

City of Hawthorne



Municipal Sewer System Master Plan

Objectives of Master Plan



- Develop electronic geographic information system (GIS) of City's sewer system
- Conduct sewer flow monitoring across City to determine sewer flows
- Determine where and why excessive rain water enters sewer system
- Videotape (CCTV) approximately 50% of City sewers to determine sewer pipe defects

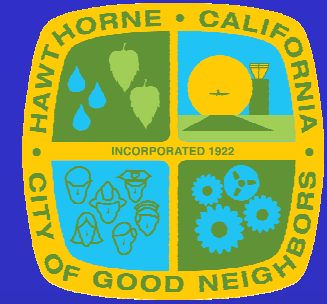


Objectives of Master Plan



- Field investigate sewer manholes to determine defects
- Using GIS, develop an accurate computer model of City's sewer system
- Using model, determine sewers of inadequate size to safely carry flows
- Develop improvement projects and costs and phase projects in a Capital Improvement Program

City Land Use and Population



- Future changes in land use and population affects sewer system planning
- City's population projected to grow 26% by year 2025
- Consequently, sewer system must be planned to carry greater flows in future as necessary



Existing City Sewer System



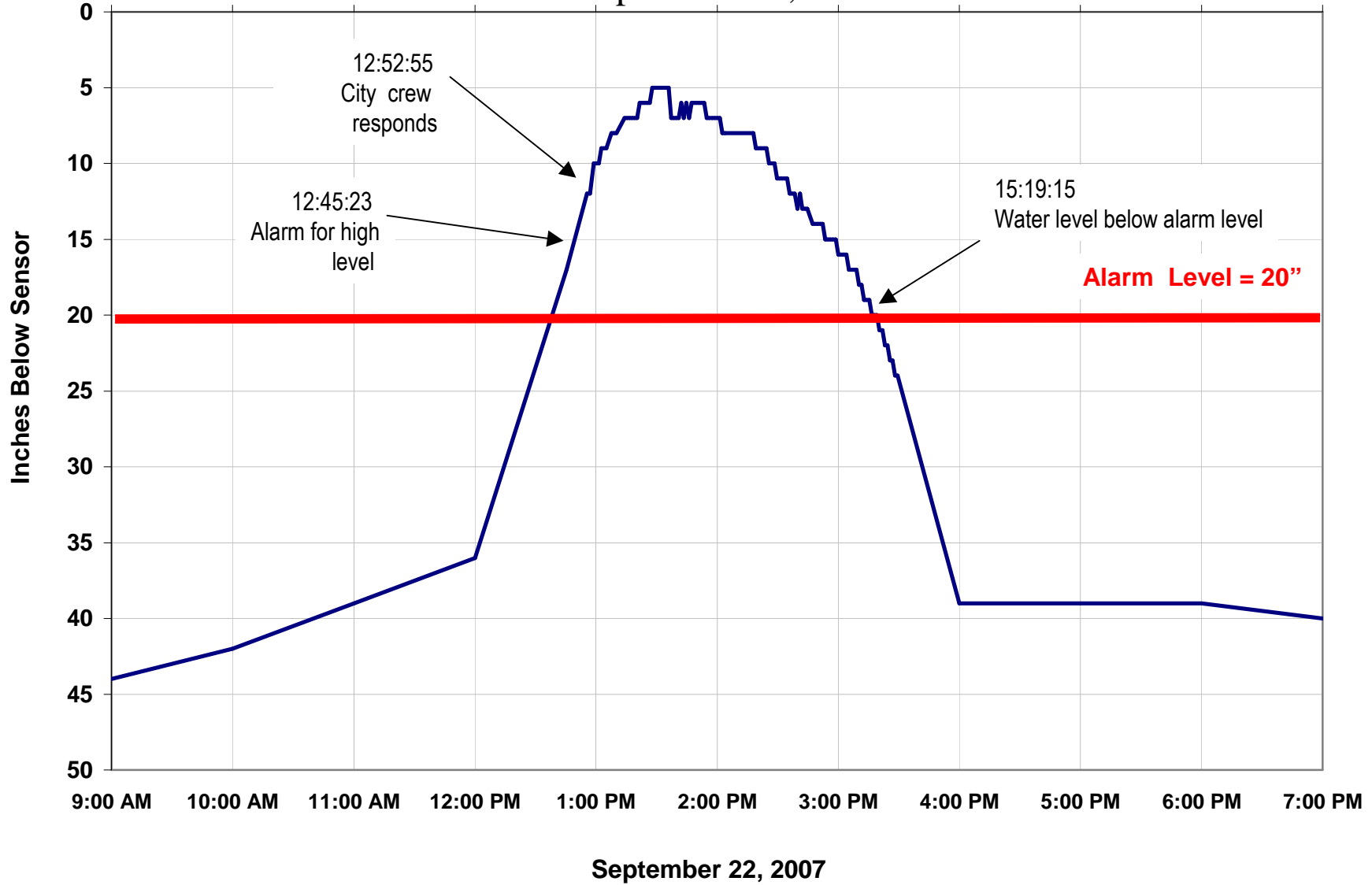
- 90 miles of sewers ranging from 4 to 18 inches in diameter and over 2,000 manholes in system
- Some sewers date back to 1920s but most constructed in 1950s
- “Hot Spots” are locations in system that can have heavier root and grease buildups
- City continuously monitors hot spot areas via smart covers and clean these sewers more often



