CITY OF HOLLISTER

Sanitary Sewer Collection System Master Plan

AUGUST 2010

PREPARED BY

WALLACE GROUP®

CITY OF HOLLISTER

SANITARY SEWER COLLECTION SYSTEM

MASTER PLAN AUGUST 2010

City Council

Mayor Victor Gomez

Vice Mayor Pauline Valdivia

Councilman Doug Emerson

Councilman Ray Friend

Councilman Eugenia Sanchez

Adopted by the City of Hollister:

Resolution No. 2010-107

August 2, 2010

REGISTERED PROFESSIONAL ENGINEER
KARI E. WAGNER
No. 66026
EXP. 6/30/12
CIVIL
STATE OF CALIFORNIA

Prepared By:

Kari Wagner, P.E. 66026
Senior Civil Engineer

WALLACE GROUP®

RESOLUTION NO. 2010-107

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF HOLLISTER ADOPTING THE 2010 SANITARY SEWER COLLECTION SYSTEM MASTER PLAN PREPARED BY WALLACE GROUP, INC.

WHEREAS, the City Council of the City of Hollister approved a professional services agreement with Wallace Group, Inc. for the preparation of a 2010 Sanitary Sewer Collection System Master Plan; and

WHEREAS, the Master Plan Study is complete and ready for adoption; and

WHEREAS, the Community Development Department has determined that the plan is categorically exempt; and

WHEREAS, the Master Plan is part of the General Plan in the Community Services and Facilities Element, Goal 2; and

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Hollister adopts the 2010 Sanitary Sewer Collection System Master Plan.

PASSED AND ADOPTED THIS 2nd day of August 2010, by the following votes:

AYES: Council Members Emerson, Sanchez, Valdivia, Friend, and Mayor Gomez.
NOES: None.
ABSENT: None.
ABSTAINED: None.

Victor Gomez, Mayor

ATTEST:

Geri Johnson, City Clerk

DUPLICATE OF ORIGINAL
ON FILE IN THE
OFFICE OF THE CITY CLERK
CITY OF HOLLISTER

APPROVED AS TO FORM:

Stephanie Atigh, City Attorney

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

City of Hollister
Sanitary Sewer Collection System Master Plan - List of Acronyms

ABS	Acrylonitrile Butadiene Styrene
ADF	Average Daily Flow
AMBAG	Association of Monterey Bay Area Government
CEQA	California Environmental Quality Act
CIP	Capital Improvement Projects
City	City of Hollister
County	San Benito County
d/D	Depth over Diameter
DOF	Department of Finance
du/ac	Dwelling Units per Acreage
E.I.T.	Engineering In Training
EIR	Environmental Impact Reports
ENR	Engineering New Record
ESRI	Environmental Systems Research Institute
FAR	Floor Area Ratio
FOG	fats, oil, and grease
FPS	Feet per Second
FRM	Fluid Resource Management
Ft	Feet
Ft/Sec	Feet per Second
GIS	Geographic Information System
GISP	Geographic Information System Professional
GPD	Gallons Per Day
GPM	Gallons Per Minute
HDPE	High Density Polyethylene
I/I	Infiltration and Inflow
LF	Linear Feet
MDDWF	Maximum Day Dry Weather Flow
MGD	Million Gallons Per Day
min	Minute
NA	Not Applicable
NAD	North American Datum
NAVD	North American Vertical Datum
ND	Negative Declarations
O&M	Operation and Maintenance
P.E.	Professional Engineer
P.L.S.	Professional Land Surveyor
PF	Peaking Factor
PHDWF	Peak Hour Dry Weather Flow
PHWWF	Peak Hour Wet Weather Flow
PVC	Polyvinyl Chloride
RDWWTP	Regional Domestic Wastewater Treatment Plant
S.F.	Square Foot
SCADA	Supervisory Control and Data Acquisition
SSCSMP	Sanitary Sewer Collection System Master Plan
VCP	Vitrified Clay Pipe
VFD	Variable Frequency Drive
w/	With

EXECUTIVE SUMMARY

This report presents the Sanitary Sewer Collection System Master Plan (SSCSMP) for the City of Hollister (City). The City is located in San Benito County (County), 40 miles east of Monterey, and is intersected by State Highways 156 and 25. The City is governed by a City Council made up of a Mayor, Vice Mayor, and three council members. The City is currently responsible for the maintenance and operation of the wastewater collection system serving the City of Hollister. In addition, there are areas outside the City limits from which the City receives wastewater flow. These areas include a small housing development, the County public works/planning facility, and the labor camp located south of the City near Hospital Road and Southside Road.

INTRODUCTION

The City of Hollister owns and operates a Regional Domestic Wastewater Treatment Plant (RDWWTP) providing wastewater treatment and disposal services to residential, industrial, and commercial customers. The City recently completed a substantial upgrade to their wastewater treatment facilities, including a plant expansion and upgrade, a seasonal storage pond system, and recycled water distribution system, allowing the City to accept additional wastewater flow from new customers. Prior to this upgrade the City was under a building moratorium, required in 2002 by the Regional Water Quality Control Board when the City's previous treatment plant reached design capacity. The moratorium was lifted at completion of the plant upgrade in 2008. The City also owns and operates an industrial wastewater treatment plant and collection system that will not be analyzed as a part of this study.

Preparation of the SSCSMP will assist the City in prioritizing both existing and future wastewater collection system needs through repair, rehabilitation, replacement, and new facility installation. The master planning process will also tie the wastewater capacity assessment, both existing and future, to the infrastructure budgeting process.

On July 7, 2009, the City authorized Wallace Group to prepare a comprehensive Sanitary Sewer Collection System Master Plan (SSCSMP). The SSCSMP was prepared in accordance with Wallace Group's proposal, dated May 14, 2009 and includes analyses of the City's wastewater flows, collection system capacity, evaluation of lift stations; and a prioritized capital improvement program.

This master plan update is presented in seven chapters, summarized as follows:

- **Chapter 1: Introduction.** This chapter presents an overview of the goals of this report, authorization and scope of work, and acknowledgment of the various staff and personnel involved in the preparation of this document.

- **Chapter 2: Land Use and Population.** This chapter focuses on the City's and the County's General Plans, existing and future population projections, land uses, and other considerations pertinent to projecting the City's existing and future wastewater flow characteristics. The existing City population is estimated at 37,054 by California DOF, with a year 2023 population projection of 55,192

persons. This year 2023 population projection is based on the City's General Plan growth rate of 2.6%, and does not correlate to full build-out of the City. Year 2023 population for the City's wastewater service is projected to be 62,272 persons, which includes new development, redevelopment, and potential septic system conversions. Land Use jurisdictions are shown on Figure ES-1 and the existing wastewater service areas are depicted on Figure ES-2.

- **Chapter 3: Collection System Overview.** This chapter provides an overview of the City's wastewater collection system, which consists of approximately 100 miles of gravity sewer pipes ranging in diameter from 4-inch to 36-inch. The City also owns and operates four (4) lift stations and corresponding force mains. Collected wastewater flows to the City's RDWWTP plant which is located off San Juan Road near State Highway 156. Figure ES-3 shows the existing collection system.

- **Chapter 4: Wastewater Flows.** This chapter provides an analysis and summary of the City's existing and future wastewater flow characteristics, based on planning/demographic information presented in Chapter 2. These wastewater flows form the basis of recommendations for recommended capital improvements in the collection system. Inflow and infiltration (I/I) was not analyzed as part of this report. The City's existing average wastewater flow is estimated at 2.5 million gallons per day (MGD) with an estimated future average wastewater flow of 4.4 MGD.

- **Chapter 5: Lift Station Evaluation.** This chapter presents a detailed evaluation of the City's four wastewater lift stations. The lift stations were evaluated based on hydraulic capacity considerations, and non-hydraulic issues relating to operations and maintenance. The analysis reviewed each lift station's hydraulic capacity relative to existing and estimated future wastewater flow, and provides recommendations for upgrades required to meet the needs of the City.

- **Chapter 6: Collection System Analysis.** This chapter presents the modeling and hydraulic analysis of the City's collection system. The City's trunk sewer system was modeled, consisting of mainline sewers 8-inches and larger. Existing 8-inch sewer pipes were not modeled as part of this project if they did not collect flow from a significant portion of the City's service area. In addition, several segments of 6-inch diameter sewer pipes were included in the sewer model under the direction of City Staff. The 6-inch segments consisted of known "problem areas" throughout the system and/or may receive additional flows from potential future development. Wet weather flow conditions were not analyzed as part of this report. Figure ES-4 provides an overview of the existing gravity wastewater collection system, lift stations, and force mains that were included in the hydraulic model.

- **Chapter 7: Capital Improvement Program.** This chapter presents the capital improvement program (CIP), which identifies required Near Term and Long Term collection system improvements for the collection system, including capital costs. This CIP will be used by the City as a strategic planning tool to plan for and forecast needed capital budgets for anticipated collection system improvements.

COLLECTION SYSTEM MODELING AND ANALYSIS

The City's collection system consists of a network of 4-inch to 36-inch gravity sewer pipes, and four (4) lift stations, providing service throughout the City and an area of the County located at Southside Road near Hospital Road. The main trunk sewer system was analyzed using MWHSoft InfoSWMM Version 8.5 hydraulic modeling program to evaluate performance of the wastewater collection system under both existing and future flow conditions.

Design criteria, as described in the City's May 1992 Design Standards, were applied in the analysis of the trunk sewer collection system model. These design criteria provide capacity buffer to prevent surcharge conditions and for fluctuations in flows due to diurnal variations. Gravity pipe performance was analyzed based on maximum percent full depth over diameter (d/D) ratio, defined as the depth of flow in a pipe divided by the diameter of the pipe. Criteria utilized are as follows:

- Minimum Velocity: 2 feet per second (fps) under average flow conditions
- Maximum Velocity: 10 fps
- Percent full (d/D) criteria:
    - 10-inches or less maximum d/D of 0.5
    - 12-inches or larger maximum d/D of 0.67
- Manning coefficient of friction:
    - n = 0.013 for VCP and RCP
    - n = 0.011 for PVC
- All new sewers are PVC, ABS, HDPE, composite or solid walled pipes with coefficient of friction "n" = 0.011.

Overall, the City's gravity sewer collection system is in good condition relative to hydraulic capacity. The sewer model results showed that in general, the majority of 8-inch and larger sewers are of sufficient capacity to serve the City's existing and future build-out population. Where improvements are recommended to the collection system, worst case d/D values are provided for reference. These d/D values represent a snapshot of the system under either: a) existing conditions, or b) proposed conditions with *all* improvements in place. In many cases, recommended upgrades would increase downstream maximum d/D, exceeding the City's standards, if the downstream recommended improvements were not constructed. Through the digital sewer model, maximum d/D was analyzed for the system as a whole, ensuring that recommended upgrades did not trigger additional downstream or upstream improvements. Details of the analysis are located in Chapter 6 of this Report.

The wastewater collection system model is based on the City's Geographic Information System (GIS) that was developed in support of this master planning project. The sewer GIS was compiled using the following data:

- Survey-grade coordinates, rim and invert elevations for the sewer manholes on the trunk sewer system;
- Sewer record plans and atlas maps; and
- San Benito County parcel and aerial photo base map.

The City will receive a copy of the GIS database and wastewater model as part of the final project deliverables for this project.

LIFT STATION EVALUATION

The lift station evaluation covered the hydraulic parameters of the City's four (4) lift stations, and reviewed key components related to ongoing operations and maintenance. Details of the analysis are presented in Chapter 5 of this Report. Some of the major considerations noted are as follows:

- The hydraulic characteristics of each lift station were analyzed and deficiencies were noted. Design criteria that apply to the lift stations and force mains are summarized in Chapter 5 of this Report.

- Force main friction loss was calculated to estimate total pump head and identify pump operating points based on manufacturer's pump curves. The force mains and pumps were evaluated for hydraulic capacity only; physical condition of the lift stations was not addressed as part of this study. Force main velocities were calculated based on estimated operating point of the lift station pumps.

- A critical factor for lift station design is the emergency response time an operator has to respond in the case of total pump failure due to power outage or another anomaly. Each of the City's lift stations is equipped with a portable generator power receptacle, and the City owns four portable generators that are dedicated for use at the lift stations.

- Future flow for each lift station was calculated based on planned developments, potential septic conversions, and future development in accordance with the City's General Plan land use, as described in detail in Chapters 2 and 4. Future flows from commercial and industrial development were calculated based on 50% of the maximum allowable square footage per the City's General Plan (not full build-out). Due to variability in wastewater generation from different industrial and commercial users, it is difficult to accurately predict future flow conditions for this type of development. As commercial and industrial development occurs, flow contributions will need to be addressed on a case by case basis.

CAPITAL IMPROVEMENT PROGRAM

The capital improvement program (CIP) costs were developed based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources. Hard construction costs were escalated by a factor of 1.4, to allow budget for "soft costs" that include preliminary engineering, engineering, administration, construction management and inspection costs. Some projects may have factors other than 1.4 depending on project type. All CIP costs are expressed in Year 2010 dollars, using McGraw-Hill ENR Construction Cost Index of **8671** (March 2010), and will need to be escalated to the year or years scheduled for the work. The unit cost for new gravity

sewers includes the proposed pipelines, manholes, lateral re-connections, sewer bypassing, traffic control, etc., and all other aspects of sewer system construction.

The recommended capital improvement projects were identified based on: 1) 34 days of in-line flow monitoring, from August 28, 2009 to September 30, 2009, to assess flow conditions during dry weather conditions; 2) detailed evaluation of the collection system by flow calculations, projections and modeling; and 3) detailed review of the City's four lift stations.

CIP RANKING

The Near Term capital improvement projects were ranked to determine the priority for construction. Table ES-1 evaluates each of the projects in five categories: overflow to a water body of the state, hydraulic capacity (d/D), community impact, maintenance hot spots, and cost. Each category was assigned a weighted importance factor based on relative impact to collection system performance and operation. The importance factor is multiplied by the corresponding category score to calculate the weighed category score, then the weighted scores are summed together to determine each project's final score.

*Although the projects are ranked as described above, it should be noted that **all** projects identified in the Near Term CIP are a result of deficiencies in the existing collection system due to existing needs and are therefore all important to be constructed within the next 1 to 5 years. It is also recommended that the City review these projects periodically to determine if any substantial changes have occurred that may re-prioritize a project to a higher ranking.*

TIMING OF RECOMMENDED IMPROVEMENTS

Identified projects are triggered either by existing deficiencies or triggered by future development. The projects that address existing deficiencies are ranked in order of importance, which is discussed in greater detail within Chapter 7 and shown in Table ES-1. These existing deficiencies are considered Near Term projects and are recommended to be completed within the next 1 to 5 years and are shown in Table ES-2. In some cases, Near Term CIP projects are triggered by existing demands but also require upgrade for future flows; in these cases the recommended project is the upgrade required to accommodate future flows.

Timing for the projects that are triggered by potential future development is always difficult to ascertain, as these projects are dependent on timing of development. These Long Term projects are presented in Table ES-3. It is recommended to construct these projects prior to or in conjunction with future development.

ALLOCATION OF CAPITAL COSTS TO EXISTING CUSTOMER BASE AND FUTURE DEVELOPMENT

It is recommended that the City conduct a rate study by a qualified firm, to determine recommended updates to the City's rate structure for sewer hook-up fees, development impact fees, and operation and maintenance costs. This section describes a general recommendation for how the City should allocate capital costs of improvements to both the existing customer and future development (impact fees).

Impact fees, or future increased connection fees, for future development are typically calculated based on the development's percentage increase in flow or impact to the infrastructure that will support the development. This potential impact could be based on a basin by basin review, or more globally based on City-wide services. For the City of Hollister, it is recommended that any allocation of impact fees be based on the overall service area as a whole. In general, this approach would be most equitable to all parties concerned. As an example, a developer could build a substantial development in one area of the City, within a collection system area that will require no future improvements to support this development. If impact fees are assessed based on basin-specific needs, this Developer would need only pay the ordinary sewer connection fee per unit. Conversely, one could build the same number of homes or fewer, in another area of the City, and could trigger collection system improvements that would be more costly, thus having to pay for a larger incremental share of the improvement.

NEAR TERM CIP RECOMMENDATIONS

The following are recommended Near Term projects to improve the City's wastewater collection system.

- **Sewer Manhole Database:** It is recommended that the City invest in the development of a comprehensive manhole inventory database. This project would include conducting an inspection of all City manholes to catalog their construction material and physical condition. This information would be added to the GIS database and ultimately result in recommendations to replace or line manholes that are in poor/substandard conditions. This database could also be used to keep track of the status on pending and completed manhole repair projects.

- **FOG Program:** It is recommended the City enhance their fats, oil, and grease (FOG) program, targeting sources tributary to the known high grease areas. The program should include an educational program, inspection program, and an enforcement program.

Near Term Collection System Trunk Line Upgrades

Figure ES-5 depicts the existing worst case dry weather flow deficiencies identified through the hydraulic modeling process. These deficiencies were analyzed and pipe upgrades were implemented in the model to solve the capacity issues. Figure ES-6 shows the overall collection system and the pipe segments that require upgrades. Each

pipe recommendation was compiled into a single project sheet and included in Chapter 7 as Near Term Project Figures No. 1 to 10. These project sheets contain a detailed view, description, and cost for the recommended Near Term CIP project.

Near Term Lift Station Improvements

Following are the recommended Near Term improvements for the City's four lift stations.

Airport Lift Station: The Airport lift station has adequate hydraulic capacity for existing conditions and requires only minimal upgrades to continue to provide reliable service:

- Install the blower and soil bed scrubber, shown as future improvements on the 2001 lift station upgrade construction drawings
- Configure SCADA controls to automatically disable the Airport lift station when the GLP lift station is out of service
- Analyze potential to bypass the GLP lift station and pump directly to the existing gravity collection system

GLP Lift Station: The GLP lift station has adequate hydraulic capacity for existing conditions. The following Near Term upgrades are recommended:

- Evaluate onsite SCADA controls for cause of failure to respond to some emergency events, and implement needed improvements
- Configure SCADA controls to automatically disable the Airport lift station when the GLP lift station is out of service

2nd & East Lift Station: The 2nd & East lift station has adequate hydraulic capacity for existing conditions. The lift station is equipped with a vent and odor scrubber to minimize hydrogen sulfide attack and a bypass line to discharge overflow to the downstream collection system. It is recommended to exercise the slide gate installed for the bypass line on a regular basis, and replace the gate if it becomes inoperable due to corrosion.

Southside Lift Station: The Southside lift station has adequate hydraulic capacity for existing conditions and there is no future development anticipated to contribute flow to this station. This lift station requires minimal upgrades to continue to provide reliable service, as follows:

- Install site security fencing to protect from vandalism
- Install a blower and odor scrubber to minimize corrosion due to hydrogen sulfide gas, or treat the wet well with a product designed to reduce hydrogen sulfide gas formation, such as Bioxide®

Refer to table ES-2 for the estimated cost of the Near Term lift station CIP projects and Chapter 7 for additional information on the recommended lift stations improvements and project sheets.

LONG TERM CIP RECOMMENDATIONS

The following are recommended Long Term projects to provide capacity for future development contributing to the City's collection system. These recommended Long Term projects will be subject to the requirements of CEQA prior to approval and funding.

Long Term Collection System Trunk Line Upgrades

Figure ES-7 depicts the future worst case dry weather flow deficiencies identified during the hydraulic modeling process. These deficiencies were analyzed and pipe upgrades were implemented in the model to solve the capacity issues. Figure ES-8 shows the overall collection system and the pipe segments that require upgrades. Each pipe recommendation was complied into a single project sheet and included in Chapter 7 as Long Term Project Figures No. 1 to 12. These project sheets contain a detailed view, description, and cost for the recommended Long Term CIP projects.

Long Term Lift Station Improvements

Airport Lift Station: To meet future flow demands from commercial and industrial development, it is recommended to replace the existing lift station with a new triplex VFD station, with the following design considerations:

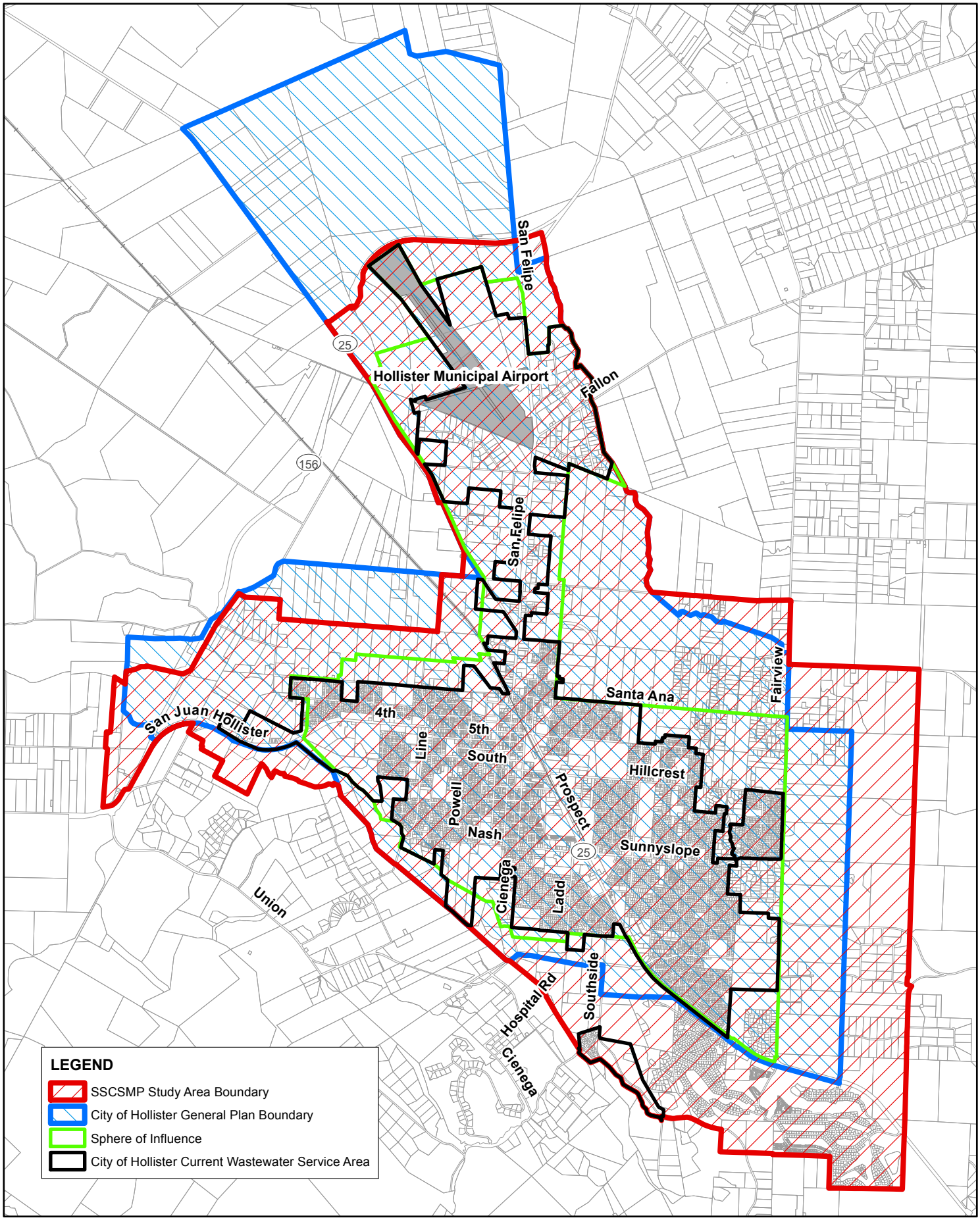
- Construct the new lift station adjacent to the existing lift station
- Convert the existing wet well to an over flow basin for emergency storage

GLP Lift Station: To provide capacity for future flows from development within the GLP tributary area, and from the recommended Airport lift station upgrade, it is recommended to replace the existing lift station with a new triplex VFD station and install a permanent stand-by generator. In the case that the Airport lift station is rerouted to bypass the GLP station, the GLP station does not require upgrades due to hydraulic constraints for future flow conditions.

2nd & East Lift Station: To provide service for future flows from residential and commercial development, the following Long Term upgrades are recommended:

- Perform a pump test and physical evaluation to determine operating capacity of the pumps prior to allowing additional services to contribute flow
- Adjust the wet well operating volume as needed to limit pump cycles

Refer to table ES-3 for the estimated cost of the Long Term lift station CIP projects and Chapter 7 for additional information on the recommended lift stations improvements and project sheets.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

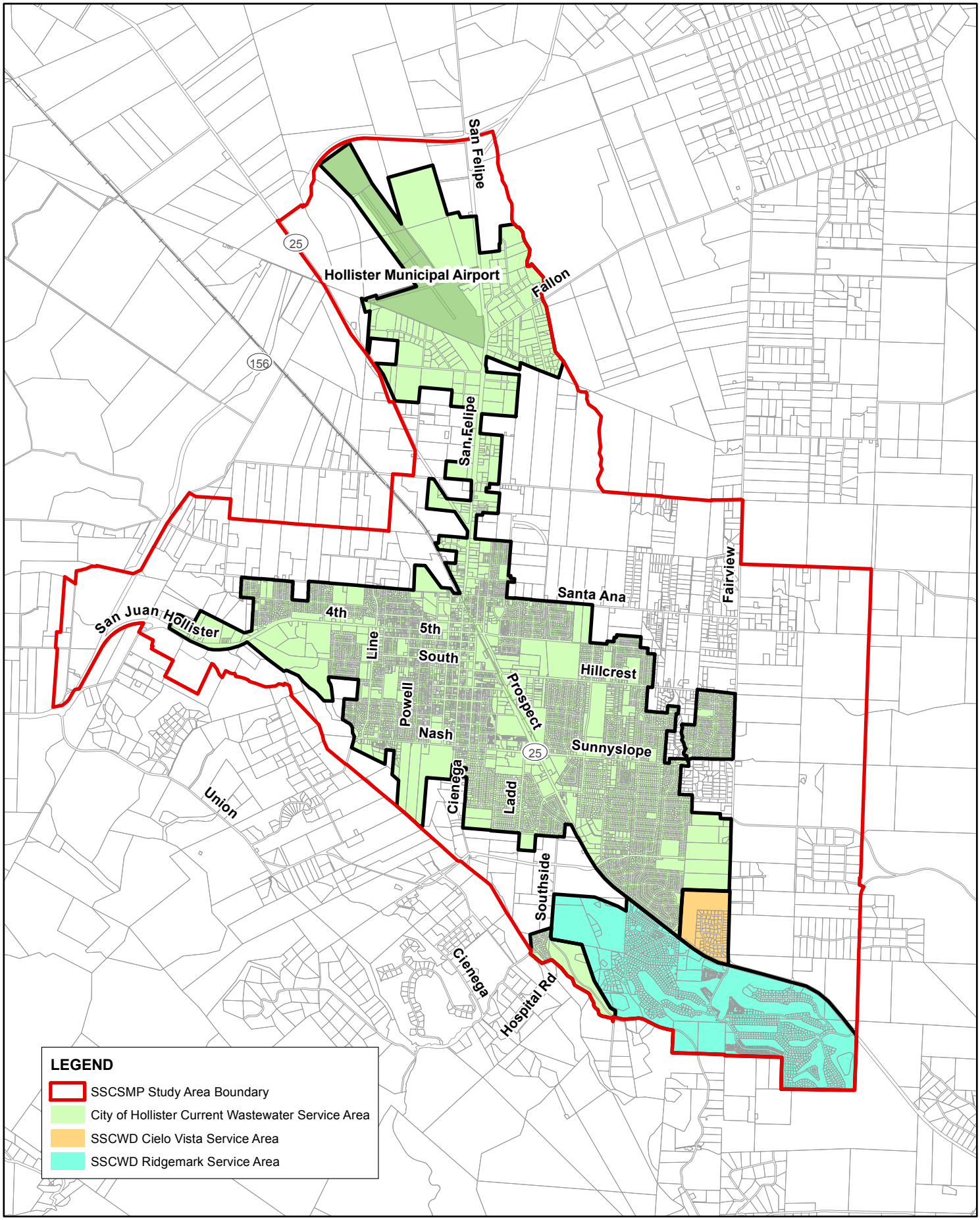
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-1: LAND USE JURISDICTIONS

NOTES:
BASEMAP COMPILED FROM GIS DATA PROVIDED BY ESRI. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED AUGUST 2010.



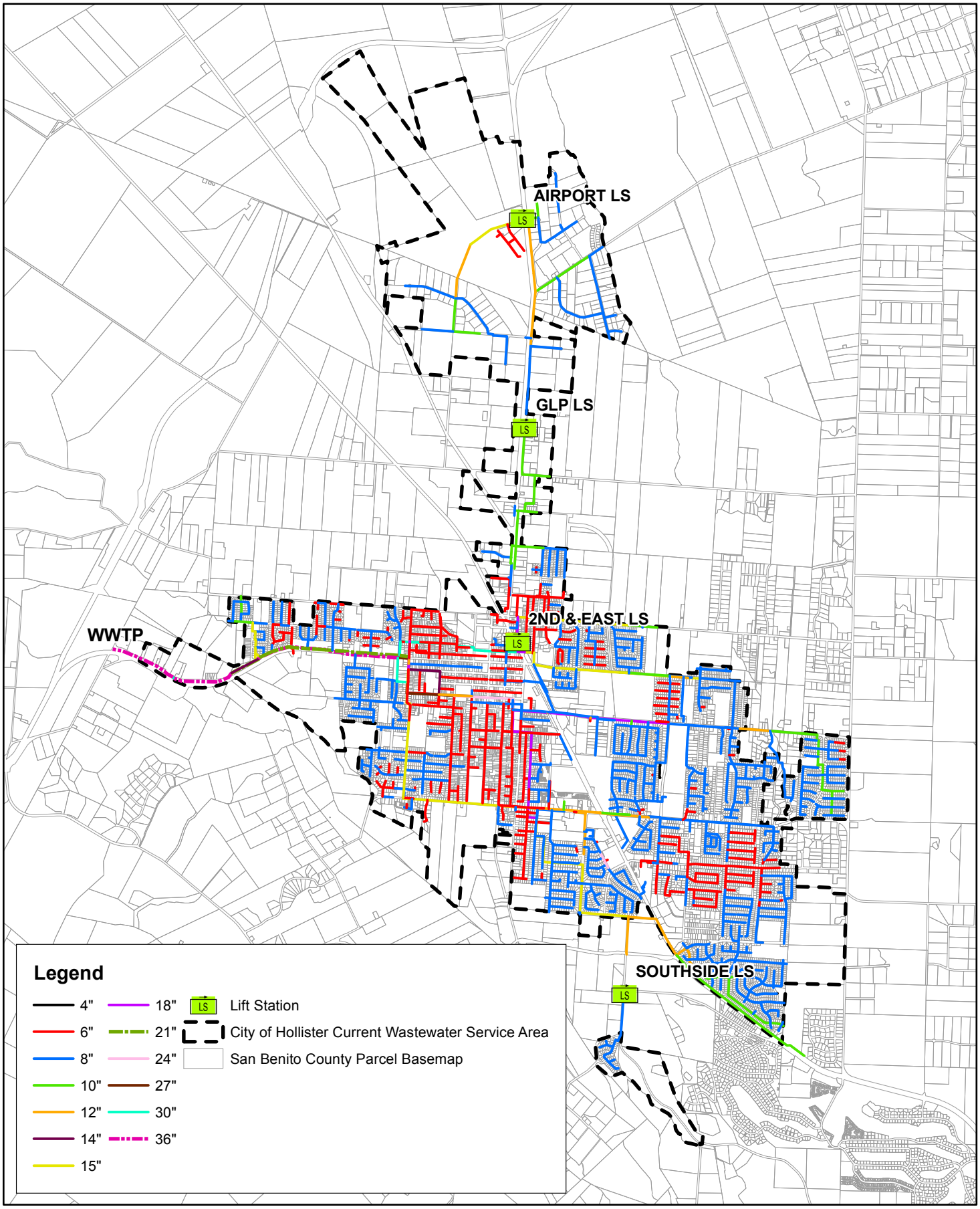
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-2: EXISTING SERVICE AREA BOUNDARIES

NOTES:
BASEMAP COMPILED FROM GIS DATA PROVIDED BY ESRI. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED AUGUST 2010.



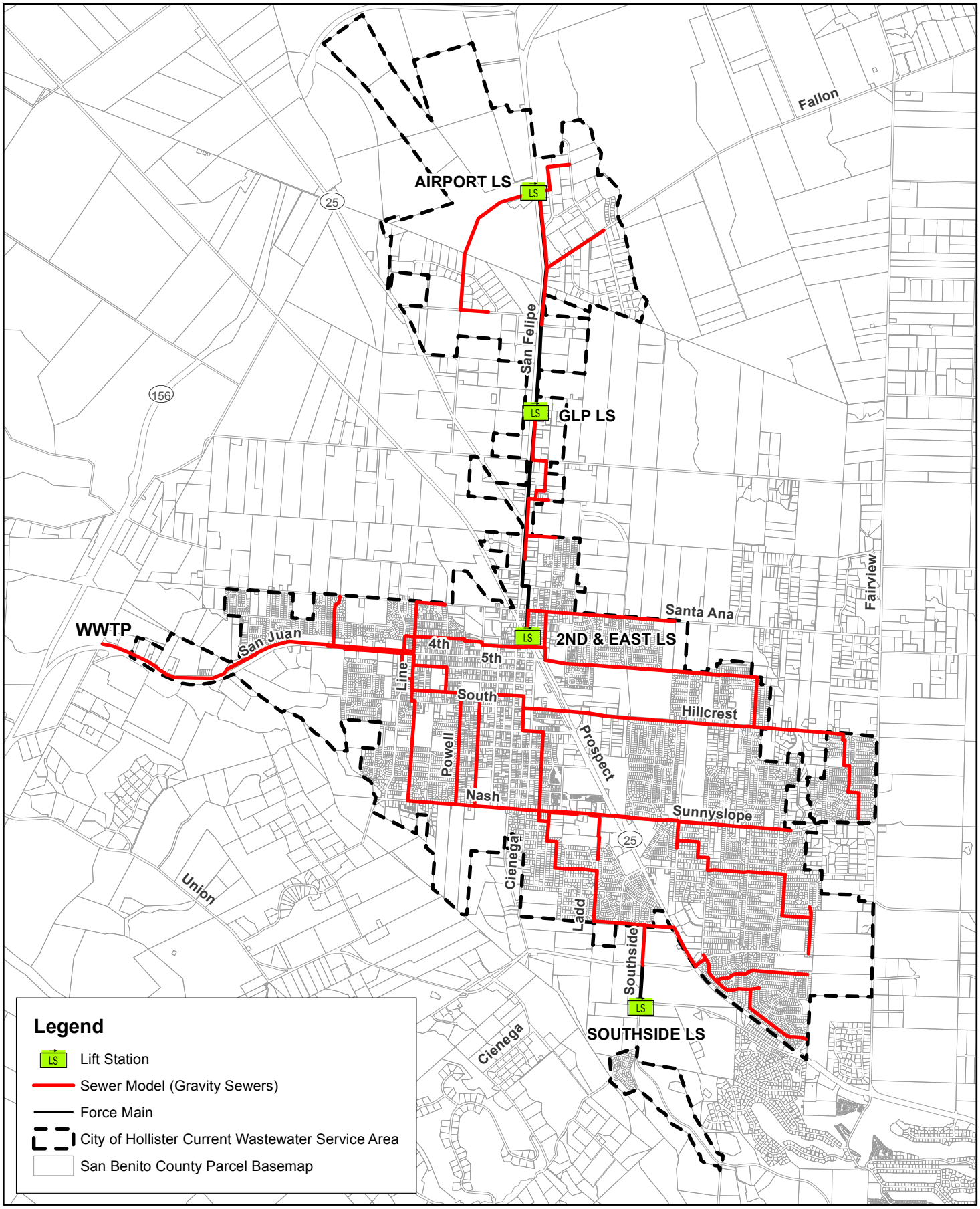
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-3: WASTEWATER SYSTEM OVERVIEW MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

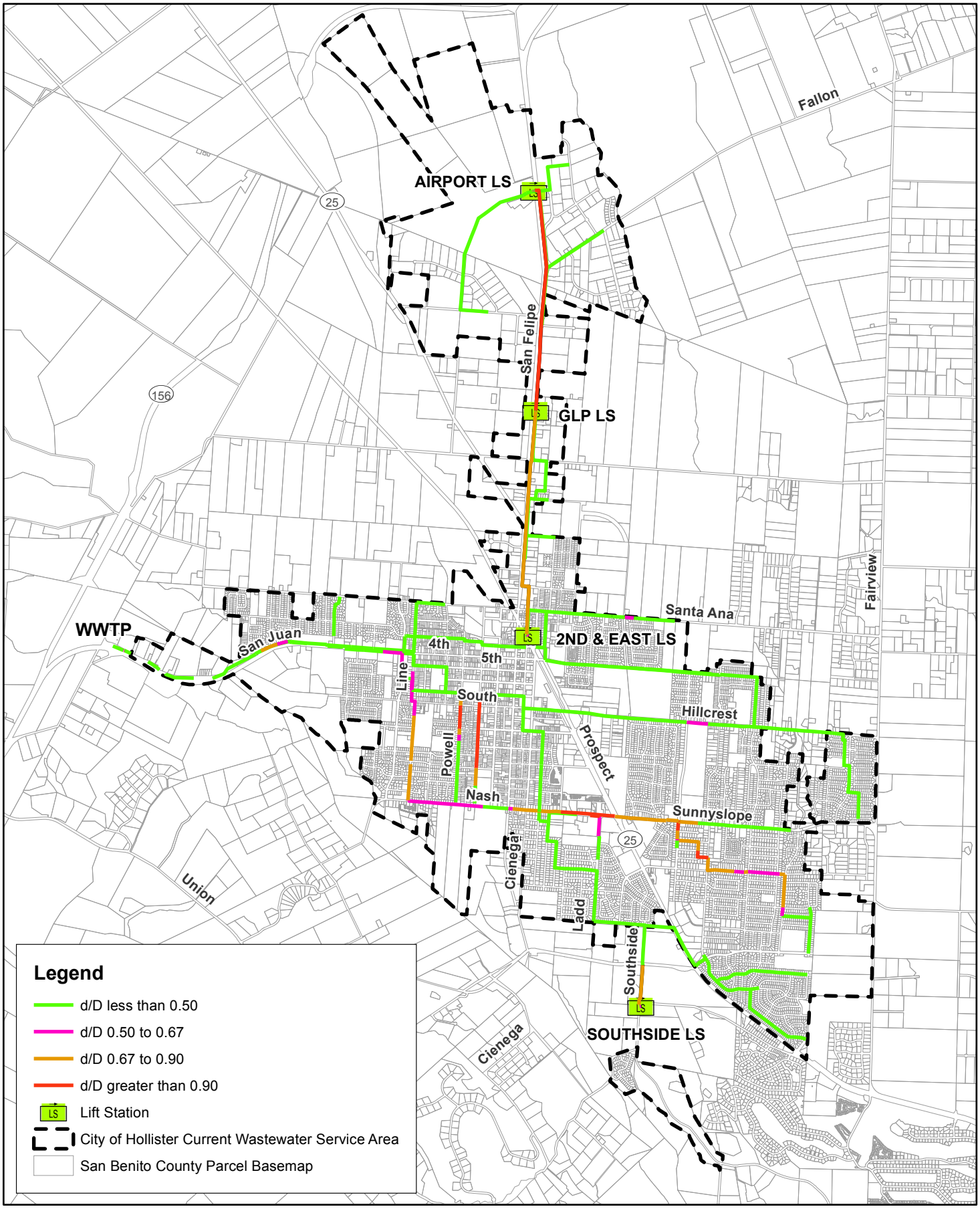
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-4: WASTEWATER MODEL OVERVIEW MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



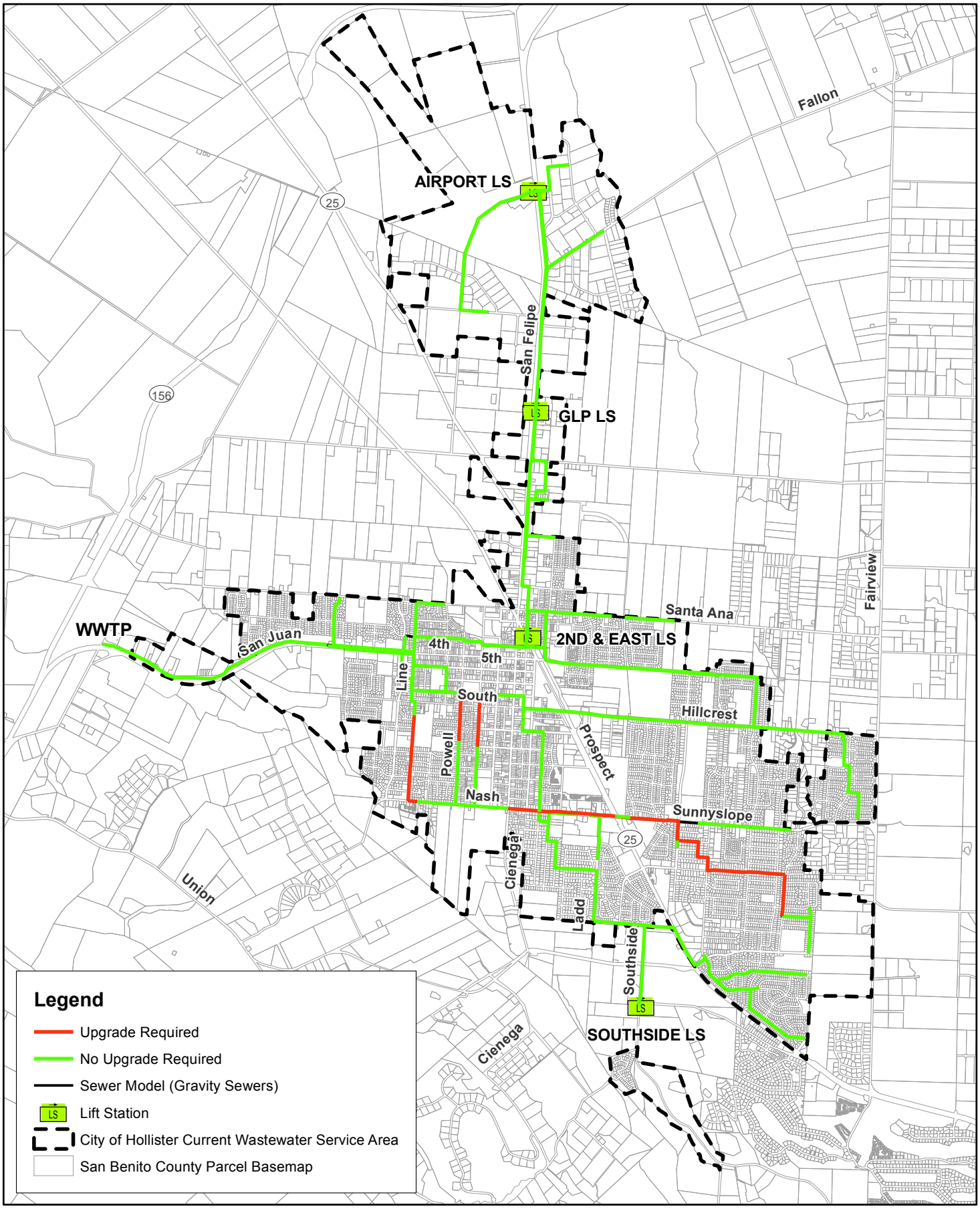
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-5: EXISTING MAXIMUM d/D DURING MDDWF CONDITIONS

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



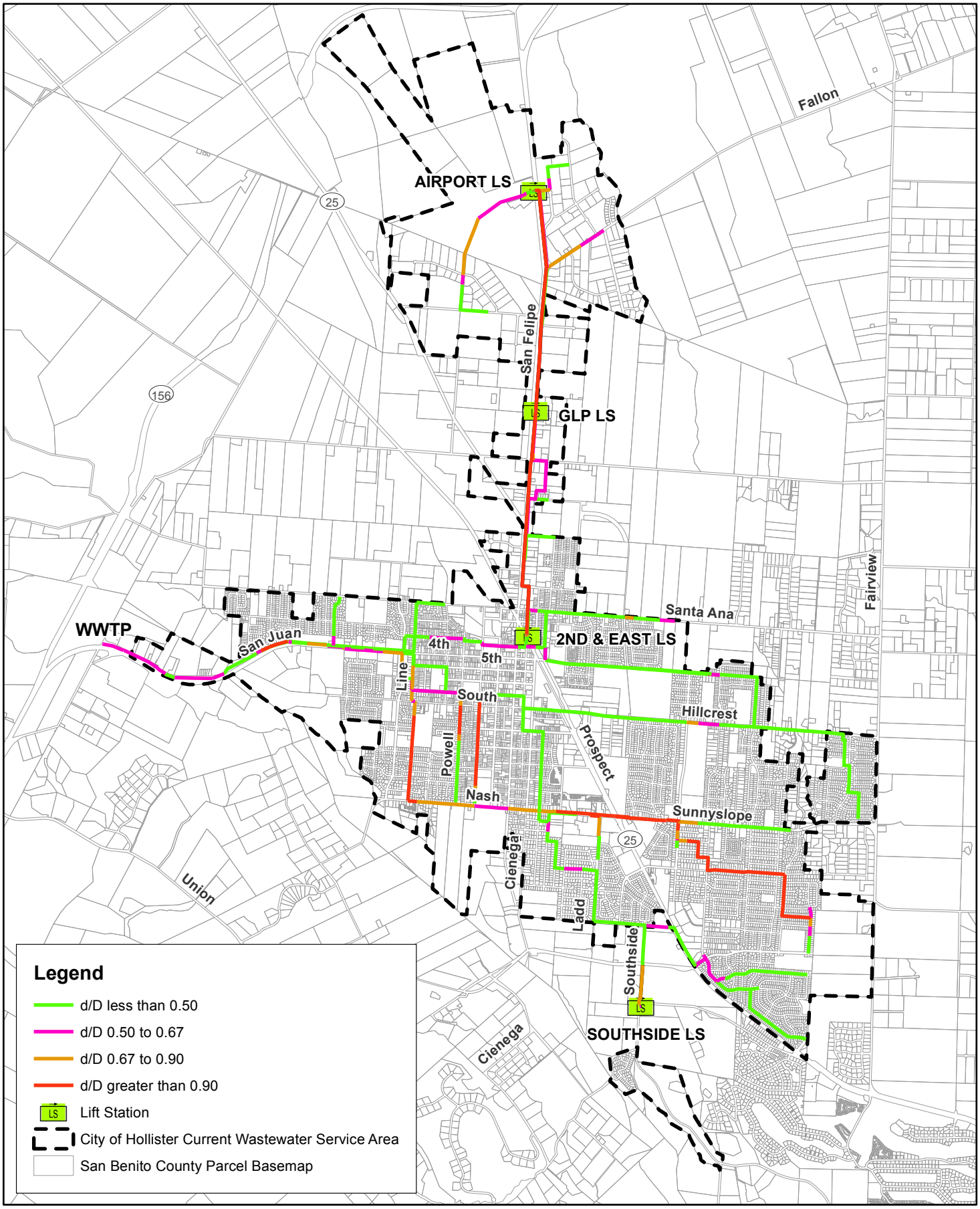
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-6: EXISTING MDDWF PIPE DEFICIENCIES

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

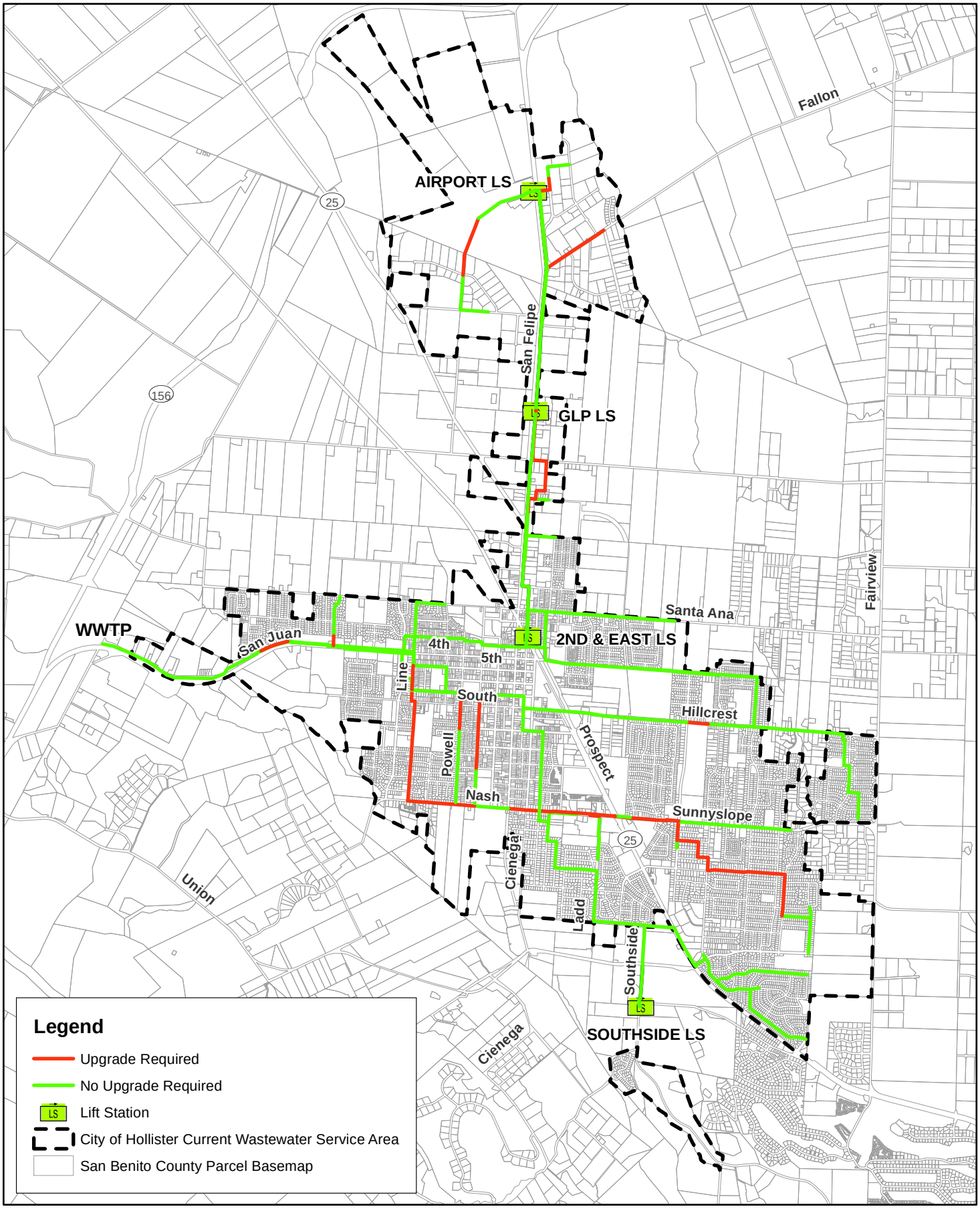
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-7: FUTURE MAXIMUM d/D DURING MDDWF CONDITIONS

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

WALLACE GROUP

612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE ES-8: FUTURE MDDWF PIPE DEFICIENCIES

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

Table ES-1. City of Hollister CIP Ranking Matrix

Importance Factor	5	4	3	2	1			
	Overflow to Water Body of the State	Design Standard	Community Impact	Maintenance Hot Spot	Cost	Impacted By Future Development		
Project Name	Yes - 10 No - 0	Meets Design Standard - 0 Doesn't Meet Design Standards - 2 Surcharging - 5 Overflowing - 10	< 1,000 - 0 1,001 to 5,000 - 5 >5,000 - 10	Not Critical - 0 Yearly Check - 5 Weekly or Monthly Checks - 10	<$25,000 - 10 $25,001 to $100,000 - 5 >$100,000 - 2	Yes/No	Score	Ranking
							= Sum of Importance Factor X Points	
Bridge Road Interconnect	0	2	10	0	10	No	48	1
Powell Street Sewer Pipe Upgrade	0	5	0	10	2	Yes	42	2
West Street Sewer Pipe Upgrade	0	5	0	10	2	Yes	42	3
Line Street Near Term Sewer Pipe Upgrade	0	2	10	0	2	No	40	4
GLP Lift Station Upgrades Near Term	0	2	0	10	10	No	38	5
Nash Road Sewer Pipe Upgrade	0	5	5	0	2	Yes	37	6
Southside Lift Station Upgrades Near Term	0	2	0	10	2	No	30	7
2nd and East Lift Station Upgrades Near Term	0	0	0	10	10	No	30	8
Sunset Drive Sewer Pipe Upgrade	0	2	5	0	2	Yes	25	9
Airport Lift Station Upgrades Near Term	0	0	0	10	5	No	25	10

Table ES-2. City of Hollister Near Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Uprade to Meet Future Needs*	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
1	**Bridge Road Interconnect**	New Pipe	--	30	--	21	Bridge Road	Northeast of Azul Court	WG549	549	Yes	Light	$250	LF	$7,500	**$10,500**
3	**Powell Street Sewer Pipe Upgrade**	Pipe Upgrade	**--**	800	6	10	Powell Street	From Wiebe Way to 7th Street	462	427	Yes	Light	$195	LF	$156,000	$218,400
				400	6	8	Powell Street	From Vali Way to Wiebe Way	459	462	Yes	Light	$180	LF	$72,000	$100,800
			Total Pipe Length	1,200											**Total**	**$319,200**
2	**West Street Sewer Pipe Upgrade**	Pipe Upgrade	**--**	800	6	10	West Street	From SMH 471 to 7th Street	471	428	Yes	Light	$195	LF	$156,000	$218,400
				1,600	6	8	West Street	From B Street to SMH 471	475	471	Yes	Light	$180	LF	$288,000	$403,200
			Total Pipe Length	2,400											**Total**	**$621,600**
4	**Line Street Near Term Sewer Pipe Upgrade**	Pipe Upgrade	--	3,000	15	18	Line Street	From Nash Road to Mica Court	274	414	Yes	Heavy	$325	LF	$975,000	**$1,365,000**
5	**GLP LS Upgrades**	Facility Upgrades	1	--	--	--	Frontage Road	Frontage Road 1,500 feet north of McCloskey Road	--	--	No	Light	$14,400	LS	$14,400	**$20,160**
6	**Nash Road Sewer Pipe Upgrade**	Pipe Upgrade	**--**	1,000	12	15	Nash Road	From San Benito Street to Prune Street	268	271	Yes	Heavy	$280	LF	$280,000	$392,000
				2,700	12	15	Tres Pinos Road	From Prune Street to Airline Highway	290	268	Yes	Heavy	$280	LF	$756,000	$1,058,400
				1,700	12	15	Sunnyslope Road	From Airline Highway to SMH 259	259	290	Yes	Heavy	$280	LF	$476,000	$666,400
				400	8	12	Sunnyslope Road	From SMH 259 to Memorial Drive	245	259	Yes	Heavy	$265	LF	$106,000	$148,400
			Total Pipe Length	5,800											**Total**	**$2,265,200**
7	**Southside LS Upgrades**	Facility Upgrades	1	--	--	--	Southside Road	At the intersection of Southside Road and Enterprise Road	--	--	No	--	$76,500	LS	$76,500	**$107,100**
8	**2nd and East LS Upgrades**	Facility Upgrades	1	--	--	--	East Street	At the intersection of 2nd Street and East Street	--	--	No	--	$7,200	LS	$7,200	**$10,080**
9	**Sunset Drive Sewer Pipe Upgrade**	Pipe Upgrade	**--**	600	8	12	Memorial Drive	From Sunnyslope Road to Cedar Street	207	245	Yes	Heavy	$265	LF	$159,000	$222,600
				700	6	12	Cedar Street	From Memorial Drive to Iris Street	204	207	Yes	Heavy	$265	LF	$185,500	$259,700
				500	6	12	Iris Street	From Cedar Street to Valley View Road	202	204	Yes	Heavy	$265	LF	$132,500	$185,500
				800	6	12	Valley View Drive	From Iris Street to Sunset Drive	188	202	Yes	Heavy	$265	LF	$212,000	$296,800
				600	6	12	Sunset Drive	From Valley View Drive to SMH 190	190	188	Yes	Heavy	$255	LF	$153,000	$214,200
				1,900	6	10	Sunset Drive	From Valley View Drive to Ciera Vista Drive	197	190	Yes	Heavy	$255	LF	$484,500	$678,300
				1,300	6	10	Ciera Vista Drive	From Sunset Drive to Tiburon Drive	199	197	Yes	Heavy	$255	LF	$331,500	$464,100
			Total Pipe Length	6,400											**Total**	**$2,321,200**

Table ES-2. City of Hollister Near Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Uprade to Meet Future Needs*	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
10	**Aiport LS Upgrades**	Facility Upgrades	1	--	--	--	San Felipe Road	At Hollister municpal airport	--	--	No	--	$76,200	LS	$76,200	**$106,680**
															TOTAL NEAR TERM PROJECT COSTS	**$7,146,720**

*** If noted "Yes", then the proposed project has existing deficiencies. In addition, upgrades are necessary for future development. The proposed pipe diameter noted in this Table is to meet the capacity needs of future development.**

**** Total includes construction cost plus preliminary engineering, design engineering, administration construction management and inspection costs. Construction costs were developed based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with**

Table ES-3. City of Hollister Long Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
1	**Aerostar Way Sewer Pipe Upgrade**	Pipe Upgrade	--	1,900	12	15	Aerostar Way	From Airway Drive to SMH 503	494	503	Light	$220	LF	$418,000	**$585,200**
2	**Hillcrest Road Sewer Pipe Upgrade**	Pipe Upgrade	--	1,400	8	10	Hillcrest Road	From El Cerro Drive to Memorial Drive	335	330	Heavy	$255	LF	$357,000	**$499,800**
3	**Fallon Road Sewer Pipe Upgrade**	Pipe Upgrade	--	2,200	10	12	Fallon Road	From Shelton Drive to Technology Parkway	485	480	Heavy	$265	LF	$583,000	**$816,200**
4	**Kirk Patrick to GLP LS**	Pipe Upgrade	--	1,600	10	12	Frontage Road	From McCloskey Road To GLP Lift Station	WG373	GLP LS	Light	$205	LF	$328,000	$459,200
		Pipe Upgrade	--	500	10	12	McCloskey Road	From McCloskey Road to Frontage Road	WG372	WG373	Light	$205	LF	$102,500	$143,500
		Pipe Upgrade	--	1,700	10	12	Kirk Patrick	From Chappel Road to McCloskey Road	525	WG372	Light	$205	LF	$348,500	$487,900
		Pipe Upgrade	--	500	10	12	San Felipe Road	From SMH 524 to Chappell Road	524	525	Light	$205	LF	$102,500	$143,500
		Total Pipe Length		4,300										**Total**	**$1,234,100**
5	**Line Street Long Term Sewer Pipe Upgrade**	Pipe Upgrade	--	1,600	15	18	Line Street	From Peridot Court to 5th Street	414	406	Heavy	$325	LF	$520,000	$728,000
		Pipe Upgrade	--	1,800	15	18	Nash Road	From West Street to Line SMH 274	281	274	Heavy	$325	LF	$585,000	$819,000
		Total Pipe Length		3,400										**Total**	**$1,547,000**
6	**Miller Road Sewer Pipe Upgrade**	Pipe Upgrade	--	300	8	12	Miller Road	From Shelton Drive to Technology Parkway	485	480	Light	$205	LF	$61,500	**$86,100**
7	**San Juan Road Sewer Pipe Upgrade**	Pipe Upgrade	--	30	27	36	San Juan Road	At the intersection of Westside Boulevard	543	542	Heavy	$400	LF	$12,000	**$16,800**

Table ES-3. City of Hollister Long Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
8	**Technology Parkway Sewer Pipe Upgrade**	Pipe Upgrade	--	700	10	12	Technology Parkway	From SMH 488 to SMH 510	488	510	Light	$205	LF	$143,500	**$200,900**
9	**Aiport LS VFD Upgrade**	Facility Upgrades	1	--	--	--	San Felipe Road	At Hollister municpal airport	--	--	Minimal	$540,000	LS	$540,000	**$756,000**
10	**GLP LS VFD Upgrade**	Facility Upgrades	1	--	--	--	Frontage Road	Frontage Road 1,500 feet north of McCloskey Road	--	--	Light	$600,000	LS	$600,000	**$840,000**
11	**2nd and East LS Upgrades**	Facility Upgrades	1	--	--	--	East Street	At the intersection of 2nd Street and East Street	--	--	Light	$6,500	LS	$6,500	**$9,100**
12	**Cushman Street Sewer Pipe Upgrade**	Pipe Upgrade	--	600	15	18	Cushman Street	From Velado Street to Andrews Drive	177	179	Light	$235	LF	$141,000	**$197,400**
														TOTAL LONG TERM PROJECT COSTS	**$6,788,600**

**** Total includes construction cost plus preliminary engineering, design engineering, administration construction management and inspection costs. Construction costs were developed based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources.**

CHAPTER 1

INTRODUCTION

This report presents the Sanitary Sewer Collection System Master Plan (SSCSMP) for the City of Hollister (City). The City is located in San Benito County (County) and 40 miles east of Monterey and is intersected by State Highways 156 and 25. The City's has an existing population of 37,054. The City is governed by a City Council made up of a Mayor, Vice Mayor, and three council members. The City is currently responsible for the maintenance and operation of the wastewater collection system serving the City of Hollister. In addition, there are two areas outside the current City limits from which the City receives wastewater flow. These areas include a small residential development located off Southside Road at Hospital Road and a residential multi-family development off County Labor Camp Road.

The City of Hollister owns and operates a Regional Domestic Wastewater Treatment Plant (RDWWTP) providing wastewater collection service to residential, industrial, and commercial customers. The City recently completed a substantial upgrade to their wastewater treatment facilities, including a plant expansion and upgrade, a seasonal storage pond system, and recycled water distribution system, allowing the City to accept additional wastewater flow from new customers. Prior to this upgrade, the City was under a building moratorium required by the Regional Water Quality Control Board in 2002 when the City's previous treatment plant reached design capacity. The moratorium was lifted at completion of the plant upgrade in 2008. The City also owns and operates an industrial wastewater treatment plant and collection system that will not be analyzed as a part of this study.

Preparation of the SSCSMP will assist the City in prioritizing both existing and future wastewater collection system needs through repair, rehabilitation, replacement, and new facility installation. The master planning process will also tie the wastewater capacity assessment, both existing and future, to the infrastructure budgeting process.

ENVIRONMENTAL REVIEW

In accordance with Title 14, California Code of Regulations, Chapter 3, Article 18 (Statutory Exemptions), this SSCSMP is considered a planning study and therefore adoption of this document is exempt from the requirements to prepare Environmental Impact Reports (EIR) or Negative Declarations (ND). However, on a project-specific basis, the California Environmental Quality Act (CEQA) must be satisfied for any major capital improvement projects described in this report that will be implemented by the City in the future, through the preparation of an appropriate EIR or ND.

AUTHORIZATION AND SCOPE OF WORK

On July 7, 2009, the City authorized Wallace Group to prepare a comprehensive Sanitary Sewer Collection System Master Plan. The SSCSMP was prepared in

accordance with Wallace Group's proposal, dated May 14, 2009. The scope of work is as follows:

Wastewater Flow Monitoring: Wallace Group will work with Fluid Resource Management (FRM) to conduct wastewater flow monitoring for a one-month period in five key flow locations throughout the City. This monitoring will provide Wallace Group with information on existing dry weather wastewater flow conditions. We will compare the wastewater flows from the monitoring devices to the influent flows entering into the City's RDWWTP, analyze the characteristics of the sewer flows, determine the diurnal peaks, and utilize the flow data for the sewer modeling.

Field Survey: The survey team will review the City's existing sewer collection system wall and atlas maps to develop working field maps to use while in the field. The survey team will locate the sewer manholes that make up the trunk sewer collection system, typically sewer pipes 8-inch and larger are incorporated into a sewer model. However not all 8-inch sewer pipes will be surveyed. Sewer pipes smaller than 8-inch will be surveyed if they are pipe segments with known maintenance issues or areas where future development may occur and connect into the City's collection system. Wallace Group will work with City Staff to determine key pipes to include in the sewer model. The field survey will include collecting the following information for the sewer model manholes:

- Northing and Easting
- Rim elevation
- Manhole depth
- Pipe Invert
- Digital photography of the interior of each manhole

The survey information will be used to develop the Citywide GIS and sewer model for this SSCSMP project.

Land Use Evaluation and Wastewater Flow: We will use population and density information from the City's General Plan, previous wastewater flow estimates, RDWWTP flows, and data from the sewer flow monitoring to determine the existing and future dry weather sewer flow for the City.

Geographic Information System (GIS): We will design and create an ESRI ArcGIS 9.4 personal geodatabase for the City. The first step in the development of the geodatabase will be to create a simplified database design to store attribute information required to store/model the sewer system inside a GIS geodatabase. We will develop the sewer geodatabase to allow for integration with the sewer modeling software. This will allow the City to efficiently transfer sewer system changes between the GIS and the sewer modeling software. We will generate updated maps for the Study Area that delineates sewer pipes, sewer structures, tributary areas, etc. for existing and future systems. These maps will be compiled from the newly developed sewer geodatabase, sewer modeling results, and locations of future development. These maps will be properly scaled and formatted for the City's use.

Collection System Modeling: We will develop a GIS-based sewer model using MWHSoft InfoSWMM version 8.5. We will model the collection system under dry weather conditions for the existing and future loadings. Wet weather conditions will not be analyzed as part of this report. Typically, sewer pipes 8-inch and larger will be part of the sewer model. However, 8-inch sewer pipes that are not part of the trunk sewer system will not be analyzed and sewer pipes smaller than 8-inch with known hydraulic problems and potential for future development will be modeled.

Sanitary Sewer Collection System Master Plan: We will utilize the information determined in the previous tasks and prepare a SSCSMP. The master plan will provide a summary of the existing facilities, wastewater flows, identified system capacity deficiencies for existing and future conditions, recommended capital improvement projects (CIP), recommended operation and maintenance (O&M) practices, and recommended inspection programs. The CIPs will be grouped into two categories; Near Term, those projects that are required due to existing deficiencies and will be prioritized based on need. Long Term, those upgrades that are required due to future development (construction timeframe dependant on future development). We will determine cost estimates for each of the CIPs and O&M activities, which will include construction and soft costs.

ACKNOWLEDGEMENTS

Wallace Group thanks and gratefully acknowledges the following City of Hollister and San Benito County staff for their efforts, involvement, input and assistance in preparing the SSCSMP:

City of Hollister

David Rubcic, P.E., P.L.S., Associate Civil Engineer
Louie Guevara, Engineering Technician
Henry Gonzales, Utility Supervisor
Dennis Rose, Wastewater Treatment Plant Supervisor
Mary Paxton, Planning Manager

San Benito County

Rene Anchieta, GIS Analyst

The SSCSMP was completed with the efforts of many team members. They include:

Wallace Group

Kari Wagner, P.E., Senior Civil Engineer
Rob Lepore, GISP, GIS Specialist
Valerie Huff, P.E., Civil Engineer
Steven G. Tanaka, P.E., Director of Water Resources
Rob Miller, P.E., Principal Engineer
Ed Reading, P.L.S., Senior Land Surveyor
Brian Meichtry, E.I.T., Engineering Associate
Erik Rutherford, E.I.T., Engineering Associate

Mark Thomas & Company
Patrick Dobbins, P.E., Senior Project Manager

Fluid Resource Management
Robiy Ellison, Maintenance Manager

San Benito Engineering and Surveying, Inc.
Ken Weatherly, P.L.S.

CHAPTER 2

LAND USE AND POPULATION

This Chapter presents the land use and existing and future population forecasts for the City's SSCSMP study area. The purpose of establishing the existing population and land use is to better understand the existing wastewater flow characteristics throughout the City's collection system, which would then provide a framework to forecast the wastewater flows that may be contributed in the future by vacant or under-utilized land. All figures are located at the end of this chapter.

INTRODUCTION

The City owns and operates a RDWWTP, which provides wastewater service to residential, commercial, and industrial customers within the City and portions of the County. The current limits of the wastewater service area are shown on Figure 2-1. The area to be evaluated as part of this study, known as the study area, is significantly larger than the current service area and is also shown on Figure 2-1. The study area boundary corresponds to the boundary as presented within the 2008 *Hollister Urban Area Water and Wastewater Master Plan*. As a reference, Figure 2-1 also depicts both the City's General Plan Boundary and the Sphere of Influence for the City.

The City also owns and operates an industrial wastewater treatment plant that provides treatment to one industrial facility within the City. The evaluation of this facility and related collection system is not part of this study.

Existing Service Area Boundary

The City of Hollister currently provides sewer service to the following:

- Incorporated City;
- Commercial facilities on Highway 156 near the RDWWTP;
- A small housing development, the County public works/planning facility, and the labor camp located south of the City near Hospital Road and Southside Road;

The existing wastewater service area is depicted on Figure 2-2. The Ridgemark and Cielo Vista Estates services areas are also depicted on Figure 2-2. These two services areas do not currently flow to the RDWWTP.

Study Area Boundary

As noted previously, the study area boundary is significantly larger than the existing service area boundary. The majority of the study area includes areas within the County that are anticipated to be either incorporated into the City and/or will be eventually served (wastewater) by the City. The areas known as Ridgemark and Cielo Vista Estates currently have their own respective wastewater treatment plants and are not part of the City's existing service area; however an option to direct the wastewater flow from these developments to the City's collection system will be evaluated as part of this study.

LAND USE

The following sections discuss the existing and future land uses within the study area. The existing land uses are based on the County's GIS database.

Land Use: Existing Wastewater Service Area

The City is comprised of primarily residential development, with commercial development in and around the downtown area, and a heavy concentration of industrial development near the airport. The City's current wastewater service area is comprised of 9,583 parcels (4,065 acres). Figure 2-3 depicts the land uses for all parcels for both the existing wastewater service area and the study area. Existing land uses within the City's wastewater service area are summarized in Table 2-1. Existing land use codes were provided by the County in GIS format. For the purpose of this SSCSMP only, County land use codes were summarized into categories that can be utilized for estimating sewer flow rates. Where possible within the existing City sewer service area, land use categories were applied to parcels with no County land use code, in order to accurately represent existing sewer flow contribution. Land use for these non-coded parcels was determined by parcel location in conjunction with aerial imagery and building type information available through ESRI and Google Earth.

