

SEWER MASTER PLAN REVIEW AND CAPITAL IMPROVEMENT PROGRAM UPDATE

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Prepared For:

CITY OF NATIONAL CITY

Engineering/Public Works Department
1234 National City Blvd
National City, CA 91950

N|V|5

15092 Avenue of Science
Suite 200
San Diego, CA 92128

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EXECUTIVE SUMMARY

The City of National City (City) provides sewer service to the area generally within its corporate limits, and receives inflows from the City of San Diego and the United States Navy in route to the regional South Metro Interceptor (SMI). There are nine (9) significant sewer basins within the City that contribute wastewater flow to the National City wastewater collection system: NC2, NC3A, NC3B, NC5, NC7M, NC8M, NC13, NC15, and NC16. The City is responsible for the maintenance, operations, and management of all sewer collection systems that transport flows generated within the City.

In order to plan and develop a wastewater Capital Improvement Program that ensures reliable and cost-effective service, the City retained the services of NV5 to update their sewer system master plan from 2011. The purpose of the Sewer System Master Plan was to prioritize needed capital improvements based upon existing (2018) wastewater flows and projected flows, and while incorporating the critical findings of the 2018 Manhole Condition Assessments conducted by NV5 and the 2009 Sewer Closed-Circuit Television and Condition Assessment Report by others..

Based on the hydraulic analysis presented in Section 6, all deficient gravity mains were grouped and prioritized into the projects illustrated in Figure 8-1. Recommended immediate projects include gravity mains that have a high risk of spilling either since they do not satisfy criteria in the hydraulic model, or because the CCTV inspection reports show severe damage to the structural integrity of the pipe.

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ATTACHMENTS

Attachment 1 - Sewer System Management Plan

Attachment 2 - Wastewater Flow Projections, Metro TAC Technical Memorandum (April 2018)

ABBREVIATIONS AND ACRONYMS

Abbreviations/Acronyms	Definition
ADWF	Average Dry Weather Flow
Avg.....	Average
dia.	Diameter
d/D.....	Depth/Diameter Ratio
ft.....	Feet
FM	Flow Monitor
gpd	Gallons per Day
gpm	Gallons per Minute
in	Inch
I/I	Inflow and Infiltration
Max.	Maximum
MGD	Million Gallons per Day
Min.	Minimum
N/A.....	Not applicable
PDWF	Peak Dry Weather Flow
PF	Peaking Factor
PVC.....	Polyvinyl Chloride
Q	Flow Rate
RDI/I.....	Rainfall-Dependent Infiltration and Inflow
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow

1.0 INTRODUCTION

The City’s most recent sewer master plan effort was completed in March 2011 and contained wastewater flow projections based on population projections, a trunk sewer InfoSWMM hydraulic model utilized for capacity analysis, as well as a twenty (20) year Capital Improvement Program (CIP) to address system deficiencies. Since that time, there has been a significant drop in wastewater flows due to a combination of economic changes and water conservation focus. Water conservation is projected to have significant continued reduction in flows throughout our arid region. With the adoption of Green Building standards, all new buildings constructed in the City will have significantly lower wastewater generation rates because the water usage will be reduced through low flow fixtures and higher efficiency appliances. National City has a blend of old and new and that means there are parts of the City with lower water use and parts with higher use. This master plan is focused on addressing existing systems that are undersized and or severely deteriorating due to age.

2.0 EXISTING SEWER COLLECTION SYSTEM

The City provides sewer service to the area generally within its corporate limits, and receives inflows from the City of San Diego and the United States Navy in route to the regional South Metro Interceptor (SMI). The City has approximately 100 miles of sewer collection pipes that drain westerly to the SMI, and ultimately to the Point Loma Wastewater Treatment Plant. Table 2-1 below includes the total lengths and percentages of each pipe diameter in the collection system. Table 2-2 includes the total lengths and percentages of each pipe material in the collection system. There are nine (9) significant sewer basins within the City that contribute wastewater flow to the National City wastewater collection system: NC2, NC3A, NC3B, NC5, NC7M, NC8M, NC13, NC15, and NC16. While the majority of the sewer collection system drains to the SMI by gravity, there is a low-lying area on Tideland Avenue west of Interstate 5, which is pumped to the interceptor. More details of the existing sewer system may be found in the 2009 Master Plan found in Attachment A.

Table 2-1 - Gravity Mains by Diameter

Diameter (in)	Total Length (ft)	Total Length (miles)	Percentage of City Gravity Mains by Length
6	205,733	38.96	37.11%
8	257,003	48.67	46.35%
10	31,173	5.9	5.62%
12	20,365	3.86	3.67%
15	16,445	3.11	2.97%
18	8,932	1.69	1.61%
24	8,286	1.57	1.49%
27	3,485	0.66	0.63%
33	2,106	0.4	0.38%
36	910	0.17	0.16%
Total	554,437	105.01	100.00%

Table 2-2 – Gravity Mains by Material

Material Abbreviation	Material Name	Total Length (ft)	Total Length (miles)	Percentage of City Gravity Mains by Length
CCP	Concrete Cylinder Pipe	1,145	0.22	0.21%
CONC	Concrete	135	0.03	0.02%
CP	Concrete Pipe	2,115	0.4	0.38%
CP/PVC	Concrete Pipe/Polyvinyl Chloride Pipe	421	0.08	0.08%
CP/VCP	Concrete Pipe/Vitrified Clay Pipe	121	0.02	0.02%
PP	Plastic Pipe	211	0.04	0.04%
PVC	Polyvinyl Chloride Pipe	15,060	2.85	2.72%
PVC/VCP	3	301	0.06	0.05%
VCP	Vitrified Clay Pipe	168,768	31.96	30.44%
VCP/CI	Vitrified Clay Pipe/Concrete Lined	340	0.06	0.06%
VCP/CP/CI	Vitrified Clay Pipe/Concrete Pipe/Concrete Lined	148	0.03	0.03%
UNK	Unknown	365,672	69.26	65.95%
Total		554,437	105.01	100.00%

3.0 WASTEWATER FLOW PROJECTIONS

3.1 2017 Average Dry Weather Wastewater Flow

To calculate the City’s 2018 ADWF, average daily water demands based on water billing records supplied by Sweetwater Authority for 2017, were allocated to individual parcels in the City’s service area and analyzed.

3.2 Existing (2017) Average Dry Weather Wastewater Flow

Recent economic conditions have had a significant impact on the people and businesses within the City. Accordingly, wastewater flow projections based on 2009 water usage do not accurately describe the quantities of current wastewater flows. As shown in Table 3-1, ADS flow monitor data were compared to the same flow meters in 2009. As the differences in the 2009 and 2017 ADS flow meter data illustrates, the 2009 wastewater flow projects varied significantly by basin from those in 2017 with most of the basins decreasing in wastewater generation.

Table 3-1 – 2009 and 2018 Average Dry Weather Flow Comparison

Flow Monitor	ADWF (gpd)		Difference (gpd)
	2009	Existing (2017)	
NC2	434,000	407,142 (out)	-26,858
NC3A	2,782,000	2,884,277 (out)	102,277
NC3B	722,000	705,836 (out)	-16,164
NC4M	403,000	398,580 (out)	-4,420
NC5	1,095,000	609,978 (out)	-485,022
NC6	15,000	12,982 (in)	2,018
NC7M	1,418,000	1,203,685 (out)	-214,315
NC8M	101,000	83,251 (out)	-17,749
NC9M	673,000	657,136 (in)	15,864
NC10	1,135,000	986,105 (in)	148,895
NC11	50,000	52,435 (in)	-2,435
NC12	338,000	331,272 (in)	6,728
NC13	21,000	20,993 (in)	7
NC15	134,000	157,040 (out)	23,040
NC16	249,000	266,542 (in)	-17,542
Total	4,608,000	4,122,324	-485,676

3.2.1 Duty Factors

The 2018 Average Dry Weather Flows by sewer basin were recalculated to correspond to the observed Existing (2017) ADWF obtained for each ADS Flow Meter and by comparing actual water use in each land use by basin. Wastewater duty factors indicate the amount of wastewater flow per gross parcel area expected from a specific land use. The average dry weather flow for each ADS Meter was attributed to a basin and wastewater duty factors were developed by integrating land acreage, land use classifications, flow monitoring data and GIS data available during this study. Table 3-2 shows duty factors that applied to specific land uses in specific sewer basins in within the City, in order to match recorded basin flows.

Table 3-2 – Existing Basin-Specific Land Use Duty Factors

Land Use	Duty Factor	Unit
NC2		
Single family residential (R-1)	200	(gpd/DU)
Minor multiple (R-2)	145	(gpd/DU)
Multiple residential (R-4)	125	(gpd/DU)
Commercial	2,115	(gpd/ac)
Industrial (M zone)	260	(gpd/ac)
Special and/or misc.	645	(gpd/ac)
Unzoned	1205	(gpd/ac)

Table 3-2 – Existing Basin-Specific Land Use Duty Factors

Land Use	Duty Factor	Unit
NC3A		
Single family residential (R-1)	165	(gpd/DU)
Minor multiple (R-2)	115	(gpd/DU)
Restricted multiple (R-3)	105	(gpd/DU)
Multiple residential (R-4)	125	(gpd/DU)
Commercial	1,185	(gpd/ac)
Industrial (M zone)	965	(gpd/ac)
Special and/or misc.	322	(gpd/ac)
Unzoned	1205	(gpd/ac)
NC3B		
Single family residential (R-1)	190	(gpd/DU)
Minor multiple (R-2)	120	(gpd/DU)
Multiple residential (R-4)	130	(gpd/DU)
Commercial	2,865	(gpd/ac)
Industrial (M zone)	430	(gpd/ac)
Special and/or misc.	645	(gpd/ac)
Unzoned	1205	(gpd/ac)
NC5		
Single family residential (R-1)	175	(gpd/DU)
Minor multiple (R-2)	110	(gpd/DU)
Restricted multiple (R-3)	105	(gpd/DU)
Multiple residential (R-4)	135	(gpd/DU)
Commercial	2,290	(gpd/ac)
Industrial (M zone)	870	(gpd/ac)
Special and/or misc.	545	(gpd/ac)
Unzoned	545	(gpd/ac)
NC7M		
Single family residential (R-1)	175	(gpd/DU)
Minor multiple (R-2)	90	(gpd/DU)
Restricted multiple (R-3)	105	(gpd/DU)
Multiple residential (R-4)	160	(gpd/DU)
Commercial	1,945	(gpd/ac)
Unzoned	180	(gpd/ac)
NC8M		
Multiple residential (R-4)	160	(gpd/DU)
Commercial	965	(gpd/ac)

Table 3-2 – Existing Basin-Specific Land Use Duty Factors

Land Use	Duty Factor	Unit
NC13		
Single family residential (R-1)	185	(gpd/DU)
Minor multiple (R-2)	120	(gpd/DU)
Multiple residential (R-4)	160	(gpd/DU)
Commercial	2,345	(gpd/ac)
NC15		
Single family residential (R-1)	210	(gpd/DU)
Multiple residential (R-4)	160	(gpd/DU)
Commercial	2,785	(gpd/ac)
Unzoned	2845	(gpd/ac)
NC16		
Single family residential (R-1)	190	(gpd/DU)
Minor multiple (R-2)	100	(gpd/DU)
Restricted multiple (R-3)	105	(gpd/DU)
Multiple residential (R-4)	200	(gpd/DU)
Commercial	2,285	(gpd/ac)
Industrial (M zone)	565	(gpd/ac)
Unzoned	1220	(gpd/ac)

The above duty factors were used to accurately model what is happening in the existing system. However, over time it is recognized that exact water usage would change and properties may change hands resulting in the need for average Land Use Duty Factors to evaluate future system needs. Table 3-3 includes NV5’s recommended Duty Factors for the City’s Land Use Zones. These factors were used in the model to project future system capacity deficiencies. As the Green building code is implemented in single family and multi-family homes as properties change ownership, and as low-flow fixtures are installed, these duty factors will continue to be lower. In addition, recently passed water conservation and drought planning statues AB1668 and SB606 will further reduce sewer generation. Based on the above, a duty factor of 180 gpd/DU was utilized for single family residential.

Table 3-3 – Land Use Duty Factors

Land Use	Duty Factor	Unit
Single family residential (R-1)	180	(gpd/DU)
Minor multiple (R-2)	115	(gpd/DU)
Restricted multiple (R-3)	105	(gpd/DU)
Multiple residential (R-4)	135	(gpd/DU)
Commercial	1,760	(gpd/ac)
Industrial (M zone)	765	(gpd/ac)
Restricted commercial	-	(gpd/ac)
Special and/or misc.	395	(gpd/ac)
Unzoned	930	(gpd/ac)

3.3 AVERAGE DRY WEATHER WASTEWATER FLOWS (ADWF) PROJECTIONS

In this analysis, once the ADWF was established for 2017 conditions, SANDAG population projections provided by City staff were utilized to create projected annual growth rates. These growth rates were interpolated and then applied to the existing ADWF wastewater flows to generate the 2023 (5-Year), 2028 (10-Year) and 2038 (20-Year) wastewater flow projections. When available, specific plans were utilized in the more immediate time-increments.

3.4 PEAK DRY WEATHER WASTEWATER FLOW (PDWF)

Peak Dry Weather Flow (PDWF) was estimated based on ADWF. PDWF takes into account the variability of wastewater generation during the day, and includes Groundwater Infiltration (GWI) if anticipated. Wastewater flowrates typically vary based on personal habit and business operation while the magnitude of GWI depends on the percentage of the sewer system submerged, the depth of the groundwater table above the sewer pipelines, and the physical condition of the system. GWI varies due to seasonal changes in groundwater levels and varies gradually due to rainfall events, however it is not directly related to any one rainfall event. In order to account for both varying wastewater generation rates during the day and GWI, PDWF is calculated by multiplying ADWF by a peaking factor.

After analyzing the current land use and determining the aforementioned duty factors, it was determined that the peaking factors used in the master plan prepared in 2011 would accurately represent current wastewater production. These peaking factors were calculated using a flow dependent equation shown below based on the *2010 Sewer Flow Monitoring Study* performed by Infrastructure Engineering Corporation (IEC). For existing flowrates, the average peak dry weather factor was 1.65.

$$\text{Peak Dry Weather Factor} = 1.6487 * (\text{Average Dry Weather Flow Rate})^{-0.035}$$

3.5 PEAK WET WEATHER WASTEWATER FLOW (PWWF)

Peak Dry weather Flow (PDWF) plus Rainfall Dependent Infiltration/Inflow (RDI/I) estimates Peak Wet Weather Wastewater Flow (PWWF) where RDI/I is storm water that enters the wastewater collection system. RDI is directly dependent on the intensity and duration of individual rainfall events but any residual flow is considered as an increase in GWI. To calculate PWWF, ADWF was multiplied by a peaking factor. The peaking factor was calculated using the equation below and based on data gathered during 2017. On average, the peak wet weather factor was 3.06 for existing flowrates.

$$\text{Peak Wet Weather Factor} = 3.0461 * (\text{Average Dry Weather Flow Rate})^{-0.052}$$

4.0 WASTEWATER COLLECTION SYSTEM CRITERIA

In an effort to provide reliable gravity sewer service while minimizing excessive wear or energy usage through force mains and lift stations, sanitary sewers shall be designed according to the following criteria:

4.1 GRAVITY MAIN DESIGN CRITERIA

Sizing a new pipeline is based on the Manning's equation and the following design criteria:

- Pipes less than 12-inches in diameter: 0.50 full at peak wet weather flow
- Pipes 12-inches in diameter and larger: 0.75 full at peak wet weather flow
- Minimum velocity: 2 feet per second
- Maximum velocity: 10 feet per second
- Manning's n: 0.013
- Minimum slope requirements for pipes 10-inches in diameter and smaller: 0.4% (0.004 ft/ft)
- Minimum slope requirements for pipes larger than 10-inches in diameter: 0.1% (0.001 ft/ft)
- Minimum pipe diameter for new construction: 8-inches

4.2 GRAVITY MAIN REPLACEMENT CRITERIA

In an effort to account for the City being mostly built-out and assure that gravity main segments are replaced due to capacity and flow constraints, the following describes the City's replacement criteria:

- Maximum Peak Wet Weather Flow depth-to-Diameter $d/D = 0.75$
- Maximum Peak Dry Weather Flow depth-to-Diameter $d/D = 0.55$ for pipes less than 12-inches in Diameter.
- All pipes requiring replacement shall be designed in accordance with the City's design criteria.

In the event that a gravity main satisfies these replacement criteria, but the pipeline immediately upstream requires upsizing, one (1) additional replacement stipulation may be applicable. The purpose of this replacement stipulation is to assure that pipe-reaches increase in diameter as they progress downstream, and prevent, wherever possible, pipe-reaches from fluctuating up and down in diameter. If a gravity main requires upsizing to a diameter larger than the diameter of the gravity main(s) immediately downstream in the same pipe-reach, and the downstream pipe(s) are less than 750 ft in length before conveying flow to a gravity main of equal or larger diameter than the diameter recommended for the deficient upstream gravity main, then the downstream gravity main(s) of less than 750 ft shall be upsized to the same diameter of the upstream pipe.

The costs for pipe replacement were estimated using an average depth of 10 feet below the ground surface. Table 4-1 shows the cost per linear foot used to estimate the construction costs for pipes to be replaced. It is estimated that these construction costs would represent approximately 70% of the total project cost.

Table 4-1 – Gravity Main Replacement Cost

Diameter (in.)	Pipe Unit Cost (\$/LF)
6	\$460
8	\$480
10	\$600
12	\$720
15	\$900
18	\$1,080
21	\$1,260
24	\$1,440
27	\$1,620
33	\$1,980
36	\$2,150
42	\$2,400

4.3 FORCE MAINS

- Minimum velocity 3 feet per second
- Maximum velocity 5 feet per second
- Maximum Allowable Headloss 10 ft/1,000 ft of pipeline
- Maximum Desired Headloss 5 ft/ 1,000 ft of pipeline

4.4 LIFT STATIONS

Lift Stations should be sized for peak wet weather flow with manufacturer’s recommended cycling times for pumping equipment and should be sized based upon the following criteria:

Lift stations should be capable of meeting the criteria with the largest capacity pump serving as standby.

- 65 percent pump efficiency should be assumed, except where other information is available.
- 95 percent motor efficiency should be assumed, except where other information is available.
- Wet wells should be sized for a minimum of two (2) hours of peak wet weather flow.
- Lift Stations should have emergency stand-by power.

5.0 HYDRAULIC MODEL UPDATE

NV5 utilized Innoyze, Inc.'s InfoSewer and ArcGIS 10.4.1 software to update the wastewater collection system model for the City. The model was used to evaluate existing City owned wastewater facilities and provide recommendations for upsizing. The main components involved in updating the City's sewer hydraulic model are assigning attribute data to emulate the City's physical facilities and loading Existing (2018) and projected 2023, 2028, and 2038 wastewater flows.

5.1 HYDRAULIC MODEL DEVELOPMENT

The City's most current GIS data, originally developed by PBS&J and updated by IEC in 2009 as part of their previous master planning effort (ssewerpipe2.shp and ssmh2.shp), was utilized as the basis for the model infrastructure. Diameters were examined and compared to September 2010 CCTV reports. Discrepancies were verified in the field by the City and subsequently updated in the hydraulic model. All City owned wastewater facilities, excluding laterals, were included in the hydraulic model. This included invert elevations, length, location, and diameters for approximately 2,100 gravity mains, as well as two (2) lift stations.

Three (3) steady-state scenarios were created in the hydraulic model for the Existing (2018), 2023, 2028, 2038 time-increments: Average Dry Weather Flow (ADWF), Peak Dry Weather Flow (PDWF) and Peak Wet Weather Flow (PWWF). These scenarios were then loaded with the wastewater flow projections developed on a parcel-level as previously described.

5.2 WASTEWATER HYDRUALIC MODEL CALIBRATION

When calibrating a hydraulic model, the best available metered data is utilized to either confirm or correct the results predicted by the model. The City provided ADS flow meter data for the NC2, NC3A, NC3B, NC4M, NC5, NC6, NC7M, NC8M, NC9M, NC10, NC11, NC12, NC13, NC15 and NC16 meter sites from 01/01/2017 to 12/31/2017. Once ADWF wastewater flow was determined for each flow meter area in the hydraulic model, the estimated flow was then compared to the ADS Flow Meter readings to ensure calibration of the hydraulic model was within 10 percent, as shown in Table 5-1.

Table 5-1 – 2018 Average Dry Weather Flow Monitor Calibration

ADS Flow Monitor	Land Use Designation	Quantity, Units		Generation Rate, Units		Calculated Wastewater Generation, GPD	Calculated Total Wastewater Generation, gpd	Measured ADS Flow Monitor ADWF, gpd	Adjusted Measured ADS for City Flows Tributary Directly to Meter, gpd	Percent Difference Between Calculated and Measured Flow
NC2	Single-Family Residential (R-1)	198	DU	200	gpd/DU	39,600	270,645	407,000	284,000	-4.7%
	Minor multiple (R-2)	106	DU	145	gpd/DU	15,370				
	Multi-Family Residential (R-4)	213	DU	125	gpd/DU	26,625				
	Commercial	48	ac	2115	gpd/ac	101,520				
	Industrial (M-zone)	70	ac	260	gpd/ac	18,200				
	Special and/or misc.	1	ac	645	gpd/ac	645				
	Unzoned	57	ac	1205	gpd/ac	68,685				
NC3A	Single-Family Residential (R-1)	2256	DU	165	gpd/DU	372,240	1,663,470	2,884,000	1,528,000	8.8%
	Minor multiple (R-2)	1297	DU	115	gpd/DU	149,155				
	Restricted multiple (R-3)	289	DU	105	gpd/DU	30,345				
	Multi-Family Residential (R-4)	2853	DU	125	gpd/DU	356,625				
	Commercial	219	ac	1185	gpd/ac	259,515				
	Industrial (M-zone)	229	ac	965	gpd/ac	220,985				
	Special and/or misc.	41	ac	320	gpd/ac	13,120				
Unzoned	217	ac	1205	gpd/ac	261,485					
NC3B	Single-Family Residential (R-1)	448	DU	190	gpd/DU	85,120	676,469	705,000	705,000	-4.2%
	Minor multiple (R-2)	435	DU	120	gpd/DU	52,200				
	Multi-Family Residential (R-4)	1507	DU	130	gpd/DU	195,910				
	Commercial	92	ac	2865	gpd/ac	263,811				
	Industrial (M-zone)	50	ac	430	gpd/ac	21,622				
	Special and/or misc.	11	ac	645	gpd/ac	6,913				
	Unzoned	42	ac	1205	gpd/ac	50,892				

Table 5-1 – 2018 Average Dry Weather Flow Monitor Calibration

ADS Flow Monitor	Land Use Designation	Quantity, Units		Generation Rate, Units		Calculated Wastewater Generation, GPD	Calculated Total Wastewater Generation, gpd	Measured ADS Flow Monitor ADWF, gpd	Adjusted Measured ADS for City Flows Tributary Directly to Meter, gpd	Percent Difference Between Calculated and Measured Flow
NC5	Single-Family Residential (R-1)	740	DU	175	gpd/DU	129,500	578,325	610,000	590,000	-2.0%
	Minor multiple (R-2)	849	DU	110	gpd/DU	93,390				
	Multi-Family Residential (R-4)	779	DU	135	gpd/DU	105,165				
	Commercial	43	ac	2290	gpd/ac	99,004				
	Industrial (M-zone)	67	ac	870	gpd/ac	58,343				
	Special and/or misc.	1	ac	545	gpd/ac	346				
	Unzoned	170	ac	545	gpd/ac	92,577				
NC7M	Single-Family Residential (R-1)	1334	DU	175	gpd/DU	233,450	429,040	1,204,000	413,000	5.8%
	Minor multiple (R-2)	286	DU	90	gpd/DU	25,740				
	Restricted multiple (R-3)	268	DU	105	gpd/DU	28,140				
	Multi-Family Residential (R-4)	418	DU	160	gpd/DU	66,880				
	Commercial	38	ac	1945	gpd/ac	74,830				
NC8M	Multi-Family Residential (R-4)	120	DU	160	gpd/DU	19,200	85,110	83,000	83,000	2.2%
	Commercial	68	ac	965	gpd/ac	65,910				
NC13	Single-Family Residential (R-1)	42	DU	185	gpd/DU	7,770	21,922	21,000	209,000	4.4%
	Minor multiple (R-2)	25	DU	120	gpd/DU	3,000				
	Multi-Family Residential (R-4)	5	DU	160	gpd/DU	800				
	Commercial	4	ac	2345	gpd/ac	10,352				
NC15	Single-Family Residential (R-1)	364	DU	210	gpd/DU	76,440	149,256	157,000	157,000	-5.0%
	Multi-Family Residential (R-4)	338	DU	160	gpd/DU	54,080				
	Commercial	2	ac	2785	gpd/ac	5,849				
	Unzoned	5	ac	2845	gpd/ac	12,888				

Table 5-1 – 2018 Average Dry Weather Flow Monitor Calibration

ADS Flow Monitor	Land Use Designation	Quantity, Units		Generation Rate, Units		Calculated Wastewater Generation, GPD	Calculated Total Wastewater Generation, gpd	Measured ADS Flow Monitor ADWF, gpd	Adjusted Measured ADS for City Flows Tributary Directly to Meter, gpd	Percent Difference Between Calculated and Measured Flow
NC16	Single-Family Residential (R-1)	415	DU	190	gpd/DU	78,850	261,096	267,000	267,000	-2.0%
	Minor multiple (R-2)	299	DU	100	gpd/DU	29,900				
	Multi-Family Residential (R-4)	126	DU	200	gpd/DU	25,200				
	Commercial	49	ac	2285	gpd/ac	112,627				
	Industrial (M-zone)	1	ac	565	gpd/ac	476				
	Unzoned	12	ac	1220	gpd/ac	14,043				

6.0 HYDRAULIC ANALYSIS

Utilizing the InfoSewer hydraulic model, the ability of City-owned wastewater infrastructure to satisfy the design criteria summarized in Section 4 was evaluated in the existing (2018), 2023, 2028 and 2038 time-increments. There are 155 gravity mains that are unable to satisfy the City's replacement criteria in 2038 and recommended for upsizing by 2038. Replacement diameters for all gravity mains were identified to satisfy the City's design criteria, and accommodate peak flows in 2038. Figure 8-1, placed at the end of this report, illustrates the location of these gravity mains. Specific information for the lift stations and force mains were not available during this study, and were therefore not included in this hydraulic analysis.

6.1 EXISTING (2018) RESULTS

In 2018, 123 gravity mains are unable to satisfy the depth-to-Diameter (d/D) ratio replacement criteria during peak wet weather flow, for a total of 32,675 linear feet (6.19 miles). These gravity mains are presented in Table 8-1, Table 8-3, and Table 8-4.

6.2 2023 RESULTS

In 2023, an additional 14 gravity mains are unable to satisfy the d/D ratio replacement criteria during peak wet weather flow, for a total of 3,381 linear feet (0.65 miles). These gravity mains are presented in Table 8-5.

6.3 2028 RESULTS

In 2028, an additional 10 gravity mains are unable to satisfy the d/D ratio replacement criteria during peak wet weather flow for a total of 2,467 linear feet. These gravity mains are presented in Table 8-6.

6.4 2038 RESULTS

In 2038, an additional 8 gravity mains are unable to satisfy the d/D ratio replacement criteria during peak wet weather flow for a total of 1,967 linear feet. These gravity mains are presented in Table 8-7.

7.0 PIPE CONDITION ASSESSMENTS

The 2009 Sewer Closed-Circuit Television and Condition Assessment Report performed by IEC included all gravity mains with missing hydraulic information, areas with known Fog, Oil and Grease (FOG) issues and areas identified as deficient in the 2008 SSMP. The observations from the CCTV inspection reports were utilized as the basis for condition assessments of the pipe sections that were inspected. The results of the conditions assessments determined the pipe section need for rehabilitation.

7.1 EXISTING (2018) RESULTS

In 2018, 28 gravity mains were identified with severe defects including holes and broken sections of pipe, for a total of 6,354 linear feet. These gravity mains are presented in Table 8-2.

7.2 2023 RESULTS

In 2023, an additional 2 gravity mains showed significant degrees of cracks and fractures, for a total of 441 linear feet.

7.3 2028 AND 2038 RESULTS

It is recommended that the pipe sections with defects that are less significant be inspected to evaluate the progression of these defects, which will aid in determining the need for these sections to be rehabilitated. These gravity mains are presented in Table 8-8.

7.4 REHABILITATION - CIPP LINING

It is recommended that cured-in-place pipe (CIPP) lining be used to repair the pipes found to need rehabilitation. The estimated costs used of CIPP lining per linear foot are shown in Table 7-1.

Table 7-1 – Gravity Main Rehabilitation Cost - CIPP

Diameter	Lining Cost (\$/LF)
6	\$115
8	\$115
10	\$138
12	\$138
15	\$138
18	\$170
21	\$170
24	\$170
27	\$170
33	\$230
36	\$230
42	\$230

8.0 RECOMMENDATIONS AND IMPROVEMENTS

NV5 utilized the results of the hydraulic analysis in Section 6, in conjunction with the findings of the 2009 Sewer Closed-Circuit Television and Condition Assessment Report to develop a phased and prioritized Capital Improvement Program (CIP). Recommended Immediate Projects include those projected as unable to satisfy criteria, and for which flow monitoring data confirmed surcharging (i.e. depth-to-Diameter ratio of 1.0). All CIP projects through 2038 are illustrated in Figure 8-1 at the end of this report.

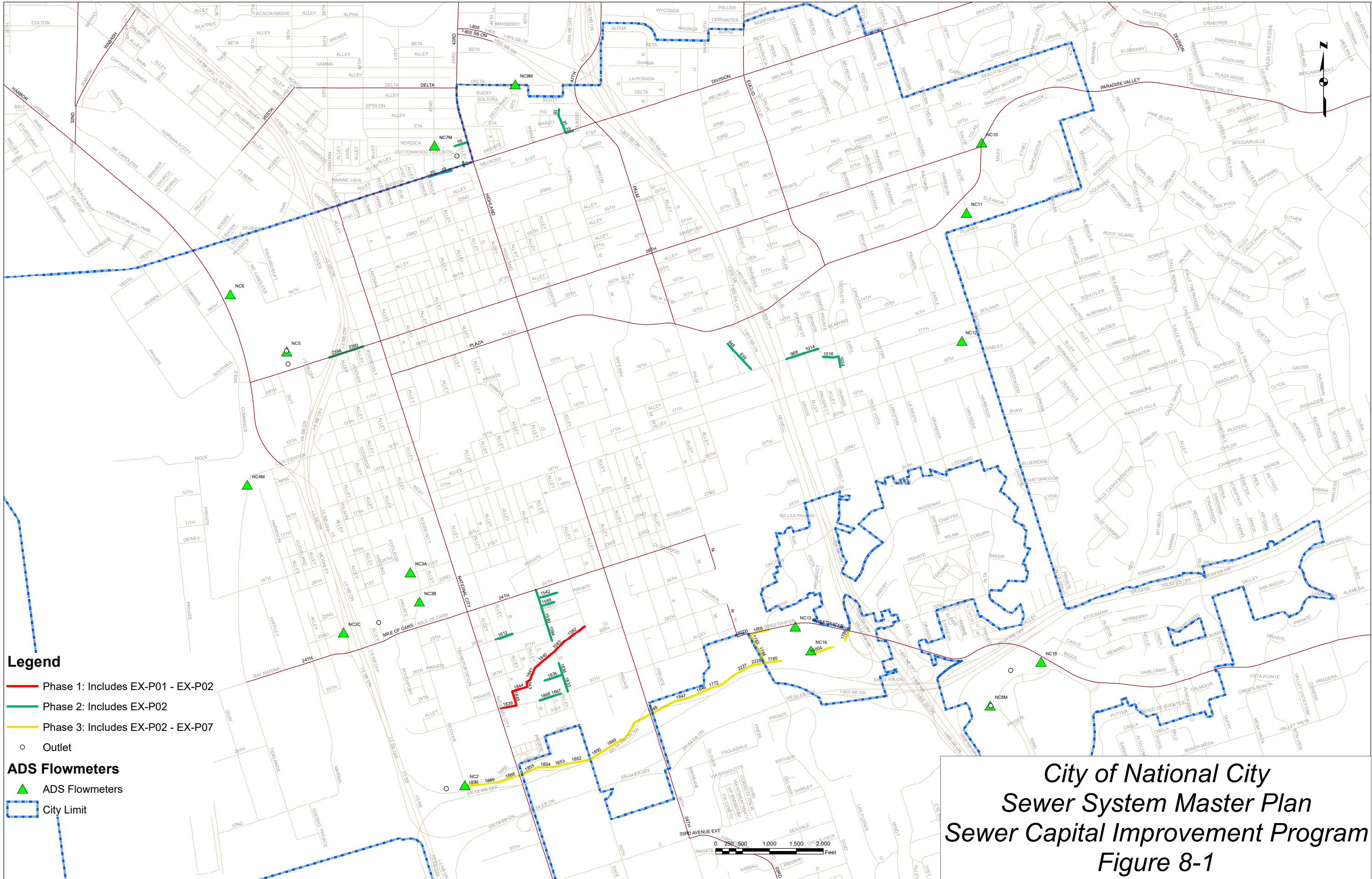
8.1 RECOMMENDED CAPITAL IMPROVEMENT PROGRAM

Based on the hydraulic model results presented in Section 6, gravity mains were prioritized in a specific year by their inability to satisfy criteria for peak dry weather conditions, and then by their inability to satisfy criteria in peak wet weather conditions. NV5 utilized the NASSCO Pipeline Assessment and Certification Program (PACP) structural observations to further prioritize projects within time-increments. The prioritization of pipe segments is shown in Table 9-1. Each phase corresponds to one year with an annual budget of approximately \$1.4 Million in construction costs. In Phase 1 and 2, there is approximately \$100,000 of budget available for the pump station and SCADA system study and approximately \$30,000 of budget available to perform field surveys, discussed later in this section. Phases 1 through 3 are grouped by location and ordered from downstream to upstream. Phases 4 and onward are prioritized based on the estimated d/D. It is recommended that future Phases be re-evaluated to determine if conditions have changed that could require re-prioritization of the proposed improvements.

Preceding the designation of the phase in the first column of Table 9-1 is an identifier that describes the reason for improvement. The letters “EX” signify that a hydraulic deficiency presented itself during the existing model run, “2023” signifies that a hydraulic deficiency presented itself during the 5-year model run and so on. R signifies that the designated improvement has been recommended for rehabilitation based on its condition assessment.

The existing model run yielded 56 pipes with a depth-to-Diameter (d/D) ratio of 1. Of these pipes, 64% had a slope of less than 0.5%. For all phases beyond Phase 2, it is recommended that manhole and pipe inverts be verified by field survey to validate any slopes less than 0.5% as currently included in the hydraulic model. These pipes are labeled in Table 9-1 with an asterisk next to the identification number in the “ID_Pipe” column. Should surveyed inverts indicate slopes that differ from those in the model, the model will need to be corrected and re-run to prioritize the improvements using the verified data.

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Legend

- Phase 1: Includes EX-P01 - EX-P02
- Phase 2: Includes EX-P02
- Phase 3: Includes EX-P02 - EX-P07
- Outlet
- ADS Flowmeters**
- ▲ ADS Flowmeters
- ▭ City Limit

**City of National City
Sewer System Master Plan
Sewer Capital Improvement Program
Figure 8-1**

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Table 8-1 – Gravity Mains Included in the Capital Improvement Program (EX)

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
EX-P01	1839	Upsize & Replace	1495-D, 4591-D	1.00	0.005	168	166	8	12	\$720	310	\$224,000
EX-P01	2221	Upsize & Replace	1495-D, 4591-D	1.00	0.009	168a	168	8	12	\$720	43	\$31,000
EX-P01	1845	Upsize & Replace	1495-D, 4591-D	1.00	0.004	169	168a	8	12	\$720	268	\$193,000
EX-P01	1844	Upsize & Replace	1495-D, 4591-D	1.00	0.004	170	169	8	12	\$720	278	\$201,000
EX-P01	1843	Upsize & Replace	1495-D, 4591-D	1.00	0.005	171	170	8	12	\$720	100	\$73,000
EX-P01	1842	Upsize & Replace	1495-D, 4591-D	1.00	0.005	172	171	8	12	\$720	80	\$58,000
EX-P01	1841	Upsize & Replace	1495-D, 4591-D	1.00	0.005	173	172	8	12	\$720	238	\$172,000
EX-P01	1840	Upsize & Replace	1495-D, 4591-D	1.00	0.004	174	173	8	12	\$720	485	\$350,000
EX-P02	1583*	Upsize & Replace	1496-D, 4591-D	1.00	0.000	175	174	8	12	\$720	243	\$175,000
EX-P02	1582	Upsize & Replace	1496-D, 4592-D	1.00	0.005	176	175	8	12	\$720	600	\$432,000

* Manhole and pipe inverts to be verified by field survey to validate slope

Total: \$1,909,000

* Costs account for an average pipe depth of 10 ft below surface

Table 8-2 – Gravity Mains Included in the Capital Improvement Program (R)

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
R-P02	1543	CIPP	2332-D	0.21	0.027	992	964	6	6	\$115	160	\$19,000
R-P02	1592	CIPP	2332-D	0.27	0.006	991	992	6	6	\$115	160	\$19,000
R-P02	1591	CIPP	2332-D	0.14	0.006	991A	991	6	6	\$115	160	\$19,000
R-P02	1590	CIPP	2332-D	0.06	0.006	990	991A	6	6	\$115	170	\$20,000
R-P02	1594	CIPP	2332-D	0.06	0.054	990	1000	6	6	\$115	331	\$39,000
R-P02	1542	CIPP	2332-D	0.14	0.006	1841	992	6	6	\$115	300	\$35,000
R-P02	2198	CIPP	2332-D	0.13	0.004	6018	1841	6	6	\$115	60	\$7,000
R-P02	1589	CIPP	2332-D	0.14	0.004	991B	991	6	6	\$115	240	\$28,000
R-P02	1836	CIPP	2332-D	0.17	0.038	1116	1115	6	6	\$115	221	\$26,000
R-P02	1833	CIPP	2332-D	0.20	0.006	1120	1116	6	6	\$115	325	\$38,000
R-P02	1835	CIPP	2332-D	0.12	0.020	1117	1116	6	6	\$115	233	\$27,000
R-P02	1867	CIPP	2332-D	0.13	0.012	1119	1119a	6	6	\$115	137	\$16,000
R-P02	1866	CIPP	2332-D	0.09	0.006	1118	1119	6	6	\$115	276	\$32,000
R-P02	1612	CIPP	2332-D	0.15	0.024	998	997	6	6	\$115	331	\$39,000
R-P02	2394	CIPP	848-L	0.28	0.022	128	307	10	10	\$138	330	\$46,000
R-P02	2393	CIPP	848-L	0.14	0.018	905	128	8	8	\$115	330	\$38,000
R-P02	948	CIPP	1511-D, 1131-L, 508-L	0.13	0.088	227	228	8	8	\$115	60	\$7,000
R-P02	939	CIPP	1511-D, 4589-D	0.08	0.064	9998	227	8	8	\$115	520	\$60,000
R-P02	1034	CIPP	2373-D, 1040-L	0.09	0.029	812a	810	6	6	\$115	195	\$23,000
R-P02	1509	CIPP	2373-D, 1040-L	0.13	0.006	810a	810	6	6	\$115	80	\$10,000
R-P02	1016	CIPP	2373-D, 1040-L	0.10	0.007	809	810a	6	6	\$115	201	\$24,000
R-P02	968	CIPP	2371-D	0.20	0.045	699	800	6	6	\$115	355	\$41,000
R-P02	1014	CIPP	2371-D	0.00	0.001	800a	699	6	6	\$115	264	\$31,000

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
R-P02	17	CIPP	2343-D, 5004-D	0.30	0.017	587	587a	8	8	\$115	78	\$10,000
R-P02	19	CIPP	2343-D, 5004-D	0.06	0.024	589	588	6	6	\$115	250	\$29,000
R-P02	20	CIPP	2343-D, 5004-D	0.03	0.097	590	589	6	6	\$115	152	\$18,000
R-P02	16	CIPP	2343-D, 5004-D	0.43	0.004	3101	591a	24	24	\$170	125	\$22,000
R-P02	91	CIPP	5001-D, 2387-D	0.44	0.010	458	450	6	6	\$115	310	\$36,000

* Costs account for an average pipe depth of 10 ft below surface

Total: \$759,000

Table 8-3 – Gravity Mains Included in the Capital Improvement Program (EX, Sweetwater River Pipeline)

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
EX-P03	1890*	Upsize & Replace	5512-D	1.00	0.001	918	1790	15	18	\$1,080	318	\$344,000
EX-P03	1889*	Upsize & Replace	5512-D, 1141-L	1.00	0.001	1791	918	15	18	\$1,080	286	\$309,000
EX-P03	1888*	Upsize & Replace	5512-D, 1604-D	1.00	0.001	1792	1791	15	18	\$1,080	524	\$566,000
EX-P03	1855*	Upsize & Replace	5512-D, 1604-D	1.00	0.001	1793	1792	15	18	\$1,080	265	\$286,000
EX-P04	1854*	Upsize & Replace	5512-D, 1604-D	1.00	0.001	1793a	1793	15	18	\$1,080	298	\$322,000
EX-P04	1853*	Upsize & Replace	5512-D, 1605-D	1.00	0.001	1794	1793a	15	18	\$1,080	263	\$285,000
EX-P04	1852*	Upsize & Replace	5512-D, 1605-D	0.78	0.001	1795	1794	15	18	\$1,080	373	\$403,000
EX-P04	1851*	Upsize & Replace	5512-D, 1605-D	1.00	0.004	1795A	1795	12	15	\$900	71	\$64,000
EX-P04	1850*	Upsize & Replace	1605-D	0.80	0.004	1796	1795A	12	15	\$900	324	\$292,000
EX-P05	1849*	Upsize & Replace	5512-D, 1605-D	1.00	0.002	1797	1796	12	15	\$900	333	\$300,000
EX-P05	1848*	Upsize & Replace	1606-D	1.00	0.002	1798	1797	12	15	\$900	497	\$448,000
EX-P05	1847*	Upsize & Replace	1606-D	1.00	0.002	1799	1798	12	15	\$900	781	\$703,000
EX-P06	1846A*	Upsize & Replace	5512-D, 1606-D	1.00	0.002	1800A	1799	12	15	\$900	325	\$293,000
EX-P06	1846*	Upsize & Replace	5512-D, 1606-D	1.00	0.002	1800	1800A	12	15	\$900	325	\$293,000
EX-P06	1772*	Upsize & Replace	5512-D	1.00	0.002	1800-1	1800	12	15	\$900	404	\$364,000
EX-P06	2227*	Upsize & Replace	5512-D	1.00	0.002	1800-2	1800-1	12	15	\$900	398	\$359,000

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
EX-P07	2228*	Upsize & Replace	5512-D	1.00	0.002	1801a	1800-2	12	15	\$900	349	\$315,000
EX-P07	2226*	Upsize & Replace	6894-D	1.00	0.001	1756a	1801a	8	12	\$720	65	\$47,000
EX-P07	1784*	Upsize & Replace	4724-D, 145-D	1.00	0.003	1756	1756a	8	10	\$600	276	\$166,000
EX-P07	1783*	Upsize & Replace	4724-D, 145-D	1.00	0.002	1754	1756	8	10	\$600	259	\$156,000
EX-P07	1805*	Upsize & Replace	2364-D	0.77	0.003	1753	1754	8	10	\$600	340	\$204,000
EX-P07	1785*	Upsize & Replace	395-D	1.00	0.001	1802	1801	10	12	\$720	260	\$188,000
EX-P07	1786*	Upsize & Replace	394-D	0.63	0.003	1638	1804	10	12	\$720	186	\$134,000
EX-P07	1781*	Upsize & Replace	140-D	1.00	0.003	1639	1638	8	10	\$600	80	\$48,000
EX-P07	10002*	Upsize & Replace	Manhole Inserted	0.63	0.004	1804b	1804a	10	12	\$720	189	\$136,000
EX-P07	10004*	Upsize & Replace	Manhole Inserted	0.63	0.004	1804a	1803	10	12	\$720	232	\$168,000

*Manhole and pipe inverts to be verified by field survey to validate slope

Total: \$7,193,000

* Costs account for an average pipe depth of 10 ft below surface

Table 8-4 – Gravity Mains Included in the Capital Improvement Program (EX)

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
EX-P08	33	Upsize & Replace	5001-D, 2387-D	1.00	0.014	451	450	6	8	\$480	140	\$ 68,000
EX-P08	93*	Upsize & Replace	5001-D, 4772-D	1.00	0.001	442	458	6	8	\$480	110	\$ 53,000
EX-P08	220	Upsize & Replace	2365-D	1.00	0.006	1071	1070	6	8	\$480	322	\$155,000
EX-P08	221	Upsize & Replace	2365-D	1.00	0.006	1069	1067	6	8	\$480	339	\$163,000
EX-P08	222	Upsize & Replace	2365-D	1.00	0.006	1070	1069	6	8	\$480	327	\$157,000
EX-P08	296	Upsize & Replace	2365-D	1.00	0.006	1067	1062	6	8	\$480	331	\$159,000
EX-P08	297	Upsize & Replace	294-D, 2365-D, 896-L	1.00	0.007	1062	1953	6	8	\$480	265	\$128,000
EX-P08	922*	Upsize & Replace	1515-D, 4580-D	1.00	0.003	189	406	8	10	\$600	479	\$ 288,000
EX-P08	924*	Upsize & Replace	1515-D, 4580-D	1.00	0.002	407	407a	8	10	\$600	103	\$ 62,000
EX-P08	925*	Upsize & Replace	1515-D, 4580-D	1.00	0.003	407a	407b	8	10	\$600	185	\$ 112,000
EX-P08	1020*	Upsize & Replace	1510-D, 4589-D	1.00	0.004	353	352	10	12	\$720	80	\$ 58,000
EX-P09	1022	Upsize & Replace	1510-D, 4589-D	1.00	0.011	352b	351	10	12	\$720	258	\$186,000
EX-P09	1026	Upsize & Replace	972-AL	1.00	0.013	741	354	10	12	\$720	90	\$ 65,000
EX-P09	1080*	Upsize & Replace	1510-D, 1645-D, 4589-D	1.00	0.002	350	1366	10	12	\$720	151	\$109,000
EX-P09	1081*	Upsize & Replace	1645-D	1.00	0.004	1365	1364	10	12	\$720	204	\$147,000
EX-P09	1082	Upsize & Replace	1645-D	1.00	0.008	1366	1365	10	12	\$720	280	\$202,000
EX-P09	1146*	Upsize & Replace	905-L, 564-D	1.00	0.003	1439	1422	18	21	\$1,260	344	\$434,000
EX-P10	1193*	Upsize & Replace	567-D	1.00	0.000	1544a	1544	18	21	\$1,260	348	\$439,000
EX-P10	2456*	Upsize & Replace	550-D	1.00	0.002	378	378A	27	33	\$1,980	308	\$609,000
EX-P10	1522*	Upsize & Replace	5001-D, 172-L	1.00	0.004	6207	502	6	8	\$480	393	\$189,000
EX-P10	1821*	Upsize & Replace	4591-D, 4582-D	1.00	0.003	166	550	8	10	\$600	35	\$ 21,000
EX-P11	2443*	Upsize & Replace	1520-D, 3990-D, 4586-D	1.00	0.002	1249	199	27	33	\$1,980	165	\$327,000
EX-P11	2455*	Upsize & Replace	551-D, 4587-D	1.00	0.002	343	378	27	33	\$1,980	250	\$495,000
EX-P11	17A	Upsize & Replace	Undocumented Manhole Inserted	1.00	0.007	591a	591	8	10	\$600	195	\$118,000
EX-P11	12A*	Upsize & Replace	District Rev	1.00	0.001	500	3100	20	21	\$1,260	309	\$390,000

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
EX-P11	4002	Upsize & Replace	1806-D, 4577-D	1.00	0.011	591	10002	8	10	\$600	67	\$41,000
EX-P11	1079	Upsize & Replace	1510-D, 4589-D	0.82	0.014	351	350	10	12	\$720	120	\$87,000
EX-P12	36	Upsize & Replace	2346-D, 5001-D	0.79	0.027	459	453	6	8	\$480	293	\$141,000
EX-P12	197	Upsize & Replace	2366-D, 710-L	0.79	0.006	1074	1073	6	8	\$480	331	\$159,000
EX-P12	1091	Upsize & Replace	1645-D, 726-D	0.79	0.016	1364	1947	10	12	\$720	100	\$72,000
EX-P12	1630*	Upsize & Replace	2406-D	0.79	0.002	1834a	1834	12	15	\$900	414	\$373,000
EX-P12	1605*	Upsize & Replace	2406-D	0.78	0.002	926	1834a	12	15	\$900	413	\$372,000
EX-P12	1143*	Upsize & Replace	564-D	0.78	0.004	1446a	1446	8	10	\$600	35	\$21,000
EX-P13	926*	Upsize & Replace	559-D, 1515-D, 4580-D	0.78	0.003	235	636	24	27	\$1,620	370	\$600,000
EX-P13	885A*	Upsize & Replace	Manhole Inserted	0.77	0.004	1319a	1319	24	27	\$1,620	78	\$126,000
EX-P13	46	Upsize & Replace	5002-D, 2383-D	0.75	0.005	468	467	8	10	\$600	215	\$129,000
EX-P13	1629*	Upsize & Replace	2329-D, 2404-D, 2406-D	0.73	0.003	957	959	10	12	\$720	60	\$ 44,000
EX-P13	172	Upsize & Replace	2366-D	0.73	0.006	1078	1077	6	8	\$480	334	\$161,000
EX-P13	1021	Upsize & Replace	1510-D, 4589-D	0.73	0.017	352	352b	10	12	\$720	30	\$ 22,000
EX-P13	1716*	Upsize & Replace	5173-D, 2437-D	0.73	0.002	6049	1892a	8	10	\$600	440	\$264,000
EX-P14	1540	Upsize & Replace	1497-D, 4592-D	0.71	0.007	180	179	8	10	\$600	326	\$196,000
EX-P14	1056	Upsize & Replace	2382-D	0.70	0.008	764	766	10	12	\$720	331	\$239,000
EX-P14	43	Upsize & Replace	5002-D, 2383-D	0.70	0.007	465	464	8	10	\$600	169	\$102,000
EX-P14	44	Upsize & Replace	5002-D	0.69	0.007	466	465	8	10	\$600	196	\$118,000
EX-P14	1878	Upsize & Replace	4591-D, 2406-D	0.68	0.007	551	926	10	12	\$720	50	\$ 36,000
EX-P14	1040	Upsize & Replace	2377-D, 297-L	0.68	0.013	769	769a	10	12	\$720	332	\$239,000
EX-P14	1728*	Upsize & Replace	5049-D, 891-D	0.67	0.003	702	701	8	10	\$600	467	\$280,000
EX-P14	2335	Upsize & Replace	3485-D, 5009-D	0.66	0.005	39	3	8	10	\$600	345	\$207,000
EX-P15	1118	Upsize & Replace	303-L, 906-L	0.66	0.017	1411	1410	6	8	\$480	233	\$112,000
EX-P15	2474	Upsize & Replace	New Pipe	0.66	0.015	769a	770	10	12	\$720	241	\$174,000
EX-P15	47	Upsize & Replace	5002-D	0.66	0.007	469	468	8	10	\$600	305	\$183,000
EX-P15	1511	Upsize & Replace	572-AL, 972-AL	0.66	0.015	743	1386	10	12	\$720	52	\$ 38,000

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
EX-P15	35	Upsize & Replace	5001-D, 680-D	0.65	0.044	453	452	6	8	\$480	83	\$ 40,000
EX-P15	34	Upsize & Replace	5001-D	0.65	0.046	452	451	6	8	\$480	160	\$ 77,000
EX-P15	149	Upsize & Replace	2366-D	0.64	0.006	1517	1079	6	8	\$480	330	\$159,000
EX-P15	2332	Upsize & Replace	1106-L, 5009-D	0.64	0.005	1883	39	8	10	\$600	269	\$162,000
EX-P15	153	Upsize & Replace	2366-D, 2370-D	0.63	0.006	1079	1078	6	8	\$480	313	\$151,000
EX-P15	1097	Upsize & Replace	726-D	0.63	0.029	1947	1994	10	12	\$720	140	\$101,000
EX-P15	1122*	Upsize & Replace	2370-D	0.63	0.003	1413	1412	8	10	\$600	177	\$107,000
EX-P15	1575	Upsize & Replace	1497-D, 4592-D	0.63	0.017	179	178	8	10	\$600	248	\$149,000
EX-P16	37	Upsize & Replace	5001-D	0.63	0.011	460A	459	8	10	\$600	26	\$ 16,000
EX-P16	174	Upsize & Replace	2366-D	0.63	0.009	1077	1076	6	8	\$480	331	\$159,000
EX-P16	148	Upsize & Replace	2366-D	0.62	0.006	1515	1517	6	8	\$480	340	\$164,000
EX-P16	1134*	Upsize & Replace	7422-D	0.62	0.002	1417	1416	8	10	\$600	165	\$ 99,000
EX-P16	1053	Upsize & Replace	2382-D	0.62	0.013	768	769	10	12	\$720	333	\$240,000
EX-P16	1531*	Upsize & Replace	899-D	0.62	0.004	738	737	8	10	\$600	353	\$ 212,000
EX-P16	48	Upsize & Replace	5002-D	0.61	0.007	470	469	8	10	\$600	378	\$227,000
EX-P16	2166*	Upsize & Replace	5055-D, 899-D	0.61	0.004	739	738	8	10	\$600	244	\$147,000
EX-P17	1576	Upsize & Replace	1497-, 4592-D	0.61	0.020	178	176	8	10	\$600	498	\$299,000
EX-P17	2163*	Upsize & Replace	5055-D, 3626-D	0.61	0.004	1847	740	8	10	\$600	349	\$210,000
EX-P17	45	Upsize & Replace	5002-D, 2383-D	0.60	0.010	467	466	8	10	\$600	130	\$78,000
EX-P17	266*	Upsize & Replace	2369-D, 837-L	0.60	0.004	1437	1436	6	8	\$480	394	\$190,000
EX-P17	1560*	Upsize & Replace	146-D	0.60	0.004	1750	1751	8	10	\$600	440	\$264,000
EX-P17	1098	Upsize & Replace	5546-D, 1645-D	0.59	0.035	1994	1356	10	12	\$720	175	\$126,000
EX-P17	126	Upsize & Replace	7901-D	0.59	0.005	534	532	8	10	\$600	310	\$187,000
EX-P18	1718	Upsize & Replace	5049-D, 899-D	0.59	0.005	737	703	8	10	\$600	344	\$207,000
EX-P18	23	Upsize & Replace	2343-D, 2399-D	0.59	0.006	585	586	6	8	\$480	130	\$ 63,000
EX-P18	1451*	Upsize & Replace	146-D, 148-D	0.58	0.003	209	1748	8	10	\$600	300	\$181,000
EX-P18	2165	Upsize & Replace	5055-D, 898-D	0.58	0.005	740	739	8	10	\$600	300	\$180,000

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
EX-P18	1453*	Upsize & Replace	146-D	0.57	0.004	1765	1750	8	10	\$600	300	\$180,000
EX-P18	1782*	Upsize & Replace	146-D	0.56	0.004	1751	1752	8	10	\$600	330	\$198,000
EX-P18	40	Upsize & Replace	5002-D, 2383-D	0.56	0.015	462	461	8	10	\$600	470	\$282,000
EX-P18	2160*	Upsize & Replace	5050-D, 3627-D	0.56	0.004	1850	1849	8	10	\$600	219	\$132,000
EX-P19	27	Upsize & Replace	2399-D, 5005-D	0.56	0.006	571	585	6	8	\$480	317	\$153,000
EX-P19	125	Upsize & Replace	5002-D, 2383-D	0.56	0.007	532	531	8	10	\$600	423	\$254,000
EX-P19	196	Upsize & Replace	2366-D	0.55	0.024	1073	1071	6	8	\$480	341	\$164,000
EX-P19	1877	Upsize & Replace	4582-D, 4591-D	0.55	0.014	550	551	10	12	\$720	241	\$174,000

*Manhole and pipe inverts to be verified by field survey to validate slope

Total: \$15,402,000

* Costs account for an average pipe depth of 10 ft below surface

Table 8-5 – Gravity Mains Included in the Capital Improvement Program (2023)

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
2023-P19	884*	Upsize & Replace	556-D	1.00	0.004	1319	1300	24	27	\$1,620	253	\$410,000
2023-P20	1144	Upsize & Replace	564-D	1.00	0.005	1422	1438	18	21	\$1,260	328	\$414,000
2023-P20	1192*	Upsize & Replace	567-D	1.00	0.003	1544	1543	18	21	\$1,260	85	\$108,000
2023-P20	886*	Upsize & Replace	557-D	0.82	0.004	1321	1320	24	27	\$1,620	288	\$467,000
2023-P20	2454*	Upsize & Replace	1425-D, 1520-D, 4586-D	0.80	0.001	341	343	33	36	\$2,150	68	\$147,000
2023-Future	779*	Upsize & Replace	558-D	0.79	0.004	1325	1312	24	27	\$1,620	566	\$917,000
2023-Future	780*	Upsize & Replace	558-D	0.79	0.004	1326	1325	24	27	\$1,620	248	\$402,000
2023-Future	781*	Upsize & Replace	559-D	0.78	0.004	638	1326	24	27	\$1,620	287	\$465,000
2023-Future	784*	Upsize & Replace	559-D	0.78	0.004	636	638	24	27	\$1,620	219	\$355,000
2023-Future	1151	Upsize & Replace	738-L, 770-L	0.77	0.005	1481a	1481	18	21	\$1,260	227	\$286,000
2023-Future	883	Upsize & Replace	556-D	0.76	0.005	1300	1296	24	27	\$1,620	341	\$553,000
2023-Future	1141	Upsize & Replace	564-D	0.76	0.007	1446	1445	18	21	\$1,260	224	\$283,000
2023-Future	1152	Upsize & Replace	310-L	0.75	0.006	1461	1481a	18	21	\$1,260	189	\$239,000
2023-Future	127	Upsize & Replace	7901-D	0.62	0.005	538	534	8	10	\$600	58	\$35,000

*Manhole and pipe inverts to be verified by field survey to validate slope

Total: \$5,081,000

* Costs account for an average pipe depth of 10 ft below surface

Table 8-6 – Gravity Mains Included in the Capital Improvement Program (2028)

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
2028-Future	974*	Upsize & Replace	5546-D, 349-D	0.79	0.003	1356	1357	15	18	\$1,080	144	\$156,000
2028-Future	1190	Upsize & Replace	567-D	0.79	0.005	1542	1541	18	21	\$1,260	283	\$357,000
2028-Future	1191	Upsize & Replace	567-D, 358-L	0.78	0.005	1543	1542	18	21	\$1,260	175	\$221,000
2028-Future	1147	Upsize & Replace	905-L, 565-D	0.78	0.007	1440	1439	18	21	\$1,260	324	\$408,000
2028-Future	2460*	Upsize & Replace	2328-D, 548-D	0.76	0.002	937	935	33	36	\$2,150	330	\$710,000
2028-Future	1452*	Upsize & Replace	146-D	0.61	0.004	1748	1765	8	10	\$600	300	\$180,000
2028-Future	1795	Upsize & Replace	146-D	0.60	0.007	1752	1753	8	10	\$600	160	\$96,000
2028-Future	1055	Upsize & Replace	2382-D	0.60	0.025	766	767	10	12	\$720	330	\$238,000
2028-Future	2331	Upsize & Replace	3486-D, 5009-D	0.59	0.009	37	1883	8	10	\$600	389	\$234,000
2028-Future	38	Upsize & Replace	5002-D, 2383-D	0.57	0.017	460	460A	8	10	\$600	31	\$19,000

*Manhole and pipe inverts to be verified by field survey to validate slope

Total: \$2,619,000

* Costs account for an average pipe depth of 10 ft below surface

Table 8-7 – Gravity Mains Included in the Capital Improvement Program (2038)

PHASE	ID_Pipe	Improvement Type	Pipe IDs	d/D	SLOPE	US MH	DS MH	Existing Diameter (in)	Replacement Diameter (in)	Cost/LF*	Length (ft)	Cost
2038-Future	1054	Upsize & Replace	2382-D	0.79	0.006	767	768	12	15	\$900	330	\$297,000
2038-Future	885	Upsize & Replace	556-D	0.79	0.006	1320	1319a	24	27	\$1,620	201	\$325,000
2038-Future	879*	Upsize & Replace	555-D, 4501-D	0.76	0.004	1296	1294	27	33	\$1,980	361	\$715,000
2038-Future	2338	Upsize & Replace	4572-D	0.59	0.013	2	43	10	12	\$720	319	\$230,000
2038-Future	2389*	Upsize & Replace	1475-D, 4583-D	0.57	0.003	129	128	10	12	\$720	330	\$238,000
2038-Future	2337	Upsize & Replace	1431-D, 5009-D, 259-L	0.56	0.010	1	2	10	12	\$720	63	\$46,000
2038-Future	1025	Upsize & Replace	1510-D	0.55	0.071	354	353	10	12	\$720	33	\$ 24,000
2038-Future	2383*	Upsize & Replace	1475-D, 4583-D	0.55	0.003	130	129	10	12	\$720	330	\$238,000

*Manhole and pipe inverts to be verified by field survey to validate slope

* Costs account for an average pipe depth of 10 ft below surface

Total: \$2,113,000

8.2 RECOMMENDED CCTV PROGRAM

The 2009 Sewer Closed-Circuit Television and Condition Assessment Report included all gravity mains with missing hydraulic information, areas with known fat, oil, and grease (FOG) issues and areas identified as deficient in the 2008 SSMP. Accordingly, those gravity mains identified in the CIP that were not included in the 2009 effort, should be included in the City's next CCTV project. The City has acquired a vactor truck and CCTV camera and has begun inspections, the pipes that were identified with numerous defects and not in immediate need of rehabilitation within the next 5 year time frame should be inspected to determine the progression of the defects identified in 2009 CCTV inspection. These pipes sections are listed in Table 8-8.

Table 8-8 – Gravity Mains Included in the CCTV Program

PHASE	US MH	DS MH	Existing Diameter (in)	Pipe Length (ft)	Pipe IDs	Improvement Type	Rehab Type	Cost per LF	Total Cost
CCTV-P01	1550	1551	6	300	2364-D	Rehab	CIPP Line	\$33	\$9,900
CCTV-P01	1551	1552	6	304	2364-D	Rehab	CIPP Line	\$33	\$10,032
CCTV-P01	1553	1554	6	225	2364-D	Rehab	CIPP Line	\$33	\$7,425
CCTV-P01	1554	1555	6	245	2364-D	Rehab	CIPP Line	\$33	\$8,085
CCTV-P01	1555	1552	6	330	2364-D	Rehab	CIPP Line	\$33	\$10,898
CCTV-P01	1556	1555	6	330	2364-D	Rehab	CIPP Line	\$33	\$10,901
CCTV-P01	1565	1557	6	331	2364-D	Rehab	CIPP Line	\$33	\$10,921
CCTV-P01	1568	1565	6	330	2364-D	Rehab	CIPP Line	\$33	\$10,897
CCTV-P01	2054	1573	6	150	2364-D	Rehab	CIPP Line	\$33	\$4,950
CCTV-P01	1563	1564	6	332	2364-D	Rehab	CIPP Line	\$33	\$10,952
CCTV-P01	1566	1567	6	288	2364-D	Rehab	CIPP Line	\$33	\$9,504
CCTV-P01	1567	1568	6	295	2364-D	Rehab	CIPP Line	\$33	\$9,735
CCTV-P01	1564	1565	6	330	2364-D	Rehab	CIPP Line	\$33	\$10,890
CCTV-P01	2147	1140	6	717	278-D	Rehab	CIPP Line	\$33	\$23,648
CCTV-P01	1201	1200	8	50	1505-D, 4589-D	Rehab	CIPP Line	\$53	\$2,624
CCTV-P01	1200	1198	8	552	1505-D, 4589-D	Rehab	CIPP Line	\$53	\$29,235
CCTV-P01	1552	4032	8	124	2364-D	Rehab	CIPP Line	\$53	\$6,598
CCTV-P01	1140	1139	8	330	278-D	Rehab	CIPP Line	\$53	\$17,490
CCTV-P01	1600	1589	8	176	736-D	Rehab	CIPP Line	\$53	\$9,354
CCTV-P01	1589	1588	8	498	736-D	Rehab	CIPP Line	\$53	\$26,389
CCTV-P01	1471	1473	10	100	5049-D, 391-D	Rehab	CIPP Line	\$65	\$6,500
CCTV-P01	1473	1474	10	40	5049-D, 391-D	Rehab	CIPP Line	\$65	\$2,600
CCTV-P01	1536	1547	12	340	2364-D	Rehab	CIPP Line	\$75	\$25,500
CCTV-P02	772	771	6	315	1121-L, 1131-L	Rehab	CIPP Line	\$33	\$10,395
CCTV-P02	764	763	6	156	1511-D	Rehab	CIPP Line	\$33	\$5,148
CCTV-P02	1848	1845	6	350	2329-D	Rehab	CIPP Line	\$33	\$11,553

PHASE	US MH	DS MH	Existing Diameter (in)	Pipe Length (ft)	Pipe IDs	Improvement Type	Rehab Type	Cost per LF	Total Cost
CCTV-P02	1849	1844	6	330	2329-D	Rehab	CIPP Line	\$33	\$10,897
CCTV-P02	1862	1727	6	338	2329-D	Rehab	CIPP Line	\$33	\$11,159
CCTV-P02	1848	1853	6	300	2329-D	Rehab	CIPP Line	\$33	\$9,897
CCTV-P02	1853	1856	6	330	2329-D	Rehab	CIPP Line	\$33	\$10,901
CCTV-P02	1849	1852	6	330	2329-D	Rehab	CIPP Line	\$33	\$10,903
CCTV-P02	1852	1858	6	331	2329-D	Rehab	CIPP Line	\$33	\$10,909
CCTV-P02	1858	1862	6	331	2329-D	Rehab	CIPP Line	\$33	\$10,916
CCTV-P02	622	626	6	329	2334-D, 2337-D	Rehab	CIPP Line	\$33	\$10,857
CCTV-P02	623	4020	6	75	2334-D, 2337-D	Rehab	CIPP Line	\$33	\$2,485
CCTV-P02	1905	1906	6	336	2356-D, 2361-D, 1149-L	Rehab	CIPP Line	\$33	\$11,104
CCTV-P02	1224	1223	6	311	2361-D	Rehab	CIPP Line	\$33	\$10,267
CCTV-P02	1446	1224	6	175	2361-D	Rehab	CIPP Line	\$33	\$5,775
CCTV-P02	1223	1232	6	339	2361-D	Rehab	CIPP Line	\$33	\$11,201
CCTV-P02	1232	1231	6	340	2361-D	Rehab	CIPP Line	\$33	\$11,220
CCTV-P02	1231	1904	6	321	2362-D, 1150-L	Rehab	CIPP Line	\$33	\$10,578
CCTV-P02	1764	1894	6	331	2362-D, 4577-D, 489-L	Rehab	CIPP Line	\$33	\$10,916
CCTV-P02	846	4026	6	114	2372-D, 1031-L, 972-AL	Rehab	CIPP Line	\$33	\$3,762
CCTV-P02	1626	1625	6	185	2405-D	Rehab	CIPP Line	\$33	\$6,105
CCTV-P02	4015	796	6	248	332a	Rehab	CIPP Line	\$33	\$8,199
CCTV-P02	514	515	8	347	1420-D, 4587-D	Rehab	CIPP Line	\$53	\$18,391
CCTV-P02	762	763	8	231	1511-D	Rehab	CIPP Line	\$53	\$12,243
CCTV-P02	763	767	8	524	1511-D	Rehab	CIPP Line	\$53	\$27,772
CCTV-P02	1320	2255	8	214	1519-D, 4587-D, 551-D	Rehab	CIPP Line	\$53	\$11,342
CCTV-P02	1906	2104	8	326	2361-D	Rehab	CIPP Line	\$53	\$17,257
CCTV-P02	1735	1734	8	330	2405-D	Rehab	CIPP Line	\$53	\$17,490
CCTV-P02	1621	924A	8	31	2405-D	Rehab	CIPP Line	\$53	\$1,618
CCTV-P02	924A	1620	8	158	2405-D	Rehab	CIPP Line	\$53	\$8,395
CCTV-P02	1625	1624	8	303	2405-D	Rehab	CIPP Line	\$53	\$16,039

PHASE	US MH	DS MH	Existing Diameter (in)	Pipe Length (ft)	Pipe IDs	Improvement Type	Rehab Type	Cost per LF	Total Cost
CCTV-P02	1624	1623	8	338	2405-D	Rehab	CIPP Line	\$53	\$17,931
CCTV-P02	1623	1621	8	321	2405-D	Rehab	CIPP Line	\$53	\$17,011
CCTV-P02	2096	1624	8	92	2405-D	Rehab	CIPP Line	\$53	\$4,876
CCTV-P02	1615	1616	8	74	4591-D, 4582-D	Rehab	CIPP Line	\$53	\$3,922
CCTV-P02	165	164	8	336	4799-D, 2392-D, 1015-L	Rehab	CIPP Line	\$53	\$17,808
CCTV-P02	1670	1673	8	278	5928-D	Rehab	CIPP Line	\$53	\$14,734
CCTV-P02	1760	1759	10	498	1497-, 4592-D	Rehab	CIPP Line	\$65	\$32,385
CCTV-P02	1890	1767	10	326	1497-D, 4592-D	Rehab	CIPP Line	\$65	\$21,166
CCTV-P02	1767	1760	10	248	1497-D, 4592-D	Rehab	CIPP Line	\$65	\$16,088
CCTV-P02	1701	1700	10	375	2327-D, 850-L	Rehab	CIPP Line	\$65	\$24,369
CCTV-P02	1863	1725	10	217	2329-D	Rehab	CIPP Line	\$65	\$14,076
CCTV-P02	1857	1863	10	331	2329-D	Rehab	CIPP Line	\$65	\$21,501
CCTV-P02	1669	2121	10	233	5928-D	Rehab	CIPP Line	\$65	\$15,145
CCTV-P02	2121	1670	10	43	5928-D	Rehab	CIPP Line	\$65	\$2,795
CCTV-P02	1612	1613	12	310	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$23,250
CCTV-P02	1592	1607	12	485	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$36,371
CCTV-P02	1607	1608	12	238	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$17,848
CCTV-P02	1608	1609	12	80	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$6,000
CCTV-P02	1609	1610	12	100	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$7,511
CCTV-P02	1610	1611	12	278	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$20,882
CCTV-P02	1611	2126	12	268	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$20,063
CCTV-P02	2126	1612	12	43	1495-D, 4591-D	Rehab	CIPP Line	\$75	\$3,225
CCTV-P02	901	1336	12	151	1510-D, 1645-D, 4589-D	Rehab	CIPP Line	\$75	\$11,325
CCTV-P02	853	852	12	333	2382-D	Rehab	CIPP Line	\$75	\$24,975
CCTV-P02	854	853	12	330	2382-D	Rehab	CIPP Line	\$75	\$24,750
CCTV-P02	855	854	12	330	2382-D	Rehab	CIPP Line	\$75	\$24,750
CCTV-P02	856	855	12	331	2382-D	Rehab	CIPP Line	\$75	\$24,825
CCTV-P02	1618	1619	12	50	4591-D, 2406-D	Rehab	CIPP Line	\$75	\$3,750

PHASE	US MH	DS MH	Existing Diameter (in)	Pipe Length (ft)	Pipe IDs	Improvement Type	Rehab Type	Cost per LF	Total Cost
CCTV-P02	1613	1616	12	35	4591-D, 4582-D	Rehab	CIPP Line	\$75	\$2,625
CCTV-P02	840	834	12	115	972-AL	Rehab	CIPP Line	\$75	\$8,625
CCTV-P02	844	840	12	325	972-AL	Rehab	CIPP Line	\$75	\$24,375
CCTV-P03	321	322	6	382	2344-D, 5005-D	Rehab	CIPP Line	\$33	\$12,606
CCTV-P03	322	325	6	347	2344-D, 5005-D	Rehab	CIPP Line	\$33	\$11,451
CCTV-P03	324	322	6	295	2344-D, 5005-D	Rehab	CIPP Line	\$33	\$9,735
CCTV-P03	39	38	6	140	5001-D, 314-L	Rehab	CIPP Line	\$33	\$4,620
CCTV-P03	357	363	8	326	1455-D, 4576-D, 5009-D	Rehab	CIPP Line	\$53	\$17,278
CCTV-P03	363	373	8	660	1455-D, 4576-D, 5009-D	Rehab	CIPP Line	\$53	\$34,980
CCTV-P03	364	363	8	330	1457-D, 5009-D	Rehab	CIPP Line	\$53	\$17,490
CCTV-P03	2223	2224	8	330	1475-D, 4583-D	Rehab	CIPP Line	\$53	\$17,490
CCTV-P03	1303	2264	8	131	1476-D, 4583-D	Rehab	CIPP Line	\$53	\$6,943
CCTV-P03	1312	2256	8	300	1476-D, 4583-D	Rehab	CIPP Line	\$53	\$15,900
CCTV-P03	2309	2283	8	165	1487-D, 4577-D	Rehab	CIPP Line	\$53	\$8,745
CCTV-P03	2283	2282	8	165	1487-D, 4577-D	Rehab	CIPP Line	\$53	\$8,745
CCTV-P03	696	2309	8	416	1487-D, 4577-D	Rehab	CIPP Line	\$53	\$22,048
CCTV-P03	2231	2232	8	307	4572-D	Rehab	CIPP Line	\$53	\$16,271
CCTV-P03	2229	2232	8	257	4572-D	Rehab	CIPP Line	\$53	\$13,621
CCTV-P03	2260	2264	12	310	1476-D, 4583-D	Rehab	CIPP Line	\$75	\$23,250
CCTV-P03	2264	2266	12	330	1476-D, 4583-D	Rehab	CIPP Line	\$75	\$24,750
CCTV-P03	2256	2260	12	350	1476-D, 4583-D, 4585-D	Rehab	CIPP Line	\$75	\$26,250
CCTV-P03	2269	2268	12	330	1482-D, 4577-D	Rehab	CIPP Line	\$75	\$24,750
CCTV-P03	2268	2362	12	335	1482-D, 4577-D	Rehab	CIPP Line	\$75	\$25,125
CCTV-P03	2362	2267	12	180	1482-D, 4577-D	Rehab	CIPP Line	\$75	\$13,500
CCTV-P03	2211	2215	12	389	3486-D, 5009-D	Rehab	CIPP Line	\$75	\$29,175
CCTV-P03	2235	2234	12	319	4572-D	Rehab	CIPP Line	\$75	\$23,925
CCTV-P03	2266	2224	15	330	1475-D, 4583-D	Rehab	CIPP Line	\$97	\$32,010
CCTV-P03	2224	2225	15	330	1475-D, 4583-D	Rehab	CIPP Line	\$97	\$32,010

PHASE	US MH	DS MH	Existing Diameter (in)	Pipe Length (ft)	Pipe IDs	Improvement Type	Rehab Type	Cost per LF	Total Cost
CCTV-P03	2249	2310	15	50	2317-D	Rehab	CIPP Line	\$97	\$4,850
CCTV-P03	2310	2250	15	240	3991-D	Rehab	CIPP Line	\$97	\$23,280
CCTV-P03	2234	2232	15	296	4572-D	Rehab	CIPP Line	\$97	\$28,712
CCTV-P03	2251	480	15	330	849-D	Rehab	CIPP Line	\$97	\$32,016
CCTV-P03	2252	2253	21	200	3991-D	Rehab	CIPP Line	\$109	\$21,800
CCTV-P03	2253	2250	21	240	3991-D	Rehab	CIPP Line	\$109	\$26,160

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ATTACHMENTS

Attachment 1 - Sewer System Management Plan

Attachment 2 - Wastewater Flow Projections, Metro TAC Technical Memorandum (April 2018)

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City of National City
Sewer System Management Plan
Volume I

DRAFT REPORT

Prepared for:

City of National City
1243 National City Blvd.
National City, CA 91950

April 2009

Prepared by:

Infrastructure Engineering Corporation
27247 Madison Ave., Suite 111
Temecula, CA 92590

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NOTE: APPENDICES ARE LOCATED IN VOLUME II OF THIS PLAN.



ABBREVIATIONS / ACRONYMS

BMP	Best Management Practice
CMMS	Computerized Maintenance Management System
CMOM	Capacity, Management, Operations and Maintenance
CIP	Capital Improvement Program
CWEA	California Water Environment Association
ECS	Environmental Compliance Services
EDU	Equivalent Dwelling Unit
MWD	Metropolitan Water District
FOG	Fats, Oils, Grease
GIS	Geographical Information System
IEC	Infrastructure Engineering Corporation
I/I	Inflow / Infiltration
MRP	Monitoring and Reporting Plan
NPDES	National Pollution Discharge Elimination System
OERP	Overflow Emergency Response Plan
O&M	Operation and Maintenance
PM	Preventative Program
PVC	Polyvinyl Chloride
RA&S	Regional Assets and Services Department
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflows
SWRCB	State of California Water Resources Control Board
WDR	Waste Discharge Requirements



EXECUTIVE SUMMARY

On May 2, 2006, after several years of public discussion and planning, the State Water Resources Control Board (SWRCB) adopted Order No. 2006-0003, a General Waste Discharge Requirement (WDR) for all publicly owned sanitary sewer collection systems in California with more than one (1) mile of sewer pipe. The goal of Order No. 2006-0003 is to provide a consistent statewide approach for reducing Sanitary Sewer Overflows (SSOs) by requiring that:

1. In the event of an SSO, all feasible steps be taken to control the released volume and prevent untreated wastewater from entering storm drains, creeks, etc.
2. If an SSO occurs, it must be reported to the SWRCB using an online reporting system developed by the SWRCB.
3. All publicly owned collection system agencies with more than 1 mile of sewer pipe in the State must develop a Sewer System Management Plan (SSMP).