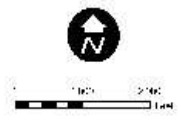
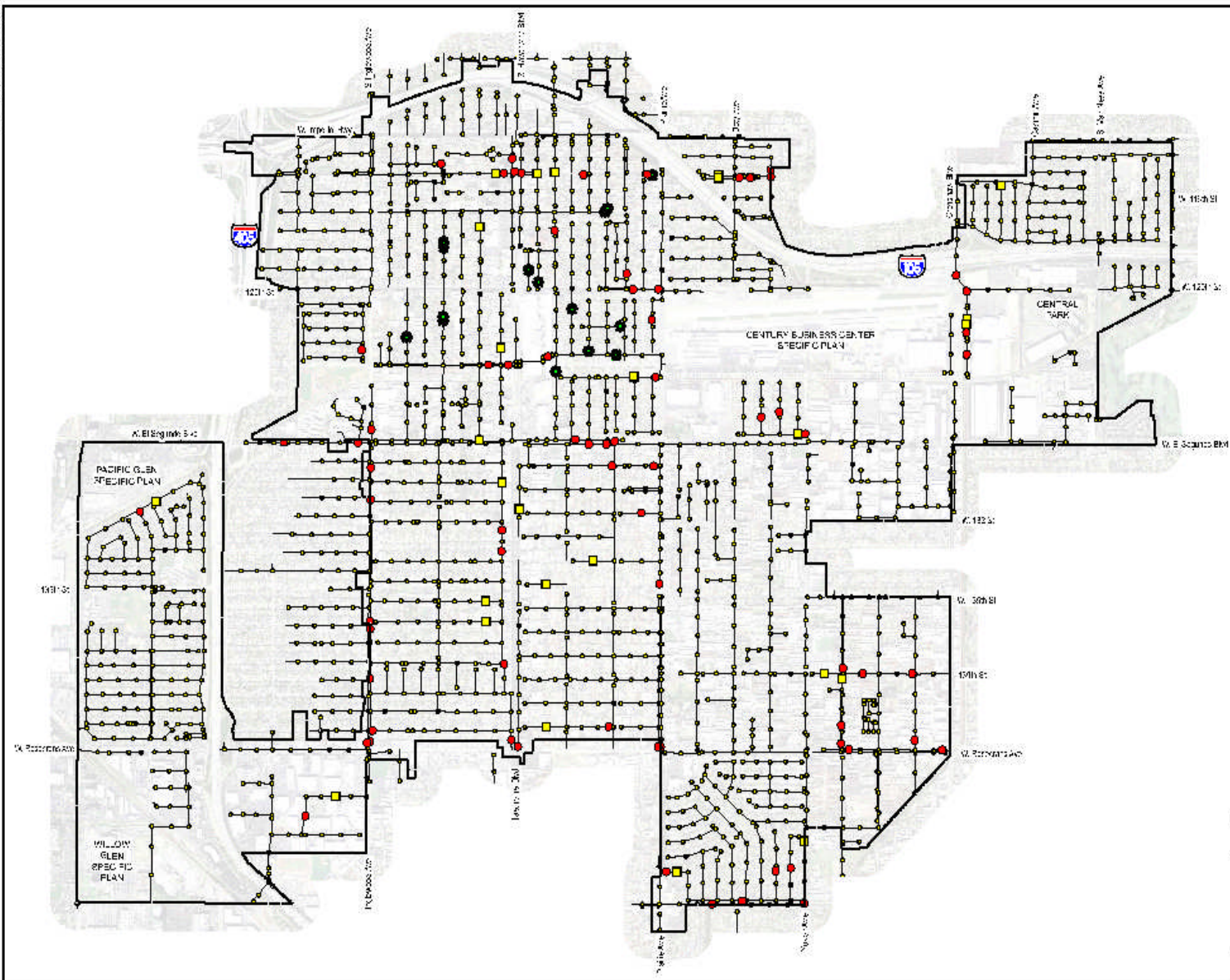




Water Level History During Rain Event
SmartCover® Location: 116th and Birch
September 22, 2007