Within the existing service area, approximately 40% of the parcel acreage is residential, with single-family accounting for 90% of the residential use. The second largest category is agriculture, comprising 17% of the service area land use, while commercial and industrial combined accounts for 16% of the land use and 9% of the parcel acreage is vacant.

Land Use: Study Area

The study area totals 12,017 parcels (12,097 acres). The land uses for the study area are summarized in Table 2-2. This table also includes the area within the current wastewater service area.

Within the study area, only 26% of the parcel acreage is residential. The largest land use within the study is agriculture, covering 48% of the total study area. Commercial and industrial land uses combined, account for 9%. Only 4% is considered vacant.

Table 2-1: City of Hollister Wastewater Service Area Existing Land Use

Land Use Category for SSCSMP	Number of Parcels	Sum of Parcel Areas [Acres]	Percent of Service Area
Agriculture	45	707	17.4%
Airport	4	329	8.1%
Commercial	383	322	7.9%
Industrial	119	314	7.7%
Low Density Residential	7,972	1,350	33.2%
Medium/High Density Residential	606	150	3.7%
Motel	4	4	0.1%
Open Space	9	49	1.2%
Residential Estate	23	67	1.6%
Roads	16	7	0.2%
School	14	92	2.3%
Unknown	42	351	8.6%
Vacant Commercial	34	37	0.9%
Vacant Industrial	84	230	5.7%
Vacant Low Density Residential	208	56	1.4%
Vacant Medium/High Density Residential	4	7.4	0.2%
Vacant Residential Estate	16	45	1.1%
TOTALS	**9,583**	**4,065**	**100.0%**

* Information provided by the County of San Benito's GIS parcel data.

Future Development Density Factors

The study area for this master plan lies within both the City and the County. To identify the future development potential for the study area, both the City's General Plan and the County's General Plan were used. Table 2-3 summarizes the land uses within the City's General Plan area and the maximum permitted density for each land use category. It should be noted that the total parcels and acres for each land use are based on the City's digital AutoCAD file provided by the City, not the City's 2005 General Plan document. Table 2-4 summarizes the land uses within the County's General Plan area and the maximum permitted density for each land use category.

Future Development Projects: Study Area

The City's Growth Management Program provides priority for medium to high density residential and mixed-use development projects within the Redevelopment Project Area. For this reason, in the near future the majority of development is anticipated to occur within the City's Redevelopment Area, which focuses growth in and near downtown Hollister. Some potential development or re-development projects identified by the City that may impact the collection system include the following:

- Mixed-use development and redevelopment in the City's downtown core and the West Gateway commercial area
- Residential development and redevelopment totaling 1,304 single family units and 2,621 multi-family units, including projects that have been approved, but not constructed, and residential units within mixed-use development

Table 2-2. SSCSMP Study Area Existing Land Use

Land Use Category for SSCSMP[1]	Existing Land Use Code per County GIS Data	No. Parcels	Total Parcel Area [Acres]	Percent of Total Acres
Agriculture	A000, AAPP, AAPR, ACHE, ADRY, AFIE, AGDX, AGRA, APAS, APOU, ARIV, AROW, ATGX, ATRG, ATRO, ATRX, AVIN, AWAL, AXXX, WAPR, WDRY, WGDX, WRGX, WROW, WTRX, WWAL	252	5822	48.1%
Airport	(BLANK)	4	329	2.7%
Commercial	CAUP, CAUT, CBAN, CBAR, CBUL, CCAW, CCCC, CCEM, CCHU, CCLH, CCOS, CCST, CFFR, CFUH, CHSP, CLAU, CLIQ, CMDO, CMST, COFF, CPAR, CRCA, CREP, CRES, CRWY, CSER, CSFG, CSFS, CSHO, CSLH, CSUP, CTHE, CTRU, CVET, CWAR, CXXX, IMST, IPAR, IREP, ITRU	407	399	3.3%
Golf Course	CGOC	23	300	2.5%
Industrial	CFSE, CLUM, CMWS, CSAN, ICAN, IEXP, IFOP, IFSE, IJUY, IMFG, IMWS, ISAN, IWAR, IWIN, IXXX	132	686	5.7%
Low Density Residential	SS01, SS02, SS03, SS04, SS05, SS06, SS07, SSM2, SSM3, SSO1, SXXX	9251	1784	14.8%
Medium/High Density Residential	CMHP, M000, MA02, MA03, MA04, MA05, MA06, MA07, MA08, MA09, MA10, MA11, MA12, MA13, MA14, MA19, MA20, MA24, MA29, MA30, MA36, MA40, MA41, MA42, MXXX, RMH1, RMH2, RSM1, RSM2, RSM3, RSM5	941	242	2.0%
Motel	CM21, CM25, CM31, CM42	4	4	0.03%
Open Space	(BLANK)	9	49	0.4%
Residential Estate	RS01, RS02, RS03, RS05, RXXX	446	1065	8.8%
Roads	IRWY, RRWY, SRWY	36	19	0.2%
School	CSCH, (BLANK)	18	103	0.8%
Unknown	(BLANK), ICOS, IOFF, XXXX	108	819	6.8%
Vacant Commercial	C000, CVLM	35	39	0.3%
Vacant Industrial	I000, IVLM	85	235	1.9%
Vacant Low Density Residential	S000, SVLM	224	68	0.6%
Vacant Medium/High Density Residential	MVLM	4	7.4	0.06%
Vacant Residential Estate	R000, RVLM	38	125	1.0%
	Total	**12,017**	**12,097**	**100.0%**

1. Land use category to be utilized for the purpose of calculating wastewater flows, for the SSCSMP only

Table 2-3. City of Hollister General Plan Land Use: SSCSMP Study Area

City Land Use Plan Designation[1]	Parcels	Acres[2]	Percent of Total Acres	Maximum Permitted Density
Agriculture	1	60	0.7%	NA[3]
Airport	10	367	4.0%	NA
Airport Support[4]	18	180	2.0%	NA
Downtown Commercial and Residential	262	55	0.6%	25 to 45 du/ac[5]
General Commercial	93	142	1.6%	2.0 FAR[6]
High Density Residential	822	402	4.4%	12 to 35 du/ac
Home Office	77	13	0.1%	8 to 12 du/ac
Industrial	268	1,790	19.6%	1.0 FAR
Low Density Residential	6,967	2,883	31.6%	1 to 8 du/ac
Medium Density Residential	1,337	430	4.7%	8 to 12 du/ac
Mixed-Use Commercial and Residential	121	150	1.6%	25 to 40 du/ac
North Gateway Commercial	108	339	3.7%	2.0 FAR
Open Space	31	273	3.0%	0.01 FAR
Public	63	621	6.8%	1.0 FAR
Residential Estate	229	1,351	14.8%	1 du/5 ac
West Gateway Commercial and Mixed Use	26	81	0.9%	20 to 35 du/ac
Total	**10,433**	**9,137**	**100.0%**	

1. Designations are as listed in the City of Hollister's digital AutoCAD file
2. Acreage is calculated as sum of parcel areas only and does not include public roadway
3. Not Applicable
4. The land use designation "Airport Support" is included under "Industrial" in the 2005 General Plan tabulation
5. Dwelling units per acre
6. Floor area ratio

Table 2-4. San Benito County General Plan Land Use: SSCSMP Study Area

County Land Use Plan Designation	Parcels	Acres	Percent of Total Acres	Maximum Permitted Density
Agricultural Productive	25	273	9.2%	1 du/5 ac
Industrial	5	127	4.3%	1.0 FAR[1]
Quasi-Public	6	68	2.3%	1.0 FAR[1]
Rural	75	1,222	41.3%	1 du/5 ac
Rural Residential	86	250	8.5%	2 du/ac
Rural Transitional	27	123	4.2%	1 du/2.5 ac
Rural/Urban	1,360	896	30.3%	20 du / ac or mobile home parks
Total	**1,584**	**2,960**	**100.0%**	

1. Floor area ratio (FAR) estimate to be used for the SSCSMP analysis only

- Four industrial developments on vacant parcels near the Airport
- Development of a new 88 room hotel off of Airway Drive near the Airport

This list is not inclusive of all potential development within the study area, and only includes those projects currently identified by the City. Additional potential development will be accounted for in this analysis based on projected density in accordance with the City and County land use plan. Locations of potential development projects are depicted on Figure 2-4.

The potential Santana Ranch development, located outside of City limits to the east of Fairview Road between Hillcrest Road and Sunnyslope Road, was not included in this analysis. At the time of this study, the likelihood of this potential development to contribute to the City's wastewater collection system is unknown. If in the future this proposed development intends to connect to the City's wastewater system, then impacts from proposed wastewater contributions must be analyzed.

Land Use Summary and Recommendations

For the purpose of this SSCSMP, existing land use codes have been summarized into categories in order to estimate existing flow contribution to the sewer collection system on a per parcel basis. To analyze future conditions, future land use within the City's General Plan Boundary will follow that of land use designations per the 2005 General Plan. Future land use outside of the City's General Plan will follow designated land use per the County's General Plan. Future density for vacant or under-utilized land will be based on maximum permitted density per the designated land use category. For parcels included in a tentative map or approved development project, the proposed project density will be used for analysis. For the purpose of locating and assigning future sewer loading for this collection system analysis, the parcels illustrated in Figure 2-4 will be considered as future contributors to the City's RDWWTP through year 2023.

POPULATION

Population for the SSCSMP is comprised of the City population and unincorporated land of the County within the study area. Three sources of information were utilized to determine existing and future population for the study area:

1. The City of Hollister's 2005 General Plan
2. The Association of Monterey Bay Area Government (AMBAG) 2008 Regional Forecast
3. The State of California Department of Finance (DOF) 2009 population estimates

It should be noted that in December 2008, the Regional Water Quality Control Board lifted the six year building moratorium from the City following the completion of the City's RDWWTP upgrade. The project included a treatment plant expansion and upgrade, a seasonal storage pond system, and recycled water distribution system, allowing the City to accept additional wastewater flow from new customers.

Existing Population

The City's RDWWTP receives flow from not only the City, but also unincorporated areas of the County. Therefore, to determine the existing population, it is necessary to identify the population from both regions.

City of Hollister: The existing population for the City was determined using the three sources noted previously. The 2005 General Plan estimates the 2010 population at 44,790 persons. This number was determined using a 2.6% average annual growth rate from year 2000. AMBAG 2008 Regional Forecast estimates the 2005 population at 37,002 persons. The California DOF estimates a year 2009 population of 37,054. Since the City has been in a building moratorium, it is expected that the population between 2002 and 2009 has not changed significantly. Therefore, it is unreasonable to expect that the population within the City is over 44,000 persons. For the purposes of this report, 37,054 persons will be used for the existing population within the existing City limits.

County of San Benito: The population of the area served by the City's wastewater treatment plant outside of the City limits includes the unincorporated 56-unit subdivision and County owned labor camp near Hospital Road and Southside Road. Population for the subdivision is estimated to be 182 persons, based on the AMBAG population density for the County of 3.25 persons per household. Per the County, seasonal population for the labor camp is estimated between 274 persons during the summer and 187 persons in the winter. Therefore, the total estimated population outside of the City limits, but currently served by the City's wastewater treatment plant, is 456 persons.

The total estimated existing population for the City's service area is **37,510** persons.

Future Population

The future population of the wastewater treatment plant service area will include infill within the City noted by the General Plan, conversion of existing County developed land on septic to be connected to the City's collection system, and future development projects within the County. In addition, the wastewater flow from the existing areas of Ridgemark and Cielo Vista Estates will be evaluated.

General Plan Boundary: At this time, the City's General Plan projects a 2023 future population based on an annual growth rate of 2.6%. This projected population is 55,192 persons, which is noted to not be full build-out. It is assumed that this estimated population does not include the existing unincorporated "islands" within the current City limits.

Septic System Conversions Within the City Service Area: The City estimates based on assessor tax rolls that approximately 880 housing units within the City's Sphere of Influence, in the unincorporated County area, are currently on septic systems. These housing units consist of a total population of approximately 3,080 persons. These units include multiple County "islands" within the City limits. These island parcels are under the jurisdiction of the County and are not served by the City's wastewater collection system or considered in the existing population estimate for the City. Outside of the City's Sphere of Influence, but within the SSCSMP study area, the City estimates an

existing population of 4,000 persons on septic systems. This estimate is based on assessor tax rolls and the 2000 Census for the Ridgemark Census designated place.

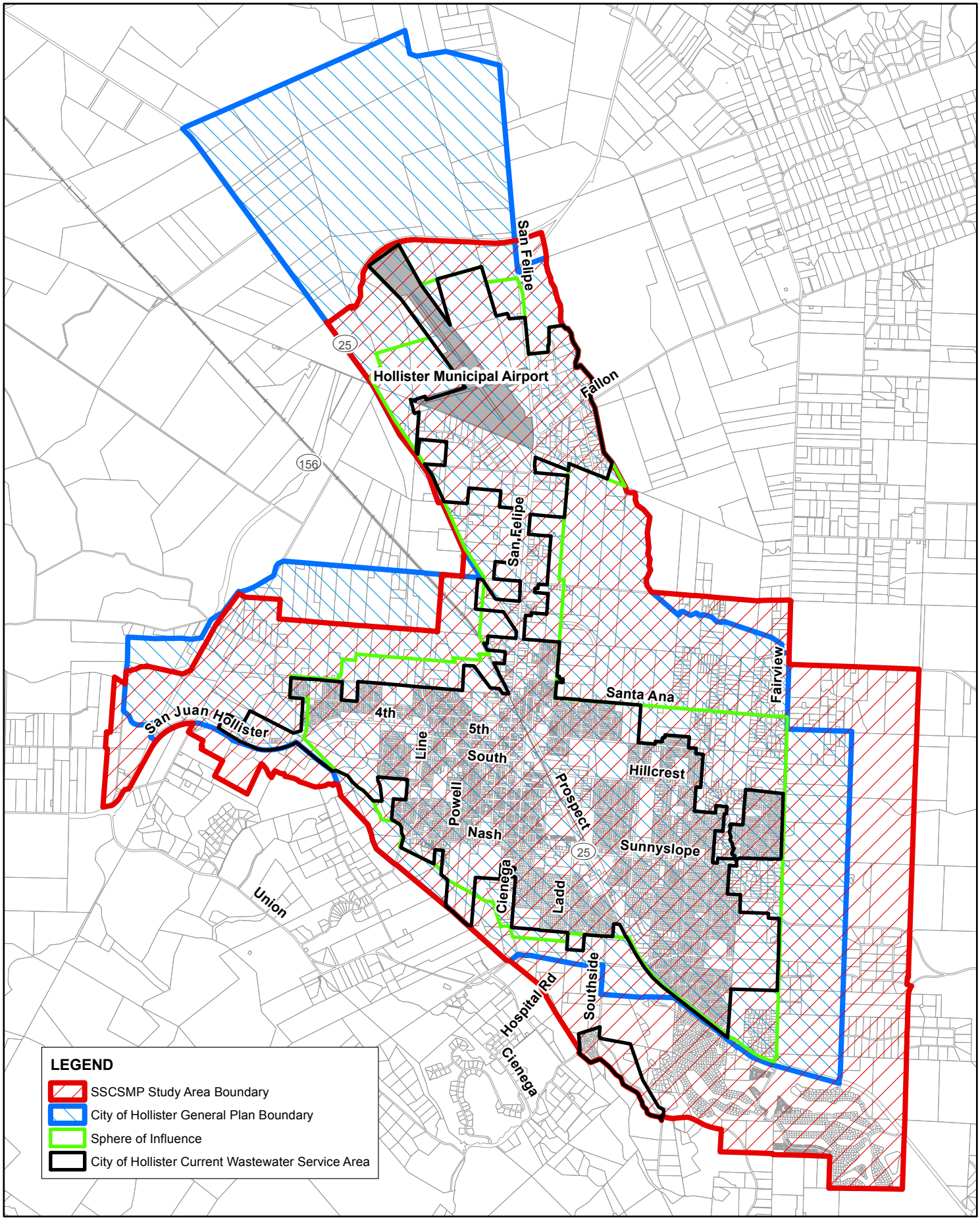
Therefore, it is estimated that a total of 7,080 persons may contribute wastewater flow in the future, through septic conversions, to the City's RDWWTP. Refer to Figure 2-4 for locations of potential septic conversions.

Future County Development Projects: At this time, the population attributed to future County development projects that are not within the City's General Plan are unknown and not accounted for in this report.

Ridgemark and Cielo Vista Estates: Population and land use will not be evaluated within this study for these County served areas. Rather, existing and projected future sewer flow rates will be in accordance with the 2008 *Hollister Urban Area Water and Wastewater Master Plan*.

The total estimated future population for the study area is **62,272** persons. This exceeds the City's General Plan due to the additional areas (septic system conversions) that are being considered for the wastewater service within the study area. This population may or may not occur by the year 2023, which is the City's General Plan planning horizon and also, does not represent full build-out. It is not the intention of this report to contradict the General Plan's population, but to anticipate the potential future impact that wastewater flow from the various contributors may have on the collection system without knowing where the development may occur first. Therefore, the conservative approach is to assume that all development potential will occur. Decisions on completion of upgrades to the collection system, WWTP, or recycled water project should be based on the General Plan and on development as it occurs and not based on this theoretical population projection from this report.

This population project does not include the population from Ridgemark or Cielo Vista Estates, nor population from future development projects that are outside the City's General Plan, but within the study area.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

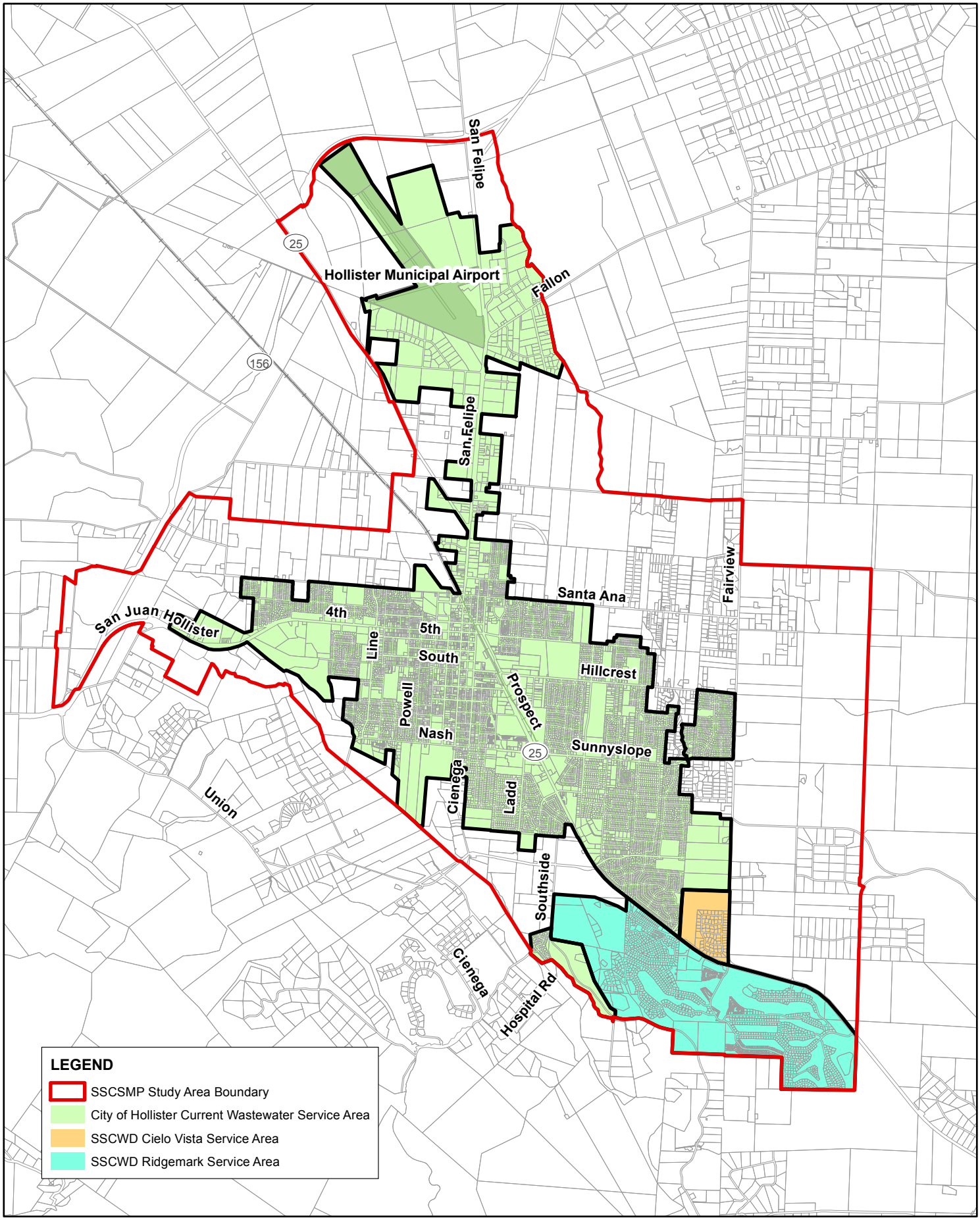
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 2-1: LAND USE JURISDICTIONS

NOTES:
BASEMAP COMPILED FROM GIS DATA PROVIDED BY ESRI. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED AUGUST 2010.



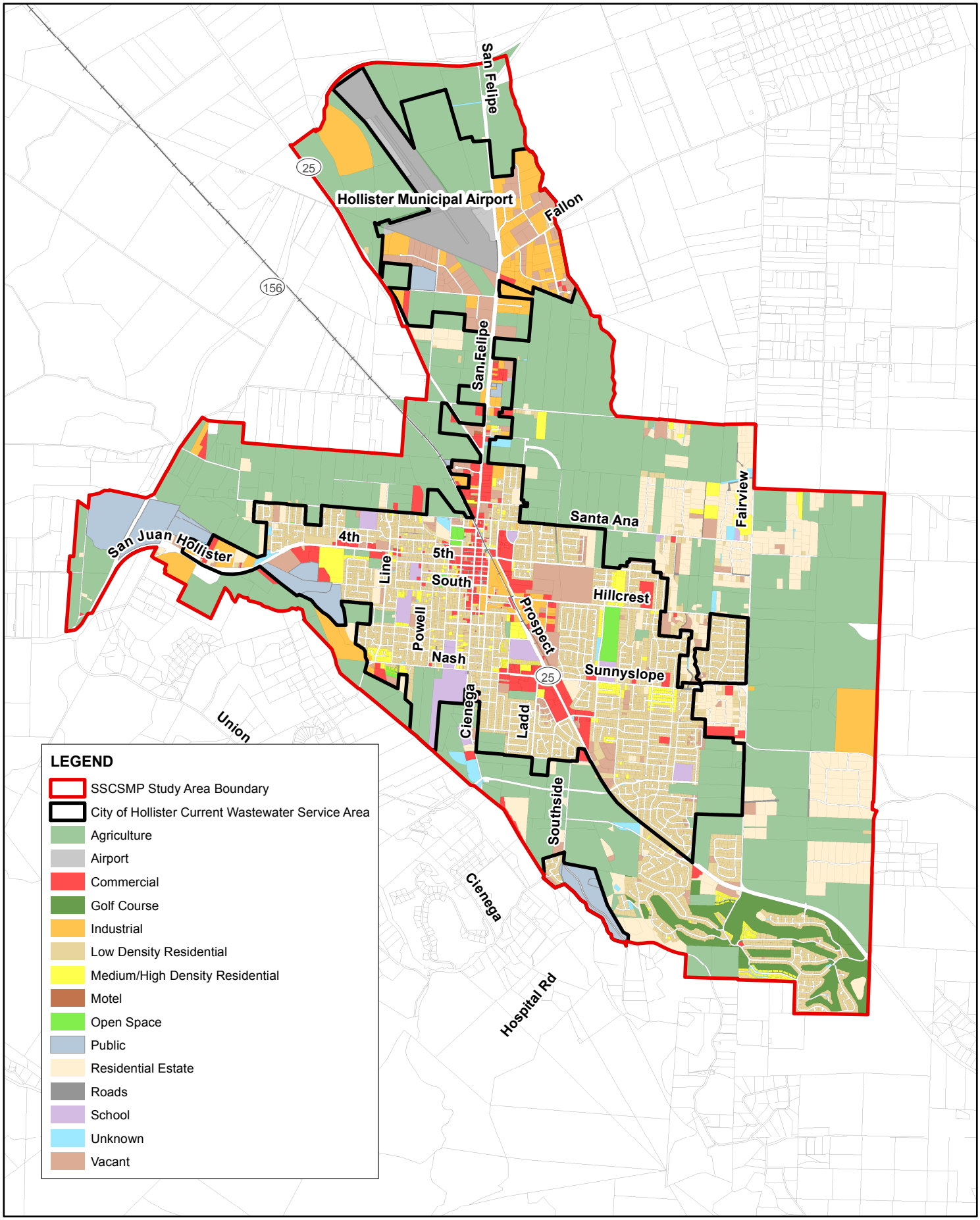
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 2-2: EXISTING SERVICE AREA BOUNDARIES

NOTES:
BASEMAP COMPILED FROM GIS DATA PROVIDED BY ESRI. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

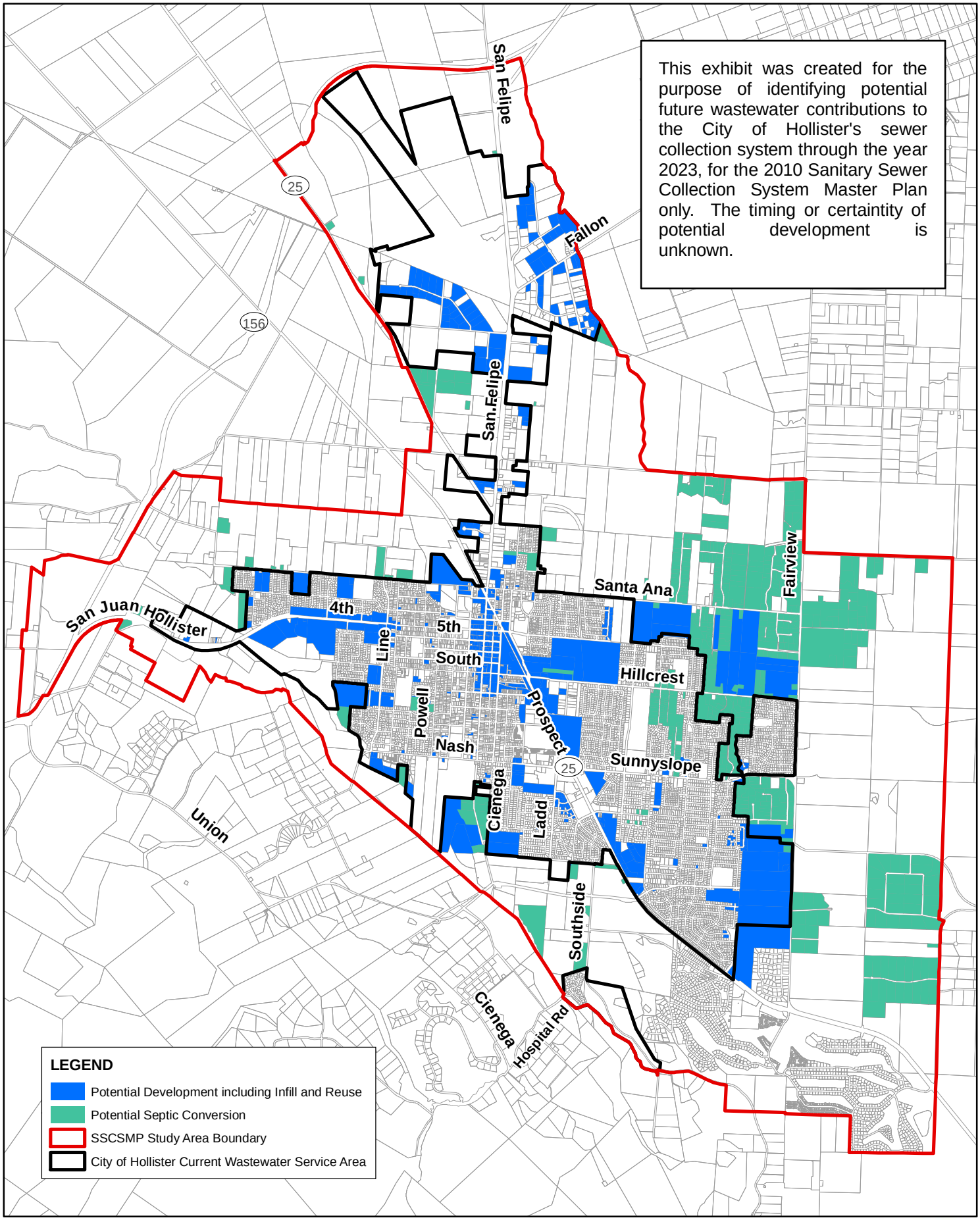
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 2-3: EXISTING LAND USE

NOTES:
BASEMAP COMPILED FROM GIS DATA PROVIDED BY ESRI. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 2-4: POTENTIAL FUTURE DEVELOPMENT CONSIDERATIONS

NOTES:
BASEMAP COMPILED FROM GIS DATA PROVIDED BY ESRI.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

CHAPTER 3

COLLECTION SYSTEM OVERVIEW

This Chapter provides an overview of the existing domestic wastewater collection system for the City. The City provides sanitary sewer collection and treatment services to the City of Hollister. In addition, there are two areas outside the City limits from which the City receives wastewater flow. These areas include a small residential development located off Southside Road at Hospital Road and a residential multi-family development off County Labor Camp Road. The City also owns and operates an industrial wastewater treatment plant that provides collection service to one industrial facility within the City. The evaluation of this facility and the related collection system is not part of this study. All figures are located at the end of this chapter.

COLLECTION SYSTEM OVERVIEW

The City's wastewater collection system consists of approximately 100 miles of gravity sewer pipes ranging in diameter from 4-inch to 36-inch. The City also owns and operates four (4) lift stations and corresponding force mains. Collected wastewater flows to the City's RDWWTP plant which is located off San Juan Road near State Highway 156.

Since the majority of the City's system was constructed in the 1950s and 1960s, the pipe material throughout the system consists primarily of Vitrified Clay Pipe (VCP). Some Polyvinyl Chloride (PVC) pipe has been installed with newer construction. Table 3-1 provides an inventory of the existing sewer pipe by diameter and Figure 3-1 shows the existing collection system. At the time of this report, total length of sewer pipe based on material was not available.

Table 3-1. Existing Pipeline Inventory by Diameter

Diameter (inches)	Length	
	Feet	Miles
4	552	0.10
6	134,333	25.44
8	267,295	50.62
10	33,630	6.37
12	22,743	4.31
14	2,789	0.53
15	26,221	4.97
18	11,504	2.18
21	5,919	1.12
24	3,860	0.73
27	2,593	0.49
30	5,409	1.02
36	8,972	1.70
Total	**525,820**	**99.59**

Manholes

The City's existing wastewater collection system contains approximately 1,850 sewer manholes. From an initial review of the surveyed manholes there are concrete and brick manholes throughout the collection system. At the time of this report sewer manhole types; concrete, brick, drop inverts, etc., was not available.

Maintenance Problem Areas

The City's operations department provided a list of known problem areas throughout the collection system. The locations listed in Table 3-2 are "hotspots" caused by grease build-up and are inspected by the City on a weekly basis.

Table 3-2 Grease Problem Areas

Location	Location
Alegria & Main St.	Monterey & Swope Alley
Astro & Mars (Airport)	Monterey St. (Health Fondation)
Busby Ct. off Hillcrest	N. Sally St. & Maple (DMV)
Central Ave. & Ranchito Ct.	Paines & Briggs Alley
College & Central Ave.	Powell & Ann St.(Alley)
College & Fremont Way	Powell & Wentz Alley
Community Center	Prune St. & Nash Rd.
Crescent Lane	San Benito St. & Hawkins
El Toro Drive	San Juan Dr & Chappell
Fremont Alley	San Juan Dr. & Maple
Hawkins & East St.	Scenic Circle
Hawkins & Nolte Alley	SierraVista & Valleyview
Haydon & Nolte Alley	Suiter & Powell
Hermosa Way (off Westwood Dr)	Suiter Alley
Line & South St.	Thompson St. (Behind Ranchers Feed)
Line St. & Canal Alley	Vets Building
Locust & Virginia	West & Ann Street
Locust Ave. & Fremont Way (CommCenter)	West & between 5th & 6th
Locust Ave. & West 2nd Street	West & Haydon
Mapleton & Fremont Way	West St. & Haydon St.
McKinnon Lumber Alley	West St. & O'Neil St.

Based on discussions with City engineering and operations staff, the following segments of the collection system are continual maintenance problems:

Powell Street
The entire length of Powell Street was identified as a maintenance hotspot by City staff due to grease build-up and flat slopes. Based on survey data the stretch of 6-inch sewer pipe from Nash Road to 7th Street varies in slope from -1.01% to 0.74%. The negative slopes occur at the intersections of South Street, Wiebe Way, and Walnut Lane. At the time of this report there was insufficient information to determine the cause of the negative slope in these areas. The sewer pipe on Powell Street receives wastewater flow from approximately 280 residential customers before it empties into the 24-inch sewer pipe on 7th Street.

West Street
The entire length of West Street was identified as a maintenance hotspot by City staff due to grease build-up and flat slopes. Based on survey data the stretch of 6-inch sewer pipe from Nash Road to 7th Street varies in slope from 0.38% to 3.5%. The shallowest pipe slopes occur in West Street from Hawkins Street to South Street. The sewer pipe on West Street receives wastewater flow from approximately 200 residential customers before it empties into the 24-inch sewer pipe on 7th Street.

Figure 3-2 illustrates the known high maintenance areas throughout the City.

Lift Stations

The City owns and operates four lift stations located throughout the collection system. These lift stations are briefly summarized in this chapter. Refer to Chapter 5 for detailed descriptions and the complete evaluation of the four lift stations and corresponding service areas.

- Airport Lift Station: The Airport Lift Station is located off Highway 156 (San Felipe Road) on Hollister Municipal Airport property near Armory Drive. The lift station receives flow from the airport, the corrections center off Airway Drive, and the commercial parks north and south of Fallon Road. The lift station discharges through a 10-inch diameter force main to the GLP Lift Station located on Frontage Road between Park Center Drive and McCloskey Road.

- GLP Lift Station: The GLP Lift Station is located on Frontage Road between Park Center Drive to the north and McCloskey Road to the south. The lift station receives flow from the Airport lift station, industrial and commercial parcels along San Felipe Road/Frontage Road from the GLP lift station to Maple Street. It also receives flow from residential lots along Rustic Street and Pacific Way to Chappell Road. The lift station discharges through a 12-inch diameter force main to a sewer manhole located at the intersection of East Street and Second Street near the 2nd and East Lift Station. The GLP lift station does not flow into the 2nd and East lift station, rather it flows to the discharge manhole located adjacent to the 2nd and East Lift Station facility.

- 2nd and East Lift Station: The 2nd and East Lift Station is located at the intersection of 2nd Street and East Street. The lift station receives flow from commercial lots located along San Felipe Road from Flora Avenue to Santa Ana Road and at the intersection of Alvarado Street and McCarthy Street. The majority of the flow to the lift station is from residential lots from East Street to San Tropez Drive and Maple Street to Meridian Street. The lift station discharges through a short 8-inch ductile iron pipe (DIP) force main to a 72-inch "discharge" sewer manhole outside the fenced enclosure of the 2nd and East Lift Station on East Street.

- Southside Lift Station: The Southside Lift Station is located near the intersection of Southside Road and Enterprise Road outside the City limits. The lift station receives flow from a residential development located off Southside Road at Hospital Road and a residential multi-family development off County Labor Camp Road. The lift station discharges through a 6-inch PVC force main to a sewer manhole located at the intersection of Southside Road and Union Road.

General Capital Improvement Project Recommendations

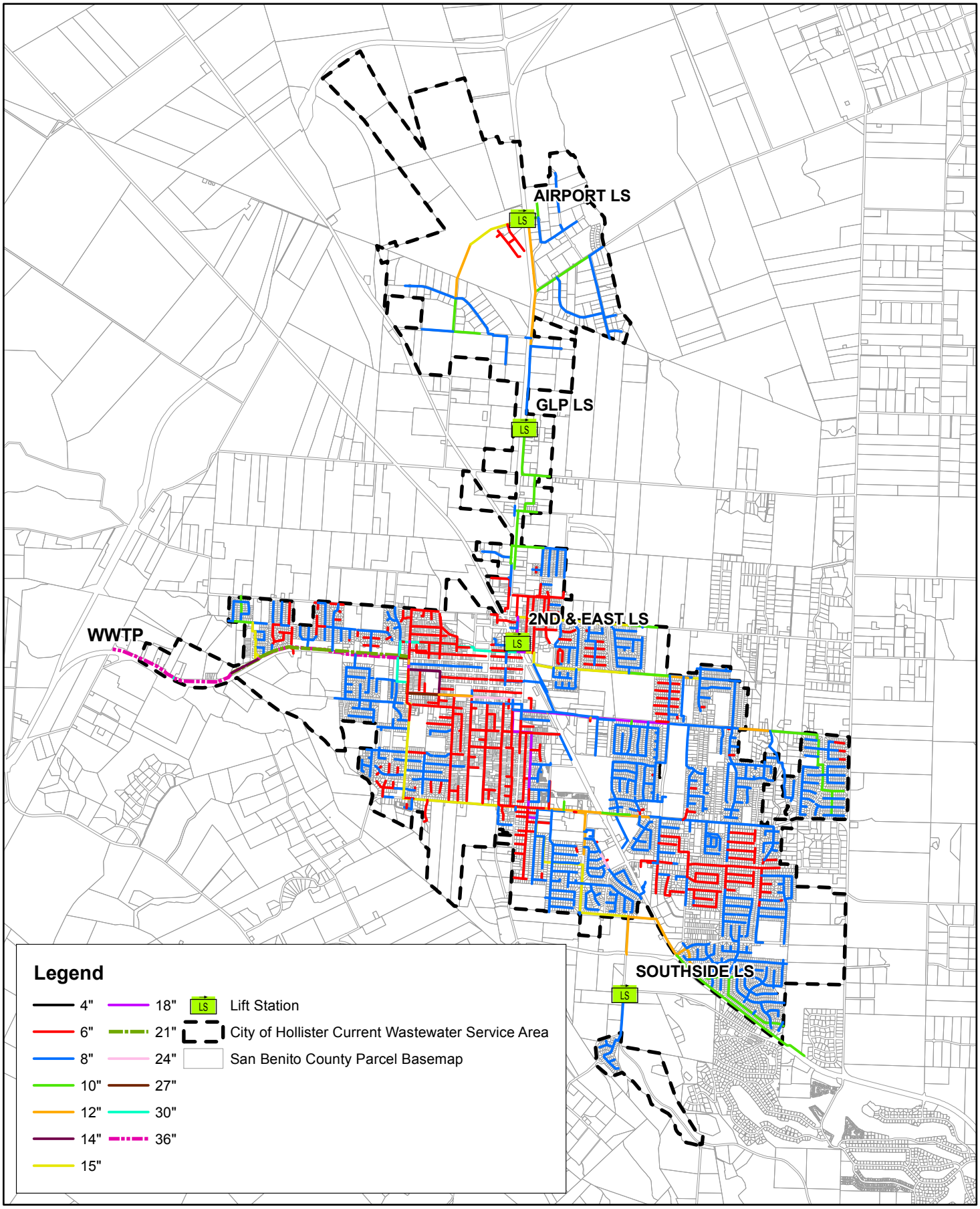
Based on the information provided above, the following are recommendations for capital improvement projects:

Sewer Manhole Database

It is recommended that the City invest in the development of a comprehensive manhole inventory database. This project would include conducting an inspection of all City manholes to catalog their construction material and physical condition. This information would be added to the GIS database and ultimately result in recommendations to replace or line manholes that are in poor/substandard conditions. This database could also be used to keep track of the status on pending and completed manhole repair projects.

FOG Program

Enhance the fats, oil, and grease (FOG) program targeting sources tributary to the known high grease areas. The program should include an educational program, inspection program, and an enforcement program.



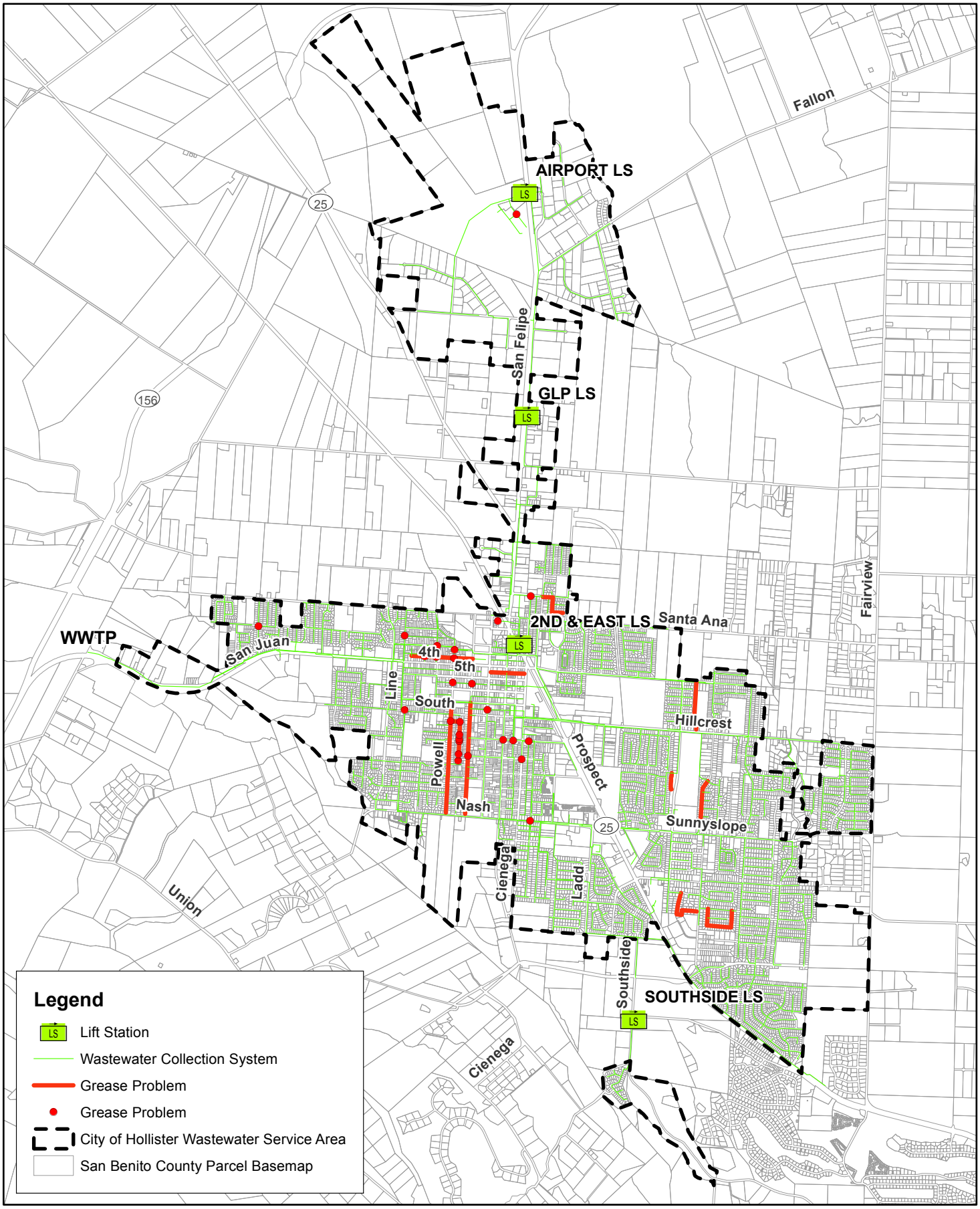
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 3-1: WASTEWATER SYSTEM OVERVIEW MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP

CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 3-2: WASTEWATER SYSTEM PROBLEM AREAS OVERVIEW MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

CHAPTER 4

WASTEWATER FLOWS

This Chapter presents the results of the sewer flow monitoring and the development of the wastewater flow characteristics used for the analysis of the collection system for the City. A portion of the referenced figures are located at the end of this chapter.

INTRODUCTION

Historical wastewater flows were examined for the City's collection system by utilizing the following sources of data:

- Sewer flow monitoring daily flow records
- City of Hollister daily flow records from the RDWWTP

A description of the flow monitoring results and historical RDWWTP flows is provided in the following sections.

SEWER FLOW MONITORING

To develop a better understanding of the existing wastewater flows from the City, flow monitoring was conducted at five (5) different locations on main trunk lines throughout the City's collection system. The flow monitoring locations are as follows:

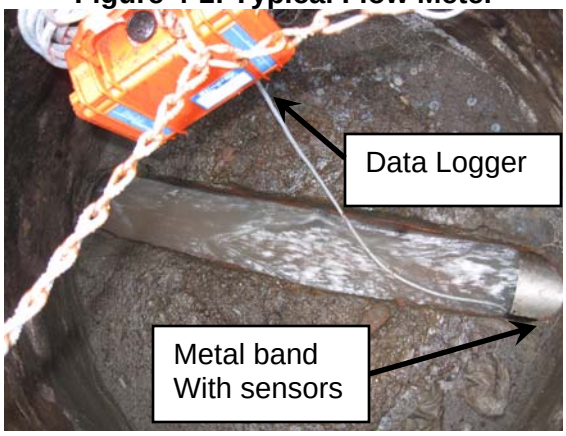
- **Central Avenue:** Located on Central Avenue west of Locust Avenue
- **Ladd Lane:** Located on Ladd Lane north of Talbot Drive
- **Line Street:** Initially located on Line Street near Peridot Court, moved to the intersection of Line Street and Steinbeck Drive
- **Tres Pinos Road:** Located on Tres Pinos Road at Ladd Lane
- **7th Street:** Located on 7th Street at Convent Alley

The locations of the flow meters and their corresponding tributary areas are depicted on Figure 4-7. The flow meters were installed August 28, 2009 and removed September 30, 2009 for a total of 34 days of monitoring. The flow meters were installed prior to the rainy season to capture representative flows during dry weather conditions. Infiltration and Inflow (I/I) analysis was not included as part of this flow monitoring exercise or report since the City's RDWWTP has not shown significant impacts from I/I flow. The goal of the following monitoring exercise was to record wastewater flow, which will be used to develop hourly/daily average flows throughout the City and diurnal trends that will be used to calibrate the sewer model.

The sites chosen to install the flow meters were based on the proposed pipes included in the sewer model development. The flow meters were set to monitor and characterize large tributary areas that would provide information about the characteristics of the collection system.

Flow Meters

Figure 4-1: Typical Flow Meter



The flow meters are insertion flow meters that consist of a circular metal band with sensors that are installed inside the sewer pipe in a manhole. They are usually installed in the upstream pipe entering a manhole. They are installed so that the wastewater entering the manhole travels over the band with the sensors, which then reads the wastewater temperature, flow depth, and velocity every 5 minutes.

Since sewer flow monitoring does not record continuous flow, it only provides a snapshot of varying flow rates which must be extrapolated to estimate wastewater generation over a 24-hour period. Flow monitoring does provide useful information about the diurnal flow patterns of the community. The following provides a summary of the benefits and the limitations with sewer flow monitoring:

Benefits

- Provides reasonably accurate measurements of hourly and daily wastewater flow averages for various tributaries within the community.
- Evaluates diurnal trends within the community, which will help estimate the peaking factors that are required to size the collection system and evaluate the remaining capacity within the existing collection system.

Limitations

- The flow meters read every 5 minutes and then are averaged over the 5 minutes. The averages are then totaled for the day to get total daily flows. Therefore, there are possibilities that the flow meter could miss higher peaks that may come through the collection system in between readings.
- Since wastewater is not a clean liquid, debris travels over the sensors, which causes blockages in the sewer mains and ultimately can change the levels and velocities in the sewer main producing inaccurate readings. If debris such as rags gets stuck on the bands, often times the level reading becomes zero, which reads as no flow in the manhole, which is incorrect.
- The flow meters need a minimum level, typically at least 1 inch over the sensor in order for the sensor to read the depth. If the level is less than 1-inch over the band, the sensor can only read velocity and can not provide estimates of the flow. Through additional manipulation, flows can be estimated with only velocity readings, but these are typically not reliable.

Flow Meter Results

The following provides a summary of results from each of the flow monitoring stations. Figure 4-1 illustrates the location of the five (5) flow meters and the tributary area to each meter.

Central Avenue:

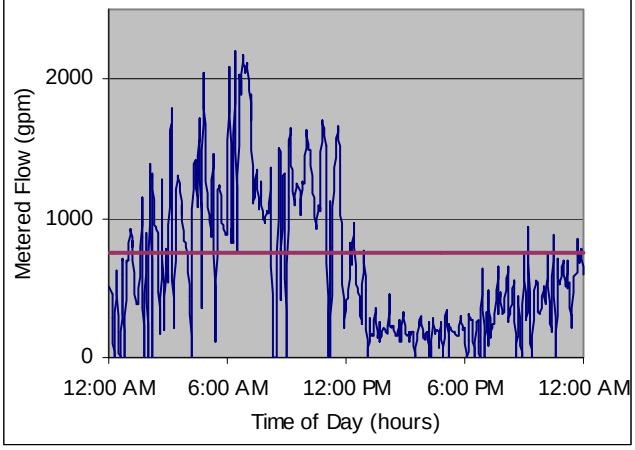
The Central Avenue flow meter was installed in a 30-inch diameter sewer pipe in the manhole on Central Avenue just west of Locust Avenue. The flow meter received flow from the following land uses within the tributary area:

- Residential
  - Residential customers from Pacific Way to Santa Ana Road, Chappell Road to Memorial Drive, and Hillcrest Road from Clearview Drive to Beverly Drive.
- Hotels
  - Best Western, Cinderella Motel, Hollister Inn, and Wiebe Motel.
- Schools
  - Maze Marguerite, Gavilan College, and Gabilan Hills Middle School.
- Commercial/Industrial
  - Industrial and commercial customers along San Felipe Road and Frontage Road from Park Center Drive to Hillcrest Road; and from Monterey Street to McCray Street from Santa Ana Road to Hillcrest Drive.
  - Industrial customers near the Hollister Municipal Airport north and south of Fallon Road.

This tributary area receives flows by gravity and pumped sewers via the Airport, GLP, and 2nd and East lift stations. The flow results from the Central Avenue flow meter appeared to be fairly inconsistent throughout the August 28, 2009 to September 30, 2009 flow monitoring period. This flow meter recorded zero readings during Labor Day weekend, which may have been caused by debris attaching to the flow meter sleeve. Review of the flow meter data clearly illustrates the flow variations attributed to lift station pumps turning on and off. Flow readings appeared to be irregular and higher then the estimated flow for this tributary area.

The average daily flow recorded for the Central Avenue flow meter was approximately 1,076,021 gallons per day (gpd) or 747 gallons per minute (gpm), which does not include the zero reading recorded during Labor Day weekend 2009, with a peak diurnal flow factor of 2.9 or approximately 2,172 gpm. This diurnal peak flow occurred on Tuesday, September 29th, 2009 and is depicted on Figure 4-2. The below average readings of this flow meter may be attributed to the large industrial and commercial land use

Figure 4-2: Central Avenue Peak Diurnal Flow



within this tributary area and impacts of the three (3) schools in the area.

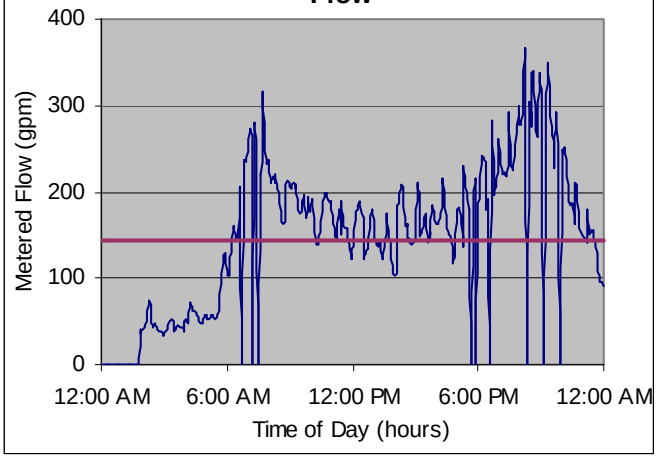
Based on our review of the flow data and the difference to our estimated flows we are not confident with the results from this flow meter. Flow results from this meter will not be used to calibrate the sewer model.

Ladd Lane:

The Ladd Lane flow meter was installed in a 15-inch diameter sewer pipe in the manhole on Ladd Lane north of Talbot Drive. The flow meter received flow from the following land uses within the tributary area:

- Residential
  - Residential customers on Ladd Lane from Talbot Drive to Southside Road and the southeast portion of the City from Union Road to Glenview Drive.
  - Residential customers outside the City limits along Southside Road at Hospital Road.
- Schools
  - Ladd Lane Elementary School.
- Commercial/Industrial
  - Minor commercial located near Ladd Lane Elementary School.

Figure 4-3: Ladd Lane Peak Diurnal Flow



This tributary area receives flow from the Southside Lift Station, which includes the residential flow from the customers outside City limits, at Southside Road at Hospital Road. The flow results from the Ladd Lane flow meter appeared to have no significant problems throughout the August 28, 2009 to September 30, 2009 flow monitoring period. This flow meter had clear and repeatable weekly trends with peak flows occurring on the weekends. The repeatable undulations correlate well to the Southside Lift Station.

The average daily flow recorded at the Ladd Lane flow meter was approximately 206,000 gpd or 143 gpm with a peak diurnal flow factor of 2.3 or approximately 339 gpm. This peak diurnal flow occurred on Tuesday, September 29th, 2009 and is depicted on Figure 4-3.

Results from the Ladd Lane flow meter matched our estimated flows. Results from this flow meter will be used to develop the residential diurnal curve for the sewer model and flow results will also be used to calibrate the sewer model.

Line Street:

The Line Street flow meter was originally installed in a 15-inch diameter sewer pipe in a manhole on Line Street near the intersection of Peridot Court. After three weeks of insufficient (zero or low) flow readings the meter was moved south to the manhole at the

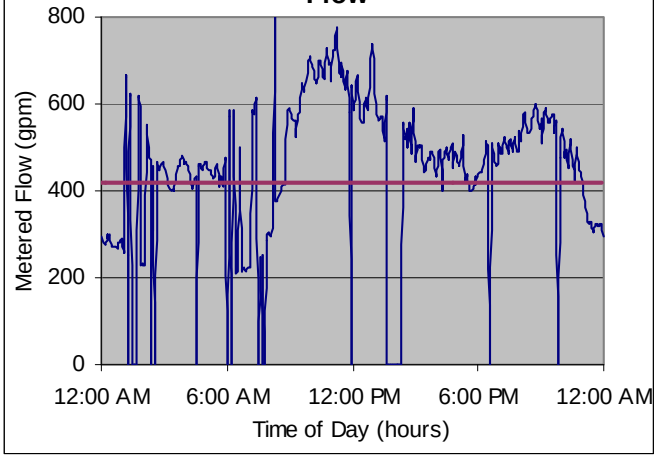
intersection of Line Street and Steinbeck Drive for a five day period. Debris or maintenance activities may have affected the performance of this flow meter. This tributary received flow from the Tres Pinos Road tributary area. The flow meter received flow from the following land uses within the tributary area:

- Residential
  - Residential customers from Steinbeck Drive south to Nash Road; a pocket of residential customers on Rancho Drive and along Hillock Drive from Ladd Lane to Carousel Drive.
- Schools
  - Portion of San Benito High School
- Commercial/Industrial
  - Commercial customers on Tres Pinos at Line Street and along Hillock Drive from Line Street to Sunset Drive.

As mentioned previously, the Line Street flow meter did not provide consistent data throughout the flow monitoring period. The original location on Line Street recorded minimal flow from August 28, 2009 to September 23, 2009. The flow meter was moved south on September 23, 2009 and recorded usable flow data over the course of five days.

The average daily flow recorded at the Line Street flow meter area during September 24, 2009 to September 30, 2009 was approximately 606,000 gpd or 420 gpm with a peak diurnal flow factor of 1.7 or approximately 728 gpm. This peak diurnal flow occurred on Sunday, September 27th, 2009 and is depicted on Figure 4-4. The diurnal peaks of this flow meter occur later in the day 9 am and 9 pm respectively, which is attributed to the flow meter being substantially downstream in the collection system.

Figure 4-4: Line Street Peak Diurnal Flow



The average daily flow also accounts for flow from the Tres Pinos tributary area. The calculated average daily flow for the Line Street tributary area was calculated to be 226,000 gpd, or 156 gpm, if flow from the Tres Pinos Road tributary area was subtracted from the total average daily flow recorded at the flow meter.

The flow results from the Line Street flow meter will be used to as a secondary source of information to calibrate the sewer model.

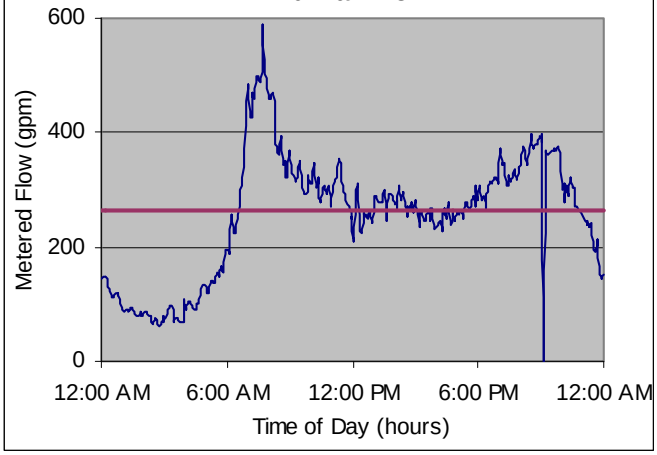
Tres Pinos Road:

The Tres Pinos Road flow meter was installed in a 12-inch diameter sewer pipe in the manhole at the intersection of Tres Pinos Road and Ladd Lane. The flow meter received flow from the following land uses within the tributary area:

- Residential
    - Residential customers between Sunnyslope Road to Union Road and Airline Highway to Calistoga Drive.
- Schools
    - Cerra Vista Elementary School and Calvary Christian.
- Commercial/Industrial
    - Minor commercial flow from customers at the corner of Sunnyslope Road and Airline Highway and at the intersection of Sunnyslope Road and Memorial Drive.

The flow results from the Tres Pinos Road flow meter were the best and clearest readings throughout the August 28, 2009 to September 30, 2009 flow monitoring period. This flow meter had clear and repeatable weekly trends, with the highest daily flows typically occurring on the weekends primarily Sundays. The average daily flow recorded at the Tres Pinos Road flow meter was approximately 380,000 gpd, or 264 gpm, with a peak diurnal flow factor of 2.2 or approximately 587 gpm. This peak diurnal flow occurred on Thursday, September 10th, and is depicted on Figure 4-5.

Figure 4-5: Tres Pinos Road Peak Diurnal Flow



Results from the Tres Pinos Road flow meter matched our estimated flows. Results from this flow meter will be used to calibrate the sewer model.

7th Street:

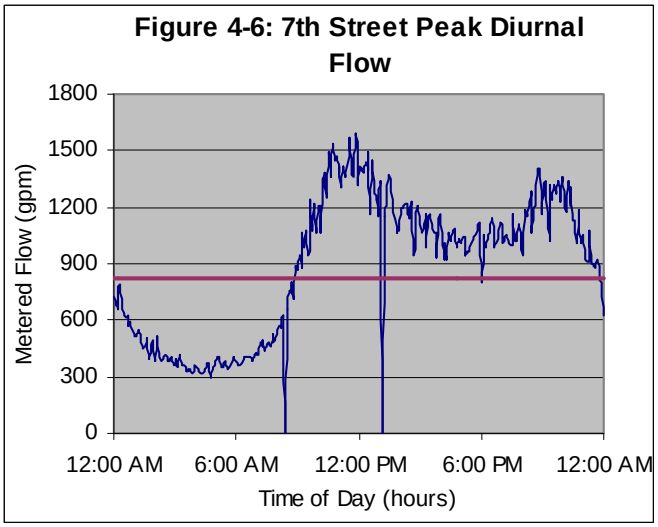
The 7th Street flow meter was installed in a 27-inch diameter sewer pipe in the manhole at the intersection of 7th Street and Convent Alley. This tributary received flow from the Ladd Lane tributary area. The flow meter received flow from the following land uses within the tributary area:

- Residential
    - Residential customers between South Street, Nash Road, and Southside Road from Powell Street to Prospect Avenue and Ladd Lane. Pocket of residential customers along Hillcrest Road from Black Forest Drive to Memorial Drive and Popp Lane Circle to Forest Creek Circle.
- Schools
    - Portion of San Benito High School, Sunnyslope Elementary School, Sacred Heart, Children's House, Rancho San Justo Middle School, Grace Bible Christian, and R.O. Hardin Elementary School.
- Commercial/Industrial
    - Commercial customers from South Street to Haydon Street and the intersection Cushman Street and Tres Pinos Road.
    - Industrial and commercial customers at South Street and Sally Street and Hillcrest Road at Industrial Drive.

The flow results from the 7th Street flow meter produced very clear and repeatable flow readings throughout the August 28, 2009 to September 30, 2009 flow monitoring period.

The average daily flow recorded at the 7th Street flow meter was approximately 1,181,653 gpd or 820 gpm with a peak diurnal flow factor of 1.9 or approximately 1,594 gpm. This peak diurnal flow occurred on Sunday, September 20th, and is depicted on Figure 4-6. The average daily flow for this meter also accounts for flow from the Ladd Lane tributary area. The calculated average daily flow for the 7th Street tributary area would be 975,653 gpd, or 677 gpm, if flow from the Ladd Lane tributary area was subtracted from the total average daily flow recorded at the flow meter.

Figure 4-6: 7th Street Peak Diurnal Flow



Results from the 7th Street flow meter matched our estimated flows. Results from this flow meter will be used to calibrate the sewer model.

Flow Meter Summary

Table 4-1 provides a summary of the estimated average daily flows for each tributary area. As mentioned earlier in the Flow Meter Results section, wastewater flow from the Tres Pinos tributary area flows into the Line Street tributary area and flows from the Ladd Lane tributary area flows into the 7th Street tributary area. A flow meter was not installed at the RDWWTP, however the City does have a permanent flow meter that records daily flows. Since a separate flow meter was not install near or upstream of the RDWWTP a separate tributary area was developed to estimate flow for customers from Powell Street west to the RDWWTP, which is shown in Figure 4-1 and referenced in Table 4-5.

Table 4-1. Flow Meter Summary of Average Day and Peak Hour Flows

Tributary Areas	Average Flow		Peak Flow	
	gpd	gpm	Peaking Factor	gpm
Central Avenue	1,076,021	747	2.9	2,172
Ladd Lane	206,000	143	2.3	339
Line Street	606,000	420	1.7	728
Tres Pinos Road	380,000	264	2.2	587
7th Street	1,181,653	820	1.9	1,594

Figures 4-8 through 4-13 show daily flow readings for each meter during the 34-day monitoring period. These figures are included at the end of this Chapter.

CITY OF HOLLISTER RDWWTP DAILY FLOW RECORDS

The City provided wastewater flow data on a daily basis from January 2004 through December 2009 for the RDWWTP. Table 4-2 provides a summary of the average daily flow for the City from 2004 through 2009 as well as the minimum and maximum daily flows for each year.

Table 4-2. City of Hollister Average Annual Flow Summary from RDWWTP

Year	Average Daily Flow (mgd)	Minimum Daily Flow (mgd)	Maximum Daily Flow (mgd)
2004	2.72	1.86	3.66
2005	2.66	0.53	4.26
2006	2.59	1.56	4.60
2007	2.46	1.84	3.63
2008	2.32	1.51	3.66
2009	2.59	1.8	3.93

EXISTING WASTEWATER FLOWS

Based on the information from the sewer flow monitoring, the City's RDWWTP record information, and reliable wastewater resources such as Metcalf & Eddy, Wastewater Engineering Treatment and Reuse, fourth addition, the wastewater generation characteristics of various existing development types within the City were developed and are presented in Table 4-3 and Table 4-4. In addition, Table 4-5 breaks down the flow characteristics of the various tributary areas based on the wastewater generation factors.

Peaking Factor Analysis

When discussing wastewater flows, it is important to define some of the terminology used to describe and analyze wastewater flows for this analysis:

Average Daily Flow (ADF) is the average flowrate over a 24-hr period based on daily flow conveyed to a RDWWTP. In the case of this report, the ADF is based on flow records from the City's RDWWTP. The ADF was determined using the average daily flows from January 2004 through October 2009 and estimated to be 2.48 mgd.

Maximum Day Dry Weather Flow (MDDWF) is the peak flow recorded for a 24-hr period by the RDWWTP flow meter. This flow condition reflects the seasonal variation in dry weather flow and commonly occurs during the summer months. For the purposes of this study, the historical MDDWF is 4.61 mgd based on flow

records from the City's RDWWTP, which occurred on April 9, 2006 resulting in a peaking factor of 1.86.

Diurnal Curve is the variation in sewer flows throughout a 24-hr period due to customer usage patterns. A separate residential and commercial diurnal curve was developed for this analysis. The residential diurnal curve was estimated from the Ladd Lane flow meter, which recorded almost entirely residential flow. The commercial diurnal curve was estimated based on a typical commercial usage pattern. The diurnal curve does not include I/I flow contributions to the collection system. Figure 4-14, located at the end of this chapter, provides a residential and commercial diurnal curve for the City's collection system with a dry weather diurnal peaking factor of 1.8 for residential and 2.1 for commercial.

Peak Hour Dry Weather Flow (PHDWF) is the peak dry weather flow anticipated in a collection system, which is used to appropriately size wastewater collection system facilities. Peak hour flow factor is calculated by multiplying the maximum day factor and the diurnal peak factor. It is important to note that the peak hour factor is applied at the flow generation location, therefore the peak is dampened due to travel time as flows travel downstream. For this reason, peak hour factors used for collection system analysis are typically higher than those used for treatment plant analysis.

Peak Hour Wet Weather Flow (PHWWF) was not analyzed as part of this report based on direction provided by the City not to proceed on wet weather analysis. The City is confident that I/I is not a significant contributor of flow to the wastewater collection system, therefore I/I flow monitoring or additional analysis was not completed as part of this report.

Table 4-3. Summary of Peaking Factor Analysis

Flow Condition	Flow (mgd)	Peaking Factor	Notes
Average Daily Flow (ADF)	2.48	--	Recorded daily flow from City's RDWWTP from January 2004 through October 2009.
Maximum Day Dry Weather Flow (MDDWF)	4.61	1.86	Recorded daily flow from City's RDWWTP on April 9, 2006.
Peak Hour Dry Weather Flow (PHDWF)		3.34 - Residential 3.90 - Commercial	Flow monitoring from August 28, 2009 through September 30, 2009. A 1.8 residential diurnal factor was determined from the Ladd Lane flow meter results. A 2.1 commercial diurnal factor was determined based on Metcalf & Eddy. The diurnal curves are presented in Figure 4-8.

Table 4-4. Existing Average Daily Flows By Land Use

Source of Flow	Quantity	Unit	Flow Factor (gal/day/unit)	Total Average Annual Flow (gal/day)
Residential	38,406	persons	50	1,920,290
Corrections Facility	160	persons	50	8,000
Hotel Rooms	119	rooms	100	11,900
School	10,859	students	20	217,180
Commercial	6,440,839	s.f.	0.06	386,450
Existing Average Daily Flows				**2,543,820**

Table 4-5. Existing Average Daily Flows By Tributary Area

Description of Tributary Area	# of Parcels	# of Residential Units	Density	Estimated Residential Population (Including Mixed-Use)	gpd	# of Corrections Facilities	# of Inmates	gpd	# of Hotels	# of Hotel Rooms	gpd	Schools	Estimated # of Students	gpd	Commercial/ Public Facility (sq. ft.)	gpd	Total Flow Calculated (gpd)	Total Flow Metered (gpd)	Flow Meter Results
Central Avenue Tributary Area																			
Central Avenue	2243	2,130	3	6,390	319,500	2	160	8,000	4	119	11,900	3	2,483	49,660	3,163,850	189,831	578,891		
																	578,891	**1,076,021**	Measured
Line Street Tributary Area																			
Line Street	811	953	2.8	2,668	133,420	0	0	0	0	0	0	1	1,475	29,500	1,087,010	65,221	228,141	226,000	Calculated[2]
Tres Pinos	1371	1,621	4.1	6,646	332,305	0	0	0	0	0	0	2	898	17,960	494,594	29,676	379,941	380,000	Measured
																	608,081	**606,000**	Measured
7th Street Tributary Area																			
7th Street	2654	2,985	4.5	13,433	671,625	0	0	0	0	0	0	7	4,846	96,920	738,170	44,290	812,835	975,653	Calculated[2]
Ladd Lane	999	1,062	3.4	3,611	180,540	0	0	0	0	0	0	1	604	12,080	251,000	15,060	207,680	206,000	Measured
																	1,020,515	**1,181,653**	Measured
RDWWTP Area																			
RDWWTP[1]	1526	1,886	3	5,658	282,900	0	0	0	0	0	0	1	553	11,060	706,214	42,373	**336,333**		
TOTAL	**9,604**	**10,637**		**38,406**	**1,920,290**	**2**	**160**	**8,000**	**4**	**119**	**11,900**	**15**	**10,859**	**217,180**	**6,440,839**	**386,450**	**2,543,820**	**2,863,674**	

1. Wastewater flows were not measured for the area between the Central Avenue and 7th Street flow meters to the RDWWTP . Estimated flows were added to this table to estimate total flow within in the current wastewater service area.
2. The Line Street and 7th Street flow meters received flow from other tributary areas as noted on this sheet. To compare estimated flows to metered flows a calculated flow value was determined for these meters.