This critical component of Order No. 2006-0003 is the development of a Sewer System Management Plan (SSMP). There are eleven specific “milestones” identified in the schedule that relate to the elements required in the WDR. The eleven milestones, and the applicable schedule for the City of National City (City), include:

1. SSMP Development Plan and Schedule (November 2, 2007)
2. Goals and Organization Structure (November 2, 2007)
3. Legal Authority (May 2, 2009)
4. Operation and Maintenance Program (May 2, 2009)
5. Design and Performance Standards (August 2, 2009)
6. Overflow Emergency Response Program (May 2, 2009)
7. Fats, Oils and Grease Control Program (May 2, 2009)
8. System Evaluation and Capacity Assurance Plan (August 2, 2009)
9. Monitoring, Measurement, and Program Modifications (August 2, 2009)
10. SSMP Program Audits (August 2, 2009)
11. Communication Program (August 2, 2009)
12. Final SSMP, incorporating all the SSMP elements. (August 2, 2009)



Although it is the SWRCB's intent that Order No. 2006-0003 be the primary regulatory mechanism for sanitary sewer systems statewide, the Order allows each regional board to issue more stringent or more prescriptive WDRs for sanitary sewer systems within their respective jurisdiction. The City is within Region 9, the San Diego Region, which adopted Order R9-2007-0005 on February 14, 2007 that contains additional provisions that all sewage collection agencies within Region 9 must adhere to, specifically relating to private lateral sewage discharges reporting.



CHAPTER 1. PROHIBITIONS AND PROVISIONS

Both State Water Resources Control Board (SWRCB) Order No. 2006-0003, as well as San Diego Regional Water Quality Control Board Order R9-2007-0005, mandate that the City of National City (City) comply with the following discharge prohibitions and provisions.

1.1 PROHIBITIONS

To meet the provisions contained in Division 7 of the California Water Code and regulations adopted there under, the City is required to comply with the following prohibitions:

- Any SSO that results in a discharge of untreated or partially treated wastewater to waters of the United States is prohibited; and,
- Any SSO that results in a discharge of untreated or partially treated wastewater that creates a nuisance as defined in California Water Code Section 13050(m) is prohibited.

Order R9-2007-0005, adopted by the San Diego Regional Water Quality Control Board, expands these prohibitions to include:

- The discharge of sewage from a sanitary sewer system any point upstream of a sewage treatment plant is prohibited.

In any enforcement action, the Regional Board will consider the efforts of City to contain, control, and clean up sewage spills from its collection system in accordance with Section 13327 of the California Water Code. The City will make every effort to contain sewage spilled from its collection systems and to prevent the sewage from entering storm drains and surface water bodies. The City will also make every effort to prevent sewage from discharging from storm drains into flood control channels and open ditches by blocking the storm drainage system and by removing the sewage from the storm drains. The use of the storm drain pipe system to contain the sewage by blocking the drain pipes, and recovering and cleaning up the spilled sewage, in order to prevent the sewage from being discharged to a surface water body is not a violation of the prohibitions listed above.

1.2 PROVISIONS

As stated in Order No. 2006-0003, the City must meet the following fifteen (15) provisions:

1. The City must comply with all conditions of Order No. 2006-0003. Any noncompliance with Order No. 2006-0003 constitutes a violation of the California Water Code and is grounds for enforcement action.
2. It is the intent of the State Water Board that sanitary sewer systems be regulated in a manner consistent with the general WDRs. Nothing in the general WDRs shall be:



- a. Interpreted or applied in a manner inconsistent with the Federal Clean Water Act, or supersede a more specific or more stringent state or federal requirement in an existing permit, regulation, or administrative/judicial order or Consent Decree;
 - b. Interpreted or applied to authorize an SSO that is illegal under either the Clean Water Act, an applicable Basin Plan prohibition or water quality standard, or the California Water Code;
 - c. Interpreted or applied to prohibit a Regional Water Board from issuing an individual NPDES permit or WDR, superseding this general WDR, for a sanitary sewer system, authorized under the Clean Water Act or California Water Code; or
 - d. Interpreted or applied to supersede any more specific or more stringent WDRs or enforcement order issues by a Regional Water Board.
3. The City shall take all feasible steps to eliminate SSOs. In the event that an SSO does occur, the City shall take all feasible steps to contain and mitigate the impacts of an SSO.
 4. In the event of an SSO, the City shall take all feasible steps to prevent untreated or partially treated wastewater from discharging from storm drains into flood control channels or waters of the United States by blocking the storm drainage system and by removing the wastewater from the storm drains.
 5. All SSOs must be reported in accordance with Section G of the general WDRs.
 6. In any enforcement action, the State and/or Regional Water Boards will consider the appropriate factors under the duly adopted State Water Board Enforcement Policy. And, consistent with the Enforcement Policy, the State and/or Regional Water Boards must consider the City's efforts to contain, control and mitigate SSOs when considering the California Water Code Section 13327 factors. In assessing these factors, the State and/or Regional Water Boards will also consider whether:
 - a. The City has complied with the requirements of Order No. 2006-0003, including requirements for reporting, developing and implementing a SSMP;
 - b. The City can identify the cause or likely cause of the discharge event;
 - c. There were no feasible alternatives to the discharge, such as temporary storage or retention of untreated wastewater, reduction of inflow and infiltration, use of adequate backup equipment, collecting and hauling of untreated wastewater to a treatment facility, or an increase in the capacity of the system as necessary to contain the design storm event identified in the SSMP. It is inappropriate to consider the lack of feasible alternatives if the City does not implement a periodic or continuing process to identify and correct problems.



- d. The discharge was exceptional, unintentional, temporary, and caused by factors beyond the reasonable control of the City;
 - e. The discharge could have been prevented by the exercise of reasonable control described in a certified SSMP for:
 - i. Proper management, operation and maintenance;
 - ii. Adequate treatment facilities, sanitary sewer system facilities, and/or components with an appropriate design capacity, to reasonably prevent SSOs (e.g., adequately enlarging treatment or collection facilities to accommodate growth, infiltration and inflow (I/I), etc.);
 - iii. Preventative maintenance (including cleaning and fats, oils, and grease (FOG) control);
 - iv. Installation of adequate backup equipment; and
 - v. Inflow and infiltration prevention and control to the extent practicable.
 - f. The sanitary sewer system design capacity is appropriate to reasonably prevent SSOs.
 - g. The City took all reasonable steps to stop and mitigate the impact of the discharge as soon as possible.
7. When a sanitary sewer overflow occurs, the City shall take all feasible steps and necessary remedial actions to 1) control or limit the volume of untreated or partially treated wastewater discharged, 2) terminate the discharge, and 3) recover as much of the wastewater discharged as possible for proper disposal, including any wash down water.

The City shall implement all remedial actions to the extent they may be applicable to the discharge and not inconsistent with an emergency response plan, including the following:

- a. Interception and rerouting of untreated or partially treated wastewater flows around the wastewater line failure;
- b. Vacuum truck recovery of sanitary sewer overflows and wash down water;
- c. Cleanup of debris at the overflow site;
- d. System modifications to prevent another SSO at the same location;
- e. Adequate sampling to determine the nature and impact of the release; and



- f. Adequate public notification to protect the public from exposure to the SSO.
8. The City shall properly manage, operate, and maintain all parts of the sanitary sewer system owned or operated by the City, and shall ensure that the system operators (including employees, contractors, or other agents) are adequately trained and possess adequate knowledge, skills, and abilities.
9. The City shall allocate adequate resources for the operation, maintenance, and repair of its sanitary sewer system, by establishing a proper rate structure, accounting mechanisms, and auditing procedures to ensure an adequate measure of revenues and expenditures. These procedures must be in compliance with applicable laws and regulations and comply with generally acceptable accounting practices.
10. The City shall provide adequate capacity to convey base flows and peak flows, including flows related to wet weather events. Capacity shall meet or exceed the design criteria as defined in the City's System Evaluation and Capacity Assurance Plan for all parts of the sanitary sewer system owned or operated by the City.
11. The City shall develop and implement a written Sewer System Management Plan (SSMP) and make it available to the State and/or Regional Water Board upon request. A copy of this document must be publicly available at the City's office and/or available on the internet. This SSMP must be approved by the City's Board of Directors at a public meeting.
12. In accordance with the California Business and Professions Code sections 6735, 7835, and 7835.1, all engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. Specific elements of the SSMP that require professional evaluation and judgments shall be prepared by or under the direction of appropriately qualified professionals, and shall bear the professional(s)' signature and stamp.
13. The mandatory elements of the Sewer System Management Plan (SSMP) are specified below, and must be approved by the deadlines listed in Order No. 2006-0003.
 - a. Goal
 - b. Organization
 - c. Legal Authority
 - d. Operation and Maintenance Program
 - e. Design and Performance Provisions
 - f. Overflow Emergency Response Plan



- g. FOG Control Program
 - h. System Evaluation and Capacity Assurance Plan
 - i. Monitoring, Measurement, and Program Modifications
 - j. SSMP Program Audits
 - k. Communication Program
14. Both the SSMP and the City's program to implement the SSMP must be certified by the City to be in compliance with the requirements set forth above and must be presented to the City's Board of Directors for approval at a public meeting. The City shall certify that the SSMP, and subparts thereof, are in compliance with the general WDRs within the time frames identified in the time schedule provided in subsection D.15, below.

In order to complete this certification, the City's authorized representative must complete the certification portion in the Online SSO Database Questionnaire by checking the appropriate milestone box, printing and signing the automated form, and sending the form to:

State Water Resources Control Board
Division of Water Quality
Attn: SSO Program Manager
P.O. Box 100
Sacramento, CA 95812

The SSMP must be updated every five (5) years, and must include any significant program changes. Re-certification by the Board of Directors of the City is required in accordance with D.14 when significant updates to the SSMP are made. To complete the re-certification process, the City shall enter the data in the Online SSO Database and mail the form to the State Water Board, as described above.

15. The City shall comply with these requirements according to the legislated schedule. This time schedule does not supersede existing requirements or time schedules associated with other permits or regulatory requirements.

The SSMP will also comply with the additional monitoring and reporting requirements outlined in Order No. R9-2007-0005. As advised by the SWRCB, content and format for portions of the SSMP were obtained from the California Water Environment Association, and the Orange County Sanitation District SSMP.



CHAPTER 2: GOALS AND ORGANIZATIONAL STRUCTURE

The City's Goals and Organization Structure addresses those mandatory SSMP provisions outlined in Section D, 13 (i) Goals and (ii) Organization of SWRCB Order No. 2006-0003.

2.1 GOALS

The goal of this SSMP is to provide a plan and schedule to properly manage, operate, and maintain all parts of the City's sanitary sewer collection system, in order to reduce and prevent Sanitary Sewer Overflows (SSO's), as well as mitigate any SSO's that do occur. Accordingly, the SSMP will satisfy the requirements of both SWRCB Order No. 2006-0003, as well as Order R9-2007-0005, subsequently adopted by Regional Board 9, San Diego Region. These Orders are attached as Appendixes A and B, respectively.

The following specific performance indicator goals have also been identified:

- Conduct a CCTV video inspection of 20% of all City-owned manholes and gravity mains every five years, including all identified FOG spots and sewer line problem areas.
- Inspect 20% of all Interceptors annually;
- Clean 50% of all gravity mains annually;
- Obtain and populate all outstanding gravity main invert data in the City's Geographic Information System (GIS) database.

2.2 ORGANIZATIONAL STRUCTURE

The City's Organizational Structure encompasses the following components:

- (1) The name of the responsible or authorized representative as described in Section J of SWRCB Order No. 2006-0003.
- (2) The names and telephone numbers for management, administrative and maintenance positions responsible for implementing specific measures in the SSMP, including clearly identifiable lines of authority.
- (3) The chain of communication, from notification to reporting of SSO's, including the person responsible for reporting SSO's to the State and Regional Water Boards, and other applicable agencies



2.2.1 *Compliance Summary*

The City maintains a Goals and Organization Structure which meets the requirements of Section D, 13 (i) Goals and (ii) Organization of SWRCB Order No. 2006-0003:

- (1) Joe H.A. Smith, the Director of Public Works, is the authorized representative for the City, as described in Section J of SWRCB Order No. 2006-2003.
- (2) The names, telephone numbers and lines of authority for management and administrative positions responsible for implementing specific measures in the SSMP are presented in the City's *National Pollutant Discharge Elimination System (NPDES) Organizational Chart*, as shown in Appendix C. Also included in Appendix C is the City's *Public Works Department Organizational Chart*, which includes names and lines of authority for the appropriate maintenance positions, with their numbers listed in the City's *Community Quick Guide*, as shown in Appendix D.
- (3) The City's *Wastewater Collection System Sewer Overflow Response Plan*, attached as Appendix E, contains the chain of communication, from notification to reporting of SSO's, including the person responsible for reporting SSO's to the State and Regional Water Boards, and other applicable agencies.

2.2.2 *Compliance Documents*

The following documents, attached as appendices, support the City's Goals and Organization Structure, thereby allowing the City to comply with the Goals and Organization Structure of the Statewide Waste Discharge Requirement (WDR):

- National Pollutant Discharge Elimination System (NPDES) and Public Works Department Organizational Charts, Appendix C.
- Community Quick Guide, Appendix D.
- Wastewater Collection System Sewer Overflow Response Plan, Appendix E.

2.2.3 *Document Descriptions*

A description for each compliance document listed above is described below:

2.2.3.1 *NPDES and Public Work Department Organizational Charts (Appendix C)*

The National Pollutant Discharge Elimination System (NPDES) Organizational Chart includes the names, telephone numbers and lines of authority for management and administrative positions responsible for implementing specific measures in the SSMP, while the names and lines of authority for maintenance positions are in the Public Works Organizational Chart



A summary for key positions, including the personnel responsible for responding to and reporting SSO's, is presented below:

- Director of Public Works – Establishes policy, plans strategy, leads staff, allocates resources, delegates responsibility, authorizes outside contractors to perform services, and may serve as public information officer. Oversees reporting of SSO's to the Online SSO System Oversees preparation of wastewater collection system planning documents; manages capital improvement delivery system; oversees documentation new and rehabilitated assets; oversees development and implementation of SSMP; provides information updates to City Council; and arranges for emergency meetings if necessary. In the event of an SSO, he is authorized to volunteer City liability, offer cleaning service and/or repair service to affected property owners.
- Street & Wastewater Supervisor – Is notified by the Non-Emergency Police Dispatcher when an SSO is reported. Oversees posting of any necessary public health warnings; provides relevant information to agency management, prepares contingency plans, reports SSO's to all relevant agencies aside from the SSO Online System, and trains field crews in regards to the Wastewater Collection System Sewer Overflow Response Plan. Prepares wastewater collection system planning documents; documents new and rehabilitated assets; and coordinates development and implementation of SSMP. In the event of an SSO, he is authorized to volunteer City liability, offer cleaning service and/or repair service to affected property owners.
- Senior Crew Chief - As leader of the Public Works Stand-By Crew, he is notified by the Non-Emergency Police Dispatcher when an SSO is reported. Oversees the SSO response, manages field operations and maintenance activities, implements contingency plans, leads emergency response, and investigates SSO's. Notifies all other members of the Public Works Stand-By Crew to assist in the SSO response; assesses the SSO and assigns the Stand-By Crew job duties in order to eliminate the overflow.
- Maintenance & Equipment Worker – Members of the Public Works Stand-By Crew. Staff preventive maintenance activities; mobilizes and responds to notification of stoppages and SSO's (mobilize sewer cleaning equipment, by-pass pumping equipment, and portable generators), all at the direction of the Sewer Crew Chief.
- Non-Emergency Police Dispatcher – If after hours, will be first notified of an SSO via the 24-Hour Non-Emergency Phone Line. Contracts Publics Works Department, and provides a verbal report of the SSO.



2.2.3.2 Community Quick Guide (Appendix D)

The City's Community Quick Guide includes numbers for those maintenance positions responsible for implementing specific measures in the SSMP.

2.2.3.3 Wastewater Collection System Sewer Overflow Response Plan (Appendix E)

The City's chain of communication for reporting SSO's is described in detail in the city's Wastewater Collection System Sewer Overflow Response Plan, prepared by the Public Works Department. The purpose of the Wastewater Collection System Sewer Overflow Response Plan is to minimize the impact of SSO's to the public and the environment, in a manner which also provides for the safety of City personnel. All sanitary sewer overflows are responded to in a timely manner to expedite the necessary steps to relieve the overflow. This response plan is the guideline for the standard operating procedures in the event of a SSO, including relieving the sewage blockage and spill containment. The response plan is reviewed periodically to ensure that all corrective measures are being taken.

All SSO's are reported as soon as: (1) the City has knowledge of the discharge, (2) reporting is possible, and (3) reporting can be provided without substantially impeding cleanup or other emergency measures. For any discharges of sewage that result in a discharge to a drainage channel or a surface water, the spill shall, as soon as possible but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services, the local health officer or directors of environmental health with jurisdiction over affected water bodies, and the San Diego Regional Water Quality Control Board.

As soon as possible, but not later than twenty-four (24) hours after becoming aware of a discharge to a drainage channel or surface water, a certification stating that the State Office of emergency Services and the local health officer or directors of environmental health with jurisdiction over the affected water bodies have been notified shall be submitted to the San Diego Regional Water Quality Control Board.

Initial reporting of SSOs must be reported to the Online SSO System as soon as possible but no later than 3 business days after we are aware of the SSO. Minimum information that must be contained in the 3-day report must include all information identified in *section 9, Monitoring and Reporting Program No. 2006-0003*. A final certified report must be completed through the Online SSO System, within 15 calendar days of the conclusion of SSO response and remediation.

Initial reporting of SSOs that do not discharge to a drainage channel or surface water must be reported to the San Diego Water Quality Control Board within 24 hours after the City becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. Minimum information that must be contained in the 24-hour report must include all information identified in *section C.2 of R9-2007-0005*.



The “Responsibilities” section of the Wastewater Collection System Sewer Overflow Response Plan identifies the Director of Public Works as the responsible or authorized representative for the city, as described in Section J of SWRCB Order No. 2006-0003, and lists his name and contact information

The Emergency Telephone lists name and contact information for the Director of Public Works, the Street and Water Supervisor, as well as the numbers for the Non-Emergency Police Dispatcher, and members of the Public Works Stand-By Crew.

Specifically, the Wastewater Collection System Overflow Response Plan contains the following sections:

- Purpose
- Background
- Policy
- Notification And Reporting
- Definitions
- Procedures
 - Mainline
 - Private Mainline or Lateral
 - Force Main Leak
 - Pump Station Leak
- Liability
- Responsibilities
- Notification And Reporting
- Regulatory Agency Reports
- Posting Requirements
- Training
- Attachments



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- Sewer Spill Report Form
- Sewer Spill Questions
- Emergency Telephone List
- County of San Diego Reporting Requirement
- County of San Diego Region Spill Report Form
- Spill Response Plan Flowchart

CHAPTER 3. LEGAL AUTHORITY

The City's Legal Authority addresses those mandatory SSMP provisions outlined in Section D, 13 (iii) Legal Authority of SWRCB Order No. 2006-0003. The City will demonstrate, through sanitary sewer system use ordinances, service agreements, or other legally binding procedures, that it possesses the necessary legal authority to:

- (1) Prevent illicit discharges into its sanitary sewer system (examples may include I/I, stormwater, chemical dumping, unauthorized debris and cut roots, etc.).
- (2) Require that sewers and connections be properly designed and constructed.
- (3) Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the City.
- (4) Limit the discharge of Fats, Oils, and Grease (FOG) and other debris that may cause blockages.
- (5) Enforce any violation of its sewer ordinances.

3.1 COMPLIANCE SUMMARY

The City is regulated by several agencies of the United States Government and the State of California, pursuant to the provisions of Federal and State Law. Federal and State Laws (including, but not limited to: 1) Federal Water Pollution Control Act, commonly known as the Clean Water Act (33 U.S.C. Section 1251 et seq); 2) California Porter Cologne Water Quality Act (California Water Code section 13000 et seq.); 3) California Health & Safety Code sections 25100 to 25250; 4) Resource Conservation and Recovery Act of 1976 (42 U.S.C. Section 6901 et seq.); and 5) California Government Code, Sections 54739-54740) grant to the City the authority to regulate and/or prohibit, by the adoption of an ordinance, and by issuance of control mechanisms, the discharge of any waste, directly or indirectly, to the City sewerage facilities. Said authority includes the right to establish limits, conditions, and prohibitions; to establish flow rates or prohibit flows discharged to the City sewerage facilities; to require the development of compliance schedules for the installation of equipment systems and materials by all users; and to take all actions necessary to enforce its authority, whether within or outside the City boundaries, including those users that are tributary to the City or within areas for which the City has contracted to provide sewerage services.

Through a series of Ordinances adopted by the City Council and the Municipal Code, the City possesses the necessary legal authority required by Section D, 13 (iii) Legal Authority of SWRCB Order No. 2006-0003:

- (1) The City prevents illicit discharges into its sanitary sewer system (including, but not limited to, I/I, stormwater, chemical dumping, and unauthorized debris) through the *National City Municipal Code*, specifically Sections 14.06.180 and 14.16.020.



- (2) The City requires that sewers and connections be properly designed and constructed per *Ordinance No. 92-2033*. The City utilizes the *Standard Specifications for Public Works Construction (Greenbook)* for design and construction standards and specifications for the installation of new sanitary sewer systems, pumps and other appurtenances, and for the rehabilitation and repair of existing sanitary sewer infrastructure. Section 3.7 of *Ordinance No. 92-2033*, also references the *San Diego Area Regional Standard Drawings*. These standards have been further customized for the specific needs of the City in the City's *Sewer Notes*.
- (3) The City ensures access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the City in Section 14.16.080 of the *National City Municipal Code*.
- (4) The City limits the discharge of Fats, Oils, and Grease (FOG) and other debris that may cause blockages through the *National City Municipal Code*, specifically Sections 14.06.180 and 14.16.020.
- (5) The City enforces any violation of its sewer ordinances in accordance with their *National City Municipal Code*, with administrative citations presented in Chapter 1.44 and administrative remedies discussed in Chapter 1.48.

3.2 COMPLIANCE DOCUMENTS

The following documents allow the City to comply with the Legal Authority requirements of the waste discharge requirement (WDR), and are attached as appendices:

- *Applicable Sections of the National City Municipal Code*, City of National City, Appendix F.
- *San Diego Area Regional Standard Drawings* - County of San Diego, April 2006, Appendix G.
- *Ordinance No. 92-2033- Standards for Public Rights-of-Way and Public Improvements*, City of National City, Appendix H.
- *Sewer Notes*, Department of Engineering, City of National City, Appendix I.

The following document is readily available to the general public, and has therefore not been attached as an appendix:

- *Standard Specifications for Public Works Construction (Greenbook)*, Public Works Standards, Inc., 2006.



3.3 DOCUMENT DESCRIPTIONS

Each of the following documents provides a portion of the City's Legal Authority, as required in Section D, 13 (iii) Legal Authority of SWRCB Order No. 2006-0003.

3.3.1 Applicable Sections of the National City Municipal Code (Appendix F)

Adopted by the City Council, referenced sections of the National City Municipal Code are described below:

- Chapter 1.44 - Contains administration requirements pertaining to City citations, including authorizing the enforcement officer to issue citations. An administrative citation should provide crucial information, including date of violation, name of violator, laws violated, etc.
- Chapter 1.48 - Contains provisions for administration remedies, authority and procedures are presented regarding enforcement actions taken if violators fail to comply with the necessary consequences of accrued citations. Guidelines for multiple infractions are also discussed in this section.
- Section 14.06.180 - Contains provisions pertaining to the City's ability to prevent illicit discharges into its sanitary sewer system including fats, oils, and grease. This code states that it unlawful to deposit any substance in the sewer system that may be detrimental to the system itself or detrimental to the sewage treatment plant.
- Section 14.16.020 - Contains provisions pertaining to the City's policies regarding objectionable sewage flows entering the sanitary sewer system. Any substance, liquid, gas or solid entering the sewer system as a result of a person, firm or corporation which causes a public nuisance or hazard to life is unlawful.
- Section 14.16.080 - Gives the director of public works, director of building and safety, duly authorized employees, or other agents of the city the authority to access all properties at a reasonable hour for the purpose of maintenance, inspection, or repairs of sewer related components

3.3.2 San Diego Area Regional Standard Drawings (Appendix G)

As referenced in the City's *Standards for Public Rights-of-Way and Public Improvements, Ordinance No. 92-2033*, these drawings are utilized as the City's sewer system standard drawings for:

- Sewer Cleanout
- 48" Diameter Precast Manhole Installation
- 60" Diameter Precast Manhole Installation



- Sewer Manhole Base
- Manhole Pipe Connectors
- Manhole Miscellaneous
- Manhole Coating and Lining System
- Existing Manhole Abandonment
- Warning/Identification Tape Installation
- Pipe Bedding and Trench Backfill for Sewer Facilities
- Concrete Protection for Sewer Pipe
- Slope Protection Installations
- Cut-Off Wall Installation in Traveled Areas
- 4" and 6" Sewer Lateral Installation
- Sewer Lateral Notes and Detail
- 4" and 6" Sewer Cut-In Wye Connections

3.3.3 Ordinance No. 92-2033 (Appendix H)

Adopted by the City on June 16 1992, *Ordinance No. 92-2033 - Standards for Public Right-of-Way and Public Improvements* requires that all new sanitary sewer systems to be properly designed and constructed in accordance with the *Standard Specifications for Public Works Construction (Greenbook)*, as well as the *San Diego Area Regional Standard Drawings*. Section 3.7 includes specifications for the following sanitary sewer elements:

- Sewer Grades
- Cradle/Encasement Requirements
- Manholes
- Sewer Locations
- Cleanouts
- Sewer Constructed Along Curved Alignments



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- Sewer Laterals

3.3.4 Sewer Notes (Appendix I)

Prepared by the City's Engineering Department, it summarizes and augments the design and construction standards in the *Greenbook* based on local nuances specific to the City.



CHAPTER 4. OPERATION AND MAINTENANCE PROGRAM

The City's Operating and Maintenance Program addresses those mandatory SSMP provisions outlined in Section D, 13 (iv) Operation and Maintenance Program of SWRCB Order No. 2006-0003.

The City's Operation and Maintenance Program encompasses the following components:

- (1) An up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes, valves and applicable storm water conveyance facilities
- (2) Routine preventive operation and maintenance activities by staff, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program includes a system to document scheduled and conducted activities, such as work orders.
- (3) A rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement focuses on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan includes a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan includes a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan.
- (4) Training on a regular basis for staff in sanitary sewer system operations and maintenance.
- (5) Equipment and replacement part inventories, including identification of critical replacement parts.

4.1 COMPLIANCE SUMMARY

The City's Operation and Maintenance (O&M) Program includes an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, as well as direction of flow and material when available. Invert elevations are identified by manhole in the City's Sewer Manhole Index. Additionally, a map of applicable storm water conveyance facilities is maintained by the Storm Water Division of the Department of Engineering.

At a minimum, the City attempts to clean each gravity main every 2 years. The City has identified sections of their sanitary sewer system that require more frequent cleaning and has accordingly developed flushing and rodding schedules for every one (1), three (3), six (6), or nine (9) months. The City also maintains a "not-to-schedule" list of gravity mains indentified as FOG problem areas



that may require even more frequent maintenance and cleaning. Lift stations are inspected every business day and cleaned at least once every five years.

As part of the *2002 Sanitary Sewer Master Plan and Storm Sewer Evaluation*, the City completed video inspection of 20% of their collection facilities. The City also performs and maintains video inspections of manholes and sewer pipes as necessary. On March 17, 2009, the City commenced with their Sewer System Master Plan, which includes a CCTV inspection of 20% of their collection facilities. These facilities were prioritized to include all identified FOG problem areas, as well as all gravity mains identified as hydraulically deficient in the City's System Evaluation and Capacity Assurance Plan (SECAP). Included in the Sewer System Master Plan is the determination of all missing invert elevations, in order to complete the City's Sewer Manhole Index.

The City allocates \$400,000 a year for rehabilitation and replacement of their sewer system. System deficiencies are prioritized, with funds allocated based on the prioritized list. The City has also created a phased and prioritized Capital Improvement Plan with funding anticipated through the Capital Improvement Fund, which includes an estimated \$5,000,000 in undesignated reserves.

The City conducts annual training on line flushing and basic maintenance. The City also provides on-going in-house technical, job skills and safety training for its Staff. The City maintains a Utility Crew Truck with necessary back-up inventory, including plugs. The City can also attain additional critical inventory from Judd Electric or Barrett Engineered Pumps. The City has a back-up pump in its inventory for each lift station.

In summary, the City maintains a Operation and Maintenance Program which meets the requirements of Section D, 13 (iv) Operation and Maintenance Program of SWRCB Order No. 2006-0003:

- (1) The City maintains an up-to-date Geographic Information System (GIS) database of their sanitary sewer system, including all gravity line segments and manholes, pumping facilities, pressure pipes and valves, as well as direction of flow and material when available. This database was utilized to create a map of the City's wastewater facilities, as presented Appendix A. Invert elevations for most manholes are included in the City's Sewer Manhole Index. Invert elevations for those manholes lacking invert elevations in the Sewer Manhole Index will be provided via a GPS survey included in the 2009 Sewer System Master Plan. A map of applicable storm water conveyance facilities is maintained by the Storm Water Division of the Department of Engineering
- (2) At a minimum, the City attempts to clean each gravity main every 2 years. The City has identified sections of their sanitary sewer system that require more frequent cleaning and has accordingly developed flushing and rodding schedules for every one (1), three (3), six (6), or nine (9) months. The City also maintains a "not-to-schedule" list of gravity mains indentified as FOG problem areas that may require even more frequent maintenance and cleaning, which is presented in the City's *Map and List of Sewer Line Problem Areas*. Lift stations are inspected every business day and cleaned at least once every five years. Additionally, City Field Staff observe all gravity mains and manholes during routine cleaning and conduct localized video inspections when their observations warrant such



further investigation. The City maintains a log of this continued video inspection. Each division maintains its own work order log filed chronologically. Daily logs of all work performed by each division are also maintained.

- (3) After evaluation of the City's system, deficiencies in capacity of gravity mains have been identified and a phased and prioritized Capital Improvement Plan (CIP) has been created based on these pipes and can be found in the City's *2008 Sewer System Hydraulic Analysis*, developed by IEC. In addition to the CIP list of pipes, the City maintains a prioritized list of sewer line problem areas in their *Map and List of Sewer Line Problem Areas*, requiring flushing or rodding every one (1), three (3), six (6), or nine (9) months, as well as a "not-to-schedule" cleaning list. Inspection of the pipes was last performed in 2002 with another inspection of 20% of the City's system included in the recently commissioned 2009 Sewer System Master Plan. These facilities were prioritized to include all identified FOG problem areas, as well as all gravity mains identified included in the Capital Improvement Plan (CIP), developed as part of the City's SECAP. The CIP is anticipated to receive funding through the Capital Improvement Fund, which includes an estimated \$5,000,000 in undesignated reserves. In addition, the City allocates \$400,000 a year for rehabilitation and replacement of their sewer system.
- (4) The City conducts annual training on line flushing and basic maintenance. The City also provides ongoing in-house technical job skills and safety training for its Staff. The City has not encountered a situation or non-compliance event that would cause it to believe that O&M Staff is not appropriately trained.
- (5) The City maintains a Utility Crew Truck with necessary back-up inventory, including plugs. The City can also attain additional critical inventory from Judd Electric or Barrett Engineered Pumps. Furthermore, the City has a back-up pump in its inventory for each lift station.

4.2 COMPLIANCE DOCUMENTS

The following documents, attached as appendices, support the City's Operation and Maintenance Program, thereby allowing the City to comply with the Operation and Maintenance Program requirements of the WDR:

- *Map and List of Sewer Line Problem Areas*, City of National City, Appendix J.
- *2008 Sewer System Hydraulic Analysis*, Infrastructure Engineering Corporation, Appendix K.
- *Existing Wastewater Facilities*, City of National City, Appendix L.

Additionally, the following document also supports the City's Operation and Maintenance Program and is available from the City's Engineering Division. Due to the size of the document, it has not been attached as an appendix.

- *2002 Sanitary Sewer Master Plan and Storm Sewer Evaluation*, City of National City.



- *Sewer Manhole Index*, City of National City.

4.3 *DOCUMENT DESCRIPTIONS*

A description for each compliance document listed above is described below:

4.3.1 *Map and List of Sewer Line Problem Areas (Appendix J)*

A map of the sewer segments prone to FOG deposits, as identified by the City, as well as a list of the Sewer Line Problem Areas, which includes the sewer segments prone to FOG deposits and classified for cleaning as either “Not-to-schedule,” “3-month,” “6-month,” or “9-month.”

4.3.2 *2008 Sewer System Hydraulic Analysis (Appendix K)*

Infrastructure Engineering Corporation (IEC) completed this September 2008 review and updated analysis of the wastewater flow projections and hydraulic analysis. This also accounted for all City-owned wastewater facilities constructed presently, as well as known developments that will be constructed in the future. Specific sections in the *2008 Sewer System Hydraulic Analysis* include:

- Introduction
- Wastewater System Design Criteria
- Wastewater Flows and Projections
- Sewer System Model Development and Calibration
- Existing Wastewater Facilities Analysis
- Capital Improvement Program

4.3.3 *Existing Wastewater Facilities (Appendix L)*

The City maintains an up-to-date Geographic Information System (GIS) database of their sanitary sewer system, including all gravity line segments and manholes, pumping facilities, pressure pipes and valves, as well as direction of flow and material when available. This database was utilized to create maps of the City’s wastewater facilities.

4.3.4 *2002 Sanitary Sewer Master Plan and Storm Sewer Evaluation, (Engineering Division)*

Conducted by PBS&J in April of 2002, the Sanitary Sewer Master Plan and Storm Sewer Evaluation Study provided the City with condition assessments and capacity analysis of sanitary and storm sewer systems, including base map development, project prioritization, and rehabilitation options. A Sewer Capital Improvement Plan to assist the City in fiscal planning was also developed.



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4.3.5 Sewer Manhole Index (Public Works Division)

Maintained by the City, the Sewer Manhole Index lists all City-owned manholes by ID, along with their invert elevations. Each invert elevation has an associated direction identified (i.e. N, S, E and/or W). Manhole IDs are illustrated on all City Maps, such as the one included in Appendix A.



CHAPTER 5. DESIGN AND PERFORMANCE PROVISIONS

The City's Design and Performance Provisions addresses those mandatory SSMP provisions outlined in Section D, 13 (v) Design and Performance Provisions of SWRCB Order No. 2006-0003. The City's Design and Performance Provisions encompass the following components:

- (1) Design and construction standards and specifications for the installation of new sanitary sewer systems, pump stations and other appurtenances; and for the rehabilitation and repair of existing sanitary sewer systems.
- (2) Procedures and standards for inspecting and testing the installation of new sewers, pumps and other appurtenances and for rehabilitation and repair projects.

5.1 COMPLIANCE SUMMARY

The City adopted *Ordinance No. 92-2033 - Standards for Public Right-of-Way and Public Improvements* which requires that all new sanitary sewer systems, as well as the rehabilitation and repair of existing sewer facilities, be designed and constructed in accordance with the *Standard Specifications for Public Works Construction (Greenbook)*, published by Public Works Standards, Inc.. Specifically, Section 3.7 of *Ordinance No. 92-2033*, references the *Greenbook*, as well as the *San Diego Area Regional Standard Drawings*. These standards have been further customized for the specific needs of the City in the City's *Sewer Notes*.

Procedures and standards for inspecting and testing the installation of new sewers and other appurtenances, and for rehabilitation and repair projects, are outlined in the *National City Municipal Code*. Specifically, Sections 14.06.130 and 14.06.140 require that all sewer facilities shall be left uncovered until the City engineer has completed inspection and testing in accordance with the *Uniform Plumbing Code*.

The City maintains Design and Performance Provisions which meet the requirements of Section D, 13 (v) Design and Performance Provisions of SWRCB Order No. 2006-0003:

- (1) Per *Ordinance No. 92-2033*, the City utilizes the *Standard Specifications for Public Works Construction (Greenbook)* for design and construction standards and specifications for the installation of new sanitary sewer systems, pumps and other appurtenances, and for the rehabilitation and repair of existing sanitary sewer infrastructure. Section 3.7 of *Ordinance No. 92-2033*, also references the *San Diego Area Regional Standard Drawings*. These standards have been further customized for the specific needs of the City in the City's *Sewer Notes*.
- (2) Per the *National City Municipal Code*, the procedures and standards for inspecting and testing the installation of new sewers, pumps and other appurtenances and for rehabilitation and repair projects, are in accordance with the *Uniform Plumbing Code*. Furthermore, Section 14.06.130 requires that all sewer facilities shall be left uncovered until the City engineer has completed inspection.



5.2 COMPLIANCE DOCUMENTS

The following documents are attached as appendices in order support the City's Design and Performance Provisions, thereby allowing the City to comply with the Design and Performance Provisions requirements of the WDR:

- *Ordinance No. 92-2033- Standards for Public Rights-of-Way and Public Improvements*, City of National City, June 16 1992, Appendix H.
- *Sewer Notes*, Department of Engineering, City of National City, Appendix I.
- *San Diego Area Regional Standard Drawings* - County of San Diego, April 2006, Appendix G
- *Applicable Sections of the Municipal Code of the City of National City*, City of National City, Appendix F.

The following documents are readily available to the general public, and have therefore not been attached as appendices:

- *Standard Specifications for Public Works Construction (Greenbook)*, Public Works Standards, Inc., 2006.
- *Uniform Plumbing Code*, Association of Plumbing and Mechanical Officials, 2006.

5.3 DOCUMENT DESCRIPTIONS

A description for each compliance document listed above is described below:

5.3.1 Ordinance No. 92-2033 (Appendix H)

Adopted by the City on June 16 1992, *Ordinance No. 92-2033 - Standards for Public Right-of-Way and Public Improvements* requires that all new sanitary sewer systems to be properly designed and constructed in accordance with the *Standard Specifications for Public Works Construction (Greenbook)*, as well as the *San Diego Area Regional Standard Drawings*. Section 3.7 includes specifications for the following sanitary sewer elements:

- Sewer Grades
- Cradle/Encasement Requirements
- Manholes
- Sewer Locations
- Cleanouts



- Sewer Constructed Along Curved Alignments
- Sewer Laterals

5.3.2 Sewer Notes (Appendix I)

Prepared by the City's Engineering Department, it summarizes and augments the design and construction standards in the *Greenbook* based on local nuances specific to the City.

5.3.3 San Diego Area Regional Standard Drawings- (Appendix G)

As referenced in the City's *Standards for Public Rights-of-Way and Public Improvements, Ordinance No. 92-2033*, these drawings include the City's sewer system standard drawings for:

- Sewer Cleanout
- 48" Diameter Precast Manhole Installation
- 60" Diameter Precast Manhole Installation
- Sewer Manhole Base
- Manhole Pipe Connectors
- Manhole Miscellaneous
- Manhole Coating and Lining System
- Existing Manhole Abandonment
- Warning/Identification Tape Installation
- Pipe Bedding and Trench Backfill for Sewer Facilities
- Concrete Protection for Sewer Pipe
- Slope Protection Installations
- Cut-Off Wall Installation in Traveled Areas
- 4" and 6" Sewer Lateral Installation
- Sewer Lateral Notes and Detail
- 4" and 6" Sewer Cut-In Wye Connections



5.3.4 Applicable Sections of the City of National City Municipal Code (Appendix F)

Adopted by the City Council, Section 14.06 contains provisions pertaining to the City's Sewer Connections, including procedures and standards for inspecting and testing the installation of new sewers, pumps and other appurtenances and for rehabilitation and repair projects. As presented in Sections 14.06.130 and 14.06.140, all sewer facilities shall be left uncovered until the City engineer has completed inspection, with facility testing to be in accordance with the *Uniform Plumbing Code*.

5.3.5 Standard Specifications for Public Works Construction, (Greenbook)

The *Greenbook*, formally known as the *Standard Specifications for Public Works Construction*, is widely used by cities and counties from Santa Barbara County to San Diego County. Publication of the *Greenbook* is under the oversight of Public Works Standards, Inc, a nonprofit mutual benefit corporation. It contains all the latest standards and recommendations that have been researched and approved by a 25-member committee, with representatives from the American Public Works Association, the Associated General Contractors of California, the Engineering Contractors Association, and the Southern California Contractors Association.

5.3.6 Uniform Plumbing Code

The 2006 Uniform Plumbing Code is designed to provide consumers with safe and sanitary plumbing systems while, at the time, allowing latitude for innovation and new technologies. The 2006 edition represents the most current approaches in the plumbing field. International Association of Plumbing and Mechanical Officials (IAPMO) developed the Uniform Plumbing Code to provide minimum standards and requirements to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation and maintenance or use of plumbing systems. The Uniform Plumbing Code includes general testing procedures, as well as specific guidance in performing leakage, water exfiltration and air pressure tests.



CHAPTER 6. OVERFLOW EMERGENCY RESPONSE PLAN

The City has developed and implemented an overflow emergency response plan that identifies measures to protect public health and the environment, thereby satisfying Section D, 13 (vi) Overflow Emergency Response Plan of SWRCB Order No. 2006-0003 by including:

- (1) Proper notification procedures so that primary responders and regulatory agencies are informed of all SSOs in a timely manner;
- (2) A program to ensure an appropriate response to all overflows;
- (3) Procedures which ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, Regional Water Boards, water suppliers, etc.) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the Monitoring and Reporting Program (MRP). All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Boards WDR's or National Pollution Discharge Elimination System (NPDES) permit requirements. The SSMP should identify the officials who will receive immediate notification;
- (4) Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;
- (5) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and
- (6) A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

The City's Overflow Emergency Response Plan complies with the additional notification requirements outlined in SWRCB Order No. WQ-2008-0002-EXEC:

- (1) For any discharges of sewage that results in a discharge to a drainage channel or a surface water, the City shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services, the local health officer or directors of environmental health with jurisdiction over affected water bodies, and the San Diego Regional Water Quality Control Board.
- (2) As soon as possible, but no later than twenty-four (24) hours after becoming aware of a discharge to a drainage channel or a surface water, the City shall submit to the San Diego Regional Water Quality Control Board a certification that the State Office of Emergency Services and the local health officer or directors of environmental health with jurisdiction over the affected water bodies have been notified of the discharge.



The City's Overflow Emergency Response Plan also complies with the additional monitoring and reporting requirements outlined in Order No. R9-2007-0005, as adopted by the San Diego Regional Water Quality Control Board:

- (1) The City shall report all SSOs in accordance with the Monitoring and Reporting Program No. 96-04 until the Sewage Collection Agency notifies the Regional Board that they can successfully report the SSOs to the State Board Online SSO System. The notification shall be a letter signed and certified by a person designated, for a municipality, state, federal or other public agency, as either a principle executive officer or ranking elected official.
- (2) For Category 1 (as defined in State Board Monitoring and Reporting Program No. 2006-0003-DWQ) SSOs, the City shall provide notification of the SSO to the Regional Board by phone, email, or fax within 24 hours after the City becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. The information reported to the Regional Board shall include the name and phone number of the person reporting the SSO, the responsible sewage collection agency, the estimated total sewer overflow volume, the location of the SSO, the receiving water (if any), the start date/time of the SSO (or whether or not the sewer overflow is still occurring at the time of the report), and confirmation that the local health services agency was or will be notified as required under the reporting requirements of the local health services agency.
- (3) The City shall provide notification of all Private Lateral Sewage Discharges (as defined in the State Board Order), for which they become aware of, that equal or exceed 1,000 gallons; result in a discharge to a drainage channel and/or surface water; and/or discharge to a storm drainpipe that was not fully captured and returned to the sanitary sewer system, to the Regional Board by phone or fax within 24 hours after the City becomes aware of the Private Lateral Sewage Discharge, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. The information reported to the Regional Board shall include the following information, if known: the name and phone number of the person reporting the Private Lateral Sewage Discharge, the service area where the Private Lateral Sewage Discharge occurred, the responsible party (other than the City, if known), the estimated Private Lateral Sewage Discharge volume, the location of the Private Lateral Sewage Discharge, the receiving water (if any), the start date/time of the Private Lateral Sewage Discharge (or whether or not the sewer overflow is still occurring at the time of the report), and confirmation that the local health services agency was or will be notified as required under the reporting requirements of the local health services agency.
- (4) The following requirement supersedes the Private Lateral Sewage Discharge Reporting Timeframe for Private Lateral Sewage Discharge in the State Board Monitoring and Reporting Program No. 2006-0003-DWQ: For Private Lateral Sewage Discharges that occur within the City's service area and that the City becomes aware of, the City shall report the Private Lateral Sewage Discharge to the State Board Online SSO Database within 30



days after the end of the calendar month in which the Lateral Sewage Discharge occurs. The City must identify the sewage discharge as occurring and caused by a private lateral, and responsible party (other than the City) should be identified, if known. The City will not be responsible for the cause, cleanup, or repair of Private Lateral Sewage Discharges, but only the reporting of those within their jurisdiction and for which they become aware of.

6.1 COMPLIANCE SUMMARY

The City has outlined specific measures to protect public health and the environment in their *Wastewater Collection System Sewer Overflow Response Plan* (Appendix E). These procedures contain a plan for responding and reporting to SSOs which includes, but is not limited to, the following:

- Descriptions, responsibilities and authorities for each management, administrative and maintenance position responsible for responding to and reporting an SSO.
- Procedures for receiving SSO notification and immediately notifying first responders of the SSO.
- Procedures to rapidly mobilize, diagnose, contain, report on, and relieve the cause of SSOs.
- Procedures to provide emergency operations, such as traffic and crowd control, in the event of an SSO.
- Procedures for reporting all SSOs, including those originating from private laterals, and notifying the proper authorities, with appropriate contact information.
- A list of agencies, with their appropriate contact information, to be notified in the event of any SSO.
- Procedures to post the proper signs to warn the public of potential contamination hazards.
- Procedures to restore the environment to the condition that existed before the SSO occurred.

The City conducts internal training sessions to ensure familiarity with these procedures and prepare staff for an SSO event, from initial notification to SSO report documentation, including any necessary emergency activities, such as traffic control.

Through these documents and programs, the City has developed and implemented an overflow emergency response plan that identifies measures to protect public health and the environment, thereby satisfying Section D, 13 (vi) Overflow Emergency Response Plan of SWRCB Order No. 2006-0003:



- (1) Sections 4, 5 and 9 of the City's *Wastewater Collection System Sewer Overflow Response Plan* outline the proper SSO notification procedures, thereby ensuring that primary responders and regulatory agencies are informed of all SSOs in a timely manner.
- (2) Sections 7 and 10 of the City's *Wastewater Collection System Sewer Overflow Response Plan* contain a program to ensure an appropriate response to all overflows;
- (3) Section 5 of the City's *Wastewater Collection System Sewer Overflow Response Plan* outlines the procedures which ensure prompt notification to appropriate regulatory agencies and other potentially affected entities of all SSOs that potentially affect public health or reach the waters of the State in accordance with the Monitoring and Reporting Program (MRP). In addition to the SWRCB Online reporting system, agencies to be notified include the Office of Emergency Service, San Diego Regional Water Quality Board, San Diego County Department of Health Services, and the San Diego Unified Port District (only if materials are released into tideland areas). Section 4 also identifies the officials who will receive immediate notification;
- (4) Section 9 of the City's *Wastewater Collection System Sewer Overflow Response Plan* City describes the internal training sessions utilized to ensure familiarity with these procedures and prepare staff and contractor personnel for an SSO event, from initial notification to SSO report documentation, including any necessary emergency activities, such as traffic control;
- (5) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities, are addressed in Section 10 of the City's *Wastewater Collection System Sewer Overflow Response Plan* ; and
- (6) As described in Section 3, the City's *Wastewater Collection System Sewer Overflow Response Plan* ensures that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs.

Provisions of the City's Overflow Emergency Response Plan, that comply with SWRCB Order No. WQ 2008-0002-EXEC, are contained in Section 5 of the City's *Wastewater Collection System Sewer Overflow Response Plan*.

- (1) In the event of a sewage discharge that results in a discharge to a drainage channel or a surface water, the City shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services, the local health officer or directors of environmental health with jurisdiction over affected water bodies, and the San Diego Regional Water Quality Control Board.
- (2) As soon as possible, but no later then twenty-four (24) hours after becoming aware of a discharge to a drainage channel or a surface water, the City shall submit to the San Diego Regional Water Quality Control Board a certification that the State Office of Emergency Services and the local health officer or directors of environmental health with jurisdiction



over the affected water bodies have been notified of the discharge.

Provisions of the City's Overflow Emergency Response Plan, that comply with San Diego Regional Water Quality Control Board Order No. R-2007-0005, are contained in Section 5 of the City's *Wastewater Collection System Sewer Overflow Response Plan*:

- (1) The City is currently reporting to the San Diego Regional Water Quality Control Board, in accordance with Monitoring and Reporting Program No. 96-04.
- (2) In the event of a SSO, the City provides notification of the SSO to the Regional Board by phone, email, or fax within 24 hours after the City becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures.
- (3) In the event of a private lateral sewer discharge, the City provides notification of the discharge to the Regional Board by phone, email, or fax within 24 hours after the City becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures.
- (4) In the event of a private lateral sewer discharge, the City reports the discharge to the State Board Online SSO Database within 30 days after the end of the calendar month in which the Lateral Sewage Discharge occurs. The City identifies the sewage discharge as occurring and caused by a private lateral, and the responsible party (other than the City) is identified, if known.

6.2 COMPLIANCE DOCUMENTS

The following documents allow the City to comply with the overflow and emergency response plan requirements of the WDR, and are attached as appendices.

- o Wastewater Collection System Sewer Overflow Response Plan, City of National City, Last Updated February 2008, Appendix E.

6.3 DOCUMENT DESCRIPTIONS

A description for each compliance document listed above is described below:

6.3.1 Wastewater Collection System Sewer Overflow Response Plan (Appendix E)

The City of National City maintains a plan for responding and reporting to SSOs in their *Sewer Overflow Response Plan*. The purpose of these procedures is to minimize the impact of SSO's to the public and the environment. This response plan is a guideline for the standard operating procedures in the event of a SSO, and is reviewed periodically by the Director of Public Works. Specifically, the *Wastewater Collection System Sewer Overflow Response Plan* addresses the following:



Policy

Includes the City's priorities in regards to a SSO event. With safety paramount, the first priority when responding to a SSO event is returning the system to operation and the secondary objective is containing the SSO. However, depending upon location, magnitude of spill, and availability of alternatives, containing the spill could supersede the primary objective.

Notification

Includes the procedures for notifying the proper authorities in the event of any SSO. Includes the Emergency Telephone lists name and contact information for the Director of Public Works, the Street and Water Supervisor, as well as the numbers for the Non-Emergency Police Dispatcher, and members of the Public Works Stand-By Crew.

Reporting

Includes the procedures for reporting SSOs to the proper authorities in the event of any SSO. All SSO's are reported as soon as: (1) the City has knowledge of the discharge, (2) reporting is possible, and (3) reporting can be provided without substantially impeding cleanup or other emergency measures. For any discharges of sewage that result in a discharge to a drainage channel or a surface water, the spill shall, as soon as possible but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services, the local health officer or directors of environmental health with jurisdiction over affected water bodies, and the San Diego Regional Water Quality Control Board.

As soon as possible, but not later than twenty-four (24) hours after becoming aware of a discharge to a drainage channel or surface water, a certification stating that the State Office of emergency Services and the local health officer or directors of environmental health with jurisdiction over the affected water bodies have been notified shall be submitted to the San Diego Regional Water Quality Control Board.

Initial reporting of SSOs must be reported to the Online SSO System as soon as possible but no later than 3 business days after we are aware of the SSO. Minimum information that must be contained in the 3-day report must include all information identified in *section 9, Monitoring and Reporting Program No. 2006-0003*. A final certified report must be completed through the Online SSO System, within 15 calendar days of the conclusion of SSO response and remediation.

Initial reporting of SSOs that do not discharge to a drainage channel or surface water must be reported to the San Diego Water Quality Control Board within 24 hours after the City becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. Minimum information that must be contained in the 24-hour report must include all information identified in *section C.2 of R9-2007-0005*.



Definitions

Provides several definitions to help classify SSO events, in order for personnel to accurately assess the probable impact on public safety, determine the proper level of response, determine the potential for outside costs associated with cleanup, and to accurately report overflows to the proper regulatory agencies. Both major and minor SSO classifications are defined; and the importance of safety throughout the cleanup process is emphasized.

Procedures

Includes the procedures for SSO response regarding unique wastewater facilities, including mainline, force main, and pump station spills. General guidelines for arrival, containment, corrective action, personnel notification, and documentation of a SSO can all be found in this section.

Liability

City officials should neutralize the situation and be polite and sympathetic to the property owner's concerns. Furthermore, the Street and Wastewater Supervisor will advise the occupant, property owner, or property manager of the procedure for filing a damage claim with the City Clerk's Office.

Responsibilities

Includes the responsibilities of various City officials when dealing with a SSO situation. Identifies the Director of Public Works as the responsible or authorized representative for the city, as described in Section J of SWRCB Order No. 2006-0003, and lists his name and contact information. Reports shall be submitted to the Street and Wastewater Supervisor or Director of Public Works by the following workday. In the event of an overflow/spill during off-hours the personnel responding shall complete all required reports and notify the appropriate supervisor by telephone as soon as the situation has been controlled. Also, the Street and Wastewater Supervisor shall be responsible for notifying regulatory agencies of SSOs within the required timeframe. Included in this section is the contact information for any necessary public agencies.

Emergency Traffic and Crowd Control

Includes the procedures to provide emergency traffic control activities in the event of an SSO. The Senior Crew Chief will utilize assistance from the City of National City Police Department

Posting Requirements

Includes the procedures to post proper signs to warn the public of potential contamination hazards. Environmental Health Services will direct the extent of the postings and when the signs are to be removed.



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Training

Includes the procedures to properly inform and train City personnel of overflow emergency response guidelines.



CHAPTER 7. FATS, OILS AND GREASE (FOG) CONTROL PROGRAM

The City's Fats, Oils and Grease Control Program addresses those mandatory SSMP provisions outlined in Section D, 13 (vii) FOG Control Program of SWRCB Order No. 2006-0003. The City's FOG Control Program helps reduce the amount of Fats, Oils and Grease discharged to the sanitary sewer system, by including:

- (1) A plan and schedule for the disposal of FOG generated within the sanitary sewer system service area, and a list of acceptable disposal facilities.
- (2) Legal authority to prohibit discharges to the system and identify measures to prevent SSO's and blockages caused by FOG.
- (3) Requirements to install grease removal devices, design standards for the removal devices, maintenance requirements, BMP requirements, record keeping and reporting requirements.
- (4) Authority to inspect grease producing facilities, enforcement authorities, and sufficient staff to inspect and enforce the FOG ordinance.
- (5) Identification of sanitary sewer system sections subject to FOG blockages and establishment of a cleaning maintenance schedule for each section.
- (6) Development and implementation of source control measures for all sources of FOG discharged to the sanitary sewer system for each section identified.
- (7) Implementation of a plan and schedule for a public education outreach program that promotes proper disposal of FOG.

7.1 COMPLIANCE SUMMARY

To reduce the amount of Fats, Oils and Grease discharged to the City's sanitary sewer system, the City has developed a FOG Control Program. The City's Department of Engineering identifies all new food service (restaurant) and automotive industry locations within the City's service area as part of their initial occupancy inspection. Restaurants are required to install grease interceptors, and to clean them twice a year. Automotive sector customers are required to have sand/oil separators, and to clean them annually. The City's Engineering Department maintains a list of customers with grease interceptors, and is developing a list of customers with sand/oil separators. All interceptors are inspected once every five years by the City's Department of Engineering.

The City has identified sections of their sanitary sewer system subject to high levels of FOG in their *Map and List of Sewer Line Problem Areas* and has developed cleaning maintenance schedules for these sections. Pipelines requiring cleaning every three (3), six (6) or nine (9) months are identified by the City as such. The City also maintains a "not-to-schedule" list of gravity mains requiring even more frequent monthly maintenance and cleanings. In summary, the City maintains a FOG Control which meets the requirements of Section D, 13 (vii) FOG Control Program of SWRCB Order No.



2006-0003:

- (1) The City maintains a plan and schedule for the disposal of FOG generated within their sanitary sewer system service area. All businesses in the food preparation and automotive sectors are identified as FOG generators by the Department of Engineering in the occupancy inspection, and are required to have grease interceptors and sand/oil separators, respectively. Restaurants are required to clean their grease interceptors twice a year, while other FOG generators are required to clean their sand/oil separators annually. A list of independent vendors which can provide collection and disposal services within the City's service area is included, and can be found in the *Independent Collection/Disposal Service Vendor List*.
- (2) The City possesses the legal authority to prohibit discharges to the system and identify measures to prevent SSO's and blockages caused by FOG through the *National City Municipal Code*, specifically Sections 14.06.180, 14.06.190 and 14.16.080.
- (3) As per Section 14.06.190 of the *National City Municipal Code*, the City requires all new food preparation and automotive service businesses to install grease interceptors and sand/oil separators, respectively. The City's Engineering Department maintains a list of customers with grease interceptors documented in their *Grease Interceptor Inspection Sheet*, and is developing a list of customers with sand/oil separators. The city utilizes the grease removal design standards discussed in *Standard Specifications for Public Works Construction (Greenbook)* for sand/oil separators and grease interceptors, as well as the appropriate, accompanying sample box. The City requires restaurants to clean their grease interceptors twice a year, and that automotive service businesses clean their sand/oil separators annually. The City's Engineering Department inspects all interceptors once every five years, and maintains records of these inspections.
- (4) The City has authority to inspect grease producing facilities through the *National City Municipal Code* Section 14.16.080, and enforces any violation of its sewer ordinances per Chapters 1.44 and 1.48 of *National City Municipal Code*. The City has sufficient staff to provide inspections of each removal device in their service area once every five years.
- (5) The City has identified sections of their sanitary sewer system subject to high levels of FOG in their *Map and List of Sewer Line Problem Areas* and has developed cleaning maintenance schedules for these sections. Pipelines requiring cleaning every three (3), six (6) or nine (9) months are identified by the City as such. The City also maintains a "not-to-schedule" list, a list of gravity mains requiring even more frequent monthly maintenance and cleanings.
- (6) The City has developed and implemented source control measures for all sources of FOG discharged to the sanitary sewer system, as identified in their *Map and List of Sewer Line Problem Areas*, by prohibiting the discharge of FOG into their sewer system per *National City Municipal Code* Section 14.06.180, and requiring appropriate source controls, such as interceptors, per Section 14.06.190.



- (7) City Staff from the Storm Water Division of the Department of Engineering meet with each interceptor owner at the time of inspection to allow for discussion regarding the City's FOG Control Program and Best Management Practices (BMP). The City has developed formal literature to be disseminated during these meetings, as well as posted on their web site, <http://www.ci.national-city.ca.us/>. The City also holds specific workshops for restaurant, residential, construction, and automotive BMPs annually.

7.2 COMPLIANCE DOCUMENTS

The following documents, attached as appendices, support the City's FOG Control Program, thereby allowing the City to comply with the FOG Control Program requirements of the Statewide General Waste Discharge Requirements (WDR):

- *Applicable Sections of the National City Municipal Code*, City of National City, Appendix F.
- *Map and List of Sewer Line Problem Areas*, City of National City, Appendix I.
- *Grease Interceptor Inspection Sheet*, City of National City, Appendix M.
- *Independent Collection/Disposal Service Vendor List*, City of National City, Appendix N.
- *Public Outreach for FOG Control*, City of National City, Appendix O.

The following document is readily available to the general public, and has therefore not been attached as an appendix:

- *Standard Specifications for Public Works Construction (Greenbook)*, Public Works Standards, Inc., 2006.

7.3 DOCUMENT DESCRIPTION

A description for each compliance document listed above is described below:

7.3.1 *Applicable Sections of the National City Municipal Code (Appendix F)*

Adopted by the City Council, referenced sections of the National City Municipal Code are described below:

- Chapter 1.44 - Contains administration requirements pertaining to City citations, including authorizing the enforcement officer to issue citations. An administrative citation should provide crucial information, including date of violation, name of violator, laws violated, etc.
- Chapter 1.48 - Contains provisions for administration remedies, authority and procedures are presented regarding enforcement actions taken if violators fail to



comply with the necessary consequences of accrued citations. Guidelines for multiple infractions are also discussed in this section.

- Section 14.06.180 - Contains provisions pertaining to the City's ability to prevent illicit discharges into its sanitary sewer system including fats, oils, and grease. This code states that it is unlawful to deposit any substance in the sewer system that may be detrimental to the system itself or detrimental to the sewage treatment plant.
- Section 14.16.020 - Contains provisions pertaining to the City's policies regarding objectionable sewage flows entering the sanitary sewer system. Any substance, liquid, gas or solid entering the sewer system as a result of a person, firm or corporation which causes a public nuisance or hazard to life is unlawful.
- Section 14.16.080 - Gives the director of public works, director of building and safety, duly authorized employees, or other agents of the city the authority to access all properties at a reasonable hour for the purpose of maintenance, inspection, or repairs of sewer related components.

7.3.2 Map and List of Sewer Problem Areas (Appendix I)

A map of the sewer segments prone to FOG deposits, as identified by the City, as well as a list of the Sewer Line Problem Areas, which includes the sewer segments prone to FOG deposits and classified for cleaning as either "Not-to-schedule," "3-month," "6-month," or "9-month."

7.3.3 Grease Interceptor Inspection Sheet (Appendix M)

A sample page from the Questionnaire/inspection sheet listing grease producing facilities and their associated sewer system FOG mitigation practices is provided. Questions from the sheet are listed below:

- Type of grease control device?
- Does facility have a grease trap or grease interceptor?
- When was the last time the grease was maintained?
- Where is the grease control device located?
- How many grease fryers are at the facility?
- About how often is fryer oil replaced?
- Do oil-recycling/grease bins have overhead coverage?
- Do oil-recycling/grease bins have secondary containment?



- Are deep fryer oil-recycling drums stored properly?
- At what time is cleaning performed?
- What is the cleaning method?
- Does the restaurant hose off the site?
- How are kitchen floor mats cleaned?
- Where is used cleaning water discharged?
- Are storm drain inlets free of grease and other food debris?

7.3.4 Independent Collection/Disposal Service Vendor List (Appendix N)

There are several independent vendors which can provide grease interceptor service. This list represents a random selection of a portion of these vendors, and does not imply City endorsement of any specific vendor.

7.3.5 Public Outreach for FOG Control (Appendix O)

The formal literature provided by City Staff from the Storm Water Division of the Department of Engineering to interceptor owners, when they inspect each interceptor. This literature is also posted on the City's web site, <http://www.ci.national-city.ca.us/>.

7.3.6 Standard Specifications for Public Works Construction, (Greenbook)

The *Greenbook*, formally known as the *Standard Specifications for Public Works Construction*, is widely used by cities and counties from Santa Barbara County to San Diego County. Publication of the *Greenbook* is under the oversight of Public Works Standards, Inc, a nonprofit mutual benefit corporation. It contains all the latest standards and recommendations that have been researched and approved by a 25-member committee, with representatives from the American Public Works Association, the Associated General Contractors of California, the Engineering Contractors Association, and the Southern California Contractors Association.



CHAPTER 8. SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN

The City's System Evaluation and Capacity Assurance Plan addresses those mandatory SSMP provisions outlined in Section D, 13 (viii) System Evaluation and Capacity Assurance Plan of SWRCB Order No. 2006-0003. The City's System Evaluation and Capacity Assurance Plan encompasses the following components:

- (1) Evaluation - Actions needed to evaluate those portions of the sanitary sewer system that are experiencing or contributing to an SSO discharge caused by hydraulic deficiency. The evaluation provides estimates of peak flows (including flows from SSOs that escape from the system) associated with conditions similar to those causing overflow events, estimates of the capacity of key system components, hydraulic deficiencies (including components of the system with limiting capacity) and the major sources that contribute to the peak flows associated with overflow events.
- (2) Design Criteria - Where design criteria do not exist or are deficient, undertake the evaluation identified in (1) above to establish appropriate design criteria.
- (3) Capacity Enhancement Measures - The steps needed to establish a short- and long-term CIP to address identified hydraulic deficiencies, including prioritization, alternatives analysis, and schedules. The CIP may include increases in pipe size, I/I reduction programs, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding.
- (4) Schedule – the City has developed a schedule of completion dates for all portions of the CIP developed in (1)-(3) above. This schedule shall be reviewed and updated consistent with the SSMP review and update requirements as described in Section D. 14.

8.1 COMPLIANCE SUMMARY

The City maintains a System Evaluation and Capacity Assurance Plan which meet the requirements of Section D, 13 (viii) System Evaluation and Capacity Assurance Plan of SWRCB Order No. 2006-0003:

- (1) The City's *2008 Sewer System Hydraulic Analysis* includes wastewater flow projections and a hydraulic analysis of all City-owned gravity mains, lift station and force mains. The analysis, performed with an H₂OMap Sewer hydraulic model, includes estimates of peak dry and wet weather flows, and outlines a Wastewater Capital Improvement Program to mitigate projected deficiencies in the Existing, 5-Year, 10-Year and 20-Year (Planning Horizon) time increment. Sanitary Sewer Overflows were not allowed to exit the system during the hydraulic analysis.
- (2) The City's *2008 Sewer System Hydraulic Analysis* summarizes the City's design criteria which ensures sufficient capacity, as well as preserves the estimated life-cycle of wastewater infrastructure.



- (3) The City has established a short- and long-term Wastewater Capital Improvement Program (CIP) to address projected hydraulic deficiencies. The CIP is included in the *2008 Sewer System Hydraulic Analysis*, and includes projected cost estimates, alternatives analysis and project prioritization by 5-Year time increment. The City's *2008 Sewer System Hydraulic Analysis* presents a phased and prioritized Capital Improvement Plan (CIP) with funding anticipated through the Capital Improvement Fund, which includes an estimated \$5,000,000 in undesignated reserves.
- (4) The City has developed their CIP, as presented above, and plans to review and update it accordingly during their *Sewer System Master Plan*, currently scheduled for completion in 2010.

8.2 COMPLIANCE DOCUMENTS

The following documents, attached as appendices, support the City's System Evaluation and Capacity Assurance Plan, thereby allowing the City to comply with the System Evaluation and Capacity Assurance Plan requirements of the WDR:

- o *2008 Sewer System Hydraulic Analysis*, Infrastructure Engineering Corporation, September 2008, Appendix K.

8.3 DOCUMENT DESCRIPTIONS

A description for each compliance document listed above is described below:

8.3.1 2008 Sewer System Hydraulic Analysis (Appendix K)

Infrastructure Engineering Corporation completed this September 2008 review and updated analysis of the wastewater flow projections and hydraulic analysis. This also accounted for all City-owned wastewater facilities constructed presently, as well as known developments that will be constructed in the future. Specific sections in the *2008 Sewer System Hydraulic Analysis* include:

- o Introduction
- o Wastewater System Design Criteria
- o Wastewater Flows and Projections
- o Sewer System Model Development and Calibration
- o Existing Wastewater Facilities Analysis
- o Capital Improvement Program



CHAPTER 9. MONITORING, MEASUREMENT, AND PROGRAM MODIFICATIONS

The City's Monitoring, Measurement, and Program Modifications addresses those mandatory SSMP provisions outlined in Section D, 13 (ix) Monitoring, Measurement, and Program Modifications of SWRCB Order No. 2006-0003. The Monitoring, Measurement, and Program Modifications encompass the following components:

- (1) Maintain relevant information that can be used to establish and prioritize appropriate SSMP activities;
- (2) Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP;
- (3) Assess the success of the preventative maintenance program;
- (4) Update program elements, as appropriate, based on monitoring or performance evaluations; and
- (5) Identify and illustrate SSO trends, including: frequency, location, and volume.

9.1 COMPLIANCE SUMMARY

The City records the location of all SSOs, blockages, and FOG hot-spots. The City has identified sections of their sanitary sewer system subject to high levels of FOG in their *Map and List of Sewer Line Problem Areas* and has developed cleaning maintenance schedules for these sections.

Pipelines requiring cleaning every three (3), six (6) or nine (9) months are identified by the City as such. The City also maintains a "not-to-schedule" list of gravity mains requiring even more frequent monthly maintenance and cleanings. City Field Staff observe all gravity mains and manholes during routine cleaning and conduct localized video inspections when their observations warrant such further investigation. The City maintains a log of this continued video inspection. Each division maintains its own work order log filed chronologically. Daily logs of all work performed by each division are also maintained.

As part of the *2002 Sanitary Sewer Master Plan and Storm Sewer Evaluation*, the City completed video inspection of 20% of their collection facilities. The City also performs and maintains video inspections of manholes and sewer pipes as necessary. On March 17, 2009, the City commenced with their Sewer System Master Plan, which includes a CCTV inspection of 20% of their collection facilities. These facilities were prioritized to include all identified FOG problem areas, as well as all gravity mains identified as hydraulically deficient in the City's System Evaluation and Capacity Assurance Plan (SECAP). Included in the Sewer System Master Plan is a priority rehabilitation ranking for all City-owned wastewater infrastructure, in order to identify pipelines with a higher risk of collapse or prone to more frequent blockages due to defects.



The City's Department of Engineering identifies all new food service (restaurant) and automotive industry locations within the City's service area as part of their initial occupancy inspection. The City's Engineering Department maintains a list of customers with grease interceptors, and is developing a list of customers with sand/oil separators. All interceptors are inspected once every five years by the City's Department of Engineering.

In order to monitor the implementation and measure the effectiveness of the SSMP, the City will track several performance indicators, including:

- Location of all SSOs over the past 12 months;
- Number of SSOs over the past 12 months, distinguishing between dry weather overflows and wet weather overflows;
- Volume distribution of SSOs (e.g. number of SSOs < 100 gallons, 100 to 999 gallons, 1,000 to 9,999 gallons, > 10,000 gallons);
- Volume of SSOs that was contained in relation to total volume of SSOs;
- SSOs by cause (e.g. roots, grease, debris, pipe failure, pump station failure, capacity, other);
- Number of Interceptors inspected over the past 12 months;
- Percentage of Interceptors inspected over the past 12 months;
- Miles of gravity mains cleaned over the past 12 months;
- Percentage of total gravity mains cleaned over the past 12 months;
- Percentage of wet wells cleaned over the past 6 months;

In order to keep the SSMP up to date, the City has assigned a staff member to review the SSMP annually. In addition to tracking the above performance indicators, the staff member will review all sections of the SSMP for effectiveness and timeliness. Collection system personnel will also be consulted annually to review the effectiveness of the SSMP, and help identify potential areas for improvement.

In summary, the City maintains a Monitoring, Measurement, and Program Modifications which meets the requirements of Section D, 13 (ix) Monitoring, Measurement, and Program Modifications of SWRCB Order No. 2006-0003:

- (1) The City records the location of all SSOs, blockages, and FOG hot-spots. The City has identified sections of their sanitary sewer system subject to high levels of FOG in their *Map and List of Sewer Line Problem Areas* and has developed cleaning maintenance schedules for



these sections. City Field Staff observe all gravity mains and manholes during routine cleaning and conduct localized video inspections when their observations warrant such further investigation. The City maintains a log of this continued video inspection. Each division maintains its own work order log filed chronologically. Daily logs of all work performed by each division are also maintained. On March 17, 2009, the City commenced with their Sewer System Master Plan, which includes a CCTV inspection of 20% of their collection facilities. The City's Department of Engineering identifies all new food service (restaurant) and automotive industry locations within the City's service area as part of their initial occupancy inspection. The City's Engineering Department maintains a list of customers with grease interceptors, and is developing a list of customers with sand/oil separators. All interceptors are inspected once every five years by the City's Department of Engineering.

- (2) The City monitors the implementation of the SSMP, and measures the effectiveness of each element by SSMP by developing and tracking performance indicators on an annual basis;
- (3) By tracking performance indicators, the City is able to assess the success of their preventative maintenance program;
- (4) The City has assigned a staff member to review the SSMP annually, in order to update all program elements as appropriate. In addition to tracking the above performance indicators, the staff member will review all sections of the SSMP for effectiveness and timeliness. Collection system personnel will also be consulted annually to review the effectiveness of the SSMP, and help identify potential areas for improvement;
- (5) The City tracks the frequency, location and volume of all SSOs.

9.2 COMPLIANCE DOCUMENTS

The following documents allow the City to comply with the Monitoring, Measurement, and Program Modifications requirements of the WDR, and are attached as appendices.

- *Map and List of Sewer Line Problem Areas*, City of National City, Appendix J.

Additionally, the following document also supports the City's Operation and Maintenance Program and is available from the City's Engineering Division. Due to the size of the document, it has not been attached as an appendix.

- *2002 Sanitary Sewer Master Plan and Storm Sewer Evaluation*, City of National City.



9.3 *DOCUMENT DESCRIPTIONS*

A description for each compliance document listed above is described below:

9.3.1 Map and List of Sewer Line Problem Areas (Appendix J)

A map of the sewer segments prone to FOG deposits, as identified by the City, as well as a list of the Sewer Line Problem Areas, which includes the sewer segments prone to FOG deposits and classified for cleaning as either “Not-to-schedule,” “3-month,” “6-month,” or “9-month.”

9.3.2 2002 Sanitary Sewer Master Plan and Storm Sewer Evaluation (Engineering Division).

Conducted by PBS&J in April of 2002, the Sanitary Sewer Master Plan and Storm Sewer Evaluation Study provided the City with condition assessments and capacity analysis of sanitary and storm sewer systems, including base map development, project prioritization, and rehabilitation options. A Sewer Capital Improvement Plan to assist the City in fiscal planning was also developed.



CHAPTER 10. SSMP PROGRAM AUDITS

The City's SSMP Program Audits addresses the mandatory SSMP provision outlined in Section D, 13 (x) SSMP Program Audits of SWRCB Order No. 2006-0003.

The City is required to conduct periodic internal audits, appropriate to the size of the system and the number of SSOs. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the City's compliance with the SSMP requirements identified in Section D, 13 of SWRCB Order No. 2006-0003, including the identification of any deficiencies in the SSMP and steps to correct them.

10.1 COMPLIANCE SUMMARY

The City will conduct an internal audit of their SSMP every two years, and focus on the effectiveness of the SSMP and the City's compliance with the SSMP requirements of Order No. 2006-0003, and Order R9-2007-0005. The audit will include, but may not be limited to, the following:

- Any significant changes to components of the SSMP, including but not limited to, Legal Authority, FOG Control Program and/or the Wastewater Collection System Overflow Emergency Response Plan.
- Any significant changes to the referenced compliance documents, presented as Volume II of the Sewer System Management Plan.
- SSMP implementation efforts over the past two years;
- A description of additions and improvements made the sanitary sewer collections system during the past two years;
- A description of the additions and improvements planned for the upcoming two years, with and estimated schedule for implementation.
- Strategies to correct deficiencies, if identified, will be developed by the responsible City division.

10.2 COMPLIANCE DOCUMENTS

There are no compliance documents for this section.

10.3 DOCUMENT DESCRIPTIONS

There are no document descriptions for this section.



CHAPTER 11. COMMUNICATION PROGRAM

The City's Communication Program addresses the mandatory SSMP provision outlined in Section D, 13 (xi) Communication Program of SWRCB Order No. 2006-0003.

The City should communicate on a regular basis with the public on the development, implementation, and performance of its SSMP. The communication system shall provide the public the opportunity to provide input to the City as the program is developed and implemented. The City shall also create a plan of communication with systems that are tributary and/or satellite to the City's sanitary sewer system.

11.1 COMPLIANCE SUMMARY

The City will communicate on a regular basis with interested parties on the implementation and performance of this SSMP. The communication program allows interested parties to provide input as the program is developed and implemented.

The City will make a Draft version of the SSMP available to the public, allow time for review, and invite public comments at a City Council meeting, thereby allowing for public input. The City anticipates discussions regarding the development and implementation of their SSMP with each agency tributary to their sanitary sewer system in the next 3 years, including the City of San Diego and the United States Navy. Additionally, the City's website (www.ci.national-city.ca.us) presents information about on-going efforts, as well as meeting agendas and minutes.

11.2 COMPLIANCE DOCUMENTS

There are no compliance documents for this section.

11.3 DOCUMENT DESCRIPTIONS

There are no compliance documents for this section.

