training Classroom	5	0	0	0	5	0	0	10	0	10	50
Collection System	Phase 3 – Mitigation of Buildout Surcharged Sewers, WWTP North Trunk Sewer	5	3	5	1	14	2	0	0	0	2	28
Collection System	Phase 3 – Mitigation of Buildout Surcharged Sewers, Greenhorn Creek Area, North Main Street, Angel Oaks Drive	1	3	0	1	5	2	0	0	0	2	10
WWTP	Influent Flow Meter and Vault	5	0	0	0	5	0	0	0	0	0	0

APPENDIX Y

CITY OF ANGELS 2010 IMPROVEMENT STANDARDS, TRENCH DETAIL SS-5



ROADWAY TRENCH



OFF-ROAD TRENCH

NOTES:

1. ALL EXCAVATION WITHIN CITY RIGHT-OF-WAY SHALL BE BACKFILLED IN ACCORDANCE WITH SECTION 19-3 OF THE STATE STANDARD SPECIFICATIONS.
2. AREA ADJACENT TO THE TRENCH SHALL SHALL BE LEFT IN A CONDITION EQUAL TO OR BETTER THAN EXISTED PRIOR TO CONSTRUCTION.
3. SAW CUT EXISTING PAVEMENT BEFORE EXCAVATING.
4. PERCENT RELATIVE COMPACTION (RC) SHALL BE RELATIVE TO THE STANDARD LABORATORY CURVE DERIVED BY ASTM TEST METHOD D1557.
5. MAXIMUM TRENCH WIDTH SHALL BE 24" PLUS OUTSIDE DIAMETER OF PIPE, NO EXCEPTIONS.

* STRUCTURAL SECTION ELEMENTS MAY BE INCREASED WHERE REQUIRED BY THE CITY ENGINEER DUE TO SOIL CONDITIONS AND/OR TRAFFIC CONSIDERATIONS. THE REPLACEMENT STRUCTURAL SECTION SHALL EQUAL THE EXISTING SECTION AS A MINIMUM REQUIREMENT IN GENERAL.

TRENCH DETAILS

DRAWN BY: MSO	SCALE: N.T.S.	DRAWING NO.:	CITY of ANGELS
APPROVED: GSG	DATE: SEPTEMBER 2010	SS-5	

REV No.:	DATE:	BY:

APPENDIX Z

PIPE UNIT COST BREAKDOWN

APPENDIX Z
CITY OF ANGELS WASTEWATER MASTER PLAN
PROBABLE UNIT PIPE CONSTRUCTION COST BASIS

						Excavation Quantities (per unit length)					Earthwork and Pavement Cost								Installation Cost						Piping Cost	TOTAL (rounded)					
											Earthwork																				
Description (Diameter and Depth)	Material	Assumed Trench Depth (ft)	Trench Width (ft)	Surface Width (ft)	Installation Rate (lf/day)	Excavation (cy)	Bedding (cy)	Backfill (cy)	Compaction (cy)	Pavement Removal & Replacement (sf)	Excavation ($/lf)	Bedding ($/lf)	Class IV Backfill ($/lf)	Compaction ($/lf)	EARTHWORK SUBTOTAL ($/lf)	Shoring for Trenches >5.5' deep ($/lf)	Pavement Removal & Replacement ($/lf)	Site Preparation ($/lf)	Labor & Equipment ($/lf)	Traffic Control ($/lf)	Permit Compliance & Public Coordination ($/lf)	Connections & Improvements with Existing Structures/ Utilities ($/lf)	Protection of Existing Structures/ Utilities ($/lf)	INSTALLATION SUBTOTAL ($/lf)	PIPING SUBTOTAL ($/lf)	Earthwork ($/lf)	Shoring for Trenches >5.5' deep ($/lf)	Pavement Removal & Replacement ($/lf)	Installation ($/lf)	Piping ($/lf)	Total Cost ($/lf)
8-inch; 0-5 ft	PVC	5.50	1.67	2.67	225	0.34	0.12	0.21	0.33	2.67	6.79	1.21	20.58	1.63	30.21	0.00	26.67	2.00	13.33	5.00	4.00	40.00	4.00	66.33	3.90	31	0	27	67	4	129
8-inch; 5-10 ft	PVC	10.50	1.67	2.67	200	0.65	0.12	0.51	0.64	2.67	12.96	1.21	51.44	3.18	68.79	6.00	26.67	2.00	15.00	5.00	4.00	40.00	4.00	68.00	3.90	69	6	27	68	4	174
8-inch; 10-15 ft	PVC	15.50	2.67	4.67	150	1.53	0.20	1.32	1.52	4.67	30.62	2.01	131.69	7.59	171.90	6.00	46.67	2.00	20.00	5.00	4.00	40.00	4.00	73.00	3.90	172	6	47	73	4	302
10-inch; 0-5 ft	PVC	5.50	1.83	2.83	225	0.37	0.14	0.22	0.35	2.83	7.47	1.38	21.50	1.77	32.12	0.00	28.33	2.00	13.33	5.00	4.00	40.00	4.00	66.33	6.10	33	0	29	67	7	136
10-inch; 5-10 ft	PVC	10.50	1.83	2.83	200	0.71	0.14	0.55	0.69	2.83	14.26	1.38	55.45	3.46	74.56	6.00	28.33	2.00	15.00	5.00	4.00	40.00	4.00	68.00	6.10	75	6	29	68	7	185
10-inch; 10-15 ft	PVC	15.50	2.83	4.83	150	1.63	0.22	1.38	1.61	4.83	32.53	2.25	138.17	8.03	180.98	6.00	48.33	2.00	20.00	5.00	4.00	40.00	4.00	73.00	6.10	181	6	49	73	7	316
12-inch; 0-5 ft	PVC	5.50	2.00	3.00	225	0.41	0.16	0.22	0.38	3.00	8.15	1.56	22.22	1.89	33.82	0.00	30.00	2.00	13.33	5.00	4.00	40.00	4.00	66.33	8.80	34	0	30	67	9	140
12-inch; 5-10 ft	PVC	10.50	2.00	3.00	200	0.78	0.16	0.59	0.75	3.00	15.56	1.56	59.26	3.74	80.12	6.00	30.00	2.00	15.00	5.00	4.00	40.00	4.00	68.00	8.80	81	6	30	68	9	194
12-inch; 10-15 ft	PVC	15.50	3.00	5.00	150	1.72	0.25	1.44	1.69	5.00	34.44	2.49	144.44	8.47	189.84	6.00	50.00	2.00	20.00	5.00	4.00	40.00	4.00	73.00	8.80	190	6	50	73	9	328
15-inch; 0-5 ft	PVC	5.50	2.25	3.25	225	0.46	0.18	0.23	0.41	3.25	9.17	1.84	22.92	2.06	35.98	0.00	32.50	2.00	13.33	5.00	4.00	40.00	4.00	66.33	13.00	36	0	33	67	13	149
15-inch; 5-10 ft	PVC	10.50	2.25	3.25	175	0.88	0.18	0.65	0.83	3.25	17.50	1.84	64.58	4.15	88.07	6.00	32.50	2.00	17.14	5.00	4.00	40.00	4.00	70.14	13.00	89	6	33	71	13	212
15-inch; 10-15 ft	PVC	15.50	3.25	5.25	150	1.87	0.29	1.53	1.82	5.25	37.31	2.86	153.47	9.10	202.74	6.00	52.50	2.00	20.00	5.00	4.00	40.00	4.00	73.00	13.00	203	6	53	73	13	348
18-inch; 0-5 ft	PVC	5.50	2.50	3.50	225	0.51	0.21	0.23	0.44	3.50	10.19	2.12	23.15	2.22	37.68	0.00	35.00	2.00	13.33	5.00	4.00	40.00	4.00	66.33	19.20	38	0	35	67	20	160
18-inch; 5-10 ft	PVC	10.50	2.50	3.50	175	0.97	0.21	0.69	0.91	3.50	19.44	2.12	69.44	4.53	95.55	6.00	35.00	2.00	17.14	5.00	4.00	40.00	4.00	70.14	19.20	96	6	35	71	20	228
18-inch; 10-15 ft	PVC	15.50	3.50	5.50	125	2.01	0.32	1.62	1.94	5.50	40.19	3.23	162.04	9.72	215.18	6.00	55.00	2.00	24.00	5.00	4.00	40.00	4.00	77.00	19.20	216	6	55	77	20	374
21-inch; 0-5 ft	PVC	5.50	2.75	3.75	225	0.56	0.24	0.23	0.47	3.75	11.20	2.42	22.92	2.36	38.90	0.00	37.50	2.00	13.33	5.00	4.00	40.00	4.00	66.33	27.00	39	0	38	67	27	171
21-inch; 5-10 ft	PVC	10.50	2.75	3.75	175	1.07	0.24	0.74	0.98	3.75	21.39	2.42	73.84	4.90	102.55	6.00	37.50	2.00	17.14	5.00	4.00	40.00	4.00	70.14	27.00	103	6	38	71	27	245
21-inch; 10-15 ft	PVC	15.50	3.75	5.75	125	2.15	0.36	1.70	2.06	5.75	43.06	3.62	170.14	10.32	227.14	6.00	57.50	2.00	24.00	5.00	4.00	40.00	4.00	77.00	27.00	228	6	58	77	27	396
24-inch; 0-5 ft	PVC	5.50	3.00	4.00	225	0.61	0.27	0.22	0.49	4.00	12.22	2.73	22.22	2.47	39.64	0.00	40.00	2.00	13.33	5.00	4.00	40.00	4.00	66.33	33.00	40	0	40	67	33	180
24-inch; 5-10 ft	PVC	10.50	3.00	4.00	175	1.17	0.27	0.78	1.05	4.00	23.33	2.73	77.78	5.25	109.09	6.00	40.00	2.00	17.14	5.00	4.00	40.00	4.00	70.14	33.00	110	6	40	71	33	260
24-inch; 10-15 ft	PVC	15.50	4.00	6.00	125	2.30	0.40	1.78	2.18	6.00	45.93	4.02	177.78	10.90	238.63	6.00	60.00	2.00	24.00	5.00	4.00	40.00	4.00	77.00	33.00	239	6	60	77	33	415