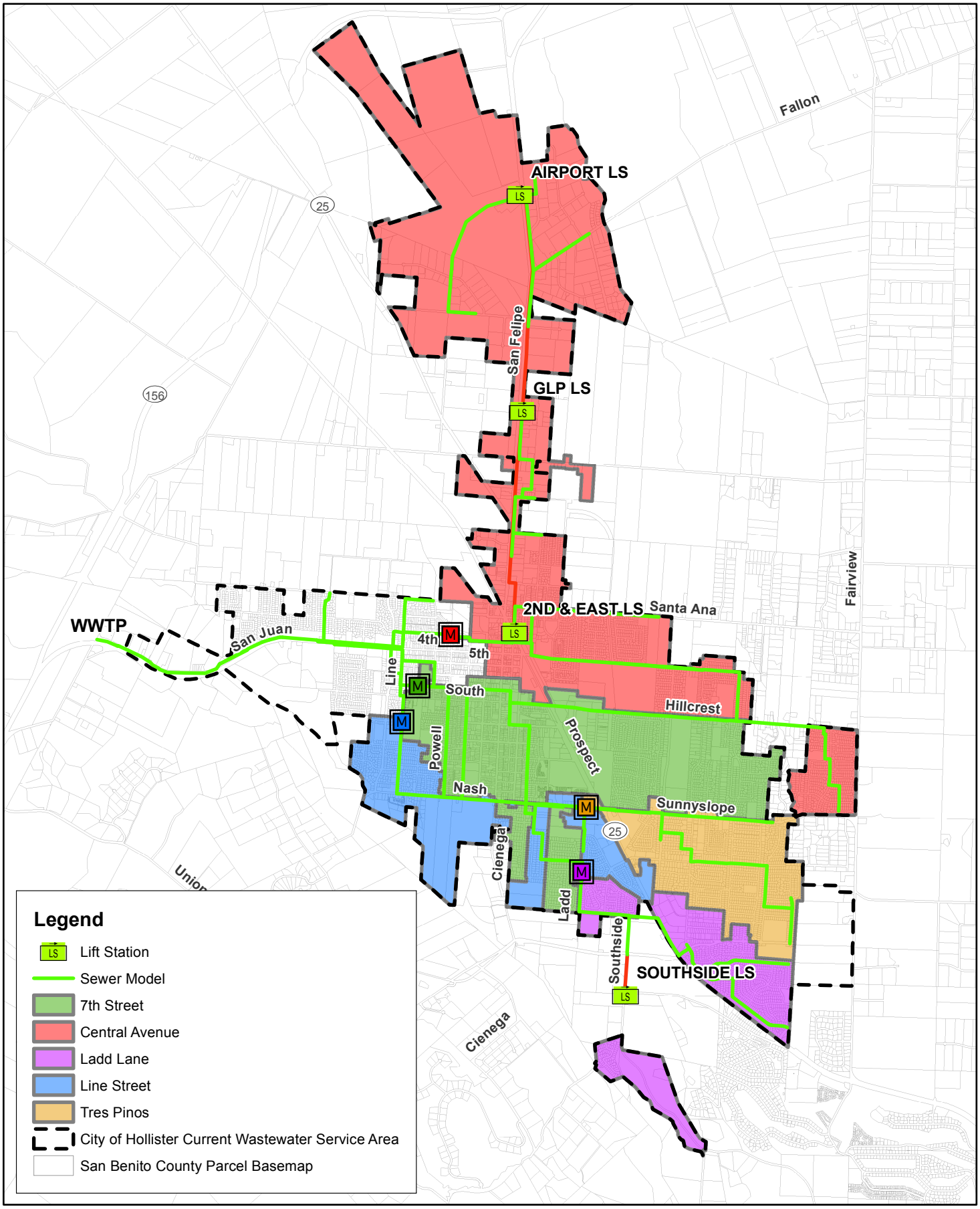
FUTURE WASTEWATER FLOWS

Projection of wastewater flow is tied closely to population projections and anticipated development. As noted in Chapter 2 of this report, the future flows for this collection system will come from infill, septic system conversion, re-development, and new development. It is unknown the timing of when these developments or septic conversions will occur in the future. Future capital improvement projects required due to future development will be required to be completed prior to the project coming on-line.

Although it is assumed that water conservation measures will be taken, such as low flow plumbing fixtures for all future development, to determine the future flows, the existing flow factors, noted in Table 4-4 will be used. In addition, the existing peaking factors noted in Table 4-3 will also be used for estimating future development MDDWF and PHDWF. Table 4-6 provides a breakdown of the land uses and the estimated future wastewater flows for the City.

Table 4-6. Future Average Daily Flows By Land Use

Source of Flow	Quantity	Unit	Flow Factor (gal/day/unit)	Total Average Annual Flow (gal/day)
Residential	62,272	persons	50	3,113,590
Corrections Facility	160	persons	50	8,000
Hotel Rooms	207	rooms	100	20,700
School	10,859	students	20	217,180
Commercial	18,704,501	s.f.	0.06	1,122,270
			Future Average Daily Flows	**4,481,740**



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 4-7: FLOW METER
LOCATION AND TRIBUTARY BASIN MAP

NOTES:
BASEMAP PROVIDE BY
SAN BENITO COUNTY.
WALLACE GROUP DID
NOT PERFORM BOUNDARY
SURVEY SERVICES FOR THIS
MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

Figure 4-8 Central Avenue Daily Flow Readings

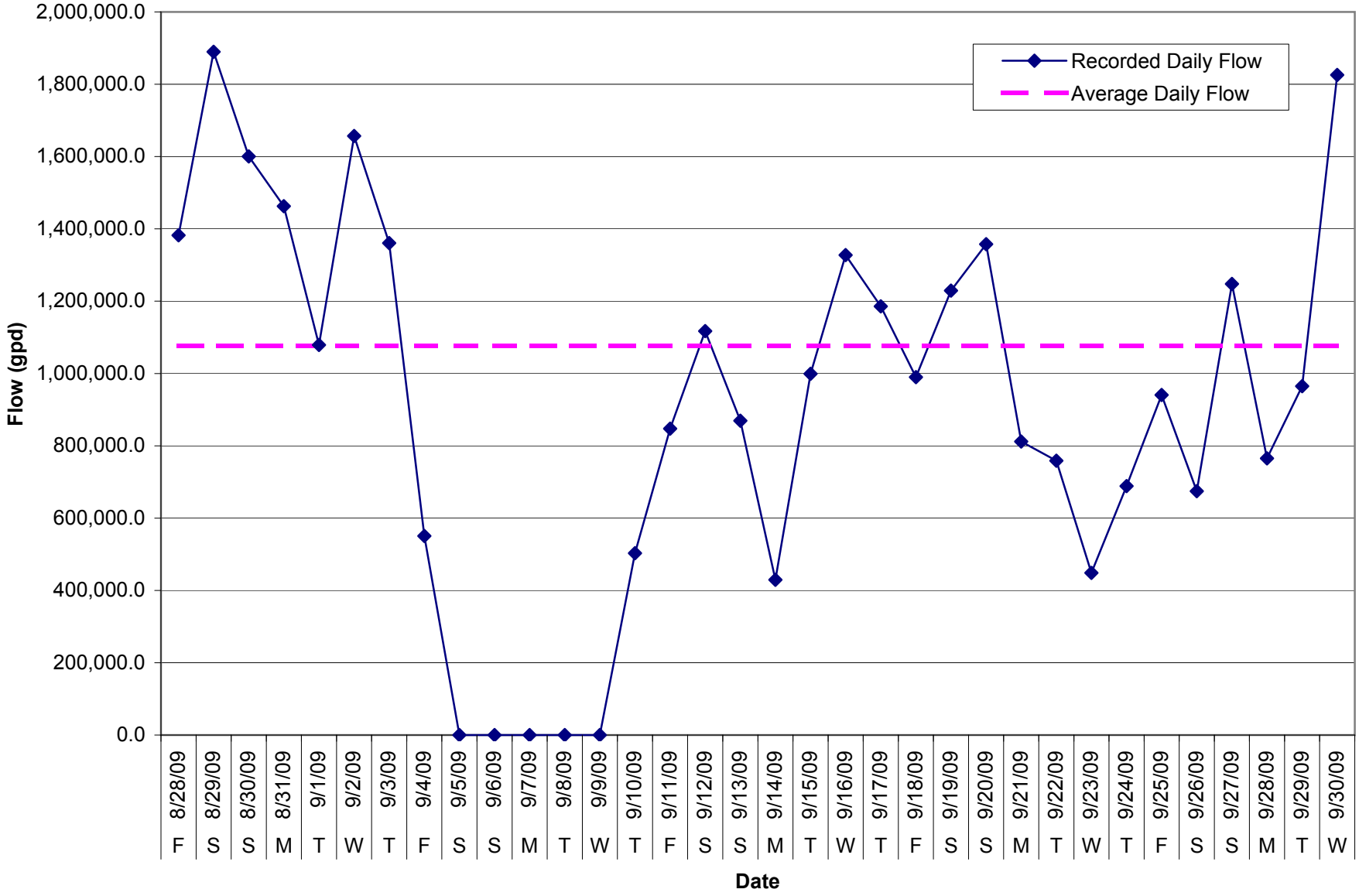


Figure 4-9 Ladd Lane Daily Flow Readings

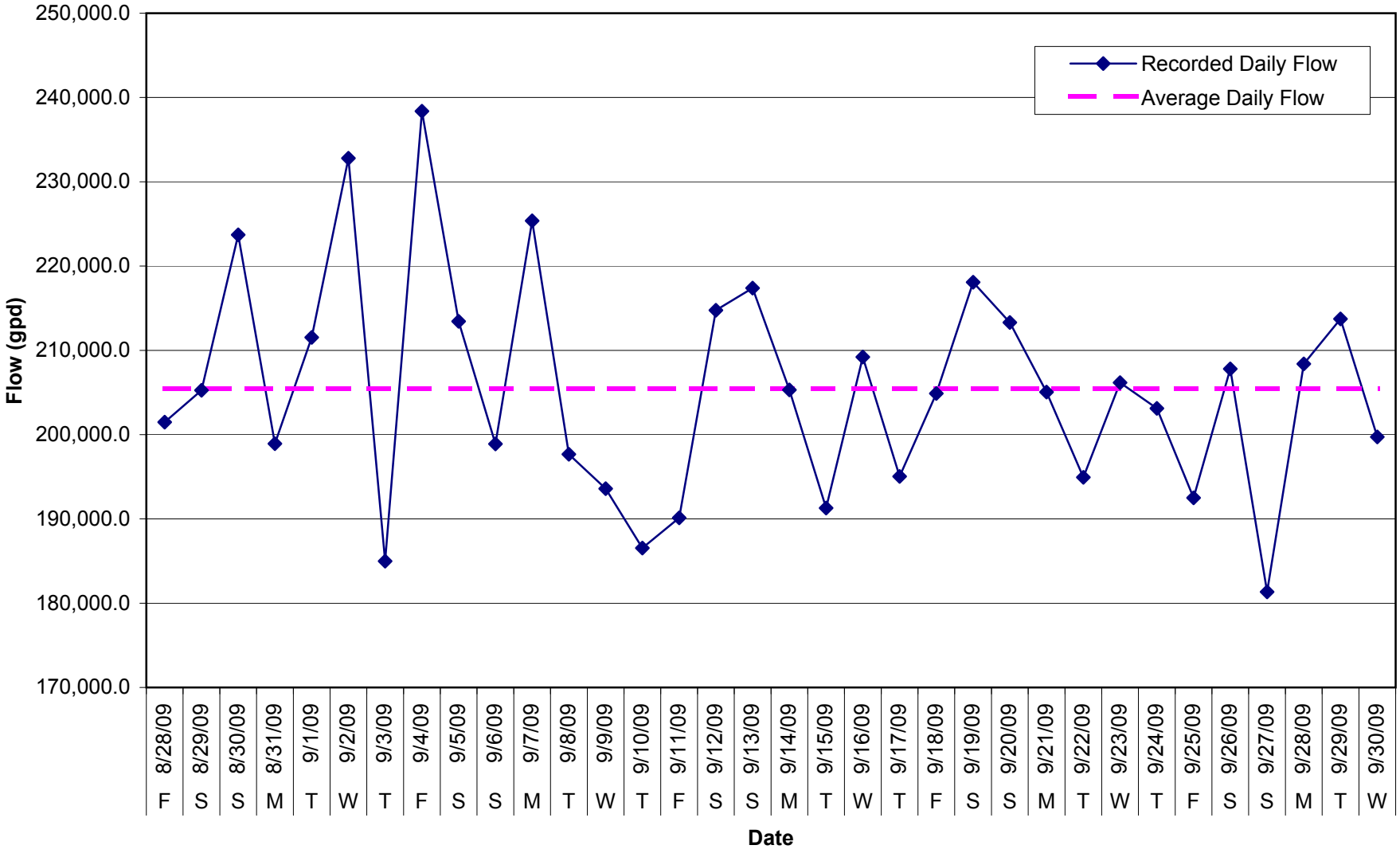


Figure 4-10 Line Street at Peridot Court Daily Flow Readings

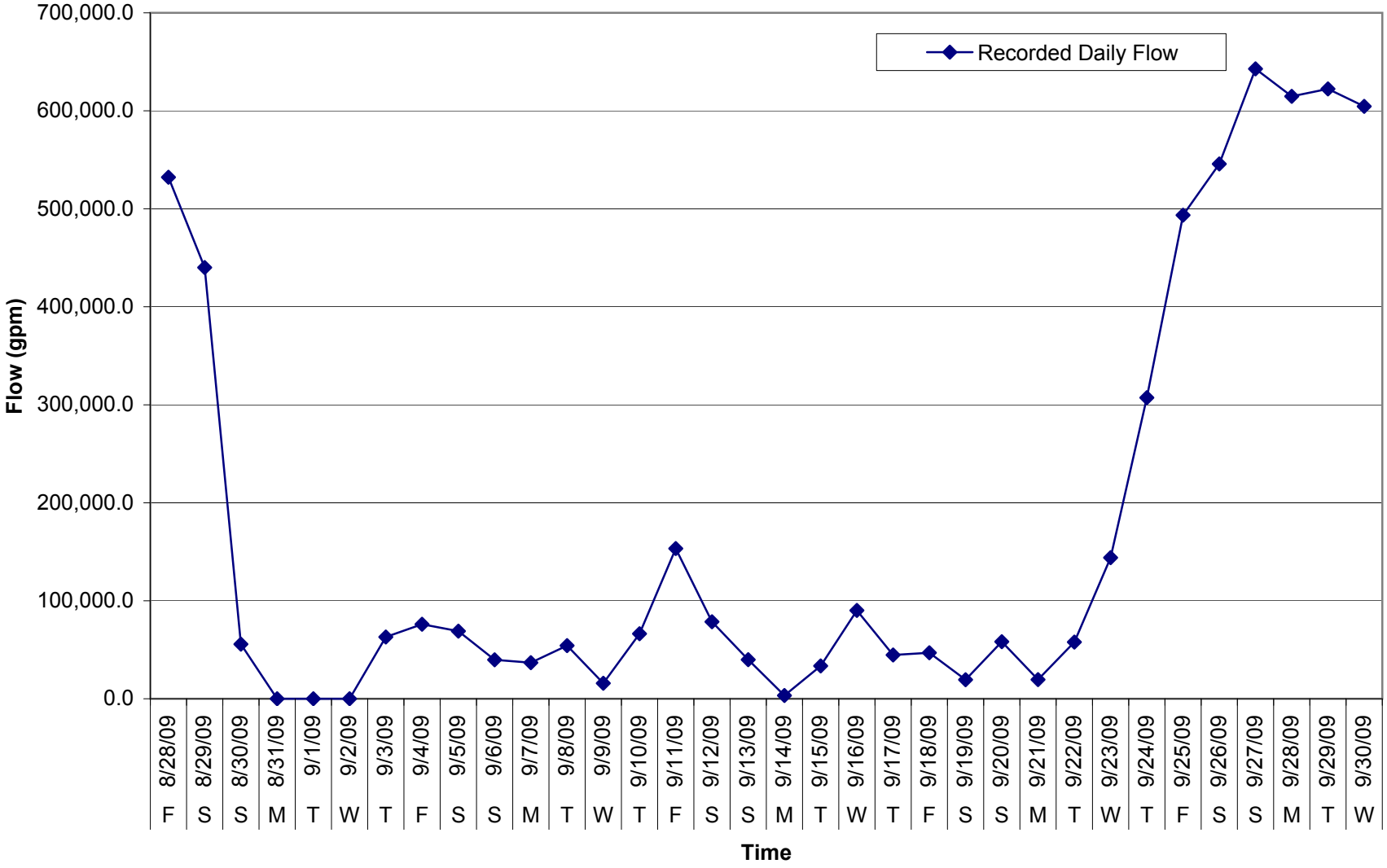


Figure 4-11 Line Street at Steinbeck Drive Daily Flow Readings

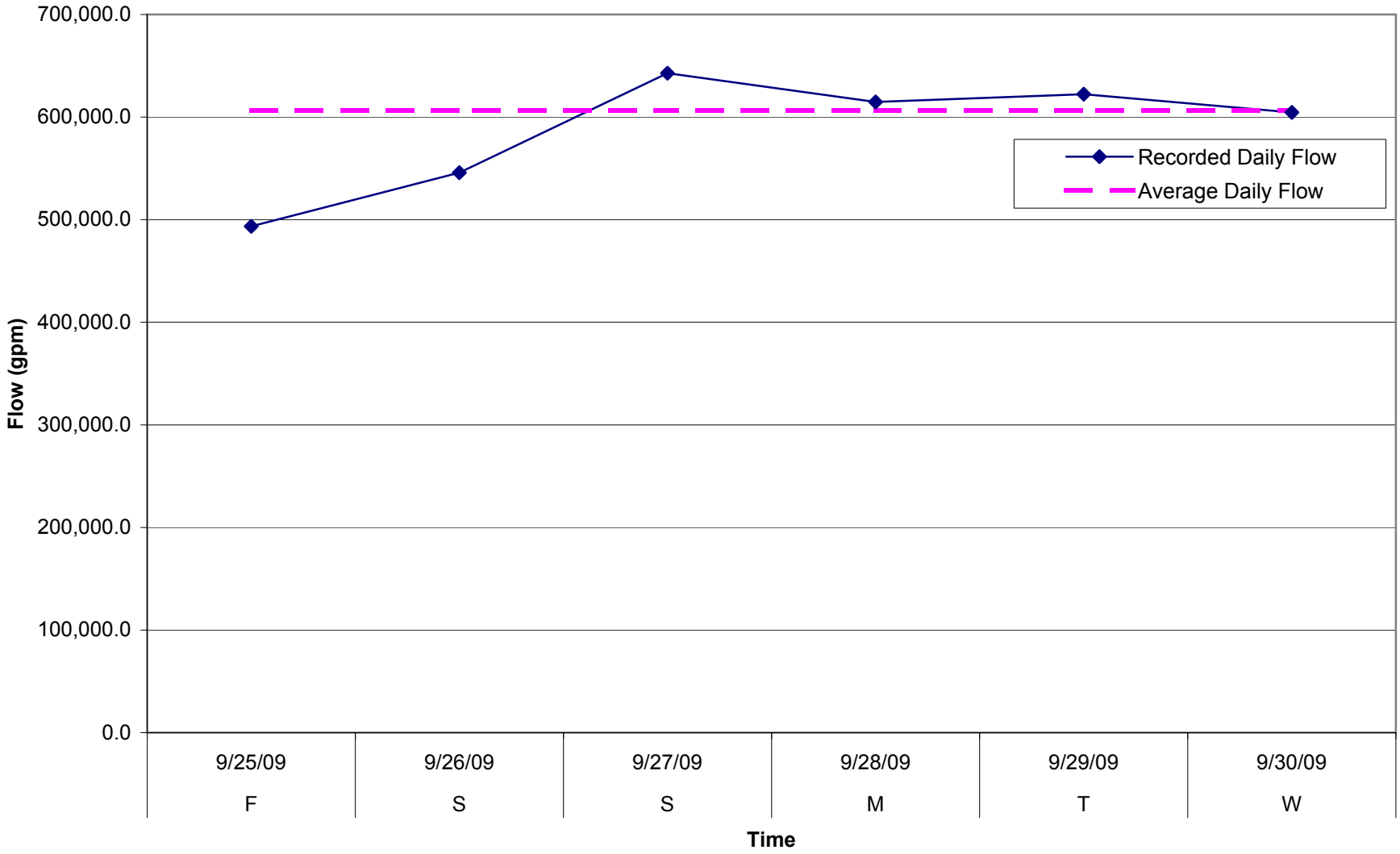


Figure 4-12 Tres Pinos Road Daily Flow Readings

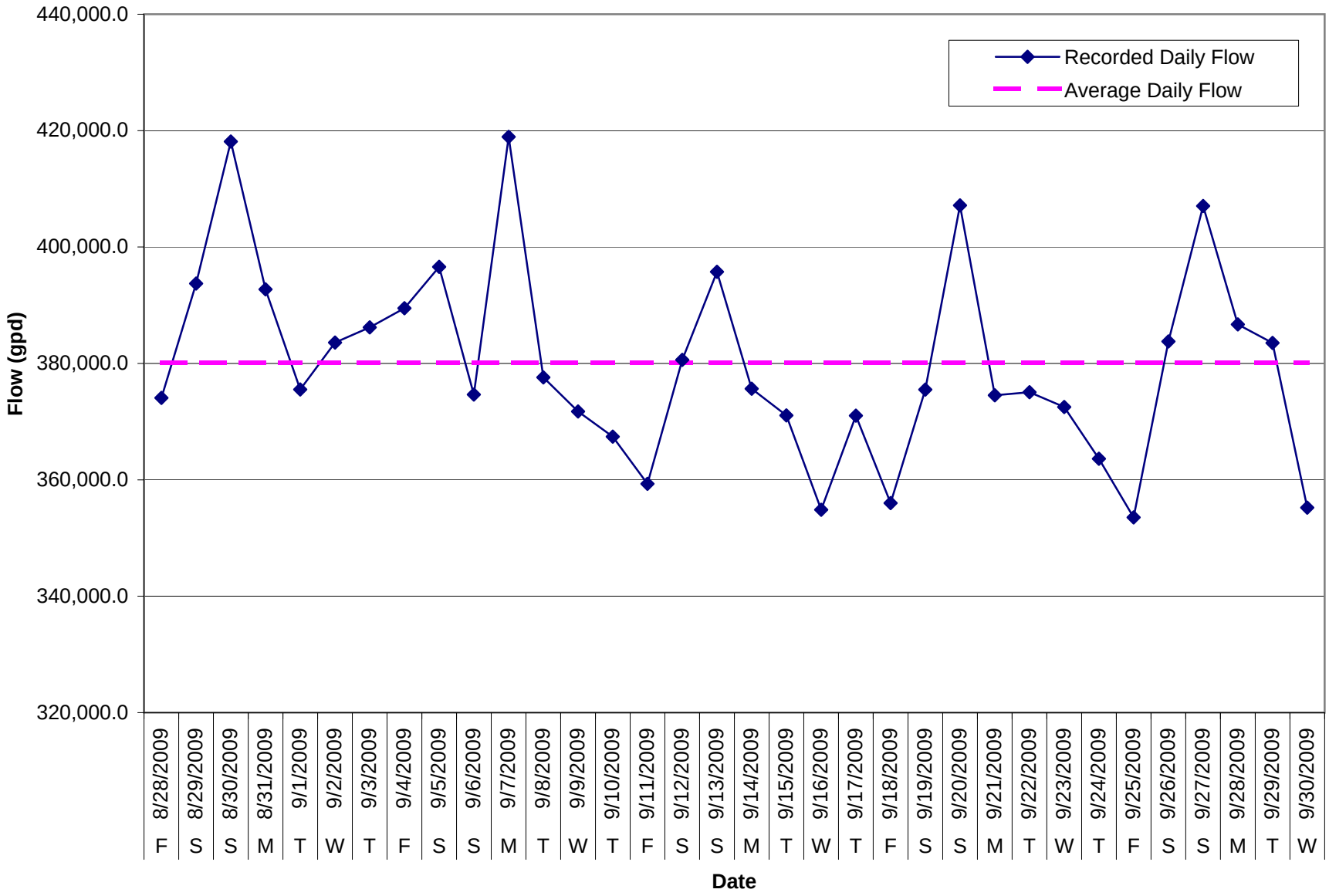


Figure 4-13 7th Street Daily Flow Readings

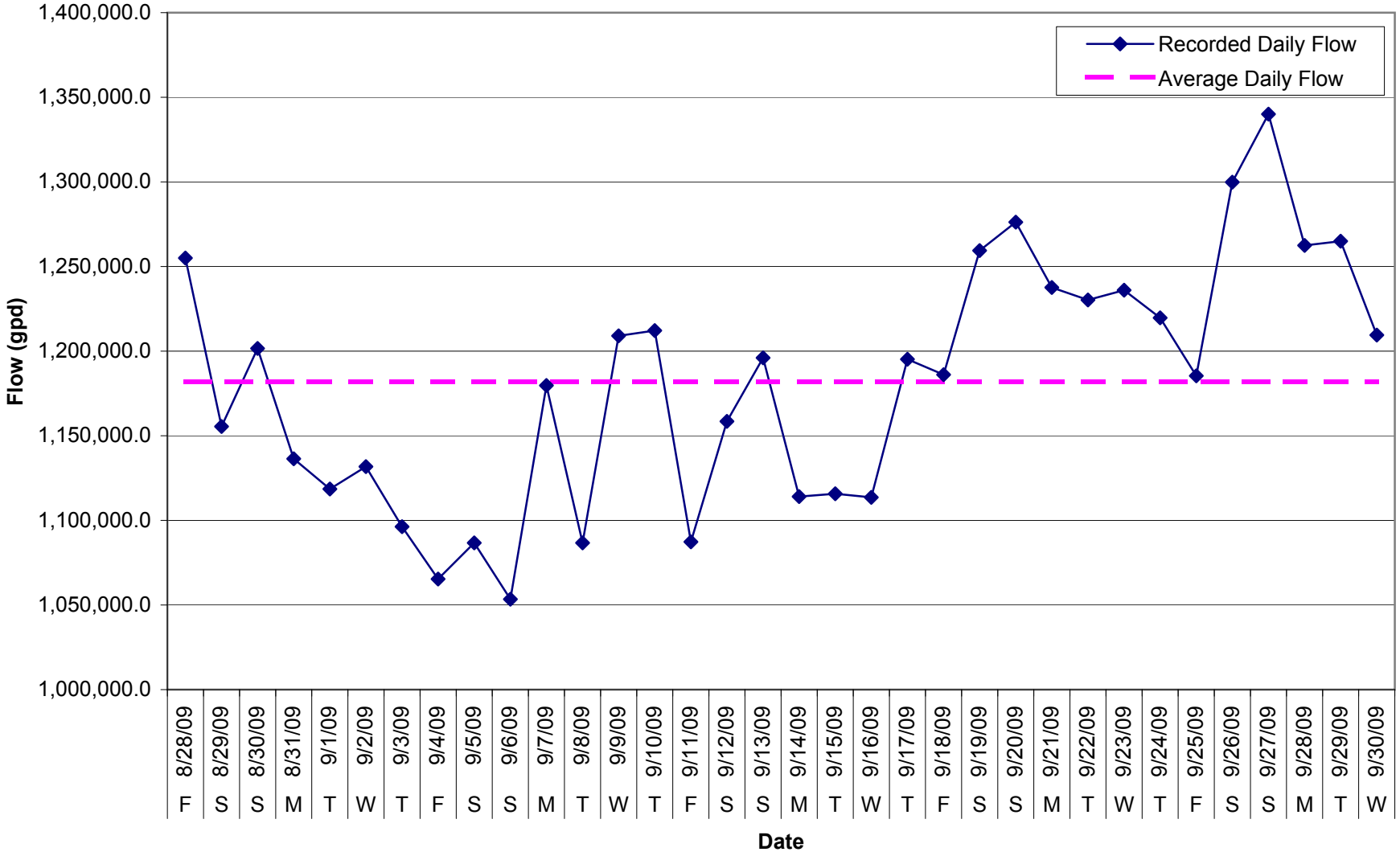
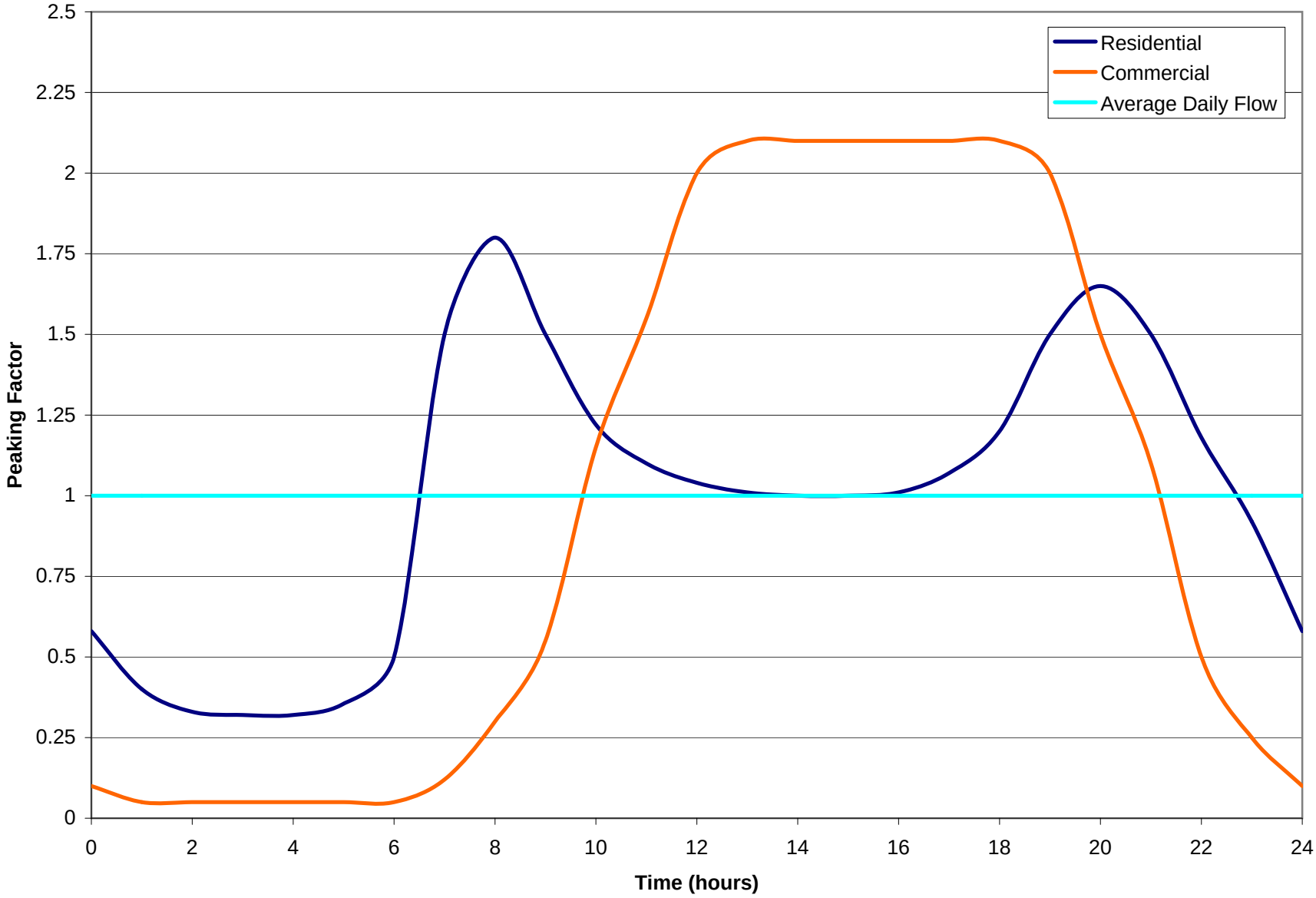


Figure 4-14 Diurnal Curve



CHAPTER 5

LIFT STATION EVALUATION

This Chapter presents the evaluation of the City's four lift stations for their ability to meet existing and future wastewater flow demands. All figures are located at the end of this chapter.

LIFT STATION BACKGROUND

The City owns and operates four lift stations located throughout the collection system. The service areas and locations of the lift stations are depicted in Figure 5-1 and their features are summarized in Table 5-1. The four lift stations are as follows:

Airport Lift Station

The Airport Lift Station is located off of Highway 156 (San Felipe Road) on Hollister Municipal Airport property near Armory Drive. This lift station collects flow from the airport, commercial and industrial parcels near the airport, and a small number of homes east of San Felipe Road.

GLP Lift Station

The GLP List Station is located on Frontage Road between Park Center Drive to the north and McCloskey Road to the south. This lift station collects flow from residential customers between San Felipe Road and North Chappell Road, commercial and industrial customers along San Felipe Road, including the Best Western and Wiebe Motel. This station also receives flow directly from the Airport Lift Station force main.

2nd & East Lift Station

The 2nd & East Lift Station is located at the intersection of Second Street and East Street. This lift station collects flow from residential customers between Highway 156 and Monte Carlo Drive, Gabilan Hills Elementary School and Maze Middle School, commercial customers along Highway 156 and McCray Street, and the Hollister Inn and Cinderella Motel.

Southside Lift Station

The Southside Lift Station is located near the intersection of Southside Road and Enterprise Road outside the City limits. This lift station collects flow from the 56 unit subdivision, San Benito County public works facility and County owned labor camp near Hospital Road and Southside Road.

PHYSICAL DESCRIPTION

Information regarding the physical characteristics of the four lift stations was provided by City staff, and above ground features were visually reviewed by Wallace Group during site visits. A physical investigation of the City's lift stations was not conducted as a part of this analysis. The lift station features are summarized in Table 5-1 and photos of the lift stations are included in Appendix A.

Table 5-1. Lift Station Summary

		Lift Station			
		Airport	**GLP**	**2nd & East**	**Southside**
Date Constructed		NA	NA	NA	1995
Date Refurbished		2001	2001	1993	---
Type		submersible	submersible	submersible	submersible
Pump Manufacturer		Wemco	Flygt	Flygt	Flygt
Number of Pumps		2	3	3	2
Horsepower (HP), each		25	20	10	7.5
Impeller Trim (in) OR Impeller Code		10.375	454	434	439
Pump Model #		E5K-ST-EEXZ4	3152-091-9144	3127-093-0850072	3127-090-439MT
Motor Model #		EEXZ4	NA	NA	NA
Motor Serial #		01DW03318-01, -02, -03	NA	NA	NA
Voltage		460	460	460	460
Speed (rpm)		1750	1750	1750	1750
Motor Type		Constant Speed	Constant Speed	Constant Speed	Constant Speed
Pump Design Point	gpm	800	NA	600	400
	TDH (ft)	70	NA	14.5	33
Total Hours of Operation[1]	Pump 1	3,978	1,025	2,052	9,164
	Pump 2	3,702	951	1,616	2,491
	Pump 3	---	963	2,020	---
Permanent Standby Generator		no	no	no	no
Portable Generator Power Receptacle		yes	yes	yes	yes
Bypass Capabilities		no	no	yes	no
Wet Pit Coating		NA	NA	epoxy	NA
Wet Well Diameter or Length (ft)		10	10	10	6
Wet Well Width (ft)		6	---	---	---
Wet Well Invert Elevation (ft)		191.38	231	258	303.62
Wet Well Total Depth (ft)		28.10	17	25	17.25
Wet Well Set Points (feet)[2]	Low Alarm	0.4	0.5	2.0	0.0
	Off	3.0	2.6	2.7	3.0
	Lead On	5.9	5.7	5.0	6.1
	Lag On	6.3	6.7	5.2	7.5
	Last On	---	7.2	5.6	---
	High Alarm	9.0	8.0	8.0	8.0
	Overflow	---	---	15.0	---
Wet Well Operating Volume (gal)[3]		1,302	1,821	1,351	656
Wet Well Maximum Volume (gal)[4]		3,860	4,406	3,525	1,692
Force Main Diameter (inches)		10	12	8 & 10	6
Force Main Material		PVC	PVC	DI	PVC
Force Main Length (feet)		6,992	7,128	37	1,320
Force Main Start Elevation (feet)[5]		193.03	231.00	260.00	303.62
Force Main End Elevation (feet)		244.67	280.12	273.72	327.32
Force Main Total Static Head (feet)		51.6	49.1	13.7	23.7

NA - Not Available

1. Total pumping hours as of October 1, 2009. Information provided by City Staff.
2. Information provided by City staff.
3. Wet well operating volume calculated based on operating range from Pump Off to Lead On
4. Wet well maximum volume calculated based on maximum desired operating range (Low Alarm to High Alarm)
5. Elevation assumed for 2nd & East and Southside Lift Stations, based on low wet well alarm.

Airport Lift Station

The Airport lift station is a duplex submersible pump configuration within a 6-foot by 10-foot rectangular wet well. The station was refurbished in 2001. At this time the station does not have dedicated back-up power. The wet well is equipped with a Bioxide® system to minimize formation of hydrogen sulfide gas and a 4-inch PVC vent pipe. The station pumps into a 10-inch PVC force main that is routed directly to the GLP lift station. This lift station is located within a fenced in area at the municipal airport.

GLP Lift Station

GLP is Hollister's largest lift station. The station is a triplex submersible pump configuration within a 10-foot diameter wet well. The station was refurbished in 2001. At this time the station does not have dedicated back-up power. The wet well is equipped with a Bioxide® system to minimize formation of hydrogen sulfide gas. The station pumps into a 12-inch PVC force main that flows to a manhole on 2nd Street adjacent to the 2nd & East lift station. This lift station is located in Frontage Road.

2nd & East Lift Station

The 2nd & East lift station is a triplex submersible pump configuration within a 10-foot diameter wet well. The station was refurbished in 1993. The lift station piping interior to the wet well was replaced in 2010 due to corrosion. The City has installed a Biocube® filtration system onsite to treat gas released from the lift station due to odor issues. At this time the lift station does not have dedicated back-up power. The station pumps into an 8-inch ductile iron force main, which transition to 10-inch and then discharges a short distance to a manhole in 2nd Street. This lift station is located within a fenced in area at the intersection of 2nd Street and East Street.

Southside Lift Station

The Southside lift station is a duplex submersible pump configuration within a 6-foot diameter wet well. The station was constructed in 1995. At this time the station does not have dedicated back-up power. The station pumps into a 6-inch PVC force main that discharges to the manhole at the intersection of Southside Road and Union Road.

Actual pump flow performance was not measured as a part of this project. Pump operation may differ from the manufacturer's curve due to physical constraints such as impeller wear and corrosion.

HYDRAULIC PERFORMANCE EVALUATION – EXISTING CONDITIONS

The hydraulic characteristics of each lift station were analyzed and deficiencies were noted. Design criteria that apply to the lift stations and force mains are summarized below.

1. Force main velocities should be greater than 2 feet per second to maintain self cleansing properties but less than 5 feet per second to minimize head loss and potential for water hammer.
2. Lift stations should be sized to convey peak flows with the largest pump out of service. Station "capacity" is therefore calculated with the largest pump out of service. This means that the lift station should be capable of operating with only one pump for a duplex station or two pumps for a triplex station.

3. Lift station wet wells should be sized to limit the number of pump starts per hour to acceptable limits as defined by the pump manufacturer. Larger lift stations may require a variable frequency drive to meet this requirement, especially those that receive direct discharge from other lift stations.
4. Lift stations should have a means of conveying peak flow during a power outage. Lift stations serving a small number of customers could use wet well storage to meet this requirement.

Force Main Hydraulic Evaluation

Force main friction loss was calculated to estimate total pump head and identify pump operating points based on manufacturer's pump curves. Pump curves for each lift station are included in Appendix A. The force mains and pumps were evaluated for hydraulic capacity only, physical condition of the lift stations is unknown.

Force main velocities were calculated based on estimated operating point of the lift station pumps. Calculated velocities are summarized in Table 5-2. As noted above, force main velocities should be greater than 2 feet per second to maintain self cleansing properties but less than 5 feet per second to minimize head loss and the potential for water hammer. Based on the calculated velocities identified in Table 5-2, the velocities within the force mains for each lift station are within acceptable ranges.

Table 5-2: Force Main Evaluation Summary

		Lift Station			
		Airport	**GLP**	**2nd & East**	**Southside**
Force Main Properties					
Force Main Diameter	inches	10	12	8 & 10	6
Hazen Williams C	--	135	135	110	135
Force Main Length	feet	6,992	7,128	37	1,320
Elevation Head	feet	51.6	49.1	13.7	23.7
Design Flows					
Simplex Flow	gpm	800	NA	600	400
Velocity	ft/sec	3.3	NA	3.8	4.5
Estimated Pump Capacity					
Simplex Flow	gpm	740	840	650	410
Velocity	ft/sec	3.0	2.4	4.1	4.7
Friction Loss[1]	ft	23.1	12.2	1.7	17.6
Total Pump Head	ft	74.7	61.3	15.4	41.3
Duplex Flow[2]	gpm	---	1,300	---	---
Velocity	ft/sec	---	3.7	---	---
Friction Loss[1]	ft	---	27.4	---	---
Total Pump Head	ft	---	76.5	---	---

NA - Not Available

1. Minor losses not calculated for Airport, GLP, or Southside. Minor losses were included for 2nd & East due to short force main length and therefore a large percent of total friction loss due to minor losses. Minor losses for 2nd & East calculated to be approximately 75% of total friction losses.

2. Duplex flow estimated using simplex pump curve to project duplex conditions

Existing Lift Station Inflow

Table 5-3 provides a summary of existing flows for each lift station based on the unit flow factors for contributing land uses as described in Chapter 4. The calculated flows for each lift station represent gravity flow to the lift station from its tributary area. The GLP lift station also receives flow from the Airport Lift Station.

Table 5-3: Existing Lift Station Inflow by Land Use

		Lift Station			
		Airport	**GLP**	**2nd & East**	**Southside**
Land Use Components					
Residential	Units	21	189	647	56
Density	Persons/Unit	3.0	3.0	3.0	3.5
Residential	Persons[1]	223	567	1,941	470
Commercial	Estimate ft^2	1,236,520	703,322	180,238	250,000
Hotels	Rooms	0	119	0	0
Schools	Students	0	0	1,683	0
Upstream Lift Station		NA	NA	Airport	NA
Flow Rate (gpd)					
Residential		11,150	28,350	97,050	23,500
Commercial		74,191	42,199	10,814	15,000
Hotel Rooms		0	11,900	0	0
Schools		0	0	33,660	0
Total Average Daily Flow	gpd	85,341	82,449	141,524	38,500
	gpm	59	57	98	27
	w/ Simplex LS	NA	797	NA	NA
Maximum Day Dry Weather Flow	Peaking Factor	1.9	1.9	1.9	1.9
	gpd	128,012	123,674	212,286	57,750
	gpm	89	86	147	40
	w/Simplex LS	NA	826	NA	NA
Peak Hour Dry Weather Flow	Residential Diurnal Factor	1.6	1.6	1.6	1.6
	Residential Peaking Factor	3.0	3.0	3.0	3.0
	Commercial Diurnal Factor	2.1	2.1	2.1	2.1
	Commercial Peaking Factor	3.9	3.9	3.9	3.9
	gpd	322,973	295,681	462,537	128,526
	gpm	224	205	321	89
	w/Simplex LS	NA	945	NA	NA

1. Estimate for the Airport Lift Station includes 140 persons for the County Jail and 20 persons for the County Juvenile Hall. Estimate for Southside Lift Station includes 274 persons for the County owned labor camp.

In addition, lift station pump records for the month of September 2009 were evaluated for average pump run times to estimate average daily flow for each of the City's four lift stations. This second method of calculating flow to the lift stations was utilized to verify the accuracy of flows calculated by land use. Table 5-4 provides a summary of calculated average lift station flow based on pump run times.

Table 5-4: Existing Lift Station Flow by Pump Run Time

	Lift Station			
	Airport	**GLP**	**2nd & East**	**Southside**
Average Total Daily Run Time[1] [min]	120	197	237	95
Estimated Simplex Pump Capacity [gpm]	740	840	650	410
Average Daily Flow [gpd]	88,800	165,507	153,987	39,122

1. Average for September 1 through September 30, 2009. Daily pump run times provided by the City.

Table 5-5 provides a comparison of lift station flows calculated from both land use and pump run times. Based on this comparison, the land use unit flow factors and lift station tributary areas closely approximate the existing flow for each of the City's lift stations. Flow to the 2nd & East station appears to be underestimated based on land use. However, using the lift station run time and the design pump flow of 600 gpm rather than the estimated pump flow of 650 gpm results in an average flow of 142,141 gpd, within 0.5% of the land use estimate. It is possible the 2nd & East station is running closer to the design flow of 600 gpm, due to additional friction losses not accounted for in this analysis, or other physical constraints such as impeller wear.

Table 5-5: Lift Station Flow Comparison Summary

	Lift Station			
	Airport	**GLP**	**2nd & East**	**Southside**
Average Flow by Land Use[1] [gpd]	85,341	167,790	141,524	38,500
Average Flow by Pump Run Time [gpd]	88,800	165,507	153,987	39,122
Percent Difference	-3.90%	1.38%	-8.09%	-1.59%

1. Flow to the GLP lift station includes flow contribution from the Airport lift station.

For the purpose of this analysis, flow rates calculated by land use will be utilized for hydraulic calculations and input to the hydraulic model.

Wet Well Capacity Evaluation

To determine the sufficiency of the wet well capacity under existing conditions, each lift station was evaluated under three different operating conditions, as follows:

1. Worst Case Scenario – this is when the flow coming into the lift station is exactly half of the flow rate of the pump
2. Average Daily Flows
3. Peak Hour Dry Weather Flows

Pump run times were calculated based on the lift station operating volumes and estimated pump flows. Table 5-6 summarizes the wet well cycle time calculations.

Table 5-6: Wet Well Cycle Times

		Lift Station			
		Airport	**GLP**	**2nd & East**	**Southside**
Wetwell Operating Volume	gallons	1,302	1,821	1,351	656
Estimated Simplex Pump Operation	gpm	740	840	650	410
Estimated Duplex Pump Operation	gpm	1,000	1,300	1,200	480
Design Simplex Pump Operation	gpm	800	NA	600	400
Worst Case Number of Pump Cycles per Hour (Flow In = One-half Pump Rate)					
Estimated Simplex Pump Operation	minutes	7.0	5.6	8.3	6.4
	Cycles per Hour	8.5	10.7	7.2	9.4
Design Simplex Pump Operation	minutes	6.5	NA	9.0	6.6
	Cycles per Hour	9.2	NA	6.7	9.2
Existing Average Daily Flow					
Estimated Simplex Pump Operation[1]	minutes	23.9	5.9	16.2	26.2
	Cycles per Hour	2.5	10.2	3.7	2.3
Design Simplex Pump Operation	minutes	23.7	NA	16.4	26.3
	Cycles per Hour	2.5	NA	3.6	2.3
Peak Hour Dry Weather Flow					
Estimated Simplex Pump Operation[1]	minutes	8.3	7.2	8.4	9.0
	Cycles per Hour	7.3	8.4	7.2	6.7
Design Simplex Pump Operation	minutes	8.0	NA	9.2	9.0
	Cycles per Hour	7.5	NA	6.5	6.6

1. The GLP lift station cycle times are calculated based on duplex mode operation for both average and peak flow conditions.

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 actual pump manufacturer's information. Often times, smaller horsepower motors are capable of starting more often than larger horsepower motors.

The following is a summary of conclusions regarding the existing wet well capacity for each lift station:

Airport Lift Station

The Airport Lift station receives approximately 59 gpm under average daily flow conditions, and 227 gpm under peak flow conditions. Based on these inflows it is anticipated that this station always operates in simplex mode. The lift station is cycling over 2 times per hour under average flow conditions and approximately 7 times per hour under peak hour dry weather flow. Based on these pump cycling times the wet well has adequate capacity for existing flows and therefore, this lift station is not required to be upgraded due to hydraulic constraints. However, the lift station appears to be cycling infrequently, with average residence time approximately twenty-three minutes; thirty minutes is typically the maximum residence time desired for a wet well to minimize odor and corrosion issues. The City is currently utilizing Bioxide® to minimize formation of hydrogen sulfide gas in the wet well. Improvement plans for the 2001 lift station upgrade indicate the future installation of a blower and soil bed scrubber. Those devices have not yet been installed at the lift station. It is recommended that the planned blower and odor scrubber are installed, to further minimize potential for corrosion due to hydrogen sulfide attack.

GLP Lift Station

The GLP lift station receives from its tributary area approximately 57 gpm under average daily flow conditions and 213 gpm under peak flow conditions. In addition, this lift station receives flow directly from the Airport lift station force main, estimated to be 740 gpm. Based on this total flow, the station is anticipated to operate in simplex mode for average and peak gravity flow conditions, and duplex mode when the Airport lift station is contributing. Taking into account the flow contribution from the Airport lift station, the lift station is cycling over 10 times per hour under average conditions and over 8 times per hour under peak conditions. Based on these pump cycling times the wet well has marginal capacity for existing flows. However, the Airport lift station inflow is not continuous over the course of an hour, so these pump cycle times are worst case estimates. Based on gravity inflow only and simplex pump operation, this lift station would cycle 2 and 5 times per hour for average day and peak hour flow, respectively. Therefore, this lift station is not required to be upgraded due to hydraulic constraints. Cycle times appear to be sufficient to minimize potential for corrosion due to hydrogen sulfide attack. In addition, the City is currently utilizing Bioxide® to minimize formation of hydrogen sulfide in the wet well.

2nd & East Lift Station

The 2nd & East lift station receives approximately 98 gpm under average flow conditions and 346 gpm under peak flow conditions. Based on these flows it is anticipated this station always operates in simplex mode. The lift station is cycling nearly 4 times per hour under average flow conditions and 6 to 7 times per hour under peak flow conditions. Based on these pump cycling times the wet well has adequate capacity for existing flows and therefore, this lift station is not required to be upgraded due to hydraulic constraints.

Southside Lift Station

The Southside lift station receives approximately 27 gpm under average flow conditions and 95 gpm under peak flow conditions. Based on these flows the station is anticipated to operate in simplex mode. The lift station is cycling twice per hour under average flow

conditions and over 6 times per hour under peak flow conditions. Based on these pump cycling times the wet well has adequate capacity for existing flows and therefore, this lift station is not required to be upgraded due to hydraulic constraints. However, the lift station appears to be cycling infrequently, with average residence time approximately twenty-six minutes; thirty minutes is typically the maximum residence time desired for a wet well to minimize odor and corrosion issues. It is recommended that the wet well be modified to minimize corrosion due to hydrogen sulfide attack by installing a blower and odor scrubber to release hydrogen sulfide gas or by treating the wet well with a product to minimize formation of hydrogen sulfide gas, such as Bioxide®.

Emergency Response Time Evaluation

Another critical factor for lift station design is the emergency response time an operator has to respond in the case of total pump failure due to power outage or another anomaly. Each of the City's lift stations is equipped with a portable generator power receptacle, and the City owns four portable generators that are dedicated for use at the lift stations. Emergency response time was evaluated for each lift station, as summarized in Table 5-7.

Table 5-7: Lift Station Emergency Response Times

	Lift Station			
	Airport	**GLP**	**2nd & East**	**Southside**
High Water Alarm (ft)	9	8	8	8
Overflow (ft)	28.10	17	15	17.25
Volume (gal)	8,573	5,288	4,113	1,957
ADF Inflow without Upstream LS (gpm)	59	57	98	27
ADF Response Time (min)	**145**	**92**	**42**	**73**
ADF Inflow with Upstream LS (gpm)	NA	797	NA	NA
ADF Response Time (min)	NA	**7**	NA	NA
PHDWF Inflow without Upstream LS (gpm)	227	213	346	95
PHDWF Response Time (min)	**38**	**25**	**12**	**21**
PHDWF Inflow with Upstream LS (gpm)	NA	953	NA	NA
PHDWF Response Time (min)	NA	**6**	NA	NA

NA= Not Applicable

Response time was calculated based on the amount of time between high water alarm and overflow. Only the 2nd & East lift station has a dedicated overflow line that gravity flows into the collection system. For the three lift stations without an overflow line, the overflow location was estimated based on upstream topography and confirmed with the City. The upstream collection system may provide some additional storage capacity for response time. Storage capacity within the collection system was not analyzed.

Response time for a lift station can be increased by increasing available storage in the wetwell or providing an overflow to additional emergency storage. Alternatively, the need for immediate response can be eliminated by installing permanent stand-by generators. Results for each lift station are provided as follows:

Airport Lift Station

The Airport lift station has the greatest emergency storage volume and response time of the City's four lift stations. Under peak flow conditions emergency response time is approximately 38 minutes, with a response time of over two hours for average flow conditions. This lift station would overflow from the collection system in the commercial area east of San Felipe Road. The manholes on Bert Drive and Technology Parkway would overflow first, with potential flooding from the manholes in Apollo Court if the overflow continued.

GLP Lift Station

The GLP lift station has a reasonable emergency storage volume; however flows to this station are high due to the direct contribution from the Airport lift station. With the Airport lift station running, emergency response time is approximately 7 minutes for average flow conditions and only 6 minutes for peak flow conditions. The station is equipped with an emergency alarm; however, according to City staff the SCADA alarm system does not always function during an emergency event. It is recommended the SCADA system be evaluated and tested for potential issues related to the alarm system. If this lift station did overflow the wastewater would flow from the manholes located near Wiebe Motel on San Felipe Road, and could cause backups in the Motel and other nearby service connections due to flat topography in the proximity of the lift station. It is recommended that the City's SCADA system be configured such that the Airport Lift Station pumps are disabled if the GLP station is not functioning, increasing the peak hour response time for GLP to 25 minutes. Because the Airport lift station response time is greater than the GLP response time, if the GLP issue was corrected within this 25 minute response window the Airport lift station could be re-enabled prior to overflow occurring from the Airport station.

2nd & East Lift Station

The 2nd and East lift station has a relatively short response time; however it does also have a bypass line that directs wastewater back to the collection system. The response time for this lift station is approximately 42 minutes under average flow conditions and only 12 minutes under peak flow conditions. Although the station would flow to the bypass line if a pump failure did occur, backwater effect from the downstream collection system may limit the by-pass flow and the station could overflow. If an overflow did occur, the wastewater would overflow from the upstream collection system, from the manholes on Lorene Drive near Rustic Court. It is noted that the bypass line was installed with a manual combination flap and slide gate to prevent backflow from entering the wetwell. Photos of this slide gate taken as a part of the manhole survey for the sewer model development indicate heavy corrosion on the slide gate. It is recommended this gate is exercised on a regular basis, and replaced if it becomes inoperable due to corrosion.

Southside Lift Station

Southside has the smallest flow of the City's lift stations but it also has the smallest volume for emergency storage. There is just over 1,900 gallons of volume available before the lift station overflows. The response time for this lift station is approximately 73

minutes under average flow conditions, reduced to 21 minutes under peak flow conditions. If this station did overflow the wastewater would flow to Southside Road and could potentially continue onto the neighboring private property.

HYDRAULIC PERFORMANCE EVALUATION – FUTURE CONDITIONS

It is critical to understand what upgrades are required to meet estimated future flows in addition to correcting existing deficiencies. The following sections analyze each lift station under the same criteria as existing wastewater flows.

Future Wastewater Flows

Future flow for each lift station was calculated based on planned developments, potential septic conversions, and future development in accordance with the City's General Plan land use, as described in detail in Chapters 2 and 4. Future flows from commercial and industrial development were calculated based on 50% of the maximum allowable square footage per the City's General Plan (not full build-out). Due to variability in wastewater generation from different industrial and commercial users, it is difficult to accurately predict future flow conditions for this type of development. As development occurs, flow contributions will need to be addressed on a case by case basis.

The following summarizes anticipated future flow contribution to each lift station. Future lift station tributary area boundaries are depicted on Figure 5-2.

Airport Lift Station
The majority of future flow to the Airport Lift station could be generated by commercial and industrial development with a smaller contribution from septic tank conversions. Total commercial and industrial development in the Airport tributary area could increase by a factor of 7.7, in terms of total square footage.

GLP Lift Station
The GLP lift station could receive future flow from commercial development, septic conversions, and a planned 88-room hotel. Future commercial development could more than double existing commercial flow, and potential septic system conversions could more than double the number of existing residences contributing to this lift station. In addition, the lift station could receive greater flow in the future from the Airport lift station.

2nd & East Lift Station
The majority of future flow contribution to the 2nd & East lift station is due to potential septic conversions. Planned development could add 96 residences, and commercial development could increase by a factor of 5.0, in terms of total square footage. Even with a significant increase in commercial development, the majority of flow to this lift station would be residential.

Southside Lift Station
No future development is anticipated in the Southside Lift Station tributary area, therefore this lift station will not be evaluated for future conditions.

Lift Station Future Flow Summary

Table 5-8 summarizes future average and peak inflow for the Airport, GLP, and 2nd & East lift stations. Southside lift station is not anticipated to receive additional inflow.

Table 5-8: Lift Station Future Flow Summary

		Lift Station		
		Airport	**GLP**	**2nd & East**
Land Use Components				
Residential	Units	75	430	1,338
Residential	Persons[1]	412	1,411	4,360
Commercial	Estimate ft^2	9,575,984	2,282,154	921,551
Hotels	Rooms	0	207	0
Schools	Students	0	0	1,683
Upstream Lift Station		NA	Airport	NA
Flow Rate (gpd)				
Residential		20,600	70,525	217,975
Commercial		574,559	136,929	55,293
Hotel Rooms		0	20,700	0
Schools		0	0	33,660
Total Average Daily Flow	gpd	595,159	228,154	306,928
	gpm	413	158	213
	w/Simplex LS[2]	NA	572	NA
Maximum Day Dry Weather Flow	Peaking Factor	1.86	1.86	1.86
	gpd	892,739	342,231	460,392
	gpm	620	238	320
	w/Simplex LS[2]	NA	858	NA
Peak Hour Dry Weather Flow	Residential Diurnal Factor	1.8	1.8	1.8
	Residential Peaking Factor	3.3	3.3	3.3
	Commercial Diurnal Factor	2.1	2.1	2.1
	Commercial Peaking Factor	3.9	3.9	3.9
	gpd	2,313,197	851,818	1,077,231
	gpm	1,606	592	748
	w/Simplex LS[2]	NA	2,198	NA

1. Estimate for the Airport Lift Station includes 140 persons for the County Jail and 20 persons for the County juvenile hall.

2. Flow contribution from upstream lift station based on anticipated future VFD operation, therefore pump flow is equal to wet well inflow.

Lift Station Evaluation – Future Flow Conditions

The following is an analysis of the Airport, GLP, and 2nd & East lift stations.

Airport Lift Station

Under existing conditions the Airport lift station wet well and pumps have adequate capacity for peak flow. The estimated simplex flow capacity at this station is 740 gpm, which could accommodate some additional flow contributions. With existing peak flow of 233 gpm, flow contributions could double and this station would still have adequate pumping capacity. It is recommended to begin the planning and design process for a lift station upgrade once the average flow for this lift station doubles, reaching a total daily pump runtime of approximately 4 hours (240 minutes). As inflow increases with future development, wet well active volume may be increased to limit pump starts with increased flows. Existing operating level is approximately 3 feet or 1,700 gallons; the operating level could be adjusted up to 8 feet or 4,700 gallons before impacting the upstream collection system. However, increasing operating levels also decreases emergency response time due to decreased emergency storage. Operating levels must also take into account low flows to minimize potential for hydrogen sulfide formation.

To provide service to all identified potential future commercial development this lift station would need to be upgraded with larger capacity pumps and a larger wet well. It is recommended this station be upgraded with VFD pumps in a triplex configuration, designed for duplex operation to pump peak commercial flow during the day and simplex operation for average flow and low flow at night from services such as the County jail and juvenile hall. The installation of VFD pumps would allow for future required storage volume to be minimized, while also minimizing impact to the GLP station. The wet well would need to be upsized to accommodate three submersible pumps. A 10-foot diameter wet well would provide adequate space to install a triplex configuration and sufficient active volume for anticipated inflow. Maximum velocity in the existing 10-inch force main would reach 6.5 feet per second, based on pumping peak inflow of 1,601 gpm. Although high, this velocity may be acceptable if it only occurs for a short duration on maximum flow days. The following are the benefits or constraints that should be evaluated during the design of a new submersible lift station with VFD pumps:

- Installing VFD pumps will decrease the plug flow conditions downstream of the lift station, reducing impacts from future development to the downstream collection system.
- Installing a new wet well will increase storage volume, increasing the amount of time for emergency response during a power failure, and reducing pump cycle times.
- The force main will need to be analyzed with the new VFD operating conditions to determine if cleansing velocities are maintained with lower flows and peak velocities are within acceptable limits.
- Due to the amount of potential inflow to this lift station in the future, it is recommended to utilize the existing wet pit as an overflow to provide additional storage during emergency conditions.

Alternatively, the Airport lift station could be upgraded with constant speed pumps in a triplex configuration. The wet well would need to be upsized to accommodate the pumps, and depending on pump design flow, the wet well may need to be greater than 10-foot diameter to provide adequate active volume. The force main would need to be upsized to 12-inch based on an estimated duplex design flow of 1,800 to 2,000 gpm.

GLP Lift Station

The GLP lift station has adequate capacity for existing flow conditions and the capability of accepting some future additional flows without requiring an upgrade. The existing duplex pump flow is estimated to be 1,300 gpm, and existing peak inflow is 945 gpm including flow contribution from the Airport lift station. Inflow from the Airport lift station makes up 78% of existing peak inflow, with peak gravity inflow only 205 gpm. Therefore, future contribution by gravity flow could be significantly increased before an upgrade would be required, but an upgrade to the Airport lift station would immediately trigger the need to upgrade the GLP lift station. The GLP wet well operating level is currently 3.1 feet, or 1,821 gallons; the maximum operating level is 3.5 feet or 2,056 gallons before affecting the upstream collection system, leaving little room to increase operating volume to accommodate for future flows. Therefore, the limitation on operating volume and direct relationship to pump cycling times may trigger the need for a lift station upgrade prior to pump capacity issues.

It is recommended this lift station be upgraded with VFD pumps in a triplex configuration. The installation of VFD pumps would minimize the requirement for wet well storage volume, and minimize impacts to the downstream collection system. The existing wet well may be large enough to accommodate three pumps and may provide adequate operating volume dependent on inflow from the Airport lift station. Maximum velocity in the existing 12-inch force main would reach 6.2 feet per second, based on pumping peak inflow of 2,174 including peak flow from the Airport lift station. Although high, this velocity may be acceptable if it only occurs for a short duration on maximum flow days. The following are the benefits or constraints that should be evaluated during the design of a new submersible lift station with VFD pumps:

- Installing VFD pumps will decrease the plug flow conditions downstream of the lift station, reducing impacts from future development to the downstream collection system.
- The force main will need to be analyzed with the new VFD operating conditions to determine if cleansing velocities are maintained with lower flows and peak velocities are within acceptable limits.

Emergency response time for this lift station will be decreased with increased flow contributions. If the Airport lift station is disabled during GLP pump failure, peak future inflow would be 573 gpm from gravity flow contributions. Assuming a VFD installation and therefore no wet well upgrade, emergency response time would be 33 minutes for average flow and only 9 minutes for peak flow. Due to this extremely short response time it is recommended that a permanent stand-by generator be installed at this location.

Alternatively, the GLP lift station could be upgraded with constant speed pumps rather than VFD pumps. These pumps would need to be sized to handle peak flow from the Airport lift station and gravity flow contribution, with design flow anticipated to be 2,600 to 2,800 under duplex operation assuming the Airport lift station has also been upgraded with single speed pumps. The wet well would need to be replaced with a 14-foot diameter wet well with total depth approximately 18 to 20 feet. In addition, the force main would need to upsized to 15-inch to accommodate duplex pump flow.

A third option would be to redesign the Airport lift station to bypass the GLP station, which would significantly decrease peak flow to GLP. With this option, the existing GLP station would have adequate capacity for future flows and would not need to be

upgraded due to hydraulic constraints. However, emergency response time would be reduced as described previously, and it would still be recommended to install a permanent stand-by generator at this location. A feasibility analysis would be required to determine if pumping from the Airport lift station to the existing gravity collection system would be possible and cost effective. The longer force main would require an increase in pump head at the Airport lift station, increasing power requirements and increasing discharge pressure at the station to potentially undesirable levels. In addition, construction of the new force main required for the re-routing may be more expensive than the life cycle cost of upgrading the GLP lift station.

2nd & East Lift Station

The 2nd and East lift station has adequate pumping capacity for existing inflow and marginal pumping capacity for future inflow. For future conditions, the lift station is anticipated to operate in simplex mode for average flow and duplex mode for peak flow. Wet well active volume will need to be adjusted to limit peak cycles per hour due to increased future flows. Existing operating level is 2.3 feet or 1,351 gallons. Operating level could be increased to 3.5 feet or 2,644 gallons without affecting the upstream collection system. With an operating level of 3.5 feet the pumps would cycle 6 times per hour under peak flow conditions. Therefore, the existing wet well has adequate capacity for future flows and does not need to be upgraded due to hydraulic constraints. It is recommended that a pump test and physical evaluation be performed on the 2nd & East lift station prior to allowing future flows to contribute, to verify pump flow rate and physical ability to provide service. Depending on physical condition of the pumps, they may be fully replaced or upgraded with new impellers to meet future flow demands.

SUMMARY OF LIFT STATION RECOMMENDATIONS

Based on the hydraulic analysis and discussion provided, the following is a summary of recommendations for the City's four lift stations.

Airport Lift Station

The Airport lift station has adequate hydraulic capacity for existing conditions and requires only minimal upgrades to continue to provide reliable service. The following near term upgrades are recommended:

- Install the blower and soil bed scrubber, shown as future improvements on the 2001 lift station upgrade construction drawings
- Configure SCADA controls to automatically disable the Airport lift station when the GLP lift station is out of service
- Analyze potential to bypass the GLP lift station and pump directly to the existing gravity collection system

To meet future flow demands from commercial and industrial development, it is recommended to replace the existing lift station with a new triplex VFD station, with the following design considerations:

- Construct the new lift station adjacent to the existing lift station
- Convert the existing wet well to an over flow basin for emergency storage

GLP Lift Station

The GLP lift station has adequate hydraulic capacity for existing conditions. The following near term upgrades are recommended:

- Evaluate onsite SCADA controls for cause of failure to respond to some emergency events, and implement needed improvements
- Configure SCADA controls to automatically disable the Airport lift station when the GLP lift station is out of service

To provide capacity for future flows from development within the GLP tributary area, and from the recommended Airport lift station upgrade, it is recommended to replace the existing lift station with a new triplex VFD station and install a permanent stand-by generator. In the case that the Airport lift station is rerouted to bypass the GLP station, the GLP station does not require upgrades due to hydraulic constraints for future flow conditions.

2nd & East Lift Station

The 2nd & East lift station has adequate hydraulic capacity for existing conditions. The lift station is equipped with a vent and odor scrubber to minimize hydrogen sulfide attack and a bypass line to discharge overflow to the downstream collection system. It is recommended to exercise the slide gate installed for the bypass line on a regular basis, and replace the gate if it becomes inoperable due to corrosion.

