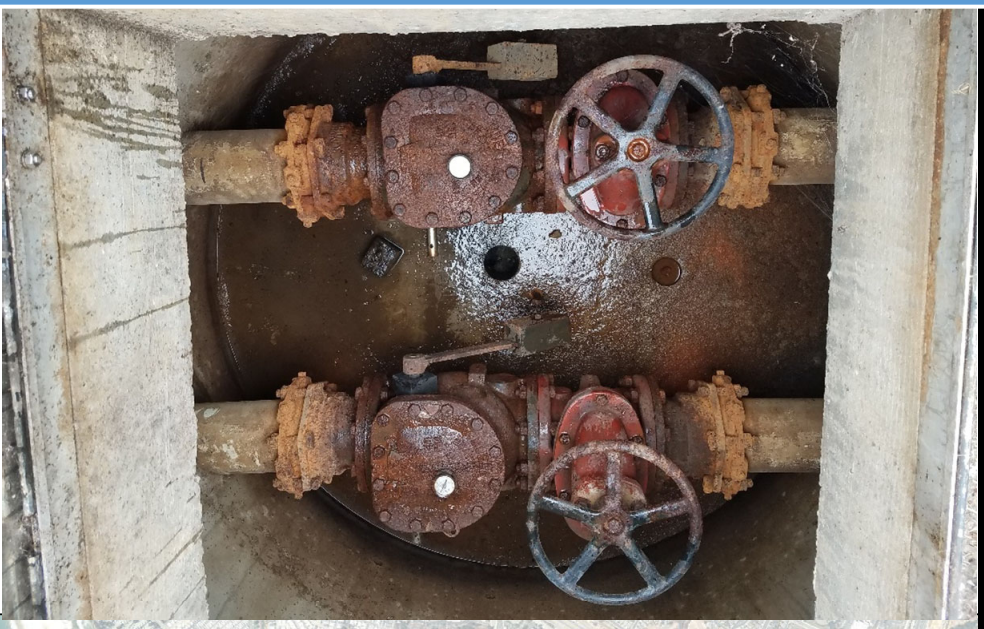
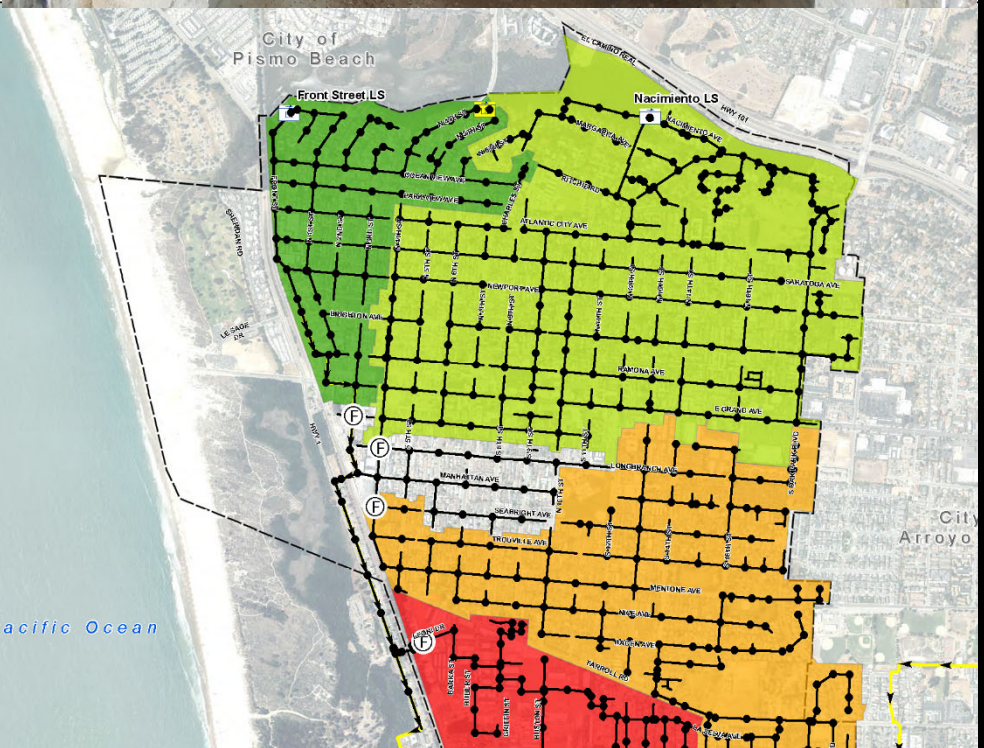
November 2019

City of Grover Beach
Sewer Master Plan





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City of Grover Beach

Sewer Master Plan

November 2019

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List of Acronyms

AC	Asbestos Cement
ADF	Average Daily Flow
APN	Assessor Parcel Number
BFE	Base Flood Elevation
CB	Central Business
CBO	Central Business Open
CC	Coastal Commercial
CCI	Construction Cost Index
CI	Coastal Industrial
CIC	Coastal Industrial Commercial
CIP	Capital Improvement Project
CMMS	Computerized Maintenance Management System
CVS	Coastal Visitor Serving
ENR	Engineering News-Record
ESRI	Environmental Systems Research Institute
EX-GSCIP	Existing Gravity Sewer Capital Improvement Project
EX-LSCIP	Existing Lift Station Capital Improvement Project
FEMA	Federal Emergency Management Agency
FM	Flow Meter
FPS	Feet per Second
FRM	Fluid Resource Management
F-GSCIP	Future Gravity Sewer Capital Improvement Project
FA-GSCIP	Future Alternative Gravity Sewer Capital Improvement Project
GIS	Geographic Information System
GPD	Gallons per Day
GPM	Gallons per Minute
GTA	Garing Taylor and Associates
HP	Horsepower
I	Industrial
LF	Linear Feet
MGD	Million Gallons per Day
MKN	Michael K. Nunley & Associates, Inc
NGVD 29	National Geodetic Vertical Datum of 1929
NPDES	National Pollutant Discharge Elimination System
OCSD	Oceano Community Services District
PHF	Peak Hour Flow
PVC	Poly Vinyl Chloride
RC	Retail Commercial
SF	Square Feet
SLOCOG	San Luis Obispo Council of Governments
SMP	Sewer Master Plan
SSLOCSD	South San Luis Obispo County Sanitation District
SSMP	Sewer System Management Plan
TBD	To Be Determined
TDH	Total Dynamic Head
VCP	Vitrified Clay Pipe
VFD	Variable Frequency Drive
VS	Visitor Serving
WWTP	Wastewater Treatment Plant

Previous Studies and Reports

The following reports, studies, and other resources were reviewed during preparation of this Sewer Master Plan report.

1. Water & Sewer Daily Average Flow Calculations for Tr 3211 El Camino Real Development 1598 El Camino, Grover Beach California dated September 7, 2018 and prepared by Garing, Taylor & Associates, Inc.

2. 2050 Regional Growth Forecast for San Luis Obispo County dated June 2017 and prepared by Beacon Economics and San Luis Obispo Council of Governments staff.

3. Commercial Medical Cannabis Ordinance Revised Initial Study – Negative Declaration dated March 2017 and prepared by Rincon Consultants.

4. Grover Beach Lift Station and New Le Sage Drive Force Main dated January 13, 2017 and prepared by Garing, Taylor & Associates, Inc.

5. Sewer Lift Station and Forcemain System Design for the Holiday Inn Express Grover Beach dated September 11, 2015 and prepared by Omega Engineering Consultants, Inc.

6. South San Luis Obispo County Sanitation District Inflow and Infiltration Study dated August 2011 and prepared by Wallace Group.

7. City of Grover Beach 2006 Sewer Master Plan dated October 2006 and prepared by Garing, Taylor and Associates.

8. South San Luis Obispo County Sanitation District Trunk Sewer System Capacity Study Final Draft Report dated May 12, 2006 and prepared by Wallace Group.

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SECTION 1 INTRODUCTION

1.1 Purpose and Scope

The purpose of this Sewer Master Plan (SMP) was to evaluate the City of Grover Beach (City) existing sewer collection system and identify necessary capital improvements to serve customer sewer flows over a 30-year planning horizon. A summary of the tasks undertaken to complete the SMP are provided below:

Data Collection and Review

MKN obtained and reviewed the following sewer system data:

- City of Grover Beach General Plan (Adopted February 16, 2010)
- Approved development plans (West Grand Avenue Master Plan, Ramona Specific Plan, etc.)
- Population estimates from the San Luis Obispo Council of Governments (SLOCOG)
- AutoCAD mapping for the existing sewer system
- Hydraulic models for the existing sewer system (to provide background information for development of updated model)
- Lift station pump curves and as-builts
- Lift station pump run times
- Trunk sewer and WWTP capacity agreement with South San Luis Obispo County Sanitation District
- Wastewater treatment plant (WWTP) daily flow records
- Flow monitoring data

Sewer Flows

Existing Average Day Flow (ADF) and Peak Hour Flow (PHF) conditions were determined using a combination of annual water production, flow measurements from a flow monitoring study completed by Fluid Resource Management (FRM) in August 2018, and development of sewer use factors based on land use types and verified through flow monitoring results. The flow analysis is described in detail in Section 3.

Review of SSLOCSD WWTP Permitted Capacity, Contractual Allocation, and Trunk Main Contractual Allocation

The City of Grover Beach is a partner agency within the South San Luis Obispo County Sanitation District (SSLOCSD), which manages the Wastewater Treatment Plant (WWTP) in Oceano and trunk sewer system. For the City's SMP, Michael K. Nunley & Associates, Inc (MKN) reviewed and compared the existing/future (buildout) City flow condition to the existing permitted capacity of the WWTP and contractual allocation of the Grover Beach section of the trunk sewer system. The review only included a comparison of the permitted capacity of the WWTP and contractual allocation to future City flows developed for the SMP. This review is discussed in Section 7.

Design Criteria

MKN reviewed the City's current design standards for sewer collection facility sizing and design. These design standards, along with industry-accepted design criteria for lift stations and force mains, were utilized to evaluate the City's existing wastewater infrastructure. The design criteria are detailed in Section 5.

Updated Hydraulic Model of Sewer Collection System

As the basis of the hydraulic model, a Geographic Information System (GIS) database and mapping were developed for the existing City sewer collection system. Historical sewer atlas and asbuilt plan information was used to develop the GIS mapping. Average daily flows were derived in the GIS database and imported into the hydraulic model. Bentley's SewerCAD CONNECT Edition hydraulic modeling software was used to simulate the operation of the sewer collection system. The hydraulic model was calibrated using results of flow monitoring study performed by Fluid Resource Management (FRM).

Improvements and Recommendations

The updated hydraulic model was used to analyze the adequacy of the existing collection system, lift stations, and force mains under existing and future flow scenarios. Upgrades were recommended based on identified deficiencies.

There are three critical areas within the City that present significant uncertainty for the City's utility infrastructure planning process:

- El Camino Real - Commercial, residential, and hotel projects have been proposed, but utility service has not been master planned for this area.
- Industrial Area Cannabis Uses and Septic Conversions - This area in the vicinity of Farroll Road is mainly served by on-site septic systems, but could be served with City utilities in the future after development occurs. Based on City Ordinance 17-05 (Adopted May 15, 2017), the City will allow establishment of commercial medical cannabis uses in industrial areas zoned Industrial (I), Coastal Industrial (CI), and Coastal Industrial Commercial (CIC). Water and sewer impacts have not been considered in current planning efforts.
- Grover Beach Lodge – The development of this project at the end of Grand Avenue could result in attracting additional hotels and commercial uses along Grand Avenue.

The City's existing sewer collection system facilities were evaluated to determine available capacity or identify necessary improvements to serve these potential future flows.

Capital Improvement Program Cost and Prioritization

A capital improvement program was developed to meet two objectives: (1) identify improvements necessary to correct hydraulic deficiencies in the existing system, and (2) identify improvements necessary to meet the demands of new development. Planning-level cost opinions and prioritization for these facilities were also provided.

SECTION 2 LAND USE AND POPULATION

This section provides an overview of the existing land uses, existing population and growth, and potential development within the City.

2.1 General

The City of Grover Beach is an incorporated city of 13,560[1] residents located in southern San Luis Obispo County with the neighboring communities of City of Pismo Beach to the north, the City of Arroyo Grande to the east, and the communities of Oceano and Halcyon to the south. The City, a general law city, currently incorporates 2.3 square miles of land with primarily residential and commercial land uses. City topography varies from sea level to greater than 200 feet above mean sea level.

2.2 Land Use

The City includes approximately 5,000 parcels. **Figure 2-1** and **Table 2-1** show the current General Plan land uses throughout the City.

Table 2-1: Gross Acreage By General Plan Land Use Category

Land Use Category	Gross Acres	Percent of Total
Low Density Residential	346	23%
Medium Density Residential	169	11%
High Density Residential	126	8%
Central Business District – Mixed Use	37	2%
Visitor Serving Mixed-Use	56	4%
Neighborhood Serving Mixed-Use	8	0%
Retail and Commercial Services	39	3%
Industrial	74	5%
Public/Quasi-Public	40	3%
Parks and Recreation	16	1%
Open Space and Resource Conservation	197	13%
Agriculture/Urban Reserve	39	3%
Rights-Of-Way and Other Land	375	25%
Total:	**1,522**	**100%**

Notes:
1. Based on City of Grover Beach General Plan, Land Use Element Adopted 02-16-10.

2.3 Population

As identified in the San Luis Obispo Council of Governments - 2050 Regional Growth Forecast for San Luis Obispo County (SLOCOG 2050 Growth Plan), the City has been one of the slowest-growing cities in the region between 2000 and 2016. The population within Grover Beach has increased by just 330 persons since 2000, which is an annual growth rate of just 0.16 percent per year. Since the City's sphere of influence is the City limits, any future development within the City will most likely consist of infill or redevelopment. The SLOCOG 2050 Growth Plan reviewed three growth scenarios (low, medium, and high) throughout the County. **Table 2-2** provides a summary of projected City population through year 2050.

[1] California Department of Finance Table 2 E-5 City/County Population and Housing Estimates, 1/1/2018

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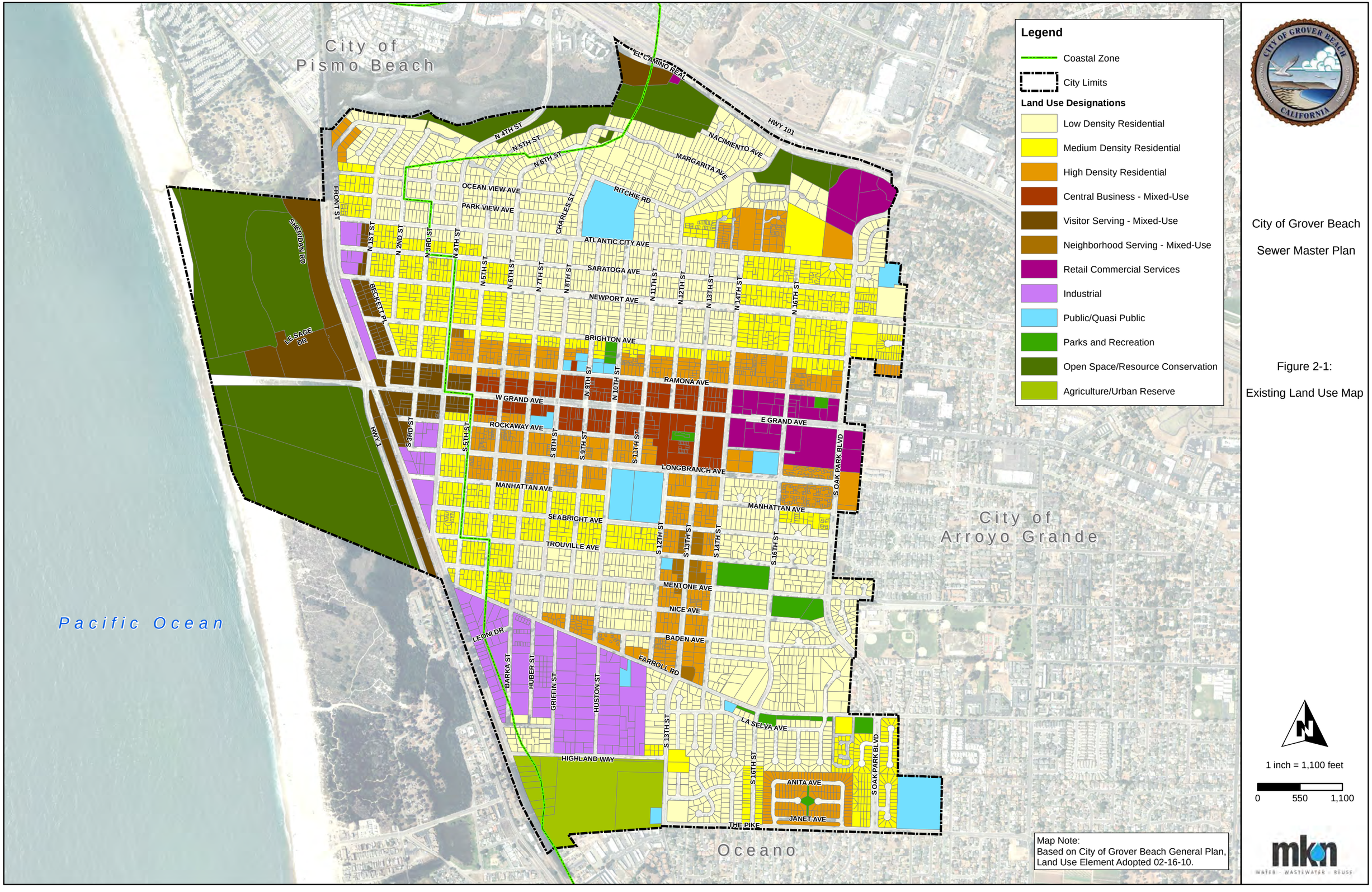

City of Grover Beach

Sewer Master Plan

Figure 2-1:

Existing Land Use Map

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Table 2-2: SLOCOG 2050 Regional Growth Forecast for City of Grover Beach										
Growth Scenario	Year									Compound Annual Growth Rate (%)
	2010	2015	2020	2025	2030	2035	2040	2045	2050	
Low	13,156	13,340	13,665	14,013	14,276	14,448	14,465	14,411	14,378	0.21
Medium	13,156	13,340	13,751	14,183	14,536	14,804	14,934	15,001	15,091	0.35
High	13,156	13,340	14,009	14,697	15,331	15,907	16,402	16,870	17,376	0.76

Notes:
1. U.S. Census Bureau (2010 Census), State of California Department of Finance (2015), Beacon Economics (forecast years).

For purposes of developing the 2019 Regional Transportation Plan and Sustainable Communities Strategy, as described in the SLOCOG 2050 Growth Plan, the SLOCOG Board of Directors adopted the medium growth scenario for regional population projections.

2.4 Future Development

To estimate the City's potential future residential, commercial and industrial development, MKN worked with the City's Community Development Department to identify properties and/or areas with future development potential within City limits. Estimates were based on the SLOCOG 2050 Growth Plan medium growth scenario. The City provided a detailed inventory of potential residential, commercial, and industrial development, including the following:

- Vacant Residential Properties
- Vacant Commercial and Industrial Properties
- Underutilized Residential Properties
- Pending Development Projects
- Underutilized West Grand Avenue Corridor Lots
- Urban Reserve Area (Strawberry Field Properties)

Table 2-3 provides a summary of vacant residential property within the City. The table includes assessor parcel number (APN), property location, zoning, lot size, potential dwelling units and estimated population (using household densities per City's General Plan - Land Use Element).

Table 2-3: Vacant Residential Property Inventory					
APN	Location	Zoning	Parcel Size (Acres)	Residential Units	Estimated Population
060-490-001	900 N 5th	CPR1	0.14	1	2
060-490-002	906 N 5th	CPR1	0.18	1	2
060-490-037	835 Pacifica	CPR1	0.14	1	2
060-482-034	811 N 1st	CR1	0.15	1	2
060-483-002	836 N 1st	CR1	0.17	1	2
060-501-026	885 N 6th	CR1	0.09	1	2
060-501-027	NA N 6th	CR1	0.17	1	2
060-502-015	933 N 6th	CR1	0.17	1	2
060-142-028	200 Block N 4th	CR2	0.17	2	4
060-327-002	500 Block Mentone	CR2	0.17	2	4
060-012-021	1032 Margarita	R1	0.28	1	2.5
060-020-020	850 N 12th	R1	0.24	1	2.5
060-153-014	300 Block N 8th	R1	0.17	1	2.5
060-163-021	347 N 11th	R1	0.17	1	2.5
060-337-007	800 Block Nice	R1	0.15	1	2.5
060-338-010	600 Block S 8th	R1	0.10	1	2.5
060-369-011	1600 Block Baden	R1	0.25	1	2.5
060-503-022	862 Charles	R1	0.14	1	2.5
060-522-005	300 Block Ocean View	R1	0.14	1	2.5
060-532-003	645 Ocean View	R1	0.14	1	2.5
060-543-007	Huber	R1	0.50	1	2.5
060-561-073	1358 Farroll	R1	0.19	1	2.5
060-574-002	Farroll	R1	1.13	5	12.5
060-089-002	408 Saratoga	R2	0.17	2	5
060-123-034	1600 Block Saratoga	R2	0.15	1	2.5
060-123-035	1600 Block Saratoga	R2	0.15	1	2.5
060-184-007	1600 Block Newport	R2	0.32	3	7.5
060-565-002	1207 South 13th Street	R2	1.02	9	22.5
060-565-003	1219 South 13th Street	R2	0.86	9	22.5
060-031-005R3	1700 Block Atlantic City	R3	3.40	68	204
060-033-011	1513 Cabrillo	R3	0.11	1	3
060-033-012	1535 Cabrillo	R3	0.11	1	3
060-176-060	1500 Block Brighton	R3	0.23	4	12
060-176-077	1500 Block Ramona	R3	0.11	1	3
060-271-030	500 Block Longbranch	R3	0.17	3	9
060-277-014	773 Manhattan	R3	0.16	3	9
060-352-018	920 S 10th	R3	0.17	5	15
			Total	**140**	**387**

Notes:

1. Allowable densities and persons per household values from pages LU-16 and LU-17 of the City of Grover Beach General Plan - Land Use Element.
2. Assumptions included 2.0 persons per dwelling unit for commercially zoned properties as directed by City staff, 2.5 for R1 and R2 zoned properties, and 3.0 for R3 zoned properties.
3. CPR1= Coastal Planned Low Density Residential, CR1= Coastal Low Density Residential, CR2= Coastal Medium Density Residential, R1= Low Density Residential, R2= Medium Density Residential, R3= High Density Residential.

Table 2-4 provides a summary of the vacant commercial and industrial property within the City. The table includes APN, property location, zoning, lot size, and estimated commercial development potential.

Table 2-4: Vacant Commercial and Industrial Property Inventory

Assessor Parcel Number	Location	Zoning	Parcel Size (SF)	Floor Area Ratio	Allowable Commercial / Industrial Development (SF)
060-211-031	Grand Avenue	CVS	14,810	0.5	7,405
060-214-002	146 North 4th Street	VS	15,246	0.5	7,623
060-214-004	147 5th Street	VS	7,841	0.5	3,920
060-214-005	401 Grand Avenue	VS	4,792	0.5	2,396
060-214-006	401 Grand Avenue	VS	4,792	0.5	2,396
060-214-007	Grand Avenue	VS	5,227	0.5	2,614
060-214-008	Grand Avenue	VS	5,227	0.5	2,614
060-214-009	483 West Grand Avenue	VS	10,019	0.5	5,009
060-215-001	402 Grand Avenue	CVS	5,663	0.5	2,831
060-215-002	Grand Avenue	CVS	5,227	0.5	2,614
060-215-003	430 Grand Avenue	CVS	5,227	0.5	2,614
060-215-006	4th Street	CVS	7,841	0.5	3,920
060-215-007	4th Street	CVS	7,841	0.5	3,920
060-228-003	Grand Avenue	CB	12,197	0.5	6,098
060-309-002	191 South Oak Park Bl	RC	77,537	0.5	38,768
060-543-016	Huber Street	I	65,340	0.5	32,670
060-544-006	964 Griffin	I	31,363	0.5	15,682
060-544-008	978 Griffin Street	I	31,799	0.5	15,899
060-545-028	Griffin Avenue	I	39,640	0.5	19,820
060-546-006	999 Huston Street	I	36,155	0.5	18,077
060-546-007	1073 Huston Street	I	35,719	0.5	17,860
060-546-009	Huston Street	I	37,897	0.5	18,949
060-541-001	Farroll Road	I	28,750	0.5	14,375
060-541-006	550 Farroll Road	CI	43,560	0.5	21,780
				Total	**269,854**

Note:
1. Floor Area Ratio factors based on values from pages LU-17 through LU-19 of the City of Grover Beach General Plan - Land Use Element.
2. CVS= Coastal Visitor Serving, VS= Visitor Serving, CB= Central Business, RC= Retail Commercial, I= Industrial, CI= Coastal Industrial.
3. SF = Square foot.

Table 2-5 provides a summary of the underutilized residential properties within the City. The table includes APN, property location, zoning, lot size, potential dwelling units and estimated population (using household densities per City's General Plan - Land Use Element).