City of National City
Sewer System Management Plan
Volume II

DRAFT REPORT

Prepared for:

City of National City
1243 National City Blvd.
National City, CA 91950

April 2009

Prepared by:

Infrastructure Engineering Corporation
27247 Madison Ave., Suite 111
Temecula, CA 92590



City of National City
Sewer System Management Plan, Volume II
Draft Report
April 2009

APPENDIX A – STATE OF CALIFORNIA WATER RESOURCES CONTROL BOARD
ORDER NO. 006-0003

APPENDIX B – CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD REGION 9,
SAN DIEGO ORDER R9-2007-0005

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APPENDIX E – WASTEWATER COLLECTION SYSTEM SEWER OVERFLOW RESPONSE PLAN

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City of National City
Sewer System Management Plan, Volume II
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April 2009

Appendix A

State of California Water Resources Control Board

Order No. 2006-0003

**STATE WATER RESOURCES CONTROL BOARD
ORDER NO. 2006-0003**

**STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS
FOR
SANITARY SEWER SYSTEMS**

The State Water Resources Control Board, hereinafter referred to as "State Water Board", finds that:

1. All federal and state agencies, municipalities, counties, districts, and other public entities that own or operate sanitary sewer systems greater than one mile in length that collect and/or convey untreated or partially treated wastewater to a publicly owned treatment facility in the State of California are required to comply with the terms of this Order. Such entities are hereinafter referred to as "Enrollees".
2. Sanitary sewer overflows (SSOs) are overflows from sanitary sewer systems of domestic wastewater, as well as industrial and commercial wastewater, depending on the pattern of land uses in the area served by the sanitary sewer system. SSOs often contain high levels of suspended solids, pathogenic organisms, toxic pollutants, nutrients, oxygen-demanding organic compounds, oil and grease and other pollutants. SSOs may cause a public nuisance, particularly when raw untreated wastewater is discharged to areas with high public exposure, such as streets or surface waters used for drinking, fishing, or body contact recreation. SSOs may pollute surface or ground waters, threaten public health, adversely affect aquatic life, and impair the recreational use and aesthetic enjoyment of surface waters.
3. Sanitary sewer systems experience periodic failures resulting in discharges that may affect waters of the state. There are many factors (including factors related to geology, design, construction methods and materials, age of the system, population growth, and system operation and maintenance), which affect the likelihood of an SSO. A proactive approach that requires Enrollees to ensure a system-wide operation, maintenance, and management plan is in place will reduce the number and frequency of SSOs within the state. This approach will in turn decrease the risk to human health and the environment caused by SSOs.
4. Major causes of SSOs include: grease blockages, root blockages, sewer line flood damage, manhole structure failures, vandalism, pump station mechanical failures, power outages, excessive storm or ground water inflow/infiltration, debris blockages, sanitary sewer system age and construction material failures, lack of proper operation and maintenance, insufficient capacity and contractor-caused damages. Many SSOs are preventable with adequate and appropriate facilities, source control measures and operation and maintenance of the sanitary sewer system.

SEWER SYSTEM MANAGEMENT PLANS

5. To facilitate proper funding and management of sanitary sewer systems, each Enrollee must develop and implement a system-specific Sewer System Management Plan (SSMP). To be effective, SSMPs must include provisions to provide proper and efficient management, operation, and maintenance of sanitary sewer systems, while taking into consideration risk management and cost benefit analysis. Additionally, an SSMP must contain a spill response plan that establishes standard procedures for immediate response to an SSO in a manner designed to minimize water quality impacts and potential nuisance conditions.
6. Many local public agencies in California have already developed SSMPs and implemented measures to reduce SSOs. These entities can build upon their existing efforts to establish a comprehensive SSMP consistent with this Order. Others, however, still require technical assistance and, in some cases, funding to improve sanitary sewer system operation and maintenance in order to reduce SSOs.
7. SSMP certification by technically qualified and experienced persons can provide a useful and cost-effective means for ensuring that SSMPs are developed and implemented appropriately.
8. It is the State Water Board's intent to gather additional information on the causes and sources of SSOs to augment existing information and to determine the full extent of SSOs and consequent public health and/or environmental impacts occurring in the State.
9. Both uniform SSO reporting and a centralized statewide electronic database are needed to collect information to allow the State Water Board and Regional Water Quality Control Boards (Regional Water Boards) to effectively analyze the extent of SSOs statewide and their potential impacts on beneficial uses and public health. The monitoring and reporting program required by this Order and the attached **Monitoring and Reporting Program No. 2006-0003**, are necessary to assure compliance with these waste discharge requirements (WDRs).
10. Information regarding SSOs must be provided to Regional Water Boards and other regulatory agencies in a timely manner and be made available to the public in a complete, concise, and timely fashion.
11. Some Regional Water Boards have issued WDRs or WDRs that serve as National Pollution Discharge Elimination System (NPDES) permits to sanitary sewer system owners/operators within their jurisdictions. This Order establishes minimum requirements to prevent SSOs. Although it is the State Water Board's intent that this Order be the primary regulatory mechanism for sanitary sewer systems statewide, Regional Water Boards may issue more stringent or more

prescriptive WDRs for sanitary sewer systems. Upon issuance or reissuance of a Regional Water Board's WDRs for a system subject to this Order, the Regional Water Board shall coordinate its requirements with stated requirements within this Order, to identify requirements that are more stringent, to remove requirements that are less stringent than this Order, and to provide consistency in reporting.

REGULATORY CONSIDERATIONS

12. California Water Code section 13263 provides that the State Water Board may prescribe general WDRs for a category of discharges if the State Water Board finds or determines that:

- The discharges are produced by the same or similar operations;
- The discharges involve the same or similar types of waste;
- The discharges require the same or similar treatment standards; and
- The discharges are more appropriately regulated under general discharge requirements than individual discharge requirements.

This Order establishes requirements for a class of operations, facilities, and discharges that are similar throughout the state.

13. The issuance of general WDRs to the Enrollees will:

- a) Reduce the administrative burden of issuing individual WDRs to each Enrollee;
- b) Provide for a unified statewide approach for the reporting and database tracking of SSOs;
- c) Establish consistent and uniform requirements for SSMP development and implementation;
- d) Provide statewide consistency in reporting; and
- e) Facilitate consistent enforcement for violations.

14. The beneficial uses of surface waters that can be impaired by SSOs include, but are not limited to, aquatic life, drinking water supply, body contact and non-contact recreation, and aesthetics. The beneficial uses of ground water that can be impaired include, but are not limited to, drinking water and agricultural supply. Surface and ground waters throughout the state support these uses to varying degrees.

15. The implementation of requirements set forth in this Order will ensure the reasonable protection of past, present, and probable future beneficial uses of water and the prevention of nuisance. The requirements implement the water quality control plans (Basin Plans) for each region and take into account the environmental characteristics of hydrographic units within the state. Additionally, the State Water Board has considered water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect

water quality in the area, costs associated with compliance with these requirements, the need for developing housing within California, and the need to develop and use recycled water.

16. The Federal Clean Water Act largely prohibits any discharge of pollutants from a point source to waters of the United States except as authorized under an NPDES permit. In general, any point source discharge of sewage effluent to waters of the United States must comply with technology-based, secondary treatment standards, at a minimum, and any more stringent requirements necessary to meet applicable water quality standards and other requirements. Hence, the unpermitted discharge of wastewater from a sanitary sewer system to waters of the United States is illegal under the Clean Water Act. In addition, many Basin Plans adopted by the Regional Water Boards contain discharge prohibitions that apply to the discharge of untreated or partially treated wastewater. Finally, the California Water Code generally prohibits the discharge of waste to land prior to the filing of any required report of waste discharge and the subsequent issuance of either WDRs or a waiver of WDRs.
17. California Water Code section 13263 requires a water board to, after any necessary hearing, prescribe requirements as to the nature of any proposed discharge, existing discharge, or material change in an existing discharge. The requirements shall, among other things, take into consideration the need to prevent nuisance.
18. California Water Code section 13050, subdivision (m), defines nuisance as anything which meets all of the following requirements:
 - a. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
 - b. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
 - c. Occurs during, or as a result of, the treatment or disposal of wastes.
19. This Order is consistent with State Water Board Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California) in that the Order imposes conditions to prevent impacts to water quality, does not allow the degradation of water quality, will not unreasonably affect beneficial uses of water, and will not result in water quality less than prescribed in State Water Board or Regional Water Board plans and policies.
20. The action to adopt this General Order is exempt from the California Environmental Quality Act (Public Resources Code §21000 et seq.) because it is an action taken by a regulatory agency to assure the protection of the environment and the regulatory process involves procedures for protection of the environment. (Cal. Code Regs., tit. 14, §15308). In addition, the action to adopt

this Order is exempt from CEQA pursuant to Cal.Code Regs., title 14, §15301 to the extent that it applies to existing sanitary sewer collection systems that constitute “existing facilities” as that term is used in Section 15301, and §15302, to the extent that it results in the repair or replacement of existing systems involving negligible or no expansion of capacity.

21. The Fact Sheet, which is incorporated by reference in the Order, contains supplemental information that was also considered in establishing these requirements.
22. The State Water Board has notified all affected public agencies and all known interested persons of the intent to prescribe general WDRs that require Enrollees to develop SSMPs and to report all SSOs.
23. The State Water Board conducted a public hearing on February 8, 2006, to receive oral and written comments on the draft order. The State Water Board received and considered, at its May 2, 2006, meeting, additional public comments on substantial changes made to the proposed general WDRs following the February 8, 2006, public hearing. The State Water Board has considered all comments pertaining to the proposed general WDRs.

IT IS HEREBY ORDERED, that pursuant to California Water Code section 13263, the Enrollees, their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted hereunder, shall comply with the following:

A. DEFINITIONS

1. **Sanitary sewer overflow (SSO)** - Any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include:
 - (i) Overflows or releases of untreated or partially treated wastewater that reach waters of the United States;
 - (ii) Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and
 - (iii) Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly owned portion of a sanitary sewer system.
2. **Sanitary sewer system** – Any system of pipes, pump stations, sewer lines, or other conveyances, upstream of a wastewater treatment plant headworks used to collect and convey wastewater to the publicly owned treatment facility. Temporary storage and conveyance facilities (such as vaults, temporary piping, construction trenches, wet wells, impoundments, tanks, etc.) are considered to be part of the sanitary sewer system, and discharges into these temporary storage facilities are not considered to be SSOs.

For purposes of this Order, sanitary sewer systems include only those systems owned by public agencies that are comprised of more than one mile of pipes or sewer lines.

3. **Enrollee** - A federal or state agency, municipality, county, district, and other public entity that owns or operates a sanitary sewer system, as defined in the general WDRs, and that has submitted a complete and approved application for coverage under this Order.
4. **SSO Reporting System** – Online spill reporting system that is hosted, controlled, and maintained by the State Water Board. The web address for this site is <http://ciwqs.waterboards.ca.gov>. This online database is maintained on a secure site and is controlled by unique usernames and passwords.
5. **Untreated or partially treated wastewater** – Any volume of waste discharged from the sanitary sewer system upstream of a wastewater treatment plant headworks.
6. **Satellite collection system** – The portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility to which the sanitary sewer system is tributary.
7. **Nuisance** - California Water Code section 13050, subdivision (m), defines nuisance as anything which meets all of the following requirements:
 - a. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
 - b. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
 - c. Occurs during, or as a result of, the treatment or disposal of wastes.

B. APPLICATION REQUIREMENTS

1. **Deadlines for Application** – All public agencies that currently own or operate sanitary sewer systems within the State of California must apply for coverage under the general WDRs within six (6) months of the date of adoption of the general WDRs. Additionally, public agencies that acquire or assume responsibility for operating sanitary sewer systems after the date of adoption of this Order must apply for coverage under the general WDRs at least three (3) months prior to operation of those facilities.
2. **Applications under the general WDRs** – In order to apply for coverage pursuant to the general WDRs, a legally authorized representative for each agency must submit a complete application package. Within sixty (60) days of adoption of the general WDRs, State Water Board staff will send specific instructions on how to

apply for coverage under the general WDRs to all known public agencies that own sanitary sewer systems. Agencies that do not receive notice may obtain applications and instructions online on the Water Board's website.

3. Coverage under the general WDRs – Permit coverage will be in effect once a complete application package has been submitted and approved by the State Water Board's Division of Water Quality.

C. PROHIBITIONS

1. Any SSO that results in a discharge of untreated or partially treated wastewater to waters of the United States is prohibited.
2. Any SSO that results in a discharge of untreated or partially treated wastewater that creates a nuisance as defined in California Water Code Section 13050(m) is prohibited.

D. PROVISIONS

1. The Enrollee must comply with all conditions of this Order. Any noncompliance with this Order constitutes a violation of the California Water Code and is grounds for enforcement action.
2. It is the intent of the State Water Board that sanitary sewer systems be regulated in a manner consistent with the general WDRs. Nothing in the general WDRs shall be:
 - (i) Interpreted or applied in a manner inconsistent with the Federal Clean Water Act, or supersede a more specific or more stringent state or federal requirement in an existing permit, regulation, or administrative/judicial order or Consent Decree;
 - (ii) Interpreted or applied to authorize an SSO that is illegal under either the Clean Water Act, an applicable Basin Plan prohibition or water quality standard, or the California Water Code;
 - (iii) Interpreted or applied to prohibit a Regional Water Board from issuing an individual NPDES permit or WDR, superseding this general WDR, for a sanitary sewer system, authorized under the Clean Water Act or California Water Code; or
 - (iv) Interpreted or applied to supersede any more specific or more stringent WDRs or enforcement order issued by a Regional Water Board.
3. The Enrollee shall take all feasible steps to eliminate SSOs. In the event that an SSO does occur, the Enrollee shall take all feasible steps to contain and mitigate the impacts of an SSO.
4. In the event of an SSO, the Enrollee shall take all feasible steps to prevent untreated or partially treated wastewater from discharging from storm drains into

flood control channels or waters of the United States by blocking the storm drainage system and by removing the wastewater from the storm drains.

5. All SSOs must be reported in accordance with Section G of the general WDRs.
6. In any enforcement action, the State and/or Regional Water Boards will consider the appropriate factors under the duly adopted State Water Board Enforcement Policy. And, consistent with the Enforcement Policy, the State and/or Regional Water Boards must consider the Enrollee's efforts to contain, control, and mitigate SSOs when considering the California Water Code Section 13327 factors. In assessing these factors, the State and/or Regional Water Boards will also consider whether:
 - (i) The Enrollee has complied with the requirements of this Order, including requirements for reporting and developing and implementing a SSMP;
 - (ii) The Enrollee can identify the cause or likely cause of the discharge event;
 - (iii) There were no feasible alternatives to the discharge, such as temporary storage or retention of untreated wastewater, reduction of inflow and infiltration, use of adequate backup equipment, collecting and hauling of untreated wastewater to a treatment facility, or an increase in the capacity of the system as necessary to contain the design storm event identified in the SSMP. It is inappropriate to consider the lack of feasible alternatives, if the Enrollee does not implement a periodic or continuing process to identify and correct problems.
 - (iv) The discharge was exceptional, unintentional, temporary, and caused by factors beyond the reasonable control of the Enrollee;
 - (v) The discharge could have been prevented by the exercise of reasonable control described in a certified SSMP for:
 - Proper management, operation and maintenance;
 - Adequate treatment facilities, sanitary sewer system facilities, and/or components with an appropriate design capacity, to reasonably prevent SSOs (e.g., adequately enlarging treatment or collection facilities to accommodate growth, infiltration and inflow (I/I), etc.);
 - Preventive maintenance (including cleaning and fats, oils, and grease (FOG) control);
 - Installation of adequate backup equipment; and
 - Inflow and infiltration prevention and control to the extent practicable.
 - (vi) The sanitary sewer system design capacity is appropriate to reasonably prevent SSOs.

- (vii) The Enrollee took all reasonable steps to stop and mitigate the impact of the discharge as soon as possible.
7. When a sanitary sewer overflow occurs, the Enrollee shall take all feasible steps and necessary remedial actions to 1) control or limit the volume of untreated or partially treated wastewater discharged, 2) terminate the discharge, and 3) recover as much of the wastewater discharged as possible for proper disposal, including any wash down water.

The Enrollee shall implement all remedial actions to the extent they may be applicable to the discharge and not inconsistent with an emergency response plan, including the following:

- (i) Interception and rerouting of untreated or partially treated wastewater flows around the wastewater line failure;
 - (ii) Vacuum truck recovery of sanitary sewer overflows and wash down water;
 - (iii) Cleanup of debris at the overflow site;
 - (iv) System modifications to prevent another SSO at the same location;
 - (v) Adequate sampling to determine the nature and impact of the release; and
 - (vi) Adequate public notification to protect the public from exposure to the SSO.
8. The Enrollee shall properly, manage, operate, and maintain all parts of the sanitary sewer system owned or operated by the Enrollee, and shall ensure that the system operators (including employees, contractors, or other agents) are adequately trained and possess adequate knowledge, skills, and abilities.
9. The Enrollee shall allocate adequate resources for the operation, maintenance, and repair of its sanitary sewer system, by establishing a proper rate structure, accounting mechanisms, and auditing procedures to ensure an adequate measure of revenues and expenditures. These procedures must be in compliance with applicable laws and regulations and comply with generally acceptable accounting practices.
10. The Enrollee shall provide adequate capacity to convey base flows and peak flows, including flows related to wet weather events. Capacity shall meet or exceed the design criteria as defined in the Enrollee's System Evaluation and Capacity Assurance Plan for all parts of the sanitary sewer system owned or operated by the Enrollee.
11. The Enrollee shall develop and implement a written Sewer System Management Plan (SSMP) and make it available to the State and/or Regional Water Board upon request. A copy of this document must be publicly available at the Enrollee's office and/or available on the Internet. This SSMP must be approved by the Enrollee's governing board at a public meeting.

12. In accordance with the California Business and Professions Code sections 6735, 7835, and 7835.1, all engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. Specific elements of the SSMP that require professional evaluation and judgments shall be prepared by or under the direction of appropriately qualified professionals, and shall bear the professional(s)' signature and stamp.
13. The mandatory elements of the SSMP are specified below. However, if the Enrollee believes that any element of this section is not appropriate or applicable to the Enrollee's sanitary sewer system, the SSMP program does not need to address that element. The Enrollee must justify why that element is not applicable. The SSMP must be approved by the deadlines listed in the SSMP Time Schedule below.

Sewer System Management Plan (SSMP)

- (i) **Goal:** The goal of the SSMP is to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system. This will help reduce and prevent SSOs, as well as mitigate any SSOs that do occur.
- (ii) **Organization:** The SSMP must identify:
 - (a) The name of the responsible or authorized representative as described in Section J of this Order.
 - (b) The names and telephone numbers for management, administrative, and maintenance positions responsible for implementing specific measures in the SSMP program. The SSMP must identify lines of authority through an organization chart or similar document with a narrative explanation; and
 - (c) The chain of communication for reporting SSOs, from receipt of a complaint or other information, including the person responsible for reporting SSOs to the State and Regional Water Board and other agencies if applicable (such as County Health Officer, County Environmental Health Agency, Regional Water Board, and/or State Office of Emergency Services (OES)).
- (iii) **Legal Authority:** Each Enrollee must demonstrate, through sanitary sewer system use ordinances, service agreements, or other legally binding procedures, that it possesses the necessary legal authority to:
 - (a) Prevent illicit discharges into its sanitary sewer system (examples may include I/I, stormwater, chemical dumping, unauthorized debris and cut roots, etc.);

- (b) Require that sewers and connections be properly designed and constructed;
 - (c) Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency;
 - (d) Limit the discharge of fats, oils, and grease and other debris that may cause blockages, and
 - (e) Enforce any violation of its sewer ordinances.
- (iv) **Operation and Maintenance Program.** The SSMP must include those elements listed below that are appropriate and applicable to the Enrollee's system:
- (a) Maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable stormwater conveyance facilities;
 - (b) Describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system to document scheduled and conducted activities, such as work orders;
 - (c) Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan;
 - (d) Provide training on a regular basis for staff in sanitary sewer system operations and maintenance, and require contractors to be appropriately trained; and

- (e) Provide equipment and replacement part inventories, including identification of critical replacement parts.

(v) **Design and Performance Provisions:**

- (a) Design and construction standards and specifications for the installation of new sanitary sewer systems, pump stations and other appurtenances; and for the rehabilitation and repair of existing sanitary sewer systems; and
 - (b) Procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects.
- (vi) **Overflow Emergency Response Plan** - Each Enrollee shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:
- (a) Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;
 - (b) A program to ensure an appropriate response to all overflows;
 - (c) Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, Regional Water Boards, water suppliers, etc.) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the MRP. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDRs or NPDES permit requirements. The SSMP should identify the officials who will receive immediate notification;
 - (d) Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;
 - (e) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and
 - (f) A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

- (vii) **FOG Control Program:** Each Enrollee shall evaluate its service area to determine whether a FOG control program is needed. If an Enrollee determines that a FOG program is not needed, the Enrollee must provide justification for why it is not needed. If FOG is found to be a problem, the Enrollee must prepare and implement a FOG source control program to reduce the amount of these substances discharged to the sanitary sewer system. This plan shall include the following as appropriate:
- (a) An implementation plan and schedule for a public education outreach program that promotes proper disposal of FOG;
 - (b) A plan and schedule for the disposal of FOG generated within the sanitary sewer system service area. This may include a list of acceptable disposal facilities and/or additional facilities needed to adequately dispose of FOG generated within a sanitary sewer system service area;
 - (c) The legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG;
 - (d) Requirements to install grease removal devices (such as traps or interceptors), design standards for the removal devices, maintenance requirements, BMP requirements, record keeping and reporting requirements;
 - (e) Authority to inspect grease producing facilities, enforcement authorities, and whether the Enrollee has sufficient staff to inspect and enforce the FOG ordinance;
 - (f) An identification of sanitary sewer system sections subject to FOG blockages and establishment of a cleaning maintenance schedule for each section; and
 - (g) Development and implementation of source control measures for all sources of FOG discharged to the sanitary sewer system for each section identified in (f) above.
- (viii) **System Evaluation and Capacity Assurance Plan:** The Enrollee shall prepare and implement a capital improvement plan (CIP) that will provide hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event. At a minimum, the plan must include:
- (a) **Evaluation:** Actions needed to evaluate those portions of the sanitary sewer system that are experiencing or contributing to an SSO discharge caused by hydraulic deficiency. The evaluation must provide estimates of peak flows (including flows from SSOs

that escape from the system) associated with conditions similar to those causing overflow events, estimates of the capacity of key system components, hydraulic deficiencies (including components of the system with limiting capacity) and the major sources that contribute to the peak flows associated with overflow events;

- (b) **Design Criteria:** Where design criteria do not exist or are deficient, undertake the evaluation identified in (a) above to establish appropriate design criteria; and
 - (c) **Capacity Enhancement Measures:** The steps needed to establish a short- and long-term CIP to address identified hydraulic deficiencies, including prioritization, alternatives analysis, and schedules. The CIP may include increases in pipe size, I/I reduction programs, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding.
 - (d) **Schedule:** The Enrollee shall develop a schedule of completion dates for all portions of the capital improvement program developed in (a)-(c) above. This schedule shall be reviewed and updated consistent with the SSMP review and update requirements as described in Section D. 14.
- (ix) **Monitoring, Measurement, and Program Modifications:** The Enrollee shall:
- (a) Maintain relevant information that can be used to establish and prioritize appropriate SSMP activities;
 - (b) Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP;
 - (c) Assess the success of the preventative maintenance program;
 - (d) Update program elements, as appropriate, based on monitoring or performance evaluations; and
 - (e) Identify and illustrate SSO trends, including: frequency, location, and volume.
- (x) **SSMP Program Audits** - As part of the SSMP, the Enrollee shall conduct periodic internal audits, appropriate to the size of the system and the number of SSOs. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the

Enrollee's compliance with the SSMP requirements identified in this subsection (D.13), including identification of any deficiencies in the SSMP and steps to correct them.

- (xi) **Communication Program** – The Enrollee shall communicate on a regular basis with the public on the development, implementation, and performance of its SSMP. The communication system shall provide the public the opportunity to provide input to the Enrollee as the program is developed and implemented.

The Enrollee shall also create a plan of communication with systems that are tributary and/or satellite to the Enrollee's sanitary sewer system.

14. Both the SSMP and the Enrollee's program to implement the SSMP must be certified by the Enrollee to be in compliance with the requirements set forth above and must be presented to the Enrollee's governing board for approval at a public meeting. The Enrollee shall certify that the SSMP, and subparts thereof, are in compliance with the general WDRs within the time frames identified in the time schedule provided in subsection D.15, below.

In order to complete this certification, the Enrollee's authorized representative must complete the certification portion in the Online SSO Database Questionnaire by checking the appropriate milestone box, printing and signing the automated form, and sending the form to:

State Water Resources Control Board
Division of Water Quality
Attn: SSO Program Manager
P.O. Box 100
Sacramento, CA 95812

The SSMP must be updated every five (5) years, and must include any significant program changes. Re-certification by the governing board of the Enrollee is required in accordance with D.14 when significant updates to the SSMP are made. To complete the re-certification process, the Enrollee shall enter the data in the Online SSO Database and mail the form to the State Water Board, as described above.

15. The Enrollee shall comply with these requirements according to the following schedule. This time schedule does not supersede existing requirements or time schedules associated with other permits or regulatory requirements.

Sewer System Management Plan Time Schedule

<u>Task and Associated Section</u>	Completion Date			
	Population > 100,000	Population between 100,000 and 10,000	Population between 10,000 and 2,500	Population < 2,500
Application for Permit Coverage Section C	6 months after WDRs Adoption			
Reporting Program Section G	6 months after WDRs Adoption ¹			
SSMP Development Plan and Schedule No specific Section	9 months after WDRs Adoption ²	12 months after WDRs Adoption ²	15 months after WDRs Adoption ²	18 months after WDRs Adoption ²
Goals and Organization Structure Section D 13 (i) & (ii)	12 months after WDRs Adoption ²		18 months after WDRs Adoption ²	
Overflow Emergency Response Program Section D 13 (vi)	24 months after WDRs Adoption ²	30 months after WDRs Adoption ²	36 months after WDRs Adoption ²	39 months after WDRs Adoption ²
Legal Authority Section D 13 (iii)				
Operation and Maintenance Program Section D 13 (iv)				
Grease Control Program Section D 13 (vii)	36 months after WDRs Adoption	39 months after WDRs Adoption	48 months after WDRs Adoption	51 months after WDRs Adoption
Design and Performance Section D 13 (v)				
System Evaluation and Capacity Assurance Plan Section D 13 (viii)				
Final SSMP, incorporating all of the SSMP requirements Section D 13				

1. In the event that by July 1, 2006 the Executive Director is able to execute a memorandum of agreement (MOA) with the California Water Environment Association (CWEA) or discharger representatives outlining a strategy and time schedule for CWEA or another entity to provide statewide training on the adopted monitoring program, SSO database electronic reporting, and SSMP development, consistent with this Order, then the schedule of Reporting Program Section G shall be replaced with the following schedule:

Reporting Program Section G	
Regional Boards 4, 8, and 9	8 months after WDRs Adoption
Regional Boards 1, 2, and 3	12 months after WDRs Adoption
Regional Boards 5, 6, and 7	16 months after WDRs Adoption

If this MOU is not executed by July 1, 2006, the reporting program time schedule will remain six (6) months for all regions and agency size categories.

2. In the event that the Executive Director executes the MOA identified in note 1 by July 1, 2006, then the deadline for this task shall be extended by six (6) months. The time schedule identified in the MOA must be consistent with the extended time schedule provided by this note. If the MOA is not executed by July 1, 2006, the six (6) month time extension will not be granted.

E. WDRs and SSMP AVAILABILITY

1. A copy of the general WDRs and the certified SSMP shall be maintained at appropriate locations (such as the Enrollee's offices, facilities, and/or Internet homepage) and shall be available to sanitary sewer system operating and maintenance personnel at all times.

F. ENTRY AND INSPECTION

1. The Enrollee shall allow the State or Regional Water Boards or their authorized representative, upon presentation of credentials and other documents as may be required by law, to:
 - a. Enter upon the Enrollee's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order;
 - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
- d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at any location.

G. GENERAL MONITORING AND REPORTING REQUIREMENTS

1. The Enrollee shall furnish to the State or Regional Water Board, within a reasonable time, any information that the State or Regional Water Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The Enrollee shall also furnish to the Executive Director of the State Water Board or Executive Officer of the applicable Regional Water Board, upon request, copies of records required to be kept by this Order.
2. The Enrollee shall comply with the attached Monitoring and Reporting Program No. 2006-0003 and future revisions thereto, as specified by the Executive Director. Monitoring results shall be reported at the intervals specified in Monitoring and Reporting Program No. 2006-0003. Unless superseded by a specific enforcement Order for a specific Enrollee, these reporting requirements are intended to replace other mandatory routine written reports associated with SSOs.
3. All Enrollees must obtain SSO Database accounts and receive a "Username" and "Password" by registering through the California Integrated Water Quality System (CIWQS). These accounts will allow controlled and secure entry into the SSO Database. Additionally, within 30 days of receiving an account and prior to recording spills into the SSO Database, all Enrollees must complete the "Collection System Questionnaire", which collects pertinent information regarding a Enrollee's collection system. The "Collection System Questionnaire" must be updated at least every 12 months.
4. Pursuant to Health and Safety Code section 5411.5, any person who, without regard to intent or negligence, causes or permits any untreated wastewater or other waste to be discharged in or on any waters of the State, or discharged in or deposited where it is, or probably will be, discharged in or on any surface waters of the State, as soon as that person has knowledge of the discharge, shall immediately notify the local health officer of the discharge. Discharges of untreated or partially treated wastewater to storm drains and drainage channels, whether man-made or natural or concrete-lined, shall be reported as required above.

Any SSO greater than 1,000 gallons discharged in or on any waters of the State, or discharged in or deposited where it is, or probably will be, discharged in or on any surface waters of the State shall also be reported to the Office of Emergency Services pursuant to California Water Code section 13271.

H. CHANGE IN OWNERSHIP

1. This Order is not transferable to any person or party, except after notice to the Executive Director. The Enrollee shall submit this notice in writing at least 30 days in advance of any proposed transfer. The notice must include a written agreement between the existing and new Enrollee containing a specific date for the transfer of this Order's responsibility and coverage between the existing Enrollee and the new Enrollee. This agreement shall include an acknowledgement that the existing Enrollee is liable for violations up to the transfer date and that the new Enrollee is liable from the transfer date forward.

I. INCOMPLETE REPORTS

1. If an Enrollee becomes aware that it failed to submit any relevant facts in any report required under this Order, the Enrollee shall promptly submit such facts or information by formally amending the report in the Online SSO Database.

J. REPORT DECLARATION

1. All applications, reports, or information shall be signed and certified as follows:
 - (i) All reports required by this Order and other information required by the State or Regional Water Board shall be signed and certified by a person designated, for a municipality, state, federal or other public agency, as either a principal executive officer or ranking elected official, or by a duly authorized representative of that person, as described in paragraph (ii) of this provision. (For purposes of electronic reporting, an electronic signature and accompanying certification, which is in compliance with the Online SSO database procedures, meet this certification requirement.)
 - (ii) An individual is a duly authorized representative only if:
 - (a) The authorization is made in writing by a person described in paragraph (i) of this provision; and
 - (b) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity.

K. CIVIL MONETARY REMEDIES FOR DISCHARGE VIOLATIONS

1. The California Water Code provides various enforcement options, including civil monetary remedies, for violations of this Order.
2. The California Water Code also provides that any person failing or refusing to furnish technical or monitoring program reports, as required under this Order, or

falsifying any information provided in the technical or monitoring reports is subject to civil monetary penalties.

L. SEVERABILITY

1. The provisions of this Order are severable, and if any provision of this Order, or the application of any provision of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.
2. This order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the Enrollee from liability under federal, state or local laws, nor create a vested right for the Enrollee to continue the waste discharge.

CERTIFICATION

The undersigned Clerk to the State Water Board does hereby certify that the foregoing is a full, true, and correct copy of general WDRs duly and regularly adopted at a meeting of the State Water Resources Control Board held on May 2, 2006.

AYE: Tam M. Doduc
Gerald D. Secundy

NO: Arthur G. Baggett

ABSENT: None

ABSTAIN: None



Song Her
Clerk to the Board



City of National City
Sewer System Management Plan, Volume II
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Appendix B

California Regional Water Quality Control Board

Region 9, San Diego

Order R9-2007-0005

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
REGION 9, SAN DIEGO REGION

ORDER R9-2007-0005

WASTE DISCHARGE REQUIREMENTS
FOR SEWAGE COLLECTION AGENCIES
IN THE SAN DIEGO REGION

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. **STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS:** State Water Resource Control Board (State Board) Order No. 2006-0003-DWQ, *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems*, adopted by the State Board on May 2 2006, establishes minimum requirements to prevent sanitary sewer overflows (SSOs) from publicly owned/ operated sanitary sewer system. Order No. 2006-0003-DWQ is the primary regulatory mechanism for sanitary sewer systems statewide, but allows each regional board to issue more stringent or more prescriptive Waste Discharge Requirements (WDRs) for sanitary sewer systems within their respective jurisdiction.
2. **ENROLLMENT UNDER ORDER NO. 2006-0003-DWQ:** In accordance with Order No. 2006-0003-DWQ, all federal and state agencies, municipalities, counties, districts, and other public entities that own, operate, acquire, or assume responsibility for sanitary sewer systems greater than one mile in length that collect and/or convey untreated or partially treated wastewater to a publicly owned treatment facility in the State of California are required to apply for coverage under the general WDRs.
3. **ORDER No. 96-04:** On May 9, 1996, this Regional Board adopted Order No. 96-04, *General Waste Discharge Requirements Prohibiting Sanitary Sewer Overflows by Sewage Collection Agencies*, prohibiting the discharge of sewage from a sanitary sewer system at any point upstream of a sewage treatment plant. Each Sewage Collection Agency currently regulated under Order No. 96-04 is required to obtain enrollment under the State Board Order No. 2006-0003-DWQ.
4. **SAN DIEGO REGION SANITARY SEWER OVERFLOW REGULATIONS:** Order No. 96-04 has been an effective regulatory mechanism in reducing the number and magnitude of sewage spills in the Region. The Order is more stringent and prescriptive than Order No. 2006-0003-DWQ in that Order No. 2006-0003-DWQ may allow some SSOs that are currently prohibited under Order No. 96-04. In order to maintain regulation of Sanitary Sewer Systems in the San Diego Region consistent with the provisions of Order No. 96-04, this Order reaffirms the prohibition on all SSOs upstream of a sewage treatment plant. This strict prohibition implements the requirements contained in the Basin Plan, California Water Code, and Federal Clean Water Act.

5. **CONSISTENT REGIONAL REQUIREMENTS:** The regulation of all Sewage Collection Agencies will be consistent within the San Diego Region by requiring agencies such as California Department of Corrections; California State University, San Marcos; San Diego State University; and University of California, San Diego, which have not been regulated under Order No. 96-04, to comply with Regional Board requirements that augment State Board Order No. 2006-0003-DWQ.
6. **BASIN PLAN:** The Regional Board adopted a Water Quality Control Plan for the San Diego Basin (hereinafter Basin Plan) on September 8, 1994. The Basin Plan was subsequently approved by the State Board on December 13, 1994. Subsequent revisions to the Basin Plan have also been adopted by the Regional Board and approved by the State Board. The Basin Plan designates beneficial uses, narrative, and numerical water quality objectives, and prohibitions which are applicable to the discharges prohibited under this Order.
7. **PROHIBITIONS CONTAINED IN BASIN PLAN:** The Basin Plan contains the following prohibitions which are applicable to the discharges prohibited under this Order:
 - a. "The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of pollution, contamination, or nuisance as defined in California Water Code Section 13050, is prohibited."
 - b. "The discharge of treated or untreated waste to lakes or reservoirs used for municipal water supply, or to inland surface water tributaries thereto, is prohibited."
 - c. "The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. ..."
 - d. "The dumping, deposition, or discharge of waste directly into waters of the state, or adjacent to such waters in any manner which may permit its being transported into the waters, is prohibited unless authorized by the Regional Board."
 - e. "The unauthorized discharge of treated or untreated sewage to waters of the state or to a storm water conveyance system is prohibited."
 - f. "The discharge of waste to land, except as authorized by waste discharge requirements or the terms described in California Water Code Section 13264 is prohibited."
 - g. "The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the Regional Board."

8. **PORTER-COLOGNE WATER QUALITY CONTROL ACT (CALIFORNIA WATER CODE, DIVISION 7):** California Water Code Section 13243 provides that a Regional Board, in establishing waste discharge requirements, may specify certain conditions or areas where the discharge of waste, or certain types of waste, is prohibited. California Water Code 13260 prohibits the discharge of waste to land prior to the filing of a required report of waste discharge and the subsequent issuance of either WDRs or a waiver of WDRs. California Water Code 13264 prohibits discharge of waste absent a report of waste discharge and waste discharge requirements.
9. **FEDERAL CLEAN WATER ACT:** The Federal Clean Water Act largely prohibits any discharge of pollutants from a point source to waters of the United States except as authorized under an NPDES permit. In general, any point source discharge of sewage effluent to waters of the United States must comply with technology-based, secondary treatment standards, at a minimum, and any more stringent requirements necessary to meet applicable water quality standards and other requirements. Hence, the unpermitted discharge of wastewater from a sanitary sewer system to waters of the United States is illegal under the Clean Water Act. Furthermore, the Code of Federal Regulation requires proper operation and maintenance of all POTW facilities including collection systems, which results in prevention of SSOs.
10. **RESCISSION OF ORDER No. 96-04:** Order No. 96-04 can be rescinded after all of the Sewage Collection Agencies regulated under Order No. 96-04 have obtained coverage under Order No. 2006-0003-DWQ.
11. **PRIVATE LATERAL SEWAGE DISCHARGES REPORTING:** Order No. 96-04 does not require Sewage Collection Agencies to report Private Lateral Sewage Discharges. Over the past several years, however, this Regional Board has been tracking the number of Private Lateral Sewage Discharges based on courtesy reports from the Sewage Collection Agencies. During the period from July 2004 through June 2006, a total of 268 Private Lateral Sewage Discharges were reported by the Agencies. During some of those months, more Private Lateral Sewage Discharges were reported than public SSOs. Because the Agencies are not required to report Private Lateral Sewage Discharges, it is not known if the numbers reported fully represent the number and locations of Private Lateral Sewage Spills in the Region.

Finding Nos. 2, 3, and 4 of State Board Order No. 2006-0003-DWQ pertaining to causes of SSOs and the potential threat to water quality resulting from SSOs are also applicable to Private Lateral Sewage Discharges. Because Private Lateral Sewage Discharges are numerous and are a potential threat to public health and the environment, there is a need to have a reliable reporting system for Private Lateral Sewage Discharges for similar reasons as the public SSOs. Although sewage collection agencies are not responsible for the cause, cleanup, or repair of Private Lateral Sewage Discharges, sewage collection agencies are typically notified and/or are the first responders to Private Lateral Sewage Discharges. Consequently, requiring the sewage collection agencies to report all known Private Lateral Sewage Discharges is reasonable and a first step toward development of a regulatory approach for reducing Private Lateral Sewage Discharges in the San Diego Region.

12. **PERMITTING FEES:** This Order will serve as additional requirements to the State Board Order No. 2006-0003-DWQ. Sewage Collection Agencies that are covered and pay the fees under State Board Order No. 2006-0003-DWQ (or orders that supersede 2006-0003-DWQ) will not be required to pay for fees under this Order No. R9-2007-0005.
13. **CALIFORNIA ENVIRONMENTAL QUALITY ACT:** The action to adopt this Order is exempt from the California Environmental Quality Act (Public Resources Code §21000 et seq.) because it is an action taken by a regulatory agency to assure the protection of the environment and the regulatory process involves procedures for protection of the environment. (Cal. Code Regs., tit. 14, §15308). In addition, the action to adopt this Order is exempt from CEQA pursuant to Cal. Code Regs., title 14, §15301 to the extent that it applies to existing sanitary sewer collection systems that constitute "existing facilities" as that term is used in Section 15301, and §15302, to the extent that it results in the repair or replacement of existing systems involving negligible or no expansion of capacity.
14. **PUBLIC NOTICE:** The Regional Board has notified all known interested persons and the public of its intent to consider adoption of this Order. Interested persons and the public have had reasonable opportunity to participate in review of the proposed Order.
15. **PUBLIC HEARING:** The Regional Board has considered all comments pertaining to this Order submitted to the Regional Board in writing, or by oral presentations at the public hearing held on February 14, 2007.

IT IS HEREBY ORDERED, that all Sewage Collection Agencies within the San Diego Region, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following, in addition to the State Water Resource Control Board Order No. 2006-0003-DWQ (or orders that supersede 2006-0003-DWQ) and its addenda (hereinafter referred to as State Board Order):

A. Definitions

1. For purposes of this Order, a Sewage Collection Agency shall mean an “enrollee”, as defined in the State Board Order, within the boundaries of the San Diego Region.

B. Prohibition

1. The discharge of sewage from a sanitary sewer system at any point upstream of a sewage treatment plant is prohibited.

C. Monitoring and Reporting Program Requirements

1. Each Sewage Collection Agency shall report all SSOs in accordance with the Monitoring and Reporting Program No. 96-04 until the Sewage Collection Agency notifies the Regional Board that they can successfully report the SSOs to the State Board Online SSO System. The notification shall be a letter signed and certified by a person designated, for a municipality, state, federal or other public agency, as either a principal executive officer or ranking elected official.
2. For Category 1 (as defined in State Board Monitoring and Reporting Program No. 2006-0003-DWQ) SSOs, the Sewage Collection Agency shall provide notification of the SSO to the Regional Board by phone, email, or fax within 24 hours after the Sewage Collection Agency becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. The information reported to the Regional Board shall include the name and phone number of the person reporting the SSO, the responsible sewage collection agency, the estimated total sewer overflow volume, the location of the SSO, the receiving water (if any), the start date/time of the SSO (if known), the end date/time of the SSO (or whether or not the sewer overflow is still occurring at the time of the report), and confirmation that the local health services agency was or will be notified as required under the reporting requirements of the local health services agency.
3. The Sewage Collection Agency shall provide notification of all Private Lateral Sewage Discharges (as defined in the State Board Order), for which they become aware of, that equal or exceed 1,000 gallons; result in a discharge to a drainage channel and/or surface water; and/or discharge to a storm drainpipe that was not fully captured and returned to the sanitary sewer system, to the Regional Board by phone or fax within 24 hours after the Sewage Collection Agency becomes aware of the Private Lateral Sewage Discharge, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. The information reported to the Regional Board shall include the following information, if known: the name and phone number of the person reporting the Private Lateral Sewage Discharge, the service area where the Private Lateral Sewage Discharge occurred, the responsible party (other than the Sewage Collection Agency, if known), the estimated Private

Lateral Sewage Discharge volume, the location of the Private Lateral Sewage Discharge, the receiving water (if any), the start date/time of the Private Lateral Sewage Discharge, the end date/time of the Private Lateral Sewage Discharge (or whether or not the sewer overflow is still occurring at the time of the report), and confirmation that the local health services agency was or will be notified as required under the reporting requirements of the local health services agency.

4. The following requirement supersedes the Private Lateral Sewage Discharge Reporting Timeframe for Private Lateral Sewage Discharges in the State Board Monitoring and Reporting Program No. 2006-0003-DWQ: For Private Lateral Sewage Discharges that occur within a Sewage Collection Agency's service area and that a Sewage Collection Agency becomes aware of, the Sewage Collection Agency shall report the Private Lateral Sewage Discharge to the State Board Online SSO Database within 30 days after the end of the calendar month in which the Private Lateral Sewage Discharge occurs. The Sewage Collection Agency must identify the sewage discharge as occurring and caused by a private lateral, and a responsible party (other than the Sewage Collection Agency) should be identified, if known. The Sewage Collection Agency will not be responsible for the cause, cleanup, or repair of Private Lateral Sewage Discharges, but only the reporting of those within their jurisdiction and for which they become aware of.

D. Notification

1. Upon completion with Monitoring and Reporting Program Requirement C.1, the Regional Board will give written notice to the Sewage Collection Agency stating that regulation of the Sewage Collection Agency under Order No. 96-04 is terminated.
2. Order No. 96-04 is rescinded once regulation of all Sewage Collection Agencies under Order No. 96-04 is terminated. The Regional Board will give written notice to all of the Sewage Collection Agencies stating that all Sewage Collection Agencies under Order No. 96-04 was terminated and, thus, Order 96-04 is rescinded.

I, John Robertus, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of Order No. 2007-0005 adopted by the California Regional Water Quality Control Board, San Diego Region on February 14, 2007.



JOHN H. ROBERTUS
Executive Officer

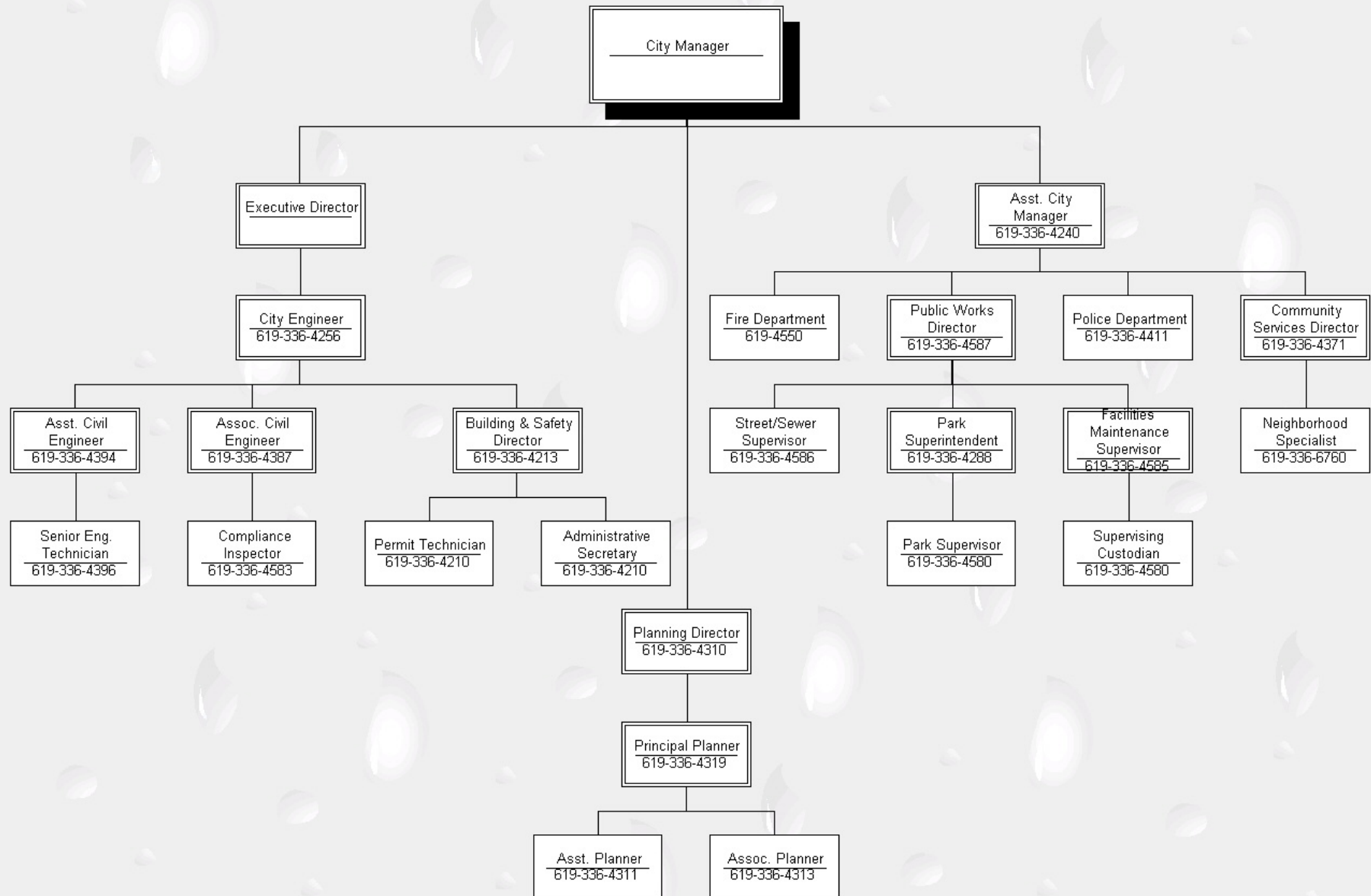


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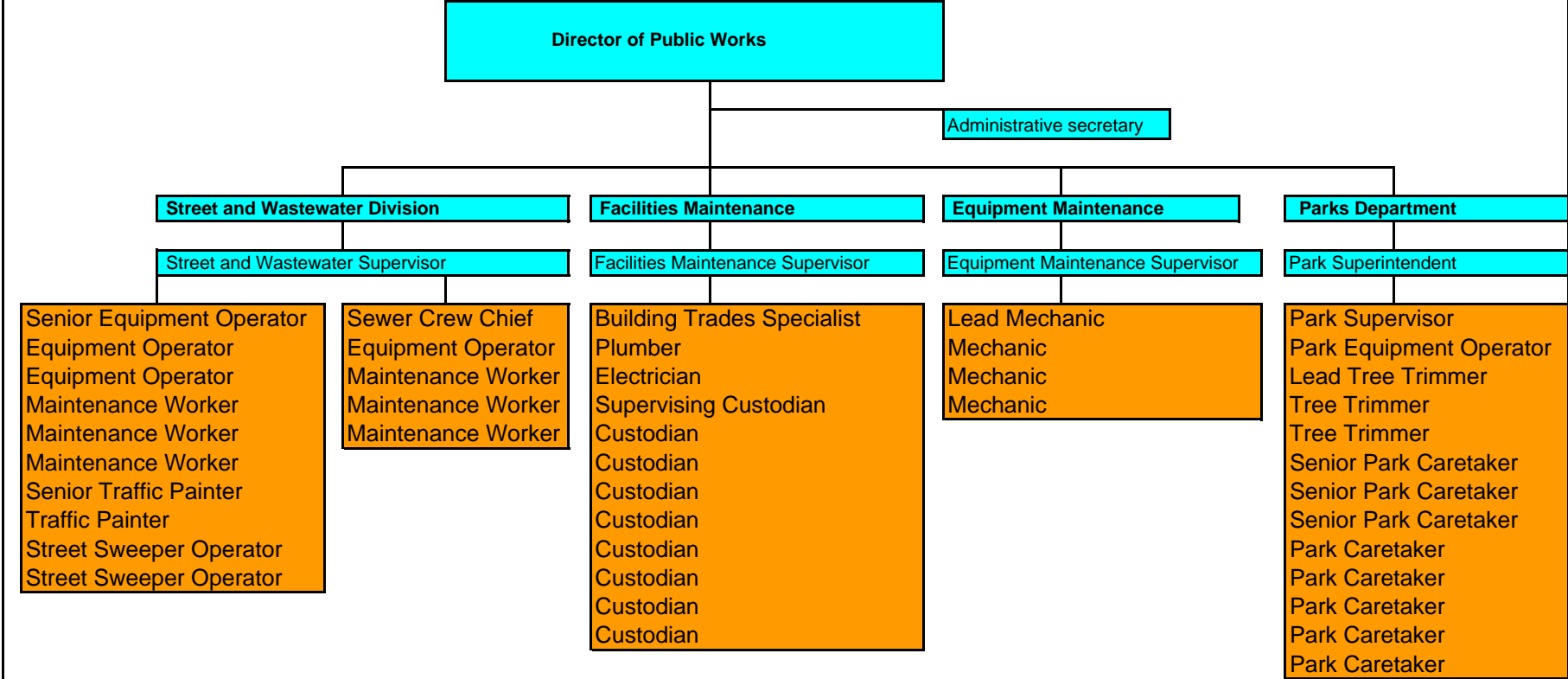
Appendix C

City of National City
NPDES and Public Work Department Organizational Charts

NPDES Organization Chart



**NATIONAL CITY PUBLIC WORKS DEPARTMENT
ORGANIZATIONAL CHART
FISCAL YEAR 2007**





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Appendix D

City of National City
Community Quick Guide

Boards & Commissions

City Council and CDC Redevelopment

First and Third Tuesday of every month,
6:00 p.m.— City Council Chambers

Civil Service Commission

Second Thursday of every other month,
5:30 p.m.— MLK Conference Room

Community & Police Relations Commission

Second Thursday of every month,
6:00 p.m.— City Council Chambers

Housing & Community Development Committee

Second Wednesday of every month,
5:30 p.m.— MLK Conference Room

Library Board of Trustees

Second Wednesday of every month,
4:30 p.m.—Library

Parks and Recreation Advisory Board

Third Thursday of every month,
4:00 p.m.— MLK Conference Room

Planning Commission

First and Third Mondays of every month,
6:00 p.m.— City Council Chambers

Public Art Committee

Fourth Tuesday of every month,
3:00 p.m.—Civic Center Conference Room

Senior Citizens Advisory Board

Third Monday of every month,
10:00 a.m.—Kimball Senior Center

Street, Tree and Parkway Committee

Third Thursday of every month,
2:00 p.m.— Civic Center Conference Room

Traffic Safety Committee

Second Wednesday of every month,
3:00 p.m.— Civic Center Conference Room

NEIGHBORHOOD COUNCIL PROGRAM

Monthly Schedule of Meetings:

Northside

First Wednesday, 6:30pm
MLK Community Center— South Room
140 E. 12th Street

Granger

First Thursday, 6:30pm
Granger Jr. High School-Library
2020 Van Ness Avenue

Central

Second Wednesday, 6:30pm
MLK Community Center— South Room
140 E. 12th Street

Eastside

Second Thursday, 6:30pm
El Toyon Recreation Center
2005 E. Fourth Street

Olivewood

Third Wednesday, 6:30pm
MLK Community Center— South Room
140 E. 12th Street

Sweetwater Heights

Fourth Wednesday, 6:30pm
7th Day Adventist Church
3737 Sweetwater Road

Old Town

Fourth Thursday, 6:30pm
Casa de Salud
1408 Harding Avenue



Community Quick Guide

Most Commonly Requested City Phone Numbers

Neighborhood Council Program

City of National City

For More Information
Call: (619) 336-4290



Phone Numbers



Police (Emergency)	9-1-1	(619) 336-4300	Human Resources	(619) 336-4300	San Diego Police Dept	(619) 531-2000
Fire (Emergency)	9-1-1	(619) 336-4306	Employment Opportunities	(619) 336-4306	24-Hour Non-Emergency Dispatch	
Paramedics (Emergency)	9-1-1	(619) 470-5800	Library	(619) 470-5800	San Diego Sheriff's Office	(858) 565-5200
24-Hour Non-Emergency Police	(619) 336-4411	(619) 336-4526	Mayor & City Council	(619) 336-4235	24-Hour Non-Emergency Dispatch	
Building & Safety Dept	(619) 336-4210	(619) 336-4310	Planning	(619) 336-4310	National City Chamber of Commerce	(619) 477-9339
Building Permits	(619) 336-4210	(619) 336-4400	Police Dept	(619) 336-4400	National School District	(619) 336-7510
Code Conformance	(619) 336-4317	(619) 336-4411	Dispatch	(619) 336-4411	Grades K-6th	
Graffiti Hotline	(619) 336-4545	(619) 336-4478	Animal Control	(619) 336-4478	Sweetwater Union High School District	(619) 691-5500
Temporary Use Permits	(619) 336-4548	(619) 336-4420	Parking Enforcement	(619) 336-4420	Grades 7th-12th	
City Attorney	(619) 336-4220	(619) 336-4420	Traffic Division	(619) 336-4420	National City Middle School	(619) 336-2600
Risk Manager-Claims	(619) 336-4370	(619) 336-4442	Vehicle Abatement	(619) 336-4442	Granger Jr. High School	(619) 472-6000
City Clerk	(619) 336-4228	(619) 336-4264	Gang Enforcement	(619) 336-4264	Sweetwater High School	(619) 336-7009
City Manager	(619) 336-4240	(619) 336-4580	Public Works Dept	(619) 336-4580	National City Adult School	(619) 336-9400
Community Development	(619) 336-4250	(619) 336-4589	Equipment Maintenance	(619) 336-4589	Southwestern College	(619) 421-6700
Housing Section 8	(619) 336-4254	(619) 336-4585	Facilities Maintenance	(619) 336-4585	CALTRANS	(619) 688-6670
Community Services	(619) 336-4290	(619) 336-4588	Parks Maintenance	(619) 336-4588	EDCO	(619) 474-8855
Neighborhood Councils	(619) 336-4290	(619) 336-4587	Sewer Maintenance	(619) 336-4587	SDG&E	(800) 411-7343
Recreation	(619) 336-4560	(619) 336-4586	Street Maintenance	(619) 336-4586	Sweetwater Authority	(619) 420-1413
Engineering	(619) 336-4380	(619) 336-4580	Tree Maintenance	(619) 336-4580	National City Cable	(619) 472-2253
Stormwater Hotline	(619) 336-4389	(619) 336-4411	After Hours Emergency	(619) 336-4411	Cox Cable	(619) 262-1122
Finance	(619) 336-4330	24-Hour Hotlines (Message)	24-Hour Hotlines (Message)			
Treasurer	(619) 336-4340	Graffiti Removal	Graffiti Removal	(619) 336-4545		
Fire Department	(619) 336-4550	Gang Enforcement	Gang Enforcement	(619) 336-4264		
Fire Marshal/Inspector	(619) 336-4550	Stormwater	Stormwater	(619) 336-4389		
Public Education Office	(619) 336-4550	Employment Opportunities	Employment Opportunities	(619) 336-4306		
Public Information/Media Line	(619) 336-4532	Recreation Centers	Recreation Centers			
Fire Emergency	9-1-1	Camacho Gym	Camacho Gym	(619) 336-6756		
		Casa de Salud	Casa de Salud	(619) 336-6757		
		El Toyon	El Toyon	(619) 472-6486		
		Kimball Senior Center	Kimball Senior Center	(619) 336-6754		
		Las Palmas Municipal Pool	Las Palmas Municipal Pool	(619) 336-6758		
		Senior Nutrition Center	Senior Nutrition Center	(619) 336-6750		



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Appendix E

City of National City

Wastewater Collection System Sewer Overflow Response Plan

CITY OF NATIONAL CITY

WASTEWATER COLLECTION SYSTEM SEWER OVERFLOW RESPONSE PLAN

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SECTION 8: LIABILITY

SECTION 9: RESPONSIBILITIES

SECTION 10: EMERGENCY TRAFFIC AND CROWD CONTROL

SECTION 11: POSTING REQUIREMENTS

SECTION 12: TRAINING

SECTION 13: ATTACHMENTS

SECTION 1: PURPOSE

The City of National City owns and operates a wastewater collection system that consists of pumping stations, gravity sewer mains, and one force main. These facilities are will maintained and normally should not result in any overflows or spills. However the possibility does exist.

This procedure provides a plan for the public health and safety. This may require that certain actions be taken to minimize the health hazards resulting from accidental sewage discharges. This policy provides guidance to City employees in procedures to be used.

SECTION 2: BACKGROUND

There is a need to standardize procedures to be followed when overflows occur. These procedures provide for a coordinated effort by trained personnel, so that all necessary actions are taken to help facilitate a timely and technically correct response.

SECTION 3: POLICY

The basic National City policy is that in the event of an overflow, every effort consistent with safety should be made to return the system to operation. A very close second priority is to contain the spill. In some instances this could be the primary consideration, depending upon location, magnitude of spill, and availability of alternatives.

SECTION 4: NOTIFICATION

In the event of a sewer overflow any employee observing an overflow shall contact Public Works and provide a verbal report. The person receiving the report shall notify the Street and Wastewater Supervisor, or the next higher classification. In the event of a sewer spill after hours contact police dispatcher or standby crew. Contacts can be made as follows.

POLICE DEPARTMENT
DISPATCHER (619) 336-4411
SEWER PAGER (619) 896-2668
STREET PAGER (619) 896-2748

DIRECTOR OF PUBLIC WORKS
JOE SMITH
OFFICE (619) 336-4580
DESK (619) 336-4587

STREET AND WASTEWATER SUPERVISOR
JEFF SERVATIUS
OFFICE (619) 336-4586
MOBILE (619) 993-2082
RADIO #20

PUBLIC WORKS STAND-BY CREW

SEWER CREW CHIEF
JOSE MALDONADO
OFFICE (619) 336-4580
MOBILE (619) 888-3582
RADIO #10

MAINTENANCE WORKER
RADIO #11

EQUIPMENT WORKER
RADIO #21

SECTION 5: REPORTING

Any employee observing an overflow shall contact public works and provide a verbal report of the incident. The person receiving the notification of the overflow shall have the responsibility to notify the appropriate personnel. Notification shall be to the sewer supervisor who shall dispatch the proper personnel. In a case where the supervisor is not available, notification shall be to the next higher classification.

- 5.1** Complete all required reports with pertinent details, including estimates of overflow volume. Turn in reports and photos to Street and Wastewater Supervisor by the start of the next workday.
- 5.2** The Director of Public Works is the responsible representative for the City, as described in Section J of the State of California Water Resources Control Board (SWRCB) Order No. 2006-0003, entitled “Statewide General Waste Discharge Requirements for Sanitary Sewer System.”
- 5.3** All SSOs must be reported as soon as: (1) the City has knowledge of the discharge, (2) reporting is possible, and (3) reporting can be provided without substantially impeding cleanup or other emergency measures. Initial reporting of SSOs must be reported to the Online SSO System as soon as possible but no later than 3 business days after the City is made aware of the SSO. Minimum information that must be contained in the 3-day report must include all information identified in Section D (ix), Monitoring and Reporting Program, of SWRCB Order No. 2006-0003. A final certified report must be completed through the Online SSO System, within 15 calendar days of the conclusion of SSO response and remediation.
- 5.4** For any discharges of sewage that result in a discharge to a drainage channel or a surface water, the spill shall, as soon as possible but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services, the local health officer or directors of environmental health with jurisdiction over affected water bodies, and the San Diego Regional Water Quality Control Board.

OFFICE OF EMERGENCY SERVICES
(800) 852-7550
(916) 262-1677 FAX

SAN DIEGO COUNTY
DEPARTMENT OF HEALTH SERVICES
PROP. 65 COORDINATOR (Clay Clifton)
P.O. BOX 85261
SAN DIEGO, CA 92186-5261
Office: (858) 495-5579
After hours: (619) 338-2222
Fax: (619) 338-2377

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
9174 SKY PARK COURT, SUITE 100
SAN DIEGO, CA 92123
Office: (858) 627-3930
Fax: (858) 571-6972

- 5.5** Initial reporting of SSOs that do not discharge to a drainage channel or surface water must be reported to the San Diego Water Quality Control Board within 24 hours after the City becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. Minimum information that must be contained in the 24-hour report must include all information identified in section C.2 of R9-2007-0005.
- 5.6** In the event of a private lateral sewer discharge, the City will provide notification of the discharge to the San Diego Regional Water Quality Control Board by phone, email, or fax within 24 hours after the City becomes aware of the SSO, notification is possible, and notification can be provided without substantially impeding cleanup or other emergency measures. The City will also report the private lateral discharge to the State Board Online SSO Database within 30 days after the end of the calendar month in which the Lateral Sewage Discharge occurs. The City identifies the sewage discharge as occurring and caused by a private lateral, and the responsible party (other than the City) is identified, if known.
- 5.7** All overflows greater than 50 gallons or less than 50 gallons if occurring within 50 feet of human habitation or poses a threat to public health and/or the environment, are to be reported to the proper regulatory agencies.
- 5.8** A copy of this report shall also be submitted within 30 days to the San Diego Unified Port District if materials are released into tideland areas.

SAN DIEGO UNIFIED PORT DISTRICT
P.O. BOX 488
SAN DIEGO, CA. 92112
ATTENTION: ENVIRONMENTAL MANAGEMENT

SECTION 6: DEFINITIONS

In order for personnel to accurately assess the probable impact on public safety and the safety of City employees, and to determine the proper level of response, the potential for outside costs associated with cleanup, potential claims for property damage and to accurately report overflows to regulatory agencies the following definitions will apply.

- 6.1 MINOR SPILL:** A minor spill is 50 gallons or less but does not occur within 50 feet of human habitation, or does not contaminate public waters, and does not pose a threat to public health or the environment. A minor spill can be effectively and satisfactorily cleaned by qualified personnel and does not require regulatory notification.
- 6.2 MAJOR SPILL:** A major spill is one that is greater than 50 gallons or less than 50 gallons but occurs within 50 feet of human habitation, contaminates public waters and/or poses a threat to public health and to the environment. Such spills do require proper regulatory agency notifications.
- 6.3 SAFETY:** Whenever City crews respond to a reported overflow they may encounter an emergency situation that requires immediate action. Remember, safety is paramount, and even during this type of incident, safe operations always take precedence over meeting schedules or getting the job done or any other commonly used short cut that may abridge proper safety practices.

Safety considerations include not only the safety of the general public, but also the safety of public works personnel. They also include traffic control and proper positioning of vehicle to avoid traffic accidents, as well as bystander safety and safety for citizens and the environment from the results of an overflow.

SECTION 7: PROCEDURES

This section will provide general guidelines for actions to be taken in response to a sewer overflow. This section will be divided into three parts: mainline blockage, force main leak, or pump station failure.

7.1 MAINLINE

- 7.1.1** If the initial report does not include sufficient information, contact the person who reported the overflow and obtain information on location and nature of problem.
- 7.1.2** Upon arrival at the reported location a determination must be made as to the source of the overflow. Is it coming from a city owned mainline, or an individual building lateral, or private sewer? (A map of the city sewer system is provided in each sewer vehicle.)
- 7.1.3** If it is determined that the overflow is originating from a city owned mainline sewer, secure the area by placing proper traffic control around the work site, contain the overflow if necessary with sandbags of fill material, and/or bypass the affected manholes if needed. Bypassing may be done by highlining or by the uses of temporary pipeline around the affected area to transport the water to a parallel main. Inspect flow conditions in the upstream and downstream manholes to determine location of blockage. Once blockage is located relieve the blockage as soon as possible.
- 7.1.4** Once the blockage has been relieved or problem corrected, every attempt should be made to return the area to original condition. Estimate the amount of sewage that has escaped the system, and file all reports with supervisor by the following workday.
- 7.1.5** If there is property damage, notify a supervisor immediately, or if after working hours notify a supervisor by the following workday. Take necessary photographs of the affected area for City records.

7.2 PRIVATE MAINLINE OR LATERAL

- 7.2.1** If it is determined that the overflow is originating from a private main or individual building lateral the owner or property manager must be notified and informed that they are responsible for corrective action and must call a licensed private contractor immediately.
- 7.2.2** The property owner shall report all major overflows from private lines within 24 hours to the County Department of Health Services, see below for contact information.

7.3 FORCE MAIN LEAK

- 7.3.1** In the event that an overflow has occurred due to a leak from a force main this will be bypassed while emergency repairs are made to the pipeline. This bypassing may be done by highlining or by the uses of temporary pipeline around the affected area to transport the water to a parallel main. The use of a pump will be necessary to convey flow.

- 7.3.2 Repairs may be done by City personnel or by a private contractor depending on the nature of the damage to the pipeline, location of leak, volume of water and the depth of the pipeline.
- 7.3.3 Due to the lack of service connections to a force main it is highly unlikely that any flooding of personal property would occur as a result of a force main leak. The threat to the environment and the public health may still exist and therefore procedures similar to those for a mainline blockage overflow may be required.

7.4 PUMP STATION FAILURE

- 7.4.1 Each pump station is fitted with an alarm system that will alert the National City Police dispatchers in the event of a system failure. City personnel, or after hours stand-by crews shall respond immediately when a report of an alarm is received.
- 7.4.2 Upon arrival to the pump station from which the alarm has originated a determination must be made to the cause of the failure. Once a determination has been made as to the cause of the alarm then take the necessary steps to return the station to proper operation. Mobilize the necessary personnel and equipment to correct the problem and notify a supervisor of the situation.
- 7.4.3 If an overflow has occurred use instructions similar to those for a mainline blockage.

SECTION 8: LIABILITY

- 8.1 Do not volunteer or disown City liability. Instead, City personnel should use neutral comments. Be polite and sympathetic to the property owners concerns. Assure them regardless of who is at fault you are there to assist them.
- 8.2 The Street and Wastewater Supervisor will advise the occupant, property owner, or property manager of the procedure for filing a claim for damages with the City Clerks office (only if there damage to real estate or personal property). A professional restoration service may be offered at the discretion of the Director of Public Works or the Street and Wastewater Supervisor.

SECTION 9: RESPONSIBILITIES

- 9.1 The Street and Wastewater Supervisor is responsible for ensuring that all personnel are provided with a copy of this response plan. All personnel are responsible for following these guidelines, and completing all the proper reports with all pertinent information.
- 9.2 Reports must be submitted immediately to a supervisor. If the overflow occurs during off-hours the person responsible shall complete all required reports and notify a supervisor by the following workday.
- 9.3 No persons other than the Director of Public Works or the Street and Wastewater Supervisor are or designee authorized to volunteer City liability or offer cleaning service or repair to affected property owners.
- 9.4 The Director of Public Works is the responsible representative for the City, as described in Section J of the State of California Water Resources Control Board (SWRCB) Order No. 2006-0003, entitled "Statewide General Waste Discharge Requirements for Sanitary Sewer System." Accordingly, the

Director of Public Works must complete the required Online SSO System reporting referenced in Section 4.3.

9.5 Apart from the Online SSO System reporting, the Street and Wastewater Supervisor shall be responsible for notifying regulatory agencies of overflows/spills within the required time frame.

SECTION 10: EMERGENCY TRAFFIC AND CROWD CONTROL

In the event that the spill is located in a high traffic area, the Senior Crew Chief will utilize assistance from the City of National City Police Department at (619) 336-4411.

SECTION 11: POSTING REQUIREMENTS

11.1 Once it has been established that the public health may be at risk, it becomes necessary to post sign warning of contamination in appropriate locations.

11.2 Environmental Health Services will direct the extent of the posting and when the signs are to be removed. It is the responsibility of the discharge to post the sign and remove signs when the event has been determined to be over.

SECTION 12: TRAINING

All personnel shall review this procedure at tailgate training sessions no less than semi- annually.

SECTION 13: ATTACHMENTS

13.1 SEWER SPILL REPORT FORM

13.2 SEWER SPILL QUESTIONS

SEWER SPILL REPORT

DATE: _____ TIME: _____ AM/PM

LOCATION: _____

REPORTED BY: _____

TIME REMEDIAL ACTION BEGAN: _____

TIME REMEDIAL ACTION ENDED: _____

ESTIMATED GALLONS SPILLED: _____

DESCRIPTION OF PROBLEM: _____

REMEDIAL ACTION TAKEN: _____

WAS SPILL CONTAINED? _____

WAS SPILL DISINFECTED? _____

PLANS AND/OR PROCEDURES TO PREVENT FUTURE OCCURRENCES: _____

IMMEDIATE SUPERVISOR NOTIFIED? _____ DEPUTY P.W. DIRECTOR ? _____

NOTIFIED: _____ DATE INITIALS

SAN DIEGO REGION WATER QUALITY CONTROL BOARD _____
SAN DIEGO COUNTY DEPT OF HEALTH SERVICES _____

SIGNATURE

DATE

SEWER SPILL QUESTIONS

1. WHO'S REPORTING SPILL
2. AGENCY
3. THEIR PHONE #
4. DATE & TIME RECEIVED
5. DATE & START TIME
6. DATE & TIME ENDED
7. LOCATION OF SPILL
8. CAUSE
9. WHAT TYPE OF STRUCTURE OVERFLOWED
10. HOW DID IT GET FROM THE POINT OF ORIGIN TO THE STORM DRAIN
11. HOW FAR DID IT TRAVEL TO GET TO STORM DRAIN, DITCH ETC.
12. VOLUME
13. GPM
14. DID IT REACH PUBLIC WATER
15. DOES THE AREA NEED TO BE QUARANTINED
16. ARE SIGNS NEEDED AT SPILL AREA OR QUARANTINE AREA
17. HOW MANY
18. WHO TO CALL IF ADDITIONAL INFO IS NEEDED
19. IS THERE PUBLIC ACCESS TO AREA



City of National City
Sewer System Management Plan, Volume II
Draft Report
April 2009

Appendix F

City of National City
Applicable Sections of the National City Municipal Code

Chapter 1.44 ADMINISTRATIVE CITATIONS

[1.44.010 Applicability.](#)

[1.44.020 Enforcement officer defined.](#)

[1.44.030 Administrative citation.](#)

[1.44.040 Method of service.](#)

[1.44.050 Amount of fines.](#)

[1.44.060 Payment of the fine.](#)

[1.44.070 Hearing request.](#)

[1.44.080 Hearing officer.](#)

[1.44.090 Hearing procedure.](#)

[1.44.100 Hearing officer's decision.](#)

[1.44.110 Recovery of administrative citation fines and costs.](#)

[1.44.120 Right to judicial review.](#)

1.44.010 Applicability.

A. This chapter provides for administrative citations which are in addition to all other legal remedies, criminal or civil, which may be pursued by the city to address any violation of this code and bring about compliance.

B. The administrative citations process set forth in this chapter may be utilized for compliance efforts to correct noncontinuing or continuing violations of this code, such as those that pertain to licensing, animal control, minor building, plumbing, electrical, mechanical, fire, grading or zoning violations, subject to the provisions of Section 1.44.030D.

C. Use of this chapter or determination of what constitutes a minor violation shall be at the sole discretion of the city official charged with responsibility for enforcement of the particular code. (Ord. 2242 § 4 (part), 2004; Ord. 2140 § 3 (part), 1998; Ord. 2121 (part), 1996)

1.44.020 Enforcement officer defined.

For purposes of this chapter, "enforcement officer" means any public officer, city employee or agent of the city with the authority by statute, ordinance or regulation to enforce any provision of this code. (Ord. 2140 § 3 (part), 1998; Ord. 2121 (part), 1996)

1.44.030 Administrative citation.

A. Whenever an enforcement officer determines that a violation has occurred, the enforcement officer shall have the authority to issue an administrative citation to any person responsible for the violation.

B. An administrative citation should provide the following information whenever possible:

1. The date of the violation;
2. The identity of the responsible person (owner, tenant, etc.), if available;
3. The address or a definite description of the location where the violation occurred;
4. The section of this code violated and a description of the violation;
5. The amount of the fine for the code violation;
6. A description of the fine payment process, including a description of the time within which and the place to which the fine shall be paid;
7. An order prohibiting the continuation or repeated occurrence of the code violation described in the administrative citation;
8. A description of the administrative citation review process, including the time within which the administrative citation may be contested and directions on how to contest the administrative citation may be obtained;
9. A statement that the property will be reinspected for compliance, and reinspection fees charged for each reinspection thereafter; and
10. The name and signature of the citing enforcement officer. The signature of the responsible party may be requested but is not necessary. If refused, the issuing officer may note this fact.

C. The administrative citation may, but need not, be signed by the person responsible for the violation.

D. The following procedures will apply in issuing administrative citations for minor code violations of a continuing nature, such as building, plumbing, mechanical, grading, zoning, fire or electrical code:

1. First, a notice of violation shall be issued allowing a minimum period for voluntary compliance and reinspection at no charge for particular violation(s). Except for building code violations or conditions affecting immediate fire and life safety, the correction period should not be less than ten days nor exceed thirty days. Building code violations shall allow for a thirty-day correction period. If conditions affecting immediate fire or life safety concerns require an immediate shutdown of the premises, or any affected portion if feasible, until correction is made, the citation shall establish a defined period for compliance and reinspection not to exceed thirty days. However, under this circumstance, a separate order to stop work or vacate the premises may be required.
2. If, upon reinspection, voluntary compliance is not obtained and the condition(s) not satisfactorily corrected, an administrative

citation may then be issued which addresses all remaining violations collectively, imposes a fine and establishes a further date for compliance and reinspection. A maximum of fifteen days may be allowed. Reinspection fees are chargeable at this point.

3. A second or subsequent administrative citation may be issued and a further fine and reinspection fee be imposed if, upon subsequent reinspection, compliance has not been obtained for the particular violation(s) cited under a preceding administrative citation.

4. If compliance is obtained after an administrative citation is issued and the same or similar violation occurs again, an administrative citation and assessment of the penalty applicable to a second violation may be issued instead.

E. An administrative citation may be used for code violations that are not of a continuing nature but may be characterized as a single event or occurrence, such as animal control violations, dumping, pollution or littering, without prior issuance of a notice of violation where the issuing officer concluded that enforcement action, rather than a verbal warning, is warranted. (Ord. 2242 § 4 (part), 2004; Ord. 2140 § 3 (part), 1998; Ord. 2121 (part), 1996)

1.44.040 Method of service.

A. The administrative citation and all notices required to be given under this chapter shall be served on the person charged in the citation by any of the following methods:

1. Personal service; or
2. Certified mail, postage prepaid, return receipt requested. Simultaneously, the same notice may be signed and sent by regular mail. If a notice that is sent by certified mail is returned unsigned, then service shall be deemed effective pursuant to regular mail, provided the notice that was sent by regular mail is not returned; or
3. Posting the notice conspicuously on or in front of the property, and mailing a copy to the property owner or other responsible party.

B. Service by certified and regular mail in the manner described above shall be effective on the date of mailing. Service by mail shall be to the responsible person's address as indicated on the current assessment roll of the San Diego County assessor.

C. Failure of a responsible party to actually receive notice regularly made in conformity with this Section 1.44.040 shall not affect the validity of the notice or the proceedings. (Ord. 2242 § 4 (part), 2004; Ord. 2140 § 3 (part), 1998; Ord. 2121 (part), 1996)

1.44.050 Amount of fines.

The following fines shall be imposed for each separate violation of the same code section:

- A. One hundred dollars for a first violation;
- B. Two hundred dollars for a second violation within the same year; and
- C. Five hundred dollars for each additional violation in the same year. (Ord. 2121 (part), 1996)

1.44.060 Payment of the fine.

A. The fine shall be paid to the city within thirty days from the date of administrative citation.

B. Any administrative citation fine paid pursuant to subsection A of this section shall be refunded in accordance with Section 1.44.100 if it is determined, after a hearing, that the person charged in the administrative citation was not responsible for the violation or that there was no violation as charged in the administrative citation.