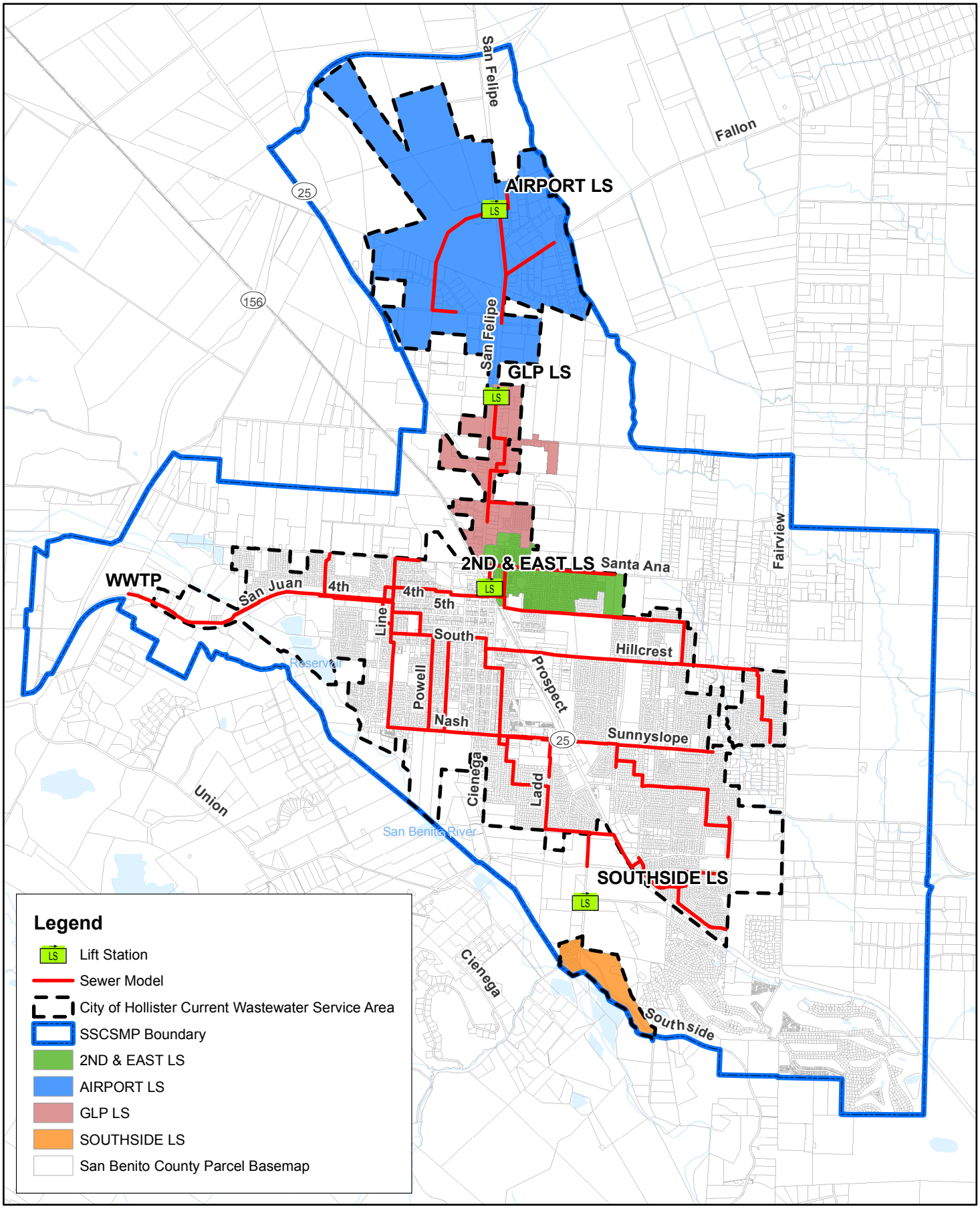
To provide service for future flows from residential and commercial development, the following long term upgrades are recommended:

- Perform a pump test and physical evaluation to determine operating capacity of the pumps prior to allowing additional services to contribute flow
- Adjust the wet well operating volume as needed to limit pump cycles

Southside Lift Station

The Southside lift station has adequate hydraulic capacity for existing conditions and there is no future development anticipated to contribute flow to this station. This lift station requires minimal upgrades to continue to provide reliable service, as follows:

- Install site security fencing to protect from vandalism
- Install a blower and odor scrubber to minimize corrosion due to hydrogen sulfide gas, or treat the wet well with a product designed to reduce hydrogen sulfide gas formation, such as Bioxide®



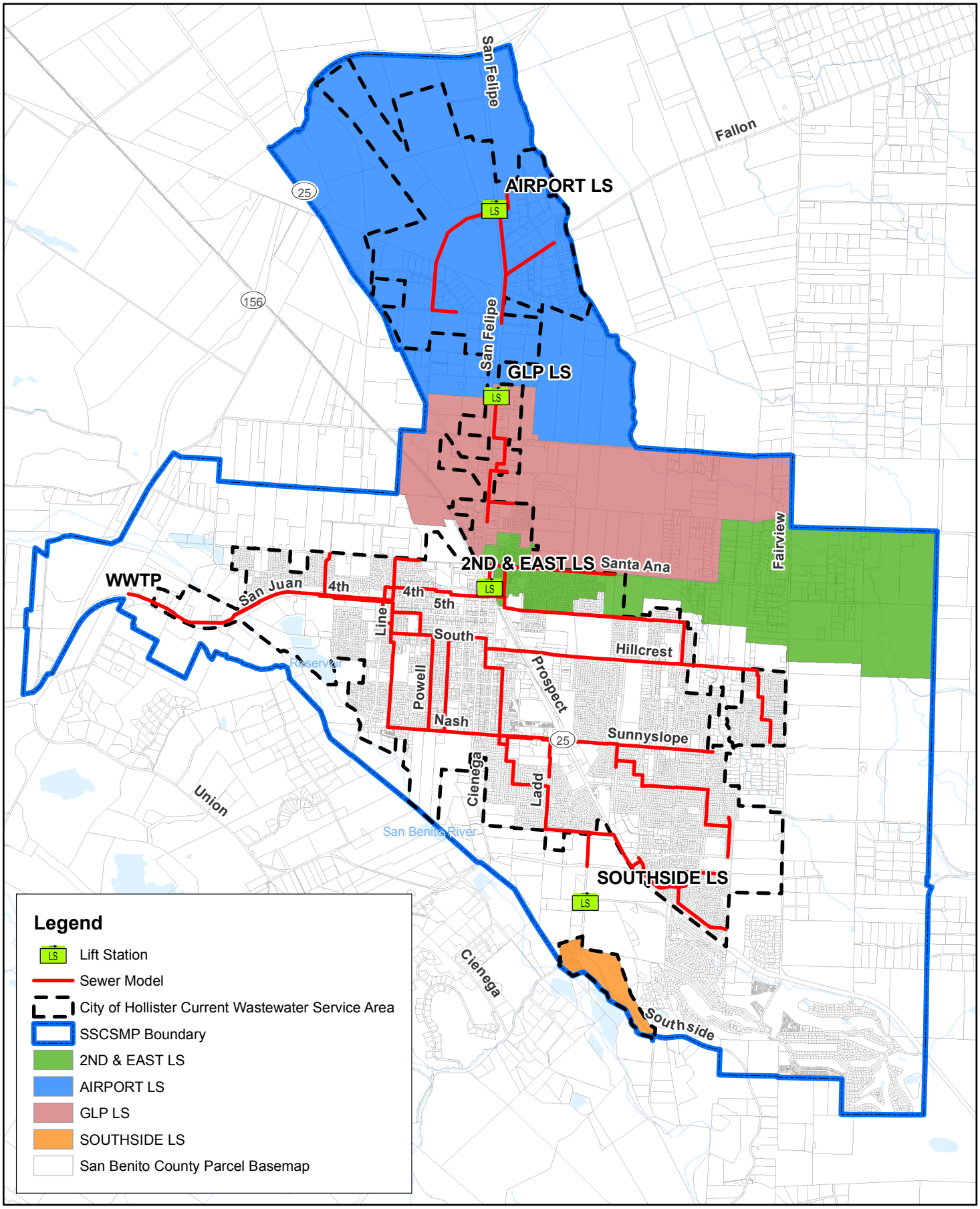
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 5-1: EXISTING LIFT STATION TRIBUTARY AREA MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 5-2: FUTURE LIFT STATION TRIBUTARY AREA MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

CHAPTER 6

COLLECTION SYSTEM ANALYSIS

This Chapter presents the analysis of the domestic wastewater collection system for the City. Refer to Chapter 5 for a detailed evaluation of the City's four (4) lift stations and corresponding force mains. All figures are provided at the end of this chapter.

INTRODUCTION

The City's collection system consists of a network of 4-inch to 36-inch gravity sewer pipes, and four (4) lift stations, providing service throughout the City and an area of the County located at Southside Road near Hospital Road. The main trunk sewer system was analyzed using MWHSoft InfoSWMM Version 8.5 sewer modeling program to evaluate performance of the wastewater collection system under both existing and future flow conditions. Figure 6-1 provides an overview of the existing gravity wastewater collection system, lift stations, and force mains that were included in the hydraulic model. Typically 8-inch sewer pipes and larger in diameter are modeled and are considered to be the trunk sewer system. However, not all 8-inch sewer pipes were modeled as part of this project. In addition, several segments of 6-inch diameter sewer pipes were included in the sewer model under the direction of City Staff. The 6-inch segments consisted of known "problem areas" throughout the system and/or may receive additional flows from potential future development.

The analysis of the wastewater collection system is based on the City's Geographic Information System (GIS) that was developed in support of this master planning project. The sewer GIS was compiled using the following data:

- Survey-grade coordinates, rim and invert elevations for the sewer manholes on the trunk sewer system;
- Sewer record plans and atlas maps; and
- San Benito County parcel and aerial photo base map.

Horizontal measurements were based the North American Datum (NAD) of 1983 California State Plane Zone 4 Feet Coordinate System. Vertical measurements were based on North American Vertical Datum (NAVD) of 1988.

COLLECTION SYSTEM ANALYSIS CRITERIA

Design criteria, as described in the City's May 1992 Design Standards, were applied in the analysis of the trunk sewer collection system model. These design criteria provide capacity buffer to prevent surcharge conditions and for fluctuations in flows due to diurnal variations. Gravity pipe performance was analyzed based on maximum percent full depth over diameter (d/D) ratio, defined as the depth of flow in a pipe divided by the diameter of the pipe. Criteria utilized are as follows:

- Minimum Velocity: 2 feet per second (fps) under average flow conditions
- Maximum Velocity: 10 fps
- Percent full (d/D) criteria:
    - 10-inches or less maximum d/D of 0.5
    - 12-inches or larger maximum d/D of 0.67
- Manning coefficient of friction:
    - n = 0.013 for VCP and RCP
    - n = 0.011 for PVC
- All new sewers are PVC, ABS, HDPE, composite or solid walled pipes with coefficient of friction "n" = 0.011.
- Minimum and Maximum Pipe Slopes per Table 6-1

Table 6-1. Minimum and Maximum Pipe Slopes

Pipe Inside Diameter (in)	Minimum Slope (%)	Maximum Slope (%)
8	0.35	8.0
10	0.25	6.0
12	0.20	4.0
15	0.15	3.0
18	0.12	2.6
21	0.10	2.0
24	0.08	1.8
27	0.08	1.5
30	0.08	1.3
33	0.08	1.2
36	0.08	1.0
39-60	0.08	0.9

COLLECTION SYSTEM FLOWS

Existing and future flows were analyzed in the sewer model for dry weather conditions only. Wet weather flows were not modeled since wet weather flow data (peaking factors) were not obtained during the flow monitoring task of this master planning project. Flow rates were derived on a per-parcel basis as described in Chapter 4 of this report. Flow parameters utilized in this analysis are defined as follows:

- ADF: Average daily dry weather system flow
- MDDWF: Maximum daily dry weather system flow
- PHDWF: Peak hour dry weather system flow

COLLECTION SYSTEM MODEL DEVELOPMENT

A hydraulic model of the sewer collection system was developed by Wallace Group with the MWHSoft InfoSWMM Version 8.5 sewer modeling program. InfoSWMM utilizes Manning's Equation for open channel flow (gravity pipes), Dynamic Wave analysis for flow routing through the collection system, and the Hazen-Williams Equation for

pressurized flow conditions (force mains). Model results were evaluated for pipeline capacity, flow velocity, and maximum d/D ratio under various flow conditions.

Flow Allocation

Wastewater flows were assigned to the sewer model utilizing estimated flows as described in Chapter 4. Flows were allocated to individual sewer manholes based on actual location of City sewer customers. Tributary areas for each modeled manhole were developed by Wallace Group and are shown on Figure B-1 included in Appendix B. Each tributary area represents the total residential, motel, commercial, and institutional customers contained within the tributary boundary. Future flows were allocated to the model based on most probable connection location (refer to Figure B-2 included in Appendix B for the future flow locations).

Diurnal curves were applied to the allocated flows to represent varying flow conditions throughout the day. A separate diurnal curve was applied to residential and commercial connections, with hotels and schools included in the residential curve. A detailed discussion of the diurnal curves for the City's sewer system is included in Chapter 4.

Model Calibration

Approximately five weeks of sewer flow data was collected in support of the hydraulic model development, as described in Chapter 4 of this report. Representative data for each flow monitoring location was compared to the model results. Through this process the diurnal curves applied to the model were adjusted to accurately represent the system flows as recorded through the flow monitoring. Model results for existing conditions were also compared to the City's maintenance records to confirm locations where the model exhibited existing collection system deficiencies. Graphs comparing model results and flow monitoring data are included in Appendix B.

System Conditions Analyzed

The hydraulic model was utilized to analyze dry weather system flow for both existing and future flow conditions. Within the model, multiple scenarios were developed that represent these various conditions. Existing and future scenarios were utilized to identify system upgrades required in order to meet performance criteria as specified, and to identify areas recommended for high priority maintenance operations. Scenarios developed consist of the following:

- *Existing MDDWF Scenario:* This scenario represents the trunk sewer system under existing maximum dry weather flow conditions.

- *Future MDDWF Scenario:* This scenario represents the trunk sewer system under future maximum dry weather flow conditions, with all future development as described in Chapter 2 flowing to the existing collection system.

- *Existing and Future WWF Scenarios:* Existing and Future WWF conditions were not analyzed as part of this master plan study, per City Staff. It should be noted that City Staff indicated that inflow and infiltration is not a major concern for the

wastewater collection system and therefore was not required to be modeled. After review of the RDWWTP daily influent flow records from 2004 to 2009, flows during peak summer demands appear to be greater than rain days.

COLLECTION SYSTEM MODEL RESULTS – EXISTING FLOW CONDITIONS

Deficient System Capacity

The following locations were identified through the analysis as having insufficient capacity to meet the City's performance standards while conveying existing population wastewater flows. Pipe upgrades identified for existing conditions may increase in diameter for future conditions, as described later in this chapter. Refer to Figure 6-2 for a system-wide map of maximum d/D under existing worst case MDDWF conditions. Refer to Figure 6-3 for an overall map of the recommended areas for pipe upgrades.

Where improvements are recommended to the collection system, worst case d/D values are provided for reference. These d/D values represent a snapshot of the system under either: a) existing conditions, or b) proposed conditions with *all* improvements in place. In many cases, recommended upgrades would increase downstream maximum d/D, exceeding the City's standards, if the downstream recommended improvements were not constructed. Through the digital sewer model, maximum d/D was analyzed for the system as a whole, ensuring that recommended upgrades did not trigger additional downstream improvements.

Sunset Drive:

- Location Extents: Sunnyslope Road to Cerra Vista Drive

The Sunset Drive pipe deficiencies consist of several individual streets and are described as follows:

Memorial Drive from Sunnyslope Road to Cedar Street is an existing 8-inch VCP that primarily receives flow from residential lots. Pipe segment d/D ranged from 0.54 to 1.00 during existing MDDWF conditions. Upgrading the existing pipe with 602 feet of 10-inch PVC decreased the d/D to a range 0.35 to 0.55.

Cedar Street from Memorial Drive to Iris Street is an existing 6-inch VCP that primarily receives flow from residential lots. Pipe segment d/D ranged from 0.86 to 0.89 during existing MDDWF conditions. Upgrading the existing pipe with 661 feet of 8-inch PVC decreased the d/D to 0.43.

Iris Street from Cedar Street to Juniper Drive is an existing 6-inch VCP that primarily receives flow from residential lots. Pipe segment d/D ranged from 0.89 to 1.00 during existing MDDWF conditions. Upgrading the existing pipe with 469 feet of 8-inch PVC decreased the d/D to 0.50.

Valley View Road from Juniper Drive to Sunset Drive is an existing 6-inch VCP that primarily receives flow from residential lots. Pipe segment d/D ranged from 0.87 to 1.00

during existing MDDWF conditions. Upgrading the existing pipe with 725 feet of 8-inch PVC decreased the d/D to 0.41.

Sunset Drive from Valley View Road to Cerra Vista Drive is an existing 6-inch VCP that primarily receives flow from residential lots. Pipe segment d/D ranged from 0.50 to 0.87 during existing MDDWF conditions. Upgrading the existing pipe with 2,399 feet of 8-inch PVC decreased the d/D to a range of 0.30 to 0.57.

Cerra Vista Drive from Sunset Drive to Tiburon Drive is an existing 6-inch PVC that primarily receives flow from residential lots. Pipe segment d/D ranged from 0.67 to 0.86 during existing MDDWF conditions. Upgrading the existing pipe with 1,287 feet of 8-inch PVC decreased the d/D to a range of 0.38 to 0.44.

Nash Road:

- Location Extents: San Benito Street to Freedom Road

The Nash Road pipe deficiencies consist of several individual streets and are described as follows:

Nash Road from San Benito Street to Prune Street is an existing 12-inch VCP sewer pipe that receives a substantial amount of residential flow from the south east portion of the City and commercial flow from Tres Pinos Road and Airline Highway. Pipe segment d/D ran at 0.69 during existing MDDWF conditions. Upgrading the existing pipe with 957 feet of 15-inch PVC decreased the d/D to a range 0.43 to 0.47.

Tres Pinos Road from Prune Street to McCray Street is an existing 12-inch VCP sewer pipe that receives a substantial amount of residential flow from the south east portion of the City and commercial flow from Tres Pinos Road and Airline Highway. During existing MDDWF model simulation a number of sewer manholes, along Tres Pinos Road from Airline Highway to Rancho Drive, indicated surcharged manholes. Digital photos of the manhole interior, collected during the field survey, confirmed that this surcharging was occurring in the system. Pipe segment d/D ranged from 0.69 to 1.0 during MDDWF conditions. Upgrading the existing pipe with 2,342 feet of 15-inch PVC decreased the d/D to a range 0.44 to 0.68.

Sunnyslope Road from McCray to Freedom Road is an existing 12-inch PVC sewer pipe. Pipe segment d/D ranged from 0.78 to 0.87 during existing MDDWF conditions. Upgrading the existing pipe with 1,307 feet of 15-inch PVC decreased the d/D to a range 0.45 to 0.52.

Sunnyslope Road from Memorial Drive west 370 feet west on Sunnyslope Road is an existing 8-inch VCP that primarily receives flow from residential lots. Pipe segment d/D ran at 0.74 during existing MDDWF conditions. Upgrading the existing pipe with 370 feet of 10-inch PVC decreased the d/D to 0.49.

Line Street:

- Location Extents: Nash Street to Peridot Court

Line Street is an existing 15-inch VCP sewer pipe that receives a substantial amount of residential flow from the southern portion of the City and commercial flow from Tres Pinos Road and Airline Highway. Line Street serves as one of the major trunk sewer pipes prior to emptying into the 36-inch trunk sewer pipe on San Juan Road. Pipe segment d/D ranged from 0.64 to 0.77 during existing MDDWF conditions. Upgrading the existing pipe with 3,000 feet of 18-inch PVC decreased the d/D to a range 0.44 to 0.58.

Powell Street:

- Location Extents: 7th Street to Glenmore Drive

Powell Street is an existing 6-inch VCP sewer pipe that receives flow from approximately 280 residential lots from Nash Street to 7th Street. Pipe segment d/D ranged from 0.6 to 1.0 during existing MDDWF conditions. Manhole surcharging was apparent during model simulations. Digital photos of the manhole interior, collected during the field survey, confirmed that this surcharging was occurring in the manholes. Upgrading the existing pipe with 388 feet of 10-inch PVC at the intersection of Powell Street and 7th Street and 1,086 of 8-inch PVC for the remaining deficient 6-inch pipe segments decreased the d/D to a range of 0.29 to 0.56.

West Street:

- Location Extents: 7th Street to Haydon Street

West Street is an existing 6-inch VCP sewer pipe that receives flow from approximately 200 residential lots from Nash Street to 7th Street. Pipe segment d/D ranged from 0.97 to 1.0 during existing MDDWF conditions. Manhole surcharging was apparent during model simulations. Digital photos of the manhole interior, collected during the field survey, confirmed that this surcharging was occurring in the manholes. Upgrading the existing pipe with 375 feet of 10-inch PVC at the intersection of West Street and 7th Street and 1,242 of 8-inch PVC for the remaining deficient 6-inch pipe segments decreased the d/D to a range of 0.41 to 0.51.

Marginal System Capacity

Locations where pipes flow close to design standards as defined by the City's performance criteria were identified within the hydraulic model, as follows. The d/D values provided represent system performance with all improvements recommended for existing conditions in place. Figure 6-4 depicts the pipes identified with marginal capacity.

Bridge Road:

- Location Extents: Valona Way to Graf Road

This portion of 21-inch VCP sewer pipe on Bridge Road ran at a d/D of 0.63 to 0.79 during existing MDDWF model simulations. Based on the model it is our assumption that the flows are not being properly distributed between the parallel lines. The 21-inch runs parallel with the main 36-inch trunk sewer on San Juan Road and supports the 36-inch trunk sewer with conveying flow to the RDWWTP.

Hillcrest Road:

- Location Extents: Memorial Drive to east of Busby Court

This portion of 8-inch VCP sewer pipe on Hillcrest Road ran at a d/D of 0.56 during existing MDDWF model simulations. Total length of 8-inch VCP under this flow condition is 658 feet.

Sunnyslope Road:

- Location Extents: Memorial Drive to El Toro Drive

This portion of 8-inch VCP sewer pipe on Sunnyslope Road ran at a d/D of 0.69 during existing MDDWF model simulations prior to downstream improvements. The d/D was reduced to 0.5 once downstream improvements were implemented. Total length of 8-inch VCP under this flow condition is 602 feet.

- Location Extents: Freedom Road to west of Memorial Drive

This portion of 12-inch VCP sewer pipe on Sunnyslope Road ran at a d/D of 0.70 during existing MDDWF model simulations prior to downstream improvements. The d/D was reduced to 0.62 once downstream improvements were implemented. Total length of 12-inch VCP under this flow condition is 312 feet.

Tres Pinos Road:

- Location Extents: Along Tres Pinos east to Ladd Lane

This portion of 12-inch VCP sewer pipe on Tres Pinos Road ran at a d/D of 1.00 during existing MDDWF model simulations prior to downstream improvements. The d/D was reduced to 0.64 once downstream improvements were implemented. Total length of 12-inch VCP under this flow condition is 340 feet.

West Street:

- Location Extents: D Court to Haydon Street

This portion of 6-inch VCP sewer pipe on West Street ran at a d/D of 1.00 during existing MDDWF model simulations prior to downstream improvements. The d/D was reduced to

0.5 once downstream improvements were implemented. Total length of 6-inch VCP under this flow condition is 1,217 feet.

Low Pipe Velocity

Low pipe velocity results in the increased likelihood for solids to settle out of wastewater flow, leading to pipe backups and blockages. The City's design standards specify a minimum pipe velocity of 2 fps at ADF to maintain solids in suspension. A total of 197 modeled pipes were identified with a velocity below 2 fps under existing average day conditions, and a total of 155 pipes did not meet velocity criteria under maximum day conditions. It is recommended that pipes identified with a maximum velocity of less than 2 fps be flushed on a regular basis that corresponds with the City's maintenance schedule. Total length of pipe running with an average day velocity less than 2 fps is 12 miles. Figure 6-4 depicts the pipes identified with low pipe velocities.

Pipe Travel Time

Excessive wastewater travel time is a result of low velocity and can lead to problems with hydrogen sulfide attack and odors throughout the collection system. Typically wastewater is oxygenated as it flows through a manhole, decreasing likelihood of hydrogen sulfide generation. Travel time exceeding thirty (30) minutes through a single pipe (manhole to manhole) is undesirable. All pipes included in the hydraulic model have an existing ADF of wastewater travel time of thirty (30) minutes or less; pipe travel time is not anticipated to cause maintenance issues for the City's system.

COLLECTION SYSTEM MODEL RESULTS – FUTURE FLOW CONDITIONS

Refer to Figure 6-5 for a system-wide map of worst case d/D under future MDDWF conditions. Refer to Figure 6-6 for an overall map of the recommended areas for pipe upgrades.

Deficient System Capacity

The following locations were identified through the analysis as having insufficient capacity to meet the City's performance standards while conveying future population wastewater flows. These flows includes potential wastewater from future developments and septic system conversions as discussed in Chapter 2 and 4.

Aerostar Way:

- Location Extents: Airway Drive 1,800 feet North towards Airport LS

Aerostar Way is an existing 12-inch VCP sewer pipe. Pipe segment d/D ranged from 0.67 to 0.87 during future MDDWF conditions. Upgrading the existing pipe with 1,900 feet of 15-inch PVC decreased the d/D to a range 0.42 to 0.51.

Bridge Road:

- Location Extents: Valona Way to Graf Road

This is an existing 21-inch VCP sewer pipe, which runs parallel with the main 36-inch trunk sewer on San Juan Road and supports the 36-inch trunk sewer with conveying flow to the RDWWTP. Pipe segment d/D ranged from 0.96 to 1.00 during future MDDWF conditions. Based on the model it is our assumption that the flows are not being properly distributed between the parallel lines. Installing 30 feet of 21-inch PVC interconnect between manholes on the 21-inch and 36-inch trunk sewer pipes decreased the d/D to a range 0.71 to 0.75 during future MDDWF conditions. The parallel 36-inch VCP ran at a d/D of 0.52 with the interconnect in place.

Hillcrest Road:

- Location Extents: Memorial Drive to El Cerro Drive

Hillcrest Road is an existing 8-inch VCP sewer pipe. Pipe segment d/D ran at 0.47 to 0.65 during future MDDWF conditions. Upgrading the existing pipe with 1,400 feet of 10-inch PVC decreased the d/D to a range 0.31 to 0.48.

Fallon Road:

- Location Extents: Frontage Road to Shelton Drive

Fallon Road is an existing 10-inch VCP sewer pipe. Pipe segment d/D ranged from 0.53 to 0.71 during future MDDWF conditions. Upgrading the existing pipe with 2,200 feet of 12-inch PVC decreased the d/D to a range 0.37 to 0.50.

Kirk Patrick to GLP LS:

- Location Extents: 425 feet south of Chappell Road to GLP Lift Station

The Kirk Patrick to GLP LS pipe deficiencies consist of several individual streets and are described as follows:

Frontage Road from McCloskey Road to GLP LS is an existing 10-inch VCP sewer pipe. Pipe segment d/D ranged from 0.58 to 0.73 during future MDDWF conditions. Upgrading the existing pipe with 1,600 feet of 12-inch PVC decreased the d/D to a range 0.43 to 0.52.

McCloskey Road from Kirk Patrick to Frontage Road is an existing 10-inch VCP sewer pipe. Pipe segment d/D ran at 0.66 during future MDDWF conditions. Upgrading the existing pipe with 500 feet of 12-inch PVC decreased the d/D to 0.44

Kirk Patrick from McCloskey to Chappell Road is an existing 10-inch VCP sewer pipe. Pipe segment d/D ranged from 0.55 to 0.62 during future MDDWF conditions. Upgrading the existing pipe with 1,700 feet of 12-inch PVC decreased the d/D to a range 0.38 to 0.42.

San Felipe Road 425 feet south of Chappell Road to Kirk Patrick is an existing 10-inch VCP sewer pipe. Pipe segment d/D ran at 0.57 during future MDDWF conditions. Upgrading the existing pipe with 500 feet of 12-inch PVC decreased the d/D to 0.39.

Line Street:

- Location Extents: 5th Street to West Street

The Line Street pipe deficiencies consist of several individual streets and are described as follows:

Line Street from 5th Street to Peridot Court is an existing 15-inch VCP sewer pipe and a major trunk line for the existing collection system. Pipe segment d/D ranged from 0.62 to 1.00 during future MDDWF conditions. Upgrading the existing pipe with 1,600 feet of 18-inch PVC decreased the d/D to a range 0.46 to 0.61.

Nash Road from Line Street to West Street is an existing 15-inch VCP sewer pipe and a major trunk line for the existing collection system. Pipe segment d/D ranged from 0.73 to 0.80 during future MDDWF conditions. Upgrading the existing pipe with 1,800 feet of 18-inch PVC decreased the d/D to a range 0.52 to 0.55.

Miller Road:

- Location Extents: San Juan Road North 290 feet

Miller Road is an existing 8-inch VCP sewer. Pipe segment d/D ran at 0.65 during future MDDWF conditions. Upgrading the existing pipe with 300 feet of 12-inch PVC decreased the d/D to 0.55 during MDDWF conditions.

Nash Road:

- Location Extents: San Benito Street to Memorial Drive

The Nash Road pipe deficiencies consist of several individual streets and are described as follows:

Nash Road from San Benito Street to Prune Street is an existing 12-inch VCP sewer pipe. Pipe segment d/D ranged from 0.79 to 0.85 during future MDDWF conditions. Upgrading the existing pipe with 1,000 feet of 15-inch PVC decreased the d/D to a range 0.55 to 0.60.

Tres Pinos Road from Prune Street to McCray Street is an existing 12-inch VCP sewer pipe. Pipe segment d/D ranged from 0.80 to 1.0 during future MDDWF conditions. Upgrading the existing pipe with 2,700 feet of 15-inch PVC decreased the d/D to a range 0.47 to 0.85.

Sunnyslope Road from McCray Street to Memorial Drive is an existing 12-inch PVC sewer pipe, with a short segment of 8-inch VCP. Pipe segment d/D ran at 1.00 during

future MDDWF conditions. Upgrading the existing pipes with 1,700 feet of 15-inch PVC and 400 feet of 12-inch PVC decreased the d/D to a range 0.40 to 0.67.

Sunset Drive:

- Location Extents: Sunnyslope Road to Cerra Vista Drive

Memorial Drive from Sunnyslope Road to Cedar Street is an existing 8-inch VCP sewer pipe. Pipe segment d/D ranged from 0.55 to 1.00 during future MDDWF conditions. Upgrading the existing pipe with 600 feet of 12-inch PVC decreased the d/D to a range 0.36 to 0.52.

Cedar Street from Memorial Drive to Iris Street to is an existing 6-inch VCP sewer pipe. Pipe segment d/D ranged from 0.86 to 1.00 during future MDDWF conditions. Upgrading the existing pipe with 700 feet of 12-inch PVC decreased the d/D to 0.35.

Iris Street View Road from Juniper Drive to Cedar Street is an existing 6-inch VCP sewer pipe. Pipe segment d/D ran at 1.00 during future MDDWF conditions. Upgrading the existing pipe with 500 feet of 12-inch PVC decreased the d/D to 0.40.

Valley View Road from Sunset Drive to Iris Street is an existing 6-inch VCP sewer pipe. Pipe segment d/D ran at 1.00 during future MDDWF conditions. Upgrading the existing pipe with 800 feet of 12-inch PVC decreased the d/D to 0.32.

Sunset Drive from Cerra Vista Drive to Valley View Road is an existing 6-inch VCP sewer pipe. Pipe segment d/D ran at 1.00 during future MDDWF conditions. Upgrading the existing pipe with 600 feet of 12-inch PVC and 1,900 feet of 10-inch PVC decreased the d/D to a range of 0.39 to 0.53.

Cerra Vista Drive from Sunset Drive to Tiburon Drive is an existing 6-inch PVC sewer pipe. Pipe segment d/D ran at 1.00 during future MDDWF conditions. Upgrading the existing pipe with 1,300 feet of 10-inch PVC decreased the d/D to a range of 0.48 to 0.57.

Powell Street:

- Location Extents: 7th Street to Vali Way

Powell Street is an existing 6-inch VCP sewer pipe. Pipe segment d/D ranged from 0.87 to 1.0 during future MDDWF conditions. Manhole surcharging was apparent during model simulations. Digital photos of the manhole interior, collected during the field survey, confirmed that this surcharging was occurring in the manholes. Upgrading the existing pipe with 800 feet of 10-inch PVC at the intersection of Powell Street and 7th Street and 400 feet of 8-inch PVC for the remaining deficient 6-inch pipe segments decreased the d/D to a range of 0.33 to 0.49.

San Juan Road:

- Location Extents: San Juan Road at Westside Boulevard

San Juan Road is an existing 27-inch VCP sewer pipe on San Juan Road. Pipe segment d/D ran at a d/D of 0.75 during future MDDWF model simulations and increased to a d/D of 0.83 once upstream system improvements were in place. This 27-inch VCP receives flow from the 30-inch VCP trunk sewer coming north from Central Avenue and then empties into the 36-inch trunk sewer on San Juan Road. Upgrading the existing pipe with 30 feet of 36-inch ADS or approved equal decreased the d/D to 0.67.

Technology Parkway:

- Location Extents: San Felipe Road 350 North of Technology Parkway

Technology Parkway is an existing 10-inch PVC sewer pipe. Pipe segment d/D ranged from 0.52 to 0.79 during future MDDWF conditions. Upgrading the existing pipe with 700 feet of 12-inch PVC decreased the d/D to a range of 0.33 to 0.57.

West Street:

- Location Extents: 7th Street to B Street

West Street is an existing 6-inch VCP sewer pipe. Pipe segment d/D ran 1.0 during future MDDWF conditions. Manhole surcharging was apparent during model simulations. Digital photos of the manhole interior, collected during the field survey, confirmed that this surcharging was occurring in the manholes. Upgrading the existing pipe with 800 feet of 10-inch PVC at the intersection of West Street and 7th Street and 1,600 of 8-inch PVC for the remaining deficient 6-inch pipe segments decreased the d/D to a range of 0.31 to 0.56.

Marginal System Capacity

Locations where pipes flow close to design standards as defined by the City's performance criteria were identified within InfoSWMM. The d/D values provided represent system performance with all improvements recommended for future conditions in place. Figure 6-7 depicts the pipes identified with marginal capacity.

Brighton Drive:

- Location Extents: Valley View Road northeast 280 feet along Brighton Drive

This portion of 8-inch PVC sewer pipe on Brighton Drive ran at a d/D of 0.56 during future MDDWF model simulations. Total length of 8-inch VCP under this flow condition is 276 feet.

Powell Street:

- Location Extents: Vali Way 370 feet South

This portion of 6-inch VCP sewer pipe on Powell Street d/D ranged from 0.74 to 1.00 during future MDDWF model simulations prior to downstream improvements. The d/D was reduced to 0.50 once downstream improvements were implemented. Total length of 6-inch VCP under this flow condition is 370 feet.

Santa Ana Road:

- Location Extents: Last pipe segment on Santa Ana Road going East

This portion of 10-inch PVC sewer pipe on Santa Ana Road ran at a d/D of 0.53 during future MDDWF model simulations. Total length of 10-inch PVC under this flow condition is 470 feet.

San Juan Road:

- Location Extents: Plumtree Drive to Westside Boulevard

This portion of 36-inch VCP sewer pipe on Westside Boulevard ranged from a d/D of 0.59 to 0.73 during future MDDWF model simulations and increased to a d/D of 0.66 to 0.83 once upstream improvements were in place. Total length of 36-inch VCP under this flow condition is 1,860 feet.

Sunnyslope Road:

- Location Extents: Memorial Drive to El Toro Drive

This portion of 8-inch VCP sewer pipe on Sunnyslope Road ran at a d/D of 0.71 during future MDDWF model simulations prior to downstream improvements. The d/D was reduced to 0.57 once downstream improvements were implemented. Total length of 8-inch VCP under this flow condition is 602 feet.

Tiburon Drive:

- Location Extents: Cerra Vista Drive to 295 feet East

This portion of 8-inch PVC sewer pipe on Tiburon Drive ran at a d/D of 1.00 during future MDDWF model simulations prior to downstream improvements. The d/D was reduced to 0.52 once downstream improvements were implemented. Total length of 8-inch PVC under this flow condition is 295 feet.

Valley View Road:

- Location Extents: Union Road 140 feet North

This portion of 8-inch PVC sewer pipe on Valley View Road ran at a d/D of 0.55 during future MDDWF model simulations. Total length of 8-inch PVC under this flow condition is 140 feet.

West Street:

- Location Extents: B Street 546 feet South

This portion of 6-inch VCP sewer pipe on West Street ran at a d/D of 1.00 during future MDDWF model simulations prior to downstream improvements. The d/D was reduced to 0.50 once downstream improvements were implemented. Total length of 6-inch VCP under this flow condition is 547 feet.

Westside Boulevard:

- Location Extents: Jan Avenue to San Juan Drive

This portion of 30-inch VCP sewer pipe on Westside Boulevard ran at a d/D of 0.66 during future MDDWF model simulations and increased to a d/D of 0.70 once upstream improvements were in place. Total length of 30-inch VCP under this flow condition is 768 feet.

Future Impacts from Ridgemark and Cielo Vista Estates

The analysis of the future capacity impacts to the City's collection system with the introduction of wastewater flow from the Ridgemark and Cielo Vista Estates assumes that all existing and future improvements, as stated in this report, are in place prior to additional flow.

Based on the Hollister Urban Area Water and Wastewater Master Plan, the Ridgemark area will have a future population of 5,137 with a future ADF of 0.46 MGD and Cielo Vista Estates is assumed to remain at 76 residences with a future ADF of 0.02 MGD in 2025. To identify the future impacts to the City's wastewater collection system by introducing flow from Ridgemark and Cielo Vista Estates, future MDDWF values had to be determined for the sewer model. For Ridgemark a Maximum Day peaking factor of 1.86 was used. For Cielo Vista Estates, the following equation from Metcalf and Eddy was used to determine a Maximum Day peaking factor:

$$\mathbf{Q_{peak}/Q_{avg} = 18 + \sqrt{P} / 4 + \sqrt{P}}$$

$\mathbf{Q_{peak}}$ = Peak Hour Flow
$\mathbf{Q_{avg}}$ = Average Daily Flow
P = Population in 1,000

Using the future ADF and population information from the Hollister Urban Area Water and Wastewater Master Plan, $\mathbf{Q_{peak}}$ from the above mention equation, and diurnal residential peaking factor used in the sewer model, the following Maximum Day peaking factors and flows in Table 6-2 were determined:

Table 6-2. Estimated MDDWF Conditions for Ridgemark and Cielo Vista Estates

Area	Future ADF (MGD)	Future Population	MDDWF PF	MDDWF (MGD)
Ridgemark	0.46	5,137	1.86	0.855
Cielo Vista	0.02	247	2.27	0.045

It is assumed that the future flow from the Ridgemark and Cielo Vista Estates areas would be introduced into the City's collection system through the existing 10-inch sewer pipe on Airline Highway. For the purpose of the model simulation the future flows were added to the sewer manhole located at the intersection of Airline Highway and Union Road. Additional upgrades, not provided in this report, would be required to connect these two developments to the City's system.

Deficient System Capacity

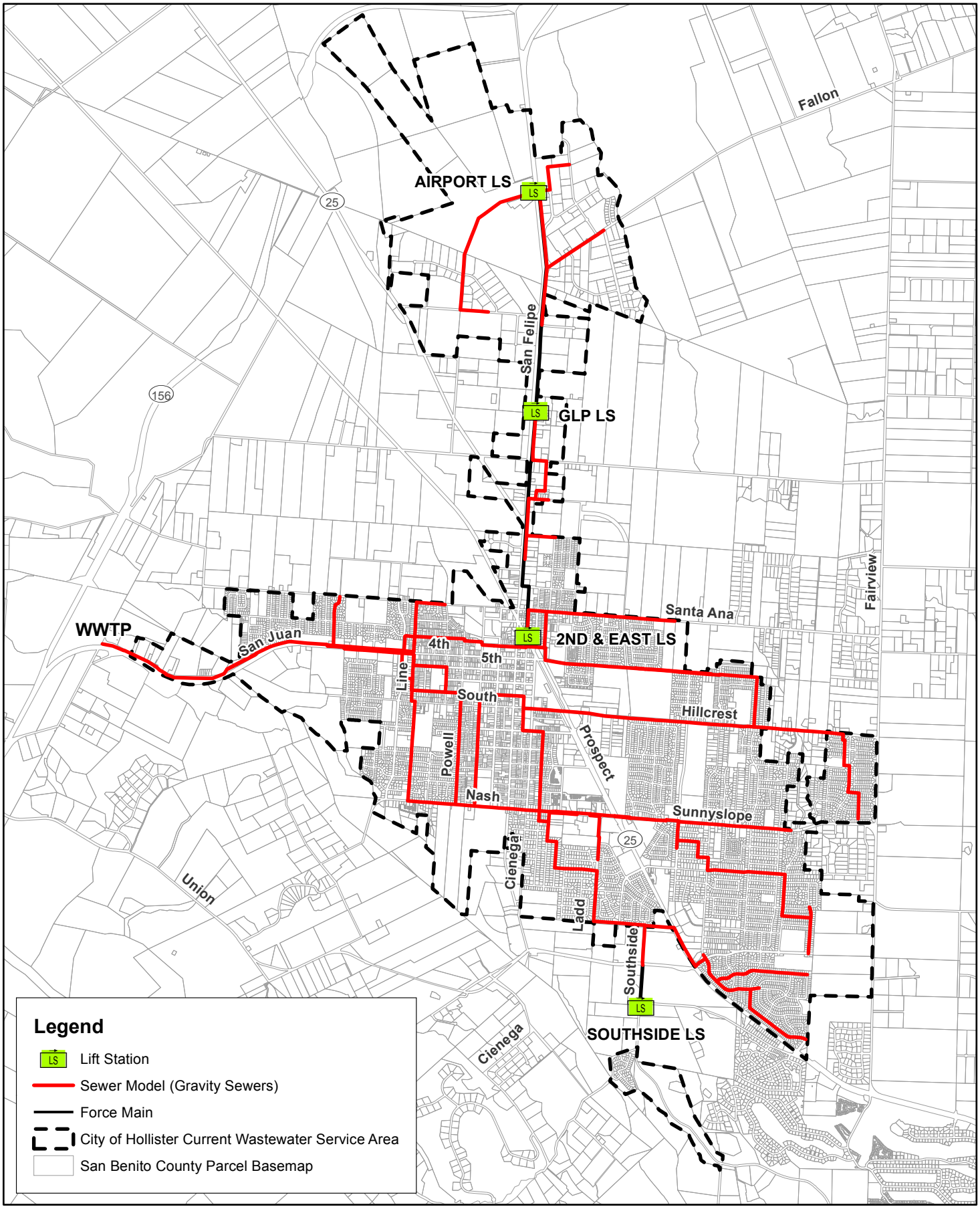
The analysis of the future capacity impacts to the City's collection system with the introduction of wastewater flow from the Ridgemark and Cielo Vista Estates was performed with all existing and future improvements in place prior to additional flow.

The following locations were identified through the analysis as having insufficient capacity to meet the City's performance standards while conveying future system flows from the Ridgemark and Cielo Vista service areas.

Cushman Street:

- Location Extents: Velado Street to Andrews Drive

Cushman Street is an existing 15-inch VCP sewer pipe. Pipe segment d/D ranged from 0.80 to 0.93 during MDDWF conditions. Upgrading the existing pipe with 600 feet of 18-inch PVC decreased the d/D to a range of 0.31 to 0.39 during MDDWF conditions.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

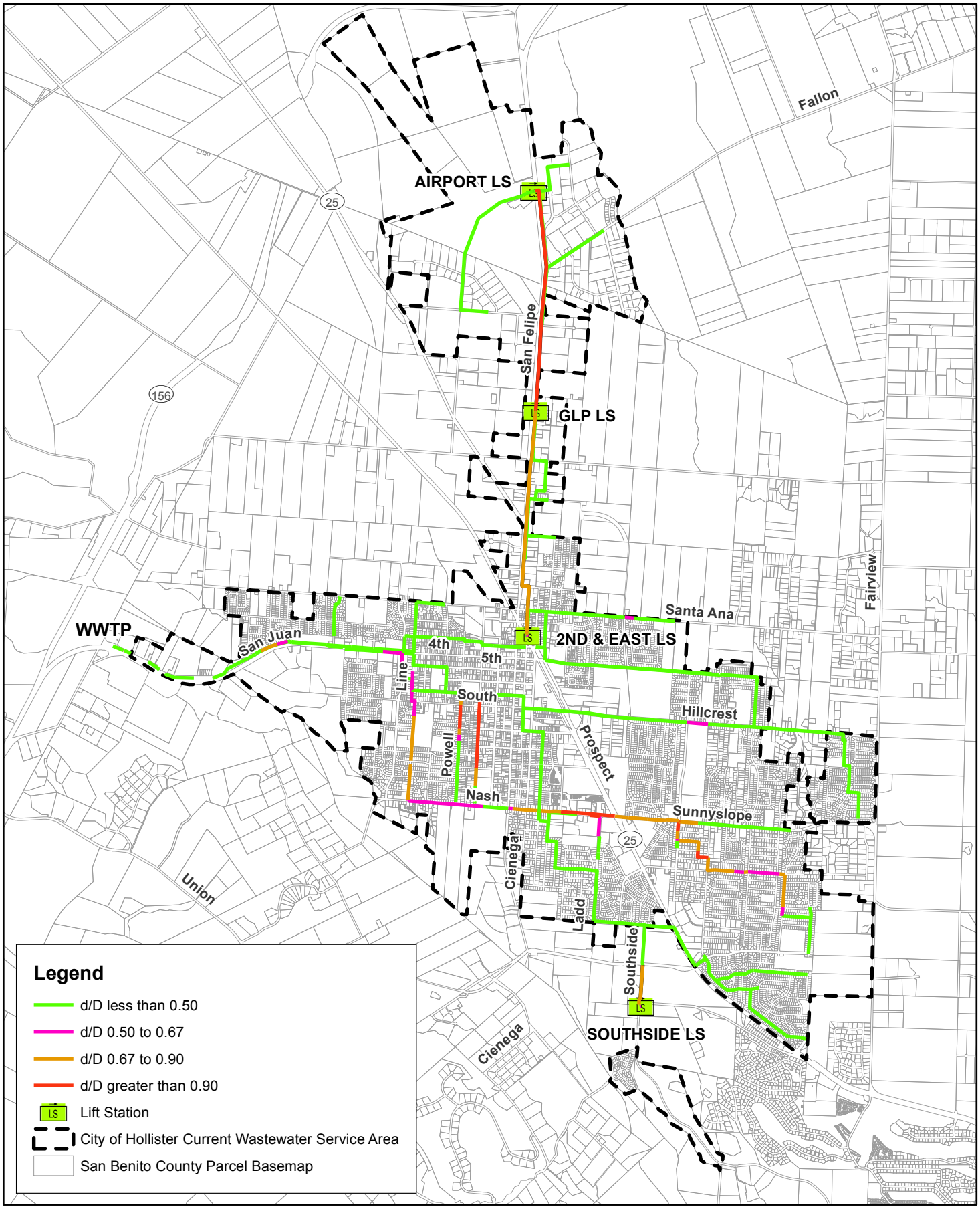
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 6-1: WASTEWATER MODEL OVERVIEW MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



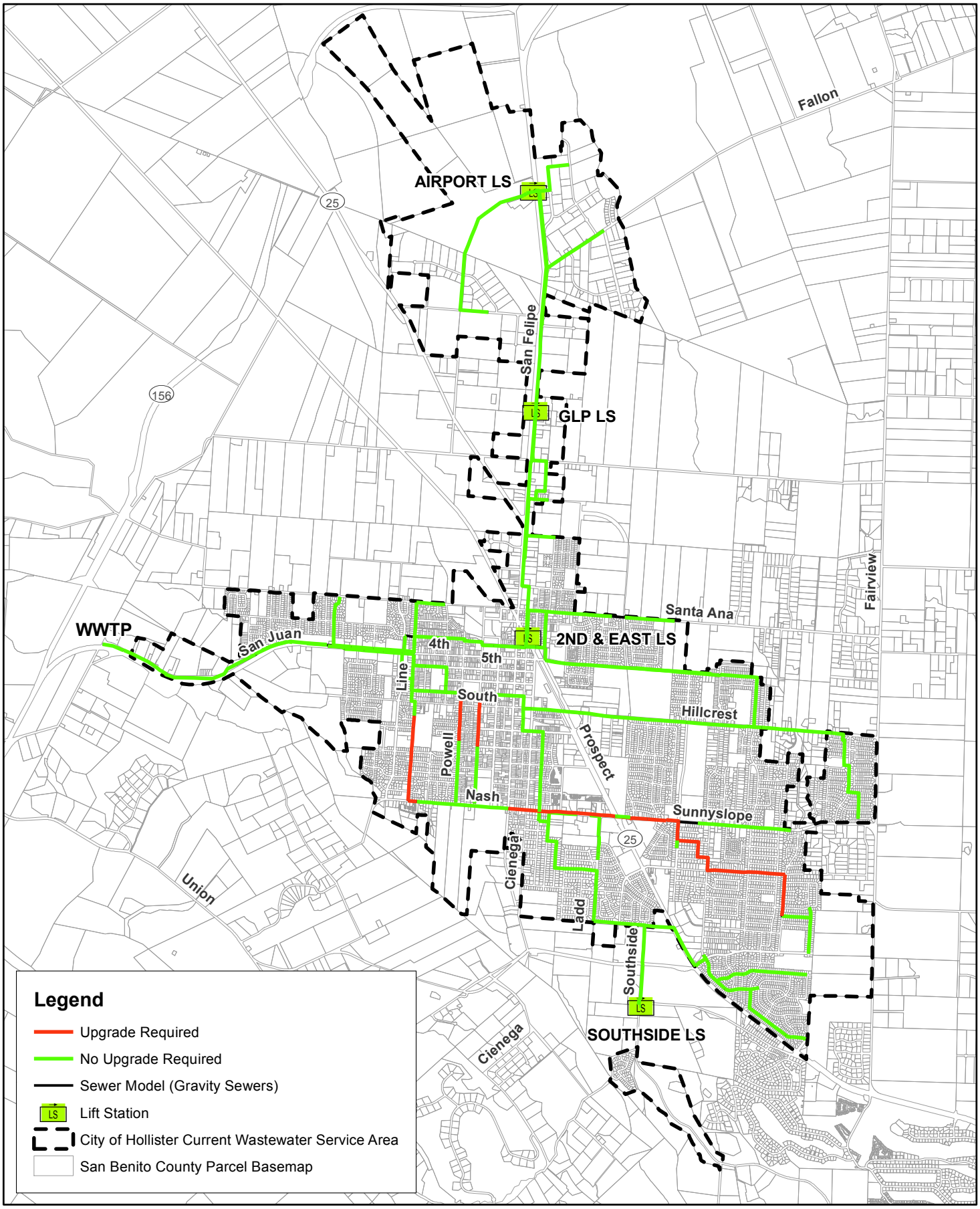
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 6-2: EXISTING MAXIMUM d/D DURING MDDWF CONDITIONS

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

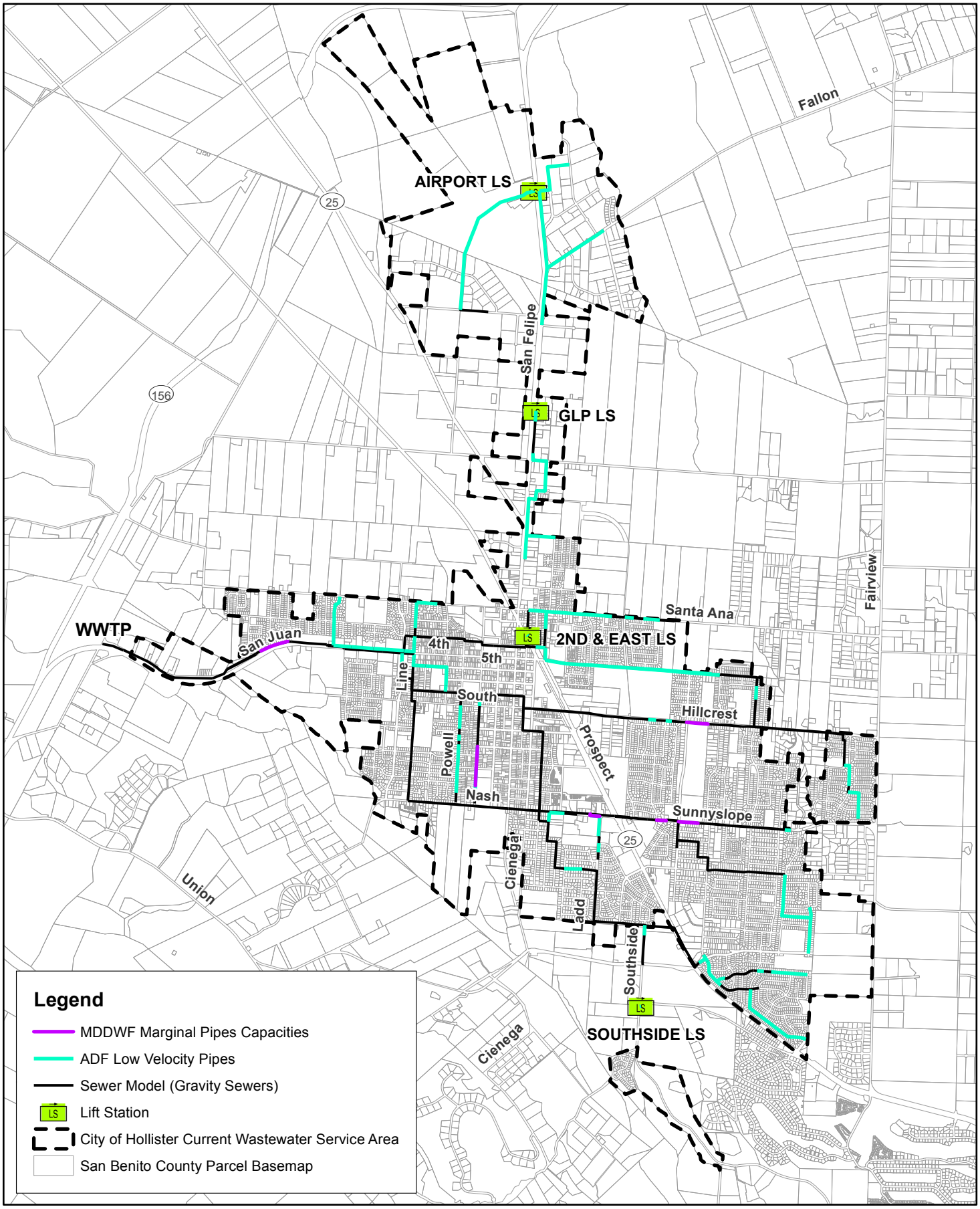
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 6-3: EXISTING MDDWF PIPE DEFICIENCIES

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

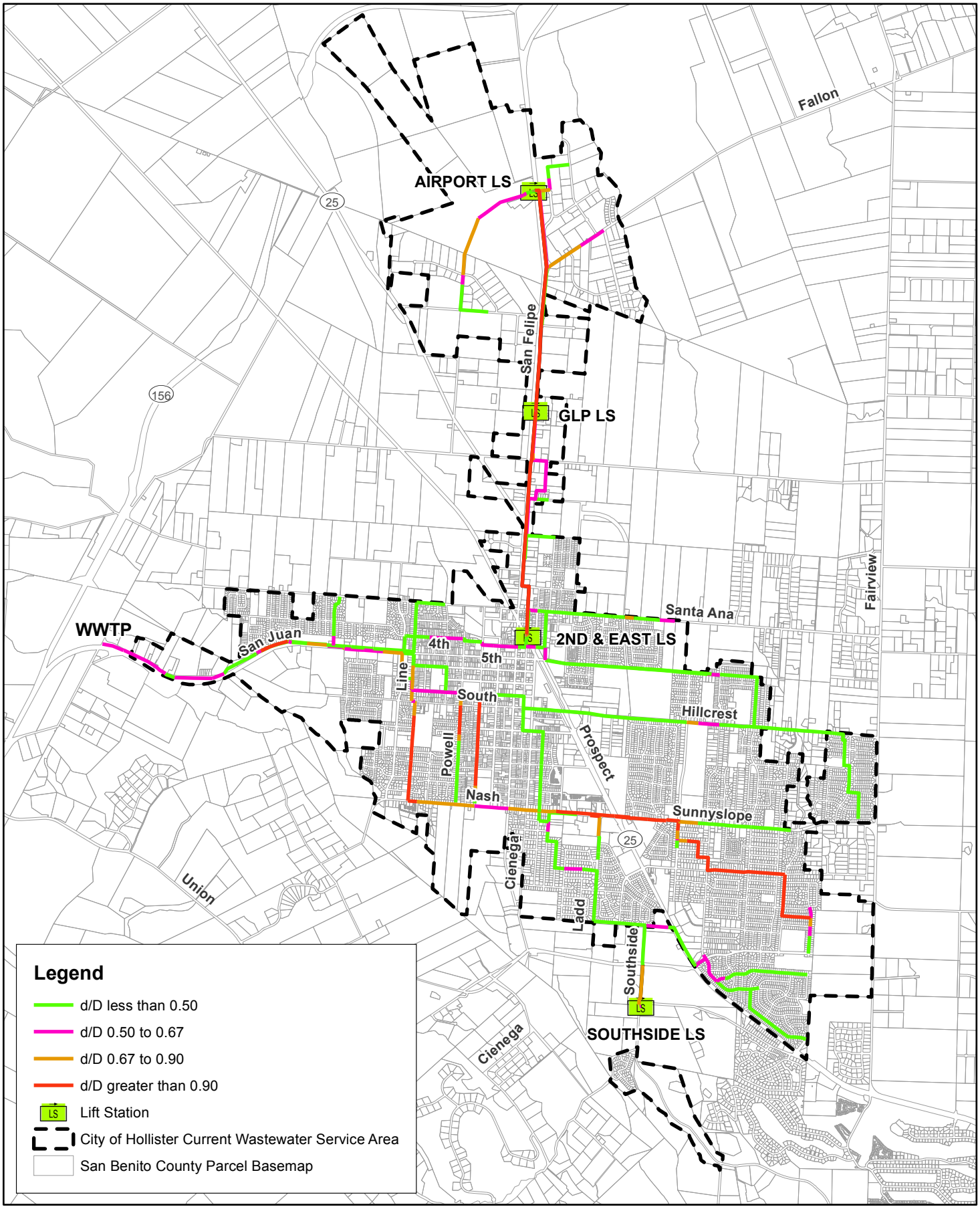


WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP
FIGURE 6-4: EXISTING MDDWF MARGINAL PIPE DEFICIENCIES AND ADF LOW VELOCITY PIPES

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

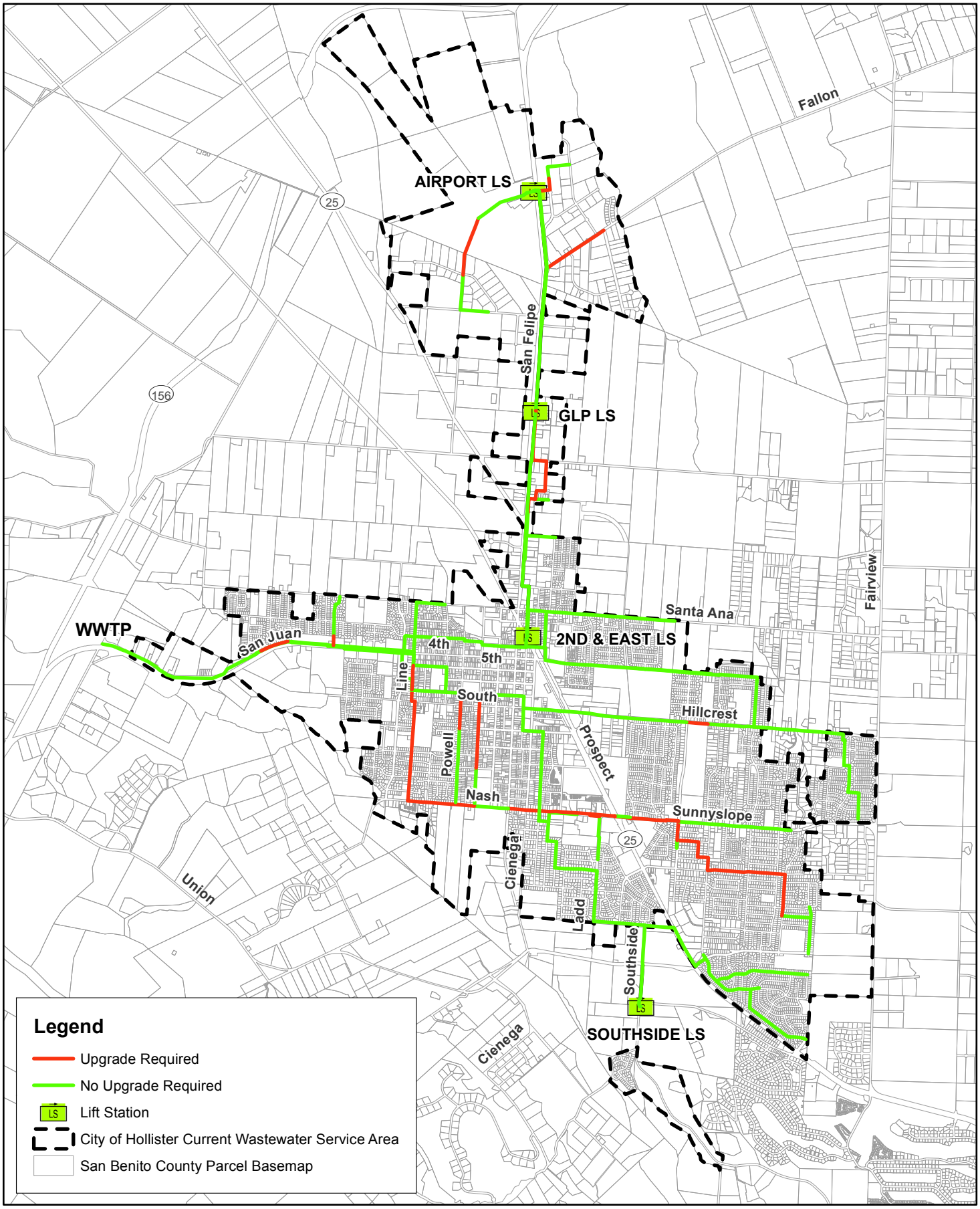
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 6-5: FUTURE MAXIMUM d/D DURING MDDWF CONDITIONS

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL

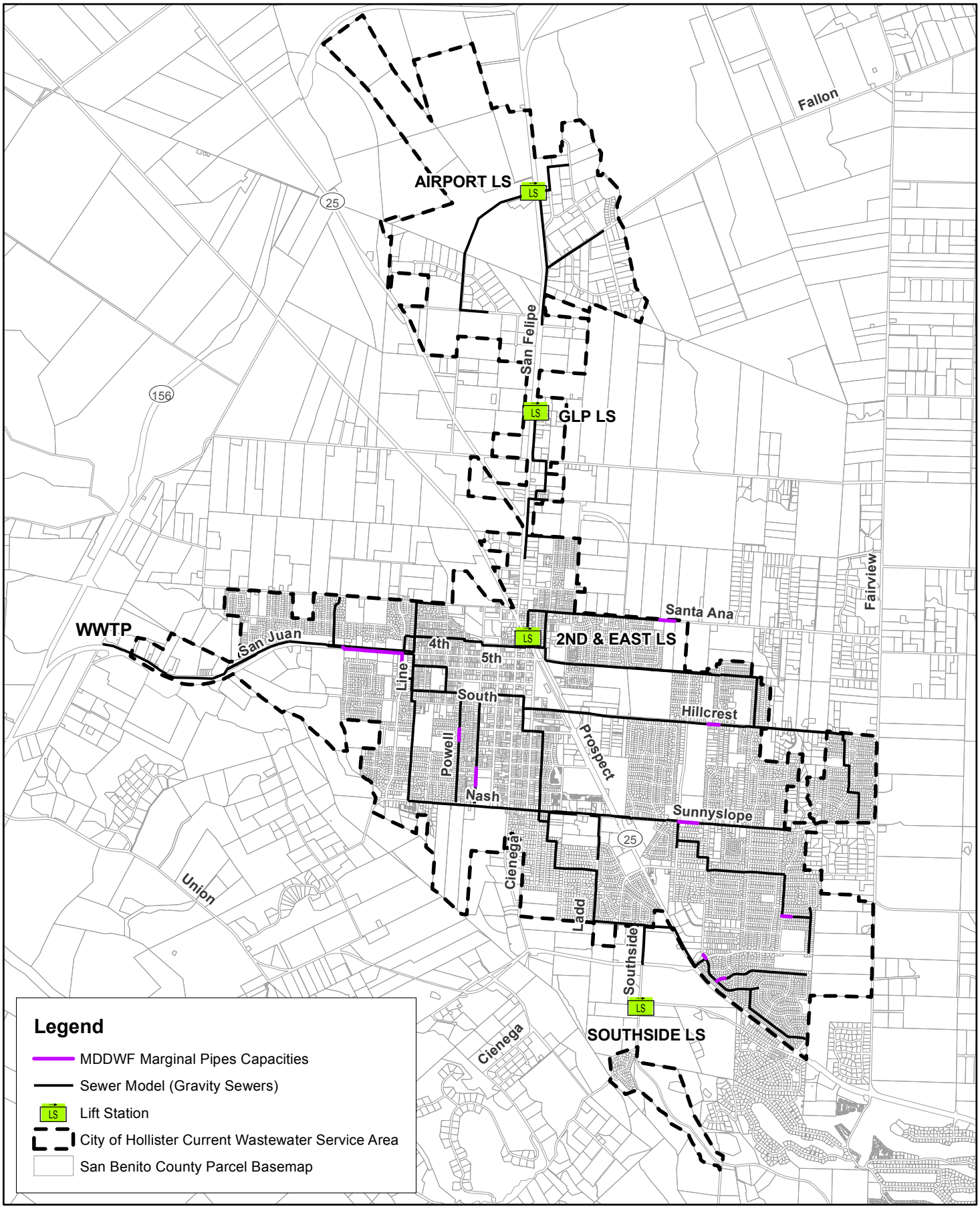
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 6-6: FUTURE MDDWF PIPE DEFICIENCIES

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE 6-7: FUTURE MDDWF MARGINAL PIPE DEFICIENCIES

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

CHAPTER 7

CAPITAL IMPROVEMENT PROGRAM

This Chapter presents the proposed Capital Improvement Program (CIP), with a brief description of the proposed projects and a preliminary cost estimate for each proposed improvement for the City. Also included in the CIP recommendations are general timelines and scheduling for the needed improvements, and general guidelines for cost allocations relative to existing and future developments.

BASIS OF CAPITAL IMPROVEMENT PROGRAM COSTS

The capital improvement program (CIP) costs were developed based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources. Hard construction costs are typically escalated by a factor of 1.4, to allow budget for "soft costs" that include preliminary engineering, engineering, administration, construction management and inspection costs. Some projects may have factors other than 1.4 depending on project type. All CIP costs are expressed in Year 2010 dollars, using McGraw-Hill ENR Construction Cost Index of **8671** (March 2010), and will need to be escalated to the year or years scheduled for the work. The unit cost for new gravity sewers includes the proposed pipelines, manholes, lateral re-connections, sewer bypassing, traffic control, etc., and all other aspects of sewer system construction.

TIMING OF RECOMMENDED IMPROVEMENTS

There are projects triggered by existing deficiencies and projects triggered by future development. The projects that address existing deficiencies are ranked in order of importance, which is discussed in greater detail within this Chapter and shown in Table 7-1. These existing deficiencies are considered Near Term projects and are recommended to be completed within the next 1 to 5 years and are shown in Table 7-2. Near Term CIP that are triggered by existing demands, but also must be upgraded for future flows are identified in Tables 7-1 and 7-2. In these cases the CIP recommendation is the upgrade required to accommodate future flows.

There are also projects that are triggered by potential future development, for which the timing is always difficult to ascertain. These Long Term projects are presented in Table 7-3.

Recommended projects have not been evaluated for potential environmental impacts as a part of this study. Projects will be subject to the requirements of CEQA prior to approval and funding.

CIP RANKING

The near term capital improvement projects were ranked to determine what priority the existing recommended projects should be constructed. Table 7-1 evaluates each of the

projects in five categories: overflow to a water body of the state, hydraulic capacity (d/D), community impact, maintenance hot spots, and cost. Each category was provided a weighted importance factor based on what factors are more important than others. The importance factor is multiplied by the score the project received and then summed together to determine its final score.

*Although the projects are ranked as described above, it should be noted that **all** projects identified in the Near Term CIPs are a result of deficiencies in the existing collection system due to existing needs and are therefore all important to be constructed within the next 1 to 5 years. It is also recommended that the City review these projects periodically to determine if any substantial changes have occurred that may re-prioritize a project to a higher ranking.*

Table 7-2 provides a summary of all the existing recommended CIPs, or Near Term Projects, in order of ranking from Table 7-1. Table 7-2 also provides an estimate of the construction and "soft" costs for each project. The costs are based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources. The cost estimates are approximate and should be used for planning purposes only. Actual project costs will vary depending upon economic conditions at the time of construction. As noted previously, these costs are based on Year 2010 dollars (McGraw-Hill ENR Construction Cost Index of **8671**) and need to be escalated to the year or years scheduled for the work.

Table 7-3 provides a summary of the future recommended CIPs, or Long Term Projects, and their estimated costs. These projects are not ranked.

Following the tables, project description sheets are provided for each project noted. The project description sheets provide the following information:

- Project name
- Project trigger
- Project benefit
- Project need
- Project cost
- Project schedule
- Project description
- Project map

These description sheets can be used by City Staff in the planning for each project, and for inclusion in fiscal year budget requests.

Exhibits 1 and 2 in Appendix D show the Near Term and Long Term CIPS throughout the City.

UNIT COSTS

Table 7-2 and 7-3 provide costs for the recommended capital improvement projects. The unit costs are based on recent construction costs and engineering judgment. The unit costs for the various pipe diameters are as follows in Table 7-4:

Table 7-4. Unit Cost for Construction of Sewer Mains

Pipe Diameter (inches)	Unit Cost ($/LF)	Notes
8	180	Typical construction
8	235	For projects with heavy traffic control requirements
10	195	Typical construction
10	255	For projects with heavy traffic control requirements
12	205	Typical construction
12	265	For projects with heavy traffic control requirements
12	300	For projects located in trenches with concrete backfill
15	220	Typical construction
15	280	For projects with heavy traffic controls requirements
15	315	For projects located in trenches with concrete backfill
18	235	Typical construction
18	325	For projects with heavy traffic controls requirements
21	250	Typical construction
21	325	For projects with heavy traffic controls requirements
36	400	Typical construction

Projects with heavy traffic control requirements will be identified using the listing of highways, major thoroughfares, major collectors, and collectors as defined in Appendix D of the City's 1992 Design Standards.