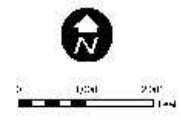
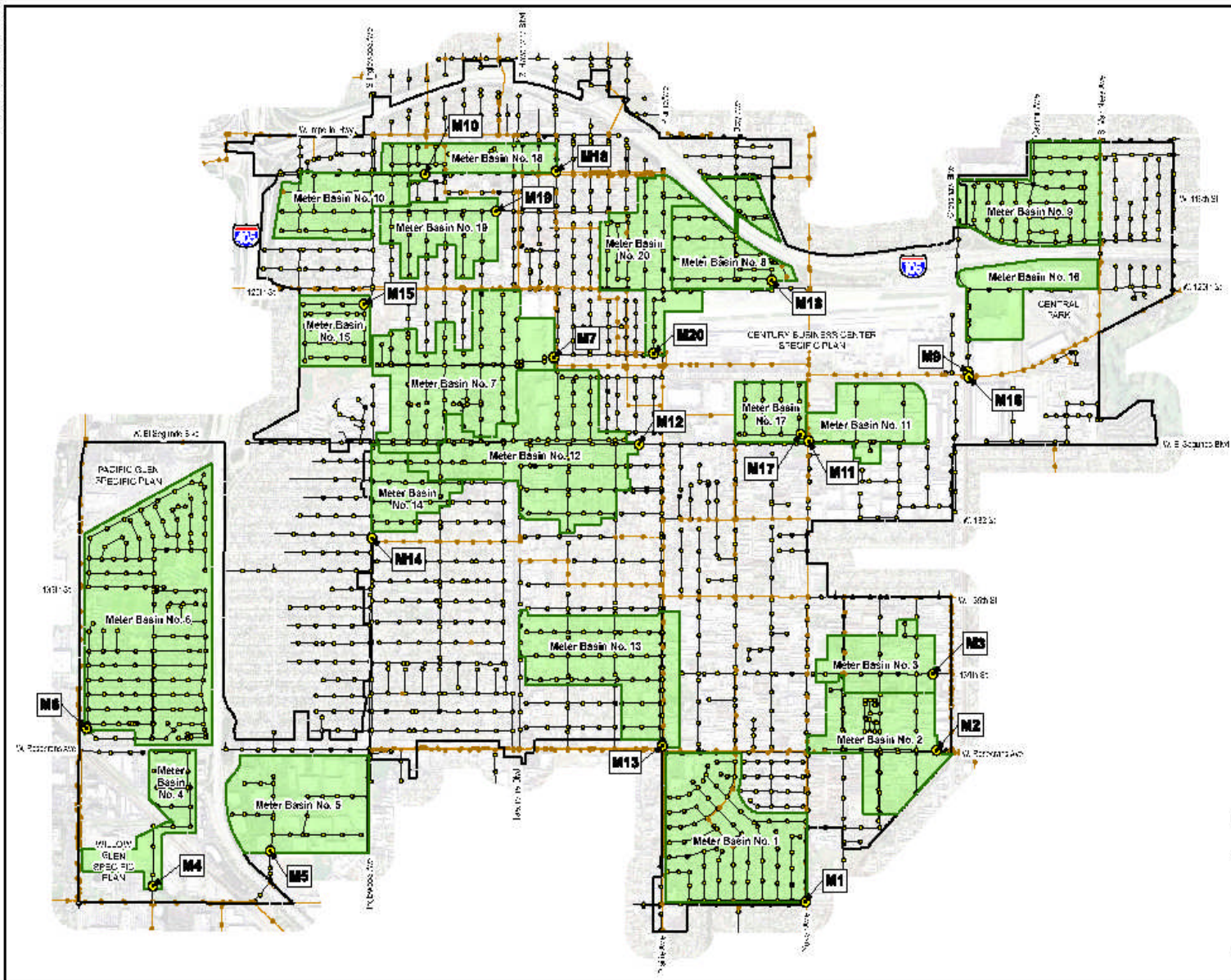
LEGEND

- Hot Spot - City
- Smart Cover
- Flap Valve
- Hot Spot
- Primary Sewer Lines - City
- City Boundary

Sewer System Flows



- Flows in 20 areas (basins) of City metered for 30 days in February 2007
- Dry weather flow patterns determined
- Metered in February in order to capture rain, which can enter system and cause overflows
- Rain water enters system via manhole and sewer openings. Sewer system defects such as broken pipe and manholes located in drainage areas let in more water