APPENDIX AA

COLLECTION SYSTEM IMPROVEMENT PROJECT COSTS

APPENDIX AA
CITY OF ANGELS WASTEWATER MASTER PLAN
COLLECTION SYSTEM IMPROVEMENT COST BREAKDOWN

Phase	Project Description	Upstream Manhole	Downstream Manhole	Length, ft	Buildout Diameter, in	Unit Price Category	Unit Cost, $	Construction Cost, $	Total Construction Cost, $	Total Project Cost, $
1	East Trunk Sewer	10	9	280	18	18-inch; 0-5 ft	160	44,800	53,760	67,200
		15	15A	43	15	15-inch; 0-5 ft	149	6,407	7,688	9,611
		15A	10	321	18	18-inch; 5-10 ft	228	73,188	87,826	109,782
		16	15	279	15	15-inch; 5-10 ft	212	59,148	70,978	88,722
		17	16	264	15	15-inch; 5-10 ft	212	55,968	67,162	83,952
		19	17	358	12	12-inch; 0-5 ft	140	50,120	60,144	75,180
		21	20	128	12	12-inch; 0-5 ft	140	17,920	21,504	26,880
		23	22	55	12	12-inch; 0-5 ft	140	7,700	9,240	11,550
		24	23	38	12	12-inch; 0-5 ft	140	5,320	6,384	7,980
		24-A	24	139	12	12-inch; 0-5 ft	140	19,460	23,352	29,190
		25	24-A	97	12	12-inch; 0-5 ft	140	13,580	16,296	20,370
		26	25	98	12	12-inch; 0-5 ft	140	13,720	16,464	20,580
		29	26	155	12	12-inch; 0-5 ft	140	21,700	26,040	32,550
		30	29	61	12	12-inch; 0-5 ft	140	8,540	10,248	12,810
	Subtotal			2316 ft					$397,571	$477,085
1	Vallecito Road	35	34	149	12	12-inch; 5-10 ft	194	28,906	34,687	43,359
		36	35	225	12	12-inch; 5-10 ft	194	43,650	52,380	65,475
		37	36	238	12	12-inch; 5-10 ft	194	46,172	55,406	69,258
		38	37	128	12	12-inch; 5-10 ft	194	24,832	29,798	37,248
		39	38	228	15	15-inch; 5-10 ft	212	48,336	58,003	72,504
		42	41	337	12	12-inch; 0-5 ft	140	47,180	56,616	70,770
		44	43	109	12	12-inch; 5-10 ft	194	21,146	25,375	31,719
		44-A	44	66	15	15-inch; 0-5 ft	149	9,834	11,801	14,751
		44-A-1	44-A	204	10	10-inch; 0-5 ft	136	27,744	33,293	41,616
		44-B	44-A	38	15	15-inch; 0-5 ft	149	5,662	6,794	8,493