Table 2-5: Underutilized Residential Properties Inventory						
APN	Location	Zoning	Parcel Size (Acres)	Total Units Built as of July 2018	Total Units Remaining as of July 2018	Estimated Population
060-574-003	1591 Farroll	R1	1.97	1	8	20
060-031-005	1700 Block Atlantic City	R2	6.5	1	57	142.5
060-154-033	238 N 7th	R3	0.34	1	6	18
060-293-006	370 S 13th	R3	0.63	0	12	36
060-293-011	1200 Block Longbranch	R3	0.35	0	7	21
060-357-016	1200 Block Baden	R3	0.3	1	5	15
			Total	**4**	**95**	**253**

Notes:
1. Allowable densities and persons per household values from pages LU-16 and LU-17 of the City of Grover Beach General Plan - Land Use Element.
2. Assumptions included 2.0 persons per dwelling unit for commercially zoned properties, 2.5 for R1 and R2 zoned properties, and 3.0 for R3 zoned properties.
3. R1= Low Density Residential, R2= Medium Density Residential, R3= High Density Residential.

Table 2-6 provides a summary of pending development projects within the City. The table includes APN, property location, zoning, lot size, potential dwelling units and estimated population (using household densities per City's General Plan - Land Use Element), commercial development, and hotels.

Table 2-6: Pending Development Projects Inventory							
APN	Location	Zoning	Status	Development Type			
				Residential Units	Estimated Population	Commercial Area (SF)	Hotel Rooms
060-086-007	340 Saratoga Avenue	CR2	Under Construction	1	2.5	0	0
060-076-008	165 Saratgoa Avenue	CR2	Under Construction	1	2.5	0	0
060-451-015	1125 Ritchie Road	R1	Under Construction	1	2.5	0	0
060-241-024	1258 Ramona	CBO	Under Construction	2	4	0	0
060-145-005	344 N. 5th Street	R2	Under Construction	2	5	0	0
060-124-057	1773 Newport Avenue	R2	Under Construction	3	7.5	0	0
060-074-006	83 Newport Avenue	CC	Under Construction	3	6	1,034	0
060-213-013	200 S. 4th Street	I	Under Construction	2	4	3,052	0
060-357-022	1210 Nice Avenue	R3	Under Construction	2	6	0	0
060-246-016	1400 Ramona Avenue	CBO	Under Construction	15	30	536	0
060-011-036	950 El Camino Real	CVS	Under Construction	0	0	0	134

Table 2-6: Pending Development Projects Inventory							
APN	Location	Zoning	Status	Development Type			
				Residential Units	Estimated Population	Commercial Area (SF)	Hotel Rooms
060-309-005	300 block Oak Park	R3	Under Construction	3	9	0	0
060-325-022	495 Mentone Avenue	CR2	Approved	1	2.5	0	0
060-282-006	410 S. 9th Street	R2	Approved	1	2.5	0	0
060-490-031	858 N. 5th Street	CPR1	Approved	1	2.5	0	0
060-014-058	129 Sand Castle	R1	Approved	1	2.5	0	0
060-133-014	266 Front Street	CC	Approved	1	2	1,148	0
060-237-007	152 N. 11th Street	CBO	Approved	3	6	2,300	0
060-297-017	461 S. 13th Street	R3	Approved	6	18	0	0
060-237-018	1176 Ramona Avenue	CBO	Approved	16	32	0	0
060-271-009	557 Manhattan Ave	R3	Approved	2	6	0	0
060-083-002	247 Newport Ave	CR2	Approved	1	2	0	0
060-288-016	557 S. 10th Street	R2	Approved	1	2	0	0
060-545-038	Huston Street	I	Approved	0	0	30,000	0
060-546-001		I					
060-546-020		I					
060-546-003		I					
060-545-029	910 Huston Street	I	Approved	0	0	6,300	0
060-131-020	Front Street	CIC	Approved	0	0	52,790	0
060-381-010	55 W. Grand Avenue	CVS	Approved	0	0	4,000	144
060-201-009	105 W. Grand Avenue	CVS	Approved	0	0	2,855	20
060-152-003	260 N. 5th Street	R3	In Process	1	3	0	0
060-031-028	1628 Laguna Court	R1	In Process	1	2.5	0	0
060-545-030	Huston Street	I	In Process	0	0	114,000	0
060-545-031		I					
060-546-004		I					

Table 2-6: Pending Development Projects Inventory							
APN	Location	Zoning	Status	Development Type			
				Residential Units	Estimated Population	Commercial Area (SF)	Hotel Rooms
060-546-005		I					
060-546-019		I					
060-174-042	267 N. 14th Street	R3	In Process	2	6	0	0
060-031-022	1598 El Camino Real	RC	In Process	7	14	4000	151
060-031-021							
			Total	**80**	**183**	**222,015**	**449**

Notes:
1. Allowable densities and persons per household values from pages LU-16 and LU-17 of the City of Grover Beach General Plan - Land Use Element.
2. Assumptions included 2.0 persons per dwelling unit for commercially zoned properties, 2.5 for R1 and R2 zoned properties, and 3.0 for R3 zoned properties.
3. CVS= Coastal Visitor Serving, VS= Visitor Serving, CB= Central Business, CBO= Central Business Open, RC= Retail Commercial, I= Industrial, CI= Coastal Industrial. R1= Low Density Residential, R2= Medium Density Residential, R3= High Density Residential, CC= Coastal Commercial, CIC= Coastal Industrial Commercial.

For potential development associated with the underutilized West Grand Avenue Corridor lots, the City directed MKN to assume 200 units with a mix of hotel and multi-family residential uses and an average occupancy of 2.0 persons per unit, totaling 400 people within the limits of the West Grand Avenue Master Plan area (as shown on **Figure 2-2**).

The only remaining undeveloped area within the City's General Plan is the Urban Reserve located south of Highland Way and east of Highway 1. The following tables (**Table 2-7** through **Table 2-9**) identify the properties associated with the Urban Reserve development area, and the potential development opportunities.

Table 2-7: Pending Urban Reserve Development Inventory		
Assessor Parcel Number	Existing Land Use	Area (Ac)
060-591-001	Agriculture / Urban Reserve	1.0
060-591-009		0.6
060-591-006		1.9
060-591-017		9.4
060-591-014		0.7
060-591-008		0.8
060-591-004		0.5
060-591-003		0.4
060-591-011		0.2
060-591-016		21.1
060-591-005		0.4
060-591-007		1.4
060-591-002		0.5
	Total	**39**

Table 2-8 provides a summary of the potential residential development associated with the Urban Reserve area in accordance with the City's General Plan.

Table 2-8: Potential Urban Reserve Residential Development						
Land Use Category	**Percent of Total Gross Acreage[1]**	**Calculated Acreage**	**Allowable Lot Density (units / gross acre)**	**Estimated Number of Units**	**Persons per Household**	**Estimated Population**
Low Density Residential[2]	50%	19	5	97	2.5	242
Medium Density Residential[2]	17%	7	9	59	2.5	148
High Density Residential[2]	6%	2	20	47	3.0	140
					Total	**530**

Notes:
1. Total acreage of the project site before subdivision (including Urban Reserve property estimated at 39 Acres).
2. Acreage exclusive of affordable housing inclusionary requirements.
3. Allowable densities and persons per household values from pages LU-16 and LU-17 of the City of Grover Beach General Plan - Land Use Element.
4. Assumptions included 2.5 for R1 and R2 zoned properties, and 3.0 for R3 zoned properties.
5. Information based on Table LU-15.1 of the City of Grover Beach General Plan - Land Use Element.

Table 2-9 provides a summary of the potential commercial development associated with the Urban Reserve Area in accordance with the City's General Plan.

Table 2-9: Potential Urban Reserve Commercial Development			
Land Use Category	**Percent of Total Gross Acreage[1]**	**Estimated Area (Acre)**	**Estimated Area (SF)**
Neighborhood Serving Mixed Use	1 acre per 1,000 residents of project	0.53	23,105
Office and Light Industrial[5]	10%	3.89	168,956
Developed Parkland[2, 4]	5 acres per 1,000 residents of project	2.65	115,524
Public/Quasi-Public[3, 4]	As determined by service provider	TBD	

Notes:
1. Total acreage of the project site before subdivision (Urban Reserve property estimated at 39 Acres).
2. Acreage of parkland exclusive of drainage detention basins.
3. Includes school sites, city facilities such as police and fire stations, storm drainage facilities.
4. These uses will require Airport Land Use Commission Review.
5. These could include mixed-use or live-work projects.
6. Information based on Table LU-15.1 of the City of Grover Beach General Plan - Land Use Element.
7. TBD = To be determined.

Figure 2-2 shows the location of the potential residential and commercial development associated with vacant properties, underutilized residential properties, pending development projects, underutilized West Grand Avenue Corridor lots, and the Urban Reserve Area.

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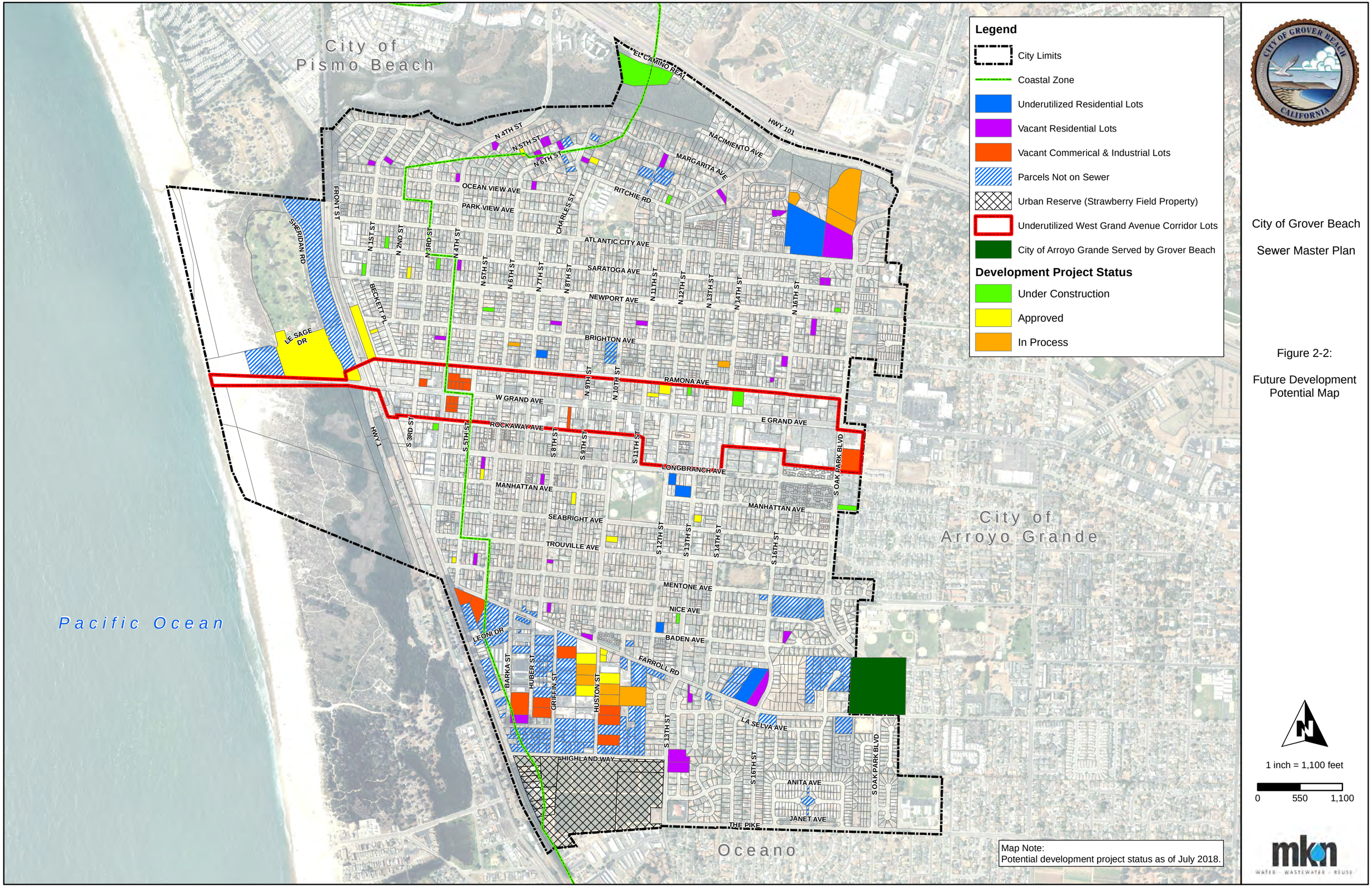

City of Grover Beach

Sewer Master Plan

Figure 2-2:

Future Development Potential Map

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Table 2-10 provides a summary of the projected future population of the City in the year 2050. The estimated population is based on potential development associated with the vacant properties, underutilized residential properties, pending development projects, underutilized West Grand Avenue Corridor lots, and the Urban Reserve Area.

Table 2-10: Future City Population Year 2050		
Category	**Source**	**Persons**
City 2018 Population	California Department of Finance Table E-5	13,560
Vacant Residential Properties	City Inventory	387
Residential Underutilized Properties	City Inventory	253
Pending Development Projects	City Inventory	183
West Grand Avenue Corridor Underutilized Lots	West Grand Avenue Master Plan	400
Urban Reserve Area	General Plan	530
	Total	**15,313**
SLOCOG 2050 Low Growth Population Estimate		14,378
SLOCOG 2050 Medium Growth Population Estimate		15,091
SLOCOG 2050 High Growth Population Estimate		17,376

The City's projected future population appears to be higher than the Medium Growth Population Estimate from the SLOCOG 2050 Growth Plan. A total future population of 15,313 people was used for analysis in the SMP.

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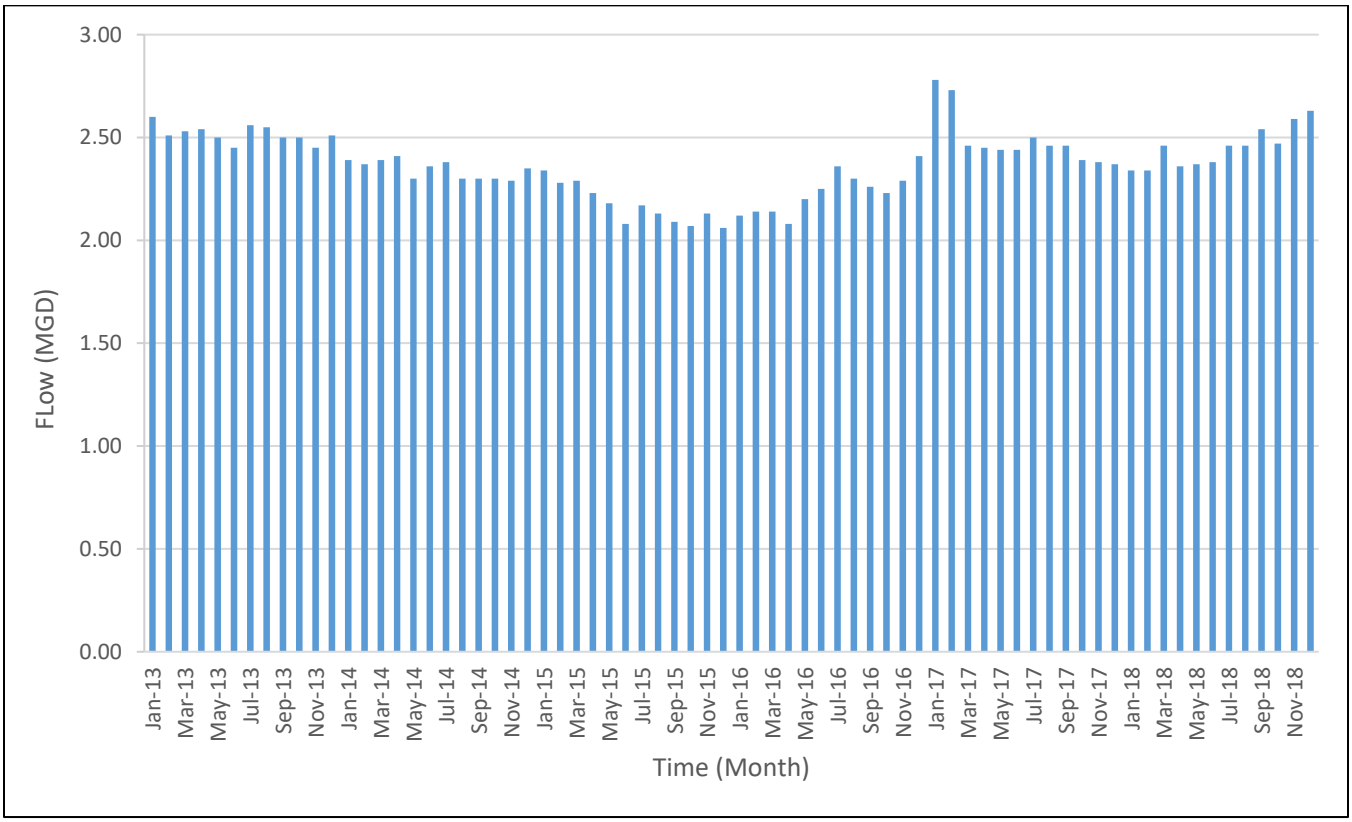
SECTION 3 EXISTING AND PROJECTED SEWER FLOWS

This section provides an overview of the flow monitoring study completed for the SMP, summarizes the existing flow conditions and the estimated future sewer flows for the City.

3.1 Wastewater Treatment Plant Flow

The City is a member agency within the SSLOCSD, which also includes the City of Arroyo Grande and Oceano Community Services District. The member agencies jointly own the wastewater treatment plant (SSLOCSD WWTP), ocean outfall, and trunk sewer collection system. **Figure 3-1** provides a summary of average monthly influent flows to the SSLOCSD WWTP from the past five years.

Figure 3-1: SSLOCSD WWTP Historical Average Monthly Influent Flow Rate



The influent flow rate is measured by a Parshall Flume and recorded by a Honeywell circle chart at the SSLOCSD WWTP. Flows from the three separate agencies are not tracked. Previous planning reports for the SSLOCSD collection system calculated average daily flow conditions per agency based on population (Census) information. However, for this SMP, City water production data and the results of the flow monitoring study were used to estimate existing sewer flow conditions within the City.

3.2 Flow Monitoring Study

To confirm baseline sewer flow conditions and develop hourly flow peaking factors for the hydraulic model, a flow monitoring study was completed. Fluid Resource Management (FRM), as a subconsultant to MKN, performed a flow monitoring study by placing four flow monitoring devices in sewer manholes at key locations throughout the City for a one month monitoring duration.

FRM installed a Greyline Instruments Stingray insertion-type flow meter, shown in **Figure 3-2**, in four key locations throughout the City. The insertion-type flow meter consists of a circular metal band with sensors on the bottom, and is installed in the upstream pipe of the sewer manhole. Sewage entering the manhole flows over the sensors, which read the wastewater temperature, depth, and velocity on a regular interval. In this case, the interval was set to two minutes.

Figure 3-2: Typical Flow Meter Installation

The four flow meters were in place from August 2, 2018 to September 9, 2018. The locations are summarized in **Table 3-1** and shown in **Figure 3-3**.

Table 3-1: Flow Meter Locations

Flow Meter	Location	Pipe Diameter (inches)	Flow Meter Basin Area (Developed Parcels) (Ac)[4]	% of Area Monitored
FM No. 1[1]	3rd Street and Rockaway Avenue	15	97	13
FM No. 2	4th Street and Longbranch Avenue	10	329	46
FM No. 3[2]	4th Street and Seabright Avenue	10	211	29
FM No. 4	410 Leoni Drive	12	85	12
Total			723	100

Notes:
1. Flow meter was originally placed within manhole located at the intersection of Front St. and Brighton Ave. However, the flow meter had to be relocated to 3rd St. and Rockaway Ave. because of debris entering the pipeline from active road construction along Front St. during the flow monitoring study.
2. Included sewer flows from Noel Street (Tract 1769) and Dixson Street (Tract 2310) within the City of Arroyo Grande, which included approximately eight acres.
3. FM = Flow meter.
4. Numbers in column were rounded to nearest one acre.

As shown in **Table 3-1** and on **Figure 3-3**, all four flow meters measured approximately 87% of the sewered parcels within the City limits. Flow meters No. 2 and No. 3 measured the majority of the sewer flows. Flow Meter No. 1 was placed to measure flows from the Front Street Lift Station area and Flow Meter No. 4 was placed to measure flows from the industrial area south of Farroll Road.

City of Pismo Beach

Pacific Ocean

City of Arroyo Grande

Oceano

Front Street LS

Nacimiento LS

South Oak Park LS

No. 1

No. 2

No. 3

No. 4

EL CAMINO REAL

HWY 101

HWY 1

FRONT ST

N 1ST ST

N 2ND ST

N 3RD ST

N 4TH ST

N 4TH ST

N 5TH ST

N 6TH ST

OCEAN VIEW AVE

PARK VIEW AVE

CHARLES ST

MARGARITA AVE

NACIMIENTO AVE

RITCHIE RD

ATLANTIC CITY AVE

SHERIDAN RD

LE SAGE DR

BRIGHTON AVE

NEWPORT AVE

N 5TH ST

N 6TH ST

N 7TH ST

N 8TH ST

N 11TH ST

N 12TH ST

N 13TH ST

N 14TH ST

N 16TH ST

SARATOGA AVE

RAMONA AVE

E GRAND AVE

ROCKAWAY AVE

LONGBRANCH AVE

MANHATTAN AVE

SEABRIGHT AVE

TROUVILLE AVE

S 5TH ST

S 8TH ST

S 9TH ST

S 11TH ST

N 10TH ST

S 12TH ST

S 14TH ST

S 16TH ST

S OAK PARK BLVD

MENTONE AVE

NICE AVE

BADEN AVE

FARROLL RD

LEONI DR

BARKA ST

HUBER ST

GRIFFIN ST

HUSTON ST

LA SELVA AVE

HIGHLAND WAY

ANITA AVE

JANET AVE

THE RIKE

Legend

- City Limits
- City Sewer Manholes
- City Lift Station
- Private Lift Station
- City Collection System
- SSLOCSD Trunk Sewer System
- Flow Meter Location
- FM Basin No. 1
- FM Basin No. 2
- FM Basin No. 3
- FM Basin No. 4

1 inch = 1,100 feet

0 550 1,100

City of Grover Beach

Sewer System Master Plan

Figure 3-3:

Flow Monitoring Locations

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3.2.1 Flow Monitoring Results

Table 3-2 includes a summary of the flow results for the August 2018 flow monitoring study. The table lists the recorded average daily flow (ADF) in gallons per day (gpd) and gallons per minute (gpm) for each flow meter (FM). ADF for this table refers to the average daily flow observed during the 6-week flow monitoring period only.

Table 3-2: Flow Monitoring Results

Flow Meter	Units	FM No. 1	FM No. 2	FM No. 3	FM No. 4
Upstream Lift Station	-	Front Street, N 4th Street (Private)	Nacimiento Avenue	-	South Oak Park
Lift Station Flow	GPM	120 / Unknown	320	-	350
Average Daily Flow	GPD	84,854	363,025	269,349	51,879
	GPM	59	252	187	36
Peak Hour Flow	GPM	190	460	326	108
Dry Weather Peak Hour Peaking Factor (PHF/ADF)	-	3.2	1.8	1.7	3.0
Peak Instantaneous Flow (2-minute data)	GPM	341	595	402	224

Based on the measured flow data and information provided by the City, the following observations and charts were developed to present the results of the flow monitoring effort:

- ADF conditions ranged from 36 gpm (FM No. 4) to 252 gpm (FM No. 2) with PHF conditions of 108 gpm (FM No. 4) to 460 gpm (FM No. 2).
- FM No. 1 was originally placed at Front Street and Brighton Avenue, but had to be relocated because of debris entering the collection system from active road construction near the Front Street Lift Station. Line debris was also experienced at the 3rd Street and Rockaway Avenue location, which is likely responsible for the poor data received, as shown in **Figure 3-4**.
- FM No. 2, 3, and 4 recorded consistent results during the flow monitoring study.
- For FM No. 4 the pumped flow from the South Oak Park lift station (350 gpm) was not observed during peak hour flow or peak instantaneous conditions. Based on typical pump runtime records provided by the City, the lift station typically only ran about 0.3 hours total per day and is located 1 mile upstream of the flow meter placement.

The following data charts show the hourly results of the flow monitoring study at the four meter locations.