Table 7-1. City of Hollister CIP Ranking Matrix

Importance Factor	5	4	3	2	1			
	Overflow to Water Body of the State	Design Standard	Community Impact	Maintenance Hot Spot	Cost	Impacted By Future Development		
Project Name	Yes - 10 No - 0	Meets Design Standard - 0 Doesn't Meet Design Standards - 2 Surcharging - 5 Overflowing - 10	< 1,000 - 0 1,001 to 5,000 - 5 >5,000 - 10	Not Critical - 0 Yearly Check - 5 Weekly or Monthly Checks - 10	<$25,000 - 10 $25,001 to $100,000 - 5 >$100,000 - 2	Yes/No	Score	Ranking
							= Sum of Importance Factor X Points	
Bridge Road Interconnect	0	2	10	0	10	No	48	1
Powell Street Sewer Pipe Upgrade	0	5	0	10	2	Yes	42	2
West Street Sewer Pipe Upgrade	0	5	0	10	2	Yes	42	3
Line Street Near Term Sewer Pipe Upgrade	0	2	10	0	2	No	40	4
GLP Lift Station Upgrades Near Term	0	2	0	10	10	No	38	5
Nash Road Sewer Pipe Upgrade	0	5	5	0	2	Yes	37	6
Southside Lift Station Upgrades Near Term	0	2	0	10	2	No	30	7
2nd and East Lift Station Upgrades Near Term	0	0	0	10	10	No	30	8
Sunset Drive Sewer Pipe Upgrade	0	2	5	0	2	Yes	25	9
Airport Lift Station Upgrades Near Term	0	0	0	10	5	No	25	10

Table 7-2. City of Hollister Near Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Uprade to Meet Future Needs*	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
1	**Bridge Road Interconnect**	New Pipe	--	30	--	21	Bridge Road	Northeast of Azul Court	WG549	549	Yes	Light	$250	LF	$7,500	**$10,500**
3	**Powell Street Sewer Pipe Upgrade**	Pipe Upgrade	**--**	800	6	10	Powell Street	From Wiebe Way to 7th Street	462	427	Yes	Light	$195	LF	$156,000	$218,400
				400	6	8	Powell Street	From Vali Way to Wiebe Way	459	462	Yes	Light	$180	LF	$72,000	$100,800
			Total Pipe Length	1,200											**Total**	**$319,200**
2	**West Street Sewer Pipe Upgrade**	Pipe Upgrade	**--**	800	6	10	West Street	From SMH 471 to 7th Street	471	428	Yes	Light	$195	LF	$156,000	$218,400
				1,600	6	8	West Street	From B Street to SMH 471	475	471	Yes	Light	$180	LF	$288,000	$403,200
			Total Pipe Length	2,400											**Total**	**$621,600**
4	**Line Street Near Term Sewer Pipe Upgrade**	Pipe Upgrade	--	3,000	15	18	Line Street	From Nash Road to Mica Court	274	414	Yes	Heavy	$325	LF	$975,000	**$1,365,000**
5	**GLP LS Upgrades**	Facility Upgrades	1	--	--	--	Frontage Road	Frontage Road 1,500 feet north of McCloskey Road	--	--	No	Light	$14,400	LS	$14,400	**$20,160**
6	**Nash Road Sewer Pipe Upgrade**	Pipe Upgrade	**--**	1,000	12	15	Nash Road	From San Benito Street to Prune Street	268	271	Yes	Heavy	$280	LF	$280,000	$392,000
				2,700	12	15	Tres Pinos Road	From Prune Street to Airline Highway	290	268	Yes	Heavy	$280	LF	$756,000	$1,058,400
				1,700	12	15	Sunnyslope Road	From Airline Highway to SMH 259	259	290	Yes	Heavy	$280	LF	$476,000	$666,400
				400	8	12	Sunnyslope Road	From SMH 259 to Memorial Drive	245	259	Yes	Heavy	$265	LF	$106,000	$148,400
			Total Pipe Length	5,800											**Total**	**$2,265,200**
7	**Southside LS Upgrades**	Facility Upgrades	1	--	--	--	Southside Road	At the intersection of Southside Road and Enterprise Road	--	--	No	--	$76,500	LS	$76,500	**$107,100**
8	**2nd and East LS Upgrades**	Facility Upgrades	1	--	--	--	East Street	At the intersection of 2nd Street and East Street	--	--	No	--	$7,200	LS	$7,200	**$10,080**
9	**Sunset Drive Sewer Pipe Upgrade**	Pipe Upgrade	**--**	600	8	12	Memorial Drive	From Sunnyslope Road to Cedar Street	207	245	Yes	Heavy	$265	LF	$159,000	$222,600
				700	6	12	Cedar Street	From Memorial Drive to Iris Street	204	207	Yes	Heavy	$265	LF	$185,500	$259,700
				500	6	12	Iris Street	From Cedar Street to Valley View Road	202	204	Yes	Heavy	$265	LF	$132,500	$185,500
				800	6	12	Valley View Drive	From Iris Street to Sunset Drive	188	202	Yes	Heavy	$265	LF	$212,000	$296,800
				600	6	12	Sunset Drive	From Valley View Drive to SMH 190	190	188	Yes	Heavy	$255	LF	$153,000	$214,200
				1,900	6	10	Sunset Drive	From Valley View Drive to Ciera Vista Drive	197	190	Yes	Heavy	$255	LF	$484,500	$678,300
				1,300	6	10	Ciera Vista Drive	From Sunset Drive to Tiburon Drive	199	197	Yes	Heavy	$255	LF	$331,500	$464,100
			Total Pipe Length	6,400											**Total**	**$2,321,200**

Table 7-2. City of Hollister Near Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Uprade to Meet Future Needs*	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
10	**Aiport LS Upgrades**	Facility Upgrades	1	--	--	--	San Felipe Road	At Hollister municpal airport	--	--	No	--	$76,200	LS	$76,200	**$106,680**
															TOTAL NEAR TERM PROJECT COSTS	**$7,146,720**

*** If noted "Yes", then the proposed project has existing deficiencies. In addition, upgrades are necessary for future development. The proposed pipe diameter noted in this Table is to meet the capacity needs of future development.**

**** Total includes construction cost plus preliminary engineering, design engineering, administration construction management and inspection costs. Construction costs were developed based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with**

Table 7-3. City of Hollister Long Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
1	**Aerostar Way Sewer Pipe Upgrade**	Pipe Upgrade	--	1,900	12	15	Aerostar Way	From Airway Drive to SMH 503	494	503	Light	$220	LF	$418,000	**$585,200**
2	**Hillcrest Road Sewer Pipe Upgrade**	Pipe Upgrade	--	1,400	8	10	Hillcrest Road	From El Cerro Drive to Memorial Drive	335	330	Heavy	$255	LF	$357,000	**$499,800**
3	**Fallon Road Sewer Pipe Upgrade**	Pipe Upgrade	--	2,200	10	12	Fallon Road	From Shelton Drive to Technology Parkway	485	480	Heavy	$265	LF	$583,000	**$816,200**
4	**Kirk Patrick to GLP LS**	Pipe Upgrade	--	1,600	10	12	Frontage Road	From McCloskey Road To GLP Lift Station	WG373	GLP LS	Light	$205	LF	$328,000	$459,200
		Pipe Upgrade	--	500	10	12	McCloskey Road	From McCloskey Road to Frontage Road	WG372	WG373	Light	$205	LF	$102,500	$143,500
		Pipe Upgrade	--	1,700	10	12	Kirk Patrick	From Chappel Road to McCloskey Road	525	WG372	Light	$205	LF	$348,500	$487,900
		Pipe Upgrade	--	500	10	12	San Felipe Road	From SMH 524 to Chappell Road	524	525	Light	$205	LF	$102,500	$143,500
			Total Pipe Length	4,300										**Total**	**$1,234,100**
5	**Line Street Long Term Sewer Pipe Upgrade**	Pipe Upgrade	--	1,600	15	18	Line Street	From Peridot Court to 5th Street	414	406	Heavy	$325	LF	$520,000	$728,000
		Pipe Upgrade	--	1,800	15	18	Nash Road	From West Street to Line SMH 274	281	274	Heavy	$325	LF	$585,000	$819,000
			Total Pipe Length	3,400										**Total**	**$1,547,000**
6	**Miller Road Sewer Pipe Upgrade**	Pipe Upgrade	--	300	8	12	Miller Road	From Shelton Drive to Technology Parkway	485	480	Light	$205	LF	$61,500	**$86,100**
7	**San Juan Road Sewer Pipe Upgrade**	Pipe Upgrade	--	30	27	36	San Juan Road	At the intersection of Westside Boulevard	543	542	Heavy	$400	LF	$12,000	**$16,800**

Table 7-3. City of Hollister Long Term Capital Improvement Program

Project #	Title	Description	Quantity	Length (Ft)	Old Diameter (in)	New Diameter (in)	Street	Location	Upstream Manhole Number	Downstream Manhole Number	Traffic Control	Construction Cost ($)		Subtotal ($)	Total Project Cost ($)**
8	**Technology Parkway Sewer Pipe Upgrade**	Pipe Upgrade	--	700	10	12	Technology Parkway	From SMH 488 to SMH 510	488	510	Light	$205	LF	$143,500	**$200,900**
9	**Aiport LS VFD Upgrade**	Facility Upgrades	1	--	--	--	San Felipe Road	At Hollister municpal airport	--	--	Minimal	$540,000	LS	$540,000	**$756,000**
10	**GLP LS VFD Upgrade**	Facility Upgrades	1	--	--	--	Frontage Road	Frontage Road 1,500 feet north of McCloskey Road	--	--	Light	$600,000	LS	$600,000	**$840,000**
11	**2nd and East LS Upgrades**	Facility Upgrades	1	--	--	--	East Street	At the intersection of 2nd Street and East Street	--	--	Light	$6,500	LS	$6,500	**$9,100**
12	**Cushman Street Sewer Pipe Upgrade**	Pipe Upgrade	--	600	15	18	Cushman Street	From Velado Street to Andrews Drive	177	179	Light	$235	LF	$141,000	**$197,400**
														TOTAL LONG TERM PROJECT COSTS	**$6,788,600**

**** Total includes construction cost plus preliminary engineering, design engineering, administration construction management and inspection costs. Construction costs were developed based on engineering judgment, confirmed bid prices for similar work in the Central Coast area, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources.**

Near Term Project No. 1: Bridge Road Interconnect

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

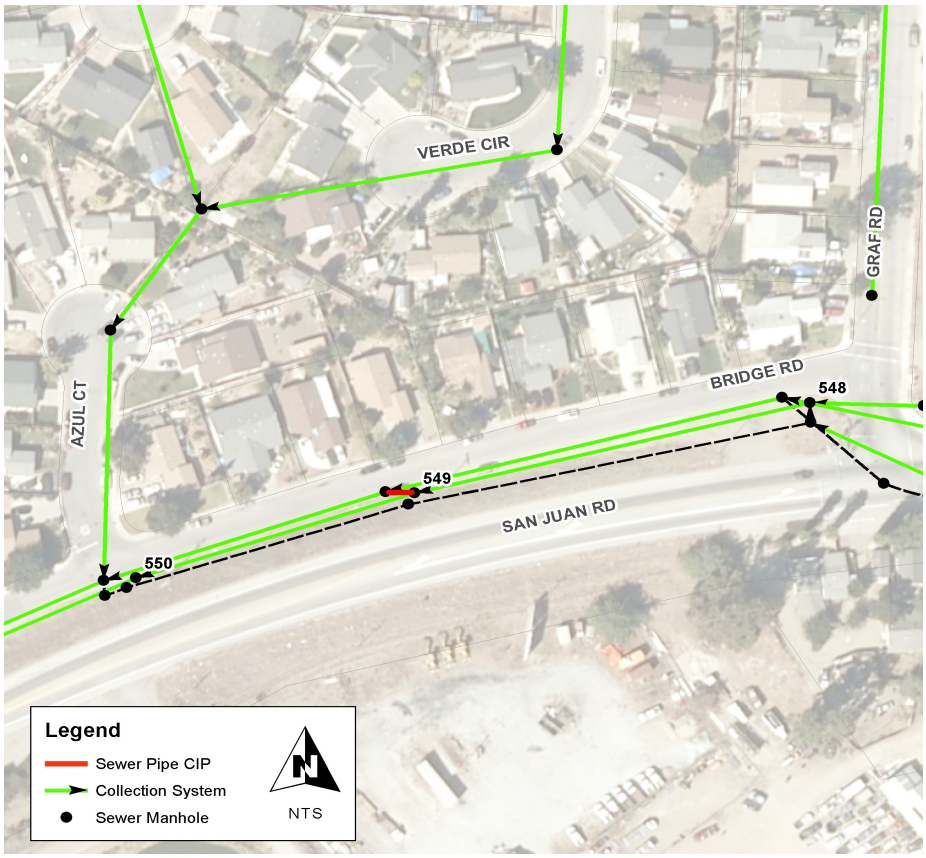
Existing Customers	60%
New Development	40%

Project Components

- [ ] Upgrade Gravity Pipeline
- [x] New Gravity Pipeline
- [ ] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 2 weeks



Project Need

- [ ] Insufficient capacity for existing flow
- [x] Insufficient capacity for future flow
- [ ] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$7,500
Planning, Engineering, CM, Legal/Admin (40%)	$3,000
Total Project Cost	**$10,500**

Project Description

The Bridge Road Near Term project proposes to add approximately 30 feet of 21-inch pipe between two sewer manholes on the existing parallel 21-inch and 36-inch sewer pipes on Bridge Road. The existing 21-inch runs at 60% to 80% full during existing peak flow conditions and 90% full during future peak flow conditions. It is assumed that wastewater flows are not properly distributed between the parallel sewer pipes. This upgrade would allow for continued use of the existing 21-inch sewer pipe without upgrading the sewer pipe.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 2: Powell Street Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

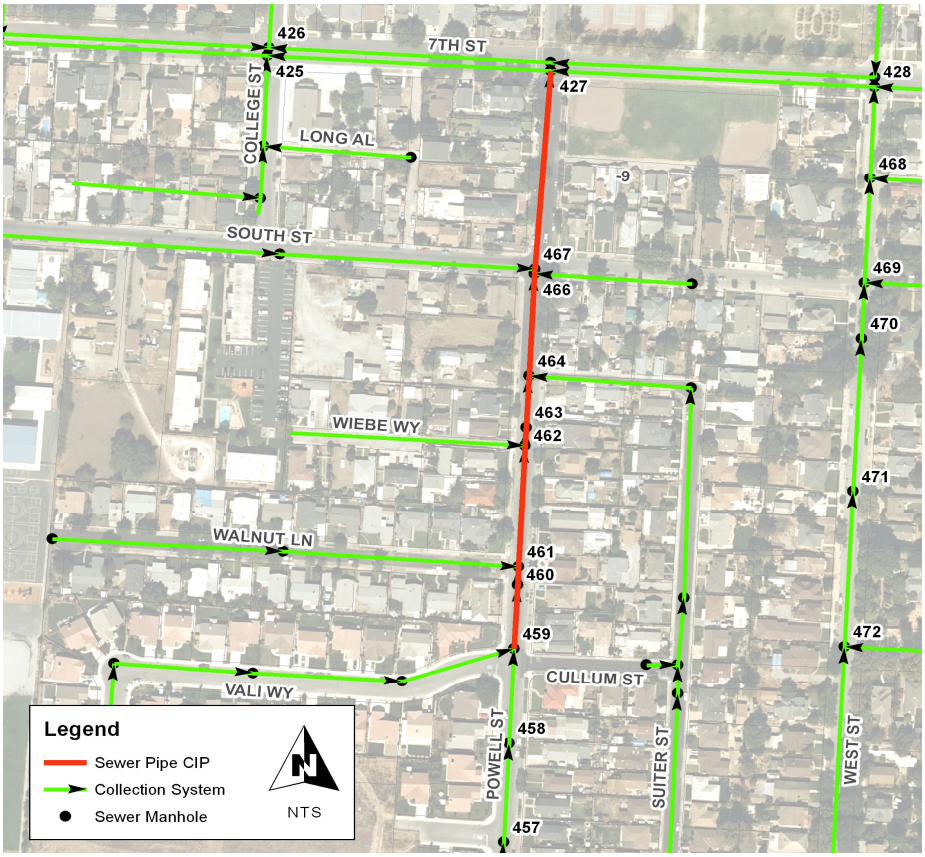
Existing Customers	95%
New Development	5%

Project Components

- [x] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] Upgrade Lift Station
- [ ] Upgrade Force Main
- [x] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 6 weeks



Project Need

- [x] Insufficient capacity for existing flow
- [x] Insufficient capacity for future flow
- [ ] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$228,000
Planning, Engineering, CM, Legal/Admin (40%)	$91,200
Total Project Cost	**$319,200**

Project Description

The Powell Street Near Term project proposes to replace approximately 1,200 feet of 6-inch pipe with 8-inch and 10-inch pipe on Powell Street from 7th Street to Vali Way. Powell Street is a known problem area and has insufficient capacity for existing conditions. These pipes segments run 50% to 100% full during existing peak flow conditions. Although these pipe will receive future flow, the pipes will not need to be upsized further to accept future flow conditions since future pipe size recommendations are being used for this near term project.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 3: West Street Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

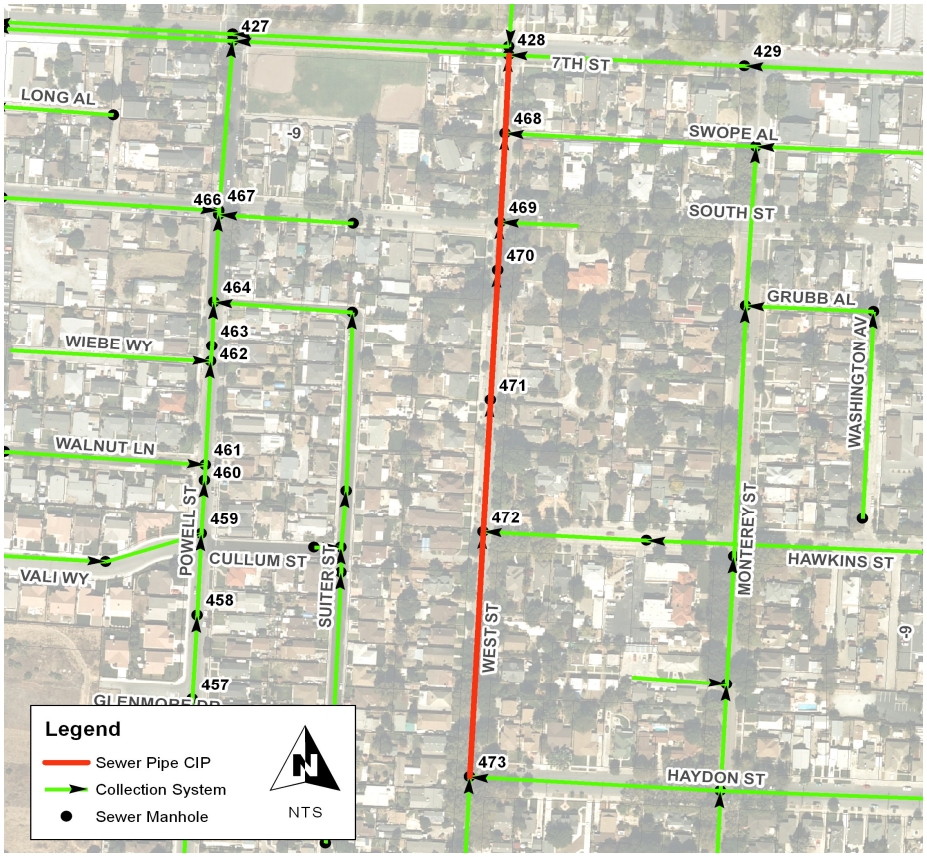
Existing Customers	90%
New Development	10%

Project Components

- [x] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 10 weeks



Project Need

- [x] Insufficient capacity for existing flow
- [x] Insufficient capacity for future flow
- [ ] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$444,000
Planning, Engineering, CM, Legal/Admin (40%)	$177,600
Total Project Cost	**$621,600**

Project Description

The West Street Near Term project proposes to replace approximately 2,400 feet of 6-inch pipe with 8-inch and 10-inch pipe on West Street from 7th Street to Haydon Street. West Street is a known problem area and has insufficient capacity for existing conditions. These pipes segments run 90% to 100% full during existing peak flow conditions. Although these pipe will receive future flow, the pipes will not need to be upsized further to accept future flow conditions since future pipe size recommendations are being used for this near term project.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:

Wallace Group

www.wallacegroup.us

San Luis Obispo, CA

Near Term Project No. 4: Line Street Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

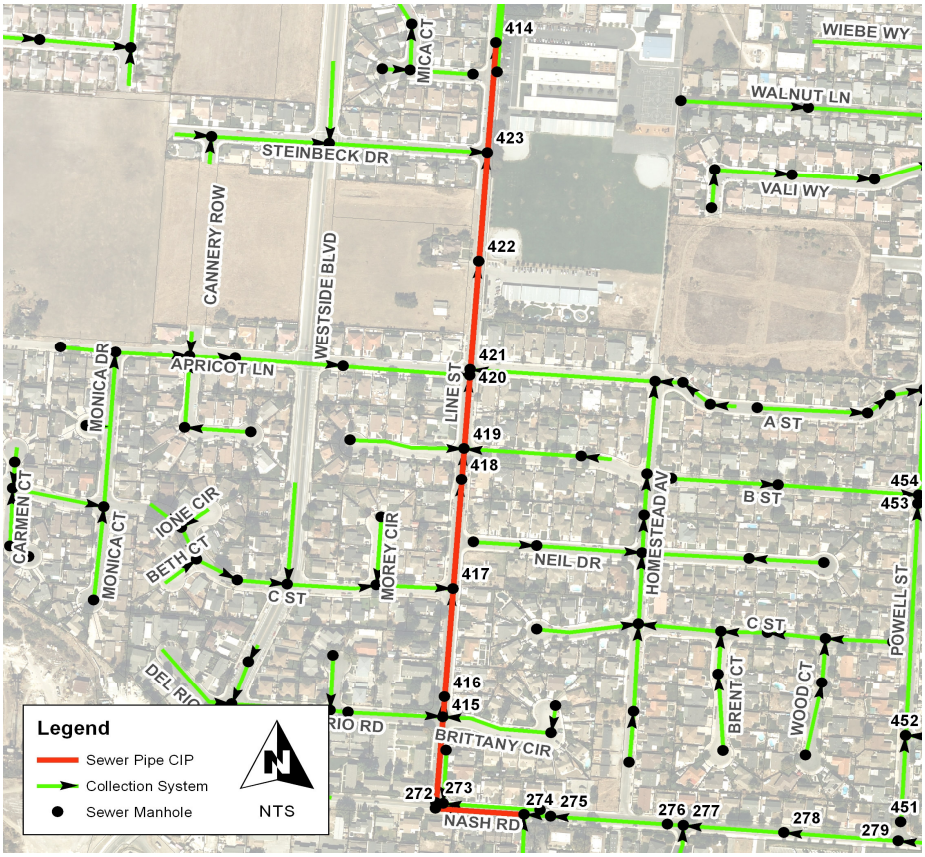
Existing Customers	70%
New Development	30%

Project Components

- [x] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 12 weeks



Project Need

- [x] Insufficient capacity for existing flow
- [x] Insufficient capacity for future flow
- [ ] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$975,000
Planning, Engineering, CM, Legal/Admin (40%)	$390,000
Total Project Cost	**$1,365,000**

Project Description

The Line Street Near Term project proposes to replace approximately 3,000 feet of 15-inch pipe with 18-inch pipe on Line Street from Nash Road to Mica Court. These pipes segments run 75% full during existing peak flow conditions. Although these pipes will receive future flow, the pipes will not need to be upsized further to accept future flow conditions.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 5: GLP Lift Station Upgrade

City of Hollister Capital Improvement Project Information Sheet
2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

Existing Customers	100%
New Development	0%

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [x] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [x] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 2 weeks

Project Need

- [ ] Insufficient capacity for existing flow
- [ ] Insufficient capacity for future flow
- [x] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$14,400
Planning, Engineering, CM, Legal/Admin (40%)	$5,760
Total Project Cost	**$20,160**

Project Description

The GLP Lift Station Near Term project proposes to evaluate the existing SCADA control system for failure to send an alarm signal when one or both of the pumps is not operating. In addition, the project proposes to reconfigure SCADA controls at the lift station to disable the pumps at the Airport Lift Station if the GLP Lift Station pumps are not operating. The SCADA controls will help to prevent overflow at the GLP Lift Station by minimizing inflow during a power outage or pump failure.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 6: Nash Road Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

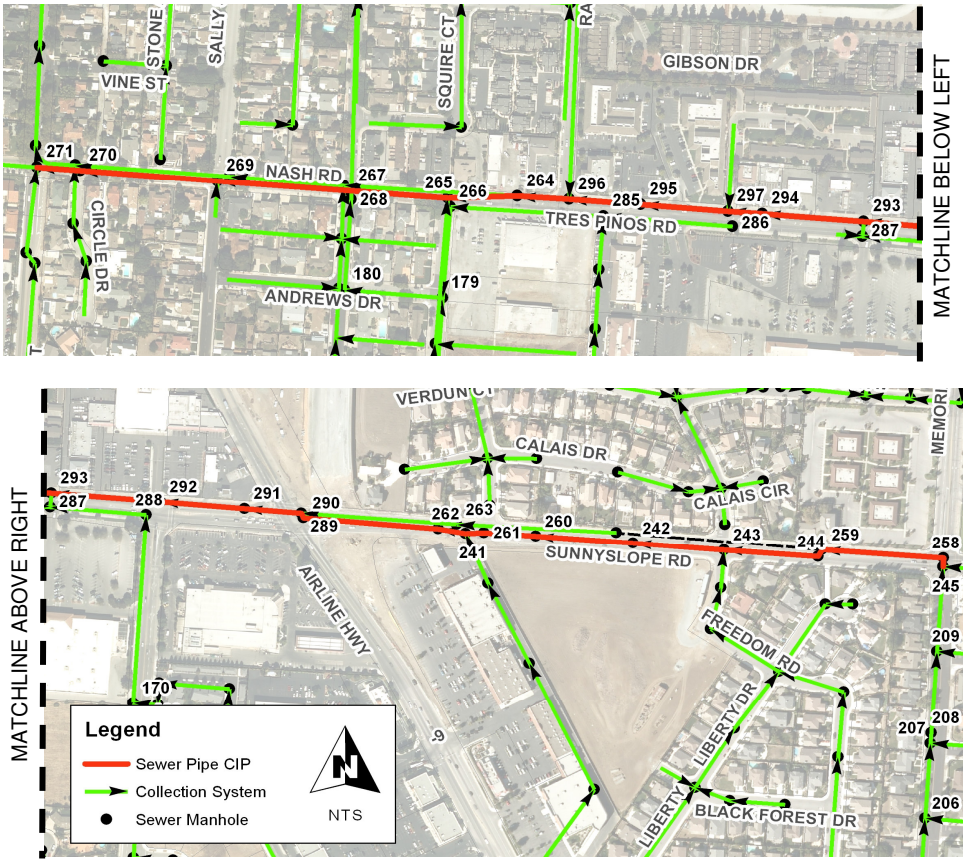
Existing Customers	70%
New Development	30%

Project Components

- [x] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 24 weeks



Project Need

- [x] Insufficient capacity for existing flow
- [x] Insufficient capacity for future flow
- [ ] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$1,618,000
Planning, Engineering, CM, Legal/Admin (40%)	$647,200
Total Project Cost	**$2,265,200**

Project Description

The Nash Road Near Term project proposes to replace approximately 5,400 feet of 12-inch pipe and 400 of 8-inch pipe with 15-inch pipe and 12-inch pipe on Nash Road from San Benito Street to Memorial Drive. These pipes segments run 70% to 100% full during existing peak flow conditions. Although these pipe will receive future flow, the pipes will not need to be upsized further to accept future flow conditions since future pipe size recommendations are being used for this near term project.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 7: Southside Lift Station Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [ ] City of Hollister
- [x] San Benito County

Project Benefit

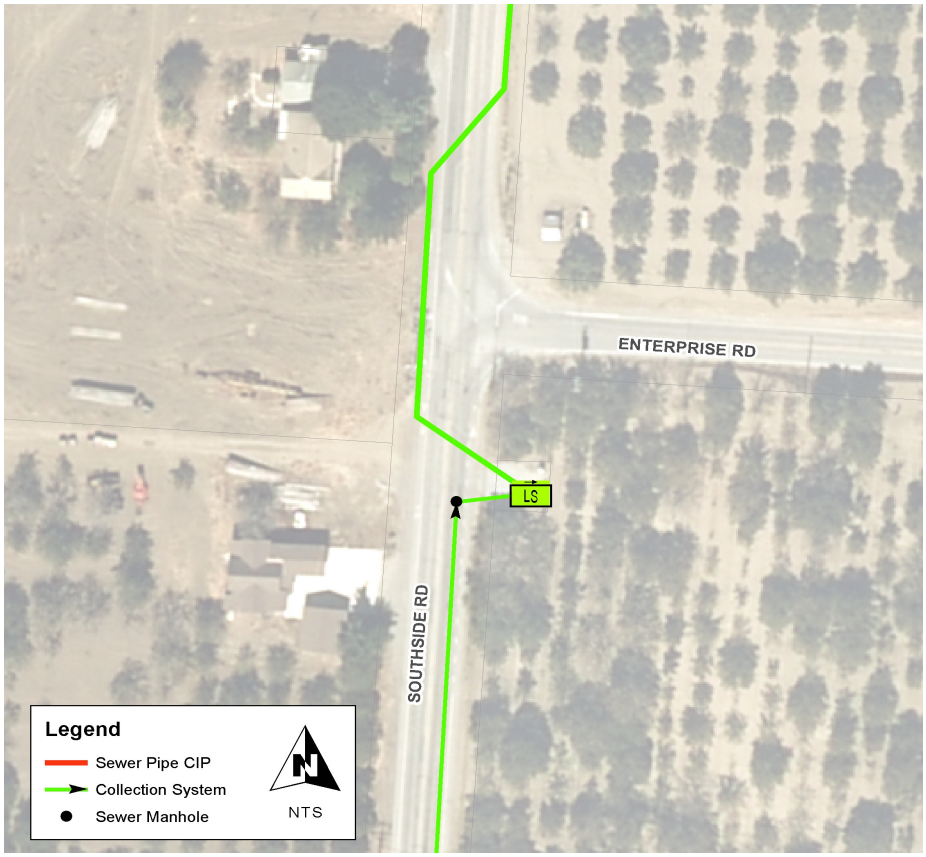
Existing Customers	100%
New Development	0%

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [x] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 3 weeks



Project Need

- [ ] Insufficient capacity for existing flow
- [ ] Insufficient capacity for future flow
- [x] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$76,500
Planning, Engineering, CM, Legal/Admin (40%)	$30,600
Total Project Cost	**$107,100**

Project Description

The Southside Lift Station Near Term project proposes to install a blower and odor scrubber adjacent to the wet well to help prevent corrosion of the wet well, pumps, and piping. In addition, it is proposed to help protect the site from vandalism by installing security fencing.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 8: 2nd and East Lift Station Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

Existing Customers	100%
New Development	0%

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] Upgrade Lift Station
- [ ] Upgrade Force Main
- [x] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 1 week

Project Need

- [ ] Insufficient capacity for existing flow
- [ ] Insufficient capacity for future flow
- [x] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$7,200
Planning, Engineering, CM, Legal/Admin (40%)	$2,880
Total Project Cost	**$10,080**

Project Description

The 2nd and East Near Term Project proposes to replace an existing slide gate due to corrosion. The slide gate protects the lift station from backflow entering the wetwell through the overflow pipeline.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 9: Sunset Drive Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

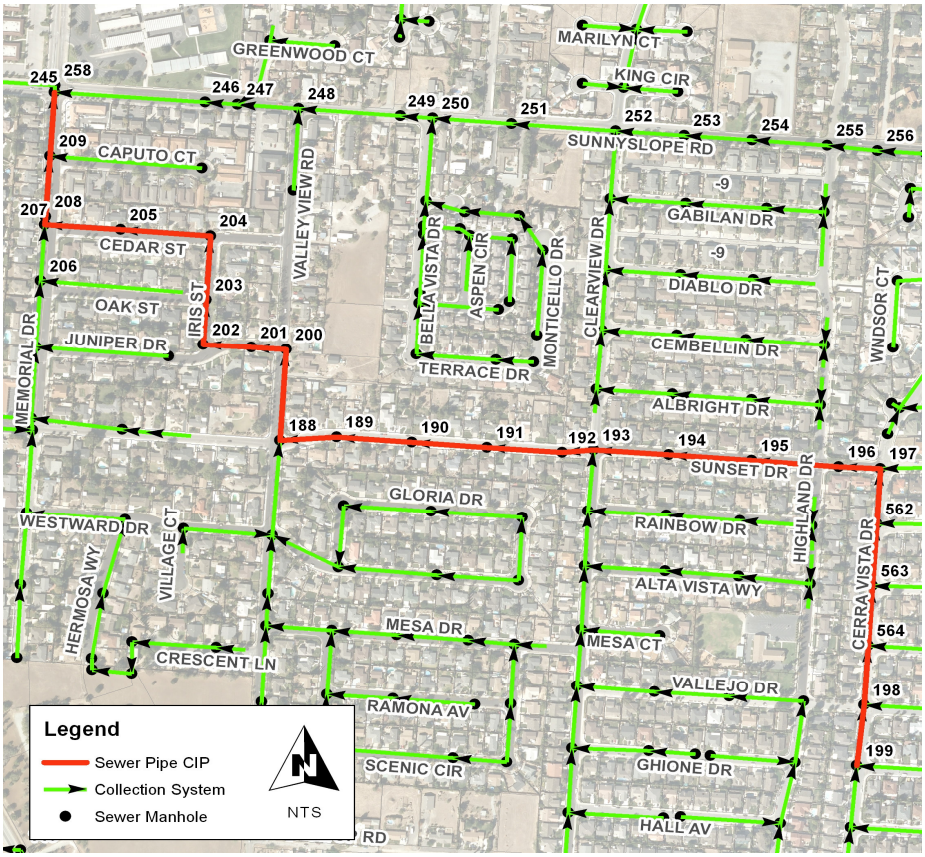
Existing Customers	60%
New Development	40%

Project Components

- [x] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [ ] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 24 weeks



Project Need

- [x] Insufficient capacity for existing flow
- [x] Insufficient capacity for future flow
- [ ] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$1,658,000
Planning, Engineering, CM, Legal/Admin (40%)	$663,200
Total Project Cost	**$2,321,200**

Project Description

The Sunset Drive Near Term project proposes to replace approximately 5,800 feet of 6-inch pipe and 600 feet of 8-inch pipe with 10-inch pipe and 12-inch pipe along Sunset Drive from Sunnyslope Road to Tiburon Drive. These pipe segments run 50% to 100% full during existing peak flow conditions. Although these pipes will receive future flow, the pipes will not need to be upsized further to accept future flow conditions since future pipe size recommendations are being used for this near term project.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Near Term Project No. 10: Airport Lift Station Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Jurisdiction

- [x] City of Hollister
- [ ] San Benito County

Project Benefit

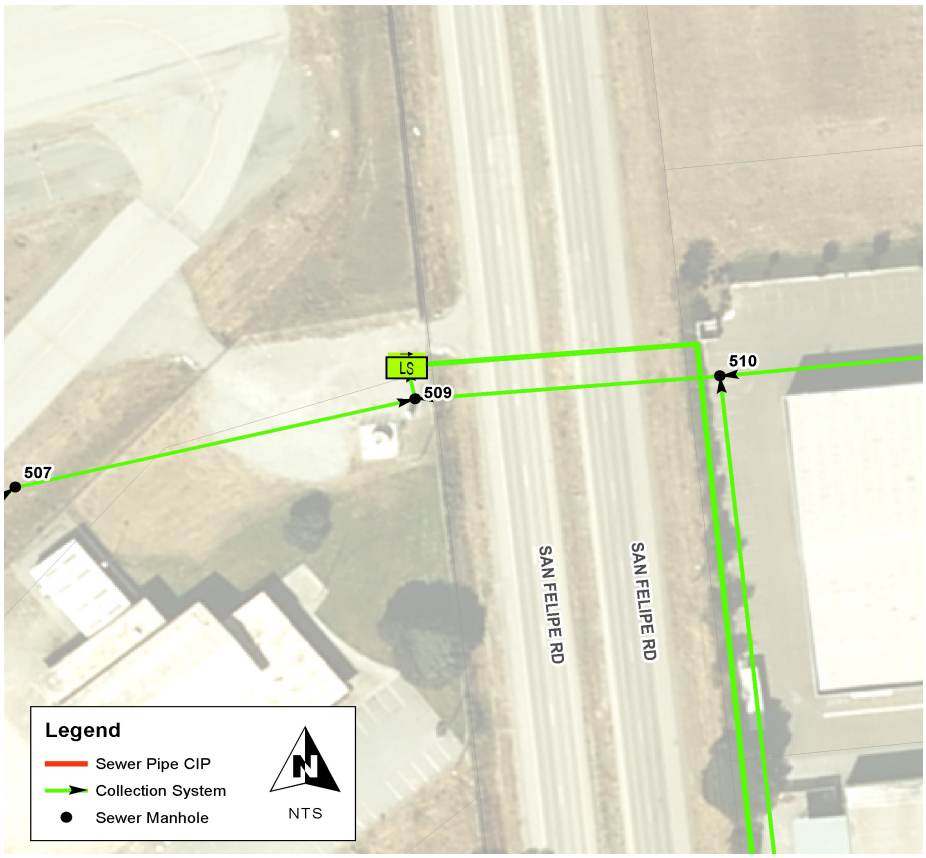
Existing Customers	100%
New Development	0%

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [x] Upgrade Lift Station
- [ ] Upgrade Force Main
- [ ] Rehabilitation/Repair
- [x] Inspection and/or analysis
- [ ] Replace Manhole

Project Scheduling

Est. Construction Duration: 3 weeks



Project Need

- [ ] Insufficient capacity for existing flow
- [ ] Insufficient capacity for future flow
- [x] Existing condition limits O&M
- [ ] Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$76,200
Planning, Engineering, CM, Legal/Admin (40%)	$30,480
Total Project Cost	**$106,680**

Project Description

The Airport Lift Station Near Term project proposes to install a blower and odor scrubber adjacent to the wet well to help prevent corrosion of the wet well, pumps, and piping. In addition, it is proposed to prepare a feasibility and cost analysis to determine if the Airport lift station could be upgraded in the future to bypass the GLP lift station and flow to the gravity collection system.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 1: Aerostar Way Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

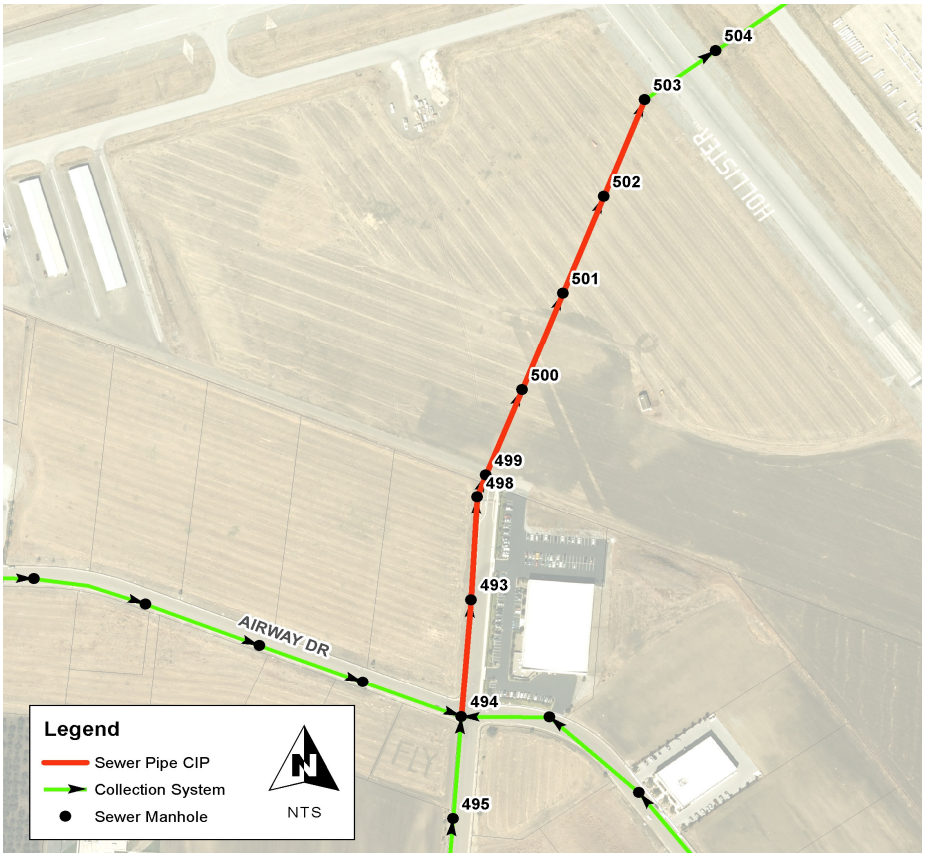
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 8 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$418,000
Planning, Engineering, CM, Legal/Admin (40%)	$167,200
Total Project Cost	**$585,200**

Project Description

The Aerostar Way Long Term project proposes to replace approximately 1,900 feet of 12-inch pipe with 15-inch pipe on Aerostar Way from Airway Drive north to the airport. These pipe segments run 70% to 90% full during future peak flow conditions. This upgrade increases collection system capacity to serve future flow conditions within the project area.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 2: Hillcrest Road Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

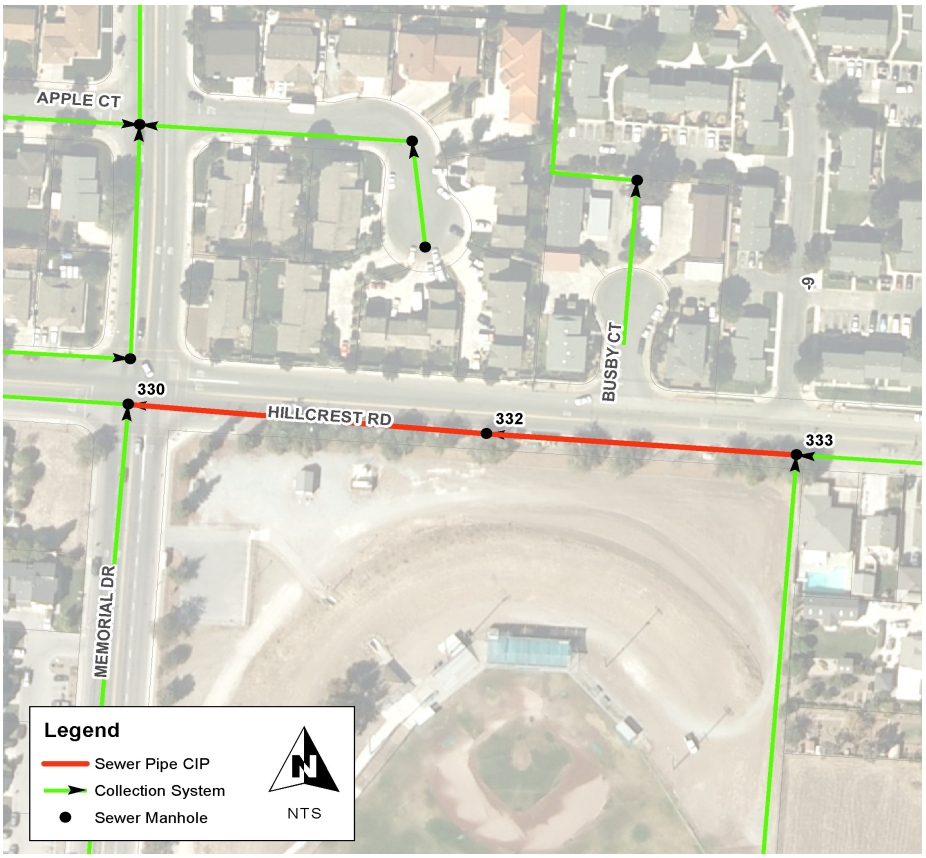
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 6 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$357,000
Planning, Engineering, CM, Legal/Admin (40%)	$142,800
Total Project Cost	**$499,800**

Project Description

The Hillcrest Road Long Term project proposes to replace approximately 1,400 feet of 8-inch pipe with 10-inch pipe on Hillcrest Road from Memorial Drive to Busby Court. These pipe segments run 50% to 70% full during future peak flow conditions. This upgrade increases collection system capacity to serve future flow conditions within the project area.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 3: Fallon Road Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

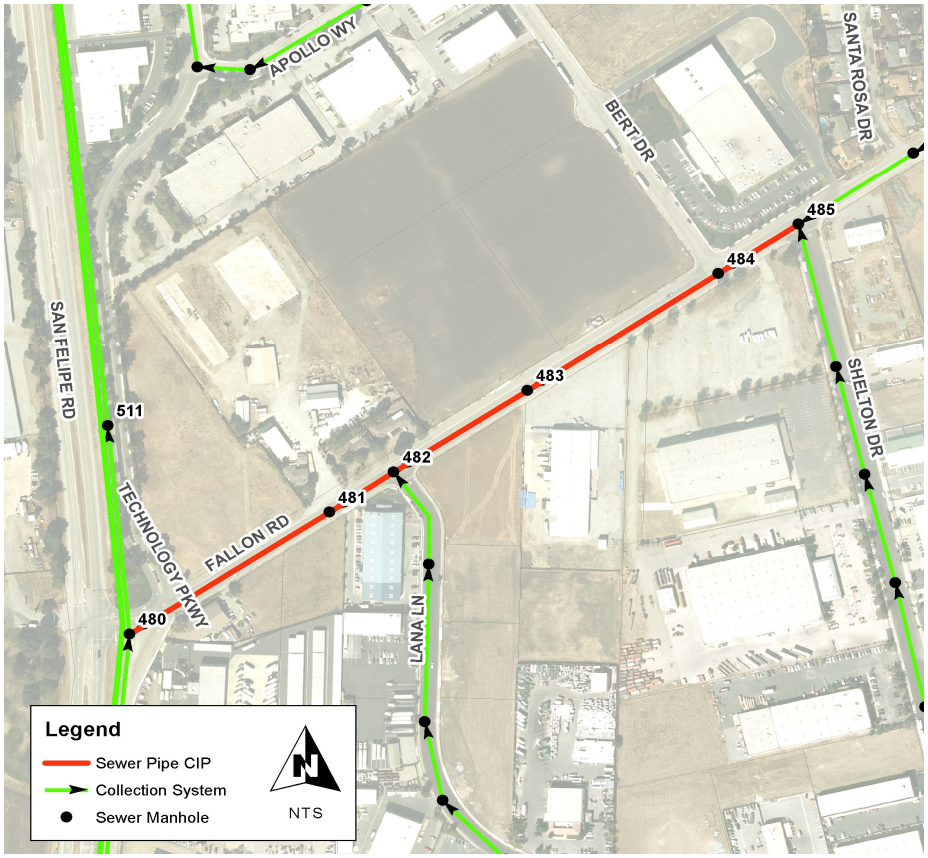
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 8 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$583,000
Planning, Engineering, CM, Legal/Admin (40%)	$233,200
Total Project Cost	**$816,200**

Project Description

The Fallon Road Long Term project proposes to replace approximately 2,200 feet of 10-inch pipe with 12-inch pipe on Fallon Road from Technology Drive to Shelton Drive. These pipe segments run 50% to 70% full during future peak flow conditions. This upgrade increases collection system capacity to serve future flow conditions within the project area.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 4: Kirk Patrick to GLP Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

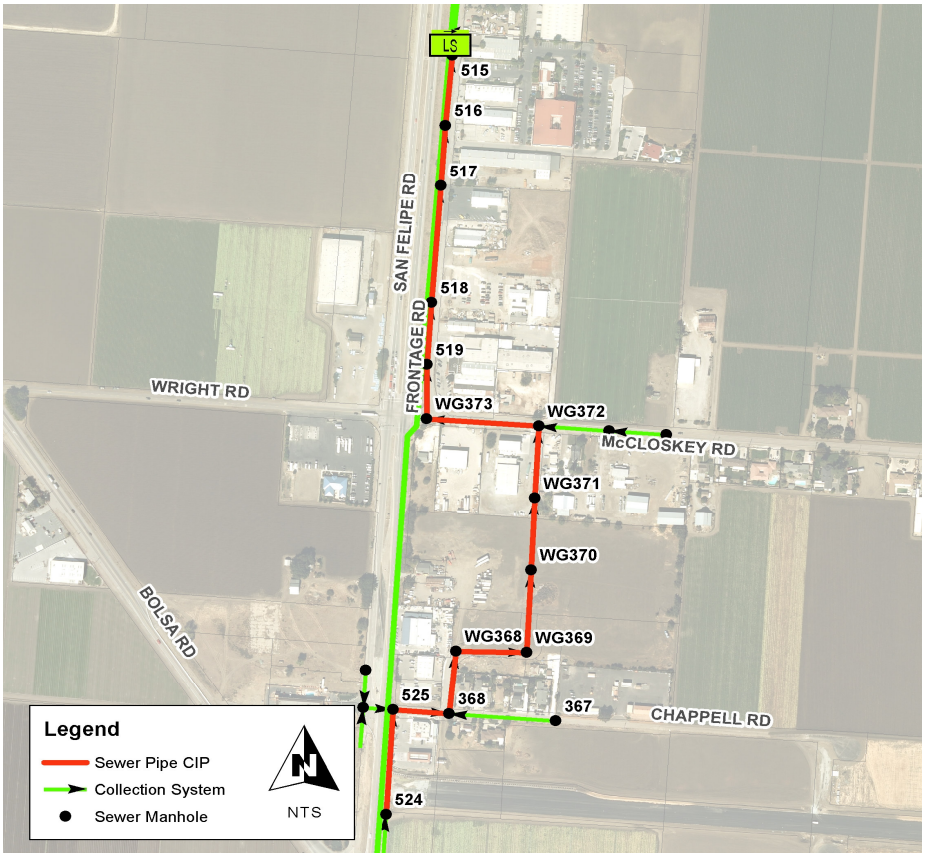
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 20 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$881,500
Planning, Engineering, CM, Legal/Admin (40%)	$352,600
Total Project Cost	**$1,234,100**

Project Description

The Kirk Patrick to GLP Lift Station Long Term project proposes to replace approximately 4,300 feet of 10-inch pipe with 12-inch pipe along Kirk Patrick from Chappell Road to GLP Lift Station. These pipe segments run 50% to 80% full during future peak flow conditions. This upgrade increases collection system capacity to serve future flow conditions within the project area.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 5: Line Street Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

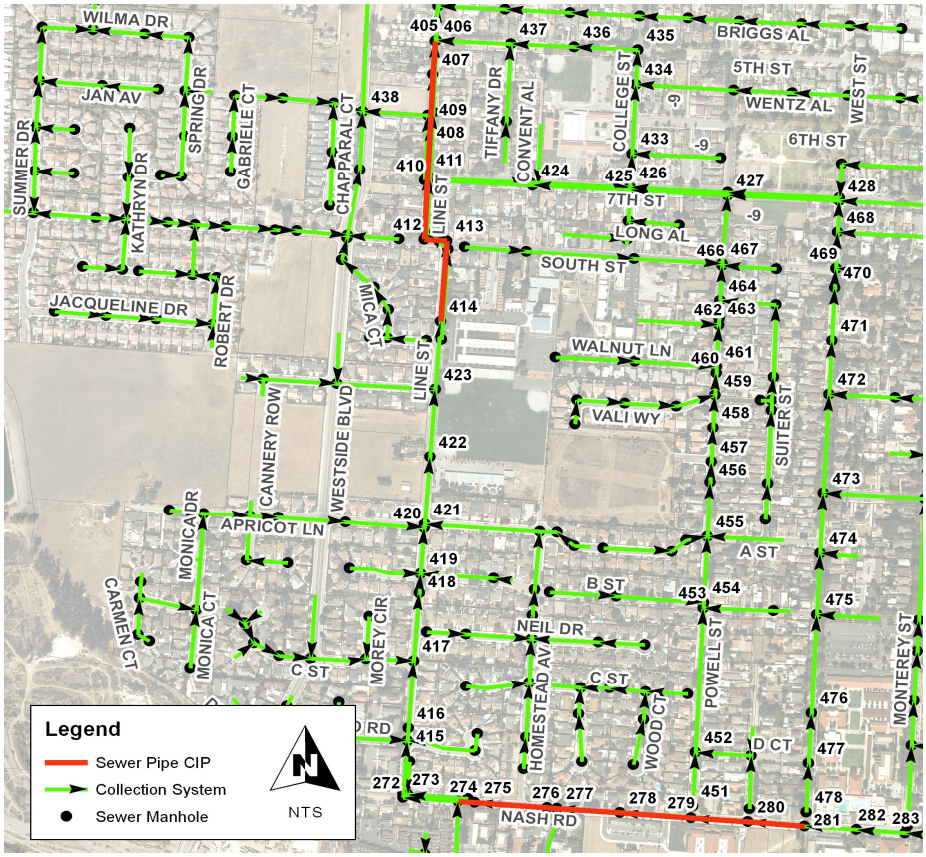
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 12 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$1,105,000
Planning, Engineering, CM, Legal/Admin (40%)	$442,000
Total Project Cost	**$1,547,000**

Project Description

The Line Street Long Term project proposes to replace approximately 3,400 feet of 15-inch pipe with 18-inch pipe on Nash Road from West Street to Homestead Avenue and Line Street from Peridot Court to 5th Street. These pipe segments run 50% to 80% full during future peak flow conditions. This upgrade increases collection system capacity to serve future flow conditions within the project area. It is recommended that Near Term Project No. 1: Line Street Sewer Pipe Upgrade be completed prior to the completion of this long term project.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 6: Miller Road Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

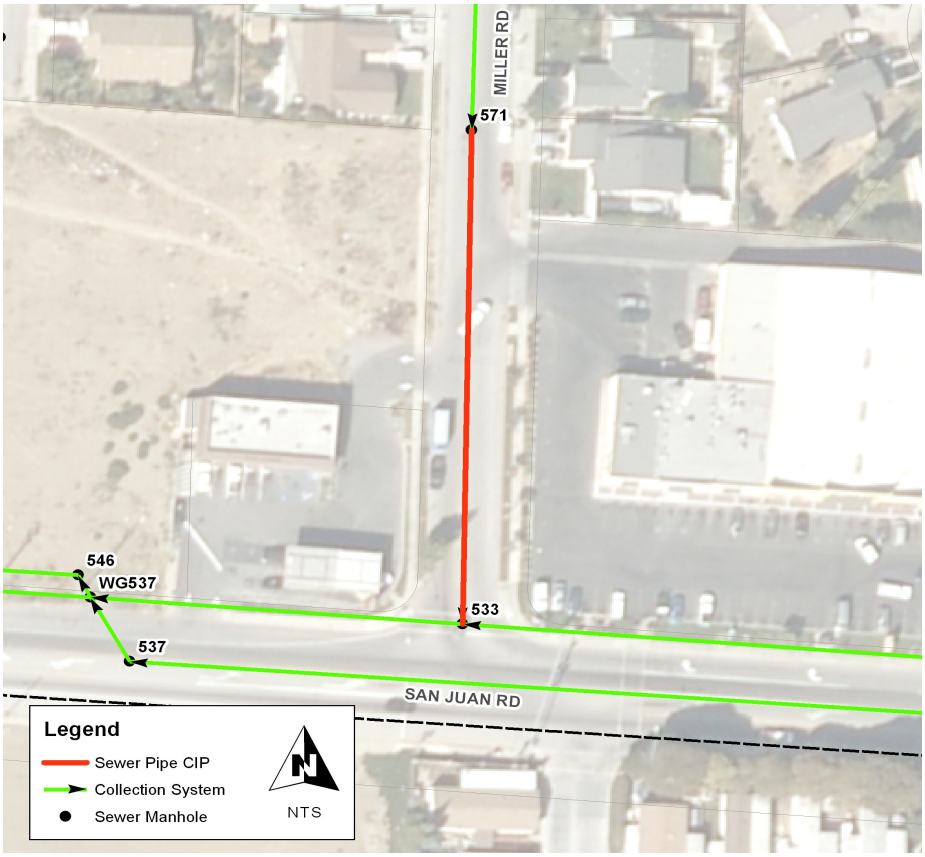
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 2 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$61,500
Planning, Engineering, CM, Legal/Admin (40%)	$24,600
Total Project Cost	**$86,100**

Project Description

The Miller Road Long Term project proposes to replace approximately 300 feet of 8-inch pipe with 12-inch pipe from San Juan Road north on Miller Road. This pipe segment runs 65% full during future peak flow conditions. This upgrade increases collection system capacity to serve future flow conditions within the project area.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 7: San Juan Road Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

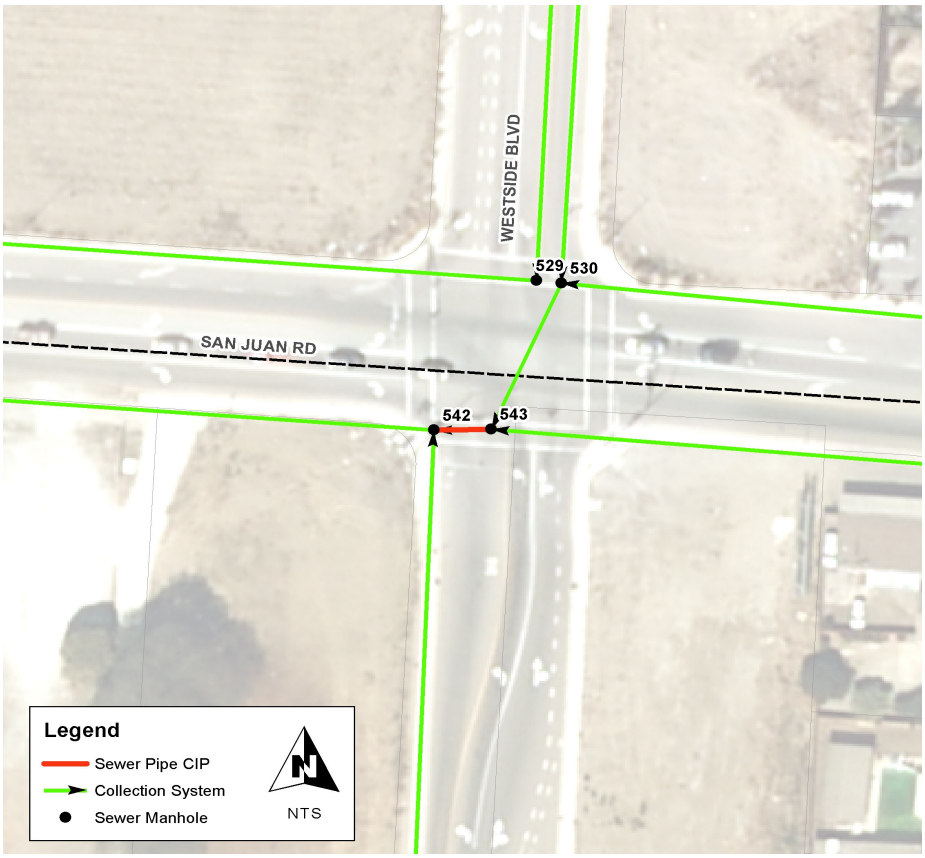
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 1 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$12,000
Planning, Engineering, CM, Legal/Admin (40%)	$4,800
Total Project Cost	**$16,800**

Project Description

The San Juan Road Long Term project proposes to replace approximately 30 feet of 27-inch pipe with 36-inch pipe on San Juan Road at Westside Boulevard. This is a short pipe segment that receives upstream flow from existing 27-inch and 36-inch pipes. This pipe segment runs at 85% full once all existing and future upstream improvements are in place.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 8: Technology Parkway Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

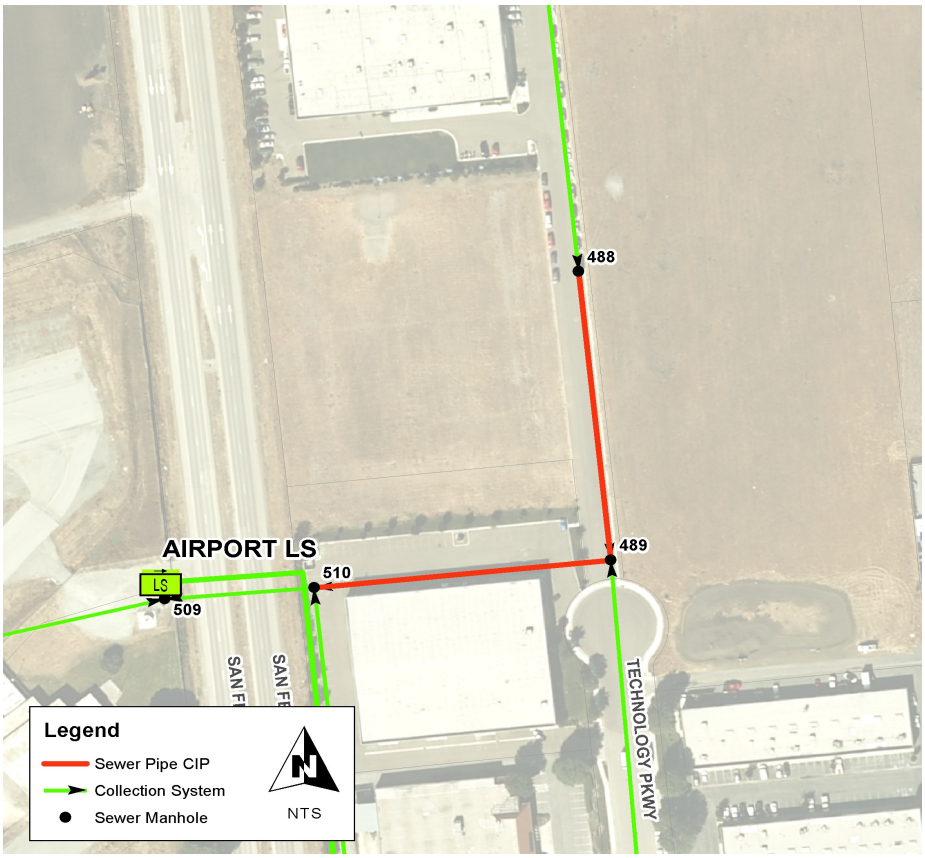
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 3 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$143,500
Planning, Engineering, CM, Legal/Admin (40%)	$57,400
Total Project Cost	**$200,900**

Project Description

The Technology Parkway Long Term project proposes to replace approximately 700 feet of 10-inch pipe with 12-inch pipe at Technology Road. These pipe segments run 50% to 80% full during future peak flow conditions. This upgrade increases collection system capacity to serve future flow conditions within the project area.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No.9: Airport Lift Station Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

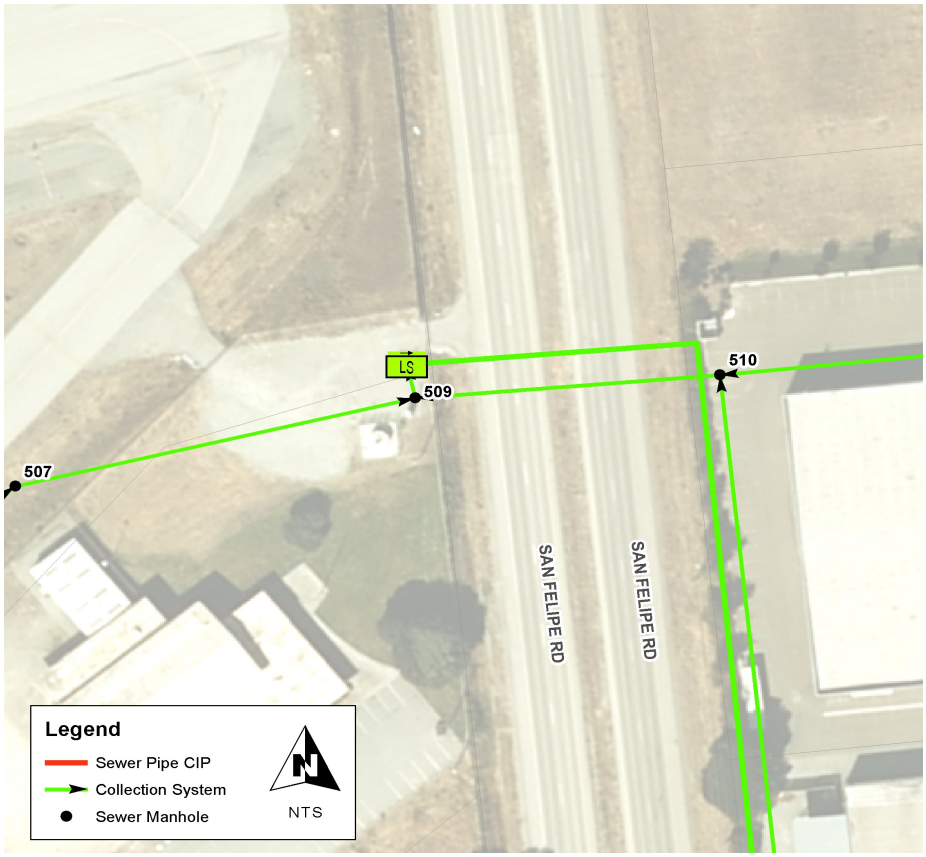
Existing Customers	0%
New Development	100%

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☑ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 20 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$540,000
Planning, Engineering, CM, Legal/Admin (40%)	$216,000
Total Project Cost	**$756,000**

Project Description

The Airport Lift Station Long Term project proposes to replace the existing lift station with a new wet well and three new VFD operated submsersible pumps capable of providing service for future flows. It is proposed to convert the existing wet well would to emergency storage to help prevent sewer overflows. The installation of VFDs will minimize impact to the GLP Lift Station and downstream collection system due to potential increased flow from the Airport Lift Station.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 10: GLP Lift Station Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

Existing Customers	0%
New Development	100%

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☑ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 24 weeks

Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$600,000
Planning, Engineering, CM, Legal/Admin (40%)	$240,000
Total Project Cost	**$840,000**

Project Description

The GLP Lift Station Long Term project proposes to upgrade the existing lift station with three new VFD operated submsersible pumps capable of providing service for future flows. The installation of VFDs will minimize impact to the downstream collection system due to potential increased future flows.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 11: 2nd and East Lift Station Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

Existing Customers	0%
New Development	100%

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☑ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 2 weeks

Project Need

- ☐ Insufficient capacity for existing flow
- ☐ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☑ Monitor capacity and performance

Project Cost Breakdown

Construction Cost[1]	$6,500
Planning, Engineering, CM, Legal/Admin (40%)	$2,600
Total Project Cost	**$9,100**

Project Description

The 2nd and East Lift Station Long Term project proposes to perform a pump test and physical evaluation of the lift station to monitor performance and capacity as future services contribute to this lift station. Project cost does not include any required upgrades or rehabilitation.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Long Term Project No. 12: Cushman Street Sewer Pipe Upgrade

City of Hollister Capital Improvement Project Information Sheet

2010 Sanitary Sewer Collection System Master Plan

Project Trigger

- ☐ Existing Condition
- ☑ Future Condition

Jurisdiction

- ☑ City of Hollister
- ☐ San Benito County

Project Benefit

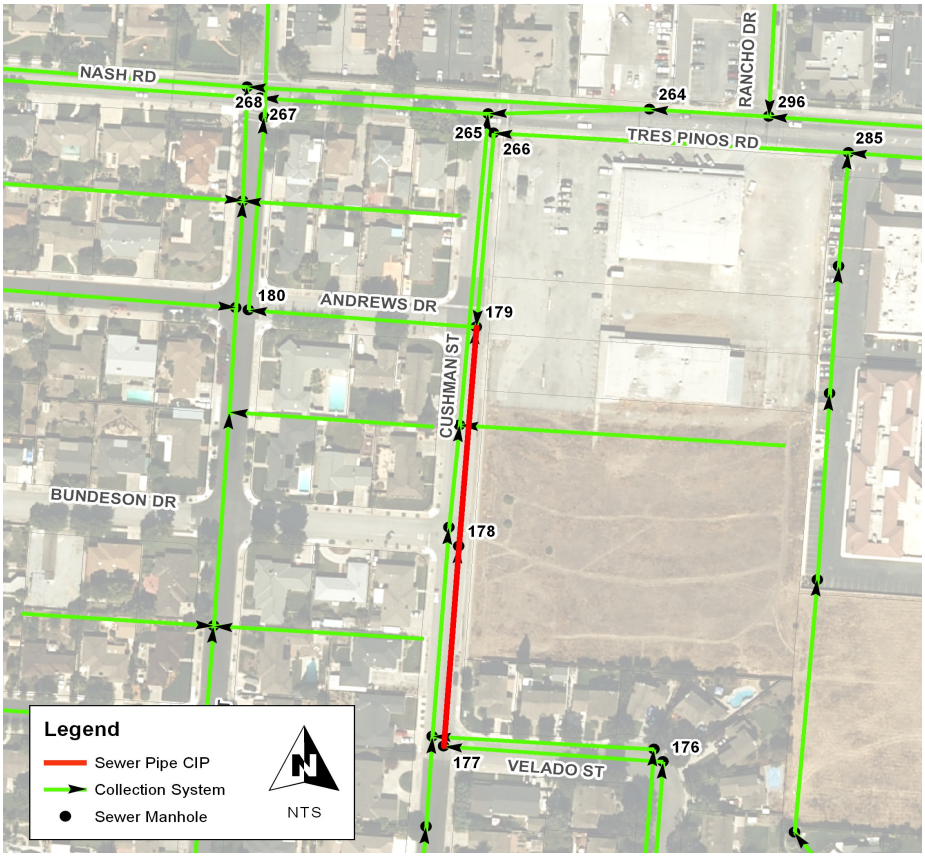
Existing Customers	0%
New Development	100%

Project Components

- ☑ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ Upgrade Lift Station
- ☐ Upgrade Force Main
- ☐ Rehabilitation/Repair
- ☐ Inspection and/or analysis
- ☐ Replace Manhole

Project Scheduling

Est. Construction Duration: 3 weeks



Project Need

- ☐ Insufficient capacity for existing flow
- ☑ Insufficient capacity for future flow
- ☐ Existing condition limits O&M
- ☐ Consolidate parallel sewer mains

Project Cost Breakdown

Construction Cost[1]	$141,000
Planning, Engineering, CM, Legal/Admin (40%)	$56,400
Total Project Cost	**$197,400**

Project Description

The Cushman Street Long Term project proposes to replace approximately 600 feet of 15-inch pipe with 18-inch pipe from Velado Street to Andrews Drive. With all existing and future improvement in place throughout the City, these pipe segments run 80% to 90% full during future peak flow conditions with the additional flow contributions from Ridgemark and Cielo Vista Estates. It is recommended that all downstream improvements are in place prior to the completion of this project. This upgrade increases collection system capacity to serve future flow conditions from Ridgemark and Cielo Vista Estates.

1. Construction costs are expressed in Year 2010 dollars, using an ENR construction Cost Index of 8671, and will need to be escalated to the year or years scheduled for the work.

PREPARED BY:
Wallace Group
www.wallacegroup.us
San Luis Obispo, CA

Appendix A

Lift Station Reference Information

APPENDIX A

LIFT STATION REFERENCE INFORMATION

This Appendix contains supplemental information regarding the City of Hollister's four lift stations.

Lift Station Site Photos

The following lift station site photos were taken by Wallace Group on July 9, 2009. Wallace group did not visually review any below ground features of the lift stations.