C. Payment of a fine under this chapter shall not excuse or discharge any continuation or repeated occurrence of the code violation that is the subject of the administrative citation. (Ord. 2121 (part), 1996)

1.44.070 Hearing request.

A. Any recipient of an administrative citation may contest that there was not a violation of the code or that he or she is not the responsible person by requesting a hearing with the city department specified on the administrative citation within thirty days from the date of the administrative citation, together with an advance deposit of the fine.

B. The request for hearing may be made via the administrative citation form in the space provided for such action.

C. The person requesting the hearing shall be notified by the department of the time and place set for the hearing at least ten days prior to the date of the hearing.

D. If the enforcement officer submits an additional written report concerning the administrative citation to the hearing officer for consideration at the hearing, then a copy of this report also shall be served on the person requesting the hearing at least five days prior to the date of the hearing. (Ord. 2242 § 4 (part), 2004; Ord. 2121 (part), 1996)

1.44.080 Hearing officer.

Upon the filing of a request for a hearing of an administrative citation, a hearing officer shall be chosen by the parties, who shall be neutral and unbiased as to the matter in contention. Experience in the subject area is preferred but not a prerequisite. The city shall maintain a panel of candidates available to serve as hearing officers for the administrative citation hearings. The enforcement officer or other designated city representative and the aggrieved party shall select a hearing officer from the list by alternately striking names from the panel list, beginning with the aggrieved party. The city and the aggrieved party may share the cost of the hearing officer, or if the aggrieved party chooses, the city will pay the full cost of the hearing officer, if requested by the aggrieved party in writing prior to the hearing.

The hearing should occur not later than sixty days from the time of the request for administrative hearing filed by the aggrieved party, unless waived by the city and the aggrieved party. (Ord. 2277 § 2, 2005; Ord. 2242 § 4 (part), 2004; Ord. 2121 (part), 1996)

1.44.090 Hearing procedure.

A. Before a hearing to contest an administrative citation is held, the fine must be deposited in advance in accordance with Section 1.44.060.

B. A hearing before the hearing officer shall be set for a date that is not less than fifteen days and not more than forty-five days from the date that the request for hearing is filed in accordance with the provisions of this chapter.

- C. At the hearing, the party contesting the administrative citation shall be given the opportunity to testify and to present evidence concerning the administrative citation.
- D. The failure of any recipient of an administrative citation to appear at the administrative citation hearing shall constitute a forfeiture of the fine and the exhaustion of his/her administrative remedies.
- E. The administrative citation and any additional report submitted by the enforcement officer shall constitute prima facie evidence of the respective facts contained in those documents.
- F. The hearing officer may continue the hearing and request additional information from the enforcement officer or the recipient of the administrative citation prior to issuing a written decision. (Ord. 2140 § 3 (part), 1998; Ord. 2121 (part), 1996)

1.44.100 Hearing officer's decision.

- A. After considering all of the testimony and evidence submitted at the hearing, the hearing officer shall issue a written decision to uphold or cancel the administrative citation and shall list in the decision the reasons for that decision. The decision of the hearing officer shall be administratively final and constitutes the exhaustion of administrative remedy. Unless appealed to the superior court as provided by statute (see Section 1.44.120), the fine and any reinspection fee imposed by the administrative citation is final.
- B. If the hearing officer determines that the administrative citation should be upheld, then the fine amount on deposit with the city shall be retained by the city.
- C. If the hearing officer determines that the administrative citation should be canceled, then the city shall promptly refund the amount of the deposited fine, together with interest at the average rate earned on the city's portfolio for the period of time that the fine amount was held by the city.
- D. The recipient of the administrative citation shall be served with a copy of the hearing officer's written decision.
- E. The employment, performance evaluation, compensation and benefits of the hearing officer shall not be directly or indirectly conditioned upon the amount of administrative citation fines upheld by the hearing officer. (Ord. 2242 § 4 (part), 2004; Ord. 2121 (part), 1996)

1.44.110 Recovery of administrative citation fines and costs.

Any past due administrative citation fine or late payment charge may be collected by any available legal means. The finance director is primarily responsible for collecting fines and reinspection fees. The city attorney is authorized to file civil process before the superior court to enforce collection. (Ord. 2242 § 4 (part), 2004; Ord. 2121 (part), 1996)

1.44.120 Right to judicial review.

Any person aggrieved by an administrative decision of a hearing officer on an administrative citation may obtain review of the administrative decision by filing an appeal to be heard with the San Diego County superior court within twenty days upon payment of the filing fee in accordance with the timelines and provisions as set forth in California Government Code Section 53069.4. Unless appealed within that time, the fine is final. (Ord. 2242 § 4 (part), 2004; Ord. 2121 (part), 1996)

Chapter 1.48 ADMINISTRATIVE REMEDIES

[1.48.010 Applicability.](#)

[1.48.020 Director and authority--Defined.](#)

[1.48.030 Compliance order.](#)

[1.48.040 Method of service.](#)

[1.48.050 Hearing--Review board--Planning commission or advisory and appeals board.](#)

[1.48.060 Hearing.](#)

[1.48.070 Hearing--Notice--Scheduling--Purpose.](#)

[1.48.080 Hearing--Procedures.](#)

[1.48.090 Administrative order.](#)

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[1.48.120 Failure to comply with administrative order.](#)

[1.48.130 Right of judicial review.](#)

[1.48.140 Recovery of administrative civil penalties.](#)

[1.48.150 Report of compliance after administrative order.](#)

[1.48.160 Compliance dispute.](#)

[1.48.170 Lien procedure.](#)

[1.48.180 Public hearing and protests.](#)

[1.48.190 Recording of lien.](#)

[1.48.200 Satisfaction of lien.](#)

1.48.010 Applicability.

A. This chapter provides for administrative remedies, which are in addition to all other legal remedies, criminal or civil, which may be pursued by the city to address any violation of this code.

B. Use of this chapter shall be at the sole discretion of the city. (Ord. 2122 (part), 1996)

1.48.020 Director and authority--Defined.

For purposes of this chapter, "director" means the head of any city department or his/her designee, who is charged with responsibility for enforcement of any provision of this code. A director has the authority to record notices of violation against real property on which violations are determined to exist. (Ord. 2140 § 4 (part), 1998; Ord. 2122 (part), 1996)

1.48.030 Compliance order.

A. Whenever the director determines that a violation of any provision of this code within the director's responsibility is occurring or exists, the director may issue a written compliance order to any person responsible for the violation.

B. A compliance order issued pursuant to this chapter shall contain the following information:

1. The date and location of the violation;
2. The identity of the responsible party, if known or available;
3. The section of this code violated and a description of the violation;
4. The actions required to correct the violation;
5. That a notice of violation may be recorded in the real property records of the county of San Diego if compliance with the order is not achieved;
6. The time period after which administrative penalties will begin to accrue if compliance with the order has not been achieved;
7. A statement that the failure to appeal or request a hearing within the times prescribed constitutes a waiver of the right to a hearing and renders the notice of compliance a final order;
8. Either a copy of this chapter or an explanation of the consequences of noncompliance with this chapter and a description of the hearing procedure and appeal process.

C. The compliance order need not be signed by the person responsible for the violation. (Ord. 2140 § 4 (part), 1998: Ord. 2122 (part), 1996)

1.48.040 Method of service.

A. The compliance order and all notices required to be given under this chapter shall be served by any of the following methods:

1. Personal service; or
2. Certified mail, postage prepaid, return receipt requested. Simultaneously, the same notice may be signed and sent by regular mail. If a notice sent by certified mail is returned unsigned, then service shall be deemed effective pursuant to regular mail, provided the notice that was sent by regular mail is not returned; or
3. Posting the notice conspicuously on or in front of the property.

B. Service by certified and regular mail in the manner described above shall be effective on the date of mailing if directed to the responsible person's address as indicated on the current assessment roll of the San Diego County assessor.

C. Failure of a responsible party to actually receive notice made in conformity with this Section 1.48.040 shall not affect the validity of the notice or proceedings. (Ord. 2140 § 4 (part), 1998: Ord. 2122 (part), 1996)

1.48.050 Hearing--Review board--Planning commission or advisory and appeals board.

In any case where a compliance order is issued by the planning director, and a hearing is to be held on such compliance order, the hearing shall be held and a decision rendered by the planning commission; in any case where a compliance order is issued by the fire chief, the director of building and safety, the city engineer or the director of public works, and a hearing is to be held on such compliance order, the hearing shall be held and a decision rendered by the advisory and appeals board. For the purposes of this chapter, the term "review board" refers to either the planning commission or the advisory and appeals board, as appropriate. In any case where a hearing is held before the review board pursuant to this chapter, the director of the city department which issues the compliance order shall serve as the secretary of the review board. If the review board cannot meet within the prescribed time, then the city council shall act as the review board, in which case the decision shall be final and constitute the exhaustion of administrative remedy. (Ord. 2140 § 4 (part), 1998: Ord. 2122 (part), 1996)

1.48.060 Hearing.

A. If the director determines that all violations have been corrected within the time specified in the compliance order, no further action shall be taken.

B. If full compliance is not achieved within the time specified in the compliance order, the director shall advise the secretary to the review board to set a hearing before the board. (Ord. 2122 (part), 1996)

1.48.070 Hearing--Notice--Scheduling--Purpose.

A. The secretary to the review board shall cause a written notice of hearing to be served on the person responsible for the violation, and, where real property is involved, a notice of hearing shall be served on the property owner at the address as it appears on the last equalized county assessment roll available on the date the notice is prepared.

B. Every notice of hearing on a compliance order shall contain the date, time and place at which the hearing shall be conducted by the review board.

C. Each hearing shall be set for a date not less than fifteen days nor more than forty-five days from the date of service of the notice of hearing unless the director determines that the matter is urgent or that good cause exists for an extension of time.

D. The purpose of the hearing is to provide the full opportunity for a person subject to a compliance order to object to the determination that a violation has occurred and/or that the violation has continued to exist, or that the person served with the compliance order is the person responsible for the violation. The failure of any person subject to a compliance order, pursuant to this chapter, to appear at the hearing shall constitute a failure to exhaust administrative remedies. (Ord. 2122 (part), 1996)

1.48.080 Hearing--Procedures.

A. At the place and time set forth in the notice of hearing, the review board shall conduct a hearing on the compliance order issued pursuant to Section 1.48.030.

B. At said hearing, after the director and any representatives of the city have presented evidence pertaining to the compliance order, the person responsible for the violation, the property owner, and any interested person may present evidence on the issue. (Ord. 2122 (part), 1996)

1.48.090 Administrative order.

A. Within a reasonable time after all evidence is received and the hearing is concluded, the review board shall render a decision, which shall be set forth in a written administrative order.

B. The administrative order shall contain findings on the following issues with respect to each violation:

1. The existence of the violation;
2. The failure of the person responsible for the violation to take corrective action within the required time period set forth in the compliance order.

C. The finding of the review board shall be supported by evidence received at the hearing.

D. If the review board finds that no violation has occurred or that the violation was corrected within the time period specified in the compliance order, the administrative order shall contain a finding of those facts.

E. If the review board finds that a violation has occurred, that the violation was not corrected within the time period specified in the compliance order, and that the person responsible for the violation was named in the compliance order, the administrative order shall contain a finding of those facts, and shall impose any or all of the following:

1. An order to correct and to record notice of violation with the county recorder, if appropriate, including a schedule for correction where appropriate;

2. Administrative penalties as provided in Section 1.48.100;
 3. Administrative costs as provided in Section 1.48.110.
- F. The administrative order shall be served upon the person responsible for the violation pursuant to the procedures set forth in Section 1.48.040. (Ord. 2140 § 4 (part), 1998; Ord. 2122 (part), 1996)

1.48.100 Administrative penalties.

- A. In any case where violation of this code would otherwise constitute a misdemeanor, the review board may impose administrative penalties for such violation in an amount not to exceed a maximum of one thousand dollars per day for each ongoing violation, except that the total administrative penalty shall not exceed one hundred thousand dollars exclusive of administrative costs, interest and restitution for compliance reinspections, for any related series of violations.
- B. In any case where violation of this code would otherwise constitute an infraction, the review board may impose administrative penalties for such violation as follows:
1. One hundred dollars for a first violation;
 2. Two hundred dollars for a second violation within the same year; and
 3. Five hundred dollars for each additional violation in the same year.
- C. In determining the amount of the administrative penalty, the board may take any or all of the following factors into consideration:
1. The duration of the violation;
 2. The frequency, recurrence and number of violations, related or unrelated, by the same violator;
 3. The seriousness of the violation;
 4. The good faith efforts of the violator to come into compliance;
 5. The economic impact of the penalty on the violator;
 6. The impact of the violation on the community;
 7. Such other factors as justice may require.
- D. Administrative penalties imposed by the appeals board shall accrue from the date specified in the compliance order and shall cease to accrue on the date the violation is corrected as determined by the Director or the review board.
- E. The review board, in its discretion, may suspend the imposition of applicable penalties for any period of time during which:
1. The violator has filed for necessary permits; and
 2. Such permits are required to achieve compliance; and
 3. Such permit applications are actively pending before the city, state or other appropriate governmental agency.
- F. Administrative penalties assessed by the review board are due by the date specified in the administrative order.
- G. Administrative penalties assessed by the review board are a debt owed to the city and, in addition to all other means of enforcement, if the violation is located on real property, may be enforced by means of a lien against the real property on which the violation occurred.
- H. If the violation is not corrected as specified in the review board's order to correct, administrative penalties shall continue to accrue on a daily basis until the violation is corrected, subject to the maximum amount set forth in subsections A and B of this section.
- I. If the violator gives written notice to the director that the violation has been corrected and if the director finds that compliance has been achieved, the director shall deem the date the written notice was postmarked or personally delivered to the director or the date of the final inspection, whichever first occurred, to be the date the violation was corrected. If no written notice is provided to the director, the violation will be deemed corrected on the date of the final inspection.
- J. The director will record a notice of correction with the county recorder when the violation has been corrected, and will record a release of lien when satisfied. (Ord. 2140 § 4 (part), 1998; Ord. 2122 (part), 1996)

1.48.110 Administrative costs.

- A. The review board shall assess administrative costs against the violator when it finds that a violation has occurred and that compliance has not been achieved within the time specified in the compliance order.
- B. The administrative costs may include any and all costs incurred by the city in connection with the matter before the review board including but not limited to, costs of investigation, staffing costs incurred in preparation for the hearing and for the hearing itself, and costs for all reinspections necessary to enforce the compliance order. (Ord. 2122 (part), 1996)

1.48.120 Failure to comply with administrative order.

Failure to pay the assessed administrative penalties and administrative costs specified in the Administrative order of the review board may be enforced as:

- A. A personal obligation of the violator; and/or
- B. If the violation is in connection with real property, a lien upon the real property. The lien shall remain in effect until all of the administrative penalties, interest and administrative costs are paid in full. (Ord. 2122 (part), 1996)

1.48.130 Right of judicial review.

The administrative order is final, unless appealed. Any person aggrieved by an administrative order of the review board may obtain judicial review of the administrative order by filing an appeal within the timelines and provisions set forth in California Government Code Section 53069.4. (Ord. 2140 § 4 (part), 1998; Ord. 2122 (part), 1996)

1.48.140 Recovery of administrative civil penalties.

The city may collect the assessed administrative civil penalties and administrative costs by use of all available legal means, including recordation of a lien pursuant to Section 1.48.170. (Ord. 2122 (part), 1996)

1.48.150 Report of compliance after administrative order.

If the director determines that compliance has been achieved after a compliance order has been sustained by the review board, the director shall file a report indicating that compliance has been achieved, and shall record a notice of compliance in the real property records if the notice of violation was recorded. (Ord. 2140 § 4 (part), 1998; Ord. 2122 (part), 1996)

1.48.160 Compliance dispute.

- A. If the director does not or refuses to file a report pursuant to Section 1.48.150 above, a violator who believes that compliance has been achieved may request a compliance hearing with the secretary to the board.
- B. The hearing shall be noticed and conducted in the same manner as a hearing on a compliance order provided in Section 1.48.050 through 1.48.090 of this chapter, except that no fees shall be required.
- C. The review board shall determine if compliance has been achieved and, if so, when it was achieved. (Ord. 2140 § 4 (part), 1998; Ord. 2122 (part), 1996)

1.48.170 Lien procedure.

- A. Whenever the amount of any administrative penalty and/or administrative cost imposed by the review board pursuant to this chapter in connection with real property has not been satisfied in full within ninety days of service of the administrative order, and/or has not been successfully challenged by a timely appeal to the municipal court, this obligation may constitute a lien against the real property on which the violation occurred.
- B. The lien provided herein shall have no force and effect until recorded with the county recorder. Once recorded, the administrative order shall have the force and effect and priority of a judgment lien governed by the provisions of Section 697.340 of the Code of Civil Procedure and may be extended as provided in Sections 683.110 to 683.220, inclusive, of the Code of Civil Procedure.
- C. Interest shall accrue on the principal amount of the judgment remaining unsatisfied pursuant to law.
- D. Prior to recording any such lien, the director of finance shall prepare and file with the city clerk a report stating the amounts due and owing.
- E. The city clerk shall fix a time, date and place for hearing such report and any protests or objections thereto by city council.
- F. The director of finance shall cause written notice to be served on the property owner not less than ten days prior to the time set for the hearing. Such notice shall be served as provided in Section 1.48.040.

1.48.180 Public hearing and protests.

- A. Any person whose real property is subject to a lien pursuant to Section 1.48.170 may file a written protest with the city clerk and/or may protest orally at the city council meeting.
- B. Each written protest or objection must contain a description of the property in which the protesting party is interested and the grounds of such protest or objection.
- C. The city council, after the hearing, shall adopt a resolution confirming, discharging or modifying the amount of the lien. (Ord. 2122 (part), 1996)

1.48.190 Recording of lien.

Thirty days following the adoption of a resolution by the city council imposing a lien, the city clerk shall file the same as a judgment lien in the office of the county recorder of San Diego County. The lien may carry such additional administrative charges as set forth by resolution of the city council. (Ord. 2122 (part), 1996)

1.48.200 Satisfaction of lien.

Once payment in full is received by the city for outstanding penalties and costs, the director of finance shall either record a notice of satisfaction or provide the property owner or financial institution with a notice of satisfaction so they may record this notice with the office of the county recorder. Such notice of satisfaction shall cancel the city's lien. (Ord. 2122 (part), 1996)

[Title 14 WATER AND SEWERS](#)

Chapter 14.06 SEWER CONNECTIONS

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14.06.010 Definitions.

For the purpose of this chapter:

- A. "Person" means and includes an individual, partnership, firm, association or corporation.
- B. "Private property" means all those lands lying within the corporate limits of National City, except those lands owned or controlled by the city and shown as a separate lot of parcel on maps filed in either the county recorder's office or the county clerk's office, or on resubdivisions authorized by the city council as provided in ordinances of the city regulating such resubdivisions or lot splits, as shown on the current tax roll for the city.
- C. "Public sewers" means and includes any and all publicly owned pipelines, manholes, lamp holes, inspection holes, cleanouts, accessories, equipment or appurtenances to any and all devices used for the disposal of the sewage of the city within the boundary lines of streets, alleys, rights-of-way or public easements.
- D. "Sewer lateral" or "lateral" means that part of any sewer extending from the sewer main in a public street, alley, easement or right-of-way to private property for the use of such property.
- E. "Sewer system service," also referred to herein as service," means and is the making available of the city sewer system to any parcel of property by the city. (Ord. 1489 §§ 2--6, 1975)

14.06.020 Connections--Required when.

It is unlawful for any person, firm, partnership, association or corporation to install, or cause to be installed, a septic tank, a cesspool, or other device or devices, for disposal of sewage in the city where the building to be connected is within two hundred feet of the available sewer system after the effective date of the ordinance codified in this chapter. The sewer system shall be deemed available where a building connection pipe may be laid with a fall of one-quarter inch per foot. (Ord. 1489 § 13, 1975)

14.06.030 Permit--Prerequisites to issuance--Fees.

If private property which is sought to be connected with a public sewer system has actually been assessed to pay for the cost and expenses of the construction of such public sewer system, or if the public sewer system has been constructed for the use of the private property by private contract by an owner of the private property or his assignor at no expense to the city, either partially or wholly, from its funds or from money derived from a bond issue authorized by an election, the city engineer shall issue a permit upon the payment of connection and permit fees as set forth in this chapter. (Ord. 2052 § 1, 1993: Ord. 1489 § 7, 1975)

14.06.040 Permit--Issuance.

Upon the receipt of an application for a permit under the provisions of this chapter, the city engineer shall, if the same is in accord with provisions hereof, and if the fee has been paid to the treasurer, issue a permit to the owners of the property to be served, in duplicate, one copy to be delivered to the permittee and one copy to be kept in the city engineer's office. (Ord. 2052 § 2, 1993: Ord. 1489 § 22, 1975)

14.06.050 Work to be performed by city.

It is unlawful for any person, other than the city, its officers, agents, permittees and/or employees, to connect any pipe, drain or sewer with, or to open or penetrate, any public sewer in the city, or to damage, remove or open any portion of any manhole, flush tank, lamp hole, inspection pipe or any other part or appurtenance to any public sewer. All sewer laterals from mains to the property line shall be constructed by the city. All connections to the sewer main in a public street, alley, easement or right-of-way shall be made by the city. (Ord. 1489 § 8, 1975)

14.06.060 Fees--Sewer laterals.

- A. In addition to any fee or other charge which the city may make for connecting with the public sewer, the owner or applicant for such connection shall pay to the city for constructing and laying a sewer lateral as defined in Section 14.06.010D, a fee as established in the fee schedule adopted by the city council.
- B. Under abnormal conditions, additional appropriate charges shall be established by the city engineer. Abnormal conditions include, but are not necessarily limited to, the following:
1. Deep sewer laterals in excess of eight feet;
 2. Difficult or unusual excavations;
 3. Unusual obstructions or hazards;
 4. Sewer connections where the conduit is larger than six inches inside diameter;
 5. If, in the opinion of the city engineer, the estimated sewage flow from any property is in excess of one thousand gallons per day, the fee shall be determined by multiplying the estimated flow, in gallons per day, by \$0.653. The city engineer may further require the installation of a flow meter. If actual flows exceed the estimated flow, an adjustment to the fee may also be required as determined by the city engineer.
- C. In case a connection is made to a public sewer where the sewer main or service lateral

is already installed across private property, the property owner shall install the building sewer to the sewer main and shall uncover the existing sewer main so that a connection can be made, which connection shall be made by the city. (Ord. 2018 § 11, 1991; Ord. 1798, 1983: Ord. 1625, 1978: Ord. 1489 § 9, 1975)

14.06.070 Fees--For property frontage.

In addition to a fee for permit or other charge which the city may make for connecting to the public sewer system, the owner or applicant (excluding those exempted by Section 14.06.030) for sewer system service to any property whose dimensions parallel to the street are fifty feet or less shall, upon making application for such service, pay the minimum sum of three hundred dollars to the city. Where the subject property is over fifty feet in width, the minimum charge shall be six dollars per foot of frontage. (Ord. 1489 § 10, 1975)

14.06.080 Connections--Approval and inspection required.

The size and number of service laterals serving any property shall be determined by the city engineer and such laterals shall be connected only upon the order of the city engineer after the appropriate fees contained in Sections 14.06.050 and 14.06.060 have been paid. The building sewer shall be inspected and approved prior to connections to the service lateral. (Ord. 2052 § 3, 1993: Ord. 1489 § 11, 1975)

14.06.090 Connections--Permit required--Issuance restrictions.

No connection to the public sewers shall be made, or any work done thereon, either in the public streets or alleys, or within property lines, until a permit for such construction and work has been issued therefor by the city. Permits for sewer connection shall be issued only to persons who have plumbing already installed in their premises, or have taken out permits therefor under the provisions of city ordinances. Applications for permits required by the provisions of this chapter shall be made to the director of building and housing. (Ord. 1489 § 21, 1975)

14.06.100 Permit--Recordkeeping required.

It shall be the duty of the city engineer to keep on file all records of sewer permits issued. It shall be the duty of the city engineer to plat sewer lines constructed hereunder on the plats in his office. (Ord. 2052 § 4, 1993: Ord. 1489 § 24, 1975)

14.06.110 Sewers appeal board established--Authority.

There is created a sewers appeal board consisting of the director of building and safety, the city engineer and a representative of the city council to be appointed by the mayor.

Any applicant for service from the sewer system who presents a special or peculiar case may be referred to the sewers appeal board by the city engineer for decision on the amount of charge to be made in addition to the three-hundred-dollar minimum charge; or any applicant who desires to present a plan of sewer service different from the number of services required by the city engineer may make a written request to the sewers appeal board for a decision. Nothing in this section shall deny the right of appeal of the applicant to the city council for the fixing of the charges; provided, however, that such appeal to the city council is made within thirty days from the date of the decision rendered by the sewers appeal board and the decision of the city council on any such appeal shall be final. (Ord. 2052 § 5, 1993; Ord. 1489 § 12, 1975)

14.06.120 City engineer to perform work authorized by permit.

Upon the issuance of a permit under the provisions of this chapter, the city engineer shall proceed with the work called for by the permit, and upon completion shall file with the city engineer a copy of that permit with a notation thereon that the work has been completed and the connection made and the date of completion, together with an itemized statement of the cost thereof, and accurate location of same. (Ord. 1489 § 23, 1975)

14.06.130 Public sewer construction--Inspection, approval and connection required.

All public sewers constructed and conduits leading thereto installed under the provisions of this chapter shall be left uncovered until the city engineer has given permission to cover the same. Existing buildings within two hundred feet of the available city sewer system shall be connected to the city sewer system at such times as the private sewer system fails or is ineffective in the disposal of liquid and solid wastes. (Ord. 1489 § 25, 1975)

14.06.140 Materials and installation specifications.

Every building sewer or drainage piping installed within the public right-of-way and the property lines that is to be connected with the public sewers shall be of approved materials listed in the Uniform Plumbing Code and shall be installed according to the listing of their approval. Piping conveying industrial, chemical or process wastes from their point of origin to sewer connected pretreatment facilities shall be of such material and design as to adequately perform its intended function to the satisfaction of the director of building and safety. Drainage discharge piping from pretreatment facilities or interceptors shall conform to standard drainage installation procedures. The installation and testing of approved materials shall be in accordance with installation and testing procedures contained in the Uniform Plumbing Code. No connection in any manner shall be made between drainage piping or sewers on private property and the public sewers until inspected and approved by the city engineer or director of building and safety, as applicable. (Ord. 2052 § 6 1993; Ord. 1489 § 15, 1975)

14.06.150 Connections--Multiple permitted when--Restrictions on lines installed by property owners.

Every building with plumbing fixtures shall be separately and independently connected to the public sewer; except, where one building stands in the rear of another building on an interior lot, the building drain from the front building may be extended to the rear building or where two or more buildings on the same property under one ownership and not subdividable may be served by a single adequately sized connection to the public sewer. Whenever a sewer line is to be installed at the cost of the property owners on or across any street, alley, easement or right-of-way or any ground dedicated to the city for any purpose, or across private property, and when said sewer is to be connected to the public sewer, or may become a part of the public sewer system, the sewer line shall be installed under the supervision of the city engineer and the city shall have the right to make extensions and connections thereto at all times. Before any lateral connections are made to any such sewer, so installed by property owners, a permit thereof must be taken out and the regular fees paid. (Ord. 1489 § 14, 1975)

14.06.160 Property owner--Responsibility for building connection line--Stoppages.

A. The property owner is responsible for the building connection line from the house to the main. The owner or occupant is responsible for calling a licensed private plumbing contractor if a stoppage occurs. City crews cannot respond to requests for service unless the owner or occupant has first obtained the service of a licensed plumber. If the licensed plumber is unsuccessful in cleaning the line and in his opinion determines that the stoppage is located in the right-of-way portion of the building connection, the plumber shall call the department of public works and request city service.

B. Whenever it is necessary for the city to relieve stoppage in laterals, if the obstruction is in the street between the sewer main and the property line, and is due to waste matter which should not have been placed in the sewer, the owner of such property shall pay to the city the cost of the removal of such obstruction. (Ord. 1852, 1985; Ord. 1489 § 20, 1975)

14.06.170 Property owner--Maintenance duties.

The building sewer or drainage piping installed within property lines and the building connection serving such building sewer or drainage piping shall be maintained by the property owner. (Ord. 1489 § 16, 1975)

14.06.180 Prohibited discharges designated.

Except as provided in Section 14.06.190 of this chapter, it is unlawful for any person to deposit, by any means whatsoever, into any plumbing fixture, floor drain, interceptor, sink, receptacle or device which is connected to the drainage system, public sewer, private sewer, septic tank or cesspool, any ashes; cinders; solids; rags; inflammable, poisonous or

explosive liquids or gases; oils; grease or any other organic, chemical or industrial waste that may be detrimental to the public sewer system or detrimental to the functioning of the sewage treatment plant. No cesspool, septic tank, seepage pit or drainfield shall be connected to any public sewer or to any building sewer leading to such public sewer. Unless approved by the director of building and safety, no rain, surface or subsurface water shall be connected to or discharged into any sewerage system. Roofs, inner courts, vent shafts, light wells or similar areas having rainwater drain, shall discharge to the outside of the building or to the gutter and shall not be connected to the sewerage system. (Ord. 2052 § 7, 1993: Ord. 1489 § 18, 1975)

14.06.190 Industrial wastes--Discharge restrictions--Permit required when.

A. Chemical or industrial liquid wastes shall not be discharged into the public sewer system without obtaining an industrial waste permit and the approval of the San Diego Metropolitan Sewerage System to discharge such wastes into the public sewer. Wastes that are known to be detrimental to the public sewer system or detrimental to the functioning of the sewage treatment plant shall be treated and disposed of as found necessary and directed by the San Diego Metropolitan Sewerage System or other authority having jurisdiction.

B. Solid wastes resulting from the preparation of any food or drink prepared on premises where such foods or drinks are served or proposed to be served for consumption may, when properly ground through a food waste disposer, be discharged into the public sewer system.

C. Interceptors (including grease, oil and sand, etc.) shall be provided when, in the judgment of the director of building and safety or the public works director, they are necessary for the proper handling of liquid wastes containing grease, flammable wastes, sandy solids, acid or alkaline substances or other ingredients harmful to the building drainage system, the public or private sewer or to public or private sewage disposal facilities. (Ord. 2052 § 8, 1993: Ord. 1489 § 19, 1975)

14.06.200 Fees--For extra inspections or violations.

When any person shall have violated or failed to comply with any of the requirements of this chapter or when, through any such violation or failure to comply by any person doing the work, it is necessary to make extra inspections of the work, there shall be charged said person a fee of ten dollars for such extra inspection made necessary on account of such violation or failure to comply. (Ord. 1489 § 17, 1975)

14.06.210 Fees--Disposition of funds.

Any money collected under the provisions of this chapter shall be credited as follows:

A. Permit inspection and connection fees to the sewer service revenue fund of the city;

B. Sewer system charges to the sewer service revenue fund of the city. (Ord. 1721, 1980: Ord. 1489 § 22 (part), 1975)

14.06.220 Violation--Penalties--Enforcement authorities.

Any person who shall violate any of the provisions of this chapter shall be deemed a violator of this chapter and shall be subject to all penalties provided under law. In addition, such violators may be subject to penalty provisions contained within the Business and Professions Code of the state of California and enforced by the registrar of contractors. (Ord. 1489 § 26, 1975)

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[Title 14 WATER AND SEWERS](#)

Chapter 14.16 POLLUTION

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14.16.010 Definitions.

The following words and phrases whenever used in this chapter or in the regulations promulgated in relation thereto shall be construed as defined herein.

A. "Industrial wastes" means all wastes other than domestic wastes.

B. "Plumbing system" means and includes all potable water supply and distribution pipes, all plumbing fixtures and traps, all drainage and vent pipe and all drains, including their respective joints and connections, devices, receptacles and appurtenances within property lines of private property.

C. "Sewage" means any liquid waste containing animal or vegetable matter in suspension or solution, including liquids containing chemicals in solution.

D. "Sewerage" is a comprehensive terms including all construction and appurtenant equipment utilized in the collection, transportation, pumping, treatment and final disposal of sewage. (Ord. 1289 § 9, 1971)

14.16.020 Objectionable sewage prohibited.

It is unlawful for any person, firm or corporation to cause to enter or permit to enter the public sewerage system any substance, liquid, gas or solid which would cause a public

nuisance or hazard to life, or would be deleterious to the plumbing system, public sewerage system or to the waters receiving the discharge of the public sewerage system. (Ord. 1289 § 2, 1971)

14.16.030 Disposal--Permit required.

Any person, firm, corporation or governmental agency desiring to discharge industrial wastes into the sewerage system shall obtain a permit to discharge such wastes into the system from the San Diego Metropolitan Sewerage System. (Ord. 2052 § 9, 1993; Ord. 1289 § 3, 1971)

14.16.040 Regulations.

The director of building and housing shall promulgate and enforce regulations necessary to the administration of this chapter. He may amend such regulations from time to time as conditions require. These regulations shall be consistent with the general policy established by the city council and shall be approved by resolution of the city council. (Ord. 1289 § 4, 1971)

14.16.050 Appeal.

In the event that any interested or affected person is dissatisfied with any action or determination of the director of building and housing, such person is entitled to make an appeal in writing to the city manager. If dissatisfied with the determination of the city manager, said person is entitled to make an appeal in writing to the city council. If thirty days or more elapse following the action or determination of any one of the officials in the above designated chain of appeal without an appeal being taken therefrom, then the action or determination of such official or officials shall be final. (Ord. 1289 § 5, 1971)

14.16.060 Notice of violation.

Any person, firm or corporation found to be violating any provision of this chapter or any regulation promulgated relative thereto shall be served by the director of building and housing with a written notice which states the nature of the violation and provides a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violation. (Ord. 1289 § 6, 1971)

14.16.070 Suspension of sewer service.

When deemed necessary by the director of public works or the director of building and safety for the preservation of the public health or safety or for the protection of public or private property, he may suspend sewer service to any person, firm or corporation using the sewer system in any manner or way to endanger the public health or safety, or public

or private property. In suspending service he may sever all pertinent connections to the public sewerage system. If such endangerment shall be imminent, then the director may act immediately to suspend sewer service coincident with notice of warning to such person, firm or corporation. (Ord. 2052 § 10, 1993: Ord. 1289 § 7, 1971)

14.16.080 Tests--Inspection.

A. The director of public works and the director of building and safety or other duly authorized employees and agents of the city shall be permitted to enter onto all properties at any reasonable hour for the purpose of:

1. Determination of the size, depth, location and condition of any sewer or drain connection;
2. Determination of the location, use and discharge connections of interceptors and plumbing fixtures; and
3. Inspection, observation, measurement, sampling and testing of the quality and characteristics of sewage or other liquids or wastes being discharged into the public sewerage system.

B. Where warranted, installation of an appropriate manhole or manholes for purposes of sampling the final industrial waste discharge may be required by the director of building and safety.

C. Whenever an analysis of the sewage and wastes from any plant, building or premises of an industrial or commercial character confirms the presence of any substance, liquid, gas or solids in sufficient quantity or condition which would cause a public nuisance or hazard to life or would be deleterious to the plumbing system, public sewerage system or to the waters receiving the discharge of the public sewerage system, the owner of the plant, building or premises shall pay to the city treasurer the cost of each such sewage and waste analysis. (Ord. 2052 § 11, 1993: Ord. 1289 § 8, 1971)

[<< previous](#) | [next >>](#)

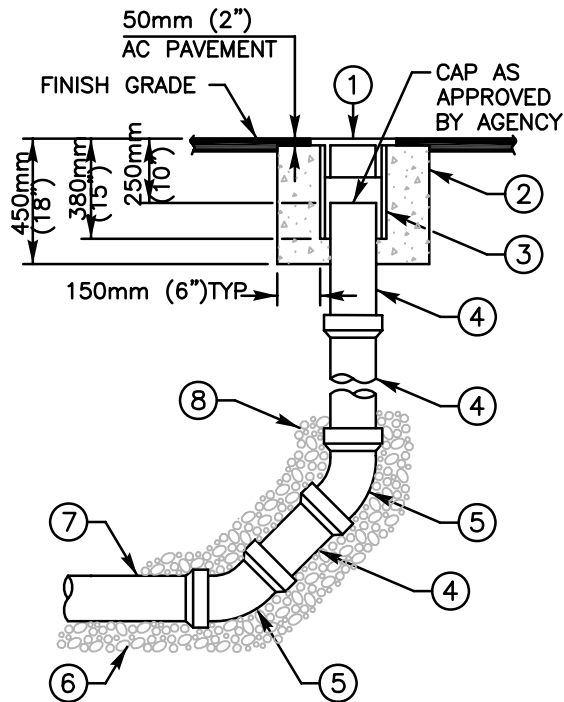


City of National City
Sewer System Management Plan, Volume II
Draft Report
April 2009

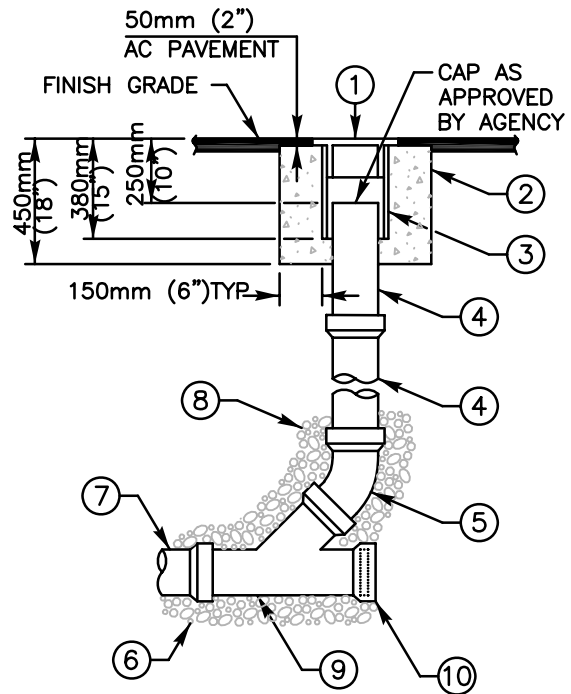
Appendix G

County of San Diego

San Diego Area Regional Standard Drawings



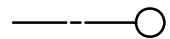
TYPE A
MAINS FOR 150mm (6")
AND 200mm (8")



TYPE B
SEWER LATERAL
CLEANOUT

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) CLEANOUTS TO BE INSTALLED AT THE END OF MAINS WHERE INDICATED ON THE PLANS
- 3) CLEANOUT PIPE TO BE SAME SIZE AND MATERIAL AS SEWER MAIN UP TO 200mm (8")
- 4) BACKFILL TO TOP OF 45° BEND WITH 19mm (3/4") CRUSHED ROCK
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



LEGEND ON PLANS

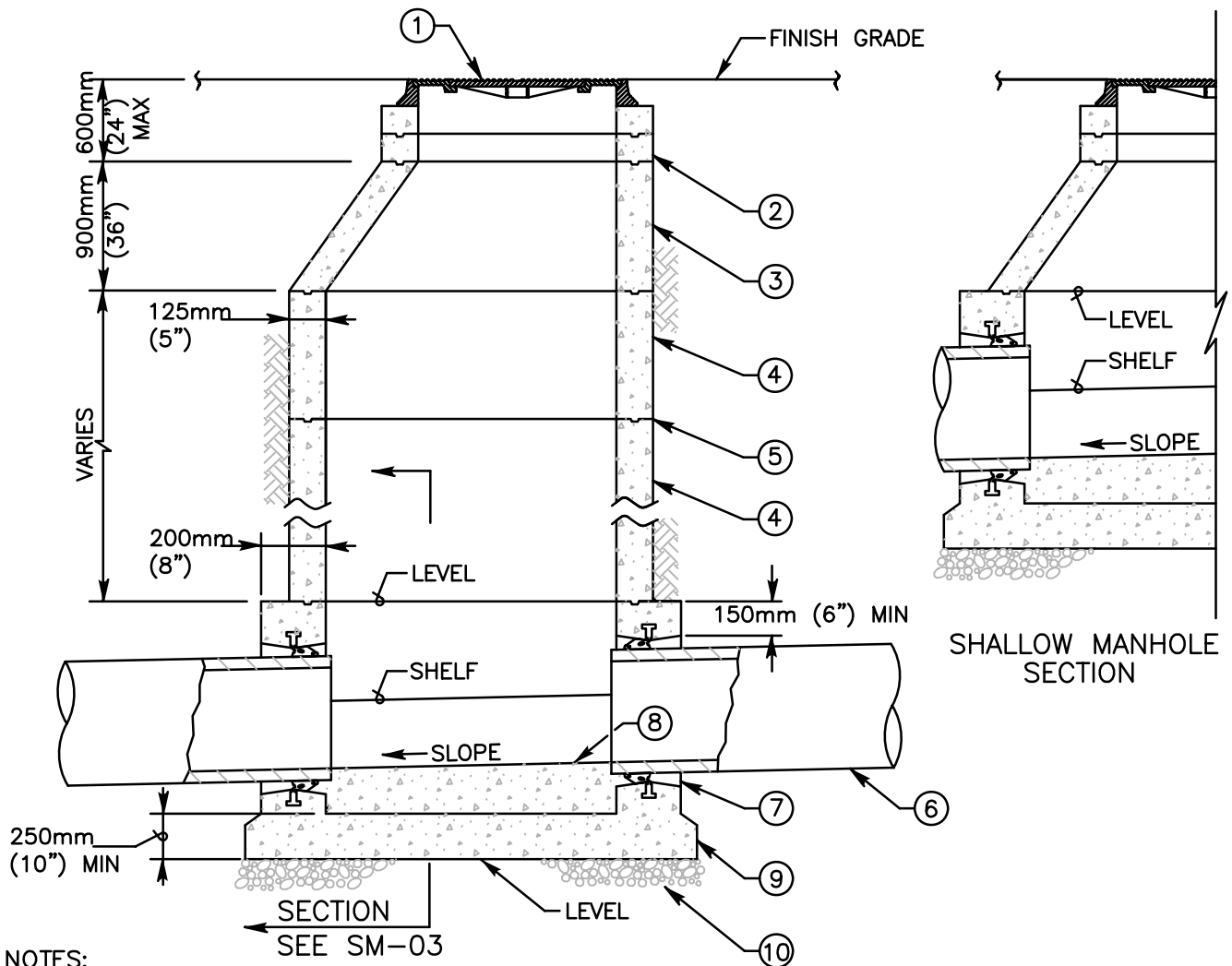
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	300mm (12") CI CLEANOUT BOX COVER MARKED 'SEWER' AND AGENCY NAME AS REQUIRED	⑤	45° ELBOW
②	CONCRETE RING	⑥	19mm (3/4") CRUSHED ROCK PIPE BEDDING
③	300mm (12") PVC, C-900 x 380mm (15") LONG (CLEANOUT BOX)	⑦	SEWER MAIN
④	SIZE x REQUIRED LENGTH PVC PIPE	⑧	19mm (3/4") CRUSHED ROCK SEE NOTE 4
		⑨	STANDARD WYE BRANCH
		⑩	INSTALL PLUG AND CONCRETE LUG

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-03		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

SEWER CLEANOUT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
<i>J. Stanton</i> 03/24/2005	
Chairperson R.C.E. 19246	Date
DRAWING NUMBER	SC-01



NOTES:

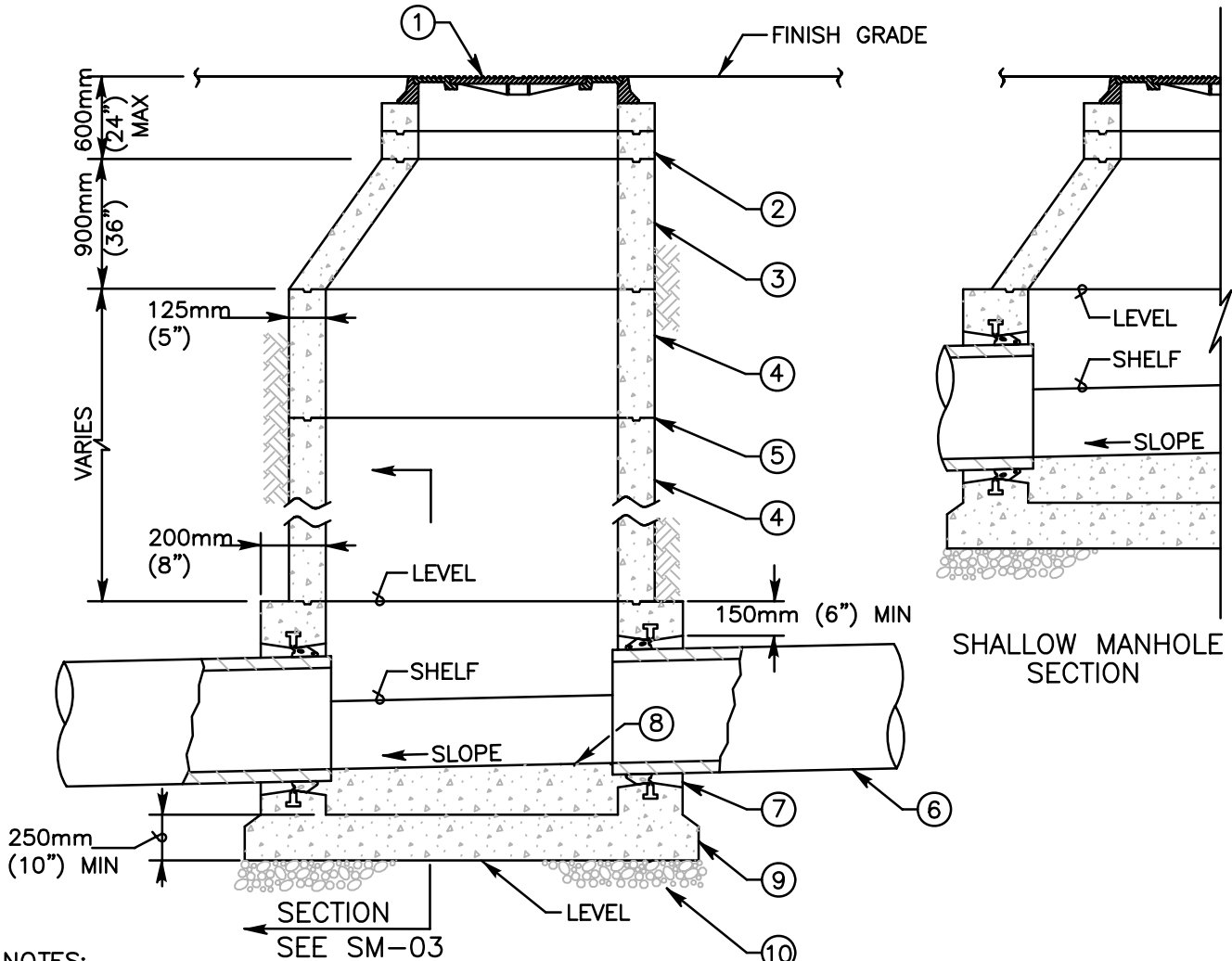
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE SEE SM-05 FOR ACCESS LOCATIONS
- 3) FOR MANHOLE BASES SEE SM-03
- 4) MANHOLES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED AND LINED PER SM-07
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

1200mm (48")

 LEGEND ON PLANS

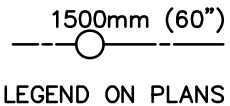
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	900mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS SEE S.D.R.S.D. M-3	⑤	WATER TIGHT JOINTS SEE SM-05
②	900mm (36") DIA GRADE RING(S) 150mm (6") TO 450mm (18") HIGH	⑥	SEWER MAIN
③	ECCENTRIC CONE SEE NOTE 2	⑦	MANHOLE PIPE CONNECTOR SEE SM-04
④	1200mm (48") DIA RING(S) VARIABLE HEIGHT	⑧	FIELD INSTALLED INVERT SEE SM-04
		⑨	CONCRETE BASE, PRECAST OR CAST IN PLACE
		⑩	150mm (6") OF 19mm (3/4") CRUSHED ROCK

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 03/24/2005 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced S-02		J. Tomasulo	03/05		
1200mm (48") DIAMETER PRECAST MANHOLE INSTALLATION				DRAWING NUMBER	SM-01




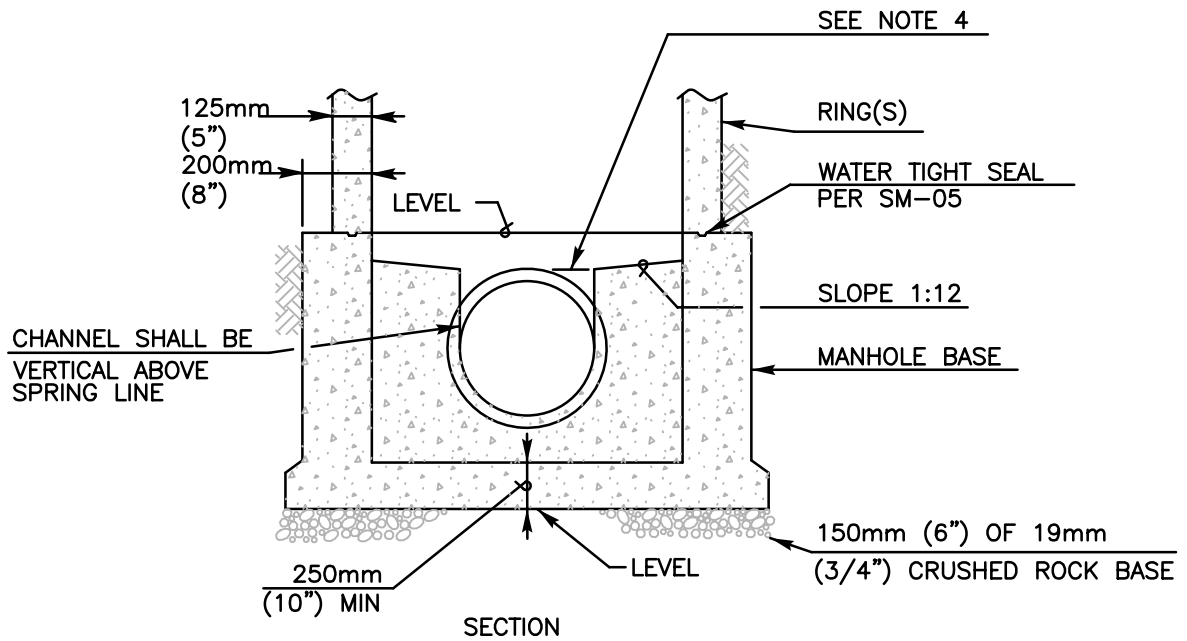
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE SEE SM-05 FOR ACCESS LOCATIONS
- 3) FOR MANHOLE BASES SEE SM-03
- 4) MANHOLES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED AND LINED PER SM-07
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	900mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS SEE S.D.R.S.D. M-3	⑤	WATER TIGHT JOINTS SEE SM-05
②	900mm (36") DIA GRADE RING(S) 150mm (6") TO 450mm (18") HIGH	⑥	SEWER MAIN
③	ECCENTRIC CONE SEE NOTE 2	⑦	MANHOLE PIPE CONNECTOR SEE SM-04
④	1500mm (60") DIA RING(S) VARIABLE HEIGHT	⑧	FIELD INSTALLED INVERT SEE SM-04
		⑨	CONCRETE BASE, PRECAST OR CAST IN PLACE
		⑩	150mm (6") OF 19mm (3/4") CRUSHED ROCK

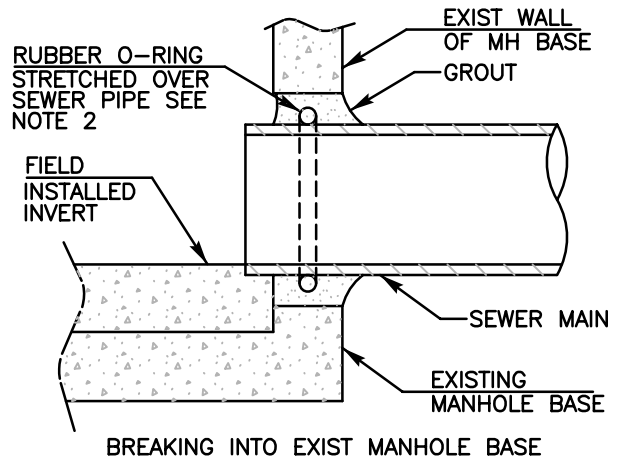
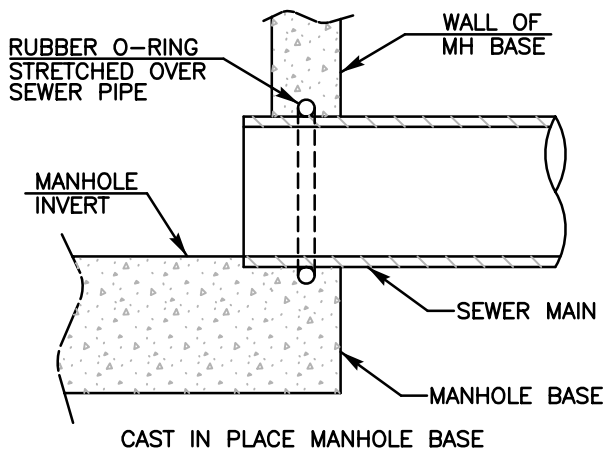
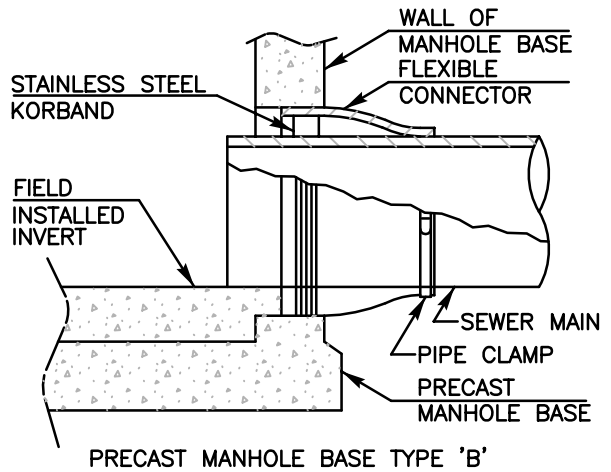
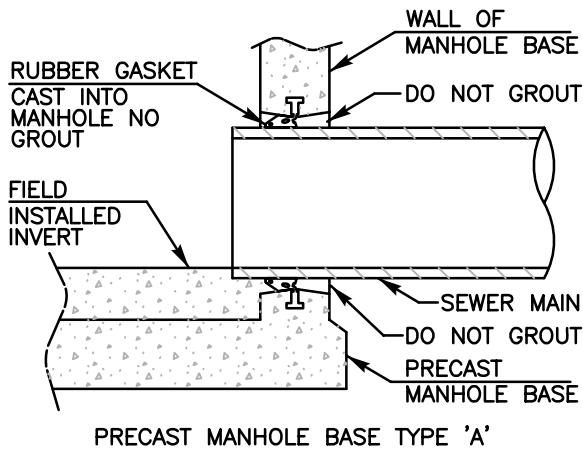
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced S-02		J. Tomasulo	03/05		
1500mm (60") DIAMETER PRECAST MANHOLE INSTALLATION				 03/24/2005 Chairperson R.C.E. 19246 Date	
				DRAWING NUMBER	SM-02



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) FOR MANHOLE INSTALLATIONS SEE SM-01 AND SM-02
- 3) MANHOLE BASES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED PER SM-07
- 4) LOWEST POINT ON SHELF SHALL BE EVEN WITH TOP OF PIPE
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

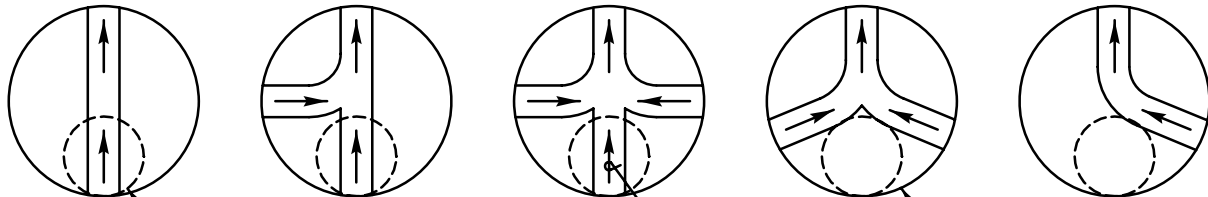
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		SEWER MANHOLE BASE
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date	
Replaced S-02		J. Tomasulo	03/05	DRAWING NUMBER	
				SM-03	



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) A RUBBER O-RING OR A FLEXIBLE CONNECTOR (AS SHOWN IN PRECAST MANHOLE BASE TYPE 'B') CAN BE USED WHEN BREAKING INTO EXISTING MANHOLE
- 3) FOR MANHOLES REQUIRING COATING AND LINING SEE SM-07
- 4) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		MANHOLE PIPE CONNECTORS
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date	
Replaced S-02		J. Tomasulo	03/05	DRAWING NUMBER	
				SM-04	

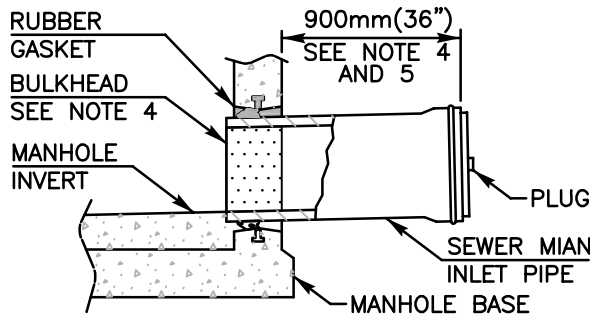


MANHOLE SHAFT
OPENING (TYP)
SEE NOTE 2

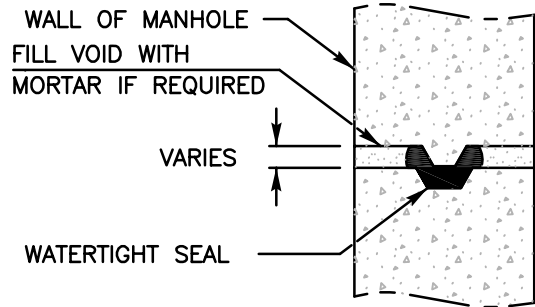
DIRECTION OF
FLOW (TYP)

MANHOLE (TYP)

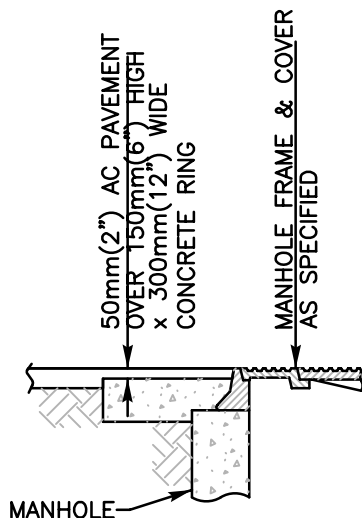
MANHOLE ACCESS LOCATION PLAN VIEW



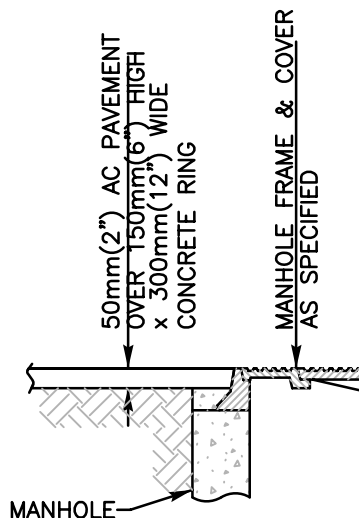
MANHOLE STUB OUT FOR FUTURE CONNECTION



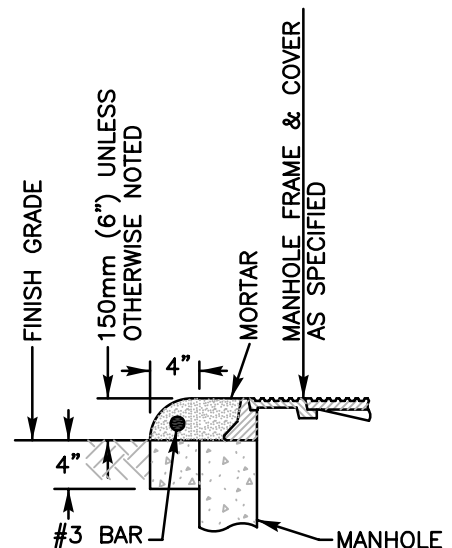
WATERTIGHT MANHOLE JOINT



PAVED AND
TRAVELED AREAS
TYPE A



PAVED AND
TRAVELED AREAS
TYPE B

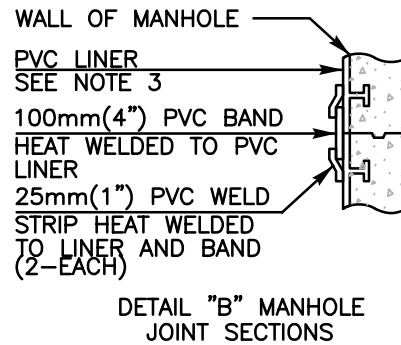
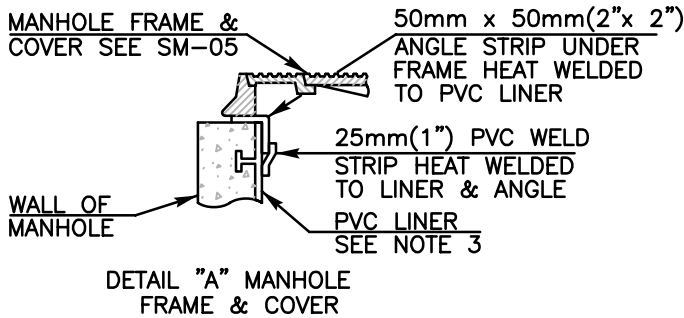
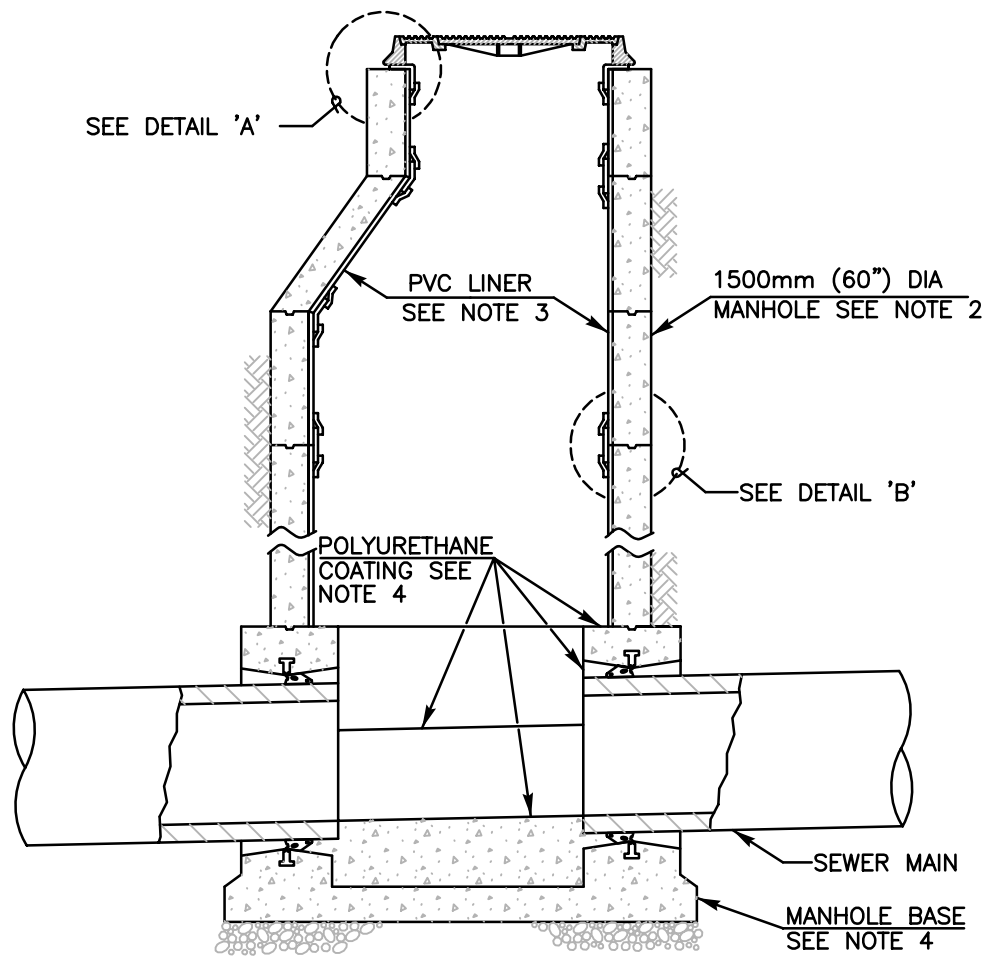


UNPAVED, UNTRAVELED,
SHOULDER AREAS, AREAS
IN EASEMENTS
TYPE C

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UP STREAM SIDE OF MANHOLE
- 3) FOR MANHOLES REQUIRING COATING AND LINING SEE SM-07
- 4) BULDHEADS SHALL BE INSTALLED AT THE MANHOLE END OF STUBS
- 5) SEWER MAIN TO BE LAID WITH BELLS UP-GRADE
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

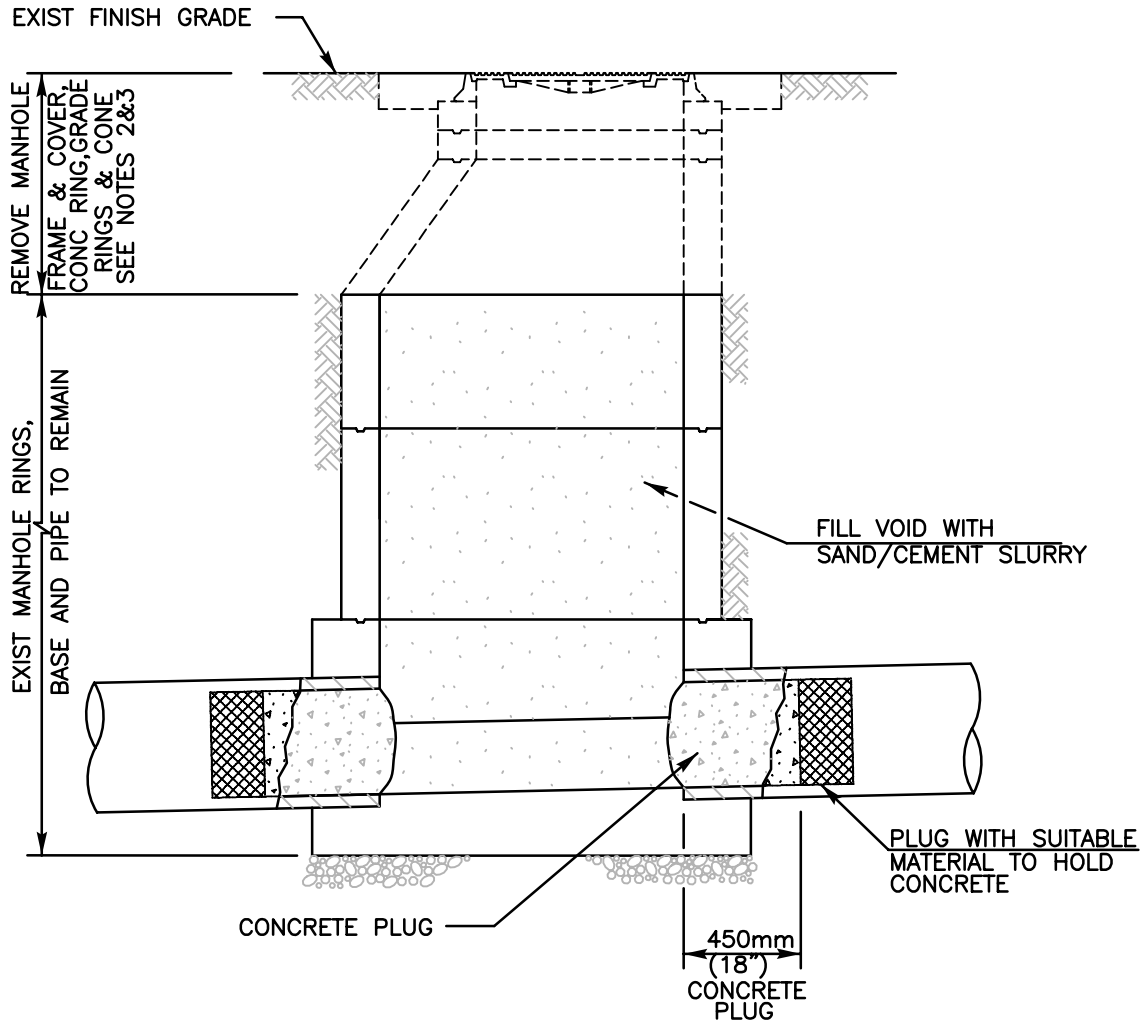
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		MANHOLE MISCELLANEOUS DETAILS	<i>J. Stanton</i> 03/24/2005
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
Replaced S-02		J. Tomasulo	03/05			DRAWING NUMBER
						SM-05



NOTES:

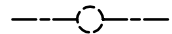
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) MANHOLES FOR SEWER MAINS 450mm(18") AND LARGER SHALL BE COATED AND LINED
- 3) MANHOLE SHAFT AND CONE SECTIONS, AND GRADE RINGS SHALL HAVE A PVC LINER PLACED WITH T-SHAPED SUPPORTS INTEGRALLY CAST INTO THE CONCRETE
- 4) ELASTOMERIC POLYURETHANE COATING SHALL BE APPLIED TO THE INTERIOR OF MANHOLE BASES
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	MANHOLE COATING AND LINING SYSTEM	03/24/2005 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03		
Replaced S-02		J. Tomasulo	03/05		
				DRAWING NUMBER	SM-07



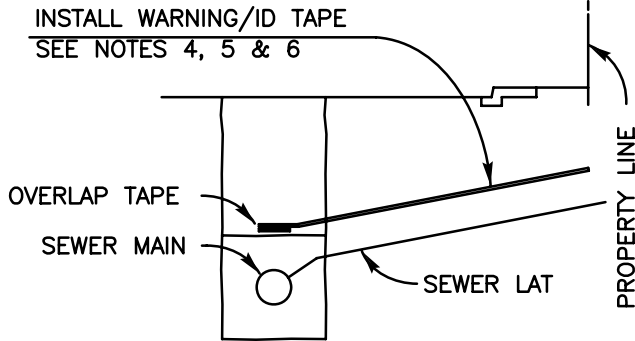
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) ALL SALVAGED MATERIAL BECOMES PROPERTY OF AGENCY OF JURISDICTION
- 3) BACKFILL PER AGENCY'S REQUIREMENT
- 4) FOR CUTTING & PLUGGING ABANDONED SEWER MAINS SEE WP-03

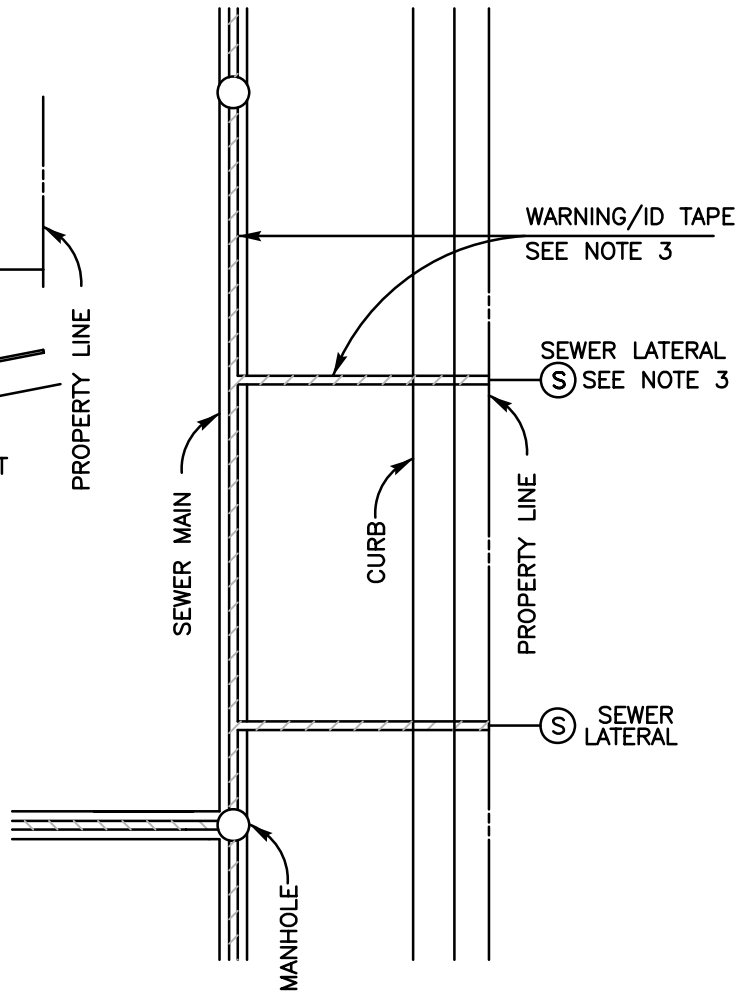


LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		EXISTING MANHOLE ABANDONMENT
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date	
Replaced S-02		J. Tomasulo	03/05	DRAWING NUMBER	
				SM-08	



SECTION AT SEWER LATERALS



PLAN

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) WARNING/IDENTIFICATION TAPE SHALL BE INSTALLED AS SPECIFIED BY AGENCY
- 3) STAMP OR CHISEL A 50mm (2") HIGH 'S' IN CURB FACE TO IDENTIFY SEWER LATERAL LOCATION
- 4) FOR SEWER LATERALS EXTEND TAPE TO PROPERTY LINE
- 5) DEPTH OF WARNING/IDENTIFICATION TAPE AS SPECIFIED BY AGENCY
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-19		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

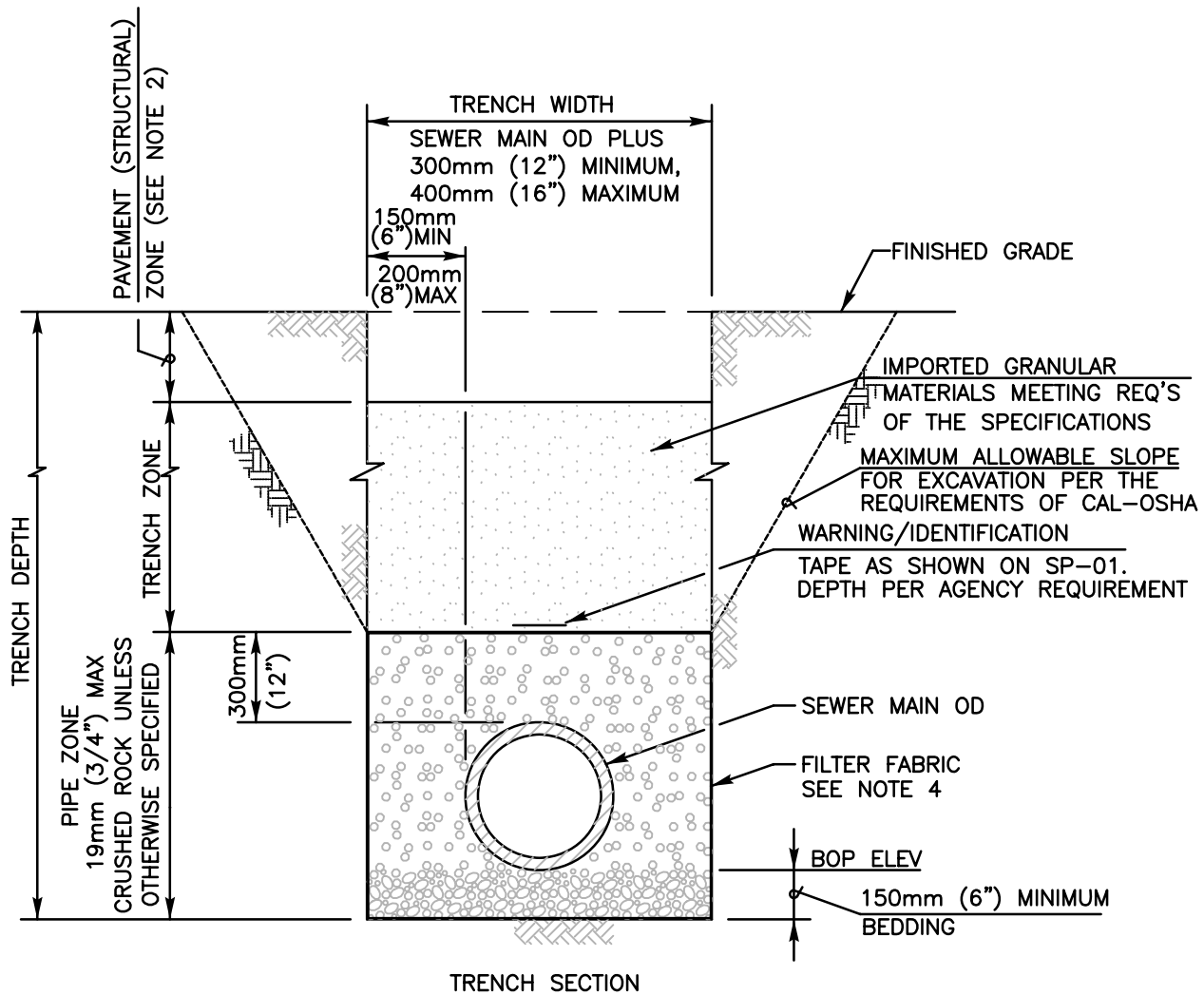
WARNING/IDENTIFICATION
TAPE INSTALLATION

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 03/24/2005

Chairperson R.C.E. 19246 Date

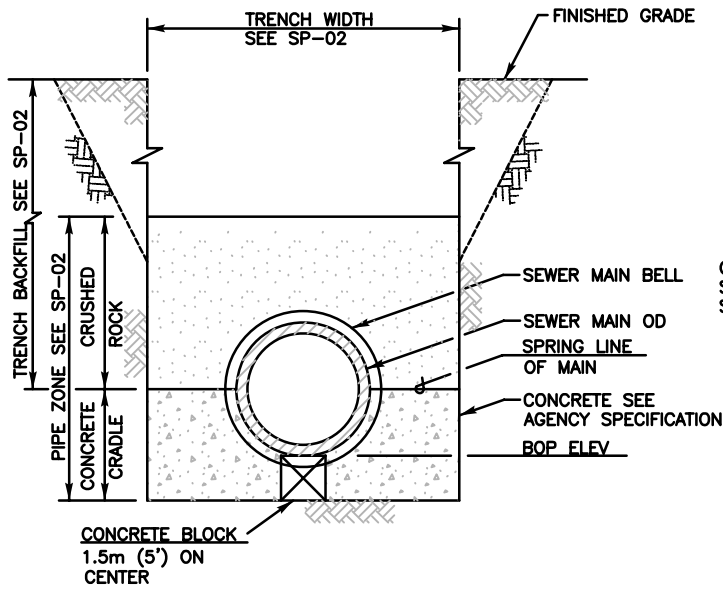
DRAWING
NUMBER SP-01



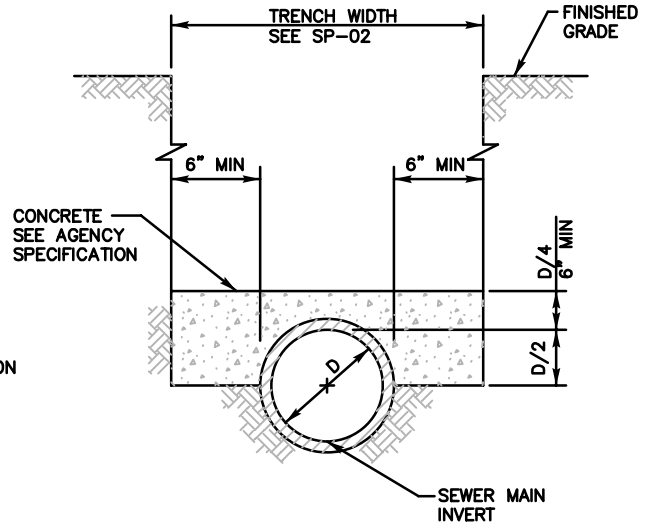
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR TRENCHING, BACKFILLING AND COMPACTING WHERE APPLICABLE
- 2) PAVING OR PAVEMENT REPAIR TO BE DONE IN ACCORDANCE WITH AGENCY OF JURISDICTION
- 3) EXCAVATE BELL HOLES AT EACH JOINT TO PERMIT PROPER ASSEMBLY AND INSPECTION OF THE ENTIRE JOINT
- 4) FILTER FABRIC AS REQUIRED BY AGENCY OF JURISDICTION (WITH A MINIMUM 12" OVERLAP).

