

SECTION 8

COLLECTION SYSTEM CONDITION ASSESSMENT

8-1 INTRODUCTION

The City of Manhattan Beach (City) established a program to begin CCTV inspections of its approximately 86 mile long sewer collection system. The scope of the Master Plan included inspections of 227,714 feet (43.1 miles) of pipe or 52.9 percent of the total system.

Condition assessment of the inspected gravity sewer pipes and manholes is presented in this section. The procedure followed to complete the assessment of the gravity sewers is as follows:

- a. Conduct CCTV Inspections.
- b. Review information provided by the CCTV contractor.
- c. Prepare a database summarizing the findings of the CCTV reports and recordings.
- d. Prioritize the CCTV recordings per the database summary to select a list of reaches with numerous or significant defects of representative types. Consider operation and maintenance issues separately and identify additional hotspots for the City's review.
- e. Select representative reaches of the system to review the CCTV recordings in detail to ensure compliance with CCTV standards and procedures and further prioritize the sewers for replacement and/or repair. Verify the completeness of the inspection reports and update the inspection database.
- f. Develop a rating system to identify and prioritize the condition deficiencies, therefore identifying the critical sewer mains in need of rehabilitation and/or repair. Focus on the sewer pipes that are at risk of collapse or prone to more frequent blockages.
- g. Develop an engineer's cost estimate for the rehabilitation/replacement of the sewer mains, including construction cost, design, inspection, administration, and contingencies.

8-2 CLOSED CIRCUIT TELEVISION (CCTV) INSPECTIONS OF GRAVITY PIPES

Empire Pipe Cleaning and Equipment, Inc. (Empire) performed video inspection work on approximately 222,714 feet of pipe between October 2008 and August 2009. Seventy-six (137) DVD's with inspection reports for 1,200 reaches of sewer were produced by Empire. Each inspection report lists the service connections and deficiencies by location in the inspected pipe. Photographs of the identified deficiencies are included in the inspection reports.

The locations of City sewers with completed CCTV inspections are shown on Figure 8-1. The CCTV inspected sewer pipes range in size from 6-inches to 15-inches in diameter. The majority of the pipes inspected is 8-inches in diameter and made of vitrified clay pipe (VCP).

National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) coding procedures formed the basis of the inspection work and reports prepared by Empire.

8-2.1 INSPECTION REPORT DATABASE SUMMARY

Initially, a database summary was developed utilizing the CCTV inspection written reports. This database summary contained a tabulation of the deficiencies identified in the written reports, including the following information:

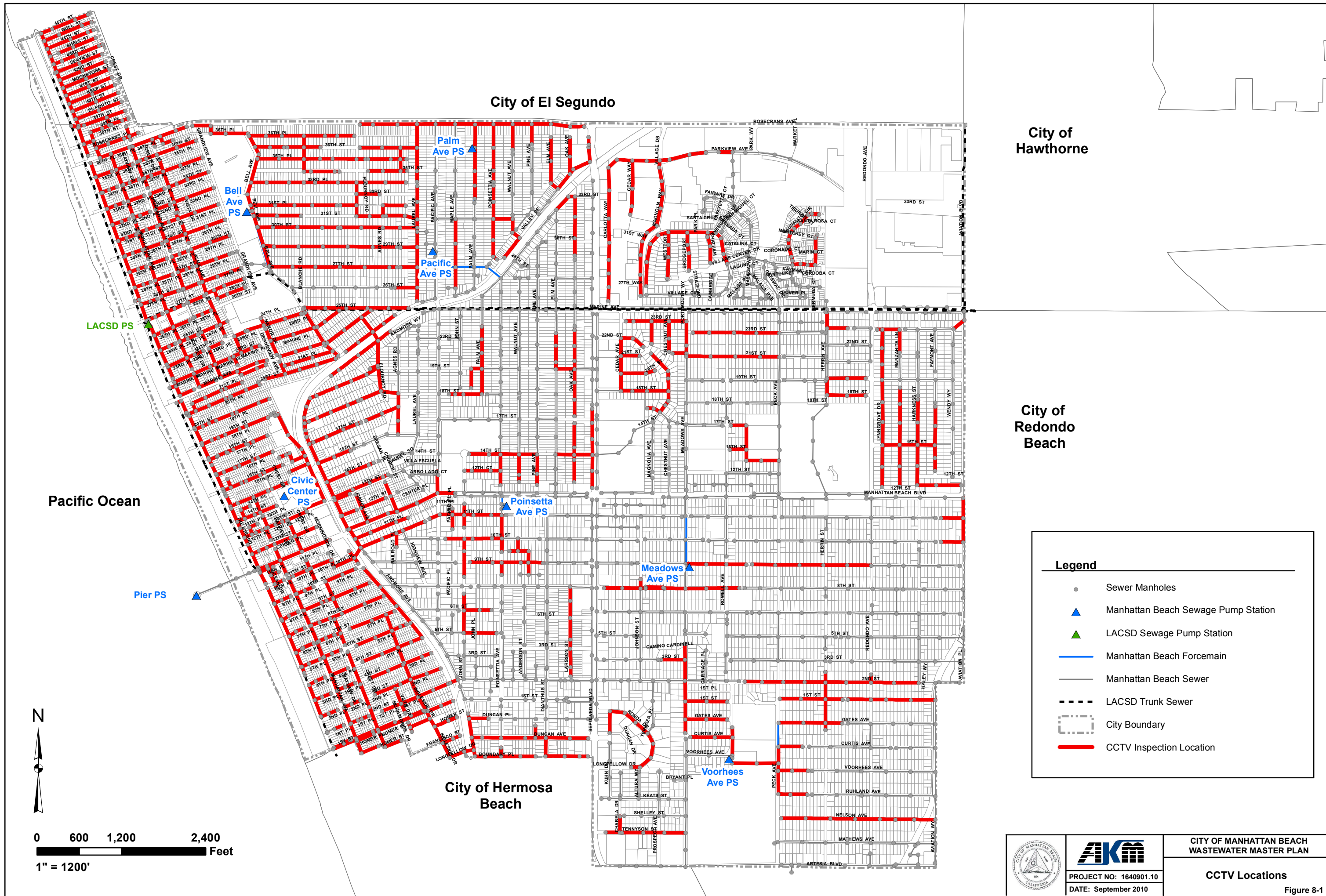
- DVD Number
- Inspection (Run) Number
- Reversal DVD Number
- Reversal Inspection (Run) Number
- Location (Street Name)
- CCTV Inspection Date
- Pipe Identification Number
- Upstream Manhole and Downstream Manhole Identification Numbers
- Direction of Camera
- Pipe Size and Material
- Atlas Length and CCTV Inspected Length of Pipe
- Deficiency Tabulation from Written Reports using PACP codes

8-2.2 REVIEW OF REPRESENTATIVE CCTV RECORDINGS

The inspection report database summary was used in selecting the recordings to be reviewed in detail. The pipe reaches selected for detailed review were those that showed the most severe structural problems and multiple deficiencies, as well as severe operation and maintenance issues.

First, the reaches that had listed deficiencies such as deformed pipe, hole in pipe, broken pipe, large offset joint, large obstacles, and ball roots were selected for review. These deficiencies can be a cause of sanitary sewer collapse, overflow or exfiltration into the surrounding soil and may need immediate attention. Next, reaches that had numerous or multiple deficiencies such as fractures, cracks, roots, deposits, obstructions, sags, camera underwater, and survey abandoned were selected. Finally, several reaches without listed deficiencies were selected in order to develop insight into the overall condition of the CCTV inspected system.