Airport Lift Station

Airport L.S. Photo 1: Wet well vault, looking south

Airport L.S. Photo 2: Control Panel, looking east to San Felipe Road

Airport L.S. Photo 3: Bioxide® Tank and upstream manhole, looking south-west

GLP Lift Station

GLP L.S. Photo 1: Wet well and vaults, looking north-west

GLP L.S. Photo 2: Wet well and Bioxide® tank, looking west

GLP L.S. Photo 3: Control panel, looking west

2nd & East Lift Station

2nd & East L.S. Photo 1: Wet well and control panel, looking east

2nd & East L.S. Photo 2: Force main valve boxes and discharge manhole, looking south

2nd & East L.S. Photo 3: BioCube® air filtration unit, looking north-west

Southside Lift Station

Southside L.S. Photo 1: Wet well and vault, looking south

Southside L.S. Photo 2: Wet well and vault, looking west

Southside L.S. Photo 3: Control panel

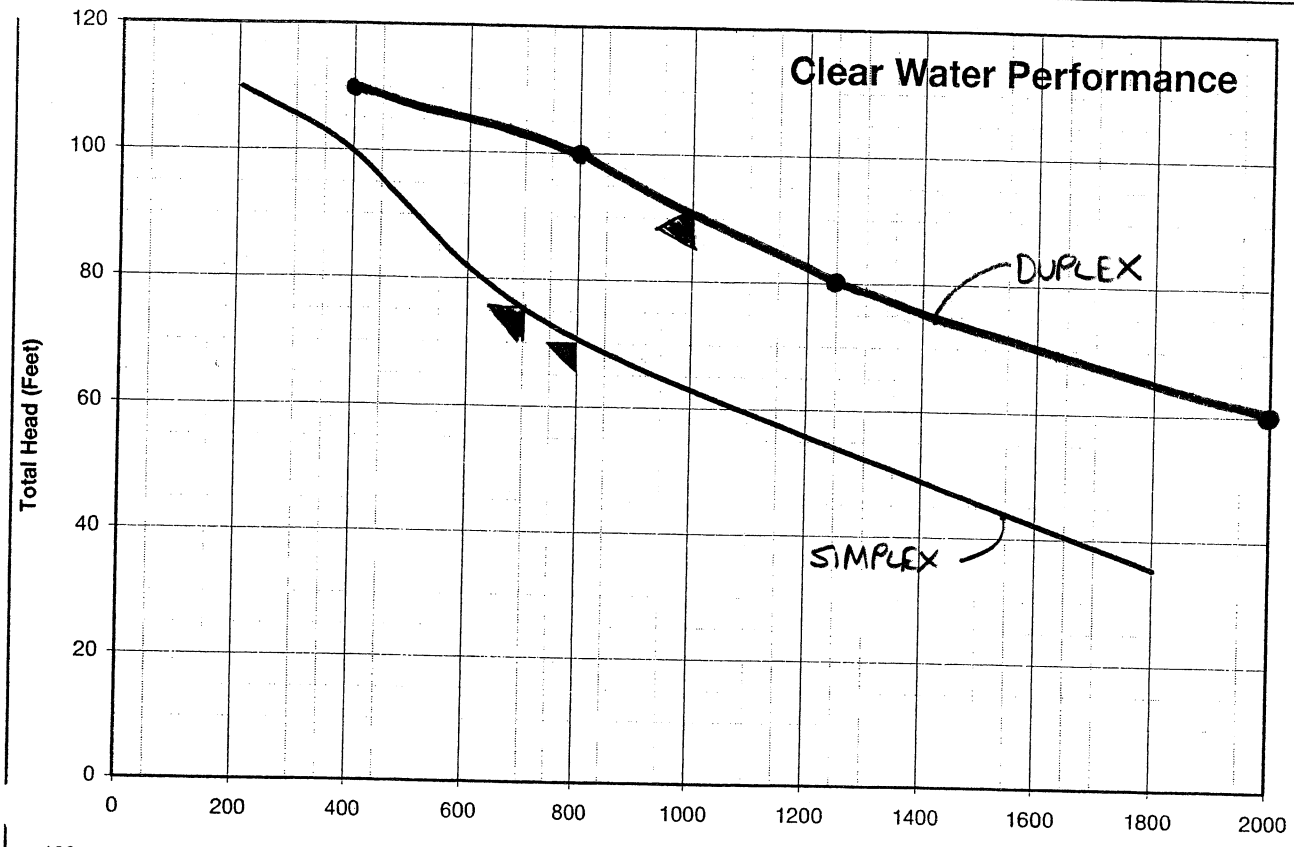
Lift Station Pump Curves

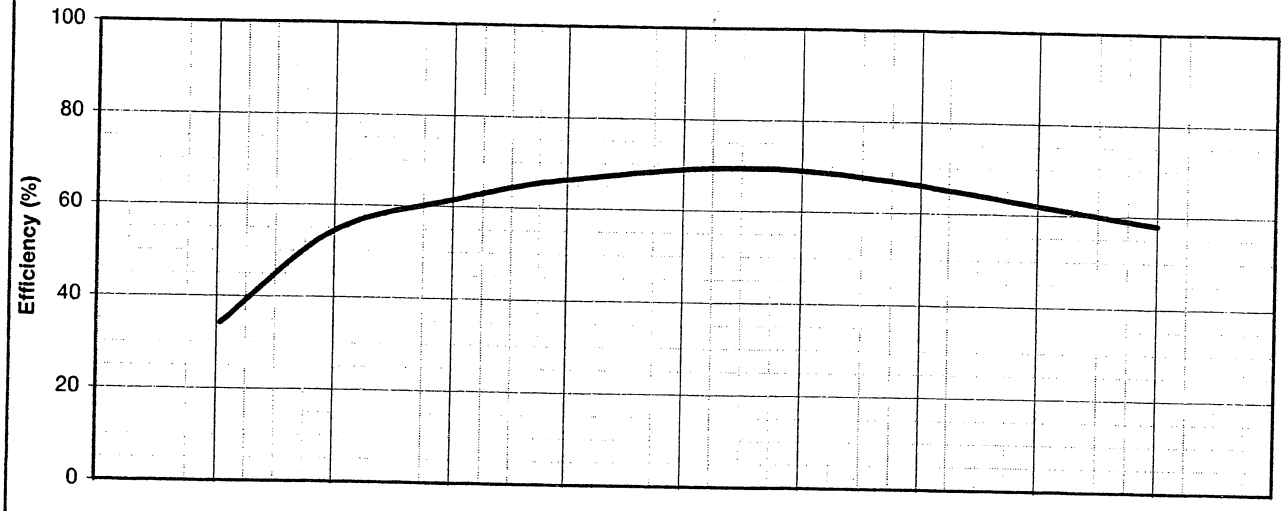
Manufacturer's pump curves for each of the City's lift stations were utilized to estimate pump operating points in both simplex and duplex conditions. The attached pump curves are annotated with their estimated duplex curve and both simplex and duplex operating points. The City provided the pump curve for the Airport Lift Station, the pump curves for GLP, 2nd & East, and Southside lift stations were obtained from the pump manufacturer based on pump model information provided by the City.

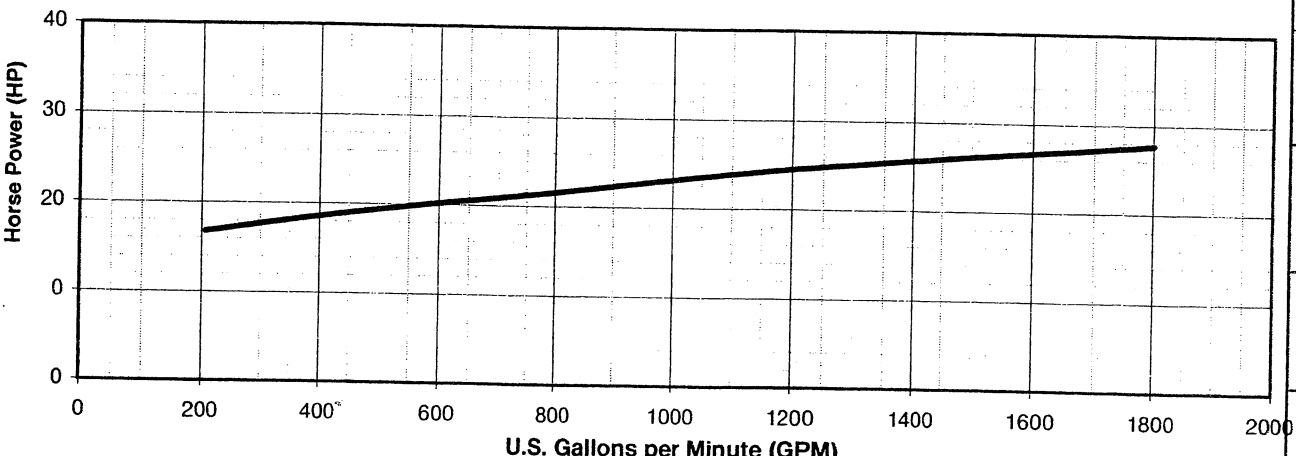
AIRPORT

WEMCO PUMP E5K-ST-EEXZ4

WEIR SPECIALTY PUMPS
440 W. 800 S. Salt Lake City, Utah 84110
Phone: (801) 359-8731 Fax: (801) 355-9303







SALES ORDER NO:
DW03318

RPM:
1700

Customer: F & M Engineering Contractors
Customer PO. 2125
Pump ID Section 11314
Certified 10-15-01

BASED ON:
TEST

DATE:
10/12/01

SERIAL NO.:
01DW03318-01

TEST NO.:
12252-1-0

Impeller Type:
C I

GLP

ITT Water & Wastewater

PERFORMANCE CURVE

PRODUCT	TYPE
CP3152.091	HT

DATE	PROJECT	CURVE NO	ISSUE
2009-11-13		63-454-00-5350	4

	1/1-LOAD	3/4-LOAD	1/2-LOAD
POWER FACTOR	0.84	0.79	0.69
EFFICIENCY	87.0 %	87.0 %	86.0 %
MOTOR DATA	---	---	---

RATED POWER	20	hp
STARTING CURRENT ...	142	A
RATED CURRENT ...	26	A
RATED SPEED	1750	rpm
TOT.MOM.OF INERTIA ...	0.24	kgm2
NO. OF BLADES	1	

IMPELLER DIAMETER: 275 mm

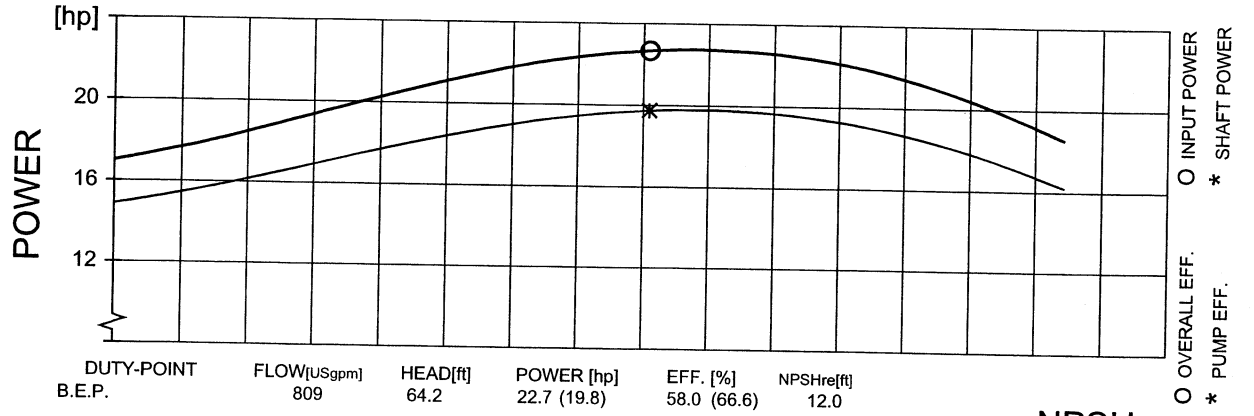
MOTOR #	STATOR	REV
25-15-4AA	12YSER	11

FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	460 V	4

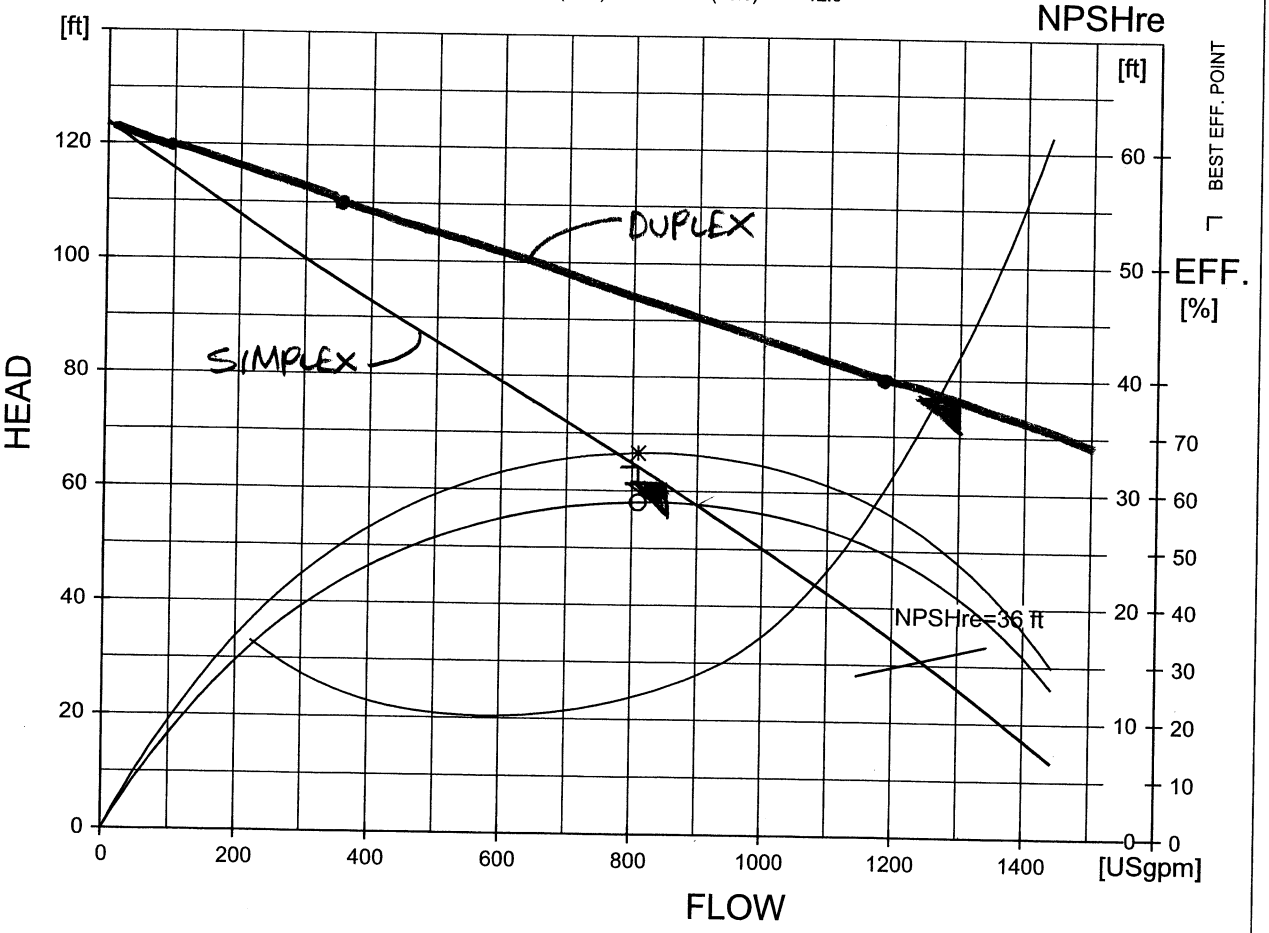
GEARTYPE	RATIO
---	---

COMMENTS

INLET/OUTLET	IMP. THROUGHLET
-/ 6 inch	2.9 inch



DUTY-POINT	FLOW[USgpm]	HEAD[ft]	POWER [hp]	EFF. [%]	NPSHre[ft]
B.E.P.	809	64.2	22.7 (19.8)	58.0 (66.6)	12.0



NPSHre = NPSH3% + min. operational margin

Performance with clear water and ambient temp 40 °C

FLYGT

HI B Curve

FLYPS3.1.6.5 (20090313)

2nd AND EAST

ITT Water & Wastewater

PERFORMANCE CURVE

PRODUCT	TYPE
CP3127.090	MT

DATE	PROJECT	CURVE NO	ISSUE
2010-01-14		63-434-00-2204	4

	1/1-LOAD	3/4-LOAD	1/2-LOAD
POWER FACTOR	0.89	0.87	0.81
EFFICIENCY	83.5 %	85.0 %	84.5 %
MOTOR DATA	---	---	---

RATED POWER	10	hp
STARTING CURRENT ...	64	A
RATED CURRENT ...	13	A
RATED SPEED	1735	rpm
TOT.MOM.OF INERTIA ...	0.086	kgm2
NO. OF BLADES	1	

IMPELLER DIAMETER: 197 mm

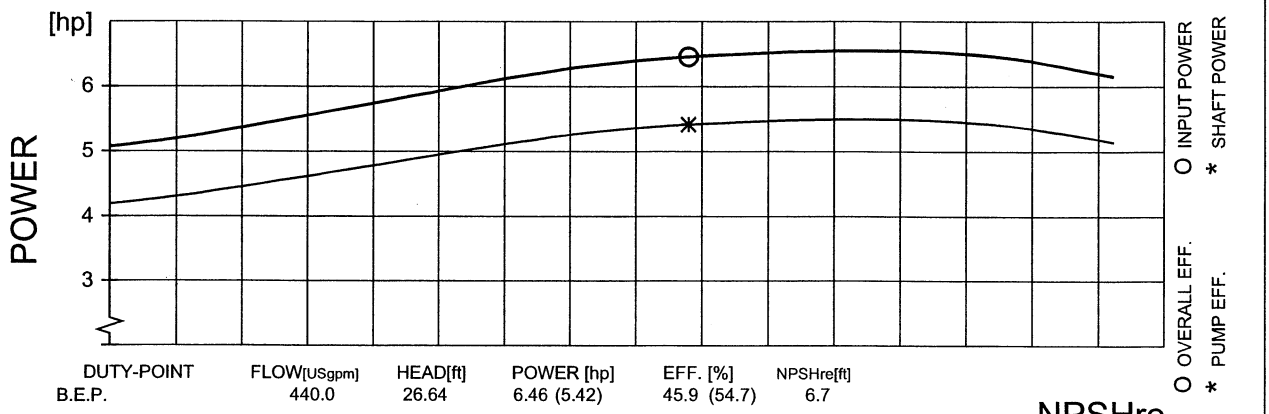
MOTOR #	STATOR	REV
21-12-4AL	12YSER	11

FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	460 V	4

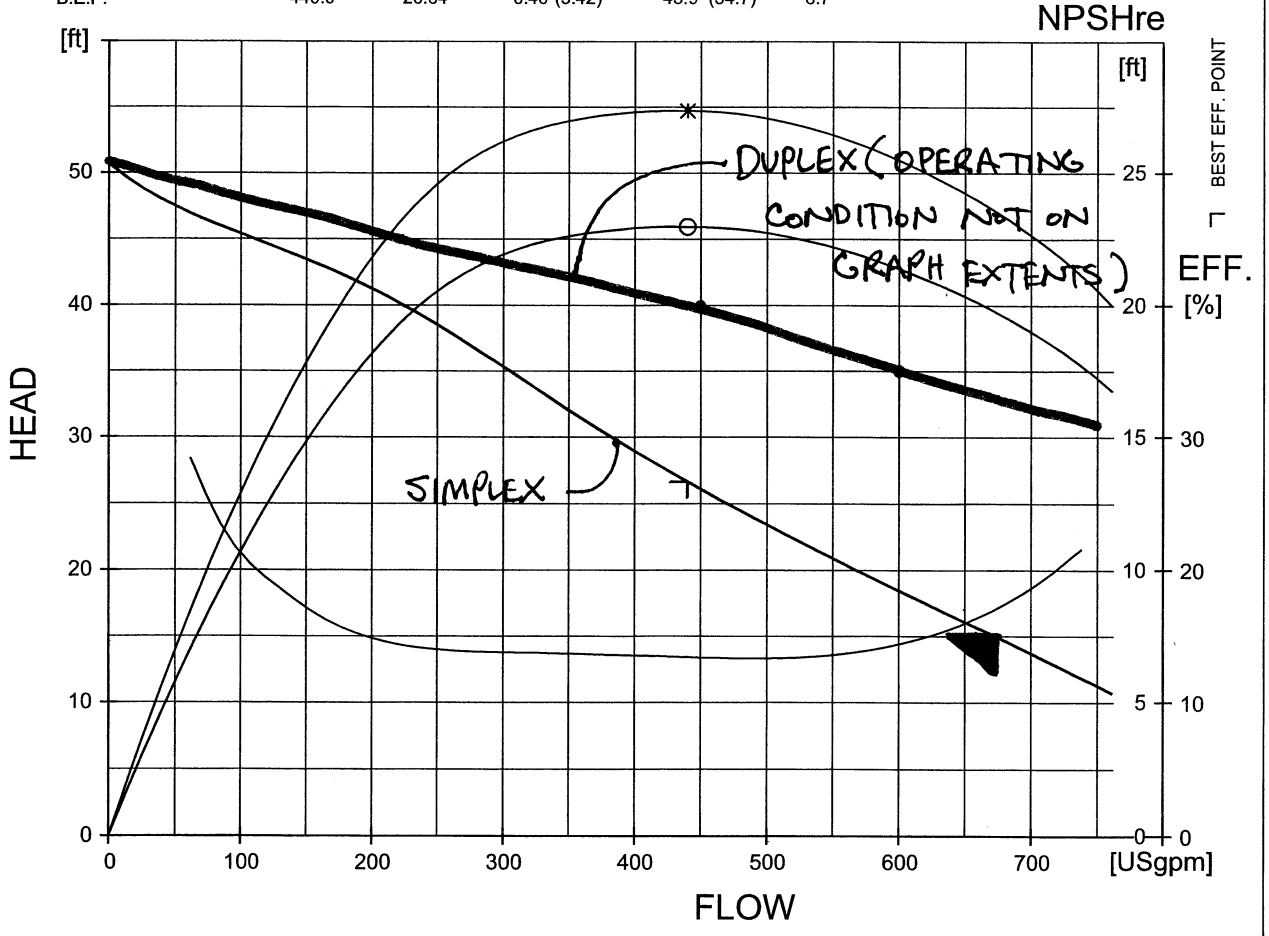
GEARTYPE	RATIO
---	---

COMMENTS

INLET/OUTLET	IMP. THROUGHLET
-/ 4 inch	3.4 inch



DUTY-POINT	FLOW[USgpm]	HEAD[ft]	POWER [hp]	EFF. [%]	NPSHre[ft]
B.E.P.	440.0	26.64	6.46 (5.42)	45.9 (54.7)	6.7



FLYPS3.1.6.5 (20090313)

NPSHre = NPSH3% + min. operational margin

Performance with clear water and ambient temp 40 °C

FLYGT

HI B Curve

SOUTHSIDE

ITT Water & Wastewater

PERFORMANCE CURVE

PRODUCT	TYPE
NP3127.090	MT

DATE: 2009-11-13 | PROJECT:

CURVE NO: 61-439-00-3004 | ISSUE: 4

	1/1-LOAD	3/4-LOAD	1/2-LOAD
POWER FACTOR	0.96	0.99	1.00
EFFICIENCY	83.0 %	84.5 %	83.0 %
MOTOR DATA	---	---	---

RATED POWER	7.5	hp
STARTING CURRENT ...	66	A
RATED CURRENT ...	30	A
RATED SPEED	1745	rpm
TOT.MOM.OF INERTIA ...	0.047	kgm2
NO. OF BLADES	2	

IMPELLER DIAMETER: 188 mm

MOTOR #	STATOR	REV
21-12-4AL	12-	13

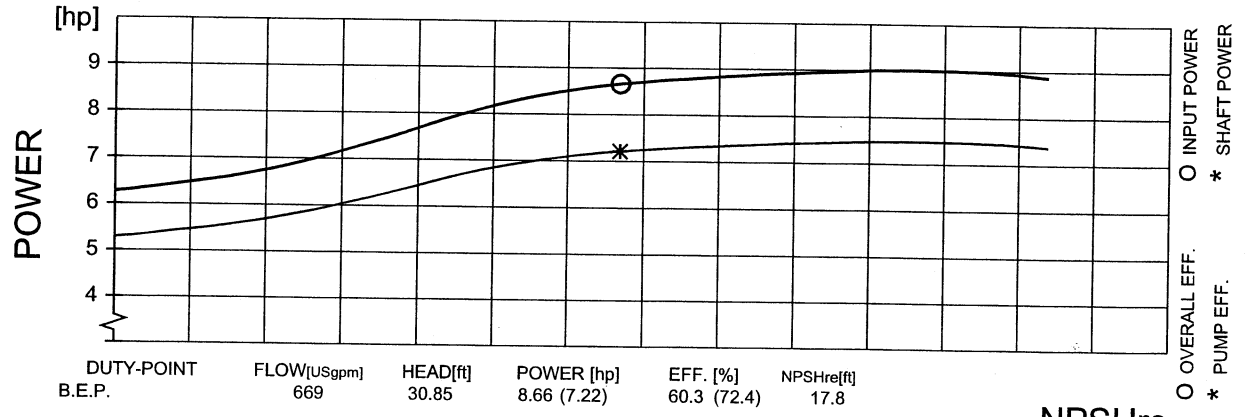
FREQ.	PHASES	VOLTAGE	POLES
60 Hz	1	230 V	4

GEARTYPE: --- | RATIO: ---

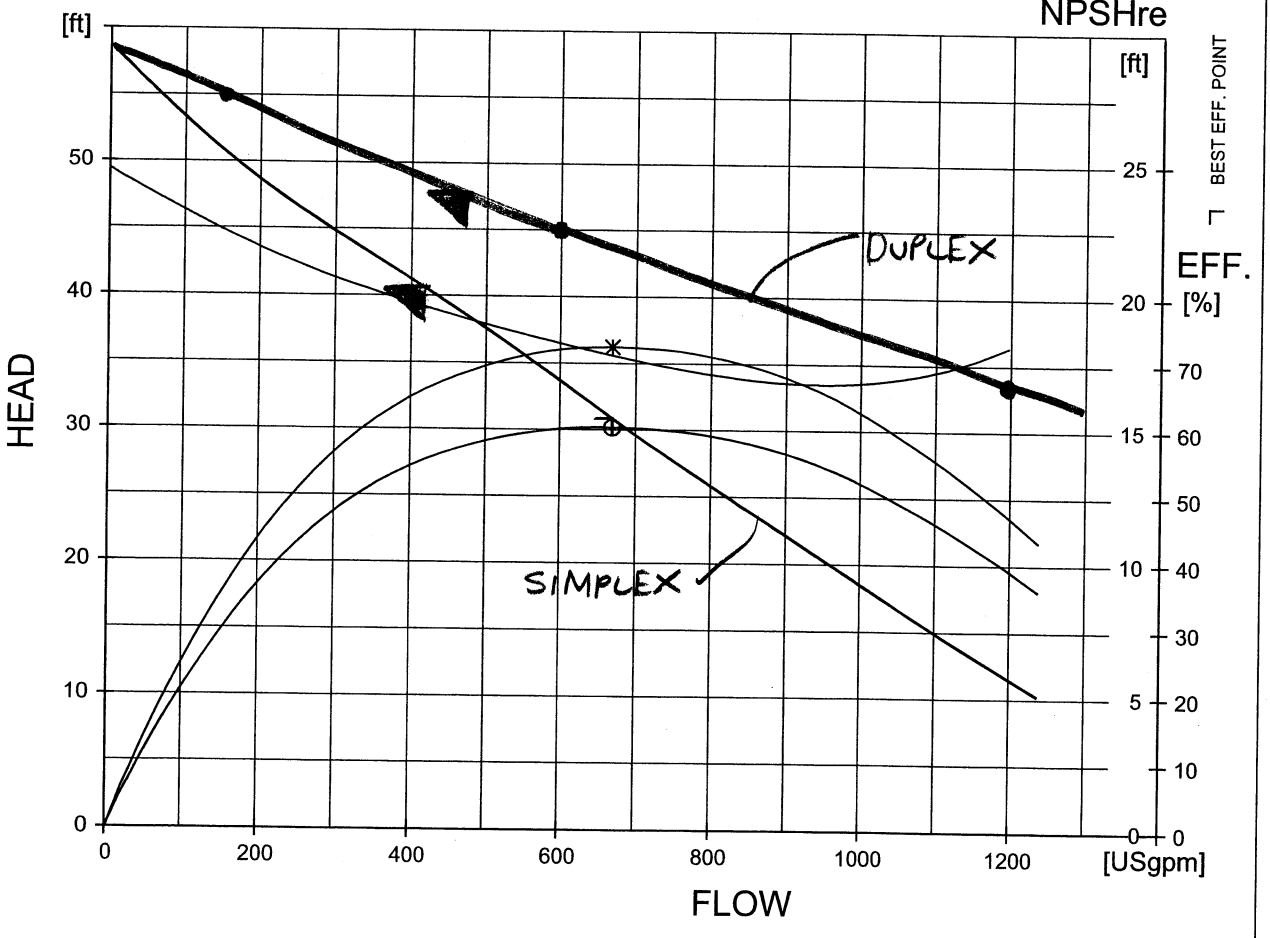
COMMENTS

INLET/OUTLET: -/ 4 inch

IMP. THROUGHLET: ---



DUTY-POINT	FLOW[USgpm]	HEAD[ft]	POWER [hp]	EFF. [%]	NPSHre[ft]
B.E.P.	669	30.85	8.66 (7.22)	60.3 (72.4)	17.8



NPSHre = NPSH3% + min. operational margin

Performance with clear water and ambient temp 40 °C

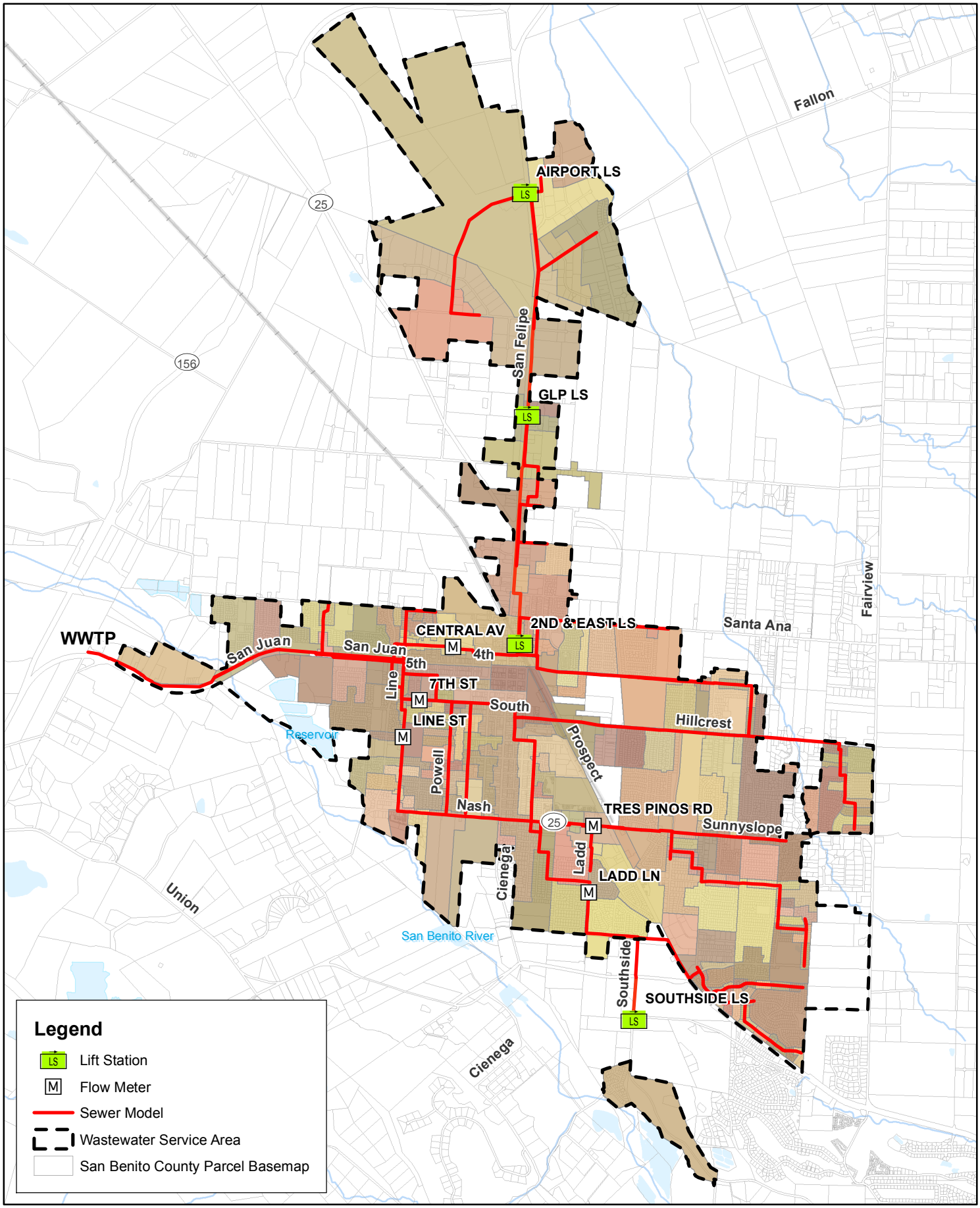
FLYGT

HI B Curve

FLYPS3.1.6.5 (20090313)

Appendix B

2010 Sewer Model Calibration and Backup Results Data



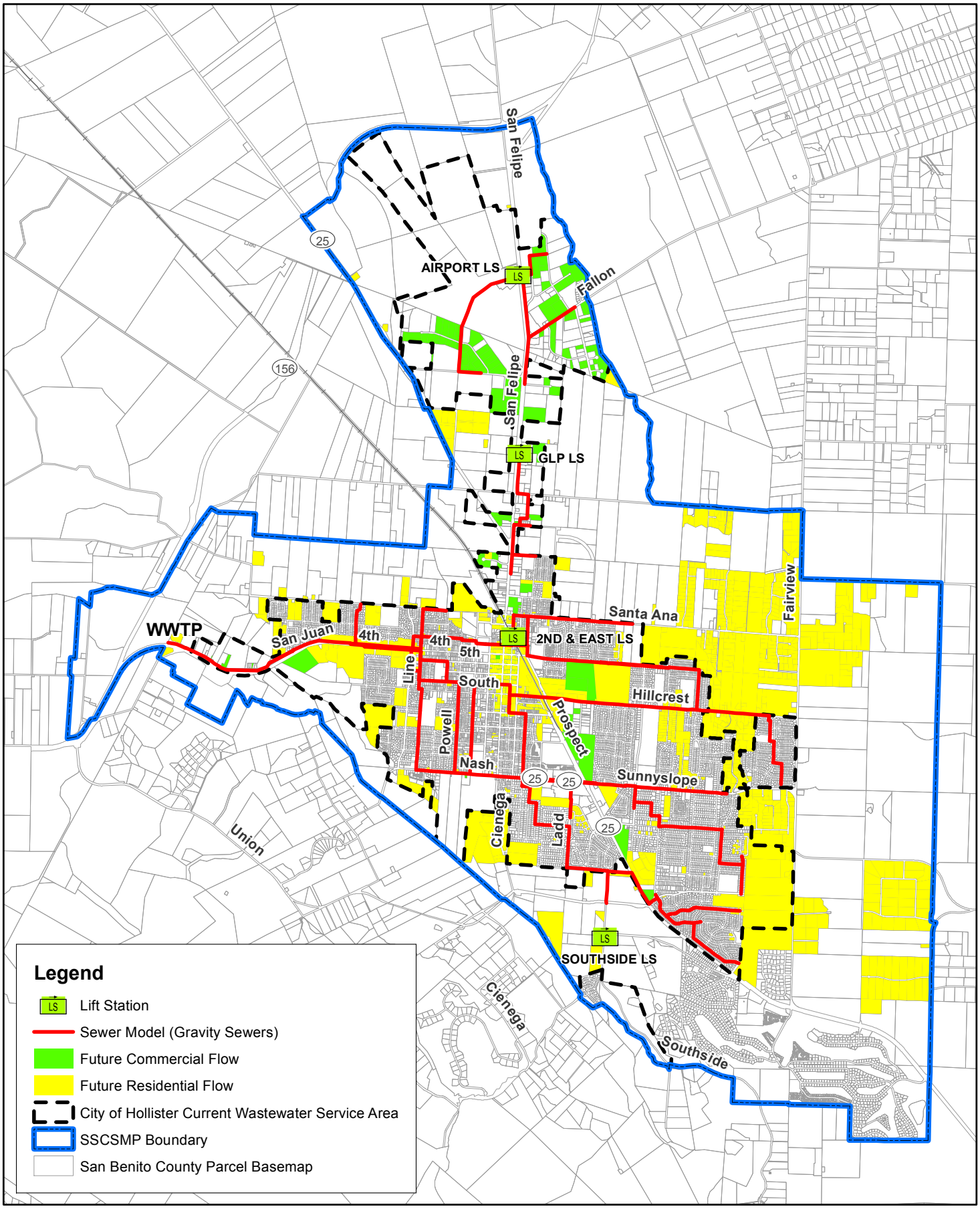
WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

NTS

CITY OF HOLLISTER
2010 SSCSMP

FIGURE B-1: WASTEWATER FLOW TRIBUTARY BASIN MAP

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY.
WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.



WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

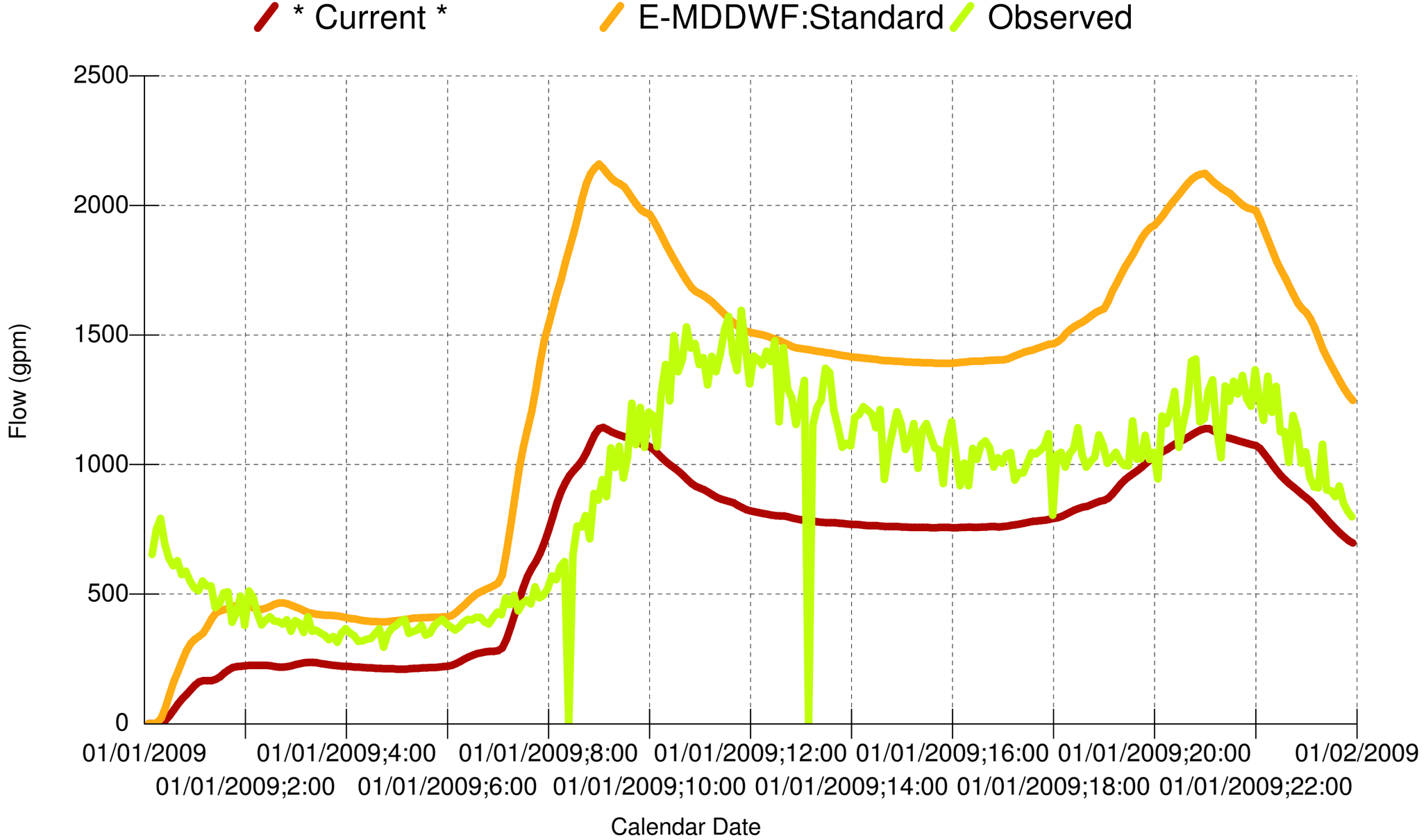
NTS

CITY OF HOLLISTER
2010 SSCSMP

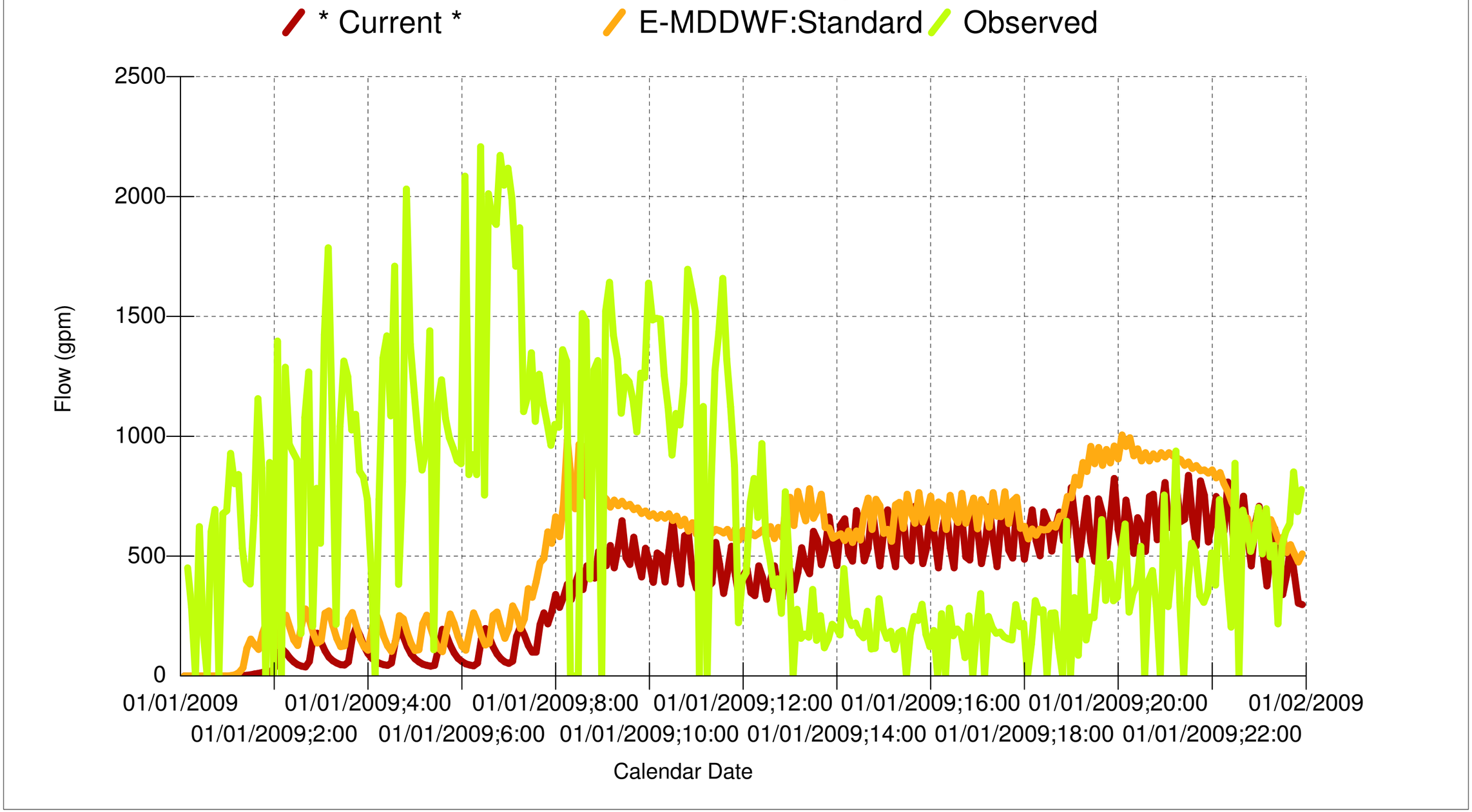
FIGURE B-2: FUTURE
SEWER FLOW LOCATIONS

NOTES:
BASEMAP PROVIDE BY
SAN BENITO COUNTY.
WALLACE GROUP DID
NOT PERFORM BOUNDARY
SURVEY SERVICES FOR THIS
MAP. NOT A LEGAL DOCUMENT.
MAP PRODUCED AUGUST 2010.

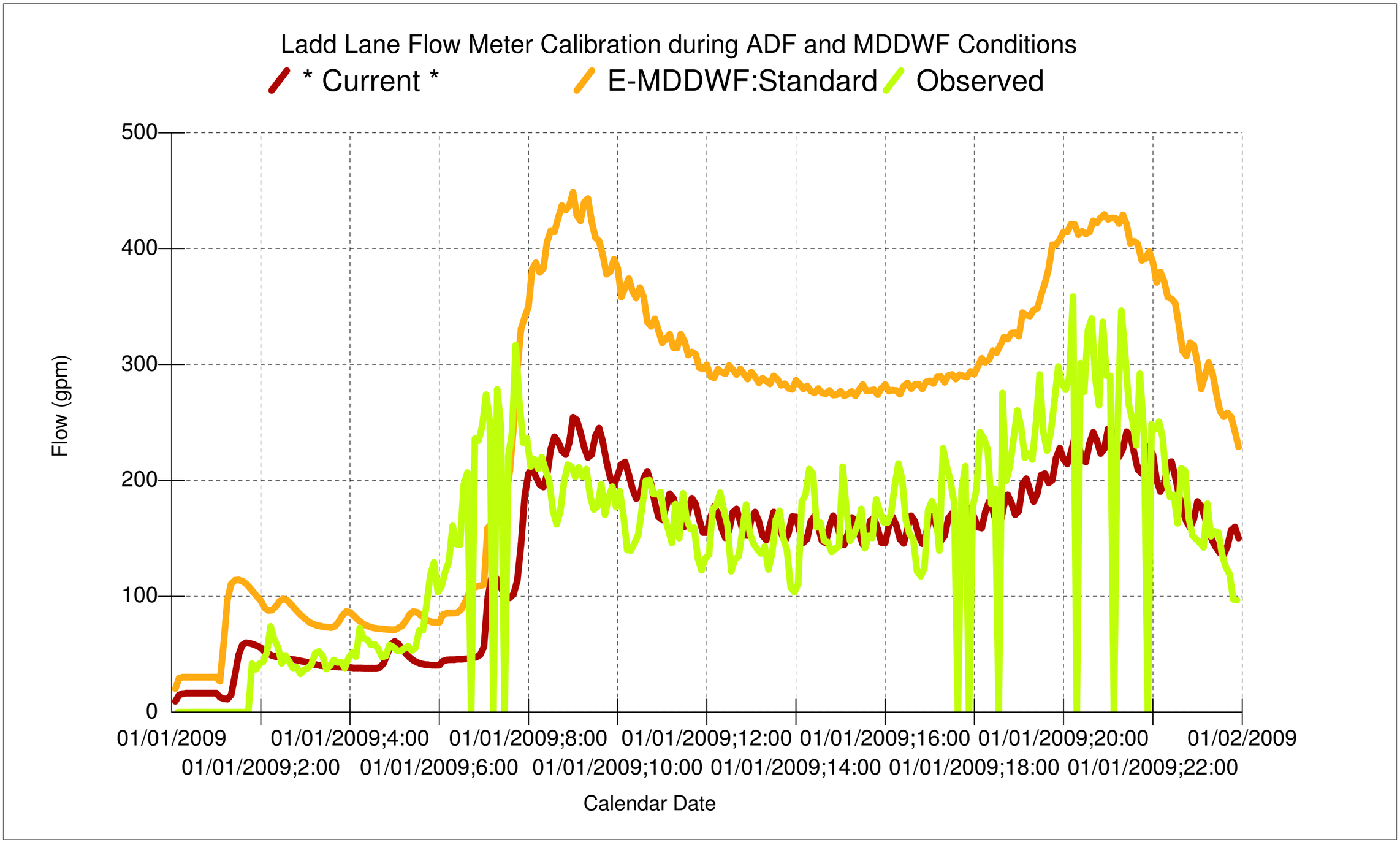
7th Street Flow Meter Calibration during ADF and MDDWF Conditions

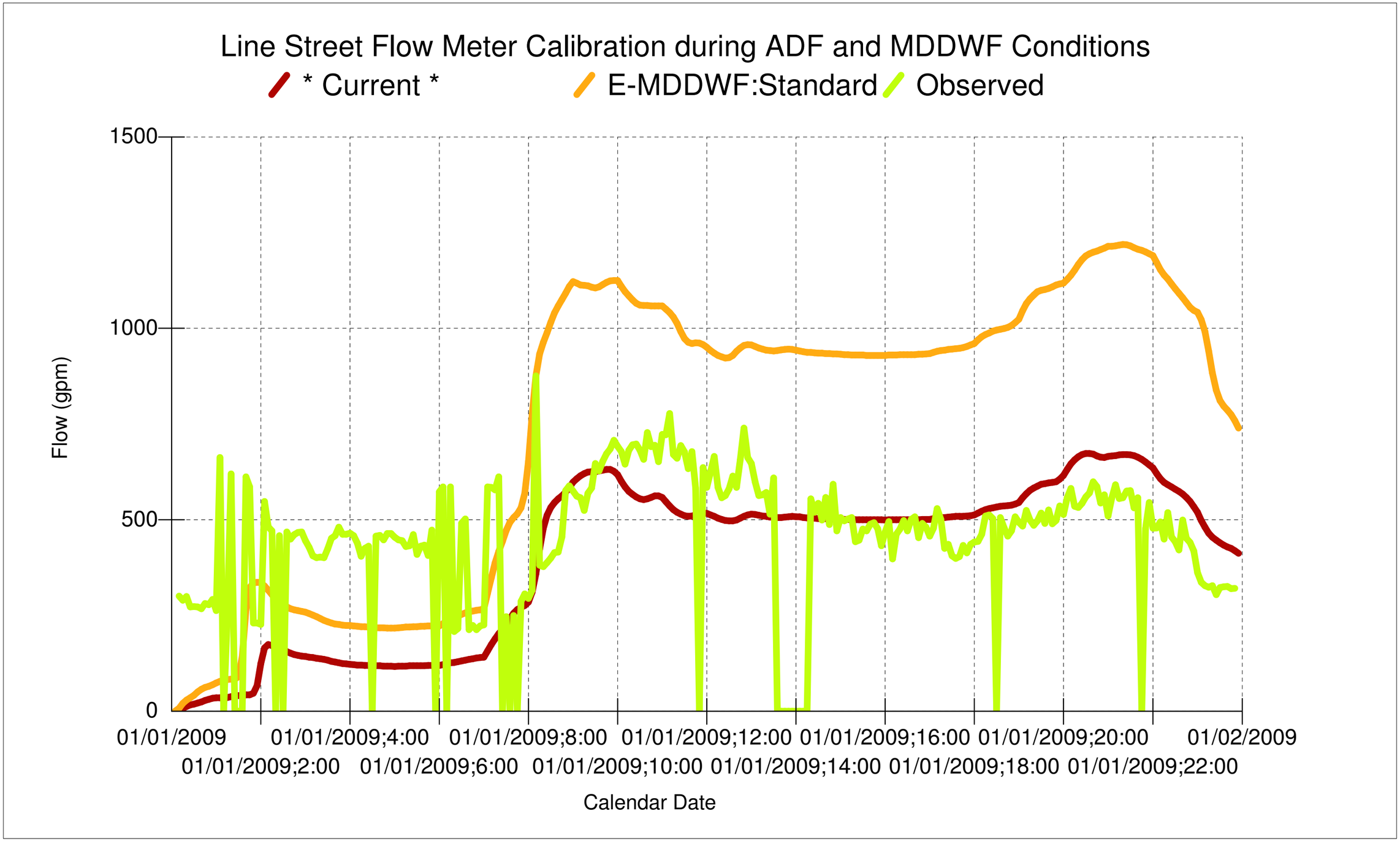


Central Avenue Flow Meter Calibration during ADF and MDDWF Conditions

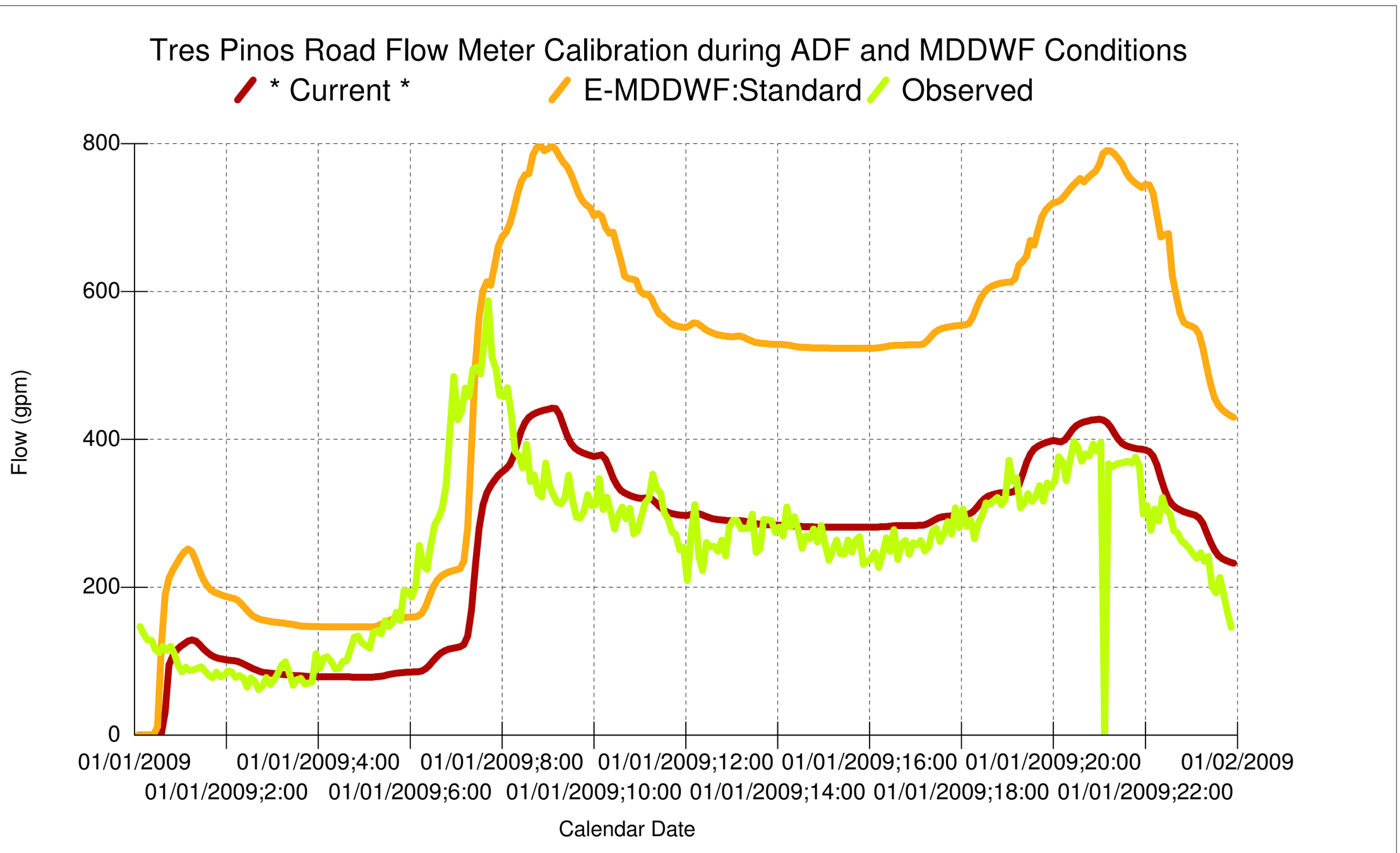


Ladd Lane Flow Meter Calibration during ADF and MDDWF Conditions




Line Street Flow Meter Calibration during ADF and MDDWF Conditions
* Current *
E-MDDWF:Standard
Observed
1500
1000
500
0
Flow (gpm)
01/01/2009
01/01/2009;2:00
01/01/2009;4:00
01/01/2009;6:00
01/01/2009;8:00
01/01/2009;10:00
01/01/2009;12:00
01/01/2009;14:00
01/01/2009;16:00
01/01/2009;18:00
01/01/2009;20:00
01/01/2009;22:00
01/02/2009
Calendar Date

Tres Pinos Road Flow Meter Calibration during ADF and MDDWF Conditions



City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Existing MDF d/D (exist pipe dia)	Existing MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
101-102	81	10	10	0.06	0.06	NO		
102-103	85	10	10	0.05	0.05	NO		
103-104	211	10	10	0.05	0.05	NO		
104-WG104	118	10	10	0.05	0.05	NO		
105-WG105	188	10	10	0.07	0.07	NO		
106-107	226	10	10	0.10	0.10	NO		
107-108	234	10	10	0.12	0.12	NO		
108-110	284	10	10	0.13	0.13	NO		
109-111	296	10	10	0.13	0.13	NO		
110-109	267	10	10	0.12	0.12	NO		
111-113	281	10	10	0.20	0.20	NO		
112-113	267	10	10	0.20	0.20	NO		
113-114	260	10	10	0.22	0.22	NO		
114-115	113	10	10	0.21	0.21	NO		
115-116	181	10	10	0.23	0.23	NO		
116-117	253	10	10	0.24	0.24	NO		
117-118	170	10	10	0.29	0.29	NO		
118-119	169	10	10	0.38	0.38	NO		
119-134	234	12	12	0.37	0.37	NO		
120-121	322	8	8	0.06	0.06	NO		
121-122	280	8	8	0.07	0.07	NO		
122-123	297	8	8	0.08	0.08	NO		
123-124	221	8	8	0.07	0.07	NO		
124-125	221	8	8	0.08	0.08	NO		
125-126	212	8	8	0.15	0.15	NO		
126-127	103	8	8	0.21	0.21	NO		
127-128	189	8	8	0.20	0.20	NO		
128-129	175	8	8	0.17	0.17	NO		
129-130	177	8	8	0.16	0.16	NO		
130-131	103	8	8	0.18	0.18	NO		
131-132	110	8	8	0.19	0.19	NO		
132-133	193	8	8	0.20	0.20	NO		
133-119	276	8	8	0.37	0.37	NO		
134-135	199	12	12	0.39	0.39	NO		
135-136	66	12	12	0.39	0.39	NO		
136-137	216	12	12	0.42	0.42	NO		
137-141	102	12	12	0.43	0.43	NO		
138-141	140	8	8	0.43	0.43	NO		
141-142	248	12	12	0.44	0.44	NO		
142-369	145	12	12	0.42	0.42	NO		
143-144	120	12	12	0.28	0.28	NO		
144-145	200	12	12	0.31	0.31	NO		
145-146	227	12	12	0.29	0.29	NO		
146-147	323	12	12	0.30	0.30	NO		
147-148	354	12	12	0.24	0.24	NO		
148-149	96	12	12	0.15	0.15	NO		
149-157	88	12	12	0.24	0.24	NO		
150-151	299	12	12	0.36	0.36	NO		
151-152	27	12	12	0.34	0.34	NO		
152-WG152	314	15	15	0.31	0.31	NO		
153-154	65	12	12	0.32	0.32	NO		
154-155	421	12	12	0.32	0.32	NO		
155-156	428	12	12	0.24	0.24	NO		
156-152	320	12	12	0.28	0.28	NO		
157-150	402	12	12	0.36	0.36	NO		
158-WG158	376	15	15	0.30	0.30	NO		
159-160	307	15	15	0.30	0.30	NO		
160-161	320	15	15	0.30	0.30	NO		
161-162	319	15	15	0.32	0.32	NO		
162-163	310	15	15	0.32	0.32	NO		
163-164	300	15	15	0.31	0.31	NO		
164-171	184	15	15	0.32	0.32	NO		
165-166	231	12	12	0.07	0.07	NO		
166-167	108	12	12	0.11	0.11	NO		
167-168	170	12	12	0.19	0.19	NO		
168-169	185	12	12	0.23	0.23	NO		
169-170	50	12	12	0.21	0.21	NO		
170-288	611	12	12	0.62	0.28	NO		
171-WG171	273	15	15	0.32	0.32	NO		
172-175	429	15	15	0.34	0.34	NO		
173-172	297	15	15	0.34	0.34	NO		
174-173	7	15	15	0.46	0.46	NO		
175-176	382	15	15	0.33	0.33	NO		
176-177	290	15	15	0.31	0.31	NO		
177-178	286	15	15	0.34	0.34	NO		
178-179	314	15	15	0.40	0.40	NO		
179-180	301	18	18	0.35	0.35	NO		
180-268	276	18	18	0.34	0.34	NO		
181-182	335	8	8	0.13	0.13	NO		
182-186	290	8	8	0.20	0.20	NO		
183-182	261	8	8	0.17	0.17	NO		
184-183	298	8	8	0.13	0.13	NO		
185-WG185	261	8	8	0.13	0.13	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Existing MDF d/D (exist pipe dia)	Existing MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
186-187	303	8	8	0.21	0.21	NO		
187-199	295	8	8	0.33	0.28	NO		
188-200	394	6	8	0.87	0.42	YES	Sunset Drive	Valley View Road
189-188	227	6	8	0.87	0.57	YES	Sunset Drive	Sunset Drive
190-189	301	6	8	0.84	0.48	YES	Sunset Drive	Sunset Drive
191-190	300	6	8	0.68	0.38	YES	Sunset Drive	Sunset Drive
192-191	300	6	8	0.64	0.37	YES	Sunset Drive	Sunset Drive
193-192	125	6	8	0.71	0.40	YES	Sunset Drive	Sunset Drive
194-193	302	6	8	0.66	0.37	YES	Sunset Drive	Sunset Drive
195-194	331	6	8	0.51	0.30	YES	Sunset Drive	Sunset Drive
196-195	348	6	8	0.50	0.30	YES	Sunset Drive	Sunset Drive
197-196	165	6	8	0.75	0.39	YES	Sunset Drive	Sunset Drive
198-564	258	6	8	0.69	0.39	YES	Sunset Drive	Cerra Vista Drive
199-198	264	6	8	0.67	0.38	YES	Sunset Drive	Cerra Vista Drive
200-201	139	6	8	1.00	0.41	YES	Sunset Drive	Valley View Road
201-202	192	6	8	1.00	0.42	YES	Sunset Drive	Valley View Road
202-203	194	6	8	1.00	0.52	YES	Sunset Drive	Iris Street
203-204	275	6	8	0.89	0.50	YES	Sunset Drive	Iris Street
204-205	359	6	8	0.89	0.43	YES	Sunset Drive	Cedar Street
205-207	302	6	8	0.86	0.45	YES	Sunset Drive	Cedar Street
206-207	242	8	8	0.37	0.32	NO		
207-208	34	8	10	0.54	0.35	YES	Sunset Drive	Memorial Drive
208-209	265	8	10	0.77	0.37	YES	Sunset Drive	Memorial Drive
209-245	274	8	10	1.00	0.44	YES	Sunset Drive	Memorial Drive
210-211	267	10	10	0.11	0.11	NO		
211-212	277	10	10	0.14	0.14	NO		
212-213	244	10	10	0.17	0.17	NO		
213-217	342	10	10	0.16	0.16	NO		
214-218	161	10	10	0.24	0.24	NO		
215-214	327	10	10	0.20	0.20	NO		
216-215	299	10	10	0.15	0.15	NO		
217-216	193	10	10	0.13	0.13	NO		
218-219	250	10	10	0.23	0.23	NO		
219-220	261	10	10	0.23	0.23	NO		
220-221	264	10	10	0.27	0.27	NO		
221-222	61	10	10	0.30	0.30	NO		
222-226	178	10	10	0.32	0.32	NO		
223-230	420	8	8	0.34	0.34	NO		
223-337	178	8	8	0.34	0.34	NO		
224-223	247	8	8	0.31	0.31	NO		
225-343	358	10	10	0.33	0.33	NO		
226-225	347	10	10	0.32	0.32	NO		
227-231	183	8	8	0.25	0.25	NO		
228-227	272	8	8	0.34	0.34	NO		
229-228	420	8	8	0.41	0.41	NO		
230-229	421	8	8	0.37	0.37	NO		
231-318	280	8	8	0.27	0.27	NO		
232-308	248	10	10	0.32	0.32	NO		
234-233	14	15	15	0.23	0.23	NO		
234-307	299	15	15	0.32	0.32	NO		
235-234	212	15	15	0.28	0.28	NO		
236-232	518	10	10	0.32	0.32	NO		
237-235	230	15	15	0.29	0.29	NO		
238-237	300	15	15	0.28	0.28	NO		
239-236	351	10	10	0.34	0.34	NO		
240-238	302	15	15	0.28	0.28	NO		
241-262	85	12	15	0.85	0.49	YES	Nash Road	Sunnyslope Road
242-260	299	12	15	0.87	0.52	YES	Nash Road	Sunnyslope Road
243-242	278	12	15	0.78	0.47	YES	Nash Road	Sunnyslope Road
244-243	288	12	12	0.70	0.62	YES	Nash Road	Sunnyslope Road
245-258	29	8	10	1.00	0.55	YES	Nash Road	Memorial Drive
246-245	602	8	8	0.69	0.51	YES	Nash Road	Sunnyslope Road
247-246	128	8	8	0.40	0.40	NO		
248-247	246	8	8	0.41	0.41	NO		
249-248	407	8	8	0.38	0.38	NO		
250-249	128	8	8	0.35	0.35	NO		
251-250	315	8	8	0.32	0.32	NO		
252-251	417	8	8	0.29	0.29	NO		
253-252	273	8	8	0.23	0.23	NO		
254-253	272	8	8	0.18	0.18	NO		
255-254	299	8	8	0.21	0.21	NO		
256-255	202	8	8	0.23	0.23	NO		
257-256	194	8	8	0.25	0.25	NO		
258-259	371	8	10	0.74	0.49	YES	Nash Road	Sunnyslope Road
259-244	26	12	12	0.48	0.50	NO		
260-261	158	12	15	0.82	0.49	YES	Nash Road	Sunnyslope Road
261-241	57	12	15	0.78	0.46	YES	Nash Road	Sunnyslope Road
262-290	413	12	15	0.79	0.47	YES	Nash Road	Sunnyslope Road
263-289	475	10	10	0.94	0.39	NO		
264-265	213	12	15	0.69	0.44	YES	Nash Road	Tres Pinos Road
265-267	302	12	15	0.70	0.44	YES	Nash Road	Tres Pinos Road
266-179	278	18	18	0.19	0.19	NO		
267-269	404	12	15	0.69	0.43	YES	Nash Road	Nash Road