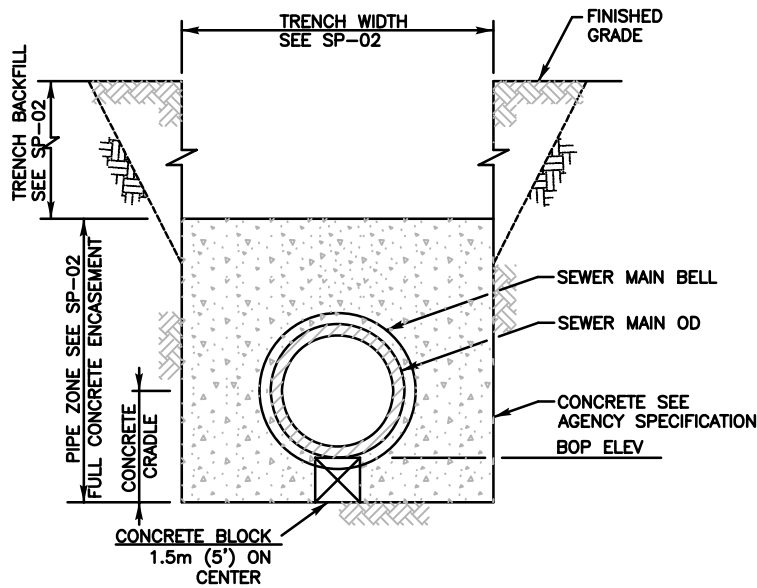
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		PIPE BEDDING AND TRENCH BACKFILL FOR SEWER FACILITIES
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date	
Replaced S-04		J. Tomasulo	03/05	DRAWING NUMBER	
				SP-02	



TRENCH SECTION
CONCRETE PIPE CRADLE



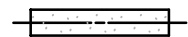
TRENCH SECTION
CONCRETE PROTECTION



TRENCH SECTION
CONCRETE PIPE ENCASEMENT

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR TRENCHING, BACKFILLING AND COMPACTING WHERE APPLICABLE
- 2) CONCRETE CRADLE SHALL BE USED WHEN THE TRENCH WIDTH AT THE UPPER LIMIT OF THE PIPE ZONE EXCEEDS THE MAX WIDTH SPECIFIED ON SP-02 AND OR DIRECTED BY AGENCY'S ENGINEER
- 3) FOR PIPE BEDDING AND TRENCH BACKFILL SEE SP-02



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-06		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

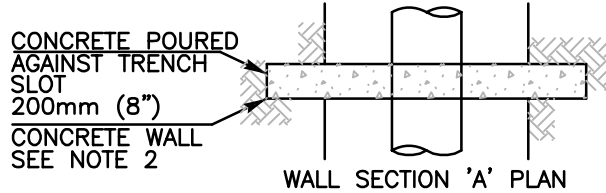
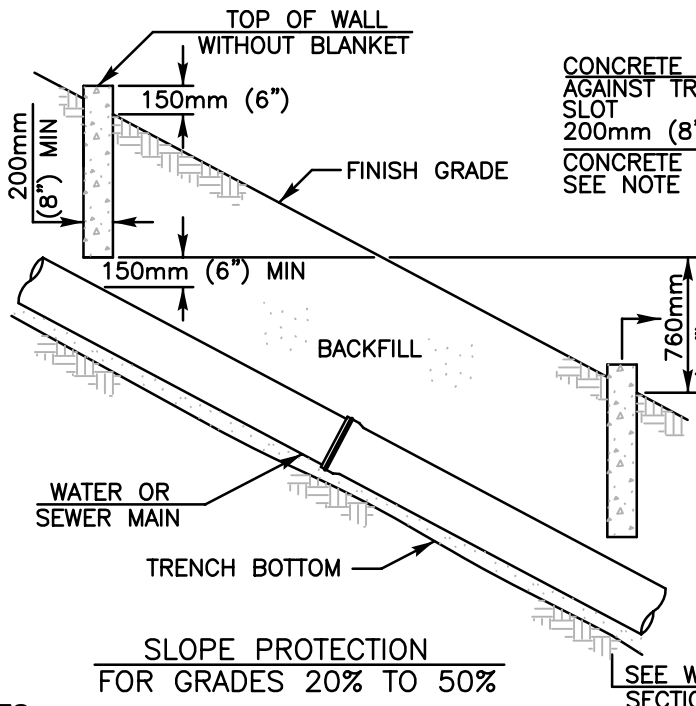
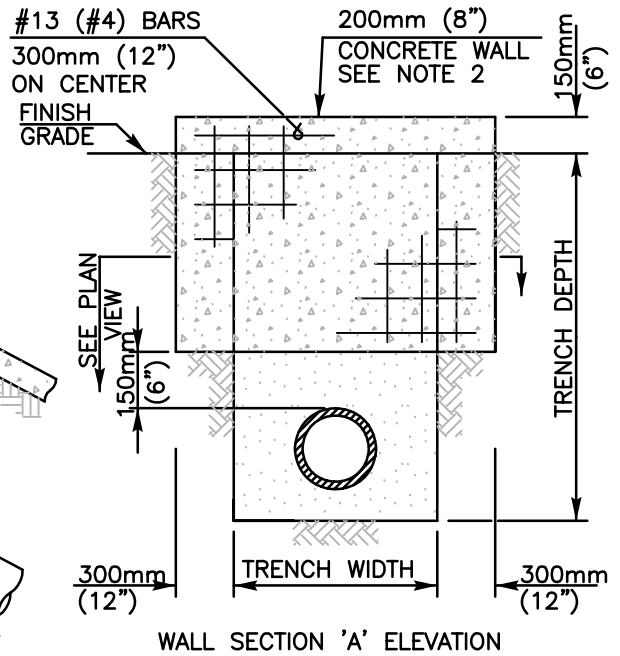
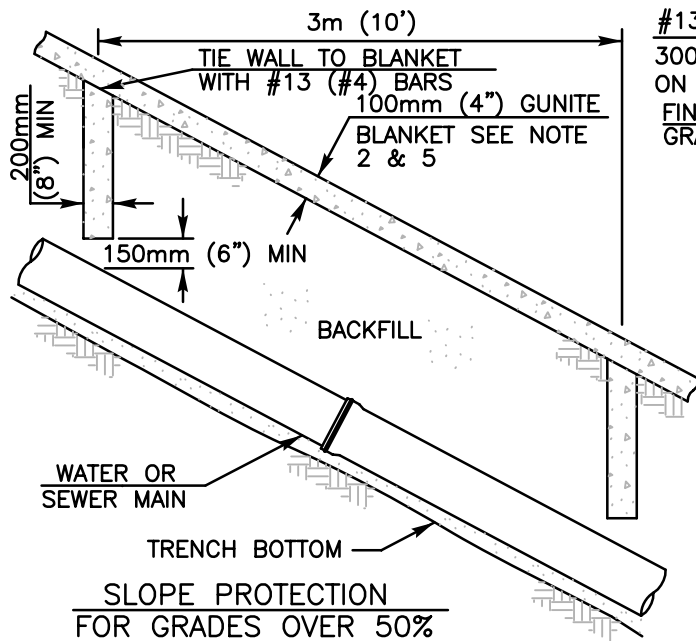
CONCRETE PROTECTION FOR
SEWER PIPE

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 03/24/2005

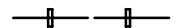
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SP-03**



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
- 3) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
- 4) FOR GRADES OVER 50%, SLOPE PROTECTION SHALL ALSO INCLUDE AC PAVING, CONCRETE SLAB OR GUNITITE BLANKET PLACED OVER THE PIPELINE ALIGNMENT
- 5) 100mm (4") GUNITITE BLANKET WITH 150mm (6") SQUARE x 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

SLOPE PROTECTION INSTALLATIONS

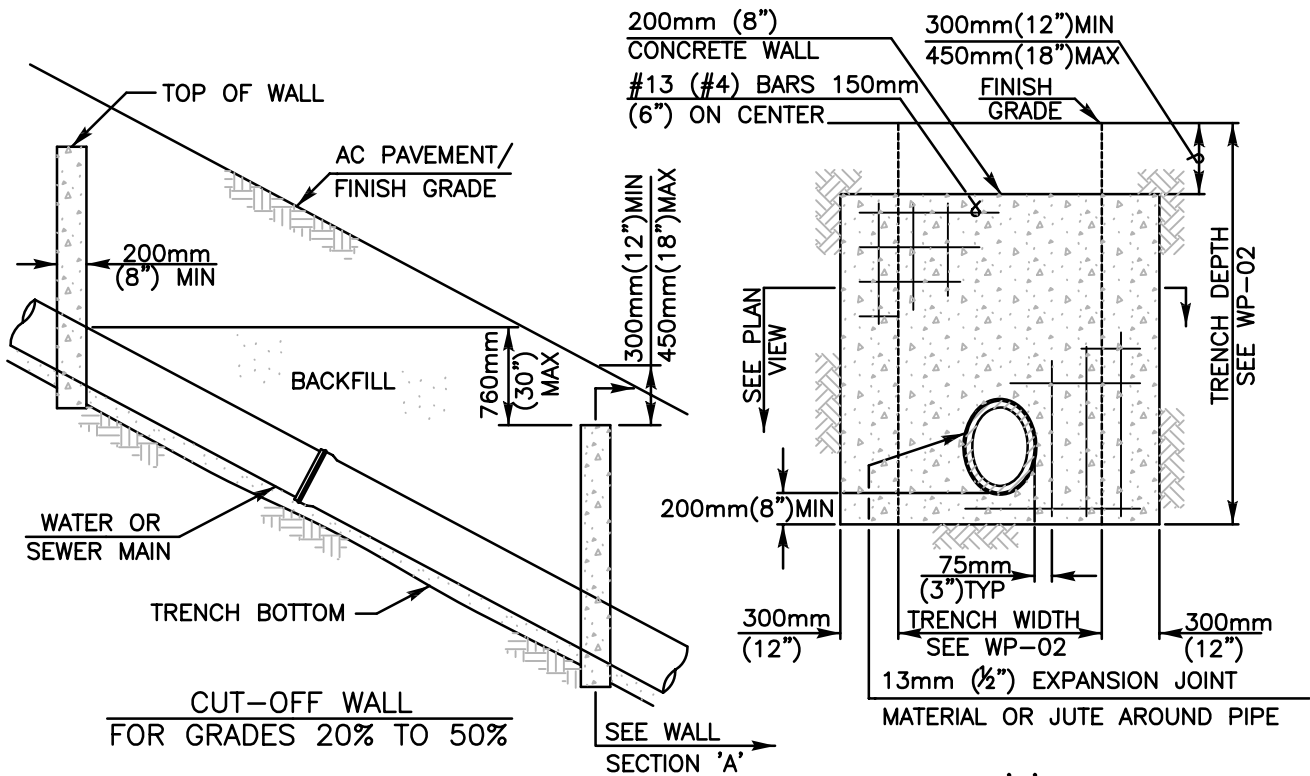
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 03/24/2005

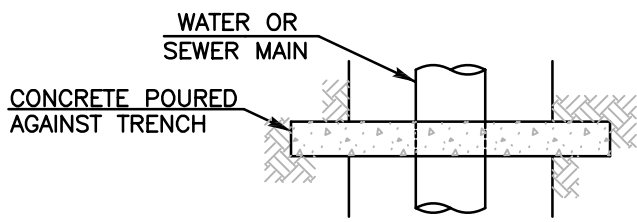
Chairperson R.C.E. 19246 Date

DRAWING NUMBER

SP-05



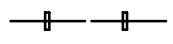
WALL SECTION 'A' ELEVATION



WALL SECTION 'A' PLAN

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) FOR USE AS TRENCH BACKFILL STABILIZATION IN TRAVELED AREAS
- 3) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
- 4) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
- 5) FOR GRADES OVER 50% SEE WP-05/SP-05



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

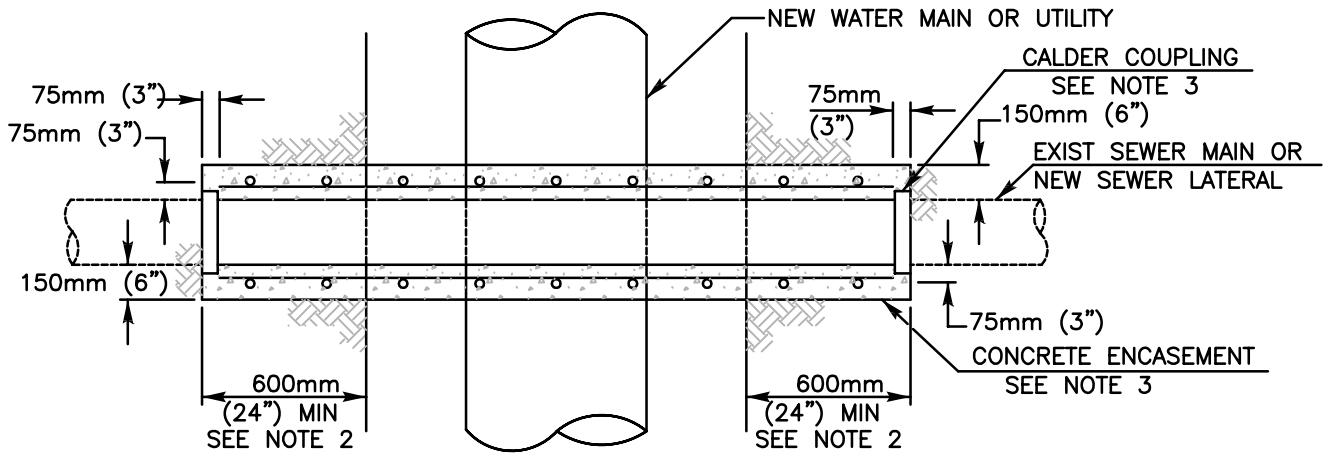
CUT-OFF WALL INSTALLATION IN TRAVELED AREAS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

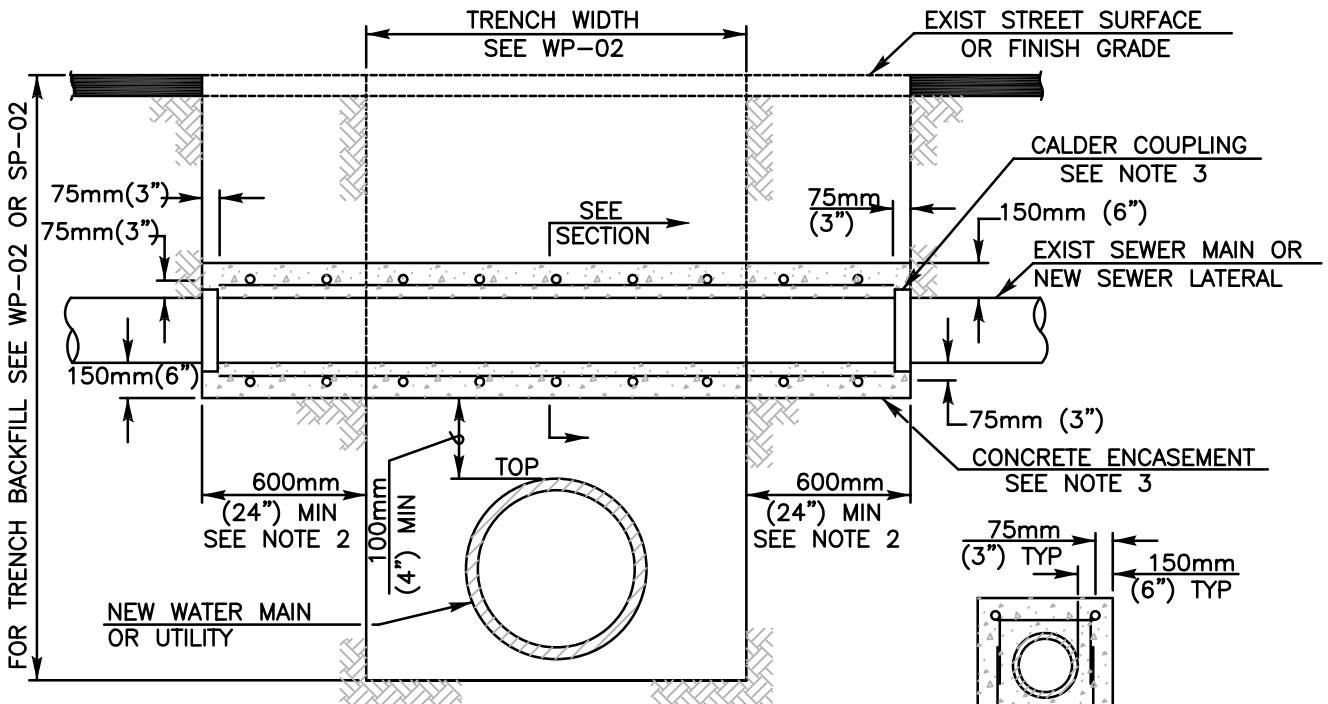
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Chairperson R.C.E. 19246 Date

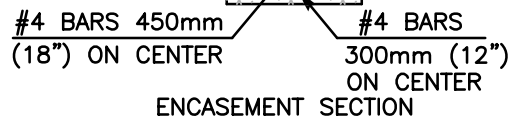
DRAWING NUMBER **SP-07**



PLAN



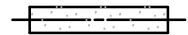
ELEVATION



ENCASEMENT SECTION

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR PROTECTION OF EXISTING FACILITIES
- 2) ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND BOTH SIDES OF TRENCH [600mm (24") MIN 1200mm (48") MAX OF SUITABLE NATIVE SUPPORT BEYOND EDGE OF TRENCH].
- 3) CONCRETE ENCASMEMENT REQUIRED FOR SEWER MAINS ONLY. CALDER COUPLINGS REQUIRED FOR SEWER LATERALS ONLY. SEWER LATERALS TO BE REPLACED WITH SCH. 80 PVC WITH NO INTERMEDIATE JOINTS.
- 4) FOR PIPE BEDDING AND TRENCH BACKFILL SEE WP-02 OR SP-02.



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

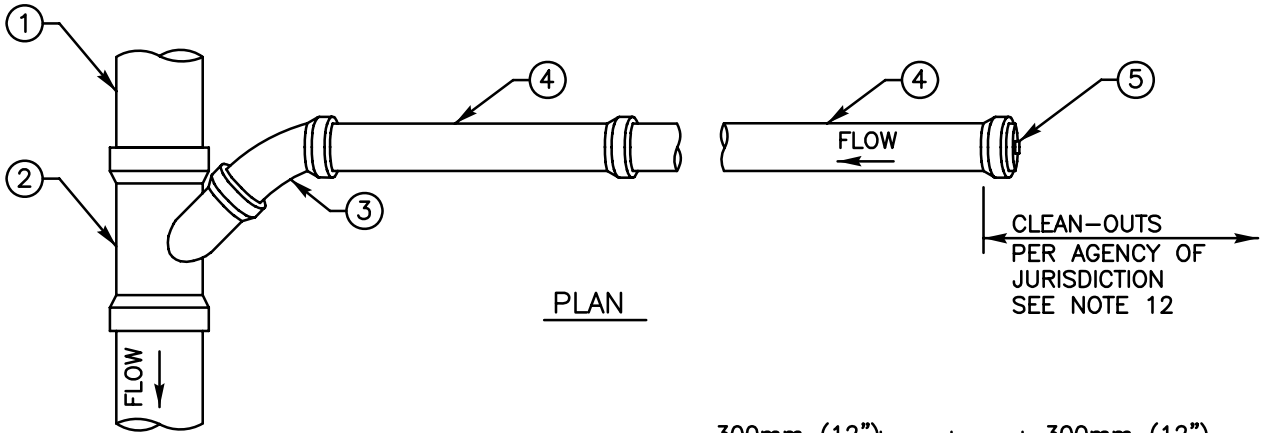
**PIPE SUPPORT FOR UNDERCUT
SEWER MAINS OR SEWER LATERALS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

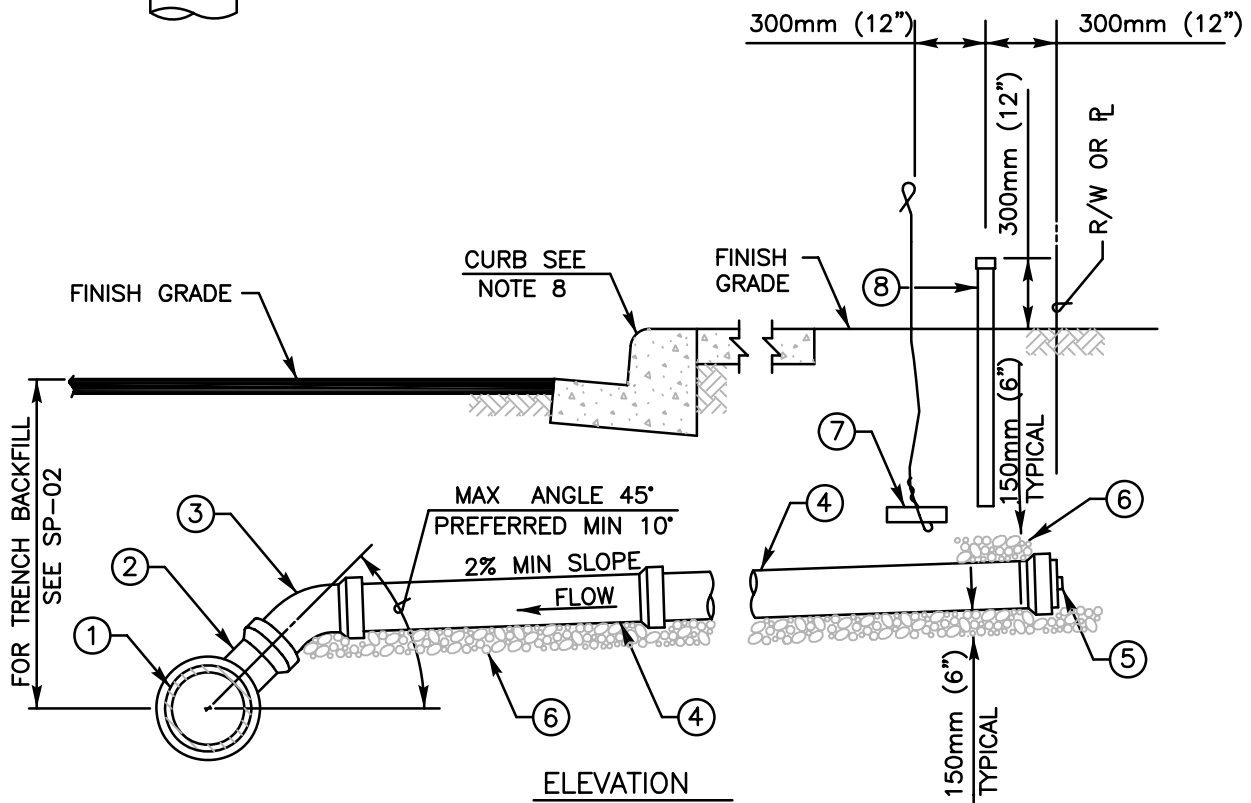
[Signature] 03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SP-09**



PLAN



ELEVATION

(INDICATE SIZE)
 (S) ————
 LEGEND ON PLANS

FOR SEWER LATERAL NOTES SEE DETAIL SS-03

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	SEWER MAIN	⑤	PLUG OR CAP
②	45° WYE	⑥	19mm (3/4") MAXIMUM CRUSHED ROCK
③	45° ELBOW	⑦	#9 WIRE ATTACHED TO A BRICK
④	PIPE LATERAL SEE NOTE 3 & 5	⑧	100mm (4") PVC PIPE WITH GLUED CAP

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-13		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

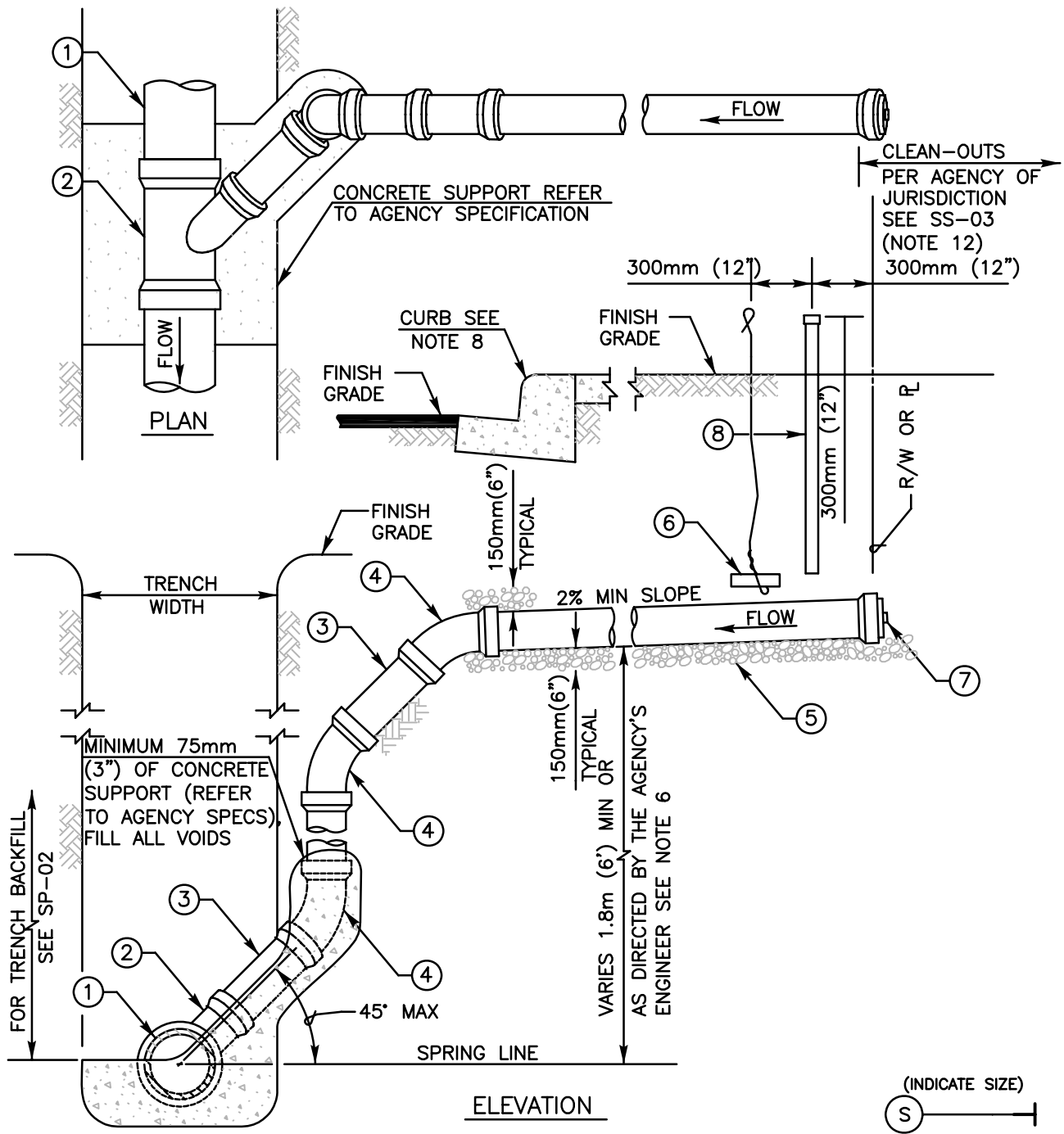
**100mm (4") AND 150mm (6")
SEWER LATERAL INSTALLATION**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SS-01**



FOR SEWER LATERAL NOTES SEE DETAIL SS-03

(INDICATE SIZE)
 S ————
 LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	SEWER MAIN	⑤	19mm (3/4") MAXIMUM CRUSHED ROCK
②	45° WYE	⑥	#9 WIRE ATTACHED TO A BRICK
③	PIPE	⑦	PLUG OR CAP
④	45° ELBOW	⑧	100mm (4") PVC PIPE WITH GLUED CAP

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-13		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

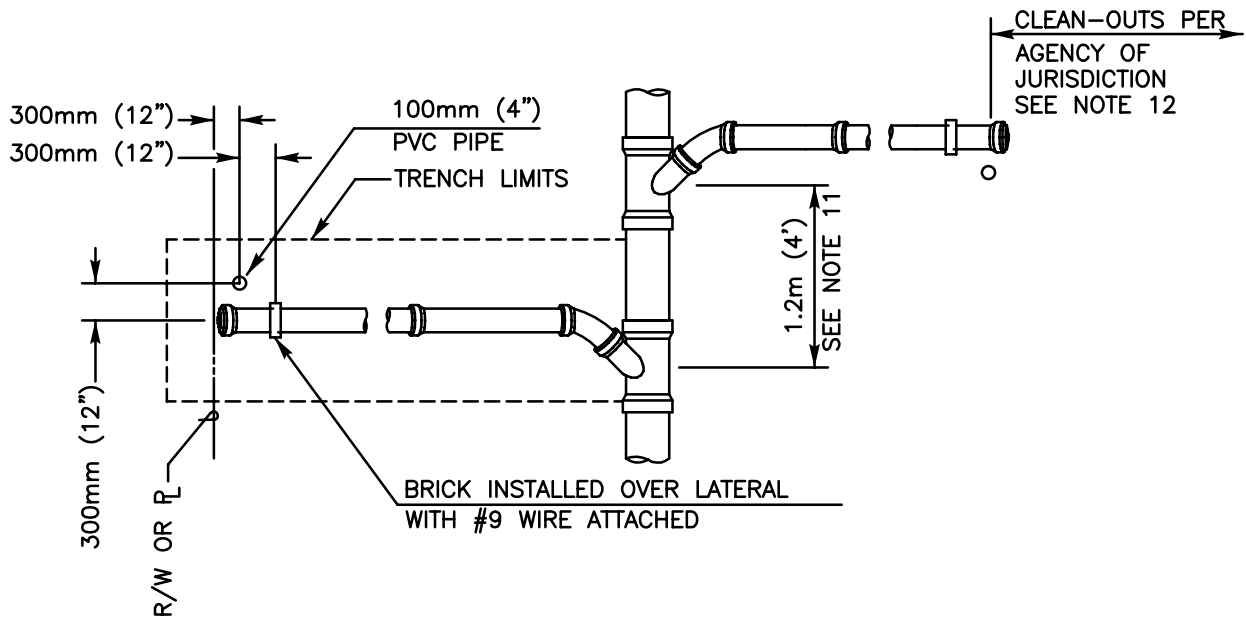
**100mm (4") AND 150mm (6")
 DEEP-CUT SEWER LATERAL INSTALLATION**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 03/24/2005

Chairperson R.C.E. 19246 Date

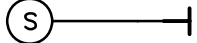
DRAWING NUMBER **SS-02**

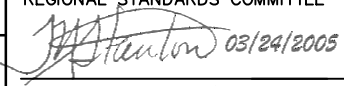


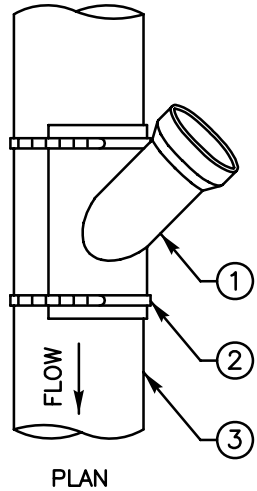
SEWER LATERAL DETAIL
SEE NOTE 10 BELOW

NOTES:

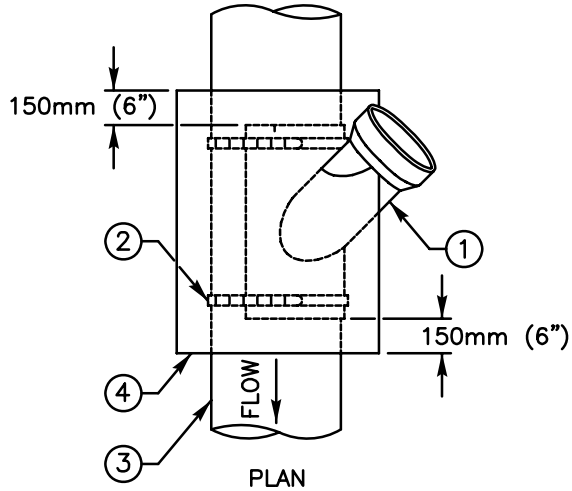
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) IN NO CASE SHALL LATERAL CONNECT DIRECTLY ON TOP OF SEWER MAIN
- 3) LATERAL SHALL BE INSTALLED TO PROPERTY LINE UNLESS SPECIFIED ON PLANS
- 4) MINIMUM 1.2m (4') COVER ABOVE LATERAL AT PROPERTY LINE
- 5) LATERAL TO HAVE A MINIMUM SLOPE OF 2%
- 6) VERTICAL PIPE SHALL BE BRACED WHILE BACKFILLING TRENCH
- 7) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON SP-01
- 8) STAMP OR CHISEL A 50mm (2") HIGH "S" IN CURB FACE OVER LATERAL TO IDENTIFY SEWER LATERAL LOCATION
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST
- 10) FOR SEWER LATERAL INSTALLATIONS SEE SS-01 AND SS-02
- 11) FOR SEWERS SPECIFIED AS PVC PIPE, A MINIMUM 0.9m (3') SECTION OF PIPE IS REQUIRED BETWEEN FITTINGS
- 12) SEWER CLEAN-OUT SEE SC-01 TYPE B AS REQUIRED BY AGENCY OF JURISDICTION

(INDICATE SIZE)

 LEGEND ON PLANS

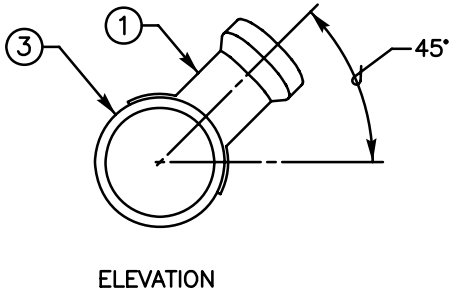
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		SEWER LATERAL NOTES AND DETAIL	 03/24/2005
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
Replaced S-13		J. Tomasulo	03/05			DRAWING NUMBER SS-03



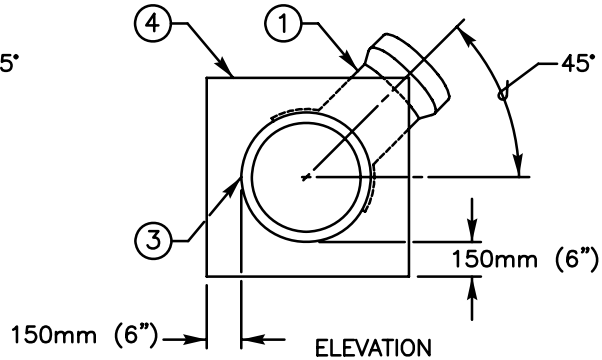
PLAN



PLAN



ELEVATION



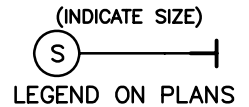
ELEVATION

CUT IN WYE CONNECTION
TYPE A

CUT IN WYE CONNECTION
TYPE B

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) CONNECTIONS TO EXISTING SEWER MAINS TO BE MADE BY AGENCY PERSONNEL IN ACCORDANCE WITH SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS
- 3) IN NO CASE SHALL CONNECTION BE MADE DIRECTLY ON TOP OF SEWER MAIN
- 4) NO MORE THAN ONE CUT IN WYE WILL BE ALLOWED FOR EACH LENGTH OF EXISTING VCP SEWER MAIN
- 5) FOR SEWER LATERAL INSTALLATION SEE SS-01 AND SS-02
- 6) FOR TRENCH BACKFILL SEE SP-02
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	45° SADDLE WYE WITH GASKET	③	EXISTING SEWER MAIN
②	STAINLESS STEEL HOSE CLAMPS (2-EACH)	④	CONCRETE ENCASEMENT

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	100mm (4") AND 150mm (6") SEWER CUT-IN WYE CONNECTIONS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75			<i>R. Stanton</i> 03/24/2005
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
Replaced S-13		J. Tomasulo	03/05			DRAWING NUMBER SS-04



City of National City
Sewer System Management Plan, Volume II
Draft Report
April 2009

Appendix H

City of National City
Ordinance No. 92-2033



CITY OF NATIONAL CITY, CALIFORNIA
COUNCIL POLICY

STANDARDS FOR PUBLIC RIGHTS-OF-WAY
AND PUBLIC IMPROVEMENTS
INSTALLED THEREON
IN ADDITION TO THE
ADOPTED
EDITION OF THE SAN DIEGO AREA
REGIONAL STANDARD DRAWINGS AND
THE REGIONAL SUPPLEMENTAL AMENDMENTS

ORDINANCE NO. 92-2033

DATE JUNE 16, 1992

- 3.6.11. Inlets shall not normally be placed within pedestrian crosswalks.
- 3.6.12. Grates will not be considered in calculations as capable of receiving any flow of water since they are easily clogged with debris.
- 3.6.13. Grates shall be capable of being safely crossed by bicycles.
- 3.6.14. Permanent access shall be provided for maintenance of all public drainage facilities.
- 3.6.15. Where public storm drains outlets across private property or open space drainage facilities shall be designated to meet structural and hydraulic requirements of the City Engineer. Minimum freeboard of 6" to be maintained.
- 3.7 Sewer
- 3.7.1. Sewer mains installed in the public right-of-way are to be designed to service not only the abutting properties, but also to the maximum practicable extent, areas beyond the immediately adjacent area. Engineering plans for all sewer mains shall be submitted to the City Engineer for his approval. Such plans shall include data on the capacity, grades and depths of all proposed sewer mains.
- 3.7.2. The minimum size main is 8 inches inside diameter in residential and commercial areas and 10 inches inside diameter in industrial areas.
- 3.7.3. Sanitary sewers and laterals within the public rights-of-way shall be constructed of extra strength vitrified clay pipe or PVC. The use of PVC pipe would not be allowed in locations where it is subject to underground water table.
- 3.7.4. Grades shall be determined by using design flow and velocities with the exception that minimum grade for 8" sewer shall not be less than 0.4%.
- 3.7.5. Sewer construction on grades of 20% or more, in newly compacted fill, shall use concrete anchors per Regional Standard Drawing No. S-9

at intervals of not more than 40 feet between anchors. Backfill shall be rounded over trench.

3.7.6. Sewer constructed on grades of 20% or more, under conditions other than above, shall use cutoff walls per Regional Standard Drawing No. S-10, at intervals of not more than 40 feet between cutoff walls.

SP-07

3.7.7. Grades above 65% shall use cast iron pipe, Class 150, without bedding.

3.7.8. Portions of sewer systems which serve the equivalent of less than 10 residential lots shall be constructed at a minimum grade of 2% if vitrified clay pipe is used. When PVC is used the minimum grade shall be 1%.

3.7.9. Cradle/Encasement Requirements - Depth (to top of pipe)

3.7.9.1. Vitrified Clay Pipe

a. 0' - 3': Concrete encasement - Regional Standard Drawing No. S-7.

b. 3' - 14': Normal installation (extra strength pipe).

c. 14' - 21': Concrete cradle - Standard Drawing No. S-6.

d. Over 21': Concrete encasement per S-7.

3.7.9.2. PVC - per Manufacturer's recommendation for long term deflections not to exceed 5%.

NOTE: Depth of cover is measured from the top of pipe to finish grade.

3.7.10 Manholes:

3.7.10.1. Regional Standard Drawing No. S-2.

3.7.10.2. Maximum distance between manholes = 400 feet.

3.7.10.3. Maximum distance from manhole to

plug on grades not exceeding 7% = 200 feet.

3.7.10.4 Manhole shall be provided as determined by the City Engineer.

3.7.10.5. In a cul-de-sac, all sewers shall terminate in a manhole.

3.7.11 Sewer Locations:

3.7.11.1 Sewer trunks and mains will normally be located on the centerline of streets unless otherwise approved by the City Engineer.

3.7.11.2. Sewer which may be extended in the future shall be constructed to the boundary of the land being developed, or to the end of permanent improvements as determined by the City Engineer.

3.7.11.3. Sewer and water lines paralleling each other shall be separated by a minimum of 10 feet.

3.7.11.4. Sewer crossing water lines shall cross under the water line.

3.7.12 Cleanouts shall be provided at a maximum of 100 foot intervals for sewer laterals.

3.7.13 Sewer constructed along curved alignments:

3.7.13.1 Horizontal Alignment:

3.7.13.1.1. Curves of radii exceeding 200 feet may be formed by the deflection of each joints or by use of specially beveled pipe.

3.7.13.1.2. Curves of radii equal to 200 feet or less will use two foot length pipe for every other length when using joint deflections.

3.7.13.1.3. Short radius may be

formed by the use of short pipe with deflected joints, beveled pipe, or a combination of both.

3.7.13.2. Vertical Culvilinear Alignment. Although straight grades are preferred between manholes, vertical curves using criteria given for horizontal alignment above may be used upon approval by the City Engineer.

3.7.14 Sewer Laterals

3.7.14.1 Shall be in accordance with Regional Standard Drawing Nos. S-13 and S-14.

3.7.14.2 Minimum grade for sewer laterals = 2% unless otherwise approved by City Engineer.

3.7.14.3 Joint sewer laterals are not allowed. One separate sewer lateral per each residential unit.

3.8 Other Utilities

3.8.1. All utilities in public rights-of-way are to conform to the requirements of the operating companies. Underground conduits and appurtenances installed under private contract for later conveyance and use by a public utility company are subject to the approval of the City Engineer in the same manner as other public improvements.

3.8.2 All utility distribution and service facilities in newly developing areas are to be placed underground and efforts are to be made during the redevelopment of older areas to underground any existing overhead facilities.

3.8.3. Trench backfilling and resurfacing shall be in conformance with the National City Standard Drawing No. 113-S-B and 120 S-B.

3.8.4. Street Lights

3.8.4.1. The number and location of street lights



City of National City
Sewer System Management Plan, Volume II
Draft Report
April 2009

Appendix I

City of National City

Sewer Notes

SEWER NOTES

1. THE SEWER SYSTEM SHOWN ON THESE PLANS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY OF NATIONAL CITY.
2. SEWER LATERALS SHALL BE SPACED SO THERE IS ONLY ONE CONNECTION IN ANY ONE PIPE LENGTH.
3. OPEN ENDS OF ALL SEWER MAINS AND LATERALS SHALL BE PROVIDED WITH PVC CLEANOUTS, AND "S-2" MANHOLES. THE CLEANOUTS SHALL BE PROVIDED TWO FEET IN FROM THE PROPERTY LINE.
4. A METALLIC IDENTIFICATION TAPE SHALL BE INSTALLED ABOVE THE SEWER LATERAL BETWEEN THE SUBGRADE AND THE STRUCTURAL SECTION OF THE SURFACE IMPROVEMENTS FROM THE SEWER MAIN TO THE CLEANOUT 12" TO 14" BELOW FINISH GRADE.
5. WHERE LATERALS AND MAINS RUN UNDER DRIVEWAYS, PARKING AREAS, STREETS OR OTHER TRAFFICED AREAS WITH A DEPTH OF LESS THEN THREE FEET OF COVER TO TOP OF PIPE THEY SHALL BE CONCRETE ENCASED PER SDRSD S-7.
6. SEWER LATER "AS BUILT" LOCATIONS SHALL BE SHOWN ON THESE PLANS.
7. ALL SEWER MAIN AND LATERALS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT NATIONAL CITY SEWER AND STREET STANDARDS AND SAID STANDARDS SHALL GOVERN ALL SEWER TRENCH BACKFILL AND RESURFACING.
8. A SEWER LATERAL CURB MARK "\$" SHALL BE INSTALLED OR REINSTALLED WHENEVER CURBS WITH SEWER LATERAL CURB MARKS ARE RECONSTRUCTED, OR WHENEVER A SEWER LATERAL IS REPLACED OR INSTALLEED. THE INTERSECTING SLASH ON THE "S" MARK SHALL SHOW THE ALIGNMENT OF THE SEWER LATERAL TO THE SEWER MAIN.
9. THE NATIONAL CITY PUBLICS WORK DEPARTMENT SHALLBE NOTIFIED FOR ANY REQUIRED WET TAP CONNECTION AND INSPECTION. CONTRACTOR SHALL PERFORM THE TRENCHING, SHORING, AND INSTALLATION OF TRAFFIC CONTROL DEVICES, INCUDING INSTALLATION OF THE SEWER LATERAL(S).
10. INSTALLATION OF 8" MAIN AS INDICATED ON THE PROJECT PLANS, AND COMPLETE RESTORATION OF THE SITE TO THE CONDITIONS EXISTING PRIOR TO THE WORK SHALL COMPY WITH SECTION 306 OF THE STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION (THE "GREENBOOK").

11. **PIPE AND JOINT MATERIALS** SEWER MAIN PIPE AND SEWER SERVICE LATERALS SHALL BE VITRIFIED CLAY EXTRA STRENGTH (VCES) AND/OR P.V.C. S.D.R. 35. APPROVED P.V.C. JOINT MATERIAL SHALL BE NEOPRENE, POLYURETHANE OR SYNTHETIC RUBBER WITH EQUAL OR GREATER RESISTANCE TO SOLVENCY, CHEMICAL OR BIOLOGICAL ATTACK. APPROVED VCES MATERIALS ARE: TYPE "G" JOINT FOR SOCKET AND SPIGOT PIPE AND TYPE "D" JOINT PLAIN-END PIPE. THE CIRCULAR SLEEVE OF THE TYPE "D" JOINT SHALL BE NEOPRENE, POLYURETHANE OR SYNTHETIC RUBBER.
12. **SEWAGE FLOW CONTROL** WHERE WORK IS TO BE PERFORMED ON AN EXISTING SEWER MAIN, SEWER SERVICE SHALL BE MAINTAINED TO ALL PROPERTIES OR OTHER ARRANGEMENTS SHALL BE MADE WITH THE APPROVAL OF THE CITY ENGINEER.
13. **BEDDING, BACKFILL AND TRENCH RESURFACING** BEDDING, BACKFILL AND TRENCH RESURFACING SHALL COMPLY WITH THE STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION (THE "GREENBOOK"), AND CITY OF NATIONAL CITY STANDARD DRAWING 113-S-B, OR AS INDICATED ON THE PROJECT PLANS. ONLY LIGHT TAMPING EQUIPMENT SHALL BE USED WITHIN THREE FEET OF ANY PIPES OR UNDERGROUND APPURTENANCES.
14. CONTRACTOR TO PERFORM FIELD INVESTIGATION AND T.V. TESTING TO LOCATE ANY EXISTING LATERALS ON THE SEWER MAIN(S) TO BE ABANDONED, OTHER THAN THOSE SHOWN ON THE SEWER PLAN. IF SUCH OTHER LATERALS ARE FOUND, THEY SHALL BE PROPERLY TIED INTO SEWER.
15. EACH PROPERTY SHALL HAVE A SEPARATE LATERAL. WHERE MORE THAN ONE BUILDING IS TO BE CONSTRUCTED ON THE SAME LOT IF THE LOT IS A DIVISIBLE LOT A SEPARATE LATERAL FOR EACH BUILDING SHALL BE INSTALLED. THE MINIMUM SIZE FOR ALL NEW LATERALS IS 6".
16. THE NEW SEWER MAIN SHALL BE VIDEO TAPED. TELEVISIONING THE SEWER MAIN SHALL FOLLOW THE REGIONAL SUPPLEMENT AMENDMENTS SECTION 306-1.4.8 PROVISIONS.

INSTALLATION OF SEWER MANHOLES

17. INSTALLATION OF THE MANHOLE BASE, PRE-CAST SECTIONS, FRAME AND COVER SHALL CONFORM TOM SECTION 306-6 OF THE "GREENBOOK" AND THE SAN DIEGO REGIONAL STANDARD DRAWING NO. S-2, AS MODIFIED HEREIN.

18. WHERE A MANHOLE IS TO BE CONSTRUCTED ON UNSTABLE NATIVE MATERIAL A STABLE BASE SHALL FIRST BE CONSTRUCTED WITH ADDITIONAL BEDDING MATERIAL, AS SPECIFIED IN SECTION 306-1.2.1 OF THE "GREENBOOK" TO THE DIMENSIONS SPECIFIED IN WRITING BY THE ENGINEER.
19. **EPOXY MORTAR** EPOXY MORTAR SHALL BE USED AT THE RISER JOINTS ON ALL MANHOLES TO CREATE WATERTIGHT JOINT TO RESIST INFILTRATION.
20. THE MORTAR SHALL BE MIXED IN ACCORDANCE TO THE MANUFACTURERS SPECIFICATIONS BUT SHALL NOT EXCEED FIVE (5) PARTS SAND AND ONE (1) PART EPOXY.
21. 490 EPOXY PUTTY OR 498 UNDERWATER EPOXY PUTTY, MANUFACTURED BY ENGARD COATINGS OF HUNTINGTON BEACH, CA., OR SIKADUR 31 HI-MOD GEL OR SIKADUR 32 HI-MOD MANUFACTURED BY SIKA CORPORATION, LOS ANGELES, CA., OR APPROVED EQUAL, ARE ACCEPTABLE EPOXIES.
22. THE CONCRETE OR OTHER SURFACES THAT ARE TO ADHERE TO THE EPOXY MORTAR ARE TO BE FREE FROM DUST, LOOSE AGGREGATE, OIL, GREASE OR OTHER CONTAMINANTS.
23. **P.V.C. LINER** ALL MANHOLES SHALL BE PROTECTED BY AN APPROVED LINING AND COATING TO PREVENT DETERIORATION OF THE INTERIOR CONCRETE SURFACE BY CORROSIVE SEWER GASES.
24. NEW PRE-CAST MANHOLE RISERS SHALL BE LINED WITH WHITE POLYVINYL CHLORIDE SHEETS MEETING THE REQUIREMENTS OF SECTION 210-2 OF THE "GREENBOOK". RISER JOINTS SHALL BE WITH JOINT STRIPS OF THE SAME MATERIAL AS THE LINER, REFER TO SECTION 210-2.4.3 OF THE "GREENBOOK" FOR MATERIAL SIZES. LINERS SHALL BE ATTACHED TO THE CONCRETE WALL WITH EMBEDDED LOCKING EXTENSIONS DURING THE FABRICATION PROCESS.
25. ALL INSTALLED LINER MEMBRANES SHALL BE FREE FROM POROSITY AND SHALL BE SPARK-TESTED BY THE CONTRACTOR IN THE PRESENCE OF THE CITY FIELD ENGINEERING INSPECTOR.
26. **POLYURETHANE COATING** ALL BASES AND EXPOSED CONCRETE MORTAR SURFACES SHALL BE PROTECTED WITH A POLYURETHANE COATING. THE MANUFACTURER SHALL SUBMIT COMPLETE SPECIFICATIONS, APPLICATION PROCEDURES AND REFERENCES FOR REVIEW AND APPROVAL.

27. THE COATING MUST BE CONTINUOUS, WITHOUT SEAMS, FREE FROM ANY DEFECTS, HOLES OR SURFACE IRREGULARITIES. IT MUST BE COMPLETELY BONDED TO THE MANHOLE STRUCTURE. THE COATING THICKNESS SHALL BE A MINIMUM OF 100 MILS AT ALL PLACES FOR NEW CONCRETE AND 125 MILS FOR EXISTING OR REPAIRED CONCRETE. THE CONTRACTOR SHALL FURNISH THE CITY ENGINEER WITH A MINIMUM OF TWO (2) PLUGS PER MANHOLE TO PERMIT VERIFICATION OF THE APPLIED THICKNESS.
28. **MATERIAL** THE MATERIAL SHALL BE ONE HUNDRED PERCENT (100%) SOLID, NON-SOLVENTED, ELASTOMERIC URETHANE WITH A MINIMUM SHORE "D" HARDNESS OF 55. THE MATERIAL MUST BE ABLE TO PASS FLEXIBILITY AS PRESCRIBED BY ASTM D1737, USING CYLINDER MANDREL OF 0.5 INCH.
29. THE COATING MATERIAL SHALL BE APPLIED TO A DRY SURFACE. RELATIVE HUMIDITY SHALL BE LESS THAN EIGHTY PERCENT (80%). THE SURFACE TEMPERATURE OF THE SUBSTRAIT SHALL BE FIVE DEGREES FAHRENHEIT (5° F) OR MORE, GREATER THAN THE DEW POINT. SURFACE AND AMBIENT TEMPERATURE SHALL BE BETWEEN NINETY DEGREES FAHRENHEIT (90° F) AND ONE HUNDRED TEN DEGREES FAHRENHEIT (110° F).
30. THE SURFACE TEMPERATURES, AMBIENT TEMPERATURE, RELATIVE HUMIDITY AND DEW POINT SHALL BE MEASURED PRIOR TO THE START OF WORK AT FOUR (4) HOUR INTERVALS THEREAFTER.
31. RELATIVE HUMIDITY SHALL BE MEASURED PER ASTM 337. THE CONTRACTOR SHALL PROVIDE AND OPERATE THE NECESSARY MEASURING EQUIPMENT TO MAINTAIN THE REQUIRED CONDITIONS.
32. THE COATING MATERIAL SHALL BE RESISTANT TO THE FOLLOWING:
 - A. OXIDIZING AGENTS
 - B. SULFURIC, PHOSPHORIC, NITRIC, CHROMIC, OLEIC, AND STEARIC ACIDS
 - C. SODIUM AND CALCIUM HYDROXIDES
 - D. FERRIC SULFATE
 - E. PETROLEUM OILS AND GREASES, VEGETABLE AND ANIMAL OILS, FATS, GREASES AND SOAPS.
33. THE COMPLETED COATING MEMBRANE SHALL BE IMPERMEABLE TO SEWER GASES AND LIQUIDS AND NON-CONDUCTIVE TO BACTERIAL OR FUNGUS GROWTH.
34. ALL INSTALLED COATING MEMBRANES SHALL BE FREE FROM POROSITY AND SHALL BE SPARK-TESTED BY THE CONTRACTOR IN THE PRESENCE OF THE CITY FIELD ENGINEERING INSPECTOR.

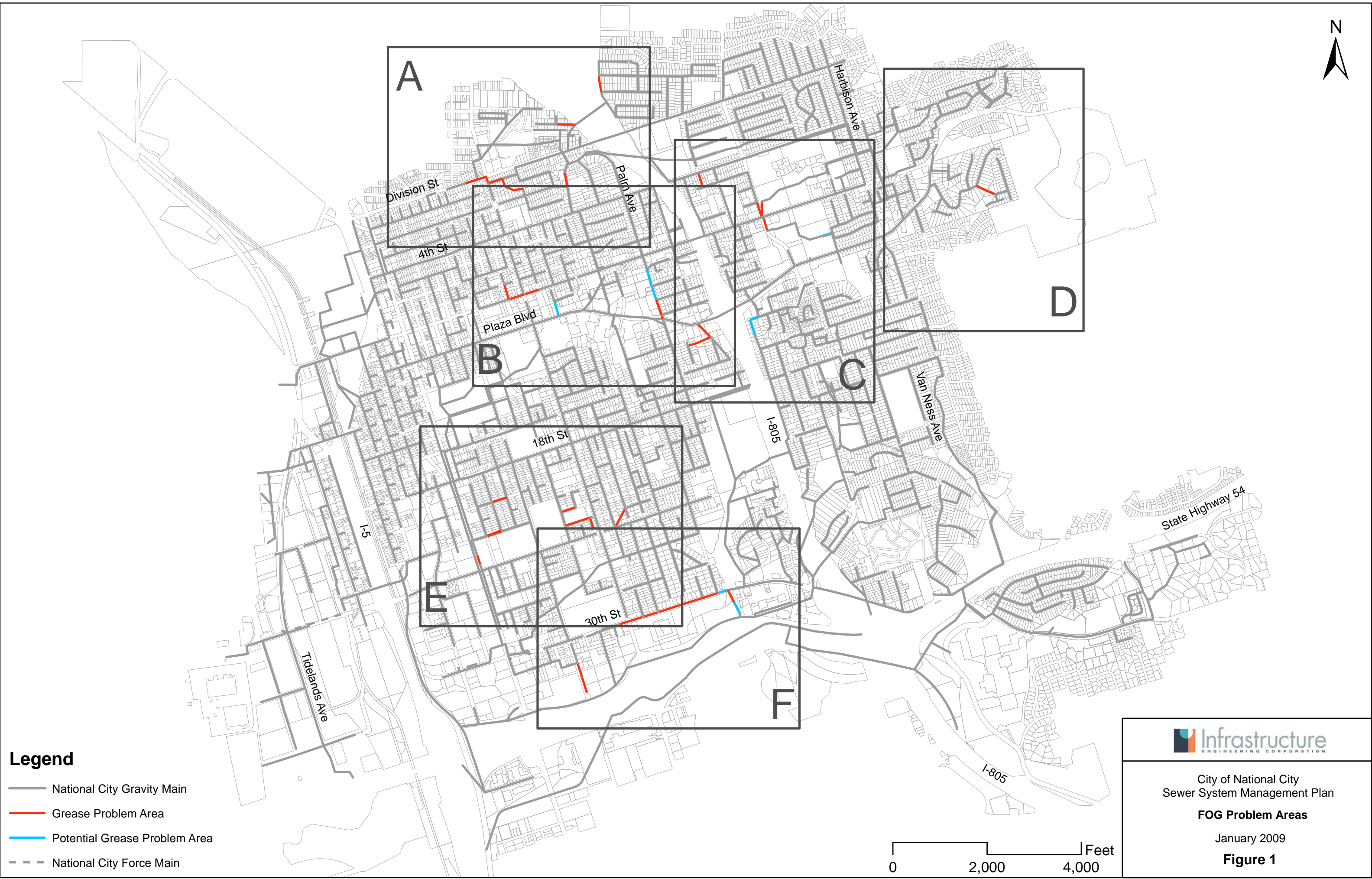
35. THE COATING SHALL HAVE GOOD IMPACT RESISTANCE.
36. THE COATING SHALL BE CAPABLE OF REPAIR AT ANY TIME DURING THE LIFE OF THE MEMBRANE
37. THE COLOR OF THE COATING SHALL BE CREAM.
38. **INSTALLATION OF THE POLYURETHANE COATING MEMBRANE** ONLY WORKERS TRAINED BY AND QUALIFIED AS INSTALLERS BY THE MANUFACTURER SHALL BE USED ON THE WORK.
39. COATING MEMBRANE COVERAGE SHALL NOT BE LESS THAN THE MINIMUM INDICATED IN THESE SPECIFICATIONS.
40. SURFACE PREPARATION OF THE CONCRETE SHALL BE BY ABRASIVE BLASTING OR ACID ETCHING.
41. THE COATING MEMBRANE SHALL BE APPLIED IN ONE CONTINUOUS COAT UTILIZING PLURAL COMPONENT AIRLESS SPRAY EQUIPMENT.
42. THE COATING MEMBRANE SHALL BE APPLIED TO ALL INTERIOR CONCRETE SURFACES EXCEPT FOR A NINETY-DEGREE (90°) ARC IN THE BOTTOM OF THE MANHOLE CHANNEL.
43. **WARRANTY** THE INSTALLED PROTECTIVE COATING SHALL BE WARRANTED BY THE CONTRACTOR TO BE FREE OF DEFECTS IN MATERIALS OR WORKMANSHIP FOR A PERIOD OF TWO (2) YEARS AFTER ACCEPTANCE. SHOULD THE COATING SHOW DEFECTS DURING THIS PERIOD, INCLUDING BUT NOT LIMITED TO BLISTERING, PEELING, CORROSION OR EROSION THE ENGINEER SHALL IMMEDIATELY NOTIFY THE CONTRACTOR. THE CONTRACTOR/APPLICATOR SHALL MAKE REPAIRS, ON A SCHEDULE AGREED TO BY THE CITY.
44. **CLEAN-UP, RESTORATION** ALL EXCESS DIRT, MATERIALS AND CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY. THE EXISTING PAVED SURFACES SHALL BE RESURFACED IN CONFORMANCE WITH SECTION 306-1.5 OF THE "GREENBOOK".







City of National City
Sewer System Management Plan, Volume II
Draft Report
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Appendix J

City of National City Map and List of Sewer Line Problem Areas

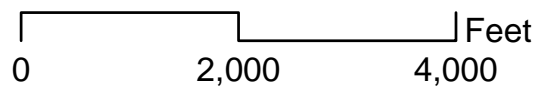


Legend

-  National City Gravity Main
-  Grease Problem Area
-  Potential Grease Problem Area
-  National City Force Main

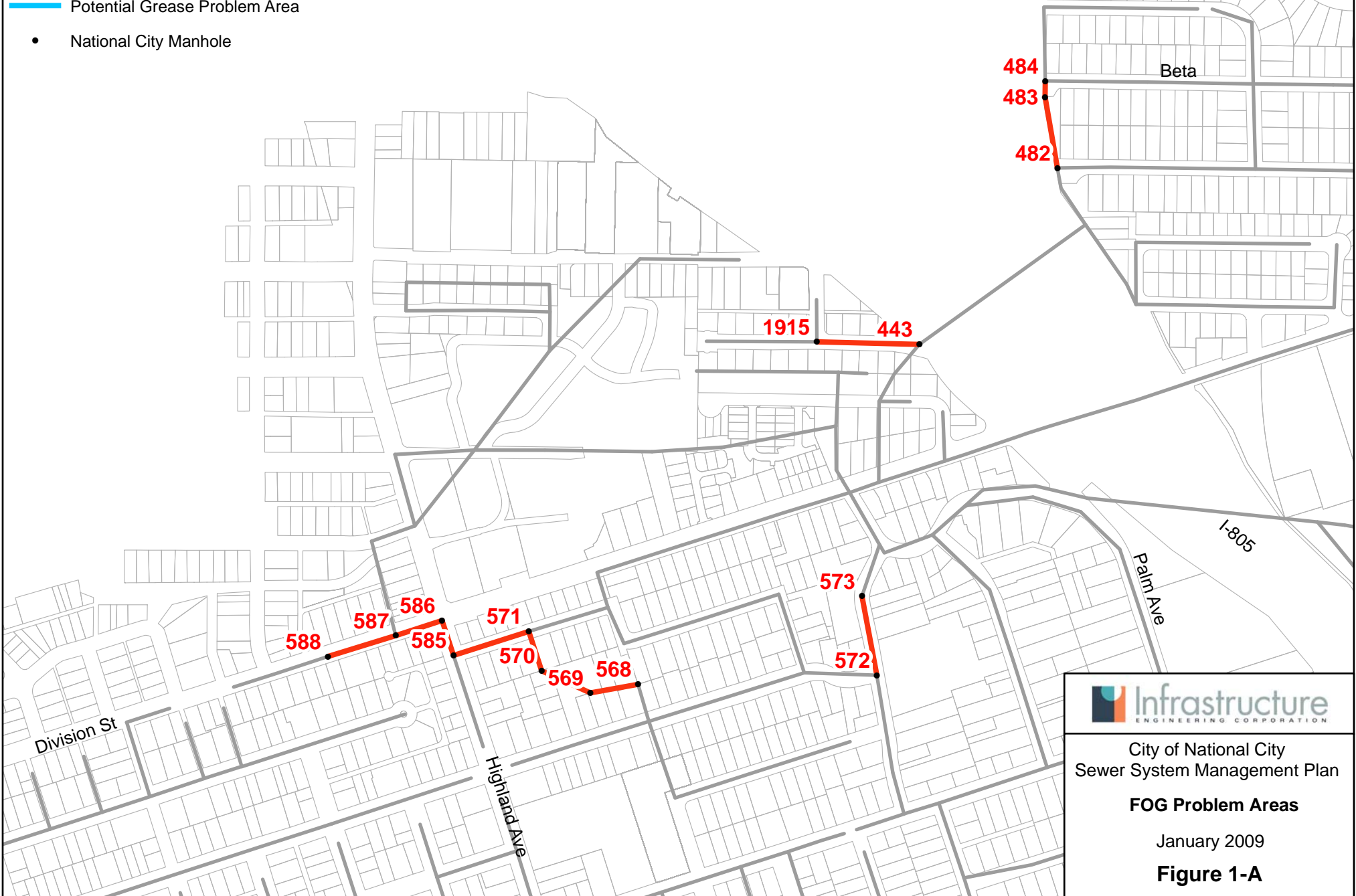


City of National City
Sewer System Management Plan
FOG Problem Areas
January 2009
Figure 1



Legend

- National City Gravity Main
- Grease Problem Area
- Potential Grease Problem Area
- National City Manhole

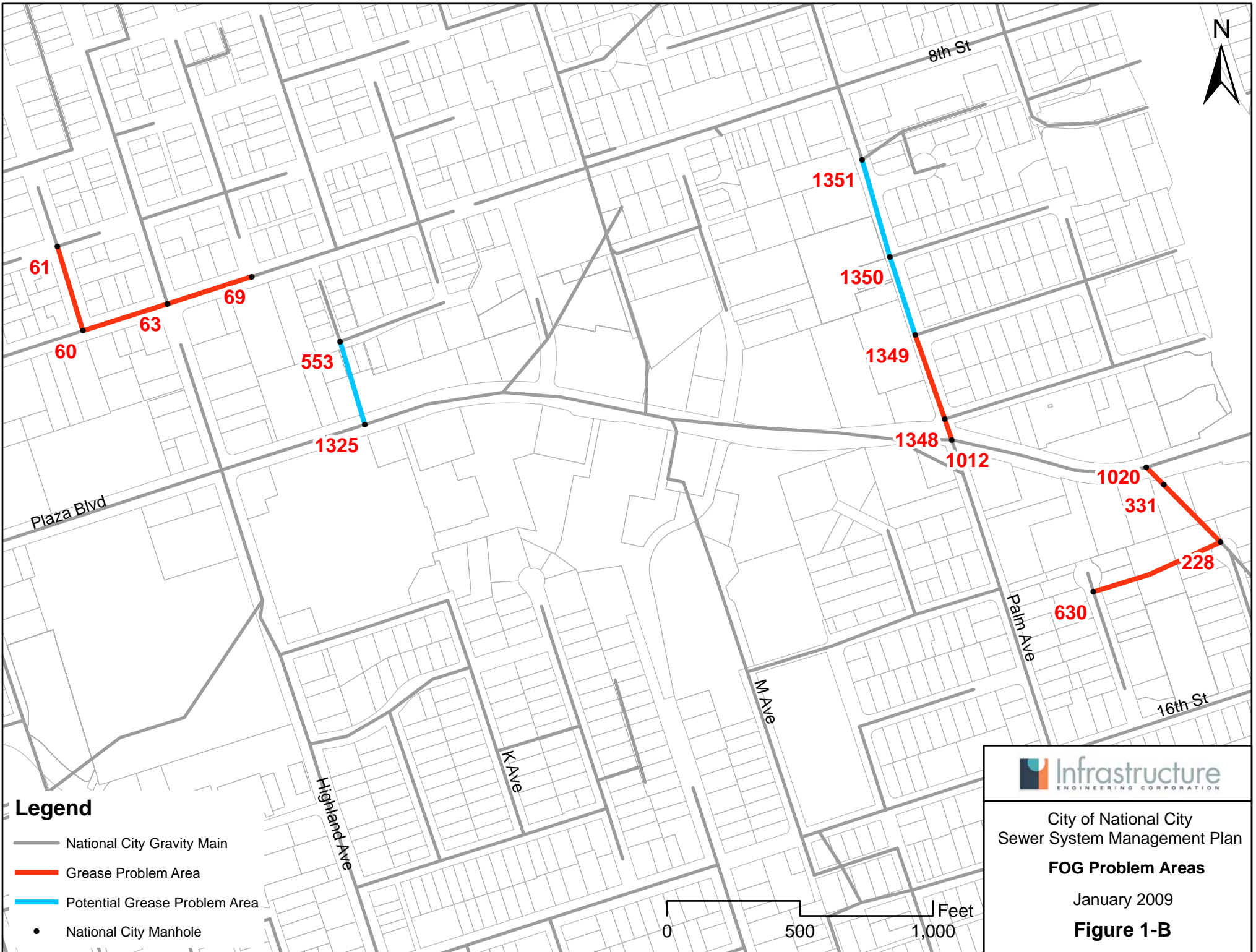


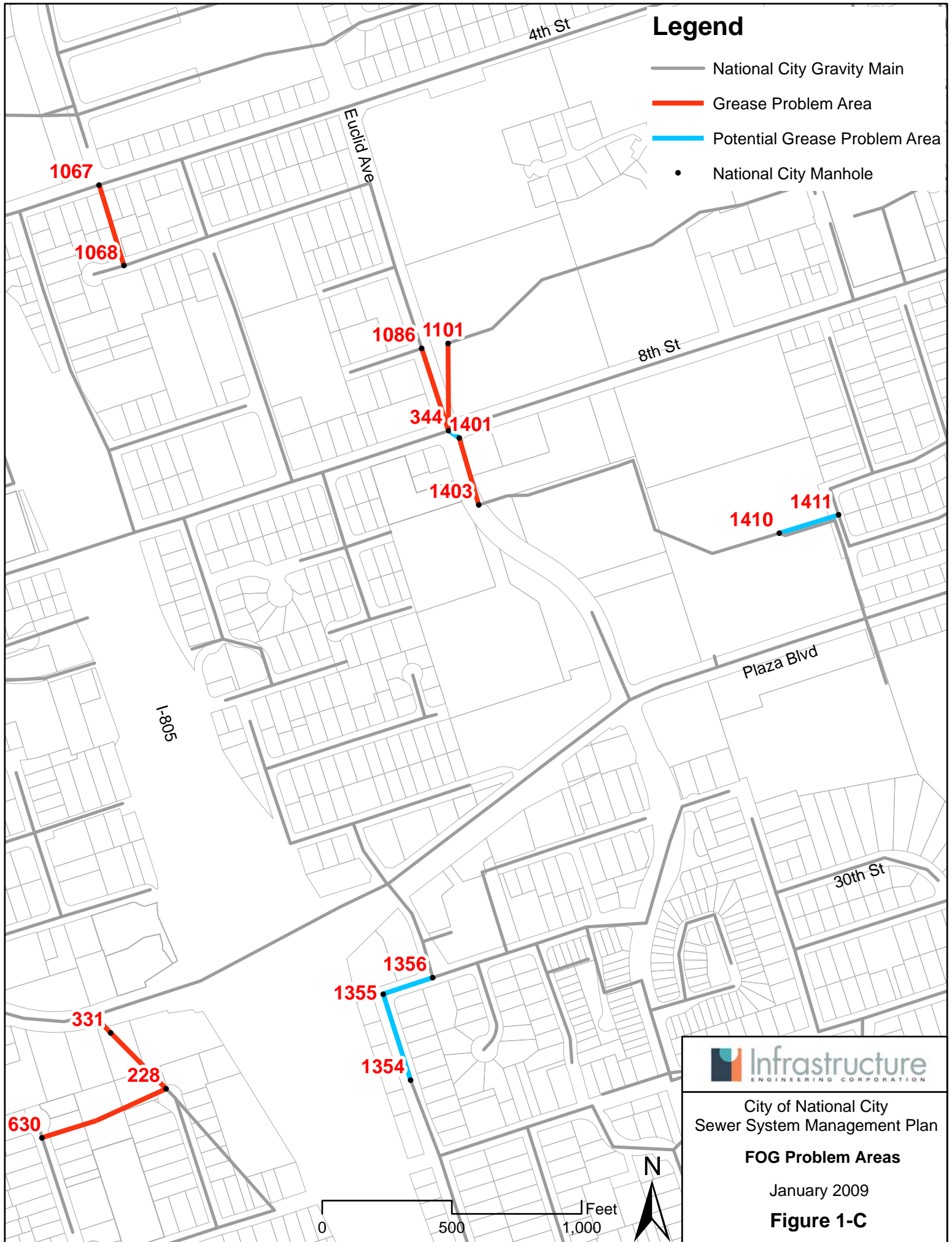
City of National City
Sewer System Management Plan

FOG Problem Areas

January 2009


Figure 1-A





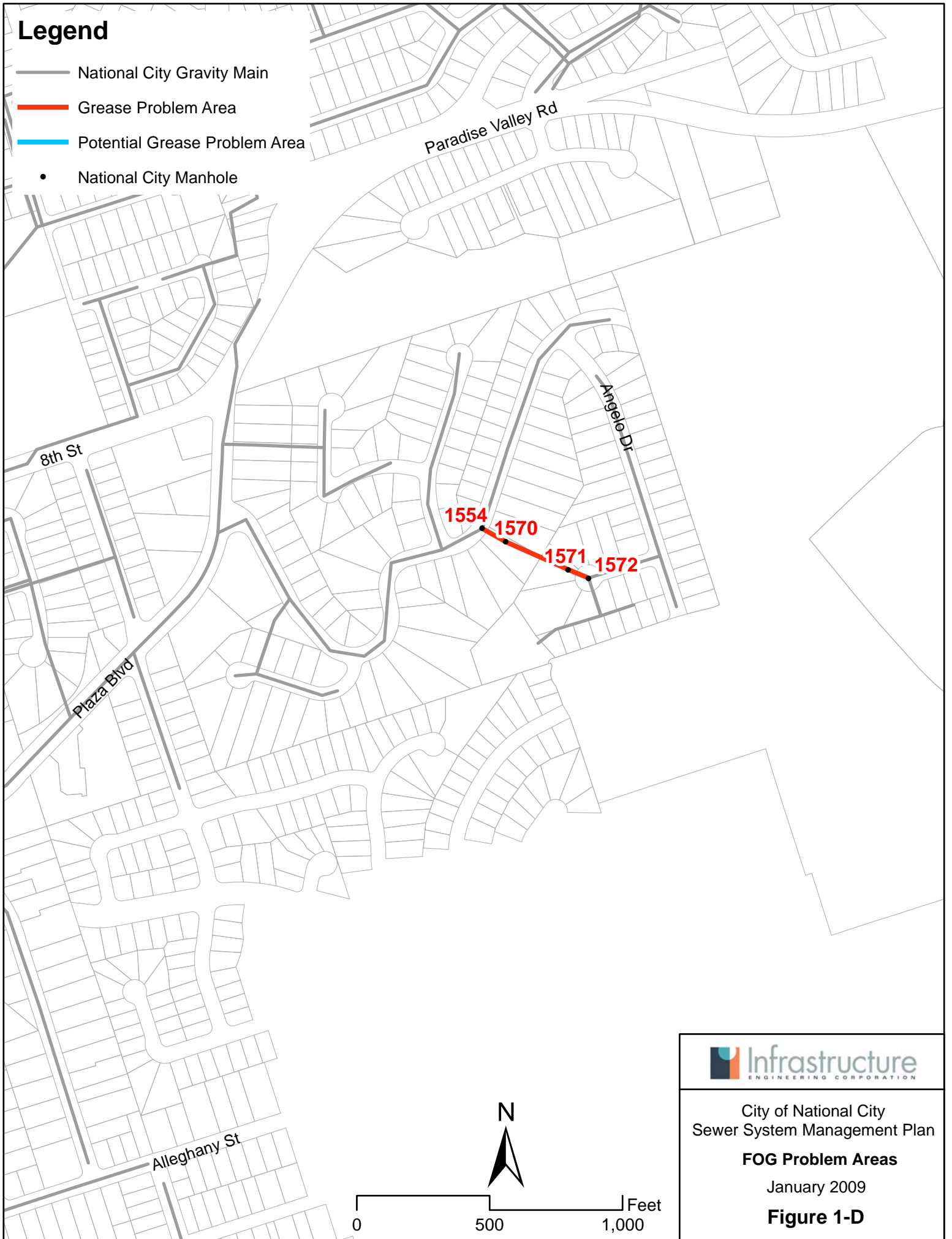
Legend

- National City Gravity Main
- Grease Problem Area
- Potential Grease Problem Area
- National City Manhole


 City of National City
 Sewer System Management Plan
FOG Problem Areas
 January 2009
Figure 1-C

Legend

- National City Gravity Main
- Grease Problem Area
- Potential Grease Problem Area
- National City Manhole

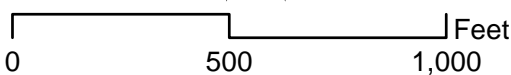


City of National City
Sewer System Management Plan

FOG Problem Areas

January 2009

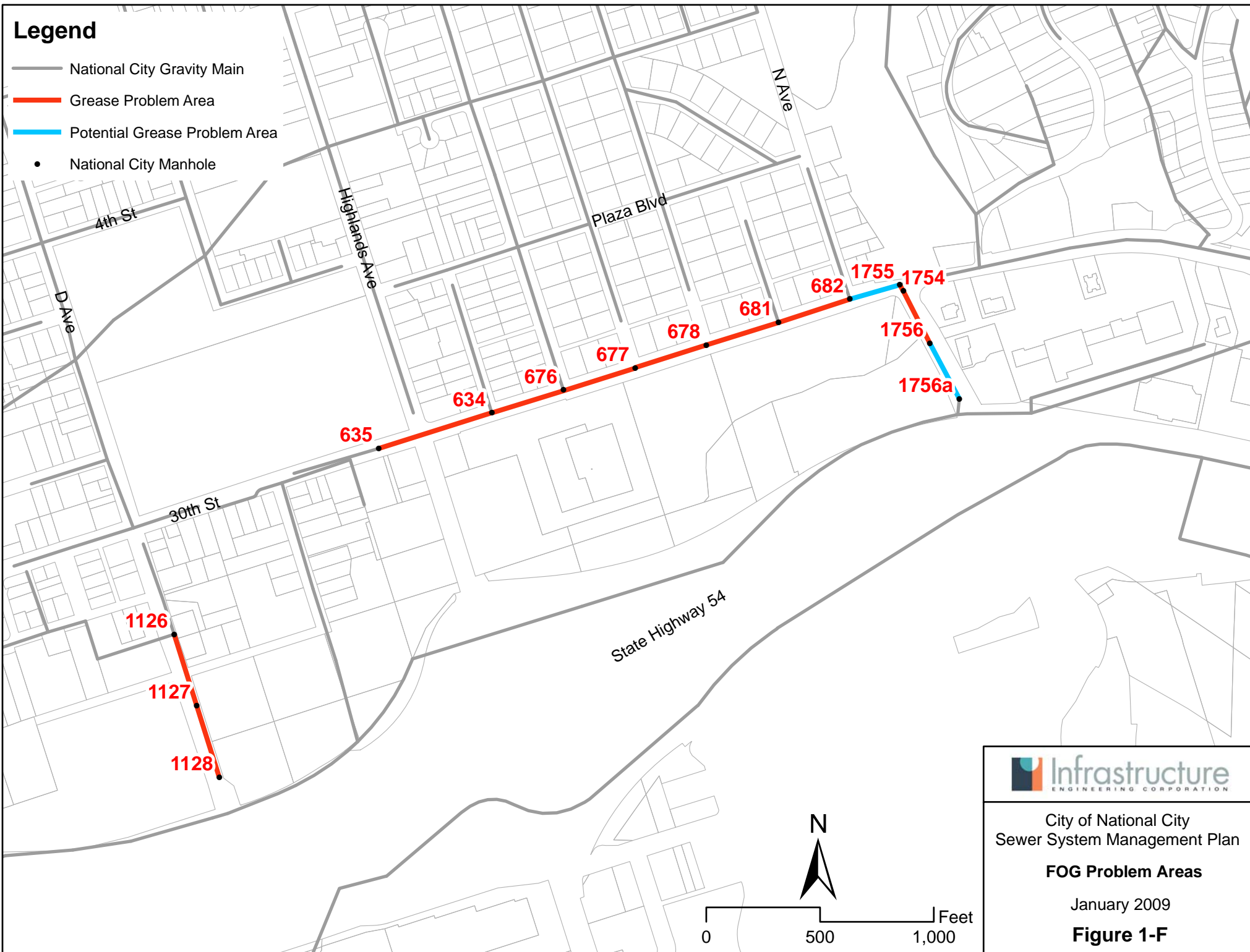
Figure 1-D






Legend

- National City Gravity Main
- Grease Problem Area
- Potential Grease Problem Area
- National City Manhole




City of National City
Sewer System Management Plan
FOG Problem Areas
January 2009
Figure 1-F

Not-to-Schedule List

Location		Manhole #	Problem/all locations Grease
700 Euclid avenue		1086 to 344	
700 Euclid avenue	easement / hospital	1101 to 344	
800 Euclid avenue		1403, 1402 to 1401	
800 Palm avenue		1351 to 1356	
1100 Palm avenue		1349, 1348 to 1012	
2100 14 th St.		1354 to 1348	
1400 Q avenue	easement to plaza	630, 629, 288, 331 to 1020	
1700 "N" avenue		1233 to 398	
600 22 nd St.		1160 to 1161	
600 & 700 22 nd St.	easement	1140A, 1140 to 1139	
Alley behind El Juan	west of Highland	1140B to 1140A	
2300 "I" to "J" avenue	easement	1144A to 971	
100 22 nd St.	north & south	1164 to 1166 & 1165 to 1166	
200 20 th St.		1186 to 1185	
400 "U" avenue	easement	1068 to 1067	
800 to 1500 30 th St.		635,634,676,677,678,681 to 682	
3000 2 nd avenue		1755,1756 to 1757	
900 Edgerton St.	easement	553 to 1320	
700 to 800 8 th St.		69,63 to 60	
700 "G" avenue		61 to 60	
2700 Arcadia avenue	easement	1441 to 1410	
Carol PL. to Manchester	easement	1572,1571,1570 to 1554	
2300 National City Blvd.		955 to 956	
100 Laurel avenue		572 to 573	
1300 Scott Drive	easement	1915 to 443	
Gamma to Beta St	easement	484 to 482	
100 Melrose St	easement	568,569,570 to 571	
600 & 700 Division St.		588 to 587 & 586 to 587	
099 Highland avenue		571 to 586	
3100 to 3300 "D" avenue		1126 to 1128	
1800 Plaza	easement from Sheryl lane	331 to 1020	

Comment [GC1]: 1351 and 1356 are on different streets on opposite sides of the I-805. Maybe its 1351 - 1348?