Recordings for 264 reaches and 53,789 feet of pipe (23.9% of total inspected) were selected and reviewed in detail. The assessment information of pipes reviewed in detail was incorporated into the original Inspection Report Database Summary. Seventy-two (72) reverse inspections were conducted and are included in the database summary. The reverse set-ups were conducted to complete runs when the camera was blocked for any reason. The length recorded for some of the reaches where reverse inspections were necessary may be shorter than actual due to blockages in the pipe, as sometimes the camera was not able to reach the same point in the pipe from two directions.



City of El Segundo

City of Hawthorne

City of Redondo Beach

City of Hermosa Beach

Pacific Ocean

LACSD PS

Pier PS

Bell Ave PS

Palm Ave PS

Pacific Ave PS

Civic Center PS

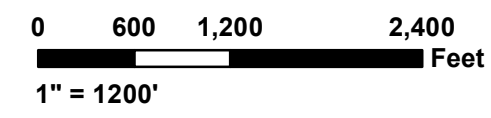
Poinsetta Ave PS

Meadows Ave PS

Voorhees Ave PS

Legend

- Sewer Manholes
- ▲ Manhattan Beach Sewage Pump Station
- ▲ LACSD Sewage Pump Station
- Manhattan Beach Forcemain
- Manhattan Beach Sewer
- - - LACSD Trunk Sewer
- ⬡ City Boundary
- CCTV Inspection Location



PROJECT NO: 1640901.10
DATE: September 2010

CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN

CCTV Locations

Figure 8-1

8-2.3 CONDITION GRADING

The PACP condition grading system was used to assign a condition rating for structural defects and operation and maintenance defects for each reach of pipe. The rating provides the ability to quantitatively measure the difference in pipe condition between one inspection and subsequent inspections, and to prioritize among different pipe segments. A grade of 1 to 5 is assigned to each defect based on potential for further deterioration or pipe failure. Pipe failure is defined as when it can no longer convey the design capacity. The grades are as follows:

5 – Immediate Attention	Defects requiring immediate attention
4 – Poor	Severe defects that will become Grade 5 defects within the foreseeable future
3 – Fair	Moderate defects that will continue to deteriorate
2 – Good	Defects that have not begun to deteriorate
1 – Excellent	Minor defects

A truly continuous defect is defined as a defect that extends more than 3 feet. A repeated continuous defect is defined as a defect that occurs in a length of pipe in at least 75 percent of the joints (i.e. 3 out of 4 joints).

The equivalent number (quantity) of “truly” and “repeating” continuous defects is calculated by dividing the length of the continuous defect by 5, normalizing the defects for comparison to other reaches. Each unit in the number of defects represents an occurrence of defect or a joint length of defective pipe. This is a PACP standard.

The grade values for the most common defects are shown in Table 8-1. For defects with variable grade values dependent on the degree of deficiency of the defect, an estimated average value was used.

Figure 8-2 shows the number of reaches where an identified deficiency was found at least once within the reach. It provides a general sense of the magnitude of the problems that were found in the City’s collection system. The problems identified most often were fine roots (835 reaches, 22% of total), cracks (563 reaches, 15% of total) and joint offset medium (437 reaches, 12% of total).

The structural defect score and O& M defect score is calculated by multiplying the number of occurrences of each defect by its assigned grade and summing them.

The structural defect index and the O&M defect index is calculated by dividing the defect score by the number of defects. It is an indicator of the distribution of defect severity.

Figure 8-3 is a plot of the number of reaches versus the highest deficiency grades found in each reach. For example, there were 218 reaches found with at least one structural deficiency grade of 5 and 4 reaches found with at least one operation and maintenance deficiency grade of 5.

Figures 8-4 through 8-6 illustrate the locations of the reaches with significant structural defects such as broken pipe, holes in pipe, and large joint offsets.

Table 8-1
Defect Codes and Condition Grades

PACP Code	Structural Defect Coding	Grade
CL	Crack - longitudinal	2
CC	Crack - circumferential	1
CM	Crack - multiple	3
CS	Crack - spiral	2
FL	Fracture - longitudinal	3
FC	Fracture - circumferential	2
FM	Fracture - multiple	4
FS	Fracture - spiral	3
BSV	Broken - soil visible	5
BVV	Broken - void visible	5
HSV	Hole - soil visible	5
HVV	Hole - void visible	5
JOL	Joint Offset - large	5 ^b
JOM	Joint Offset - medium	3 ^a
JSL	Joint Separated - large	2
JSM	Joint Separated - medium	1
RPZ	Point Repair - other	1
MWLS	Miscellaneous - water level, sag.	2

^a PACP grade is 1. Grade was increased for this report, because defect is considered to be major.

^b PACP grade is 2. Grade was increased for this report, because defect is considered to be severe.

PACP Code	Operational & Maintenance and Construction Features	Grade
DAE	Deposits Attached - encrustation	2
DAGS	Deposits Attached - grease	2
DAR	Deposits Attached - ragging	2
DAZ	Deposits Attached - other	2
DSF	Deposits Settled - fine	2
DSC	Deposits Settled - hard/compacted	2
DSZ	Deposits Settled - other	2
DNF	Deposits Ingress - fine material (silt & sand)	2
RFB	Roots Fine - barrel	2
RFL	Roots Fine - lateral	1
RFC	Roots Fine - connection	1
RFJ	Roots Fine - joint	1
RMB	Roots Medium - barrel	4
RML	Roots Medium - lateral	3
RMC	Roots Medium - connection	3
RMJ	Roots Medium - joint	3
RBB	Roots Ball - barrel	5
RBL	Roots Ball - lateral	4
RBC	Roots Ball - connection	4
RBJ	Roots Ball - joint	4
RTB	Roots Tap - barrel	3
RTC	Roots Tap - connection	2
RTJ	Roots Tap - joint	2
IW	Infiltration - Weeper	2
ID	Infiltration - Dripper	3
IR	Infiltration - Runner	4
IG	Infiltration - Gusher	5
OBI	Obstacles - protruding through wall	4
OBJ	Obstacles - wedged in joint	4
OBC	Obstacles - through connection	4
OBP	Obstacles -external pipe cable	4
OBS	Obstacles - build into structure	4
OBN	Obstacles - construction debris	4
OBR	Obstacles - rocks	4
OBZ	Obstacles - other	4
VC	Vermin - cockroach	1
TFD	Tap (Lateral) - factory made defective	2
TB	Tap (Lateral) - break in	3
TBI	Tap (Lateral) - intruding	3
TBA	Tap (Lateral) - active	3
TBB	Tap (Lateral) - abandoned	0
TBC	Tap (Lateral) - capped	2
ISSRH	Intruding Seal Material - ring hanging	4
LL	Line - left	2
LD	Line - Down	2
MCU	Miscellaneous - camera underwater	4
MSC	Miscellaneous - shape/size change	0
MMC	Miscellaneous - material change	0
MSA	Miscellaneous - survey abandoned	0