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Existing MDF d/D (exist pipe dia)	Existing MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
268-440	610	18	18	0.33	0.33	NO		
269-270	421	12	15	0.69	0.43	YES	Nash Road	Nash Road
270-271	132	12	15	0.66	0.47	YES	Nash Road	Nash Road
271-284	273	15	15	0.47	0.48	NO		
272-273	19	15	18	0.64	0.44	YES	Line Street	Line Street
273-415	295	15	18	0.71	0.50	YES	Line Street	Line Street
274-272	281	15	18	0.65	0.44	YES	Line Street	Nash Road
275-274	85	15	15	0.61	0.56	NO		
276-275	371	15	15	0.61	0.63	NO		
277-276	50	15	15	0.63	0.65	NO		
278-277	321	15	15	0.62	0.63	NO		
279-278	364	15	15	0.63	0.65	NO		
280-279	291	15	15	0.64	0.66	NO		
281-280	290	15	15	0.62	0.63	NO		
282-281	265	15	15	0.55	0.56	NO		
283-282	250	15	15	0.49	0.50	NO		
284-283	268	15	15	0.47	0.48	NO		
285-266	469	8	8	0.20	0.20	NO		
286-285	395	8	8	0.14	0.14	NO		
287-293	46	12	12	1.00	0.64	NO		
288-287	294	12	12	1.00	0.52	NO		
289-291	174	12	15	1.00	0.50	YES	Nash Road	Tres Pinos Road
290-289	17	12	15	0.82	0.45	YES	Nash Road	Sunnyslope Road
291-292	258	12	15	1.00	0.55	YES	Nash Road	Tres Pinos Road
292-293	334	12	15	1.00	0.59	YES	Nash Road	Tres Pinos Road
293-294	311	12	15	1.00	0.52	YES	Nash Road	Tres Pinos Road
294-297	105	12	15	1.00	0.48	YES	Nash Road	Tres Pinos Road
295-296	219	12	15	1.00	0.68	YES	Nash Road	Tres Pinos Road
296-264	158	12	15	0.86	0.56	YES	Nash Road	Tres Pinos Road
297-295	268	12	15	1.00	0.59	YES	Nash Road	Tres Pinos Road
298-374	383	15	15	0.42	0.42	NO		
299-298	317	15	15	0.38	0.38	NO		
2NDEJ-WG380	152	10	10	0.67	0.67	NO		
300-299	343	15	15	0.38	0.38	NO		
301-300	261	15	15	0.38	0.38	NO		
302-301	249	15	15	0.39	0.39	NO		
303-302	223	15	15	0.39	0.39	NO		
304-303	286	15	15	0.38	0.38	NO		
305-304	300	15	15	0.36	0.36	NO		
306-305	263	15	15	0.38	0.38	NO		
307-306	551	15	15	0.39	0.39	NO		
308-307	18	10	10	0.29	0.29	NO		
309-240	301	15	15	0.29	0.29	NO		
310-239	511	10	10	0.34	0.34	NO		
311-309	292	12	12	0.36	0.36	NO		
312-310	448	8	8	0.34	0.34	NO		
313-311	288	12	12	0.36	0.36	NO		
314-312	271	8	8	0.19	0.19	NO		
315-316	20	8	8	0.39	0.39	NO		
316-313	382	15	15	0.49	0.49	NO		
317-315	283	8	8	0.33	0.33	NO		
318-317	402	8	8	0.29	0.29	NO		
319-321	508	10	10	0.04	0.04	NO		
320-319	470	10	10	0.02	0.02	NO		
321-322	292	15	15	0.11	0.11	NO		
322-356	279	15	15	0.60	0.60	NO		
323-355	596	18	18	0.37	0.37	NO		
324-323	286	18	18	0.38	0.38	NO		
325-324	231	18	18	0.40	0.40	NO		
326-327	28	18	18	0.36	0.36	NO		
327-325	244	18	18	0.40	0.40	NO		
328-326	266	18	18	0.38	0.38	NO		
329-328	195	18	18	0.43	0.43	NO		
330-329	462	18	18	0.35	0.35	NO		
332-330	353	8	8	0.56	0.56	NO		
333-332	305	8	8	0.52	0.52	NO		
334-333	346	8	8	0.44	0.44	NO		
335-334	334	8	8	0.37	0.37	NO		
336-335	410	8	8	0.39	0.39	NO		
337-336	151	8	8	0.38	0.38	NO		
338-224	295	12	12	0.22	0.22	NO		
339-338	324	12	12	0.25	0.25	NO		
340-339	366	12	12	0.25	0.25	NO		
341-340	258	10	10	0.27	0.27	NO		
342-341	275	10	10	0.24	0.24	NO		
343-342	301	10	10	0.29	0.29	NO		
344-345	25	24	24	0.33	0.33	NO		
345-432	178	24	24	0.38	0.38	NO		
349-344	235	18	18	0.33	0.33	NO		
350-349	548	18	18	0.35	0.35	NO		
351-350	350	18	18	0.33	0.33	NO		
352-351	233	18	18	0.38	0.38	NO		
353-352	663	18	18	0.37	0.37	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Existing MDF d/D (exist pipe dia)	Existing MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
354-353	511	18	18	0.33	0.33	NO		
355-354	220	18	18	0.35	0.35	NO		
356-357	255	15	15	0.23	0.23	NO		
357-358	144	15	15	0.25	0.25	NO		
358-359	318	15	15	0.29	0.29	NO		
359-366	82	15	15	0.31	0.31	NO		
360-379	763	18	18	0.25	0.25	NO		
361-360	277	15	15	0.40	0.40	NO		
362-361	279	15	15	0.32	0.32	NO		
363-362	23	6	6	0.44	0.44	NO		
364-362	375	15	15	0.31	0.31	NO		
365-364	462	15	15	0.29	0.29	NO		
366-365	395	15	15	0.28	0.28	NO		
367-368	400	10	10	0.17	0.17	NO		
368-WG368	257	10	10	0.33	0.33	NO		
369-370	55	12	12	0.30	0.30	NO		
370-143	79	12	12	0.22	0.22	NO		
371-363	523	6	6	0.14	0.14	NO		
372-371	529	6	6	0.10	0.10	NO		
373-372	64	6	6	0.00	0.00	NO		
374-375	307	15	15	0.39	0.39	NO		
375-376	300	18	18	0.38	0.37	NO		
376-396	242	30	30	0.28	0.27	NO		
377-376	20	27	27	0.25	0.25	NO		
378-380	42	12	12	0.24	0.25	NO		
379-2NDE	44	18	18	0.55	0.55	NO		
380-WG380	24	18	18	0.17	0.16	NO		
381-377	242	27	27	0.25	0.25	NO		
382-530	451	30	30	0.24	0.23	NO		
383-382	38	30	30	0.25	0.24	NO		
384-402	270	6	6	0.23	0.23	NO		
385-383	99	30	30	0.26	0.25	NO		
386-385	400	30	30	0.26	0.25	NO		
387-386	366	30	30	0.28	0.27	NO		
388-387	364	30	30	0.29	0.28	NO		
389-388	300	30	30	0.27	0.26	NO		
390-389	57	30	30	0.26	0.24	NO		
391-390	59	30	30	0.23	0.22	NO		
392-391	535	30	30	0.26	0.25	NO		
393-392	97	30	30	0.32	0.31	NO		
394-393	353	30	30	0.30	0.29	NO		
395-394	405	30	30	0.28	0.27	NO		
396-395	342	30	30	0.28	0.28	NO		
397-398	61	6	6	0.14	0.14	NO		
398-399	201	6	6	0.19	0.19	NO		
399-400	275	6	6	0.26	0.26	NO		
400-401	251	6	6	0.36	0.36	NO		
401-384	244	6	6	0.29	0.29	NO		
402-403	5	8	8	0.16	0.16	NO		
403-528	203	18	18	0.12	0.12	NO		
404-545	137	12	12	0.31	0.31	NO		
405-404	188	12	12	0.25	0.25	NO		
406-545	330	18	18	0.37	0.38	NO		
407-406	182	15	15	0.63	0.64	NO		
408-438	334	30	30	0.40	0.40	NO		
409-407	276	15	15	0.67	0.68	NO		
410-408	358	27	27	0.51	0.51	NO		
411-409	278	15	15	0.62	0.64	NO		
412-411	360	15	15	0.60	0.61	NO		
413-412	117	15	15	0.53	0.55	NO		
414-413	445	15	15	0.64	0.66	NO		
415-416	69	15	18	0.72	0.50	YES	Line Street	Line Street
416-417	375	15	18	0.68	0.46	YES	Line Street	Line Street
417-418	375	15	18	0.68	0.46	YES	Line Street	Line Street
418-419	106	15	18	0.69	0.46	YES	Line Street	Line Street
419-420	253	15	18	0.70	0.48	YES	Line Street	Line Street
420-421	20	15	18	0.68	0.46	YES	Line Street	Line Street
421-422	374	15	18	0.72	0.48	YES	Line Street	Line Street
422-423	374	15	18	0.71	0.48	YES	Line Street	Line Street
423-414	377	15	18	0.74	0.58	YES	Line Street	Line Street
424-410	552	27	27	0.46	0.47	NO		
425-424	496	27	27	0.47	0.47	NO		
426-433	189	14	14	0.35	0.35	NO		
427-425	501	27	27	0.46	0.46	NO		
428-427	571	24	24	0.44	0.44	NO		
429-428	488	24	24	0.38	0.38	NO		
430-429	609	24	24	0.37	0.37	NO		
431-430	259	24	24	0.39	0.39	NO		
432-431	176	24	24	0.35	0.35	NO		
433-434	381	14	14	0.15	0.15	NO		
434-435	189	14	14	0.17	0.17	NO		
435-436	325	14	14	0.17	0.17	NO		
436-437	324	14	14	0.18	0.18	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Existing MDF d/D (exist pipe dia)	Existing MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
437-405	381	14	14	0.21	0.21	NO		
438-542	768	30	30	0.52	0.52	NO		
440-441	383	18	18	0.33	0.33	NO		
441-442	461	18	18	0.34	0.34	NO		
442-443	456	18	18	0.34	0.34	NO		
443-444	564	18	18	0.31	0.31	NO		
444-445	366	18	18	0.32	0.32	NO		
445-446	268	18	18	0.34	0.34	NO		
446-447	345	18	18	0.34	0.34	NO		
447-344	336	18	18	0.34	0.34	NO		
448-397	396	6	6	0.15	0.15	NO		
449-448	246	6	6	0.16	0.16	NO		
450-449	237	6	6	0.06	0.06	NO		
451-452	297	6	6	0.09	0.09	NO		
452-453	799	6	6	0.24	0.24	NO		
453-454	30	6	6	0.33	0.33	NO		
454-455	364	6	6	0.40	0.40	NO		
455-456	302	6	6	0.44	0.44	NO		
456-457	113	6	6	0.45	0.41	NO		
457-458	189	6	8	0.60	0.29	YES	Powell Street	Powell Street
458-459	181	6	8	0.87	0.29	YES	Powell Street	Powell Street
459-460	121	6	8	1.00	0.42	YES	Powell Street	Powell Street
460-461	35	6	8	1.00	0.47	YES	Powell Street	Powell Street
461-462	232	6	8	1.00	0.51	YES	Powell Street	Powell Street
462-463	35	6	8	1.00	0.55	YES	Powell Street	Powell Street
463-464	99	6	8	1.00	0.45	YES	Powell Street	Powell Street
464-466	195	6	8	1.00	0.56	YES	Powell Street	Powell Street
466-467	9	6	10	1.00	0.47	YES	Powell Street	Powell Street
467-427	379	6	10	0.85	0.38	YES	Powell Street	Powell Street
468-428	175	6	10	0.97	0.51	YES	West Street	West Street
469-468	200	6	10	1.00	0.41	YES	West Street	West Street
470-469	106	6	8	1.00	0.46	YES	West Street	West Street
471-470	292	6	8	1.00	0.50	YES	West Street	West Street
472-471	296	6	8	1.00	0.46	YES	West Street	West Street
473-472	548	6	8	1.00	0.43	YES	West Street	West Street
474-473	333	6	6	1.00	0.53	NO		
475-474	337	6	6	1.00	0.51	NO		
476-475	547	6	6	0.75	0.49	NO		
477-476	278	6	6	0.49	0.47	NO		
478-477	270	6	6	0.24	0.24	NO		
479-526	898	10	10	0.25	0.25	NO		
480-511	594	12	12	0.25	0.25	NO		
481-480	627	10	10	0.27	0.27	NO		
482-481	204	10	10	0.26	0.26	NO		
483-482	419	10	10	0.25	0.25	NO		
484-483	600	10	10	0.21	0.21	NO		
485-484	252	10	10	0.20	0.20	NO		
486-487	670	10	10	0.16	0.16	NO		
487-488	360	10	10	0.15	0.15	NO		
488-489	354	10	10	0.21	0.21	NO		
489-510	336	10	10	0.31	0.31	NO		
490-497	237	10	10	0.13	0.13	NO		
491-490	600	10	10	0.06	0.06	NO		
492-491	266	10	10	0.00	0.00	NO		
493-498	294	12	12	0.15	0.15	NO		
494-493	332	12	12	0.16	0.16	NO		
495-494	291	10	10	0.14	0.14	NO		
496-495	249	10	10	0.09	0.09	NO		
497-496	300	10	10	0.11	0.11	NO		
498-499	65	12	12	0.16	0.16	NO		
499-500	260	12	12	0.18	0.18	NO		
500-501	295	12	12	0.17	0.17	NO		
501-502	293	12	12	0.16	0.16	NO		
502-503	295	12	12	0.16	0.16	NO		
503-504	232	15	15	0.14	0.14	NO		
504-505	304	15	15	0.14	0.14	NO		
505-506	298	15	15	0.13	0.13	NO		
506-508	748	15	15	0.13	0.13	NO		
507-509	227	15	15	0.10	0.10	NO		
508-507	119	15	15	0.13	0.13	NO		
509-AP	21	15	15	0.53	0.53	NO		
510-509	169	15	15	0.15	0.15	NO		
511-510	1797	12	12	0.26	0.26	NO		
512-520	256	12	12	0.12	0.12	NO		
514-GLP	11	10	10	0.37	0.37	NO		
515-514	49	10	10	0.43	0.43	NO		
516-515	284	10	10	0.40	0.40	NO		
517-516	246	10	10	0.35	0.35	NO		
518-517	476	10	10	0.34	0.34	NO		
519-518	251	10	10	0.37	0.37	NO		
520-521	509	12	12	0.12	0.12	NO		
521-522	503	12	12	0.12	0.12	NO		
522-480	503	12	12	0.19	0.19	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Existing MDF d/D (exist pipe dia)	Existing MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
523-526	727	10	10	0.22	0.22	NO		
524-525	425	10	10	0.34	0.34	NO		
525-368	210	10	10	0.34	0.34	NO		
526-524	722	10	10	0.33	0.33	NO		
527-WG527	7	14	14	0.08	0.08	NO		
528-530	301	21	21	0.23	0.23	NO		
529-531	943	21	21	0.09	0.09	NO		
530-543	79	36	36	0.17	0.17	NO		
531-532	688	21	21	0.11	0.11	NO		
532-533	545	21	21	0.19	0.19	NO		
533-WG537	173	21	21	0.47	0.48	NO		
535-536	477	36	36	0.37	0.37	NO		
536-548	93	36	36	0.34	0.34	NO		
537-WG537	27	36	36	0.33	0.34	NO		
538-537	473	36	36	0.39	0.40	NO		
539-547	403	36	36	0.49	0.50	NO		
540-539	201	36	36	0.44	0.44	NO		
541-540	582	36	36	0.50	0.50	NO		
542-541	596	36	36	0.55	0.55	NO		
543-542	26	27	27	0.48	0.49	NO		
544-543	310	27	27	0.26	0.26	NO		
545-544	35	36	36	0.19	0.19	NO		
546-535	612	36	36	0.36	0.36	NO		
547-538	78	36	36	0.55	0.56	NO		
548-549	333	36	36	0.22	0.22	NO		
548-WG548	23	21	21	0.45	0.45	NO		
549-550	240	36	36	0.30	0.30	NO		
550-552	480	36	36	0.31	0.32	NO		
551-553	152	21	21	0.47	0.48	NO		
552-SPI	43	36	36	0.31	0.31	NO		
553-552	7	21	21	0.33	0.33	NO		
562-197	240	6	8	0.86	0.44	YES	Sunset Drive	Cerra Vista Drive
563-562	268	6	8	0.78	0.43	YES	Sunset Drive	Cerra Vista Drive
564-563	257	6	8	0.75	0.41	YES	Sunset Drive	Cerra Vista Drive
565-566	190	8	8	0.13	0.13	NO		
566-567	122	8	8	0.13	0.13	NO		
567-568	240	8	8	0.13	0.13	NO		
568-569	256	8	8	0.20	0.20	NO		
569-570	228	8	8	0.28	0.28	NO		
570-571	239	8	8	0.25	0.25	NO		
571-533	291	8	8	0.44	0.45	NO		
576-577	326	36	36	0.46	0.47	NO		
577-578	586	36	36	0.46	0.46	NO		
578-582	229	36	36	0.47	0.48	NO		
580-WWTP	331	36	36	0.40	0.40	NO		
581-580	349	36	36	0.46	0.47	NO		
582-581	24	36	36	0.50	0.51	NO		
583-576	109	36	36	0.45	0.46	NO		
584-583	221	36	36	0.41	0.42	NO		
585-584	32	36	36	0.32	0.33	NO		
586-585	280	36	36	0.38	0.39	NO		
587-586	592	36	36	0.47	0.47	NO		
588-587	582	36	36	0.45	0.45	NO		
APJ-GLP	6953	10	10	1.00	1.00	NO		
WG322-356	395	15	15	0.20	0.20	NO		
WG384-383	224	30	30	0.26	0.25	NO		
GLPJ-378	7121	12	12	0.69	0.69	NO		
WG537-546	43	36	36	0.42	0.42	NO		
SBCO-SS	42	8	8	0.56	0.56	NO		
SPI-SPO	1100	36	36	0.36	0.36	NO		
SPO-WG588	172	36	36	0.37	0.37	NO		
SSJ-153	1246	6	6	0.73	0.73	NO		
WG104-105	146	10	10	0.06	0.06	NO		
WG105-106	197	10	10	0.08	0.08	NO		
WG152-158	456	15	15	0.32	0.32	NO		
WG158-159	431	15	15	0.29	0.29	NO		
WG171-173	549	15	15	0.45	0.45	NO		
WG185-184	287	8	8	0.12	0.12	NO		
WG368-WG369	265	10	10	0.34	0.34	NO		
WG369-WG370	333	10	10	0.35	0.35	NO		
WG370-WG371	293	10	10	0.35	0.35	NO		
WG371-WG372	293	10	10	0.35	0.35	NO		
WG372-WG373	422	10	10	0.36	0.36	NO		
WG373-519	219	10	10	0.39	0.39	NO		
WG380-381	88	27	27	0.24	0.24	NO		
WG401-WG403	13	18	18	0.06	0.06	NO		
WG403-403	277	18	18	0.09	0.09	NO		
WG527-528	38	18	18	0.10	0.10	NO		
534-WG534	187	21	21	0.47	0.48	NO		
WG534-WG536	307	21	21	0.40	0.41	NO		
WG536-548	79	21	21	0.35	0.35	NO		
WG537-534	618	21	21	0.58	0.58	NO		
WG548-WG549	335	21	21	0.63	0.64	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Existing MDF d/D (exist pipe dia)	Existing MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
WG549-WG551	243	21	21	0.79	0.80	NO		
WG551-551	300	21	21	0.77	0.78	NO		
WG588-588	385	36	36	0.41	0.42	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Future MDF d/D (exist pipe dia)	Future MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
101-102	81	10	10	0.15	0.15	NO		
102-103	85	10	10	0.15	0.15	NO		
103-104	211	10	10	0.12	0.12	NO		
104-WG104	118	10	10	0.10	0.10	NO		
105-WG105	188	10	10	0.11	0.11	NO		
106-107	226	10	10	0.13	0.13	NO		
107-108	234	10	10	0.16	0.16	NO		
108-110	284	10	10	0.17	0.17	NO		
109-111	296	10	10	0.17	0.17	NO		
110-109	267	10	10	0.16	0.16	NO		
111-113	281	10	10	0.23	0.23	NO		
112-113	267	10	10	0.21	0.21	NO		
113-114	260	10	10	0.24	0.24	NO		
114-115	113	10	10	0.23	0.23	NO		
115-116	181	10	10	0.25	0.25	NO		
116-117	253	10	10	0.26	0.26	NO		
117-118	170	10	10	0.31	0.31	NO		
118-119	169	10	10	0.46	0.46	NO		
119-134	234	12	12	0.50	0.50	NO		
120-121	322	8	8	0.43	0.43	NO		
121-122	280	8	8	0.39	0.39	NO		
122-123	297	8	8	0.34	0.34	NO		
123-124	221	8	8	0.26	0.26	NO		
124-125	221	8	8	0.27	0.27	NO		
125-126	212	8	8	0.35	0.35	NO		
126-127	103	8	8	0.43	0.43	NO		
127-128	189	8	8	0.40	0.40	NO		
128-129	175	8	8	0.34	0.34	NO		
129-130	177	8	8	0.32	0.32	NO		
130-131	103	8	8	0.36	0.36	NO		
131-132	110	8	8	0.38	0.38	NO		
132-133	193	8	8	0.39	0.39	NO		
133-119	276	8	8	0.56	0.56	NO		
134-135	199	12	12	0.53	0.53	NO		
135-136	66	12	12	0.53	0.53	NO		
136-137	216	12	12	0.56	0.56	NO		
137-141	102	12	12	0.58	0.58	NO		
138-141	140	8	8	0.55	0.55	NO		
141-142	248	12	12	0.58	0.58	NO		
142-369	145	12	12	0.56	0.56	NO		
143-144	120	12	12	0.38	0.38	NO		
144-145	200	12	12	0.42	0.42	NO		
145-146	227	12	12	0.39	0.39	NO		
146-147	323	12	12	0.40	0.40	NO		
147-148	354	12	12	0.33	0.33	NO		
148-149	96	12	12	0.21	0.21	NO		
149-157	88	12	12	0.34	0.34	NO		
150-151	299	12	12	0.53	0.53	NO		
151-152	27	12	12	0.48	0.48	NO		
152-WG152	314	15	15	0.43	0.44	NO		
153-154	65	12	12	0.33	0.33	NO		
154-155	421	12	12	0.34	0.35	NO		
155-156	428	12	12	0.26	0.26	NO		
156-152	320	12	12	0.35	0.36	NO		
157-150	402	12	12	0.52	0.52	NO		
158-WG158	376	15	15	0.41	0.41	NO		
159-160	307	15	15	0.42	0.42	NO		
160-161	320	15	15	0.42	0.42	NO		
161-162	319	15	15	0.44	0.44	NO		
162-163	310	15	15	0.43	0.43	NO		
163-164	300	15	15	0.41	0.41	NO		
164-171	184	15	15	0.43	0.43	NO		
165-166	231	12	12	0.09	0.09	NO		
166-167	108	12	12	0.14	0.14	NO		
167-168	170	12	12	0.20	0.20	NO		
168-169	185	12	12	0.22	0.22	NO		
169-170	50	12	12	0.44	0.22	NO		
170-288	611	12	12	0.87	0.26	NO		
171-WG171	273	15	15	0.42	0.42	NO		
172-175	429	15	15	0.44	0.44	NO		
173-172	297	15	15	0.44	0.45	NO		
174-173	7	15	15	0.57	0.57	NO		
175-176	382	15	15	0.43	0.43	NO		
176-177	290	15	15	0.40	0.40	NO		
177-178	286	15	15	0.45	0.45	NO		
178-179	314	15	15	0.53	0.53	NO		
179-180	301	18	18	0.45	0.45	NO		
180-268	276	18	18	0.44	0.45	NO		
181-182	335	8	8	0.56	0.30	NO		
182-186	290	8	8	1.00	0.48	NO		
183-182	261	8	8	0.84	0.47	NO		
184-183	298	8	8	0.53	0.42	NO		
185-WG185	261	8	8	0.49	0.49	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Future MDF d/D (exist pipe dia)	Future MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
186-187	303	8	8	1.00	0.48	NO		
187-199	295	8	8	1.00	0.52	NO		
188-200	394	6	12	1.00	0.33	YES	Sunset Drive	Valley View Road
189-188	227	6	12	1.00	0.47	YES	Sunset Drive	Sunset Drive
190-189	301	6	12	1.00	0.39	YES	Sunset Drive	Sunset Drive
191-190	300	6	10	1.00	0.41	YES	Sunset Drive	Sunset Drive
192-191	300	6	10	1.00	0.40	YES	Sunset Drive	Sunset Drive
193-192	125	6	10	1.00	0.44	YES	Sunset Drive	Sunset Drive
194-193	302	6	10	1.00	0.44	YES	Sunset Drive	Sunset Drive
195-194	331	6	10	1.00	0.39	YES	Sunset Drive	Sunset Drive
196-195	348	6	10	1.00	0.39	YES	Sunset Drive	Sunset Drive
197-196	165	6	10	1.00	0.53	YES	Sunset Drive	Sunset Drive
198-564	258	6	10	1.00	0.48	YES	Sunset Drive	Cerra Vista Drive
199-198	264	6	10	1.00	0.48	YES	Sunset Drive	Cerra Vista Drive
200-201	139	6	12	1.00	0.32	YES	Sunset Drive	Valley View Road
201-202	192	6	12	1.00	0.32	YES	Sunset Drive	Valley View Road
202-203	194	6	12	1.00	0.40	YES	Sunset Drive	Iris Street
203-204	275	6	12	1.00	0.38	YES	Sunset Drive	Iris Street
204-205	359	6	12	1.00	0.33	YES	Sunset Drive	Cedar Street
205-207	302	6	12	0.86	0.35	YES	Sunset Drive	Cedar Street
206-207	242	8	8	0.38	0.37	NO		
207-208	34	8	12	0.55	0.36	YES	Sunset Drive	Memorial Drive
208-209	265	8	12	0.78	0.37	YES	Sunset Drive	Memorial Drive
209-245	274	8	12	1.00	0.43	YES	Sunset Drive	Memorial Drive
210-211	267	10	10	0.11	0.11	NO		
211-212	277	10	10	0.14	0.14	NO		
212-213	244	10	10	0.17	0.17	NO		
213-217	342	10	10	0.16	0.16	NO		
214-218	161	10	10	0.24	0.24	NO		
215-214	327	10	10	0.20	0.20	NO		
216-215	299	10	10	0.15	0.15	NO		
217-216	193	10	10	0.13	0.13	NO		
218-219	250	10	10	0.23	0.23	NO		
219-220	261	10	10	0.23	0.23	NO		
220-221	264	10	10	0.27	0.27	NO		
221-222	61	10	10	0.30	0.30	NO		
222-226	178	10	10	0.32	0.32	NO		
223-230	420	8	8	0.40	0.40	NO		
223-337	178	8	8	0.40	0.40	NO		
224-223	247	8	8	0.37	0.37	NO		
225-343	358	10	10	0.35	0.35	NO		
226-225	347	10	10	0.33	0.33	NO		
227-231	183	8	8	0.29	0.29	NO		
228-227	272	8	8	0.40	0.40	NO		
229-228	420	8	8	0.47	0.47	NO		
230-229	421	8	8	0.43	0.43	NO		
231-318	280	8	8	0.32	0.32	NO		
232-308	248	10	10	0.32	0.32	NO		
234-233	14	15	15	0.30	0.30	NO		
234-307	299	15	15	0.39	0.39	NO		
235-234	212	15	15	0.35	0.35	NO		
236-232	518	10	10	0.32	0.32	NO		
237-235	230	15	15	0.36	0.36	NO		
238-237	300	15	15	0.36	0.36	NO		
239-236	351	10	10	0.34	0.34	NO		
240-238	302	15	15	0.35	0.35	NO		
241-262	85	12	15	1.00	0.64	YES	Nash Road	Sunnyslope Road
242-260	299	12	15	1.00	0.67	YES	Nash Road	Sunnyslope Road
243-242	278	12	15	1.00	0.60	YES	Nash Road	Sunnyslope Road
244-243	288	12	15	1.00	0.55	YES	Nash Road	Sunnyslope Road
245-258	29	8	12	1.00	0.52	YES	Nash Road	Memorial Drive
246-245	602	8	8	0.71	0.57	YES	Nash Road	Sunnyslope Road
247-246	128	8	8	0.44	0.44	NO		
248-247	246	8	8	0.45	0.45	NO		
249-248	407	8	8	0.41	0.41	NO		
250-249	128	8	8	0.37	0.37	NO		
251-250	315	8	8	0.34	0.34	NO		
252-251	417	8	8	0.31	0.31	NO		
253-252	273	8	8	0.25	0.25	NO		
254-253	272	8	8	0.21	0.21	NO		
255-254	299	8	8	0.25	0.25	NO		
256-255	202	8	8	0.27	0.27	NO		
257-256	194	8	8	0.29	0.29	NO		
258-259	371	8	12	1.00	0.46	YES	Nash Road	Memorial Drive
259-244	26	12	15	1.00	0.40	YES	Nash Road	Sunnyslope Road
260-261	158	12	15	1.00	0.62	YES	Nash Road	Sunnyslope Road
261-241	57	12	15	1.00	0.58	YES	Nash Road	Sunnyslope Road
262-290	413	12	15	1.00	0.60	YES	Nash Road	Sunnyslope Road
263-289	475	10	10	1.00	0.50	NO		
264-265	213	12	15	0.80	0.54	YES	Nash Road	Tres Pinos Road
265-267	302	12	15	0.87	0.56	YES	Nash Road	Tres Pinos Road
266-179	278	18	18	0.25	0.25	NO		
267-269	404	12	15	0.85	0.55	YES	Nash Road	Nash Road

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Future MDF d/D (exist pipe dia)	Future MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
268-440	610	18	18	0.43	0.43	NO		
269-270	421	12	15	0.83	0.54	YES	Nash Road	Nash Road
270-271	132	12	15	0.79	0.60	YES	Nash Road	Nash Road
271-284	273	15	15	0.54	0.62	NO		
272-273	19	15	18	0.99	0.56	YES	Line Street	Line Street
273-415	295	15	18	1.00	0.62	YES	Line Street	Line Street
274-272	281	15	18	0.92	0.56	YES	Line Street	Line Street
275-274	85	15	18	0.80	0.53	YES	Line Street	Nash Road
276-275	371	15	18	0.75	0.53	YES	Line Street	Nash Road
277-276	50	15	18	0.75	0.54	YES	Line Street	Nash Road
278-277	321	15	18	0.73	0.52	YES	Line Street	Nash Road
279-278	364	15	18	0.74	0.54	YES	Line Street	Nash Road
280-279	291	15	18	0.76	0.55	YES	Line Street	Nash Road
281-280	290	15	18	0.73	0.53	YES	Line Street	Nash Road
282-281	265	15	15	0.63	0.64	NO		
283-282	250	15	15	0.56	0.64	NO		
284-283	268	15	15	0.54	0.61	NO		
285-266	469	8	8	0.25	0.25	NO		
286-285	395	8	8	0.18	0.18	NO		
287-293	46	12	15	1.00	0.73	YES	Nash Road	Tres Pinos Road
288-287	294	12	15	1.00	0.47	YES	Nash Road	Tres Pinos Road
289-291	174	12	15	1.00	0.65	YES	Nash Road	Tres Pinos Road
290-289	17	12	15	1.00	0.56	YES	Nash Road	Sunnyslope Road
291-292	258	12	15	1.00	0.72	YES	Nash Road	Tres Pinos Road
292-293	334	12	15	1.00	0.76	YES	Nash Road	Tres Pinos Road
293-294	311	12	15	1.00	0.64	YES	Nash Road	Tres Pinos Road
294-297	105	12	15	1.00	0.59	YES	Nash Road	Tres Pinos Road
295-296	219	12	15	1.00	0.85	YES	Nash Road	Tres Pinos Road
296-264	158	12	15	0.90	0.68	YES	Nash Road	Tres Pinos Road
297-295	268	12	15	1.00	0.75	YES	Nash Road	Tres Pinos Road
298-374	383	15	15	0.53	0.53	NO		
299-298	317	15	15	0.47	0.47	NO		
2NDEJ-WG380	152	10	10	0.70	0.90	NO		
300-299	343	15	15	0.46	0.46	NO		
301-300	261	15	15	0.45	0.45	NO		
302-301	249	15	15	0.46	0.46	NO		
303-302	223	15	15	0.47	0.47	NO		
304-303	286	15	15	0.45	0.45	NO		
305-304	300	15	15	0.43	0.43	NO		
306-305	263	15	15	0.45	0.45	NO		
307-306	551	15	15	0.46	0.46	NO		
308-307	18	10	10	0.29	0.29	NO		
309-240	301	15	15	0.36	0.36	NO		
310-239	511	10	10	0.34	0.34	NO		
311-309	292	12	12	0.45	0.45	NO		
312-310	448	8	8	0.34	0.34	NO		
313-311	288	12	12	0.45	0.45	NO		
314-312	271	8	8	0.19	0.19	NO		
315-316	20	8	8	0.49	0.49	NO		
316-313	382	15	15	0.58	0.58	NO		
317-315	283	8	8	0.41	0.41	NO		
318-317	402	8	8	0.34	0.34	NO		
319-321	508	10	10	0.82	0.49	NO		
320-319	470	10	10	0.53	0.53	NO		
321-322	292	15	15	1.00	0.32	NO		
322-356	279	15	15	1.00	0.69	NO		
323-355	596	18	18	0.41	0.41	NO		
324-323	286	18	18	0.42	0.42	NO		
325-324	231	18	18	0.44	0.44	NO		
326-327	28	18	18	0.40	0.40	NO		
327-325	244	18	18	0.45	0.45	NO		
328-326	266	18	18	0.43	0.43	NO		
329-328	195	18	18	0.48	0.48	NO		
330-329	462	18	18	0.39	0.39	NO		
332-330	353	8	10	0.66	0.47	YES	Hillcrest Road	Hillcrest Road
333-332	305	8	10	0.65	0.41	YES	Hillcrest Road	Hillcrest Road
334-333	346	8	10	0.56	0.36	YES	Hillcrest Road	Hillcrest Road
335-334	334	8	10	0.47	0.31	YES	Hillcrest Road	Hillcrest Road
336-335	410	8	8	0.49	0.46	NO		
337-336	151	8	8	0.46	0.47	NO		
338-224	295	12	12	0.28	0.28	NO		
339-338	324	12	12	0.31	0.31	NO		
340-339	366	12	12	0.30	0.30	NO		
341-340	258	10	10	0.30	0.30	NO		
342-341	275	10	10	0.26	0.26	NO		
343-342	301	10	10	0.32	0.32	NO		
344-345	25	24	24	0.40	0.40	NO		
345-432	178	24	24	0.47	0.47	NO		
349-344	235	18	18	0.40	0.40	NO		
350-349	548	18	18	0.42	0.42	NO		
351-350	350	18	18	0.40	0.40	NO		
352-351	233	18	18	0.44	0.44	NO		
353-352	663	18	18	0.42	0.42	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Future MDF d/D (exist pipe dia)	Future MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
354-353	511	18	18	0.38	0.38	NO		
355-354	220	18	18	0.40	0.40	NO		
356-357	255	15	15	1.00	0.39	NO		
357-358	144	15	15	1.00	0.40	NO		
358-359	318	15	15	1.00	0.45	NO		
359-366	82	15	15	1.00	0.48	NO		
360-379	763	18	18	1.00	0.35	NO		
361-360	277	15	15	1.00	0.56	NO		
362-361	279	15	15	1.00	0.47	NO		
363-362	23	6	6	1.00	0.54	NO		
364-362	375	15	15	1.00	0.45	NO		
365-364	462	15	15	1.00	0.43	NO		
366-365	395	15	15	1.00	0.43	NO		
367-368	400	10	10	0.27	0.23	NO		
368-WG368	257	10	12	0.55	0.38	YES	Kirk Patrick To GLP LS	Kirk Patrick
369-370	55	12	12	0.41	0.41	NO		
370-143	79	12	12	0.30	0.30	NO		
371-363	523	6	6	1.00	0.14	NO		
372-371	529	6	6	0.61	0.10	NO		
373-372	64	6	6	0.11	0.00	NO		
374-375	307	15	15	0.55	0.52	NO		
375-376	300	18	18	0.72	0.65	NO		
376-396	242	30	30	0.55	0.51	NO		
377-376	20	27	27	0.57	0.51	NO		
378-380	42	12	12	0.66	0.66	NO		
379-2NDE	44	18	18	1.00	0.56	NO		
380-WG380	24	18	18	0.34	0.33	NO		
381-377	242	27	27	0.60	0.54	NO		
382-530	451	30	30	0.47	0.46	NO		
383-382	38	30	30	0.50	0.45	NO		
384-402	270	6	6	0.30	0.30	NO		
385-383	99	30	30	0.53	0.48	NO		
386-385	400	30	30	0.52	0.48	NO		
387-386	366	30	30	0.56	0.51	NO		
388-387	364	30	30	0.58	0.52	NO		
389-388	300	30	30	0.55	0.50	NO		
390-389	57	30	30	0.53	0.47	NO		
391-390	59	30	30	0.48	0.44	NO		
392-391	535	30	30	0.51	0.46	NO		
393-392	97	30	30	0.60	0.55	NO		
394-393	353	30	30	0.57	0.52	NO		
395-394	405	30	30	0.54	0.50	NO		
396-395	342	30	30	0.55	0.51	NO		
397-398	61	6	6	0.14	0.14	NO		
398-399	201	6	6	0.19	0.19	NO		
399-400	275	6	6	0.27	0.27	NO		
400-401	251	6	6	0.37	0.37	NO		
401-384	244	6	6	0.30	0.30	NO		
402-403	5	8	8	0.19	0.19	NO		
403-528	203	18	18	0.14	0.14	NO		
404-545	137	12	12	0.34	0.36	NO		
405-404	188	12	12	0.28	0.28	NO		
406-545	330	18	18	0.43	0.47	NO		
407-406	182	15	18	0.74	0.59	YES	Line Street	Line Street
408-438	334	30	30	0.47	0.47	NO		
409-407	276	15	18	0.80	0.56	YES	Line Street	Line Street
410-408	358	27	27	0.60	0.61	NO		
411-409	278	15	18	0.74	0.53	YES	Line Street	Line Street
412-411	360	15	18	0.70	0.51	YES	Line Street	Line Street
413-412	117	15	18	0.62	0.46	YES	Line Street	Line Street
414-413	445	15	18	0.76	0.53	YES	Line Street	Line Street
415-416	69	15	18	1.00	0.63	YES	Line Street	Line Street
416-417	375	15	18	1.00	0.58	YES	Line Street	Line Street
417-418	375	15	18	1.00	0.58	YES	Line Street	Line Street
418-419	106	15	18	1.00	0.59	YES	Line Street	Line Street
419-420	253	15	18	1.00	0.60	YES	Line Street	Line Street
420-421	20	15	18	0.99	0.58	YES	Line Street	Line Street
421-422	374	15	18	1.00	0.61	YES	Line Street	Line Street
422-423	374	15	18	0.97	0.60	YES	Line Street	Line Street
423-414	377	15	18	0.97	0.61	YES	Line Street	Line Street
424-410	552	27	27	0.55	0.56	NO		
425-424	496	27	27	0.56	0.56	NO		
426-433	189	14	14	0.38	0.38	NO		
427-425	501	27	27	0.55	0.55	NO		
428-427	571	24	24	0.53	0.53	NO		
429-428	488	24	24	0.47	0.47	NO		
430-429	609	24	24	0.46	0.46	NO		
431-430	259	24	24	0.48	0.48	NO		
432-431	176	24	24	0.43	0.43	NO		
433-434	381	14	14	0.17	0.17	NO		
434-435	189	14	14	0.20	0.20	NO		
435-436	325	14	14	0.20	0.20	NO		
436-437	324	14	14	0.20	0.20	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Future MDF d/D (exist pipe dia)	Future MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
437-405	381	14	14	0.24	0.24	NO		
438-542	768	30	30	0.71	0.70	NO		
440-441	383	18	18	0.42	0.43	NO		
441-442	461	18	18	0.43	0.43	NO		
442-443	456	18	18	0.42	0.42	NO		
443-444	564	18	18	0.38	0.38	NO		
444-445	366	18	18	0.40	0.40	NO		
445-446	268	18	18	0.42	0.42	NO		
446-447	345	18	18	0.41	0.41	NO		
447-344	336	18	18	0.41	0.41	NO		
448-397	396	6	6	0.15	0.15	NO		
449-448	246	6	6	0.16	0.16	NO		
450-449	237	6	6	0.06	0.06	NO		
451-452	297	6	6	0.09	0.09	NO		
452-453	799	6	6	0.25	0.25	NO		
453-454	30	6	6	0.33	0.33	NO		
454-455	364	6	6	0.41	0.41	NO		
455-456	302	6	6	0.45	0.45	NO		
456-457	113	6	6	0.46	0.46	NO		
457-458	189	6	6	0.74	0.50	NO		
458-459	181	6	6	1.00	0.46	NO		
459-460	121	6	8	1.00	0.43	YES	Powell Street	Powell Street
460-461	35	6	8	1.00	0.48	YES	Powell Street	Powell Street
461-462	232	6	8	1.00	0.49	YES	Powell Street	Powell Street
462-463	35	6	10	1.00	0.41	YES	Powell Street	Powell Street
463-464	99	6	10	1.00	0.33	YES	Powell Street	Powell Street
464-466	195	6	10	1.00	0.44	YES	Powell Street	Powell Street
466-467	9	6	10	1.00	0.49	YES	Powell Street	Powell Street
467-427	379	6	10	0.87	0.39	YES	Powell Street	Powell Street
468-428	175	6	10	1.00	0.56	YES	West Street	West Street
469-468	200	6	10	1.00	0.44	YES	West Street	West Street
470-469	106	6	10	1.00	0.35	YES	West Street	West Street
471-470	292	6	10	1.00	0.36	YES	West Street	West Street
472-471	296	6	8	1.00	0.44	YES	West Street	West Street
473-472	548	6	8	1.00	0.43	YES	West Street	West Street
474-473	333	6	8	1.00	0.36	YES	West Street	West Street
475-474	337	6	8	1.00	0.31	YES	West Street	West Street
476-475	547	6	6	1.00	0.45	NO		
477-476	278	6	6	0.74	0.49	NO		
478-477	270	6	6	0.24	0.24	NO		
479-526	898	10	10	0.32	0.33	NO		
480-511	594	12	12	0.57	0.57	NO		
481-480	627	10	12	0.67	0.50	YES	Fallon Road	Fallon Road
482-481	204	10	12	0.71	0.47	YES	Fallon Road	Fallon Road
483-482	419	10	12	0.68	0.45	YES	Fallon Road	Fallon Road
484-483	600	10	12	0.56	0.38	YES	Fallon Road	Fallon Road
485-484	252	10	12	0.53	0.37	YES	Fallon Road	Fallon Road
486-487	670	10	10	0.30	0.31	NO		
487-488	360	10	10	0.28	0.27	NO		
488-489	354	10	12	0.52	0.33	YES	Technology Parkway	Technology Parkway
489-510	336	10	12	0.79	0.57	YES	Technology Parkway	Technology Parkway
490-497	237	10	10	0.25	0.25	NO		
491-490	600	10	10	0.12	0.12	NO		
492-491	266	10	10	0.00	0.00	NO		
493-498	294	12	15	0.71	0.42	YES	Aerostar Way	Aerostar Way
494-493	332	12	15	0.69	0.43	YES	Aerostar Way	Aerostar Way
495-494	291	10	10	0.51	0.41	NO		
496-495	249	10	10	0.17	0.17	NO		
497-496	300	10	10	0.22	0.22	NO		
498-499	65	12	15	0.81	0.45	YES	Aerostar Way	Aerostar Way
499-500	260	12	15	0.87	0.51	YES	Aerostar Way	Aerostar Way
500-501	295	12	15	0.79	0.48	YES	Aerostar Way	Aerostar Way
501-502	293	12	15	0.73	0.44	YES	Aerostar Way	Aerostar Way
502-503	295	12	15	0.67	0.46	YES	Aerostar Way	Aerostar Way
503-504	232	15	15	0.55	0.55	NO		
504-505	304	15	15	0.57	0.57	NO		
505-506	298	15	15	0.54	0.54	NO		
506-508	748	15	15	0.53	0.53	NO		
507-509	227	15	15	0.36	0.36	NO		
508-507	119	15	15	0.53	0.53	NO		
509-AP	21	15	15	0.59	0.59	NO		
510-509	169	15	15	0.35	0.35	NO		
511-510	1797	12	12	0.61	0.61	NO		
512-520	256	12	12	0.24	0.24	NO		
514-GLP	11	10	12	0.62	0.47	YES	Kirk Patrick To GLP LS	Frontage Road/San Felipe Road
515-514	49	10	12	0.73	0.52	YES	Kirk Patrick To GLP LS	Frontage Road/San Felipe Road
516-515	284	10	12	0.70	0.47	YES	Kirk Patrick To GLP LS	Frontage Road/San Felipe Road
517-516	246	10	12	0.60	0.41	YES	Kirk Patrick To GLP LS	Frontage Road/San Felipe Road
518-517	476	10	12	0.58	0.40	YES	Kirk Patrick To GLP LS	Frontage Road/San Felipe Road
519-518	251	10	12	0.64	0.43	YES	Kirk Patrick To GLP LS	Frontage Road/San Felipe Road
520-521	509	12	12	0.24	0.24	NO		
521-522	503	12	12	0.22	0.22	NO		
522-480	503	12	12	0.39	0.39	NO		

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Future MDF d/D (exist pipe dia)	Future MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
523-526	727	10	10	0.29	0.29	NO		
524-525	425	10	12	0.57	0.39	YES	Kirk Patrick To GLP LS	San Felipe Road
525-368	210	10	12	0.56	0.39	YES	Kirk Patrick To GLP LS	Kirk Patrick
526-524	722	10	10	0.51	0.47	NO		
527-WG527	7	14	14	0.08	0.08	NO		
528-530	301	21	21	0.41	0.41	NO		
529-531	943	21	21	0.11	0.11	NO		
530-543	79	36	36	0.45	0.46	NO		
531-532	688	21	21	0.15	0.15	NO		
532-533	545	21	21	0.36	0.34	NO		
533-WG537	173	21	21	0.78	0.76	NO		
535-536	477	36	36	0.51	0.51	NO		
536-548	93	36	36	0.46	0.46	NO		
537-WG537	27	36	36	0.48	0.58	NO		
538-537	473	36	36	0.55	0.60	NO		
539-547	403	36	36	0.73	0.71	NO		
540-539	201	36	36	0.67	0.66	NO		
541-540	582	36	36	0.73	0.72	NO		
542-541	596	36	36	0.82	0.82	NO		
543-542	26	27	36	0.85	0.66	YES	San Juan Road	San Juan Road
544-543	310	27	27	0.53	0.56	NO		
545-544	35	36	36	0.22	0.24	NO		
546-535	612	36	36	0.51	0.54	NO		
547-538	78	36	36	0.77	0.76	NO		
548-549	333	36	36	0.35	0.35	NO		
548-WG548	23	21	21	0.69	0.68	NO		
549-550	240	36	36	0.52	0.52	NO		
550-552	480	36	36	0.51	0.50	NO		
551-553	152	21	21	0.44	0.44	NO		
552-SPI	43	36	36	0.45	0.44	NO		
553-552	7	21	21	0.41	0.41	NO		
562-197	240	6	10	1.00	0.57	YES	Sunset Drive	Cerra Vista Drive
563-562	268	6	10	1.00	0.50	YES	Sunset Drive	Cerra Vista Drive
564-563	257	6	10	1.00	0.50	YES	Sunset Drive	Cerra Vista Drive
565-566	190	8	8	0.13	0.13	NO		
566-567	122	8	8	0.13	0.13	NO		
567-568	240	8	8	0.13	0.13	NO		
568-569	256	8	8	0.25	0.25	NO		
569-570	228	8	8	0.38	0.39	NO		
570-571	239	8	8	0.34	0.32	NO		
571-533	291	8	12	0.65	0.54	YES	Miller Road	Miller Road
576-577	326	36	36	0.71	0.70	NO		
577-578	586	36	36	0.70	0.69	NO		
578-582	229	36	36	0.71	0.70	NO		
580-WWTP	331	36	36	0.57	0.57	NO		
581-580	349	36	36	0.68	0.67	NO		
582-581	24	36	36	0.73	0.72	NO		
583-576	109	36	36	0.69	0.68	NO		
584-583	221	36	36	0.62	0.61	NO		
585-584	32	36	36	0.47	0.46	NO		
586-585	280	36	36	0.54	0.54	NO		
587-586	592	36	36	0.69	0.68	NO		
588-587	582	36	36	0.67	0.66	NO		
APJ-GLP	6953	10	10	1.00	1.00	NO		
WG322-356	395	15	15	1.00	0.35	NO		
WG384-383	224	30	30	0.52	0.47	NO		
GLPJ-378	7121	12	12	1.00	1.00	NO		
WG537-546	43	36	36	0.60	0.62	NO		
SBCO-SS	42	8	8	0.56	0.56	NO		
SPI-SPO	1100	36	36	0.52	0.51	NO		
SPO-WG588	172	36	36	0.54	0.53	NO		
SSJ-153	1246	6	6	0.74	0.73	NO		
WG104-105	146	10	10	0.11	0.11	NO		
WG105-106	197	10	10	0.11	0.11	NO		
WG152-158	456	15	15	0.45	0.45	NO		
WG158-159	431	15	15	0.41	0.41	NO		
WG171-173	549	15	15	0.57	0.57	NO		
WG185-184	287	8	8	0.45	0.45	NO		
WG368-WG369	265	10	12	0.57	0.39	YES	Kirk Patrick To GLP LS	Kirk Patrick
WG369-WG370	333	10	12	0.59	0.40	YES	Kirk Patrick To GLP LS	Kirk Patrick
WG370-WG371	293	10	12	0.59	0.41	YES	Kirk Patrick To GLP LS	Kirk Patrick
WG371-WG372	293	10	12	0.62	0.42	YES	Kirk Patrick To GLP LS	Kirk Patrick
WG372-WG373	422	10	12	0.66	0.44	YES	Kirk Patrick To GLP LS	McCloskey Road
WG373-519	219	10	12	0.69	0.46	YES	Kirk Patrick To GLP LS	Frontage Road/San Felipe Road
WG380-381	88	27	27	0.47	0.44	NO		
WG401-WG403	13	18	18	0.07	0.07	NO		
WG403-403	277	18	18	0.10	0.10	NO		
WG527-528	38	18	18	0.11	0.11	NO		
534-WG534	187	21	21	0.68	0.64	NO		
WG534-WG536	307	21	21	0.57	0.53	NO		
WG536-548	79	21	21	0.49	0.47	NO		
WG537-534	618	21	21	0.83	0.82	NO		
WG548-WG549	335	21	21.1	0.76	0.75	YES	Bridge Road	Bridge Road

City of Hollister
2010 Sewer Model Results
Worst Case d/D, Pipe Upgrades, and CIPs

Pipe ID	Length [feet]	Existing Diameter [inches]	Proposed Diameter [inches]	Future MDF d/D (exist pipe dia)	Future MDF d/D (proposed pipe dia)	CIP	CIP Name	Location
WG549-WG551	243	21	21.1	0.72	0.71	YES	Bridge Road	Bridge Road
WG551-551	300	21	21.1	0.72	0.71	YES	Bridge Road	Bridge Road
WG588-588	385	36	36	#N/A	0.60	NO		

Appendix C

Surveyor’s Report for City of Hollister Sewer Manhole Survey

SURVEYOR'S REPORT FOR
CITY OF HOLLISTER
SANITARY SEWER SYSTEM SURVEY

DATE PREPARED: SEPTEMBER 30, 2009
PREPARED FOR: CITY OF HOLLISTER, CALIFORNIA
PREPARED BY: EDWARD M. READING, PLS 8081

WALLACE GROUP®

WALLACE GROUP
612 CLARION COURT
SAN LUIS OBISPO, CA 93401

PROJECT DESCRIPTION

Wallace Group surveyed 476 sanitary sewer manholes appurtenant to the City of Hollister sewer system for inclusion in a Geographic Information System (GIS). This data will be used in revised sewer atlases and in a sanitary sewer master plan.

PROJECT UNITS, DATUMS, PROJECTIONS, & REFERENCE SYSTEMS

All units are U.S. Survey Feet.

Horizontal:
The horizontal datum for this survey is the North American Datum of 1983, 2007 [NAD83 (2007)], epoch date of 2007.0000.

The projection used is the California Coordinate System of 1983 (CCS83), Zone 4 projection. All coordinates provided are grid coordinates.

This survey tied to 2 National Geodetic Survey (NGS) control monuments:

PID	DESIGNATION	WG PT.#	NORTHING	EASTING
GU2612	HOLLISTER	1	2203485.77	5857502.00
GU3630	HOLLAIR	2	2217094.29	5859397.50

The NGS Data Sheets for the utilized control points are included in Appendix A.

The Basis of Bearings for this Survey is the California Coordinate System, Zone 4, NAD83(2007), epoch date of 2007.0000 as determined locally by a line from ***HOLLISTER*** to ***HOLLAIR*** being ***N 07° 55' 46.5" E*** as derived from geodetic values published by the NGS.

Vertical:
The vertical datum for this survey is the City of Hollister Vertical Control Network as provided by Mr. David Rubcic, PE, PLS - Associate Civil Engineer, City of Hollister.

This survey tied to the following City Vertical Control Points:

BM 5 - having a published elevation of 310.172
BM 10 - having a published elevation of 484.860
BM 22 - having a published elevation of 281.706
BM 31 - having a published elevation of 231.307

The City Of Hollister data sheets for the utilized vertical control points are included in Appendix B.

CONTROL SURVEY

Real-Time Kinematic (RTK) GPS techniques were employed to establish the project control. Observations were made on August 10, 2009. 2 Trimble R8 GPS receivers were used. The observations were processed using Trimble's Geomatic Office (TGO) software version 1.62. The largest Least Squares vertical residual was 0.03'. The Least Squares horizontal residual was 0.05'.

SANITARY SEWER STRUCTURE FIELD SURVEY

Real-Time Kinematic (RTK) GPS techniques were employed to locate the sewer line structures. This portion of the survey was conducted between August 10, 2009 and September 30, 2009. Four Trimble R8 GPS receivers were used. The manufacturer's stated accuracy for these receivers in RTK mode is 1cm + 1 ppm horizontal, and 2 cm + 1 ppm vertical.

The procedures for surveying the manholes were as follows:

1. One RTK occupation (at the center of the manhole lid) of at least 30 epochs with software reported precisions of at most 0.05' horizontally and vertically.
2. Force loss of initialization either manually or through the data collector software.
3. Re-initialize.
4. Reoccupy manhole until a position within 0.10' horizontally and vertically of previous position is obtained.

Our procedures for measuring inverts and photographing the manholes were as follows:

1. Determine north.
2. Paint point number in white paint adjacent to manhole and oriented so that it can be read from the south.
3. Photograph manhole and number.
3. Remove lid and photograph manhole so that north is up in the photo.
4. Measure vertical distance from center of channel in structure to manhole rim.
5. Photograph measurement (as a check).
6. Record measurement in field book.

A coordinate listing of the surveyed structures is included as Appendix C.

Edward M. Reading, P.L.S. 8081
Expires 12/31/09

Appendix A – NGS Data Sheets

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.71
1        National Geodetic Survey,   Retrieval Date = SEPTEMBER 30, 2009
 GU2612 ***********************************************************************
 GU2612  DESIGNATION -  HOLLISTER
 GU2612  PID         -  GU2612
 GU2612  STATE/COUNTY-  CA/SAN BENITO
 GU2612  USGS QUAD   -  HOLLISTER (1995)
 GU2612
 GU2612                        *CURRENT SURVEY CONTROL
 GU2612  ______________________________________________________________________
 GU2612* NAD 83(2007)-  36 51 20.80737(N)    121 24 25.53206(W)     ADJUSTED
 GU2612* NAVD 88     -       125.     (meters)     410.     (feet)  SCALED
 GU2612  ______________________________________________________________________
 GU2612  EPOCH DATE  -        2007.00
 GU2612  X          -  -2,662,733.739 (meters)                      COMP
 GU2612  Y          -  -4,361,044.164 (meters)                      COMP
 GU2612  Z          -   3,804,654.050 (meters)                      COMP
 GU2612  LAPLACE CORR-           3.13  (seconds)                    DEFLEC99
 GU2612  ELLIP HEIGHT-          91.990 (meters)          (02/10/07) ADJUSTED
 GU2612  GEOID HEIGHT-         -33.01  (meters)                      GEOID03
 GU2612
 GU2612  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 GU2612  Type    PID    Designation                        North   East  Ellip
 GU2612  ----------------------------------------------------------------------
 GU2612  NETWORK GU2612 HOLLISTER                          0.92   1.29   8.80
 GU2612  ----------------------------------------------------------------------
 GU2612
 GU2612.The horizontal coordinates were established by GPS observations
 GU2612.and adjusted by the National Geodetic Survey in February 2007.
 GU2612
 GU2612.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 GU2612.See National Readjustment for more information.
 GU2612.The horizontal coordinates are valid at the epoch date displayed above.
 GU2612.The epoch date for horizontal control is a decimal equivalence
 GU2612.of Year/Month/Day.
 GU2612
 GU2612.The orthometric height was scaled from a topographic map.
 GU2612
 GU2612.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 GU2612
 GU2612.The Laplace correction was computed from DEFLEC99 derived deflections.
 GU2612
 GU2612.The ellipsoidal height was determined by GPS observations
 GU2612.and is referenced to NAD 83.
 GU2612
 GU2612.The geoid height was determined by GEOID03.
 GU2612
 GU2612;                    North         East     Units Scale Factor Converg.
 GU2612;SPC CA 4     -   671,623.807 1,785,370.180   MT  0.99994879   -1 26 09.7
 GU2612;SPC CA 4     - 2,203,485.77  5,857,502.00   sFT  0.99994879   -1 26 09.7
 GU2612;SPC CA 3     -   539,877.650 1,919,103.167   MT  1.00005026   -0 33 19.3
 GU2612;SPC CA 3     - 1,771,248.59  6,296,257.64   sFT  1.00005026   -0 33 19.3
 GU2612;UTM  10      - 4,080,057.907   642,003.079   MT  0.99984842   +0 57 20.1
 GU2612
 GU2612!             -  Elev Factor  x  Scale Factor =   Combined Factor
```

```
GU2612!SPC CA 4     -   0.99998556  x   0.99994879  =   0.99993435
GU2612!SPC CA 3     -   0.99998556  x   1.00005026  =   1.00003582
GU2612!UTM  10      -   0.99998556  x   0.99984842  =   0.99983399
GU2612
GU2612|---------------------------------------------------------------------|
GU2612| PID    Reference Object                    Distance      Geod. Az   |
GU2612|                                                          dddmmss.s  |
GU2612| GU2614 HOLLISTER RM 2                      22.049 METERS 04233      |
GU2612| GU3620 HOLLISTER CATH CH SPIRE            APPROX. 0.5 KM 2044611.0  |
GU2612| GU3813 FREMONT PEAK TV STA KSBW MAST      APPROX.14.0 KM 2173946.6  |
GU2612| GU2621 B 698                              APPROX. 2.3 KM 2554444.9  |
GU2612| GU2620 PICKET AZ MK RESET                                2574201.8  |
GU2612| GU2613 HOLLISTER RM 1                      48.049 METERS 29716      |
GU2612|---------------------------------------------------------------------|
GU2612
GU2612                          SUPERSEDED SURVEY CONTROL
GU2612
GU2612  NAD 83(1992)-  36 51 20.79504(N)    121 24 25.51754(W) AD(1991.35) 1
GU2612  ELLIP H (08/05/94)   92.026  (m)                       GP(1991.35) 4 2
GU2612  NAD 83(1992)-  36 51 20.78939(N)    121 24 25.51981(W) AD(1991.35) 1
GU2612  NAD 83(1986)-  36 51 20.79310(N)    121 24 25.51562(W) AD(1984.00) 1
GU2612  NAD 27      -  36 51 20.98116(N)    121 24 21.76974(W) AD(       ) 1
GU2612  NGVD 29 (??/??/92)  124.146  (m)          407.30   (f) ADJ UNCH    1 1
GU2612
GU2612.Superseded values are not recommended for survey control.
GU2612.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
GU2612.See file dsdata.txt to determine how the superseded data were derived.
GU2612
GU2612_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SFF4200380058(NAD 83)
GU2612_MARKER: DS = TRIANGULATION STATION DISK
GU2612_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
GU2612_SP_SET: CONCRETE POST
GU2612_STAMPING: HOLLISTER 1930 1966
GU2612_MARK LOGO: CGS
GU2612_MAGNETIC: A = STEEL ROD ADJACENT TO MONUMENT
GU2612_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
GU2612+STABILITY: SURFACE MOTION
GU2612_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
GU2612+SATELLITE: SATELLITE OBSERVATIONS - August 23, 2007
GU2612
GU2612  HISTORY     - Date     Condition        Report By
GU2612  HISTORY     - 1930     MONUMENTED       CGS
GU2612  HISTORY     - 1951     SEE DESCRIPTION  CGS
GU2612  HISTORY     - 1962     SEE DESCRIPTION  CGS
GU2612  HISTORY     - 1966     SEE DESCRIPTION  CADH
GU2612  HISTORY     - 1966     SEE DESCRIPTION  CGS
GU2612  HISTORY     - 1967     SEE DESCRIPTION  CGS
GU2612  HISTORY     - 1967     GOOD             NGS
GU2612  HISTORY     - 1973     GOOD             NGS
GU2612  HISTORY     - 1976     GOOD             NGS
GU2612  HISTORY     - 19930511 GOOD             CADT
GU2612  HISTORY     - 20040630 GOOD             CADT
GU2612  HISTORY     - 20070823 GOOD             CADT
GU2612
GU2612                          STATION DESCRIPTION
GU2612
GU2612'DESCRIBED BY COAST AND GEODETIC SURVEY 1930 (GLB)
GU2612'IN HOLLISTER, ON CULTIVATED KNOLL, 615 FEET NORTH ALONG RIDGE
GU2612'FROM NORTH SIDE OF BUILDINGS WHICH COVER THE CITY RESERVOIR,
GU2612'AND ABOUT 20 METERS (66 FEET) WEST OF OLD FENCE LINE.  SURFACE
GU2612'AND UNDERGROUND MARKS ARE STANDARD STATION DISKS IN CONCRETE,
GU2612'NOTES 1A AND 7A.  SURFACE MARK PROJECTS 10 INCHES.  REFERENCE
GU2612'MARKS ARE STANDARD REFERENCE DISKS IN CONCRETE, NOTE 11A.  NO.
GU2612'1 IS IN FENCE LINE AND 48.100 METERS (157.81 FEET) FROM STATION
GU2612'IN AZIMUTH 297 DEG 18 MIN.  NO. 2 IS IN FENCE LINE AND 22.052
```

GU2612'METERS (72.35 FEET) FROM STATION IN AZIMUTH 42 DEG 34 MIN.
GU2612
GU2612 STATION RECOVERY (1951)
GU2612
GU2612'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1951 (LGT)
GU2612'THE STATION WAS RECOVERED AND ALL THE MARKS WERE FOUND IN
GU2612'GOOD CONDITION. THE AZIMUTHS TO THE REFERENCE MARKS WERE 180
GU2612'DEGREES IN ERROR FROM THE DATA IN SPECIAL PUBLICATION 202.
GU2612'THE 1930 DISTANCES WERE CHECKED BY MEASURING FROM MARK TO MARK
GU2612'WHICH IS A SLOPE DISTANCE. THERE IS NO NOTICEABLE DISPLACEMENT
GU2612'OF ANY OF THE MARKS. BENCH MARK B 698 WAS USED AS THE AZIMUTH
GU2612'MARK ON THIS DATE. A COMPLETE DESCRIPTION FOLLOWS.
GU2612'
GU2612'THE STATION IS LOCATED ON THE TOP OF A LOW GRASSY HILL ABOUT
GU2612'0.3 MILE NORTHWEST OF THE CENTER OF HOLLISTER. THE MARK IS
GU2612'A STANDARD STATION MARK DISK SET IN THE TOP OF A 12 INCH
GU2612'SQUARE CONCRETE POST THAT PROJECTS ABOUT 6 INCHES ABOVE THE
GU2612'SURROUNDING SURFACE. IT IS ABOUT 100 YARDS WEST OF A SMALL
GU2612'WHITE BUILDING ON THE TOP OF THE HILL, 45 FEET NORTH OF THE
GU2612'CENTER OF A TRACK ROAD, 10 FEET SOUTH OF THE CENTER OF A TRACK
GU2612'ROAD AND 5 FEET NORTHEAST OF A WHITE WITNESS POST. THE MARK
GU2612'IS STAMPED HOLLISTER 1930.
GU2612'
GU2612'THE UNDERGROUND MARK IS A STANDARD STATION MARK DISK SET IN
GU2612'CONCRETE 3 FEET BELOW THE GROUND SURFACE.
GU2612'
GU2612'REFERENCE MARK NUMBER 1 IS A STANDARD REFERENCE MARK DISK SET
GU2612'IN THE TOP OF A 12 INCH SQUARE CONCRETE POST THAT PROJECTS 1
GU2612'INCH ABOVE THE SURROUNDING SURFACE. IT IS ABOUT 15 FEET NORTH OF
GU2612'THE CENTER OF A TRACK ROAD AND ABOUT 7 FEET LOWER THAN THE
GU2612'STATION MARK. THE MARK IS STAMPED HOLLISTER NO 1 1930.
GU2612'
GU2612'REFERENCE MARK NUMBER 2 IS A STANDARD REFERENCE MARK DISK SET
GU2612'IN THE TOP OF A 12 INCH SQUARE CONCRETE POST THAT PROJECTS 1 INCH
GU2612'ABOVE THE SURROUNDING SURFACE. IT IS ABOUT 4 FEET LOWER THE
GU2612'THE STATION MARK AND STAMPED HOLLISTER NO 2 1930.
GU2612'
GU2612'BENCH MARK B 698 IS A STANDARD U.S.C. AND G.S. BENCH MARK DISK
GU2612'SET IN THE NORTHWEST CONCRETE ABUTMENT OF THE BRIDGE ACROSS THE
GU2612'SAN BENITO RIVER. IT IS 12 FEET NORTH OF THE CENTER LINE OF STATE
GU2612'HIGHWAY 156 AND 6 FEET WEST OF THE WEST END OF THE BRIDGE. THE
GU2612'MARK IS STAMPED B698 1943.
GU2612'
GU2612'TO REACH THE BENCH MARK FROM THE INTERSECTION OF SAN BENITO
GU2612'STREET AND FOURTH STREET IN HOLLISTER, GO WEST ON FOURTH
GU2612'STREET (STATE HIGHWAY 156) FOR 1.65 MILES TO THE WEST END
GU2612'OF THE BRIDGE ACROSS THE SAN BENITO RIVER AND THE BENCH MARK ON
GU2612'THE RIGHT AS DESCRIBED.
GU2612'
GU2612'TO REACH THE STATION FROM THE INTERSECTION OF SAN BENITO STREET
GU2612'AND FOURTH STREET IN HOLLISTER, GO NORTH ON SAN BENITO STREET
GU2612'FOR 0.1 MILE TO HILL STREET. TURN LEFT, WEST, ON HILL STREET
GU2612'FOR 0.1 MILE TO A 3 WAY FORK. TAKE THE CENTER FORK AND GO
GU2612'0.2 MILE TO THE STATION AS DESCRIBED. A DRIVE STATION.
GU2612'
GU2612'OBSERVATIONS WERE MADE FROM A 1.11 METERS TRIPOD.
GU2612
GU2612 STATION RECOVERY (1962)
GU2612
GU2612'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1962 (JCC)
GU2612'THE STATION MARK, REFERENCE MARKS 1 AND 2 WERE RECOVERED. THE
GU2612'STATION MARK WAS SLIGHTLY CHIPPED ON THE SOUTHEAST SIDE. HOWEVER,
GU2612'NO MOVEMENT WAS APPARENT. THE REFERENCE MARKS APPEARED TO BE IN
GU2612'THEIR ORIGINAL STATE. BENCH MARK B698 HAD BEEN MOVED TO A
GU2612'DIFFERENT LOCATION ON THE BRIDGE AND IS NO LONGER VISIBLE FROM

GU2612'THE STATION. A NEW AZIMUTH MARK WAS ESTABLISHED FOR
GU2612'TRIANGULATION STATION PICKET 1930 AND WAS ALSO USED FOR AN
GU2612'AZIMUTH MARK FOR THIS STATION. FOLLOWING IS A COMPLETE NEW
GU2612'DESCRIPTION.
GU2612'
GU2612'THE STATION IS ABOUT 1/4 MILE NORTHWEST OF THE CENTER OF HOLLISTER,
GU2612'ON THE SUMMIT OF A LOW GRASSY HILL, HAVING A SMALL GROWTH OF TREES
GU2612'NEAR THE EAST SLOPE AND ABOUT 100 YARDS WEST OF A SMALL WHITE
GU2612'BUILDING.
GU2612'
GU2612'TO REACH THE STATION FROM THE INTERSECTION OF SAN BENITO AND
GU2612'FOURTH STREETS IN HOLLISTER, GO NORTH ON SAN BENITO STREET
GU2612'FOR 0.1 MILE TO HILL STREET. TURN LEFT AND GO WEST ON HILL
GU2612'STREET FOR 0.1 MILE TO A 3-WAY FORK. TAKE THE CENTER FORK AND
GU2612'CONTINUE WESTERLY FOR 0.2 MILE TO THE STATION.
GU2612'
GU2612'THE STATION MARK IS A STANDARD DISK STAMPED HOLLISTER 1930
GU2612'SET IN THE TOP OF A CONCRETE POST PROJECTING 8 INCHES. IT IS
GU2612'3.3 FEET NORTH OF A WITNESS POST, 26 FEET NORTHEAST OF THE
GU2612'CENTERLINE OF A TRACK ROAD 12 FEET SOUTHWEST OF THE CENTERLINE
GU2612'OF A TRACK ROAD AND 26 FEET EAST-SOUTHEAST OF THE CENTERLINE
GU2612'OF A CURVE FORMED BY THE TWO ROADS.
GU2612'
GU2612'REFERENCE MARK 1 IS A STANDARD DISK STAMPED HOLLISTER NO 1 1930
GU2612'SET IN THE TOP OF A 12-INCH SQUARE CONCRETE POST PROJECTING 1
GU2612'INCH. IT IS 1 FOOT SOUTHEAST OF A FENCE, 30 FEET NORTHWEST
GU2612'OF THE CENTERLINE OF A LOOP FORMED BY A TRACK ROAD, 30.7 FEET
GU2612'WEST OF THE CENTERLINE OF A TRACK ROAD AND ABOUT 6 FEET LOWER
GU2612'THAN THE STATION.
GU2612'
GU2612'REFERENCE MARK 2 IS A STANDARD DISK STAMPED HOLLISTER NO 2 1930
GU2612'SET IN THE TOP OF A 12-INCH SQUARE CONCRETE POST PROJECTING 1 INCH.
GU2612'IT IS 66.1 FEET SOUTHWEST OF A FENCE, 60.7 FEET NORTHEAST OF THE
GU2612'CENTERLINE OF A TRACK ROAD AND ABOUT 4 FEET LOWER THAN THE
GU2612'STATION.
GU2612'
GU2612'THE AZIMUTH MARK IS A STANDARD DISK STAMPED PICKET 1951
GU2612'RESET 1961 CEMENTED IN A DRILL HOLE IN THE CONCRETE WALKWAY AT THE
GU2612'SOUTHEAST CORNER OF A BRIDGE SPANNING THE SAN BENITO RIVER AND
GU2612'15 FEET SOUTHWEST OF THE CENTERLINE OF STATE HIGHWAY 156. TO
GU2612'REACH THE MARK FROM THE INTERSECTION OF SAN BENITO AND FOURTH
GU2612'STREETS IN HOLLISTER GO WESTERLY ON STATE HIGHWAY 156 AND SAN
GU2612'BENITO STREET FOR 1.65 MILE TO THE MARK ON THE LEFT.
GU2612
GU2612 STATION RECOVERY (1966)
GU2612
GU2612'RECOVERY NOTE BY CA DIV OF HIGHWAYS 1966 (LDK)
GU2612'SURFACE MARK IS LYING ON ITS SIDE. SUB-SURFACE MARK IN GOOD
GU2612'CONDITION AND UNCOVERED FOR USE. TRIPOD LEFT OVER HOLE FOR
GU2612'PROTECTION.
GU2612
GU2612 STATION RECOVERY (1966)
GU2612
GU2612'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1966 (EHS)
GU2612'THE SURFACE STATION MARK WAS FOUND LYING ON TOP OF THE GROUND.
GU2612'THE UNDERGROUND STATION MARK WAS RECOVERED IN GOOD CONDITION
GU2612'18 INCHES BELOW THE SURFACE OF THE GROUND. THE POSITION WAS
GU2612'HELD, THE MARK WAS REMOVED, A NEW UNDERGROUND STATION MARK,
GU2612'STAMPED HOLLISTER 1930 1966 WAS SET 3 FEET BELOW THE SURFACE OF
GU2612'THE GROUND, AND A NEW SURFACE STATION MARK, STAMPED HOLLISTER
GU2612'1930 1966 WAS SET ABOVE IT, FLUSH WITH THE GROUND, AND 3.5
GU2612'FEET EAST OF A METAL WITNESS POST.
GU2612'
GU2612'REFERENCE MARK 1 (157.720 FT. (48.073 M.) WNW. OF THE STATION
GU2612'MARK) AND REFERENCE MARK 2 (72.264 FT. 22.026 M. NE. OF THE

GU2612'STATION MARK) WERE RECOVERED IN GOOD CONDITION.
GU2612'
GU2612'THE BRIDGE IN WHICH THE AZIMUTH MARK (BENCH MARK B 698) WAS
GU2612'SET HAS BEEN REMOVED AND REPLACED WITH A NEW STRUCTURE.
GU2612'
GU2612'THE PREVIOUS DESCRIPTIONS ARE ADEQUATE.
GU2612'
GU2612'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--AT HOLLISTER
GU2612
GU2612 STATION RECOVERY (1967)
GU2612
GU2612'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1967 (CND)
GU2612'THE STATION WAS RECOVERED AND ALL MARKS FOUND IN GOOD
GU2612'CONDITION.
GU2612'
GU2612'A COMPLETE NEW DESCRIPTION OF THE STATION FOLLOWS.
GU2612'
GU2612'THE STATION IS LOCATED ON PARK HILL ABOUT 1/4 MILE NORTHWEST
GU2612'OF THE CENTER OF HOLLISTER AND ABOUT 0.2 MILE NORTHWEST OF THE
GU2612'ENTRANCE TO SAN BENITO RANGER HEADQUARTERS OF THE CALIFORNIA
GU2612'DIVISION OF FORESTRY. THE PROPERTY IS OWNED BY THE CITY OF
GU2612'HOLLISTER.
GU2612'
GU2612'TO REACH THE STATION FROM THE COURTHOUSE IN HOLLISTER, GO EAST
GU2612'ON FIFTH STREET FOR 0.1 MILE TO SAN BENITO STREET. TURN LEFT
GU2612'AND GO NORTH ON SAN BENITO STREET FOR 0.15 MILE TO A SIDE ROAD
GU2612'LEFT. TURN LEFT AND GO WESTERLY UPHILL ON FURLONG ALLEY FOR
GU2612'0.1 MILE TO A FORK. KEEP LEFT AND CONTINUE WESTERLY ON A BLADED
GU2612'ROAD FOR 0.2 MILE TO THE HIGHEST POINT OF THE HILL AND THE
GU2612'STATION.
GU2612'
GU2612'THE STATION MARK IS A STANDARD DISK STAMPED HOLLISTER 1930
GU2612'1966, SET IN THE TOP OF A 12-INCH SQUARE CONCRETE MONUMENT
GU2612'WHICH IS FLUSH WITH THE SURFACE. IT IS 85 YARDS WEST OF A LARGE
GU2612'MUNICIPAL WATER TANK, 55 YARDS EAST OF A FENCE AND 3.1 FEET
GU2612'EAST OF A WITNESS POST. (NOTE 1A 7A)
GU2612'
GU2612'REFERENCE MARK 1 IS A STANDARD DISK STAMPED HOLLISTER NO 1
GU2612'1930, SET IN THE TOP OF A 12-INCH SQUARE CONCRETE MONUMENT WHICH
GU2612'PROJECTS 1-INCH. IT IS 121 FEET SOUTH OF A T-FENCE CORNER,
GU2612'63 FEET NORTH OF A T-FENCE CORNER AND 1.5 FEET EAST OF THE
GU2612'FENCE. (NOTE 11A)
GU2612'
GU2612'REFERENCE MARK 2 IS A STANDARD DISK STAMPED HOLLISTER NO 2
GU2612'1930, SET IN THE TOP OF A 12-INCH SQUARE CONCRETE MONUMENT WHICH
GU2612'PROJECTS 1-INCH. IT IS 75 YARDS WEST OF THE LARGE MUNICIPAL
GU2612'WATER TANK, 72.5 FEET NORTHEAST OF THE WITNESS POST AND 65 FEET
GU2612'SOUTH-SOUTHWEST OF A DILAPIDATED FENCE. (NOTE 11A)
GU2612'
GU2612'BENCH MARK B 698 IS A STANDARD DISK STAMPED B 698 RESET 1953,
GU2612'CEMENTED IN A DRILL HOLE IN THE SOUTHWEST ABUTMENT OF BRIDGE 43-07
GU2612'OVER THE SAN BENITO RIVER. IT IS 19 FEET NORTHWEST OF THE CENTER
GU2612'OF STATE HIGHWAY 156 AND ABOUT 3 FEET BELOW THE LEVEL OF THE
GU2612'HIGHWAY.
GU2612'
GU2612'TO REACH BENCH MARK B 698 FROM THE COURTHOUSE IN HOLLISTER,
GU2612'GO NORTH ON MONTEREY STREET FOR 1 BLOCK TO STATE HIGHWAY 156,
GU2612'TURN LEFT AND GO WESTERLY ON STATE HIGHWAY 156 FOR 1.6
GU2612'MILES TO THE SOUTHWEST EDGE OF THE BRIDGE AND THE MARK ON
GU2612'THE RIGHT.
GU2612
GU2612 STATION RECOVERY (1967)
GU2612
GU2612'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1967
GU2612'IN HOLLISTER.

GU2612'ON THE HIGHEST POINT OF PARK HILL, 0.2 MILE NORTHWEST OF THE
GU2612'ENTRANCE TO SAN BENITO RANGER HEADQUARTERS OF THE CALIFORNIA
GU2612'DIVISION OF FORESTRY, 85 YARDS WEST OF A LARGE MUNICIPAL WATER
GU2612'TANK, 55 YARDS EAST OF A FENCE, 3.1 FEET EAST OF A METAL WITNESS
GU2612'POST, AND SET IN THE TOP OF A 12-INCH SQUARE CONCRETE POST FLUSH
GU2612'WITH THE GROUND.
GU2612
GU2612 STATION RECOVERY (1973)
GU2612
GU2612'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1973 (LJW)
GU2612'RECOVERED THE STATION AND REFERENCE MARKS NOS. 1 AND 2 IN GOOD
GU2612'CONDITION AS DESCRIBED.
GU2612'
GU2612'HEIGHT OF LIGHT ABOVE STATION MARK 4.63 FEET.
GU2612'
GU2612'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN
GU2612'IN HOLLISTER.
GU2612
GU2612 STATION RECOVERY (1976)
GU2612
GU2612'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1976 (CLN)
GU2612'THE STATION MARK, PICKET AZIMUTH MARK 1961, AND REFERENCE MARKS 1
GU2612'AND 2 WERE RECOVERED IN GOOD CONDITION. SMALL DIFFERENCES WERE
GU2612'NOTED BETWEEN THE DISTANCES AND DIRECTIONS TO THE REFERENCE MARKS
GU2612'MEASURED ON THIS DATE AND THE PREVIOUS MEASUREMENTS AND THE
GU2612'DIRECTION TO PICKET AZIMUTH MARK 1961 MEASURED ON THIS DATE
GU2612'DIFFERED FROM THE DIRECTION MEASURED IN 1962 BY ABOUT 17 SECONDS.
GU2612'THE PREVIOUS DESCRIPTIONS ARE ADEQUATE WITH THE FOLLOWING
GU2612'ADDITIONS--
GU2612'
GU2612'THE STATION MARK IS 2.1 FEET NORTH OF A METAL WITNESS POST.
GU2612'
GU2612'STEEL REINFORCING BARS, 3/8-INCH IN DIAMETER AND 2-1/2-FEET
GU2612'LONG, WERE DRIVEN FLUSH WITH THE GROUND ON THE NORTH SIDES OF THE
GU2612'STATION MARK AND REFERENCE MARKS 1 AND 2.
GU2612'
GU2612'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN
GU2612'AT HOLLISTER.
GU2612
GU2612 STATION RECOVERY (1993)
GU2612
GU2612'RECOVERY NOTE BY CALTRANS 1993
GU2612'THE STATION MARK AND REFERENCE MARKS NO. 1 AND NO. 2 WERE RECOVERED. A
GU2612'COMPLETE NEW DESCRIPTION FOLLOWS.
GU2612'$
GU2612'THE STATION IS LOCATED IN THE CITY OF HOLLISTER AT THE WEST END OF
GU2612'HILL STREET IN VISTA PARK HILL.
GU2612'$
GU2612'TO REACH THE STATION FROM THE INTERSECTION OF SAN BENITO STREET (STATE
GU2612'HIGHWAY 156) AND 4TH STREET (STATE HIGHWAY 25) IN THE CITY OF
GU2612'HOLLISTER, GO NORTH ON SAN BENITO STREET (STATE HIGHWAY 25/156) FOR
GU2612'0.1 MI (0.2 KM) TO THE INTERSECTION WITH HILL STREET ON THE LEFT AND
GU2612'FURLONG ALLEY ON THE RIGHT. TURN LEFT AND GO WEST ON HILL STREET FOR
GU2612'0.1 MI (0.2 KM) TO A 4-WAY INTERSECTION. BEAR RIGHT AND ENTER VISTA
GU2612'PARK HILL, A CITY OF HOLLISTER PARK. TAKE THE RIGHT FORK (ONE WAY)
GU2612'NORTH-NORTHWEST INTO VISTA PARK HILL FOR ABOUT 0.1 MI (0.2 KM) TO A
GU2612'PARKING AREA NEAR A SOFTBALL FIELD BACKSTOP AND A LARGE STEEL WATER
GU2612'STORAGE TANK. PARK VEHICLE HERE AND PACK ABOUT 400 FT (121.9 M) WEST
GU2612'ACROSS THE PARK TO THE STATION AT THE HIGHEST POINT OF PARK HILL.
GU2612'$
GU2612'THE STATION IS 146 FT (44.5 M) EAST OF A T-FENCE CORNER (FENCE RUNS
GU2612'NORTH, SOUTH AND WEST) AND 38 FT (11.6 M) SOUTHEAST OF A USGS
GU2612'NATIONAL CENTER FOR EARTHQUAKE RESEARCH DISK STAMPED HOLLISTER ECC
GU2612'ENCASED IN PVC PIPE SURROUNDED BY A 3 FT (0.9 M) TRIANGULAR CONCRETE
GU2612'MONUMENT PROJECTING ABOUT 1 FT (0.3 M) ABOVE THE GROUND.