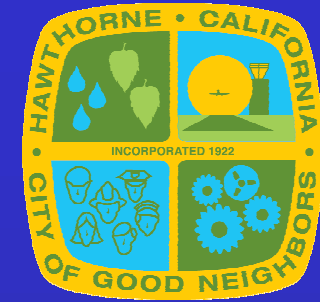


LEGEND

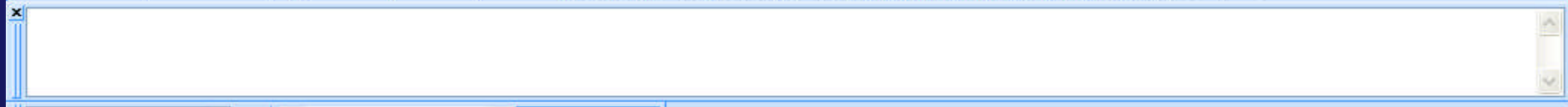
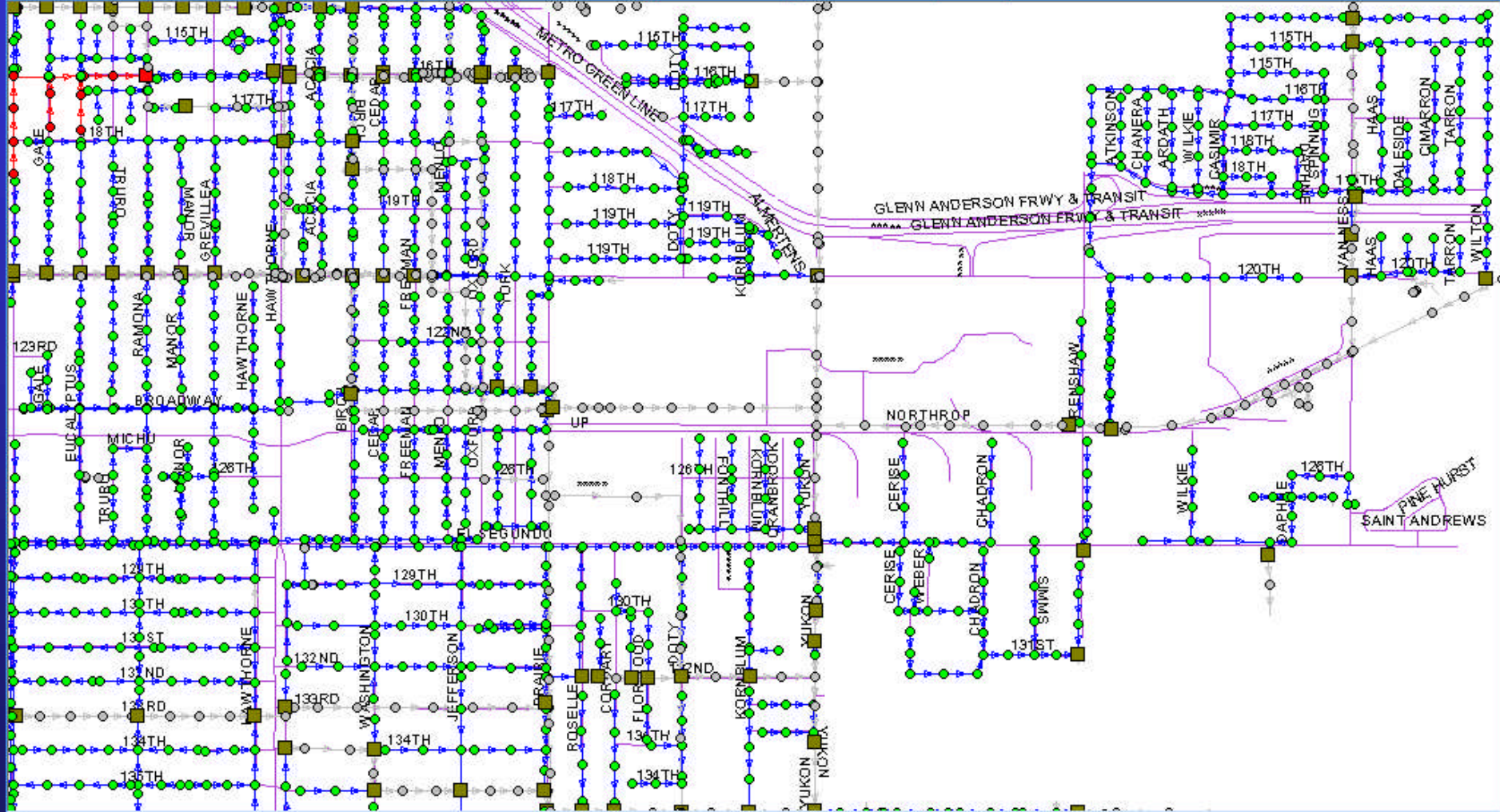
- Flow Meter location
- Corbius - City
- Corbius - County
- Sanitary Sewer Lines - City
- Sanitary Sewer Lines - County
- City Boundary
- Meter Basin

CITY OF HAWTHORNE
Figure 4-1
Municipal Sewer System
Master Plan
**Flow Meter Locations/
 Metered Areas**