**Figure 8-2
Sewer Reaches with Identified Deficiencies**

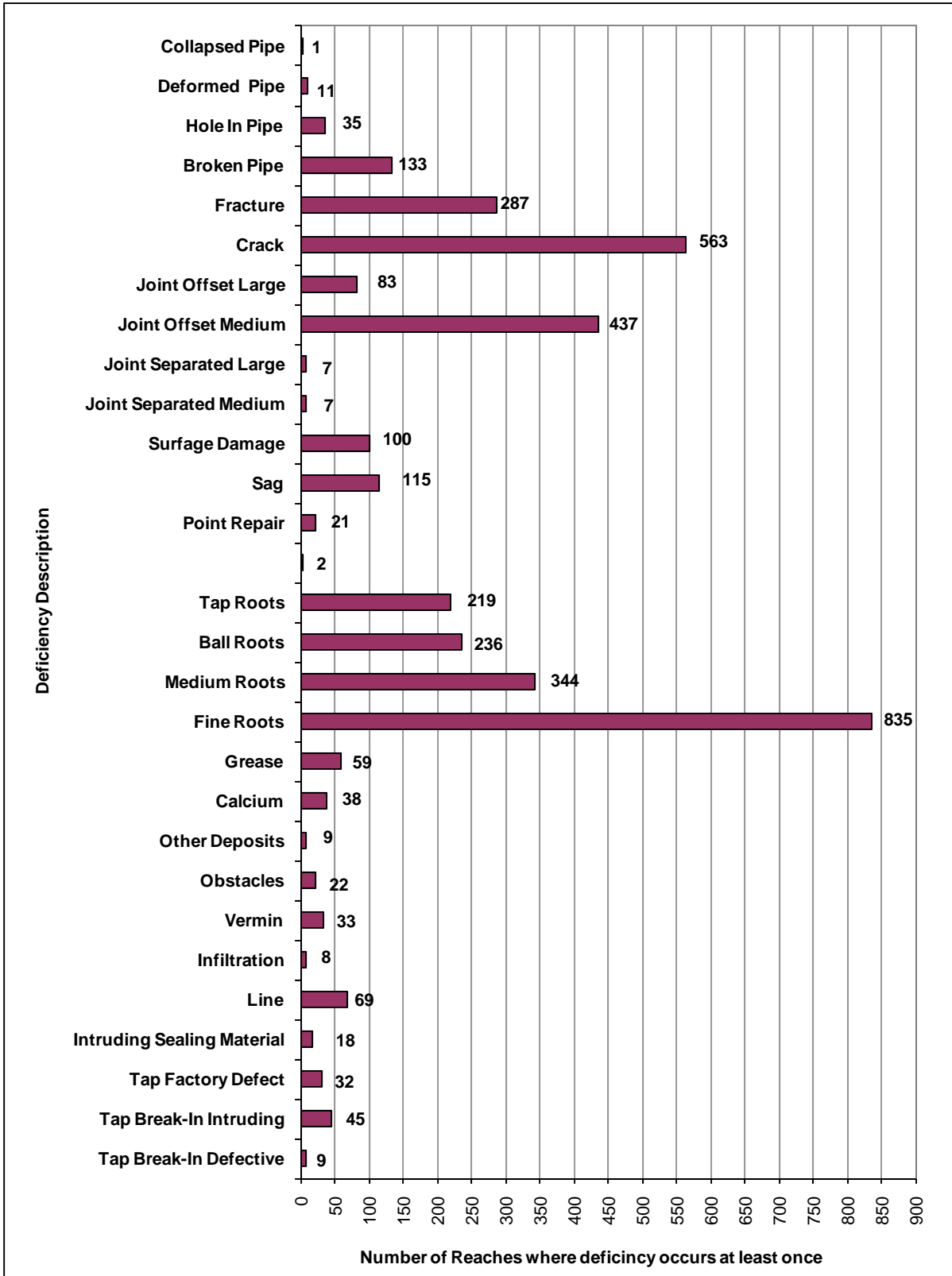
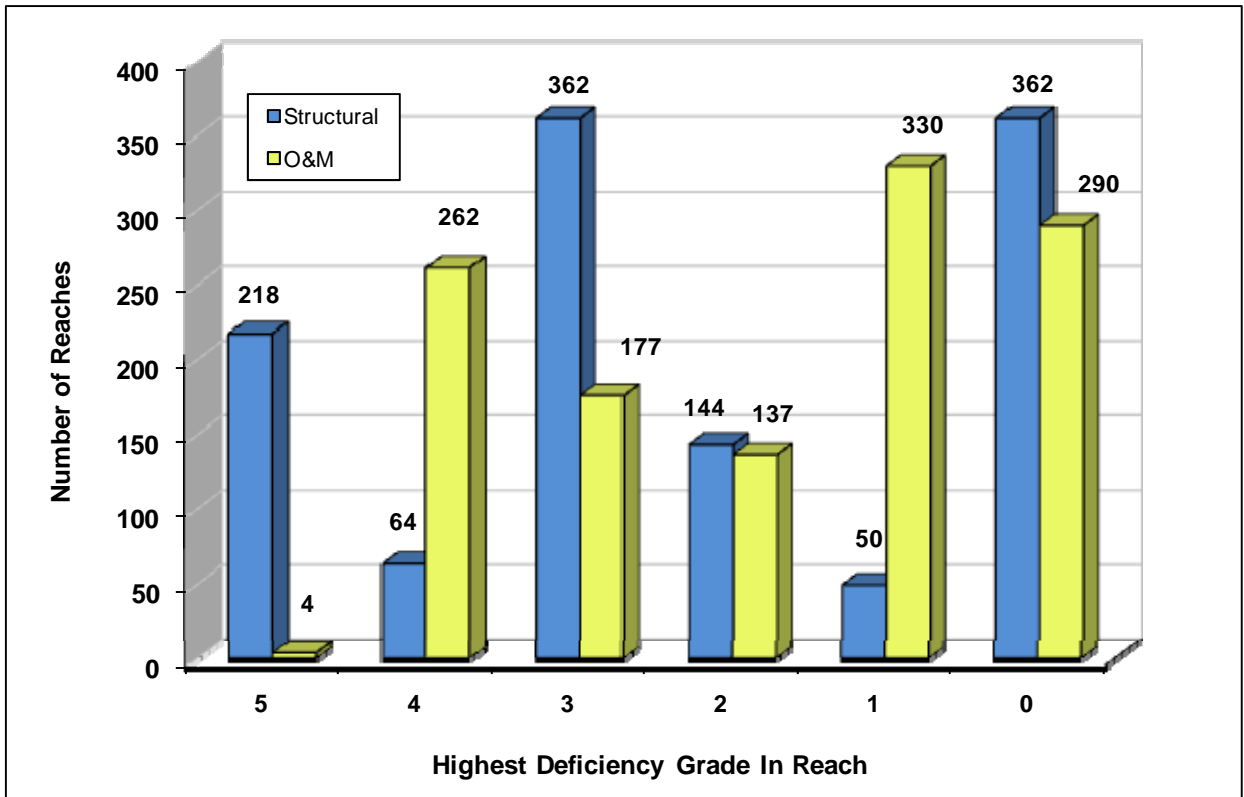
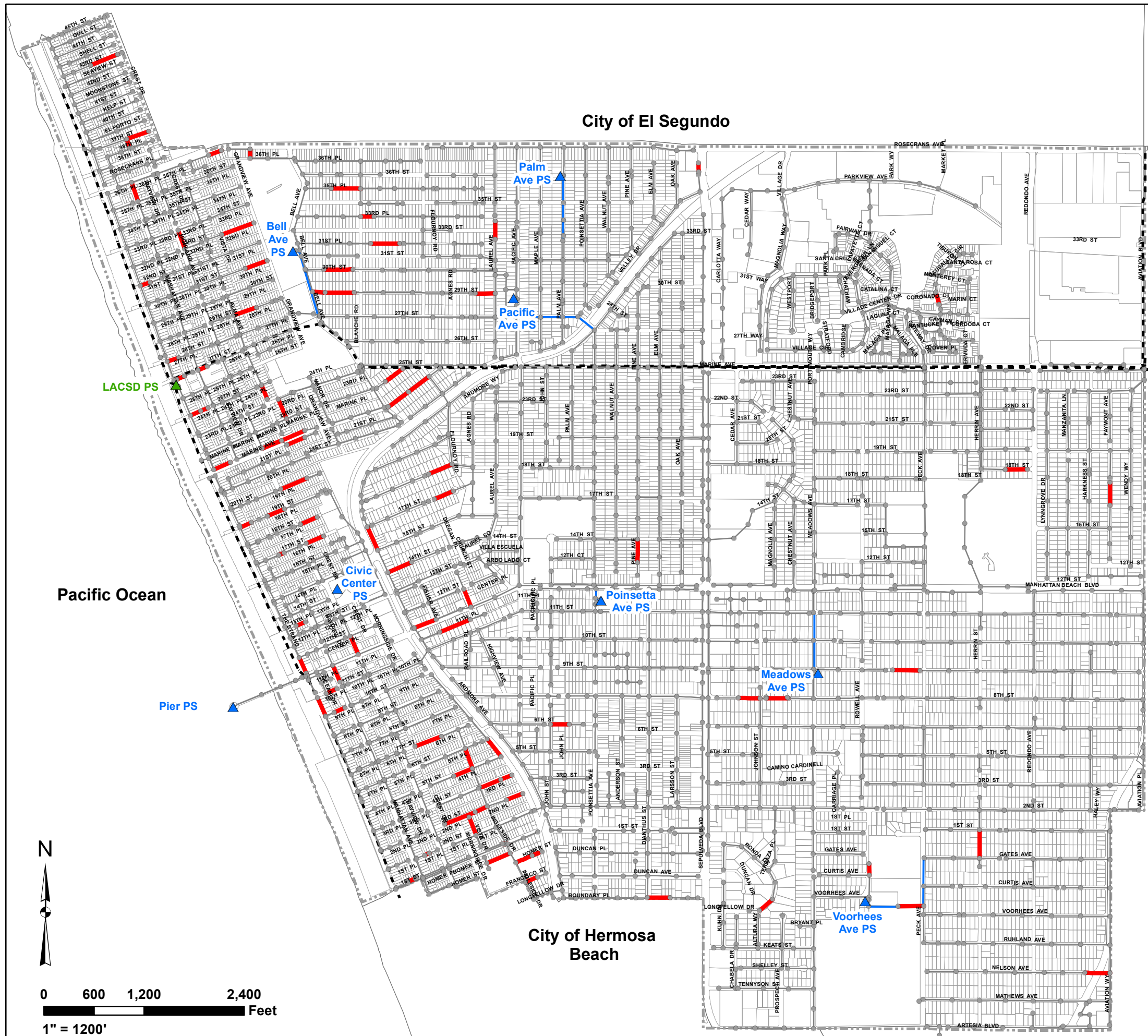