Figure 3-4: Flow Meter No. 1 - Hourly Flow Conditions

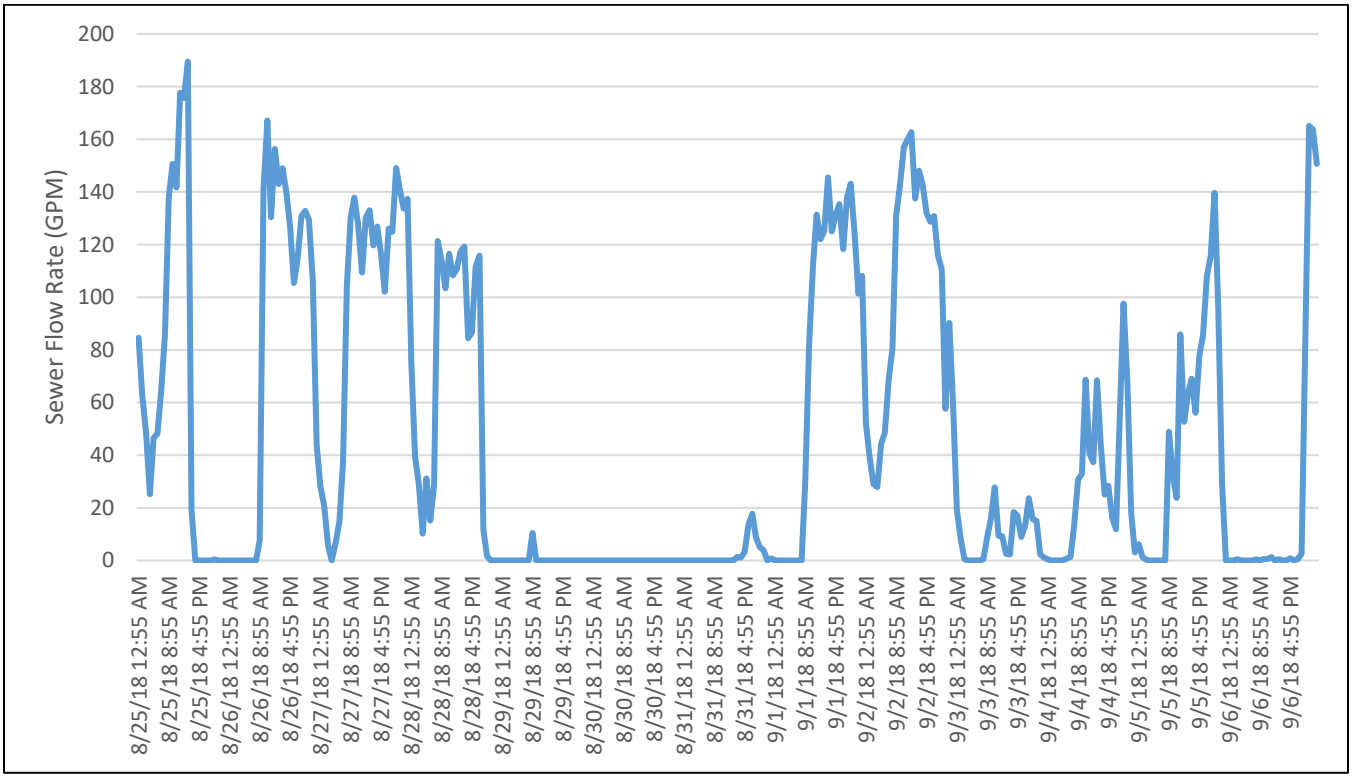


Figure 3-5: Flow Meter No. 2 - Hourly Flow Conditions

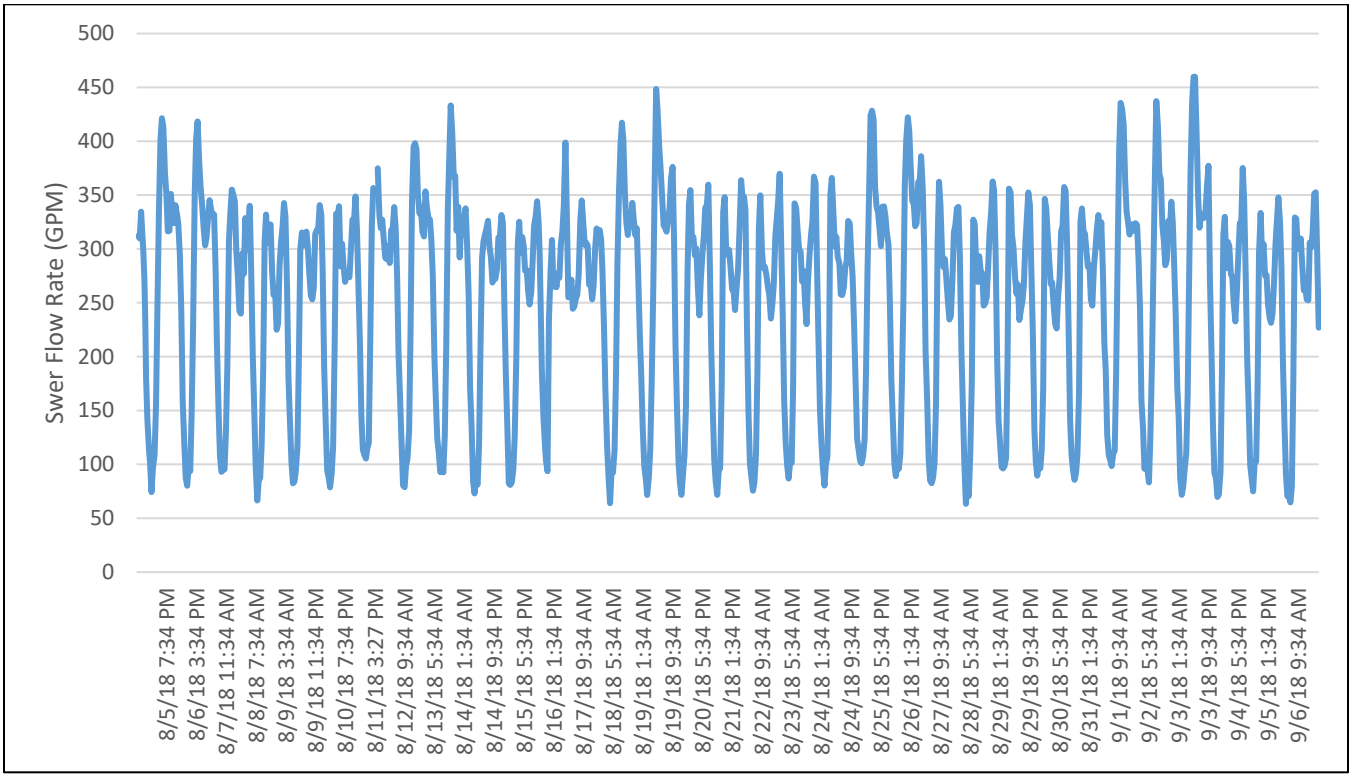


Figure 3-6: Flow Meter No. 3 - Hourly Flow Conditions

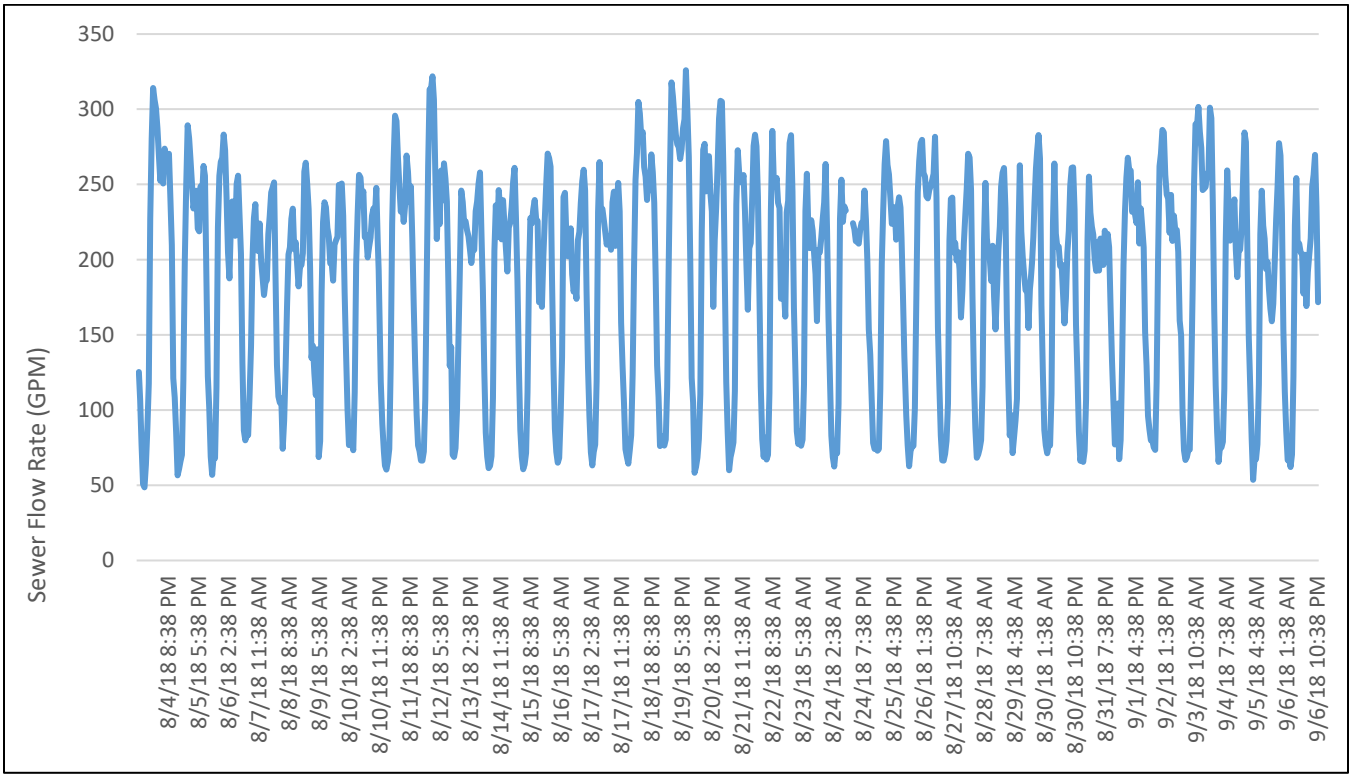
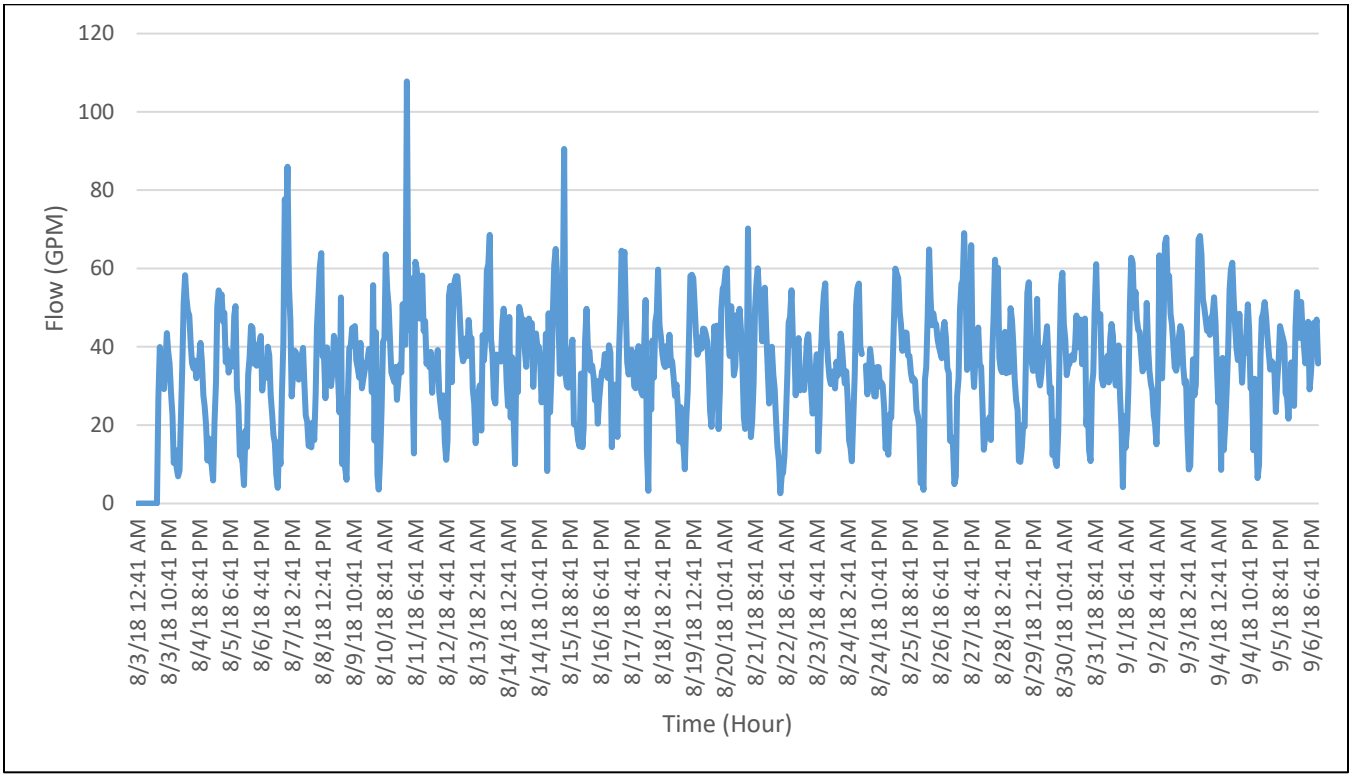


Figure 3-7: Flow Meter No. 4 - Hourly Flow Conditions



Additional charts for the flow monitoring study are included in Appendix A of the SMP.

3.2.2 Sewer Use Factor Development

As described in the City's 2019 Water Master Plan (Section 3.4), MKN utilized historical water production values for calculating existing water demand conditions for the water system hydraulic analysis. To determine existing sewer flows, MKN used water demand information from the Water Master Plan and data collected from the flow monitoring study. MKN's approach included the following:

1. Identified/coded all parcels within the City limits as developed or undeveloped (as of August 2018) based on development information provided by the City.
2. Identified/coded parcels that receive existing water and sewer service (based on water billing records, AutoCAD mapping for sewer laterals, etc.).
3. Estimated water usage per acre for existing developed sewered parcels within the flow monitoring boundaries (shown in **Figure 3-3)** based on August 2018 water production data.
4. Reduced water usage based on assumed sewer use factors (adjusted from the City's 2006 Sewer Master Plan).
5. Compared the estimated average daily flow (based on water usage and sewer use factors) to recorded average daily flow measure by the flow meters.

MKN applied the following water to sewer reduction factors to develop existing sewer flows and verify the flow estimates based on the results of the flow monitoring study (**Table 3-3**):

Table 3-3: Sewer Use Factors

Customer Class	Water Use to Sewer Flow Reduction (%)
Single Family Residential	70
Multi-Family Residential	80
Commercial / Institutional	90
Industrial	95

Table 3-4 and **Table 3-5** provide a comparison of the estimated average daily sewer flow per flow meter basin and measured average daily sewer flow recorded by the flow meters.

Table 3-4: Flow Meters No. 1 and No. 2 Flow Validation Summary

Customer Class	Sewer Use Factor	FM No. 1 Sewer Basin			FM No. 2 Sewer Basin		
		Area (Ac)	Water Demand (gpd)	Sewer Flow (gpd)	Area (Ac)	Water Demand (gpd)	Sewer Flow (gpd)
Single Family Residential	70%	52	120,882	84,617	134	311,503	218,052
Multi-Family Residential	80%	28	22,132	17,705	123	97,222	77,777
Commercial / Institutional	90%	13	13,565	12,208	71	74,085	66,677
Industrial	95%	5	1,280	1,216	1	256	243
				Estimated Sewer Flow	115,747		362,749
				Metered Sewer Flow	84,854		363,025
				% Difference	31%		0%

As noted earlier in this Section, FM No. 1 experienced significant debris within the pipeline, which is likely responsible for the poor flow data results. FM No. 2 represents approximately 46% of the total area measured during the flow monitoring study. As shown in **Table 3-4**, for the FM No. 2 basin, estimated sewer flow using sewer use factors and August 2018 water usage closely match the recorded average daily flow for the flow meter basin.

Table 3-5: Flow Meters No. 3 and No. 4 Flow Validation Summary

Customer Class	Sewer Use Factor	FM No. 3 Sewer Basin			FM No. 4 Sewer Basin		
		Area (Ac)	Water Demand (gpd)	Sewer Flow (gpd)	Area (Ac)	Water Demand (gpd)	Sewer Flow (gpd)
Single Family Residential	70%	110	255,711	178,998	32	75,543	52,880
Multi-Family Residential	80%	72	56,831	45,465	25	19,760	15,808
Commercial / Institutional	90%	29	30,156	27,140	10	10,753	9,678
Industrial	95%	1	159	151	17	4,353	4,135
			Estimated Sewer Flow	251,754			82,502
			Metered Sewer Flow	269,349			51,879
			% Difference	7%			46%

FM No. 3 represents approximately 29% of the total area measured during the flow monitoring study. As shown in Table 3-5, for the FM No. 3 basin, the estimated sewer flow using the sewer use factors and August 2018 water usage is within 7% of the recorded average daily flow for the flow meter basin. The recorded flows for FM No. 4 were significantly different than the estimated flow rates. The reason for the difference is unknown. FM No. 4 only represented approximately 12% of the total area measured during the flow monitoring study.

3.3 Existing Sewer Flow and Peaking Factors

The following flow conditions were used to analyze the existing sewer collection system, lift stations, force mains and are referenced throughout the report.

3.3.1 Average Daily Flow

ADF is the average daily sewer flow over the course of a year and is generally obtained by averaging the mean monthly flows conveyed to a WWTP through the course of a year. For this project, since the WWTP treats flows for other service areas and the total flow from the City's collection system is not measured, the ADF was determined using City water production and applying sewer use factors from **Table 3-5.**

Table 3-6: Existing Estimated Average Daily Flow

Flow Type	Developed Acreage[1]	Water Usage Factor (GPD/Acre)[2]	Estimated Water Usage (GPD)	Sewer Use Factor	Average Daily Flow (GPD)
Single Family Residential	321	2,054	658,431	70%	460,902
Multi-Family Residential	283	698	197,565	80%	158,052
Commercial / Institutional	126	922	116,454	90%	104,808
Industrial	29	226	6,583	95%	6,254
Total	**759**		**979,032**		**730,016**

Notes:
1. Acreage is for existing sewered parcels only.
2. Water Usage factors as presented in the City's 2019 Water Master Plan Table 3-8.

The existing ADF was estimated to be 0.73 million gallons per day (MGD).

3.3.2 Peak Hour Flow

Peak hour flow (PHF) is the maximum flow experienced within one hour, and is typically used for sizing collection system gravity pipe and lift stations. PHF is typically derived from WWTP influent records, flow monitoring, or empirical equations used to estimate PHF based on service area population. The influent meter at the SSLOCSD WWTP does not separate incoming flows from the member agencies and therefore cannot be used to estimate PHF conditions. As shown in **Table 3-2,** PHF peaking factors of 1.7 to 1.8 were observed, but only represent dry weather conditions. Peaking factors from FM No. 1 and FM No. 4 were excluded because of potential flow meter inaccuracy issues. However, based on a review of Wastewater Engineering Treatment and Reuse, fifth edition, by Metcalf and Eddy, Figure 3-13, a peaking factor of 3.0 for a population of 13,000 people is recommended. This value is closer to the PHF peaking factors seen from FM No. 1 and FM No. 4 (3.2 and 3.0, respectively). Since the flow monitoring study was performed over a short period, and additional PHF records for the City are unavailable, the literature peaking factor of 3.0 (cited above) was used for this report.

Wet weather flow conditions were not analyzed for the SMP since the flow monitoring study was limited to dry weather conditions. Additionally, wet weather impacts are estimated to be minimal based on the results of the "South San Luis Obispo County Sanitation District Inflow and Infiltration Study" dated August 2011 and prepared by Wallace Group. The SSLOCSD flow monitoring study placed seven meters throughout the SSLOCSD collection system and collected flow data during dry and wet weather conditions. The results for the City of Grover Beach included the following:

This basin has minimal I/I for the majority of storm events, and exhibits inflow only during larger storm events. Additional flow monitoring is not warranted at this time. The potential for inflow may be further studied by conducting field investigations to locate manholes in obvious paths of surface flow. (Wallace Group August 2011)

Table 3-7 summarizes the existing ADF and PHF conditions used to evaluate the City's existing sewer collection system.

Table 3-7: Existing Flows				
Flow Condition	**Flow Rate (MGD)**	**Flow Rate (GPM)**	**Peaking Factor**	**Source**
Average Daily Flow	0.73	507	-	2015-2018 water production and August 2018 flow monitoring study.
Peak Hour Flow	2.19	1,521	3.0	Metcalf and Eddy Figure 3-13 (ibid).

3.4 Future Sewer Flow

To estimate sewer flows associated with future residential, commercial, and industrial development, MKN utilized the future water demands identified in the City's 2019 Water Master Plan (Table 3-13) and applied the sewer use factors shown in **Table 3-5** for future flow conditions.

To estimate the City's 2050 sewer flow, MKN used the vacant property inventories (residential, commercial, and underutilized property), pending development projects, West Grande Avenue redevelopment, and buildout of the Urban Reserve Area to project future flows, which are summarized in **Table 3-8**.

Table 3-8: Estimated Future Sewer Average Daily Flow				
Flow Type	**Development Type**	**Average Day Water Demand (GPD)**	**Sewer Use Factor**	**Average Day Flow (GPD)**
Residential	Vacant Residential Properties	45,279	70%-80%[4]	34,560
	Residential Underutilized Properties	29,543	70%-80%[4]	23,400
	Pending Development Projects	21,353	80%	17,082
	West Grand Avenue Corridor Underutilized Lots	46,800	80%	37,440
	Urban Reserve	62,058	70%	43,441
	Subtotal	**205,032**		**155,923**
Hotel	Under Construction[1]	17,990	90%	16,191
	Approved[2]	37,360	90%	33,624
	In Process[3]	110,880	90%	99,792
	Subtotal	**166,230**		**149,607**
Commercial	Under Construction	157	90%	141
	Approved	630	90%	567
	Approved (Restaurant)[2]	-	-	-
	In Process (Restaurant)[3]	-	-	-
	Vacant Commercial Properties	9,474	90%	8,527
	Urban Reserve	19,206	90%	17,285
	Subtotal	**29,468**		**26,521**
Industrial	Under Construction	305	95%	290
	Approved	8,909	95%	8,464
	In Process	11,400	95%	10,830
	Vacant Industrial Properties	17,511	95%	16,636
	Subtotal	**38,125**		**36,219**
Septic Conversions	Low Density Residential	31,724	70%	22,207
	Medium Density Residential	761	80%	609
	Industrial	6,154	95%	5,846
	Subtotal	**38,639**		**28,662**
			Additional Flow	**396,931**
			Existing Flow	**730,016**
			Total Future Flow	**1,126,947**

Notes:

1. Water demand based on a percentage of estimated wastewater flow presented in the "Sewer Lift Station and Forcemain System Design for the Holiday Inn Express Grover Beach" report dated September 11, 2015 and prepared by Omega Engineering Consultants, Inc.
2. Water demand based on a percentage of estimated wastewater flow presented in the Grover Beach Lift Station and New Le Sage Drive Force Main report dated January 13, 2017 and prepared by Garing, Taylor & Associates, Inc. Flow estimate includes approved 4,000 square foot restaurant.
3. Water demand based on the Water & Sewer Daily Average Flow Calculations For Tr 3211 El Camino Real Development 1598 El Camino, Grover Beach California report dated September 7, 2018 and prepared by Garing, Taylor & Associates, Inc. Flow estimate includes pending 4,000 square foot restaurant and seven single family residential lots.
4. Vacant residential properties and residential underutilized properties include both single family residential and multi-family residential uses.

Table 3-9 summarizes the future ADF and PHF conditions used to evaluate the City's existing sewer collection system.

Table 3-9: Future Flows			
Flow Condition	**Flow Rate (MGD)**	**Flow Rate (GPM)**	**Peaking Factor**
Average Daily Flow	1.13	783	-
Peak Hour Flow	3.38	2,348	3.0 X ADF

Recommended gravity pipelines will be sized based on the design criteria described in Section 5. However, there may be instances where new development (not identified in this SMP) occurs that may result in hydraulic capacity requirements that exceed the capacity of existing gravity pipes. Such cases will need to be analyzed on a case-by-case basis when the developments are proposed to determine if supplemental system improvements are needed.

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SECTION 4 EXISTING SYSTEM OVERVIEW

This section provides an overview of the City's existing sewer collection system facilities including gravity sewer pipes, lift stations, and manholes.

4.1 Overview

The City provides sewer collection services for approximately 13,560 customers with wastewater treatment provided by the SSLOCSD. The sewer collection system consists of 35 miles of gravity collection system piping ranging in diameter from 6-inch to 12-inch, 0.5 miles of force main, approximately 360 manholes, 270 cleanouts, and three lift stations ranging from 120 to 350 GPM (simplex operation). In addition to City sewer facilities, there are several private lift stations that pump into the existing collection system. Detailed descriptions of the City's facilities are provided below.