Hydraulic Model of Sewer System

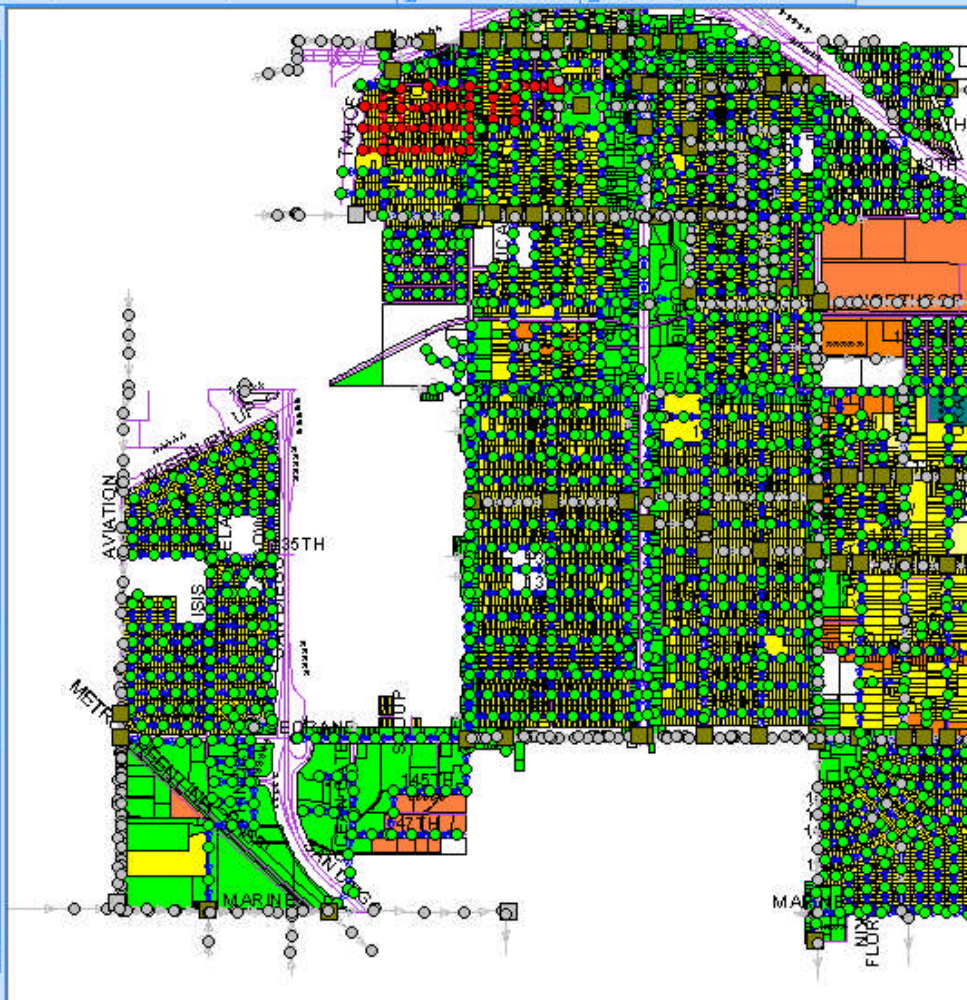


- A hydraulic model of sewer system was developed to evaluate sewer flows
- Model developed with state-of-the-art software and GIS developed as part of project
- Sewers found to be too small to safely carry flows will be recommended for replacement with larger sewers
- Sewer capacity evaluations with model still in progress with no results to report to date



Map Legend

- + Polygon_M13
- + Polygon_M14
- + Polygon_M15
- + Polygon_M16
- + Polygon_M17
- + Polygon_M18
- + Polygon_M19
- + Polygon_M20
- + Parcels (ZONE)
 - C-1
 - C-2
 - C-3
 - H
 - M-1
 - M-2
 - R-1
 - R-2
 - R-3
 - R-4
 - UNC



Attribute Browser -- Node

MANHOLE: E7_48-C, E7_48

(ID)	E7_48-C
Description	E7_48
<input checked="" type="checkbox"/> Geometry	
X	6458312.924905870
Y	1786670.746787840
<input checked="" type="checkbox"/> Modeling	
Diameter	4.000
Rim Elevation	53.770
Headloss Coef.	
<input checked="" type="checkbox"/> Load1	0.965
Type1	0: Unpeakable Flow
Pattern1	PATN1, Residential
Coverage1	
<input checked="" type="checkbox"/> Load2	
<input checked="" type="checkbox"/> Load3	
<input checked="" type="checkbox"/> Load4	
<input checked="" type="checkbox"/> Load5	
<input checked="" type="checkbox"/> Load6	
<input checked="" type="checkbox"/> Load7	
<input checked="" type="checkbox"/> Load8	
<input checked="" type="checkbox"/> Load9	
<input checked="" type="checkbox"/> Load10	
<input checked="" type="checkbox"/> Information	
Type	0: Loading
Elevation	48.300
Installation Year	0
Retirement Year	

Node [Link](#)

Sewer System Investigations



- 49 miles of City sewers were videotaped (55% of total City sewers) to evaluate pipe condition
- 400 manholes were field inspected (20% of total City manholes)
- Inspections were spread across City but concentrated in basins with high wet-weather flows
- High wet-weather flow is a sign of possible sewer pipe and manhole defects



MH D7-46
CORDARY AVE.

TO
Upstream

MH D7-45
(est)200

1.8 FT
General Photo

8" inch VCP
02/13/2007

12:26

1.8 FT

MH D7-45
CORDARY AVE.

TO
Upstream

MH D7-44
(est)175

151.0 FT
Tap Factory Active
3 O.Clock

Remarks W/ ROOTS MEDIUM

8" inch VCP
02/13/2007

13:01

1

MH E7-48
144TH ST.