APPENDIX AA
CITY OF ANGELS WASTEWATER MASTER PLAN
COLLECTION SYSTEM IMPROVEMENT COST BREAKDOWN

Phase	Project Description	Upstream Manhole	Downstream Manhole	Length, ft	Buildout Diameter, in	Unit Price Category	Unit Cost, $	Construction Cost, $	Total Construction Cost, $	Total Project Cost, $
1	Vallecito Road	45	44-B	37	12	12-inch; 0-5 ft	140	5,180	6,216	7,770
		50	49	92	12	12-inch; 0-5 ft	140	12,880	15,456	19,320
		Subtotal		1851 ft					$321,522	$385,826
2	West Trunk Sewer	9-1	T-7	307	18	18-inch; 10-15 ft	374	114,818	137,782	172,227
		9-10	T-1	71	10	10-inch; 5-10 ft	185	13,135	15,762	19,703
		9-10	9-11	318	10	10-inch; 0-5 ft	136	43,248	51,898	64,872
		9-2	9-1	331	15	15-inch; 5-10 ft	212	70,172	84,206	105,258
		9-3	T-6	185	12	12-inch; 0-5 ft	140	25,900	31,080	38,850
		9-4	T-5	182	12	12-inch; 0-5 ft	140	25,480	30,576	38,220
		9-5	T-4	225	12	12-inch; 5-10 ft	194	43,650	52,380	65,475
		9-6	T-3	150	10	10-inch; 0-5 ft	136	20,400	24,480	30,600
		9-7	T-2	169	15	15-inch; 5-10 ft	212	35,828	42,994	53,742
		9-8	9-7	305	15	15-inch; 5-10 ft	212	64,660	77,592	96,990
		9-8	9-9	39	12	12-inch; 5-10 ft	194	7,566	9,079	11,349
		T-1	9-9	119	12	12-inch; 0-5 ft	140	16,660	19,992	24,990
		T-2	9-6	103	10	10-inch; 5-10 ft	185	19,055	22,866	28,583
		T-3	9-5	135	10	10-inch; 0-5 ft	136	18,360	22,032	27,540
		T-4	9-4	103	12	12-inch; 5-10 ft	194	19,982	23,978	29,973
		T-5	9-3	96	12	12-inch; 0-5 ft	140	13,440	16,128	20,160
		T-6	9-2	82	12	12-inch; 0-5 ft	140	11,480	13,776	17,220
		T-7	9	146	18	18-inch; 10-15 ft	374	54,604	65,525	81,906
		Subtotal		3066 ft					$618,438	$742,126

APPENDIX AA
CITY OF ANGELS WASTEWATER MASTER PLAN
COLLECTION SYSTEM IMPROVEMENT COST BREAKDOWN

Phase	Project Description	Upstream Manhole	Downstream Manhole	Length, ft	Buildout Diameter, in	Unit Price Category	Unit Cost, $	Construction Cost, $	Total Construction Cost, $	Total Project Cost, $
3	Main Street, Angel Oaks Drive, Greenhorn Creek area	100	99	332	10	10-inch; 0-5 ft	136	45,152	54,182	67,728
		101-1	101A	79	8	8-inch; 0-5 ft	129	10,191	12,229	15,287
		A-11	A-12	332	10	10-inch; 5-10 ft	185	61,420	73,704	92,130
		A-12	A-13	306	10	10-inch; 0-5 ft	136	41,616	49,939	62,424
		A-8	A-9	289	8	8-inch; 0-5 ft	129	37,281	44,737	55,922
		A-9	A-10	257	8	8-inch; 0-5 ft	129	33,153	39,784	49,730
		G-17	PS2	101	8	8-inch; 0-5 ft	129	13,029	15,635	19,544
		G-17-2	G-17-1	211	8	8-inch; 0-5 ft	129	27,219	32,663	40,829
		G-26	G-17-7	241	8	8-inch; 10-15 ft	302	72,782	87,338	109,173
		G-27	G-26	177	8	8-inch; 5-10 ft	174	30,798	36,958	46,197
	Subtotal			2325 ft					$372,641	$447,169
3	WWTP North Trunk Sewer	2	Outfall	254	21	21-inch; 0-5 ft	171	43,434	52,121	65,151
		3	2	98	21	21-inch; 0-5 ft	171	16,758	20,110	25,137
		4	3	63	21	21-inch; 0-5 ft	171	10,773	12,928	16,160
		5	4	184	21	21-inch; 0-5 ft	171	31,464	37,757	47,196
		6	5	83	21	21-inch; 0-5 ft	171	14,193	17,032	21,290
		7	6	165	21	21-inch; 0-5 ft	171	28,215	33,858	42,323
		8	7	240	21	21-inch; 0-5 ft	171	41,040	49,248	61,560
		9	8	324	21	21-inch; 0-5 ft	171	55,404	66,485	83,106
	Subtotal			1411 ft					$241,281	$289,537