4.2 Gravity Collection System

The City's existing sewer collection system is shown in **Figure 4-1** and an inventory of the existing sewer collection system are provided in the following tables. This information was obtained from the City's existing sewer atlas information. **Table 4-1** provides a summary of the sewer collection system inventory by pipe size:

Table 4-1: Sewer Collection System Inventory by Pipe Size

Diameter (Inches)	Length		
	Feet	Miles	% of total
6	64,731	12.3	35
8	108,224	20.5	58
10	10,933	2.1	6
12	2,061	0.4	1
Total	**185,950**	**35.2**	**100**

Table 4-2 provides a summary of the sewer collection system inventory by pipe material type:

Table 4-2: Sewer Collection System Inventory by Pipe Material

Material	Length		
	Feet	Miles	% of total
Poly Vinyl Chloride (PVC)	40,890	7.7	22
Vitrified Clay	145,060	27.5	78
Total	**185,950**	**35.2**	**100**

Table 4-3 provides a summary of the sewer collection system inventory by installation period:

Table 4-3: Sewer Collection System Inventory by Installation Period

Installation Period	Length		
	Feet	Miles	% of total
1960s	122,004	23.1	66
1970s	14,198	2.7	8
1980s	25,374	4.8	14
1990s	15,124	2.9	8
2000 - Present	8,074	1.5	4
Unknown	879	0.2	0.5
Total	**185,653**	**35**	**100**

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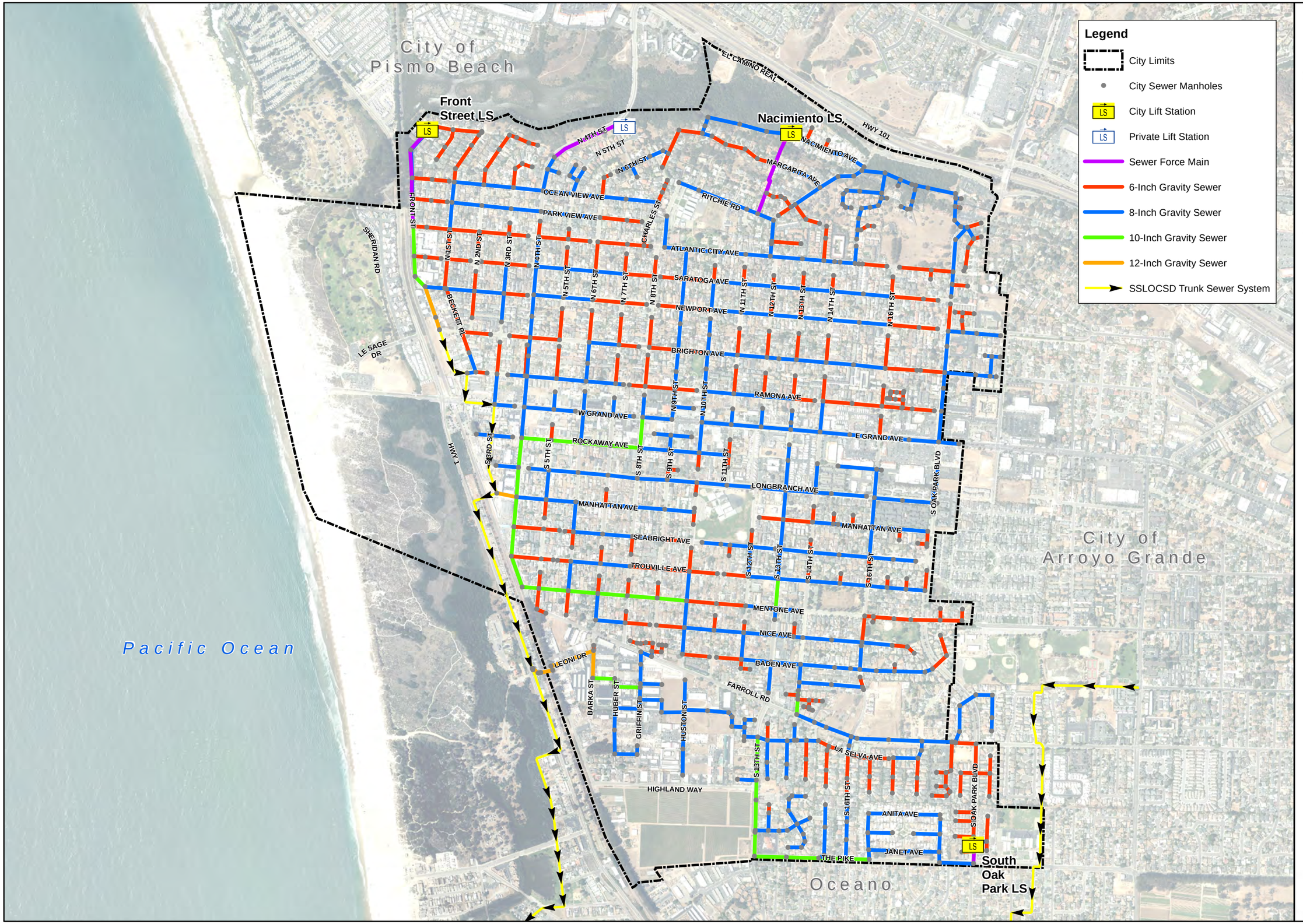

City of Grover Beach

Sewer Master Plan

Figure 4-1:

Sewer Collection System Map

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4.3 Lift Stations

The City's existing sewer collection system includes three lift station facilities as shown in **Figure 4-1**. Below is a summary of the lift stations.

4.3.1 Nacimiento Avenue Lift Station

The Nacimiento Avenue Lift Station is located at the west end of Nacimiento Avenue outside of the roadway. There is an adjacent stream/creek that has flooded this area in the past during heavy rainfall events.

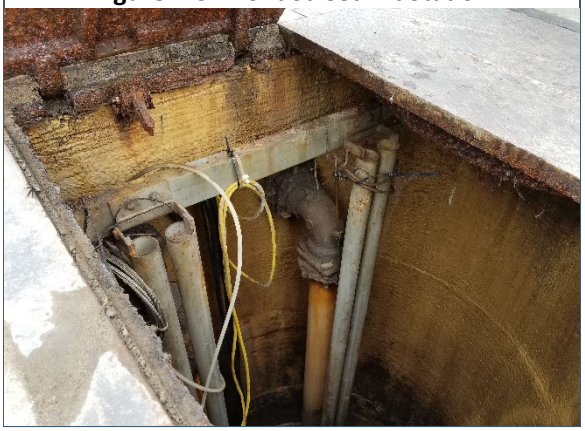
Figure 4-2: Nacimiento Avenue Lift Station

The Nacimiento Avenue Lift Station was a wet pit / dry pit configuration constructed in the 1960s with the original City sewer collection system. In 2001, the facility was rehabilitated with an 8-foot diameter concrete wet well with valve vaults, duplex submersible solids-handling pumps rated at 320 gallons per minute (gpm) at 151 feet of total dynamic head (TDH), and elevated platform with control panel, permanent standby generator, and 500-gallon propane tank.

This lift station collects residential and limited retail commercial flows from adjacent neighborhood and serves approximately 234 parcels. A photo of the lift station wet well is shown in **Figure 4-2**.

4.3.2 Front Street Lift Station

Figure 4-3: Front Street Lift Station



The Front Street Lift Station is located at 897 Front Street within the roadway. The control panel is located on the south side of the street behind the back of the existing sidewalk.

The Front Street Lift Station was a wet pit / dry pit configuration constructed in the 1960s with the original sewer collection system. In 1985 the facility was rehabilitated with a 5-foot diameter concrete wet well with valve vaults, duplex submersible solids-handling pumps rated at 120 gpm at 53 feet TDH.

This lift station collects residential flows from the adjacent neighborhood and serves approximately 74 parcels. A photo of the lift station wet well is shown in **Figure 4-3**.

Since the lift station is located within the roadway the access hatches are made of cast iron, which requires a crane or other means to remove the hatches and access the pumps within the wet well.

4.3.3 South Oak Park Lift Station

The South Oak Park Lift Station is located within a road median on South Oak Park Boulevard at Driftwood Street.

The South Oak Park Lift Station was installed in the early 1980s to serve a residential development located on South Oak Park Boulevard and the Pike. The concrete wet well is 5 feet in diameter and approximately 20 feet deep. This facility is a packaged lift station with duplex self-priming suction lift pumps located above grade within an enclosure, and a below-grade wet well. The pumps were last replaced in 2015 and are rated at 350 gpm at 33 feet TDH.

This lift station collects residential flows from the adjacent residential neighborhood and serves approximately 65 parcels. A photo of the lift station site is shown in **Figure 4-4**.

Figure 4-4: South Oak Park Lift Station

Table 4-4 provides a detailed summary of the City's lift stations.

Table 4-4: Lift Station Summary

Parameter	Nacimiento Avenue Lift Station	Front Street Lift Station	South Oak Park Lift Station
Lift Station Specifications			
Date Constructed	1965	1965	1982
Date Refurbished	2001	1985	-
Lift Station Type	Wet Well	Wet Well	Wet Well
Permanent Standby Generator	Yes	No	No
Portable Generator Power Receptacle	No	Yes	Yes
Bypass Capabilities	Yes	Yes	Yes
Pump Characteristics			
Pump Type	Submersible Solids-Handling	Submersible Solids-Handling	Self-Priming Suction Lift
Pump Manufacturer	Fairbanks Nijhuis	Wemco	Gorman-Rupp
Pump Model #	5433MV	-	T4A3S-B
Impeller Trim (in)	12	-	9 3/4
Impeller Code	T4C1KH	-	Standard
Number of Pumps	2	2	2
Pump Serial #	10504587, 10504589	-	1319605
Last Pump Replacement	2017	2000	2015
Motor Characteristics			
Horsepower (HP), each	30	10	7.5
Speed (rpm)	1775	1750	1277
Phase/Voltage/Frequency	3/460/60	-	3/230/60
Simplex Pump Performance			
Design Point (Flow Rate, TDH) (2006 SMP)	320 gpm @ 151 feet	120 gpm @ 53 feet	350 gpm @ 33 feet
Static Lift (from Pump off elevation) (ft)	141.02	17.99	19.49

Table 4-4: Lift Station Summary			
Parameter	Nacimiento Avenue Lift Station	Front Street Lift Station	South Oak Park Lift Station
Average Daily Hours of Operation (based on 2017 City records)			
Pump 1 (hrs)	1.62	0.65	0.15
Pump 2 (hrs)	1.16	0.74	0.14
Total (hrs)	2.78	1.39	0.29
Wet Well Characteristics			
Wet Well Coating	Yes	Yes	Yes
Wet Well Diameter (ft)	8.00	5.00	5.00
Wet Well Rim Elevation (ft)	25.00	14.70	80.00
Bottom of Wet Well Lid (ft)	24.00	13.00	79.00
Lowest Inlet Pipe Invert (ft)	17.25	7.45	65.50
Wet Well Base Elevation (ft)	13.40	1.00	59.50
Wet Well Total Depth (ft)	10.60	12.00	19.50
Wet Well Operating Points			
Pump Set Points Elevations (feet)[1, 2, 3]			
Overflow	NA	NA	NA
High Alarm	17.20	7.00	65.50
Lag On	17.20	7.00	65.50
Lead On	16.50	6.00	65.30
Off	14.40	2.00	61.50
Low Alarm	NA	NA	NA
Pump Set Points Levels (feet)			
Overflow	NA	NA	NA
High Alarm	3.80	6.00	6.00
Lag On	3.80	6.00	6.00
Lead On	3.10	5.00	5.80
Lead Off	1.00	1.00	2.00
Low Alarm	NA	NA	NA
Wet Well Active Volume (gal)	790	588	558
Force Main Characteristics			
Force Main Diameter (in)	6	4	6
Force Main Material	Asbestos Cement (AC)	Asbestos Cement	PVC
Force Main Length (ft)	1,126	1,282	236
Installation Date	1965	1965	1982
Force Main Start Elevation at end of Valve Vault (ft)[3,4]	20.50	9.80	77.00
Force Main End Elevation at Gravity Manhole (ft)[3,4]	155.42	19.99	81.01

Notes:

1. Nacimiento Lift Station elevations based on construction plans prepared by Garing Taylor & Associates January 3, 2001.
2. Front Street Lift Station elevations based on construction plans prepared by Garing Taylor & Associates November 1, 1985.
3. South Oak Park Lift Station and force main elevations based on construction plans by Westland Engineering July 1982.
4. Force main elevations based on construction plans by Boyle Engineering April 1965 for the Nacimiento Avenue and Front Street lift stations.

Figure 4-5 shows the existing sewer collection system, the locations of the three City lift stations, and identifies the parcels that contribute sewer flow to the lift stations.

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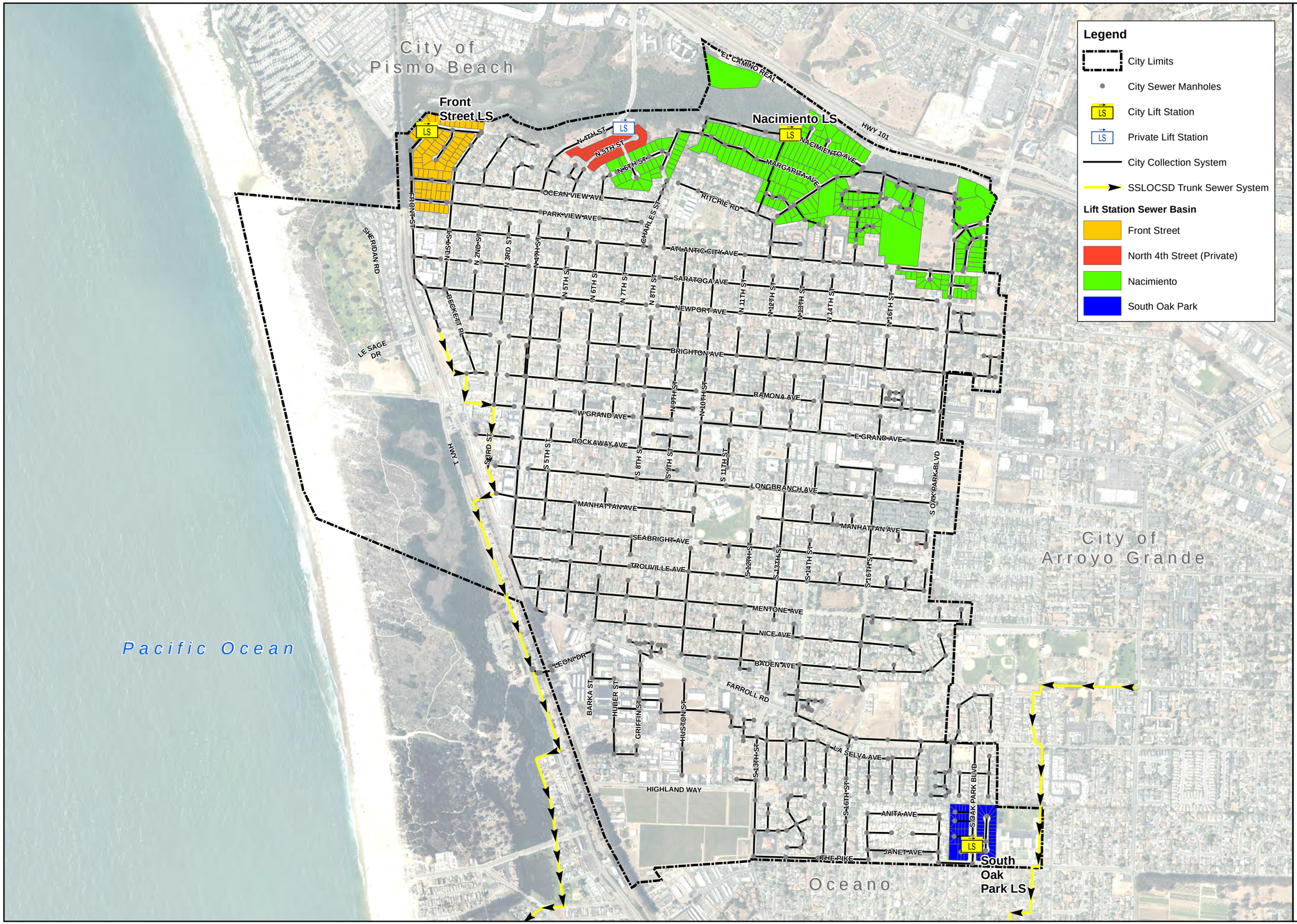

City of Grover Beach

Sewer Master Plan

Figure 4-5:

Lift Station
Sewer Basin Map

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4.4 Operation and Maintenance Areas

The City conducts regular operation and maintenance of the collection system, including the following:

- Daily inspections of the three City lift stations
- Monthly lift station inspection and operation
- Underground utility locating for construction projects by City or others
- Performance of main taps and lateral connections
- Field inspections of construction and modifications to the collection system
- Painting and other minor maintenance of lift stations
- Coordination of lift station pump maintenance with vendors
- Coordination of sewer main maintenance with vendors including monthly and annual line cleaning, described in detail below
- Response to wastewater emergencies
- Maintenance of manual records related to service and repair work performed; tracking, reporting, interpretation of information and adjusting maintenance schedules, and maintenance of program documentation
- Pipeline root treatment (every two years)

Table 4-5 provides a summary of the gravity pipeline segments that are treated every two years for root intrusion (by contractors).

Table 4-5: Collection System Root Treatment

Location/Description	Pipe Size (inches)
100 Block of No. 13th St	6
Atlantic City Avenue	6
Front Street	8
Longbranch Avenue	8
Longbranch Avenue	8
Longbranch Avenue	8
Newport Avenue	6
Newport Avenue	6
Parkview Avenue	6
Trouville Avenue	6

Table 4-6 provides a summary of the gravity pipeline segments that require cleaning two to three times a year.

Table 4-6: Collection System Gravity Line Jetting				
Location/Description	**Pipe Size (inches)**	**Pipe Material**	**Installation Date**	**Pipe Length (feet)**
Oceanview and Front, jet east on Oceanview	6	VCP	1965	248
1800 and 1900 blks of Newport, jet east from manhole on Oak Park through pine trees to second manhole. There are (2) manholes	8	VCP	1965	358
844 Front St. Jet south to next manhole	8	VCP	1965	349
300 blk of Parkview, jet east from 3rd	8	VCP	1965	372
1700 Brighton, jet west to dead end	6	VCP	1965	300
100 blk of So. 6th jet north from Rockaway	8	VCP	1965	384
11th and Ramona, jet North on 11th to dead end	6	VCP	1965	339
China Buffet, Jet entire main in 100 blk So. Oak Park to Longbranch	8	VCP	1980	503
1700 blk Longbranch, jet entire blk	8	VCP	1971	373
1600 blk Longbranch, jet entire blk	8	VCP	1971	351
14th and Seabright, jet east from 14th	8	VCP	1965	367
13th and Seabright, jet east from 13th	8	VCP	1965	363
Longbranch 14th to 16th jet east to dead end	8	VCP	1968	638
1400 blk Grand jet east on Grand to Taco Bell from 14th	8	VCP	1965	372
100 blk of No. 4th jet north from Grand Ave	8	VCP	1965	385
1100 and 1200 blks Brighton, jet east	8	VCP	1965	588
Jet north on 10th street Rockaway to Grand	8	VCP	1965	385
1100 block of Newport, jet east	8	VCP	1965	369
N 4th and Ramona, jet east on Ramona from 4th, 300 feet	8	VCP	1965	370
Charles and Oceanview, jet north on Charles to dead end	6	VCP	1965	300
1100 blk Ramona, jet east from 11th to 12th on Ramona	8	VCP	1965	371
N. 9th behind Post Office, jet east 150 feet after 4:30pm	8	VCP	1965	253
13th and Highland, jet south on 13th Highland to Del Mar	10	VCP	1976	619
800 blk Rockaway, jet east from 8th to 9th	8	VCP	1965	371
1000 blk Rockaway, jet east from 10th to 11th	8	VCP	1965	369
900 blk Trouville, jet west to clean out	6	VCP	1965	337
4th and Seabright, jet east on Seabright to 5th	6	VCP	1965	371
4th and Manhattan, jet east on Manhattan to 5th	8	VCP	1965	396
Total (approximately 6% of the collection system)				**10,801**

Notes:
1. VCP = Vitrified Clay Pipe.
2. BLK = blocks.

4.5 SSLOCSD WWTP and Trunk Sewer System

The City is a member agency of the SSLOCSD, which also includes the City of Arroyo Grande and Oceano Community Services District. The member agencies jointly own the SSLOCSD WWTP, ocean outfall, and trunk sewer collection system.

The SSLOCSD trunk sewer collection system consists of approximately 9 miles of gravity sewer ranging in diameter from 12-inch to 33-inch with 540 manholes. The City's portion of the trunk sewer system consists of 2 miles of gravity sewer (approximately 20% of the total), with diameters ranging from 15-inch to 24-inch.

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SECTION 5 DESIGN CRITERIA

This section provides an overview of the design criteria used to analyze the City's existing sewer collection system including gravity sewer pipes, lift stations, and force mains. The City has adopted design standards and specifications for sewer collection system improvements. These design standards, along with industry-accepted design criteria for lift stations and force mains, were utilized to evaluate the ability of the City's existing sewer infrastructure to meet existing and future flows.

5.1 Gravity Collection System Criteria

Table 5-1 provides a summary of the City's design standards for sewer improvements.

Table 5-1: City Design Standards for Gravity Sewer Pipe

Pipe Grade to Achieve 2.0 fps (Flow Full Pipe)		
Diameter (in)	**Slope (Feet/Foot)**	
	Recommended	Minimum Acceptable
6	0.0050	0.0035
8	0.0035	0.0025
10	0.0025	0.0020
12	0.0020	0.0015
15	0.0015	0.0012
18	0.0012	0.0006
Pipe Velocity (fps)		
Minimum	2.0	
Maximum	10.0	
Pipe Size		
Minimum	8-inch (6-inch subject to City approval)	

Notes:
1. FPS = feet per second.

Table 5-2 provides a summary of the pipe capacity depth over Diameter (d/D) criteria used to evaluate the existing collection system, new collection system pipes, and the SSLOCSD trunk.

Table 5-2: Pipe d/D Evaluation Criteria

Parameter	Pipe Size (inches)	Required d/D	Flow Condition
New City Pipe	>= 8	0.50	Peak Hour Flow
Existing City Pipe	<= 8	0.50	
	>= 10	0.75	
SSLOCSD Trunk Sewer Pipeline[1]	>= 15	Less than 2 feet surcharge above crown of pipe and at least 5 feet below manhole rim	

Notes:
1. As a future improvement, the City may consider installation of a watertight manhole cover and ultrasonic level indicator at one of the locations likely to surcharge per the model.

As identified in **Table 5-2**, it is required that new gravity sewer pipelines (>= 8-inch) be designed with a maximum d/D of 0.5 during peak hour conditions. However as directed by City staff, for the hydraulic evaluation of existing City pipelines an exceedance of 10% over the maximum d/D values (**Table 5-2**) was allowed and noted in the pipeline deficiency tables in Sections 7.1 and 8.1.

5.2 Lift Station Criteria

The following design criteria were used to evaluate capacity of the City's three existing lift stations under existing and future flow conditions.

5.2.1 Pump Capacity

It is recommended that lift stations are designed with a minimum of two pumps, such that the pumping system can serve the full design flow with the largest pump offline, to provide full redundancy if one pump fails or requires service, to alternate pump cycles to minimize wear on the pump components, and to provide supplemental pumping capacity to convey instantaneous peak flows. Each pump should be sized to convey the peak hour flow entering the wet well.

5.2.2 Wet Well Capacity and Pump Cycle Times

Another factor in lift station design and evaluation is Pump Cycle Time, which is defined as the sum of the fill time and drain time for the wet well. Wet wells should be large enough to prevent rapid pump cycling and small enough to reduce residence time to minimize odors and settling/accumulation of solids. The following equation was used to determine the time between starts for a constant speed pump in a wet well:

$$T = \text{Fill Time} + \text{Drain Time}$$

$$\text{Fill Time} = V_{ACTIVE}/Q_{IN}$$

$$\text{Drain Time} = V_{ACTIVE}/(Q_{PUMP} - Q_{IN})$$

Where T is the cycle time between starts, Q_{PUMP} is the rated capacity of a single pump in gpm, Q_{IN} is the inflow (average and peak hour upstream flow to the wet well) and V_{ACTIVE} is the available active volume of the wet well. The maximum recommended cycle time is 30 minutes to reduce odor issues associated with extended detention times. Lift station pumps should typically cycle not more than 5 or 6 times per hour to limit pump starts. This recommendation, however, should be based on the actual pump manufacturer's information, as smaller horsepower motors may be capable of starting more often.

To evaluate the capacity of the lift station wet wells under existing and future ADF and PHF inflow conditions, the available active volume is calculated and compared to the recommended based on pump cycle time. The active wet well volume is the volume between the "lead pump off" and "lead pump on" set points. The minimum recommended active volume for the City lift stations were determined using the following equation:

$$V_{MIN} = Q_{PUMP}T/4$$

Where V_{MIN} is the minimum active volume in gallons, Q_{PUMP} is the rated capacity of a single pump in gallons per minute (gpm), and T is cycle time in minutes (the minimum recommended cycle time is 10 minutes, or six starts per hour).

5.3 Force Main Criteria

Force mains were analyzed to determine if they are properly sized to convey the lift station pumped flow, while maintaining minimum pipeline velocities to re-suspend solids and provide pipeline cleaning. It is recommended that lift station force mains convey minimum velocities of 3.5 to 6 feet per second (fps) with maximum velocities less than 10 fps to minimize head loss and potential for surge events.

SECTION 6 HYDRAULIC COMPUTER MODEL

6.1 Overview

This section provides an overview of the collection system hydraulic model developed for this project to analyze the ability of the existing system to serve existing and future flows.

6.2 Model Development

MKN developed an updated hydraulic model using Bentley SewerCAD CONNECT Edition Version 10 (SewerCAD) hydraulic modeling software to simulate the operation of the gravity collection system. SewerCAD incorporates the Manning's equation for open channel flow and Hazen-Williams formula for pressure pipes (lift station force mains). The hydraulic model was run under steady state conditions using a backwater analysis. This type of analysis starts at the collection system outlet location (SSLOCSD WWTP headworks for the SMP) with an assigned outlet condition (either free discharge, submerged, or tailwater control). From the outlet location SewerCAD proceeds in an upstream direction performing the hydraulic analysis.