TO
Downstream

MH E7-49
(est)400

128.2 FT
Hole Soil Visible
9 O.Clock

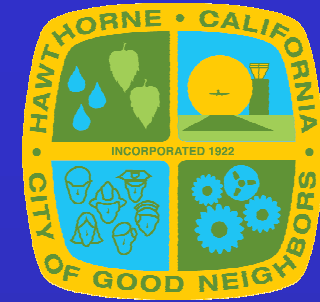
Remarks IN TFA

8" inch VCP
02/08/2007

08:51

128.2 FT

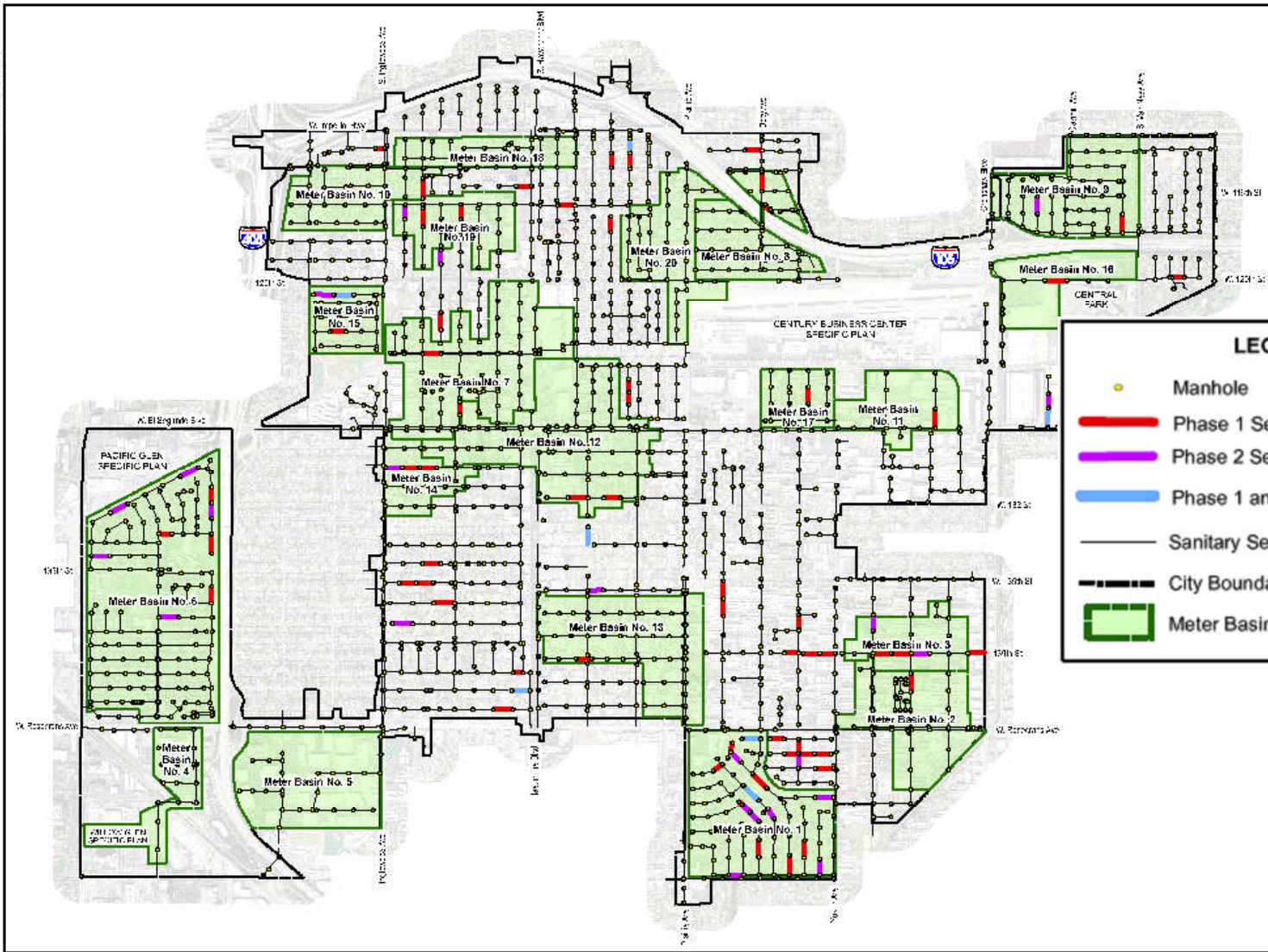
Investigation Results



- 4 miles of sewers need improvements in Phase 1 and 2 miles need Phase 2 improvements
- Of 400 manholes, 28 had a structural defect such as wall cracking
- Phase 1 projects are scheduled to occur within the next 5 years to correct the most severe defects
- Phase 2 projects are scheduled to occur within the following 5 years (years 6 -10)