APPENDIX BB

WASTEWATER TREATMENT PLANT IMPROVEMENT PROJECT COSTS

APPENDIX BB
CITY OF ANGELS WASTEWATER MASTER PLAN
WWTP IMPROVEMENTS DETAILED PROJECT COSTS

Item No.	Description	Quantity	Unit Cost, ($)	Subtotal, ($)	Construction Cost[a], ($)	Project Cost[b], ($)
1	Grit Chamber at Headworks[c]	1	59,000 LS	59,000	71,000	89,000
2	Pre-Filter Turbidimeter	1	3,500 EA	3,500	5,000	6,000
3	Gunite Side Slopes at EQ Basin	36,600	2.50 SF	91,500	110,000	138,000
4	Concrete Partition Walls at EQ Basin[c]	15	650 CY	9,630	12,000	15,000
5	Sludge Removal Facilities at EQ Basin[c]	600	650 CY	390,000	468,000	585,000
6	Conversion of Existing Sludge Drying Beds to Stockpile Areas	2	12,900 EA	25,800	31,000	39,000
7	Office Building with Training Classroom	800	250 SF	200,000	240,000	300,000
8	Influent Flow Meter and Vault[c]	1	38,000 LS	38,000	46,000	58,000
			Total	817,430	983,000	1,230,000

[a] Construction costs include a 20% contingency
[b] Project costs include a 25% contingency for engineering, construction management, and administration
[c] See detailed costs below

Detailed Costs

		Quantity	Unit Cost, ($)	Subtotal, ($)
Item No. 1	Grit Chamber at Headworks: Assume 6' x 6' x 8.5' interior dimensions w/1' thick side walls and 1.5' thick base			
	Excavation (Assume 5' from all edges)	174	40 CY	6,960
	Backfill	150	40 CY	6,012
	Concrete Walls/Slabs	13	1,000 CY	13,000
	Fiberglass Grating	36	150 SF	5,400
	Aeration - Air Piping (Assume 4" piping from existing blowers to grit chamber)	220	40 LF	8,800
	Grit Pump (Assume 5 hp)	1	10,000 LS	10,000
	Grit Separator	1	8,000 LS	8,000
	Subtotal			58,172
Item No. 4	Mitigation of Short Circuiting at EQ Basin: Add partitions to prevent sludge collection at basin outlet			
	Concrete Wall Partitions (Assume 4' high, 6" thick)	15	650 CY	9,630
	Subtotal			9,630
	Length of Partition Walls	200	ft	
Item No. 5	Sludge Removal Facilities at EQ Basin: Add concrete to bottom of EQ Basin for working/drying sludge			
	Concrete Bottom at EQ Basin (Assume 6" thick)	600	650 CY	390,000
	Subtotal			390,000

Sludge Drying Area Calcs		Stockpile Area Calcs	
Sludge Drying Area Required for 20-Year Projections, sf	29,955	Stockpile Area Required for 20-Year Projections, sf	5,129
Existing Sludge Drying Area, sf	4,800	Existing Stockpile Area, sf	1,600
Area Lost from Conversion to Stockpile Area, sf	3,200	Additional Stockpile Area Required, sf	3,529
Additional Sludge Drying Area Required, sf	28,355	Area per Sludge Drying Bed, sf	800
Area of Bottom of EQ Basin, sf	32,414	Beds Required for Conversion to Stockpile Area	4
(measured in AutoCAD Phase III Record DWG)		Assumed Number of Units for Conversion	2
		(1 unit = 2 beds)	

Item No. 8	Influent Flow Meter: Assume 6' x 6' x 8.5' vault interior dimensions w/6" thick side walls and base			
	12" Flowmeter	1	11,000 EA	11,000
	12" FCA	1	1,300 EA	1,300
	12" Pipe and Fittings	1	1,000 LS	1,000
	Excavation (Assume 5 ft from all edges)	145	40 CY	5,780
	Backfill	129	40 CY	5,163
	6'-0" x 6'-0" x 8'-6" Flowmeter Vault	5	1,000 CY	5,000
	Flowmeter Vault Hatch	1	7,000 EA	7,000
	Vault ladders	8.5	150 LF	1,275
	Subtotal			37,518