A representative model of the existing pipes and pumping facilities was developed using the following information:

- The City's 2013 collection system atlas AutoCAD file (prepared by GTA). The AutoCAD file provided the following information:
  - Gravity pipe alignment and manhole locations
  - Gravity pipe diameter, material, and installation dates
  - Lift station locations and force main alignments
- 1965 Asbuilt Plans for the original collection system (prepared by Boyle Engineering). The Asbuilt Plans provided:
  - Manhole rim elevations
  - Gravity invert elevations
  - Pipe slopes based on the National Geodetic Vertical Datum of 1929 (NGVD 29)
- For gravity pipe segments installed after 1965, pipe slope and manhole depth values were taken from available asbuilt plans provided by the City. Rim and invert elevations for these areas were estimated based on available elevations from manholes in the 1965 system.
- Field visits with City staff to each lift station.
- Pump curves from pump vendors for the lift stations.
- The portion of the SSLOCSD trunk sewer system was included in the updated hydraulic model from the City to the SSLOCSD WWTP based on the City's 1964 asbuilts for the collection system.

The existing sewer collection system was mapped using an Environmental Systems Research Institute (ESRI) GIS geodatabase and integrated with the City's GIS parcel basemap (provided by the City). Pipe characteristics and average day flows (from each sewered parcel) were recorded in the sewer GIS database and imported into the hydraulic model. A skeletonized hydraulic model was constructed to evaluate the collection system. Only pipe segments with invert information were included, amounting to approximately 45% of the total collection system and covering the majority of the major trunk mains (**Figure 6-1**). Existing and future flows from areas not imported in the hydraulic model were assigned to the closest downstream manhole.

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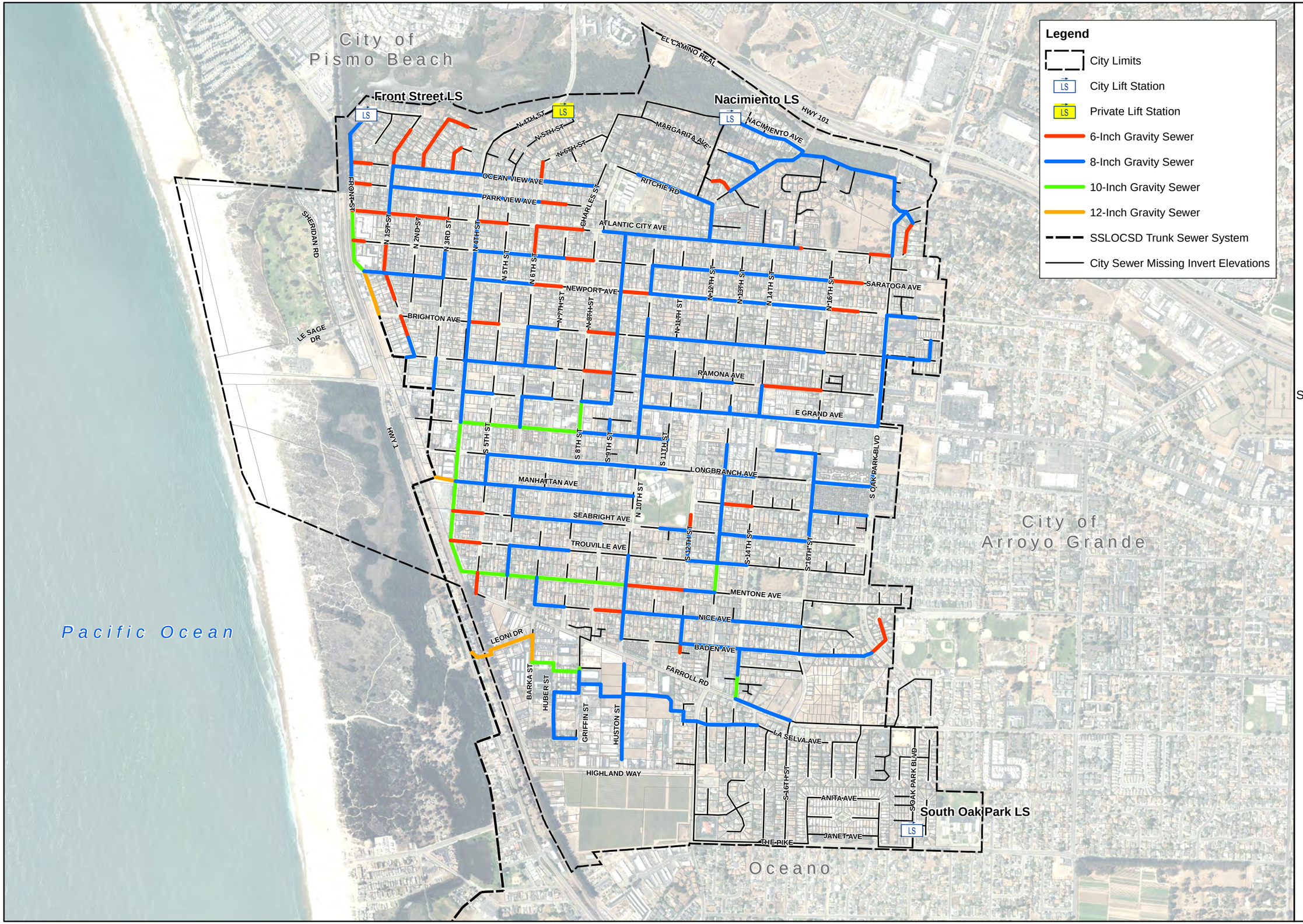

City of Grover Beach

Sewer System Master Plan

Figure 6-1:

Sewer Collection System Hydraulic Model

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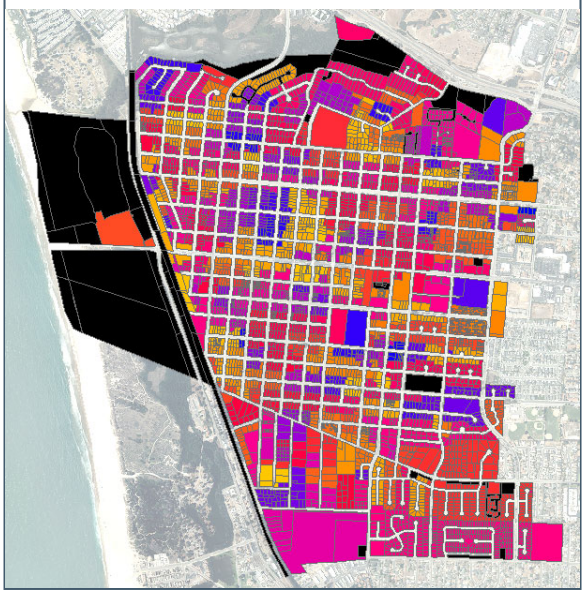
Pipe segments not imported in the hydraulic model because of missing invert information included the following:

- ❑ 6-inch pipe segments serving cul-de-sacs with a clean out at end (elevation for cleanout not available)
- ❑ 6-inch and 8-inch pipes segments serving built out residential subdivisions (primarily south of Farroll Avenue and along the east side of the City limits)

6.2.1 Sewer Flow Allocation

To determine the distribution of sewer flows into the collection system, existing flow conditions were established as described in Section 3. City water demands were converted to sewer flows based on land use duty factors verified with flow monitoring data.

Figure 6-2: Sewer Flow Allocation



Each parcel within the City was coded with an existing sewer flow and future sewer flow (with additional flow from development if applicable). Each parcel was also coded with the closest downstream manhole based on the sewer lateral mapping from the City's AutoCAD atlas.

Each manhole imported into the hydraulic model was "loaded" with the existing and future sewer flows from the upstream parcels entering the manhole. **Figure 6-2** shows the "sewersheds" that were developed for loading existing and future flows into the hydraulic model. Black areas are parcels that do not convey sewer flows to the collection system (such as parks, drainage basins, road parcels, etc.)

The City's portion of the SSLOCSD pipeline within the hydraulic model included estimated residential and commercial sewer flows from the Oceano Community Services District (OCSD) service area, and the OCSD Pier Avenue Lift Station pumped flowrate (200 gpm).

For the three proposed hotels included in Table 6-1 it is our understanding that each project will construct an onsite lift station and private force main to convey sewer flow to the City's collection system. The discharge location and pump flowrates were provided by Garing Taylor and Associates and are summarized in Table 6-1 below:

Table 6-1: Future Hotel Lift Stations

Hotel Development	Assumed Discharge Location	Assumed Private Lift Station Flowrate (gpm)
Holiday Inn Express	Nacimiento Avenue Lift Station Wet Well	75
Grover Beach Lodge	Manhole in Front Street at Brighton Avenue with 15-inch downstream pipe	273
1598 El Camino	Manhole in Atlantic City Avenue at Ritchie Road with 8-inch downstream pipe	185

6.2.2 Model Scenarios

The following model simulations were completed as part of the SMP project to identify existing pipe capacity (d/D) and pipe velocity deficiencies:

- Existing conditions with 1) existing system; and 2) existing system including capital improvements
  - Average Daily Flow
  - Peak Hour Flow
- Future conditions with 1) existing system; and 2) existing system including capital improvements (based on future development in Table 3-8 excluding West Grand Avenue Development and Septic Conversions)
  - Average Daily Flow
  - Peak Hour Flow
- Alternative Future conditions with 1) existing system; and 2) existing system including capital improvements (based on future development in Table 3-8 with West Grand Avenue Development and Septic Conversions)
  - Average Daily Flow
  - Peak Hour Flow

6.2.3 Model Settings

With the corrected sewer system network, existing and future flows imported into SewerCAD the following modeling parameters were configured:

- Adjustment of vendor-supplied lift station pump curves to account for minor manifold losses and friction losses to simulate the performance of the pumps
- Lift station wet well levels were set to the low wet well level (pump off position) to simulate "worst-case" static lift conditions
- Lift stations were set to "on" during existing and future ADF and PHF flow conditions
- All hydraulic simulations were completed under "Steady State" time analysis
- The following Hazen-Williams friction coefficients were used for force mains
  - Asbestos Cement Pipe: 120
  - Polyvinyl Chloride: 140
- The following Mannings N friction coefficients were used for gravity pipelines:
  - Polyvinyl Chloride: 0.013
  - Vitrified Clay: 0.015

6.3 Hydraulic Model Flow Validation

As described in Section 3.2.2, MKN used the August 2018 flow monitoring and water production data to develop sewer use factors (water usage reduction) to estimate existing and future flow conditions within the hydraulic model.

SECTION 7 EXISTING FLOWS - HYDRAULIC ANALYSIS AND CONDITION ASSESSMENT

This section summarizes the hydraulic evaluation of the City's existing sewer collection system to serve existing flows and visual condition assessment of the three lift stations.

7.1 Gravity Collection System

7.1.1 Hydraulic Model Evaluation – Existing Flow Conditions

The City's existing sewer collection system contains over 35 miles of gravity sewer pipe ranging from 6-inch to 12-inch in size (excluding the SSLOCSD trunk sewer collection system) and consists of PVC or vitrified clay pipe. As described in Section 6.2, a skeletonized hydraulic model was constructed to evaluate the collection system. Only pipe segments with invert information were included, amounting to approximately 45% of the total collection (**Figure 6-1**). The City's portion of the SSLOCSD trunk sewer system was also imported into the hydraulic model with estimated residential and commercial sewer flows from the OCSD service area, and the OCSD Pier Avenue Lift Station pumped flowrate (200 gpm). Existing and future flows for areas not imported into the hydraulic model were assigned to the closest downstream manhole. Gravity collection system deficiencies were primarily determined based on a hydraulic evaluation of pipeline sizes, slope, and downstream restrictions using the following designations:

- "A" designation was used to track and identify deficiencies for gravity sewer pipes less than or equal to 8-inch in diameter and evaluated for a d/D less than or equal to 0.5.
- "B" designation was used to track and identify deficiencies for gravity sewer pipes greater than or equal to 10-inch in diameter and evaluated for a d/D less than or equal to 0.75.

Figure 7-1 provides an overview of typical gravity pipeline velocities during existing PHF conditions. Approximately 33% of the modeled City sewer collection system will achieve self-cleaning velocities equal to or greater than 2 FPS during peak hour conditions. **Table 7-1** and **Figure 7-2** provides an overview of the collection system deficiencies identified through the hydraulic model simulations during existing PHF conditions.

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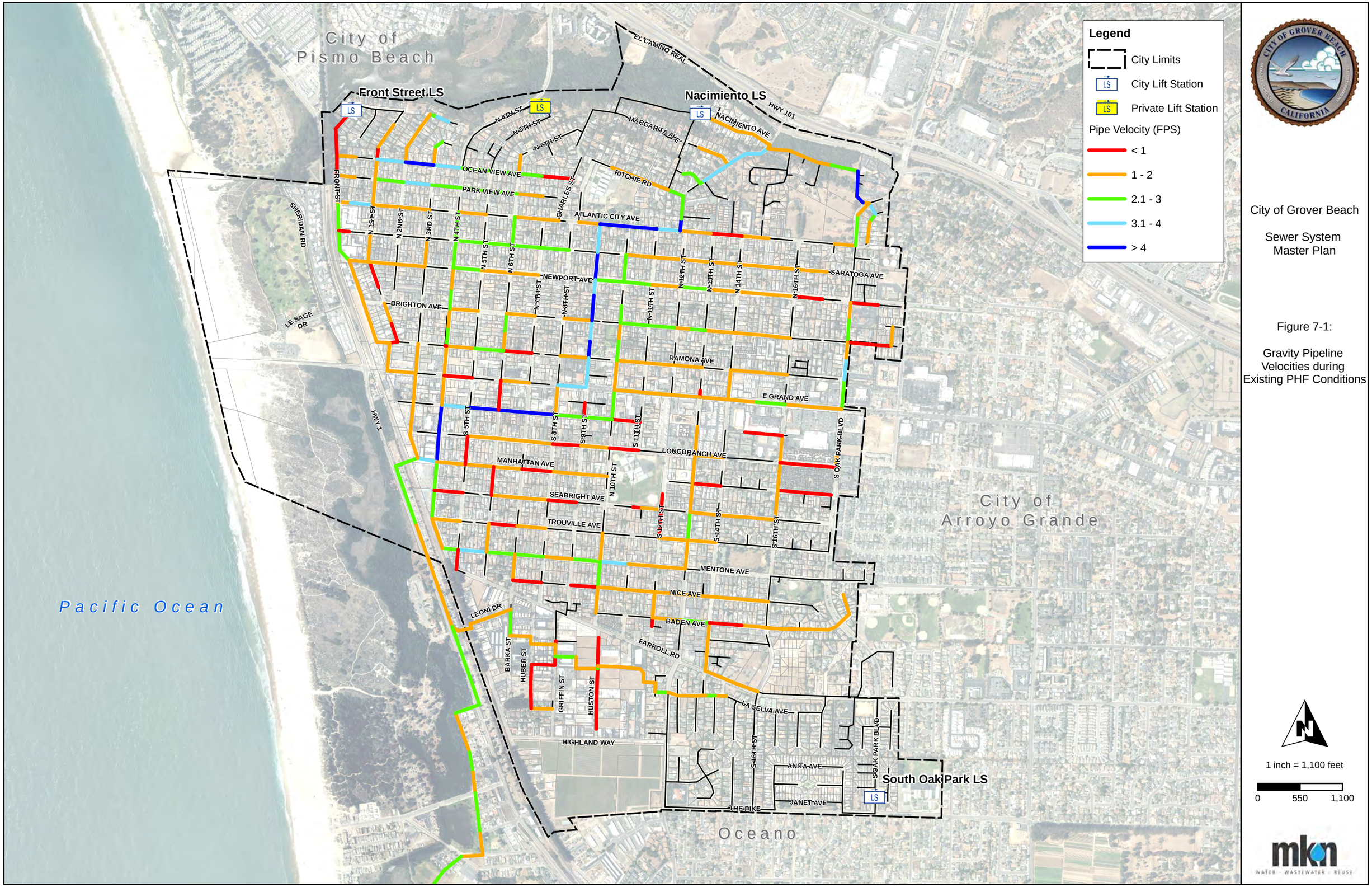

City of Grover Beach

Sewer System
Master Plan

Figure 7-1:

Gravity Pipeline
Velocities during
Existing PHF Conditions

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Table 7-1: Collection System Deficiencies during Existing PHF Conditions						
Deficiency Identification	Location	Existing Facility		Peak Hour		Notes
		Diameter (inches)	Length (feet)	Flow (gpm)	d/D	
A-1	Trouville Ave (S 4th St to S 5th St)	6	371	3	0.59	Capacity limitation
A-2	Ramona Ave (N 8th St to N 9th St)	6	369	5	1.00	Downstream pipe causes surcharged condition during PHF
A-3	Manhattan Ave (S 4th St to S 5th St)	8	369	48	0.86	Downstream pipe causes surcharged condition during PHF
A-4	Newport Ave (N 9th St to N 10th St)	6	370	66	0.72	Capacity limitation
A-5	S 4th St (W Grand Ave to Rockaway Ave)	8	385	103	0.64	Capacity limitation
A-6	Atlantic City Ave (Front St to N 1st St)	6	456	138	0.70	Capacity limitation
A-7	Griffin St	8	138	145	0.59	Capacity limitation
A-8	Rockaway Ave (S 8th St to S 9th St)	8	371	151	0.61	Capacity limitation
A-9	Mentone Ave (S 12th St to S 13th St)	8	375	160	1.00	Capacity limitation
A-10	Mentone Ave (S 10th St to S 12th St)	6	735	173	0.87	Capacity limitation
A-11	Nice Ave (S 10th St to S 12th St)	8	741	198	0.66	Capacity limitation
A-12	S 10th St (Mentone Ave to Nice Ave)	8	334	209	0.71	Capacity limitation
A-13	Ritchie Rd (Ritchie Ct to N 12th St)	8	360	335	1.00	Capacity limitation
A-14	N 12th St (Ritchie Road to Atlantic City Ave)	8	425	341	1.00	Capacity limitation
A-15	Atlantic City Ave (N 9th St to N 12th St)	8	1045	376	0.66	Capacity limitation
A-16	N 9th St (Atlantic Ave to W Grand Ave)	8	2127	509	0.60 - 1.00	Capacity limitation
A-17	W Grand Ave (8th St to 9th St)	8	369	511	1.00	Capacity limitation
B-1	S 8th St (W Grand Ave to Rockaway Ave)	10	385	513	0.98	Capacity limitation
B-2	S 4th St (Longbranch Ave to Trouville Ave)	10	1109	787	0.76 - 1.00	Downstream pipe causes surcharged condition during PHF
B-3	Manhattan Ave (S 3rd St to 4th St)	12	252	1283	1.00	Capacity limitation

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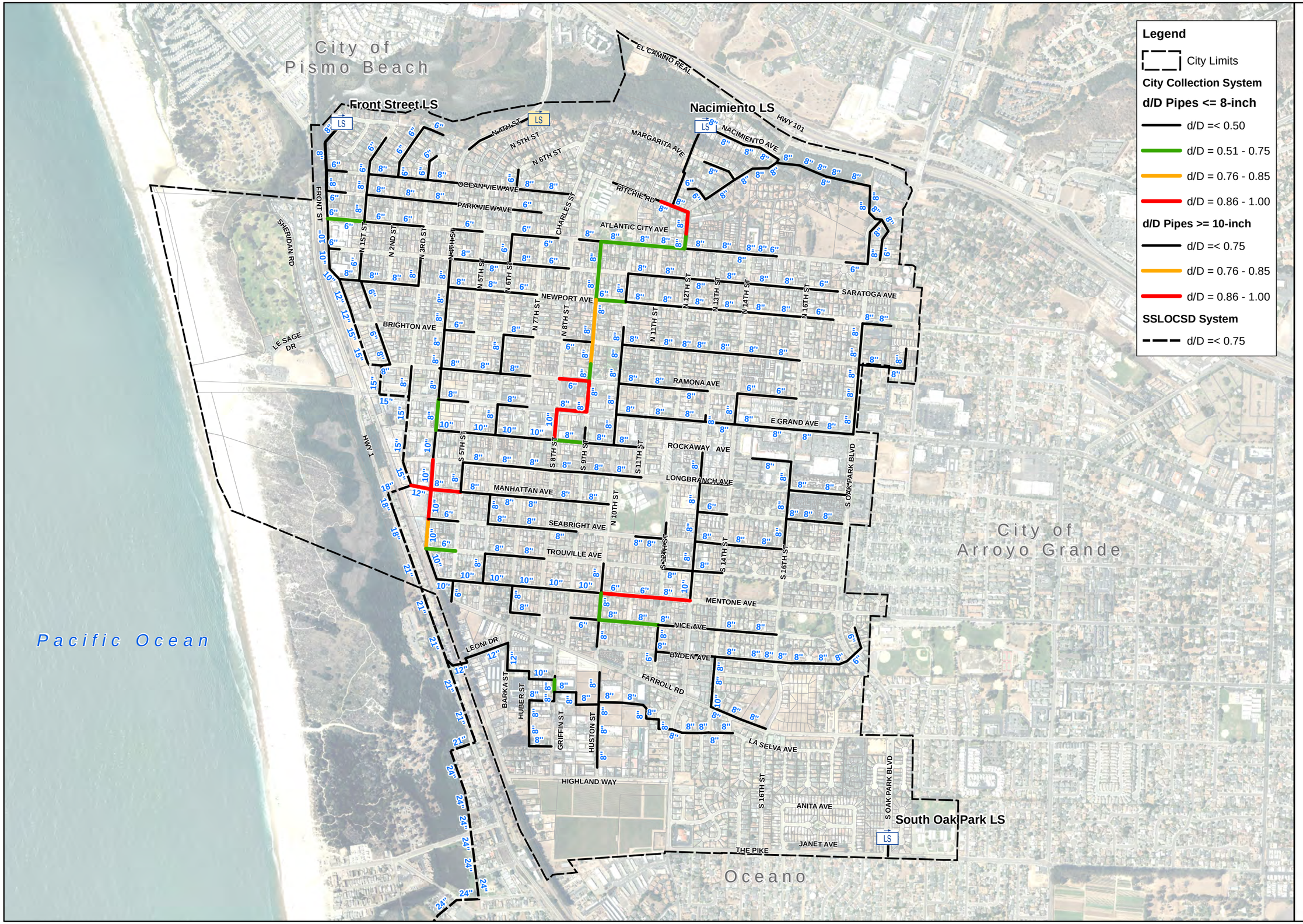

City of Grover Beach

Sewer System Master Plan

Figure 7-2:

Existing PHF Collection System Capacity

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Table 7-2 provides a summary of the recommended improvements to address capacity deficiencies associated with existing PHF conditions.

Table 7-2: Recommended Improvements to Address Existing Flows

Improvement	Model Deficiency Addressed	Location	Existing Facility		Proposed Improvement		
			Diameter (inches)	PHF d/D	Diameter (inches)	Length (feet)	PHF d/D
1	A-1	Trouville Ave	6	0.59	8	371	0.45
2	A-4	Newport Ave	6	0.72	8	370	0.48
3	A-5	N 4th St	8	0.64	10	385	0.50
4	A-6	Atlantic City Ave	6	0.70	8	456	0.43
5	A-7	Griffin St	8	0.59	10	138	0.41
6	A-8	Rockaway Ave	8	0.61	10	371	0.46
7	A-9	Mentone Ave	8	1.00	10	375	0.42
8	A-10	Mentone Ave	6	0.87	10	735	0.49
9	A-11	Nice Ave	8	0.66	10	741	0.45
10	A-12	S 10th St	8	0.71	10	334	0.54
11	A-13	Ritchie Rd	8	1.00	10	211	0.57
12	A-14	N 12th St	8	1.00	10	425	0.56
13	A-15	Atlantic City Ave	8	0.66	10	1045	0.49
14	A-16 / A-2	N 9th St	8	1.00	10	2127	0.47 - 0.56
15	A-17	W Grand Ave	8	1.00	12	369	0.53
16	B-1	S 8th St	10	0.98	12	385	0.56
17	B-3 / A-3 / B-2	Manhattan Ave	12	0.86-1.00	18	252	0.43

7.2 Lift Stations and Force Mains

7.2.1 Hydraulic Analysis

For each lift station, a system curve was developed to estimate the existing pump performance. The system curve represents the total dynamic head (TDH) imposed on a pump for any given flow rate. TDH is the sum of static head (elevation), minor head losses (bends, valves, fittings), and dynamic friction loss (through pipes and fittings). Static head was estimated using fluid level pump control points, force main discharge elevations, and wet well ground elevations based on asbuilt plans. Lift station system curves can vary with the fluid level in the wet well and assumed friction coefficient. Accordingly, two system curves were developed to bracket the high and low anticipated TDH. The manufacturer's pump curve shows the anticipated flow for any given TDH. The intersection of the pump curve and system curves provides an estimate for the actual lift station pumped flows. **Figures 7-3** through **7-5** present the current system curves plotted against the existing lift station pump curves during simplex and duplex operation. Lift station asbuilts and manufacturer pump curves are included in Appendices B and C of this report.