Comment [GC2]: 1354 and 1348 on different streets on opposite sides of the I-805. Maybe its 13541 - 1356?

Comment [GC3]: Should be 228?

Comment [GC4]: No 1757. Maybe its 1756a? Also, is 1755-682 a problem? It's between two pipes with FOG.

Comment [GC5]: 1320 not near by. 1325?

Comment [GC6]: 1411?

Monthly Flushing List

Flushed 1st week of the month

<u>Segment</u>	<u>Block</u>	<u>Street</u>	<u>Date Flushed</u>
0-002	1800	18th St Center	
423-601	2200	18th St	
987-988	2500	F Ave	
61-60	700	8th St	
69-63	800	8th St	
902-336	1100	A Ave. ES	
236-237	1300	A Ave. ES	
744-748	1600	Lanoitan Ave	
745-744	1600	Lanoitan Ave	
1285-1286	400	14th St ES	
1284-1285	400	14th St ES	
1355-1356	2100	14th St	
1348-1012	1200	Plaza/Palm	
553-1325	900	Edgerton Way ES	
587-586	600	Division St	
170-169	100	30th St @ A /easement	
677-676	1100	30th St	
676-634	900	30th St	
635-634	800	30th St	
710-708	3200	Stockman St	
1351-1027	1600	9th St	
1233-398	1700	N Ave	
1403-1402	800	Euclid Ave	
331-1020	1200	Sheryl Lane	
1139-966	2300	F Ave- to El Juan Alley	
0-1140	2300	Alley, El Juan	
1139-1140	600	23rd St	
1808-1832	300	W. 24th St	
1831-1832	400	W. 24th St	
570-571	800	Melrose St ES	
1100-1101	2400	7th St ES	
971-1144	900	24th St ES I Ave to J Ave	
1166-1164	100	22nd St North	
1166-1165	100	22nd St South	
744-1386	1600	Lanoitan Ave	
1756-1757	3100	2nd Ave	
1801-1802	3100	2nd Ave ES East side	
1801-1800	3100	2nd Ave ES West side	

Quarterly Flushing/Rodding						
<u>3 Month Flushing</u>			January	April	July	October
63-30	700	G Ave				
708-704	3100	Stockman St				
1757-1801	3100	Edgemere Ave				
1195-1197	1100	20th St				
49-50	600	E Ave				
<u>3 Month Rodding</u>						
1917-Main C.O.	3200	5th St				
C.O.-Main 4	300	E Ave				
C.O.-Main 5	700	3rd St				
706-705	3100	Biggs Ct				
707-706	3200	Biggs Ct				
0-1021	1800	11th St				
1458-1457	1300	Harbison Ave				
680-681	2900	M Ave				
683-682	2900	N Ave				
978-981	2500	N Ave				
1479-1478	2100	1st St				
1510-1509	2400	2nd St				
1609-1608	2800	Peachblossom Ln				



City of National City
Sewer System Management Plan, Volume II
Draft Report
April 2009

Appendix K

Infrastructure Engineering Corporation
2008 Sewer System Hydraulic Analysis



CITY OF NATIONAL CITY
SEWER SYSTEM MANAGEMENT PLAN

DRAFT TECHNICAL MEMORANDUM NO. 9

Date: September 19, 2008 –1st DRAFT

Subject: 2008 SEWER SYSTEM HYDRAULIC ANALYSIS

Prepared By: Tiffani Jennings, E.I.T.; Jeff Kirshberg Ph.D., P.E. (C67882)
Reviewed By: Scott Humphrey, P.E. (C64206)

EXECUTIVE SUMMARY

In support of the Sewer System Management Plan (SSMP), Infrastructure Engineering Corporation (IEC) has developed this 2008 Sewer System Hydraulic Analysis for the City of National City (City). IEC developed wastewater flow projections for the Existing, 5-Year, 10-Year and the 20-Year (Planning Horizon) time increments. The Existing Average Dry Weather Flow of 4.22 mgd is anticipated to increase by 56%, reaching 6.57 mgd in the 20-Year time-increment. In addition to including the proposed Downtown Specific Plan development, these projections include all wastewater flows with treatment costs attributed to the City.

Under Existing flow conditions, 111 gravity mains are unable to satisfy the City's design criteria. An additional 79 gravity mains fail to satisfy design criteria in the 20-Year time increment, with a combined length of 50,598 ft. These pipelines, illustrated in Figure 4 and presented in Table 12, have been included in the City's proposed Wastewater Capital Improvement Plan (CIP). Estimated probable costs for the Wastewater CIP total \$13.4 Million, with the Existing, 5-Year, 10-Year and 20-Year costs identified as \$8.4 Million, \$1.0 Million, \$0.8 Million and \$3.2 Million respectively. No additional South Metro Interceptor capacity is required to accommodate the projected daily wastewater flows in the 20-Year (Planning Horizon) time increment. Estimates of probable capital costs provided herein represent "Conceptual" level costs as established by the American Association of Cost Engineers (AACE) and represent an accuracy of +50% to -30%.



WASTEWATER FLOW PROJECTIONS

IEC developed wastewater flow projections for the Existing, 5-Year, 10-Year and the 20-Year (Planning Horizon) time increments. As summarized in Table 4, the Existing average dry weather flow of 4.22 mgd, with treatment costs attributed to the City, is anticipated to increase by 56%, reaching 6.57 mgd in the 20-Year time-increment, which includes the proposed Downtown Specific Plan development.

Average Dry Weather Wastewater Flow (ADWF)

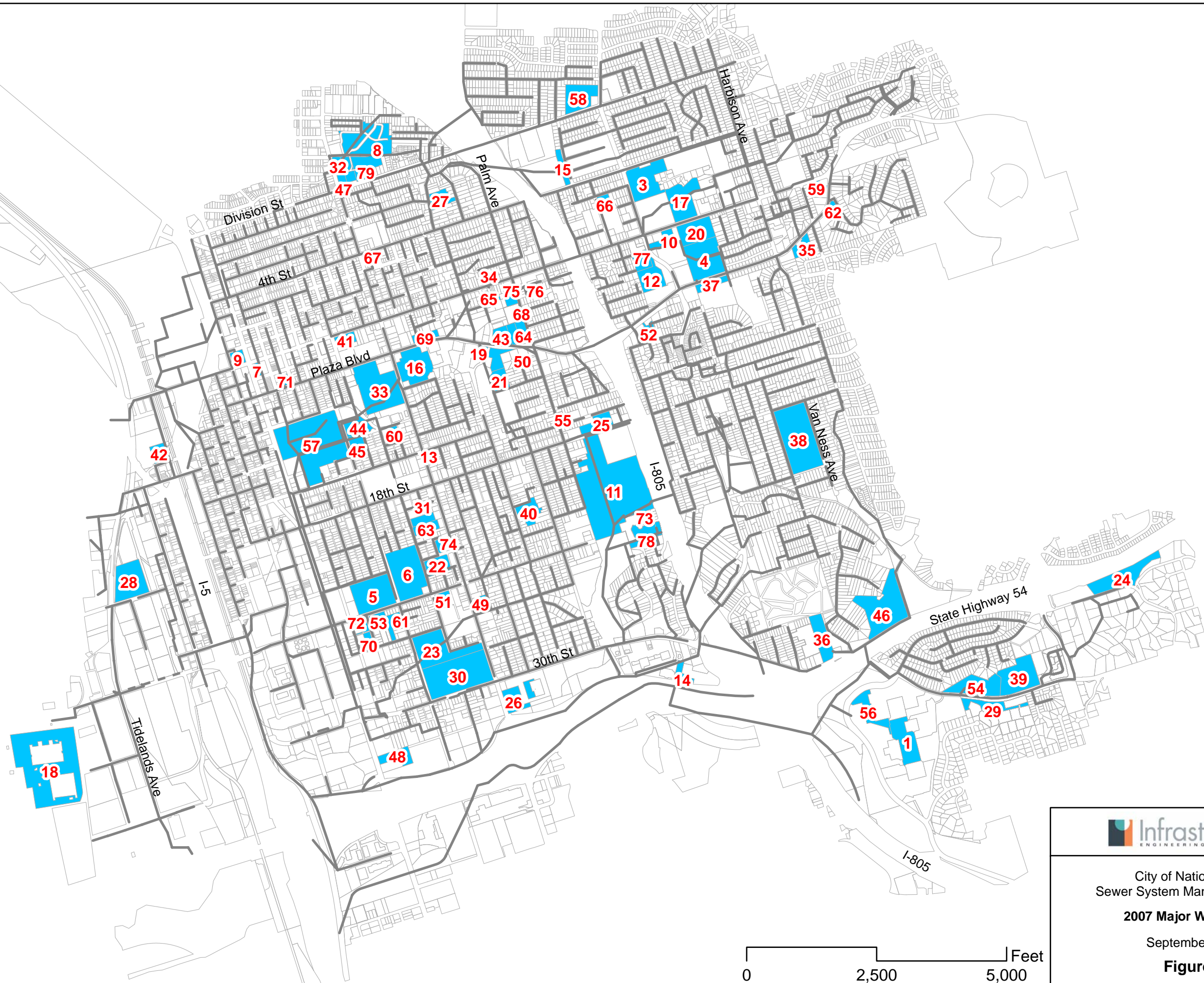
Average Dry Weather Wastewater Flow (ADWF), or base flow, is domestic (or sanitary) wastewater flow from residential, commercial, and institutional (schools, churches, hospitals, etc.) sources, plus industrial wastewater. The wastewater flow is affected by population and land uses in an area. Wastewater flow varies throughout the day in response to personal habits and business operation. In this case these flows were estimated by multiplying water demands by Return-To-Sewer (RTS) ratios based on land use and basin.

To calculate the City's ADWF, 2007 average daily water demands, as supplied by Sweetwater Authority, were allocated to individual parcels in the City's service area. 2007 water billing records were analyzed, and a list of the Major Water Users, with average daily water demands greater than 10,000 gpd, was compiled. As presented in Table 1, there are 80 Major Users accounting for 1.9 mgd of the City's total water demand. These Major Users are illustrated in Figure 1.




Each parcel's average daily water demand was then multiplied by a corresponding RTS ratio, based on land use and sewer basin, with data presented in Table 2. For residential parcels, Multiple (R-4) had the highest RTS ratio of 0.80, followed by Restricted Multiple (R-3) with 0.75, Minor Multiple (R-2) with 0.71, and finally Single Family Residential (R-1) with a RTS of 0.66. Industrial (M zone) received a RTS of 0.90, Special and/or Misc. used 0.71, and Unzoned was 0.64. Commercial areas used a RTS of 0.73 or 0.60 corresponding to Restricted Commercial, with the exception of the Plaza Bonita Commercial area that utilized a RTS of 0.56 due to large scale landscaping. Several flow monitor areas utilized different RTS ratios or were calculated separately based on special cases within the zone. NC2 and NC3B ratios were derived from the above ratios using a factor of 0.743 and 0.851 respectively in order to account for higher landscaping demands in these areas. NC5 ratios were higher due to a combination of ADS flow monitor data and an assumed base flow throughout the zone.

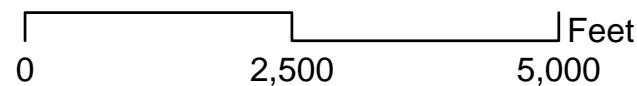
ADWF for the parcels tributary to flow monitors NC13 and NC16 were calculated based on acreage and land use and presented in Table 3. Within zone NC13, Commercial areas received 3194 gpd/ac, while Single Family and Unzoned were assigned 1198 gpd/ac. For NC16 wastewater was assigned as follows: Commercial – 1267 gpd/ac, Industrial – 1742 gpd/ac, Minor Multiple (R-2) and Restricted Residential (R-3) – 634 gpd/ac, Multiple Residential (R-4) – 792 gpd/ac and finally Single Family and Unzoned – 475 gpd/ac.

Once wastewater flow was determined for each flow monitor area, the estimated flow was then compared to the ADS Flow Monitor readings to ensure calibration of the hydraulic model.



Legend

-  2007 Major Water User
-  National City Gravity Main
-  National City Force Main





City of National City
Sewer System Management Plan
2007 Major Water Users
September 2008
Figure 1



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
1*	901-2000-0	NAVY PUBLIC WORKS CTR CODE 611	W END W 19TH ST	Government	146,835	146,835
2	902-2100-1	WESTFIELD SHOPPINGTOWN PLAZA BONITA	3030 PLAZA BONITA RD	Commercial	48,987	97,010
	902-2000-1				48,024	
3	541-4700-0	PARADISE VALLEY HOSPITAL	2400 E 4TH ST / 655 EUCLID AVE	Commercial	82,612	86,338
	541-2850-0				1,914	
	553-0980-0				1,812	
4	901-8200-1	PLAZA MANOR PRESERVATION LP	2617 - 2721 E PLAZA BLVD	MF Residential	65,117	85,481
	901-8190-1				20,364	
5	901-1500-0	AFL-CIO BLDG TRADES	309 E 24TH ST	MF Residential	80,776	80,776
6	902-2000-0	WESTFIELD SHOPPINGTOWN PLAZA BONITA	3030 PLAZA BONITA RD	Commercial	34,597	72,796
	902-2100-0				29,805	
	902-2110-0				8,394	
7	901-1000-0	AFL-CIO BLDG TRADES	525 E 24TH ST	MF Residential	72,714	72,714
8	131-2870-0	RADISSON SUITES HOTEL/ PACIFIC BAYVIEW LLC	801 NATIONAL CITY BLVD	Commercial	23,959	68,767
	131-2830-0				21,614	
	131-2870-2				13,638	
	131-2830-2				9,556	
9	100-1420-1	PARK VILLAS	817 ETA ST	MF Residential	16,911	68,691
	100-1240-1				15,630	
	100-1300-1				13,749	
	100-1360-1				10,529	
	100-1180-1				7,064	
	100-1120-1				4,808	
10	109-1682-1	HOLIDAY INN/ PACIFICA HARBORVIEW ONE LP	700 NATIONAL CITY BLVD	Commercial	15,192	49,774
	109-1682-2				13,534	
	109-1684-2				10,693	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
10	109-1684-1	HOLIDAY INN/ PACIFICA HARBORVIEW ONE LP	700 NATIONAL CITY BLVD	Commercial	10,355	49,774
11	541-2100-2	CHATEAU GARDENS APARTMENTS	2424 E 8TH ST	MF Residential	14,442	38,410
	541-2100-3				10,234	
	541-2200-3				7,416	
	541-2200-2				6,318	
12	511-1140-0	CITY OF NATIONAL CITY P/W	1780, 1800, 1810 E 22ND ST & 2100-2200 NEWELL ST	Government	13,368	35,258
	511-1300-1				9,025	
	511-1130-0				7,964	
	511-1260-0				4,043	
	511-1240-0	564				
	511-1180-1	NATIONAL CITY GOLF COURSE	1780 E 22ND ST	Golf Course	295	
13	541-1600-0	NATIONAL MANAGEMENT	910 EUCLID AVE	MF Residential	12,894	34,451
	541-1400-0				9,624	
	541-1700-0				7,769	
	541-1800-0				4,164	
14	164-2660-2	J C LAUNDRY GROUP INC	1605 HIGHLAND AVE	Commercial	17,487	34,416
	164-2660-1				16,929	
15	501-1220-0	HOLIDAY SPA HEALTH #604-01	1910 SWEETWATER RD	Commercial	25,530	33,609
	501-1220-1				8,078	
16	515-0580-0	CITY OF NATIONAL CITY P/W	226 U AVE	Government	31,549	32,047
	515-0540-0				498	
17	192-5950-1	HOMETOWN BUFFETT #714/ CAL-AMERICAN/ SHOWBIZ PIZZA PL #439/ WATERMILL EXPRESS	1135, 1143, 1145 HIGHLAND AVE & 910, 986 E PLAZA BLVD	Commercial	9,775	30,988
	192-5740-1				9,443	
	192-5950-0				8,814	
	192-5900-2				2,103	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
17	192-5720-0	HOMETOWN BUFFETT #714/ CAL-AMERICAN/ SHOWBIZ PIZZA PL #439/ WATERMILL EXPRESS	1135, 1143, 1145 HIGHLAND AVE & 910, 986 E PLAZA BLVD	Commercial	541	30,988
	192-5940-2				311	
18	541-2700-1	PARADISE VLY HEALTH CARE CTR	2575 E 8TH ST	Commercial	29,356	29,356
19	901-3000-0	SAN DIEGO UNIFIED PORT DIST	24TH AT QUAY	Government	25,975	25,975
20	192-6301-3	CENTRE DEVELOPMENT LLC	1302 E PLAZA BLVD	Commercial	25,520	25,520
21	901-8000-0	PARADISE HILLS ASSOCIATES	2606-2728 E 8TH ST	MF Residential	24,977	24,977
22	175-0660-2	BAY PLAZA LLC/ FORTUNE COMMERCIAL CORP	1420 E PLAZA BLVD	Commercial	22,053	24,543
	175-0740-4				1,928	
	175-0620-3				562	
23	169-2261-0	NATIONAL MANAGEMENT	700 E 22ND ST	MF Residential	23,965	23,965
24	191-3541-0	NC SCH DIST SWEETWATER HIGH SCHOOL	ES D AVE AT 27TH	Government	23,163	23,163
25	834-1940-3	PARK BONITA APARTMENTS	3501-3549 VALLEY RD	MF Residential	4,886	23,047
	834-2180-3				4,213	
	834-1780-3				4,107	
	834-2020-3				3,049	
	834-1540-3				2,715	
	834-1620-3				2,162	
	834-2100-3				1,914	
26	512-1180-0	B-L ENTERPRISES	1715, 1831 E 18TH ST & 1826 E 17TH ST	MF Residential	4,746	20,921
	512-0700-0				4,361	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
26	512-0660-0	B-L ENTERPRISES	1715, 1831 E 18TH ST & 1826 E 17TH ST	MF Residential	4,136	20,921
	512-0740-0				3,851	
	512-0620-0				3,828	
27	177-2474-3	BROADWAY/ SWEETWATER SQUARE LLC	3007 HIGHLAND AVE	Commercial	4,752	20,887
	177-2474-2				4,429	
	177-2400-1				3,426	
	177-2520-4				1,541	
	177-2520-3				1,492	
	177-2400-0				1,328	
	177-2478-3				1,051	
	177-2560-3				838	
	177-2476-3				611	
	177-2476-2				529	
	177-2472-2				352	
	177-2560-2				316	
	177-2220-4				172	
	177-2478-4				27	
	177-2470-3				12	
177-2470-2	10					
28	101-7060-4	PROGRESS MANAGEMENT	203 LAUREL AVE	MF Residential	11,794	19,860
	101-8140-4				8,066	
29	152-3320-0	COSTCO WHOLESALE V#92978-00	1001 W 19TH ST	Commercial	10,066	19,534
	152-3300-1				9,468	
30	581-0795-1	BONITA CREEK HOA	3401 PASEO DE PAZ	MF Residential	2,428	18,716
	581-0741-1				1,873	
	581-0821-1				1,846	
	581-0751-1				1,644	
	581-0711-1				1,512	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
30	581-0791-1	BONITA CREEK HOA	3401 PASEO DE PAZ	MF Residential	1,350	18,716
	581-0771-1				1,328	
	581-0831-1				1,307	
	581-0793-1				1,291	
	581-0781-1				1,131	
	581-0761-1				1,027	
	581-0731-1				576	
	581-0721-1				555	
	581-0700-2				531	
	581-0753-1				316	
31	191-3860-0	NC SCH DIST SWEETWATER HIGH SCHOOL	2900 HIGHLAND AVE	Government	8,908	18,208
	171-6000-0				4,381	
	171-6010-0				3,892	
	171-3070-0				947	
	171-3055-0				80	
32	169-3580-2	NATIONAL MANAGEMENT	1917 F AVE	MF Residential	18,194	18,194
33	100-0440-1	ALL NICKS LAUNDERLAND/ ENS MANAGEMENT LLC	51-151 N HIGHLAND AVE	Commercial	11,960	18,050
	100-0400-1				3,004	
	100-0480-1				2,572	
	100-0600-1				324	
	100-0620-1				191	
34	144-0580-7	WAL-MART STORE # 01-5023	1100 HIGHLAND AVE	Commercial	17,335	17,335
35	121-5081-1	TREVOR THOMAS ENTERPRISES LLC/ MOYER, WAYNE	1417 E 8TH ST	Commercial	9,181	16,772
	121-5081-2				7,591	
36	549-0500-4	WASH AMERICA INC/ KIM, SHAN	3126-3154 PLAZA BLVD	Commercial	12,236	16,735
	549-0620-2				3,525	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
	549-0540-2				973	
37	576-1500-2	REXMERE LAKE VILLAGE LLC/ BONITA VISTA	2621 SWEETWATER RD	Mobile Homes	16,735	16,735
38	541-0680-3	NC GALLERIA	2720 E PLAZA BLVD	Commercial	16,651	16,651
39	563-1700-0	NC SCH DIST GRANGER JR HIGH SCHOOL	2101 GRANGER AVE	Government	16,640	16,640
40	581-4480-0	BONITA PARK HOA	3612-3804, 3733 FAIRLINDO WAY & 3640, 3702 FAIRLOMAS RD	MF Residential	3,324	16,354
	581-4200-0				2,990	
	581-4320-0				2,326	
	581-4360-0				1,814	
	581-4520-0				1,771	
	581-4440-0				1,676	
	581-4280-1				1,443	
	581-4400-0				785	
	581-4242-0				225	
41	167-0580-0	INTER CITY MANOR APT/ LINARES, MANUEL	2043-2123 L AVE	MF Residential	7,910	15,851
	167-0500-0				4,695	
	167-0540-0				2,340	
	167-0620-0				830	
	167-3820-2				76	
42	131-4260-1	FINBERG, FRED	801 E AVE	Commercial	8,029	15,788
	131-4240-6	J'S LAUNDRY LAND	550 E 8TH ST	Commercial	7,759	
43	152-1200-4	HANSON AGGREGATE PACIFIC SOUTHWEST	601 W 12TH ST	Commercial	14,780	14,780
44	125-4860-3	SATHAPOME, KHAMPHOU/ PLAZA SQUARE LTD/ FSC FOODS CORP/ BASKIN ROBBINS	1401 & 1493 E PLAZA BLVD	Commercial	8,755	14,521
	125-4940-1				2,890	
	125-5100-8				2,150	
	125-4900-4				541	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
	125-4900-3				186	
45	151-1700-0	COMM DEV - KIMBALL TOWERS	1317 D AVE	MF Residential	9,587	14,503
	151-1660-0				4,916	
46	901-6000-0	MORGAN TOWERS	1415 D AVE	MF Residential	14,341	14,341
47	902-1010-1	BO PARADISE MOBIL HOME PARK	WS CALLE ABAJO	Mobile Homes	14,319	14,319
48	100-0860-1	PROGRESS MANAGEMENT	31 & 131 N HIGHLAND AVE	MF Residential	7,748	14,239
	100-0820-1				6,490	
49	193-1700-6	METZGER, REINHOLD/ OLSON, ALLAN	3221 NATIONAL CITY BLVD	Mobile Homes	13,019	14,048
	193-1700-7				1,029	
50	174-3920-2	OCNNN PROPERTIES, LLC/ HIGHLANDERS SENIOR RESIDENCE	2525 HIGHLAND AVE	Commercial	7,433	13,933
	174-3930-1				3,236	
	174-3920-1				2,252	
	174-3940-4				605	
	174-3940-5				258	
	174-3930-2				150	
51	175-0860-1	PACIFIC CASTLE BAY PLAZA LLC	1430 E PLAZA BLVD BLDG E	Commercial	4,621	13,780
	175-1540-6				3,543	
	175-1220-2				1,160	
	175-1260-10				1,051	
	175-0780-1				840	
	175-1380-5				777	
	175-1380-4				607	
	175-0940-1				285	
	175-1180-6				225	
	175-1340-11				219	
	175-1300-4				215	
175-0820-1	117					



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
51	175-1340-10	PACIFIC CASTLE BAY PLAZA LLC	1430 E PLAZA BLVD BLDG E	Commercial	45	13,780
	175-0980-1				27	
	175-1060-2				23	
	175-1500-3				14	
	175-1420-2				10	
52	171-4580-2	CURREN, WILLAIM S	608 E 24TH ST	MF Residential	7,197	13,778
	171-4620-2				6,580	
53	557-0660-0	GROVE PLAZA LTD	2220 E PLAZA BLVD	Commercial	13,626	13,626
54	196-3460-1	WINDSOR CARE CENTER NC INC	220 E 24TH ST	Commercial	13,560	13,560
55	581-4000-0	BONITA PARK HOA	3231-3511, 3328-3512 FAIRLOMAS RD	MF Residential	2,166	13,450
	581-4800-0				1,807	
	581-4160-0				1,697	
	581-4560-0				1,482	
	581-4080-0				1,281	
	581-4680-0				1,072	
	581-4720-0				867	
	581-4600-0				857	
	581-4120-0				744	
	581-4760-0				672	
	581-4040-0				518	
	581-4650-0				287	
56	512-1860-6	QUIOGUI, NONIE/ 16 PALMS LLC	1629 PALM AVE	MF Residential	7,714	13,444
	512-1860-5				5,730	
57	581-5210-0	OUTBACK STEAKHOUSE #0582	2980 PLAZA BONITA RD	Commercial	6,652	13,056
	581-5200-0				6,404	
58	136-2620-0	CITY OF NATIONAL CITY	130 & 340 E 12TH ST	Government	10,013	12,997
	136-2540-0				1,381	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
	143-4180-0				1,086	
	151-1600-0				516	
59	525-5420-5	NATIONAL CITY PLAZA LLC	4-36 N EUCLID AVE	Commercial	6,619	12,702
	525-5800-0				1,693	
	525-5620-2				1,119	
	525-5180-0				1,004	
	525-5700-6				717	
	525-5340-3				420	
	525-5540-1				371	
	525-5260-5				324	
	525-5580-6				199	
	525-5460-3				90	
	525-5220-7				86	
	525-5300-7				41	
525-5500-6	18					
60	549-2130-0	NORDAN PLAZA/ NORMY'S HAIR STYLING	3400 E 8TH ST	Commercial	8,828	12,638
	549-2130-1				3,810	
61	144-2810-0	TELACU HOUSING-NAT'L CITY INC	650 E 14TH ST	MF Residential	8,025	12,515
	144-2815-0				4,490	
62	191-0900-5	H VIEW RESIDENCIES LLC	2420 D AVE	MF Residential	7,076	12,443
	191-0500-11				3,910	
	191-0500-12				1,457	
63	556-3340-7	ILLINOIS ST LLC/ MANCHESTER HILLS 29 LLC	900-910 MANCHESTER	MF Residential	7,306	12,224
	556-3340-8				4,918	
64	169-3260-10	PROFESSIONAL REAL ESTATE MANAGEMENT	2005 F AVE	MF Residential	6,574	12,171
	169-3380-11				5,597	
65	125-4820-3	HA PENNY INN	1535 E PLAZA BLVD	Commercial	12,060	12,060



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
66	125-1820-3	MC DONALD, ZORA	1442 E 8TH ST	MF Residential	11,945	11,945
67	515-2860-1	GHC OF NATIONAL CITY II LLC	541 S V AVE	Commercial	11,847	11,847
68	117-2060-4	GUERRERO, CLARISSA/ ALVES JR, JOHN F	404 I AVE	MF Residential	5,757	11,511
	117-2060-3				5,754	
69	125-4740-6	PINEWOOD APARTMENTS	1104 PALM AVE	MF Residential	11,499	11,499
70	125-5380-4	PERFORMANCE PROPERTY MANAGEMENT	925-1105 E PLAZA BLVD	Commercial	5,879	11,470
	125-5340-9				5,591	
71	196-3180-5	GOLDEN TREE APARTMENTS	2500, 2510, 2520, 2530 B AVE	MF Residential	3,201	11,341
	196-3220-5				3,039	
	196-3140-5				2,744	
	196-3100-6				2,357	
72	131-1860-3	MASON FAMILY PROPERTIES LLC	930 B AVE	MF Residential	5,961	11,337
	131-1860-4				5,375	
73	196-2940-5	GOLDEN TREE APARTMENTS	2400, 2410, 2420, 2430 B AVE	MF Residential	3,246	11,228
	196-2980-5				2,912	
	196-3020-5				2,578	
	196-3060-5				2,492	
74	511-2140-3	LAS PALMAS PARK VILLAS HOA	1904, 1905, 1915, 1925 VIA LAS PALMAS	MF Residential	2,857	11,224
	511-2020-3				2,580	
	511-2260-3				1,857	
	511-2180-3				1,795	
	511-2220-3				1,484	
	511-2060-3				652	
75	169-2660-3	LEWIS, THOMAS L	2115-2145 G AVE	MF Residential	5,691	11,179
	169-2700-3				5,488	
76	125-2310-0	PALM AVE INVESTORS LTD	900 PALM AVE	MF Residential	6,156	11,138
	125-2300-3				4,982	



Table 1 - 2007 Major Water Users in the City of National City

2007 Major User ID	Customer Number	Service Name	Service Address	Meter Type	2007 Average Daily Water Bill Demand (gpd)	2007 Average Daily Water Demand (gpd)
77	513-1580-9	ALOHA VILLAGE APTS	1604 E 9TH ST	MF Residential	11,031	11,031
78	523-3140-2	GHC OF NATIONAL CITY I LLC	902 EUCLID AVE	Commercial	7,669	10,859
	523-2240-1				3,191	
79	511-1900-4	PACIFIC PALMS HOMEOWNERS ASSN	1842-1928, 1935 VIA LAS PALMAS	MF Residential	2,676	10,517
	511-1820-4				2,519	
	511-1980-4				2,166	
	511-1780-4				1,769	
	511-1860-4				916	
	511-1940-4				471	
80	100-1000-3	HAPPY HOLLOW MOBILE HOME PARK	999 E DIVISION ST	Mobile Homes	10,234	10,234
Total					1,902,791	1,902,791



Table 2- Average Dry Weather Flow Monitor Calibration

Flow Monitor	Zone	2007 Average Daily Water Demand (gpd)	2007 Flow Monitor Average Daily Water Demand (gpd)	Return to Sewer Ratio	Calculated Average Dry Weather Flow (gpd)	Calculated Flow Monitor Average Dry Weather Flow (gpd)	Measured ADS Flow Monitor ADWF for City Flows Tributary Directly to Meter (gpd)	Percent Difference Between Calculated and Measured Flow
NC2	Commercial	69,898	259,927	0.54	37,745	138,838	138,185	0.47%
	Industrial (M zone)	13,353		0.67	8,947			
	Minor multiple (R-2)	13,886		0.53	7,360			
	Multiple residential (R-4)	46,032		0.59	27,159			
	Restricted multiple (R-3)	613		0.56	343			
	Single family residential (R-1)	76,759		0.50	38,380			
	Special and/or misc.	0		0.53	0			
	Unzoned	39,386		0.48	18,905			
NC3A	Commercial	772,432	2,346,224	0.73	563,875	1,720,991	1,720,584	0.02%
	Industrial (M zone)	24,895		0.90	22,406			
	Minor multiple (R-2)	108,396		0.71	76,961			
	Multiple residential (R-4)	775,231		0.80	620,185			
	Restricted commercial	4,541		0.60	2,725			
	Restricted multiple (R-3)	4,177		0.75	3,132			
	Single family residential (R-1)	527,434		0.66	348,107			
	Special and/or misc.	13,778		0.71	9,782			
Unzoned	115,340	0.64	73,817					
NC3B	Commercial	178,950	883,548	0.62	110,949	571,908	571,287	0.11%
	Industrial (M zone)	76,378		0.77	58,811			
	Minor multiple (R-2)	47,413		0.60	28,448			
	Multiple residential (R-4)	400,846		0.68	272,575			



Table 2- Average Dry Weather Flow Monitor Calibration

Flow Monitor	Zone	2007 Average Daily Water Demand (gpd)	2007 Flow Monitor Average Daily Water Demand (gpd)	Return to Sewer Ratio	Calculated Average Dry Weather Flow (gpd)	Calculated Flow Monitor Average Dry Weather Flow (gpd)	Measured ADS Flow Monitor ADWF for City Flows Tributary Directly to Meter (gpd)	Percent Difference Between Calculated and Measured Flow
	Restricted multiple (R-3)	264		0.64	169			
	Single family residential (R-1)	126,336		0.57	72,012			
	Special and/or misc.	2,152		0.60	1,291			
	Unzoned	51,208		0.54	27,652			
NC5	Commercial	306,957	859,585	0.88	270,122	777,066	804,543	-3.42%
	Industrial (M zone)	203,272		0.93	189,043			
	Minor multiple (R-2)	2,537		0.88	2,233			
	Multiple residential (R-4)	203,579		0.95	193,400			
	Single family residential (R-1)	122,926		0.86	105,716			
	Special and/or misc.	1,959		0.86	1,685			
	Unzoned	18,356		0.81	14,868			
NC7M	Commercial	101,357	816,224	0.73	73,991	572,611	572,785	-0.03%
	Industrial (M zone)	0		0.90	0			
	Minor multiple (R-2)	22,983		0.71	16,318			
	Multiple residential (R-4)	111,852		0.80	89,481			
	Restricted multiple (R-3)	69,707		0.75	52,281			
	Single family residential (R-1)	377,554		0.66	249,185			
	Special and/or misc.	91,172		0.71	64,732			
	Unzoned	41,599		0.64	26,623			
NC8M	Plaza Bonita Commercial	182,862	182,862	0.56	102,403	102,403	101,369	1.02%
NC15	Multiple residential (R-4)	2,342	244,957	0.80	1,874	164,786	163,499	0.79%
	Restricted multiple (R-3)	30,961		0.75	23,221			
	Single family residential (R-1)	211,653		0.66	139,691			
	Unzoned	0		0.64	0			
Total		5,593,327	5,593,327	-	4,048,603	4,048,603	4,072,252	-



Table 3 - Average Dry Weather Flow for Basin NC13 & NC16

Flow Monitor	Zone	Acreage	2007 Flow Monitor Average Daily Water Demand (gpd)	Factor (gpd/AC)	Calculated Average Dry Weather Flow (gpd)	Calculated Flow Monitor Average Dry Weather Flow (gpd)
NC13	Commercial	6.22	17	3,194	19,849	33,250
	Single family residential (R-1)	6.27		1,198	7,504	
	Unzoned	4.92		1,198	5,897	
NC16	Commercial	42.27	372	1,267	53,557	222,297
	Industrial (M zone)	0.68		1,742	1,188	
	Minor multiple (R-2)	22.49		633	14,250	
	Multiple residential (R-4)	23.68		792	18,752	
	Restricted multiple (R-3)	0.58		633	369	
	Single family residential (R-1)	212.36		475	100,894	
	Unzoned	70.06		475	33,286	
Total		390	390	-	255,547	255,547



Average Dry Weather Wastewater Flow (ADWF) Projections

Once ADWF was established for Existing conditions, SANDAG population projections by census tract were utilized to create projected annual growth rates. These growth rates were interpolated and then applied to the existing ADWF wastewater flows to generate the 5-year, 10-year and 20-year wastewater flow projections. When available, specific plans were utilized in the more immediate time-increments. El Centro, a portion of the Downtown Specific Plan, is assumed to reach build-out in the 5-Year time increment. The remaining portions of the Downtown Specific Plan are assumed to develop at the appropriate SANDAG census tract rate, with build-out anticipated in the 20-Year (Planning Horizon) time-increment. The Richard A. Reynolds Groundwater Desalination Facility is not anticipated to affect existing National City gravity mains, as it is assumed that the Desalination Facility will construct a separate, parallel gravity main, to convey their discharge directly to the South Coast Metro Interceptor. The projected ADWF in gpd at each ADS Flow Meter site is presented below in Table 4.

Table 4 - Projected ADWF by ADS Flow Meter

Flow Meter	ADWF (gpd) acquired from Hydraulic Model Data & House Counts			
	Existing	5-Year	10-Year	20-Year
NC2	398,131	414,289	443,373	509,944
NC3A	3,426,126	3,695,641	4,033,664	4,572,693
NC3B	553,247	565,527	568,759	654,719
NC5	791,092	923,587	1,124,592	2,285,377
NC6	28,438	40,718	57,522	69,802
NC7M	1,380,533	1,420,605	1,460,030	1,536,296
NM8M	102,118	109,228	111,167	118,922
NC9M	681,218	696,730	714,827	741,972
NC10	1,295,219	1,414,142	1,555,039	1,664,266
NC11	58,169	63,339	69,802	74,973
NC12	341,255	381,973	458,885	536,443
NC13	33,608	34,255	34,901	41,364
NC15	162,226	175,152	177,737	190,664
NC16	221,687	232,674	244,308	285,026
Un-metered Flow	48,155	48,155	48,155	48,155

Costs of treatment are allocated to the City from the City of San Diego based on, among other things, these ADS Flow Meter readings and previously submitted house counts. Utilizing these equations, Table 5 presents the ADWF in the Existing, 5-Year, 10-Year and 20-Year time-increments, whose treatment costs are attributed to the City.



Table 5 - Projected Flows Attributed to National City Treatment Costs by ADS Flow Meter

Flow Meter	ADWF (gpd) Attributed to National City Treatment Costs				Formula
	Existing	5-Year	10-Year	20-Year	
NC2*	289,728	301,406	325,773	372,955	$NC2 - (NC13 * 0.6853) - (NC16 * 0.3674) - (29.6 * 240) - (12 * 265)$
NC3A	1,745,263	1,849,967	1,963,718	2,310,791	$NC3A - NC10 - NC11 - NC12 + (46 * 265) + (6 * 265)$
NC3B	553,247	565,527	568,759	654,719	NC3B
NC5	755,685	875,900	1,060,100	2,208,605	$NC5 - NC6 - (26.3 * 265)$
NC7M	565,887	590,448	611,776	660,896	$NC7M - NC9M - (18 * 265) - (42 * 265) - (16 * 265) - (291 * 265) - (36 * 265) - (100.5 * 265)$
NM8M	102,118	109,228	111,167	118,922	NC8M
NC15	162,226	175,152	177,737	190,664	NC15
Un-metered Flow	48,155	48,155	48,155	48,155	$((43 + 47 + 76.5) * 265) + (16.8 * 240)$
Total	4,222,308	4,515,781	4,867,184	6,565,706	---

* - Based on National City being responsible for 31.47% of NC13 flow and 63.26% of NC16 flow.



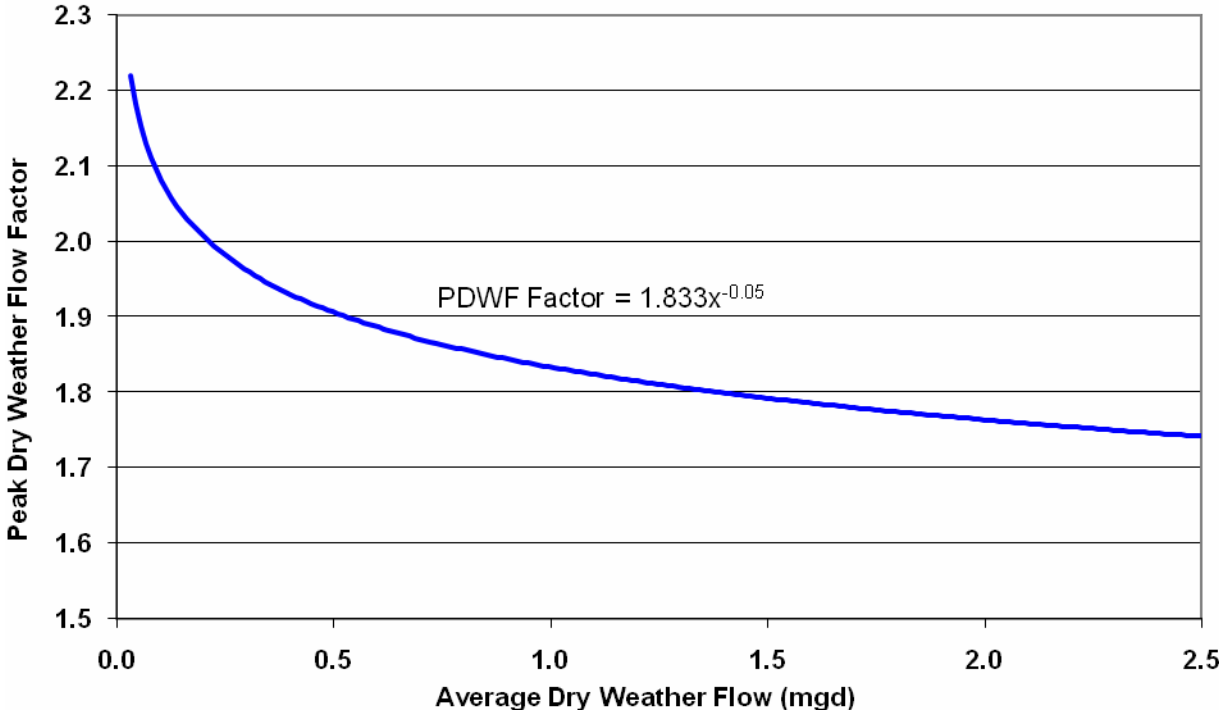
Peak Dry Weather Wastewater Flow (PDWF)

Wastewater flow varies throughout the day in response to personal habits and business operation. Peak Dry Weather Flow (PDWF), which accounts for peak usage patterns and also includes estimates of Groundwater Infiltration (GWI). GWI is defined as groundwater entering the collection system through pipe joints and manhole walls due to an aging system or improper construction. The magnitude of GWI depends on the depth of the groundwater table above the pipelines, the percentage of the system submerged, and the physical condition of the system. Variation in groundwater levels in the City is seasonal in nature. The GWI tends to be low during the summer and fall months (dry weather) and increases gradually as the wet weather season progresses. While GWI is affected by rainfall, it responds gradually and is not directly related to any one individual rainfall event. It is assumed that the ADWF and GWI are taken into account in the peak dry weather flow equations. Therefore, no further contingency for these components are necessary.

To calculate Peak Dry Weather Wastewater Flow (PDWF), ADWF was then multiplied by a peaking factor. The peaking factor was established based on the average ADS Flow Monitor readings during 28 dry weather days, November 1 to November 28. Figure 2 shows the equation and curve generated for PDWF, in mgd.

$$\text{Peak Dry Weather Factor} = 1.833 \times (\text{Average Dry Weather Flow Rate})^{-0.05}$$

Figure 2 - Peak Dry Weather Factor Curve





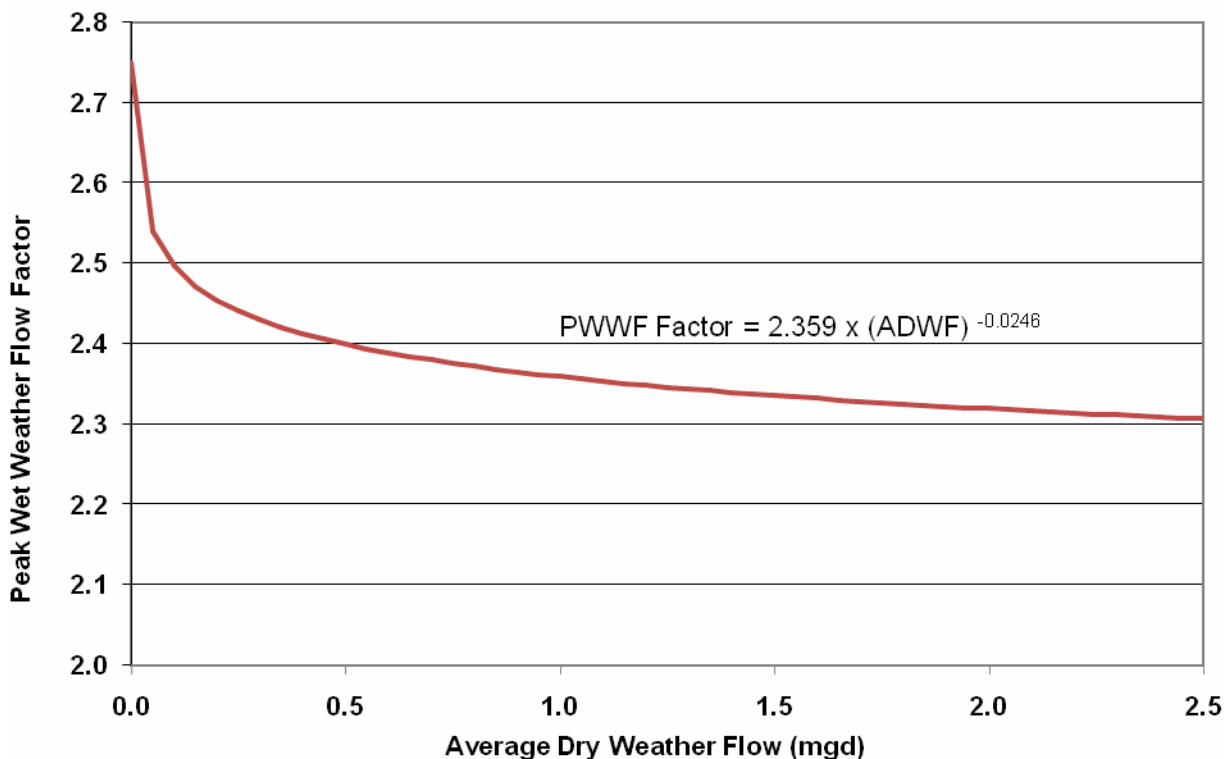
Peak Wet Weather Wastewater Flow (PWWF)

Peak Wet Weather Wastewater Flow (PPWF) is estimated as Peak Dry Weather Flow (PDWF) plus Rainfall Dependent Infiltration/Inflow (RDI/I). RDI/I is storm water that enters the wastewater collection system in direct response to the intensity and duration of individual rainfall events. RDI/I may recede gradually after a storm; however, any residual flow is considered to be a general increase in GWI.

In order to estimate PWWF, ADWF tributary to each wastewater facility was multiplied by the City's standard Peak Wet Weather Factor, as per the *2002 Sanitary Sewer Master Plan and Storm Sewer Evaluation*. This equation, as presented below in mgd, is illustrated in Figure 3.

$$\text{Peak Wet Weather Factor} = 2.359 \times (\text{Average Dry Weather Flow Rate})^{-0.0246}$$

Figure 3 - Peak Wet Weather Factor Curve





WASTEWATER COLLECTION SYSTEM CRITERIA

In analyzing a wastewater system, it is necessary to derive standards regarding the amount of flow that may be efficiently conveyed by a given wastewater pipeline. In an effort to provide reliable gravity sewer service while minimizing excessive wear or energy usage through force mains and lift stations, sanitary sewers shall be designed according to the following criteria:

Gravity Mains

- Pipes less than 12-inches in diameter: $\frac{1}{2}$ full at peak wet weather flow
- Pipes 12-inches in diameter and larger: $\frac{3}{4}$ full at peak wet weather flow
- Minimum velocity: 2 feet per second
- Maximum velocity: 10 feet per second
- Manning's n: .013
- Minimum slope requirements for pipes: 0.1% (0.001 ft/ft)
- Minimum pipe diameter for new construction: 8 in

In the event that a gravity main satisfies these criteria, but the pipeline immediately upstream requires upsizing, one additional design stipulation may be applicable. The purpose of this design stipulation is to insure that pipe-reaches increase in diameter as they progress downstream, and prevent, wherever possible, pipe-reaches from fluctuating up and down in diameter. If a gravity main requires upsizing to a diameter larger than the diameter of the gravity main(s) immediately downstream in the same pipe-reach, and the downstream pipe(s) are less than 750 ft in length before conveying flow to a gravity main of equal or larger diameter than the diameter recommended for the deficient upstream gravity main, then the downstream gravity main(s) of less than 750 ft shall be upsized to the same diameter of the upstream pipe.

Force Mains

- Minimum velocity: 3 feet per second
- Maximum velocity: 5 feet per second
- Maximum Allowable Headloss: 10 ft/1,000 ft of pipeline
- Maximum Desired Headloss: 5 ft/ 1,000 ft of pipeline

Lift Station Requirements

Lift Stations should be sized for peak wet weather flow with manufacturer's recommended cycling times for pumping equipment and should be sized based upon the following criteria:



- Lift stations should be capable of meeting the criteria with the largest capacity pump serving as standby.
- 65 percent pump efficiency should be assumed, except where other information is available.
- 95 percent motor efficiency should be assumed, except where other information is available.
- Wet well should be sized for a minimum of two hours of peak wet weather flow.
- Lift Stations should have emergency stand-by power.

HYDRAULIC MODEL DEVELOPMENT

IEC utilized MWH Soft, Inc.'s H2OMap Sewer GIS 9.0, SP 1, Update #1 software to create a wastewater collection system model for the City. The model was used to evaluate existing City owned wastewater facilities and provide recommendations for upsizing. The main components involved in developing the City's sewer hydraulic model are assigning attribute data to emulate the City's physical facilities and loading existing and projected wastewater flows.

The City's most current GIS data, originally developed by PBS&J as part of their previous master planning effort (ssewerpipe2.shp and ssmh2.shp), was utilized as the basis for the model infrastructure. All City owned wastewater facilities, excluding laterals, were then input into the hydraulic model from the City's GIS data. This included invert elevations, length, location and diameters for approximately 2,100 gravity mains, as well as two (2) lift stations.

Three (3) steady-state scenarios were created in the hydraulic model for each time-increment: average dry weather flow (ADWF), peak dry weather flow (PDWF) and peak wet weather flow (PWDF). These scenarios were then loaded with the wastewater flows developed as previously described.

HYDRAULIC MODEL CALIBRATION

When calibrating a hydraulic model, the best available metered data is utilized to either confirm or correct the results predicted by the model. The City provided ADS flow meter data for the NC2, NC3A, NC3B, NC4M, NC5, NC6, NC7M, NC8M, NC9M, NC10, NC11, NC12, NC13, NC15 and NC16 meter sites. Since data was recorded hourly for a full year, an average flow taken from a dry span of 28 days to ascertain an average dry weather flow which was then compared to the model during the ADWF scenario to ensure the model was producing the correct flow for each area. Flows occurring in the model during the PDWF scenario were compared to peak flows during the 28 day span to make certain that each area was peaking correctly in accordance with the ADS flow meter data. Table 6 presents the comparison between the results generated with the H2OMap steady state scenarios and the recorded ADS flow meter data.



Table 6 - Hydraulic Model Calibration

Flow Monitor	ADS Flow Meter Data			Hydraulic Model				
	ADWF (gpd)	PDWF (gpd)	Peak Dry Peak Factor	ADWF (gpd)	Percent Difference Between Model and Measured Flow	PDWF (gpd)	Peak Dry Peak Factor	Percent Difference Between Model and Measured Flow
NC2	393,732	723,700	1.84	398,131	1.12%	763,947	1.92	5.56%
NC3A	3,415,425	5,745,600	1.68	3,426,126	0.31%	5,905,398	1.72	2.78%
NC3B	571,287	971,700	1.70	553,247	-3.16%	1,044,448	1.89	7.49%
NC5	840,475	1,169,000	1.39	791,092	-5.88%	1,430,300	1.81	22.35%
NC7	1,387,498	2,712,200	1.95	1,380,533	-0.50%	2,512,880	1.82	-7.35%
NC8	101,369	593,900	5.86	102,118	0.74%	593,965	5.82	0.01%
NC13	33,250	60,800	1.83	33,608	1.08%	73,034	2.17	20.12%
NC15	163,499	311,700	1.91	162,226	-0.78%	335,439	2.07	7.62%
NC16	222,297	436,100	1.96	221,687	-0.27%	437,557	1.97	0.33%

Based on the results presented in Table 5, the H2OMap Sewer Model is calibrated, with 90% of the above flow rates predicted to within 10%. Furthermore, all average day flows are emulated within 6% of measured flows, and all but two (2) flow meters, NC5 and NC13, are predicting peak flows within 8% of measured flows. Peak flows at the NC13 meter, are 20% too high, but due to the low average flow at NC13 (33,250 gpd) this discrepancy is less than 15,000 gpd. Peak predictions at the NC5 meter are also 22% too large, which is attributed to the extremely low peak factor recorded, 1.39. It is recommended that the City further investigate flows tributary to meter NC5, and try to identify potentially large base flow infiltration. By insuring the H2OMap model is calibrated to the recorded data, results predicted for the Existing time increment represent the best flow projections and facility hydraulic input information currently available to the City.

HYDRAULIC MODELING RESULTS

Under existing flow conditions, 71 pipes are unable to satisfy the design criteria in PDWF. An additional 40 pipes are unable to meet criteria during a wet weather event, totaling 111 pipes unable to satisfy design criteria during Existing PWWF. Figure 4 illustrates the location of each gravity main based on the corresponding Pipe ID in Tables 7-10.

In order to establish the most encompassing view of pipes that will require replacement, the 20 year PWWF scenario was modeled. This will allow the City to upsize pipes appropriately by taking into account peak flow projections in the future. The 20 year scenario also takes into account the full



Downtown Specific Plan being implemented and any upsizing needed in that area. Under the 20 year projected flows, 119 pipes were unable to satisfy during the PDWF with an additional 37 pipes failing during a wet weather event, totaling 156 unable to meet criteria in the 20 year PWWF scenario.

For the gravity mains recommended for upsizing, average dry weather flow (ADWF), peak dry weather flow with peaking factor and subsequent depth-to-Diameter ratio (d/D), peak wet weather flow (PWWF) with the corresponding peaking factor, and resulting depth-to-Diameter ratios were projected for each pipeline in the 20 year time increment. Comprising a total of 42,864 linear feet, the 156 pipelines that require upsizing, recommended replacement diameters and their corresponding new depth-to-Diameter ratios, were calculated to satisfy the design criteria. Tables 7-10 present a summary of the 190 gravity mains comprising a total of 50,598 linear feet, with detailed hydraulic modeling results for all pipelines in the Existing, 5-Year, 10-Year and 20-Year time increment.



Table 7 - Gravity Mains Unable to Satisfy Design Criteria for Existing Conditions

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM1	8	43	0.005	538	534	128,617	2.04	261,758	0.47	2.49	319,927	0.53	10	0.39
GM2	8	314	0.005	534	532	135,080	2.03	274,038	0.49	2.48	335,439	0.55	10	0.40
GM3	8	392	0.007	532	531	141,543	2.02	286,318	0.46	2.47	350,304	0.52	10	0.38
GM4	8	350	0.024	531	530	142,190	2.02	287,611	0.33	2.48	352,243	0.37	10	0.28
GM5	8	371	0.045	530	470	142,836	2.02	288,904	0.28	2.48	353,535	0.31	10	0.24
GM6	8	396	0.007	470	469	173,213	2.00	347,072	0.52	2.47	427,216	0.59	10	0.43
GM7	8	276	0.007	469	468	175,152	2.00	350,950	0.52	2.46	431,740	0.59	10	0.43
GM8	8	235	0.005	468	467	175,798	2.00	352,243	0.58	2.47	433,679	0.67	10	0.48
GM9	8	132	0.010	467	466	189,371	1.99	377,449	0.48	2.46	465,995	0.55	10	0.41
GM10	8	203	0.007	466	465	190,017	1.99	378,742	0.55	2.46	467,287	0.63	10	0.46
GM11	8	173	0.007	465	464	194,541	1.99	386,498	0.55	2.45	476,982	0.63	10	0.46
GM12	8	212	0.038	464	463	196,480	1.99	390,375	0.35	2.45	482,152	0.39	10	0.30
GM13	8	268	0.020	463	462	196,480	1.99	390,375	0.41	2.45	482,152	0.46	10	0.35
GM16	8	94	0.005	460	459	196,480	1.99	390,375	0.61	2.45	482,152	0.71	10	0.51
GM17	8	42	0.007	459	509	196,480	1.99	390,375	0.56	2.45	482,152	0.64	10	0.47
GM18	8	213	0.035	509	453	196,480	1.99	390,375	0.35	2.45	482,152	0.40	10	0.30
GM19	8	91	0.041	453	452	197,127	1.99	391,668	0.34	2.45	483,445	0.38	10	0.29
GM20	8	163	0.046	452	451	199,066	1.98	394,900	0.33	2.45	487,969	0.37	10	0.28
GM21	8	112	0.014	451	450	199,712	1.98	396,192	0.46	2.45	489,262	0.52	10	0.39
GM22	8	122	0.032	450	1879	247,539	1.97	487,323	0.41	2.44	604,953	0.46	10	0.35
GM24	6	332	0.006	1074	1073	58,169	2.11	122,800	0.46	2.52	146,714	0.51	8	0.35
GM25	6	330	0.024	1073	1071	120,215	2.04	244,954	0.46	2.48	298,598	0.52	8	0.37
GM26	6	325	0.006	1071	1070	120,861	2.04	246,247	0.72	2.48	299,891	1.00	10	0.39
GM27	6	344	0.006	1070	1069	123,447	2.03	250,771	0.74	2.48	306,354	1.00	10	0.39
GM28	6	332	0.006	1069	1067	131,202	2.03	266,929	0.78	2.48	325,744	1.00	10	0.41
GM29	6	324	0.006	1067	1062	133,788	2.03	271,453	0.78	2.48	332,207	1.00	10	0.41
GM30	6	326	0.007	1062	1953	136,373	2.02	275,977	0.77	2.47	337,377	1.00	10	0.41
GM35	6	387	0.004	587	591	58,815	2.10	123,447	0.52	2.52	148,007	0.58	8	0.38
GM36	6	393	0.004	6207	502	681,218	1.87	1,272,598	1.00	2.38	1,622,256	1.00	15	0.60
GM37	15	383	0.001	500	3101	1,299,097	1.81	2,350,009	1.00	2.34	3,044,799	1.00	24	0.64
GM38	8	182	0.004	3101	591	1,321,718	1.81	2,388,788	1.00	2.34	3,096,505	1.00	24	0.42
GM39	6	142	0.004	1466	1465	63,339	2.10	133,141	0.56	2.52	159,640	0.63	8	0.42
GM40	6	318	0.007	1465	1417	65,924	2.11	138,958	0.47	2.53	166,750	0.53	8	0.36
GM41	6	164	0.008	1415	1413	78,851	2.08	164,165	0.50	2.52	198,419	0.56	8	0.38
GM42	8	176	0.001	1413	1412	84,668	2.08	175,798	0.55	2.51	212,638	0.62	10	0.46
GM43	8	106	0.010	1412	1411	85,314	2.08	177,091	0.32	2.52	214,577	0.36	10	0.27
GM44	6	239	0.013	1411	1410	91,131	2.06	188,078	0.48	2.50	228,150	0.53	10	0.27
GM47	8	280	0.007	1408	1407	160,287	2.01	321,866	0.49	2.47	395,546	0.55	10	0.41

Table 7 - Gravity Mains Unable to Satisfy Design Criteria for Existing Conditions

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM48	8	60	0.060	1407	1406	184,200	2.00	367,754	0.30	2.46	453,068	0.33	10	0.25
GM49	8	368	0.001	1406	1405	184,200	2.00	367,754	1.00	2.46	453,068	1.00	12	0.66
GM50	8	73	0.023	1405	1404	190,017	1.99	378,742	0.39	2.46	467,287	0.43	12	0.26
GM51	8	121	0.001	1404	1403	221,040	1.98	436,910	1.00	2.45	540,967	1.00	12	0.62
GM52	8	269	0.012	1403	1401	221,040	1.98	436,910	0.51	2.45	540,967	0.58	12	0.33
GM53	8	49	0.012	1401	344	221,687	1.98	438,203	0.51	2.45	542,260	0.58	12	0.33
GM54	18	190	0.001	1544b	1544a	1,295,219	1.81	2,343,545	1.00	2.34	3,035,751	1.00	24	0.70
GM55	18	84	0.001	1544a	1544	1,296,512	1.81	2,345,484	1.00	2.34	3,038,983	1.00	24	0.70
GM56	18	297	0.001	1544	1543	1,296,512	1.81	2,345,484	1.00	2.34	3,038,983	1.00	24	0.70
GM61	18	324	0.002	1440	1439	1,472,310	1.80	2,647,314	0.70	2.34	3,440,345	1.00	21	0.75
GM62	18	344	0.007	1439	1422	1,474,249	1.80	2,650,546	0.47	2.34	3,444,870	0.55	21	0.50
GM64	10	334	0.010	764	766	345,133	1.93	667,645	0.48	2.42	835,688	0.55	12	0.53
GM66	10	330	0.006	767	768	352,243	1.93	680,572	0.57	2.42	852,492	0.66	12	0.64
GM67	10	331	0.013	768	769	354,182	1.93	683,803	0.46	2.42	857,016	0.52	12	0.51
GM68	10	332	0.015	769	769a	394,253	1.92	756,837	0.46	2.41	951,379	0.52	12	0.51
GM69	10	241	0.015	769a	770	399,424	1.92	766,532	0.46	2.41	963,659	0.53	12	0.51
GM70	10	242	0.090	770	743	399,424	1.92	766,532	0.29	2.41	963,659	0.32	12	0.32
GM71	10	99	0.003	743	1386	400,070	1.92	767,825	1.00	2.41	964,951	1.00	15	0.61
GM72	10	234	0.018	1386	742a	436,264	1.91	833,749	0.47	2.41	1,050,265	0.53	15	0.37
GM73	8	33	0.047	354	353	440,788	1.91	841,505	0.50	2.41	1,061,253	0.57	12	0.39
GM74	10	78	0.013	353	352	442,081	1.91	844,090	0.52	2.41	1,063,838	0.60	12	0.57
GM75	10	30	0.013	352	352b	442,081	1.91	844,090	0.51	2.41	1,063,838	0.59	12	0.56
GM76	10	252	0.013	352b	351	445,312	1.91	849,907	0.52	2.41	1,071,594	0.60	12	0.58
GM77	10	120	0.014	351	350	456,946	1.91	871,235	0.51	2.40	1,098,739	0.59	12	0.57
GM78	10	151	0.002	350	1366	457,592	1.91	871,882	1.00	2.41	1,100,678	1.00	15	0.74
GM79	10	262	0.002	1366	1365	459,531	1.91	875,760	1.00	2.41	1,105,202	1.00	15	0.74
GM80	10	204	0.009	1365	1364	462,763	1.91	881,576	0.60	2.40	1,112,312	0.70	15	0.46
GM81	10	118	0.018	1364	1947	469,226	1.90	893,210	0.48	2.40	1,127,823	0.55	15	0.38
GM83	8	180	0.034	1994	1356	489,908	1.90	930,696	0.58	2.40	1,176,297	0.68	15	0.33
GM85	6	345	0.012	1233	398	91,131	2.06	187,432	0.48	2.50	227,504	0.54	8	0.39
GM86	8	404	0.004	189	406	166,750	2.00	334,146	0.60	2.47	411,058	0.70	12	0.39
GM87	8	350	0.024	406	407	168,042	2.00	336,731	0.36	2.47	414,289	0.41	12	0.25
GM88	8	60	0.004	407	407a	196,480	1.99	390,375	0.67	2.45	482,152	0.80	12	0.42
GM89	8	182	0.004	407a	407b	196,480	1.99	390,375	0.67	2.45	482,152	0.80	12	0.42
GM90	8	50	0.043	407b	408	201,651	1.98	400,070	0.34	2.45	494,433	0.38	12	0.23
GM108	8	391	0.009	37	1883	175,152	1.86	325,744	0.47	2.24	392,961	0.52	10	0.46
GM109	8	269	0.005	1883	39	179,676	1.86	333,500	0.56	2.24	403,302	0.63	12	0.41
GM110	8	331	0.005	39	3	187,432	1.86	347,719	0.57	2.24	420,752	0.65	12	0.45





Table 7 - Gravity Mains Unable to Satisfy Design Criteria for Existing Conditions

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM111	10	144	0.060	3	1	263,051	1.83	480,214	0.25	2.22	584,917	0.28	12	0.27
GM114	10	333	0.004	43	424	362,584	1.80	652,780	0.63	2.21	801,433	0.74	15	0.61
GM115	10	467	0.010	424	814	378,095	1.80	679,925	0.49	2.21	835,688	0.55	15	0.50
GM116	12	670	0.018	814	830	378,095	1.80	679,925	0.32	2.21	835,688	0.35	15	0.42
GM119	10	40	0.009	817	817a	379,388	1.80	682,511	0.51	2.21	838,919	0.58	15	0.57
GM120	10	263	0.008	817a	455	407,826	1.80	734,862	0.54	2.22	906,136	0.61	15	0.60
GM123	8	336	0.005	145	-	139,604	1.88	261,758	0.48	2.25	314,110	0.54	12	0.57
GM124	8	180	0.005	-	131	141,543	1.88	265,636	0.49	2.25	318,634	0.54	12	0.58
GM129	8	325	0.003	130	129	168,689	1.87	315,403	0.64	2.26	380,681	0.73	15	0.58
GM130	8	334	0.003	129	128	169,981	1.87	317,988	0.63	2.26	383,912	0.73	15	0.63
GM138	6	300	0.005	1185	1168	54,291	2.12	115,044	0.47	2.52	137,019	0.52	8	0.38
GM139	6	325	0.005	1168	1164	54,937	2.12	116,337	0.47	2.53	138,958	0.52	8	0.38
GM140	6	332	0.005	1164	1166	56,230	2.11	118,922	0.48	2.53	142,190	0.53	8	0.38
GM141	8	24	0.004	954	953	91,131	2.07	188,725	0.65	2.51	228,796	0.76	10	0.38
GM142	6	326	0.005	953	955	91,131	2.07	188,725	0.63	2.51	228,796	0.73	10	0.36
GM143	6	218	0.005	955	956	91,131	2.07	188,725	0.63	2.51	228,796	0.72	10	0.35
GM144	6	122	0.005	956	957	93,070	2.07	192,602	0.66	2.51	233,320	0.76	10	0.37
GM145	8	60	0.003	957	959	250,771	1.96	492,494	1.00	2.44	611,416	1.00	12	0.53
GM146	8	325	0.005	180	179	131,849	2.03	267,575	0.49	2.48	327,036	0.55	10	0.44
GM147	8	248	0.022	179	178	175,152	2.00	350,950	0.38	2.46	431,740	0.42	10	0.33
GM148	8	496	0.005	178	176	177,737	2.00	355,474	0.58	2.47	438,203	0.67	12	0.39
GM149	8	492	0.005	176	175	196,480	1.99	391,022	0.61	2.46	482,799	0.70	12	0.40
GM150	8	243	0.002	175	174	208,760	1.98	414,289	1.00	2.46	512,529	1.00	12	0.55
GM151	8	485	0.003	174	173	221,040	1.98	436,910	0.79	2.45	540,967	1.00	12	0.49
GM152	8	238	0.005	173	172	221,687	1.98	438,203	0.69	2.45	542,906	1.00	12	0.45
GM153	8	80	0.005	172	171	222,333	1.98	439,496	0.69	2.45	544,199	1.00	12	0.44
GM154	8	100	0.005	171	170	222,979	1.98	440,788	0.69	2.45	545,492	1.00	12	0.44
GM155	8	278	0.004	170	169	223,626	1.98	442,081	0.70	2.45	547,430	1.00	12	0.45
GM156	8	236	0.004	169	168a	224,272	1.98	443,373	0.71	2.45	548,723	1.00	12	0.45
GM157	8	43	0.009	168a	168	224,272	1.98	443,373	0.55	2.45	548,723	0.63	12	0.37
GM158	8	313	0.005	168	166	224,918	1.98	444,666	0.70	2.45	550,662	1.00	12	0.45
GM159	8	20	0.001	166	550	224,918	1.98	444,666	1.00	2.45	550,662	1.00	12	0.74
GM160	10	241	0.014	550	551	240,430	1.97	473,750	0.36	2.44	587,502	0.41	12	0.34
GM167	8	467	0.003	702	701	111,813	2.03	227,504	0.51	2.48	277,270	0.57	10	0.45
GM168	8	457	0.002	6049	1892a	102,118	5.82	593,965	1.00	7.27	741,972	1.00	10	0.49
GM169	8	124	0.003	1639	1638	95,009	2.05	195,188	0.47	2.49	236,552	0.53	10	0.45
GM171	8	415	0.004	1629	1635	115,044	2.04	234,613	0.49	2.49	286,318	0.55	10	0.44
GM173	8	305	0.005	1636	1637	115,044	2.04	234,613	0.46	2.49	286,318	0.51	10	0.41

Table 7 - Gravity Mains Unable to Satisfy Design Criteria for Existing Conditions

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Wet Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM174	8	321	0.005	1637	1638	115,044	2.04	234,613	0.47	2.49	286,318	0.53	10	0.42
GM175	10	238	0.003	1638	1804	210,053	1.98	415,582	0.51	2.45	513,822	0.58	12	0.50
GM176	10	657	0.004	1804	1803	221,687	1.97	437,557	0.51	2.44	541,614	0.58	12	0.50
GM177	10	596	0.004	1803	1802	221,687	1.97	437,557	0.49	2.44	541,614	0.56	12	0.48
GM178	10	282	0.003	1802	1801	225,565	1.97	444,666	0.56	2.44	550,662	0.65	12	0.55
GM179	8	359	0.003	1753	1755	99,533	2.05	204,236	0.48	2.49	248,186	0.53	10	0.46
GM180	8	32	0.003	1755	1754	141,543	2.02	285,672	0.58	2.47	349,657	0.66	12	0.40
GM181	8	258	0.002	1754	1756	146,068	2.01	294,074	0.66	2.47	360,645	0.78	12	0.45
GM182	8	277	0.003	1756	1756a	148,007	2.01	297,952	0.60	2.47	365,169	0.69	12	0.42
GM183	8	71	0.001	1756a	1801a	148,007	2.01	297,952	1.00	2.47	365,169	1.00	12	0.55
GM185	12	399	0.002	1800-2	1800-1	372,925	1.93	718,058	0.65	2.42	901,612	0.77	15	0.60
GM186	12	404	0.002	1800-1	1800	372,925	1.93	718,058	0.65	2.42	901,612	0.78	15	0.60
GM187	12	650	0.002	1800	1799	372,925	1.93	718,058	0.64	2.42	901,612	0.76	15	0.59
GM188	12	781	0.002	1799	1798	372,925	1.93	718,058	0.65	2.42	901,612	0.77	15	0.60
GM189	12	440	0.002	1798	1797	372,925	1.93	718,058	0.65	2.42	901,612	0.78	15	0.60
GM190	12	335	0.002	1797	1796	379,388	1.92	729,692	0.65	2.42	916,478	0.78	15	0.60