Figure 8-3
Deficiency Grades





City of Hawthorne

City of Redondo Beach

Legend

- Sewer Manholes
- ▲ Manhattan Beach Sewage Pump Station
- ▲ LACSD Sewage Pump Station
- Manhattan Beach Force Main
- Manhattan Beach Sewer
- - - LACSD Trunk Sewer
- ⊃ City Boundary
- Location Identified with Large Offset Joints



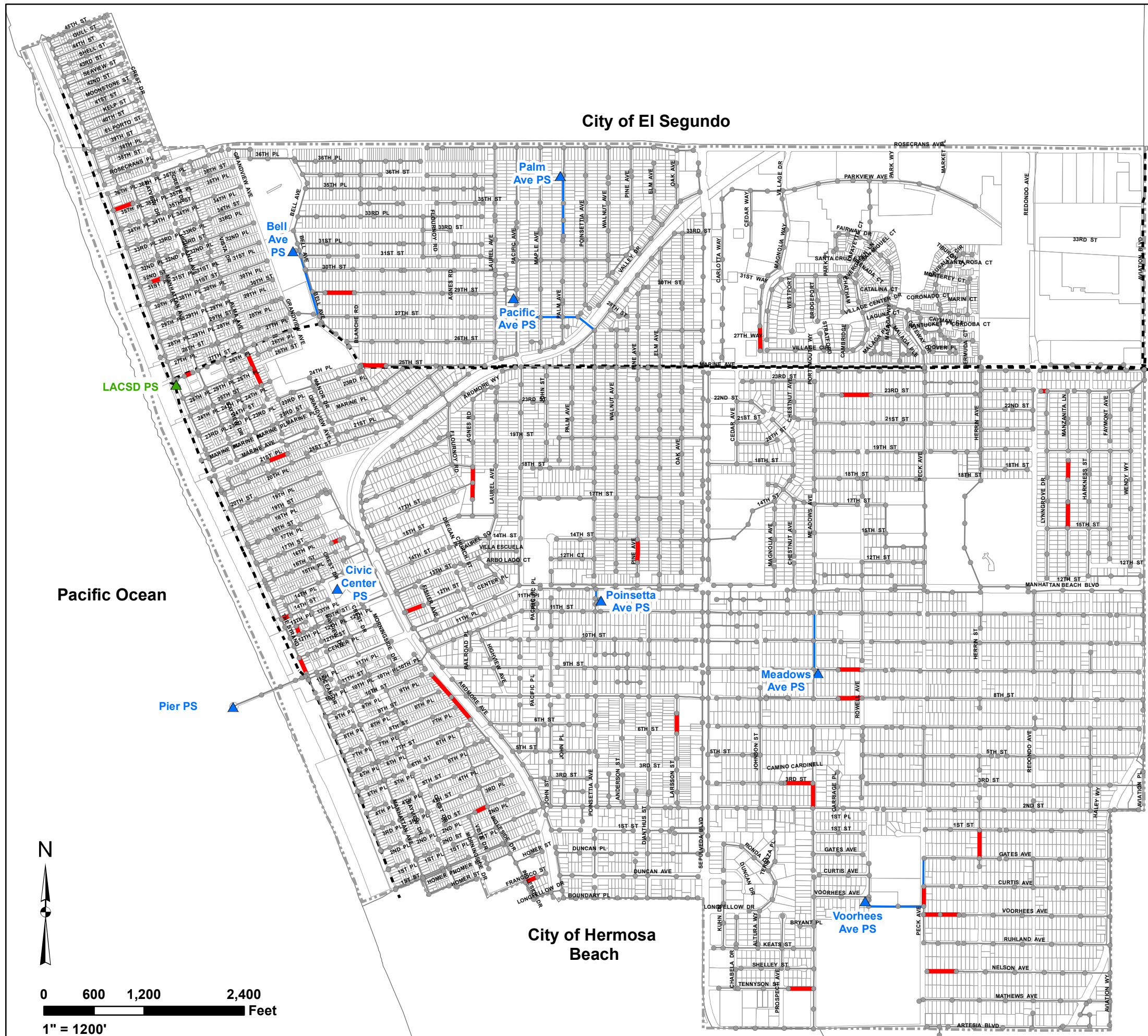
		CITY OF MANHATTAN BEACH WASTEWATER MASTER PLAN
		Large Offset Joints <small>PROJECT NO: 1640901.10</small> <small>DATE: September 2010</small>