DATE: 11/15/07 11:45 AM



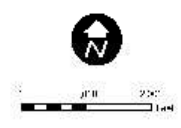
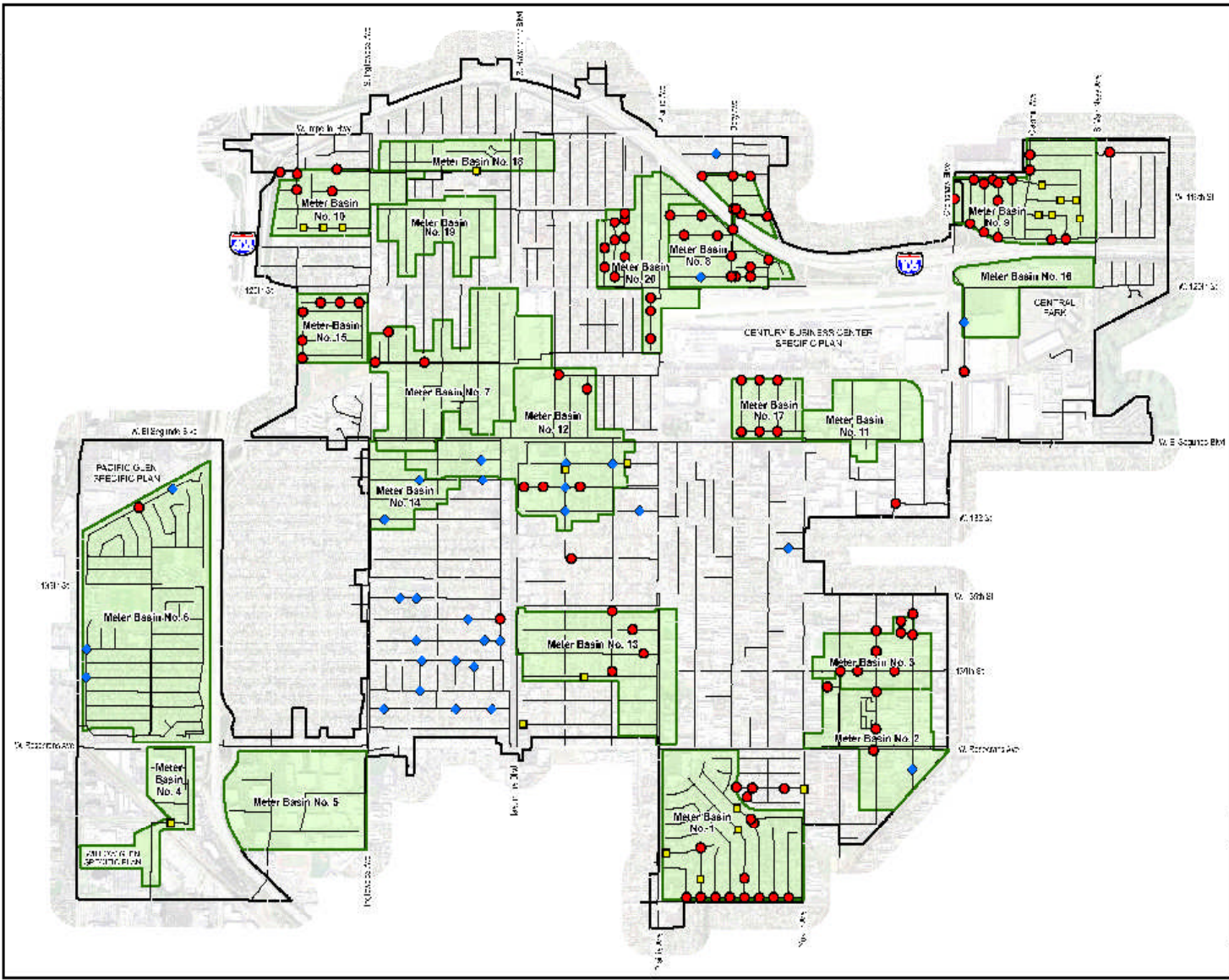
LEGEND

- Manhole
- Phase 1 Sewer Improvements
- Phase 2 Sewer Improvements
- Phase 1 and 2 Sewer Improvements
- Sanitary Sewer Line
- City Boundary
- Meter Basin

CITY OF HAWTHORNE

Figure 6-2
Recommended Sewer Improvement Projects

TETRA TECH November 2007



LEGEND

Manhole Deficiencies

- Corrective Deficiency
- Structural Deficiency
- ◆ Outdated Sheets, Covers and/or Frames

— Secondary Sewer Line

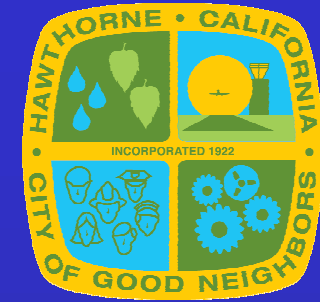
— City Boundary

■ Meter Basin

Note: Color Shaded areas indicate the meter basin boundaries. The boundaries are not intended to be a boundary for construction. The boundaries are for informational purposes only.