Table 8 - Gravity Mains Unable to Satisfy Design Criteria for 5-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM1	8	43	0.005	538	534	129,910	2.03	264,344	0.48	2.48	322,512	0.54	10	0.39
GM2	8	314	0.005	534	532	136,373	2.03	276,624	0.49	2.48	338,670	0.55	10	0.40
GM3	8	392	0.007	532	531	143,482	2.02	290,196	0.46	2.48	355,474	0.52	10	0.38
GM4	8	350	0.024	531	530	144,129	2.02	290,843	0.33	2.48	356,767	0.37	10	0.28
GM5	8	371	0.045	530	470	144,775	2.02	292,135	0.28	2.47	358,060	0.32	10	0.24
GM6	8	396	0.007	470	469	175,798	2.00	352,243	0.52	2.47	433,679	0.59	10	0.43
GM7	8	276	0.007	469	468	177,737	2.00	355,474	0.53	2.47	438,203	0.60	10	0.43
GM8	8	235	0.005	468	467	178,383	2.00	356,767	0.59	2.46	439,496	0.68	10	0.48
GM9	8	132	0.010	467	466	192,602	1.99	383,912	0.49	2.46	473,750	0.56	10	0.41
GM10	8	203	0.007	466	465	193,249	1.99	385,205	0.55	2.46	475,043	0.63	10	0.46
GM11	8	173	0.007	465	464	197,773	1.99	392,961	0.56	2.45	484,738	0.64	10	0.46
GM12	8	212	0.038	464	463	199,712	1.98	396,192	0.35	2.45	489,262	0.39	10	0.30
GM13	8	268	0.020	463	462	199,712	1.98	396,192	0.41	2.45	489,262	0.47	10	0.35
GM14	8	492	0.015	462	461	199,712	1.98	396,192	0.45	2.45	489,262	0.51	10	0.38
GM15	8	361	0.038	461	460	199,712	1.98	396,192	0.35	2.45	489,262	0.39	10	0.30
GM16	8	94	0.005	460	459	199,712	1.98	396,192	0.61	2.45	489,262	0.71	10	0.51
GM17	8	42	0.007	459	509	199,712	1.98	396,192	0.56	2.45	489,262	0.65	10	0.47
GM18	8	213	0.035	509	453	199,712	1.98	396,192	0.36	2.45	489,262	0.40	10	0.30
GM19	8	91	0.041	453	452	200,358	1.98	397,485	0.34	2.45	491,201	0.38	10	0.29
GM20	8	163	0.046	452	451	202,297	1.98	401,363	0.33	2.45	495,725	0.37	10	0.28
GM21	8	112	0.014	451	450	202,944	1.98	402,655	0.46	2.45	497,018	0.52	10	0.39
GM22	8	122	0.032	450	1879	253,356	1.97	498,310	0.41	2.44	619,172	0.46	10	0.35
GM24	6	332	0.006	1074	1073	60,754	2.11	127,971	0.47	2.52	153,177	0.53	8	0.35
GM25	6	330	0.024	1073	1071	125,385	2.03	254,649	0.47	2.48	310,878	0.53	8	0.37
GM26	6	325	0.006	1071	1070	126,032	2.03	255,942	0.75	2.48	312,817	1.00	10	0.39
GM27	6	344	0.006	1070	1069	129,263	2.03	262,405	0.77	2.48	320,573	1.00	10	0.39
GM28	6	332	0.006	1069	1067	138,312	2.02	279,855	0.82	2.47	341,902	1.00	10	0.41
GM29	6	324	0.006	1067	1062	141,543	2.02	285,672	1.00	2.47	349,657	1.00	10	0.41
GM30	6	326	0.007	1062	1953	143,482	2.02	289,550	0.81	2.47	354,828	1.00	10	0.41
GM33	6	146	0.006	585	586	56,876	2.10	119,569	0.46	2.52	143,482	0.51	8	0.34
GM34	6	194	0.019	586	587	56,876	2.10	119,569	0.34	2.52	143,482	0.37	8	0.25
GM35	6	387	0.004	587	591	60,107	2.10	126,032	0.53	2.52	151,238	0.59	8	0.38
GM36	6	393	0.004	6207	502	696,730	1.87	1,300,390	1.00	2.38	1,658,449	1.00	15	0.60
GM37	15	383	0.001	500	3101	1,337,876	1.81	2,416,579	1.00	2.34	3,133,345	1.00	24	0.64
GM38	8	182	0.004	3101	591	1,361,144	1.80	2,456,651	1.00	2.34	3,186,343	1.00	24	0.42
GM39	6	142	0.004	1466	1465	63,985	2.10	134,434	0.56	2.53	161,579	0.64	8	0.42
GM40	6	318	0.007	1465	1417	66,571	2.11	140,251	0.47	2.52	168,042	0.53	8	0.36
GM41	6	164	0.008	1415	1413	79,497	2.08	165,457	0.51	2.52	200,358	0.57	8	0.38

Table 8 - Gravity Mains Unable to Satisfy Design Criteria for 5-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Wet Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM42	8	176	0.001	1413	1412	85,314	2.08	177,091	0.55	2.52	214,577	0.63	10	0.46
GM43	8	106	0.010	1412	1411	85,960	2.08	178,383	0.32	2.51	215,870	0.36	10	0.27
GM44	6	239	0.013	1411	1410	92,423	2.06	190,664	0.48	2.50	231,381	0.54	10	0.27
GM45	6	270	0.016	1410	1409	93,070	2.06	191,956	0.45	2.50	232,674	0.51	10	0.25
GM46	8	239	0.026	1409	1408	162,226	2.01	325,744	0.35	2.47	400,070	0.39	10	0.29
GM47	8	280	0.007	1408	1407	162,226	2.01	325,744	0.49	2.47	400,070	0.56	10	0.41
GM48	8	60	0.060	1407	1406	186,786	1.99	372,279	0.30	2.46	459,531	0.33	10	0.25
GM49	8	368	0.001	1406	1405	186,786	1.99	372,279	1.00	2.46	459,531	1.00	12	0.66
GM50	8	73	0.023	1405	1404	192,602	1.99	383,266	0.39	2.46	473,104	0.44	12	0.26
GM51	8	121	0.001	1404	1403	223,626	1.97	441,435	1.00	2.45	546,784	1.00	12	0.62
GM52	8	269	0.012	1403	1401	223,626	1.97	441,435	0.51	2.45	546,784	0.58	12	0.33
GM53	8	49	0.012	1401	344	224,272	1.97	442,727	0.51	2.45	548,723	0.58	12	0.33
GM54	18	190	0.001	1544b	1544a	1,414,142	1.80	2,547,782	1.00	2.34	3,307,850	1.00	24	0.70
GM55	18	84	0.001	1544a	1544	1,415,434	1.80	2,549,721	1.00	2.34	3,310,436	1.00	24	0.70
GM56	18	297	0.001	1544	1543	1,415,434	1.80	2,549,721	1.00	2.34	3,310,436	1.00	24	0.70
GM61	18	324	0.002	1440	1439	1,603,512	1.79	2,870,940	0.74	2.33	3,738,944	1.00	21	0.75
GM62	18	344	0.007	1439	1422	1,605,451	1.79	2,874,172	0.50	2.33	3,743,468	0.58	21	0.50
GM64	10	334	0.010	764	766	386,498	1.92	742,618	0.51	2.41	933,282	0.59	12	0.53
GM65	10	330	0.015	766	767	392,961	1.92	754,898	0.46	2.41	948,793	0.53	12	0.48
GM66	10	330	0.006	767	768	394,900	1.92	758,130	0.61	2.41	953,318	0.72	12	0.64
GM67	10	331	0.013	768	769	397,485	1.92	762,654	0.48	2.41	959,134	0.56	12	0.51
GM68	10	332	0.015	769	769a	441,435	1.91	842,797	0.49	2.41	1,062,545	0.56	12	0.51
GM69	10	241	0.015	769a	770	447,251	1.91	853,138	0.49	2.41	1,076,118	0.57	12	0.51
GM70	10	242	0.090	770	743	447,251	1.91	853,138	0.30	2.41	1,076,118	0.34	12	0.32
GM71	10	99	0.003	743	1386	447,898	1.91	854,431	1.00	2.41	1,077,410	1.00	15	0.61
GM72	10	234	0.018	1386	742a	485,384	1.90	922,294	0.49	2.40	1,165,310	0.57	15	0.37
GM73	8	33	0.047	354	353	489,908	1.90	930,696	0.53	2.40	1,176,297	0.61	12	0.39
GM74	10	78	0.013	353	352	491,847	1.90	933,928	0.55	2.40	1,180,821	0.64	12	0.57
GM75	10	30	0.013	352	352b	491,847	1.90	933,928	0.54	2.40	1,180,821	0.63	12	0.56
GM76	10	252	0.013	352b	351	495,079	1.90	939,745	0.55	2.40	1,187,931	0.64	12	0.58
GM77	10	120	0.014	351	350	509,944	1.90	966,890	0.54	2.40	1,222,832	0.63	12	0.57
GM78	10	151	0.002	350	1366	510,590	1.90	968,183	1.00	2.40	1,224,771	1.00	15	0.74
GM79	10	262	0.002	1366	1365	513,176	1.90	972,707	1.00	2.40	1,230,588	1.00	15	0.74
GM80	10	204	0.009	1365	1364	517,700	1.90	981,109	0.64	2.40	1,240,929	0.77	15	0.46
GM81	10	118	0.018	1364	1947	524,809	1.89	993,389	0.51	2.40	1,257,733	0.59	15	0.38
GM83	8	180	0.034	1994	1356	546,784	1.89	1,032,815	0.62	2.39	1,309,438	0.74	15	0.33
GM85	6	345	0.012	1233	398	96,301	2.06	198,419	0.50	2.50	240,430	0.56	8	0.39
GM86	8	404	0.004	189	406	175,152	2.00	350,304	0.62	2.46	431,093	0.73	12	0.39





Table 8 - Gravity Mains Unable to Satisfy Design Criteria for 5-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM87	8	350	0.024	406	407	176,445	2.00	352,889	0.37	2.46	434,325	0.42	12	0.25
GM88	8	60	0.004	407	407a	206,175	1.98	409,119	0.69	2.45	505,420	1.00	12	0.42
GM89	8	182	0.004	407a	407b	206,175	1.98	409,119	0.69	2.45	505,420	1.00	12	0.42
GM90	8	50	0.043	407b	408	211,346	1.98	418,813	0.35	2.45	517,700	0.39	12	0.23
GM104	27	198	0.002	1249	199	3,524,367	1.72	6,065,685	0.64	2.29	8,060,219	0.80	33	0.61
GM108	8	391	0.009	37	1883	189,371	1.86	352,889	0.49	2.26	427,216	0.55	10	0.46
GM109	8	269	0.005	1883	39	193,895	1.86	360,645	0.59	2.26	437,557	0.67	12	0.41
GM110	8	331	0.005	39	3	202,297	1.86	376,156	0.60	2.26	456,946	0.69	12	0.45
GM111	10	144	0.060	3	1	280,502	1.83	512,529	0.26	2.23	626,281	0.29	12	0.27
GM113	10	300	0.013	2	43	389,729	1.80	703,193	0.46	2.22	866,065	0.52	12	0.61
GM114	10	333	0.004	43	424	389,729	1.80	703,193	0.67	2.22	866,065	0.79	15	0.61
GM115	10	467	0.010	424	814	411,058	1.80	740,679	0.51	2.22	913,246	0.58	15	0.50
GM116	12	670	0.018	814	830	411,058	1.80	740,679	0.33	2.22	913,246	0.37	15	0.42
GM119	10	40	0.009	817	817a	412,997	1.80	743,911	0.54	2.22	917,770	0.62	15	0.57
GM120	10	263	0.008	817a	455	453,715	1.80	818,237	0.57	2.24	1,014,071	0.66	15	0.60
GM123	8	336	0.005	145	-	144,775	1.88	271,453	0.49	2.25	326,390	0.55	12	0.57
GM124	8	180	0.005	-	131	148,007	1.88	277,916	0.50	2.26	334,146	0.56	12	0.58
GM129	8	325	0.003	130	129	184,200	1.87	345,133	0.68	2.27	418,167	0.80	15	0.58
GM130	8	334	0.003	129	128	186,139	1.88	349,011	0.68	2.27	422,691	0.80	15	0.63
GM131	6	149	0.004	6110	144	59,461	2.00	118,922	0.51	2.36	140,251	0.57	8	0.37
GM138	6	300	0.005	1185	1168	54,937	2.11	115,691	0.47	2.52	138,312	0.52	8	0.38
GM139	6	325	0.005	1168	1164	55,583	2.10	116,983	0.47	2.51	139,604	0.53	8	0.38
GM140	6	332	0.005	1164	1166	56,876	2.10	119,569	0.48	2.51	142,836	0.53	8	0.38
GM141	8	24	0.004	954	953	91,777	2.07	190,017	0.66	2.51	230,089	0.76	10	0.38
GM142	6	326	0.005	953	955	91,777	2.07	190,017	0.63	2.51	230,089	0.73	10	0.36
GM143	6	218	0.005	955	956	91,777	2.07	190,017	0.63	2.51	230,089	0.72	10	0.35
GM144	6	122	0.005	956	957	93,716	2.07	193,895	0.66	2.51	235,259	0.77	10	0.37
GM145	8	60	0.003	957	959	256,588	1.96	503,481	1.00	2.44	625,635	1.00	12	0.53
GM146	8	325	0.005	180	179	135,727	2.03	275,331	0.50	2.48	336,731	0.56	10	0.44
GM147	8	248	0.022	179	178	179,030	2.00	358,060	0.38	2.47	441,435	0.43	10	0.33
GM148	8	496	0.005	178	176	181,615	2.00	363,230	0.59	2.46	447,251	0.68	12	0.39
GM149	8	492	0.005	176	175	201,005	1.99	399,424	0.61	2.46	493,786	0.71	12	0.40
GM150	8	243	0.002	175	174	213,931	1.98	423,984	1.00	2.45	524,809	1.00	12	0.55
GM151	8	485	0.003	174	173	226,857	1.97	447,898	0.81	2.45	555,186	1.00	12	0.49
GM152	8	238	0.005	173	172	227,504	1.97	449,190	0.70	2.45	556,479	1.00	12	0.45
GM153	8	80	0.005	172	171	228,150	1.97	450,483	0.70	2.45	558,418	1.00	12	0.44
GM154	8	100	0.005	171	170	228,796	1.97	451,776	0.70	2.45	559,711	1.00	12	0.44
GM155	8	278	0.004	170	169	229,443	1.97	453,068	0.72	2.45	561,003	1.00	12	0.45

Table 8 - Gravity Mains Unable to Satisfy Design Criteria for 5-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Wet Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM156	8	236	0.004	169	168a	230,089	1.97	454,361	0.72	2.45	562,942	1.00	12	0.45
GM157	8	43	0.009	168a	168	230,089	1.97	454,361	0.56	2.45	562,942	0.64	12	0.37
GM158	8	313	0.005	168	166	230,735	1.97	455,007	0.71	2.45	564,235	1.00	12	0.45
GM159	8	20	0.001	166	550	230,735	1.97	455,007	1.00	2.45	564,235	1.00	12	0.74
GM160	10	241	0.014	550	551	246,247	1.97	484,738	0.37	2.44	601,721	0.41	12	0.34
GM167	8	467	0.003	702	701	120,861	2.03	244,954	0.53	2.47	297,952	0.60	10	0.45
GM168	8	457	0.002	6049	1892a	109,228	2.05	223,626	0.60	2.49	272,099	0.69	10	0.49
GM169	8	124	0.003	1639	1638	100,825	2.05	206,821	0.49	2.49	250,771	0.55	10	0.45
GM171	8	415	0.004	1629	1635	120,215	2.04	244,954	0.50	2.48	298,598	0.56	10	0.44
GM172	8	140	0.005	1635	1636	120,215	2.04	244,954	0.45	2.48	298,598	0.51	10	0.40
GM173	8	305	0.005	1636	1637	120,215	2.04	244,954	0.47	2.48	298,598	0.52	10	0.41
GM174	8	321	0.005	1637	1638	120,215	2.04	244,954	0.48	2.48	298,598	0.54	10	0.42
GM175	10	238	0.003	1638	1804	221,040	1.97	436,264	0.52	2.44	540,321	0.60	12	0.50
GM176	10	657	0.004	1804	1803	232,674	1.97	458,239	0.52	2.44	568,113	0.59	12	0.50
GM177	10	596	0.004	1803	1802	232,674	1.97	458,239	0.50	2.44	568,113	0.57	12	0.48
GM178	10	282	0.003	1802	1801	236,552	1.97	465,348	0.58	2.44	577,161	0.67	12	0.55
GM179	8	359	0.003	1753	1755	104,057	2.04	212,638	0.49	2.48	258,527	0.55	10	0.46
GM180	8	32	0.003	1755	1754	146,714	2.01	295,367	0.59	2.47	361,938	0.68	12	0.40
GM181	8	258	0.002	1754	1756	151,238	2.01	303,769	0.68	2.47	372,925	0.80	12	0.45
GM182	8	277	0.003	1756	1756a	153,177	2.01	307,647	0.61	2.46	377,449	0.70	12	0.42
GM183	8	71	0.001	1756a	1801a	153,177	2.01	307,647	1.00	2.46	377,449	1.00	12	0.55
GM185	12	399	0.002	1800-2	1800-1	389,083	1.92	747,789	0.67	2.42	939,745	0.81	15	0.60
GM186	12	404	0.002	1800-1	1800	389,083	1.92	747,789	0.67	2.42	939,745	0.81	15	0.60
GM187	12	650	0.002	1800	1799	389,083	1.92	747,789	0.66	2.42	939,745	0.79	15	0.59
GM188	12	781	0.002	1799	1798	389,083	1.92	747,789	0.67	2.42	939,745	0.80	15	0.60
GM189	12	440	0.002	1798	1797	389,083	1.92	747,789	0.67	2.42	939,745	0.82	15	0.60
GM190	12	335	0.002	1797	1796	395,546	1.92	759,422	0.67	2.41	954,610	0.81	15	0.60





Table 9 - Gravity Mains Unable to Satisfy Design Criteria for 10-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM1	8	43	0.005	538	534	130,556	2.03	265,636	0.48	2.49	324,451	0.54	10	0.39
GM2	8	314	0.005	534	532	137,019	2.03	277,916	0.49	2.48	339,963	0.55	10	0.40
GM3	8	392	0.007	532	531	144,129	2.02	291,489	0.47	2.48	357,413	0.53	10	0.38
GM4	8	350	0.024	531	530	144,775	2.02	292,782	0.34	2.48	358,706	0.37	10	0.28
GM5	8	371	0.045	530	470	145,421	2.02	294,074	0.29	2.48	359,999	0.32	10	0.24
GM6	8	396	0.007	470	469	178,383	2.00	356,767	0.53	2.46	439,496	0.60	10	0.43
GM7	8	276	0.007	469	468	180,322	2.00	360,645	0.53	2.47	444,666	0.60	10	0.43
GM8	8	235	0.005	468	467	180,969	2.00	361,938	0.59	2.46	445,959	0.68	10	0.48
GM9	8	132	0.010	467	466	195,834	1.99	389,729	0.49	2.46	481,506	0.56	10	0.41
GM10	8	203	0.007	466	465	196,480	1.99	391,022	0.56	2.46	482,799	0.64	10	0.46
GM11	8	173	0.007	465	464	201,005	1.98	398,778	0.56	2.45	492,494	0.65	10	0.46
GM12	8	212	0.038	464	463	203,590	1.98	403,302	0.35	2.45	498,957	0.40	10	0.30
GM13	8	268	0.020	463	462	203,590	1.98	403,302	0.42	2.45	498,957	0.47	10	0.35
GM14	8	492	0.015	462	461	203,590	1.98	403,302	0.45	2.45	498,957	0.51	10	0.38
GM15	8	361	0.038	461	460	203,590	1.98	403,302	0.35	2.45	498,957	0.39	10	0.30
GM16	8	94	0.005	460	459	203,590	1.98	403,302	0.62	2.45	498,957	0.72	10	0.51
GM17	8	42	0.007	459	509	203,590	1.98	403,302	0.57	2.45	498,957	0.65	10	0.47
GM18	8	213	0.035	509	453	203,590	1.98	403,302	0.36	2.45	498,957	0.40	10	0.30
GM19	8	91	0.041	453	452	204,236	1.98	404,594	0.35	2.45	500,249	0.39	10	0.29
GM20	8	163	0.046	452	451	206,175	1.98	408,472	0.34	2.45	504,774	0.38	10	0.28
GM21	8	112	0.014	451	450	206,821	1.98	409,765	0.47	2.45	506,713	0.53	10	0.39
GM22	8	122	0.032	450	1879	258,527	1.97	508,005	0.42	2.44	631,452	0.47	10	0.35
GM24	6	332	0.006	1074	1073	62,693	2.09	131,202	0.48	2.52	157,701	0.54	8	0.35
GM25	6	330	0.024	1073	1071	129,910	2.02	263,051	0.48	2.48	321,866	0.55	8	0.37
GM26	6	325	0.006	1071	1070	130,556	2.02	264,344	0.77	2.48	323,159	1.00	10	0.39
GM27	6	344	0.006	1070	1069	134,434	2.02	272,099	0.79	2.48	332,853	1.00	10	0.39
GM28	6	332	0.006	1069	1067	144,775	2.02	292,135	1.00	2.47	358,060	1.00	10	0.41
GM29	6	324	0.006	1067	1062	148,007	2.02	298,598	1.00	2.48	366,462	1.00	10	0.41
GM30	6	326	0.007	1062	1953	151,238	2.02	305,062	1.00	2.47	374,218	1.00	10	0.41
GM33	6	146	0.006	585	586	57,522	2.10	120,861	0.46	2.52	144,775	0.51	8	0.34
GM34	6	194	0.019	586	587	57,522	2.10	120,861	0.34	2.52	144,775	0.37	8	0.25
GM35	6	387	0.004	587	591	60,754	2.10	127,324	0.53	2.51	152,531	0.59	8	0.38
GM36	6	393	0.004	6207	502	714,827	1.86	1,332,706	1.00	2.38	1,700,460	1.00	15	0.60
GM37	15	383	0.001	500	3101	1,376,009	1.80	2,482,504	1.00	2.34	3,220,598	1.00	24	0.64
GM38	8	182	0.004	3101	591	1,399,276	1.80	2,521,929	1.00	2.34	3,273,596	1.00	24	0.42
GM39	6	142	0.004	1466	1465	67,217	2.10	140,897	0.58	2.52	169,335	0.66	8	0.42
GM40	6	318	0.007	1465	1417	69,802	2.10	146,714	0.49	2.53	176,445	0.54	8	0.36
GM41	6	164	0.008	1415	1413	82,729	2.08	171,920	0.52	2.52	208,114	0.58	8	0.38

Table 9 - Gravity Mains Unable to Satisfy Design Criteria for 10-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM42	8	176	0.001	1413	1412	89,192	2.07	2.07	2.51	224,272	0.64	10	0.46
GM43	8	106	0.010	1412	1411	89,838	2.07	2.06	2.51	186,139	0.33	10	0.27
GM44	6	239	0.013	1411	1410	96,301	2.06	2.06	2.50	198,419	0.49	10	0.27
GM45	6	270	0.016	1410	1409	96,948	2.06	2.06	2.50	199,712	0.46	10	0.25
GM46	8	239	0.026	1409	1408	166,750	2.00	2.00	2.47	334,146	0.35	10	0.29
GM47	8	280	0.007	1408	1407	166,750	2.00	2.00	2.47	334,146	0.50	10	0.41
GM48	8	60	0.060	1407	1406	191,310	1.99	1.99	2.46	380,681	0.30	10	0.25
GM49	8	368	0.001	1406	1405	191,310	1.99	1.99	2.46	380,681	1.00	12	0.66
GM50	8	73	0.023	1405	1404	197,127	1.99	1.99	2.46	391,668	0.39	12	0.26
GM51	8	121	0.001	1404	1403	228,150	1.97	1.97	2.44	450,483	1.00	12	0.62
GM52	8	269	0.012	1403	1401	228,150	1.97	1.97	2.44	450,483	0.52	12	0.33
GM53	8	49	0.012	1401	344	228,796	1.97	1.97	2.45	451,776	0.52	12	0.33
GM54	18	190	0.001	1544b	1544a	1,555,039	1.79	1.79	2.33	2,788,212	1.00	24	0.70
GM55	18	84	0.001	1544a	1544	1,556,331	1.79	1.79	2.33	2,790,797	1.00	24	0.70
GM56	18	297	0.001	1544	1543	1,556,331	1.79	1.79	2.33	2,790,797	1.00	24	0.70
GM61	18	324	0.002	1440	1439	1,762,506	1.78	1.78	2.33	3,140,454	0.81	21	0.75
GM62	18	344	0.007	1439	1422	1,764,445	1.78	1.78	2.33	3,143,686	0.52	21	0.50
GM64	10	334	0.010	764	766	463,409	1.91	1.90	2.40	882,869	0.57	12	0.53
GM65	10	330	0.015	766	767	471,165	1.90	1.90	2.40	896,442	0.51	12	0.48
GM66	10	330	0.006	767	768	473,104	1.90	1.90	2.40	900,320	0.69	12	0.64
GM67	10	331	0.013	768	769	475,689	1.90	1.90	2.40	904,844	0.54	12	0.51
GM68	10	332	0.015	769	769a	529,980	1.89	1.89	2.40	1,003,084	0.54	12	0.51
GM69	10	241	0.015	769a	770	537,089	1.89	1.89	2.40	1,015,364	0.55	12	0.51
GM70	10	242	0.090	770	743	537,736	1.89	1.89	2.40	1,016,657	0.33	12	0.32
GM71	10	99	0.003	743	1386	538,382	1.89	1.89	2.39	1,017,949	1.00	15	0.61
GM72	10	234	0.018	1386	742a	581,039	1.88	1.88	2.39	1,094,215	0.55	15	0.37
GM73	8	33	0.047	354	353	586,210	1.88	1.88	2.39	1,103,263	0.59	12	0.39
GM74	10	78	0.013	353	352	588,148	1.88	1.88	2.39	1,107,141	0.61	12	0.57
GM75	10	30	0.013	352	352b	588,148	1.88	1.88	2.39	1,107,141	0.60	12	0.56
GM76	10	252	0.013	352b	351	592,673	1.88	1.88	2.39	1,114,897	0.62	12	0.58
GM77	10	120	0.014	351	350	608,184	1.88	1.88	2.39	1,142,688	0.61	12	0.57
GM78	10	151	0.002	350	1366	608,831	1.88	1.88	2.39	1,143,981	1.00	15	0.74
GM79	10	262	0.002	1366	1365	611,416	1.88	1.88	2.39	1,148,505	1.00	15	0.74
GM80	10	204	0.009	1365	1364	616,586	1.88	1.88	2.39	1,157,554	0.72	15	0.46
GM81	10	118	0.018	1364	1947	624,342	1.88	1.88	2.39	1,171,126	0.56	15	0.38
GM82	10	122	0.034	1947	1994	646,317	1.87	1.87	2.38	1,210,552	0.48	15	0.33
GM83	8	180	0.034	1994	1356	649,549	1.87	1.87	2.38	1,216,369	0.70	15	0.33
GM85	6	345	0.012	1233	398	98,240	2.06	2.06	2.50	202,297	0.50	8	0.39





Table 9 - Gravity Mains Unable to Satisfy Design Criteria for 10-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM86	8	404	0.004	189	406	177,091	2.00	353,535	0.63	2.46	435,618	0.73	12	0.39
GM87	8	350	0.024	406	407	178,383	2.00	356,121	0.37	2.46	438,849	0.42	12	0.25
GM88	8	60	0.004	407	407a	208,114	1.98	412,350	0.70	2.45	509,944	1.00	12	0.42
GM89	8	182	0.004	407a	407b	208,114	1.98	412,350	0.70	2.45	509,944	1.00	12	0.42
GM90	8	50	0.043	407b	408	213,285	1.98	422,045	0.35	2.45	522,224	0.39	12	0.23
GM91	24	324	0.003	235	636	3,493,343	1.72	6,015,272	0.62	2.29	7,991,063	0.77	27	0.64
GM92	24	219	0.004	636	638	3,499,160	1.72	6,024,321	0.58	2.29	8,003,990	0.70	27	0.60
GM93	24	287	0.004	638	1326	3,513,379	1.72	6,047,588	0.58	2.29	8,035,013	0.70	27	0.60
GM102	6	202	0.002	338	236	29,084	2.20	63,985	0.47	2.58	74,973	0.51	10	0.44
GM103	8	292	0.012	236	237	29,084	2.20	63,985	0.19	2.58	74,973	0.20	10	0.28
GM104	27	198	0.002	1249	199	3,843,001	1.71	6,585,970	0.67	2.28	8,770,522	1.00	33	0.61
GM108	8	391	0.009	37	1883	195,188	1.86	363,876	0.50	2.26	441,435	0.56	10	0.46
GM109	8	269	0.005	1883	39	199,712	1.86	371,632	0.60	2.26	451,129	0.69	12	0.41
GM110	8	331	0.005	39	3	209,407	1.86	389,729	0.62	2.26	473,750	0.71	12	0.45
GM111	10	144	0.060	3	1	288,257	1.83	526,748	0.26	2.24	644,378	0.29	12	0.27
GM113	10	300	0.013	2	43	423,984	1.81	765,886	0.48	2.23	946,854	0.55	12	0.61
GM114	10	333	0.004	43	424	423,984	1.81	765,886	0.71	2.23	946,854	1.00	15	0.61
GM115	10	467	0.010	424	814	469,872	1.80	847,322	0.55	2.24	1,051,558	0.64	15	0.50
GM116	12	670	0.018	814	830	469,872	1.80	847,322	0.36	2.24	1,051,558	0.40	15	0.42
GM119	10	40	0.009	817	817a	482,152	1.80	869,943	0.59	2.24	1,080,642	0.69	15	0.57
GM120	10	263	0.008	817a	455	539,675	1.80	974,000	0.64	2.25	1,215,722	0.76	15	0.60
GM123	8	336	0.005	145	-	191,310	1.89	360,645	0.59	2.29	438,849	0.67	12	0.57
GM124	8	180	0.005	-	131	195,188	1.89	368,401	0.59	2.30	448,544	0.68	12	0.58
GM129	8	325	0.003	130	129	250,125	1.88	469,872	1.00	2.30	575,868	1.00	15	0.58
GM130	8	334	0.003	129	128	257,234	1.88	482,799	1.00	2.30	592,673	1.00	15	0.63
GM131	6	149	0.004	6110	144	78,204	2.00	156,409	0.60	2.39	186,786	0.68	8	0.37
GM133	10	330	0.011	307	226	372,279	1.85	690,267	0.48	2.30	855,724	0.55	15	0.50
GM138	6	300	0.005	1185	1168	54,291	2.12	115,044	0.47	2.52	137,019	0.52	8	0.38
GM139	6	325	0.005	1168	1164	54,937	2.12	116,337	0.47	2.53	138,958	0.52	8	0.38
GM140	6	332	0.005	1164	1166	56,230	2.11	118,922	0.48	2.53	142,190	0.53	8	0.38
GM141	8	24	0.004	954	953	91,131	2.07	188,725	0.65	2.51	228,796	0.76	10	0.38
GM142	6	326	0.005	953	955	91,131	2.07	188,725	0.63	2.51	228,796	0.73	10	0.36
GM143	6	218	0.005	955	956	91,131	2.07	188,725	0.63	2.51	228,796	0.72	10	0.35
GM144	6	122	0.005	956	957	93,070	2.07	192,602	0.66	2.51	233,320	0.76	10	0.37
GM145	8	60	0.003	957	959	255,295	1.96	500,896	1.00	2.44	622,403	1.00	12	0.53
GM146	8	325	0.005	180	179	140,897	2.02	285,026	0.51	2.48	349,011	0.58	10	0.44
GM147	8	248	0.022	179	178	184,200	2.00	367,754	0.39	2.46	453,715	0.43	10	0.33
GM148	8	496	0.005	178	176	186,786	2.00	372,925	0.60	2.46	460,178	0.70	12	0.39

Table 9 - Gravity Mains Unable to Satisfy Design Criteria for 10-Year Projection

Pipe ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM149	8	492	0.005	176	175	206,175	1.98	409,119	2.45	506,066	0.73	12	0.40
GM150	8	243	0.002	175	174	219,101	1.98	433,679	2.45	537,089	1.00	12	0.55
GM151	8	485	0.003	174	173	232,028	1.97	457,592	2.45	567,466	1.00	12	0.49
GM152	8	238	0.005	173	172	232,674	1.97	458,885	2.44	568,759	1.00	12	0.45
GM153	8	80	0.005	172	171	233,320	1.97	460,178	2.45	570,698	1.00	12	0.44
GM154	8	100	0.005	171	170	233,967	1.97	461,470	2.44	571,991	1.00	12	0.44
GM155	8	278	0.004	170	169	234,613	1.97	462,763	2.45	573,929	1.00	12	0.45
GM156	8	236	0.004	169	168a	235,259	1.97	464,056	2.45	575,222	1.00	12	0.45
GM157	8	43	0.009	168a	168	235,259	1.97	464,056	2.45	575,222	0.65	12	0.37
GM158	8	313	0.005	168	166	235,906	1.97	464,702	2.44	576,515	1.00	12	0.45
GM159	8	20	0.001	166	550	235,906	1.97	464,702	2.44	576,515	1.00	12	0.74
GM160	10	241	0.014	550	551	251,417	1.97	494,433	2.44	614,001	0.42	12	0.34
GM162	8	243	0.004	739	738	100,825	2.06	207,468	2.50	252,064	0.51	10	0.38
GM163	8	354	0.004	738	737	100,825	2.06	207,468	2.50	252,064	0.51	10	0.38
GM167	8	467	0.003	702	701	122,800	2.02	248,186	2.46	302,476	0.60	10	0.45
GM168	8	457	0.002	6049	1892a	111,167	2.05	227,504	2.49	276,624	0.70	10	0.49
GM169	8	124	0.003	1639	1638	111,167	2.04	226,857	2.48	275,977	0.58	10	0.45
GM171	8	415	0.004	1629	1635	120,861	2.04	246,247	2.49	300,537	0.56	10	0.44
GM172	8	140	0.005	1635	1636	120,861	2.04	246,247	2.49	300,537	0.51	10	0.40
GM173	8	305	0.005	1636	1637	120,861	2.04	246,247	2.49	300,537	0.53	10	0.41
GM174	8	321	0.005	1637	1638	120,861	2.04	246,247	2.49	300,537	0.54	10	0.42
GM175	10	238	0.003	1638	1804	232,028	1.97	456,946	2.44	566,174	0.62	12	0.50
GM176	10	657	0.004	1804	1803	244,308	1.97	480,214	2.44	595,904	0.61	12	0.50
GM177	10	596	0.004	1803	1802	244,308	1.97	480,214	2.44	595,904	0.59	12	0.48
GM178	10	282	0.003	1802	1801	248,186	1.96	487,323	2.44	604,953	0.69	12	0.55
GM179	8	359	0.003	1753	1755	118,276	2.04	241,076	2.49	294,074	0.59	10	0.46
GM180	8	32	0.003	1755	1754	162,872	2.01	327,036	2.47	402,009	0.73	12	0.40
GM181	8	258	0.002	1754	1756	168,042	2.00	336,731	2.47	414,289	1.00	12	0.45
GM182	8	277	0.003	1756	1756a	169,981	2.00	340,609	2.46	418,813	0.77	12	0.42
GM183	8	71	0.001	1756a	1801a	169,981	2.00	340,609	2.46	418,813	1.00	12	0.55
GM184	12	446	0.002	1801a	1800-2	418,167	1.91	800,140	2.41	1,006,962	0.79	15	0.57
GM185	12	399	0.002	1800-2	1800-1	418,167	1.91	800,140	2.41	1,006,962	1.00	15	0.60
GM186	12	404	0.002	1800-1	1800	418,167	1.91	800,140	2.41	1,006,962	1.00	15	0.60
GM187	12	650	0.002	1800	1799	418,167	1.91	800,140	2.41	1,006,962	1.00	15	0.59
GM188	12	781	0.002	1799	1798	418,167	1.91	800,140	2.41	1,006,962	1.00	15	0.60
GM189	12	440	0.002	1798	1797	418,167	1.91	800,140	2.41	1,006,962	1.00	15	0.60
GM190	12	335	0.002	1797	1796	424,630	1.91	811,774	2.41	1,021,827	1.00	15	0.60





Table 10 - Gravity Mains Unable to Satisfy Design Criteria for 20-Year Projection

Pipe ID	ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM1	127	8	43	0.005	538	534	134,434	2.03	272,746	0.49	2.48	333,500	0.55	10	0.39
GM2	126	8	314	0.005	534	532	142,190	2.02	287,611	0.50	2.48	352,243	0.56	10	0.40
GM3	125	8	392	0.007	532	531	150,592	2.02	303,769	0.48	2.47	372,279	0.54	10	0.38
GM4	124	8	350	0.024	531	530	151,238	2.01	304,415	0.34	2.47	374,218	0.38	10	0.28
GM5	123	8	371	0.045	530	470	151,884	2.01	305,708	0.29	2.47	375,510	0.32	10	0.24
GM6	48	8	396	0.007	470	469	186,786	1.99	372,279	0.54	2.46	459,531	0.62	10	0.43
GM7	47	8	276	0.007	469	468	188,725	1.99	376,156	0.54	2.46	464,056	0.62	10	0.43
GM8	46	8	235	0.005	468	467	190,017	1.99	378,742	0.61	2.46	467,287	0.71	10	0.48
GM9	45	8	132	0.010	467	466	206,821	1.98	410,411	0.51	2.45	507,359	0.58	10	0.41
GM10	44	8	203	0.007	466	465	207,468	1.98	411,704	0.58	2.45	509,298	0.66	10	0.46
GM11	43	8	173	0.007	465	464	211,992	1.98	419,460	0.58	2.45	518,993	0.67	10	0.46
GM12	42	8	212	0.038	464	463	214,577	1.98	424,630	0.36	2.45	525,456	0.41	10	0.30
GM13	41	8	268	0.020	463	462	214,577	1.98	424,630	0.43	2.45	525,456	0.49	10	0.35
GM14	40	8	492	0.015	462	461	214,577	1.98	424,630	0.47	2.45	525,456	0.53	10	0.38
GM15	39	8	361	0.038	461	460	214,577	1.98	424,630	0.36	2.45	525,456	0.41	10	0.30
GM16	38	8	94	0.005	460	459	214,577	1.98	424,630	0.64	2.45	525,456	0.76	10	0.51
GM17	37	8	42	0.007	459	509	214,577	1.98	424,630	0.59	2.45	525,456	0.68	10	0.47
GM18	36	8	213	0.035	509	453	214,577	1.98	424,630	0.37	2.45	525,456	0.42	10	0.30
GM19	35	8	91	0.041	453	452	215,224	1.98	425,923	0.35	2.45	526,748	0.40	10	0.29
GM20	34	8	163	0.046	452	451	217,809	1.98	430,447	0.35	2.45	533,212	0.39	10	0.28
GM21	33	8	112	0.014	451	450	218,455	1.98	431,740	0.48	2.45	534,504	0.55	10	0.39
GM22	32	8	122	0.032	450	1879	273,392	1.96	535,150	0.43	2.44	666,353	0.48	10	0.35
GM23	172	6	337	0.006	1078	1077	57,522	2.11	121,508	0.46	2.53	145,421	0.51	8	0.33
GM24	197	6	332	0.006	1074	1073	64,632	2.10	135,727	0.49	2.52	162,872	0.55	8	0.35
GM25	196	6	330	0.024	1073	1071	138,958	2.02	281,148	0.50	2.47	343,841	0.57	8	0.37
GM26	220	6	325	0.006	1071	1070	140,251	2.02	283,733	1.00	2.47	347,072	1.00	10	0.39
GM27	222	6	344	0.006	1070	1069	144,129	2.02	290,843	1.00	2.48	356,767	1.00	10	0.39
GM28	221	6	332	0.006	1069	1067	155,116	2.02	312,817	1.00	2.48	383,912	1.00	10	0.41
GM29	296	6	324	0.006	1067	1062	159,640	2.01	320,573	1.00	2.47	394,253	1.00	10	0.41
GM30	297	6	326	0.007	1062	1953	163,518	2.00	327,683	1.00	2.47	403,302	1.00	10	0.41
GM31	298	8	398	0.010	1953	1954	163,518	2.00	327,683	0.45	2.47	403,302	0.51	10	0.36
GM32	299	8	247	0.124	1954	1054	163,518	2.00	327,683	0.23	2.47	403,302	0.26	10	0.19
GM33	23	6	146	0.006	585	586	58,815	2.10	123,447	0.47	2.52	148,007	0.52	8	0.34
GM34	22	6	194	0.019	586	587	58,815	2.10	123,447	0.34	2.52	148,007	0.38	8	0.25
GM35	17	6	387	0.004	587	591	62,046	2.09	129,910	0.54	2.51	155,762	0.60	8	0.38

Table 10 - Gravity Mains Unable to Satisfy Design Criteria for 20-Year Projection

Pipe ID	ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM36	1522	6	393	0.004	6207	502	741,972	1.86	1,379,887	1.00	2.38	1,763,153	1.00	15	0.60
GM37	12	15	383	0.001	500	3101	1,450,335	1.80	2,609,182	1.00	2.34	3,389,933	1.00	24	0.64
GM38	16	8	182	0.004	3101	591	1,474,249	1.80	2,649,900	1.00	2.34	3,444,223	1.00	24	0.42
GM39	136	6	142	0.004	1466	1465	70,449	2.09	147,360	0.60	2.51	177,091	0.68	8	0.42
GM40	133	6	318	0.007	1465	1417	73,034	2.10	153,177	0.50	2.52	184,200	0.56	8	0.36
GM41	123	6	164	0.008	1415	1413	85,960	2.08	178,383	0.53	2.51	215,870	0.60	8	0.38
GM42	122	8	176	0.001	1413	1412	92,423	2.07	191,310	0.58	2.51	232,028	0.66	10	0.46
GM43	121	8	106	0.010	1412	1411	93,070	2.07	192,602	0.34	2.51	233,320	0.37	10	0.27
GM44	118	6	239	0.013	1411	1410	100,179	2.06	206,175	0.50	2.50	250,125	0.56	10	0.27
GM45	117	6	270	0.016	1410	1409	100,825	2.06	207,468	0.47	2.50	252,064	0.53	10	0.25
GM46	116	8	239	0.026	1409	1408	173,859	2.00	347,719	0.36	2.46	428,508	0.40	10	0.29
GM47	115	8	280	0.007	1408	1407	173,859	2.00	347,719	0.51	2.46	428,508	0.58	10	0.41
GM48	274	8	60	0.060	1407	1406	199,712	1.99	396,839	0.31	2.45	489,908	0.35	10	0.25
GM49	273	8	368	0.001	1406	1405	199,712	1.99	396,839	1.00	2.45	489,908	1.00	12	0.66
GM50	272	8	73	0.023	1405	1404	205,529	1.98	407,826	0.40	2.45	504,127	0.45	12	0.26
GM51	271	8	121	0.001	1404	1403	238,491	1.97	469,872	1.00	2.44	582,978	1.00	12	0.62
GM52	270	8	269	0.012	1403	1401	238,491	1.97	469,872	0.53	2.44	582,978	0.61	12	0.33
GM53	269	8	49	0.012	1401	344	239,137	1.97	471,165	0.53	2.44	584,271	0.61	12	0.33
GM54	1194	18	190	0.001	1544b	1544a	1,664,266	1.79	2,973,705	1.00	2.33	3,877,256	1.00	24	0.70
GM55	1193	18	84	0.001	1544a	1544	1,665,559	1.79	2,976,290	1.00	2.33	3,880,487	1.00	24	0.70
GM56	1192	18	297	0.001	1544	1543	1,665,559	1.79	2,976,290	1.00	2.33	3,880,487	1.00	24	0.70
GM57	1177	18	350	0.004	1462	1461	1,855,576	1.78	3,297,509	0.63	2.32	4,310,934	0.78	21	0.58
GM58	1152	18	169	0.006	1461	1481a	1,855,576	1.78	3,297,509	0.59	2.32	4,310,934	0.71	21	0.54
GM59	1151	18	66	0.008	1481a	1481	1,861,393	1.78	3,307,204	0.53	2.32	4,324,507	0.63	21	0.49
GM60	1148	18	335	0.010	1481	1440	1,885,953	1.78	3,349,215	0.50	2.32	4,380,090	0.58	21	0.46
GM61	1147	18	324	0.002	1440	1439	1,889,185	1.78	3,354,385	1.00	2.32	4,387,200	1.00	21	0.75
GM62	1146	18	344	0.007	1439	1422	1,891,124	1.78	3,357,617	0.55	2.32	4,391,724	0.65	21	0.50
GM63	1144	18	312	0.004	1422	1438	1,898,233	1.78	3,369,897	0.64	2.32	4,407,882	0.80	21	0.59
GM64	1056	10	334	0.010	764	766	541,614	1.89	1,023,766	0.63	2.39	1,297,158	0.75	12	0.53
GM65	1055	10	330	0.015	766	767	550,016	1.89	1,038,631	0.56	2.39	1,316,548	0.65	12	0.48
GM66	1054	10	330	0.006	767	768	552,601	1.89	1,043,156	0.78	2.39	1,323,011	1.00	12	0.64
GM67	1053	10	331	0.013	768	769	555,833	1.89	1,048,972	0.59	2.39	1,330,120	0.69	12	0.51
GM68	1040	10	332	0.015	769	769a	619,818	1.88	1,163,371	0.59	2.39	1,479,420	0.70	12	0.51
GM69	2474	10	241	0.015	769a	770	627,574	1.88	1,176,943	0.60	2.39	1,497,516	0.71	12	0.51
GM70	1039	10	242	0.090	770	743	628,220	1.88	1,178,236	0.36	2.39	1,498,809	0.41	12	0.32
GM71	1511	10	99	0.003	743	1386	628,866	1.88	1,179,529	1.00	2.39	1,500,102	1.00	15	0.61
GM72	1038	10	234	0.018	1386	742a	675,401	1.87	1,262,257	0.60	2.38	1,608,683	0.71	15	0.37
GM73	1025	8	33	0.047	354	353	681,218	1.87	1,272,598	0.65	2.38	1,622,256	0.78	12	0.39





Table 10 - Gravity Mains Unable to Satisfy Design Criteria for 20-Year Projection

Pipe ID	ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM74	1020	10	78	0.013	353	352	683,157	1.87	1,275,830	0.68	2.38	1,626,780	1.00	12	0.57
GM75	1021	10	30	0.013	352	352b	683,157	1.87	1,275,830	0.66	2.38	1,626,780	0.81	12	0.56
GM76	1022	10	252	0.013	352b	351	687,681	1.87	1,284,232	0.68	2.38	1,637,121	1.00	12	0.58
GM77	1079	10	120	0.014	351	350	704,486	1.87	1,313,962	0.67	2.38	1,676,546	0.82	12	0.57
GM78	1080	10	151	0.002	350	1366	705,132	1.87	1,315,255	1.00	2.38	1,677,839	1.00	15	0.74
GM79	1082	10	262	0.002	1366	1365	707,717	1.86	1,319,779	1.00	2.38	1,683,656	1.00	15	0.74
GM80	1081	10	204	0.009	1365	1364	712,888	1.86	1,328,828	0.82	2.38	1,695,936	1.00	15	0.46
GM81	1091	10	118	0.018	1364	1947	720,643	1.86	1,342,400	0.62	2.38	1,714,033	0.74	15	0.38
GM82	1097	10	122	0.034	1947	1994	744,557	1.86	1,385,057	0.52	2.38	1,769,616	0.60	15	0.33
GM83	1098	8	180	0.034	1994	1356	749,081	1.86	1,392,813	0.79	2.38	1,779,957	1.00	15	0.33
GM84	977	15	150	0.002	1358	1359	813,713	1.85	1,507,211	0.66	2.37	1,929,256	0.82	18	0.57
GM85	889	6	345	0.012	1233	398	109,228	2.04	222,979	0.53	2.49	271,453	0.60	8	0.39
GM86	922	8	404	0.004	189	406	189,371	1.99	376,803	0.66	2.45	464,702	0.77	12	0.39
GM87	923	8	350	0.024	406	407	190,664	1.99	379,388	0.39	2.45	467,934	0.43	12	0.25
GM88	924	8	60	0.004	407	407a	220,394	1.97	434,971	0.73	2.45	539,028	1.00	12	0.42
GM89	925	8	182	0.004	407a	407b	220,394	1.97	434,971	0.73	2.45	539,028	1.00	12	0.42
GM90	928	8	50	0.043	407b	408	225,565	1.97	444,666	0.36	2.44	551,308	0.40	12	0.23
GM91	926	24	324	0.003	235	636	3,792,588	1.71	6,503,242	0.65	2.28	8,657,416	1.00	27	0.64
GM92	784	24	219	0.004	636	638	3,798,405	1.71	6,512,936	0.61	2.28	8,670,343	0.75	27	0.60
GM93	781	24	287	0.004	638	1326	3,812,624	1.71	6,536,204	0.61	2.28	8,702,012	0.75	27	0.60
GM94	780	24	248	0.004	1326	1325	3,827,489	1.71	6,560,118	0.61	2.28	8,734,974	0.76	27	0.60
GM95	779	24	565	0.004	1325	1312	3,837,830	1.71	6,576,922	0.61	2.28	8,758,242	0.76	27	0.60
GM96	785	24	253	0.012	1312	1958	3,862,390	1.71	6,616,993	0.45	2.28	8,813,179	0.53	27	0.44
GM97	786	24	262	0.017	1958	1321	3,863,037	1.71	6,617,640	0.40	2.28	8,814,471	0.48	27	0.40
GM98	886	24	279	0.004	1321	1320	3,999,410	1.71	6,840,619	0.63	2.28	9,118,887	0.79	27	0.62
GM99	885	24	252	0.004	1320	1319	3,999,410	1.71	6,840,619	0.63	2.28	9,118,887	0.79	27	0.62
GM100	884	24	253	0.004	1319	1300	3,999,410	1.71	6,840,619	0.63	2.28	9,118,887	0.79	27	0.62
GM101	2423	6	128	0.010	337	338	84,668	2.07	175,152	0.49	2.50	211,992	0.55	8	0.36
GM102	2424	6	202	0.002	338	236	90,484	2.06	186,786	1.00	2.50	226,211	1.00	10	0.44
GM103	2428	8	292	0.012	236	237	100,825	2.06	207,468	0.34	2.50	252,064	0.38	10	0.28
GM104	2443	27	198	0.002	1249	199	4,237,254	1.71	7,225,824	0.72	2.28	9,647,574	1.00	33	0.61
GM105	2317	8	328	0.005	6	4	221,687	1.94	429,154	0.66	2.38	528,041	0.78	12	0.39
GM106	2318	8	333	0.006	4	2	272,099	1.92	523,517	0.74	2.38	648,902	1.00	12	0.43
GM107	2327	8	330	0.013	36	37	201,005	1.89	380,034	0.46	2.31	463,409	0.51	10	0.37
GM108	2331	8	391	0.009	37	1883	246,893	1.89	466,641	0.58	2.32	573,283	0.67	10	0.46
GM109	2332	8	269	0.005	1883	39	251,417	1.89	475,043	0.72	2.32	583,624	1.00	12	0.41
GM110	2335	8	331	0.005	39	3	288,904	1.89	544,845	0.80	2.33	672,816	1.00	12	0.45
GM111	2336	10	144	0.060	3	1	401,363	1.85	741,326	0.31	2.30	921,648	0.35	12	0.27

Table 10 - Gravity Mains Unable to Satisfy Design Criteria for 20-Year Projection

Pipe ID	ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM112	2337	10	73	0.010	1	2	482,152	1.84	0.57	2.30	1,108,434	0.66	12	0.49
GM113	2338	10	300	0.013	2	43	789,153	1.81	0.72	2.29	1,810,980	1.00	12	0.61
GM114	2339	10	333	0.004	43	424	802,726	1.81	1.00	2.29	1,842,003	1.00	15	0.61
GM115	2343	10	467	0.010	424	814	911,307	1.80	1.00	2.30	2,092,774	1.00	15	0.50
GM116	2344	12	670	0.018	814	830	911,307	1.80	0.52	2.30	2,092,774	0.60	15	0.42
GM117	2345	12	330	0.008	830	817	911,307	1.80	0.66	2.30	2,092,774	0.81	15	0.53
GM118	2305	8	371	0.005	46	5105	129,910	2.03	0.48	2.48	321,866	0.53	10	0.38
GM119	2346	10	40	0.009	817	817a	1,041,217	1.80	1.00	2.30	2,392,666	1.00	15	0.57
GM120	2347	10	263	0.008	817a	455	1,111,019	1.79	1.00	2.30	2,552,952	1.00	15	0.60
GM121	2359	8	162	0.006	149	148	139,604	2.01	0.49	2.45	342,548	0.55	10	0.39
GM122	2362	8	335	0.004	148	145	223,626	1.97	0.73	2.43	544,199	1.00	12	0.42
GM123	2365	8	336	0.005	145	-	422,045	1.91	1.00	2.40	1,013,425	1.00	12	0.57
GM124	2367	8	180	0.005	-	131	432,386	1.91	1.00	2.40	1,037,985	1.00	12	0.58
GM125	2369	8	329	0.019	131	130	453,715	1.90	0.67	2.40	1,088,398	1.00	12	0.40
GM126	2380	8	330	0.003	135	134	124,093	2.03	0.55	2.47	307,001	0.63	10	0.44
GM127	2381	8	333	0.003	134	133	129,263	2.02	0.56	2.47	318,634	0.64	10	0.45
GM128	2382	8	333	0.003	133	130	132,495	2.02	0.58	2.46	326,390	0.66	10	0.46
GM129	2383	8	325	0.003	130	129	618,525	1.87	1.00	2.38	1,471,664	1.00	15	0.58
GM130	2389	8	334	0.003	129	128	709,010	1.86	1.00	2.37	1,682,363	1.00	15	0.63
GM131	536	6	149	0.004	6110	144	58,169	2.11	0.52	2.52	146,714	0.58	8	0.37
GM132	2394	10	330	0.022	128	307	881,576	1.84	0.66	2.36	2,081,141	0.81	15	0.40
GM133	2399	10	330	0.011	307	226	929,404	1.84	1.00	2.36	2,191,661	1.00	15	0.50
GM134	2472	10	330	0.024	226	265	929,404	1.84	0.66	2.36	2,191,661	0.82	15	0.40
GM135	2408	8	660	0.005	87	278	120,215	1.99	0.46	2.41	290,196	0.52	10	0.37
GM136	2416	18	221	0.001	265	454	1,174,358	1.81	0.69	2.38	2,791,443	1.00	21	0.63
GM137	2417	18	292	0.008	454	455	1,174,358	1.81	0.41	2.38	2,791,443	0.48	21	0.38
GM138	1996	6	300	0.005	1185	1168	65,924	2.10	0.52	2.51	165,457	0.59	8	0.38
GM139	1997	6	325	0.005	1168	1164	67,217	2.10	0.53	2.51	168,689	0.59	8	0.38
GM140	1998	6	332	0.005	1164	1166	68,510	2.09	0.53	2.51	171,920	0.60	8	0.38
GM141	2239	8	24	0.004	954	953	110,520	2.05	0.75	2.50	275,977	1.00	10	0.38
GM142	2013	6	326	0.005	953	955	110,520	2.05	0.72	2.50	275,977	1.00	10	0.36
GM143	1546	6	218	0.005	955	956	110,520	2.05	0.71	2.50	275,977	1.00	10	0.35
GM144	1623	6	122	0.005	956	957	112,459	2.05	0.75	2.49	280,502	1.00	10	0.37
GM145	1629	8	60	0.003	957	959	298,598	1.95	1.00	2.43	725,168	1.00	12	0.53
GM146	1540	8	325	0.005	180	179	159,640	2.01	0.55	2.47	394,253	0.63	10	0.44
GM147	1575	8	248	0.022	179	178	208,114	1.98	0.41	2.45	510,590	0.46	10	0.33
GM148	1576	8	496	0.005	178	176	211,346	1.98	0.65	2.45	518,346	0.77	12	0.39
GM149	1582	8	492	0.005	176	175	233,967	1.97	0.68	2.45	572,637	0.82	12	0.40





Table 10 - Gravity Mains Unable to Satisfy Design Criteria for 20-Year Projection

Pipe ID	ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather Flow (gpd)	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM150	1583	8	243	0.002	175	174	248,832	1.97	489,908	1.00	2.44	608,184	1.00	12	0.55
GM151	1840	8	485	0.003	174	173	263,697	1.96	517,054	1.00	2.44	643,085	1.00	12	0.49
GM152	1841	8	238	0.005	173	172	264,344	1.96	518,346	0.79	2.44	645,024	1.00	12	0.45
GM153	1842	8	80	0.005	172	171	264,990	1.96	519,639	0.79	2.44	646,317	1.00	12	0.44
GM154	1843	8	100	0.005	171	170	265,636	1.96	520,932	0.79	2.44	647,610	1.00	12	0.44
GM155	1844	8	278	0.004	170	169	266,283	1.96	521,578	0.82	2.44	649,549	1.00	12	0.45
GM156	1845	8	236	0.004	169	168a	266,929	1.96	522,870	0.82	2.44	650,841	1.00	12	0.45
GM157	2221	8	43	0.009	168a	168	266,929	1.96	522,870	0.61	2.44	650,841	0.72	12	0.37
GM158	1839	8	313	0.005	168	166	267,575	1.96	524,163	0.80	2.44	652,134	1.00	12	0.45
GM159	1821	8	20	0.001	166	550	267,575	1.96	524,163	1.00	2.44	652,134	1.00	12	0.74
GM160	1877	10	241	0.014	550	551	285,026	1.95	556,479	0.40	2.43	693,498	0.45	12	0.34
GM161	1878	10	60	0.007	551	926	286,318	1.95	558,418	0.48	2.43	696,730	0.54	12	0.41
GM162	2166	8	243	0.004	739	738	107,935	2.05	221,040	0.47	2.49	268,868	0.53	10	0.38
GM163	1531	8	354	0.004	738	737	107,935	2.05	221,040	0.47	2.49	268,868	0.53	10	0.38
GM164	1718	8	349	0.005	737	703	109,228	2.05	223,626	0.46	2.49	272,099	0.51	10	0.37
GM165	1725	8	176	0.040	703	702A	190,664	1.99	380,034	0.34	2.46	468,580	0.38	10	0.28
GM166	1726	8	25	0.040	702A	702	131,202	1.99	260,466	0.28	2.45	321,220	0.31	10	0.23
GM167	1728	8	467	0.003	702	701	131,202	2.02	265,636	0.56	2.47	323,805	0.63	10	0.45
GM168	1716	8	457	0.002	6049	1892a	118,922	2.04	242,369	0.63	2.48	295,367	0.73	10	0.49
GM169	1781	8	124	0.003	1639	1638	128,617	2.03	261,112	0.56	2.48	318,634	0.64	10	0.45
GM170	1759	8	404	0.004	1617	1629	103,411	2.05	211,992	0.46	2.49	257,880	0.51	10	0.37
GM171	1770	8	415	0.004	1629	1635	142,190	2.02	286,965	0.55	2.47	351,596	0.62	10	0.44
GM172	1771	8	140	0.005	1635	1636	142,190	2.02	286,965	0.50	2.47	351,596	0.56	10	0.40
GM173	1773	8	305	0.005	1636	1637	142,190	2.02	286,965	0.51	2.47	351,596	0.58	10	0.41
GM174	1774	8	321	0.005	1637	1638	142,190	2.02	286,965	0.53	2.47	351,596	0.60	10	0.42
GM175	1786	10	238	0.003	1638	1804	270,807	1.96	529,980	0.59	2.43	659,243	0.68	12	0.50
GM176	1787	10	657	0.004	1804	1803	285,026	1.95	555,833	0.59	2.43	692,852	0.68	12	0.50
GM177	1788	10	596	0.004	1803	1802	285,026	1.95	555,833	0.56	2.43	692,852	0.65	12	0.48
GM178	1785	10	282	0.003	1802	1801	290,196	1.95	565,527	0.66	2.43	705,132	0.78	12	0.55
GM179	1805	8	359	0.003	1753	1755	138,312	2.02	279,855	0.58	2.48	342,548	0.66	10	0.46
GM180	2230	8	32	0.003	1755	1754	186,139	1.99	370,986	0.69	2.46	457,592	1.00	12	0.40
GM181	1783	8	258	0.002	1754	1756	191,310	1.99	380,681	1.00	2.46	469,872	1.00	12	0.45
GM182	1784	8	277	0.003	1756	1756a	193,249	1.99	384,559	0.72	2.46	475,043	1.00	12	0.42
GM183	2226	8	71	0.001	1756a	1801a	193,249	1.99	384,559	1.00	2.46	475,043	1.00	12	0.55
GM184	2228	12	446	0.002	1801a	1800-2	483,445	1.90	918,416	0.73	2.40	1,160,785	1.00	15	0.57
GM185	2227	12	399	0.002	1800-2	1800-1	483,445	1.90	918,416	0.79	2.40	1,160,785	1.00	15	0.60
GM186	1772	12	404	0.002	1800-1	1800	483,445	1.90	918,416	0.79	2.40	1,160,785	1.00	15	0.60
GM187	1846	12	650	0.002	1800	1799	483,445	1.90	918,416	0.77	2.40	1,160,785	1.00	15	0.59

Table 10 - Gravity Mains Unable to Satisfy Design Criteria for 20-Year Projection

Pipe ID	ID	Existing Diameter (in)	Pipe Length (ft)	Slope	Upstream Manhole ID	Downstream Manhole ID	Average Dry Weather Flow (gpd)	Peak Dry Weather Factor	Peak Dry Weather d/D	Peak Wet Weather Factor	Peak Wet Weather Flow (gpd)	Peak Wet Weather d/D	Replacement Diameter (in)	Replacement PWWF d/D
GM188	1847	12	781	0.002	1799	1798	483,445	1.90	1.90	0.79	1,160,785	1.00	15	0.60
GM189	1848	12	440	0.002	1798	1797	483,445	1.90	1.90	0.80	1,160,785	1.00	15	0.60
GM190	1849	12	335	0.002	1797	1796	490,555	1.90	1.90	0.79	1,177,590	1.00	15	0.60





GRAVITY MAIN UNIT COSTS

Unit costs used to develop capital cost estimates for proposed facilities were developed using the Engineering News Record Construction Cost Index (ENR-CCI) 20-city national average, and recently completed projects by IEC of a similar nature. These estimates are based on the best available data at the time of this report; however, since prices of materials and labor fluctuate with time, new estimates should be obtained during pre-design for proposed facilities to confirm budget amounts. Recent market trends have indicated substantial volatility in the price of construction materials such as steel and concrete. These factors, coupled with the high level of similar work currently being performed, have on occasion resulted in a generally unpredictable bidding environment.

The ENR-CCI is an inflation index used to adjust prices from one time period to another. The cost estimates presented in this report are based upon an ENR-CCI cost index of 8,293 for July 2008. Costs estimated herein for recommended facilities should be adjusted in the future either by making new estimates or by comparing the future ENR-CCI index to 8,293.

A factor of 20 percent of total construction cost has been used for engineering and administration, which includes, but is not limited to the following:

- Planning and design reports
- Design
- CEQA compliance
- Permits
- Surveying
- Service during construction (submittals, as-builts)
- Inspection

A factor of 30 percent has been added for contingencies. These engineering, administration and contingency factors have been incorporated into all unit costs. Estimates of probable capital costs provided represent Order of Magnitude level costs as established by the American Association of Cost Engineers (AACE) and represent an accuracy of +50% to -30%.

Table 11 presents the gravity main unit costs used in developing capital costs.



Table 11 - Gravity Main Unit Costs

Pipe Diameter (in)	Pipe Unit Cost (\$/LF)
8	\$195
10	\$210
12	\$225
15	\$260
18	\$290
21	\$340
24	\$375
27	\$420
33	\$485

Note: Units costs include Engineering, Legal, Administration, and Contingencies

PROPOSED GRAVITY MAIN CAPITAL IMPROVEMENT PROGRAM

The City's wastewater collection system will require improvements to 190 of the City's gravity mains. Though there are only 156 pipelines unable to satisfy design criteria, 34 additional pipes downstream of these must be upsized as well to ensure insure that pipe-reaches increase in diameter as they progress downstream, and prevent, wherever possible, pipe-reaches from fluctuating up and down in diameter. Estimated costs for these improvements are presented. Estimates of probable capital costs provided herein represent "Conceptual" level costs as established by the American Association of Cost Engineers (AACE) and represent an accuracy of +50% to -30%. Cost estimates should be verified and updated during the pre-design phase of each project.

Gravity main recommendations were based upon the collection system's ability to convey the peak wet weather flow in all time increments, while satisfying the established design criteria. 190 gravity mains, with a combined length of 50,598 linear feet, are presented in Table 12. Figure 4 illustrates the location of each gravity main based on the corresponding Pipe ID.

The total estimated probable cost of the gravity main capital improvement program is \$13.4 Million. Cost estimates for each project have been developed based upon the proposed replacement diameter, the estimated length of each project, and the unit costs presented in Table 11.



Figure 4A

Figure 4B

Legend

▲ ADS Flow Monitor

PS Lift Station

• Manhole

— Force Main

Gravity Mains

— Recommended for Existing time-increment

— Recommended for 5-year time-increment

— Recommended for 10-year time-increment

— Recommended for 20-year time-increment

— National City Pipeline

— County Pipeline

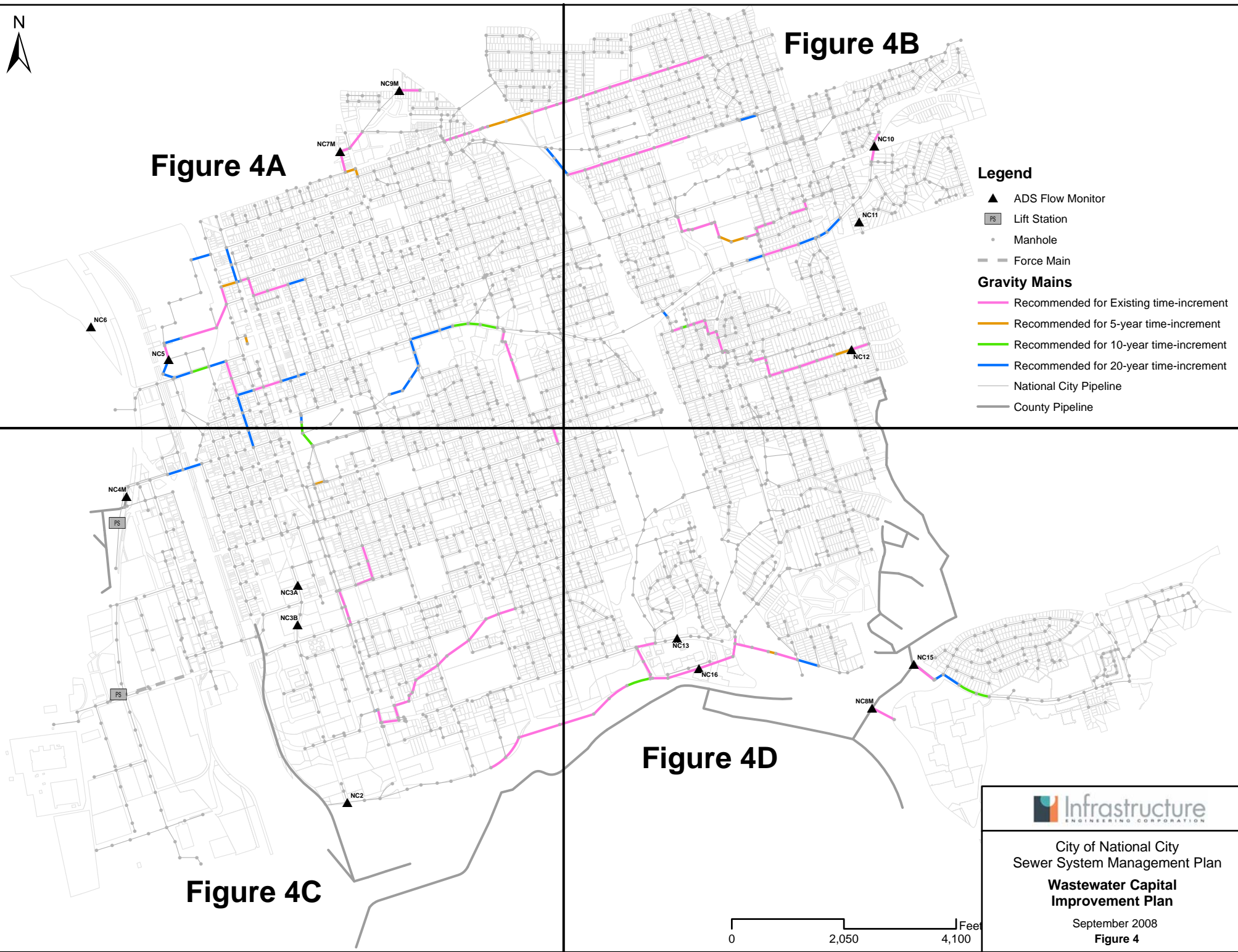


Figure 4C

Figure 4D

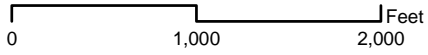


City of National City
Sewer System Management Plan

**Wastewater Capital
Improvement Plan**

September 2008

Figure 4

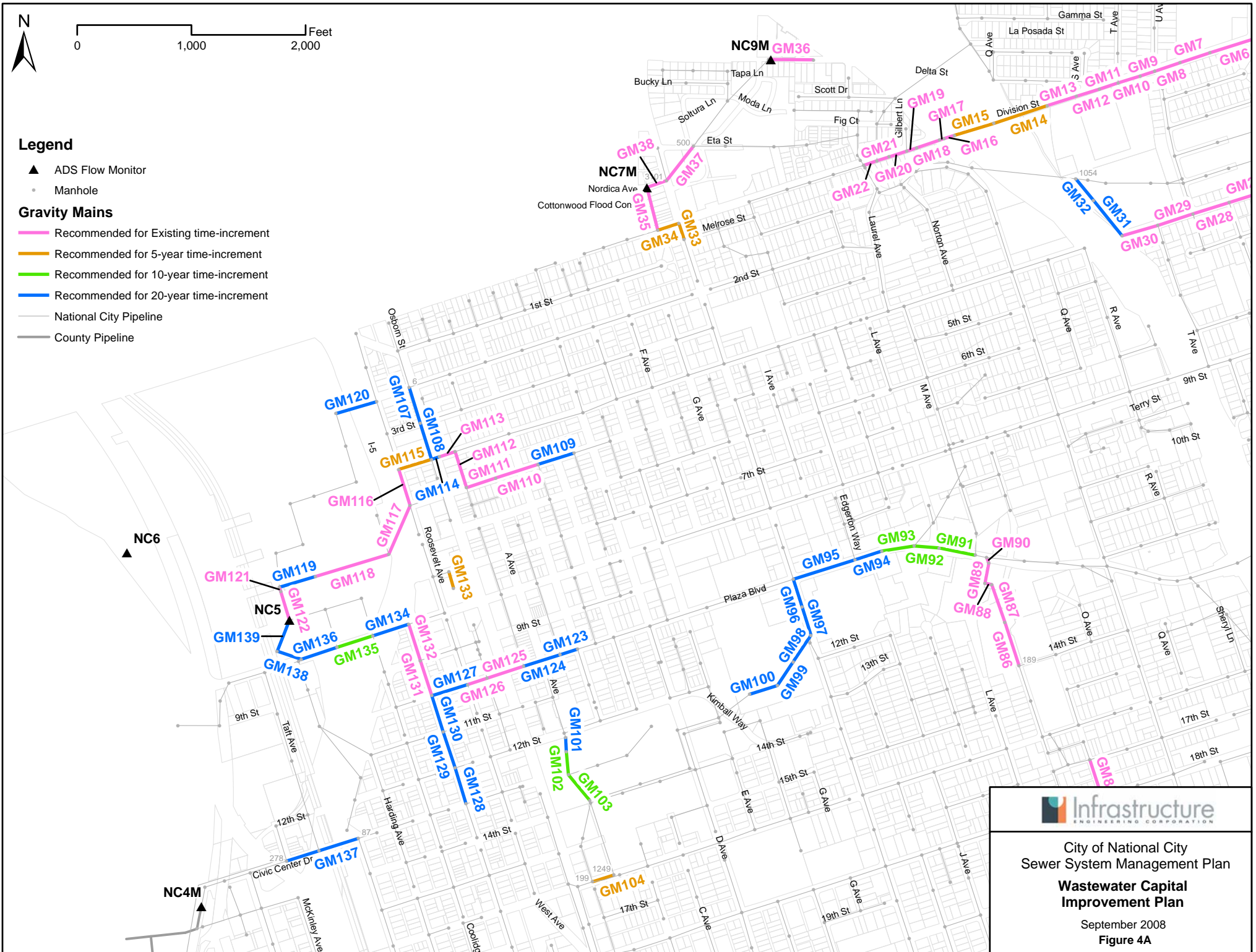


Legend

- ▲ ADS Flow Monitor
- Manhole

Gravity Mains

- Recommended for Existing time-increment
- Recommended for 5-year time-increment
- Recommended for 10-year time-increment
- Recommended for 20-year time-increment
- National City Pipeline
- County Pipeline



City of National City
 Sewer System Management Plan
**Wastewater Capital
 Improvement Plan**

September 2008
 Figure 4A



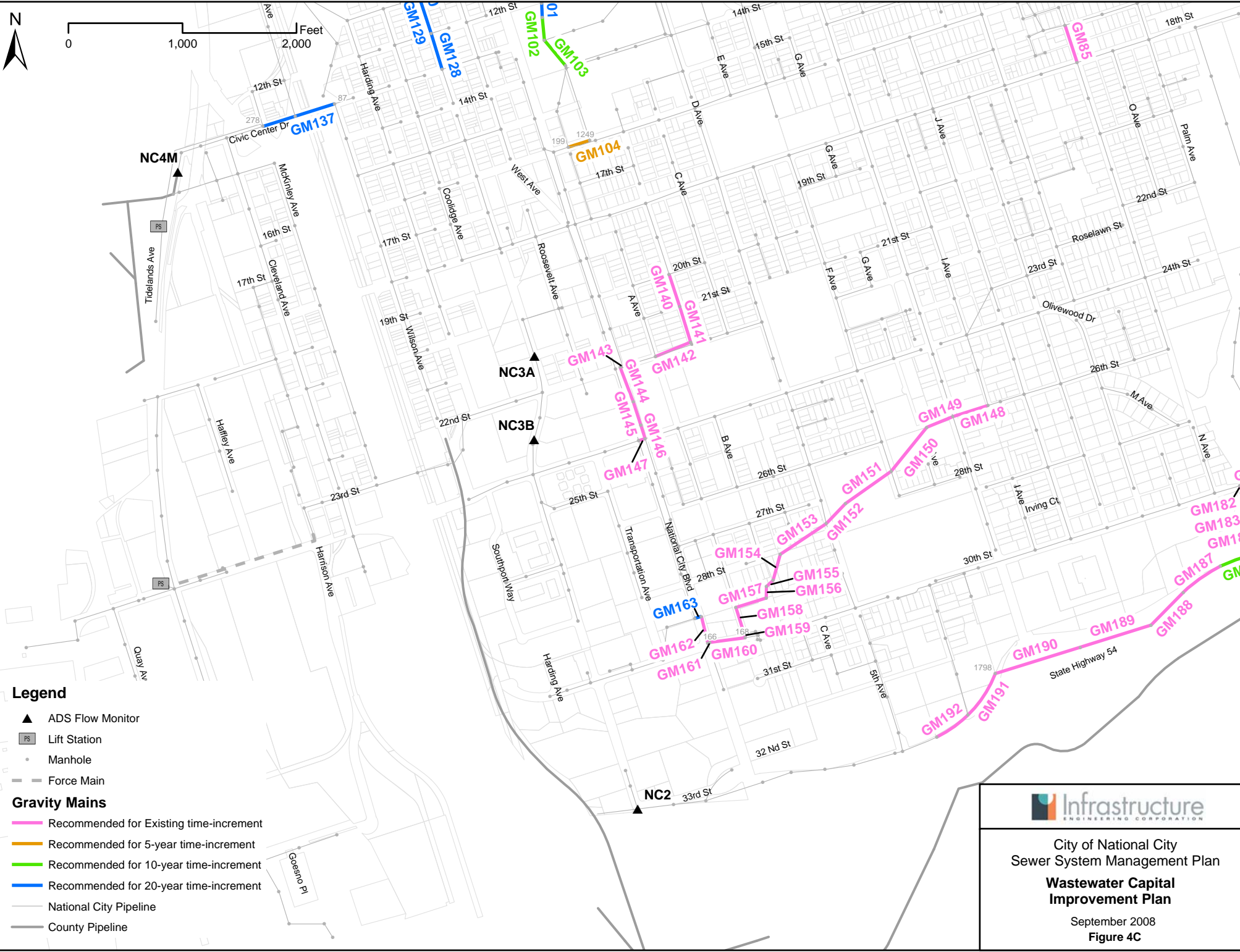
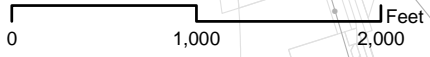
Legend

- ▲ ADS Flow Monitor
- Manhole
- Gravity Mains**
- Recommended for Existing time-increment
- Recommended for 5-year time-increment
- Recommended for 10-year time-increment
- Recommended for 20-year time-increment
- National City Pipeline
- County Pipeline