Figure 8-6





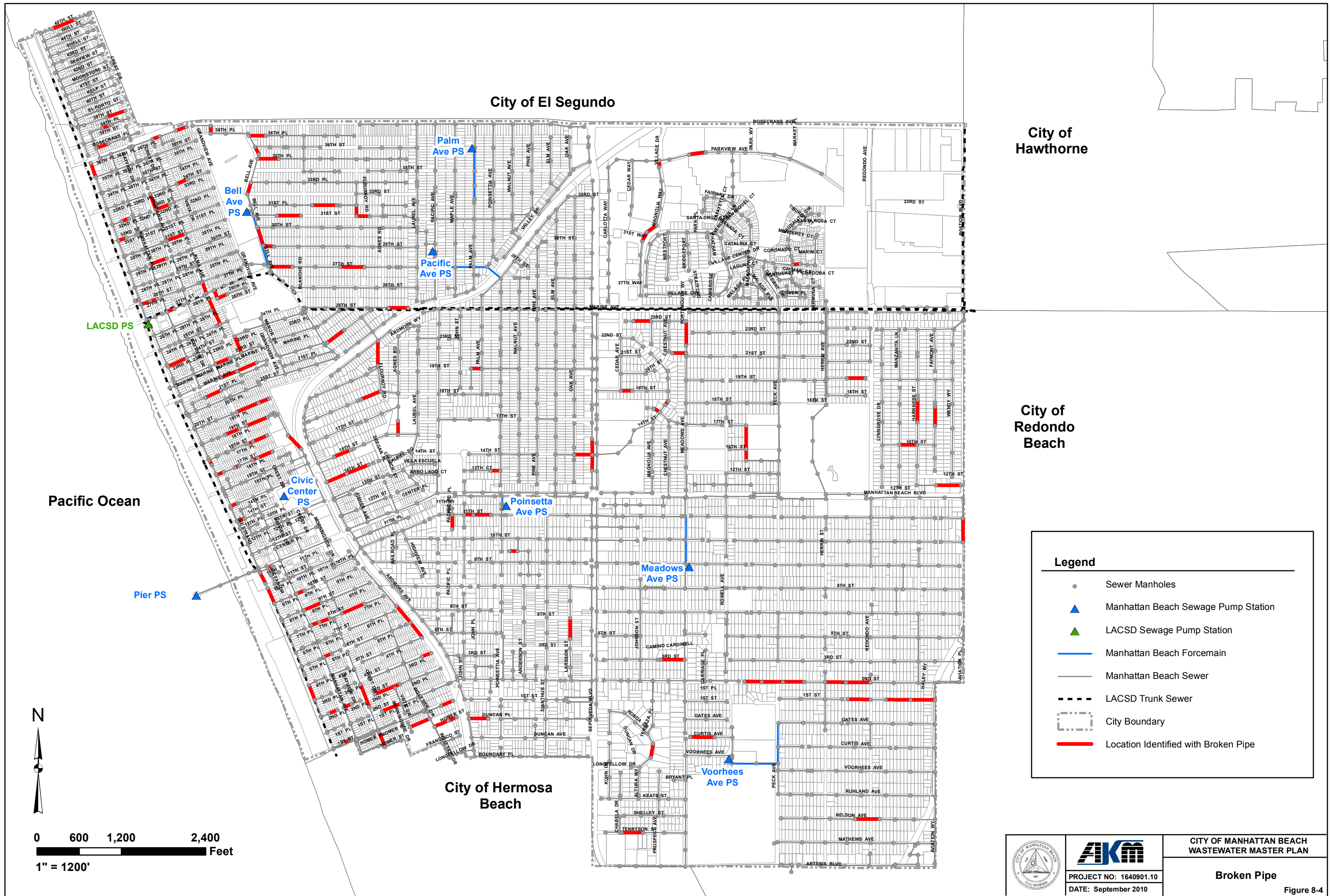
City of Hawthorne

City of Redondo Beach

Legend

- Sewer Manholes
- ▲ Manhattan Beach Sewage Pump Station
- ▲ LACSD Sewage Pump Station
- Manhattan Beach Forcemain
- Manhattan Beach Sewer
- - - LACSD Trunk Sewer
- ⋯ City Boundary
- Location Identified with Hole in Pipe

		CITY OF MANHATTAN BEACH WASTEWATER MASTER PLAN	
		PROJECT NO: 1640901.10 DATE: September 2010	Holes in Pipe Figure 8-5



City of El Segundo

City of Hawthorne

City of Redondo Beach

Pacific Ocean

City of Hermosa Beach

Legend

- Sewer Manholes
- ▲ Manhattan Beach Sewage Pump Station
- ▲ LACSD Sewage Pump Station
- Manhattan Beach Forcemain
- Manhattan Beach Sewer
- - - LACSD Trunk Sewer
- ⊃ City Boundary
- Location Identified with Broken Pipe



0 600 1,200 2,400
Feet
1" = 1200'



PROJECT NO: 1640901.10
DATE: September 2010

CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN

Broken Pipe

Figure 8-4

8-2.4 REHABILITATION AND REPLACEMENT PRIORITIES

The purpose of CCTV inspections is to determine the condition of the City's existing gravity sewers, and formulate a rehabilitation plan for the defective sewers. The defect scores and indexes provide a good indication as to which pipes are in poor condition, but cannot be relied upon solely to prioritize improvement projects. The priorities are selected primarily with consideration of the health and safety of the public and protection of the environment by minimizing the possibility of sanitary sewer overflows and leakage. The pipe capacity, location of particular defects, and the tributary areas/wastewater flow rates are other considerations used in formulating the final capital improvement project priorities.

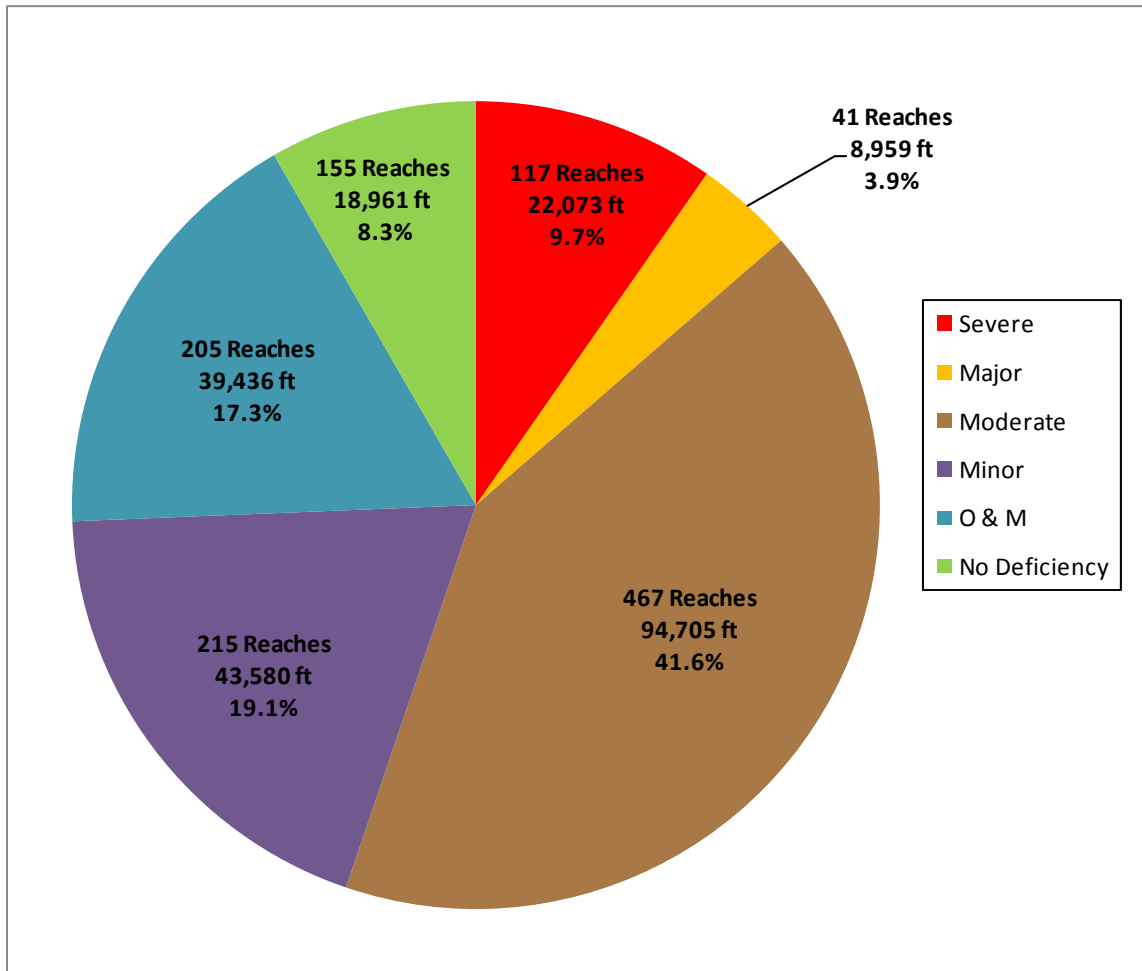
The initial priorities for improvements to the sewers are based on the severity of the pipe defects. The six (6) categories utilized in this report are as follows:

- a. Severe Condition – This category primarily includes structural defects of deformed pipe, hole in pipe, broken pipe, and large joint offsets.
- b. Major Condition – This category primarily includes structural defects of multiple fractures, medium joint offsets and major sags. Pipes with a large number of cracks are also included.
- c. Moderate Condition – Pipes in this category have fractures, cracks, small and medium joint offsets, and sags.
- d. Minor Condition – Pipes in this category have slight sags, cracks, and small joint offsets.
- e. O&M – This condition is for operational and maintenance problems and construction feature defects. There are no structural defects.
- f. No Defects – This condition is for the pipe with no structural, operation and maintenance or construction feature defects.

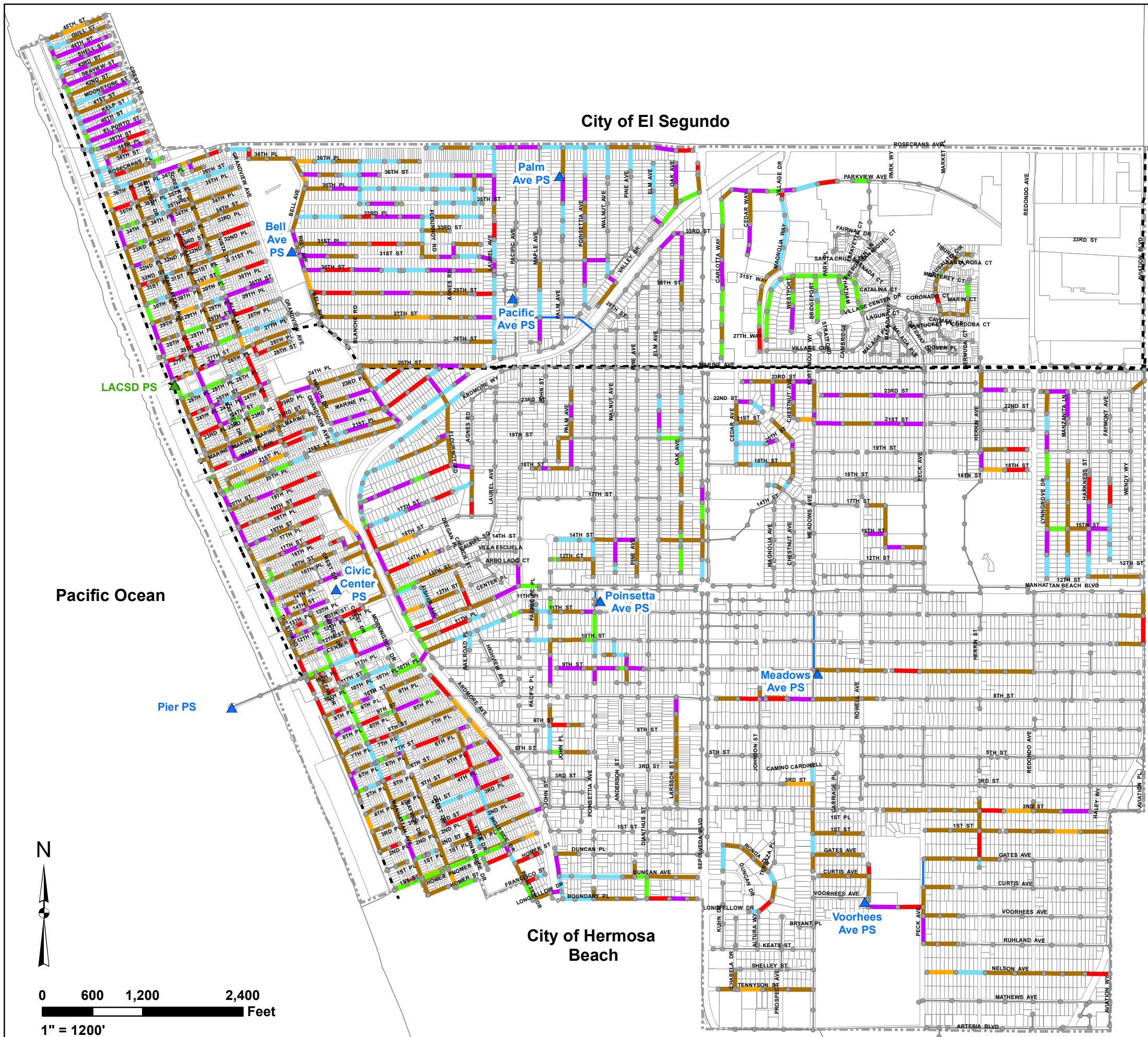
Figure 8-7 shows the distribution of the condition priorities assigned to the pipes with completed inspections. Figure 8-8 shows the CCTV locations, color coded by rehabilitation/replacement priority.

The gravity pipe condition inspection summary, sorted by priority is shown in Appendix 5, Gravity Pipe Condition Inspection Summary. Planning level recommendations are included and are based upon the pipe defects reported in the CCTV Inspection Reports and review of select recordings. Actual improvements must be designed based upon further detailed review of each recording, taking into consideration other factors such as location, age and flow capacity of the pipe, existing utilities, and concurrent infrastructure construction projects. The initial priorities are given to the reaches with severe and major structural defects.

Figure 8-7
CCTV Inspection Priorities



The City of Manhattan Beach will address the “Severe” and “Major” collection system deficiencies. Table 8-2 lists the project priorities assigned to the 87 reaches of collection system identified as in “Severe” or “Major” condition, as well as planning level implementation costs based upon August 2010 dollars. The collection system construction estimates are based upon replacement at \$45 per diameter inch per foot of pipe. Implementation cost is determined by adding 35 percent of construction cost to cover engineering, inspection, and administration. The total estimated cost of upgrading the sewers with severe or major condition priorities is \$15,330,000. This is based on the assessment of 43.1 miles of pipe or 52.9 percent of the total gravity sewer system. Assuming that similar deficiencies will be identified when the remainder of the system is CCTV inspected, the total cost for rehabilitation and replacement of the remaining gravity sewer pipes is estimated at approximately \$13,600,000.



City of Hawthorne

City of Redondo Beach

City of El Segundo

City of Hermosa Beach

Pacific Ocean

Legend

- Sewer Manholes
- ▲ Manhattan Beach Sewage Pump Station
- ▲ LACSD Sewage Pump Station
- Manhattan Beach Forcemain
- Manhattan Beach Sewer
- - - LACSD Trunk Sewer
- City Boundary
- CCTV Inspection Location

Gravity Sewer Condition Priorities

- Severe Condition
- Major Condition
- Moderate Condition
- Minor Condition
- O&M Condition
- No Defects



0 600 1,200 2,400 Feet
1" = 1200'



AKM
PROJECT NO: 1640901.10
DATE: September 2010

CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN

Gravity Sewer
Condition Priorities
Figure 8-8

8-2.5 FOLLOW-UP CCTV INSPECTION AND CONDITION ASSESSMENT PROGRAM

- a. Portions of the system rated to be in **Severe Structural Deficiency** condition will be inspected **annually** and evaluated to determine if immediate corrective action is needed.
- b. Portions of the system rated to be in **Major Structural Deficiency** condition will be CCTV inspected and evaluated once every **three (3) years**
- c. Portions of the system rated to be in **Moderate Structural Deficiency** condition will be CCTV inspected and evaluated once every **five (5) years**
- d. Portions of the system rated to be in **Minor Structural Deficiency** condition will be CCTV inspected and evaluated once every **ten (10) years**
- e. Portions of the system with **no structural deficiencies** will be CCTV inspected and evaluated once every **ten (10) years**
- f. Portions of the system with **Operational and Maintenance** deficiencies, except the **Hot Spots**, will be CCTV inspected and evaluated once every **four (4) years**.
- g. **Hot Spots**, except siphons, will be CCTV inspected and evaluated **before and after each maintenance activity and cleaning for one year** to establish the appropriateness of the method, and then **annually**.