Figure 7-3: Nacimentio Avenue Lift Station Pump Curve Vs System Curves

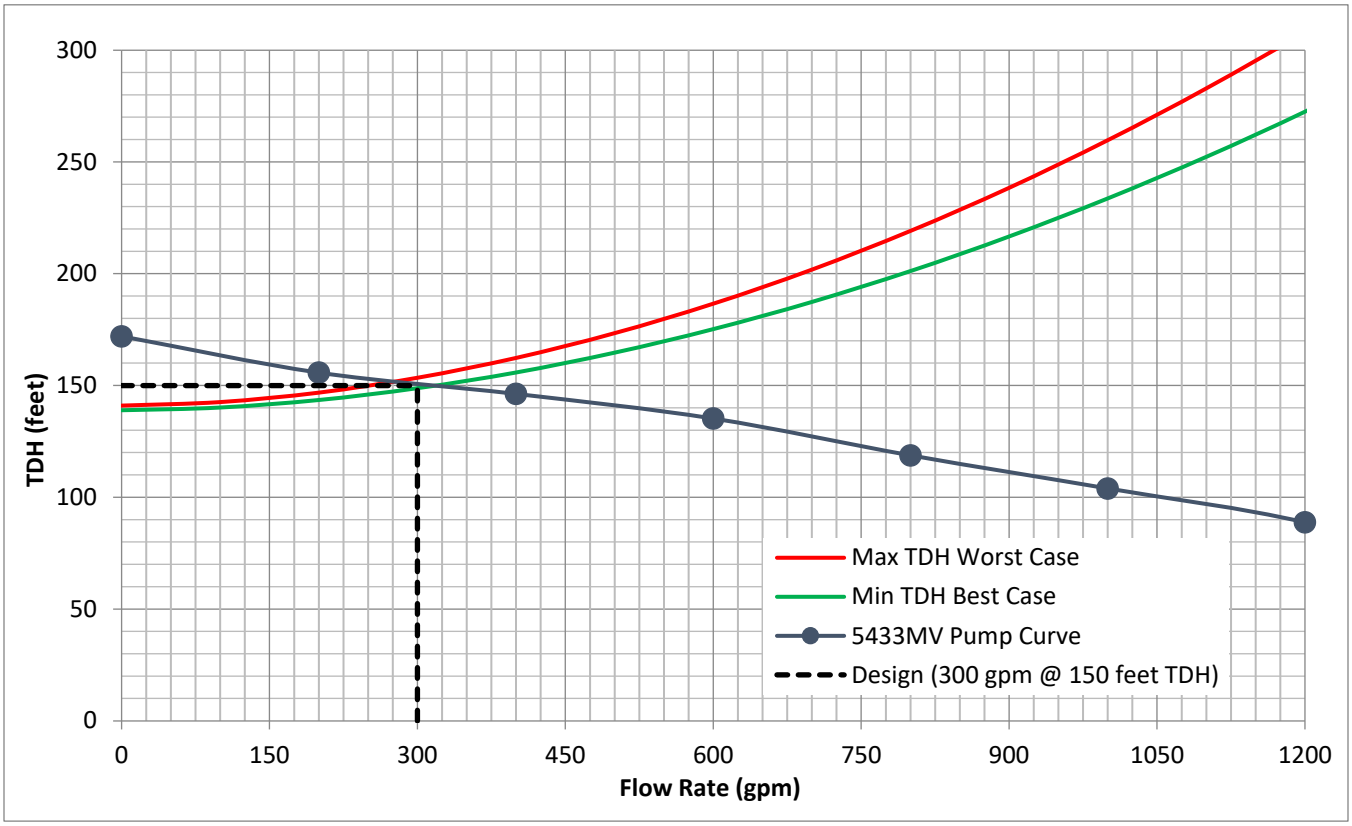


Figure 7-4: Front Street Lift Station Pump Curve Vs System Curves

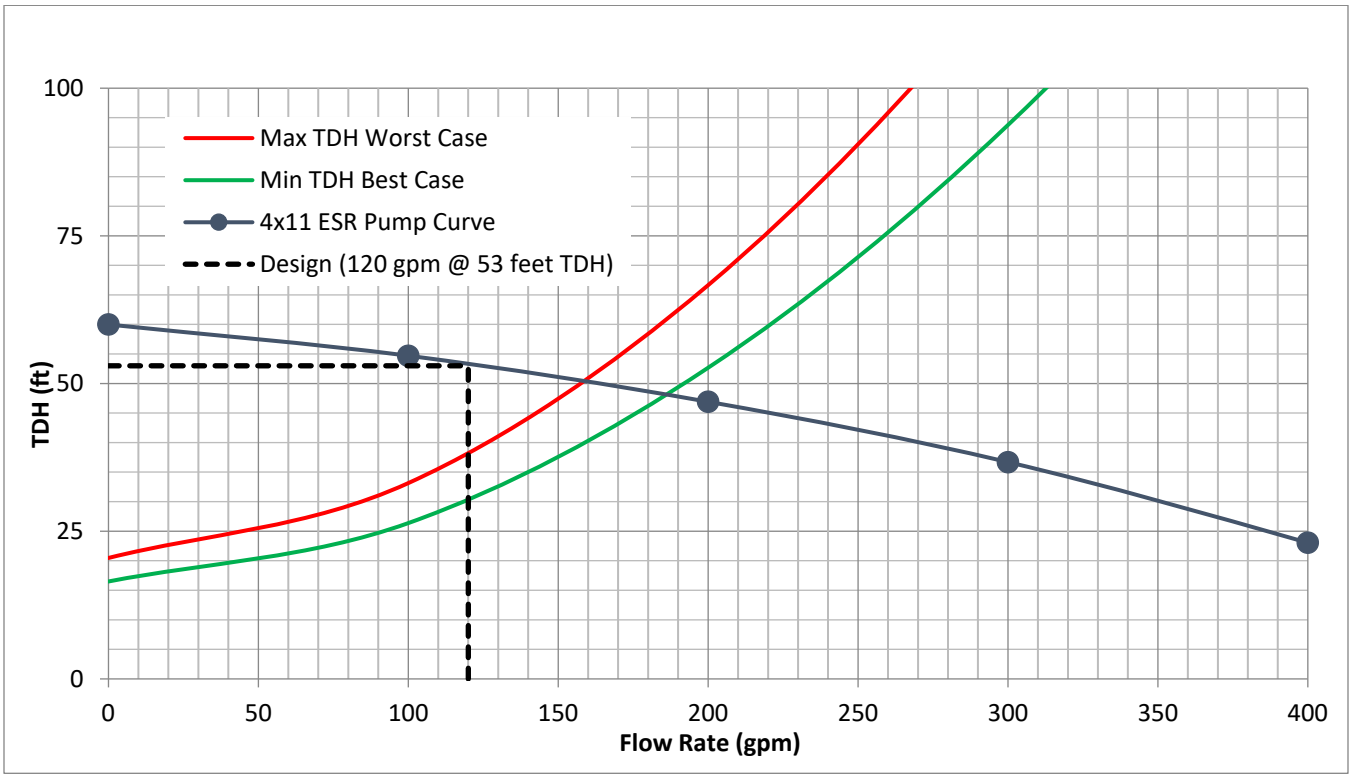
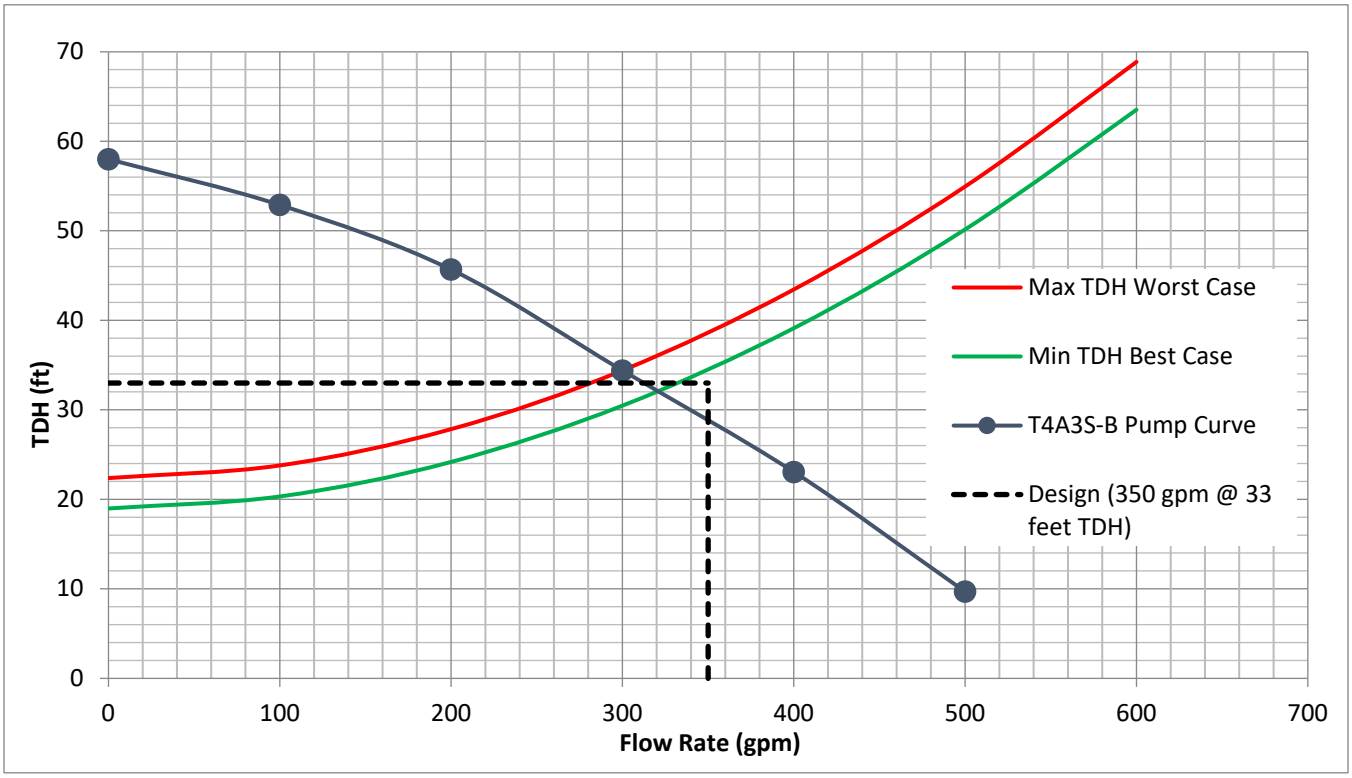


Figure 7-5: South Oak Park Lift Station Pump Curve Vs System Curves



Based on review of the system and pumps for each lift station the following observations can be made:

- ❑ Nacimiento Avenue Lift Station operates near the intended design point
- ❑ Front Street Lift Station pumps more than design point
- ❑ South Oak Park Lift Station pumps less than design point

The pumping capacities of Front Street and South Oak Park lift station exceed the peak hour flows entering the wet well, but are required to maintain pipe cleaning velocities within the force mains (**Table 7-5**).

In addition to review of existing pump curve information the following design criteria were used to analyze and evaluate the City's three lift stations under existing flow conditions:

- ❑ Pump Capacity
- ❑ Pump Cycle Times
- ❑ Wet Well Active Volumes/Capacity
- ❑ Force Main Velocities

Table 7-3 provides a summary of the pump capacity of the City's three lift stations. In addition, pump runtime records for calendar year 2017 were provided by City for all three lift stations.

Table 7-3: Lift Station Pump Capacity for Existing Flows				
Land Uses Served		**Lift Station**		
		Nacimiento Avenue	**Front Street**	**South Oak Park**
Low Density Residential		196	37	-
Medium Density Residential		19	27	65
High Density Residential		15	10	-
Retail Commercial Services		3	-	-
Visitor Serving - Mixed-Use		1	-	-
Total (# of parcels)		**234**	**74**	**65**
Pump 1	hours	1.62	0.65	0.15
Pump 2	hours	1.16	0.74	0.14
Total Average	hours	2.78	1.33	0.29
Estimated Flow Conditions				
ADF	gpd	79,200	13,813	8,418
	gpm	55	10	6
PHF	Peaking Factor	3.0	3.0	3.0
	gpm	165	29	18
Pump Capacity[1]	gpm	**320**	**170**	**300**

Notes:
1. Pump capacity based on system curve evaluation completed in this Section.

Based on the pumping capacity analysis completed in **Table 7-3** the three City lift stations appear to have sufficient pumping capacity, with a single pump in operation, to convey existing ADF and PHF conditions.

Table 7-4 provides an evaluation of the pump cycle times and wet well active volumes for each of the three City lift stations during ADF and PHF conditions. The maximum recommended cycle time is 30 minutes during ADF conditions to reduce odor issues associated with extended detention times. Lift station pumps should typically cycle not more than 5 or 6 times per hour during PHF conditions to limit pump starts.

Table 7-4: Lift Station Pump Cycle Time for Existing Flows								
Lift Station	**ADF (gpm)** / **PHF (gpm)**	**Active Volume (gal)**	**Q_{PUMP} (gpm)**	**Fill Time (min)**	**Drain Time (min)**	**Cycle Time (min)**	**Total Starts per Hour**	**Starts per Hour per Pump**
Nacimiento Avenue	55	790	320	14	3	17	3	<2
	165	790	320	5	5	10	6	3
Front Street	10	587	170	61	4	65	<1	<1
	29	587	170	20	4	25	3	<2
South Oak Park	6	558	300	95	2	97	<1	<1
	18	558	300	32	2	34	2	1

Notes:
1. ADF = average daily flow
2. PHF = peak hour flow
3. min = minutes
4. gal = gallons

Review of the pump cycle time analysis for each of the lift stations identified the following conditions:

- Pumps at the Nacimiento Avenue Lift Station cycle at 17 and 10 minutes during ADF and PHF conditions (respectively) with less than 3 starts per hour per pump during PHF conditions
- Pumps at the Front Street Lift Station cycle at 65 and 25 minutes during ADF and PHF conditions (respectively) with less than 1 start per hour per pump during PHF conditions
- Pumps at the South Oak Park Lift Station cycle at 97 and 34 minutes during ADF and PHF conditions (respectively) with less than 1 start per hour per pump during PHF conditions

Table 7-5 provides an evaluation of the existing lift station active volumes (based on current operating levels) and the recommended minimum active volumes based on recommended pump cycle times.

Table 7-5: Minimum Active Volume for Existing Flow Conditions

Lift Station	Wet Well Diameter	Volume per Foot	Q_{PUMP}	Current Operating Conditions[1]		Recommended Conditions		
				Active Depth	Active Volume	Cycle Time[2]	Active Volume	Active Depth
	feet	gal	gpm	feet	gal	min	gal	feet
Nacimiento Ave	8.0	376.0	320.0	2.1	790	10.0	800.0	2.1
Front Street	5.0	146.9	170.0	4.0	588	10.0	425.0	2.9
South Oak Park	5.0	146.9	300.0	3.8	558	10.0	750.0	5.1

Notes:
1. The minimum recommended cycle time is 10 minutes, or six starts per hour for pumps.
2. The existing lift station active volumes were determined based on asbuilt information.

Based on the pump cycle time analysis the Front Street and South Oak Park lift stations experience extended detention times during ADF conditions. This is associated with the low upstream flow into the wet well and current operating levels of the existing pumps. The extended detention time could be reduced by limiting active volumes of the wet wells.

Per the results in **Table 7-5** the three lift stations appear to have sufficient active volume capacity to minimize the number of the pump starts to serve existing flow conditions. For lift station force mains it is recommended that pipeline velocities be greater than 3.5 feet per second to provide cleaning velocities, but less than 5.0 – 10.0 feet per second to minimize head loss and surge events. **Table 7-6** provides an overview of the hydraulic analysis completed for the City's lift station force mains.

Table 7-6: Force Main Evaluation for Existing Flows

Parameter		Lift Station		
		Nacimiento Avenue	Front Street	South Oak Park
Force Main Diameter	inches	6	4	6
Force Main Material	--	AC	AC	PVC
Hazen Williams C	--	120	120	140
Force Main Length	feet	1,126	1,282	236
Design Flows				
Flow	gpm	320	170	300
Force Main Hydraulics				
Velocity	fps	3.6	4.3	3.5
Travel Time to Gravity system	minutes	5	5	1

The three City lift station force mains appear to operate within the velocity recommendations identified above during normal pumping operations.

7.3 Condition Assessment

In addition to the hydraulic analysis of the existing lift stations, MKN completed site visits on August 20, 2018 to each site to complete a visual inspection (including photos) to confirm and supplement as-built information, document existing conditions, and identify deficiencies. During these visits, MKN observed the general configuration of the lift stations and in particular reviewed the following items:

- ❑ Flood Resilience (where applicable)
- ❑ Backup Power Provisions
- ❑ Signs of Wet Well Corrosion
- ❑ Failure of Pipe or Mechanical System Coatings
- ❑ Operation and Maintenance Issues
- ❑ Bypass Provisions
- ❑ Operational Safety Concerns

The field assessments included discussions with City staff with respect to operational issues, age of facilities, and staff observation. Observations from the visual condition assessment of the lift stations are documented below. Site photos from the condition assessment are included in Appendix D.

7.3.1 Nacimiento Lift Station

A summary of the condition assessment for the Nacimiento Avenue Lift Station is presented in **Table 7-7**.

Table 7-7: Nacimiento Avenue Lift Station Condition Assessment Summary

Assessment Item	Observations
Flood Resilience	The lift station is located within the Meadow Creek floodplain (Zone AE) based on review of Federal Emergency Management Agency (FEMA) Flood Maps. The lift station site appears to be approximately 5-feet below the base flood elevation (BFE). The elevated platform with control panel and generator are likely above this elevation. However, the wet well and valve vault would be inundated during a major flood event. City staff also commented that this area experiences flooding during major winter storms.
Backup Power Provisions	Lift station facility includes an onsite generator with propane fuel tank
Signs of Wet Well Corrosion	Wet well has an embedded plastic liner (T-Lock). No areas of coating failure were observed. However, a new pipe penetration was installed on the north side of the wet well. The new liner repair around the pipe penetration does not appear to be welded to the existing liner.
Failure of Pipe or Mechanical System Coatings	Discharge pipe fittings located within the wet well are corroded. In particular the mechanical joint adapter at the discharge piping interface with the wet well is severely corroded. Fittings and valves located in the below grade vaults have areas of minor to moderate surface corrosion.
Operation and Maintenance Access	The below grade valve vaults include an open drain hole in the floor. Evidence of groundwater flooding the vaults was observed. Staff indicated one of the two Variable Frequency Drives (VFDs) had been recently replaced and they needed to replace older remaining VFD.
Bypassing Provisions	Bypass connection located in below grade vault.
Safety Issues for Operator Access	Staff did not indicate any potential safety issues or concerns at the time of the site visit.

7.3.2 Front Street Lift Station

A summary of the condition assessment for the Front Street Lift Station is presented in **Table 7-8**.

Table 7-8: Front Street Lift Station Condition Assessment Summary	
Assessment Item	**Observations**
Flood Resilience	The lift station is not located within any mapped flood zones.
Backup Power Provisions	Lift station facility includes a portable generator receptacle at the main disconnect.
Signs of Wet Well Corrosion	Wet well is coated with a chemical resistant coating. Some bulging areas were observed and may be signs of concrete corrosion occurring behind the coating.
Failure of Pipe or Mechanical System Coatings	Discharge pipe fittings located within the wet well are corroded. In particular the mechanical joint adapter at the discharge piping interface with the wet well is severely corroded. Fittings and valves located in the below grade vaults have areas of minor to moderate surface corrosion. The underside of the wet well hatch is severely corroded.
Operation and Maintenance Access	The wet well is accessed through a cast iron hatch with two hinged panels. These panels are extremely heavy and require use of a truck or other type of lifting mechanism to open. The wet well and valve vaults are located within the roadway however, it is within a residential neighborhood and traffic is light.
Bypassing Provisions	Bypass connection located in below grade vault.
Safety Issues for Operator Access	Staff did not indicate any potential safety issues or concerns at the time of the site visit.

7.3.3 South Oak Park Lift Station

A summary of the condition assessment for the South Oak Park Lift Station is presented in **Table 7-9**.

Table 7-9: South Oak Park Lift Station Condition Assessment Summary	
Assessment Item	**Observations**
Flood Resilience	The lift station is not located within any mapped flood zones.
Backup Power Provisions	A portable generator receptacle is located at the main disconnect.
Signs of Wet Well Corrosion	Wet well is coated with a chemical resistant coating without any signs of failure.
Failure of Pipe or Mechanical System Coatings	Force main pipe fittings located within the wet well are severely corroded. The manhole frame located on the wet well also shows signs of corrosion.
Operation and Maintenance Access	Staff has reported issues with rags getting caught in the check valves resulting in the pumps loosing prime. This situation occurs two to three times a year. Maintenance on the lift station is complicated by the fiberglass enclosure. The enclosure needs to be fully removed to perform major maintenance and repairs.
Bypassing Provisions	No bypass connection was observed.
Safety Issues for Operator Access	South Oak Street is an arterial road and work associated with the lift station requires traffic control (blockage of a lane).

7.4 SSLOCSD WWTP Permitted Capacity and City Contractual Allocation

The City of Grover Beach is a partner agency of the SSLOCSD, which manages the Oceano WWTP and trunk sewer collection system that serves the City of Grover Beach, City of Arroyo Grande, and OCSD. For the City's SMP, MKN reviewed and compared the existing and future City flow conditions to the existing permitted capacity of the Oceano WWTP. **Table 7-10** provides a summary of the current flows and design flows for the Oceano WWTP.

Table 7-10: SSLOCSD WWTP Flows

Flow Condition	Current Value (MGD)	Design Value (MGD)
Average Day Dry Weather Flow	2.1	3.8
Average Annual	2.3	4.2
Maximum Month	2.8	5.1
Peak Day	3.9	8.4
Peak Hour	8.1	10.0

Notes:
1. Current and design flow values are based on design plans for the South San Luis Obispo County Sanitation District WWTP Redundancy Project dated April 2019 and prepared by Kennedy/Jenks Consultants.
2. Permitted capacity per Waste Discharge Requirements for the South San Luis Obispo County Sanitation District Wastewater Treatment Facility Discharge to the Pacific Ocean ORDER NO. R3-2019-0002 / NPDES NO. CA0048003 is 5.0 MGD on a maximum month basis.

Based on the Amendment to Agreement for Sale and Purchase of Capacity and Operation and Maintenance of Sewage Facility dated March 16, 1992 (1992 Amendment) the following is understood about the City's current contractual allocation of the Oceano WWTP. Capacity values within the Agreement are assumed to represent maximum month flow conditions.

- On March 16, 1964, the City entered into an agreement with SSLOCSD to purchase 1.0 MGD treatment capacity in the WWTP located at 1600 Aloha Place.
- SSLOCSD expanded the original treatment capacity from 2.5 MGD to 5.0 MGD (current permitted capacity) from 1964 to 1992.
- Per the 1992 Amendment, the City purchased an additional 0.5 MGD of treatment capacity for a total of 1.5 MGD or approximately 33% of the currently permitted capacity of 5.0 MGD.
- Acceptance of 1992 Amendment by City rescinded and canceled the March 16, 1964 agreement between the two agencies.

Based on **Table 7-11**, it appears that the City will be at their treatment capacity allocation (1.5 MGD) to serve the estimated future flow conditions (at buildout) as identified in this report.

Table 7-11: City Capacity of SSLOCSD WWTP

Flow Condition	Design Value (MGD)	Estimated City Capacity of 30% (MGD)	Existing Flow (MGD)	Future Flow (MGD)
Average Day Dry Weather Flow	3.8	1.1	0.7	1.1
Average Annual	4.2	1.3	0.8	1.2
Maximum Month	5.1	1.5	1.0	1.5
Peak Day	8.4	2.5	1.6	2.4
Peak Hour	10.0	3.0	1.9	2.9

SECTION 8 FUTURE FLOWS - HYDRAULIC ANALYSIS

This section summarizes the hydraulic evaluation of the City's existing collection system to serve future and future alternative flows.