```
GU2612'$
GU2612'THE STATION WAS OCCUPIED AS PART OF A CALIFORNIA HPGN DENSIFICATION
GU2612'SURVEY.
GU2612
GU2612                          STATION RECOVERY (2004)
GU2612
GU2612'RECOVERY NOTE BY CALTRANS 2004 (RF)
GU2612'RECOVERED IN GOOD CONDITION.
GU2612
GU2612                          STATION RECOVERY (2007)
GU2612
GU2612'RECOVERY NOTE BY CALTRANS 2007 (GT)
GU2612'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.71
1        National Geodetic Survey,   Retrieval Date = SEPTEMBER 30, 2009
 GU3630 ***********************************************************************
 GU3630  DESIGNATION -  HOLLAIR
 GU3630  PID         -  GU3630
 GU3630  STATE/COUNTY-  CA/SAN BENITO
 GU3630  USGS QUAD   -  SAN FELIPE (1971)
 GU3630
 GU3630                        *CURRENT SURVEY CONTROL
 GU3630  ______________________________________________________________________
 GU3630* NAD 83(2007)-  36 53 35.79708(N)    121 24 06.40278(W)     ADJUSTED
 GU3630* NAVD 88     -        67.10   (meters)     220.1    (feet)  LEVELING
 GU3630  ______________________________________________________________________
 GU3630  EPOCH DATE  -        2007.00
 GU3630  X           - -2,661,004.107 (meters)                      COMP
 GU3630  Y           - -4,359,120.264 (meters)                      COMP
 GU3630  Z           -  3,807,948.162 (meters)                      COMP
 GU3630  LAPLACE CORR-          3.75  (seconds)                     DEFLEC99
 GU3630  ELLIP HEIGHT-         34.123 (meters)          (02/10/07) ADJUSTED
 GU3630  GEOID HEIGHT-        -32.94  (meters)                      GEOID03
 GU3630
 GU3630  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 GU3630  Type    PID    Designation                      North   East  Ellip
 GU3630  ----------------------------------------------------------------------
 GU3630  NETWORK GU3630 HOLLAIR                           2.43   5.14  17.93
 GU3630  ----------------------------------------------------------------------
 GU3630  VERT ORDER  -  THIRD ?
 GU3630
 GU3630.The horizontal coordinates were established by GPS observations
 GU3630.and adjusted by the National Geodetic Survey in February 2007.
 GU3630
 GU3630.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 GU3630.See National Readjustment for more information.
 GU3630.The horizontal coordinates are valid at the epoch date displayed above.
 GU3630.The epoch date for horizontal control is a decimal equivalence
 GU3630.of Year/Month/Day.
 GU3630
 GU3630.The orthometric height was determined by differential leveling.
 GU3630.The vertical network tie was performed by a horz. field party for horz.
 GU3630.obs reductions. Reset procedures were used to establish the elevation.
 GU3630
 GU3630.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 GU3630
 GU3630.The Laplace correction was computed from DEFLEC99 derived deflections.
 GU3630
 GU3630.The ellipsoidal height was determined by GPS observations
 GU3630.and is referenced to NAD 83.
 GU3630
 GU3630.The geoid height was determined by GEOID03.
 GU3630
 GU3630;                    North         East     Units Scale Factor Converg.
 GU3630;SPC CA 4     -   675,771.692 1,785,947.929   MT  0.99995162   -1 25 58.3
 GU3630;SPC CA 4     - 2,217,094.29  5,859,397.50   sFT  0.99995162   -1 25 58.3
 GU3630;SPC CA 3     -   544,034.321 1,919,617.140   MT  1.00004035   -0 33 07.6
 GU3630;SPC CA 3     - 1,784,885.93  6,297,943.90   sFT  1.00004035   -0 33 07.6
```

```
GU3630;UTM  10      - 4,084,225.871   642,407.163   MT  0.99984984   +0 57 34.6
GU3630
GU3630!             -  Elev Factor  x  Scale Factor =   Combined Factor
GU3630!SPC CA 4     -   0.99999464  x   0.99995162  =   0.99994627
GU3630!SPC CA 3     -   0.99999464  x   1.00004035  =   1.00003499
GU3630!UTM  10      -   0.99999464  x   0.99984984  =   0.99984449
GU3630
GU3630|----------------------------------------------------------------------|
GU3630| PID    Reference Object                      Distance      Geod. Az  |
GU3630|                                                            dddmmss.s |
GU3630| DA7693 HOLLAIR RM 1                          13.154 METERS 05510     |
GU3630| GU2638 R 738                                 21.575 METERS 17633     |
GU3630| GU3813 FREMONT PEAK TV STA KSBW MAST       APPROX.17.7 KM 2103708.9 |
GU3630| GU4284 HOLLAIR AZ MK                         445.142 METERS 2491136.1 |
GU3630|----------------------------------------------------------------------|
GU3630
GU3630                          SUPERSEDED SURVEY CONTROL
GU3630
GU3630  NAD 83(1992)-  36 53 35.78421(N)    121 24 06.39066(W) AD(1991.35) 1
GU3630  NAD 83(1992)-  36 53 35.78667(N)    121 24 06.38983(W) AD(1991.35) 1
GU3630  ELLIP H (11/17/92)   34.145  (m)                       GP(1991.35) 5 1
GU3630  NAD 83(1986)-  36 53 35.78806(N)    121 24 06.38876(W) AD(1984.00) 2
GU3630  NAD 27      -  36 53 35.97991(N)    121 24 02.63681(W) AD(       ) 2
GU3630  NGVD 29 (07/19/86)   66.95   (m)          219.7    (f) LEVELING    3
GU3630
GU3630.Superseded values are not recommended for survey control.
GU3630.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
GU3630.See file dsdata.txt to determine how the superseded data were derived.
GU3630
GU3630_U.S. NATIONAL GRID SPATIAL ADDRESS: 10SFF4240784226(NAD 83)
GU3630_MARKER: DS = TRIANGULATION STATION DISK
GU3630_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
GU3630_SP_SET: CONCRETE POST
GU3630_STAMPING: HOLLAIR 1962
GU3630_MARK LOGO: CGS
GU3630_MAGNETIC: O = OTHER; SEE DESCRIPTION
GU3630_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
GU3630+STABILITY: SURFACE MOTION
GU3630_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
GU3630+SATELLITE: SATELLITE OBSERVATIONS - May 04, 1992
GU3630
GU3630  HISTORY     - Date     Condition        Report By
GU3630  HISTORY     - 1962     MONUMENTED       CGS
GU3630  HISTORY     - 1962     GOOD             CGS
GU3630  HISTORY     - 1973     SEE DESCRIPTION  NGS
GU3630  HISTORY     - 19920504 GOOD             NGS
GU3630  HISTORY     - 19940615 GOOD             NGS
GU3630
GU3630                          STATION DESCRIPTION
GU3630
GU3630'DESCRIBED BY COAST AND GEODETIC SURVEY 1962 (JCC)
GU3630'THE STATION IS LOCATED ABOUT 2-1/2 MILES NORTH OF HOLLISTER,
GU3630'NEAR THE NORTHEAST CORNER OF THE HOLLISTER MUNICIPAL AIRPORT.
GU3630'
GU3630'TO REACH THE STATION FROM THE HOLLISTER POST OFFICE, GO WEST ON
GU3630'5TH. STREET FOR 2 BLOCKS.  THEN RIGHT, NORTH, ON STATE HIGHWAY
GU3630'156 FOR 2.6 MILES TO THE ENTRANCE TO THE AIRPORT ON THE LEFT.
GU3630'TURN LEFT, ENTER THE AIRPORT, THEN TURN RIGHT (NORTHERLY)
GU3630'FOR 0.3 MILE TO THE STATION.  TO REACH THE AZIMUTH MARK FROM THE
GU3630'STATION, FOLLOW THE MAIN RUNWAY WESTERLY FOR 0.25 MILE TO THE
GU3630'AZIMUTH MARK IN A RUNWAY LIGHT ON THE NORTH SIDE OF THE RUNWAY.
GU3630'
GU3630'THE STATION IS A STANDARD DISK STAMPED HOLLAIR 1962 SET ON THE
GU3630'TOP OF A 12 INCH SQUARE CONCRETE MONUMENT THAT PROJECTS 4
GU3630'INCHES.  IT IS 106 FEET WEST OF THE CENTER OF STATE HIGHWAY
```

GU3630'156, 79 FEET WEST-SOUTHWEST OF THE NORTHWEST FENCE CORNER OF
GU3630'THE AIRPORT, 37 FEET SOUTH OF THE CENTER OF A GRAVELED ROAD AND
GU3630'3.8 FEET EAST-SOUTHEAST OF A METAL WITNESS POST.
GU3630'
GU3630'REFERENCE MARK NO. 1 IS A STANDARD DISK STAMPED HOLLAIR NO 1
GU3630'1962 SET ON THE TOP OF A 12 INCH SQUARE CONCRETE MONUMENT THAT
GU3630'PROJECTS 6 INCHES. IT IS 37 FEET WEST OF THE FENCE CORNER,
GU3630'2 FEET SOUTH OF A WIRE FENCE AND AT ABOUT THE SAME ELEVATION
GU3630'AS THE STATION.
GU3630'
GU3630'BENCH MARK R 738 IS A STANDARD IRON DISK STAMPED R 738 1945
GU3630'CEMENTED IN A DRILL HOLE IN A CONCRETE FOUNDATION (4 FEET SQUARE)
GU3630'FOR THE BOUNDARY LIGHT AT THE NORTHEAST CORNER OF THE AIRPORT
GU3630'RUNWAY. IT IS ABOUT 115 FEET WEST OF THE CENTER OF HIGHWAY
GU3630'156, 84 FEET WEST OF THE WIRE FENCE AND 80 FEET SOUTH OF THE
GU3630'WIRE FENCE.
GU3630'
GU3630'THE AZIMUTH MARK IS A STANDARD DISK STAMPED HOLLAIR 1962 CEMENTED
GU3630'IN A DRILL HOLE IN A CONCRETE FOUNDATION (4 FEET SQUARE) FOR
GU3630'A BOUNDARY LIGHT ON THE NORTH SIDE OF THE RUNWAY. IT IS 108
GU3630'FEET EAST OF THE INTERSECTION OF A BLACK TOPPED ROAD WITH THE
GU3630'RUNWAY AND 94 FEET SOUTH-SOUTHEAST OF A FENCE CORNER. IT IS
GU3630'AT THE 7TH RUNWAY LIGHT WEST OF THE NORTHEAST CORNER OF THE
GU3630'RUNWAY.
GU3630
GU3630 STATION RECOVERY (1962)
GU3630
GU3630'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1962
GU3630'RECOVERED IN GOOD CONDITION.
GU3630
GU3630 STATION RECOVERY (1973)
GU3630
GU3630'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1973 (LJW)
GU3630'RECOVERED THE STATION, REFERENCE MARK NO. 2, AND THE AZIMUTH
GU3630'MARK IN GOOD CONDITION, AND THE DESCRIPTION IS ADEQUATE.
GU3630'REFERENCE MARK NO. 1 HAS BEEN REMOVED BY ROAD CONSTRUCTION.
GU3630'
GU3630'HEIGHT OF LIGHT ABOVE STATION MARK 3.82 FEET.
GU3630'
GU3630'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--2.5 MILES
GU3630'NE OF HOLLISTER
GU3630
GU3630 STATION RECOVERY (1992)
GU3630
GU3630'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
GU3630'STATION IS LOCATED ABOUT 5 KM (3.1 MI) NORTH OF HOLLISTER, IN THE
GU3630'NORTHEAST CORNER OF THE HOLLISTER MUNICIPAL AIRPORT, AT THE END OF
GU3630'RUNWAY 24. OWNERSHIP--CITY OF HOLLISTER, 375 FIFTH STREET,
GU3630'HOLLISTER, CA 95023. AIRPORT MANAGER IS ALLEN RITTER, PHONE
GU3630'408-637-7996 OR 637-8221.
GU3630'TO REACH FROM THE JUNCTION OF STATE HIGHWAYS 25 AND 156 ON THE NORTH
GU3630'SIDE OF HOLLISTER, GO NORTH ON HIGHWAY 156 FOR 2.76 KM (1.71 MI) TO
GU3630'THE AIRPORT ENTRANCE ON THE LEFT. TURN LEFT, WEST, ON PAVED ROAD FOR
GU3630'0.12 KM (0.07 MI) TO A SLANTED T-ROAD (OFFICE IS STRAIGHT AHEAD).
GU3630'TURN RIGHT, NORTHWEST, ON SKY LANE DRIVE FOR 0.23 KM (0.14 MI) TO A
GU3630'DRIVE ON THE LEFT JUST BEFORE REACHING A CABLE FENCE GAP. TURN LEFT,
GU3630'SOUTHWEST, BETWEEN BUILDINGS FOR 0.06 KM (0.04 MI) TO THE APRON. TURN
GU3630'RIGHT, NORTHWEST, ON APRON THEN RAMP FOR 0.10 KM (0.06 MI) TO THE
GU3630'PARALLEL TAXI. TURN RIGHT, NORTHEAST, ON TAXI FOR 0.36 KM (0.22 MI)
GU3630'TO THE RUNWAY END. PASS AROUND RUNWAY END FOR 0.06 KM (0.04 MI) TO
GU3630'THE STATION NEAR THE PERIMETER FENCE.
GU3630'STATION MARK IS SET IN THE TOP OF A 30-CM SQUARE CONCRETE POST
GU3630'PROJECTING 10 CM. POST IS BADLY CHIPPED BUT SOLID. IT IS 51.5 M
GU3630'(169.0 FT) NORTHWEST OF THE EXTENDED CENTER OF THE RUNWAY, 4.9 M
GU3630'(16.1 FT) EAST OF THE EAST CORNER OF A RECTANGULAR WELL CASING, 6.8 M

GU3630'(22.3 FT) SOUTHEAST OF THE PERIMETER FENCE, 7.9 M (25.9 FT)
GU3630'EAST-SOUTHEAST OF A PIPE GATEPOST ALONG ROAD ACROSS FENCE, 1.3 M
GU3630'(4.3 FT) EAST OF A METAL WITNESS POST AND 0.5 M (1.6 FT)
GU3630'WEST-NORTHWEST OF A FIBERGLASS WITNESS POST.
GU3630
GU3630 STATION RECOVERY (1994)
GU3630
GU3630'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1994
GU3630'THE STATION IS LOCATED AT THE HOLLISTER MUNI AIRPORT NORTH OF RUNWAY
GU3630'END 23. THE STATION IS LOCATED 171.0 FT (52.1 M) NNW OF CL END PAVING
GU3630'RWY 23, ABOUT 530 FT (161.5 M) NE OF A WINDSOCK, 25.5 FT (7.8 M) SE OF
GU3630'A 6 INCH DIA STEEL FENCE POST, AND 3.7 FT (1.1 M) E OF A METAL WITNESS
GU3630'POST. THE STATION IS A STANDARD USCGS TRIANGULAR DISK STAMPED HOLLAIR
GU3630'1962 AND SET IN THE TOP OF A 12 INCH SQUARE CONCRETE MONUMENT THAT
GU3630'PROJECTS 1.0 FT (0.3 M) ABOVE THE GROUND.

*** retrieval complete.
Elapsed Time = 00:00:00

Appendix B – City Of Hollister Vertical Control Data Sheets

MEMORANDUM

DATE: MARCH 18, 1992

TO: HOLLISTER AREA DEVELOPERS AND ENGINEERS

FROM: JIM PERRINE, ENGINEERING DEPARTMENT

SUBJECT: CITY OF HOLLISTER VERTICAL CONTROL WORK

As you know, the City of Hollister has been in the process of establishing uniform horizontal and vertical control networks. The vertical portion of the survey has been completed and consists of 36 bench marks. Attached is a list of these bench marks with Name, Elevation, and Description.

The Vertical Control Network Survey for the City of Hollister was established under the general guidelines of the Second Order Class I specifications as prepared by the Federal Geodetic Control Committee and as published by National Ocean Survey.

The vertical control is based on the existing Bench Mark C-1055, a 3" Brass Disc stamped "1967 Hollister USC&G", located at the base of the flagpole at the San Benito County Court House. The published elevation of C-1055 is 87.9440 meters. The conversion formula 12m/39.37 ft. was used to convert the elevation to 288.530 U. S. Survey Feet. Bench Mark C-1055 is based on an assumed datum.

All new projects will be required to be tied directly to this datum with one of the 36 primary bench marks shown on the plans. All projects currently in process which have a substantial amount of engineering done are requested to provide an equation to convert from the project datum to the City of Hollister datum.

Having all projects on the same vertical datum should prove beneficial to us all.

STATION	ELEVATION IN FEET (Assumed datum)	DESCRIPTION OF LOCATION
BM #1	278.610	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 1" set at the top of curb, located at the Northeast corner of the intersection of San Benito Street and Santa Ana Road, 1' South of the Catch Basin at the North end of the return.
BM #2	279.427	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 2", set at the top of curb, located at the Southeast corner of the intersection of Santa Ana Road and Recht Street at the West end of the return, adjacent to a Fire Hydrant.
BM #3	283.429	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 3", set in a 6" diameter, 3' deep Concrete Monument, located South of Santa Ana Road, 5' West and 5' North of a Fire Hydrant.
BM #4	291.026	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 4", set at the top of curb, located at the Northeast corner of the intersection of Santa Ana Road and Kane Street at the East end of the return.
BM #5	310.172	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 5", set at the top of curb, located at the Northeast corner of the intersection of Santa Ana Road and Daffodil Drive at the East end of the return.
BM #6	328.744	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 6", set at the top of the curb, located at the Northwest corner of the intersection of Santa Ana Road and Fairview Road, at the West end of the return.

BM #7	352.100	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 7", set at the top of curb, located at the Southwest corner of the intersection of Fairview Road and Meridian Street at the West end of the return.
BM #8	398.971	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 8", set at the top of the curb, located at the Southeast corner of the intersection of Sunnyslope Road and Holliday Drive, at the East end of the return, 1.0 feet East of a Catch Basin.
BM #9	424.869	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 9", set at the top of a 2' high, 2' diameter Concrete PAD WITH A WATER VALVE, LOCATED APPROXIMATELY 300 FEET SOUTH OF JOHN SMITH ROAD AND APPROXIMATELY 30' EAST OF FAIRVIEW ROAD.
BM #10	484.860	2 1/2" BRASS DISC, STAMPED CITY OF HOLLISTER BENCH MARK NO. 10", SET AT THE TOP OF CURB LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF FAIRVIEW ROAD AND CIELO VISTA AT THE NORTH END OF THE RETURN.
BM #11	390.834	2 1/2" BRASS DISC, STAMPED "CITY OF HOLLISTER BENCH MARK NO. 11", SET AT THE TOP OF CURB, LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF SUNNYSLOPE ROAD AND SUNNYSLOPE LANE, 1.0' EAST OF A CATCH BASIN.
BM #12	384.019	2 1/2" BRASS DISC, STAMPED "CITY OF HOLLISTER BENCH MARK NO. 12" SET AT THE TOP OF CURB, LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF SUNNYSLOPE ROAD AND CLEARVIEW DRIVE, 1.0' NORTH OF A CATCH BASIN AT THE SOUTH END OF THE RETURN.

BM #13	322.837	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 13", set at the top of curb, located at the Southeast corner of the intersection of Sunnyslope Road and Memorial Drive, 1.0' West of a Catch Basin at the East end of the return.
BM #14	309.375	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 14", set at the top of curb, located at the Southwest corner of the intersection of Nash Road and Southside Road, 1.0' South of Catch Basin at the South end of the return.
BM #15	303.757	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 15", set at the top of curb, located at the Southeast corner of the intersection of Nash Road and Prune Street, 1.0' West of a Catch Basin at the East end of the return.
BM #16	297.105	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 16", set at the top of curb, located at the Southeast corner of the intersection of Nash Road and Monterey Street, 1.0' West of a Catch Basin.
BM #17	292.304	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 17", set at the top of curb, located at the Southeast corner of the intersection of Monterey Street and "B" Street, adjacent to a Fire Hydrant.
BM #18	283.534	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 18", set at the top of curb, located at the Southeast corner of the intersection of Monterey Street and South Street, 1.0' East of a Catch Basin at mid-point of the curve.

BM #19	291.460	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 19", set at the top of curb, located at the Northwest corner of the intersection of Line Street and Nash Road.
BM #20	286.478	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 20", set at the top of curb, located at the Southwest corner of the intersection of Line Street and "B" Street, adjacent to a Fire Hydrant at the South end of the return.
BM #21	277.585	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 21", set at the top of curb, located at the Southwest corner of the intersection of Line Street and South Street, 1.0' East of a Catch Basin.
BM #22	281.706	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 22", set at the top of curb, located at the Northeast corner of the intersection of South Street and Summer Drive, adjacent to a Fire Hydrant at the East end of the return.
BM #23	276.321	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 23", set at the top of curb, located at the Northeast corner of the intersection of Line Street and Fourth Street, 1.0' North of a Catch Basin at the North end of the return.
BM #24	279.245	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 24", set at the top of curb, located at the Southwest corner of the intersection of Fourth Street and Rajkovich Way, 1.0' East of a Catch Basin at the West end of retun.

BM #25	271.536	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 25", set at the top of curb, located at the Northwest corner of the intersection of Graf Road and Bridge Road, adjacent to a Fire Hydrant and Lampolier at the North end of the return.
BM #26	248.873	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 26", set at the top of of the North end of a 0.5' x 8.0' high Concrete Headwall with a 24" R.C.P., located 5' North of San Juan - Hollister Road, adjacent to #2600 San Juan - Hollister Road.
BM #27	253.823	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 27", set at the top of a 10' x 10' x 3' high Concrete Easement for a Gate Valve, located approximately 100' Northwest of the Domestic Treatment Plant Station.
BM #28	268.515	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 28", set at the top of a 1' x 8' Concrete Headwall with a 24' R.C.P., located approximately 400' South and 50' East of the intersection of Highway #25 and Highway #156.
BM #29	256.889	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 29", set at the top of a 1' x 8' Concrete Headwall with a 24" R.C.P., located at the Northwest corner of the intersection of McCloskey Road and San Felipe Road (Highway #156 Frontage Road).
BM #30	237.385	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 30", set at the top of curb, located at the Southeast corner of the intersection of San Felipe Road and Park Center Drive, at the South end of the return.

BM #31	231.307	2 1/2" Brass Disc, stamped "City of Hollister Bench Mark No. 31", set at the top of curb, located at the Southeast corner of the intersection of San Felipe Road and Fallon Road, at the South end of the return.
BM C-1055	288.530	3" Brass Disc, stamped "1967 Hollister USC&G", set at the base of a Flagpole, located at San Benito County Court House.
Station Graff	273.259	2 1/2" Brass Disc set in Concrete, RCE 19764, located along the North side of Hwy. 156, 100 feet West of Graf Road, between Hwy. 156 and Bridge Road.
Station Hollair	217.407	3" Brass Disc in Concrete, USGS Station "HOLLAIR" at Northeast corner of Hollister Airport, North of the National Guard Building, East end of Taxiway.
Station Walnut	404.208	2 1/2" Brass Disc set in Concrete, RCE 18764, at the Southeast corner of Sunnyslope Road and Cerra Vista Avenue in the landscape area of the entry way into the Walnut Park Subdivision.
Station CDF	401.063	2 1/2" Brass Disc set in Concrete, RCE 18764, North side of driveway at end of return, into the Hollister Forest Fire Station, 1979 Fairview Avenue.

Appendix C – Coordinate Listing Of Surveyed Structures

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
101	2190498.91	5867901.89	435.44	SSMH	13.02	422.42	
102	2190531.67	5867828.06	434.24	SSMH	12.05	422.19	
103	2190552.48	5867745.56	432.73	SSMH	10.76	421.97	
104	2190567.25	5867534.89	428.98	SSMH	7.95	421.03	
105	2190626.24	5867284.82	424.28	SSMH	7.90	416.38	
106	2190857.29	5866976.52	416.53	SSMH	7.49	409.04	
107	2190994.49	5866796.78	411.88	SSMH	6.98	404.90	
108	2191135.79	5866610.00	410.31	SSMH	7.50	402.81	
109	2191467.97	5866170.56	407.55	SSMH	8.18	399.37	
110	2191306.76	5866383.06	408.77	SSMH	7.70	401.07	
111	2191763.21	5866184.37	405.86	SSMH	12.87	392.99	
112	2192086.38	5866459.63	413.32	SSMH	12.85	400.47	
113	2192043.49	5866196.33	405.33	SSMH	13.34	391.99	
114	2192055.08	5865936.78	397.99	SSMH	10.25	387.74	
115	2192059.45	5865823.43	394.78	SSMH	10.33	384.45	
116	2192023.51	5865646.23	390.07	SSMH	10.10	379.97	
117	2192064.43	5865407.71	386.01	SSMH	9.99	376.02	
118	2192174.41	5865277.71	383.79	SSMH	10.94	372.85	
119	2192288.53	5865153.59	381.58	SSMH	9.48	372.10	
120	2192494.97	5867944.27	435.32	SSMH	8.66	426.66	
121	2192519.10	5867623.57	437.81	SSMH	12.48	425.33	
122	2192540.28	5867344.47	434.41	SSMH	11.82	422.59	
123	2192562.02	5867048.07	431.01	SSMH	10.97	420.04	
124	2192579.72	5866827.46	424.07	SSMH	12.80	411.27	
125	2192595.91	5866607.44	413.52	SSMH	11.14	402.38	
126	2192612.72	5866396.33	408.78	SSMH	13.26	395.52	
127	2192619.92	5866294.02	406.89	SSMH	12.35	394.54	
128	2192565.96	5866117.12	403.51	SSMH	10.85	392.66	
129	2192511.53	5865954.66	400.23	SSMH	10.87	389.36	
130	2192520.76	5865778.21	393.93	SSMH	10.50	383.43	
131	2192506.12	5865676.12	391.59	SSMH	11.10	380.49	
132	2192449.15	5865581.60	389.57	SSMH	10.76	378.81	
133	2192380.99	5865404.97	385.65	SSMH	10.40	375.25	
134	2192455.11	5864989.01	380.36	SSMH	9.05	371.31	
135	2192631.03	5864910.36	379.71	SSMH	8.82	370.89	
136	2192697.04	5864911.72	379.28	SSMH	8.57	370.71	
137	2192904.83	5864866.14	378.97	SSMH	8.73	370.24	
138	2193109.30	5864736.16	378.66	SSMH	7.93	370.73	
139	2193280.52	5864684.35	377.58	SSMH	6.26	371.32	
140	2193154.67	5864698.37	378.17	SSMH	7.16	371.01	
141	2192992.12	5864812.65	379.48	SSMH	9.43	370.05	
142	2192857.47	5864604.64	375.68	SSMH	6.18	369.50	
143	2192872.21	5864422.79	372.75	SSMH	8.06	364.69	
144	2192973.03	5864357.19	370.97	SSMH	8.35	362.62	
145	2193143.38	5864253.33	368.54	SSMH	7.65	360.89	
146	2193340.34	5864141.27	366.24	SSMH	7.34	358.90	
147	2193627.11	5863992.57	362.63	SSMH	8.60	354.03	
148	2193943.31	5863832.58	358.41	SSMH	7.90	350.51	
149	2193951.94	5863737.22	346.63	SSMH	9.65	336.98	
150	2193983.55	5863249.08	330.28	SSMH	8.09	322.19	
151	2194008.89	5862951.32	327.95	SSMH	6.95	321.00	
152	2194025.18	5862929.18	327.61	SSMH	6.79	320.82	
153	2192793.33	5862867.17	331.50	SSMH	4.83	326.67	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
154	2192857.88	5862860.36	331.28	SSMH	7.14	324.14	Yes
155	2193278.05	5862888.69	330.63	SSMH	7.35	323.28	
156	2193705.40	5862915.34	329.94	SSMH	7.99	321.95	
157	2193952.29	5863649.48	335.12	SSMH	10.15	324.97	
158	2194085.59	5862160.65	325.92	SSMH	8.36	317.56	
159	2194148.32	5861355.53	323.09	SSMH	9.26	313.83	
160	2194455.07	5861374.37	322.52	SSMH	10.22	312.30	
161	2194774.23	5861395.85	321.67	SSMH	10.63	311.04	
162	2195092.58	5861416.63	320.34	SSMH	10.75	309.59	
163	2195402.37	5861437.44	319.62	SSMH	11.31	308.31	
164	2195701.33	5861457.35	319.06	SSMH	12.70	306.36	
165	2196045.45	5861480.12	318.25	SSMH	12.15	306.10	
166	2196276.13	5861495.49	316.58	SSMH	11.11	305.47	
167	2196384.34	5861502.24	316.15	SSMH	10.77	305.38	
168	2196553.19	5861517.09	314.97	SSMH	10.12	304.85	
169	2196737.52	5861527.54	313.36	SSMH	8.99	304.37	
170	2196774.80	5861494.65	312.73	SSMH	9.44	303.29	
171	2195718.44	5861273.67	310.70	SSMH	5.25	305.45	
172	2195792.23	5860151.12	308.43	SSMH	8.60	299.83	
173	2195771.51	5860447.46	308.71	SSMH	7.40	301.31	
174	2195769.55	5860454.00	308.62	SSMH	7.33	301.29	Yes
175	2196220.41	5860178.73	306.39	SSMH	8.55	297.84	
176	2196601.38	5860204.70	304.34	SSMH	8.78	295.56	
177	2196623.58	5859915.94	306.06	SSMH	12.29	293.77	
178	2196909.18	5859935.47	305.73	SSMH	14.80	290.93	
179	2197222.02	5859958.55	305.05	SSMH	14.96	290.09	
180	2197246.10	5859658.43	304.66	SSMH	15.30	289.36	
181	2194579.82	5868014.49	426.42	SSMH	6.91	419.51	
182	2194250.00	5868052.35	425.42	SSMH	7.68	417.74	
183	2193989.82	5868037.95	426.37	SSMH	7.41	418.96	
184	2193692.32	5868019.20	427.64	SSMH	6.39	421.25	
185	2193145.38	5867983.21	431.29	SSMH	8.04	423.25	
186	2194268.39	5867762.66	429.38	SSMH	13.03	416.35	
187	2194288.82	5867459.89	424.68	SSMH	9.79	414.89	
188	2195713.13	5864866.20	377.37	SSMH	5.66	371.71	
189	2195727.15	5865093.11	378.23	SSMH	5.39	372.84	
190	2195704.54	5865393.05	385.35	SSMH	6.07	379.28	
191	2195682.37	5865692.53	391.55	SSMH	6.39	385.16	
192	2195659.87	5865991.22	399.11	SSMH	6.09	393.02	
193	2195671.26	5866116.00	401.69	SSMH	6.95	394.74	
194	2195650.04	5866416.93	405.96	SSMH	6.88	399.08	
195	2195625.62	5866747.40	411.06	SSMH	7.05	404.01	
196	2195599.29	5867093.95	414.39	SSMH	5.17	409.22	
197	2195590.62	5867258.86	413.16	SSMH	3.48	409.68	
198	2194569.40	5867194.08	416.45	SSMH	3.88	412.57	
199	2194307.24	5867165.12	418.26	SSMH	4.98	413.28	
200	2196106.87	5864890.34	368.84	SSMH	7.96	360.88	
201	2196115.59	5864752.03	362.73	SSMH	5.30	357.43	
202	2196127.58	5864560.52	356.37	SSMH	5.57	350.80	
203	2196320.91	5864572.17	353.79	SSMH	6.82	346.97	
204	2196594.88	5864589.56	349.58	SSMH	5.56	344.02	
205	2196621.88	5864231.10	338.74	SSMH	4.77	333.97	
206	2196402.48	5863913.17	337.67	SSMH	5.39	332.28	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
207	2196644.09	5863929.56	333.41	SSMH	5.97	327.44	
208	2196677.97	5863931.58	332.85	SSMH	6.20	326.65	
209	2196942.11	5863949.54	327.14	SSMH	6.17	320.97	
210	2197308.49	5869514.58	394.36	SSMH	14.78	379.58	
211	2197575.33	5869527.88	389.74	SSMH	11.17	378.57	
212	2197852.41	5869535.19	387.44	SSMH	9.96	377.48	
213	2198095.96	5869541.94	386.85	SSMH	10.39	376.46	
214	2198949.48	5869244.44	374.19	SSMH	10.65	363.54	
215	2198622.62	5869236.55	377.42	SSMH	10.27	367.15	
216	2198324.15	5869230.87	383.66	SSMH	10.98	372.68	
217	2198133.34	5869201.79	387.55	SSMH	12.52	375.03	
218	2198956.88	5869083.24	374.25	SSMH	11.52	362.73	Yes
219	2199207.10	5869088.91	374.95	SSMH	13.79	361.16	Yes
220	2199467.99	5869096.45	367.79	SSMH	10.97	356.82	
221	2199732.30	5869102.36	363.16	SSMH	9.15	354.01	
222	2199739.76	5869042.30	361.80	SSMH	8.22	353.58	
223	2200142.58	5866298.38	333.67	SSMH	7.49	326.18	
224	2200123.48	5866544.41	340.01	SSMH	6.72	333.29	
225	2199953.50	5868715.31	363.45	SSMH	12.49	350.96	
226	2199916.56	5869060.78	358.66	SSMH	6.01	352.65	
227	2201672.13	5866399.05	322.14	SSMH	5.37	316.77	
228	2201400.51	5866380.92	324.47	SSMH	6.34	318.13	
229	2200981.85	5866353.89	326.57	SSMH	6.33	320.24	
230	2200561.28	5866326.67	329.39	SSMH	6.40	322.99	
231	2201687.58	5866216.90	317.99	SSMH	6.29	311.70	
232	2201937.42	5862896.24	286.03	SSMH	6.84	279.19	
233	2201924.39	5862932.77	285.94	SSMH	10.55	275.39	
234	2201923.95	5862946.29	285.88	SSMH	10.60	275.28	
235	2201907.63	5863157.26	286.43	SSMH	10.92	275.51	
236	2201898.55	5863412.83	287.70	SSMH	6.72	280.98	
237	2201890.89	5863386.92	287.22	SSMH	11.47	275.75	
238	2201868.32	5863685.57	288.22	SSMH	12.08	276.14	
239	2201871.49	5863762.86	288.66	SSMH	6.81	281.85	
240	2201837.24	5863986.35	287.88	SSMH	11.37	276.51	
241	2197323.99	5862509.26	310.19	SSMH	5.00	305.19	
242	2197291.96	5863021.87	309.48	SSMH	2.95	306.53	
243	2197270.51	5863299.34	310.48	SSMH	3.07	307.41	
244	2197248.30	5863586.01	317.49	SSMH	8.88	308.61	
245	2197215.42	5863968.00	321.69	SSMH	6.07	315.62	
246	2197172.62	5864568.71	340.21	SSMH	7.74	332.47	
247	2197163.12	5864696.71	342.66	SSMH	7.70	334.96	
248	2197144.50	5864941.56	346.44	SSMH	6.56	339.88	
249	2197113.40	5865347.16	355.07	SSMH	5.65	349.42	
250	2197103.82	5865475.08	359.00	SSMH	6.04	352.96	
251	2197080.03	5865788.89	367.54	SSMH	5.15	362.39	
252	2197049.35	5866204.96	383.47	SSMH	5.80	377.67	
253	2197029.55	5866477.30	390.27	SSMH	6.27	384.00	
254	2197010.46	5866748.94	396.21	SSMH	6.09	390.12	
255	2196987.44	5867047.37	397.28	SSMH	4.57	392.71	
256	2196964.33	5867247.80	400.22	SSMH	5.60	394.62	
257	2196950.99	5867441.02	404.81	SSMH	9.20	395.61	
258	2197244.27	5863969.83	321.53	SSMH	6.41	315.12	
259	2197270.67	5863599.43	317.31	SSMH	7.45	309.86	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
260	2197314.41	5862723.82	309.80	SSMH	4.09	305.71	
261	2197326.71	5862566.50	310.23	SSMH	4.75	305.48	
262	2197339.06	5862425.68	310.71	SSMH	5.70	305.01	
263	2197353.01	5862482.42	310.52	SSMH	6.65	303.87	
264	2197532.80	5860187.21	305.00	SSMH	6.62	298.38	
265	2197526.22	5859974.55	305.02	SSMH	7.68	297.34	
266	2197498.70	5859981.58	305.03	SSMH	7.61	297.42	
267	2197549.09	5859673.62	303.51	SSMH	8.00	295.51	
268	2197521.65	5859678.98	303.68	SSMH	14.83	288.85	
269	2197579.44	5859271.14	301.84	SSMH	8.45	293.39	
270	2197611.47	5858851.56	298.94	SSMH	8.31	290.63	
271	2197621.56	5858720.09	298.43	SSMH	8.50	289.93	
272	2197858.97	5855618.98	290.94	SSMH	12.31	278.63	
273	2197878.32	5855619.18	291.33	SSMH	12.64	278.69	Yes
274	2197838.27	5855899.71	290.81	SSMH	11.40	279.41	
275	2197831.91	5855984.76	290.49	SSMH	10.77	279.72	
276	2197803.98	5856355.10	290.22	SSMH	9.59	280.63	
277	2197800.05	5856405.28	290.45	SSMH	9.65	280.80	
278	2197775.63	5856725.20	290.98	SSMH	9.35	281.63	
279	2197747.34	5857088.58	291.91	SSMH	9.40	282.51	
280	2197725.45	5857378.65	291.54	SSMH	8.37	283.17	
281	2197702.26	5857667.42	294.61	SSMH	10.56	284.05	
282	2197682.23	5857931.87	295.89	SSMH	10.50	285.39	
283	2197663.12	5858181.01	297.16	SSMH	10.29	286.87	
284	2197642.77	5858447.89	297.84	SSMH	9.37	288.47	
285	2197470.62	5860449.35	303.42	SSMH	4.55	298.87	
286	2197439.82	5860843.54	305.69	SSMH	6.01	299.68	
287	2197409.50	5861241.06	307.55	SSMH	6.76	300.79	
288	2197384.61	5861534.32	309.53	SSMH	8.00	301.53	
289	2197390.20	5862008.38	309.62	SSMH	7.28	302.34	Yes
290	2197374.45	5862014.46	310.37	SSMH	6.55	303.82	
291	2197405.30	5861834.74	309.94	SSMH	7.98	301.96	
292	2197427.01	5861577.47	310.30	SSMH	9.03	301.27	
293	2197454.89	5861245.07	307.97	SSMH	7.11	300.86	
294	2197478.28	5860935.21	306.83	SSMH	6.71	300.12	
295	2197506.29	5860563.19	303.81	SSMH	5.02	298.79	
296	2197522.38	5860344.57	303.96	SSMH	5.42	298.54	
297	2197486.04	5860830.42	305.63	SSMH	5.89	299.74	
298	2202204.38	5859855.36	283.04	SSMH	11.48	271.56	
299	2202148.35	5860166.91	282.96	SSMH	10.97	271.99	
300	2202093.46	5860505.42	282.95	SSMH	10.59	272.36	
301	2202076.82	5860765.43	283.64	SSMH	10.95	272.69	
302	2202063.30	5861014.12	284.55	SSMH	11.64	272.91	
303	2202048.80	5861237.04	284.16	SSMH	11.00	273.16	
304	2202028.73	5861522.56	285.01	SSMH	11.50	273.51	
305	2202006.35	5861821.93	284.10	SSMH	10.10	274.00	
306	2201987.69	5862084.74	284.92	SSMH	10.68	274.24	
307	2201947.12	5862634.28	286.33	SSMH	11.44	274.89	Yes
308	2201957.18	5862648.95	286.70	SSMH	8.39	278.31	
309	2201813.71	5864286.54	287.13	SSMH	10.32	276.81	
310	2201833.04	5864272.41	287.54	SSMH	3.94	283.60	
311	2201792.25	5864577.64	288.57	SSMH	11.18	277.39	
312	2201798.30	5864719.36	290.34	SSMH	4.88	285.46	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
313	2201770.58	5864864.35	290.60	SSMH	12.80	277.80	
314	2201778.04	5864989.72	291.85	SSMH	4.26	287.59	
315	2201758.79	5865254.78	296.25	SSMH	6.55	289.70	
316	2201741.40	5865244.89	295.88	SSMH	18.46	277.42	Yes
317	2201739.60	5865537.00	301.97	SSMH	5.91	296.06	
318	2201706.43	5865937.70	309.33	SSMH	6.40	302.93	
319	2203442.26	5863390.01	284.71	SSMH	8.16	276.55	
320	2203407.52	5863858.64	284.79	SSMH	6.95	277.84	
321	2203479.48	5862883.42	283.99	SSMH	8.52	275.47	
322	2203501.42	5862592.68	281.78	SSMH	7.11	274.67	
323	2200407.83	5862521.16	293.33	SSMH	10.09	283.24	
324	2200387.50	5862806.48	293.61	SSMH	9.79	283.82	
325	2200370.09	5863036.34	294.26	SSMH	10.12	284.14	
326	2200349.55	5863307.18	294.43	SSMH	9.80	284.63	
327	2200351.99	5863279.34	294.33	SSMH	9.80	284.53	
328	2200330.47	5863572.53	295.70	SSMH	10.75	284.95	
329	2200318.48	5863767.02	296.16	SSMH	11.04	285.12	
330	2200286.96	5864227.70	295.55	SSMH	7.97	287.58	Yes
331	2200281.62	5864229.40	295.40	SSMH	6.69	288.71	
332	2200255.64	5864579.36	295.98	SSMH	4.35	291.63	
333	2200232.88	5864883.75	303.18	SSMH	8.01	295.17	
334	2200208.93	5865228.72	310.55	SSMH	7.75	302.80	
335	2200187.20	5865562.43	317.79	SSMH	7.83	309.96	
336	2200152.35	5865970.71	325.54	SSMH	8.45	317.09	
337	2200158.28	5866121.31	328.94	SSMH	8.30	320.64	
338	2200100.55	5866838.32	346.44	SSMH	11.10	335.34	
339	2200075.27	5867161.79	350.09	SSMH	12.86	337.23	
340	2200046.69	5867526.66	342.84	SSMH	3.44	339.40	
341	2200025.96	5867784.17	351.36	SSMH	7.47	343.89	
342	2200004.75	5868058.75	364.94	SSMH	17.15	347.79	
343	2199981.40	5868358.81	364.91	SSMH	15.72	349.19	
344	2200709.80	5859181.05	285.18	SSMH	11.84	273.34	
345	2200734.68	5859181.17	285.04	SSMH	12.17	272.87	Yes
346	2200725.17	5859157.61	285.51	SSMH	9.18	276.33	Yes
347	2200722.15	5859207.16	285.10	SSMH	8.90	276.20	
348	2200716.18	5859324.32	285.58	SSMH	8.20	277.38	Yes
349	2200702.48	5859416.17	285.73	SSMH	11.79	273.94	
350	2200666.22	5859962.60	290.96	SSMH	15.03	275.93	
351	2200633.02	5860310.92	291.85	SSMH	14.85	277.00	Yes
352	2200617.13	5860543.38	291.93	SSMH	14.54	277.39	
353	2200562.28	5861204.33	292.25	SSMH	12.35	279.90	Yes
354	2200475.55	5861708.11	292.62	SSMH	11.10	281.52	
355	2200457.88	5861927.51	293.34	SSMH	11.27	282.07	Yes
356	2203553.18	5861921.00	281.21	SSMH	8.31	272.90	
357	2203572.06	5861666.69	280.54	SSMH	8.33	272.21	
358	2203582.70	5861522.78	280.15	SSMH	8.31	271.84	
359	2203607.76	5861206.13	279.66	SSMH	8.64	271.02	
360	2203745.48	5859341.48	279.23	SSMH	12.29	266.94	
361	2203724.51	5859617.26	277.71	SSMH	10.21	267.50	
362	2203703.70	5859895.44	277.86	SSMH	9.85	268.01	Yes
363	2203682.32	5859888.10	277.70	SSMH	?	?	
364	2203675.90	5860269.90	277.03	SSMH	8.05	268.98	
365	2203641.45	5860730.28	278.72	SSMH	8.53	270.19	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
366	2203612.40	5861124.48	279.61	SSMH	8.65	270.96	
367	2207145.55	5859958.95	263.53	SSMH	10.94	252.59	
368	2207175.39	5859559.91	262.99	SSMH	11.89	251.10	
369	2192759.90	5864497.31	374.40	SSMH	5.24	369.16	
370	2192806.21	5864466.91	373.79	SSMH	4.89	368.90	
371	2203159.56	5859862.97	279.47	SSMH	4.50	274.97	
372	2202631.77	5859835.47	281.04	SSMH	4.80	276.24	
373	2202567.97	5859831.82	281.32	SSMH	3.62	277.70	
374	2202587.46	5859869.03	281.30	SSMH	10.35	270.95	
375	2202605.35	5859562.26	282.54	SSMH	11.97	270.57	
376	2202601.40	5859260.55	284.35	SSMH	14.50	269.85	
377	2202621.45	5859262.51	284.58	SSMH	14.52	270.06	
378	2202992.01	5859283.67	283.84	SSMH	3.72	280.12	
379	2202983.51	5859302.43	283.26	SSMH	17.11	266.15	
380	2202953.72	5859300.61	284.16	SSMH	4.82	279.34	
381	2202863.54	5859275.23	283.56	SSMH	13.13	270.43	
382	2202942.70	5855527.83	276.61	SSMH	12.58	264.03	Yes
383	2202956.71	5855562.81	277.32	SSMH	13.25	264.07	
384	2202937.67	5855831.16	277.91	SSMH	10.19	267.72	
385	2202932.28	5855885.08	278.19	SSMH	13.65	264.54	
386	2202911.78	5856284.52	279.37	SSMH	14.17	265.20	
387	2202893.08	5856650.17	280.62	SSMH	15.09	265.53	
388	2202874.53	5857013.88	283.00	SSMH	16.97	266.03	
389	2202859.12	5857313.35	285.44	SSMH	18.98	266.46	
390	2202853.17	5857370.39	286.02	SSMH	?	?	
391	2202794.57	5857369.34	285.68	SSMH	18.88	266.80	
392	2202765.03	5857903.95	287.97	SSMH	20.39	267.58	
393	2202669.41	5857919.54	287.57	SSMH	20.04	267.53	
394	2202649.02	5858272.32	290.84	SSMH	22.59	268.25	
395	2202625.78	5858676.16	288.44	SSMH	19.70	268.74	
396	2202610.95	5859018.30	285.57	SSMH	16.17	269.40	
397	2203984.42	5855888.99	277.94	SSMH	4.20	273.74	
398	2203923.22	5855885.50	277.34	SSMH	4.56	272.78	
399	2203722.57	5855874.06	277.89	SSMH	6.26	271.63	
400	2203448.20	5855858.91	277.98	SSMH	7.70	270.28	
401	2203197.44	5855845.36	278.59	SSMH	9.60	268.99	Yes
402	2202667.71	5855815.82	276.78	SSMH	10.70	266.08	
403	2202664.48	5855812.47	276.77	SSMH	11.47	265.30	
404	2202230.54	5855798.06	276.82	SSMH	11.64	265.18	
405	2202042.43	5855788.43	277.53	SSMH	12.13	265.40	Yes
406	2202037.47	5855783.66	277.52	SSMH	11.69	265.83	
407	2201855.88	5855772.45	277.74	SSMH	11.35	266.39	
408	2201630.27	5855746.69	278.48	SSMH	14.82	263.66	
409	2201580.72	5855758.4	278.58	SSMH	11.30	267.28	
410	2201272.47	5855729.17	278.26	SSMH	14.32	263.94	
411	2201303.13	5855744.43	278.57	SSMH	10.04	268.53	
412	2200943.92	5855726.73	277.9	SSMH	7.89	270.01	
413	2200935.14	5855843.08	277.54	SSMH	6.35	271.19	
414	2200491.57	5855810.88	279.73	SSMH	7.49	272.24	
415	2198172.88	5855642.32	290.45	SSMH	12.50	277.95	
416	2198242.14	5855646.52	290.3	SSMH	12.37	277.93	
417	2198616.57	5855673.71	288.43	SSMH	11.47	276.96	Yes
418	2198990.95	5855701.73	286.96	SSMH	10.85	276.11	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
419	2199096.85	5855709.73	286.96	SSMH	11.15	275.81	
420	2199349.24	5855727.16	286.48	SSMH	11.39	275.09	
421	2199369.34	5855728.98	286.66	SSMH	11.42	275.24	
422	2199742.66	5855756	285.55	SSMH	11.33	274.22	
423	2200115.88	5855783.49	282.64	SSMH	9.25	273.39	
424	2201243.58	5856279.99	277.79	SSMH	12.74	265.05	
425	2201216.29	5856775.42	275.82	SSMH	10.39	265.43	
426	2201231.03	5856778.64	275.93	SSMH	8.52	267.41	
427	2201187.52	5857275.1	272.84	SSMH	6.28	266.56	Yes
428	2201157.03	5857844.96	282.75	SSMH	14.85	267.90	Yes
429	2201131.94	5858331.94	284.2	SSMH	14.40	269.80	
430	2201104.68	5858940.79	284.57	SSMH	13.39	271.18	
431	2201088.01	5859199.15	283.86	SSMH	12.00	271.86	
432	2200912.46	5859190.44	284.14	SSMH	11.50	272.64	
433	2201419.43	5856788.04	276.41	SSMH	8.45	267.96	5.67 Drop ?
434	2201800.34	5856807.6	276.78	SSMH	9.74	267.04	
435	2201988.99	5856817.1	277.23	SSMH	10.43	266.80	
436	2202005.55	5856492.47	276.89	SSMH	10.55	266.34	
437	2202022.64	5856168.52	277.5	SSMH	11.55	265.95	
438	2201651.66	5855413.57	279.61	SSMH	16.15	263.46	Yes
439	2198152.99	5859702.05	299.85	SSMH	5.77	294.08	
440	2198131.49	5859696.97	299.89	SSMH	12.74	287.15	
441	2198514.39	5859715.93	297.84	SSMH	11.60	286.24	
442	2198974.63	5859742.29	295.12	SSMH	10.20	284.92	
443	2199429.96	5859765.81	292.84	SSMH	9.23	283.61	
444	2199993.29	5859791.15	290.37	SSMH	9.27	281.10	
445	2200015.85	5859426.12	290.12	SSMH	10.95	279.17	Yes
446	2200029.2	5859158.46	289.19	SSMH	11.40	277.79	
447	2200374.16	5859174.78	286.94	SSMH	11.05	275.89	
448	2203954.99	5856283.53	278.75	SSMH	3.99	274.76	
449	2203935.93	5856529.1	279.75	SSMH	4.07	275.68	
450	2203917.76	5856765.4	281.27	SSMH	4.83	276.44	
451	2197812.44	5857095.85	292.18	SSMH	5.64	286.54	
452	2198109.52	5857110.94	290.46	SSMH	5.88	284.58	
453	2198907.91	5857150.99	283.45	SSMH	4.34	279.11	
454	2198937.5	5857152.59	283.16	SSMH	4.27	278.89	
455	2199301.18	5857171.13	280.16	SSMH	3.61	276.55	
456	2199603.16	5857186.06	278.3	SSMH	3.52	274.78	
457	2199716.16	5857191.8	277.72	SSMH	3.74	273.98	
458	2199904.59	5857201.29	277.02	SSMH	4.14	272.88	
459	2200085.83	5857210.25	275.76	SSMH	4.15	271.61	
460	2200206.62	5857216.5	275.02	SSMH	4.24	270.78	
461	2200241.21	5857218.18	274.86	SSMH	4.06	270.80	
462	2200472.62	5857229.69	273.57	SSMH	3.51	270.06	
463	2200507.45	5857231.6	273.49	SSMH	3.38	270.11	
464	2200605.85	5857236.4	272.81	SSMH	2.90	269.91	
465	2200619.71	5857232.83	272.94	SSMH	5.35	267.59	
466	2200800.32	5857246.05	272.79	SSMH	3.53	269.26	
467	2200809.19	5857246.41	272.99	SSMH	3.64	269.35	
468	2200982.63	5857837.25	283.53	SSMH	9.35	274.18	
469	2200783.03	5857827.17	284.46	SSMH	9.18	275.28	
470	2200676.76	5857821.9	284.22	SSMH	8.53	275.69	
471	2200385.63	5857807.15	284.46	SSMH	7.32	277.14	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
472	2200089.69	5857791.85	284.89	SSMH	6.32	278.57	
473	2199542.36	5857764.08	287.25	SSMH	5.83	281.42	
474	2199209.8	5857747.33	288.64	SSMH	5.47	283.17	
475	2198872.78	5857730.17	290.29	SSMH	5.21	285.08	
476	2198326.58	5857702.65	292.38	SSMH	4.56	287.82	
477	2198049.15	5857688.68	293.4	SSMH	4.25	289.15	
478	2197779.5	5857675.15	294.64	SSMH	3.92	290.72	
479	2205989.49	5860173	268.79	SSMH	11.11	257.68	
480	2214304.73	5859913.74	233.11	SSMH	21.20	211.91	
481	2214650.03	5860436.91	229.12	SSMH	15.29	213.83	
482	2214764.09	5860605.9	228.8	SSMH	14.59	214.21	
483	2214995.2	5860955.25	227.99	SSMH	12.84	215.15	
484	2215327.73	5861454.84	227.24	SSMH	10.50	216.74	
485	2215466.57	5861665.33	227.11	SSMH	9.58	217.53	
486	2217498.12	5860598.97	215.55	SSMH	7.95	207.60	
487	2217427.01	5859932.5	215.21	SSMH	8.92	206.29	
488	2217069.32	5859969.97	215.8	SSMH	10.38	205.42	
489	2216717.23	5860006.45	217.69	SSMH	13.54	204.15	
490	2213012.71	5857236.92	234.9	SSMH	9.80	225.10	
491	2212970.18	5857835.11	235.29	SSMH	7.91	227.38	
492	2212949.76	5858099.95	235.81	SSMH	7.48	228.33	
493	2214417.07	5857345.77	226.13	SSMH	15.49	210.64	
494	2214085.67	5857319.95	227.5	SSMH	15.90	211.60	
495	2213795.81	5857297.85	228.61	SSMH	10.65	217.96	
496	2213547.9	5857279.01	229.71	SSMH	7.28	222.43	
497	2213248.97	5857254.84	230.78	SSMH	6.78	224.00	
498	2214710.49	5857361.61	226.45	SSMH	16.74	209.71	
499	2214771.83	5857383.78	225.75	SSMH	16.29	209.46	
500	2215014.09	5857478.7	225.62	SSMH	16.63	208.99	
501	2215288.81	5857585.92	224.33	SSMH	15.86	208.47	
502	2215561.84	5857692.76	222.95	SSMH	15.26	207.69	
503	2215836.83	5857800.29	222.37	SSMH	15.50	206.87	
504	2215975.42	5857986.25	221.26	SSMH	15.06	206.20	
505	2216154.55	5858231.26	220.48	SSMH	14.68	205.80	
506	2216330.63	5858471.43	220.44	SSMH	15.27	205.17	
507	2216616.89	5859282.84	219.45	SSMH	16.02	203.43	
508	2216544.8	5859187.99	219.71	SSMH	16.00	203.71	
509	2216669.6	5859503.58	219.81	SSMH	17.05	202.76	Yes
510	2216683.51	5859671.86	219.06	SSMH	15.27	203.79	
511	2214895.62	5859857.45	224.59	SSMH	14.59	210.00	
512	2212541.87	5859757.03	237.28	SSMH	11.31	225.97	
513	2212126.39	5859726.61	238.75	SSMH	10.50	228.25	
514	2209895.52	5859575.96	249.29	SSMH	10.83	238.46	
515	2209846.16	5859572.28	249.5	SSMH	10.94	238.56	Yes
516	2209563.36	5859546.75	251.74	SSMH	11.78	239.96	
517	2209318.04	5859529.23	252.24	SSMH	11.15	241.09	
518	2208843.47	5859494.91	254.86	SSMH	11.26	243.60	
519	2208592.69	5859477.68	256.08	SSMH	11.68	244.40	
520	2212797.29	5859767.51	236.53	SSMH	12.08	224.45	
521	2213303.37	5859817.54	233.64	SSMH	11.95	221.69	
522	2213804.09	5859865.81	232.89	SSMH	14.38	218.51	
523	2205320.93	5859229.8	271.26	SSMH	9.80	261.46	
524	2206767.41	5859324.1	264.68	SSMH	11.58	253.10	

Pt No	Northing	Easting	Rim Elevation	Desc	Depth	Invert	Drop
525	2207191.75	5859350.87	262.6	SSMH	10.91	251.69	
526	2206046.86	5859276.79	267.52	SSMH	12.43	255.09	
527	2202423.16	5855807.86	276.50	SSMH	11.66	264.84	
528	2202461.55	5855801.78	276.17	SSMH	12.02	264.15	
529	2202493.21	5855490.53	276.60	SSMH	13.25	263.35	
530	2202491.95	5855501.89	276.43	SSMH	13.34	263.09	
531	2202563.12	5854550.43	279.99	SSMH	17.92	262.07	
532	2202616.50	5853864.19	278.46	SSMH	17.43	261.03	
533	2202658.81	5853320.78	274.98	SSMH	14.82	260.16	
534	2202721.05	5852502.41	272.90	SSMH	13.93	258.97	
535	2202729.46	5852501.75	272.65	SSMH	13.94	258.71	
536	2202773.40	5852026.88	272.82	SSMH	16.03	256.79	
537	2202636.83	5853139.96	273.51	SSMH	13.82	259.69	
538	2202603.77	5853611.92	279.56	SSMH	19.49	260.07	
539	2202522.73	5854068.37	279.05	SSMH	18.24	260.81	
540	2202509.67	5854269.16	279.52	SSMH			
541	2202463.89	5854849.25	279.18	SSMH	17.74	261.44	
542	2202419.40	5855443.84	276.25	SSMH	14.55	261.70	
543	2202419.90	5855470.00	276.79	SSMH	13.85	262.94	
544	2202393.15	5855779.14	276.09	SSMH	12.36	263.73	
545	2202366.96	5855802.68	276.46	SSMH	12.17	264.29	
546	2202687.65	5853111.92	272.89	SSMH	13.59	259.30	
547	2202548.27	5853666.23	277.68	SSMH	17.73	259.95	
548	2202776.25	5851933.55	272.18	SSMH	15.25	256.93	
549	2202696.18	5851609.88	261.93	SSMH	6.86	255.07	
550	2202620.89	5851381.84	260.71	SSMH	6.98	253.73	
551	2202492.51	5851084.24	259.48	SSMH	5.12	254.36	
552	2202420.00	5850945.57	259.62	SSMH	6.26	253.36	
553	2202427.01	5850947.50	259.81	SSMH	5.66	254.15	
562	2195351.06	5867243.94	413.67	SSMH	3.02	410.65	
563	2195083.89	5867226.89	414.50	SSMH	3.30	411.20	
564	2194827.27	5867210.74	415.34	SSMH	3.34	412.00	
565	2204158.07	5853515.00	273.98	SSMH	7.21	266.77	
566	2203971.09	5853483.50	273.20	SSMH	7.09	266.11	
567	2203909.98	5853377.63	272.90	SSMH	7.39	265.51	
568	2203671.80	5853347.63	273.05	SSMH	8.27	264.78	
569	2203415.78	5853340.59	274.38	SSMH	10.65	263.73	
570	2203188.40	5853332.53	274.54	SSMH	11.51	263.03	
571	2202949.32	5853325.69	273.82	SSMH	11.51	262.31	
576	2201977.92	5847870.36	251.18	SSMH	7.38	243.80	
577	2202157.83	5847598.74	248.80	SSMH	5.58	243.22	
578	2202410.93	5847069.72	250.68	SSMH	8.19	242.49	
579	2202701.77	5846188.19	246.59	SSMH	5.56	241.03	
580	2202638.85	5846516.19	258.06	SSMH	16.45	241.61	
581	2202502.14	5846837.79	256.17	SSMH	14.13	242.04	
582	2202507.12	5846861.77	255.37	SSMH	13.40	241.97	
583	2201901.27	5847947.70	251.72	SSMH	7.79	243.93	
584	2201792.47	5848139.87	253.20	SSMH	8.50	244.70	
585	2201763.39	5848153.13	254.42	SSMH	9.42	245.00	
586	2201666.50	5848415.88	256.15	SSMH	10.87	245.28	
587	2201652.48	5849007.61	258.10	SSMH	11.90	246.20	
588	2201638.87	5849588.95	261.49	SSMH	14.25	247.24	

Appendix D

Exhibits

SANITARY SEWER COLLECTION SYSTEM MASTER PLAN

EXHIBIT 1 NEAR TERM PROJECTS OVERVIEW MAP

1 inch = 1,500 Feet

0 750 1,500

JOB NO: 1011-0001
MAP DOC: HOLLISTERCIPS_24X36.MXT
CREATED BY: RAL
DATE: 08-23-10

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

HOLLISTER
Hometown, California
Est. 1872

SANITARY SEWER COLLECTION SYSTEM MASTER PLAN

EXHIBIT 2
LONG TERM PROJECTS OVERVIEW MAP

1 inch = 1,500 Feet

0 750 1,500

JOB NO: 1011-0001
MAP DOC: HOLLISTERCIPS_24X36.MXT
CREATED BY: RAL
DATE: 08-23-10

NOTES:
BASEMAP PROVIDE BY SAN BENITO COUNTY. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING/GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us
WALLACE GROUP