As structural deficiency mitigation projects are implemented, their condition will be reclassified, and they will be included in the appropriate category for follow up CCTV inspection and condition assessment work.

8-3 MANHOLE INSPECTIONS AND ASSESSMENTS

The condition of the manholes associated with the 52.9 miles of gravity pipes inspected was also assessed. A total of 1,075 manholes were inspected and assessed. Photos were taken of each element of the manholes and inspection reports were prepared.

The manhole inspections included general evaluations of the following elements:

- Manhole Cover
- Frame
- Cone
- Barrel
- Rungs
- Bench
- Channel

Each element was rated as good, fair, poor, or failing. Signs of debris, grease, vermin, and odors were also noted in the inspection reports. The results of the inspections are summarized in Table 8-3.

**Table 8-3
Manhole Elements Condition Summary**

Condition	Manhole Cover	Frame	Cone	Barrel / Wall	Rungs	Bench	Channel	Debris	Grease	Vermin	Odor
Good	1070	1068	1030	1048	612	1022	960				
Fair		7	37	22	155	38	95				
Poor			7	4	150	15	20				
Failing			1	1	67						
Broken	2										
Cracked	3										
Not Applicable					91						
Yes								15		55	3
No								1060	1075	1020	1072

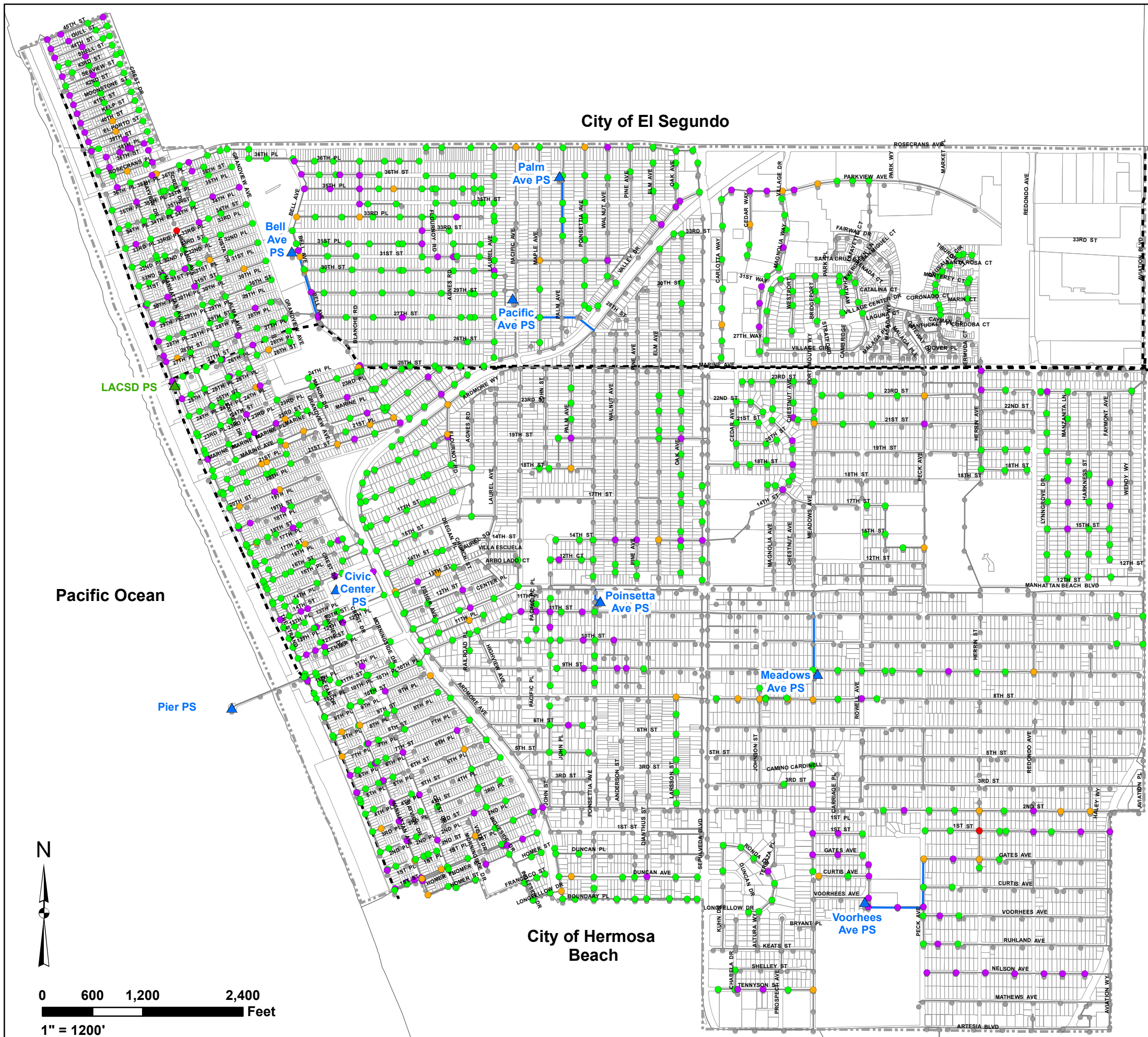
8-3.1 Rehabilitation Priorities

Point values were assigned to each condition rating in order to prioritize the manholes for rehabilitation. The assigned point values are as follows:

Condition Rating	Point Value
Good	0
Fair	1
Poor	5*
Failing	10*
Broken	10
Crack	8
Yes	1
No	0

**For Rungs, Failing is given a point value of 3 and Poor is given a point value of 2*

Rungs are not considered as urgent a problem since the City no longer uses them to access manholes. If City staff must enter a sewer manhole, tripods are utilized. The detailed manhole condition inspection summary, sorted by priority can be found in Appendix 6, Manhole Condition Inspection Summary. Manhole locations colored by total point value are shown on Figure 8-9.



City of Hawthorne

City of Redondo Beach

City of Hermosa Beach

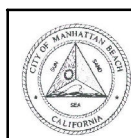
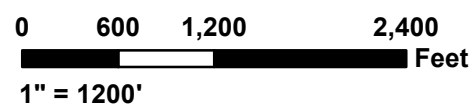
Pacific Ocean

Legend

- Sewer Manholes
- ▲ Manhattan Beach Sewage Pump Station
- ▲ LACSD Sewage Pump Station
- Manhattan Beach Forcemain
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- ⬡ City Boundary

Manhole Inspection Priority Score

- 0 - 5
- 6 - 9
- 10 - 19
- 20 - 23



PROJECT NO: 1640901.10
DATE: September 2010

CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN

Manhole Inspections

Figure 8-9

8-3.2 Manhole Improvements

A total of thirty-two (32) manholes were identified to have poor conditions in the manhole cover, cone, barrel, bench, and/or channel. Preliminary recommendations are shown in Table 8-4.