**Figure 6-4
Recommended Manhole
Improvements**

Investigation Results



- A total of 333 break-in sewer taps were discovered
- These connections were not authorized by City and are typically poorly constructed
- Most probably convey standard wastewater but some could possibly be connected to storm drains
- It is recommended that these connections be identified and rehabilitated

Estimated Improvement Costs



- Costs and years of implementation not finalized at this time
- Preliminary estimates are approximately \$2.5 million for Phase 1 sewer improvements and \$2 million for Phase 2 sewer improvements
- These costs do not include sewer capacity improvements (not determined at this time) or identification and rehabilitation of break-in taps



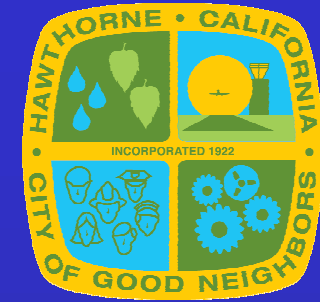
Estimated Improvement Costs



- Smoke-testing to identify owners of break-in taps estimated at \$125,000
- Cost to rehabilitate 333 break-in taps estimated to cost between \$2.5 and \$3.5 million (preliminary estimate)
- Manhole rehabilitation costs estimated at \$500,000 (preliminary estimate) for Phase 1 implementation



Summary



- Sewer and manhole improvements will:
 - Upgrade system structural integrity
 - Reduce rainwater from entering system
 - Increase capacity to carry existing and future dry and wet-weather flows
 - **Reduce possibility of sewer overflows**
- Public Works will implement program to videotape remaining 41 miles of sewers and investigate remaining 1,600 manholes

Pipe No.	Street Address	Sewer Length Videod (ft)	Pipe Dia (in)	Year Installed	Structural Ratings			Structural Comments
					Overall Pipe Defects Rating	Pipe Defects Rating/ Length	Total Number Defects	
E6-47_E6-37	13700 Kornblum	263	8	No Match	56	0.21	29	Longitudinal cracks (2) 38' - 47'; 56', 78' - 240'
144th st 3	3748 144th st	249	8	1953	52	0.21	22	Multiple cracking (3) and longitudinal cracking (2) along entire length of segment
Cordary ave	13614 Cordary ave	299	8	No Match	52	0.17	27	Multiple fracture (4) at 140'; longitudinal cracking (2) 18 spots along entire length; multiple cracking (3) 2 spots
B6-2_B6-4	13515 Glasgow pl	303	8	No Match	48	0.16	23	Multiple fracture (4) @ 268.2; Longitudinal cracking (2) 20.5' to 298'
Kornblum 6	14400 Kornblum	260	8	No Match	45	0.17	16	Broken pipe w/ void visible (5) at 83' and 85'; multiple fracture (4) & multiple cracking (3) between 83' and 191'.
E6-65_E6-66	3623 139th st	267	8		45	0.17	18	Multiple and Longitudinal cracks (2 & 3) at 32' - 50', 91' - 123', 177' - 186', 206', and 226' - 260'
B5-6_B5-8	13043 Glasgow	275	8	No Match	42	0.15	21	Hole in pipe with soil visible (5) & multiple fractures (4) at 139'- longitudinal cracking occurs along entire length
Cordary ave	13614 Cordary ave	302	8	No Match	40	0.13	21	longitudinal cracks (2) at 15 locations along entire length
F6-21_F6-22	3334 139th st	329	8		36	0.11	13	Multiple cracks at (3) at 6' to 13'; 36', 146', 202' to 218', 257'; Multiple Fracture (4) at 125'
C6-4_C6-3	136th st	302	8	No Date	35	0.12	17	Hole void visible (5) at 205 to 206; Multiple cracks (3) at 164' and 205.6

As a byproduct of this Sewer Master Plan, the Public Works Department will implement a complete GIS software system (Arc View) in January, available for citywide use.

The screenshot shows a web browser window titled "City of Redding - Microsoft Internet Explorer" displaying a GIS application. The address bar shows a local URL: `http://localhost:8008/mapguide/mapviewer/ajax/?WEBLAYOUT=Library%3a%2f%2fRedding%2fLayouts%2fRedding.WebLayout`. The main map area shows a detailed street map of Redding, Oregon, with several areas highlighted in orange and red, indicating a buffer zone. The map includes labels for neighborhoods like LENOX, INGLEWOOD, HAWTHORNE, GARDENA, and LAUREL. A "Create a Buffer" dialog box is open on the right side of the map. The dialog box has the following settings:

- Buffer settings:** "Select features on the image." (highlighted in yellow)
- Distance around features:** 1 Kilometers
- Layers to include in the buffer:** General Plan
- Name for the resulting buffer layer:** Buffer 1
- Merge buffer areas
- Fill style:** Solid, Foreground color: Red, Transparency: 50%, Background color: Transparent
- Border style:** Solid, Line color: Black, Line thickness: 1

At the bottom of the browser window, the status bar shows: "X: 1969052.879314, Y: 636491.372683 (Meter)", "1 feature selected", "1: 14,368", "32 x 47 (km)", and "Powered by MapGuide".