8.1 Gravity Collection System

8.1.1 Hydraulic Model Evaluation – Future Flow Conditions

Table 8-1 and **Figure 8-1** provides an overview of the collection system deficiencies identified through the hydraulic model simulations during future PHF conditions. MKN evaluated the collection system under the following future flow conditions: 1) Future flow excluding West Grand Avenue Development and Septic Conversion Areas and 2) Future "alternative" flow scenario including West Grand Avenue Development and Septic Conversion Areas. The deficiency identification numbering continues sequentially from the pipe deficiencies in **Table 7-1** to identify if any of the recommended improvements to address existing flow capacity deficiencies should be upgraded to serve future flows. The evaluation was based on the following assumptions for the future and alternative future flow hydraulic analysis:

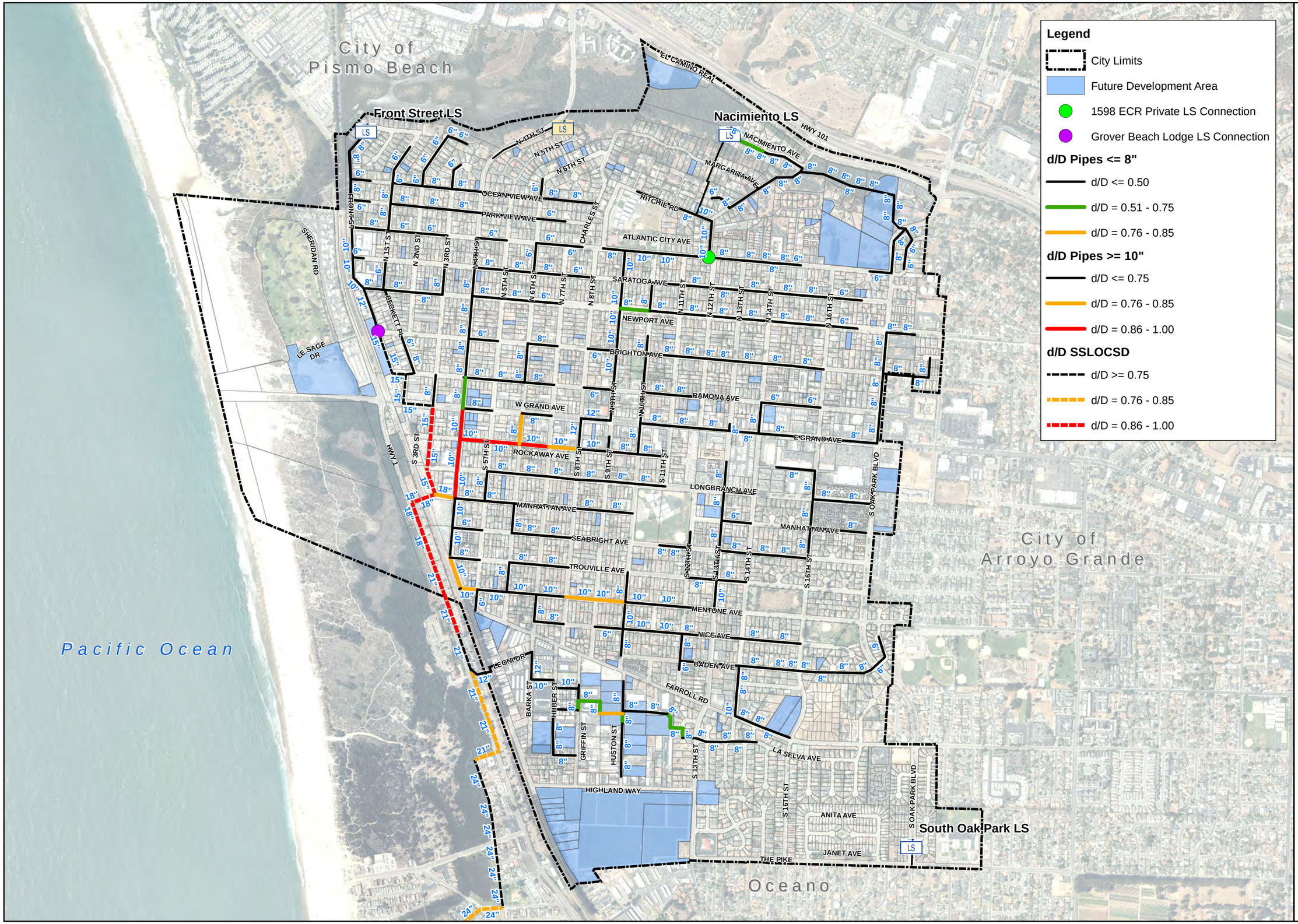
- Model results assume improvements to mitigate existing PHF deficiencies (**Table 7-2**) are completed prior to the addition of future flows within the model.
- Future flow from the Holiday Inn Express (75 gpm) will be conveyed to the Nacimiento Avenue Lift Station Wet Well.
- Future flows from Grover Beach Lodge (273 gpm) will be conveyed to the existing manhole in Front Street at Brighton Avenue. The existing downstream pipe is 15-inch and part of the SSLOCSD trunk sewer system.
- Future flows from 1598 El Camino (185 gpm) will be conveyed to the existing manhole in Atlantic City Avenue at Ritchie Road. The existing downstream pipe is 8-inch and recommended to be upgraded to 10-inch (**Table 7-2**) to address existing flow capacity deficiencies.
- A "C" designation was used to track and identify deficiencies for gravity sewer pipes greater than or equal to 15-inch in diameter within the SSLOCSD trunk sewer system.
- During future PHF conditions, the flow depth within the SSLOCSD trunk sewer will cause a surcharged condition. For the future flow analysis, MKN reviewed several pipeline upgrade alternatives for portions of the SSLOCSD trunk sewer system as follows:
  - Alternative 1: Upgrade the existing SSLOCSD trunk sewer system (18-inch and 21-inch) from Manhattan Avenue to Coolidge Drive to 24-inch. This increases pipeline capacity within the SSLOCSD, but pipeline upgrades are still required within the City system at Manhattan Avenue and upstream to reduce manhole surcharging.
  - Alternative 2: Upgrade the existing SSLOCSD trunk sewer (18-inch) from Manhattan Avenue to Trouville Avenue to 21-inch and upgrade the existing 12-inch and 10-inch on North 4th Street to 15-inch. This increases pipeline capacity within the SSLOCSD and City pipelines and reduces upstream manhole surcharging.
  - Alternative 3: Upgrade the City's existing 12-inch and 10-inch on South 4th Street to 15-inch. This increases pipeline capacity within the City pipeline, but flow depth in the existing SSLOCSD trunk sewer (18-inch) will surcharge SSLOCSD manholes greater than the two feet above the pipe crown during future peak hour conditions.
  - Alternative 4: New gravity pipeline under railroad at Mentone Avenue to divert flow from Manhattan Avenue. This increases pipeline capacity within the SSLOCSD trunk sewer (18-inch), but pipeline upgrades are still required on the City system at Manhattan Avenue and upstream to reduce manhole surcharging.

SewerCAD profile views of the above referenced alternatives are included in Appendix E to show the variations in water levels during existing and future conditions. For the hydraulic analysis and budgetary purposes, it was assumed that Alternative 2 will be implemented. This will require coordination between the two agencies and an agreement on terms and conditions for developing the budget.

Based on the hydraulic analysis, there are several pipeline deficiencies in **Table 8-1** that marginally exceed (within 10%) the recommended design criteria (Section 5.1). During a project review meeting with City staff on June 12, 2019 it was agreed that marginally deficient pipelines would not require capital improvements in the near future.

Table 8-1: Collection System Deficiencies during Future PHF Conditions

Deficiency Identification	Location	Existing Facility		Peak Hour		Notes
		Diameter (inches)	Length (feet)	Flow (gpm)	d/D	
A-5	S 4th St (W Grand Ave to Rockaway Ave)	10	385	118	0.82	Downstream pipe causes surcharged condition during PHF
A-18	N 6th St (W Grand Ave to Rockaway Ave)	8	385	10	0.59	Downstream pipe causes surcharged condition during PHF
A-19	Nacimiento Ave (Upstream of lift station)	8	458	166	0.59	Capacity limitation
A-20	Easement (Griffin St to Huston St)	8	709	317	0.73	Capacity limitation
A-21	Easement (Huston St to Messina Ct)	8	463	153	0.53	Improvement not recommended
A-22	Messina Ct	8	118	142	0.51	Improvement not recommended
A-23	S 4th St (W Grand Ave to Ramona Ave)	8	385	105	0.59	Improvement not recommended
A-24	Newport Ave (N 9th St to N 10th St)	8	369	70	0.69	Downstream sewer causes surcharge condition
B-2	S 4th St (Rockaway Ave to Manhattan Ave)	10	740	1031	1.00	Capacity limitation
B-4	S 4th St (Trouville Ave to Mentone Ave)	10	405	482	0.80	Improvement not recommended
B-5	Mentone Ave (S 4th St to S 5th St)	10	206	481	0.78	Improvement not recommended
B-6	Mentone Ave (S 8th St to S 10th St)	10	740	441	0.77 - 0.79	Improvement not recommended
B-7	Rockaway Ave (S 4th St to S 8th St)	10	1479	910	1.00	Capacity limitation
C-1	N 3rd St (E Grand Ave to Manhattan Ave)	15	1106	639	1.00	Downstream pipe causes surcharged condition during PHF
C-2	Highway 1 (Manhattan Ave to Trouville Ave)	18	1081	2213	1.00	Capacity limitation causes surcharge conditions within City system



City of Grover Beach

Sewer Master Plan

Figure 8-1:

Future PHF Collection System with Capacity Improvements to Address Existing Flows

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Table 8-2 provides a summary of the recommended improvements to address capacity deficiencies associated with future PHF conditions (as described in **Table 8-1**).

Table 8-2: Recommended Improvements to Address Future Flows							
Improvement	Model Deficiency Addressed	Location	Existing Facility		Proposed Improvement		
			Diameter (inches)	PHF d/D	Diameter (inches)	Length (feet)	PHF d/D
1	A-20	Easement (Griffin St to Huston St)	8	0.73	10	709	0.57
2	A-19	Nacimiento Ave	8	0.59	10	458	0.44
3	B-2 / A-5	S 4th St	10	1.00	12	740	0.64
4	B-7 / A-18 / A-24	Rockaway Ave	10	1.00	12	1479	0.65
SSLOCSD System	C-2 / C-1	Highway 1	18	1.00	21	1081	0.74

Notes:
1. Deficiencies A-21, A-22, A-23, B-4, B-5, and B-6 were not recommended for mitigation and are not influenced by the above improvements.

8.1.2 Hydraulic Model Evaluation – Future Alternative Flow Conditions

Table 8-3 and **Figure 8-2** provides an overview of the collection system deficiencies identified through the hydraulic model simulations under future alternative PHF conditions. The future alternative PHF condition was modeled under the assumption that all existing and future recommended improvements were constructed prior to the addition of future flows.

Table 8-3: Collection System Deficiencies during Future Alternative PHF Conditions						
Deficiency Identification	Location	Existing Facility		Peak Hour		Notes
		Diameter (inches)	Length (feet)	Flow (gpm)	d/D	
A-21	Sewer Easement (Huston St to Messina Ct)	8	463	155	0.53	Improvement not recommended
A-22	Messina Ct	8	118	142	0.51	Improvement not recommended
A-25	S 12th St (Nice Ave to Baden Ave)	8	335	184	0.52	Improvement not recommended
A-26	S 10th St (Trouville Ave to Mentone Ave)	8	371	10	0.53	Improvement not recommended
A-28	Baden Ave (S 13th St to S 14th St)	8	371	168	0.51	Improvement not recommended
B-2	S 4th St (Manhattan Ave to Trouville Ave)	10	740	526	0.80	Capacity limitation
B-4	S 4th St (Trouville Ave to Mentone Ave)	10	405	520	0.96	Capacity limitation
B-5	Mentone Ave (S 4th St to S 5th St)	10	206	519	0.96	Capacity limitation
B-6	Mentone Ave S (8th St to S 10th St)	10	740	478	0.93	Capacity limitation

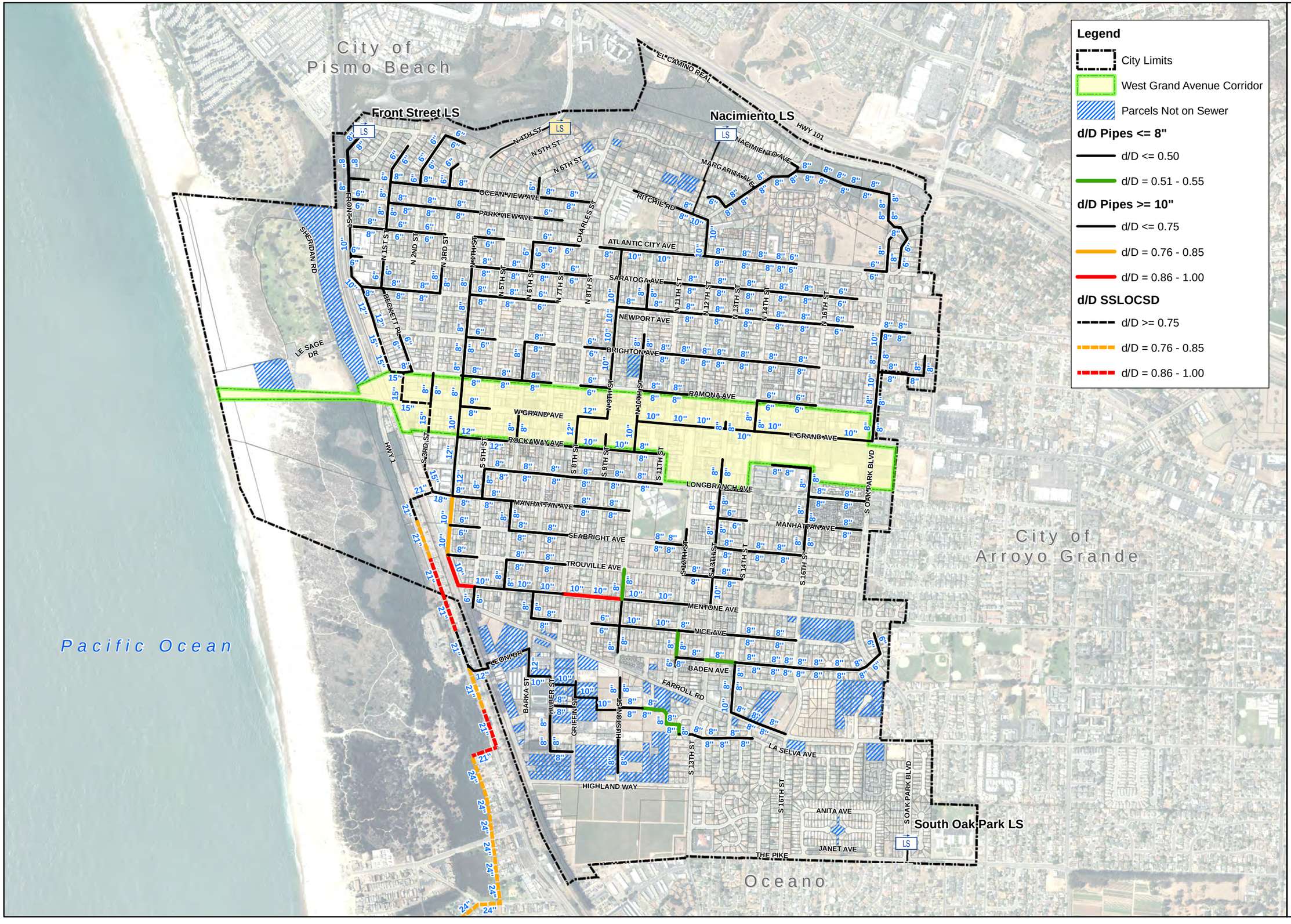
Table 8-4 provides a summary of the recommended improvements to address capacity deficiencies associated with future alternative PHF conditions.

Table 8-4: Recommended Improvements to Address Future Alternative Flows

Improvement	Model Deficiency Addressed	Location	Existing Facility		Proposed Improvement		
			Diameter (inches)	PHF d/D	Diameter (inches)	Length (feet)	PHF d/D
1	B-2	S 4th St	10	0.80	12	740	0.58
2	B-4	S 4th St	10	0.96	12	405	0.58
3	B-5	Mentone Ave	10	0.96	12	206	0.56
4	B-6	Mentone Ave	10	0.93	12	740	0.58

Notes:

1. Deficiencies A-21, A-22, A-25, A-26, and A-28 were not recommended to be upgraded and are not influenced by the above improvements.



Legend

- City Limits
- West Grand Avenue Corridor
- Parcels Not on Sewer

d/D Pipes <= 8"

- d/D <= 0.50
- d/D = 0.51 - 0.55

d/D Pipes >= 10"

- d/D <= 0.75
- d/D = 0.76 - 0.85
- d/D = 0.86 - 1.00

d/D SSLOCSD

- d/D >= 0.75
- d/D = 0.76 - 0.85
- d/D = 0.86 - 1.00

City of Grover Beach

Sewer Master Plan

Figure 8-2:

Future Alternative PHF

Collection System with Capacity Improvements to Address Future Flows

1 inch = 1,100 feet

0 550 1,100

mkn WATER · WASTEWATER · REUSE

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8.2 Lift Stations

8.2.1 Hydraulic Analysis

The following design criteria were used to analyze and evaluate the City's three lift stations under future flow conditions:

- ❑ Pump Capacity
- ❑ Pump Cycle Times
- ❑ Wet Well Active Volumes/Capacity

Table 8-5 provides a summary of the pump capacity of the City's three lift stations to serve future flows.

Table 8-5: Lift Station Pump Capacity for Future Flows

Future Flow Conditions		Lift Station		
		Nacimiento Avenue	Front Street	South Oak Park
ADF	gpd	95,565	13,977	8,418
	gpm	66	10	6
Upstream Lift Station Pumped Flow	gpm	75	-	-
PHF	Peaking Factor	3.0	3.0	3.0
	gpm	274	29	18
Simplex Pump Capacity	gpm	**320**	**170**	**300**

Based on the pumping capacity analysis completed in **Table 8-5** the three City lift stations appear to have sufficient pumping capacity, with a single pump in operation, to convey future ADF and PHF conditions. **Tables 8-6** provides an evaluation of the pump cycle times and wet well active volumes for each of the three City lift stations during ADF and PHF conditions. The maximum recommended cycle time is 30 minutes during ADF conditions to reduce odor issues associated with extended detention times. Lift station pumps should typically cycle not more than 5 or 6 times per hour to during PHF conditions to limit pump starts.

Table 8-6: Lift Station Pump Cycle Time for Future Flows

Lift Station	ADF (gpm) / PHF (gpm)	Active Volume (gal)	Q_{PUMP} (gpm)	Fill Time (min)	Drain Time (min)	Cycle Time (min)	Total Starts per Hour	Starts per Hour per Pump
Nacimiento Avenue	66	790	320	12	3	15	4	2
	274	790	320	3	17	20	3	1
Front Street	10	587	170	61	4	65	1	0
	29	587	170	20	4	25	2	1
South Oak Park	6	558	300	95	2	97	1	0
	18	558	300	32	2	34	2	1

Notes:
1. ADF = average daily flow
2. PHF = peak hour flow
3. min = minutes
4. gal = gallons

Review of the pump cycle time analysis for each of the lift stations identified the following conditions:

- Pumps at the Nacimiento Avenue Lift Station cycle at 15 and 20 minutes during ADF and PHF conditions (respectively) with less than 2 starts per hour per pump
- Pumps at the Front Street Lift Station cycle at 65 and 25 minutes during ADF and PHF conditions (respectively) with less than 1 start per hour per pump during PHF conditions
- Pumps at the South Oak Park Lift Station cycle at 97 and 34 minutes during ADF and PHF conditions (respectively) with less than 1 starts per hour per pump during PHF conditions

Based on the pump cycle time analysis the Front Street and South Oak Park lift stations experience extended detention times during ADF conditions. This is associated with the low upstream flow into the wet well and current operating levels of the existing pumps. The extended detention time could be reduced by limiting active volumes of the wet wells.

SECTION 9 RECOMMENDED IMPROVEMENTS AND OPINION OF PROBABLE COSTS

9.1 Capital Improvement Criteria

Capital improvements are recommended to address deficiencies associated with existing and future flows as identified in this report. The following provides a summary of typical design life and cost estimating assumptions.

9.1.1 Typical Facility Lifecycle

Table 9-1 presents a general estimate of the design life that can be expected for wastewater system facilities if routine maintenance is performed.

Table 9-1: Replacement Facility Expected Life

Facility	Expected Life
Gravity pipelines	60 years
Lift Station	
Site piping and valves	20-30 years
Electrical and control facilities at lift stations	20-30 years
Pumps	10-15 years
Wet Well Coatings	10-15 years

9.1.2 Opinion of Probable Cost

Cost opinions are based on the following assumptions:

- Except where other data are available, cost opinions are generally derived from bid prices from similar sewer utility projects, with adjustments for inflation, size, complexity, and location.
- Construction cost opinions were developed in May 2019. Use 20-Cities Engineering News-Record (ENR) Construction Cost Index (CCI) May 2019 = 11230.01 to escalate estimated cost to present value.
- Engineering, project administration, and construction management were estimated at 30 percent of total construction costs.
- Construction contingency was estimated at 30 percent of total construction costs.
- Cost opinions are “budget-level” and may not fully account for site-specific conditions or design decisions that will affect the actual costs.

The opinions of probable cost prepared by MKN represent our judgment and are supplied for the general guidance of the City. Assumptions have been stated based on the information available at the time of preparation. Since MKN has no control over the cost of labor and material, or over competitive bidding or market conditions, MKN does not guarantee the accuracy of such opinions as compared to contractor bids or actual project costs. **Table 9-2** includes unit costs for sewer collection system infrastructure improvements.

Table 9-2: Pipeline Unit Construction Cost by Size	
Item Description	**Budgetary Cost($/LF)**
8-inch pipeline	$250
10-inch pipeline	$275
12-inch pipeline	$295
18-inch pipeline	$340
21-inch pipeline	$390
Jack and Bore	$500
Engineering, Project Administration, and Construction Management	30%
Construction Contingency	30%

Notes:
1. Pipeline costs are based on work in existing streets and include excavation, installation, backfill, pavement repair, upstream and downstream manholes, manholes spaced at 300 ft where needed, traffic control, and connection of existing laterals to new pipe. Cost does not include bypassing.
2. LF = linear foot.

In addition to cost opinions, each project has been assigned a priority ranking to identify why the improvement should be completed. The following describes the priority ranking for capital projects:

- Priority 1: Recommended to address gravity pipeline capacity deficiencies that exceed the recommended design criteria during peak hour flow conditions.
- Priority 2: Recommended to address physical deficiencies such as condition of coatings, which could result in future problems.

9.2 Gravity Collection System

Improvements for Existing Conditions

The following improvements address capacity deficiencies (**Table 7-1**) throughout the gravity sewer collection system to serve existing flows:

- Replace existing 8-inch gravity sewer along Richie Road from the Nacimiento Avenue Lift Station discharge manhole to Atlantic City Avenue with 10-inch
- Replace existing 8-inch gravity sewer along Atlantic City Avenue from 12th Street to 9th Street with 10-inch
- Replace existing 8-inch gravity sewer along 9th Street from Atlantic City Avenue to Grand Avenue with 10-inch
- Replace existing 8-inch gravity sewer along Grand Avenue from 8th Street to 9th Street with 12-inch
- Replace existing 10-inch gravity sewer along 8th Street from Grand Avenue to Rockaway Avenue with 12-inch
- Replace existing 12-inch gravity sewer along Manhattan Avenue from 4th Street to 3rd Street with 18-inch
- Replace existing 6-inch gravity sewer along Atlantic City Avenue from Front Street to 1st Street with 8-inch
- Replace existing 6-inch gravity sewer along Trouville Avenue from 4th Street to 5st Street with 8-inch
- Existing 6-inch and 8-inch gravity sewer along Mentone Avenue from 10th Street to 13st Street with 10-inch
- Replace existing 8-inch gravity sewer along 10th Street from Nice Avenue to Mentone Avenue with 10-inch
- Replace existing 8-inch gravity sewer along Nice Avenue from 10th Street to 12th Street with 10-inch

- ❑ Replace existing 8-inch gravity sewer along Griffin Street with 10-inch
- ❑ Install up to 18 HDPE manhole inserts within collection system manholes along Meadow Creek to reduce I/I into Nacimiento Lift Station

The recommended gravity collection system improvements to address existing flow deficiencies as described above are shown in **Table 9-4**.

Improvements for Future Conditions

To serve future flows, it was assumed the City already constructed the recommended improvements to address existing flow deficiencies. In addition, segments of the existing SSLOCSD trunk sewer system will be required to be upgraded to reduce surcharge conditions within the City's collection system. The required improvements within the SSLOCSD trunk sewer system will consist of the following:

- ❑ Replace the existing 18-inch trunk sewer under the railroad (350 linear feet) and 18-inch trunk sewer along Highway 1 (730 linear feet) with 21-inch trunk sewer. It was assumed that the portion under the railroad will be installed via jack and bore.

The following improvements address capacity deficiencies (**Table 8-1**) throughout the gravity sewer collection system to serve future flows:

- ❑ Replace 8-inch gravity sewer along sewer easement from Griffin Street to Huston Street with 10-inch
- ❑ Replace 8-inch gravity sewer along Nacimiento Avenue from Nacimiento Avenue to Mono Street with 10-inch
- ❑ Replace 10-inch gravity sewer along 4th Street from Manhattan Avenue to Rockaway Avenue with 12-inch
- ❑ Replace 10-inch gravity sewer along Rockaway Avenue from 4th Street to 8th Street with 12-inch

The recommended gravity collection system improvements to address future flow deficiencies as described above are shown in **Table 9-6**.

Future Alternative Conditions

To serve future alternative flow conditions (additional flow from West Grand Avenue Corridor and septic conversions), it was assumed the City already constructed the recommended improvements to address existing and future flow deficiencies. This also included the required improvements within the SSLOCSD trunk sewer system. The following improvements address capacity deficiencies (**Table 8-3**) throughout the gravity sewer collection system to serve future alternative flows:

- ❑ Replace 10-inch gravity sewer along 4th Street from Manhattan Avenue to Mentone Avenue with 12-inch
- ❑ Replace 10-inch gravity sewer along Mentone Avenue from 4th Street to 10th Street with 12-inch

The above described pipe segments were identified to have marginal d/D deficiencies (up to d/D of 0.80 or less than 10%) during future flow simulations, but not significant requiring replacement. However, additional flow from West Grand Avenue Corridor and septic conversions would increase flow depth within the SSLOCSD trunk sewer system creating a surcharged condition that impacts the sewer segments on 4th Street and Mentone Avenue.

The recommended gravity collection system improvements to address future alternative flow deficiencies as described above are shown in **Table 9-7**.