City of National City
Sewer System Management Plan
**Wastewater Capital
Improvement Plan**

September 2008
Figure 4B



Legend

- ▲ ADS Flow Monitor
- PS Lift Station
- Manhole
- Force Main

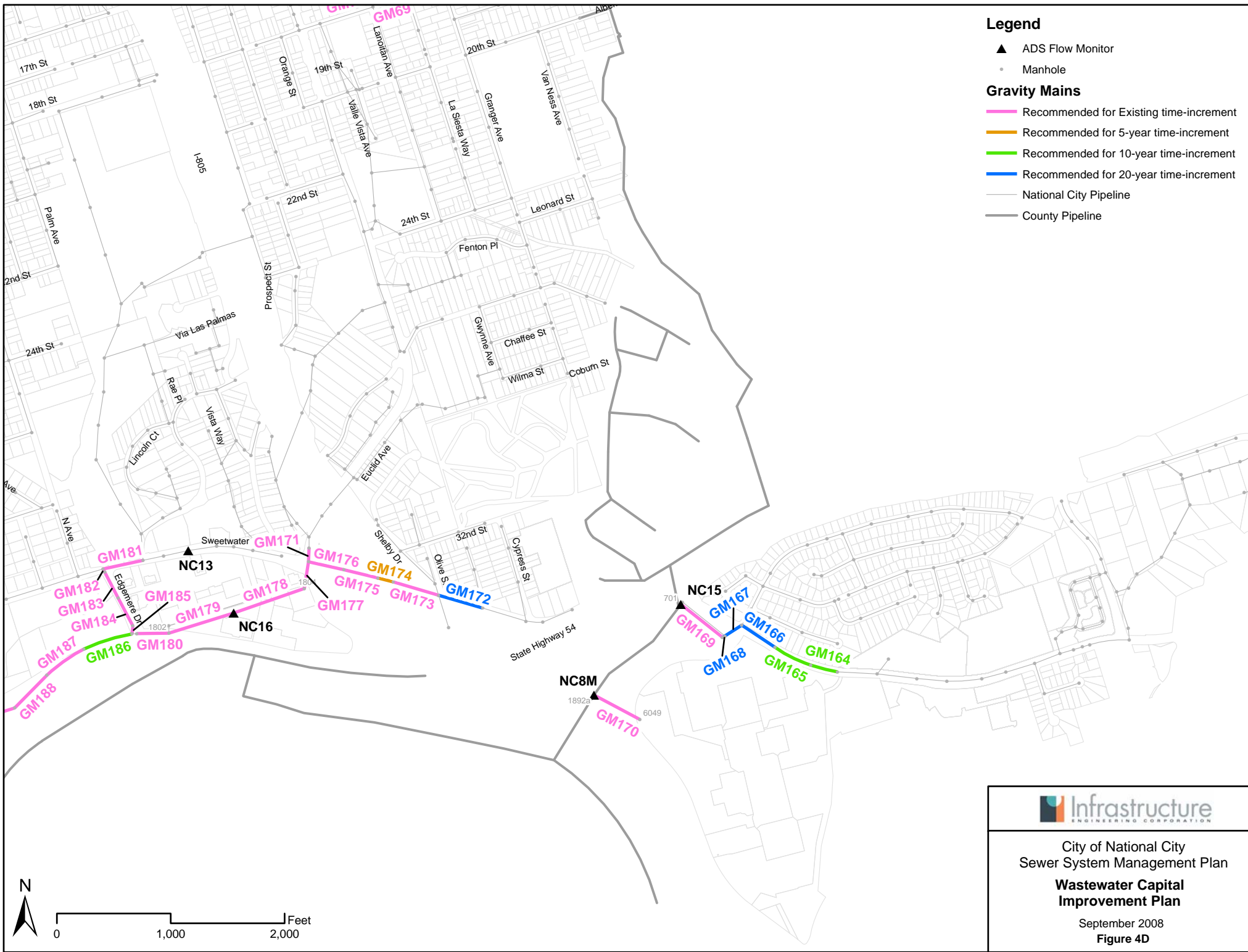
Gravity Mains

- Recommended for Existing time-increment
- Recommended for 5-year time-increment
- Recommended for 10-year time-increment
- Recommended for 20-year time-increment
- National City Pipeline
- County Pipeline



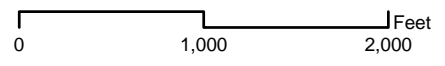
City of National City
 Sewer System Management Plan
**Wastewater Capital
 Improvement Plan**


September 2008
Figure 4C



Legend

- ▲ ADS Flow Monitor
 - Manhole
- Gravity Mains**
- Recommended for Existing time-increment
 - Recommended for 5-year time-increment
 - Recommended for 10-year time-increment
 - Recommended for 20-year time-increment
 - National City Pipeline
 - County Pipeline





City of National City
Sewer System Management Plan
**Wastewater Capital
Improvement Plan**
September 2008
Figure 4D



Table 12 - Recommended Gravity Main Capital Improvement Plan

Pipe ID	Upstream Manhole ID	Downstream Manhole ID	Pipe Length (ft)	Existing Diameter (in)	Replacement Diameter (in)	Unit Cost (\$/LF)	Total Cost (\$)
Existing							
GM1	538	534	43	8	10	\$210	\$8,985
GM2	534	532	314	8	10	\$210	\$65,950
GM3	532	531	392	8	10	\$210	\$82,306
GM4*	531	530	350	8	10	\$210	\$73,406
GM5*	530	470	371	8	10	\$210	\$77,927
GM6	470	469	396	8	10	\$210	\$83,237
GM7	469	468	276	8	10	\$210	\$57,928
GM8	468	467	235	8	10	\$210	\$49,446
GM9	467	466	132	8	10	\$210	\$27,730
GM10	466	465	203	8	10	\$210	\$42,594
GM11	465	464	173	8	10	\$210	\$36,360
GM12*	464	463	212	8	10	\$210	\$44,526
GM13*	463	462	268	8	10	\$210	\$56,262
GM16	460	459	94	8	10	\$210	\$19,802
GM17	459	509	42	8	10	\$210	\$8,916
GM18*	509	453	213	8	10	\$210	\$44,668
GM19*	453	452	91	8	10	\$210	\$19,024
GM20*	452	451	163	8	10	\$210	\$34,273
GM21	451	450	112	8	10	\$210	\$23,527
GM22*	450	1879	122	8	10	\$210	\$25,605
GM24	1074	1073	332	6	8	\$195	\$64,827
GM25	1073	1071	330	6	8	\$195	\$64,356
GM26	1071	1070	325	6	10	\$210	\$68,291
GM27	1070	1069	344	6	10	\$210	\$72,319
GM28	1069	1067	332	6	10	\$210	\$69,774
GM29	1067	1062	324	6	10	\$210	\$67,949
GM30	1062	1953	326	6	10	\$210	\$68,507
GM35	587	591	387	6	8	\$195	\$75,550
GM36	6207	502	393	6	15	\$260	\$102,299
GM37	500	3101	383	15	24	\$375	\$143,697
GM38	3101	591	182	8	24	\$375	\$68,424
GM39	1466	1465	142	6	8	\$195	\$27,632
GM40	1465	1417	318	6	8	\$195	\$62,033
GM41	1415	1413	164	6	8	\$195	\$31,949
GM42	1413	1412	176	8	10	\$210	\$36,912
GM43*	1412	1411	106	8	10	\$210	\$22,240
GM44	1411	1410	239	6	10	\$210	\$50,216



Table 12 - Recommended Gravity Main Capital Improvement Plan

Pipe ID	Upstream Manhole ID	Downstream Manhole ID	Pipe Length (ft)	Existing Diameter (in)	Replacement Diameter (in)	Unit Cost (\$/LF)	Total Cost (\$)
GM47	1408	1407	280	8	10	\$210	\$58,800
GM48*	1407	1406	60	8	10	\$210	\$12,671
GM49	1406	1405	368	8	12	\$225	\$82,757
GM50*	1405	1404	73	8	12	\$225	\$16,457
GM51	1404	1403	121	8	12	\$225	\$27,201
GM52	1403	1401	269	8	12	\$225	\$60,554
GM53	1401	344	49	8	12	\$225	\$11,014
GM54	1544b	1544a	190	18	24	\$375	\$71,235
GM55	1544a	1544	84	18	24	\$375	\$31,373
GM56	1544	1543	297	18	24	\$375	\$111,375
GM61	1440	1439	324	18	21	\$340	\$110,082
GM62*	1439	1422	344	18	21	\$340	\$117,039
GM64	764	766	334	10	12	\$225	\$75,127
GM66	767	768	330	10	12	\$225	\$74,250
GM67	768	769	331	10	12	\$225	\$74,570
GM68	769	769a	332	10	12	\$225	\$74,661
GM69	769a	770	241	10	12	\$225	\$54,289
GM70*	770	743	242	10	12	\$225	\$54,484
GM71	743	1386	99	10	15	\$260	\$25,804
GM72	1386	742a	234	10	15	\$260	\$60,894
GM73	354	353	33	8	12	\$225	\$7,439
GM74	353	352	78	10	12	\$225	\$17,480
GM75	352	352b	30	10	12	\$225	\$6,826
GM76	352b	351	252	10	12	\$225	\$56,607
GM77	351	350	120	10	12	\$225	\$27,000
GM78	350	1366	151	10	15	\$260	\$39,369
GM79	1366	1365	262	10	15	\$260	\$68,214
GM80	1365	1364	204	10	15	\$260	\$53,040
GM81	1364	1947	118	10	15	\$260	\$30,726
GM83	1994	1356	180	8	15	\$260	\$46,865
GM85	1233	398	345	6	8	\$195	\$67,336
GM86	189	406	404	8	12	\$225	\$90,900
GM87*	406	407	350	8	12	\$225	\$78,750
GM88	407	407a	60	8	12	\$225	\$13,565
GM89	407a	407b	182	8	12	\$225	\$40,881
GM90*	407b	408	50	8	12	\$225	\$11,303
GM108	37	1883	391	8	10	\$210	\$82,081
GM109	1883	39	269	8	12	\$225	\$60,482



Table 12 - Recommended Gravity Main Capital Improvement Plan

Pipe ID	Upstream Manhole ID	Downstream Manhole ID	Pipe Length (ft)	Existing Diameter (in)	Replacement Diameter (in)	Unit Cost (\$/LF)	Total Cost (\$)
GM110	39	3	331	8	12	\$225	\$74,575
GM111*	3	1	144	10	12	\$225	\$32,400
GM114	43	424	333	10	15	\$260	\$86,672
GM115	424	814	467	10	15	\$600**	\$280,014
GM116*	814	830	670	12	15	\$260	\$174,128
GM119	817	817a	40	10	15	\$260	\$10,326
GM120	817a	455	263	10	15	\$260	\$68,258
GM123	145	-	336	8	12	\$225	\$75,580
GM124	-	131	180	8	12	\$225	\$40,399
GM129	130	129	325	8	15	\$260	\$84,523
GM130	129	128	334	8	15	\$260	\$86,750
GM138	1185	1168	300	6	8	\$195	\$58,527
GM139	1168	1164	325	6	8	\$195	\$63,443
GM140	1164	1166	332	6	8	\$195	\$64,818
GM141	954	953	24	8	10	\$210	\$5,092
GM142	953	955	326	6	10	\$210	\$68,399
GM143	955	956	218	6	10	\$210	\$45,675
GM144	956	957	122	6	10	\$210	\$25,536
GM145	957	959	60	8	12	\$225	\$13,500
GM146	180	179	325	8	10	\$210	\$68,177
GM147*	179	178	248	8	10	\$210	\$51,975
GM148	178	176	496	8	12	\$225	\$111,693
GM149	176	175	492	8	12	\$225	\$110,665
GM150	175	174	243	8	12	\$225	\$54,675
GM151	174	173	485	8	12	\$225	\$109,114
GM152	173	172	238	8	12	\$225	\$53,543
GM153	172	171	80	8	12	\$225	\$18,000
GM154	171	170	100	8	12	\$225	\$22,534
GM155	170	169	278	8	12	\$225	\$62,647
GM156	169	168a	236	8	12	\$225	\$53,019
GM157	168a	168	43	8	12	\$225	\$9,677
GM158	168	166	313	8	12	\$225	\$70,470
GM159	166	550	20	8	12	\$225	\$4,433
GM160*	550	551	241	10	12	\$225	\$54,225
GM167	702	701	467	8	10	\$210	\$98,001
GM168	6049	1892a	457	8	10	\$210	\$95,881
GM169	1639	1638	124	8	10	\$210	\$25,978
GM171	1629	1635	415	8	10	\$550**	\$228,090



Table 12 - Recommended Gravity Main Capital Improvement Plan

Pipe ID	Upstream Manhole ID	Downstream Manhole ID	Pipe Length (ft)	Existing Diameter (in)	Replacement Diameter (in)	Unit Cost (\$/LF)	Total Cost (\$)
GM173	1636	1637	305	8	10	\$550**	\$167,916
GM174	1637	1638	321	8	10	\$550**	\$176,550
GM175	1638	1804	238	10	12	\$225	\$53,456
GM176	1804	1803	657	10	12	\$225	\$147,825
GM177	1803	1802	596	10	12	\$225	\$134,100
GM178	1802	1801	282	10	12	\$225	\$63,425
GM179	1753	1755	359	8	10	\$210	\$75,418
GM180	1755	1754	32	8	12	\$225	\$7,125
GM181	1754	1756	258	8	12	\$225	\$57,978
GM182	1756	1756a	277	8	12	\$225	\$62,275
GM183	1756a	1801a	71	8	12	\$225	\$15,914
GM185	1800-2	1800-1	399	12	15	\$260	\$103,836
GM186	1800-1	1800	404	12	15	\$260	\$104,962
GM187	1800	1799	650	12	15	\$260	\$169,088
GM188	1799	1798	781	12	15	\$260	\$203,008
GM189	1798	1797	440	12	15	\$260	\$114,511
GM190	1797	1796	335	12	15	\$260	\$86,976
Existing Subtotal			33,922		-	-	\$8,388,716
5-Year							
GM14	462	461	492	8	10	\$550**	\$270,662
GM15*	461	460	361	8	10	\$550**	\$198,451
GM33	585	586	146	6	8	\$195	\$28,436
GM34*	586	587	194	6	8	\$195	\$37,736
GM45	1410	1409	270	6	10	\$210	\$56,700
GM46*	1409	1408	239	8	10	\$210	\$50,291
GM65	766	767	330	10	12	\$225	\$74,250
GM104	1249	199	198	27	33	\$485	\$96,230
GM113	2	43	300	10	12	\$225	\$67,597
GM131	6110	144	149	6	8	\$195	\$29,117
GM172	1635	1636	140	8	10	\$550**	\$77,000
5-Year Subtotal			2,820		-	-	\$986,471
10-Year							
GM82	1947	1994	122	10	15	\$260	\$31,599
GM91	235	636	324	24	27	\$420	\$136,186
GM92*	636	638	219	24	27	\$420	\$92,148
GM93*	638	1326	287	24	27	\$420	\$120,600
GM102	338	236	202	6	10	\$210	\$42,336
GM103*	236	237	292	8	10	\$210	\$61,304



Table 12 - Recommended Gravity Main Capital Improvement Plan

Pipe ID	Upstream Manhole ID	Downstream Manhole ID	Pipe Length (ft)	Existing Diameter (in)	Replacement Diameter (in)	Unit Cost (\$/LF)	Total Cost (\$)
GM133	307	226	330	10	15	\$260	\$85,816
GM162	739	738	243	8	10	\$210	\$50,978
GM163	738	737	354	8	10	\$210	\$74,250
GM184	1801a	1800-2	446	12	15	\$260	\$115,845
10-Year Subtotal			2,818		-	-	\$811,061
20-Year							
GM23	1078	1077	337	6	8	\$195	\$65,691
GM31	1953	1954	398	8	10	\$210	\$83,635
GM32*	1954	1054	247	8	10	\$210	\$51,786
GM57	1462	1461	350	18	21	\$340	\$119,017
GM58*	1461	1481a	169	18	21	\$340	\$57,355
GM59*	1481a	1481	66	18	21	\$340	\$22,352
GM60*	1481	1440	335	18	21	\$340	\$114,044
GM63	1422	1438	312	18	21	\$340	\$106,114
GM84	1358	1359	150	15	18	\$290	\$43,643
GM94	1326	1325	248	24	27	\$420	\$104,215
GM95	1325	1312	565	24	27	\$420	\$237,505
GM96*	1312	1958	253	24	27	\$420	\$106,071
GM97*	1958	1321	262	24	27	\$420	\$110,099
GM98	1321	1320	279	24	27	\$420	\$117,216
GM99	1320	1319	252	24	27	\$420	\$105,670
GM100	1319	1300	253	24	27	\$420	\$106,457
GM101	337	338	128	6	8	\$195	\$24,863
GM105	6	4	328	8	12	\$225	\$73,799
GM106	4	2	333	8	12	\$225	\$74,900
GM107	36	37	330	8	10	\$210	\$69,340
GM112	1	2	73	10	12	\$225	\$16,501
GM117	830	817	330	12	15	\$260	\$85,800
GM118	46	5105	371	8	10	\$550**	\$204,077
GM121	149	148	162	8	10	\$210	\$34,002
GM122	148	145	335	8	12	\$225	\$75,287
GM125	131	130	329	8	12	\$225	\$74,011
GM126	135	134	330	8	10	\$210	\$69,355
GM127	134	133	333	8	10	\$210	\$69,862
GM128	133	130	333	8	10	\$210	\$70,004
GM132	128	307	330	10	15	\$260	\$85,837
GM134	226	265	330	10	15	\$260	\$85,835
GM135	87	278	660	8	10	\$210	\$138,543



Table 12 - Recommended Gravity Main Capital Improvement Plan

Pipe ID	Upstream Manhole ID	Downstream Manhole ID	Pipe Length (ft)	Existing Diameter (in)	Replacement Diameter (in)	Unit Cost (\$/LF)	Total Cost (\$)
GM136	265	454	221	18	21	\$340	\$75,228
GM137*	454	455	292	18	21	\$340	\$99,306
GM161	551	926	60	10	12	\$225	\$13,478
GM164	737	703	349	8	10	\$210	\$73,273
GM165*	703	702A	176	8	10	\$210	\$36,903
GM166*	702A	702	25	8	10	\$210	\$5,197
GM170	1617	1629	404	8	10	\$210	\$84,808
20-Year Subtotal			11,038		-	-	\$3,191,079
Total			50,598		-	-	\$13,377,326

* - Reflects gravity mains being upsized due to adjacent gravity upsizing driven by capacity criteria

** - Unit cost reflects the fact that pipeline is located under Interstate-5 or Interstate-805

South Metro Interceptor Capacity

Based on the projected flows attributed to National City treatment Costs presented in Table 3, potential impacts due to the projected wastewater flows to the City's ultimate capacity rights in the South Metro Interceptor were analyzed. According to City Staff, the City has average daily capacity rights of, at least, 7.10 mgd in the South Metro Interceptor. Based on the most recent *Quarterly Metropolitan Sewage System Billing Invoice*, prepared by the City of San Diego's Metropolitan Wastewater Division and submitted to the City in the First Quarter of 2008, the City is currently utilizing 4.25 mgd of their average daily flow capacity in the South Metro Interceptor.

As shown in Table 4, projected average daily wastewater flows with treatment costs allocated to the City are expected to increase 56% to 6.57 mgd in the 20-Year (Planning Horizon) time increment. This includes all wastewater flows projected in the Downtown Specific Plan Utilities Impact Report, prepared by IEC and submitted to the City in November 2006. Based on these projections, there is no additional South Metro Interceptor capacity required to accommodate the projected daily wastewater flows projected for the 20-Year (Planning Horizon) time increment.



CONCLUSION

Based on the H20Map hydraulic model developed as part of this study, 190 gravity mains will require upsizing to accommodate the 20-Year projected wastewater flows. Estimated probable costs for the Capital Improvement Plan total \$13.4 Million and are summarized in Table 13, with the Existing, 5-Year, 10-Year and 20-Year costs identified as \$8.4 Million, \$1.0 Million, \$0.8 Million and \$3.2 Million respectively. Estimates of probable capital costs provided represent Order of Magnitude level costs as established by the American Association of Cost Engineers (AACE) and represent an accuracy of +50% to -30%.

Table 13 - Summary of Capital Improvement Plan

Time-Increment	Total Length	Total Cost (\$)
Existing	33,922	\$8,388,716
5-Year	2,820	\$986,471
10-Year	2,818	\$811,061
20-Year	11,038	\$3,191,079
Total	50,598	\$13,377,326



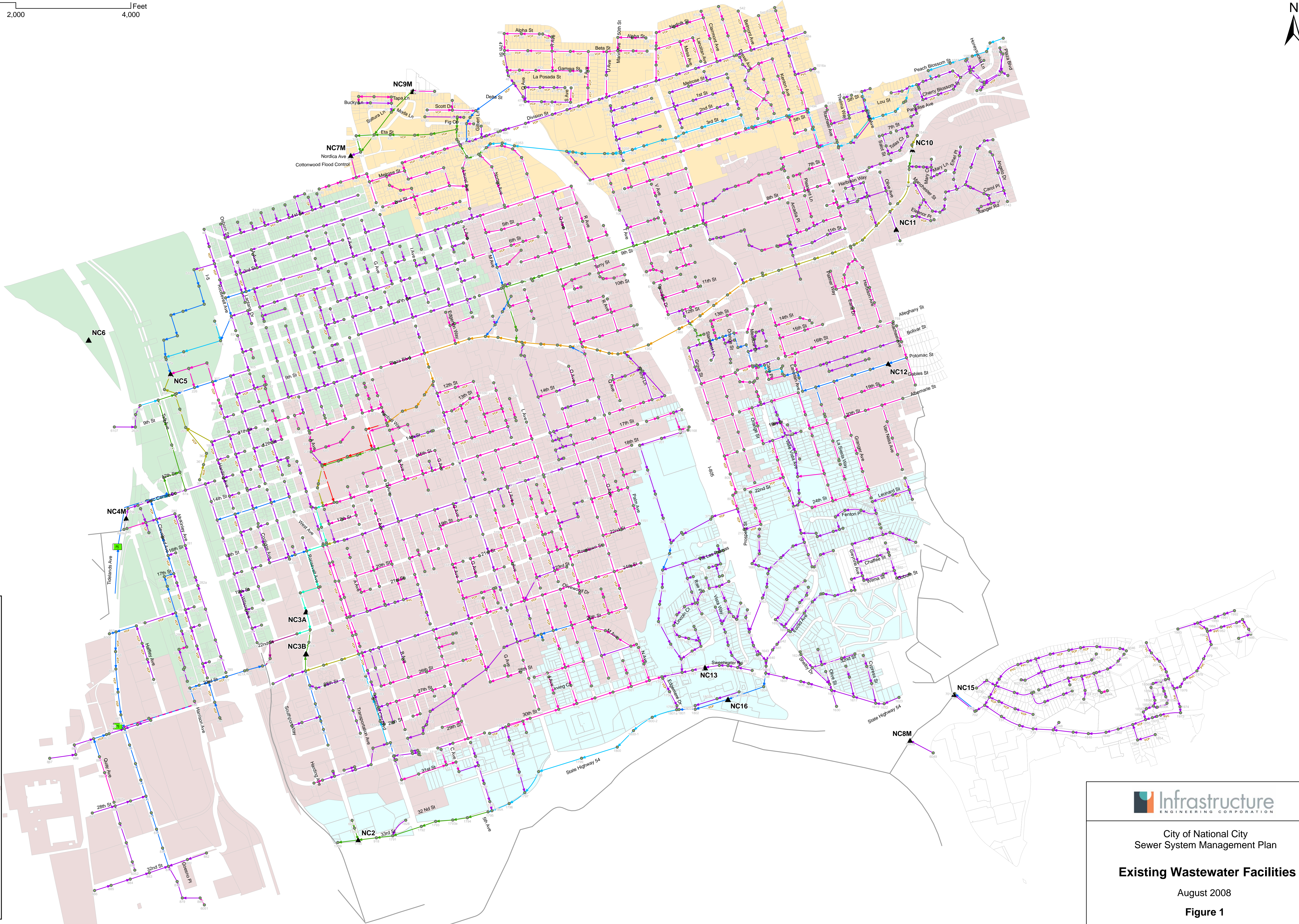
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Appendix L

City of National City
Existing Wastewater Facilities

Legend

- ▲ Flow Monitor
- Manhole
- Lift Station
- Force Main
- Gravity Main**
- 6 in. Diameter
- 8 in. Diameter
- 10 in. Diameter
- 12 in. Diameter
- 15 in. Diameter
- 18 in. Diameter
- 24 in. Diameter
- 27 in. Diameter
- 33 in. Diameter
- 36 in. Diameter
- County Line



Infrastructure
ENGINEERING CORPORATION

City of National City
Sewer System Management Plan

Existing Wastewater Facilities

August 2008

Figure 1



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Appendix M

City of National City
Grease Interceptor Inspection Sheet

Business	Street Address:	SIC	inspect_date	Inspector Name:	Likely type of grease control device (not a question on form: tentatively derived from other questions)	Does facility have a grease trap or grease interceptor?	Comment	When was the last time the grease was maintained?	Where is the grease control device located?	Location comment (if other)	How many grease fryers are at the facility?	About how often is fryer oil replaced?	How is used oil disposed of?	Comment	Do oil-recycling/grease bins have overhead coverage?	Comment	Do oil-recycling/grease bins have secondary containment?
Maharlika Café & Grill	1819 E Plaza Blvd.	5812	15-Apr-08	Manouchehr Dadkhah/Yolando Vitug	Trap	Yes	Grease trap	April 2008	Other	side the kitchen	2	2x/week	Outside rendering service		No		No
Mc Donalds #6773	2145 E Plaza Blvd.	5812	15-Apr-08	Manouchehr Dadkhah/Yolando Vitug	Interceptor	Yes		March 2008	Outside		6	Weekly	Outside rendering service		No		Yes
Popeyes Chicken	2210 E Plaza Blvd.	5812	15-Apr-08	Manouchehr Dadkhah/Yolando Vitug		No		NA	NA		6	Weekly	Outside rendering service		No		Yes
Da Kines	1635 Sweetwater Road #H	5812	17-Mar-08	Manouchehr Dadkhah	Trap	Yes		February 2008	Other	side the kitchen	1	Weekly	Outside rendering service		Yes		Yes
Mike's Giant NY Pizza #5	1635 Sweetwater Road, C-1	5812	17-Mar-08	Manouchehr Dadkhah	Trap	Yes		March 2008	Under the sink		1	Weekly	Outside rendering service		No		No
Casa De Oro Restaurant	1510 Sweetwater Road, A	5812	17-Mar-08	Manouchehr Dadkhah	Trap	Yes		March 2008	Under the sink		1	Weekly	Outside rendering service		No		No
Carl's Jr.	1502 Sweetwater Road	5812	17-Mar-08	Manouchehr Dadkhah		No		NA	NA		3	Weekly	Outside rendering service		No		Yes
Star Express	3124 E Plaza Blvd.	5812	14-Mar-08	Stefano Grossi	Trap	Yes		February 2008	Other	Kitchen floor	3	Daily	Outside rendering service		Yes		No
Valerios Family Bake Shop	2720 E Plaza Blvd., H	5461	14-Mar-08	Stefano Grossi	Trap	Yes		February 2008	Under the sink		2	2x/Weekly	Outside rendering service		No		No
SWAN HALL CATERING & BANQUET	401 MILE OF CARS WAY	5812	14-Mar-08	Manouchehr Dadkhah	Trap	Yes		February 2008	Under the sink		2	Monthly	Outside rendering service		Yes		No
Yum Yum Donut Franchise #502	3122 E Plaza Blvd.	5461	14-Mar-08	Stefano Grossi		No		NA	NA		1	Weekly	Other	See D8	NA		NA
Pinoy Ranch	3403 E Plaza Blvd., D-E	5411	14-Mar-08	Stefano Grossi		No		NA	NA		1	2x/month	Outside rendering service		No		No
Seven-Eleven #18978D	3100 E Plaza Blvd.	5411	14-Mar-08	Stefano Grossi		NA		NA	NA		NA	NA			NA		NA
ChowKing	2220 E Plaza Blvd., T	5812	13-Mar-08	Stefano Grossi	Interceptor	Yes		February	Outside		3	Weekly	Outside rendering service		No		No
Family Loompya Seafood Market	2720 E Plaza Blvd., A	5411	13-Mar-08	Stefano Grossi	Trap	Yes		NA	Under the sink		2	Weekly	Outside rendering service		Yes		No
Papa John's Pizza #1335	1130 Plaza Blvd.	5812	13-Mar-08	Manouchehr Dadkhah	Trap	Yes		December 2007	Under the sink		0	NA			NA		NA
Jack in the Box #80	3138 Plaza Blvd.	5812	13-Mar-08	Manouchehr Dadkhah		No		NA	NA		4	3/weekly	Outside rendering service		No	Open lid	Yes
Manila Seafood Oriental Market	2220 E Plaza Blvd., K	5411	13-Mar-08	Stefano Grossi		No		NA	NA		2	Weekly	Outside rendering service		No		No
FAMILY HOUSE OF PANCAKES	1900 E PLAZA BLVD	5812	13-Mar-08	Stefano Grossi		No		NA	NA		2	Weekly	Outside rendering service		No		No
CALIFORNIA PRODUCE CORPORATION	1736 E PLAZA BL	5431	13-Mar-08	Stefano Grossi		NA		NA	NA		NA	NA			NA		NA
Karihan Filipino Food	2220 E Plaza Blvd., #A1	5812	12-Mar-08	Manouchehr Dadkhah	Trap	Yes		January 2008	Other	side the kitchen	1	Weekly	Outside rendering service		Yes		Yes
Zarritos Family Restaurant	505 E 8th Street	5812	12-Mar-08	Stefano Grossi	Trap	Yes		February	Other	by the sink and stove	2	Daily	Outside rendering service		No		No
Cafe La Maze	1441 Highland Avenue	5812	12-Mar-08	Manouchehr Dadkhah	Trap	Yes		February 2008	Other	Indoors	2	2/weekly	Outside rendering service		Yes		Yes
3 GIRASOLES MEXICAN RESTAURANT	1231 HIGHLAND AVE	5812	12-Mar-08	Manouchehr Dadkhah	Trap	Yes		February 2008	Other	Kitchen	1	Weekly	Outside rendering service		Yes		Yes
BIRRIAS CHIVOS & CHEVES	2401 HIGHLAND AVE STE 10	5812	12-Mar-08	Manouchehr Dadkhah	Trap	Yes		February 2007	Other	Inside kitchen	1	2/weekly	Outside rendering service		Yes	Indoors	Yes
Senor Pancho Fresh Mexican Grill	2030 Highland Avenue	5812	12-Mar-08	Manouchehr Dadkhah	Interceptor	Yes		February 2008	Outside		1	2/weekly	Outside rendering service		No		No
Karina's Mexican Style Seafood	1705 Highland Avenue	5812	12-Mar-08	Manouchehr Dadkhah	Trap	Yes		March 2008	Under the sink		1	2/weekly	Outside rendering service		No		No
TROPICAL DELI	2808 18TH STREET	5812	12-Mar-08	Stefano Grossi		No		NA	NA		NA	NA			NA		NA
La Taquiza	1641 Highland Avenue	5812	12-Mar-08	Manouchehr Dadkhah		No		NA	NA		1	Weekly	Outside rendering service		No		No
National City Market	240 E 18th Street	5411	12-Mar-08	Stefano Grossi		No		NA	NA		NA	NA			NA		NA
Seven-Eleven #17265	1601 E 18th Street	5411	12-Mar-08	Stefano Grossi		NA					0				NA		NA
ASIAN MARKET	3400 E 8TH ST STE 111-112	5411	12-Mar-08	Stefano Grossi		NA		NA	NA		NA				NA		NA
Seven-Eleven #18218C	807 E 8th Street	5411	12-Mar-08	Stefano Grossi		NA		NA	NA		NA				NA		NA
Chuck E Cheese's	1143 Highland Avenue	5812	11-Mar-08	Manouchehr Dadkhah	Interceptor	Yes		January 2008	Outside		0	NA			NA		NA
Foodland IGA	303 Highland Avenue	5411	11-Mar-08	Manouchehr Dadkhah	Interceptor	Yes		January 2008	Outside		1	2/Weekly	Outside rendering service		No		No
Conching's Café	3400 E 08th Street	5812	11-Mar-08	Stefano Grossi	Trap	Yes		February	Under the sink		1	Weekly	Outside rendering service		No		No
Pancho Villa's Mexican Grill	3100 8th Street	5812	11-Mar-08	Stefano Grossi		No		NA	NA		1	Weekly	Outside rendering service		No		No
Cozines Grocery	402 Civic Center Drive	5411	11-Mar-08	Stefano Grossi/Manouchehr Dadkhah		No		NA	NA		1	Monthly	Other	Indoors	Yes		Yes
Cotijas Mexican Food	740 E 30th Street	5812	07-Feb-08	Manouchehr Dadkhah	Trap	Yes		January 2008	Under the sink		1	2 times/a week	Outside rendering service		Yes		Yes
99 CENT ONLY STORES	1320 Highland Avenue	5999	05-Feb-08	Manouchehr Dadkhah		NA			NA						NA		NA
POINT POINT JOINT (TURO-TURO)	916 E 8th Street, 1, 2	5812	01-Feb-08	Peter Smith/Crystal Grover	Interceptor	Yes		1 week ago	Outside		3-4 large woks	Weekly	Other	in a container in the back	NA		NA
Submarina	1210 E. Plaza Boulevard	5812	22-Jan-08	Manouchehr Dadkhah		No		NA	NA		None	NA	NA		NA		NA
Lollicup Teazone	1105 E Plaza Blvd., A	5812	22-Jan-08	Manouchehr Dadkhah		No		NA	NA		1	Weekly	Outside rendering service		No		No
TORTAS OASIS	1210 E PLAZA BLVD STE 404	5812	21-Jan-08	Manouchehr Dadkhah	Trap	Yes		December 2007		by the restaurant	None	NA	NA		NA		NA



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Appendix N

City of National City Independent Collection/Disposal Service Vendor List

Partial List of Independent Vendors which can Provide Collection
and Disposal Services within the District's Service Area

Darling Intl.	San Diego, CA 92126	(800) 870-8866
San Diego Drain Experts	Serving the National City Area	(866) 900-9460
Rapid Plumbing	Serving the National City Area	(800) 997-2743
Roto-Rooter	Serving the National City Area	(619) 873-4654



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Appendix O

City of National City
Public Outreach for FOG Control



***THE CITY OF NATIONAL CITY
SEWER SYSTEM MANAGEMENT PLAN***

DRAFT TECHNICAL MEMORANDUM NO. 7A

Date: January 13, 2009 – 1st **DRAFT**

Subject: PUBLIC OUTREACH PROGRAM FOR FOG CONTROL PROGRAM

Prepared By: Jeff Kirshberg Ph.D., P.E. (C67882)
Reviewed By: Jon Wells, P.E.; Scott Humphrey, P.E. (C64206)

WHAT IS FOG?

Residual fats, oils, and grease (FOG) are by-products that food service establishments must constantly manage. Typically, FOG enters a facility's plumbing system from ware washing, floor cleaning, and equipment sanitation. Sanitary sewer systems are neither designed nor equipped to handle the FOG that accumulates on the interior of the sewer collection system pipes. The best way to manage FOG is to keep the material out of the plumbing systems. The following are suggestions for proper FOG management.

GENERAL PREVENTION

- Never pour grease or oil down sink drains or toilets.
- Scrape grease material and food scraps from all cookware and dishware into a can or the trash for disposal.
- Use strainers in sink drains to catch food scraps and other solids, and empty the drain strainers into the trash for disposal.
- Don't put grease or greasy food in your home garbage disposal. These units only shred solid material into smaller pieces and do not prevent grease from going down the drain.
- Wipe cookware and dishware prior to washing. Don't rely on commercial additives in detergents to dissolve grease: They may just pass it down the line and cause problems in other areas.
- Clean kitchen exhaust system filters routinely.
- Talk with your friends and neighbors about the grease problem so that the community is aware of the risk.



TIPS FOR RESTAURANTS

- Train all employees to properly handle used fat, oil and grease.
- Post “No Grease” signs over sink and floor drains.
- Dispose of all fat, oil and grease in an appropriate recycling bin.
- Keep drains clean by using vinegar and warm water or commercial products to dissolve grease. Be cautious of chemicals and additives that claim to dissolve grease. Some additives simply push the grease farther down the pipe.
- Install a grease interceptor, grease trap, or oil/water separator that is sized to handle the grease or oil produced at your business.
- Have an approved grease and oil removal company regularly maintain your grease interceptor or oil/water separator. Keep records of when your equipment is cleaned.

GREASE TRAPS

A grease trap is designed to prevent grease, oil, solids and other debris from entering the waste stream, where it becomes a problem by clogging sewers and disrupting the water flow in the system. The grease trap captures those wastes and contains them until a waste hauler or pumper service can properly remove them. The following are suggestions for grease trap maintenance:

- A grease trap should be checked quarterly and maintained to ensure it is properly working.
- Backups, odors and drainage problems are all signs that a grease trap is not functioning as it should.
- Train all staff on the location, purpose, function, and proper maintenance of grease traps on an annual basis or more frequently, dependent upon staff turn over.
- The most important management procedure for grease traps is that a company representative be present during any cleaning, pumping or skimming performed by a vendor.

DRY CLEAN-UP

Practice dry cleanup. Remove food waste with “dry” methods such as scraping, wiping, or sweeping before using “wet” methods that use water. Wet methods typically wash the water and waste materials into the drains where it eventually collects on the interior walls of the drainage pipes. Do not pour grease, fats or oils from cooking down the drain and do not use the sinks to dispose of food scraps. Likewise it is important to educate kitchen staff not to remove drain screens as this may allow paper or plastic cups, straws, and other utensils to enter the plumbing system during



clean up. The success of dry clean up is dependent upon the behavior of the employee and availability of the tools for removal of food waste before washing. To practice dry clean up:

- Use rubber scrapers to remove fats, oils and grease from cookware, utensils, chafing dishes, and serving ware.
- Use food grade paper to soak up oil and grease under fryer baskets.
- Use paper towels to wipe down work areas. Cloth towels will accumulate grease that will eventually end up in your drains from towel washing/rinsing.

SPILL PREVENTION

Preventing spills reduces the amounts of waste on food preparation and serving areas that will require clean up. A dry workplace is safer for employees in avoiding slips, trips, and falls. For spill prevention:

- Empty containers before they are full to avoid spills.
- Use a cover to transport interceptor contents to rendering barrel.
- Provide employees with the proper tools (ladles, ample container, etc.) to transport materials without spilling.

TIPS FOR THE AUTOMOTIVE SECTOR

Employees need to be trained before they begin handling and disposing of hazardous materials, and they need to be re-trained whenever new procedures or new equipment is implemented.

FLOOR CLEANING

- Keep the floor clean - catch leaks and place the liquid in appropriate containers.
- If a small spill occurs, clean it up immediately with industrial absorbent material or shop towels. (Never clean spills by hosing them down with water).
- Use dry floor cleaning methods. (This includes sweeping and vacuuming).
- Use non-toxic soaps to clean floors (pH 5.5 to 9.5).
- If you wash the floors with water, ensure wastewater is collected and heavy metals and grease are removed before the water is discharged to the drain.

FLOOR DRAINS



- Perform vehicle maintenance in areas where there are no floor drains.
- If there are floor drains present in work area, seal them off or cover with absorbent pads during work to prevent spills from entering drains.
- Never have floor drains present in areas where hazardous material is stored or ensure that the drains are sealed.
- All floor drains should be sealed unless connected to a holding tank, a sump or an oil/sand separator.
- Shop wastes should never be drained into a storm drain, the sewer system, surface water or onto the ground.

WASTE MANAGEMENT

- Waste fluids include motor oil, power steering fluid, transmission fluid, brake fluid, antifreeze and coolant.
- Use containers that are in good condition to store waste and replace leaky containers immediately.
- Label all raw material containers and have MSDS sheets readily available so employees know what they are working with.
- Each station should have separate, labeled containers for each waste, or labeled waste sinks which discharge to appropriate waste holding tanks.
- Never place incompatible wastes in the same containers or in close proximity to each other. They may cause an explosion, fire or corrosion.
- Each service bay should have a waste collection station.
- Always keep container lids or bung holes closed except when filling or emptying containers.
- Carefully transfer vehicle liquid waste directly into the receiving container.
- Put wastes in separate, labeled containers that won't leak or corrode and that are hard to overturn.
- Make sure containers are empty before placing them in the waste disposal bin.
- Post a list detailing how to dispose of different wastes.

DRIP PANS



- Do not leave full drip pans or other open containers lying around.
- Place a drip pan underneath vehicles and equipment when performing maintenance such as removing parts, unscrewing filters and unclipping hoses.
- Place dirty parts in drip pans instead of on the floor.

OIL AND OIL FILTERS

- Used oil includes crankcase oil, metal-working oil, gear oil, transmission fluid; brake fluid and hydraulic fluid.
- Keep used oil in a separate, marked, watertight, rodent-proof container in a secure place.
- Make sure your used oil storage tanks or drums have proper containment in case of a spill or leak.
- Routinely inspect vehicles and equipment for leaks and inspect incoming vehicles for leaking oil and other fluids.
- Place drip pans underneath leaking vehicles to collect dripping oil. Don't forget to pour the oil from the drip pan into a used oil drum.
- Try to prevent spills when servicing vehicles. If a spill occurs clean it up immediately with rags. Wring out the oil into the used oil drum.
- Place a drain rack over a waste oil sink to drain and collect the residual oil from parts/containers prior to disposal.
- Puncture oil filters with a nail, drain the filter for at least 24 hours, then crush and recycle the filters.
- Keep drained filters in a separate container marked "used oil filters only".
- Never dispose of used oil down a storm drain, septic tank, dry well, sewer or in a dumpster.
- Never pour oil on the ground, even for dust suppression.

SHOP TOWELS



- Shop towels and clothing that have come in contact with hazardous waste need to be sent to a commercial or non-commercial laundry or to a dry cleaner to be cleaned. If they are sent to one of the above places they do not need to be disposed of as a Special Waste.
- Never use disposable paper towels or rags.
- Use cloth towels that can be cleaned and used again.
- Send your shop towels to a laundry or dry cleaning service.

SPILL PREVENTION, CLEAN-UP AND RESPONSE

- Keep emergency spill equipment and clean-up kit(s) in areas where there is a potential for spills.
- Keep MSDS forms in an accessible location.
- Designate one person to be in charge in the event of a spill.
- Contain the spilled material to prevent it from reaching drains.
- Immediately apply absorbent to spilled material.
- Provide detailed instructions for employees regarding clean-up procedures, including how to handle fires and explosions.
- Instruct employees to report spills immediately including the material type, approximate volume and drainage system it had entered.

ENGINE CLEANING

- Forbid washing of engines, undercarriages or truck cargo bays, mounted equipment and tanks that may contain metals or toxic materials in the regular wash lane.
- Provide special bays for washing or steam cleaning engines, undercarriages, truck-mounted equipment, truck cargo bays, truck-mounted tanks and heavy equipment.
- Make sure that there are no drains in the washing area.
- Alternatively, place a temporary plug over the storm drain and direct the wastewater to an oil/water separator.
- Use a designated area with a covered concrete spill containment pad for all vehicle washing.



- Place signage in the wash area indicating that it is a wash area and other maintenance activities are prohibited (e.g. oil changes).
- Aromatic and chlorinated hydrocarbon solvents should be eliminated from washing operations (check MSDS sheets).

CLEANING PRODUCTS

- Buy from suppliers who accept materials and containers back for recycling.
- Use biodegradable, phosphate-free, water-based cleaners.
- Use pH neutral cleaners to minimize dissolving metals.
- Avoid the use of halogenated compounds, petroleum-based cleaners or phenolics if at all possible; use water-based cleaners.

ALTERNATIVE CLEANING METHODS

- Use a spray with flow restricted, spring loaded triggers and monitor to minimize wash water use.
- Use waterless hand cleaners.
- Try using safe cleaning alternatives such as baking soda and vinegar.
- Forbid the use of customer-supplied detergents, soaps and chemicals to avoid pollution, unknown chemical reactions and interference with oil/water separators and metals traps.
- Keep the use of soaps and non-foaming detergents to a minimum since they reduce the efficiency of oil/water separators.
- Rather than using detergents, use hot water/steaming methods to remove oil from engines, tools and equipment (treat wastewater before it is released to the drain).
- Use non-solvent cleaners.
- Use non-chlorinated compounds rather than chlorinated (as they are less toxic, disposal costs are less expensive).



TECHNICAL MEMORANDUM

To: Roberto Yano
City of National City

Date: April 15, 2018

From: NV5, Inc.
Carmen Kasner, PE

Project: Metro TAC Projections

Subject: Wastewater Flow Projections **NV5 Project No.:**

Purpose of Memorandum

The purpose of this memo is to update wastewater flow projections for the City of National City (City) in 2050. These projections will be used to distribute the wastewater portion of the Pure Water Debt that will be based on the needed capacity requirements in the Metro System.

The City of National City completed a full Wastewater Masterplan in 2011. Since that time, significant changes in flows and development in the City have occurred. The City of San Diego is developing the Pure Water program that will take wastewater and treat it to an advanced level. A portion of the cost of the program will be paid for by wastewater contributors because of the programs resulting offload of the Point Loma Wastewater treatment plant. The Pure water program will result in debt service that will be borne by each of the Metro JP members. A Metro JPA subcommittee, Regional Wastewater Disposal Agreement Flow Commitment Working Group (Working Group) has developed an initial estimate of the individual members' wastewater capacity in the year 2050. See Attachment 1. The flows in 2050 will be used to determine the appropriate proportion of the debt service of the Pure Water Program for each member agency. This memo will validate those projections.

Methodology

The following spreadsheets are included as attachments to this memo:

Sheet No.	Name	Contents
1	Generation Rates-LU	Calculation of Generation Rates based on FY 2017 flows and projections of 2050 Land Use
2	Generation Rates-Pop	Calculation of Generation Rates based on FY 2017 flows and projections of 2050 Population
3	Chart 1 - WW Flow_Chart	Chart of average month WW flows from FY 2008 to 2018
4	Chart 2 - Growth_Chart_LU	Chart of the City's projected residential and land use growth
5	Chart 3 - Growth_Chart_Pop	Chart of the City's projected population and employment growth
6	Growth	Growth data, Land Use and Population

Chart 1 shows a review of average monthly wastewater flows recorded by ADS flowmeters from 2008 to March 2018. An analysis was conducted to evaluate the wastewater trends and how much flows have dropped due to conservation and system improvements. This was used to compare to the previous master plan projections completed in 2011, which was focused on overall contract capacity rights within the Metro system.

Wastewater generation rates were developed by comparing the City’s land use data projections compiled by SANDAG (Series 12 and 13) to the City’s Metro flow meters at fifteen (15) locations. Existing land uses within the study area are categorized as single-family residential, multi-family residential, commercial, industrial and institutional. Land use and population growth projections are shown in Chart 2 and 3.

Monthly wastewater flows from FY 2017 were used to determine the average dry weather flow (ADWF) for the year. Estimated land use for 2017 were used in combination with the 2017 ADWF to develop estimates of 2017 generation rates as shown in Table 1.

In 2010 the City’s vacancy rate was 6.0% and in 2017 was 15.3% [8]. Because the vacancy rate was so large, an adjustment was made to the Multi-family Residential to better calibrate existing flow projections.

Table 1 - 2017 (Generation Unit Calibration)					
Category	Quantity	Units	Generation Rate	Units	Estimated Wastewater Generation, GPD
Single-Family Residential	8,862	DU	160	gpd/DU	1,417,840
Multi-Family Residential	7,951 (6,758 used)	DU	140	gpd/DU	1,113,158 (946,184)
Commercial	610	ac	500	gpd/ac	304,938
Industrial	515	ac	500	gpd/ac	257,500
Institutional	1,950	ac	500	gpd/ac	975,063
Total, MGD=					4.02 (3.9)
Existing (ADS) Flow =					3.88
Calibration =					0.00

Existing ADS flows do not account for some wastewater disposal that are not measured with flow meters, but rather that are calculated by house counts instead. There are flows between the City and County of San Diego that fall into that category. The City’s billing to the City of San Diego in 2018 was 3.90 MGD for ADWF.

The 4.02 MGD of ADWF is assuming all apartments are fully occupied in 2017.

Results

The resulting generation rates for 2017 were utilized to project 2050 generation rates with land use estimates developed by SANDAG as shown in Table 2. The estimated overall wastewater generation rate for the City is 5.04 MGD, as shown in Table 2.

Table 2 - 2050 (Projection)					
Category	Quantity	Units	Generation Rate	Units	Estimated Wastewater Generation, GPD
Single-Family Residential	7,983	DU	160	gpd/DU	1,277,280
Multi-Family Residential	16,452	DU	140	gpd/DU	2,303,280
Commercial	475	ac	500	gpd/ac	237,500
Industrial	479	ac	500	gpd/ac	239,500
Institutional	1,966	ac	500	gpd/ac	983,000
Total, MGD					5.04

It is expected that these generation rates will decrease over time as an increasing number of existing homes replace fixtures with more efficient units. An alternative projection utilizing lower generation rates to reflect anticipated conservation in water consumption is shown in Table 3. Under this alternative, the total wastewater flow is expected to be 4.65 MGD of ADWF.

Table 3 - 2050 (Projection - Lower Generation Rate)					
Category	Quantity	Units	Generation Rate	Units	Estimated Wastewater Generation, GPD
Single-Family Residential	7,983	DU	150	gpd/DU	1,197,450
Multi-Family Residential	16,452	DU	130	gpd/DU	2,138,760
Commercial	475	ac	450	gpd/ac	213,750
Industrial	479	ac	450	gpd/ac	215,550
Institutional	1,966	ac	450	gpd/ac	884,700
Total, MGD					4.65



OFFICES NATIONWIDE

The review of the flow rates show an overall decrease in wastewater generation. While there has been a steady increase in population in National City since 2008 the City saw an overall reduction in wastewater generation. A major driver for reductions in wastewater flow is the reductions in per-capita water consumption. This trend may be attributed to the implementation of the Green Building Code Standards (CALgreen), a focus on conservation during the drought or the price of water.

Wastewater Flow Projections Due to CALGreen:

Projecting wastewater flows to 2050 is challenging in that many technological improvements can happen in 30 years. In the last 30 years with the droughts in California, the focus on conservation and Green building has resulted in a tremendous reduction in wastewater generation. See table 4 below for examples of improvements since 1975.

In 2010, California approved the California Green Building Standards Code (Part 11 of Title 24 of the California Code of Regulations (CALGreen) which requires new buildings in California to become more efficient by mandating new construction to meet minimum standards (effective January 1, 2011). In 2016, CALGreen was updated, and became effective January 2017. The City of Imperial Beach Municipal Code Chapter 15.38.010 adopts and enforces CALGreen by reference. All new buildings must comply with these standards.

RESIDENTIAL INDOOR WATER USE

Additionally all single-family residential properties when sold will require upgrades to the current standards. Multi-family properties are to be upgraded by 2019 but there are no methods currently in place for compliance. When properties change ownership, they will be required to be brought into conformance with these building code requirements. By 2050, it can be assumed that all single-family residential homes will have been brought up to current standards.

The 2010 CALGreen legislation targeted indoor water use of 40 gallons per capita per day (gpcd). The EPA WaterSense program projects 39.5 gpcd in their Water Efficient Single Family New Home Specification Supporting Statement, May 2008 [2] while the American Water Works Association expects 43.5 gpcd in their Water Conservation Measurements Metrics Guidance Report, January 2010 [6].

The Regional Wastewater Disposal Agreement Flow Commitment Working group in developing their projections used a sewer generation rate (UGR) of 53 gallons per day per capita (gpdpc). GPDPC is an equivalent measurement of gpcd just a different abbreviation.

When addressing residential water use, CALGreen requires installation of ultra-low fixtures for showerheads, bathroom and kitchen faucets, and toilets (known as prescriptive requirements). Historical flow rates of water fixtures over time are presented in Table 4. Clothes washers are not covered by CALGreen requirements, but are included in the table for comparison. All new clothes washers meet the CALGreen requirement and since clothes washers generally have a life of 10-15 years, it can be expected that by 2050 all clothes washers will be in compliance. From an inspection of Table 4, it is important to recognize the significant decrease in fixture/appliance water use since 2008. These decreases have

contributed to reductions in historical per capita water demands. Additionally with the emphasis on water conservation and the corresponding increases in water costs imposed by the potable water purveyors, water use is continuing to drop.

TABLE 4
REQUIRED FLOW RATES FOR RESIDENTIAL
FIXTURES AND APPLIANCES SINCE 1975^a

Fixture/Appliance 2008	Year						Percent Reduction In Water Use Since
	1975	1980	1992	2008	2011	2013	
Shower (gpm) ^b	3.5	2.5	2.5	2.5	2.0	2.0	20
Toilets (gpf) ^c	5.0	3.6	1.6	1.6	1.28	1.28	20
Faucets (gpm)	2.5	2.5	2.5	2.2	1.8	1.8/1.5 ^f	18
Clothes washers (gal/ft ³) ^d	15.0	15.0	15.0	8.5	6.0 ^g	6.0 ^g	30

^a California's Residential Indoor Water Use, May 2015 [1]

^b gpm = gallons per minute

^c gpf= gallons per foot

^d gal/ft³ = gallons per cubic foot

^e CALGreen fixture rates

^f Kitchen faucets = 1.8 gpm, lavatory faucets = 1.5 gpm

^g Regulated by CCR Title 20, Div 2, Ch 4, Article 4, Section 1605.3

From the above table and a typical home, in a recent study by Consol [1] it has been projected that residential properties could have wastewater generation rates as low as 31.8 gpcd; however, the frequency/duration of use assumptions for fixtures were low and did not include dishwashers and water waste related to hot water delivery system efficiency. Occupant behavior related to water use can vary greatly and is difficult to predict. Lower income households however, are more sensitive to increases in water costs from the potable water purveyors, thus as the water providers for National City increase their costs, water savings will continue.

COMMERCIAL INDOOR WATER USE

For new non-residential (commercial) construction, CALGreen mandates installation of ultra-low flow fixtures similar to those required for residential as summarized in Table 5.

**TABLE 5
 REQUIRED FLOW RATES FOR NON-RESIDENTIAL FIXTURES**

Fixture	CALGreen 2013
Shower (gpm)	2.0
Toilets (gpf)	1.28
Urinals (gpf)	0.5
Lavatory Faucets (gpm)	0.5
Kitchen Faucets (gpm)	1.8
Wash Fountains (gpm)	1.8

Typical demand factors for commercial indoor water use are as follows:

1. Restaurants: 370 gallons per square foot per year [6]
2. Markets: 84 gallons per square foot per year [6]
3. Offices: 27 gallons per square foot per year [6]
4. Hotels: 105 gallons per room per day, 80% occupancy rate [6]

The Regional Wastewater Disposal Agreement Flow Commitment Working group in developing their projections used a sewer generation rate (UGR) of 53 for Population and 18 gpdpc for employment. These are higher than CALGreen, but account for the potential that not all homes will be upgraded and there will still be some infiltration and inflow (I&I) in Cities system.

I&I while technically should not be accounted for in ADWF's, if there is systemic infiltration due to high groundwater or tidal influences, reducing I&I to zero will be very difficult to achieve. The City is starting to focus on I&I and will be addressing the issue in the coming years which should reduce flows further.

Population based projection –Working Group Validation

A projection utilizing population and employment growth is shown in Table 6. We completed this analysis to validate the Working Groups projections. Under this projection, utilizing a generation rate of 53 gallons-per-day-per-capita (gpdpc) for population generation and 18



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gpcpd for employment based generation, the total wastewater flow is expected to be 5.24 MGD

Table 6 - 2050 (Projection – Population Based)					
Category	Quantity	Units	Generation Rate	Units	Estimated Wastewater Generation, GPD
Population	85,424	PC	53	gpd/DU	4,527,472
Employment	39,785	PC	18	gpd/DU	716,130
Total, MGD					5.24

This is actually significantly higher than what the Working group was projecting for National City which was 3.9 MGD ADWF. We do not have any information on where their numbers were obtained.

Combined flow projection:

The vast majority of buildout that remains for the City is in Multi-family housing and all new housing will be built with CALGreen standards. One other alternative projection method would be to use the existing billing flows for 2018 of 3.9 and then add a projection for population and employment increase using the Working Groups flow projection rates to 2050.

This results in the following calculation in Table 7:

Table 7 - 2050 (Projection – Combined)					
Type	Difference between 2050 and 2017	Units	Generation Rate	Units	Additional Flow Estimated Wastewater Generation, GPD
Population	24,540	PC	53	gpcpd	1,300,627
Employment	10,792	PC	18	gpcpd	194,258
Total Additional				MGD	1.495
Actual 2017 Flow				MGD	3.900
Projected 2050 Flow				MGD	5.395

The basis of this assumption is that flows from existing housing and populations are not going to reduce greatly over time because of the demographics and housing situations but that new population would go in buildings that would all be built to current standards and would have significant flow reductions. This does not correspond to the reductions in flows seen in the past few years with the City during a positive economic period and low vacancy rates.



OPTIONS FOR THE CITY:

For the question at hand of what wastewater flow projection the City should use for 2050, there are several options:

1. Use the ultimate build out ADWF projections from Additional Dwelling Units at current generation rates - 5.04 MGD for ADWF- here after referred to as Master Plan 1 Projections.
2. Use the ultimate build out ADWF projections from Additional Dwelling Units at decreased generation rates - 4.65 MGD for ADWF- here after referred to as Master Plan 2 Projections.
3. Use the Working Group's recommendation of 3.9 MGD for ADWF- here after referred to as Working Group Projections.
4. Use an adjusted Population Projection of 5.24 MGD for ADWF - here after referred to as Population Projection.
5. Use a modified flow population flow projection of 5.395 MGD for ADWF - here after referred to as Modified Population Projection.

The implication of which assumption to use is the amount of debt service that the City will be required to undertake for the Pure Water Program. The City's contract capacity in the Metro system does not officially change from 7.487 as a part of this analysis. However, at some point in the future, the City and the other Metro agencies will need to reconcile the contract capacity. At that time, City will need to develop a formal confirmation of what they are willing to commit to for ultimate flows.

While this is ultimately the City's decision, NV5 recommends using either the Population Projection or the Master Plan 1 projections.

It should be noted that the reduced wastewater flows does not reduce the treatment costs of wastewater. As the water consumption of the City's residents decrease, the wastewater strength increases.

References

[1] *Codes and Standards Consulting California Residential Indoor Water Use - Second Edition, prepared by ConSol, May 2015.*

[2] *Water-Efficient Single Family New Home Specification Supporting Statement, United States Environmental Protection Agency - Water Sense, May 2008.*

<https://www.epa.gov/watersense/homes-specification>

[3] *"Dishwashers Key Product Criteria ", Energy Star, accessed 18 January 2016.*

<https://www.energystar.gov/products/appliances/dishwashers>

[4] *California Single-Family Water Use Efficiency Study*, prepared by William B. DeOreo, et. al. sponsored by California Department of Water Resources, June 2011.

[5] Not used

[6] *Commercial and Institutional End Users of Water*, prepared by American Water Works Association Research Foundation, 2000.

[7] Institute, P. (2014). *Urban Water Conservation and Efficiency Potential in California*. Oakland, CA: Pacific Institute.

[8] *San Diego County Apartment Association Survey, Spring 2010 & Spring 2017*

METRO TAC

REGIONAL WASTEWATER DISPOSAL AGREEMENT FLOW COMMITMENT WORKING GROUP

- REVIEW THE FLOW COMMITMENT SECTION OF THE REGIONAL WASTEWATER DISPOSAL AGREEMENT AND MAKE RECOMMENDATIONS OF THE FISCAL RESPONSIBILITIES OF MEMBERS WHO MIGHT WITHDRAW OR REDUCE THEIR FLOW FROM THE METRO SYSTEM.
- PROPOSED ALTERNATIVE TO FAIRLY DISTRIBUTE NEW DEBT, BASED ON SANDAG'S PROJECTION OF POPULATION TO THE YEAR 2050 AND CITY OF SAN DIEGO'S SEWER UNIT GENERATION RATES.
- METRO SYSTEM AVERAGE DRY WEATHER FLOW PROJECTION TO 2050 = 179 MGD
- METRO SYSTEM CONTRACT CAPACITY = 255 MGD
- METRO SYSTEM CURRENT FLOWS = 153 MGD

METRO SYSTEM AVERAGE ANNUAL DRY WEATHER FLOW PROJECTION TO 2050 = 179 MGD

PARTICIPATING AGENCIES PROJECTED FLOWS BASED ON SANDAG'S POPULATION PROJECTIONS AND CITY OF SD SEWER UNIT GENERATION RATE (UGR) OF 53 GPDP BY 2050 AND AN UGR OF 18 GPDP FOR EMPLOYMENT

Agency	FY 18 Billing Flows	Contract Capacity (MGD)	2050 Projected Flow (MGD)	Metro Capacity Rights	
				(Assume 6 MGD Padre Dam) MGD	(Assume 15 MGD Padre Dam) MGD
Chula Vista	16.198	20.864	19.526	19.526	19.526
Coronado	2.431	3.25	2.431	2.431	2.431
Del Mar	0.031	0.876	0.031	0.031	0.031
East Otay Mesa	0.167	1	4.29	4.29	4.29
El Cajon	7.31	10.915	<u>7.574</u>	7.574	<u>1.825</u>
Imperial Beach	2.3	3.755	2.3	2.3	2.3
La Mesa	4.631	6.993	4.801	4.801	4.801
Lakeside/Alpine	2.818	4.841	<u>6.711</u>	<u>3.711</u>	<u>0.5</u>
Lemon Grove	2.279	3.027	2.279	2.279	2.279
National City	3.9	7.487	3.9	3.9	3.9
Otay	0.202	1.287	0.381	0.381	0.381
Padre Dam	2.48	6.225	<u>2.48</u>	<u>0.54</u>	<u>0.5</u>
Poway	2.58	5.894	3.101	3.101	3.101
Spring Valley	4.439	10.353	8.33	8.33	8.33
Wintergardens	0.921	1.309	0.921	0.921	0.921
San Diego	100.7	166.922	109.855	109.855	109.855
Total	153.387	254.998	178.911	173.971	164.971

METRO SYSTEM AVERAGE ANNUAL DRY WEATHER FLOW PROJECTION TO 2050 = 179 MGD

METRO SYSTEM OVERALL CONTRACT CAPACITY = 255 MGD

POTENTIAL SCENARIO IF POINT LOMA WAIVER IS NOT GRANTED

100 MGD POINT LOMA (PLWWTP) SECONDARY TREATMENT

15 MGD SOUTH BAY WATER RECLAMATION PLANT (SBWRP)

52 MGD NORTH CITY WATER RECLAMATION PLANT (NCWRP) – PHASE 1 EXPANSION

6 MGD METRO BIOSOLIDS CENTER (MBC) CENTRATE

15 MGD PADRE DAM

TOTAL 188 MGD

(173MGD METRO SYSTEM AND 15MGD PADRE DAM)

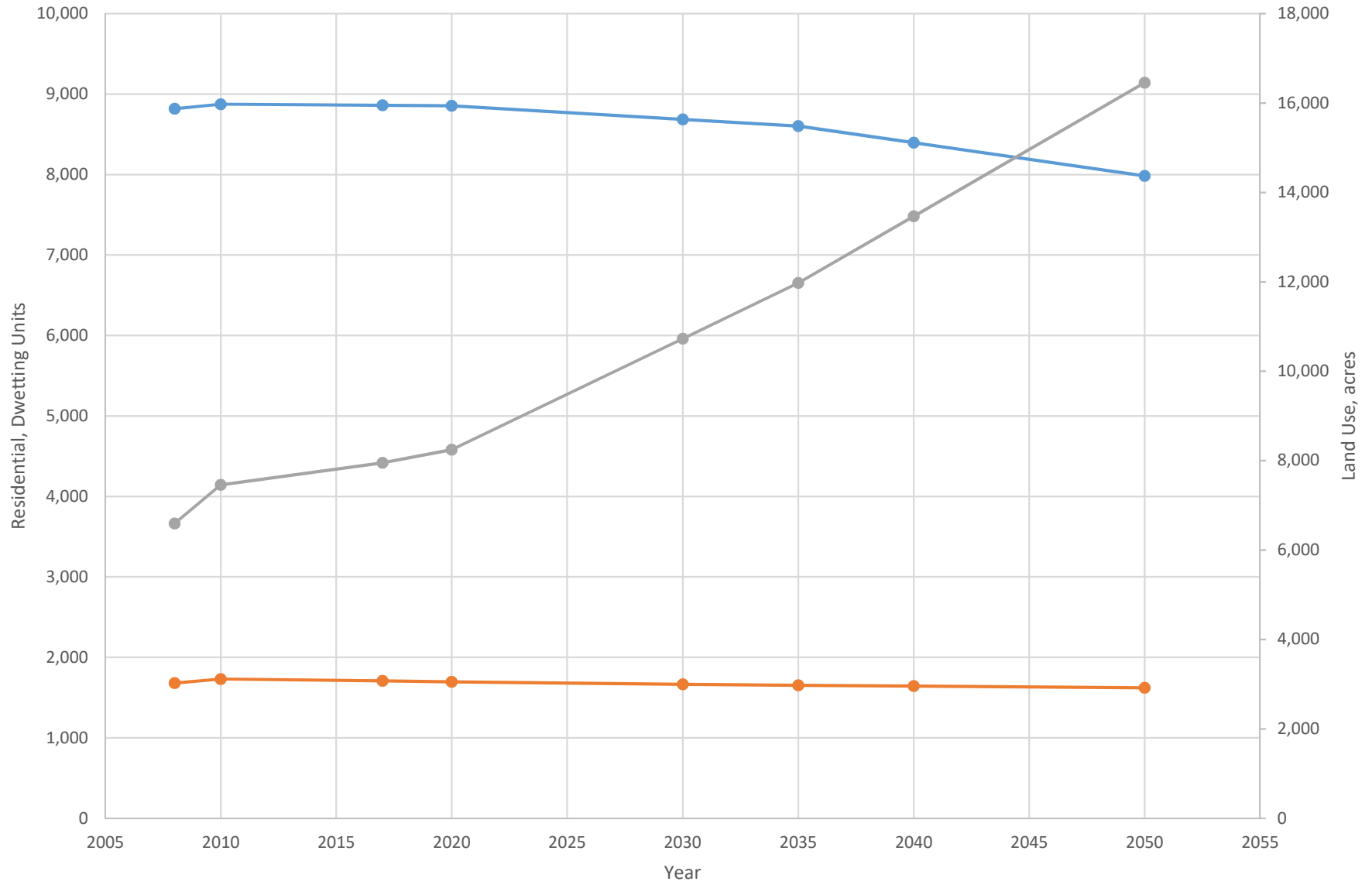
PROPOSED DEBT ALLOCATION

new phase 1 debt

- THE PROPOSED METHOD TO DISTRIBUTE THE WASTEWATER PORTION OF PURE WATER DEBT IS BASED ON THE NEEDED CAPACITY REQUIREMENT OF 179 MGD BASED ON CAPACITY RIGHTS IN THE METRO SYSTEM.
- FOR EXAMPLE IF AN AGENCY DECIDES TO NOT SEND FLOW TO THE METRO SYSTEM, THEN THE AGENCY SHOULD NOT PARTICIPATE IN ANY OF PURE WATER DEBT.

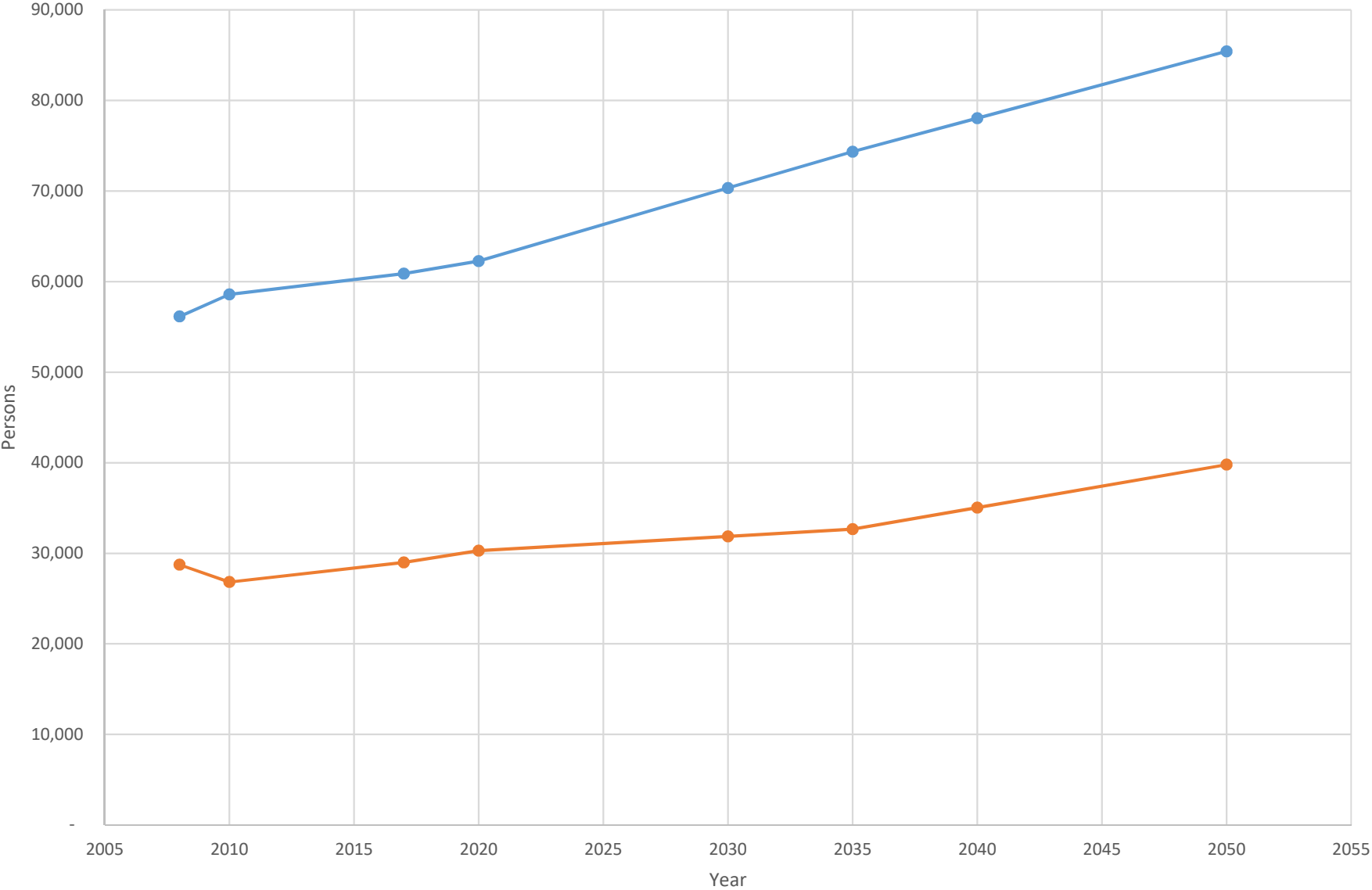
Category	2008					2017 (Generation Unit Calibration)					2050 (Projection)				
	Quantity	Units	Generation Rate	Units	Estimated Wastewater Generation, GPD	Quantity	Units	Generation Rate	Units	Estimated Wastewater Generation, GPD	Quantity	Units	Generation Rate	Units	Estimated Wastewater Generation, GPD
Total															
Population	56,144	PC	60 gpcpd		3,368,640	60,884	DU	53 gpd/DU		3,226,845.38	85,424	PC	53 gpd/DU		4,527,472
Employment	28,743	PC	22 gpcpd		632,346	28,993	DU	18 gpd/DU		521,871.75	39,785	PC	18 gpd/DU		716,130
Total, MGD					4.00					3.75					5.24
			Existing Flow =		4.07			Existing Flow =		3.88					
			Calibration =		(0.02)			Calibration =		(0.03)					

City of National City, Residential and Land Use Growth



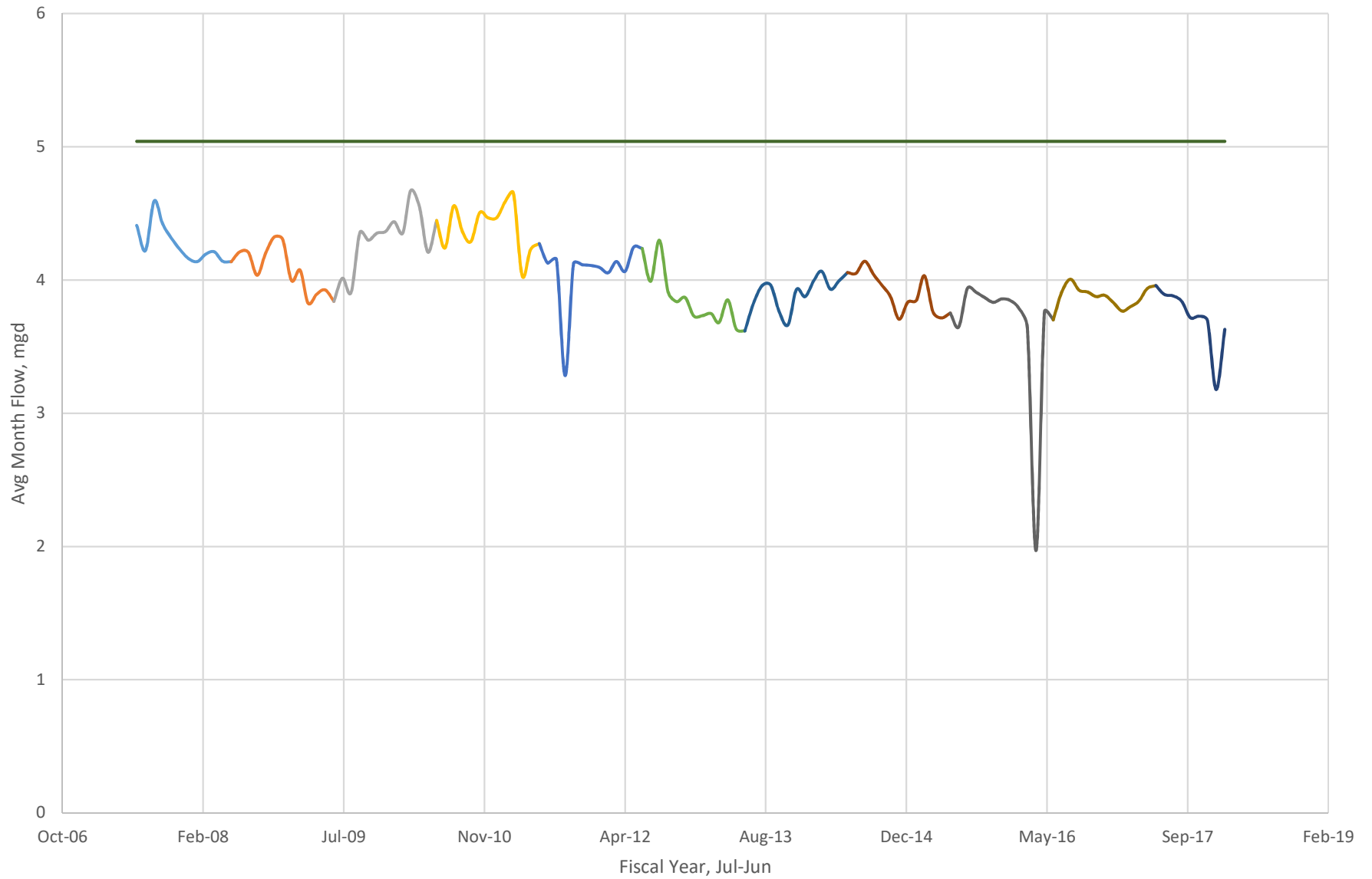
● Single-Family Residential ● Multi-Family Residential ● Land Use

City of National City, Population and Employment Growth



Population Employment

City of La Mesa, Wastewater Flow, mgd



— 2008 — 2009 — 2010 — 2011 — 2012 — 2013 — 2014 — 2015 — 2016 — 2017 — 2018 — 2050 Projected Flow

Total SANDAG + General Plan Adjustment	Unit	2008¹	2012²	2017³	2020²	2030³	2035²	2040³	2050²
Single-Family Residential	DU	8819.00	8,874	8,862	8,854	8,687	8,603	8,396	7,983
Multi-Family Residential	DU	6594.00	7,458	7,951	8,247	10,731	11,973	13,466	16,452
Commercial	ac	607.00	653	610	584	535	511	499	475
Industrial	ac	538.00	540	515	500	497	496	490	479
Institutional	ac	1882.00	1,922	1,950	1,967	1,966	1,966	1,966	1,966

SANDAG Population	Unit	2008¹	2010²	2017³	2020²	2030³	2035²	2040³	2050²
Population	PC	56,144	58,582	60,883.88	62,265	70,317	74,343	78,037	85,424
Employment	PC	28,743	26,826	28,992.88	30,293	31,871	32,660	35,035	39,785

Vacancy Rate Year
6.0% 2010⁴
15.30% 2017⁵

Sources:

- 1 SANDAG Regional Growth Forecast, City of National City, Series 12
- 2 SANDAG Regional Growth Forecast, City of National City, Series 13
- 3 Extrapolated from 2, SANDAG Series 13 data
- 4 San Diego County Apartment Association Survey, Spring 2010
- 5 San Diego County Apartment Association Survey, Spring 2017 (Zip codes)