The manhole rehabilitation cost estimates are based on the following:

Replacement	\$30,000
Line Manhole	\$10,000
Repair Mortar	\$ 6,000
Replace Frame and Cover	\$ 3,500

The total estimated cost of upgrading the manholes with poor conditions is \$316,000. This is based on the assessment 1,075 manholes or 53 percent of all the manholes. The total number of manholes in the sewer system is estimated at 2,031. Assuming that similar deficiencies will be identified when the remainder of the system is CCTV inspected, the total remaining cost for rehabilitation and replacement of the manholes in poor condition is estimated at approximately \$280,000.

**Table 8-4
Manhole Rehabilitation and Replacement Recommendations and Cost
Estimates**

Inspection Phase	Session ID	Street	Manhole	Inspection Date	Surface Condition	Manhole Cover	Frame	Cone	Barrel / Wall	Rungs	Bench	Channel	Debris	Grease	Vermin	Odor	Priority Score	Condition Ranking	Comment	Recommendation	Project Cost (\$)
1	25	Highland Ave	19-015	1/12/09	Pavement - Concrete Collar	Good	Good	Failing	Failing	Good	Good	Good	No	No	No	No	24	1	Fractures in cone and barrel. Fracture seen in street pavement surrounding manhole cover.	Replace	30,000
1	28	1st St	01-080	11/21/08	Pavement - Concrete Collar	Good	Good	Poor	Poor	Failing	Poor	Poor	No	No	0	No	22	2	Missing mortar. Corrosion at bench and channel.	Line manhole	10,000
1	74	Duncan Ave	10-039	12/19/08	Pavement - Concrete Collar	Good	Good	Good	Good	Failing	Poor	Poor	No	No	No	No	18	3	Corrosion at bench and channel.	Line manhole	10,000
1	90	Gates Ave	01-072	11/20/08	Pavement - Concrete Collar	Good	Good	Poor	Fair	Poor	Poor	Poor	No	Yes	0	Yes	15	4	Corrosion at bench and channel.	Line manhole	10,000
1	51	Curtis Ave	05-052	12/2/08	Pavement - Concrete Collar	Broken	Good	Good	Good	Poor	Poor	Poor	No	No	No	No	14	5	Broken manhole cover. Corrosion at bench and channel.	Replace manhole cover and line	13,500
1	36	2nd St	01-086	11/24/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Poor	Poor	Yes	No	0	No	11	6	Corrosion at bench and channel.	Line manhole	10,000
1	109	18th St	06-244	12/5/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Poor	Poor	No	No	No	No	10	7	Corrosion at bench and channel.	Line manhole	10,000
1	23	8th St	04-054	12/1/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Poor	Poor	No	No	No	No	10	8	Corrosion at bench and channel.	Line manhole	10,000
1	50	Meadows Ave	05-023	12/2/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Poor	Poor	No	No	No	No	10	9	Corrosion at bench and channel. Not a smooth transition.	Line manhole	10,000
1	130	14th St	06-191	12/8/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Poor	Poor	No	No	No	No	10	10	Corrosion at bench and channel.	Line manhole	10,000
1	291	Cedar Way	25-012	1/22/09	Pavement - Concrete Collar	Good	Good	Poor	Poor	Poor	Good	Good	No	No	No	No	10	11	Corrosion and cracking in cone and wall	Line manhole	10,000
1	293	Village Dr	25-025	1/22/09	Pavement - Concrete Collar	Good	Good	Poor	Poor	Poor	Good	Good	No	No	No	No	10	12	Corrosion in cone and barrel.	Line manhole	10,000
1	53	Rowell Ave	05-055	12/2/08	Pavement - Concrete Collar	Broken	Good	Good	Good	Fair	Good	Good	No	No	No	No	9	13	Broken manhole cover.	Replace manhole cover	3,500
1	47	Tennyson St	05-020	12/2/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Fair	Poor	No	No	No	No	9	14	Corrosion at channel.	Line manhole	10,000
1	60	Voorhees Ave	05-005	12/2/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Fair	Poor	No	No	No	No	9	15	Corrosion at channel.	Line manhole	10,000
1	181	Flourmoy Rd	17-057	1/8/09	Pavement - Concrete Collar	Good	Good	Good	Good	Fair	Poor	Poor	No	No	No	No	9	16	Corrosion at bench and channel.	Line manhole	10,000
1	46	11th St	09-028	12/18/08	Pavement - Concrete Collar	Good	Good	Good	Good	Good	Poor	Poor	No	No	Yes	No	9	17	Corrosion at bench and channel.	Line manhole	10,000
2	235	The Strand	12-030A	7/20/09	Pavement - Concrete Collar	Good	Good	Good	Poor	Poor	Good	Fair	No	No	No	No	9	18	Missing mortar.	Repair mortar	6,000
1	80	14th St	06-050	12/4/08	Pavement - Concrete Collar	Good	Good	Good	Good	Good	Poor	Poor	No	No	No	No	8	19	Corrosion at bench and channel.	Line manhole	10,000
1	131	14th St	06-077	12/8/08	Pavement - Concrete Collar	Good	Good	Good	Good	Good	Poor	Poor	No	No	No	No	8	20	Corrosion at bench and channel.	Line manhole	10,000
1	178	31st St	17-053	1/8/09	Pavement - Concrete Collar	Good	Good	Good	Good	Good	Poor	Poor	No	No	No	No	8	21	Corrosion at channel.	Line manhole	10,000
1	99	Manhattan Ave	11-116A	12/22/08	Pavement - Concrete Collar	Good	Good	Poor	Good	Poor	Good	Good	No	No	No	No	8	22	Cracks in cone.	Line manhole	10,000
3	25	35th Pl	17-049	8/11/09	Pavement - Concrete Collar	Good	Good	Good	Good	Fair	Fair	Poor	No	No	0	No	8	23	Corrosion at bench and channel.	Line manhole	10,000
1	284	The Strand	14-064	1/21/09	Pavement - Concrete Collar	Cracked	Good	Good	Good	N/A	Good	Good	No	No	No	No	7	24	Cracked manhole cover.	Replace manhole cover	3,500
1	119	19th St	06-030	12/5/08	Pavement - Concrete Collar	Good	Good	Good	Good	Good	Fair	Poor	No	No	No	No	7	25	Corrosion at channel.	Line manhole	10,000
1	205	Blanche Rd	17-040	1/9/09	Pavement - Concrete Collar	Good	Good	Good	Good	Fair	Good	Poor	No	No	No	No	7	26	Corrosion at channel.	Line manhole	10,000
1	26	1st St	01-061	11/21/08	Pavement - Concrete Collar	Good	Good	Good	Good	Fair	Good	Poor	No	No	0	No	7	27	Corrosion at channel.	Line manhole	10,000
1	143	Marine Ave	15-053	1/7/09	Pavement - Concrete Collar	Good	Good	Poor	Good	Fair	Good	Good	No	No	No	No	7	28	Missing mortar and possibly bricks.	Repair mortar	6,000
1	87	Highview Ave	11-040	12/22/08	Pavement - Concrete Collar	Good	Good	Good	Good	Poor	Good	Good	Yes	No	No	No	7	29	Cracks in cone.	Line manhole	10,000
2	191	1st St	12-026	7/16/09	Pavement - Concrete Collar	Good	Good	Good	Good	Good	Poor	Fair	No	No	No	No	7	30	Corrosion at bench and channel.	Line manhole	10,000
2	278	3rd St	10-139	7/22/09	Pavement - Concrete Collar	Cracked	Good	Good	Good	Good	Good	Good	No	No	No	No	7	31	Cracked manhole cover.	Replace manhole cover	3,500
1	100	Manhattan Ave	11-117	12/22/08	Pavement - Concrete Collar	Good	Good	Poor	Good	Good	Good	Good	No	No	No	No	6	32	Cracks in cone.	Line manhole	10,000
Total																				316,000	