9.3 Lift Stations

Existing Conditions

Based on the hydraulic analysis completed in Section 7.2.1, the existing City lift stations have sufficient pumping capacity and wet well volume to convey existing City flows. However, based on the condition assessment MKN identified a number of recommended improvements to address existing physical deficiencies and improve facility operations. The following provides a brief description of the improvements for the three City lift stations:

- Nacimiento Avenue Lift Station Rehabilitation: Replace/re-coat existing valves and pipe fittings within wet well and valve vault.
- Front Street Lift Station Rehabilitation: Complete detailed investigation of wet well coating, replace/re-coat existing valves and pipe fittings within wet well and valve vault, and install new hatch system.
- South Oak Park Lift Station Rehabilitation: Replace/re-coat existing pipe fittings within wet well, retrofit fiberglass enclosure to allow for user access, and install bypass connection.
- Based on the pump cycle time analysis, the Front Street and South Oak Park lift stations experience extended detention times during ADF conditions. This is associated with low flow entering the wet well and current set points of the existing pumps. It is recommended that the existing wet well working volumes be minimized to reduce extended detention times.

Future Conditions

No lift station improvements are recommended to address future flow deficiencies.

Future Alternative Conditions

No lift station improvements are recommended to address future alternative flow deficiencies.

9.4 Maintenance and Operation

The following section identifies potential projects that the City could implement to more efficiently operate and manage the existing sewer collection system facilities. Opinions of cost for these options are included in **Table 9-5**.

9.4.1 Sewer System Management Plan

It is recommended that the City continue to clean, video, and monitor the collection system pipelines on an annual basis, bi-annual basis, and/or as required by the Regional Water Quality Control Board. For the City's Sewer System Management Plan (SSMP) compliance MKN has included an allowance for the City to complete the biannual audits and report updates as required by the SSMP.

9.4.2 Asset Management Strategy

In conjunction with the recommended wastewater system staffing and to more efficiently plan, budget, manage and complete system-wide maintenance and repair tasks, it is recommended that the City implement an asset management strategy. This system would consist of integrating a Computerized Maintenance Management System (CMMS), asset inventory and condition/capacity assessment and Geographic Information Systems (GIS). The City has completed a preliminary asset inventory, capacity assessment, and GIS development as part of this Sewer Master Plan update. Some common asset management software programs that the City may consider evaluating include Cityworks, Cartegraph, Lucity, Accela and Infro/Hanson.

9.4.3 Updating the City Geographic Information System (GIS) and Hydraulic Model

MKN recommends that the City update and maintain their GIS wastewater collection database, atlas, and hydraulic model on a semi-annual basis. The updates should include new piping, lift stations, manholes, pumps, flow data, replacements, etc. The wastewater GIS can be expanded to include integration with asset management and automated work-order systems. For most asset management implementations, an agency's GIS database is the central repository for asset information. Maintaining the master plan hydraulic model will allow the City to model new developments or system changes outside the scope of the 2019 Sewer Master Plan.

9.5 Capital Improvements Summary

Table 9-3 provides an overall summary of the opinion of probable costs associated with the required collection system improvements to serve existing and future flows within the City.

Table 9-3: SMP Cost Summary

Improvement	Estimated Project Cost
To Address Existing Flow Deficiencies	
Gravity Collection System	$4,045,000
Lift Stations	$258,000
Operations and Maintenance (Allowance)	$260,000
Subtotal Existing	**$4,563,000**
To Address Future Flow Deficiencies	
Gravity Collection System	$1,567,000
Subtotal Future	**$1,567,000**
To Address Future Alternative Flow Deficiencies	
Gravity Collection System	$993,000
Subtotal Future Alternative	**$993,000**
Total City Improvements	**$7,123,000**
SSLOCSD Trunk Sewer Required Improvements	
SSLOCSD Trunk Sewer System	$738,000

Tables 9-4 through **9-7** provide a detailed summary of the individual capital improvement projects and opinions of probable cost (including engineering, project administration, construction management, and construction contingency) with the required collection system improvements to serve existing and future flows within the City. Project locations are shown on **Figure 9-1** (existing deficiencies), **Figure 9-2** (future deficiencies), and **Figure 9-3** (future alternative deficiencies).

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Table 9-4: Collection System Capital Improvements for Existing Flows

Project Number	Sewer Improvement	Limits	Existing Facility	Deficiency	Capital Improvement Project (CIP)		Notes	Priority	Construction Cost ($)	Engineering, Project Administration, and Construction Management ($)	Contingency Cost ($)	Opinion of Cost ($)
			Diameter (inches)	PHF d/D	Diameter (inches)	Length (feet)						
Gravity Collection System												
EX-GSCIP-1	Trouville Avenue Gravity Sewer Upgrade	South 4th Street to South 5th Street	6	0.59	8	371		Priority 1	$93,000	$28,000	$28,000	$149,000
EX-GSCIP-2	Atlantic City Avenue Gravity Sewer Upgrade	Front Street to North 1st Street	6	0.70	8	456		Priority 1	$114,000	$35,000	$35,000	$184,000
EX-GSCIP-3	Griffin Street	Griffin Street	8	0.59	10	153		Priority 1	$43,000	$13,000	$13,000	$69,000
EX-GSCIP-4	Mentone Avenue Gravity Sewer Upgrade	South 12th Street to South 13th Street	8	1.00	10	375		Priority 1	$104,000	$32,000	$32,000	$168,000
	Mentone Avenue Gravity Sewer Upgrade	South 10th Street to South 12th Street	6	0.87	10	735		Priority 1	$203,000	$61,000	$61,000	$325,000
	Nice Avenue Gravity Sewer Upgrade	South 10th Street to South 12th Street	8	0.66	10	741		Priority 1	$204,000	$62,000	$62,000	$328,000
	South 10th Street Gravity Sewer Upgrade	Mentone Avenue to Nice Avenue	8	0.71	10	334		Priority 1	$92,000	$28,000	$28,000	$148,000
EX-GSCIP-5	Newport Avenue Gravity Sewer Upgrade	North 9th Street to North 10th Street	6	0.72	8	370		Priority 1	$93,000	$28,000	$28,000	$149,000
	Ritchie Road Gravity Sewer Upgrade	Ritchie Court to North 12th Street	8	1.00	10	211		Priority 1	$58,000	$18,000	$18,000	$94,000
	North 12th Street Gravity Sewer Upgrade	Ritchie Road to Atlantic City Avenue	8	1.00	10	425		Priority 1	$117,000	$36,000	$36,000	$189,000
	Atlantic City Avenue Gravity Sewer Upgrade	North 9th Street to North 12th Street	8	0.66	10	1045		Priority 1	$288,000	$87,000	$87,000	$462,000
	North 9th Street Gravity Sewer Upgrade	Atlantic Avenue to West Grand Avenue	8	1.00	10	2127		Priority 1	$586,000	$176,000	$176,000	$938,000
	West Grand Avenue Gravity Sewer Upgrade	8th Street to 9th Street	8	1.00	12	369		Priority 1	$109,000	$33,000	$33,000	$175,000
	South 8th Street Gravity Sewer Upgrade	West Grand Avenue to Rockaway Avenue	10	0.98	12	385		Priority 1	$114,000	$35,000	$35,000	$184,000
	Rockaway Avenue Gravity Sewer Upgrade	South 8th Street to South 9th Street	8	0.61	10	371		Priority 1	$103,000	$31,000	$31,000	$165,000
EX-GSCIP-6	South 4th Street Gravity Sewer Upgrade	West Grand Avenue to Rockaway Avenue	8	0.64	10	385		Priority 1	$106,000	$32,000	$32,000	$170,000
	Manhattan Avenue Gravity Sewer Upgrade	South 3rd Street to South 4th Street	12	0.86-1.00	18	252		Priority 1	$86,000	$26,000	$26,000	$138,000
EX-GSCIP-7	Install HDPE Mahole Liners	18 Manhole Locations Upstream of Nacimiento Avenue Lift Station	-	-	-	-		Priority 2	$6,000	$2,000	$2,000	$10,000
											Subtotal	$4,045,000

Lift Stations

Project	Project Name	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Construction Cost ($)	Engineering, Project Administration, and Construction Management ($)	Contingency Cost ($)	Opinion of Cost ($)
EX-LSCIP-1	Nacimiento Avenue Lift Station Rehabilitation	Discharge pipe fittings located within the wet well are severely corroded. Fittings and valves located in the below grade vaults have areas of moderate surface corrosion.	Replace/re-coat existing valves and pipe fittings within wet well and valve vault.	Assumes $25,000 for bypassing for work performed in wet well and/or lift station is offline for repairs.	Priority 2	$45,000	$14,000	$14,000	$73,000
EX-LSCIP-2	Front Street Lift Station Rehabilitation	Minor bulging of wet well coating (potential concrete corrosion). Discharge pipe fittings located within the wet well are corroded. Fittings and valves located in the below grade vaults have areas moderate surface corrosion. Wet well hatch is severely corroded. Hatch panels are extremely heavy and require use of a truck to open.	Complete detailed investigation of wet well coating, replace/re-coat existing valves and pipe fittings within wet well and valve vault, install new hatch system.	Assumes $20,000 for bypassing for work performed in wet well and/or lift station is offline for repairs.	Priority 2	$55,000	$17,000	$17,000	$89,000
EX-LSCIP-3	South Oak Park Lift Station Rehabilitation	Pump intake and pipe fittings within the wet well are severely corroded and manhole frame shows signs of corrosion. Staff has reported issues with ragging of pumps. Maintenance on the lift station is complicated by the fiberglass enclosure. No bypass connection was observed.	Replace/re-coat existing pipe fittings within wet well, retrofit fiberglass enclosure to allow for user access, and install bypass connection.	Assumes $20,000 for bypassing for work performed in wet well and/or lift station is offline for repairs.	Priority 2	$60,000	$18,000	$18,000	$96,000
								Subtotal	$258,000
								Total	**$4,303,000**

Notes:
EX-GSCIP = Existing Gravity Sewer Capital Improvement Project
EX-LSCIP = Existing Lift Station Capital Improvement Project
Costs rounded to the nearest $1,000.
Engineering and Administration costs estimated at 30%. Construction contingency estimated at 30%
Construction cost opinions were developed in May 2019. Use 20-Cities ENR CCI May 2019 = 11230.01 to escalate estimated cost to present value.

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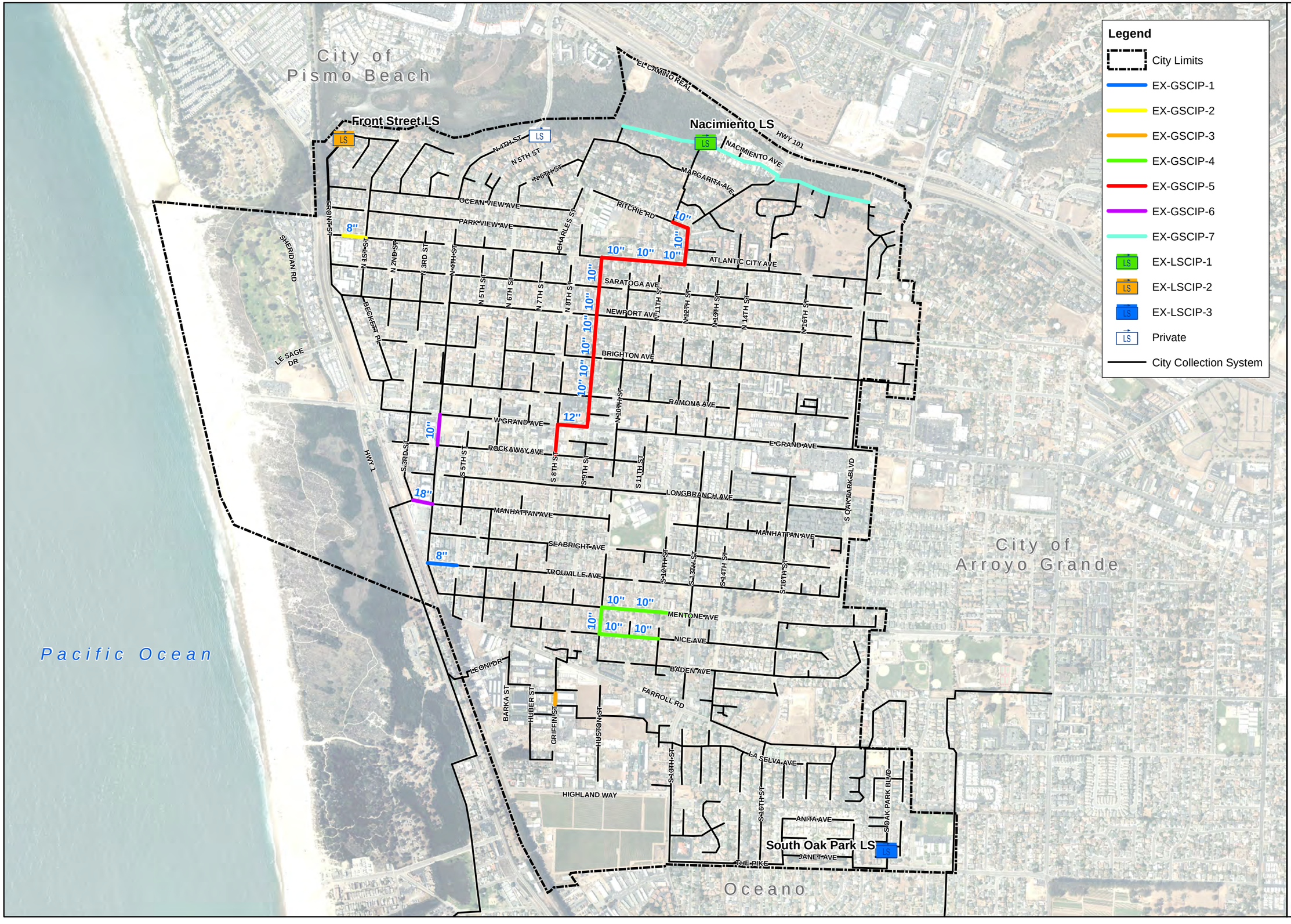

City of Grover Beach

Sewer Master Plan

Figure 9-1:

CIPs for Existing Collection System Deficiencies

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Table 9-5: Operation and Maintenance Improvements			
Project	**Improvement**	**Description**	**Opinion of Cost ($)**
OM-1	Asset Management Strategy Allowance	Initial selection and purchase of asset management software, implementation, training, and first five years of data hosting by selected software vendor.	$100,000
OM-2	Updating the City Geographic Information System (GIS) and Hydraulic Model Allowance	Complete annual updates of existing water GIS and hydraulic model. Assumes five years of support ($10,000 per year allowance).	$50,000
OM-3	Sanitary Sewer System Management Plan Update	Update to report required every five years. Assumes two updates over the next 10 years.	$60,000
OM-4	Sanitary Sewer System Management Plan Audit	Audits required every two years, assumes five audits over the next 10 years.	$50,000
		Total	**$260,000**

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Table 9-6: Collection System Capital Improvements for Future Flows

Project	Sewer Improvement	Limits	Existing Facility	Deficiency	Capital Improvement Project (CIP)		Notes	Priority	Construction Cost ($)	Engineering, Project Administration, and Construction Management ($)	Contingency Cost ($)	Opinion of Cost ($)
			Diameter (inches)	PHF d/D	Diameter (inches)	Length (feet)						
F-GSCIP-1	Easement Gravity Sewer Upgrade	Griffin Street to Huston Street	8	0.73	10	709		Priority 1	$195,000	$59,000	$59,000	$313,000
F-GSCIP-2	Nacimiento Avenue Gravity Sewer Upgrade	To Nacimiento Lift Station	8	0.59	10	458		Priority 1	$126,000	$38,000	$38,000	$202,000
F-GSCIP-3	South 4th Street Gravity Sewer Upgrade	Rockaway Avenue to Manhattan Avenue	10	1.00	12	740		Priority 1	$219,000	$66,000	$66,000	$351,000
	Rockaway Avenue Gravity Sewer Upgrade	South 4th Street to South 8th Street	10	1.00	12	1479		Priority 1	$437,000	$132,000	$132,000	$701,000
											Total	**$1,567,000**
SSLOCSD Trunk Sewer Improvements												
	SSLOCSD Trunk Sewer Improvements	Manhattan Ave to Trouville Ave	18	1.00	21	730	Open trench	Priority 1	$285,000	$86,000	$86,000	$457,000
						350	Jack and Bore Installation	Priority 1	$175,000	$53,000	$53,000	$281,000
											Total	**$738,000**

Notes:
F-GSCIP = Future Gravity Sewer Capital Improvement Project
Costs rounded to the nearest $1,000.
Engineering and Administration costs estimated at 30%. Construction contingency estimated at 30%
Construction cost opinions were developed in May 2019. Use ENR CCI May 2019 = 11230.01 to escalate estimated cost to present value.

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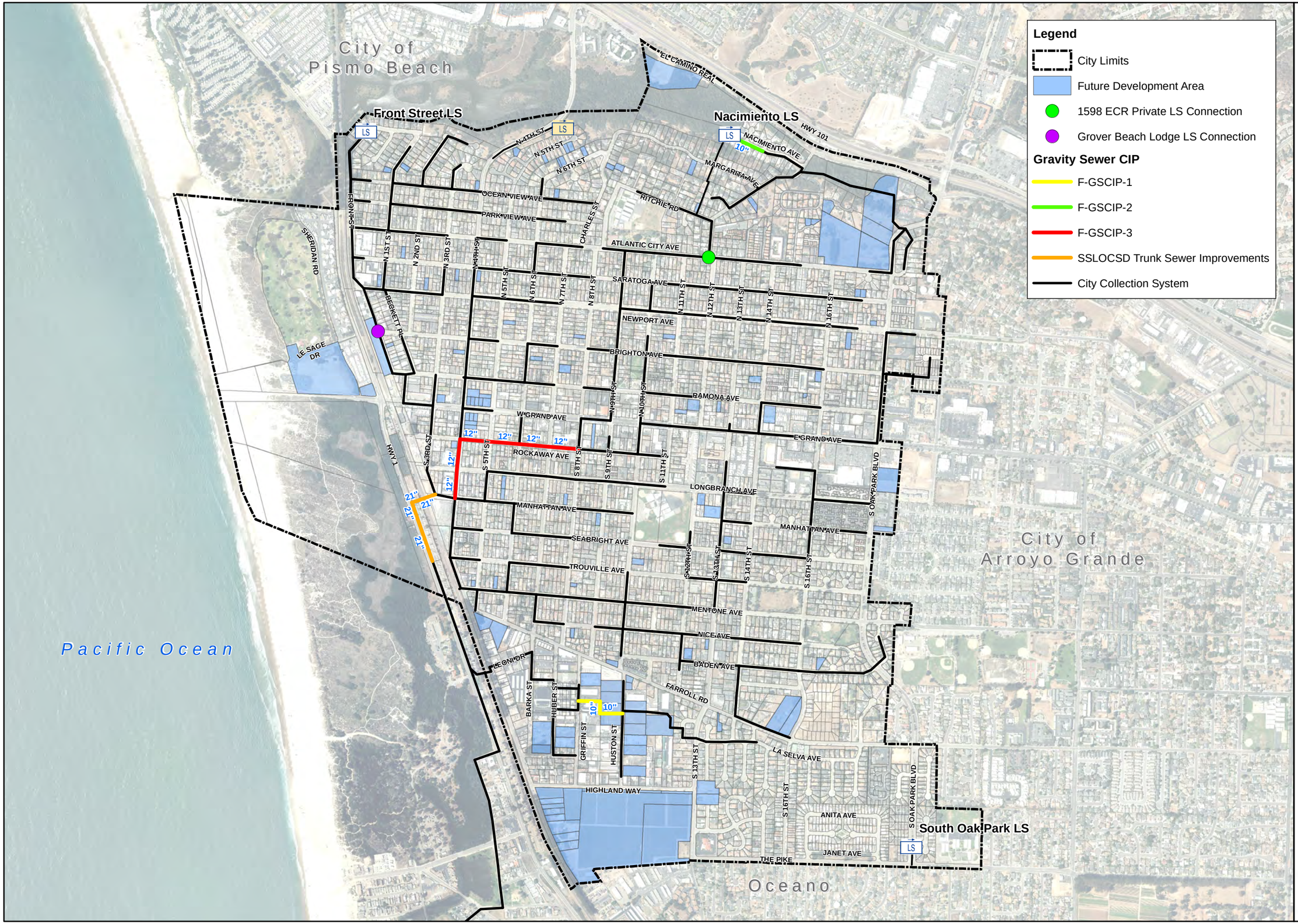

City of Grover Beach

Sewer Master Plan

Figure 9 2:

CIPs for Future Collection System Deficiencies

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Table 9-7: Collection System Capital Improvements for Future Alternative Flows

Project	Sewer Improvement	Limits	Existing Facility	Deficiency	Capital Improvement Project (CIP)		Notes	Priority	Construction Cost ($)	Engineering, Project Administration, and Construction Management ($)	Contingency Cost ($)	Opinion of Cost ($)
			Diameter (inches)	PHF d/D	Diameter (inches)	Length (feet)						
FA-GSCIP-1	South 4th Street Gravity Sewer Upgrade	Manhattan Avenue to Trouville Avenue	10	0.80	12	740		Priority 1	$219,000	$66,000	$66,000	$351,000
		Trouville Avenue to Mentone Avenue	10	0.96	12	405		Priority 1	$120,000	$36,000	$36,000	$192,000
	Mentone Avenue Gravity Sewer Upgrade	South 4th Street to South 5th Street	10	0.96	12	206		Priority 1	$61,000	$19,000	$19,000	$99,000
		South 8th Street to South 10th Street	10	0.93	12	740		Priority 1	$219,000	$66,000	$66,000	$351,000
											Total	**$993,000**

Notes:
FA-GSCIP = Future Alternative Gravity Sewer Capital Improvement Project
Costs rounded to the nearest $1,000.
Engineering and Administration costs estimated at 30%. Construction contingency estimated at 30%
Construction cost opinions were developed in May 2019. Use ENR CCI May 2019 = 11230.01 to escalate estimated cost to present value.

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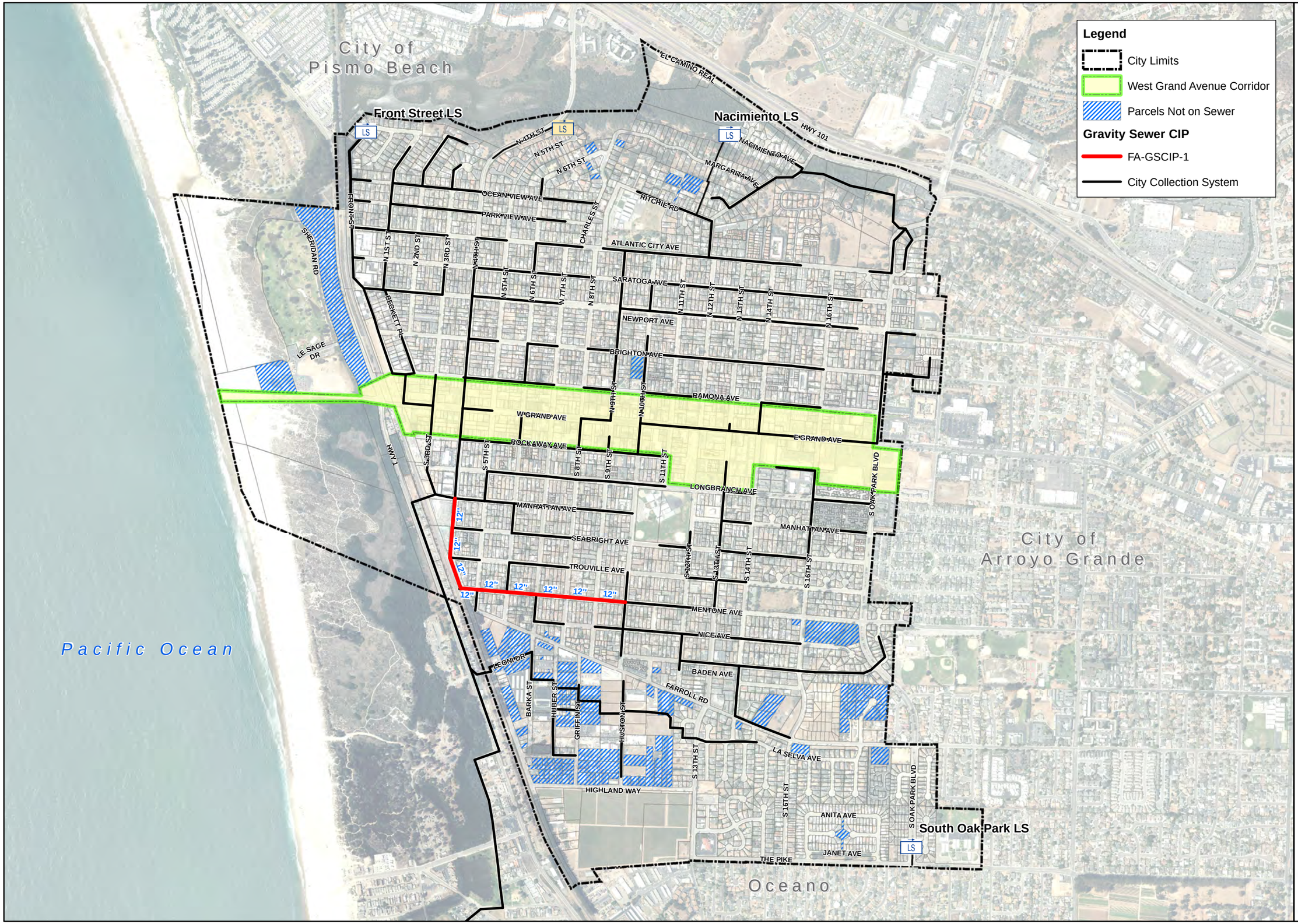

City of Grover Beach

Sewer Master Plan

Figure 9 3:

CIPs for Future Alternative Collection System Deficiencies